

## 1.2. 地質・土質・材料

## 12. 地質・土質・材料

調査において行われた試験結果及び柱状図を次ページより添付する。

Actual Quantities of Soil Investigation Performed

Borehole Location	Borehole Number	Drilling Depth(m)	Penetration Test (nos.)	Undisturbed Soil Sampling (no.)	Unit Weight (no.)	Moisture Content (nos.)	Specific Gravity (nos.)	Liquid and Plastic Limits (nos.)	Gnading Analysis (nos.)	Unconfined Compression Test (no.)	Consolidation Test (no.)
Near Dutiluur Pass	BH-1	10.26	8	-	-	-	-	-	-	-	-
Togos River	BH-1	11.20	11	-	-	1	1	-	1	-	-
	BH-2	15.22	15	-	-	-	-	-	-	-	-
	BH-1	12.33	12	-	-	-	-	-	-	-	-
Kherlen River	BH-2	15.31	15	-	-	1	1	-	1	-	-
	BH-3	12.24	12	-	-	1	1	1	1	-	-
	BH-4	3.00	-	1	1	-	-	-	-	1	1
	BH-1	9.35	9	-	-	1	1	-	1	-	-
Urgun Valley	BH-1	19.40	19	-	-	1	1	1	1	-	-
Urt Valley	BH-1	19.40	19	-	-	1	1	1	1	-	-
Murun River	BH-1	15.45	15	-	-	3	3	1	3	-	-
Swamp at Tsenkhermandal	-	-	-	-	-	-	1	1	-	-	-
Total		143.16	135	1	1	9	10	5	9	1	1

### Actual Quantities of Material Tests on Bulk Soil Samples Performed

No.	Sample No.*	Sampling Location		Grading Analysis (nos.)	Specific Gravity (nos.)	Moisture Content (nos.)	Liquid and Plastic Limits (nos.)	Compaction** Test (Series)	Soaked CBR*** (Series)
		N	E						
1	BCD-4	47°41'227	107°52'556	1	1	1	1	1	1
2	BCD-3	47°43'023	107°57'712	1	1	1	1	1	1
3	BCD-2	47°42'803	108°03'387	1	1	1	1	1	1
4	BCD-1	47°41'570	108°10'105	1	1	1	1	1	1
5	BC1A-2	47°39'155	108°17'453	1	1	1	1	1	1
6	BC1A-1A	47°41'534	108°23'349	1	1	1	1	1	1
7	BC1A-1B	47°41'534	108°23'349	1	1	1	1	1	1
8	BC4A-5	47°41'736	108°32'564	1	1	1	1	1	1
9	BC4A-4	47°45'384	108°37'606	1	1	1	1	1	1
10	BC4A-3	47°48'343	108°44'014	1	1	1	1	1	1
11	BC4A-2	47°47'154	108°50'181	1	1	1	1	1	1
12	BC4A-1	47°45'149	108°57'347	1	1	1	1	1	1
13	BC5-1	47°42'484	109°03'335	1	1	1	1	1	1
14	BC6-4	47°38'223	109°09'452	1	1	1	1	1	1
15	BC6-3	47°35'065	109°15'285	1	1	1	1	1	1
16	BC6-2	47°32'793	109°22'787	1	1	1	1	1	1
17	BC6-1	47°28'961	109°29'967	1	1	1	1	1	1
18	BC7-1	47°27'955	109°34'863	1	1	1	1	1	1
19	BC7-2	47°27'244	109°41'328	1	1	1	1	1	1
20	BC8-1	47°25'497	109°51'133	1	1	1	1	1	1
21	BC8-2	47°25'136	109°57'586	1	1	1	1	1	1
22	BC9-3	47°25'306	110°04'905	1	1	1	1	1	1
23	BC9-2	47°24'655	110°12'549	1	1	1	1	1	1
24	BC9-1	47°22'836	110°21'462	1	1	1	1	1	1
25	BC10-1	47°21'778	110°29'827	1	1	1	1	1	1
26	BC10-2	47°19'793	110°37'142	1	1	1	1	1	1
27	BC 4-1	47°45'814	108°51'149	No test was carried out.					
28	BPD-5	47°42'208	107°50'500	1	1	1	1	1	1
29	BPD-4	47°41'533	107°54'975	1	1	1	1	1	1
30	BPD-3	47°42'207	108°00'510	1	1	1	1	1	1
31	BPD-2	47°42'454	108°07'173	1	1	1	1	1	1
32	BPD-1	47°41'286	108°11'803	1	1	1	1	1	1
33	BP1A-2	47°38'712	108°16'600	1	1	1	1	1	1
34	BPIA-1	47°41'023	108°24'347	1	1	1	1	1	1
35	BP3A-1	47°41'907	108°27'102	1	1	1	1	1	1
36	BP4A-5	47°43'005	108°34'922	1	1	1	1	1	1
37	BP4A-4	47°47'229	108°39'724	1	1	1	1	1	1
38	BP4A-3	47°48'458	108°46'637	1	1	1	1	1	1
39	BP4A-2	47°45'287	108°54'323	1	1	1	1	1	1
40	BP5-1	47°44'648	108°59'570	1	1	1	1	1	1
41	Tin mine2	47°43'299	109°03'973	1	1	1	1	1	1
42	Tin mine1	47°40'640	109°07'966	1	1	1	1	1	1
43	BP6-3	47°38'853	109°15'469	1	1	1	1	1	1
44	BP6-2	47°33'955	109°19'720	1	1	1	1	1	1
45	BP6-1	47°32'376	109°23'126	1	1	1	1	1	1
46	BP7-1	47°28'185	109°32'330	1	1	1	1	1	1
47	BP7-2	47°27'193	109°39'934	1	1	1	1	1	1
48	BP7-3	47°26'642	109°44'519	1	1	1	1	1	1
49	BP8-1	47°27'095	109°47'594	1	1	1	1	1	1
50	BP9-3	47°24'313	110°01'365	1	1	1	1	1	1
51	BP9-2	47°24'239	110°14'123	1	1	1	1	1	1
52	BP9-1	47°23'190	110°20'311	1	1	1	1	1	1
53	BP10-2	47°23'083	110°27'021	1	1	1	1	1	1
54	BP10-1	47°21'581	110°36'300	1	1	1	1	1	1
55	BPD-4'	47°41'257	107°54'455	No test was carried out.					
56	BP 1A-1'	47°40'803	108°24'015	No test was carried out.					
57	BP 4-1	47°46'726	108°57'184	No test was carried out.					
	<b>Total</b>	57 samples		53	53	53	53	53	53

\* BC: Samples taken along road alignment

\*\* BP: Samples taken from possible borrow pits

\*\* Modified Proctor test

\*\*\* CBR test at the optimum water content of the modified Proctor test.

Three test specimens were prepared using three different compaction energy, 10, 25 and 56 blows per layer

**Actual Quantities of Aggregate Tests on Rock Samples**

No.	Sampling Location		Production of Aggregate (nos.)	Los Angeles Abrasion Test (nos.)	Soundness* Test (nos.)	Specific Gravity and Absorption** Test (nos.)	Flakyness Index (nos.)	Stripping of Bitumen-Aggregate Mixture (nos.)
	N	E						
1	47°42'932	108°25'846	1	1	1	2	1	1
2	47°40'640	109°07'966	1	1	1	2	1	1
3	47°23'308	110°23'202	1	1	1	2	1	-
Total			3	3	3	6	3	2

\* Soundness test by sodium sulphate

\*\* One each for two different sizes of aggregate

**Actual Quantities of Sieving Analysis Performed on Sand Samples  
Taken from Possible Sources of Fine Aggregate**

No.	Name of Samples and/or Sampling Location	Sampling Location		Sieving Analysis (nos.)
		N	E	
1	Zoomond Sand Pit	47°47'163	107°28'892	1
2	Kherlen River	47°41'765	108°28'999	1
3*	Ex-Tsenkhermandal Tine Mine	47°43'299	109°03'973	(1)
4	Gold Mine at Tsenkher	47°35'109	109°11'790	1
5	Murun	47°23'252	110°16'188	1
6	Undurkhaan Sand Pit	47°26'633	110°40'159	1
Total				5(6)

\* This sample is same as th bulk soil sample for CBR test, Tine Mine-2.

**Actual Quantities of Cement Stabilization Test Performed**

No.	Name of Samples and/or Sampling Location	Sampling Location		Cement Stabilization Test (Series)
		N	E	
1	Kherlen River	47°41'765	108°28'999	1
2	BP 9-2 at Murun	47°24'239	110°14'123	1
Total				2

# FIG DRILLING LOG

Project No \_\_\_\_\_ Project The Feasibility Study on \_\_\_\_\_ Type of Drilling Dry Core  
 Hole Number BH-1 near DuKor Pass Construction of Eastern Arterial \_\_\_\_\_ Date 01/06/01  
N47°42'00" E 101°57'00" Road in Mawabeh  
 Water Table \_\_\_\_\_ m. Driller Is. Gumbah

Remarks  
 D Dynamic Cone Penetration Test

Scale in ft	Elevation in m	Depth in m	Thickness in m	Legend	Type of Soil	Colour	Relative Density or Consistency	General Remarks	Sampling		Dynamic Cone Penetration Test									
									Depth in ft	Sample No.	N-Value Blows/30cm	Blows Per Each 15 cm			N - Value					
												15cm	15cm	15cm	10	20	30	40	50	
1				x	Silty Sand with Gravel			Fill (Rock #8) Max size of rock fragments: 200mm												
2		2.10	2.10	x	Silty Sand with Gravel	Greyish Brown to Grey	Very Dense	Core consists of weathered rock fragments of 2 to 4cm in length.												
3				x	Silty Sand with Gravel	Greyish Brown to Grey	Very Dense	Core consists of weathered rock fragments of 2 to 4cm in length.	3.15	3.38	50/23	15	35	15/8	50					
4				x	Silty Sand with Gravel	Greyish Brown to Grey	Very Dense	Core consists of weathered rock fragments of 2 to 4cm in length.	4.15	4.33	53/18	21	43	10/2	53					
5				x	Silty Sand with Gravel	Greyish Brown to Grey	Very Dense	Core consists of weathered rock fragments of 2 to 4cm in length.	5.15	5.32	54/17	24	44	10/2	54					
6				x	Silty Sand with Gravel	Greyish Brown to Grey	Very Dense	Core consists of weathered rock fragments of 2 to 4cm in length.	6.15	6.32	55/17	26	45	10/2	55					
7				x	Silty Sand with Gravel	Greyish Brown to Grey	Very Dense	Core consists of weathered rock fragments of 2 to 4cm in length.	7.15	7.31	52/16	25	47	5/1	52					
8				x	Silty Sand with Gravel	Greyish Brown to Grey	Very Dense	Core consists of weathered rock fragments of 2 to 4cm in length.	8.15	8.25	50/16	31	50/20		50					
9				x	Silty Sand with Gravel	Greyish Brown to Grey	Very Dense	Core consists of weathered rock fragments of 2 to 4cm in length.	9.15	9.32	56/17	28	46	10/2	56					
10		9.50	7.40	x	Silty Sand with Gravel	Greyish Brown to Grey	Very Dense	Consisting of weathered rock fragments.	10.15	10.26	50/11	33	50/11		50					
11		10.26	0.76	x	Silty Sand with Gravel	Greyish Brown to Grey	Very Dense	Consisting of weathered rock fragments.												
12								-END OF DRILLING-												
13																				
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Prepared by \_\_\_\_\_ Checked by \_\_\_\_\_ Approved by \_\_\_\_\_

# FIG DRILLING LOG

Project No. \_\_\_\_\_

Project The Feasibility Study on Construction of Eastern Arterial Road in Monopoli

Type of Drilling Dry Core

**Remarks**

D Dynamic Cone Penetration Test  
A frozen zone was encountered

Hole Number BH-1 at Lopez River

Date 30/05/01 & 31/05/01

Water Table 0.75 m

Driller \_\_\_\_\_

Scale in m	Elevation in m	Depth in m	Thickness in m	Legend	Type of Soil	Colour	Relative Density or Consistency	General Remarks	Dynamic Cone Penetration Test														
									Sampling		Blows Per Each 15 cm			N - Value									
									Depth in m	Sample No.	N-Value Blows/30cm	15cm	15cm	15cm	10	20	30	40	50				
1	0.30	0.30			Silty Sand	Dark Brown	Very Dense	Sand in fine gravel. With roots at top. With gravel at bottom.	1.15	D-1	50/8	46	50/8										
2					Sand and Gravel	Light Brownish Grey to Greyish Brown	Very Dense	Sand in fine to medium gravel. Gravel: Subangular to subrounded (max 20mm, prevailing < 25mm. With silt throughout of the layer)	1.23														
3	3.00	2.70			Sand and Gravel	Brown to Brownish Grey	Very Dense	Sand in fine to coarse grained. Gravel: Subangular to subrounded (max 30mm, prevailing < 15mm. Silt content is higher than the above layer)	2.15	D-2	50/5	39	50/5										
4	4.50	1.50			Silty Sand and Gravel	Greyish Brown	Very Dense	Sand in fine to coarse grained. Gravel: Subangular to subrounded (max 30mm, prevailing < 15mm. Silt content is higher than the above layer)	3.15	D-3	50/7	30	50/7										
5					Silty Sand and Gravel	Greyish Brown	Very Dense	Sand in fine to coarse grained. Gravel: Subangular to subrounded (max 30mm, prevailing < 20mm. (Trace) prevailing < 20mm.	4.15	D-4	60/12	26	50	10/2									
6					Silty Sand and Gravel	Greyish Brown	Very Dense	Sand in fine to coarse grained. Gravel: Subangular to subrounded (max 30mm, prevailing < 20mm. (Trace) prevailing < 20mm.	4.32														
7	7.50	3.00			Silty Sand and Gravel	Greyish Brown	Very Dense	Sand in fine to coarse grained. Gravel: Subangular to subrounded (max 30mm, prevailing < 20mm. (Trace) prevailing < 20mm.	5.15	D-5	58/12	21	48	10/2									
8	8.00	0.50			Silty Clay	Brownish Grey	Very Soft	Plastic. Moist - wet.	6.15	D-6	50/10	34	50/10										
9					Silty Sand and Gravel	Brownish Grey to Grey	Very Dense	Sand in fine to coarse grained. Gravel: Subangular to subrounded (max 30mm, prevailing < 15mm. Very silty throughout of the layer)	7.15	D-7	55/8	24	45	10/3									
10					Silty Sand and Gravel	Brownish Grey to Grey	Very Dense	Sand in fine to coarse grained. Gravel: Subangular to subrounded (max 30mm, prevailing < 15mm. Very silty throughout of the layer)	7.33														
11	11.20	3.20			Silty Sand and Gravel	Brownish Grey to Grey	Very Dense	Sand in fine to coarse grained. Gravel: Subangular to subrounded (max 30mm, prevailing < 15mm. Very silty throughout of the layer)	8.15	D-8	50/8		50/8										
12								-END OF DRILLING-	8.23	D-9	50/8	32	50/8										
13									9.15														
14									9.23														
15									10.15	D-10	50/7	35	50/7										
16									10.22														
17									11.15	D-11	50/5	39	50/5										
18									11.20														

Prepared by \_\_\_\_\_

Checked by \_\_\_\_\_

Approved by \_\_\_\_\_



# FIG DRILLING LOG

Project No \_\_\_\_\_ Project Feasibility Study on Type of Drilling Dry Core  
Construction of Eastern Arterial  
 Hole Number BH-2 at Topaz River Road in Monjele Date 01/06/01  
 Water Table Q-46 m Driller \_\_\_\_\_

Remarks  
 0 Dynamic Cone Penetration Test

Scale in m	Elevation in m	Depth in m	Thickness in m	Legend	Type of Soil	Colour	Relative Density or Consistency	General Remarks	Sampling		Dynamic Cone Penetration Test								
									Depth in m	Sample No.	N-Value Blows/30cm	Blows Per Each 15 cm							
												15cm	15cm	15cm	15cm	N - Value			
									10 20 30 40 50										
	0.37	0.30			Silty Sand and Gravel with Boulder	Light Brown		Sand is very fine grained. With roots and gravel.											
1	1.00	0.70			Sand and Gravel	Slightly Brownish Grey	Very Dense	with boulders. Size of boulder 100mm. With little silt.	1.15	0-1	50/8	42	50/8						
2					Sand and Gravel	Brownish Grey		Sand is fine to medium grained. Gravel: subrounded (max 40mm) (prevailing < 15mm). With little silt throughout of the layer.	1.23										
3									2.00	0-2	50/5	50/5							
4	4.00	3.00			Silty Sand and Gravel	Greyish Brown to Brown	Very Dense	Sand is fine to medium grained. Gravel: subrounded (max 30mm) (prevailing < 15mm).	2.05										
5									3.15	0-3	50/14	27	50/14						
6									3.29										
7	7.00	3.00			Silty Sand and Gravel	Grey to Greyish Brown	Very Dense	Sand is fine to coarse grained. Gravel: subrounded (max 50mm) (prevailing < 10mm). Gravel content is low below 8m.	4.15	0-4	50/13	29	50/13						
8									4.28										
9									5.15	0-5	50/12	33	50/12						
10									5.27										
11	11.00	4.00			Silty Sand and Gravel	Grey to Light Brownish Grey	Very Dense	Material is same as above layer except fine content. This layer contains more silt.	6.15	0-6	50/17	32	48	10/7					
12									6.32										
13									7.15	0-7	56/18	24	46	10/3					
14									7.33										
15	15.22	4.22							8.15	0-8	50/14	27	50/14						
16									8.29										
17									9.15	0-9	50/11	31	50/11						
18									9.26										
19									10.15	0-10	50/9	36	50/9						
20									10.24										
21									11.15	0-11	50/8	38	50/8						
22									11.23										
23									12.15	0-12	54/20	21	44	10/5					
24									12.35										
25									13.15	0-13	50/9	38	50/9						
26									13.24										
27									14.15	0-14	50/14	31	50/14						
28									14.29										
29									15.15	0-15	50/7	37	50/7						
30									15.22										
31																			

Prepared by \_\_\_\_\_ Checked by \_\_\_\_\_ Approved by \_\_\_\_\_

# FIG DRILLING LOG

Project No \_\_\_\_\_ Project The Feasibility Study on Type of Drilling Dry Casing  
Construction of Eastern Arterial  
Hole Number BH-1 at Kherin River Road in Mongolia Date 26/05/01 & 27/05/01  
Water Table 0.10 m. Driller \_\_\_\_\_

**Remarks**  
D Dynamic Cone Penetration Test  
Forces between 2.0 and 2.5m

Scale in m	Elevation in m	Depth in m	Thickness in m	Legend	Type of Soil	Colour	Relative Density or Consistency	General Remarks	Sampling		Dynamic Cone Penetration Test										
									Depth in m	Sample No.	N-Value Blows/30cm	Blows Per Each 15 cm			N - Value						
												15cm	15cm	15cm	10	20	30	40	50		
1					Sand with Gravel	Light Brown	Very Dense	Sand is fine to coarse grained. Gravel. Subrounded φmax 100mm (prevailing < 30mm. Very few silt and clay content) throughout of the layer	1.15	n-18	50/25	8	27	23/11	50	80/45/25cm					
2									1.40	n-7	50/5	50/5									
3			3.50	3.50					2.00		Forced										
4		4.00	0.50		Sand	Light Brown	Very Dense	Sand is fine to medium grained.	2.05	n-23	50/23	16	32	18/8	50	80/45/23cm					
5		5.00	1.00		Sand and Gravel	Light Brown	Very Dense	Sand is fine to coarse grained. Subrounded gravel φmax 70mm. #prevailing < 25mm.	3.15	n-13	51/20	18	41	10/5	51	80/45/20cm					
6					Silty Sand with Gravel	Bluish Grey	Very Dense	Sand is fine grained. Gravel: subrounded φmax 40mm. #prevailing < 40mm	4.35	n-2	50/20	20	38	11/5	50	80/45/20cm					
7		6.50	1.50		Silty Sand with Gravel	Bluish Grey to light Brownish Grey	Very Dense	Sand is fine grained. Very silty throughout of the layer. Gravel: subrounded φmax 60mm. #prevailing < 20mm. Gravel content is high at 9m and 10m. With sand lenses between 8.5m and 9m.	5.15	n-2	50/20	20	38	11/5	50	80/45/20cm					
8									5.35	n-2	56/18	24	48	10/3	56	80/45/18cm					
9									6.15	n-23	50/20	15	34	16/5	50	80/45/20cm					
10									7.35	n-23	51/20	18	38	12/5	51	80/45/20cm					
11									8.15	n-2	50/22	35	50/22		50	80/45/12cm					
12		12.33	5.83						8.35	n-10	50/11	33	50/11		50	80/45/11cm					
13									10.15	n-11	50/13	29	50/13		50	80/45/13cm					
14									10.26												
15									11.15	n-11	50/13	29	50/13		50	80/45/13cm					
16									11.28												
17									12.15	n-12	58/18	25	48	10/3	58	80/45/18cm					
18									12.33												
19																					
20																					
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28																					
29																					
30																					
31																					

Prepared by \_\_\_\_\_ Checked by \_\_\_\_\_ Approved by \_\_\_\_\_

# FIG DRILLING LOG

**Project No** \_\_\_\_\_ **Project** The feasibility Study on \_\_\_\_\_ **Type of Drilling** Dry Core  
**Hole Number** 84-2 at Kueren River \_\_\_\_\_ **Construction of Eastern Arterial Road to Mangala** \_\_\_\_\_ **Date** 27/05/01 & 29/05/01  
**Water Table** 0.-1.0 m \_\_\_\_\_ **Driller** \_\_\_\_\_

**Remarks**  
 0 Dynamic Cone Penetration Test  
 between 2.0m and 2.5m

Scale in m	Elevation in m	Depth in m	Thickness in m	Legend	Type of Soil	Colour	Relative Density or Consistency	General Remarks	Sampling		Dynamic Cone Penetration Test										
									Depth in m	Sample No.	N-Value Blows/30cm	Blows Per Each 15 cm			N - Value						
												15cm	15cm	15cm	10	20	30	40	50		
1					Sand and Gravel	Light Brown	Very Dense	Sand is fine to coarse gravel. Gravel subrounded & max 40mm & prevailing 10mm. Very low silt and clay content throughout the layer	1.15 1.43	0-18	50/28	8	22	28/13	50	BL045/28cm					
2									2.00 2.08	0-2	50/3	50/3									
3									3.15 3.36	0-2	50/21	19	39	11/5	50	BL045/21cm					
4									4.15 4.33	0-4	50/28	21	43	7/3	50	BL045/18cm					
5		5.50	5.50						5.15 5.32	0-2	56/17	26	48	8/7	56	BL045/17cm					
6					Silty Sand and Gravel	Bluish Grey to slightly Brownish and Bluish Grey	Very Dense	Sand is fine to gravel. Very silty throughout of the layer. Gravel subrounded & max 70mm & prevailing < 20mm. Gravel content is low at 6 and 9m.	6.15 6.29	0-5	50/14	30	50/14		50	BL045/14cm					
7									7.15 7.27	0-2	50/12	32	50/12		50	BL045/12cm					
8									8.15 8.27	0-8	50/12	31	50/12		50	BL045/12cm					
9									9.15 9.29	0-9	50/14	30	50/14		50	BL045/14cm					
10									10.15 10.32	0-10	56/17	28	46	10/2	56	BL045/17cm					
11									11.15 11.32	0-11	50/17	19	38	12/7	50	BL045/17cm					
12									12.15 12.37	0-12	56/22	18	29	21/7	50	BL045/22cm					
13									13.15 13.33	0-13	50/18	24	42	8/3	50	BL045/18cm					
14									14.15 14.33	0-14	50/20	19	39	11/5	50	BL045/20cm					
15		15.31	9.81						15.15 15.31	0-15	50/18	23	42	8/1	50	BL045/18cm					
16					-END OF DRILLING-																
17																					
18																					
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Prepared by \_\_\_\_\_ Checked by \_\_\_\_\_ Approved by \_\_\_\_\_

# FIG DRILLING LOG

Project No \_\_\_\_\_ Project The Feasibility Study on Type of Drilling Dry Core  
Construction of Eastern Arterial  
 Hole Number BH-3 of Kharin River Date 29/05/01  
Road in Monopole  
 Water Table 0.055 m. Driller \_\_\_\_\_

**Remarks**  
 D Dynamic Cone Penetration Test  
 UD Open Drive Sampler  
 Forzen between 1.0m and 3.0m

Scale in m	Elevation in m	Depth in m	Thickness in m	Legend	Type of Soil	Colour	Relative Density or Consistency	General Remarks	Sampling		Dynamic Cone Penetration Test										
									Depth in m	Sample No.	N-Value Blows/30cm	Blows Per Each 15 cm			N - Value						
												15cm	15cm	15cm	10	20	30	40	50		
		0.50	0.50		Organic Clayey Silt	Black	Very Soft	With all. With very fine sand.													
1					Silty Clay	Dark Grey	(Very Soft)	High moisture content. Plastic. With very fine sand throughout of the layer with subrounded gravel below 2m.	0.50 0.90 1.10	UD-1	Recovery = 30 cm 50/90-50/90										
2																					
3		1.00	2.50		Sand and Gravel	Greyish Brown	Very Dense	Sand is fine to coarse grained. Gravel subrounded & max 50mm. & prevailing 10mm.	2.00 2.08	D-2	50/8 50/8 Forzen										
4		4.00	1.00		Silty Sand with Gravel	Grey	Very Dense	Gravel subrounded & max 50mm. & prevailing 20mm.	1.15 1.36	D-2	50/21 16 36 14/6										
5		5.00	1.00		Sand with Gravel	Brown	Very Dense	Sand is fine to coarse grained. Gravel subrounded & max 50mm. & prevailing 20mm.	4.15 4.40	D-2	50/25 21 29 21/10										
6		6.00	1.00		Silty Sand with Gravel	Brown Grey	Very Dense	Sand is fine to coarse grained. Gravel subrounded & max 50mm. & prevailing 10mm.	5.15 5.32	D-2	50/17 18 43 17/2										
7					Silty Sand with Gravel	Brown Grey	Very Dense	Sand is fine grained. Very silty throughout of the layer. Gravel subrounded & max 50mm. & prevailing < 10mm.	8.15 8.30	D-2	50/15 28 50/15										
8									7.15 7.31	D-2	51/16 20 46 5/1										
9									8.15 8.31	D-2	53/16 23 48 5/1										
10		10.50	4.50		Sand and Gravel	Light Brownish Grey	Very Dense	Sand is fine to coarse grained. Gravel subrounded & max 50mm. & prevailing 20mm.	10.15 10.31	D-2	51/18 18 41 10/2										
11		11.50	1.00		Silty Sand and Gravel	Light Brownish Grey	Very Dense	Sand is fine grained. Very silty. Gravel subrounded & max 50mm.	11.15 11.29	D-11	50/14 31 50/10										
12		12.24	0.74		Silty Sand and Gravel	Light Brownish Grey	Very Dense	Sand is fine grained. Very silty. Gravel subrounded & max 50mm.	12.15 12.24	D-12	50/9 30 50/9										
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Prepared by \_\_\_\_\_ Checked by \_\_\_\_\_ Approved by \_\_\_\_\_

