



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

28/05/2019

Subject: Compliance Status of Environment Clearance conditions for Dhangarwadi Bauxite Mines.

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 status against the conditions laid down in the Environment Clearance for period of October'18 to March'19 along with environment monitoring reports.

Hope you will please find the above in order.

Thanking you,

Yours very truly,

A handwritten signature in blue ink, appearing to read 'Uday V. Pawar', is written over a blue ink stamp that is partially visible and illegible.

Uday V. Pawar
Head – West Coast Mines
Hindalco Industries Limited

Encl. A/a

Copy to:

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

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

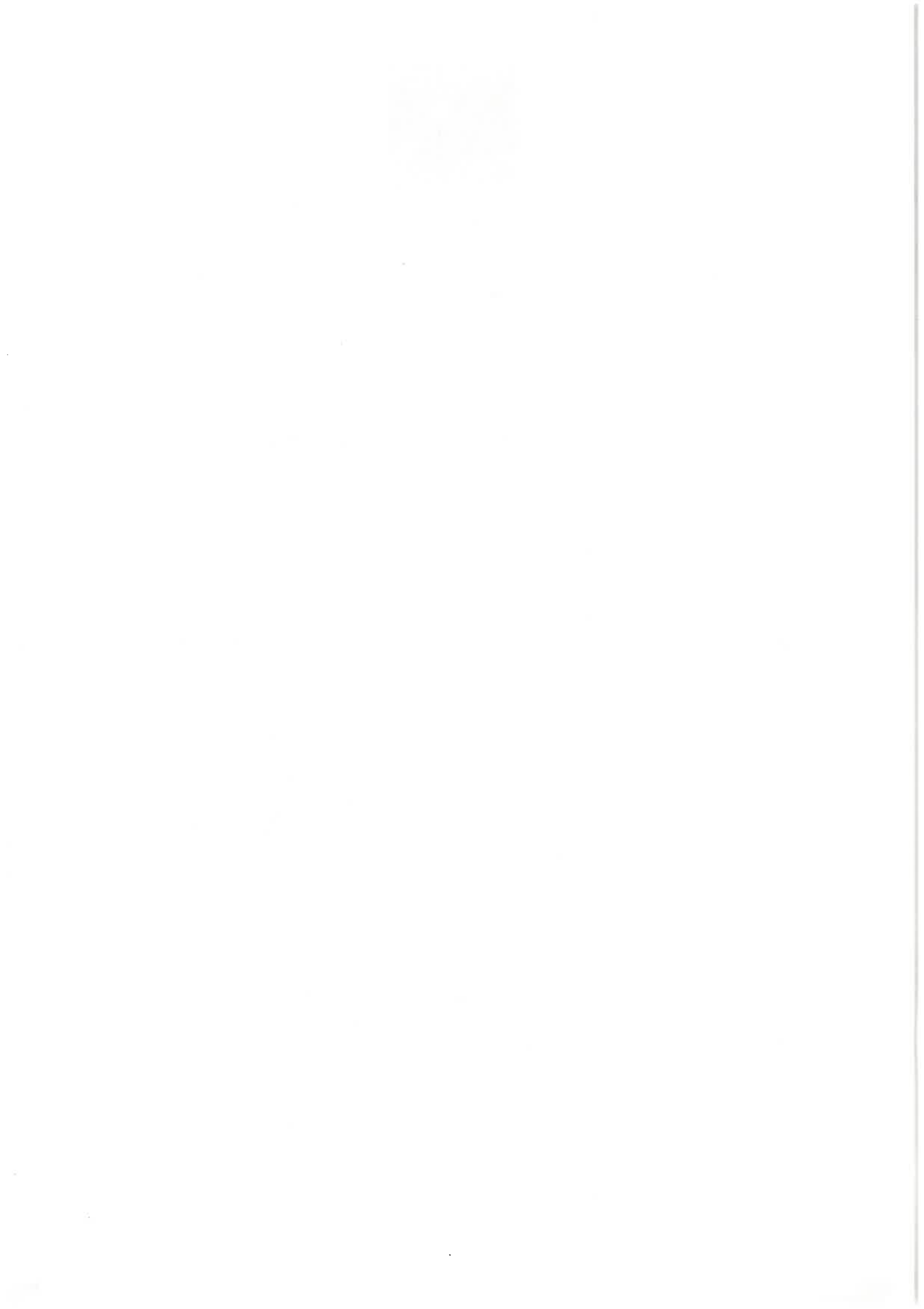
Hindalco Industries Limited

Durgmanwadi Mines: PO Radhanagari - 416 212, Dist. Kolhapur, Maharashtra, T: +91 02321 202072, 202178, 133,

Kolhapur Office: T:+91 0231 2661458, 2666621, 2021461, 2021462

Registered Office: Ahura Centre, 1st Floor, B-Wing, Mahakali Caves Road, Andheri (East), Mumbai - 400 093, India

T: +91 22 6691 7000 | Fax: +91 22 6691 7001 | E: hindalco@adityabirla.com | W: www.hindalco.com | Corporate ID 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 has been backfilled for reclamation and rehabilitation of mined out area.
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°. 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.	<p>There is no overburden dumps exist today. As of now, OB generated during mining operation is being used for backfilling of mined out area simultaneously.</p> <p>Backfilled area has been scientifically vegetated with indigenous species and native shrub.</p> <p>Monitoring and management of rehabilitated areas is being done regularly so that vegetation becomes self-sustaining.</p> <p>Compliance status is being submitted on six monthly.</p>
iii)	<p>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.</p> <p>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 intervals.</p>	<p>Garland drains have been provided to arrest the silt and sediment flows from the mine area, roads, green belt development etc.</p> <p>The flow from the settling tanks is then channelized through check dams. Drains and check dams are de-silted and maintained properly.</p> <p>Garland drains have been constructed for mine pit . Sumps of sufficient capacity are provided. Sump provides adequate retention period to allow settling of silt material. Sedimentation pits have been constructed at the corners of the garland drains and desilted at regular intervals.</p>

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.	<p>The lease area has natural green belt with indigenous species which is undisturbed and maintained.</p> <p>On slope of backfilled area, plantation of local species "Karvy" to control slope stability and soil erosion has been carried out with the help of expertise / Government agencies.</p> <p>A nursery has been developed for indigenous and local species (around 4000) for plantation in mined out area at the mines.</p> <p>The plantation is carried out every year as per plan. Till date 37,150 saplings have been planted & restored about 18.0 Ha area.</p> <p>During the year 2018-19, 12,000 saplings have been planted to cover 5.0 Ha.</p>
vi)	Implement suitable conservation measures to augment ground water resources in the area in consultation with the Regional Director, Central Ground Water Board.	<p>Water harvesting pond has been developed in the mined out areas as per the condition given in the NOC of CGWA.</p> <p>Drip irrigation is in practice as conservation measures to save the water.</p>
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.	<p>The ground water quality is monitored on quarterly basis.</p> <p>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.</p>
viii)	Prior permission from the competent authority to be obtained for drawl of ground water, if any.	Permission for ground water withdrawal has been obtained from CGWA.
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	<p>There is a system to check the PUC certificates of all hired trucks regularly.</p> <p>Timely maintenance of all heavy</p>

	transportation of mineral. The vehicles should be covered with a tarpaulin and shall not be over loaded.	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 of adequate size 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 in operation. Final closure plan needs to be approved by Indian Bureau of Mines. Final Mine closure plan require to be submitted to IBM as per their guidelines and Rule 24 of MCDR, two years prior to the closure of the mine. The copy of the same will be submitted to MoEF.

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.	As a part of conservation measures for protection of flora and fauna , 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. Further core area is fenced with parapet wall, barbed wire and thus natural vegetation is protected. Mining is being done only in day light. Awareness programme is being conducted in nearby villages.
iv.	Four ambient air quality monitoring stations shall be established in the core zone & buffer zone for RPM, SPM, SO ₂ , NO _x monitoring. Location	Ambient air quality stations have been established in the core and buffer area.

	of the stations should be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets and frequency of monitoring should be undertaken in consultation with the State Pollution Control Board.	
v.	Regular submission of data on ambient air quality (RPM, SPM, SO ₂ ,NO _x) 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. 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 operation 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 levels in work environment is within the standard limits. 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.19 th May, 1993 and 31 st 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 full-fledged Environment cell operates at the unit level and qualified personnel are employed.

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 development work.	Not applicable, as this is an operating mine.																								
xiii.	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.	<p>The separate funds have been allocated for implementation of environmental protection measures along with item-wise breakup such as furnished below.</p> <table border="1" data-bbox="826 607 1385 1317"> <thead> <tr> <th>SO. NO.</th> <th>Shop Order Description</th> <th>Expenditure for the year 2018-19 (Rs.)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Nurssery & Plantation (5117)</td> <td>6,58,338.0</td> </tr> <tr> <td>2</td> <td>After care (5118)</td> <td>6,20,068.0</td> </tr> <tr> <td>3</td> <td>Environment Monitoring (5119)</td> <td>7,50,100.0</td> </tr> <tr> <td>4</td> <td>Dust suppression</td> <td>6,15,221.0</td> </tr> <tr> <td>5</td> <td>Statutory Compliance</td> <td>50,982.0</td> </tr> <tr> <td>6</td> <td>Environment Others</td> <td>6,00,063.0</td> </tr> <tr> <td>7</td> <td>Mine restoration & rehabilitation</td> <td>3,95,515.0</td> </tr> </tbody> </table>	SO. NO.	Shop Order Description	Expenditure for the year 2018-19 (Rs.)	1	Nurssery & Plantation (5117)	6,58,338.0	2	After care (5118)	6,20,068.0	3	Environment Monitoring (5119)	7,50,100.0	4	Dust suppression	6,15,221.0	5	Statutory Compliance	50,982.0	6	Environment Others	6,00,063.0	7	Mine restoration & rehabilitation	3,95,515.0
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xv.	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.	Agreed and Noted.																								
xvi.	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.	Complied.																								

xvii.	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.	Complied.
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

Post Monsoon

2018

M/S HINDALCO INDUSTRIES LIMITED

DHANGARWADI BAUXITE MINE

DHANGARWADI VILLAGE,
SAHUWADI TALUK,

KOLHAPUR DISTRICT,
MAHARASHTRA

IND.BH.41.17.0348/HSR



BHAGAVATHI ANA LABS

PREPARED BY

BHAGAVATHI ANA LABS PVT LTD.,

7-2-C-14, Industrial Estate,
Sanathnagar, Hyderabad
500 018

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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 Post Monsoon season of the year 2018.

The monitoring was carried out in the selected locations in core zone and buffer zone around the mine lease area during the months of September 2018, October 2018 & November 2018 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, 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 Post Monsoon season of the year 2018.

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 and fine particulate sampler has been used for AAQ monitoring. Maximum, minimum, average and percentile values have been computed from the 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 meter.

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 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.

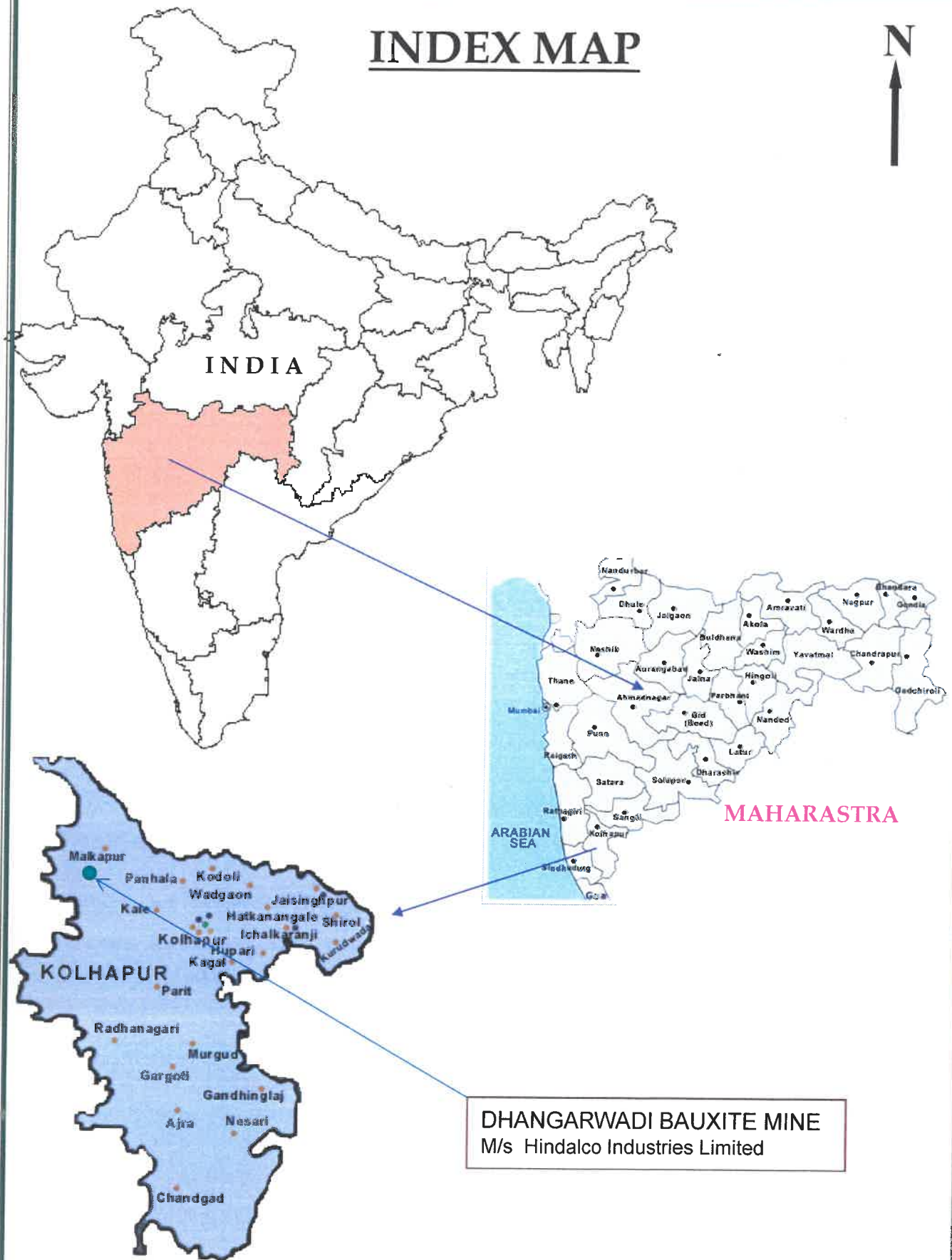
MINE DETAIL

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



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 Dhopeswar Junction, located 6 kms from Malkapur Town on Ratnagiri - Nagpur National Highway.

