

Gujarat Metro Rail Corporation (GMRC) Limited

Interim Technical Report of Geotechnical Investigation for proposed Gift City Extension line (3.33 Km Elevated Viaduct and 3 nos. of stations, Phase 2B) of Ahmedabad Metro Rail Project Phase 2 Borehole No. 1 to 15

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Technical report on Geotechnical Investigation for proposed Gift City Extension line (3.33 Km Elevated Viaduct and 3 nos. of stations, Phase 2B) of Ahmedabad Metro Rail Project Phase 2

Borehole No. 1 to 15

1.0 Introduction

This report summarizes the geotechnical investigation performed by us for the proposed structure for Gift City extension line of Ahmedabad Metro Rail Project Phase 2. A complete geotechnical investigation was undertaken by us to obtain the required subsurface information to study and to indicate the nature and behavior of sub soil under stress redistribution and deformation due to underground construction. For this purpose, it is necessary

1. To determine the soil profile of the site
2. To know physical properties and strength characteristics of soil at various depths.

Technical report covers following points,

1. Exploratory bore holes – 15 Nos.
2. Undisturbed samples at regular intervals.
3. Collection of disturbed samples at different intervals.
4. Standard penetration tests in soil at every 1.50m interval.
5. To find physical properties and strength characteristics of undisturbed samples
6. To find physical properties of disturbed samples.
7. To locate ground water table.
8. Interpretation of results, analysis and recommendations.

2.0 Field Exploration

2.1 Exploratory Bore Holes

The exploratory drill hole of 150mm diameter was drilled by rotary drilling method with mud circulation as per IS: 1892. Calix type drilling machine was used. TC section bits and cross blade clay cutter bits were employed depending on the type of stratum. All drill holes were terminated at planned depth. The details of the test bore at the proposed location are as under:

Details of the Exploratory Bore Hole

Bore hole no.	Location	Location Co-ordinates		Depth Investigated (m)
		E	N	
BH-1	GP-6/14	261901	2565232	45.0
BH-2	GP-6/12	261900	2565179	45.0
BH-3	GP-6/10	261896	2565123	45.0
BH-4	GP-6/08	261890	2565065	45.0
BH-5	GP-6/06	261883	2565013	45.0
BH-6	GP-6/04	261877	2564956	45.0
BH-7	GP-6/02	261869	2564903	45.0
BH-8	GTP-06-2/08	261860	2564054	45.0
BH-9	Shahpur station 6	261856	2564814	45.0
BH-10	Shahpur station 4	261853	2564776	45.0
BH-11	GP-3/17	263241	2562796	45.0
BH-12	GP-3/19	263260	2562544	45.0
BH-13	GP-5/21	261828	2564449	45.0
BH-14	GP-3/29	263682	2563128	45.0
BH-15	GP3/39	263071	2563355	45.0

Note: Coordinates were decided by clients.

2.2 Sampling

Sampling was carried out in such a way that reliable estimation of soil properties in each different layer of soil is obtained.

2.2.1 Disturbed samples

Disturbed samples were collected during boring and from the split spoon sampler, almost at every meter interval. The samples recovered were logged, labeled and placed in polyethylene bags and sent to laboratory for testing.

2.2.2 Undisturbed samples

Undisturbed soil samples were collected in thin walled seamless stainless steel Shelby tubes of 85 & 100mm diameter and 450 mm length. The UDS were collected at various depths in different boreholes to represent various strata. The samples were sealed with paraffin wax, labeled and transported to our laboratory at Gota, Ahmedabad for testing.

2.2.3 Standard penetration test

The standard penetration tests were conducted in accordance with IS: 2131-1981 at 1.50m interval. The test results show, N Value i.e. the blow counts of last 30 cm penetration of split spoon sampler when 63.5 kg hammer is dropped from 5 cm height.

3.0 Laboratory Testing

The following table lists the laboratory tests conducted on soil samples collected from various depths to find physical properties and strength characteristics.

List of Laboratory Tests

Tests	Recommended procedure	Type Samples
Sample Preparation	IS 2720 Part 1	DS / UDS
Moisture Content	IS 2720 Part 2	DS / UDS
Bulk / Dry Unit Weight	IS 2720 Part 29	UDS
Specific Gravity	IS 2720 Part 3	DS
Liquid Limit	IS 2720 Part 5	DS / UDS
Plastic Limit	IS 2720 Part 5	DS / UDS
Grain Size Analysis	IS 2720 Part 4	DS / UDS
Soil Classification	IS 1498	DS / UDS
Unconfined compression Test	IS 2720 Part 10	UDS
Triaxial Compression Test	IS 2720 Part 11 & 12	UDS
Direct Shear Test	IS 2720 Part 13	UDS
Consolidation Test	IS 2720 Part 15	UDS
Permeability test	IS 2720 Part 17	UDS

4.0 Site Surface and Geologic Conditions

4.1 Subsurface Soil Conditions

Based on the investigations at the site (see boring logs), the subsurface can be said to be more or less uniform in explored area. There can be six generalized major stratum.

Stratum No. 1 –

From existing ground level to approximately 19.0m depth, medium to very dense, dark brownish to yellowish brown, fine to medium grained, clayey sand and silty clayey sand with occasional gravels is found.

Stratum No. 2 –

This layer comprises of reddish yellow, fine to very fine grained, very stiff, sandy clays of intermediate plasticity with occasional to little gravels upto about 25.0m depth.

Stratum No. 3 –

This layer consists of very dense, Yellowish brown, fine to medium grained, clayey sand with occasional gravels upto about 26.30m depth.

Stratum No. 4 –

Very stiff, fine to medium grained, yellowish brown, fine to very fine grained, sandy clays of intermediate plasticity with some gravels is encountered upto about 35.0m depth.

Stratum No. 5

From 35.0m to 36.90m depth, Yellowish brown to reddish yellow, fine to very fine grained, very dense, clayey sand is observed.

Stratum No. 6

Last layer up to the depth investigated i.e. 45m comprises of hard, fine to very fine grained, reddish yellow, sandy clays of intermediate to high plasticity.

4.2 Groundwater Conditions

Groundwater was not encountered upto 45.0m depths during our subsurface investigation in Month of April 2026.

5.0 Geologic Hazards**5.1 General**

Geologic and seismic hazards are those hazards that may impact a site due to the surrounding geologic and seismic conditions. Geologic hazards include landslides, flooding and erosion, subsidence, and poor soil conditions. Seismic hazards include phenomena that occur during or soon after an earthquake, such as primary ground rupture, strong ground shaking, liquefaction and seismically induced settlement.

The potential for these hazards to impact the site have been assessed based on available information and published data and it can be concluded that there is no potential for landslides, subsidence, fault surface rupture, surface erosion, shear strength loss in seismic condition. Possibility of water logging within site may need to be studied in detail. All identified geologic are considered less significant.

5.2 Poor Soil Conditions (Expansive, Corrosive Soils)

Expansive soils are fine-grained soils (generally high plasticity clays) that can undergo a significant increase in volume with an increase in water content and a significant decrease in volume with a decrease in water content. Changes in the water content of a highly expansive soil can result in severe distress to structures constructed on or against the soil. At site such expansive clays are not encountered near ground level and may be up to probable depth of construction.

Corrosive soils are materials that have the potential to adversely impact buried metallic pipes, concrete, and other underground structures due to their chemical makeup. Factors that influence soil corrosivity include pH, electrical resistivity, and chemical constituents (chloride, sulfate, etc.). Based on test results, it can be said that near soils are typically slightly alkaline and are slightly corrosive to uncoated steel, and are very slightly corrosive to rebar in concrete materials. Soil can be classified in Class 1 based on sulphite content and as per the table no. 4 of IS: 456, 2000. In such exposure, mitigation measures may not be necessary from stand point of sulphite content. The buried concrete may be subjected to moderate exposure.

5.3 Primary Ground Rupture

Primary ground rupture is ground deformation that occurs along the surface trace of the causative fault during an earthquake. No active faults are known to exist in available references, within the subject site area. Therefore, primary ground rupture may not be considered a hazard to the project.

5.4 Strong Ground Motion

The site is located within a seismically active region (Zone 3; *ref IS 1893*). Because the site is in probable seismically active region, it follows that it may be subjected to seismic shaking and strong ground motion resulting from seismic activity along active faults.

5.5 Shear Strength Loss

Liquefaction is a phenomenon whereby, during periods of oscillatory ground motion caused by an event such as an earthquake, the pore-water pressure in a loose, saturated poorly graded cohesionless soils increases to the point where the effective stress in the soil becomes zero and the soil loses a portion of its shear strength. Potential for shear strength loss in earthquake condition may be insignificant because of dense sands.

6.0 Computation of Safe Bearing Capacity

For the proposed structure Bored cast in situ pile is recommended. The bored cast in situ pile in compression; uplift and lateral load having various diameters of various lengths are given in Appendix no. 1 to 15. Initial and routine pile load tests shall be carried out on the piles at site to confirm the capacity of pile worked out theoretically. More reliance would be on the actual load test for all combination of the loads. For design and construction, specification of IS: 2911 (part 1/sec 2) shall strictly be followed.

7.0 Conclusions

7.1 General stratifications are as described in 4.1. For individual locations respective bore logs show the sub soil profiles. Generally alternate layers of granular non cohesive to slightly sandy soils and cohesive soils were observed.

7.2 For the proposed structure Bored cast in situ pile is recommended. The bored cast in situ pile in compression; uplift and lateral load having various diameters of various lengths are given in Appendix no. 1 to 15. Initial and routine pile load tests shall be carried out on the piles at site to confirm the capacity of pile worked out theoretically. More reliance would be on the actual load test for all combination of the loads. For design and construction, specification of IS: 2911 (part 1/sec 2) shall strictly be followed.

7.3 Groundwater was not encountered upto 45.0m depths during our subsurface investigation in Month of April 2026.

7.4 It can be said that near soils are slightly corrosive to uncoated steel and very slightly corrosive to rebar in concrete materials. Soil is classified in Class 1 as per the table no. 4 of IS: 456, 2000. Ordinary portland cement (opc) or ppc or psc can be used. The buried concrete shall be designed for moderate exposure condition as suggested in Table no. 3 of IS: 456, 2000. The minimum cement content though shall not be less than 300 kg/m³ and the W/C shall not be more than 0.50. All necessary precautions including, clear cover to the reinforcement shall be adequate enough.

8.0 Limitations

We have prepared this report for the exclusive use of clients and as per the scope and specification instructed by them verbally or in writing. No other use is anticipated or authorized by clients. The report shall be used only by the client for the project and purposes described herein at the locations shown by him and explored by us.

The finding and recommendations are valid when the onsite and offsite conditions affecting the structures in project are not changed due to the actions of man or nature. Professional judgments presented in this report are based on evaluations of the technical information gathered, understanding of the proposed construction, and general experience in the geotechnical field. We have performed according to generally accepted geotechnical engineering practices followed in the project area at the time the services were provided.

The findings and recommendations presented in this report are based upon soil conditions inferred from site explorations, interpolation of the soil conditions between exploration locations, and extrapolation of these conditions throughout the proposed site area. The extent of investigation as well as specific exploration locations were dictated by the clients. The findings and recommendations are further based on the assumption that the subsurface conditions do not deviate

appreciably from those reported and those assumed. The potential for encountering conditions different from those assumed can never be discounted.

If different subsurface conditions are encountered if any, must be brought to our attention before execution & in a timely manner so that the need for revised recommendations can be evaluated. In the event of changes in design loads or structural characteristics or in location of the structure, clients should review its design based on our recommendation and their applicability to the revision he made in a timely manner.

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Appendix – 1

Calculation of Safe Load on Uniform Diameter Bored Cast in situ Pile.

Project Name: - Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for GMRCL
Location: GP-6/14

The safe load is calculated as follows,

1) Design Stipulations

- | | |
|---|---|
| 1. Type of pile | - Bored cast in situ uniform diameter pile. |
| 2. Pile diameter considered | - 1.00, 1.20, 1.50m |
| 3. Termination depth of pile considered | - 22.00, 24.00, 26.00, 28.00m |
| 4. Cut off Level | - 2.50 m from EGL. |
| 5. Factor of Safety | - 2.50 for compression and 3.00 for uplift |
| 6. Depth of Water table | - Not encountered upto investigation depth. |
| 7. Ref | - IS 2911 P-I, Sec-II, 2021. |

2) Test Data

The parameters are based on BH 1. For evaluation of safe load on piles following characterized layers are considered as described in table below,

Depth (m), from N.G.L.	Cohesion kg/cm ²	Angle of Internal Friction ϕ	Bulk / Submerged Density gm/cc γ_b / γ_{sub}	Reduction Factor α	Earth pressure coefficient K	Angle of wall friction $\delta = \phi$	SPT N Value
0.00 to 2.50	No contribution considered – Within Cutoff Level						
2.50 to 3.50	0.03~0.00*	25	1.61/NA	NA	1.50	19	7
3.50 to 7.50	0.15~0.00*	27	1.83/NA	NA	1.00	27	19-24
7.50 to 19.30	0.03 [#] ~0.00*	30 [#]	1.99 [#] /NA	NA	1.50	23	23->100
19.30 to 26.50	0.12~0.00*	30	2.01/NA	NA	1.00	30	43-77
26.50 to 29.30	2.93 ^{\$}	0	2.05/NA	0.28	NA	NA	43

Notes: - Layers are characterized based on classification and the state of soil in that stratum.

* - In cohesive soils the contribution of the angle of internal friction being insignificant is ignored. While in partly cohesive granular soils contribution of the cohesion being insignificant is ignored.

Shear parameters are the most representative for the layer. NA means not applicable. Characterized N values are considered for each layer.

- # Average of the parameters falling in the same layer has been considered.

- \$ cohesion is obtained as half of the Unconfined Compressive Strength (UCS).

3) Ultimate Load in Compression

3.1) Ultimate load in Compression by Bearing

Ultimate load on pile in end bearing,

$$q_{ub} = A_p * N_c * C_p$$

$$A_p = \text{Cross section area of Pile stem at toe} = \pi d^2/4$$

$$D = \text{Diameter of pile} = d \text{ in m}$$

$$N_c = 9$$

$$C_p = \text{Cohesion at Pile Tip} = 2.93 \text{ kg/cm}^2$$

$$q_{ub} = 0.785 d^2 * 9 * 29.30 = \mathbf{207.00 d^2} \text{ (For Pile terminating at 22.00 to 28.00m from G.L.).}$$

3.2) Ultimate Load in Compression by Skin Friction

Ultimate load in skin friction,

$$q_{uf} = \sum K_i P D_i \tan \delta_i A_{si} + \alpha_i C_{ai} A_{si}$$

First Layer – No contribution considered – (Within Cutoff Level).

$$\text{Second Layer} - K_2 P D_2 \tan \delta_2 A_{s2} = 1.50 * 0.81 * \tan 19 * \pi d * 1.00 = \mathbf{1.31 d}$$

$$\text{Third Layer} - K_3 P D_3 \tan \delta_3 A_{s3} = 1.00 * 5.27 * \tan 27 * \pi d * 4.00 = \mathbf{33.73 d}$$

$$\text{Fourth Layer} - K_4 P D_4 \tan \delta_4 A_{s4} = 1.50 * 20.67 * \tan 23 * \pi d * 11.80 = \mathbf{487.66 d}$$

$$\text{Fifth Layer} - K_5 P D_5 \tan \delta_5 A_{s5} = 1.00 * 28.83 * \tan 30 * \pi d * (\ell - 19.30) = \mathbf{52.29 d (\ell - 19.30)}$$

(For Pile terminating at 22.00 to 26.00m from G.L.).

Fifth Layer – $K5 PD5 \tan \delta_5 A s_5 = 1.00 * 28.83 * \tan 30 * \pi d * 7.20 = 376.50 d$

Sixth Layer – $\alpha_6 Ca_6 A s_6 = 0.28 * 29.30 * \pi d * (\ell - 26.50) = 25.77 d (\ell - 26.50)$

(For Pile terminating at 28.00m from G.L.).

quf = 522.70 d + 52.29 d ($\ell - 19.30$) (For Pile terminating at 22.00 to 26.00m from G.L.).

quf = 899.20 d + 25.77 d ($\ell - 26.50$) (For Pile terminating at 28.00m from G.L.).

Where, ℓ is the pile length and d is diameter of piles, substituting

Ultimate load by both bearing and friction can be as follows for various lengths of piles,

$q_{uc} = q_{ub} + q_{uf}$

$q_{uc} = 207.00 d^2 + 522.70 d + 52.29 d (\ell - 19.30)$ (For Pile terminating at 22.00 to 26.00m from G.L.).

$q_{uc} = 207.00 d^2 + 899.20 d + 25.77 d (\ell - 26.50)$ (For Pile terminating at 28.00m from G.L.).

By substituting various diameters of piles having various lengths, the safe load is worked out considering the safety factor of 2.50 and are given in table below,

Safe Load on Piles in Compression (in Ton)

Termination Depth of Pile in m, from EGL	Termination Depth of Pile in m, from cut-off	Diameter of Pile in, m		
		1.00	1.20	1.50
22.00	19.50	348.32	451.94	603.08
24.00	21.50	390.14	512.55	689.77
26.00	23.50	431.95	573.16	785.20
28.00	25.50	457.86	606.86	833.61

3.3) Ultimate Load in Uplift

Considering skin friction for determination of uplift

Safe Load on Piles in Uplift (in Ton)

Termination Depth of Pile in m, from EGL	Termination Depth of Pile in m, from cut-off	Diameter of Pile in, m		
		1.00	1.20	1.50
22.00	19.50	221.27	277.26	347.31
24.00	21.50	256.11	327.76	419.55
26.00	23.50	290.96	378.27	499.08
28.00	25.50	312.55	406.35	539.42

Note: Self weight of pile is not considered in calculation of ultimate load in uplift.

3.4) Lateral Pile Capacity

The lateral load carrying capacity of long, flexible to intermediate piles constructed with M35 grade concrete and having no free (unsupported) length may be evaluated at a permissible lateral deflection of 1/100 of the pile diameter, in accordance with the provisions of IS 2911 (Part 1/Section 2), as summarized below:

Diameter in, m		1.00	1.20	1.50
Subgrade Reaction in MN/m ³		1.45	1.45	1.45
Stiffness Factor T, in m		4.00	4.63	5.53
Depth of Fixity in, m	Free Head	7.60	8.80	10.50
	Fixed Head	8.70	10.10	12.10
Allowable Horizontal Force in, T	Free Head	10.10	16.30	29.10
	Fixed Head	26.80	43.10	77.00
Allowable Moment Capacity in, Tm	Free Head	26.94	50.07	106.93
	Fixed Head	95.88	178.22	380.58

4) Notes:

1) Initial and Routine pile load tests shall be carried out as per IS 2911, P-4 on the piles to confirm the capacity of pile worked out theoretically. For design and construction, specifications of IS 2911, P-I, S-2, shall strictly be followed. Termination depth of pile shall be from EGL.

Appendix – 2

Calculation of Safe Load on Uniform Diameter Bored Cast in situ Pile.

Project Name: - Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for GMRCCL
Location: GP-6/12

The safe load is calculated as follows,

1) Design Stipulations

- | | |
|---|---|
| 1. Type of pile | - Bored cast in situ uniform diameter pile. |
| 2. Pile diameter considered | - 1.00, 1.20, 1.50m |
| 3. Termination depth of pile considered | - 22.00, 24.00, 26.00, 28.00m |
| 4. Cut off Level | - 2.50 m from EGL. |
| 5. Factor of Safety | - 2.50 for compression and 3.00 for uplift |
| 6. Depth of Water table | - Not encountered upto investigation depth. |
| 7. Ref | - IS 2911 P-I, Sec-II, 2021. |

2) Test Data

The parameters are based on BH 2. For evaluation of safe load on piles following characterized layers are considered as described in table below,

Depth (m), from N.G.L.	Cohesion kg/cm ²	Angle of Internal Friction ϕ	Bulk / Submerged Density gm/cc γ_b / γ_{sub}	Reduction Factor α	Earth pressure coefficient K	Angle of wall friction $\delta = \phi$	SPT N Value
0.00 to 2.50	No contribution considered – Within Cutoff Level						
2.50 to 4.00	0.04~0.00*	25	1.61/NA	NA	1.50	19	12
4.00 to 6.00	0.62	8~0*	1.79/NA	0.72	NA	NA	14
6.00 to 18.50	0.05 [#] ~0.00*	30 [#]	1.95 [#] /NA	NA	1.50	23	17->100
18.50 to 29.00	0.18 [#] ~0.00*	26 [#]	2.06 [#] /NA	NA	1.00	26	44-85

Notes: - Layers are characterized based on classification and the state of soil in that stratum.

* - In cohesive soils the contribution of the angle of internal friction being insignificant is ignored. While in partly cohesive granular soils contribution of the cohesion being insignificant is ignored.

Shear parameters are the most representative for the layer. NA means not applicable. Characterized N values are considered for each layer.

- # Average of the parameters falling in the same layer has been considered.

3) Ultimate Load in Compression

3.1) Ultimate load in Compression by Bearing

Ultimate load on pile in end bearing,

$$q_{ub} = A_p (0.5 \cdot D \cdot \gamma N_\gamma + PD N_q)$$

A_p = Cross section area of Pile stem at toe = $\pi d^2/4$

D = Diameter of pile = d in m

N_γ = 13.18

N_q = 12.00

$$q_{ub} = 0.785d^2 (0.5 \cdot d \cdot 2.06 \cdot 13.18 + 28.42 \cdot 12.00) = 10.66d^3 + 267.72d^2$$

(For Pile terminating at 22.00 to 28.00m from GL)

3.2) Ultimate Load in Compression by Skin Friction

Ultimate load in skin friction,

$$q_{uf} = K_i P D_i \tan \delta_i A_{si} + a_i C_{ai} A_{si}$$

First Layer – No contribution considered – (Within Cutoff Level).

Second Layer – $K_2 PD_2 \tan \delta_2 A_{s2} = 1.50 \cdot 1.21 \cdot \tan 19^\circ \cdot \pi \cdot d \cdot 1.50 = 2.95 d$

Third Layer – $\alpha_3 C_{a3} A_{s3} = 0.72 \cdot 6.20 \cdot \pi \cdot d \cdot 2.00 = 28.05 d$

Fourth Layer – $K_4 PD_4 \tan \delta_4 A_{s4} = 1.50 \cdot 18.18 \cdot \tan 23^\circ \cdot \pi \cdot d \cdot 12.50 = 454.57 d$

Fifth Layer – $K_5 PD_5 \tan \delta_5 A_{s5} = 1.00 \cdot 28.42 \cdot \tan 26^\circ \cdot \pi \cdot d \cdot (l - 18.50) = 43.55 d (l - 18.50)$

(For Pile terminating at 22.00 to 28.00m from G.L.).

$$q_{uf} = 485.57 d + 43.55 d (\ell - 18.50) \text{ (For Pile terminating at 22.00 to 28.00m from G.L.)}$$

Where, ℓ is the pile length and d is diameter of piles, substituting

Ultimate load by both bearing and friction can be as follows for various lengths of piles,

$$q_{uc} = q_{ub} + q_{uf}$$

$$q_{uc} = 10.66d^3 + 267.72d^2 + 485.57 d + 43.55 d (\ell - 18.50)$$

(For Pile terminating at 22.00 to 28.00m from G.L.).

By substituting various diameters of piles having various lengths, the safe load is worked out considering the safety factor of 2.50 and are given in table below,

Safe Load on Piles in Compression (in Ton)

Termination Depth of Pile in m, from EGL	Termination Depth of Pile in m, from cut-off	Diameter of Pile in, m		
		1.00	1.20	1.50
22.00	19.50	366.49	514.97	733.57
24.00	21.50	401.31	567.00	841.35
26.00	23.50	436.13	617.71	939.24
28.00	25.50	470.95	668.42	1027.23

3.3) Ultimate Load in Uplift

Considering skin friction for determination of uplift

Safe Load on Piles in Uplift (in Ton)

Termination Depth of Pile in m, from EGL	Termination Depth of Pile in m, from cut-off	Diameter of Pile in, m		
		1.00	1.20	1.50
22.00	19.50	212.62	267.05	333.82
24.00	21.50	241.64	310.42	394.53
26.00	23.50	270.65	352.67	461.54
28.00	25.50	299.67	394.93	534.87

Note: Self weight of pile is not considered in calculation of ultimate load in uplift.

3.4) Lateral Pile Capacity

The lateral load carrying capacity of long, flexible to intermediate piles constructed with M35 grade concrete and having no free (unsupported) length may be evaluated at a permissible lateral deflection of 1/100 of the pile diameter, in accordance with the provisions of IS 2911 (Part 1/Section 2), as summarized below:

Diameter in, m		1.00	1.20	1.50
Subgrade Reaction in MN/m ³		2.90	2.90	2.90
Stiffness Factor T, in m		3.48	4.03	4.81
Depth of Fixity in, m	Free Head	6.60	7.70	9.10
	Fixed Head	7.60	8.80	10.50
Allowable Horizontal Force in, T	Free Head	15.40	24.70	44.10
	Fixed Head	40.70	65.30	116.70
Allowable Moment Capacity in, Tm	Free Head	35.55	66.07	141.09
	Fixed Head	126.52	235.16	502.18

4) Notes:

1) Initial and Routine pile load tests shall be carried out as per IS 2911, P-4 on the piles to confirm the capacity of pile worked out theoretically. For design and construction, specifications of IS 2911, P-I, S-2, shall strictly be followed. Termination depth of pile shall be from EGL.

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Appendix – 3

Calculation of Safe Load on Uniform Diameter Bored Cast in situ Pile.

Project Name: - Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for GMRCCL
Location: GP-6/10

The safe load is calculated as follows,

1) Design Stipulations

- | | |
|---|---|
| 1. Type of pile | - Bored cast in situ uniform diameter pile. |
| 2. Pile diameter considered | - 1.00, 1.20, 1.50m |
| 3. Termination depth of pile considered | - 22.00, 24.00, 26.00, 28.00m |
| 4. Cut off Level | - 2.50 m from EGL. |
| 5. Factor of Safety | - 2.50 for compression and 3.00 for uplift |
| 6. Depth of Water table | - Not encountered upto investigation depth. |
| 7. Ref | - IS 2911 P-I, Sec-II, 2021. |

2) Test Data

The parameters are based on BH 3. For evaluation of safe load on piles following characterized layers are considered as described in table below,

Depth (m), from N.G.L.	Cohesion kg/cm ²	Angle of Internal Friction ϕ	Bulk / Submerged Density gm/cc γ_b / γ_{sub}	Reduction Factor α	Earth pressure coefficient K	Angle of wall friction $\delta = \phi$	SPT N Value
0.00 to 2.50	No contribution considered – Within Cutoff Level						
2.50 to 2.60	0.05~0.00*	25	1.65/NA	NA	1.50	19	-
2.60 to 7.80	0.64	6~0*	1.78/NA	0.70	NA	NA	9-35
7.80 to 20.00	0.07 [#] ~0.00*	29 [#]	2.05 [#] /NA	NA	1.50	22	34->100
20.00 to 33.00	0.19 [#] ~0.00*	26 [#]	2.10 [#] /NA	NA	1.00	26	48-66

Notes: - Layers are characterized based on classification and the state of soil in that stratum.

* - In cohesive soils the contribution of the angle of internal friction being insignificant is ignored. While in partly cohesive granular soils contribution of the cohesion being insignificant is ignored.

Shear parameters are the most representative for the layer. NA means not applicable. Characterized N values are considered for each layer.

- # Average of the parameters falling in the same layer has been considered.

3) Ultimate Load in Compression

3.1) Ultimate load in Compression by Bearing

Ultimate load on pile in end bearing,

$$q_{ub} = A_p (0.5 \cdot D \cdot \gamma N_\gamma + PD N_q)$$

A_p = Cross section area of Pile stem at toe = $\pi d^2/4$

D = Diameter of pile = d in m

$N_\gamma = 13.18$

$N_q = 12.00$

$$q_{ub} = 0.785d^2 (0.5 \cdot d \cdot 2.10 \cdot 13.18 + 29.31 \cdot 12.00) = 10.86d^3 + 276.10d^2$$

(For Pile terminating at 22.00 to 28.00m from GL)

3.2) Ultimate Load in Compression by Skin Friction

Ultimate load in skin friction,

$$q_{uf} = K_i P D_i \tan \delta_i A_{si} + a_i C_{ai} A_{si}$$

First Layer – No contribution considered – (Within Cutoff Level).

Second Layer – $K_2 PD_2 \tan \delta_2 A_{s2} = 1.50 \cdot 0.08 \cdot \tan 19^\circ \cdot \pi \cdot d \cdot 0.10 = 0.01 d$

Third Layer – $\alpha_3 C_{a3} A_{s3} = 0.70 \cdot 6.40 \cdot \pi \cdot d \cdot 5.20 = 73.19 d$

Fourth Layer – $K_4 PD_4 \tan \delta_4 A_{s4} = 1.50 \cdot 21.93 \cdot \tan 22^\circ \cdot \pi \cdot d \cdot 12.20 = 509.39 d$

Fifth Layer – $K_5 PD_5 \tan \delta_5 A_{s5} = 1.00 \cdot 29.31 \cdot \tan 26^\circ \cdot \pi \cdot d \cdot (\ell - 20.00) = 44.91 d (\ell - 20.00)$

(For Pile terminating at 22.00 to 28.00m from G.L.).

$$q_{uf} = 582.59 d + 44.91 d (\ell - 20.00) \text{ (For Pile terminating at 22.00 to 28.00m from G.L.)}$$

Where, ℓ is the pile length and d is diameter of piles, substituting

Ultimate load by both bearing and friction can be as follows for various lengths of piles,

$$q_{uc} = q_{ub} + q_{uf}$$

$$q_{uc} = 10.86d^3 + 276.10d^2 + 582.59 d + 44.91 d (\ell - 20.00)$$

(For Pile terminating at 22.00 to 28.00m from G.L.)

By substituting various diameters of piles having various lengths, the safe load is worked out considering the safety factor of 2.50 and are given in table below,

Safe Load on Piles in Compression (in Ton)

Termination Depth of Pile in m, from EGL	Termination Depth of Pile in m, from cut-off	Diameter of Pile in, m		
		1.00	1.20	1.50
22.00	19.50	383.47	531.55	758.51
24.00	21.50	419.38	583.71	868.97
26.00	23.50	455.28	635.88	969.35
28.00	25.50	491.19	688.04	1059.64

3.3) Ultimate Load in Uplift

Considering skin friction for determination of uplift

Safe Load on Piles in Uplift (in Ton)

Termination Depth of Pile in m, from EGL	Termination Depth of Pile in m, from cut-off	Diameter of Pile in, m		
		1.00	1.20	1.50
22.00	19.50	223.92	276.27	346.94
24.00	21.50	253.84	319.71	409.32
26.00	23.50	283.76	363.21	478.13
28.00	25.50	313.68	406.68	553.37

Note: Self weight of pile is not considered in calculation of ultimate load in uplift.

3.4) Lateral Pile Capacity

The lateral load carrying capacity of long, flexible to intermediate piles constructed with M35 grade concrete and having no free (unsupported) length may be evaluated at a permissible lateral deflection of 1/100 of the pile diameter, in accordance with the provisions of IS 2911 (Part 1/Section 2), as summarized below:

Diameter in, m		1.00	1.20	1.50
Subgrade Reaction in MN/m ³		2.15	2.15	2.15
Stiffness Factor T, in m		3.70	4.28	5.11
Depth of Fixity in, m	Free Head	7.00	8.10	9.70
	Fixed Head	8.10	9.30	11.10
Allowable Horizontal Force in, T	Free Head	12.80	20.60	36.80
	Fixed Head	34.00	54.60	97.50
Allowable Moment Capacity in, Tm	Free Head	31.54	58.62	125.17
	Fixed Head	112.25	208.63	445.53

4) Notes:

1) Initial and Routine pile load tests shall be carried out as per IS 2911, P-4 on the piles to confirm the capacity of pile worked out theoretically. For design and construction, specifications of IS 2911, P-I, S-2, shall strictly be followed. Termination depth of pile shall be from EGL.

Dr. K. K. Thaker

Appendix – 4

Calculation of Safe Load on Uniform Diameter Bored Cast in situ Pile.

Project Name: - Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for GMRL
Location: GP-6/08

The safe load is calculated as follows,

1) Design Stipulations

- | | |
|---|---|
| 1. Type of pile | - Bored cast in situ uniform diameter pile. |
| 2. Pile diameter considered | - 1.00, 1.20, 1.50m |
| 3. Termination depth of pile considered | - 22.00, 24.00, 26.00, 28.00m |
| 4. Cut off Level | - 2.50 m from EGL. |
| 5. Factor of Safety | - 2.50 for compression and 3.00 for uplift |
| 6. Depth of Water table | - Not encountered upto investigation depth. |
| 7. Ref | - IS 2911 P-I, Sec-II, 2021. |

2) Test Data

The parameters are based on BH 4. For evaluation of safe load on piles following characterized layers are considered as described in table below,

Depth (m), from N.G.L.	Cohesion kg/cm ²	Angle of Internal Friction ϕ	Bulk / Submerged Density gm/cc γ_b / γ_{sub}	Reduction Factor α	Earth pressure coefficient K	Angle of wall friction $\delta = 3/4\phi$	SPT N Value
0.00 to 2.50	No contribution considered – Within Cutoff Level						
2.50 to 7.80	0.81	8~0*	1.76/NA	0.57	NA	NA	16-61
7.80 to 19.20	0.03 [#] ~0.00*	31 [#]	2.07 [#] /NA	NA	1.50	23	38->100
19.20 to 25.30	5.17 ^{\$}	0	2.20/NA	0.28	NA	NA	94->100
25.30 to 29.40	0.00	33 ^{\$}	2.20/NA	NA	1.50	25	70->100

Notes: - Layers are characterized based on classification and the state of soil in that stratum.

* - In cohesive soils the contribution of the angle of internal friction being insignificant is ignored. While in partly cohesive granular soils contribution of the cohesion being insignificant is ignored.

Shear parameters are the most representative for the layer. NA means not applicable. Characterized N values are considered for each layer.

- # Average of the parameters falling in the same layer has been considered.

- \$ Parameters of this layer is considered based on SPT N value. Cohesion is obtained using correlation given by Stroud, 1975.

3) Ultimate Load in Compression

3.1) Ultimate load in Compression by Bearing

Ultimate load on pile in end bearing,

$$q_{ub} = A_p * N_c * C_p$$

$$A_p = \text{Cross section area of Pile stem at toe} = \pi d^2 / 4$$

$$D = \text{Diameter of pile} = d \text{ in m}$$

$$N_c = 9$$

$$C_p = \text{Cohesion at Pile Tip} = 5.17 \text{ kg/cm}^2$$

$$q_{ub} = 0.785 d^2 * 9 * 51.70 = 365.26 d^2 \text{ (For Pile terminating at 22.00 to 24.00m from G.L.)}$$

Ultimate load on pile in end bearing,

$$q_{ub} = A_p (0.5 * D \gamma N_v + PD N_q)$$

$$A_p = \text{Cross section area of Pile stem at toe} = \pi d^2 / 4$$

$$D = \text{Diameter of pile} = d \text{ in m}$$

$$N_v = 37.78$$

$$N_q = 35.00$$

$$q_{ub} = 0.785 d^2 (0.5 * d * 2.20 * 37.78 + 29.41 * 35.00) = 32.62 d^3 + 808.04 d^2$$

(For Pile terminating at 26.00 to 28.00m from GL)

3.2) Ultimate Load in Compression by Skin Friction

Ultimate load in skin friction,

$$q_{uf} = K_i P D_i \tan \delta_i A_{si} + \alpha_i C_{ai} A_{si}$$

First Layer – No contribution considered – (Within Cutoff Level).

Second Layer – $\alpha_2 Ca_2 As_2 = 0.57 * 8.10 * \pi d * 5.30 = 76.88 d$

Third Layer – $K_3 PD_3 \tan \delta_3 As_3 = 1.50 * 21.13 * \tan 23^\circ * \pi d * 11.40 = 481.83 d$

Fourth Layer – $\alpha_4 Ca_4 As_4 = 0.28 * 51.70 * \pi d * (\ell - 19.20) = 45.48 d (\ell - 19.20)$

(For Pile terminating at 22.00 to 24.00m from G.L.).

Fourth Layer – $\alpha_4 Ca_4 As_4 = 0.28 * 51.70 * \pi d * 6.10 = 277.41 d$

Fifth Layer – $K_5 PD_5 \tan \delta_5 As_5 = 1.50 * 29.41 * \tan 25^\circ * \pi d * (\ell - 25.30) = 64.63 d (\ell - 25.30)$

(For Pile terminating at 26.00 to 28.00m from G.L.).

quf = 558.71 d + 45.48 d ($\ell - 19.20$) (For Pile terminating at 22.00 to 24.00m from G.L.).

quf = 836.12 d + 64.63 d ($\ell - 25.30$) (For Pile terminating at 26.00 to 28.00m from G.L.).

Where, ℓ is the pile length and d is diameter of piles, substituting

Ultimate load by both bearing and friction can be as follows for various lengths of piles,

$q_{uc} = q_{ub} + q_{uf}$

$q_{uc} = 365.26 d^2 + 558.71 d + 45.48 d (\ell - 19.20)$

(For Pile terminating at 22.00 to 24.00m from G.L.).

$q_{uc} = 32.62 d^3 + 808.04 d^2 + 836.12 d + 64.63 d (\ell - 25.30)$

(For Pile terminating at 26.00 to 28.00m from G.L.).

By substituting various diameters of piles having various lengths, the safe load is worked out considering the safety factor of 2.50 and are given in table below,

Safe Load on Piles in Compression (in Ton)

Termination Depth of Pile in m, from EGL	Termination Depth of Pile in m, from cut-off	Diameter of Pile in, m		
		1.00	1.20	1.50
22.00	19.50	420.46	539.62	740.27
24.00	21.50	456.83	583.26	794.82
26.00	23.50	688.71	1016.59	1717.53
28.00	25.50	740.39	1092.05	1837.95

3.3) Ultimate Load in Uplift

Considering skin friction for determination of uplift

Safe Load on Piles in Uplift (in Ton)

Termination Depth of Pile in m, from EGL	Termination Depth of Pile in m, from cut-off	Diameter of Pile in, m		
		1.00	1.20	1.50
22.00	19.50	228.63	274.36	342.95
24.00	21.50	258.94	310.72	388.40
26.00	23.50	293.71	356.37	453.07
28.00	25.50	336.77	419.25	553.42

Note: Self weight of pile is not considered in calculation of ultimate load in uplift.

3.4) Lateral Pile Capacity

The lateral load carrying capacity of long, flexible to intermediate piles constructed with M35 grade concrete and having no free (unsupported) length may be evaluated at a permissible lateral deflection of 1/100 of the pile diameter, in accordance with the provisions of IS 2911 (Part 1/Section 2), as summarized below:

Diameter in, m		1.00	1.20	1.50
Subgrade Reaction in MN/m ³		3.70	3.70	3.70
Stiffness Factor T, in m		3.31	3.84	4.58
Depth of Fixity in, m	Free Head	6.30	7.30	8.70
	Fixed Head	7.20	8.40	10.00
Allowable Horizontal Force in, T	Free Head	17.80	28.60	51.00
	Fixed Head	47.10	75.60	135.10
Allowable Moment Capacity in, Tm	Free Head	39.18	72.83	155.53
	Fixed Head	139.47	259.23	553.58

4) Notes:

1) Initial and Routine pile load tests shall be carried out as per IS 2911, P-4 on the piles to confirm the capacity of pile worked out theoretically. For design and construction, specifications of IS 2911, P-I, S-2, shall strictly be followed. Termination depth of pile shall be from EGL.

Dr. K. K. Thaker

Appendix – 5

Calculation of Safe Load on Uniform Diameter Bored Cast in situ Pile.

Project Name: - Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for GMRL
Location: GP-6/06

The safe load is calculated as follows,

1) Design Stipulations

- | | |
|---|---|
| 1. Type of pile | - Bored cast in situ uniform diameter pile. |
| 2. Pile diameter considered | - 1.00, 1.20, 1.50m |
| 3. Termination depth of pile considered | - 22.00, 24.00, 26.00, 28.00m |
| 4. Cut off Level | - 2.50 m from EGL. |
| 5. Factor of Safety | - 2.50 for compression and 3.00 for uplift |
| 6. Depth of Water table | - Not encountered upto investigation depth. |
| 7. Ref | - IS 2911 P-I, Sec-II, 2021. |

2) Test Data

The parameters are based on BH 5. For evaluation of safe load on piles following characterized layers are considered as described in table below,

Depth (m), from N.G.L.	Cohesion kg/cm ²	Angle of Internal Friction ϕ	Bulk / Submerged Density gm/cc γ_b / γ_{sub}	Reduction Factor α	Earth pressure coefficient K	Angle of wall friction $\delta = \phi$	SPT N Value
0.00 to 2.50	No contribution considered – Within Cutoff Level						
2.50 to 5.70	0.15~0.00*	27	1.86/NA	NA	1.00	27	14-30
5.70 to 16.60	0.04 [#] ~0.00*	30 [#]	2.00 [#] /NA	NA	1.50	23	40-92
16.60 to 31.30	3.58 ^{\$}	0	2.00/NA	0.28	NA	NA	64->100

Notes: - Layers are characterized based on classification and the state of soil in that stratum.

* - In cohesive soils the contribution of the angle of internal friction being insignificant is ignored. While in partly cohesive granular soils contribution of the cohesion being insignificant is ignored.

Shear parameters are the most representative for the layer. NA means not applicable. Characterized N values are considered for each layer.

- # Average of the parameters falling in the same layer has been considered.

- \$ Parameters of this layer is considered based on SPT N value. Cohesion is obtained using correlation given by Stroud, 1975.

3) Ultimate Load in Compression

3.1) Ultimate load in Compression by Bearing

Ultimate load on pile in end bearing,

$$q_{ub} = A_p * N_c * C_p$$

$$A_p = \text{Cross section area of Pile stem at toe} = \pi d^2 / 4$$

$$D = \text{Diameter of pile} = d \text{ in m}$$

$$N_c = 9$$

$$C_p = \text{Cohesion at Pile Tip} = 3.58 \text{ kg/cm}^2$$

$$q_{ub} = 0.785 d^2 * 9 * 35.80 = \mathbf{252.93 d^2} \text{ (For Pile terminating at 22.00 to 28.00m from G.L.).}$$

3.2) Ultimate Load in Compression by Skin Friction

Ultimate load in skin friction,

$$q_{uf} = K_i P D_i \tan \delta_i A_{si} + \alpha_i C_{ai} A_{si}$$

First Layer – No contribution considered – (Within Cutoff Level).

$$\text{Second Layer} - K_2 P D_2 \tan \delta_2 A_{s2} = 1.00 * 2.98 * \tan 27 * \pi d * 3.20 = \mathbf{15.26 d}$$

$$\text{Third Layer} - K_3 P D_3 \tan \delta_3 A_{s3} = 1.50 * 16.85 * \tan 23 * \pi d * 10.90 = \mathbf{367.38 d}$$

$$\text{Fourth Layer} - \alpha_4 C_{a4} A_{s4} = 0.28 * 35.80 * \pi d * (\ell - 16.60) = \mathbf{31.49 d (\ell - 16.60)}$$

(For Pile terminating at 22.00 to 28.00m from G.L.).

$$q_{uf} = \mathbf{382.64 d + 31.49 d (\ell - 16.60)} \text{ (For Pile terminating at 22.00 to 28.00m from G.L.).}$$

Where, ℓ is the pile length and d is diameter of piles, substituting

Ultimate load by both bearing and friction can be as follows for various lengths of piles,

$$q_{uc} = q_{ub} + q_{uf}$$

$$q_{uc} = 252.93 d^2 + 382.64 d + 31.49 d (l - 16.60) \text{ (For Pile terminating at 22.00 to 28.00m from G.L.)}$$

By substituting various diameters of piles having various lengths, the safe load is worked out considering the safety factor of 2.50 and are given in table below,

Safe Load on Piles in Compression (in Ton)

Termination Depth of Pile in m, from EGL	Termination Depth of Pile in m, from cut-off	Diameter of Pile in, m		
		1.00	1.20	1.50
22.00	19.50	322.15	410.86	559.10
24.00	21.50	347.33	441.08	596.87
26.00	23.50	372.51	471.29	634.64
28.00	25.50	397.69	501.51	672.41

3.3) Ultimate Load in Uplift

Considering skin friction for determination of uplift

Safe Load on Piles in Uplift (in Ton)

Termination Depth of Pile in m, from EGL	Termination Depth of Pile in m, from cut-off	Diameter of Pile in, m		
		1.00	1.20	1.50
22.00	19.50	184.15	220.98	276.22
24.00	21.50	205.13	246.16	307.70
26.00	23.50	226.12	271.34	339.17
28.00	25.50	247.10	296.52	370.65

Note: Self weight of pile is not considered in calculation of ultimate load in uplift.

3.4) Lateral Pile Capacity

The lateral load carrying capacity of long, flexible to intermediate piles constructed with M35 grade concrete and having no free (unsupported) length may be evaluated at a permissible lateral deflection of 1/100 of the pile diameter, in accordance with the provisions of IS 2911 (Part 1/Section 2), as summarized below:

Diameter in, m		1.00	1.20	1.50
Subgrade Reaction in MN/m ³		3.30	3.30	3.30
Stiffness Factor T, in m		3.39	3.92	4.69
Depth of Fixity in, m	Free Head	6.40	7.50	8.90
	Fixed Head	7.40	8.60	10.20
Allowable Horizontal Force in, T	Free Head	16.60	26.70	47.60
	Fixed Head	44.00	70.60	126.10
Allowable Moment Capacity in, Tm	Free Head	37.43	69.57	148.57
	Fixed Head	133.23	247.64	528.82

4) Notes:

1) Initial and Routine pile load tests shall be carried out as per IS 2911, P-4 on the piles to confirm the capacity of pile worked out theoretically. For design and construction, specifications of IS 2911, P-I, S-2, shall strictly be followed. Termination depth of pile shall be from EGL.

Dr. K. K. Thaker

Appendix – 6

Calculation of Safe Load on Uniform Diameter Bored Cast in situ Pile.

Project Name: - Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for GMRL
Location: GP-6/04

The safe load is calculated as follows,

1) Design Stipulations

- | | |
|---|---|
| 1. Type of pile | - Bored cast in situ uniform diameter pile. |
| 2. Pile diameter considered | - 1.00, 1.20, 1.50m |
| 3. Termination depth of pile considered | - 22.00, 24.00, 26.00, 28.00m |
| 4. Cut off Level | - 2.50 m from EGL. |
| 5. Factor of Safety | - 2.50 for compression and 3.00 for uplift |
| 6. Depth of Water table | - Not encountered upto investigation depth. |
| 7. Ref | - IS 2911 P-I, Sec-II, 2021. |

2) Test Data

The parameters are based on BH 6. For evaluation of safe load on piles following characterized layers are considered as described in table below,

Depth (m), from N.G.L.	Cohesion kg/cm ²	Angle of Internal Friction ϕ	Bulk / Submerged Density gm/cc γ_b / γ_{sub}	Reduction Factor α	Earth pressure coefficient K	Angle of wall friction $\delta = 3/4\phi$	SPT N Value
0.00 to 2.50	No contribution considered – Within Cutoff Level						
2.50 to 5.60	0.91 [#]	7 [#] ~0*	1.83/NA	0.49	NA	NA	19-26
5.60 to 19.70	0.04 [#] ~0.00*	31	2.04 [#] /NA	NA	1.50	23	37->100
19.70 to 32.60	5.60 ^{\$}	0	2.15/NA	0.28	NA	NA	>100

Notes: - Layers are characterized based on classification and the state of soil in that stratum.

* - In cohesive soils the contribution of the angle of internal friction being insignificant is ignored. While in partly cohesive granular soils contribution of the cohesion being insignificant is ignored.

Shear parameters are the most representative for the layer. NA means not applicable. Characterized N values are considered for each layer.

- # Average of the parameters falling in the same layer has been considered.

- \$ Parameters of this layer is considered based on SPT N value. Cohesion is obtained using correlation given by Stroud, 1975.

3) Ultimate Load in Compression

3.1) Ultimate load in Compression by Bearing

Ultimate load on pile in end bearing,

$$q_{ub} = A_p * N_c * C_p$$

$$A_p = \text{Cross section area of Pile stem at toe} = \pi d^2/4$$

$$D = \text{Diameter of pile} = d \text{ in m}$$

$$N_c = 9$$

$$C_p = \text{Cohesion at Pile Tip} = 5.60 \text{ kg/cm}^2$$

$$q_{ub} = 0.785 d^2 * 9 * 56.00 = \mathbf{395.64 d^2} \text{ (For Pile terminating at 22.00 to 28.00m from G.L.).}$$

3.2) Ultimate Load in Compression by Skin Friction

Ultimate load in skin friction,

$$q_{uf} = K_i P D_i \tan \delta_i A_{si} + \alpha_i C_{ai} A_{si}$$

First Layer – No contribution considered – (Within Cutoff Level).

$$\text{Second Layer} - \alpha_2 C_{a2} A_{s2} = 0.49 * 9.10 * \pi d * 3.10 = \mathbf{43.43 d}$$

$$\text{Third Layer} - K_3 P D_3 \tan \delta_3 A_{s3} = 1.50 * 20.06 * \tan 23^\circ * \pi d * 14.10 = \mathbf{565.77 d}$$

$$\text{Fourth Layer} - \alpha_4 C_{a4} A_{s4} = 0.28 * 56.00 * \pi d * (\ell - 19.70) = \mathbf{49.26 d (\ell - 19.70)}$$

(For Pile terminating at 22.00 to 28.00m from G.L.).

$$q_{uf} = \mathbf{609.20 d + 49.26 d (\ell - 19.70)} \text{ (For Pile terminating at 22.00 to 28.00m from G.L.).}$$

Where, ℓ is the pile length and d is diameter of piles, substituting

Ultimate load by both bearing and friction can be as follows for various lengths of piles,

$$q_{uc} = q_{ub} + q_{uf}$$

$$q_{uc} = 395.64 d^2 + 609.20 d + 49.26 d (l - 19.70) \text{ (For Pile terminating at 22.00 to 28.00m from G.L.)}$$

By substituting various diameters of piles having various lengths, the safe load is worked out considering the safety factor of 2.50 and are given in table below,

Safe Load on Piles in Compression (in Ton)

Termination Depth of Pile in m, from EGL	Termination Depth of Pile in m, from cut-off	Diameter of Pile in, m		
		1.00	1.20	1.50
22.00	19.50	447.12	574.53	789.38
24.00	21.50	486.51	621.80	848.46
26.00	23.50	525.90	669.06	907.54
28.00	25.50	565.29	716.33	966.62

3.3) Ultimate Load in Uplift

Considering skin friction for determination of uplift

Safe Load on Piles in Uplift (in Ton)

Termination Depth of Pile in m, from EGL	Termination Depth of Pile in m, from cut-off	Diameter of Pile in, m		
		1.00	1.20	1.50
22.00	19.50	240.72	288.87	361.08
24.00	21.50	273.55	328.26	410.32
26.00	23.50	306.37	367.64	459.55
28.00	25.50	339.19	407.03	508.79

Note: Self weight of pile is not considered in calculation of ultimate load in uplift.

3.4) Lateral Pile Capacity

The lateral load carrying capacity of long, flexible to intermediate piles constructed with M35 grade concrete and having no free (unsupported) length may be evaluated at a permissible lateral deflection of 1/100 of the pile diameter, in accordance with the provisions of IS 2911 (Part 1/Section 2), as summarized below:

Diameter in, m		1.00	1.20	1.50
Subgrade Reaction in MN/m ³		4.30	4.30	4.30
Stiffness Factor T, in m		3.22	3.72	4.45
Depth of Fixity in, m	Free Head	6.10	7.10	8.50
	Fixed Head	7.00	8.10	9.70
Allowable Horizontal Force in, T	Free Head	19.50	31.30	55.80
	Fixed Head	51.50	82.80	147.90
Allowable Moment Capacity in, Tm	Free Head	41.61	77.34	165.17
	Fixed Head	148.11	275.30	587.88

4) Notes:

1) Initial and Routine pile load tests shall be carried out as per IS 2911, P-4 on the piles to confirm the capacity of pile worked out theoretically. For design and construction, specifications of IS 2911, P-I, S-2, shall strictly be followed. Termination depth of pile shall be from EGL.

Dr. K. K. Thaker

Appendix – 7

Calculation of Safe Load on Uniform Diameter Bored Cast in situ Pile.

Project Name: - Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for GMRCCL
Location: GP-6/02

The safe load is calculated as follows,

1) Design Stipulations

- | | |
|---|---|
| 1. Type of pile | - Bored cast in situ uniform diameter pile. |
| 2. Pile diameter considered | - 1.00, 1.20, 1.50m |
| 3. Termination depth of pile considered | - 22.00, 24.00, 26.00, 28.00m |
| 4. Cut off Level | - 2.50 m from EGL. |
| 5. Factor of Safety | - 2.50 for compression and 3.00 for uplift |
| 6. Depth of Water table | - Not encountered upto investigation depth. |
| 7. Ref | - IS 2911 P-I, Sec-II, 2021. |

2) Test Data

The parameters are based on BH 7. For evaluation of safe load on piles following characterized layers are considered as described in table below,

Depth (m), from N.G.L.	Cohesion kg/cm ²	Angle of Internal Friction ϕ	Bulk / Submerged Density gm/cc γ_b / γ_{sub}	Reduction Factor α	Earth pressure coefficient K	Angle of wall friction $\delta = \phi$	SPT N Value
0.00 to 2.50	No contribution considered – Within Cutoff Level						
2.50 to 4.80	0.46	8~0*	1.75/NA	0.94	NA	NA	10-23
4.80 to 19.50	0.02#~0.00*	31#	1.97/NA	NA	1.50	23	28->100
19.50 to 23.60	0.16~0.00*	26	2.07/NA	NA	1.00	26	63-76
23.60 to 29.60	0.00\$	33\$	2.07/NA	NA	1.50	25	>100

Notes: - Layers are characterized based on classification and the state of soil in that stratum.

* - In cohesive soils the contribution of the angle of internal friction being insignificant is ignored. While in partly cohesive granular soils contribution of the cohesion being insignificant is ignored.

Shear parameters are the most representative for the layer. NA means not applicable. Characterized N values are considered for each layer.

- # Average of the parameters falling in the same layer has been considered.

- \$ Parameters of this layer is considered based on correlations with SPT N value.

3) Ultimate Load in Compression

3.1) Ultimate load in Compression by Bearing

Ultimate load on pile in end bearing,

$$q_{ub} = A_p (0.5 \cdot D \cdot \gamma \cdot N_\gamma + PDN_q)$$

$$A_p = \text{Cross section area of Pile stem at toe} = \pi d^2 / 4$$

$$D = \text{Diameter of pile} = d \text{ in m}$$

$$N_\gamma = 13.18$$

$$N_q = 12.00$$

$$q_{ub} = 0.785d^2 (0.5 \cdot d \cdot 2.07 \cdot 13.18 + 29.04 \cdot 12.00) = 10.71d^3 + 273.56d^2$$

(For Pile terminating at 22.00m from GL)

Ultimate load on pile in end bearing,

$$q_{ub} = A_p (0.5 \cdot D \cdot \gamma \cdot N_\gamma + PDN_q)$$

$$A_p = \text{Cross section area of Pile stem at toe} = \pi d^2 / 4$$

$$D = \text{Diameter of pile} = d \text{ in m}$$

$$N_\gamma = 37.78$$

$$N_q = 35.00$$

$$q_{ub} = 0.785d^2 (0.5 \cdot d \cdot 2.07 \cdot 37.78 + 29.04 \cdot 35.00) = 30.70d^3 + 797.87d^2$$

(For Pile terminating at 24.00 to 28.00m from GL)

3.2) Ultimate Load in Compression by Skin Friction

Ultimate load in skin friction,

$$q_{uf} = K_i P D_i \tan \delta_i A_{si} + a_i C_{ai} A_{si}$$

First Layer – No contribution considered – (Within Cutoff Level).

Second Layer – $\alpha_2 C_{a2} A_{s2} = 0.94 * 4.60 * \pi d * 2.30 = 31.24 d$

Third Layer – $K_3 PD_3 \tan \delta_3 A_{s3} = 1.50 * 18.50 * \tan 23^\circ * \pi d * 14.70 = 543.98 d$

Fourth Layer – $K_4 PD_4 \tan \delta_4 A_{s4} = 1.00 * 29.04 * \tan 26^\circ * \pi d * (\ell - 19.50) = 44.50 d (\ell - 19.50)$

(For Pile terminating at 22.00m from G.L.).

Fourth Layer – $K_4 PD_4 \tan \delta_4 A_{s4} = 1.00 * 29.04 * \tan 26^\circ * \pi d * 4.10 = 182.44 d$

Fifth Layer – $K_5 PD_5 \tan \delta_5 A_{s5} = 1.50 * 29.04 * \tan 25^\circ * \pi d * (\ell - 23.60) = 63.81 d (\ell - 23.60)$

(For Pile terminating at 24.00 to 28.00m from G.L.).

quf = $575.22 d + 44.50 d (\ell - 19.50)$ (For Pile terminating at 22.00m from G.L.).

quf = $757.66 d + 63.81 d (\ell - 23.60)$ (For Pile terminating at 24.00 to 28.00m from G.L.).

Where, ℓ is the pile length and d is diameter of piles, substituting

Ultimate load by both bearing and friction can be as follows for various lengths of piles,

$q_{uc} = q_{ub} + q_{uf}$

quc = $10.71d^3 + 273.56d^2 + 575.22 d + 44.50 d (\ell - 19.50)$

(For Pile terminating at 22.00m from G.L.).

quc = $30.70d^3 + 797.87d^2 + 757.66 d + 63.81 d (\ell - 23.60)$

(For Pile terminating at 24.00 to 28.00m from G.L.).

By substituting various diameters of piles having various lengths, the safe load is worked out considering the safety factor of 2.50 and are given in table below,

Safe Load on Piles in Compression (in Ton)

Termination Depth of Pile in m, from EGL	Termination Depth of Pile in m, from cut-off	Diameter of Pile in, m		
		1.00	1.20	1.50
22.00	19.50	388.19	538.01	764.67
24.00	21.50	644.62	972.39	1594.95
26.00	23.50	695.64	1046.29	1762.41
28.00	25.50	746.67	1120.19	1881.11

3.3) Ultimate Load in Uplift

Considering skin friction for determination of uplift

Safe Load on Piles in Uplift (in Ton)

Termination Depth of Pile in m, from EGL	Termination Depth of Pile in m, from cut-off	Diameter of Pile in, m		
		1.00	1.20	1.50
22.00	19.50	228.73	283.68	355.59
24.00	21.50	260.95	330.35	422.95
26.00	23.50	303.47	391.94	520.17
28.00	25.50	346.00	453.52	618.76

Note: Self weight of pile is not considered in calculation of ultimate load in uplift.

3.4) Lateral Pile Capacity

The lateral load carrying capacity of long, flexible to intermediate piles constructed with M35 grade concrete and having no free (unsupported) length may be evaluated at a permissible lateral deflection of 1/100 of the pile diameter, in accordance with the provisions of IS 2911 (Part 1/Section 2), as summarized below:

Diameter in, m		1.00	1.20	1.50
Subgrade Reaction in MN/m ³		2.50	2.50	2.50
Stiffness Factor T, in m		3.59	4.15	4.96
Depth of Fixity in, m	Free Head	6.80	7.90	9.40
	Fixed Head	7.80	9.00	10.80
Allowable Horizontal Force in, T	Free Head	14.10	22.60	40.30
	Fixed Head	37.20	59.80	106.80
Allowable Moment Capacity in, Tm	Free Head	33.50	62.26	132.96
	Fixed Head	119.23	221.61	473.24

4) Notes:

1) Initial and Routine pile load tests shall be carried out as per IS 2911, P-4 on the piles to confirm the capacity of pile worked out theoretically. For design and construction, specifications of IS 2911, P-I, S-2, shall strictly be followed. Termination depth of pile shall be from EGL.

Dr. K. K. Thaker

Appendix – 8

Calculation of Safe Load on Uniform Diameter Bored Cast in situ Pile.

Project Name: - Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for GMRCCL
Location: GTP 06-2/08

The safe load is calculated as follows,

1) Design Stipulations

- | | |
|---|---|
| 1. Type of pile | - Bored cast in situ uniform diameter pile. |
| 2. Pile diameter considered | - 1.00, 1.20, 1.50m |
| 3. Termination depth of pile considered | - 22.00, 24.00, 26.00, 28.00m |
| 4. Cut off Level | - 3.00 m from EGL. |
| 5. Factor of Safety | - 2.50 for compression and 3.00 for uplift |
| 6. Depth of Water table | - Not encountered upto investigation depth. |
| 7. Ref | - IS 2911 P-I, Sec-II, 2021. |

2) Test Data

The parameters are based on BH 8. For evaluation of safe load on piles following characterized layers are considered as described in table below,

Depth (m), from N.G.L.	Cohesion kg/cm ²	Angle of Internal Friction ϕ	Bulk / Submerged Density gm/cc γ_b / γ_{sub}	Reduction Factor α	Earth pressure coefficient K	Angle of wall friction $\delta = \phi$	SPT N Value
0.00 to 3.00	No contribution considered – Within Cutoff Level						
3.00 to 7.00	0.05~0.00*	26	1.78/NA	NA	1.50	20	10-21
7.00 to 19.90	0.04 [#] ~0.00*	31 [#]	2.07 [#] /NA	NA	1.50	23	35->100
19.90 to 32.60	5.20 ^{\$}	0	2.15/NA	0.28	NA	NA	44->100

Notes: - Layers are characterized based on classification and the state of soil in that stratum.

* - In cohesive soils the contribution of the angle of internal friction being insignificant is ignored. While in partly cohesive granular soils contribution of the cohesion being insignificant is ignored.

Shear parameters are the most representative for the layer. NA means not applicable. Characterized N values are considered for each layer.

- # Average of the parameters falling in the same layer has been considered.

- \$ Parameters of this layer is considered based on SPT N value. Cohesion is obtained using fig. 3 of IS:2911, Part-1, Section-2.

3) Ultimate Load in Compression

3.1) Ultimate load in Compression by Bearing

Ultimate load on pile in end bearing,

$$q_{ub} = A_p * N_c * C_p$$

$$A_p = \text{Cross section area of Pile stem at toe} = \pi d^2 / 4$$

$$D = \text{Diameter of pile} = d \text{ in m}$$

$$N_c = 9$$

$$C_p = \text{Cohesion at Pile Tip} = 5.20 \text{ kg/cm}^2$$

$$q_{ub} = 0.785 d^2 * 9 * 52.00 = \mathbf{367.38 d^2} \text{ (For Pile terminating at 22.00 to 28.00m from G.L.).}$$

3.2) Ultimate Load in Compression by Skin Friction

Ultimate load in skin friction,

$$q_{uf} = K_i P D_i \tan \delta_i A_{si} + \alpha_i C_{ai} A_{si}$$

First Layer – No contribution considered – (Within Cutoff Level).

$$\text{Second Layer} - K_2 P D_2 \tan \delta_2 A_{s2} = 1.50 * 3.56 * \tan 20^\circ * \pi d * 4.00 = \mathbf{24.41 d}$$

$$\text{Third Layer} - K_3 P D_3 \tan \delta_3 A_{s3} = 1.50 * 20.47 * \tan 23^\circ * \pi d * 12.90 = \mathbf{527.93 d}$$

$$\text{Fourth Layer} - \alpha_4 C_{a4} A_{s4} = 0.28 * 52.00 * \pi d * (\ell - 19.90) = \mathbf{45.72 d (\ell - 19.90)}$$

(For Pile terminating at 22.00 to 28.00m from G.L.).

$$q_{uf} = \mathbf{552.34 d + 45.72 d (\ell - 19.90)} \text{ (For Pile terminating at 22.00 to 28.00m from G.L.).}$$

Where, ℓ is the pile length and d is diameter of piles, substituting

Ultimate load by both bearing and friction can be as follows for various lengths of piles,

$$q_{uc} = q_{ub} + q_{uf}$$

$$q_{uc} = 367.38 d^2 + 552.34 d + 45.72 d (l - 19.90) \text{ (For Pile terminating at 22.00 to 28.00m from G.L.)}$$

By substituting various diameters of piles having various lengths, the safe load is worked out considering the safety factor of 2.50 and are given in table below,

Safe Load on Piles in Compression (in Ton)

Termination Depth of Pile in m, from EGL	Termination Depth of Pile in m, from cut-off	Diameter of Pile in, m		
		1.00	1.20	1.50
22.00	19.00	406.31	522.84	719.68
24.00	21.00	442.88	566.73	774.54
26.00	23.00	479.46	610.62	829.40
28.00	25.00	516.03	654.51	884.26

3.3) Ultimate Load in Uplift

Considering skin friction for determination of uplift

Safe Load on Piles in Uplift (in Ton)

Termination Depth of Pile in m, from EGL	Termination Depth of Pile in m, from cut-off	Diameter of Pile in, m		
		1.00	1.20	1.50
22.00	19.00	216.13	259.36	324.20
24.00	21.00	246.61	295.93	369.92
26.00	23.00	277.09	332.51	415.63
28.00	25.00	307.57	369.08	461.35

Note: Self weight of pile is not considered in calculation of ultimate load in uplift.

3.4) Lateral Pile Capacity

The lateral load carrying capacity of long, flexible to intermediate piles constructed with M35 grade concrete and having no free (unsupported) length may be evaluated at a permissible lateral deflection of 1/100 of the pile diameter, in accordance with the provisions of IS 2911 (Part 1/Section 2), as summarized below:

Diameter in, m		1.00	1.20	1.50
Subgrade Reaction in MN/m ³		2.50	2.50	2.50
Stiffness Factor T, in m		3.59	4.15	4.96
Depth of Fixity in, m	Free Head	6.80	7.90	9.40
	Fixed Head	7.80	9.00	10.80
Allowable Horizontal Force in, T	Free Head	14.10	22.60	40.30
	Fixed Head	37.20	59.80	106.80
Allowable Moment Capacity in, Tm	Free Head	33.50	62.26	132.96
	Fixed Head	119.23	221.61	473.24

4) Notes:

1) Initial and Routine pile load tests shall be carried out as per IS 2911, P-4 on the piles to confirm the capacity of pile worked out theoretically. For design and construction, specifications of IS 2911, P-I, S-2, shall strictly be followed. Termination depth of pile shall be from EGL.

Dr. K. K. Thaker

Appendix – 9

Calculation of Safe Load on Uniform Diameter Bored Cast in situ Pile.

Project Name: - Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for GMRL
Location: Shahpur Station 6

The safe load is calculated as follows,

1) Design Stipulations

- | | |
|---|---|
| 1. Type of pile | - Bored cast in situ uniform diameter pile. |
| 2. Pile diameter considered | - 1.00, 1.20, 1.50m |
| 3. Termination depth of pile considered | - 22.00, 24.00, 26.00, 28.00m |
| 4. Cut off Level | - 2.50 m from EGL. |
| 5. Factor of Safety | - 2.50 for compression and 3.00 for uplift |
| 6. Depth of Water table | - Not encountered upto investigation depth. |
| 7. Ref | - IS 2911 P-I, Sec-II, 2021. |

2) Test Data

The parameters are based on BH 9. For evaluation of safe load on piles following characterized layers are considered as described in table below,

Depth (m), from N.G.L.	Cohesion kg/cm ²	Angle of Internal Friction ϕ	Bulk / Submerged Density gm/cc γ_b / γ_{sub}	Reduction Factor α	Earth pressure coefficient K	Angle of wall friction $\delta = \phi$	SPT N Value
0.00 to 2.50	No contribution considered – Within Cutoff Level						
2.50 to 19.50	0.05 [#] ~0.00*	30 [#]	2.01 [#] /NA	NA	1.50	23	8->100
19.50 to 35.10	5.13 ^{\$}	0	2.14/NA	0.28	NA	NA	42->100

Notes: - Layers are characterized based on classification and the state of soil in that stratum.

* - In cohesive soils the contribution of the angle of internal friction being insignificant is ignored. While in partly cohesive granular soils contribution of the cohesion being insignificant is ignored.

Shear parameters are the most representative for the layer. NA means not applicable. Characterized N values are considered for each layer.

- # Average of the parameters falling in the same layer has been considered.

- \$ Parameters of this layer is considered based on SPT N value. Cohesion is obtained using fig. 3 of IS:2911, Part-1, Section-2.

3) Ultimate Load in Compression

3.1) Ultimate load in Compression by Bearing

Ultimate load on pile in end bearing,

$$q_{ub} = A_p * N_c * C_p$$

$$A_p = \text{Cross section area of Pile stem at toe} = \pi d^2 / 4$$

$$D = \text{Diameter of pile} = d \text{ in m}$$

$$N_c = 9$$

$$C_p = \text{Cohesion at Pile Tip} = 5.13 \text{ kg/cm}^2$$

$$q_{ub} = 0.785 d^2 * 9 * 51.30 = \mathbf{362.43 d^2} \text{ (For Pile terminating at 22.00 to 28.00m from G.L.).}$$

3.2) Ultimate Load in Compression by Skin Friction

Ultimate load in skin friction,

$$q_{uf} = K_i P D_i \tan \delta_i A_{si} + \alpha_i C_{ai} A_{si}$$

First Layer – No contribution considered – (Within Cutoff Level).

$$\text{Second Layer} - K_2 P D_2 \tan \delta_2 A_{s2} = 1.50 * 17.09 * \tan 23 * \pi d * 17.00 = \mathbf{580.85 d}$$

$$\text{Third Layer} - \alpha_3 C_{a3} A_{s3} = 0.28 * 51.30 * \pi d * (\ell - 19.50) = \mathbf{45.13 d (\ell - 19.50)}$$

(For Pile terminating at 22.00 to 28.00m from G.L.).

$$q_{uf} = \mathbf{580.85 d + 45.13 d (\ell - 19.50)} \text{ (For Pile terminating at 22.00 to 28.00m from G.L.).}$$

Where, ℓ is the pile length and d is diameter of piles, substituting

Ultimate load by both bearing and friction can be as follows for various lengths of piles,

$$q_{uc} = q_{ub} + q_{uf}$$

$$q_{uc} = \mathbf{362.43 d^2 + 580.85 d + 45.13 d (\ell - 19.50)} \text{ (For Pile terminating at 22.00 to 28.00m from G.L.).}$$

By substituting various diameters of piles having various lengths, the safe load is worked out considering the safety factor of 2.50 and are given in table below,

Safe Load on Piles in Compression (in Ton)

Termination Depth of Pile in m, from EGL	Termination Depth of Pile in m, from cut-off	Diameter of Pile in, m		
		1.00	1.20	1.50
22.00	19.50	422.42	541.69	742.36
24.00	21.50	458.50	584.99	796.48
26.00	23.50	494.58	628.29	850.60
28.00	25.50	530.66	671.59	904.73

3.3) Ultimate Load in Uplift

Considering skin friction for determination of uplift

Safe Load on Piles in Uplift (in Ton)

Termination Depth of Pile in m, from EGL	Termination Depth of Pile in m, from cut-off	Diameter of Pile in, m		
		1.00	1.20	1.50
22.00	19.50	231.20	277.44	346.80
24.00	21.50	261.27	313.53	391.91
26.00	23.50	291.34	349.61	437.01
28.00	25.50	321.41	385.69	482.11

Note: Self weight of pile is not considered in calculation of ultimate load in uplift.

3.4) Lateral Pile Capacity

The lateral load carrying capacity of long, flexible to intermediate piles constructed with M35 grade concrete and having no free (unsupported) length may be evaluated at a permissible lateral deflection of 1/100 of the pile diameter, in accordance with the provisions of IS 2911 (Part 1/Section 2), as summarized below:

Diameter in, m		1.00	1.20	1.50
Subgrade Reaction in MN/m ³		1.80	1.80	1.80
Stiffness Factor T, in m		3.83	4.43	5.30
Depth of Fixity in, m	Free Head	7.30	8.40	10.10
	Fixed Head	8.30	9.70	11.50
Allowable Horizontal Force in, T	Free Head	11.50	18.50	33.10
	Fixed Head	30.60	49.10	87.70
Allowable Moment Capacity in, Tm	Free Head	29.37	54.59	116.58
	Fixed Head	104.54	194.32	414.97

4) Notes:

1) Initial and Routine pile load tests shall be carried out as per IS 2911, P-4 on the piles to confirm the capacity of pile worked out theoretically. For design and construction, specifications of IS 2911, P-I, S-2, shall strictly be followed. Termination depth of pile shall be from EGL.

Dr. K. K. Thaker

Appendix – 10

Calculation of Safe Load on Uniform Diameter Bored Cast in situ Pile.

Project Name: - Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for GMRC
Location: Shahpur Station 4

The safe load is calculated as follows,

1) Design Stipulations

- | | |
|---|---|
| 1. Type of pile | - Bored cast in situ uniform diameter pile. |
| 2. Pile diameter considered | - 1.00, 1.20, 1.50m |
| 3. Termination depth of pile considered | - 22.00, 24.00, 26.00, 28.00m |
| 4. Cut off Level | - 2.50 m from EGL. |
| 5. Factor of Safety | - 2.50 for compression and 3.00 for uplift |
| 6. Depth of Water table | - Not encountered upto investigation depth. |
| 7. Ref | - IS 2911 P-I, Sec-II, 2021. |

2) Test Data

The parameters are based on BH 10. For evaluation of safe load on piles following characterized layers are considered as described in table below,

Depth (m), from N.G.L.	Cohesion kg/cm ²	Angle of Internal Friction ϕ	Bulk / Submerged Density gm/cc γ_b / γ_{sub}	Reduction Factor α	Earth pressure coefficient K	Angle of wall friction $\delta = \phi$	SPT N Value
0.00 to 2.50	No contribution considered – Within Cutoff Level						
2.50 to 16.30	0.03 [#] ~0.00*	32 [#]	2.12 [#] /NA	NA	1.50	24	18-76
16.30 to 29.30	5.60 ^{\$}	0	2.19/NA	0.28	NA	NA	64->100

Notes: - Layers are characterized based on classification and the state of soil in that stratum.

* - In cohesive soils the contribution of the angle of internal friction being insignificant is ignored. While in partly cohesive granular soils contribution of the cohesion being insignificant is ignored.

Shear parameters are the most representative for the layer. NA means not applicable. Characterized N values are considered for each layer.

- # Average of the parameters falling in the same layer has been considered.

- \$ Parameters of this layer is considered based on SPT N value. Cohesion is obtained using fig. 3 of IS:2911, Part-1, Section-2.

3) Ultimate Load in Compression

3.1) Ultimate load in Compression by Bearing

Ultimate load on pile in end bearing,

$$q_{ub} = A_p * N_c * C_p$$

$$A_p = \text{Cross section area of Pile stem at toe} = \pi d^2 / 4$$

$$D = \text{Diameter of pile} = d \text{ in m}$$

$$N_c = 9$$

$$C_p = \text{Cohesion at Pile Tip} = 5.60 \text{ kg/cm}^2$$

$$q_{ub} = 0.785 d^2 * 9 * 56.00 = \mathbf{395.64 d^2} \text{ (For Pile terminating at 22.00 to 28.00m from G.L.).}$$

3.2) Ultimate Load in Compression by Skin Friction

Ultimate load in skin friction,

$$q_{uf} = K_i P D_i \tan \delta_i A_{si} + \alpha_i C_{ai} A_{si}$$

First Layer – No contribution considered – (Within Cutoff Level).

$$\text{Second Layer} - K_2 P D_2 \tan \delta_2 A_{s2} = 1.50 * 14.63 * \tan 24 * \pi d * 13.80 = \mathbf{423.38 d}$$

$$\text{Third Layer} - \alpha_3 C_{a3} A_{s3} = 0.28 * 56.00 * \pi d * (\ell - 16.30) = \mathbf{49.24 d (\ell - 16.30)}$$

(For Pile terminating at 22.00 to 28.00m from G.L.).

$$q_{uf} = \mathbf{423.38 d + 49.24 d (\ell - 16.30)} \text{ (For Pile terminating at 22.00 to 28.00m from G.L.).}$$

Where, ℓ is the pile length and d is diameter of piles, substituting

Ultimate load by both bearing and friction can be as follows for various lengths of piles,

$$q_{uc} = q_{ub} + q_{uf}$$

$$q_{uc} = \mathbf{395.64 d^2 + 423.38 d + 49.24 d (\ell - 16.30)} \text{ (For Pile terminating at 22.00 to 28.00m from G.L.).}$$

By substituting various diameters of piles having various lengths, the safe load is worked out considering the safety factor of 2.50 and are given in table below,

Safe Load on Piles in Compression (in Ton)

Termination Depth of Pile in m, from EGL	Termination Depth of Pile in m, from cut-off	Diameter of Pile in, m		
		1.00	1.20	1.50
22.00	19.50	439.84	565.79	778.45
24.00	21.50	479.23	613.06	837.53
26.00	23.50	518.62	660.32	896.62
28.00	25.50	558.00	707.59	955.70

3.3) Ultimate Load in Uplift

Considering skin friction for determination of uplift

Safe Load on Piles in Uplift (in Ton)

Termination Depth of Pile in m, from EGL	Termination Depth of Pile in m, from cut-off	Diameter of Pile in, m		
		1.00	1.20	1.50
22.00	19.50	234.65	281.58	351.98
24.00	21.50	267.48	320.97	401.22
26.00	23.50	300.30	360.36	450.45
28.00	25.50	333.12	399.75	499.69

Note: Self weight of pile is not considered in calculation of ultimate load in uplift.

3.4) Lateral Pile Capacity

The lateral load carrying capacity of long, flexible to intermediate piles constructed with M35 grade concrete and having no free (unsupported) length may be evaluated at a permissible lateral deflection of 1/100 of the pile diameter, in accordance with the provisions of IS 2911 (Part 1/Section 2), as summarized below:

Diameter in, m		1.00	1.20	1.50
Subgrade Reaction in MN/m ³		4.10	4.10	4.10
Stiffness Factor T, in m		3.25	3.76	4.49
Depth of Fixity in, m	Free Head	6.20	7.10	8.50
	Fixed Head	7.10	8.20	9.80
Allowable Horizontal Force in, T	Free Head	18.90	30.40	54.30
	Fixed Head	50.10	80.40	143.70
Allowable Moment Capacity in, Tm	Free Head	40.83	75.88	162.05
	Fixed Head	145.31	270.10	576.79

4) Notes:

1) Initial and Routine pile load tests shall be carried out as per IS 2911, P-4 on the piles to confirm the capacity of pile worked out theoretically. For design and construction, specifications of IS 2911, P-I, S-2, shall strictly be followed. Termination depth of pile shall be from EGL.

Dr. K. K. Thaker

Appendix – 11

Calculation of Safe Load on Uniform Diameter Bored Cast in situ Pile.

Project Name: - Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for GMRL
Location: GP-3/17

The safe load is calculated as follows,

1) Design Stipulations

- | | |
|---|---|
| 1. Type of pile | - Bored cast in situ uniform diameter pile. |
| 2. Pile diameter considered | - 1.00, 1.20, 1.50m |
| 3. Termination depth of pile considered | - 22.00, 24.00, 26.00, 28.00m |
| 4. Cut off Level | - 2.50 m from EGL. |
| 5. Factor of Safety | - 2.50 for compression and 3.00 for uplift |
| 6. Depth of Water table | - Not encountered upto investigation depth. |
| 7. Ref | - IS 2911 P-I, Sec-II, 2021. |

2) Test Data

The parameters are based on BH 11. For evaluation of safe load on piles following characterized layers are considered as described in table below,

Depth (m), from N.G.L.	Cohesion kg/cm ²	Angle of Internal Friction ϕ	Bulk / Submerged Density gm/cc γ_b / γ_{sub}	Reduction Factor α	Earth pressure coefficient K	Angle of wall friction $\delta = \phi$	SPT N Value
0.00 to 2.50	No contribution considered – Within Cutoff Level						
2.50 to 10.60	0.06 [#] ~0.00*	31 [#]	1.99 [#] /NA	NA	1.50	23	15->100
10.60 to 26.70	0.20 [#] ~0.00*	26 [#]	2.11 [#] /NA	NA	1.00	26	35->100
26.70 to 29.60	0.00	33 ^{\$}	2.09/NA	NA	1.50	25	50->100

Notes: - Layers are characterized based on classification and the state of soil in that stratum.

* - In cohesive soils the contribution of the angle of internal friction being insignificant is ignored. While in partly cohesive granular soils contribution of the cohesion being insignificant is ignored.

Shear parameters are the most representative for the layer. NA means not applicable. Characterized N values are considered for each layer.

- # Average of the parameters falling in the same layer has been considered.

- \$ Parameters of this layer is considered based on correlations with SPT N value.

3) Ultimate Load in Compression

3.1) Ultimate load in Compression by Bearing

Ultimate load on pile in end bearing,

$$q_{ub} = A_p (0.5 \cdot D \cdot \gamma \cdot N_v + P D N_q)$$

$$A_p = \text{Cross section area of Pile stem at toe} = \pi d^2 / 4$$

$$D = \text{Diameter of pile} = d \text{ in m}$$

$$N_v = 13.18$$

$$N_q = 12.00$$

$$q_{ub} = 0.785d^2 (0.5 \cdot d \cdot 2.11 \cdot 13.18 + 30.68 \cdot 12.00) = 10.92d^3 + 289.01d^2$$

(For Pile terminating at 22.00 to 26.00m from GL)

Ultimate load on pile in end bearing,

$$q_{ub} = A_p (0.5 \cdot D \cdot \gamma \cdot N_v + P D N_q)$$

$$A_p = \text{Cross section area of Pile stem at toe} = \pi d^2 / 4$$

$$D = \text{Diameter of pile} = d \text{ in m}$$

$$N_v = 37.78$$

$$N_q = 35.00$$

$$q_{ub} = 0.785d^2 (0.5 \cdot d \cdot 2.09 \cdot 37.78 + 30.68 \cdot 35.00) = 30.99d^3 + 842.93d^2$$

(For Pile terminating at 28.00m from GL)

3.2) Ultimate Load in Compression by Skin Friction

Ultimate load in skin friction,

$$q_{uf} = K_i P D_i \tan \delta_i A_{si} + \alpha_i C_{ai} A_{si}$$

First Layer – No contribution considered – (Within Cutoff Level).

Second Layer – $K_2 PD_2 \tan \delta_2 A_{s2} = 1.50 \times 8.06 \times \tan 23^\circ \times \pi \times d \times 8.10 = 130.52 \text{ d}$

Third Layer – $K_3 PD_3 \tan \delta_3 A_{s3} = 1.00 \times 28.15 \times \tan 26^\circ \times \pi \times d \times (\ell - 10.60) = 43.11 \text{ d } (\ell - 10.60)$

(For Pile terminating at 22.00 to 26.00m from G.L.).

Third Layer – $K_3 PD_3 \tan \delta_3 A_{s3} = 1.00 \times 30.68 \times \tan 26^\circ \times \pi \times d \times 16.10 = 756.47 \text{ d}$

Fourth Layer – $K_4 PD_4 \tan \delta_4 A_{s4} = 1.50 \times 30.68 \times \tan 25^\circ \times \pi \times d \times (\ell - 26.70) = 67.38 \text{ d } (\ell - 26.70)$

(For Pile terminating at 24.00 to 28.00m from G.L.).

quf = $130.52 \text{ d} + 43.11 \text{ d } (\ell - 10.60)$ (For Pile terminating at 22.00 to 26.00m from G.L.).

quf = $886.99 \text{ d} + 67.38 \text{ d } (\ell - 26.70)$ (For Pile terminating at 28.00m from G.L.).

Where, ℓ is the pile length and d is diameter of piles, substituting

Ultimate load by both bearing and friction can be as follows for various lengths of piles,

$q_{uc} = q_{ub} + q_{uf}$

quc = $10.92d^3 + 289.01d^2 + 130.52 \text{ d} + 43.11 \text{ d } (\ell - 10.60)$

(For Pile terminating at 22.00 to 26.00m from G.L.).

quc = $30.99d^3 + 842.93d^2 + 886.99 \text{ d} + 67.38 \text{ d } (\ell - 26.70)$

(For Pile terminating at 28.00m from G.L.).

By substituting various diameters of piles having various lengths, the safe load is worked out considering the safety factor of 2.50 and are given in table below,

Safe Load on Piles in Compression (in Ton)

Termination Depth of Pile in m, from EGL	Termination Depth of Pile in m, from cut-off	Diameter of Pile in, m		
		1.00	1.20	1.50
22.00	19.50	368.73	506.87	728.47
24.00	21.50	420.53	569.03	841.95
26.00	23.50	461.61	637.40	945.31
28.00	25.50	739.40	1112.26	1839.47

3.3) Ultimate Load in Uplift

Considering skin friction for determination of uplift

Safe Load on Piles in Uplift (in Ton)

Termination Depth of Pile in m, from EGL	Termination Depth of Pile in m, from cut-off	Diameter of Pile in, m		
		1.00	1.20	1.50
22.00	19.50	207.30	248.77	310.96
24.00	21.50	250.48	300.57	375.71
26.00	23.50	284.70	357.54	446.93
28.00	25.50	324.86	420.97	539.77

Note: Self weight of pile is not considered in calculation of ultimate load in uplift.

