



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

26/05/2020

Subject: Compliance Status of Environment Clearance No. J-11015/406/2006-IA.II (M) conditions for Dhangarwadi Bauxite Mines (M. L. Area 41.80 Ha.).

Dear Sir,

We have been granted Environment Clearance to our **Dhangarwadi Bauxite Mines** on 13th of April 2007 vide clearance **No J-11015/406/2006-IA.II (M)**.

Please be informed that, mining operations have been stopped due to directions received from Ministry of Environment Forest & Climate Change on 14th February 2020. The same is enclosed for your ready reference as Annexure - 1.

We are herewith submitting the compliance status against the conditions laid down in the Environment Clearance for period of **October'2019 to March'2020** along with environment monitoring reports attached as annexure – 2.

Hope you will please find the above in order.

Thanking you,

Yours very truly,

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

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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. | <p>The top soil generated during overburden removal was backfilled for reclamation and rehabilitation of mined out area, when the mine was operational.</p> <p>Please be informed that, Since February 2020, mining operations have been stopped due to directions received from MoEF & CC.</p> |
| 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 was being used for backfilling of mined out area simultaneously.</p> <p>Backfilled area has been scientifically vegetated with indigenous species and native shrubs.</p> <p>Monitoring and management of rehabilitated areas was being done regularly so that vegetation becomes self-sustaining, when the mine was operational.</p> <p>Compliance status is being submitted on six monthly.</p> <p>Please be informed that, Since February 2020, mining operations have been stopped due to directions received from MoEF & CC.</p> |
| iii) | Garland drains to be constructed to arrest silt and sediment flows from watering the mine area, roads, green belt development etc. The drains shall be regularly desilted particularly after monsoon and maintained properly. Garland drain (size, gradient and length) shall be constructed for both mine pit and for waste dump and sump capacity shall be designed keeping 50% safety margin over and above peak sudden rainfall (based on 50 years data) and maximum | <p>Garland drains were provided to arrest the silt and sediment flows from the mine area, roads, green belt development etc, when the mine was operational.</p> <p>The flow from the settling tanks was then channelized through check dams. Drains and check dams were de-silted and maintained properly.</p> <p>Garland drains were constructed for mine pit. Sumps of sufficient capacity were provided. Sump was provided adequate retention period to allow settling of silt</p> |

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| | <p>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>material. Sedimentation pits were constructed at the corners of the garland drains and desilted at regular intervals, when the mine was operational.</p> <p>Please be informed that, Since February 2020, mining operations have been stopped due to directions received from MoEF & CC.</p> |
| iv) | <p>Drilling and blasting shall be by using dust extractors/wet drilling.</p> | <p>Drilling and blasting was carried out by using mist water jet (wet drilling), when the mine was operational.</p> <p>Please be informed that, Since February 2020, mining operations have been stopped due to directions received from MoEF & CC.</p> |
| v) | <p>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> | <p>The lease area has natural green belt with indigenous species which was undisturbed and maintained.</p> <p>On slope of backfilled area, plantation of local species "Karvy" to control slope stability and soil erosion was carried out with the help of expertise / Government agencies.</p> <p>The plantation is carried out every year as per plan. Till date 49,150 saplings have been planted & restored about 24.0 Ha area.</p> <p>During the year 2019-20, 12,000 saplings have been planted to cover 6.0 Ha.</p> <p>Please be informed that, Since February 2020, mining operations have been stopped due to directions received from MoEF & CC.</p> |
| vi) | <p>Implement suitable conservation measures to augment ground water resources in the area in consultation with the Regional Director, Central Ground Water Board.</p> | <p>Water harvesting pond was developed in the mined out areas as per the condition given in the NOC of CGWA.</p> <p>Drip irrigation was in practice as conservation measures to save the water, when the mine was operational.</p> <p>Please be informed that, Since February 2020, mining operations have been stopped due to directions received from MoEF & CC.</p> |

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| 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 was carried out to a depth of 7 to 10 Mts from the surface. There was no interaction with the ground water and hence there was no disturbance to the ground water, when the mine was operational.</p> <p>Please be informed that, Since February 2020, mining operations have been stopped due to directions received from MoEF & CC.</p> |
| viii) | Prior permission from the competent authority to be obtained for drawl of ground water, if any. | <p>Permission for ground water withdrawal has been obtained from CGWA.</p> <p>Please be informed that, Since February 2020, mining operations have been stopped due to directions received from MoEF & CC.</p> |
| ix) | Vehicular emissions to be kept under control and regularly monitored. Measures to be taken for maintenance of vehicles used in mining operations and in transportation of mineral. The vehicles should be covered with a tarpaulin and shall not be over loaded. | <p>There was a system to check the PUC certificates of all hired trucks regularly.</p> <p>Timely maintenance of all heavy equipments was carried out.</p> <p>All transport vehicles were covered with tarpaulin. The vehicles were weighed within the mines. All the vehicles were carrying bauxite as per RLW, when the mine was operational.</p> <p>Please be informed that, Since February 2020, mining operations have been stopped due to directions received from MoEF & CC.</p> |
| x) | At the end of the mining, the void shall be used as water body for water conservation and recharging of the ground water. | <p>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.</p> <p>Please be informed that, Since February 2020, mining operations have been stopped due to directions received from MoEF & CC.</p> |
| 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. | <p>Please be informed that, Since February 2020, mining operations have been stopped due to directions received from MoEF & CC.</p> <p>The final closure plan will be submitted as</p> |

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| | | per the directions of competent authorities post resumption of mining operations. |
| 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 | Noted and agreed. Please be informed that, Since February 2020, mining operations have been stopped due to directions received from MoEF & CC. |
| ii. | No change in the calendar plan including excavation, quantum of mineral bauxite & waste shall be made | Noted and agreed. Please be informed that, Since February 2020, mining operations have been stopped due to directions received from MoEF & CC. |
| 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 were scientifically afforested. For this we procured soil, manure, vermi compost, bagasse and press-mud to improve the condition of plantation base. We had engaged experts to implement afforestation activity. Care had been taken to plant mostly local flora along with some exotic species. The working hours were restricted only to day light, when the mine was operational. Please be informed that, Since February 2020, mining operations have been stopped due to directions received from MoEF & CC. |
| 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 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. | Ambient air quality stations have been established in the core and buffer area. |
| 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 | The monitoring is carried out as per the schedule and Data is submitted regularly. Reports are attached. |

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| | six months. | |
| 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 was being used for dust suppression during mining operation and transportation, when the mine was operational. Please be informed that, Since February 2020, mining operations have been stopped due to directions received from MoEF & CC. |
| 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 were within the standard limits. All the workers engaged in operations of HEMM were provided with ear-plugs / muffs, when the mine was operational. Please be informed that, Since February 2020, mining operations have been stopped due to directions received from MoEF & CC. |
| 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. | Not Applicable, because there was no industrial waste water as there was 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 was provided and all the workers engaged in operations were provided dust masks, when the mine was operational. |
| 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 was done once in a year for all employees and there are no cases of occupational health hazards, when the mine was operational. |
| 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. | Please be informed that, Since February 2020, mining operations have been stopped due to directions received from MoEF & CC. |

| 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 (from Apr-19 to Mar-20).</p> <table border="1" data-bbox="826 365 1383 1059"> <thead> <tr> <th>SO. NO.</th> <th>Shop Order Description</th> <th>Expenditure for the year 2019-20 (Rs.)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Nurssery & Plantation (5117)</td> <td>7,12,283.0</td> </tr> <tr> <td>2</td> <td>After care (5118)</td> <td>1965.0</td> </tr> <tr> <td>3</td> <td>Environment Monitoring (5119)</td> <td>4,86,535.0</td> </tr> <tr> <td>4</td> <td>Dust suppression (5120)</td> <td>3,35,328.0</td> </tr> <tr> <td>5</td> <td>Statutory Compliance (5121)</td> <td>93,376.0</td> </tr> <tr> <td>6</td> <td>Environment Others</td> <td>40,804.0</td> </tr> <tr> <td colspan="2">TOTAL</td> <td>16,70,291.0</td> </tr> </tbody> </table> <p>Please be informed that, Since February 2020, mining operations have been stopped due to directions received from MoEF & CC.</p> | SO. NO. | Shop Order Description | Expenditure for the year 2019-20 (Rs.) | 1 | Nurssery & Plantation (5117) | 7,12,283.0 | 2 | After care (5118) | 1965.0 | 3 | Environment Monitoring (5119) | 4,86,535.0 | 4 | Dust suppression (5120) | 3,35,328.0 | 5 | Statutory Compliance (5121) | 93,376.0 | 6 | Environment Others | 40,804.0 | TOTAL | | 16,70,291.0 |
|--------------|--|--|---------|------------------------|--|---|------------------------------|------------|---|-------------------|--------|---|-------------------------------|------------|---|-------------------------|------------|---|-----------------------------|----------|---|--------------------|----------|--------------|--|--------------------|
| SO. NO. | Shop Order Description | Expenditure for the year 2019-20 (Rs.) | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | Nurssery & Plantation (5117) | 7,12,283.0 | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | After care (5118) | 1965.0 | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | Environment Monitoring (5119) | 4,86,535.0 | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | Dust suppression (5120) | 3,35,328.0 | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | Statutory Compliance (5121) | 93,376.0 | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | Environment Others | 40,804.0 | | | | | | | | | | | | | | | | | | | | | | | | |
| TOTAL | | 16,70,291.0 | | | | | | | | | | | | | | | | | | | | | | | | |
| xiv. | 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. | Please be informed that, Since February 2020, mining operations have been stopped due to directions received from MoEF & CC. | | | | | | | | | | | | | | | | | | | | | | | | |
| 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 | Complied. | | | | | | | | | | | | | | | | | | | | | | | | |

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| | for 30 days. | |
| 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. |

ANNEXURE – 1

F.No. J-11015/406/2006-IA-II (M)
Government of India
Ministry of Environment, Forest and Climate Change
IA-II (Non Coal Mining)

Vayu Wing, 3rd Floor,
Indira Paryavaran Bhavan, Aliganj,
Jor Bagh Road, New Delhi-110 003

Dated: 28th January, 2020

Sub.: Direction to the Unit under section 5 of the Environment (Protection) Act, 1986 – for revocation of Environmental Clearance -regarding

Whereas, Environmental Clearance was granted vide letter No J-11015/406/2006-IA. II (M) dated 13.04.2007 for Dhangarwadi Bauxite Mines Project of M/s Hindalco Industries Limited in Kolhapur District in Maharashtra.

Whereas, as per direction of the Hon'ble Supreme Court a team constituted by the Ministry of Environment Forest & Climate Change (MoEF&CC) visited the mining site of M/s Punthembekar Minerals limited during 10-11 October, 2017 and submitted it report to the Ministry. The matter was thereafter examined in the Ministry at it has found that Dhangarwadi Bauxite Mines Project of M/s Hindalco Industries Limited is located within 10 KM from connecting corridor of Chandoli National Park and Radhanagri Wildlife Sanctuary.

Whereas, the Hon'ble Supreme Court in its order dated 04.08.2006 in IA 1000 W.P. (c) 202 of 1995 (T.N Godavaram vs. Union of India) prohibited the mining activity around protected and as an interim measure directed that 1 Km safety zone shall be maintained subject to the order that may be made in this I.A. regarding Jamua Ramgarh Sanctuary.

Whereas, as per Ministry vide OM No. J-11013/41/2006-IA (I) dated 02/12/2009, all the development projects/activities for which the environment clearance had been granted prior to 02/12/2009 and were located within 10 KM radius of National Park/Wildlife Sanctuary were required to obtain wildlife clearance from National Board for Wildlife. In this regard, a public notice was also inserted in newspapers by the Impact Assessment Division of the Ministry in January 2009 asking the Project Proponents to seek wildlife clearance from Standing Committee of National Board for Wildlife by 31st January 2009.

Whereas, in exercise of powers vested under Section 5 of Environment (Protection) Act, 1986 direction was issued vide LR No Z-11013/3/2018 dated 15.03.2018 wherein it has mentioned that " to immediately stop all the mining activity till Wildlife Clearance from Standing Committee



of National Board of Wildlife is obtained and to show cause as why Environmental Clearance granted No J-11015/406/2006-IA.II(M) dated 13.04.2007 for Dhangarwadi Bauxite Mines Project of M/s Hindalco Industries Limited should not be revoked for carrying out mining activity within 10KM of connecting corridor of Chandoli National Park and Radhanagri Wildlife Sanctuary. You are requested to reply within 15 days of receipt of this letter, failing which your EC may be kept in abeyance."

Whereas, the reply submitted by M/s Hindalco Industries Limited vide LR dated 30.03.2018 and information submitted through email dated 30.10.2018 was examined in the Ministry. After examining the proposal, the Ministry sought clarification from National Tiger Conservation Authority (NTCA) vide email dated 17.12.2018 & 18.12.2018 and Lr. No. J-11015/406/2006-IA. II (M) dated 14.01.2019 regarding distance of mining lease from Sahyadri Tiger Reserve and notification for establishment of the same. The Ministry also sought clarification from Ministry of Mines vide Lr. No. J-11015/406/2006-IA. II (M) dated 14.01.2019 regarding mining of Aluminous Laterite by PP without including the same in the mining lease.

Whereas, the National Tiger Conservation Authority (NTCA) vide its letter No. vide its letter No 7-37/2017-NTCA dated 27.03.2019 forwarded the letter No A/D-11/No.38 (17-18)/1383/2018-19 dated 14.03.2019 issued by Conservator of Forest & Field Officer, wherein, it has mentioned that the aerial distance of Dhangarwadi Bauxite Mines Project is 6.58 KM from the boundary of Sahyadri Tiger Reserve and 46.35 KM from Radhanagari Wildlife Sanctuary, the Sahyadri Tiger Reserve was notified on 21.08.2012 and location map of the mining lease and its distance from the protected area. Thus, it's clear from the above that from 21.08.2012 onwards for carrying out mining activities the PP was required to obtain NBWL Clearance.

Whereas, as per the past production details submitted for Dhangarwadi Bauxite Mines Project it has observed that project proponent in addition to Bauxite also mined Aluminous Laterite from 2014-15 onwards. The Ministry in this regard sought clarification from Ministry of Mines, Govt of India vide its letter No. J-11015/406/2006-IA.II (M) dated 14.01.2019. The Ministry of Mines vide its letter No 16/7/2019-M.VI dated 08.02.2019 informed the ministry that *"The mineral name which has been mentioned in the mining lease deed only can be dispatched and for dispatching the mineral(s) not mentioned in the mining lease deed these minerals needs to be included in the lease deed"*. It is clear from the reply of Ministry of Mines that PP cannot dispatch Aluminous Laterite without including the same in the mining lease deed and without obtaining a prior EC for the same. The Ministry of Mines vide its notification dated 10.02.2015 also declared Laterite as a Minor Mineral.

Whereas, Ministry has notified S.O. 804(E) dated 14.03.2017 for dealing with violation category proposals as per this notification " *In case the projects or activities requiring prior environmental clearance under Environment Impact Assessment Notification, 2006 from the concerned Regulatory Authority are brought for environmental clearance after starting the construction work, or have undertaken expansion, modernization, and change in product- mix without prior environmental clearance, these projects shall be treated as cases of violations..*" Further as per para 13 (3) of this notification "*In cases of violation, action will be taken against the project proponent by the respective State or State Pollution Control Board under the provisions of section 19 of the Environment (Protection) Act, 1986 and further, no consent to operate or occupancy certificate will be issued till the project is granted the environmental clearance*". In the instant case the M/s Hindalco Industries Limited, dispatched Aluminous Laterite from 2014-15 onwards without obtaining a prior environmental clearance for the same and thus it's a violation as per S.O. 804(E) dated 14.03.2017.

Whereas, the Hon'ble Supreme Court in W.P(C) 114 of 2014 in the matter of Common Cause vs Uol in its judgement dated 2.08.2017 inter-alia mentioned that "*para 128 ..a mining lease is required to adhere to the terms of the mining scheme, the mining plan and the mining lease as well as the statutes such as the EPA, the FCA, the Water (Prevention and Control of Pollution) Act, 1974 and the Air (Prevention and Control of Pollution) Act, 1981. If any mining operation is conducted in violation of any of these requirements, then that mining operation is illegal or unlawful. Any extraction of a mineral through an illegal or unlawful mining operation would become illegally or unlawfully extracted mineral...*". "*Para 186 (6) With effect from 14th September, 2006 all mining projects having a lease area of 5 hectares or more are required to have an EC. The extraction of any mineral in such a case without an EC would amount to illegal or unlawful mining attracting the provisions of Section 21(5) of the MMDR Act*". In the instant case M/s Hindalco Industries Limited, dispatched Aluminous Laterite from 2014-15 onwards without obtaining a prior environmental clearance from MoEF&CC, without consent to operate from State Pollution Control Board and without including the Aluminous Laterite in the mining lease deed.

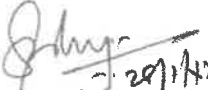
Whereas, the Hon'ble Supreme Court in W.P(C) 202/1995 in I.A 3949 in its order dated 2.11.2018 inter-alia mentioned that "*The Chief Secretary has assured us that he will look into the matter and see whether any illegal mining has been going on, that is to say, mining 'without any forest clearance or clearance from the Standing Committee of the National Board of Wildlife. It that is so, necessary steps be taken by the State of Maharashtra to recover the amounts due to illegal mining (if any) under Section 21 (5) if the Mines and Mineral (development and Regulation) Act, 1957*".

The Ministry has examined the submission made against MoEF&CC letter No. Z-11013/3/2018 dated 15.03.2018 and other information received, and is of considered view that there is violation of provision stipulated under EIA Notification, 2006 and amendment made therein.

