



## MOISTURE CONTENT & WASH SIEVE ANALYSIS

### Test Result

**Project** Geotechnical Investigation for Residential Building

**Client** Fortress Holdings Limited

**Location** Plot #2731, Road #20/A, Block-M, Bashundhara R/A, Dhaka, Bangladesh

**Borehole No.** 6

**Date** 14-Sep-21

**Sheet No.** 1 of 2

Sample ID	Depth (m)	Can No.	Weight of Can (gm)	Weight of Can + Moist Soil (gm)	Weight of Can + Dry Soil (gm)	Weight of Dry Soil (gm)	Weight of Moisture (gm)	Moisture Content (%)	Weight of + Washed Dry Soil (gm)	Weight of Washed Dry Soil (gm)	Coarse Content (%)	Fines Content (%)
D-01	1.5	129	12.76	101.50	94.13	81.37	7.37	9.1	78.30	65.54	81	19
D-02	3.0	608	13.42	122.66	104.10	90.68	18.56	20.5	62.90	49.48	55	45
D-03	4.5	440	13.27	128.27	111.03	97.76	17.24	17.6	72.70	59.43	61	39
D-04	6.0	235	15.00	135.46	105.50	90.50	29.96	33.1	26.92	11.92	13	87
D-05	7.5	582	10.79	123.84	95.27	84.48	28.57	33.8	20.93	10.14	12	88
D-06	9.0	450	12.07	109.74	81.66	69.59	28.08	40.4	19.31	7.24	10	90
D-07	10.5	337	13.76	110.74	81.26	67.50	29.48	43.7	14.31	0.55	1	99
D-08	12.0	485	15.14	109.96	81.68	66.54	28.28	42.5	15.31	0.17	0	100
D-09	13.5	454	12.92	129.47	95.66	82.74	33.81	40.9	13.28	0.36	0	100
D-10	15.0	246	13.67	112.00	82.62	68.95	29.38	42.6	14.49	0.82	1	99
D-11	16.5	610	12.91	113.94	84.05	71.14	29.89	42.0	14.12	1.21	2	98
D-12	18.0	518	11.96	121.53	89.22	77.26	32.31	41.8	17.90	5.94	8	92
D-13	19.5	238	12.68	112.84	83.91	71.23	28.93	40.6	17.08	4.40	6	94
D-14	21.0	268	13.80	135.16	98.58	84.78	36.58	43.1	16.05	2.25	3	97
D-15	22.5	489	14.21	117.98	92.00	77.79	25.98	33.4	14.80	0.59	1	99
D-16	24.0	379	14.96	108.46	81.40	66.44	27.06	40.7	15.18	0.22	0	100
D-17	25.5	190	10.27	114.21	83.74	73.47	30.47	41.5	10.70	0.43	1	99
D-18	27.0	276	15.76	118.37	88.18	72.42	30.19	41.7	15.80	0.04	0	100
D-19	28.5	249	13.19	105.46	95.81	82.62	9.65	11.7	73.11	59.92	73	27



Smart Development Engineering (SDE) Limited





## **APPENDIX 2B: SIEVE ANALYSIS**

## GRAIN SIZE DISTRIBUTION (SIEVE ANALYSIS)

### Test Result

**Project** Geotechnical Investigation for Residential Building

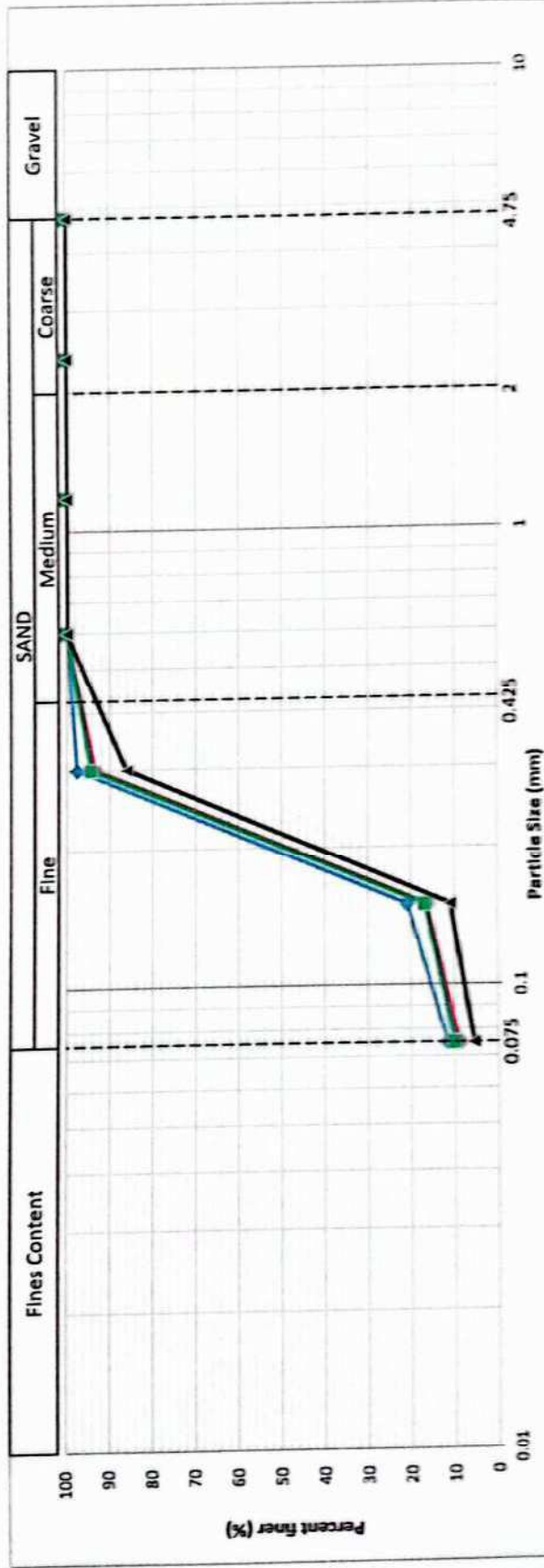
**Client** Fortress Holdings Limited

**Location** Plot #2731, Road #20/A, Block-M, Bashundhara R/A, Dhaka, Bangladesh

**Borehole No.** 1

**Date** 2021-09-13

**Sheet No.** 1 of 3



Symbol	BH No.	Sample ID	Depth (m)	Gravel (%)	Sand (%)	Fines (%)	FM	D <sub>10</sub>	D <sub>30</sub>	D <sub>60</sub>	Granularity	Classification
—●—	001	D-01	1.5	0	88	12	1.03	<0.075	0.16	0.21	Coarse grained	Poorly Graded SAND with silt (NP)
—●—	001	D-02	3.0	0	91	9	1.08	0.084	0.17	0.22	Coarse grained	Silty SAND (NP)
—●—	001	D-03	4.5	0	90	10	1.07	0.075	0.17	0.22	Coarse grained	Silty SAND (NP)
—●—	001	D-04	6.0	0	95	5	1.16	0.13	0.18	0.24	Coarse grained	Silty SAND (NP)



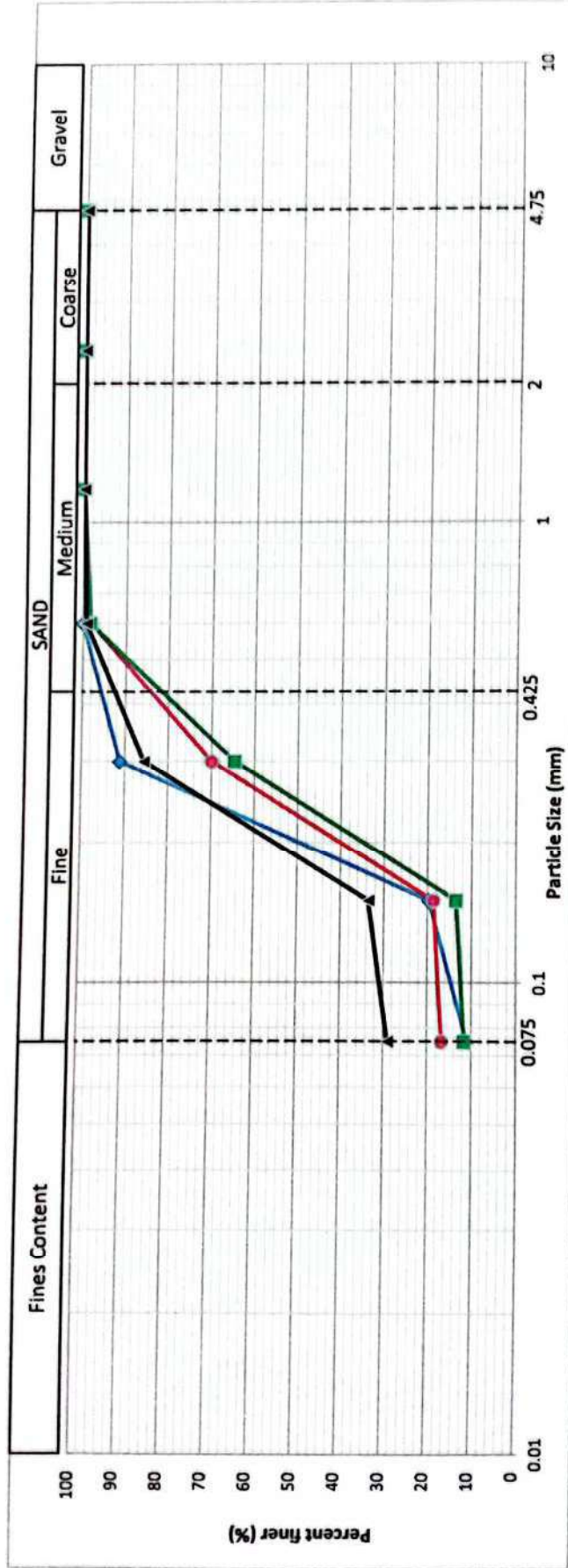
Smart Development Engineering (SDE) Limited

## GRAIN SIZE DISTRIBUTION (SIEVE ANALYSIS)

### Test Result

**Project** Geotechnical Investigation for Residential Building  
**Client** Fortress Holdings Limited  
**Location** Plot #2731, Road #20/A, Block-M, Bashundhara R/A, Dhaka, Bangladesh