3.4) Lateral Pile Capacity

The lateral load carrying capacity of long, flexible to intermediate piles constructed with M35 grade concrete and having no free (unsupported) length may be evaluated at a permissible lateral deflection of 1/100 of the pile diameter, in accordance with the provisions of IS 2911 (Part 1/Section 2), as summarized below:

Diameter in, m		1.00	1.20	1.50
Subgrade Reaction in MN/m ³		3.50	3.50	3.50
Stiffness Factor T, in m		3.35	3.88	4.64
Depth of Fixity in, m	Free Head	6.40	7.40	8.80
	Fixed Head	7.30	8.50	10.10
Allowable Horizontal Force in, T	Free Head	17.20	27.60	49.30
	Fixed Head	45.50	73.20	130.70
Allowable Moment Capacity in, Tm	Free Head	38.32	71.23	152.11
	Fixed Head	136.40	253.53	541.42

4) Notes:

1) Initial and Routine pile load tests shall be carried out as per IS 2911, P-4 on the piles to confirm the capacity of pile worked out theoretically. For design and construction, specifications of IS 2911, P-I, S-2, shall strictly be followed. Termination depth of pile shall be from EGL.

Dr. K. K. Thaker

Appendix – 12

Calculation of Safe Load on Uniform Diameter Bored Cast in situ Pile.

Project Name: - Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for GMRCL
Location: GPP3/19

The safe load is calculated as follows,

1) Design Stipulations

- | | |
|---|---|
| 1. Type of pile | - Bored cast in situ uniform diameter pile. |
| 2. Pile diameter considered | - 1.00, 1.20, 1.50m |
| 3. Termination depth of pile considered | - 22.00, 24.00, 26.00, 28.00m |
| 4. Cut off Level | - 2.50 m from EGL. |
| 5. Factor of Safety | - 2.50 for compression and 3.00 for uplift |
| 6. Depth of Water table | - Not encountered upto investigation depth. |
| 7. Ref | - IS 2911 P-I, Sec-II, 2021. |

2) Test Data

The parameters are based on BH 12. For evaluation of safe load on piles following characterized layers are considered as described in table below,

Depth (m), from N.G.L.	Cohesion kg/cm ²	Angle of Internal Friction ϕ	Bulk / Submerged Density gm/cc γ_b / γ_{sub}	Reduction Factor α	Earth pressure coefficient K	Angle of wall friction $\delta = \phi$	SPT N Value
0.00 to 2.50	No contribution considered – Within Cutoff Level						
2.50 to 4.70	0.05~0.00*	26	1.78/NA	NA	1.50	20	19-28
4.70 to 5.30	0.15~0.00*	26	1.83/NA	NA	1.00	26	28
5.30 to 13.60	0.14 [#] ~0.00*	23 [#]	1.95 [#] /NA	NA	1.50	17	29->100
13.60 to 26.60	0.20 [#] ~0.00*	26 [#]	2.09 [#] /NA	NA	1.00	26	35->100
26.60 to 31.80	0.00	33 ^{\$}	2.11/NA	NA	1.50	25	37->100

Notes: - Layers are characterized based on classification and the state of soil in that stratum.

* - In cohesive soils the contribution of the angle of internal friction being insignificant is ignored. While in partly cohesive granular soils contribution of the cohesion being insignificant is ignored.

Shear parameters are the most representative for the layer. NA means not applicable. Characterized N values are considered for each layer.

- # Average of the parameters falling in the same layer has been considered.

- \$ Parameters of this layer is considered based on correlations with SPT N value.

3) Ultimate Load in Compression

3.1) Ultimate load in Compression by Bearing

Ultimate load on pile in end bearing,

$$q_{ub} = A_p (0.5 \cdot D \cdot \gamma \cdot N_\gamma + PDN_q)$$

$$A_p = \text{Cross section area of Pile stem at toe} = \pi d^2/4$$

$$D = \text{Diameter of pile} = d \text{ in m}$$

$$N_\gamma = 13.18$$

$$N_q = 12.00$$

$$q_{ub} = 0.785d^2 (0.5 \cdot d \cdot 2.09 \cdot 13.18 + 29.35 \cdot 12.00) = 10.81d^3 + 276.48d^2$$

(For Pile terminating at 22.00 to 26.00m from GL)

Ultimate load on pile in end bearing,

$$q_{ub} = A_p (0.5 \cdot D \cdot \gamma \cdot N_\gamma + PDN_q)$$

$$A_p = \text{Cross section area of Pile stem at toe} = \pi d^2/4$$

$$D = \text{Diameter of pile} = d \text{ in m}$$

$$N_\gamma = 37.78$$

$$N_q = 35.00$$

$$q_{ub} = 0.785d^2 (0.5 \cdot d \cdot 2.11 \cdot 37.78 + 29.35 \cdot 35.00) = 31.29d^3 + 806.39d^2$$

(For Pile terminating at 28.00m from GL)

3.2) Ultimate Load in Compression by Skin Friction

Ultimate load in skin friction,

$$q_{uf} = K_i P D_i \tan \delta_i A_{s_i} + \alpha_i C_{ai} A_{s_i}$$

First Layer – No contribution considered – (Within Cutoff Level).

Second Layer – $K_2 P D_2 \tan \delta_2 A_{s2} = 1.50 * 1.96 * \tan 20^\circ * \pi * d * 2.20 = 7.39 \text{ d}$

Third Layer – $K_3 P D_3 \tan \delta_3 A_{s3} = 1.00 * 4.47 * \tan 26^\circ * \pi * d * 0.60 = 4.11 \text{ d}$

Fourth Layer – $K_4 P D_4 \tan \delta_4 A_{s4} = 1.50 * 13.11 * \tan 17^\circ * \pi * d * 8.30 = 156.69 \text{ d}$

Fifth Layer – $K_5 P D_5 \tan \delta_5 A_{s5} = 1.00 * 29.35 * \tan 26^\circ * \pi * d * (\ell - 13.60) = 44.95 \text{ d } (\ell - 13.60)$

(For Pile terminating at 22.00 to 26.00m from G.L.).

Fifth Layer – $K_5 P D_5 \tan \delta_5 A_{s5} = 1.00 * 29.35 * \tan 26^\circ * \pi * d * 13.00 = 584.34 \text{ d}$

Sixth Layer – $K_6 P D_6 \tan \delta_6 A_{s6} = 1.50 * 29.35 * \tan 25^\circ * \pi * d * (\ell - 26.60) = 64.46 \text{ d } (\ell - 26.60)$

(For Pile terminating at 28.00m from G.L.).

$q_{uf} = 168.19 \text{ d} + 44.95 \text{ d } (\ell - 13.60)$ (For Pile terminating at 22.00 to 26.00m from G.L.).

$q_{uf} = 752.53 \text{ d} + 64.46 \text{ d } (\ell - 26.60)$ (For Pile terminating at 28.00m from G.L.).

Where, ℓ is the pile length and d is diameter of piles, substituting

Ultimate load by both bearing and friction can be as follows for various lengths of piles,

$$q_{uc} = q_{ub} + q_{uf}$$

$$q_{uc} = 10.81d^3 + 276.48d^2 + 168.19 \text{ d} + 44.95 \text{ d } (\ell - 13.60)$$

(For Pile terminating at 22.00 to 26.00m from G.L.).

$$q_{uc} = 31.29d^3 + 806.39d^2 + 752.53 \text{ d} + 64.46 \text{ d } (\ell - 26.60)$$

(For Pile terminating at 28.00m from G.L.).

By substituting various diameters of piles having various lengths, the safe load is worked out considering the safety factor of 2.50 and are given in table below,

Safe Load on Piles in Compression (in Ton)

Termination Depth of Pile in m, from EGL	Termination Depth of Pile in m, from cut-off	Diameter of Pile in, m		
		1.00	1.20	1.50
22.00	19.50	333.20	466.56	675.42
24.00	21.50	369.16	526.61	785.93
26.00	23.50	405.12	592.80	886.39
28.00	25.50	672.16	1051.02	1755.06

3.3) Ultimate Load in Uplift

Considering skin friction for determination of uplift

Safe Load on Piles in Uplift (in Ton)

Termination Depth of Pile in m, from EGL	Termination Depth of Pile in m, from cut-off	Diameter of Pile in, m		
		1.00	1.20	1.50
22.00	19.50	181.90	221.51	276.89
24.00	21.50	211.87	271.55	339.44
26.00	23.50	241.83	326.72	408.39
28.00	25.50	280.91	388.07	499.55

Note: Self weight of pile is not considered in calculation of ultimate load in uplift.

3.4) Lateral Pile Capacity

The lateral load carrying capacity of long, flexible to intermediate piles constructed with M35 grade concrete and having no free (unsupported) length may be evaluated at a permissible lateral deflection of 1/100 of the pile diameter, in accordance with the provisions of IS 2911 (Part 1/Section 2), as summarized below:

Diameter in, m		1.00	1.20	1.50
Subgrade Reaction in MN/m ³		4.30	4.30	4.30
Stiffness Factor T, in m		3.22	3.72	4.45
Depth of Fixity in, m	Free Head	6.10	7.10	8.50
	Fixed Head	7.00	8.10	9.70
Allowable Horizontal Force in, T	Free Head	19.50	31.30	55.80
	Fixed Head	51.50	82.80	147.90
Allowable Moment Capacity in, Tm	Free Head	41.61	77.34	165.17
	Fixed Head	148.11	275.29	587.88

4) Notes:

1) Initial and Routine pile load tests shall be carried out as per IS 2911, P-4 on the piles to confirm the capacity of pile worked out theoretically. For design and construction, specifications of IS 2911, P-I, S-2, shall strictly be followed. Termination depth of pile shall be from EGL.

Dr. K. K. Thaker

Appendix – 13

Calculation of Safe Load on Uniform Diameter Bored Cast in situ Pile.

Project Name: - Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for GMRCCL
Location: GP-5/21

The safe load is calculated as follows,

1) Design Stipulations

- | | |
|---|---|
| 1. Type of pile | - Bored cast in situ uniform diameter pile. |
| 2. Pile diameter considered | - 1.00, 1.20, 1.50m |
| 3. Termination depth of pile considered | - 22.00, 24.00, 26.00, 28.00m |
| 4. Cut off Level | - 2.50 m from EGL. |
| 5. Factor of Safety | - 2.50 for compression and 3.00 for uplift |
| 6. Depth of Water table | - Not encountered upto investigation depth. |
| 7. Ref | - IS 2911 P-I, Sec-II, 2021. |

2) Test Data

The parameters are based on BH 13. For evaluation of safe load on piles following characterized layers are considered as described in table below,

Depth (m), from N.G.L.	Cohesion kg/cm ²	Angle of Internal Friction ϕ	Bulk / Submerged Density gm/cc γ_b / γ_{sub}	Reduction Factor α	Earth pressure coefficient K	Angle of wall friction $\delta = \phi$	SPT N Value
0.00 to 2.50	No contribution considered – Within Cutoff Level						
2.50 to 16.80	0.02 [#] ~0.00*	32	2.02 [#] /NA	NA	1.50	24	12->100
16.80 to 33.40	4.28 ^{\$}	0	2.19/NA	0.28	NA	NA	37->100

Notes: - Layers are characterized based on classification and the state of soil in that stratum.

* - In cohesive soils the contribution of the angle of internal friction being insignificant is ignored. While in partly cohesive granular soils contribution of the cohesion being insignificant is ignored.

Shear parameters are the most representative for the layer. NA means not applicable. Characterized N values are considered for each layer.

- # Average of the parameters falling in the same layer has been considered.

- \$ cohesion is obtained as half of the Unconfined Compressive Strength (UCS).

3) Ultimate Load in Compression

3.1) Ultimate load in Compression by Bearing

Ultimate load on pile in end bearing,

$$q_{ub} = A_p * N_c * C_p$$

$$A_p = \text{Cross section area of Pile stem at toe} = \pi d^2 / 4$$

$$D = \text{Diameter of pile} = d \text{ in m}$$

$$N_c = 9$$

$$C_p = \text{Cohesion at Pile Tip} = 4.28 \text{ kg/cm}^2$$

$$q_{ub} = 0.785 d^2 * 9 * 42.80 = \mathbf{302.38 d^2} \text{ (For Pile terminating at 22.00 to 28.00m from G.L.).}$$

3.2) Ultimate Load in Compression by Skin Friction

Ultimate load in skin friction,

$$q_{uf} = K_i P D_i \tan \delta_i A_{si} + \alpha_i C_{ai} A_{si}$$

First Layer – No contribution considered – (Within Cutoff Level).

$$\text{Second Layer} - K_2 P D_2 \tan \delta_2 A_{s2} = 1.50 * 14.44 * \tan 24^\circ * \pi d * 14.30 = \mathbf{433.02 d}$$

$$\text{Third Layer} - \alpha_3 C_{a3} A_{s3} = 0.28 * 42.80 * \pi d * (\ell - 16.80) = \mathbf{37.63 d (\ell - 16.80)}$$

(For Pile terminating at 22.00 to 28.00m from G.L.).

$$q_{uf} = \mathbf{433.02 d + 37.63 d (\ell - 16.80)} \text{ (For Pile terminating at 22.00 to 28.00m from G.L.).}$$

Where, ℓ is the pile length and d is diameter of piles, substituting

Ultimate load by both bearing and friction can be as follows for various lengths of piles,

$$q_{uc} = q_{ub} + q_{uf}$$

$$q_{uc} = \mathbf{302.38 d^2 + 433.02 d + 37.63 d (\ell - 16.80)} \text{ (For Pile terminating at 22.00 to 28.00m from G.L.).}$$

By substituting various diameters of piles having various lengths, the safe load is worked out considering the safety factor of 2.50 and are given in table below,

Safe Load on Piles in Compression (in Ton)

Termination Depth of Pile in m, from EGL	Termination Depth of Pile in m, from cut-off	Diameter of Pile in, m		
		1.00	1.20	1.50
22.00	19.50	372.47	475.99	649.41
24.00	21.50	402.57	512.11	694.57
26.00	23.50	432.67	548.24	739.73
28.00	25.50	462.78	584.36	784.88

3.3) Ultimate Load in Uplift

Considering skin friction for determination of uplift

Safe Load on Piles in Uplift (in Ton)

Termination Depth of Pile in m, from EGL	Termination Depth of Pile in m, from cut-off	Diameter of Pile in, m		
		1.00	1.20	1.50
22.00	19.50	209.59	251.51	314.39
24.00	21.50	234.68	281.62	352.02
26.00	23.50	259.77	311.72	389.65
28.00	25.50	284.85	341.83	427.28

Note: Self weight of pile is not considered in calculation of ultimate load in uplift.

3.4) Lateral Pile Capacity

The lateral load carrying capacity of long, flexible to intermediate piles constructed with M35 grade concrete and having no free (unsupported) length may be evaluated at a permissible lateral deflection of 1/100 of the pile diameter, in accordance with the provisions of IS 2911 (Part 1/Section 2), as summarized below:

Diameter in, m		1.00	1.20	1.50
Subgrade Reaction in MN/m ³		2.90	2.90	2.90
Stiffness Factor T, in m		3.48	4.03	4.81
Depth of Fixity in, m	Free Head	6.60	7.70	9.10
	Fixed Head	7.60	8.80	10.50
Allowable Horizontal Force in, T	Free Head	15.40	24.70	44.10
	Fixed Head	40.70	65.30	116.70
Allowable Moment Capacity in, Tm	Free Head	35.55	66.07	141.09
	Fixed Head	126.52	235.16	502.18

4) Notes:

1) Initial and Routine pile load tests shall be carried out as per IS 2911, P-4 on the piles to confirm the capacity of pile worked out theoretically. For design and construction, specifications of IS 2911, P-I, S-2, shall strictly be followed. Termination depth of pile shall be from EGL.

Dr. K. K. Thaker

Appendix – 14

Calculation of Safe Load on Uniform Diameter Bored Cast in situ Pile.

Project Name: - Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for GMRCCL
Location: 14 (GP 3 / 29)

The safe load is calculated as follows,

1) Design Stipulations

- | | |
|---|---|
| 1. Type of pile | - Bored cast in situ uniform diameter pile. |
| 2. Pile diameter considered | - 1.00, 1.20, 1.50m |
| 3. Termination depth of pile considered | - 22.00, 24.00, 26.00, 28.00m |
| 4. Cut off Level | - 2.50 m from EGL. |
| 5. Factor of Safety | - 2.50 for compression and 3.00 for uplift |
| 6. Depth of Water table | - Not encountered upto investigation depth. |
| 7. Ref | - IS 2911 P-I, Sec-II, 2021. |

2) Test Data

The parameters are based on BH 14. For evaluation of safe load on piles following characterized layers are considered as described in table below,

Depth (m), from N.G.L.	Cohesion kg/cm ²	Angle of Internal Friction ϕ	Bulk / Submerged Density gm/cc γ_b / γ_{sub}	Reduction Factor α	Earth pressure coefficient K	Angle of wall friction $\delta = \phi$	SPT N Value
0.00 to 2.50	No contribution considered – Within Cutoff Level						
2.50 to 4.00	0.08~0.00*	26	1.62/NA	NA	1.50	20	6
4.00 to 6.00	0.40	4~0*	1.70/NA	1.00	NA	NA	5
6.00 to 12.60	0.04 [#] ~0.00*	29 [#]	1.94 [#] /NA	NA	1.50	22	9-41
12.60 to 17.00	1.83	6~0*	2.01/NA	0.28	NA	NA	25-37
17.00 to 17.60	0.23~0.00*	25	1.98/NA	NA	1.00	25	33
17.60 to 20.50	0.09~0.00*	30	1.97/NA	NA	1.50	23	28-39
20.50 to 34.00	6.07 ^{\$}	0	1.97/NA	0.28	NA	NA	55->100

Notes: - Layers are characterized based on classification and the state of soil in that stratum.

* - In cohesive soils the contribution of the angle of internal friction being insignificant is ignored. While in partly cohesive granular soils contribution of the cohesion being insignificant is ignored.

Shear parameters are the most representative for the layer. NA means not applicable. Characterized N values are considered for each layer.

- # Average of the parameters falling in the same layer has been considered.

- \$ Parameters of this layer is considered based on SPT N value. Cohesion is obtained using fig. 3 of IS:2911, Part-1, Section-2.

3) Ultimate Load in Compression

3.1) Ultimate load in Compression by Bearing

Ultimate load on pile in end bearing,

$$q_{ub} = A_p * N_c * C_p$$

$$A_p = \text{Cross section area of Pile stem at toe} = \pi d^2 / 4$$

$$D = \text{Diameter of pile} = d \text{ in m}$$

$$N_c = 9$$

$$C_p = \text{Cohesion at Pile Tip} = 6.07 \text{ kg/cm}^2$$

$$q_{ub} = 0.785 d^2 * 9 * 60.70 = \mathbf{428.85 d^2} \text{ (For Pile terminating at 22.00 to 28.00m from G.L.).}$$

3.2) Ultimate Load in Compression by Skin Friction

Ultimate load in skin friction,

$$q_{uf} = K_i P D_i \tan \delta_i A_{s_i} + \alpha_i C_{a_i} A_{s_i}$$

First Layer – No contribution considered – (Within Cutoff Level).

$$\text{Second Layer} - K_2 P D_2 \tan \delta_2 A_{s2} = 1.50 * 1.22 * \tan 20^\circ * \pi d * 1.50 = \mathbf{3.14 d}$$

$$\text{Third Layer} - \alpha_3 C_{a3} A_{s3} = 1.00 * 4.00 * \pi d * 2.00 = \mathbf{25.12 d}$$

$$\text{Fourth Layer} - K_4 P D_4 \tan \delta_4 A_{s4} = 1.50 * 12.23 * \tan 22^\circ * \pi d * 6.60 = \mathbf{153.60 d}$$

Fifth Layer – $\alpha_5 Ca_5 As_5 = 0.28 * 18.30 * \pi d * 4.40 = 70.79 d$

Sixth Layer – $K_6 PD_6 \tan \delta_6 As_6 = 1.00 * 28.07 * \tan 25^\circ * \pi d * 0.60 = 24.66 d$

Seventh Layer – $K_7 PD_7 \tan \delta_7 As_7 = 1.50 * 28.47 * \tan 23^\circ * \pi d * 2.90 = 165.07 d$

Eighth Layer – $\alpha_8 Ca_8 As_8 = 0.28 * 60.70 * \pi d * (\ell - 20.50) = 53.37 d (\ell - 20.50)$

(For Pile terminating at 22.00 to 28.00m from G.L.).

quf = 442.38 d + 53.37 d ($\ell - 20.50$) (For Pile terminating at 22.00 to 28.00m from G.L.).

Where, ℓ is the pile length and d is diameter of piles, substituting

Ultimate load by both bearing and friction can be as follows for various lengths of piles,

quc = qud + quf

quc = 428.85 d² + 442.38 d + 53.37 d ($\ell - 20.50$) (For Pile terminating at 22.00 to 28.00m from G.L.).

By substituting various diameters of piles having various lengths, the safe load is worked out considering the safety factor of 2.50 and are given in table below,

Safe Load on Piles in Compression (in Ton)

Termination Depth of Pile in m, from EGL	Termination Depth of Pile in m, from cut-off	Diameter of Pile in, m		
		1.00	1.20	1.50
22.00	19.50	380.51	506.28	710.05
24.00	21.50	423.21	557.52	774.09
26.00	23.50	465.90	608.75	838.13
28.00	25.50	508.59	659.98	902.17

3.3) Ultimate Load in Uplift

Considering skin friction for determination of uplift

Safe Load on Piles in Uplift (in Ton)

Termination Depth of Pile in m, from EGL	Termination Depth of Pile in m, from cut-off	Diameter of Pile in, m		
		1.00	1.20	1.50
22.00	19.50	174.14	216.06	270.07
24.00	21.50	209.72	258.75	323.44
26.00	23.50	245.30	301.45	376.81
28.00	25.50	280.88	344.14	430.17

Note: Self weight of pile is not considered in calculation of ultimate load in uplift.

3.4) Lateral Pile Capacity

The lateral load carrying capacity of long, flexible to intermediate piles constructed with M35 grade concrete and having no free (unsupported) length may be evaluated at a permissible lateral deflection of 1/100 of the pile diameter, in accordance with the provisions of IS 2911 (Part 1/Section 2), as summarized below:

Diameter in, m		1.00	1.20	1.50
Subgrade Reaction in MN/m ³		0.75	0.75	0.75
Stiffness Factor T, in m		4.56	5.28	6.31
Depth of Fixity in, m	Free Head	8.70	10.00	12.00
	Fixed Head	9.90	11.50	13.80
Allowable Horizontal Force in, T	Free Head	6.80	11.00	19.60
	Fixed Head	18.10	29.00	51.90
Allowable Moment Capacity in, Tm	Free Head	20.69	38.46	82.14
	Fixed Head	73.66	136.91	292.37

4) Notes:

1) Initial and Routine pile load tests shall be carried out as per IS 2911, P-4 on the piles to confirm the capacity of pile worked out theoretically. For design and construction, specifications of IS 2911, P-I, S-2, shall strictly be followed. Termination depth of pile shall be from EGL.

Appendix – 15

Calculation of Safe Load on Uniform Diameter Bored Cast in situ Pile.

Project Name: - Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for GMRL
Location: (GP 3 / 39)

The safe load is calculated as follows,

1) Design Stipulations

- | | |
|---|---|
| 1. Type of pile | - Bored cast in situ uniform diameter pile. |
| 2. Pile diameter considered | - 1.00, 1.20, 1.50m |
| 3. Termination depth of pile considered | - 22.00, 24.00, 26.00, 28.00m |
| 4. Cut off Level | - 2.50 m from EGL. |
| 5. Factor of Safety | - 2.50 for compression and 3.00 for uplift |
| 6. Depth of Water table | - Not encountered upto investigation depth. |
| 7. Ref | - IS 2911 P-I, Sec-II, 2021. |

2) Test Data

The parameters are based on BH 15. For evaluation of safe load on piles following characterized layers are considered as described in table below,

Depth (m), from N.G.L.	Cohesion kg/cm ²	Angle of Internal Friction ϕ	Bulk / Submerged Density gm/cc γ_b / γ_{sub}	Reduction Factor α	Earth pressure coefficient K	Angle of wall friction $\delta = \phi$	SPT N Value
0.00 to 2.50	No contribution considered – Within Cutoff Level						
2.50 to 13.80	0.05 [#] ~0.00*	28 [#]	1.86 [#] /NA	NA	1.50	21	13->100
13.80 to 16.80	3.77	3~0*	2.10/NA	0.28	NA	NA	36->100
16.80 to 18.00	0.17~0.00*	28	2.05/NA	NA	1.50	21	40
18.00 to 22.50	3.34 [#]	2 [#] ~0*	1.99 [#] /NA	0.28	NA	NA	21->100
22.50 to 30.30	0.00	33 ^{\$}	1.95/NA	NA	1.50	25	44->100

Notes: - Layers are characterized based on classification and the state of soil in that stratum.

* - In cohesive soils the contribution of the angle of internal friction being insignificant is ignored. While in partly cohesive granular soils contribution of the cohesion being insignificant is ignored.

Shear parameters are the most representative for the layer. NA means not applicable. Characterized N values are considered for each layer.

- # Average of the parameters falling in the same layer has been considered.

- \$ Parameters of this layer is considered based on correlations with SPT N value.

3) Ultimate Load in Compression

3.1) Ultimate load in Compression by Bearing

Ultimate load on pile in end bearing,

$$q_{ub} = A_p * N_c * C_p$$

$$A_p = \text{Cross section area of Pile stem at toe} = \pi d^2 / 4$$

$$D = \text{Diameter of pile} = d \text{ in m}$$

$$N_c = 9$$

$$C_p = \text{Cohesion at Pile Tip} = 3.34 \text{ kg/cm}^2$$

$$q_{ub} = 0.785 d^2 * 9 * 33.40 = 235.97 d^2$$

(For Pile terminating at 22.00m from G.L.).

Ultimate load on pile in end bearing,

$$q_{ub} = A_p (0.5 * D \gamma N_\gamma + P D N_q)$$

$$A_p = \text{Cross section area of Pile stem at toe} = \pi d^2 / 4$$

$$D = \text{Diameter of pile} = d \text{ in m}$$

$$N_\gamma = 37.78$$

$$N_q = 35.00$$

$$q_{ub} = 0.785 d^2 (0.5 * d * 1.95 * 37.78 + 28.75 * 35.00) = 28.92 d^3 + 789.91 d^2$$

(For Pile terminating at 24.00 to 28.00m from GL)

3.2) Ultimate Load in Compression by Skin Friction

Ultimate load in skin friction,

$$q_{uf} = K_i P D_i \tan \delta_i A_{s_i} + \alpha_i C_{ai} A_{s_i}$$

First Layer – No contribution considered – (Within Cutoff Level).

Second Layer – $K_2 P D_2 \tan \delta_2 A_{s_2} = 1.50 * 10.51 * \tan 21^\circ * \pi d * 11.30 = \mathbf{214.72 \text{ d}}$

Third Layer – $\alpha_3 C_{a3} A_{s_3} = 0.28 * 37.70 * \pi d * 3.00 = \mathbf{99.44 \text{ d}}$

Fourth Layer – $K_4 P D_4 \tan \delta_4 A_{s_4} = 1.50 * 28.55 * \tan 21^\circ * \pi d * 1.20 = \mathbf{61.94 \text{ d}}$

Fifth Layer – $\alpha_5 C_{a5} A_{s_5} = 0.28 * 33.40 * \pi d * (\ell - 18.00) = \mathbf{29.37 \text{ d } (\ell - 18.00)}$

(For Pile terminating at 22.00m from G.L.).

Fifth Layer – $\alpha_5 C_{a5} A_{s_5} = 0.28 * 33.40 * \pi d * 4.50 = \mathbf{132.14 \text{ d}}$

Sixth Layer – $K_6 P D_6 \tan \delta_6 A_{s_6} = 1.50 * 28.75 * \tan 25^\circ * \pi d * (\ell - 22.50) = \mathbf{63.14 \text{ d } (\ell - 22.50)}$

(For Pile terminating at 24.00 to 28.00m from G.L.).

$q_{uf} = 376.10 \text{ d} + 29.37 \text{ d } (\ell - 18.00)$ (For Pile terminating at 22.00m from G.L.).

$q_{uf} = 508.24 \text{ d} + 63.14 \text{ d } (\ell - 22.50)$ (For Pile terminating at 24.00 to 28.00m from G.L.).

Where, ℓ is the pile length and d is diameter of piles, substituting

Ultimate load by both bearing and friction can be as follows for various lengths of piles,

$$q_{uc} = q_{ub} + q_{uf}$$

$q_{uc} = 235.97 d^2 + 376.10 d + 29.37 d (\ell - 18.00)$

(For Pile terminating at 22.00m from G.L.).

$q_{uc} = 28.92 d^3 + 789.91 d^2 + 508.24 d + 63.14 d (\ell - 22.50)$

(For Pile terminating at 24.00 to 28.00m from G.L.).

By substituting various diameters of piles having various lengths, the safe load is worked out considering the safety factor of 2.50 and are given in table below,

Safe Load on Piles in Compression (in Ton)

Termination Depth of Pile in m, from EGL	Termination Depth of Pile in m, from cut-off	Diameter of Pile in, m		
		1.00	1.20	1.50
22.00	19.50	291.80	372.82	508.50
24.00	21.50	568.74	868.88	1453.52
26.00	23.50	619.25	942.15	1616.67
28.00	25.50	669.77	1015.43	1738.35

3.3) Ultimate Load in Uplift

Considering skin friction for determination of uplift

Safe Load on Piles in Uplift (in Ton)

Termination Depth of Pile in m, from EGL	Termination Depth of Pile in m, from cut-off	Diameter of Pile in, m		
		1.00	1.20	1.50
22.00	19.50	164.51	197.42	246.77
24.00	21.50	200.98	249.09	320.32
26.00	23.50	243.08	310.15	416.10
28.00	25.50	285.17	371.21	517.50

Note: Self weight of pile is not considered in calculation of ultimate load in uplift.

3.4) Lateral Pile Capacity

The lateral load carrying capacity of long, flexible to intermediate piles constructed with M35 grade concrete and having no free (unsupported) length may be evaluated at a permissible lateral deflection of 1/100 of the pile diameter, in accordance with the provisions of IS 2911 (Part 1/Section 2), as summarized below:

Diameter in, m		1.00	1.20	1.50
Subgrade Reaction in MN/m ³		3.10	3.10	3.10
Stiffness Factor T, in m		3.43	3.97	4.75
Depth of Fixity in, m	Free Head	6.50	7.50	9.00
	Fixed Head	7.50	8.70	10.40
Allowable Horizontal Force in, T	Free Head	16.00	25.70	45.90
	Fixed Head	42.30	68.00	121.50
Allowable Moment Capacity in, Tm	Free Head	36.51	67.86	144.90
	Fixed Head	129.94	241.52	515.76

4) Notes:

1) Initial and Routine pile load tests shall be carried out as per IS 2911, P-4 on the piles to confirm the capacity of pile worked out theoretically. For design and construction, specifications of IS 2911, P-I, S-2, shall strictly be followed. Termination depth of pile shall be from EGL.

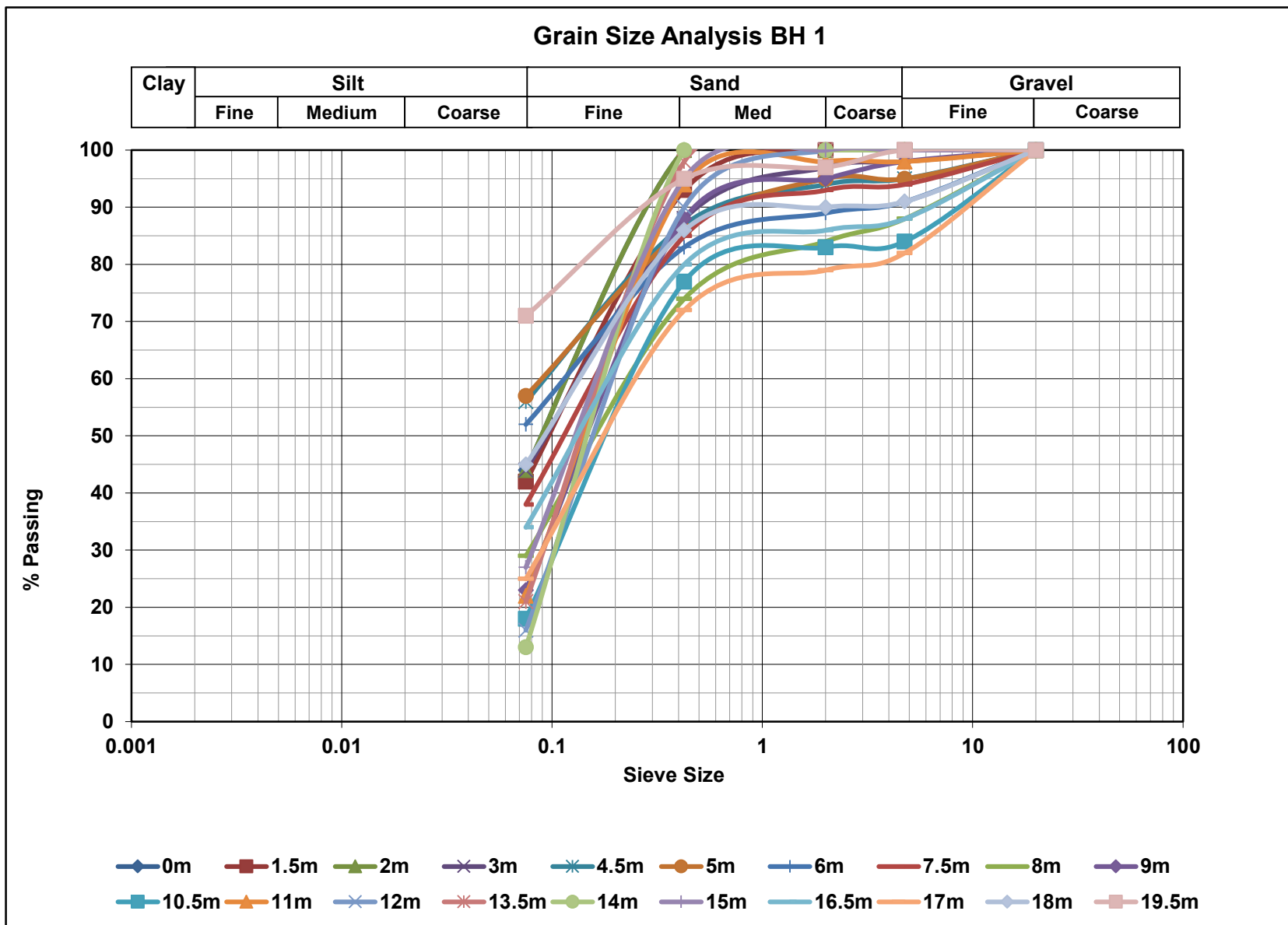
Dr. K. K. Thaker

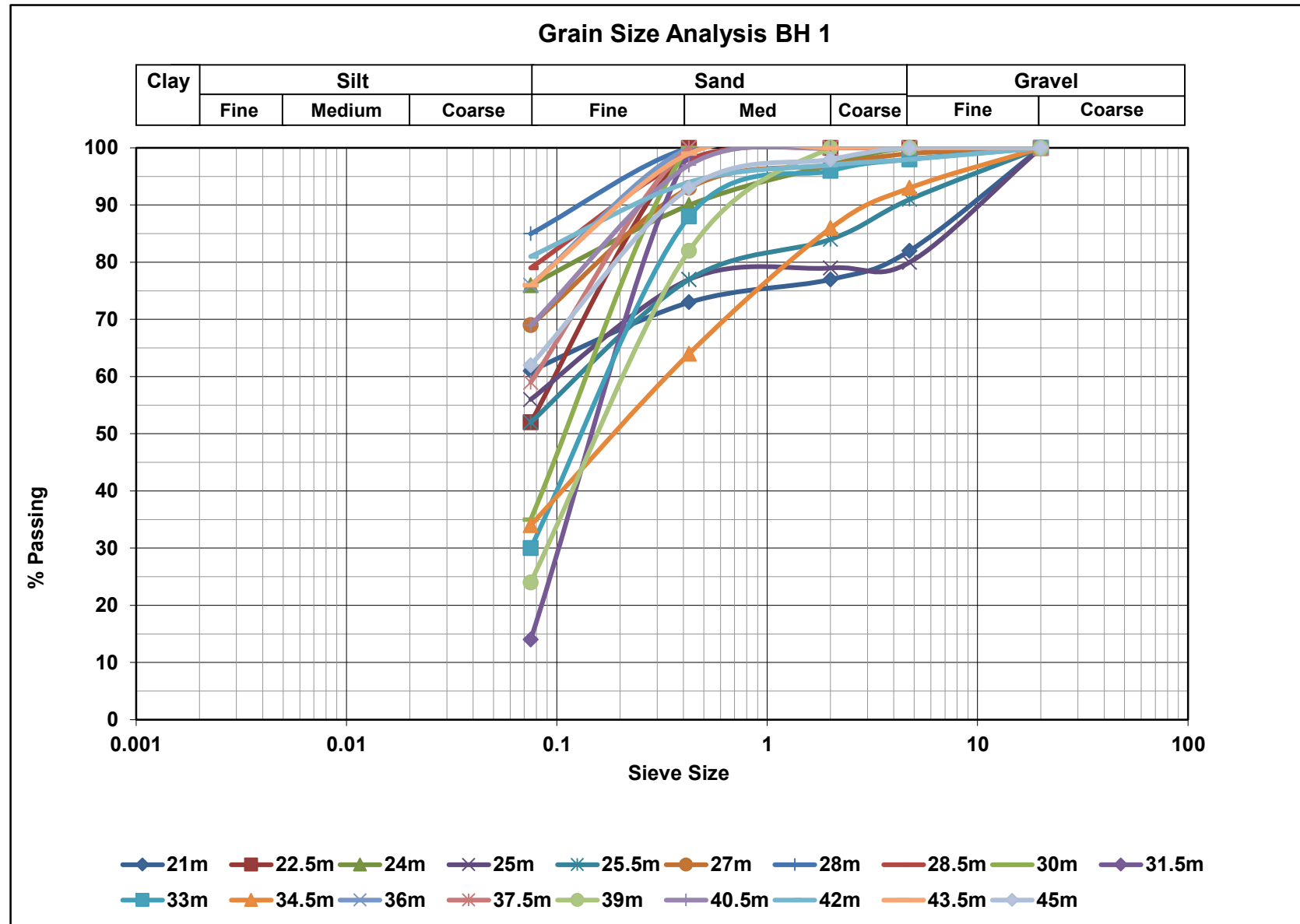
NOTATIONS

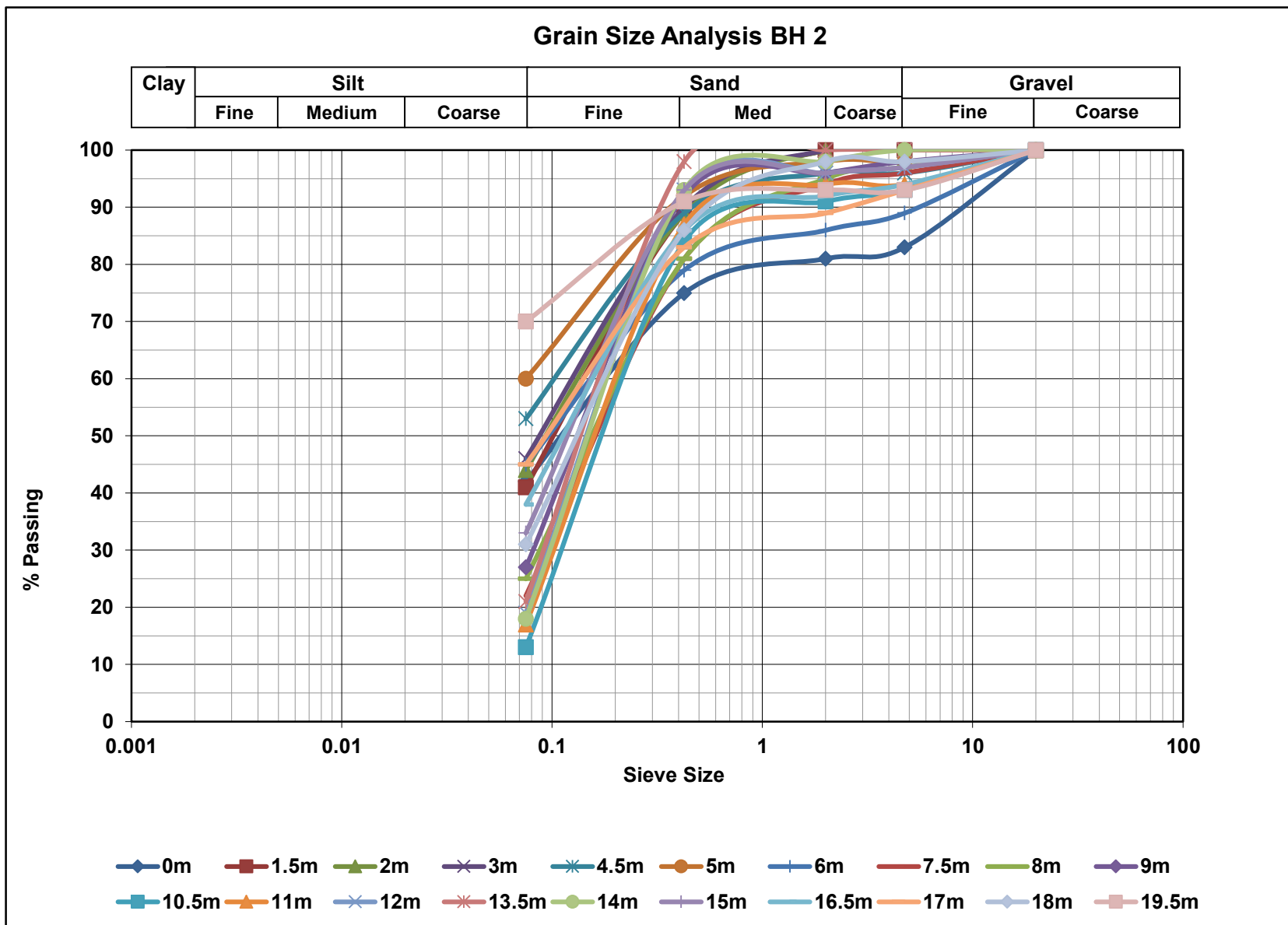
C	Cohesion
ϕ	Angle of internal friction of soil
DS	Disturbed Sample
UDS	Undisturbed Sample
NMC	Natural Moisture Content
NP	Non Plastic Soils
G	Specific Gravity
G	Gravel Content
M	Silt Content
S	Sand Content
C	Clay Content
LL	Liquid Limit
PL	Plastic Limit
PI	Plasticity Index
Cc	Compression Index
K	Coefficient of Permeability
UCS	Unconfined Compression
N	SPT Value
BH	Bore Hole
Suffix	The Number of Bore Holes
Nc,Nq,N _γ	Bearing Capacity Factor
Sc,Sq,S _γ	Shape Factors
γ	Density of Soil
D	Depth of foundation
FS	Factor of Safety
Cv	Coefficient of consolidation
UU	Unconsolidated undrained triaxial test
CU	Consolidated undrained triaxial test
CD	Consolidated drained triaxial test
GC	Clayey Gravels
GP	Poorely Graded Gravels
GW	Well Graded Gravels
SC	Clayey Sand
SM	Silty Sand
SW	Wel Graded Sand
SP	Poorly Graded Sand
CH	Clays of High Plasticity
CI	Clays of Intermediate Plasticity
CL	Clays of Low Plasticity
MH	Silts of High Plasticity
MI	Silts of Intermediate Plasticity
ML	Silts of Low Plasticity

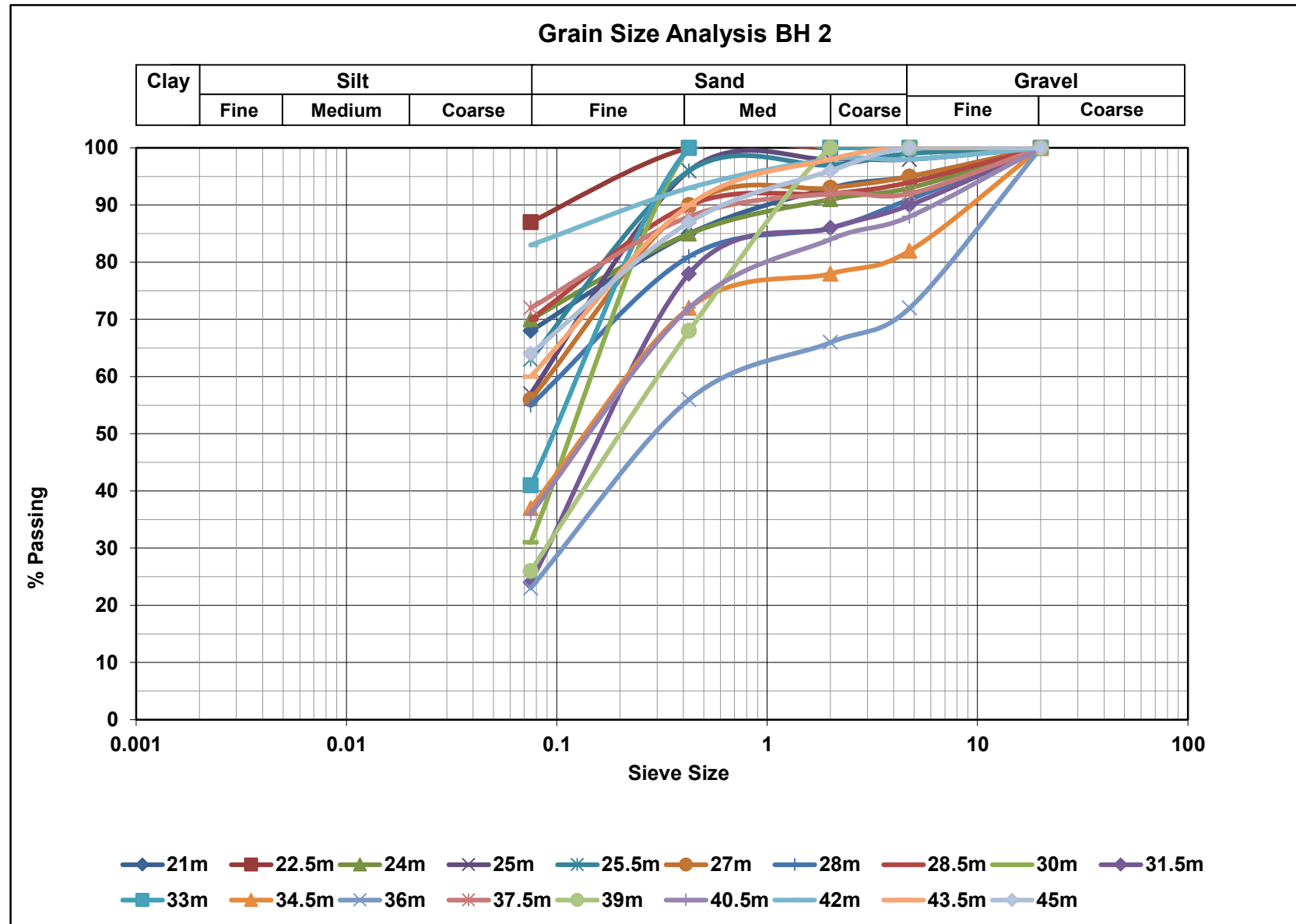
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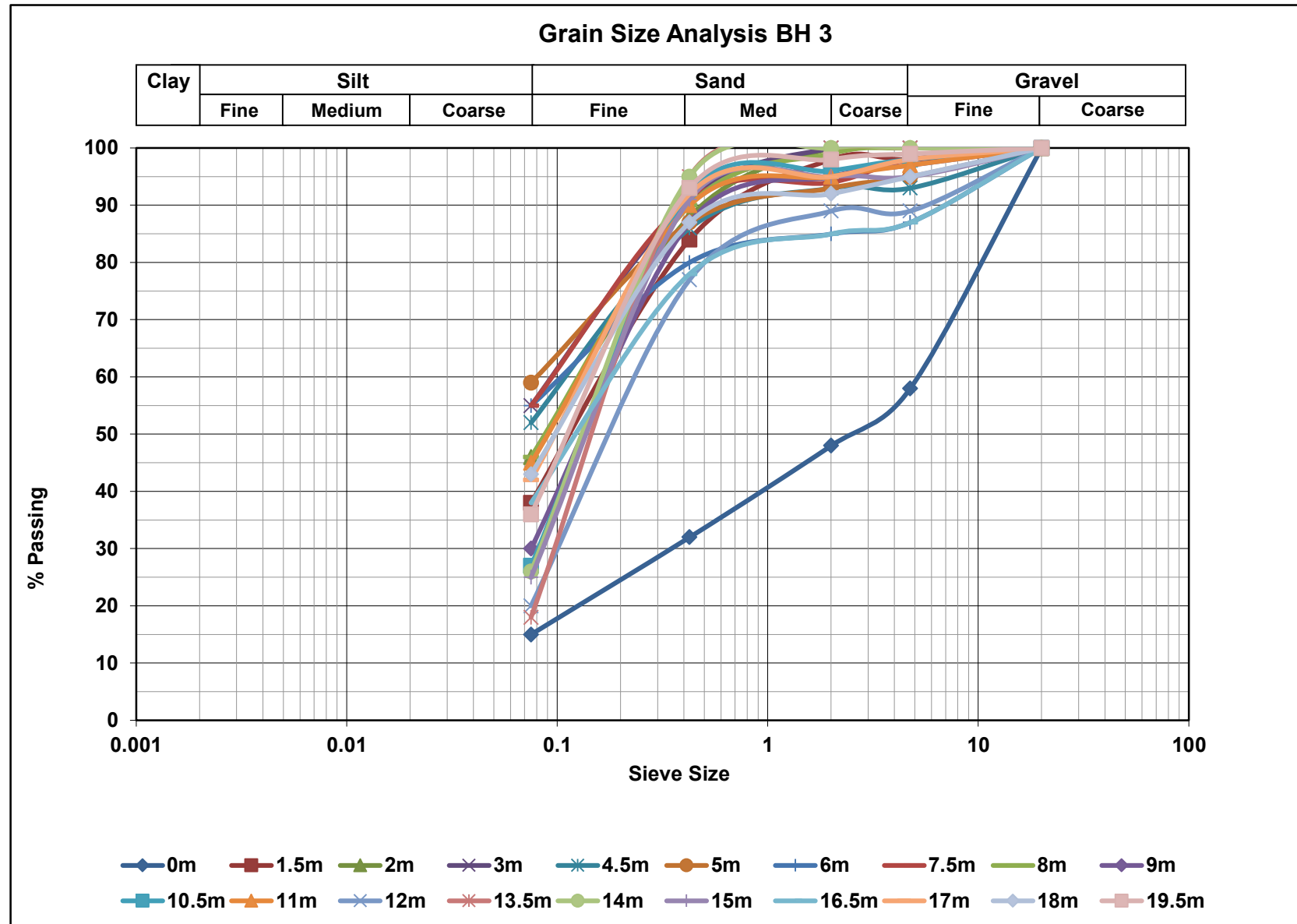
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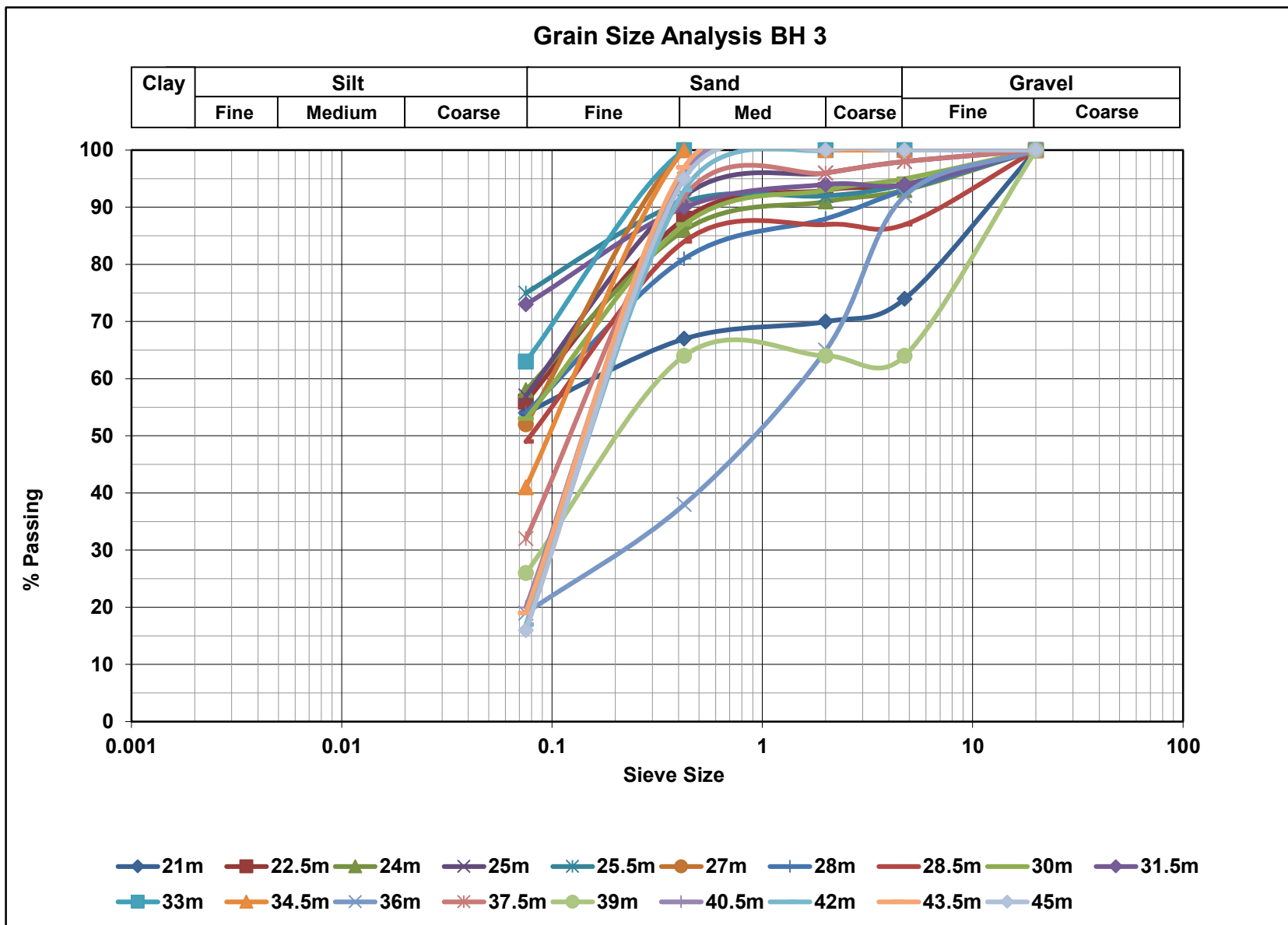