# FIG DRILLING LOG

Project No \_\_\_\_\_ Project The Feasibility Study on Type of Drilling Dry Core  
Construction of Eastern Arterial  
 Hole Number BH-4 at Kham Lin Date 30/05/01  
Road in Monywa  
 Water Table α-0.40 m. Driller \_\_\_\_\_

Remarks  
 frozen between 1.0 and 2.5m

Scale in m	Elevation in m	Depth in m	Thickness in m	Legend	Type of Soil	Colour	Relative Density or Consistency	General Remarks	Sampling		Dynamic Cone Penetration Test				
									Depth in m	Sample No.	No. Blows/30cm	Blows Per Each 15 cm			
												15cm	15cm	15cm	15cm
										10	20	30	40	50	
		0.50	0.50	x	Silty Sand	Dark Grey		with many roots of the first 10cm. With organic fragment (occasional) with gravel.							
1		0.80	0.30	x	Sand and Gravel	Grey		with sil. 4 men 60mm.							
2				x	Silty Clay	Dark Grey		Occasionally with fine gravel (Gravel 4 men 30mm. This layer of gravel at 1.5 and 2.0m.							
3		1.80	2.00	x				4 men 70mm.							
4		3.00	0.20	x											
5					-	DO	DRILLING								
6															
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Prepared by \_\_\_\_\_ Checked by \_\_\_\_\_ Approved by \_\_\_\_\_

# FIG DRILLING LOG

Project No \_\_\_\_\_ Project The Feasibility Study on Type of Drilling Dry Core  
Construction of Eastern Arterial  
 Hole Number BH-1 of Tumbhar River Date 24/05/01 & 25/05/01  
 Water Table GL-0.80 m. Driller \_\_\_\_\_

**Remarks**  
 D Dynamic Cone Penetration Test  
 Forzen between 2.0 and 2.5m

Scale in m	Elevation in m	Depth in m	Thickness in m	Legend	Type of Soil	Colour	Relative Density or Consistency	General Remarks	Sampling		Dynamic Cone Penetration Test									
									Depth in m	Sample No.	N-Value Blows/30cm	Blows Per Each 15 cm			N - Value					
												15cm	15cm	15cm	10	20	30	40	50	
		0.15	0.15		Sand	Dark Grey														
1		1.00	0.85		Sand and Gravel	Dry		Sand is fine grained. With roots.	1.15	U-1R	50/27	11	28	22/12						
2					Silty Sand with Gravel	Light Brownish Grey	Very Dense	With boulders. φmax 110mm. φprevailing < 80mm.	1.42											
3		3.00	2.00		Silty Sand with Gravel	Light Brownish Grey	Dense	Consisting of subrounded and subangular gravel φmax 80mm. φprevailing < 20mm.	2.00	P-2	50/15	50/15								
4		4.00	0.50		Silty Clay			Consisting of subrounded and subangular gravel φmax 80mm. φprevailing < 20mm. Very silty.	3.15	D-3R	44	18	25	19						
5		5.00	1.00		Silty Sand with Gravel	Light Brown	Very Dense	Material is as upper layer but silt content is less.	4.15	P-4R	52	15	19	33						
6					Silty Sand and Gravel	Yellowish Brown to Brown	Very Dense	Consisting of subrounded and subangular gravel φmax 80mm. φprevailing < 20mm.	5.15	U-5R	50/25	19	29	21/10						
7		7.00	2.00		Silty Sand and Gravel	Light Brownish Grey to Light Brown	Very Dense	Consisting of subrounded and subangular gravel φmax 80mm. φprevailing < 20mm.	6.15	P-6R	50/20	9	35	15/5						
8					Silty Sand and Gravel	Light Brownish Grey to Light Brown	Very Dense	Consisting of subrounded and subangular gravel φmax 50mm. φprevailing < 20mm. With layers of fine to medium grained sand.	7.15	P-7R	51/18	21	41	10/4						
9		8.35	2.35		Silty Sand and Gravel	Light Brownish Grey to Light Brown	Very Dense	Consisting of subrounded and subangular gravel φmax 50mm. φprevailing < 20mm. With layers of fine to medium grained sand.	8.15	P-8R	50/17	16	45	5/2						
10					-END OF DRILLING-					9.15	U-9R	50/20	15	40	10/5					
11																				
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Prepared by \_\_\_\_\_ Checked by \_\_\_\_\_ Approved by \_\_\_\_\_

# FIG DRILLING LOG

**Project No** \_\_\_\_\_ **Project** The Feasibility Study in \_\_\_\_\_ **Type of Drilling** Dry Core  
**Hole Number** BH-1 at Urgan Valley \_\_\_\_\_ **Construction of Eastern Arterial Road in Manqala** \_\_\_\_\_ **Date** 23/05/01  
**Water Table** a-60 \_\_\_\_\_ **m** \_\_\_\_\_ **Driller** \_\_\_\_\_

**Remarks**  
 D : Dynamic Cone Penetration Test  
 A cone with 30.5mm in dia. End 60 of angle of apex is used.  
 Force between 2.0 and 2.5m  
 Final casing depth is 13m.

Scale in m	Elevation in m	Depth in m	Thickness in m	Legend	Type of Soil	Colour	Relative Density or Consistency	General Remarks	Sampling		Dynamic Cone Penetration Test							
									Depth in m	Sample No.	N-Value Blows/30cm	Blows Per Each 15 cm	N - Value					
													10	20	30	40	50	
	0.30	0.30			Silty Sand	Rock												
1	0.00	0.50			Silty Sand and Gravel	Light Brown	Very Dense	Sand is very fine grained. Very silty. Roots at top.										
2					Silty Sand with Gravel	Brown	Very Dense	Sand is fine to medium grained. Subangular and subrounded gravel (max 70mm). (prevailing < 40mm).	1.35	D-18	53	8	21	32				53 BLOWS/30cm
3	2.90	2.10						Sand nearly consists of fine to medium sand. Size of gravel (max 80mm). (prevailing < 40mm). (Higher gravel content at top).	1.45		50/15	50/15						
4	4.00	1.10			Sand and Gravel	Brown to Yellowish Brown	Very Dense	Sand is coarse grained. Size of gravel (max 80mm). (prevailing < 40mm).	3.15	D-38	80	15	35	45				80 BLOWS/30cm
5					Silty Sand	Reddish Brown to Brown	Dense to Very Dense	Sand is fine to medium grained. Traces of subrounded gravel below 4.2m. (max 40mm). (prevailing < 30mm).	4.15	D-4	50/13	28	50/13					50 BLOWS/15cm
6									5.15	D-38	36	21	20	16				
7									6.15	D-38	50/26	11	23	27/11				50 BLOWS/26cm
8	8.00	4.00							7.15	D-78	54/25	10	24	30/10				54 BLOWS/25cm
9	8.50	0.50			Silty Clay	Reddish Brown	Soft	Moist. Plastic. Traces of sand.	8.15	D-88	14	4	6	8				
10	8.50	1.00			Sand with Gravel	Reddish Brown	Dense	Sand is fine to coarse grained with gravel. (max 25mm). (prevailing < 10mm).	9.15	D-98	34	9	18	16				
11					Clayey Silty	Reddish Brown	Stiff to Very Stiff	Moist. Plastic. Traces of sand and decomposed fine gravel.	10.15	D-108	13	3	6	7				
12									11.15	D-118	15	4	7	8				
13	13.50	4.00							12.15	D-128	18	5	8	10				
14	14.50	1.00			Clayey Silty	Reddish Brown	Very Stiff	With some sand. Moist. Plastic.	13.15	D-138	14	4	6	8				
15					Silty Sand	Yellowish Brown	Very Dense	Sand is fine to coarse grained. Very silty throughout of the layer. Traces of subrounded to subangular gravel up to 10m. More gravel below 10m. (max 40mm). (prevailing < 10mm).	14.15	D-148	21	7	9	12				
16									15.15	D-158	52	10	22	30				52 BLOWS/30cm
17									16.15	D-168	57	9	25	32				57 BLOWS/30cm
18									17.15	D-178	51	10	21	30				51 BLOWS/30cm
19	18.00	4.90							18.15	D-188	50/28	9	28	27/13				50 BLOWS/28cm
20									18.15	D-198	51/25	13	31	20/10				51 BLOWS/25cm
21									19.40									
22																		
23																		
24																		
25																		
26																		
27																		
28																		
29																		
30																		
31																		

Prepared by \_\_\_\_\_ Checked by \_\_\_\_\_ Approved by \_\_\_\_\_

# FIG DRILLING LOG

Project No. \_\_\_\_\_ Project: Feasibility Study on Construction of Eastern Arrial Road in Mongala Type of Drilling: Dry Core  
 Hole Number: BH-1 of Urt Valley Date: 21/05/01  
 Water Table: CL-86 m. Driller: \_\_\_\_\_

**Remarks**  
 0 Dynamic Cone Penetration Test  
 casing depth 13m  
 Seepage of water at 12.5m  
 Frozen between 2.3 and 3.0m  
 The sample of 17m could not be recovered due to caving of the well

Scale in m	Elevation in m	Depth in m	Thickness in m	Legend	Type of Soil	Colour	Relative Density or Consistency	General Remarks	Sampling		Standard Penetration Test								
									Depth in m	Sample No.	M-Value Blows/30cm	Blows Per Each 15 cm			N - Value				
									15cm	15cm	15cm	10	20	30	40	50			
1	0.40	0.40	0.40	b s s	Silty Sand	Dark Grey	Very Dense	With roots at top. Subangular gravel. (max 80mm. Spreading < 20mm.	1.35	0-18	54	9	24	30					
2	1.50	1.10	0.60	b s s	Sand with Gravel	Light Brown	Very Dense	Most Gravel subangular/subrounded gravel. Boulder at bottom $\Phi$ 200mm. Spreading < 30mm.	1.45	0-2	50/10	50/10						54 BLOW/20cm	
3	2.50	0.50	0.50	b s s	Dry Sand and Gravel	Light Brown	Very Dense	Gravel. (max 80mm. Spreading < 30mm.	2.00	0-2	50/10	50/10						50 BLOW/20cm	
4	2.75	0.25	0.25	b s s	Dry Sand and Gravel	Reddish Brown	Stiff	Gravel. (max 80mm. Spreading < 30mm.	2.30	0-13	13	7	7	6					
5				b s s	Silty Clay		Medium	With boulder. max 120mm. Most traces of subangular gravel throughout of the layer (max 80mm. Spreading < 10mm. Trace of fine sand throughout of the layer. Silty Clay between 7.0 and 7.8m.	3.15	0-13	13	7	7	6					
6				b s s			Stiff to Very Stiff		4.15	0-13	4	2	2	2					
7				b s s					4.45	0-53	11	3	5	6					
8				b s s					5.15	0-53	11	3	5	6					
9				b s s					5.45	0-53	11	3	5	6					
10				b s s					6.15	0-53	10	3	5	5					
11				b s s					6.45	0-53	10	3	5	5					
12				b s s					7.15	0-73	18	5	8	10					
13				b s s					7.45	0-73	18	5	8	10					
14				b s s					8.15	0-83	11	3	5	6					
15				b s s					8.45	0-83	11	3	5	6					
16				b s s					9.15	0-83	14	4	6	6					
17				b s s					9.45	0-83	14	4	6	6					
18	12.50	9.75	2.75	b s s	Sandy Silt	Reddish Brown	Stiff to Very Stiff	Sand is very fine grained.	10.15	0-103	23	11	10	13					
19	14.50	2.00	2.00	b s s	Dry Sand with Gravel	Reddish Brown	Very Dense	Gravel in subangular to subrounded type. Spreading < 30mm. Trace of boulder throughout of the layer. Very clayey throughout of the layer.	10.45	0-103	23	11	10	13					
20	14.50	2.00	2.00	b s s	Dry Sand with Gravel	Reddish Brown	Very Dense	Gravel in subangular to subrounded type. Spreading < 30mm. Trace of boulder throughout of the layer. Very clayey throughout of the layer.	11.15	0-113	11	4	5	6					
21	14.50	2.00	2.00	b s s	Dry Sand with Gravel	Reddish Brown	Very Dense	Gravel in subangular to subrounded type. Spreading < 30mm. Trace of boulder throughout of the layer. Very clayey throughout of the layer.	11.45	0-113	11	4	5	6					
22	14.50	2.00	2.00	b s s	Dry Sand with Gravel	Reddish Brown	Very Dense	Gravel in subangular to subrounded type. Spreading < 30mm. Trace of boulder throughout of the layer. Very clayey throughout of the layer.	12.15	0-113	14	4	6	8					
23	14.50	2.00	2.00	b s s	Dry Sand with Gravel	Reddish Brown	Very Dense	Gravel in subangular to subrounded type. Spreading < 30mm. Trace of boulder throughout of the layer. Very clayey throughout of the layer.	12.45	0-113	14	4	6	8					
24	14.50	2.00	2.00	b s s	Dry Sand with Gravel	Reddish Brown	Very Dense	Gravel in subangular to subrounded type. Spreading < 30mm. Trace of boulder throughout of the layer. Very clayey throughout of the layer.	13.15	0-113	14	3	6	6					
25	14.50	2.00	2.00	b s s	Dry Sand with Gravel	Reddish Brown	Very Dense	Gravel in subangular to subrounded type. Spreading < 30mm. Trace of boulder throughout of the layer. Very clayey throughout of the layer.	13.45	0-113	14	3	6	6					
26	14.50	2.00	2.00	b s s	Dry Sand with Gravel	Reddish Brown	Very Dense	Gravel in subangular to subrounded type. Spreading < 30mm. Trace of boulder throughout of the layer. Very clayey throughout of the layer.	14.15	0-113	18	4	7	9					
27	14.50	2.00	2.00	b s s	Dry Sand with Gravel	Reddish Brown	Very Dense	Gravel in subangular to subrounded type. Spreading < 30mm. Trace of boulder throughout of the layer. Very clayey throughout of the layer.	14.45	0-113	18	4	7	9					
28	14.50	2.00	2.00	b s s	Dry Sand with Gravel	Reddish Brown	Very Dense	Gravel in subangular to subrounded type. Spreading < 30mm. Trace of boulder throughout of the layer. Very clayey throughout of the layer.	15.15	0-15	50/8	46	50/8					50 BLOW/30cm	
29	14.50	2.00	2.00	b s s	Dry Sand with Gravel	Reddish Brown	Very Dense	Gravel in subangular to subrounded type. Spreading < 30mm. Trace of boulder throughout of the layer. Very clayey throughout of the layer.	15.23	0-15	50/8	46	50/8					50 BLOW/30cm	
30	14.50	2.00	2.00	b s s	Dry Sand with Gravel	Reddish Brown	Very Dense	Gravel in subangular to subrounded type. Spreading < 30mm. Trace of boulder throughout of the layer. Very clayey throughout of the layer.	16.15	0-15	50/12	52	50/12					50 BLOW/12cm	
31	14.50	2.00	2.00	b s s	Dry Sand with Gravel	Reddish Brown	Very Dense	Gravel in subangular to subrounded type. Spreading < 30mm. Trace of boulder throughout of the layer. Very clayey throughout of the layer.	16.27	0-15	50/12	52	50/12					50 BLOW/12cm	
32	17.90	3.40	3.40	b s s	Dry Sand and Gravel	Light Brown	Very Dense	Sand is fine to coarse grained. Gravel subrounded to subangular (max 30mm. Spreading < 10mm. Less clay content in of upper layer.	17.15	0-17	50/10	50	50/10					50 BLOW/30cm	
33	18.40	1.50	1.50	b s s	Dry Sand and Gravel	Light Brown	Very Dense	Sand is fine to coarse grained. Gravel subrounded to subangular (max 30mm. Spreading < 10mm. Less clay content in of upper layer.	17.25	0-17	50/10	50	50/10					50 BLOW/30cm	
34	18.40	1.50	1.50	b s s	Dry Sand and Gravel	Light Brown	Very Dense	Sand is fine to coarse grained. Gravel subrounded to subangular (max 30mm. Spreading < 10mm. Less clay content in of upper layer.	18.15	0-18	53/25	25	28	25/10					53 BLOW/25cm
35	18.40	1.50	1.50	b s s	Dry Sand and Gravel	Light Brown	Very Dense	Sand is fine to coarse grained. Gravel subrounded to subangular (max 30mm. Spreading < 10mm. Less clay content in of upper layer.	18.40	0-18	53/25	25	28	25/10					53 BLOW/25cm
36				b s s				-END OF DRILLING-											

Prepared by \_\_\_\_\_ Checked by \_\_\_\_\_ Approved by \_\_\_\_\_



# FIG DRILLING LOG

Project No \_\_\_\_\_ Project Description Construction of Eastern Arterial Type of Drilling Dry Core  
 Hole Number BH-1 of Murun River Road in Manzala Date 09/05/01 - 10/05/01  
 Water Table 0.435 m Driller Is. Goshah

**Remarks**  
 D Dynamic Cone Penetration Test  
 Forzen between 0.40 and 2.50m

Scale in m	Elevation in m	Depth in m	Thickness in m	Legend	Type of Soil	Colour	Relative Density or Consistency	General Remarks	Sampling		Dynamic Cone Penetration Test										
									Depth in m	Sample No.	N-Value Blows/30cm	Blows Per Each 15 cm			N - Value						
												15cm	15cm	15cm	10	20	30	40	50		
		0.40	0.40	x	Silty Sand	Grey		Top 10cm with roots. Sand is very fine grained.													
		0.80	0.40	x	Sandy Silty Sand and Gravel	Black		Plastic. High moisture content with organic fragments.													
		1.30	0.50	x	Sand and Gravel	Light Grey			Sand is fine to coarse grained. φmax 300mm.												
		3.00	1.70	x	Sand and Gravel	Light Brown		Sand is fine to coarse grained. With boulder φmax 150mm. φprevailing < 30mm.	2.15	D-7	50/5	40	50/5								
		4.00	1.00	x	Silty Sand and Gravel	Brownish Grey	Dense	Sand is fine to coarse grained. φmax 100mm. φprevailing < 30mm.	3.15	D-38	44	7	20	24							
		4.45		x	Sand with Gravel	Light Brown to Brown	Dense to Very Dense		Sand is fine to coarse grained. φmax 40mm. φprevailing < 10mm.	4.15	D-48	47	7	25	22						
		5.15	1.80	x	Silty Sand and Gravel	Light Blush Grey	Very Dense	With boulder occasionally φmax 130mm. φprevailing < 30mm. Less gravel contents at 7 m.	5.15	D-58	56	8	25	31	56	BLOWS/30cm					
		6.40		x	Silty Sand and Gravel	Light Blush Grey	Very Dense		With boulder occasionally φmax 130mm. φprevailing < 30mm. Less gravel contents at 7 m.	6.15	D-98	105/25	16	55	50/0	105	BLOWS/25cm				
		7.15		x	Silty Sand and Gravel	Light Blush Grey	Very Dense	With boulder occasionally φmax 130mm. φprevailing < 30mm. Less gravel contents at 7 m.	7.15	D-78	100/25	16	58	50/0	100	BLOWS/25cm					
		7.40		x	Silty Sand and Gravel	Light Blush Grey	Very Dense		With boulder occasionally φmax 130mm. φprevailing < 30mm. Less gravel contents at 7 m.	8.15	D-88	110/20	18	60	50/5	110	BLOWS/20cm				
		8.50	2.70	x	Silty Sand and Gravel	Light Blush Grey	Very Dense	With boulder occasionally φmax 130mm. φprevailing < 30mm. Less gravel contents at 7 m.	8.15	D-98	105/25	20	55	50/0	105	BLOWS/25cm					
		9.00	0.50	x	Silty Clay	Yellowish Brown	Hard		Most traces of sand seams.	10.15	D-108	100/20	20	58	50/0	100	BLOWS/20cm				
		10.80	2.30	x	Silty Sand and Gravel	Light Blush Grey	Very Dense	Sand is very fine grained. With some silt at bottom.	10.15	D-98	105/25	20	55	50/0	105	BLOWS/25cm					
		11.50	0.70	x	Silty Clay	Yellowish Brown	Hard		Most traces of sand seams.	11.15	D-118	32	10	20	12						
		12.15		x	Sand	Brown Blush Grey	Medium	Sand is very fine grained. With some silt at bottom.	12.15	D-128	20	6	8	11							
		12.45		x	Sand	Brown Blush Grey	Medium		Sand is very fine grained. With some silt at bottom.	12.15	D-138	23	7	10	13						
		14.50	3.00	x	Sand and Gravel	Bluish Grey	Dense	Sand is fine to coarse grained. Gravel is subangular one dia 15 to 25mm.		14.15	D-148	27	7	12	15						
		15.45	0.95	x	Sand and Gravel	Bluish Grey	Dense	Sand is fine to coarse grained. Gravel is subangular one dia 15 to 25mm.	15.15	D-158	31	9	13	18							
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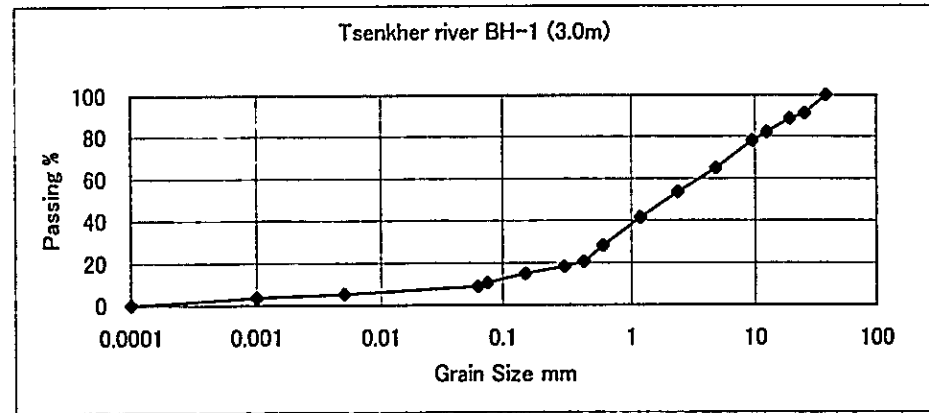
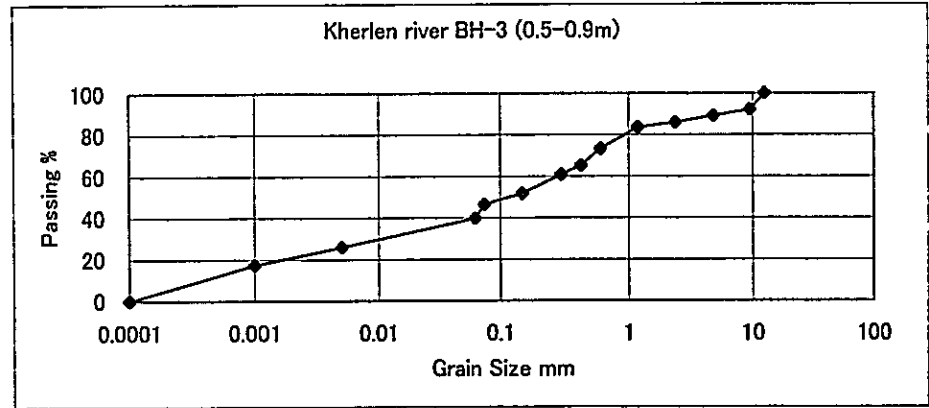
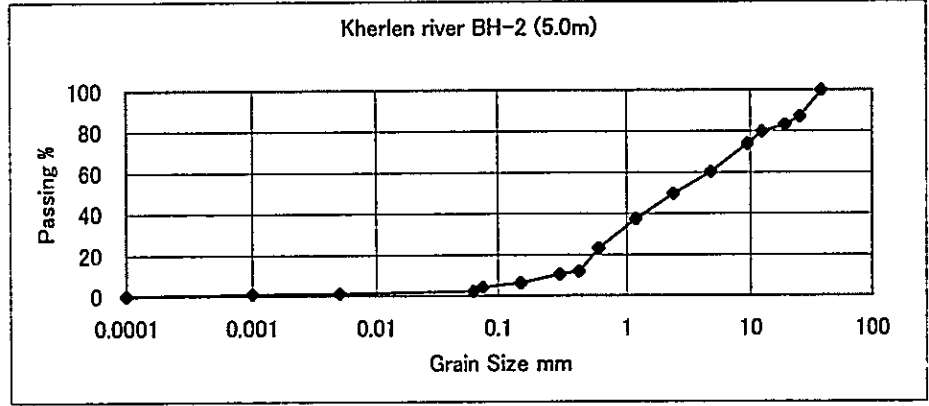
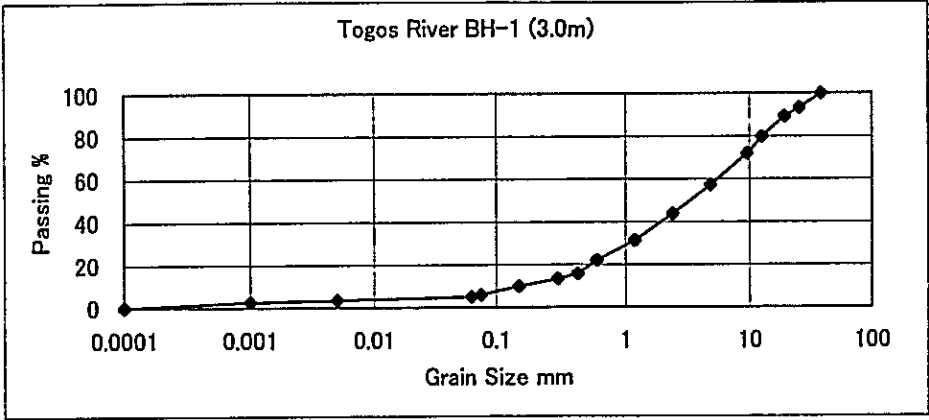
Prepared by \_\_\_\_\_ Checked by \_\_\_\_\_ Approved by \_\_\_\_\_