**Borehole No.** 1  
**Date** 2021-09-13  
**Sheet No.** 2 of 3



Symbol	BH No.	Sample ID	Depth (m)	Gravel (%)	Sand (%)	Fines (%)	FM	D <sub>10</sub>	D <sub>30</sub>	D <sub>60</sub>	Granularity	Classification
—●—	001	D-05	7.5	0	89	11	1.11	<0.075	0.17	0.22	Coarse grained	Silty SAND (NP)
—●—	001	D-20	30.0	0	83	17	1.39	<0.075	0.17	0.26	Coarse grained	Silty SAND (NP)
—●—	001	D-21	31.5	0	88	12	1.43	<0.075	0.19	0.28	Coarse grained	Silty SAND (NP)
—●—	001	D-22	33.0	0	71	29	1.23	<0.075	0.087	0.21	Coarse grained	Silty SAND (NP)

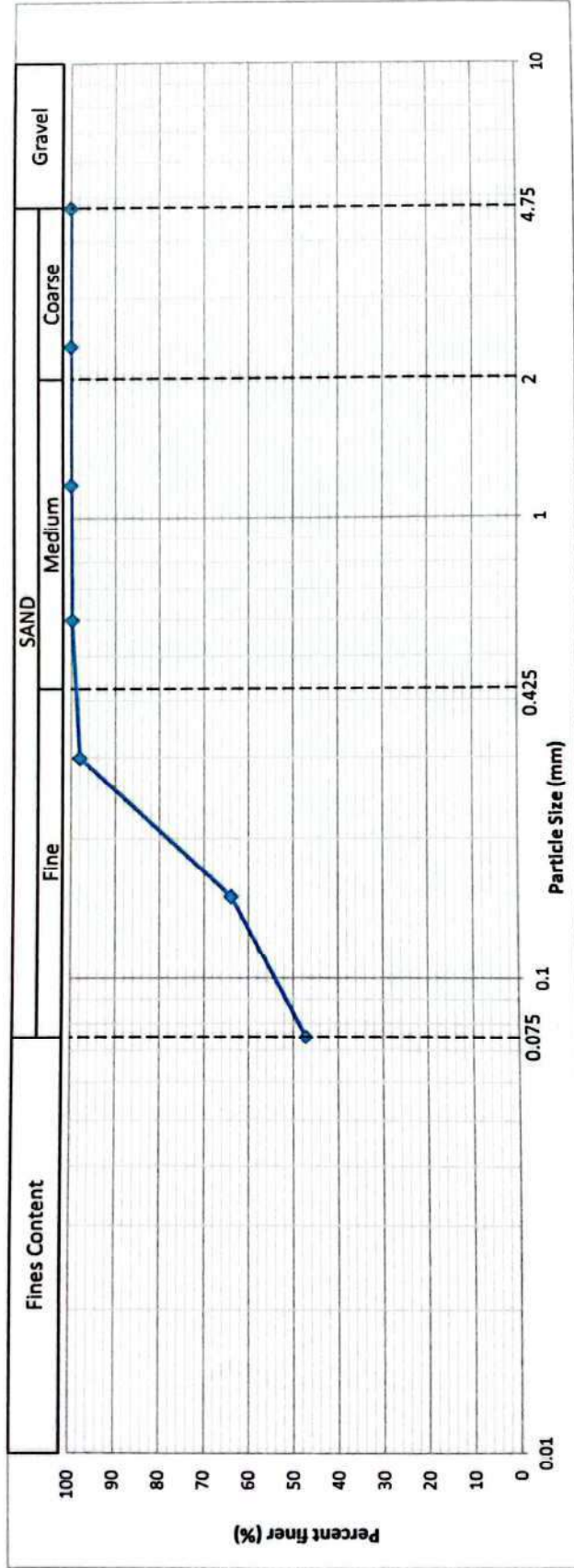


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## GRAIN SIZE DISTRIBUTION (SIEVE ANALYSIS)

### Test Result

**Project** Geotechnical Investigation for Residential Building  
**Client** Forteress Holdings Limited  
**Location** Plot #2731, Road #20/A, Block-M, Bashundhara R/A, Dhaka, Bangladesh  
**Borehole No.** 1  
**Date** 2021-09-13  
**Sheet No.** 3 of 3



Symbol	BH No.	Sample ID	Depth (m)	Gravel (%)	Sand (%)	Fines (%)	FM	D <sub>10</sub>	D <sub>30</sub>	D <sub>60</sub>	Granularity	Classification
◆—	001	D-23	34.0	0	53	47	1.06	<0.075	<0.075	0.13	Coarse grained	Silty SAND (NP)

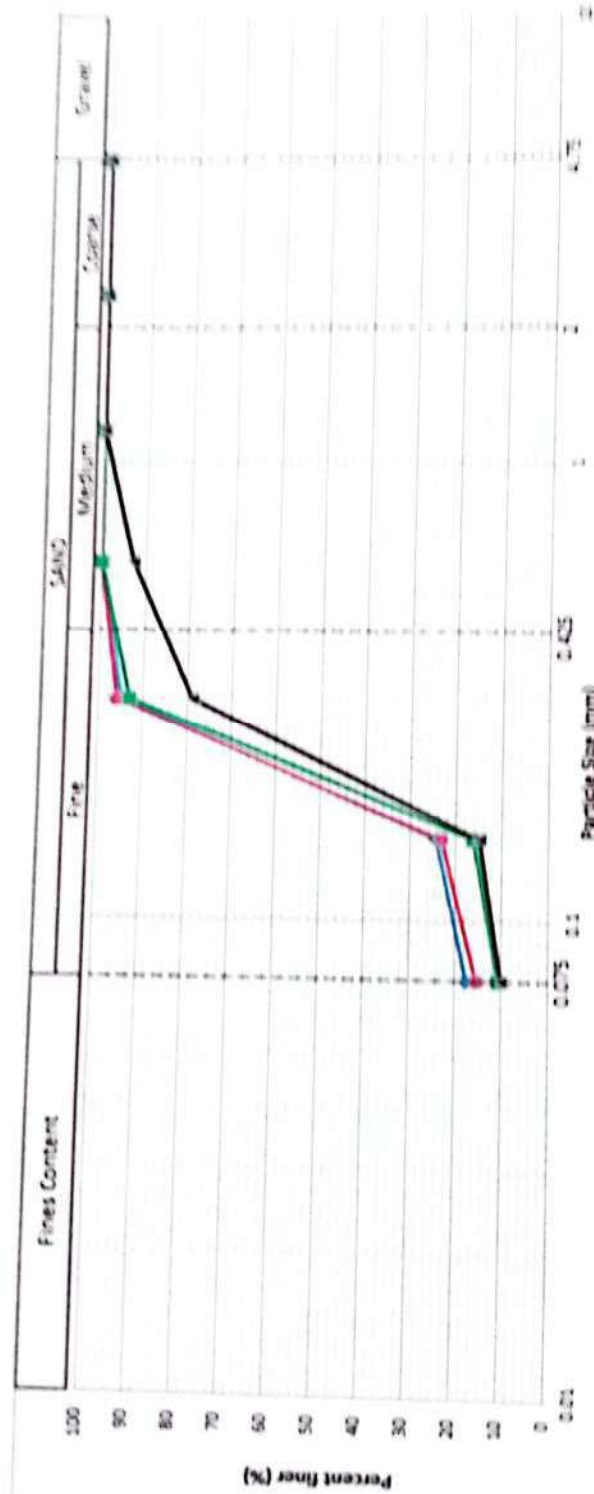


## GRAIN SIZE DISTRIBUTION (SIEVE ANALYSIS)

**Project** Geotechnical Investigation for Residential Building  
**Client** Fortress Holdings Limited  
**Location** Plot #2731, Road #20/A, Block-M, Beshundhara R/A, Dhaka, Bangladesh

### Test Result

**Borehole No.** 2  
**Date** 2021-09-27  
**Sheet No.** 1 of 2



Symbol	BH No.	Sample ID	Depth (m)	Gravel (%)	Sand (%)	Fines (%)	FM	D <sub>10</sub>	D <sub>30</sub>	D <sub>60</sub>	Granularity	Classification
◆	002	D-01	1.5	0	83	17	1.07	< 0.075	0.16	0.21	Coarse grained	Poorly Graded SAND with Silt NP
◆	002	D-02	3.0	0	85	15	1.05	< 0.075	0.16	0.21	Coarse grained	Silt SAND NP
◆	002	D-03	4.5	0	89	11	1.08	< 0.075	0.17	0.22	Coarse grained	Silt SAND NP
◆	002	D-04	6.0	0	90	10	1.11	< 0.075	0.18	0.24	Coarse grained	Silt SAND NP



