

CORRIGENDUM**Date: 12-09-2024****Tender for Engaging a Consultant for the Design and Development of Construction of a Landfill Site with Cells for the Safe Disposal of Solid Hazardous Waste as per GPCB/CPCB Norms at the New TSDF Site.****Pre-Bid Meeting Summary:**

A pre-bid meeting was held at 14:00 Hrs on September 5, 2024, at the CETP Conference Room followed by a visit to the New TSDF Site. CEO provided an introduction and led a preliminary discussion about the development of the New TSDF site. The following points were discussed and have been finalized:

Technical Clarifications:

Sr. No.	Issue	Query	Reply by Vapi Green Enviro Limited
1	Technical Details Page 5/12	General Layout and Design: Green Belt Area.	Green Belt Area will be considered as 40% of the total area.
2	New Point	Environment Clearance (EC)	Environment Clearance has already been obtained by VGEL.
3	New Point	Request for Site Layout/Drawing with Tender	Site Drawing with boundary demarcation will be attached with the Corrigendum.
4	New Point	Inquiry for Appointment of Third-Party Quality Assurance (TPQA) Agency.	Appointment of TPQA Agency will be managed separately by VGEL.
5	General (Page 7/12)	Soil Investigation	Contour Drawing and Soil Investigation Testing to be conducted as per CPCB Guidelines. Consultant is responsible for testing and associated costs. Contour Drawing and Soil Investigation report of single bore is attached.
6	New Point	Geo Hydrological Survey	Included in the consultant's scope of work.



Sr. No.	Issue	Query	Reply by Vapi Green Enviro Limited
7	Part B (Page 8/12)	Designing of Hazardous Solid Waste Disposal Cell: Leachate Collection Sump	Leachate Collection System, including dry and wet sumps, to be designed integrally with the cell.
8	Part B (Page 8/12)	Phase-wise Cell Development	Approx. 50,000 to 60,000 MT of waste to be landfilled annually. Subdivision and number of cells to be finalized with the approved consultant/agency.
9	New Point	Scope of Consultant: Cost of Approval of Design Drawings etc.	All data required for submissions to various authorities to be provided by the consultant. VGEL will handle submissions.
10	New Point	Ground Water Flow Direction Quality DATA Soil Investigation	Included in the consultant's scope and considered part of the project.
11	New Point	Approval of Design and Drawing from Reputed Authorities like IIT/NIT	Responsibility of VGEL.
12	New Point	Appointment of Site Engineer/Project Manager.	Required to be deputed during project execution with a minimum of 5 years' experience in Civil Engineering. Project Manager Regular site visits also mandatory.
13	New Point	Bifurcation/Stages of Total Work	1st Part: Basic Engineering + Preliminary Design. 2nd Part: Detailed Engineering + DPR + Costing + BOQ + Tender Preparation. 3rd Part: Supervision during the execution of the project.
14	New Point	Payment Stages	Detailed in the tender document, including milestones for payments throughout project stages.



VB

[Signature]

[Signature]

Revised Payment Stages as per Tender Document:

Sr. No.	Particulars	% of Total Fees	Cumulative %
	Part 1: Comprehensive Design and Estimation of the Hazardous Solid Waste Cell and Associated Amenities		
1	Award of Contract	05%	05%
2	Submission and Approval of General Arrangement (GA) Drawings for the Site, and Submission of Detailed Technical Data from Soil Investigation. Payment will be processed upon acceptance of the report.	20%	25%
	Part 2: Estimate and Bill of Quantities (BOQ) for the Entire Project and Phase 1 of the Hazardous Solid Waste Cell, including all Amenities, along with Tender Documents.		
1	Submission and Approval of Detailed Design and Estimation, including a Comprehensive Bill of Quantities (BOQ) for Utilities. Payment will be processed upon acceptance of the report.	20%	45%
2	Submission and Approval of Detailed Design and Estimation, including a Comprehensive Bill of Quantities (BOQ) for the Entire Hazardous Solid Waste Cell. Payment will be processed upon acceptance of the report.	20%	65%
3	Estimate with Detailed Bill of Quantities (BOQ) and Preparation for Phase 1 of the Cell and Associated Amenities. Payment will be processed upon acceptance of the report.	15%	80%
4	Preparation of Tenders for Phase 1 of the Hazardous Solid Waste Cell and all Amenities. Payment will be processed upon acceptance of the tender documents.	10%	90%
5	Evaluation of Tenders and Finalization of the Contracting Agency.	5%	95%



Handwritten signature/initials

Handwritten signature

Handwritten signature

Sr. No.	Particulars	% of Total Fees	Cumulative %
6	Retention Amount will be paid upon completion of the Defect Liability Period for Phase 1 of the Project and submission of the Stability Certificate.	05%	100%
	Part 3: Supervision and Certification During Project Execution. Payment will be made on a monthly basis.		
1	Deputation of an Engineer to the Site for the Duration of Phase 1 Execution until Completion.	Per Month	Per Month

Revised Price Bid Format:

Sr No	Description	Unit	Total Amount
1	Part 1: Comprehensive Design and Estimation for the Hazardous Solid Waste Cell and Associated Amenities	Lumpsum	
2	Part 2: Estimate and Bill of Quantities (BOQ) for the Entire Project and Phase 1 of the Cell, including All Amenities and Tender Documents		
3	Part 3: Supervision and Certification During Project Execution. Payment will be made on a monthly basis.	Per Month	

Additional Instructions:

