

**PROJECT : PROPOSED CONSTRUCTION OF BUILDING FOR
ABIRAMI PET INDUSTRIES PVT LTD,
GANGAIKONDAN,
TIRUNELVELI.**

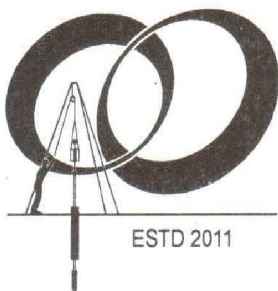
TITLE : SOIL INVESTIGATION REPORT

**SUBMITTED TO : M/S. SAI SITE PLAN ENGINEERS,
NO: 80/41, SEMBIYAM REDHILLS ROAD,
KATHIRVEDU,
CHENNAI - 600 066.**

SURVEY NO : 1599 pt, 1600 pt, 1601 pt, 1610 pt, 1611 pt, 1617 pt

**SITE ADDRESS : PLOT NO: 3B,
SIPCOT INDUSTRIAL GROWTH CENTER,
GANGAIKONDAN,
TIRUNELVELI.**

CONSULTANTS & CONTRACTORS:



**HAMILTON MATERIAL TESTINGS PVT.LTD.
TESTING LAB FOR SOIL & BUILDING MATERIALS
REGD.NO: 2011/33/028/01317/DHDA/E
No.93-I/8, Ashok Nagar, 3rd Street,
Thoothukudi - 628 008.
Ph: 0461- 2311367**

Ref: /HMTPL

Date: 04.10.18

SOIL TEST REPORT

The Soil samples collected from Two Bore Holes

(Standard penetration test samples and Disturbed Samples) at the

Proposed Construction of building for Abirami Pet Industries Pvt Ltd,

Gangaikondan, Tirunelveli.

The Soil Samples were analyzed in our laboratory and the test

results are in Annexure.

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SOIL EXPLORATION:

Name of Project – Proposed Construction of building for
Abirami Pet Industries Pvt. Ltd, Gangaikondan, Tirunelveli.

INTRODUCTION

Geotechnical Investigation for the **“Proposed Construction of building for
Abirami Pet Industries Pvt. Ltd, Gangaikondan, Tirunelveli.”**

were carried out by us.

2. Scope of Work

Two boreholes were drilled through manually operated Auger drilling system on the proposed alignment of structures up to Hard Strata for preliminary identification of type and extent of soil layers. The Safe Bearing Capacity of layers at different depth is based on Standard Penetration test values which are conducted in the bore holes at regular intervals. Submitting geotechnical investigation report for the above project based on field and laboratory test results and recommendation of suitable foundation systems.

3. Field work

Field investigations were carried out on 26th September 2018 through manually operated Auger drilling system on the proposed site.

3.1 Drilling through soil medium

3.1.1 MANUALLY OPERATED AUGER BORING

Two boreholes were drilled through manually operated Auger drilling system. The borehole walls, where weak, were supported by temporary steel casing.

3.1.2. STANDARD PENETRATION TEST

The test measures the penetration resistance of the split spoon sampler, when it is driven into the soil, at the bottom of a borehole in a standard manner. The N-value, which is the number of blow required to achieve 300mm penetration of the soil, indicates the relative density of sand or gravel, the consistency of other soil such as silts or clays and the strength of weak rocks. The test is described in IS 2131 - 1981.

The split spoon sampler is attached to stiff drill rod and lowered to the bottom of the bore hole. A standard blow consists of dropping a mass of 65kg free fall through 760 mm on to an anvil at the top of the rods and ensuing that this amount of dynamic energy is transferred to the sampler as much as possible.

The number of blows required to achieve each 150mm penetration is recorded for a fall penetration of 450mm. The initial 150mm penetration is referred to as seating drive and the blows required for this penetration are not considered as this zone is in disturbed soil. The next 300mm of penetration is referred to as the test drive and the number of blows required to achieve this fully is termed the penetration resistance or N-value. The SPT results are given in the annexure.

4. SAMPLING:

The disturbed samples were collected thro SPT sampler. Ground water table were observed one day after completion of investigation.

4. 1 LABORATORY TESTS

Following laboratory tests are conducted.

- a) Sieve analysis
- b) Specific gravity and Direct Shear Test.

5. Sub Soil Conditions

The soil conditions at this site found through Standard Penetration Test samples is uniform deposit of Medium Sand followed by Sandy Gravel Reddish Colour and the bore hole terminated at same layer.

6. Engineering Appraisal

Based on Laboratory results on the samples collected from investigation locations, the shear strength parameters such as C (Cohesive Strength) and Φ (angle of internal friction) can be correlated with SPT values.

7. Design Methodology

The Safe Bearing Capacity of the soil can be calculated on Shear failure Criteria and Settlement Criteria and any foundation system has to satisfy the above said criteria.

The former one depends on shear strength and the bearing capacity equation suggested by IS 6403 as follows.