Rail head

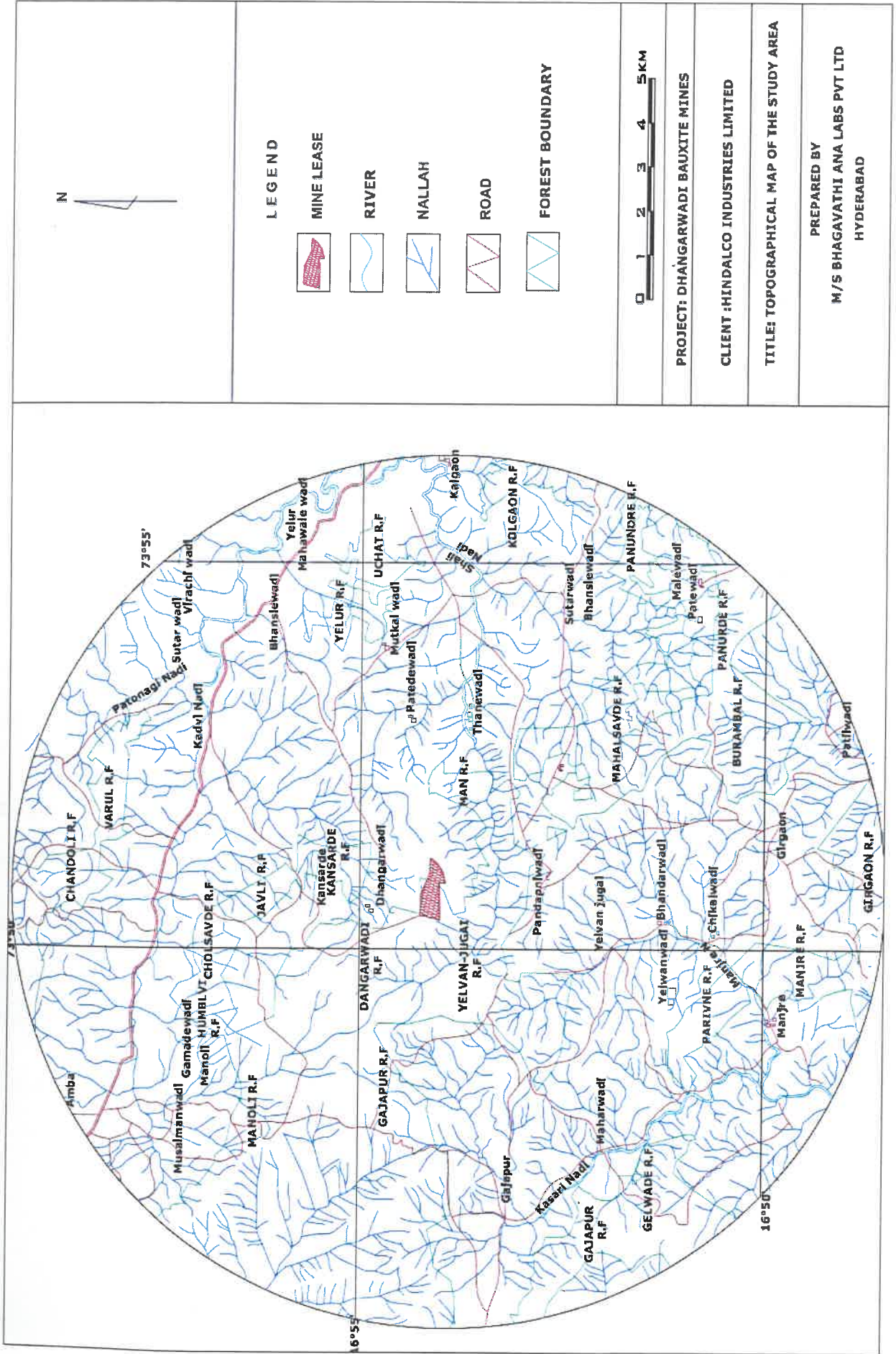
The nearest railway head is Kolhapur which is situated at a distance of about 56 kms by road from the lease area.

Sea Port






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

Airport

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



LEGEND

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



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° 52' to 16° 56'
Longitude	73° 48' to 73° 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 Dhopeswar 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/HUMIDITY			WIND SPEED Km/h			WIND DIRECTION		
	MIN	MAX	AVERAGE HUMIDITY	MIN	MAX	AVERAGE			
04-09-2018	24	29	80	0	7	3.5	N,NW		
06-09-2018	25	30	80	0	12	6.0	SSE-NE		
10-09-2018	23	30	78	0	5	2.5	S-NE		
12-09-2018	23	30	82	0	7	3.5	NE-W		
18-09-2018	23	32	65	0	2	1.0	N-W		
20-09-2018	23	30	86	0	11	5.5	NNW		
25-09-2018	24	32	77	0	3	1.5	N-SSW		
27-09-2018	21	31	75	0	5	2.5	SSW-NW		

MICRO-METEOROLOGICAL DATA

DATE	TEMPERATURE/HUMIDITY			WIND SPEED Km/h			WIND DIRECTION
	MIN	MAX	AVERAGE HUMIDITY	MIN	MAX	AVERAGE	
03-10-2018	24	35	60	0	3	1.5	NNE
05-10-2018	25	36	70	0	5	2.5	N-NW
10-10-2018	24	33	83	0	6	3.0	SSE-N
12-10-2018	26	34	67	0	7	3.5	N-NNE
15-10-2018	24	35	70	0	10	5.0	NE-E
17-10-2018	23	32	68	0	4	2.0	E-SE
23-10-2018	24	33	71	0	5	2.5	SE-N
26-10-2018	24	37	80	0	2	1.0	SE-N

MICRO-METEOROLOGICAL DATA

DATE	TEMPERATURE/HUMIDITY			WIND SPEED Km/h			WIND DIRECTION
	MIN	MAX	AVERAGE HUMIDITY	MIN	MAX	AVERAGE	
02-11-2018	21	35	70	0	4	2.0	SSE
05-11-2018	24	36	74	0	3	1.5	NNE
09-11-2018	23	35	72	0	7	3.5	SE-NE
13-11-2018	20	36	70	0	8	4.0	ENE-W
16-11-2018	21	37	60	0	2	1.0	SE-NNW
20-11-2018	24	33	62	0	6	3.0	SE-SW
22-11-2018	23	36	67	0	9	4.5	SE-NNE
26-11-2018	21	35	70	0	3	1.5	NE-NW

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 for obtaining

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 BL & APM 550 Equipment's were used for monitoring particulate matter(PM10), particulate matter(PM2.5), gaseous pollutants etc.

METHOD FOR TESTING PM10/PM 2.5

Name of Pollutant	PM10/pm 2.5
Medium	Air
Instrument	Respirable Dust Sampler/Fine particulate sampler
Duration	24 hourly
Mode	Continuous
Unit	$\mu\text{g}/\text{m}^3$
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	24 hourly	24 hourly
Mode	Continuous	Continuous
Unit	$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$
Procedure	As per IS 5182 (Part II)	As per IS 5182 (Part IV),

Monitoring Location Details

Respirable dust sampler and Fine Particulate 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, PM 10, PM 2.5, SO₂, NO_x, CO collected during post Monsoon season of the year 2018 are presented in annexure and are summarized in the following table.

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

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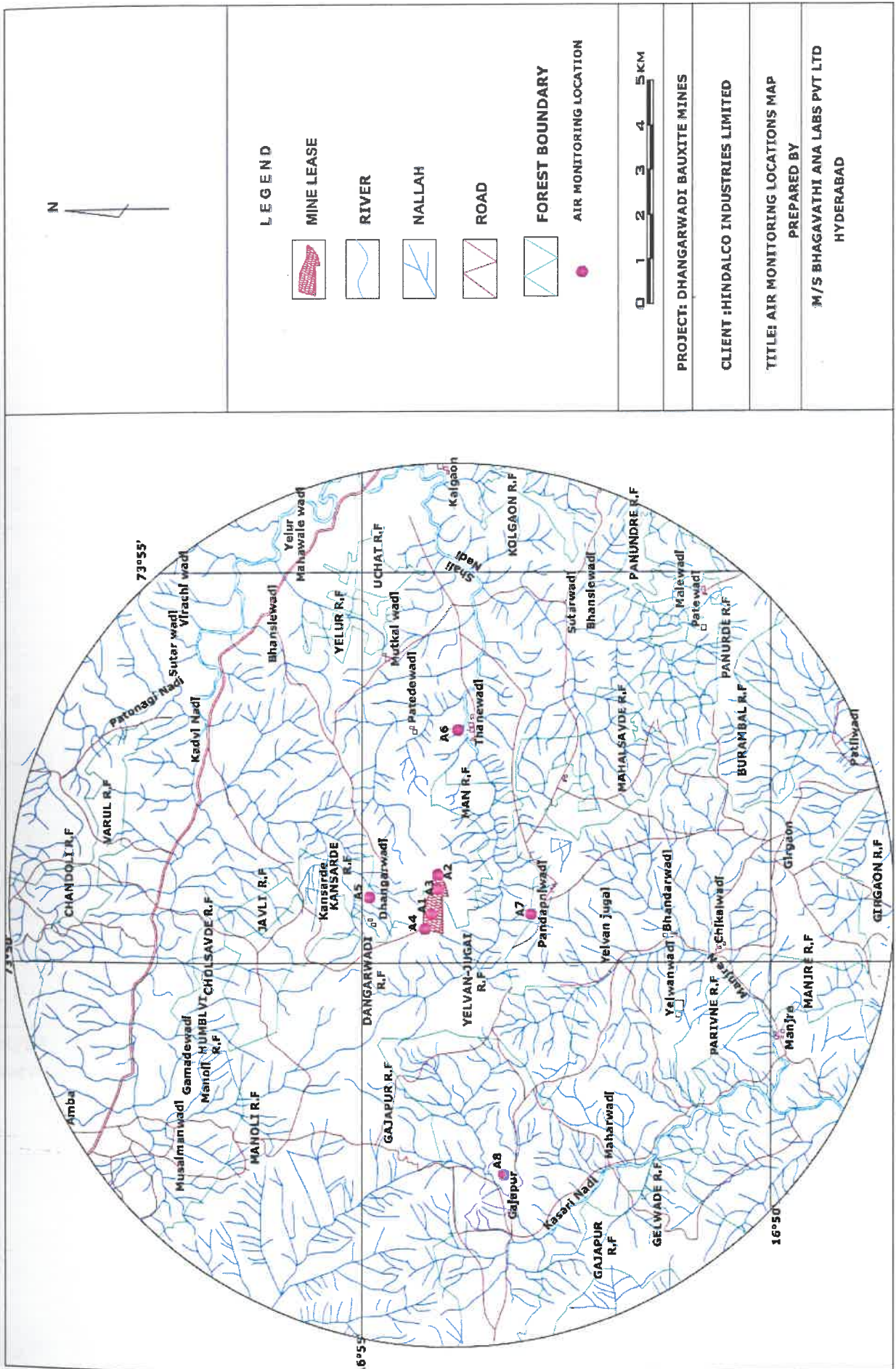
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



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LEGEND

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



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		PM 10	PM 2.5	SO ₂	NO _x	CO
1	Core zone	Min	32.6	11.0	5.0	10.0	<1
		Max	58.4	18.3	8.2	12.3	<1
		Average	47.2	15.0	6.5	10.9	<1
		98 th %tile	58.3	18.3	8.0	12.1	<1
2	Near Dumping site	Min	34.4	10.6	4.4	9.8	<1
		Max	56.5	19.0	8.2	12.3	<1
		Average	46.4	14.8	6.5	10.8	<1
		98 th %tile	56.0	18.8	8.0	12.1	<1
3	Near Haulage Road	Min	30.4	9.8	5.0	9.5	<1
		Max	58.4	18.2	10.6	12.0	<1
		Average	45.3	14.4	7.5	10.8	<1
		98 th %tile	57.4	18.1	10.4	11.9	<1
4	Near Mines office	Min	32.9	11.2	5.0	9.8	<1
		Max	56.5	19.1	8.5	12.3	<1
		Average	47.6	15.1	6.5	10.7	<1
		98 th %tile	56.0	18.8	8.2	12.1	<1
5	Dhangarwadi village	Min	29.6	8.9	4.9	9.8	<1
		Max	54.6	18.0	7.9	12.2	<1
		Average	43.8	13.6	6.1	10.6	<1
		98 th %tile	54.4	17.7	7.8	11.9	<1
6	Thanewadi village	Min	27.5	8.5	4.4	9.5	<1
		Max	55.3	17.4	7.6	11.3	<1
		Average	43.3	13.4	5.7	10.3	<1
		98 th %tile	55.1	17.3	7.2	11.3	<1
7	Pandapaniwadi village	Min	30.0	9.9	4.6	9.2	<1
		Max	54.8	18.0	7.1	11.3	<1
		Average	44.0	14.2	5.8	10.3	<1
		98 th %tile	53.9	17.9	7.1	11.2	<1
8	Gajapur village	Min	29.6	9.9	4.9	9.6	<1
		Max	54.5	17.3	7.6	11.4	<1
		Average	44.0	13.7	6.2	10.4	<1
		98 th %tile	53.7	17.1	7.5	11.3	<1

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 (Aerial 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.

