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Geophysical Survey Report for Textile Park Nandgaon Peth MIDC Area District Amravati (M.S.), India

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ABSTRACT

Textile industry is one of the major industries in the world that provide employment with no required special skills and play a major role in the economy of many countries. The textile industry utilizes various chemicals and large amount of water during the production process. Colour is the major pollutants present in the effluent from various textile industries. These are highly toxic to living things and have hazardous effect on their health. Thus removal of colour using natural flocculant is a major step towards the protection of natural resources. Coagulation-flocculation is the most widely used method and is applicable for the removal of the colour even at low concentrations. This paper represents the results of investigations carried out for the removal of colour along with SS, DS, TS and COD from waste water by using natural flocculant i.e. Cactus, Aloevera, and combination of Cactus & Aloevera. The colour removal efficiency of flocculant was investigated by batch wise coagulation flocculation method. The effect of various important parameters on the % removal of colour was studied to find the optimum condition for the maximum removal of colour. The parameters like pH, coagulant dose, flocculant dose, coagulant mixing time, coagulant mixing speed, flocculant mixing time, flocculant mixing speed, setting time & concentration of waste water were investigated. These parameters for Cactus were found to be 12, 10 ml/L, 20 ml/L, 2 min, 140 rpm, 15 min, 70 rpm, 6 min, 300 ml/L respectively, for Aloevera were Journal of Water Resource Engineering & Pollution Studies Volume 5 Issue 1 found to be 11.5, 10 ml/L, 100 ml/L, 2 min, 140 rpm, 15 min, 30 rpm, 1 min, 300 ml/L respectively and simultaneously for combination of Cactus & Aloevera were found to be 12, 10 ml/L, 10% + 80% (Cactus + Aloevera dose) ml/L, 2 min, 140 rpm, 25 min, 50 rpm, 10 min, 300 ml/L respectively. These natural flocculants gives maximum colour removal efficiency in the range 85-100%. The colour removal

efficiency was found in between 85-100% for all parameters. All the result was validated on the basis of mathematical analysis. All the graphs were fitted to various trend lines out of which polynomial third order curve is best fit to experimental work as the coefficient of correlation (R2 value) is closer to unity.

MAP SHOWING DRAINAGE OF STUDY AREA

SILENT FEATURE OF STUDY REA

1	Villae	Narayanpur (G/S N. 31)
2	Taluka	Amravati
3	District	Amravati
4	Toposheet no	55 G/16
5	Co-ordiantes	3 -B
6	Quadrant	77° 51'14.328" N 21° 1' 29.928" E
7	Altitude m msl	~ 365
8	Watershed no	PTP -6
9	Morphozone	UDP
10	Geology	Deccan trap
11	Well depth range M	~ 10 to 18
12	Static water level Summer M	~ 8 to 12
	Static water level Winter M	~ 4 to 6
14	Aquifer	Fracture jointed massive basalt and Vesicular zeolitic basalt
15	Monsoon rainfall Normal mm	782
16	Main crop	cotton,soiabin Jawar wheat, gram (Chana), vegetables

Keywords : Soil Sand High Efficiency Hybrid System(SSHEHS) Vertical Electrical Soundings(VES)

I. INTRODUCTION

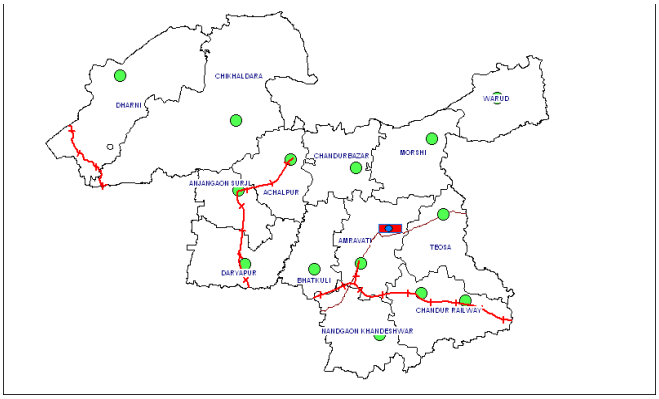
As per request of Executive Engineer, MIDC, Dn, Amravati vide letter No.DE/AMT/TP/D-64160/of 2014, Dated 23-12-2014 Geophysical investigation for Soil Sand High Efficiency Hybrid System (SSHEHS) for their proposed Textile Park @ Nandgaon peth MIDC area , geophysical and hydrological investigation is conducted by this office.

