

DURGAMANWADI BAUXITE MINE

**RADHANAGARI TALUKA,
KOLHAPUR DISTRICT
MAHARASHTRA**

M/S HINDALCO INDUSTRIES LIMITED

ENVIRONMENTAL QUALITY MONITORING REPORT

**SUMMER 2018
(MARCH, APRIL, MAY)**

IND.BH.41.17.0348/HSR



BHAGAVATHI ANA LABS

Bhagavathi Ana Labs Pvt. Ltd.,

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PREFACE

M/S Hindalco Industries Limited entrusted environmental quality monitoring at **Durgmanwadi Bauxite Mine** situated Radhanagari Taluka, Kolhapur district, Maharashtra to **Bhagavathi Ana Labs Pvt. Limited, Hyderabad** during summer season of the year 2018.

The environmental monitoring was carried out in core zone and buffer zone during the months of March, April & May 2018 for the following environmental parameters.

- Micro-meteorology
- Ambient air quality
- Ambient noise level quality
- Water quality
- Soil quality

The data obtained was compiled to assess the current environmental status of the mining as well as the surrounding villages in the study area.

Bhagavathi Ana Labs Pvt. Limited, Hyderabad gratefully acknowledges the cooperation extended by management and staff of M/S Hindalco Industries Limited and the village people to the field staff.

EXECUTIVE SUMMARY

Durgamanwadi Bauxite Mine environmental quality monitoring includes the monitoring of ambient air quality, noise level quality, water quality, soil quality & micro-meteorology in core zone and buffer zone around the mine lease area.

AMBIENT AIR QUALITY

The scenario of the existing ambient air quality in the study region has been assessed through a network of selected ambient air quality locations. Pre-calibrated respirable and fine particulate dust sampler has been used for monitoring the existing AAQ status. Maximum, minimum, average and percentile values have been computed from the raw data collected at all individual sampling stations to represent the ambient air quality status.

AMBIENT NOISE LEVEL MONITORING

Mining and allied activities usually cause noise pollution. Excessive noise levels will cause adverse effects on human beings and associated environment including domestic animals, wild life, natural ecosystem and structures. To know the ambient noise levels in the study area, noise levels were recorded at mining area and nearby villages using noise level recorder.

WATER QUALITY MONITORING

Water quality monitoring consists of the study of surface and ground water sources and its quality in the core and buffer zone of the lease area. Assessment of water quality in the study area and in the mine area includes the quality assessment of parameters as per the Indian Standard IS 10500 (Drinking water standard). Water samples were collected from selected locations during study period and analyzed in the laboratory as per the standard IS&APHA procedures.

SOIL QUALITY MONITORING

The normal mineral composition of plants is affected by alteration in soil conditions. Organic remains accumulate mainly on the surface of the soil. Soils that have low stability of structure disperse and slake when they are wetted by

rains or water from irrigation and may develop a hard crust as the soil surface dries. This crust presents a serious barrier for emerging seedlings. With some crops, often, it is the main cause for poor growth. Alkaline soils are especially problematic (USDA, 1973). In the present study, soil samples were collected from the identified locations and are analyzed in the laboratory.

MICROMETEOROLOGY

Meteorological scenario helps to understand the trends of the climatic factors. It also helps in the identification of sampling stations in the study area. Meteorological scenario exerts a critical influence on air quality as the pollution arises from the interaction of atmospheric contaminants with adverse meteorological conditions

INDEX MAP

N



INDIA



MAHARASTRA

ARABIAN SEA



KOLHAPUR



(Mine Lease Area)

DURGMANWADI BAUXITE MINE

M/s Hindalco Industries Limited

NOT TO SCALE

MICRO-METEOROLOGY

Meteorological data within the project area during the air quality survey period was assessed.

PRIMARY / BASIC METEOROLOGICAL PARAMETERS

- Wind Velocity
- Wind Direction

Since the dispersion and diffusion of pollutants mainly depend on the above factors these factors are considered as primary meteorological parameters.

SECONDARY METEOROLOGICAL PARAMETERS

- Ambient Temperature

MICRO-METEOROLOGICAL DATA

DATE	TEMPERATURE/HUMIDITY			WIND SPEED Km/h			WIND DIRECTION
	MIN	MAX	AVERAGE HUMIDITY	MIN	MAX	AVERAGE	
06-03-2018	23	33	73.5	0	9	4.5	SSE & NE
08-03-2018	22	33	68.5	0	11	5.5	ESE & N
13-03-2018	22	36	49.5	0	4	2.0	WNW & N
15-03-2018	26	31	68.0	0	6	3.0	NNW & SE
20-03-2018	23	33	68.5	0	9	4.5	NW & E
22-03-2018	23	32	54.5	0	5	2.5	NNW & N
27-03-2018	27	32	80.0	0	2	1.0	NW & N
29-03-2018	24	31	78.0	0	3	1.5	SSE & WSW

MICRO-METEOROLOGICAL DATA

DATE	TEMPERATURE/HUMIDITY			WIND SPEED Km/h			WIND DIRECTION
	MIN	MAX	AVERAGE HUMIDITY	MIN	MAX	AVERAGE	
03-04-2018	23	32	71.0	0	7	3.5	ESE & ENE
05-04-2018	26	31	76.0	0	2	1.0	E & W
10-04-2018	24	32	62.5	0	5	2.5	NE & N
12-04-2018	25	33	72.0	0	6	3.0	NNE & NW
17-04-2018	27	32	75.0	0	3	1.5	N & E
19-04-2018	28	32	77.5	0	4	2.0	WSW & NE
24-04-2018	24	33	71.5	0	6	3.0	SE & NW
26-04-2018	25	33	71.5	0	4	2.0	N & NNW

MICRO-METEOROLOGICAL DATA

DATE	TEMPERATURE/HUMIDITY			WIND SPEED Km/h			WIND DIRECTION
	MIN	MAX	AVERAGE HUMIDITY	MIN	MAX	AVERAGE	
02-05-2018	26	32	70.5	0	7	3.5	N & NW
04-05-2018	26	32	82.5	0	3	1.5	SE & NW
09-05-2018	28	34	63.5	0	4	2.0	N & NW
11-05-2018	27	34	68.0	0	3	1.5	SE & W
16-05-2018	30	34	65.5	0	4	2.0	E & WNW
18-05-2018	26	32	71.0	0	3	1.5	ENE & W
25-05-2018	28	33	70.5	0	11	5.5	NNE & NW
30-05-2018	29	32	71.0	0	8	4.0	NW

ENVIRONMENTAL QUALITY

Environmental monitoring includes air, noise, water & soil quality status within core zone and buffer zone around the Durgmanwadi Bauxite Mines Lease area at Radhanagari Taluka, Kolhapur district, Maharashtra.

AMBIENT AIR QUALITY

The ambient air quality monitoring was to assess the existing levels of the air pollution. Air pollution forms an important and critical factor to study the environmental issues in the mining areas. Thus, air quality has to be frequently monitored to know the extent of pollution due to mining and allied activities.

Ambient air quality monitoring stations were set up at eight selected locations, 4 in core zone and 4 in buffer zone.

