ADITYA BIRLA

HINDALCO

Registered Post

The Additional PCCF,
Ministry of Environment, Forests & Climate Change
Regional office (West Central Zone),
Ground Floor, East Wing,
"New Secretary Building"
Civil lines, Nagpur - 440001

05/10/2017

Subject: Compliance Status of Environment Clearance conditions

Dear Sir,

We have been granted Environment Clearance to our Dhangarwadi Bauxite Mines on 5th of February 2007 vide clearance No J-11015/406/2006-IA.II(M).

We are herewith submitting the compliance against the conditions laid down in the Environment Clearance; for the 6 months duration (April'17 to September'17) along with the environment monitoring reports of Air, Water and Noise quality for the post summer and monsoon seasons.

Hope you will please find the above in order.

Thanking you,

Yours very truly,

Mainak Chakraborty
Vice President – Mines

Encl. A/a
Copy to:
1. The Chief Conservator of Forests (Central)
Ministry of Environment & Forests
Regional office, BHOPAL.

2. The Member Secretary,
Central Pollution Control Board,
Parivesh Bhavan, East Arjun Nagar,
DELHI - 110032

3. The Regional Officer
Maharashtra Pollution Control Board
Udyog Bhawan, KOLHAPUR.

HINDALCO INDUSTRIES LIMITED
Registered Office : Century Bhavan, 3rd Floor, Dr. Annie Besant Road, Worli, Mumbai 400 030. Telephone + 91 22 6662 6666
Durgmanwadi Mines : PO Radhanagari - 416 212 Dist. Kolhapur, Maharashtra. T. : + 91 02321 202072 / 202178 / 133
Kolhapur Office : T. : 91 0231 2661458, 2666621, 2021461, 2021462
Website : www.hindalco.com E-mail : hindalco@adityabirla.com
Corporate Identity No. : L27020MH1958PLC011238

ENVIRONMENT CLEARANCE COMPLIANCE STATUS

ENVIRONMENT CLEARANCE No. J-11015/406/2006-IA.II(M) dt. 13/04/2007

DHANGARWADI BAUXITE MINES

Sr. No.	CONDITIONS	COMPLIANCE
A) Specific Conditions :-		
i)	Top soil to be stacked properly with proper slope with adequate safeguards and to be backfilled for reclamation and rehabilitation of mined out area.	The top soil generated during overburden removal is around 20,000 tonnes which has been used for restoration.
ii)	Overburden shall be stacked at earmarked dump site(s) only and shall not be kept active for long period. The maximum height of the dump shall not exceed 30 m, each stage shall preferably be of 10 m and over all slope of the dump shall not exceed 28^0. The mine pit area to be reclaimed by backfilling the OB in a phased manner. The OB dumps to be scientifically vegetated with suitable native species to prevent erosion and surface run off. Monitoring and management of rehabilitated areas to be continue until the vegetation becomes self-sustaining. Compliance status shall be submitted to the Ministry of Environment & Forests on six monthly basis.	Overburden dumps are stacked separately as per the guidelines and the same will be used for backfilling in mined out area. Plantation has been carried out on OB dumps with native shrub species namely Karvi to prevent erosion and surface run-off. Backfilling of mined out area is being done simultaneously and backfilled area has been scientifically vegetated with indigenous species. Compliance status is being submitted on six monthly.
iii)	Garland drains to be constructed to arrest silt and sediment flows from watering the mine area, roads, green belt development etc. The drains shall be regularly desilted particularly after monsoon and maintained properly. Garland drain (size, gradient and length) shall be constructed for both mine pit and for waste dump and sump capacity shall be designed keeping 50% safety margin over and above peak sudden rainfall (based on 50 years data) and maximum discharge in the area adjoining the mine site. Sump capacity shall also provide adequate retention period to allow proper settling of silt material. Sedimentation pits shall be constructed at the corners of the garland drains and desilted at regular	Garland drains have been provided to arrest the silt and sediment flows from the mine area. The flow from the settling tanks is then channelised through check dams. Drains and check dams are de-silted and maintained properly. The storm-water flowing through check dams is monitored and found within limit.

	intervals.	
iv)	Drilling and blasting shall be by using dust extractors/wet drilling.	Drilling and blasting is being carried out by using mist water jet (wet drilling).
v)	Plantation to be raised in an area of 22.32 ha. including green belt of adequate width by planting the native species around the ML area, roads, OB dump sites etc. in consultation with the local DFO / Agriculture Department. The density of the trees should be around 2500 plants per ha.	The lease area has natural green belt with indigenous species which is undisturbed and maintained. On slope of the OB dump plantation of local species "Karvy" to control slope stability and soil erosion has been carried out with the help of expertise / Government agencies. A nursery has been developed for indigenous and local species (around 2000) for plantation in mined out area at the mines. The plantation is carried out every year as per plan. Till date 25,150 saplings have been planted & restored about 13.0 Ha area. During the year 2017-18, 9,000 saplings have been planted to cover 5.0 Ha.
vi)	Implement suitable conservation measures to augment ground water resources in the area in consultation with the Regional Director, Central Ground Water Board.	Water harvesting pond has been developed in the mined out areas as per the mine closure planning. As the mine plateau is on high elevation, the water accumulated in mined out area mostly percolates down to the nearby water sources. Some water is also evaporated during dry months.
vii)	Regular monitoring of ground water level and quality shall be carried out by establishing a network of existing wells and constructing new piezometers during the mining operation. The monitoring shall be carried out four times in a year – pre-monsoon (April-May), monsoon (August), post-monsoon (November) and winter (January) and the data thus collected may be sent regularly to MOEF, Central Ground Water Authority and Regional Director Central Ground Water Board.	The ground water quality is monitored on quarterly basis. The mining is carried out to a depth of 7 to 10 Mts from the surface. There is no interaction with the ground water and hence there is no disturbance to the ground water.
viii)	Prior permission from the competent authority to be obtained for drawl of	Noted

	ground water, if any.	
ix)	Vehicular emissions to be kept under control and regularly monitored. Measures to be taken for maintenance of vehicles used in mining operations and in transportation of mineral. The vehicles should be covered with a tarpaulin and shall not be over loaded.	There is a system to check the PUC certificates of all hired trucks regularly. Timely maintenance of all heavy equipments is carried out. All transport vehicles are covered with tarpaulin. The vehicles are weighed within the mines. All the vehicles are carrying bauxite as per RLW.
x)	At the end of the mining, the void shall be used as water body for water conservation and recharging of the ground water.	At the end of the mining, the void will be used as water body for water conservation and recharging of the ground water.
xi)	A Final Mine Closure Plan, alongwith details of Corpus Fund, should be submitted to the Ministry of Environment & Forests 5 years in advance of final mine closure for approval.	Mine is still operational. Final Mine closure plan will be submitted to concerned agency in due course.
B) General Conditions :-		
i.	No change in mining technology and scope of working shall be made without prior approval of the Ministry of Environment & Forests	There is no change in the mining technology and in the scope of working.
ii.	No change in the calendar plan including excavation, quantum of mineral bauxite & waste shall be made	The production is restricted to the approved quantity.
iii.	Conservation measures for protection of flora & fauna in the core & buffer zone shall be drawn up in consultation with the local forest and wildlife department.	Mined out area is scientifically afforested. For this we procure manure, vermi compost to improve the condition of plantation base. We had engaged experts to implement afforestation activity. Care has been taken to plant mostly local flora along with some exotic species. The core area is fenced with parapet wall and the natural vegetation is protected.
iv.	Four ambient air quality monitoring stations shall be established in the core zone & buffer zone for RPM, SPM, SO2, NOx monitoring. Location of the stations should be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets and frequency of	Ambient air quality stations have been established in the core and buffer area.

	monitoring should be undertaken in consultation with the State Pollution Control Board.	
v.	Regular submission of data on ambient air quality (RPM, SPM, SO2,NOx) to the Ministry including its Regional Office and the State Pollution Control Board once in six months.	The monitoring is carried out as per the schedule and Data is submitted regularly. The Post monsoon and winter season reports are attached.
vi.	Regular control of fugitive dust emissions from all the sources. Water spraying arrangement on haul roads, loading and unloading and at transfer points shall be provided and properly maintained.	Truck mounted mobile water tanker is being used for dust suppression during mining and transportation.
vii.	Take measures for control of noise levels below 85 dBA in the work environment. Workers engaged in operations of HEMM, shall be provided with ear-plugs / muffs.	The noise level at the mine periphery is within the standard. All the workers engaged in operations of HEMM are provided with ear-plugs / muffs.
viii.	Proper collection, treatment of industrial waste water to conform to the standards prescribed under GSR 422 (E) dt.19th May, 1993 and 31st December, 1993 or as amended from time to time. Oil and grease trap shall be installed before discharge of workshop effluents.	There is no industrial waste water as there is no mineral processing is carried out.
ix.	Provide adequate training and information on safety & health aspects & provide protective respiratory devices to personnel working in dusty areas	Regular training to employees on Safety and Health aspects is provided and all the workers engaged in operations are provided dust masks.
x.	Undertake periodic Occupational health surveillance program of the workers to observe any contractions due to exposure to dust and take corrective measures, if needed.	The health surveillance is done once in a year for all employees and there are no cases of occupational health hazards.
xi.	Set-up separate environmental management cell with suitable qualified personnel	A qualified person has been employed at the unit level. A full fledged Environment cell operates at the corporate level.
xii.	Inform the Regional Office located at Bhopal regarding date of financial closures and final approval of the project by the concerned authorities and the date of start of land	complied in due course.

<table>
<tr><td></td><td>development work.</td><td></td></tr>
<tr><td>xiii.</td><td>The funds earmarked for environmental protection measures to be kept in separate account and should not be diverted for other purpose. Yearwise expenditure shall be reported to the Ministry and its Regional Office.</td><td>The separate funds have been allocated for implementation of environmental protection measures along with item-wise breakup such as furnished below. The expenditures are upto Sep-2017.
<table>
<tr><th>SO. NO.</th><th>Shop Order Description</th><th>Expenditure for the year 2017-18 (Rs.) Upto September-17</th></tr>
<tr><td>1</td><td>Aftercare</td><td>1,58,094.0</td></tr>
<tr><td>2</td><td>Environment Monitoring</td><td>3,27,406.0</td></tr>
<tr><td>3</td><td>Dust suppression</td><td>1,48,828.0</td></tr>
<tr><td>4</td><td>Statutory Compliance</td><td>1,186.0</td></tr>
<tr><td>5</td><td>Environment Others</td><td>2,555.0</td></tr>
<tr><td>6</td><td>Mine restoration & rehabilitation</td><td>4,10,000.0</td></tr>
</table></td></tr>
<tr><td>xiv.</td><td>Inform the Regional Office located at Bhopal regarding date of financial closures and final approval of the project by the concerned authorities and the date of start of land development work.</td><td>Will be complied in due course.</td></tr>
<tr><td>xv.</td><td>The Regional Office of this Ministry located at Bhopal should monitor compliance of the stipulated conditions. The project authority should extend full co-operation to the officer(s) of the Regional Office by furnishing the requisite data / information / monitoring reports.</td><td>The project authority will extend full co-operation to the officer(s) of the Regional Office by furnishing the requisite data / information / monitoring reports.</td></tr>
<tr><td>xvi.</td><td>Copy of the clearance letter be marked to concerned Panchayat / local NGO, if any, from whom suggestion / representation has been received while processing the proposal.</td><td>Complied.</td></tr>
<tr><td>xvii.</td><td>State Pollution Control Board to display a copy of the clearance letter at the Regional Office, District Industry Centre and Collector's office / Tehsildar's Office for 30 days.</td><td>Complied.</td></tr>
</table>

xviii.	Advertise at least in two local newspapers widely circulated, one of which shall be in the vernacular language of the locality concerned, within 7 days of the issue of the clearance letter informing that the project has been accorded environmental clearance and a copy of the clearance letter is available with the State Pollution Control Board and also at web site of the Ministry of Environment and Forests at http://envfor.nic.in and a copy of the same shall be forwarded to the Regional Office of this Ministry located at Bhopal.	Complied.

ENVIRONMENTAL QUALITY MONITORING REPORT

MONSOON 2017

DHANGARWADI BAUXITE MINE

DHANGARWADI VILLAGE,
SAHUWADI TALUK,

KOLHAPUR DISTRICT,
MAHARASHTRA

IND.BH.41.16.0322/HSR

M/S HINDALCO INDUSTRIES LIMITED

PREPARED BY

BHAGAVATHI ANA LABS PVT LTD.,
7-2-C-14, Industrial Estate,
Sanathnagar, Hyderabad
500 018

CONTENTS

PREFACE

Environmental quality monitoring at **Dhangarwadi bauxite mine** situated at Dhangarwadi village, Shahuwadi taluka, Kolhapur, Maharashtra of **M/S. Hindalco Industries Limited** entrusted to **Bhagavathi Ana Labs Pvt. Limited, Hyderabad** during monsoon season of the year 2017.

The monitoring was carried out in the selected locations in core zone and buffer zone around the mine lease area. Accordinly, ground and surface water samples were collected during the month of August 2017

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 their field staff.

EXECUTIVE SUMMARY

Dhangarwadi Bauxite Mine of **M/S Hindalco Industries Limited** includes the study of the water quality only in core zone and buffer zone around the mine lease area during the monsoon season of the year 2017.

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.

AREA DETAILS

INTRODUCTION

Hindalco Industries is one of the leading producers of aluminum in the country. The company business involves bauxite mining to alumina refining. Alumina metal conversion, sheet, extrusion, foil manufacturing and is spread all over the country. The company is operating number of bauxite mines in Maharashtra, Orissa, Chhattisgarh and Jharkhand to feed the Alumina Plants located in Belgaum, Renukut and Muri.

