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GEOTECHNICAL INVESTIGATION REPORT FOR PROPOSED CONSTRUCTION OF IT BLOCK COMMERCIAL BUILDING (SB,B1,B2&G+11) FOR M/S.TANNY SHELTERS PRIVATE LIMITED SF.NO:522/2A2,2B1 AND 523/1B &2A, SARKAR SAMAKULAM AT SATHY ROAD-OPP TO KUMARAN HOSPITAL IN KURUMBAPALAYAM SS KULAM.

REPORT BY:

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NS GEO SOLUTIONS

SOIL AND FOUNDATION EXPERTS

NS GEO
COIMBATORE

GEOTECHNICAL INVESTIGATION REPORT

PROJECT: **GEOTECHNICAL INVESTIGATION REPORT FOR PROPOSED CONSTRUCTION OF IT BLOCK COMMERCIAL BUILDING (SB,B1,B2&G+11) FOR M/S.TANNY SHELTERS PRIVATE LIMITED SF.NO:522/2A2,2B1 AND 523/1B &2A, SARKAR SAMAKULAM AT SATHY ROAD-OPP TO KUMARAN HOSPITAL IN KURUMBAPALAYAM SS KULAM.**

LOCATION:

M/S. TANNY SHELTERS PRIVATE LIMITED,
SF.NO:522/2A2,2B1 AND 523/1B&2A,
SARKAR SAMAKULAM,
SATHY ROAD-OPP TO KUMARAN HOSPITAL,
KURUMBAPALAYAM SS KULAM.

B.H No	LATITUDE	LONGITUDE
01	11.107196˚	77.025435˚
02	11.106883˚	77.025403˚
03	11.106895˚	77.025413˚
04	11.107284˚	77.024961˚

REPORT No	DATE	REV
063/NS/2024	21.08.24	00

TO

M/S. TANNY SHELTERS PRIVATE LIMITED,
SF.NO:522/2A2,2B1 AND 523/1B&2A,
SARKAR SAMAKULAM,
SATHY ROAD-OPP TO KUMARAN HOSPITAL,
KURUMBAPALAYAM SS KULAM.

Reg : Proposed Construction of IT Block Commercial Building (SB,B1,B2&G+11) for M/S.Tanny Shelters Private Limited Sf.No:522/2A2,2B1 and 523/1B &2A, Sarkar Samakulam at Sathy Road-Opp to Kumaran Hospital in Kurumbapalayam Ss Kulam.

The NS Geo Solutions, Coimbatore has completed the geotechnical exploration services for the above mentioned project.

This geotechnical investigation report presents the results of the subsurface exploration and provides geotechnical recommendations; design recommendations for your structure foundation are presented here in final form together with a summary of field and laboratory data.

We appreciate the opportunity to be of service to you on this project. If you have any comments concerning this report or if we may be of further services, please contact us.

NS GEO SOLUTIONS

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INTRODUCTION

This report presents the results of the geotechnical investigations carried out by N S Civil Engineering Solutions, Coimbatore. A detailed soil investigation report was requested by the client for obtaining the soil profile and recommendation of most suitable foundation system for the proposed construction of commercial building. The report comprises of the details of soil investigation, analysis of field and lab test results and recommendation of most suitable foundation system. This Geotechnical Investigation Report for Proposed Construction of IT Block Commercial Building (SB,B1,B2&G+11) for M/S.Tanny Shelters Private Limited Sf.No:522/2A2,2B1 and 523/1B &2A, Sarkar Samakulam at Sathy Road-Opp to Kumaran Hospital in Kurumbapalayam Ss Kulam.

Standard Penetration Test with Four number of bore holes were drilled at the site up to a maximum depth of 15.0m below existing ground level. The investigation consists of drilling four boreholes, soil sampling, field and laboratory testing and preparation of the Geotechnical Investigation Report for Proposed Construction of IT Block Commercial Building (SB,B1,B2&G+11) for M/S.Tanny Shelters Private Limited Sf.No:522/2A2,2B1 and 523/1B &2A, Sarkar Samakulam at Sathy Road-Opp to Kumaran Hospital in Kurumbapalayam Ss Kulam.

The proposed site has plain terrain in which the bore holes has been tested in plain ground. The site was cleaned while the starting of geotechnical investigation. The total number of bore hole has been decided as four (04) as agreed by the Client and the Consultant. The bore holes have been located in the maximum loaded area of the proposed site, the locations of borehole were chosen by Client. The nature of field tests includes standard penetration tests, disturbed sampling through split spoon sampler, identification of different soil layers, and location of ground water table, complete logging of the borehole etc., and the depth of bore hole was terminated to a maximum depth of 15.0m from EGL.

SCOPE OF WORK

The scope of this investigation is to:

i) Determine the soil profile at the site, with ground water observation.

ii) Recommend a suitable foundation system and safe bearing pressure at foundation level.

iii) Suggestion on backfill.

Four boreholes was drilled to a maximum depth of 15.0m. Soil samples were collected for visual identification, classification and laboratory testing. The bore log sub soil profile is presented in Appendix~A~

DESCRIPTION OF THE SITE

This **Geotechnical Investigation Report for Proposed Construction of IT Block Commercial Building (SB,B1,B2&G+11) for M/S.Tanny Shelters Private Limited Sf.No:522/2A2,2B1 and 523/1B &2A, Sarkar Samakulam at Sathy Road-Opp to Kumaran Hospital in Kurumbapalayam Ss Kulam.**

The site consists of four bore holes at maximum loaded area.

EXPLORATION PROGRAM & TECHNIQUES

After the visual inspection of the site, the subsurface investigation was carried out as mentioned below: four exploration boreholes were drilled to a maximum depth of 15.0m.

BH - 1 was started on 06.08.2024 and completed on 07.08.2024.
BH - 2 was started on 08.08.2024 and completed on 09.08.2024.
BH - 3 was started on 09.08.2024 and completed on 10.08.2024.
BH - 4 was started on 06.08.2024 and completed on 07.08.2024.

Rotary drilling was performed using water as drilling fluid in the sub soil with casing pipe to stabilize the borehole up to the required depth. Field testing and sampling were conducted in accordance with IS: 2131- 1981.Standard Penetration Test (SPT) was performed on the sub soil. In this test, a standard split spoon of length about 450 mm and cutting edge diameter of 51/35 mm initially penetrates the soil for 15cm to bypass the expected accumulated sludge at the bottom of the hole by means of a 63.5 kg (140 lb) hammer falling freely along a guide from a height of 750 mm. The total number of rows of blows (N) required, advancing the spoon into the bore, for another two successive 15cm (a total of 30 cm) is recorded as a measure of the soil relative density or consistency as given in Table ~A~ Along with, for further drilling using NX impregnated Tungsten Carbide cutter to be used to a depth till Weathered rock and NX impregnated Diamond cutter to be used in case of hard rock.

The fieldwork was carried out under the N S Civil Engineering Solutions and representative from client in accordance with Indian Standard mentioned earlier. The drilling rig used for the exploration is calyx rig with hand operated machine, so the SPT done manually on inspection of our engineer.

LABORATORY TESTING:

The soil samples obtained by way of Spoon Samples and core recoveries were analyzed in the Geotechnical Engineering laboratory for its classification and the results are shown in the borehole log.

SUB SURFACE SOIL DESCRIPTION

Based on boreholes information, sub surface soil profile for **Geotechnical Investigation Report for Proposed Construction of IT Block Commercial Building (SB,B1,B2&G+11) for M/S.Tanny Shelters Private Limited Sf.No:522/2A2,2B1 and 523/1B &2A, Sarkar Samakulam at Sathy Road-Opp to Kumaran Hospital in Kurumbapalayam Ss Kulam.**

Bore holes no: 1

In BH-1, top soil consists of Poorly graded sand (SP) from 1.5m to 8.0m which is followed by Soft weathered rock (SWR) from 8.0m to 15.0m.

Bore holes no: 2

In BH-2, top soil consists of Poorly graded sand (SP) from 1.5m to 3.0m which is followed by Soft weathered rock (SWR) from 3.0m to 8.0m.

Bore holes no: 3

In BH-3, top soil consists of Poorly graded sand (SP) from 1.5m to 3.0m which is followed by Soft weathered rock (SWR) from 3.0m to 10.0m.

Bore holes no: 4

In BH-4, top soil consists of Poorly graded sand (SP) from 1.5m to 4.5m which is followed by Soft weathered rock (SWR) from 4.5m to 15.0m.

GROUND WATER

Ground water table was not found in the borehole.

COMPUTATION OF BEARING CAPACITY AND SETTLEMENT

Bearing capacity and settlement of the proposed industrial building is computed by assuming the depth of foundation as 10.0m, 11.0m, 12.0m and 13.0m from the existing ground level. From the boreholes data, the least 'N' values was taken for each depth and attempts are made to determine the bearing capacity and settlement for boreholes data. The bearing capacity and settlement calculations are carried out to suggest the most suitable foundation system for the proposed residential building, keeping the depth of foundation as 9.0m, 10.0m, 11.0m, 12.0m and 13.0m width of foundation as 2.0m.

Allowable Bearing Capacity

The design shear strength parameters (‘c’ and 'Φ' values) below the foundation depth of 10.0m, 11.0m, 12.0m and 13.0m are calculated. Using Bureau of Indian Standard IS 6403-1981 equation, the allowable bearing capacity computed for one borehole for an allowable settlement of 25mm.

Settlement of Soil Layer

One of the important aspects of any foundation system is to satisfy the settlement criteria apart from bearing capacity criteria. In order to determine the settlement for 2.0m breadth foundation. IS 8009 (Part 1)-1976 is used. The settlement of soil layers below 10.0m, 11.0m, 12.0m and 13.0m depth of foundation is calculated up to '2B' of foundation.

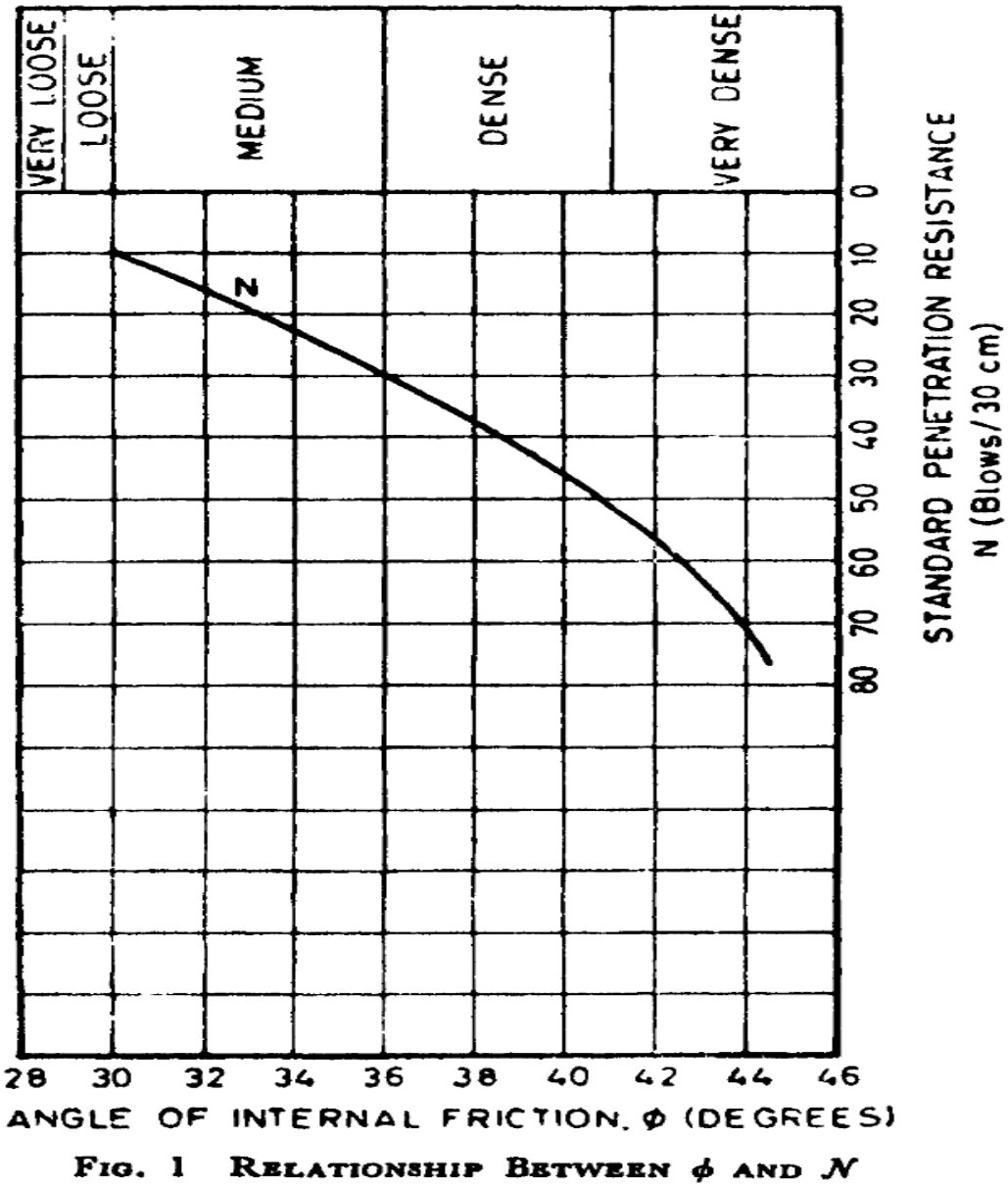


FIG. 1 RELATIONSHIP BETWEEN ϕ AND N

TABLE 1 BEARING CAPACITY FACTORS

(*Clause* 5.1.1)

ϕ (Degrees)	Bearing Capacity Factors		
	N_c	N_q	$N\gamma$
0	5·14	1·00	0·00
5	6·49	1·57	0·45
10	8·35	2·47	1·22
15	10·98	3·94	2·65
20	14·83	6·40	5·39
25	20 72	10·66	10 88
30	30·14	18·40	22·40
35	46 12	33·30	48 03
40	75·31	64·20	109·41
45	138·88	134·88	271·76
50	266·89	319·07	762·89

NOTE — For obtaining values of N'_c, N'_q and $N'\gamma$, calculate $\phi' = \tan^{-1}(0\,67 \tan \phi)$. Read N_c, N_q, and $N\gamma$, from the Table corresponding to the value of ϕ' instead of ϕ which are values of N'_c, N'_q, $N'\gamma$ respectively.

TABLE 2 SHAPE FACTORS

Sl No.	Shape of Base	Shape Factor		
		s_c	s_q	$s\gamma$
i)	Continuous strip	1·00	1·00	1·00
ii)	Rectangle	$1+0·2\ B/L$	$1+0·2\ B/L$	$1-0·4\ B/L$
iii)	Square	1·3	1·2	0·8
iv)	Circle	1·3	1·2	0·6

Use B as the diameter in the bearing capacity formula.

5.1.2.2 The depth factors shall be as under:

$d_c = 1 + 0{\cdot}2\ D_f/B\ \sqrt{N\phi}$

$d_q = d_\gamma = 1$ for $\phi < 10°$

$d_q = d_\gamma = 1 + 0{\cdot}1\ D_f/B\sqrt{N\phi}$ for $\phi > 10°$

NOTE — The correction is to be applied only when back filling is done with proper compaction.