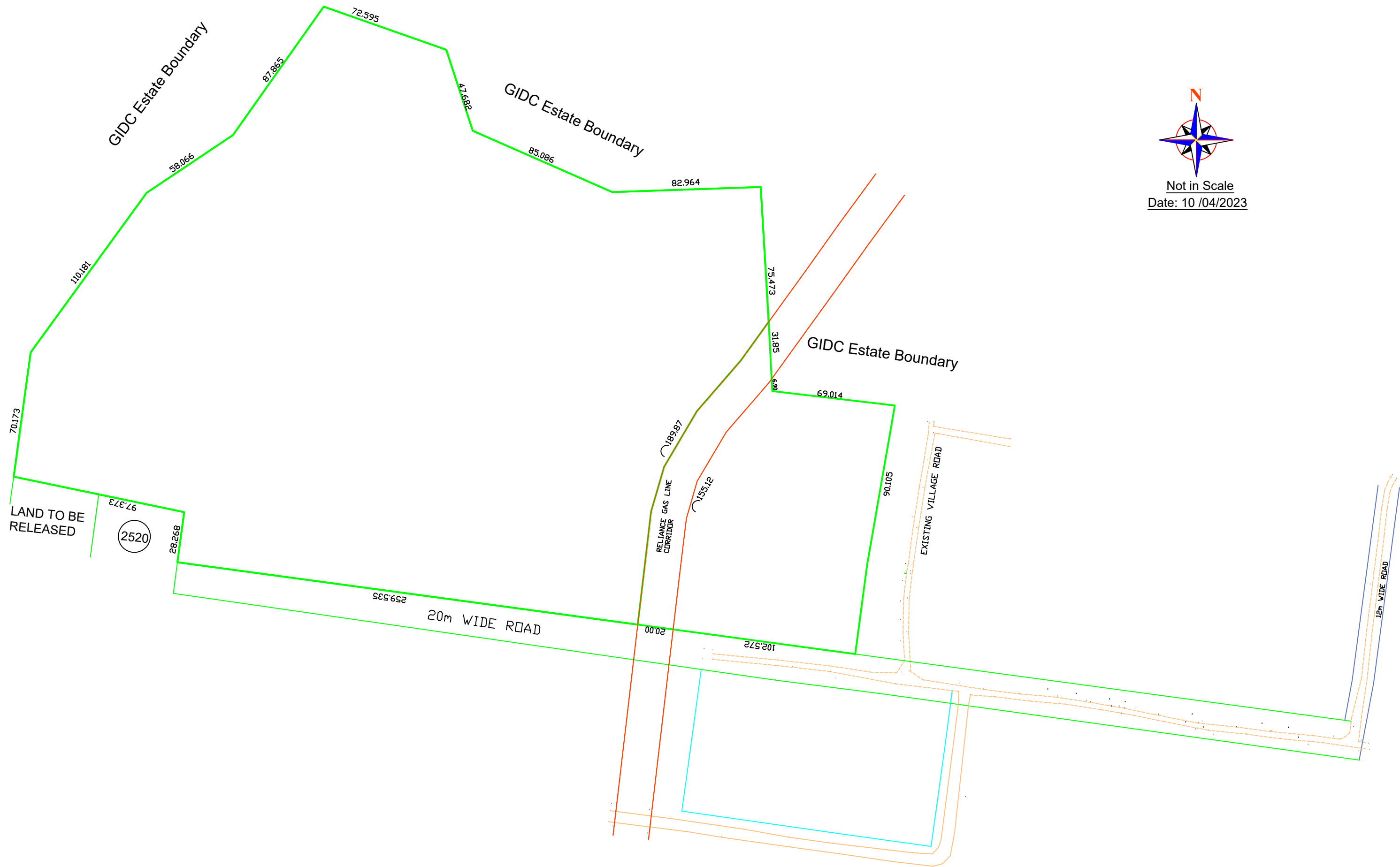
Bidders are requested to submit their offers within the extended time limit on or before **13:00 PM on September 23, 2024** at our Head Office: **Vapi Green Enviro Limited, Plot No. 135 VIA House Char Rasta, GIDC Vapi - 396195.**



Handwritten signature

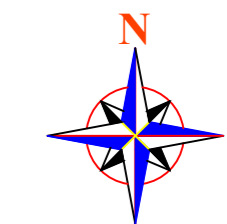
Handwritten signature

Handwritten signature




 Not in Scale
 Date: 10 /04/2023

NTSDF SITE LAYOUT AT KOCHARAVA



SCALE - 1CM= 5.00 M

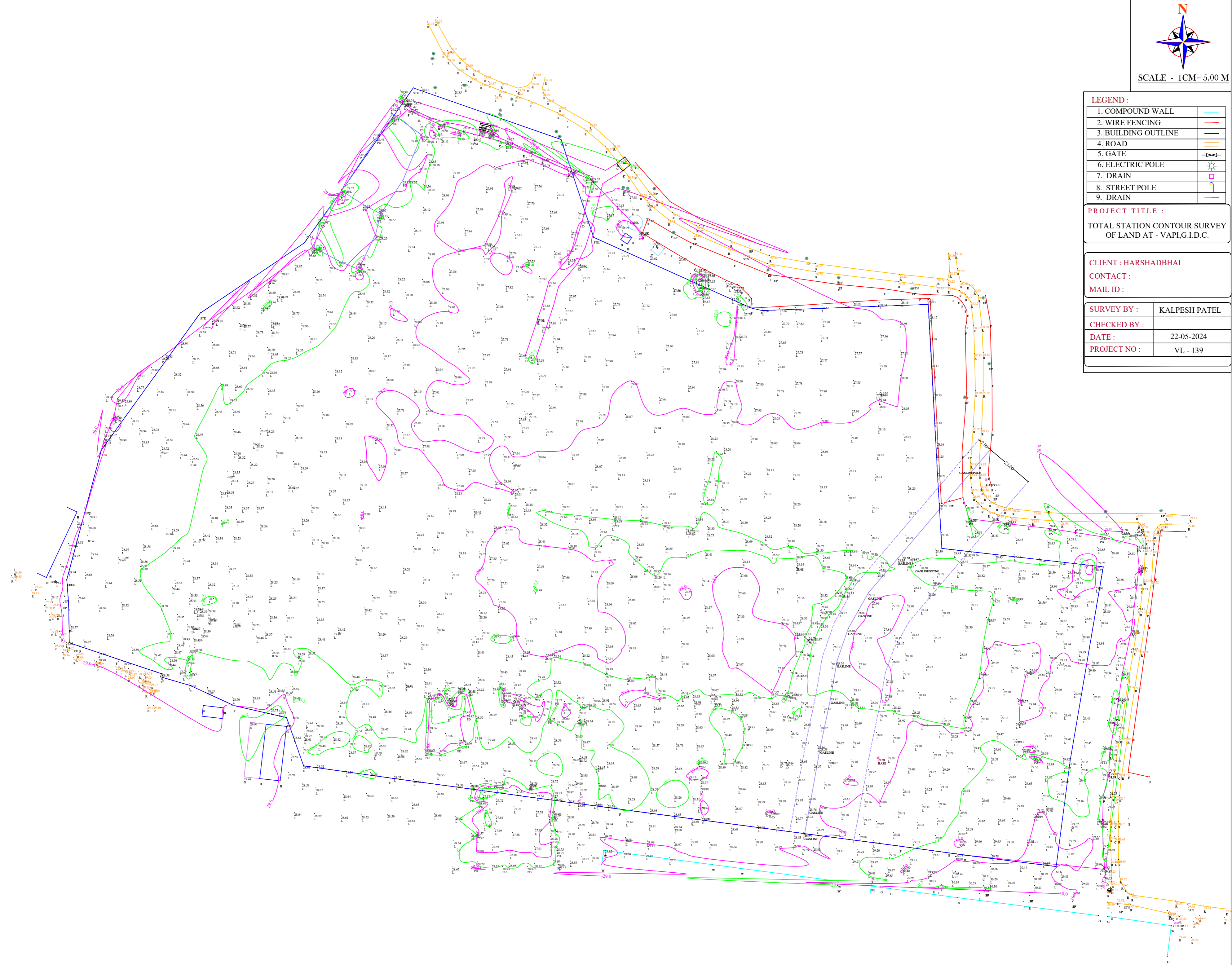
LEGEND :

