



INTERIM REPORT FOR THE PROPOSED IT PARK BUILDING (G+5) FOR KIIDC KOTTARAKKARA, KOLLAM

Client (For MatterLab) : Kerala Irrigation Infrastructure Development Corporation (KIIDC)
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: Enchakkal Junction, Chakkai (PO), Trivandrum
Contact : Mr. Bajichandran
Project No : GT- 410
Project Name : Geotechnical investigation for Proposed IT Park Building (G+5) at
: Kallada irrigation Head Quarters campus, Kottarakkara.
Project Location : Kottarakkara, Kollam
Tel / Fax No : 9946771389
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1 INTRODUCTION

Kerala Irrigation Infrastructure Development Corporation (KIIDC) has entrusted the work of Geotechnical Investigation for the Construction of IT Park (G+5 Building) at Kallada Irrigation Head Quarters Campus at Kottarakkara, Kollam District to M/s Matter Material Testing & Research Laboratory (P) Ltd. Five boreholes were bored using rotary drilling technique at the proposed locations. The field geotechnical investigation was started on 08th October 2024 and was completed on 18th October 2024. Standard Penetration test (SPT) was conducted within the borehole as required. Soil and rock samples were collected, and relevant laboratory tests were carried out on it. This report presents the results of the geotechnical investigation and foundation recommendation for the proposed IT Park.

2 SCOPE OF WORK

The scope of this work comprised of:

- Drilling of five borehole at the proposed locations as per the direction of the Client.
- Collection of soil and rock samples and performing necessary laboratory tests on the collected samples.
- Preparation of Geotechnical Report with results of the geotechnical investigation, laboratory tests and foundation recommendations.

3 GEOLOGY OF THE AREA

The Kollam district can be broadly divided into three geological provinces – the westernmost Quaternary alluvial deposits followed by a narrow N-S zone of late Tertiary sediments and the easternmost Precambrian metamorphic. The Precambrian metamorphic are represented by Khondalite, Charnockite and Migmatite groups. They are intruded by younger basic dykes and overlain by Tertiary and Quaternary sediments. High grade metamorphic rocks of Khondalite Group include calc-granulite, quartzite and garnet-biotite-sillimanite gneiss with or without graphite. Thin lenticular bands of calc-granulite occur within charnockite and migmatite. The Khondalite paragneiss tends to occur as linear bodies towards the middle and western part of the district. The Charnockite Group consists of pyroxene granulite, cordierite gneiss and hypersthene-hornblende granite gneiss (charnockite). It mostly occurs as concordant bands and lenses of varied dimensions in Khondalite and migmatite with a diffused contact. It grades into gneiss. Generally, it is garnetiferous near the contact with the gneiss. The rock shows

granoblastic texture and is mostly intermediate to acidic. Pyroxene granulite occurs as thin, discordant, lenticular patches, within migmatite, and is concordant with the para gneiss. Cordierite gneiss is found as impersistent bands and lenses within garnet-biotite gneiss and is confined to the contact with gneiss and charnockite. It displays xenoblastic gneissose texture and consists of varying proportions of cordierite, plagioclase, microperthite, quartz, biotite, hypersthene, garnet and hornblende. Near Punalur, there is a small body of dunite. The Migmatite Complex comprising garnet-biotite gneiss and quartzo-feldspathic gneiss are the major rock units of the area and they are traversed by the pegmatite and aplite veins. The rocks of the Migmatite Complex are widely distributed and interlayered with rocks of Charnockite Group. Garnet-biotite gneiss has a larger areal distribution and is characterised by the presence of biotite foliae and concentration of garnet in layers. Bands and lenses of quartzo-feldspathic gneiss occur within it. Granite gneiss of Peninsular Gneissic Complex occurs as small lenses towards the east. All the older rocks are intruded by basic intrusive of doleritic composition having a general NW-SE trend. Towards west, the rocks of Archaean age are unconformably overlain by sedimentary rocks of Mio-Pliocene age. Two distinct sequence of sediments are noticeable. A lower marine sequence (Quilon Formation) represented by fossiliferous limestone and marl and an upper non-marine sequence of alternating beds of sandstone and clay, with carbonaceous clay and lignite seams towards the bottom (Warkalli Formation). These beds are horizontally disposed and lateritised at the top. The midland portion representing the Tertiary sedimentary terrain and the western part of the Archaean terrain is extensively lateritised and the laterite is 5 to 10m thick. The coastal plain is covered by Quaternary (**Figure 1**).