5.1.2.3 The inclination factor shall be as under:

$$i_c = i_q = \left(1 - \frac{\alpha}{90}\right)^2$$

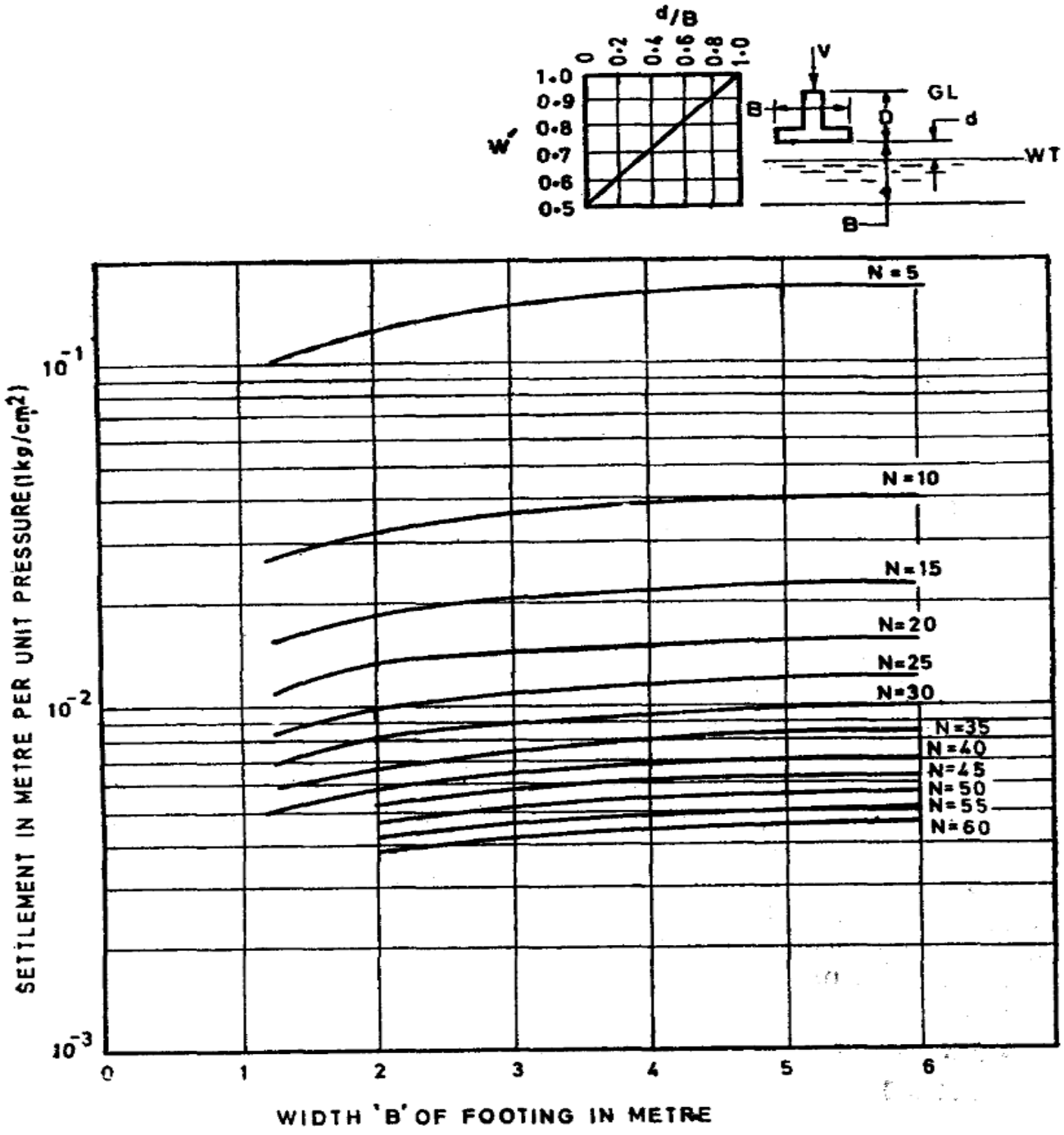
$$i_\gamma = \left(1 - \frac{\alpha}{\phi}\right)^2$$

5.1.2.4 *Effect of water table*

a) If the water table is likely to permanently remain at or below a depth of ($D_f + B$) beneath the ground level surrounding the footing then $W' = 1$.

b) If the water table is located at a depth D_f or likely to rise to the base of the footing or above then the value of W' shall be taken as 0·5.

c) If the water table is likely to permanently got located at depth $D_f < D_w < (D_f + B)$, then the value of W' be obtained by linear interpolation.



GL = Ground level. WT = Water table.

FIG. 9 SETTLEMENT PER UNIT PRESSURE FROM STANDARD PENETRATION RESISTANCE

Type of Material	Safe Bearing Capacity, kPa
1. Soft Rock or Shale	440
2. Gravel, sandy gravel, silty sandy gravel; very dense and offer high resistance to penetration during excavation (soil shall include the groups GW, GP, GM, GC)	400**
3. Sand (other than fine sand), gravelly sand, silty sand; dry (soil shall include the groups SW, SP, SM, SC)	200**
4. Fine sand; loose & dry (soil shall include the groups SW, SP)	100**
5. Silt, clayey silt, clayey sand; dry lumps which can be easily crushed by finger (soil shall include the groups ML, MI, SC, MH)	150
6. Clay, sandy clay; can be indented with strong thumb pressure (soil shall include the groups CL, CI, CH)	150
7. Soft clay; can be indented with modest thumb pressure (soil shall include the groups CL, CI, CH)	100
8. Very soft clay; can be penetrated several centimeters with thumb pressure (soil shall include the groups CL, CI, CH)	50
9. Organic clay & Peat (soil shall include the groups OI, OH, OL, Pt)	To be determined after investigation.
10. Fills	To be determined after investigation.

Model sample for SBC calculation:

Bore holes number	01
Depth	10.0m
SPT value,(N)	50
Breadth of footing,(B)	2.5m
Depth of footing,(D_f)	3.0m

Shear criteria:

Net Ultimate bearing capacity, (q_{nu})

q_{nu} $=1.3CN_c+q(N_q-1)+0.4B\gamma N_\gamma$

C - Cohesion

q - $\gamma * D_f$

W - water table correction factor(0.5 for worst case)

N_c, N_q, N_γ - Bearing Capacity factor depends on ϕ (from IS 6403:1981)

d_c, d_q, d_γ - Depth factor from IS 6403:1981

i_c, I_q, i_γ - Inclination factor from IS 6403:1981

S_c, S_q, S_γ - Shape factor from IS 6403:1981

ϕ - Angle of internal friction which is get from N value (from IS 6403)

For N=50 and ϕ=36

N_c=51.95	N_q =39.48	N_γ=60.30
d_c= 1.49	d_q = 1.24	d_q = 1.24
S_c= 1.3	S_q=1.3	S_γ=1.3 (assuming Square footing)
i_c = 1	i_q = 1	i_γ= 1

Taking,Unit weight ,ɣ =10kN/m^3

Net ultimate bearing capacity,q_{nu} = 10*2.0* (39.48-1)+0.4*10*2.0*60.30

=1252kN/m^2

Safe Bearing Capacity q_s = q_{ns}/F.O.S

Factor of safety,(F.O.S) = 3.5

Safe Bearing capacity q_s = 357kN/m^2

Settlement Criteria:

Observed SPT 'N' value = 50

As per IS 8009(part1)-1976, from Fig 9 in IS 8009

For Breadh, B (max) = 2.5m

Settlement/Unit pressure =0.0048 m/(kg/cm^2)

Water table correction factor = 0.5

For settlement of 25mm

Unit pressure =25*0.5/ 4.8

Allowable Bearing pressure = 2.60 kg/cm^2……..... (2)

Safe bearing capacity is taken as minimum of Shear criteria (1) and settlement criteria (2).

Allowable Bearing capacity = 260kN/m^2

GENERAL GUIDELINES IN SOIL FILLING

If the foundation material is fine soil (clay and silt) it should be stiff. If the foundation soil is coarse- grained (sand or gravel) it should be dense. Soft, loose, compressible, or organic top soils are not acceptable.

For foundation, in such cases the existing weak soil should be replaced up to stiff or dense soil strata below the foundation with well compacted good quality granular soil. The minimum width of replacement shall be length of reinforcement plus 1 meter and this will ensure that the foundation soil has sufficient bearing capacity to withstand bearing pressures in both static and as well as seismic conditions. The foundation may be located on the compacted granular soil fill.

GENERAL COMMENTS

The recommendations for foundation design and construction are based on the information obtained from the borehole drilled at site. When foundation construction is underway, the recommendations of this report should be checked through field inspection, to validate the information for use during the construction stage. Any variation in underground conditions revealed by the boreholes should be brought to our attention for alternate recommendations, if needed. The Professional Services performed for the preparation of report were accomplished in accordance with current and locally accepted geotechnical engineering principles and practices. The recommendations presented in this report are based upon the data obtained from the borings at the indicated locations and/or from other information discussed in this report. In case of pile foundation the pile must to be rests on the harder rock stratum, if the depth 1.00m is not strong the pile has to be advanced to till the harder rock stratum.

EXCAVATION

Excavation through the overburden soil can be carried out by conventional equipment such as dozers and poclain excavators. Under-excavation shall not be done, thereby not to disturb the existing foundation. Since the proposed structure is nearby the existing Commercial building it should be care that existing foundation not to be disturbed in any causes.

DRAINAGE

It is recommended to design an effective rainwater drainage system to get rid of the consequences of the rain water percolation into these layers. The site should be graded so as to direct rainwater and water away from all planned structures.

FOUNDATIONS ON FILLS

In such cases the foundations have to be built under controlled conditions with proper compaction can be designed as normal foundation. Uncontrolled fills should be excavated and they should be either refilled with controlled fill or foundation should commence from Natural ground level. The Report and SBC calculation were completely based on the bore hole terminated; apart from this any weak layer encountered during excavations should also be reported to N.S. Civil Engineering Solutions.

CERTIFICATION

The total no of pages in the report is 70, along with SBC (Safe Bearing Capacity) value for Proposed Construction of IT Block Commercial Building (SB,B1,B2&G+11) for M/S.Tanny Shelters Private Limited Sf.No:522/2A2,2B1 and 523/1B &2A, Sarkar Samakulam at Sathy Road-Opp to Kumaran Hospital in Kurumbapalayam SS Kulam. The footing should be rest at the good bearing stratum. In this site, four bore holes was drilled and depth of exploration was also terminated to a maximum depth of 15.0m. The report is mainly based on the investigation done in and around bore holes explored for commercial building. The suitable method of Ground improvement techniques should be adopted as per IS 13094:1992, before laying foundation System. Enough care may be taken to design a suitable dewatering system while construction of foundation is in progress, so that the bottom of excavation and foundation layer shall be relatively dry. The water seeking trees around the proposed structure is also to be removed to avoid shrinkage cracks. However, it is the sole discretion of the structural engineer / client to vary the depth considering the SBC and strata during excavation and design the structure accordingly, provided strictly adhering to the recommendations. Interpretations are provided based on factual field & Laboratory test results & shall be applicable for investigated locations. There is a possibility that strata variations could occur. If any variations indicate significant deviation from the findings of this report, same shall be brought to our notice.

Depth of Foundation (m)	Safe Bearing Capacity (kN/m2)
10.0m	260
11.0m	297
12.0m	328
13.0m	390

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APPENDIX - A

BORE LOG & SUB SOIL PROFILE

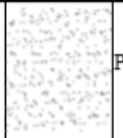
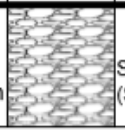
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N.S.CIVIL ENGINEERING SOLUTIONS COIMBATORE.	CLIENT : M/S.Tanny shelters private limited, DIA & TYPE OF BORING : 100mm Rotary boring with drilling mud circulation BORE HOLE NO : BH 01 GROUND WATER TABLE : nil	BORING STARTED : 06.08.2024 BORING COMPLETED : 07.08.2024 LOCATION : kurumbapal palayam, ss kulam.

DEPTH	PROFILE	DESCRIPTION OF STRATA	THICKNESS OF STRATA	STARTING DEPTH in "m"	CLOSING DEPTH in "m"	BLOWS / 15 cm			SPT "N"	REMARKS
						15 cm	15 cm	15 cm		
1.5m-8.0m		POORLY GRADED SAND(SP)	6.5m	0	1.5	13	18/7	R	>50	D.S
				1.5	3.0	20	R	R	>50	D.S
				3.0	4.5	22	R	R	>50	D.S
				4.5	6.5	20	R	R	>50	D.S
				6.5	8.0	10	R	R	>50	D.S
8.0m-15.0m		SOFT WEATHERED ROCK (SWR)	7.0m	8.0	15.0	ROCK PIECES				DIAMOND PIT
THE BORE HOLE IS TERMINATED AT 15.0m				D.S - DISTURBED SAMPLE						

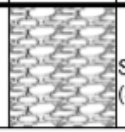
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N.S.CIVIL ENGINEERING SOLUTIONS COIMBATORE.	CLIENT : M/S.Tanny shelters private limited, DIA & TYPE OF BORING : 100mm Rotary boring with drilling mud circulation BORE HOLE NO : BH 02 GROUND WATER TABLE : nil	BORING STARTED : 08.08.2024 BORING COMPLETED : 09.08.2024 LOCATION : kurumbapal palayam, ss kulam.

DEPTH	PROFILE	DESCRIPTION OF STRATA	THICKNESS OF STRATA	STARTING DEPTH in "m"	CLOSING DEPTH in "m"	BLOWS / 15 cm			SPT "N"	REMARKS
						15 cm	15 cm	15 cm		
0m-1.5m		POORLY GRADED SAND(SP)	1.5m	0	1.5	30	R	R	>50	D.S
2.0m-8.0m		SOFT WEATHERED ROCK (SWR)	6.0m	2.0	8.0	ROCK PIECES				DIAMOND PIT
THE BORE HOLE IS TERMINATED AT 8.0m				D.S - DISTURBED SAMPLE						

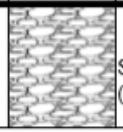
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N.S.CIVIL ENGINEERING SOLUTIONS COIMBATORE.	CLIENT : M/S.Tanny shelters private limited, DIA & TYPE OF BORING : 100mm Rotary boring with drilling mud circulation BORE HOLE NO : BH 03 GROUND WATER TABLE : nil	BORING STARTED : 09.08.2024 BORING COMPLETED : 10.08.2024 LOCATION : kurumbapal palayam, ss kulam.

DEPTH	PROFILE	DESCRIPTION OF STRATA	THICKNESS OF STRATA	STARTING DEPTH in "m"	CLOSING DEPTH in "m"	BLOWS / 15 cm			SPT "N"	REMARKS
						15 cm	15 cm	15 cm		
0m-3.0m		POORLY GRADED SAND(SP)	3.0m	0	1.5	11	30	15/3	>50	D.S
				1.5	3.0	20	R	R	>50	D.S
4.5m-10.0m		SOFT WEATHERED ROCK (SWR)	5.5m	4.5	10.0	ROCK PIECES				DIAMOND PIT
THE BORE HOLE IS TERMINATED AT 10.0m				D.S - DISTURBED SAMPLE						

GEOTECHNICAL INVESTIGATION REPORT FOR PROPOSED CONSTRUCTION OF IT BLOCK COMMERCIAL BUILDING (SB,B1,B2&G+11) FOR M/S.TANNY SHELTERS PRIVATE LIMITED SF.NO:522/2A2,2B1 AND 523/1B &2A, SARKAR SAMAKULAM AT SATHY ROAD-OPP TO KUMARAN HOSPITAL IN KURUMBAPALAYAM SS KULAM.

N.S.CIVIL ENGINEERING SOLUTIONS COIMBATORE.	CLIENT : M/S.Tanny shelters private limited, DIA & TYPE OF BORING : 100mm Rotary boring with drilling mud circulation BORE HOLE NO : BH 04 GROUND WATER TABLE : nil	BORING STARTED : 06.08.2024 BORING COMPLETED : 07.08.2024 LOCATION : kurumbapal palayam, ss kulam.