Now, therefore, in exercise of powers vested under Section 5 of Environment (Protection) Act, 1986, the Environmental Clearance granted vide letter J-11015/406/2006-IA. II (M) dated 13.04.2007 for Dhangarwadi Bauxite Mines Project of M/s Hindalco Industries Limited located villages Dhangarwadi, Gholaswade, Ainwadi, Hambavali, Javil & Manoli in District Kolhapur in Maharashtra is **revoked herewith** due above mentioned reasons and as the window for applying under violation category has already been closed.

Lastly, it may be noted that violation of the direction under Section 5 of Environment (Protection) Act, 1986 shall attract penal action under section 15 of the Environment (Protection) Act, 1986.

This issues with the approval of the Competent Authority.


(Sundeep)

Director/Scientist – 'F'

Email: Sundeep.moef@gmail.com

Phone/Fax: 011-24695339

To,

M/s Hindalco Industries Limited

P.O Radhanagri, Kolhapur, Maharashtra-416212

Copy to:

1) **The Chief Secretary**, Government of Maharashtra, 6th Floor Main Building, Mantralaya, Dr. Madan Cama Road, Fort, Mumbai-400032

2) **The Chairman**, Maharashtra Pollution Control Board, Kalpataru Point, 3rd and 4th floor, Opp. Cine Planet, Sion Circle, Mumbai-400 022.

3) **The Controller General**, Indian Bureau of Mines
2nd Floor, Indira Bhawan, Civil Lines, Nagpur- 440 001
Phone : + 91 712 2560041, Fax : + 91 712 2565073
email : cg@ibm.gov.in

4) **The Director**, Directorate of Geology & Mining,
Government of Maharashtra, "Khanij Bhawan", Plot No 27, Shivaji Nagar, Cement Road,
Nagpur-440010.

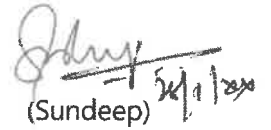
5) **The District Collector** (Kolhapur),
District Collector Office, Kolhapur
New Shahupuri, Kolhapur, Maharashtra 416003

6) **The Additional Principal Chief Conservator of Forests (C)**,
Ministry of Environment, Forest and Climate Change, Regional Office (WCZ), Ground Floor,
East Wing, New Secretariat Building Civil Lines, Nagpur-440001
Tel.No.0712-2531318, Fax: 0712-2531318
Email: apccfcentral-ngp-mef@gov.in

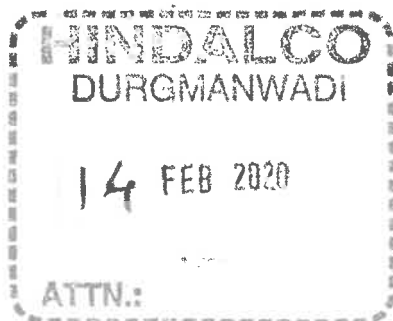
7) **Mr. Kumar Mangalam Birla**,
Chairman, Hindalco Industries Limited
Birla Centurion, 7th floor
Pandurang Budhkar Road
Worli, Mumbai 400 030

8) MoEFCC Website

9) Guard File


(Sundeep) 24/1/2020

Director/Scientist – 'F'



ANNEXURE – 2

DHANGARWADI BAUXITE MINE

**TAHSIL: SHAHUWADI, DISTRICT: KOLHAPUR,
STATE: MAHARASHTRA**

OF

M/s HINDALCO INDUSTRIES LTD.

ENVIRONMENTAL QUALITY MONITORING REPORT

**SEASON - POST MONSOON 2019
SEPTEMBER, OCTOBER, NOVEMBER**

PREPARED BY



EQUINOX ENVIRONMENTS (I) PVT. LTD.,

**ENVIRONMENTAL; CIVIL & CHEMICAL ENGINEERS, CONSULTANTS & ANALYSTS,
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An ISO 9001:2015 & QCI NABET ACCREDITED ORGANIZATION



2019 - 2020

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PREFACE

M/s. Hindalco Industries Limited entrusted environmental quality monitoring at **Dhangarwadi Bauxite Mine** situated in Dhangarwadi village, Shahuwadi Tahsil, Kolhapur District, Maharashtra to **Equinox Environments (India) Pvt. Ltd.** during post monsoon season of the year 2019.

According to MoU dt. 1st September 2018, The **Equinox Environments (India) Pvt. Ltd.** has availed the various monitoring services by lab viz. **Green Envirosafe Engineers & Consultant Pvt. Ltd.** which is recognized and duly approved by the **Ministry of Environment, Forests & Climate Change (MoEFCC); New Delhi** (through Notification No. S.O. 1174 (E) dated 18.07.2007 as amended vide Notification No. S.O. 388 (E) dated 10.02.2017) and NABL (ISO/IEC 17025:2005 vide certificate number TC-8061 dated 03.11.2018) has also received certifications namely ISO 9001:2015 and OHSAS 18001: 2007 from Crescent Quality Certification Pvt. Ltd.

The environmental monitoring for water quality was carried out in core zone and buffer zone during the months of September–October–November 2019. The data obtained was compiled to assess the current environmental status of the mining as well as the surrounding villages in the study area for following environmental parameters.

- ❖ Micro-meteorology
- ❖ Ambient air quality
- ❖ Ambient noise level quality
- ❖ Water quality
- ❖ Soil Quality
- ❖ DG set Stack monitoring

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

Equinox Environments India Pvt. Ltd. gratefully acknowledges the cooperation extended by management and staff of M/s. Hindalco Industries Limited and village people to the 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 and soil quality in core zone and buffer zone in and around the mine lease area during the post monsoon season of the year 2019

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 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.

SOIL QUALITY MONITORING

The normal mineral composition of plants is affected by alteration in soil conditions. Organic remains accumulate mainly on the surface of the soil. Soils that have low stability of structure disperse and slake when they are wetted by rains or water from irrigation and may develop a hard crust as the soil surface dries. This crust presents a serious barrier for emerging seedlings. With some crops often it is the main cause for poor growth. In the present study, soil samples were collected from the identified locations and analyzed in the laboratory.

MICROMETEOROLOGY

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

AREA DETAILS

INTRODUCTION

Hindalco Industries is one of the leading producers of aluminum in the country. The company business involves bauxite mining to alumina refining. Alumina to 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.

As per the directions of the Government of Maharashtra the mining plan was prepared for the entire lease area of 41.80 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 in the revenue land and The Environmental Clearance was obtained for the production of 0.6 million TPA of bauxite over the entire area. The mining lease was executed by the collector of Kolhapur over the area on 05/05/2008 and the lease expires on 04/05/2038.

MINE DETAIL

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

GEOGRAPHICAL DETAILS

Latitude: 16.0°54.0'0.0"
Longitude: 73.0°49.0'5.0"
MSL: 1020 m

DETAILS OF LEASE AREA

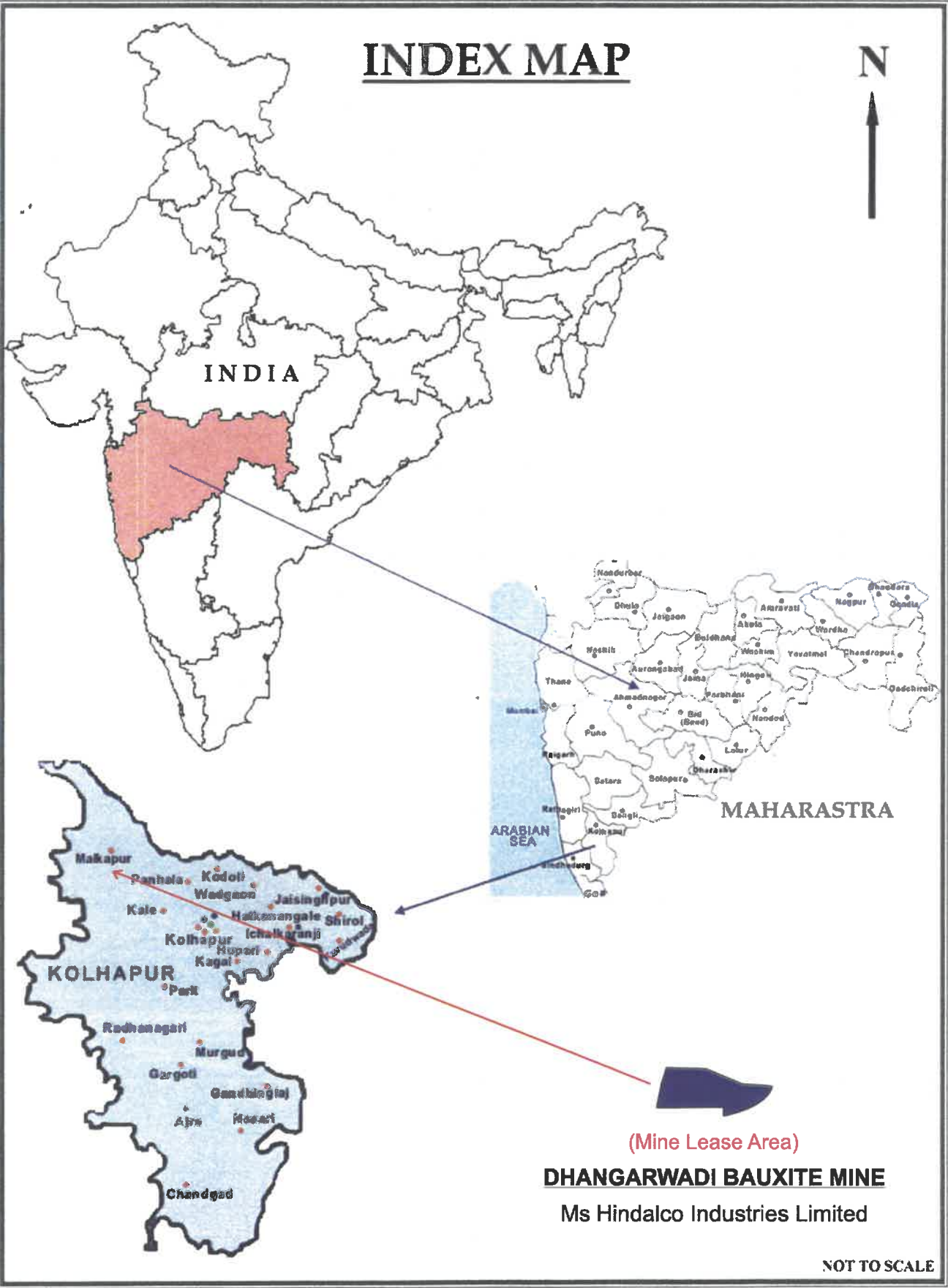
The following table gives the details of the area in terms of District, Tahsil, Village, Gat no. and Area granted in hectors.

| District | Tahsil | Village | Gat No. | Area Granted (ha) |
|----------|-----------|--------------|--------------|-------------------|
| Kolhapur | Shahuwadi | Dhangarwadi | 45 | 12.32 |
| | | | 46 (p) | 6.53 |
| | | | 50(p) | 2.17 |
| | | | 52 | 10.58 |
| | | | 53(p) | 5.09 |
| | | | 56(p) | 2.76 |
| | | Ainwadi | 106(p) | 2.35 |
| | | Total | 41.80 | |

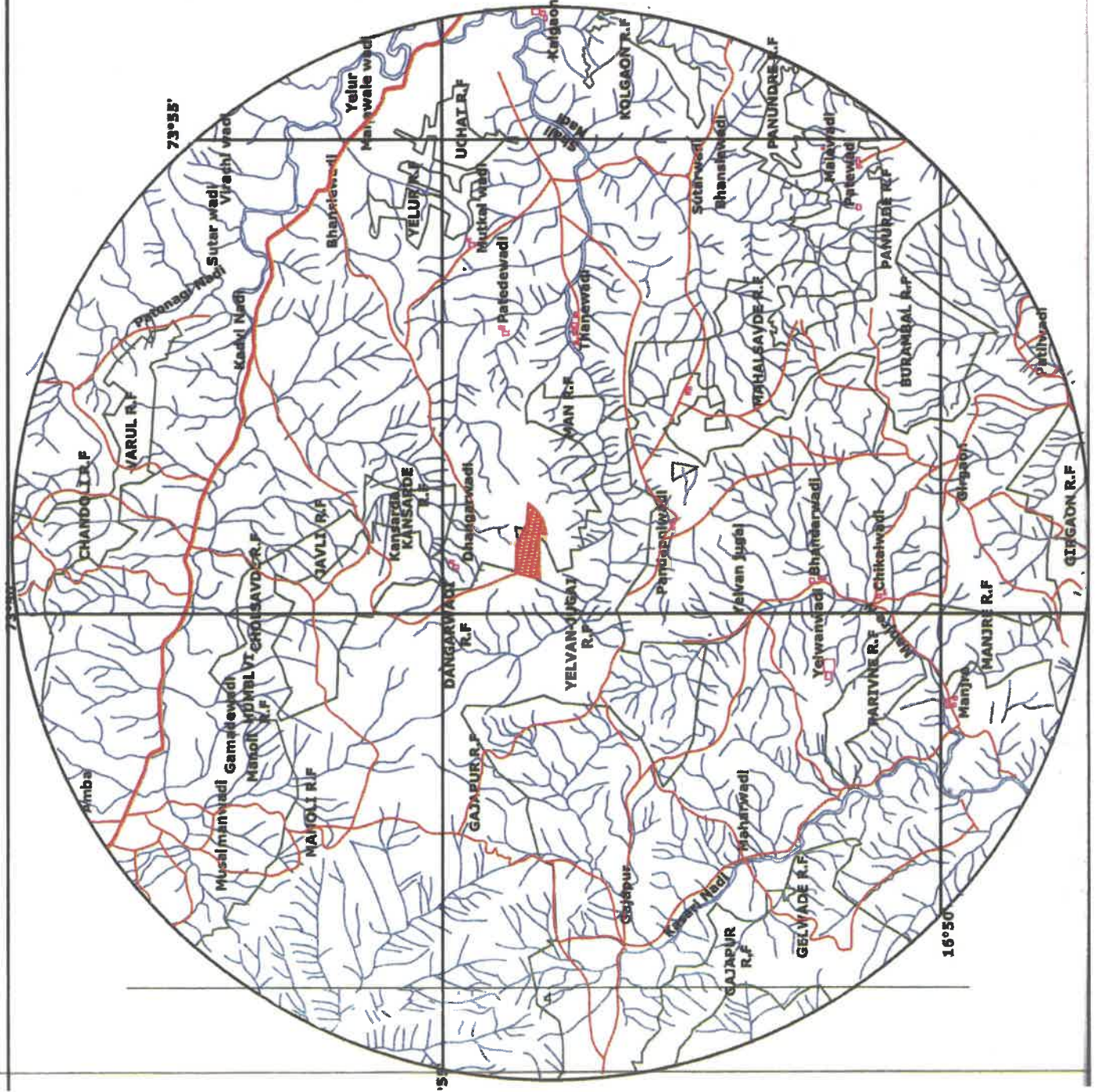
| DHANGARWADI BAUXITE MINE (M/s. Hindalco Industries Limited) | |
|--|---|
| DETAILS | |
| State | Maharashtra |
| District | Kolhapur |
| Tahsil | Shahuwadi |
| Village | Dhangarwadi |
| Latitude | 16°54'0.0" |
| Longitude | 73°49'5.0" |
| Nature of the area | Plateau terrain |
| Toposheet no. | 47 H/13. |
| GENERAL CLIMATIC CONDITIONS | |
| Maximum temperature | 40.0° C |
| Minimum temperature | 16.0° C |
| ACCESSIBILITY | |
| Road connectivity | Approached by road connecting Dhopeswar Junction which is at a distance of 8 kms, located 6 kms from Malkapur Town on Ratnagiri-Nagpur National Highway (NH-204). |
| Rail connectivity | Kolhapur railway station (56 km) |
| Airport | Kolhapur (60 km) |
| Sea Port | Ratnagiri (95 km) |
| Biosphere reserve | Not any |
| Sanctuary | Chandoli wild life sanctuary is situated at about 20 kms. |

INDEX MAP

N



NOT TO SCALE



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
 Equinox Environments India Pvt. Ltd.,
 Kolhapur

MICRO-METEOROLOGY

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

PRIMARY / BASIC METEOROLOGICAL PARAMETERS

- Wind Speed (Km/h)
- 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
- Humidity

| Meteorological Data September - 2019 | | | | | | | |
|---|-------------|-----|---------------------|-----------------|-----|---------|-------------------|
| Date | Temperature | | AVERAGE Humidity | Wind Speed Km/h | | | Wind Direction |
| | MIN | MAX | | MIN | MAX | AVERAGE | |
| 02.09.2019 | 17 | 29 | 82 | 0 | 9 | 4.5 | West |
| 03.09.2019 | 17 | 31 | 83 | 0 | 10 | 5.0 | West |
| 09.09.2019 | 18 | 29 | 82 | 0 | 12 | 5.5 | West |
| 10.09.2019 | 18 | 32 | 95 | 0 | 8 | 3.5 | West |
| 16.09.2019 | 17 | 30 | 93 | 0 | 13 | 5.5 | West |
| 17.09.2019 | 18 | 31 | 87 | 0 | 11 | 4.5 | West |
| 23.09.2019 | 17 | 30 | 92 | 0 | 10 | 4.0 | West |
| 24.09.2019 | 18 | 31 | 90 | 0 | 9 | 3.5 | West |

| Meteorological Data October - 2019 | | | | | | | |
|---|-------------|-----|---------------------|-----------------|-----|---------|-------------------|
| Date | Temperature | | AVERAGE Humidity | Wind Speed Km/h | | | Wind Direction |
| | MIN | MAX | | MIN | MAX | AVERAGE | |
| 07.10.2019 | 18 | 33 | 76 | 0 | 9 | 4.5 | West |
| 08.10.2019 | 20 | 31 | 78 | 0 | 10 | 5.0 | West |
| 14.10.2019 | 18 | 33 | 83 | 0 | 10 | 4.5 | West |
| 15.10.2019 | 19 | 32 | 76 | 0 | 12 | 4.5 | West |
| 21.10.2019 | 20 | 32 | 85 | 0 | 13 | 6.0 | West |
| 22.10.2019 | 17 | 33 | 83 | 0 | 11 | 5.5 | West |
| 28.10.2019 | 17 | 32 | 79 | 0 | 12 | 5.5 | West |
| 29.10.2019 | 20 | 33 | 83 | 0 | 9 | 4.5 | West |

| Meteorological Data November - 2019 | | | | | | | |
|--|-------------|-----|---------------------|-----------------|-----|---------|-------------------|
| Date | Temperature | | AVERAGE Humidity | Wind Speed Km/h | | | Wind Direction |
| | MIN | MAX | | MIN | MAX | AVERAGE | |
| 04.11.2019 | 16 | 32 | 69 | 0 | 8 | 4.0 | East |
| 05.11.2019 | 18 | 33 | 68 | 0 | 11 | 3.5 | East |
| 11.11.2019 | 17 | 35 | 72 | 0 | 12 | 6.0 | East |
| 12.11.2019 | 18 | 33 | 63 | 0 | 11 | 5.5 | East |
| 18.11.2019 | 18 | 35 | 68 | 0 | 9 | 4.0 | East |
| 19.11.2019 | 19 | 34 | 60 | 0 | 11 | 5.0 | East |
| 25.11.2019 | 17 | 35 | 58 | 0 | 8 | 3.5 | East |
| 26.11.2019 | 17 | 34 | 59 | 0 | 12 | 5.5 | East |

