

1.0 AUGER BORING

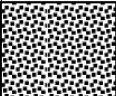
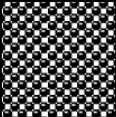
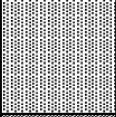
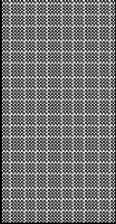
Auger boring is carried out at 14 locations for the project corridor. Bore log chart for all the bore hole locations is given in Figure 1-1 through Figure 1-14 below. The following conclusions are drawn based on field and laboratory investigations.

- The sub soil varies from top (nil / 0 depth) to 1.5m depth loose soil was observed followed by medium dense to dense strata up to refusal stage.
- During the time of investigation water table was not encountered up to the refusal stage; however the same may be subjected to seasonal fluctuations.
- Liquid limit and Plastic limit indicates that, soil is of low compressibility in nature.

The Net Safe Bearing Capacity (SBC) values obtained for the bore holes are presented in Table 1-1 below.

Table 1-1 SBC of Soil by Auger Boring


Bore Hole No.	SBC (kN/m ²)		
	1.5m below NGL	2.0m below NGL	3.0m below NGL
BH-1	120	150	200
BH-2	120	150	200
BH-3	120	150	200
BH-4	120	150	200
BH-5	120	150	200
BH-6	120	150	200
BH-7	120	150	200
BH-8	120	150	200
BH-9	150	180	220
BH-10	150	180	220
BH-11	150	180	250
BH-12	150	180	250
BH-13	150	180	240
BH-14	150	180	240

DESCRIPTION	Legend	Depth (m)	Sample	N – Value	Remarks
Filled up soil		0.0	--	--	At the time of investigation water table was not encountered up to termination depth.
		0.5	DS	--	
Yellowish brown silty Sand with gravel		1.5	SPT	15	
			DS		
Yellowish red silty Sand		3.0	SPT	22	
			DS		
Greyish to whitish yellow sandy Silt		4.5	SPT	30	
		6.0	SPT	34	
			DS		

SPT: Standard penetration test

DS: Disturbed sample

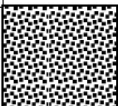
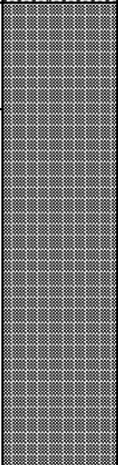
Figure 1-1 Bore Log at BH-01

DESCRIPTION	Legend	Depth (m)	Sample	N – Value	Remarks
Yellowish brown sandy Silt		0.0	--	--	At the time of investigation water table was not encountered up to termination depth.
		0.5	DS	--	
Brownish yellow sandy Silt		1.5	SPT DS	15	
		3.0	SPT DS	17	
		4.5	SPT DS	22	
		6.0	SPT DS	30	

SPT: Standard penetration test

DS: Disturbed sample

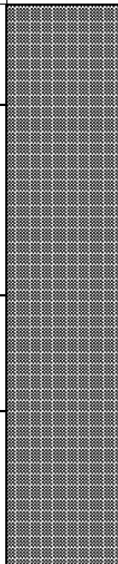
Figure 1-2 Bore Log at BH-02

DESCRIPTION	Legend	Depth (m)	Sample	N – Value	Remarks
Filled up soil		0.0	--	--	At the time of investigation water table was not encountered up to termination depth.
		0.5	DS	--	
Yellowish brown sandy Silt		1.5	SPT DS	05	
Reddish yellow sandy Silt		3.0	SPT DS	14	
		4.5	SPT DS	29	
		6.0	SPT DS	43	

SPT: Standard penetration test

DS: Disturbed sample

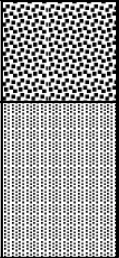
Figure 1-3 Bore Log at BH-03

DESCRIPTION	Legend	Depth (m)	Sample	N – Value	Remarks	
Brownish sandy Silt		0.0	--	--	At the time of investigation water table was not encountered up to termination depth.	
		0.5	DS	--		
Reddish brown sandy Silt		1.5	SPT DS	06		
Brownish yellow sandy Silt		3.0	SPT DS	09		
Greyish yellow sandy Silt		4.5	SPT DS	15		
		6.0	SPT DS	27		

SPT: Standard penetration test

DS: Disturbed sample


Figure 1-4 Bore Log at BH-04

DESCRIPTION	Legend	Depth (m)	Sample	N – Value	Remarks
Filled up soil		0.0	-	-	At the time of investigation water table was not encountered up to termination depth.
		0.5	DS	-	
Yellowish red silty Sand <i>(Refusal Strata)</i>		1.5	SPT DS	>50	

