

**REPORT ON GEOTECHNICAL INVESTIGATION AND
RECOMMENDATIONS FOR THE FOUNDATION OF PROPOSED
CONSTRUCTION OF RETAINING WALL ON MOGALTUR MAJOR DRAIN
IN POOLAPALLI VILLAGELIMITS IN PALAKOLLU MANDAL IN
WEST GODAVARI DISTRICT, A.P.**

NAME OF THE STRUCTURE :- CONSTRUCTION OF RETAINING WALL

**LOCATION :- MOGALTUR MAJOR DRAIN IN POOLAPALLI
VILLAGELIMITS IN PALAKOLLU MANDAL IN
WEST GODAVARI DISTRICT, A.P.**



**SOIL BORING BY : M/s. SRI SRINIVASA TUBE WELL WORKS,
PERAVALI, EAST GODAVARI DISTRICT, A.P.
CELL No. 9849562294**

**Client : THE DEPUTY EXECUTIVE ENGINEER,
DRAINAGE SUB DIVISION,
PALAKOLLU,
WEST GODAVARI DISTRICT, A.P.**

**Consultant : DEPARTMENT OF CIVIL ENGINEERING
S.R.K.R. ENGINEERING COLLEGE
CHINNAMIRAM
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1. INTRODUCTION

The Deputy Executive Engineer, Drainage Sub Division, Palakollu, West Godavari District, A.P. Proposed Construction of Retaining Wall on Mogaltur Major Drain in Poolapalli Village, limits in Palakollu Mandal, Weest Godavari District, A.P. The Deputy Executive Engineer requested the Civil Engineering Department, S.R.K.R. Engineering College, Bhimavaram, West Godavari District, Andhra Pradesh to conduct the laboratory geotechnical testing of soil samples for the proposed Construction of Retaining Wall on Mogaltur Major Drain in Poolapalli Village, limits in Palakollu Mandal, Weest Godavari District, A.P. The soil exploration work was carried out by M/s. Srinivasa Tube Well Works, Peravali, East Godavari District, A.P, on behalf of The Deputy Executive Engineer, Drainage Sub Division, Palakollu, West Godavari District, A.P.

1.1. Responsibilities of Soil exploration team:

The following are the responsibilities of M/s. Srinivasa Tube Well Works, Peravali, East Godavari District, A.P.

- Soil Boring of 150mm diameter up to 10.00-30.00meters at site location as specified by the client.
- Conducting standard penetration tests (SPT) at regular intervals as specified by the client.
- Collection of undisturbed and disturbed soil samples from the bore hole by conducting SPT tests.
- Identify the location of ground water table.
- The soil samples collected during the soil exploration process are to be submitted to the laboratory for the testing.

Laboratory soil testing was carried out by the Geotechnical Engineering Lab, Civil Engineering Department, S.R.K.R. Engineering College; Bhimavaram. The report contains the results of laboratory tests. Recommendations on the bearing capacity of soil and type and depth of foundation for the proposed structure are also included.

2. THE STRUCTURE AND LOCATION

The Deputy Executive Engineer, Drainage Sub Division, Palakollu, West Godavari District, A.P. Proposed Construction of Retaining Wall on Mogaltur Major Drain in Poolapalli Village, limits in Palakollu Mandal, Weest Godavari District, A.P.

3. SUB SOIL INVESTIGATION

3.1. *Field Investigation Procedure:*

The following procedure has been adopted for sub-soil investigations to the Proposed Construction of Retaining Wall on Mogaltur Major Drain in Poolapalli Village, limits in Palakollu Mandal, Weest Godavari District, A.P.

3.1.1. *Borings:*

Boring was done using a combination of shell and auger methods depending upon the type of strata met within the borehole. A Bore hole of 150 mm diameter was drilled to facilitate collection of disturbed soil samples and to conduct Standard Penetration Test (SPT). The drill rods will be standard "A" type as specified by IS: 1892-1979. The bore hole was stabilized with casing pipe.

3.1.2. *Undisturbed And Disturbed Soil Sampling:*

Undisturbed soil samples were collected using thin-walled sampling tubes and split spoon samplers as per the procedure given in IS: 2132-1972 at desired levels in the bore hole (clayey strata) to determine shear strength of the soil. Number of disturbed and representative soil samples were collected from the auger cuttings and borings for identification and for conducting laboratory tests.

3.1.3. *Standard Penetration Tests (SPT):*

Standard Penetration Tests (SPT) were conducted at every 1.0 meters up to 6.0-30.00 meters depth in one bore hole. These tests were carried out according to IS:2131-1981. A stratum is considered to be hard/refusal, when the Standard Penetration Test value, N was greater than 50 as per IS:2132-1981 clause 3.3.3.