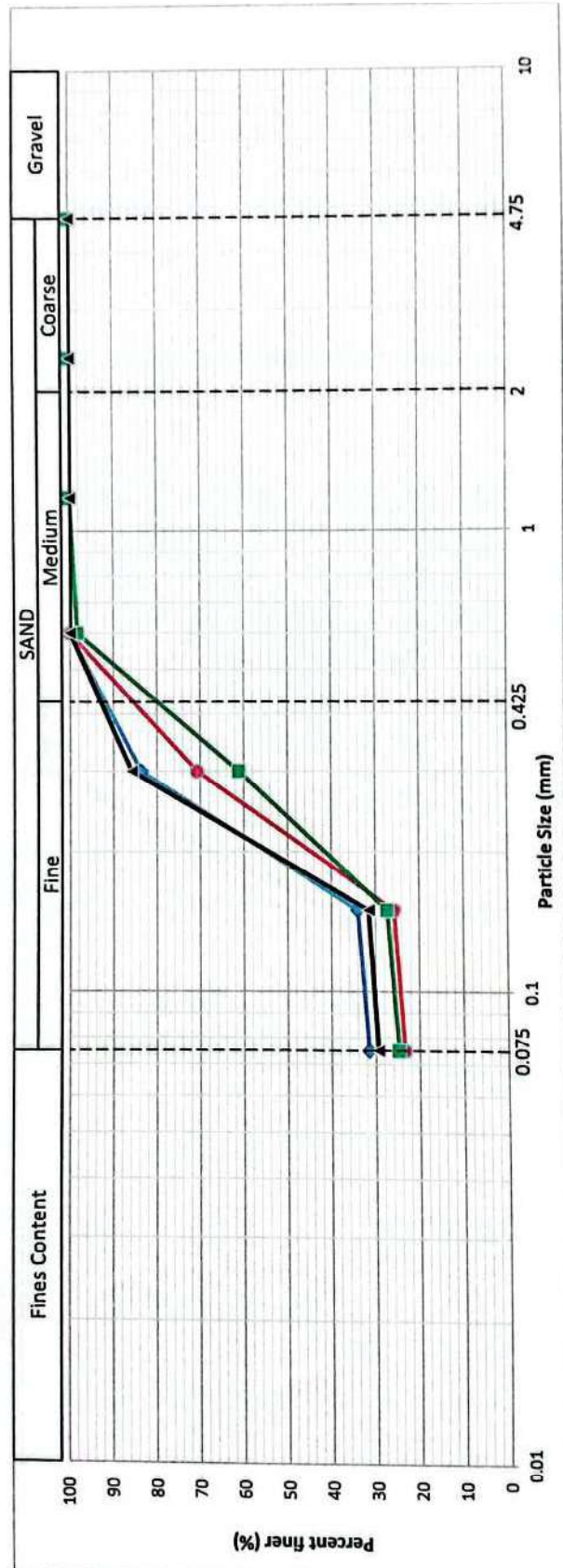
Smart Development Engineering (SDE) Limited

## GRAIN SIZE DISTRIBUTION (SIEVE ANALYSIS)

### Test Result

**Borehole No.** 2  
**Date** 2021-09-27  
**Sheet No.** 2 of 2

**Project** Geotechnical Investigation for Residential Building  
**Client** Fortress Holdings Limited  
**Location** Plot #2731, Road #20/A, Block-M, Bashundhara R/A, Dhaka, Bangladesh



Symbol	BH No.	Sample ID	Depth (m)	Gravel (%)	Sand (%)	Fines (%)	FM	D <sub>10</sub>	D <sub>30</sub>	D <sub>60</sub>	Granularity	Classification
◆	002	D-19	28.5	0	69	31	1.25	<0.075	0.16	0.22	Coarse grained	Silty SAND (NP)
●	002	D-20	30.0	0	77	23	1.39	<0.075	0.16	0.25	Coarse grained	Silty SAND (NP)
■	002	D-21	31.5	0	75	25	1.56	<0.075	0.16	0.29	Coarse grained	Silty SAND (NP)
▲	002	D-22	33.0	0	71	29	1.21	<0.075	0.091	0.22	Coarse grained	Silty SAND (NP)



Smart Development Engineering (SDE) Limited

## GRAIN SIZE DISTRIBUTION (SIEVE ANALYSIS)

### Test Result

**Project:** Geotechnical Investigation for Residential Building

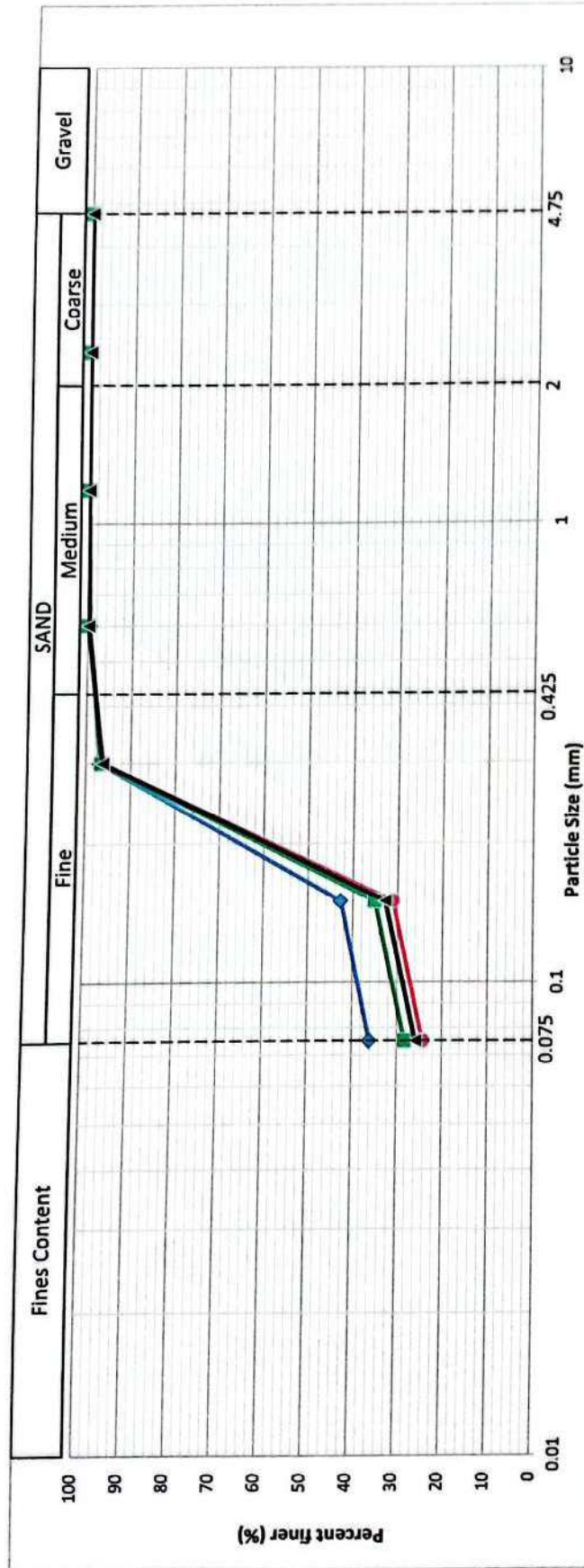
**Client:** Fortress Holdings Limited

**Location:** Plot #2731, Road #20/A, Block-M, Bashundhara R/A, Dhaka, Bangladesh

**Borehole No.** 3

**Date** : 23/09/2021

**Sheet No.** 1 of 3



Symbol	BH No.	Sample ID	Depth (m)	Gravel (%)	Sand (%)	Fines (%)	FM	D <sub>10</sub>	D <sub>30</sub>	D <sub>60</sub>	Granularity	Classification
◆	003	D-01	1.5	0	64	36	1.06	<0.075	<0.075	0.19	Coarse grained	Poorly Graded SAND with Silt (NP)
●	003	D-02	3.0	0	76	24	1.06	<0.075	0.13	0.20	Coarse grained	Silty SAND (NP)
■	003	D-03	4.5	0	72	28	1.06	<0.075	0.090	0.20	Coarse grained	Silty SAND (NP)
▲	003	D-04	6.0	0	74	26	1.06	<0.075	0.11	0.20	Coarse grained	Silty SAND (NP)



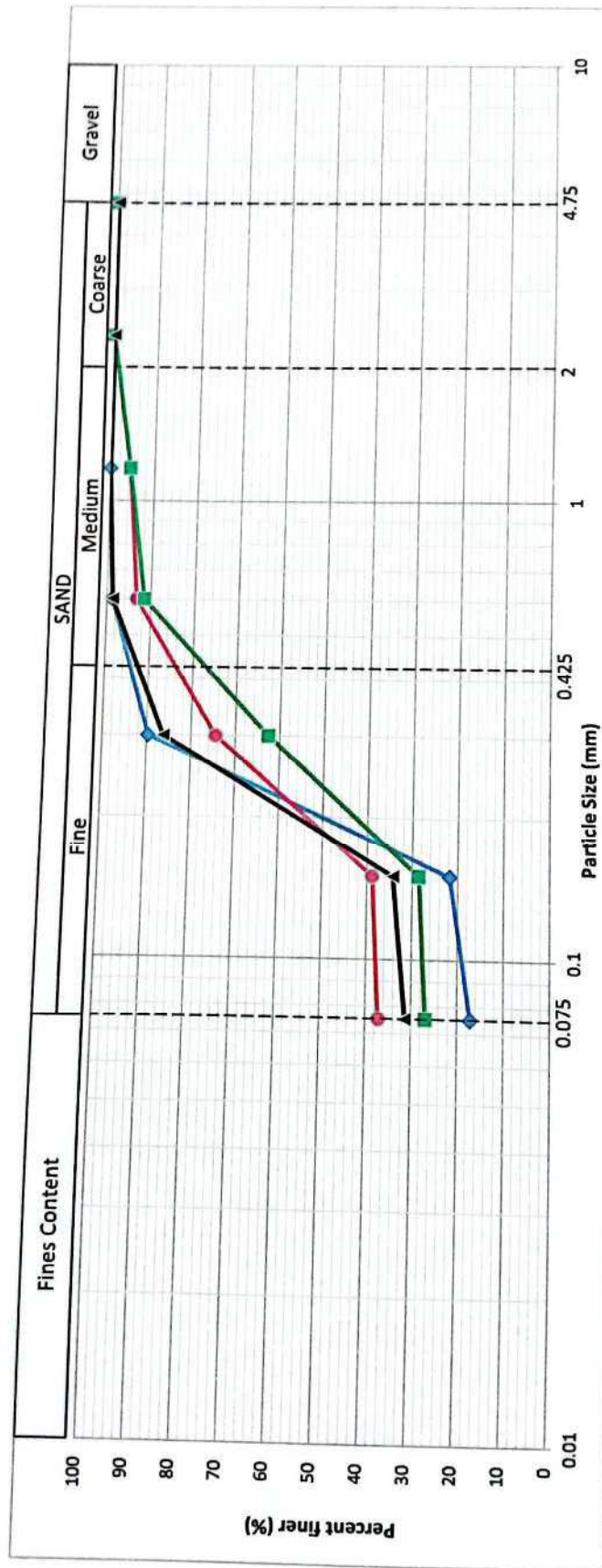
Smart Development Engineering (SDE) Limited

## GRAIN SIZE DISTRIBUTION (SIEVE ANALYSIS)

**Project:** Geotechnical Investigation for Residential Building  
**Client:** Fortress Holdings Limited  
**Location:** Plot #2731, Road #20/A, Block-M, Bashundhara R/A, Dhaka, Bangladesh