1. COMPOUND WALL	
2. WIRE FENCING	
3. BUILDING OUTLINE	
4. ROAD	
5. GATE	
6. ELECTRIC POLE	
7. DRAIN	
8. STREET POLE	
9. DRAIN	

PROJECT TITLE :
TOTAL STATION CONTOUR SURVEY
OF LAND AT - VAPI,G.I.D.C.

CLIENT : HARSHADBHAI
CONTACT :
MAIL ID :

SURVEY BY :	KALPESH PATEL
CHECKED BY :	
DATE :	22-05-2024
PROJECT NO :	VL - 139





UNIQUE GEOCIVIL SERVICES PVT. LTD.

Experience and Accuracy with Excellence !!!



UNIQUE GEOCIVIL SERVICES PVT. LTD.

Experience and Accuracy with Excellence !!!

CIN : U74999GJ2021PTC125952

GEOTECHNICAL INVESTIGATION REPORT

Customer: Vapi Green Enviro Ltd.

PMC: -

Design Consultant: -

Contractor: -

Project: Geotechnical Investigation for New TSDF Site at Vapi, Valsad.

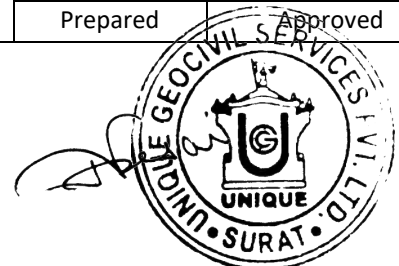
Project No.
2425053

Riv.:
0

This document shall not be transmitted/copied by any person or entity not authorized by us/customer. It shall not be used either in full or in part by any person or entity without our/customer's prior permission in writing.

Notes:

0	24.08.2024	-	HP		NHD	
Rev.	Issue Date	Details	Ini.	Sign.	Ini.	Sign.
			Prepared		Approved	





SUMMARY REPORT

Topic	Summary of Results
Project	Geotechnical Investigation for New TSDF Site
Location	Karvad, Vapi
Scope of Work	One (1) exploratory borehole (10 m Depth)
Site Stratigraphy	The top 4.0 m soil strata is cohesive in nature followed by non-cohesive sand up to 9.0 m. Strata thereafter is weathered rock till termination level.
Water Table	The borehole water level was not encountered until termination level during the subsurface exploratory borehole conducted in June 2024. (Refer Sec. 2.6 of the report)
Liquefaction Susceptibility Assessment	The water level is below termination and the non-cohesive strata is in very dense state. This type of strata is non-liquefiable till termination.

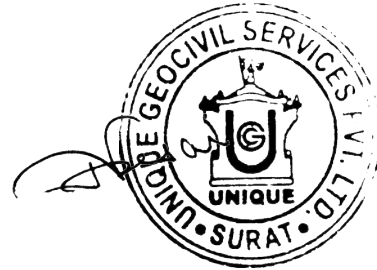




TABLE OF CONTENT

Sr. No.	Description	Page No.
-	Abstract & Disclaimer	-
1.0	Introduction	1
1.1	Project Description	1
2.0	Scope of Work	1
2.1	Field Test Performed	1
2.2	Laboratory Test Performed	1
2.3	Drilling	2
2.4	Standard Penetration Test	2
2.5	Disturbed & Undisturbed Samples	3
2.6	Ground water	4
2.7	Laboratory Test	4
2.7.1	Physical Properties	5
2.7.2	Shear Properties	6
3.0	Observation & Foundation Recommendation	6
3.1	Ground Water	6
3.2	Site Stratigraphy	7
3.3	Liquefaction Susceptibility Assessment	7
-	IS Soil Classification	8
-	Standard Penetration Test Results	9

Annexure:

- ❖ Laboratory test results.
- ❖ Summary of Geotechnical Exploration.
- ❖ BH Location Details



ABSTRACT

In the following pages, is presented the report with analysis, prepared from the thorough study of geotechnical investigation results.

The detailed scope of the work is decided as per the discussion with the customer. The test location detail is shown in layout plan is provided by the customer's representative and it is submitted with the report.

A geotechnical investigation work was undertaken to obtain the required subsurface information to study and define the nature and behavior of soil. Such information was obtained through following steps:

- By making test boreholes and other field tests.
- By observing ground water table in boreholes
- By performing required in-situ tests
- By testing the samples in laboratory to classify it and to determine the engineering properties of soil/rock.

DISCLAIMER

We have employed accepted geotechnical engineering procedures and our opinions and conclusions are made in accordance with generally accepted principles and practices of this profession. The contents of this report are valid as of the date of preparation. However, changes in the condition of the site can occur over time because of either natural processes or human activity. In addition, advancements in the practice of geotechnical engineering and changes in applicable practice codes may affect the validity of this report. Consequently, this report should not be relied upon after an elapsed period of twelve months without a review by us for verification of validity. Our investigation did not include the evaluation or assessment of any potential environmental hazards or groundwater contamination that may be present.

Every measurement has uncertainty. It is an established fact that no measuring instrument can determine the true value of any measurement. The cumulative effect of factors such as sensitivity of equipment, accuracy in calibration, human factors and environmental conditions will determine the overall uncertainty in the parameter determined from these measurements. Uncertainty is associated with reported results, which we have evaluated based on the above given criteria/s. Measurement uncertainty values will be provided on request.

Any discrepancy observed in soil strata/Water level during execution shall be brought to our attention before proceeding further.



1.0 INTRODUCTION:

Vapi Green Enviro Ltd. appointed M/s Unique Geocivil Services Pvt. Ltd. as Geotechnical Investigating Agency for above mentioned Project.

1.1 PROJECT DESCRIPTION:

The proposed site is located at Karvad, Vapi. The project is for new TSDF Site.

2.0 SCOPE OF WORK:

The principal objective of the exploration work was to determine the soil profile and to get recommendation regarding type of foundation and bearing capacity.

