

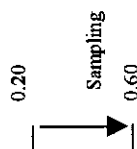
Record of Test Pit for Bulk Soil Sampling

Sample No.:BC 9-2

Coordinates N:47°24'655

E:110°12'549

Depth (m)	Type of Soil	Color	Description
0.65	Silty Sand	Dark Brown to Brown	Sand is very fine to fine grained. With some subangular and angular gravel, ø prevailing ≤30mm. With roots for the first 25cm.
1.00	Sand & Gravel	Light Grey	<u>Talus deposits</u> Gravel: Mainly consisting of angular gravel, ø max: 60mm, ø prevailing ≤50mm.



Material Test Results

Grading Analysis (%)		LL	Ip	Wn	Wopt	MDD	CBR-Value (%)	
G	S	F	(%)	(%)	(%)	g/cm ³	95%MDD	98%MDD
17	62	21	26	6	1.2	5.5	14	41

G	Gravel content	Ip	Plasticity index
S	Sand content	Wn	Naitonal moisture content
F	Particles finer than 0.075mm	Wopt	Optimum moisture content determined by Modified Proctor test
LL	Liquid Limit	MDD	Mazimum dry density determined by Modified Proctor test

Record of Test Pit for Bulk Soil Sampling

Sample No.:BC 9-1

Coordinates N:47°22'836

E:110°21'462

Depth (m)	Type of Soil	Color	Description
0.30	Silty Sand	Brown	Sand is very fine grained. With roots.
0.35	Silty Sand with Gravel	Brown	Sand is very fine grained.
0.75	Silty Sand with Gravel	Light Grey	Sand is very fine grained. With angular to subangular gravel. ø max: 150mm, ø prevailing ≤40mm.
0.85	Sand with Gravel	Light Brown	ø max: 80mm, ø prevailing <25mm.
1.00	Sand & Gravel	Brown	Boulder (ø 250mm) at 0.9m. With angular to subangular gravel. ø prevailing ≤20mm.

0.30

Sampling

0.75

Material Test Results

Grading Analysis (%)		LL	Ip	Wn	Wopt	MDD	CBR-Value (%)	
G	S	F	(%)	(%)	(%)	g/cm ³	95%MDD	98%MDD
42	46	12	17	4	2.4	2.026	21	30

G Gravel content

S Sand content

F Particles finer than 0.075mm

LL Liquid Limit

Ip Plasticity index

Wn Natural moisture content

Wopt Optimum moisture content determined by Modified Proctor test

MDD Maximum dry density determined by Modified Proctor test

Record of Test Pit for Bulk Soil Sampling

Sample No.:BC 10-1

Coordinates N:47°21'778

E:110°29'827

Depth (m)	Type of Soil	Color	Description
0.15	Silty Sand	Dark Brown	With roots. Dry and hard. Sand is very fine grained.
0.50	Silty Sand	Light Grey to Brown	With roots up to 40cm from the ground surface. Sand is very fine grained. Very Silty.
0.90	Silty Sand	Brown	Moist Sand is very fine to fine grained. Very silty at top.
1.00	Silty Sand	Brown mottled Green	Moist Sand is very fine grained.

0.30
0.50
Sampling

Material Test Results

Grading Analysis (%)		LL	Ip	Wn	Wopt	MDD	CBR-Value (%)	
G	S	F	(%)	(%)	(%)	g/cm ³	95%MDD	98%MDD
3	47	50	36	15	5.4	8.5	2.105	-
								14

G	Gravel content	Ip	Plasticity index
S	Sand content	Wn	National moisture content
F	Particles finer than 0.075mm	Wopt	Optimum moisture content determined by Modified Proctor test
LL	Liquid Limit	MDD	Maximum dry density determined by Modified Proctor test

Record of Test Pit for Bulk Soil Sampling

Sample No.:BC 10-2

Coordinates N:47°19'793

E-110°37'142

Depth (m)	Type of Soil	Color	Description
0.35	Silty Sand	Dark Brown to Dark Grey	With roots. Sand is very fine grained. With some fine subrounded gravel. $\phi=2$ to 5mm. Very silty.
0.70	Silty Sand	Light Grey	Sand is very fine grained. Very silty. Trace of subrounded fine gravel, ϕ max=10mm, ϕ prevailing ≤ 5 mm.
1.00	Silty Sand	Light Brown	Material is same as the upper layer, but has higher moisture content.

0.25
0.70
Sampling

Material Test Results

Grading Analysis (%)		LL	Ip	Wn	Wopt	MDD	CBR-Value (%)	
G	S	F		(%)	(%)	g/cm ³	95%MDD	98%MDD
2.5	48	27	28	6	4.9	9.5	4	5

G	Gravel content	Ip	Plasticity index
S	Sand content	Wn	Nattonal moisture content
F	Particles finer than 0.075mm	Wopt	Opimum moisture content determined by Modified Proctor test
LL	Liquid Limit	MDD	Mazimum dry density determined by Modified Proctor test

E-11. Material Conditions at Possible Borrow Pit

Material Conditions at Possible Borrow Pit

Sample No.:599 Coordinates N:47°42'99S E:107°48'86S

Present Status: Existing Borrow Pit (In operation)

Weathered igneous rock

Sample No.:BP D-5 Coordinates N:47°42'20S E:107°50'50S

Present Status: Existing Borrow Pit (In operation)

Weathered igneous rock
Max. size: 250mm, prevailing size ≤ 80mm

Material Test Results

Grading Analysis (%)				LL (%)	Ip	Wn (%)	Wopt (%)	MDD g/cm ³	CBR-Value (%)	
G	S	F							95% MDD	98%MDD
85	7	8		Non Plastic	Non Plastic	4.8	9.3	2.048	-	4

G	Gravel content	Ip	Plasticity index
S	Sand content	Wn	Natural moisture content
F	Particles finer than 0.075mm	Wopt	Optimum moisture content determined by Modified Proctor test
LL	Liquid Limit	MDD	Maximum dry density determined by Modified Proctor test