On getting concurrence from Central Government, Government of Maharashtra has indicated its intention to grant mining lease over of 122.63 ha, out of which 41.80 ha falls under non forest area. As per the directions of the Government of Maharashtra the mining plan was prepared for the entire lease area of 122.63 ha and the same was approved by the Indian Bureau of Mines vide letter no. MP/KLP/MAH-73-SZ, DT.11/11/2003. On submission of approved mining plan Government of Maharashtra has sanctioned mining lease for the production of bauxite for the revenue land of 41.80 and keeping pending of sanction of mining lease for the forest land of 80.83 ha subject to obtaining "No Objection certificate" from the Ministry of Environment and Forest, Govt. of India. The Environmental Clearance was obtained for the production of 0.6 million TPA of bauxite over an entire area of 122.63 ha.

Considering the delay in the process of forest clearance for the area falling under forest land, the Government of Maharashtra has granted mining lease only for the non forest land of 41.80 ha. by keeping pending the grant of mining lease for the forest area. Accordingly, the mining lease was executed by the collector of Kolhapur over an area 41.80 ha. on 05/05/2008 for period of 30 years.

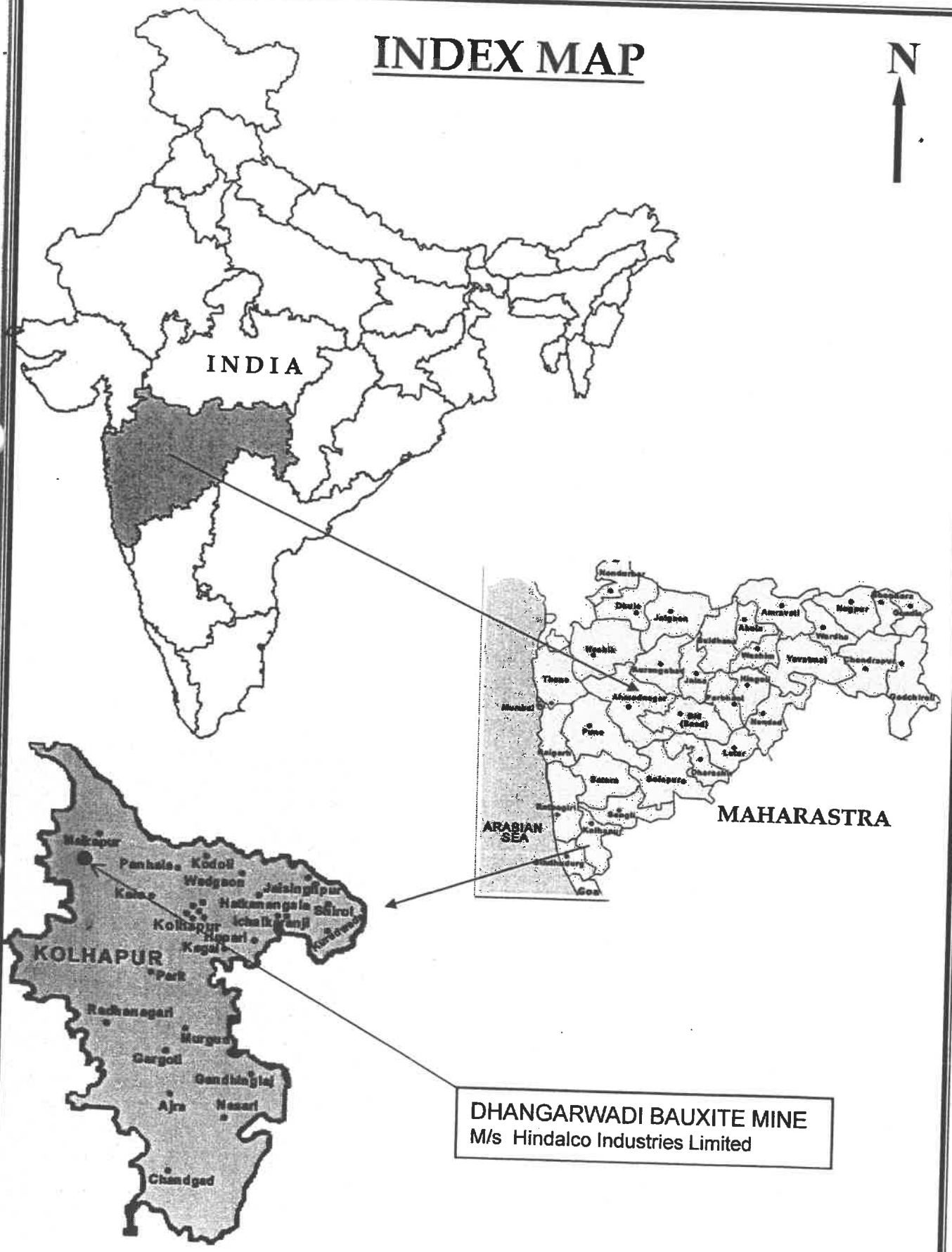
MINE DETAIL

Dhangarwadi bauxite mine is located near Dhangarwadi village of Shahuwadi taluka of Kolhapur District in Maharashtra state.

GEOGRAPHICAL DETAILS:

Latitude	:	$16^0\,52'$ to $16^0\,56'$
Longitude	:	$73^0\,48'$ to $73^0\,51'$

INDEX MAP


N
INDIA
MAHARASTRA
ARABIAN SEA
KOLHAPUR
Malkapur
Panhala
Kodoli
Wadgaon
Jaisingpur
Kale
Hatkanangale
Shirol
Kolhapur
Ichalkaranji
Hupari
Kagal
Patil
Radhanagari
Kurgud
Gargoti
Gandhinglaj
Ajra
Nesari
Chandgad
DHANGARWADI BAUXITE MINE
M/s Hindalco Industries Limited
NOT TO SCALE

Details of lease area

The following table gives the details of the area in terms of district, taluka, village, gat no., etc.

District	Taluka	Village	Gat No.	Area granted (ha)	Owner/Occupier.
Kolhapur	Shahuwadi	Dhangarwadi			
"	"	"	45	12.32	Private land
"	"	"	46(part)	6.53	Private land
"	"	"	50(part)	2.17	Private land
"	"	"	52	10.58	Private land
"	"	"	53(part)	5.09	Private land
"	"	"	56(part)	2.76	Private land
Kolhapur	Shahuwadi	Ainwadi	106(part)	2.35	Private land
				41.80	

ACCESSIBILITY

The district headquarter Kolhapur is connected to Mumbai by broad gauge railway line of South Central Railway of Indian Railway. Daily trains services are available from Mumbai and many other important places to Kolhapur. The nearest (i) railway station is Kolhapur at a distance of 56 kms eastwards with respect to the mines. The district is well served by a network of good roads - National Highways, State Highways and Major District roads. The National Highway Mumbai – Pune- Bangalore passes through Kolhapur.

Road

Dhangarwadi is approachable by a distance of 8 kms from Dhopeshwar Junction, located 6 kms from Malkapur Town on Ratnagiri – Nagpur National Highway.

Rail head

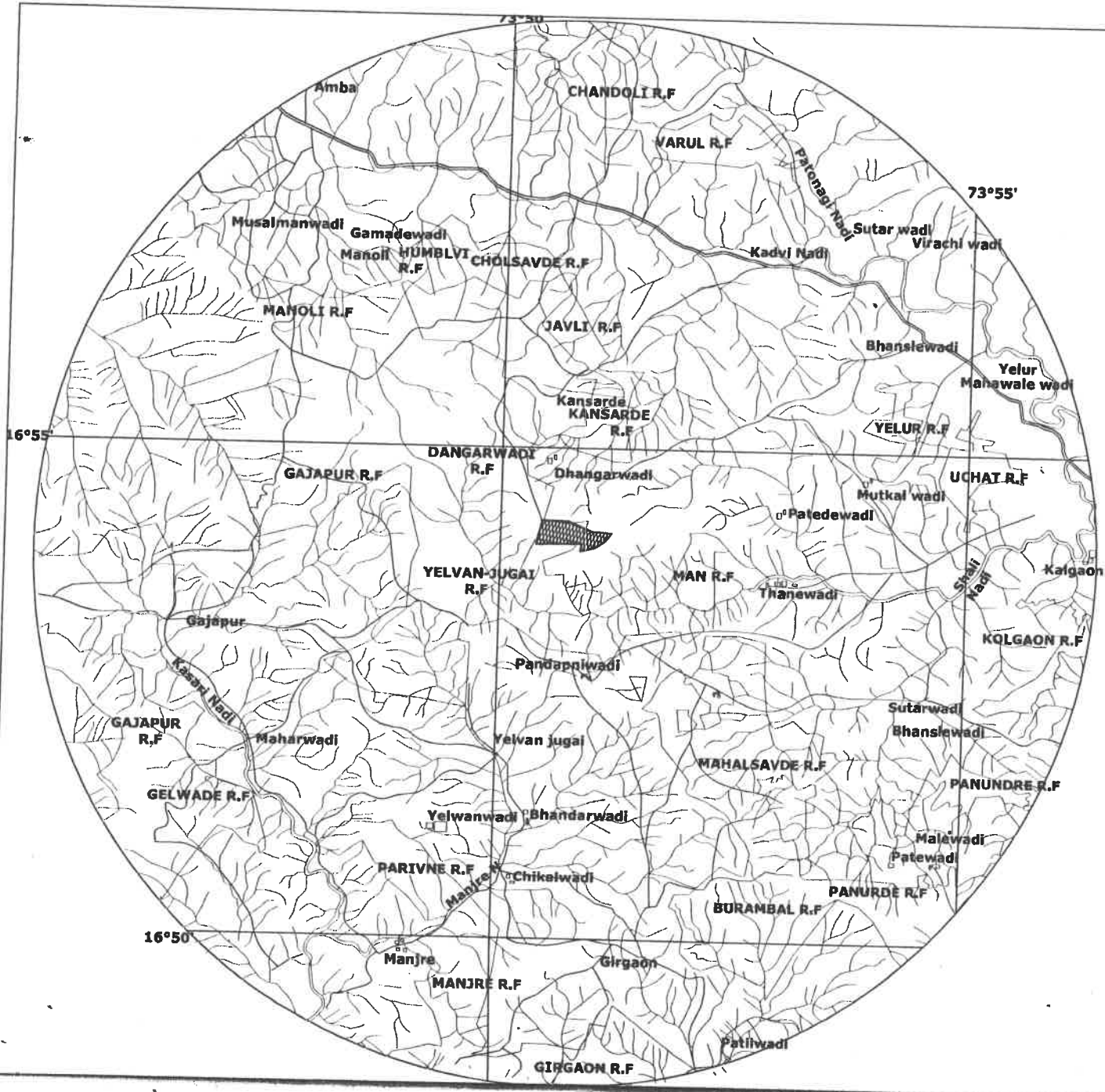
The nearest railway head is Kolhapur which is situated at a distance of about 56 kms by road from the lease area.

Sea Port

The nearest sea port is Ratnagiri sea port is about 95 kms form the mine

Airport

The nearest airport is at Kolhapur which is around 60 kms by road from the lease area.



PROJECT: DHANGARWADI BAUXITE MINES

CLIENT :HINDALCO INDUSTRIES LIMITED

TITLE: TOPOGRAPHICAL MAP OF THE STUDY AREA

PREPARED BY
M/S BHAGAVATHI ANA LABS PVT LTD
HYDERABAD

DHANGARWADI BAUXITE MINE
(M/s. Hindalco Industries Limited)

DETAILS

State	Maharashtra
District	Kolhapur
Taluka	Shahuwadi
Village	Dhangarwadi
Latitude	16^0 52′ to 16^0 56′
Longitude	73^0 48′ to 73^0 51′
Nature of the area	Plateau terrain
Topposheet no.	47 H/13.

GENERAL CLIMATIC CONDITIONS

Maximum temperature	40.0 °C
Minimum temperature	16.0° C

ACCESSIBILITY

Road connectivity	Approached by road connecting to Dhopeshwar Junction which is at a distance of 8 kms, located 6 kms from Malkapur Town on Ratnagiri-Nagpur National Highway (NH-4).
Rail connectivity	Kolhapur railway station (56km)
Airport	Kolhapur(60km)
Biosphere reserve	Not any
Sanctuary	Chandoli wild life sanctuary is situated at about 50 kms .

ENVIRONMENTAL QUALITY

Environmental quality monitoring at **Dhangarwadi Bauxite Mine** of **M/S Hindalco Industries Limited** at Dhangarwadi village of Shahuwadi taluka, Kolhapur district, Maharashtra includes monitoring of water quality status within core zone and buffer zone around the mine lease area.

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. following two important systems of water bodies:

- Surface water quality.
- Ground water quality.

Surface water quality

Tamrapani and Ghataprabha River are the surface water source in the study area. There are others seasonal nallah which flows in the study area. Proper drainage system has prepared to drag the monsoon water into the mine pit so as to reduce the water pollution. Buffer zone has many seasonal nallah and spring which used to recharge the ground during summer.