### Test Result

**Borehole No.** 3  
**Date** : 23/09/2021  
**Sheet No.** 2 of 3



Symbol	BH No.	Sample ID	Depth (m)	Gravel (%)	Sand (%)	Fines (%)	FM	D <sub>10</sub>	D <sub>30</sub>	D <sub>60</sub>	Granularity	Classification
Blue diamond	003	D-05	7.5	0	83	17	1.15	<0.075	0.16	0.22	Coarse grained	Silty SAND (NP)
Red circle	003	D-20	30.0	0	63	37	1.60	<0.075	<0.075	0.23	Coarse grained	Silty SAND (NP)
Green square	003	D-21	31.5	0	73	27	1.71	<0.075	0.15	0.28	Coarse grained	Silty SAND (NP)
Black triangle	003	D-22	33.0	0	69	31	1.23	<0.075	<0.075	0.21	Coarse grained	Silty SAND (NP)



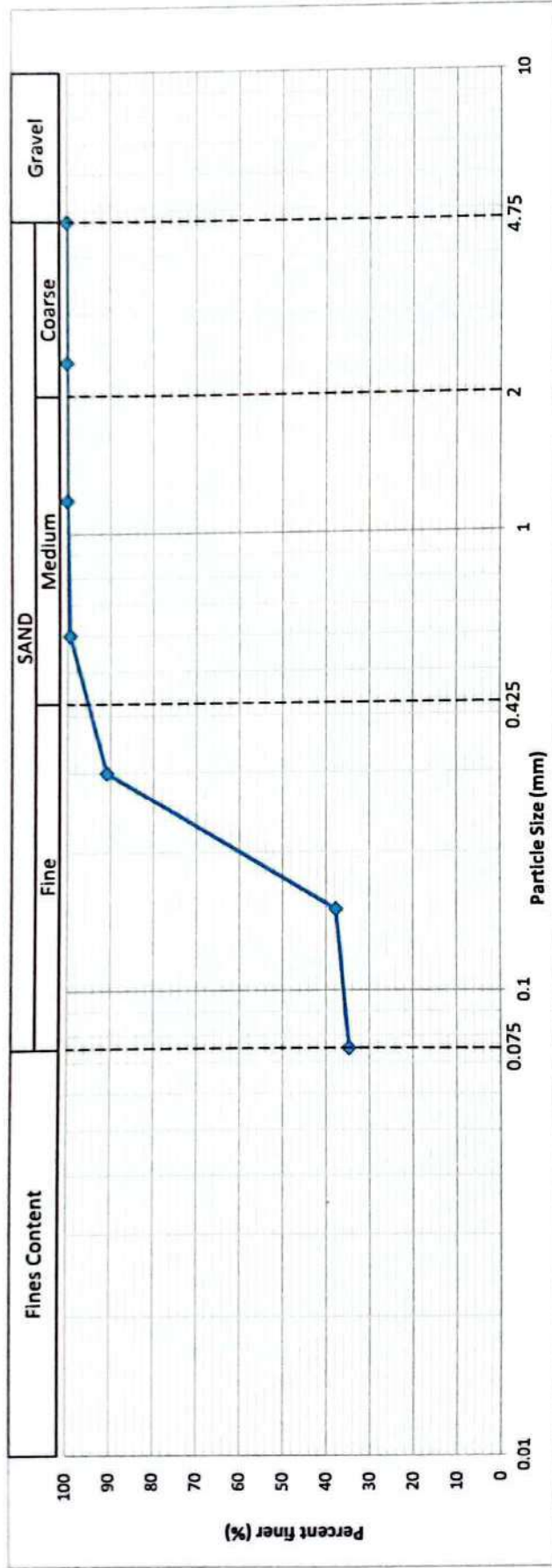
Smart Development Engineering (SDE) Limited

## GRAIN SIZE DISTRIBUTION (SIEVE ANALYSIS)

### Test Result

**Project:** Geotechnical Investigation for Residential Building  
**Client:** Forteress Holdings Limited  
**Location:** Plot #2731, Road #20/A, Block-M, Bashundhara R/A, Dhaka, Bangladesh

**Borehole No.** 3  
**Date** : 23/09/2021  
**Sheet No.** 3 of 3



Symbol	BH No.	Sample ID	Depth (m)	Gravel (%)	Sand (%)	Fines (%)	FM	D <sub>10</sub>	D <sub>30</sub>	D <sub>60</sub>	Granularity	Classification
◆	003	D-23	34.5	0	65	35	1.16	<0.075	<0.075	0.20	Coarse grained	Silty SAND (NP)



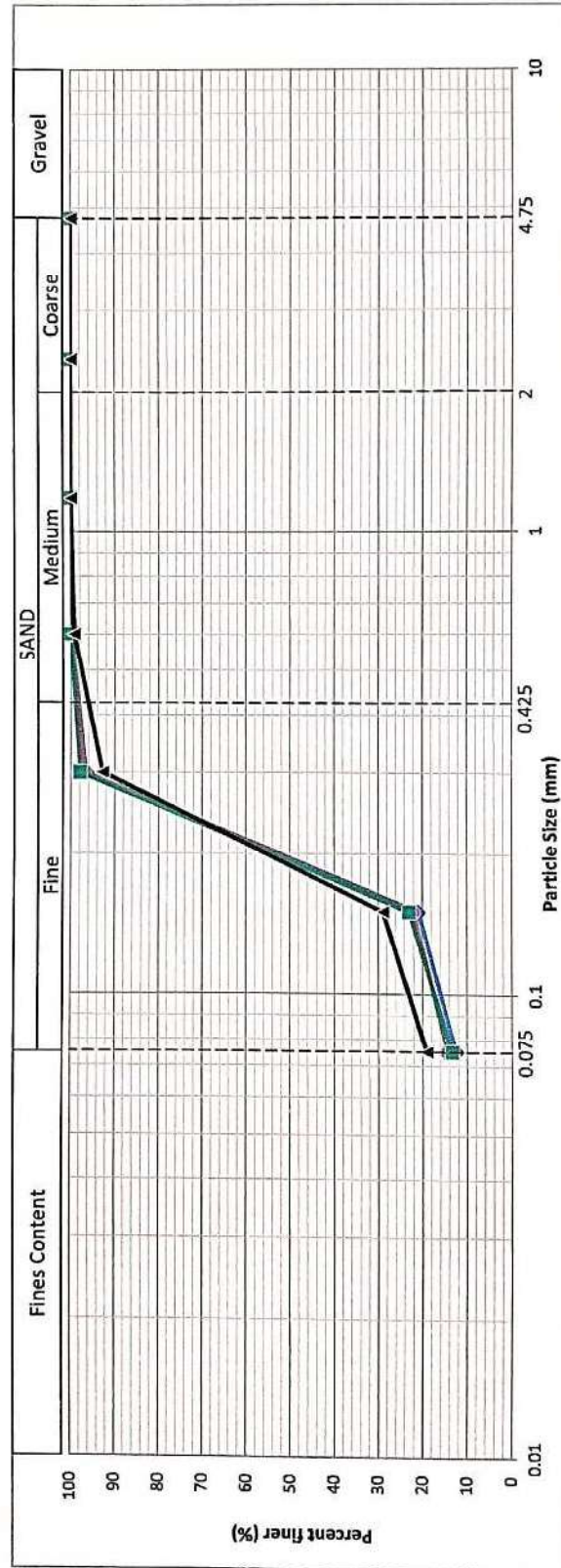
Smart Development Engineering (SDE) Limited

## GRAIN SIZE DISTRIBUTION (SIEVE ANALYSIS)

### Test Result

**Project:** Geotechnical Investigation for Residential Building  
**Client:** Forteress Holdings Limited  
**Location:** Plot #2731, Road #20/A, Block-M, Bashundhara R/A, Dhaka, Bangladesh

**Borehole No.** 4  
**Date** : 23/09/2021  
**Sheet No.** 1 of 2



Symbol	BH No.	Sample ID	Depth (m)	Gravel (%)	Sand (%)	Fines (%)	FM	D <sub>10</sub>	D <sub>30</sub>	D <sub>60</sub>	Granularity	Classification
◆	004	D-01	1.5	0	88	12	1.05	<0.075	0.16	0.21	Coarse grained	Poorly Graded SAND with Silt (NP)
●	004	D-02	3.0	0	86	14	1.04	<0.075	0.16	0.21	Coarse grained	Silty SAND (NP)
■	004	D-03	4.5	0	87	13	1.03	<0.075	0.16	0.21	Coarse grained	Silty SAND (NP)
▲	004	D-04	6.0	0	81	19	1.11	<0.075	0.15	0.21	Coarse grained	Silty SAND (NP)