ENVIRONMENTAL QUALITY

Environmental quality monitoring at Dhangarwadi Bauxite Mine of M/s.Hindalco Industries Limited at Dhangarwadi village of Shahuwadi Tahsil, Kolhapur district, Maharashtra includes monitoring of various environmental components like air, noise and soil water quality status within core zone and buffer zone in and 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

Ambient Fine Dust Sampler was used for monitoring particulate matter (PM₁₀), particulate matter (PM_{2.5}) and other gaseous pollutants.

| | | |
|----------------|------------------------------------|---|
| Sr. No. | Instrument Name | Ambient Fine Dust Sampler |
| 1. | Model No. | IPM-FDS-M 2.5 μ /10 μ Fine Dust Sampler |
| 2. | Serial No. | FDSM/2018-19/368-1 |
| 3. | Calibration Details | From 02/08/2019 To 02/07/2020 |
| 4. | Calibration Certificate No. | IPM-FDS/18-19/368-1 |

METHOD FOR TESTING PM₁₀/ PM_{2.5}

| | | |
|----------------|-------------------|--|
| Sr. No. | Content | Details |
| 1. | Name of Pollutant | PM ₁₀ / PM _{2.5} |
| 2. | Medium | Air |
| 3. | Instrument | Respirable Dust Sampler / Fine Particulate Sampler |
| 4. | Duration | 24 hourly |
| 5. | Mode | Continuous |
| 6. | Unit | $\mu\text{g}/\text{m}^3$ |
| 7. | Method | Gravimetric |

METHOD FOR TESTING

| | | | | |
|----------------|--------------------------|------------------------------|---|------------------------|
| Sr. No. | Name of Pollutant | Sulphur Dioxide | Oxides of Nitrogen | Carbon monoxide |
| 1. | Method | Modified West & Geake Method | Modified Jacob & Hochheiser Modified (Na-Arsenite) Method | NDIR Method |
| 2. | Frequency | 24 hourly | 24 hourly | 24 hourly |
| 3. | Mode | Continuous | Continuous | Continuous |
| 4. | Unit | $\mu\text{g}/\text{m}^3$ | $\mu\text{g}/\text{m}^3$ | mg/m^3 |
| 5. | Procedure | AS Per IS 5182 (Part II) | AS Per IS 5182 (Part IV) | NDIR Method |

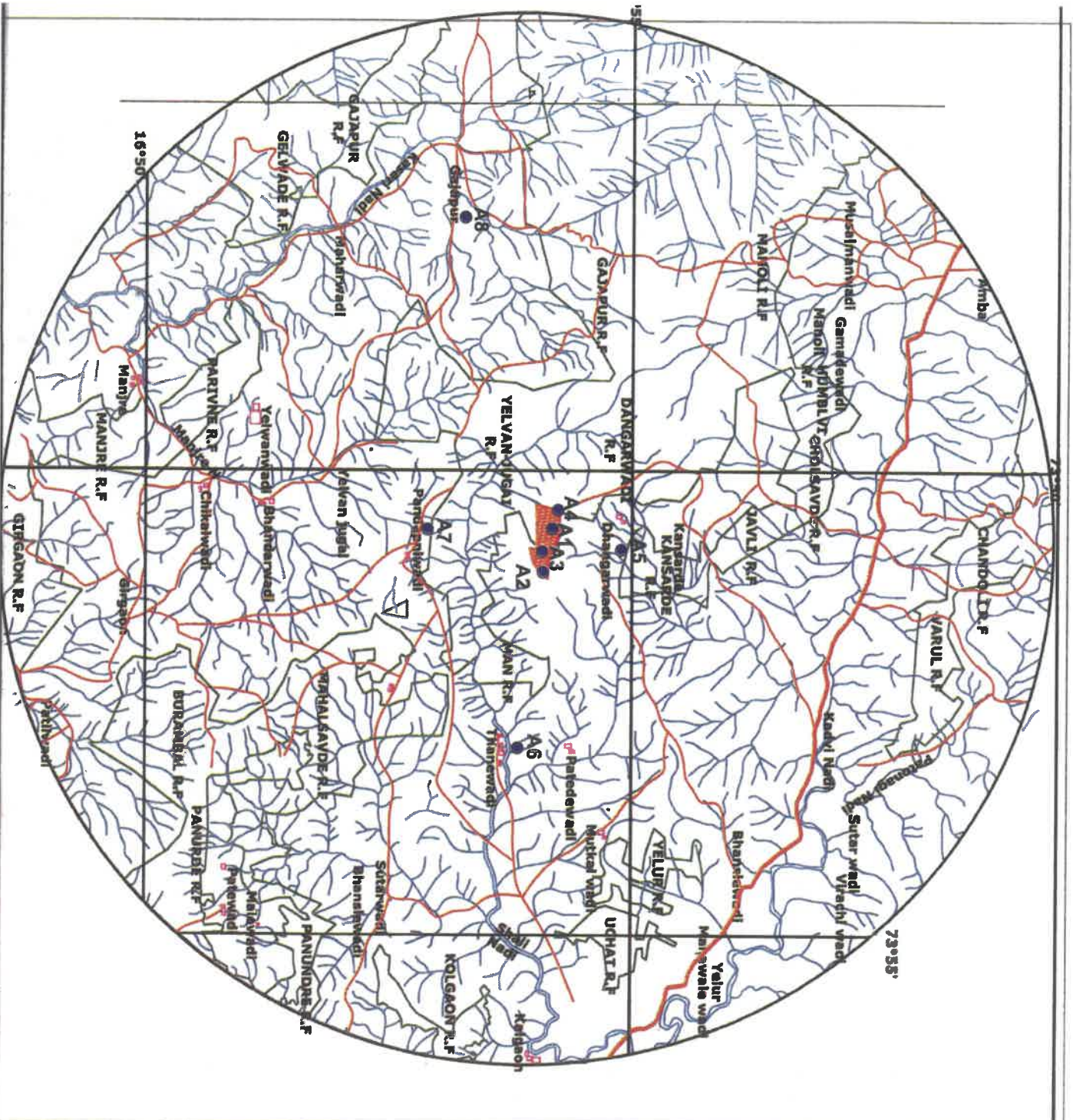
Monitoring Location Details

Respirable dust sampler and Fine particulate sampler were placed at a height of 3m 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 PM₁₀, PM_{2.5}, SO₂, NO_x, CO and HC collected during post







monsoon season of the year 2019 are presented in annexure and are summarized in the following table.

AMBIENT AIR QUALITY MONITORING STATION

| Sl. No. | Station Code | Name Of The Sampling Station | Direction W.R.T. Mines Lease Area |
|----------------|---------------------|-------------------------------------|--|
| 1 | A-1 | Near Mine Working Area | --- |
| 2 | A-2 | Near Dump Site | --- |
| 3 | A-3 | Near Haulage Road | --- |
| 4 | A-4 | Near Mines Office /DG Set | --- |
| 5 | A-5 | Dhangarwadi Village | N |
| 6 | A-6 | Thanewadi Village | ESW |
| 7 | A-7 | Pandapniwadi Village | S |
| 8 | A-8 | Gajapur Village | WSW |



LEGEND

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



PROJECT : DHANGARWADI BAUXITE MINES

CLIENT : HINDALCO INDUSTRIES LIMITED

TITLE : AIR MONITORING LOCATIONS MAP

**PREPARED BY
EQUINOX ENVIRONMENTS INDIA PVT. LTD.,
KOLHAPUR**



Recognised by Ministry of Environment, Forest & Climate Change (MoEF) Govt. of India and ISO/IEC 17025:2005 (NABL), ISO 9001:2015 and OHSAS 18001:2007 Certified Company

Ambient Air Quality Monitoring Report

| | | | |
|----------------------------------|--|----------------|------------|
| Report No- | GESEC/PRO/2019-20/12/221-244 | Date of Report | 10/12/2019 |
| Name of Client | Equinox Environments (i) Pvt- Ltd-, Kolhapur, Maharashtra | | |
| Project Name & Address | M/s. Hindalco Industries Limited (Dhangarwadi Bauxite Mine) A/P. Dhangarwadi village, Tahsil. Shahuwadi, District. Kolhapur, State. Maharashtra | | |
| Sample Collected and Analyzed by | Green EnviroSAFE Engineers & Consultant Pvt- Ltd, Pune, Maharashtra | | |

| Name Of Instrument& Calibration Details | Make | Date of calibration | Calibration Due Date | Calibration Certificate No- |
|---|-----------|---------------------|----------------------|-----------------------------|
| Ambient Fine Dust | Instrumex | 08/02/2019 | 07/02/2020 | IPM-FDS/18-19/368-1 |

NAME OF LOCATION- Station: A1, Near Mine Working Area

| Sampling Date | Date of Sample Registration | Parameter | PM10 µg/m3 | PM2-5 µg/m3 | SO2 µg/m3 | NOX µg/m3 | CO mg/m3 | Hydro-Carbon µg/m3 |
|-----------------|-----------------------------|-----------|-------------------------------|-------------------------------|------------------------------------|----------------------------------|----------------|-----------------------|
| | | Limit | 100 (µg/m3) | 60 (µg/m3) | 80 (µg/m3) | 80 (µg/m3) | 04 (mg/m3) | N.S (µg/m3) |
| Analysis Method | | | IS: 5181 (Part-23) 2006 | IS: 5181 (Part-23) 2006 | Modified West & Gaeke Method | Jacob & Hocheiser's Method | NDIR Method | GC Method |

| September – 2019 | | | | | | | | |
|------------------|------------|--------|------|------|------|------|------|------|
| 02.09.2019 | 06.09.2019 | Week-1 | 49.2 | 16.3 | 8.2 | 11.5 | 0.07 | 0.03 |
| 03.09.2019 | 06.09.2019 | Week-1 | 53.5 | 17.1 | 9.8 | 14.5 | 0.08 | 0.02 |
| 09.09.2019 | 13.09.2019 | Week-2 | 52.4 | 20.0 | 10.5 | 12.8 | 0.06 | 0.04 |
| 10.09.2019 | 13.09.2019 | Week-2 | 56.7 | 16.1 | 8.8 | 15.6 | 0.07 | 0.02 |
| 16.09.2019 | 20.09.2019 | Week-3 | 50.7 | 18.6 | 10.3 | 17.2 | 0.08 | 0.05 |
| 17.09.2019 | 20.09.2019 | Week-3 | 53.7 | 15.7 | 10.2 | 16.4 | 0.09 | 0.03 |
| 23.09.2019 | 27.09.2019 | Week-4 | 51.4 | 19.1 | 11.2 | 17.8 | 0.07 | 0.04 |
| 24.09.2019 | 27.09.2019 | Week-4 | 50.9 | 17.8 | 9.9 | 13.9 | 0.06 | 0.05 |
| October – 2019 | | | | | | | | |
| 07.10.2019 | 11.10.2019 | Week-2 | 50.2 | 18.2 | 7.1 | 14.0 | 0.07 | 0.05 |
| 08.10.2019 | 11.10.2019 | Week-2 | 51.4 | 16.8 | 8.7 | 18.3 | 0.06 | 0.03 |
| 14.10.2019 | 18.10.2019 | Week-3 | 54.7 | 16.1 | 8.8 | 12.8 | 0.06 | 0.06 |
| 15.10.2019 | 18.10.2019 | Week-3 | 53.5 | 15.9 | 10.5 | 15.1 | 0.07 | 0.05 |
| 21.10.2019 | 25.10.2019 | Week-4 | 51.2 | 18.5 | 9.8 | 15.4 | 0.05 | 0.03 |
| 22.10.2019 | 25.10.2019 | Week-4 | 57.2 | 17.4 | 9.0 | 13.7 | 0.08 | 0.05 |
| 28.10.2019 | 01.11.2019 | Week-5 | 58.9 | 18.5 | 8.5 | 12.6 | 0.04 | 0.03 |
| 29.10.2019 | 01.11.2019 | Week-5 | 56.6 | 19.0 | 7.7 | 13.3 | 0.07 | 0.04 |
| November – 2019 | | | | | | | | |
| 04.11.2019 | 08.11.2019 | Week-1 | 50.6 | 16.7 | 10.8 | 16.8 | 0.07 | 0.03 |
| 05.11.2019 | 08.11.2019 | Week-1 | 54.3 | 15.9 | 11.4 | 17.5 | 0.06 | 0.05 |
| 11.11.2019 | 15.11.2019 | Week-2 | 58.2 | 17.8 | 13.3 | 16.4 | 0.08 | 0.04 |
| 12.11.2019 | 15.11.2019 | Week-2 | 48.7 | 19.1 | 11.7 | 18.9 | 0.06 | 0.02 |
| 18.11.2019 | 22.11.2019 | Week-3 | 53.8 | 18.4 | 14.5 | 19.7 | 0.07 | 0.06 |
| 19.11.2019 | 22.11.2019 | Week-3 | 52.5 | 20.1 | 12.6 | 16.1 | 0.06 | 0.04 |
| 25.11.2019 | 29.11.2019 | Week-4 | 51.2 | 18.6 | 12.7 | 16.6 | 0.07 | 0.05 |
| 26.11.2019 | 29.11.2019 | Week-4 | 52.1 | 17.5 | 13.1 | 17.3 | 0.08 | 0.03 |

Remark: All Parameters are within NAAQS Standards.
N.S. Not Specified

Lab Chemist



Authorized Signatory



Recognised by Ministry of Environment, Forest & Climate Change (MoEF) Govt. of India and ISO/IEC 17025:2005 (NABL), ISO 9001:2015 and OHSAS 18001:2007 Certified Company

Ambient Air Quality Monitoring Report

| | | | |
|----------------------------------|--|----------------|------------|
| Report No- | GESEC/PRO/2019-20/12/245-269 | Date of Report | 10/12/2019 |
| Name of Client | Equinox Environments (I) Pvt- Ltd-, Kolhapur, Maharashtra | | |
| Project Name & Address | M/s. Hindalco Industries Limited (Dhangarwadi Bauxite Mine) A/P. Dhangarwadi village, Tahsil. Shahuwadi, District. Kolhapur, State. Maharashtra | | |
| Sample Collected and Analyzed by | Green EnviroSAFE Engineers & Consultant Pvt- Ltd, Pune, Maharashtra- | | |

| Name Of Instrument & Calibration Details | Make | Date of calibration | Calibration Due Date | Calibration Certificate No- |
|--|-----------|---------------------|----------------------|-----------------------------|
| Ambient Fine Dust | Instrumex | 08/02/2019 | 07/02/2020 | IPM-FDS/18-19/368-2 |

NAME OF LOCATION- Station: A2, Near Dump Site

| Sampling Date | Date of Sample Registration | Parameter | 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 | Hydro-Carbon |
|------------------------|-----------------------------|-----------|---------------------------------------|--|--------------------------------------|--------------------------------------|----------------------------|-----------------------------|
| | | Limit | 100 (µg/m ³) | 60 (µg/m ³) | 80 (µg/m ³) | 80 (µg/m ³) | 04 (mg/m ³) | N.S (µg/m ³) |
| Analysis Method | | | IS: 5181 (Part-23) 2006 | IS: 5181 (Part-23) 2006 | (Modified West & Gaeke Method) | (Jacob & Hocheiser's Method) | NDIR Method | GC Method |

September – 2019

| | | | | | | | | |
|------------|------------|--------|------|------|------|------|------|------|
| 02.09.2019 | 06.09.2019 | Week-1 | 49.7 | 16.6 | 13.2 | 16.9 | 0.06 | 0.05 |
| 03.09.2019 | 06.09.2019 | Week-1 | 53.4 | 17.4 | 11.8 | 14.4 | 0.07 | 0.06 |
| 09.09.2019 | 13.09.2019 | Week-2 | 57.2 | 17.2 | 12.9 | 14.8 | 0.08 | 0.03 |
| 10.09.2019 | 13.09.2019 | Week-2 | 54.8 | 15.7 | 14.5 | 17.5 | 0.05 | 0.05 |
| 16.09.2019 | 20.09.2019 | Week-3 | 49.5 | 14.6 | 12.2 | 18.6 | 0.07 | 0.03 |
| 17.09.2019 | 20.09.2019 | Week-3 | 50.2 | 17.8 | 15.1 | 18.7 | 0.07 | 0.04 |
| 23.09.2019 | 27.09.2019 | Week-4 | 54.8 | 16.4 | 12.0 | 17.9 | 0.06 | 0.04 |
| 24.09.2019 | 27.09.2019 | Week-4 | 50.5 | 18.5 | 13.5 | 18.0 | 0.05 | 0.06 |