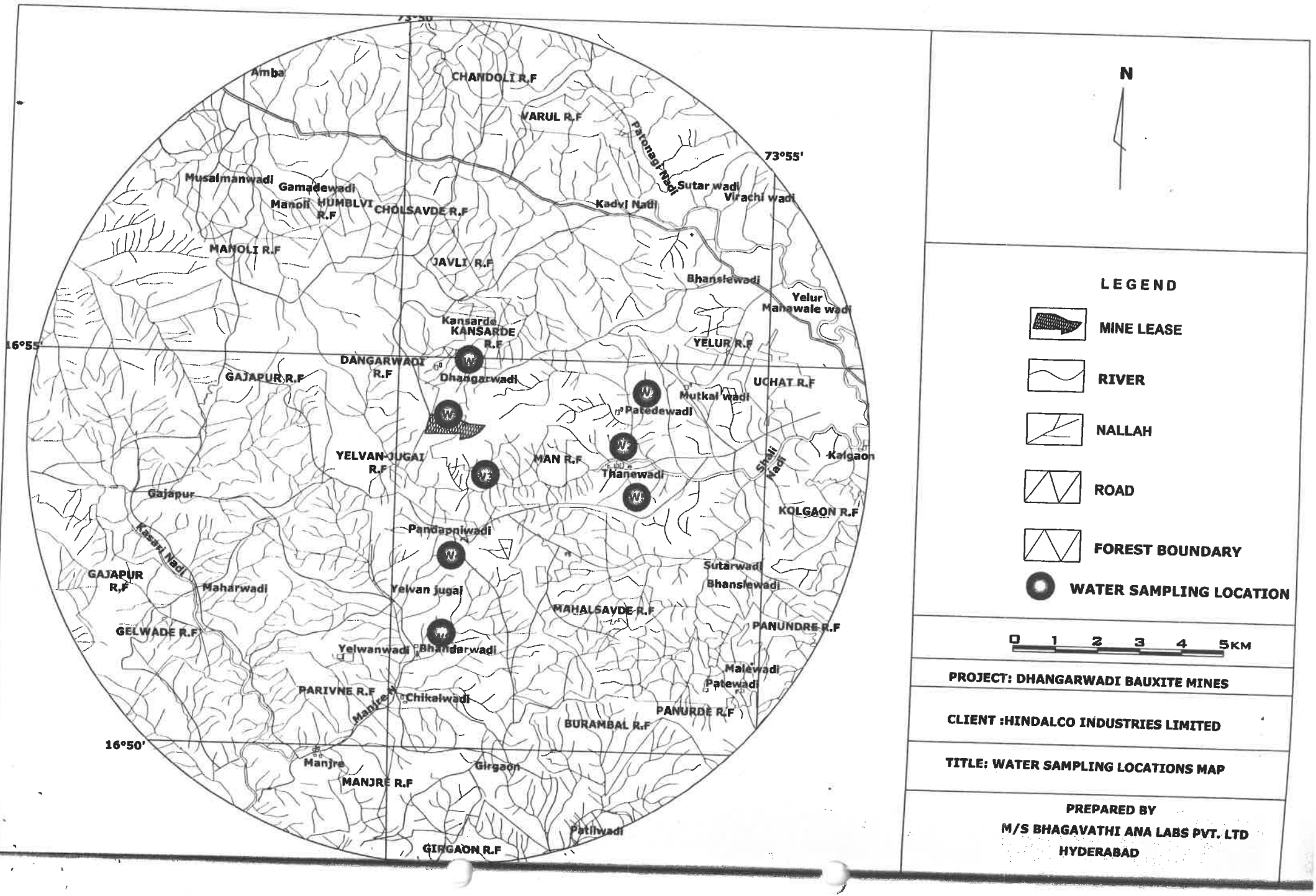
Ground water quality

The most important source of drinking water in the study area is the ground water, which is tapped by a bore well. The buffer zone is good in ground water source. The ground water in the study area gets recharged by rainwater during summer.

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). A total of 9 locations have selected, out of which one in core zone and seven are in buffer zone. Location of water quality monitoring stations is given below.

WATER QUALITY MONITORING LOCATIONS

Code		Name of sampling station	Source of water
W – 1		Mine pit water	Surface water
W – 2		Shali nadi (up stream)	Surface water
W – 3		Shali nadi (down stream)	Surface water
W – 4		Pandapniwadi village	Ground water
W – 5		Thanewadi village	Ground water
W –6		Dhangarwadi village	Ground water
W – 7		Patewadi village	Ground water
W – 8		Bhandarwadi village	Ground water


N
LEGEND
MINE LEASE
RIVER
NALLAH
ROAD
FOREST BOUNDARY
WATER SAMPLING LOCATION
0 1 2 3 4 5KM
PROJECT: DHANGARWADI BAUXITE MINES
CLIENT :HINDALCO INDUSTRIES LIMITED
TITLE: WATER SAMPLING LOCATIONS MAP
PREPARED BY
M/S BHAGAVATHI ANA LABS PVT. LTD
HYDERABAD
73°55'
16°55'
16°50'
Amba
CHANDOLI R.F
VARUL R.F
Patonagar Nadi
Sutar wadi
Virachi wadi
Kadvi Nadi
Musalmanwadi
Gamadewadi
Manoli
HUMBLVI R.F
CHOLSAVDE R.F
MANOLI R.F
JAVLI R.F
Bhanslewadi
Yelur
Mahawale wadi
YELUR R.F
Kansarde
KANSARDE R.F
DANGARWADI R.F
Dhangarwadi
GAJAPUR R.F
UCHAT R.F
Mutkal wadi
Patedewadi
YELVAN-JUGAI R.F
MAN R.F
Thanewadi
Shidi Nadi
Kalgaon
Gajapur
KOLGAON R.F
Pandapniwadi
Kasavi Nadi
GAJAPUR R.F
Maharwadi
Yelvan jugai
Sutarwadi
Bhanslewadi
MAHALSAVDE R.F
PANUNDRE R.F
GELWADE R.F
Yelwanwadi
Bhandarwadi
Malewadi
Patewadi
PARIVNE R.F
Chikalwadi
Manjre
PANURDE R.F
BURAMBAL R.F
Manjre
Girgaon
MANJRE R.F
Patilwadi
GIRGAON R.F

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 monsoon season of the year 2017 as per the prescribed sample collecting methods and analyzed as per the IS standard procedures. Complete analysis report of water samples are given below.

SURFACE WATER QUALITY

Date of Sampling: 11.08.2017

Sl. No	Parameter	Units	W-1 MINE PIT WATER	W-2 SHALI NADI UP STREAM	W-3 SHALI NADI DOWN STREAM
1	Odour	–	Un-objectionable	Un-objectionable	Un-objectionable
2	Taste	–	Agreeable	Agreeable	Agreeable
3	Color	Hazen units	<5	<5	<5
4	pH	–	6.55	6.63	6.59
5	Turbidity	NTU	<5	<5	<5
6	Dissolved Oxygen	mg/l	7.0	7.40	7.00
7	Total Dissolved solids	mg/l	69	54	66
8	Total Suspended solids	mg/l	34	44	36
9	Alkalinity as $CaCO_3$	mg/l	20.0	23.0	21
10	Total Hardness as $CaCO_3$	mg/l	36.0	25.0	40.7
11	Nitrate as NO_3	mg/l	0.29	0.32	0.37
12	Phosphates as PO_4	mg/l	0.01	0.02	0.01
13	Chlorides as Cl	mg/l	20	11.6	13.53
14	Sulphates as SO_4	mg/l	2.7	3.2	3.4
15	Sodium as Na	mg/l	6	5.6	4
16	Potassium as K	mg/l	2.4	3.1	1.6
17.	Calcium as Ca	mg/l	8.4	11.2	14.4
18	Magnesium as Mg	mg/l	3	2	4
19	Lead as Pb	mg/l	BDL	BDL	BDL
20	Manganese as Mn	mg/l	0.01	0.01	0.02
21	Cadmium as Cd	mg/l	BDL	BDL	BDL
22	Chromium as Cr	mg/l	BDL	BDL	BDL
23	Copper as Cu	mg/l	BDL	BDL	BDL
24	Zinc as Zn	mg/l	BDL	BDL	BDL
25	Iron as Fe	mg/l	0.14	0.16	0.17
26	Fluoride as F	mg/l	BDL	BDL	BDL
27	Mercury as Hg	mg/l	BDL	BDL	BDL
28	Selenium as Se	mg/l	BDL	BDL	BDL
29	Arsenic as As	mg/l	BDL	BDL	BDL
30	Cyanide as CN	mg/l	BDL	BDL	BDL
31	Boron as B	mg/l	BDL	BDL	BDL
32	B.O.D	mg/l	7	6	7

BDL: Below Detectable Limit

mg/l: Milligram per liter

GROUND WATER QUALITY

Date of Sampling: 11.08.2017

Sl. No	Parameter	Units	W-4 PANDAPNIWADI VILLAGE	W - 5 THANEWADI VILLAGE	W -6 DHANGARWADI VILLAGE	W-7 PATEWADI VILLAGE	W -8 BHANDAR WADI VILLAGE
1	Odour	--	Un-objectionable	Un-objectionable	Un-objectionable	Un-objectionable	Un-objectionable
2	Taste	--	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3	Color	Hazen units	<5	<5	<5	<5	<5
4	pH	--	6.77	6.89	6.72	6.54	6.50
5	Turbidity	NTU	<5	<5	<5	<5	<5
6	Dissolved Oxygen	mg/l	4.70	5.20	5.50	5.00	4.70
7	Total Dissolved solids	mg/l	59	119	23	34	132
8	Total Suspended solids	mg/l	33	14	10	17	14
9	Alkalinity as $CaCO_3$	mg/l	25	54	9	12	16
10	Total Hardness as $CaCO_3$	mg/l	33.0	55.0	13.0	19.0	69.0
11	Nitrate as NO_3	mg/l	0.44	1	0.11	0.14	0.66
12	Phosphates as PO_4	mg/l	0.02	0.02	0.01	0.01	0.01
13	Chlorides as Cl	mg/l	11.6	15.47	14.5	11.6	11.6
14	Sulphates as SO_4	mg/l	2.4	5.3	1	5	8
15	Sodium as Na	mg/l	4.3	14	1.6	3.2	11
16	Potassium as K	mg/l	3	5	1	2.1	6.4
17	Calcium as Ca	mg/l	12.8	14.4	9.6	8.8	11.2
18	Magnesium as Mg	mg/l	3.4	6.7	1.7	2.3	7
19	Lead as Pb	mg/l	BDL	BDL	BDL	BDL	BDL
20	Manganese as Mn	mg/l	0.02	0.02	0.02	0.06	0.07
21	Cadmium as Cd	mg/l	BDL	BDL	BDL	BDL	BDL
22	Chromium as Cr	mg/l	BDL	BDL	BDL	BDL	BDL
23	Copper as Cu	mg/l	BDL	BDL	BDL	BDL	BDL
24	Zinc as Zn	mg/l	BDL	BDL	BDL	BDL	BDL
25	Iron as Fe	mg/l	0.12	0.13	0.16	0.12	0.11
26	Fluoride as F	mg/l	BDL	BDL	BDL	BDL	BDL
27	Mercury as Hg	mg/l	BDL	BDL	BDL	BDL	BDL
28	Selenium as Se	mg/l	BDL	BDL	BDL	BDL	BDL
29	Arsenic as As	mg/l	BDL	BDL	BDL	BDL	BDL
30	Cyanide as CN	mg/l	BDL	BDL	BDL	BDL	BDL
31	Boron as B	mg/l	BDL	BDL	BDL	BDL	BDL
32	B.O.D	mg/l	<4	<4	<4	<4	<4

BDL: Below Detectable Limit

mg/l: Milligram per liter

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

RESULTS & DISCUSSION

- The pH of the study area varies from 6.50 to 6.89 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 4.70 to 7.40.
- Total Dissolved Solids found to be in the range of 23 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 9 to 54.0 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 13 to 69 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 of the water sample collected in the study area is found to in the range of 11.6 to 20 mg/l. As per IS 10500 standard for drinking water, the desirable limit is 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 8.4 to 14.40 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 1.7 to 7 mg/l.
- Iron content of the water in the study area found to be in the range of 0.11 to 0.17 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.

DOMESTIC EFFLUENT ANALYSIS

Sample Type: **Canteen waste water**

Date of sampling: 11.08.2017

Sl.No	Test	Result
1	**Total Suspended Solids, mg/l**	**79**
2	**Total Dissolved Solids, mg/l**	**96**
3	**COD, mg/l**	**14**
4	**BOD for 3 days at 27°C, mg/l**	**6**
5	**Total Solids**	**67**
6	**Oil and Grease, mg/l**	**<5**

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 $CaCo_3$	mg /l	200	600
9	Total hardness as $CaCo_3$	mg /l	300	600
10	Nitrates NO_3	mg /l	45	100
11	Phosphates PO_4	mg /l	-----	
12	Chlorides as Cl	mg /l	250	1000
13	Sulphates, SO_4^{2-}	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

DHANGARWADI MINES				
WELL DEPTHS OF VILLAGES				
S.NO.	LOCATION	NAME OF THE MINE AREA	TOTAL DEPTH IN MTS	WATER LEVEL FROM SURFACEIN MTS
				11.08.2017
1	PANDAPNIWADI VILLAGE	DHANGARWADI	6.00	4.0
2	DHANGARWADI VILLAGE	DHANGARWADI	6.00	5.0

ENVIRONMENTAL QUALITY MONITORING REPORT

SUMMER 2017

DHANGARWADI BAUXITE MINE

DHANGARWADI VILLAGE, SAHUWADI TALUK, KOLHAPUR DISTRICT, MAHARASHTRA

IND.BH.41.16.0322/HSR

M/S HINDALCO INDUSTRIES LIMITED

PREPARED BY

BHAGAVATHI ANA LABS PVT LTD.,
7-2-C-14, Industrial Estate,
Sanathnagar, Hyderabad
500 018

CONTENTS

PREFACE

Environmental quality monitoring at **Dhangarwadi bauxite mine** situated at Dhangarwadi village, Shahuwadi taluka, Kolhapur, Maharashtra of **M/S. Hindalco Industries Limited** entrusted to **Bhagavathi Ana Labs Pvt. Limited, Hyderabad** during summer season of the year 2017.

The monitoring was carried out in the selected locations in core zone and buffer zone around the mine lease area during the months of March,, April & May 2017 for the following environmental parameters.

- → Micro-meteorology,
- → Ambient air quality,
- → Ambient noise level quality,
- → Water quality

The data was compiled to assess the current environmental status due to mining as well as allied activities around 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 their field staff.

EXECUTIVE SUMMARY

Dhangarwadi Bauxite Mine of **M/S Hindalco Industries Limited** includes the study of the ambient air quality, noise level quality, water quality in core zone and buffer zone around the mine lease area during the Summer season of the year 2017.