Material Conditions at Possible Borrow Pit

Sample No.:BP D-3

Coordinates N:47°42'207

E:108°00'510

Present Status: No Borrow Pit

Depth (m)	Type of Soil	Color	Description
0.15	Silty Sand	Dark Brown	With roots. Sand is very fine grained. Trace of coarse sand.
0.50	Silty Sand	Brown to Dark brown	Sand is very fine to coarse grained. ømax. Size 10mm
0.90	Sandy Silt with Gravel	Yellowish Brown	Snad is fine to coarse grained. Fine sand is prevailing. Gravel: Subangular Max. size: 50mm, Prevailing size ≤ 10mm
1.00	Sand & Gravel	Yellowish Brown	Max. : 100mm, Prevailing ≤ 10mm
1.05	Sand & Gravel	Light Grey	Consisting of rock fragments Gravel: Subangular to angular
1.6	Sand & Gravel	Light Brown	Max. size: =180mm, ø prevailing size ≤ 20mm Materials derived from weathered granitic rock

1.05
1.6
Sampling

Material Test Results

Grading Analysis (%)			LL (%)	Ip	Wn (%)	Wopt (%)	MDD g/cm ³	CBR-Value (%)	
G	S	F						95% MDD	98%MDD
77	15	9	23	8	3	7.8	2.059	14	26

G	Gravel content	Ip	Plasticity index
S	Sand content	Wn	Natural moisture content
F	Particles finer than 0.075mm	Wopt	Optimum moisture content determined by Modified Proctor test
LL	Liquid Limit	MDD	Maximum dry density determined by Modified Proctor test

Material Conditions at Possible Borrow Pit

Sample No.:BP D-4

Coordinates N:47°41'533

E:107°54'975

Present Status: Existing Borrow Pit (not used)

Abandoned borrow pit located on the slope of a small granitic rock hill.
Material sampled is sand and gravel with boulder, consisting of weathered granite, talus deposits and decomposed granite.
A part of the borrow pit consists of black shale.

Material Test Results

Grading Analysis (%)			LL (%)	Ip	Wn (%)	Wopt (%)	MDD g/cm ³	CBR-Value (%)	
G	S	F						95% MDD	98%MDD
66	17	17	26	6	3.1	5.9	2.045	29	32

G Gravel content

S Sand content

F Particles finer than 0.075mm

LL Liquid Limit

Ip Plasticity index

Wn Natural moisture content

Wopt Optimum moisture content determined by Modified Proctor test

MDD Maximum dry density determined by Modified Proctor test

Material Conditions at Possible Borrow Pit

Sample No.:583

Coordinates N:47°41'935

E:107°55'600

Present Status: Existing Borrow Pit (not used)

Abandoned borrow pit located beside the existing road.
0-0.5 m Blak Sandy silt, 0.5-1.0m Light grey Sandy silt and 1.0-2.0m.
Light grey very Silty Sand and gravel.

Material Conditions at Possible Borrow Pit

Sample No.:BP D-2

Coordinates N:47°42'45.4

E:108°07'17.3

Present Status: No Borrow Pit

Depth (m)	Type of Soil	Color	Description
0.15	Silty Sand	Dark Brown	Sand is very fine grained. With roots. Trace of coarse sand and fine gravel.
0.50	Silty Sand with Gravel	Dark Brown to Greyish Brown	Sand is very fine grained. With gravel size rock fragments and subangular gravel max. size 30mm, prevailing size ≤ 10mm
0.70	Silty Sand	Greyish Brown	Sand is very fine grained. Occasionally with subangular gravel.
0.90	Silty Sand	Slightly Greenish & Greyish Brown	Sand is very fine grained. Less silt content in comparison with the upper layer.
1.10	Silty Sand & Gravel	Greyish Brown	Sand is very fine grained. With some gravel. ømax.: 150mm(Subangular) øprevailing ≤ 10mm, (Subangular and subrounded)
1.45	Sand & Gravel	Greyish Brown	Sand is very fine grained. ømax.: 2.50mm (1 piece only), prevailing ≤ 10mm

1.1

1.45

Sampling

Material Test Results

Grading Analysis (%)			LL (%)	Ip	Wn (%)	Wopt (%)	MDD g/cm ³	CBR-Value (%)	
G	S	F						95% MDD	98%MDD
44	41	15	26	8	5.2	5.5	2.073	-	5

G Gravel content

S Sand content

F Particles finer than 0.075mm

LL Liquid Limit

Ip Plasticity index

Wn Natural moisture content

Wopt Optimum moisture content determined by Modified Proctor test

MDD Maximum dry density determined by Modified Proctor test

Material Conditions at Possible Borrow Pit

Sample No.:BP D-1

Coordinates N:47°41'286

E:108°11'803

Present Status: Close to Abandoned Borrow Pit

Depth (m)	Type of Soil	Color	Description
0.10	Silty Sand	Dark Brown	Sand is very fine grained. With roots.
0.50	Silty Sand	Greyish Brown	Sand is very fine grained. Very silty
0.75	Silty Sand with Gravel	Brown	Trace of subangular graveles throughout of the layer.
0.90	Silty Sand	Very silty.	Gravel: Rock fragments and subangular gravel ømax.: 50mm, øprevailing ≤ 20mm
1.40	Silty Sand	Slightly Greenish & Greyish Brown	Sand is very fine grained. With little subanguer to Subrounded gravel. Prevailing < 20mm
	Silty Sand with Gravel	Slightly Greyish	Sand is very fine to fine grained. Sand becomes coarser with depth. Gravel: Subangular ømax.: 80mm in general 100 to 200mm at 1m. øprevailing ≤ 30mm

1.00
Sampling
1.40

Material Test Results

Grading Analysis (%)		LL (%)	Ip	Wn (%)	Wopt (%)	MDD g/cm ³	CBR-Value (%)	
G	S						95% MDD	98% MDD
50	30	20	6	5.4	10.4	2.167	18	29

G	Gravel content	Ip	Plasticity index
S	Sand content	Wn	Natural moisture content
F	Particles finer than 0.075mm	Wopt	Optimum moisture content determined by Modified Proctor test
LL	Liquid Limit	MDD	Maximum dry density determined by Modified Proctor test