SPT: Standard penetration test

DS: Disturbed sample

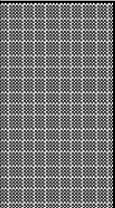
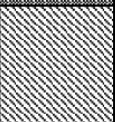
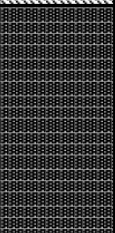
Figure 1-5 Bore Log at BH-05

DESCRIPTION	Legend	Depth (m)	Sample	N – Value	Remarks
Filled up soil		0.0	-	-	At the time of investigation water table was not encountered up to termination depth.
		0.5	DS	-	
<i>(Refusal Strata)</i>		1.5	SPT DS	>50	

SPT: Standard penetration test

DS: Disturbed sample

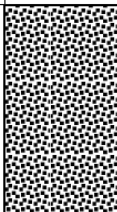
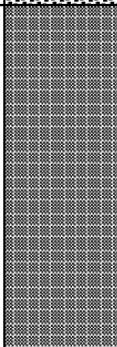
Figure 1-6 Bore Log at BH-06

DESCRIPTION	Legend	Depth (m)	Sample	N – Value	Remarks
Brownish sandy Silt		0.0	--	--	At the time of investigation water table was not encountered up to termination depth.
		0.5	DS	--	
Yellowish brown sandy Silt		1.5	SPT DS	08	
Whitish brown silty Sand with gravel		3.0	SPT DS	13	
		4.5	SPT DS	10	
Greyish yellow sandy Silt with clay binder		6.0	SPT DS	14	

SPT: Standard penetration test

DS: Disturbed sample


Figure 1-7 Bore Log at BH-07

DESCRIPTION	Legend	Depth (m)	Sample	N – Value	Remarks
Filled up soil		0.0	--	--	At the time of investigation water table was not encountered up to termination depth.
		0.5	DS	--	
		1.5	SPT DS	05	
Brownish yellow sandy Silt (Refusal Strata)		3.0	SPT DS	17	
		4.5	SPT DS	30	
		6.0	SPT DS	>50	

SPT: Standard penetration test

DS: Disturbed sample

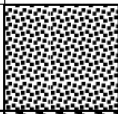

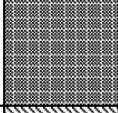
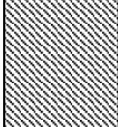
Figure 1-8 Bore Log at BH-08

DESCRIPTION	Legend	Depth (m)	Sample	N – Value	Remarks
Filled up soil		0.0	-	-	At the time of investigation water table was not encountered up to termination depth.
		0.5	DS	-	
(Refusal Strata)		1.5	SPT DS	>50	

SPT: Standard penetration test

DS: Disturbed sample

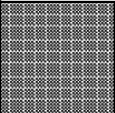

Figure 1-9 Bore Log at BH-09

DESCRIPTION	Legend	Depth (m)	Sample	N – Value	Remarks
Filled up soil		0.0	-	-	At the time of investigation water table was not encountered up to termination depth.
		0.5	DS	-	
Yellowish brown silty Sand with gravel		1.5	SPT DS	10	
Brownish yellow sandy Silt		3.0	SPT DS	24	
Whitish yellow silty Sand (Refusal Strata)		4.5	SPT DS	>50	

SPT: Standard penetration test

DS: Disturbed sample

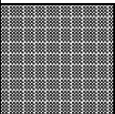
Figure 1-10 Bore Log at BH-10

DESCRIPTION	Legend	Depth (m)	Sample	N – Value	Remarks
Reddish yellow sandy Silt		0.0	-	-	At the time of investigation water table was not encountered up to termination depth.
		0.5	DS	-	
Yellowish red sandy Silt		1.5	SPT DS	04	
Brownish yellow silty Sand (Refusal Strata)		3.0	SPT DS	>50	

SPT: Standard penetration test

DS: Disturbed sample


Figure 1-11 Bore Log at BH-11

DESCRIPTION	Legend	Depth (m)	Sample	N – Value	Remarks
		0.0	-	-	At the time of investigation water table was not encountered up to termination depth.
		0.5	DS	-	
Yellowish red sandy Silt		1.5	SPT DS	06	
Whitish yellow sandy Silt (Refusal Strata)		3.0	SPT DS	>50	

SPT: Standard penetration test

DS: Disturbed sample

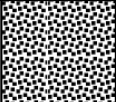


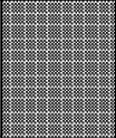
Figure 1-12 Bore Log at BH-12

DESCRIPTION	Legend	Depth (m)	Sample	N – Value	Remarks
		0.0	-	-	At the time of investigation water table was not encountered up to termination depth.
Filled up soil		0.5	DS	-	
(Refusal Strata)		1.5	SPT DS	>50	

SPT: Standard penetration test

DS: Disturbed sample

Figure 1-13 Bore Log at BH-13

DESCRIPTION	Legend	Depth (m)	Sample	N – Value	Remarks
Filled up soil		0.0	--	--	At the time of investigation water table was not encountered up to termination depth.
		0.5	DS	--	
Yellowish brown silty Sand with gravel		1.5	SPT DS	09	
Whitish yellow silty Sand		3.0	SPT DS	26	
Greyish yellow sandy Silt (Refusal Strata)		4.5	SPT DS	>50	