October – 2019

| | | | | | | | | |
|------------|------------|--------|------|------|------|------|------|------|
| 07.10.2019 | 11.10.2019 | Week-2 | 49.1 | 16.8 | 13.1 | 16.8 | 0.06 | 0.05 |
| 08.10.2019 | 11.10.2019 | Week-2 | 51.5 | 17.6 | 11.7 | 14.1 | 0.05 | 0.04 |
| 14.10.2019 | 18.10.2019 | Week-3 | 53.2 | 15.8 | 12.5 | 16.6 | 0.06 | 0.04 |
| 15.10.2019 | 18.10.2019 | Week-3 | 51.1 | 18.1 | 14.1 | 17.5 | 0.08 | 0.05 |
| 21.10.2019 | 25.10.2019 | Week-4 | 49.5 | 17.5 | 12.9 | 18.7 | 0.07 | 0.06 |
| 22.10.2019 | 25.10.2019 | Week-4 | 48.6 | 15.5 | 15.2 | 18.5 | 0.08 | 0.05 |
| 28.10.2019 | 01.11.2019 | Week-5 | 50.3 | 16.4 | 13.3 | 17.9 | 0.09 | 0.05 |
| 29.10.2019 | 01.11.2019 | Week-5 | 50.0 | 17.7 | 12.7 | 16.4 | 0.05 | 0.04 |

November – 2019

| | | | | | | | | |
|------------|------------|--------|------|------|------|------|------|------|
| 04.11.2019 | 08.11.2019 | Week-1 | 50.3 | 16.6 | 12.5 | 17.6 | 0.06 | 0.05 |
| 05.11.2019 | 08.11.2019 | Week-1 | 48.8 | 18.5 | 14.3 | 19.1 | 0.07 | 0.03 |
| 11.11.2019 | 15.11.2019 | Week-2 | 51.2 | 15.8 | 11.7 | 16.8 | 0.05 | 0.04 |
| 12.11.2019 | 15.11.2019 | Week-2 | 50.3 | 18.6 | 13.3 | 18.8 | 0.08 | 0.06 |
| 18.11.2019 | 22.11.2019 | Week-3 | 48.6 | 20.1 | 12.8 | 17.6 | 0.06 | 0.05 |
| 19.11.2019 | 22.11.2019 | Week-3 | 49.3 | 16.8 | 11.3 | 18.4 | 0.05 | 0.03 |
| 25.11.2019 | 29.11.2019 | Week-4 | 51.1 | 18.6 | 14.2 | 19.0 | 0.08 | 0.06 |
| 26.11.2019 | 29.11.2019 | Week-4 | 53.4 | 19.4 | 13.1 | 17.5 | 0.07 | 0.05 |

Remark: All Parameters are within NAAQS Standards.
N.S. Not Specified

Lab Chemist



Authorized Signatory



Recognised by Ministry of Environment, Forest & Climate Change (MoEF) Govt. of India and ISO/IEC 17025:2005 (NABL), ISO 9001:2015 and OHSAS 18001:2007 Certified Company

Ambient Air Quality Monitoring Report

| | | | |
|----------------------------------|--|----------------|------------|
| Report No- | GESEC/PRO/2019-20/12/270-293 | Date of Report | 10/12/2019 |
| Name of Client | Equinox Environments (I) Pvt- Ltd-, Kolhapur, Maharashtra | | |
| Project Name & Address | M/s. Hindalco Industries Limited (Dhangarwadi Bauxite Mine) A/P. Dhangarwadi village, Tahsil. Shahuwadi, District. Kolhapur, State. Maharashtra | | |
| Sample Collected and Analyzed by | Green EnviroSAFE Engineers & Consultant Pvt- Ltd, Pune, Maharashtra- | | |

| Name Of Instrument & Calibration Details | Make | Date of calibration | Calibration Due Date | Calibration Certificate No- |
|--|-----------|---------------------|----------------------|-----------------------------|
| Ambient Fine Dust | Instrumex | 08/02/2019 | 07/02/2020 | IPM-FDS/18-19/367-1 |

NAME OF LOCATION- Station: A3, Near Haulage Road

| Sampling Date | Date of Sample Registration | Parameter | 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 | Hydro-Carbon N.S (µg/m ³) |
|-------------------------|-----------------------------|-----------|---------------------------------------|--|--------------------------------------|--------------------------------------|----------------------------|---|
| | | Limit | 100 (µg/m ³) | 60 (µg/m ³) | 80 (µg/m ³) | 80 (µg/m ³) | 04 (mg/m ³) | |
| Analysis Method | | | IS: 5181 (Part-23) 2006 | IS: 5181 (Part-23) 2006 | (Modified West & Gaeke Method) | (Jacob & Hocheiser's Method) | NDIR Method | GC Method |
| September – 2019 | | | | | | | | |
| 02.09.2019 | 06.09.2019 | Week-1 | 48.8 | 16.7 | 11.7 | 16.5 | 0.07 | 0.05 |
| 03.09.2019 | 06.09.2019 | Week-1 | 55.2 | 18.4 | 12.4 | 15.4 | 0.05 | 0.04 |
| 09.09.2019 | 13.09.2019 | Week-2 | 53.5 | 15.8 | 14.1 | 18.1 | 0.08 | 0.02 |
| 10.09.2019 | 13.09.2019 | Week-2 | 49.7 | 17.5 | 13.2 | 15.3 | 0.05 | 0.05 |
| 16.09.2019 | 20.09.2019 | Week-3 | 52.3 | 18.6 | 11.5 | 16.5 | 0.06 | 0.05 |
| 17.09.2019 | 20.09.2019 | Week-3 | 53.1 | 15.5 | 15.1 | 17.7 | 0.09 | 0.06 |
| 23.09.2019 | 27.09.2019 | Week-4 | 50.5 | 17.1 | 11.9 | 18.8 | 0.06 | 0.04 |
| 24.09.2019 | 27.09.2019 | Week-4 | 54.3 | 18.0 | 12.5 | 15.9 | 0.07 | 0.03 |
| October – 2019 | | | | | | | | |
| 07.10.2019 | 11.10.2019 | Week-2 | 51.2 | 16.3 | 11.8 | 18.4 | 0.07 | 0.03 |
| 08.10.2019 | 11.10.2019 | Week-2 | 49.8 | 18.4 | 13.2 | 15.8 | 0.07 | 0.05 |
| 14.10.2019 | 18.10.2019 | Week-3 | 55.2 | 15.8 | 11.2 | 16.5 | 0.05 | 0.05 |
| 15.10.2019 | 18.10.2019 | Week-3 | 49.1 | 16.5 | 12.3 | 17.9 | 0.08 | 0.02 |
| 21.10.2019 | 25.10.2019 | Week-4 | 49.7 | 18.8 | 13.4 | 15.5 | 0.07 | 0.06 |
| 22.10.2019 | 25.10.2019 | Week-4 | 51.5 | 15.7 | 14.0 | 16.2 | 0.06 | 0.04 |
| 28.10.2019 | 01.11.2019 | Week-5 | 52.1 | 18.0 | 12.7 | 18.0 | 0.09 | 0.03 |
| 29.10.2019 | 01.11.2019 | Week-5 | 53.7 | 17.5 | 13.6 | 17.4 | 0.08 | 0.03 |
| November – 2019 | | | | | | | | |
| 04.11.2019 | 08.11.2019 | Week-1 | 52.1 | 16.3 | 13.5 | 16.6 | 0.07 | 0.03 |
| 05.11.2019 | 08.11.2019 | Week-1 | 53.4 | 15.4 | 15.0 | 18.0 | 0.06 | 0.05 |
| 11.11.2019 | 15.11.2019 | Week-2 | 54.2 | 18.8 | 12.6 | 16.2 | 0.05 | 0.04 |
| 12.11.2019 | 15.11.2019 | Week-2 | 50.5 | 15.4 | 13.2 | 15.8 | 0.08 | 0.04 |
| 18.11.2019 | 22.11.2019 | Week-3 | 51.4 | 16.8 | 14.3 | 15.5 | 0.07 | 0.06 |
| 19.11.2019 | 22.11.2019 | Week-3 | 50.3 | 18.0 | 12.2 | 16.7 | 0.04 | 0.05 |
| 25.11.2019 | 29.11.2019 | Week-4 | 49.8 | 16.8 | 11.4 | 18.4 | 0.06 | 0.04 |
| 26.11.2019 | 29.11.2019 | Week-4 | 53.6 | 18.5 | 14.5 | 17.6 | 0.08 | 0.03 |

Remark: All Parameters are within NAAQS Standards.
N.S. Not Specified

Lab Chemist



Authorized Signatory

Recognised by Ministry of Environment, Forest & Climate Change (MoEF) Govt. of India and ISO/IEC 17025:2005 (NABL), ISO 9001:2015 and OHSAS 18001:2007 Certified Company

Ambient Air Quality Monitoring Report

| | | | |
|----------------------------------|--|----------------|------------|
| Report No- | GESEC/PRO/2019-20/12/294-317 | Date of Report | 10/12/2019 |
| Name of Client | Equinox Environments (I) Pvt- Ltd-, Kolhapur, Maharashtra | | |
| Project Name & Address | M/s. Hindalco Industries Limited (Dhangarwadi Bauxite Mine) A/P. Dhangarwadi village, Tahsil. Shahuwadi, District. Kolhapur, State. Maharashtra | | |
| Sample Collected and Analyzed by | Green Envirosafe Engineers & Consultant Pvt- Ltd, Pune, Maharashtra- | | |

| Name Of Instrument& Calibration Details | Make | Date of calibration | Calibration Due Date | Calibration Certificate No- |
|---|-----------|---------------------|----------------------|-----------------------------|
| Ambient Fine Dust | Instrumex | 08/02/2019 | 07/02/2020 | IPM-FDS/18-19/367-2 |

NAME OF LOCATION- Station: A4, Near Mines Office /DG Set

| Sampling Date | Date of Sample Registration | Parameter | 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 | Hydro-Carbon µg/m ³ |
|-------------------------|-----------------------------|-----------|--|---|--|--|--|--|
| | | Limit | 100 (µg/m ³) IS: 5181 (Part-23) 2006 | 60 (µg/m ³) IS: 5181 (Part-23) 2006 | 80 (µg/m ³) (Modified West & Gaeke Method) | 80 (µg/m ³) (Jacob & Hocheiser's Method) | 04 (mg/m ³) NDIR Method | N.S (µg/m ³) GC Method |
| September – 2019 | | | | | | | | |
| 04.09.2019 | 07.09.2019 | Week-1 | 53.4 | 16.2 | 13.2 | 15.6 | 0.08 | 0.05 |
| 05.09.2019 | 07.09.2019 | Week-1 | 51.5 | 15.8 | 11.6 | 16.2 | 0.06 | 0.02 |
| 11.09.2019 | 14.09.2019 | Week-2 | 52.2 | 18.5 | 13.6 | 18.0 | 0.06 | 0.04 |
| 12.09.2019 | 14.09.2019 | Week-2 | 54.7 | 17.7 | 11.7 | 19.8 | 0.08 | 0.04 |
| 18.09.2019 | 21.09.2019 | Week-3 | 49.9 | 15.3 | 14.1 | 15.7 | 0.05 | 0.06 |
| 19.09.2019 | 21.09.2019 | Week-3 | 51.2 | 17.7 | 14.4 | 16.5 | 0.04 | 0.05 |
| 25.09.2019 | 28.09.2019 | Week-4 | 53.3 | 15.5 | 12.2 | 17.3 | 0.07 | 0.04 |
| 26.09.2019 | 28.09.2019 | Week-4 | 54.1 | 16.6 | 13.6 | 18.6 | 0.08 | 0.03 |
| October – 2019 | | | | | | | | |
| 09.10.2019 | 12.10.2019 | Week-2 | 51.2 | 16.2 | 14.4 | 15.9 | 0.07 | 0.05 |
| 10.10.2019 | 12.10.2019 | Week-2 | 53.5 | 17.6 | 12.6 | 17.5 | 0.08 | 0.06 |
| 16.10.2019 | 19.10.2019 | Week-3 | 49.8 | 16.8 | 15.3 | 18.8 | 0.06 | 0.06 |
| 17.10.2019 | 19.10.2019 | Week-3 | 51.2 | 15.6 | 11.1 | 16.7 | 0.06 | 0.04 |
| 23.10.2019 | 26.10.2019 | Week-4 | 50.6 | 16.5 | 12.4 | 15.6 | 0.08 | 0.03 |
| 24.10.2019 | 26.10.2019 | Week-4 | 53.2 | 17.4 | 13.5 | 16.5 | 0.05 | 0.04 |
| 30.10.2019 | 02.11.2019 | Week-5 | 52.1 | 18.1 | 14.6 | 15.2 | 0.07 | 0.06 |
| 31.10.2019 | 02.11.2019 | Week-5 | 49.5 | 15.8 | 15.6 | 16.4 | 0.08 | 0.05 |
| November – 2019 | | | | | | | | |
| 06.11.2019 | 09.11.2019 | Week-1 | 53.4 | 16.5 | 11.0 | 16.2 | 0.06 | 0.05 |
| 07.11.2019 | 09.11.2019 | Week-1 | 52.7 | 15.8 | 13.5 | 15.7 | 0.08 | 0.04 |
| 13.11.2019 | 16.11.2019 | Week-2 | 50.3 | 17.6 | 15.1 | 17.6 | 0.06 | 0.05 |
| 14.11.2019 | 16.11.2019 | Week-2 | 50.5 | 18.0 | 12.4 | 15.1 | 0.05 | 0.03 |
| 20.11.2019 | 23.11.2019 | Week-3 | 51.9 | 16.7 | 13.4 | 16.5 | 0.05 | 0.04 |
| 21.11.2019 | 23.11.2019 | Week-3 | 49.2 | 17.4 | 14.2 | 17.3 | 0.07 | 0.06 |
| 27.11.2019 | 30.11.2019 | Week-4 | 49.8 | 16.9 | 12.6 | 18.1 | 0.08 | 0.04 |
| 28.11.2019 | 30.11.2019 | Week-4 | 53.6 | 17.4 | 14.5 | 17.0 | 0.06 | 0.05 |

Remark: All Parameters are within NAAQS Standards.
N.S. Not Specified


Lab Chemist




Authorized Signatory

Recognised by Ministry of Environment, Forest & Climate Change (MoEF) Govt. of India and ISO/IEC 17025:2005 (NABL), ISO 9001:2015 and OHSAS 18001:2007 Certified Company

Ambient Air Quality Monitoring Report

| | | | | | | | | |
|---|-----------------------------|--|---|---|--|--|--|---|
| Report No- | | GESEC/PRO/2019-20/12/318-341 | | Date of Report | | 10/12/2019 | | |
| Name of Client | | Equinox Environments (I) Pvt- Ltd-, Kolhapur, Maharashtra | | | | | | |
| Project Name & Address | | M/s. Hindalco Industries Limited (Dhangarwadi Bauxite Mine) A/P. Dhangarwadi village, Tahsil. Shahuwadi, District. Kolhapur, State. Maharashtra | | | | | | |
| Sample Collected and Analyzed by | | Green Envirosafe Engineers & Consultant Pvt- Ltd, Pune, Maharashtra- | | | | | | |
| Name Of Instrument & Calibration Details | | Make | Date of calibration | Calibration Due Date | Calibration Certificate No- | | | |
| Ambient Fine Dust | | Instrumex | 08/02/2019 | 07/02/2020 | IPM-FDS/18-19/368-1 | | | |
| NAME OF LOCATION- Station: A 5, Dhangarwadi Village | | | | | | | | |
| Sampling Date | Date of Sample Registration | Parameter | 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 | Hydro-Carbon N.S (µg/m ³) |
| Analysis Method | | | Limit 100 (µg/m ³) IS: 5181 (Part-23) 2006 | 60 (µg/m ³) IS: 5181 (Part-23) 2006 | 80 (µg/m ³) {Modified West & Gaeke Method} | 80 (µg/m ³) {Jacob & Hocheiser's Method} | 04 (mg/m ³) NDIR Method | N.S (µg/m ³) GC Method |
| September – 2019 | | | | | | | | |
| 04.09.2019 | 07.09.2019 | Week-1 | 42.8 | 12.4 | 10.5 | 12.1 | 0.05 | 0.03 |
| 05.09.2019 | 07.09.2019 | Week-1 | 43.2 | 13.0 | 11.8 | 13.8 | 0.07 | 0.05 |
| 11.09.2019 | 14.09.2019 | Week-2 | 41.8 | 11.8 | 09.4 | 14.7 | 0.04 | 0.04 |
| 12.09.2019 | 14.09.2019 | Week-2 | 43.1 | 12.8 | 10.2 | 15.0 | 0.06 | 0.02 |
| 18.09.2019 | 21.09.2019 | Week-3 | 44.2 | 13.3 | 09.4 | 11.6 | 0.05 | 0.05 |
| 19.09.2019 | 21.09.2019 | Week-3 | 43.7 | 12.5 | 11.8 | 13.5 | 0.05 | 0.04 |
| 25.09.2019 | 28.09.2019 | Week-4 | 42.5 | 11.6 | 08.6 | 11.4 | 0.07 | 0.03 |
| 26.09.2019 | 28.09.2019 | Week-4 | 42.4 | 12.2 | 12.5 | 14.9 | 0.06 | 0.04 |
| October – 2019 | | | | | | | | |
| 09.10.2019 | 12.10.2019 | Week-2 | 42.2 | 11.6 | 10.4 | 12.6 | 0.03 | 0.03 |
| 10.10.2019 | 12.10.2019 | Week-2 | 41.8 | 12.4 | 10.3 | 14.7 | 0.05 | 0.01 |
| 16.10.2019 | 19.10.2019 | Week-3 | 43.7 | 11.8 | 11.3 | 13.1 | 0.04 | 0.05 |
| 17.10.2019 | 19.10.2019 | Week-3 | 41.4 | 13.4 | 09.5 | 11.8 | 0.02 | 0.04 |
| 23.10.2019 | 26.10.2019 | Week-4 | 42.4 | 12.0 | 10.7 | 11.3 | 0.05 | 0.06 |
| 24.10.2019 | 26.10.2019 | Week-4 | 44.2 | 11.5 | 11.0 | 13.5 | 0.03 | 0.02 |
| 30.10.2019 | 02.11.2019 | Week-5 | 43.4 | 12.9 | 09.4 | 12.5 | 0.04 | 0.04 |
| 31.10.2019 | 02.11.2019 | Week-5 | 42.2 | 13.7 | 11.5 | 13.3 | 0.03 | 0.02 |
| November – 2019 | | | | | | | | |
| 06.11.2019 | 09.11.2019 | Week-1 | 42.7 | 12.6 | 09.6 | 13.8 | 0.04 | 0.03 |
| 07.11.2019 | 09.11.2019 | Week-1 | 41.5 | 11.8 | 11.3 | 11.1 | 0.02 | 0.05 |
| 13.11.2019 | 16.11.2019 | Week-2 | 43.3 | 13.1 | 10.5 | 10.5 | 0.03 | 0.02 |
| 14.11.2019 | 16.11.2019 | Week-2 | 40.3 | 10.7 | 08.5 | 12.7 | 0.05 | 0.04 |
| 20.11.2019 | 23.11.2019 | Week-3 | 41.5 | 11.6 | 11.1 | 13.5 | 0.03 | 0.03 |
| 21.11.2019 | 23.11.2019 | Week-3 | 41.6 | 12.4 | 09.4 | 10.6 | 0.04 | 0.05 |
| 27.11.2019 | 30.11.2019 | Week-4 | 42.8 | 11.5 | 08.6 | 12.9 | 0.05 | 0.04 |
| 28.11.2019 | 30.11.2019 | Week-4 | 40.3 | 10.9 | 10.3 | 12.3 | 0.03 | 0.02 |