In geophysical investigation 5 Vertical Electrical Soundings (VES) were conducted, Litho logs of 5 VES were examined and historical data available this office is also studied for preparation of this report.

II. Location of the study area

The proposed project area lies in taluka Amravati of Amravati district and is located due north-east of Amravati District head quarter at a distance of about ~ 23 km (Plate 1) On Amravati Nagpur Road . The area falls in Survey of India, Toposheet No. 55 G/16 3B between 77° 51' 14.328" to 77° 51' 27.54" N N latitude and 21° 1' 29.928" E to 21° 1' 33.96" E longitude. The proposed project lies in the mini watershed 7/15 of elementary watershed PTP -6 (demarcated by GSDA, 1974) . The study area is accessible by tar road through out the year.

Location of the Proposed project



III. Rainfall and Climate

The nearest rain gauge station is located at district head quarter Amravati From the data. The rainfall recorded from last 12 years from rain-gauge station at Amravati has been adopted for rainfall analysis. This area receives an average annual rainfall of 782 mm.

The climate in the area is generally dry. The year may be divided into three seasons. The winter season is from November to February, summer season from March to May, and the monsoon season from June to October. The area receives the rainfall during monsoon season i.e. from June to October.

IV. Physiography and Drainage

The study area is drained by a first and second order stream which is a tributary of Pedhi and Wardha River. The stream flows from North east to South west direction and divides project area into two basin boundrues i.e Wardha and Tapi Purna .(plate 2)

V. Geomorphology

Major study area is marked with exposed rock and thin soil covered. The area falls under UDP zone thin soil cover and weathered mantle . The Physiography of the village indicates gentle slope due South and Southeast.

VI. Soil

Major portion of the study area is covered by medium grain black cotton soil in north east and south east portion soil thickness varies from 0.30 to 0.50 m .While in northern west and south western part it varies from 1 to 0.50 m .Medium grain murmatic soil derived from disintegration of basalt.

VII. Cropping Pattern

In the area kharif, rabbi and perennial crops are grown. During field survey it has been observed that the kharif crop requires watering only in dry spell, while rabbi and perennial crops are based on groundwater irrigation. The crops grown in the area are given;

The main and important crops of Kharif season are cotton,soiabin Jawar and Tur. During rabbi season wheat, gram (Chana), vegetables are important crops. The cropping pattern changes every year depending upon the monsoon and other socio-economic factors prevailing in the area. Under perennial crops, Orange is prevalent in the area.

The perennial irrigation in the area is very less than that of Kharif and Rabbi crop.

VIII. Aquifer

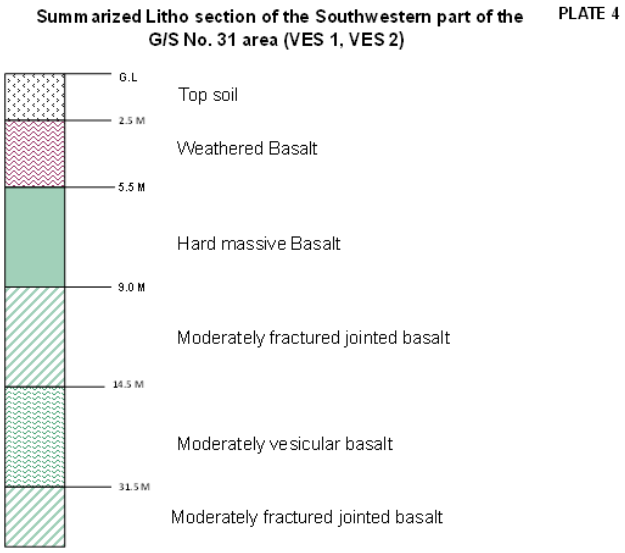
The study of ground water regime is based field survey conducted in the village area both jointed and fractured massive basalt and Vesicular basalt acts as a shallow aquifer in the north east and south east part of the project area.. The static water level during pre and post monsoon, fluctuation & potentials of the wells represented the unconfined shallow aquifer zone is available in the study area.