The entire field testing was carried out as per relevant IS codes and/or as per the instructions of the representatives of the customer. The samples collected from various test locations/depths, were sealed, labelled, and transported to our laboratory at Udhna, Surat. The required laboratory tests were conducted as per relevant IS codes.

This report has been prepared after careful study of the field and laboratory test results.

2.1 FIELD TESTS PERFORMED:

- Drilling 01 no. of 150 mm dia. bore hole with casing whenever required up to maximum depth of 10.0 m from ground level.
- Carry out Standard penetration Test (SPT) at every 2.0/3.0 m interval alternate to UDS or continuous SPT at 1.0/1.5 m if strata is non-cohesive in nature.
- Collecting disturbed soil samples at every meter interval or as per the stratification of soil and recording depth at which soil changes.
- Collecting undisturbed samples (UDS) at 2.0/3.0 m interval alternate to S P Test.
- Observation of borehole water table using drilled holes.

2.2 LABORATORY TESTS PERFORMED:

- Natural moisture content.
- Field Density, Moisture content and Dry Density of undisturbed samples.
- Grain size Analysis.



- Liquid Limit and Plastic Limit.
- Specific gravity Test for Undisturbed samples.
- Diff. Free Swell Index.
- Rock Properties (Density, Sp. Gravity, Porosity, Water Absorption)
- Test for shear properties of selected samples.
 - a) Unconfined compressive Strength on saturated cohesive soils.
 - b) Triaxial Shear (UU) Test.
 - c) Direct Shear Test (In case of non-cohesive soil).

2.3 DRILLING:

Drilling of 150 mm ϕ borehole is carried out by ~~manual shell & auger boring method~~ / mechanical rotary drilling machine. Bore is cleaned properly before conducting S P Test or Collecting U D Samples. In weathered rock and hard rock drilling is performed with NX size core bit.

Casing is required to be lowered if the boreholes do not retain its shape. Care is taken that ground water level is maintained during the drilling and particularly before testing or sampling levels. In no case casing is allowed to advance below the bottom of borehole. Alternatively, Bentonite Slurry is also used to retain sides. The work was in general accordance with IS 1892-2021.

2.4 STANDARD PENETRATION TEST:

The Standard Penetration Tests are carried out as per IS 2131: 1981. In general, the tests are conducted at 2.0/3.0 m intervals. If soil strata is non-cohesive in nature, it is carried out at 1.0/1.5 m intervals.

Before testing, the borehole is cleaned properly, and Split Spoon Sampler is centrally seated in borehole. In the case of SPT to be conducted below water table care is taken that casing position is above the borehole depth. The water level in the borehole is maintained above or at least at the water table.



A standard hammer (Donut type) of 63.5 kg is dropped from a height of 75 cm. and the no. of blows for penetration of Split Spoon Sampler for 0-15, 15-30 and 30-45 cms are noted.

The SPT 'N'-values are described as follows: -

1. The number of blows for each 15 cm penetration of the split spoon sampler is recorded.
2. The blows required to penetrate the initial 15 cm of the split spoon for seating the sampler is ignored due to the possible presence of loose materials or cuttings from the drilling operation.
3. The cumulative number of blows required to penetrate the balance 30 cm of the 45 cm split spoon sampler is termed the SPT value or the 'N' value. For example, a SPT value reported as "20" means that 20 blows were imparted to penetrate the split spoon sampler by the last 30 cm.
4. Where the number of blows required to penetrate the first 15 cm/ balance 30 cm of the split spoon sampler exceeds 50, the number of blows is presented along with the corresponding penetration. For example, an SPT value reported as "50/100 mm" means that 50 blows were imparted to penetrate the split spoon sampler by 100 mm (beyond initial 150 mm).

Sample moisture content is collected in moisture cans. For non-plastic silts and fine Sands N_s value is corrected for effective overburden pressure and dilatancy Correction is added for tests conducted below water table.

2.5 DISTURBED AND UNDISTURBED SAMPLES:

Disturbed samples from shell or from Split Spoon Sampler is collected in polythene bags with proper labels.

Undisturbed samples in 70/100 mm ϕ Shelby tubes are collected at 2.0/3.0 m intervals. The sampling tube is connected to the rod adopter with ball check valve. Before lowering the sampler, the bore is cleaned properly, and sampling tube is lightly oiled from inner and outer side.



Sampling tube is pushed into the borehole by pressure/hammering as per the soil stiffness. The sampling tube is immediately waxed.

In case of medium to coarse, non-cohesive, sand samples, where sampling is unsuccessful, Standard Penetration Test is carried out on cleaning the borehole.

2.6 GROUNDWATER:

The borehole water level was measured in the boreholes after drilling and sampling was completed. The measured water levels are presented in "Summary of Geotechnical Exploration". The time required for a Borehole water level to stabilize at or near the ground water level depends upon permeability of the formation and the initial head differential between borehole water level and ground water level. In fine grain soil (Silt & Clay), this stabilization time is in days (Ref. IS 6395). Therefore, borehole water level may be different than ground water table. It should be noted that groundwater levels might change and can vary with seasonal rainfall patterns, long-term climate fluctuations and with the influence of local site conditions.

2.7 LABORATORY TESTS:

The laboratory testing has been carried out in our NABL accredited laboratory. The quality procedure in our laboratory conforms to ISO/IEC-17025-2017 having Certificate No. TC-8053.

Disturbed, undisturbed and Standard Penetration Test samples from the field are brought to the laboratory with care and are grouped according to observations in the fields. On completion of shear, compressibility, permeability etc. tests on UD samples, these samples are placed in oven along with the S P Test samples and disturbed samples. Samples are selected such that each soil strata is adequately represented by the physical properties. The representative samples are dried in oven for 24 hours at 110 ± 5 °C.



The following tests were conducted on selected samples recovered from the boreholes:

Name of Test	Reference Standard
Bulk Density	By Calculation
Natural Moisture Content	IS 2720-Part 2-1973
Specific Gravity	IS 2720-Part 3-1980
Grain Size Analysis	IS 2720-Part 4-1985
Atterberg's Limit (LL, PL & PI)	IS 2720-Part 5-1985
Unconfined Compression Test	IS 2720-Part 10-1991
Triaxial Shear Test (UU)	IS 2720-Part 11-1993
Free Swell Index	IS 2720-Part 40-1977
Consolidation Test	IS 2720-Part 15-1986
Density, Spec. Gravity & Water Abs. of Rock	IS 13030-1991

2.7.1 PHYSICAL PROPERTIES:

The moisture cans collected from SPT samples from the field are weighed and placed in oven for drying to determine natural moisture content (NMC).

