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GEOLOGICAL SITE INVESTIGTION IN PONDICHERRY

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ABSTRACT: The objective of a site investigation is to assess the suitability of a site for the purposed project which involves exploring the ground conditions at and below the surface. It also should foresee the difficulty that may arise during construction. It is prerequisite for successful and economic design. Indeed investigation should not cease once construction begins. This research in site investigation can provide surface and subsurface geological, hydrogeological condition for various Civil engineering projects in Puducherry on the basis of geological, Geophysical and Remote sensing data. The scope of this project includes (i) to understand the surface and subsurface geological, hydrological condition of Puducherry, (ii) to analyze whether the water in the study area is suitable for construction as per IS codes, (iii) to understand the role of geology in Civil engineering, (iv) to understand role of remote sensing and GIS in Civil engineering

INTRODUCTION

A site investigation is usually consists of three stages, namely a desk study, a preliminary reconnaissance and a site influence an engineering project and should exploration,

there must be a degree of provide an indication of the general flexibility in the procedure since not two environmental relationship of the site sites are the same. The objective of desk concerned. Geographical information system study is to examine available archival (GIS) represent a form of technology that is records, literature, maps, imagery and capable of capturing, storing, retrieving, photographs relevant to the area or site ascertain a general picture of the existing geological conditions prior to the field investigation.

The preliminary reconnaissance involves examination of soil and rock types present, surface drainage and associated features, land slip areas, ground cover and obstructions, earlier use of site, evidence of underground workings etc. Remote sensing involves the identification and analysis of phenomena on the Earth's surface by using devices borne by aircraft or spacecraft. Engineering geomorphological a maps shows how surface expression will editing, analyzing, comparing and concerned to displaying spatial information.

TOPOSHEET OF PONDICHERRY

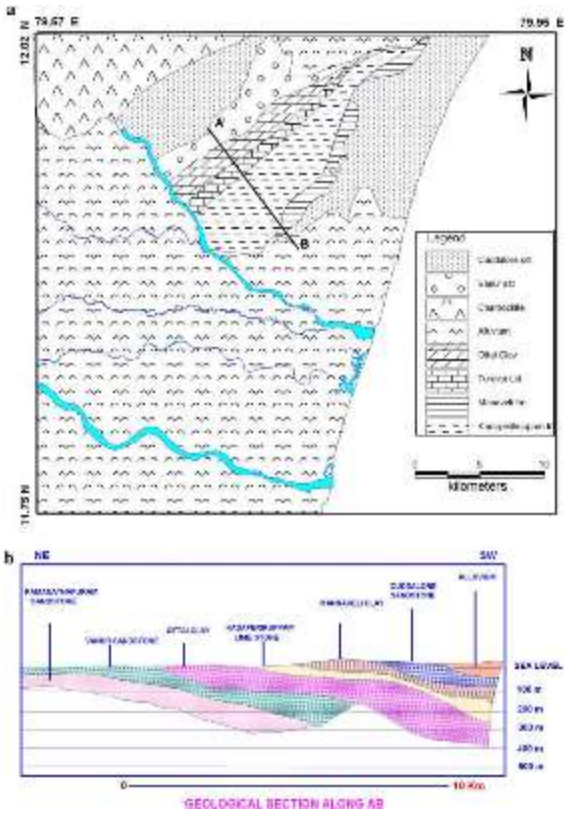
SATELLITE IMAGE OF PONDICHERRY

LOCATION AND OBSERVATION

Pondicherry region is located on the coromandal coast and it lies between North Latitudes 11° 46' and 12° 03' and Eastern latitudes 79° 37' and 79° 52 '. On three sides, this region is surrounded by Land that belongs to the South Arcot district of Tamil Nadu, while the Eastern side is bounded by the Bay of Bengal. It is south of Madras, 162 Kms away by road. This region is interspread with the enclaves of Cuddalore, Villupuram and Tindivanam Taluks of the South Arcot district. Pondicherry is connected with the NH45 and NH66 and it could be reached with both road and railways. The observations made by the satellite image are (i) the area is generally a peneplain, (ii) the terrain becomes a little undulating with prominent high grounds varying from 30 to 100m above mean sea level towards northwest and northeastern parts of the region, (iii) some minor lineaments are there, (iv) it has two rivers.