**Summary of Laboratory Soil Tests on Samples Collected from Boreholes**

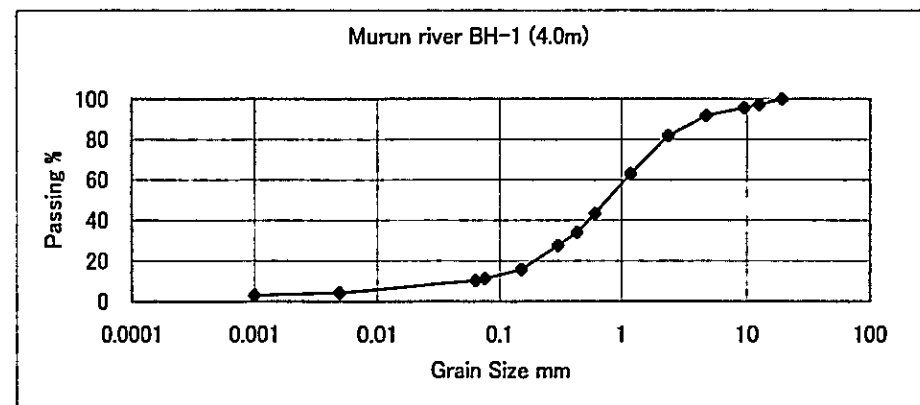
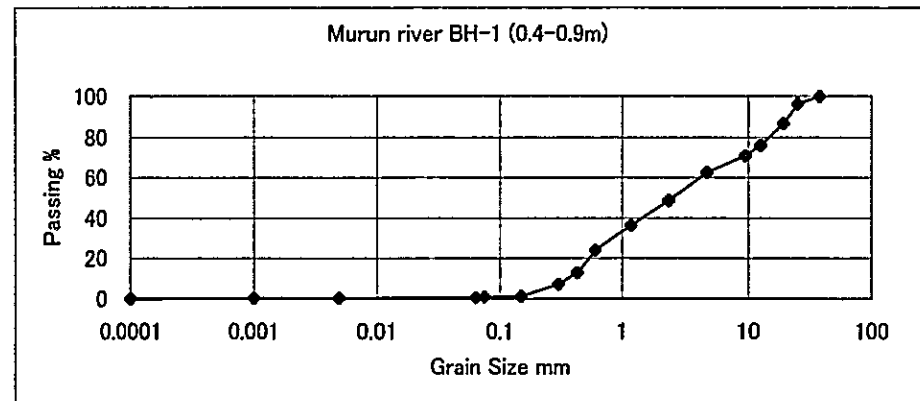
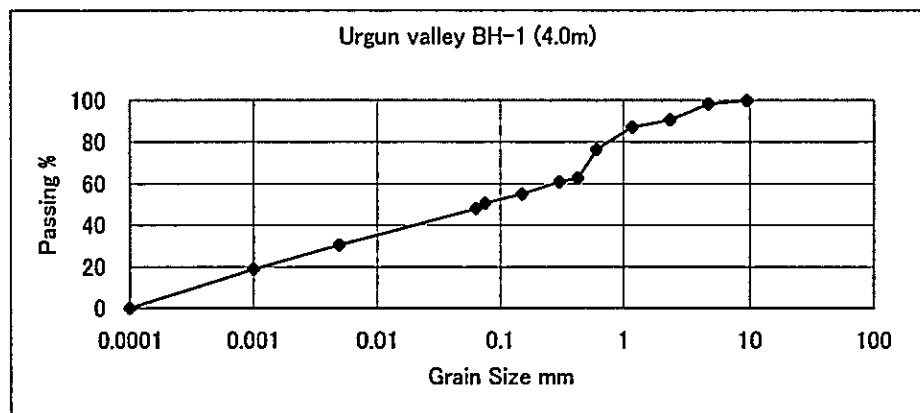
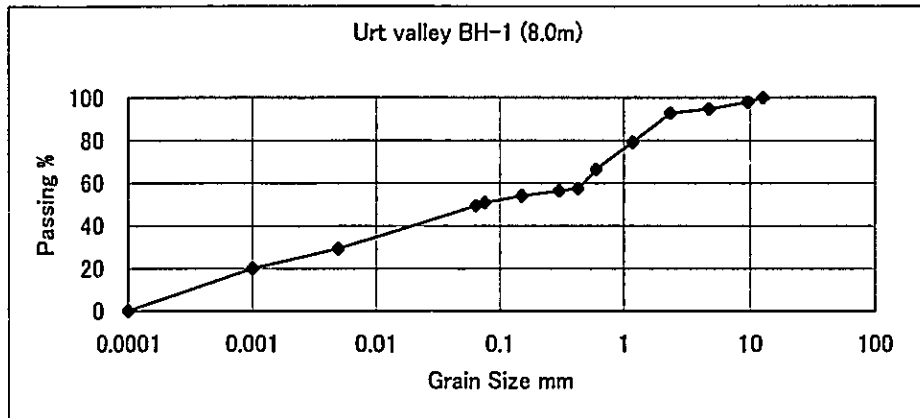
Borehole No.	Togos River BH-1	Kherlen River BH-2	Kherlen River BH-3	Tsenker River BH-1	Urgun Valley BH-1	Urt Valley BH-1	Murun River BH-1	Murun River BH-1	Swamp at Tsenkhermandal
Sampling depth (m)	3.0	5.0	0.5 to 0.9	3.0	4.0	8.0	0.4 to 0.9	4.0	0.15
Natural Moisture Content (%)	7.3	7.7	28.8	8.1	17.4	20.9	9.1	39.6**	-
Specific Gravity	2.68	2.65	2.57	2.67	2.68	2.66	2.65	2.69	2.68
Wet Density (g/cm <sup>3</sup> )	-	-	1.763	-	-	-	-	-	-
Liquid Limit (%)	-	-	22.0	-	14.8	28.5	-	32.0	18.8
Plastic Limit (%)	-	-	16.9	-	12.1	18.1	-	21.6	6.3
Plasticity Index	-	-	5.0	-	3	10	-	10	13
Gravel Content* (%)	43	40	11	35	2	5	38	18	-
Sand Content (%)	51	56	42	55	47	44	61	78	-
Clay and Silt Content (%)	6	4	47	10	51	51	1	4	-
Unified Soil Classification	SW - SM	SW	SC-SM	SW - SM	ML	CL	SW	SW	SW - SM
Compression Index	-	-	0.18	-	-	-	-	-	-
Unconfined Compressive Strength (KN/m <sup>2</sup> )	-	-	15.0	-	-	-	-	-	-

\* Retained on a 4.75mm sieve

\*\* Sample contains organic matter.



**Grading Curves of Samples Taken from Boreholes**

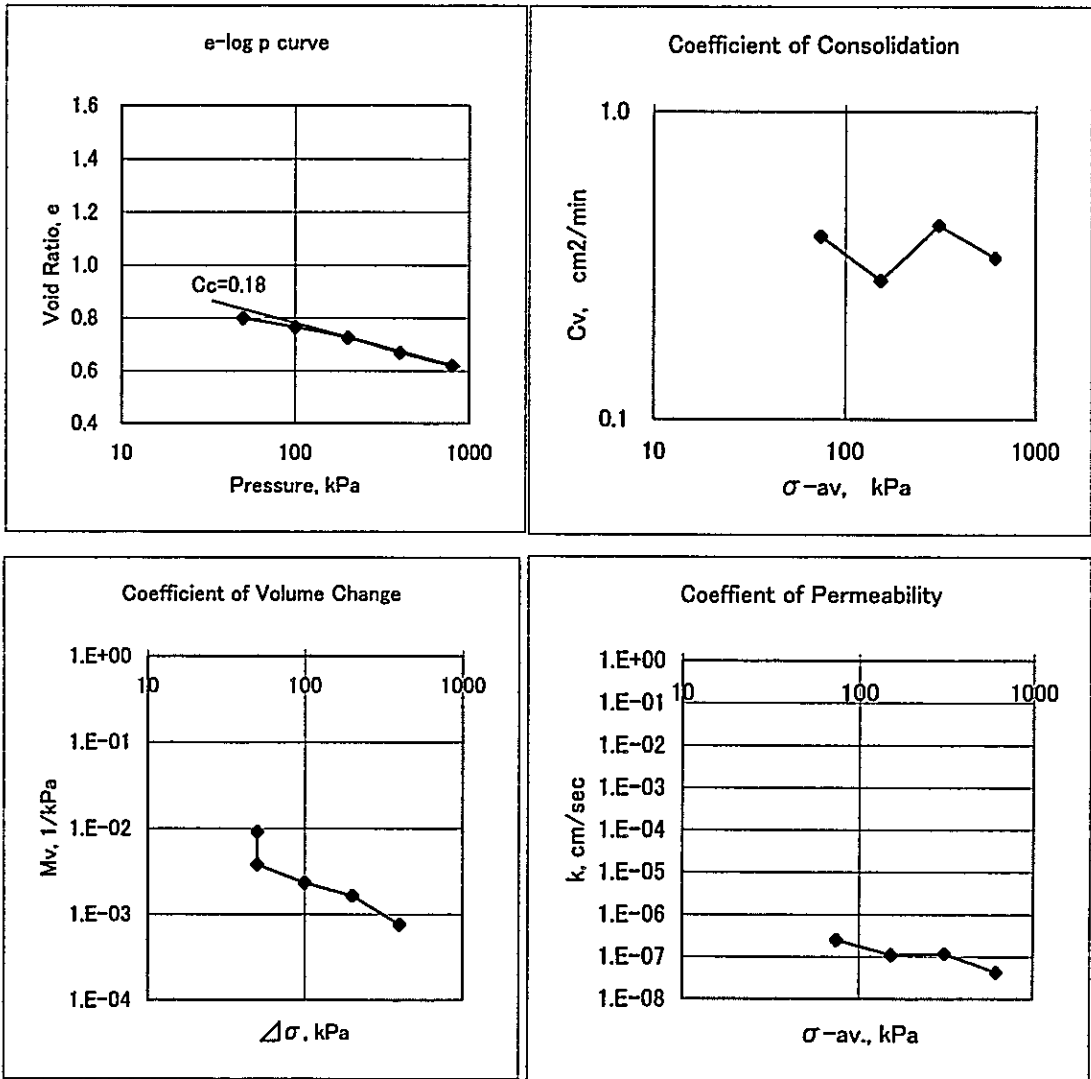


**Grading Curves of Samples Taken from Boreholes**

Initial condition of soil		Final condition of soil	
Gs	2.58	2.58	
W, %	28.8	18.8	
e	0.88	0.62	
$\gamma_t$ , g/cm <sup>3</sup>	1.763	1.89	
$\gamma_d$ , g/cm <sup>3</sup>	1.37	1.59	
Sr, %	84	78	
Hs,mm	13.26	13.26	

		Settlement,mm					
Pressure,kPa		0	50	100	200	400	800
0			0.040	1.140	1.587	2.125	2.865
0.1			0.205	1.210	1.760	2.360	3.110
0.25			0.390	1.215	1.770	2.375	3.125
0.5			0.505	1.220	1.780	2.395	3.140
1			0.622	1.250	1.787	2.505	3.200
2			0.690	1.280	1.822	2.535	3.245
4			0.860	1.325	1.880	2.565	3.270
8			0.935	1.370	1.935	2.600	3.300
15			1.041	1.415	1.980	2.620	3.350
30			1.057	1.440	2.010	2.660	3.400
60			1.085	1.475	2.035	2.700	3.445
120			1.117	1.547	2.045	2.745	3.480
900			1.137	1.580	2.107	2.845	3.527
1440	0		1.140	1.587	2.125	2.865	3.532
f		1.88	1.799	1.765	1.725	1.669	1.619
e <sub>f</sub>		0.88	0.799	0.765	0.725	0.669	0.619
t <sub>50</sub>		-		3.00	4.00	2.50	3.00
h-average		2.50	2.44	2.36	2.31	2.25	2.18
C <sub>v</sub> , cm <sup>2</sup> /min				0.39	0.28	0.43	0.34
M <sub>v</sub> , /kPa			9.1E-03	3.8E-03	2.3E-03	1.6E-03	7.6E-04
k, cm/s				2.5E-07	1.1E-07	1.2E-07	4.3E-08
$\Delta\sigma$ , kPa			50	50	100	200	400
$\sigma$ -average, kPa			25	75	150	300	600

Summary of Consolidation Test Results (BH-3 at Kherlen River)



Consolidation Test Results (BH-3 at Kherlen River)

**Material Test Results of Bulk Soil Samples Taken along Road Alignment**

Sample No.	Sampling Location		Sampling Depth (m)	Geological Unit	AASHTO Soil Classification	Grading Analysis (%)			LL (%)	Ip	Wn (%)	Wopt (%)	CBR-value (%)		
	N	E				G	S	F					95%MDD	98%MDD	
BCD-4	47°41'227	107°52'556	0.3 to 0.7	Aeolian/Talus deposits	A-2-4	58	21	21	30	10	5.2	4.8	2.229	7	11
BCD-3	47°43'023	107°57'712	0.45 to 1.00	Talus/ fan deposits	A-2-4	35	54	11	27	9	4.9	6.2	2.125	-	5
BCD-2	47°42'803	108°03'387	0.2 to 0.4	Fluvial deposit	A-1-a	53	37	10	Non plastic	2	5.6	11.5	1.753	-	24
BCD-1	47°41'570	108°10'105	0.45 to 1.00	Alluvial deposit	A-2-4	14	59	27	12	2	4.8	14.1	1.830	14	19
BC1A-2	47°39'155	108°17'453	0.30 to 1.00	Fluvial deposit	A-1-a	52	37	15	Non plastic	4	4.4	4.6	1.855	-	14
BC1A-1A	47°41'533	108°23'352	0.25 to 0.60	Alluvial deposit	A-1-b	42	46	12	19	3	4.2	4.3	2.223	-	17
BC1A-1B	47°41'533	108°23'352	0.65 to 1.00	Fluvial deposit	A-1-b	29	60	11	16	3	7.6	6.0	2.083	-	25
BC4A-5	47°41'736	108°32'564	0.40 to 0.75	Terrace deposit	A-1-b	25	67	8	Non plastic	4	4.0	4.5	2.076	-	10
BC4A-4	47°45'384	108°37'606	0.42 to 0.84	Terrace or fluvial deposits	A-2-4	10	72	18	24	2	4.6	6.0	1.932	-	34
BC4A-3	47°48'343	108°44'014	0.25 to 0.70	Talus deposit (diorite origin)	A-1-b	47	39	14	25	6	7.0	6.8	2.161	-	30
BC4A-2	47°47'154	108°50'181	0.30 to 1.00	Talus deposit (diorite origin)	A-2-4	29	36	35	29	5	4.9	5.4	2.199	-	10
BC4A-1	47°45'149	108°57'347	0.30 to 1.00	Talus or weathered diorite	A-1-a	56	30	14	18	2	4.6	5.0	2.223	15	20
BC5-1	47°42'484	109°03'335	0.20 to 0.50	Fluvial deposit	A-6	20	41	39	32	14	5.1	7.8	2.127	9	11
BC6-4	47°38'223	109°09'452	0.15 to 0.40	Aeolian / fluvial deposits	A-2-4	23	42	35	21	1	10.4	7.6	2.126	-	4
BC6-3	47°35'065	109°15'285	0.20 to 0.40	Aeolian/fluvial dep.s (diorite origin)	A-4	10	43	47	28	6	9.2	9.0	2.119	-	19
BC6-2	47°32'793	109°22'787	0.15 to 0.50	Aeolian/fluvial dep.s (diorite origin)	A-4	10	45	45	19	6	9.0	12.6	1.961	-	4
BC6-1	47°28'961	109°29'967	0.30 to 0.65	Lake deposit	A-2-4	19	56	25	25	8	8.8	6.1	2.050	-	9
BC7-1	47°27'955	109°34'863	0.25 to 0.35	Aeolian or alluvial deposits	A-4	8	44	48	31	6	7.1	11.1	1.969	9	14
BC7-2	47°27'244	109°41'328	0.25 to 0.45	Alluvial deposit	A-4	5	47	48	32	6	8.4	11.8	2.007	-	4
BC8-1	47°25'497	109°51'133	0.20 to 0.55	Fluvial deposit	A-2-6	52	32	16	37	19	3.4	7.6	2.157	-	21
BC8-2	47°25'136	109°57'586	0.20 to 0.45	Aeolian / lake deposits	A-2-4	32	39	29	35	7	5.9	9.5	2.085	5	13
BC9-3	47°25'306	110°04'905	0.30 to 0.50	Fluvial deposit	A-2-4	3	75	22	26	6	6.5	8.6	2.019	-	13
BC9-2	47°24'655	110°12'549	0.20 to 0.60	Fluvial deposit	A-2-4	17	62	21	26	6	1.2	5.5	2.053	14	44
BC9-1	47°22'836	110°21'462	0.30 to 0.75	Fluvial or fan deposit	A-1-b	42	46	12	17	4	2.4	7.4	2.026	21	30
BC10-1	47°21'778	110°29'827	0.30 to 0.50	Alluvial deposit	A-6	3	47	50	36	15	5.4	8.5	2.105	18	20
BC10-2	47°19'793	110°37'142	0.20 to 0.70	Alluvial deposit mix with Aeolian dep.s	A-2-4	25	48	27	28	6	4.5	9.5	2.085	4	5

<b>G</b>	Gravel content	<b>Ip</b>	Plasticity index
<b>S</b>	Sand content	<b>NP</b>	Non plastic
<b>F</b>	Particles finer than 0.075mm	<b>Wn</b>	Natural moisture content
<b>LL</b>	Liquid limit	<b>Wopt</b>	Optimum moisture content determined by Modified Proctor test
		<b>MDD</b>	Maximum dry density determined by Modified Proctor test

**Material Test Results of Bulk Soil Samples Taken from Possible Borrow Pits**

Sample No.	Sampling Location		Geological Unit	Present Statous	AASHTO Soil Classification	Grading Analysis (%)			LL (%)	Ip (%)	Wn (%)	Gs	Wopt (%)	MDD g/cm <sup>3</sup>		CBR-value (%)
	N	E				G	S	F						95%MDD	98%MDD	
BPD-5			Weathered shale	In operation	A-1-a	85	7	8	Non	4.8	2.66	9.3	2.048	-	4	
BPD-4	47°41'227	107°52'556	Weathered granite & shale	Abandoned borrow pit	A-1-b	66	17	17	26	3.1	2.65	5.9	2.045	29	32	
BPD-3	47°42'207	108°00'510	Talus deposit (granite origin)	No borrow pit	A-2-4	77	15	8	23	3	2.73	7.8	2.059	14	26	
BPD-2	47°42'454	108°07'173	Terrace deposit	No borrow pit	A-2-4	44	41	15	26	8	2.71	5.5	2.073	-	5	
BPD-1	47°41'286	108°11'803	Terrace deposit	Close to abandoned b.p	A-1-b	50	30	20	23	6	2.69	10.4	2.167	18	29	
BP1A-2	47°38'712	108°16'600	Alluvial deposit	Close to abandoned b.p	A-1-b	33	56	11	20	6	2.68	3.5	2.182	5	8	
BP1A-1	47°41'023	108°24'347	Talus deposit (granite origin)	No borrow pit	A-1-b	22	66	12	22	5	2.67	7.2	2.093	5	9	
BP3A-1	47°41'907	108°27'102	Talus deposit & weathered granite	Abandoned borrow pit	A-1-b	47	30	23	17	2	2.72	5	2.067	15	25	
BP4A-5	47°43'005	108°34'922	Talus deposit (granite origin)	No borrow pit	A-1-b	38	50	12	30	5	2.69	4.4	2.139	-	27	
BP4A-4	47°47'229	108°39'724	Talus deposit (granite origin)	No borrow pit	A-1-b	38	49	13	Non	5.6	2.68	5.5	2.199	-	3	
BP4A-3	47°48'458	108°46'637	Talus or terrace deposit	No borrow pit	A-1-b	42	45	13	21	8	2.67	8.4	2.104	-	20	
BP4A-2	47°45'287	108°54'323	Talus deposit (granite origin)	No borrow pit	A-1-b	34	48	18	16	NP	2.68	6.1	2.178	18	26	
BP5-1	47°44'648	108°59'570	Fluvial deposit	Abandoned borrow pit	A-2-4	56	34	10	25	10	2.70	5.4	2.23	-	20	
Tin	47°43'299	109°03'973	Fluvial deposit	Tailing waste	A-1-b	31	63	6	Non	2	2.61	2.9	2.081	9	13	
Tin	47°40'640	109°07'966	Fluvial deposit	Tailing waste	A-1-a	62	36	2	Non	1.8	2.65	6	2.134	9	13	
BP6-3	47°38'853	109°15'469	Talus deposit (diorite origin)	Garbage dumping ground	A-2-4	60	26	14	29	9	2.2	2.70	2.15	-	25	
BP6-2	47°33'955	109°19'720	Weathered granite rock	Abandoned borrow pit	A-1-b	39	37	24	Non	2.5	2.71	8.2	1.965	-	25	
BP6-1	47°32'376	109°23'126	Weathered sedimentary rock	Abandoned borrow pit	A-2-4	43	30	27	18	2	2.3	2.70	2.246	-	6	
BP7-1	47°28'185	109°32'330	Weathered shale	Abandoned borrow pit	A-1-b	70	11	19	31	6	2.71	5.4	2.334	16	21	
BP7-2	47°27'193	109°39'934	Talus deposits & weathered Sedimentary rock	Abandoned borrow pit	A-2-4	50	16	34	25	9	2.72	5.9	2.189	8	9	
BP7-3	47°26'642	109°44'519	Talus deposit (sandstone origin)	No borrow pit	A-1-a	74	15	11	27	5	2.67	8.6	2.125	-	-	
BP8-1	47°27'095	109°47'594	Talus deposit (shale origin)	Abandoned borrow pit	A-1-a	71	16	13	19	4	2.2	0.66	1.759	-	10	
BP9-3	47°24'313	110°01'365	Fluvial deposits	Abandoned borrow pit	A-1-b	57	22	21	26	1	2.4	2.71	1.839	-	13	
BP9-2	47°24'239	110°14'123	Alluvial deposit	Abandoned borrow pit	A-1-b	21	71	8	Non	2.2	2.65	5.6	1.957	-	13	
BP9-1	47°23'190	110°20'311	Fluvial deposit	Abandoned borrow pit	A-1-b	30	48	22	17	4	2.4	2.70	2.217	-	12	
BP10-2	47°23'083	110°27'021	Fluvial deposit	Abandoned borrow pit	A-1-a	58	14	28	25	1	2.67	11.8	2.11	-	11	
BP10-1	47°21'581	110°36'300	Talus deposit & weathered diorite	In operation	A-1-b	48	36	16	22	4	2.68	6.2	2.304	-	20	

**G** Gravel content  
**S** Sand content  
**F** Particles finer than 0.075mm  
**LL** Liquid limit  
**Ip** Plasticity index  
**NP** Non plastic  
**Wn** Natural moisture content  
**Gs** Specific Gravity  
**Wopt** Optimum moisture content determined by Modified Proctor test  
**MDD** Maximum dry density determined by Modified Proctor test



**Summary of Results of Index Property Tests on Bulk Soil Samples Taken along Road Alignment**

Sample No.	Sampling Location		Sampling Depth (m)	Sieving Test Result (Percent passing at each sieve)													LL (%)	Ip	Soil Classification		
	N	E		50.0	37.5	25	19	12.5	9.5	4.75	2.36	1.18	0.6	0.425	0.300	0.15				0.075	
BCD-4	47°41'227	107°52'556	0.3 to 0.7	100	96.2	75.7	68.6	59.6	55.8	48.8	42.7	37.7	31.6	27.8	26.4	22.9	21.2	30	10	A-2-4	
BCD-3	47°43'023	107°57'712	0.45 to 1.00		100	100	100	97.6	91.3	85.2	74.2	63.8	49.5	41.4	32.7	24.7	17.3	10.9	9.5	Non plastic	A-2-4
BCD-2	47°42'803	108°03'387	0.2 to 0.4																		A-1-a
BCD-1	47°41'570	108°10'105	0.45 to 1.00																		A-2-4
BC1A-2	47°39'155	108°17'453	0.30 to 1.00	100	88	81.2	72.9	66.9	65.3	57.6	50	32.8	27.7	24.4	21.1	17.5	15.3	Non plastic		A-1-a	
BC1A-1A	47°41'533	108°23'352	0.25 to 0.60	100	100	95.4	90.1	87	78.5	69.8	60.5	51.8	45	38.2	26.9	16.4	12.3	19	3		A-1-b
BC1A-1B	47°41'533	108°23'352	0.65 to 1.00			100	96	90.5	86.2	77.9	71.9	63.6	45.4	33.9	29.6	16.6	10.8	16	3		A-1-b
BC4A-5	47°41'736	108°32'564	0.40 to 0.75	100	100	94.0	90.2	89.0	86.7	81.2	77.2	63.2	55.9	33.7	23.4	13.1	8.1	Non plastic		A-1-b	
BC4A-4	47°45'384	108°37'606	0.42 to 0.84																		A-2-4
BC4A-3	47°48'343	108°44'014	0.25 to 0.70	100	100	96.5	93.9	90.6	87.6	78.3	57.3	38	21	18.4	16.6	15.1	13.8	25	6		A-1-b
BC4A-2	47°47'154	108°50'181	0.30 to 1.00			100	98.2	97.4	94.5	84.7	72.6	62.6	57.8	52.8	47.8	40.0	35.0	29	5		A-2-4
BC4A-1	47°45'149	108°57'347	0.30 to 1.00	100	100	98.4	96.3	83.3	74.8	57.8	45.5	33	26.5	22	19.7	15.7	13.9	18	2		A-1-a
BC5-1	47°42'484	109°03'335	0.20 to 0.50			100	97.5	92.6	90.6	84.8	80.9	77.1	73.0	53.3	48.7	40.8	38.8	32	14		A-6
BC6-4	47°38'223	109°09'452	0.15 to 0.40																		A-2-4
BC6-3	47°35'065	109°15'285	0.20 to 0.40																		A-4
BC6-2	47°32'793	109°22'787	0.15 to 0.50																		A-4
BC6-1	47°28'961	109°29'967	0.30 to 0.65			100	99.5	99.1	97.7	94.7	83.1	69.1	54.1	46.2	39.7	31.6	25.4	25	8		A-2-4
BC7-1	47°27'955	109°34'863	0.25 to 0.35																		A-4
BC7-2	47°27'244	109°41'328	0.25 to 0.45																		A-4
BC8-1	47°25'497	109°51'133	0.20 to 0.55	100	100	92.5	90.5	84.4	80	66.5	51.6	36.2	27.8	24.1	20.5	17.8	16	37	19		A-2-6
BC8-2	47°25'136	109°57'586	0.20 to 0.45			100	99.5	95.8	94.2	85.8	72	55.7	11.3	40.4	37.3	33	29.3	35	7		A-2-4
BC9-3	47°25'306	110°04'905	0.30 to 0.50																		A-2-4
BC9-1	47°22'836	110°21'462	0.30 to 0.75			100	94.2	91.2	89.0	85.7	84.4	79.1	66.6	60.2	49.7	28.7	21.1	17	4		A-2-4
BC9-2	47°24'655	110°12'549	0.20 to 0.60	100	100	88.2	82.3	79.9	76.2	68.0	59.7	50.2	42.2	35.4	28.0	17.1	12.0	26	6		A-1-b
BC10-1	47°21'778	110°29'827	0.30 to 0.50																		A-6
BC10-2	47°19'793	110°37'142	0.20 to 0.70																		A-2-4