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	54.9	56.7	58.7	58.5	59.0	47.1	48.2	48.7
07:00	57.0	56.9	58.5	58.8	59.6	54.5	56.6	56.7
08:00	57.9	59.3	60.4	59.7	61.3	57.0	58.5	58.9
09:00	61.7	61.7	60.8	61.4	62.1	59.7	61.4	61.7
10:00	64.2	64.3	63.6	64.6	64.8	62.0	63.4	64.0
11:00	66.6	67.1	66.5	66.7	67.7	69.5	71.5	72.0
12:00	66.7	66.6	66.9	66.6	67.8	70.6	73.1	72.9
13:00	67.3	67.4	66.5	67.2	68.1	68.8	71.1	71.7
14:00	66.4	67.7	68.5	68.2	68.7	68.9	70.6	71.8
15:00	65.1	66.4	65.8	65.2	66.8	67.2	69.0	70.2
16:00	70.1	71.8	69.3	69.2	69.9	65.5	67.4	68.4
17:00	72.0	72.5	66.6	69.4	67.4	63.6	65.4	67.3
18:00	68.1	69.3	68.0	68.7	68.6	62.2	64.3	66.0
19:00	63.0	63.9	62.8	64.0	63.6	61.3	63.6	65.0
20:00	59.8	59.7	59.6	59.3	60.5	55.9	58.1	59.9
21:00	59.0	59.7	58.6	59.4	59.6	55.0	57.0	58.8
22:00	58.7	60.1	60.0	59.6	60.9	48.4	50.9	52.5
23:00	58.7	58.8	58.5	59.1	59.9	47.3	50.1	51.1
00:00	57.8	59.2	60.5	60.5	61.4	47.2	50.4	51.0
01:00	57.6	58.1	58.4	58.5	59.6	47.3	51.4	51.1
02:00	58.5	57.9	57.3	58.2	58.3	47.9	51.5	51.4
03:00	58.3	58.5	57.9	58.6	58.7	48.1	51.9	52.4
04:00	57.5	58.8	60.3	60.4	61.7	43.5	46.7	46.9
05:00	57.8	58.9	59.9	59.8	60.7	43.4	46.4	46.4
Min	54.9	56.7	57.3	58.2	58.3	43.4	46.4	46.4
Max	72.0	72.5	69.3	69.4	69.9	70.6	73.1	72.9

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 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 during Post Monsoon.

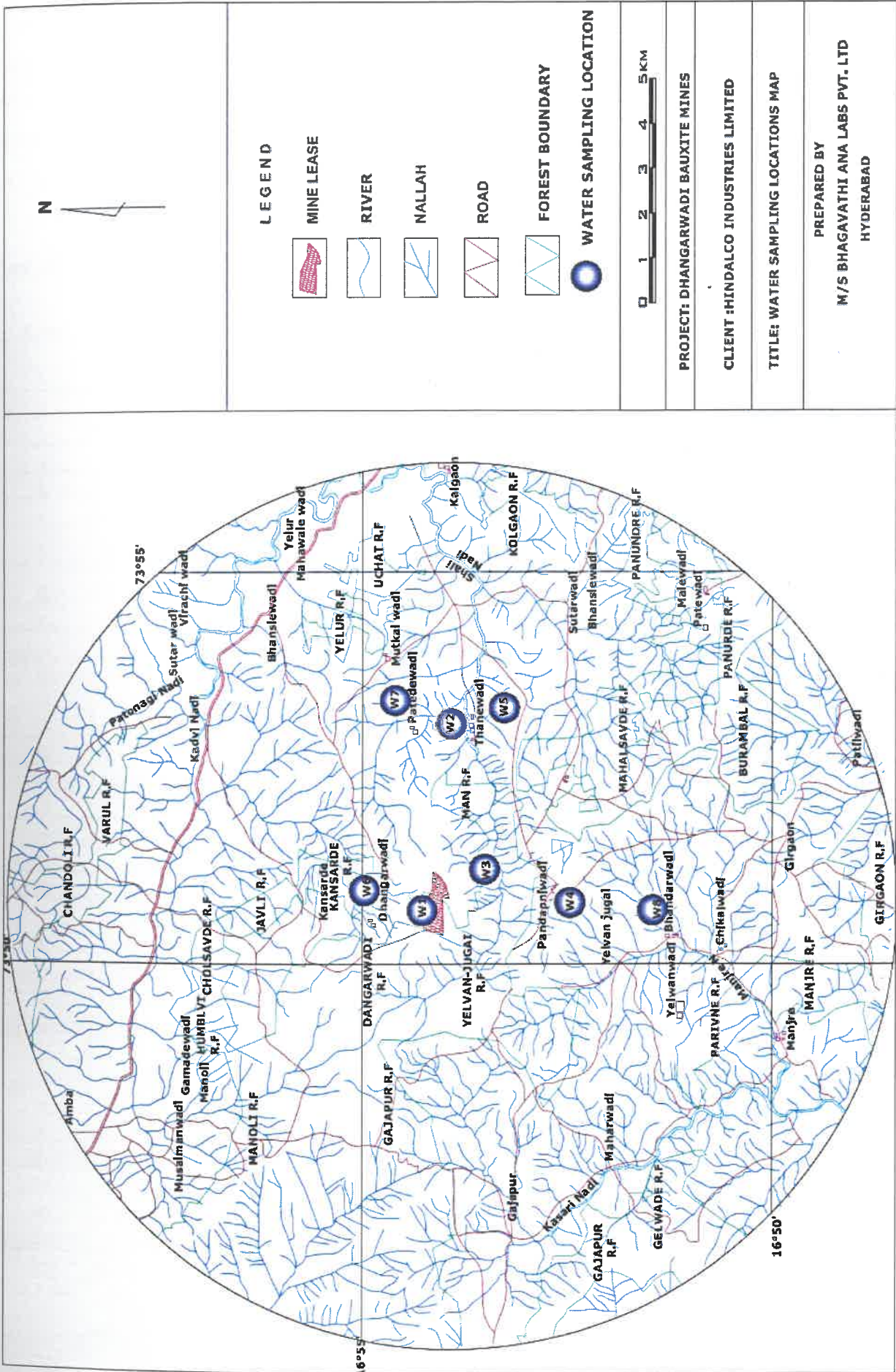
▣ Ground water quality

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 in monsoon season.







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	Near mine office borewell	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



LEGEND

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



PROJECT: DHANGARWADI BAUXITE MINES

CLIENT: HINDALCO INDUSTRIES LIMITED

TITLE: WATER SAMPLING LOCATIONS MAP

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

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 Post Monsoon season of the year 2018 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: 25.11.2018

Sl. No	Parameter	Units	W-1 Near mine office borewell	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	--	6.5	7.1	6.89
5	Turbidity	NTU	<5	<5	<5
6	Dissolved Oxygen	mg/l	4	7	6
7	Total Dissolved solids	mg/l	50	200	234
8	Total Suspended solids	mg/l	0	34	36
9	Alkalinity as CaCO ₃	mg/l	18	32	34
10	Total Hardness as CaCO ₃	mg/l	90	176	180
11	Nitrate as NO ₃	mg/l	0.04	1.1	0.33
12	Phosphates as PO ₄	mg/l	0.05	0.06	0.09
13	Chlorides as Cl	mg/l	6.1	33.4	12.35
14	Sulphates as SO ₄	mg/l	1.23	2.15	4.7
15	Sodium as Na	mg/l	2	1.64	1.80
16	Potassium as K	mg/l	0.02	0.06	0.07
17	Calcium as Ca	mg/l	15	34.7	36
18	Magnesium as Mg	mg/l	7	17	9
19	Lead as Pb	mg/l	BDL	BDL	BDL
20	Manganese as Mn	mg/l	0.01	0.04	0.05
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	0.07	0.05	0.09
26	Fluoride as F	mg/l	0.41	0.83	0.93
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	2	4	6

BDL: Below Detectable Limit

mg/l: Milligram per liter

GROUND WATER QUALITY

Date of Sampling: 25.11.2018

Sl. No	Parameter	Units	W-4 PANDAPNIWADI VILLAGE	W - 5 THANEWADI VILLAGE	W -6 DHANGARWADI VILLAGE	W-7 PATEWADI VILLAGE	W -8 BHANGARWADI 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	--	6.66	6.76	6.79	6.5	6.5
5	Turbidity	NTU	<5	<5	<5	<5	<5
6	Dissolved Oxygen	mg/l	4	5	6	5	6
7	Total Dissolved solids	mg/l	78	69	56	124	45
8	Total Suspended solids	mg/l	7	9	11	12	8
9	Alkalinity as CaCO ₃	mg/l	19	21	16	27	21
10	Total Hardness as CaCO ₃	mg/l	88	65	42	134	31
11	Nitrate as NO ₃	mg/l	0.09	0.45	0.38	0.25	0.29
12	Phosphates as PO ₄	mg/l	0.04	0.07	0.03	0.06	0.09
13	Chlorides as Cl	mg/l	12.8	11.34	13	19	16
14	Sulphates as SO ₄	mg/l	3.2	3.1	2.76	4.33	3.1
15	Sodium as Na	mg/l	1.66	1.79	2.5	2	5.1
16	Potassium as K	mg/l	0.09	0.11	0.07	0.9	1.7
17	Calcium as Ca	mg/l	20.3	18.1	11	13	14
18	Magnesium as Mg	mg/l	6.7	5.33	3.21	5	4.9
19	Lead as Pb	mg/l	BDL	BDL	BDL	BDL	BDL
20	Manganese as Mn	mg/l	0.03	0.02	0.09	0.09	0.11
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	0.07	0.09	0.11	0.12	0.18
26	Fluoride as F	mg/l	0.12	0.16	0.13	0.11	0.09
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	3	4	3	2	2

BDL: Below Detectable Limit

mg/l: Milligram per liter

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

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

Date of sampling: 25.11.2018

Sl.No	Test	Result
1	Total Suspended Solids, mg/l	24
2	Total Dissolved Solids, mg/l	70
3	COD, mg/l	5
4	BOD for 3 days at 27°C, mg/l	3
5	Total Solids	16
6	Oil and Grease, mg/l	<5

Sample Type: **Canteen waste water**

Date of sampling: 26.11.2018

Sl.No	Test	Result
1	Total Suspended Solids, mg/l	22
2	Total Dissolved Solids, mg/l	44
3	COD, mg/l	4
4	BOD for 3 days at 27°C, mg/l	2
5	Total Solids	15
6	Oil and Grease, mg/l	<5

RESULTS & DISCUSSION

- The pH of the study area varies from 6.5 to 7.1 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. to 7.00.
- Total Dissolved Solids found to be in the range of 45 to 234 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 18 to 34 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 31 to 176.0 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 6.1 to 33.4 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 11 to 34.7 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 4.9 to 6.7 mg/l.
- Iron content of the water in the study area found to be in the range of 0.05 to 0.18 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

Stack Analysis Report				
Name of the Industry	DHANGARWADI BAUXITE MINE			
Address	DHANGARWADI			
DATE	26-11-2018			
Stack details				
Stack attached to	D.G.Set(45 KVA)		Diameter of stack (mtr) D	0.1
Height of stack above ground (mtr)	5.5		Stack crossectional area m2	0.0020
Fuel used	H.S.D		Consumption of fuel (KLD)	3
Additional Load	Nil		Load on the system	90%
EMMISSION DETAILS				
Particulars		Value	* Permissible limit	Method of analysis
Temperature (°C)	:	122.00	NA	As per IS:11255
Velocity of flue gas (m/sec)	:	9.05	NA	As per IS:11255
Gas flow rate at NTP (Nm ³ /hour)	:	49	NA	As per IS:11255
Particulate matter (mg/Nm ³)	:	44.09	150.00	As per IS:11255
SO ₂ (Kg/Hr)	:	0.07	0.29	As per IS:11255
* Permissible Limits	As per the MPCB consent			
Ambient Meteorology				
Wind Velocity (Km/hr)	6		Ambient Temp °C	32
Wind Direction	E		Humidity %	65
Details of instrument used - Pollutech model,PEM-SMK 10				
Name of instrument	Calibration date		Validity	
PEM SMK 10	31-01-2018		30-01-2019	
"" Calibration Report No. PICS/F/SMK/01-18/134				
* Recognised by Ministry of Environment & Forests, as "Environmental Laboratory " vide Notification S. O. 428 (E) valid upto Jan , 2019				

AMBIENT AIR QUALITY**Station: A1, CORE ZONE**

S.No.	Month	Date	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 _x ($\mu\text{g}/\text{m}^3$)	CO (Mg/m ³)
			24 hrs Average	24 hrs Average	24 hrs Average	24 hrs Average	24 hrs Average
1	Sep-18	04-09-2018	52.7	16.0	6.8	10.5	<1
2		06-09-2018	49.0	15.3	7.2	11.4	<1
3		10-09-2018	44.4	13.4	BDL	BDL	<1
4		12-09-2018	37.6	11.4	5.8	10.9	<1
5		18-09-2018	46.7	14.3	5.4	10.1	<1
6		20-09-2018	39.4	12.3	BDL	BDL	<1
7		25-09-2018	55.9	17.1	7.4	11.4	<1
8		27-09-2018	32.6	18.1	8.2	12.3	<1
1	Oct-18	03-10-2018	46.1	14.0	5.0	10.3	<1
2		05-10-2018	52.6	16.3	5.8	10.1	<1
3		10-10-2018	55.7	17.7	BDL	BDL	<1
4		12-10-2018	58.4	18.3	7.0	11.5	<1
5		15-10-2018	36.3	11.0	BDL	BDL	<1
6		17-10-2018	37.6	13.4	7.3	11.8	<1
7		23-10-2018	39.6	12.6	6.6	10.7	<1
8		26-10-2018	50.4	15.7	7.0	11.0	<1
1	Nov-18	02-11-2018	44.1	13.7	5.2	10.6	<1
2		05-11-2018	48.5	14.7	6.0	10.9	<1
3		09-11-2018	58.2	18.2	6.9	11.1	<1
4		13-11-2018	55.7	17.1	7.6	11.7	<1
5		16-11-2018	46.3	13.9	BDL	BDL	<1
6		20-11-2018	53.1	16.1	6.5	10.8	<1
7		22-11-2018	50.2	15.6	5.5	10.0	<1
8		26-11-2018	42.4	12.8	BDL	BDL	<1