3.1.4. Depth of Borings:

The Three bore holes were drilled up to a depth of 30.0 meters below the existing ground level. If the penetration of the spoon is less than 300 mm for 50 blows, the N value is written as >50.

3.2. Log of Bores:

The results obtained from the field operation are shown in bore log data (Section 5: Table A).

4. LABORATORY TESTS

The samples were tested at the Geotechnical laboratory, Department of Civil Engineering, S. R. K. R. Engineering College, Bhimavaram.

The following tests were performed on the Soil samples:

1. Natural Moisture Content
2. Soil classification: Index Properties-Liquid limit (LL), Plastic limit (PL), Plasticity index (PI), Sieve analysis, Relative density, Free swell index (FSI)
3. Compaction Parameters: Optimum moisture content (OMC) and Maximum dry density (MDD)
4. Shear strength: Unconfined compressive strength, Tri-axial test, Direct shear test.

All the above tests were conducted as per the provisions laid down in the relevant IS code of practice (IS: 2720-Methods of Tests for Soils). The test results for all the samples tested have been tabulated in proper format and have been presented in the results section of this report.

5. SUB SOIL PROFILE

Based on the Bore logs, the generalized subsoil profile in the site is as follows.

Table A: Bore log data

Depth Below GL	Visual identification of soil and IS soil classification	Recorded N Value
0.00-1.00	Filled soil	--
1.00-2.00	Brownish clay [CH]	--
2.00-17.00	Black clay [CH]	2-3
17.00-30.00	Brownish clay [CH]	7-38

The ground water level was encountered within the borehole depth.

6. LIMITATIONS OF THE REPORT:

- The laboratory test results apply only to the samples sent to the laboratory.
- The soil testing laboratory is not responsible for sampling procedures.
- Laboratory results apply only to the specific samples tested and may not represent the full extent of the site.

7. SELECTION OF TYPE OF FOUNDATION AND BEARING CAPACITY

The soil from 0.0m to 1.0m is filled soil, from 1.00m to 2.00m is brownish clay, from 2.00m to 17.00m is black clay and from 17.00m to 30.00m is brownish clay. Deep foundation in the form of bored cast in situ pile foundation is suitable. It should rest on sound strata of adequate bearing capacity and safe from settlement considerations. It should have adequate embedded length so as resist the overturning moments due to horizontal forces. The foundation can be decided based on loading and soil characteristics.

8. COMPUTATION OF NET SAFE BEARING CAPACITY OF THE SOIL FOR SHALLOW FOUNDATIONS:

The allowable bearing capacity of shallow foundation by shear criteria can be calculated by using the equation as given in IS:6403-1981.

The net ultimate bearing capacity formulae for strip/isolated footing are given below:

- a) for general shear failure $q_{nu} = cN_c S_c d_c i_c + q(N_q - 1) s_q d_q i_q + \frac{1}{2} B \gamma N_\gamma S_\gamma d_\gamma i_\gamma W'$
- b) for local shear failure $q_{nu} = \frac{2}{3} cN'_c S_c d_c i_c + q(N'_q - 1) s_q d_q i_q + \frac{1}{2} B \gamma N'_\gamma S_\gamma d_\gamma i_\gamma W'$

Where,

q_{nu} = Net ultimate bearing capacity

c = Cohesion

N_c, N_q, N_γ = Bearing capacity factor

S_c, S_q, S_γ = Shape factor

d_c, d_q, d_γ = Depth Factor

i_c, i_q, i_γ = Inclination factor

q = Net overburden pressure

B = Width of foundation

γ = Density of Soil

ω' = Water correction factor

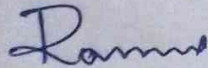
9. RECOMMENDATIONS

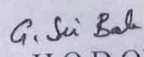
Based on field and laboratory test results on soil samples collected from the bore holes, the following recommendations are made.

- 1) Deep foundation in the form of bored cast in situ pile foundation is suitable.
- 2) The details of the safe load carrying capacity of the pile are given in the following table.
- 3) Check the safe load carrying capacity of pile by conducting pile load test according to IS:2911(Part IV).