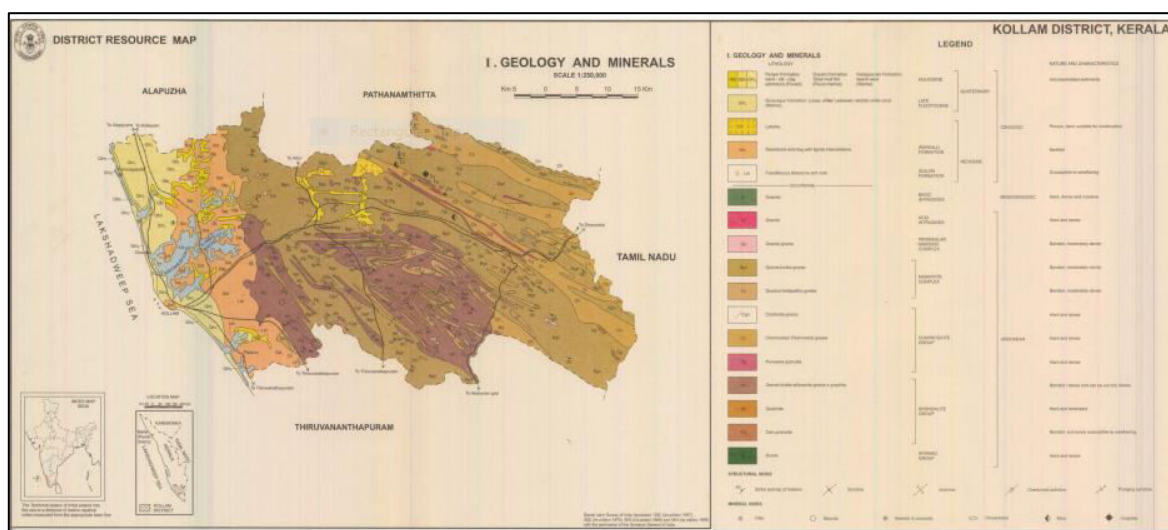


Figure 1: Geology of Kollam District (Source: District Resource Map, Kollam District, Geological Survey of India)

4 FIELD INVESTIGATIONS

4.1 Boreholes

The fieldwork includes boring of five boreholes in soil and rock. The details of the borehole with respect to depth of investigation are given in **Table 1**. The boring operations at the site is shown in **Figure 2 to 6**.

Table 1: Details of boreholes with depth of investigation

Sl. No.	Borehole ID	Depth of Investigation (m)	Depth of Water Table from Existing Ground Level (m)
1	BH-01	19.50	4.40
2	BH-02	24.00	4.60
3	BH-03	21.60	4.40
4	BH-04	23.00	5.10
5	BH-05	20.00	6.70
6	BH-06	17.40	5.30



Figure 2: Borehole location at BH-01



Figure 3: Borehole location at BH-02



Figure 3: Borehole location at BH-03



Figure 4: Borehole location at BH-04



Figure 5: Borehole location at BH-05



Figure 6: Borehole location at BH-06

4.2 Rotary drilling

Rotary drilling technique was adopted for advancing and cleaning out borehole in overburden soil between sample intervals. Standard penetration test (SPT) is conducted at every 1.00 m until 3.00 m and 1.50 m up to 15.00 m and 3.00 m after that or at change of strata.

4.3 Drilling equipment

Mechanical rotary drilling rigs were used for the purpose. The rigs are well suited for the required work. The rigs are new and well-maintained.

Soil Boring: The boring was advanced by rotating drill string connected by series of drill rods. The boring diameter of 150mm was formed using a drill bit (Soil Cutter) in soil. The drill bit cuts the subsoil at the bottom of the borehole and the soil fragments were removed by drilling mud (bentonite) which is under circulation. Bentonite slurry is used for stabilizing the borehole.

In the hard/ soft rock stratum consisting of intact or jointed rock mass or boulders, the boreholes were advanced by rotary drilling with NX size diamond coring bit.

4.4 Observation during drilling

Sampling

The samples collected from the SPT sampler are treated as representative samples. Immediately after collection of sample from the sampler, the sample was transferred to a double walled polythene bag. A sample label is attached, and the bag is tied tightly with thread to avoid any loss of moisture.

Standard Penetration Test

This test was performed as per IS 2131-1981. The split spoon sampler was lowered and driven under impact of a 63.5 kg load with a free fall of 75 cm for 45 cm penetration at the bottom of the hole. Initial 15 cm penetration is considered as seating drive and number of blows required to penetrate the sampler for remaining 30 cm (out of 45 cm mark usually driven in soil) is recorded as 'N' value at that depth. If the sampler does not fully penetrate into soil, then the test is terminated after 50 blows and corresponding penetration is noted down.

Extraction of Cores:

The core samples were extracted from the core barrels in a manner to prevent disturbances to the core. All the pieces of cores were sequentially numbered from top to bottom. Arrows

indicating the lower end of the piece are marked on each core. Rock classification in terms of weathering and state of fractures is carried out in the following manner. Tabulation given in below explain it briefly.