	Min	32.6	11.0	5.0	10.0
	Max	58.4	18.3	8.2	12.3
	Mean	47.2	15.0	6.5	10.9
	10th percentile	37.6	12.4	5.3	10.1
	30th percentile	44.0	13.6	5.8	10.6
	50th percentile	47.6	15.0	6.7	10.9
	95th percentile	57.9	18.2	7.7	11.9
	98th percentile	58.3	18.3	8.0	12.1

BDL: BELOW DETECTABLE LIMIT

AMBIENT AIR QUALITY

Station: A2, NEAR DUMP SITE							
S.No.	Month	Date	PM 10 (µg/m ³)	PM 2.5 (µg/m ³)	SO ₂ (µg/m ³)	NO _x (µg/m ³)	CO (Mg/m ³)
			24 hrs Average	24 hrs Average	24 hrs Average	24 hrs Average	24 hrs Average
1	Sep-18	04-09-2018	41.3	12.6	BDL	BDL	<1
2		06-09-2018	43.8	13.6	BDL	BDL	<1
3		10-09-2018	34.4	10.7	7.6	11.4	<1
4		12-09-2018	50.8	16.0	6.8	11.2	<1
5		18-09-2018	46.6	14.7	5.7	10.6	<1
6		20-09-2018	48.5	15.6	6.4	11.6	<1
7		25-09-2018	38.8	11.7	8.2	12.3	<1
8		27-09-2018	53.5	17.2	6.0	9.8	<1
1	Oct-18	03-10-2018	36.6	11.6	BDL	BDL	<1
2		05-10-2018	56.5	18.0	BDL	BDL	<1
3		10-10-2018	43.1	13.5	7.0	10.5	<1
4		12-10-2018	34.7	10.6	BDL	BDL	<1
5		15-10-2018	48.1	15.4	5.8	10.4	<1
6		17-10-2018	54.6	17.1	7.1	11.1	<1
7		23-10-2018	51.1	16.5	7.7	11.5	<1
8		26-10-2018	46.8	14.5	5.5	10.0	<1
1	Nov-18	02-11-2018	40.2	12.5	BDL	BDL	<1
2		05-11-2018	49.2	16.3	4.4	9.8	<1
3		09-11-2018	55.3	19.0	7.7	11.0	<1
4		13-11-2018	46.0	14.5	6.6	10.4	<1
5		16-11-2018	50.0	17.0	6.7	10.6	<1
6		20-11-2018	42.5	13.0	BDL	BDL	<1
7		22-11-2018	54.0	18.6	6.1	10.7	<1
8		26-11-2018	47.8	15.0	5.7	10.3	<1

Min	34.4	10.6	4.4	9.8
Max	56.5	19.0	8.2	12.3
Mean	46.4	14.8	6.5	10.8
10th percentile	37.3	11.6	5.6	9.9
30th percentile	43.0	13.4	6.0	10.4
50th percentile	47.3	14.8	6.6	10.6
95th percentile	55.2	18.5	7.8	11.7
98th percentile	56.0	18.8	8.0	12.1

AMBIENT AIR QUALITY

Station: A3, NEAR HAULAGE ROAD

Mg/m ³ Average	S.No.	Month	Date	PM 10 (µg/m ³)	PM 2.5 (µg/m ³)	SO ₂ (µg/m ³)	NO _x (µg/m ³)	CO (Mg/m ³)
				24 hrs Average	24 hrs Average	24 hrs Average	24 hrs Average	24 hrs Average
<1	1	Sep-18	04-09-2018	43.9	14.3	5.8	10.9	<1
<1	2		06-09-2018	38.2	12.8	9.5	BDL	<1
<1	3		10-09-2018	30.4	11.0	10.6	11.5	<1
<1	4		12-09-2018	48.5	15.6	10.2	BDL	<1
<1	5		18-09-2018	52.1	17.8	9.4	11.0	<1
<1	6		20-09-2018	54.3	18.2	9.6	9.9	<1
<1	7		25-09-2018	46.5	16.4	8.7	11.3	<1
<1	8		27-09-2018	33.3	10.1	8.5	12.0	<1
<1	1	Oct-18	03-10-2018	48.5	14.5	5.4	10.6	<1
<1	2		05-10-2018	41.8	12.6	BDL	BDL	<1
<1	3		10-10-2018	52.1	15.7	6.3	11.5	<1
<1	4		12-10-2018	44.4	13.4	6.2	9.6	<1
<1	5		15-10-2018	54.9	16.5	6.9	10.4	<1
<1	6		17-10-2018	33.5	10.6	BDL	BDL	<1
<1	7		23-10-2018	31.5	9.8	BDL	BDL	<1
<1	8		26-10-2018	56.2	17.1	7.5	11.3	<1
<1	1	Nov-18	02-11-2018	58.4	18.0	5.0	10.2	<1
<1	2		05-11-2018	38.7	11.7	BDL	BDL	<1
<1	3		09-11-2018	52.4	17.3	7.7	11.8	<1
<1	4		13-11-2018	42.5	13.0	6.8	10.9	<1
<1	5		16-11-2018	48.5	15.1	6.5	10.8	<1
<1	6		20-11-2018	45.7	14.1	6.2	10.6	<1
<1	7		22-11-2018	49.9	16.7	5.4	9.5	<1
<1	8		26-11-2018	40.6	12.4	BDL	BDL	<1

Min	30.4	9.8	5.0	9.5
Max	58.4	18.2	10.6	12.0
Mean	45.3	14.4	7.5	10.8
10th percentile	33.4	10.7	5.4	9.8
30th percentile	41.7	12.8	6.2	10.6
50th percentile	46.1	14.4	6.9	10.9
95th percentile	56.0	18.0	10.2	11.8
98th percentile	57.4	18.1	10.4	11.9

AMBIENT AIR QUALITY

Station: A4, NEAR MINES OFFICE							
S.No.	Month	Date	PM 10 (µg/m ³)	PM 2.5 (µg/m ³)	SO ₂ (µg/m ³)	NO _x (µg/m ³)	CO (Mg/m ³)
			24 hrs Average	24 hrs Average	24 hrs Average	24 hrs Average	24 hrs Average
1	Sep-18	04-09-2018	32.9	11.2	5.9	10.5	<1
2		06-09-2018	49.2	16.0	7.7	11.8	<1
3		10-09-2018	51.3	17.0	5.4	10.8	<1
4		12-09-2018	40.1	12.2	BDL	BDL	<1
5		18-09-2018	47.2	15.0	8.5	12.3	<1
6		20-09-2018	44.8	14.1	6.5	9.8	<1
7		25-09-2018	53.2	18.0	6.7	10.0	<1
8		27-09-2018	42.3	13.5	BDL	BDL	<1
1	Oct-18	03-10-2018	54.1	16.3	5.4	10.0	<1
2		05-10-2018	49.2	14.8	7.1	11.1	<1
3		10-10-2018	50.3	15.2	7.5	10.5	<1
4		12-10-2018	52.4	16.5	5.0	9.9	<1
5		15-10-2018	36.6	11.2	BDL	BDL	<1
6		17-10-2018	45.1	13.6	6.8	11.0	<1
7		23-10-2018	55.4	18.4	7.3	11.2	<1
8		26-10-2018	40.3	12.6	BDL	BDL	<1
1	Nov-18	02-11-2018	42.6	12.5	BDL	BDL	<1
2		05-11-2018	56.5	19.1	5.6	10.9	<1
3		09-11-2018	49.9	15.0	5.9	10.8	<1
4		13-11-2018	46.6	14.8	5.0	10.0	<1
5		16-11-2018	54.7	18.5	6.4	10.7	<1
6		20-11-2018	52.3	17.2	7.4	11.1	<1
7		22-11-2018	44.4	13.6	BDL	BDL	<1
8		26-11-2018	50.1	16.0	6.9	10.4	<1

	Min	32.9	11.2	5.0	9.8
	Max	56.5	19.1	8.5	12.3
	Mean	47.6	15.1	6.5	10.7
	10th percentile	40.1	12.3	5.3	10.0
	30th percentile	44.8	13.6	5.9	10.4
	50th percentile	49.2	15.0	6.6	10.7
	95th percentile	55.3	18.4	7.8	11.9
	98th percentile	56.0	18.8	8.2	12.1

Station: A 5, DHNGARWADI VILLAGE							
S.No.	Month	Date	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 _x ($\mu\text{g}/\text{m}^3$)	CO (Mg/m ³)
			24 hrs Average	24 hrs Average	24 hrs Average	24 hrs Average	24 hrs Average
<1							
<1							
1	Sep-18	04-09-2018	45.2	13.7	4.9	10.0	<1
2		06-09-2018	31.9	9.8	BDL	BDL	<1
3		10-09-2018	46.6	14.0	5.9	11.3	<1
4		12-09-2018	52.6	17.2	7.5	12.2	<1
5		18-09-2018	36.2	11.6	BDL	BDL	<1
6		20-09-2018	50.4	16.6	5.5	9.8	<1
7		25-09-2018	29.6	8.9	6.2	10.3	<1
8		27-09-2018	40.4	12.5	6.7	11.5	<1
1	Oct-18	03-10-2018	42.3	12.8	4.9	10.3	<1
2		05-10-2018	32.2	9.8	BDL	BDL	<1
3		10-10-2018	50.6	15.2	6.2	11.3	<1
4		12-10-2018	38.5	11.6	6.7	10.9	<1
5		15-10-2018	46.0	13.8	7.9	10.3	<1
6		17-10-2018	48.0	14.8	6.6	10.1	<1
7		23-10-2018	35.5	10.8	BDL	BDL	<1
8		26-10-2018	54.3	16.6	5.3	9.9	<1
1	Nov-18	02-11-2018	39.6	12.0	5.9	10.9	<1
2		05-11-2018	36.2	11.2	BDL	BDL	<1
3		09-11-2018	49.7	16.0	6.6	10.7	<1
4		13-11-2018	52.8	17.0	7.4	11.1	<1
5		16-11-2018	54.6	18.0	5.1	10.0	<1
6		20-11-2018	42.6	13.5	5.6	10.4	<1
7		22-11-2018	45.1	14.0	4.9	9.8	<1
8		26-11-2018	50.9	15.5	BDL	BDL	<1

Min	29.6	8.9	4.9	9.8
Max	54.6	18.0	7.9	12.2
Mean	43.8	13.6	6.1	10.6
10th percentile	33.2	10.1	4.9	9.8
30th percentile	39.5	12.0	5.5	10.1
50th percentile	45.2	13.7	6.0	10.4
95th percentile	54.1	17.2	7.6	11.6
98th percentile	54.4	17.7	7.8	11.9

AMBIENT AIR QUALITY

Station: A6, THANEWADI-VILLAGE

S.No.	Month	Date	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 _x ($\mu\text{g}/\text{m}^3$)	CO (Mg/m ³)
			24 hrs Average	24 hrs Average	24 hrs Average	24 hrs Average	24 hrs Average
1	Sep-18	04-09-2018	50.5	16.7	6.1	10.1	<1
2		06-09-2018	42.1	12.7	BDL	BDL	<1
3		10-09-2018	46.5	13.3	5.0	10.3	<1
4		12-09-2018	37.6	11.5	BDL	BDL	<1
5		18-09-2018	44.1	15.4	5.7	10.8	<1
6		20-09-2018	53.9	17.4	5.9	9.9	<1
7		25-09-2018	30.5	9.6	BDL	BDL	<1
8		27-09-2018	27.5	8.5	6.0	9.8	<1
1	Oct-18	03-10-2018	48.9	15.2	6.0	10.5	<1
2		05-10-2018	50.1	16.5	5.5	10.0	<1
3		10-10-2018	46.8	14.4	6.3	10.4	<1
4		12-10-2018	54.8	17.0	5.0	11.3	<1
5		15-10-2018	40.2	12.0	BDL	BDL	<1
6		17-10-2018	37.6	11.5	4.8	9.6	<1
7		23-10-2018	33.3	9.1	BDL	BDL	<1
8		26-10-2018	35.2	10.9	BDL	BDL	<1
1	Nov-18	02-11-2018	50.4	15.8	5.8	10.2	<1
2		05-11-2018	52.3	16.7	5.4	10.1	<1
3		09-11-2018	55.3	17.2	7.6	11.2	<1
4		13-11-2018	48.1	14.8	6.3	10.5	<1
5		16-11-2018	40.7	12.6	BDL	BDL	<1
6		20-11-2018	46.6	13.1	4.9	9.9	<1
7		22-11-2018	35.7	10.2	4.4	9.5	<1
8		26-11-2018	31.4	9.3	BDL	BDL	<1

Min	27.5	8.5	4.4	9.5
Max	55.3	17.4	7.6	11.3
Mean	43.3	13.4	5.7	10.3
10th percentile	32.0	9.4	4.9	9.7
30th percentile	37.6	11.5	5.2	9.9
50th percentile	45.3	13.2	5.8	10.1
95th percentile	54.7	17.2	6.6	11.2
98th percentile	55.1	17.3	7.2	11.3