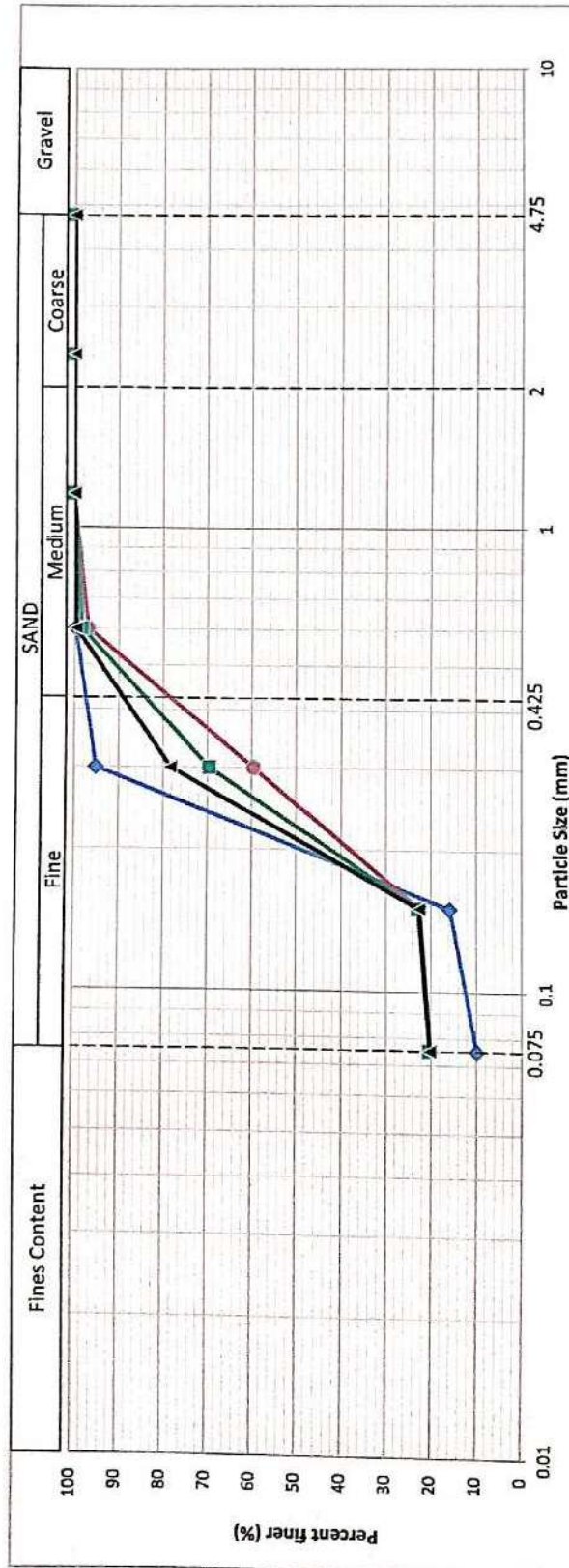


## GRAIN SIZE DISTRIBUTION (SIEVE ANALYSIS)

### Test Result

**Project:** Geotechnical Investigation for Residential Building  
**Client:** Fortress Holdings Limited  
**Location:** Plot #2731, Road #20/A, Block-M, Bashundhara R/A, Dhaka, Bangladesh

**Borehole No.** 4  
**Date** : 23/09/2021  
**Sheet No.** 2 of 2



Symbol	BH No.	Sample ID	Depth (m)	Gravel (%)	Sand (%)	Fines (%)	FM	D <sub>10</sub>	D <sub>30</sub>	D <sub>60</sub>	Granularity	Classification
◆	004	D-05	7.5	0	90	10	1.06	0.076	0.17	0.22	Coarse grained	Silty SAND (NP)
●	004	D-21	31.5	0	80	20	1.56	<0.075	0.17	0.30	Coarse grained	Silty SAND (NP)
■	004	D-22	33.0	0	80	20	1.42	<0.075	0.17	0.26	Coarse grained	Silty SAND (NP)
▲	004	D-21	31.5	0	80	20	1.28	<0.075	0.16	0.24	Coarse grained	Silty SAND (NP)



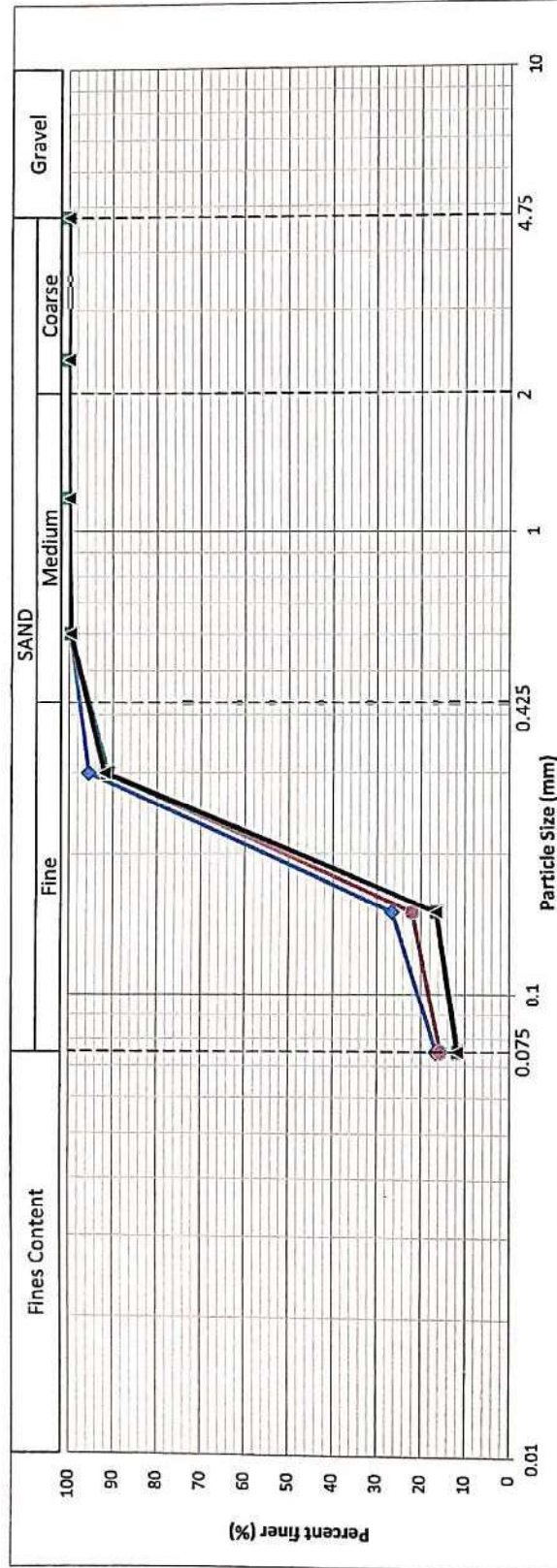
Smart Development Engineering (SDE) Limited

## GRAIN SIZE DISTRIBUTION (SIEVE ANALYSIS)

### Test Result

**Project:** Geotechnical Investigation for Residential Building  
**Client:** Forteress Holdings Limited  
**Location:** Plot #2731, Road #20/A, Block-M, Bashundhara R/A, Dhaka, Bangladesh

**Borehole No.:** 5  
**Date:** 20/09/2021  
**Sheet No.:** 1 of 3



Symbol	BH No.	Sample ID	Depth (m)	Gravel (%)	Sand (%)	Fines (%)	FM	D <sub>10</sub>	D <sub>30</sub>	D <sub>60</sub>	Granularity	Classification
◆	005	D-01	1.5	0	83	17	1.07	<0.075	0.16	0.21	Coarse grained	Poorly Graded SAND with Silt (NP)
●	005	D-02	3.0	0	84	16	1.11	<0.075	0.16	0.22	Coarse grained	Silty SAND (NP)
■	005	D-03	4.5	0	89	11	1.11	<0.075	0.17	0.22	Coarse grained	Silty SAND (NP)
▲	005	D-04	6.0	0	88	12	1.10	<0.075	0.17	0.22	Coarse grained	Silty SAND (NP)



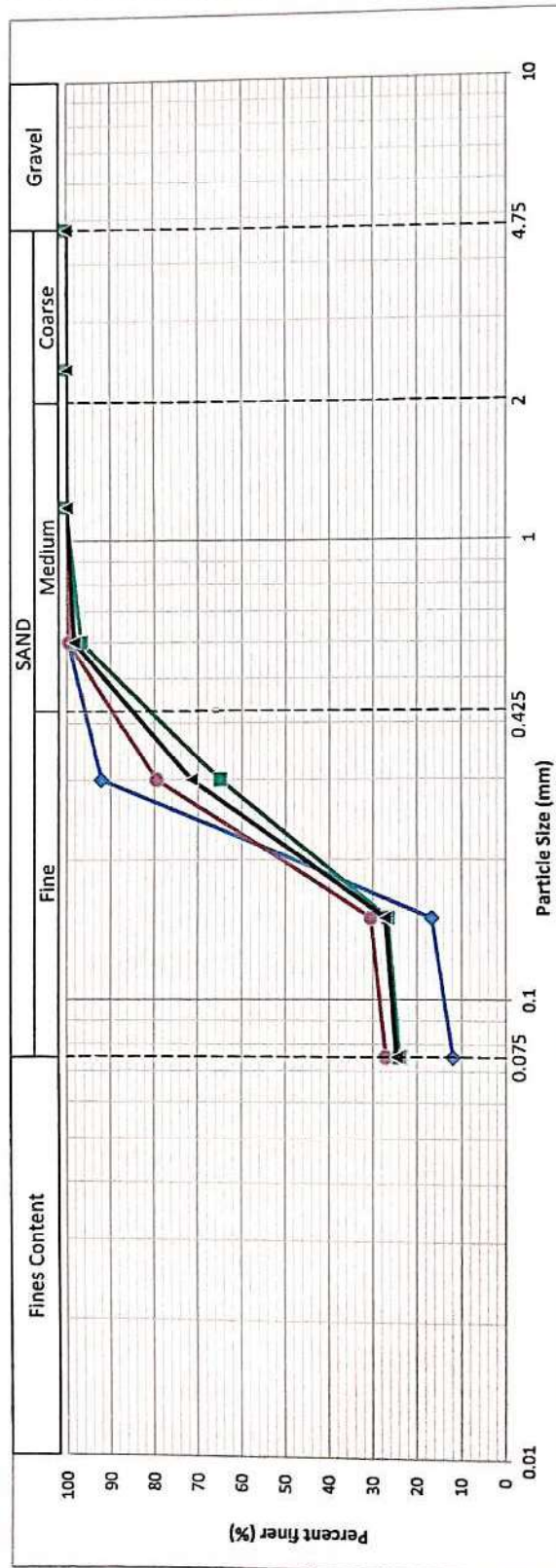
Smart Development Engineering (SDE) Limited

### GRAIN SIZE DISTRIBUTION (SIEVE ANALYSIS)

#### Test Result

Project: Geotechnical Investigation for Residential Building  
 Client: Forteress Holdings Limited  
 Location Plot #2731, Road #20/A, Block-M, Bashundhara R/A, Dhaka, Bangladesh

Borehole No. 5  
 Date : 20/09/2021  
 Sheet No. 2 of 3



Symbol	BH No.	Sample ID	Depth (m)	Gravel (%)	Sand (%)	Fines (%)	FM	D <sub>10</sub>	D <sub>30</sub>	D <sub>60</sub>	Granularity	Classification
◆	005	D-05	7.5	0	88	12	1.10	<0.075	0.17	0.22	Coarse grained	Silty SAND (NP)
●	005	D-19	28.5	0	73	27	1.30	<0.075	0.14	0.23	Coarse grained	Silty SAND (NP)
■	005	D-20	30.0	0	76	24	1.52	<0.075	0.16	0.27	Coarse grained	Silty SAND (NP)
▲	005	D-21	31.5	0	75	25	1.41	<0.075	0.16	0.25	Coarse grained	Silty SAND (NP)