Remark: All Parameters are within NAAQS Standards.
N.S. Not Specified

Lab Chemist




Authorized Signatory



Recognised by Ministry of Environment, Forest & Climate Change (MoEF) Govt. of India and ISO/IEC 17025:2005 (NABL), ISO 9001:2015 and OHSAS 18001:2007 Certified Company

Ambient Air Quality Monitoring Report

| | | | | | | | | |
|--|-----------------------------|--|---------------------------------------|--|--------------------------------------|--------------------------------------|----------------------------|-----------------------------|
| Report No- | | GESEC/PRO/2019-20/12/342-365 | | Date of Report | | 10/12/2019 | | |
| Name of Client | | Equinox Environments (I) Pvt- Ltd-, Kolhapur, Maharashtra | | | | | | |
| Project Name & Address | | M/s. Hindalco Industries Limited (Dhangarwadi Bauxite Mine) A/P. Dhangarwadi village, Tahsil. Shahuwadi, District. Kolhapur, State. Maharashtra | | | | | | |
| Sample Collected and Analyzed by | | Green Envirosafe Engineers & Consultant Pvt- Ltd, Pune, Maharashtra- | | | | | | |
| Name Of Instrument & Calibration Details | | Make | Date of calibration | Calibration Due Date | Calibration Certificate No- | | | |
| Ambient Fine Dust | | Instrumex | 08/02/2019 | 07/02/2020 | IPM-FDS/18-19/368-2 | | | |
| NAME OF LOCATION- Station: A6, Thanewadi Village | | | | | | | | |
| Sampling Date | Date of Sample Registration | Parameter | 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 | Hydro-Carbon |
| | | Limit | 100 (µg/m ³) | 60 (µg/m ³) | 80 (µg/m ³) | 80 (µg/m ³) | 04 (mg/m ³) | N.S (µg/m ³) |
| Analysis Method | | | IS: 5181 (Part-23) 2006 | IS: 5181 (Part-23) 2006 | (Modified West & Gaeke Method) | (Jacob & Hocheiser's Method) | NDIR Method | GC Method |
| September – 2019 | | | | | | | | |
| 04.09.2019 | 07.09.2019 | Week-1 | 41.8 | 10.6 | 09.5 | 11.8 | 0.04 | 0.03 |
| 05.09.2019 | 07.09.2019 | Week-1 | 45.1 | 12.8 | 11.2 | 13.1 | 0.02 | 0.04 |
| 11.09.2019 | 14.09.2019 | Week-2 | 44.5 | 10.5 | 08.5 | 10.6 | 0.05 | 0.02 |
| 12.09.2019 | 14.09.2019 | Week-2 | 43.1 | 13.4 | 10.1 | 12.4 | 0.03 | 0.03 |
| 18.09.2019 | 21.09.2019 | Week-3 | 42.5 | 11.7 | 09.4 | 13.8 | 0.02 | 0.04 |
| 19.09.2019 | 21.09.2019 | Week-3 | 41.6 | 12.6 | 11.1 | 15.5 | 0.04 | 0.02 |
| 25.09.2019 | 28.09.2019 | Week-4 | 43.3 | 10.8 | 10.4 | 13.3 | 0.03 | 0.01 |
| 26.09.2019 | 28.09.2019 | Week-4 | 44.6 | 13.0 | 09.6 | 12.7 | 0.03 | 0.03 |
| October – 2019 | | | | | | | | |
| 09.10.2019 | 12.10.2019 | Week-2 | 43.4 | 13.1 | 09.3 | 11.8 | 0.04 | 0.03 |
| 10.10.2019 | 12.10.2019 | Week-2 | 40.3 | 11.6 | 11.2 | 13.3 | 0.02 | 0.02 |
| 16.10.2019 | 19.10.2019 | Week-3 | 41.5 | 10.7 | 09.4 | 14.4 | 0.05 | 0.04 |
| 17.10.2019 | 19.10.2019 | Week-3 | 40.9 | 12.3 | 08.9 | 12.6 | 0.03 | 0.03 |
| 23.10.2019 | 26.10.2019 | Week-4 | 41.8 | 13.0 | 10.4 | 14.1 | 0.05 | 0.02 |
| 24.10.2019 | 26.10.2019 | Week-4 | 41.4 | 11.8 | 09.2 | 13.3 | 0.04 | 0.01 |
| 30.10.2019 | 02.11.2019 | Week-5 | 42.5 | 10.5 | 11.3 | 16.5 | 0.03 | 0.02 |
| 31.10.2019 | 02.11.2019 | Week-5 | 43.5 | 11.6 | 10.6 | 14.7 | 0.02 | 0.04 |
| November – 2019 | | | | | | | | |
| 06.11.2019 | 09.11.2019 | Week-1 | 41.4 | 11.7 | 09.0 | 12.1 | 0.02 | 0.02 |
| 07.11.2019 | 09.11.2019 | Week-1 | 42.2 | 10.9 | 11.2 | 13.5 | 0.05 | 0.04 |
| 13.11.2019 | 16.11.2019 | Week-2 | 45.2 | 12.5 | 08.4 | 13.7 | 0.03 | 0.03 |
| 14.11.2019 | 16.11.2019 | Week-2 | 43.6 | 11.8 | 11.0 | 14.9 | 0.02 | 0.05 |
| 20.11.2019 | 23.11.2019 | Week-3 | 42.4 | 13.5 | 09.2 | 11.7 | 0.04 | 0.02 |
| 21.11.2019 | 23.11.2019 | Week-3 | 41.5 | 14.4 | 08.4 | 12.8 | 0.03 | 0.03 |
| 27.11.2019 | 30.11.2019 | Week-4 | 42.3 | 10.4 | 10.8 | 13.0 | 0.04 | 0.04 |
| 28.11.2019 | 30.11.2019 | Week-4 | 41.9 | 12.1 | 09.5 | 13.6 | 0.03 | 0.03 |

Remark: All Parameters are within NAAQS Standards.
N.S. Not Specified

Lab Chemist




Authorized Signatory





Recognised by Ministry of Environment, Forest & Climate Change (MoEF) Govt. of India and ISO/IEC 17025:2005 (NABL), ISO 9001:2015 and OHSAS 18001:2007 Certified Company

Ambient Air Quality Monitoring Report

| | | | |
|----------------------------------|--|----------------|------------|
| Report No- | GESEC/PRO/2019-20/12/366-413 | Date of Report | 10/12/2019 |
| Name of Client | Equinox Environments (I) Pvt- Ltd-, Kolhapur, Maharashtra | | |
| Project Name & Address | M/s. Hindalco Industries Limited (Dhangarwadi Bauxite Mine) A/P. Dhangarwadi village, Tahsil. Shahuwadi, District. Kolhapur, State. Maharashtra | | |
| Sample Collected and Analyzed by | Green EnviroSAFE Engineers & Consultant Pvt- Ltd, Pune, Maharashtra- | | |

| Name Of Instrument & Calibration Details | Make | Date of calibration | Calibration Due Date | Calibration Certificate No- |
|--|-----------|---------------------|----------------------|-----------------------------|
| Ambient Fine Dust | Instrumex | 08/02/2019 | 07/02/2020 | IPM-FDS/18-19/367-1 |

NAME OF LOCATION- Station: A7, Pandapniwadi Village

| Sampling Date | Date of Sample Registration | Parameter | 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 | Hydro-Carbon |
|------------------------|-----------------------------|-----------|---------------------------------------|--|---|--------------------------------------|----------------------------|-----------------------------|
| | | Limit | 100 (µg/m ³) | 60 (µg/m ³) | 80 (µg/m ³) | 80 (µg/m ³) | 04 (mg/m ³) | N.S (µg/m ³) |
| Analysis Method | | | IS: 5181 (Part-23) 2006 | IS: 5181 (Part-23) 2006 | (Modified West & Gaeke Method) | (Jacob & Hocheiser's Method) | NDIR Method | GC Method |

September – 2019

| | | | | | | | | |
|------------|------------|--------|------|------|------|------|------|------|
| 06.09.2019 | 09.09.2019 | Week-1 | 41.8 | 12.8 | 10.4 | 13.6 | 0.03 | 0.02 |
| 07.09.2019 | 09.09.2019 | Week-1 | 43.1 | 10.6 | 09.1 | 12.3 | 0.02 | 0.05 |
| 13.09.2019 | 16.09.2019 | Week-2 | 42.3 | 13.1 | 11.3 | 14.7 | 0.04 | 0.03 |
| 14.09.2019 | 16.09.2019 | Week-2 | 41.6 | 11.5 | 09.5 | 13.1 | 0.02 | 0.02 |
| 20.09.2019 | 23.09.2019 | Week-3 | 42.7 | 12.3 | 08.8 | 10.5 | 0.05 | 0.04 |
| 21.09.2019 | 23.09.2019 | Week-3 | 43.8 | 12.5 | 10.0 | 13.4 | 0.03 | 0.02 |
| 27.09.2019 | 30.09.2019 | Week-4 | 44.6 | 13.4 | 11.1 | 15.4 | 0.03 | 0.03 |
| 28.09.2019 | 30.09.2019 | Week-4 | 42.1 | 10.4 | 08.5 | 13.2 | 0.04 | 0.04 |

October – 2019

| | | | | | | | | |
|------------|------------|--------|------|------|------|------|------|------|
| 11.10.2019 | 14.10.2019 | Week-2 | 41.4 | 13.2 | 10.4 | 14.2 | 0.03 | 0.02 |
| 12.10.2019 | 14.10.2019 | Week-2 | 42.4 | 11.8 | 08.9 | 12.8 | 0.02 | 0.04 |
| 18.10.2019 | 21.10.2019 | Week-3 | 44.0 | 12.4 | 11.5 | 14.6 | 0.04 | 0.03 |
| 19.10.2019 | 21.10.2019 | Week-3 | 41.3 | 10.5 | 10.3 | 14.5 | 0.05 | 0.01 |
| 25.10.2019 | 28.10.2019 | Week-4 | 42.1 | 12.7 | 09.8 | 13.5 | 0.02 | 0.03 |
| 26.10.2019 | 28.10.2019 | Week-4 | 43.4 | 11.5 | 09.2 | 11.4 | 0.03 | 0.02 |

November – 2019

| | | | | | | | | |
|------------|------------|--------|------|------|------|------|------|------|
| 01.11.2019 | 05.11.2019 | Week-1 | 43.2 | 11.7 | 11.1 | 12.6 | 0.03 | 0.01 |
| 02.11.2019 | 05.11.2019 | Week-1 | 41.4 | 13.8 | 08.3 | 12.4 | 0.05 | 0.03 |
| 08.11.2019 | 12.11.2019 | Week-2 | 42.2 | 10.7 | 10.3 | 13.8 | 0.02 | 0.03 |
| 09.11.2019 | 12.11.2019 | Week-2 | 42.2 | 14.1 | 11.6 | 15.5 | 0.04 | 0.04 |
| 15.11.2019 | 19.11.2019 | Week-3 | 41.5 | 13.6 | 09.2 | 12.5 | 0.02 | 0.05 |
| 16.11.2019 | 19.11.2019 | Week-3 | 43.1 | 10.8 | 10.4 | 13.7 | 0.03 | 0.02 |
| 22.11.2019 | 26.11.2019 | Week-4 | 40.3 | 11.4 | 12.3 | 13.2 | 0.04 | 0.02 |
| 23.11.2019 | 26.11.2019 | Week-4 | 42.5 | 13.9 | 10.4 | 13.3 | 0.05 | 0.03 |
| 29.11.2019 | 03.12.2019 | Week-5 | 45.3 | 12.4 | 09.2 | 10.5 | 0.03 | 0.02 |
| 30.11.2019 | 03.12.2019 | Week-5 | 43.8 | 11.3 | 08.7 | 11.2 | 0.04 | 0.03 |

Remark: All Parameters are within NAAQS Standards.
N.S. Not Specified

Lab Chemist



Authorized Signatory



Recognised by Ministry of Environment, Forest & Climate Change (MoEF) Govt. of India and ISO/IEC 17025:2005 (NABL), ISO 9001:2015 and OHSAS 18001:2007 Certified Company

Ambient Air Quality Monitoring Report

| | | | |
|----------------------------------|--|----------------|------------|
| Report No- | GESEC/PRO/2019-20/12/414-437 | Date of Report | 10/12/2019 |
| Name of Client | Equinox Environments (I) Pvt- Ltd-, Kolhapur, Maharashtra | | |
| Project Name & Address | M/s. Hindalco Industries Limited (Dhangarwadi Bauxite Mine) A/P. Dhangarwadi village, Tahsil. Shahuwadi, District. Kolhapur, State. Maharashtra | | |
| Sample Collected and Analyzed by | Green EnviroSAFE Engineers & Consultant Pvt- Ltd, Pune, Maharashtra- | | |

| Name Of Instrument& Calibration Details | Make | Date of calibration | Calibration Due Date | Calibration Certificate No- |
|---|-----------|---------------------|----------------------|-----------------------------|
| Ambient Fine Dust | Instrumex | 08/02/2019 | 07/02/2020 | IPM-FDS/18-19/368-2 |

NAME OF LOCATION- Station: A 8, Gajapur Village

| Sampling Date | Date of Sample Registration | Parameter | 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 | Hydro-Carbon N.S (µg/m ³) |
|------------------------|-----------------------------|-----------|---------------------------------------|--|--------------------------------------|--------------------------------------|----------------------------|---|
| | | Limit | 100 (µg/m ³) | 60 (µg/m ³) | 80 (µg/m ³) | 80 (µg/m ³) | 04 (mg/m ³) | |
| Analysis Method | | | IS: 5181 (Part-23) 2006 | IS: 5181 (Part-23) 2006 | (Modified West & Gaeke Method) | (Jacob & Hocheiser's Method) | NDIR Method | GC Method |

September – 2019

| | | | | | | | | |
|------------|------------|--------|------|------|------|------|------|------|
| 06.09.2019 | 09.09.2019 | Week-1 | 41.7 | 11.6 | 09.3 | 12.5 | 0.04 | 0.03 |
| 07.09.2019 | 09.09.2019 | Week-1 | 42.2 | 13.4 | 10.6 | 12.7 | 0.02 | 0.01 |
| 13.09.2019 | 16.09.2019 | Week-2 | 41.3 | 10.5 | 09.5 | 13.4 | 0.03 | 0.04 |
| 14.09.2019 | 16.09.2019 | Week-2 | 42.8 | 12.5 | 08.4 | 11.8 | 0.05 | 0.03 |
| 20.09.2019 | 23.09.2019 | Week-3 | 43.5 | 11.6 | 11.1 | 14.4 | 0.02 | 0.02 |
| 21.09.2019 | 23.09.2019 | Week-3 | 43.1 | 13.0 | 09.8 | 14.0 | 0.03 | 0.02 |
| 27.09.2019 | 30.09.2019 | Week-4 | 42.1 | 14.1 | 11.3 | 15.3 | 0.04 | 0.03 |
| 28.09.2019 | 30.09.2019 | Week-4 | 44.5 | 12.7 | 08.2 | 11.6 | 0.03 | 0.01 |

October – 2019

| | | | | | | | | |
|------------|------------|--------|------|------|------|------|------|------|
| 11.10.2019 | 14.10.2019 | Week-2 | 41.4 | 13.3 | 09.5 | 11.3 | 0.03 | 0.02 |
| 12.10.2019 | 14.10.2019 | Week-2 | 43.3 | 11.5 | 10.1 | 13.6 | 0.02 | 0.03 |
| 18.10.2019 | 21.10.2019 | Week-3 | 41.1 | 10.8 | 08.6 | 11.8 | 0.04 | 0.01 |
| 19.10.2019 | 21.10.2019 | Week-3 | 44.4 | 12.2 | 10.2 | 14.4 | 0.03 | 0.04 |
| 25.10.2019 | 28.10.2019 | Week-4 | 42.5 | 10.5 | 09.5 | 12.5 | 0.05 | 0.03 |
| 26.10.2019 | 28.10.2019 | Week-4 | 43.5 | 11.7 | 10.3 | 12.4 | 0.02 | 0.02 |