Table 2: Weathering Classification of Rock

Terms	Description	Grade
Fresh	No visible sign of rock material weathering; perhaps slight discoloration on Minor discontinuity surfaces.	W ₁
Slightly Weathered	Discoloration indicates weathering of rock material and discontinuity surfaces. All the rock material may be discolored by weathering.	W ₂
Moderately Weathered	Less than half of the rock material is decomposed or disintegrated to a soil. Fresh or discolored rock is present either as a continuous framework or as core stones.	W ₃
Highly Weathered	More than half of the rock material is decomposed or disintegrated to a soil. Fresh or discolored rock is present either as discontinuous framework or as core stones	W ₄
Completely Weathered	All rock material is decomposed and / or disintegrated to soil. The original mass structures still largely intact.	W ₅

-As per IS 4464-2020

It should be understood that all grades of weathering may not be seen in a given rock mass and that in some cases a particular grade may be present to a very small extent. Distribution of the various weathering grades of rock material in the rock mass may be related to the porosity of the rock material and the presence of open discontinuities of all types in the rock mass.

Storing of core samples

All core pieces are placed in standard core boxes in a serial order and correct sequence from top in descending order. The shallowest core shall be placed to the top left-hand corner of every compartment starting with cores placed adjacent to the hinged section. Core boxes shall confirm to IS 4078-1980.

Ground Water Table:

Observations were made for ground water in borehole after 24 hours of boring. The Ground Water Table ranges from 4.40 m to 6.70 m below the Existing Ground Level (EGL) at the time of investigation (2nd and 3rd weeks of October, 2024).

Preparation of Bore Logs:

On completion of each borehole, the soil samples were examined and logged. The final log is prepared on the basis of visual examination of soil samples and laboratory testing data. The following are observed and recorded in the bore log:

The commencement and completion date, location of borehole, elevation of top and bottom of boring, ground water table, boundaries of each soil layer that encountered, classification and description of the soil, blow count values obtained from SPT tests, collection of soil samples etc.

The borelogs are attached as **Appendix I**.

5 LABORATORY INVESTIGATION

The laboratory tests were conducted as per relevant parts of Indian Standard. A summary of laboratory tests carried out are shown below in **Table 3** and the summary of laboratory testing is presented in **Appendix II**.

Table 3: Details of various laboratory tests and relevant IS codes followed

Sl No.	Type of Sample	Description	Test Method
1	Soil	Natural Moisture Content	IS: 2720 (Part-2) – 1973
2		Grain-Size Analysis	IS: 2720 (Part-4) – 1985
3		Atterberg's Limit	IS: 2720 (Part-5) – 1985
4		Specific gravity	IS: 2720 (Part-3) – 1980
5	Rock	Dry Density	ISRM Suggested Method
6		Porosity	ISRM Suggested Method
7		Unconfined Compressive Strength Test	IS: 9143-1979
8		Point Load Test	ISRM Suggested Method

5.1 Laboratory tests (Soil)

Natural Moisture Content (NMC)

Natural moisture content (NMC) of soil samples were determined as per IS: 2720 (Part-2)-1973

Grain size analysis (Sieve & hydrometer)

The grain size distribution of some representative samples was determined from sieve analysis and hydrometer analysis depending upon the average grain diameter of the soil samples. The higher grained samples like sand were analyzed through sieve and the lower grain samples like fine silt and clay were analyzed through hydrometer. The results have been presented in the summary table.

Atterberg limits (Liquid limit and Plastic limit)

The Liquid limit is the moisture content at which the groove, formed by a standard tool in to the sample of soil taken in the standard cup close for 12 mm on being given 25 blows in a standard manner. At this limit the soil possesses low shear strength.

Plastic limit is taken as the water content at which 3mm soil thread shows hair line cracks just appearing on the surface.

Specific Gravity

This test has been carried out to determine the specific gravity of fine-grained soil by density bottle method as per IS: 2720 (Part III/Sec 1) – 1980. Specific gravity is the ratio of the weight in air of a given volume of a material at a standard temperature to the weight in air of an equal volume of distilled water at the same temperature.

5.2 Laboratory tests (Rock)

Density/ Porosity

The density and porosity are determined using the International Society for Rock Mechanics (ISRM) suggested saturation and buoyancy techniques. This test is intended to measure the porosity, the dry density and related properties of a rock sample. The presence of pores in the fabric of a rock material decreases its strength, and increases its deformability. A low density

rock is usually highly porous. It is often sufficient, therefore, to quote values for porosity alone, but a complete description requires values for both porosity and density.

Unconfined Compressive Strength test

The unconfined compressive strength test is primarily an index test for strength classification of rock materials. Compressive strength tests were carried out on selected rock core samples as per IS: 9143-1979.