U D samples are extracted using an extractor and samples are prepared as per the required sizes of the test to be performed. Before extracting from tube, weight and volume of sample are noted. Average bulk density is calculated in laboratory and samples are placed in oven to get the field moisture content for computing the dry density.

Specific gravity with specific gravity bottle / pycnometer is calculated as per IS 2720 (Part – 3, section 1&2): 1980. From the results of dry density and specific gravity the saturation of sample in % is calculated which is a useful data for deciding the condition of triaxial shear test.

Grain size analysis is made by IS sieves. IS sieves commonly used are 4.75 mm, 2.00 mm, 1.00 mm 425 microns, 250 microns and 75 microns. For the coarse grain soil, a graph of partial size v/s cumulative % finer is plotted. For fine grain soil wet analysis is made and material fine than 75 micron is found out by hydrometer test. Mechanical digital single pan balance of 1 kg capacity with 0.1 gram least count is used.

Project No.: 2425053

Page 5 of 9



Liquid limits and Plastic limits tests are carried out with distilled water as per IS 2720 (Part – 5): 1985. The samples are tested at a minimum of 24 hours after the addition of water. For liquid limit test cone penetration method is adopted but occasionally value is checked on Casagrande standard.

For the foundation soil sample showing high plasticity are checked for swelling and shrinkage. Firstly, for rough estimate, free swell test as per IS 2720 (Part – 40): 1977 is being carried out and getting positive indication of swelling. Shrinkage limit test is carried out as per IS 2720 (Part – 6): 1972.

2.7.2 SHEAR PROPERTIES:

Shear tests are carried out by three methods.

- 1) Unconfined compressive strength as per IS 2720 (Part–10): 1973 for the saturated plastic soil undisturbed samples and cores of SPT samples.
- 2) Triaxial shear test is carried out on sample size of 38 mm ϕ and 76 mm in height on motorized 30-speed load frame with digital display arrangements for load and pore-pressure. The confining pressure is applied to the cell by Air-water constant pressure system. The test is carried out for Unconsolidated Undrained (UU) test without pore-pressure measurement as per IS 2720 (Part–11): 1993.
- 3) Direct box shear test is carried out on non-plastic medium to coarse sand soil as per IS 2720 (Part – 13): 1986.

3.0 OBSERVATION & FOUNDATION RECOMMENDATION:

3.1 Groundwater:

The borehole water level was not encountered until termination level during the subsurface exploratory borehole conducted in June 2024.



3.2 Site Stratigraphy:

BH No.	Stratigraphy	
	Layer No. (Depth in m)	Soil Type/Classification
03	Layer-1 (0.0 to 4.0)	Soil strata is cohesive (CH Type) in nature having Avg. Dry Density: 1.50 g/cc, NMC: 22%, FSI: 42-82% & N _{spt} : 5
	Layer-2 (4.0 to 9.0)	Soil strata is non-cohesive (SW-SM, SP Type) in nature having Dry Density: 1.72 g/cc, NMC: 12-16% & N _{spt} : 40-54
	Layer-3 (9.0 to 10.0)	Strata is highly weathered rock having core recovery: 11%

3Detail description of the soil profile is provided in "Summary of Geotechnical Exploration".

3.3 Liquefaction Susceptibility Assessment:

As per IS: 1893 (Part 1) - 2016, liquefaction is likely in loose fine sand (SP) below the water table. In General, if $N_{spt} > 30$, soil strata are non-liquefiable. In this case, the water level is below termination and the non-cohesive strata is in very dense state. This type of strata is non-liquefiable till termination.

Site location is in Zone-III as per Earthquake Zone given in IS: 1893 (Part 1) – 2016.

Table-1

BH No.	Weighted SPT Value*
03	39

* Calculated based on SPT values 3.0 m below ground level

For Unique Geocivil Services Pvt. Ltd.

Authorized Signatory





I. S. CLASSIFICATION

GW: Well graded gravel, gravel-sand mixture, or no fines.

GP: Poorly graded gravels or gravel sand mixture, little or no fines.

GM: Silty gravels, poorly graded gravel-sand-silt mixtures.

GC: Clayey gravels, poorly graded gravel-sand-clay mixtures.

SW: Well-graded sands, gravelly sands; little or no fines.

SP: Poorly graded sands or gravelly sands, little or no fines.

SM: Silty sands, poorly graded sand-silt mixtures.

SC: Clayey sands, poorly graded sand-clay mixtures.

ML: Inorganic silt and very fine sands rock flour; silty or clayey fine sands or clayey silts with non-to low plasticity.

CL: Inorganic clays, gravelly clays, sandy clays, silty clays, lean clays of low plasticity.

OL: organic silts and organic silty clay of low plasticity.

MI: Inorganic silts, silty or clayey fine sands or clayey silts of medium plasticity.

CI: Inorganic clays, gravelly clays, sandy clays, silty clays, lean clays of medium plasticity.

OI: Organic silts and organic silty clays of medium plasticity.

MH: Inorganic silt of highly compressibility, micaceous or diatomaceous fine sandy or silty soils, elastic silts.

CH: Inorganic clays of high plasticity, fat clays.

OH: Organic Clays of medium to high plasticity.

Pt: Peat and other highly organic soil with very high compressibility.



STANDARD PENETRATION TEST RESULTS for BH 03					
Depth Belwo EGL	2	4	6	7	8.5
Strata Type - C: Cohesive, NC: Non-cohesive	C	NC	NC	NC	NC
% (Fine Sand+S+C) in NC Layer		22	18	2	2
Observed SPT Value in Field	10	57	75	96	86
Penetration in mm	300	300	300	300	300
Extrapolated SPT Value (If Penetration is less than 300 mm)	10	57	75	96	86
Water Level	-	-	-	-	-
Saturated Density in t/m ³	1.82	1.86	1.98	2	2
Submerged Density in t/m ³	0.82	0.86	0.98	1	1
Effective overburden Pressure, σ'_{v0} in t/m ²	3.64	7.44	11.88	14	17
C _{HT} (Rope & Pully: ER=40%)	0.67	0.67	0.67	0.67	0.67
C _{HW}	1.00	1.00	1.00	1.00	1.00
C _{BD}	1.05	1.05	1.05	1.05	1.05
C _{RL}	0.75	0.85	0.85	0.95	0.95
C _{SS}	1	1	1	1	1
SPT Corrected, (N1) ₆₀	5	34	45	64	57
Overburden Correction	1.00	1.17	0.93	0.85	0.77
SPT Corrected, (N1)' ₆₀	5	40	41	54	44
Dilatancy Correction, (N1)" ₆₀	5	40	41	54	44