TABLE - 1

S.No.	Length (m)	Pile diameter (mm)	Safe load in tones (t)
1	22.0	300	23.0
2	22.0	400	31.0
3	22.0	450	35.0
4	22.0	500	40.0
5	22.0	600	48.0
6	25.0	300	29.0
7	25.0	400	40.0
8	25.0	450	45.0
9	25.0	500	51.0
10	25.0	600	62.0


INCHARGE
OF GT LAB.
**IN-CHARGE, GT & TE LABS
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China Amiram, Bhimavaram-534 204**

DEPARTMENT OF CIVIL ENGINEERING
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LABORATORY SOIL TEST RESULTS

Borehole No.: - 1.			G.W.L.: 3.20m.b.g.l.					Sheet No.					
Identification tests			Test results of soil engineering										
Depth in Mts.	Ref. No. of soil sample	Visual Identification	N - Value	% passing 75 μ I.S. sieve	% passing 4.75 mm I.S. sieve	Atterberg limits of soil passing 425 μ I/S. Sieve		I.S soil classification	Field test		Triaxial Test		Safe bearing capacity t/m ² .
						Liquid limit, %	Plastic limit, %		N.M.C. %	Bulk Density g/cc	C Kg/cm ²	ϕ Degrees	
0.0-1.00		Filled soil											
1.00-2.00		Brownish clay											
2.00-17.00		Black clay											
3.00-3.45	SPT1	-do-	2	98	100	70	30	CH	45	1.71	0.11	--	1.0
4.50-4.95	SPT2	-do-	2	98	100	70	30	CH	44	1.70	0.11	--	1.0
6.0-6.45	SPT3	-do-	2	98	100	--	--	--	42	1.70	0.10	--	1.0
8.00-8.45	SPT4	-do-	2	98	100	--	--	--	41	1.70	0.10	--	1.0
10.00-10.45	SPT5	-do-	2	98	100	--	--	--	44	1.70	--	--	--
12.00-12.45	SPT6	-do-	2	98	100	--	--	--	44	1.71	--	--	--
14.00-14.45	SPT7	-do-	3	98	100	9	28	CH	45	1.72	0.14	--	1.5
16.00-16.45	SPT8	-do-	3	98	100	--	--	--	42	1.72	0.15	--	1.5
17.00-30.00		Brownish clay											
18.0-18.45	SPT9	-do-	7	98	100	67	26	CH	31	1.78	0.45	--	5.0
20.00-20.45	UDS	-do-	--	98	100	66	26	CH	24	1.80	0.90	--	10.0
22.00-22.45	SPT10	-do-	17	98	100	64	22	CH	28	1.86	1.05	--	18.0
24.00-24.45	SPT11	-do-	22	97	100	62	21	CH	30	1.92	1.25	--	21.0
26.00-26.45	SPT12	-do-	26	97	100	61	22	CH	28	1.94	1.58	--	27.0
28.00-28.45	SPT13	-do-	31	97	100	--	--	--	28	1.95	1.85	--	32.0
30.00-30.45	SPT14	-do-	38	96	100	60	20	CH	30	1.98	--	--	--

Note: The test results apply only to the samples sent to the laboratory.

**DEPARTMENT OF CIVIL ENGINEERING
S.R.K.R. ENGINEERING COLLEGE
SUB SOIL PROFILE**

Date: 19-01-2026

BORE LOG										Date: 19-01-2026													
Bore Hole: I.					Field Investigation																		
Type of Boring : Wash Boring			Bore Hole diameter mm			G.W.L : 2.30 m. b.g.l.																	
Depth below G.L.	Soil profile	Description of soil	Thickness of layer in meters	Depth at which sample are collected		Depth at which test is conducted in meters	0-15 cm	15-30 cm	30-45 cm	N - Value	Graphical representation of Penetration Resistance												
				D.S.	U.D. S						20	40	60	80	100								
1	Filled soil	Brownish clay	1.00																				
2			1.00																				
3	Black clay		15.0																				
4				SPT1	3.0	1	1	1	2														
5				SPT2	4.50	1	1	1	2														
6				SPT3	6.0	1	1	1	2														
7				SPT4	8.0	1	1	1	2														
8																							
9																							
10				SPT5	10.0	1	1	1	2														
11																							
12	SPT6	12.0	1	1	1	2																	
13																							
14	SPT7	14.0	1	1	2	2																	
15	SPT8	16.0	1	1	2	3																	
16	SPT9	18.0	2	3	4	7																	
17																							
18																							
19																							
20																							
21					UDS	20.0	--	--	--	--													
22	SPT10					22.0	5	7	10	17													
23	Brownish clay		13.0																				
24				SPT11	24.0	8	9	13	22														
25				SPT12	26.0	10	11	15	26														
26																							
27				SPT13																			
28				SPT14	28.0	10	15	16	31														
29																							
30						30.0	14	18	20	38													

Note: The test results apply only to the samples sent to the laboratory.