SOILS

Soils in the area have been classified into (i) Red soil (ii) Black soil (iii) Alluvial soil and (iv) Colluvial soil. The major part is covered by Red soil of red sandy/clay loam type. Ferruginous red soils are also seen at places. Alluvial soils occur along the river courses and eastern part of the coastal areas. Sand coastal alluvium (arenaceous soil) are seen all along the coast as a narrow belt.



DIRECT METHODS

Exploration should be carried out to a depth that includes all strata likely to be significantly affected by structural loading. Experience has shown that damaging settlement usually does not take place when the added stress in the soil due to the weight of a structure is less than 10% of the effective overburden stress. It therefore would seem logical to sink boreholes on compact sites to depths where the additional stress does not exceed 10% of the stress due to the weight of the overlying strata. The simplest method whereby data relating to subsurface conditions in soils can be obtained is by hand augering. Power augers are used when the depth is more than 7m. The power augers are available as solid stem or hollow stem. The later are used in those soils which the borehole does not remain open. Rotary drills are used for drilling through rock, although they can penetrate and take samples from soil. Depending on the conditions, the boreholes may be unlined, lined with steel mesh or cased with steel pipe. Pits and trenches allow the ground conditions in soils and highly weathered rocks to be examined directly, although they are limited as far as their depth is concerned. A detailed account of the logging of cores for engineering purposes is provided by Anon(1995). Description and classification of soils, and of rocks and rock masses, can be found in Anon(1999), while a description and classification of weathered rocks is given in Anon(1995) and of discontinuities in Barton(1978).

The type of drilling is Reverse circulation Method. Here the Bentonite clay is used as a drilling fluid. It will help to stabilize the drill and lubricant between drill bit and formation. Drilled samples are collected by drilling fluid from the sub – surface to surface. Sampling were taken from beginning to Target depth (Expected depth), Litho-logs of Kalapet, villianur, JIPMER, Kanniyakovil are taken.

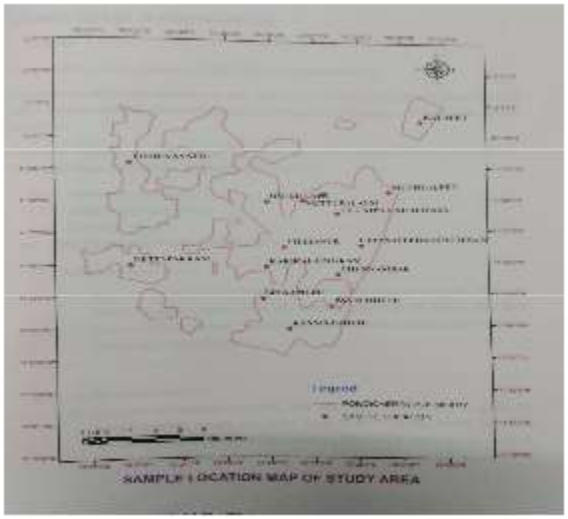
SAMPLE LOCATION

SAMPLING OF SOILS---- As far as soils are concerned, samples may be divided into two types, disturbed and undisturbed. Disturbed samples can be obtained by hands

auger. Samples of fine soils should be approximately 0.5 kg in weight, providing a sufficient sixe for index testing. The samples are sealed in jars. A large sample is necessary if the particle size distribution of coarse soil is required, and this may be retained in a tough plastic sack.

An undisturbed sample can be regarded as one that is removed from its natural condition. Although it must be admitted that no sample is ever totally undisturbed. Careful and trimming is used to produce a regular block, normally a cube of about 250mm dimensions. Block samples are covered with muslin and sealed with wax. Such samples are particularly useful when it is necessary to test specific horizons, such as shear zones.