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AMBIENT AIR QUALITY

Station: A7, PANDARPANI VILLAGE							
S.No.	Month	Date	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 _x ($\mu\text{g}/\text{m}^3$)	CO (Mg/m^3)
			24 hrs Average	24 hrs Average	24 hrs Average	24 hrs Average	24 hrs Average
1	Sep-18	04-09-2018	44.2	14.8	BDL	BDL	<1
2		06-09-2018	30.0	9.9	5.3	10.0	<1
3		10-09-2018	40.5	12.8	5.1	9.9	<1
4		12-09-2018	48.8	16.7	6.0	10.0	<1
5		18-09-2018	46.7	15.8	5.6	10.4	<1
6		20-09-2018	50.2	17.7	6.5	10.8	<1
7		25-09-2018	33.3	10.7	BDL	BDL	<1
8		27-09-2018	42.4	13.8	BDL	BDL	<1
1	Oct-18	03-10-2018	40.0	13.0	BDL	BDL	<1
2		05-10-2018	54.8	17.4	5.7	10.9	<1
3		10-10-2018	45.2	14.1	4.6	10.1	<1
4		12-10-2018	39.3	12.4	5.8	10.4	<1
5		15-10-2018	35.0	10.7	BDL	BDL	<1
6		17-10-2018	49.0	15.2	7.1	11.1	<1
7		23-10-2018	51.4	16.0	6.4	9.5	<1
8		26-10-2018	37.2	11.3	4.8	9.2	<1
1	Nov-18	02-11-2018	45.3	14.6	BDL	BDL	<1
2		05-11-2018	52.9	18.0	5.4	10.4	<1
3		09-11-2018	50.4	16.1	6.6	10.9	<1
4		13-11-2018	40.0	12.6	5.9	10.1	<1
5		16-11-2018	38.1	11.9	7.0	11.3	<1
6		20-11-2018	42.5	13.8	BDL	BDL	<1
7		22-11-2018	51.4	17.1	4.9	10.5	<1
8		26-11-2018	48.1	15.1	5.4	9.9	<1

Min	30.0	9.9	4.6	9.2
Max	54.8	18.0	7.1	11.3
Mean	44.0	14.2	5.8	10.3
10th percentile	35.7	10.9	4.9	9.7
30th percentile	40.0	12.8	5.4	10.0
50th percentile	44.7	14.3	5.7	10.4
95th percentile	52.6	17.7	7.0	11.2
98th percentile	53.9	17.9	7.1	11.2

AMBIENT AIR QUALITY

Station: A 8, GAJAWADI VILLAGE

S.No.	Month	Date	PM 10 (µg/m ³)	PM 2.5 (µg/m ³)	SO ₂ (µg/m ³)	NO _x (µg/m ³)	CO (Mg/m ³)
			24 hrs Average	24 hrs Average	24 hrs Average	24 hrs Average	24 hrs Average
1	Sep-18	04-09-2018	46.1	15.0	5.4	9.7	<1
2		06-09-2018	34.2	10.4	BDL	BDL	<1
3		10-09-2018	54.5	16.4	6.8	10.8	<1
4		12-09-2018	48.7	14.9	5.2	10.6	<1
5		18-09-2018	41.9	13.9	6.3	10.2	<1
6		20-09-2018	29.6	9.9	BDL	BDL	<1
7		25-09-2018	37.1	12.0	BDL	BDL	<1
8		27-09-2018	52.9	17.0	6.2	10.1	<1
1	Oct-18	03-10-2018	41.9	12.6	6.0	10.3	<1
2		05-10-2018	48.9	14.7	BDL	BDL	<1
3		10-10-2018	34.4	10.4	6.4	9.9	<1
4		12-10-2018	50.4	15.5	5.4	10.6	<1
5		15-10-2018	43.6	13.7	BDL	BDL	<1
6		17-10-2018	46.7	14.1	6.8	10.7	<1
7		23-10-2018	39.1	11.8	BDL	BDL	<1
8		26-10-2018	52.7	16.3	7.3	10.9	<1
1	Nov-18	02-11-2018	49.8	15.1	7.6	11.4	<1
2		05-11-2018	52.3	17.3	4.9	9.6	<1
3		09-11-2018	38.2	12.1	7.0	10.8	<1
4		13-11-2018	34.5	10.4	BDL	BDL	<1
5		16-11-2018	47.3	14.5	5.9	9.8	<1
6		20-11-2018	50.4	16.5	6.6	10.7	<1
7		22-11-2018	36.4	11.1	BDL	BDL	<1
8		26-11-2018	44.7	13.1	5.4	10.0	<1

Min	29.6	9.9	4.9	9.6
Max	54.5	17.3	7.6	11.4
Mean	44.0	13.7	6.2	10.4
10th percentile	34.4	10.4	5.3	9.8
30th percentile	39.0	12.1	5.7	10.1
50th percentile	45.4	14.0	6.3	10.4
95th percentile	52.9	16.9	7.3	11.0
98th percentile	53.7	17.1	7.5	11.3

BDL for SO_x-2.0 & NO_x-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 SURFACE IN MTS
				25.11.2018
1	PANDAPNIWADI VILLAGE	DHANGARWADI	6.00	1.80
2	DHANGARWADI VILLAGE	DHANGARWADI	6.00	1.40

ENVIRONMENTAL QUALITY MONITORING REPORT

Winter

2018-19

M/S HINDALCO INDUSTRIES LIMITED

DHANGARWADI BAUXITE MINE

**DHANGARWADI VILLAGE,
SAHUWADI TALUK,**

**KOLHAPUR DISTRICT,
MAHARASHTRA**

IND.BH.41.17.0348/HSR



BHAGAVATHI ANA LABS

PREPARED BY

BHAGAVATHI ANA LABS PVT LTD.,

**7-2-C-14, Industrial Estate,
Sanathnagar, Hyderabad
500 018**

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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 winter season of the year 2018-19.

The monitoring was carried out in the selected locations in core zone and buffer zone around the mine lease area during the months of December 2018, January 2019 & February 2019 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, 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 winter season of the year 2018-19.

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 and fine particulate sampler has been used for AAQ monitoring. Maximum, minimum, average and percentile values have been computed from the 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 meter.

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 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.

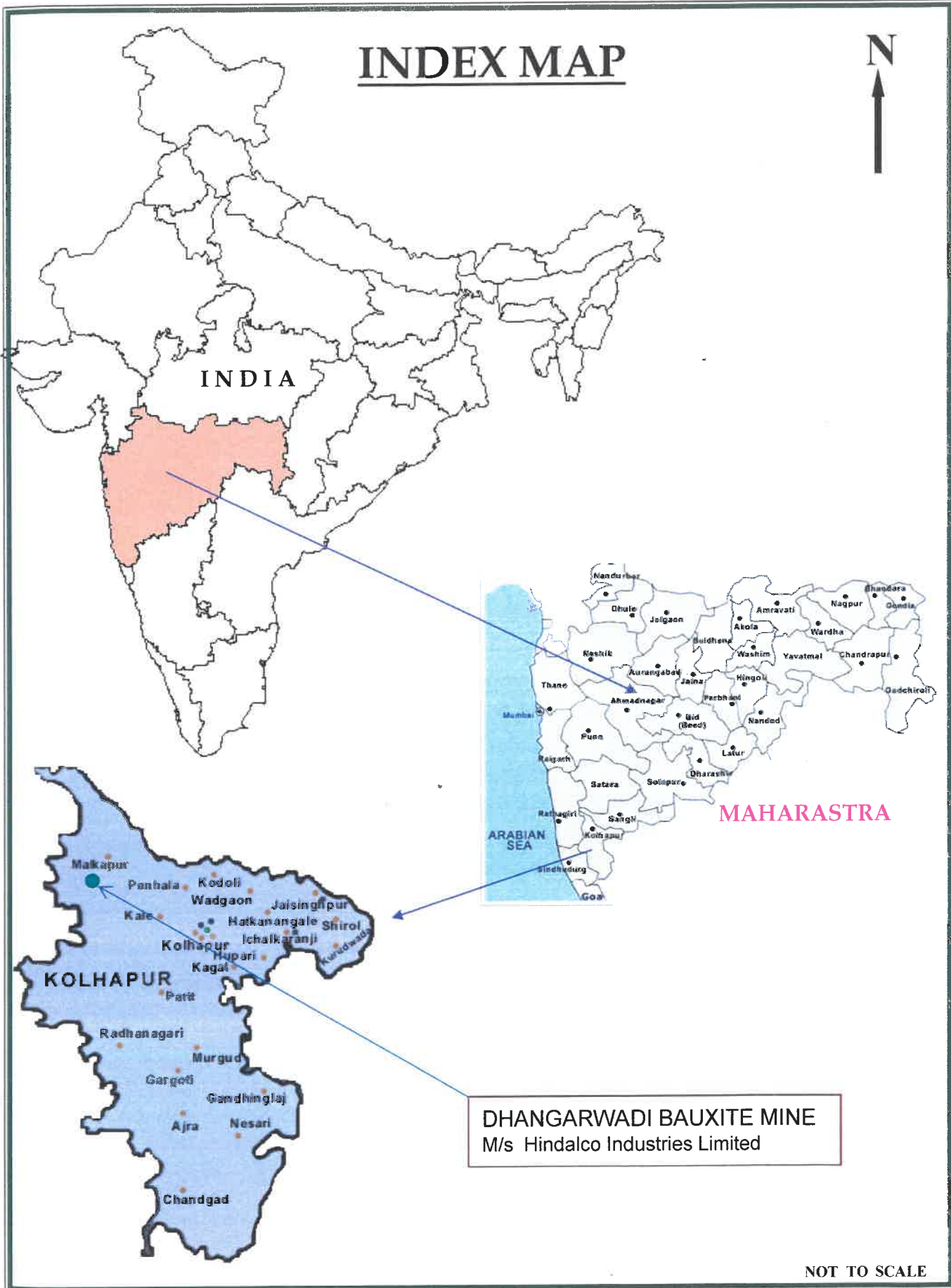
MINE DETAIL

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

GEOGRAPHICAL DETAILS:

Latitude : 16° 52' to 16° 56'
Longitude : 73° 48' to 73° 51'

INDEX MAP



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 Dhopeswar 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.

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

DETAILS

State	Maharashtra
District	Kolhapur
Taluka	Shahuwadi
Village	Dhangarwadi
Latitude	16° 52' to 16° 56'
Longitude	73° 48' to 73° 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 Dhopeswar 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/HUMIDITY			WIND SPEED Km/h			WIND DIRECTION
	MIN	MAX	AVERAGE HUMIDITY	MIN	MAX	AVERAGE	
04-12-2018	21	34	66	0	7	3.5	SSE,SSW
06-12-2018	23	31	67	0	9	4.5	W,N
11-12-2018	16	29	62	0	12	6.0	NW,E
13-12-2018	19	31	58	0	6	3.0	ENE,ESE
18-12-2018	19	32	56	0	5	2.5	WNW,N
20-12-2018	20	30	60	0	4	2.0	NNW,N
26-12-2018	21	29	62	0	7	3.5	NNW,N
28-12-2018	18	32	60	0	5	2.5	ESE,NE

Dhargarwadi Bauxite mine

Environmental Quality Monitoring Report

MICRO-METEOROLOGICAL DATA									
DATE	TEMPERATURE/HUMIDITY			WIND SPEED Km/h			WIND DIRECTION		
	MIN	MAX	AVERAGE HUMIDITY	MIN	MAX	AVERAGE			
02-01-2019	16	32	55	0	8	4.0	NW,N		
04-01-2019	18	32	57	0	9	4.5	W,E		
09-01-2019	17	32	54	0	7	3.5	WNW,N		
11-01-2019	18	30	56	0	6	3.0	N,WNW		
16-01-2019	20	32	51	0	10	5.0	NW,N		
18-01-2019	19	32	52	0	7	3.5	W,N		
23-01-2019	19	29	50	0	8	4.0	WNW,N		
25-01-2019	16	28	48	0	8	4.0	NNW,N		

MICRO-METEOROLOGICAL DATA								
DATE	TEMPERATURE/HUMIDITY			WIND SPEED Km/h			WIND DIRECTION	
	MIN	MAX	AVERAGE HUMIDITY	MIN	MAX	AVERAGE		
05-02-2019	20	32	65	0	9	4.5	W,NNE	
07-02-2019	18	27	65	0	11	5.5	NNW,NW	
12-02-2019	23	31	65	0	4	2.0	W,ENE	
14-02-2019	23	30	65	0	8	4.0	NW,N	
19-02-2019	19	30	65	0	9	4.5	NW,N	
21-02-2019	23	30	65	0	11	5.5	W,NNW	
26-02-2019	21	33	65	0	8	4.0	NNW,NNW	
28-02-2019	18	29	65	0	9	4.5	NE,NW	

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 for obtaining

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 BL & APM 550 Equipment's were used for monitoring particulate matter(PM10), particulate matter(PM2.5), gaseous pollutants etc.