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 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.

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

AREA DETAILS

INTRODUCTION

Hindalco Industries is one of the leading producer of aluminum in the country. The company business involves bauxite mining to alumina refining. Alumina metal conversion, sheet, extrusion, foil manufacturing and is spread all over the country. The company is operating number of bauxite mines in Maharashtra, Orissa, Chhattisgarh and Jharkhand to feed the Alumina Plants located in Belgaum, Renukut and Muri.

On getting concurrence from Central Government, Government of Maharashtra has indicated its intention to grant mining lease over of 122.63 ha, out of which 41.80 ha falls under non forest area. As per the directions of the Government of Mharashtra the mining plan was prepared for the entire lease area of 122.63 ha and the same was approved by the Indian Bureau of Mines vide letter no. MP/KLP/MAH-73-SZ, DT.11/11/2003. On submission of approved mining plan Government of Maharashtra has sanctioned mining lease for the production of bauxite for the revenue land of 41.80 and keeping pending of sanction of mining lease for the forest land of 80.83 ha subject to obtaining "No Objection certificate" from the Ministry of Environment and Forest, Govt. of India. The Environmental Clearance was obtained for the production of 0.6 million TPA of bauxite over an entire area of 122.63 ha.

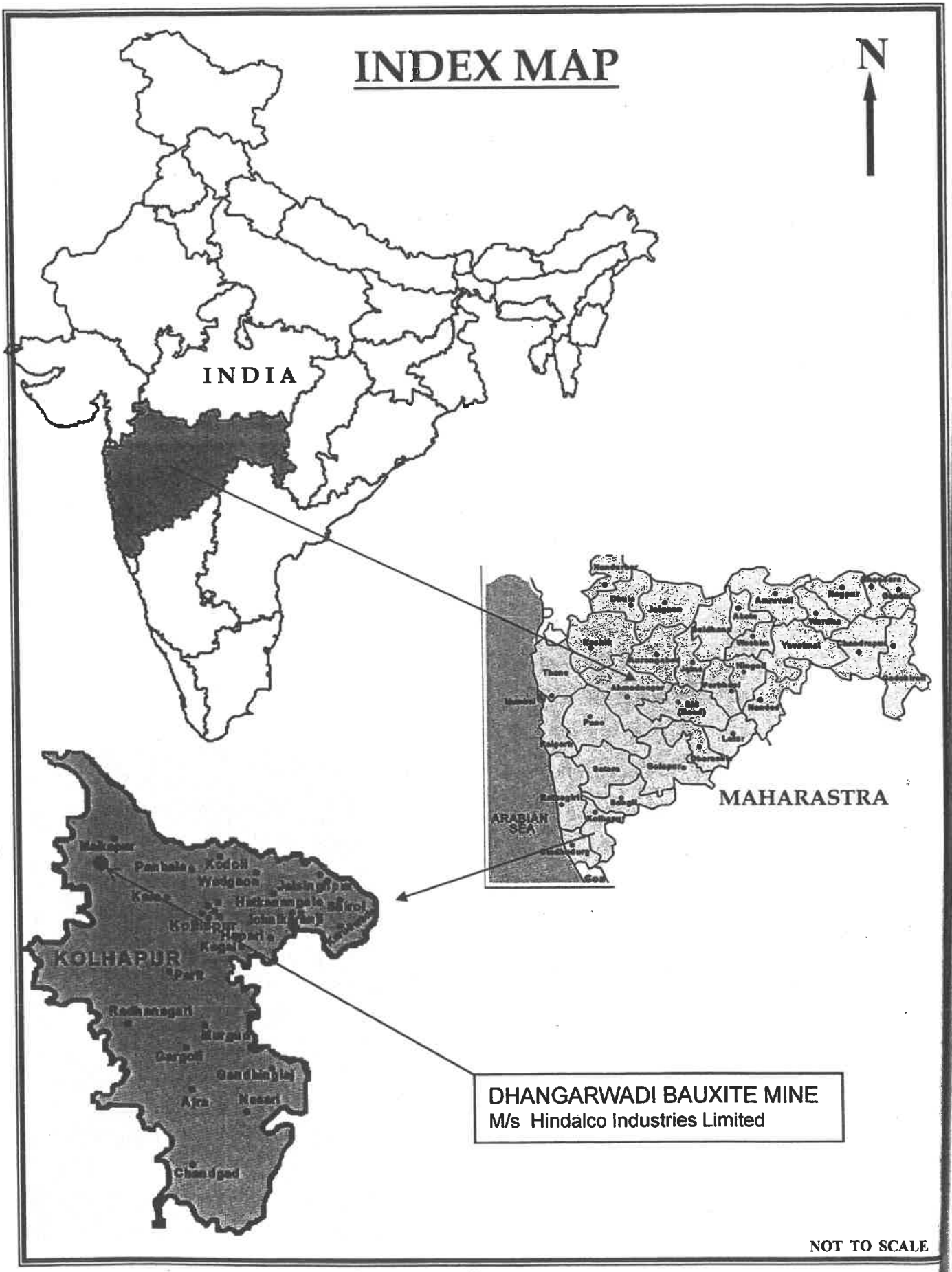
Considering the delay in the process of forest clearance for the area falling under forest land, the Government of Maharashtra has granted mining lease only for the non forest land of 41.80 ha. by keeping pending the grant of mining lease for the forest area. Accordingly, the mining lease was executed by the collector of Kolhapur over an area 41.80 ha. on 05/05/2008 for period of 30 years.

MINE DETAIL

Dhangarwadi bauxite mine is located near Dhangarwadi village of Shahuwadi taluka of Kolhapur District in Maharashtra state.

GEOGRAPHICAL DETAILS:

Latitude	:	$16^0\,52'$ to $16^0\,56'$
Longitude	:	$73^0\,48'$ to $73^0\,51'$


INDEX MAP
N
INDIA
MAHARASTRA
ARABIAN SEA
KOLHAPUR
DHANGARWADI BAUXITE MINE
M/s Hindalco Industries Limited
NOT TO SCALE

Details of lease area

The following table gives the details of the area in terms of district, taluka, village, gat no., etc.

District	Taluka	Village	Gat No.	Area granted (ha)	Owner/Occupier.
Kolhapur	Shahuwadi	Dhangarwadi			
"	"	"	45	12.32	Private land
"	"	"	46(part)	6.53	Private land
"	"	"	50(part)	2.17	Private land
"	"	"	52	10.58	Private land
"	"	"	53(part)	5.09	Private land
"	"	"	56(part)	2.76	Private land
Kolhapur	Shahuwadi	Ainwadi	106(part)	2.35	Private land
				41.80	

ACCESSIBILITY

The district headquarter Kolhapur is connected to Mumbai by broad gauge railway line of South Central Railway of Indian Railway. Daily trains services are available from Mumbai and many other important places to Kolhapur. The nearest (i) railway station is Kolhapur at a distance of 56 kms eastwards with respect to the mines. The district is well served by a network of good roads - National Highways, State Highways and Major District roads. The National Highway Mumbai – Pune- Bangalore passes through Kolhapur.

Road

Dhangarwadi is approachable by a distance of 8 kms from Dhopeshwar Junction, located 6 kms from Malkapur Town on Ratnagiri – Nagpur National Highway.

Rail head

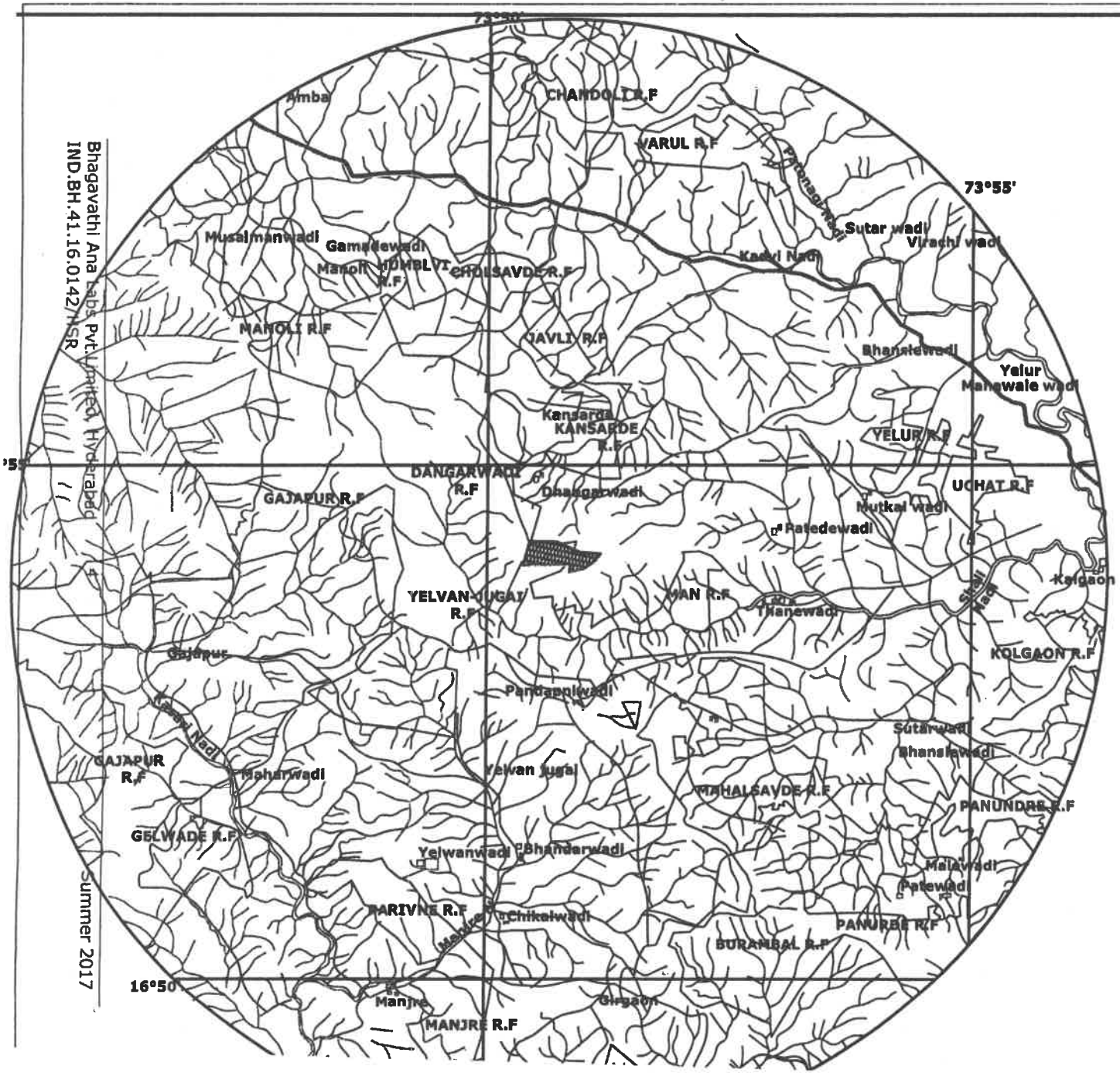
The nearest railway head is Kolhapur which is situated at a distance of about 56 kms by road from the lease area.

Sea Port

The nearest sea port is Ratnagiri sea port is about 95 kms form the mine

Airport

The nearest airport is at Kolhapur which is around 60 kms by road from the lease area.



Bhagavathi Ana Labs Pvt Limited, Hyderabad
IND.BH.41.16.0142/NSR

Summer 2017

N

LEGEND

- MINE LEASE
- RIVER
- NALLAH
- ROAD
- FOREST BOUNDARY

0 1 2 3 4 5km

Dhangarwadi Bauxite mine

Environmental Quality Monitoring Report

PROJECT: DHANGARWADI BAUXITE MINES

CLIENT :HINDALCO INDUSTRIES LIMITED

TITLE: TOPOGRAPHICAL MAP OF THE STUDY AREA

PREPARED BY

M/S BHAGAVATHI ANA LABS PVT LTD

DHANGARWADI BAUXITE MINE
(M/s. Hindalco Industries Limited)

DETAILS

State	Maharashtra
District	Kolhapur
Taluka	Shahuwadi
Village	Dhangarwadi
Latitude	16^0 52′ to 16^0 56′
Longitude	73^0 48′ to 73^0 51′
Nature of the area	Plateau terrain
Topposheet no.	47 H/13.

GENERAL CLIMATIC CONDITIONS

Maximum temperature	40.0 °C
Minimum temperature	16.0° C

ACCESSIBILITY

Road connectivity	Approached by road connecting to Dhopeshwar Junction which is at a distance of 8 kms, located 6 kms from Malkapur Town on Ratnagiri-Nagpur National Highway (NH-4).
Rail connectivity	Kolhapur railway station (56km)
Airport	Kolhapur(60km)
Biosphere reserve	Not any
Sanctuary	Chandoli wild life sanctuary is situated at about 50 kms .