Material Conditions at Possible Borrow Pit

Sample No.:BP 1A-2

Coordinates N:47°38'712

E:108°16'600

Present Status: Close to Abandoned Borrow Pit

Depth (m)	Type of Soil	Color	Description
0.15	Silty Sand	Dark Brown	With roots. Sand is very fine grained.
0.70	Silty Sand	Light Grey to Light Brown	Sand is very fine grained. Very silty. Moist
1.10	Silty Sand	Light Grey to Light Brown	Sand is very fine grained. Silt content is less than that in the upper Layer. Moist Trace of subangular to subrounded gravels throughout of the layer, ϕ prevailing ≤ 30 mm

0.70
Sampling
1.10

Material Test Results

Grading Analysis (%)		LL (%)	Ip	Wn (%)	Wopt (%)	MDD g/cm ³	CBR-Value (%)	
G	F						95% MDD	98% MDD
33	56	11	20	6	5.8	3.5	5	7

G Gravel content	Ip Plasticity index	
S Sand content	Wn Natural moisture content	
F Particles finer than 0.075mm	Wopt Optimum moisture content determined by Modified Proctor test	
LL Liquid Limit	MDD Maximum dry density determined by Modified Proctor test	

Material Conditions at Possible Borrow Pit

Sample No.:500

Present Status: Existing Borrow Pit (not used) located beside Railway, Close to BPIA-2

Depth (m)	Type of Soil	Color	Description
0.30	Silty Sand	Dark Brown	With roots at top. Sand is very fine grained. Thickness is variable (20 to 30cm).
0.50	Silty Sand	Yellowish Brown	Sand is very fine to fine grained. Very silty. Trace of fine gravel. Thickness is variable.
1.00	Sand & Gravel	Yellowish Brown	Gravel: Subangular ϕ prevailing \leq 20mm, Thickness is variable (30 to 50cm). With sand with gravel portions.
0.90	Silty Sand	Yellowish Brown	Moist

Material Conditions at Possible Borrow Pit

Sample No.:552

Coordinates N:47°40'720

E:108°19'583

Present Status: Existing Borrow Pit (not used)

Abandoned borrow pit consisting of sand and gravel of fluvial deposits.
Side borrow also used for construction of the existing road. (about 1.2km/section)

Material Conditions at Possible Borrow Pit

Sample No.:551

Coordinates N:47°41'933

E:108°21'739

Present Status: Coal Waste

Hill of coal waste consisting of light grey very silty fine sand.
Excavated material from trench dug around mining area; very silty fine to medium sand, brown to light grey coloured.
Materials are judged to be not so good for road construction.

Material Conditions at Possible Borrow Pit

Sample No.:800

Coordinates N:47°42'783

E:108°24'073

Present Status: Stock piles beside shallow pit

Consisting of sand and gravel to sand with gravel in fluvial deposits in origin.
Materials are judged to be good for road construction.

Material Conditions at Possible Borrow Pit

Sample No.:BP 1A-1

Coordinates N:47°41'023

E:108°24'347

Present Status: No Borrow Pit

Depth (m)	Type of Soil	Color	Description
0.20	Silty Sand	Dark Brown	With roots. Sand is very fine to fine grained.
0.30	Silty Sand with Gravel	Dark Brown	Gravel: rock fragments.
0.40	Sand & Gravel	Dark Brown	Sand is very fine grained. Gravel: rock fragments. Max. size: 100mm, prevailing \leq 60mm.
0.65	Sand & Gravel	Brown	Material is same as the upper layer.
0.75	Silty Sand	Brown	Very silty. With little gravel. Sand is very fine grained.
1.45	Silty Sand	Yellowish Brown	Decomposed granite? Sand is very fine grained. Occasionally with granite fragments with less than 50mm in max. dimension.

0.75

Sampling

1.45

Material Test Results

Grading Analysis (%)			LL (%)	Ip			MDD		CBR-Value (%)	
G	S	F			(%)	(%)	g/cm ³		95% MDD	98% MDD
22	66	12	22	5	4.7	7.2	2.093		5	9

G Gravel content

S Sand content

F Particles finer than 0.075mm

LL Liquid Limit

Ip

Plasticity index

W_n Natural moisture content

W_{opt} Optimum moisture content determined by Modified Proctor test

MDD Maximum dry density determined by Modified Proctor test

Material Conditions at Possible Borrow Pit

Sample No.:BP 3A-1

Coordinates N:47°41'907

E:108°27'102

Present Status: Existing Borrow Pit (not used)

Depth (m)	Type of Soil	Color	Description
0.20	Silty Sand	Dark Brown	With roots at top. Sand is very fine to fine grained.
0.60/0.80	Silty Sand	Dark Brown to Light Brown	Sand is fine to coarse grained. With little diorite fragments. Thickness is variable, 40 to 60cm.
1.00/1.50	Sand with Gravel to Sand & Gravel	Light Brown	Talus deposits underlain by very weathered granite. Thickness is more than 0.5m.
	Weathered Diorite		With many fissures. Friable to sand and gravel. Max. size: 200mm.

0.8

1.5

Sampling sand & Gravel

Material Test Results

Grading Analysis (%)		LL (%)	Ip	Wn (%)	Wopt (%)	MDD g/cm ³	CBR-Value (%)	
G	S	F					95% MDD	98% MDD
47	30	23	17	2	5.1	5	15	25

G Gravel content

S Sand content

F Particles finer than 0.075mm

LL Liquid Limit

Ip

Plasticity index

Wn Natural moisture content

Wopt Optimum moisture content determined by Modified Proctor test

MDD Maximum dry density determined by Modified Proctor test

Material Conditions at Possible Borrow Pit

Sample No.:522 Coordinates N:47°41'765 E:108°28'999

Present Status: Existing Sand Pit at Kherlen River (Mined occasionally)

Brown fine sand.
Sampling for cement stabilization test and sieving

Sample No.:520 Coordinates N:47°41'536 E:108°29'479

Present Status: Abandoned Sand Pit

Abandoned sand pit.
Brown fine sand underlying the terrace developing left side of valley and Kherlen River.
Need slope protection and drainage.