SPT: Standard penetration test

DS: Disturbed sample

Figure 1-14 Bore Log at BH-14

1.1.1 Laboratory Testing

Samples procured were transported to laboratory for obtaining Index and Engineering properties. In the laboratory, samples were visually classified by Geotechnical Engineer. Laboratory tests are being carried out as per relevant IS: 2720 guidelines. Generally, Soil Samples were tested for following parameters,

- Particle Size analysis
- Bulk Density
- Natural Moisture Content
- Atterberg's limits

The test results are tabulated in Table 1-2 and Grain Size Analysis chart for all the bore hole locations is given in Figure 1-15 through Figure 1-28 below.

Table 1-2 Grain Size Analysis Results

Bore Hole No.	Depth (m)	Water Content (%)	Atterberg's Limit			Grain Size Distribution				
			Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (PI)	Gravel (%)	Sand (%)			Silt & Clay
							Coarse	Medium	Fine	
01	1.5	10.3	--	--	--	1.0	4.7	22.8	34.0	37.5
	3.0	13.0	36.5	19.0	17.5	0.0	1.3	17.3	19.3	62.1
	6.0	16.0	--	--	--	5.3	3.9	23.3	14.6	52.9
02	1.5	11.8	33.6	14.3	19.3	0.0	0.0	17.7	24.3	58.0

Bore Hole No.	Depth (m)	Water Content (%)	Atterberg's Limit			Grain Size Distribution				
			Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (PI)	Gravel (%)	Sand (%)			Silt & Clay
							Coarse	Medium	Fine	
	3.0	11.9	--	--	--	0.6	2.9	21.2	18.5	56.8
	6.0	14.9	--	--	--	2.3	6.9	25.2	13.3	52.3
03	1.5	12.4	34.5	16.0	18.5	5.8	8.3	19.0	25.2	41.7
	4.5	17.5	--	--	--	0.0	0.2	19.0	20.3	60.5
	6.0	16.3	--	--	--	0.2	0.8	15.4	14.3	69.3
04	1.5	11.5	32.5	11.3	21.2	14.2	8.4	17.8	28.6	31.0
	3.0	13.6	34.1	14.9	19.2	0.0	0.8	26.0	24.8	48.4
	6.0	16.3	--	--	--	0.1	5.2	35.1	25.4	34.2
05	1.0	7.0	29.0	14.3	14.7	1.8	18.1	41.1	13.4	25.6
	1.5	11.8	33.0	17.4	15.6	2.8	10.2	42.0	17.5	27.5
06	1.5m	6.5	--	--	--	4.5	5.1	27.1	19.4	43.9
07	1.5	11.8	38.6	19.7	19.0	0.0	0.0	17.6	30.4	52.0
	4.5	14.2	--	--	--	0.1	1.4	25.8	31.4	41.3
	6.0	16.7	--	--	--	1.8	1.9	28.4	33.4	34.5
08	1.5	12.3	33.5	16.2	17.3	5.0	7.8	18.8	29.2	39.2
	4.5	13.3	41.8	--	NP	0.0	0.0	17.0	23.0	60.0
	6.0	16.9	--	--	--	0.9	0.0	19.2	15.9	63.9
09	1.5	8.3	--	--	--	11.5	13.0	33.0	24.3	18.2
10	1.5	12.6	29.1	17.7	11.3	1.6	4.4	28.2	30.7	35.1
	4.5	7.2	--	--	--	6.1	9.4	30.2	25.0	29.3
11	1.5	11.6	37.1	19.0	18.0	0.0	2.2	16.8	25.5	55.5
	3.0	17.8	46.8	--	NP	0.0	0.0	18.0	19.4	62.6
12	1.5	16.0	--	--	--	1.0	3.7	20.8	17.1	57.4
	3.0	17.8	46.1	--	NP	0.0	0.0	16.3	18.0	65.7
13	1.5	20.6	29.0	--	NP	34.3	8.5	24.0	18.0	15.2
14	1.5	12.0	30.7	16.1	14.6	3.0	9.2	33.8	22.8	31.2
	3.0	5.8	--	--	--	1.4	8.8	39.0	26.2	24.6
	4.5	10.8	--	--	--	1.8	3.0	30.3	32.3	32.6