METHOD OF SAMPLING

Ambient air quality monitoring has been carried out with a frequency of two days per week at eight locations for one season (i.e. 24 times at each location in a season). The Monitoring data for air environment is generated for the parameters like Particulate matter (PM10), Fine Particulate Matter (PM2.5) Sulphur Dioxide (SO₂) and Oxides of Nitrogen (NO_x), and co.

AMBIENT AIR QUALITY MONITORING STATIONS

SL. NO	STATION CODE	NAME OF SAMPLING LOCATION	DIRECTION w.r.t MINES
1	A - 1	Core zone	--
2	A - 2	Near Mines office	--
3	A - 3	Near haulage road	--
4	A - 4	Near Weigh Bridge	--
5	A - 5	Padsali village	N
6	A - 6	Durgmanwadi village	E
7	A - 7	Kariwade village	SW
8	A - 8	Chavanwadi village	NE



KEY PLAN

LEGEND

- Mining Lease
- Metal Road
- Unmetal Road
- Water Courses
- Forest Area



PROJECT : DURGAMANWADI

BAUXITE MINES

TITLE : KEY PLAN

PREPARED BY

M/s BHAGAVATHI ANA LABS PVT L.

HIDYERABAD









SUMMARY OF AMBIENT AIR QUALITY RESULTS

Sl. No.	Location		PM 10 ($\mu\text{g}/\text{m}^3$)	PM 2.5 ($\mu\text{g}/\text{m}^3$)	SO ₂ ($\mu\text{g}/\text{m}^3$)	NO ₂ ($\mu\text{g}/\text{m}^3$)
1	Core zone	Min	25.5	8.1	4.7	9.4
		Max	63.8	20.1	8.0	18.4
		Average	47.3	14.8	6.1	13.0
		98 th %tile	63.2	19.6	7.8	18.2
2	Near Mine Office	Min	27.8	9.0	4.8	9.8
		Max	57.1	18.5	7.4	17.0
		Average	42.1	13.6	5.8	12.8
		98 th %tile	55.7	18.0	7.2	16.2
3	Near Haulage Road	Min	24.8	8.9	4.4	8.4
		Max	51.5	18.1	9.1	17.2
		Average	38.2	13.5	6.7	12.8
		98 th %tile	50.7	17.7	8.9	16.8
4	Near Weigh Bridge	Min	23.1	7.3	3.7	7.0
		Max	56.1	18.3	9.2	17.4
		Average	38.1	12.3	6.2	11.7
		98 th %tile	53.3	17.5	8.7	16.6
5	Padsali village	Min	28.0	9.9	4.7	8.4
		Max	63.7	20.7	9.8	17.7
		Average	43.8	14.6	7.0	12.6
		98 th %tile	62.6	20.6	9.8	17.6
6	Durgamanwadi village	Min	32.6	10.4	6.0	11.4
		Max	64.7	20.9	12.1	17.7
		Average	41.9	13.4	7.8	14.1
		98 th %tile	63.1	20.4	11.8	17.4
7	Kariwade village	Min	32.8	9.9	5.0	10.4
		Max	59.6	18.2	9.1	20.5
		Average	46.9	14.1	7.0	15.3
		98 th %tile	58.5	17.9	9.0	20.1
8	Chavanwadi village	Min	33.0	9.9	5.0	10.7
		Max	60.2	18.2	9.1	18.2
		Average	46.3	13.9	7.0	15.1
		98 th %tile	59.2	17.6	8.8	18.2

NOTE: The results relate only to the condition prevailing at the time of sampling
Method of measurement: As per IS 5182



AMBIENT AIR QUALITY LOCATIONS

- LEGEND**
-  MINING LEASE
 -  METAL ROAD
 -  UNMETAL ROAD
 -  WATER COURSES
 -  FOREST AREA
 -  AAQ LOCATIONS



PROJECT : DURGAMANWADI

BAUXITE MINES

TITLE : AAQ LOCATIONS

PREPARED BY

M/s BHAGAVATHI ANA LABS PVT. L

HDYERABAD



AMBIENT NOISE LEVEL QUALITY

Noise is nothing but unwanted sound produced due to various activities. As a part of occupational health and safety measures, certain safeguards have been incorporated to mitigate noise pollution in working environment. So noise level surveys were carried out at 8 selected locations in and around the mine lease area. Noise survey has been conducted in the study area for the period of 24 hr at each location. The noise level results are given below.

AMBIENT NOISE LEVEL MONITORING STATIONS

SL. NO	CODE	NAME OF SAMPLING LOCATION	DIRECTION w.r.t. MINES
1	N - 1	Core zone	--
2	N - 2	Near Mines Office	--
3	N - 3	Mines Haulage Road	--
4	N - 4	Near Weigh Bridge	--
5	N - 5	Padsali village	N
6	N - 6	Durgmanwad village	E
7	N - 7	Kariwade village	SW
8	N - 8	Chavanwadi village	NE

NOISE AMBIENT STANDARDS

AREA CODE	CATEGORY OF AREA	LIMIT IN dB (A) Leq	
		DAY TIME	NIGHT TIME
A	Industrial Area	75	70
B	Commercial Area	65	55
C	Residential Area	55	45
D	Silence Area	50	40







Note:

1. Day time is reckoned in between 6 am and 9 pm.
2. Night time is reckoned in between 9 pm and 6 am.
3. Silence zone is defined as area upto 100 meters around such premises as hospitals, educational institutions and courts. The silence zones are to be declared by the Competent Authority.
4. Mixed categories of areas should be declared as "one of the four above mentioned categories by the Competent Authority and the corresponding standards shall apply.