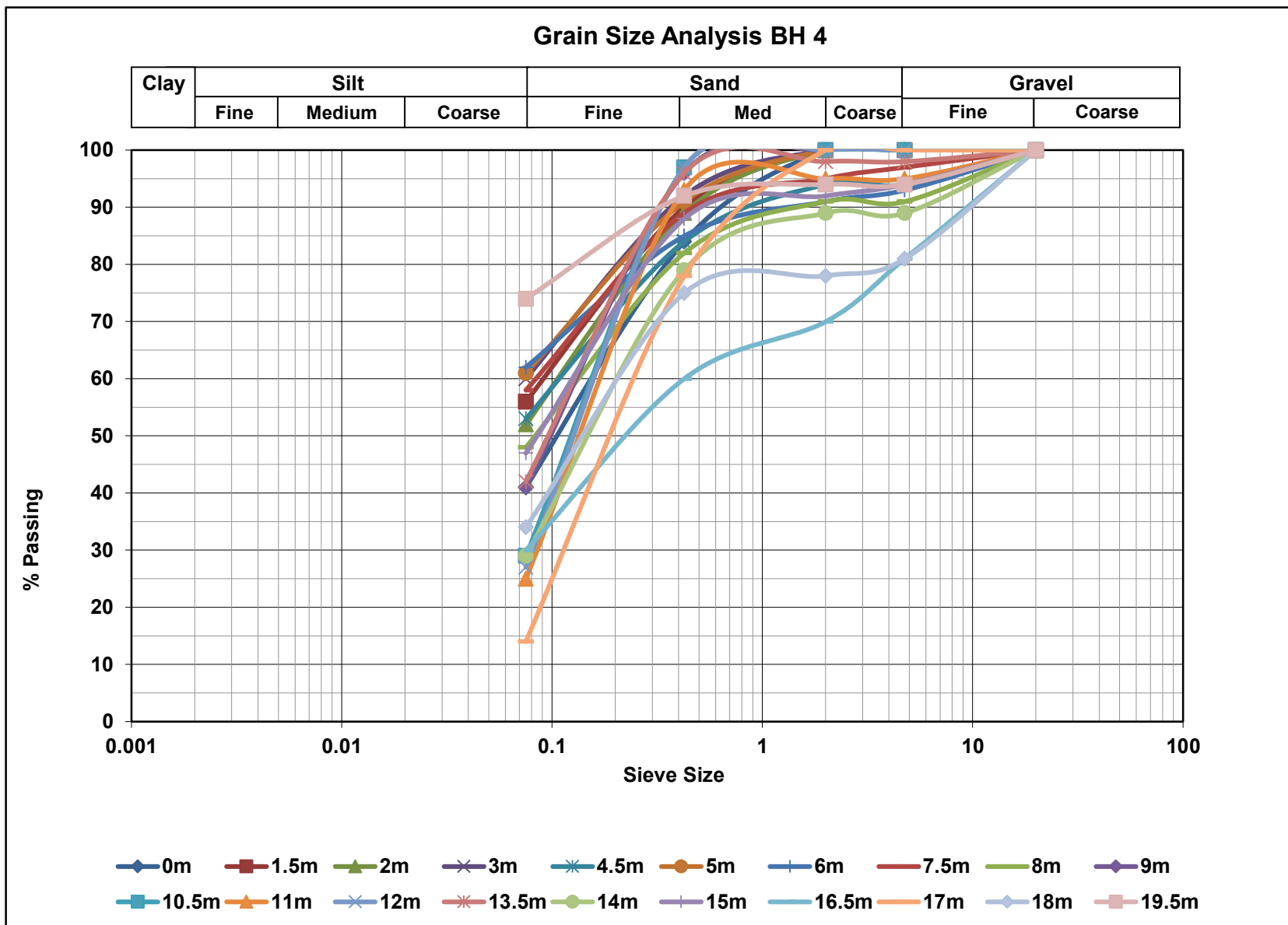


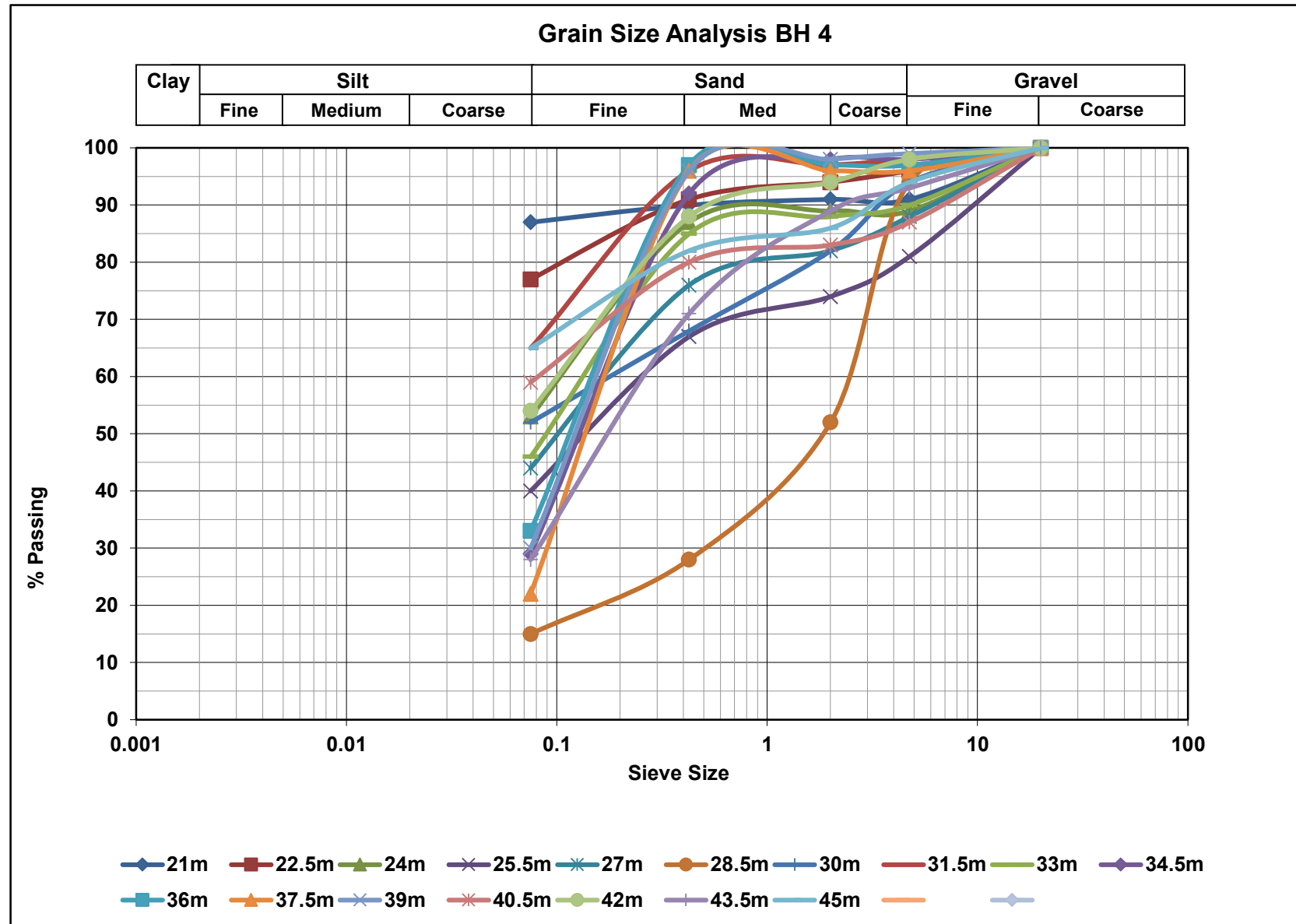


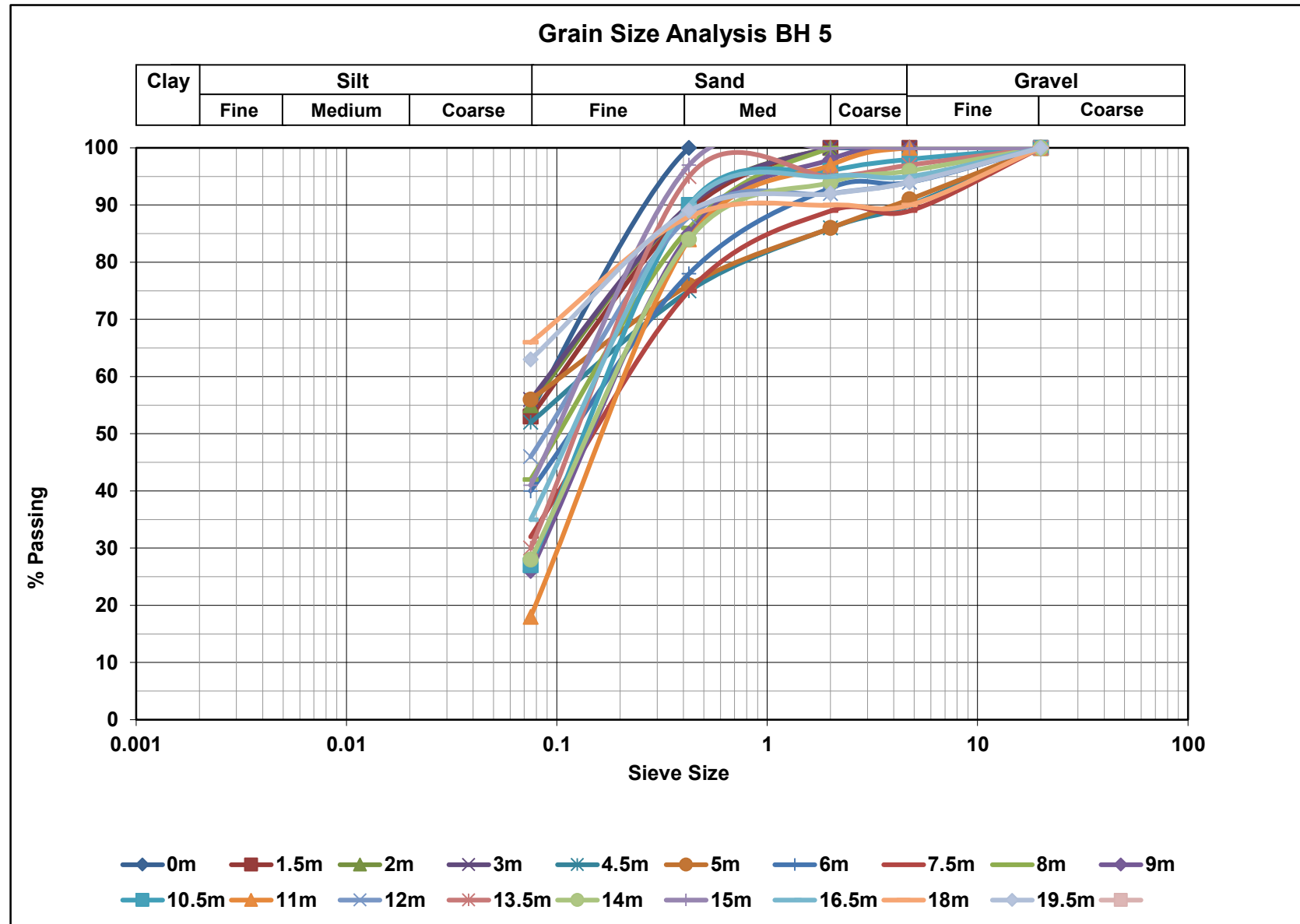


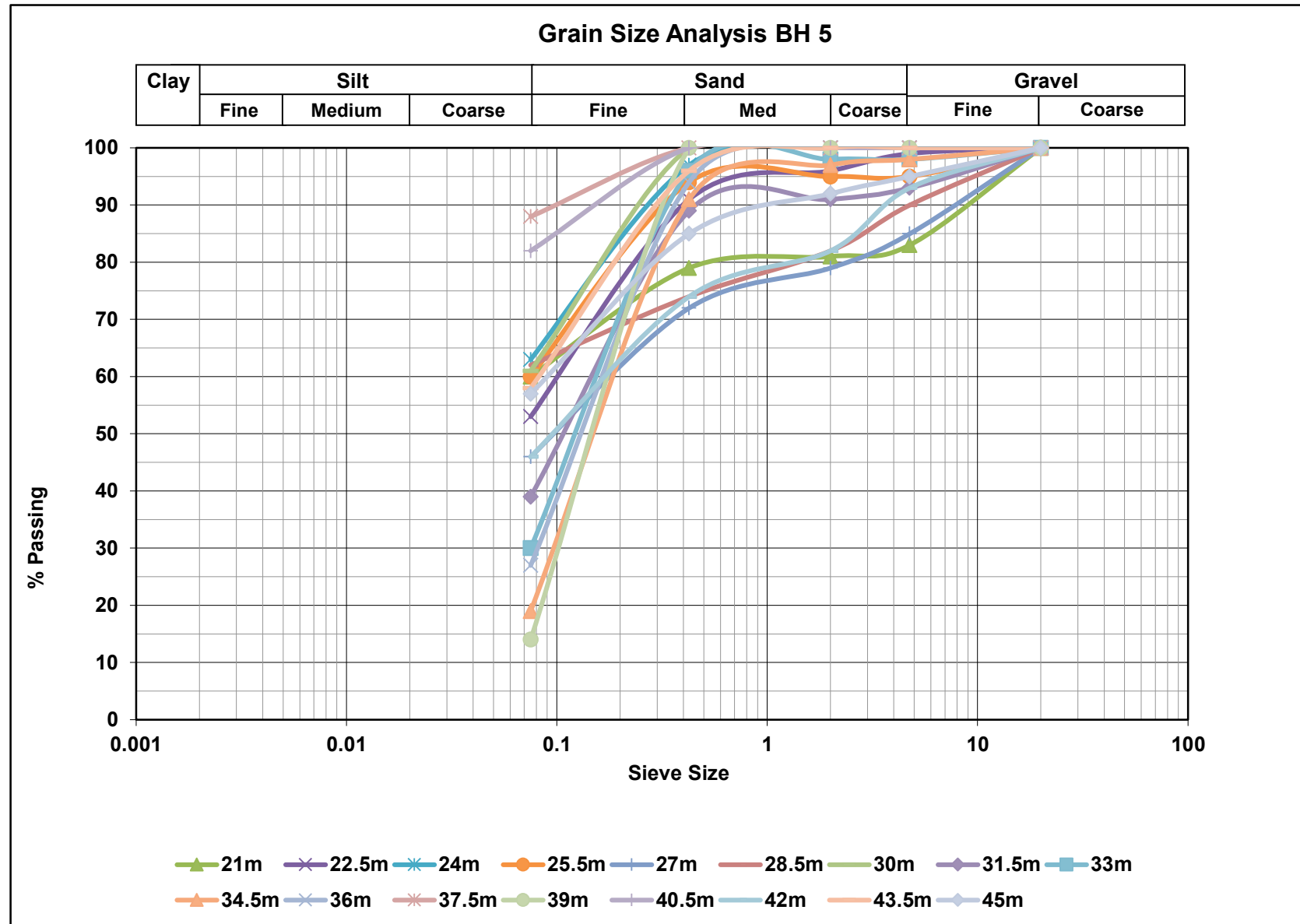


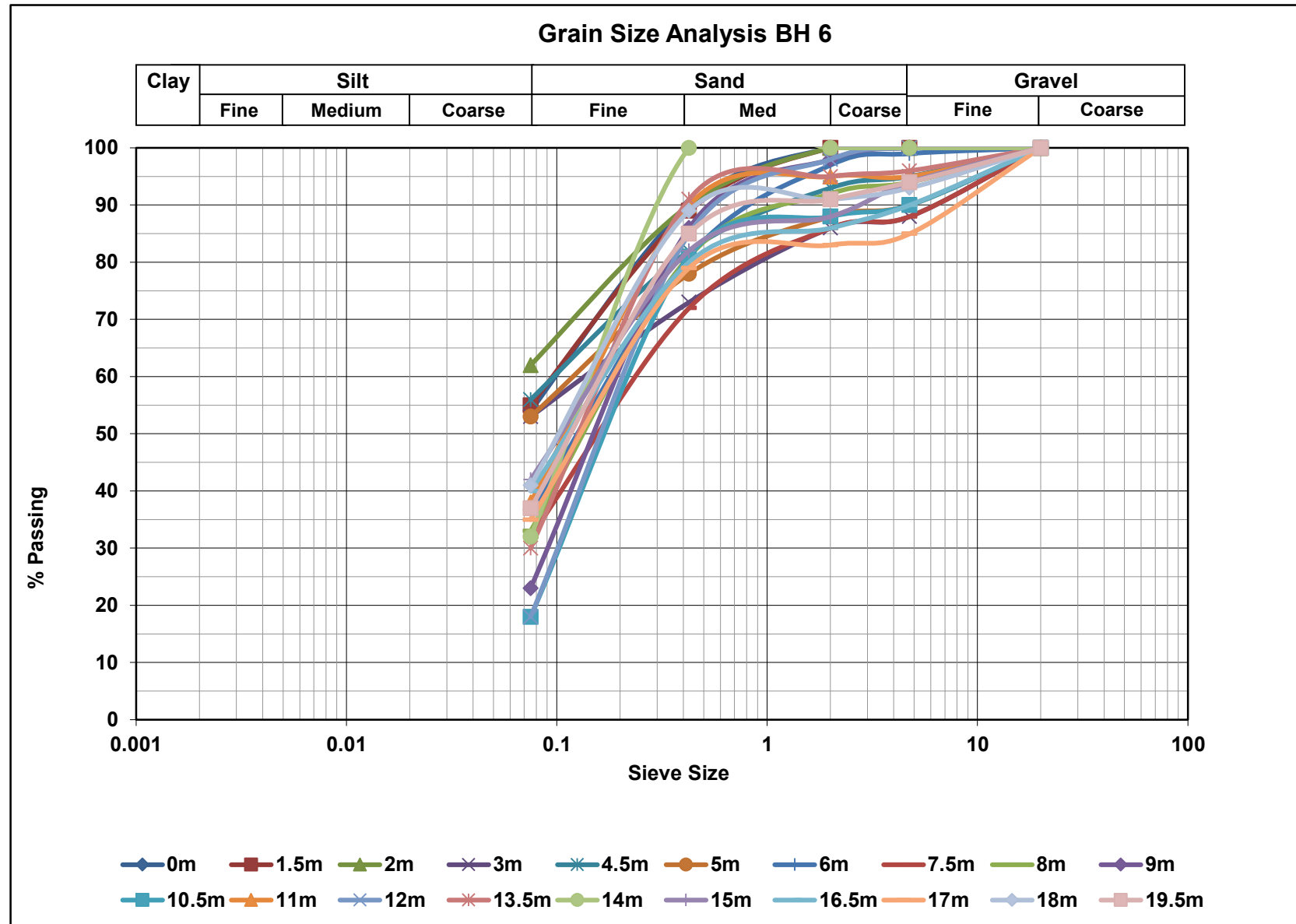


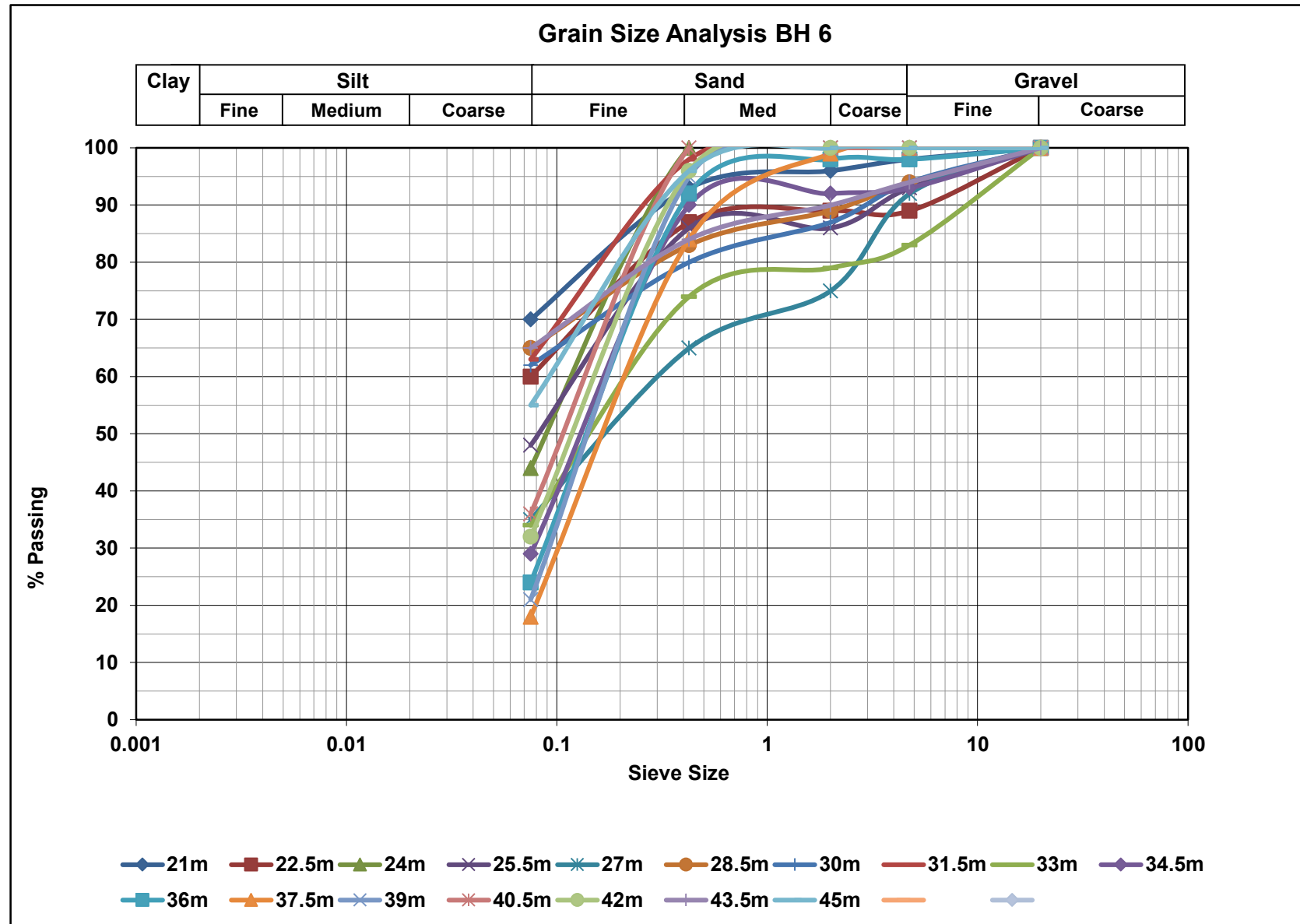


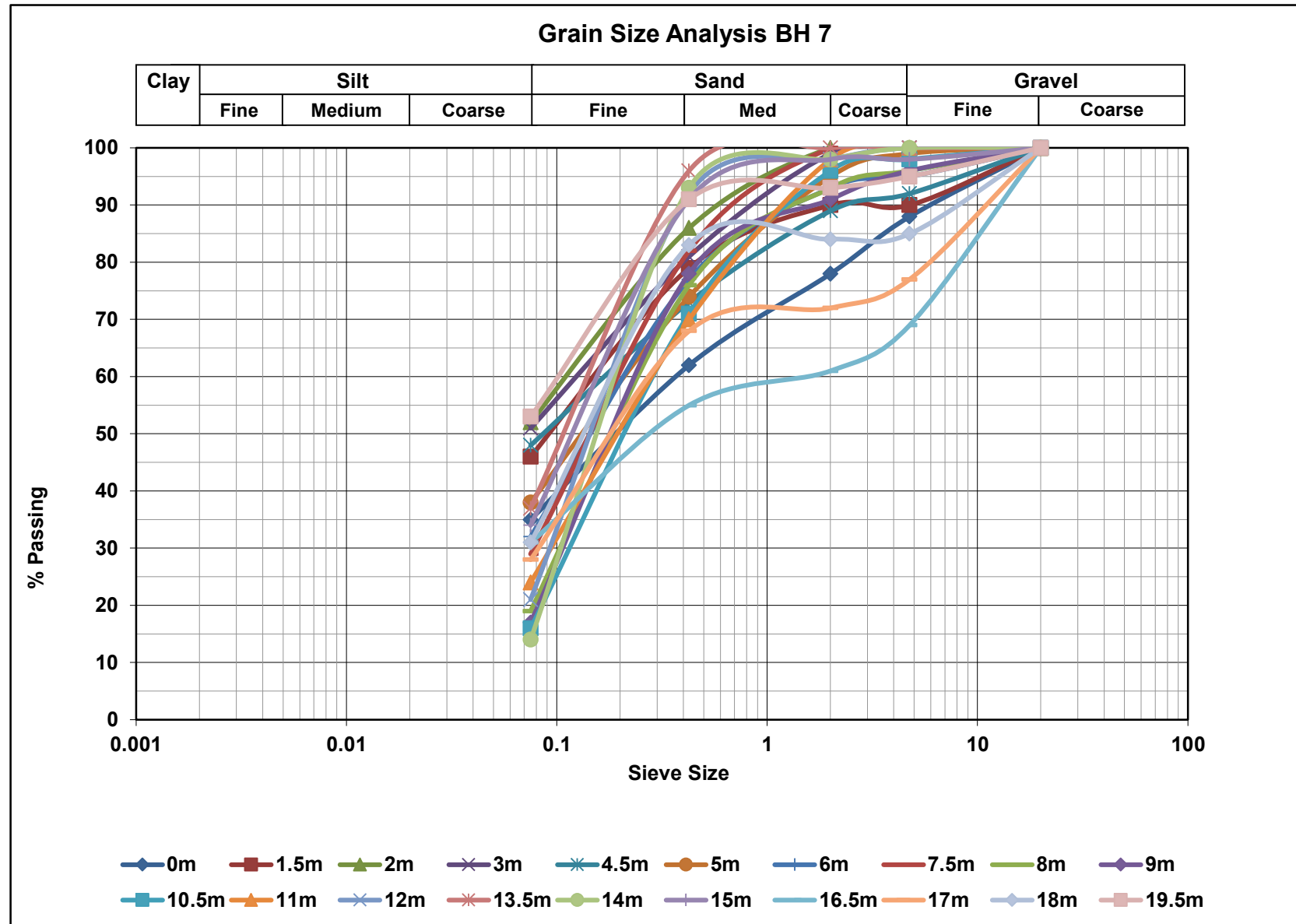


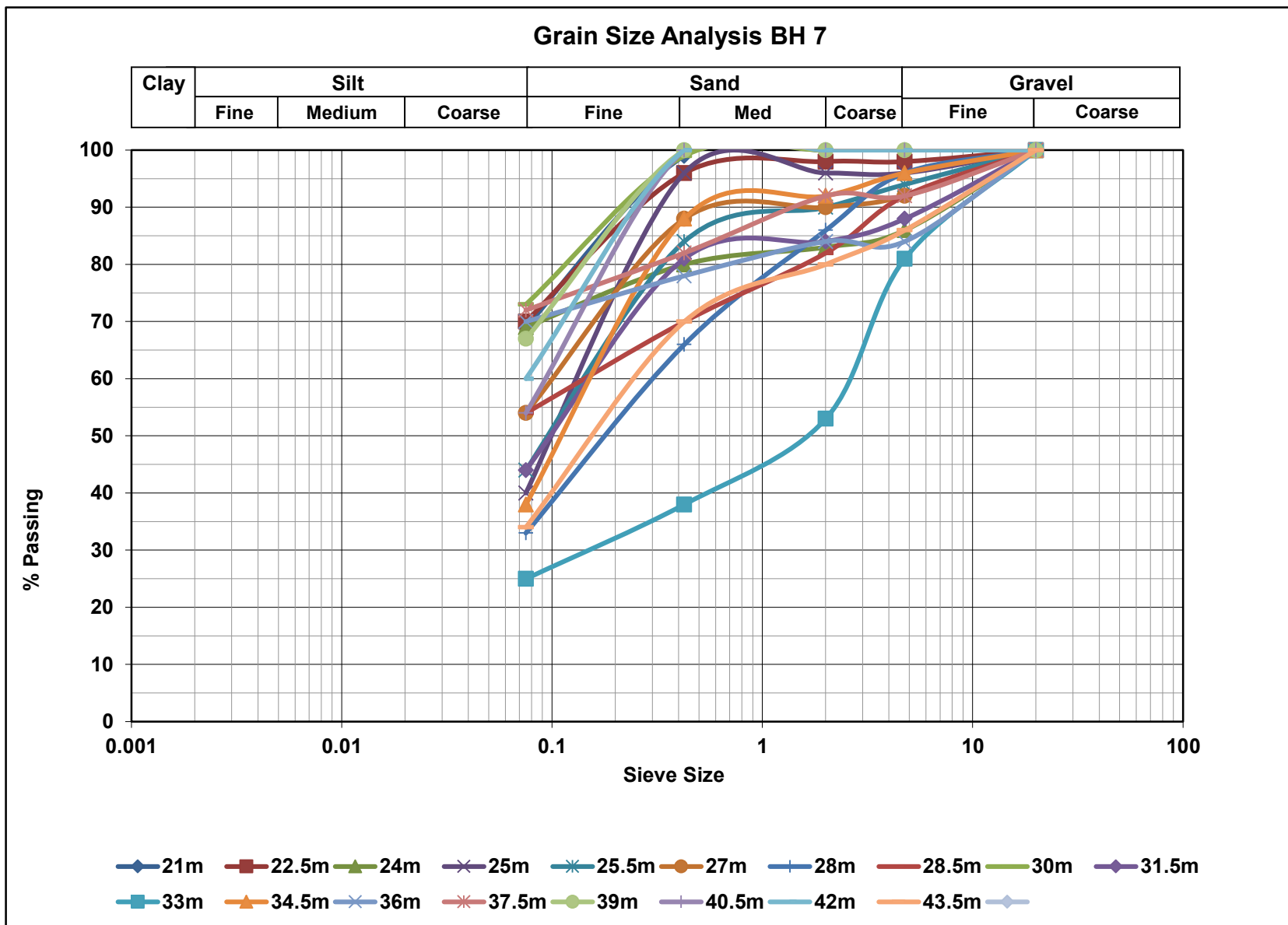


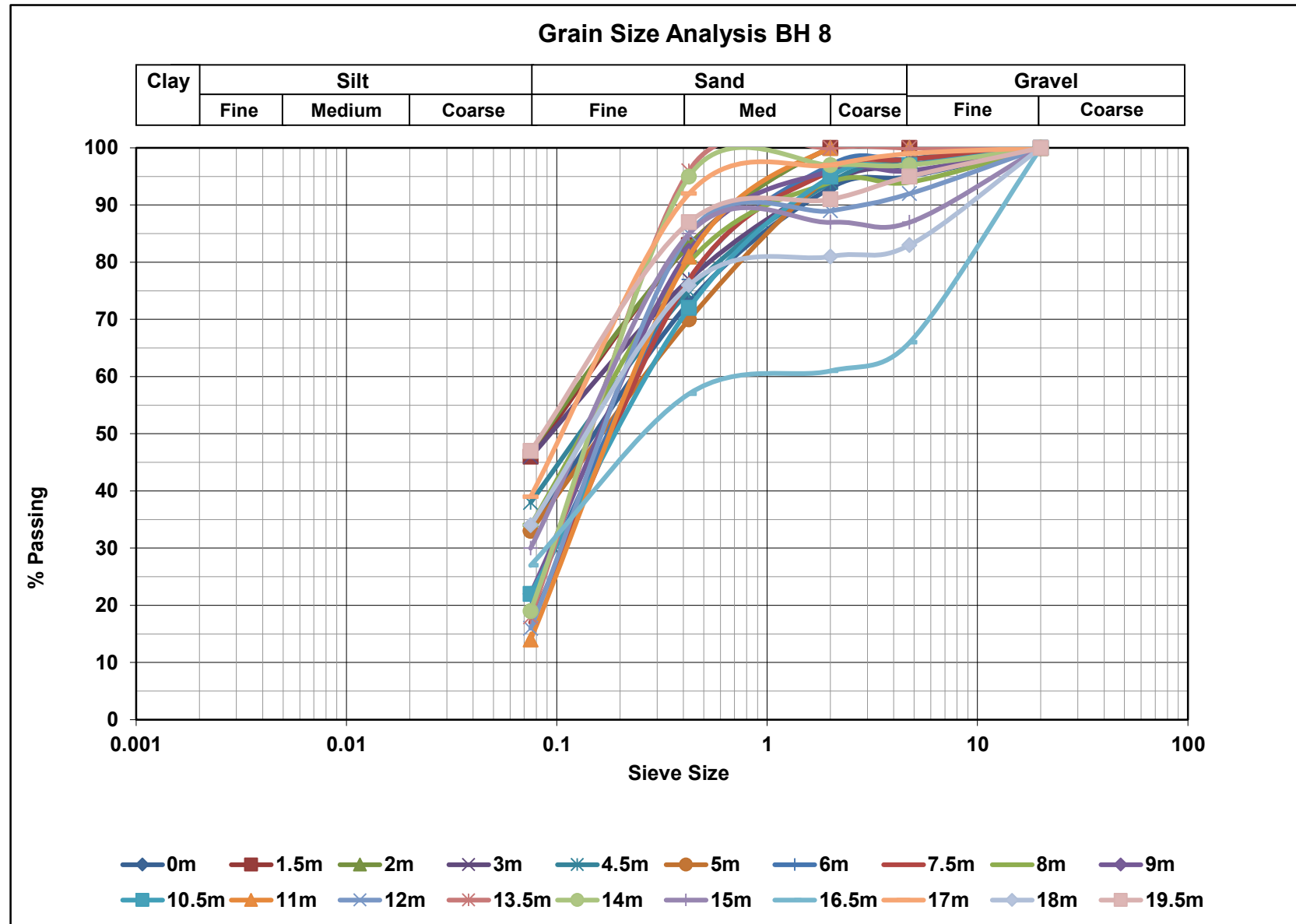


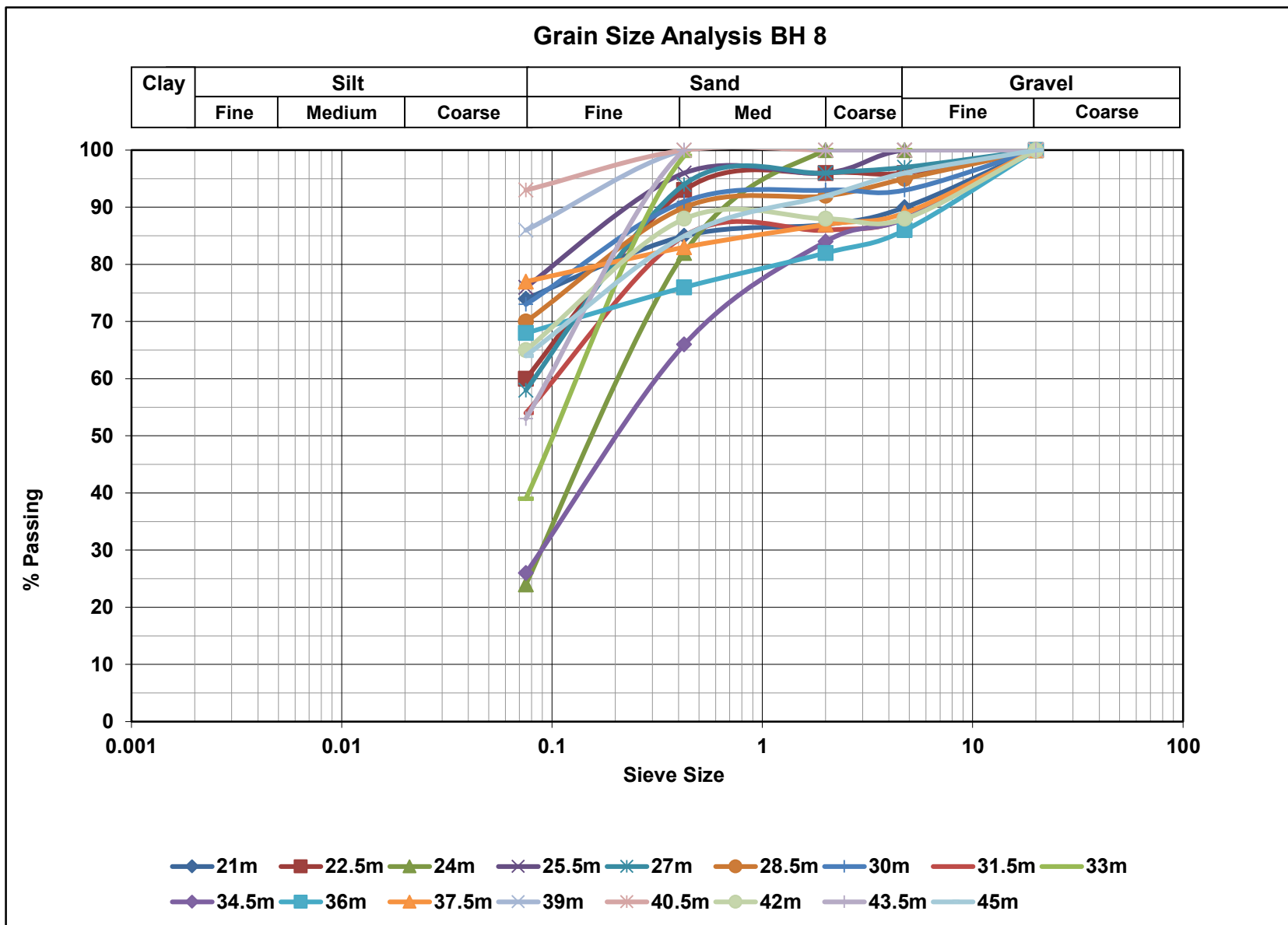


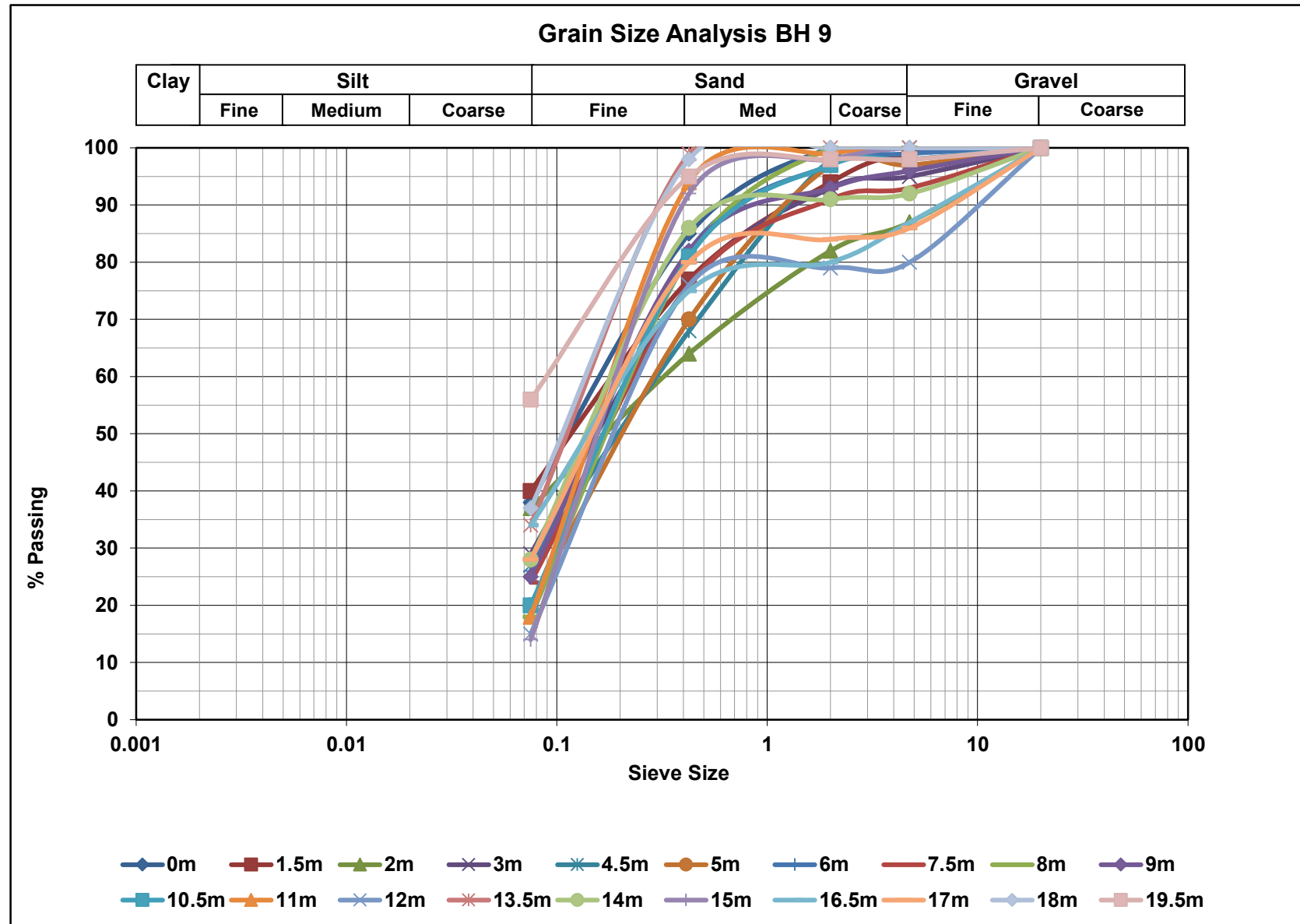


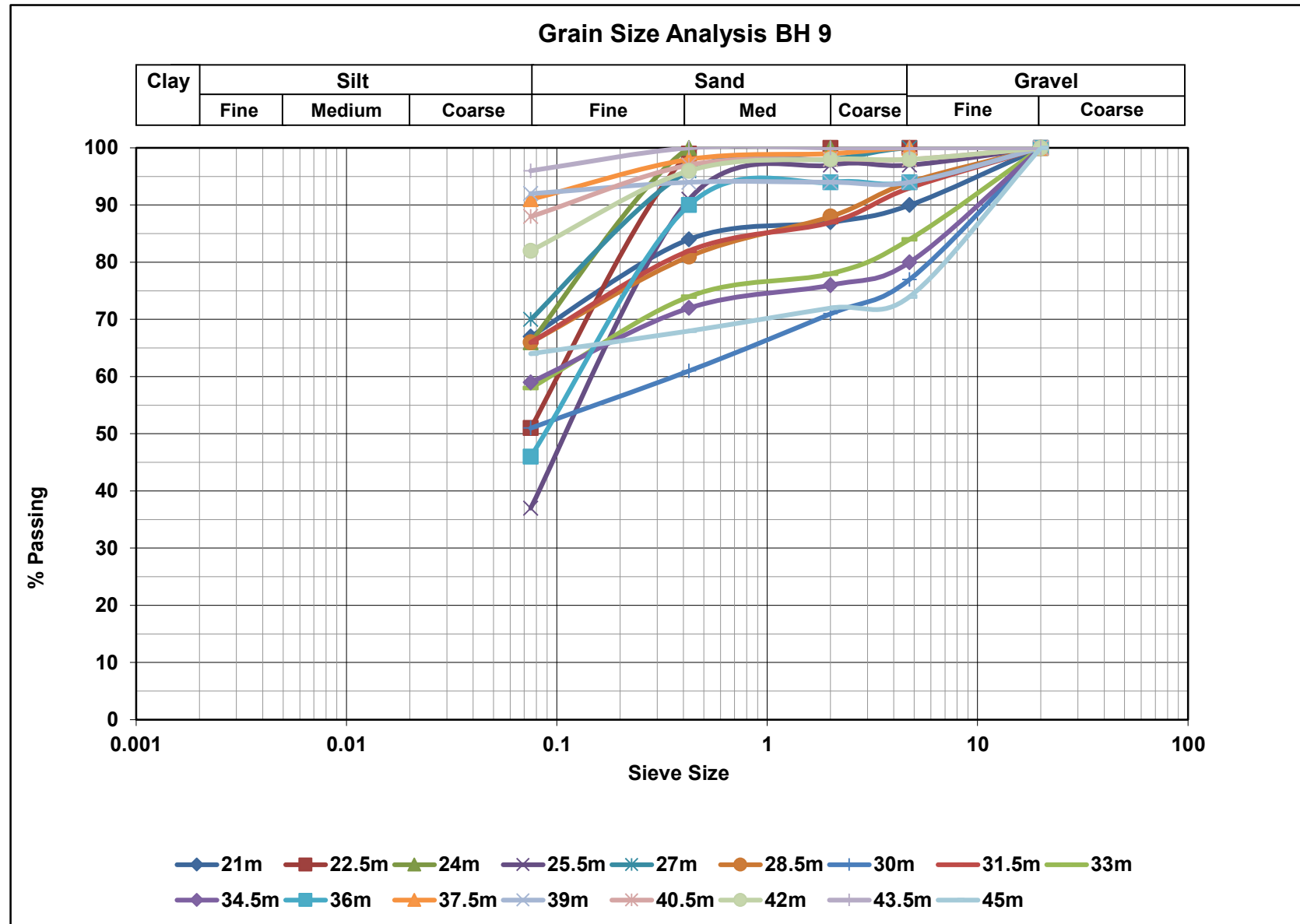


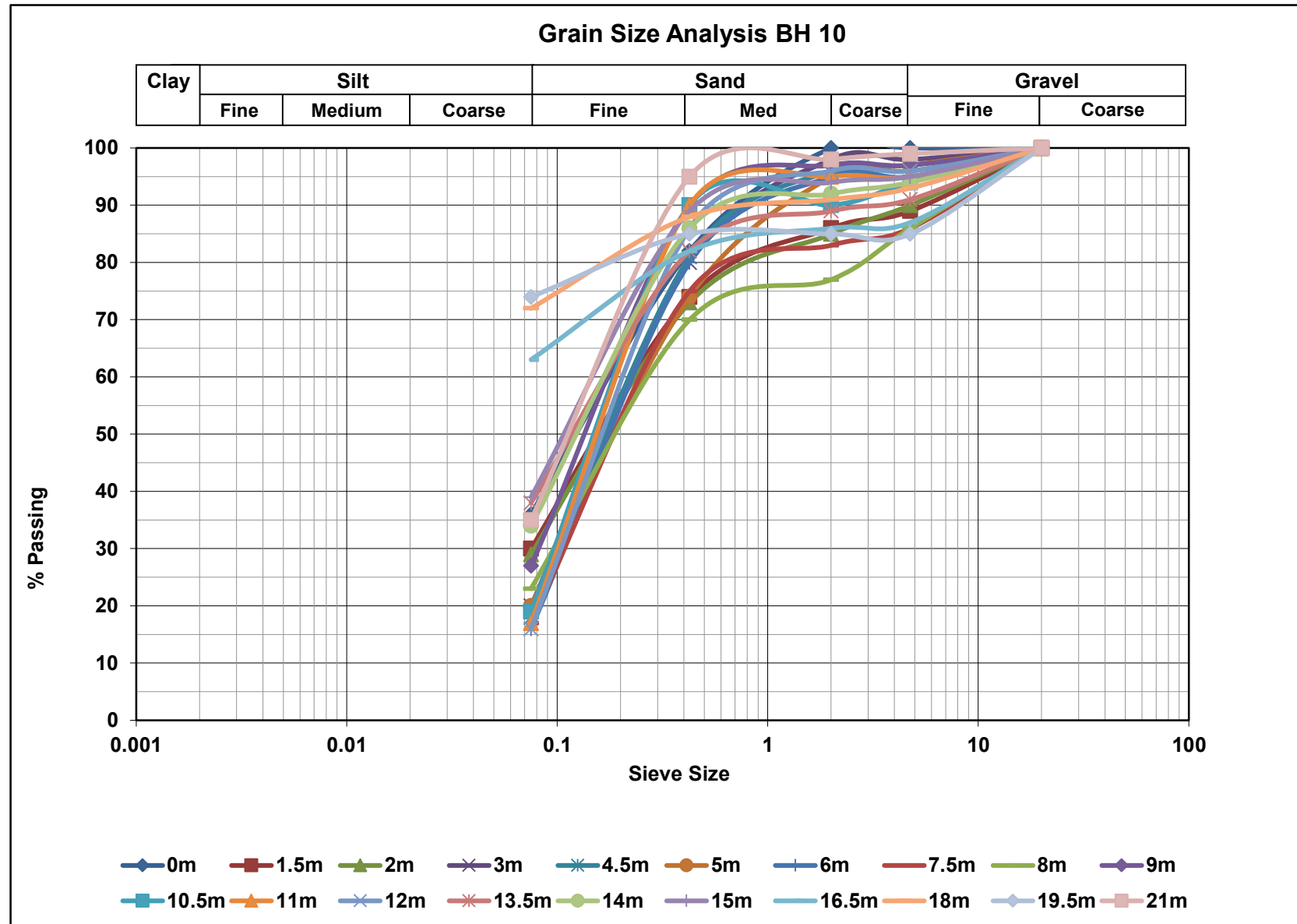


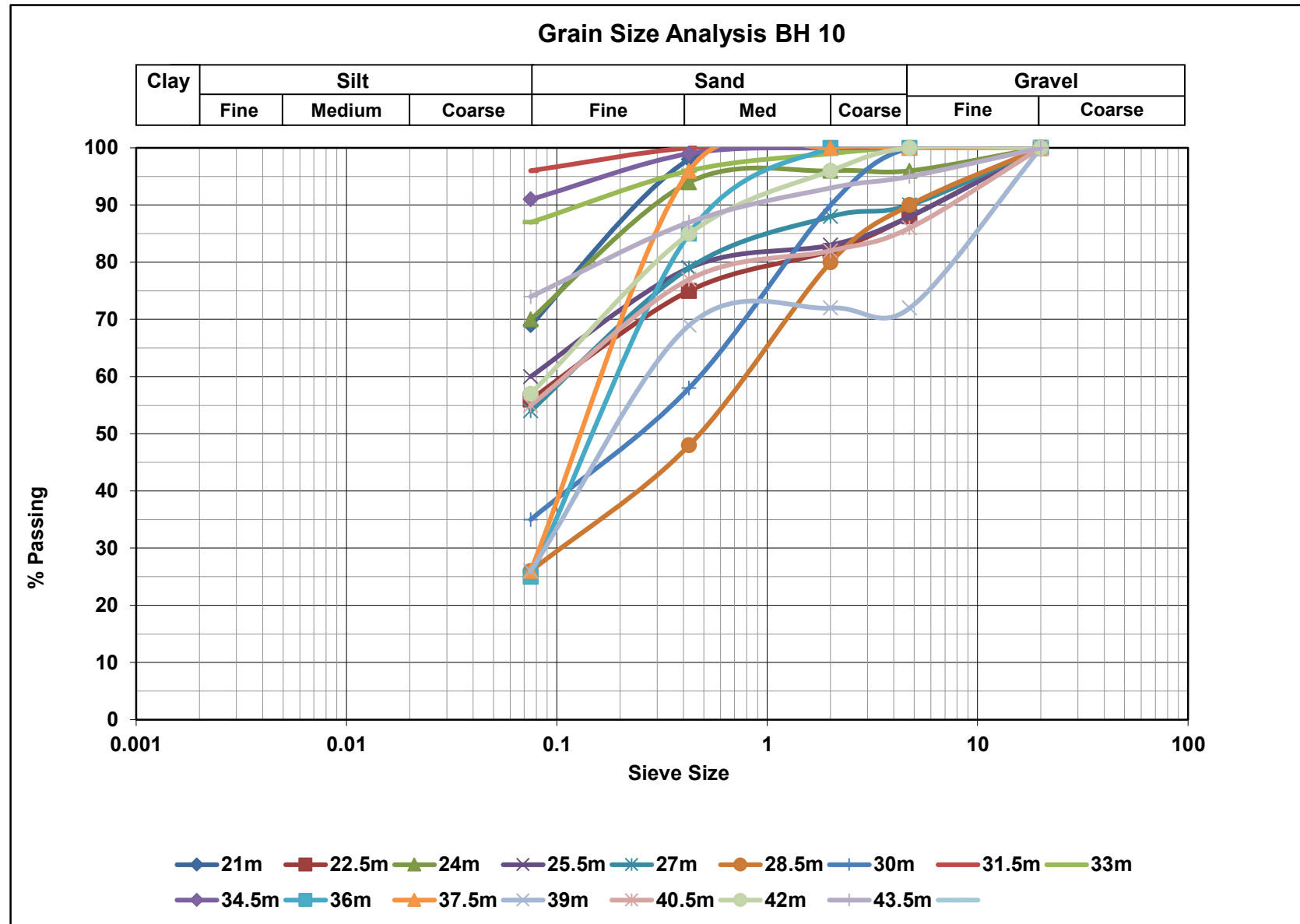


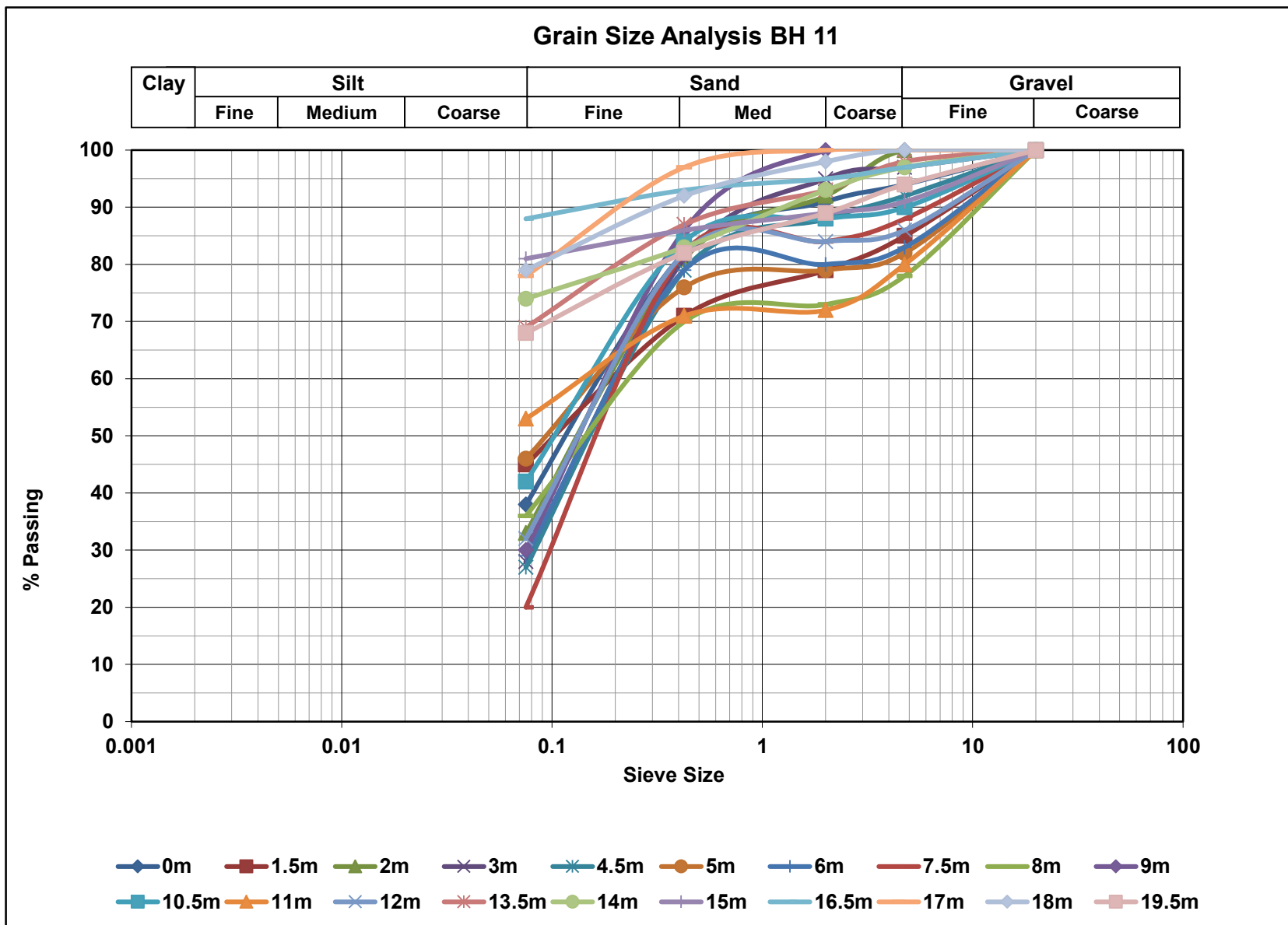


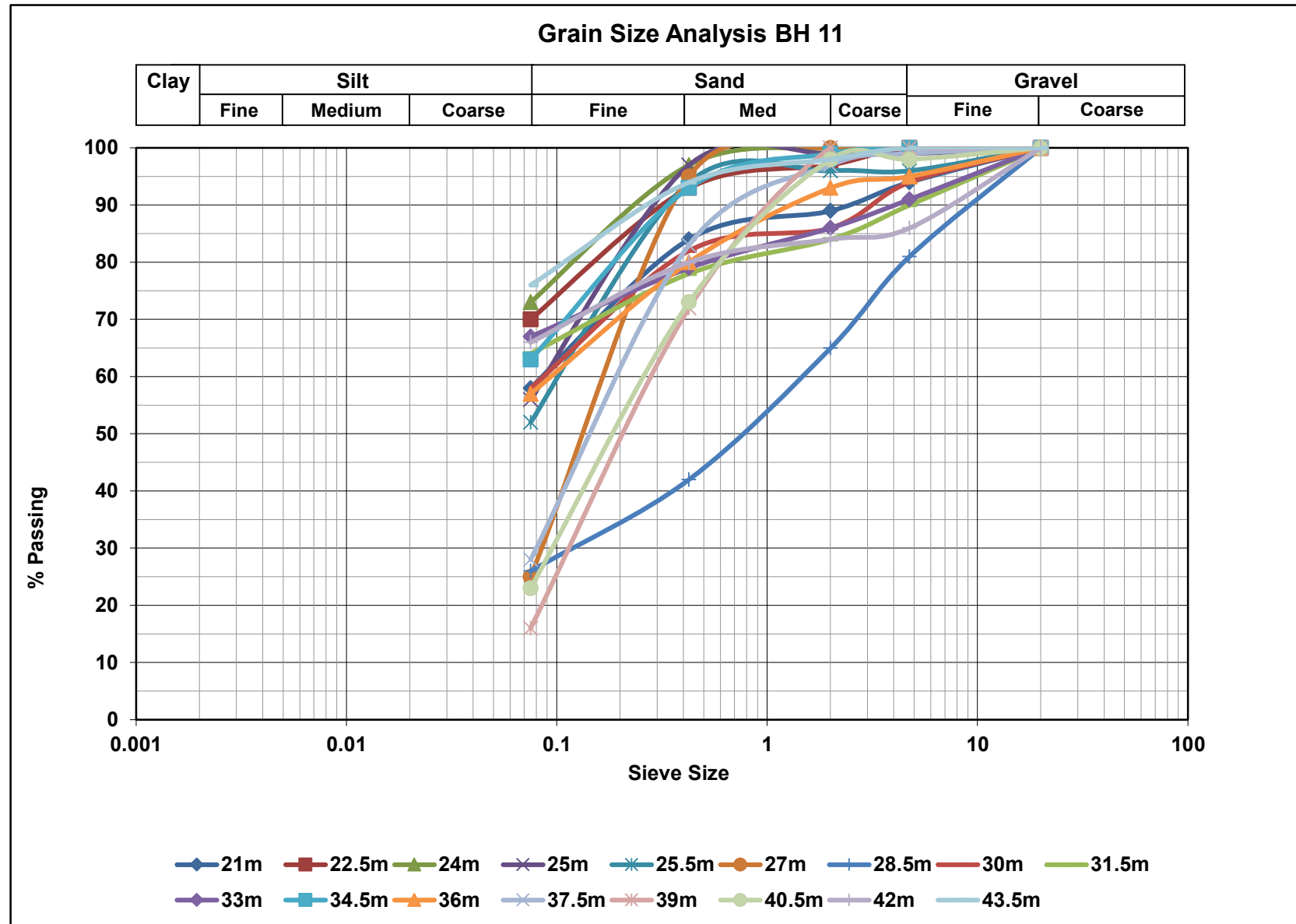


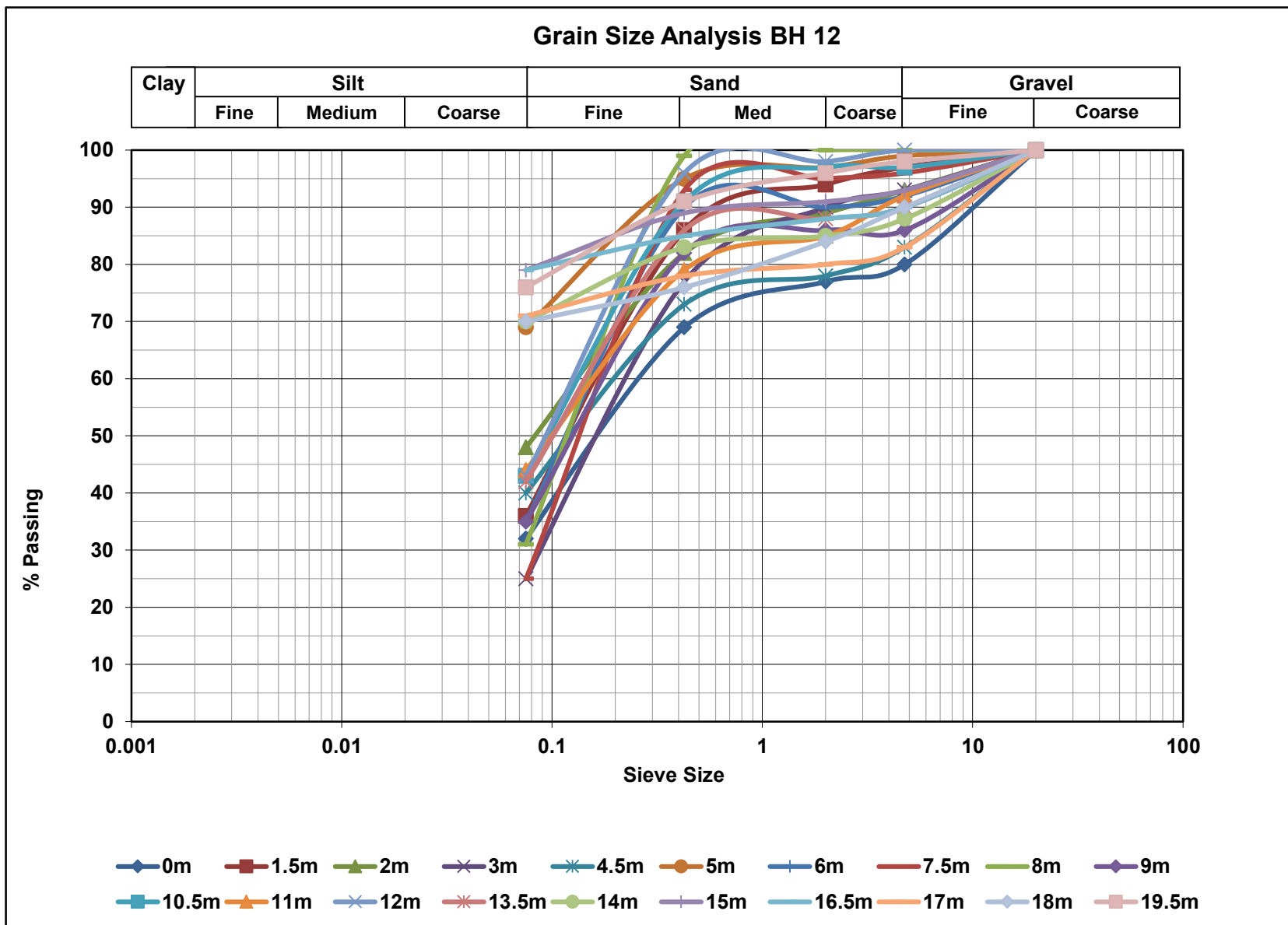


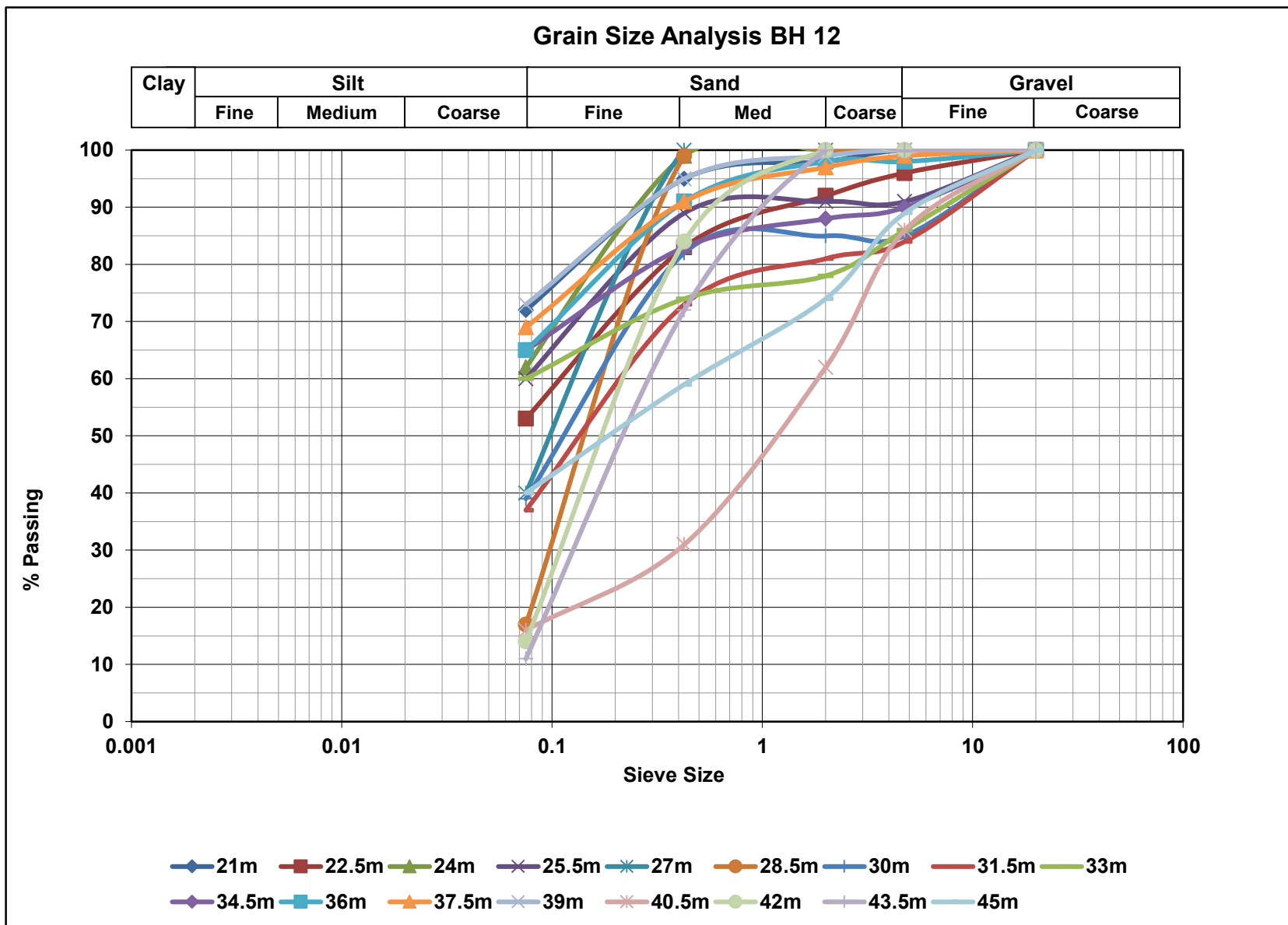


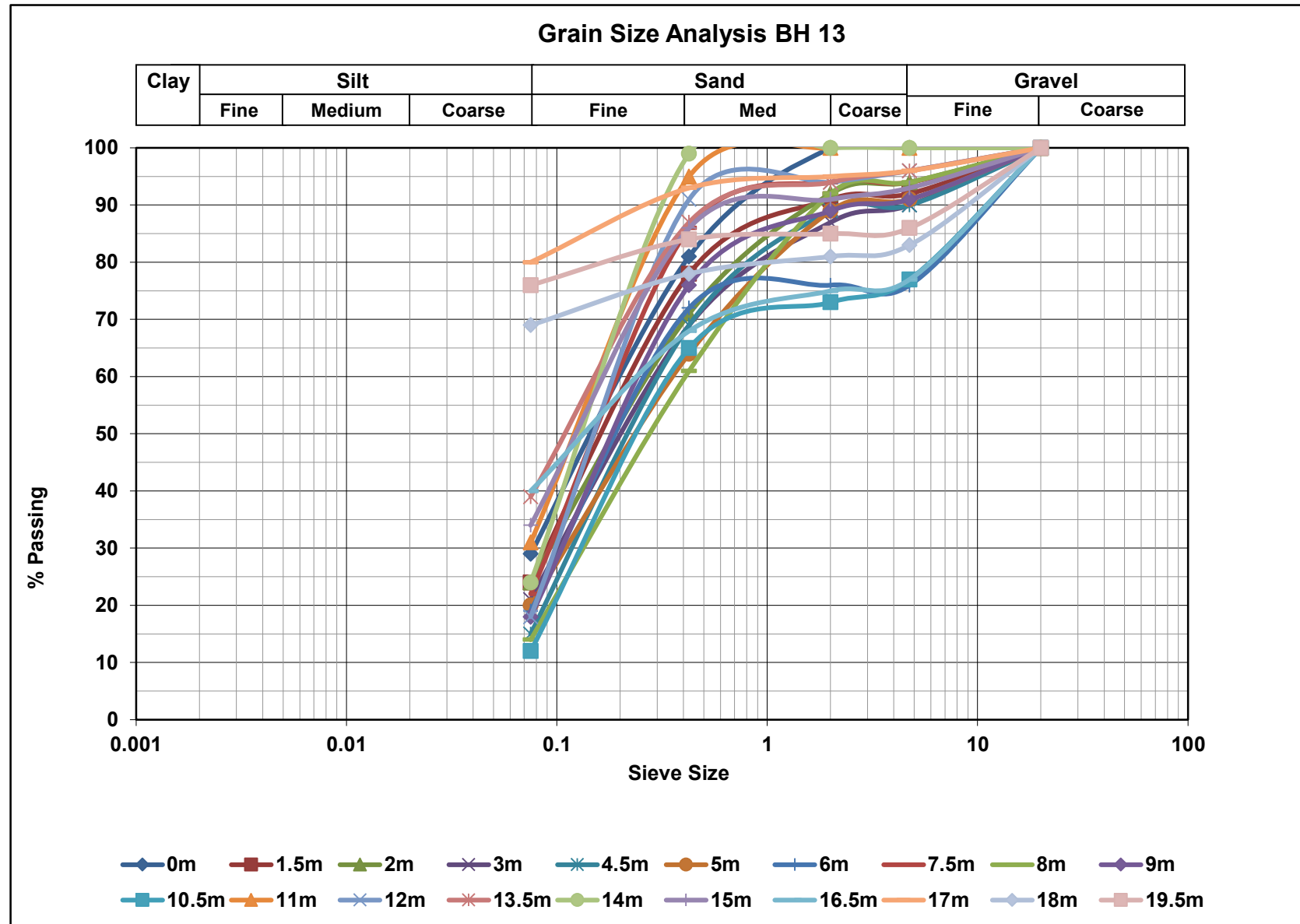


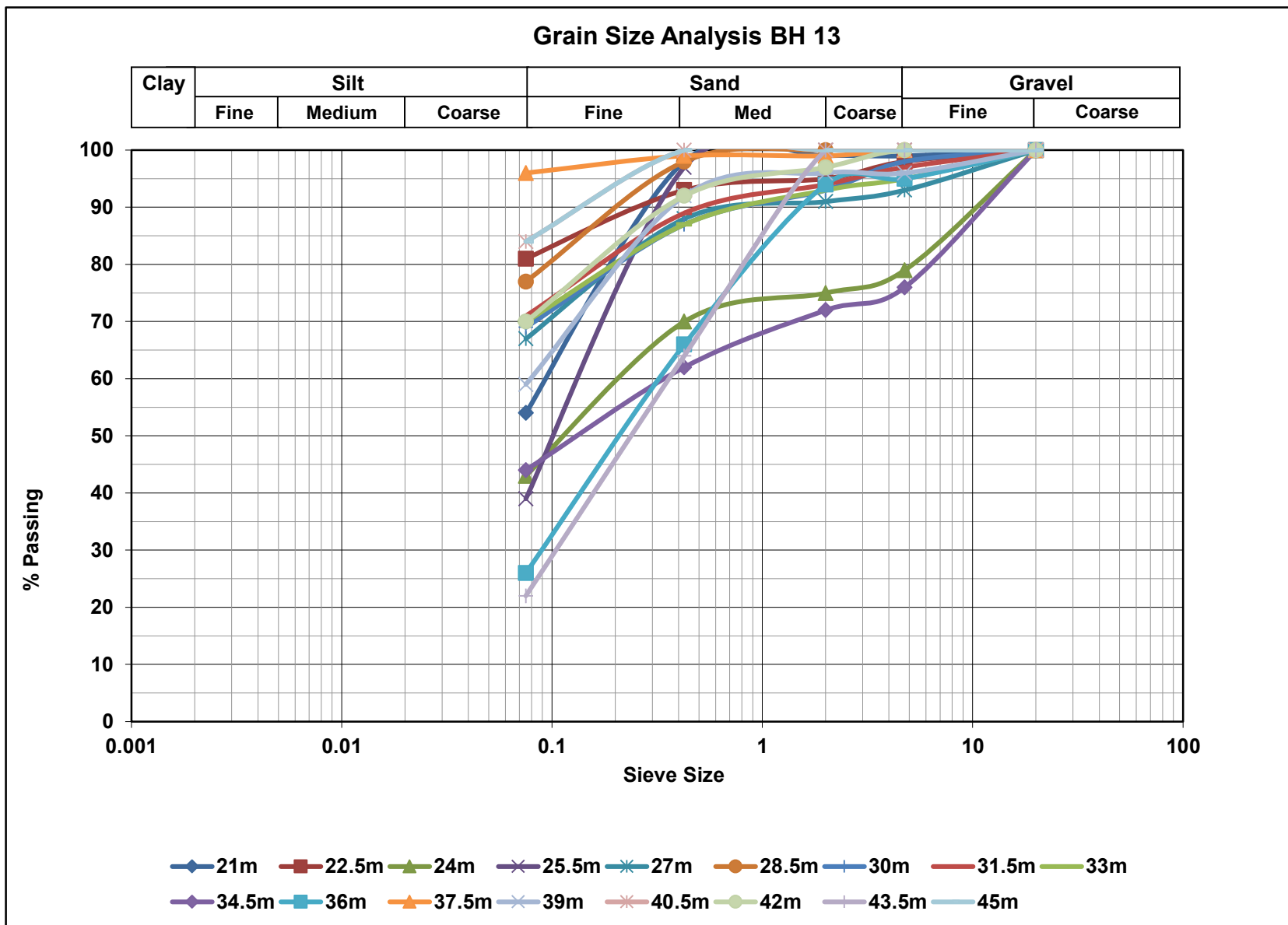


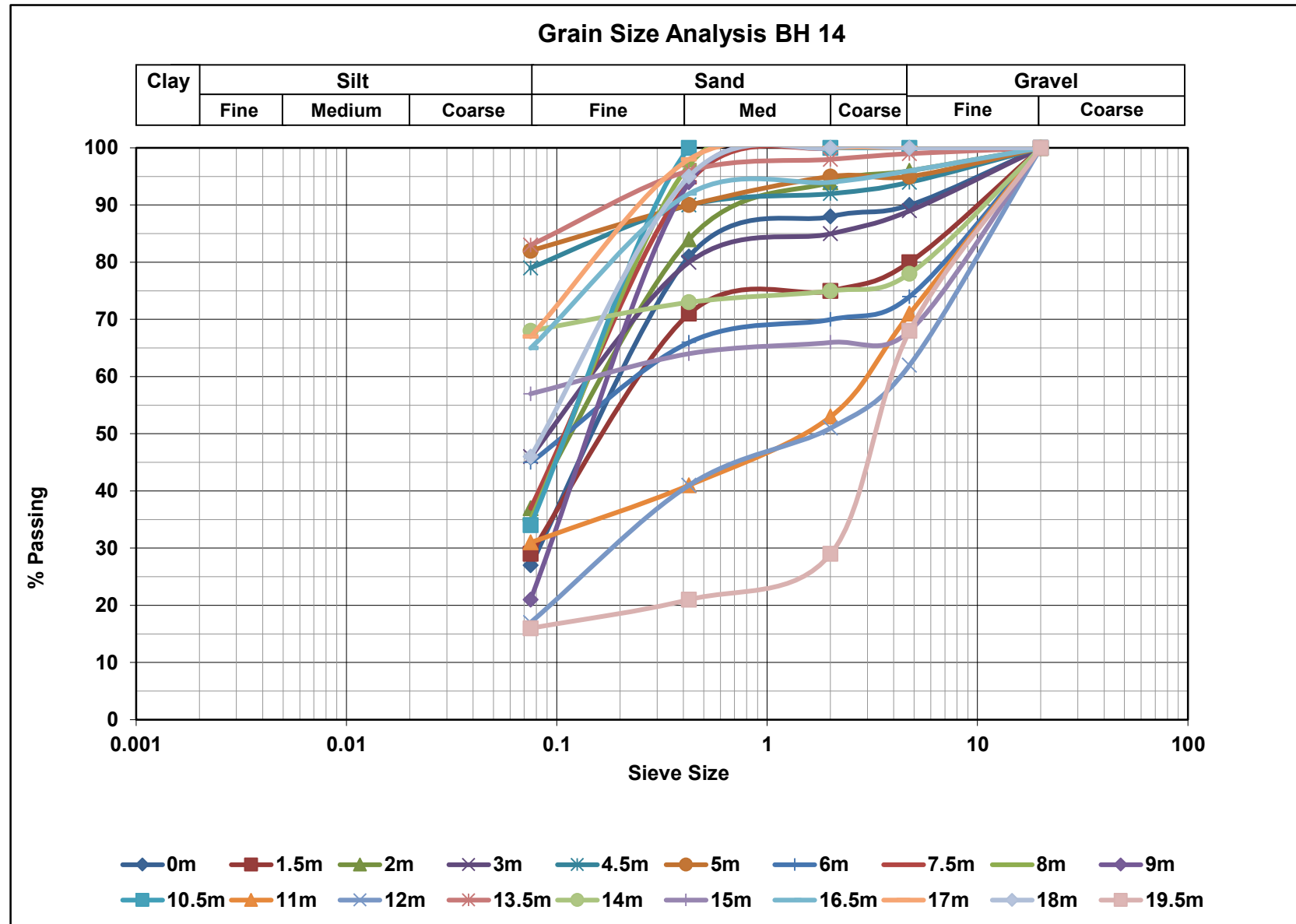


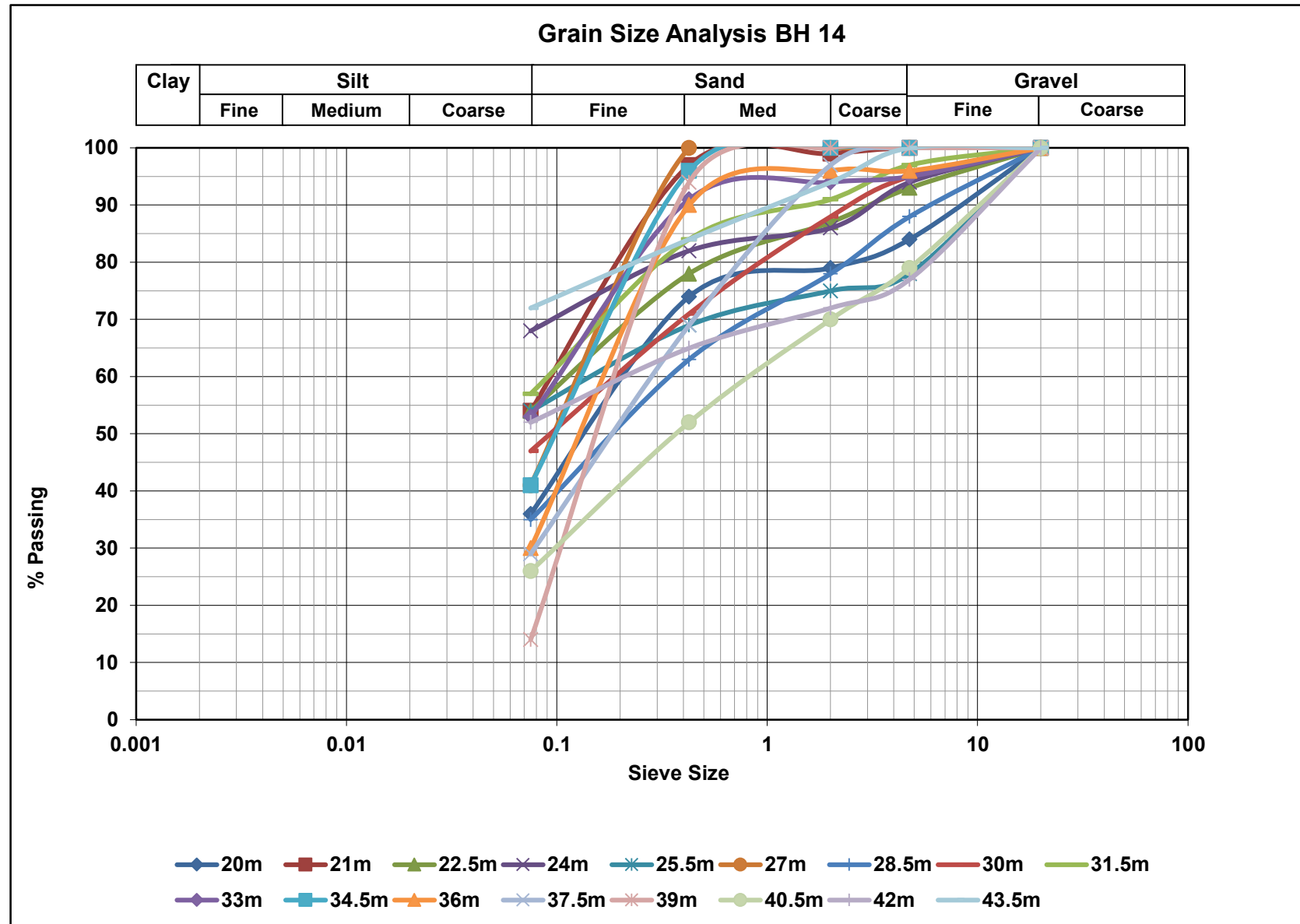


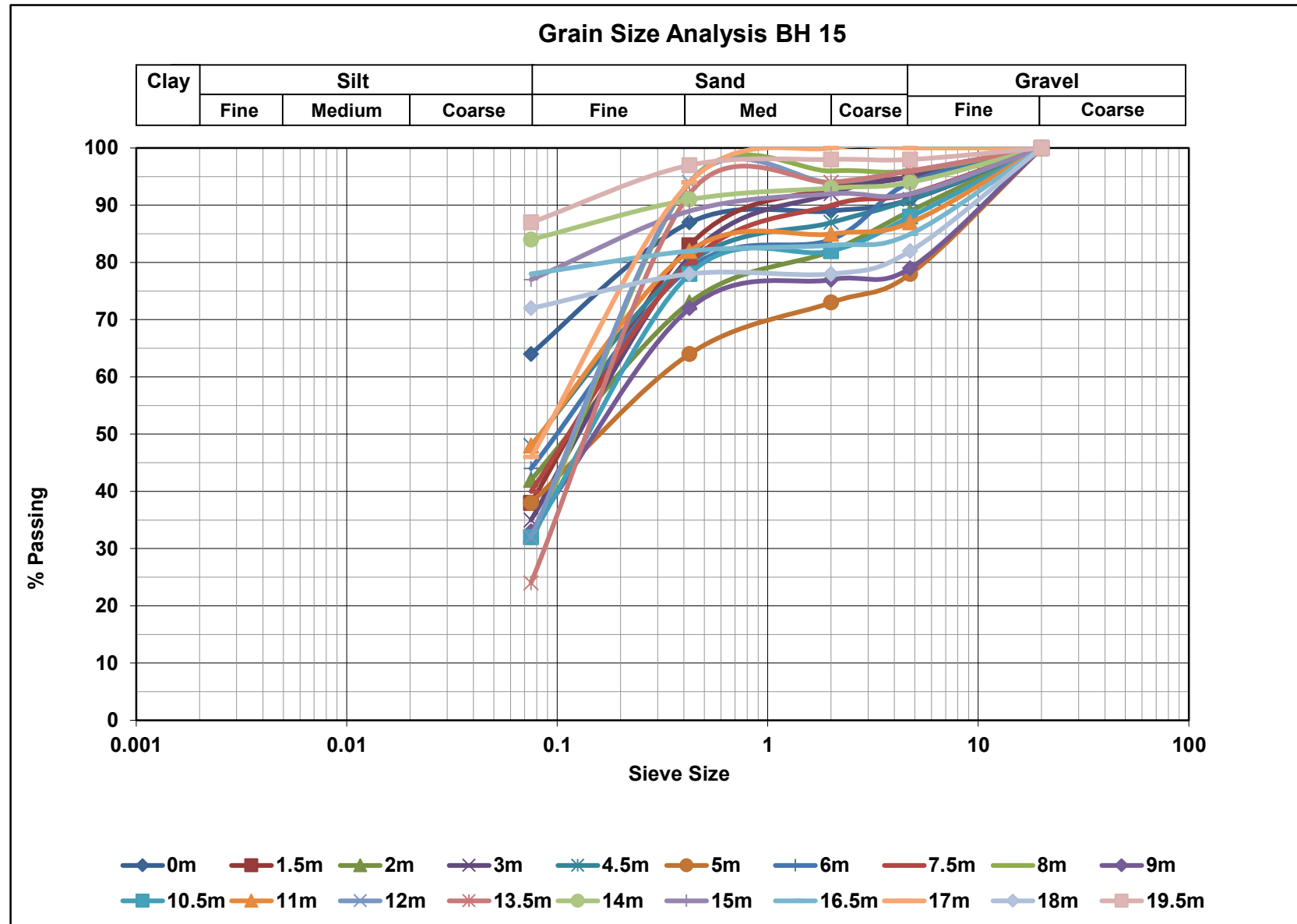


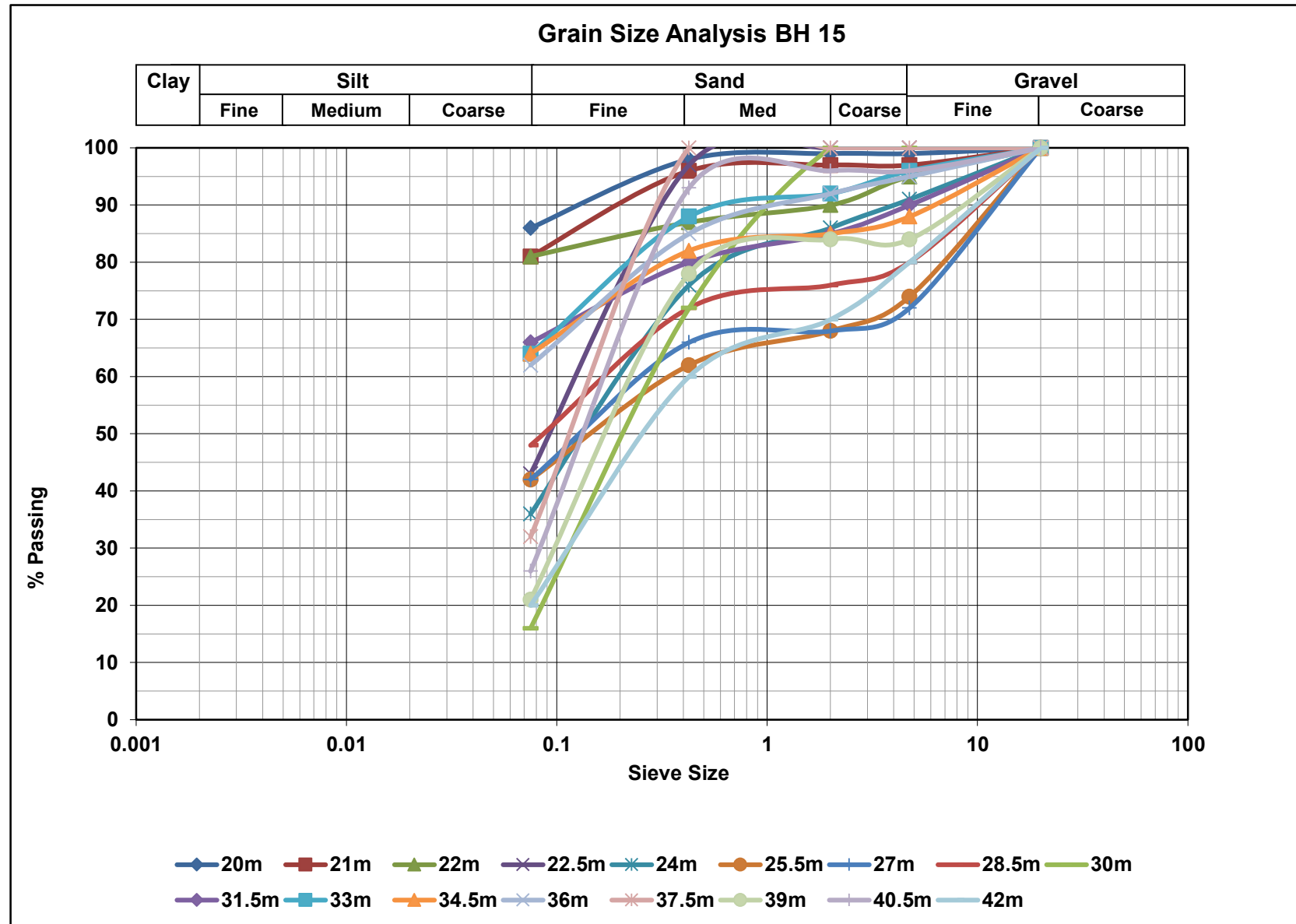












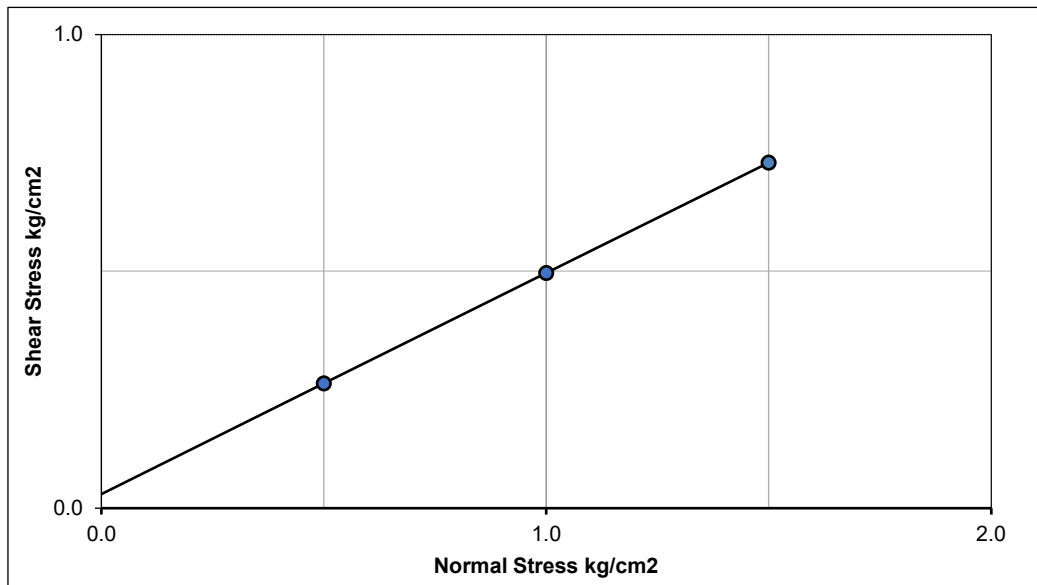
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Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in
Project : Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for
GMRL

BH No. : 1

Depth in m : 2.0

Results of the Direct Shear Test Results



Cohesion in kg/cm² : 0.03

Angle of Internal Friction : 25

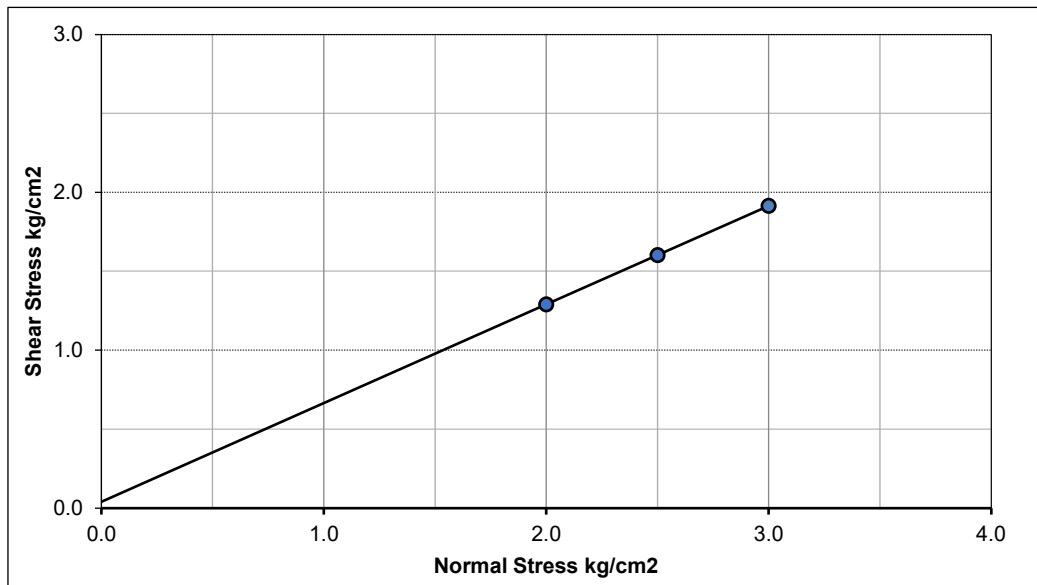
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Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in
Project : Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for
GMRL

BH No. : 1

Depth in m : 11.0

Results of the Direct Shear Test Results



Cohesion in kg/cm² : 0.04

Angle of Internal Friction : 32

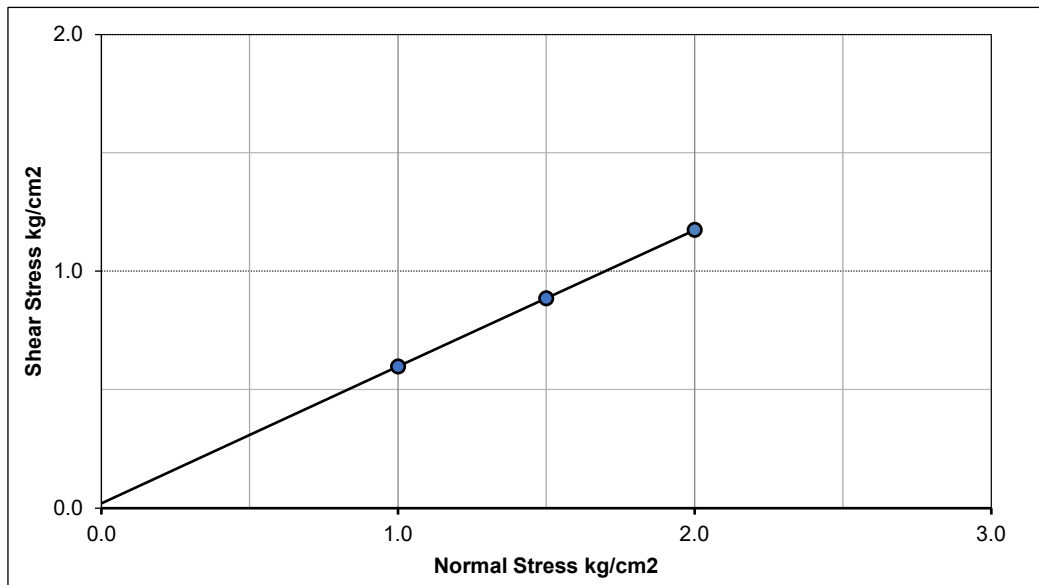
K.C.T. Consultancy Services LLP, Ahmedabad

Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in
Project : Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for
GMRL

BH No. : 2

Depth in m : 8.0

Results of the Direct Shear Test Results



Cohesion in kg/cm² : 0.02

Angle of Internal Friction : 30

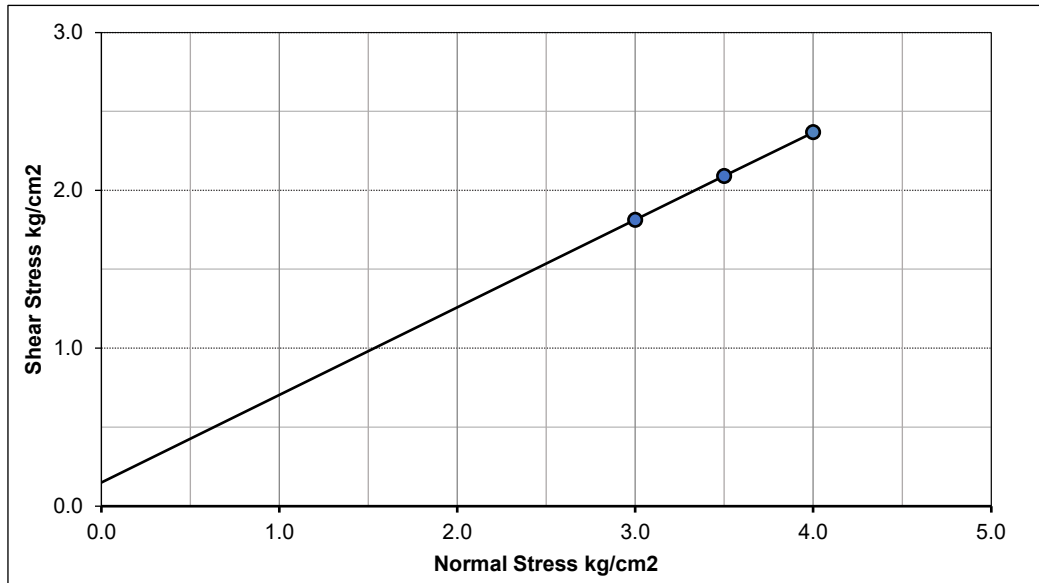
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Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in
Project : Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for
GMRL

BH No. : 2

Depth in m : 17.0

Results of the Direct Shear Test Results



Cohesion in kg/cm² : 0.15

Angle of Internal Friction : 29

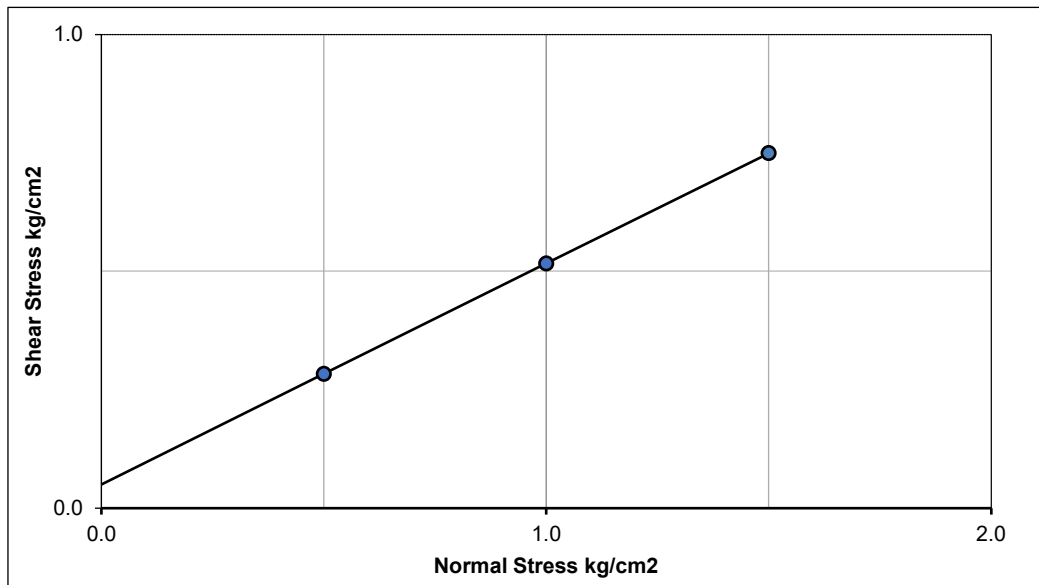
K.C.T. Consultancy Services LLP, Ahmedabad

Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in
Project : Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for
GMRL

BH No. : 3

Depth in m : 2.0

Results of the Direct Shear Test Results



Cohesion in kg/cm² : 0.05

Angle of Internal Friction : 25

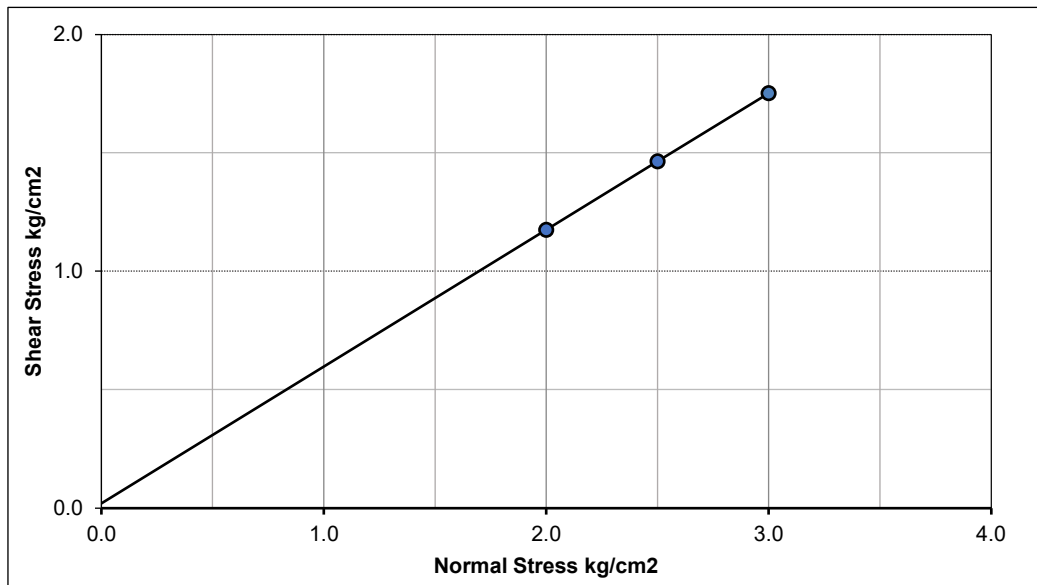
K.C.T. Consultancy Services LLP, Ahmedabad

Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in
Project : Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for
GMRL

BH No. : 3

Depth in m : 14.0

Results of the Direct Shear Test Results



Cohesion in kg/cm² : 0.02

Angle of Internal Friction : 30

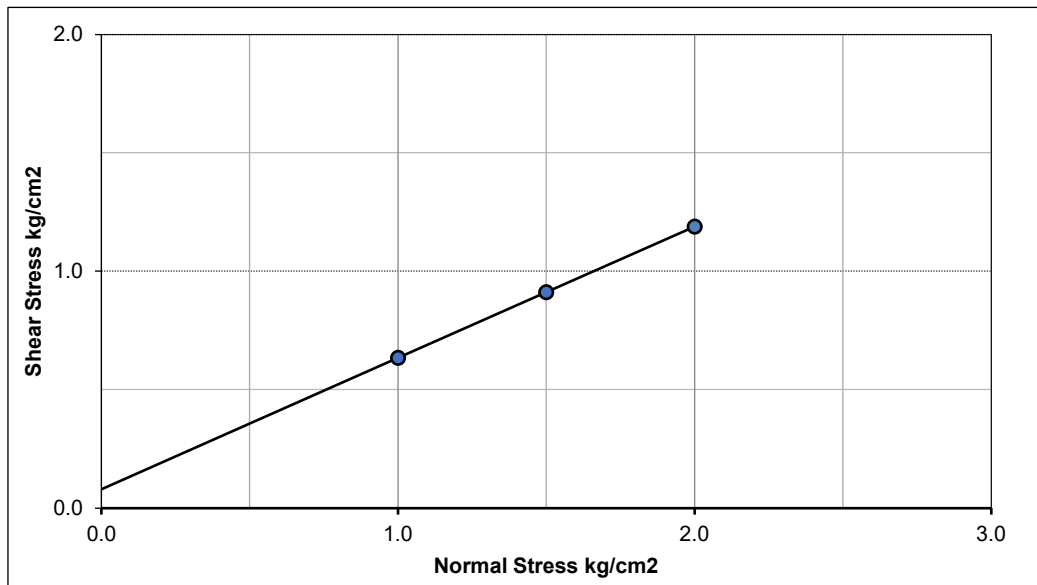
K.C.T. Consultancy Services LLP, Ahmedabad

Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in
Project : Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for
GMRL

BH No. : 4

Depth in m : 8.0

Results of the Direct Shear Test Results



Cohesion in kg/cm² : 0.08

Angle of Internal Friction : 29

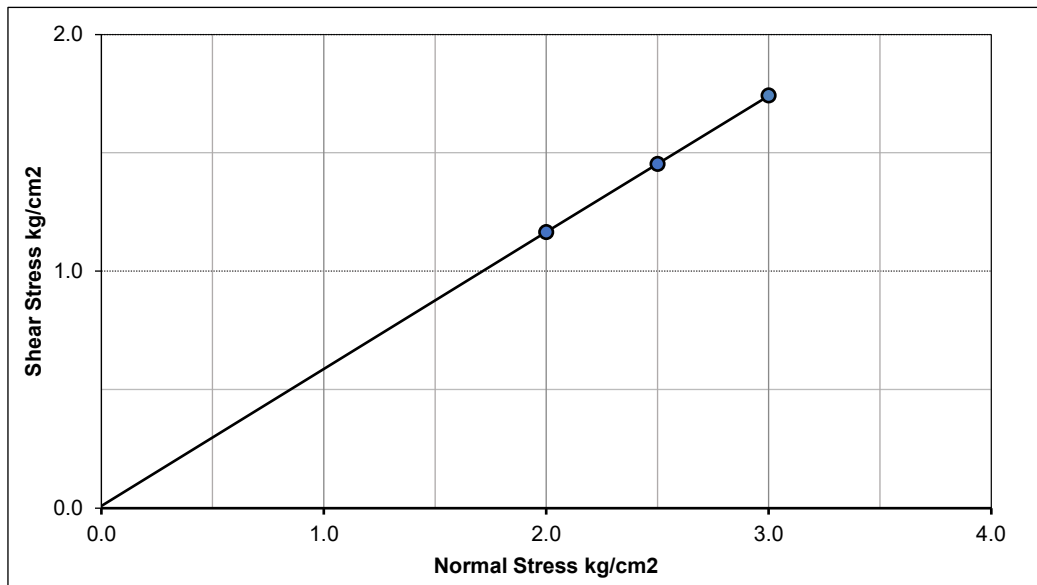
K.C.T. Consultancy Services LLP, Ahmedabad

Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in
Project : Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for
GMRL

BH No. : 4

Depth in m : 11.0

Results of the Direct Shear Test Results



Cohesion in kg/cm² : 0.01

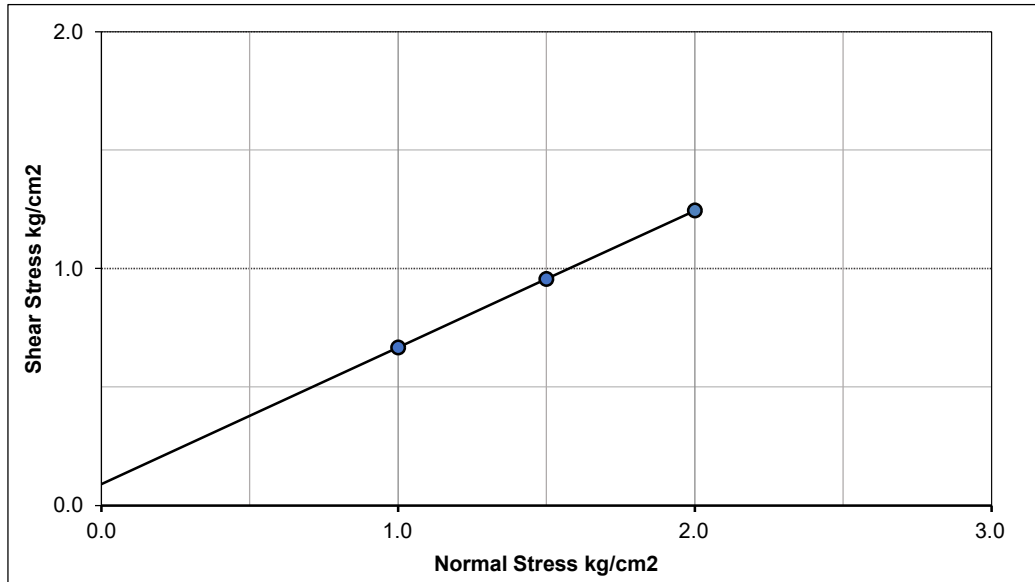
Angle of Internal Friction : 30

K.C.T. Consultancy Services LLP, Ahmedabad

Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in
Project : Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for
GMRCL

BH No. : 5

Depth in m : 8.0

Results of the Direct Shear Test Results

Cohesion in kg/cm^2 : 0.09

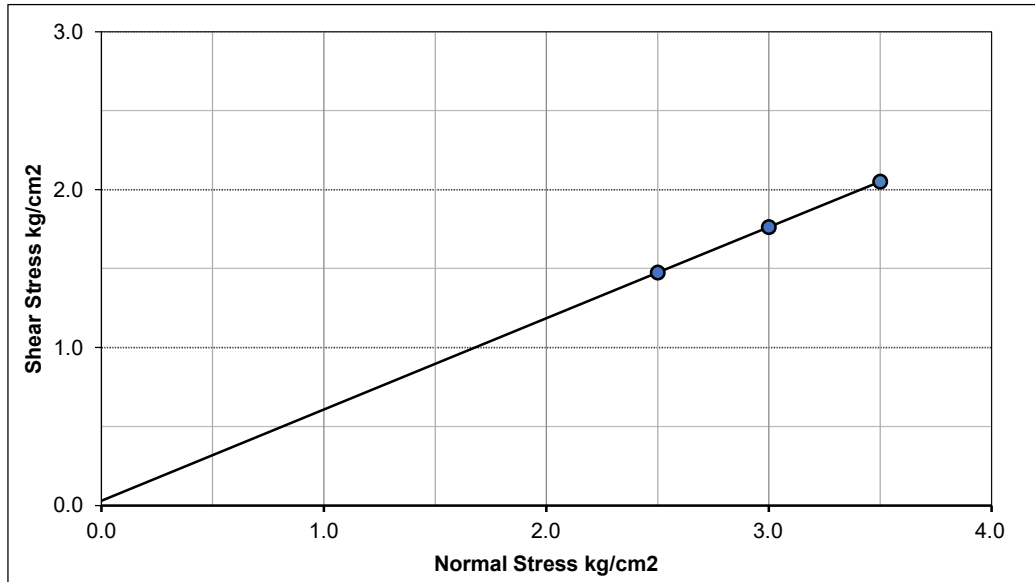
Angle of Internal Friction : 30

K.C.T. Consultancy Services LLP, Ahmedabad

Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in
Project : Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for
GMRCL

BH No. : 5

Depth in m : 14.0

Results of the Direct Shear Test Results

Cohesion in kg/cm² : 0.03

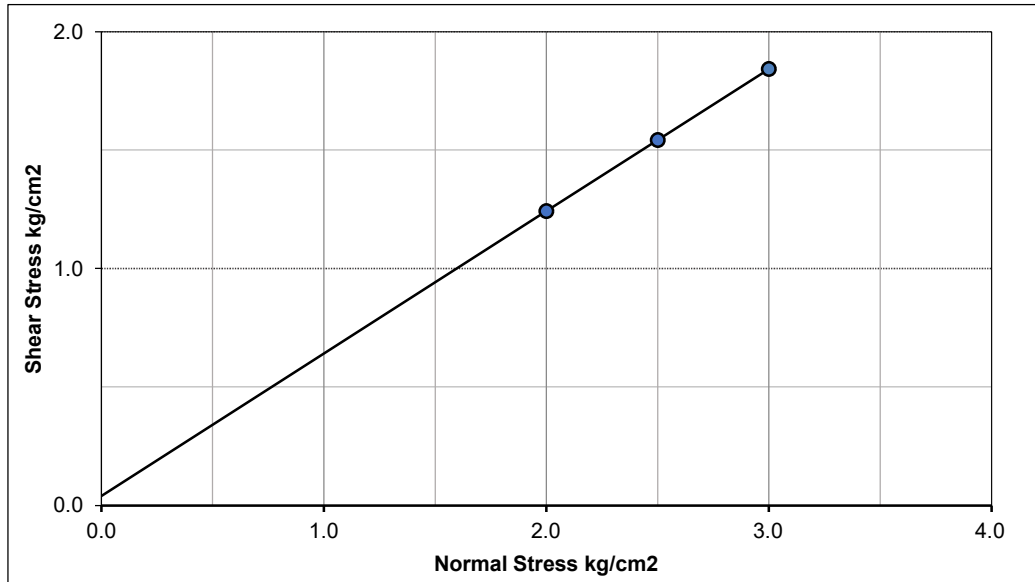
Angle of Internal Friction : 30

K.C.T. Consultancy Services LLP, Ahmedabad

Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in
Project : Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for
GMRCL

BH No. : 6

Depth in m : 11.0

Results of the Direct Shear Test Results

Cohesion in kg/cm² : 0.04

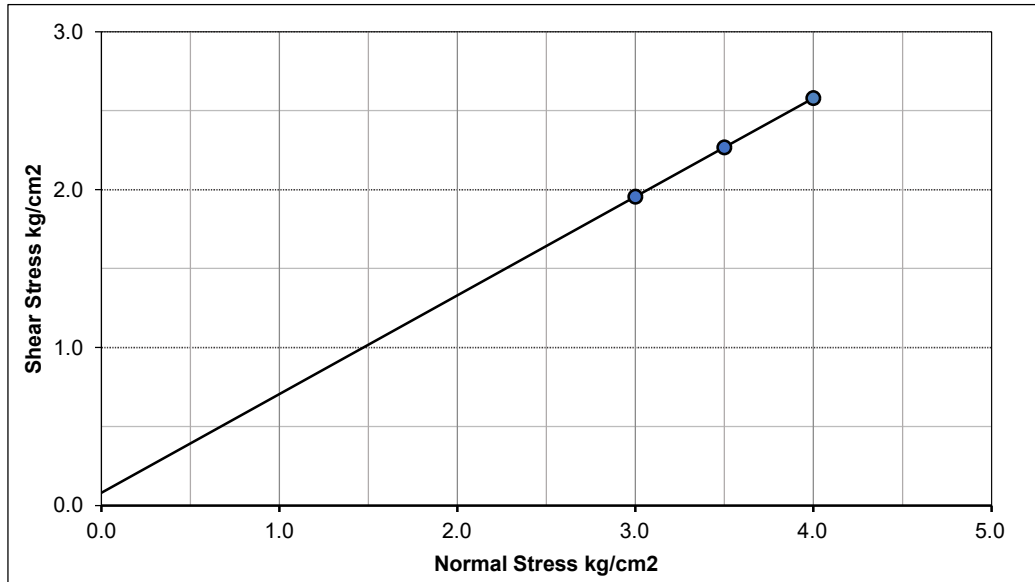
Angle of Internal Friction : 31

K.C.T. Consultancy Services LLP, Ahmedabad

Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in
Project : Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for
GMRCL