Point Load Test

The point load test is primarily an index test for strength classification of rock materials. Point load tests were carried out on selected rock core samples as per the International Society for Rock Mechanics (ISRM) suggested method. As per IS: 8764 - 1998, the uni-axial compressive strength (q_c) of rock may be predicted from the following correlation:

$$q_c = 22 * I_s (50)$$

6 SUMMARY AND RECOMMENDATIONS

6.1 General

The geotechnical investigation for the proposed IT Park Building for KIIDC at Kottarakkara, Kollam was carried out by M/s Matter Material Testing & Research Laboratory (P) Ltd. The investigations comprised drilling six boreholes, carrying out SPT at regular intervals, collection of soil and rock samples and carrying out laboratory tests on soil and rock samples. The depth of investigation varies from 17.40 m to 24.00 m below the existing ground level (EGL). The ground water table was observed at depths ranging from 4.40 m to 6.70 m below EGL during the period of investigation (08th to 18th October 2024).

From the geotechnical investigation at BH-01 location, it is observed that stiff to very stiff lateritic soil (CH/SC) having N value ranging from 11 to 20 is followed by hard lateritic soil (SM with 40-47% fines) up to 13.50 m below EGL. At 17.50 m depth, highly to completely weathered rock is encountered and is continued up to the borehole termination depth, 19.50 m below EGL.

6.2 Recommendations on Shallow Foundations

For the proposed G+5 Building, shallow foundations may be considered. The **safe bearing capacity** was calculated as per **IS 6403:1981 (reaffirmed 2021)** and the **settlements** were assessed in accordance with **IS 8009 (Part 1):1976 (reaffirmed 2018)**.

The recommended **gross allowable bearing pressure** for **isolated square/ rectangular footings (L/B<1.5)**, placed at a **depth** of about **1.50 m below the Existing Ground Level** are as follows:

For isolated footings (**square/rectangular with L/B<1.5**), width ranging from **1.50 – 2.50 m**:
15 t/m².

For isolated footings (**square/rectangular with L/B<1.5**), width ranging from **2.50 – 4.00 m**:
12 t/m².

6.3 Recommendations on Pile foundations socketed in completely / highly weathered rock or hard rock

In case, shallow foundations are not viable due to higher load requirements or construction difficulties, bored and cast in-situ concrete piles terminating in completely/ highly weathered or hard rock are considered. Rock strata is encountered at depths ranging from 17.50 m to 20.60 m below the Existing Ground Level. Piles socketed in completely/ highly weathered rock strata are anticipated at locations represented by BH-01, BH-04, BH-05 and BH-06 while piles socketed in hard rock are anticipated at locations represented by boreholes BH-02 and BH-03. A minimum socketing of 2 times the pile diameter (2D) in completely/highly weathered rock (soft rock) strata is recommended while 300 mm socketing has to be ensured in hard rock. The pile capacity calculations are based on **IS 2911-Part-1-Section 2: 2010**.

The recommended safe geotechnical capacity of Piles socketed into completely/highly weathered rock or hard rock is summarized in **Table 5**.

Table 5: Pile capacity values for the piles end bearing in completely/ highly weathered or hard rock

Diameter of Pile (mm)	Minimum Socket Length in IGM Stratum (mm)	Recommended safe geotechnical capacity in axial compression (T)
500	1000 mm in completely/highly weathered rock or 300 mm in hard rock	75
600	1200 mm in completely/highly weathered rock or 300 mm in hard rock	105
700	1400 mm in completely/highly weathered rock or 300 mm in hard rock	145
800	1600 mm in completely/highly weathered rock or 300 mm in hard rock	190

The above recommendations are made based on the subsoil profile encountered at the site. If there is any variation in soil profile during execution, fresh recommendation may be obtained from M/s Matter Material Testing & Research Laboratory (P) Ltd. or from a qualified and experienced geotechnical engineer.

APPENDIX-I

BORELOGS


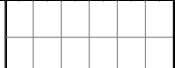


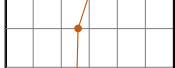
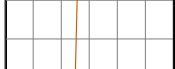








FIELD BORELOG

PROJECT	: Geotechnical Investigation for the Proposed IT Park Building for KIADC Kottarakkara	SHEET NO.	: 1 of 1	START DATE	: 08/10/2024
CLIENT	: KIADC	BORE DIAMETER (mm)	: 150	END DATE	: 09/10/2024
PROPOSED STRUCTURE	: G+5 Building	BORING TYPE	: Rotary	REDUCED LEVEL (m)	:
LOCATION	: Kottarakkara, Kollam	TERMINATION DEPTH (m)	: 19.50	EASTING (m)	:
BOREHOLE NO.	: BH-01	WATER LEVEL	: 4.40 m below EGL	NORTHING (m)	:

DEPTH m	GRAPHIC LOG	VISUAL DESCRIPTION OF STRATA	THICKNESS OF LAYER m	SAMPLE DEPTH	SAMPLE TYPE	BLOW COUNT/15CM			SPT N VALUE	DEPTH V/S N VALUE					REMARKS		
						N1	N2	N3		0	10	20	30	40		50	60
1.00		Hard lateritic clay with gravel	1.00	1.00	SPT-1	20	21	23	44								
		Stiff to very stiff lateritic clay with sandy silt	9.50	2.00	SPT-2	10	9	11	20								
				3.00	SPT-3	9	7	9	16								
				4.50	SPT-4	8	6	7	13								
				6.00	SPT-5	5	5	7	12								
				7.50	SPT-6	4	5	6	11								
				9.00	SPT-7	5	6	6	12								
10.50				10.50	SPT-8	8	10	22	32								
		Hard lateritic soil with clayey sand and gravel	3.00	12.00	SPT-9	10	14	24	38								
13.50				13.50	SPT-10	32	>50	>	>50								Balance = 15 cm
		Hard laterite or lateritic soil	4.00	15.00	SPT-11	38	>50	>	>50							Balance = 18 cm	
17.50				17.50	SPT-12	>50	>	>	>50								Rebound, Balance = 45 cm, No sample
				Highly to completely weathered rock	1.00	17.50 - 18.50	RC-1										CR = 40% RQD = Nil
18.50		Highly to completely weathered rock	1.00	18.50 - 19.50	RC-2										CR = 45% RQD = Nil		
19.50		Borehole is terminated at a depth of 19.50 m below the Existing Ground Level (EGL)															

FIELD BORELOG


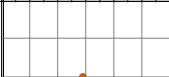
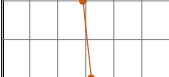

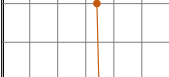




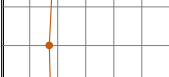





PROJECT	: Geotechnical Investigation for the Proposed IT Park Building for KIHC Kottarakkara	SHEET NO.	: 1 of 2	START DATE	: 10/10/2024
CLIENT	: KHDC	BORE DIAMETER (mm)	: 150	END DATE	: 11/10/2024
PROPOSED STRUCTURE	: G+5 Building	BORING TYPE	: Rotary	REDUCED LEVEL (m)	:
LOCATION	: Kottarakkara, Kollam	TERMINATION DEPTH (m)	: 24.00	EASTING (m)	:
BOREHOLE NO.	: BH-02	WATER LEVEL	: 4.60 m below EGL	NORTHING (m)	:

DEPTH m	GRAPHIC LOG	VISUAL DESCRIPTION OF STRATA	THICKNESS OF LAYER m	SAMPLE DEPTH	SAMPLE TYPE	BLOW COUNT/15CM			SPT N VALUE	DEPTH V/S N VALUE					REMARKS
						N1	N2	N3		0	10	20	30	40	
		Very stiff to hard lateritic soil with clayey sand and gravel	12.00	1.00	SPT-1	10	13	14	27						
2.00				SPT-2	14	15	20	35							
3.00				SPT-3	13	13	13	26							
4.50				SPT-4	8	13	12	25							
6.00				SPT-5	9	15	16	31							
7.50				SPT-6	20	25	21	46							
9.00				SPT-7	19	26	22	48							
10.50				SPT-8	13	16	18	34							
12.00				SPT-9	5	12	20	32							
		Hard laterite or lateritic soil	9.00	13.50	SPT-10	13	20	30	50						Balance = 3 cm
15.00				SPT-11	30	34	>16	>50							
18.00				SPT-12	>50	>	>	>50						Balance = 30 cm	

FIELD BORELOG

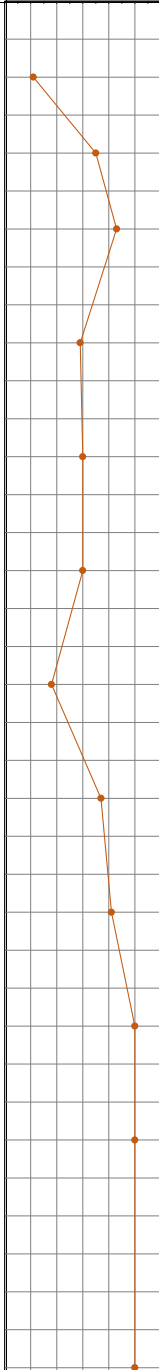
PROJECT : Geotechnical Investigation for the Proposed IT Park Building for KHDC Kottarakkara	SHEET NO. : 2 of 2	START DATE : 10/10/2024
CLIENT : KHDC	BORE DIAMETER (mm) : 150	END DATE : 11/10/2024
PROPOSED STRUCTURE : G+5 Building	BORING TYPE : Rotary	REDUCED LEVEL (m) :
LOCATION : Kottarakkara, Kollam	TERMINATION DEPTH (m) : 24.00	EASTING (m) :
BOREHOLE NO. : BH-02	WATER LEVEL : 4.60 m below EGL	NORTHING (m) :