DEPTH	PROFILE	DESCRIPTION OF STRATA	THICKNESS OF STRATA	STARTING DEPTH in "m"	CLOSING DEPTH in "m"	BLOWS / 15 cm			SPT "N"	REMARKS
						15 cm	15 cm	15 cm		
0m-4.5m		POORLY GRADED SAND(SP)	4.5m	0	1.5	13	15	18	23	D.S
				1.5	3.0	5	10	18	>50	D.S
				3.0	4.5	14	20	R	>50	D.S
4.5m-15.0m		SOFT WEATHERED ROCK (SWR)	10.5m	4.5	15.0	ROCK PIECES				DIAMOND PIT

THE BORE HOLE IS TERMINATED AT 15.0m

D.S - DISTURBED SAMPLE

GRAIN SIZE ANALYSIS TEST (As per IS 2720 (Part 4) - 1985)

Name of Project	**Subsoil Investigation for the construction of Commercial Building at KURUMBAPALAYAM SS KULAM.**

BH-1 **Depth** 1.5m

Report No : 063/NS/2024 **Date** 21.08.24

Weight of soil taken:130g

S.No	Sieve Size (mm)	Weight Retained(gm)	Percentage of weight Retained (%)	Cumulative percentage Retaind (%)	Percentage of Finess (%)
1	4.75	22	16.92	16.92	83.08
2	2.36	10	7.69	24.62	75.38
3	1.18	20	15.38	40.00	60.00
4	0.6	17	13.08	53.08	46.92
5	0.3	23	17.69	70.77	29.23
6	0.15	10	7.69	78.46	21.54
7	0.075	6	4.62	83.08	16.92
8	Pan	22	16.92	100.00	0.00

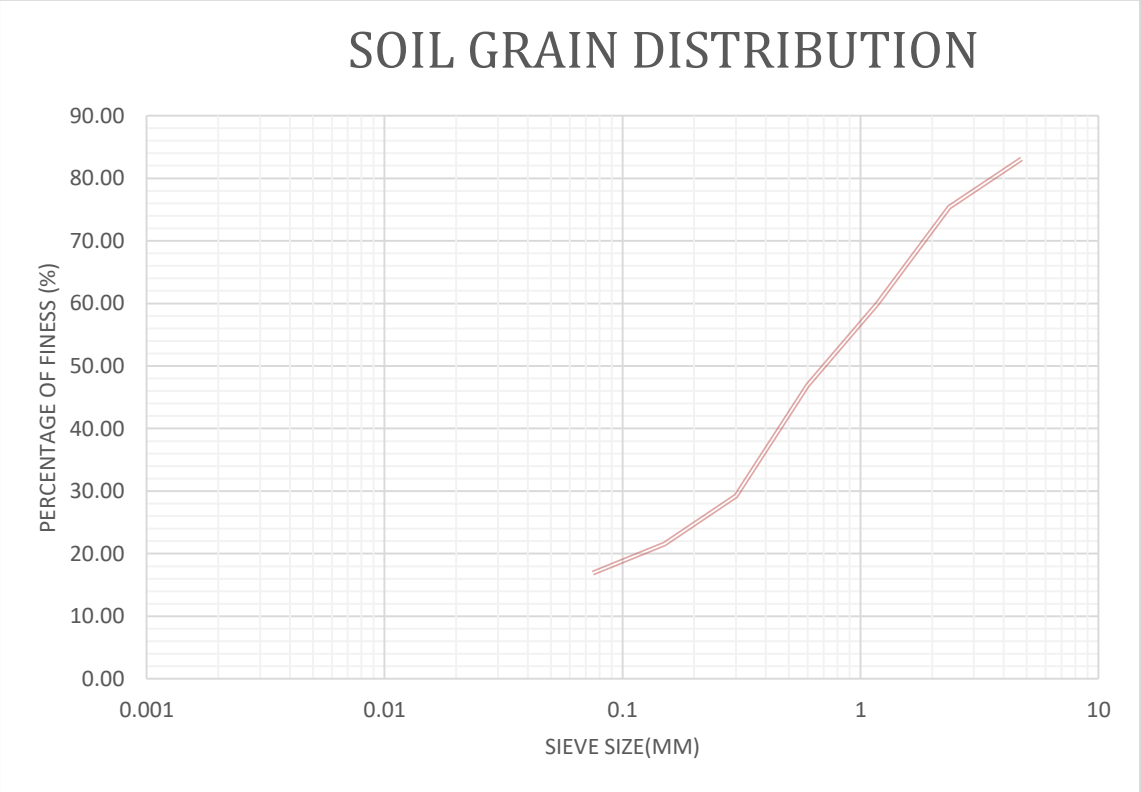
Based on Gradation curve the following sizes of soil particles are obtained (As per IS 1498-1970)

Gravel = 16.92 %

Silt & Clay = 16.92 %

Sand = 66.15 %

Soil Description	**POORLY GRADED SAND (SP)**


SOIL GRAIN DISTRIBUTION
90.00
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
PERCENTAGE OF FINESS (%)
0.001
0.01
0.1
1
10
SIEVE SIZE(MM)

Name of Project	**Subsoil Investigation for the construction of Commercial Building at KURUMBAPALAYAM SS KULAM.**

BH-1 **Depth** 3.0m

Report No : 063/NS/2024 **Date** 21.08.24

Weight of soil taken:130g

S.No	Sieve Size (mm)	Weight Retained(gm)	Percentage of weight Retained (%)	Cumulative percentage Retaind (%)	Percentage of Finess (%)
1	4.75	0	0.00	0.00	100.00
2	2.36	2	1.54	1.54	98.46
3	1.18	25	19.23	20.77	79.23
4	0.6	43	33.08	53.85	46.15
5	0.3	50	38.46	92.31	7.69
6	0.15	7	5.38	97.69	2.31
7	0.075	2	1.54	99.23	0.77
8	Pan	1	0.77	100.00	0.00

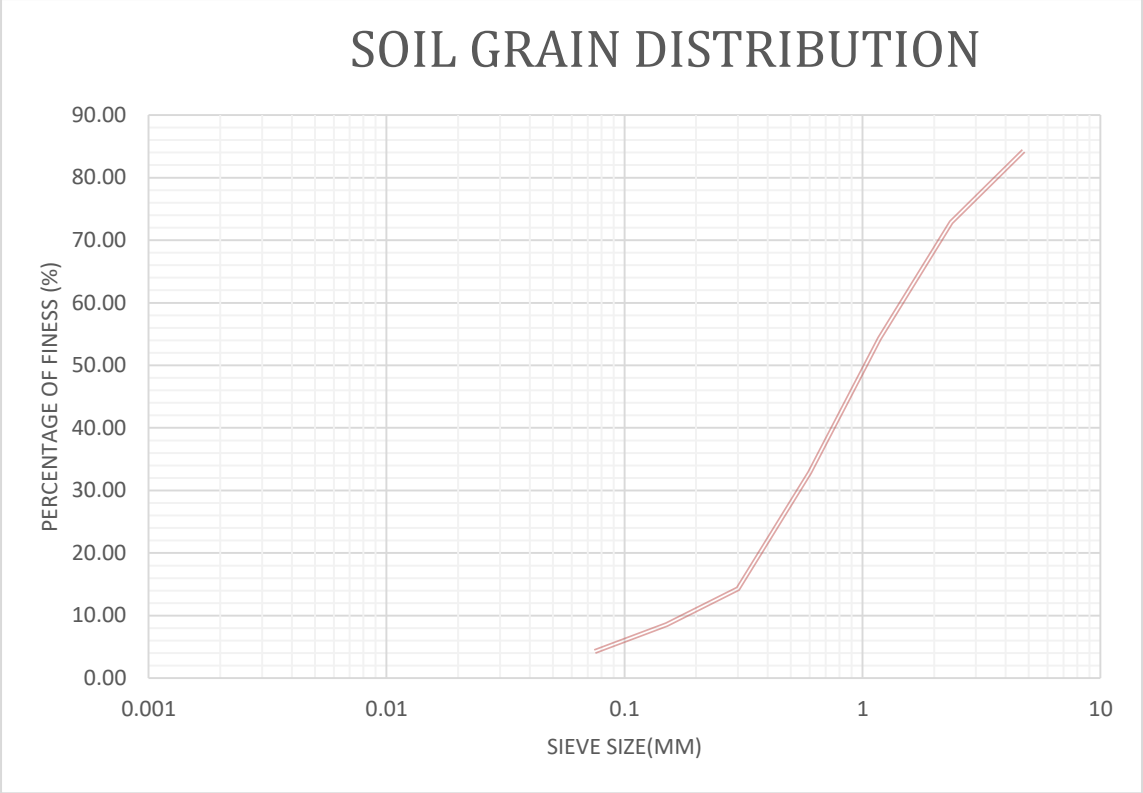
Based on Gradation curve the following sizes of soil particles are obtained (As per IS 1498-1970)

Gravel = 0.00 %

Silt & Clay = 0.77 %

Sand = 99.23 %

Soil Description	**POORLY GRADED SAND (SP)**


SOIL GRAIN DISTRIBUTION
90.00
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
PERCENTAGE OF FINESS (%)
0.001
0.01
0.1
1
10
SIEVE SIZE(MM)

Name of Project	**Subsoil Investigation for the construction of Commercial Building at KURUMBAPALAYAM SS KULAM.**

BH-3 **Depth** 1.5m

Report No : 063/NS/2024 **Date** 21.08.24

Weight of soil taken:200g

S.No	Sieve Size (mm)	Weight Retained(gm)	Percentage of weight Retained (%)	Cumulative percentage Retaind (%)	Percentage of Finess (%)
1	4.75	12	6.00	6.00	94.00
2	2.36	22	11.00	17.00	83.00
3	1.18	45	22.50	39.50	60.50
4	0.6	38	19.00	58.50	41.50
5	0.3	39	19.50	78.00	22.00
6	0.15	11	5.50	83.50	16.50
7	0.075	6	3.00	86.50	13.50
8	Pan	27	13.50	100.00	0.00

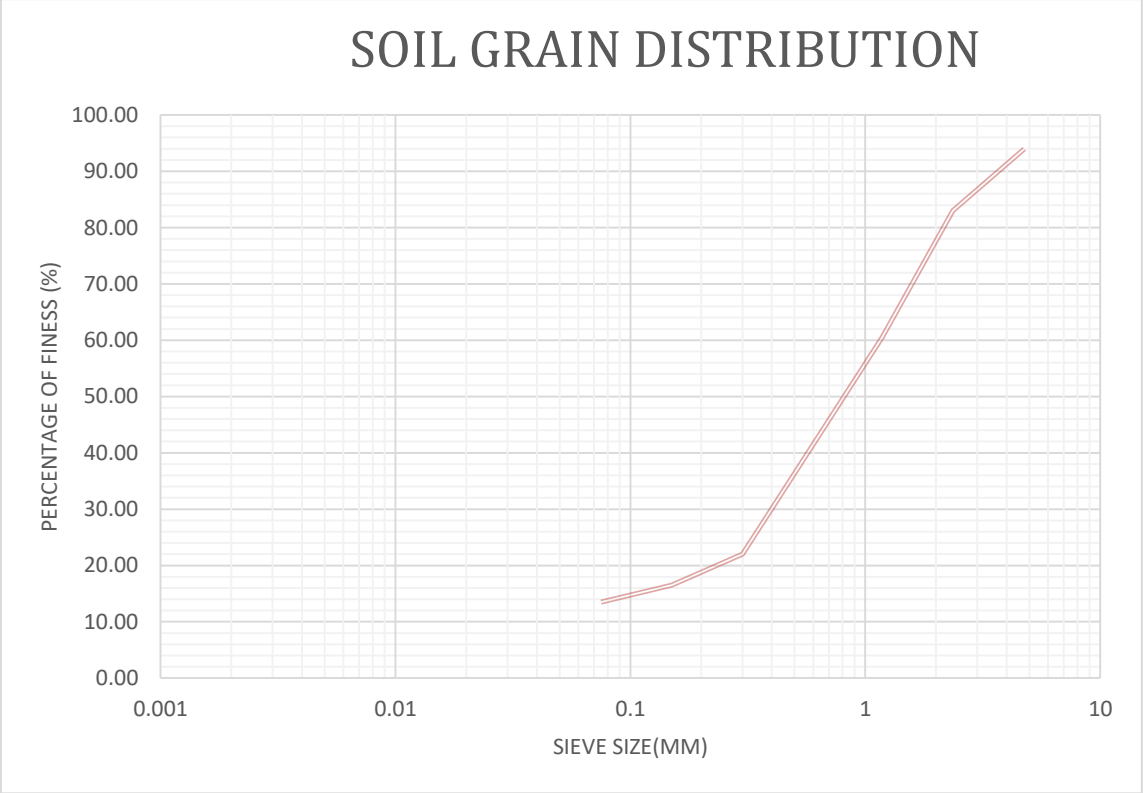
Based on Gradation curve the following sizes of soil particles are obtained (As per IS 1498-1970)

Gravel = 6.00 %

Silt & Clay = 13.50 %

Sand = 80.50 %

Soil Description	**POORLY GRADED SAND (SP)**


SOIL GRAIN DISTRIBUTION
100.00
90.00
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
PERCENTAGE OF FINESS (%)
0.001
0.01
0.1
1
10
SIEVE SIZE(MM)

Name of Project	**Subsoil Investigation for the construction of Commercial Building at KURUMBAPALAYAM SS KULAM.**

BH-3 **Depth** 3.0m

Report No : 063/NS/2024 **Date** 21.08.24

Weight of soil taken:50g

S.No	Sieve Size (mm)	Weight Retained(gm)	Percentage of weight Retained (%)	Cumulative percentage Retaind (%)	Percentage of Finess (%)
1	4.75	0	0.00	0.00	100.00
2	2.36	1	2.00	2.00	98.00
3	1.18	5	10.00	12.00	88.00
4	0.6	7	14.00	26.00	74.00
5	0.3	14	28.00	54.00	46.00
6	0.15	11	22.00	76.00	24.00
7	0.075	7	14.00	90.00	10.00
8	Pan	5	10.00	100.00	0.00

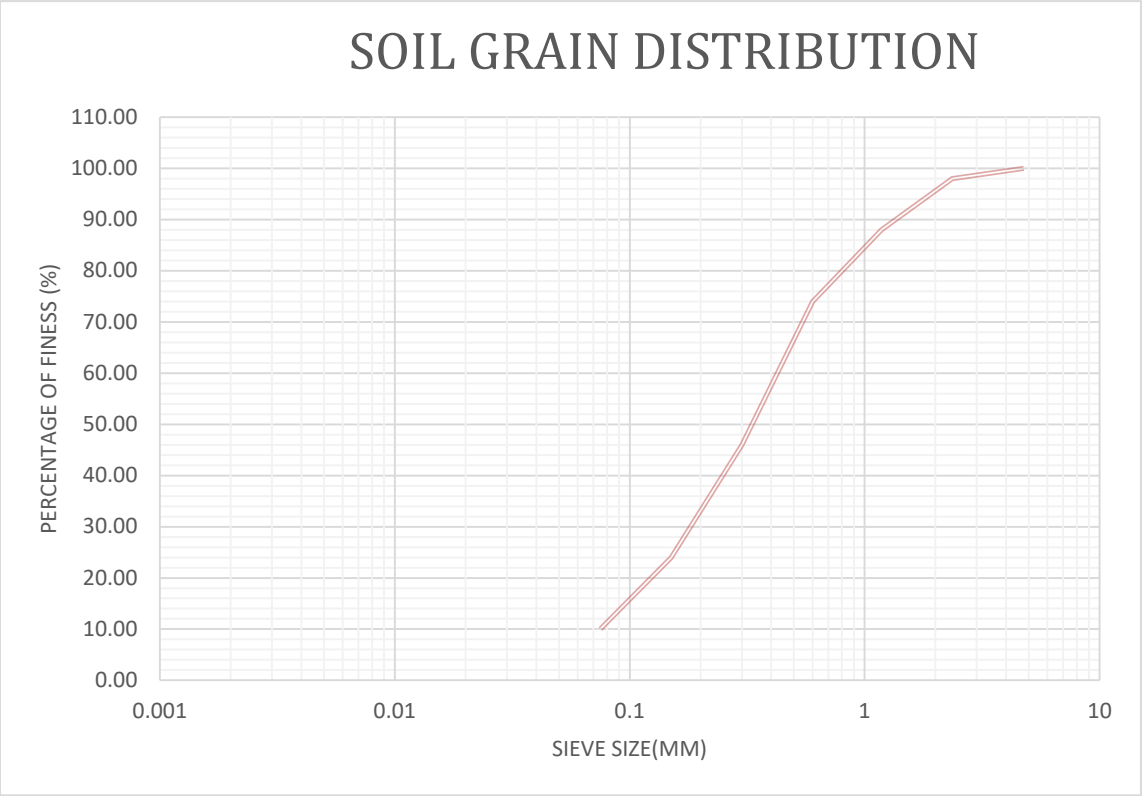
Based on Gradation curve the following sizes of soil particles are obtained (As per IS 1498-1970)