BH No. : 6

Depth in m : 17.0

Results of the Direct Shear Test Results

Cohesion in kg/cm^2 : 0.08

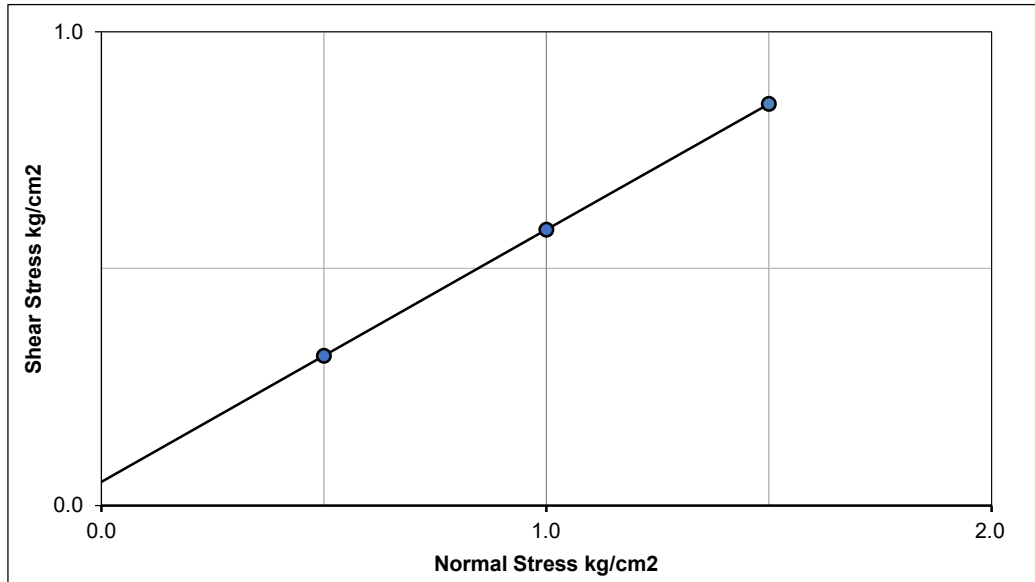
Angle of Internal Friction : 32

K.C.T. Consultancy Services LLP, Ahmedabad

Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in
 Project : Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for
 GMRCL

BH No. : 7

Depth in m : 5.0

Results of the Direct Shear Test Results

Cohesion in kg/cm² : 0.05

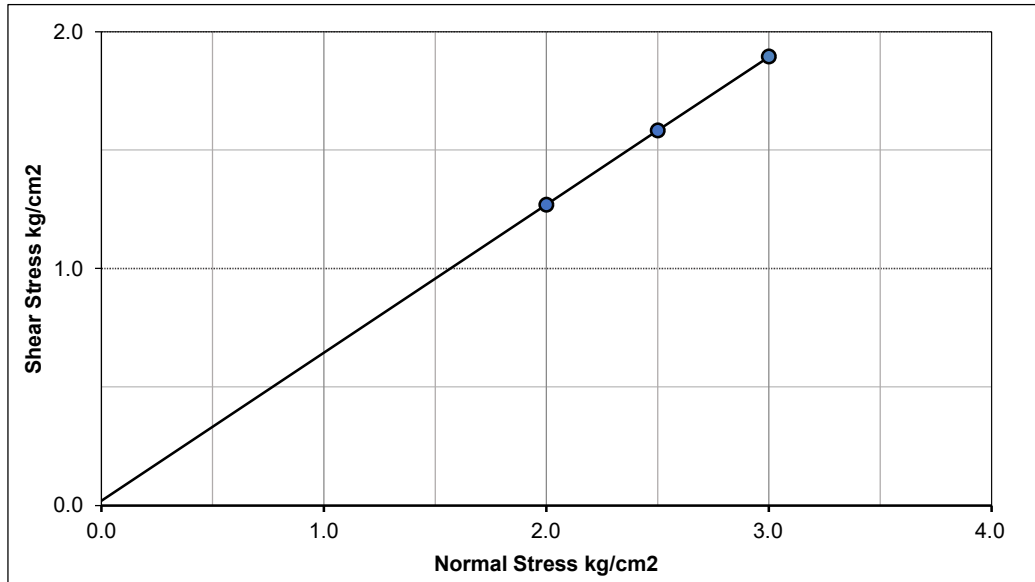
Angle of Internal Friction : 28

K.C.T. Consultancy Services LLP, Ahmedabad

Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in
Project : Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for
GMRCL

BH No. : 7

Depth in m : 11.0

Results of the Direct Shear Test Results

Cohesion in kg/cm² : 0.02

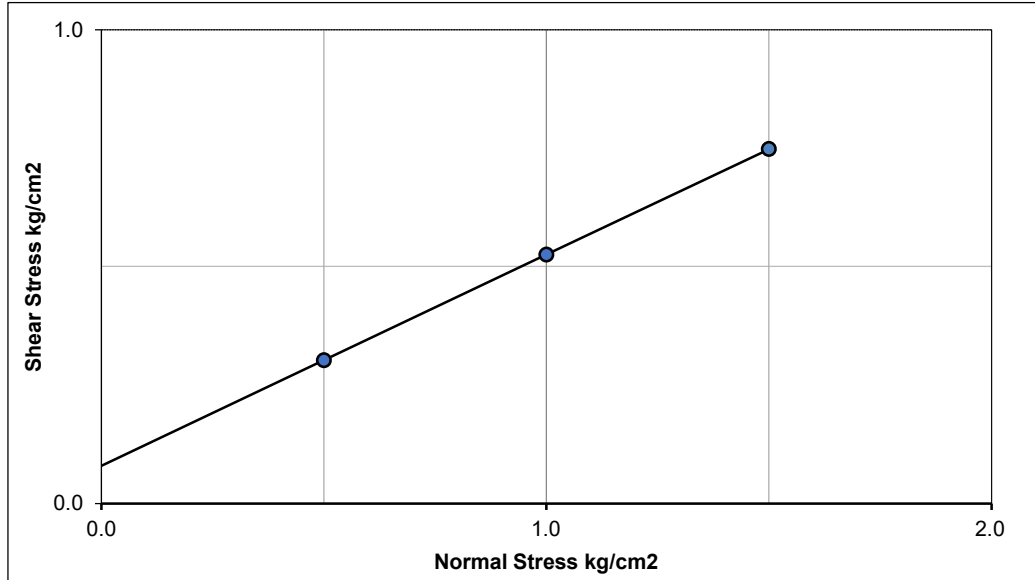
Angle of Internal Friction : 32

K.C.T. Consultancy Services LLP, Ahmedabad

Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in
Project : Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for
GMRCL

BH No. : 8

Depth in m : 2.0

Results of the Direct Shear Test Results

Cohesion in kg/cm² : 0.08

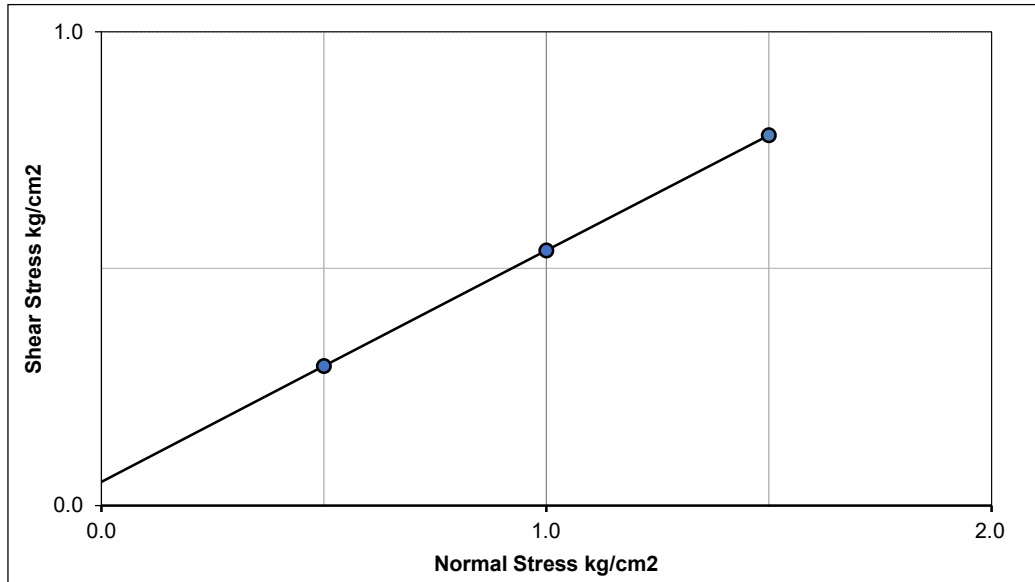
Angle of Internal Friction : 24

K.C.T. Consultancy Services LLP, Ahmedabad

Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in
Project : Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for
GMRCL

BH No. : 8

Depth in m : 5.0

Results of the Direct Shear Test Results

Cohesion in kg/cm² : 0.05

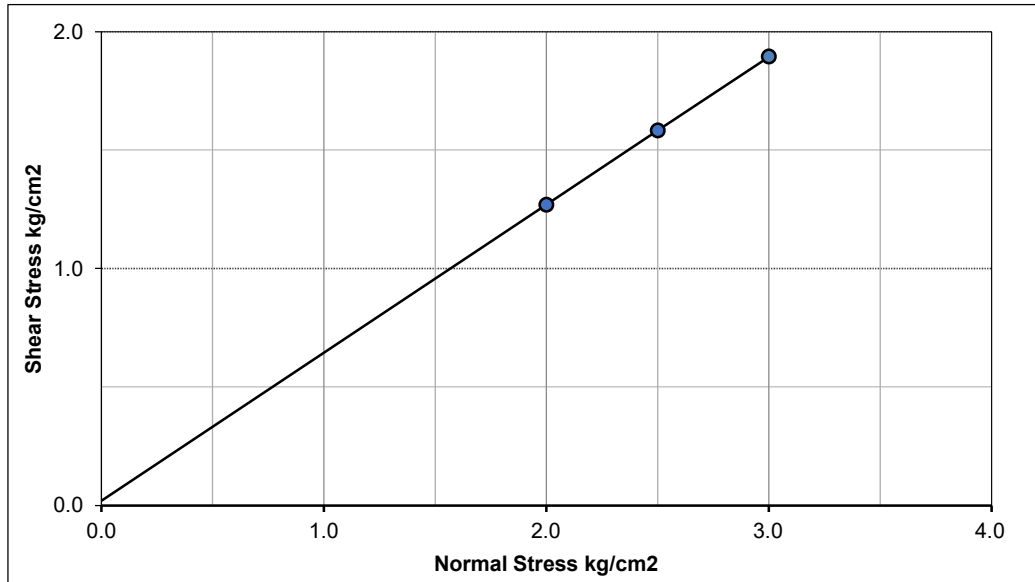
Angle of Internal Friction : 26

K.C.T. Consultancy Services LLP, Ahmedabad

Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in
Project : Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for
GMRCL

BH No. : 8

Depth in m : 14.0

Results of the Direct Shear Test Results

Cohesion in kg/cm² : 0.02

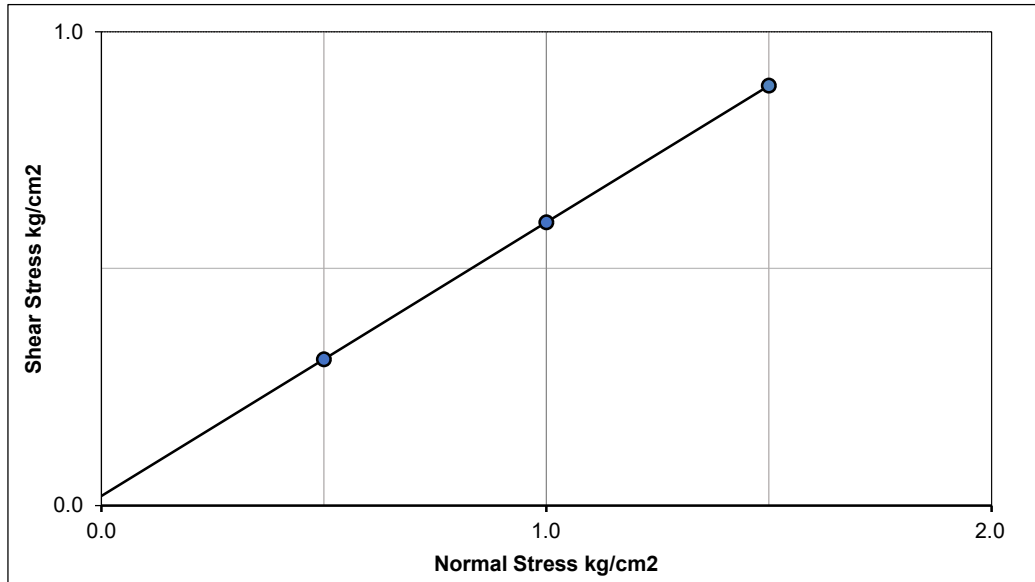
Angle of Internal Friction : 32

K.C.T. Consultancy Services LLP, Ahmedabad

Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in
Project : Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for
GMRCL

BH No. : 9

Depth in m : 5.0

Results of the Direct Shear Test Results

Cohesion in kg/cm² : 0.02

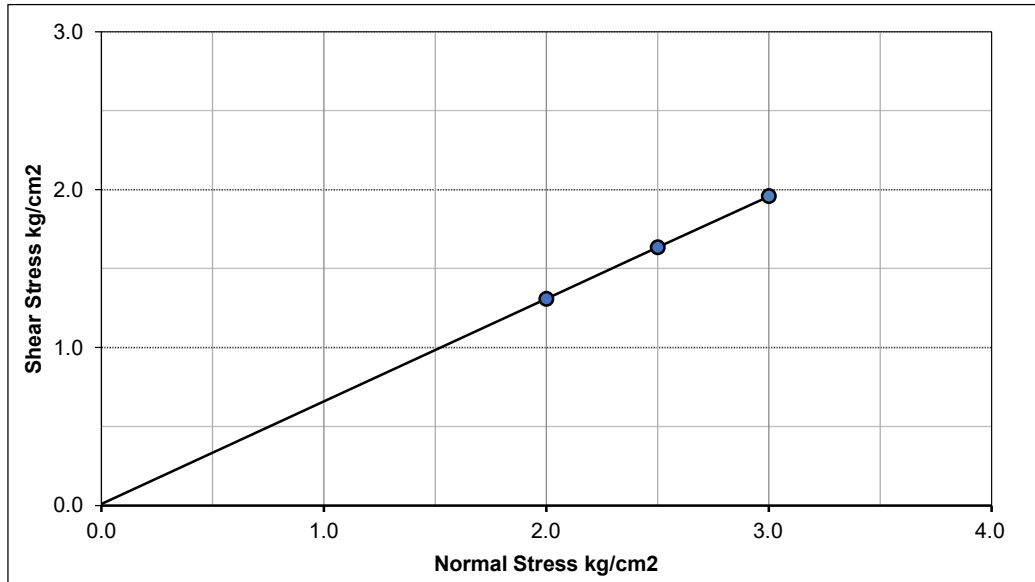
Angle of Internal Friction : 30

K.C.T. Consultancy Services LLP, Ahmedabad

Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in
Project : Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for
GMRCL

BH No. : 9

Depth in m : 11.0

Results of the Direct Shear Test Results

Cohesion in kg/cm² : 0.01

Angle of Internal Friction : 33

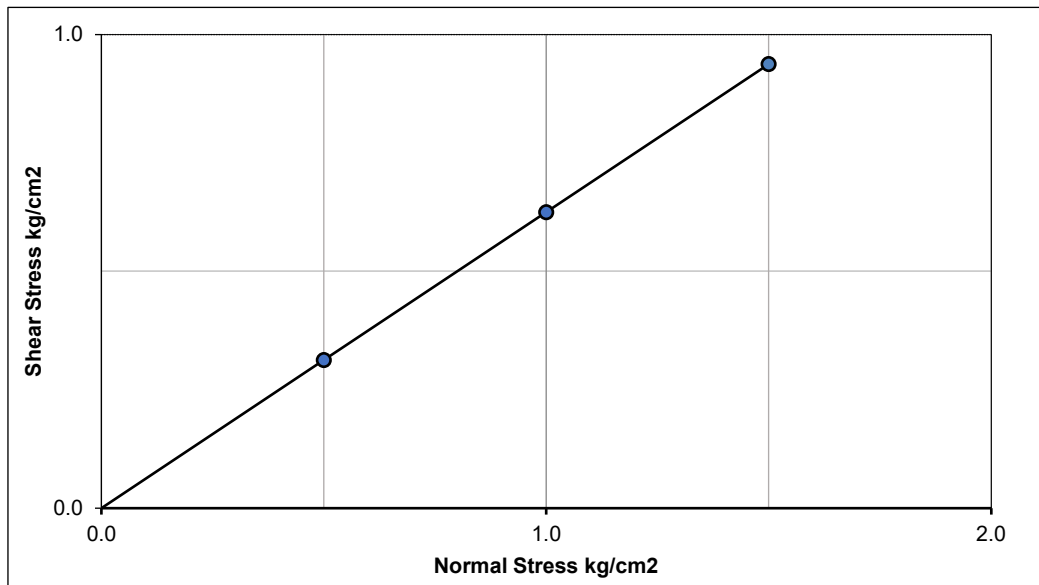
K.C.T. Consultancy Services LLP, Ahmedabad

Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in
Project : Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for
GMRL

BH No. : 10

Depth in m : 5.0

Results of the Direct Shear Test Results



Cohesion in kg/cm² : 0

Angle of Internal Friction : 32

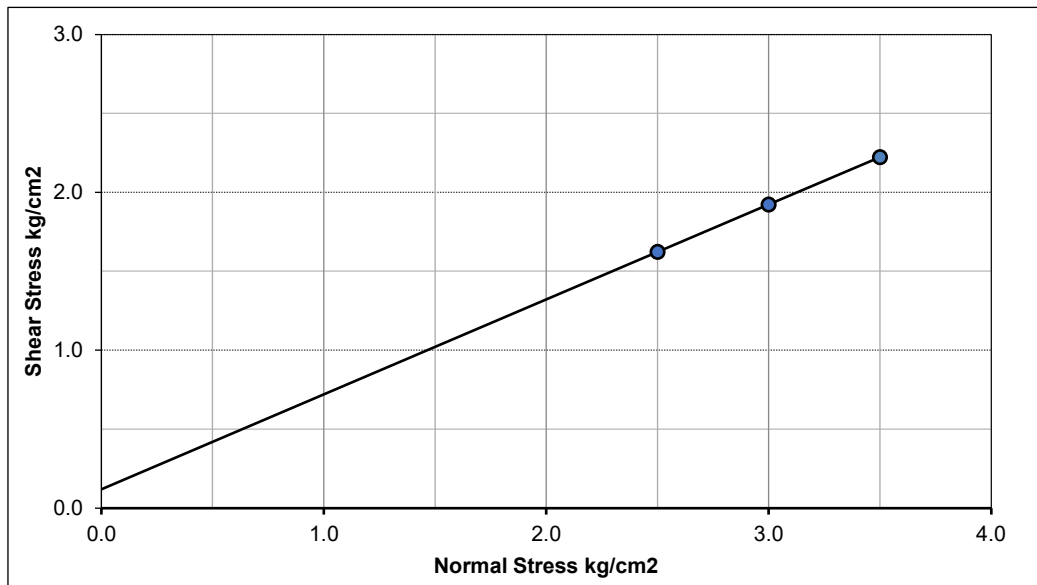
K.C.T. Consultancy Services LLP, Ahmedabad

Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in
Project : Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for
GMRL

BH No. : 10

Depth in m : 14.0

Results of the Direct Shear Test Results



Cohesion in kg/cm^2 : 0.12

Angle of Internal Friction : 31

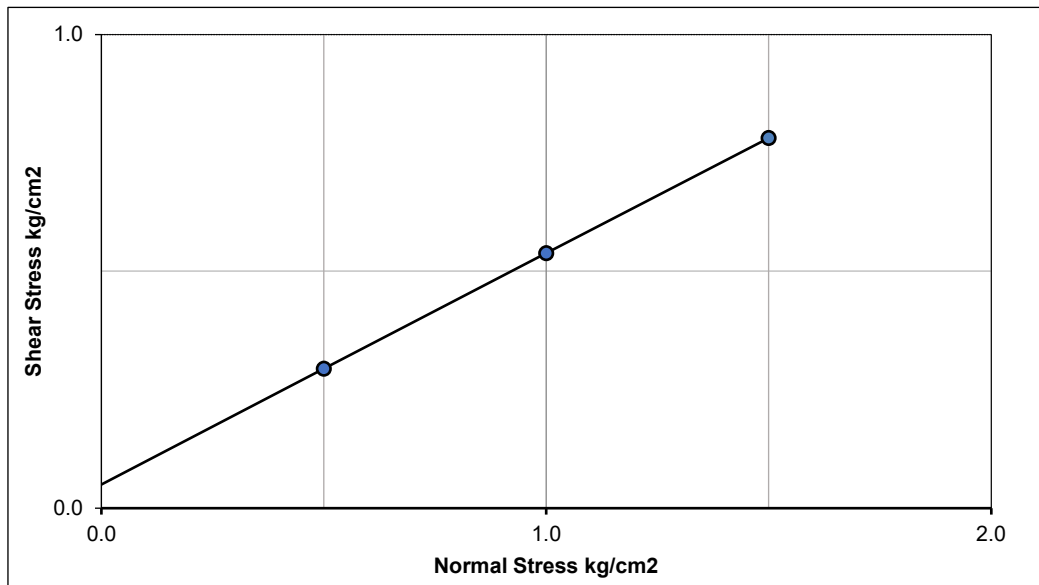
K.C.T. Consultancy Services LLP, Ahmedabad

Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in
Project : Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for
GMRL

BH No. : 11

Depth in m : 2.0

Results of the Direct Shear Test Results



Cohesion in kg/cm² : 0.05

Angle of Internal Friction : 26

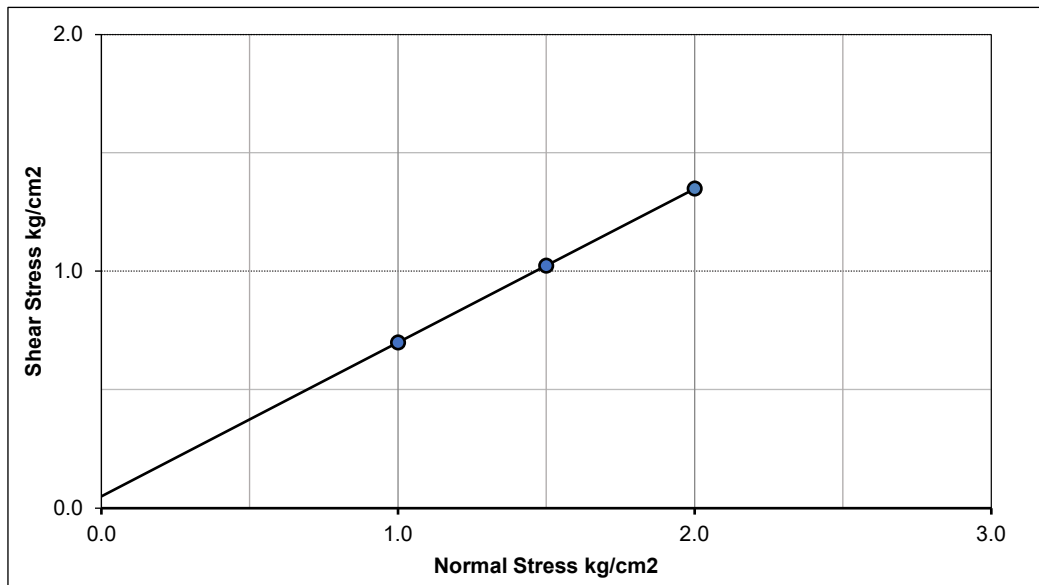
K.C.T. Consultancy Services LLP, Ahmedabad

Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in
Project : Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for
GMRL

BH No. : 11

Depth in m : 8.0

Results of the Direct Shear Test Results



Cohesion in kg/cm² : 0.05

Angle of Internal Friction : 33

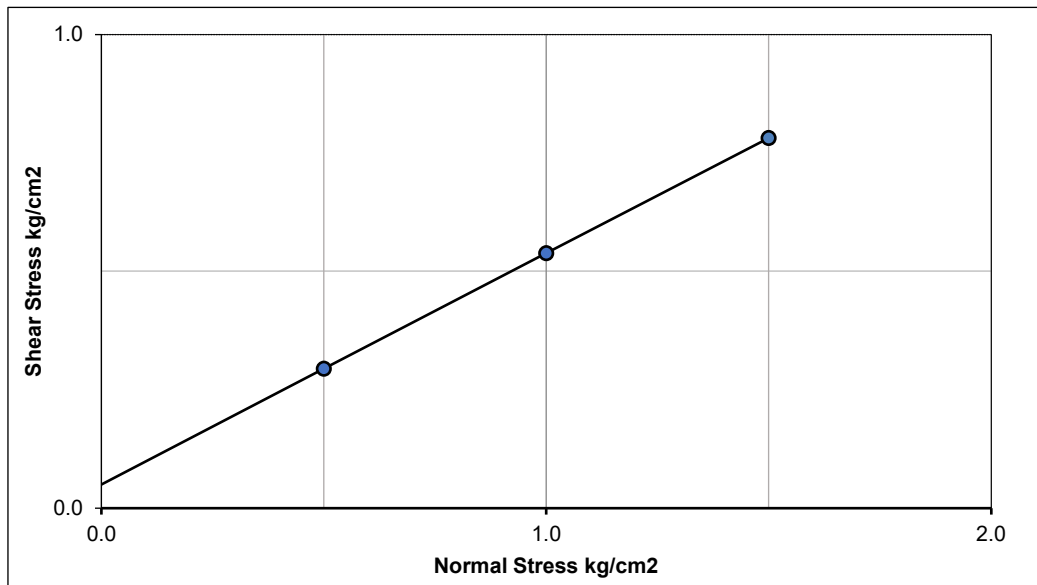
K.C.T. Consultancy Services LLP, Ahmedabad

Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in
Project : Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for
GMRL

BH No. : 12

Depth in m : 2.0

Results of the Direct Shear Test Results



Cohesion in kg/cm² : 0.05

Angle of Internal Friction : 26

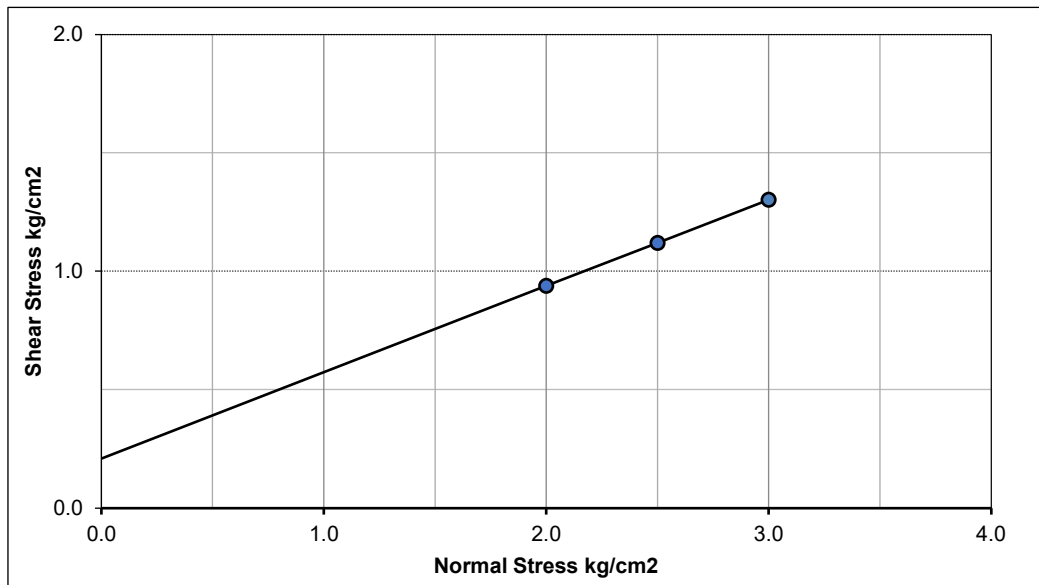
K.C.T. Consultancy Services LLP, Ahmedabad

Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in
Project : Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for
GMRL

BH No. : 12

Depth in m : 11.0

Results of the Direct Shear Test Results



Cohesion in kg/cm^2 : 0.21

Angle of Internal Friction : 20

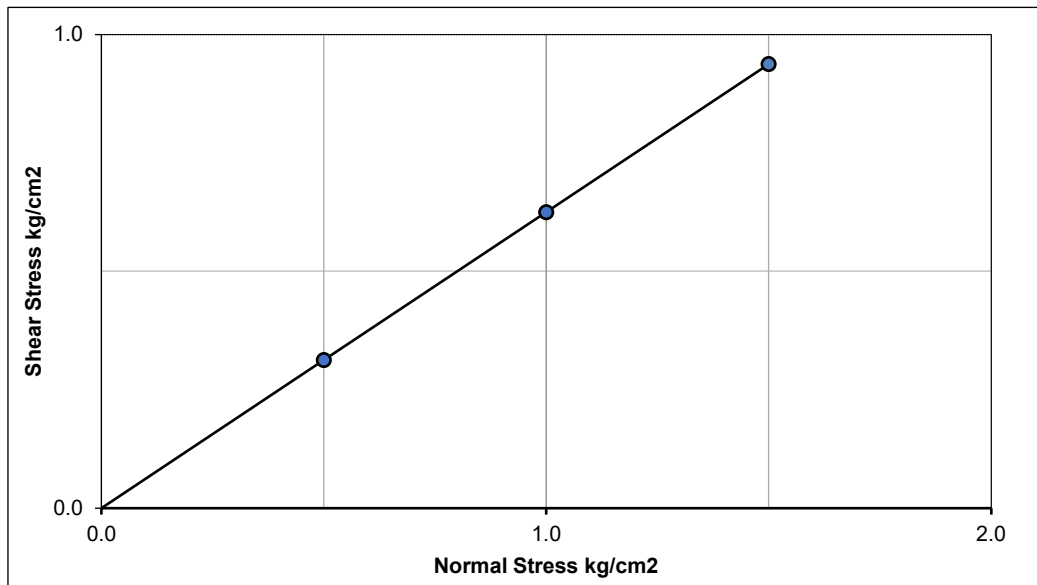
K.C.T. Consultancy Services LLP, Ahmedabad

Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in
Project : Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for
GMRL

BH No. : 13

Depth in m : 5.0

Results of the Direct Shear Test Results



Cohesion in kg/cm² : 0

Angle of Internal Friction : 32

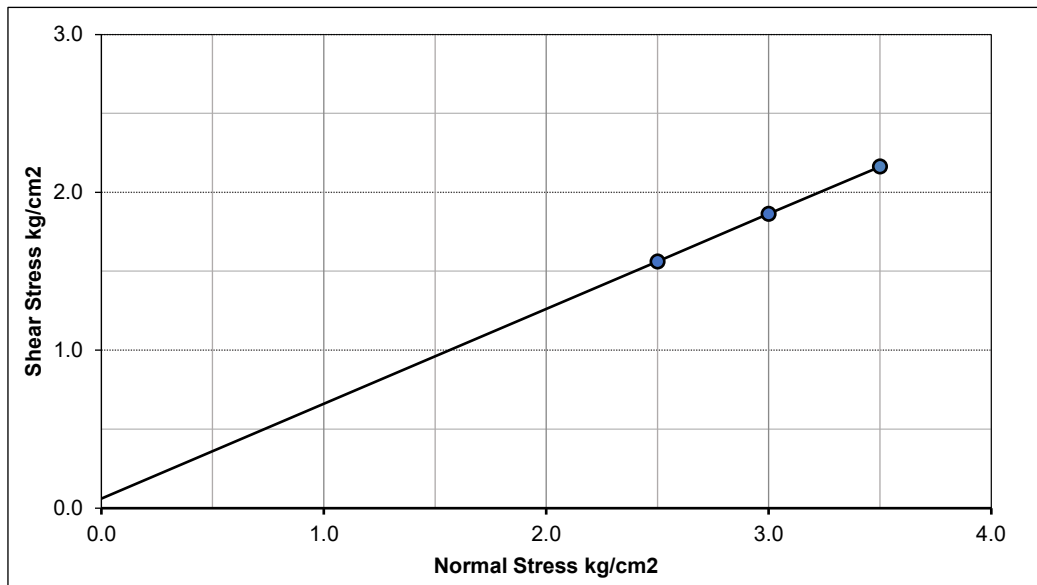
K.C.T. Consultancy Services LLP, Ahmedabad

Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in
Project : Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for
GMRL

BH No. : 13

Depth in m : 14.0

Results of the Direct Shear Test Results



Cohesion in kg/cm² : 0.06

Angle of Internal Friction : 31

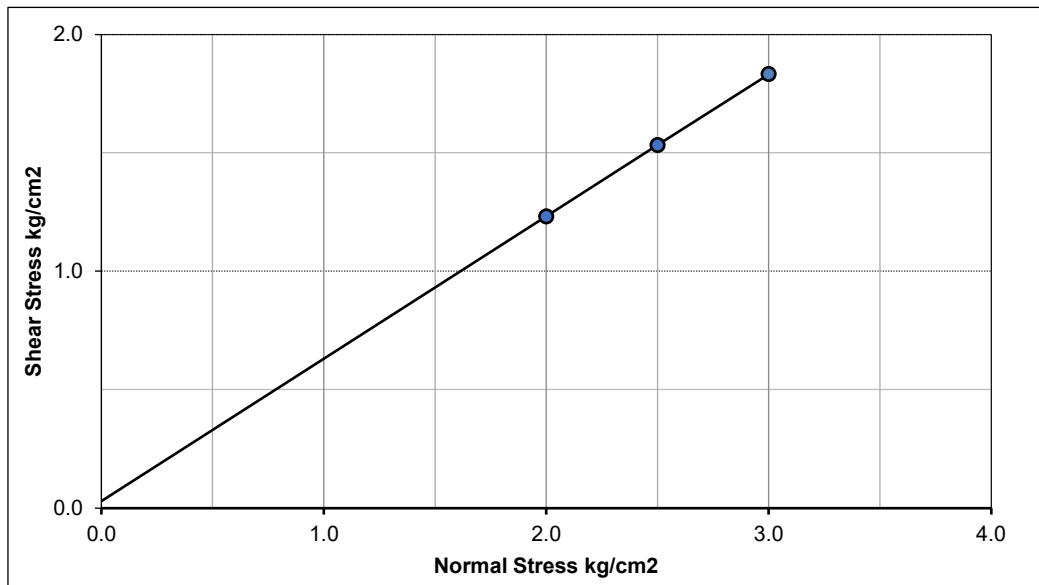
K.C.T. Consultancy Services LLP, Ahmedabad

Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in
Project : Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for
GMRL

BH No. : 14

Depth in m : 11.0

Results of the Direct Shear Test Results



Cohesion in kg/cm² : 0.03

Angle of Internal Friction : 31

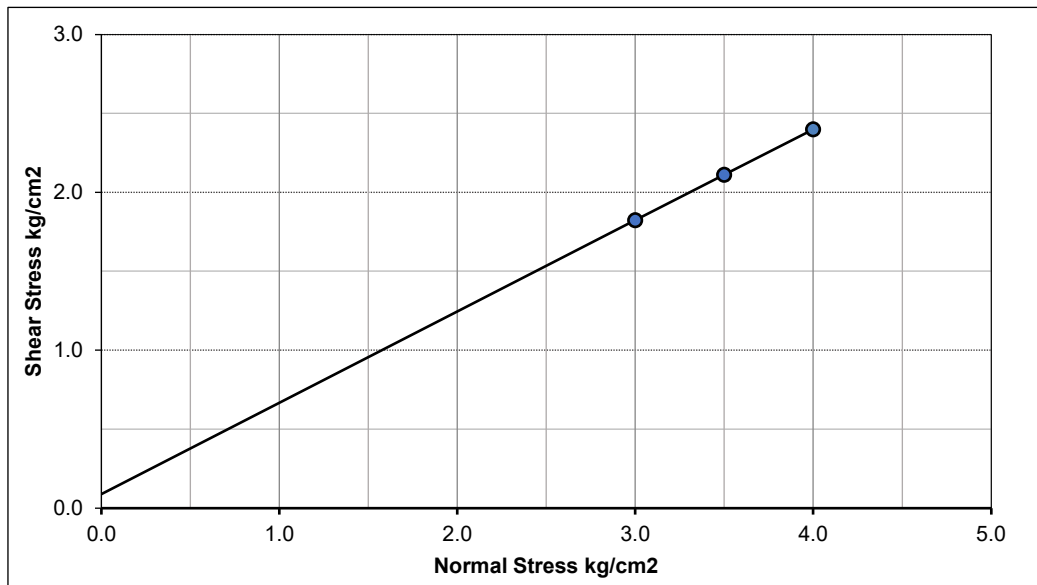
K.C.T. Consultancy Services LLP, Ahmedabad

Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in
Project : Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for
GMRL

BH No. : 14

Depth in m : 20.0

Results of the Direct Shear Test Results



Cohesion in kg/cm² : 0.09

Angle of Internal Friction : 30

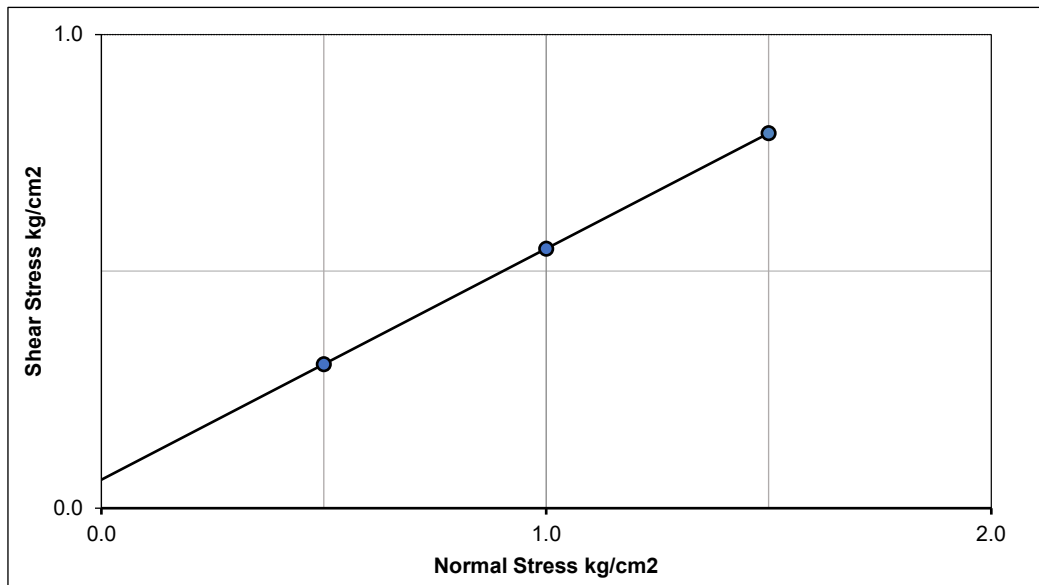
K.C.T. Consultancy Services LLP, Ahmedabad

Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in
Project : Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for
GMRL

BH No. : 15

Depth in m : 2.0

Results of the Direct Shear Test Results



Cohesion in kg/cm² : 0.06

Angle of Internal Friction : 26

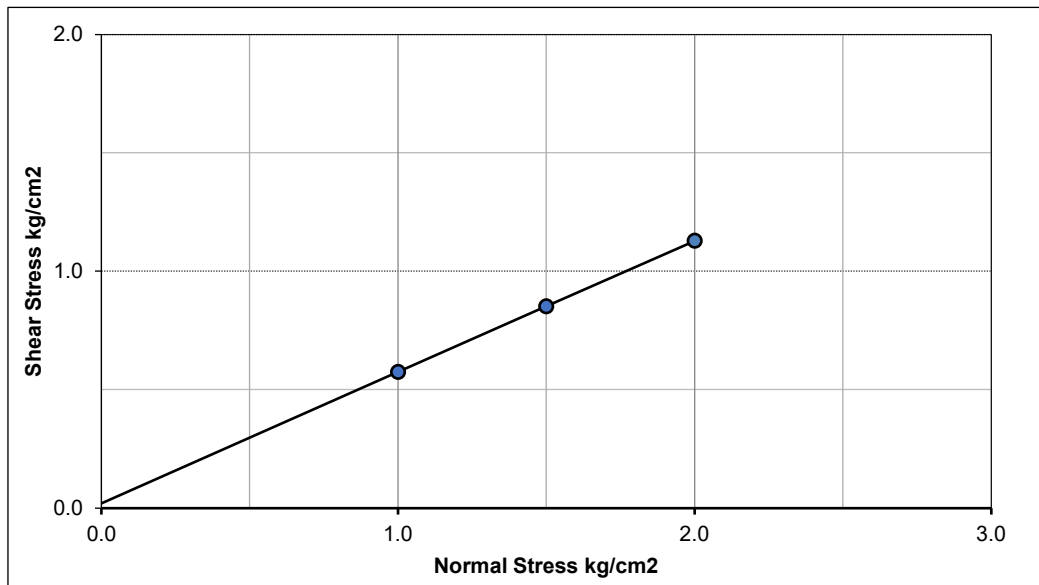
K.C.T. Consultancy Services LLP, Ahmedabad

Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in
Project : Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for
GMRL

BH No. : 15

Depth in m : 8.0

Results of the Direct Shear Test Results



Cohesion in kg/cm² : 0.02

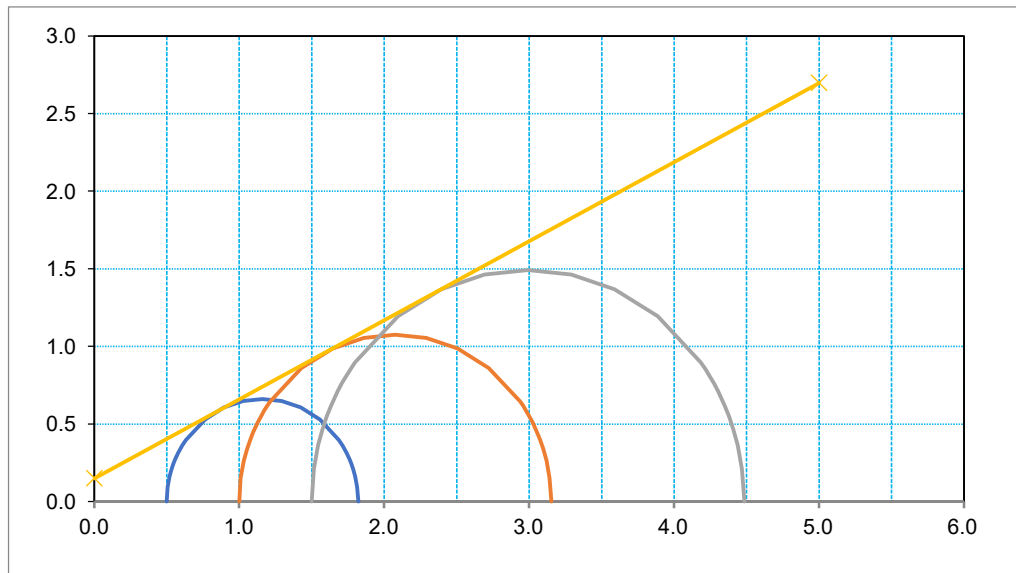
Angle of Internal Friction : 29

K.C.T. Consultancy Services LLP, Ahmedabad

Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in
Project : Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for
GMRL

BH No. : 1 (GTP - 6/14)

Depth in m : 5.0

Results of the Triaxial Shear Test Results

Cohesion in kg/cm² : 0.15

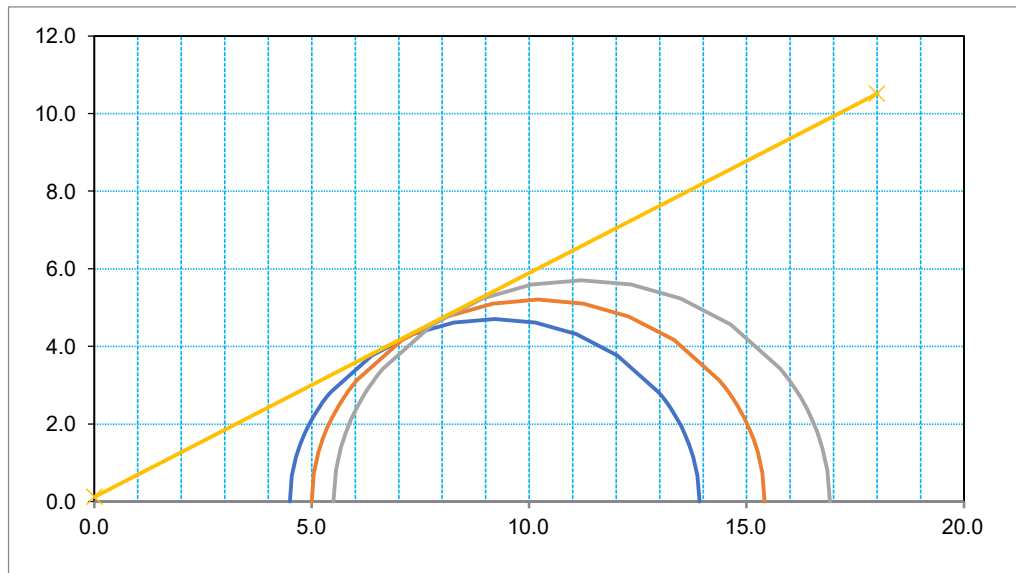
Angle of Internal Friction : 27

K.C.T. Consultancy Services LLP, Ahmedabad

Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in
Project : Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for
GMRCCL

BH No. : 1 (GTP - 6/14)

Depth in m : 25.0

Results of the Triaxial Shear Test Results

Cohesion in kg/cm^2 : 0.12

Angle of Internal Friction : 30

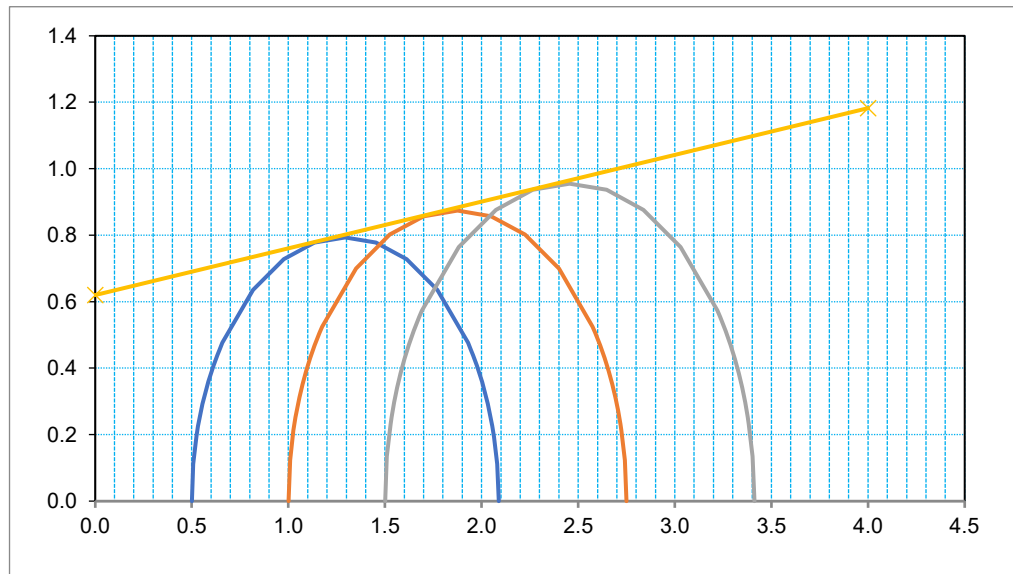
K.C.T. Consultancy Services LLP, Ahmedabad

Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in
Project : Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for
GMRL

BH No. : 2 (GP - 6/12)

Depth in m : 5.0

Results of the Triaxial Shear Test Results



Cohesion in kg/cm² : 0.62

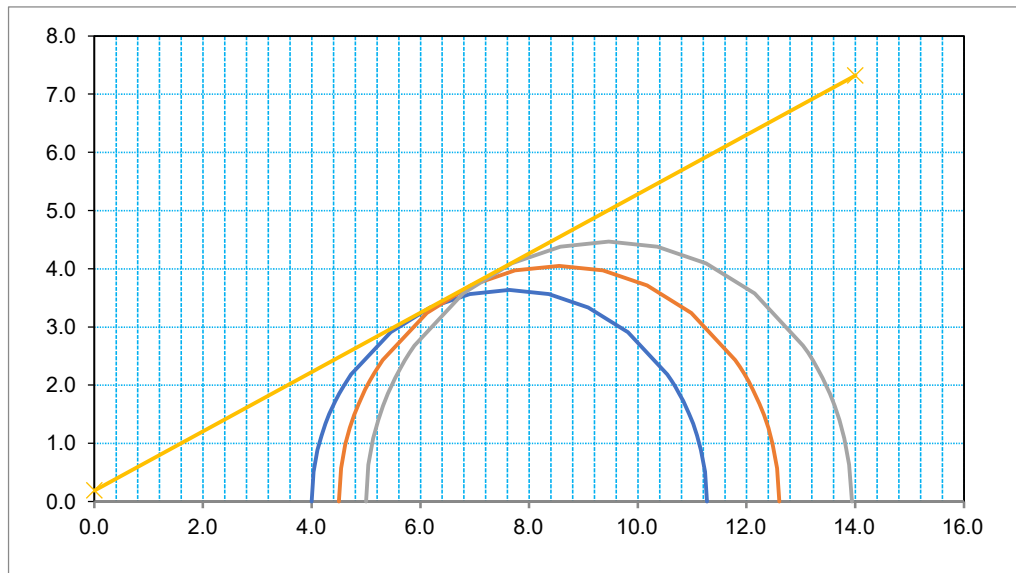
Angle of Internal Friction : 8

K.C.T. Consultancy Services LLP, Ahmedabad

Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in
Project : Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for
GMRL

BH No. : 2 (GP - 6/12)

Depth in m : 22.0

Results of the Triaxial Shear Test Results

Cohesion in kg/cm^2 : 0.19

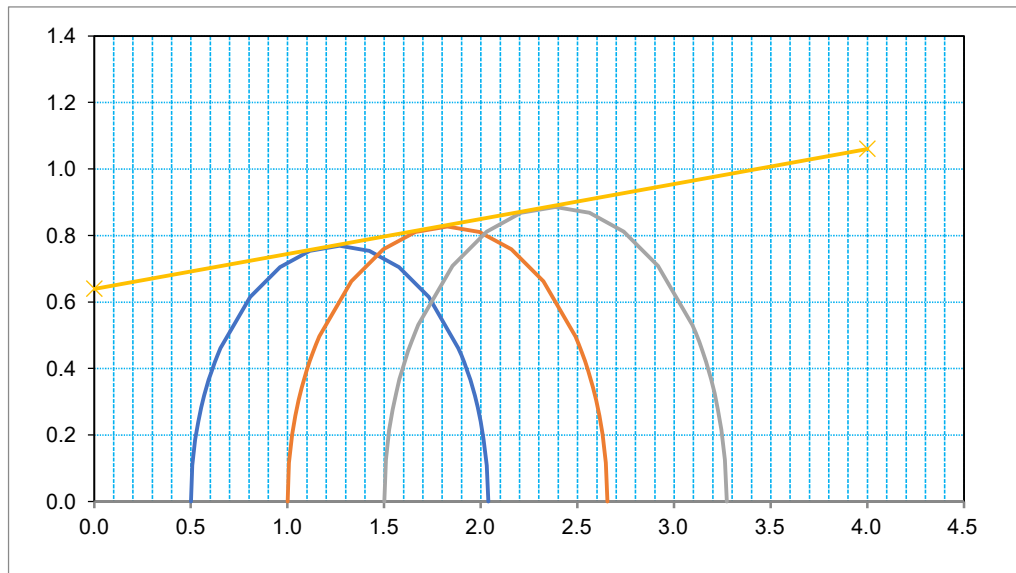
Angle of Internal Friction : 27

K.C.T. Consultancy Services LLP, Ahmedabad

Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in
Project : Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for
GMRL

BH No. : 3 (GP - 6/10)

Depth in m : 5.0

Results of the Triaxial Shear Test Results

Cohesion in kg/cm² : 0.64

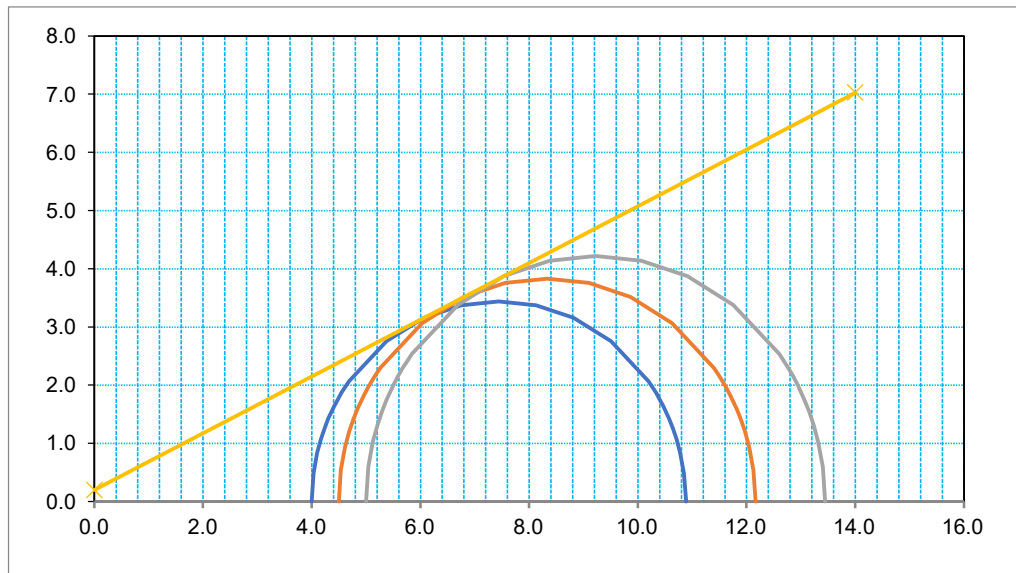
Angle of Internal Friction : 6

K.C.T. Consultancy Services LLP, Ahmedabad

Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in
Project : Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for
GMRL

BH No. : 3 (GP - 6/10)

Depth in m : 31.0

Results of the Triaxial Shear Test Results

Cohesion in kg/cm^2 : 0.2

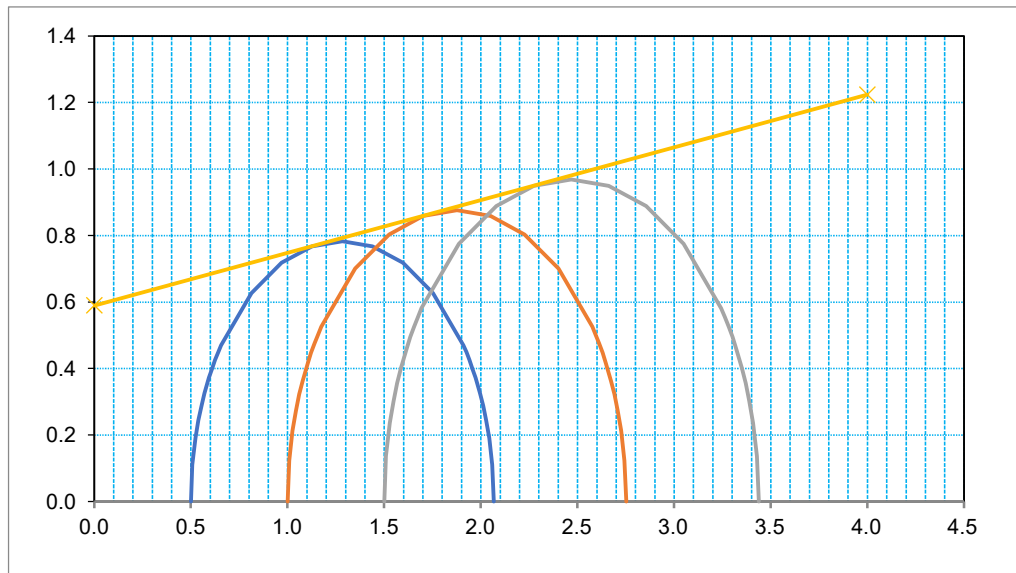
Angle of Internal Friction : 26

K.C.T. Consultancy Services LLP, Ahmedabad

Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in
Project : Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for
GMRCCL

BH No. : 4 (GP - 6/8)

Depth in m : 2.0

Results of the Triaxial Shear Test Results

Cohesion in kg/cm² : 0.59

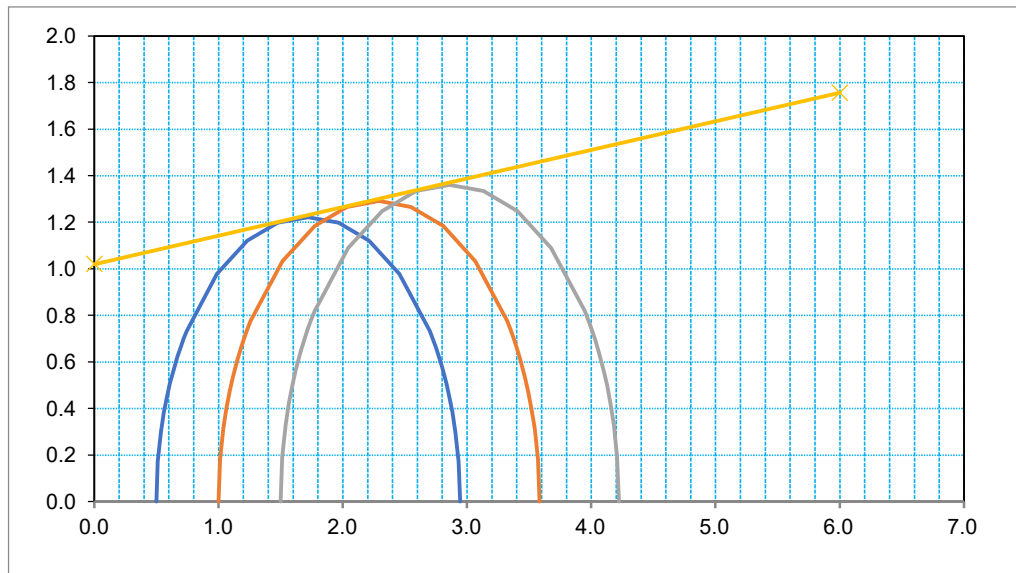
Angle of Internal Friction : 9

K.C.T. Consultancy Services LLP, Ahmedabad

Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in
Project : Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for
GMRCCL

BH No. : 4 (GP - 6/8)

Depth in m : 5.0

Results of the Triaxial Shear Test Results

Cohesion in kg/cm² : 1.02

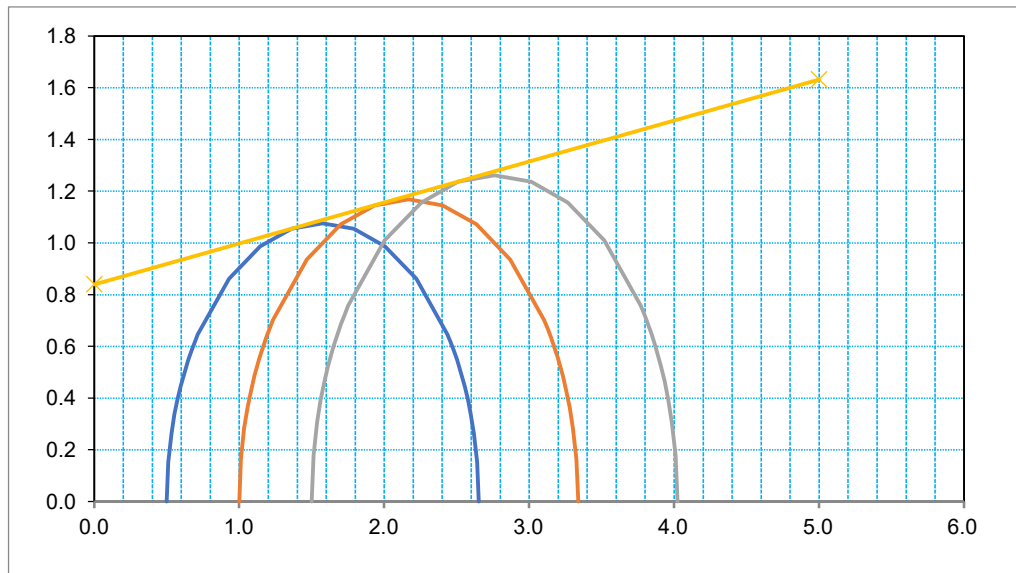
Angle of Internal Friction : 7

K.C.T. Consultancy Services LLP, Ahmedabad

Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in
Project : Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for
GMRL

BH No. : 5 (GP - 6/6)

Depth in m : 2.0

Results of the Triaxial Shear Test Results

Cohesion in kg/cm² : 0.84

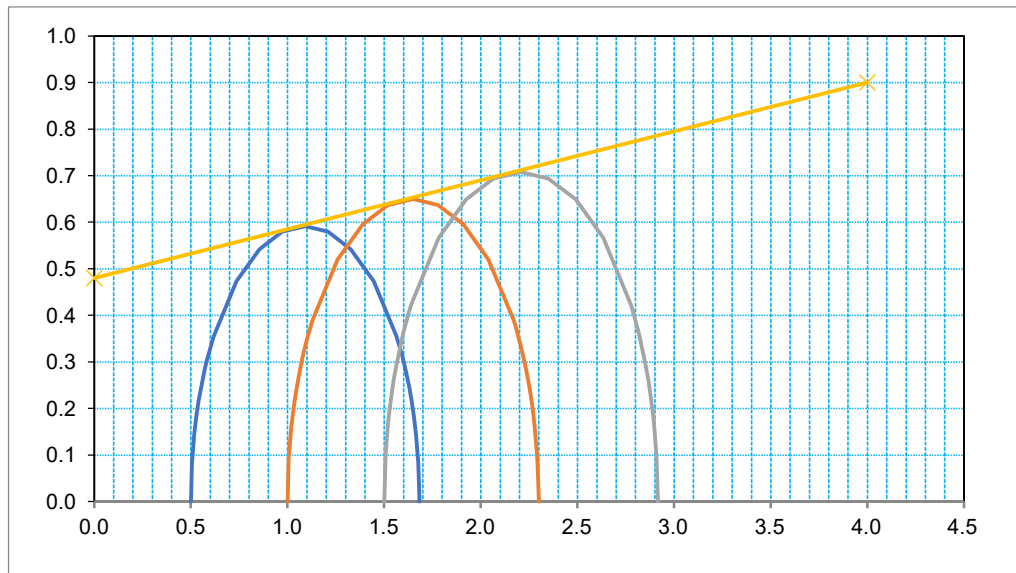
Angle of Internal Friction : 9

K.C.T. Consultancy Services LLP, Ahmedabad

Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in
Project : Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for
GMRCCL

BH No. : 6 (GP - 6/4)

Depth in m : 2.0

Results of the Triaxial Shear Test Results

Cohesion in kg/cm^2 : 0.48

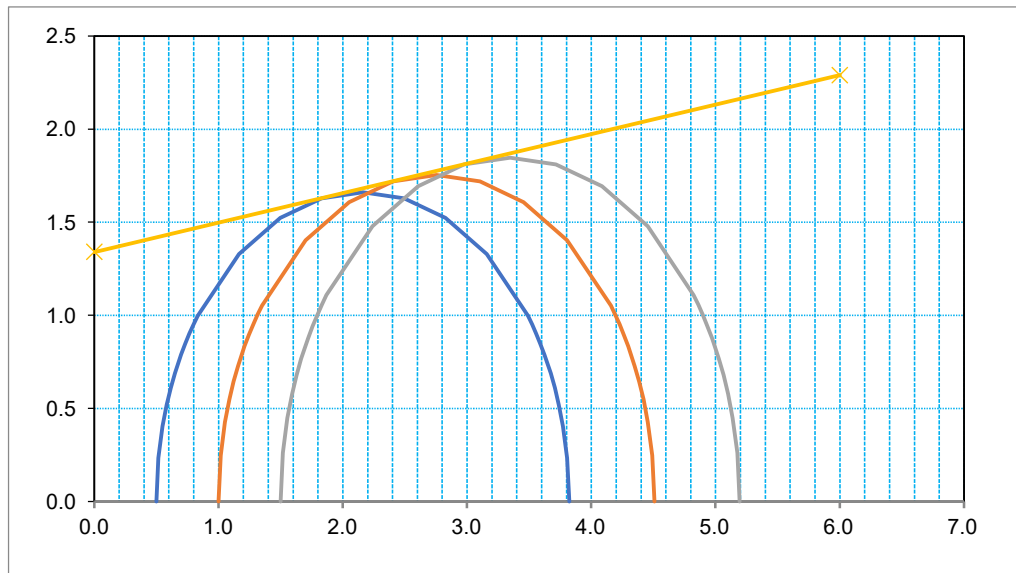
Angle of Internal Friction : 6

K.C.T. Consultancy Services LLP, Ahmedabad

Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in
Project : Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for
GMRL

BH No. : 6 (GP - 6/4)

Depth in m : 5.0

Results of the Triaxial Shear Test Results

Cohesion in kg/cm² : 1.34

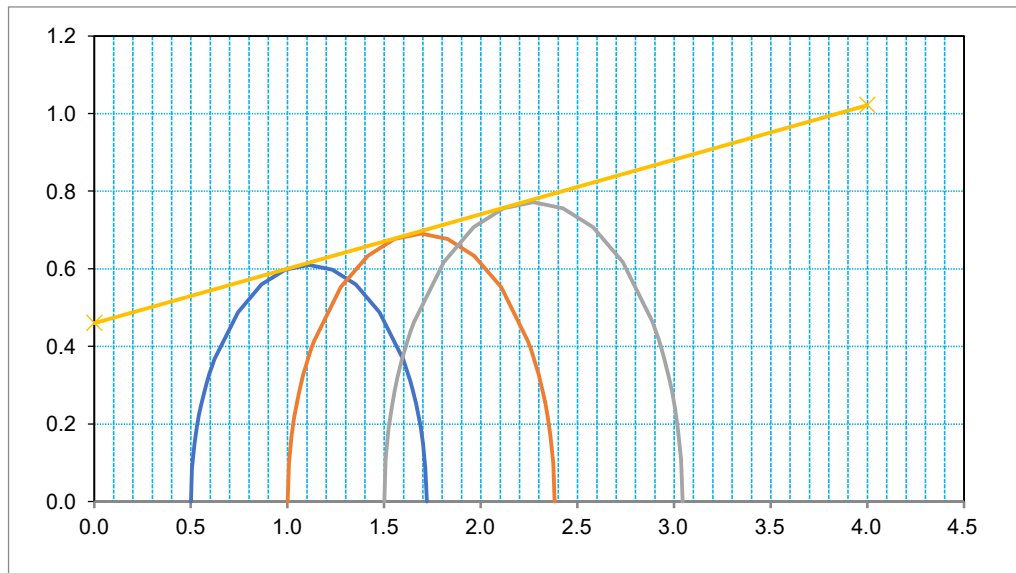
Angle of Internal Friction : 9

K.C.T. Consultancy Services LLP, Ahmedabad

Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in
Project : Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for
GMRC

BH No. : 7 (GP - 6/2)

Depth in m : 2.0

Results of the Triaxial Shear Test Results

Cohesion in kg/cm² : 0.46

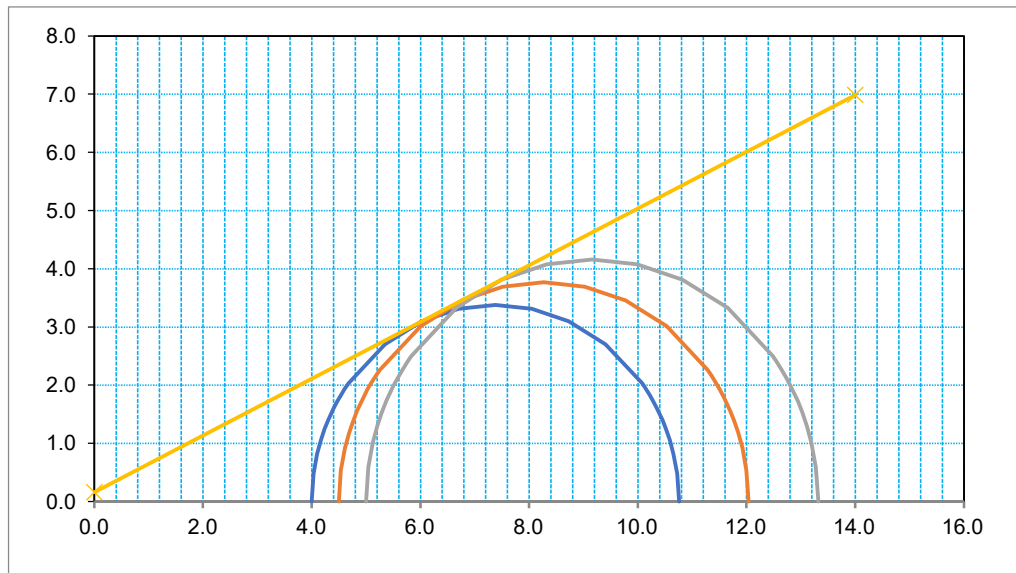
Angle of Internal Friction : 8

K.C.T. Consultancy Services LLP, Ahmedabad

Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in
Project : Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for
GMRCCL

BH No. : 7 (GP - 6/2)

Depth in m : 20.0

Results of the Triaxial Shear Test Results

Cohesion in kg/cm^2 : 0.16

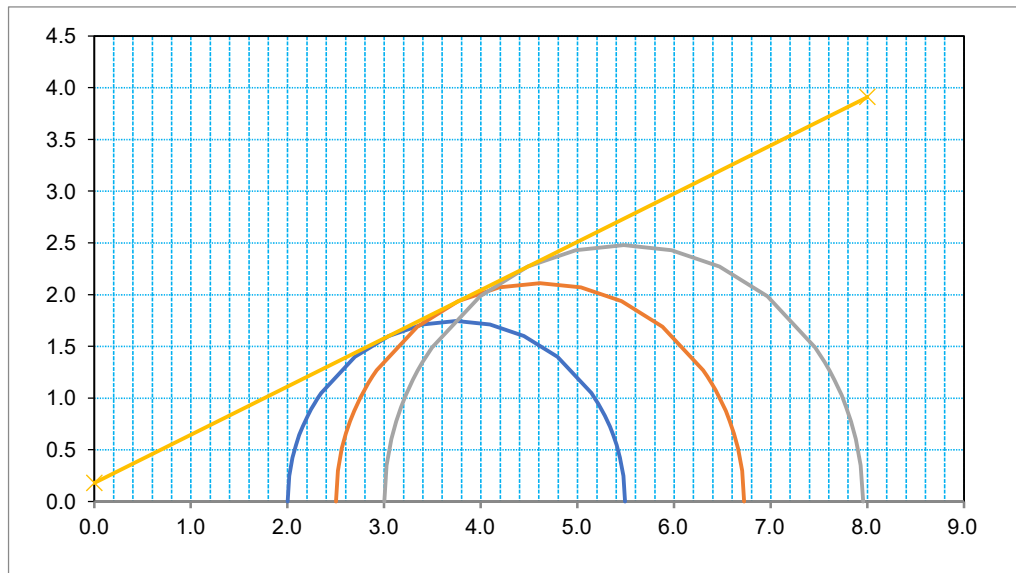
Angle of Internal Friction : 26

K.C.T. Consultancy Services LLP, Ahmedabad

Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in
Project : Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for
GMRCCL

BH No. : 11 (GP 3 / 17)

Depth in m : 11.0

Results of the Triaxial Shear Test Results

Cohesion in kg/cm² : 0.18

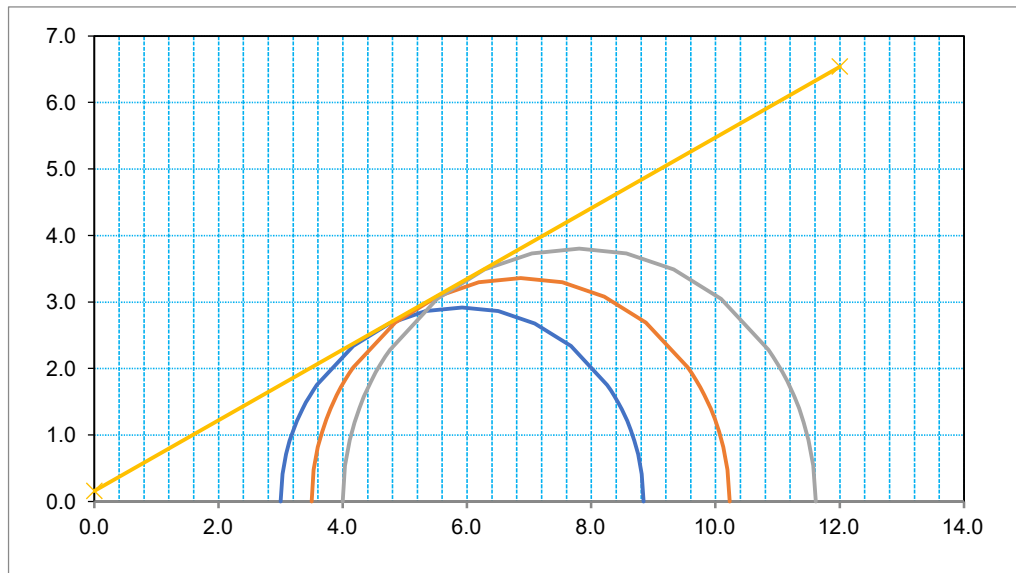
Angle of Internal Friction : 25

K.C.T. Consultancy Services LLP, Ahmedabad

Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in
Project : Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for
GMRCCL

BH No. : 11 (GP 3 / 17)

Depth in m : 17.0

Results of the Triaxial Shear Test Results

Cohesion in kg/cm² : 0.16

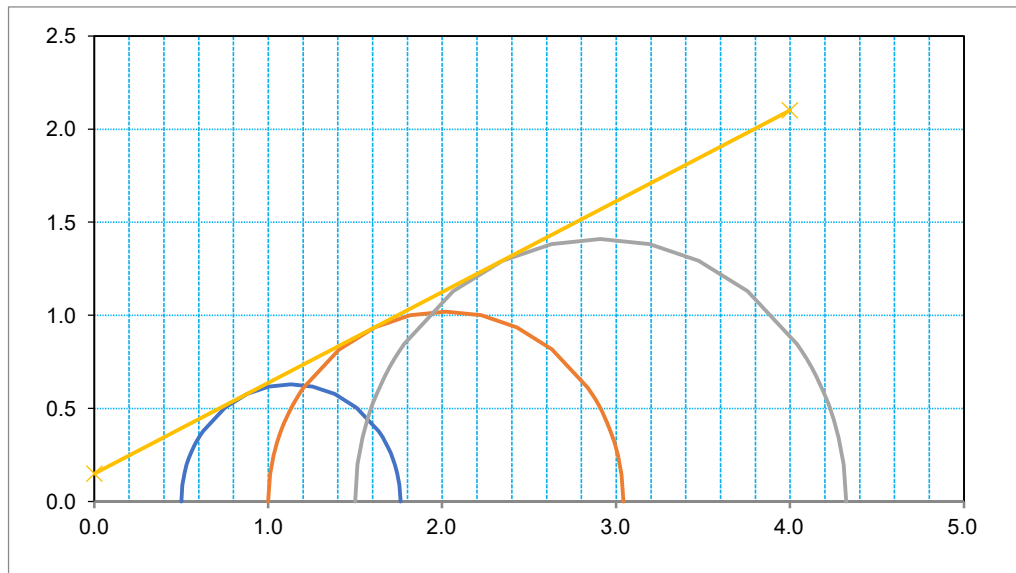
Angle of Internal Friction : 28

K.C.T. Consultancy Services LLP, Ahmedabad

Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in
Project : Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for
GMRL

BH No. : 12 (GPP 3 / 19)

Depth in m : 5.0

Results of the Triaxial Shear Test Results

Cohesion in kg/cm² : 0.15

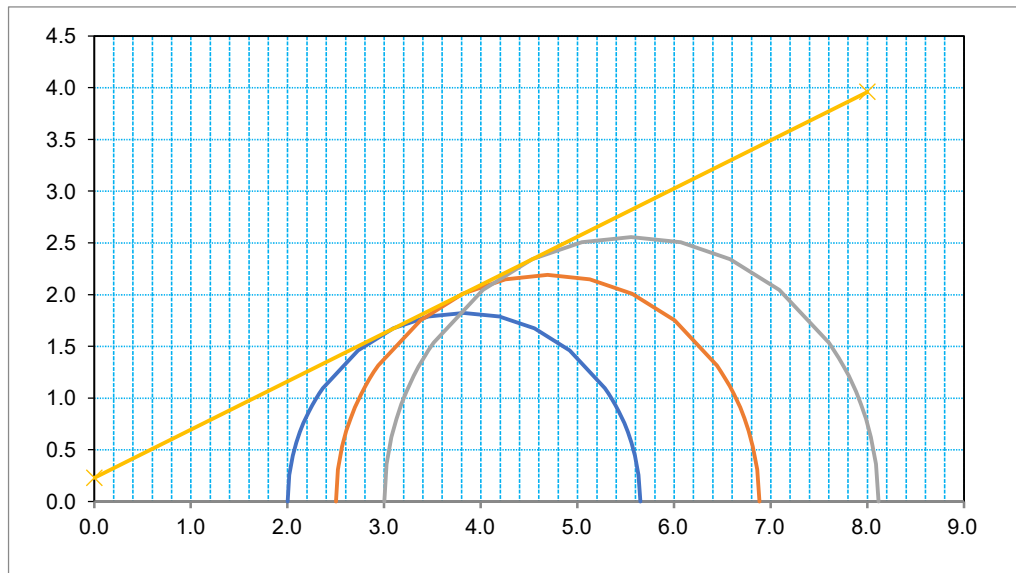
Angle of Internal Friction : 26

K.C.T. Consultancy Services LLP, Ahmedabad

Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in
Project : Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for
GMRL

BH No. : 12 (GPP 3 / 19)

Depth in m : 14.0

Results of the Triaxial Shear Test Results

Cohesion in kg/cm² : 0.23

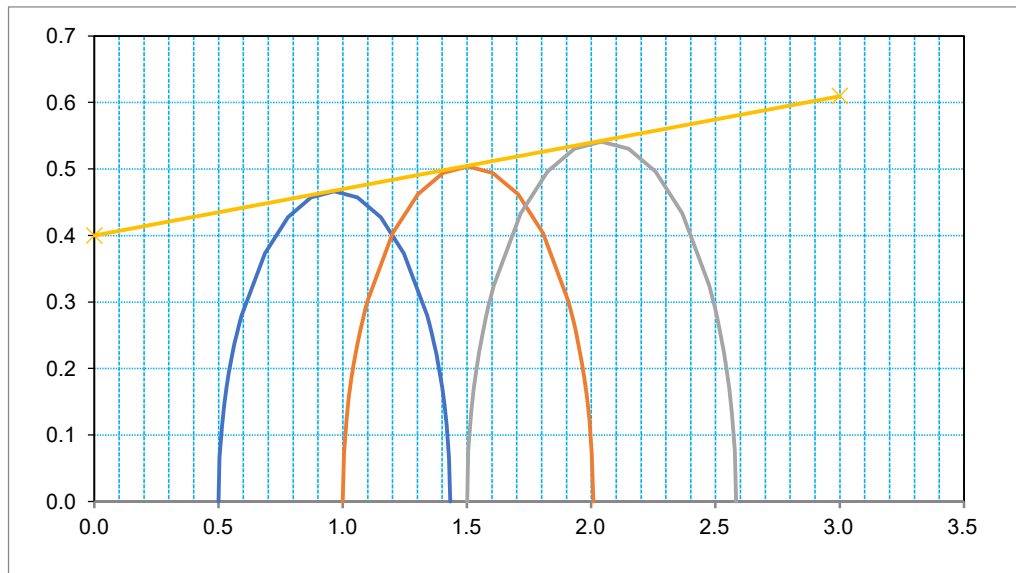
Angle of Internal Friction : 25

K.C.T. Consultancy Services LLP, Ahmedabad

Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in
Project : Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for
GMRC

BH No. : 14 (GP 3 / 29)

Depth in m : 5.0

Results of the Triaxial Shear Test Results

Cohesion in kg/cm^2 : 0.4

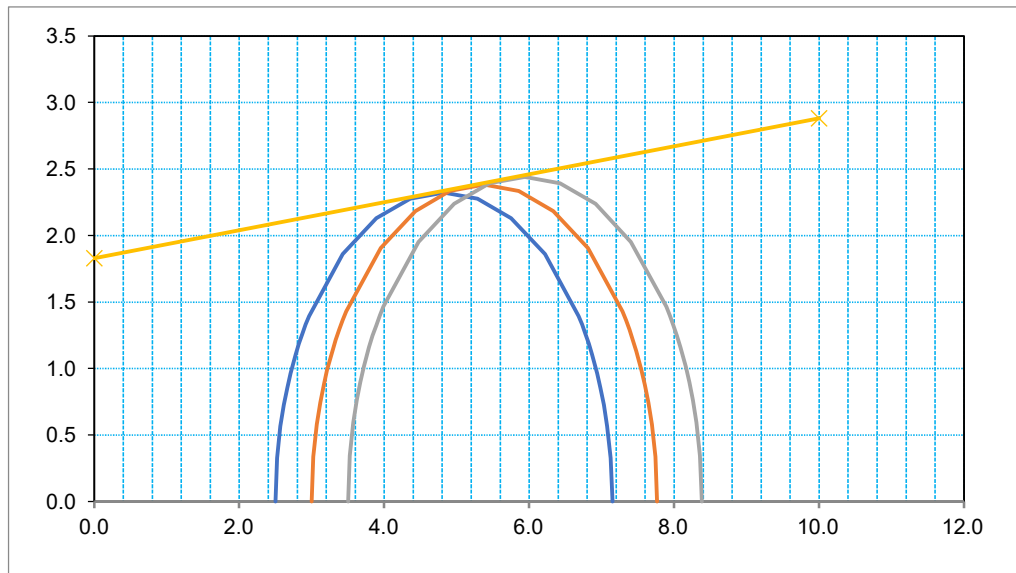
Angle of Internal Friction : 4

K.C.T. Consultancy Services LLP, Ahmedabad

Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in
Project : Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for
GMRL

BH No. : 14 (GP 3 / 29)

Depth in m : 14.0

Results of the Triaxial Shear Test Results

Cohesion in kg/cm^2 : 1.83

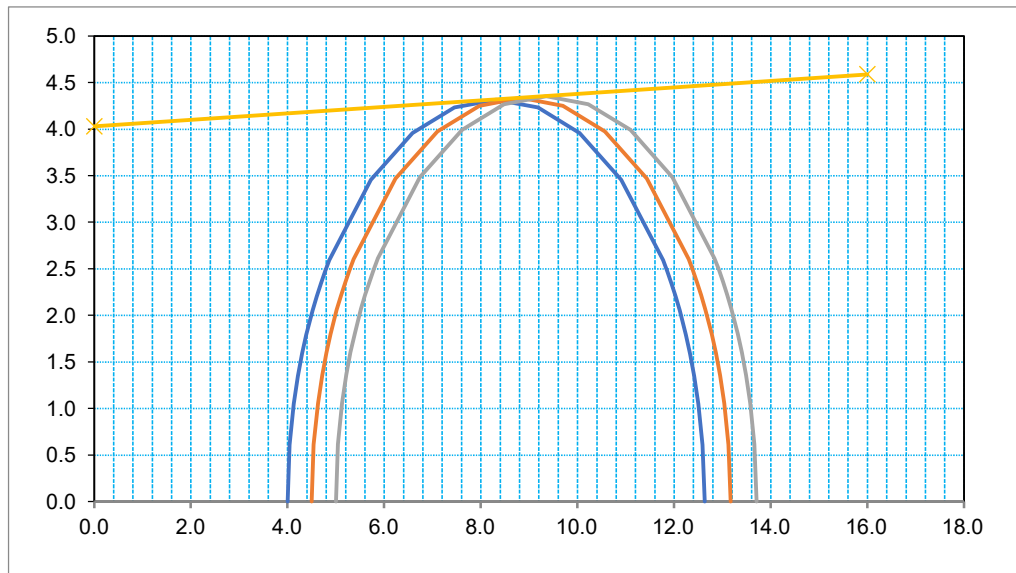
Angle of Internal Friction : 6

K.C.T. Consultancy Services LLP, Ahmedabad

Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in
Project : Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for
GMRL