DEPTH m	GRAPHIC LOG	VISUAL DESCRIPTION OF STRATA	THICKNESS OF LAYER m	SAMPLE DEPTH	SAMPLE TYPE	BLOW COUNT/15CM			SPT N VALUE	DEPTH V/S N VALUE						REMARKS		
						N1	N2	N3		0	10	20	30	40	50		60	
21.00				21.00	SPT-13	>50	>	>	>50									Rebound, Balance = 45 cm, No sample
22.00		Moderately weathered rock	1.00	21.00 - 22.00	RC-1													CR = 65% RQD = 62%
23.00		Moderately weathered rock	1.00	22.00 - 23.00	RC-2													CR = 69% RQD = 50%
24.00		Moderately to highly weathered rock	1.00	23.00 - 24.00	RC-3													CR = 57% RQD = 28%
		Borehole is terminated at a depth of 24.00 m below the Existing Ground Level (EGL)																

FIELD BORELOG															
PROJECT		: Geotechnical Investigation for the Proposed IT Park Building for KHDC Kottarakkara			SHEET NO.		: 1 of 2		START DATE		: 12/10/2024				
CLIENT		: KHDC			BORE DIAMETER (mm)		: 150		END DATE		: 13/10/2024				
PROPOSED STRUCTURE		: G+5 Building			BORING TYPE		: Rotary		REDUCED LEVEL (m)		:				
LOCATION		: Kottarakkara, Kollam			TERMINATION DEPTH (m)		: 21.60		EASTING (m)		:				
BOREHOLE NO.		: BH-03			WATER LEVEL		: 4.40 m below EGL		NORTHING (m)		:				
DEPTH m	GRAPHIC LOG	VISUAL DESCRIPTION OF STRATA	THICKNESS OF LAYER m	SAMPLE DEPTH	SAMPLE TYPE	BLOW COUNT/15CM			SPT N VALUE	DEPTH V/S N VALUE					REMARKS
						N1	N2	N3		0	10	20	30	40	
6.00		Very stiff to hard lateritic clay with gravel	6.00	1.00	SPT-1	12	14	15	29						
				2.00	SPT-2	11	15	17	32						
				3.00	SPT-3	12	16	18	34						
				4.50	SPT-4	14	15	20	35						
				6.00	SPT-5	16	10	9	19						
10.50		Very stiff lateritic clay with gravel	4.50	7.50	SPT-6	6	7	10	17						
				9.00	SPT-7	10	9	9	18						
				10.50	SPT-8	17	24	23	47						
				12.00	SPT-9	21	29	21	50						
		Hard laterite or lateritic soil	10.10	13.50	SPT-10	>50	>	>	>50						Balance = 3 cm
				15.00	SPT-11	>50	>	>	>50						Balance = 30 cm
				18.00	SPT-12	>50	>	>	>50						Balance = 35 cm

FIELD BORELOG

PROJECT	: Geotechnical Investigation for the Proposed IT Park Building for KIHC Kottarakkara	SHEET NO.	: 1 of 2	START DATE	: 14/10/2024
CLIENT	: KIHC	BORE DIAMETER (mm)	: 150	END DATE	: 15/10/2024
PROPOSED STRUCTURE	: G+5 Building	BORING TYPE	: Rotary	REDUCED LEVEL (m)	:
LOCATION	: Kottarakkara, Kollam	TERMINATION DEPTH (m)	: 23.00	EASTING (m)	:
BOREHOLE NO.	: BH-04	WATER LEVEL	: 5.10 m below EGL	NORTHING (m)	:

DEPTH m	GRAPHIC LOG	VISUAL DESCRIPTION OF STRATA	THICKNESS OF LAYER m	SAMPLE DEPTH	SAMPLE TYPE	BLOW COUNT/15CM			SPT N VALUE	DEPTH V/S N VALUE					REMARKS
						N1	N2	N3		0	10	20	30	40	
1.00		Stiff lateritic clay	1.00	1.00	SPT-1	3	5	6	11						
		Stiff to hard lateritic soil with clayey sand and gravel	11.00	2.00	SPT-2	12	16	19	35						
				3.00	SPT-3	17	20	23	43						
				4.50	SPT-4	14	14	15	29						
				6.00	SPT-5	12	13	17	30						
				7.50	SPT-6	11	14	16	30						
				9.00	SPT-7	8	9	9	18						
				10.50	SPT-8	11	15	22	37						
12.00				12.00	SPT-9	14	17	24	41						
		Hard laterite or lateritic soil	6.00	13.50	SPT-10	22	38	>12	>50						Balance = 12 cm
				15.00	SPT-11	30	>50	>	>50						Balance = 18 cm
18.00				18.00	SPT-12	>50	>	>	>50						Rebound, Balance = 45 cm, No sample
		Highly weathered rock	1.00	18.00 - 19.00	RC-1										CR = 45% RQD = 20%
		Completely weathered rock	2.00	19.00 - 20.00	RC-2										CR = Nil RQD = Nil
20.00															