Material Conditions at Possible Borrow Pit

Sample No.:BP 4A-5

Coordinates N:47°43'00S

E:108°34'92E

Present Status: No Borrow Pit

Depth (m)	Type of Soil	Color	Description
0.20	Silty Sand	Dark Brown	With roots. Sand is very fine grained. Very silty.
0.30/0.40	Silty Sand	Dark Brown	With roots. Sand is very fine grained. With some rock fragments.
1.00	Sand with Gravel	Yellowish Brown	<u>Talus deposits</u> Sand is fine to medium grained. With gravel size rock fragments. max. size: 200mm (1 piece) Prevailing size ≤ 60mm
1.50	Sand & Gravel	Yellowish Brown	<u>Talus deposits</u> Sand is fine to medium grained. With gravel size rock fragments. max. size: 100mm (1 piece) Prevailing size ≤ 60mm

1.00
1.5
Sampling

Material Test Results

Grading Analysis (%)		LL (%)	Ip	Wn (%)	Wopt (%)	MDD g/cm ³	CBR-Value (%)	
G	S	F					95% MDD	98% MDD
38	50	12	30	5	5.3	4.4	2.139	-
								25

G

Gravel content

S

Sand content

F

Particles finer than 0.075mm

LL

Liquid Limit

Ip

Plasticity index

Wn

Natural moisture content

Wopt

Optimum moisture content determined by Modified Proctor test

MDD

Maximum dry density determined by Modified Proctor test

Material Conditions at Possible Borrow Pit

Sample No.:BP 4A-4

Coordinates N:47° 47'229

E:108°39'724

Present Status: No Borrow Pit

Depth (m)	Type of Soil	Color	Description
0.30	Silty Sand	Dark Brown	With roots. Sand is very fine grained.
1.40	Sand with Gravel	Yellowish Brown	<u>Talus deposits</u> Sand is fine to medium grained. With gravel size rock fragments throughout of the layer. Max. size: 200mm, Prevailing size \leq 50mm With boulder size of rock fragments at 0.3m.

0.50

Sampling

1.40

Material Test Results

Grading Analysis (%)		LL (%)	Ip	W _n (%)	W _{opt} (%)	MDD g/cm ³	CBR-Value (%)	
G	S						95% MDD	98% MDD
38	49	13	Non Plastic	5.6	5.5	2.199	-	3

G

Gravel content

S

Sand content

F

Particles finer than 0.075mm

LL

Liquid Limit

Ip

Plasticity index

W_n

Natural moisture content

W_{opt}

Optimum moisture content determined by Modified Proctor test

MDD

Maximum dry density determined by Modified Proctor test

Material Conditions at Possible Borrow Pit

Sample No.:BP 4A-3

Coordinates N:47°48'458

E:108°46'637

Present Status: No Borrow Pit

Depth (m)	Type of Soil	Color	Description
0.20	Silty Sand	Dark Brown	With roots. Sand is very fine grained.
1.20	Silty Sand with Gravel	Brown to Yellowish Brown	Sand is fine to medium grained. Grave: Subangular to angular. ø max. : 150mm (few), prevailing size ≤ 50mm With roots throughout of the layer.
1.50	Silty Sand & Gravel	Yellowish Brown	Sand is fine grained. Grave: Subangular to angular. ø prevailing size < 50mm. Trace of roots at top.

1.20
Sampling
1.50

Material Test Results

Grading Analysis (%)			LL (%)	Ip	Wn (%)	Wopt (%)	MDD g/cm ³	CBR-Value (%)	
G	S	F						95% MDD	98%MDD
42	45	13	21	5	4.6	8.4	2.104	-	20

G Gravel content **Ip** Plasticity index
S Sand content **Wn** Natural moisture content
F Particles finer than 0.075mm **Wopt** Optimum moisture content determined by Modified Proctor test
LL Liquid Limit **MDD** Maximum dry density determined by Modified Proctor test

Material Conditions at Possible Borrow Pit

Sample No.:BP 4A-2

Coordinates N:47°45'287

E:108°54'323

Present Status: No Borrow Pit

Depth (m)	Type of Soil	Color	Description
0.40	Silty Sand with Gravel	Dark Brown	With roots. Sand is very fine to fine grained. With rock fragments. Very silty.
0.50	Silty Sand	Dark Brown	Sand is fine grained.
1.35	Sand & Gravel with Silt	Yellowish Brown	Materials are derived from weathered granite. Sand is fine grained. Grave: rock fragments max. size=150mm Prevailing size ≤ 15mm Encountered boulder layer at 1.35m.

0.50

sampling

1.35

Material Test Results

Grading Analysis (%)			LL (%)	Ip	W _n (%)	W _{opt} (%)	MDD g/cm ³	CBR-Value (%)	
G	S	F						95% MDD	98% MDD
34	48	18	16	Non Plastic	4.9	6.1	2.178	18	26

G

Gravel content

S

Sand content

F

Particles finer than 0.075mm

LL

Liquid Limit

Ip

Plasticity index

W_n

Natural moisture content

W_{opt}

Optimum moisture content determined by Modified Proctor test

MDD

Maximum dry density determined by Modified Proctor test

Material Conditions at Possible Borrow Pit

Sample No.:536

Coordinates N:47°45'658

E:108°54'146

Present Status: No Borrow Pit (Head of gully eched on a low lying area)

Consisting of Sand and gravel with boulder.

ø Max. size: 250mm.

ø Prevailing < 40mm.

Sample No.:601

Coordinates N:47°45'254

E:108°56'194

Present Status: No Borrow Pit

Area underlain by highly weathered granite

Sample No.:602

Coordinates N:47°45'435

E:108°57'044

Present Status: No Borrow Pit

A small hill underlain by highly weathered granite.