November – 2019

| | | | | | | | | |
|------------|------------|--------|------|------|------|------|------|------|
| 01.11.2019 | 05.11.2019 | Week-1 | 42.6 | 12.6 | 08.8 | 10.8 | 0.03 | 0.02 |
| 02.11.2019 | 05.11.2019 | Week-1 | 43.4 | 10.8 | 11.2 | 12.1 | 0.02 | 0.03 |
| 08.11.2019 | 12.11.2019 | Week-2 | 41.1 | 13.2 | 09.6 | 13.5 | 0.04 | 0.04 |
| 09.11.2019 | 12.11.2019 | Week-2 | 42.3 | 11.4 | 10.3 | 14.5 | 0.03 | 0.03 |
| 15.11.2019 | 19.11.2019 | Week-3 | 44.5 | 10.6 | 08.4 | 12.6 | 0.03 | 0.02 |
| 16.11.2019 | 19.11.2019 | Week-3 | 40.1 | 11.4 | 10.4 | 13.5 | 0.02 | 0.04 |
| 22.11.2019 | 26.11.2019 | Week-4 | 43.3 | 12.8 | 09.8 | 11.7 | 0.05 | 0.04 |
| 23.11.2019 | 26.11.2019 | Week-4 | 41.5 | 12.5 | 11.7 | 12.4 | 0.04 | 0.05 |
| 29.11.2019 | 03.12.2019 | Week-5 | 42.2 | 13.1 | 09.9 | 13.9 | 0.05 | 0.02 |
| 30.11.2019 | 03.12.2019 | Week-5 | 44.4 | 10.4 | 10.5 | 13.0 | 0.03 | 0.03 |

Remark: All Parameters are within NAAQS Standards.
N.S. Not Specified

Lab Chemist



Authorized Signatory

Summary of Ambient Air Quality

| S. No. | Location | | 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) | HC (µg/m ³) |
|--------|---------------------------|-----------------|--|---|---|---|----------------------------|----------------------------|
| 1 | Near Mine Working Area | Min | 48.70 | 15.70 | 7.10 | 11.50 | 0.04 | 0.02 |
| | | Max | 58.90 | 20.10 | 14.50 | 19.70 | 0.09 | 0.06 |
| | | Mean | 53.07 | 17.72 | 10.38 | 15.59 | 0.07 | 0.04 |
| | | 10th percentile | 50.32 | 15.96 | 8.29 | 12.80 | 0.06 | 0.02 |
| | | 30th percentile | 51.20 | 16.79 | 8.98 | 13.99 | 0.06 | 0.03 |
| | | 50th percentile | 52.45 | 17.80 | 10.25 | 15.85 | 0.07 | 0.04 |
| | | 95th percentile | 58.05 | 19.87 | 13.27 | 18.81 | 0.08 | 0.06 |
| | | 98th percentile | 58.58 | 20.05 | 13.95 | 19.33 | 0.09 | 0.06 |
| 2 | Near Dump Site | Min | 48.60 | 14.60 | 11.30 | 14.10 | 0.05 | 0.03 |
| | | Max | 57.20 | 20.10 | 15.20 | 19.10 | 0.09 | 0.06 |
| | | Mean | 51.10 | 17.25 | 13.08 | 17.42 | 0.07 | 0.05 |
| | | 10th percentile | 48.89 | 15.73 | 11.73 | 15.28 | 0.05 | 0.03 |
| | | 30th percentile | 48.86 | 16.58 | 12.50 | 16.89 | 0.06 | 0.04 |
| | | 50th percentile | 50.30 | 17.30 | 13.00 | 17.60 | 0.07 | 0.05 |
| | | 95th percentile | 54.80 | 19.28 | 15.01 | 18.97 | 0.08 | 0.06 |
| | | 98th percentile | 56.10 | 19.78 | 15.15 | 19.05 | 0.09 | 0.06 |
| 3 | Near Haulage Road | Min | 48.80 | 15.40 | 11.20 | 15.30 | 0.04 | 0.02 |
| | | Max | 55.20 | 18.80 | 15.10 | 18.80 | 0.09 | 0.06 |
| | | Mean | 51.88 | 17.11 | 12.97 | 16.86 | 0.07 | 0.04 |
| | | 10th percentile | 49.70 | 15.56 | 11.56 | 15.50 | 0.05 | 0.03 |
| | | 30th percentile | 50.48 | 16.30 | 12.29 | 16.17 | 0.06 | 0.03 |
| | | 50th percentile | 51.80 | 16.95 | 12.95 | 16.55 | 0.07 | 0.04 |
| | | 95th percentile | 55.07 | 18.77 | 14.93 | 18.40 | 0.09 | 0.06 |
| | | 98th percentile | 55.20 | 18.80 | 15.05 | 18.62 | 0.09 | 0.06 |
| 4 | Near Mines Office /DG Set | Min | 49.20 | 15.30 | 11.00 | 15.10 | 0.04 | 0.02 |
| | | Max | 54.70 | 18.50 | 15.60 | 19.80 | 0.08 | 0.06 |
| | | Mean | 51.78 | 16.82 | 13.36 | 16.83 | 0.07 | 0.05 |
| | | 10th percentile | 49.80 | 15.66 | 11.63 | 15.60 | 0.05 | 0.03 |
| | | 30th percentile | 50.59 | 16.20 | 12.58 | 16.17 | 0.06 | 0.04 |
| | | 50th percentile | 51.70 | 16.75 | 13.50 | 16.50 | 0.07 | 0.05 |
| | | 95th percentile | 54.03 | 18.09 | 15.27 | 18.77 | 0.08 | 0.06 |
| | | 98th percentile | 54.42 | 18.32 | 15.46 | 19.34 | 0.08 | 0.06 |
| 5 | Dhangarwadi Village | Min | 40.30 | 10.70 | 8.50 | 10.50 | 0.02 | 0.01 |
| | | Max | 44.20 | 13.70 | 12.50 | 15.00 | 0.07 | 0.06 |
| | | Mean | 42.46 | 12.23 | 10.32 | 12.80 | 0.04 | 0.04 |
| | | 10th percentile | 41.43 | 11.50 | 8.84 | 11.16 | 0.03 | 0.02 |
| | | 30th percentile | 41.80 | 11.78 | 9.49 | 12.07 | 0.03 | 0.03 |
| | | 50th percentile | 42.45 | 12.30 | 10.35 | 12.80 | 0.04 | 0.04 |
| | | 95th percentile | 44.13 | 13.39 | 11.80 | 14.87 | 0.07 | 0.05 |
| | | 98th percentile | 44.20 | 13.56 | 12.18 | 14.95 | 0.07 | 0.06 |
| 6 | Thanewadi | Min | 40.30 | 10.40 | 8.40 | 10.60 | 0.02 | 0.01 |

| | | | | | | | | |
|---|--------------------------|-----------------|-------|-------|-------|-------|------|------|
| | Village | Max | 45.20 | 14.40 | 11.30 | 16.50 | 0.05 | 0.05 |
| | | Mean | 42.60 | 11.97 | 9.90 | 13.30 | 0.03 | 0.03 |
| | | 10th percentile | 41.40 | 10.53 | 8.62 | 11.80 | 0.02 | 0.02 |
| | | 30th percentile | 41.78 | 11.53 | 9.29 | 12.69 | 0.03 | 0.02 |
| | | 50th percentile | 42.35 | 11.80 | 9.55 | 13.30 | 0.03 | 0.03 |
| | | 95th percentile | 45.03 | 13.49 | 11.20 | 15.41 | 0.05 | 0.04 |
| | | 98th percentile | 45.15 | 13.99 | 11.25 | 16.04 | 0.05 | 0.05 |
| 7 | Pandapniwa di Village | Min | 40.30 | 10.40 | 8.30 | 10.50 | 0.02 | 0.01 |
| | | Max | 45.30 | 14.10 | 12.30 | 15.50 | 0.05 | 0.05 |
| | | Mean | 42.59 | 12.18 | 10.01 | 13.16 | 0.03 | 0.03 |
| | | 10th percentile | 41.40 | 10.63 | 8.73 | 11.26 | 0.02 | 0.02 |
| | | 30th percentile | 42.07 | 11.49 | 9.20 | 12.59 | 0.03 | 0.02 |
| | | 50th percentile | 42.35 | 12.35 | 10.15 | 13.25 | 0.03 | 0.03 |
| | | 95th percentile | 44.51 | 13.89 | 11.59 | 15.30 | 0.05 | 0.05 |
| | 98th percentile | 44.98 | 14.01 | 11.98 | 15.45 | 0.05 | 0.05 | |
| 8 | Gajapur Village | Min | 40.10 | 10.40 | 8.20 | 10.80 | 0.02 | 0.01 |
| | | Max | 44.50 | 14.10 | 11.70 | 15.30 | 0.05 | 0.05 |
| | | Mean | 42.62 | 12.01 | 9.88 | 12.90 | 0.03 | 0.03 |
| | | 10th percentile | 41.16 | 10.53 | 8.46 | 11.63 | 0.02 | 0.01 |
| | | 30th percentile | 42.06 | 11.40 | 9.50 | 12.37 | 0.03 | 0.02 |
| | | 50th percentile | 42.55 | 11.95 | 9.85 | 12.65 | 0.03 | 0.03 |
| | | 95th percentile | 44.49 | 13.39 | 11.29 | 14.49 | 0.05 | 0.04 |
| | 98th percentile | 44.50 | 13.78 | 11.52 | 14.93 | 0.05 | 0.05 | |

Remark:

All the obtained air quality values in core zone and buffer zone as compared with the air quality standards prescribed by Central Pollution Control Board 2009 are found to be within the limit.

Revised National Ambient Air Quality Standards

Revised National Ambient Air Quality Standards (MoEF notification G.S.R 826(E), dated 16.11.2009)

| Sl. No | Pollutant | Time Weighted Average | New Standards (Schedule VII, Rule 3 (3B) 16 th Nov 2009 | | Methods of measurement |
|--------|--|-----------------------|--|--|---|
| | | | Concentration in ambient air | | |
| | | | Industrial Area Residential, Rural & other Areas | Ecologically sensitive area (Notified by Central Govt) | |
| 1 | Sulphur Dioxide(SO ₂) | Annual Avg* | 50.0 µg/m ³ | 20.0 µg/m ³ | -Improved West and Gaeke method -Ultraviolet fluorescence |
| | | 24 hours** | 80.0 µg/m ³ | 80.0 µg/m ³ | |
| 2 | Oxides of Nitrogen as NO ₂ | Annual Avg* | 40.0 µg/m ³ | 30.0 µg/m ³ | -Modified Jacob and Hochheise (Sodium Arsenite) -Chemiluminescence |
| | | 24 hours** | 80.0 µg/m ³ | 80.0 µg/m ³ | |
| 3 | Particulate matter (size less than 10µm) | Annual Avg* | 60.0 µg/m ³ | 60.0 µg/m ³ | -Gravimetric -TOEM -Beta attenuation |
| | | 24 hours** | 100.0 µg/m ³ | 100.0 µg/m ³ | |
| 4 | Particulate matter (size less than 2.5 µm) | Annual Avg* | 40.0 µg/m ³ | 40.0 µg/m ³ | -Gravimetric -TOEM -Beta attenuation |
| | | 24 hours** | 60.0 µg/m ³ | 60.0 µg/m ³ | |
| 5 | Lead (Pb) | Annual Avg* | 0.50 µg/m ³ | 0.50 µg/m ³ | -AAS/ICP method for sampling on EPM2000 or Equivalent Filter paper -ED-XRF using Teflon filter paper |
| | | 24 hours** | 1.0 µg/m ³ | 1.0 µg/m ³ | |
| 6 | Carbon Monoxide (CO) | 8 hours** | 2.0 mg/m ³ | 2.0 mg/m ³ | -Non Dispersive Infra Red (NDIR) spectroscopy |
| 7 | Ozone | 8 hours** | 100.0 µg/m ³ | 100.0 µg/m ³ | -Photometric |
| | | 1 hour | 180.0 µg/m ³ | 180.0 µg/m ³ | -Chemiluminescence |
| | | 24 hours** | 60.0 µg/m ³ | 60.0 µg/m ³ | -Chemical method |
| 8 | Ammonia (NH ₃) | Annual Avg* | 100.0 µg/m ³ | 100.0 µg/m ³ | -Chemiluminescence |
| | | 24 hours** | 400.0 µg/m ³ | 400.0 µg/m ³ | -Indo-Phenol Blue method |
| 9 | Benzene | Annual Avg* | 5.0 µg/m ³ | 5.0 µg/m ³ | -GC based continuous analyzer -Adsorption/desorption followed by GC analysis |
| 10 | Benzo(a) pyrene | Annual Avg* | 1.0 ng/m ³ | 1.0 ng/m ³ | -Solvent extraction followed by GC/HPLC extraction |
| 11 | Arsenic | Annual Avg* | 6.0 ng/m ³ | 6.0 ng/m ³ | AAS/ICP method for sampling on EPM2000 OR Equivalent Filter paper |
| 12 | Nickel | | 20.0 ng/m ³ | 20.0 ng/m ³ | -AAS/ICP method for sampling on EPM2000 OR Equivalent Filter paper |

- * Annual Arithmetic mean of minimum 104 measurements in a year taken twice a Week 24 hourly at uniform interval,
- ** 24 hourly / 8 hourly or 1 hourly monitored values as applicable shall be complied with 98 % of the time in a year. However, 2% of the time, they may exceed the limits but not on two consecutive days of monitoring.



Recognised by Ministry of Environment, Forest & Climate Change (MoEF) Govt. of India and ISO/IEC 17025:2005 (NABL), ISO 9001:2015 and OHSAS 18001:2007 Certified Company

Stack Analysis Report

| | | | |
|--|--|----------------------|-----------------------------|
| Report No. | GESEC/PRO/2019-20/12/457 | Date of Report | 10/12/2019 |
| Name of Client | Equinox Environments (I) Pvt. Ltd., Kolhapur, Maharashtra. | | |
| Project Name and Address | M/s. Hindalco Industries Limited, (Dhangarwadi Bauxite Mine), A/P. Dhangarwadi Village, Tahsil. Shahuwadi, District. Kolhapur, State. Maharashtra. | | |
| Sample Collected By | Green EnviroSafe Engineers & Consultant Pvt. Ltd, Pune, Maharashtra. | | |
| Date of Sampling | 18/11/2019 | | |
| Name Of Instrument & Calibration Details | Date of calibration | Calibration Due Date | Calibration Certificate No. |
| Stack Monitoring Kit | 22/12/2018 | 21/12/2019 | UI/181222/525/001 |
| Analysis Method | Emission testing Methodology for Air Pollution-EPA | | |

Stack Details

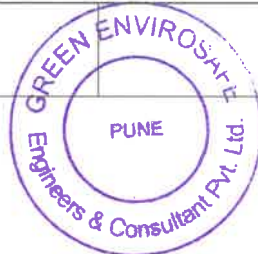
| | | | |
|----------------------------------|------------------|---|------------|
| Stack –attached to | DG(45KVA) [-II-] | I.D. of stack at port (m)D | 0.10 |
| Crosssection of the stack | Round | Stack crosssectional area (m ²) | 0.0079 |
| Height of stack above ground (m) | 5.50 | Consumption of fuel (l/hr) | 3.0 |
| Fuel used | HSD | Load on the system | Approx.90% |

Emission details

| Sr. No. | Particulars | Value |
|---------|--|--------|
| 1 | Temperature (°C) | 125.00 |
| 2 | Differential Pressure | 0.50 |
| 3 | Velocity of the gas (m/sec) | 2.68 |
| 4 | Gas flow rate at NTP (Nm ³ /hr) | 56.77 |
| 5 | Particulate matter | 22.50 |
| 6 | SO ₂ (Kg/Hr) | 0.005 |

ANALYZED BY

(Signature)



AUTHORIZED SIGNATORY

(Signature)

Terms and conditions

- The report is refer only to the sample tested and not applies to the bulk.
- The results shown in this test report may differ based on various factors including temperature, humidity, pressure, retention time etc.
- The test report cannot be reproduced wholly or in part and cannot be used for promotional or publicity purpose without the written consent of laboratory, GESEC.
- Samples will be retained for a period of seven (7) days after completion of analysis. Longer retention periods can be arranged, on request of the customer
- We strictly maintain the confidentiality of all test result of sample(s) collected by us/ supplied by customer and not revel to third party unless required by the statutory or legal requirement
- MoEF approved Lab by Govt. of India. From date 09/02/2017 to 08/02/2022.

| Stack Analysis Report | | | | |
|---------------------------|--|--|----------------------------|------------|
| Stack Details | | | | |
| Stack –attached to | DG (45 KVA) [-II-] | | I.D. of stack at port (m)D | 0.10 |
| Crosssection of the stack | Round | | Stack crosssectional area | 0.0079 |
| Height of stack above | 5.50 | | Consumption of fuel | 3.0 |
| Fuel used | HSD | | Load on the system | Approx.90% |
| Emission details | | | | |
| Sr. No. | Particulars | | Value | |
| 1 | Temperature (°C) | | 125.00 | |
| 2 | Differential Pressure | | 0.50 | |
| 3 | Velocity of the gas (m/sec) | | 2.68 | |
| 4 | Gas flow rate at NTP (Nm ³ /hr) | | 56.77 | |
| 5 | Particulate matter | | 22.50 | |
| 6 | SO ₂ (Kg/Hr) | | 0.005 | |

Remark:

The obtained stack monitoring results as compared with the values standards prescribed in consents given by Maharashtra Pollution Control Board 2009 are found to be within the limit.