Gravel = 0.00 %

Silt & Clay = 10.00 %

Sand = 90.00 %

Soil Description	**POORLY GRADED SAND (SP)**


SOIL GRAIN DISTRIBUTION
110.00
100.00
90.00
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
PERCENTAGE OF FINESS (%)
0.001
0.01
0.1
1
10
SIEVE SIZE(MM)

Name of Project	**Subsoil Investigation for the construction of Commercial Building at KURUMBAPALAYAM SS KULAM.**

BH-4 **Depth** 1.5m

Report No : 063/NS/2024 **Date** 21.08.24

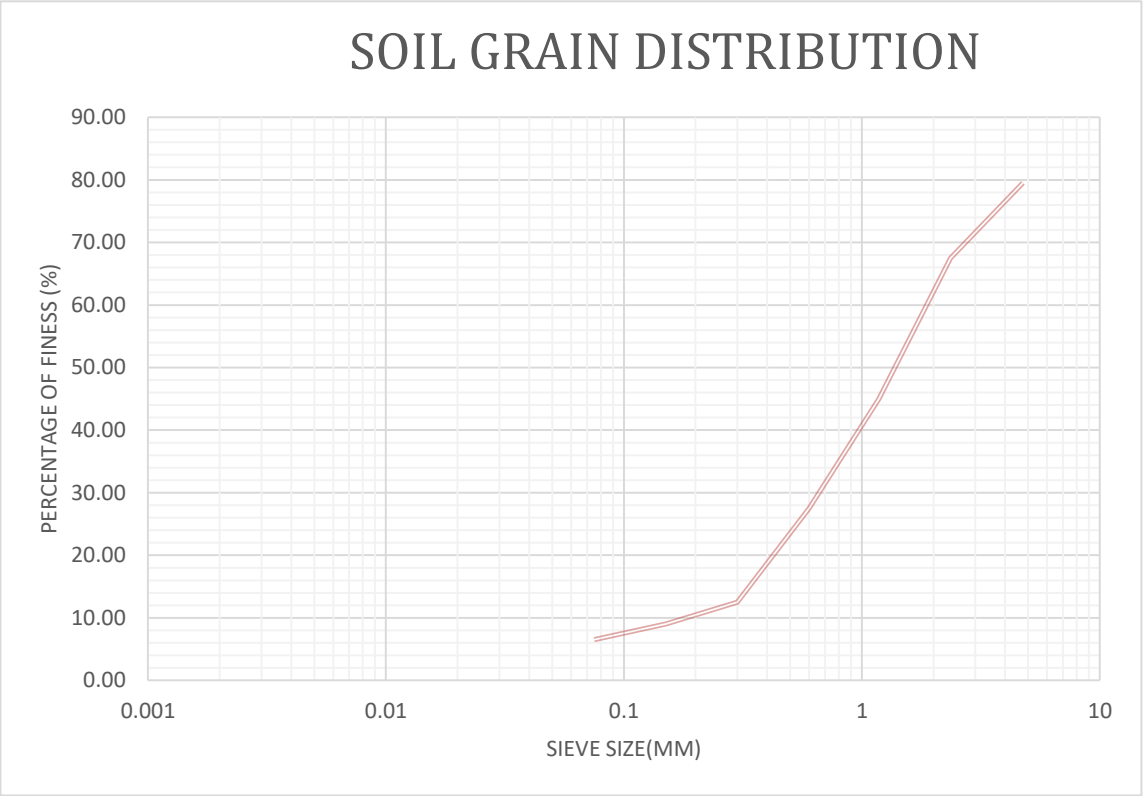
Weight of soil taken:200g

S.No	Sieve Size (mm)	Weight Retained(gm)	Percentage of weight Retained (%)	Cumulative percentage Retaind (%)	Percentage of Finess (%)
1	4.75	41	20.50	20.50	79.50
2	2.36	24	12.00	32.50	67.50
3	1.18	45	22.50	55.00	45.00
4	0.6	35	17.50	72.50	27.50
5	0.3	30	15.00	87.50	12.50
6	0.15	7	3.50	91.00	9.00
7	0.075	5	2.50	93.50	6.50
8	Pan	13	6.50	100.00	0.00

Based on Gradation curve the following sizes of soil particles are obtained (As per IS 1498-1970)

Gravel	=	20.50	%
Silt & Clay	=	6.50	%
Sand	=	73.00	%

Soil Description	**POORLY GRADED SAND (SP)**


SOIL GRAIN DISTRIBUTION
90.00
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
PERCENTAGE OF FINESS (%)
0.001
0.01
0.1
1
10
SIEVE SIZE(MM)

Name of Project	**Subsoil Investigation for the construction of Commercial Building at KURUMBAPALAYAM SS KULAM.**

BH-4 **Depth** 3.0m

Report No : 063/NS/2024 **Date** 21.08.24

Weight of soil taken:70g

S.No	Sieve Size (mm)	Weight Retained(gm)	Percentage of weight Retained (%)	Cumulative percentage Retaind (%)	Percentage of Finess (%)
1	4.75	11	15.71	15.71	84.29
2	2.36	8	11.43	27.14	72.86
3	1.18	13	18.57	45.71	54.29
4	0.6	15	21.43	67.14	32.86
5	0.3	13	18.57	85.71	14.29
6	0.15	4	5.71	91.43	8.57
7	0.075	3	4.29	95.71	4.29
8	Pan	3	4.29	100.00	0.00

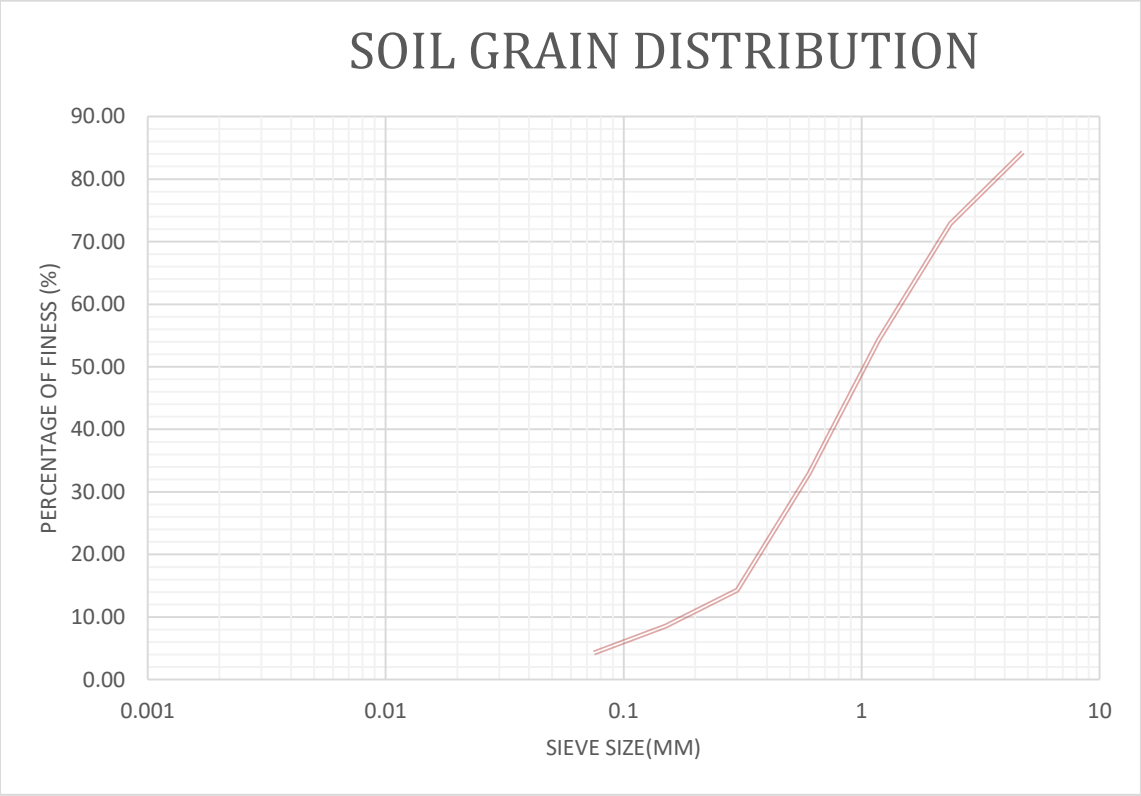
Based on Gradation curve the following sizes of soil particles are obtained (As per IS 1498-1970)

Gravel = 15.71 %

Silt & Clay = 4.29 %

Sand = 80.00 %

Soil Description	**POORLY GRADED SAND (SP)**


SOIL GRAIN DISTRIBUTION
90.00
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
PERCENTAGE OF FINESS (%)
0.001
0.01
0.1
1
10
SIEVE SIZE(MM)

NOTE

ABBREVIATION:

W_N	=	Natural Moisture content (%)
W_L	=	Liquid limit (%)
W_P	=	Plasticity Limit (%)
I_P	=	Plasticity Index (%)
F.S.I	=	Free Swell Index (%)
IS	=	Indian Standard Classification
ML	=	Inorganic clay
CL	=	Low compressibility Clay of W_L < 35%
CI	=	Inorganic Clay of 35% < WL <50%
CH	=	High Compressibility Clay of W_L > 50%
SW	=	Well graded sand
SP	=	Poorly graded sand
GW	=	Well graded gravel
GP	=	Poorly graded gravel

Table No: ~A~

Correlations of SPT N values with Common properties of soils

A) **Granular Soil**

Standard Penetration No., SPT N	Description	Relative Density, %	Approx. Angle of Internal Friction, Φ	Approx. Rang of Most. Unit Wt.,kN/m^3
<4	Very loose	20	29	11-16
4-10	Loose	20-40	29-30	14-18
10-30	Medium	40-60	30-36	17-20
30-50	Dense	60-80	36-41	17-22
>50	Very Dense	80	41	20-29

B) **Cohesive Soil**

Standard Penetration No., SPT N	Description	Unconfined Compressive Strength, kPa	Approx. Rang of Most. Unit Wt., kN/m^3
< 2	Very Soft	0-25	14.4-16
2-4	Soft	25-50	16-17.4
4-8	Firm (medium)	50-100	17.6-19.2
8-15	Stiff Very	100-200	19.2-20.8
15-30	Stiff	200-400	20.8-22.4
>30	Hard	> 400	> 20

Note:

These values are most appropriate values in general. However, the soil properties vary between sites to site and hence it shall be used only for guidance.

List of code books as followed

S.NO	IS CODES	DESCRIPTION
1	IS 6403:1981	code of practice of determination of bearing capacity of shallow foundation
2	IS 8009 (part I)-1878	code of practice for calculations of settlements of foundations
3	IS 12070 (1987)	code of practice for design and construction of shallow foundation on rocks
4	IS 13063:1991	structural safety of School Building (STILT+3 with Basement) on shallow foundation on rocks
5	IS:2911 (PART III)-1980	code of practice for design and construction of pile foundation under reamed piles
6	IS:2911 (PART II)-1980	code of practice for design and construction of pile foundation Bored cast in situ pile
7	IS 2911 Part IV-1980	code of practice for design and construction of pile foundation Plate load test
8	IS 13094:1992	Selection of ground improvement techniques for foundation in weak soils Guidelines
9	IS 8764 (1998)	Method of Determination of Point load Strength index of rocks
10	IS 13030:1981	Method of test for laboratory determination of water content , Porosity ,Density and related Properties rock materials
11	IS 5878- part v-1976	Code of practice for construction of Tunnels conveying water- concrete lining
12	IS 5878- part II-1976	Underground excavation in rocks
13	IS 5878- part II- 1976 section 1	Drilling and Blasting
14	IS 5878- part II-1976 section 2	Ventilation, Light and dewatering

SITE SOIL SAMPLE PHOTOS

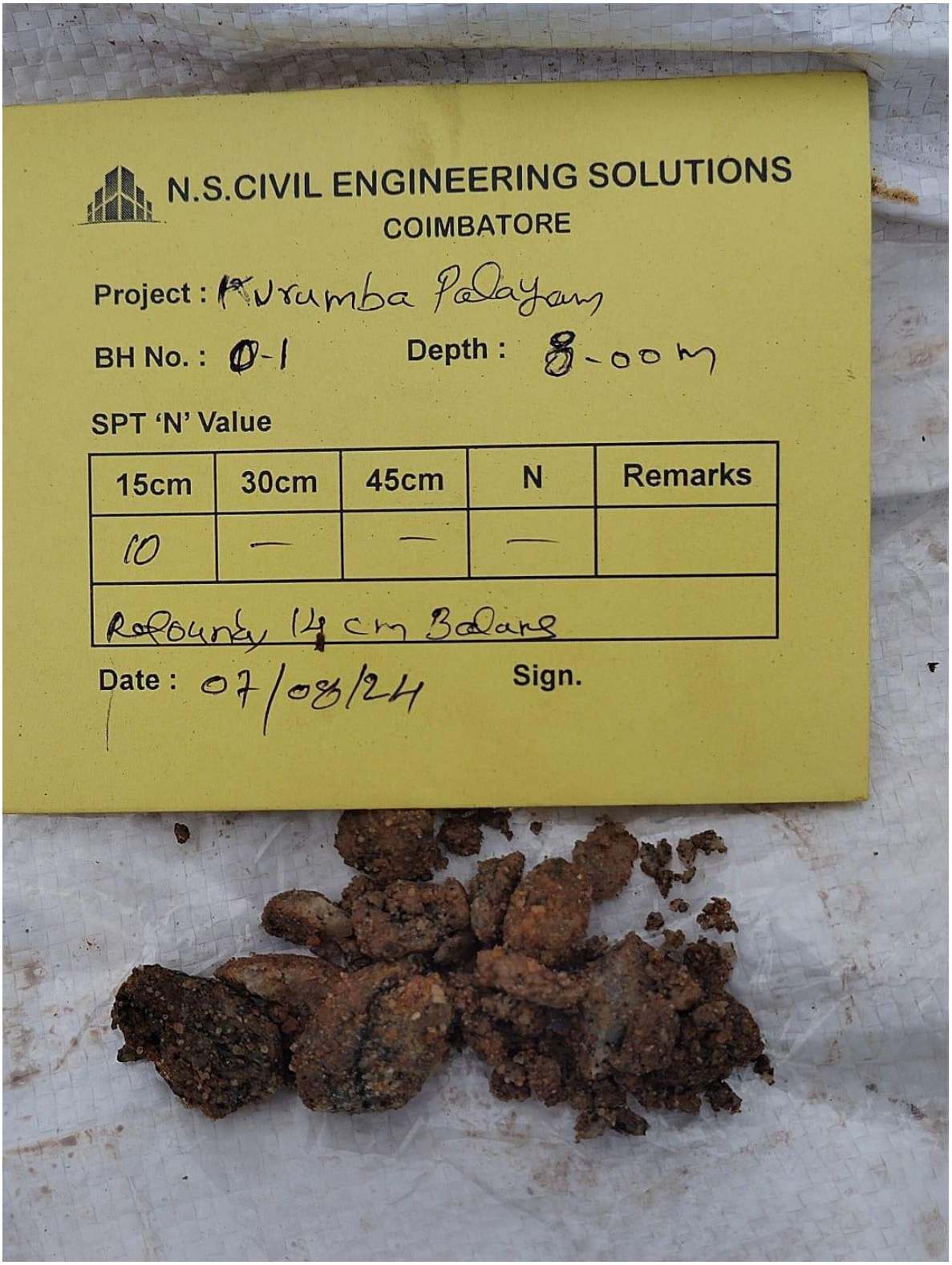
B.H 01


GPS Map Camera
Kurumbapalayam SSKulam, Tamil Nadu, India
424F+VQM, Kurumbapalayam SSKulam, Tamil Nadu 641035, India
Lat 11.107196°
Long 77.025435°
06/08/24 07:42 AM GMT +05:30
Google


N.S.CIVIL ENGINEERING SOLUTIONS
COIMBATORE
Project : Kuramba Palayam
BH No. : 01
Depth : 1-5 m
SPT 'N' Value
15cm
30cm
45cm
N
Remarks
13
18
—
—
Refusal, 7cm Balance
Date : 06-08-24
Sign.