IX. Geology

In General the area is covered by basalt. On the basis of field traverses, the entire area is covered by thin black cotton soil layer followed by highly weathered fractured yellowish grey color basalt .(plate IV)

The general geological section shows two flow units the section is as follows

Flow Unit	Description of flow	Altitude in MSL
I	Vesicular zeolitic trap	375-371
	Weathered massive trap	371- 362
II	Vesicular zeolitc trap	362- 350



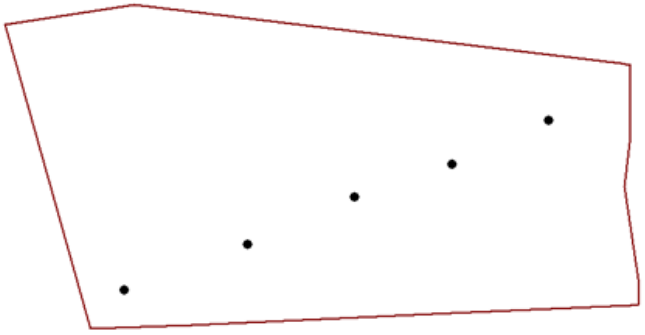
X. Hydrogeology

On the historical data total 79 irrigation wells are present in the MIDC area . The general well depth ranges from 10 to 18 m bgl . The post monsoon static water level range from 4 to 6 m ,while the pre monsoon water level ranges from 8 to 12 m . The average winter yield is 36 to 72 KLPD. While in summer it is 18 to 36 KLPD. The specific yield is 0.5 % . The main aquifer is fracture jointed weathered basalt the thickness ranging from 6 to 8 M the hydraulic conductivity 0.062 cu m / sq m .

XI. Geophysical Survey

The resistivity survey is carried by Vertical Electrical Sounding by Schlumberger Method in Gut/Survey No 31 land. Total 5 no. of Vertical electrical soundings (VES) i.e., VES 1, VES 2, VES 3, VES 4 and VES 5 are taken (plate 3).

MAP SHOWING VERTICAL ELECTRICAL SOUNDING LOCATION OF THE STUDY AREA



XII. Geophysical Data Interpretation

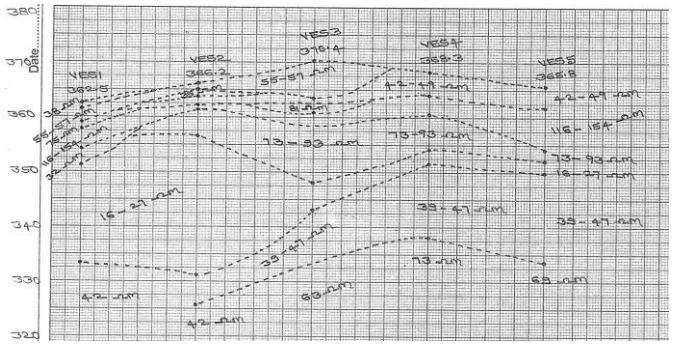
12.1 Summarized Litho section of the Southwestern part of the G/S No. 31 area (VES 1 & VES 2)

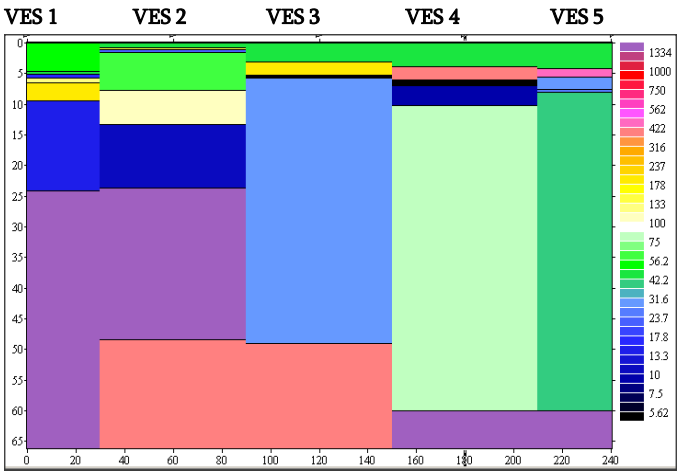
VES 1 and VES 2 summarized litho section of the southwestern part of the G/S No. 31 area having top/first layer black cotton soil resistivity is 48 ohm m, thickness is 2.5 m. Second layer weathered basalt resistivity is 40 ohm m, thickness is 3 m. Third layer hard massive basalt resistivity is 118 ohm m, thickness is 3.5 m. Fourth layer moderately fractured jointed basalt resistivity is 32 ohm m, thickness is 5.5 m. Fifth layer moderately vesicular basalt resistivity is 26 ohm m, thickness is 17 m. Sixth layer is moderately fractured jointed basalt (plate 4).