BH No. : 15 (GP 3 / 39)

Depth in m : 20.0

Results of the Triaxial Shear Test Results

Cohesion in kg/cm^2 : 4.03

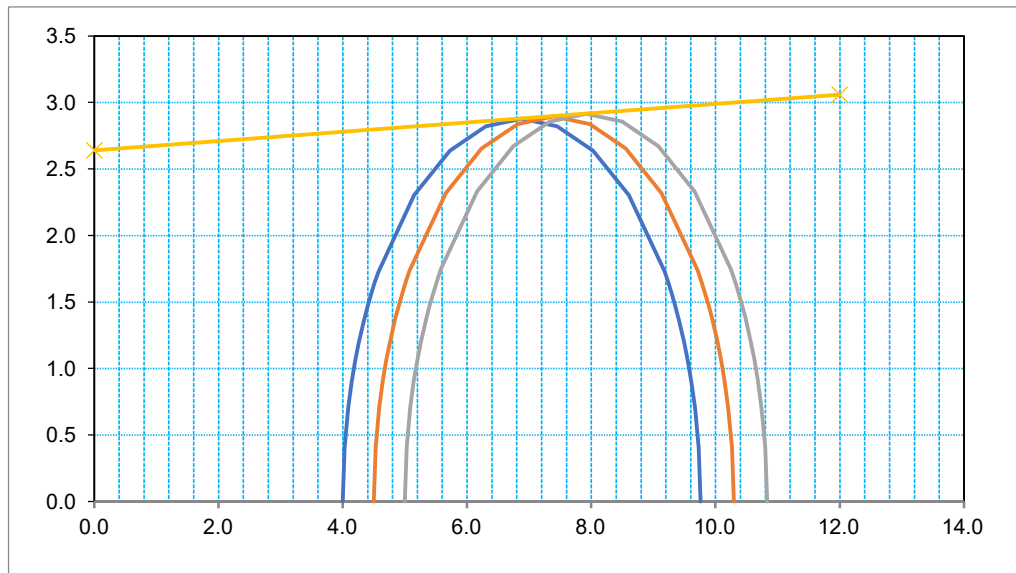
Angle of Internal Friction : 2

K.C.T. Consultancy Services LLP, Ahmedabad

Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in
Project : Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for
GMRL

BH No. : 15 (GP 3 / 39)

Depth in m : 22.0

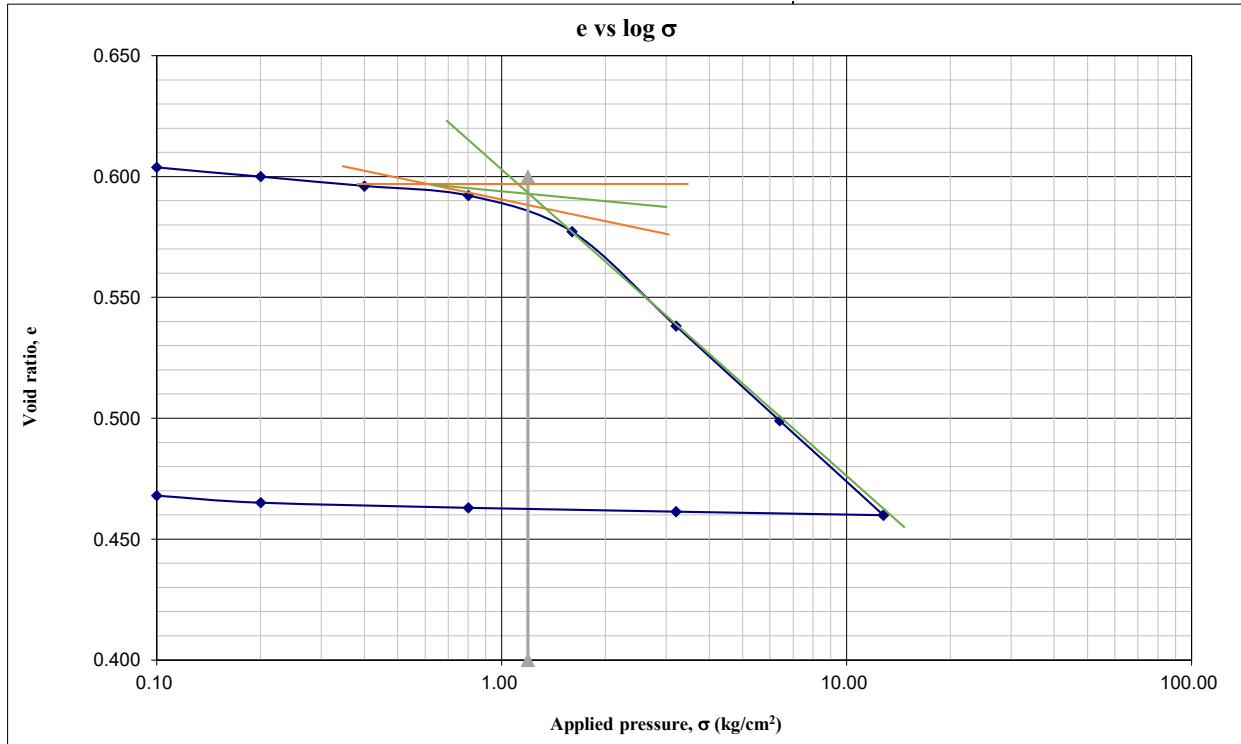
Results of the Triaxial Shear Test Results

Cohesion in kg/cm^2 : 2.64

Angle of Internal Friction : 2

Project: Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for GMRCL

BH No.: 1.00 **Depth:** 5m



Result:

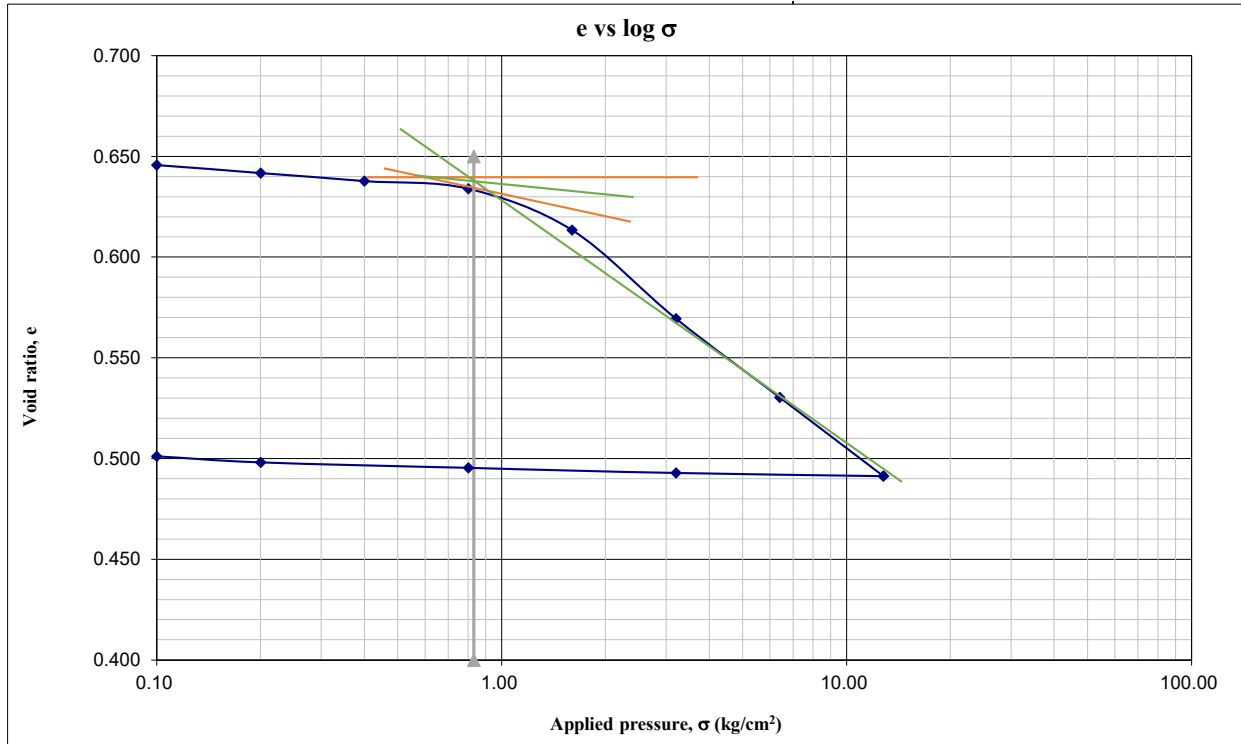
$$Cc = \frac{de}{\log \left(\frac{\sigma_f}{\sigma_c} \right)}$$

$$Cc = 0.13$$

$$Pc = 1.19 \text{ kg/cm}^2$$

Project: Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for GMRCL

BH No.: 2.00 **Depth:** 5m



Result:

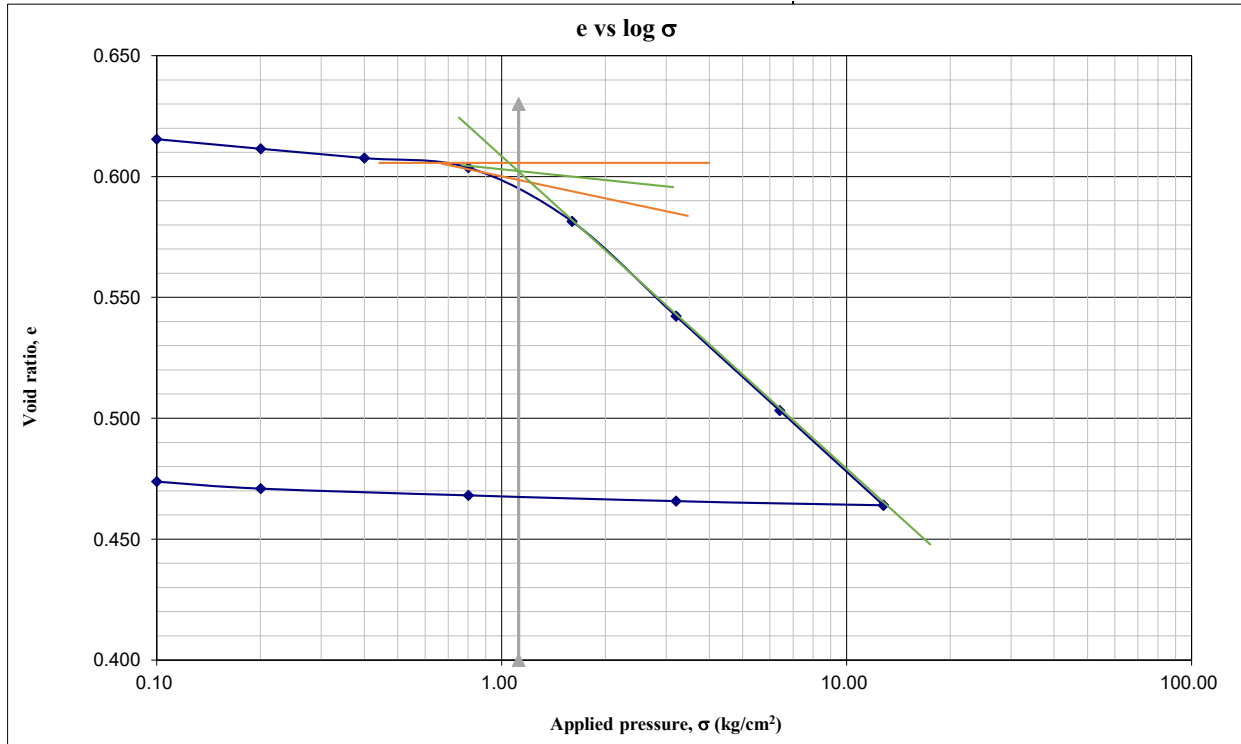
$$C_c = \frac{de}{\log \left(\frac{\sigma_f}{\sigma_c} \right)}$$

$$C_c = 0.13$$

$$P_c = 0.83 \text{ kg/cm}^2$$

Project: Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for GMRCL

BH No.: 3.00 **Depth:** 5m



Result:

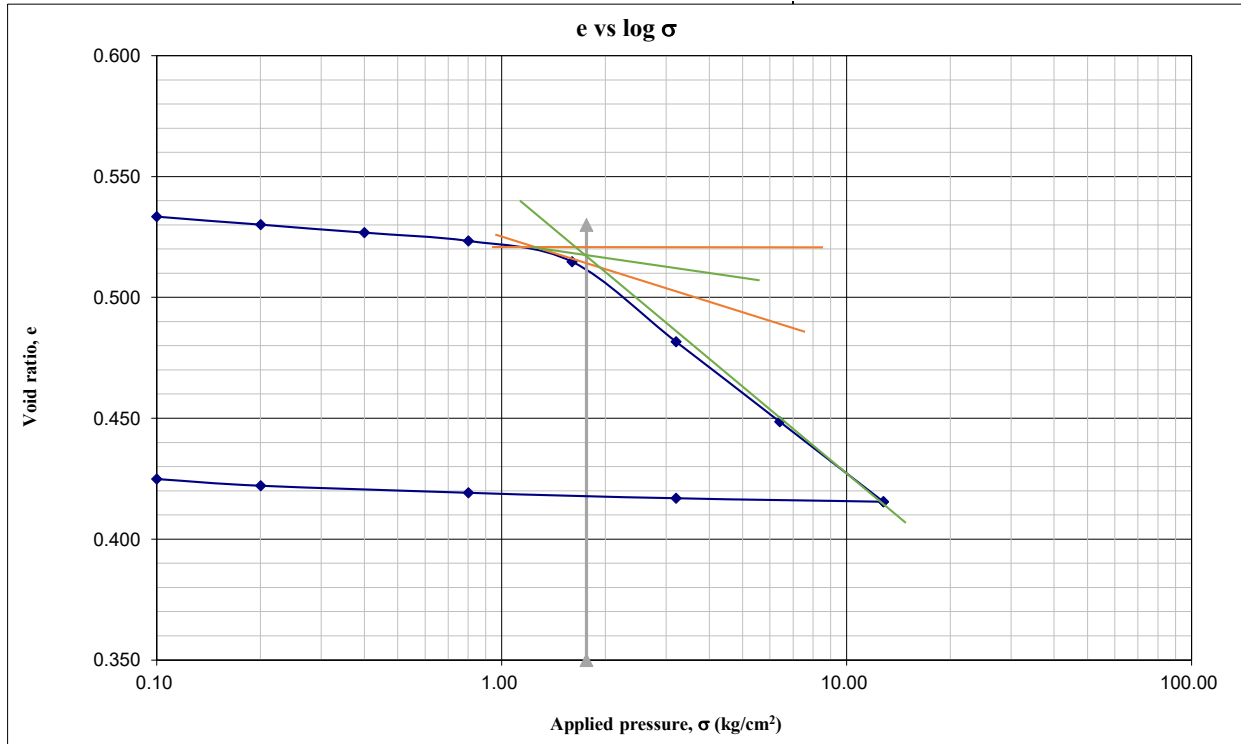
$$Cc = \frac{de}{\log \left(\frac{\sigma_f}{\sigma_c} \right)}$$

$$Cc = 0.13$$

$$Pc = 1.12 \text{ kg/cm}^2$$

Project: Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for GMRCL

BH No.: 5.00 **Depth:** 5m



Result:

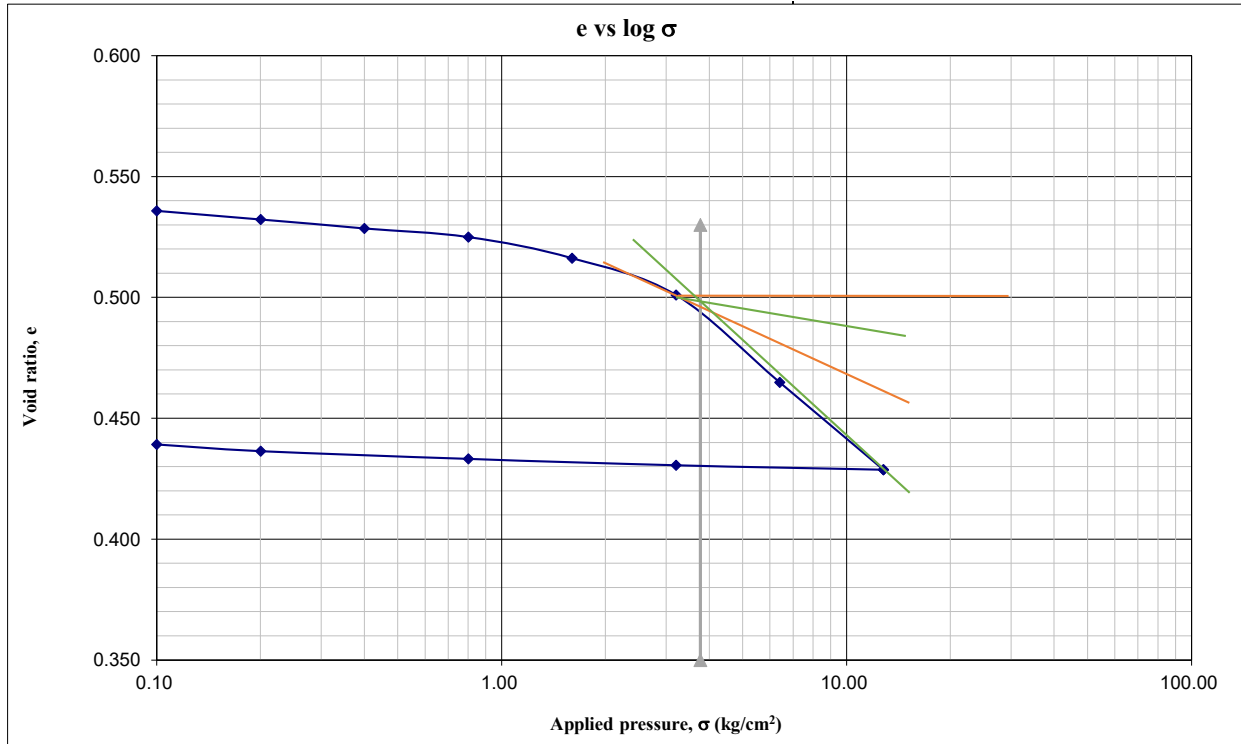
$$C_c = \frac{de}{\log \left(\frac{\sigma_f}{\sigma_c} \right)}$$

$$C_c = 0.11$$

$$P_c = 1.76 \text{ kg/cm}^2$$

Project: Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for GMRCL

BH No.: 12 **Depth:** 5m



Result:

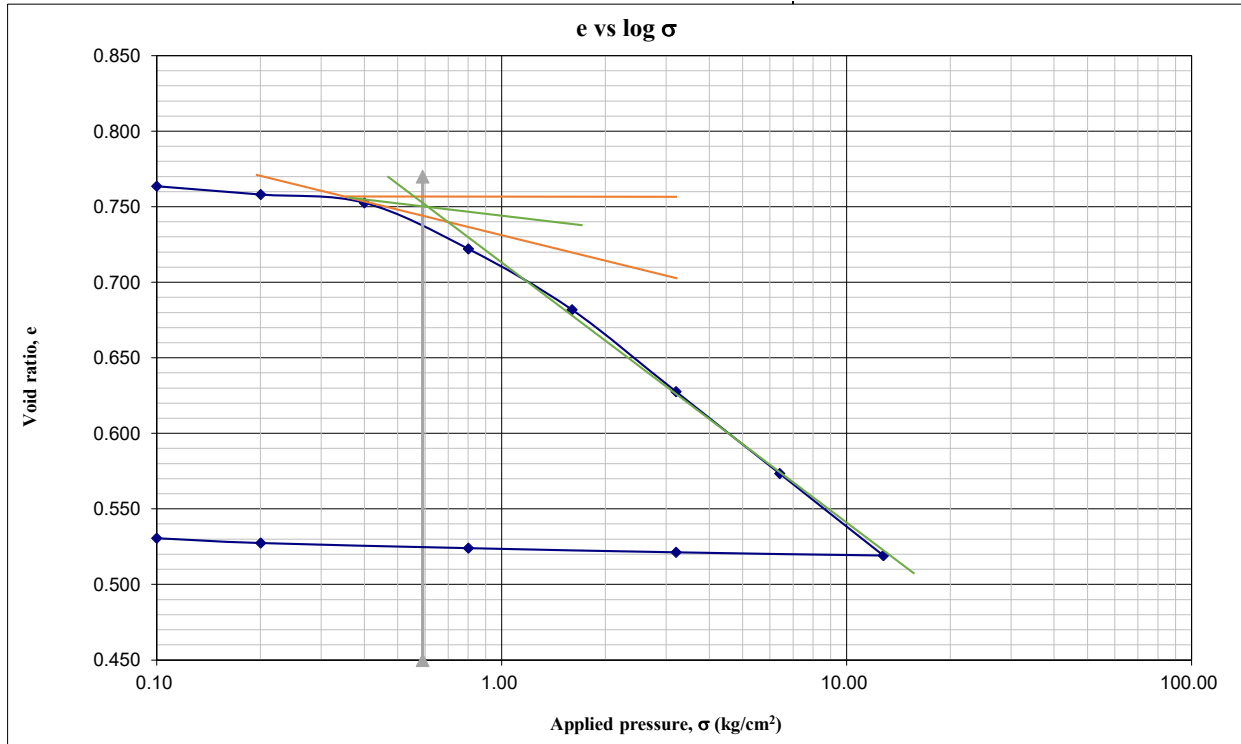
$$Cc = \frac{de}{\log \left(\frac{\sigma_f}{\sigma_c} \right)}$$

$$Cc = 0.12$$

$$Pc = 3.77 \text{ kg/cm}^2$$

Project: Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for GMRCL

BH No.: 14 **Depth:** 5m



Result:

$$C_c = \frac{de}{\log \left(\frac{\sigma_f}{\sigma_c} \right)}$$

$$C_c = 0.18$$

$$P_c = 0.59 \text{ kg/cm}^2$$

SPT N-value Correction

K.C.T. Consultancy Services LLP, Ahmedabad.

Project : Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for GMRL

BH : 1 (GTP - 6/14)

GWT depth below EGL (m) 45.00

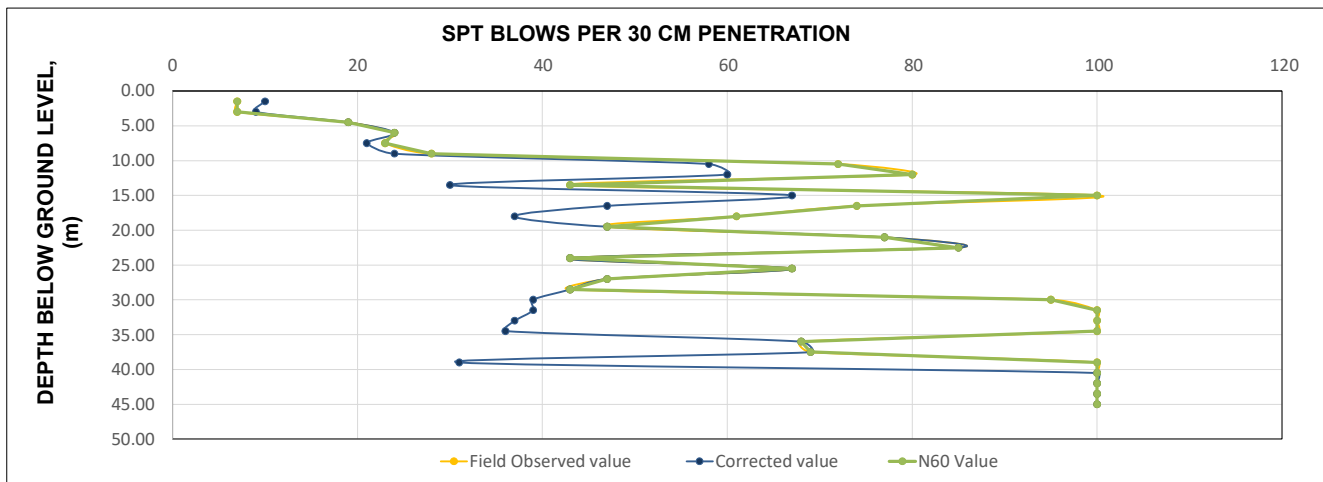
Depth (d), m	Field SPT (N _R)	Energy Correction (N ₆₀)	Type of Soil	Bulk unit weight (γ) (t/m ³)	Submerged unit weight (γ') (t/m ³)	Effective Overburden Pressure (σ') , (t/m ²)	Effective Overburden Pressure (σ') , (kg/cm ²)	Overburden correction Factor	Corrected SPT (N') value for overburden (N ₁₆₀)	Final Corrected value after Dilatancy Corrections (N ₁₆₀)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1.50	7	7	S	1.61	1.61	2.42	0.24	1.48	10	10
3.00	7	7	S	1.61	1.61	4.83	0.48	1.25	9	9
4.50	19	19	C	1.61	1.61	7.25	0.72	NA	19	19
6.00	24	24	C	1.83	1.83	9.99	1.00	NA	24	24
7.50	23	23	S	1.83	1.83	12.74	1.27	0.92	21	21
9.00	28	28	S	1.82	1.82	15.47	1.55	0.86	24	24
10.50	72	72	S	1.82	1.82	18.20	1.82	0.80	58	58
12.00	80	80	S	2.08	2.08	21.32	2.13	0.75	60	60
13.50	43	43	S	2.08	2.08	24.44	2.44	0.70	30	30
15.00	100	100	S	1.94	1.94	27.35	2.73	0.67	67	67
16.50	74	74	S	1.94	1.94	30.26	3.03	0.63	47	47
18.00	61	61	S	2.13	2.13	33.45	3.35	0.60	37	37
19.50	47	47	C	2.13	2.13	36.65	3.66	NA	47	47
21.00	77	77	C	2.13	2.13	39.84	3.98	NA	77	77
22.50	85	85	C	2.13	2.13	43.04	4.30	NA	85	85
24.00	43	43	C	2.13	2.13	46.23	4.62	NA	43	43
25.50	67	67	C	2.13	2.13	49.43	4.94	NA	67	67
27.00	47	47	C	2.13	2.13	52.62	5.26	NA	47	47
28.50	43	43	C	2.13	2.13	55.82	5.58	NA	43	43
30.00	95	95	S	2.13	2.13	59.01	5.90	0.41	39	39
31.50	100	100	S	2.13	2.13	62.21	6.22	0.39	39	39
33.00	100	100	S	2.13	2.13	65.40	6.54	0.37	37	37
34.50	100	100	S	2.13	2.13	68.60	6.86	0.36	36	36
36.00	68	68	C	2.13	2.13	71.79	7.18	NA	68	68
37.50	69	69	C	2.13	2.13	74.99	7.50	NA	69	69
39.00	100	100	S	2.13	2.13	78.18	7.82	0.31	31	31
40.50	100	100	C	2.13	2.13	81.38	8.14	NA	100	100
42.00	100	100	C	2.13	2.13	84.57	8.46	NA	100	100
43.50	100	100	C	2.13	2.13	87.77	8.78	NA	100	100
45.00	100	100	C	2.13	1.13	89.46	8.95	NA	100	100

Note:-

C - Cohesive Soil

S - Sandy Soil

NA - Not Applicable



SPT N-value Correction

K.C.T. Consultancy Services LLP, Ahmedabad.

Project : Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for GMRL

BH : 2 (GP - 6/12)

GWT depth below EGL (m) 45.00

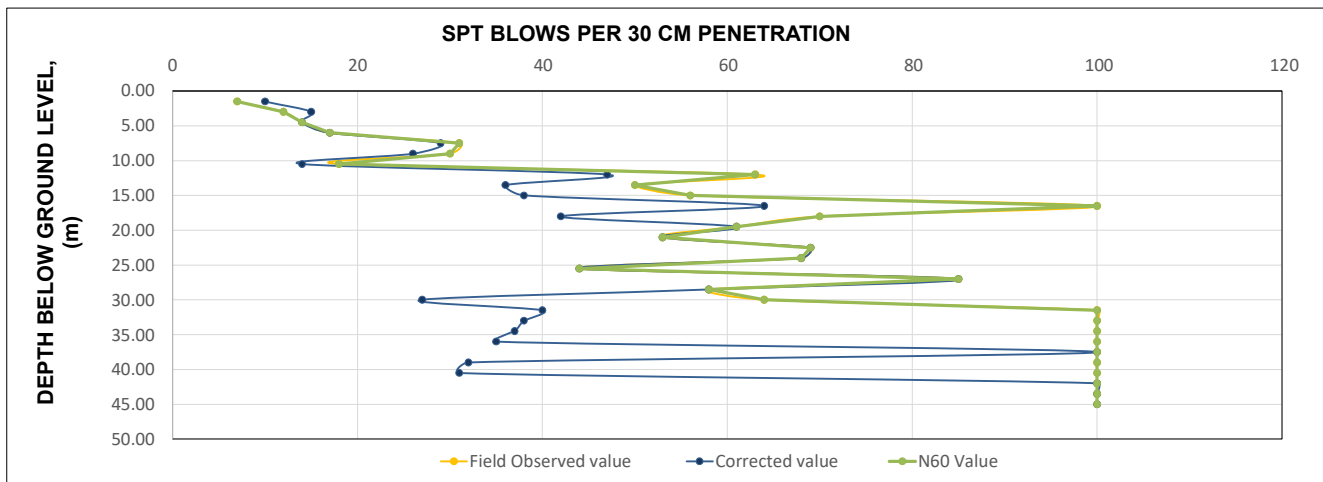
Depth (d), m	Field SPT (N _R)	Energy Correction (N ₆₀)	Type of Soil	Bulk unit weight (γ) (t/m ³)	Submerged unit weight (γ') (t/m ³)	Effective Overburden Pressure (σ') (t/m ²)	Effective Overburden Pressure (σ') (kg/cm ²)	Overburden correction Factor	Corrected SPT (N') value for overburden (N ₁₆₀)	Final Corrected value after Dilatancy Corrections (N ₁₆₀)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1.50	7	7	S	1.61	1.61	2.42	0.24	1.48	10	10
3.00	12	12	S	1.61	1.61	4.83	0.48	1.25	15	15
4.50	14	14	C	1.61	1.61	7.25	0.72	NA	14	14
6.00	17	17	S	1.79	1.79	9.93	0.99	1.00	17	17
7.50	31	31	S	1.79	1.79	12.62	1.26	0.92	29	29
9.00	30	30	S	1.95	1.95	15.54	1.55	0.85	26	26
10.50	18	18	S	1.95	1.95	18.47	1.85	0.80	14	14
12.00	63	63	S	1.76	1.76	21.11	2.11	0.75	47	47
13.50	50	50	S	1.76	1.76	23.75	2.37	0.71	36	36
15.00	56	56	S	2.00	2.00	26.75	2.67	0.67	38	38
16.50	100	100	S	2.00	2.00	29.75	2.97	0.64	64	64
18.00	70	70	S	2.10	2.10	32.90	3.29	0.60	42	42
19.50	61	61	C	2.10	2.10	36.05	3.60	NA	61	61
21.00	53	53	C	2.10	2.10	39.20	3.92	NA	53	53
22.50	69	69	C	2.07	2.07	42.30	4.23	NA	69	69
24.00	68	68	C	2.07	2.07	45.41	4.54	NA	68	68
25.50	44	44	C	2.07	2.07	48.51	4.85	NA	44	44
27.00	85	85	C	2.04	2.04	51.57	5.16	NA	85	85
28.50	58	58	C	2.04	2.04	54.63	5.46	NA	58	58
30.00	64	64	S	2.04	2.04	57.69	5.77	0.42	27	27
31.50	100	100	S	2.04	2.04	60.75	6.08	0.40	40	40
33.00	100	100	S	2.04	2.04	63.81	6.38	0.38	38	38
34.50	100	100	S	2.04	2.04	66.87	6.69	0.37	37	37
36.00	100	100	S	2.04	2.04	69.93	6.99	0.35	35	35
37.50	100	100	C	2.04	2.04	72.99	7.30	NA	100	100
39.00	100	100	S	2.04	2.04	76.05	7.61	0.32	32	32
40.50	100	100	S	2.04	2.04	79.11	7.91	0.31	31	31
42.00	100	100	C	2.04	2.04	82.17	8.22	NA	100	100
43.50	100	100	C	2.04	2.04	85.23	8.52	NA	100	100
45.00	100	100	C	2.04	1.04	86.79	8.68	NA	100	100

Note:-

C - Cohesive Soil

S - Sandy Soil

NA - Not Applicable



SPT N-value Correction

K.C.T. Consultancy Services LLP, Ahmedabad.

Project : Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for GMRL

BH : 3 (GP - 6/10)

GWT depth below EGL (m)

45.00

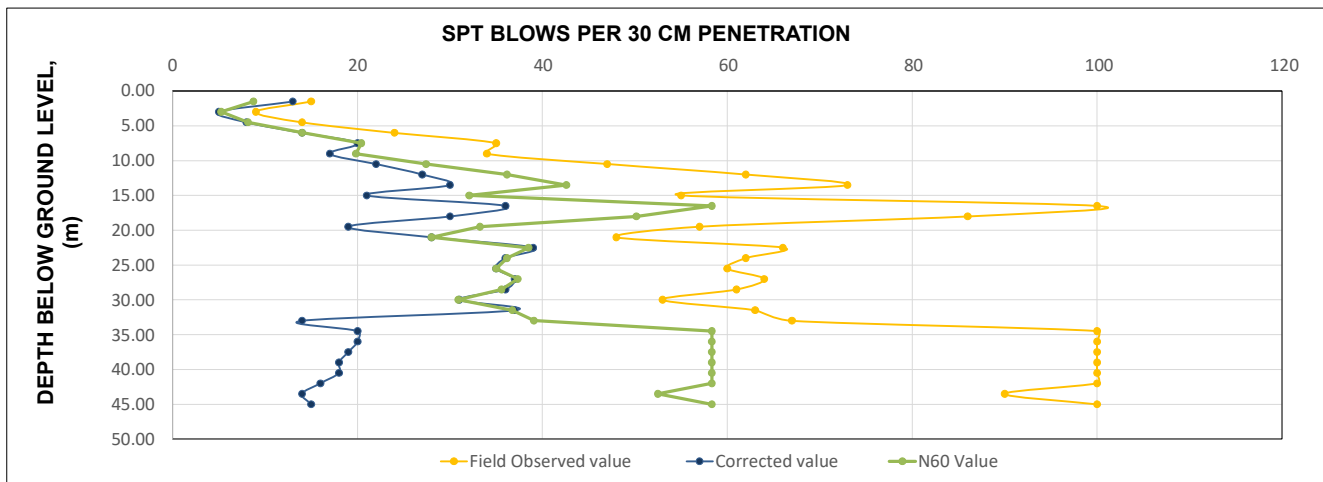
Depth (d), m	Field SPT (N _R)	Energy Correction (N ₆₀)	Type of Soil	Bulk unit weight (γ) (t/m ³)	Submerged unit weight (γ') (t/m ³)	Effective Overburden Pressure (σ') , (t/m ²)	Effective Overburden Pressure (σ') , (kg/cm ²)	Overburden correction Factor	Corrected SPT (N') value for overburden (N ₁₆₀)	Final Corrected value after Dilatancy Corrections (N ₁₆₀)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1.50	15	9	S	1.65	1.65	2.48	0.25	1.47	13	13
3.00	9	5	C	1.65	1.65	4.95	0.50	NA	5	5
4.50	14	8	C	1.65	1.65	7.43	0.74	NA	8	8
6.00	24	14	C	1.78	1.78	10.10	1.01	NA	14	14
7.50	35	20	C	1.78	1.78	12.77	1.28	NA	20	20
9.00	34	20	S	1.89	1.89	15.60	1.56	0.85	17	17
10.50	47	27	S	1.89	1.89	18.44	1.84	0.80	22	22
12.00	62	36	S	2.07	2.07	21.54	2.15	0.75	27	27
13.50	73	43	S	2.07	2.07	24.65	2.46	0.70	30	30
15.00	55	32	S	2.09	2.09	27.78	2.78	0.66	21	21
16.50	100	58	S	2.09	2.09	30.92	3.09	0.62	36	36
18.00	86	50	S	2.15	2.15	34.14	3.41	0.59	30	30
19.50	57	33	S	2.15	2.15	37.37	3.74	0.56	19	19
21.00	48	28	C	2.15	2.15	40.59	4.06	NA	28	28
22.50	66	39	C	2.15	2.15	43.82	4.38	NA	39	39
24.00	62	36	C	2.15	2.15	47.04	4.70	NA	36	36
25.50	60	35	C	2.15	2.15	50.27	5.03	NA	35	35
27.00	64	37	C	2.15	2.15	53.49	5.35	NA	37	37
28.50	61	36	C	2.15	2.15	56.72	5.67	NA	36	36
30.00	53	31	C	2.15	2.15	59.94	5.99	NA	31	31
31.50	63	37	C	2.15	2.15	63.17	6.32	NA	37	37
33.00	67	39	S	2.15	2.15	66.39	6.64	0.37	14	14
34.50	100	58	S	2.15	2.15	69.62	6.96	0.35	20	20
36.00	100	58	S	2.15	2.15	72.84	7.28	0.34	20	20
37.50	100	58	S	2.15	2.15	76.07	7.61	0.32	19	19
39.00	100	58	S	2.15	2.15	79.29	7.93	0.31	18	18
40.50	100	58	S	2.15	2.15	82.52	8.25	0.30	18	18
42.00	100	58	S	2.15	2.15	85.74	8.57	0.28	16	16
43.50	90	53	S	2.15	2.15	88.97	8.90	0.27	14	14
45.00	100	58	S	2.15	1.15	90.69	9.07	0.26	15	15

Note:-

C - Cohesive Soil

S - Sandy Soil

NA - Not Applicable



SPT N-value Correction

K.C.T. Consultancy Services LLP, Ahmedabad.

Project : Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for GMRL

BH : 4 (GP - 6/8)

GWT depth below EGL (m) 45.00

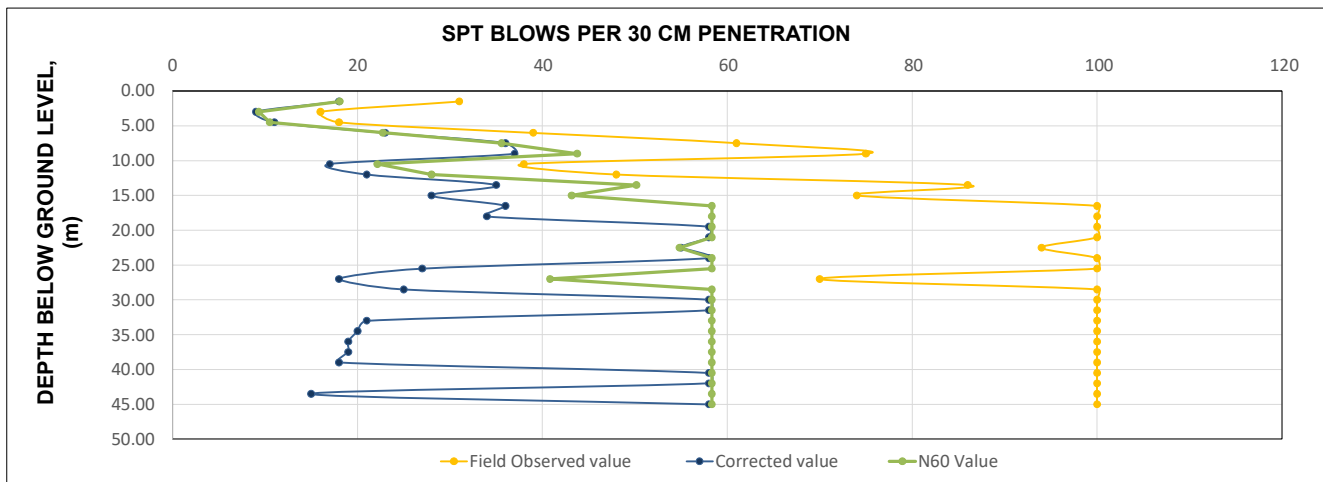
Depth (d), m	Field SPT (N _R)	Energy Correction (N ₆₀)	Type of Soil	Bulk unit weight (γ) (t/m ³)	Submerged unit weight (γ') (t/m ³)	Effective Overburden Pressure (σ') (t/m ²)	Effective Overburden Pressure (σ') (kg/cm ²)	Overburden correction Factor	Corrected SPT (N') value for overburden (N ₁₆₀)	Final Corrected value after Dilatancy Corrections (N ₁₆₀)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1.50	31	18	C	1.72	1.72	2.58	0.26	NA	18	18
3.00	16	9	C	1.72	1.72	5.16	0.52	NA	9	9
4.50	18	11	C	1.72	1.72	7.74	0.77	NA	11	11
6.00	39	23	C	1.80	1.80	10.44	1.04	NA	23	23
7.50	61	36	C	1.80	1.80	13.14	1.31	NA	36	36
9.00	75	44	S	2.03	2.03	16.19	1.62	0.84	37	37
10.50	38	22	S	2.03	2.03	19.23	1.92	0.78	17	17
12.00	48	28	S	1.90	1.90	22.08	2.21	0.74	21	21
13.50	86	50	S	1.90	1.90	24.93	2.49	0.70	35	35
15.00	74	43	S	2.14	2.14	28.14	2.81	0.66	28	28
16.50	100	58	S	2.14	2.14	31.35	3.14	0.62	36	36
18.00	100	58	S	2.20	2.20	34.65	3.47	0.59	34	34
19.50	100	58	C	2.20	2.20	37.95	3.80	NA	58	58
21.00	100	58	C	2.20	2.20	41.25	4.13	NA	58	58
22.50	94	55	C	2.20	2.20	44.55	4.46	NA	55	55
24.00	100	58	C	2.20	2.20	47.85	4.79	NA	58	58
25.50	100	58	S	2.20	2.20	51.15	5.12	0.46	27	27
27.00	70	41	S	2.20	2.20	54.45	5.45	0.44	18	18
28.50	100	58	S	2.20	2.20	57.75	5.78	0.42	25	25
30.00	100	58	C	2.20	2.20	61.05	6.11	NA	58	58
31.50	100	58	C	2.20	2.20	64.35	6.44	NA	58	58
33.00	100	58	S	2.20	2.20	67.65	6.77	0.36	21	21
34.50	100	58	S	2.20	2.20	70.95	7.10	0.35	20	20
36.00	100	58	S	2.20	2.20	74.25	7.43	0.33	19	19
37.50	100	58	S	2.20	2.20	77.55	7.76	0.32	19	19
39.00	100	58	S	2.20	2.20	80.85	8.09	0.30	18	18
40.50	100	58	C	2.20	2.20	84.15	8.42	NA	58	58
42.00	100	58	C	2.20	2.20	87.45	8.75	NA	58	58
43.50	100	58	S	2.20	2.20	90.75	9.08	0.26	15	15
45.00	100	58	C	2.20	1.20	92.55	9.26	NA	58	58

Note:-

C - Cohesive Soil

S - Sandy Soil

NA - Not Applicable



SPT N-value Correction**K.C.T. Consultancy Services LLP, Ahmedabad.**

Project : Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for GMRL

BH : 5 (GP - 6/6)

GWT depth below EGL (m)

45.00

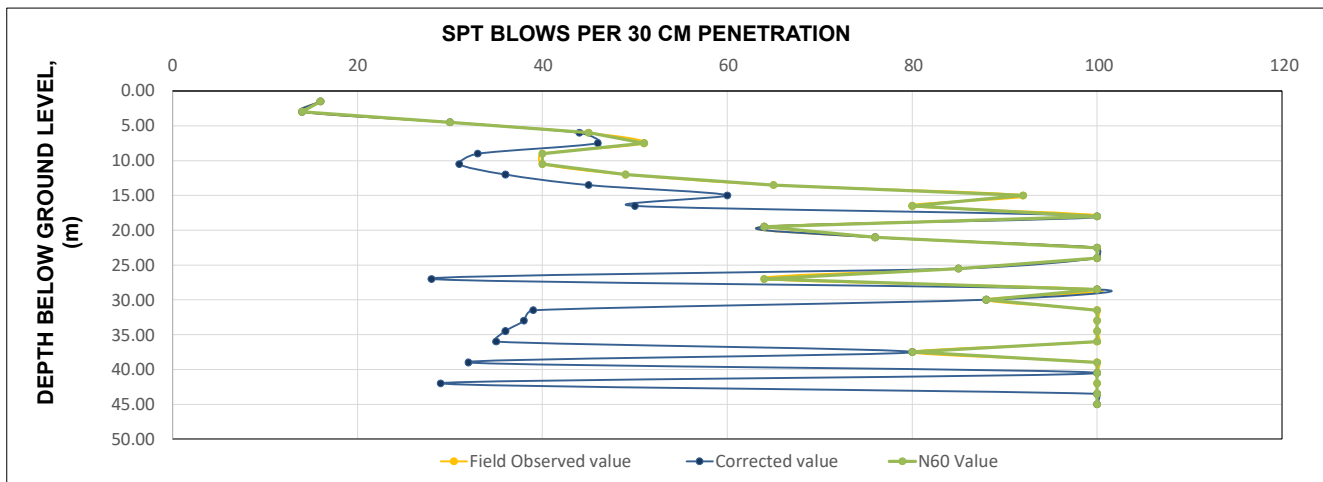
Depth (d), m	Field SPT (N _R)	Energy Correction (N ₆₀)	Type of Soil	Bulk unit weight (γ) (t/m ³)	Submerged unit weight (γ') (t/m ³)	Effective Overburden Pressure (σ') , (t/m ²)	Effective Overburden Pressure (σ') , (kg/cm ²)	Overburden correction Factor	Corrected SPT (N') value for overburden (N ₁₆₀)	Final Corrected value after Dilatancy Corrections (N ₁₆₀)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1.50	16	16	C	1.75	1.75	2.63	0.26	NA	16	16
3.00	14	14	C	1.75	1.75	5.25	0.53	NA	14	14
4.50	30	30	C	1.75	1.75	7.88	0.79	NA	30	30
6.00	45	45	S	1.86	1.86	10.67	1.07	0.98	44	44
7.50	51	51	S	1.86	1.86	13.46	1.35	0.90	46	46
9.00	40	40	S	2.03	2.03	16.50	1.65	0.83	33	33
10.50	40	40	S	2.03	2.03	19.55	1.95	0.78	31	31
12.00	49	49	S	1.94	1.94	22.46	2.25	0.73	36	36
13.50	65	65	S	1.94	1.94	25.37	2.54	0.69	45	45
15.00	92	92	S	2.04	2.04	28.43	2.84	0.65	60	60
16.50	80	80	S	2.04	2.04	31.49	3.15	0.62	50	50
18.00	100	100	C	2.04	2.04	34.55	3.45	NA	100	100
19.50	64	64	C	2.04	2.04	37.61	3.76	NA	64	64
21.00	76	76	C	2.04	2.04	40.67	4.07	NA	76	76
22.50	100	100	C	2.04	2.04	43.73	4.37	NA	100	100
24.00	100	100	C	2.04	2.04	46.79	4.68	NA	100	100
25.50	85	85	C	2.04	2.04	49.85	4.98	NA	85	85
27.00	64	64	S	2.04	2.04	52.91	5.29	0.44	28	28
28.50	100	100	C	2.04	2.04	55.97	5.60	NA	100	100
30.00	88	88	C	2.04	2.04	59.03	5.90	NA	88	88
31.50	100	100	S	2.04	2.04	62.09	6.21	0.39	39	39
33.00	100	100	S	2.04	2.04	65.15	6.51	0.38	38	38
34.50	100	100	S	2.04	2.04	68.21	6.82	0.36	36	36
36.00	100	100	S	2.04	2.04	71.27	7.13	0.35	35	35
37.50	80	80	C	2.04	2.04	74.33	7.43	NA	80	80
39.00	100	100	S	2.04	2.04	77.39	7.74	0.32	32	32
40.50	100	100	C	2.04	2.04	80.45	8.04	NA	100	100
42.00	100	100	S	2.04	2.04	83.51	8.35	0.29	29	29
43.50	100	100	C	2.04	2.04	86.57	8.66	NA	100	100
45.00	100	100	C	2.04	1.04	88.13	8.81	NA	100	100

Note:-

C - Cohesive Soil

S - Sandy Soil

NA - Not Applicable



SPT N-value Correction

K.C.T. Consultancy Services LLP, Ahmedabad.

Project : Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for GMRL

BH : 6 (GTP - 6/4)

GWT depth below EGL (m) 45.00

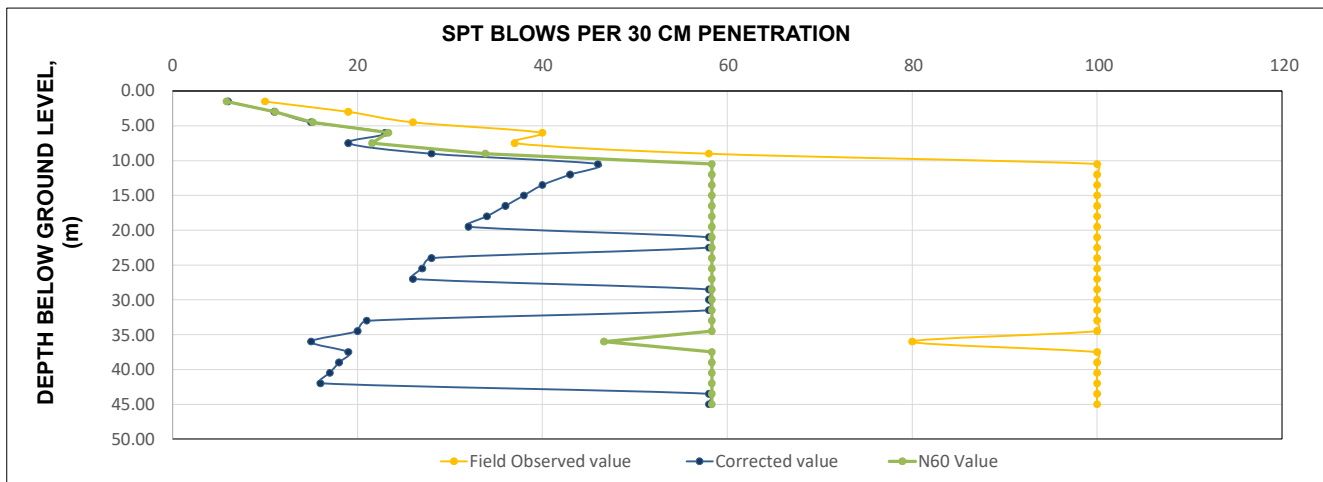
Depth (d), m	Field SPT (N _R)	Energy Correction (N ₆₀)	Type of Soil	Bulk unit weight (γ) (t/m ³)	Submerged unit weight (γ') (t/m ³)	Effective Overburden Pressure (σ') , (t/m ²)	Effective Overburden Pressure (σ') , (kg/cm ²)	Overburden correction Factor	Corrected SPT (N') value for overburden (N ₁₆₀)	Final Corrected value after Dilatancy Corrections (N ₁₆₀)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1.50	10	6	C	1.81	1.81	2.72	0.27	NA	6	6
3.00	19	11	C	1.81	1.81	5.43	0.54	NA	11	11
4.50	26	15	C	1.81	1.81	8.15	0.81	NA	15	15
6.00	40	23	S	1.85	1.85	10.92	1.09	0.97	23	23
7.50	37	22	S	1.85	1.85	13.70	1.37	0.90	19	19
9.00	58	34	S	1.85	1.85	16.47	1.65	0.83	28	28
10.50	100	58	S	1.85	1.85	19.25	1.92	0.78	46	46
12.00	100	58	S	2.10	2.10	22.40	2.24	0.73	43	43
13.50	100	58	S	2.10	2.10	25.55	2.55	0.69	40	40
15.00	100	58	S	2.05	2.05	28.62	2.86	0.65	38	38
16.50	100	58	S	2.05	2.05	31.70	3.17	0.62	36	36
18.00	100	58	S	2.15	2.15	34.92	3.49	0.58	34	34
19.50	100	58	S	2.15	2.15	38.15	3.81	0.55	32	32
21.00	100	58	C	2.15	2.15	41.37	4.14	NA	58	58
22.50	100	58	C	2.15	2.15	44.60	4.46	NA	58	58
24.00	100	58	S	2.15	2.15	47.82	4.78	0.48	28	28
25.50	100	58	S	2.15	2.15	51.05	5.10	0.46	27	27
27.00	100	58	S	2.15	2.15	54.27	5.43	0.44	26	26
28.50	100	58	C	2.15	2.15	57.50	5.75	NA	58	58
30.00	100	58	C	2.15	2.15	60.72	6.07	NA	58	58
31.50	100	58	C	2.15	2.15	63.95	6.39	NA	58	58
33.00	100	58	S	2.15	2.15	67.17	6.72	0.36	21	21
34.50	100	58	S	2.15	2.15	70.40	7.04	0.35	20	20
36.00	80	47	S	2.15	2.15	73.62	7.36	0.33	15	15
37.50	100	58	S	2.15	2.15	76.85	7.68	0.32	19	19
39.00	100	58	S	2.15	2.15	80.07	8.01	0.31	18	18
40.50	100	58	S	2.15	2.15	83.30	8.33	0.29	17	17
42.00	100	58	S	2.15	2.15	86.52	8.65	0.28	16	16
43.50	100	58	C	2.15	2.15	89.75	8.97	NA	58	58
45.00	100	58	C	2.15	1.15	91.47	9.15	NA	58	58

Note:-

C - Cohesive Soil

S - Sandy Soil

NA - Not Applicable



SPT N-value Correction

K.C.T. Consultancy Services LLP, Ahmedabad.

Project : Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for GMRL

BH : 7 (GTP - 6/2)

GWT depth below EGL (m) 45.00

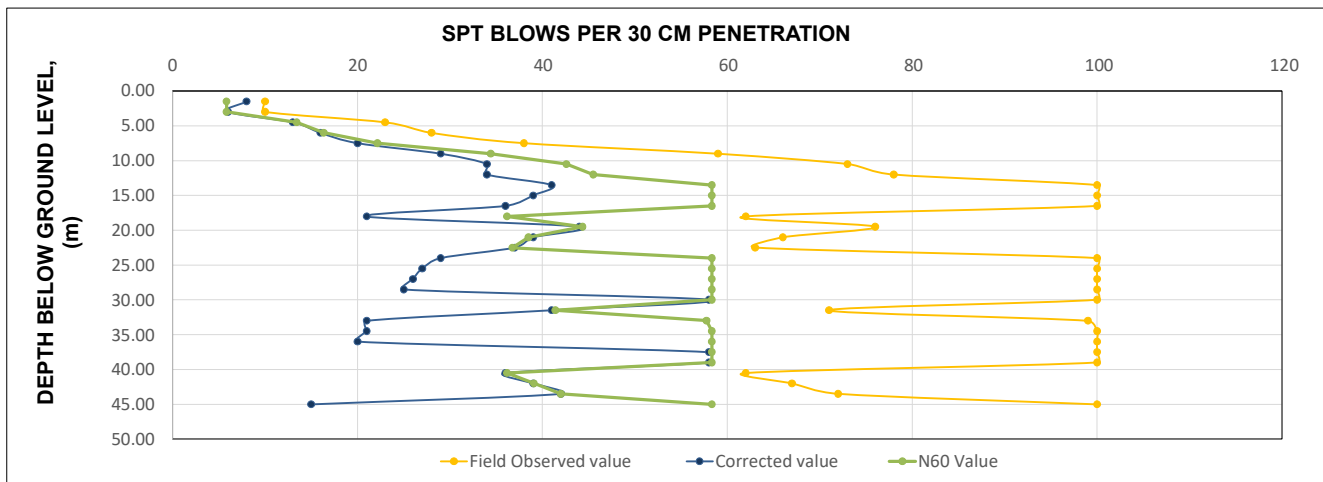
Depth (d), m	Field SPT (N _R)	Energy Correction (N ₆₀)	Type of Soil	Bulk unit weight (γ) (t/m ³)	Submerged unit weight (γ') (t/m ³)	Effective Overburden Pressure (σ') , (t/m ²)	Effective Overburden Pressure (σ') , (kg/cm ²)	Overburden correction Factor	Corrected SPT (N') value for overburden (N ₁₆₀)	Final Corrected value after Dilatancy Corrections (N ₁₆₀)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1.50	10	6	S	1.75	1.75	2.63	0.26	1.45	8	8
3.00	10	6	C	1.75	1.75	5.25	0.53	NA	6	6
4.50	23	13	C	1.75	1.75	7.88	0.79	NA	13	13
6.00	28	16	S	1.76	1.76	10.52	1.05	0.98	16	16
7.50	38	22	S	1.76	1.76	13.16	1.32	0.91	20	20
9.00	59	34	S	1.87	1.87	15.96	1.60	0.85	29	29
10.50	73	43	S	1.87	1.87	18.77	1.88	0.79	34	34
12.00	78	46	S	2.05	2.05	21.84	2.18	0.74	34	34
13.50	100	58	S	2.05	2.05	24.92	2.49	0.70	41	41
15.00	100	58	S	2.10	2.10	28.07	2.81	0.66	39	39
16.50	100	58	S	2.10	2.10	31.22	3.12	0.62	36	36
18.00	62	36	S	2.08	2.08	34.34	3.43	0.59	21	21
19.50	76	44	C	2.08	2.08	37.46	3.75	NA	44	44
21.00	66	39	C	2.07	2.07	40.56	4.06	NA	39	39
22.50	63	37	C	2.07	2.07	43.67	4.37	NA	37	37
24.00	100	58	S	2.07	2.07	46.77	4.68	0.49	29	29
25.50	100	58	S	2.07	2.07	49.88	4.99	0.46	27	27
27.00	100	58	S	2.07	2.07	52.98	5.30	0.44	26	26
28.50	100	58	S	2.07	2.07	56.09	5.61	0.43	25	25
30.00	100	58	C	2.07	2.07	59.19	5.92	NA	58	58
31.50	71	41	C	2.07	2.07	62.30	6.23	NA	41	41
33.00	99	58	S	2.07	2.07	65.40	6.54	0.37	21	21
34.50	100	58	S	2.07	2.07	68.51	6.85	0.36	21	21
36.00	100	58	S	2.07	2.07	71.61	7.16	0.34	20	20
37.50	100	58	C	2.07	2.07	74.72	7.47	NA	58	58
39.00	100	58	C	2.07	2.07	77.82	7.78	NA	58	58
40.50	62	36	C	2.07	2.07	80.93	8.09	NA	36	36
42.00	67	39	C	2.07	2.07	84.03	8.40	NA	39	39
43.50	72	42	C	2.07	2.07	87.14	8.71	NA	42	42
45.00	100	58	S	2.07	1.07	88.74	8.87	0.27	16	15

Note:-

C - Cohesive Soil

S - Sandy Soil

NA - Not Applicable



SPT N-value Correction

K.C.T. Consultancy Services LLP, Ahmedabad.

Project : Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for GMRL

BH : 8 (GTP 06-2/08)

GWT depth below EGL (m) 45.00

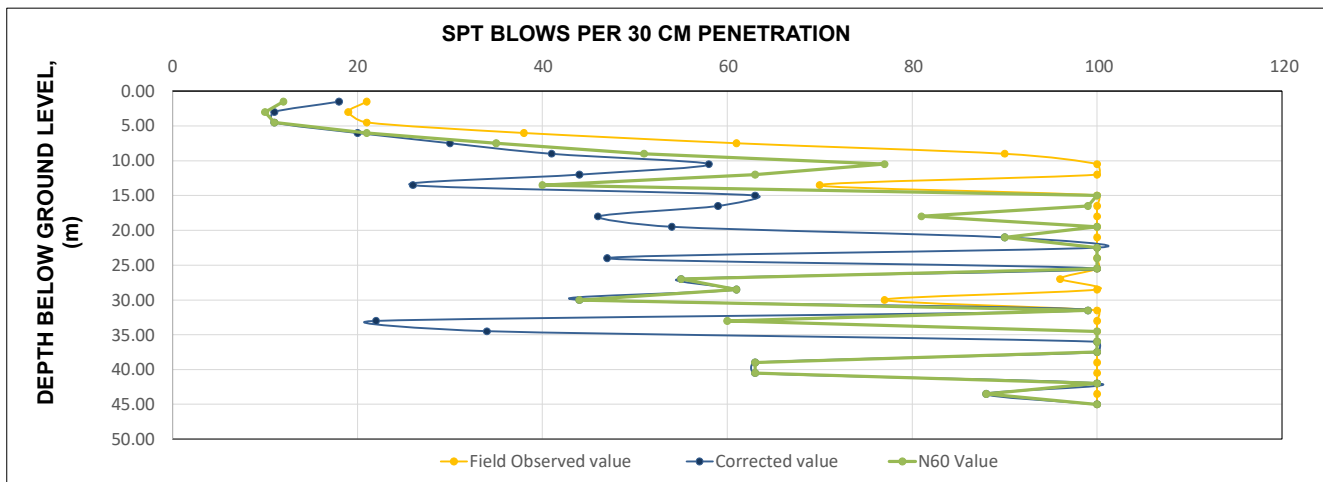
Depth (d), m	Field SPT (N _R)	Energy Correction (N ₆₀)	Type of Soil	Bulk unit weight (γ) (t/m ³)	Submerged unit weight (γ') (t/m ³)	Effective Overburden Pressure (σ') (t/m ²)	Effective Overburden Pressure (σ') (kg/cm ²)	Overburden correction Factor	Corrected SPT (N') value for overburden (N ₁₆₀)	Final Corrected value after Dilatancy Corrections (N ₁₆₀)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1.50	21	12	S	1.65	1.65	2.48	0.25	1.47	18	18
3.00	19	10	S	1.65	1.65	7.43	0.74	1.10	11	11
4.50	21	11	S	1.65	1.65	9.90	0.99	1.01	11	11
6.00	38	21	S	1.78	1.78	12.57	1.26	0.93	20	20
7.50	61	35	S	1.78	1.78	15.24	1.52	0.86	30	30
9.00	90	51	S	2.05	2.05	18.32	1.83	0.80	41	41
10.50	100	77	S	2.05	2.05	21.39	2.14	0.75	58	58
12.00	100	63	S	2.05	2.05	24.47	2.45	0.70	44	44
13.50	70	40	S	2.05	2.05	27.54	2.75	0.66	26	26
15.00	100	100	S	1.96	1.96	30.48	3.05	0.63	63	63
16.50	100	99	S	1.96	1.96	33.42	3.34	0.60	59	59
18.00	100	81	S	2.15	2.15	36.65	3.66	0.57	46	46
19.50	100	100	S	2.15	2.15	39.87	3.99	0.54	54	54
21.00	100	90	C	2.15	2.15	43.10	4.31	NA	90	90
22.50	100	100	C	2.15	2.15	46.32	4.63	NA	100	100
24.00	100	100	S	2.15	2.15	49.55	4.95	0.47	47	47
25.50	100	100	C	2.15	2.15	52.77	5.28	NA	100	100
27.00	96	55	C	2.15	2.15	56.00	5.60	NA	55	55
28.50	100	61	C	2.15	2.15	59.22	5.92	NA	61	61
30.00	77	44	C	2.15	2.15	62.45	6.24	NA	44	44
31.50	100	99	C	2.15	2.15	65.67	6.57	NA	99	99
33.00	100	60	S	2.15	2.15	68.90	6.89	0.36	22	22
34.50	100	100	S	2.15	2.15	72.12	7.21	0.34	34	34
36.00	100	100	C	2.15	2.15	75.35	7.53	NA	100	100
37.50	100	100	C	2.15	2.15	78.57	7.86	NA	100	100
39.00	100	63	C	2.15	2.15	81.80	8.18	NA	63	63
40.50	100	63	C	2.15	2.15	85.02	8.50	NA	63	63
42.00	100	100	C	2.15	2.15	88.25	8.82	NA	100	100
43.50	100	88	C	2.15	2.15	91.47	9.15	NA	88	88
45.00	100	100	C	2.15	1.15	93.20	9.32	NA	100	100

Note:-

C - Cohesive Soil

S - Sandy Soil

NA - Not Applicable



SPT N-value Correction

K.C.T. Consultancy Services LLP, Ahmedabad.

Project : Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for GMRL

BH : 9 (Shahpur Station 6)

GWT depth below EGL (m)

45.00

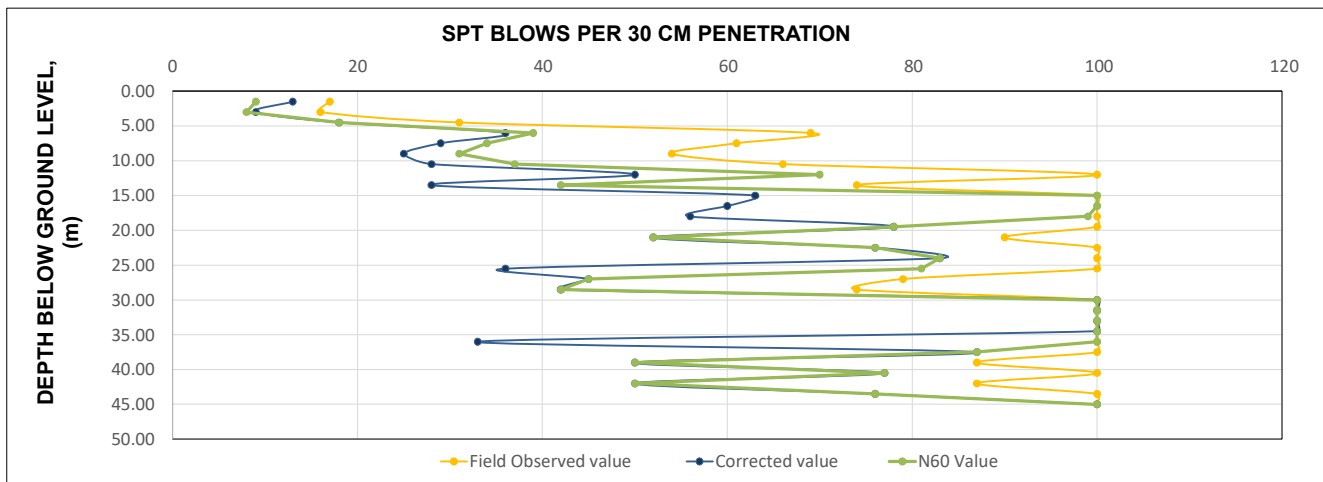
Depth (d), m	Field SPT (N _R)	Energy Correction (N ₆₀)	Type of Soil	Bulk unit weight (γ) (t/m ³)	Submerged unit weight (γ') (t/m ³)	Effective Overburden Pressure (σ') , (t/m ²)	Effective Overburden Pressure (σ') , (kg/cm ²)	Overburden correction Factor	Corrected SPT (N') value for overburden (N ₁₆₀)	Final Corrected value after Dilatancy Corrections (N ₁₆₀)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1.50	17	9	S	1.61	1.61	2.42	0.24	1.48	13	13
3.00	16	8	S	1.61	1.61	7.25	0.72	1.11	9	9
4.50	31	18	S	1.61	1.61	9.66	0.97	1.01	18	18
6.00	69	39	S	1.90	1.90	12.51	1.25	0.93	36	36
7.50	61	34	S	1.90	1.90	15.36	1.54	0.86	29	29
9.00	54	31	S	1.86	1.86	18.15	1.82	0.80	25	25
10.50	66	37	S	1.86	1.86	20.94	2.09	0.75	28	28
12.00	100	70	S	2.01	2.01	23.96	2.40	0.71	50	50
13.50	74	42	S	2.01	2.01	26.97	2.70	0.67	28	28
15.00	100	100	S	2.16	2.16	30.21	3.02	0.63	63	63
16.50	100	100	S	2.16	2.16	33.45	3.35	0.60	60	60
18.00	100	99	S	2.14	2.14	36.66	3.67	0.57	56	56
19.50	100	78	C	2.14	2.14	39.87	3.99	NA	78	78
21.00	90	52	C	2.14	2.14	43.08	4.31	NA	52	52
22.50	100	76	C	2.14	2.14	46.29	4.63	NA	76	76
24.00	100	83	C	2.14	2.14	49.50	4.95	NA	83	83
25.50	100	81	S	2.14	2.14	52.71	5.27	0.45	36	36
27.00	79	45	C	2.14	2.14	55.92	5.59	NA	45	45
28.50	74	42	C	2.14	2.14	59.13	5.91	NA	42	42
30.00	100	100	C	2.14	2.14	62.34	6.23	NA	100	100
31.50	100	100	C	2.14	2.14	65.55	6.56	NA	100	100
33.00	100	100	C	2.14	2.14	68.76	6.88	NA	100	100
34.50	100	100	C	2.14	2.14	71.97	7.20	NA	100	100
36.00	100	100	S	2.14	2.14	75.18	7.52	0.33	33	33
37.50	100	87	C	2.14	2.14	78.39	7.84	NA	87	87
39.00	87	50	C	2.14	2.14	81.60	8.16	NA	50	50
40.50	100	77	C	2.14	2.14	84.81	8.48	NA	77	77
42.00	87	50	C	2.14	2.14	88.02	8.80	NA	50	50
43.50	100	76	C	2.14	2.14	91.23	9.12	NA	76	76
45.00	100	100	C	2.14	1.14	92.94	9.29	NA	100	100

Note:-

C - Cohesive Soil

S - Sandy Soil

NA - Not Applicable



SPT N-value Correction

K.C.T. Consultancy Services LLP, Ahmedabad.

Project : Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for GMRL

BH : 10 (Shahpur Station 4)

GWT depth below EGL (m) 45.00

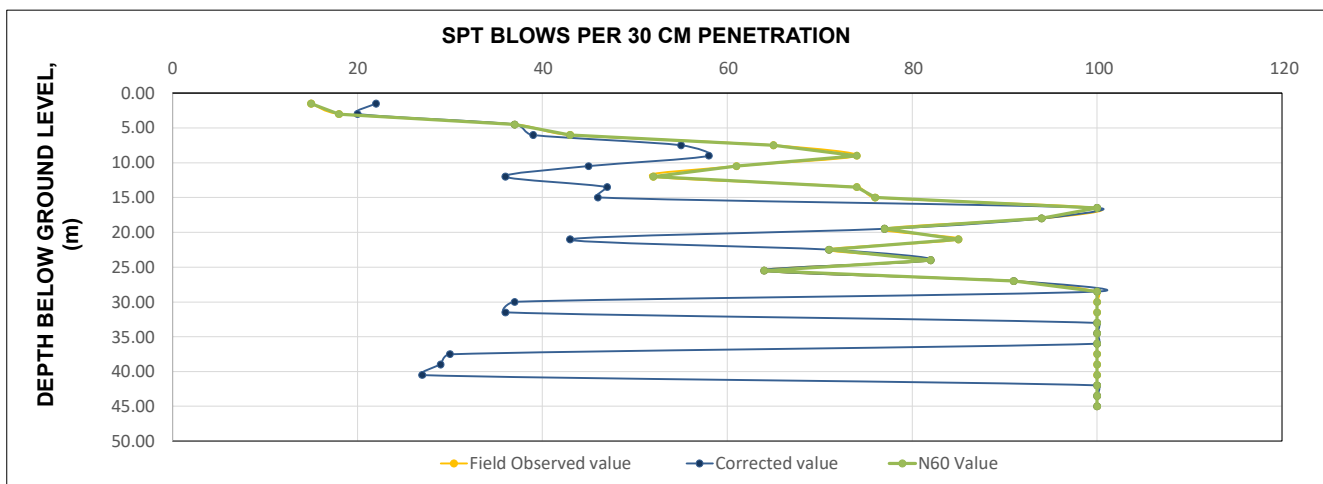
Depth (d), m	Field SPT (N _R)	Energy Correction (N ₆₀)	Type of Soil	Bulk unit weight (γ) (t/m ³)	Submerged unit weight (γ') (t/m ³)	Effective Overburden Pressure (σ') (t/m ²)	Effective Overburden Pressure (σ') (kg/cm ²)	Overburden correction Factor	Corrected SPT (N') value for overburden (N ₁₆₀)	Final Corrected value after Dilatancy Corrections (N ₁₆₀)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1.50	15	15	S	1.70	1.70	2.55	0.26	1.46	22	22
3.00	18	18	S	1.70	1.70	7.65	0.77	1.09	20	20
4.50	37	37	S	1.70	1.70	10.20	1.02	1.00	37	37
6.00	43	43	S	1.99	1.99	13.19	1.32	0.91	39	39
7.50	65	65	S	1.99	1.99	16.17	1.62	0.84	55	55
9.00	74	74	S	2.10	2.10	19.32	1.93	0.78	58	58
10.50	61	61	S	2.10	2.10	22.47	2.25	0.73	45	45
12.00	52	52	S	2.20	2.20	25.77	2.58	0.69	36	36
13.50	74	74	S	2.20	2.20	29.07	2.91	0.64	47	47
15.00	76	76	S	2.19	2.19	32.36	3.24	0.61	46	46
16.50	100	100	C	2.19	2.19	35.64	3.56	NA	100	100
18.00	94	94	C	2.19	2.19	38.93	3.89	NA	94	94
19.50	77	77	C	2.19	2.19	42.21	4.22	NA	77	77
21.00	85	85	S	2.19	2.19	45.50	4.55	0.50	43	43
22.50	71	71	C	2.19	2.19	48.78	4.88	NA	71	71
24.00	82	82	C	2.19	2.19	52.07	5.21	NA	82	82
25.50	64	64	C	2.19	2.19	55.35	5.54	NA	64	64
27.00	91	91	C	2.19	2.19	58.64	5.86	NA	91	91
28.50	100	100	C	2.19	2.19	61.92	6.19	NA	100	100
30.00	100	100	S	2.19	2.19	65.21	6.52	0.37	37	37
31.50	100	100	S	2.19	2.19	68.49	6.85	0.36	36	36
33.00	100	100	C	2.19	2.19	71.78	7.18	NA	100	100
34.50	100	100	C	2.19	2.19	75.06	7.51	NA	100	100
36.00	100	100	C	2.19	2.19	78.35	7.83	NA	100	100
37.50	100	100	S	2.19	2.19	81.63	8.16	0.30	30	30
39.00	100	100	S	2.19	2.19	84.91	8.49	0.29	29	29
40.50	100	100	S	2.19	2.19	88.20	8.82	0.27	27	27
42.00	100	100	C	2.19	2.19	91.48	9.15	NA	100	100
43.50	100	100	C	2.19	2.19	94.77	9.48	NA	100	100
45.00	100	100	C	2.19	1.19	96.55	9.66	NA	100	100

Note:-

C - Cohesive Soil

S - Sandy Soil

NA - Not Applicable



SPT N-value Correction**K.C.T. Consultancy Services LLP, Ahmedabad.**

Project : Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for GMRL

BH : 11 (GP 3 / 17)

GWT depth below EGL (m) 45.00

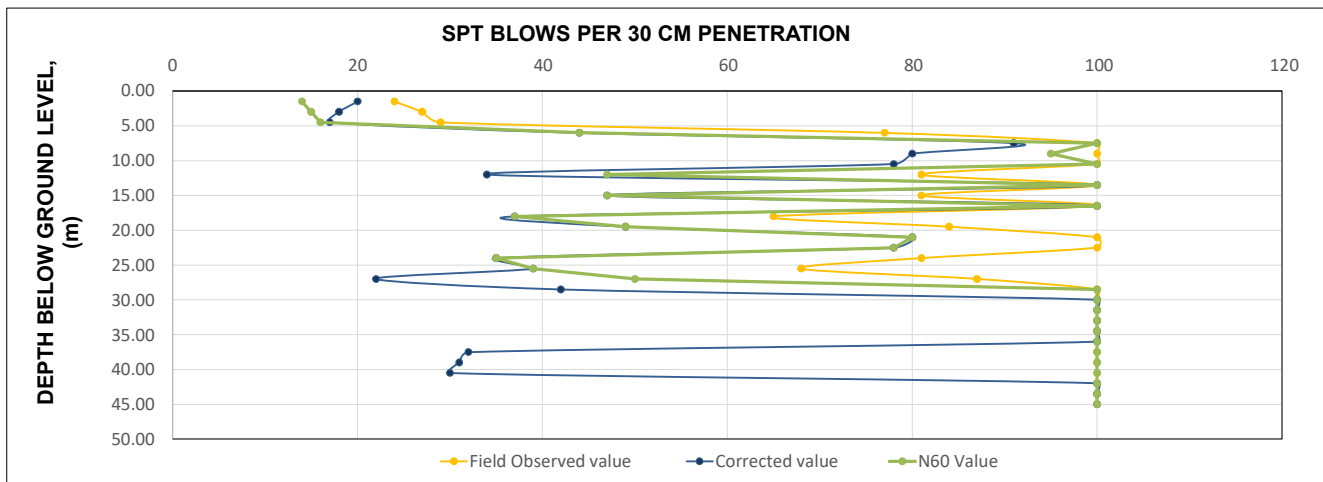
Depth (d), m	Field SPT (N _R)	Energy Correction (N ₆₀)	Type of Soil	Bulk unit weight (γ) (t/m ³)	Submerged unit weight (γ') (t/m ³)	Effective Overburden Pressure (σ') , (t/m ²)	Effective Overburden Pressure (σ') , (kg/cm ²)	Overburden correction Factor	Corrected SPT (N') value for overburden (N ₁₆₀)	Final Corrected value after Dilatancy Corrections (N ₁₆₀)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1.50	24	14	S	1.69	1.69	2.54	0.25	1.46	20	20
3.00	27	15	S	1.69	1.69	5.07	0.51	1.23	18	18
4.50	29	16	S	1.69	1.69	7.61	0.76	1.09	17	17
6.00	77	44	S	1.81	1.81	10.32	1.03	0.99	44	44
7.50	100	100	S	1.81	1.81	13.04	1.30	0.91	91	91
9.00	100	95	S	2.16	2.16	16.28	1.63	0.84	80	80
10.50	100	100	S	2.16	2.16	19.52	1.95	0.78	78	78
12.00	81	47	S	2.20	2.20	22.82	2.28	0.73	34	34
13.50	100	100	C	2.20	2.20	26.12	2.61	NA	100	100
15.00	81	47	C	2.12	2.12	29.30	2.93	NA	47	47
16.50	100	100	C	2.12	2.12	32.48	3.25	NA	100	100
18.00	65	37	C	2.03	2.03	35.52	3.55	NA	37	37
19.50	84	49	C	2.03	2.03	38.57	3.86	NA	49	49
21.00	100	80	C	2.03	2.03	41.61	4.16	NA	80	80
22.50	100	78	C	2.03	2.03	44.66	4.47	NA	78	78
24.00	81	35	C	2.03	2.03	47.70	4.77	NA	35	35
25.50	68	39	C	2.09	2.09	50.84	5.08	NA	39	39
27.00	87	50	S	2.09	2.09	53.97	5.40	0.44	22	22
28.50	100	100	S	2.09	2.09	57.11	5.71	0.42	42	42
30.00	100	100	C	2.09	2.09	60.24	6.02	NA	100	100
31.50	100	100	C	2.09	2.09	63.38	6.34	NA	100	100
33.00	100	100	C	2.09	2.09	66.51	6.65	NA	100	100
34.50	100	100	C	2.09	2.09	69.65	6.96	NA	100	100
36.00	100	100	C	2.09	2.09	72.78	7.28	NA	100	100
37.50	100	100	S	2.09	2.09	75.92	7.59	0.32	32	32
39.00	100	100	S	2.09	2.09	79.05	7.91	0.31	31	31
40.50	100	100	S	2.09	2.09	82.19	8.22	0.30	30	30
42.00	100	100	C	2.09	2.09	85.32	8.53	NA	100	100
43.50	100	100	C	2.09	2.09	88.46	8.85	NA	100	100
45.00	100	100	C	2.09	1.09	90.09	9.01	NA	100	100

Note:-

C - Cohesive Soil

S - Sandy Soil

NA - Not Applicable



SPT N-value Correction

K.C.T. Consultancy Services LLP, Ahmedabad.

Project : Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for GMRL

BH : 12 (GPP 3 / 19)

GWT depth below EGL (m)

45.00

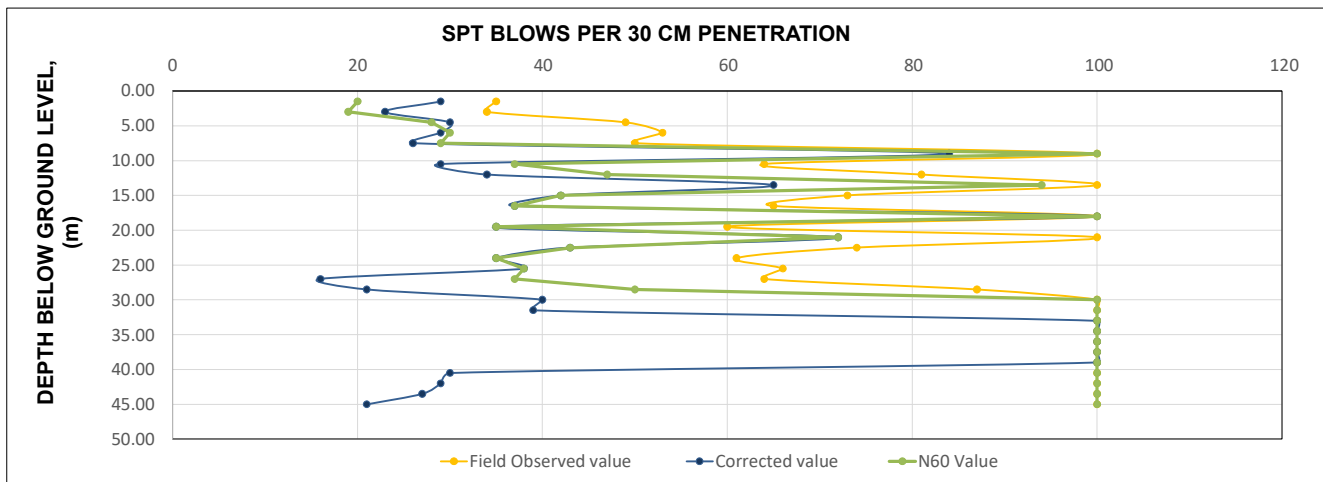
Depth (d), m	Field SPT (N _R)	Energy Correction (N ₆₀)	Type of Soil	Bulk unit weight (γ) (t/m ³)	Submerged unit weight (γ') (t/m ³)	Effective Overburden Pressure (σ') (t/m ²)	Effective Overburden Pressure (σ') (kg/cm ²)	Overburden correction Factor	Corrected SPT (N') value for overburden (N ₁₆₀)	Final Corrected value after Dilatancy Corrections (N ₁₆₀)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1.50	35	20	S	1.78	1.78	2.67	0.27	1.44	29	29
3.00	34	19	S	1.78	1.78	5.34	0.53	1.21	23	23
4.50	49	28	S	1.78	1.78	8.01	0.80	1.08	30	30
6.00	53	30	S	1.83	1.83	10.76	1.08	0.98	29	29
7.50	50	29	S	1.83	1.83	13.50	1.35	0.90	26	26
9.00	100	100	S	1.93	1.93	16.40	1.64	0.84	84	84
10.50	64	37	S	1.93	1.93	19.29	1.93	0.78	29	29
12.00	81	47	S	1.96	1.96	22.23	2.22	0.73	34	34
13.50	100	94	S	1.96	1.96	25.17	2.52	0.69	65	65
15.00	73	42	C	2.05	2.05	28.25	2.82	NA	42	42
16.50	65	37	C	2.05	2.05	31.32	3.13	NA	37	37
18.00	100	100	C	2.11	2.11	34.49	3.45	NA	100	100
19.50	60	35	C	2.11	2.11	37.65	3.77	NA	35	35
21.00	100	72	C	2.11	2.11	40.82	4.08	NA	72	72
22.50	74	43	C	2.11	2.11	43.98	4.40	NA	43	43
24.00	61	35	C	2.11	2.11	47.15	4.71	NA	35	35
25.50	66	38	C	2.11	2.11	50.31	5.03	NA	38	38
27.00	64	37	S	2.11	2.11	53.48	5.35	0.44	16	16
28.50	87	50	S	2.11	2.11	56.64	5.66	0.42	21	21
30.00	100	100	S	2.11	2.11	59.81	5.98	0.40	40	40
31.50	100	100	S	2.11	2.11	62.97	6.30	0.39	39	39
33.00	100	100	C	2.11	2.11	66.14	6.61	NA	100	100
34.50	100	100	C	2.11	2.11	69.30	6.93	NA	100	100
36.00	100	100	C	2.11	2.11	72.47	7.25	NA	100	100
37.50	100	100	C	2.11	2.11	75.63	7.56	NA	100	100
39.00	100	100	C	2.11	2.11	78.80	7.88	NA	100	100
40.50	100	100	S	2.11	2.11	81.96	8.20	0.30	30	30
42.00	100	100	S	2.11	2.11	85.13	8.51	0.29	29	29
43.50	100	100	S	2.11	2.11	88.29	8.83	0.27	27	27
45.00	100	100	S	2.11	1.11	89.96	9.00	0.27	27	21

Note:-

C - Cohesive Soil

S - Sandy Soil

NA - Not Applicable



SPT N-value Correction

K.C.T. Consultancy Services LLP, Ahmedabad.