Smart Development Engineering (SDE) Limited

## GRAIN SIZE DISTRIBUTION (SIEVE ANALYSIS)

### Test Result

**Project:** Geotechnical Investigation for Residential Building

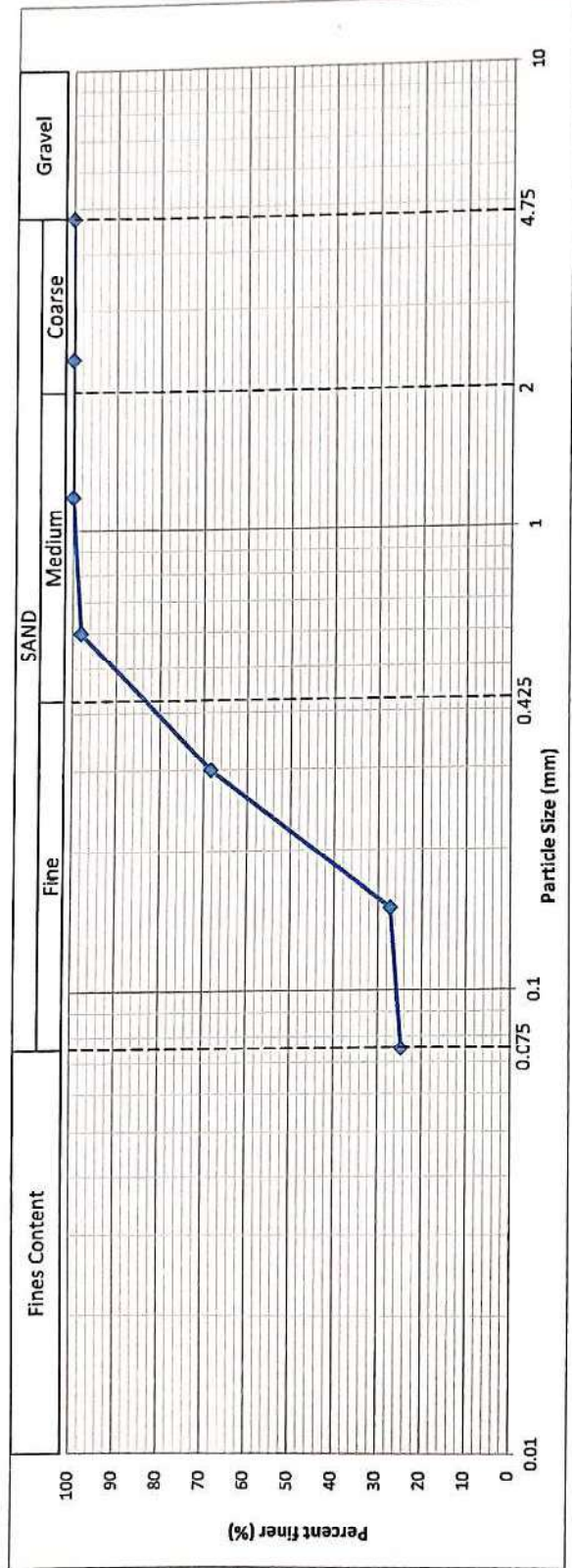
**Client:** Fortress Holdings Limited

**Location:** Plot #2731, Road #20/A, Block-M, Bashundhara R/A, Dhaka, Bangladesh

**Borehole No.:** 5

**Date:** 20/09/2021

**Sheet No.:** 3 of 3



Symbol	BH No.	Sample ID	Depth (m)	Gravel (%)	Sand (%)	Fines (%)	FM	D <sub>10</sub>	D <sub>30</sub>	D <sub>60</sub>	Granularity	Classification
◆	005	D-22	33.0	0	75	25	1.46	<0.075	0.16	0.26	Coarse grained	Silty SAND (NP)

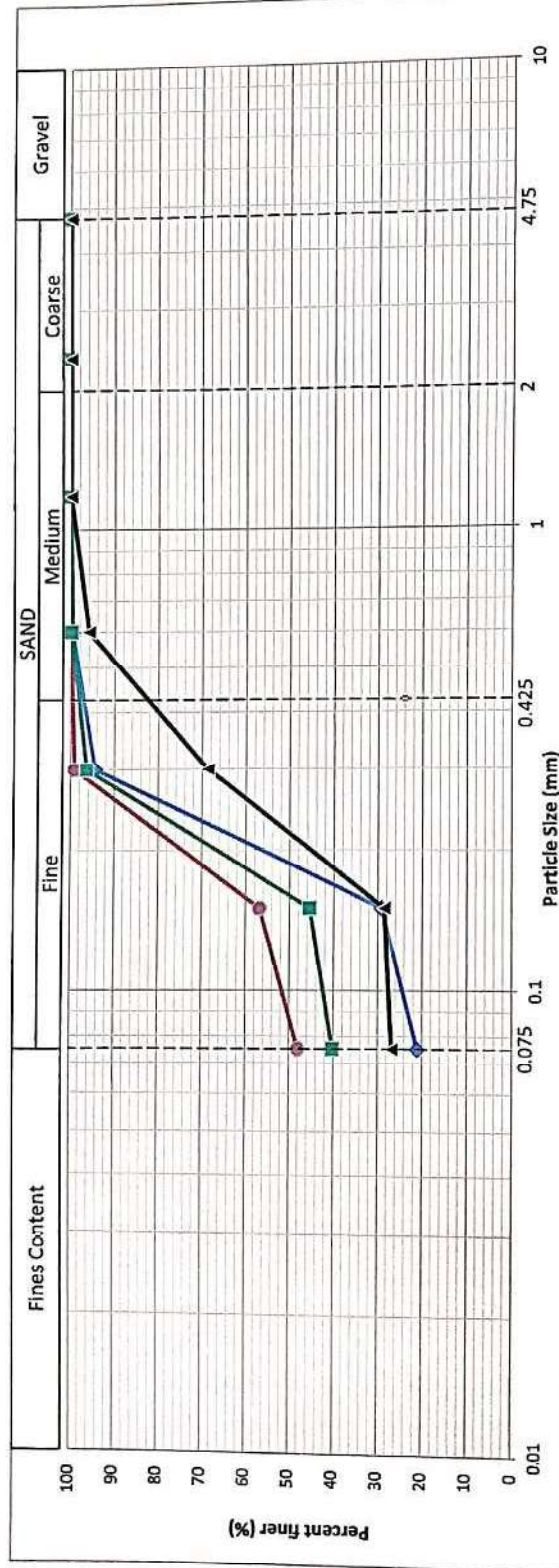


Smart Development Engineering (SDE) Limited

## GRAIN SIZE DISTRIBUTION (SIEVE ANALYSIS)

### Test Result

**Project:** Geotechnical Investigation for Residential Building  
**Client:** Fortress Holdings Limited  
**Location:** Plot #2731, Road #20/A, Block-M, Bashundhara R/A, Dhaka, Bangladesh  
**Borehole No.:** 6  
**Date:** 16/09/2021  
**Sheet No.:** 1 of 2



Symbol	BH No.	Sample ID	Depth (m)	Gravel (%)	Sand (%)	Fines (%)	FM	D <sub>10</sub>	D <sub>30</sub>	D <sub>60</sub>	Granularity	Classification
◆	006	D-01	1.5	0	79	21	1.09	<0.075	0.15	0.21	Coarse grained	Poorly Graded SAND with Silt (NP)
●	006	D-02	3.0	0	52	48	1.02	<0.075	<0.075	0.16	Coarse grained	Silty SAND (NP)
■	006	D-03	4.5	0	60	40	1.07	<0.075	<0.075	0.18	Coarse grained	Silty SAND (NP)
▲	006	D-19	28.5	0	73	27	1.50	<0.075	0.15	0.26	Coarse grained	Silty SAND (NP)



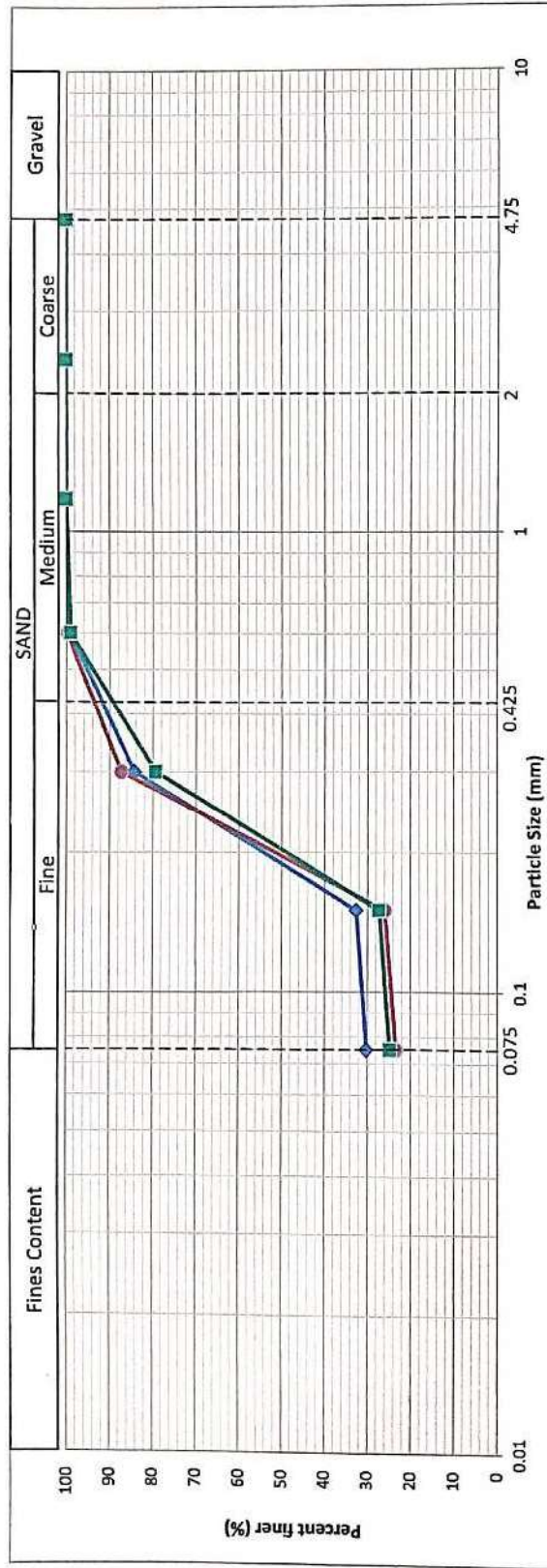
Smart Development Engineering (SDE) Limited