AMBIENT NOISE QUALITY LOCATIONS

LEGEND

-  MINING LEASE
-  METAL ROAD
-  UNMETAL ROAD
-  WATER COURSES
-  FOREST AREA
-  NOISE LOCATIONS



PROJECT : DURGAMANWADI

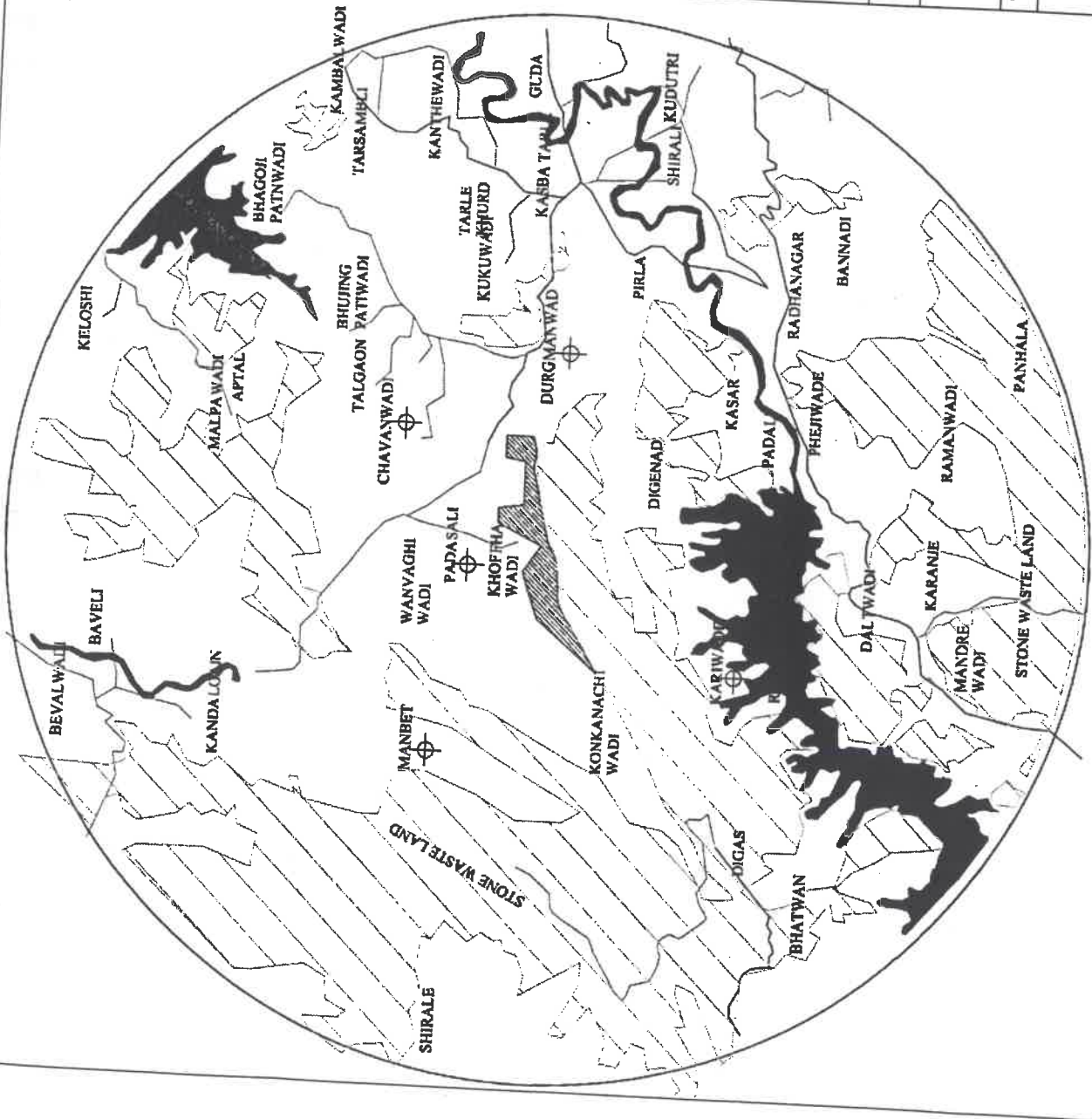
BAUXITE MINES

TITLE : NOISE LOCATIONS

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CORE ZONE NOISE LEVEL MONITORING DATA

Location →	N - 1 CORE ZONE	N - 2 NEAR MINES OFFICE	N - 3 MINES HAULAGE ROAD	N-4 NEAR WEIGH BRIDGE
Time (Hrs) ↓	dB(A)			
06.00	46.2	46.9	48.0	48.7
07.00	53.4	54.4	55.4	56.7
08.00	55.0	56.1	57.8	59.3
09.00	57.8	59.1	60.7	62.5
10.00	60.2	61.0	62.6	64.7
11.00	67.5	68.5	71.0	73.3
12.00	68.7	69.6	72.5	74.8
13.00	67.3	68.2	70.6	73.0
14.00	67.5	68.5	70.6	73.0
15.00	65.8	66.8	69.2	71.7
16.00	64.1	65.1	68.0	69.8
17.00	62.5	64.1	66.4	68.2
18.00	61.0	62.3	65.1	66.9
19.00	59.9	61.5	64.4	66.4
20.00	54.8	56.2	58.6	60.6
21.00	53.2	55.5	57.4	59.0
22.00	47.5	49.4	50.7	52.2
23.00	46.6	48.4	49.9	51.0
24.00	46.9	48.6	49.6	50.5
01.00	47.1	49.0	50.3	50.5
02.00	47.9	49.9	50.7	51.0
03.00	48.6	50.3	51.3	51.4
04.00	43.6	45.3	45.8	45.8
05.00	43.6	45.3	45.3	45.8
Minimum Value: - (L_{Min})	43.6	45.3	45.3	45.8
Maximum Value: - (L_{Max})	68.7	69.6	72.5	74.8

NOTE: The results relate only to the condition prevailing at the time of sampling

BUFFER ZONE NOISE LEVEL MONITORING DATA

Location →	N - 4 PADSA LI VILLAG E	N - 5 DURGAMA NWADI VILLAGE	N - 6 KARIWADE VILLAGE	N-8 CHAVAN WADI VILLAGE
Time (Hrs) ↓	dB(A)			
06.00	56.8	58.7	60.6	60.6
07.00	58.2	59.5	60.4	60.4
08.00	59.8	60.6	62.4	61.5
09.00	63.8	63.5	63.5	63.6
10.00	66.4	65.6	65.9	66.4
11.00	68.4	69.0	68.7	68.6
12.00	69.1	68.7	67.9	69.5
13.00	68.6	68.3	68.3	69.6
14.00	68.7	69.2	69.8	70.3
15.00	67.1	67.6	67.7	68.3
16.00	73.0	72.5	71.5	71.1
17.00	74.0	74.9	68.0	71.8
18.00	69.5	70.1	69.8	70.8
19.00	65.0	65.2	64.8	65.5
20.00	61.3	61.5	61.0	61.7
21.00	60.9	60.8	60.8	61.5
22.00	61.1	62.0	61.6	61.1
23.00	60.6	60.8	60.8	61.4
24.00	60.7	61.1	62.2	62.4
01.00	59.8	59.7	60.4	61.5
02.00	60.1	59.1	59.4	59.8
03.00	60.3	59.7	60.4	61.4
04.00	60.1	60.8	62.4	62.7
05.00	59.9	60.4	61.8	62.1
Minimum Value: - (L_{Min})	56.8	58.7	59.4	59.8
Maximum Value: - (L_{Max})	74.0	74.9	71.5	71.8

RESULT & DISCUSSION

The obtained L_d, L_n noise levels are compared with the ambient noise level standards and are found to be within the limit.

WATER QUALITY

Water quality monitoring consists of the study of water sources and its quality in the core and buffer zone of the lease area. Its study consists of following two important systems of water bodies:

- Surface water quality.
- Ground water quality.

The buffer zone is good in ground and surface water source. The rainwater regularly recharges this ground water during rainy season. There are two streams flowing in the study area, which are considered to be good source of water.

Assessment of water quality in the study area and in the mine area includes the quality assessment of parameters as per the IS 10500 (Drinking Water Standard). A total of 6 quality monitoring stations selected for sample collection in the study area. Location of water quality monitoring stations is given in Table.