Totally 14 sample locations were chosen for water analysis. For that, standard grid method was prepared on the toposheet and from each grid one representative sample was taken. So that sample will get equally distributed. The sample location map as follows:

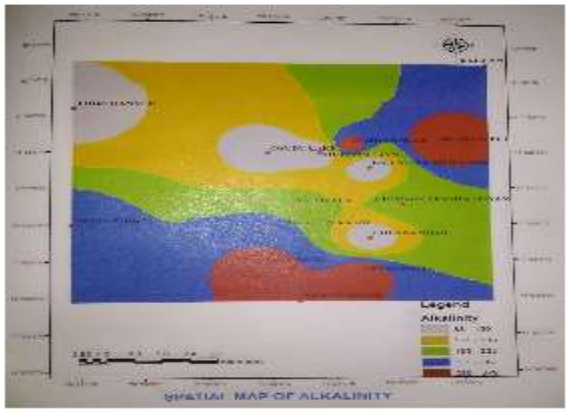


ANALYSIS OF WATER SAMPLE

They are three major steps involved in the experiment. They are (i) preparation of reagents, (ii) calibrating the instrument, (iii) testing of sample.

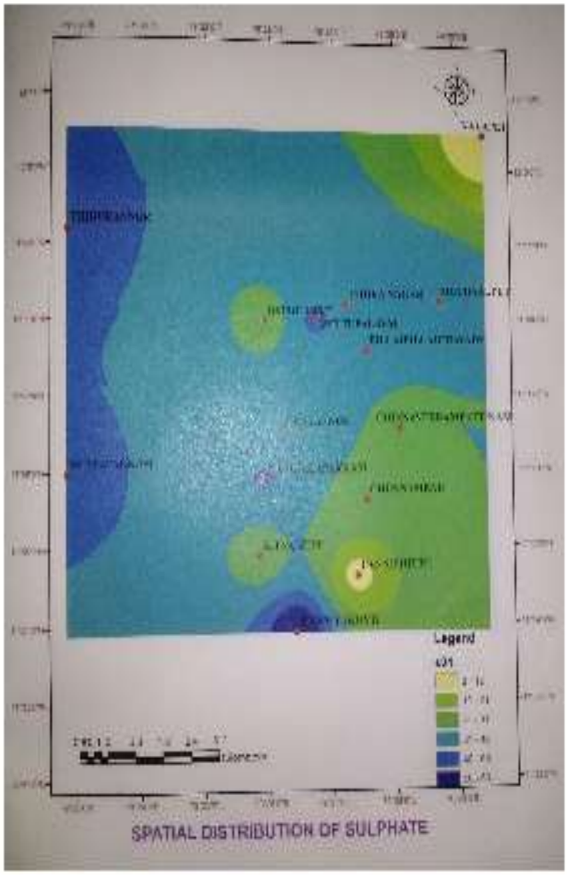
ALKALINITY TEST

To determine the alkalinity of given water sample with the stipulations as per IS: 3025 (Part 23) – Reaffirmed 2003. The alkalinity of water can be determined by titrating the water sample with sulphuric acid of known values of Ph, volume and concentrations. Based on stoichiometry of the reaction and number of moles of sulphuric acid needed to reach the end point, the concentration of alkalinity in water is calculated.