## GRAIN SIZE DISTRIBUTION (SIEVE ANALYSIS)

### Test Result

**Project:** Geotechnical Investigation for Residential Building  
**Client:** Fortress Holdings Limited  
**Location:** Plot #2731, Road #20/A, Block-M, Bashundhara R/A, Dhaka, Bangladesh

**Borehole No.:** 6  
**Date:** 16/09/2021  
**Sheet No.:** 2 of 2



Symbol	BH No.	Sample ID	Depth (m)	Gravel (%)	Sand (%)	Fines (%)	FM	D <sub>10</sub>	D <sub>30</sub>	D <sub>60</sub>	Granularity	Classification
—◆—	006	D-20	30.0	0	70	30	1.25	<0.075	<0.075	0.22	Coarse grained	Silty SAND (NP)
—●—	006	D-21	31.5	0	77	23	1.18	<0.075	0.16	0.22	Coarse grained	Silty SAND (NP)
—■—	006	D-22	33.0	0	75	25	1.30	<0.075	0.16	0.23	Coarse grained	Silty SAND (NP)



Smart Development Engineering (SDE) Limited

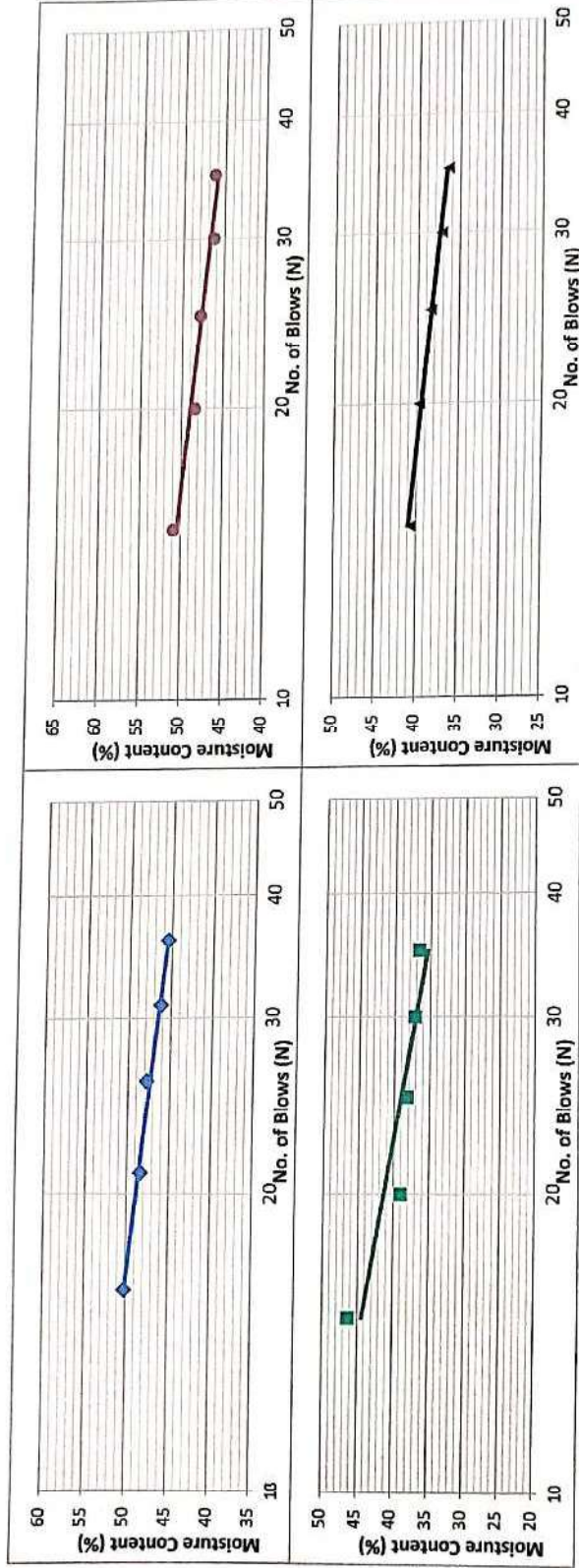


## **APPENDIX 2C: ATTERBERG LIMIT CURVES**

## LIQUID LIMIT & PLASTIC LIMIT

### Test Result

**Project** Geotechnical Investigation for Residential Building  
**Client** Fortress Holdings Limited  
**Location** Plot #2731, Road #20/A, Block-M, Bashundhara R/A, Dhaka, Bangladesh  
**Borehole No.** 1  
**Date** : 12/09/2021 to 13/09/2021  
**Sheet No.** 1 of 4



Symbol	Bore Hole No.	Sample ID	Depth (m)	Liquid Limit, LL	Plastic Limit, PL	Plasticity Index, PI	Classification
◆	001	D-06	9.0	48	25	23	Lean CLAY
●	001	D-07	10.5	48	24	24	Lean CLAY
■	001	D-08	12.0	39	24	15	Lean CLAY
▲	001	D-09	13.5	38	24	14	Lean CLAY

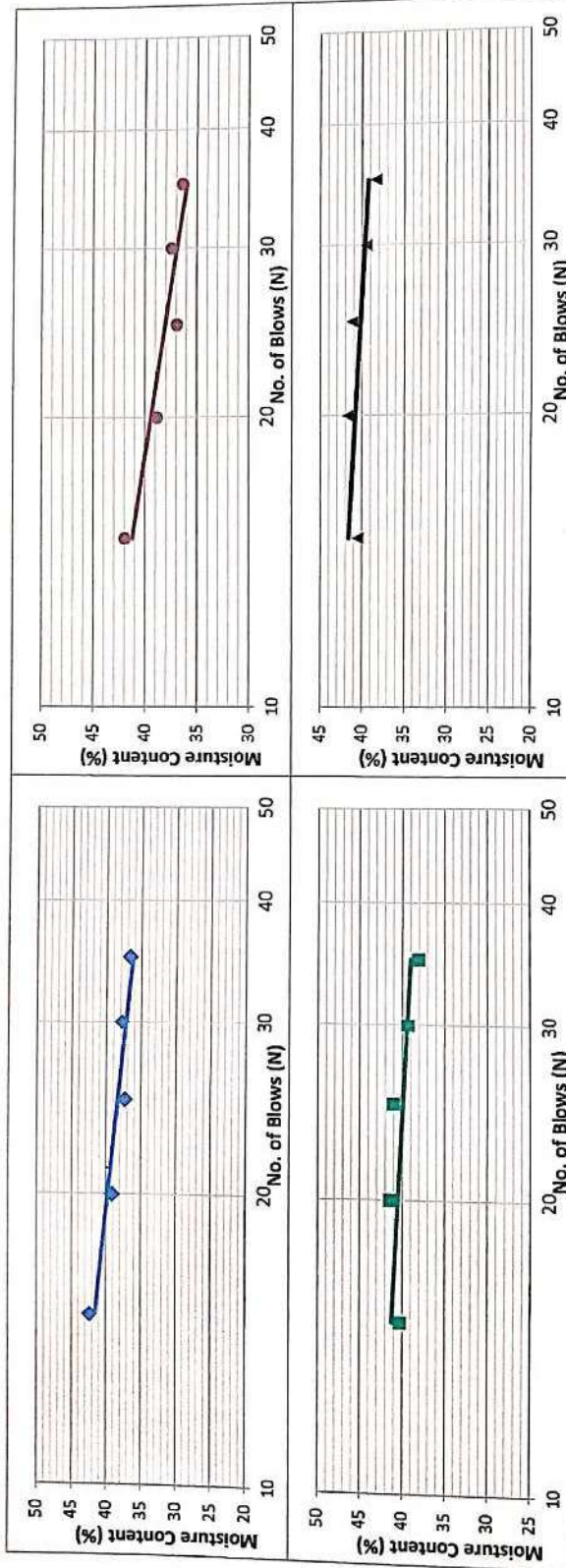


Smart Development Engineering (SDE) Limited

## LIQUID LIMIT & PLASTIC LIMIT

### Test Result

**Project** Geotechnical Investigation for Residential Building  
**Client** Fortress Holdings Limited  
**Location** Plot #2731, Road #20/A, Block-M, Bashundhara R/A, Dhaka, Bangladesh  
**Borehole No.** 1  
**Date** : 12/09/2021 to 13/09/2021  
**Sheet No.** 2 of 4



Symbol	Bore Hole No.	Sample ID	Depth (m)	Liquid Limit, LL	Plastic Limit, PL	Plasticity Index, PI	Classification
◆	001	D-10	15.0	38	24	14	Lean CLAY
●	001	D-11	16.5	38	24	14	Lean CLAY
■	001	D-12	18.0	40	23	17	Lean CLAY
▲	001	D-13	19.5	40	22	18	Lean CLAY