WATER QUALITY MONITORING LOCATIONS

Sl. No	Name of Sampling Station	Source of Water
1	W1 Talgaon village	Ground water
2	W2 Durgamanwadi village	Ground water
3	W3 Chavanwadi village	Ground water
4	W4 Padsali village	Surface water
5	W5 Tulsi stream	Surface water
6	W6 Mine Accumulated water	Surface water







SAMPLING DETAILS

The water samples were collected from selected sampling locations, which are coming under core zone and buffer zone around the mine lease area. Samples were collected in the summer season as per the prescribed sample collecting methods and analyzed as per the IS & APHA standard procedures. report of water samples are given below.



WATER QUALITY LOCATIONS

LEGEND

-  MINING LEASE
-  METAL ROAD
-  UNMETAL ROAD
-  WATER COURSES
-  FOREST AREA
-  WATER LOCATIONS



PROJECT : DURGAMANWADI

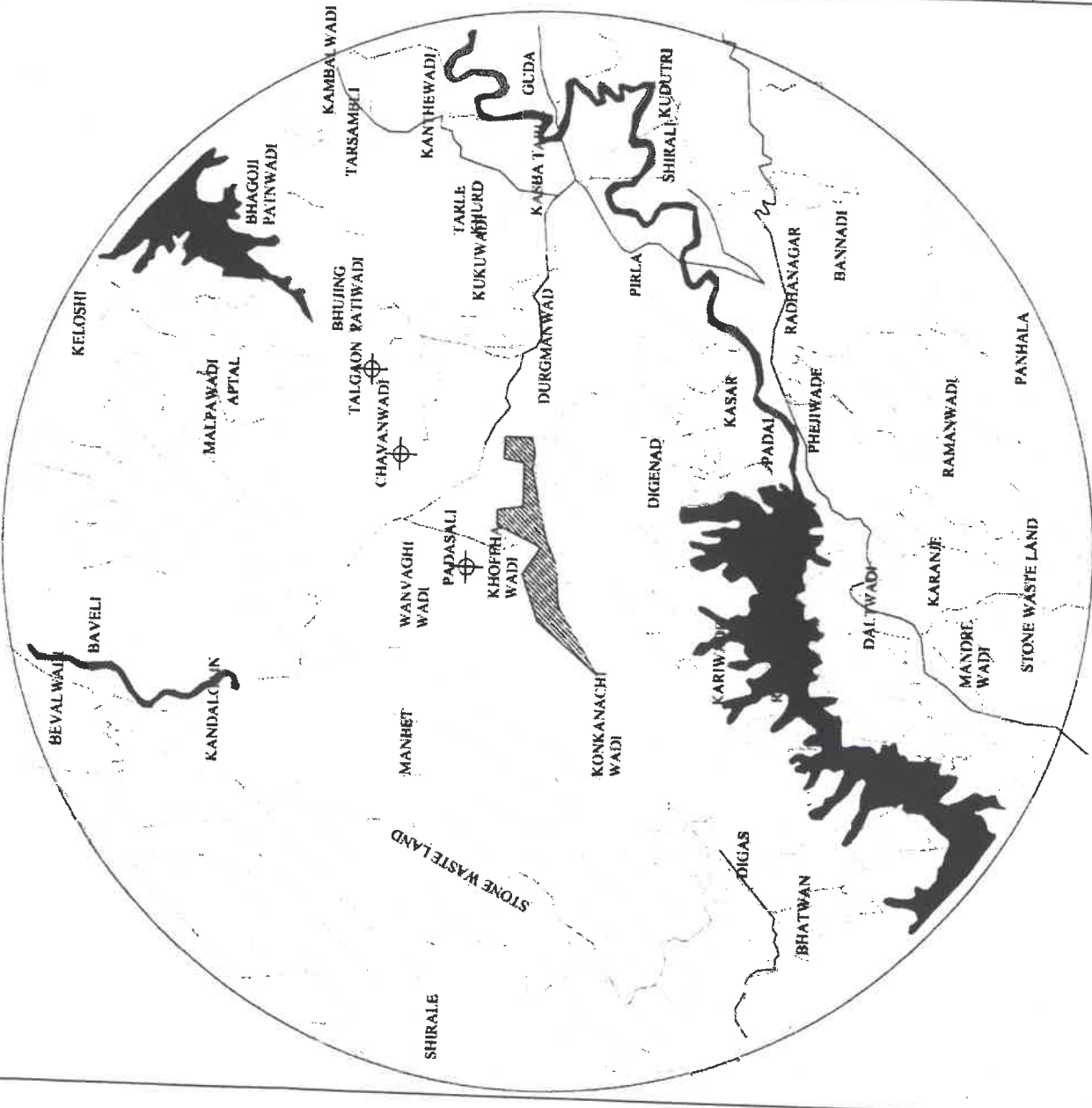
BAUNITE MINES

TITLE : WATER LOCATIONS

PREPARED BY

M/s BHAGAVATHI ANA LABS PVT.L.

HYDERABAD



TALGAON VILLAGE

Location Name	:	Talgaon village
Date	:	29.05.2018
Sample Type	:	Ground water

Sl. No.	Parameter	Unit	Result
1	Odour		Un-objectionable
2	Taste		Agreeable
3	Colour	Hazen Units	<5
4	pH		6.69
5	Turbidity	NTU	<5
6	Dissolved Oxygen	mg/l	4.7
7	Total Dissolved Solids	mg/l	132
8	Total Suspended Solids	mg/l	23
9	Alkalinity as CaCO ₃	mg/l	24.0
10	Total Hardness as CaCO ₃	mg/l	116.0
11	Nitrates NO ₃	mg/l	0.19
12	Phosphates PO ₄	mg/l	2.39
13	Chlorides as Cl	mg/l	10.63
14	Sulphates as SO ₄ ²⁻	mg/l	2.55
15	Sodium as Na.	mg/l	2.23
16	Potassium as K	mg/l	0.08
17	Calcium as Ca	mg/l	30
18	Magnesium as Mg	mg/l	11
19	Lead (Pb)	mg/l	BDL
20	Manganese as Mn	mg/l	0.01
21	Cadmium (Cd)	mg/l	BDL
22	Chromium (Cr)	mg/l	BDL
23	Copper (Cu)	mg/l	BDL
24	Zinc (Zn)	mg/l	BDL
25	Iron as Fe	mg/l	0.06
26	Fluoride as F	mg/l	0.54
27	Mercury as (Hg)	mg/l	BDL
28	Selenium as Se	mg/l	BDL
29	Arsenic as As	mg/l	BDL
30	Cyanide as CN	mg/l	BDL
31	Boron as B	mg/l	BDL
32	B.O.D (3 days 27°C)	mg/l	5

BDL: Below Detectable Limit

mg/l: - Milligram per liter

DURGAMANWADI VILLAGE

Location Name	:	Durgamanwadi village			
Date	:	29.05.2018	Sample Type	:	Ground water