N.S.CIVIL ENGINEERING SOLUTIONS
COIMBATORE
Project : Kurumba Palayam
BH No. : 01
Depth : 3-00 m
SPT 'N' Value
15cm
30cm
45cm
N
Remarks
20/
—
—
—
Refusal, 13 cm Below
Date : 06-08-24
Sign.


N.S.CIVIL ENGINEERING SOLUTIONS
COIMBATORE
Project : Kurumba Palayam
BH No. : 01
Depth : 4-5-m
SPT 'N' Value
15cm
30cm
45cm
N
Remarks
22/
—
—
—
Refusal, 10 cm Balance
Date : 06-08-24
Sign.



N.S.CIVIL ENGINEERING SOLUTIONS
COIMBATORE

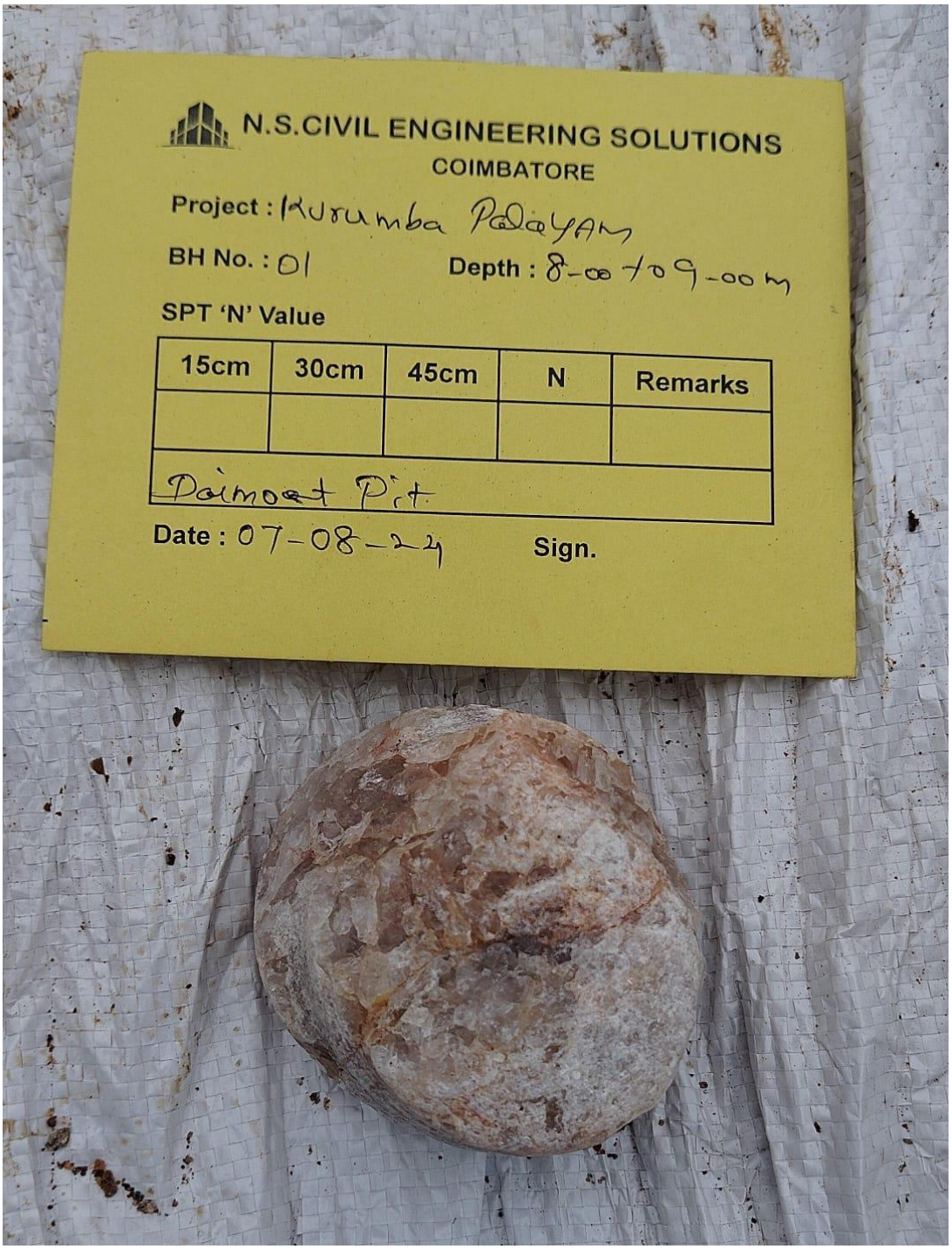
Project : Kurumba Palayam

BH No. : BH-1 Depth : 8.00 m

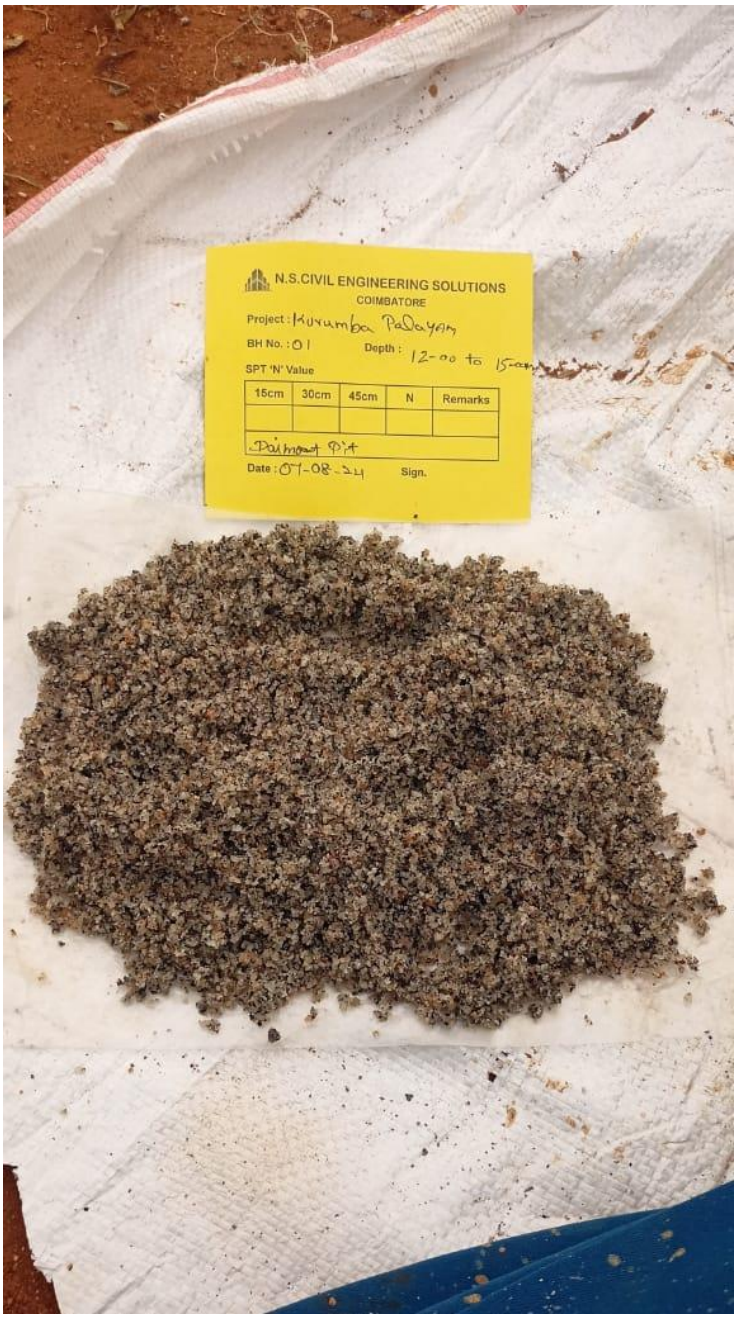
SPT 'N' Value

15cm	30cm	45cm	N	Remarks
10	—	—	—	
Refusal 14 cm Below				

Date : 07/08/24 Sign.


N.S.CIVIL ENGINEERING SOLUTIONS
COIMBATORE
Project : Kurumba Palayam
BH No. : 01
Depth : 8-00 to 9-00 m
SPT 'N' Value
15cm
30cm
45cm
N
Remarks
Daimoat Pit
Date : 07-08-24
Sign.


N.S.CIVIL ENGINEERING SOLUTIONS
COIMBATORE
Project : Kurumba Palayam
BH No. : 01
Depth : 9-00 to 12-00 m
SPT 'N' Value
15cm
30cm
45cm
N
Remarks
Daimond Pit
Date : 07-08-24
Sign.

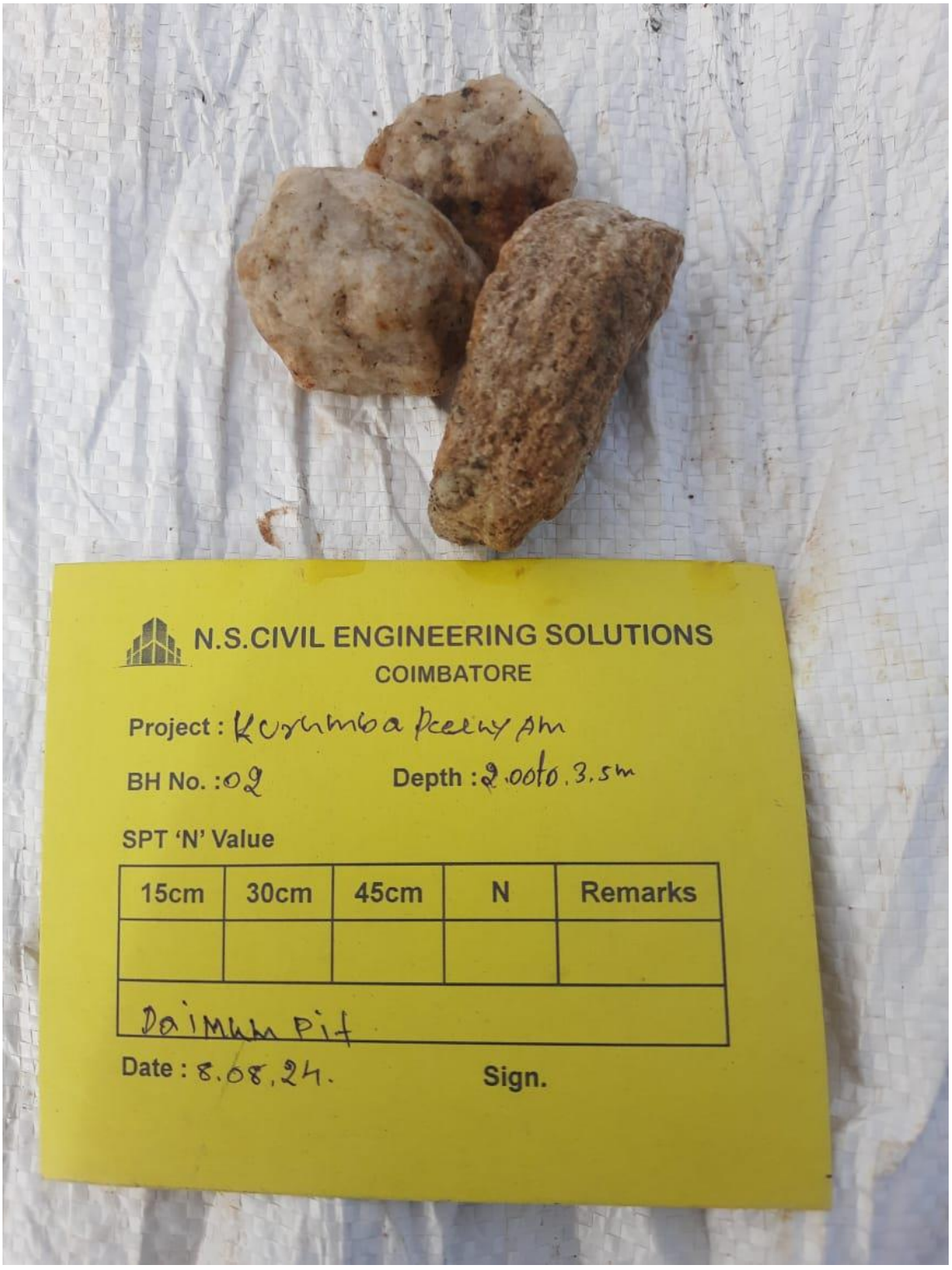

N.S.CIVIL ENGINEERING SOLUTIONS
COIMBATORE
Project : Kurumba Palayam
BH No. : 01
Depth : 12-00 to 15-
SPT 'N' Value
15cm
30cm
45cm
N
Remarks
Pavement Pit
Date : 07-08-24
Sign.