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			WIND SPEED Km/h			WIND DIRECTION
	MIN	MAX	AVERAGE	MIN	MAX	AVERAGE	
07-03-2017	18	32	25.0	0	6	3.0	SE
10-03-2017	18	31	24.5	0.1	9	4.6	E
14-03-2017	19	31	25.0	0	12	6.0	E
17-03-2017	20	34	27.0	0	15	7.5	SSE
21-03-2017	21	33	27.0	0	12	6.0	E
24-03-2017	22	31	26.5	0	11	5.5	E
27-03-2017	23	33	28.0	0	9	4.5	E
29-03-2017	25	33	29.0	0	18	9.0	SE

MICRO-METEOROLOGICAL DATA

DATE	TEMPERATURE			WIND SPEED Km/h			WIND DIRECTION
	MIN	MAX	AVERAGE	MIN	MAX	AVERAGE	
04-04-2017	24	33	28.5	0	4	2.0	E
06-04-2017	23	32	27.5	0	5.4	2.7	SE
11-04-2017	24	32	28.0	0	9.4	4.7	W
15-04-2017	26	32	29.0	0	11.3	5.7	SE
18-04-2017	25	33	29.0	0.2	12.4	6.3	SE
20-04-2017	24	33	28.5	0	16.6	8.3	SSE
25-04-2017	24	34	29.0	0.1	12.2	6.2	W
27-04-2017	25	34	29.5	0	11	5.5	W

MICRO-METEOROLOGICAL DATA							
DATE	TEMPERATURE			WIND SPEED Km/h			WIND DIRECTION
	MIN	MAX	AVERAGE	MIN	MAX	AVERAGE	
02-05-2017	24	32	28.0	0	12	6.0	E
05-05-2017	25	33	29.0	0	11.6	5.8	SE
09-05-2017	25	34	29.5	0	10.3	5.2	SE
12-05-2017	27	34	30.5	0	12.5	6.3	W
16-05-2017	25	34	29.5	0	6.4	3.2	W
19-05-2017	27	34	30.5	0.2	7.4	3.8	SE
23-05-2017	28	35	31.5	0.1	4.3	2.2	SE
26-05-2017	27	34	30.5	0.2	6.6	3.4	W

ENVIRONMENTAL QUALITY

Environmental quality monitoring at **Dhangarwadi Bauxite Mine** of **M/S Hindalco Industries Limited** at Dhangarwadi village of Shahuwadi taluka, Kolhapur district, Maharashtra includes monitoring of various environmental components like air, noise & water quality status within core zone and buffer zone around the mine lease area.

AMBIENT AIR QUALITY

The main aim of the ambient air quality monitoring within core zone and buffer zone was to assess the environmental condition and to know the existing levels of the air pollution in the project area. 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.

SELECTION OF SAMPLING LOCATIONS

The status of the ambient air quality has been assessed through ambient air quality-monitoring network. The design of monitoring network in the air quality surveillance program has been based on the following considerations:

- Meteorological conditions on synoptic scale
- Topography of the study area
- Representatives of regional background air quality

Ambient air quality monitoring stations were set up at eight locations, 4 in core zone and 4 in buffer zone with due considerations to the above mentioned points.

INSTRUMENT USED FOR SAMPLING

Respirable dust samplers APM-460 instruments were used for monitoring suspended particulate matter, particulate matter(PM10), gaseous pollutants etc.

METHOD FOR TESTING SPM / PM10

Name of Pollutant	SPM / PM10
Medium	Air
Instrument	Respirable Dust Sampler
Duration	Every 24 hours
Mode	Continuous
Unit	$\mu g/m^3$
Method	Gravimetric

METHOD FOR TESTING

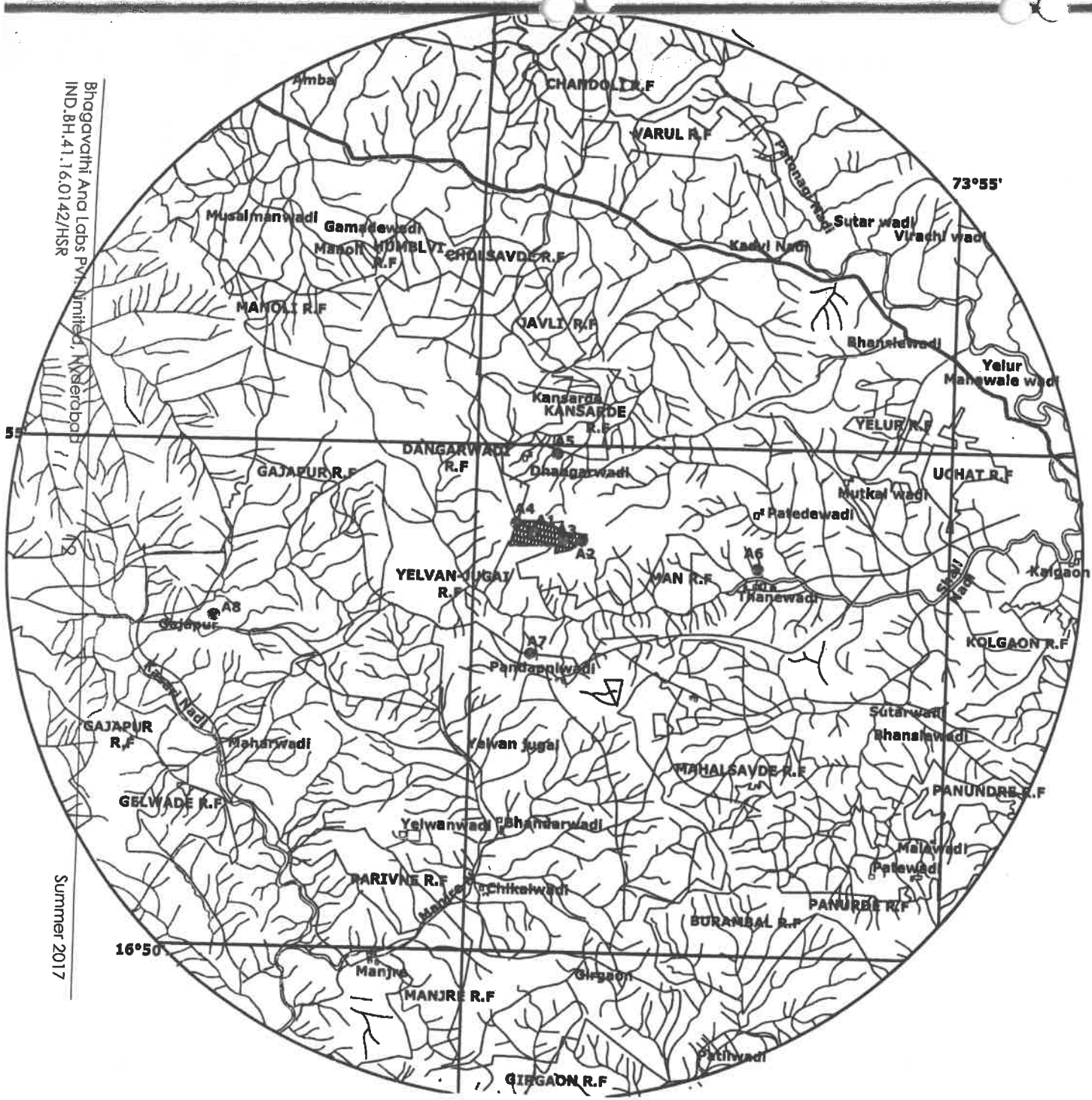
Name of Pollutant	**Sulphur dioxide**	**Oxides of Nitrogen**
Method	Modified West & Geake Method	Modified Jacob & Hochheiser Modified (Na-Arsenite) Method
Frequency	8 hour	8 hour
Mode	Continuous	Continuous
Unit	$\mu g/m^3$	µg/m3
Procedure	As per IS 5182 (Part II)	As per IS 5182 (Part IV), 1975

AMBIENT AIR QUALITY MONITORING STATION

SL. NO	STATION CODE	NAME OF SAMPLING STATION	DIRECTION w.r.t MINES LEASE AREA	DISTANCE FROM LEASE AREA (Arial distance)
1	A – 1	Core zone	- - -	- - -
2	A – 2	Near Dumping Site	- - -	- - -
3	A – 3	Near Haulage Road	- - -	- - -
4	A– 4	Near Mines office	- - -	- - -
5	A – 5	Dhangarwadi village	N	2.1km
6	A – 6	Thanewadi village	ESE	3.7km
7	A – 7	Pandapniwadi village	S	2.2km
8	A – 8	Gajapur village	WSW	5.6km

Monitoring Location Details

Respirable dust sampler was placed at a height of 3 m above the ground level in above mentioned monitoring locations. These stations were selected so as to assess present pollution level due to mining and allied activities. The observed levels of SPM, PM 10, SO_2, NO_x collected during summer season of the year 2017 are presented in detail in annexure and are summarized in the following table.



Bhagavathi Ana Labs Pvt. Limited, Hyderabad
IND.8H.41.16.0142/HSR

Summer 2017

N

Dhangarwadi Bauxite mine

LEGEND

- MINE LEASE
- RIVER
- NALLAH
- ROAD
- FOREST BOUNDARY
- AIR MONITORING LOCATION

0 1 2 3 4 5km

Environmental Quality Monitoring Report

PROJECT: DHANGARWADI BAUXITE MINES

CLIENT :HINDALCO INDUSTRIES LIMITED

TITLE: AIR MONITORING LOCATIONS MAP

PREPARED BY

M/S BHAGAVATHI ANA LABS PVT LTD
HYDERABAD

SUMMARY OF AMBIENT AIR QUALITY

Sl. No.	Location		SPM	PM 10	SO_2	NOx
1	Core zone	Min	93.0	33.5	5.4	10.8
		Max	132.8	47.8	7.7	15.4
		Average	109.9	39.6	6.4	12.8
		98th %tile	131.2	47.2	7.6	15.2
2	Near Dumping site	Min	77.0	27.0	4.5	9.0
		Max	127.0	44.5	7.4	14.8
		Average	104.0	36.4	6.1	12.1
		98th %tile	125.2	43.8	7.3	14.6
3	Near Haulage Road	Min	79.0	27.7	4.9	9.4
		Max	133.0	46.6	8.3	15.8
		Average	106.9	37.4	6.7	12.7
		98th %tile	128.4	44.9	8.0	15.2
4	Near Mines office	Min	93.0	32.6	6.5	10.4
		Max	123.0	43.1	8.6	13.8
		Average	104.5	36.5	7.3	11.7
		98th %tile	122.1	42.7	8.5	13.7
5	Dhangarwadi village	Min	93.0	31.6	5.3	12.6
		Max	150.0	51.0	8.5	20.4
		Average	110.9	37.7	6.3	15.1
		98th %tile	142.6	48.5	8.1	19.4
6	Thanewadi village	Min	67.0	24.1	5.7	9.8
		Max	137.0	49.3	11.7	20.0
		Average	108.6	39.1	9.3	15.8
		98th %tile	135.3	48.7	11.6	19.7
7	Pandapniwadi village	Min	78.0	31.2	7.4	12.6
		Max	144.0	57.6	13.7	23.3
		Average	106.2	42.5	10.1	17.2
		98th %tile	138.9	55.6	13.2	22.5
8	Gajapur village	Min	55.0	22.0	5.2	8.9
		Max	144.0	57.6	13.7	23.3
		Average	104.2	41.7	9.9	16.9
		98th %tile	134.6	53.8	12.8	21.8

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

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. Noise pollution survey has been carried out in the study area to assess the impacts of the mining activities. 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.

AMBIENT NOISE LEVEL MONITORING STATIONS

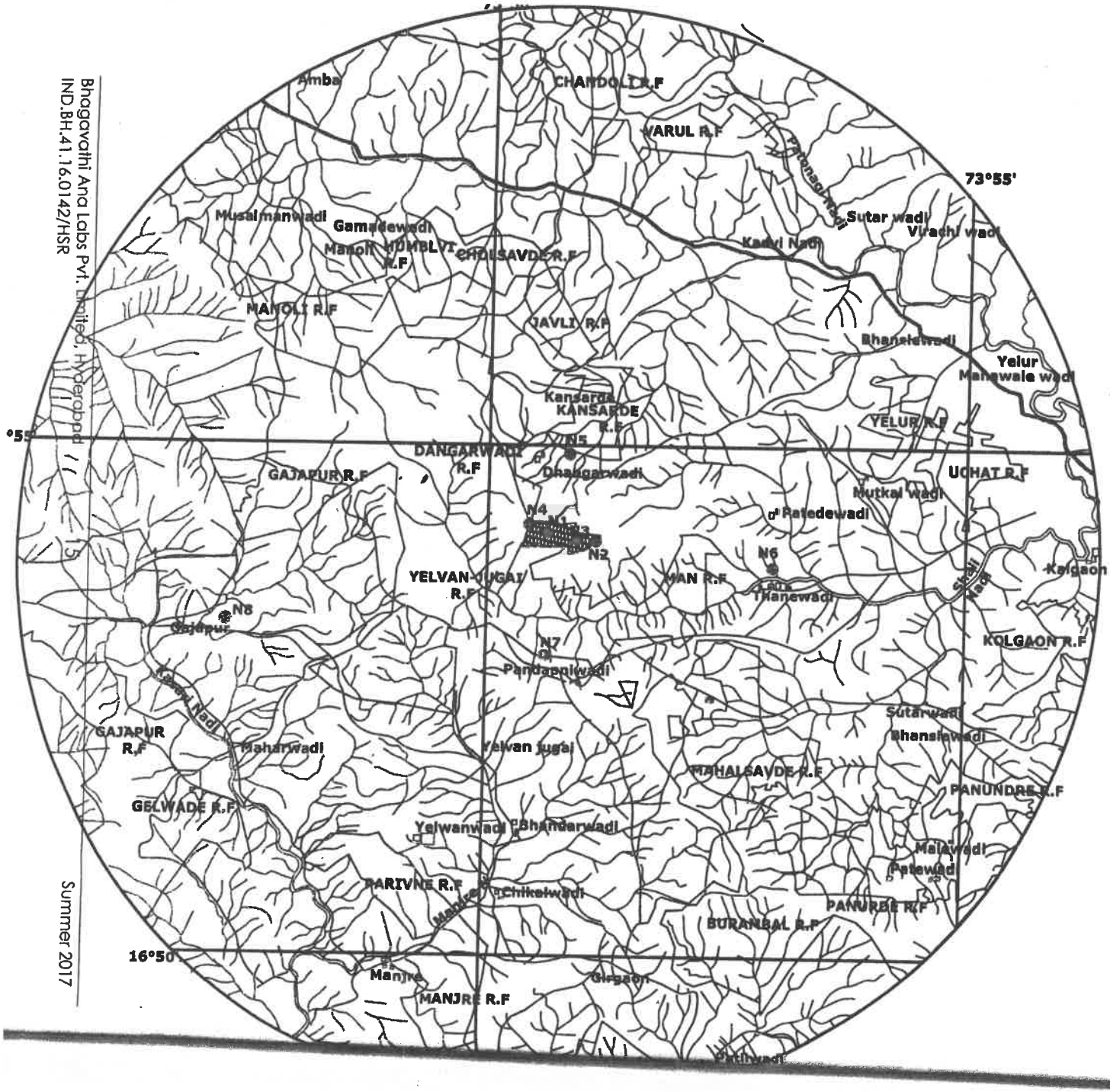
SL. NO	STATION CODE	NAME OF SAMPLING STATION	DIRECTION w.r.t MINES LEASE AREA	DISTANCE FROM LEASE AREA (Arial distance)
1	N- 1	Core zone	- - -	- - -
2	N - 2	Near Dumping Site	- - -	- - -
3	N - 3	Near Haulage Road	- - -	- - -
4	N- 4	Near Mines office	- - -	- - -
5	N - 5	Dhangarwadi village	N	2.1km
6	N - 6	Thanewadi village	ESE	3.7km
7	N - 7	Pandapniwadi village	S	2.2km
8	N - 8	Gajapur village	SW	5.6km