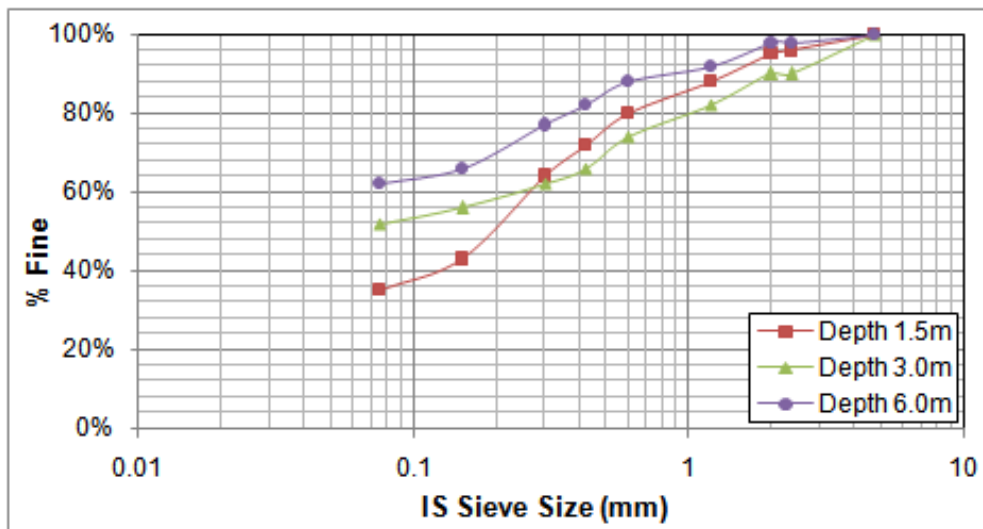


Figure 1-15 Grain Size Analysis for BH-01

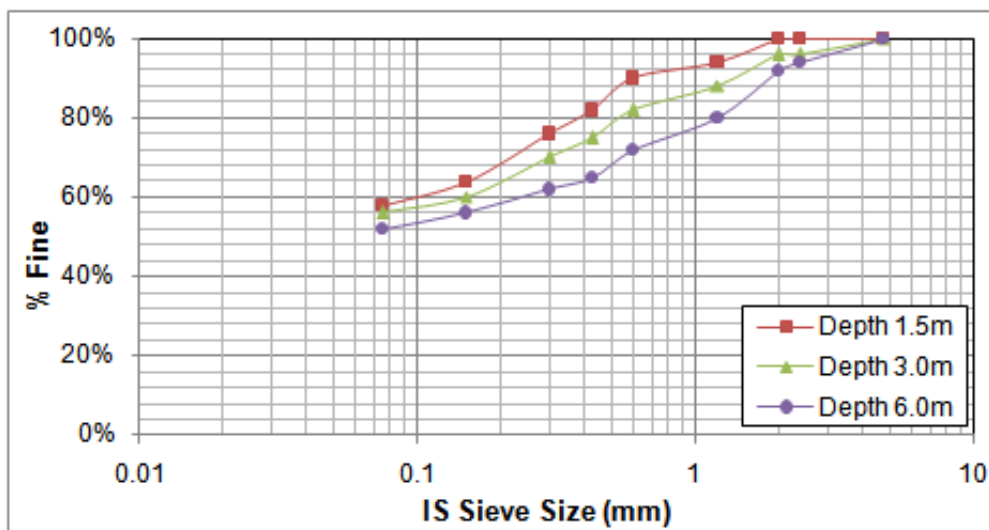


Figure 1-16 Grain Size Analysis for BH-02