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

**Summary of Results of Index Property Tests on Bulk Soil Samples Taken from Possible Borrow Pits**

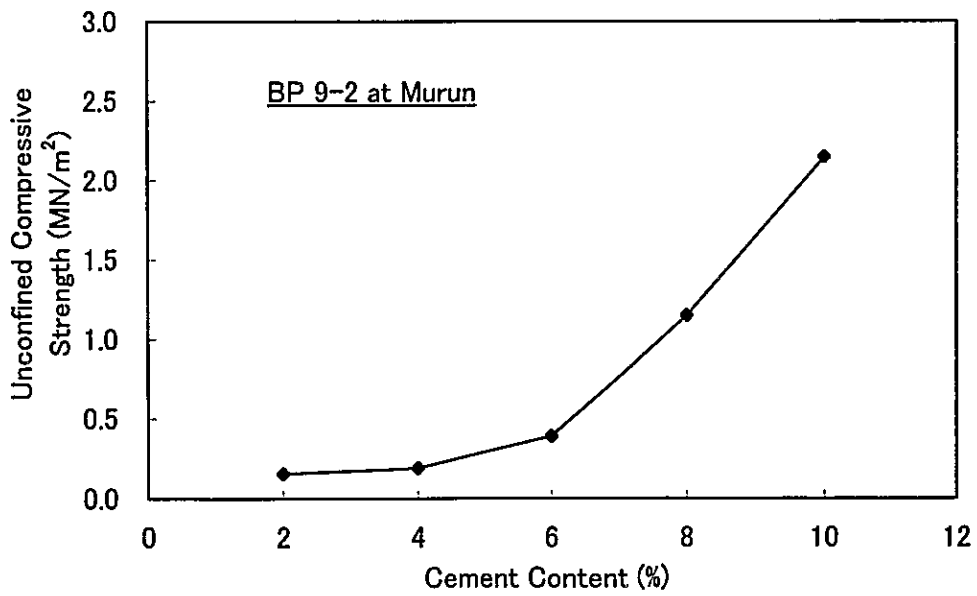
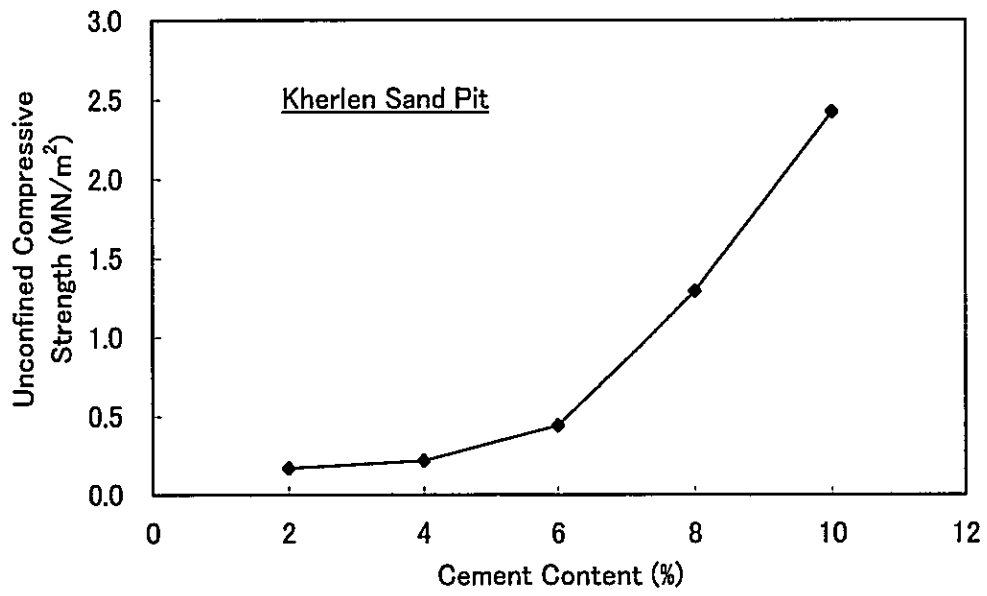
Sample No.	Sampling Location		Sieving Test Result (Present passing at each sieve)														LL (%)	Ip	Soil Classification
	N	E	50.0	37.5	25	19	12.5	9.5	4.75	2.36	1.18	0.6	0.425	0.300	0.15	0.075			
BPD-5	47°42'208	107°50'500	75.8	68	58	48	38.1	30.5	22.8	15.1	12.1	10.8	10.2	9.9	9.2	7.9	Non Plastic	A-1-a	
BPD-4	47°41'227	107°52'556	100	89.4	82.5	73.4	64.8	58.2	46.2	35.4	29.2	23.5	20.2	19	17.9	17.4	6	A-1-b	
BPD-3	47°42'207	108°00'510		100	85.7	77.7	66.2	56.2	37.6	25.6	18.3	15.0	12.5	11.5	9.2	7.7	8	A-2-4	
BPD-2	47°42'454	108°07'173		100	87.6	84.9	82.2	76.6	69.8	61.8	49.7	39.7	31.1	27.6	20.3	14.6	8	A-2-4	
BPD-1	47°41'286	108°11'803		100	81.5	73.7	73.4	67.9	58.6	50.6	43.3	37.3	32.5	36.2	24.7	20.4	6	A-1-b	
BP1A-2	47°38'712	108°16'600			100	99.5	98.7	96.3	89.6	71.5	51.8	38.5	31.5	24.4	17.4	11.1	20	A-1-b	
BP1A-1	47°41'023	108°24'347			100	97.6	94.8	93.5	89.3	79.9	65.3	44.9	36	29.2	18.5	12.2	22	A-1-b	
BP3A-1	47°41'907	108°27'102			100	94.7	90.5	85.5	74	55	44.9	39.2	34.6	32.4	28.6	22.6	17	A-1-b	
BP4A-5	47°43'005	108°34'922		100	98	96.7	92	85.2	74.4	63.2	53.7	42.1	33.9	26.6	18.4	11.6	30	A-1-b	
BP4A-4	47°47'229	108°39'724		100	99.4	98.0	92.3	85.0	73.7	63.0	53.8	43.7	34.5	26.3	19.0	12.9	Non Plastic	A-1-b	
BP4A-3	47°48'458	108°46'637			100	94.2	89.7	81.2	70.6	59.1	46.6	36.1	27.3	22.3	16.8	13.3	21	A-1-b	
BP4A-2	47°45'287	108°54'323			100	99.0	94.2	89.7	75.4	67.4	60.4	48.1	38.1	29.3	23.1	17.8	NP	A-1-b	
BP5-1	47°44'648	108°59'570		100	96.8	87.2	80.8	76.5	57.3	45.9	39.9	32.4	23.1	17.1	12.1	10.4	25	A-2-4	
Tin mine2	47°43'299	109°03'973				100	98.5	96.4	86.9	72.9	55.1	40.3	27.3	19.0	9.2	5.7	Non Plastic	A-1-b	
Tin mine1	47°40'640	109°07'966	84.2			75.4	66.1	60.1	56.8	49.2	40.0	32.5	27.2	23.6	22.1	19.5	2.3	Non Plastic	A-1-a
BP6-3	47°38'853	109°15'469		100	84.8	75.3	69.3	59.8	48.6	41.9	35.6	31.4	24.4	20.1	16.1	13.7	29	A-2-4	
BP6-2	47°33'955	109°19'720					100	99	94.5	79.8	62.8	49.5	34.8	31.8	28.5	26.8	2.3	Non Plastic	A-1-b
BP6-1	47°32'376	109°23'126	100	94.3	93.4	92.3	88	81.3	67	59.1	45.6	37.1	34.4	31.1	29.3	26.6	18	A-2-4	
BP7-1	47°28'185	109°32'330	88.4	78.0	74.4	65.0	53.1	47.5	41.7	31.7	26.0	23.4	22.4	21.7	20.4	19.4	31	A-1-b	
BP7-2	47°27'193	109°39'934	100	92.7	78.3	69.0	65.3	62.4	55.9	51.1	47.1	45.0	41.0	39.7	37.0	34.0	25	A-2-4	
BP7-3	47°26'642	109°44'519	93.5	85.3	73.8	64.6	50.9	45.7	35.1	28.6	23.2	19.2	16.6	15.2	12.6	11.1	27	A-1-a	
BP8-1	47°27'095	109°47'594	100	74.6	65.7	60.3	62.2	46.3	35.4	30.0	25.2	21.4	20.3	18.4	15.0	12.8	19	A-1-a	
BP9-3	47°24'313	110°01'365		100	86	77.3	68.7	63.1	51.8	44.8	38.7	32.7	27.5	25.2	22.5	20.5	26	A-1-b	
BP9-2	47°24'239	110°14'123		100	90.3	86.5	86	83.8	81.4	79.9	79.3	60.1	44.3	32.7	14.1	7.6	Non Plastic	A-1-b	
BP9-1	47°23'190	110°20'311		100	95.4	92.3	89.1	87.1	81.0	72.4	62.4	54	47.1	38.6	28	22.2	17	A-1-b	
BP10-2	47°23'083	110°27'021	98.9	96.5	87.8	81.7	70.2	61.5	41.4	30.2	23.2	19.7	16.9	15.9	12.4	10.3	25	A-1-a	
BP10-1	47°21'581	110°36'300	82.6	80.2	77.6	75.9	73.4	69.7	62.3	53	45.2	32.1	26.2	22.2	18.1	16	22	A-1-b	

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

**Summary of Aggregate Tests Results for Rock Samples**

Name of Sampling Location	Sampling Location		Type of Material	Soundness* (%)	Los Angeles Abrasion (%)	Flakiness Index**	Specific Gravity***	Water Absorption*** (%)	Bitumen Coated Area**** (%)
	N	E							
Quarry at Tumor Ulgi Mt., Kherlen	47°42'932	108°25'847	Granodiorite fragments	2	8.6	10	2.64 2.61	1.1 2.0	>95
Stock Pile of Tailing Deposits (Boulder) at Tsenkhermandal	47°40'640	109°03'973	Alluvial boulder stones collected from surface of gravel tailings	2	8.7	11	2.54 2.52	1.6 1.8	>95
Delger Mt. at Murun	47°24'391	110°35'890	Boulder size of weathered tuff scattered on slope of the Delger mountain	2	10.4	10	2.56 2.54	1.5 1.9	-

- \* By sodium sulphate
- \*\* Aggregates passing a 37.5mm sieve and retained on a 10.0mm sieve
- \*\*\* Above the line : size 4.75mm to 12.5mm  
Below the line : size 19.0mm to 37.5mm
- \*\*\*\* After 30 minutes immersion into water kept 80±1°C



Results of Cement Stabilization Test

**Record of Test Pit for Bulk Soil Sampling**

Sample No.:BCD-4      Coordinates N:47°41'227      E:107°52'556

Depth (m)	Type of Soil	Color	Description
0.40	Sandy Silt	Dark Brown	With some gravel up to 30 cm from the ground surface. Gravel: Rock fragments Max.size: 150 mm Prevailing size: ≤20mm. With roots at top
0.60	Sandy Silt	Dark Brown to Brown	Trace of gravel (rock fragments). Material is same as the upper layer.
0.80	Sandy Silt with Gravel	Brown	Max.size: 80mm Prevailing size: ≤30mm
1.00	Silty Sand with Gravel	Slightly Greenish Green	Very silty



**Material Test Results**

Grading Analysis (%)		LL (%)	Ip	Wn (%)	Wopt (%)	MDD g/cm <sup>3</sup>	CBR-Value (%)	
G	S	F					95%MDD	98%MDD
58	21	21	30	10	4.8	2.229	7	11

**G** Gravel content      **Ip** Plasticity index  
**S** Sand content      **Wn** Natlional 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.:BCD-3

Coordinates N:47°43'023

E:107°57'712

Depth (m)	Type of Soil	Color	Description
0.35	Silty Sand	Dark Brown	Sand is very fine grained. With roots throughout of the layer.
0.45	Silty Sand with Gravel	Brown to Dark Brownish Yellow	Sand is very fine grained. With subangular gravel, max: $\phi$ 100mm, $\phi$ prevailing $\leq$ 30mm.
1.00	Silty Sand	Yellowish Brown to Light Brown	Sand is very fine grained. Trace of rock fragments and subangular gravels. max.size: 80mm, prevailing size: $\leq$ 25mm.

0.45

Sampling

1.00

**Material Test Results**

Grading Analysis (%)		LL (%)	Ip	Wn (%)	Wopt (%)	MDD g/cm <sup>3</sup>	CBR-Value (%)	
G	S	F	11	27	9	6.2	95%MDD	98%MDD
35	54	11	11	27	9	6.2	-	5

**G** Gravel content      **Ip** Plasticity index  
**S** Sand content      **Wn** Naitional 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.: -

Coordinates N:

E:

Gully close to BCD-3

Depth (m)	Type of Soil	Color	Description
0.15	Silty Sand	Black to Dark Brown	Sand is very fine grained. With roots Occasionally with rock fragments.
0.50	Silty Sand with Gravel	Yellowish Brown to Light Brown with Whitish Parts	Very silty, with rock fragments
0.80	Silty Sand		Very silty. Sand is very fine grained.
0.85	Silty Sand		With some rock fragments.
1.00	Sand & Gravel		Gravel: Subgranular to subrounded. $\phi$ max: 40mm, $\phi$ prevailing $\leq$ 20mm.

Record of Test Pit for Bulk Soil Sampling

SampleNo.:BCD-2

Coordinates N:47°42'803

E:108°03'387

Depth (m)	Type of Soil	Color	Description
0.10	Silty Sand	Dark Brown	With roots. Sand is very fine grained.
0.20	Sand & Gravel with Silt	Dark Brown	<u>Fluvial deposits</u> Sand is very fine to fine grained. Gravel: Subangular to subrounded. $\phi$ prevailing $\leq 20$ mm.
0.40/0.60	Silty Sand with Gravel		<u>Fluvial deposits</u> Sand is very fine grained. Silt content is less than that in the upper layer. $\phi$ prevailing $\leq 30$ mm.
0.80	Silty Sand & Gravel		<u>Fluvial deposits</u> Sand is fine grained. Gravel: Subangular to subrounded $\phi$ max: 50mm, $\phi$ prevailing $\leq 20$ mm.
1.00	Sand & Gravel	Yellowish Brown	

Material Test Results

G	Grading Analysis (%)		LL (%)	Ip	Wn (%)	Wopt (%)	CBR-Value (%)	
	S	F					95%MDD	98%MDD
53	37	10	Non Plastic	Non Plastic	5.6	11.5	1.753	24

**G** Gravel content  
**S** Sand content  
**F** Particles finer than 0.075mm  
**LL** Liquid Limit  
**Ip** Plasticity index  
**Wn** National 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

SampleNo.:BCD-1      Coordinates N:47°41'570      E:108°10'105

Depth (m)	Type of Soil	Color	Description
0.20	Silty Sand	Dark Brown	With roots. Very silty. Sand is very fine grained.
0.40	Silty Sand	Dark Brown	Sand is very fine grained. Silt content is less than that in the upper layer. Trace of gravel.
0.45	Silty Sand	Brown	Sand is very fine to fine grained. With some fine subrounded quartz particles.
1.00	Silty Sand	Light Brown Grey	Sand is very fine grained. With very silty portions.

0.45  
Sampling  
1.00

Material Test Results

Grading Analysis (%)		LL	Ip	Wn	Wopt	MDD	CBR-Value (%)	
G	S	(%)		(%)	(%)	g/cm <sup>3</sup>	95%MDD	98%MDD
14	59	12	Non Plastic	4.8	14.1	1.83	-	19

**G** Gravel content      **Ip** Plasticity index  
**S** Sand content      **Wn** Natinal 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

Record of Test Pit for Bulk Soil Sampling

SampleNo.:BC 1A-2

Coordinates N:47°39'155

E:108°17'453

Depth (m)	Type of Soil	Color	Description
0.15	Silty Sand	Dark Brown	With roots. Sand is very fine grained.
0.30	Sand & Gravel with Silt	Dark Brown	With roots. Gravel: Subrounded to Subangular $\phi$ max: 80mm, $\phi$ prevailing $\leq$ 30mm.
			Fluvial deposits Sand is fine to coarse grained. $\phi$ max: 80mm. $\phi$ prevailing $\leq$ 40mm.
1.00	Sand & Gravel	Yellowish Brown to Brown	Moist throughout of the layer.



Material Test Results

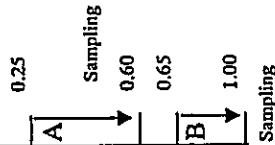
Grading Analysis (%)		LL (%)	Ip	Wn (%)	Wopt (%)	MDD g/cm <sup>3</sup>	CBR-Value (%)	
G	S	F	Non Plastic	Non Plastic	Non Plastic	1.855	95%MDD	98%MDD
52	37	15	Non Plastic	Non Plastic	4.4	4.6	-	14

**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 1A-1      Coordinates N: 47°41'53.4      E: 108°23'34.9

Depth (m)	Type of Soil	Color	Description
0.15	Silty Sand	Dark Brown	Very silty. With roots. Sand is very fine grained. Sand is very fine grained. With some roots.
0.35	Silty Sand	Dark Brown	Silt content is less than that in the layer. Sand is very fine grained.
0.65	Silty Sand	Greenish Brown	Material is same as the upper layer, but less silt content.
1.00	Sand with Gravel	Brown	Fluvial deposits Clean sand with gravel.



Material Test Results

Sample	Grading Analysis (%)		LL (%)	Ip	Wn (%)	Wopt (%)	MDD g/cm <sup>3</sup>	CBR-Value (%)	
	G	S						95%MDD	98%MDD
A	42	46	19	3	4.2	4.3	2.223	-	17
B	29	60	16	3	7.6	6	2.083	-	25

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

**Record of Test Pit for Bulk Soil Sampling**

Sample No.: BC 4A-5

Coordinates N: 47°41'736

E: 108°32'564

Depth (m)	Type of Soil	Color	Description
0.15	Silty Sand	Dark Brown	With roots. Sand s fine grained. Sand is fine grained.
0.20/0.30	Silty Sand	Dark Brown	Less silt content in comparison with the upper layer. Sand is fine grained.
0.40	Sand	Dark Brown to Brown	With some silt and trace of gravel with less than 50mm in diameter.
0.50	Sand	Brown	Sand is fine grained. With some gravel. Moist.
0.75	Sand & Gravel	Brown	With subangular gravel, $\phi$ max. 90mm, $\phi$ prevailing $\leq$ 40mm, Moist.
1.00	Sand & Gravel to Sand with Gravel	Yellowish Brown	Clean, Moist. Sand is fine grained. $\phi$ max: 150mm, $\phi$ prevailing $\leq$ 60mm.

Sampling

**Material Test Results**

Grading Analysis (%)		LL (%)	Ip	Wn (%)	Wopt (%)	MDD g/cm <sup>3</sup>	CBR-Value (%)	
G	S	F					95% MDD	98% MDD
25	26	8	Non Plastic	4.0	4.5	2.076	-	7

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

Record of Test Pit for Bulk Soil Sampling

Sample No.: BC 4A-4                      Coordinates N: 47°45'38.4                      E: 108°37'60.6

Depth (m)	Type of Soil	Color	Description
0.30	Silty Sand	Dark Brown	With roots. Sand is very fine grained. Sand is fine grained.
0.42	Silty Sand	Greyish Brown to Brown	With some roots up to this layer Less silt content in comparison with the upper layer.
0.80	Sand	Light Brown to Light Brownish Grey	Sand is fine grained. With some silt at top of this layer.
1.00	Sand	Brown	Sand is fine grained.

Material Test Results

Grading Analysis (%)		LL (%)	Ip	Wn (%)	Wopt (%)	MDD g/cm <sup>3</sup>	CBR-Value (%)	
G	S	F					95%MDD	98%MDD
10	72	18	24	2	4.6	1.932	-	10

**G** Gravel content                      **Ip** Plasticity index  
**S** Sand content                      **Wn** Natlional 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.:** -

**Coordinates N:**

**E:**

No. BC4A-4 + 7.6km along the existing trail

<b>Depth (m)</b>	<b>Type of Soil</b>	<b>Color</b>	<b>Description</b>
0.15	Sandy Silt	Dark Brown	With roots, very silty
0.50	Sandy Silt	Light Brownish Grey	Sand is very fine grained. Moist.

Record of Test Pit for Bulk Soil Sampling

Sample No.: BC 4A-3      Coordinates N: 47°48'34.3      E: 108°44'01.4

Depth (m)	Type of Soil	Color	Description
0.25	Silty Sand	Brown	Sand is very fine grained. With roots at top. Very silty.
0.70	Silty Sand	Brown	Sand is fine to coarse grained. Very silty. Occasionally with angular gravel, $\phi$ max. 50mm.
1.00	Sand & Gravel with Silt	Brown	Decomposed diorite Sand is fine to coarse grained. Gravel: Angular rock fragments. Max. size: 80mm, prevailing size $\leq$ 20mm.

Material Test Results

Grading Analysis (%)		LL (%)	Ip	Wn (%)	Wopt (%)	MDD g/cm <sup>3</sup>	CBR-Value (%)	
G	S	F					95%MDD	98%MDD
47	39	14	25	6	7.0	6.8	-	30

**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 4A-2

Coordinates N: 47° 47' 15.4

E: 108° 50' 18.1

Depth (m)	Type of Soil	Color	Description
0.15	Silty Sand	Dark Brown	With roots. Sand is very fine grained. Very silty.
0.30	Silty Sand	Dark Brown	Sand is very fine grained. Less silt content in comparison with the upper layer. Dry.
1.00	Silty Sand with Gravel	Light Greenish Brown	Sand is very fine to fine grained. Gravel: Angular diorite fragments. Max. size: 50mm, prevailing size ≤ 15mm.

Sampling

Material Test Results

Grading Analysis (%)		LL (%)	Ip	Wn (%)	Wopt (%)	MDD g/cm <sup>3</sup>	CBR-Value (%)	
G	S						95%MDD	98%MDD
29	36	29	5	4.9	5.4	2.199	-	10

**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.: Gully developed on the slope of Pass (UB side)

Depth (m)	Type of Soil	Color	Description
0.30	Sandy Silt to Silty Sand	Black	With roots at top. Sand is very fine grained. Silty sand is prevailing.
0.80	Silty Sand with Gravel to Silty Sand & Gravel	Yellowish Brown	Heterogeneous layer. Sand is very fine to medium grained, originated from decomposed diorite. Gravel content is variable from place to place. Gravel: diorite fragments. Prevailing size $\leq 50\text{mm}$ .

Record of Test Pit for Bulk Soil Sampling

Sample No.: BC 4A-1

Coordinates N: 47° 45' 149

E: 108° 57' 347

Depth (m)	Type of Soil	Color	Description
0.10	Silty Sand	Dark Brown	With roots. Sand is very fine grained. With some rock fragments.
0.30	Sand & Gravel with Silt	Dark Brown	Gravel consists of weathered brown coloured rock fragments. Max.size: 80mm, Prevailing size ≤40mm. <u>Decomposed diorite</u>
1.00	Sand & Gravel	Brown	Material is same as the upper layer. Max.size: 60mm, Prevailing size ≤40mm. With clayey portion at 1m.

0.30  
Sampling  
1.00

Material Test Results

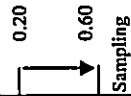
Grading Analysis (%)		LL (%)	Ip	Wn (%)	Wopt (%)	MDD g/cm <sup>3</sup>	CBR-Value (%)	
G	S	F					95%MDD	98%MDD
56	30	14	18	2	5	2.223	15	20

**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 4-1                      Coordinates N: 47° 45' 814                      E: 108° 51' 149

Depth (m)	Type of Soil	Color	Description
0.30	Silty Sand	Dark Grey	With roots. Sand is very fine grained. Trace of gravel.
0.60	Sand with Gravel	Brown to Yellowish Brown	Sand is fine grained. With angular granite fragments; Prevailing size ≤25mm, Silty at the top.
1.00	Sand & Gravel	Yellowish Brown	Sand is fine grained. Gravel: granite fragments. Occasionally with boulder Max. size: 180mm, Prevailing size ≤30mm.



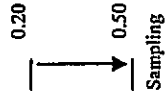
Record of Test Pit for Bulk Soil Sampling

Sample No.: BC 5-1

Coordinates N: 47°42'484

E: 109°03'335

Depth (m)	Type of Soil	Color	Description
0.20	Silty Sand	Dark Brown	Very silty. Sand is very fine grained. With roots.
0.50	Silty Sand & Gravel	Dark Brown to Yellowish Brown	Gravel: subangular to subrounded. $\phi$ max: 200mm, $\phi$ prevailing $\leq$ 30mm.
1.00	Sand with Gravel	Yellowish Brown	Sand is fine grained. Gravel: subangular to subrounded. $\phi$ max: 90mm, $\phi$ prevailing $\leq$ 30mm.



Material Test Results

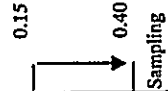
G	Grading Analysis (%)		LL (%)	Ip	Wn (%)	Wopt (%)	MDD g/cm <sup>3</sup>	CBR-Value (%)	
	S	F						95%MDD	98%MDD
20	41	39	32	14	5.1	7.8	2.127	9	11

**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 6-4      Coordinates N: 47°38'22.3      E: 109°09'45.2

Depth (m)	Type of Soil	Color	Description
0.30	Silty Sand	Dark Brown	Sand is very fine grained. With roots up to 15cm from the ground surface.
0.40	Silty Sand	Brownish Grey	Sand is fine to medium grained. With some fine gravel. With some roots.
0.55	Silty Sand & Gravel	Light Brown	Fluvial deposits With some roots up to 50cm, from the ground surface. Gravel: Subrounded ø max. size: 50mm, ø prevailing ≤10mm.
0.70	Sand with Gravel	Light Brown	Fluvial deposits ø max. size: 30mm, ø prevailing ≤10mm.
0.80	Sand	Light Brown	Fluvial deposits Sand is fine grained. With some gravel.
1.00	Sand	Light Brown	Material is same as the upper layer, but moisture content is higher.