Project : Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for GMRL

BH : 13 (GP 5 / 21)

GWT depth below EGL (m) 45.00

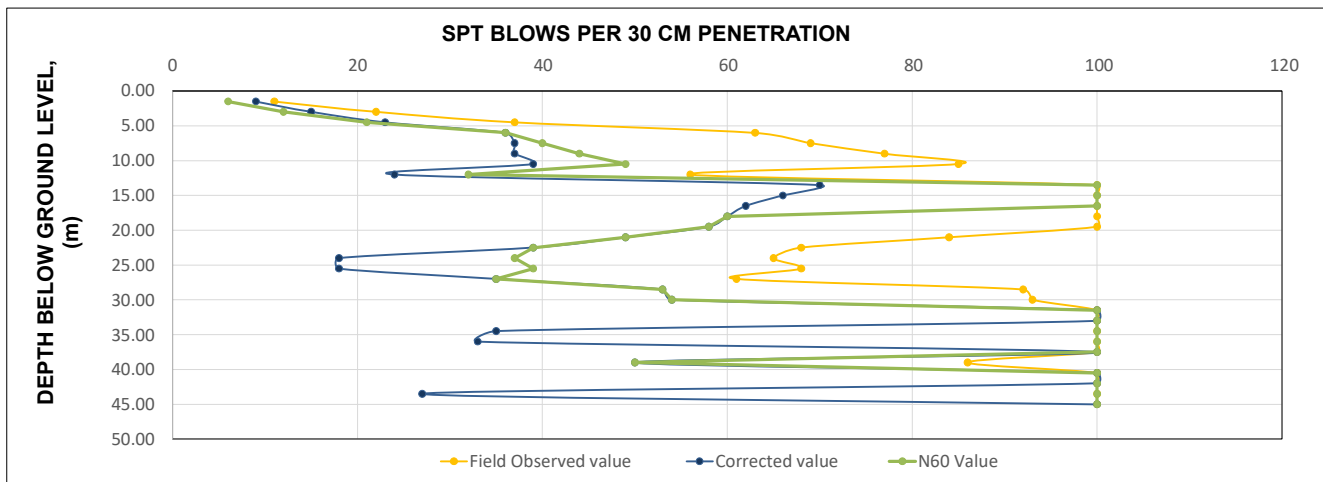
Depth (d), m	Field SPT (N _R)	Energy Correction (N ₆₀)	Type of Soil	Bulk unit weight (γ) (t/m ³)	Submerged unit weight (γ') (t/m ³)	Effective Overburden Pressure (σ') (t/m ²)	Effective Overburden Pressure (σ') (kg/cm ²)	Overburden correction Factor	Corrected SPT (N') value for overburden (N ₁₆₀)	Final Corrected value after Dilatancy Corrections (N ₁₆₀)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1.50	11	6	S	1.59	1.59	2.39	0.24	1.48	9	9
3.00	22	12	S	1.59	1.59	4.77	0.48	1.25	15	15
4.50	37	21	S	1.59	1.59	7.16	0.72	1.11	23	23
6.00	63	36	S	1.89	1.89	9.99	1.00	1.00	36	36
7.50	69	40	S	1.89	1.89	12.83	1.28	0.92	37	37
9.00	77	44	S	1.96	1.96	15.77	1.58	0.85	37	37
10.50	85	49	S	1.96	1.96	18.71	1.87	0.79	39	39
12.00	56	32	S	1.96	1.96	21.65	2.16	0.74	24	24
13.50	100	100	S	1.96	1.96	24.59	2.46	0.70	70	70
15.00	100	100	S	2.20	2.20	27.89	2.79	0.66	66	66
16.50	100	100	S	2.20	2.20	31.19	3.12	0.62	62	62
18.00	100	60	C	2.19	2.19	34.47	3.45	NA	60	60
19.50	100	58	C	2.19	2.19	37.76	3.78	NA	58	58
21.00	84	49	C	2.19	2.19	41.04	4.10	NA	49	49
22.50	68	39	C	2.19	2.19	44.33	4.43	NA	39	39
24.00	65	37	S	2.19	2.19	47.61	4.76	0.48	18	18
25.50	68	39	S	2.19	2.19	50.90	5.09	0.46	18	18
27.00	61	35	C	2.19	2.19	54.18	5.42	NA	35	35
28.50	92	53	C	2.19	2.19	57.47	5.75	NA	53	53
30.00	93	54	C	2.19	2.19	60.75	6.08	NA	54	54
31.50	100	100	C	2.19	2.19	64.04	6.40	NA	100	100
33.00	100	100	C	2.19	2.19	67.32	6.73	NA	100	100
34.50	100	100	S	2.19	2.19	70.61	7.06	0.35	35	35
36.00	100	100	S	2.19	2.19	73.89	7.39	0.33	33	33
37.50	100	100	C	2.19	2.19	77.18	7.72	NA	100	100
39.00	86	50	C	2.19	2.19	80.46	8.05	NA	50	50
40.50	100	100	C	2.19	2.19	83.75	8.37	NA	100	100
42.00	100	100	C	2.19	2.19	87.03	8.70	NA	100	100
43.50	100	100	S	2.19	2.19	90.32	9.03	0.27	27	27
45.00	100	100	C	2.19	1.19	92.10	9.21	NA	100	100

Note:-

C - Cohesive Soil

S - Sandy Soil

NA - Not Applicable



SPT N-value Correction

K.C.T. Consultancy Services LLP, Ahmedabad.

Project : Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for GMRL

BH : 14 (GP 3 / 29)

GWT depth below EGL (m) 45.00

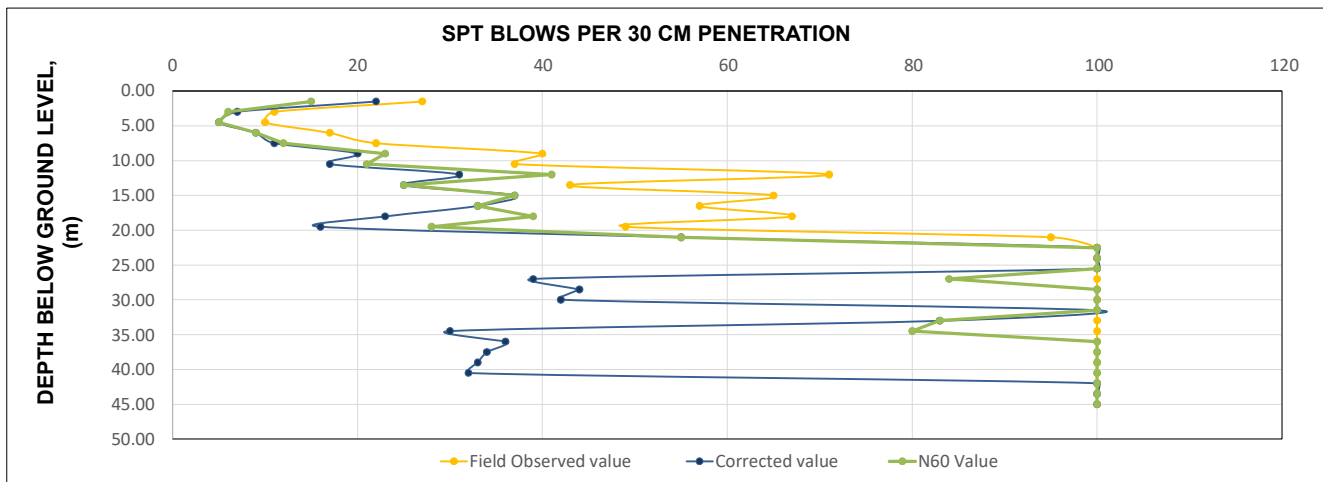
Depth (d), m	Field SPT (N _R)	Energy Correction (N ₆₀)	Type of Soil	Bulk unit weight (γ) (t/m ³)	Submerged unit weight (γ') (t/m ³)	Effective Overburden Pressure (σ') (t/m ²)	Effective Overburden Pressure (σ') (kg/cm ²)	Overburden correction Factor	Corrected SPT (N') value for overburden (N ₁₆₀)	Final Corrected value after Dilatancy Corrections (N ₁₆₀)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1.50	27	15	S	1.62	1.62	2.43	0.24	1.47	22	22
3.00	11	6	S	1.62	1.62	4.86	0.49	1.24	7	7
4.50	10	5	C	1.62	1.62	7.29	0.73	NA	5	5
6.00	17	9	S	1.70	1.70	9.84	0.98	1.01	9	9
7.50	22	12	S	1.70	1.70	12.39	1.24	0.93	11	11
9.00	40	23	S	1.87	1.87	15.20	1.52	0.86	20	20
10.50	37	21	S	1.87	1.87	18.00	1.80	0.81	17	17
12.00	71	41	S	2.01	2.01	21.02	2.10	0.75	31	31
13.50	43	25	C	2.01	2.01	24.03	2.40	NA	25	25
15.00	65	37	C	2.01	2.01	27.05	2.70	NA	37	37
16.50	57	33	C	2.01	2.01	30.06	3.01	NA	33	33
18.00	67	39	S	1.98	1.98	33.03	3.30	0.60	23	23
19.50	49	28	S	1.98	1.98	36.00	3.60	0.57	16	16
21.00	95	55	C	1.97	1.97	38.96	3.90	NA	55	55
22.50	100	100	C	1.97	1.97	41.91	4.19	NA	100	100
24.00	100	100	C	1.97	1.97	44.87	4.49	NA	100	100
25.50	100	100	C	1.97	1.97	47.82	4.78	NA	100	100
27.00	100	84	S	1.97	1.97	50.78	5.08	0.46	39	39
28.50	100	100	S	1.97	1.97	53.73	5.37	0.44	44	44
30.00	100	100	S	1.97	1.97	56.69	5.67	0.42	42	42
31.50	100	100	C	1.97	1.97	59.64	5.96	NA	100	100
33.00	100	83	C	1.97	1.97	62.60	6.26	NA	83	83
34.50	100	80	S	1.97	1.97	65.55	6.56	0.37	30	30
36.00	100	100	S	1.97	1.97	68.51	6.85	0.36	36	36
37.50	100	100	S	1.97	1.97	71.46	7.15	0.34	34	34
39.00	100	100	S	1.97	1.97	74.42	7.44	0.33	33	33
40.50	100	100	S	1.97	1.97	77.37	7.74	0.32	32	32
42.00	100	100	C	1.97	1.97	80.33	8.03	NA	100	100
43.50	100	100	C	1.97	1.97	83.28	8.33	NA	100	100
45.00	100	100	C	1.97	0.97	84.74	8.47	NA	100	100

Note:-

C - Cohesive Soil

S - Sandy Soil

NA - Not Applicable



SPT N-value Correction

K.C.T. Consultancy Services LLP, Ahmedabad.

Project : Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for GMRL

BH : 15 (GP 3 / 39)

GWT depth below EGL (m) 45.00

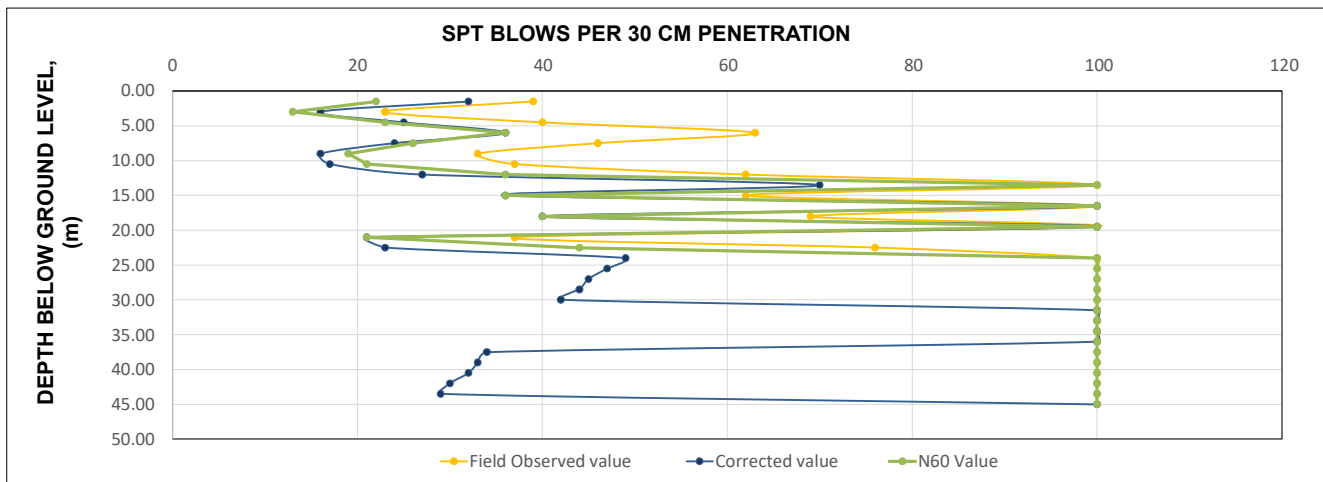
Depth (d), m	Field SPT (N _R)	Energy Correction (N ₆₀)	Type of Soil	Bulk unit weight (γ) (t/m ³)	Submerged unit weight (γ') (t/m ³)	Effective Overburden Pressure (σ') , (t/m ²)	Effective Overburden Pressure (σ') , (kg/cm ²)	Overburden correction Factor	Corrected SPT (N') value for overburden (N ₁₆₀)	Final Corrected value after Dilatancy Corrections (N ₁₆₀)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1.50	39	22	S	1.69	1.69	2.54	0.25	1.46	32	32
3.00	23	13	S	1.69	1.69	5.07	0.51	1.23	16	16
4.50	40	23	S	1.69	1.69	7.61	0.76	1.09	25	25
6.00	63	36	S	1.88	1.88	10.43	1.04	0.99	36	36
7.50	46	26	S	1.88	1.88	13.25	1.32	0.91	24	24
9.00	33	19	S	1.79	1.79	15.93	1.59	0.85	16	16
10.50	37	21	S	1.79	1.79	18.62	1.86	0.79	17	17
12.00	62	36	S	1.90	1.90	21.47	2.15	0.75	27	27
13.50	100	100	S	1.90	1.90	24.32	2.43	0.70	70	70
15.00	62	36	C	2.10	2.10	27.47	2.75	NA	36	36
16.50	100	100	C	2.10	2.10	30.62	3.06	NA	100	100
18.00	69	40	C	2.05	2.05	33.69	3.37	NA	40	40
19.50	100	100	C	2.05	2.05	36.77	3.68	NA	100	100
21.00	37	21	C	2.02	2.02	39.80	3.98	NA	21	21
22.50	76	44	S	1.95	1.95	42.72	4.27	0.52	23	23
24.00	100	100	S	1.95	1.95	45.65	4.56	0.49	49	49
25.50	100	100	S	1.95	1.95	48.57	4.86	0.47	47	47
27.00	100	100	S	1.95	1.95	51.50	5.15	0.45	45	45
28.50	100	100	S	1.95	1.95	54.42	5.44	0.44	44	44
30.00	100	100	S	1.95	1.95	57.35	5.73	0.42	42	42
31.50	100	100	C	1.95	1.95	60.27	6.03	NA	100	100
33.00	100	100	C	1.95	1.95	63.20	6.32	NA	100	100
34.50	100	100	C	1.95	1.95	66.12	6.61	NA	100	100
36.00	100	100	C	1.95	1.95	69.05	6.90	NA	100	100
37.50	100	100	S	1.95	1.95	71.97	7.20	0.34	34	34
39.00	100	100	S	1.95	1.95	74.90	7.49	0.33	33	33
40.50	100	100	S	1.95	1.95	77.82	7.78	0.32	32	32
42.00	100	100	S	1.95	1.95	80.75	8.07	0.30	30	30
43.50	100	100	S	1.95	1.95	83.67	8.37	0.29	29	29
45.00	100	100	C	1.95	0.95	85.10	8.51	NA	100	100

Note:-

C - Cohesive Soil

S - Sandy Soil

NA - Not Applicable



RESULTS OF CHEMICAL ANALYSIS OF SOIL

Sr. No.	Borehole no.	Result			
		Depth(m)	pH	SO ₃ in %	Chloride (mg/l)
1	BH-1	2.00	6.14	0.17	70
2	BH-3	1.50	6.77	0.18	80
3	BH-4	2.00	6.36	0.15	75
4	BH-7	4.50	6.17	0.16	82
5	BH-8	1.50	6.72	0.18	74
6	BH-9	3.00	6.11	0.19	79
7	BH-11	2.00	6.10	0.20	80
8	BH-12	3.00	6.62	0.14	78
9	BH-14	2.00	6.62	0.16	90
10	BH-15	3.00	6.37	0.17	95

KCT Consultancy Services[®] LLP, Ahmedabad

RESULTS OF LABORATORY TEST

Project :- Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for GMRC

BH No. :- 1 (GTP - 6/14)

Co-Ordinate :- E - 261901, N - 2565232

Sr No	Depth of Sample m	Type of Sample	Field Bulk Density gm / cc	Field Dry Density gm / cc	Natural Moisture Content %	Specific Gravity	Grain Size Analysis				Consistency limits			Shrinkage Limit	Swelling Pressure Kg/cm ²	Free Swell Index %	Soil Classification	Shear Parameter		Unconfined Compression Test Kg/cm ²	UCS by Point Load Index in rock Kg/cm ²	Type of Shear Test	Consolidation Parameters			SPT N Value		Rock Quality Designation %	Void Ratio	Porosity %	
							Gravel %	Sand %	Silt %	Clay %	Liquid Limit %	Plastic Limit %	Plasticity Index %					Cohesion C Kg/cm ²	Angle of Internal Friction φ Degree				Compression Index C _c	Coefficient of Volume Compressibility m _v cm ² /kg	Pre-consolidation Pressure kg/cm ²	Observed	N 60 (ER 60 %)				
1	0.00	DS	-	-	-	-	0	56	26	18	29	14	15	-	-	-	SC	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	1.50	SPT	-	-	-	-	0	58	25	17	27	13	14	-	-	-	SC	-	-	-	-	-	-	-	-	7	7	-	-	-	-
3	2.00	UDS	1.61	1.48	8.64	2.65	0	56	31	13	28	16	12	-	-	-	SC	0.03	25	-	-	DSU	-	-	-	-	-	-	0.79	44.1	
4	3.00	SPT	-	-	-	-	2	54	30	14	24	14	10	-	-	-	SC	-	-	-	-	-	-	-	-	7	7	-	-	-	-
5	4.50	SPT	-	-	-	-	5	39	43	13	26	15	11	-	-	-	CL	-	-	-	-	-	-	-	-	19	19	-	-	-	-
6	5.00	UDS	1.83	1.65	10.61	2.66	5	38	40	17	29	14	15	-	-	-	CL	0.15	27	-	-	TCU	0.13	0.0117	1.19	-	-	-	0.61	37.8	
7	6.00	SPT	-	-	-	-	9	39	36	16	30	16	14	-	-	-	CL	-	-	-	-	-	-	-	-	24	24	-	-	-	-
8	7.50	SPT	-	-	-	-	6	56	25	13	24	13	11	-	-	-	SC	-	-	-	-	-	-	-	-	23	23	-	-	-	-
9	8.00	UDS	1.82	1.67	8.78	2.66	12	59	21	8	22	15	7	-	-	-	SM-SC	0.02	29	-	-	DSU	-	-	-	-	-	-	0.59	37.1	
10	9.00	SPT	-	-	-	-	2	75	15	8	21	15	6	-	-	-	SM-SC	-	-	-	-	-	-	-	-	28	28	-	-	-	-
11	10.50	SPT	-	-	-	-	16	66	12	6	20	14	6	-	-	-	SM-SC	-	-	-	-	-	-	-	-	72	72	-	-	-	-
12	11.00	Remoulded	2.08	1.96	6.18	2.67	2	76	12	10	24	17	7	-	-	-	SM-SC	0.04	32	-	-	DSU	-	-	-	-	-	-	0.36	26.6	
13	12.00	SPT	-	-	-	-	0	84	8	8	20	14	6	-	-	-	SM-SC	-	-	-	-	-	-	-	-	80	80	-	-	-	-
14	13.50	SPT	-	-	-	-	0	79	11	10	26	19	7	-	-	-	SM-SC	-	-	-	-	-	-	-	-	43	43	-	-	-	-
15	14.00	UDS	1.94	1.84	5.59	2.68	0	87	4	9	24	18	6	-	-	-	SM-SC	0.01	32	-	-	DSU	-	-	-	-	-	-	0.46	31.4	
16	15.00	SPT	-	-	-	-	0	73	19	8	25	18	7	-	-	-	SM-SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
17	16.50	SPT	-	-	-	-	12	54	20	14	30	16	14	-	-	-	SC	-	-	-	-	-	-	-	-	74	74	-	-	-	-
18	17.00	UDS	2.13	1.96	8.67	2.68	18	57	9	16	26	15	11	-	-	-	SC	0.08	30	-	-	DSU	-	-	-	-	-	-	0.37	26.9	
19	18.00	SPT	-	-	-	-	9	46	31	14	31	18	13	-	-	-	SC	-	-	-	-	-	-	-	-	61	61	-	-	-	-
20	19.50	SPT	-	-	-	-	0	29	48	23	41	21	20	-	-	-	CI	-	-	-	-	-	-	-	-	47	47	-	-	-	-
21	21.00	SPT	-	-	-	-	18	21	35	26	44	20	24	-	-	-	CI	-	-	-	-	-	-	-	-	77	77	-	-	-	-
22	22.50	SPT	-	-	-	-	0	48	34	18	36	20	16	-	-	-	CI	-	-	-	-	-	-	-	-	85	85	-	-	-	-
23	24.00	SPT	-	-	-	-	0	24	43	33	45	17	28	-	-	-	CI	-	-	-	-	-	-	-	-	43	43	-	-	-	-
24	25.00	UDS	2.01	1.81	10.82	2.67	20	24	27	29	39	14	25	-	-	-	CI	0.12	30	-	-	TCU	-	-	-	-	-	-	0.47	32.1	
25	25.50	SPT	-	-	-	-	9	39	26	26	38	15	23	-	-	-	CI	-	-	-	-	-	-	-	-	67	67	-	-	-	-
26	27.00	SPT	-	-	-	-	1	30	42	27	40	16	24	-	-	-	CI	-	-	-	-	-	-	-	-	47	47	-	-	-	-
27	28.00	UDS	2.05	1.83	11.97	2.66	0	15	57	28	43	18	25	-	-	-	CI	-	-	5.9	-	UCS	-	-	-	-	-	-	0.45	31.2	
28	28.50	SPT	-	-	-	-	0	21	56	23	39	19	20	-	-	-	CI	-	-	-	-	-	-	-	-	43	43	-	-	-	-
29	30.00	SPT	-	-	-	-	0	65	26	9	25	16	9	-	-	-	SC	-	-	-	-	-	-	-	-	95	95	-	-	-	-
30	31.50	SPT	-	-	-	-	0	86	13	1	NP	NP	NP	-	-	-	SM	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
31	33.00	SPT	-	-	-	-	2	68	19	11	21	13	8	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
32	34.50	SPT	-	-	-	-	7	59	21	13	25	14	11	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
33	36.00	SPT	-	-	-	-	0	24	56	20	37	19	18	-	-	-	CI	-	-	-	-	-	-	-	-	68	68	-	-	-	-
34	37.50	SPT	-	-	-	-	0	41	41	18	36	20	16	-	-	-	CI	-	-	-	-	-	-	-	-	69	69	-	-	-	-
35	39.00	SPT	-	-	-	-	0	76	17	7	21	16	5	-	-	-	SM	-	-	-	-	-	-	-	-	100	100	-	-	-	-
36	40.50	SPT	-	-	-	-	0	31	44	25	47	24	23	-	-	-	CI	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
37	42.00	SPT	-	-	-	-	2	17	52	29	49	23	26	-	-	-	CI	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
38	43.50	SPT	-	-	-	-	0	24	49	27	48	24	24	-	-	-	CI	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
39	45.00	SPT	-	-	-	-	0	38	35	27	44	21	23	-	-	-	CI	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-

UDS - Undisturbed Sample
DS - Disturbed Sample
SPT - Standard Penetration Tests
NP - Non Plastic

TUU - Triaxial Unconsolidated Undrained
TCU - Triaxial Consolidated Undrained
DSU - Direct Shear Test
UCS - Unconfined Compression Strength

RESULTS OF LABORATORY TEST

Project :- Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for GMRC

BH No. :- 2 (GP - 6/12)

Co-Ordinate :- E - 261900, N - 2565179

Sr No	Depth of Sample m	Type of Sample	Field Bulk Density gm / cc	Field Dry Density gm / cc	Natural Moisture Content %	Specific Gravity	Grain Size Analysis				Consistency limits			Shrinkage Limit	Swelling Pressure Kg/cm ²	Free Swell Index %	Soil Classification	Shear Parameter		Unconfined Compression Test Kg/cm ²	UCS by Point Load Index in rock Kg/cm ²	Type of Shear Test	Consolidation Parameters			SPT N Value		Rock Quality Designation %	Void Ratio	Porosity %	
							Gravel %	Sand %	Silt %	Clay %	Liquid Limit %	Plastic Limit %	Plasticity Index %					Cohesion C Kg/cm ²	Angle of Internal Friction φ Degree				Compression Index C _c	Coefficient of Volume Compressibility m _v cm ² /kg	Pre-consolidation Pressure kg/cm ²	Observed	N 60 (ER 60 %)				
1	0.00	DS	-	-	-	-	17	41	25	17	27	13	14	-	-	-	SC	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	1.50	SPT	-	-	-	-	0	59	27	14	26	15	11	-	-	-	SC	-	-	-	-	-	-	-	-	7	7	-	-	-	-
3	2.00	UDS	1.61	1.45	10.69	2.65	0	56	26	18	28	16	12	-	-	-	SC	0.04	25	-	-	DSU	-	-	-	-	-	-	0.82	45.1	-
4	3.00	SPT	-	-	-	-	0	54	29	17	24	13	11	-	-	-	SC	-	-	-	-	-	-	-	-	12	12	-	-	-	-
5	4.50	SPT	-	-	-	-	4	43	40	13	25	14	11	-	-	-	CL	-	-	-	-	-	-	-	-	14	14	-	-	-	-
6	5.00	UDS	1.79	1.61	11.36	2.65	2	38	45	15	27	13	14	-	-	-	CL	0.62	8	-	-	TUU	0.13	0.0157	0.83	-	-	-	0.65	39.3	-
7	6.00	SPT	-	-	-	-	11	44	33	12	24	14	10	-	-	-	SC	-	-	-	-	-	-	-	-	17	17	-	-	-	-
8	7.50	SPT	-	-	-	-	4	74	15	7	19	13	6	-	-	-	SM-SC	-	-	-	-	-	-	-	-	31	31	-	-	-	-
9	8.00	UDS	1.95	1.73	12.74	2.66	3	72	18	7	20	14	6	-	-	-	SM-SC	0.02	30	-	-	DSU	-	-	-	-	-	-	0.54	35.0	-
10	9.00	SPT	-	-	-	-	2	71	16	11	21	14	7	-	-	-	SM-SC	-	-	-	-	-	-	-	-	30	30	-	-	-	-
11	10.50	SPT	-	-	-	-	7	80	3	10	19	13	6	-	-	-	SM-SC	-	-	-	-	-	-	-	-	18	18	-	-	-	-
12	11.00	UDS	1.76	1.65	6.69	2.67	6	77	6	11	24	17	7	-	-	-	SM-SC	0.01	29	-	-	DSU	-	-	-	-	-	-	0.62	38.2	-
13	12.00	SPT	-	-	-	-	3	78	10	9	21	15	6	-	-	-	SM-SC	-	-	-	-	-	-	-	-	63	63	-	-	-	-
14	13.50	SPT	-	-	-	-	0	79	9	12	23	16	7	-	-	-	SM-SC	-	-	-	-	-	-	-	-	50	50	-	-	-	-
15	14.00	Remoulded	2.00	1.85	8.22	2.67	0	82	8	10	22	16	6	-	-	-	SM-SC	0.02	32	-	-	DSU	-	-	-	-	-	-	0.44	30.8	-
16	15.00	SPT	-	-	-	-	3	64	19	14	25	14	11	-	-	-	SC	-	-	-	-	-	-	-	-	56	56	-	-	-	-
17	16.50	SPT	-	-	-	-	6	56	16	22	31	15	16	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
18	17.00	UDS	2.10	1.94	8.18	2.66	7	48	15	30	34	14	20	-	-	-	SC	0.15	29	-	-	DSU	-	-	-	-	-	-	0.37	27.0	-
19	18.00	SPT	-	-	-	-	2	67	15	16	23	13	10	-	-	-	SC	-	-	-	-	-	-	-	-	70	70	-	-	-	-
20	19.50	SPT	-	-	-	-	7	23	48	22	38	19	19	-	-	-	CI	-	-	-	-	-	-	-	-	61	61	-	-	-	-
21	21.00	SPT	-	-	-	-	5	27	42	26	41	18	23	-	-	-	CI	-	-	-	-	-	-	-	-	53	53	-	-	-	-
22	22.00	UDS	2.07	1.85	12.17	2.65	0	13	67	20	39	22	17	-	-	-	CI	0.19	27	-	-	TCU	-	-	-	-	-	-	0.44	30.4	-
23	22.50	SPT	-	-	-	-	7	23	49	21	38	20	18	-	-	-	CI	-	-	-	-	-	-	-	-	69	69	-	-	-	-
24	24.00	SPT	-	-	-	-	2	41	37	20	36	19	17	-	-	-	CI	-	-	-	-	-	-	-	-	68	68	-	-	-	-
25	25.50	SPT	-	-	-	-	1	36	39	24	37	16	21	-	-	-	CI	-	-	-	-	-	-	-	-	44	44	-	-	-	-
26	26.00	UDS	2.04	1.82	12.35	2.67	5	39	27	29	40	15	25	-	-	-	CI	0.16	25	-	-	TCU	-	-	-	-	-	-	0.47	32.0	-
27	27.00	SPT	-	-	-	-	9	36	32	23	36	16	20	-	-	-	CI	-	-	-	-	-	-	-	-	85	85	-	-	-	-
28	28.50	SPT	-	-	-	-	6	24	45	25	40	18	22	-	-	-	CI	-	-	-	-	-	-	-	-	58	58	-	-	-	-
29	30.00	SPT	-	-	-	-	0	69	18	13	26	15	11	-	-	-	SC	-	-	-	-	-	-	-	-	64	64	-	-	-	-
30	31.50	SPT	-	-	-	-	10	66	18	6	21	16	5	-	-	-	SM	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
31	33.00	SPT	-	-	-	-	0	59	27	14	26	17	9	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
32	34.50	SPT	-	-	-	-	18	45	27	10	24	16	8	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
33	36.00	SPT	-	-	-	-	28	49	12	11	23	15	8	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
34	37.50	SPT	-	-	-	-	8	20	51	21	40	21	19	-	-	-	CI	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
35	39.00	SPT	-	-	-	-	0	74	21	5	21	17	4	-	-	-	SM	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
36	40.50	SPT	-	-	-	-	12	52	30	6	25	20	5	-	-	-	SM	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
37	42.00	SPT	-	-	-	-	2	15	55	28	45	21	24	-	-	-	CI	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
38	43.50	SPT	-	-	-	-	0	40	28	32	44	16	28	-	-	-	CI	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
39	45.00	SPT	-	-	-	-	0	36	30	34	45	15	30	-	-	-	CI	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-

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KCT Consultancy Services[®] LLP, Ahmedabad

RESULTS OF LABORATORY TEST

Project :- Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for GMRL

BH No. :- 3 (GP - 6/10)

Co-Ordinate :- E - 261896, N - 2565123

Sr No	Depth of Sample m	Type of Sample	Field Bulk Density gm / cc	Field Dry Density gm / cc	Natural Moisture Content %	Specific Gravity	Grain Size Analysis				Consistency limits			Shrinkage Limit %	Swelling Pressure Kg/cm ²	Free Swell Index %	Soil Classification	Shear Parameter		Unconfined Compression Test Kg/cm ²	UCS by Point Load Index in rock Kg/cm ²	Type of Shear Test	Consolidation Parameters			SPT N Value		Rock Quality Designation %	Void Ratio	Porosity %
							Gravel %	Sand %	Silt %	Clay %	Liquid Limit %	Plastic Limit %	Plasticity Index %					Cohesion C Kg/cm ²	Angle of Internal Friction φ Degree				Compression Index C _c	Coefficient of Volume Compressibility m _v cm ² /kg	Pre-consolidation Pressure kg/cm ²	Observed	N 60 (ER 60 %)			
1	0.00	DS	-	-	-	-	42	43	2	13	24	15	9	-	-	-	Filled up Soil	-	-	-	-	-	-	-	-	-	-	-	-	-
2	1.50	SPT	-	-	-	-	2	60	22	16	25	14	11	-	-	-	SC	-	-	-	-	-	-	-	-	15	9	-	-	-
3	2.00	UDS	1.65	1.54	7.37	2.66	0	54	30	16	27	15	12	-	-	-	SC	0.05	25	-	-	DSU	-	-	-	-	-	-	0.73	42.2
4	3.00	SPT	-	-	-	-	0	45	44	11	26	16	10	-	-	-	CL	-	-	-	-	-	-	-	-	9	5	-	-	-
5	4.50	SPT	-	-	-	-	7	41	38	14	27	14	13	-	-	-	CL	-	-	-	-	-	-	-	-	14	8	-	-	-
6	5.00	UDS	1.78	1.64	8.79	2.65	5	36	41	18	29	13	16	-	-	-	CL	0.64	6	-	-	TUU	0.13	0.0174	1.12	-	-	-	0.62	38.3
7	6.00	SPT	-	-	-	-	13	32	34	21	33	15	18	-	-	-	CL	-	-	-	-	-	-	-	-	24	14	-	-	-
8	7.50	SPT	-	-	-	-	2	43	37	18	32	16	16	-	-	-	CL	-	-	-	-	-	-	-	-	35	20	-	-	-
9	8.00	UDS	1.89	1.72	9.76	2.65	0	54	24	22	35	16	19	-	-	-	SC	0.08	29	-	-	DSU	-	-	-	-	-	-	0.54	35.0
10	9.00	SPT	-	-	-	-	3	67	20	10	24	17	7	-	-	-	SM-SC	-	-	-	-	-	-	-	-	34	20	-	-	-
11	10.50	SPT	-	-	-	-	2	71	20	7	23	17	6	-	-	-	SM-SC	-	-	-	-	-	-	-	-	47	27	-	-	-
12	11.00	UDS	2.07	1.84	12.62	2.65	3	52	34	11	30	23	7	-	-	-	SM-SC	0.06	30	-	-	DSU	-	-	-	-	-	-	0.44	30.6
13	12.00	SPT	-	-	-	-	11	69	10	10	23	16	7	-	-	-	SM-SC	-	-	-	-	-	-	-	-	62	36	-	-	-
14	13.50	SPT	-	-	-	-	0	82	8	10	21	15	6	-	-	-	SM-SC	-	-	-	-	-	-	-	-	73	43	-	-	-
15	14.00	Remoulded	2.09	1.91	9.17	2.67	0	74	15	11	22	15	7	-	-	-	SM-SC	0.02	30	-	-	DSU	-	-	-	-	-	-	0.39	28.3
16	15.00	SPT	-	-	-	-	5	70	18	7	23	17	6	-	-	-	SM-SC	-	-	-	-	-	-	-	-	55	32	-	-	-
17	16.50	SPT	-	-	-	-	13	49	25	13	30	18	12	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-
18	17.00	Remoulded	2.15	1.98	8.80	2.66	2	56	22	20	31	16	15	-	-	-	SC	0.12	29	-	-	DSU	-	-	-	-	-	-	0.35	25.7
19	18.00	SPT	-	-	-	-	5	52	16	27	33	15	18	-	-	-	SC	-	-	-	-	-	-	-	-	86	50	-	-	-
20	19.50	SPT	-	-	-	-	1	63	21	15	27	17	10	-	-	-	SC	-	-	-	-	-	-	-	-	57	33	-	-	-
21	20.00	DS	-	-	-	-	26	17	42	15	35	21	14	-	-	-	Cl	-	-	-	-	-	-	-	-	-	-	-	-	-
22	21.00	SPT	-	-	-	-	6	38	31	25	37	16	21	-	-	-	Cl	-	-	-	-	-	-	-	-	48	28	-	-	-
23	22.00	UDS	2.09	1.84	13.46	2.65	7	35	33	25	40	17	23	-	-	-	Cl	0.18	26	-	-	TCU	-	-	-	-	-	-	0.44	30.5
24	22.50	SPT	-	-	-	-	2	41	36	21	37	19	18	-	-	-	Cl	-	-	-	-	-	-	-	-	66	39	-	-	-
25	24.00	SPT	-	-	-	-	6	19	50	25	42	21	21	-	-	-	Cl	-	-	-	-	-	-	-	-	62	36	-	-	-
26	25.50	SPT	-	-	-	-	0	48	31	21	36	17	19	-	-	-	Cl	-	-	-	-	-	-	-	-	60	35	-	-	-
27	27.00	SPT	-	-	-	-	7	39	25	29	40	15	25	-	-	-	Cl	-	-	-	-	-	-	-	-	64	37	-	-	-
28	28.50	SPT	-	-	-	-	13	38	24	25	39	17	22	-	-	-	Cl	-	-	-	-	-	-	-	-	61	36	-	-	-
29	30.00	SPT	-	-	-	-	5	42	31	22	36	16	20	-	-	-	Cl	-	-	-	-	-	-	-	-	53	31	-	-	-
30	31.00	UDS	2.11	1.85	13.89	2.67	6	21	41	32	43	15	28	-	-	-	Cl	0.20	26	-	-	TCU	-	-	-	-	-	-	0.44	30.6
31	31.50	SPT	-	-	-	-	0	37	41	22	39	19	20	-	-	-	Cl	-	-	-	-	-	-	-	-	63	37	-	-	-
32	33.00	SPT	-	-	-	-	0	59	25	16	27	17	10	-	-	-	SC	-	-	-	-	-	-	-	-	67	39	-	-	-
33	34.50	SPT	-	-	-	-	8	73	18	1	NP	NP	NP	-	-	-	SM	-	-	-	-	-	-	-	-	>100	>100	-	-	-
34	36.00	SPT	-	-	-	-	2	66	20	12	25	14	11	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-
35	37.50	SPT	-	-	-	-	36	38	17	9	24	16	8	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-
36	39.00	SPT	-	-	-	-	0	80	12	8	23	18	5	-	-	-	SM	-	-	-	-	-	-	-	-	>100	>100	-	-	-
37	40.50	SPT	-	-	-	-	0	83	11	6	18	14	4	-	-	-	SM	-	-	-	-	-	-	-	-	>100	>100	-	-	-
38	42.00	SPT	-	-	-	-	0	81	14	5	19	15	4	-	-	-	SM	-	-	-	-	-	-	-	-	>100	>100	-	-	-
39	43.50	SPT	-	-	-	-	0	79	14	7	22	17	5	-	-	-	SM	-	-	-	-	-	-	-	-	90	53	-	-	-
40	45.00	SPT	-	-	-	-	0	84	14	2	NP	NP	NP	-	-	-	SM	-	-	-	-	-	-	-	-	>100	>100	-	-	-

UDS - Undisturbed Sample
DS - Disturbed Sample
SPT - Standard Penetration Tests
NP - Non Plastic

TUU - Triaxial Unconsolidated Undrained
TCU - Triaxial Consolidated Undrained
DSU - Direct Shear Test
UCS - Unconfined Compression Strength

KCT Consultancy Services[®] LLP, Ahmedabad

RESULTS OF LABORATORY TEST

Project :- Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for GMRL

BH No. :- 4 (GP - 6/8)

Co-Ordinate :- E - 261890, N - 2565065

Sr No	Depth of Sample m	Type of Sample	Field Bulk Density gm / cc	Field Dry Density gm / cc	Natural Moisture Content %	Specific Gravity	Grain Size Analysis				Consistency limits			Shrinkage Limit	Swelling Pressure Kg/cm ²	Free Swell Index %	Soil Classification	Shear Parameter		Unconfined Compression Test Kg/cm ²	UCS by Point Load Index in rock Kg/cm ²	Type of Shear Test	Consolidation Parameters			SPT N Value		Rock Quality Designation %	Void Ratio	Porosity %	
							Gravel %	Sand %	Silt %	Clay %	Liquid Limit %	Plastic Limit %	Plasticity Index %					Cohesion C Kg/cm ²	Angle of Internal Friction ϕ Degree				Compression Index C _c	Coefficient of Volume Compressibility mv cm ² /kg	Pre-consolidation Pressure kg/cm ²	Observed	N 60 (ER 60 %)				
1	0.00	DS	-	-	-	-	0	59	26	15	28	16	12	-	-	-	SC	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	1.50	SPT	-	-	-	-	0	44	40	16	29	15	14	-	-	-	CL	-	-	-	-	-	-	-	-	31	18	-	-	-	-
3	2.00	UDS	1.72	1.61	6.58	2.65	0	48	41	11	26	16	10	-	-	-	CL	0.59	9	-	-	TUU	0.12	0.0086	0.39	-	-	-	0.64	39.1	-
4	3.00	SPT	-	-	-	-	0	40	48	12	28	17	11	-	-	-	CL	-	-	-	-	-	-	-	-	16	9	-	-	-	-
5	4.50	SPT	-	-	-	-	6	41	44	9	26	18	8	-	-	-	CL	-	-	-	-	-	-	-	-	18	11	-	-	-	-
6	5.00	UDS	1.80	1.64	10.04	2.65	0	39	45	16	30	16	14	-	-	-	CL	1.02	7	-	-	TUU	-	-	-	-	-	-	0.62	38.3	-
7	6.00	SPT	-	-	-	-	7	31	43	19	31	15	16	-	-	-	CL	-	-	-	-	-	-	-	-	39	23	-	-	-	-
8	7.50	SPT	-	-	-	-	3	39	44	14	29	17	12	-	-	-	CL	-	-	-	-	-	-	-	-	61	36	-	-	-	-
9	8.00	Remoulded	2.03	1.90	6.91	2.66	9	43	22	26	33	16	17	-	-	-	SC	0.08	29	-	-	DSU	-	-	-	-	-	-	0.40	28.6	-
10	9.00	SPT	-	-	-	-	0	59	21	20	31	17	14	-	-	-	SC	-	-	-	-	-	-	-	-	75	44	-	-	-	-
11	10.50	SPT	-	-	-	-	0	71	21	8	28	21	7	-	-	-	SM-SC	-	-	-	-	-	-	-	-	38	22	-	-	-	-
12	11.00	UDS	1.90	1.79	5.88	2.67	5	70	15	10	27	21	6	-	-	-	SM-SC	0.01	30	-	-	DSU	-	-	-	-	-	-	0.49	32.8	-
13	12.00	SPT	-	-	-	-	0	73	18	9	29	22	7	-	-	-	SM-SC	-	-	-	-	-	-	-	-	48	28	-	-	-	-
14	13.50	SPT	-	-	-	-	2	56	34	8	30	23	7	-	-	-	SM-SC	-	-	-	-	-	-	-	-	86	50	-	-	-	-
15	14.00	Remoulded	2.14	1.96	9.34	2.66	11	60	20	9	26	20	6	-	-	-	SM-SC	0.02	32	-	-	DSU	-	-	-	-	-	-	0.36	26.4	-
16	15.00	SPT	-	-	-	-	6	47	32	15	30	16	14	-	-	-	SC	-	-	-	-	-	-	-	-	74	43	-	-	-	-
17	16.50	SPT	-	-	-	-	19	51	19	11	27	17	10	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
18	17.00	Remoulded	2.20	1.99	10.67	2.67	0	86	3	11	25	16	9	-	-	-	SC	0.04	33	-	-	DSU	-	-	-	-	-	-	0.34	25.5	-
19	18.00	SPT	-	-	-	-	19	47	15	19	28	15	13	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
20	19.50	SPT	-	-	-	-	6	20	51	23	38	18	20	-	-	-	CI	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
21	21.00	SPT	-	-	-	-	9	4	61	26	42	20	22	-	-	-	CI	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
22	22.50	SPT	-	-	-	-	4	19	56	21	41	22	19	-	-	-	CI	-	-	-	-	-	-	-	-	94	55	-	-	-	-
23	24.00	SPT	-	-	-	-	11	36	31	22	39	20	19	-	-	-	CI	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
24	25.50	SPT	-	-	-	-	19	41	22	18	30	18	12	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
25	27.00	SPT	-	-	-	-	12	44	23	21	31	17	14	-	-	-	SC	-	-	-	-	-	-	-	-	70	41	-	-	-	-
26	28.50	SPT	-	-	-	-	6	79	13	2	NP	NP	NP	-	-	-	SW-SM	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
27	30.00	SPT	-	-	-	-	6	42	28	24	37	16	21	-	-	-	CI	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
28	31.50	SPT	-	-	-	-	2	33	43	22	40	21	19	-	-	-	CI	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
29	33.00	SPT	-	-	-	-	10	44	24	22	35	18	17	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
30	34.50	SPT	-	-	-	-	2	69	14	15	30	16	14	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
31	36.00	SPT	-	-	-	-	3	64	14	19	31	15	16	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
32	37.50	SPT	-	-	-	-	4	74	16	6	24	19	5	-	-	-	SM	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
33	39.00	SPT	-	-	-	-	1	69	16	14	29	17	12	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
34	40.50	SPT	-	-	-	-	13	28	31	28	42	18	24	-	-	-	CI	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
35	42.00	SPT	-	-	-	-	2	44	32	22	39	19	20	-	-	-	CI	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
36	43.50	SPT	-	-	-	-	7	65	17	11	26	17	9	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
37	45.00	SPT	-	-	-	-	6	29	44	21	40	21	19	-	-	-	CI	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-

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RESULTS OF LABORATORY TEST

Project :- Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for GMRL

BH No. :- 5 (GP - 6/6)

Co-Ordinate :- E - 261883, N - 2565013

Sr No	Depth of Sample m	Type of Sample	Field Bulk Density gm / cc	Field Dry Density gm / cc	Natural Moisture Content %	Specific Gravity	Grain Size Analysis				Consistency limits			Shrinkage Limit %	Swelling Pressure Kg/cm ²	Free Swell Index %	Soil Classification	Shear Parameter		Unconfined Compression Test Kg/cm ²	UCS by Point Load Index in rock Kg/cm ²	Type of Shear Test	Consolidation Parameters			SPT N Value		Rock Quality Designation %	Void Ratio	Porosity %	
							Gravel %	Sand %	Silt %	Clay %	Liquid Limit %	Plastic Limit %	Plasticity Index %					Cohesion C Kg/cm ²	Angle of Internal Friction ϕ Degree				Compression Index C _c	Coefficient of Volume Compressibility m _v cm ² /kg	Pre-consolidation Pressure kg/cm ²	Observed	N 60 (ER 60 %)				
1	0.00	DS	-	-	-	-	0	46	39	15	27	14	13	-	-	-	CL	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	1.50	SPT	-	-	-	-	0	47	42	11	25	15	10	-	-	-	CL	-	-	-	-	-	-	-	16	16	-	-	-	-	-
3	2.00	UDS	1.75	1.61	8.71	2.65	0	45	40	15	27	14	13	-	-	-	CL	0.84	9	-	-	TUU	0.13	0.0143	0.36	-	-	-	0.65	39.3	-
4	3.00	SPT	-	-	-	-	0	44	42	14	28	16	12	-	-	-	CL	-	-	-	-	-	-	-	14	14	-	-	-	-	-
5	4.50	SPT	-	-	-	-	10	38	37	15	30	17	13	-	-	-	CL	-	-	-	-	-	-	-	30	30	-	-	-	-	-
6	5.00	UDS	1.86	1.73	7.82	2.65	9	35	38	18	31	15	16	-	-	-	CL	0.15	27	-	-	DSU	0.11	0.0071	1.76	-	-	-	0.54	34.9	-
7	6.00	SPT	-	-	-	-	6	54	23	17	29	16	13	-	-	-	SC	-	-	-	-	-	-	-	45	45	-	-	-	-	-
8	7.50	SPT	-	-	-	-	11	57	16	16	26	15	11	-	-	-	SC	-	-	-	-	-	-	-	51	51	-	-	-	-	-
9	8.00	UDS	2.03	1.80	12.67	2.66	0	58	29	13	30	18	12	-	-	-	SC	0.09	30	-	-	DSU	-	-	-	-	-	-	0.48	32.3	-
10	9.00	SPT	-	-	-	-	0	74	19	7	25	19	6	-	-	-	SM-SC	-	-	-	-	-	-	-	40	40	-	-	-	-	-
11	10.50	SPT	-	-	-	-	2	71	19	8	26	19	7	-	-	-	SM-SC	-	-	-	-	-	-	-	40	40	-	-	-	-	-
12	11.00	UDS	1.94	1.80	7.63	2.67	0	82	11	7	23	17	6	-	-	-	SM-SC	0.01	31	-	-	DSU	-	-	-	-	-	-	0.48	32.5	-
13	12.00	SPT	-	-	-	-	6	48	37	9	29	22	7	-	-	-	SM-SC	-	-	-	-	-	-	-	49	49	-	-	-	-	-
14	13.50	SPT	-	-	-	-	3	67	23	7	27	21	6	-	-	-	SM-SC	-	-	-	-	-	-	-	65	65	-	-	-	-	-
15	14.00	UDS	2.04	1.93	5.84	2.66	4	68	18	10	26	20	6	-	-	-	SM-SC	0.03	30	-	-	DSU	-	-	-	-	-	-	0.38	27.5	-
16	15.00	SPT	-	-	-	-	0	59	25	16	29	16	13	-	-	-	SC	-	-	-	-	-	-	-	92	92	-	-	-	-	-
17	16.50	SPT	-	-	-	-	5	60	23	12	26	15	11	-	-	-	SC	-	-	-	-	-	-	-	80	80	-	-	-	-	-
18	18.00	SPT	-	-	-	-	10	24	42	24	41	19	22	-	-	-	CI	-	-	-	-	-	-	-	>100	>100	-	-	-	-	-
19	19.50	SPT	-	-	-	-	6	31	40	23	39	18	21	-	-	-	CI	-	-	-	-	-	-	-	64	64	-	-	-	-	-
20	21.00	SPT	-	-	-	-	17	23	38	22	38	19	19	-	-	-	CI	-	-	-	-	-	-	-	76	76	-	-	-	-	-
21	22.50	SPT	-	-	-	-	1	46	37	16	36	21	15	-	-	-	CI	-	-	-	-	-	-	-	>100	>100	-	-	-	-	-
22	24.00	SPT	-	-	-	-	0	37	47	16	30	16	14	-	-	-	CL	-	-	-	-	-	-	-	>100	>100	-	-	-	-	-
23	25.50	SPT	-	-	-	-	5	35	42	18	31	15	16	-	-	-	CL	-	-	-	-	-	-	-	85	85	-	-	-	-	-
24	27.00	SPT	-	-	-	-	15	39	35	11	29	19	10	-	-	-	SC	-	-	-	-	-	-	-	64	64	-	-	-	-	-
25	28.50	SPT	-	-	-	-	10	28	40	22	41	21	20	-	-	-	CI	-	-	-	-	-	-	-	>100	>100	-	-	-	-	-
26	30.00	SPT	-	-	-	-	0	39	38	23	39	18	21	-	-	-	CI	-	-	-	-	-	-	-	88	88	-	-	-	-	-
27	31.50	SPT	-	-	-	-	7	54	12	27	37	20	17	-	-	-	SC	-	-	-	-	-	-	-	>100	>100	-	-	-	-	-
28	33.00	SPT	-	-	-	-	2	68	15	15	35	22	13	-	-	-	SC	-	-	-	-	-	-	-	>100	>100	-	-	-	-	-
29	34.50	SPT	-	-	-	-	2	79	13	6	20	16	4	-	-	-	SM	-	-	-	-	-	-	-	>100	>100	-	-	-	-	-
30	36.00	SPT	-	-	-	-	0	73	2	25	38	18	20	-	-	-	SC	-	-	-	-	-	-	-	>100	>100	-	-	-	-	-
31	37.50	SPT	-	-	-	-	0	12	64	24	41	20	21	-	-	-	CI	-	-	-	-	-	-	-	80	80	-	-	-	-	-
32	39.00	SPT	-	-	-	-	0	86	11	3	NP	NP	NP	-	-	-	SM	-	-	-	-	-	-	-	>100	>100	-	-	-	-	-
33	40.50	SPT	-	-	-	-	0	18	58	24	40	19	21	-	-	-	CI	-	-	-	-	-	-	-	>100	>100	-	-	-	-	-
34	42.00	SPT	-	-	-	-	7	47	24	22	28	15	13	-	-	-	SC	-	-	-	-	-	-	-	>100	>100	-	-	-	-	-
35	43.50	SPT	-	-	-	-	0	42	36	22	37	18	19	-	-	-	CI	-	-	-	-	-	-	-	>100	>100	-	-	-	-	-
36	45.00	SPT	-	-	-	-	5	38	34	23	40	19	21	-	-	-	CI	-	-	-	-	-	-	-	>100	>100	-	-	-	-	-

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RESULTS OF LABORATORY TEST

Project :- Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for GMRC

BH No. :- 6 (GTP - 6/4)

Co-Ordinate :- E - 261877, N - 2564956

Sr No	Depth of Sample m	Type of Sample	Field Bulk Density gm / cc	Field Dry Density gm / cc	Natural Moisture Content %	Specific Gravity	Grain Size Analysis				Consistency limits			Shrinkage Limit	Swelling Pressure Kg/cm ²	Free Swell Index %	Soil Classification	Shear Parameter		Unconfined Compression Test Kg/cm ²	UCS by Point Load Index in rock Kg/cm ²	Type of Shear Test	Consolidation Parameters			SPT N Value		Rock Quality Designation %	Void Ratio	Porosity %	
							Gravel %	Sand %	Silt %	Clay %	Liquid Limit %	Plastic Limit %	Plasticity Index %					Cohesion C Kg/cm ²	Angle of Internal Friction ϕ Degree				Compression Index C _c	Coefficient of Volume Compressibility mv cm ² /kg	Pre-consolidation Pressure kg/cm ²	Observed	N 60 (ER 60 %)				
1	0.00	DS	-	-	-	-	0	46	44	10	25	16	9	-	-	-	CL	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	1.50	SPT	-	-	-	-	0	45	40	15	28	15	13	-	-	-	CL	-	-	-	-	-	-	-	-	10	6	-	-	-	-
3	2.00	UDS	1.81	1.59	14.15	2.65	0	38	45	17	30	16	14	-	-	-	CL	0.48	6	-	-	TUU	0.14	0.0242	0.38	-	-	-	0.67	40.2	-
4	3.00	SPT	-	-	-	-	12	35	36	17	31	15	16	-	-	-	CL	-	-	-	-	-	-	-	-	19	11	-	-	-	-
5	4.50	SPT	-	-	-	-	5	39	44	12	28	17	11	-	-	-	CL	-	-	-	-	-	-	-	-	26	15	-	-	-	-
6	5.00	UDS	1.85	1.71	8.26	2.65	10	37	39	14	29	16	13	-	-	-	CL	1.34	9	-	-	TUU	-	-	-	-	-	-	0.55	35.5	-
7	6.00	SPT	-	-	-	-	1	63	23	13	26	17	9	-	-	-	SC	-	-	-	-	-	-	-	-	40	23	-	-	-	-
8	7.50	SPT	-	-	-	-	12	56	22	10	23	15	8	-	-	-	SC	-	-	-	-	-	-	-	-	37	22	-	-	-	-
9	8.00	UDS	1.85	1.75	5.65	2.66	6	61	24	9	25	18	7	-	-	-	SM-SC	0.04	29	-	-	DSU	-	-	-	-	-	-	0.52	34.2	-
10	9.00	SPT	-	-	-	-	0	77	15	8	22	16	6	-	-	-	SM-SC	-	-	-	-	-	-	-	-	58	34	-	-	-	-
11	10.50	SPT	-	-	-	-	10	72	10	8	21	15	6	-	-	-	SM-SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
12	11.00	Remoulded	2.10	1.94	8.43	2.66	5	57	29	9	26	19	7	-	-	-	SM-SC	0.04	31	-	-	DSU	-	-	-	-	-	-	0.37	27.2	-
13	12.00	SPT	-	-	-	-	0	82	10	8	20	14	6	-	-	-	SM-SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
14	13.50	SPT	-	-	-	-	4	66	19	11	24	17	7	-	-	-	SM-SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
15	14.00	Remoulded	2.05	1.92	6.70	2.67	0	68	22	10	26	19	7	-	-	-	SM-SC	0.02	32	-	-	DSU	-	-	-	-	-	-	0.39	28.0	-
16	15.00	SPT	-	-	-	-	6	52	24	18	30	16	14	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
17	16.50	SPT	-	-	-	-	10	50	26	14	28	15	13	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
18	17.00	Remoulded	2.15	2.02	6.35	2.68	15	50	19	16	25	13	12	-	-	-	SC	0.08	32	-	-	DSU	-	-	-	-	-	-	0.33	24.6	-
19	18.00	SPT	-	-	-	-	7	52	25	16	31	16	15	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
20	19.50	SPT	-	-	-	-	6	57	23	14	28	17	11	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
21	21.00	SPT	-	-	-	-	2	28	47	23	41	21	20	-	-	-	CI	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
22	22.50	SPT	-	-	-	-	11	29	41	19	39	22	17	-	-	-	CI	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
23	24.00	SPT	-	-	-	-	0	56	21	23	33	17	16	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
24	25.50	SPT	-	-	-	-	7	45	13	35	38	16	22	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
25	27.00	SPT	-	-	-	-	8	57	18	17	31	18	13	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
26	28.50	SPT	-	-	-	-	6	29	38	27	43	20	23	-	-	-	CI	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
27	30.00	SPT	-	-	-	-	6	32	41	21	41	22	19	-	-	-	CI	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
28	31.50	SPT	-	-	-	-	0	37	43	20	40	23	17	-	-	-	CI	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
29	33.00	SPT	-	-	-	-	17	49	12	22	31	16	15	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
30	34.50	SPT	-	-	-	-	7	64	16	13	26	15	11	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
31	36.00	SPT	-	-	-	-	2	74	17	7	22	17	5	-	-	-	SM	-	-	-	-	-	-	-	-	80	47	-	-	-	-
32	37.50	SPT	-	-	-	-	0	82	13	5	19	15	4	-	-	-	SM	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
33	39.00	SPT	-	-	-	-	0	80	15	5	21	17	4	-	-	-	SM	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
34	40.50	SPT	-	-	-	-	0	79	15	6	23	18	5	-	-	-	SM	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
35	42.00	SPT	-	-	-	-	0	64	22	14	27	16	11	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
36	43.50	SPT	-	-	-	-	6	29	40	25	41	19	22	-	-	-	CI	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
37	45.00	SPT	-	-	-	-	0	45	36	19	38	21	17	-	-	-	CI	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-

UDS - Undisturbed Sample
DS - Disturbed Sample
SPT - Standard Penetration Tests
NP - Non Plastic

TUU - Triaxial Unconsolidated Undrained
TCU - Triaxial Consolidated Undrained
DSU - Direct Shear Test
UCS - Unconfined Compression Strength

KCT Consultancy Services[®] LLP, Ahmedabad

RESULTS OF LABORATORY TEST

Project :- Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for GMRL

BH No. :- 7 (GTP - 6/2)

Co-Ordinate :- E - 261869, N - 2564903

Sr No	Depth of Sample m	Type of Sample	Field Bulk Density gm / cc	Field Dry Density gm / cc	Natural Moisture Content %	Specific Gravity	Grain Size Analysis				Consistency limits			Shrinkage Limit %	Swelling Pressure Kg/cm ²	Free Swell Index %	Soil Classification	Shear Parameter		Unconfined Compression Test Kg/cm ²	UCS by Point Load Index in rock Kg/cm ²	Type of Shear Test	Consolidation Parameters			SPT N Value		Rock Quality Designation %	Void Ratio	Porosity %
							Gravel %	Sand %	Silt %	Clay %	Liquid Limit %	Plastic Limit %	Plasticity Index %					Cohesion C Kg/cm ²	Angle of Internal Friction φ Degree				Compression Index C _c	Coefficient of Volume Compressibility mv cm ² /kg	Pre-consolidation Pressure kg/cm ²	Observed	N 60 (ER 60 %)			
1	0.00	DS	-	-	-	-	12	53	21	14	26	15	11	-	-	-	Filled up Soil	-	-	-	-	-	-	-	-	-	-	-	-	-
2	1.50	SPT	-	-	-	-	10	44	27	19	30	17	13	-	-	-	SC	-	-	-	-	-	-	-	-	10	6	-	-	-
3	2.00	UDS	1.75	1.56	12.53	2.66	0	48	34	18	32	16	16	-	-	-	CL	0.46	8	-	-	TUU	0.14	0.0268	0.44	-	-	-	0.71	41.5
4	3.00	SPT	-	-	-	-	0	49	38	13	31	19	12	-	-	-	CL	-	-	-	-	-	-	-	-	10	6	-	-	-
5	4.50	SPT	-	-	-	-	8	44	29	19	33	16	17	-	-	-	CL	-	-	-	-	-	-	-	-	23	13	-	-	-
6	5.00	UDS	1.76	1.65	6.71	2.66	1	61	20	18	28	17	11	-	-	-	SC	0.05	28	-	-	DSU	-	-	-	-	-	-	0.61	38.0
7	6.00	SPT	-	-	-	-	5	63	16	16	25	15	10	-	-	-	SC	-	-	-	-	-	-	-	-	28	16	-	-	-
8	7.50	SPT	-	-	-	-	0	71	16	13	24	16	8	-	-	-	SC	-	-	-	-	-	-	-	-	38	22	-	-	-
9	8.00	UDS	1.87	1.77	5.74	2.67	4	77	10	9	26	19	7	-	-	-	SM-SC	0.01	30	-	-	DSU	-	-	-	-	-	-	0.51	33.8
10	9.00	SPT	-	-	-	-	4	79	8	9	25	19	6	-	-	-	SM-SC	-	-	-	-	-	-	-	-	59	34	-	-	-
11	10.50	SPT	-	-	-	-	2	82	9	7	23	17	6	-	-	-	SM-SC	-	-	-	-	-	-	-	-	73	43	-	-	-
12	11.00	Remoulded	2.05	1.92	6.87	2.67	0	76	16	8	27	20	7	-	-	-	SM-SC	0.02	32	-	-	DSU	-	-	-	-	-	-	0.39	28.2
13	12.00	SPT	-	-	-	-	0	79	14	7	26	20	6	-	-	-	SM-SC	-	-	-	-	-	-	-	-	78	46	-	-	-
14	13.50	SPT	-	-	-	-	0	63	28	9	28	21	7	-	-	-	SM-SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-
15	14.00	Remoulded	2.10	1.98	6.16	2.66	0	86	7	7	21	15	6	-	-	-	SM-SC	0.00	33	-	-	DSU	-	-	-	-	-	-	0.34	25.6
16	15.00	SPT	-	-	-	-	2	64	17	17	31	17	14	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-
17	16.50	SPT	-	-	-	-	31	38	13	18	29	16	13	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-
18	17.00	Remoulded	2.08	1.97	5.62	2.68	23	49	15	13	30	18	12	-	-	-	SC	0.05	32	-	-	DSU	-	-	-	-	-	-	0.36	26.5
19	18.00	SPT	-	-	-	-	15	54	10	21	33	16	17	-	-	-	SC	-	-	-	-	-	-	-	-	62	36	-	-	-
20	19.50	SPT	-	-	-	-	5	42	25	28	39	15	24	-	-	-	CI	-	-	-	-	-	-	-	-	76	44	-	-	-
21	20.00	Remoulded	2.07	1.82	13.44	2.65	0	31	42	27	44	19	25	-	-	-	CI	0.16	26	-	-	TCU	-	-	-	-	-	-	0.45	31.1
22	21.00	SPT	-	-	-	-	2	28	43	27	45	22	23	-	-	-	CI	-	-	-	-	-	-	-	-	66	39	-	-	-
23	22.00	SPT	-	-	-	-	14	17	38	31	47	20	27	-	-	-	CI	-	-	-	-	-	-	-	-	63	37	-	-	-
24	24.00	SPT	-	-	-	-	4	56	25	15	29	16	13	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-
25	25.50	SPT	-	-	-	-	6	50	22	22	32	17	15	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-
26	27.00	SPT	-	-	-	-	8	47	19	26	33	16	17	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-
27	28.50	SPT	-	-	-	-	4	63	20	13	26	17	9	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-
28	30.00	SPT	-	-	-	-	8	38	31	23	39	19	20	-	-	-	CI	-	-	-	-	-	-	-	-	>100	>100	-	-	-
29	31.50	SPT	-	-	-	-	0	27	51	22	42	22	20	-	-	-	CI	-	-	-	-	-	-	-	-	71	41	-	-	-
30	33.00	SPT	-	-	-	-	12	44	24	20	36	20	16	-	-	-	SC	-	-	-	-	-	-	-	-	99	58	-	-	-
31	34.50	SPT	-	-	-	-	19	56	7	18	28	16	12	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-
32	36.00	SPT	-	-	-	-	4	58	22	16	33	18	15	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-
33	37.50	SPT	-	-	-	-	16	14	45	25	41	20	21	-	-	-	CI	-	-	-	-	-	-	-	-	>100	>100	-	-	-
34	39.00	SPT	-	-	-	-	8	20	51	21	40	22	18	-	-	-	CI	-	-	-	-	-	-	-	-	>100	>100	-	-	-
35	40.50	SPT	-	-	-	-	0	33	51	16	37	23	14	-	-	-	CI	-	-	-	-	-	-	-	-	62	36	-	-	-
36	42.00	SPT	-	-	-	-	0	46	37	17	36	21	15	-	-	-	CI	-	-	-	-	-	-	-	-	67	39	-	-	-
37	43.50	SPT	-	-	-	-	0	40	36	24	41	20	21	-	-	-	CI	-	-	-	-	-	-	-	-	72	42	-	-	-
38	45.00	SPT	-	-	-	-	14	52	23	11	26	16	10	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-

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RESULTS OF LABORATORY TEST

Project :- Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for GMRC

BH No. :- 8 (GTP 06-2/08)

Co-Ordinate :- E - 261860, N - 2564054

Sr No	Depth of Sample m	Type of Sample	Field Bulk Density gm / cc	Field Dry Density gm / cc	Natural Moisture Content %	Specific Gravity	Grain Size Analysis				Consistency limits			Shrinkage Limit %	Swelling Pressure Kg/cm ²	Free Swell Index %	Soil Classification	Shear Parameter		Unconfined Compression Test Kg/cm ²	UCS by Point Load Index in rock Kg/cm ²	Type of Shear Test	Consolidation Parameters			SPT N Value		Rock Quality Designation %	Void Ratio	Porosity %
							Gravel %	Sand %	Silt %	Clay %	Liquid Limit %	Plastic Limit %	Plasticity Index %					Cohesion C Kg/cm ²	Angle of Internal Friction ϕ Degree				Compression Index C _c	Coefficient of Volume Compressibility m _v cm ² /kg	Pre-consolidation Pressure kg/cm ²	Observed	N 60 (ER 60 %)			
1	0.00	DS	-	-	-	-	5	62	21	12	25	15	10	-	-	-	Filled up Soil	-	-	-	-	-	-	-	-	-	-	-	-	-
2	1.50	SPT	-	-	-	-	0	54	32	14	28	17	11	-	-	-	Filled up Soil	-	-	-	-	-	-	-	-	21	12	-	-	-
3	2.00	UDS	1.65	1.52	8.31	2.65	0	53	30	17	30	16	14	-	-	-	Filled up Soil	0.08	24	-	-	DSU	-	-	-	-	-	-	0.74	42.5
4	3.00	SPT	-	-	-	-	3	51	27	19	26	13	13	-	-	-	SC	-	-	-	-	-	-	-	-	19	10	-	-	-
5	4.50	SPT	-	-	-	-	2	60	25	13	22	14	8	-	-	-	SC	-	-	-	-	-	-	-	-	21	11	-	-	-
6	5.00	UDS	1.78	1.61	10.69	2.66	3	64	20	13	24	13	11	-	-	-	SC	0.05	26	-	-	DSU	-	-	-	-	-	-	0.65	39.5
7	6.00	SPT	-	-	-	-	2	77	10	11	21	12	9	-	-	-	SC	-	-	-	-	-	-	-	-	38	21	-	-	-
8	7.50	SPT	-	-	-	-	2	81	8	9	19	13	6	-	-	-	SM-SC	-	-	-	-	-	-	-	-	61	35	-	-	-
9	8.00	UDS	2.05	1.82	12.57	2.67	6	60	26	8	22	15	7	-	-	-	SM-SC	0.03	31	-	-	DSU	-	-	-	-	-	-	0.47	31.8
10	9.00	SPT	-	-	-	-	4	74	11	11	20	13	7	-	-	-	SM-SC	-	-	-	-	-	-	-	-	90	51	-	-	-
11	10.50	SPT	-	-	-	-	3	75	13	9	19	13	6	-	-	-	SM-SC	-	-	-	-	-	-	-	-	>100	77	-	-	-
12	11.00	Remoulded	2.10	1.95	7.59	2.68	0	86	6	8	18	12	6	-	-	-	SM-SC	0.01	33	-	-	DSU	-	-	-	-	-	-	0.37	27.2
13	12.00	SPT	-	-	-	-	8	76	9	7	21	15	6	-	-	-	SM-SC	-	-	-	-	-	-	-	-	>100	63	-	-	-
14	13.50	SPT	-	-	-	-	0	82	8	10	23	16	7	-	-	-	SM-SC	-	-	-	-	-	-	-	-	70	40	-	-	-
15	14.00	UDS	1.96	1.85	5.84	2.67	3	78	12	7	24	18	6	-	-	-	SM-SC	0.02	32	-	-	DSU	-	-	-	-	-	-	0.44	30.6
16	15.00	SPT	-	-	-	-	13	57	22	8	22	15	7	-	-	-	SM-SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-
17	16.50	SPT	-	-	-	-	34	39	13	14	27	14	13	-	-	-	SC	-	-	-	-	-	-	-	-	>100	99	-	-	-
18	17.00	Remoulded	2.15	2.01	6.73	2.66	1	60	22	17	29	15	14	-	-	-	SC	0.10	30	-	-	DSU	-	-	-	-	-	-	0.32	24.3
19	18.00	SPT	-	-	-	-	17	49	13	21	31	18	13	-	-	-	SC	-	-	-	-	-	-	-	-	>100	81	-	-	-
20	19.50	SPT	-	-	-	-	5	48	29	18	33	17	16	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-
21	21.00	SPT	-	-	-	-	10	16	51	23	40	20	20	-	-	-	CI	-	-	-	-	-	-	-	-	>100	90	-	-	-
22	22.50	SPT	-	-	-	-	4	36	42	18	38	22	16	-	-	-	CI	-	-	-	-	-	-	-	-	>100	>100	-	-	-
23	24.00	SPT	-	-	-	-	0	76	18	6	18	14	4	-	-	-	SM	-	-	-	-	-	-	-	-	>100	>100	-	-	-
24	25.50	SPT	-	-	-	-	0	24	49	27	41	18	23	-	-	-	CI	-	-	-	-	-	-	-	-	>100	>100	-	-	-
25	27.00	SPT	-	-	-	-	3	39	35	23	38	17	21	-	-	-	CI	-	-	-	-	-	-	-	-	96	55	-	-	-
26	28.50	SPT	-	-	-	-	5	25	39	31	46	19	27	-	-	-	CI	-	-	-	-	-	-	-	-	>100	61	-	-	-
27	30.00	SPT	-	-	-	-	7	20	37	36	48	18	30	-	-	-	CI	-	-	-	-	-	-	-	-	77	44	-	-	-
28	31.50	SPT	-	-	-	-	12	34	26	28	44	20	24	-	-	-	CI	-	-	-	-	-	-	-	-	>100	99	-	-	-
29	33.00	SPT	-	-	-	-	0	61	28	11	29	19	10	-	-	-	SC	-	-	-	-	-	-	-	-	>100	60	-	-	-
30	34.50	SPT	-	-	-	-	12	62	13	13	27	16	11	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-
31	36.00	SPT	-	-	-	-	14	18	36	32	54	25	29	-	-	-	CH	-	-	-	-	-	-	-	-	>100	>100	-	-	-
32	37.50	SPT	-	-	-	-	11	12	40	37	56	24	32	-	-	-	CH	-	-	-	-	-	-	-	-	>100	>100	-	-	-
33	39.00	SPT	-	-	-	-	0	14	64	22	43	23	20	-	-	-	CI	-	-	-	-	-	-	-	-	>100	63	-	-	-
34	40.50	SPT	-	-	-	-	0	7	67	26	49	27	22	-	-	-	CI	-	-	-	-	-	-	-	-	>100	63	-	-	-
35	42.00	SPT	-	-	-	-	12	23	45	20	37	19	18	-	-	-	CI	-	-	-	-	-	-	-	-	>100	>100	-	-	-
36	43.50	SPT	-	-	-	-	0	47	32	21	36	18	18	-	-	-	CI	-	-	-	-	-	-	-	-	>100	88	-	-	-
37	45.00	SPT	-	-	-	-	4	32	40	24	39	17	22	-	-	-	CI	-	-	-	-	-	-	-	-	>100	>100	-	-	-

UDS - Undisturbed Sample
DS - Disturbed Sample
SPT - Standard Penetration Tests
NP - Non Plastic

TUU - Triaxial Unconsolidated Undrained
TCU - Triaxial Consolidated Undrained
DSU - Direct Shear Test
UCS - Unconfined Compression Strength

KCT Consultancy Services[®] LLP, Ahmedabad

RESULTS OF LABORATORY TEST

Project :- Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for GMRC

BH No. :- 9 (Shahpur Station 6)

Co-Ordinate :- E - 261856, N - 2564814

Sr No	Depth of Sample m	Type of Sample	Field Bulk Density gm / cc	Field Dry Density gm / cc	Natural Moisture Content %	Specific Gravity	Grain Size Analysis				Consistency limits			Shrinkage Limit %	Swelling Pressure Kg/cm ²	Free Swell Index %	Soil Classification	Shear Parameter		Unconfined Compression Test Kg/cm ²	UCS by Point Load Index in rock Kg/cm ²	Type of Shear Test	Consolidation Parameters			SPT N Value		Rock Quality Designation %	Void Ratio	Porosity %
							Gravel %	Sand %	Silt %	Clay %	Liquid Limit %	Plastic Limit %	Plasticity Index %					Cohesion C Kg/cm ²	Angle of Internal Friction φ Degree				Compression Index C _c	Coefficient of Volume Compressibility m _v cm ² /kg	Pre-consolidation Pressure kg/cm ²	Observed	N 60 (ER 60 %)			
1	0.00	DS	-	-	-	-	0	62	21	17	24	13	11	-	-	-	SC	-	-	-	-	-	-	-	-	-	-	-	-	-
2	1.50	SPT	-	-	-	-	1	59	27	13	26	14	12	-	-	-	SC	-	-	-	-	-	-	-	-	17	9	-	-	-
3	2.00	UDS	1.61	1.52	6.17	2.66	13	50	22	15	25	13	12	-	-	-	SC	0.08	25	-	-	DSU	-	-	-	-	-	-	0.75	43.0
4	3.00	SPT	-	-	-	-	5	66	21	8	20	14	6	-	-	-	SM-SC	-	-	-	-	-	-	-	-	16	8	-	-	-
5	4.50	SPT	-	-	-	-	0	73	18	9	19	13	6	-	-	-	SM-SC	-	-	-	-	-	-	-	-	31	18	-	-	-
6	5.00	UDS	1.90	1.79	6.08	2.67	3	77	12	8	21	15	6	-	-	-	SM-SC	0.02	30	-	-	DSU	-	-	-	-	-	-	0.49	32.9
7	6.00	SPT	-	-	-	-	1	73	16	10	22	15	7	-	-	-	SM-SC	-	-	-	-	-	-	-	-	69	39	-	-	-
8	7.50	SPT	-	-	-	-	7	69	15	9	20	13	7	-	-	-	SM-SC	-	-	-	-	-	-	-	-	61	34	-	-	-
9	8.00	UDS	1.86	1.76	5.74	2.67	0	82	10	8	19	13	6	-	-	-	SM-SC	0.01	31	-	-	DSU	-	-	-	-	-	-	0.52	34.1
10	9.00	SPT	-	-	-	-	4	71	16	9	21	14	7	-	-	-	SM-SC	-	-	-	-	-	-	-	-	54	31	-	-	-
11	10.50	SPT	-	-	-	-	2	78	10	10	19	13	6	-	-	-	SM-SC	-	-	-	-	-	-	-	-	66	37	-	-	-
12	11.00	Remoulded	2.01	1.88	6.89	2.66	0	82	8	10	23	16	7	-	-	-	SM-SC	0.01	33	-	-	DSU	-	-	-	-	-	-	0.41	29.3
13	12.00	SPT	-	-	-	-	20	65	7	8	21	15	6	-	-	-	SM-SC	-	-	-	-	-	-	-	-	>100	70	-	-	-
14	13.50	SPT	-	-	-	-	0	66	26	8	25	18	7	-	-	-	SM-SC	-	-	-	-	-	-	-	-	74	42	-	-	-
15	14.00	Remoulded	2.16	1.91	12.82	2.65	8	64	12	16	26	14	12	-	-	-	SC	0.11	30	-	-	DSU	-	-	-	-	-	-	0.38	27.8
16	15.00	SPT	-	-	-	-	0	86	-3	17	24	13	11	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-
17	16.50	SPT	-	-	-	-	13	53	10	24	31	14	17	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-
18	17.00	Remoulded	2.14	1.97	8.64	2.66	14	58	14	14	27	15	12	-	-	-	SC	0.14	30	-	-	DSU	-	-	-	-	-	-	0.35	25.9
19	18.00	SPT	-	-	-	-	0	63	20	17	29	16	13	-	-	-	SC	-	-	-	-	-	-	-	-	>100	99	-	-	-
20	19.50	SPT	-	-	-	-	2	42	35	21	38	19	19	-	-	-	CI	-	-	-	-	-	-	-	-	>100	78	-	-	-
21	21.00	SPT	-	-	-	-	10	23	40	27	41	18	23	-	-	-	CI	-	-	-	-	-	-	-	-	90	52	-	-	-
22	22.50	SPT	-	-	-	-	0	49	37	14	29	17	12	-	-	-	CL	-	-	-	-	-	-	-	-	>100	76	-	-	-
23	24.00	SPT	-	-	-	-	0	34	53	13	30	19	11	-	-	-	CL	-	-	-	-	-	-	-	-	>100	83	-	-	-
24	25.50	SPT	-	-	-	-	3	60	26	11	26	17	9	-	-	-	SC	-	-	-	-	-	-	-	-	>100	81	-	-	-
25	27.00	SPT	-	-	-	-	0	30	44	26	39	16	23	-	-	-	CI	-	-	-	-	-	-	-	-	79	45	-	-	-
26	28.50	SPT	-	-	-	-	6	28	36	30	42	15	27	-	-	-	CI	-	-	-	-	-	-	-	-	74	42	-	-	-
27	30.00	SPT	-	-	-	-	23	26	18	33	44	16	28	-	-	-	CI	-	-	-	-	-	-	-	-	>100	>100	-	-	-
28	31.50	SPT	-	-	-	-	7	27	37	29	45	18	27	-	-	-	CI	-	-	-	-	-	-	-	-	>100	>100	-	-	-
29	33.00	SPT	-	-	-	-	16	26	29	29	46	20	26	-	-	-	CI	-	-	-	-	-	-	-	-	>100	>100	-	-	-
30	34.50	SPT	-	-	-	-	20	21	35	24	44	22	22	-	-	-	CI	-	-	-	-	-	-	-	-	>100	>100	-	-	-
31	36.00	SPT	-	-	-	-	6	48	33	13	28	16	12	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-
32	37.50	SPT	-	-	-	-	0	9	60	31	53	25	28	-	-	-	CH	-	-	-	-	-	-	-	-	>100	87	-	-	-
33	39.00	SPT	-	-	-	-	6	2	57	35	55	24	31	-	-	-	CH	-	-	-	-	-	-	-	-	87	50	-	-	-
34	40.50	SPT	-	-	-	-	2	10	56	32	51	22	29	-	-	-	CH	-	-	-	-	-	-	-	-	>100	77	-	-	-
35	42.00	SPT	-	-	-	-	2	16	49	33	52	23	29	-	-	-	CH	-	-	-	-	-	-	-	-	87	50	-	-	-
36	43.50	SPT	-	-	-	-	0	4	65	31	53	25	28	-	-	-	CH	-	-	-	-	-	-	-	-	>100	76	-	-	-
37	45.00	SPT	-	-	-	-	26	10	33	31	51	24	27	-	-	-	CH	-	-	-	-	-	-	-	-	>100	>100	-	-	-

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RESULTS OF LABORATORY TEST

Project :- Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for GMRL

BH No. :- 10 (Shahpur Station 4)

Co-Ordinate :- E - 261853, N - 2564776

Sr No	Depth of Sample m	Type of Sample	Field Bulk Density gm / cc	Field Dry Density gm / cc	Natural Moisture Content %	Specific Gravity	Grain Size Analysis				Consistency limits			Shrinkage Limit %	Swelling Pressure Kg/cm ²	Free Swell Index %	Soil Classification	Shear Parameter		Unconfined Compression Test Kg/cm ²	UCS by Point Load Index in rock Kg/cm ²	Type of Shear Test	Consolidation Parameters			SPT N Value		Rock Quality Designation %	Void Ratio	Porosity %	
							Gravel %	Sand %	Silt %	Clay %	Liquid Limit %	Plastic Limit %	Plasticity Index %					Cohesion C Kg/cm ²	Angle of Internal Friction ϕ Degree				Compression Index C _c	Coefficient of Volume Compressibility m _v cm ² /kg	Pre-consolidation Pressure kg/cm ²	Observed	N 60 (ER 60 %)				
1	0.00	DS	-	-	-	-	0	64	18	18	24	13	11	-	-	-	SC	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	1.50	SPT	-	-	-	-	11	59	19	11	22	13	9	-	-	-	SC	-	-	-	-	-	-	-	-	15	15	-	-	-	-
3	2.00	UDS	1.70	1.58	7.53	2.66	10	61	19	10	20	12	8	-	-	-	SC	0.03	27	-	-	DSU	-	-	-	-	-	-	0.68	40.6	-
4	3.00	SPT	-	-	-	-	2	78	13	7	20	15	5	-	-	-	SM	-	-	-	-	-	-	-	-	18	18	-	-	-	-
5	4.50	SPT	-	-	-	-	4	78	13	5	18	14	4	-	-	-	SM	-	-	-	-	-	-	-	-	37	37	-	-	-	-
6	5.00	Remoulded	1.99	1.77	12.13	2.67	3	77	14	6	19	14	5	-	-	-	SM	0.00	32	-	-	DSU	-	-	-	-	-	-	0.50	33.5	-
7	6.00	SPT	-	-	-	-	5	79	11	5	18	14	4	-	-	-	SM	-	-	-	-	-	-	-	-	43	43	-	-	-	-
8	7.50	SPT	-	-	-	-	14	69	12	5	19	15	4	-	-	-	SM	-	-	-	-	-	-	-	-	65	65	-	-	-	-
9	8.00	Remoulded	2.10	1.92	9.43	2.67	14	63	17	6	19	14	5	-	-	-	SM	0.00	33	-	-	DSU	-	-	-	-	-	-	0.39	28.1	-
10	9.00	SPT	-	-	-	-	3	70	19	8	20	13	7	-	-	-	SM-SC	-	-	-	-	-	-	-	-	74	74	-	-	-	-
11	10.50	SPT	-	-	-	-	6	75	10	9	23	17	6	-	-	-	SM-SC	-	-	-	-	-	-	-	-	61	61	-	-	-	-
12	11.00	Remoulded	2.20	1.90	15.82	2.66	5	78	9	8	19	13	6	-	-	-	SM-SC	0.02	32	-	-	DSU	-	-	-	-	-	-	0.40	28.6	-
13	12.00	SPT	-	-	-	-	4	80	3	13	25	15	10	-	-	-	SC	-	-	-	-	-	-	-	-	52	52	-	-	-	-
14	13.50	SPT	-	-	-	-	9	53	22	16	28	13	15	-	-	-	SC	-	-	-	-	-	-	-	-	74	74	-	-	-	-
15	14.00	UDS	2.19	1.95	12.31	2.65	6	60	21	13	24	14	10	-	-	-	SC	0.12	31	-	-	DSU	-	-	-	-	-	-	0.36	26.4	-
16	15.00	SPT	-	-	-	-	5	56	29	10	23	14	9	-	-	-	SC	-	-	-	-	-	-	-	-	76	76	-	-	-	-
17	16.50	SPT	-	-	-	-	13	24	45	18	36	20	16	-	-	-	CI	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
18	18.00	SPT	-	-	-	-	7	21	48	24	41	19	22	-	-	-	CI	-	-	-	-	-	-	-	-	94	94	-	-	-	-
19	19.50	SPT	-	-	-	-	15	11	57	17	37	22	15	-	-	-	CI	-	-	-	-	-	-	-	-	77	77	-	-	-	-
20	21.00	SPT	-	-	-	-	1	64	13	22	31	18	13	-	-	-	SC	-	-	-	-	-	-	-	-	85	85	-	-	-	-
21	22.50	SPT	-	-	-	-	0	31	44	25	43	20	23	-	-	-	CI	-	-	-	-	-	-	-	-	71	71	-	-	-	-
22	24.00	SPT	-	-	-	-	12	32	35	21	41	22	19	-	-	-	CI	-	-	-	-	-	-	-	-	82	82	-	-	-	-
23	25.50	SPT	-	-	-	-	4	26	41	29	45	19	26	-	-	-	CI	-	-	-	-	-	-	-	-	64	64	-	-	-	-
24	27.00	SPT	-	-	-	-	12	28	35	25	42	20	22	-	-	-	CI	-	-	-	-	-	-	-	-	91	91	-	-	-	-
25	28.50	SPT	-	-	-	-	10	36	29	25	43	22	21	-	-	-	CI	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
26	30.00	SPT	-	-	-	-	10	64	14	12	25	16	9	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
27	31.50	SPT	-	-	-	-	0	65	21	14	29	17	12	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
28	33.00	SPT	-	-	-	-	0	4	64	32	55	28	27	-	-	-	CH	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
29	34.50	SPT	-	-	-	-	0	13	52	35	52	22	30	-	-	-	CH	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
30	36.00	SPT	-	-	-	-	0	9	54	37	53	20	33	-	-	-	CH	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
31	37.50	SPT	-	-	-	-	0	75	15	10	27	18	9	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
32	39.00	SPT	-	-	-	-	0	74	11	15	29	19	10	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
33	40.50	SPT	-	-	-	-	28	46	8	18	44	19	25	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
34	42.00	SPT	-	-	-	-	14	31	29	26	43	21	22	-	-	-	CI	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
35	43.50	SPT	-	-	-	-	0	43	37	20	38	20	18	-	-	-	CI	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
36	45.00	SPT	-	-	-	-	5	21	40	34	47	18	29	-	-	-	CI	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-