Net ultimate Bearing Capacity is given by

$$C N_c S_c d_c i_c + \gamma D (N_q - 1) S_q d_q i_q + 0.5 \gamma B N_\gamma S_\gamma d_\gamma i_\gamma W'$$

The Safe Bearing Capacity is the maximum gross intensity of loading that the soil can carry safely without failing in shear which is obtained by the Net ultimate Bearing Capacity divided by factor of safety (2.5 to 3.0)

The later one follows Settlement Criteria, that the intensity of the loading will cause within the permissible settlement is termed as allowable bearing pressure given by correcting the field SPT values

1. **Correction due to Dialtancy (N').** (This correction is based on the assumption that critical void ratio occurs at approximately $N = 15$, and in fine grained cohesionless soils, the coefficient of permeability is low that the excess pore water pressure developed by the driving impedes the penetration of split spoon sampler, thus increasing the N value.)

$$N' = 15 + 0.5 (N_o - 15)$$

2. **Correction due to Overburden Pressure**

$$N = 0.77 N' \log_{10} (2000/ p'_o)$$

p'_o effective over burden pressure should be greater than 25 kPa

Net Allowable Bearing Pressure developed by Terzaghi and Peck (1948)

$$q_s = 35 (N_{cor} - 3) ((B + 0.3) / 2B)^2 R_{w2} F_d$$

The Allowable Bearing Pressure of soil = Net allowable bearing Pressure of soil + p'_o

8. Foundation recommendation:

It is recommended that the Shallow Foundations may be adopted in the Form of Isolated/ Combined Footing which is laid at the depth of 2.00m to 2.50m from the Existing Ground Level.

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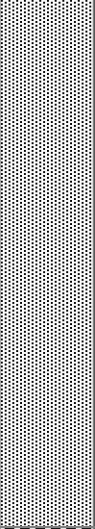

Abirami Pet Industries Pvt. Ltd, Gangaikondan, Tirunelveli.

Date of Commencement - 26.09.18

G.W. T. : Not Met

Date of Completion - 26.09.18

Bore Hole No. 1

Depth below G.L. (R.L.)	Soil Profile	Description of Soil	Thickness of layer (m)	Standard Penetration test data					Relative density / consistency
				Depth at which test is conducted	N - Value depth of penetration				
					15cm	30cm	45cm	For 30cm	
1.50		Medium Sand	1.50	1.00	5	8	10	18	Medium
				2.00	12	16	20	36	Dense
				3.00	24	27	50- 2cm	>50	V Dense
3.00		Sandy Gravel Reddish	1.50						
		End of Bore Hole							


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Bore Hole No. 1

Soil Profile and depth in meters	Depth of Sampling	IS Soil Classification	Free Swell Index %	Atterberg Limits			Grain Size Distribution %					Shear Strength Parameters		Standard Penetration Test "N" Value			
				Liquid Limit	Plastic Limit	Plasticity Index	Gravel	Coarse Grained			Fine Grained		C	Ø°	Depth of Testing M	Observed N Value	Safe Bearing Capacity T/ m ²
								Coarse	Medium	Fine	Silt	Clay					
	1.50	SP		NP			6	4	49	38	3	0	0	31	1.00	18	15.77
															2.00	36	26.95
															3.00	>50	36.85
	3.00	GW		NP			53	5	23	15	4	0	0	34			

NP - Non Plastic

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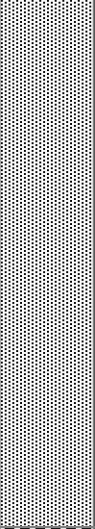

Abirami Pet Industries Pvt. Ltd, Gangaikondan, Tirunelveli.

Date of Commencement - 26.09.18

G.W. T. : Not Met

Date of Completion - 26.09.18

Bore Hole No. 2

Depth below G.L. (R.L)	Soil Profile	Description of Soil	Thickness of layer (m)	Standard Penetration test data					Relative density / consistency
				Depth at which test is conducted	N - Value depth of penetration				
					15cm	30cm	45cm	For 30cm	
1.50		Medium Sand	1.50	1.00	3	5	11	16	Medium
				2.00	9	14	17	31	Dense
				3.00	19	25	50- 2cm	>50	V Dense
3.00		Sandy Gravel Reddish	1.50						
		End of Bore Hole							


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Bore Hole No. 2

Soil Profile and depth in meters	Depth of Sampling	IS Soil Classification	Free Swell Index %	Atterberg Limits			Grain Size Distribution %					Shear Strength Parameters		Standard Penetration Test "N" Value			
				Liquid Limit	Plastic Limit	Plasticity Index	Gravel	Coarse Grained		Fine Grained		C	Ø°	Depth of Testing M	Observed N Value	Safe Bearing Capacity T/ m ²	
								Coarse	Medium	Fine	Silt						Clay
	1.50	SP		NP			5	3	52	36	4	0	0	29	1.00	16	14.57
															2.00	31	23.87
															3.00	>50	36.85
	3.00	GW		NP			55	4	25	13	3	0	0	32			

NP - Non Plastic

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