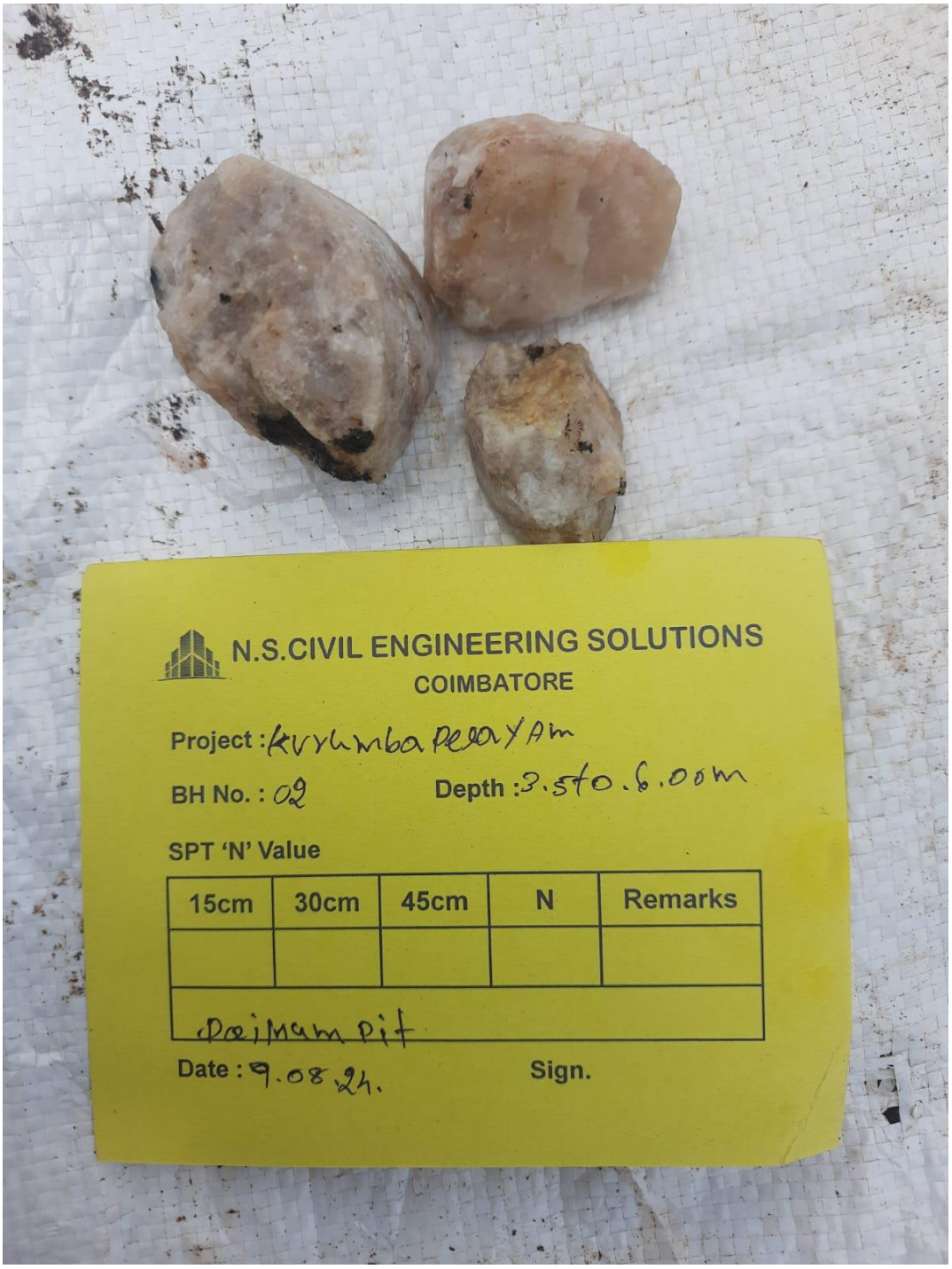
B.H 02

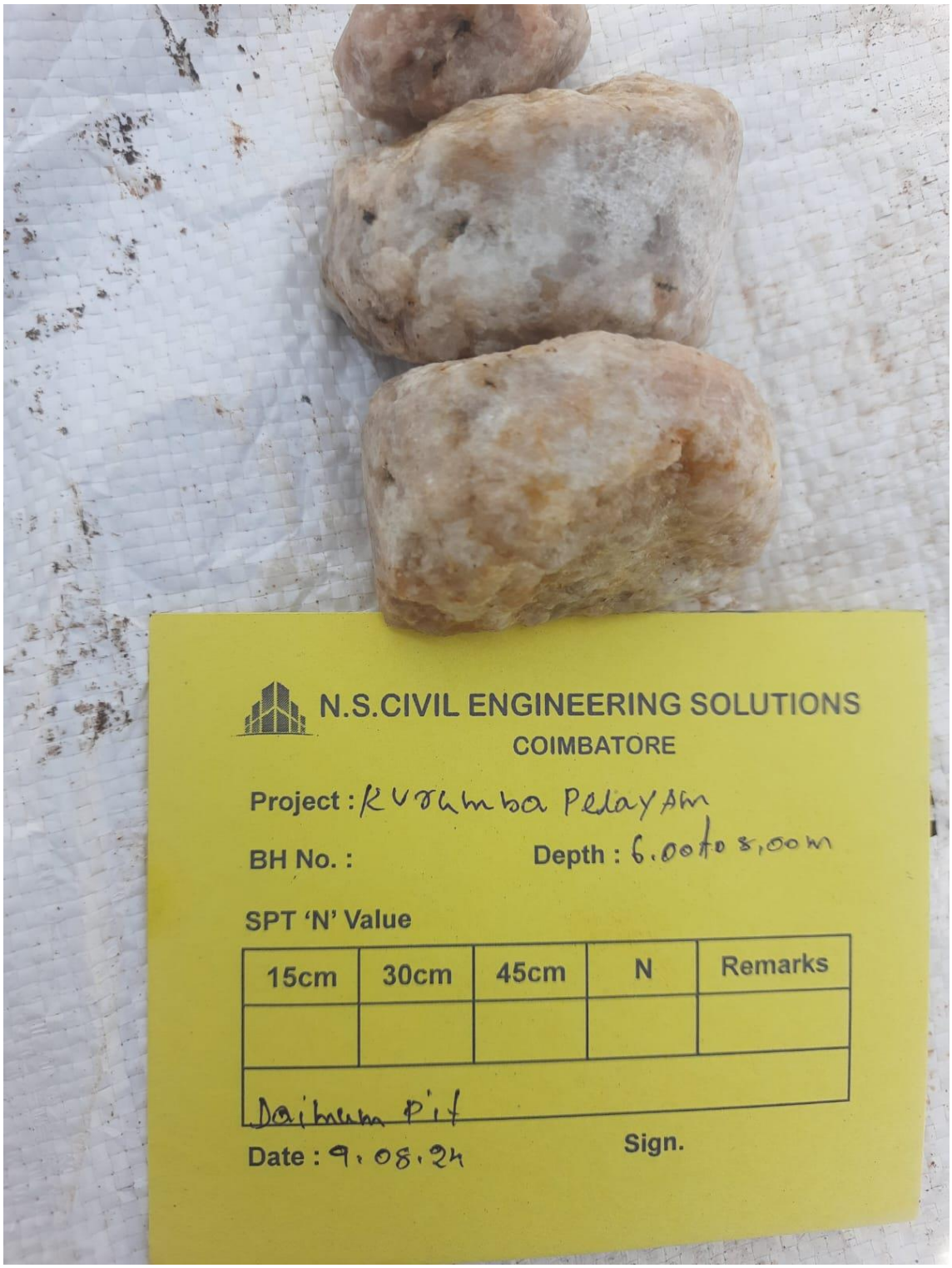

GPS Map Camera
Kurumbapalayam SSKulam, Tamil Nadu, India
424F+VQM, Kurumbapalayam SSKulam, Tamil Nadu 641035, India
Lat 11.106883°
Long 77.025403°
08/08/24 10:52 AM GMT +05:30
Google


N.S.CIVIL ENGINEERING SOLUTIONS
COIMBATORE
Project : Kurumba Palayam
BH No. : 02
Depth : 1 - 5 m
SPT 'N' Value
15cm
30cm
45cm
N
Remarks
30/
-
-
-
3- balance
Date : 08-08-24
Sign.


N.S.CIVIL ENGINEERING SOLUTIONS
COIMBATORE
Project : Kurumba Palayam
BH No. : 02
Depth : 2.00m
SPT 'N' Value
15cm
30cm
45cm
N
Remarks
Daimam pit
Date : 08.08.24.
Sign.


N.S.CIVIL ENGINEERING SOLUTIONS
COIMBATORE
Project : Kurumba Palayam
BH No. :02
Depth : 2.00 to 3.5m
SPT 'N' Value
15cm
30cm
45cm
N
Remarks
Date : 8.08.24.
Sign.

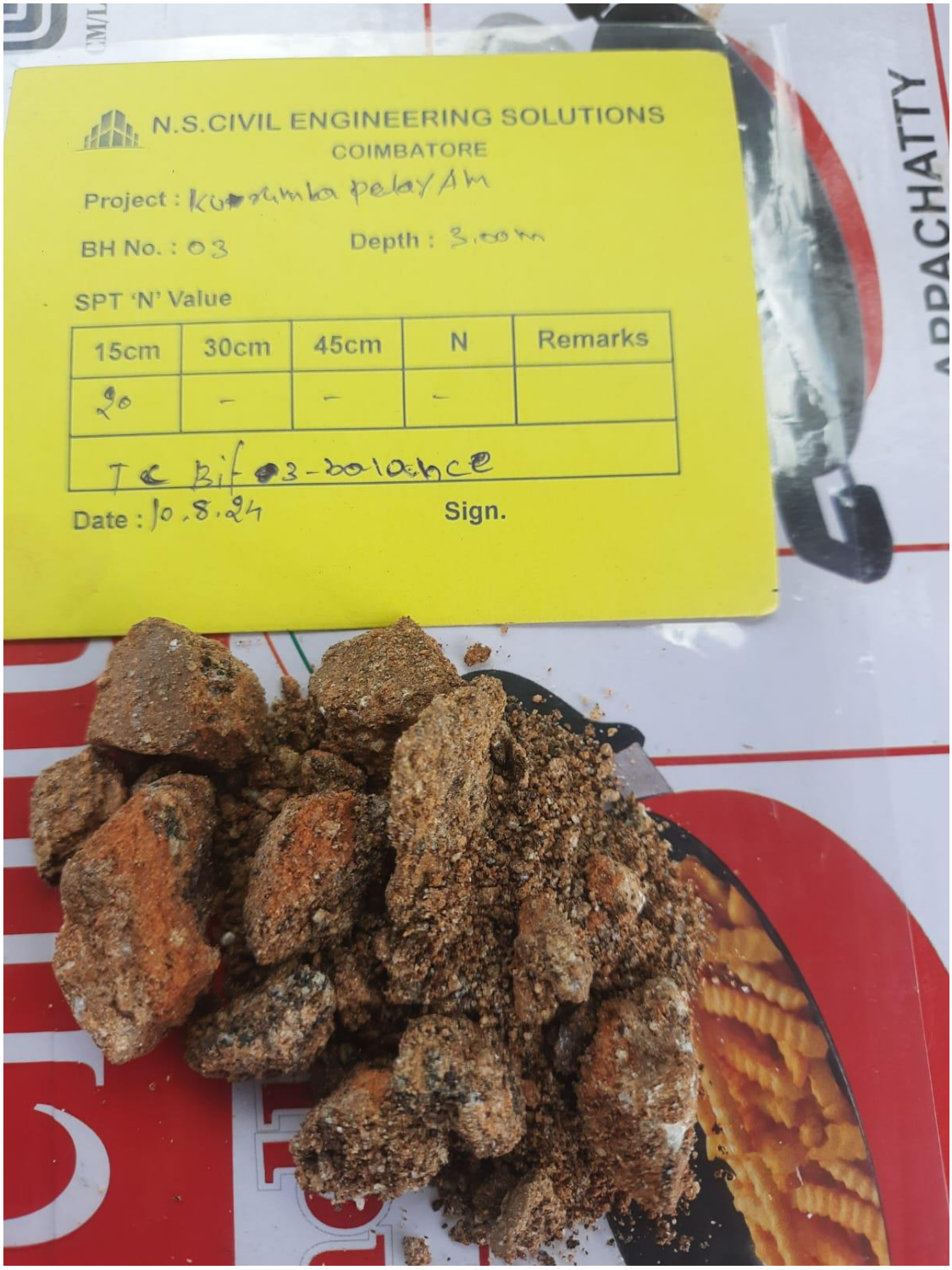

N.S.CIVIL ENGINEERING SOLUTIONS
COIMBATORE
Project : Kurumbapalayam
BH No. : 02
Depth : 3.5 to 6.00m
SPT 'N' Value
15cm
30cm
45cm
N
Remarks
Poiman Pit
Date : 9.08.24.
Sign.

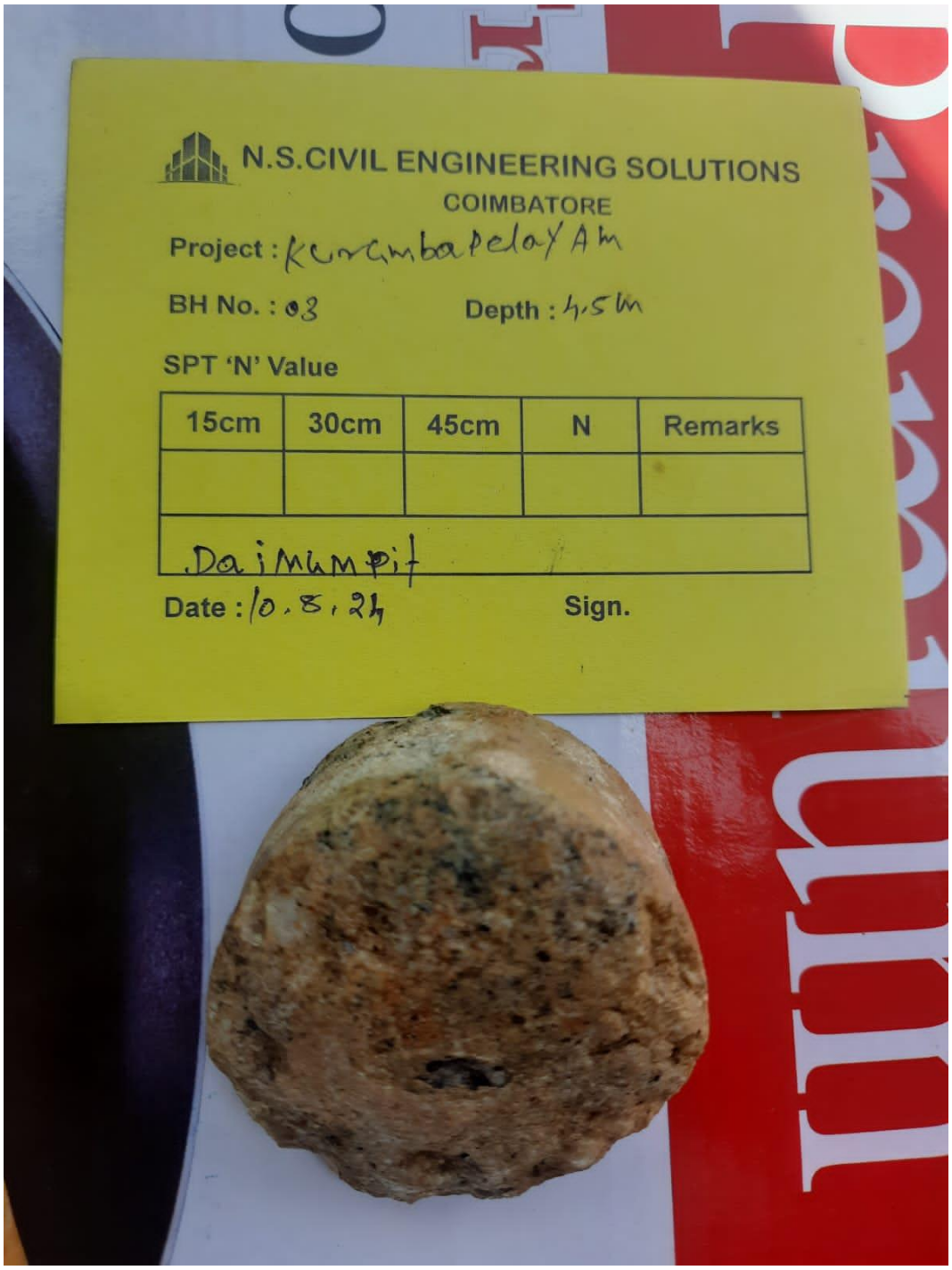

N.S.CIVIL ENGINEERING SOLUTIONS
COIMBATORE
Project : Kurumba Palayam
BH No. :
Depth : 6.00 to 8.00 m
SPT 'N' Value
15cm
30cm
45cm
N
Remarks
Laterite Pit
Date : 9.08.24
Sign.