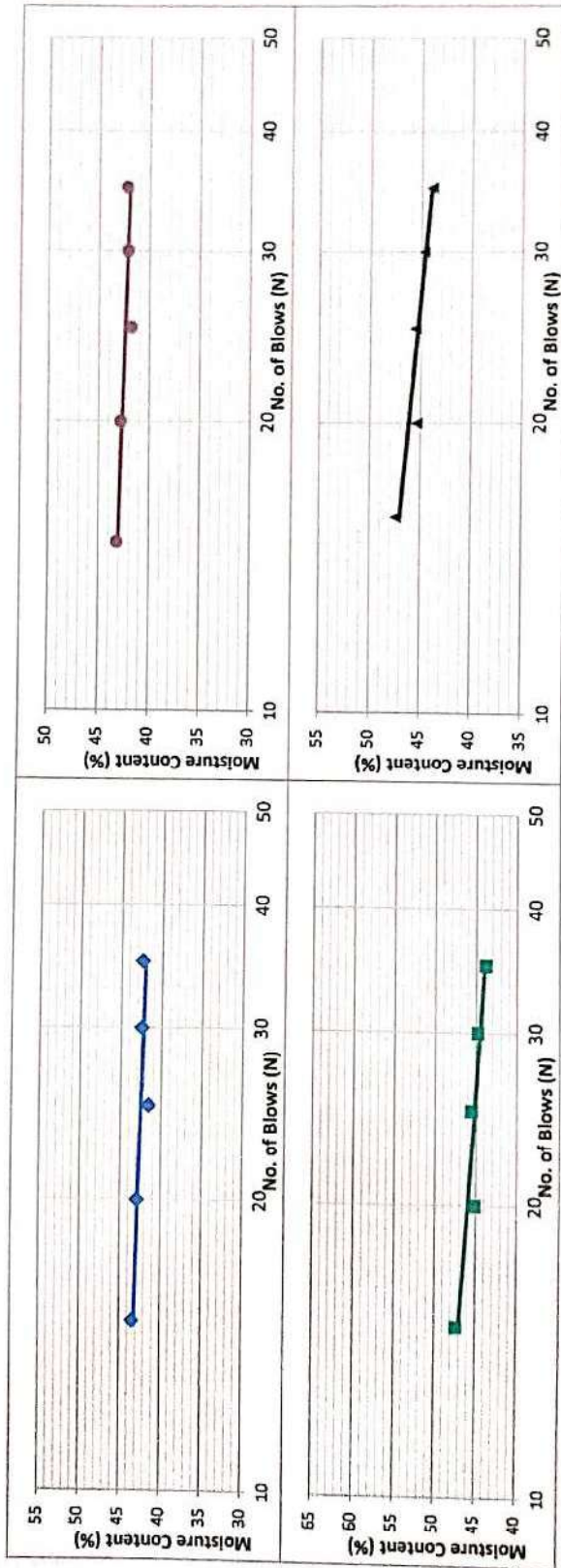


Smart Development Engineering (SDE) Limited

## LIQUID LIMIT & PLASTIC LIMIT

### Test Result

**Project** Geotechnical Investigation for Residential Building  
**Client** Fortress Holdings Limited  
**Location** Plot #2731, Road #20/A, Block-M, Bashundhara R/A, Dhaka, Bangladesh  
**Borehole No.** 1  
**Date** : 12/09/2021 to 13/09/2021  
**Sheet No.** 3 of 4



Symbol	Bore Hole No.	Sample ID	Depth (m)	Liquid Limit, $\omega_L$	Plastic Limit, PL	Plasticity Index, PI	Classification
◆	222	D-14	21.0	42	24	18	Lean CLAY
●	222	D-15	22.5	42	25	17	Lean CLAY
■	222	D-16	24.0	45	24	21	Lean CLAY
▲	222	D-17	25.5	45	24	21	Lean CLAY



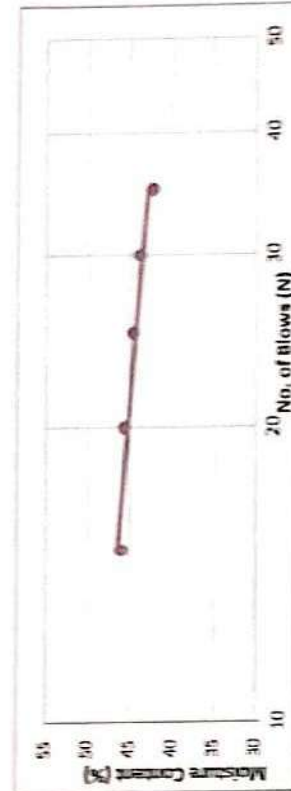
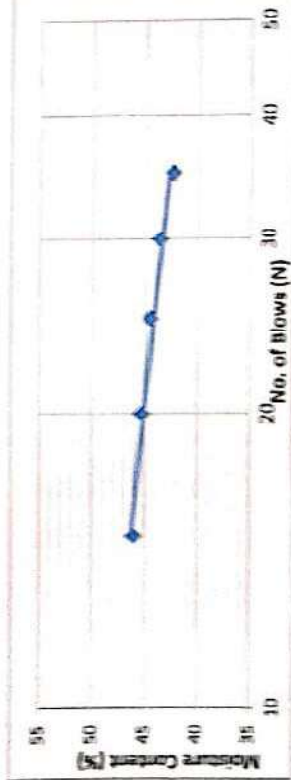
Smart Development Engineering (SDE) Limited

### LIQUID LIMIT & PLASTIC LIMIT

#### Test Result

**Project** Geotechnical Investigation for Residential Building  
**Client** Forteres Holdings Limited  
**Location** Plot #2731, Road #20/A, Block-M, Bashundhara II/A, Dhaka, Bangladesh

**Borehole No.** 1  
**Date** : 12/09/2021 to 13/09/2021  
**Sheet No.** 4 of 4



Symbol	Bore Hole No.	Sample ID	Depth (m)	Liquid Limit, LL	Plastic Limit, PL	Plasticity Index, PI	Classification
◆	001	D-18	27.0	44	24	20	Lean CLAY
◆	001	D-19	28.5	44	24	20	Lean CLAY
◆	-	-	-	-	-	-	-
◆	-	-	-	-	-	-	-



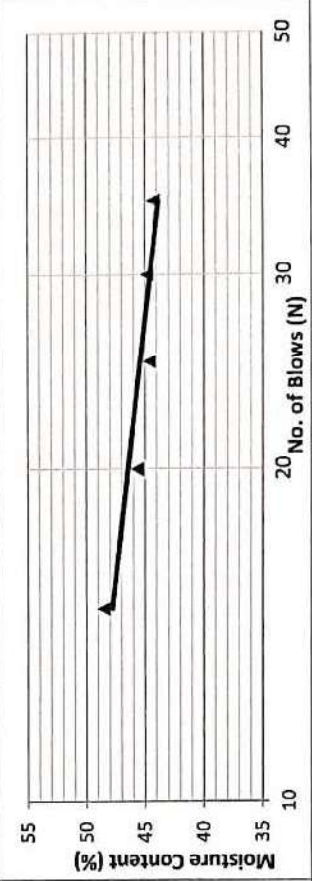
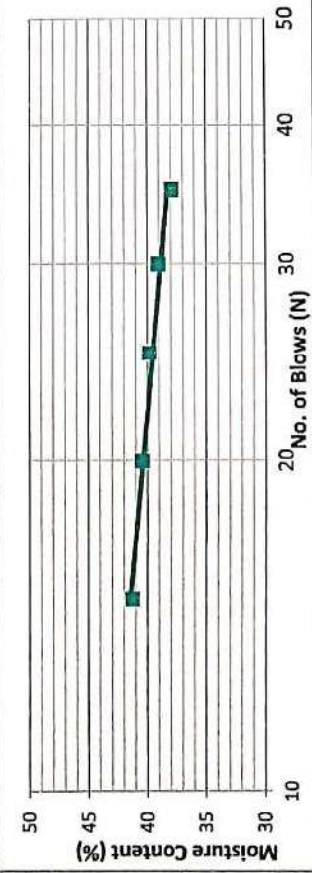
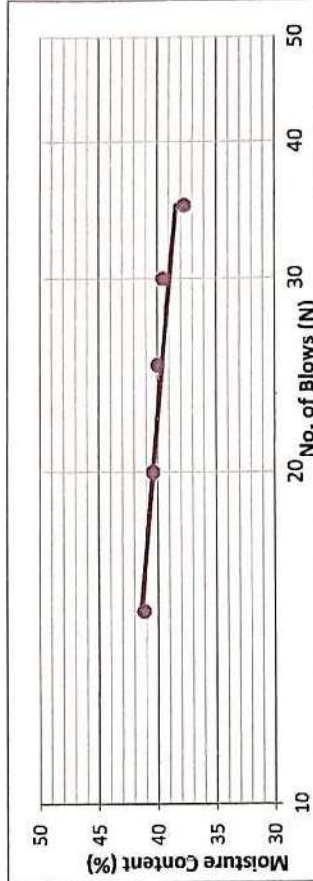
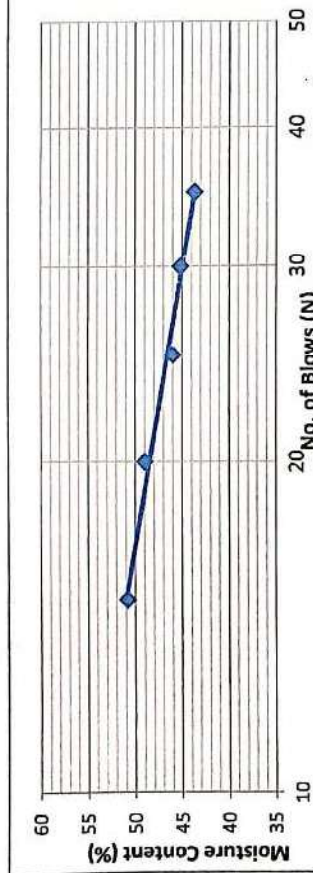
Smart Development Engineering (SDE) Limited

## LIQUID LIMIT & PLASTIC LIMIT

### Test Result

**Project** Geotechnical Investigation for Residential Building  
**Client** Forteress Holdings Limited  
**Location** Plot #2731, Road #20/A, Block-M, Bashundhara R/A, Dhaka, Bangladesh

**Borehole No.** 2  
**Date** : 26/09/2021 to 27/09/2021  
**Sheet No.** 1 of 1



Symbol	Bore Hole No.	Sample ID	Depth (m)	Liquid Limit, LL	Plastic Limit, PL	Plasticity Index, PI	Classification
—◆—	002	D-5,6	7.5-9.00	47	25	22	Lean CLAY
—●—	002	D-7,8,9,10	10.5-15.0	40	22	18	Lean CLAY
—■—	002	D-11,12,13,14	16.5-21	40	22	18	Lean CLAY
—▲—	002	D-15,16,17,18	22.5-27	45	27	18	Lean CLAY