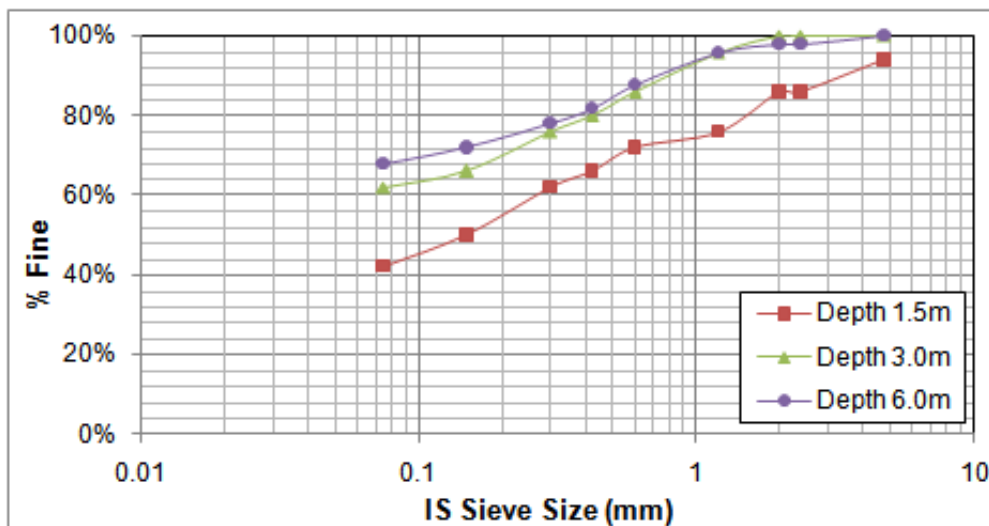
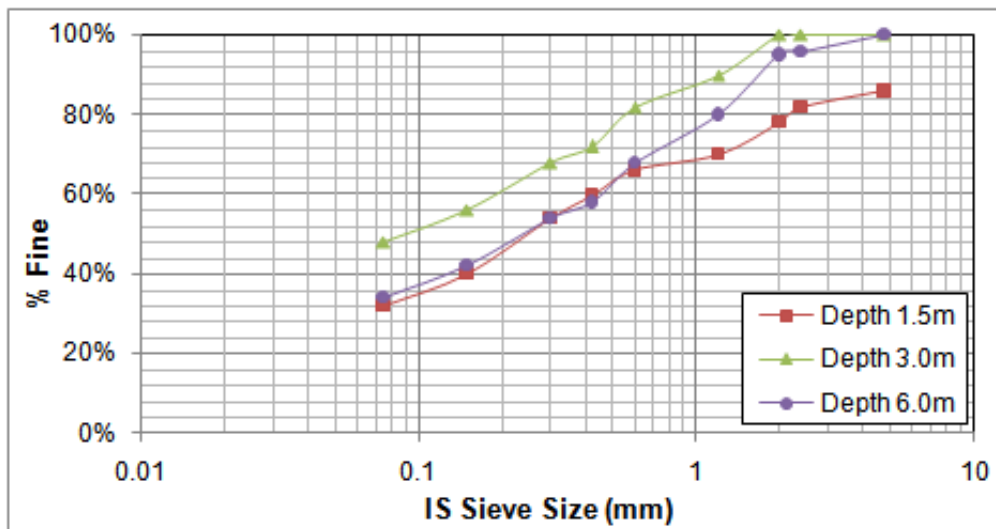
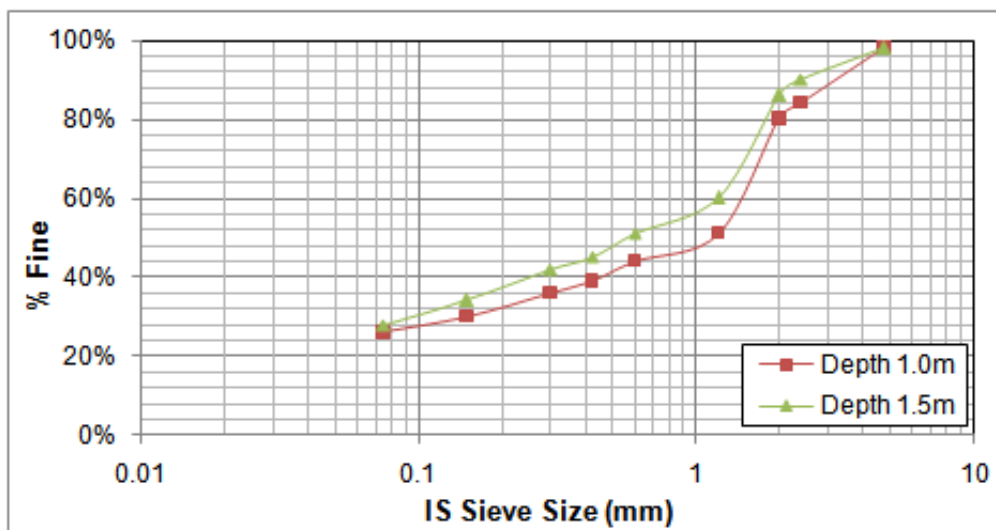
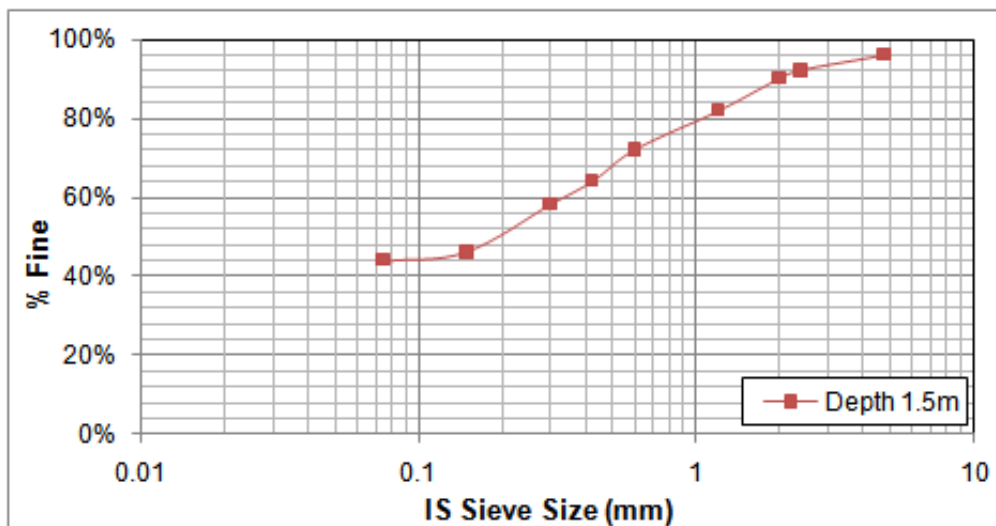