METHOD FOR TESTING PM10/PM 2.5

Name of Pollutant	PM10/pm 2.5
Medium	Air
Instrument	Respirable Dust Sampler/Fine particulate sampler
Duration	24 hourly
Mode	Continuous
Unit	$\mu\text{g}/\text{m}^3$
Method	Gravimetric

METHOD FOR TESTING

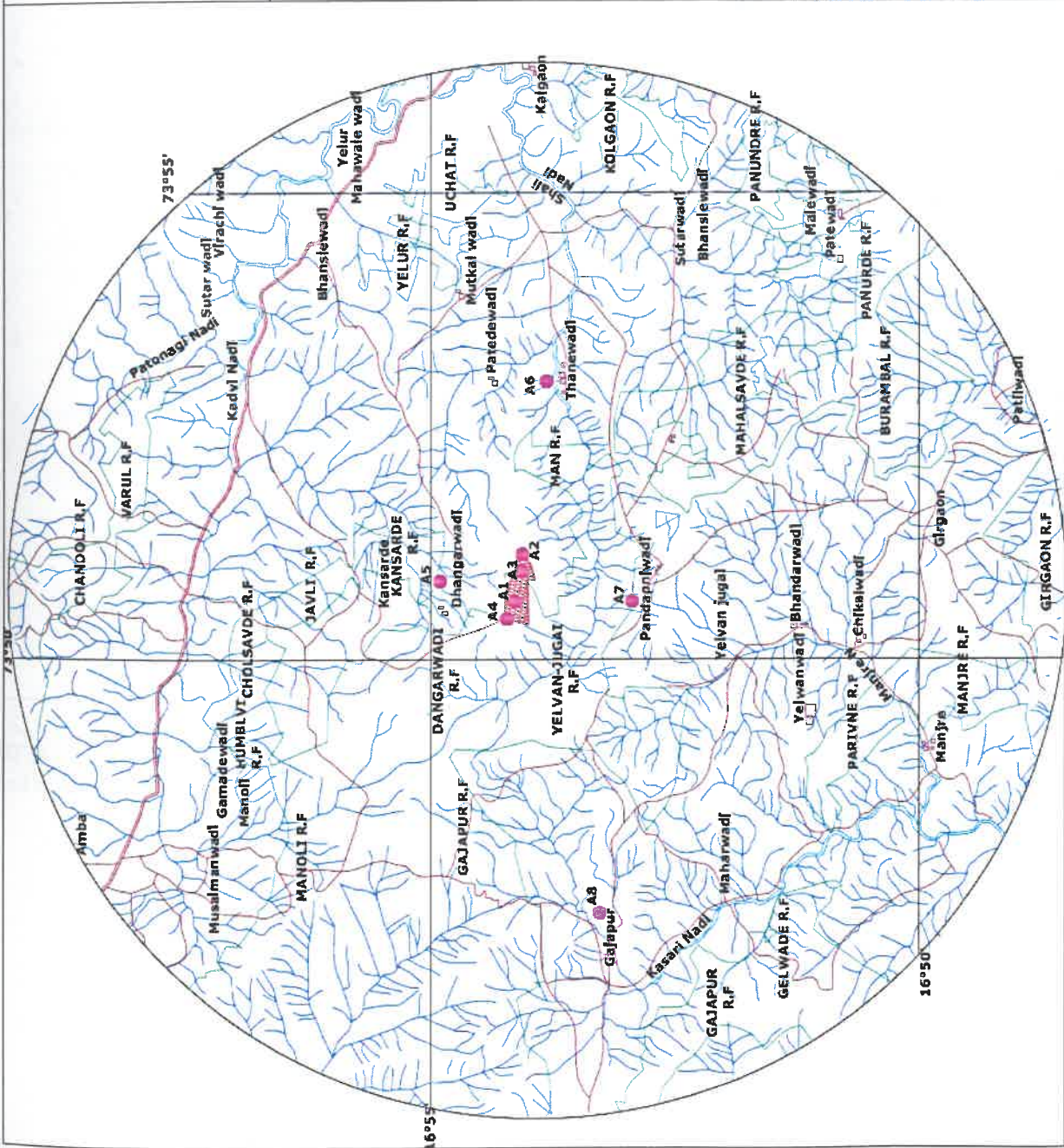
Name of Pollutant	Sulphur dioxide	Oxides of Nitrogen
Method	Modified West & Geake Method	Modified Jacob & Hochheiser Modified (Na-Arsenite) Method
Frequency	24 hourly	24 hourly
Mode	Continuous	Continuous
Unit	$\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$
Procedure	As per IS 5182 (Part II)	As per IS 5182 (Part IV),

Monitoring Location Details







Respirable dust sampler and Fine Particulate 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, PM 10, PM 2.5, SO₂, NO_x, CO collected during Winter season of the year 2018-19 are presented in annexure and are summarized in the following table.

AMBIENT AIR QUALITY MONITORING STATION

SL. NO	STATION CODE	NAME OF SAMPLING STATION	DIRECTION w.r.t MINES LEASE AREA	DISTANCE FROM LEASE AREA (Aerial 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



LEGEND

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



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		PM 10	PM 2.5	SO ₂	NO _x	CO
1	Core zone	Min	35.2	10.4	4.5	9.4	<1
		Max	61.6	20.4	7.0	12.3	<1
		Average	51.1	16.0	5.7	10.9	<1
		98 th %tile	61.1	19.9	6.9	12.2	<1
2	Near Dumping site	Min	35.3	10.6	5.0	9.2	<1
		Max	62.1	20.4	8.4	12.3	<1
		Average	52.0	16.2	6.4	10.8	<1
		98 th %tile	61.5	20.3	8.2	12.2	<1
3	Near Haulage Road	Min	37.4	8.7	4.5	9.6	<1
		Max	61.1	19.6	8.0	12.3	<1
		Average	49.8	15.0	6.2	10.9	<1
		98 th %tile	60.7	19.4	7.9	12.2	<1
4	Near Mines office	Min	42.5	12.0	4.6	9.2	<1
		Max	62.0	20.4	8.2	12.1	<1
		Average	52.2	16.4	6.2	10.8	<1
		98 th %tile	61.4	20.2	8.0	12.1	<1
5	Dhangarwadi village	Min	32.3	9.8	5.1	9.7	<1
		Max	58.0	19.0	7.8	13.4	<1
		Average	48.2	14.7	6.4	11.1	<1
		98 th %tile	57.7	18.7	7.7	13.1	<1
6	Thanewadi village	Min	30.4	9.5	4.6	9.7	<1
		Max	58.6	19.3	8.0	12.2	<1
		Average	48.5	15.1	6.2	10.9	<1
		98 th %tile	58.5	18.8	7.9	12.1	<1
7	Pandapaniwadi village	Min	38.7	11.1	4.6	9.5	<1
		Max	64.2	20.1	8.4	11.8	<1
		Average	49.4	15.3	6.4	10.7	<1
		98 th %tile	62.8	19.6	8.3	11.8	<1
8	Gajapur village	Min	32.0	9.8	4.6	9.8	<1
		Max	59.0	19.0	7.0	12.0	<1
		Average	48.7	14.8	5.7	10.9	<1
		98 th %tile	58.6	18.9	6.9	11.9	<1

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 (Aerial 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

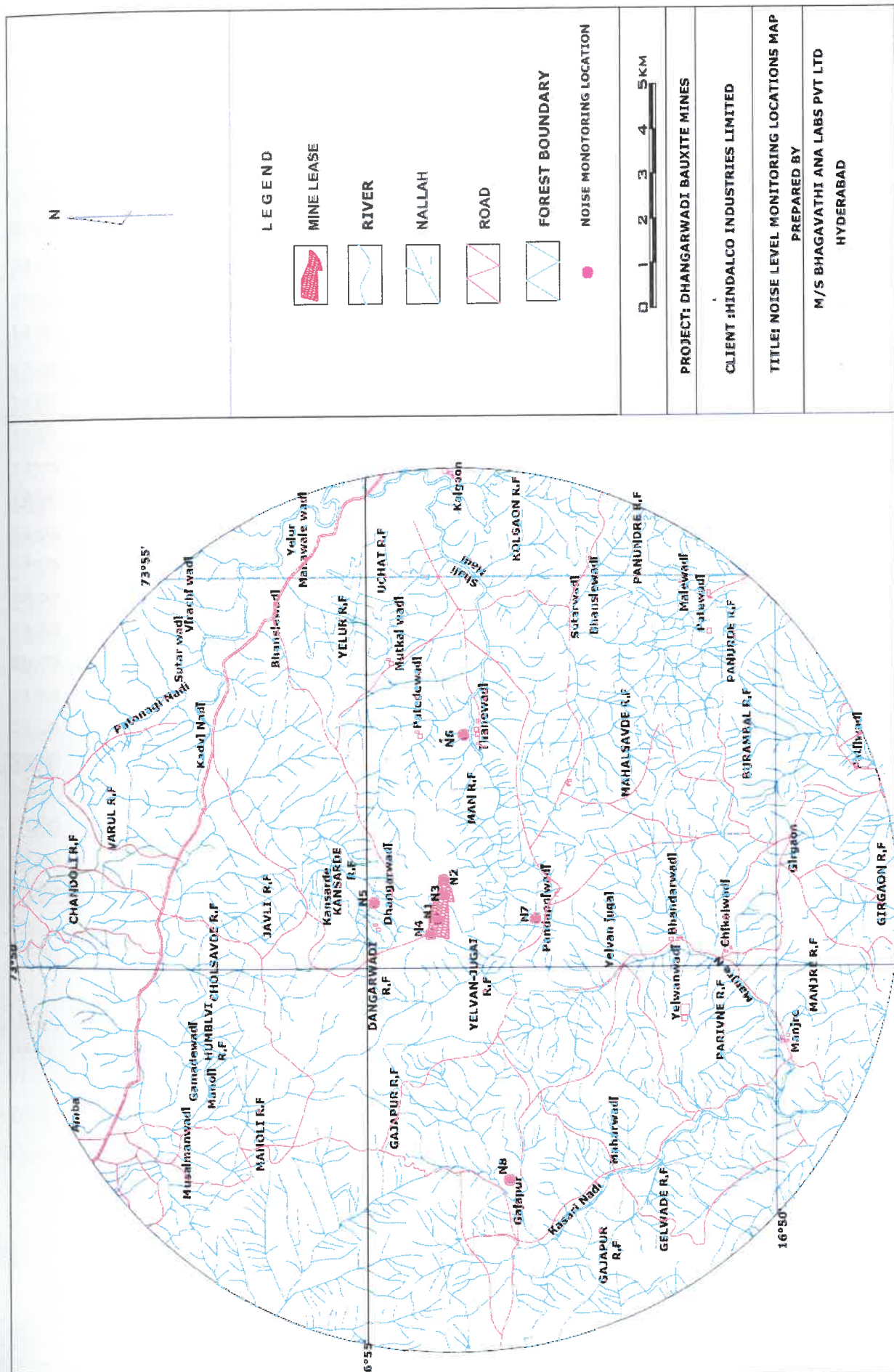
Note:

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.

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

Time	N1, Core zone	N2, Near Dumping site	N3 Near Haulag e road	N4, Near Mines Office	N5, Dhangar wadi village	N6, Thanewadi village	N7, Pandapni wadi village	N8, Gajapur village
06:00	44.9	45.5	46.7	47.2	58.3	59.1	59.6	61.0
07:00	52.5	52.5	54.6	54.7	59.1	59.9	60.2	61.4
08:00	54.2	54.6	56.4	56.9	60.1	61.5	61.8	62.7
09:00	57.3	57.0	59.5	59.5	63.9	62.4	63.2	64.1
10:00	59.3	58.9	61.4	61.7	64.9	64.9	66.7	66.6
11:00	66.8	66.4	69.5	69.5	68.4	67.4	68.3	69.7
12:00	68.1	67.5	71.0	70.6	67.9	67.7	69.2	69.4
13:00	66.2	65.9	69.2	69.2	68.2	67.6	69.2	69.2
14:00	66.2	65.5	68.6	68.7	68.7	68.8	69.3	71.4
15:00	64.3	64.2	66.9	66.9	67.8	66.9	67.2	68.9
16:00	62.6	62.7	65.8	65.5	72.5	70.0	70.7	71.9
17:00	61.6	60.8	64.5	64.3	74.5	66.9	70.9	69.2
18:00	60.7	59.8	63.0	62.9	70.1	69.3	70.8	70.7
19:00	60.1	58.6	61.9	62.5	64.6	63.9	65.6	65.8
20:00	55.5	53.8	57.3	57.8	61.6	61.1	61.4	62.4
21:00	54.8	52.5	56.3	56.4	60.9	60.3	60.8	61.8
22:00	49.1	46.9	50.3	49.8	61.4	60.7	61.1	61.9
23:00	48.4	46.0	49.6	49.3	59.8	60.1	61.0	61.3
00:00	48.1	46.4	50.0	49.5	60.5	61.9	62.1	63.3
01:00	48.3	46.4	50.3	50.0	60.1	59.0	60.3	61.5
02:00	49.3	46.6	51.0	50.3	59.4	58.8	59.3	60.2
03:00	49.3	47.4	51.6	50.7	59.3	58.8	60.4	61.2
04:00	44.9	42.7	46.4	46.1	60.9	61.5	61.9	63.6
05:00	44.4	42.1	46.3	45.9	60.0	60.9	61.7	63.1
Min	44.4	42.1	46.3	45.9	58.3	58.8	59.3	60.2
Max	68.1	67.5	71.0	70.6	74.5	70.0	70.9	71.9

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 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 during Post Monsoon.