Sl. No.	Parameter	Unit	Result
1	Odour		Un-objectionable
2	Taste		Agreeable
3	Colour	Hazen Units	<5
4	pH		6.64
5	Turbidity	NTU	<5
6	Dissolved Oxygen	mg/l	5.10
7	Total Dissolved Solids	mg/l	116
8	Total Suspended Solids	mg/l	21
9	Alkalinity as CaCO ₃	mg/l	20
10	Total Hardness as CaCO ₃	mg/l	82.0
11	Nitrates NO ₃	mg/l	0.15
12	Phosphates PO ₄	mg/l	0.02
13	Chlorides as Cl	mg/l	12.57
14	Sulphates as SO ₄ ²⁻	mg/l	2.17
15	Sodium as Na.	mg/l	2.14
16	Potassium as K	mg/l	0.12
17	Calcium as Ca	mg/l	23
18	Magnesium as Mg	mg/l	6
19	Lead (Pb)	mg/l	BDL
20	Manganese as Mn	mg/l	0.02
21	Cadmium (Cd)	mg/l	BDL
22	Chromium (Cr)	mg/l	BDL
23	Copper (Cu)	mg/l	BDL
24	Zinc (Zn)	mg/l	BDL
25	Iron as Fe	mg/l	0.07
26	Fluoride as F	mg/l	0.12
27	Mercury as (Hg)	mg/l	BDL
28	Selenium as Se	mg/l	BDL
29	Arsenic as As	mg/l	BDL
30	Cyanide as CN	mg/l	BDL
31	Boron as B	mg/l	BDL
32	B.O.D (3 days 27°C)	mg/l	3

BDL: Below Detectable Limit

mg/l: - Milligram per liter

CHAVANWADI VILLAGE

Location Name	:	Chavanwadi village
Date	:	29.05.2018
Sample Type	:	Ground water

Sl. No.	Parameter	Unit	Result
1	Odour		Un-objectionable
2	Taste		
3	Colour	Hazen Units	Agreeable
4	pH		<5
5	Turbidity	NTU	6.75
6	Dissolved Oxygen	mg/l	<5
7	Total Dissolved Solids	mg/l	5.30
8	Total Suspended Solids	mg/l	56
9	Alkalinity as CaCO ₃	mg/l	15
10	Total Hardness as CaCO ₃	mg/l	16.0
11	Nitrates NO ₃	mg/l	44.0
12	Phosphates PO ₄	mg/l	0.13
13	Chlorides as Cl	mg/l	0.02
14	Sulphates as SO ₄ ²⁻	mg/l	13.53
15	Sodium as Na.	mg/l	1.91
16	Potassium as K	mg/l	0.48
17	Calcium as Ca	mg/l	0.08
18	Magnesium as Mg	mg/l	14.4
19	Lead (Pb)	mg/l	1.92
20	Manganese as Mn	mg/l	BDL
21	Cadmium (Cd)	mg/l	0.23
22	Chromium (Cr)	mg/l	BDL
23	Copper (Cu)	mg/l	BDL
24	Zinc (Zn)	mg/l	BDL
25	Iron as Fe	mg/l	BDL
26	Fluoride as F	mg/l	0.12
27	Mercury as (Hg)	mg/l	0.49
28	Selenium as Se	mg/l	BDL
29	Arsenic as As	mg/l	BDL
30	Cyanide as CN	mg/l	BDL
31	Boron as B	mg/l	BDL
32	B.O.D (3 days 27°C)	mg/l	BDL
			3.5

BDL: Below Detectable Limit

mg/l: - Milligram per liter

PADSALI VILLAGE

Location Name	:	Padsali village	
Date	:	29.05.2018	Sample Type : Surface water

Sl. No.	Parameter	Unit	
1	Odour		Un-objectionable
2	Taste		Agreeable
3	Colour	Hazen Units	<5
4	pH		6.87
5	Turbidity	NTU	<5
6	Dissolved Oxygen	mg/l	5.00
7	Total Dissolved Solids	mg/l	46
8	Total Suspended Solids	mg/l	11
9	Alkalinity as CaCO ₃	mg/l	16
10	Total Hardness as CaCO ₃	mg/l	36.0
11	Nitrates NO ₃	mg/l	0.101
12	Phosphates PO ₄	mg/l	0.02
13	Chlorides as Cl	mg/l	11.6
14	Sulphates as SO ₄ ²⁻	mg/l	3.29
15	Sodium as Na.	mg/l	0.24
16	Potassium as K	mg/l	0.04
17	Calcium as Ca	mg/l	9
18	Magnesium as Mg	mg/l	3.2
19	Lead (Pb)	mg/l	BDL
20	Manganese as Mn	mg/l	0.01
21	Cadmium (Cd)	mg/l	BDL
22	Chromium (Cr)	mg/l	BDL
23	Copper (Cu)	mg/l	BDL
24	Zinc (Zn)	mg/l	BDL
25	Iron as Fe	mg/l	0.08
26	Fluoride as F	mg/l	0.29
27	Mercury as (Hg)	mg/l	BDL
28	Selenium as Se	mg/l	BDL
29	Arsenic as As	mg/l	BDL
30	Cyanide as CN	mg/l	BDL
31	Boron as B	mg/l	BDL
32	B.O.D (3 days 27°C)	mg/l	4

BDL: Below Detectable Limit

mg/l: - Milligram per liter

TULSI STREAM

Location Name	:	Tulsi stream			
Date	:	29.05.2018	Sample Type	:	Surface Water

Sl. No.	Parameter	Unit	Result
1	Odour		Un-objectionable
2	Taste		Agreeable
3	Colour	Hazen Units	<5
4	pH		6.52
5	Turbidity	NTU	7.22
6	Dissolved Oxygen	mg/l	<5
7	Total Dissolved Solids	mg/l	7.00
8	Total Suspended Solids	mg/l	118
9	Alkalinity as CaCO ₃	mg/l	34
10	Total Hardness as CaCO ₃	mg/l	40
11	Nitrates NO ₃	mg/l	66.0
12	Phosphates PO ₄	mg/l	0.76
13	Chlorides as Cl	mg/l	0.03
14	Sulphates as SO ₄ ²⁻	mg/l	30
15	Sodium as Na.	mg/l	6
16	Potassium as K	mg/l	7
17	Calcium as Ca	mg/l	2.5
18	Magnesium as Mg	mg/l	17
19	Lead (Pb)	mg/l	6
20	Manganese as Mn	mg/l	BDL
21	Cadmium (Cd)	mg/l	0.08
22	Chromium (Cr)	mg/l	BDL
23	Copper (Cu)	mg/l	BDL
24	Zinc (Zn)	mg/l	BDL
25	Iron as Fe	mg/l	BDL
26	Fluoride as F	mg/l	0.19
27	Mercury as (Hg)	mg/l	0.01
28	Selenium as Se	mg/l	BDL
29	Arsenic as As	mg/l	BDL
30	Cyanide as CN	mg/l	BDL
31	Boron as B	mg/l	BDL
32	B.O.D (3 days 27°C)	mg/l	BDL
			6

BDL: Below Detectable Limit

mg/l: - Milligram per liter

MINE ACCUMULATED WATER

Location Name	:	Mine Accumulated Water			
Date	:	29.05.2018	Sample Type	:	Surface Water