Material Test Results

G	Grading Analysis (%)		LL (%)	Ip	Wn (%)	Wopt (%)	CBR-Value (%)		
	S	F					MDD g/cm <sup>3</sup>	95% MDD	98% MDD
23	42	35	21	1	10.4	7.6	2.126	-	4

**G** Gravel content      **Ip** Plasticity index  
**S** Sand content      **Wn** Naïtonal 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 6-3

Coordinates N: 47°35'06S

E: 109°15'28E

Depth (m)	Type of Soil	Color	Description
0.15	Silty Sand	Dark Brown	Sand is very fine grained. Very silty. With roots.
0.30	Silty Sand	Dark Brown	Sand is very fine to fine grained. Trace of roots.
0.50	Silty Sand	Dark Brown	Sand is fine to medium grained. Sand is derived from weathered granite. Trace of roots.
1.00	Sand with Gravel	Slightly Greenish Grey	Residual soil of granite rock. Sand is fine to coarse grained. With fine gravel size granite fragments throughout of the layer.

0.20

0.40

Sampling

Material Test Results

G	Grading Analysis (%)		LL (%)	Ip	Wn (%)	Wopt (%)	MDD g/cm <sup>3</sup>	CBR-Value (%)	
	S	F						95%MDD	98%MDD
10	43	47	28	6	9.2	9	2.119	-	19

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

Record of Test Pit for Bulk Soil Sampling

Coordinates N:47°32'793      E:109°22'787

Sample No.: BC 6-2

Depth (m)	Type of Soil	Color	Description
0.15	Silly Sand	Dark Brown	With roots. Sand is very fine grained. Trace of rock fragments, size ≤ 20mm.
0.50	Silly Sand	Dark Brown	Sand is very fine grained. Trace of rock fragments, size ≤ 40mm. With roots up to 65cm from the ground surface.
1.00	Silly Sand	Slightly Greenish Light Brown	Sand is very fine to fine grained. Less silt content in comparison with the upper layer.

Material Test Results

Grading Analysis (%)		LL (%)	Ip	Wn (%)	Wopt (%)	MDD g/cm <sup>3</sup>	CBR-Value (%)	
G	S	F					95%MDD	98%MDD
10	45	45	32	10	12.6	1.961	-	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

Record of Test Pit for Bulk Soil Sampling

Jargalkhaan Sum

Sample No.:BC 6-1

Coordinates N:47°28'961

E:109°29'967

Depth (m)	Type of Soil	Color	Description
0.30	Silty Sand	Dark Brown	With roots. Sand is very fine grained. With some angular gravel, size 1.5 to 20mm.
0.40	Silty Sand	Dark Brown	Material is same as the upper layer, but less gravel content.
0.80	Silty Sand	Light Grey to Light	Sand is very fine to fine grained. Trace of subangular to subrounded gravel. $\phi$ max: 10mm.
0.95	Silty Sand with Gravel	Brown Grey	Trace of organic fragments.
1.00	Clayey Silt with Sand	Light Grey	Sand is fine to coarse grained. $\phi$ max: 70mm, $\phi$ prevailing $\leq$ 25mm.
		Light Brown	



Material Test Results

Grading Analysis (%)		LL (%)	Ip	Wn (%)	Wopt (%)	MDD g/cm <sup>3</sup>	CBR-Value (%)	
G	S	F					95%MDD	98%MDD
19	56	25	8	8.8	6.1	2.05	-	9

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

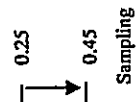




Record of Test Pit for Bulk Soil Sampling

Sample No.: BC 7-2                      Coordinates N: 47°27'24.4                      E: 109°41'32.8

Depth (m)	Type of Soil	Color	Description
0.20	Silty Sand with Gravel	Brown	With roots at top. Sand is fine grained.
0.35	Silty Sand	Light Brown	With rock fragments, 20 to 30mm in length. Sand is fine grained.
0.75	Sandy Silt	Light Grey	Very Silty.
1.05	Silt	Reddish Brown	Sand is very fine grained. Moist. Moist. Mottled white.



Material Test Results

G	Grading Analysis (%)		LL (%)	Ip	Wn (%)	Wopt (%)	MDD g/cm <sup>3</sup>	CBR-Value (%)	
	S	F						95%MDD	98%MDD
5	47	48	32	6	8.4	11.6	1.956	-	3

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

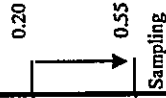
Record of Test Pit for Bulk Soil Sampling

Sample No.: BC 8-1

Coordinates N: 47°25'497

E: 109°51'133

Depth (m)	Type of Soil	Color	Description
0.20	Silty Sand	Brown	Sand is very fine grained. With roots (up to 45cm from the ground surface).
0.55	Silty Sand & Gravel	Light Grey	Gravel: Angular to subangular ø max: 150mm, ø prevailing ≤30mm. Origin of gravel: Slate, shale.
1.00	Silty Sand & Gravel	Slightly Greenish Light Grey	Material is same as the upper layer.



Material Test Results

Grading Analysis (%)		LL	Ip	Wn	Wopt	MDD	CBR-Value (%)	
G	S	(%)	(%)	(%)	(%)	g/cm <sup>3</sup>	95%MDD	98%MDD
52	32	37	19	3.4	7.6	2.157	-	21
	F							
	16							

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

Chandgana Steppe /7km/

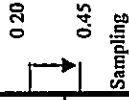
Record of Test Pit for Bulk Soil Sampling

Sample No.:BC 8-2

Coordinates N:47°25'136

E:109°57'586

Depth (m)	Type of Soil	Color	Description
0.40	Silty Sand	Dark Brown	With roots. Sand is very fine grained. Trace of fine gravel. Very silty.
1.00	Silty Sand & Gravel	Light Brownish Grey	Moist. Gravel: subangular ø prevailing size ≤15mm.



Material Test Results

Grading Analysis (%)		LL (%)	Ip	Wn (%)	Wopt (%)	MDD g/cm <sup>3</sup>	CBR-Value (%)			
G	S	F	29	35	7	5.9	9.5	2.085	95%MDD	98%MDD
32	39								5	13

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

Chandgana Steppe /20km/

Record of Test Pit for Bulk Soil Sampling

Sample No.:BC 9-3

Coordinates N:47°25'306

E:110°04'905

Depth (m)	Type of Soil	Color	Description
0.30	Silty Sand	Dark Grey	Sand is fine to medium grained. With many roots for the first 5cm. With some coarse sand particles, $\phi$ 1.0 to 2.0mm.
0.50	Sand	Light Brownish Grey	Sand is fine grained. With some silt.
1.50	Sand with Gravel	Brown	Sand mainly consists of fine grained particles. Gravel: $\phi$ prevailing $\leq$ 4mm.

0.3  
Sampling

0.5

Material Test Results

Grading Analysis (%)		LL (%)	Ip	Wn (%)	Wopt (%)	MDD g/cm <sup>3</sup>	CBR-Value (%)	
G	S						95%MDD	98%MDD
3	75	26	6	6.5	8.6	2.019	-	13

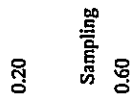
G Gravel content  
S Sand content  
F Particles finer than 0.075mm  
LL Liquid Limit

Ip Plasticity index  
Wn Natonal moisture content  
Wopt Optimum moisture content determined by Modified Proctor test  
MDD Mazimum dry density determined by Modified Proctor test

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, $\phi$ prevailing $\leq 30$ mm. With roots for the first 25cm.
1.00	Sand & Gravel	Light Grey	<u>Talus deposits</u> Gravel: Mainly consisting of angular gravel, $\phi$ max: 60mm, $\phi$ prevailing $\leq 50$ mm.



Material Test Results

Grading Analysis (%)		LL (%)	Ip	Wn (%)	Wopt (%)	MDD g/cm <sup>3</sup>	CBR-Value (%)	
G	S	F					95%MDD	98%MDD
17	62	21	6	1.2	5.5	2.063	14	41

**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

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. $\phi$ max:150mm, $\phi$ prevailing $\leq$ 40mm.
0.85	Sand with Gravel	Light Brown	$\phi$ max: 80mm, $\phi$ prevailing $<$ 25mm.
1.00	Sand & Gravel	Brown	Boulder ( $\phi$ 250mm) at 0.9m. With angular to subangular gravel. $\phi$ prevailing $\leq$ 20mm.



Material Test Results

Grading Analysis (%)		LL (%)	Ip	Wn (%)	Wopt (%)	MDD g/cm <sup>3</sup>	CBR-Value (%)	
G	S	F					95% MDD	98% MDD
42	46	12	4	2.4	7.4	2.026	21	30

**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 10-1                      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.



Material Test Results

G	Grading Analysis (%)		LL (%)	Ip	Wn (%)	Wopt (%)	MDD g/cm <sup>3</sup>	CBR-Value (%)	
	S	F						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** Naitional 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



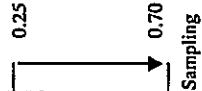
Record of Test Pit for Bulk Soil Sampling

Sample No.: BC 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, $\phi$ max=10mm, $\phi$ prevailing $\leq$ 5mm.
1.00	Silty Sand	Light Brown	Material is same as the upper layer, but has higher moisture content.



Material Test Results

Grading Analysis (%)		LL (%)	Ip	Wn (%)	Wopt (%)	MDD g/cm <sup>3</sup>	CBR-Value (%)	
G	S	F					95%MDD	98%MDD
25	48	27	28	6	9.5	2.085	4	5

**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

Material Conditions at Possible Borrow Pit

Sample No.:599

Coordinates N:47°42'99S

E:107°48'86E

Present Status: Existing Borrow Pit (In operation)

Weathered igneous rock

Sample No.:BP D-5

Coordinates N:47°42'20S

E:107°50'50E

Present Status: Existing Borrow Pit (In operation)

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

Material Test Results

G	Grading Analysis (%)		LL (%)	Ip	Wn (%)	Wopt (%)	MDD g/cm <sup>3</sup>	CBR-Value (%)	
	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 Max. size: =180mm, ø prevailing size ≤ 20mm
1.6	Sand & Gravel	Light Brown	Materials derived from weathered granitic rock

1.05  
1.6  
Sampling

**Material Test Results**

G	Grading Analysis (%)		LL (%)	Ip	Wn (%)	Wopt (%)	MDD g/cm <sup>3</sup>	CBR-Value (%)	
	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**

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

<b>G</b>	Gravel content	<b>Ip</b>	Plasticity index
<b>S</b>	Sand content	<b>Wn</b>	Natural moisture content
<b>F</b>	Particles finer than 0.075mm	<b>Wopt</b>	Optimum moisture content determined by Modified Proctor test
<b>LL</b>	Liquid Limit	<b>MDD</b>	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)

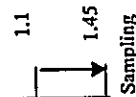
Abandoned borrow pit located beside the existing road.  
0-0.5 m Blak Sandy silt, 0.5-1.0m Light grey Sandy silt and 1.0-2.0m.  
Light grey very Silty Sand and gravel.

**Material Conditions at Possible Borrow Pit**

Sample No.:BP D-2      Coordinates N:47°42'454      E:108°07'173

**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



**Material Test Results**

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

<b>G</b>	Gravel content	<b>Ip</b>	Plasticity index
<b>S</b>	Sand content	<b>Wn</b>	Natural moisture content
<b>F</b>	Particles finer than 0.075mm	<b>Wopt</b>	Optimum moisture content determined by Modified Proctor test
<b>LL</b>	Liquid Limit	<b>MDD</b>	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 Trace of subangular graveles throughout of the layer.
0.75	Silty Sand with Gravel	Greyish Brown mottled White	Very silty. Gravel: Rock fragments and subangular gravel ømax.: 50mm, øprevailing ≤ 20mm
0.90	Silty Sand	Slightly Greenish & Greyish Brown	Sand is very fine grained. With little subanguer to Subrounded gravel. Prevailing < 20mm
1.40	Silty Sand with Gravel	Slightly Greyish Light Brown	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 (%)	CBR-Value (%)	
					MDD g/cm <sup>3</sup>	95% MDD
G 50	23	6	5.4	10.4	2.167	18
S 30						29
F 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 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
			Sand is very fine grained. Silt content is less than that in the upper Layer. Moist
1.10	Silty Sand	Light Grey to Light Brown	Trace of subangular to subrounded gravels throughout of the layer, $\phi$ prevailing $\leq$ 30mm

0.70  
Sampling  
1.10

**Material Test Results**

G	Grading Analysis (%)		LL (%)	Ip	Wn (%)	Wopt (%)	MDD g/cm <sup>3</sup>	CBR-Value (%)	
	S	F						95% MDD	98% MDD
33	56	11	20	6	5.8	3.5	2.182	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 Yellowish Brown	With roots at top. Sand is very fine grained. Thickness is variable (20 to 30cm). Sand is very fine to fine grained. Very silty. Trace of fine gravel. Thickness is variable.
0.50	Silty Sand	Yellowish Brown	Gravel: Subangular $\phi$ prevailing $\leq$ 20mm, Thickness is variable (30 to 50cm). With sand with gravel portions.
1.00	Silty Sand	Yellowish Brown	Moist
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**

Coordinates N:47°41'023      E:108°24'347

Sample No.:BP 1A-1

**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 ≤ 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.
			Decomposed granite? Sand is very fine grained. Occasionally with granite fragments with less than 50mm in max. dimension.
1.45	Silty Sand	Yellowish Brown	

0.75  
Sampling  
1.45

**Material Test Results**

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

**G** Gravel content      **Ip** Plasticity index  
**S** Sand content      **W<sub>n</sub>** Natural moisture content  
**F** Particles finer than 0.075mm      **W<sub>opt</sub>** 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 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.
	Sand with Gravel to Sand & Gravel		Talus deposits underlain by very weathered granite. Thickness is more than 0.5m.
1.00/1.50	Weathered Diorite	Light Brown	With many fissures. Friable to sand and gravel. Max. size: 200mm.

0.8

1.5

Sampling sand & Gravel

**Material Test Results**

G	Grading Analysis (%)		LL (%)	Ip	Wn (%)	Wopt (%)	MDD g/cm <sup>3</sup>	CBR-Value (%)	
	S	F						95% MDD	98% MDD
47	30	23	17	2	5.1	5	2.067	15	25

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.: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	Silly 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	Talus deposits 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	Talus deposits Sand is fine to medium grained. With gravel size rock fragments. max. size: 100mm (1 piece) Prevailing size ≤ 60mm

1.00  
1.50  
Sampling

**Material Test Results**

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

**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-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 ≤ 50mm With boulder size of rock fragments at 0.3m.

0.50

Sampling

1.40

**Material Test Results**

G	Grading Analysis (%)		LL (%)	Ip	Wn (%)	Wopt (%)	CBR-Value (%)	
	S	F					95% MDD	98%MDD
38	49	13	Non Plastic	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**

**Wn**

**Wopt**

**MDD**

Plasticity index

Natural moisture content

Optimum moisture content determined by Modified Proctor test

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**

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

**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.
0.50	Silty Sand	Dark Brown	With rock fragments. Very silty. 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.

**Material Test Results**

G	Grading Analysis (%)		LL (%)	Ip	Wn (%)	Wopt (%)	MDD g/cm <sup>3</sup>	CBR-Value (%)	
	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  
 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.: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.

∅ Max. size: 250mm.

∅ 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 $\leq$ 30mm
0.30/0.50	Sand with Gravel	Light Brown	Sand is fine grained. Gravel consists of subangular and angular gravel. $\phi$ max. size: 150mm (few), $\phi$ prevailing $\leq$ 30mm
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 < 50mm

0.90  
sampling  
1.00

**Material Test Results**

G	Grading Analysis (%)		LL (%)	Ip	Wn (%)	Wopt (%)	CBR-Value (%)	
	S	F					95% MDD	98% MDD
56	34	10	25	10	2.1	5.4	-	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 Tailins 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 <sup>3</sup>	CBR-Value (%)	
	S	F						95% MDD	98% MDD
31	63	6	Non Plastic	Non Plastic	2	2.9	2.081	9	13

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

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

<b>G</b>	Gravel content	<b>Ip</b>	Plasticity index
<b>S</b>	Sand content	<b>Wn</b>	Natural moisture content
<b>F</b>	Particles finer than 0.075mm	<b>Wopt</b>	Optimum moisture content determined by Modified Proctor test
<b>LL</b>	Liquid Limit	<b>MDD</b>	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  
Not 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	Talus deposits Material consists of diorite fragments. max. size: 200mm, prevailing size ≤ 50mm

0.30  
1.50  
Sampling

Material Test Results

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

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.: 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.

**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

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

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

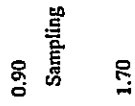
Sample No.:BP 6-1

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. Sand is very fine grained.
0.50	Gravelly Silty Sand	Dark Brown to Brown	Material is same as the upper layer.
0.85	Silty Sand with Gravel	Light Grey	Sand is fine grained. Gravel: rock fragments, prevailing size ≤10mm
0.90	Sandy Silt	White	With rock fragments.
1.70	Silty Sand & Gravel	Slightly Greenish Grey	Gravel: rock fragments Prevailitn sizes ≤ 30mm.
	Gravel		Rock fragmetns, max.size: 150mm. Prevailitn sizes ≤ 60mm.



Material Test Results

G	Grading Analysis (%)		LL (%)	Ip	Wn (%)	Wopt (%)	CBR-value (%)	
	S	F					95%MDD	98%MDD
43	30	27	20	3	2.3	4	-	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. Prevaillin size≤30mm, Thickness is variable.
0.85	Silty Sand with Gravel	Grey	Talus deposits to <u>Weathered Shale</u> . Material consists of flaky shale fragmentns. max. size: 250mm, prevaillign size≤75mm.

0.5  
Sampling  
2.00

Material Test Results

G	Grading Analysis (%)		LL (%)	Ip	Wn (%)	Wopt (%)	MDD g/cm <sup>3</sup>	CBR-value (%)	
	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.

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 preddominant 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 fragmetus. 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.
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.

0.60  
Sampling  
1.00

**Material Test Results**

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

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.: 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.
2.50	Silty Sand with Gravel	Light Grey	<u>Talus deposits</u> Gravel consists of rock fragments max. size: 150mm, prevallign size≤70mm.
	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, prevailign size≤50mm.
0.30/0.40	Silly Sand & Gravel	Dark Brown	Sand is very fine grained. With gravel size rock fragments.
0.80	Silly 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, prevailign size≤60mm.

0.50  
0.80  
Sampling

**Material Test Results**

G	Grading Analysis (%)		LL (%)	Ip	Wn (%)	Wopt (%)	MDD g/cm <sup>3</sup>	CBR-value (%)	
	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°26'55Z

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°47'594

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 fragmetns, size≤50mm
1.00	Silly Sand with Gravel	Brown to Dark Brown	With rock fragmetns. 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

G	Grading Analysis (%)		LL (%)	Ip	Wn (%)	Wopt (%)	MDD g/cm <sup>3</sup>	CBR-value (%)	
	S	F						95%MDD	98%MDD
71	16	13	19	4	2.2	9.2	1.759	-	10

**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.: 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

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

G	Grading Analysis (%)		LL (%)	Ip	Wn (%)	Wopt (%)	MDD g/cm <sup>3</sup>	CBR-value (%)	
	S	F						95%MDD	98%MDD
21	71	8	Non Plastic	Non Plastic	2.2	5.6	1.957	-	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°23'306

E:110°15'286

Present Status: Existing Borrow Pit (not used)

Decomposed granitic rock (course 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 deposit as No. BP9-2



Material Conditions at Possible Borrow Pit

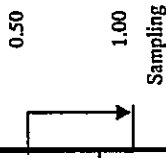
Sample No.: BP9-1

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	<u>Terace deporites</u> Gravel: Subrounded ø max. 150mm, ø Prevailing <60mm. Gravel contents is variable.
1.30	Silty Sand & Gravel		<u>Terace deporites</u> Gravel: Angular and subrounded. ø max. 150mm, Gravel consist is variable.
	Sand & Gravel		<u>Terace deporites</u> Gravel contents is variable.



Material Test Results

G	Grading Analysis (%)		LL (%)	Ip	Wn (%)	Wopt (%)	MDD g/cm <sup>3</sup>	CBR-value (%)	
	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	<u>Fluvial deposits</u> Gravel: Subrounded to subangular. ø max. 80mm, With very silty portions.
1.80	Silty Sand & Gravel	Brown	<u>Fluvial deposits</u> Gravel: Subrounded ø max. 80mm, ø Prevailing ≤30mm

0.90  
Sampling  
1.80

Material Test Results

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

**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.: 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. Weathered diorite
0.80	Silty Sand & Gravel	Light Brown	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.

**Material Test Results**

G	Grading Analysis (%)		LL (%)	Ip	Wn (%)	Wopt (%)	CBR-value (%)		
	S	F					MDD g/cm <sup>3</sup>	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	<u>Residual soil of diorite</u>
	Silty Sand to Sand & Gravel	Slightly Greenish Grey	<u>Residual soil to weathered diorite</u> 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. Very silty.
0.50	Silty Sand with Gravel	Light Gray	Sand is fine grained. With subangular to subrounded gravel. $\phi$ max: 150mm, $\phi$ prevailing $\leq$ 30mm
1.50	Clayey Sand & Gravel	Brown	Gravel mainly consists of subrounded gravel. $\phi$ max: 60mm, $\phi$ prevailing $\leq$ 30mm

Material Conditions at Possible Borrow Pit

Sample No.: Undurkhaan 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 brown, 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:  $\phi$  Max. 250mm,  $\phi$  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

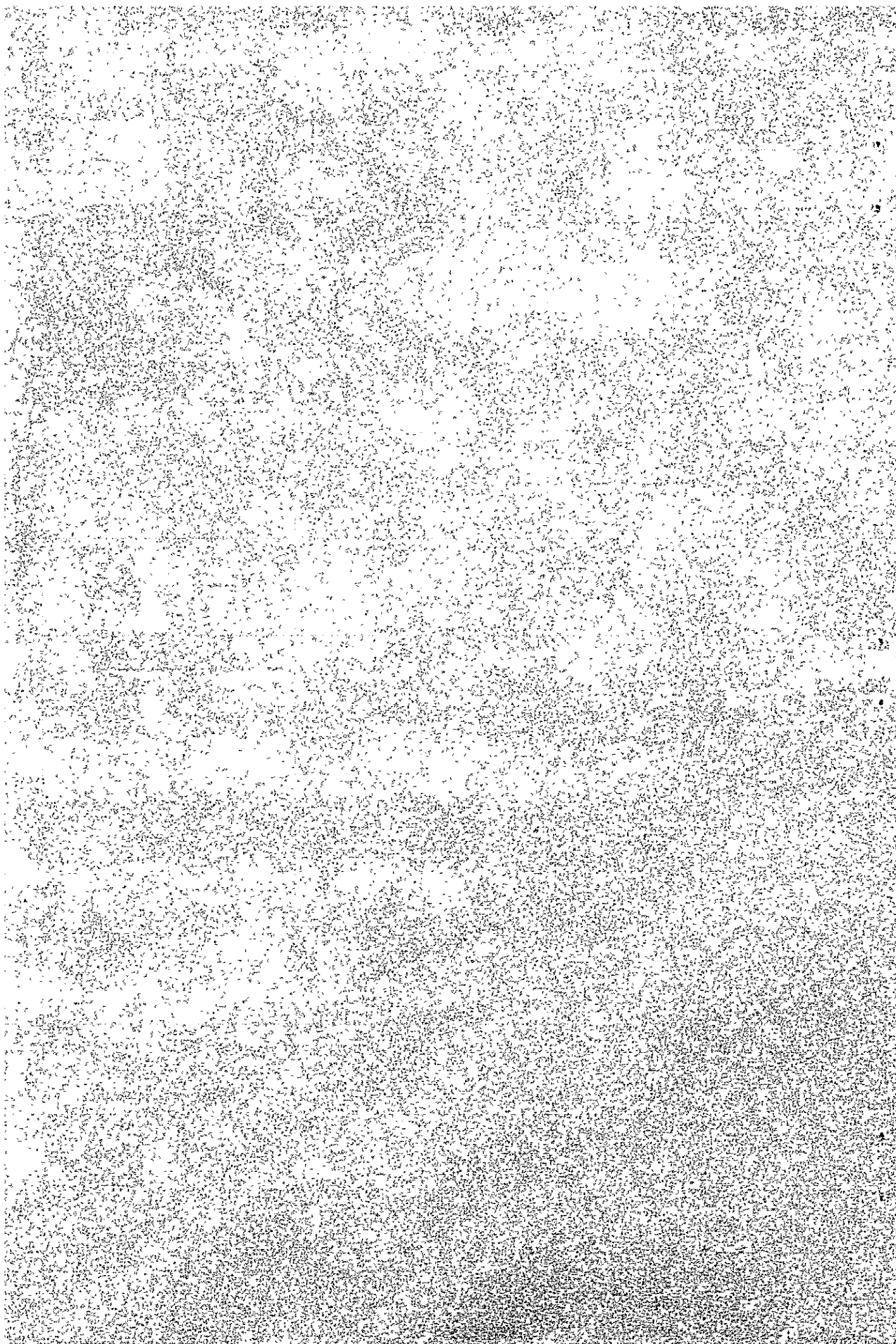
E:108°51'229

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

### 13. 環境





1.3. 環境

調査において行われた調査結果を次ページより添付する。

項目	内容	備考	備考	備考
1	...	...	...	...
2	...	...	...	...
3	...	...	...	...
4	...	...	...	...
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項目	内容	備考	備考	備考	備考	備考	備考	備考	備考
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項目	内容	備考	備考	備考	備考	備考	備考	備考	備考
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3	...	...	...	...	...	...	...	...	...
4	...	...	...	...	...	...	...	...	...