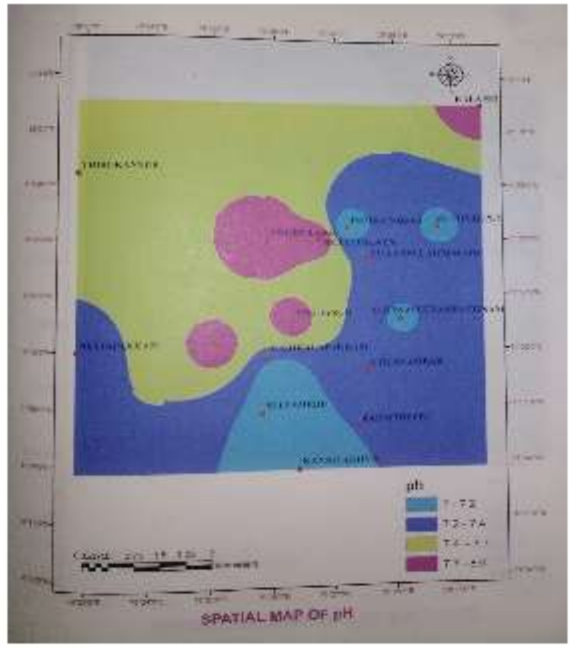


PH TEST

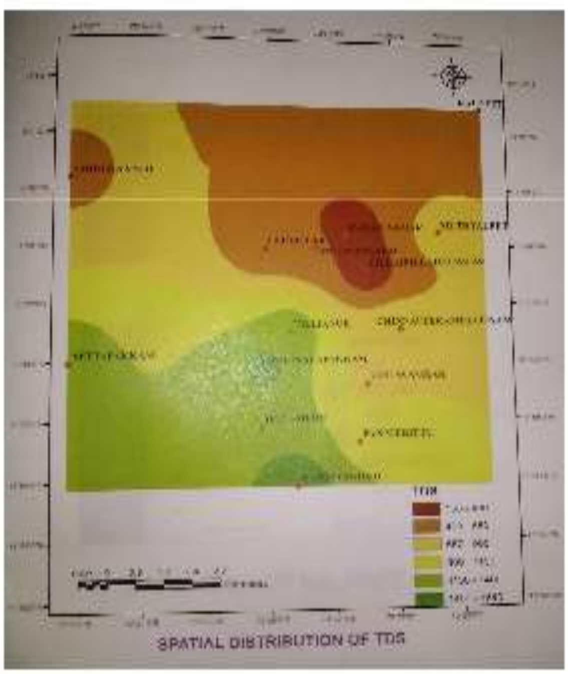
In a clean dry 100mL beaker take the water sample and place it in a magnetic stirrer, insert the Teflon coated stirring bar and stir well.Now place the electrode in the beaker containing the water sample and check for the reading in the ph meter. Wait until you get a stable reading. The Ph of the given water sample is known. Also TDS, So4 were analysed in water samples.



SPATIAL DISTRIBUTION OF SULPHATE



SPATIAL MAP OF pH



SPATIAL DISTRIBUTION OF TDS

SAMPLE NUMBER	PLACE	pH	SO4 (Mg/l)	ALKALINITY	TDS (Mg/l)
1	KALAGET	7.9	[illegible]	365.8	432
2	MU[illegible]IYAL PET	7.[illegible]	[illegible]	375.4	[illegible]
3	IN[illegible]RA NAGAR	7	27	[illegible]	[illegible]
4	[illegible]APILLAICHAVADY	7.3	[illegible]	[illegible]	492
5	MUTHUPALAYAM	[illegible]	[illegible]	94	477
6	[illegible]	[illegible]	[illegible]	94	477
7	CHINNA VEERAMPATTINAM	[illegible]	25	228.4	778
8	[illegible]	7.5	27	58	[illegible]
9	PANSITHITH	7	[illegible]	327	[illegible]
10	S[illegible]VAMEDU	7	56	327	1343
11	[illegible]ATAPAKKAM	7.9	47	256.8	[illegible]
12	KANIYAKOVIL	7	[illegible]	[illegible]	1640
13	VILLIYANUR	7.9	[illegible]	[illegible]	[illegible]

TABLE 1 PARAMETERS OF STUDY AREA

GEOLOGY IN CONSTRUCTION

geology is the most important factor that determines the nature, form and cost of the following. (i) open excavation (ii) tunnels and tunneling (iii) underground caverns (iv) reservoirs (v) dams and dam sites (vi) highways (vii) railroads (vii) bridges (xi) foundations for buildings.

CONCLUSION

Satellite images shows that terrain is peneplain, with the elevation of 30m above mean sea levelSatellite images shows the terrain is. So there was no elevation control.

Some minor alignments are present. On the basis of water analysis Ph, so4, alkalinity, TDS the values are less than permissible limit (IS CODE 456:200). So it will not affect concrete and foundation. In Villianur and Kanniyakovil area clay occurs from 0 to 80 feet depth. So there should be proper care taken while constructing huge structures.

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