Material Conditions at Possible Borrow Pit

Sample No.:BP 5-1

Coordinates N:47°44'648

E:108°59'570

Present Status: No Borrow Pit

Depth (m)	Type of Soil	Color	Description
0.30/0.50	Silty Sand with Gravel	Dark Brown to Brown	With roots at top. Sand is fine grained. Gravel mainly consists of rock fragments. Prevailing size $\leq 30\text{mm}$
0.30/0.50	Sand with Gravel	Light Brown	Sand is fine grained. Gravel consists of subangular and angular gravel. ϕ max. size: 150mm (few), ϕ prevailing $\leq 30\text{mm}$
1.00	Silty Sand & Gravel	Greenish Grey to Brownish Grey	Sand is fine grained. Gravel mainly consists of rock fragments, flaky. Max. size: 150mm Prevailing size $< 50\text{mm}$

0.90
sampling
1.00

Material Test Results

Grading Analysis (%)			LL (%)	Ip	Wn (%)	Wopt (%)	MDD g/cm ³	CBR-Value (%)	
G	S	F						95% MDD	98% MDD
56	34	10	25	10	2.1	5.4	2.23	-	19

G	Gravel content	Ip	Plasticity index
S	Sand content	Wn	Natural moisture content
F	Particles finer than 0.075mm	Wopt	Optimum moisture content determined by Modified Proctor test
LL	Liquid Limit	MDD	Maximum dry density determined by Modified Proctor test

Material Conditions at Possible Borrow Pit

Sample No.: Tin mine 2

Coordinates N: 47° 43' 299

E: 109° 03' 973

Present Status: Stock Pile of Sand Tailings at Tsenkhermandal

Tailings at abandoned tin mine (Fluvial deposits in origin)
Brown fine sand with gravel
Gravel: Subrounded to subangular
ø Max: 150mm (few)
ø Prevailing ≤ 50mm.

Material Test Results

G	Grading Analysis (%)		LL (%)	Ip	Wn (%)	Wopt (%)	MDD g/cm ³	CBR-Value (%)	
	S	F						95% MDD	98% MDD
31	63	6	Non Plastic	Non Plastic	2	2.9	2.081	9	13

C	Gravel content	Ip	Plasticity index
S	Sand content	Wn	Natural moisture content
F	Particles finer than 0.075mm	Wopt	Optimum moisture content determined by Modified Proctor test
LL	Liquid Limit	MDD	Maximum dry density determined by Modified Proctor test

Material Conditions at Possible Borrow Pit

Sample No.: Tin mine 1

Coordinates N: 47° 40' 640

E: 109° 07' 966

Present Status: Stock Pile of Gravel Tailings at Tsenkhermandal

Tailings at abandoned tin mine (Fluvial deposits in origin)
Sand and gravel with boulder
ø Max: 150mm (few)
ø Prevailing ≤ 50mm.

Material Test Results

Grading Analysis (%)			LL (%)	Ip	Wn (%)	Wopt (%)	MDD g/cm ³	CBR-Value (%)	
G	S	F						95% MDD	98% MDD
62	36	2	Non Plastic	Non Plastic	1.8	6	2.134	9	13

G Gravel content

Ip Plasticity index

S Sand content

Wn Natural moisture content

F Particles finer than 0.075mm

Wopt Optimum moisture content determined by Modified Proctor test

LL Liquid Limit

MDD Maximum dry density determined by Modified Proctor test

Material Conditions at Possible Borrow Pit

Sample No.:488

Coordinates N:47°42'481

E:109°03'129

Present Status: Existing Borrow Pit (not used)

Fluvial deposits
Consisting of subrounded to subangular sand & gravel with boulder
No so good quality as road construction materials

Sample No.:485

Coordinates N:47°44'650

E:108°59'574

Present Status: Existing Borrow Pit (not used)

Abandoned big borrow pit
Top soil: Brown silty very fine to fine sand with thickness of 30 to 60cm
silty Sand and gravel; silty sand with gravel, brown to reddish brown in colour,
underline the top soil. Gravel mainly consists of angular rock fragments.
Prevailing size \leq 30mm, max. size: 150mm.

Material Conditions at Possible Borrow Pit

Sample No.: 495 Coordinates N:47°40'413 E:109°07'028

Present Status: Existing Borrow Pit (Not used)

Abandoned borrow pit
Occupied by gel
Not much minable reserve
Materials consist of talus deposits and weathered rock

Material Conditions at Possible Borrow Pit

Sample No.:BP 6-3

Coordinates N:47°38'853

E:108°09'469

Present Status: Garbage Dumping ground (Ex-borrow Pit)

Depth (m)	Type of Soil	Color	Description
0.20	Silty Sand	Dark Brown	With roots. Sand is very fine grained. Trace of gravel (rock fragments) size ≤ 10mm
0.30	Sandy Silt with Gravel	Dark brown	Sand is very fine grained. Gravel consists of diorite fragments. max. size: 50mm
1.50	Sandy Silt & Gravel	Brown	<u>Talus deposits</u> Material consists of diorite fragments. max. size: 200mm, prevailing size ≤ 50mm

Sampling

Material Test Results

Grading Analysis (%)		LL (%)	Ip	Wn (%)	Wopt (%)	MDD g/cm ³	CBR-value (%)	
G	S	F					95%MDD	98%MDD
60	26	14	29	9	2.2	5	2.15	-
								14

G	Gravel content	Ip	Plasticity index
S	Sand content	Wn	Natural moisture content
F	Particles finer than 0.075mm	Wopt	Optimum moisture content determined by Modified Proctor test
LL	Liquid Limit	MDD	Maximum dry density determined by Modified Proctor test

Material Conditions at Possible Borrow Pit

Sample No.: Gold Mine Coordinates N:47°34'967 E:108°11'832

Present Status: Sand Tailings at Gold Mine

Tailing depositis Brown sand and gravel Sand is very fine to coarse grained.
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Material Conditions at Possible Borrow Pit

Sample No.:603

Coordinates N: -

E: -

Present Status: Abandoned Borrow Pit at Khamar Pass

Depth (m)	Type of Soil	Color	Description
0.10	Silty Sand & Gravel	Dark Brown	With roots
0.30	Sandy Silt with Gravel	Brown	With granite rock fragments. max. size: 50mm, prevailing size < 20mm.
1.50	Sandy Silt & Gravel	Brown	Desomposed granitic rock max. size: 200mm Thickness is variable.
1.50	Sand with Gravel	Brown	Desomposed granitic rock sand is coarse grained.