項目	内容	備考	備考	備考	備考	備考	備考	備考	備考	備考	備考	備考	備考	備考	備考	備考	備考	備考	備考
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5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
6	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
7	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
8	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
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10	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

**Table 13-1 Beginning, end and continue days of all seasons in Erdene - Undurkhaan**

<b>Undurkhaan</b>	Winter	Spring	Summer	Autumn
Begin	9.XI	14.III	14.V	15.IX
End	14.III	14.V	15.IX	9.XI
Day	125	61	124	55
<b>Erdene</b>	Winter	Spring	Summer	Autumn
Begin	27.X	27.III	18.V	6.IX
End	27.III	18.V	6.IX	27.X
Day	151	52	111	51
<b>Kherlen</b>	Winter	Spring	Summer	Autumn
Begin	1.XI	28.III	15.V	17.IX
End	28.III	15.V	17.IX	1.XI
Day	147	48	125	45

**Table 13-2 Sun illumination and time of the month and year**

Station	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Sum
Ulaanbaatar	172	202	268	276	300	277	261	246	251	223	175	146	2797
Undurkhaan	203	205	267	269	309	295	277	268	256	235	197	175	2960
Choibalsan	196	213	272	273	305	308	299	283	259	240	202	179	3029

**Table 13-3 Sun illumination and time of the twenty four hours**

Station	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Average
Ulaanbaatar	5.5	7.2	8.6	9.2	9.7	9.2	8.4	7.9	8.4	7.2	5.8	4.7	7.7
Undurkhaan	6.5	7.3	8.6	9.0	10.0	9.8	8.9	8.6	8.5	7.8	6.6	5.6	8.1
Choibalsan	6.3	7.6	8.8	9.1	9.8	10.2	9.6	9.1	8.6	7.7	6.7	5.8	8.4

**Table 13-4 Sun ray sum in horizontal surface , mJ/m<sup>2</sup>**

Latitude	Month												Year
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	
43 <sup>0</sup>	228.5	332.6	495.0	591.7	694.8	681.6	587.2	575.0	514.0	401.2	261.4	191.4	5554.4
44 <sup>0</sup>	224.4	324.1	487.2	587.5	685.8	670.8	599.7	554.1	504.2	386.1	253.7	204.8	5482.4
45 <sup>0</sup>	216.8	305.8	484.2	571.3	685.6	617.9	567.0	547.7	488.4	371.9	234.6	185.5	5276.7
46 <sup>0</sup>	197.7	272.0	437.6	519.0	682.1	621.8	548.6	501.9	434.1	339.7	224.1	171.5	4950.1
47 <sup>0</sup>	176.4	263.6	426.6	505.2	647.4	620.9	547.2	507.3	431.2	313.4	184.3	138.2	4761.7
48 <sup>0</sup>	162.7	268.8	428.8	500.5	631.6	620.3	547.0	505.3	409.1	312.6	187.3	137.3	4711.3
49 <sup>0</sup>	151.8	241.5	403.8	494.8	600.4	601.4	540.7	504.9	397.6	288.8	174.0	138.3	4538.0
50 <sup>0</sup>	144.1	234.7	394.6	493.3	582.6	589.3	536.1	458.6	358.2	265.4	160.3	110.3	4327.5

**Table 13-5 Sun straight ray in horizontal surface, mJ/m<sup>2</sup>**

Latitude	Month												Year
	I	II	III	IV	Y	VI	VII	VIII	IX	X	XI	XII	
43 <sup>o</sup>	156.0	213.0	314.1	371.5	463.5	410.6	372.8	371.5	354.2	281.3	173.7	130.3	3612.5
44 <sup>o</sup>	161.5	215.1	308.7	356.1	423.4	425.3	369.1	356.0	361.0	283.8	167.0	126.6	3553.6
45 <sup>o</sup>	145.8	207.7	308.4	373.5	424.6	434.9	400.1	378.0	369.7	261.5	158.8	119.7	3582.7
46 <sup>o</sup>	111.3	162.0	261.1	363.1	424.0	428.1	397.8	367.2	312.1	212.2	128.3	96.7	3263.9
47 <sup>o</sup>	88.0	157.0	247.0	308.7	400.3	362.7	309.1	305.1	300.4	190.0	97.3	64.8	2830.4
48 <sup>o</sup>	87.0	156.5	257.2	294.7	366.6	358.3	304.7	290.3	256.4	190.2	92.7	64.4	2719.0
49 <sup>o</sup>	73.1	135.0	236.1	275.4	322.5	356.6	293.0	248.0	225.4	158.7	83.4	52.8	2460.0
50 <sup>o</sup>	64.8	155.5	183.3	187.5	263.0	230.9	212.9	207.5	173.4	136.9	80.0	51.3	1947.0

**Table 13-6 Sun dispersion ray, mJ/m<sup>2</sup>**

Latitude	Month												Year
	I	II	III	IV	Y	VI	VII	VIII	IX	X	XI	XII	
43 <sup>o</sup>	72.8	96.5	152.1	192.5	212.0	221.2	212.5	178.8	130.6	97.3	70.4	64.0	1700.7
44 <sup>o</sup>	89.2	113.7	186.5	238.2	275.4	257.8	237.4	205.7	155.8	121.6	95.8	79.5	2056.6
45 <sup>o</sup>	86.1	106.6	186.4	238.1	272.8	251.6	263.3	214.8	157.9	118.7	82.8	72.1	2051.2
46 <sup>o</sup>	86.0	111.0	176.7	221.8	279.5	272.7	252.8	214.7	163.3	126.5	106.8	74.8	2086.6
47 <sup>o</sup>	88.4	115.9	179.6	224.8	247.1	253.5	250.1	202.2	150.7	113.5	87.0	73.4	1986.2
48 <sup>o</sup>	80.4	104.2	174.9	228.4	268.2	255.6	253.7	216.0	154.5	119.2	85.5	72.8	2013.4
49 <sup>o</sup>	79.2	107.2	167.4	217.0	268.0	250.9	237.1	209.7	159.8	128.7	90.6	79.2	1994.8
50 <sup>o</sup>	79.2	106.3	167.0	214.0	254.0	223.7	227.3	197.6	148.4	113.2	77.4	64.2	1872.3

**Table 13-7 Sun reflection ray, mJ/m<sup>2</sup>**

Latitude	Month												Year
	I	II	III	IV	Y	VI	VII	VIII	IX	X	XI	XII	
43 <sup>o</sup>	61.7	68.9	100.1	101.1	114.3	110.8	99.1	97.8	83.6	74.6	56.9	50.3	1019.2
44 <sup>o</sup>	102.9	105.1	130.4	132.7	147.8	132.7	119.6	111.2	104.1	98.0	91.0	81.8	1357.3
45 <sup>o</sup>	106.0	127.1	168.8	175.1	205.2	192.8	179.4	162.9	151.2	124.3	101.0	96.0	1789.8
46 <sup>o</sup>	89.3	107.7	137.1	139.0	145.9	135.3	119.3	117.9	102.5	94.7	89.8	79.9	1358.4
47 <sup>o</sup>	89.6	110.2	134.2	140.0	131.7	104.5	97.1	93.0	78.2	72.1	65.4	63.4	1179.4
48 <sup>o</sup>	85.5	99.6	110.1	114.3	127.5	120.4	109.6	101.3	85.9	81.2	74.0	71.5	1180.9
49 <sup>o</sup>	75.5	96.8	188.8	106.8	119.8	105.2	95.7	89.2	75.2	81.0	67.1	57.4	1158.5
50 <sup>o</sup>	67.1	74.9	94.4	110.6	132.8	113.2	101.6	93.3	80.1	67.9	51.2	44.4	1031.5

**Table 13-8 Sun absorbed ray, mJ/m<sup>2</sup>**

Latitude	Month												Year
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	
43 <sup>o</sup>	167.7	231.3	362.0	469.4	574.2	538.2	496.6	456.8	405.1	306.5	187.3	144.6	4339.7
44 <sup>o</sup>	148.0	221.5	360.4	462.4	549.3	544.9	490.1	449.2	402.8	304.4	167.9	121.7	4222.6
45 <sup>o</sup>	138.0	178.7	319.0	414.8	494.2	485.5	466.7	417.5	354.5	284.3	137.0	89.2	3779.4
46 <sup>o</sup>	113.7	169.4	295.6	375.6	467.1	471.9	437.1	389.3	335.7	244.7	131.3	90.6	3522.0
47 <sup>o</sup>	106.8	151.4	305.3	371.5	431.3	452.1	417.0	395.9	285.9	227.0	118.9	73.9	3337.0
48 <sup>o</sup>	95.3	159.8	330.3	404.2	512.8	485.7	462.0	395.8	325.6	231.8	113.8	65.2	3582.3
49 <sup>o</sup>	91.4	155.0	307.3	392.5	472.9	490.7	459.8	412.2	319.7	221.0	115.8	83.8	3522.1
50 <sup>o</sup>	81.6	125.7	238.8	300.7	390.3	376.8	348.3	318.8	259.9	191.9	99.9	70.2	2802.9

**Table 13-9 Reflection of sun ray, %**

Latitude	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
44 <sup>o</sup>	41	32	26	22	21	19	19	19	20	24	36	39
45 <sup>o</sup>	50	42	35	30	30	28	28	28	29	33	43	52
46 <sup>o</sup>	42	37	30	25	23	21	21	22	22	27	40	44
47 <sup>o</sup>	38	38	31	25	21	19	19	20	21	30	39	42
48 <sup>o</sup>	51	38	26	22	20	19	19	20	21	26	39	52
49 <sup>o</sup>	47	43	34	25	23	21	21	21	22	29	41	44
50 <sup>o</sup>	37	33	23	22	20	19	18	18	19	23	30	36

**Table 13-10 Balance of sun ray, mJ/m<sup>2</sup>**

Latitude	Month												Year
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	
43 <sup>o</sup>	-4.0	67.2	150.2	263.6	315.7	344.8	330.3	285.6	214.2	110.6	14.3	-8.7	2083.8
44 <sup>o</sup>	-39.8	27.4	111.4	210.9	273.7	305.2	281.1	242.8	172.1	61.7	-31.7	-53.2	1561.6
45 <sup>o</sup>	-27.4	33.2	96.3	184.0	247.9	269.5	274.5	219.7	150.3	58.1	-21.9	-41.5	1442.7
46 <sup>o</sup>	-36.4	17.0	110.7	191.6	253.3	287.3	270.3	221.5	148.2	66.2	-11.5	-42.4	1475.8
47 <sup>o</sup>	-3.9	45.1	156.7	205.2	275.0	311.9	295.4	266.9	172.4	99.7	5.8	-1.8	1828.4
48 <sup>o</sup>	-29.7	33.4	134.6	217.3	295.9	311.7	302.5	255.9	163.1	64.3	-17.6	-40.7	1690.7
49 <sup>o</sup>	-49.5	24.5	99.0	184.2	260.9	300.5	297.2	255.2	150.5	48.7	-22.6	-62.7	1485.9
50 <sup>o</sup>	-26.8	3.7	67.8	141.9	209.6	230.6	215.4	181.7	119.1	34.0	-42.1	-41.1	1093.8

Table 13-11 Plant Diversity list (Erdene –Undurkhaan)

Name of plant	Region Mongol-Daguur	Region medium Khalkh	Rare plants	Endemic plants
1.LYCOPODIOPHYTA				
1.Selaginellaceae Mett.				
Selaginella bocalis (Kaulf.) Rupr.	+	+		
S.sanguinolenta (L.) Spring	+	+		
2.EQUISETOPHYTA				
2.Equisetaceae Rich.				
Equisetum arvense L.	+	+		
E.fluviatile L.	+			
E.hyemale L.	+			
E.palustre L.	+			
E.pratense L.	+			
E.sylvaticum L.	+			
3.PTERIDOPHYTA				
3.Sinopteridaceae Koidz.				
Aleuritopteris argentea (S.G.Gmel.) Fec.	+	+		
4.Polypodiaceae Bercht. Et Presl.				
Polypodium sibiricum Sipl.	+	+		
5.Aspladiaceae Mett. ex Frank.	+			
Dryopteris fragrans (L.) Schott.				
6.Athyriaceae Alst.				
Athyrium filix-femina (L.) Roth.	+			
Cystopteris fragilis(L.)Bernh.	+	+		
7.Woodsiaceae (Diels.) Herter.				
Woodsia acuminata (Fomin) Sipl.	+	+		
W.silvensis (L.) R.Br.	+	+		
8.Thepteridaceae Pichii-Sermolii				
Phegopteris connectilis (Michx.) Watt.	+			
4.PINOPHYTA				
9.Pinaceae Lindl.				
Larix dahurica x L.sibirica	+			
L.sibirica Ledeb.	+	+		
10.Cupressaceae Bartl.				
Juniperus pseudosabina Fisch. et Mey.	+	+		
J.sabina L.	+	+		
11.Ephedraceae Dumort.				
Ephedra equisetina Bunge		+		
E.Fedtsvhenkoae Pauls.	+			
E.monosperma C.A.Mey.	+	+		
E.sinica Starf.	+	+		
5.MAGNOLIOPHYTA				
12.Typhaceae Juss.				
Typha Laxmannii Lepech.	+	+		
13.Sparganiaceae Rrudolfii Sparganium stloniferum	+			
Bush-Ham ex Juz.				
14.Potamogetonaceae Dumort.				
Potamogeton gramicus L.	+	+		
P.pectinatus L.	+	+		
P.perfoliatus L.	+	+		
P.praelongus Wulf.	+	+		
P.pusillus L.	+	+		
P.vaginatius Turcz.	+	+		
15.Zannichelliaceae Dumort.				
Zannichellia pedunculata Reich.	+	+		
16.Juncaginaceae Rich.				
Triglochin maritimum L.	+	+		
T.palustre L.	+	+		
17.Poaceae Barnh.				
Spodoipogon sibiricus Trin.	+			
Panicum miliaceumL.	+			
Setaria viridis (L.) P. B.	+	+		

Phalaroides arundinacea L.	+			
Hierochloa glabra Trin.	+			
H.odorata (L.) P. B.	+			
Achnatherum splendens (Trin.) Nevski	+	+		
Stipa baicalensis Roshev.	+	+		
S.brevifolia Griseb.		+		
S.glaresosa P.Smirn.		+		
S.gobica Roshev.	+	+		+
S.grandis P.Smirn.	+	+		
S.Klemenzi Roshev.	+	+		+
S.Krylovii Roshev.	+	+		
S.sibirica (L.) Lam.	+	+		
Phleum phleoides (L.) Karst.	+	+		
Alopecurus aequalis Sobol.	+	+		
A.arundinaceus Poir.	+	+		
A.brachystachyus Bieb.	+	+		
A.pratensis L.	+	+		
Agrostis gigantea Roth.	+			
A.mongolica Roshev.	+	+		
A.stolonifera L.	+	+		
A.trinii Turcz.	+	+		
Calamagrostis epigeios (L.) Roth.	+	+		
C.macrolepis Litv.	+	+		
C.macilentia (Griseb.) Litv.	+			
C.neglecta (Ehrh.) Gaerth., Mey et Schrenb.	+	+		
C.purpurea (Trin.) Trin.	+			
C.sajanensis Malyshev.	+			
Deschampsia caespitosa (L.) Beauv.	+			
D. Sukatschewii (Popl.) Roshev.	+			
Trisetum sibiricum Rupr.	+	+		
Helictotrichon dahuricum (Kom.) Kitag.	+			
H.pubescens (Huds.) Pilg.	+			
H.Schellianum (Hack.) Kitag.	+	+		
Avena fatua L.	+			
A.sativa L.	+			
Chloris virgata Sw.		+		
Tripogon chinensis (Franch.) Hack.	+	+		
Beckmannia syzigachne (Steud.) Fern.	+	+		
Enneapogon borealis (Griseb.) Honda.		+		
Phragmites communis Trin.	+	+		
Cleistogenes kitagawae Honda.	+	+		
C.songarica (Roshev.) Ohwi		+		
C.squarrosa (Trin.) Keng.	+	+		
Eragrostis minor Host.	+	+		
E.pilosa (L.) Beauv.	+	+		
Koeleria altaica (Domin.) Kryl.	+	+		
K.cristata (L.) Pers.	+	+		
K.mukdenensis domin.	+	+		
Catabrosa aquatica (L.) P.B.	+	+		
Melica virgata Turcz. ex Trin	+	+		
Poa argunensis Roshev .	+	+		
P.attenuata Trin.	+	+		
P.botryoides Trin.	+	+		
P.nemoralis L.	+	+		
P.ochotensis Trin.	+			
P.palustris Trin.	+			
P.pratensis L.	+	+		
P.sibirica Roshev.	+			
P.subfastigiata Trin.	+	+		
Scolochloa festucacea (Willd.) Link.	+			
Glyceria triflora (Korsh.) Kom.	+	+		
Puccinellia macranthera (Krecz.) Norlindh.	+	+		
P.tenuiflora (Griseb.) Scribn. Et Merr.	+	+		
Festuca dahurica (St.-Yves.) Krecz. Et Bobr.	+	+		
F.lenensis Drob.	+	+		
F.ovina L.	+			

<i>F.rubra</i> L.	+	+		
<i>F.sibirica</i> Hack. ex Boiss.	+	+		
<i>F.valesiaca</i> Gaud.	+			
<i>F.valesiaca</i> ssp. <i>hycophylla</i> (St.-Yves.) Tzvel.	+			
<i>Bromus inermis</i> Leys.	+	+		
<i>B.Korotkyi</i> Drob.	+	+		
<i>B.pumpellianus</i> Scribn.	+	+		
<i>Agropyron cristatum</i> (L.) Beauv.	+	+		
<i>A.desertorum</i> (Fisch. ex Link.) Schult		+		
<i>A.fragile</i> (Roth.) Candargy		+		
<i>A.krylovianum</i> Schischk.	+			
<i>A.michnoi</i> Roshev.	+	+		
<i>A.pectinatum</i> (Bieb.) Beauv.	+	+		
<i>Hordeum Roshevitzii</i> Bowden.	+	+		
<i>H.brevisubulatum</i> (Trin.) Link.	+	+		
<i>H.turkestanicum</i> Nevskii		+		
<i>Leymus chinensis</i> (Trin.) Tzvel.	+	+		
<i>L.poboanus</i> (Claus.) Pilg.		+		
<i>L.racemosus</i> (Lam.) Tzvel.		+		
<i>L.secalinus</i> (Georgi.) Tzvel.	+	+		
<i>Elymus aegopodoides</i> (Drob.) Worosch.	+			
<i>E.brachypodioides</i> (Nevskj) Peschkova	+			
<i>Elymus confusus</i> (Roshev.) Tzvel.	+	+		
<i>E.dahuricus</i> Turcz. ex Griseb.	+	+		
<i>E.excelsum</i> Turcz. ex Griseb.	+			
<i>E.gmelinii</i> (Ledeb.) Tzvel.	+	+		
<i>E.transbaicalensis</i> (Nevskj) Tzvel.	+			
<i>E.sibiricus</i> L.	+	+		
18. Cyperaceae Juss.				
<i>Cyperus fuscus</i> L.		+		
<i>Eriophorum polystachyon</i> L.	+			
<i>E. polystachyon</i> ssp. <i>komarovii</i> (V.Vassil) Novosellova.	+	+		
<i>Baeothryon pumilum</i> (Vahl.) A. et D.Love	+	+		
<i>Scirpus Hippolitii</i> V.Krecz.	+	+		
<i>S.orientalis</i> Ohwi	+			
<i>S.radicans</i> Schuhr.	+			
<i>Bolboschoenus planiculmis</i> (Fr. Schmidt.) Egor.	+	+		
<i>Blysmus rufus</i> (Huds.) Link.	+	+		
<i>B.sinocompressus</i> Tang. Et Wang.	+	+		
<i>Dichstylis micheliana</i> (L.) Ness.	+			
<i>Eleocharis acicularis</i> (L.) Roem. et Schult.	+			
<i>E. acicularis</i> ssp. <i>yokoscens</i> (Franch. Et Savat.) Egor.	+			
<i>E.meridionalis</i> Steud.	+	+		
<i>E.palustris</i> (L.) Roem et Schult.	+	+		
<i>Kobresia filifolia</i> (Turcz.) Clarke.	+	+		
<i>Carex appendiculata</i> (Trautv. et Mey.) Kuk	+	+		
<i>C. argunensis</i> Turcz. ex Trev.	+			
<i>C. aspratillis</i> V.Krecz.	+			
<i>C. atherodes</i> Spreng.	+	+		
<i>C. coriophora</i> Fisch. et Mey.	+	+		
<i>C. delicata</i> Clarke	+	+		
<i>C. dichroa</i> (Freyn.) V.Krecz.	+			
<i>C. duriuscula</i> C.A.Mey.	+	+		
<i>C. enervis</i> C.A.Mey.	+	+		
<i>C. Korshinskyi</i> Kom.	+	+		
<i>C. lithophila</i> Turcz.	+			
<i>C. media</i> R.Br.	+			
<i>C. microglochis</i> Wahlenb.	+	+		
<i>C. orbicularis</i> Boott.	+	+		
<i>C. pediformis</i> C.A.Mey	+	+		
<i>C. relaxa</i> V.Krecz.	+	+		
<i>C. reptabunda</i> (Trautv.) V.Krecz.	+	+		
<i>C. rhynchophysa</i> C.A.Mey	+			
<i>C. rostrata</i> Stokes		+		



C. sabulosa Turcz. ex Kunth.	+	+		
C. sajanensis V.Krecz.	+	+		
C. schmidtii Meinsh.	+			
C. Sedakovii C.A.Mey. ex Meinsh.	+			
C. Gotoi Ohwi	+			
C. selengensis Ivanova	+			
C. stenophylloides V.Krecz.		+		
C. supermascula V.Krecz.	+			
C. tomentosa L.	+	+		
C. vesicata Meinsh.	+	+		
19.Araceae Juss.				
Acorus calamus L.	+			
20.Lemnaceae S.F.Gray.				
Lemna minor L.	+	+		
21.Juncaceae Juss.				
Juncus alpino-articulatus Chaix.	+	+		
J. bufonius L.	+	+		
J. bufonius ssp. ambiguus (Guss.) Schinz. Et Thell.	+			
J. bufonius ssp. turkestanicus (V.Krecz. et Gontsch.) V.Novikov	+			
J. compressus Jacq.	+	+		
J. Gerardii Loiss.	+	+		
J. leucochlamys Zing. Ex V.Krecz	+			
J. orchonicus V.Novikov	+	+		
J. salsuginosus Turcz. ex E.Mey.	+	+		
22.Melanthiaceae				
Veratrum lobelianum Bernh.	+			
V. nigrum L.	+			
23.Hemerocallidaceae				
Hemerocallis minor Mill.	+	+		
H. lilio-asphodelus L.	+			
24.Alliaceae J.Agardh. Allium altaicum Pall.		+		
A. anisopodium Ledeb.	+	+		
A. bidentatum Fisch. ex Prokh.	+	+		
A. buriaticum Frisen.	+	+		
A. dauricum Frisen.	+			
A. eduardii Stearn.	+	+		
A. leucocephalum Turcz. ex Ledeb.	+	+		
A. lineare L.	+			
A. maximowiczii Regel	+			
A. mongolicum Turcz. ex Regel.	+	+		+
A. polyrhizum Turcz. ex Regel.	+	+		
A. prostratum Trev.	+	+		
A. ramosum L.	+	+		
A. senescens L.	+	+		
A. splendens Willd. Ex Schult. Et Schult. Fit.	+	+		
A. stellerianum Willd.	+			
A. strictum Schrad.	+	+		
A. tenuissimum L.	+	+		
A. vodopjanovae Frisen.	+	+		
Calloscordum nerinifolium Herb.	+			
25.Liliaceae Juss.				
Gagea pauciflora Turcz. ex Ledeb.	+			
Lilium dauricum Ker-Gawl.	+			
L. martagon L.	+			
L. pumilum Delite	+	+		
26.Asparagaceae				
Asparagus dahuricus Fisch	+	+		
27.Convallariaceae				
Polygonatum sibiricum Delaroché	+	+		
28.Iridaceae Juss.				
Iris Bungei Maxim.		+		+
I. dichotoma Pall.	+	+		
I. humilis Georgi	+	+		
I. lavtea Pall.	+	+		
I. Potaninii Maxim.	+	+		

<i>I.tenuifolia</i> Pall.		+		
<i>I.tigridia</i> Bge.	+	+		
29.Orchdaceae Juss.				
<i>Herminium monorchis</i> (L.) R.Br.	+	+		
<i>Coeloglossum viride</i> (L.) C.Hartm.	+			
<i>Orchis salina</i> Turcz. ex Lindl.= <i>Dactylorhiza salina</i> (Turcz. ex Lindl.) Soo	+	+		
30.Salicaceae Mirb.				
<i>Salix ledebouriana</i> Trautv.	+			
<i>S.microstachya</i> Turcz. ex Trautv.	+	+		
<i>S.pseudopentandra</i> (B.Flod.) B.Flod.	+	+		
<i>S.rosmarinifolia</i> L.	+			
<i>S.taraikensis</i> Kimura	+			
31.Betulaceae S.F.Gray				
<i>Betula microphylla</i> Bge.	+	+		
32.Ulmaceae Mirb.				
<i>Ulmus pumila</i> L.	+	+		
<i>U.japonica</i> (Rehd.) Sarg.		+		
33.Cannabaceae Endl.				
<i>Cannabis ruderalis</i> Janisch.	+	+		
34.Urticaceae Juss.				
<i>Urtica angustifolia</i> Fisch. ex Hornem.	+			
<i>U.cannabina</i> L.	+	+		
35.Santalaceae R.Br.				
<i>Thesium longifolium</i> Turcz. ex Ledeb.	+			
<i>Th. refractum</i> C.A.Mey.	+	+		
<i>Th. repens</i> Ledeb.	+			
<i>Th. saxatile</i> Turcz. ex A.DC.	+	+		
36.Polygonaceae Juss.				
<i>Rheum undulatum</i> L.	+			
<i>Rumex acetosella</i> L.	+	+		
<i>R.aquaticus</i> L.	+	+		
<i>R.Gmelini</i> Turcz. ex Ledeb.	+	+		
<i>R.Marschallianus</i> Reich.		+		
<i>R.stenophyllus</i> Ledeb.	+			
<i>R.thyrsoflorus</i> Fingerh.	+	+		
<i>Atraphaxis pungens</i> (M.B.) Jaub. Et Spach.	+	+		
<i>Polygonum aviculare</i> L.	+	+		
<i>P.cognatum</i> Meissn.	+	+		
<i>P.neglectum</i> Bess.	+			
<i>Fagopyrum esculentum</i> Moench.	+	+		
<i>F. tataricum</i> (L.) Gaertn.	+			
<i>Fallopia convolvulus</i> (L.) A.Love	+	+		
<i>Knorringia sibirica</i> (Laxm.) Tzvel.	+	+		
<i>Persicaria Amphibia</i> (L.) S.F.Gray.	+	+		
<i>P.Hydropiper</i> (L.) Spach.	+	+		
<i>P.lapathifolia</i> (L.) S.F.Gray.	+	+		
<i>P.sungareensis</i> Kitag.	+	+		
<i>Aconogon alpinum</i> (L.) Schur.	+	+		
<i>A.angustifolium</i> (L.) Hara	+	+		
<i>A.chaneyi</i> (B.Fedtsch. ex Schward.) Hara		+		
<i>A.divaricatum</i> (L.) Nakai ex Mori.	+	+		
<i>A. seriseum</i> (Pall. Ex Georgii) Hara		+		
<i>A.valerii</i> (A.Skvorts.) Sojak.	+	+		
<i>Bistorta alopecuroides</i> (Turcz. ex Meissn.) Kom.	+	+		
<i>Bistorta vivipara</i> (L.) S.F.Gray.	+	+		
37.Chenopodiaceae Vent.				
<i>Chenopodium acuminatum</i> Willd.	+	+		
<i>Ch. album</i> L.	+	+		
<i>Ch. aristatum</i> L.	+	+		
<i>Ch. glaucum</i> L.	+	+		
<i>Ch. hybridum</i> L.	+	+		
<i>Ch. prostratum</i> Bunge	+	+		
<i>Atriplex fera</i> (L.) Bunge	+	+		
<i>A. laevis</i> C.A.Mey.	+	+		
<i>A. sibirica</i> L.	+	+		
<i>Krascheninikovia ceratoides</i> (L.) Guildenst.	+	+		