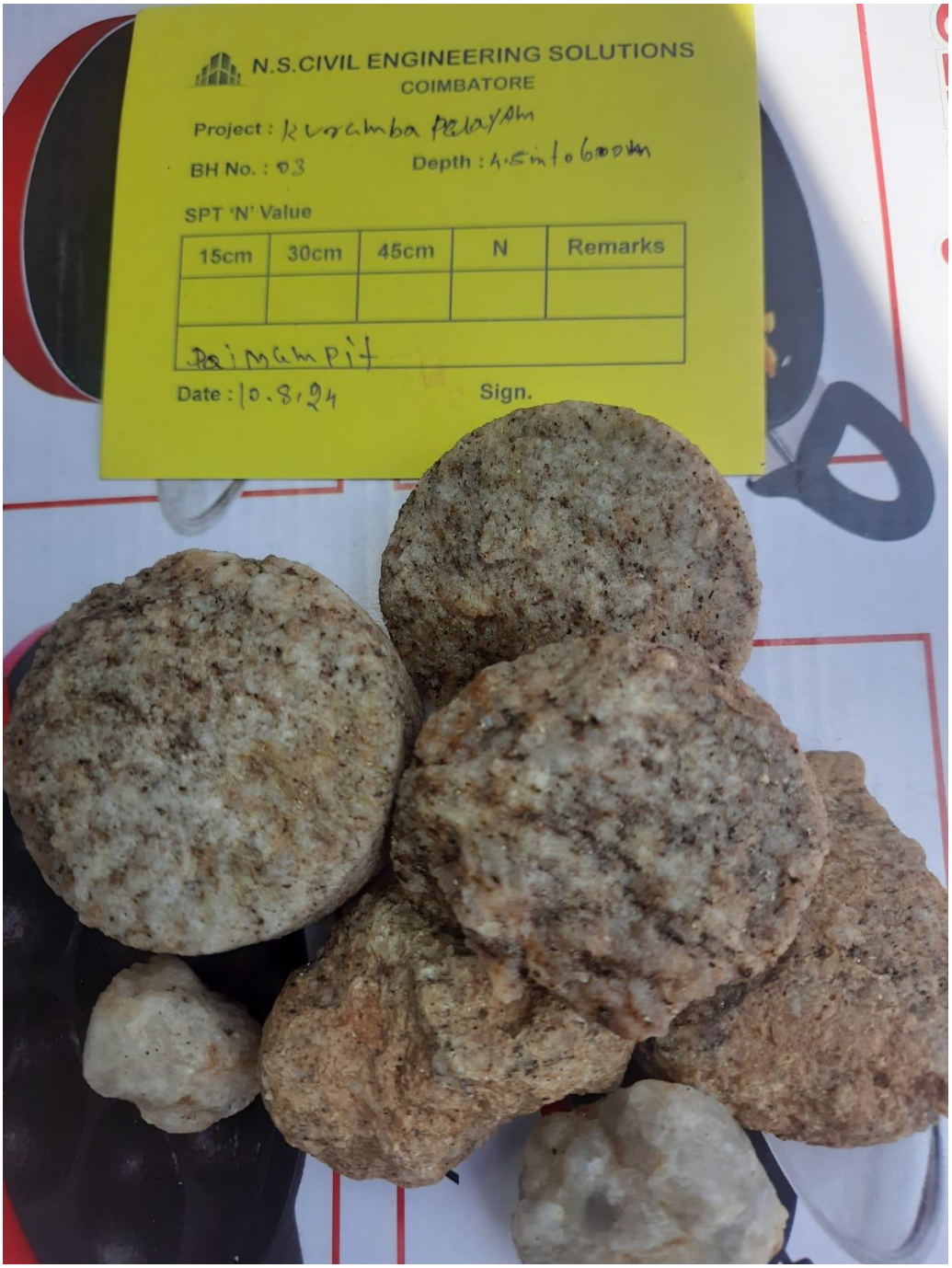
B.H 03




N.S.CIVIL ENGINEERING SOLUTIONS
COIMBATORE
Project : Kurumba palayam
BH No. : 03
Depth : 1.5 m
SPT 'N' Value
15cm | 30cm | 45cm | N | Remarks
11 | 30 | 15/ | — |
13 - balance
Date : 09.08.24
Sign.


N.S.CIVIL ENGINEERING SOLUTIONS
COIMBATORE
Project : Kurumba palayAm
BH No. : 03
Depth : 3.00 m
SPT 'N' Value
15cm
30cm
45cm
N
Remarks
20
-
-
-
TC Bit 3-balance
Date : 10.8.24
Sign.


N.S.CIVIL ENGINEERING SOLUTIONS
COIMBATORE
Project : Kurumbapalayam
BH No. : 03
Depth : 4.5m
SPT 'N' Value
15cm
30cm
45cm
N
Remarks
Date : 10.8.24
Sign.


N.S.CIVIL ENGINEERING SOLUTIONS
COIMBATORE
Project : Kurumba palayam
BH No. : 03
Depth : 4.5m to 6.00m
SPT 'N' Value
15cm
30cm
45cm
N
Remarks
Boring Pit
Date : 10.8.24
Sign.


N.S.CIVIL ENGINEERING SOLUTIONS
COIMBATORE
Project : Kurumbapalayam
BH No. : 03
Depth : 6.00m to 8.00m.
SPT 'N' Value
15cm
30cm
45cm
N
Remarks
Minimum pit
Date : 10.8.24
Sign.

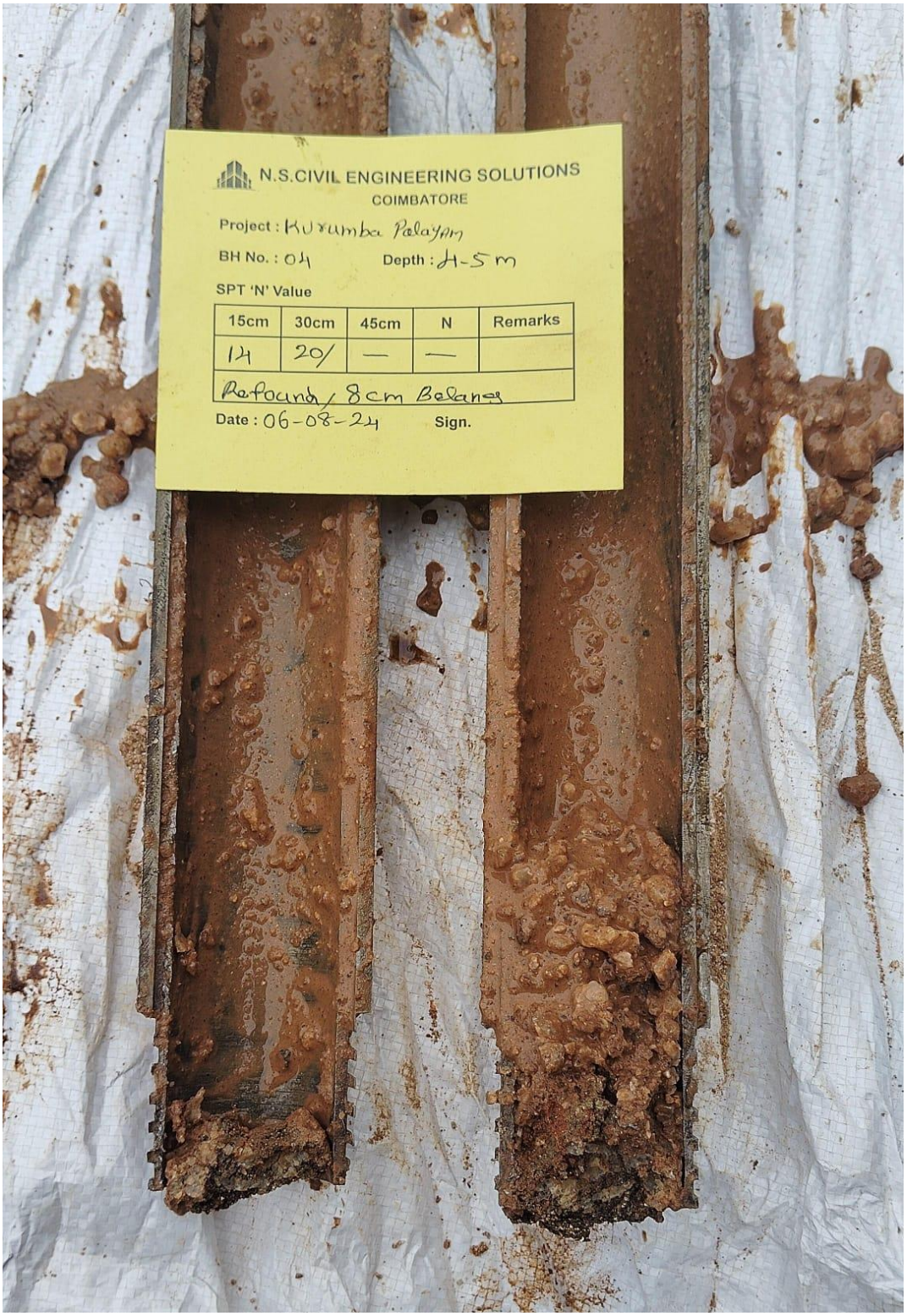

N.S.CIVIL ENGINEERING SOLUTIONS
COIMBATORE
Project : Vd rambapalayAm
BH No. : 03
Depth : 8.00m to 10.00m
SPT 'N' Value
15cm
30cm
45cm
N
Remarks
7/
-
-
-
Dai Mudpit - 5 - balance
Date : 10.8.24.
Sign.

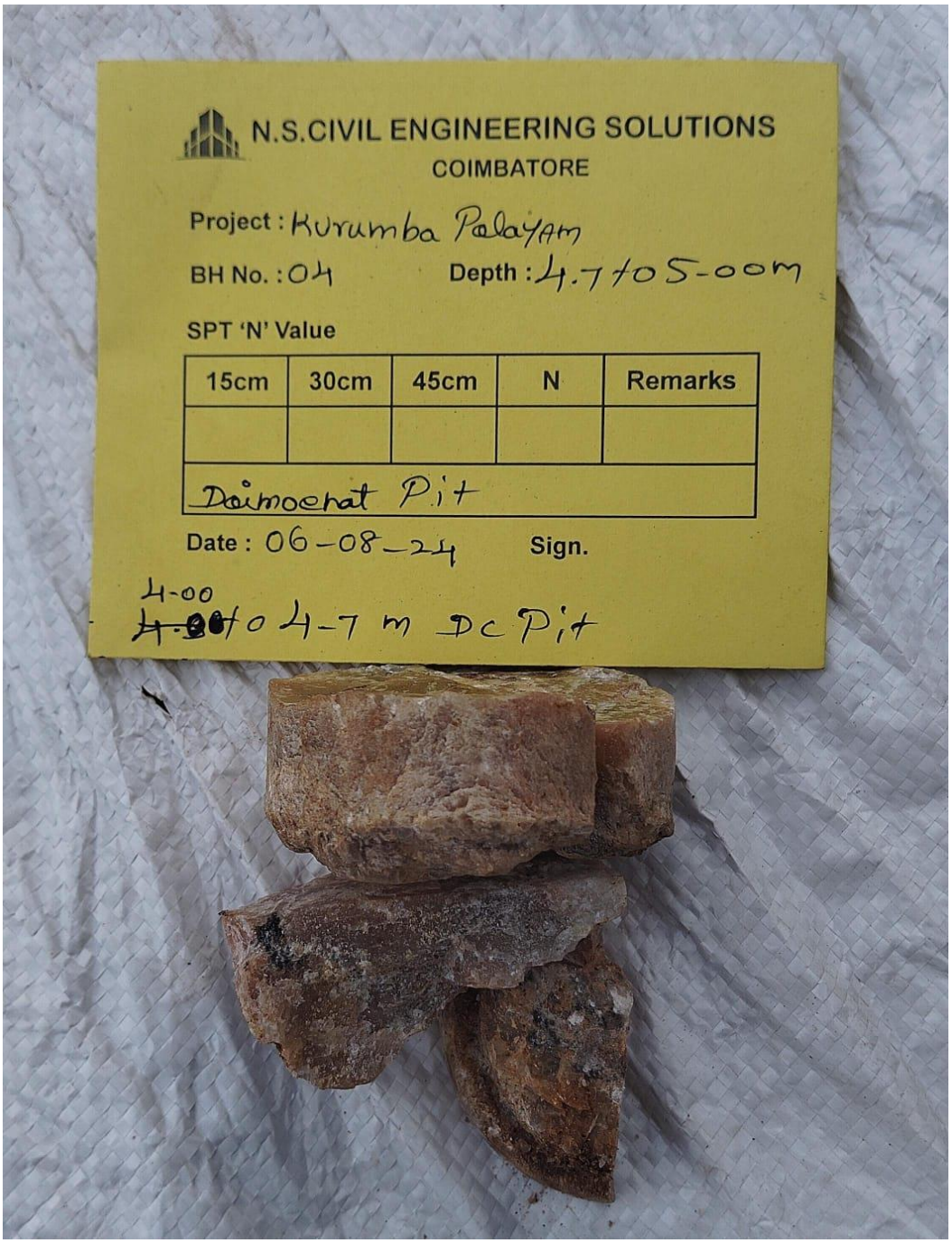
B.H 04


GPS Map Camera
Kurumbapalayam SSKulam, Tamil Nadu, India
424F+VQM, Kurumbapalayam SSKulam, Tamil Nadu 641035, India
Lat 11.107284°
Long 77.024961°
06/08/24 07:41 AM GMT +05:30
Google

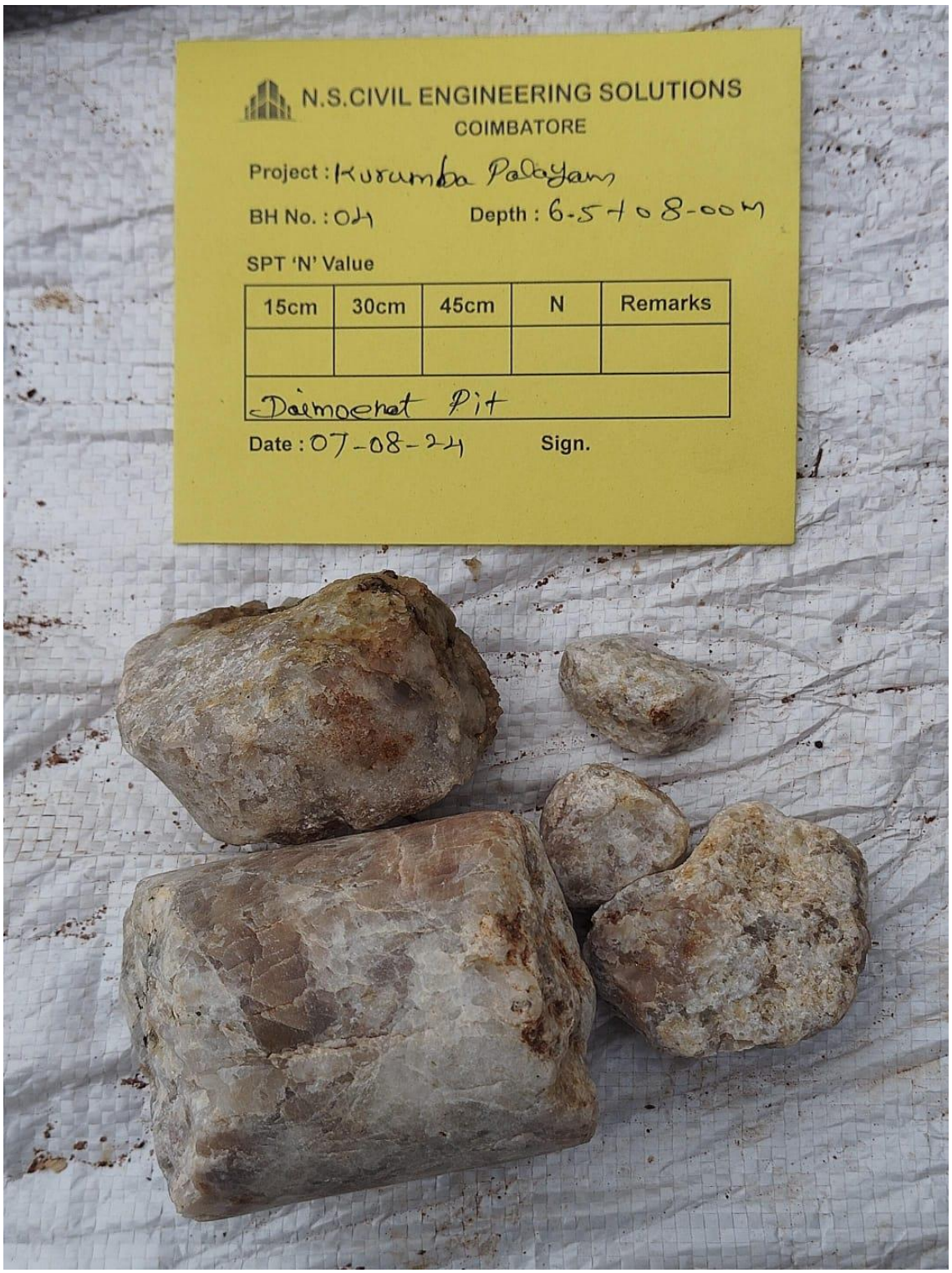

N.S.CIVIL ENGINEERING SOLUTIONS
COIMBATORE
Project : Kurumba Palayam
BH No. : 04
Depth : 1-5 M
SPT 'N' Value
15cm
30cm
45cm
N
Remarks
13
15
18
23
Date : 06-08-24
Sign.