Figure 1-17 Grain Size Analysis for BH-03

**Figure 1-18 Grain Size Analysis for BH-04****Figure 1-19 Grain Size Analysis for BH-05****Figure 1-20 Grain Size Analysis for BH-06**

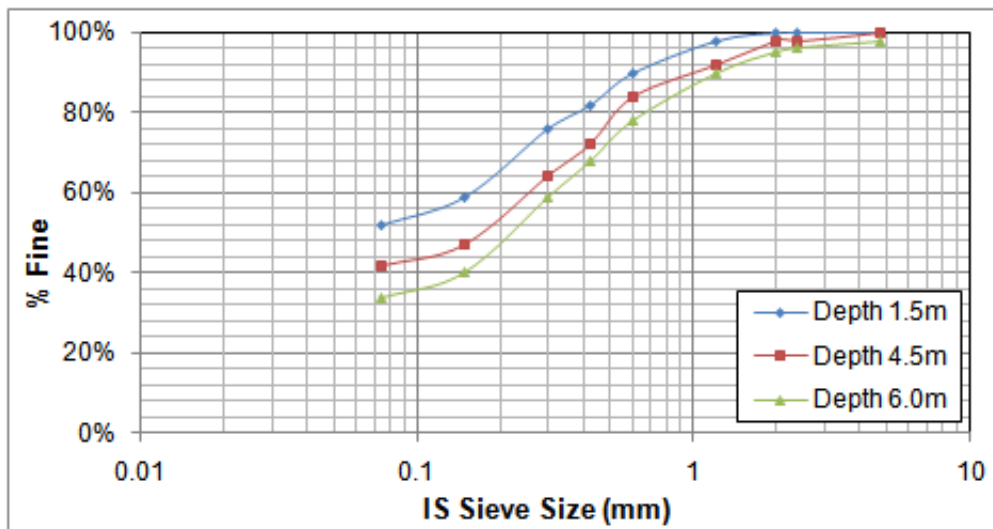


Figure 1-21 Grain Size Analysis for BH-07

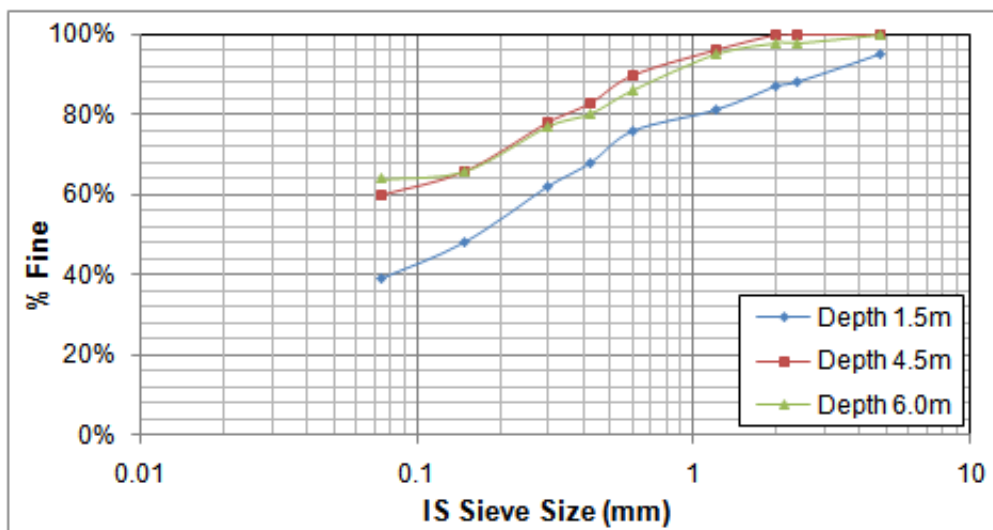