TABLE - 5
PARTICLE SIZE ANALYSIS

Project No. : 2425053

Bore Hole No. : 03

Soil Strata	Depth Sample Type	Gravel in % (>4.75 mm)	Sand in %			Silt in % + Clay in %
			(4.75 - 2 mm)	(2mm - 425 μ)	(425 - 75 μ)	
0.00 to 1.00	0.00/D	0	2	7	6	85
1.00 to 4.00	1.00/U	2	4	13	8	73
1.00 to 4.00	2.00/S	2	3	8	8	79
1.00 to 4.00	3.00/U	6	2	6	5	43 + 38
4.00 to 9.00	4.00/S	12	21	45	11	11
4.00 to 9.00	5.00/U	29	29	23	10	9
4.00 to 9.00	6.00/S	13	31	38	9	9
4.00 to 9.00	7.00/S	40	33	25	2	0
4.00 to 9.00	8.50/S	13	66	19	2	0



TABLE - 7A UNCONFINED COMPRESSION TEST TABLE

Project No. 2425053

Bore Hole No. 03

Depth Sample (mts.)	Type of Sample (UD/Rm)	Qu (Kg/cm ²)	Cu (Kg/cm ²)
3.00	UD(Undisturbed)	1.50	



TABLE - 7B TRIAXIAL SHEAR TEST

Project No. : 2425053

Bore Hole No. : 03

Depth Sample	Sample Type (UD/Rm)	Normal Stress at Failure	Cell Pressure (Kg/cm ²)	Pore Pressure (Kg/cm ²)	Shear Values from Graph	
					Cuu (Kg/cm ²)	Øuu (Phi)
1.00	Undisturbed	2.44	0.50	0.00	0.68	11.64
	Undisturbed	3.13	1.00	0.00		
	Undisturbed	4.69	2.00	0.00		

MOHR CIRCLE

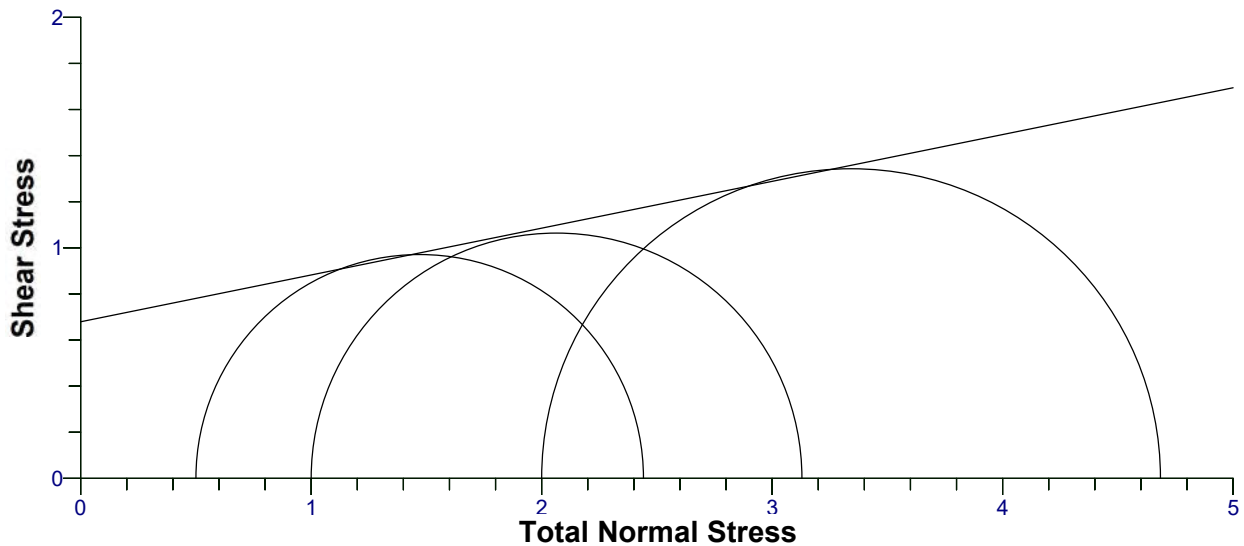




TABLE - 7B TRIAXIAL SHEAR TEST

Project No. : 2425053

Bore Hole No. : 03

Depth Sample	Sample Type (UD/Rm)	Normal Stress at Failure	Cell Pressure (Kg/cm ²)	Pore Pressure (Kg/cm ²)	Shear Values from Graph	
					Cuu (Kg/cm ²)	Øuu (Phi)
3.00	Undisturbed	2.71	0.50	0.00	0.78	11.37
	Undisturbed	3.33	1.00	0.00		
	Undisturbed	4.92	2.00	0.00		

MOHR CIRCLE

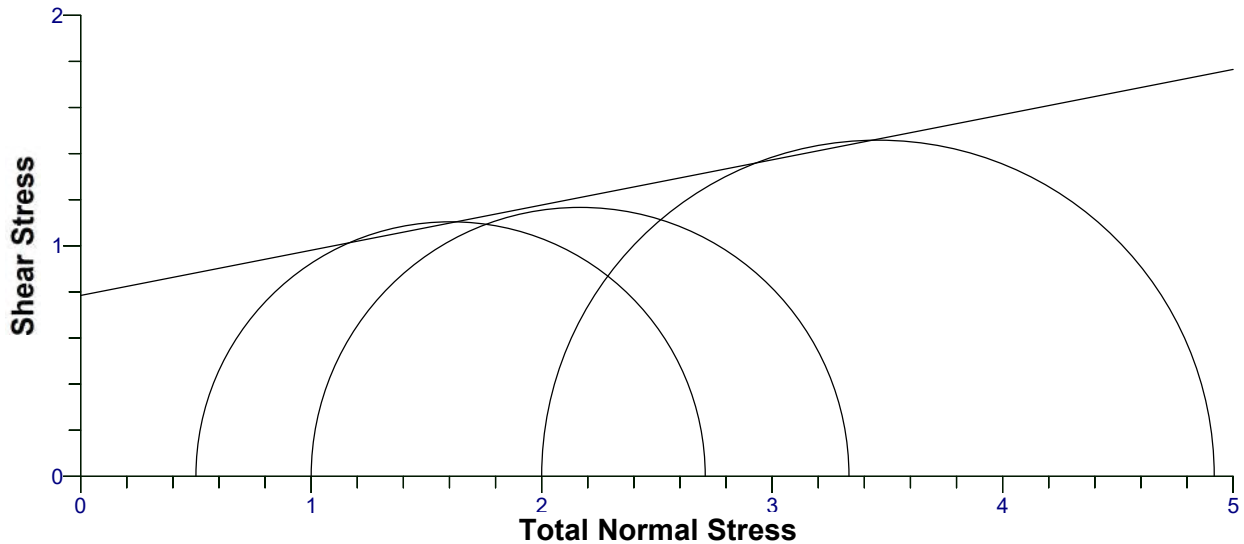




TABLE - 7C BOX SHEAR TEST

Project No. : 2425053

Bore Hole No. 03

Depth Sample	Sample Type (UD/Rm)	Normal Stress σ in Kg/cm ²	Shearing Stress τ in Kg/cm ²	Shear Values from Graph	
				Cuu (Kg/cm ²)	ϕ uu (Kg/cm ²)
5.00	Undisturbed	0.50	0.35	0.02	33.14
	Undisturbed	1.00	0.67		
	Undisturbed	1.50	1.00		