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RESULTS OF LABORATORY TEST

Project :- Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for GMRL

BH No. :- 11 (GP 3 / 17)

Co-Ordinate :- E - 263241, N - 2562796

Sr No	Depth of Sample m	Type of Sample	Field Bulk Density gm / cc	Field Dry Density gm / cc	Natural Moisture Content %	Specific Gravity	Grain Size Analysis				Consistency limits			Shrinkage Limit %	Swelling Pressure Kg/cm²	Free Swell Index %	Soil Classification	Shear Parameter		Unconfined Compression Test Kg/cm²	UCS by Point Load Index in rock Kg/cm²	Type of Shear Test	Consolidation Parameters			SPT N Value		Rock Quality Designation %	Void Ratio	Porosity %	
							Gravel %	Sand %	Silt %	Clay %	Liquid Limit %	Plastic Limit %	Plasticity Index %					Cohesion C Kg/cm²	Angle of Internal Friction ϕ Degree				Compression Index C _c cm²/kg	Coefficient of Volume Compressibility mv kg/cm²	Pre-consolidation Pressure kg/cm²	Observed	N 60 (ER 60 %)				
1	0.00	DS	-	-	-	-	6	56	21	17	23	13	10	-	-	-	SC	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	1.50	SPT	-	-	-	-	15	40	26	19	26	14	12	-	-	-	SC	-	-	-	-	-	-	-	-	24	14	-	-	-	-
3	2.00	UDS	1.69	1.57	7.32	2.66	0	67	22	11	22	13	9	-	-	-	SC	0.05	26	-	-	DSU	-	-	-	-	-	-	0.69	40.8	-
4	3.00	SPT	-	-	-	-	3	69	17	11	21	13	8	-	-	-	SC	-	-	-	-	-	-	-	-	27	15	-	-	-	-
5	4.50	SPT	-	-	-	-	8	65	18	9	22	14	8	-	-	-	SC	-	-	-	-	-	-	-	-	29	16	-	-	-	-
6	5.00	UDS	1.81	1.70	6.56	2.67	18	38	26	18	33	17	16	-	-	-	SC	0.07	30	-	-	DSU	-	-	-	-	-	-	0.57	36.4	-
7	6.00	SPT	-	-	-	-	17	54	7	22	29	16	13	-	-	-	SC	-	-	-	-	-	-	-	-	77	44	-	-	-	-
8	7.50	SPT	-	-	-	-	12	68	7	13	24	14	10	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
9	8.00	UDS	2.16	1.86	16.41	2.68	22	42	19	17	29	16	13	-	-	-	SC	0.05	33	-	-	DSU	-	-	-	-	-	-	0.44	30.8	-
10	9.00	SPT	-	-	-	-	0	70	12	18	28	17	11	-	-	-	SC	-	-	-	-	-	-	-	-	>100	95	-	-	-	-
11	10.50	SPT	-	-	-	-	10	48	12	30	40	19	21	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
12	11.00	UDS	2.20	1.92	14.67	2.67	20	27	28	25	38	16	22	-	-	-	CI	0.18	25	-	-	TCU	-	-	-	-	-	-	0.39	28.1	-
13	12.00	SPT	-	-	-	-	14	54	18	14	33	20	13	-	-	-	SC	-	-	-	-	-	-	-	-	81	47	-	-	-	-
14	13.50	SPT	-	-	-	-	2	29	37	32	46	17	29	-	-	-	CI	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
15	14.00	UDS	2.12	1.83	15.89	2.65	3	23	45	29	47	22	25	-	-	-	CI	0.21	26	-	-	TCU	-	-	-	-	-	-	0.45	31.0	-
16	15.00	SPT	-	-	-	-	9	10	61	20	42	24	18	-	-	-	CI	-	-	-	-	-	-	-	-	81	47	-	-	-	-
17	16.50	SPT	-	-	-	-	3	9	66	22	43	23	20	-	-	-	CI	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
18	17.00	UDS	2.03	1.77	14.86	2.65	0	22	60	18	37	21	16	-	-	-	CI	0.16	28	-	-	TCU	-	-	-	-	-	-	0.50	33.3	-
19	18.00	SPT	-	-	-	-	0	21	50	29	43	17	26	-	-	-	CI	-	-	-	-	-	-	-	-	65	37	-	-	-	-
20	19.50	SPT	-	-	-	-	6	26	41	27	42	18	24	-	-	-	CI	-	-	-	-	-	-	-	-	84	49	-	-	-	-
21	21.00	SPT	-	-	-	-	6	36	33	25	38	16	22	-	-	-	CI	-	-	-	-	-	-	-	-	>100	80	-	-	-	-
22	22.50	SPT	-	-	-	-	0	30	41	29	39	14	25	-	-	-	CI	-	-	-	-	-	-	-	-	>100	78	-	-	-	-
23	24.00	SPT	-	-	-	-	0	27	47	26	41	17	24	-	-	-	CI	-	-	-	-	-	-	-	-	81	35	-	-	-	-
24	25.00	UDS	2.09	1.75	19.28	2.65	1	43	27	29	39	14	25	-	-	-	CI	0.24	26	-	-	TCU	-	-	-	-	-	-	0.51	33.9	-
25	25.50	SPT	-	-	-	-	4	44	33	19	36	18	18	-	-	-	CI	-	-	-	-	-	-	-	-	68	39	-	-	-	-
26	27.00	SPT	-	-	-	-	0	75	13	12	24	15	9	-	-	-	SC	-	-	-	-	-	-	-	-	87	50	-	-	-	-
27	28.50	SPT	-	-	-	-	19	55	6	20	28	16	12	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
28	30.00	SPT	-	-	-	-	6	36	21	37	51	20	31	-	-	-	CH	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
29	31.50	SPT	-	-	-	-	10	26	23	41	54	19	35	-	-	-	CH	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
30	33.00	SPT	-	-	-	-	9	24	32	35	53	21	32	-	-	-	CH	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
31	34.50	SPT	-	-	-	-	0	37	34	29	44	17	27	-	-	-	CI	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
32	36.00	SPT	-	-	-	-	5	38	33	24	39	18	21	-	-	-	CI	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
33	37.50	SPT	-	-	-	-	1	71	7	21	31	17	14	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
34	39.00	SPT	-	-	-	-	0	84	3	13	26	16	10	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
35	40.50	SPT	-	-	-	-	2	73	12	13	27	15	12	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
36	42.00	SPT	-	-	-	-	14	20	29	37	53	20	33	-	-	-	CH	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
37	43.50	SPT	-	-	-	-	0	24	41	35	52	22	30	-	-	-	CH	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
38	45.00	SPT	-	-	-	-	9	15	38	38	55	21	34	-	-	-	CH	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-

UDS - Undisturbed Sample
DS - Disturbed Sample
SPT - Standard Penetration Tests
NP - Non Plastic

TUU - Triaxial Unconsolidated Undrained
TCU - Triaxial Consolidated Undrained
DSU - Direct Shear Test
UCS - Unconfined Compression Strength

KCT Consultancy Services[®] LLP, Ahmedabad

RESULTS OF LABORATORY TEST

Project :- Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for GMRL

BH No. :- 12 (GPP 3 / 19)

Co-Ordinate :- E - 263260, N - 2562544

Sr No	Depth of Sample m	Type of Sample	Field Bulk Density gm / cc	Field Dry Density gm / cc	Natural Moisture Content %	Specific Gravity	Grain Size Analysis				Consistency limits			Shrinkage Limit	Swelling Pressure Kg/cm ²	Free Swell Index %	Soil Classification	Shear Parameter		Unconfined Compression Test Kg/cm ²	UCS by Point Load Index in rock Kg/cm ²	Type of Shear Test	Consolidation Parameters			SPT N Value		Rock Quality Designation %	Void Ratio	Porosity %	
							Gravel %	Sand %	Silt %	Clay %	Liquid Limit %	Plastic Limit %	Plasticity Index %					Cohesion C Kg/cm ²	Angle of Internal Friction ϕ Degree				Compression Index C _c	Coefficient of Volume Compressibility mv cm ² /kg	Pre-consolidation Pressure kg/cm ²	Observed	N 60 (ER 60 %)				
1	0.00	DS	-	-	-	-	20	48	19	13	23	14	9	-	-	-	SC	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	1.50	SPT	-	-	-	-	3	61	19	17	25	15	10	-	-	-	SC	-	-	-	-	-	-	-	-	35	20	-	-	-	-
3	2.00	UDS	1.78	1.62	9.69	2.65	7	45	30	18	28	14	14	-	-	-	SC	0.05	26	-	-	DSU	-	-	-	-	-	-	0.63	38.8	-
4	3.00	SPT	-	-	-	-	7	68	13	12	21	12	9	-	-	-	SC	-	-	-	-	-	-	-	-	34	19	-	-	-	-
5	4.50	SPT	-	-	-	-	17	43	21	19	30	14	16	-	-	-	SC	-	-	-	-	-	-	-	-	49	28	-	-	-	-
6	5.00	UDS	1.83	1.72	6.29	2.65	1	30	41	28	44	18	26	-	-	-	CI	0.15	26	-	-	TCU	0.12	0.0071	3.77	-	-	-	0.54	35.0	-
7	6.00	SPT	-	-	-	-	8	57	19	16	30	20	10	-	-	-	SC	-	-	-	-	-	-	-	-	53	30	-	-	-	-
8	7.50	SPT	-	-	-	-	4	71	15	10	29	21	8	-	-	-	SC	-	-	-	-	-	-	-	-	50	29	-	-	-	-
9	8.00	UDS	1.93	1.79	8.04	2.67	0	69	15	16	31	19	12	-	-	-	SC	0.07	27	-	-	DSU	-	-	-	-	-	-	0.49	33.1	-
10	9.00	SPT	-	-	-	-	14	51	18	17	32	18	14	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
11	10.50	SPT	-	-	-	-	3	54	20	23	41	20	21	-	-	-	SC	-	-	-	-	-	-	-	-	64	37	-	-	-	-
12	11.00	UDS	1.96	1.81	8.49	2.66	8	48	11	33	44	18	26	-	-	-	SC	0.21	20	-	-	DSU	-	-	-	-	-	-	0.47	32.1	-
13	12.00	SPT	-	-	-	-	0	57	19	24	39	16	23	-	-	-	SC	-	-	-	-	-	-	-	-	81	47	-	-	-	-
14	13.50	SPT	-	-	-	-	10	48	15	27	38	17	21	-	-	-	SC	-	-	-	-	-	-	-	-	>100	94	-	-	-	-
15	14.00	UDS	2.06	1.86	10.89	2.66	12	18	33	37	54	21	33	-	-	-	CH	0.23	25	-	-	TCU	-	-	-	-	-	-	0.43	30.2	-
16	15.00	SPT	-	-	-	-	7	14	43	36	56	24	32	-	-	-	CH	-	-	-	-	-	-	-	-	73	42	-	-	-	-
17	16.50	SPT	-	-	-	-	10	11	56	23	46	25	21	-	-	-	CI	-	-	-	-	-	-	-	-	65	37	-	-	-	-
18	17.00	UDS	2.11	1.77	18.95	2.67	17	12	49	22	47	28	19	-	-	-	CI	0.16	28	-	-	TCU	-	-	-	-	-	-	0.51	33.6	-
19	18.00	SPT	-	-	-	-	10	20	41	29	49	23	26	-	-	-	CI	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
20	19.50	SPT	-	-	-	-	2	22	44	32	47	19	28	-	-	-	CI	-	-	-	-	-	-	-	-	60	35	-	-	-	-
21	21.00	SPT	-	-	-	-	0	28	46	26	39	16	23	-	-	-	CI	-	-	-	-	-	-	-	-	>100	72	-	-	-	-
22	22.50	SPT	-	-	-	-	4	43	33	20	37	19	18	-	-	-	CI	-	-	-	-	-	-	-	-	74	43	-	-	-	-
23	24.00	SPT	-	-	-	-	0	38	35	27	39	16	23	-	-	-	CI	-	-	-	-	-	-	-	-	61	35	-	-	-	-
24	25.50	SPT	-	-	-	-	9	31	30	30	40	15	25	-	-	-	CI	-	-	-	-	-	-	-	-	66	38	-	-	-	-
25	27.00	SPT	-	-	-	-	0	60	27	13	30	18	12	-	-	-	SC	-	-	-	-	-	-	-	-	64	37	-	-	-	-
26	28.50	SPT	-	-	-	-	0	83	5	12	26	17	9	-	-	-	SC	-	-	-	-	-	-	-	-	87	50	-	-	-	-
27	30.00	SPT	-	-	-	-	15	46	13	26	46	21	25	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
28	31.50	SPT	-	-	-	-	16	47	13	24	43	23	20	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
29	33.00	SPT	-	-	-	-	14	26	29	31	45	17	28	-	-	-	CI	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
30	34.50	SPT	-	-	-	-	10	25	31	34	49	19	30	-	-	-	CI	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
31	36.00	SPT	-	-	-	-	2	33	33	32	44	17	27	-	-	-	CI	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
32	37.50	SPT	-	-	-	-	1	30	38	31	48	20	28	-	-	-	CI	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
33	39.00	SPT	-	-	-	-	0	27	39	34	49	19	30	-	-	-	CI	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
34	40.50	SPT	-	-	-	-	14	70	5	11	25	18	7	-	-	-	SM-SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
35	42.00	SPT	-	-	-	-	0	86	7	7	23	17	6	-	-	-	SM-SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
36	43.50	SPT	-	-	-	-	0	87	5	8	23	17	6	-	-	-	SM-SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
37	45.00	SPT	-	-	-	-	11	49	24	16	29	16	13	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-

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RESULTS OF LABORATORY TEST

Project :- Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for GMRL

BH No. :- 13 (GP 5 / 21)

Co-Ordinate :- E - 261842, N - 2564697

Sr No	Depth of Sample m	Type of Sample	Field Bulk Density gm / cc	Field Dry Density gm / cc	Natural Moisture Content %	Specific Gravity	Grain Size Analysis				Consistency limits			Shrinkage Limit	Swelling Pressure Kg/cm ²	Free Swell Index	Soil Classification	Shear Parameter		Unconfined Compression Test Kg/cm ²	UCS by Point Load Index in rock Kg/cm ²	Type of Shear Test	Consolidation Parameters			SPT N Value		Rock Quality Designation %	Void Ratio	Porosity %	
							Gravel %	Sand %	Silt %	Clay %	Liquid Limit %	Plastic Limit %	Plasticity Index %					Cohesion C Kg/cm ²	Angle of Internal Friction ϕ Degree				Compression Index C _c	Coefficient of Volume Compressibility m _v cm ² /kg	Pre-consolidation Pressure kg/cm ²	Observed	N 60 (ER 60 %)				
1	0.00	DS	-	-	-	-	0	71	12	17	28	15	13	-	-	-	SC	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	1.50	SPT	-	-	-	-	8	68	11	13	25	14	11	-	-	-	SC	-	-	-	-	-	-	-	-	11	6	-	-	-	-
3	2.00	UDS	1.59	1.49	6.49	2.66	6	70	10	14	26	13	13	-	-	-	SC	0.04	24	-	-	DSU	-	-	-	-	-	-	-	0.78	43.9
4	3.00	SPT	-	-	-	-	10	69	13	8	20	15	5	-	-	-	SM	-	-	-	-	-	-	-	-	22	12	-	-	-	-
5	4.50	SPT	-	-	-	-	10	75	12	3	NP	NP	NP	-	-	-	SM	-	-	-	-	-	-	-	-	37	21	-	-	-	-
6	5.00	UDS	1.89	1.73	9.01	2.67	9	71	16	4	NP	NP	NP	-	-	-	SM	0.00	32	-	-	DSU	-	-	-	-	-	-	-	0.54	35.1
7	6.00	SPT	-	-	-	-	24	57	14	5	21	17	4	-	-	-	SM	-	-	-	-	-	-	-	-	63	36	-	-	-	-
8	7.50	SPT	-	-	-	-	6	72	14	8	24	19	5	-	-	-	SM	-	-	-	-	-	-	-	-	69	40	-	-	-	-
9	8.00	Remoulded	1.96	1.82	7.92	2.67	6	80	11	3	NP	NP	NP	-	-	-	SM	0.00	33	-	-	DSU	-	-	-	-	-	-	-	0.47	32.0
10	9.00	SPT	-	-	-	-	9	73	11	7	22	18	4	-	-	-	SM	-	-	-	-	-	-	-	-	77	44	-	-	-	-
11	10.50	SPT	-	-	-	-	23	65	10	2	NP	NP	NP	-	-	-	SM	-	-	-	-	-	-	-	-	85	49	-	-	-	-
12	11.00	DS	-	-	-	-	0	69	23	8	25	20	5	-	-	-	SM	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13	12.00	SPT	-	-	-	-	4	78	12	6	22	18	4	-	-	-	SM	-	-	-	-	-	-	-	-	56	32	-	-	-	-
14	13.50	SPT	-	-	-	-	4	57	16	23	29	15	14	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
15	14.00	Remoulded	2.20	2.00	9.87	2.66	0	76	9	15	26	16	10	-	-	-	SC	0.06	31	-	-	DSU	-	-	-	-	-	-	-	0.33	24.7
16	15.00	SPT	-	-	-	-	7	59	19	15	27	15	12	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
17	16.50	SPT	-	-	-	-	23	37	21	19	29	13	16	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
18	17.00	UDS	2.19	1.89	15.97	2.65	4	16	60	20	40	22	18	-	-	-	CI	-	-	8.6	-	UCS	-	-	-	-	-	-	-	0.40	28.7
19	18.00	SPT	-	-	-	-	17	14	46	23	41	20	21	-	-	-	CI	-	-	-	-	-	-	-	-	>100	60	-	-	-	-
20	19.50	SPT	-	-	-	-	14	10	50	26	43	19	24	-	-	-	CI	-	-	-	-	-	-	-	-	>100	58	-	-	-	-
21	21.00	SPT	-	-	-	-	1	45	37	17	38	23	15	-	-	-	CI	-	-	-	-	-	-	-	-	84	49	-	-	-	-
22	22.50	SPT	-	-	-	-	2	17	57	24	42	20	22	-	-	-	CI	-	-	-	-	-	-	-	-	68	39	-	-	-	-
23	24.00	SPT	-	-	-	-	21	36	26	17	29	18	11	-	-	-	SC	-	-	-	-	-	-	-	-	65	37	-	-	-	-
24	25.50	SPT	-	-	-	-	0	61	22	17	26	16	10	-	-	-	SC	-	-	-	-	-	-	-	-	68	39	-	-	-	-
25	27.00	SPT	-	-	-	-	7	26	49	18	40	23	17	-	-	-	CI	-	-	-	-	-	-	-	-	61	35	-	-	-	-
26	28.50	SPT	-	-	-	-	0	23	50	27	43	19	24	-	-	-	CI	-	-	-	-	-	-	-	-	92	53	-	-	-	-
27	30.00	SPT	-	-	-	-	2	29	46	23	41	20	21	-	-	-	CI	-	-	-	-	-	-	-	-	93	54	-	-	-	-
28	31.50	SPT	-	-	-	-	3	26	46	25	44	22	22	-	-	-	CI	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
29	33.00	SPT	-	-	-	-	5	25	42	28	46	21	25	-	-	-	CI	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
30	34.50	SPT	-	-	-	-	24	32	31	13	30	18	12	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
31	36.00	SPT	-	-	-	-	5	69	19	7	21	16	5	-	-	-	SM	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
32	37.50	SPT	-	-	-	-	0	4	65	31	46	19	27	-	-	-	CI	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
33	39.00	SPT	-	-	-	-	4	37	37	22	42	23	19	-	-	-	CI	-	-	-	-	-	-	-	-	86	50	-	-	-	-
34	40.50	SPT	-	-	-	-	0	16	57	27	45	21	24	-	-	-	CI	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
35	42.00	SPT	-	-	-	-	0	30	47	23	41	20	21	-	-	-	CI	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
36	43.50	SPT	-	-	-	-	0	78	12	10	25	16	9	-	-	-	SC	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-
37	45.00	SPT	-	-	-	-	0	16	62	22	42	22	20	-	-	-	CI	-	-	-	-	-	-	-	-	>100	>100	-	-	-	-

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RESULTS OF LABORATORY TEST

Project :- Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for GMRL

BH No. :- 14 (GP 3 / 29)

Co-Ordinate :- E - 263682, N - 2563128

Sr No	Depth of Sample m	Type of Sample	Field Bulk Density gm / cc	Field Dry Density gm / cc	Natural Moisture Content %	Specific Gravity	Grain Size Analysis				Consistency limits			Shrinkage Limit %	Swelling Pressure Kg/cm²	Free Swell Index %	Soil Classification	Shear Parameter		Unconfined Compression Test Kg/cm²	UCS by Point Load Index in rock Kg/cm²	Type of Shear Test	Consolidation Parameters			SPT N Value		Rock Quality Designation %	Void Ratio	Porosity %	
							Gravel %	Sand %	Silt %	Clay %	Liquid Limit %	Plastic Limit %	Plasticity Index %					Cohesion C Kg/cm²	Angle of Internal Friction ϕ Degree				Compression Index C _c cm²/kg	Coefficient of Volume Compressibility m _v kg/cm²	Pre-consolidation Pressure kg/cm²	Observed	N 60 (ER 60 %)				
1	0.00	DS	-	-	-	-	10	63	17	10	23	15	8	-	-	-	SC	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	1.50	SPT	-	-	-	-	20	51	18	11	25	15	10	-	-	-	SC	-	-	-	-	-	-	-	-	27	15	-	-	-	-
3	2.00	UDS	1.62	1.54	5.35	2.66	4	59	27	10	23	14	9	-	-	-	SC	0.08	26	-	-	DSU	-	-	-	-	-	-	0.73	42.2	-
4	3.00	SPT	-	-	-	-	11	43	24	22	34	16	18	-	-	-	SC	-	-	-	-	-	-	-	-	11	6	-	-	-	-
5	4.50	SPT	-	-	-	-	6	15	58	21	38	19	19	-	-	-	CI	-	-	-	-	-	-	-	-	10	5	-	-	-	-
6	5.00	UDS	1.70	1.49	13.81	2.64	5	13	55	27	43	18	25	-	-	-	CI	0.40	4	-	-	TUU	0.18	0.0293	0.59	-	-	-	0.77	43.4	-
7	6.00	SPT	-	-	-	-	26	29	14	31	39	16	23	-	-	-	SC	-	-	-	-	-	-	-	-	17	9	-	-	-	-
8	7.50	SPT	-	-	-	-	0	63	26	11	22	13	9	-	-	-	SC	-	-	-	-	-	-	-	-	22	12	-	-	-	-
9	8.00	UDS	1.87	1.60	17.06	2.65	0	65	25	10	24	15	9	-	-	-	SC	0.05	27	-	-	DSU	-	-	-	-	-	-	0.66	39.7	-
10	9.00	SPT	-	-	-	-	0	79	13	8	21	16	5	-	-	-	SM	-	-	-	-	-	-	-	-	40	23	-	-	-	-
11	10.50	SPT	-	-	-	-	0	66	22	12	24	16	8	-	-	-	SC	-	-	-	-	-	-	-	-	37	21	-	-	-	-
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13	12.00	SPT	-	-	-	-	38	45	8	9	19	13	6	-	-	-	SM-SC	-	-	-	-	-	-	-	-	71	41	-	-	-	-
14	13.50	SPT	-	-	-	-	1	16	58	25	42	20	22	-	-	-	CI	-	-	-	-	-	-	-	-	43	25	-	-	-	-
15	14.00	UDS	2.01	1.74	15.28	2.67	22	10	40	28	43	19	24	-	-	-	CI	1.83	6	-	-	TUU	0.11	0.0065	5.11	-	-	-	0.53	34.7	-
16	15.00	SPT	-	-	-	-	32	11	38	19	40	23	17	-	-	-	CI	-	-	-	-	-	-	-	-	65	37	-	-	-	-
17	16.50	SPT	-	-	-	-	4	31	50	15	36	22	14	-	-	-	CI	-	-	-	-	-	-	-	-	57	33	-	-	-	-
18	17.00	UDS	1.98	1.77	11.86	2.66	0	33	44	23	37	17	20	-	-	-	CI	0.23	25	-	-	TCU	0.10	0.0051	7.34	-	-	-	0.50	33.5	-
19	18.00	SPT	-	-	-	-	0	54	26	20	31	15	16	-	-	-	SC	-	-	-	-	-	-	-	-	67	39	-	-	-	-
20	19.50	SPT	-	-	-	-	32	52	7	9	25	17	8	-	-	-	SC	-	-	-	-	-	-	-	-	49	28	-	-	-	-
21	20.00	UDS	1.97	1.81	8.93	2.68	16	48	7	29	32	15	17	-	-	-	SC	0.09	30	-	-	DSU	-	-	-	-	-	-	0.48	32.5	-
22	21.00	SPT	-	-	-	-	0	46	31	23	36	16	20	-	-	-	CI	-	-	-	-	-	-	-	-	95	55	-	-	-	-
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UDS - Undisturbed Sample
DS - Disturbed Sample
SPT - Standard Penetration Tests
NP - Non Plastic

TUU - Triaxial Unconsolidated Undrained
TCU - Triaxial Consolidated Undrained
DSU - Direct Shear Test
UCS - Unconfined Compression Strength

KCT Consultancy Services[®] LLP, Ahmedabad

RESULTS OF LABORATORY TEST

Project :- Proposed structure in GIFT City Extension Line (3.33 km elevated viaduct in Phase 2 B) of Ahmedabad Metro Rail, Project Phase 2 Gandhinagar for GMRC

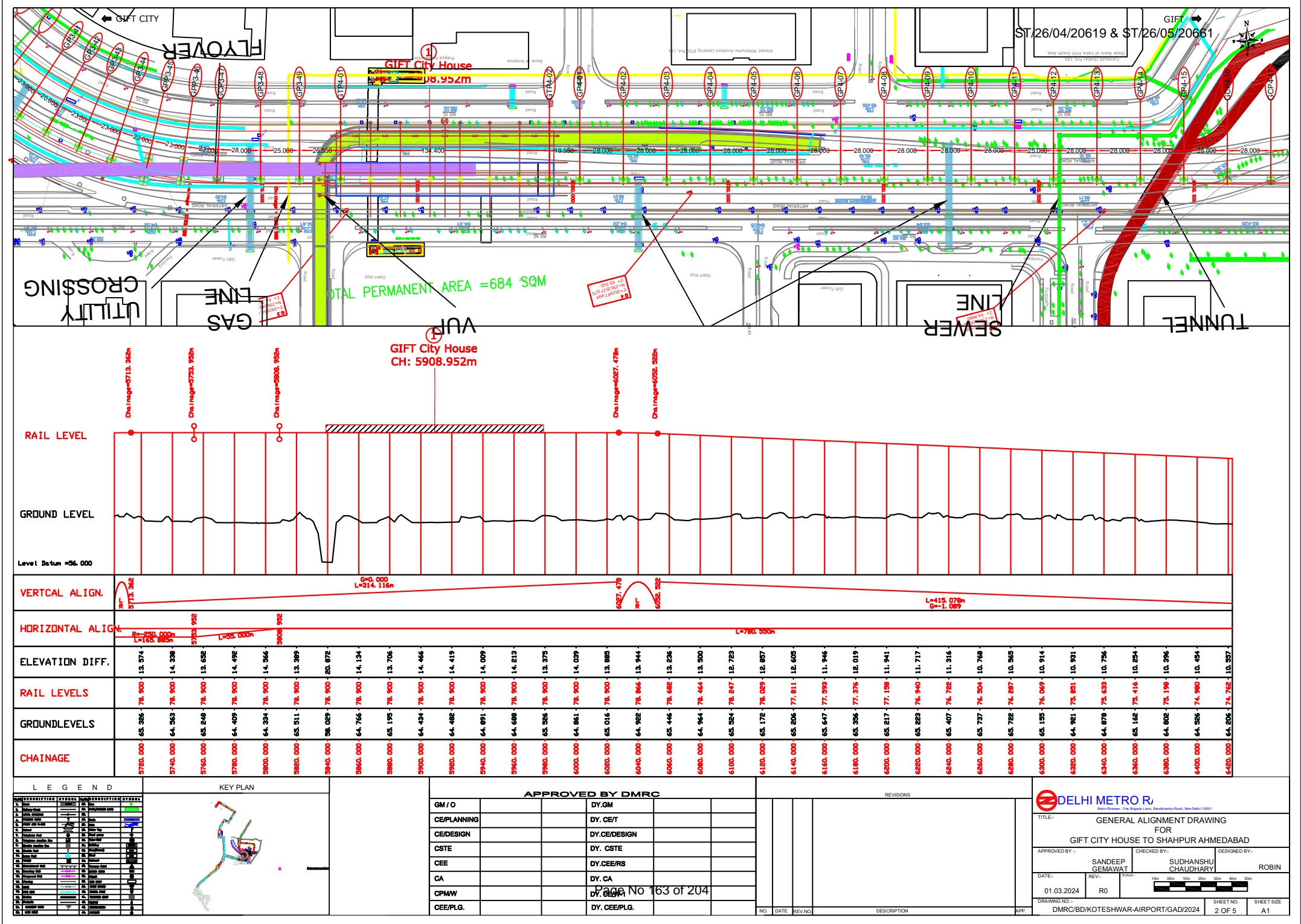
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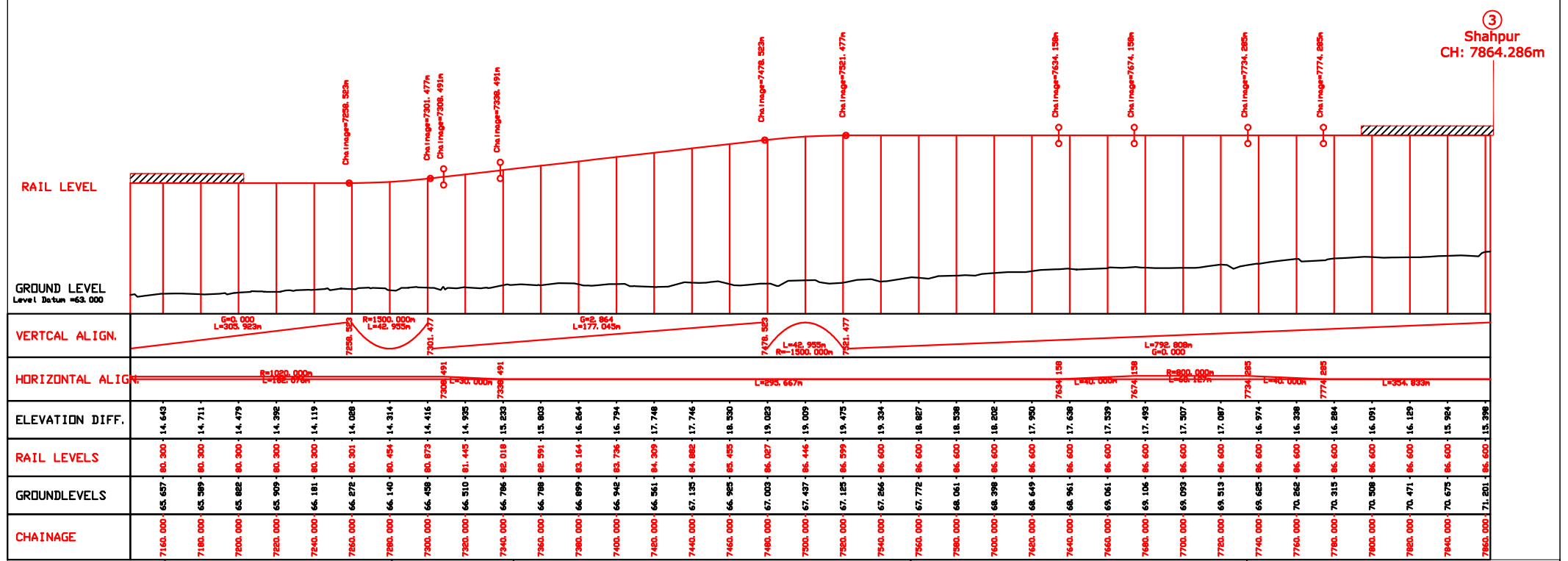
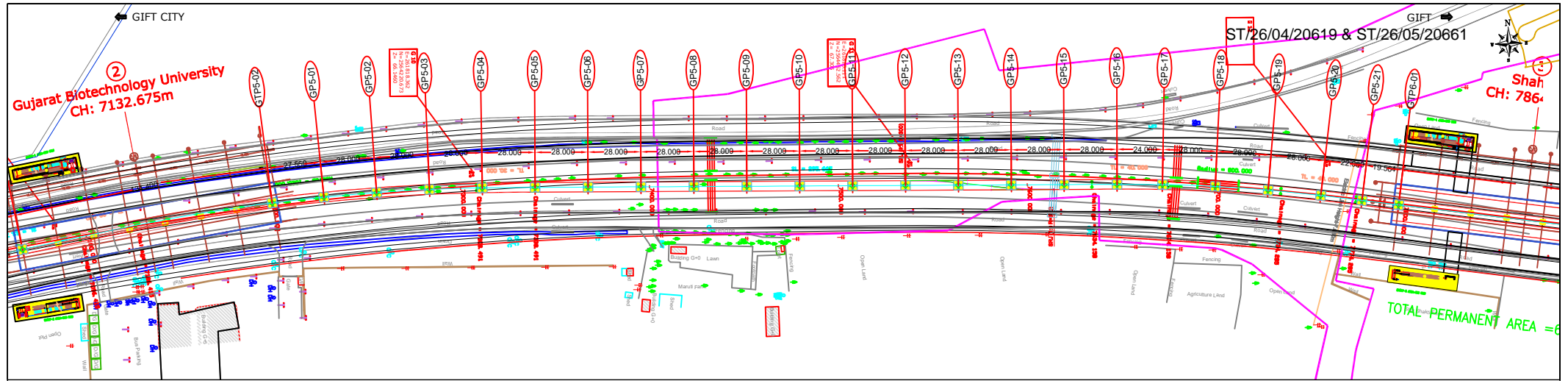
Co-Ordinate :- E - 263071, N - 2563355

Sr No	Depth of Sample m	Type of Sample	Field Bulk Density gm / cc	Field Dry Density gm / cc	Natural Moisture Content %	Specific Gravity	Grain Size Analysis				Consistency limits			Shrinkage Limit	Swelling Pressure Kg/cm ²	Free Swell Index %	Soil Classification	Shear Parameter		Unconfined Compression Test Kg/cm ²	UCS by Point Load Index in rock Kg/cm ²	Type of Shear Test	Consolidation Parameters			SPT N Value		Rock Quality Designation %	Void Ratio	Porosity %
							Gravel %	Sand %	Silt %	Clay %	Liquid Limit %	Plastic Limit %	Plasticity Index %					Cohesion C Kg/cm ²	Angle of Internal Friction φ Degree				Compression Index C _c	Coefficient of Volume Compressibility m _v cm ² /kg	Pre-consolidation Pressure kg/cm ²	Observed	N 60 (ER 60 %)			
1	0.00	DS	-	-	-	-	9	27	47	17	32	17	15	-	-	-	CL	-	-	-	-	-	-	-	-	-	-	-	-	-
2	1.50	SPT	-	-	-	-	5	57	25	13	24	13	11	-	-	-	SC	-	-	-	-	-	-	-	39	22	-	-	-	-
3	2.00	UDS	1.69	1.60	5.39	2.65	11	47	23	19	26	12	14	-	-	-	SC	0.06	26	-	-	DSU	-	-	-	-	-	-	0.65	39.5
4	3.00	SPT	-	-	-	-	5	60	18	17	25	13	12	-	-	-	SC	-	-	-	-	-	-	-	23	13	-	-	-	-
5	4.50	SPT	-	-	-	-	9	43	27	21	32	15	17	-	-	-	SC	-	-	-	-	-	-	-	40	23	-	-	-	-
6	5.00	UDS	1.88	1.73	8.37	2.67	22	40	20	18	30	16	14	-	-	-	SC	0.04	28	-	-	DSU	-	-	-	-	-	-	0.54	35.0
7	6.00	SPT	-	-	-	-	6	50	25	19	29	17	12	-	-	-	SC	-	-	-	-	-	-	-	63	36	-	-	-	-
8	7.50	SPT	-	-	-	-	8	52	30	10	25	18	7	-	-	-	SM-SC	-	-	-	-	-	-	-	46	26	-	-	-	-
9	8.00	UDS	1.79	1.66	7.64	2.65	4	65	22	9	26	20	6	-	-	-	SM-SC	0.02	29	-	-	DSU	-	-	-	-	-	-	0.59	37.2
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23	22.00	UDS	1.95	1.75	11.73	2.65	5	14	59	22	41	22	19	-	-	-	CI	2.64	2	-	-	TUU	-	-	-	-	-	-	0.52	34.1
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25	24.00	SPT	-	-	-	-	9	55	24	12	26	15	11	-	-	-	SC	-	-	-	-	-	-	-	>100	>100	-	-	-	-
26	25.50	SPT	-	-	-	-	26	32	16	26	39	16	23	-	-	-	SC	-	-	-	-	-	-	-	>100	>100	-	-	-	-
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29	30.00	SPT	-	-	-	-	0	84	8	8	21	16	5	-	-	-	SM	-	-	-	-	-	-	-	>100	>100	-	-	-	-
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31	33.00	SPT	-	-	-	-	4	32	41	23	40	19	21	-	-	-	CI	-	-	-	-	-	-	-	>100	>100	-	-	-	-
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39	45.00	SPT	-	-	-	-	0	48	24	28	42	18	24	-	-	-	CI	-	-	-	-	-	-	-	>100	>100	-	-	-	-

UDS - Undisturbed Sample
DS - Disturbed Sample
SPT - Standard Penetration Tests
NP - Non Plastic

TUU - Triaxial Unconsolidated Undrained
TCU - Triaxial Consolidated Undrained
DSU - Direct Shear Test
UCS - Unconfined Compression Strength





LEGEND

APPROVED BY DMRC

GM / O	DY.GM
CE/PLANNING	DY. CE/T
CE/DESIGN	DY. CE/DESIGN
CSTE	DY. CSTE
CEE	DY. CEE/RS
CA	DY. CA
CPMW	DY. CPMW
CEE/PLG.	DY. CEE/PLG.

REVISIONS

NO.	DATE	REV. NO.	DESCRIPTION	APP.

DELHI METRO R

TITLE:-
GENERAL ALIGNMENT DRAWING
FOR
GIFT CITY HOUSE TO SHAHPUR AHMEDABAD

APPROVED BY:-
SANDEEP
GEMAWAT

CHECKED BY:-
SUDHANSHU
CHAUDHARY

DESIGNED BY:-
ROBIN

DATE:-
01.03.2024

REV:-
R0

SCALE:-
10m 00m 20m 30m 40m 50m

DRAWING NO:-
DMRC/BD/KOTESHWAR-AIRPORT/GAD/2024

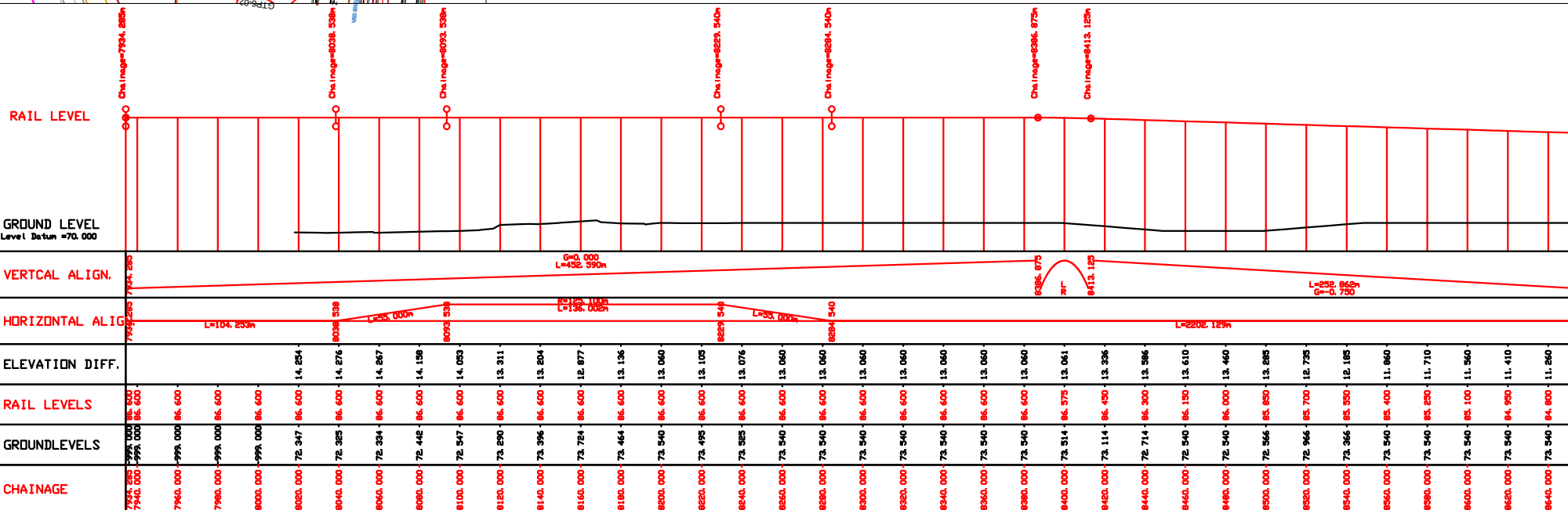
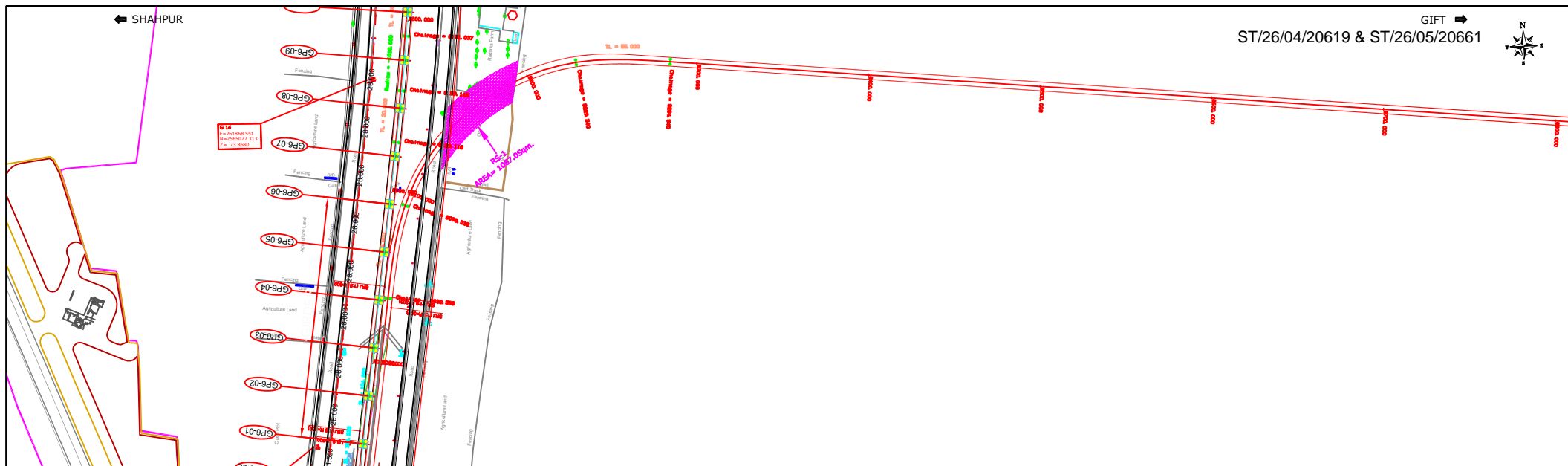
SHEET NO.
4 OF 5

SHEET SIZE
A1

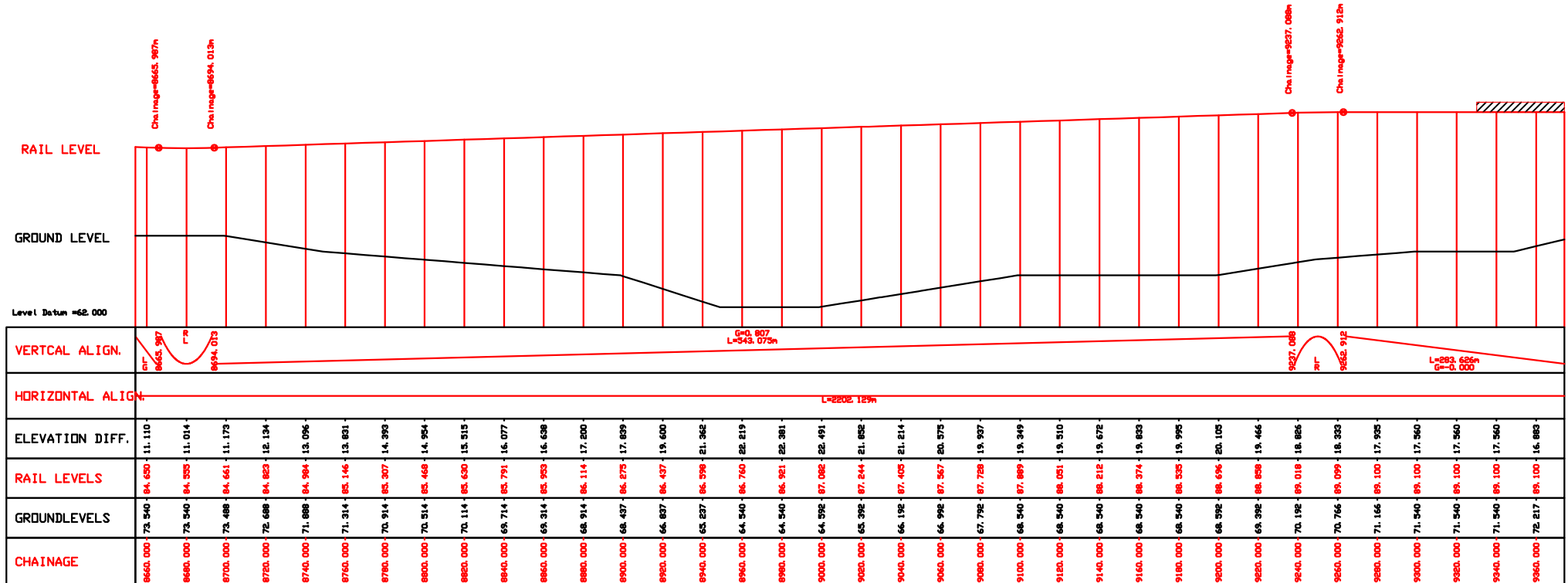
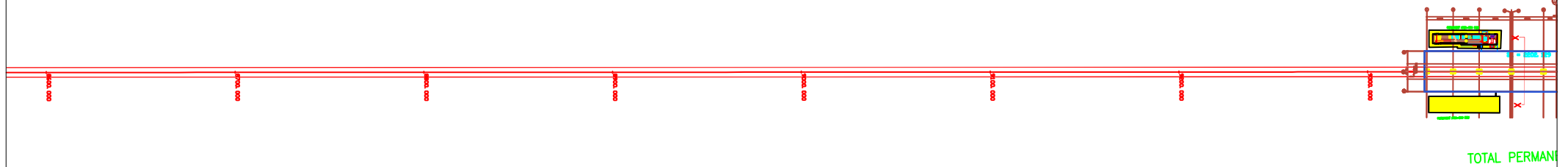
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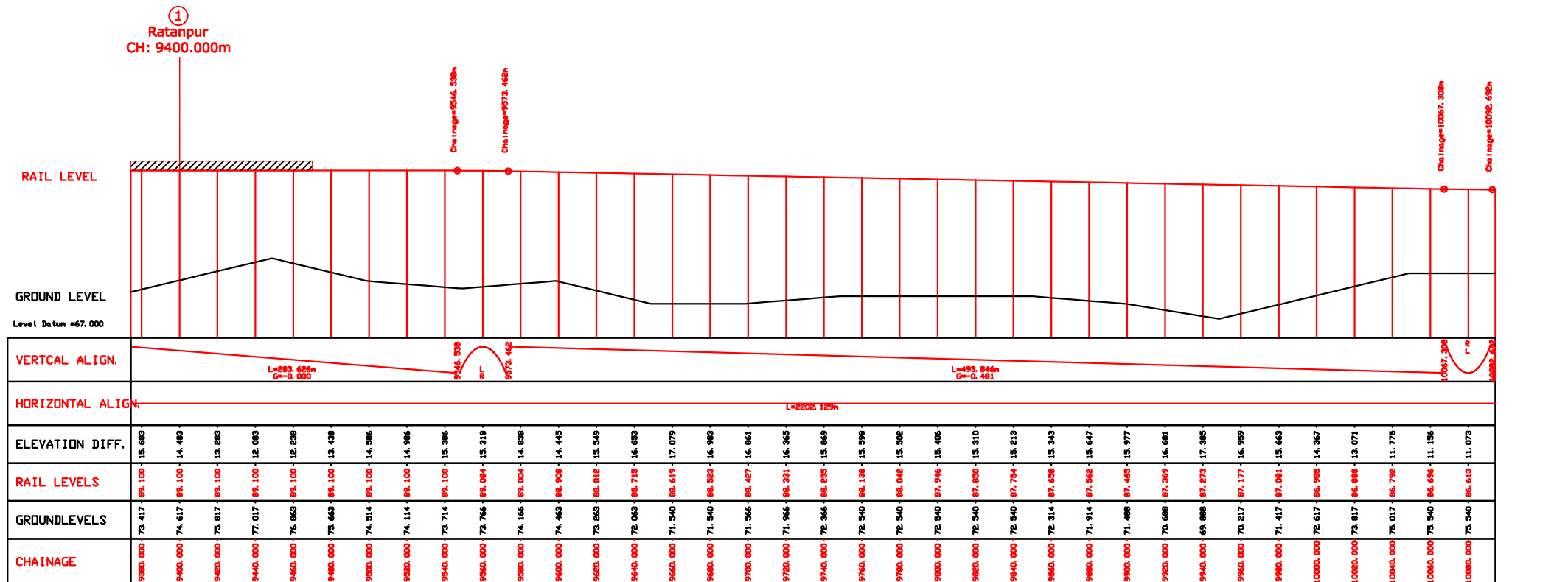
← SHAHPUR

GIFT →
ST/26/04/20619 & ST/26/05/20661



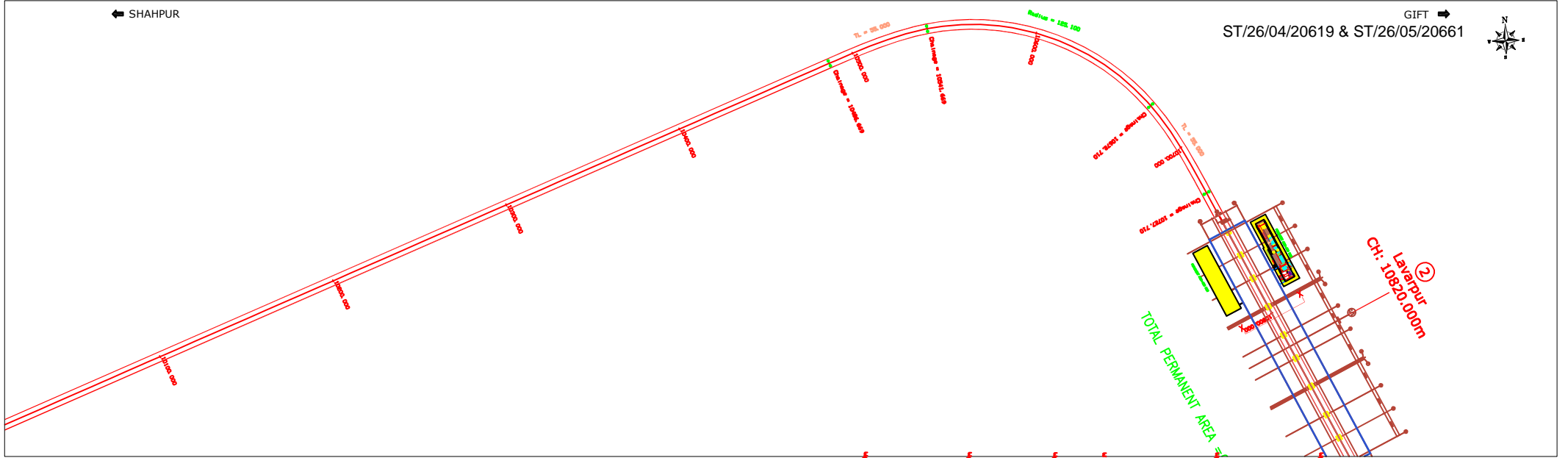
LEGEND					KEY PLAN		APPROVED BY DMRC					REVISIONS					DELHI METRO R/ <small>Metro Division - File Designation: Koteswara Road, New Delhi-110001</small>																																																																																																																														
<table><tr><th>NO.</th><th>DESCRIPTION</th><th>DATE</th><th>BY</th><th>CHKD.</th><th>APPD.</th></tr><tr><td>1</td><td>General Alignment</td><td>01.03.2024</td><td>RO</td><td></td><td></td></tr><tr><td>2</td><td>Vertical Alignment</td><td>01.03.2024</td><td>RO</td><td></td><td></td></tr><tr><td>3</td><td>Horizontal Alignment</td><td>01.03.2024</td><td>RO</td><td></td><td></td></tr><tr><td>4</td><td>Elevation Diff.</td><td>01.03.2024</td><td>RO</td><td></td><td></td></tr><tr><td>5</td><td>Rail Levels</td><td>01.03.2024</td><td>RO</td><td></td><td></td></tr><tr><td>6</td><td>Ground Levels</td><td>01.03.2024</td><td>RO</td><td></td><td></td></tr><tr><td>7</td><td>Chainage</td><td>01.03.2024</td><td>RO</td><td></td><td></td></tr></table>					NO.	DESCRIPTION	DATE	BY	CHKD.	APPD.	1	General Alignment	01.03.2024	RO			2	Vertical Alignment	01.03.2024	RO			3	Horizontal Alignment	01.03.2024	RO			4	Elevation Diff.	01.03.2024	RO			5	Rail Levels	01.03.2024	RO			6	Ground Levels	01.03.2024	RO			7	Chainage	01.03.2024	RO					<table><tr><th>GM / O</th><th></th><th></th><th>DY. GM</th><th></th><th></th></tr><tr><td>CE/PLANNING</td><td></td><td></td><td>DY. CE/T</td><td></td><td></td></tr><tr><td>CE/DESIGN</td><td></td><td></td><td>DY. CE/DESIGN</td><td></td><td></td></tr><tr><td>CSTE</td><td></td><td></td><td>DY. CSTE</td><td></td><td></td></tr><tr><td>CEE</td><td></td><td></td><td>DY. CEE/RS</td><td></td><td></td></tr><tr><td>CA</td><td></td><td></td><td>DY. CA</td><td></td><td></td></tr><tr><td>CPMW</td><td></td><td></td><td>DY. CPMW</td><td></td><td></td></tr><tr><td>CEE/PLG.</td><td></td><td></td><td>DY. CEE/PLG.</td><td></td><td></td></tr></table>					GM / O			DY. GM			CE/PLANNING			DY. CE/T			CE/DESIGN			DY. CE/DESIGN			CSTE			DY. CSTE			CEE			DY. CEE/RS			CA			DY. CA			CPMW			DY. CPMW			CEE/PLG.			DY. CEE/PLG.			<table><tr><th>NO.</th><th>DATE</th><th>REV. NO.</th><th>DESCRIPTION</th><th>APP.</th></tr><tr><td></td><td></td><td></td><td></td><td></td></tr></table>					NO.	DATE	REV. NO.	DESCRIPTION	APP.						<table><tr><td colspan="2">APPROVED BY -</td><td>CHECKED BY -</td><td>DESIGNED BY -</td></tr><tr><td colspan="2">SANDEEP GEMAWAT</td><td>SUDHANSHU CHAUDHARY</td><td>ROBIN</td></tr><tr><td colspan="2">DATE - 01.03.2024</td><td>REV. - R0</td><td>SCALE - </td></tr><tr><td colspan="2">DRAWING NO. - DMRC/BD/KOTESHWAR-AIRPORT/GAD/2024</td><td>SHEET NO. 1 OF 6</td><td>SHEET SIZE A1</td></tr></table>					APPROVED BY -		CHECKED BY -	DESIGNED BY -	SANDEEP GEMAWAT		SUDHANSHU CHAUDHARY	ROBIN	DATE - 01.03.2024		REV. - R0	SCALE -	DRAWING NO. - DMRC/BD/KOTESHWAR-AIRPORT/GAD/2024		SHEET NO. 1 OF 6	SHEET SIZE A1
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SHAHPUR

GIFT
ST/26/04/20619 & ST/26/05/20661



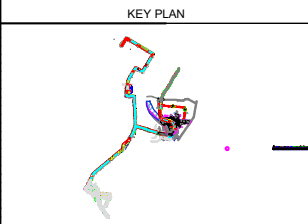
RAIL LEVEL

GROUND LEVEL

Level Datum =69.000

VERTICAL ALIGN.																				
HORIZONTAL ALIGN.																				
ELEVATION DIFF.	11.074	11.462	11.851	12.425	13.254	13.939	13.128	12.316	11.721	11.319	10.923	10.281	10.909	11.124	11.512	11.875	11.863	11.852	12.292	
RAIL LEVELS	86.398	86.377	86.365	86.354	86.342	86.331	86.319	86.308	86.296	86.285	86.273	86.262	86.250	86.239	86.227	86.215	86.204	86.192	86.181	
GROUNDLEVELS	75.314	73.114	74.714	74.088	73.288	72.592	73.392	74.192	74.766	75.156	75.540	75.540	75.540	75.540	75.540	75.540	75.540	75.540	75.540	
CHAINAGE	10100.000	10120.000	10140.000	10160.000	10180.000	10200.000	10220.000	10240.000	10260.000	10280.000	10300.000	10320.000	10340.000	10360.000	10380.000	10400.000	10420.000	10440.000	10460.000	

LEGEND	
1. Right of Way	2. Right of Way
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93. Right of Way	94. Right of Way
95. Right of Way	96. Right of Way
97. Right of Way	98. Right of Way
99. Right of Way	100. Right of Way



APPROVED BY DMRC	
GM / O	DY.GM
CE/PLANNING	DY. CE/T
CE/DESIGN	DY. CE/DESIGN
CSTE	DY. CSTE
CEE	DY. CEE/RS
CA	DY. CA
CPMWW	DY. CPMWW
CEE/PLG.	DY. CEE/PLG.

REVISIONS	
NO.	DATE
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2	01.03.2024
3	01.03.2024
4	01.03.2024
5	01.03.2024
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97	01.03.2024
98	01.03.2024
99	01.03.2024
100	01.03.2024

TITLE:-
GENERAL ALIGNMENT DRAWING
FOR
SHAHPUR TO GIFT AHMEDABAD

APPROVED BY:-
SANDHEEP
GEMAWAT

CHECKED BY:-
SUDHANSHU
CHAUDHARY

DESIGNED BY:-
ROBIN

DATE:-
01.03.2024

REV:-
R0

SCALE:-
1:1000

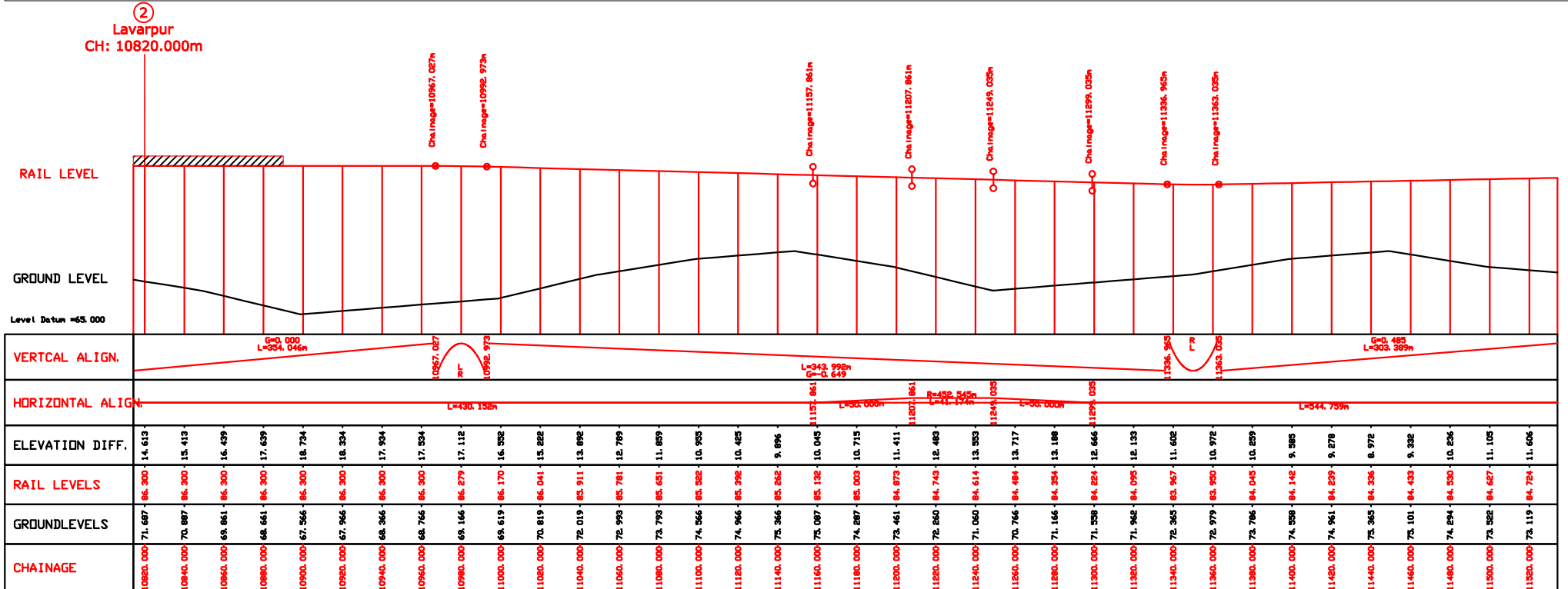
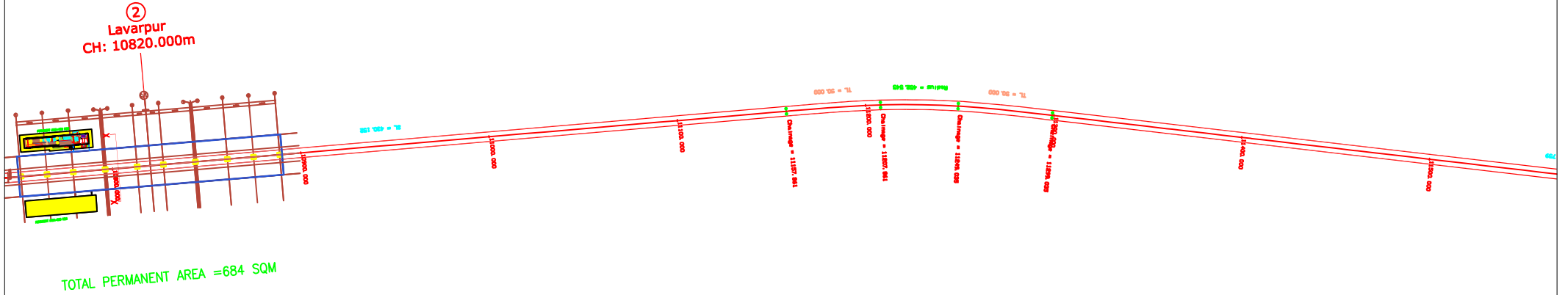
DRAWING NO:-
DMRC/BD/KOTESHWAR-AIRPORT/GAD/2024

SHEET NO.
4 OF 6

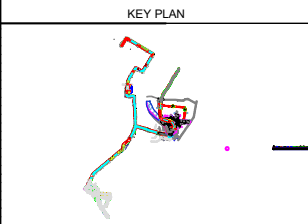
SHEET SIZE
A1

SHAHPUR

GIFT
ST/26/04/20619 & ST/26/05/20661



LEGEND		
NO.	DESCRIPTION	SYMBOL
1	Right of Way	Red line
2	Track Centerline	Blue line
3	Ground Level	Black line
4	Rail Level	Red line
5	Elevation Difference	Red line
6	Horizontal Alignment	Red line
7	Vertical Alignment	Red line
8	Chainage	Red line
9	Ground Levels	Black line
10	Rail Levels	Red line
11	Elevation Difference	Red line
12	Horizontal Alignment	Red line
13	Vertical Alignment	Red line
14	Chainage	Red line
15	Ground Levels	Black line
16	Rail Levels	Red line
17	Elevation Difference	Red line
18	Horizontal Alignment	Red line
19	Vertical Alignment	Red line
20	Chainage	Red line



APPROVED BY DMRC			
GM / O		DY. GM	
CE/PLANNING		DY. CE/T	
CE/DESIGN		DY. CE/DESIGN	
CSTE		DY. CSTE	
CEE		DY. CEE/RS	
CA		DY. CA	
CPMW		DY. CPMW	
CEE/PLG.		DY. CEE/PLG.	

REVISIONS			
NO.	DATE	REV. NO.	DESCRIPTION

DELHI METRO R
Metro Division - Phase II, Sector 1, Connaught Place, New Delhi 110021

TITLE:-
GENERAL ALIGNMENT DRAWING
FOR
SHAHPUR TO GIFT AHMEDABAD

APPROVED BY:-
SANDEEP GEMAWAT

CHECKED BY:-
SUDHANSHU CHAUDHARY

DESIGNED BY:-
ROBIN

DATE:-
01.03.2024

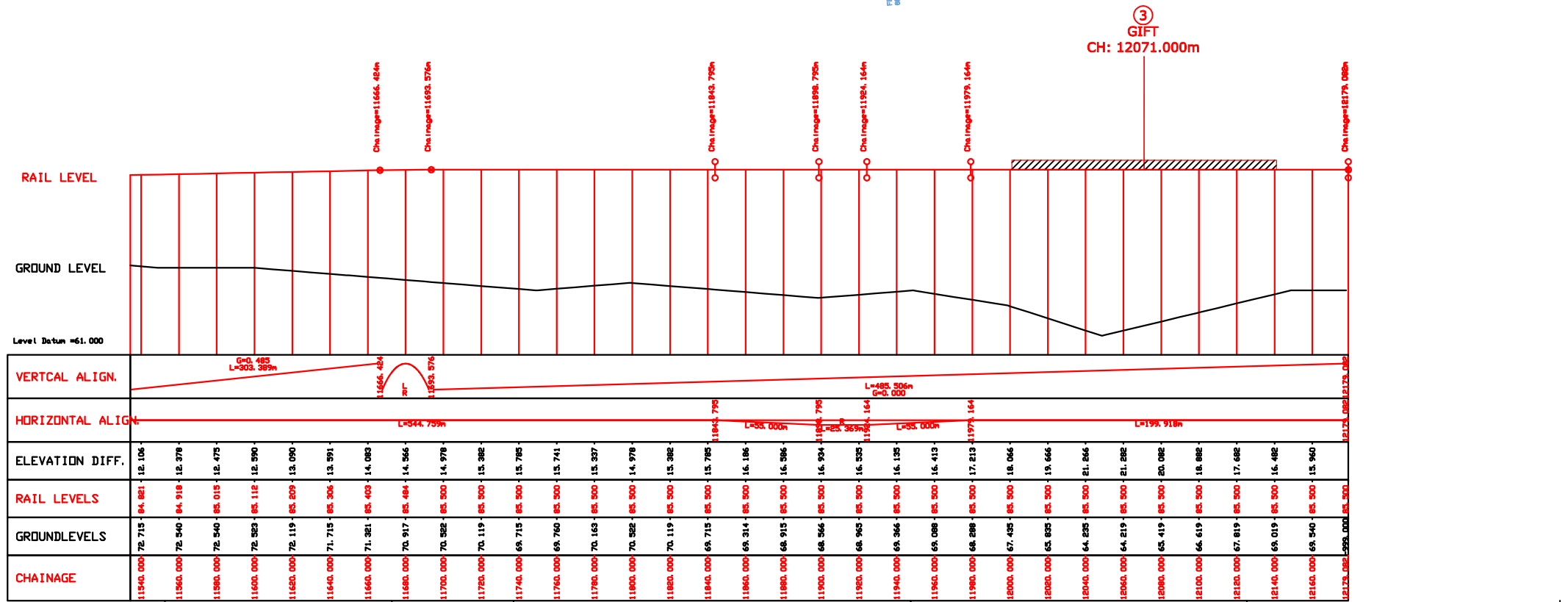
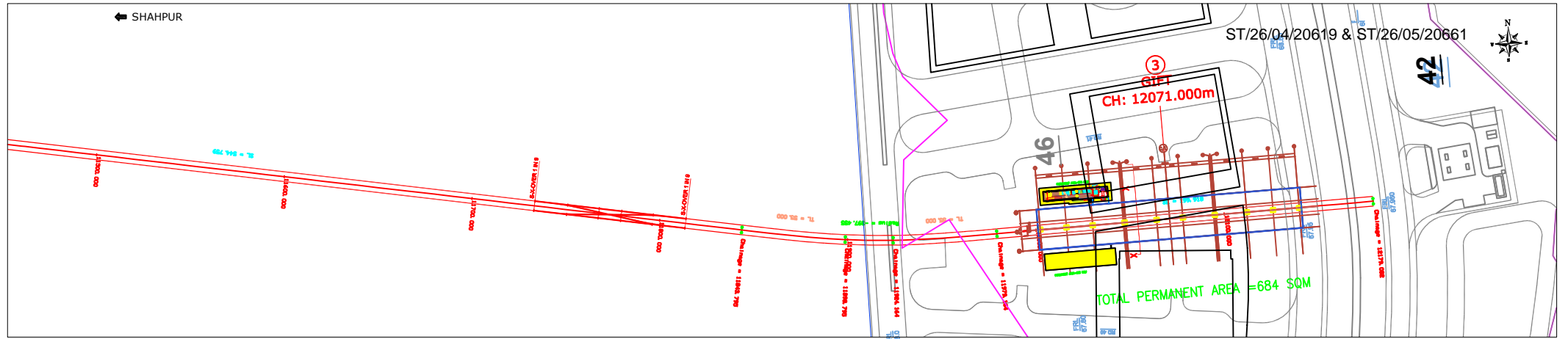
REV:-
R0

SCALE:-
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DRAWING NO:-
DMRC/BD/KOTESHWAR-AIRPORT/GAD/2024

SHEET NO.
5 OF 6

SHEET SIZE
A1



LEGEND		KEY PLAN		APPROVED BY DMRC		REVISIONS		DELHI METRO R	
NO.	DESCRIPTION	SYMBOL	NO.	DESCRIPTION	SYMBOL	NO.	DESCRIPTION	TITLE	GENERAL ALIGNMENT DRAWING FOR SHAHPUR TO GIFT AHMEDABAD
1	Right of Way	---	1	GM / O	---	1	DATE	APPROVED BY	SANDEEP GEMAWAT
2	Right of Way	---	2	CE/PLANNING	---	2	REV	CHECKED BY	SUDHANSHU CHAUDHARY
3	Right of Way	---	3	CE/DESIGN	---	3	SCALE	DESIGNED BY	ROBIN
4	Right of Way	---	4	CSTE	---	4	DATE	DATE	01.03.2024
5	Right of Way	---	5	CEE	---	5	REV	REV	R0
6	Right of Way	---	6	CA	---	6	SCALE	SCALE	10m 20m 30m 40m 50m
7	Right of Way	---	7	CPMW	---	7	DESCRIPTION	DRAWING NO.	DMRC/BD/KOTESHWAR-AIRPORT/GAD/2024
8	Right of Way	---	8	CEE/PLG	---	8	NO.	SHEET NO.	6 OF 6
9	Right of Way	---	9		---	9	DATE	SHEET SIZE	A1
10	Right of Way	---	10		---	10	REV NO.		
11	Right of Way	---	11		---	11	DESCRIPTION		
12	Right of Way	---	12		---	12	NO.		
13	Right of Way	---	13		---	13	DATE		
14	Right of Way	---	14		---	14	REV NO.		
15	Right of Way	---	15		---	15	DESCRIPTION		
16	Right of Way	---	16		---	16	NO.		
17	Right of Way	---	17		---	17	DATE		
18	Right of Way	---	18		---	18	REV NO.		
19	Right of Way	---	19		---	19	DESCRIPTION		
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45	Right of Way	---	45		---	45	DATE		
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98	Right of Way	---	98		---	98	REV NO.		
99	Right of Way	---	99		---	99	DESCRIPTION		
100	Right of Way	---	100		---	100	NO.		