NATIONAL AMBIENT NOISE QUALITY 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 Zone	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.**



PROJECT: DHANGARWADI BAUXITE MINES

CLIENT :HINDALCO INDUSTRIES LIMITED

TITLE: NOISE LEVEL MONITORING LOCATIONS MAP

PREPARED BY

M/S BHAGAVATHI ANA LABS PVT LTD
HYDERABAD

Bhagavathi Ana Labs Pvt. Limited, Hyderabad
IND.BH.41.16.0142/HSR

Summer 2017

Dhangarwadi Bauxite mine

Environmental Quality Monitoring Report

AMBIENT NOISE LEVEL MONITORING RESULTS [Leq in dB(A)]

Time	N1, Core zone	N2, Near Dumping site	N3 Near Haulage road	N4, Near Mines Office	N5, Dhangar wadi village	N6, Thanewadi village	N7, Pandapni wadi village	N8, Gajapur village
06:00	47.7	48.4	49.6	49.7	57.2	58.9	61.0	60.5
07:00	55.5	56.7	57.4	57.3	58.4	59.2	60.3	61.2
08:00	57.3	59.1	59.8	59.6	60.4	60.9	62.6	62.1
09:00	60.3	61.9	63.0	62.7	63.7	64.4	63.4	64.1
10:00	62.9	64.5	65.6	64.7	65.7	66.2	66.1	67.5
11:00	70.5	73.2	74.4	72.7	68.1	69.3	69.2	68.7
12:00	71.9	74.8	75.0	74.3	68.5	69.3	68.9	69.2
13:00	70.1	73.5	73.6	72.8	69.3	69.2	68.7	70.2
14:00	69.6	73.7	73.3	72.2	68.2	69.1	70.5	70.0
15:00	67.9	71.6	71.5	71.0	67.5	67.6	67.7	67.8
16:00	66.1	70.2	70.1	69.4	72.2	73.6	71.6	71.9
17:00	64.6	68.8	68.7	67.5	74.7	74.6	68.0	72.2
18:00	63.3	67.5	66.7	65.9	69.3	70.7	69.7	71.5
19:00	62.3	66.2	65.7	65.0	65.8	65.7	65.6	65.9
20:00	57.2	60.9	60.3	59.3	61.0	62.2	61.7	61.5
21:00	56.5	59.3	58.7	58.4	60.9	61.2	61.2	61.8
22:00	50.5	52.3	51.8	52.1	61.3	61.8	61.4	61.3
23:00	49.6	51.6	50.4	50.6	60.8	60.3	61.7	61.8
00:00	49.4	51.3	50.2	50.2	60.7	61.4	62.7	63.1
01:00	49.8	51.4	50.3	50.4	59.6	59.9	60.8	61.3
02:00	50.7	52.2	51.1	51.4	59.6	60.0	59.1	60.6
03:00	51.1	52.3	52.1	51.7	60.0	60.0	60.2	61.5
04:00	45.8	47.2	46.5	46.2	60.4	60.6	62.4	62.7
05:00	45.5	46.5	45.7	45.6	59.7	60.8	62.1	62.8
Min	**45.5**	**46.5**	**45.7**	**45.6**	**57.2**	**58.9**	**59.1**	**60.5**
Max	**71.9**	**74.8**	**75.0**	**74.3**	**74.7**	**74.6**	**71.6**	**72.2**
Ld	**66.3**	**69.6**	**70.0**	**68.9**	**68.0**	**68.7**	**67.4**	**68.3**
Ln	**49.4**	**51.0**	**50.3**	**50.3**	**60.3**	**60.7**	**61.4**	**62.0**

All the obtained noise level quality values in core zone and buffer zone are compared with the noise level standards prescribed by Central Pollution Control Board. The observations revealed that the values 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.

- **Surface water quality**

  Tamrapani and Ghataprabha River are the surface water source in the study area. There are others seasonal nallah which flows in the study area. Proper drainage system has prepared to drag the monsoon water into the mine pit so as to reduce the water pollution. Buffer zone has many seasonal nallah and spring which used to recharge the ground water Table.

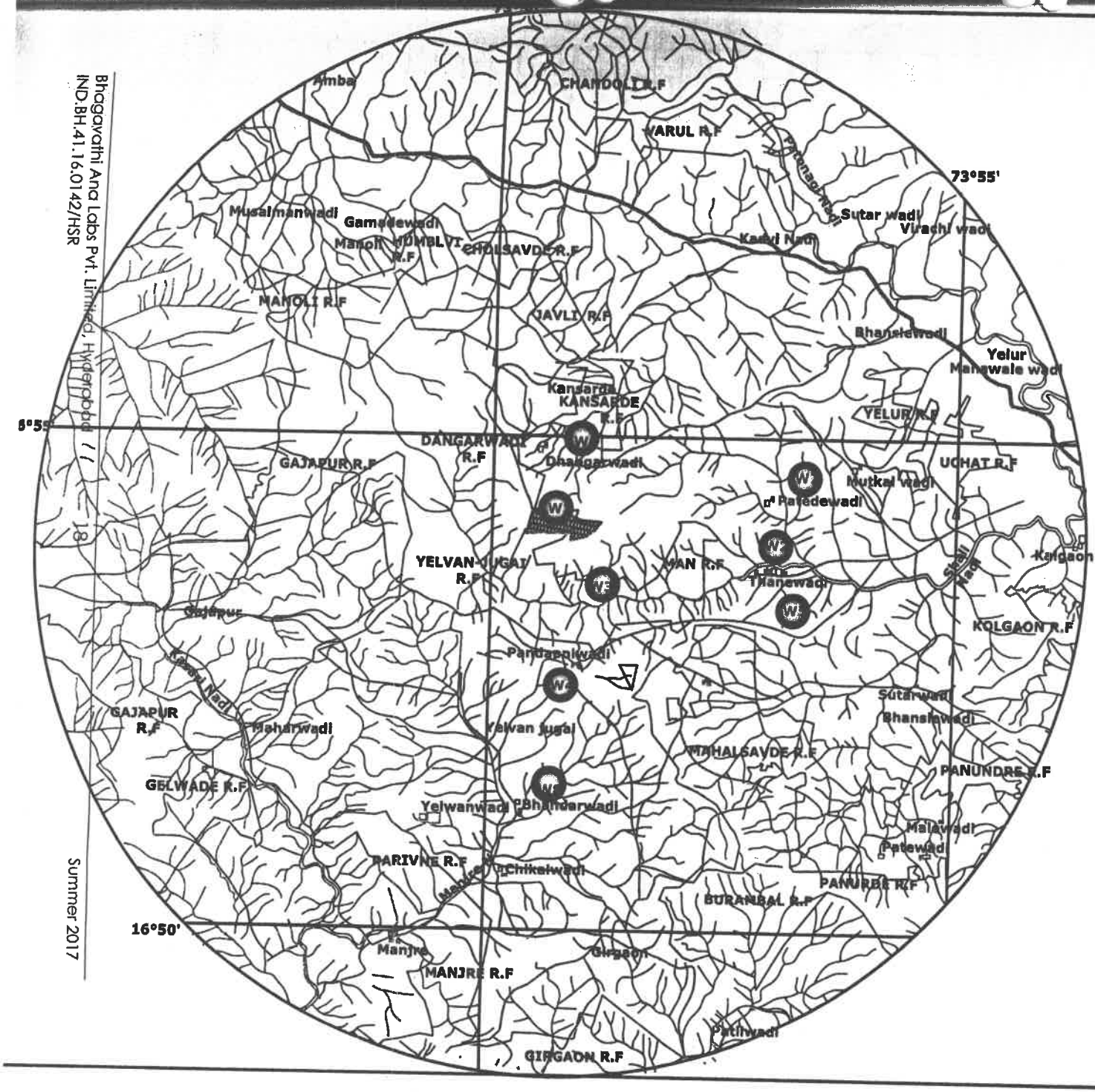
- **Ground water quality**

  The most important source of drinking water in the study area is the ground water, which is tapped by a bore well. The buffer zone is good in ground water source. The ground water in the study area gets recharged by rainwater.

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). A total of 8 locations have selected, out of which one in core zone and seven are in buffer zone. Location of water quality monitoring stations is given below.

WATER QUALITY MONITORING LOCATIONS

Code		Name of sampling station	Source of water
W – 1		Mine pit water	Surface water
W – 2		Shali nadi (up stream)	Surface water
W – 3		Shali nadi (down stream)	Surface water
W – 4		Pandapniwadi village	Ground water
W – 5		Thanewadi village	Ground water
W – 6		Dhangarwadi village	Ground water
W –7		Patewadi village	Ground water
W – 8		Bhandarwadi village	Ground water



N

LEGEND

- MINE LEASE
- RIVER
- NALLAH
- ROAD
- FOREST BOUNDARY
- WATER SAMPLING LOCATION

0 1 2 3 4 5km

PROJECT: DHANGARWADI BAUXITE MINES

CLIENT :HINDALCO INDUSTRIES LIMITED

TITLE: WATER SAMPLING LOCATIONS MAP

PREPARED BY
M/S BHAGAVATHI ANA LABS PVT. LTD
HYDERABAD

Dhangarwadi Bauxite mine

Environmental Quality Monitoring Report

Summer 2017

Bhagavathi Ana Labs Pvt. Limited, Hyderabad
IND.BH.41.16.0142/HSR

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 of the year 2017 as per the prescribed sample collecting methods and analyzed as per the IS standard procedures. Complete analysis report of water samples are given below.

SURFACE WATER QUALITY

Date of Sampling: 26.05.2017

Sl. No	Parameter	Units	W-1 MINE PIT WATER	W-2 SHALI NADI UP STREAM	W-3 SHALI NADI DOWN STREAM
1	Odour	--	Un-objectionable	Un-objectionable	Un-objectionable
2	Taste	--	Agreeable	Agreeable	Agreeable
3	Color	Hazen units	<5	<5	<5
4	pH	--	6.53	6.59	6.57
5	Turbidity	NTU	<5	<5	<5
6	Dissolved Oxygen	mg/l	6.0	7.00	7.20
7	Total Dissolved solids	mg/l	35	86	52
8	Total Suspended solids	mg/l	23	43	33
9	Alkalinity as $CaCO_3$	mg/l	12.0	30	20.0
10	Total Hardness as $CaCO_3$	mg/l	20.0	37.0	31.0
11	Nitrate as NO_3	mg/l	0.11	2.1	0.47
12	Phosphates as PO_4	mg/l	0.04	0.02	0.02
13	Chlorides as Cl	mg/l	9	19	12
14	Sulphates as SO_4	mg/l	2	7	3
15	Sodium as Na	mg/l	2.2	11	3
16	Potassium as K	mg/l	1.6	4.3	2.4
17	Calcium as Ca	mg/l	6.3	12	10
18	Magnesium as Mg	mg/l	2.7	3	3
19	Lead as Pb	mg/l	BDL	BDL	BDL
20	Manganese as Mn	mg/l	0.01	0.01	0.01
21	Cadmium as Cd	mg/l	BDL	BDL	BDL
22	Chromium as Cr	mg/l	BDL	BDL	BDL
23	Copper as Cu	mg/l	BDL	BDL	BDL
24	Zinc as Zn	mg/l	BDL	BDL	BDL
25	Iron as Fe	mg/l	0.06	0.06	0.08
26	Fluoride as F	mg/l	0.04	0.04	0.03
27	Mercury as Hg	mg/l	BDL	BDL	BDL
28	Selenium as Se	mg/l	BDL	BDL	BDL
29	Arsenic as As	mg/l	BDL	BDL	BDL
30	Cyanide as CN	mg/l	BDL	BDL	BDL
31	Boron as B	mg/l	BDL	BDL	BDL
32	BOD	mg/l	6	10	8