BOX SHEAR GRAPH

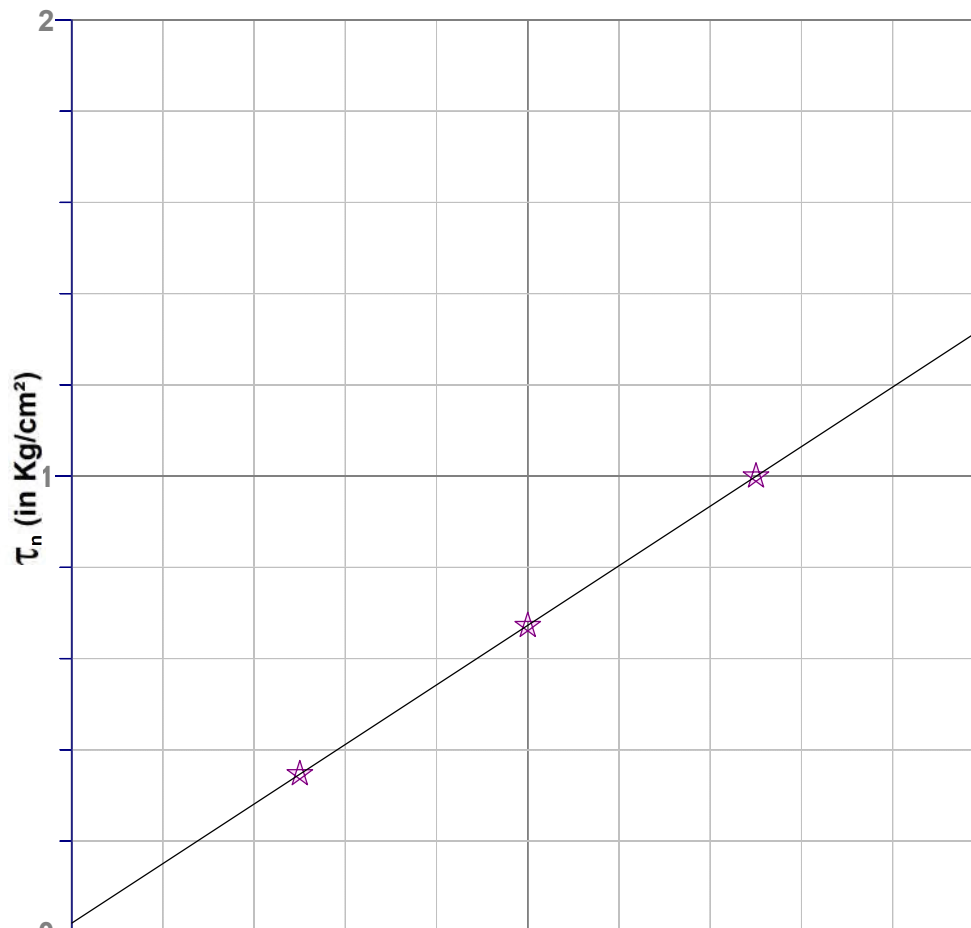




TABLE - 8 CONSOLIDATION TEST

Project No. : 2425053
Depth : 3.00 mt

Specific Gravity : 2.77

Bore Hole No. : 03
Final Moisture Content 26.86 %

Pressure in Kg/cm ²	Final Readings	Change of Height in mm	Height of Sample in mm	Change in Ht. in mm	Void Ratio	Coeff. of Vol. Change Mv (cm ² /Kg)	T90 in mins	Coeff. of Consolidation Cv (cm ² /sec)
0.10	7.154	-0.0400	20.0000	-0.0037	0.8699	2.0000e-02		
0.20	7.114	-0.1270	19.9600	-0.0119	0.8661	3.1814e-02		
0.40	6.987	-0.3020	19.8330	-0.0282	0.8543	3.8068e-02		
0.80	6.685	-0.4470	19.5310	-0.0418	0.8260	2.8608e-02		
1.60	6.238	-0.6030	19.0840	-0.0564	0.7842	1.9748e-02	8.86	1.5879e-04
3.20	5.635	-0.9340	18.4810	-0.0873	0.7279	1.5793e-02		
6.40	4.701	0.3730	17.5470	0.0349	0.6405	4.4286e-03		
1.60	5.074	0.7400	17.9200	0.0692	0.6754	2.7530e-02		
0.10	5.814		18.6600		0.7446			