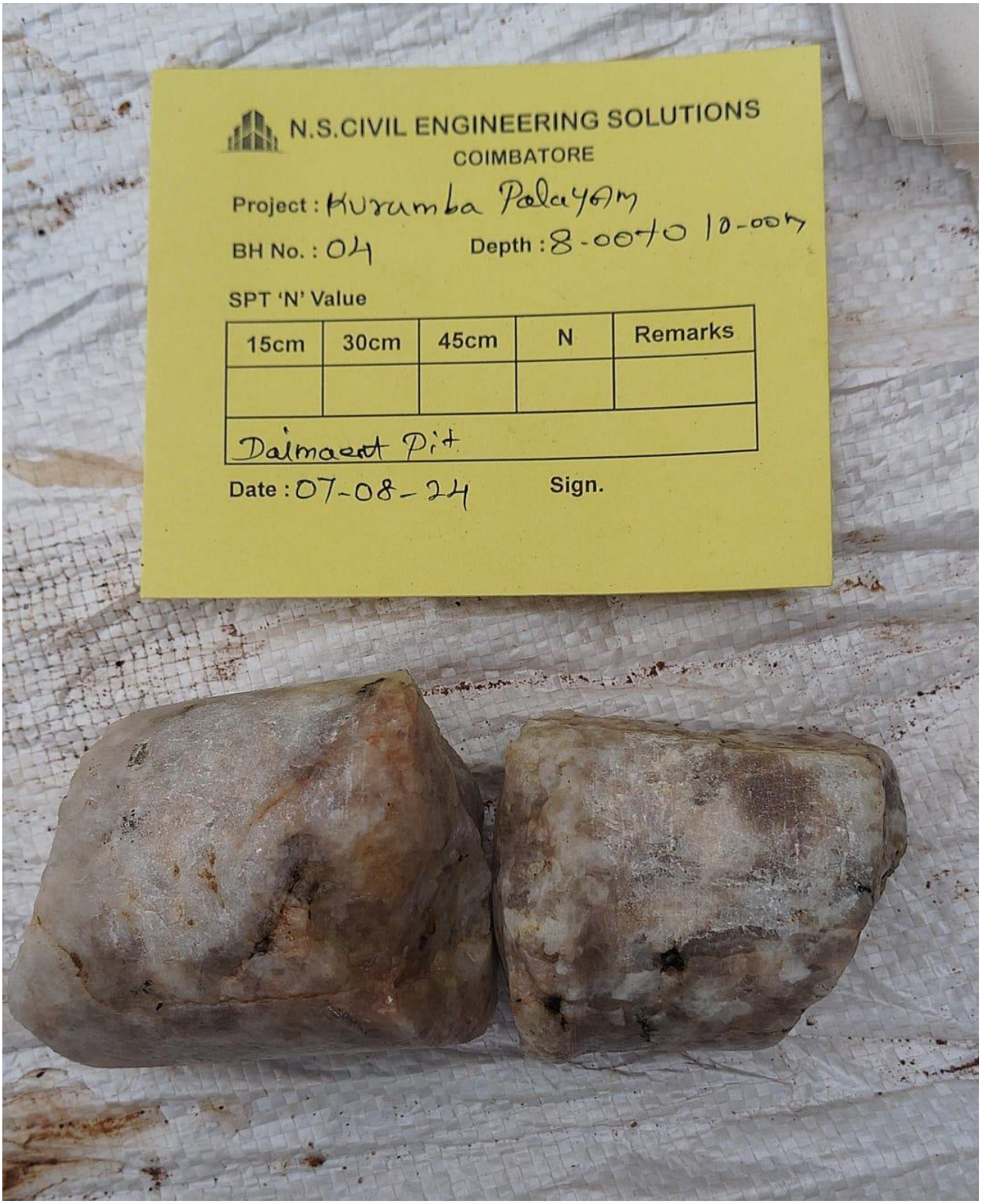

N.S.CIVIL ENGINEERING SOLUTIONS
COIMBATORE
Project : Kurumba Palayam
BH No. : 04
Depth : 3-00 m
SPT 'N' Value
15cm
30cm
45cm
N
Remarks
5
10
18
No Sampel Recover
Date : 06-08-24
Sign.

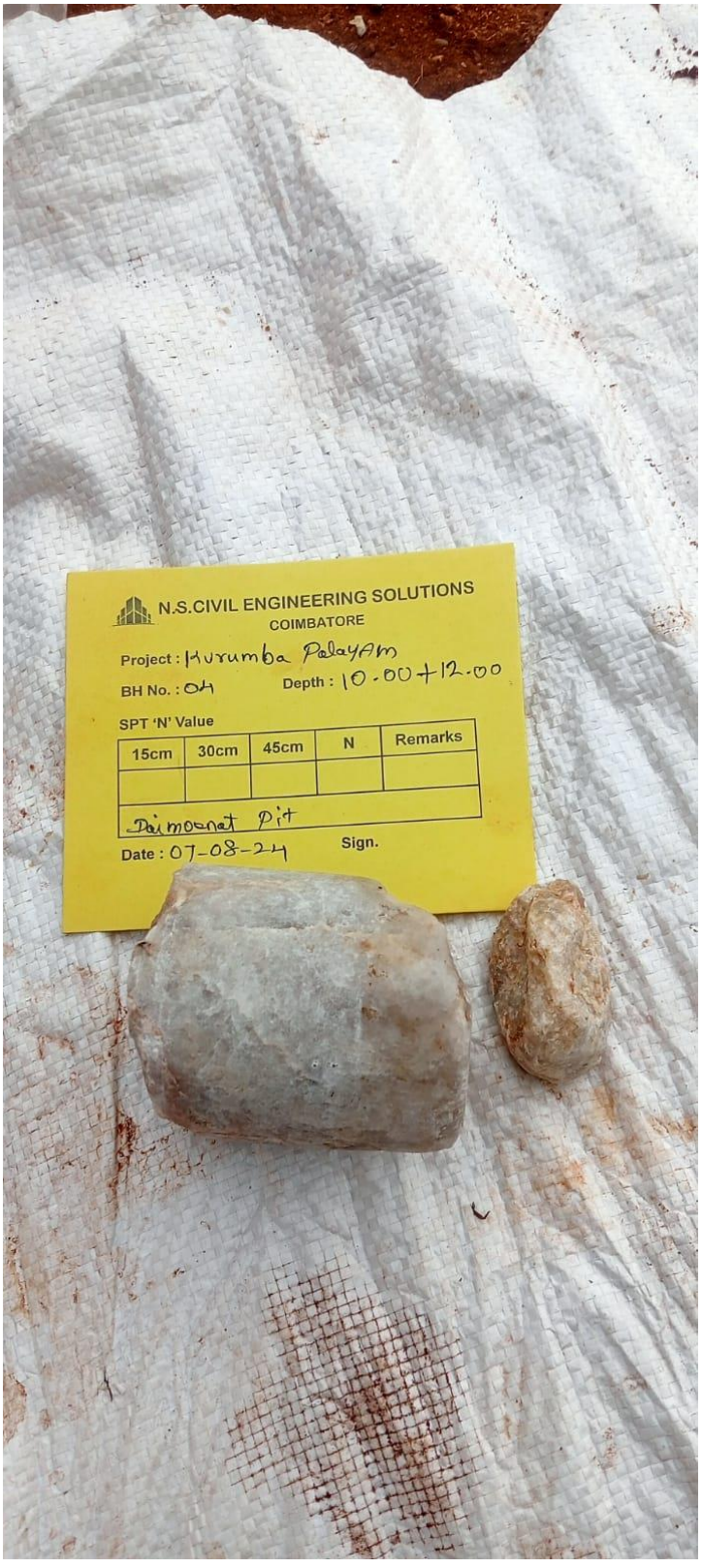

N.S.CIVIL ENGINEERING SOLUTIONS
COIMBATORE
Project : Kurumba Palayam
BH No. : 04
Depth : 4-5m
SPT 'N' Value
15cm
30cm
45cm
N
Remarks
14
20/
—
—
Refound / 8cm Below
Date : 06-08-24
Sign.

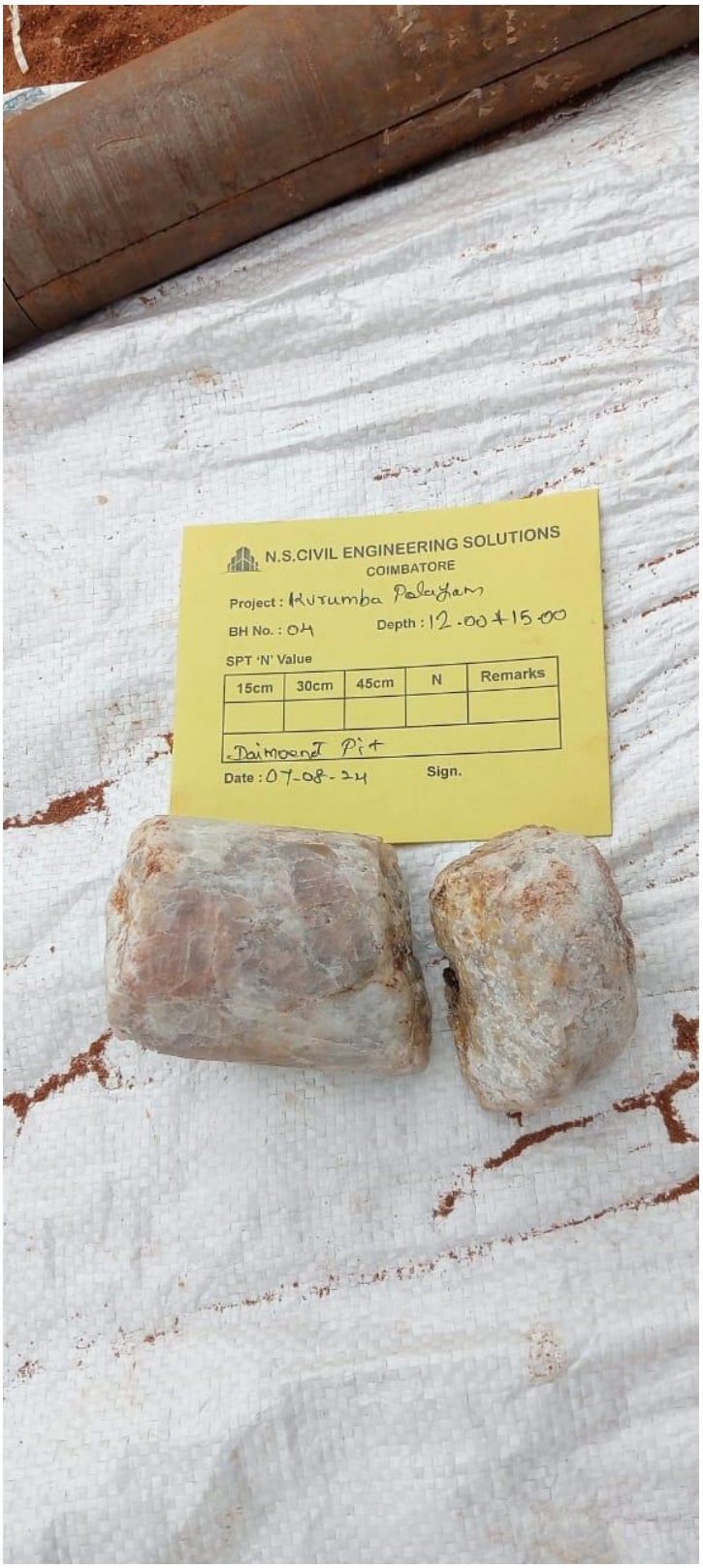

N.S.CIVIL ENGINEERING SOLUTIONS
COIMBATORE
Project : Kurumba Palayam
BH No. : 04
Depth : 4.7 to 5-00m
SPT 'N' Value
15cm
30cm
45cm
N
Remarks
Daimochat Pit
Date : 06-08-24
Sign.
4-00
4-7 m DC Pit


N.S.CIVIL ENGINEERING SOLUTIONS
COIMBATORE
Project : Kurumba Palayam
BH No. : 04
Depth : 5.00 to 6.5 m
SPT 'N' Value
15cm
30cm
45cm
N
Remarks
Diamond Pit
Date : 07-08-24
Sign.


N.S.CIVIL ENGINEERING SOLUTIONS
COIMBATORE
Project : Kurumba Palayam
BH No. : 04
Depth : 6-5 to 8-00M
SPT 'N' Value
15cm
30cm
45cm
N
Remarks
Daimochat Pit
Date : 07-08-24
Sign.


N.S.CIVIL ENGINEERING SOLUTIONS
COIMBATORE
Project : Kurumba Palayam
BH No. : 04
Depth : 8-00+0 10-00
SPT 'N' Value
15cm
30cm
45cm
N
Remarks
Daimaent Pit
Date : 07-08-24
Sign.


N.S.CIVIL ENGINEERING SOLUTIONS
COIMBATORE
Project : Kurumba Palayam
BH No. : 04
Depth : 10.00+12.00
SPT 'N' Value
15cm
30cm
45cm
N
Remarks
Diamond Pit
Date : 07-08-24
Sign.


N.S.CIVIL ENGINEERING SOLUTIONS
COIMBATORE
Project : Kurumba Palayam
BH No. : 04
Depth : 12.00 to 15.00
SPT 'N' Value
15cm
30cm
45cm
N
Remarks
Diamond Pit
Date : 07-08-24
Sign.

THANK YOU!!!

THE LANDLENS SUITE

Eight ways to know a piece of land before you pay for it.

This report covers one part of the picture. These cover the rest, drawn from the same government records, for any property in Tamil Nadu.

LandLens One
Ask anything about a property and get an answer grounded in live government records, with the sources shown.
/landlens/one

Verify My Land
Every record check run on one property and returned as a single report.
/landlens/verify-my-land

Legal Opinion
An advocate's written opinion on the title, built on the records we pull for it.
/landlens

One Map
Every layer on one map: the parcel, its boundary, zoning, water bodies and what sits around it.
/landlens/one/map

PriceMap
What land actually changed hands for around this plot, taken from the registered deeds.
/landlens/pricemap

Build Scope
What you are allowed to build here: floor space, height, coverage and setbacks.
/landlens/build-scope

Property Tracker
Watch a property and hear about it when something new is registered against it.
/landlens/property-tracker

Deal Room
Run the transaction in one place: documents, stamping, signatures and the parties.
/landlens/deal-room

FREE TOOLS · NO ACCOUNT NEEDED

Twenty-four checks you can run yourself, at no cost.

Records and verification

The registers themselves, read for you.

- Encumbrance Certificate
- Patta and Chitta
- Field Measurement Sketch
- EC Analyzer
- Bank charge check
- Court case search
- Seller background check
- Approval check by survey

Value and duty

What it is worth and what it costs to register.

- Guideline value by street
- Guideline value by survey
- Stamp duty and registration fees
- Capital gains
- Floor space index
- Area unit converter

Zoning and land use

What the plan says can happen on this land.

- Land use zone finder
- CMDA land use check
- Coastal regulation zone
- Master plan check
- Water bodies finder
- Airport height clearance

Registers and directories

Who holds it, and which office keeps the record.

- Find your registering office
- Temple property check
- Waqf property check
- RERA register

Every free tool
/tools

Services we run for you
/services

The LandLens suite
/landlens/one

Verified RealEstate™

Every claim in this document traces back to a government record.

- Legal opinions, due diligence and title verification
- Building plan, layout and sub-division approvals
- Completion and occupancy certificates, regularisation
- Escrow, negotiation and NRI property management
- Land survey, soil testing, architecture and construction

Verified RealEstate
3/350/2 Mettukuppam,
OMR Thoraipakkam,
Chennai 600 097, India
hello@verified.realestate
+91 9996 12 9996

Prepared from the registers named on the page each finding sits on. Where a register could not be read, this document says so in its place rather than leaving the gap to be read as a clean result.