Axyris prostrata L.	+	+		
A. amaranthoides L.	+	+		
A. hybrida L.	+	+		
Bassia dasyphylla (Fisch. et Mey.) Ktze.	+	+		
Kochia densiflora Turcz. ex Moq.				
K. prostrata (L.) Schrad.	+	+		
K. scoparia (L.) Schrad.	+	+		
Corispermum chinganicum Iljin.	+	+		
C. declinatum Steph.	+	+		
C. mongolicum Iljin.		+		
Suaeda corniculata (C.A.Mey.) Bunge	+	+		
Salsola collina Pall.	+	+		
S. tragus L.	+	+		
Micropeplis arachnoides (Moq.) Bunge	+	+		
38. Caryophyllaceae Juss.				
Stellaria cherleriae (Fisch. ex Ser.) Williams.	+	+		
S. crassifolia Fhrh.	+	+		
S. dahurica Willd.	+			
S. dichotoma L.	+	+		
S. irrigua Bunge	+			
S. media (L.) Cyr.	+			
S. petraea Bunge	+			
Cerastium arvense L.	+	+		
C. davuricum Fisch. ex Spreng	+			
Minuartia arctica (Siev. Ex Ser.) Aschers et Graebn.	+			
M. laricina (L.) Mattf.	+			
M. regeliana (Trautv.) Mattf.		+		
Arenaria capillaris Poir.	+	+		
A. juncea M.B.	+			
A. meyeri Fenzl.	+			
Moechringia lateriflora (L.) Fenzl.	+			
Silene jenssensensis Willd.	+	+		
S. repens Patr.	+	+		
Lychnis sibirica L.	+			
Melandrium apricum (Turcz.)	+	+		
M. mongolicum (Maxim.) Grub.	+		+	
Gypsophila davurica Turcz.	+	+		
G. desertorum (Bge.) Fenzl.	+	+		+
G. paniculata L.	+			
G. Patrini Ser.	+			
Dianthus superbus L.	+	+		
D. versicolor Fisch ex Link.	+	+		
39. Ranunculaceae Juss.				
Caltha membranacea (Turcz.) Schipz.	+			
C. natans Pall. Ex Georgi	+			
C. palustris L.	+			
Trollius asiaticus L.	+			
T. ledebouri Reichb.	+			
Leptopyrum fumarioides (L.) Reichb.	+	+		
Aquilegia viridiflora Pall.	+	+		
Delphinium triste Fisch.	+			
D. cheilanthum Fisch.	+	+		
D. dissectum Huth.	+	+		
D. grandiflorum L.	+			
Aconitum ambiguum Reich.	+			
A. baicalense Turcz. ex Rapaics.	+			
A. barbatum Pers.	+			
A. glandulosum Rapaics.	+			
A. septentrionale Koelle	+	+		
A. turczaninowii Worosch.	+			
Anemone crinita Juz.	+			
Pulsatilla ambigua (Turcz.) Juz.	+			
P. bungeana C.A.Mey.	+	+		
P. flavescens (Zucc.) Juz.	+			
P. multifida (G.Pritz.) Juz.	+			

P. Turczaninovii Kryl. Et Serg.	+	+		
Halerpester salsuginosa (Pall. Ex Serg.) Greene	+	+		
H. sarmentosa (Adans.) Kom.	+	+		
Ranunculus Gmelinii DC.	+			
R. japonicus Thunb.	+			
R. longicaulis var. pulchellus (C.A.Mey.) Gubanov	+	+		
R. natans C.A.Mey.	+	+		
R. pedatifidus Smith.	+			
R. propinquus C.A.Mey.	+	+		
R. repens L.	+	+		
R. scleratus L.	+	+		
Thalictrum petaloideum L.	+			
Th. simplex L.	+	+		
Th. squarrosum Steph. Ex Willd.	+	+		
40. Menispermaceae Juss.				
Menispermum dauricum DC.	+			
41. Papaveraceae Juss.				
Papaver nudicaule L.	+	+		
P. rubro-aurantiacum (DC.) Fisch ex Steud.	+	+		
Chiazospermum erectum L.	+	+		
Ch. lactiflorum Kar. et Kir.	+	+		
42. Cruciferae Juss.				
Brassica campestris L.	+			
B. juncea (L.) Czern.	+			
Lepidium amplexicaule Willd		+		
L. cordatum Willd.		+		
L. densiflorum Schrad.	+	+		
L. latifolium L.	+	+		
Isatis costata C.A.Mey.	+	+		
I. oblongata DC.	+	+		
Thlaspi arvense L.	+			
Alyssum lenense Adans.	+	+		
A. obovatum (C.A.Mey.) Turcz.	+	+		
Pilotrichum canescens C.A.Mey.	+	+		
P. tenuifolium (Steph.) C.A.Mey.	+	+		
Draba nemorosa L.	+	+		
Cardamine pratensis L.	+			
Arabis hirsuta (L.) Scop.	+			
A. pendula L.	+			
Rorippa islandica (Oed.) Borb.	+			
Dontostemon integrifolius (L.) C.A.Mey	+	+		
Dimorphostemon pectinatus (DC.) V. Golubk.	+	+		
Clausia aprica (Steph.) Korn.-Tr.	+			
Erysimum flavum (Georgi) Bobr.	+	+		
E. canescens Roth.	+	+		
E. cheiranthoides L.	+	+		
Sisimbrium polymorphum (Murr.) Roth.	+	+		
S. heteromallum C.A.Mey.	+	+		
Thellungiella salsuginea (Pall.) O.E.Schutz.		+		
Camelina sativa (L.) Crantz.	+			
43. Crassulaceae DC.				
Orostachis fimbriata (Turcz.) Berger.	+	+		
O. malocophylla (Pall.) Fisch.	+	+		
O. spinosa (L.) C.A.Mey.	+	+		
O. thyrsoflora Fisch.	+	+		
44. Parnassiaceae				
Parnassia palustris L.	+	+		
45. Grossulariaceae				
Ribes diacantha Pall.	+			
46. Rosaceae Juss.				
Spiraea aquilegifolia Pall.	+	+		
S. pubescens Turcz.	+			
S. flexuosa Fisch. ex Camb.	+	+		
S. hyperisifolia L.	+			
S. media Franz. Schmidt.	+			
S. sericea Turcz.	+	+		
Cotoneaster melanocarpus Fisch ex Blytt.	+	+		

<i>C. mongolicus</i> Pojark.	+	+		+
<i>Dasiphora fruticosa</i> (L.) Rydb.	+	+		
<i>D. parvifolia</i> (Fisch.) Juz.	+	+		
<i>Comarum palustre</i> L.	+			
<i>Potentilla acaulis</i> L.	+	+		
<i>P. acervata</i> Sojak.	+	+		
<i>P. anserina</i> L.	+	+		
<i>P. bifurca</i> L.	+	+		
<i>P. conferta</i> Bunge	+	+		
<i>P. leucophylla</i> Pall.	+	+		
<i>P. longifolia</i> Willd. Ex Schlecht.	+	+		
<i>P. multifida</i> L.	+	+		
<i>P. norvegica</i> L.	+			
<i>P. pensylvanica</i> L.	+	+		
<i>P. sericea</i> L.	+	+		
<i>P. supina</i> L.	+	+		
<i>P. tanacetifolia</i> Willd. Ex Schlecht.	+	+		
<i>P. verticillaris</i> Steph.	+	+		
<i>P. virgata</i> Lehm.	+	+		
<i>Sibbaldianthe adpressa</i> (Bunge) Juz.	+	+		
<i>Chamaerhodes altaica</i> Pall.	+	+		
<i>Ch. erecta</i> (L.) Bunge	+	+		
<i>Agrimonia pilosa</i> Ledeb.	+			
<i>Sanguisorba officinalis</i> L.	+	+		
<i>Rosa acicularis</i> Lindl.	+	+		
<i>Amygdalus pedunculata</i> Pall	+	+		
47. Leguminosae Juss.				
<i>Thermopsis dahurica</i> Czefr.	+	+		
<i>Trigonella coerulea</i> (Desr.) Ser.	+			
<i>Medicago falcata</i> L.	+	+		
<i>M. lupulina</i> L.	+	+		
<i>M. ruthenica</i> (L.) Trautv.	+	+		
<i>M. sativa</i> L.	+			
<i>Melilotus albus</i> Medic.	+	+		
<i>M. dentatus</i> (Waldst. Et Kit.) Pers.	+	+		
<i>M. suaveolens</i> Ledeb.	+	+		
<i>Trifolium eximium</i> Steph. Ex DC.	+	+		
<i>T. lupinester</i> L.	+	+		
<i>Caragana leucophloea</i> Pojark.	+	+		
<i>C. microphylla</i> (Pall.) Lam.	+	+		
<i>C. pygmaea</i> (L.) DC.	+	+		
<i>Gueldenstaedtia verna</i> (Georgi) boriss.	+			
<i>Astragalus adsurgens</i> Pall.	+	+		
<i>A. brevisfolius</i> Ledeb.	+	+		+
<i>A. galactites</i> Pall.	+	+		+
<i>A. inopinatus</i> Boriss.	+	+		
<i>A. laguroides</i> Pall.	+	+		
<i>A. emliilotoides</i> Pall	+	+		
<i>A. miniatus</i> Bge.	+	+		
<i>A. mongholicus</i> Bunge	+	+		
<i>A. pseudochorinensis</i> Ulzji.	+		+	
<i>A. puberulus</i> Ledeb.	+			
<i>A. rytidocarpus</i> ledeb.	+			
<i>A. scaberrimus</i> Bunge	+	+		
<i>A. suffruticosus</i> DC.	+	+		
<i>A. tenuis</i> Turcz.	+	+		
<i>A. uliginosus</i> L.	+	+		
<i>A. versicolor</i> Pall.	+	+		
<i>A. viridiflavus</i> Ulzji.	+		+	
<i>Oxytropis ambigua</i> (Pall.) DC.	+			
<i>O. ampullata</i> (Pall.) Pers.		+		
<i>O. baicalia</i> (Pall.) Pers.	+			
<i>O. caespitosa</i> (Pall.) Pers.	+	+		+
<i>O. coerulea</i> (Pall.) DC.	+			
<i>O. deflexa</i> (Pall.) DC.	+			
<i>O. filiformis</i> DC.	+	+		+

<i>O. glabra</i> (Lam.) DC.	+	+		
<i>O. gracillima</i> Bunge	+	+		+
<i>O. grandiflora</i> (Pall.) DC.	+			
<i>O. klementzii</i> Ulzji.	+	+	+	
<i>O. kossinskyi</i> B.Fedtsch. et Basil.	+	+		+
<i>O. lanata</i> (Pall.) DC.	+	+		+
<i>O. lasiopoda</i> Bunge	+	+		+
<i>O. leptophylla</i> (Pall.) DC.	+	+		
<i>O. mixotriche</i> Bunge	+	+		
<i>O. myriophylla</i> (Pall.) DC.	+	+		
<i>O. nitens</i> Turcz.	+	+		+
<i>O. oxycephala</i> (Pall.) DC.	+	+		
<i>O. prostrata</i> (Pall.) DC.	+	+		+
<i>O. pseudoglandulosa</i> Gontsch. Ex Grub.	+	+	+	
<i>O. reverdattoi</i> Jurtz.	+			+
<i>O. salina</i> Vass.	+	+		+
<i>O. selengensis</i> Bunge	+	+		+
<i>O. squamulosa</i> DC.	+	+		
<i>O. strobilacea</i> Bunge	+			
<i>O. turczaninovii</i> Jurtz.	+			+
<i>O. viridiflava</i> Kom.	+	+	+	
<i>Hedysarum fruticosum</i> Pall.	+	+		
<i>H. dahuricum</i> Turcz.	+	+		
<i>H. ferganense</i> Korsh.	+	+		
<i>Onobrychis sibirica</i> Sirj.	+	+		
<i>Lespedeza dahurica</i> (Laxm.) Schindl.	+	+		
<i>L. juncea</i> (L.fil.) Pers.	+	+		
<i>Vicia amoena</i> Fisch.	+	+		
<i>Vicia costata</i> Ledeb	+	+		
<i>V. cracca</i> L.	+	+		
<i>V. megalotropis</i> Ledeb	+	+		
<i>V. multicaulis</i> Ledeb.	+	+		
<i>V. unijuga</i> A.Br.	+	+		
<i>V. Venosa</i> (Willd. Ex Link ) Maxim.	+	+		
<i>V. geminiflora</i> Trautv.	+			
<i>Lathyrus humilis</i> (Ser.) Spreng.	+	+		
<i>L. palustris</i> L. ssp. pilosus (Cham.) Hulten.	+	+		
<i>L. pratensis</i> L.	+			
48. Geraniaceae Juss.				
<i>Geranium pratense</i> L.	+			
<i>Geranium pratense</i> ssp. transbaicalicum (Serg.) Gubanov	+			
<i>G. pseudosibiricum</i> J.Mayer	+			
<i>G. sibiricum</i> L.	+	+		
<i>G. wlssovianum</i> Fisch. ex Link.	+			
<i>Erodium stephanianum</i> Willd.	+	+		
49. Linaceae S.F.Gray				
<i>Linum sibiricum</i> DC.	+	+		
50. Rutaceae Juss.	+	+		
<i>Haplophyllum dauricum</i> (L.) G.Don				
51. Polygalaceae R.Br.				
<i>Polygala hybrida</i> DC.	+			
<i>P. tenuifolia</i> Willd.	+	+		
52. Euphorbiaceae Juss.				
<i>Euphorbia discolor</i> Ledeb.	+	+		
<i>E. esula</i> L.	+			
<i>E. fischeriana</i> Steud.	+			
<i>E. humifusa</i> Willd.	+	+		
53. Rhamnaceae R.Br.				
<i>Rhamnus erythroxylon</i> Pall.		+		
54. Malvaceae Juss				
<i>Malva neglecta</i> Wallr.	+			
<i>M. verticillata</i> L.	+	+		
55. Tamaricaceae Link.				
<i>Myricaria longifolia</i> (Willd.) Ehrenb.	+			
56. Violaceae Batsch.				
<i>Viola dissecta</i> Ledeb.	+			

57.Thymeliaceae Juss.				
Diartron linifolium Turcz.	+			
Stellera chamaejasme L.	+			
58.Onagraceae Juss.				
Epilobium palustre L.	+	+		
Chamenerion angustifolium (L.) Scop.	+	+		
59.Haloragaceae R.Br.				
Myriophyllum spicatum L.	+	+		
M. verticillatum L.	+	+		
60.Hippuridaceae Link. Hippuris vulgaris L.	+	+		
61.Umbelliferae Juss.				
Sphallerocarpus gracilis (Bess. Ex Trev.) K.-Pol.	+	+		
Pleurospermum uralense Hoffm.	+	+		
Bupleurum bicaule Helm.	+	+		
B. scorzonifolium Willd.	+	+		
Cicuta virosa L.	+	+		
Carum buriaticum Turcz.	+	+		
C. carvi L.	+	+		
Sium suave Walt.	+			
Cnidium dahuricum (Jacq.) Turcz. ex Fisch. et Mey.	+	+		
Conioselinum tataricum Hoffm.	+			
Angelica dahurica (Fisch. ex Hoffm.) Benth. Et Hook. Fil. Ex Franch. Et Savat	+			
A. tenuifolia (Pall. Ex Spreng) Pimenov	+	+		
Phlojodicarpus sibiricus (Steph.) K.-Pol.	+	+		
Saposhnikovia divaricata (Turcz.) Schischk.	+			
Peucedanum vaginatum Ledeb	+			
P. salinum Pall. Ex Spreng.	+			
P. hystrix Bunge	+	+		
Heracleum dissectum Ldb.	+			
Kadenia salina (Turcz.) Lavrova et V.Tichomirov	+	+		
Kitagawia baicalensis (Redow. Ex Willd.) Pimenov	+	+		
62.Primulaceae Vent. Primula farinosa L.	+			
P. nutans Georgi	+			
Androsace incana Lam.	+	+		
A. lactiflora Pall.	+			
A. maxima L. ssp. Turczaninowii (Freyn.) Fed.	+	+		
A. septentrionalis L.	+	+		
Trientalis europaea L.	+			
Glaux maritima L.	+	+		
63.Plumbaginaceae Juss.				
Goniolimon speciosum (L.) Boiss.	+	+		
Limonium aureum (L.) Hill.	+	+		
L. flexuosum (L.) O.Kuntze	+	+		
64.Gentianaceae Juss.				
Gentiana dahurica Fisch.	+			
G. decumbens L.fil.	+	+		
G. leucomelaena	+	+		
G. macrophylla Pall.	+			
G. nutans Bunge	+			
G. squarrosa Ledeb.	+	+		
Lomatogonium rotatum (L.) Fries.	+			
Anagellidium dichotomum (L.) Griseb.	+			
65.Menyanthaceae Dum.				
Nymphoides peltatum (S.G.Gmel.) Ktze.	+	+		
66.Asclepiadaceae R.Br.				
Vinceoxicum sibiricum (L.) Desne	+	+		
67.Convulvulaceae Juss.				
Convolvulus ammannii Desr.	+	+		
C. chinensis Ker.-Gawl.	+	+		
68.Cuscutaceae Dum.				
Cuscuta chinensis Lam.	+			
C. europaea L.	+			
C. monogyna Vahl.	+	+		
69.Polemoniaceae Juss.				

Polemonium racemosum (Rgl.) Kitam.	+			
70.Boraginaceae Juss.				
Myosotis caespitosa S.F.Schult.	+			
M. sylvatica (Ehrh.) Hoffm.	+			
Lappula consanguinea (fisch. et Mey.) Curke.	+			
L. intermedia (Ldb.) M.Pop.	+	+		
L. myosotis Moench.	+	+		
Amblynotus rupestris (Pall.) M.Pop. ex Serg.	+	+		
Anoplocoryum compressum (Turcz.) Ldb.	+			
71.Berbenaceae Jaume.				
Caryopteris mongolica Bge.	+	+		+
72.Labiatae Juss.				
Amethystea coerulea L.	+	+		
Scutellaria baicalensis Georgi	+	+		
S. galericulata L.	+			
S. grandiflora Sims.	+			
S. scordifolia Fisch. ex Schrank.	+	+		
Lagopsis supina (Steph.) Ik.-Gal.	+			
Lophanthus chinensis (Raf.) Benth.	+	+		
Schizonepeta multifida (L.) Briq.	+	+		
Dracocephalum foetidum Bge	+	+		
D. fruticosum Steph. Ex Willd.	+	+		+
D. junatovii A.Budantz.	+		+	
D. nutans L.	+			
D. origanoides Steph. Ex Willd.	+	+		
D. Ruyschiana L.	+			
Phlomis tuberosa L.	+	+		
Galeopsis bifida Boenn.	+			
Lamium album L.	+			
Leonurus deminutus V.Krecz.	+	+		
L. mongolicus V.Krecz. et Kuprain	+	+	+	
L. sibiricus L.	+	+		
Panzeria lanata (L.) Bge.	+	+		
Thymus baicalensis Serg.	+			
Th. dahuricus Serg.	+			
Th. gobicus Tscherneva	+	+	+	
Th. michaelis R.Kam. et A.Budantz.	+	+		
Mentha arvensis L.	+	+		
73.Solanaceae Juss.				
Physochlaina physaloides (L.) G.Don.	+	+		
Hyoscyamus niger L.	+	+		
74.Scrophulariaceae Juss.				
Linaria buriatica Turcz.	+	+		
L. acutiloba Fisch. ex Reichb.	+	+		
Scrophularia incisa Weinm.	+	+		
Veronica anagallis-aquatica	+	+		
V. daurica Stev.	+	+		
V. incana L.	+	+		
V. linarifolia Pall. Ex Link.	+	+		
V. longifolia L.	+			
V. pinnata L.	+			
V. spuria L.	+			
Veronicastrum sibiricum (L.) Pennel.	+			
Castilleja pallida (L.) Spreng.	+	+		
Euphrasia tatarica fisch. ex Spreng.	+	+		
Odontites rubra (Baumb.) Pers.	+	+		
Pedicularis achilleifolia Steph.	+	+		
P. flava Pall.	+	+		+
P. karoi Freyn.	+	+		
P. labrodorica Wirsing	+			
P. myriophylla Pall.	+	+		
P. resupinata L.	+	+		
P. rubens Steph.	+			
P. sceptrum-carolinum L.	+			
P. spicata Pall.	+			
P. striata Pall.	+	+		



<i>P. uliginosa</i> Bunge	+			
<i>P. venusta</i> Schang. Ex Bge.	+	+		
<i>P. verticillata</i> L.	+			
<i>Cymbaria dagurica</i> L.	+	+		
75. Orobanchaceae Vent.				
<i>Orobanche coerulescens</i> Steph.	+	+		
76. Lentibulariaceae Rich.				
<i>Utricularia vulgaris</i> L.	+	+		
77. Plantaginaceae Juss.				
<i>Plantago depressa</i> Schiecht.	+	+		
<i>P. major</i> L.	+	+		
<i>P. salsa</i> Pall.	+	+		
78. Rubiaceae Juss. <i>Galium boreale</i> L.	+			
<i>G. verum</i> L.	+	+		
79. Valerianaceae Batsch.				
<i>Patrinia rupestris</i> (Pall.) Dufur.	+			
<i>P. scabiosifolia</i> Fisch. ex Link	+			
<i>P. sibirica</i> (L.) Juss.	+			
<i>V. alternifolia</i> Ledeb.	+			
80. Dipsacaceae Juss.				
<i>Scabiosa comosa</i> Fisch. ex Roem. Et Schult.	+	+		
81. Campanulaceae Juss.				
<i>Campanula glomerata</i> L.	+			
<i>Adenophora coronifolia</i> Fisch.	+			
<i>A. crispata</i> (Korsh.) Kitag.	+			
<i>Adenophora Gmelinii</i> (Spreng.) Fisch.	+			
<i>Adenophora stenanthina</i> (Ledeb.) Kitag.	+	+		
82. Asteraceae Dumort. <i>Solidago dahurica</i> Kitag.	+			
<i>Heteropappus altaicus</i> (Willd.) Novopokr.	+	+		
<i>H. biennis</i> (Ledeb.) Tamamsch. Ex Grub.	+	+		
<i>H. hispidus</i> (Thunb.) Less.	+	+		
<i>Aster alpinus</i> L.	+	+		
<i>Arctogeron gramineum</i> (L.) DC.	+	+		
<i>Galatella dahurica</i> DC.	+			
<i>Erigeron lonchophyllus</i> Hook	+			
<i>Leontopodium conglobatum</i> (Turcz.) Hand.-Mazz.	+	+		
<i>L. leontopodioides</i> (Willd.) Beauverd.	+	+		
<i>Inula britannica</i> L.	+	+		
<i>Bidens tripartita</i> L.	+			
<i>Achillea alpina</i> L.	+	+		
<i>A. acuminata</i> (Ldb.) Sch. Bip.	+			
<i>A. asiatica</i> Serg.	+			
<i>Chrysanthemum Zawadskii</i> Herb.	+			
<i>Filifolium sibiricum</i> (L.) Kitam.	+	+		
<i>Artemisia Adamsii</i> Bess.	+	+		
<i>A. anchifolia</i> Web. Ex Stechm.	+	+		
<i>A. annua</i> L.	+	+		
<i>A. argyi</i> Levl. Et Vaniot.	+	+		
<i>A. ayrata</i> Kom.	+	+		
<i>A. bargusinesis</i> Spreng.	+			
<i>A. borealis</i> Pall.	+			
<i>A. brachyloba</i> Franch.	+	+		
<i>A. caespitosa</i> Ledeb.	+	+		+
<i>A. capillaris</i> Thunb.	+	+		
<i>A. commutata</i> Bess.	+	+		
<i>A. depauperata</i> Krasch.	+	+		
<i>A. desertorum</i> Spreng.	+			
<i>A. dolosa</i> Krasch.	+	+		
<i>A. dracunculus</i> L.	+	+		
<i>A. Freyniana</i> (Pamp.) Krasch	+	+		
<i>A. frigida</i> Willd.	+	+		
<i>A. glauca</i> Pall. Ex Willd.	+			
<i>A. Gmelinii</i> Web. Ex Stechm.	+	+		
<i>A. halodendron</i> Turcz.	+	+		
<i>A. integrifolia</i> L.	+	+		
<i>A. klementzae</i> Krasch. Ex Leonova	+	+		
<i>A. laciniata</i> Willd.	+	+		