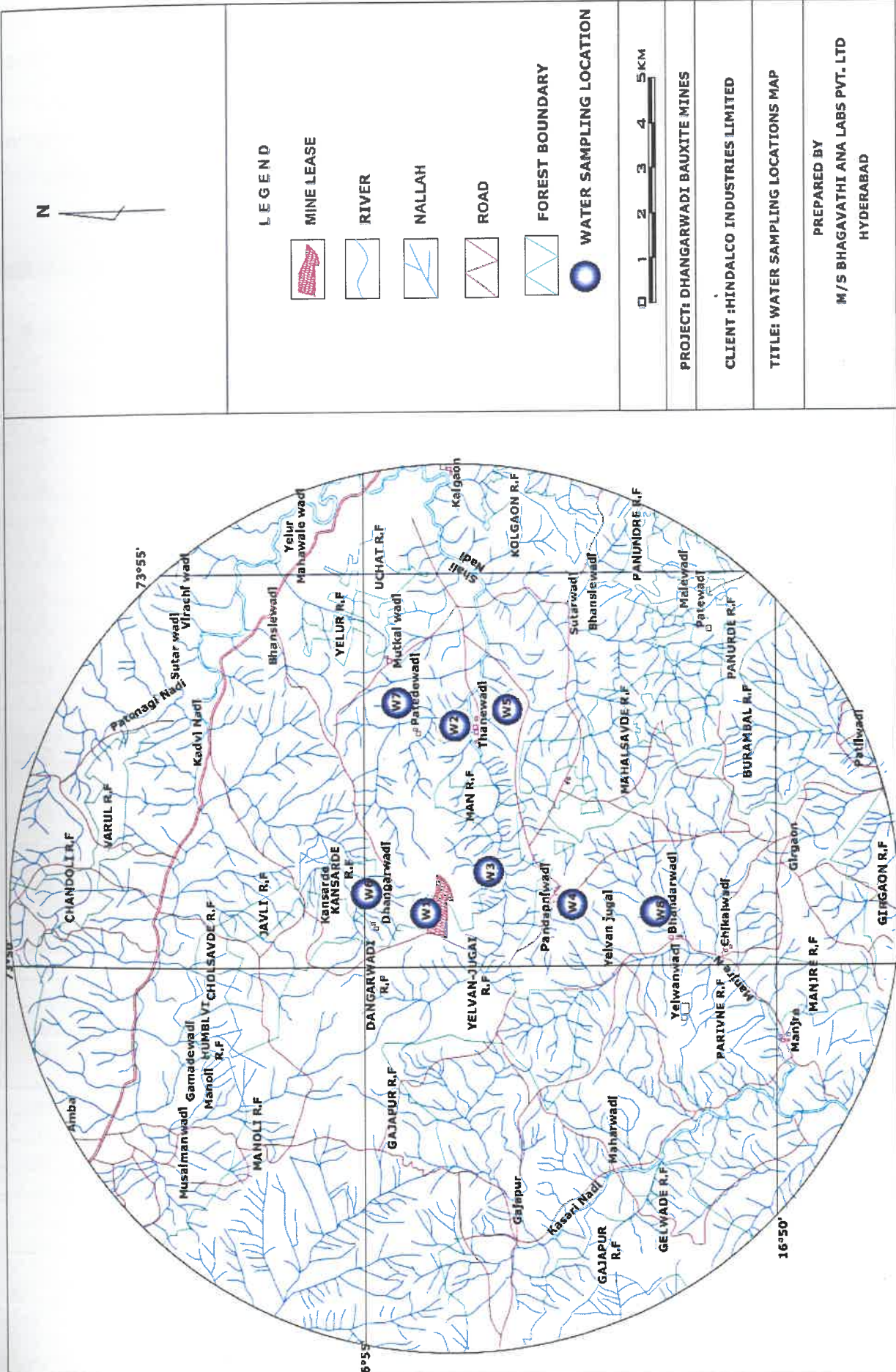
▣ Ground water quality

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 in monsoon season.







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	Near mine office borewell	Ground 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



LEGEND

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



PROJECT: DHANGARWADI BAUXITE MINES

CLIENT: HINDALCO INDUSTRIES LIMITED

TITLE: WATER SAMPLING LOCATIONS MAP

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

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 winter season of the year 2018-19 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: 28.2.2019**

Sl. No	Parameter	Units	W-1 Near mine office borewell	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	--	6.79	6.82	6.67
5	Turbidity	NTU	<5	<5	<5
6	Dissolved Oxygen	mg/l	5.0	6.20	6.89
7	Total Dissolved solids	mg/l	30	132	150
8	Total Suspended solids	mg/l	1	7	9
9	Alkalinity as CaCO ₃	mg/l	15.0	16	22.0
10	Total Hardness as CaCO ₃	mg/l	30.0	108.0	45.0
11	Nitrate as NO ₃	mg/l	0.2	0.19	0.76
12	Phosphates as PO ₄	mg/l	1.40	0.02	0.02
13	Chlorides as Cl	mg/l	13	20	13
14	Sulphates as SO ₄	mg/l	1.3	10.4	6
15	Sodium as Na	mg/l	9	12	2
16	Potassium as K	mg/l	3	6.48	0.13
17	Calcium as Ca	mg/l	8.8	20	14
18	Magnesium as Mg	mg/l	1.94	3	5
19	Lead as Pb	mg/l	BDL	BDL	BDL
20	Manganese as Mn	mg/l	0.04	0.15	0.04
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	0.02	0.09
26	Fluoride as F	mg/l	0.22	0.16	0.23
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	0.9	1.7	2

BDL: Below Detectable Limit

mg/l: Milligram per liter

GROUND WATER QUALITY

Date of Sampling: 28.2.2019

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	--	6.79	6.50	6.89	6.56	6.92
5	Turbidity	NTU	<5	<5	<5	<5	<5
6	Dissolved Oxygen	mg/l	4.70	4.78	4.32	4.70	5.00
7	Total Dissolved solids	mg/l	62	61	36	72	150
8	Total Suspended solids	mg/l	1	2	1	1	1.3
9	Alkalinity as CaCO ₃	mg/l	13	13	6	27	14
10	Total Hardness as CaCO ₃	mg/l	48.0	24.0	26.0	34.0	40.0
11	Nitrate as NO ₃	mg/l	0.25	0.15	0.2	0.99	0.3
12	Phosphates as PO ₄	mg/l	0.02	0.03	0.01	0.02	0.03
13	Chlorides as Cl	mg/l	14.5	10	11	17	9.67
14	Sulphates as SO ₄	mg/l	5	2.2	2	3.1	1.8
15	Sodium as Na	mg/l	6.42	4.62	2.1	8	10.68
16	Potassium as K	mg/l	8	2.62	1.12	3.7	6.62
17	Calcium as Ca	mg/l	15	7.2	9	9	9
18	Magnesium as Mg	mg/l	3	1.45	1	3	4.39
19	Lead as Pb	mg/l	BDL	BDL	BDL	BDL	BDL
20	Manganese as Mn	mg/l	0.05	0.04	0.04	0.07	0.33
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	0.10	0.09	0.11	0.24	0.11
26	Fluoride as F	mg/l	0.35	0.26	0.40	0.02	0.17
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	0.6	0.9	0.4	0.3	0.5

BDL: Below Detectable Limit

mg/l: Milligram per liter

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

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

Date of sampling: 28.2.2019

Sl.No	Test	Result
1	Total Suspended Solids, mg/l	27
2	Total Dissolved Solids, mg/l	46
3	COD, mg/l	3.3
4	BOD for 3 days at 27°C, mg/l	1.9
5	Total Solids	17
6	Oil and Grease, mg/l	<5

RESULTS & DISCUSSION

- ❑ The pH of the study area varies from 6.5 to 6.92 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 4.32 to 6.89.
- ❑ Total Dissolved Solids found to be in the range of 30 to 150 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 6 to 27 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 24 to 108 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 9.67 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 7.20 to 20 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 to 5 mg/l.
- ❑ Iron content of the water in the study area found to be in the range of 0.02 to 0.24 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

Stack Analysis Report				
Name of the Industry	DHANGARWADI BAUXITE MINE			
Address	DHANGARWADI			
DATE	14-02-2019			
Stack details				
Stack attached to	D.G.Set(45 KVA)		Diameter of stack (mtr) D	0.1
Height of stack above ground (mtr)	5.5		Stack crosssectional area m2	0.0020
Fuel used	H.S.D		Consumption of fuel (KLD)	3
Additional Load	Nil		Load on the system	90%
EMMISSION DETAILS				
Particulars		Value	* Permissible limit	Method of analysis
Temperature (°C)	:	122.00	NA	As per IS:11255
Velocity of flue gas (m/sec)	:	9.96	NA	As per IS:11255
Gas flow rate at NTP (Nm ³ /hour)	:	54	NA	As per IS:11255
Particulate matter (mg/Nm ³)	:	23.15	150.00	As per IS:11255
SO ₂ (Kg/Hr)	:	0.06	0.29	As per IS:11255
* Permissible Limits	As per the MPCB consent			
Ambient Meteorology				
Wind Velocity (Km/hr)	5		Ambient Temp °C	30
Wind Direction	SW		Humidity %	66
Details of instrument used - Pollutech model,PEM-SMK 10				
* Recognised by Ministry of Environment & Forests, as "Environmental Laboratory " vide Notification S. O. 428 (E) valid upto Jan , 2019				

DHANGARWADI MINES

WELL DEPTHS OF VILLAGES

S.NO.	LOCATION	NAME OF THE MINE AREA	TOTAL DEPTH IN MTS	WATER LEVEL FROM SURFACE IN MTS
				28.2.2019
1	PANDAPNIWADI VILLAGE	DHANGARWADI	6.00	1.10
2	DHANGARWADI VILLAGE	DHANGARWADI	6.00	3.90

AMBIENT AIR QUALITY

Station: A1, CORE ZONE							
S.No.	Month	Date	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 _x ($\mu\text{g}/\text{m}^3$)	CO (Mg/m^3)
			24 hrs Average	24 hrs Average	24 hrs Average	24 hrs Average	24 hrs Average
1	Dec-18	12/4/2018	41.2	12.5	BDL	BDL	<1
2		12/6/2018	56.2	18.3	5.1	12.0	<1
3		12/11/2018	48.5	15.4	4.5	11.6	<1
4		12/13/2018	59.8	19.0	6.7	10.8	<1
5		12/18/2018	42.4	13.4	BDL	BDL	<1
6		12/20/2018	53.4	17.4	7.0	11.1	<1
7		12/26/2018	51.6	16.5	5.7	10.5	<1
8		12/28/2018	46.1	14.0	6.4	9.9	<1
1	Jan-19	1/2/2019	49.0	15.5	5.0	10.2	<1
2		1/4/2019	45.0	13.6	BDL	BDL	<1
3		1/9/2019	54.7	17.5	5.5	11.8	<1
4		1/11/2019	43.5	12.7	BDL	BDL	<1
5		1/16/2019	46.5	14.6	4.5	10.0	<1
6		1/18/2019	61.6	19.2	6.1	11.0	<1
7		1/23/2019	60.2	18.0	6.7	12.1	<1
8		1/25/2019	55.1	16.5	6.1	12.3	<1
1	Feb-19	2/5/2019	52.7	16.3	4.5	10.6	<1
2		2/7/2019	55.0	17.0	5.0	11.4	<1
3		2/12/2019	60.4	20.4	6.6	10.4	<1
4		2/14/2019	43.3	12.5	5.5	10.9	<1
5		2/19/2019	58.6	19.2	6.2	9.4	<1
6		2/21/2019	56.8	18.2	5.2	10.3	<1
7		2/26/2019	35.2	10.4	BDL	BDL	<1
8		2/28/2019	50.6	15.1	BDL	BDL	<1

	Min	35.2	10.4	4.5	9.4
	Max	61.6	20.4	7.0	12.3
	Mean	51.1	16.0	5.7	10.9
	10th percentile	42.6	12.6	4.5	10.0
	30th percentile	46.5	14.5	5.1	10.4
	50th percentile	52.2	16.4	5.6	10.8
	95th percentile	60.4	19.2	6.8	12.1
	98th percentile	61.1	19.9	6.9	12.2

BDL: BELOW DETECTABLE LIMIT

AMBIENT AIR QUALITY

Station: A2, NEAR MINES OFFICE

S.No.	Month	Date	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 _x ($\mu\text{g}/\text{m}^3$)	CO (Mg/m ³)
			24 hrs Average	24 hrs Average	24 hrs Average	24 hrs Average	24 hrs Average
1	Dec-18	12/4/2018	41.1	12.6	BDL	BDL	<1
2		12/6/2018	53.7	16.6	7.4	11.0	<1
3		12/11/2018	60.4	19.0	5.1	10.5	<1
4		12/13/2018	58.5	18.1	5.6	10.2	<1
5		12/18/2018	50.8	14.3	6.2	9.7	<1
6		12/20/2018	35.3	10.6	5.1	11.5	<1
7		12/26/2018	58.5	17.8	BDL	BDL	<1
8		12/28/2018	46.4	13.5	6.4	9.2	<1
1	Jan-19	1/2/2019	42.3	12.9	BDL	BDL	<1
2		1/4/2019	57.2	19.3	6.1	9.5	<1
3		1/9/2019	60.2	20.2	7.8	11.3	<1
4		1/11/2019	50.0	16.5	6.6	10.4	<1
5		1/16/2019	47.6	15.4	6.1	10.7	<1
6		1/18/2019	45.2	14.4	BDL	BDL	<1
7		1/23/2019	55.1	17.3	8.4	12.3	<1
8		1/25/2019	54.3	18.3	5.0	9.9	<1
1	Feb-19	2/5/2019	48.8	14.7	6.6	12.2	<1
2		2/7/2019	58.3	18.6	7.7	11.7	<1
3		2/12/2019	50.9	15.2	BDL	BDL	<1
4		2/14/2019	60.9	19.2	7.7	11.3	<1
5		2/19/2019	56.4	17.2	6.0	10.2	<1
6		2/21/2019	62.1	20.4	BDL	BDL	<1
7		2/26/2019	54.7	16.3	7.2	11.7	<1
8		2/28/2019	39.5	11.5	5.0	10.3	<1

Min	35.3	10.6	5.0	9.2
Max	62.1	20.4	8.4	12.3
Mean	52.0	16.2	6.4	10.8
10th percentile	41.5	12.7	5.0	9.6
30th percentile	48.6	14.7	6.0	10.2
50th percentile	54.0	16.6	6.3	10.6
95th percentile	60.8	20.1	7.9	12.2
98th percentile	61.5	20.3	8.2	12.2