GROUND WATER QUALITY

Date of Sampling: 26.05.2017

Sl. No	Parameter	Units	W-4 PANDAPNIWADI VILLAGE	W - 5 THANEWADI VILLAGE	W -6 DHANGARWADI VILLAGE	W-7 PATEWADI VILLAGE	W -8 BHANDARWADI VILLAGE
1	Odour	–	Un-objectionable	Un-objectionable	Un-objectionable	Un-objectionable	Un-objectionable
2	Taste	–	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3	Color	Hazen units	<5	<5	<5	<5	<5
4	pH	--	6.60	6.50	6.63	6.66	6.84
5	Turbidity	NTU	<5	<5	<5	<5	<5
6	Dissolved Oxygen	mg/l	5.60	5.00	4.40	5.34	4.66
7	Total Dissolved solids	mg/l	30	82	121	44	66
8	Total Suspended solids	mg/l	22	16	55	9	5
9	Alkalinity as $CaCO_3$	mg/l	7	36	57	13	17
10	Total Hardness as $CaCO_3$	mg/l	16.0	38.4	45.0	22.0	30.0
11	Nitrate as NO_3	mg/l	0.3	2	2	0.3	0.3
12	Phosphates as PO_4	mg/l	0.02	0.03	0.01	0.01	0.01
13	Chlorides as Cl	mg/l	11	12.8	20	12	22
14	Sulphates as SO_4	mg/l	1.1	6	6	3	2.7
15	Sodium as Na	mg/l	2.9	10	17	3.3	9
16	Potassium as K	mg/l	1.4	2.2	8.6	3.2	3
17	Calcium as Ca	mg/l	5.3	10	9	6	10
18	Magnesium as Mg	mg/l	2	3.3	2.9	2.8	2
19	Lead as Pb	mg/l	BDL	BDL	BDL	BDL	BDL
20	Manganese as Mn	mg/l	0.01	0.01	0.01	0.01	0.01
21	Cadmium as Cd	mg/l	BDL	BDL	BDL	BDL	BDL
22	Chromium as Cr	mg/l	BDL	BDL	BDL	BDL	BDL
23	Copper as Cu	mg/l	BDL	BDL	BDL	BDL	BDL
24	Zinc as Zn	mg/l	BDL	BDL	BDL	BDL	BDL
25	Iron as Fe	mg/l	0.14	0.07	0.10	0.01	0.06
26	Fluoride as F	mg/l	0.02	0.03	0.04	0.02	0.04
27	Mercury as Hg	mg/l	BDL	BDL	BDL	BDL	BDL
28	Selenium as Se	mg/l	BDL	BDL	BDL	BDL	BDL
29	Arsenic as As	mg/l	BDL	BDL	BDL	BDL	BDL
30	Cyanide as CN	mg/l	BDL	BDL	BDL	BDL	BDL
31	Boron as B	mg/l	BDL	BDL	BDL	BDL	BDL
32	B.O.D	mg/l	5	6	9	2	7

BDL: Below Detectable Limit **mg/l: Milligram per liter**

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

RESULTS & DISCUSSION surface and ground water

- The pH of the study area varies from 6.5 to 6.84 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 4.40 to 7.20.
- Total Dissolved Solids found to be in the range of 30.0 to 121.0 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 7.0 to 57.0 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 16 to 45.0 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 of the water sample collected in the study area is found to in the range of 9.0 to 22.0 mg/l. As per IS 10500 standard for drinking water, the desirable limit is 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 5.3 to 12.0 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 2 to 3.30 mg/l.
- Iron content of the water in the study area found to be in the range of 0.01 to 0.14 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 $CaCo_3$	mg /l	200	600
9	Total hardness as $CaCo_3$	mg /l	300	600
10	Nitrates NO_3	mg /l	45	100
11	Phosphates PO_4	mg /l	-----	
12	Chlorides as Cl	mg /l	250	1000
13	Sulphates, SO_4^{2-}	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

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 for the summer season, 2017.

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.

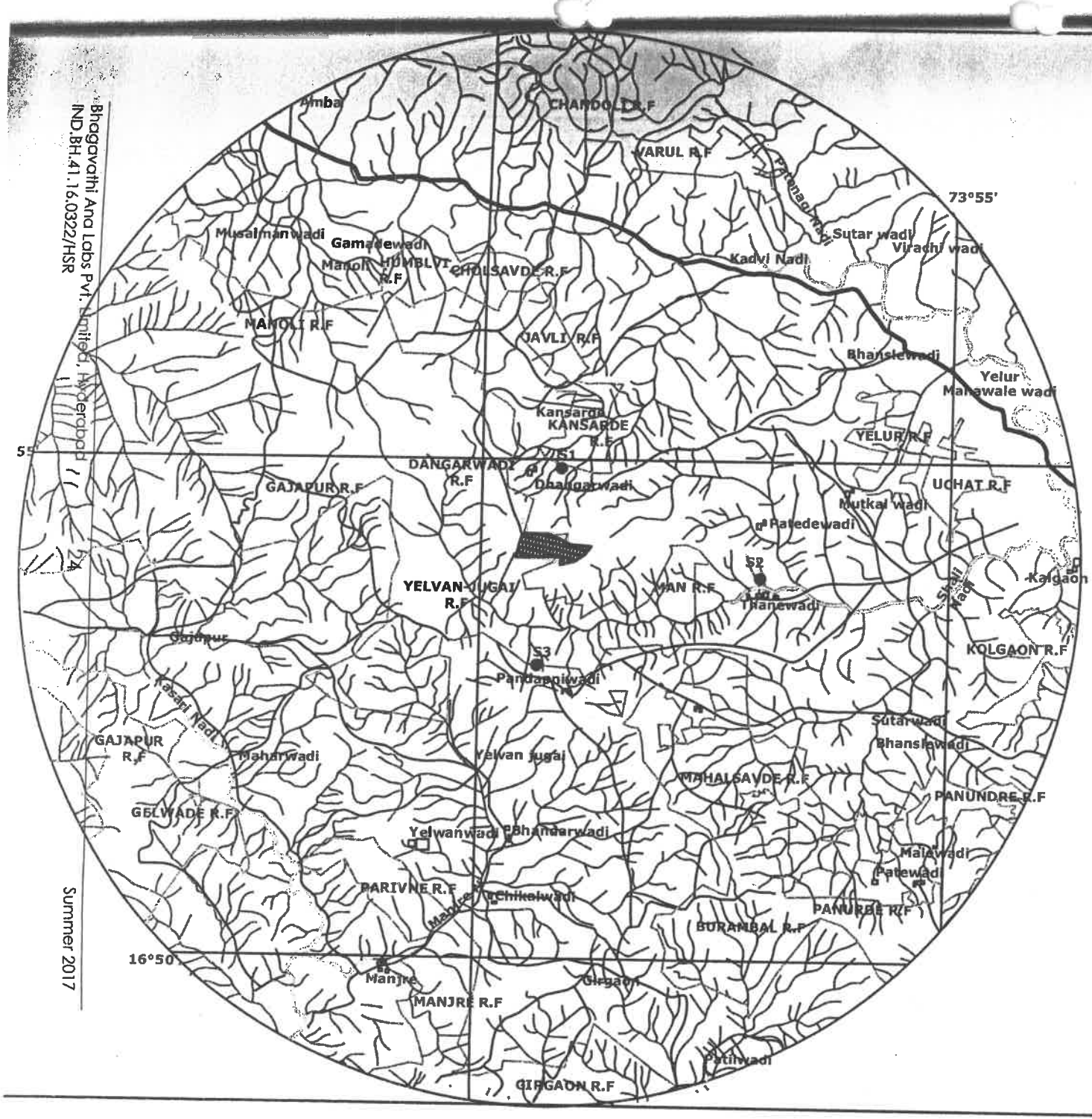
The present study on the soil profile establishes the environmental characteristics and identifies the incremental concentrations if any, due to the mining activities. The sampling locations have been identified with the following objectives;

- → To determine the soil characteristics of the study area
- → To determine the impact of mining activity on soil characterization; and
- → To determine the impact on soils more importantly from agricultural productivity point of view.

Soil could well represent the topsoil cover which is rich in nutrient content, where additional features like the textural class, infiltration rate, field capacity & wilting coefficient, pH etc are important.

SOIL SAMPLING AND ANALYSIS

Three 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



Bhagavathi Ana Labs Pvt. Limited, Hyderabad
IND.BH.41.16.0322/HSR

Summer 2017

N

LEGEND

- MINE LEASE
- RIVER
- NALLAH
- ROAD
- FOREST BOUNDARY
- SOIL MONOTORING LOCATION

0 1 2 3 4 5km

PROJECT: DHANGARWADI BAUXITE MINES

CLIENT :HINDALCO INDUSTRIES LIMITED

TITLE: SOIL MONITORING LOCATIONS MAP

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HYDERABAD

Dhangarwadi Bauxite mine

Environmental Quality Monitoring Report

SOIL SAMPLING LOCATIONS

Sl. No	Code	Name of Sampling Station
1	S1	Dhangarwadi village
2	S2	Thanewadi village
3	S3	Pandapniwadi village

Soil quality

Sl. No.	Parameter	Unit	S1	S2	S3
1	pH (1:2 Soil Water Extract)	-	6	6.01	6.21
2	Electrical Conductivity	µS/cm	78	121	100
3	Total Soluble Salts	mg/kg	134	122	123
4	Nitrate as N	mg/kg	18	16	16
5	Phosphorous as P_2O_5	mg/kg	42	45	48
6	Potash as K_2O	mg/kg	66	72	70
7	Sodium as Na_2O	mg/kg	99	107	106
8	Calcium as Ca	mg/kg	577	655	678
9	Magnesium as Mg	mg/kg	123	127	133
10	Chloride as Cl	mg/kg	17	20	23
11	Organic carbon	%	0.45	0.49	0.50
12	Texture	-	Silty sand	Sandy Loam	Sandy Loam
13	Sand	%	34	36	50
14	Silt	%	52	45	30
15	Clay	%	14	19	20

AMBIENT AIR QUALITY

Station: A1, CORE ZONE						
S.No.	Month	Date	SPM	PM 10	SO_2 (µg/m^3)	NO_x (µg/m^3)
			µg/m^3	µg/m^3	24 hrs Average	24 hrs Average
1	MARCH '17	07-03-2017	107.0	38.5	6.2	12.4
2		10-03-2017	123.0	44.3	7.1	14.3
3		14-03-2017	125.0	45.0	7.3	14.5
4		17-03-2017	100.0	36.0	5.8	11.6
5		21-03-2017	97.0	34.9	5.6	11.3
6		24-03-2017	99.0	35.6	5.7	11.5
7		27-03-2017	104.0	37.4	6.0	12.1
8		29-03-2017	107.0	38.5	6.2	12.4
1	APRIL'17	04-04-2017	114.6	41.3	6.7	13.3
2		06-04-2017	129.3	46.5	7.5	15.0
3		11-04-2017	129.1	46.5	7.5	15.0
4		15-04-2017	95.2	34.3	5.5	11.1
5		18-04-2017	97.2	35.0	5.6	11.3
6		20-04-2017	103.1	37.1	6.0	12.0
7		25-04-2017	107.0	38.5	6.2	12.4
8		27-04-2017	113.3	40.8	6.6	13.2
1	MAY'17	02-05-2017	112.0	40.3	6.5	13.0
2		05-05-2017	122.7	44.2	7.1	14.2
3		09-05-2017	132.8	47.8	7.7	15.4
4		12-05-2017	93.1	33.5	5.4	10.8
5		16-05-2017	93.0	33.5	5.4	10.8
6		19-05-2017	106.2	38.2	6.2	12.3
7		23-05-2017	110.8	39.9	6.4	12.9
8		26-05-2017	116.8	42.0	6.8	13.6
	Min		93.0	33.5	5.4	10.8
	Max		132.8	47.8	7.7	15.4
	Mean		109.9	39.6	6.4	12.8
	10th percentile		95.8	34.5	5.6	11.1
	30th percentile		102.8	37.0	6.0	11.9
	50th percentile		107.0	38.5	6.2	12.4
	95th percentile		129.2	46.5	7.5	15.0
	98th percentile		131.2	47.2	7.6	15.2

BDL: BELOW DETECTABLE LIMIT

AMBIENT AIR QUALITY

Station: A2, NEAR DUMPING SITE						
S.No.	Month	Date	SPM $\mu g/m^3$	PM 10 $\mu g/m^3$	SO_2 ($\mu g/m^3$) 24 hrs Average	NO_x ($\mu g/m^3$) 24 hrs Average
1	MARCH '17	07-03-2017	112.0	39.2	6.5	13.1
2		10-03-2017	123.0	43.1	7.2	14.4
3		14-03-2017	107.0	37.5	6.2	12.5
4		17-03-2017	99.0	34.7	5.8	11.6
5		21-03-2017	123.0	43.1	7.2	14.4
6		24-03-2017	106.0	37.1	6.2	12.4
7		27-03-2017	122.0	42.7	7.1	14.2
8		29-03-2017	127.0	44.5	7.4	14.8
1	APRIL'17	04-04-2017	106.0	37.1	6.2	12.4
2		06-04-2017	77.0	27.0	4.5	9.0
3		11-04-2017	98.0	34.3	5.7	11.4
4		15-04-2017	95.0	33.3	5.5	11.1
5		18-04-2017	103.0	36.1	6.0	12.0
6		20-04-2017	101.0	35.4	5.9	11.8
7		25-04-2017	96.0	33.6	5.6	11.2
8		27-04-2017	104.0	36.4	6.1	12.1
1	MAY'17	02-05-2017	90.0	31.5	5.3	10.5
2		05-05-2017	121.0	42.4	7.1	14.1
3		09-05-2017	103.0	36.1	6.0	12.0
4		12-05-2017	97.0	34.0	5.7	11.3
5		16-05-2017	106.0	37.1	6.2	12.4
6		19-05-2017	96.0	33.6	5.6	11.2
7		23-05-2017	90.0	31.5	5.3	10.5
8		26-05-2017	94.0	32.9	5.5	11.0
	Min		77.0	27.0	4.5	9.0
	Max		127.0	44.5	7.4	14.8
	Mean		104.0	36.4	6.1	12.1
	10th percentile		91.2	31.9	5.3	10.6
	30th percentile		96.9	33.9	5.7	11.3
	50th percentile		103.0	36.1	6.0	12.0
	95th percentile		123.0	43.1	7.2	14.4
	98th percentile		125.2	43.8	7.3	14.6