FIELD BORELOG

PROJECT : Geotechnical Investigation for the Proposed IT Park Building for KIIDC Kottarakkara	SHEET NO. : 2 of 2	START DATE : 14/10/2024
CLIENT : KIIDC	BORE DIAMETER (mm) : 150	END DATE : 15/10/2024
PROPOSED STRUCTURE : G+5 Building	BORING TYPE : Rotary	REDUCED LEVEL (m) :
LOCATION : Kottarakkara, Kollam	TERMINATION DEPTH (m) : 23.00	EASTING (m) :
BOREHOLE NO. : BH-04	WATER LEVEL : 5.10 m below EGL	NORTHING (m) :

DEPTH m	GRAPHIC LOG	VISUAL DESCRIPTION OF STRATA	THICKNESS OF LAYER m	SAMPLE DEPTH	SAMPLE TYPE	BLOW COUNT/15CM			SPT N VALUE	DEPTH V/S N VALUE						REMARKS	
						N1	N2	N3		0	10	20	30	40	50		60
21.00		Completely weathered rock	1.00	21.00 - 22.00	RC-3												CR = Nil RQD = Nil
22.00		Moderately to completely weathered rock	1.00	22.00 - 23.00	RC-4												CR = 60% RQD = Nil
23.00		Highly to completely weathered rock	1.00	23.00 - 24.00	RC-5												CR = 20% RQD = Nil
		Borehole is terminated at a depth of 23.00 m below the Existing Ground Level (EGL)															

FIELD BORELOG

PROJECT	: Geotechnical Investigation for the Proposed IT Park Building for KIADC Kottarakkara	SHEET NO.	: 1 of 1	START DATE	: 16/10/2024
CLIENT	: KIADC	BORE DIAMETER (mm)	: 150	END DATE	: 17/10/2024
PROPOSED STRUCTURE	: G+5 Building	BORING TYPE	: Rotary	REDUCED LEVEL (m)	:
LOCATION	: Kottarakkara, Kollam	TERMINATION DEPTH (m)	: 20.00	EASTING (m)	:
BOREHOLE NO.	: BH-05	WATER LEVEL	: 6.70 m below EGL	NORTHING (m)	:

DEPTH m	GRAPHIC LOG	VISUAL DESCRIPTION OF STRATA	THICKNESS OF LAYER m	SAMPLE DEPTH	SAMPLE TYPE	BLOW COUNT/15CM			SPT N VALUE	DEPTH V/S N VALUE					REMARKS	
						N1	N2	N3		0	10	20	30	40		50
		Stiff to hard lateritic clay with gravels	9.00	1.00	SPT-1	5	6	7	13							
				2.00	SPT-2	10	13	18	31							
				3.00	SPT-3	12	17	21	38							
				4.50	SPT-4	8	7	6	13							
				6.00	SPT-5	7	8	8	16							
				7.50	SPT-6	12	12	13	25							
9.00				9.00	SPT-7	5	7	9	16							
		Hard laterite or lateritic soil	8.00	10.50	SPT-8	18	22	25	47							
				12.00	SPT-9	23	29	>21	>50						Balance = 5 cm	
				13.50	SPT-10	>50	>	>	>50						Balance = 30 cm	
				15.00	SPT-11	>50	>	>	>50						Balance = 35 cm	
17.00				17.00	SPT-12	>50	>	>	>50						Rebound, Balance = 45 cm, No Sample	
		Slightly to highly weathered rock	1.00	17.00 - 18.00	RC-1										CR = 70% RQD = 48%	
18.00			Moderately to highly weathered rock	1.00	18.00 - 19.00	RC-2									CR = 56% RQD = 32%	
19.00			Moderately to highly weathered rock	1.00	19.00 - 20.00	RC-3									CR = 55% RQD = 24%	
20.00			Borehole is terminated at a depth of 20.00 m below the Existing Ground Level (EGL)													