<i>A. latifolia</i> Ledeb.	+			
<i>A. leucophylla</i> (Bess.) Turcz. ex Clarke.	+	+		
<i>A. macilenta</i> (Maxim.) Krasch	+			
<i>A. macrocephala</i> Jacq. Ex Bess.	+	+		
<i>A. mandschurica</i> (Kom.) Kom	+	+		
<i>A. mongolica</i> (Bess.) Fisch. ex Nakai	+	+		
<i>A. mongolorum</i> ssp. <i>gobica</i> Krasch.	+	+	+	
<i>A. monostachya</i> Bunge ex Maxim.	+	+		
<i>A. oxycephala</i> Kitag.	+	+		
<i>A. palustris</i> L.	+	+		
<i>A. phaeolepis</i> Krasch.	+	+		
<i>A. pycnorhiza</i> Ledeb.	+	+		
<i>A. rupripes</i> Nakai	+	+		
<i>A. rupestris</i> L.	+	+		
<i>A. rutifolia</i> Steph. Ex Spreng	+	+		
<i>A. scoparia</i> Waldst. Et Kit.	+	+		
<i>A. sericea</i> Web. Ex Stechm.	+	+		
<i>A. sieversiana</i> Willd.	+	+		
<i>A. stolonifera</i> (Maxim.) Kom.	+			
<i>A. sylvatica</i> L.	+			
<i>A. tanacetifolia</i> L.	+	+		
<i>A. xanthochroa</i> Krasch.	+	+		+
<i>A. xylorhiza</i> Krasch. Ex Filatova	+	+	+	
<i>Cacalia hastata</i> L.	+			
<i>Senecio ambraceus</i> Turcz.	+	+		
<i>S. arcticus</i> Rupr.	+			
<i>S. erucifolius</i> L.	+			
<i>S. integrifolius</i> (L.) Clairv.	+	+		
<i>S. jacobaea</i> L.	+	+		
<i>Ligularia fischeri</i> (Ledeb.) Turcz.	+			
<i>L. sagitta</i> (Maxim.) Mattf.	+			
<i>L. sibirica</i> (L.) Cass.	+			
<i>Echinops latifolius</i> Tausch.	+	+		
<i>Saussurea alata</i> DC.	+			
<i>S. amara</i> (L.) DC.	+	+		
<i>S. elongata</i> DC	+			
<i>S. laciniata</i> Ledeb.	+	+		
<i>S. parviflora</i> (Poir.) DC.	+			
<i>S. runcinata</i> DC.	+	+		
<i>S. salicifolia</i> (L.) DC.	+	+		
<i>Cardus crispus</i> L.	+			
<i>Serratula centauroides</i> L.	+	+		
<i>S. marginata</i> Tausch.	+	+		
<i>Synurus deltoides</i> (Ait.) Nakai	+			
<i>Rhaphonticum uniflorum</i> (L.) DC.	+	+		
<i>Scorsonera austriaca</i> Willd.	+	+		
<i>S. radiata</i> Fisch.	+			
<i>Tragopogon trachycarpus</i> S.Nikit.	+	+		
<i>Picris hieracioides</i> L.	+			
<i>P. japonica</i> Thunb.	+			
<i>Sonchus arvensis</i> L.	+	+		
<i>Youngia tenuifolia</i> (Willd.) Bab. Et Stebbins	+	+		
<i>Ixeridium gramineum</i> (Fisch.) Tzvel.	+	+		
<i>Taraxacum asiaticum</i> Dahlst.	+	+		
<i>T. ceratophorum</i> (Ledeb.) DC	+			
<i>T. collinum</i> DC.	+	+		
<i>T. commixtiforme</i> Soest.	+			
<i>T. dealbatum</i> Hand.-Mazz.	+	+		
<i>T. dissectum</i> (Ledeb.) Ledeb	+			
<i>T. leucanthum</i> (Ledeb.) Ledeb	+	+		
<i>T. mongoliforme</i> Doll.	+			+
<i>T. sinicum</i> Kitag.	+			
<i>Crepis Bungei</i> Ledeb.	+			
<i>Crepis tectorum</i> L.	+			
<i>Hieracleum umbellatum</i> L.	+			

**Table 13-12 Mammals of Mongolia listed (Erdene Sum to Undurkhaan)**

Names of species			Assertion of rareness		
Latin	mongolian	English	Red book of Mongolia 1997	List of rare species of Mongolia, 1995	Appendix I; II of CITES, 2000
Canis lupus	Саарал чоно	Grey wolf	-	-	II
Felis manul	Мануул	Pallas Cat Manul	-	-	II
Ovis ammon	Аргаль	Argali	+	+	II

**Table 13-13 Main parameters of Hydrometric Sections form (Erdene-Undurkhaan)**

A (km)-square of watershed area (River bed,dry bed,ravin and channel)

L (km)- Long of erosion line in watershed area,

B max (km) – Maximum width of watershed area

D km/km<sup>2</sup> – average density of river net of watershed area

1	Coordination		A km <sup>2</sup>	L km.	Bmax km.	B m km	D km/km <sup>2</sup>
	E	N					
Main route subway No-1							
1	107° 51' 40"	47° 41' 15"	2,56	2,05	1,3	1,24	0,80
2	107° 52' 00"	47° 41' 12"	1,68	2,25	0,6	0,74	1,34
3	107° 52' 07"	47° 41' 16"	0,80	1,05	0,5	0,76	1,31
4	107° 54' 27"	47° 41' 39"	11,9	4,45	3,3	2,67	0,37
5	107° 52' 24"	47° 41' 45"	4,5	3,4	2,0	1,32	0,75
6	107° 56' 09"	47° 42' 21"	12,8	8,9	2,7	1,43	0,67
7	107° 59' 47"	47° 43' 29"	119,2	67,8	15,9	1,77	0,57
8	108° 06' 17"	47° 42' 12"	34,5	11,7	3,2	2,95	0,34
9	108° 25' 45"	47° 46' 48"	56,7	12,1	4,2	4,68	0,21
10	108° 29' 47"	47° 43' 08"	1,6	1,8	0,8	0,89	1,12
11	108° 29' 50"	47° 43' 12"	0,95	1,8	0,6	0,53	1,89
12	108° 30' 00"	47° 44' 00"	7,8	2,0	1,3	3,90	0,26
13	108° 31' 29"	47° 46' 00"	2,2	2,0	1,3	1,10	0,91
14	108° 34' 12"	47° 41' 12"	9,9	8,3	2,6	1,19	0,84
15	108° 35' 00"	47° 47' 26"	1,4	1,95	0,7	0,72	11,39
16	108° 37' 00"	47° 48' 37"	1,5	1,3	0,7	1,15	0,87
17	108° 40' 94"	47° 50' 43"	1,1	1,3	0,8	0,85	1,18
18	108° 38' 35"	47° 41' 12"	48,6	13,7	5,2	3,55	0,28
19	108° 39' 51"	47° 55' 41"	12,9	13,0	3,5	0,99	1,01
20	108° 50' 18"	47° 47' 04"	1,40	2,1	1,2	0,67	1,50
21	108° 54' 23"	47° 45' 52"	5,6	5,2	1,9	1,07	0,93
22	108° 58' 50"	47° 44' 10"	0,7	1,3	0,6	0,54	1,86
23	109° 01' 57"	47° 43' 15"	0,8	0,7	0,4	1,14	0,87
24	109° 07' 02"	47° 40' 43"	1,2	1,0	0,6	1,20	0,83
25	109° 07' 15"	47° 40' 37"	172,9	54,0	17,4	3,20	0,11
26	109° 08' 57"	47° 39' 32"	1,08	0,7	0,5	1,59	0,65
27	109° 09' 00"	47° 38' 45"	73,4	27,3	8,9	2,69	0,37
28	109° 10' 38"	47° 37' 09"	6,8	6,1	2,6	1,12	0,90
29	109° 13' 26"	47° 36' 09"	36,7	16,0	5,9	2,29	0,43
30	109° 15' 00"	47° 35' 43"	13,1	10,8	3,4	1,21	0,82
31	109° 18' 19"	47° 34' 08"	1,3	1,4	1,0	0,93	1,07
32	109° 24' 34"	47° 32' 10"	107,6	55,2	8,8	1,94	0,51
33	109° 49' 21"	47° 27' 22"	56,9	18,2	7,5	3,12	0,32
34	110° 20' 10"	47° 22' 57"	214,9	108,3	Ç0,6	1,98	0,50

35	-	-	1.9	1.9	1.2	1,00	1,00
36	-	-	4.2	3.8	1.7	1,10	0,90
Subway No-2							
37	110 <sup>0</sup> 16' 41''	47 <sup>0</sup> 23' 52''	1.2	1.5	0.8	0,80	1,25
38	110 <sup>0</sup> 14' 19''	47 <sup>0</sup> 24' 13''	22.3	14.5	5.4	1,54	0,65
39	110 <sup>0</sup> 24' 44''	47 <sup>0</sup> 41' 15''	3.2	6.8	2.7	0,47	2,12
Subway No-3							
40	108 <sup>0</sup> 41' 12''	47 <sup>0</sup> 47' 39''	23.9	9.0	3.05	2,65	0,38
41	108 <sup>0</sup> 40' 43''	47 <sup>0</sup> 47' 25''	1.3	1.5	0.9	0,87	1,15
42	108 <sup>0</sup> 39' 21''	47 <sup>0</sup> 46' 28''	11.9	6.4	2.3	5,17	0,53
43	108 <sup>0</sup> 37' 53''	47 <sup>0</sup> 45' 30''	12.4	8.6	2.8	1,44	0,69
44	108 <sup>0</sup> 36' 03''	47 <sup>0</sup> 44' 23''	4.8	4.3	1.6	1,12	0,89
45	108 <sup>0</sup> 33' 45''	47 <sup>0</sup> 43' 12''	6.0	7.4	1.9	0,81	0,23
46	108 <sup>0</sup> 33' 08''	47 <sup>0</sup> 42' 31''	7.3	6.1	2.4	1,20	0,83
47	108 <sup>0</sup> 31' 48''	47 <sup>0</sup> 41' 37''	3.5	5.5	1.7	0,64	1,57
48	108 <sup>0</sup> 28' 34''	47 <sup>0</sup> 41' 23''	4.7	7.2	2.3	0,65	1,53
49	108 <sup>0</sup> 26' 30''	47 <sup>0</sup> 41' 31''	-	-	-	-	-
Subway No-4							
50	108 <sup>0</sup> 10' 56''	47 <sup>0</sup> 39' 24''	95.6	12.8	10.7	7,46	0,13
51	108 <sup>0</sup> 05' 00''	47 <sup>0</sup> 37' 25''	3.9	4.05	1.8	0,96	1,04
52	108 <sup>0</sup> 01' 55''	47 <sup>0</sup> 37' 00''	10.7	8.30	2.60	1,29	0,77
53	107 <sup>0</sup> 59' 09''	47 <sup>0</sup> 38' 17''	3.8	4.70	1.36	0,80	1,24
54	107 <sup>0</sup> 57' 22''	47 <sup>0</sup> 38' 31''	5.5	4.5	1.65	1,22	0,81
55	107 <sup>0</sup> 56' 10''	47 <sup>0</sup> 38' 09''	2.65	2.75	1.5	0,96	1,04
56	107 <sup>0</sup> 54' 51''	47 <sup>0</sup> 30' 37''	4.75	3.80	1.45	1,25	0,80
57	107 <sup>0</sup> 54' 10''	47 <sup>0</sup> 40' 00''	3.25	3.05	1.9	1,06	0,94
58	107 <sup>0</sup> 52' 45''	47 <sup>0</sup> 40' 37''	1.08	1.15	0.7	0,94	1,06
59	107 <sup>0</sup> 54' 05''	47 <sup>0</sup> 40' 50''	0.4	0.6	0.6	0,67	1,50

**Table 13-14 Ordinates need to calculate average intensity of precipitation in various term (by N.Dashdeleg, Ts.Sugar.1971)**

Ordination	Term / minut /										
	5	10	20	40	60	90	150	300	720	1440	2880
$\Psi_{1\tau}(\tau)$	0.150	0.232	0.320	0.450	0.478	0.570	0.736	0.936	1.050	1.230	1.480
$\Psi_{25\tau}(\tau)$	0.030	0.025	0.016	0.010	0.008	0.006	0.004	0.002	0.001	0.002	0.001

**Table 13-15 1% fidelity maximum precipitation per day (by Bayandelger Sum)**

Year	Term / minute /											
	5	10	20	40	60	90	150	300	720	1440	2880	Å
1971	4,8	9,7	17,0	23,6	27,0	28,8	29,9	32,9	33,4	33,4	33,8	33,2
1972	3,8	6,2	10,2	11,0	11,0	11,0	11,0	12,4	20,1	21,8	22,0	20,8
1973	4,4	7,2	12,4	20,2	20,6	21,0	23,4	35,3	37,9	38,4	38,4	38,4
1975	1,4	3,1	5,7	6,5	6,9	7,2	13,9	17,1	17,1	25,4	29,3	25,4
1976	3,5	4,8	1,8	6,9	9,8	13,1	16,1	18,4	18,4	20,2	20,2	20,2
1977	3,5	4,9	6,0	6,2	6,4	7,6	13,6	39,8	49,0	52,2	53,6	47,7
1978	1,7	2,5	3,2	6,0	6,9	7,3	7,4	14,2	14,2	17,0	17,0	17,0

**Table 13-16 Maximum discharge on hydrometric sections of eastern arterial road (m3/sec)**

	A km <sup>2</sup>	L km.	D km/km <sup>2</sup>	16.670Ψ(τ)H <sub>1%</sub>	Q <sub>1%</sub>
<b>Main route No-1</b>					
1	2,56	2,05	0,80	3,38	7,09
2	1,68	2,25	1,34	2,2	4,62
3	0,80	1,05	1,31	1,05	2,20
4	11,9	4,45	0,37	15,59	28,06
5	4,5	3,4	0,75	5,9	12,39
6	12,8	8,9	0,67	16,77	30,18
7	119,2	67,8	0,57	156,17	187,4
8	34,5	11,7	0,34	45,2	81,36
9	56,7	12,1	0,21	74,29	133,72
10	1,6	1,8	1,12	2,09	4,39
11	0,95	1,8	1,89	1,24	2,6
12	7,8	2,0	0,26	10,22	18,39
13	2,2	2,0	0,91	2,88	6,04
14	9,9	8,3	0,84	12,97	23,34
15	1,4	1,95	1,39	1,83	3,84
16	1,5	1,3	0,87	1,96	4,12
17	1,1	1,3	1,18	1,44	2,31
18	48,6	13,7	0,28	63,67	114,6
19	12,9	13,0	1,01	16,9	30,42
20	1,40	2,1	1,50	1,83	3,84
21	5,6	5,2	0,93	7,33	15,39
22	0,7	1,3	1,86	0,92	1,93
23	0,8	0,7	0,87	1,05	2,2
24	1,2	1,0	0,83	1,57	3,29
25	172,9	54,0	0,11	226,53	271,84
26	1,08	0,7	0,65	1,41	2,96
27	73,4	27,3	0,37	96,17	173,1
28	6,8	6,1	0,90	8,91	18,71
29	36,7	16,0	0,43	48,08	86,54
30	13,1	10,8	0,82	17,16	30,88
31	1,3	1,4	1,07	1,7	3,57
32	107,6	55,2	0,51	140,98	169,17
33	56,9	18,2	0,32	74,55	134,19
34	214,9	108,3	0,50	281,56	337,87

35	1,9	1,9	1,00	2,49	5,23
36	4,2	3,8	0,90	5,5	11,55
Subway No-2					
37	1,2	1,5	1,25	1,57	3,29
38	22,3	14,5	0,65	29,21	52,58
39	3,2	6,8	2,12	4,19	8,79
Subway No-3					
40	23,9	9,0	0,38	31,31	56,39
41	1,3	1,5	1,15	1,7	3,57
42	11,9	6,4	0,53	15,59	28,06
43	12,4	8,6	0,69	16,24	29,23
44	4,8	4,3	0,89	6,29	13,21
45	6,0	7,4	0,23	7,86	16,51
46	7,3	6,1	0,83	9,56	20,07
47	3,5	5,5	1,57	4,58	9,62
48	4,7	7,2	1,53	6,16	12,94
49	-	-	-		
Subway No-4					
50	95,6	12,8	0,13	125,25	150,3
51	3,9	4,05	1,04	5,11	10,73
52	10,7	8,30	0,77	14,02	25,24
53	3,8	4,70	1,24	4,98	10,46
54	5,5	4,5	0,81	7,2	15,12
55	2,65	2,75	1,04	3,47	7,29
56	4,75	3,80	0,80	6,22	13,06
57	3,25	3,05	0,94	4,26	8,95
58	1,08	1,15	1,06	1,41	2,96
59	0,4	0,6	1,50	0,52	1,09

**Table 13-17 Soil analyses**

No.	Analysis	Method	Number of sample
1	Humus	I.V.Turin	11
2	Potassium, Phosphorus from one extract	B.P.Machigin	11
3	Soil reaction, PH	Potentiometer	16
4	Carbonate CO <sub>2</sub>	Calcimeter	5
5	Texture	N.A.Kachinskii	16

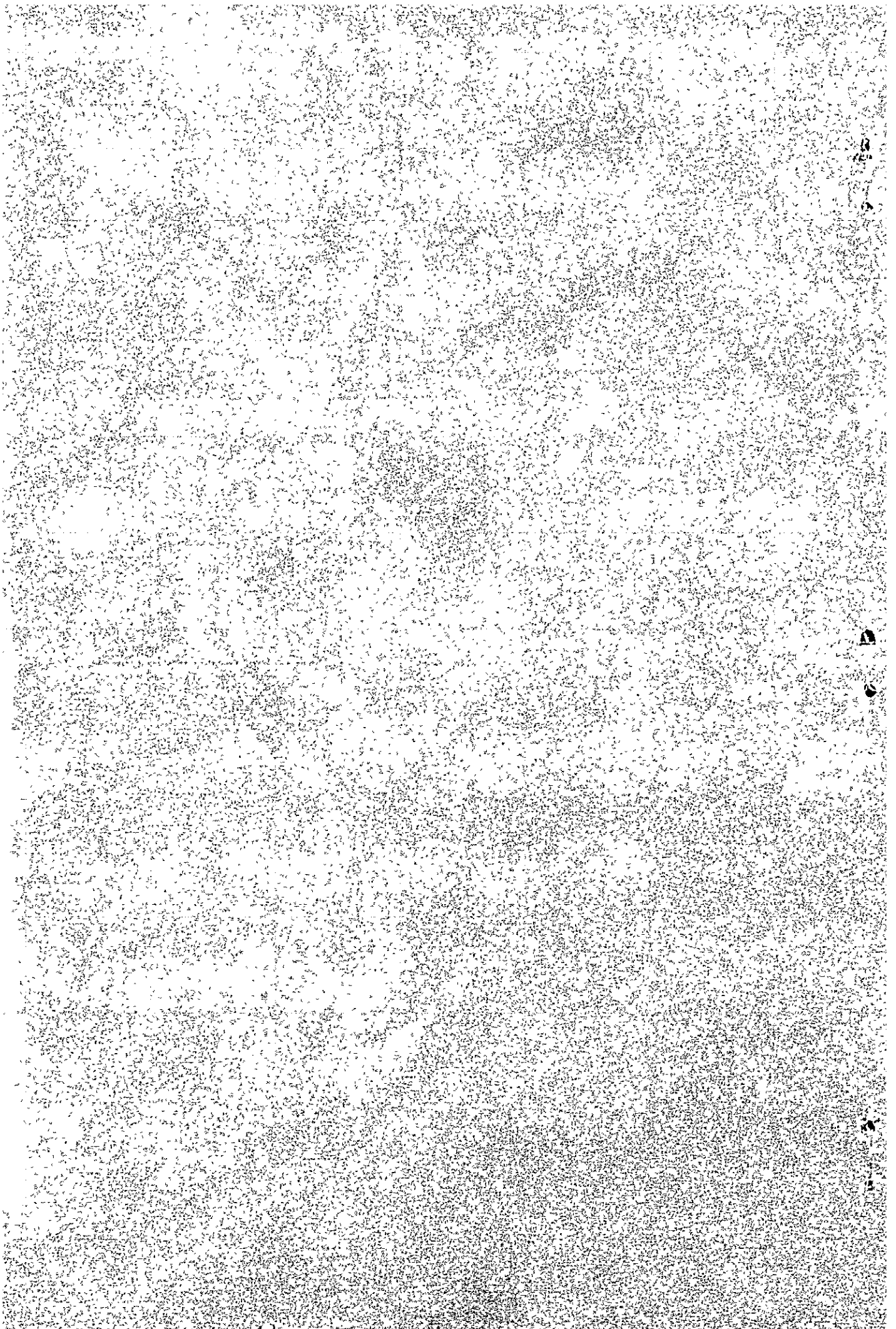
**Table 13-18 Main soils properties of area along the main eastern roads**

Profile 1	Horizon	Depth of soil sample sm.	Humus %	Soil reaction, PH of soil	Carbonate %	Mobile, In the 100 g. of soil		Texture, %		Soil index
						P <sub>2</sub> O <sub>5</sub>	KgO	<0.001	<0.01	
<b>DKsp /Tsagaan hutul/</b>										
23	A	2-12	2.23	6.8	-	2.42	18.23	4.3	12.4	1 ýë
<b>DKcp /12 km east from Erdene /</b>										
3	A	2-12	2.63	6.8	-	2.33	21.7	8.4	24.6	1 õø
<b>DKc</b>										
6	A	3-16	3.89	7.2	-	2.64	22.4	8.6	22.4	2 õø
<b>DKs /15 km north-west from Tsenkhermandal/</b>										
10	A	0-10	3.91	7.6	-	2.2	23.0	4.8	13.7	2 ýë
	A	10-20	3.84	7.6	-	1.9	18.9	4.9	16.8	
	BK	20-30	-	7.4	-	0.96	21.1	7.8	18.3	
<b>Mc /Halzan valley/</b>										
25	A	0-20	5.98	6.8	-	2.8	31.0	10.1	26.3	3 õø
<b>Kss /Ikh Khar lake valley of Jargalthaan/</b>										
27	A	0-18	3.21	7.6	-	1.98	19.7	8.3	24.3	4 õø
<b>DKs /North-east from engine well/</b>										
31	A	0-10	3.26	7.2	-	1.95	18.61	10.8	27.8	5 õø
	A	10-23	1.97	7.4	-	0.98	20.0	9.80	22.6	
	AB	23-28	0.68	7.4	0.5	-	-	10.8	27.3	
<b>DKtc /North from ground road, nearby crop field/</b>										
220*	A	0-20	2.30	7.2	-	0.96	15.2	4.9	15.2	5 ýë
	AB	20-39	1.10	6.4	-	0.48	5.6	8.9	14.8	
<b>DKs /Ust valley/</b>										
34	A	0-29	3.96	7.6	-	1.88	20.4	10.8	28.8	6 õø
	B	30-40	1.68	7.4	-	1.06	17.8	9.8	24.0	
	C	40-60	-	6.4	1.33	-	-	7.8	20.1	
<b>Ac /Togos river/</b>										
4	A	0-10	3.88	7.8	-	0.96	17.0	11.0	26.8	7 õø
	B	20-30	1.61	7.9	1.4	0.86	20.7	9.8	24.9	
	C	40-50	-	7.9	4.9	-	-	4.80	11.6	
<b>Amc /Kherlen Ireland/</b>										
69*	A	0-10	2.86	6.8	-	0.96	19.7	7.80	15.10	8 ýë
	AB	10-18	0.88	7.16	-	2.0	17.0	9.70	18.10	
<b>Ass /2 km east from Kherlen r./</b>										
63*	A	0-10	3.24	6.8	-	0.45	14.0	5.80	17.80	9 ýë
<b>Amc /1 km north from Ajgan lake/</b>										
9	A	0-30	4.28	7.8	-	1.96	15.0	12.50	40.0	10 õø

220\*, 69\*, 63\* – From other sources

## 14. その他





#### 1.4. その他

モンゴル国において実施された以下の道路分野の調査、設計及び施工プロジェクトの報告書を参考にした。

No.	Title	Size	Date	Published By
1	Kuwait Fund, Darkhan Erdenet Road Project, Draft Final Report, Volume 1 Main Report	A4	1997	Intercontinental Consultants & Technocrats PVT.Ltd
2	Kuwait Fund, Darkhan Erdenet Road Project, Pavement Condition Report	A4	1997	Intercontinental Consultants & Technocrats PVT.Ltd
3	Kuwait Fund, Darkhan Erdenet Road Project, Pavement Design Report	A4	1997	Intercontinental Consultants & Technocrats PVT.Ltd
4	Kuwait Fund, Construction of Darkhan-Erdenet Road from km 0.00 to 184.00 (excluding reconstruction of Orkhon and Burgaltai bridges), Bidding Documents, Volume 4-Part I, Drawings Road Works	A3		Intercontinental Consultants & Technocrats PVT.Ltd
5	Kuwait Fund, Construction of Darkhan-Erdenet Road from km 0.00 to 184.00 (excluding reconstruction of Orkhon and Burgaltai bridges), Bidding Documents, Volume 4-Part II, Drawings Bridge Works	A3		Intercontinental Consultants & Technocrats PVT.Ltd
6	Kuwait Fund, Feasibility Study for Erdenet-Bulgan-Murun Road Project, Final Report, Volume 1 Main Report	A4	2001	Intercontinental Consultants & Technocrats PVT.Ltd
7	Kuwait Fund, Feasibility Study for Erdenet-Bulgan-Murun Road Project, Final Report, Volume 2 Annexures	A4	2001	Intercontinental Consultants & Technocrats PVT.Ltd
8	ADB, Technical Assistance. Road Master Plan & Feasibility Study. Volume 3, Road and Road Transport Sector Profile	A4	1995	Intercontinental Consultants & Technocrats PVT.Ltd. In association with Scott Wilson Kirkpatrick (consulting engineers)
9	ADB, Technical Assistance. Road Master Plan & Feasibility Study. Volume 2, Feasibility Study, Preliminary Engineering Design & Initial Environmental Examination	A4	January, 1995	Intercontinental Consultants & Technocrats PVT Ltd. In association with Scott Wilson Kirkpatrick (consulting engineers)
10	ADB, Second Road Development Project, Progress Report No1	A4	April, 1998	Intercontinental Consultants & Technocrats PVT.Ltd
11	ADB, Second Road Development Project, Progress Report No4	A4	July, 1998	Intercontinental Consultants & Technocrats PVT.Ltd

No.	Title	Size	Date	Published By
12	ADB, Roads Development Project, Project Completion Report Volume 2: Annexures	A4	April, 2001	Intercontinental Consultants & Technocrats PVT.Ltd
13	ADB, Roads Development Project, Project Completion Report Volume 1: Main Reports	A4	April 2001	Intercontinental Consultants & Technocrats PVT.Ltd
14	Dornod Area Development Project	A4	1996	Ministry of Infrastructure, National Design and Research Center
15	Mongolia, The World Bank, Transport Rehabilitation Project, Roads Subproject, 1996 Mid Term Progress Report	A4	July, 1996	Intercontinental Consultants & Technocrats PVT Ltd
16	ASD, TA No. 2380-MON, Contract No. COCS 96/137, Institutional Strengthening of the Roads Sector, Draft Final Report, Volume 1-Executive Summary, Project No.7402.T820.250	A4	March, 1997	N.D.Lea International Ltd. In association with Dorsch Consult, Padego Co. Ltd. & Technology Training Associates Ltd.
17	Transport Rehabilitation Project, Roads Sub-Project, The Road Network and Road Maintenance Resources	A4	Feb-97	Scott Wilson Kirkpatrick, Transport Research Laboratory
18	Transport Rehabilitation Project, Mongolia (C-2615-MOG), Transport Sector Policy Advisor, Closing Report, Volume 2, Appendices	A4	Aug-98	Scott Wilson Kirkpatrick
19	Transport Rehabilitation Project, Mongolia (C-2615-Mog), Transport Sector Policy Advisor, Closing Report, Volume 1, Text	A4	Aug-98	Scott Wilson Kirkpatrick