AMBIENT AIR QUALITY

Station: A3,NEAR HAULAGE ROAD						
S.No.	Month	Date	SPM	PM 10	SO_2 (µg/m^3)	NO_x (µg/m^3)
			µg/m^3	µg/m^3	24 hrs Average	24 hrs Average
1	MARCH '17	07-03-2017	89.0	31.2	5.6	10.6
2		10-03-2017	121.0	42.4	7.6	14.4
3		14-03-2017	103.0	36.1	6.4	12.2
4		17-03-2017	104.0	36.4	6.5	12.4
5		21-03-2017	123.0	43.1	7.7	14.6
6		24-03-2017	111.0	38.9	6.9	13.2
7		27-03-2017	109.0	38.2	6.8	12.9
8		29-03-2017	95.0	33.3	5.9	11.3
1	APRIL'17	04-04-2017	120.0	42.0	7.5	14.3
2		06-04-2017	121.0	42.4	7.6	14.4
3		11-04-2017	123.0	43.1	7.7	14.6
4		15-04-2017	79.0	27.7	4.9	9.4
5		18-04-2017	93.0	32.6	5.8	11.0
6		20-04-2017	101.0	35.4	6.3	12.0
7		25-04-2017	123.0	43.1	7.7	14.6
8		27-04-2017	133.0	46.6	8.3	15.8
1	MAY'17	02-05-2017	98.0	34.3	6.1	11.6
2		05-05-2017	103.0	36.1	6.4	12.2
3		09-05-2017	104.0	36.4	6.5	12.4
4		12-05-2017	121.0	42.4	7.6	14.4
5		16-05-2017	106.0	37.1	6.6	12.6
6		19-05-2017	102.0	35.7	6.4	12.1
7		23-05-2017	90.0	31.5	5.6	10.7
8		26-05-2017	93.0	32.6	5.8	11.0

	Min		79.0	27.7	4.9	9.4
	Max		133.0	46.6	8.3	15.8
	Mean		106.9	37.4	6.7	12.7
	10th percentile		90.9	31.8	5.7	10.8
	30th percentile		100.7	35.2	6.3	12.0
	50th percentile		104.0	36.4	6.5	12.4
	95th percentile		123.0	43.1	7.7	14.6
	98th percentile		128.4	44.9	8.0	15.2

AMBIENT AIR QUALITY

Station: A4, NEAR MINES OFFICE						
S.No.	Month	Date	SPM	PM 10	SO_2 ($\mu g/m^3$)	NO_x ($\mu g/m^3$)
			$\mu g/m^3$	$\mu g/m^3$	24 hrs Average	24 hrs Average
1	MARCH '17	07-03-2017	95.0	33.3	6.7	10.6
2		10-03-2017	103.0	36.1	7.2	11.5
3		14-03-2017	123.0	43.1	8.6	13.8
4		17-03-2017	104.0	36.4	7.3	11.6
5		21-03-2017	99.0	34.7	6.9	11.1
6		24-03-2017	103.0	36.1	7.2	11.5
7		27-03-2017	121.0	42.4	8.5	13.6
8		29-03-2017	106.0	37.1	7.4	11.9
1	APRIL'17	04-04-2017	93.0	32.6	6.5	10.4
2		06-04-2017	95.0	33.3	6.7	10.6
3		11-04-2017	103.0	36.1	7.2	11.5
4		15-04-2017	106.0	37.1	7.4	11.9
5		18-04-2017	111.0	38.9	7.8	12.4
6		20-04-2017	104,5	34.0	7.0	11.0
7		25-04-2017	120.0	42.0	8.4	13.4
8		27-04-2017	107.0	37.5	7.5	12.0
1	MAY'17	02-05-2017	96.0	33.6	6.7	10.8
2		05-05-2017	103.0	36.1	7.2	11.5
3		09-05-2017	104.0	36.4	7.3	11.6
4		12-05-2017	111.0	38.9	7.8	12.4
5		16-05-2017	95.0	33.3	6.7	10.6
6		19-05-2017	104.0	36.4	7.3	11.6
7		23-05-2017	103.0	36.1	7.2	11.5
8		26-05-2017	99.0	34.7	6.9	11.1
	Min		93.0	32.6	6.5	10.4
	Max		123.0	43.1	8.6	13.8
	Mean		104.5	36.5	7.3	11.7
	10th percentile		95.0	33.3	6.7	10.6
	30th percentile		101.4	34.7	7.0	11.1
	50th percentile		103.0	36.1	7.2	11.5
	95th percentile		120.9	42.3	8.5	13.5
	98th percentile		122.1	42.7	8.5	13.7

AMBIENT AIR QUALITY

Station: A 5, DHANGARWADI VILLAGE						
S.No.	Month	Date	SPM	PM 10	SO_2 (µg/m^3)	NO_x (µg/m^3)
			µg/m^3	µg/m^3	24 hrs Average	24 hrs Average
1	MARCH '17	07-03-2017	150.0	51.0	8.5	20.4
2		10-03-2017	103.0	35.0	5.8	14.0
3		14-03-2017	107.0	36.4	6.1	14.6
4		17-03-2017	108.0	36.7	6.1	14.7
5		21-03-2017	112.0	38.1	6.3	15.2
6		24-03-2017	134.0	45.6	7.6	18.2
7		27-03-2017	122.0	41.5	6.9	16.6
8		29-03-2017	106.0	36.0	6.0	14.4
1	APRIL'17	04-04-2017	99.0	33.7	5.6	13.5
2		06-04-2017	122.0	41.5	6.9	16.6
3		11-04-2017	111.0	37.7	6.3	15.1
4		15-04-2017	104.0	35.4	5.9	14.1
5		18-04-2017	107.0	36.4	6.1	14.6
6		20-04-2017	102.0	34.7	5.8	13.9
7		25-04-2017	99.4	33.8	5.6	13.5
8		27-04-2017	93.4	31.8	5.3	12.7
1	MAY'17	02-05-2017	100.0	34.0	5.7	13.6
2		05-05-2017	104.0	35.4	5.9	14.1
3		09-05-2017	134.0	45.6	7.6	18.2
4		12-05-2017	122.0	41.5	6.9	16.6
5		16-05-2017	123.0	41.8	7.0	16.7
6		19-05-2017	93.0	31.6	5.3	12.6
7		23-05-2017	100.0	34.0	5.7	13.6
8		26-05-2017	106.4	36.2	6.0	14.5

	Min		93.0	31.6	5.3	12.6
	Max		150.0	51.0	8.5	20.4
	Mean		110.9	37.7	6.3	15.1
	10th percentile		99.1	33.7	5.6	13.5
	30th percentile		102.9	35.0	5.8	14.0
	50th percentile		106.7	36.3	6.0	14.5
	95th percentile		134.0	45.6	7.6	18.2
	98th percentile		142.6	48.5	8.1	19.4

AMBIENT AIR QUALITY

Station: A6, THANEWADI VILLAGE						
S.No.	Month	Date	SPM	PM 10	SO_2 (µg/m^3)	NO_x (µg/m^3)
			µg/m^3	µg/m^3	24 hrs Average	24 hrs Average
1	MARCH '17	07-03-2017	106.0	38.2	9.1	15.4
2		10-03-2017	111.0	40.0	9.5	16.2
3		14-03-2017	109.0	39.2	9.3	15.9
4		17-03-2017	107.0	38.5	9.2	15.6
5		21-03-2017	104.0	37.4	8.9	15.2
6		24-03-2017	123.0	44.3	10.5	17.9
7		27-03-2017	112.0	40.3	9.6	16.3
8		29-03-2017	116.0	41.8	9.9	16.9
1	APRIL'17	04-04-2017	98.0	35.3	8.4	14.3
2		06-04-2017	95.0	34.2	8.1	13.8
3		11-04-2017	100.0	36.0	8.6	14.6
4		15-04-2017	133.4	48.0	11.4	19.4
5		18-04-2017	122.9	44.2	10.5	17.9
6		20-04-2017	103.3	37.2	8.9	15.1
7		25-04-2017	104.4	37.6	8.9	15.2
8		27-04-2017	101.6	36.6	8.7	14.8
1	MAY'17	02-05-2017	89.0	32.0	7.6	13.0
2		05-05-2017	67.0	24.1	5.7	9.8
3		09-05-2017	95.0	34.2	8.1	13.8
4		12-05-2017	133.3	48.0	11.4	19.4
5		16-05-2017	127.0	45.7	10.9	18.5
6		19-05-2017	137.0	49.3	11.7	20.0
7		23-05-2017	122.4	44.1	10.5	17.8
8		26-05-2017	88.4	31.8	7.6	12.9

	Min		67.0	24.1	5.7	9.8
	Max		137.0	49.3	11.7	20.0
	Mean		108.6	39.1	9.3	15.8
	10th percentile		90.8	32.7	7.8	13.2
	30th percentile		101.4	36.5	8.7	14.8
	50th percentile		106.5	38.3	9.1	15.5
	95th percentile		133.4	48.0	11.4	19.4
	98th percentile		135.3	48.7	11.6	19.7

AMBIENT AIR QUALITY

Station: A7, PANDAPANIWADI VILLAGE						
S.No.	Month	Date	SPM	PM 10	SO_2 (µg/m^3)	NO_x (µg/m^3)
			µg/m^3	µg/m^3	24 hrs Average	24 hrs Average
	NAAQSTANDARDS		100	60	80	80
1	MARCH '17	07-03-2017	104.0	41.6	9.9	16.8
2		10-03-2017	112.0	44.8	10.7	18.1
3		14-03-2017	107.0	42.8	10.2	17.3
4		17-03-2017	121.0	48.4	11.5	19.6
5		21-03-2017	133.0	53.2	12.7	21.5
6		24-03-2017	100.0	40.0	9.5	16.2
7		27-03-2017	95.0	38.0	9.0	15.4
8		29-03-2017	78.4	31.4	7.5	12.7
1	APRIL'17	04-04-2017	106.0	42.4	10.1	17.2
2		06-04-2017	111.0	44.4	10.6	18.0
3		11-04-2017	123.0	49.2	11.7	19.9
4		15-04-2017	120.0	48.0	11.4	19.4
5		18-04-2017	104.0	41.6	9.9	16.8
6		20-04-2017	144.0	57.6	13.7	23.3
7		25-04-2017	99.0	39.6	9.4	16.0
8		27-04-2017	101.0	40.4	9.6	16.4
1	MAY'17	02-05-2017	78.0	31.2	7.4	12.6
2		05-05-2017	90.0	36.0	8.6	14.6
3		09-05-2017	93.0	37.2	8.9	15.1
4		12-05-2017	103.0	41.2	9.8	16.7
5		16-05-2017	107.0	42.8	10.2	17.3
6		19-05-2017	106.0	42.4	10.1	17.2
7		23-05-2017	111.0	44.4	10.6	18.0
8		26-05-2017	102.0	40.8	9.7	16.5
	Min		78.0	31.2	7.4	12.6
	Max		144.0	57.6	13.7	23.3
	Mean		106.2	42.5	10.1	17.2
	10th percentile		90.9	36.4	8.7	14.7
	30th percentile		100.9	40.4	9.6	16.3
	50th percentile		105.0	42.0	10.0	17.0
	95th percentile		131.5	52.6	12.5	21.3
	98th percentile		138.9	55.6	13.2	22.5

AMBIENT AIR QUALITY

Station: A 8, GAJAPUR VILLAGE						
S.No.	Month	Date	SPM	PM 10	SO_2 (µg/m^3)	NO_x (µg/m^3)
			µg/m^3	µg/m^3	24 hrs Average	24 hrs Average
1	MARCH '17	07-03-2017	112.0	44.8	10.7	18.1
2		10-03-2017	89.0	35.6	8.5	14.4
3		14-03-2017	55.0	22.0	5.2	8.9
4		17-03-2017	104.0	41.6	9.9	16.8
5		21-03-2017	105.3	42.1	10.0	17.0
6		24-03-2017	100.0	40.0	9.5	16.2
7		27-03-2017	102.4	41.0	9.8	16.6
8		29-03-2017	106.0	42.4	10.1	17.2
1	APRIL'17	04-04-2017	99.0	39.6	9.4	16.0
2		06-04-2017	103.0	41.2	9.8	16.7
3		11-04-2017	107.0	42.8	10.2	17.3
4		15-04-2017	113.0	45.2	10.8	18.3
5		18-04-2017	104.0	41.6	9.9	16.8
6		20-04-2017	108.0	43.2	10.3	17.5
7		25-04-2017	99.4	39.8	9.5	16.1
8		27-04-2017	77.5	31.0	7.4	12.5
1	MAY'17	02-05-2017	100.0	40.0	9.5	16.2
2		05-05-2017	107.9	43.2	10.3	17.5
3		09-05-2017	106.3	42.5	10.1	17.2
4		12-05-2017	107.4	43.0	10.2	17.4
5		16-05-2017	123.4	49.4	11.8	20.0
6		19-05-2017	123.6	49.4	11.8	20.0
7		23-05-2017	144.0	57.6	13.7	23.3
8		26-05-2017	103.0	41.2	9.8	16.7

	Min		55.0	22.0	5.2	8.9
	Max		144.0	57.6	13.7	23.3
	Mean		104.2	41.7	9.9	16.9
	10th percentile		92.0	36.8	8.8	14.9
	30th percentile		102.2	40.9	9.7	16.5
	50th percentile		104.7	41.9	10.0	16.9
	95th percentile		123.6	49.4	11.8	20.0
	98th percentile		134.6	53.8	12.8	21.8

BDL for SOx-2.0 & NOx-4.5

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

Method of measurement: As per CPCB Manual & IS 5182

DHANGARWADI MINES				
WELL DEPTHS OF VILLAGES				
S.NO.	LOCATION	NAME OF THE MINE AREA	TOTAL DEPTH IN MTS	WATER LEVEL FROM SURFACEIN MTS
				27.05.2017
1	PANDAPNIWADI VILLAGE	DHANGARWADI	6.00	1.00
2	DHANGARWADI VILLAGE	DHANGARWADI	6.00	2.40