12.2 Summarized Litho section of the Northeastern part of the G/S No. 31 area (VES 3, VES 4 & VES 5)

VES 3, VES 4 & VES 5 summarized litho section of the southwestern part of the G/S No. 31 area having top/first layer black cotton soil mix with highly weathered basalt resistivity is 46 ohm m, thickness is 5.5 m. Second layer hard massive basalt resistivity is 110 ohm m, thickness is 8.5 m. Third layer moderately fractured jointed basalt resistivity is 45 ohm m, thickness is 2.5 m. Fourth layer moderately vesicular basalt resistivity is 20 ohm m, thickness is 13.5 m. Fifth layer is hard massive basalt (plate 5).

12.3 Geo electrical cross section of VES 1, VES 2, VES 3, VES 4 & VES 5



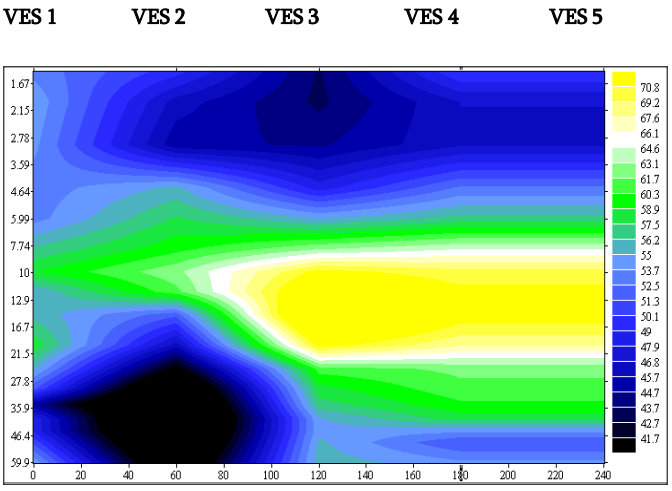


Southwest part of the G/S No. 31 area is covered by VES 1 & VES 2 soundings. Geo electrical cross section southwestern part of resistivity range 35-38 ohm m and 55 -57 ohm m area indicates soft formation. Resistivity range 73-75 ohm m and 116 -154 ohm m area indicates hard formation. Resistivity range 16-27 ohm m and 32-42 ohm m indicates moderately hard formation.

Northeast part of the G/S No. 31 area is covered by VES 3 VES 4 & VES 5 soundings. Geo electrical cross section northeast part of resistivity range 42-49 ohm m and 55 -57 ohm m area indicates soft formation. Resistivity range 73-93 ohm m and 116 -154 ohm m area indicates hard formation. Resistivity range 16-27 ohm m and 39-47 ohm m indicates moderately hard formation. Resistivity range 69-73 ohm m indicates hard formation (plates 6&7).

12.4 Pseudo cross section of VES 1, VES 2, VES 3, VES 4 & VES 5

MAP SHOWING THE PSEUDO CROSS SECTION OF THE STUDY AREA



Southwest part of the G/S No. 31 area is covered by VES 1 & VES 2 soundings. Pseudo cross section southwestern part of resistivity range 42-54 ohm m light blue to blue color area indicates soft formation. Resistivity range 54-64 ohm m light green to green color area indicates moderately hard formation. Resistivity range 64-72 ohm m light yellow to yellow color indicates hard formation. Resistivity range 40-42 ohm m thick blue color indicates moderately hard formation.

Northeast part of the G/S No. 31 area is covered by VES 3 VES 4 & VES 5 soundings. Pseudo cross section southwestern part of resistivity range 42-52 ohm m light blue to blue color area indicates soft formation. Resistivity range 54-64 ohm m light green to green color area indicates moderately hard formation. Resistivity range 64-72 ohm m light yellow to yellow color indicates hard formation. Resistivity range 52-54 ohm m thick blue color indicates hard formation (plates 8).

XIII. Observations

On the basis of Geophysical investigations, following observations are made.

1) The southwest part of G/S No. 31 land area covered by VES 1 & VES 2 where soft formation encountered at a ground level to 2.5 m depth, hard formation encounter at a depth of 5.5 to 9.0

m and moderately hard formation encounter at a depth of 9.0 m to 31.5 m.

2) The northeast part of G/S No. 31 land area covered by VES 3, VES 4 & VES 5 where soft formation encountered at a ground level to 5.5 m depth, hard formation encounter at a depth of 5.5 to 14.0 m, moderately hard formation encounter at a depth of 14.0 m to 30.0 m and hard formation encounter at a depth of 30.0 m onwards.

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