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

| SI. No. | Station Code | Name Of The Sampling Station | Direction W.R.T. Mines Lease Area |
|---------|--------------|------------------------------|-----------------------------------|
| 1 | A-1 | Near Mine Working Area | --- |
| 2 | A-2 | Near Dump Site | --- |
| 3 | A-3 | Near Haulage Road | --- |
| 4 | A-4 | Near Mines Office /DG Set | --- |
| 5 | A-5 | Dhangarwadi Village | N |
| 6 | A-6 | Thanewadi Village | ESW |
| 7 | A-7 | Pandapniwadi Village | S |
| 8 | A-8 | Gajapur Village | WSW |

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 up to 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.



LEGEND



MINE LEASE



RIVER



NALLAH



ROAD



FOREST BOUNDARY

NOISE MONITORING LOCATIONS

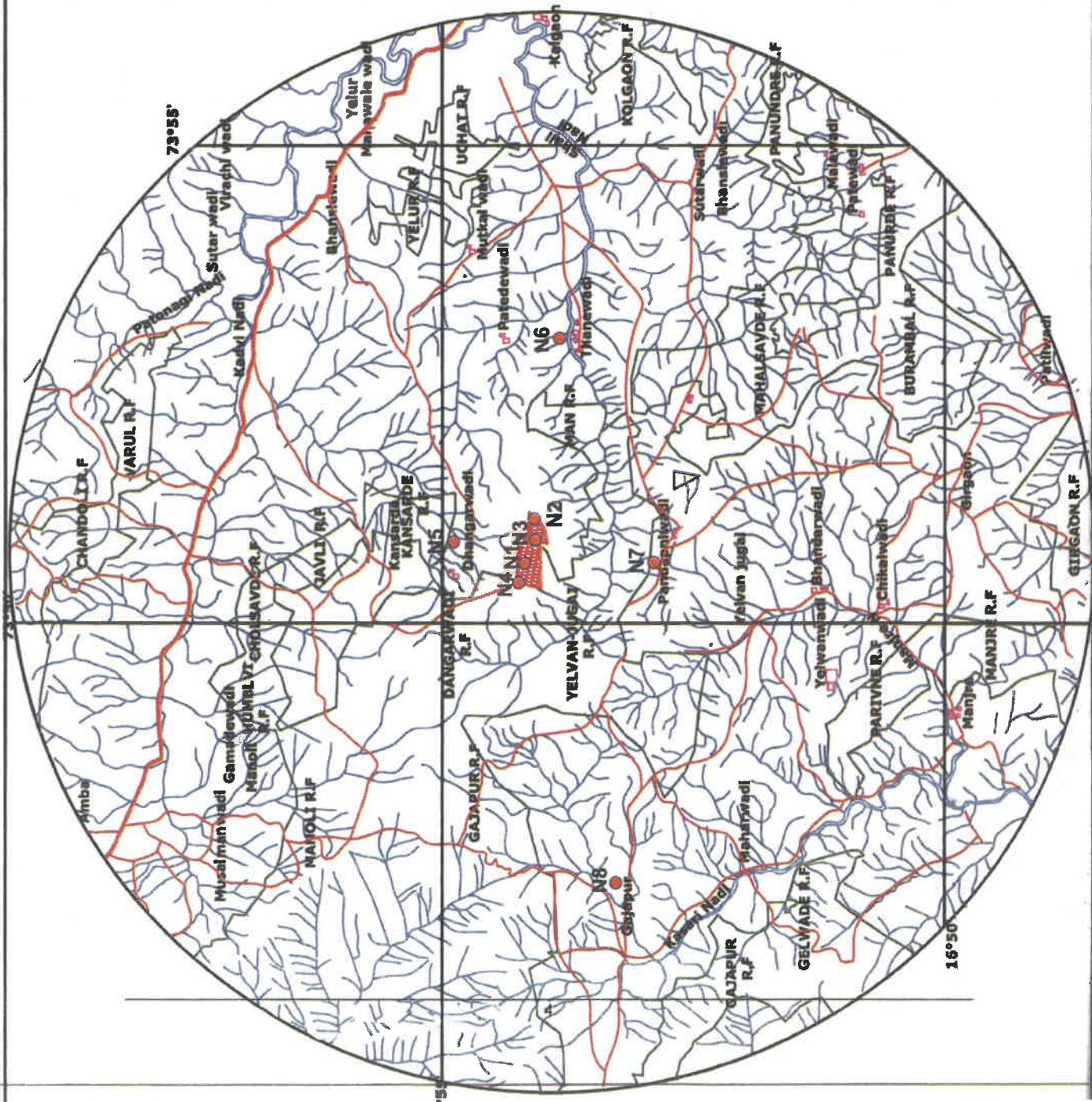


PROJECT: DHANGARWADI BAUXITE MINES

CLIENT: HENDALCO INDUSTRIES LIMITED

TITLE: NOISE LEVEL MONITORING LOCATIONS MAP

**PREPARED BY
EQUINOX ENVIRONMENTS INDIA PVT. LTD.,
KOLHAPUR**





Recognised by Ministry of Environment, Forest & Climate Change (MoEF) Govt. of India and ISO/IEC 17025:2005 (NABL), ISO 9001:2015 and OHSAS 18001:2007 Certified Company

Ambient Noise Monitoring Report

| | | | |
|---|---|-----------------------------|------------------------------------|
| Report No. | GESEC/PRO/2019-20/12/438-445 | Date of Report | 10/12/2019 |
| Name of Client | Equinox Environments (I) Pvt. Ltd., Kolhapur, Maharashtra. | | |
| Project Name and Address | M/s. Hindalco Industries Limited, (Dhangarwadi Bauxite Mine), A/P. Dhangarwadi Village, Tahsil. Shahuwadi, District. Kolhapur, State. Maharashtra. | | |
| Sample Collected By | Green EnviroSAFE Engineers & Consultant Pvt. Ltd, Pune, Maharashtra. | | |
| Date of Sampling | Nov-2019 | | |
| Name of Instrument & Calibration Details | Date of calibration | Calibration Due Date | Calibration Certificate No. |
| Sound Level meter | 01/06/2019 | 31/05/2020 | TECH/CAL/2019/671/16 |
| Analysis Method | S: 4758-1968 Reaff.2002. | | |

| Date | 04.11.2019 | 05.11.2019 | 11.11.2019 | 12.11.2019 | 18.11.2019 | 19.11.2019 | 25.11.2019 | 26.11.2019 |
|----------|------------------------|----------------|-------------------|---------------------------|---------------------|-------------------|----------------------|-----------------|
| Location | Near Mine Working Area | Near Dump Site | Near Haulage Road | Near Mines Office /DG Set | Dhangarwadi Village | Thanewadi Village | Pandapniwadi Village | Gajapur Village |
| Time | N1 | N2 | N3 | N4 | N5 | N6 | N7 | N8 |
| 6.00 | 52.6 | 56.7 | 54.1 | 51.8 | 38.9 | 39.6 | 40.1 | 41.4 |
| 7.00 | 59.7 | 57.7 | 59.6 | 56.9 | 35.9 | 36.6 | 36.9 | 38.0 |
| 8.00 | 61.3 | 59.6 | 61.3 | 59.0 | 36.8 | 38.1 | 38.4 | 39.2 |
| 9.00 | 63.2 | 61.8 | 60.5 | 54.9 | 43.2 | 41.8 | 42.5 | 43.3 |
| 10.00 | 63.2 | 63.6 | 62.2 | 56.9 | 44.1 | 44.1 | 45.8 | 45.7 |
| 11.00 | 63.7 | 64.1 | 63.2 | 57.7 | 50.1 | 49.2 | 47.2 | 48.5 |
| 12.00 | 64.9 | 58.6 | 63.7 | 59.6 | 49.7 | 49.5 | 48.1 | 48.3 |
| 13.00 | 63.1 | 63.6 | 62.0 | 57.4 | 49.9 | 49.4 | 48.1 | 48.1 |
| 14.00 | 63.1 | 63.2 | 61.5 | 56.9 | 50.4 | 50.5 | 48.2 | 50.1 |
| 15.00 | 61.4 | 62.0 | 59.9 | 55.2 | 49.6 | 48.7 | 46.2 | 47.8 |
| 16.00 | 59.8 | 60.6 | 60.7 | 53.9 | 50.2 | 47.9 | 49.5 | 50.6 |
| 17.00 | 63.5 | 58.9 | 60.5 | 52.8 | 50.2 | 43.2 | 49.7 | 48.1 |
| 18.00 | 62.7 | 57.9 | 63.7 | 58.0 | 50.8 | 50.0 | 49.6 | 49.5 |
| 19.00 | 62.1 | 56.8 | 59.9 | 57.7 | 45.7 | 45.0 | 44.7 | 44.9 |
| 20.00 | 58.8 | 52.4 | 55.6 | 53.3 | 36.4 | 35.9 | 40.8 | 41.8 |
| 21.00 | 53.3 | 54.9 | 58.4 | 55.7 | 36.6 | 36.1 | 36.5 | 37.5 |
| 22.00 | 48.0 | 49.7 | 52.8 | 49.6 | 37.1 | 36.5 | 36.8 | 37.6 |
| L10 | 53.0 | 53.9 | 55.0 | 52.4 | 36.5 | 36.3 | 36.9 | 37.9 |
| L50 | 62.1 | 58.9 | 60.5 | 56.9 | 45.7 | 44.1 | 45.8 | 45.7 |
| L90 | 63.6 | 63.6 | 63.4 | 58.4 | 50.3 | 49.7 | 49.5 | 49.7 |
| Lday | 64.0 | 60.5 | 61.6 | 57.5 | 48.8 | 47.1 | 48.4 | 48.0 |
| 23.00 | 51.1 | 48.8 | 52.2 | 51.9 | 39.3 | 39.6 | 40.5 | 40.7 |
| 24.00 | 50.8 | 49.2 | 52.5 | 52.1 | 39.1 | 40.4 | 40.5 | 41.7 |
| 1.00 | 51.0 | 49.2 | 52.8 | 52.5 | 39.6 | 38.6 | 39.8 | 40.9 |
| 2.00 | 51.9 | 49.4 | 53.5 | 52.8 | 39.0 | 38.4 | 38.9 | 39.7 |
| 3.00 | 51.9 | 50.1 | 54.0 | 53.2 | 38.9 | 38.4 | 39.9 | 40.6 |
| 4.00 | 47.8 | 45.8 | 49.2 | 48.9 | 40.4 | 40.9 | 41.3 | 42.9 |
| 5.00 | 47.3 | 45.2 | 49.1 | 48.7 | 39.5 | 40.4 | 41.1 | 42.4 |
| L10 | 47.6 | 45.5 | 49.2 | 48.8 | 38.9 | 38.4 | 39.4 | 40.3 |
| L50 | 51.0 | 49.2 | 52.5 | 52.1 | 39.3 | 39.6 | 40.5 | 40.9 |
| L90 | 51.9 | 49.7 | 53.7 | 53.0 | 39.9 | 40.6 | 41.2 | 42.6 |





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CIN No. : U74900PN2013PTC149666

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| | | | | | | | | |
|----------|------|------|------|------|------|------|------|------|
| Lnight | 51.3 | 49.5 | 52.9 | 52.4 | 39.4 | 39.7 | 40.5 | 41.0 |
| Ldn | 63.2 | 60.1 | 62.1 | 60.0 | 49.0 | 48.2 | 49.3 | 49.4 |
| Avg L10 | 50.3 | 49.7 | 52.1 | 50.6 | 37.7 | 37.4 | 38.2 | 39.1 |
| Avg L 50 | 56.5 | 54.0 | 56.5 | 54.5 | 42.5 | 41.9 | 43.1 | 43.3 |
| Avg L 90 | 57.7 | 56.6 | 58.6 | 55.7 | 45.1 | 45.1 | 45.3 | 46.2 |

Lab Chemist



Authorized Signatory

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

| Date | 04.11.2019 | 05.11.2019 | 11.11.2019 | 12.11.2019 | 18.11.2019 | 19.11.2019 | 25.11.2019 | 26.11.2019 |
|---------------------|------------------------|----------------|-------------------|---------------------------|---------------------|-------------------|----------------------|-----------------|
| Location | Near Mine Working Area | Near Dump Site | Near Haulage Road | Near Mines Office /DG Set | Dhangarwadi Village | Thanewadi Village | Pandapniwadi Village | Gajapur Village |
| L ₁₀ | 53.0 | 53.9 | 55.0 | 52.4 | 36.5 | 36.3 | 36.9 | 37.9 |
| L ₅₀ | 62.1 | 58.9 | 60.5 | 56.9 | 45.7 | 44.1 | 45.8 | 45.7 |
| L ₉₀ | 63.6 | 63.6 | 63.4 | 58.4 | 50.3 | 49.7 | 49.5 | 49.7 |
| L _{day} | 64.0 | 60.5 | 61.6 | 57.5 | 48.8 | 47.1 | 48.4 | 48.0 |
| L ₁₀ | 47.6 | 45.5 | 49.2 | 48.8 | 38.9 | 38.4 | 39.4 | 40.3 |
| L ₅₀ | 51.0 | 49.2 | 52.5 | 52.1 | 39.3 | 39.6 | 40.5 | 40.9 |
| L ₉₀ | 51.9 | 49.7 | 53.7 | 53.0 | 39.9 | 40.6 | 41.2 | 42.6 |
| L _{night} | 51.3 | 49.5 | 52.9 | 52.4 | 39.4 | 39.7 | 40.5 | 41.0 |
| L _{dn} | 63.2 | 60.1 | 62.1 | 60.0 | 49.0 | 48.2 | 49.3 | 49.4 |
| Avg L ₁₀ | 50.3 | 49.7 | 52.1 | 50.6 | 37.7 | 37.4 | 38.2 | 39.1 |
| Avg L ₅₀ | 56.5 | 54.0 | 56.5 | 54.5 | 42.5 | 41.9 | 43.1 | 43.3 |
| Avg L ₉₀ | 57.7 | 56.6 | 58.6 | 55.7 | 45.1 | 45.1 | 45.3 | 46.2 |

Remark:

All the obtained noise level quality values in core zone and buffer zone as compared with the noise level standards prescribed by Central Pollution Control Board are found to be within the limit.

WATER QUALITY

Environmental quality monitoring at Dhargarwadi Bauxite Mine of M/s. Hindalco Industries Limited at Dhargarwadi village of Shahuwadi Tahsil, Kolhapur district, Maharashtra includes water monitoring of various environmental components viz. ground, surface and domestic waste water within core zone and buffer zone around the mine lease area.

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.

A total of 8 locations have selected, out of which 5 are for ground water and 3 are for surface water. Location of water quality monitoring stations is given below.

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. 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). Samples were collected in the post monsoon season of the year 2019 as per the prescribed sample collecting methods and analyzed as per the IS standard procedures.

WATER QUALITY MONITORING LOCATIONS

| Code | Name of Sampling Station | Source of Water |
|-------------|---------------------------------|------------------------|
| W-1 | Mine Pit Water | Surface Water |
| W-2 | Shali Nadi (Up Stream) | Surface Water |
| W-3 | Shali Nadi (Down Stream) | Surface Water |
| W-4 | Pandapniwadi Village | Ground Water |
| W-5 | Thanewadi Village | Ground Water |
| W-6 | Dhargarwadi Village | Ground Water |
| W-7 | Patewadi Village | Ground Water |
| W-8 | Bhandarwadi Village | Ground Water |

SURFACE WATER QUALITY

Proper drainage system has prepared to drag the monsoon water into the mine pit area for harvesting rain water and overflow of the same is being channelized through series of check dams and settling tanks so as to reduce the water pollution. Buffer zones have seasonal nallahs which used to recharge the ground water table. A total of 3 locations have selected of which 1 from core zone and 2 from buffer zone.