FIELD BORELOG																
PROJECT		: Geotechnical Investigation for the Proposed IT Park Building for KHDC Kottarakkara			SHEET NO.		: 1 of 1			START DATE		: 17/10/2024				
CLIENT		: KHDC			BORE DIAMETER (mm)		: 150			END DATE		: 18/10/2024				
PROPOSED STRUCTURE		: G+5 Building			BORING TYPE		: Rotary			REDUCED LEVEL (m)		:				
LOCATION		: Kottarakkara, Kollam			TERMINATION DEPTH (m)		: 17.40			EASTING (m)		:				
BOREHOLE NO.		: BH-06			WATER LEVEL		: 5.30 m below EGL			NORTHING (m)		:				
DEPTH m	GRAPHIC LOG	VISUAL DESCRIPTION OF STRATA	THICKNESS OF LAYER m	SAMPLE DEPTH	SAMPLE TYPE	BLOW COUNT/15CM			SPT N VALUE	DEPTH V/S N VALUE					REMARKS	
						N1	N2	N3		0	10	20	30	40		50
2.00		Hard lateritic clay with gravel	2.00	1.00	SPT-1	11	16	19	35							
				2.00	SPT-2	12	17	23	40							
7.50		Stiff to very stiff lateritic clay with sandy silt	5.50	3.00	SPT-3	5	6	8	14							
				4.50	SPT-4	6	5	7	12							
				6.00	SPT-5	5	5	6	11							
				7.50	SPT-6	7	8	10	18							
12.00		Very stiff lateritic soil with clayey sand and gravel	4.50	9.00	SPT-7	9	12	16	28							
				10.50	SPT-8	10	15	17	32							
				12.00	SPT-9	18	20	25	45							
				13.50	SPT-10	>50	>	>	>50							
15.40		Hard laterite or lateritic soil	3.40	15.00	SPT-11	>50	>	>	>50							
				15.40	SPT-12	>50	>	>	>50							
16.40		Highly to completely weathered rock	1.00	15.40 - 16.40	RC-1										CR = 13% RQD = Nil	
17.40		Highly to completely weathered rock	1.00	16.40 - 17.40	RC-2										CR = 17% RQD = Nil	
		Borehole is terminated at a depth of 17.40 m below the Existing Ground Level (EGL)														

APPENDIX-III
LABORATORY TEST RESULTS

SUMMARY OF LABORATORY TEST RESULTS

Report Number : ML24/W-005849

Project : Geotechnical Investigation for the Proposed IT Park Building for KIIDC Kottarakkara



Borehole ID : BH-02

N Value	Depth (m)	Type of sample (SPT/DS/UDS/ RC)	Soil/rock description	IS Classification	For Rock cores					
					Core Recovery (%)	RQD (%)	Water absorption (%)	Porosity (%)	PLI (Mpa)	UCS (MPa)
	21.00 - 22.00	RC	Moderately weathered rock	-	65	62				35
	22.00 - 23.00	RC	Moderately weathered rock	-	69	50				61.5
	23.00 - 24.00	RC	Moderately to highly weathered rock	-	57	28				42.8

Borehole ID : BH-03

N Value	Depth (m)	Type of sample (SPT/DS/UDS/ RC)	Soil/rock description	IS Classification	For Rock cores					
					Core Recovery (%)	RQD (%)	Water absorption (%)	Porosity (%)	PLI (Mpa)	UCS (MPa)
	20.60 - 21.60	RC	Moderately to highly weathered rock	-	60	20				32.5

Borehole ID : BH-04

N Value	Depth (m)	Type of sample (SPT/DS/UDS/ RC)	Soil/rock description	IS Classification	For Rock cores					
					Core Recovery (%)	RQD (%)	Water absorption (%)	Porosity (%)	PLI (Mpa)	UCS (MPa)
	18.00 - 19.00	RC	Completely weathered rock	-	Nil	Nil			0.2	
	21.00 - 22.00	RC	Moderately to completely weathered rock	-	60	Nil			0.1	
	22.00 - 23.00	RC	Highly to completely weathered rock	-	20	Nil			0.2	

SUMMARY OF LABORATORY TEST RESULTS

Report Number : ML24/W-005849

Project : Geotechnical Investigation for the Proposed IT Park Building for KIIDC Kottarakkara



Borehole ID : BH-05

N Value	Depth (m)	Type of sample (SPT/DS/UDS/ RC)	Soil/rock description	IS Classification	For Rock cores					
					Core Recovery (%)	RQD (%)	Water absorption (%)	Porosity (%)	PLI (Mpa)	UCS (MPa)
	17.00 - 18.00	RC	Slightly to highly weathered rock	-	70	48			0.7	
	18.00 - 19.00	RC	Moderately to highly weathered rock	-	56	32				5.9
	19.00 - 20.00	RC	Moderately to highly weathered rock	-	55	24			0.05	

Borehole ID : BH-06

N Value	Depth (m)	Type of sample (SPT/DS/UDS/ RC)	Soil/rock description	IS Classification	For Rock cores					
					Core Recovery (%)	RQD (%)	Water absorption (%)	Porosity (%)	PLI (Mpa)	UCS (MPa)
	15.40 - 16.40	RC	Highly to completely weathered rock	-	13	Nil			0.4	
	16.40 - 17.40	RC	Highly to completely weathered rock	-	17	Nil			0.3	