Bore Hole No. : 1

Location : GP-6/14

Date of Completion: 06-04-2026

Depth of Termination : 45.0 m

Rig No.: 1

Diameter of Bore: 150 mm

Co-ordinates: E 261901, N 2565232

Type of Hammer: Auto Trip Hammer

Depth of Water Table : Not encountered during investigation

Hammer Efficiency: 60%

BORE LOG DATA SHEET 1 OF 2

Method of Boring	Depth m	Casing	Notation	Soil Description	Depth of Sample m	Drill Run		Type of Sample	SPT N Value/Penetration of S.S.S				Remarks
						From m	To m		N ₁	N ₂	N ₃	N	
Rotary Drilling by mud circulation	0.00	Not Used		Dark Brownish to reddish brown, fine to very fine grained, clayey sand with occasional gravels (SC) 0.00 to 3.50m	0.00	0.00	1.50	DS	-	-	-	-	
	0.50												
	1.00												
	1.50				1.50	1.50	2.00	SPT	2	3	4	7	
	2.00				2.00	2.00	3.00	UDS	-	-	-	-	
	2.50			Reddish yellow, fine to medium grained, sandy clays of low plasticity with occasional to little gravels (CL) 3.50 to 7.50m									
	3.00				3.00	3.00	4.50	SPT	3	3	4	7	
	3.50												
	4.00												
	4.50				4.50	4.50	5.00	SPT	6	8	11	19	
	5.00				5.00	5.00	6.00	UDS	-	-	-	-	
	5.50			Reddish yellow, fine to very fine grained, clayey sand with occasional gravels (SC) 7.50 to 8.00m									
	6.00				6.00	6.00	7.50	SPT	8	11	13	24	
	6.50												
	7.00												
	7.50				7.50	7.50	8.00	SPT	8	11	12	23	
	8.00			Yellowish brown, fine to medium grained, silty clayey sand with occasional to some gravels (SM-SC) 8.00 to 16.30m	8.00	8.00	9.00	UDS	-	-	-	-	
	8.50												
	9.00				9.00	9.00	10.50	SPT	8	12	16	28	
	9.50												
	10.00												
	10.50				10.50	10.50	11.00	SPT	15	32	40	72	
	11.00				11.00	11.00	12.00	UDS	-	-	-	-	
	11.50												
	12.00				12.00	12.00	13.50	SPT	22	35	45	80	
	12.50												
	13.00			Reddish yellow, fine to medium grained, clayey sand with some to much gravels (SC) 16.30 to 19.30m	13.50	13.50	14.00	SPT	10	17	26	43	
	13.50				14.00	14.00	15.00	UDS	-	-	-	-	
	14.00												
	14.50				15.00	15.00	16.50	SPT	16	36	70/13 cm	>100	
	15.00												
	15.50												
	16.00				16.50	16.50	17.00	SPT	16	31	43	74	
	16.50				17.00	17.00	18.00	UDS	-	-	-	-	
	17.00												
	17.50				18.00	18.00	19.50	SPT	19	30	31	61	
	18.00			Reddish brown, fine to very fine grained, sandy clays of intermediate plasticity (CI) 19.30 to 22.00m									
	18.50												
	19.00												
	19.50				19.50	19.50	21.00	SPT	16	20	27	47	
	20.00												
	20.50			Yellowish brown, fine to very fine grained, sandy clays of intermediate plasticity (CI) 22.00 to 23.40m	21.00	21.00	22.50	SPT	24	35	42	77	
	21.00												
	21.50												
	22.00				22.50	22.50	24.00	SPT	18	30	55	85	
	22.50												
	23.00			Yellowish brown, fine to medium grained, sandy clays of intermediate plasticity with some gravels (CI)	24.00	24.00	25.00	SPT	12	17	26	43	
	23.50												
	24.00												
	24.50												
	25.00				25.00	25.00	25.50	UDS	-	-	-	-	

23.40 to 26.50m

Bore Hole No. : 1

Location : GP-6/14

Date of Completion: 06-04-2026

Depth of Termination : 45.0 m

Rig No.: 1

Diameter of Bore: 150 mm

Co-ordinates: E 261901, N 2565232

Type of Hammer: Auto Trip Hammer

Depth of Water Table : Not encountered during investigation

Hammer Efficiency: 60%

BORE LOG DATA SHEET 2 OF 2

Method of Boring	Depth m	Casing	Notation	Soil Description	Depth of Sample m	Drill Run		Type of Sample	SPT N Value/Penetration of S.S.S				Remarks																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
						From m	To m		N ₁	N ₂	N ₃	N																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
Rotary drilling method	25.50			Yellowish brown, fine to medium grained, sandy clays of intermediate plasticity with some gravels (CI) 23.40 to 26.50m	25.50	25.50	27.00	SPT	14	31	36	67																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
	26.00																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								

Bore Hole No. : 2

Location : GP-6/12

Date of Completion: 09-04-2026

Depth of Termination : 45.0 m

Rig No.: 1

Diameter of Bore: 150 mm

Co-ordinates: E 261900, N 2565179

Type of Hammer: Auto Trip Hammer

Depth of Water Table : Not encountered during investigation

Hammer Efficiency: 60%

BORE LOG DATA SHEET 1 OF 2

Method of Boring	Depth m	Casing	Notation	Soil Description	Depth of Sample m	Drill Run		Type of Sample	SPT N Value/Penetration of S.S.S				Remarks
						From m	To m		N ₁	N ₂	N ₃	N	
Rotary Drilling by mud circulation	0.00	Not Used		Brownish, fine to very fine grained, clayey sand with little gravels (SC) 0.00 to 2.30m	0.00	0.00	1.50	DS	-	-	-	-	
	0.50				1.50	1.50	2.00	SPT	2	3	4	7	
	1.00												
	1.50												
	2.00			2.00	2.00	3.00	UDS	-	-	-	-		
	2.50			3.00	3.00	4.50	SPT	3	5	7	12		
	3.00												
	3.50												
	4.00			4.50	4.50	5.00	SPT	4	6	8	14		
	4.50												
	5.00			5.00	5.00	6.00	UDS	-	-	-	-		
	5.50												
	6.00			6.00	6.00	7.50	SPT	6	7	10	17		
	6.50												
	7.00				7.50	7.50	8.00	SPT	8	13	18	31	
	7.50												
	8.00		8.00		8.00	9.00	UDS	-	-	-	-		
	8.50												
	9.00			9.00	9.00	10.50	SPT	7	11	19	30		
	9.50												
	10.00			10.50	10.50	11.00	SPT	4	7	11	18		
	10.50												
	11.00			11.00	11.00	12.00	UDS	-	-	-	-		
	11.50												
	12.00			12.00	12.00	13.50	SPT	14	28	35	63		
	12.50												
	13.00			13.50	13.50	14.00	SPT	11	24	26	50		
	13.50												
	14.00			14.00	14.00	15.00	UDS	-	-	-	-		
	14.50												
	15.00			15.00	15.00	16.50	SPT	14	23	33	56		
	15.50												
16.00	16.50	16.50		17.00	SPT	19	36	64/14 cm	>100				
16.50													
17.00	17.00	17.00		18.00	UDS	-	-	-	-				
17.50													
18.00	18.00	18.00		19.50	SPT	21	30	40	70				
18.50													
19.00		19.50	19.50	21.00	SPT	15	26	35	61				
19.50													
20.00		21.00	21.00	22.00	SPT	19	21	32	53				
20.50													
21.00		22.00	22.00	22.50	UDS	-	-	-	-				
21.50													
22.00		22.50	22.50	24.00	SPT	26	29	40	69				
22.50													
23.00		24.00	24.00	25.50	SPT	14	24	44	68				
23.50													
24.00													
24.50													
25.00													
				21.50 to 25.00m									

21.50 to 25.00m

Bore Hole No. : 2

Location : GP-6/12

Date of Completion: 09-04-2026

Depth of Termination : 45.0 m

Rig No.: 1

Diameter of Bore: 150 mm

Co-ordinates: E 261900, N 2565179

Type of Hammer: Auto Trip Hammer

Depth of Water Table : Not encountered during investigation

Hammer Efficiency: 60%

BORE LOG DATA SHEET 2 OF 2

Method of Boring	Depth m	Casing	Notation	Soil Description	Depth of Sample m	Drill Run		Type of Sample	SPT N Value/Penetration of S.S.S				Remarks		
						From m	To m		N ₁	N ₂	N ₃	N			
Rotary drilling method	25.50			Yellowish brown, fine to very fine grained, sandy clays of intermediate plasticity with occasional to little gravels (CI) 25.00 to 29.00m	25.50	25.50	26.00	SPT	17	19	25	44			
	26.00				26.00	27.00	UDS	-	-	-	-				
	26.50														
	27.00				27.00	28.50	SPT	20	35	50	85				
	27.50														
	28.00														
	28.50			28.50	30.00	SPT	18	27	31	58					
	29.00					Reddish yellow, fine to very fine grained, clayey sand (SC) 29.00 to 30.70m									
	29.50														
	30.00			30.00	31.50		SPT	19	29	36	64				
	30.50														
	31.00					Reddish yellow, fine to very fine grained, silty sand with little plastic fines (SM) 30.70 to 32.20m									
	31.50			31.50	33.00		SPT	45	55/12 cm	-	>100				
	32.00														
	32.50					Yellowish brown, fine to coarse grained, clayey sand with much gravels (SC) 32.20 to 37.00m									
	33.00			33.00	34.50		SPT	25	46	55/6 cm	>100				
	33.50														
	34.00														
	34.50			34.50	36.00		SPT	100/6 cm	-	-	>100				
	35.00														
	35.50														
	36.00			36.00	37.50	SPT	100/6 cm	-	-	>100					
	36.50														
	37.00					Reddish yellow, fine to very fine grained, silty clays of intermediate plasticity with little gravels (CI) 37.00 to 38.50m									
	37.50			37.50	39.00		SPT	17	54	50/6 cm	>100				
	38.00														
	38.50					Yellowish brown, fine to medium grained, silty sand with little plastic fines and occasional gravels (SM) 38.50 to 41.00m									
	39.00			39.00	40.50		SPT	22	78/14 cm	-	>100				
	39.50														
	40.00														
40.50	40.50	42.00	SPT	100/10 cm	-		-	>100							
41.00			Yellowish brown, very fine grained, clays of intermediate plasticity with occasional gravels (CI)												
41.50															
42.00	42.00	43.50		SPT	100/9 cm	-	-	>100							
42.50															
43.00															
43.50	43.50	45.00		SPT	100/14 cm	-	-	>100							
44.00															
44.50															
45.00	45.00	45.15		SPT	30	55	45/5 cm	>100							
41.00 to 45.00m															

Bore Hole No. : 3

Location : GP 6/10

Depth of Termination : 45.0 m

Co-ordinates: E 261896, N 2565123

Depth of Water Table : Not encountered during investigation

Rig No.: 2

Date of Completion: 10-04-2026

Diameter of Bore: 150 mm

Type of Hammer: Manual Trip Hammer

Hammer Efficiency: 35%

BORE LOG DATA SHEET 1 OF 2

Method of Boring	Depth m	Casing	Notation	Soil Description	Depth of Sample m	Drill Run		Type of Sample	SPT N Value/Penetration of S.S.S				Remarks
						From m	To m		N ₁	N ₂	N ₃	N	
Rotary Drilling by mud circulation	0.00	Not Used		Blackish brown, fine to coarse grained, filled up silty sand with little plastic fines and debris 0.00 to 0.20m	0.00	0.00	1.50	DS	-	-	-	-	
	0.50												
	1.00			Dark brownish, fine to medium grained, clayey sand with occasional gravels (SC) 0.20 to 2.60m	1.50	1.50	2.00	SPT	6	7	8	15	
	1.50				2.00	2.00	3.00	UDS	-	-	-	-	
	2.00												
	2.50												
	3.00				3.00	3.00	4.50	SPT	4	4	5	9	
	3.50												
	4.00												
	4.50			Yellowish brown to light yellowish brown, fine to medium grained, sandy clays of low plasticity with little to occasional gravels (CL) 2.60 to 7.80m	4.50	4.50	5.00	SPT	6	7	7	14	
	5.00				5.00	5.00	6.00	UDS	-	-	-	-	
	5.50												
	6.00				6.00	6.00	7.50	SPT	10	11	13	24	
	6.50												
	7.00												
	7.50				7.50	7.50	8.00	SPT	11	13	22	35	
	8.00			Yellowish brown, fine to medium grained, clayey sand with occasional to little gravels (SC) 7.80 to 9.00m	8.00	8.00	9.00	UDS	-	-	-	-	
	8.50												
	9.00				9.00	9.00	10.50	SPT	12	16	18	34	
	9.50												
	10.00												
	10.50			Yellowish brown, fine to medium grained, silty clayey sand with occasional to little gravels (SM-SC) 9.00 to 13.30m	10.50	10.50	11.00	SPT	16	22	25	47	
	11.00				11.00	11.00	12.00	UDS	-	-	-	-	
	11.50												
	12.00				12.00	12.00	13.50	SPT	20	26	36	62	
	12.50												
	13.00												
	13.50				13.50	13.50	14.00	SPT	22	33	40	73	
	14.00			Yellowish brown, fine to medium grained, silty sand with occasional to little gravels (SM) 13.30 to 16.10m	14.00	14.00	15.00	UDS	-	-	-	-	
	14.50												
	15.00				15.00	15.00	16.50	SPT	26	27	28	55	
	15.50												
	16.00				16.50	16.50	17.00	SPT	44	57/12 cm	-	>100	
	16.50				17.00	17.00	18.00	UDS	-	-	-	-	
	17.00			Reddish yellow, fine to very fine grained, clayey sand with occasional to little gravels (SC) 16.10 to 20.00m									
	17.50				18.00	18.00	19.50	SPT	22	41	45	86	
	18.00												
	18.50												
	19.00												
	19.50				19.50	19.50	20.00	SPT	23	24	33	57	
	20.00				20.00	20.00	21.00	DS	-	-	-	-	
	20.50												
	21.00				21.00	21.00	22.00	SPT	22	23	25	48	
	21.50												
	22.00			Yellowish brown to reddish brown, fine to very fine grained, sandy clays of intermediate plasticity with little to some gravels (CI)	22.00	22.00	22.50	UDS	-	-	-	-	
	22.50				22.50	22.50	24.00	SPT	27	31	35	66	
	23.00												
	23.50												
	24.00												
	24.50				24.00	24.00	25.50	SPT	25	29	33	62	
	25.00												

20.00 to 33.00m

Bore Hole No. : 3

Location : GP 6/10

Depth of Termination : 45.0 m

Rig No.: 2

Date of Completion: 10-04-2026

Diameter of Bore: 150 mm

Co-ordinates: E 261896, N 2565123

Type of Hammer: Manual Trip Hammer

Depth of Water Table : Not encountered during investigation

Hammer Efficiency: 35%

BORE LOG DATA SHEET 2 OF 2

Method of Boring	Depth m	Casing	Notation	Soil Description	Depth of Sample m	Drill Run		Type of Sample	SPT N Value/Penetration of S.S.S				Remarks
						From m	To m		N ₁	N ₂	N ₃	N	
Rotary drilling method	25.50				25.50	25.50	27.00	SPT	18	27	33	60	
	26.00												
	26.50												
	27.00				27.00	27.00	28.50	SPT	20	24	40	64	
	27.50												
	28.00												
	28.50			Yellowish brown to reddish brown, fine to very fine grained, sandy clays of intermediate plasticity with little to some gravels (CI) 20.00 to 33.00m	28.50	28.50	30.00	SPT	24	32	29	61	
	29.00												
	29.50												
	30.00				30.00	30.00	31.00	SPT	22	22	31	53	
	30.50												
	31.00				31.00	31.00	31.50	UDS	-	-	-	-	
	31.50				31.50	31.50	33.00	SPT	25	29	34	63	
	32.00												
	32.50												
	33.00			Yellowish brown, fine to very fine grained, clayey sand with little gravels (SC) 33.00 to 33.70m	33.00	33.00	34.50	SPT	27	30	37	67	
	33.50												
	34.00			Yellowish brown, fine to coarse grained, silty sand with little plastic fines and occasional to much gravels (SM) 33.70 to 35.30m	34.50	34.50	36.00	SPT	47	60/12 cm	-	>100	
	34.50												
	35.00												
	35.50												
	36.00				36.00	36.00	37.50	SPT	43	66/13 cm	-	>100	
	36.50												
	37.00			Yellowish brown, fine to coarse grained, clayey sand with occasional to much gravels (SC) 35.30 to 38.90m	37.50	37.50	39.00	SPT	60/8 cm	-	-	>100	
	37.50												
	38.00												
	38.50												
	39.00				39.00	39.00	40.50	SPT	42	65/10 cm	-	>100	
	39.50												
	40.00												
	40.50				40.50	40.50	42.00	SPT	33	59/14 cm	-	>100	
	41.00												
	41.50												
	42.00			Yellowish brown, fine to medium grained, silty sand (SM)	42.00	42.00	43.50	SPT	35	62/15 cm	-	>100	
	42.50												
	43.00												
	43.50				43.50	43.50	45.00	SPT	27	36	54	90	
	44.00												
	44.50												
	45.00				45.00	45.00	45.15	SPT	35	70	-	>100	
38.90 to 45.00m					10 cm								

Bore Hole No. : 4

Location : GP-6/08

Date of Completion: 10-04-2026

Depth of Termination : 45.0 m

Rig No.: 2

Diameter of Bore: 150 mm

Co-ordinates: E 261890, N 2565065

Type of Hammer: Manual Trip Hammer

Depth of Water Table : Not encountered during investigation

Hammer Efficiency: 35%

BORE LOG DATA SHEET 1 OF 2

Method of Boring	Depth m	Casing	Notation	Soil Description	Depth of Sample m	Drill Run		Type of Sample	SPT N Value/Penetration of S.S.S				Remarks																
						From m	To m		N ₁	N ₂	N ₃	N																	
Rotary Drilling by mud circulation	0.00	Not Used		Dark brownish, fine to medium grained, clayey sand (SC) 0.00 to 1.30m	0.00	0.00	1.50	DS	-	-	-	-																	
	0.50																												
	1.00																												
	1.50													1.50	1.50	2.00	SPT	13	15	16	31								
	2.00			2.00	2.00	3.00	UDS	-	-	-	-	Reddish yellow to yellowish brown, fine to medium grained, sandy clays of low plasticity with occasional gravels (CL) 1.30 to 7.80m																	
	2.50																												
	3.00														3.00	3.00	4.50	SPT	2	8	8	16							
	3.50																												
	4.00																												
	4.50			4.50	4.50	5.00	SPT	7	8	10	18																		
	5.00			5.00	5.00	6.00	UDS	-	-	-	-																		
	5.50																												
	6.00															6.00	6.00	7.50	SPT	15	18	21	39						
	6.50																												
	7.00																												
	7.50			7.50	7.50	8.00	SPT	17	28	35	61																		
	8.00			8.00	8.00	9.00	UDS	-	-	-	-	Yellowish brown, fine to medium grained, clayey sand with occasional to little gravels (SC) 7.80 to 10.30m																	
	8.50																												
	9.00															9.00	9.00	10.50	SPT	27	37	38	75						
	9.50																												
	10.00																												
	10.50			10.50	10.50	11.00	SPT	15	17	21	38																		
	11.00			11.00	11.00	12.00	UDS	-	-	-	-	Yellowish brown, fine to medium grained, silty clayey sand with occasional to little gravels (SM-SC) 10.30 to 14.70m																	
	11.50																												
	12.00															12.00	12.00	13.50	SPT	17	21	27	48						
	12.50																												
	13.00																												
	13.50			13.50	13.50	14.00	SPT	21	37	49	86																		
	14.00			14.00	14.00	15.00	UDS	-	-	-	-	Yellowish brown, fine to medium grained, clayey sand with occasional gravels (SC) 14.70 to 17.40m																	
	14.50																												
	15.00															15.00	15.00	16.50	SPT	14	30	44	74						
	15.50																												
16.00																													
16.50	16.50	16.50	17.00	SPT	35	70/11 cm	-	>100																					
17.00	17.00	17.00	18.00	UDS	-	-	-	-	Reddish yellow, fine to very fine grained, clayey sand with much gravels (SC) 17.40 to 19.20m																				
17.50																													
18.00												18.00	18.00	19.50	SPT	56	50/10 cm	-	>100										
18.50																													
19.00																													
19.50	19.50	19.50	21.00	SPT	38	70/15 cm	-	>100																					
20.00																													
20.50																													
21.00												21.00	21.00	22.50	SPT	30	60	42/7 cm	>100										
21.50																													
22.00																													
22.50																						22.50	22.50	24.00	SPT	22	36	58	94
23.00																													
23.50																													
24.00																													
24.50																													
25.00																													
19.20 to 25.30m																													

Bore Hole No. : 4

Location : GP-6/08

Date of Completion: 10-04-2026

Depth of Termination : 45.0 m

Rig No.: 2

Diameter of Bore: 150 mm

Co-ordinates: E 261890, N 2565065

Type of Hammer: Manual Trip Hammer

Depth of Water Table : Not encountered during investigation

Hammer Efficiency: 35%

BORE LOG DATA SHEET 2 OF 2

Method of Boring	Depth m	Casing	Notation	Soil Description	Depth of Sample m	Drill Run		Type of Sample	SPT N Value/Penetration of S.S.S				Remarks
						From m	To m		N ₁	N ₂	N ₃	N	
Rotary drilling method	25.50			Yellowish brown, fine to medium grained, clayey sand with little to some gravels (SC) 25.30 to 27.10m	25.50	25.50	27.00	SPT	24	60	41/6 cm	>100	
	26.00												
	26.50												
	27.00				27.00	27.00	28.50	SPT	18	30	40	70	
	27.50			Yellowish brown, fine to coarse grained, well graded sand and silty sand with little gravels (SW-SM) 27.10 to 29.40m									
	28.00												
	28.50				28.50	28.50	30.00	SPT	36	50	51	>100	
	29.00												
	29.50												
	30.00				30.00	30.00	31.50	SPT	80	20/2 cm	-	>100	
	30.50			Reddish yellow, fine to very fine grained, sandy clays of intermediate plasticity with occasional gravels (CI) 29.40 to 32.30m									
	31.00												
	31.50				31.50	31.50	33.00	SPT	24	75/15 cm	-	>100	
	32.00												
	32.50												
	33.00				33.00	33.00	34.50	SPT	37	65/11 cm	-	>100	
	33.50												
	34.00			Yellowish brown, fine to medium grained, clayey sand with occasional to little gravels (SC) 32.30 to 36.60m									
	34.50				34.50	34.50	36.00	SPT	29	73/12 cm	-	>100	
	35.00												
	35.50				36.00	36.00	37.50	SPT	70	32/3 cm	-	>100	
	36.00												
	36.50			Yellowish brown, fine to very fine grained, silty sand with little plastic fines (SM) 36.60 to 38.00m									
	37.00				37.50	37.50	39.00	SPT	31	70/13 cm	-	>100	
	37.50												
	38.00												
	38.50			Yellowish brown, fine to very fine grained, clayey sand with occasional gravels (SC) 38.00 to 40.00m									
	39.00				39.00	39.00	40.50	SPT	40	60/14 cm	-	>100	
	39.50												
	40.00				40.50	40.50	42.00	SPT	101/10 cm	-	-	>100	
	40.50												
	41.00			Yellowish brown, fine to very fine grained, sandy clays of intermediate plasticity with little to occasional gravels (CI) 40.00 to 43.50m									
	41.50												
	42.00				42.00	42.00	43.50	SPT	101/8 cm	-	-	>100	
	42.50												
	43.00												
	43.50			Yellowish brown, fine to medium grained, clayey sand with little gravels (SC) 43.50 to 44.70m									
	44.00				43.50	43.50	45.00	SPT	101/15 cm	-	-	>100	
	44.50			Reddish yellow, fine to very fine grained, sandy clays of intermediate plasticity with little gravels (CI)									
	45.00				45.00	45.00	45.15	SPT	101/11 cm	-	-	>100	
44.70 to 45.00m													

Bore Hole No. : 5

Location : GP-6/06

Date of Completion: 12-04-2026

Depth of Termination : 45.0 m

Rig No.: 3

Diameter of Bore: 150 mm

Co-ordinates: E 261883, N 2565013

Type of Hammer: Auto Trip Hammer

Depth of Water Table : Not encountered during investigation

Hammer Efficiency: 60%

BORE LOG DATA SHEET 1 OF 2

Method of Boring	Depth m	Casing	Notation	Soil Description	Depth of Sample m	Drill Run		Type of Sample	SPT N Value/Penetration of S.S.S				Remarks		
						From m	To m		N ₁	N ₂	N ₃	N			
Rotary Drilling by mud circulation	0.00	<div>Not Used</div>		Dark brownish to yellowish brown, fine to medium grained, sandy clays of low plasticity (CL) 0.00 to 2.50m	0.00	0.00	1.50	DS	-	-	-	-			
	0.50														
	1.00														
	1.50														
	2.00					1.50	1.50	2.00	SPT	3	7	9		16	
	2.50					2.00	2.00	3.00	UDS	-	-	-		-	
	3.00														
	3.50					3.00	3.00	4.50	SPT	4	5	9		14	
	4.00				Yellowish brown, fine to medium grained, sandy clays of low plasticity with little to some gravels (CL) 2.50 to 5.70m										
	4.50														
	5.00														
	5.50														
	6.00					6.00	6.00	7.50	SPT	11	20	25		45	
	6.50				Yellowish brown, fine to medium grained, clayey sand with occasional to some gravels (SC) 5.70 to 8.30m										
	7.00														
	7.50														
	8.00														
	8.50														
	9.00					Yellowish brown, fine to medium grained, silty clayey sand with occasional to some gravels (SM-SC) 8.30 to 11.60m	9.00	9.00	10.50	SPT	10	19		21	40
	9.50														
	10.00														
	10.50														
	11.00						10.50	10.50	11.00	SPT	13	20		20	40
	11.50						11.00	11.00	12.00	UDS	-	-		-	-
	12.00					Yellowish brown, fine to very fine grained, silty clayey sand with occasional to little gravels (SM-SC) 11.60 to 14.60m									
	12.50														
	13.00														
	13.50														
	14.00						13.50	13.50	14.00	SPT	14	25		40	65
	14.50						14.00	14.00	15.00	UDS	-	-		-	-
	15.00					Yellowish brown, fine to very fine grained, clayey sand with occasional to little gravels (SC) 14.60 to 16.60m	15.00	15.00	16.50	SPT	19	37		55	92
	15.50														
16.00					16.50	16.50	18.00	SPT	20	35	45	80			
16.50				Yellowish brown, fine to very fine grained, silty clays of intermediate plasticity with occasional to little gravels (CI) 16.60 to 23.10m											
17.00															
17.50															
18.00						18.00	18.00	19.50	SPT	27	40	60/10 cm	>100		
18.50															
19.00															
19.50					19.50	19.50	21.00	SPT	14	25	39	64			
20.00															
20.50															
21.00					21.00	21.00	22.50	SPT	20	32	44	76			
21.50															
22.00															
22.50					22.50	22.50	24.00	SPT	20	40	60/12 cm	>100			
23.00				Yellowish brown, fine to very fine grained, silty clays of low plasticity (CL)											
23.50															
24.00						24.00	24.00	25.50	SPT	21	41	59/10 cm	>100		
24.50															
25.00															
23.10 to 25.90m															

Project : Proposed Gift City Extension Line (3.33 Km Elevated Viaduct, Phase -2B) of Ahmedabad Metro Rail, Project Phase 2, GMRC Limited

ST/26/04/20619 & ST/26/05/20661

Date of Start: 10-04-2026

Bore Hole No. : 5

Location : GP-6/06

Date of Completion: 12-04-2026

Depth of Termination : 45.0 m

Rig No.: 3

Diameter of Bore: 150 mm

Co-ordinates: E 261883, N 2565013

Type of Hammer: Auto Trip Hammer

Depth of Water Table : Not encountered during investigation

Hammer Efficiency: 60%

BORE LOG DATA SHEET 2 OF 2

Method of Boring	Depth m	Casing	Notation	Soil Description	Depth of Sample m	Drill Run		Type of Sample	SPT N Value/Penetration of S.S.S				Remarks
						From m	To m		N ₁	N ₂	N ₃	N	
Rotary drilling method	25.50												

Bore Hole No. : 6

Location : GP-6/04

Date of Completion: 12-04-2026

Depth of Termination : 45.0 m

Rig No.: 2

Diameter of Bore: 150 mm

Co-ordinates: E 261877, N 2564956

Type of Hammer: Manual Trip Hammer

Depth of Water Table : Not encountered during investigation

Hammer Efficiency: 35%

BORE LOG DATA SHEET 1 OF 2

Method of Boring	Depth m	Casing	Notation	Soil Description	Depth of Sample m	Drill Run		Type of Sample	SPT N Value/Penetration of S.S.S				Remarks
						From m	To m		N ₁	N ₂	N ₃	N	
Rotary Drilling by mud circulation	0.00	Not Used		Dark brownish, fine to medium grained, sandy clays of low plasticity with occasional gravels (CL) 0.00 to 2.40m	0.00	0.00	1.50	DS	-	-	-	-	
	0.50												
	1.00												
	1.50												
	2.00			Yellowish brown, fine to medium grained, sandy clays of low plasticity with little gravels (CL) 2.40 to 5.60m	1.50	1.50	2.00	SPT	4	5	5	10	
	2.50				2.00	2.00	3.00	UDS	-	-	-	-	
	3.00												
	3.50												
	4.00			Yellowish brown to reddish yellow, fine to medium grained, clayey sand with little to occasional gravels (SC) 5.60 to 7.80m	3.00	3.00	4.50	SPT	6	8	11	19	
	4.50												
	5.00												
	5.50												
	6.00			Yellowish brown, fine to medium grained, silty clayey sand with occasional gravels (SM-SC) 7.80 to 10.30m	4.50	4.50	5.00	SPT	8	11	15	26	
	6.50				5.00	5.00	6.00	UDS	-	-	-	-	
	7.00												
	7.50												
	8.00			Yellowish brown, fine to medium grained, silty clayey sand with occasional gravels (SM-SC) 10.30 to 13.30m	6.00	6.00	7.50	SPT	16	17	23	40	
	8.50												
	9.00												
	9.50												
	10.00			Yellowish brown, fine to medium grained, silty clayey sand with little gravels (SM-SC) 13.30 to 15.00m	7.50	7.50	8.00	SPT	14	15	22	37	
	10.50				8.00	8.00	9.00	UDS	-	-	-	-	
	11.00												
	11.50												
	12.00			Yellowish brown, fine to coarse grained, clayey sand with little to some gravels (SC) 15.00 to 19.70m	9.00	9.00	10.50	SPT	19	25	33	58	
	12.50												
	13.00												
	13.50												
	14.00			Reddish yellow, fine to very fine grained, silty clays of intermediate plasticity with occasional gravels (CI) 19.70 to 23.30m	10.50	10.50	11.00	SPT	28	50	53	>100	
	14.50				11.00	11.00	12.00	UDS	-	-	-	-	
	15.00												
	15.50												
	16.00			Yellowish brown, fine to very fine grained, silty clayey sand (SC)	12.00	12.00	13.50	SPT	27	56	50/12 cm	>100	
	16.50												
	17.00												
	17.50												
	18.00			Yellowish brown, fine to very fine grained, silty clayey sand (SC)	13.50	13.50	14.00	SPT	24	44	60/13 cm	>100	
	18.50				14.00	14.00	15.00	UDS	-	-	-	-	
	19.00												
	19.50												
	20.00			Yellowish brown, fine to very fine grained, silty clayey sand (SC)	15.00	15.00	16.50	SPT	30	72/9 cm	-	>100	
	20.50												
	21.00												
	21.50												
	22.00			Yellowish brown, fine to very fine grained, silty clayey sand (SC)	16.50	16.50	17.00	SPT	50	53/13 cm	-	>100	
	22.50				17.00	17.00	18.00	UDS	-	-	-	-	
	23.00												
	23.50												
	24.00			Yellowish brown, fine to very fine grained, silty clayey sand (SC)	18.00	18.00	19.50	SPT	37	65/12 cm	-	>100	
	24.50												
	25.00												
	25.00												

23.30 to 25.10m

Project : Proposed Gift City Extension Line (3.33 Km Elevated Viaduct, Phase -2B) of Ahmedabad Metro Rail, Project Phase 2, GMRC Limited

ST/26/04/20619 & ST/26/05/20661

Date of Start: 10-04-2026

Bore Hole No. : 6

Location : GP-6/04

Date of Completion: 12-04-2026

Depth of Termination : 45.0 m

Rig No.: 2

Diameter of Bore: 150 mm

Co-ordinates: E 261877, N 2564956

Type of Hammer: Manual Trip Hammer

Depth of Water Table : Not encountered during investigation

Hammer Efficiency: 35%

BORE LOG DATA SHEET 2 OF 2

Method of Boring	Depth m	Casing	Notation	Soil Description	Depth of Sample m	Drill Run		Type of Sample	SPT N Value/Penetration of S.S.S				Remarks
						From m	To m		N ₁	N ₂	N ₃	N	
Rotary drilling method	25.50				25.50	25.50	27.00	SPT	101/15 cm	-	-	>100	
	26.00												
	26.50												
	27.00			Yellowish brown to brownish, fine to coarse grained, clayey sand with little gravels (SC) 25.10 to 28.00m	27.00	27.00	28.50	SPT	70	35/4 cm	-	>100	
	27.50												
	28.00												
	28.50				28.50	28.50	30.00	SPT	40	62/13 cm	-	>100	
	29.00												
	29.50												
	30.00			Yellowish brown, fine to medium grained, sandy clays of intermediate plasticity with occasional gravels (CI) 28.00 to 32.60m	30.00	30.00	31.50	SPT	42	60/12 cm	-	>100	
	30.50												
	31.00												
	31.50				31.50	31.50	33.00	SPT	20	40	60/7 cm	>100	
	32.00												
	32.50												
	33.00				33.00	33.00	34.50	SPT	50	53/9 cm	-	>100	
	33.50												
	34.00			Reddish yellow, fine to medium grained, clayey sand with little to some gravels (SC) 32.60 to 36.00m	34.50	34.50	36.00	SPT	38	68/15 cm	-	>100	
	34.50												
	35.00												
	35.50												
	36.00				36.00	36.00	37.50	SPT	27	38	42	80	
	36.50												
	37.00												
	37.50				37.50	37.50	39.00	SPT	70	32/4 cm	-	>100	
	38.00												
	38.50			Yellowish brown, fine to medium grained, silty sand (SM) 36.00 to 41.30m	39.00	39.00	40.50	SPT	50	53/10 cm	-	>100	
	39.00												
	39.50												
	40.00												
	40.50				40.50	40.50	42.00	SPT	40	61/13 cm	-	>100	
	41.00												
	41.50												
	42.00			Yellowish brown, fine to very fine grained, clayey sand (SC) 41.30 to 42.80m	42.00	42.00	43.50	SPT	101/6 cm	-	-	>100	
	42.50												
	43.00												
	43.50				43.50	43.50	45.00	SPT	101/5 cm	-	-	>100	
	44.00			Yellowish brown, fine to medium grained, sandy clays of intermediate plasticity with occasional gravels (CI)									
	44.50												
	45.00				45.00	45.00	45.09	SPT	101/9 cm	-	-	>100	
42.80 to 45.00m													

Bore Hole No. : 7

Location : GP-6/02

Date of Completion: 12-04-2026

Depth of Termination : 45.0 m

Rig No.: 2

Diameter of Bore: 150 mm

Co-ordinates: E 261869, N 2564903

Type of Hammer: Manual Trip Hammer

Depth of Water Table : Not encountered during investigation

Hammer Efficiency: 35%

BORE LOG DATA SHEET 1 OF 2

Method of Boring	Depth m	Casing	Notation	Soil Description	Depth of Sample m	Drill Run		Type of Sample	SPT N Value/Penetration of S.S.S				Remarks
						From m	To m		SPT N Value/Penetration of S.S.S				
									N ₁	N ₂	N ₃	N	
Rotary Drilling by mud circulation	0.00	Not Used		Dark brownish, fine to coarse grained, filled up clayey sand with debris 0.00 to 0.30m	0.00	0.00	1.50	DS	-	-	-	-	
	0.50			Brownish, fine to medium grained, clayey sand with little gravels (SC) 0.30 to 1.80m	1.50	1.50	2.00	SPT	5	5	5	10	
	1.00			Brownish, fine to medium grained, clayey sand with little gravels (SC) 0.30 to 1.80m									
	1.50												
	2.00			Brownish, fine to medium grained, sandy clays of low plasticity with occasional gravels (CL) 1.80 to 4.80m	2.00	2.00	3.00	UDS	-	-	-	-	
	2.50												
	3.00				3.00	4.50	SPT	4	3	7	10		
	3.50												
	4.00												
	4.50				4.50	5.00	SPT	8	10	13	23		
	5.00			Yellowish brown, fine to medium grained, clayey sand with little gravels (SC) 4.80 to 7.90m	5.00	5.00	6.00	UDS	-	-	-	-	
	5.50												
	6.00				6.00	7.50	SPT	11	13	15	28		
	6.50												
	7.00												
	7.50				7.50	8.00	SPT	13	16	22	38		
	8.00			Yellowish brown, fine to very fine grained, silty clayey sand with occasional gravels (SM-SC) 7.30 to 15.00m	8.00	8.00	9.00	UDS	-	-	-	-	
	8.50												
	9.00				9.00	10.50	SPT	14	22	37	59		
	9.50												
	10.00												
	10.50				10.50	11.00	SPT	25	30	43	73		
	11.00				11.00	12.00	UDS	-	-	-	-		
	11.50												
	12.00				12.00	13.50	SPT	23	33	45	78		
	12.50												
	13.00												
	13.50				13.50	14.00	SPT	41	63/13 cm	-	>100		
	14.00				14.00	15.00	UDS	-	-	-	-		
	14.50												
	15.00			Yellowish brown, fine to medium grained, clayey sand with some gravels (SC) 15.00 to 19.50m	15.00	15.00	16.50	SPT	38	67/14 cm	-	>100	
	15.50												
16.00													
16.50	16.50	17.00			SPT	69/15 cm	-	-	>100				
17.00	17.00	18.00			UDS	-	-	-	-				
17.50													
18.00	18.00	19.50			SPT	27	31	31	62				
18.50													
19.00													
19.50		Reddish yellow, fine to very fine grained, silty clays of intermediate plasticity with occasional gravels (CI) 19.50 to 23.60m			19.50	19.50	20.00	SPT	33	37	39	76	
20.00			20.00	21.00	UDS	-	-	-	-				
20.50													
21.00			21.00	22.00	SPT	25	29	37	66				
21.50													
22.00			22.00	24.00	SPT	26	30	33	63				
22.50													
23.00													
23.50		Yellowish brown, fine to very fine grained, clayey sand with some gravels (SC)	24.00	24.00	25.50	SPT	46	60/11 cm	-	>100			
24.50													
25.00													
23.60 to 29.60 m													

Bore Hole No. : 7

Location : GP-6/02

Rig No.: 2

Diameter of Bore: 150 mm

Depth of Termination : 45.0 m

Type of Hammer: Manual Trip Hammer

Co-ordinates: E 261869, N 2564903

Hammer Efficiency: 35%

Depth of Water Table : Not encountered during investigation

BORE LOG DATA SHEET 2 OF 2

Method of Boring	Depth m	Casing	Notation	Soil Description	Depth of Sample m	Drill Run		Type of Sample	SPT N Value/Penetration of S.S.S				Remarks
						From m	To m		N ₁	N ₂	N ₃	N	
Rotary drilling method	25.50				25.50	25.50	27.00	SPT	50	62/10 cm	-	>100	
	26.00												
	26.50												
	27.00			Yellowish brown, fine to very fine grained, clayey sand with some gravels (SC) 23.60 to 29.60m	27.00	27.00	28.50	SPT	37	69/13 cm	-	>100	
	27.50												
	28.00												
	28.50				28.50	28.50	30.00	SPT	37	60/14 cm	-	>100	
	29.00												
	29.50												
	30.00			Yellowish brown, fine to coarse grained, sandy clays of intermediate plasticity (CI) 29.60 to 32.00m	30.00	30.00	31.50	SPT	27	65/13 cm	-	>100	
	30.50												
	31.00				31.50	31.50	33.00	SPT	25	31	40	71	
	31.50												
	32.00												
	32.50			Light yellowish brown, fine to medium grained, clayey sand with occasional gravels (SC) 32.00 to 34.00m	33.00	33.00	34.50	SPT	36	47	52	99	
	33.00												
	33.50												
	34.00												
	34.50				34.50	34.50	36.00	SPT	37	55/5 cm	-	>100	
	35.00			Yellowish brown, fine to medium grained, clayey sand with occasional to much gravels (SC) 34.00 to 36.90m									
	35.50				36.00	36.00	37.50	SPT	40	62/10 cm	-	>100	
	36.00												
	36.50												
	37.00				37.50	37.50	39.00	SPT	38	59/13 cm	-	>100	
	37.50												
	38.00												
	38.50												
	39.00			Reddish yellow, fine to very fine grained, clays of intermediate plasticity with some gravels (CI) 36.90 to 41.50m	39.00	39.00	40.50	SPT	31	57/15 cm	-	>100	
	39.50												
	40.00												
	40.50				40.50	40.50	42.00	SPT	20	37	35	62	
	41.00												
	41.50												
	42.00			Reddish yellow, fine to very fine grained, sandy clays of intermediate plasticity with little gravels (CI) 41.50 to 44.30m	42.00	42.00	43.50	SPT	26	30	37	67	
	42.50												
	43.00				43.50	43.50	45.00	SPT	29	33	39	72	
	43.50												
	44.00												
	44.50												
	45.00			Reddish yellow, fine to very fine grained, clayey sand with little gravels (SC)	45.00	45.00	45.15	SPT	42	70	-	>100	
				44.30 to 45.00m	7 cm								

Project : Proposed Gift City Extension Line (3.33 Km Elevated Viaduct, Phase -2B) of Ahmedabad Metro Rail Project

Bore Hole No. : 8

Date of Start: 13-04-2026

Location : GTP 06-2/08

Date of Completion: 14-04-2026

Depth of Termination : 45.0 m

Rig No.: 2

Diameter of Bore: 150 mm

Co-ordinates: E 261860, N 2564054

Type of Hammer: Manual Trip Hammer

Depth of Water Table : Not encountered during investigation

Hammer Efficiency: 35%

BORE LOG DATA SHEET 1 OF 2

Method of Boring	Depth m	Casing	Notation	Soil Description	Depth of Sample m	Drill Run		Type of Sample	SPT N Value/Penetration of S.S.S				Remarks
						From m	To m		N ₁	N ₂	N ₃	N	
Rotary Drilling by mud circulation	0.00	Not Used		Dark Brownish, fine to medium grained, filled up clayey sand with debris 0.00 to 2.70m	0.00	0.00	1.50	DS	-	-	-	-	
	0.50												
	1.00												
	1.50												
	2.00				1.50	1.50	2.00	SPT	7	9	12	21	
	2.50				2.00	2.00	3.00	UDS	-	-	-	-	
	3.00			Brownish, fine to medium grained, clayey sand (SC) 2.70 to 4.10m	3.00	3.00	4.50	SPT	6	9	10	19	
	3.50												
	4.00												
	4.50				4.50	4.50	5.00	SPT	6	8	13	21	
	5.00				5.00	5.00	6.00	UDS	-	-	-	-	
	5.50												
	6.00			Yellowish brown, fine to medium grained, clayey sand with occasional gravels (SC) 4.10 to 7.00m	6.00	6.00	7.50	SPT	13	16	22	38	
	6.50												
	7.00												
	7.50				7.50	7.50	8.00	SPT	15	25	36	61	
	8.00				8.00	8.00	9.00	UDS	-	-	-	-	
	8.50												
	9.00			Yellowish brown, fine to medium grained, silty clayey sand with occasional to little gravels (SM) 7.00 to 13.30m	9.00	9.00	10.50	SPT	20	37	53	90	
	9.50												
	10.00												
	10.50				10.50	10.50	11.00	SPT	23	44	60/10 cm	>100	
	11.00				11.00	11.00	12.00	UDS	-	-	-	-	
	11.50												
	12.00			Yellowish brown, fine to medium grained, silty clayey sand with little gravels (SM-SC) 13.30 to 16.30m	12.00	12.00	13.50	SPT	22	40	60/13 cm	>100	
	12.50												
	13.00												
	13.50				13.50	13.50	14.00	SPT	20	25	45	70	
	14.00				14.00	14.00	15.00	UDS	-	-	-	-	
	14.50												
	15.00			Yellowish brown, fine to medium grained, clayey sand with occasional to some gravels (SC) 16.30 to 19.90m	15.00	15.00	16.50	SPT	35	70/13 cm	-	>100	
15.50													
16.00													
16.50	16.50	16.50			17.00	SPT	56	50/10 cm	-	>100			
17.00	17.00	17.00			18.00	UDS	-	-	-	-			
17.50													
18.00		Yellowish brown, fine to medium grained, clayey sand with occasional to some gravels (SC) 16.30 to 19.90m	18.00	18.00	19.50	SPT	40	60/15 cm	-	>100			
18.50													
19.00													
19.50			19.50	19.50	21.00	SPT	50	52/10 cm	-	>100			
20.00													
20.50													
21.00		Yellowish brown, fine to very fine grained, sandy clays of intermediate plasticity with little gravels (CI) 19.90 to 23.00m	21.00	21.00	22.50	SPT	26	44	60/8 cm	>100			
21.50													
22.00													
22.50			22.50	22.50	24.00	SPT	27	53	50/6 cm	>100			
23.00													
23.50													
24.00		Yellowish brown, fine to medium grained, silty sand with little plastic fines (SM)	24.00	24.00	25.50	SPT	35	70/8 cm	-	>100			
24.50													
25.00													
23.00 to 25.30m													

Project : Proposed Gift City Extension Line (3.33 Km Elevated Viaduct, Phase -2B) of Ahmedabad Metro Rail Project

Bore Hole No. : 8

Date of Start: 13-04-2026

Location : GTP 06-2/08

Date of Completion: 14-04-2026

Depth of Termination : 45.0 m

Rig No.: 2

Diameter of Bore: 150 mm

Co-ordinates: E 261860, N 2564054

Type of Hammer: Manual Trip Hammer

Depth of Water Table : Not encountered during investigation

Hammer Efficiency: 35%

BORE LOG DATA SHEET 2 OF 2

Method of Boring	Depth m	Casing	Notation	Soil Description	Depth of Sample m	Drill Run		Type of Sample	SPT N Value/Penetration of S.S.S				Remarks
						From m	To m		N ₁	N ₂	N ₃	N	
Rotary drilling method	25.50			Yellowish brown, fine to medium grained, silty sand with little plastic fines (SM) 23.00 to 25.30m	25.50	25.50	27.00	SPT	25	75/14 cm	-	>100	
	26.00			Yellowish brown, fine to very fine grained, sandy clays of intermediate plasticity with little gravels (CI) 25.30 to 28.60m	27.00	27.00	28.50	SPT	28	43	53	96	
	26.50												
	27.00												
	27.50												
	28.00												
	28.50												
	29.00			Reddish yellow, fine to very fine grained, clays of intermediate plasticity occasional to some gravels (CI) 28.60 to 32.60m	28.50	28.50	30.00	SPT	15	31	70/14 cm	>100	
	29.50												
	30.00												
	30.50												
	31.00												
	31.50												
	32.00			Reddish yellow, fine to very fine grained, clayey sand with some gravels (SC) 32.60 to 35.90m	31.50	31.50	33.00	SPT	42	60/12 cm	-	>100	
	32.50												
	33.00												
	33.50												
	34.00												
	34.50												
	35.00			Yellowish brown, fine to very fine grained, clays of high plasticity with some gravels (CH) 35.90 to 38.30m	34.50	34.50	36.00	SPT	101/15 cm	-	-	>100	
	35.50												
	36.00												
	36.50												
	37.00												
	37.50												
	38.00			Reddish yellow to reddish brown, fine to very fine grained, silty and sandy clays of intermediate plasticity with occasional gravels (CI)	36.00	36.00	37.50	SPT	101/15 cm	-	-	>100	
	38.50												
	39.00												
	39.50												
	40.00												
40.50													
41.00	Reddish yellow to reddish brown, fine to very fine grained, silty and sandy clays of intermediate plasticity with occasional gravels (CI)	40.50	40.50	42.00	SPT	35	40	60/13 cm	>100				
41.50													
42.00													
42.50													
43.00													
43.50													
44.00	Reddish yellow to reddish brown, fine to very fine grained, silty and sandy clays of intermediate plasticity with occasional gravels (CI)	43.50	43.50	45.00	SPT	30	40	60/8 cm	>100				
44.50													
45.00													
38.30 to 45.00m													

Project : Proposed Gift City Extension Line (3.33 Km Elevated Viaduct, Phase -2B) of Ahmedabad Metro Rail Project

Bore Hole No. : 9

Location : Shahpur Station 6

Depth of Termination : 45.0 m

Co-ordinates : E 261856, N 2564814

Depth of Water Table : Not encountered during investigation

Rig No.: 2

Date of Start: 13-04-2026

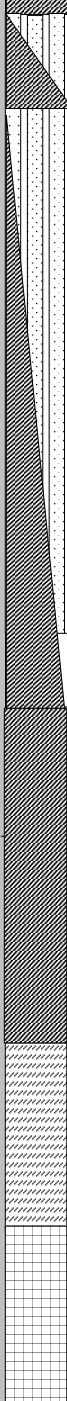
Date of Completion: 14-04-2026

Diameter of Bore: 150 mm

Type of Hammer: Manual Trip Hammer

Hammer Efficiency: 35%

BORE LOG DATA SHEET 1 OF 2

Method of Boring	Depth m	Casing	Notation	Soil Description	Depth of Sample m	Drill Run		Type of Sample	SPT N Value/Penetration of S.S.S				Remarks
						From m	To m		N ₁	N ₂	N ₃	N	
Rotary Drilling by mud circulation	0.00	Not Used		Blackish brown, fine to medium grained, clayey sand (SC) 0.00 to 0.80m	0.00	0.00	1.50	DS	-	-	-	-	
	0.50												
	1.00												
	1.50			Yellowish brown, fine to medium grained, clayey sand with occasional to some gravels (SC) 0.80 to 2.70m	1.50	1.50	2.00	SPT	5	7	10	17	
	2.00				2.00	2.00	3.00	UDS	-	-	-	-	
	2.50												
	3.00			Yellowish brown, fine to medium grained, silty clayey sand with occasional gravels (SM-SC) 2.70 to 4.30m	3.00	3.00	4.50	SPT	8	10	6	16	
	3.50												
	4.00												
	4.50				4.50	4.50	5.00	SPT	10	12	19	31	
	5.00				5.00	5.00	6.00	UDS	-	-	-	-	
	5.50												
	6.00				6.00	6.00	7.50	SPT	19	27	42	69	
	6.50												
	7.00												
	7.50				7.50	7.50	8.00	SPT	18	22	39	61	
	8.00			Yellowish brown, fine to medium grained, silty clayey sand with occasional gravels (SM-SC) 4.30 to 12.90m	8.00	8.00	9.00	UDS	-	-	-	-	
	8.50												
	9.00				9.00	9.00	10.50	SPT	21	21	33	54	
	9.50												
	10.00												
	10.50				10.50	10.50	11.00	SPT	28	32	34	66	
	11.00				11.00	11.00	12.00	UDS	-	-	-	-	
	11.50												
	12.00				12.00	12.00	13.50	SPT	27	40	60/11 cm	>100	
	12.50												
	13.00			Yellowish brown, fine to very fine grained, silty clayey sand with occasional gravels (SM-SC) 12.90 to 14.00m	13.50	13.50	14.00	SPT	30	35	39	74	
	13.50												
	14.00				14.00	14.00	15.00	UDS	-	-	-	-	
	14.50			Yellowish brown, fine to medium grained, clayey sand (SC) 14.20 to 16.20m	15.00	15.00	16.50	SPT	44	64/12 cm	-	>100	
	15.00												
	15.50												
16.00		16.50	16.50	17.00	SPT	41	70/13 cm	-	>100				
16.50													
17.00	Yellowish brown, fine to medium grained, clayey sand with some gravels (SC) 16.20 to 19.50m	17.00	17.00	18.00	UDS	-	-	-	-				
17.50													
18.00		18.00	18.00	19.50	SPT	36	65/13 cm	-	>100				
18.50													
19.00													
19.50		19.50	19.50	21.00	SPT	40	59/15 cm	-	>100				
20.00													
20.50	Reddish yellow, fine to very fine grained, clays of intermediate plasticity with little gravels (CI) 19.50 to 22.40m	21.00	21.00	22.50	SPT	28	40	50	90				
21.00													
21.50													
22.00													
22.50		22.50	22.50	24.00	SPT	33	57/15 cm	-	>100				
23.00													
23.50	Yellowish brown, fine to very fine grained, sandy clays of low plasticity (CL)	24.00	24.00	25.50	SPT	39	62/15 cm	-	>100				
24.00													
24.50													
25.00													
22.40 to 25.30m													

Project : Proposed Gift City Extension Line (3.33 Km Elevated Viaduct, Phase -2B) of Ahmedabad Metro Rail Project

Bore Hole No. : 9

Location : Shahpur Station 6

Depth of Termination : 45.0 m

Rig No.: 2

Co-ordinates: E 261856, N 2564814

Depth of Water Table : Not encountered during investigation

Date of Start: 13-04-2026

Date of Completion: 14-04-2026

Diameter of Bore: 150 mm

Type of Hammer: Manual Trip Hammer

Hammer Efficiency: 35%

BORE LOG DATA SHEET 2 OF 2

Method of Boring	Depth m	Casing	Notation	Soil Description	Depth of Sample m	Drill Run		Type of Sample	SPT N Value/Penetration of S.S.S				Remarks	
						From m	To m		N ₁	N ₂	N ₃	N		
Rotary drilling method	25.50				25.50	25.50	27.00	SPT	35	60/15 cm	-	>100		
	26.00			Yellowish brown, fine to medium grained, clayey sand with occasional gravels (SC) 25.30 to 26.30m										
	26.50													
	27.00													
	27.50													
	28.00													
	28.50													
	29.00													
	29.50													
	30.00			Yellowish brown, fine to medium grained, sandy clays of intermediate plasticity with little to some gravels (CI) 26.30 to 35.10m										
	30.50													
	31.00													
	31.50													
	32.00													
	32.50													
	33.00													
	33.50													
	34.00													
	34.50													
	35.00			Yellowish brown, fine to very fine grained, clayey sand with occasional to some gravels (SC) 35.10 to 36.90m										
	35.50													
	36.00													
	36.50													
	37.00													
	37.50													
	38.00													
	38.50													
	39.00													
	39.50													
	40.00													
40.50														
41.00	Reddish brown to reddish yellow, very fine grained, clays of high plasticity with occasional gravels (CH)													
41.50														
42.00														
42.50														
43.00														
43.50														
44.00														
44.50														
45.00														
				36.90 to 45.00m										

Project : Proposed Gift City Extension Line (3.33 Km Elevated Viaduct, Phase -2B) of Ahmedabad

ST/26/04/2019-18-57/26/05/2026

Bore Hole No. : 10

Date of Start: 13-04-2026

Location : Shahpur Station 4

Date of Completion: 15-04-2026

Depth of Termination : 45.0 m

Rig No.: 3

Diameter of Bore: 150 mm

Co-ordinates: E 261853, N 2564776

Type of Hammer: Auto Trip Hammer

Depth of Water Table : Not encountered during investigation

Hammer Efficiency: 60%

BORE LOG DATA SHEET 1 OF 2

Method of Boring	Depth m	Casing	Notation	Soil Description	Depth of Sample m	Drill Run		Type of Sample	SPT N Value/Penetration of S.S.S				Remarks
						From m	To m		N ₁	N ₂	N ₃	N	
Rotary Drilling by mud circulation	0.00	Not Used		Brownish black, fine to medium grained, filled up clayey sand 0.00 to 1.00m	0.00	0.00	1.50	DS	-	-	-	-	
	0.50												
	1.00												
	1.50			Yellowish brown, fine to medium grained, clayey sand with little to some gravels (SC) 1.00 to 2.50m	1.50	1.50	2.00	SPT	6	7	8	15	
	2.00				2.00	3.00	UDS	-	-	-	-		
	2.50												
	3.00			Yellowish brown, fine to medium grained, silty sand with little plastic fines and some to much gravels (SM) 2.50 to 9.00m	3.00	3.00	4.50	SPT	4	8	10	18	
	3.50												
	4.00												
	4.50				4.50	4.50	5.00	SPT	8	17	20	37	
	5.00				5.00	5.00	6.00	UDS	-	-	-	-	
	5.50												
	6.00				6.00	6.00	7.50	SPT	10	19	24	43	
	6.50												
	7.00												
	7.50				7.50	7.50	8.00	SPT	11	23	42	65	
	8.00				8.00	8.00	9.00	UDS	-	-	-	-	
	8.50												
	9.00			Yellowish brown, fine to medium grained, silty clayey sand with some gravels (SM-SC) 9.00 to 11.60m	9.00	9.00	10.50	SPT	17	30	44	74	
	9.50												
	10.00				10.50	10.50	11.00	SPT	13	25	36	61	
	10.50				11.00	11.00	12.00	UDS	-	-	-	-	
	11.00			Yellowish brown, fine to medium grained, clayey sand with little to occasional gravels (SC) 11.60 to 16.30m	12.00	12.00	13.50	SPT	16	22	30	52	
	12.50												
	13.00												
	13.50				13.50	13.50	14.00	SPT	18	32	42	74	
	14.00				14.00	14.00	15.00	UDS	-	-	-	-	
	14.50												
	15.00				15.00	15.00	16.50	SPT	21	31	45	76	
	15.50												
	16.00			Yellowish brown, fine to very fine grained, silty clays of intermediate plasticity with some gravels (CI) 16.30 to 20.00m	16.50	16.50	18.00	SPT	21	32	68/14 CM	>100	
	17.00												
17.50													
18.00	18.00	18.00			19.50	SPT	22	35	58	94			
18.50													
19.00													
19.50		Yellowish brown, fine to very fine grained, clayey sand with occasional gravels (SC) 20.00 to 22.10m	19.50	19.50	21.00	SPT	21	34	43	77			
20.00													
20.50													
21.00			21.00	21.00	22.50	SPT	25	35	50	85			
21.50													
22.00		Yellowish brown, fine to very fine grained, sandy clays of intermediate plasticity with occasional to some gravels (CI)	22.50	22.50	24.00	SPT	18	31	40	71			
22.50													
23.00													
23.50													
24.00			24.00	24.00	25.50	SPT	20	30	52	82			
24.50													
25.00													
				22.10 to 29.30m									

Project : Proposed Gift City Extension Line (3.33 Km Elevated Viaduct, Phase -2B) of Ahmedabad

ST/26/04/2019-18-57/25/05/2026

Bore Hole No. : 10

Date of Start: 13-04-2026

Location : Shahpur Station 4

Date of Completion: 15-04-2026

Depth of Termination : 45.0 m

Rig No.: 3

Diameter of Bore: 150 mm

Co-ordinates: E 261853, N 2564776

Type of Hammer: Auto Trip Hammer

Depth of Water Table : Not encountered during investigation

Hammer Efficiency: 60%

BORE LOG DATA SHEET 2 OF 2

Method of Boring	Depth m	Casing	Notation	Soil Description	Depth of Sample m	Drill Run		Type of Sample	SPT N Value/Penetration of S.S.S				Remarks
						From m	To m		N ₁	N ₂	N ₃	N	
Rotary drilling method	25.50				25.50	25.50	27.00	SPT	12	28	36	64	
	26.00												
	26.50												
	27.00			Yellowish brown, fine to very fine grained, sandy clays of intermediate plasticity with occasional to some gravels (CI) 22.10 to 29.30m	27.00	27.00	28.50	SPT	15	32	59	91	
	27.50												
	28.00												
	28.50				28.50	28.50	30.00	SPT	15	39	61/10 cm	>100	
	29.00												
	29.50												
	30.00			Light brownish, fine to coarse grained, clayey sand with some gravels (SC) 29.30 to 32.00m	30.00	30.00	31.50	SPT	100/13 cm	-	-	>100	
	30.50												
	31.00												
	31.50				31.50	31.50	33.00	SPT	100/12 cm	-	-	>100	
	32.00												
	32.50												
	33.00				33.00	33.00	34.50	SPT	60	40/4 cm	-	>100	
	33.50												
	34.00			Reddish brown, very fine grained, clays of high plasticity (CH) 32.00 to 37.00m	34.50	34.50	36.00	SPT	70	30/3 cm	-	>100	
	34.50												
	35.00												
	35.50												
	36.00				36.00	36.00	37.50	SPT	25	75/14 cm	-	>100	
	36.50												
	37.00												
	37.50			Yellowish brown, fine to medium grained, clayey sand (SC) 37.00 to 38.50m	37.50	37.50	39.00	SPT	34	66/11 cm	-	>100	
	38.00												
	38.50												
	39.00				39.00	39.00	40.50	SPT	30	70/15 cm	-	>100	
	39.50			Yellowish brown, fine to very fine grained, clayey sand with some gravels (SC) 38.50 to 41.50m									
	40.00				40.50	40.50	42.00	SPT	54	46/4 cm	-	>100	
	40.50												
	41.00												
	41.50				42.00	42.00	43.50	SPT	60	40/3 cm	-	>100	
	42.00												
	42.50												
	43.00			Yellowish brown, fine to very fine grained, sandy clays of intermediate plasticity with some gravels (CI)	43.50	43.50	45.00	SPT	65	65/3 cm	-	>100	
	43.50												
	44.00												
	44.50												
	45.00				45.00	45.00	45.15	SPT	40	60/8 cm	-	>100	
41.50 to 45.00m													

Project : Proposed Gift City Extension Line (3.33 Km Elevated Viaduct, Phase -2B) of Ahmedabad Metro Rail Project

Bore Hole No. : 11

Date of Start: 16-04-2026

Location : GP3/17

Date of Completion: 17-04-2026

Depth of Termination : 45.0 m

Rig No.: 2

Diameter of Bore: 150 mm


Co-ordinates: E 263241, N 2562796

Type of Hammer: Manual Trip Hammer

Depth of Water Table : Not encountered during investigation

Hammer Efficiency: 35%

BORE LOG DATA SHEET 1 OF 2

Method of Boring	Depth m	Casing	Notation	Soil Description	Depth of Sample m	Drill Run		Type of Sample	SPT N Value/Penetration of S.S.S				Remarks
						From m	To m		N ₁	N ₂	N ₃	N	
Rotary Drilling by mud circulation	0.00	Not Used			0.00	0.00	1.50	DS	-	-	-	-	
	0.50												
	1.00												
	1.50				1.50	2.00	SPT	6	11	13	24		
	2.00				2.00	3.00	UDS	-	-	-	-		
	2.50												
	3.00			Yellowish brown, fine to medium grained, clayey sand with occasional to some gravels (SC) 0.00 to 7.00m	3.00	3.00	4.50	SPT	8	11	16	27	
	3.50												
	4.00												
	4.50				4.50	5.00	SPT	7	12	17	29		
	5.00				5.00	6.00	UDS	-	-	-	-		
	5.50												
	6.00			6.00	7.50	SPT	10	32	45	77			
	6.50												
	7.00			Yellowish brown, fine to very fine grained, clayey sand with some to much gravels (SC) 7.00 to 10.60m	7.50	7.50	8.00	SPT	32	65/15 cm	-	>100	
	7.50												
	8.00				8.00	9.00	UDS	-	-	-	-		
	8.50												
	9.00				9.00	10.50	SPT	30	44	56/7 cm	>100		
	9.50												
	10.00			Yellowish brown, fine to coarse grained, sandy clays of intermediate plasticity with much gravels (CI) 10.60 to 11.80m	10.50	10.50	11.00	SPT	30	70/15 cm	-	>100	
	10.50												
	11.00				11.00	12.00	UDS	-	-	-	-		
	11.50												
	12.00				12.00	13.50	SPT	29	29	52	81		
	12.50												
	13.00			Reddish yellow, fine to very fine grained, clayey sand with some gravels (SC) 11.80 to 13.40m	13.50	13.50	14.00	SPT	39	63/14 cm	-	>100	
	13.50												
	14.00				14.00	15.00	UDS	-	-	-	-		
	14.50												
	15.00				15.00	16.50	SPT	21	30	51	81		
	15.50												
	16.00			Reddish brown to yellowish brown, fine to very fine grained, clays of intermediate plasticity with occasional to some gravels (CI) 13.40 to 22.30m	16.50	16.50	17.00	SPT	50	55/11 cm	-	>100	
16.50													
17.00	17.00	18.00	UDS		-	-	-	-					
17.50													
18.00	18.00	19.50	SPT		15	25	40	65					
18.50													
19.00	Yellowish brown, fine to very fine grained, sandy clays of intermediate plasticity with occasional gravels (CI)	19.50	19.50	21.00	SPT	23	34	50	84				
19.50													
20.00													
20.50													
21.00		21.00	22.50	SPT	21	50	53/9 cm	>100					
21.50													
22.00	Yellowish brown, fine to very fine grained, sandy clays of intermediate plasticity with occasional gravels (CI)	22.50	22.50	24.00	SPT	22	45	60/10 cm	>100				
22.50													
23.00													
23.50													
24.00		24.00	25.00	SPT	16	21	40	61					
24.50													
25.00		25.00	25.50	UDS	-	-	-	-					
22.30 to 26.70m													

Project : Proposed Gift City Extension Line (3.33 Km Elevated Viaduct, Phase -2B) of Ahmedabad Metro Rail Project

Bore Hole No. : 11

Location : GP3/17

Depth of Termination : 45.0 m

Co-ordinates : E 263241, N 2562796

Depth of Water Table : Not encountered during investigation

Rig No.: 2

Date of Start: 16-04-2026

Date of Completion: 17-04-2026

Diameter of Bore: 150 mm

Type of Hammer: Manual Trip Hammer

Hammer Efficiency: 35%

BORE LOG DATA SHEET 2 OF 2

Method of Boring	Depth m	Casing	Notation	Soil Description	Depth of Sample m	Drill Run		Type of Sample	SPT N Value/Penetration of S.S.S				Remarks																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
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Rotary drilling method	25.50			Yellowish brown, fine to very fine grained, sandy clays of intermediate plasticity with occasional gravels (CI) 22.30 to 26.70m	25.50	25.50	27.00	SPT	21	32	36	68																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
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Project : Proposed Gift City Extension Line (3.33 Km Elevated Viaduct, Phase -2B) of Ahmedabad Metro Rail Project

Bore Hole No. : 12

Date of Start: 15-04-2026

Location : GPP3/19

Date of Completion: 17-04-2026

Depth of Termination : 45.0 m

Rig No.: 2

Diameter of Bore: 150 mm

Co-ordinates: E 263260, N 2562544

Type of Hammer: Manual Trip Hammer

Depth of Water Table : Not encountered during investigation

Hammer Efficiency: 35%

BORE LOG DATA SHEET 1 OF 2

Method of Boring	Depth m	Casing	Notation	Soil Description	Depth of Sample m	Drill Run		Type of Sample	SPT N Value/Penetration of S.S.S				Remarks
						From m	To m		N ₁	N ₂	N ₃	N	
Rotary Drilling by mud circulation	0.00	Not Used		Yellowish brown, fine to medium grained, clayey sand with occasional to some gravels (SC) 0.00 to 4.70m	0.00	0.00	1.50	DS	-	-	-	-	
	0.50												
	1.00												
	1.50												
	2.00			Yellowish brown, fine to medium grained, clayey sand with occasional to some gravels (SC) 0.00 to 4.70m	1.50	1.50	2.00	SPT	16	17	18	35	
	2.50				2.00	2.00	3.00	UDS	-	-	-	-	
	3.00												
	3.50				3.00	3.00	4.50	SPT	15	15	19	34	
	4.00			Yellowish brown, fine to very fine grained, sandy clays of intermediate plasticity with occasional gravels (CI) 4.70 to 5.30m									
	4.50				4.50	4.50	5.00	SPT	21	24	25	49	
	5.00				5.00	5.00	6.00	UDS	-	-	-	-	
	5.50												
	6.00			Yellowish brown, fine to very fine grained, clayey sand with occasional gravels (SC) 5.30 to 8.50m	6.00	6.00	7.50	SPT	18	25	28	53	
	6.50												
	7.00				7.50	7.50	8.00	SPT	16	23	27	50	
	7.50				8.00	8.00	9.00	UDS	-	-	-	-	
	8.00			Yellowish brown, fine to medium grained, clayey sand with occasional to little gravels (SC) 8.50 to 13.60m									
	8.50				9.00	9.00	10.50	SPT	34	67/7 cm	-	>100	
	9.00												
	9.50												
	10.00			Yellowish brown, fine to medium grained, clayey sand with occasional to little gravels (SC) 8.50 to 13.60m	10.50	10.50	11.00	SPT	28	31	33	64	
	10.50				11.00	11.00	12.00	UDS	-	-	-	-	
	11.00												
	11.50				12.00	12.00	13.50	SPT	33	39	42	81	
	12.00			Dark reddish brown, fine to very fine grained, sandy clays high plasticity with some gravels (CH) 13.60 to 15.70m									
	12.50				13.50	13.50	14.00	SPT	30	37	50/6 cm	>100	
	13.00				14.00	14.00	15.00	UDS	-	-	-	-	
	13.50				15.00	15.00	16.50	SPT	30	33	40	73	
	14.00			Yellowish brown, fine to very fine grained, silty clays of intermediate plasticity with little to some gravels (CI) 15.70 to 19.30m									
	14.50				16.50	16.50	17.00	SPT	22	24	41	65	
	15.00				17.00	17.00	18.00	UDS	-	-	-	-	
	15.50				18.00	18.00	19.50	SPT	76/15 cm	-	-	>100	
	16.00			Yellowish brown, fine to very fine grained, sandy clays of intermediate plasticity with little gravels (CI)									
	16.50				19.50	19.50	21.00	SPT	18	24	36	60	
	17.00												
	17.50				21.00	21.00	22.50	SPT	27	40	62/11 cm	>100	
	18.00			Yellowish brown, fine to very fine grained, sandy clays of intermediate plasticity with little gravels (CI)									
	18.50				22.50	22.50	24.00	SPT	18	26	48	74	
	19.00												
	19.50				24.00	24.00	25.50	SPT	23	26	35	61	
	20.00			19.30 to 26.60m									
	20.50												
	21.00												
	21.50												
	22.00												
	22.50												
	23.00												
	23.50												
	24.00												
	24.50												
	25.00												

19.30 to 26.60m

Project : Proposed Gift City Extension Line (3.33 Km Elevated Viaduct, Phase -2B) of Ahmedabad Metro Rail Project

Bore Hole No. : 12

Date of Start: 15-04-2026

Location : GPP3/19

Date of Completion: 17-04-2026

Depth of Termination : 45.0 m

Rig No.: 2

Diameter of Bore: 150 mm


Co-ordinates: E 263260, N 2562544

Type of Hammer: Manual Trip Hammer

Depth of Water Table : Not encountered during investigation

Hammer Efficiency: 35%

BORE LOG DATA SHEET 2 OF 2

Method of Boring	Depth m	Casing	Notation	Soil Description	Depth of Sample m	Drill Run		Type of Sample	SPT N Value/Penetration of S.S.S				Remarks		
						From m	To m		N ₁	N ₂	N ₃	N			
Rotary drilling method	25.50			Yellowish brown, fine to very fine grained, sandy clays of intermediate plasticity with little gravels (CI) 19.30 to 26.60m	25.50	25.50	27.00	SPT	23	27	39	66			
	26.00														
	26.50														
	27.00				Yellowish brown, fine to very fine grained, clayey sand (SC) 26.60 to 28.60m	27.00	27.00	28.50	SPT	28	32	32	64		
	27.50														
	28.00														
	28.50					28.50	28.50	30.00	SPT	33	39	48	87		
	29.00														
	29.50														
	30.00				Yellowish brown to reddish brown, fine to very fine grained, clayey sand with occasional to some gravels (SC) 28.60 to 31.80m	30.00	30.00	31.50	SPT	41	57/7 cm	-	>100		
	30.50														
	31.00														
	31.50					31.50	31.50	33.00	SPT	67/11 cm	-	-	>100		
	32.00														
	32.50														
	33.00						33.00	33.00	34.50	SPT	60/14 cm	-	-	>100	
	33.50														
	34.00														
	34.50						34.50	34.50	36.00	SPT	65/15 cm	-	-	>100	
	35.00														
	35.50					Yellowish brown to reddish brown, fine to very fine grained, sandy clays of intermediate plasticity with occasional to some gravels (CI) 31.80 to 40.00m	36.00	36.00	37.50	SPT	34	50/5 cm	-	>100	
	36.00														
	36.50														
	37.00														
	37.50						37.50	37.50	39.00	SPT	29	55/15 cm	-	>100	
	38.00														
	38.50														
	39.00						39.00	39.00	40.50	SPT	70/8 cm	-	-	>100	
	39.50														
	40.00					Yellowish brown, fine to coarse grained, silty clayey sand with some gravels (SM-SC) 40.00 to 41.50m	40.50	40.50	42.00	SPT	72/8 cm	-	-	>100	
40.50															
41.00															
41.50															
42.00					42.00	42.00	43.50	SPT	69/14 cm	-	-	>100			
42.50				Yellowish brown, fine to medium grained, silty clayey sand (SM-SC) 41.50 to 44.10m											
43.00															
43.50					43.50	43.50	45.00	SPT	71/13 cm	-	-	>100			
44.00															
44.50				Reddish brown, fine to coarse grained, clayey sand with some gravels (SC)											
45.00					45.00	45.00	45.15	SPT	67/10 cm	-	-	>100			
44.10 to 45.00m															

Project : Proposed Gift City Extension Line (3.33 Km Elevated Viaduct, Phase -2B) of Ahmedabad Metro Rail Project

Bore Hole No. : 13

Location : GP-5/21

Depth of Termination : 45.0 m

Co-ordinates : E 261828.092, N 2564449.872

Depth of Water Table : Not encountered during investigation

Rig No. : 3

Date of Start: 16-04-2026

Date of Completion: 18-04-2026

Diameter of Bore: 150 mm

Type of Hammer: Auto Trip Hammer

Hammer Efficiency: 60%

BORE LOG DATA SHEET 1 OF 2

Method of Boring	Depth m	Casing	Notation	Soil Description	Depth of Sample m	Drill Run		Type of Sample	SPT N Value/Penetration of S.S.S				Remarks				
						From m	To m		N ₁	N ₂	N ₃	N					
Rotary Drilling by mud circulation	0.00	Not Used		Dark Brownish, fine to very fine grained, filled up clayey sand 0.00 to 1.30m	0.00	0.00	1.50	DS	-	-	-	-					
	0.50					Yellowish brown, fine to medium grained, clayey sand with little gravels (SC) 1.30 to 2.50m	1.50	1.50	2.00	SPT	4	5		6	11		
	1.00						2.00	2.00	3.00	UDS	-	-		-	-		
	1.50			Yellowish brown, fine to medium grained, silty sand with little plastic fines and little gravels (SM) 2.50 to 5.60m			3.00	3.00	4.50	SPT	4	8		14	22		
	2.00					Yellowish brown, fine to medium grained, silty sand (SM) 5.60 to 10.70m	4.50	4.50	5.00	SPT	6	16		21	37		
	2.50						5.00	5.00	6.00	UDS	-	-		-	-		
	3.00							Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m	6.00	6.00	7.50	SPT		12	22	41	63
	3.50									Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m	7.50	7.50		8.00	SPT	12	24
	4.00				8.00	8.00					9.00	UDS		-	-	-	-
	4.50			Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m	9.00	9.00			10.50	SPT	15	27		50	77		
	5.00					Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m	10.50	10.50	11.00	SPT	18	30		55	85		
	5.50			Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m			11.00	11.00	12.00	DS	-	UDS attempted but not recovered					
	6.00					Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m	12.00	12.00	13.50	SPT	19	24		32	56		
	6.50			Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m			13.00	13.00	14.00	SPT	28	70/14 cm		-	>100		
	7.00					Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m	13.50	13.50	15.00	DS	-	UDS attempted but not recovered					
	7.50			Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m			14.00	14.00	15.00	DS	-	UDS attempted but not recovered					
	8.00					Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m	14.50	14.50	16.50	SPT	29	71/13 cm		-	>100		
	8.50			Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m			15.00	15.00	16.50	SPT	29	71/13 cm		-	>100		
	9.00					Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m	15.50	15.50	16.50	SPT	29	71/13 cm		-	>100		
	9.50			Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m			16.00	16.00	17.00	SPT	36	64/14 cm		-	>100		
	10.00					Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m	16.50	16.50	17.00	SPT	36	64/14 cm		-	>100		
	10.50			Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m			17.00	17.00	18.00	UDS	-	-		-	-		
	11.00					Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m	17.50	17.50	18.00	UDS	-	-		-	-		
	11.50			Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m			18.00	18.00	19.50	SPT	24	37		63/14 cm	>100		
	12.00					Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m	18.50	18.00	19.50	SPT	24	37		63/14 cm	>100		
	12.50			Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m			19.00	19.50	21.00	SPT	21	33		67/15 cm	>100		
	13.00					Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m	19.50	19.50	21.00	SPT	21	33		67/15 cm	>100		
	13.50			Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m			20.00	21.00	22.50	SPT	27	34		50	84		
	14.00					Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m	20.50	21.00	22.50	SPT	27	34		50	84		
	14.50			Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m			21.00	21.00	22.50	SPT	27	34		50	84		
15.00		Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m			21.50	21.00	22.50	SPT	27	34	50	84					
15.50				Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m	22.00	22.50	24.00	SPT	18	29	39	68					
16.00		Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m			22.50	22.50	24.00	SPT	18	29	39	68					
16.50				Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m	23.00	22.50	24.00	SPT	18	29	39	68					
17.00		Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m			23.50	22.50	24.00	SPT	18	29	39	68					
17.50				Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m	24.00	24.00	25.50	SPT	18	24	41	65					
18.00		Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m			24.50	24.00	25.50	SPT	18	24	41	65					
18.50				Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m	25.00	24.00	25.50	SPT	18	24	41	65					
19.00		Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m			25.50	24.00	25.50	SPT	18	24	41	65					
19.50				Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m	26.00	24.00	25.50	SPT	18	24	41	65					
20.00		Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m			26.50	24.00	25.50	SPT	18	24	41	65					
20.50				Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m	27.00	24.00	25.50	SPT	18	24	41	65					
21.00		Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m			27.50	24.00	25.50	SPT	18	24	41	65					
21.50				Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m	28.00	24.00	25.50	SPT	18	24	41	65					
22.00		Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m			28.50	24.00	25.50	SPT	18	24	41	65					
22.50				Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m	29.00	24.00	25.50	SPT	18	24	41	65					
23.00		Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m			29.50	24.00	25.50	SPT	18	24	41	65					
23.50				Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m	30.00	24.00	25.50	SPT	18	24	41	65					
24.00		Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m			30.50	24.00	25.50	SPT	18	24	41	65					
24.50				Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m	31.00	24.00	25.50	SPT	18	24	41	65					
25.00		Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m			31.50	24.00	25.50	SPT	18	24	41	65					
25.50				Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m	32.00	24.00	25.50	SPT	18	24	41	65					
26.00		Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m			32.50	24.00	25.50	SPT	18	24	41	65					
26.50				Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m	33.00	24.00	25.50	SPT	18	24	41	65					
27.00		Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m			33.50	24.00	25.50	SPT	18	24	41	65					
27.50				Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m	34.00	24.00	25.50	SPT	18	24	41	65					
28.00		Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m			34.50	24.00	25.50	SPT	18	24	41	65					
28.50				Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m	35.00	24.00	25.50	SPT	18	24	41	65					
29.00		Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m			35.50	24.00	25.50	SPT	18	24	41	65					
29.50				Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m	36.00	24.00	25.50	SPT	18	24	41	65					
30.00		Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m			36.50	24.00	25.50	SPT	18	24	41	65					
30.50				Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m	37.00	24.00	25.50	SPT	18	24	41	65					
31.00		Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m			37.50	24.00	25.50	SPT	18	24	41	65					
31.50				Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m	38.00	24.00	25.50	SPT	18	24	41	65					
32.00		Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m			38.50	24.00	25.50	SPT	18	24	41	65					
32.50				Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m	39.00	24.00	25.50	SPT	18	24	41	65					
33.00		Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m			39.50	24.00	25.50	SPT	18	24	41	65					
33.50				Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m	40.00	24.00	25.50	SPT	18	24	41	65					
34.00		Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m			40.50	24.00	25.50	SPT	18	24	41	65					
34.50				Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m	41.00	24.00	25.50	SPT	18	24	41	65					
35.00		Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m			41.50	24.00	25.50	SPT	18	24	41	65					
35.50				Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m	42.00	24.00	25.50	SPT	18	24	41	65					
36.00		Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m			42.50	24.00	25.50	SPT	18	24	41	65					
36.50				Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m	43.00	24.00	25.50	SPT	18	24	41	65					
37.00		Yellowish brown, fine to very fine grained, silty sand with little plastic fines and occasional gravels (SM) 10.70 to 13.00m			43.50	24.00	25.50	SPT	18	24	41	65					

Project : Proposed Gift City Extension Line (3.33 Km Elevated Viaduct, Phase -2B) of Ahmedabad Metro Rail Project

Bore Hole No. : 13

Date of Start: 16-04-2026

Location : GP-5/21

Date of Completion: 18-04-2026

Depth of Termination : 45.0 m

Rig No.: 3

Diameter of Bore: 150 mm

Co-ordinates: E 261828.092, N 2564449.872

Type of Hammer: Auto Trip Hammer

Depth of Water Table : Not encountered during investigation

Hammer Efficiency: 60%

BORE LOG DATA SHEET 2 OF 2

Method of Boring	Depth m	Casing	Notation	Soil Description	Depth of Sample m	Drill Run		Type of Sample	SPT N Value/Penetration of S.S.S				Remarks	
						From m	To m		N ₁	N ₂	N ₃	N		
Rotary drilling method	25.50			Yellowish brown, fine to very fine grained, clayey sand (SC) 24.00 to 26.50m	25.50	25.50	27.00	SPT	14	28	40	68		
	26.00					27.00	27.00	28.50	SPT	18	27	33		61
	26.50													
	27.00													
	27.50													
	28.00													
	28.50					28.50	28.50	30.00	SPT	28	42	50		92
	29.00													
	29.50													
	30.00													
	30.50													
	31.00					31.50	31.50	33.00	SPT	60	40/3 cm	-		>100
	31.50													
	32.00													
	32.50													
	33.00													
	33.50					33.00	33.00	34.50	SPT	31	69/6 cm	-		>100
	34.00													
	34.50													
	35.00													
	35.50													
	36.00					36.00	36.00	37.50	SPT	38	62/5 cm	-		>100
	36.50													
	37.00													
	37.50													
	38.00													
	38.50					39.00	39.00	40.50	SPT	21	39	47		86
	39.00													
	39.50													
	40.00													
40.50														
41.00				40.50	40.50	42.00	SPT	30	70/12 cm	-	>100			
41.50														
42.00														
42.50														
43.00														
43.50				43.50	43.50	45.00	SPT	32	70/13 cm	-	>100			
44.00														
44.50														
45.00														
44.10 to 45.00m														

Project : Proposed Gift City Extension Line (3.33 Km Elevated Viaduct, Phase -2B) of Ahmedabad Metro Rail Project

Bore Hole No. : 14

Location : GP3/29

Depth of Termination : 45.0 m

Rig No.: 2

Co-ordinates: E 263682, N 2563128

Depth of Water Table : Not encountered during investigation

Date of Start: 17-04-2026

Date of Completion: 19-04-2026

Diameter of Bore: 150 mm

Type of Hammer: Manual Trip Hammer

Hammer Efficiency: 35%

BORE LOG DATA SHEET 1 OF 2

Method of Boring	Depth m	Casing	Notation	Soil Description	Depth of Sample m	Drill Run		Type of Sample	SPT N Value/Penetration of S.S.S				Remarks				
						From m	To m		N ₁	N ₂	N ₃	N					
Rotary Drilling by mud circulation	0.00	Not Used		Yellowish brown to brownish, fine to medium grained, clayey sand with little to some gravels (SC) 0.00 to 4.00m	0.00	0.00	1.50	DS	-	-	-	-					
	0.50																
	1.00																
	1.50							1.50	1.50	2.00	SPT	10		12	15	27	
	2.00							2.00	2.00	3.00	UDS	-		-	-	-	
	2.50																
	3.00							3.00	3.00	4.50	SPT	5		5	6	11	
	3.50																
	4.00																
	4.50							4.50	4.50	5.00	SPT	3		4	6	10	
	5.00							5.00	5.00	6.00	UDS	-		-	-	-	
	5.50																
	6.00							6.00	6.00	7.50	SPT	6		7	10	17	
	6.50																
	7.00							Brownish to yellowish brown, fine to medium grained, clayey sand (SC) 7.20 to 8.60m									
	7.50							7.50	7.50	8.00	SPT	7		9	13	22	
	8.00							8.00	8.00	9.00	UDS	-		-	-	-	
	8.50																
	9.00							Yellowish brown, fine to medium grained, silty sand with little plastic fines and occasional to much gravels (SM) 8.60 to 10.30m	9.00	9.00	10.50	SPT		12	17	23	40
	9.50																
	10.00																
	10.50							Yellowish brown, fine to very fine grained, clayey sand (SC) 10.30 to 11.50m	10.50	10.50	11.00	SPT		9	13	24	37
	11.00							11.00	11.00	12.00	UDS	-		-	-	-	
	11.50							Reddish brown, very fine grained,silty clayey sand with occasional gravels (SM-SC) 11.50 to 12.60m									
	12.00							12.00	12.00	13.50	SPT	12		34	37	72	
	12.50																
	13.00								13.50	13.50	14.00	SPT		7	16	27	43
	13.50								14.00	14.00	15.00	UDS		-	-	-	-
	14.00																
	14.50							Reddish brown, very fine grained, silty clays of intermediate plasticity with occasional to some gravels (CI) 12.60 to 17.60m	15.00	15.00	16.50	SPT		16	25	40	65
	15.00																
	15.50								16.50	16.50	17.00	SPT		10	21	36	57
	16.00								17.00	17.00	18.00	UDS		-	-	-	-
16.50																	
17.00																	
17.50				Dark reddish Brown, fine to very fine grained, clayey sand (SC) 17.60 to 18.50m	18.00	18.00	19.50	SPT	22	27	40	67					
18.00																	
18.50																	
19.00				Yellowish brown, fine to coarse grained, clayey sand with much gravels (SC) 18.50 to 20.50m	19.50	19.50	20.00	SPT	14	20	29	49					
19.50					20.00	20.00	21.00	UDS	-	-	-	-					
20.00																	
20.50					21.00	21.00	22.50	SPT	25	40	55	95					
21.00																	
21.50																	
22.00																	
22.50				Yellowish brown and greyish, fine to medium grained, sandy clays of intermediate plasticity with little gravels (CI)	22.50	22.50	24.00	SPT	32	70/15cm	-	>100					
23.00																	
23.50																	
24.00					24.00	24.00	25.50	SPT	67	35/5 cm	-	>100					
24.50																	
25.00																	
20.50 to 26.70m																	

Project : Proposed Gift City Extension Line (3.33 Km Elevated Viaduct, Phase -2B) of Ahmedabad Metro Rail Project

Bore Hole No. : 14

Date of Start: 17-04-2026

Location : GP3/29

Date of Completion: 19-04-2026

Depth of Termination : 45.0 m

Rig No.: 2

Diameter of Bore: 150 mm

Co-ordinates: E 263682, N 2563128

Type of Hammer: Manual Trip Hammer

Depth of Water Table : Not encountered during investigation

Hammer Efficiency: 35%

BORE LOG DATA SHEET 2 OF 2

Method of Boring	Depth m	Casing	Notation	Soil Description	Depth of Sample m	Drill Run		Type of Sample	SPT N Value/Penetration of S.S.S				Remarks																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
						From m	To m		N ₁	N ₂	N ₃	N																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
Rotary drilling method	25.50			Yellowish brown and greyish, fine to medium grained, sandy clays of intermediate plasticity with little gravels (CI) 20.50 to 26.70m	25.50	25.50	27.00	SPT	45	56/15 cm	-	>100																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
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Project : Proposed Gift City Extension Line (3.33 Km Elevated Viaduct, Phase -2B) of Ahmedabad Metro Rail Project

Bore Hole No. : 15

Date of Start: 17-04-2026

Location : GP3/39

Date of Completion: 19-04-2026

Depth of Termination : 45.0 m

Rig No.: 2

Diameter of Bore: 150 mm

Co-ordinates: E 263071, N 2563355

Type of Hammer: Manual Trip Hammer

Depth of Water Table : Not encountered during investigation

Hammer Efficiency: 35%

BORE LOG DATA SHEET 1 OF 2

Method of Boring	Depth m	Casing	Notation	Soil Description	Depth of Sample m	Drill Run		Type of Sample	SPT N Value/Penetration of S.S.S				Remarks
						From m	To m		N ₁	N ₂	N ₃	N	
Rotary Drilling by mud circulation	0.00	Not Used		Yellowish brown, fine to very fine grained, sandy clays of low plasticity with little gravels (CL) 0.00 to 1.30m	0.00	0.00	1.50	DS	-	-	-	-	
	0.50												
	1.00												
	1.50		Yellowish brown, fine to medium grained, clayey sand with occasional to some gravels (SC) 1.30 to 7.30m	1.50	1.50	2.00	SPT	15	21	18	39		
	2.00			2.00	2.00	3.00	UDS	-	-	-	-		
	2.50												
	3.00			3.00	4.50	SPT	8	11	12	23			
	3.50												
	4.00												
	4.50			4.50	5.00	SPT	17	19	21	40			
	5.00			5.00	6.00	UDS	-	-	-	-			
	5.50												
	6.00			6.00	7.50	SPT	25	29	34	63			
	6.50												
	7.00												
	7.50		Yellowish brown, fine to very fine grained, silty clayey sand with occasional to little gravels (SM-SC) 7.30 to 8.60m	7.50	7.50	8.00	SPT	16	22	24	46		
	8.00			8.00	9.00	UDS	-	-	-	-			
	8.50												
	9.00		Yellowish brown, fine to very fine grained, clayey sand with occasional to little gravels (SC) 8.60 to 12.80m	9.00	9.00	10.50	SPT	11	14	19	33		
	9.50												
	10.00												
	10.50			10.50	11.00	SPT	13	15	22	37			
	11.00			11.00	12.00	UDS	-	-	-	-			
	11.50												
	12.00			12.00	13.50	SPT	27	30	32	62			
	12.50												
	13.00		Yellowish brown, fine to very fine grained, silty clayey sand with little gravels (SM-SC) 12.80 to 13.80m	13.50	13.50	14.00	SPT	35	56/14 cm	-	>100		
	13.50			14.00	15.00	UDS	-	-	-	-			
	14.00												
	14.50		Reddish brown, very fine grained, clays of intermediate plasticity with occasional to little gravels (CI) 13.80 to 16.80m	15.00	15.00	16.50	SPT	26	29	33	62		
	15.50												
	16.00												
	16.50			16.50	17.00	SPT	29	46	58	>100			
	17.00			17.00	18.00	UDS	-	-	-	-			
	17.50		Yellowish brown to reddish brown, fine to medium grained, clayey sand with little gravels (SC) 16.60 to 18.00m	18.00	18.00	19.50	SPT	25	31	38	69		
	18.50												
19.00													
19.50	19.50	20.00		SPT	35	60/15 cm	-	>100					
20.00	20.00	21.00		UDS	-	-	-	-					
20.50													
21.00	21.00	22.00		SPT	16	17	20	37					
21.50													
22.00	Yellowish brown, fine to medium grained, sandy clays of intermediate plasticity with some gravels (CI) 18.00 to 22.50m	22.00	22.00	22.50	UDS	-	-	-	-				
22.50		22.50	24.00	SPT	22	30	46	76					
23.00													
23.50													
24.00		24.00	25.50	SPT	40	57/15 CM	-	>100					
24.50													
25.00													
22.50 to 29.20m													

Project : Proposed Gift City Extension Line (3.33 Km Elevated Viaduct, Phase -2B) of Ahmedabad Metro Rail Project

Bore Hole No. : 15

Location : GP3/39

Depth of Termination : 45.0 m

Co-ordinates: E 263071, N 2563355

Depth of Water Table : Not encountered during investigation

Rig No.: 2

Date of Start: 17-04-2026

Date of Completion: 19-04-2026

Diameter of Bore: 150 mm

Type of Hammer: Manual Trip Hammer

Hammer Efficiency: 35%

BORE LOG DATA SHEET 2 OF 2

Method of Boring	Depth m	Casing	Notation	Soil Description	Depth of Sample m	Drill Run		Type of Sample	SPT N Value/Penetration of S.S.S				Remarks		
						From m	To m		N ₁	N ₂	N ₃	N			
Rotary drilling method	25.50			Yellowish brown to reddish brown, fine to very fine grained, clayey sand (SC) 22.50 to 29.20m	25.50	25.50	27.00	SPT	65/15 cm	-	-	>100			
	26.00														
	26.50														
	27.00							46	59/15 cm	-	>100				
	27.50														
	28.00														
	28.50						28.50	28.50	30.00	SPT	70/14 cm	-		-	>100
	29.00														
	29.50					Yellowish brown, fine to medium grained, silty sand with little plastic fines (SM) 29.20 to 30.30m									
	30.00					30.00	30.00	31.50	SPT	37	56/13 cm	-		>100	
	30.50														
	31.00														
	31.50						31.50	31.50	33.00	SPT	47	59/15 cm		-	>100
	32.00														
	32.50														
	33.00						33.00	33.00	34.50	SPT	62/15 cm	-		-	>100
	33.50					Yellowish brown, fine to medium grained, sandy clays of interemdiat e plasticity with occasional to little gravels (CI) 30.30 to 37.00m									
	34.00														
	34.50						34.50	34.50	36.00	SPT	76/14 cm	-		-	>100
	35.00														
	35.50														
	36.00						36.00	36.00	37.50	SPT	67/15 cm	-		-	>100
	36.50														
	37.00														
	37.50						37.50	37.50	39.00	SPT	32	60/7 cm		-	>100
	38.00														
	38.50						Yellowish brown, fine to very fine grained, clayey sand with little gravels (SC) 37.00 to 41.00m								
	39.00						39.00	39.00	40.50	SPT	77/15 cm	-		-	>100
	39.50														
	40.00														
40.50				40.50	40.50	42.00	SPT	52	57/15 cm	-	>100				
41.00															
41.50				Yellowish brown, fine to medium grained, silty clayey sand with occasional gravels (SM-SC) 41.00 to 43.90m											
42.00				42.00	42.00	43.50	SPT	70/11 cm	-	-	>100				
42.50															
43.00															
43.50				43.50	43.50	45.00	SPT	69/15 cm	-	-	>100				
44.00															
44.50				Reddish yellow, fine to very fine grained, sandy clays of intermediate plasticity (CI)											
45.00				45.00	45.00	45.15	SPT	40	58/15 cm	-	>100				
43.90 to 50.00m															

Photographs