Pre-Consolidation Pressure in kg/cm²: 1.33

Cc: 0.20

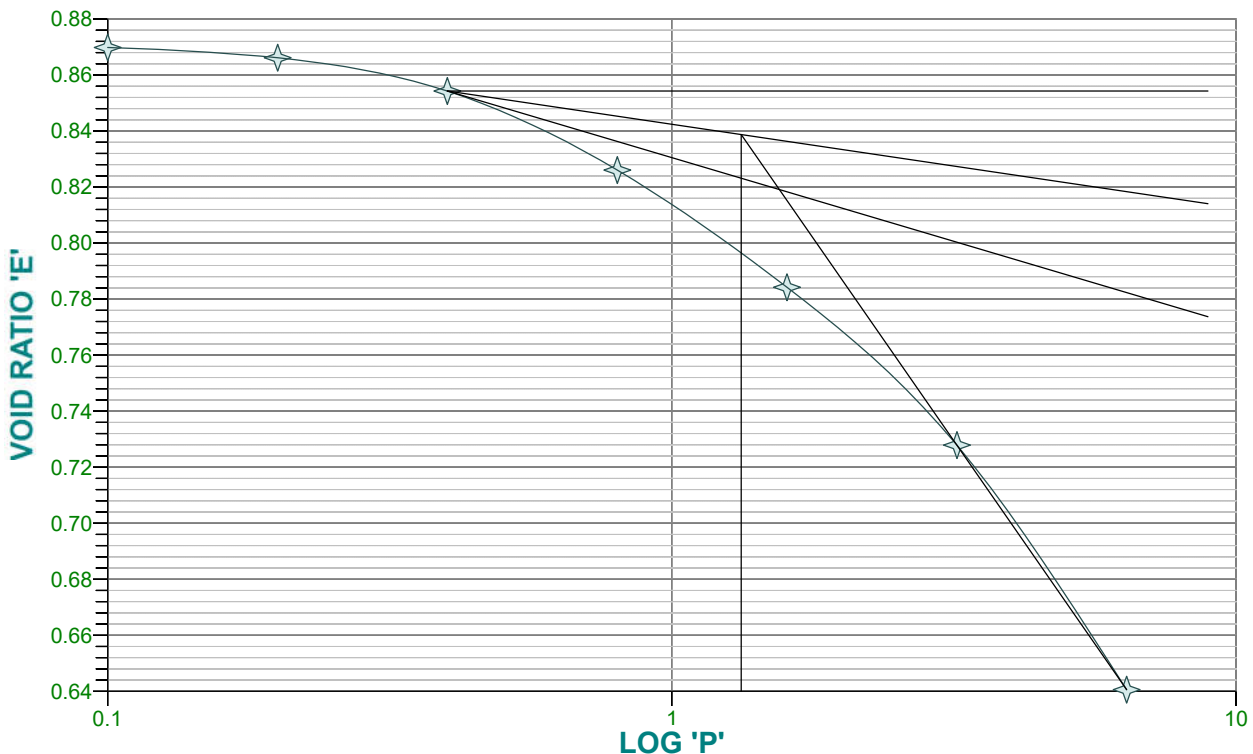




TABLE - 11 PROPERTIES OF ROCK

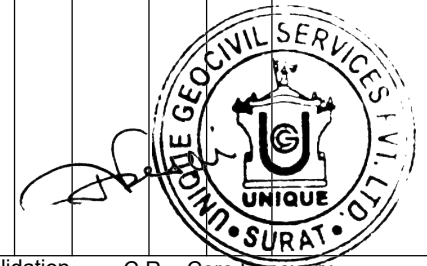
Project No. : 2425053

Bore Hole No. : 03

Depth Sample (mts.)	Core Recovery	Rock Quality Designation	Absorption (in %)	Specific Gravity (Rock Sample)	Uniaxial Compressive Strength (Kg/cm ²)
9.00	11.00	0.00	1.55	3.09	

SUMMARY OF GEOTECHNICAL EXPLORATIONS

Project No. :2425053		Project : NEW TSDF SITE KARVAD, VAPI																				
Bore Hole No. :03		Bore Hole Started on :21-06-24 Completed on : 22-06-24					Depth of Water Table : Below Termination Level															
Method of Drilling :ROTARY DRILLING		Diameter of Bore Hole : 150 mm R. L. of Ground Level :					Location of Bore Hole :															
Depth in metres	I. S. Classification	Visual Soil Description	Field Test /Samples		No. of Blows per 300 mm	Rock Properties		Natural Moist. Content %	Density (in gms/cc)		Specific Gravity	Particle Size Analysis			Atterberg Limits			Shrinkage Lim. %	Free swell Indx %	Shear Properties		Additional Tests or Remarks
			SPT VST	UDS DS		C.R. %	RQD %		Bulk	Dry		Gr. %	Sn %	Silt+Clay	LL %	PL %	PI %			Test Type	C (Kg/cm ²)	
00.00	CH	BLACK FIRM HIGH PLASTIC CLAY WITH SAND		DS								0	15	85	51	26	25		42			
01.00		YELLOW FIRM TO STIFF HIGH PLASTIC CLAY WITH SAND		UDS				22.42	1.82	1.49	2.75	2	25	73	53	27	26		64	Tuu	0.68	11.6°
02.00	CH		SPT	DS	07			21.87				2	19	79	60	29	31		64			
03.00				UDS				23.38	1.86	1.51	2.77	6	13	43+38	71	33	38	10	82	Tuu	0.78	11.4°
04.00		BLACK DENSE TO VERY DENSE COARSE TO MEDIUM SAND WITH GRAVEL	SPT	DS	40			15.92				12	77	11								
05.00				UDS				15.65	1.98	1.72	2.73	29	62	9						Buu	0.02	33.1°
06.00			SPT	DS	41			16.21				13	78	9								
07.00	SW-SM		SPT	DS	54			12.02				40	60	0								
08.50			SPT	DS	44			14.11				13	87	0								
09.00		HIGHLY WEATHERED GREY VERY POOR VERY WEAK BALAST ROCK		CORE			11	0														
10.00		TERMINATION																				



SPT - Standard Penetration Test DS - Disturbed Sample Gr - Gravel LL - Liquid Limit PI - Plasticity Index Cv - Coeff. of Consolidation C.R. - Core Recovery
 UDS - Undisturbed Sample VST - Vane Shear Test Sn - Sand PL - Plastic Limit C, Ø - Shear Parameters Mv - Coeff. of Volume Change RQD - Rock Quality Designation



UNIQUE GEOCIVIL SERVICES PVT. LTD.


B/216,Road No. 6-F,New Industrial Estate, Udhna,Surat-394210, Gujarat, India


2425053


BH Location Details


Legend


-  BH 03
-  Singh & Companies

 BH 03

 SINGH AND COMPANIES

 Precision Pack

 Chandratech

 Hindco Brothers 400 ft

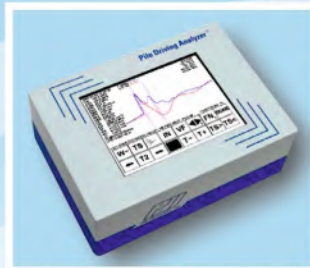
Google Earth

Image © 2024 Airbus



Facilities Available:

- Complete Geotechnical Investigation
- Civil Engineering Material Testing
- Pavement Design
- Non-Destructive Testing of Concrete
- Static & Dynamic Testing of Pile
- Pile Integrity Testing
- Land Survey



UNIQUE GEOCIVIL SERVICES PVT. LTD.

Experience and Accuracy with Excellence !!!

📍 Plot No. B/216, Road No. 6-F, New Industrial Estate, Udhna, Surat - 394 210. Gujarat. INDIA.
☎ +91 6351 238 577 / 578 ✉ info@uniquesurat.com 🌐 www.uniquesurat.com