Figure 1-22 Grain Size Analysis for BH-08

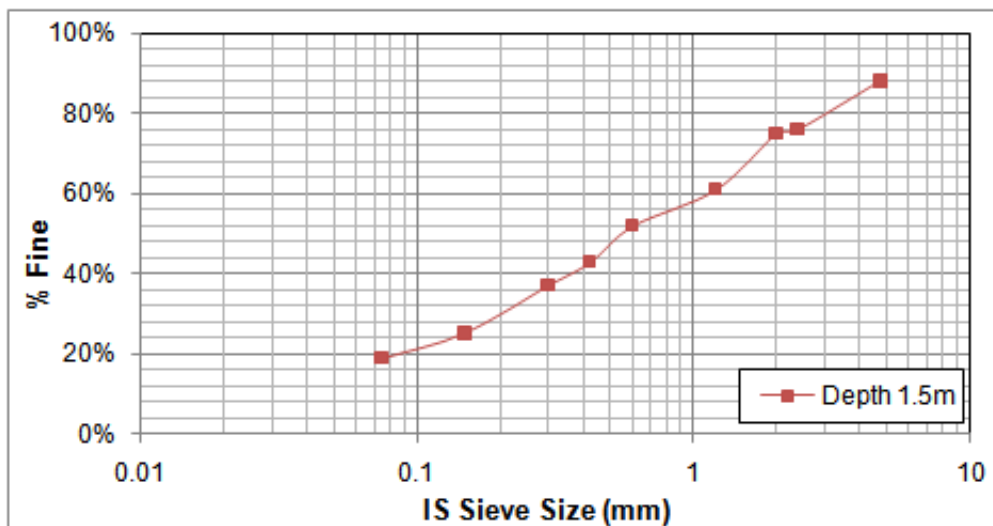
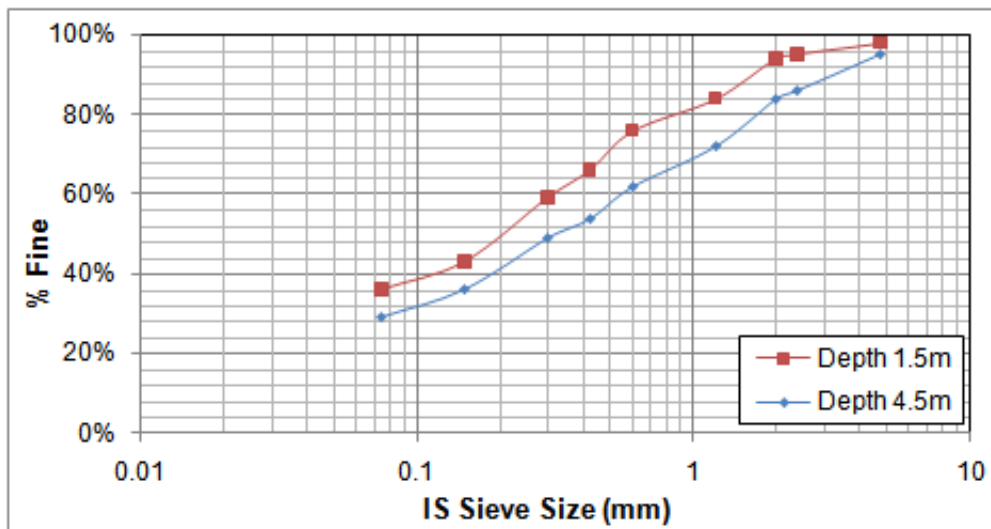
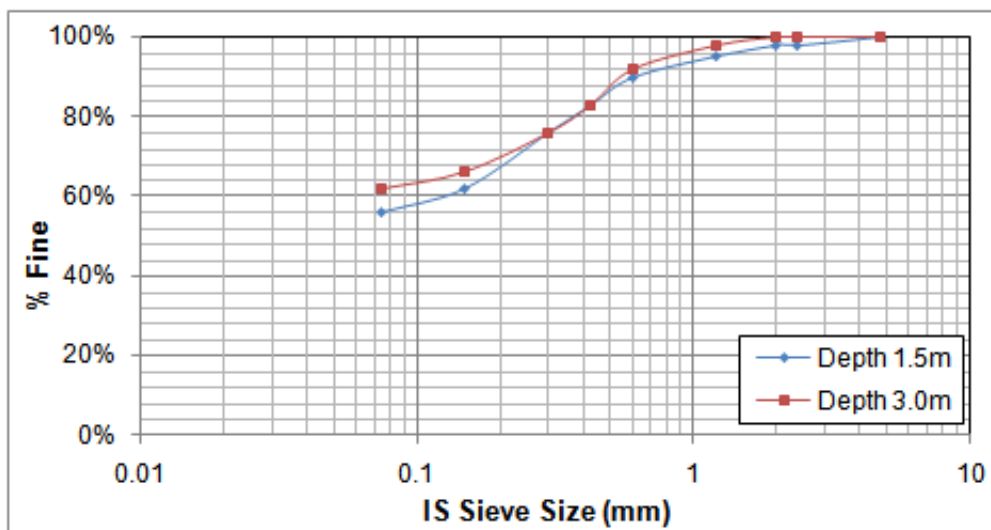
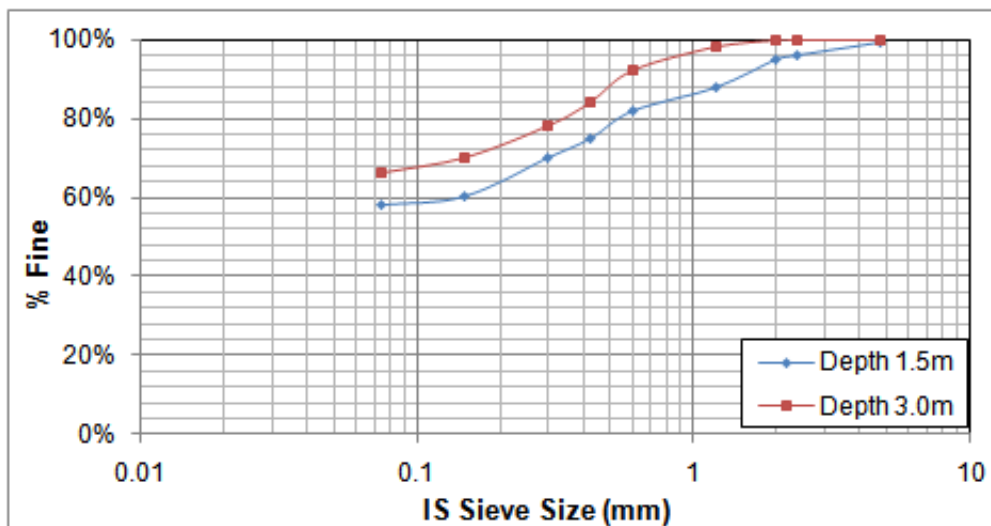
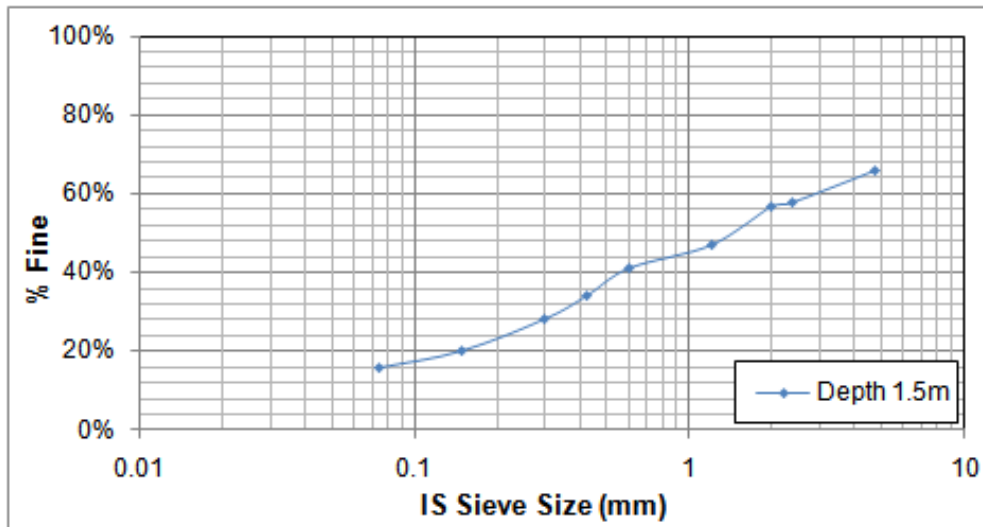
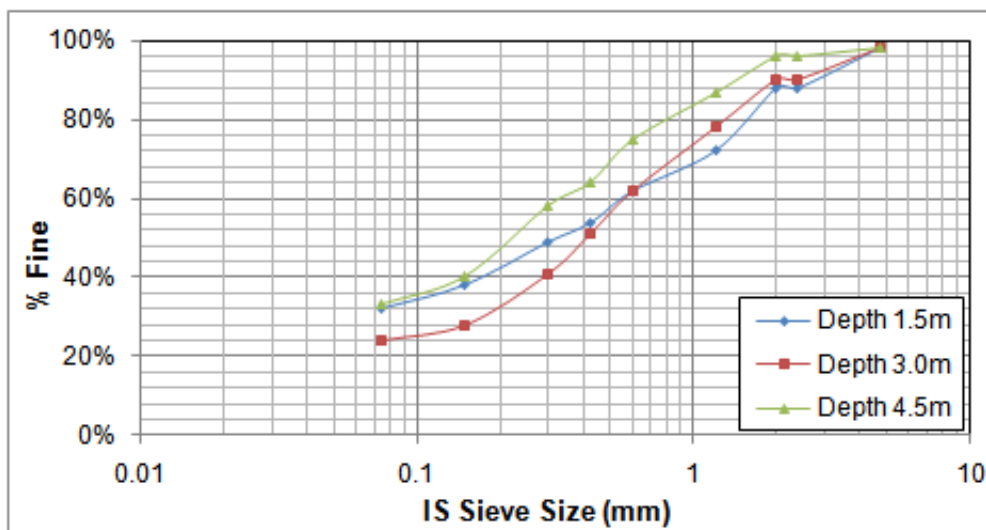


Figure 1-23 Grain Size Analysis for BH-09

**Figure 1-24 Grain Size Analysis for BH-10****Figure 1-25 Grain Size Analysis for BH-11****Figure 1-26 Grain Size Analysis for BH-12**

**Figure 1-27 Grain Size Analysis for BH-13****Figure 1-28 Grain Size Analysis for BH-14**