Sl. No.	Parameter	Unit	Result
1	Odour		Un-objectionable
2	Taste		Agreeable
3	Colour	Hazen Units	<5
4	pH		6.50
5	Turbidity	NTU	<5
6	Dissolved Oxygen	mg/l	6.80
7	Total Dissolved Solids	mg/l	40
8	Total Suspended Solids	mg/l	25
9	Alkalinity as CaCO ₃	mg/l	12
10	Total Hardness as CaCO ₃	mg/l	32.0
11	Nitrates NO ₃	mg/l	0.05
12	Phosphates PO ₄	mg/l	0.01
13	Chlorides as Cl	mg/l	9.67
14	Sulphates as SO ₄ ²⁻	mg/l	1.27
15	Sodium as Na.	mg/l	0.62
16	Potassium as K	mg/l	0.06
17	Calcium as Ca	mg/l	9
18	Magnesium as Mg	mg/l	2.4
19	Lead (Pb)	mg/l	BDL
20	Manganese as Mn	mg/l	0.03
21	Cadmium (Cd)	mg/l	BDL
22	Chromium (Cr)	mg/l	BDL
23	Copper (Cu)	mg/l	BDL
24	Zinc (Zn)	mg/l	BDL
25	Iron as Fe	mg/l	0.06
26	Fluoride as F	mg/l	0.25
27	Mercury as (Hg)	mg/l	BDL
28	Selenium as Se	mg/l	BDL
29	Arsenic as As	mg/l	BDL
30	Cyanide as CN	mg/l	BDL
31	Boron as B	mg/l	BDL
32	B.O.D (3 days 27°C)	mg/l	4

DOMESTIC EFFLUENT ANALYSISSample Type: **Canteen waste water**

Date of sampling: 29.05.2018

Sl.No	Test	Result
1	Total Suspended Solids, mg/l	44
2	Total Dissolved Solids, mg/l	56
3	COD, mg/l	3
4	BOD for 3 days at 27°C, mg/l	6
5	Total Solids	24
6	Oil and Grease, mg/l	<5

Sample Type: **Canteen waste water**

Date of sampling: 30.05.2018


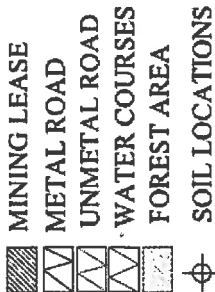

Sl.No	Test	Result
1	Total Suspended Solids, mg/l	49
2	Total Dissolved Solids, mg/l	67
3	COD, mg/l	3.2
4	BOD for 3 days at 27°C, mg/l	5
5	Total Solids	27
6	Oil and Grease, mg/l	<5

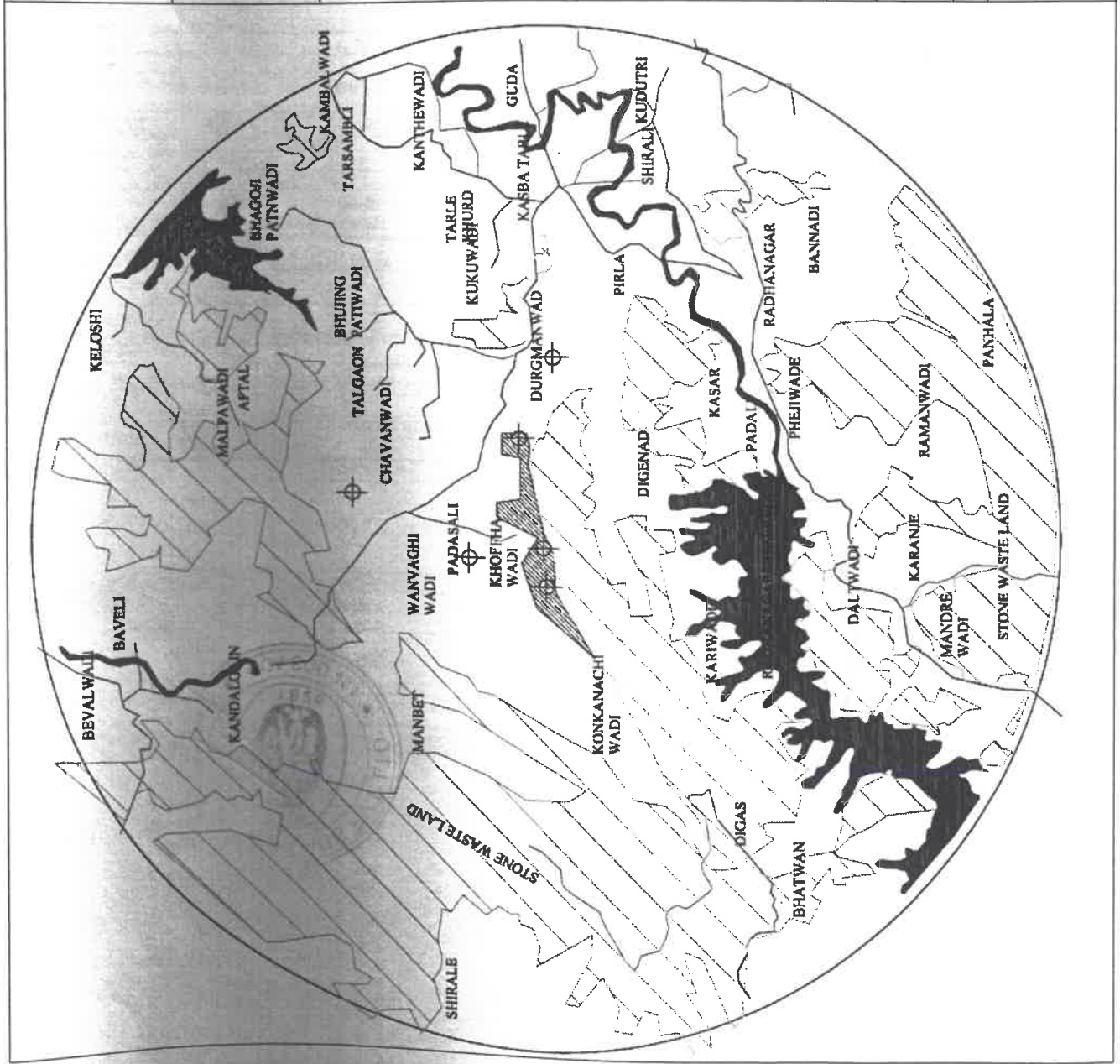
RESULTS & DISCUSSION

- The pH of the study area varies from 6.64 to 7.22 in the study area. The permissible range of pH is 6.5 to 8.5.
- Dissolved Oxygen content of the study area has been found to be in the range of 4.67 to 7.00.
- Total Dissolved Solids found to be in the range of 40 to 132 mg/l in the water sample collected in study area. As per IS 10500 standard for drinking water, the desirable limit is 500 mg/l and maximum permissible limit is 2000 mg/l.
- Alkalinity as CaCO_3 is found to be in the range of 12 to 40 in the water sample collected in study area. As per IS 10500 standard for drinking water, the desirable limit is 200 mg/l and maximum permissible limit is 600 mg/l.
- Total hardness as CaCO_3 of the water sample collected in the study area is found to in the range of 32 to 116 mg/l. As per IS 10500 standard for drinking water, the desirable limit is 300 mg/l and maximum permissible limit is 600 mg/l.
- Chloride content of the water in the study area found to be in the range of 9.67 to 30.0 mg/l. As per IS 10500 standard for drinking water, the desirable limit 250 mg/l and maximum permissible limit is 1000 mg/l.
- Calcium content of the water in the study area found to be in the range of 9 to 30 mg/l. As per IS 10500 standard for drinking water, the desirable limit 75 mg/l and maximum permissible limit is 200 mg/l.
- Magnesium content of the water in the study area found to be in the range of 1.9 to 11 mg/l.
- Iron content of the water in the study area found to be in the range of 0.6 to 0.19 mg/l. As per IS 10500 standard for drinking water, the desirable limit 0.3 mg/l and maximum permissible limit is 1.0 mg/l.