Material Conditions at Possible Borrow Pit

Sample No.:BP 6-2

Coordinates N:47°33'955

E:108°19'720

Present Status:

Depth (m)	Type of Soil	Color	Description
0.40	Silty Sand	Dark Brown	Sand is very fine to fine grained. With large rock fragments occasionally max. size: 100mm, With roots at top.
0.55	Silty Sand with Gravel	Brown	Residual soil of granitic rock Sand is fine grained. Gravel: rock fragments
1.00	Sand	Slightly Greenish Green	Residual soil of granitic rock Sand is fine to coarse grained. With fragments of dyke rock occasionally, prevailing size ≤ 50mm

0.55

Sampling

1.00

Material Test Results

Grading Analysis (%)			LL (%)	Ip	Wn (%)	Wopt (%)	MDD g/cm ³	CBR-value (%)	
G	S	F						95%MDD	98%MDD
39	37	24	Non Plastic	Non Plastic	2.5	8.2	1.965	-	25

G

Gravel content

S Sand content

F Particles finer than 0.075mm

LL Liquid Limit

Ip

Plasticity index

Wn Natural moisture content

Wopt Optimum moisture content determined by Modified Proctor test

MDD Maximum dry density determined by Modified Proctor test

Material Conditions at Possible Borrow Pit

Sample No.:BP 6-1

Coordinates N:47°32'376

E:109°23'126

Present Status:

Depth (m)	Type of Soil	Color	Description
0.15	Silty Sand	Dark Brown	With roots and boulder size rock fragments.
0.50	Gravelly Silty Sand	Dark Brown to Brown	Sand is very fine grained.
0.85	Silty Sand with Gravel	Light Grey	Material is same as the upper layer.
0.90	Sandy Silt	White	Sand is fine grained.
		Slightly Greenish Grey	Gravel: rock fragments, prevailing size ≤10mm
1.70	Silty Sand & Gravel		With rock fragments.
	Gravel		Gravel: rock fragments Prevailitn size≤ 30mm.
			Rock fragmetns, max.size: 150mm. Prevailitn size≤ 60mm.

0.90
Sampling
1.70

Material Test Results

Grading Analysis (%)			LL (%)	Ip	Wn (%)	Wopt (%)	MDD g/cm ³	CBR-value (%)	
G	S	F						95%MDD	98%MDD
43	30	27	20	3	2.3	4	2.246	-	6

G Gravel content
S Sand content
F Particles finer than 0.075mm
LL Liquid Limit
Ip Plasticity index
Wn Natural moisture content
Wopt Optimum moisture content determined by Modified Proctor test
MDD Maximum dry density determined by Modified Proctor test

Material Conditions at Possible Borrow Pit

Sample No.:BP 7-1

Coordinates N:47°28'18S

E:109°32'33O

Present Status:

Depth (m)	Type of Soil	Color	Description
0.35/0.50	Silty Sand with Gravel	Dark Brown	With roots. With shale fragments. Prevalitin size≤30mm, Thickness is variable.
0.85	Silty Sand with Gravel	Grey	Talus deposits to Weathered Shale Material consists of flaky shale fragmetns. max. size: 250mm, prevallign size≤75mm.

0.5

Sampling

2.00

Material Test Results

Grading Analysis (%)			LL (%)	Ip	Wn (%)	Wopt (%)	MDD g/cm ³	CBR-value (%)	
G	S	F						95%MDD	98%MDD
70	11	19	31	6	2.1	5.4	2.334	16	21

G

Gravel content

Ip

Plasticity index

S

Sand content

Wn

Natural moisture content

F

Particles finer than 0.075mm

Wopt

Optimum moisture content determined by Modified Proctor test

LL

Liquid Limit

MDD

Maximum dry density determined by Modified Proctor test

Material Conditions at Possible Borrow Pit

Sample No.: 604

Coordinates N:47°28'303

E:109°33'926

Present Status: No Borrow Pit

A hill consisting of shale, sandstone and quartzite.
Shale is predominate and is not so flaky.
Soil layer covering the weathered rock formation
may be thick.

E - 85

Material Conditions at Possible Borrow Pit

Sample No.: 605

Coordinates N:47°26'511

E:109°44'026

Present Status: No Borrow Pit

A hill consisting of weathered shale and sandstone.
Shale is predddominant and is not so flaky.

Material Conditions at Possible Borrow Pit

Sample No.:BP 7-2

Coordinates N:47°27'193

E:109°39'934

Present Status: Existing Borrow Pit (not used)

Depth (m)	Type of Soil	Color	Description	
0.30	Silty Sand	Dark Brown	With roots. Sand is very fine grained. With some rock fragmetns. Very silty.	
0.60	Silty Sand	Light Grey	Heterogeneous Material changes to silt with gravel and silty sand and gravel in the borrow pit. The layer is absent in some places.	0.60
1.00	Silty Sand with Gravel	Reddish Brown to Light Brown	Material changes to silty sand and gravel at some places. Gravel: rock fragments. max. size: 200mm, prevailign size<30mm.	1.00

Sampling

Material Test Results

Grading Analysis (%)			LL (%)	Ip	Wn (%)	Wopt (%)	MDD g/cm ³	CBR-value (%)	
G	S	F						95%MDD	98%MDD
50	16	34	25	9	3.3	5.9	2.189	8	9

G	Gravel content	Ip	Plasticity index
S	Sand content	Wn	Natural moisture content
F	Particles finer than 0.075mm	Wopt	Optimum moisture content determined by Modified Proctor test
LL	Liquid Limit	MDD	Maximum dry density determined by Modified Proctor test

Material Conditions at Possible Borrow Pit

Sample No.: 452 Coordinates N:47°27'010 E:109°40'724

Present Status: Existing Borrow Pit (not used)

Depth (m)	Type of Soil	Color	Description
0.30	Silty Sand	Dark Brown	With roots. Sand is very fine grained.
0.50/0.70	Silty Sand with Gravel	Light Grey	Very silty. With rock fragments.
	Silty Sand with Gravel		<u>Talus deposits</u> Gravel consists of rock fragments max. size: 150mm, prevailign size<70mm.
2.50	Silty Sand & Gravel	Light Grey	Weathered rock Friable 20 to 50 fragments

Material Conditions at Possible Borrow Pit

Sample No.: BP7-3

Coordinates N:47°26'642

E:109°44'519

Present Status: No Borrow Pit

Depth (m)	Type of Soil	Color	Description
0.20	Silty Sand with Gravel	Dark Brown	With roots. Sand is very fine grained. With rock fragmetns. max. size: 80mm, prevallign size≤50mm.
0.30/0.40	Silty Sand & Gravel	Dark Brown	Sand is very fine grained. With gravel size rock fragments.
0.80	Silty Sand with Gravel		Sand is very fine grained. With gravel size rock fragments.
1.20	Sand & Gravel with Silt		Gravel: rock fragmetns max. size: 150mm, prevallign size≤60mm.