AMBIENT AIR QUALITY

Station: A3, NEAR HAULAGE ROAD

S.No.	Month	Date	PM 10 (µg/m ³)	PM 2.5 (µg/m ³)	SO ₂ (µg/m ³)	NO _x (µg/m ³)	CO (Mg/m ³)
			24 hrs Average	24 hrs Average	24 hrs Average	24 hrs Average	24 hrs Average
1	Dec-18	12/4/2018	51.9	16.1	5.5	9.6	<1
2		12/6/2018	54.2	15.2	4.5	10.2	<1
3		12/11/2018	50.8	14.4	BDL	BDL	<1
4		12/13/2018	40.0	13.9	5.9	10.6	<1
5		12/18/2018	57.7	8.7	6.7	11.7	<1
6		12/20/2018	45.4	18.1	5.3	12.3	<1
7		12/26/2018	55.8	11.6	6.1	10.5	<1
8		12/28/2018	42.7	10.7	BDL	BDL	<1
1	Jan-19	1/2/2019	47.0	15.3	BDL	BDL	<1
2		1/4/2019	54.3	18.5	6.5	10.3	<1
3		1/9/2019	55.0	17.0	5.6	10.5	<1
4		1/11/2019	42.6	12.1	7.7	11.7	<1
5		1/16/2019	44.1	13.3	6.6	10.6	<1
6		1/18/2019	60.2	19.1	6.2	11.2	<1
7		1/23/2019	50.0	16.4	8.0	11.1	<1
8		1/25/2019	43.5	14.5	BDL	BDL	<1
1	Feb-19	2/5/2019	41.6	12.7	BDL	BDL	<1
2		2/7/2019	50.0	15.1	7.4	11.2	<1
3		2/12/2019	45.1	13.9	5.1	11.9	<1
4		2/14/2019	56.1	17.0	7.2	11.5	<1
5		2/19/2019	37.4	11.4	5.0	10.9	<1
6		2/21/2019	53.8	16.2	5.7	11.0	<1
7		2/26/2019	61.1	19.6	6.0	10.3	<1
8		2/28/2019	54.3	18.5	BDL	BDL	<1

Min	37.4	8.7	4.5	9.6
Max	61.1	19.6	8.0	12.3
Mean	49.8	15.0	6.2	10.9
10th percentile	41.9	11.5	5.1	10.2
30th percentile	45.0	13.8	5.6	10.5
50th percentile	50.4	15.1	6.1	10.9
95th percentile	59.8	19.0	7.8	12.0
98th percentile	60.7	19.4	7.9	12.2

AMBIENT AIR QUALITY

Station: A4, Near Dump Site

S.No.	Month	Date	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 _x ($\mu\text{g}/\text{m}^3$)	CO (Mg/m^3)
			24 hrs Average	24 hrs Average	24 hrs Average	24 hrs Average	24 hrs Average
1	Dec-18	12/4/2018	56.4	19.5	5.0	9.4	<1
2		12/6/2018	54.7	18.4	5.5	10.3	<1
3		12/11/2018	47.0	13.1	BDL	BDL	<1
4		12/13/2018	51.9	16.4	6.2	11.6	<1
5		12/18/2018	53.0	17.3	6.5	11.5	<1
6		12/20/2018	43.6	12.0	BDL	BDL	<1
7		12/26/2018	48.8	14.0	7.2	12.1	<1
8		12/28/2018	49.3	15.3	6.4	10.1	<1
1	Jan-19	1/2/2019	56.0	18.4	4.6	9.2	<1
2		1/4/2019	51.3	15.5	5.6	9.6	<1
3		1/9/2019	45.5	13.5	BDL	BDL	<1
4		1/11/2019	58.9	19.0	6.3	9.5	<1
5		1/16/2019	49.9	16.5	5.0	10.2	<1
6		1/18/2019	47.8	14.2	BDL	BDL	<1
7		1/23/2019	52.3	17.6	6.6	11.8	<1
8		1/25/2019	60.6	20.4	5.1	11.4	<1
1	Feb-19	2/5/2019	56.9	18.3	6.0	10.2	<1
2		2/7/2019	52.6	16.6	6.6	10.8	<1
3		2/12/2019	42.5	12.8	BDL	BDL	<1
4		2/14/2019	62.0	20.0	6.4	12.1	<1
5		2/19/2019	51.1	15.6	7.0	11.7	<1
6		2/21/2019	46.5	13.2	8.2	11.3	<1
7		2/26/2019	54.1	17.0	7.6	11.5	<1
8		2/28/2019	59.6	19.4	BDL	BDL	<1

Min	42.5	12.0	4.6	9.2
Max	62.0	20.4	8.2	12.1
Mean	52.2	16.4	6.2	10.8
10th percentile	45.8	13.1	5.0	9.4
30th percentile	49.3	15.2	5.7	10.2
50th percentile	52.1	16.5	6.3	11.1
95th percentile	60.5	20.0	7.6	12.1
98th percentile	61.4	20.2	8.0	12.1

AMBIENT AIR QUALITY

Station: A 5, DHANGARWADI VILLAGE							
S.No.	Month	Date	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 _x ($\mu\text{g}/\text{m}^3$)	CO (Mg/m ³)
			24 hrs Average	24 hrs Average	24 hrs Average	24 hrs Average	24 hrs Average
1	Dec-18	12/4/2018	56.2	19.0	6.5	10.8	<1
2		12/6/2018	51.5	15.0	BDL	BDL	<1
3		12/11/2018	40.0	11.8	6.2	11.5	<1
4		12/13/2018	43.2	13.2	5.5	9.7	<1
5		12/18/2018	43.4	12.3	7.8	11.9	<1
6		12/20/2018	57.2	17.6	6.6	10.4	<1
7		12/26/2018	47.4	14.4	BDL	BDL	<1
8		12/28/2018	54.9	16.4	5.7	10.3	<1
1	Jan-19	1/2/2019	56.7	17.1	6.5	9.7	<1
2		1/4/2019	43.7	12.8	BDL	BDL	<1
3		1/9/2019	51.6	16.1	7.1	11.1	<1
4		1/11/2019	46.6	13.5	BDL	BDL	<1
5		1/16/2019	47.2	14.4	5.7	10.8	<1
6		1/18/2019	37.9	11.4	5.1	10.4	<1
7		1/23/2019	57.0	18.5	6.2	10.2	<1
8		1/25/2019	48.9	15.0	7.2	11.4	<1
1	Feb-19	2/5/2019	48.4	14.5	5.5	11.4	<1
2		2/7/2019	58.0	18.4	BDL	BDL	<1
3		2/12/2019	51.3	15.5	BDL	BDL	<1
4		2/14/2019	39.5	11.7	7.1	13.4	<1
5		2/19/2019	35.3	10.2	5.8	12.6	<1
6		2/21/2019	53.1	16.4	7.6	10.4	<1
7		2/26/2019	32.3	9.8	6.6	12.0	<1
8		2/28/2019	56.1	17.0	6.1	11.1	<1

Min	32.3	9.8	5.1	9.7
Max	58.0	19.0	7.8	13.4
Mean	48.2	14.7	6.4	11.1
10th percentile	38.4	11.5	5.5	10.1
30th percentile	43.7	13.2	5.8	10.4
50th percentile	48.6	14.7	6.4	10.9
95th percentile	57.2	18.5	7.6	12.7
98th percentile	57.7	18.7	7.7	13.1

AMBIENT AIR QUALITY

Station: A6, GAJAPUR VILLAGE

S.No.	Month	Date	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 _x ($\mu\text{g}/\text{m}^3$)	CO (Mg/m^3)
			24 hrs Average	24 hrs Average	24 hrs Average	24 hrs Average	24 hrs Average
1	Dec-18	12/4/2018	55.5	17.6	7.2	11.8	<1
2		12/6/2018	46.0	13.7	BDL	BDL	
3		12/11/2018	48.8	14.3	6.6	10.9	
4		12/13/2018	56.8	18.0	6.1	10.8	
5		12/18/2018	52.0	15.2	5.6	9.8	
6		12/20/2018	53.9	16.0	5.2	10.6	
7		12/26/2018	43.9	12.9	6.1	11.0	
8		12/28/2018	39.1	11.8	BDL	BDL	
1	Jan-19	1/2/2019	50.5	16.3	5.2	9.7	<1
2		1/4/2019	45.3	14.4	BDL	BDL	<1
3		1/9/2019	58.4	19.3	5.5	9.7	<1
4		1/11/2019	46.9	15.3	7.2	11.5	<1
5		1/16/2019	51.7	17.0	6.1	10.6	<1
6		1/18/2019	43.1	13.4	6.7	11.2	<1
7		1/23/2019	55.5	18.0	4.6	9.9	<1
8		1/25/2019	40.4	12.5	BDL	BDL	<1
1	Feb-19	2/5/2019	56.0	17.7	6.4	11.2	<1
2		2/7/2019	54.0	16.2	7.0	11.8	<1
3		2/12/2019	47.8	14.2	5.9	10.9	<1
4		2/14/2019	49.6	15.7	7.6	11.3	<1
5		2/19/2019	36.2	10.7	BDL	BDL	<1
6		2/21/2019	30.4	9.5	5.5	12.2	<1
7		2/26/2019	43.4	13.4	BDL	BDL	<1
8		2/28/2019	58.6	18.2	8.0	12.0	<1

Min	30.4	9.5	4.6	9.7
Max	58.6	19.3	8.0	12.2
Mean	48.5	15.1	6.2	10.9
10th percentile	39.5	12.0	5.2	9.8
30th percentile	45.1	13.7	5.6	10.6
50th percentile	49.2	15.3	6.1	10.9
95th percentile	58.2	18.2	7.7	12.0
98th percentile	58.5	18.8	7.9	12.1

AMBIENT AIR QUALITY

Station: A7, THANEWADI VILLAGE							
S.No.	Month	Date	PM 10 (µg/m ³)	PM 2.5 (µg/m ³)	SO ₂ (µg/m ³)	NO _x (µg/m ³)	CO (Mg/m ³)
			24 hrs Average	24 hrs Average	24 hrs Average	24 hrs Average	24 hrs Average
1	Dec-18	12/4/2018	42.1	12.7	BDL	BDL	<1
2		12/6/2018	58.5	19.0	5.1	10.2	<1
3		12/11/2018	48.0	15.3	6.6	10.3	<1
4		12/13/2018	57.1	18.4	6.0	10.0	<1
5		12/18/2018	51.5	16.2	4.7	10.1	<1
6		12/20/2018	39.9	11.1	6.1	11.8	<1
7		12/26/2018	44.7	13.2	BDL	BDL	<1
8		12/28/2018	47.1	14.6	6.8	11.5	<1
1	Jan-19	1/2/2019	51.4	16.2	6.6	10.1	<1
2		1/4/2019	55.5	18.4	7.1	10.7	<1
3		1/9/2019	49.3	15.4	6.0	10.2	<1
4		1/11/2019	42.6	13.6	BDL	BDL	<1
5		1/16/2019	38.7	11.3	4.6	9.5	<1
6		1/18/2019	47.1	14.3	8.4	10.4	<1
7		1/23/2019	43.7	12.6	BDL	BDL	<1
8		1/25/2019	52.4	17.0	8.1	11.6	<1
1	Feb-19	2/5/2019	41.8	12.6	6.6	10.5	<1
2		2/7/2019	61.1	18.6	5.9	11.8	<1
3		2/12/2019	47.6	15.0	6.9	11.3	<1
4		2/14/2019	44.4	13.4	BDL	BDL	<1
5		2/19/2019	56.5	17.2	7.6	10.7	<1
6		2/21/2019	64.2	20.1	6.7	10.2	<1
7		2/26/2019	54.5	16.5	BDL	BDL	<1
8		2/28/2019	47.0	14.2	5.4	10.8	<1

Min	38.7	11.1	4.6	9.5
Max	64.2	20.1	8.4	11.8
Mean	49.4	15.3	6.4	10.7
10th percentile	41.9	12.6	5.0	10.1
30th percentile	44.7	13.6	6.0	10.2
50th percentile	47.8	15.2	6.6	10.5
95th percentile	60.7	18.9	8.2	11.8
98th percentile	62.8	19.6	8.3	11.8



AMBIENT AIR QUALITY

Station: A 8, PANDAPANI VILLAGE

S.No.	Month	Date	PM 10 (µg/m ³)	PM 2.5 (µg/m ³)	SO ₂ (µg/m ³)	NO _x (µg/m ³)	CO (Mg/m ³)
			24 hrs Average	24 hrs Average	24 hrs Average	24 hrs Average	24 hrs Average
1	Dec-18	12/4/2018	50.4	15.0	5.6	10.7	<1
2		12/6/2018	52.9	16.6	6.1	11.0	<1
3		12/11/2018	58.1	17.8	6.6	10.5	<1
4		12/13/2018	44.6	13.2	5.0	9.9	<1
5		12/18/2018	42.1	12.5	BDL	BDL	<1
6		12/20/2018	50.5	14.5	5.1	10.8	<1
7		12/26/2018	57.3	19.0	5.4	9.8	<1
8		12/28/2018	36.6	10.3	BDL	BDL	<1
1	Jan-19	1/2/2019	59.0	18.7	6.1	10.7	<1
2		1/4/2019	48.6	14.6	7.0	11.7	<1
3		1/9/2019	57.3	17.2	6.4	11.0	<1
4		1/11/2019	42.8	12.5	BDL	BDL	<1
5		1/16/2019	53.3	16.4	5.6	10.5	<1
6		1/18/2019	38.6	11.4	5.1	10.8	<1
7		1/23/2019	52.5	15.5	5.6	10.9	<1
8		1/25/2019	46.2	13.2	BDL	BDL	<1
1	Feb-19	2/5/2019	47.9	14.6	6.0	10.8	<1
2		2/7/2019	56.0	17.0	BDL	BDL	<1
3		2/12/2019	32.0	9.8	5.6	11.4	<1
4		2/14/2019	50.0	15.0	5.0	12.0	<1
5		2/19/2019	43.5	13.4	6.3	10.8	<1
6		2/21/2019	51.3	16.7	4.6	11.1	<1
7		2/26/2019	39.4	11.4	4.9	11.6	<1
8		2/28/2019	57.9	18.4	BDL	BDL	<1

Min	32.0	9.8	4.6	9.8
Max	59.0	19.0	7.0	12.0
Mean	48.7	14.8	5.7	10.9
10th percentile	38.8	11.4	5.0	10.3
30th percentile	44.4	13.2	5.2	10.7
50th percentile	50.2	14.8	5.6	10.8
95th percentile	58.1	18.7	6.7	11.7
98th percentile	58.6	18.9	6.9	11.9

BDL for SO_x-2.0 & NO_x-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