**DRINKING WATER STANDARDS
AS PER IS: 10500**

Sl. NO	PARAMETER	UNIT	DESIRABLE LIMIT AS PER IS: 10500	MAXIMUM PERMISSIBLE LIMIT AS PER IS: 10500
1	Odour		Un-objectionable	
2	Taste		Agreeable	
3	Colour	Hazen Units	5	25
4	pH		6.5 -8.5	
5	Turbidity	NTU	5	10
6	Dissolved Oxygen	mg /l	-----	
7	Total Dissolved Solids	mg /l	500	2000
8	Alkalinity as CaCo3	mg /l	200	600
9	Total hardness as CaCo3	mg /l	300	600
10	Nitrates NO3	mg /l	45	100
11	Phosphates PO4	mg /l	-----	
12	Chlorides as Cl	mg /l	250	1000
13	Sulphates, SO42-	mg /l	200	400
14	Sodium as Na	mg /l	-----	
15	Potassium as K	mg /l	-----	
16	Calcium as Ca	mg /l	75	200
17	Magnesium, Mg	mg /l	30	100
18	Lead (Pb)	mg /l	0.05	0.05
19	Manganese	mg /l	0.1	0.3
20	Cadmium (Cd)	mg /l	0.01	0.01
21	Chromium (Cr)	mg /l	0.05	0.05
22	Copper (Cu)	mg /l	0.05	1.5
23	Zinc (Zn)	mg /l	5	15
24	Iron as Fe	mg /l	0.3	1.0
25	Fluoride as F	mg /l	1	1.5
26	Mercury as Hg	mg /l	0.001	0.001
27	Selenium as se	mg /l	0.01	0.01
28	Arsenic as As	mg /l	0.05	0.05
29	Cyanide as CN	mg/l	0.05	0.05
30	Boron as B	mg/l	1	5

	<h2>SOIL QUALITY LOCATIONS</h2>
LEGEND 	
	
PROJECT : DURGAMANWADI BAUXITE MINES	
TITLE : SOIL LOCATIONS	
PREPARED BY M/s BHAGAVATHI ANA LABS PVT. L HDYERABAD	



SOIL QUALITY

The normal mineral composition of plants is affected by alteration in soil condition. It is essential to determine the potential of soil in the area and identify the impacts of mining activity on soil quality. So soil sample has been collected from different villages around the lease area during study period.

In order to study the soil profile of the region, sampling locations were selected to assess the existing soil conditions around the project area representing various land use conditions. The physico-chemical and heavy metal concentrations were determined. The samples were collected by ramming a soil augur in to the soil upto a depth of 90cm. The soil sample was prepared in accordance with IS: 2720 (Part-I)-1983 for various tests.

The sampling locations have been identified to determine the baseline soil characteristics of study area

Soil Sampling and Analysis

A total of six locations were selected for analyzing the soil quality status in study area. The soil samples were collected from the selected areas. The samples have been analyzed for physico-chemical parameters and were given in the table.

SOIL QUALITY

S. No	Test Parameters	Results				
		Top Soil Of Dump	Non mineralized afforestation area	Rice plot NEAR Durgamwadi village	Jawar plot near village padsali,	Forest area soil Near Chavanwadi
1	pH (1:5 Aq. Extraction)	6.26	7.08	6.45	6.44	6.40
2	E.C (μ s) (1:5 Aq. Suspension)	59.1	118.3	58.4	72.2	41.6
3	Nitrate Nitrogen as N, mg/kg	11	16.5	11	5.5	16.5
4	Available Phosphorous as P_2O_5 , mg/kg	<5	0.09	<5	<5	<5
5	Potassium as K_{20} , mg/kg	12	259	51	55.4	17.0
6	Available Sodium Na_2O , mg/kg	9.0	25.0	10.6	9.0	9.5
7	Ex. Calcium, mg/kg	514.60	3730.86	1543.80	900.55	1200
8	Ex. Magnesium, mg/kg	494.02	884.03	546.02	702.03	182.01
9	Water Soluble Chlorides as Cl mg/kg	19	33	33	24	29
10	Organic Carbon,%	6.25	5.42	6.56	5.46	6.0
11	Texture	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil	Sandy Soil
	a) Sand, %	89.50	89.91	89.52	89.50	88.39
	b) Silt, %	3.68	3.27	3.67	3.67	4.23
	c) Clay, %	6.82	6.82	6.81	6.83	7.38
12	Total Soluble Salts, mg/kg	0.16	1.81	1.07	0.41	0.11



Stack Analysis Report			
Name of the unit	DURGAMNWADI BAUXITE MINE		
Address	VILLAGE DURGAMNWADI DIST KOLHAPUR		
Date & Time	5/28/2018		
Stack details			
Sack - I attached to	DG (1000KVA) [-I]	I. D. Of stack at port (mtr) D	0.2
crosssection of the stack	Round	Stack crosssectional area m2	0.0314
Height of stack above ground (mtr)	17	Consumption of fuel (lit/hr)	55
Fuel used	HSD	Load on the ssystem	Approx. 85 %

EMMISSION DETAILS				
Particulars		Value	* Permissible limit	Method of analysis
Temperature (°C)	:	179.00	NA	As per IS:11255 (Part 3)-2008
Velocity of flue gas (m/sec)	:	10.69	NA	As per IS:11255 (Part 3)-2008
Gas flow rate at stack condition (m ³ /hour)	:	1210	NA	As per IS:11255 (Part 3)-2008
Gas flow rate at NTP (Nm ³ /hour)	:	789	NA	As per IS:11255 (Part 3)-2008
Particulate matter	:	12.00	150 mg/day	As per IS:11255 (Part 1)- 1985
SO ₂ (Kg/Hr)	:	2.4	10 kg/day	As per IS:11255 (Part 2)-1985
* Permissible Limits	As per the PCB consent			

Details of instrument used - Pollutech model, PEM-SMK 10					
Name of instrument	Range	Sensitivity	Calibration date	Validity	Traceability
Pitot tube	0-200 mm WC	0.01 mmWC	1/31/2018	1/30/2019	FCRI
Manometer (ΔP)	0-200 mm WC	001 mmWC	1/31/2018	1/30/2019	FCRI
Pyrometer	27-600 °C	1°C	1/31/2018	1/30/2019	FCRI
Particulate Matter Flow meter	2-60 LPM	1 LPM	1/31/2018	1/30/2019	FCRI
Gaseous Flow Meter	0.6-6.0 LPM	0.1 LPM	1/31/2018	1/30/2019	FCRI
DGM Vacuum gauge	0-760 mmWC	10 mmWC	1/31/2018	1/30/2019	FCRI
DGM temp	0-100 °C	1°C	1/31/2018	1/30/2019	FCRI