0.50
0.80
Sampling

Material Test Results

Grading Analysis (%)			LL (%)	Ip	Wn (%)	Wopt (%)	MDD g/cm ³	CBR-value (%)	
G	S	F						95%MDD	98%MDD
74	15	11	27	5	4.9	8.6	2.125	-	-

G	Gravel content	Ip	Plasticity index
S	Sand content	Wn	Natural moisture content
F	Particles finer than 0.075mm	Wopt	Optimum moisture content determined by Modified Proctor test
LL	Liquid Limit	MDD	Maximum dry density determined by Modified Proctor test

Material Conditions at Possible Borrow Pit

Sample No.: 300

Coordinates N:47°26'552

E:109°46'036

Present Status:

Existing Borrow Pit at Dutt Pass (occasionally used)

Weathered slate/shale
Too flaky

Material Conditions at Possible Borrow Pit

Sample No.: BP8-1

Coordinates N:47°27'09S

E:109°47'59E

Present Status: Existing Borrow Pit (not used)

Depth (m)	Type of Soil	Color	Description
0.43/0.60	Silty Sand with Gravel	Dark Brown	With roots. Sand is very fine grained. With rock fragments, size≤50mm
1.00	Silty Sand with Gravel	Brown to Dark Brown	With rock fragments. prevailing size≤50mm
2.00	Sand & Gravel		With relatively flaky rock fragments. max. size: 150mm, prevailign size≤80mm.
3.00	Silty Sand & Gravel		Material is same as th upper layer, but silt content is higher.

1.00

2.00

Sampling

Material Test Results

Grading Analysis (%)		LL (%)	Ip	Wn (%)	Wopt (%)	MDD g/cm ³	CBR-value (%)	
G	F						95%MDD	98%MDD
71	13	19	4	2.2	9.2	1.759	-	10

G

S Gravel content

F Sand content

LL Particles finer than 0.075mm

Liquid Limit

Ip Plasticity index

Wn Natural moisture content

Wopt Optimum moisture content determined by Modified Proctor test

MDD Maximum dry density determined by Modified Proctor test

Material Conditions at Possible Borrow Pit

Sample No.: BP9-3

Coordinates N:47°24'313

E:110°01'365

Present Status: Existing Borrow Pit (not used)

Depth (m)	Type of Soil	Color	Description
0.15	Silty Sand with Gravel	Dark Brown	With roots. Sand is very fine grained. Gravel consists of rock fragments. size 100 to 150mm.
0.70	Silty Sand with Gravel	Light Gray	Very silty. Gravel consists of rock fragments and subangular gravel. ø max: 200mm
	Silty Sand & Gravel	Purplish Grey	Moist Gravel: Subangular and angular ømax. 200mm, ø Prevailing≤50mm

0.70
Sampling
0.90

Material Test Results

Grading Analysis (%)		LL (%)	Ip	Wn (%)	Wopt (%)	MDD g/cm ³	CBR-value (%)	
G	S						95%MDD	98%MDD
57	22	21	26	1	2.4	16.6	1.839	-
								13

G

Gravel content

S

Sand content

F

Particles finer than 0.075mm

LL

Liquid Limit

Ip

Plasticity index

Wn

Natural moisture content

Wopt

Optimum moisture content determined by Modified Proctor test

MDD

Maximum dry density determined by Modified Proctor test

Material Conditions at Possible Borrow Pit

Sample No.: 604

Coordinates N:47°25'120

E:109°55'929

Present Status: Existing Borrow Pit (not used)

Depth (m)	Type of Soil	Color	Description
0.30	Silty Sand	Dark Brown	With roots. Sand is very fine grained. Trace of fine gravel
0.60	Silty with Gravel	Light Grey	With subrounded gravel Very silty
1.20	Silty Sand and Gravel	Reddish Brown	Gravel is subrounded type. ø max. 100mm, ø Prevailing ≤20mm

Material Conditions at Possible Borrow Pit

Sample No.: BP-9-2

Coordinates N:47°24'239

E:110°14'123

Present Status: Existing Borrow Pit (not used)

Abandoned borrow pit, very deep.
Material mainly consists of brown sand.
Sand with subangular sedimentary rock gravel overlies the brown sand layer.
The sample taken for the material tests was mixed with two layers.
The sample for the cement stabilization test was taken from the sand layer.

Material Test Results

Grading Analysis (%)			LL (%)	Ip	Wn (%)	Wopt (%)	MDD g/cm ³	CBR-value (%)	
G	S	F						95%MDD	98%MDD
21	71	8	Non Plastic	Non Plastic	2.2	5.6	1.957	-	13

G	Gravel content	Ip	Plasticity index
S	Sand content	Wn	Natural moisture content
F	Particles finer than 0.075mm	Wopt	Optimum moisture content determined by Modified Proctor test
LL	Liquid Limit	MDD	Maximum dry density determined by Modified Proctor test

Material Conditions at Possible Borrow Pit

Sample No.: 604

Coordinates N:47°23'306

E:110°15'286

Present Status: Existing Borrow Pit (not used)

Decomposed granitic rock (corse sand to sand with gravel)
underlies a 30 to 40cm thick dark brown silty very fine sand layer

Material Conditions at Possible Borrow Pit

Sample No.: Murun Sand

Coordinates N:47°23'252

E:110°16'188

Present Status: Gully developed the toe of mountain

Brown fine to medium sand with trace of hard grano-diorite bouldens
Sand may be same deposite as No. BP9-2

Material Conditions at Possible Borrow Pit

Sample No.: BP9-1

Coordinates N:47°23'190

E:110°20'311

Present Status: Existing Borrow Pit (not used)

Depth (m)	Type of Soil	Color	Description
0.25	Silty Sand with Gravel	Dark Brown	With roots. Sand is very fine grained. With subangular gravel.
0.80	Silty Sand & Gravel	Light Grey	Terace deporites Gravel: Subrounded ø max. 150mm, ø Prevailing <60mm. Gravel contents is variable.
1.30	Silty Sand & Gravel		Terace deporites Gravel: Angular and subrounded. ø max. 150mm, Gravel constet is variable.
	Sand & Gravel		Terace deporites Gravel contents is variable.

0.50
1.00
Sampling

Material Test Results

Grading Analysis (%)			LL (%)	Ip	Wn (%)	Wopt (%)	MDD g/cm ³	CBR-value (%)	
G	S	F						95%MDD	98%MDD
30	48	22	17	4	2.4	6.1	2.217	-	12

G Gravel content **Ip** Plasticity index
S Sand content **Wn** Natural moisture content
F Particles finer than 0.075mm **Wopt** Optimum moisture content determined by Modified Proctor test
LL Liquid Limit **MDD** Maximum dry density determined by Modified Proctor test

Material Conditions at Possible Borrow Pit

Sample No.: BP10-2

Coordinates N:47°23'083

E:110°27'021

Present Status: Existing Borrow Pit (not used)

Depth (m)	Type of Soil	Color	Description
0.20	Silty Sand with Gravel	Dark Brown	With roots. Sand is very fine grained. Gravel: Subangular to angular. ø Prevailing <20mm
0.30	Silty Sand with Gravel	Dark Brown	Material is same as the upper layer, but contains more gravel.
0.90	Silty Sand with Gravel	Light Brown to Brown	Fluvial deposits Gravel: Subrounded to subangular. ø max. 80mm, With very silty portions.
1.80	Silty Sand & Gravel	Brown	Fluvial deposits Gravel: Subrounded ø max. 80mm, ø Prevailing <30mm

0.90
Sampling
1.80

Material Test Results

Grading Analysis (%)			LL (%)	Ip	Wn (%)	Wopt (%)	MDD g/cm ³	CBR-value (%)	
G	S	F						95%MDD	98%MDD
58	14	28	25	1	4.7	11.8	2.11	-	11

G	Gravel content	Ip	Plasticity index
S	Sand content	Wn	Natural moisture content
F	Particles finer than 0.075mm	Wopt	Optimum moisture content determined by Modified Proctor test
LL	Liquid Limit	MDD	Maximum dry density determined by Modified Proctor test

Material Conditions at Possible Borrow Pit

Sample No.: BP10-1

Coordinates N:47°21'581

E:110°36'300

Present Status: Existing Borrow Pit (In operation)

Depth (m)	Type of Soil	Color	Description
0.20	Silty Sand	Dark Brown	With roots. Sand is very fine grained. With some rock fragments.
0.40	Silty Sand with Gravel to Sand & Gravel	Light Brown	Talus deposits — Gravel consists of rock fragments.
0.80	Silty Sand & Gravel	Light Brown	Weathered diorite Gravel consists of rock fragments. Max. size: 100mm, Prevailing size<50mm
1.60	Silty Sand & Gravel	Greenish Grey to Brown	Weathered diorite Gravel consists of rock fragments. Max. size: 200mm, Prevailing size<20mm
	Sand & Gravel	Greenish Grey	Weathered diorite Gravel consists of rock fragments.

0.40

1.60

Sampling

Material Test Results

Grading Analysis (%)		LL (%)	Ip	Wn (%)	Wopt (%)	MDD g/cm ³	CBR-value (%)	
G	S	F					95%MDD	98%MDD
48	36	16	22	4	4.8	6.2	2.304	-
								20

G

Gravel content

S

Sand content

F

Particles finer than 0.075mm

LL

Liquid Limit

Ip

Plasticity index

Wn

Natural moisture content

Wopt

Optimum moisture content determined by Modified Proctor test

MDD

Maximum dry density determined by Modified Proctor test

Record of Test Pit for Bulk Soil Sampling

Sample No.:468

Coordinates N:47°20'508

E:110°34'790

Present Status: Status Existing Borrow Pit (Not used)

Depth (m)	Type of Soil	Color	Description
0.20	Silty Sand	Reddish Brown to Brown	Sand is very fine to medium grained. With some gravel. Roots at top.
0.40	Silty Sand	Slightly Greenish Grey	Residual soil of diorite
	Silty Sand to Sand & Gravel	Slightly Greenish Grey	Residual soil to weathered diorite Sand is very fine to coarsegrained. Rock is friable to sand or sand and gravel. With light strike of hammer.

Sample No.:474

Coordinates N:47°20'393

E:110°36'100

Present Status: Garbage Dumping Ground (ex-borrow pit)

Depth (m)	Type of Soil	Color	Description
0.20	Silty Sand with Gravel	Dark Brown	Sand is very fine to fine grained. With roots. Very silty.
0.50	Silty Sand with Gravel	Light Gray	Very silty. Sand is fine grained. With subangular to subrounded gravel. ø max: 150mm, ø prevailing ≤ 30mm
1.50	Clayey Sand & Gravel	Brown	Gravel mainly consists of subrounded gravel. ø max: 60mm, ø prevailing ≤ 30mm

Material Conditions at Possible Borrow Pit

Sample No.: Undrukhaan Sand Pit **Coordinates N:47°26'633** **E:110°40'159**

Present Status: Existing Sand Pit (In operation occasionally)

Approximately 10m thick alluvial brown fine sand underlain by weathered rock

Material Conditions at Possible Borrow Pit

Sample No.: BP 4-1

Coordinates N:47°46'726

E:108°57'184

Present Status: Existing Borrow Pit (not used)

Top soil: Dark borwn, silty very fine sand with roots, 30 cm in thickness.
Terrace deposits: Underlying the top soil and overlying residual soil of granitic rock.
Material consist of yellowish brown silty sand and gravel.
Gravel: ø Max. 250mm, ø Prevailing size \leq 50mm. Flaky
Thickness of layer is 0.5 to 1.2m
Residual soil of granite: Material consist of yellowish brown very silty sand and coarse sand.
Total thickness of sand layer exceed 1.1m.

Material Conditions at Possible Borrow Pit

Sample No.: 4001

Coordinates N:47°48'880

E:108°53'744

Present Status: No Borrow Pit

Underlain by silty fine to coarse sand and sand with gravel calssified to talus deposits,
granitic rock in origin

Sample No.: 4002

Coordinates N:47°49'203

E:108°51'229

Present Status: Existing Borrow Pit (not used)

Top soil: Sand with granite fragments, less than 50cm in thickness
Decomposed granite: Silty coarse sand with fine gravel.
With rich in gravel size rock fragments at a few location of pit,
Max. size 200mm