* Recognised by Ministry of Environment & Forests, as "Environmental Laboratory" vide Notification S. O. 428 (E) valid upto Jan. 2019
 * The results relate only to the condition prevailing at the time of sampling

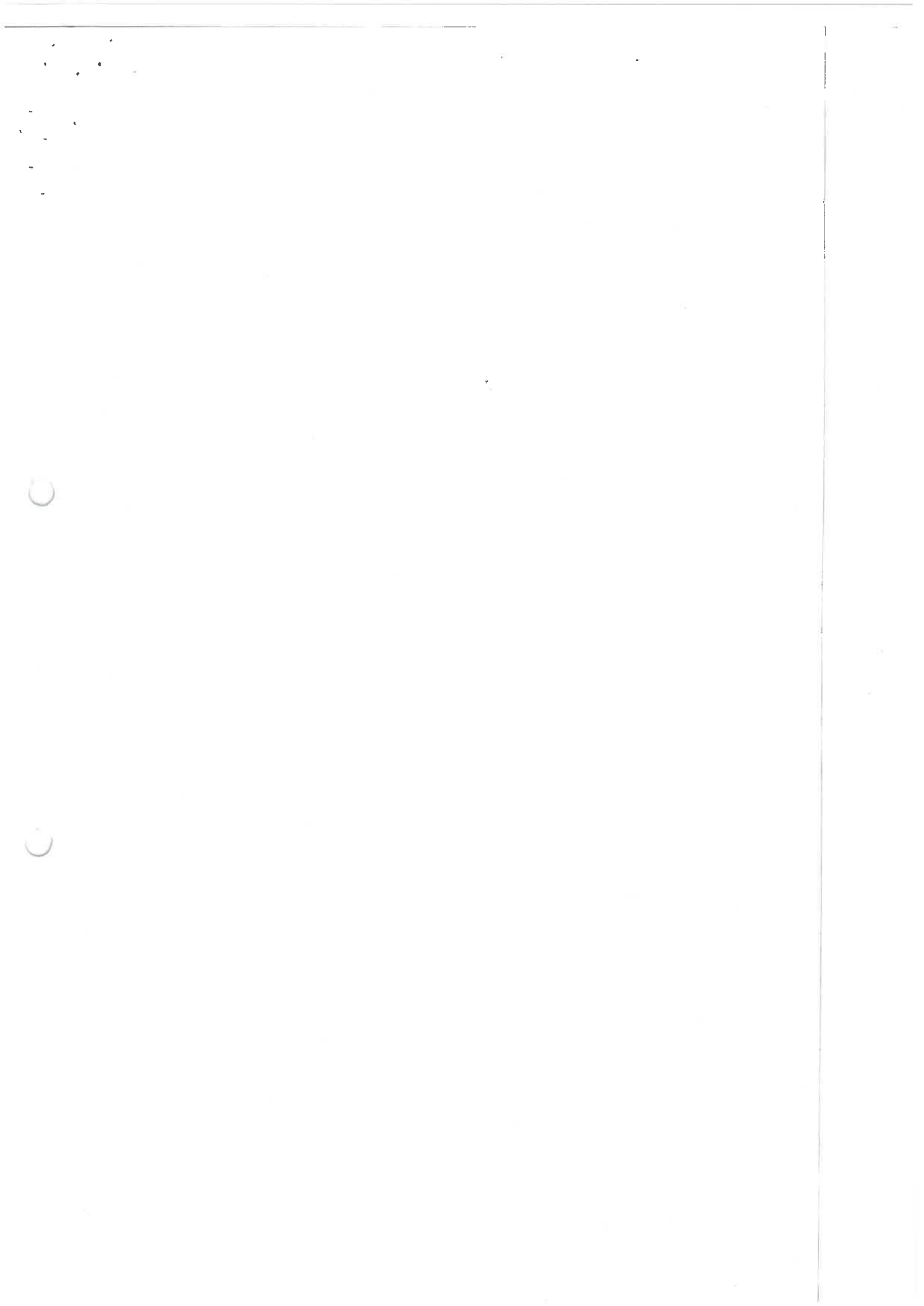
Stack Analysis Report	
Name of the unit	DURGAMNWADI BAUXITE MINE
Address	VILLAGE DURGAMNWADI DIST KOLHAPUR
Date & Time	28-05-2018

Stack details			
Stack - 2 attached to	DG (1000KVA) [-II-]	I. D. Of stack at port (mtr) D	0.2
crosssection of the stack	Round	Stack crosssectional area m2	0.0314
Height of stack above ground (mtr)	17	Consumption of fuel (lit/hr)	55
Fuel used	HSD	Load on the system	Approx. 85 %

EMMISSION DETAILS				
Particulars		Value	* Permissible limit	Method of analysis
Temperature (°C)	:	170.00	NA	As per IS:11255 (Part 3)-2008
Velocity of flue gas (m/sec)	:	9.61	NA	As per IS:11255 (Part 3)-2008
Gas flow rate at stack condition (m ³ /hour)	:	1087	NA	As per IS:11255 (Part 3)-2008
Gas flow rate at NTP (Nm ³ /hour)	:	725	NA	As per IS:11255 (Part 3)-2008
Particulate matter	:	14.0	150 mg/day	As per IS:11255 (Part 1)- 1985
SO ₂ (Kg/Hr)	:	1.9	10 kg/day	As per IS:11255 (Part 2)-1985
* Permissible Limits	As per the PCB consent			

Details of instrument used - Pollutech model,PEM-SMK 10					
Name of instrument	Range	Sensitivity	Calibration date	Validity	Traceability
Pitot tube	0~200 mm WC	0.01 mmWC	31-01-2018	30-01-2019	FCRI
Manometer (ΔP)	0~200 mm WC	001 mmWC	31-01-2018	30-01-2019	FCRI
Pyrometer	27~600 °C	1°C	31-01-2018	30-01-2019	FCRI
Particulate Matter Flow meter	2~60 LPM	1 LPM	31-01-2018	30-01-2019	FCRI
Gaseous Flow Meter	0.6~6.0 LPM	0.1 LPM	31-01-2018	30-01-2019	FCRI
DGM Vacuum gauge	0~760 mmWC	10 mmWC	31-01-2018	30-01-2019	FCRI
DGM temp	0~100 °C	1°C	31-01-2018	30-01-2019	FCRI

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 * The results relate only to the condition prevailing at the time of sampling



DURGAMANWADI MINES

WELL DEPTHS OF VILLAGES

S.NO.	LOCATION	NAME OF THE MINE AREA	TOTAL DEPTH IN MTS	WATER LEVEL FROM SURFACE IN MTS
				29.05.2018
1	PADSALI VILLAGE	DMW	4.1	0.90
2	CHAVANWADI VILLAGE	DMW	2.80	2.20

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