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TEST CERTIFICATE

| | | | |
|---|---|----------------------|--|
| Client Name: | Equinox Environments (I) Pvt. Ltd., Kolhapur, Maharashtra. | Report Number | GESEC/PRO/2019- 20/12/451-453 |
| Project Name and Address: M/s. Hindalco Industries Limited, Dhangarwadi Bauxite Mine, Dhangarwadi Village, Shahuwadi Taluka, Kolhapur District, Maharashtra. | Date of Report | 10/12/2019 | |
| | Nature of sample | Surface Water | |
| | Date of Sampling | 18/11/2019 | |
| | Date of Sample Received | 19/11/2019 | |
| Sample Collected & Analyzed By: Green EnviroSAFE Engineers & Consultant Pvt- Ltd, Pune, Maharashtra. | Date of Sample Analysis | 19/11/2019 | |

| Sr. No. | Parameter | Unit(s) | Location | | |
|---------|-------------------------------------|---------|------------------------------------|-------------------------------|---------------------------------|
| | | | W1 Near Mine Office Borewell | W-2 ShaliNadi Up Stream | W-3 ShaliNadi Down Stream |
| 1. | Odor | -- | Un-objectionable | Un-objectionable | Un-objectionable |
| 2. | Taste | -- | Agreeable | Agreeable | Agreeable |
| 3. | Color | Hazen | <5 | <5 | <5 |
| 4. | pH | -- | 7.65 | 7.52 | 7.61 |
| 5. | Turbidity | NTU | <5 | <5 | <5 |
| 6. | DO | mg/lit | 3.37 | 4.96 | 4.22 |
| 7. | TDS | mg/lit | 153.7 | 108.22 | 165.47 |
| 8. | TSS | mg/lit | 12.31 | 8.19 | 14.80 |
| 9. | BOD:3 days at 27°C | mg/lit | 7.27 | 4.18 | 5.99 |
| 10. | Alkalinity as CaCO ₃ | mg/lit | 15.96 | 12.62 | 26.03 |
| 11. | Total Hardness as CaCO ₃ | mg/lit | 72.68 | 36.62 | 99.90 |
| 12. | Nitrate as NO ₃ | mg/lit | 12.53 | 9.58 | 13.86 |
| 13. | Phosphorous as PO ₄ | mg/lit | 0.25 | 0.01 | 0.03 |
| 14. | Chlorides as Cl ⁻ | mg/lit | 43.58 | 21.44 | 36.98 |
| 15. | Sulphates as SO ₄ | mg/lit | 1.96 | 0.45 | 0.69 |
| 16. | Sodium as Na | mg/lit | 1.18 | 0.18 | 0.43 |
| 17. | Potassium as K | mg/lit | 3.06 | 1.13 | 2.88 |
| 18. | Calcium as Ca | mg/lit | 18.51 | 9.62 | 25.77 |
| 19. | Magnesium as Mg | mg/lit | 6.41 | 3.05 | 8.61 |
| 20. | Lead as Pb | mg/lit | BDL | BDL | BDL |
| 21. | Manganese as Mn | mg/lit | BDL | BDL | BDL |
| 22. | Cadmium as Cd | mg/lit | BDL | BDL | BDL |
| 23. | Chromium as Cr | mg/lit | BDL | BDL | BDL |
| 24. | Copper as Cu | mg/lit | BDL | BDL | BDL |
| 25. | Zinc as Zn | mg/lit | BDL | BDL | BDL |
| 26. | Iron as Fe | mg/lit | 0.19 | 0.10 | 0.14 |
| 27. | Fluorides as F ⁻ | mg/lit | 0.07 | 0.04 | 0.05 |





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| | | | | | |
|-----|----------------|--------|-----|-----|-----|
| 28. | Mercury as Hg | mg/lit | BDL | BDL | BDL |
| 29. | Selenium as Se | mg/lit | BDL | BDL | BDL |
| 30. | Arsenic as As | mg/lit | BDL | BDL | BDL |
| 31. | Cyanide as CN | mg/lit | BDL | BDL | BDL |
| 32. | Boron as B | mg/lit | BDL | BDL | BDL |

ANALYZED BY-



AUTHORIZED SIGNATORY

SURFACE WATER QUALITY

| Sr. No. | Parameter | Unit (s) | Location | | |
|---------|-------------------------------------|----------|-----------------------|--------------------------------|----------------------------------|
| | | | W-1 Mine Pit Water | W-2 Shali Nadi Up Stream | W-3 Shali Nadi Down Stream |
| 1. | Odor | -- | Un-objectionable | Un-objectionable | Un-objectionable |
| 2. | Taste | -- | Agreeable | Agreeable | Agreeable |
| 3. | Color | Hazen | <5 | <5 | <5 |
| 4. | pH | -- | 7.65 | 7.52 | 7.61 |
| 5. | Turbidity | NTU | <5 | <5 | <5 |
| 6. | DO | mg/lit | 3.37 | 4.96 | 4.22 |
| 7. | TDS | mg/lit | 153.7 | 108.22 | 165.47 |
| 8. | TSS | mg/lit | 12.31 | 8.19 | 14.80 |
| 9. | BOD:3 days at 27°C | mg/lit | 7.27 | 4.18 | 5.99 |
| 10. | Alkalinity as CaCO ₃ | mg/lit | 15.96 | 12.62 | 26.03 |
| 11. | Total Hardness as CaCO ₃ | mg/lit | 72.68 | 36.62 | 99.90 |
| 12. | Nitrate as NO ₃ | mg/lit | 12.53 | 9.58 | 13.86 |
| 13. | Phosphorous as PO ₄ | mg/lit | 0.25 | 0.01 | 0.03 |
| 14. | Chlorides as Cl ⁻ | mg/lit | 43.58 | 21.44 | 36.98 |
| 15. | Sulphates as SO ₄ | mg/lit | 1.96 | 0.45 | 0.69 |
| 16. | Sodium as Na | mg/lit | 1.18 | 0.18 | 0.43 |
| 17. | Potassium as K | mg/lit | 3.06 | 1.13 | 2.88 |
| 18. | Calcium as Ca | mg/lit | 18.51 | 9.62 | 25.77 |
| 19. | Magnesium as Mg | mg/lit | 6.41 | 3.05 | 8.61 |
| 20. | Lead as Pb | mg/lit | BDL | BDL | BDL |
| 21. | Manganese as Mn | mg/lit | BDL | BDL | BDL |
| 22. | Cadmium as Cd | mg/lit | BDL | BDL | BDL |
| 23. | Chromium as Cr | mg/lit | BDL | BDL | BDL |
| 24. | Copper as Cu | mg/lit | BDL | BDL | BDL |
| 25. | Zinc as Zn | mg/lit | BDL | BDL | BDL |
| 26. | Iron as Fe | mg/lit | 0.19 | 0.10 | 0.14 |
| 27. | Fluorides as F ⁻ | mg/lit | 0.07 | 0.04 | 0.05 |
| 28. | Mercury as Hg | mg/lit | BDL | BDL | BDL |
| 29. | Selenium as Se | mg/lit | BDL | BDL | BDL |
| 30. | Arsenic as As | mg/lit | BDL | BDL | BDL |
| 31. | Cyanide as CN | mg/lit | BDL | BDL | BDL |
| 32. | Boron as B | mg/lit | BDL | BDL | BDL |

Note:



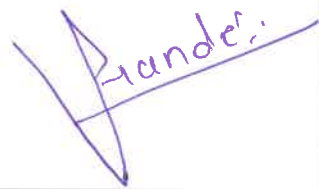
- mg/l: milligram per liter
- BDL: Below Desirable Limit

Remark:

All the parameters of the surface water samples collected from various sites are well below the desirable limit and maximum permissible limit as per IS: 10500 Standard for Drinking Water.



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| TEST CERTIFICATE | | | | |
|--|----------------------|--|--------------------|---------------------------------|
| Report Number : GESEC/PRO/2019-20/12/437 | | | | |
| DHANGARWADI MINES | | | Date of Sampling | 22/11/2019 |
| WELL DEPTHS OF VILLAGES | | | Date of Analysis | 23/11/2019 |
| | | | Date of Report | 13/12/2019 |
| Sr. NO. | LOCATION | NAME OF THE MINE AREA | TOTAL DEPTH IN MTS | WATER LEVEL FROM SURFACE IN MTS |
| 1 | PANDAPNIWADI VILLAGE | DHANGARWADI | 6.00 | 1.10 |
| 2 | DHANGARWADI VILLAGE | DHANGARWADI | 6.00 | 2.75 |
| ANALYZED BY- | | AUTHORIZED SIGNATORY- | | |
|  | |   | | |

Terms and conditions

1. The report is refer only to the sample tested and not applies to the bulk.
2. The results shown in this test report may differ based on various factors including temperature, humidity, pressure, retention time etc.
3. The test report cannot be reproduced wholly or in part and cannot be used for promotional or publicity purpose without the written consent of laboratory, GESEC.
4. Samples will be retained for a period of seven (7) days after completion of analysis. Longer retention periods can be arranged, on request of the customer.
5. We strictly maintain the confidentiality of all test result of sample(s) collected by us/ supplied by customer and not revel to third party unless required by the statutory or legal requirement.
6. MoEF approved Lab by Govt. of India. From date. 09/02/2017 to 08/02/2022.

GROUND WATER QUALITY

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

Assessment of water quality in the study area and in the mine area includes the quality assessment of parameters as per the Indian Standard IS 10500 (Drinking water standard). A total of 5 locations have selected from buffer zone.

| DHANGARWADI MINES | | | |
|--------------------------------|----------------------|------------------------------|---|
| Well Depths of Villages | | | |
| S.No. | Location | Total Depth in Meters | Water Level From Surface in Meters |
| 1 | Pandapniwadi Village | 6.00 | 1.10 |
| 2 | Dhangarwadi Village | 6.00 | 2.75 |



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TEST CERTIFICATE

| | | | |
|----------------------------------|---|--------------------------------|-------------------------------------|
| Client Name: | Equinox Environments (I) Pvt. Ltd., Kolhapur, Maharashtra. | Report Number | GESEC/PRO/2019-20/12/446-450 |
| Project Name and Address: | M/s. Hindalco Industries Limited (Dhangarwadi Bauxite Mine) A/P. Dhangarwadi village, Tahsil. Shahuwadi, District. Kolhapur, State. Maharashtra. | Date of Report | 10/12/2019 |
| | | Nature of sample | Ground water |
| | | Date of Sampling | 18/11/2019 |
| | | Date of Sample Received | 19/11/2019 |
| | | Date of Sample Analysis | 19/11/2019 |

| Sample Collected & Analyzed By : | | | Location | | | | |
|---|-------------------------------------|-------------|-----------------------|-------------------|---------------------|------------------|----------------------|
| Green EnviroSafe Engineers & Consultant Pvt- Ltd, Pune, Maharashtra | | | PANDAPNI WADI VILLAGE | THANEWADI VILLAGE | DHANGARWADI VILLAGE | PATEWADI VILLAGE | BHANDAR WADI VILLAGE |
| Sr. No. | Parameter | Unit(s) | W-4 | W-5 | W-6 | W-7 | W-8 |
| 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 | -- | 7.65 | 7.52 | 7.60 | 7.55 | 7.59 |
| 5. | Turbidity | NTU | <5.00 | <5.00 | <5.00 | <5.00 | <5.00 |
| 6. | Dissolved Oxygen | mg/l | 2.82 | 2.36 | 2.91 | 2.35 | 2.65 |
| 7. | Total Dissolved solids | mg/l | 152.32 | 129.50 | 136.98 | 144.57 | 142.91 |
| 8. | Total Suspended solids | mg/l | 2.75 | 3.84 | 3.96 | 4.98 | 5.01 |
| 9. | B.O.D | mg/l | 4.58 | 2.98 | 3.5 | 4.11 | 3.75 |
| 10. | Alkalinity as CaCO ₃ | mg/l | 13.74 | 15.96 | 10.27 | 22.11 | 22.73 |
| 11. | Total Hardness as CaCO ₃ | mg/l | 127.27 | 71.94 | 67.10 | 61.11 | 89.69 |
| 12. | Nitrate as NO ₃ | mg/l | 5.62 | 6.28 | 9.02 | 10.43 | 15.87 |
| 13. | Phosphates as PO ₄ | mg/l | 0.46 | 0.83 | 0.66 | 0.11 | 0.69 |
| 14. | Chlorides as Cl | mg/l | 45.86 | 32.97 | 55.93 | 37.14 | 21.25 |
| 15. | Sulphates as SO ₄ | mg/l | 5.31 | 9.01 | 4.70 | 8.26 | 3.71 |
| 16. | Sodium as Na | mg/l | 1.45 | 2.35 | 1.98 | 4.74 | 6.22 |
| 17. | Potassium as K | mg/l | 8.36 | 7.54 | 3.24 | 10.53 | 13.05 |
| 18. | Calcium as Ca | mg/l | 29.50 | 19.86 | 14.76 | 18.05 | 21.44 |
| 19. | Magnesium as Mg | mg/l | 12.99 | 5.41 | 7.33 | 3.88 | 8.76 |
| 20. | Lead as Pb | mg/l | BDL | BDL | BDL | BDL | BDL |
| 21. | Manganese as Mn | mg/l | BDL | BDL | BDL | BDL | BDL |
| 22. | Cadmium as Cd | mg/l | BDL | BDL | BDL | BDL | BDL |
| 23. | Chromium as Cr | mg/l | BDL | BDL | BDL | BDL | BDL |
| 24. | Copper as Cu | mg/l | BDL | BDL | BDL | BDL | BDL |
| 25. | Zinc as Zn | mg/l | BDL | BDL | BDL | BDL | BDL |
| 26. | Iron as Fe | mg/l | 0.02 | 0.04 | 0.09 | BDL | 0.01 |
| 27. | Fluoride as F | mg/l | 0.01 | 0.25 | BDL | 0.32 | 0.18 |
| 28. | Mercury as Hg | mg/l | BDL | BDL | BDL | BDL | BDL |
| 29. | Selenium as Se | mg/l | BDL | BDL | BDL | BDL | BDL |
| 30. | Arsenic as As | mg/l | BDL | BDL | BDL | BDL | BDL |
| 31. | Cyanide as CN | mg/l | BDL | BDL | BDL | BDL | BDL |
| 32. | Boron as B | mg/l | BDL | BDL | BDL | BDL | BDL |

Lab Chemist

M. D. D. D.



Authorized Signatory

A. Hande

| Sr. No. | Parameter | Unit (s) | Location | | | | |
|---------|-------------------------------------|-------------|--------------------------------|-----------------------------|-------------------------------|----------------------------|--------------------------------|
| | | | 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 | <5.00 | <5.00 | <5.00 | <5.00 | <5.00 |
| 4. | pH | -- | 7.65 | 7.52 | 7.60 | 7.55 | 7.59 |
| 5. | Turbidity | NTU | <5.00 | <5.00 | <5.00 | <5.00 | <5.00 |
| 6. | Dissolved Oxygen | mg/l | 2.82 | 2.36 | 2.91 | 2.35 | 2.65 |
| 7. | Total Dissolved solids | mg/l | 152.32 | 129.50 | 136.98 | 144.57 | 142.91 |
| 8. | Total Suspended solids | mg/l | 2.75 | 3.84 | 3.96 | 4.98 | 5.01 |
| 9. | B.O.D | mg/l | 4.58 | 2.98 | 3.5 | 4.11 | 3.75 |
| 10. | Alkalinity as CaCO ₃ | mg/l | 13.74 | 15.96 | 10.27 | 22.11 | 22.73 |
| 11. | Total Hardness as CaCO ₃ | mg/l | 127.27 | 71.94 | 67.10 | 61.11 | 89.69 |
| 12. | Nitrate as NO ₃ | mg/l | 5.62 | 6.28 | 9.02 | 10.43 | 15.87 |
| 13. | Phosphates as PO ₄ | mg/l | 0.46 | 0.83 | 0.66 | 0.11 | 0.69 |
| 14. | Chlorides as Cl | mg/l | 45.86 | 32.97 | 55.93 | 37.14 | 21.25 |
| 15. | Sulphates as SO ₄ | mg/l | 5.31 | 9.01 | 4.70 | 8.26 | 3.71 |
| 16. | Sodium as Na | mg/l | 1.45 | 2.35 | 1.98 | 4.74 | 6.22 |
| 17. | Potassium as K | mg/l | 8.36 | 7.54 | 3.24 | 10.53 | 13.05 |
| 18. | Calcium as Ca | mg/l | 29.50 | 19.86 | 14.76 | 18.05 | 21.44 |
| 19. | Magnesium as Mg | mg/l | 12.99 | 5.41 | 7.33 | 3.88 | 8.76 |
| 20. | Lead as Pb | mg/l | BDL | BDL | BDL | BDL | BDL |
| 21. | Manganese as Mn | mg/l | BDL | BDL | BDL | BDL | BDL |
| 22. | Cadmium as Cd | mg/l | BDL | BDL | BDL | BDL | BDL |
| 23. | Chromium as Cr | mg/l | BDL | BDL | BDL | BDL | BDL |
| 24. | Copper as Cu | mg/l | BDL | BDL | BDL | BDL | BDL |
| 25. | Zinc as Zn | mg/l | BDL | BDL | BDL | BDL | BDL |
| 26. | Iron as Fe | mg/l | 0.02 | 0.04 | 0.09 | BDL | 0.01 |
| 27. | Fluoride as F | mg/l | 0.01 | 0.25 | BDL | 0.32 | 0.18 |
| 28. | Mercury as Hg | mg/l | BDL | BDL | BDL | BDL | BDL |
| 29. | Selenium as Se | mg/l | BDL | BDL | BDL | BDL | BDL |
| 30. | Arsenic as As | mg/l | BDL | BDL | BDL | BDL | BDL |
| 31. | Cyanide as CN | mg/l | BDL | BDL | BDL | BDL | BDL |
| 32. | Boron as B | mg/l | BDL | BDL | BDL | BDL | BDL |

Note:

- mg/l: milligram per liter
- BDL: Below Desirable Limit

Remark:

All the parameters of the surface water samples collected from various sites are well below the desirable limit and maximum permissible limit as per IS: 10500 Standard for Drinking Water.

DRINKING WATER STANDERDS AS PER IS:10500

| Sr. No. | Parameter | Unit | Desirable Limit | Maximum Permissible Limit |
|---------|-------------------------------------|------------|------------------|---------------------------|
| 1 | Odor | | Un-objectionable | |
| 2 | Taste | | Agreeable | |
| 3 | Colour | Hazen unit | 5.00 | 25.00 |
| 4 | pH | | 6.5-8.5 | |
| 5 | Turbidity | NTU | 5.00 | 10.00 |
| 6 | Dissolved Oxygen | mg/l | --- | |
| 7 | Total Dissolved Solids | mg/l | 500.00 | 2000.00 |
| 8 | Total Suspended Solids | mg/l | --- | |
| 9 | BOD 3 at 27°C | mg/l | --- | |
| 10 | Alkalinity as CaCO ₃ | mg/l | 200.00 | 600.00 |
| 11 | Total Hardness as CaCO ₃ | mg/l | 300.00 | 600.00 |
| 12 | Nitrates as NO ₃ | mg/l | 45.00 | 100.00 |
| 13 | Phosphorus as PO ₄ | mg/l | --- | |
| 14 | Chlorides as Cl | mg/l | 250.00 | 1000.00 |
| 15 | Sulphates as SO ₄ | mg/l | 200.00 | 400.00 |
| 16 | Sodium as Na | mg/l | --- | |
| 17 | Potassium as K | mg/l | --- | |
| 18 | Calcium as Ca | mg/l | 75.00 | 200.00 |
| 19 | Magnesium as Mg | mg/l | 30.00 | 100.00 |
| 20 | Lead (Pb) | mg/l | 0.05 | 0.05 |
| 21 | Manganese (Mn) | mg/l | 0.10 | 0.30 |
| 22 | Cadmium (Cd) | mg/l | 0.01 | 0.01 |
| 23 | Chromium (Cr) | mg/l | 0.05 | 0.05 |
| 24 | Copper (Cu) | mg/l | 0.05 | 1.50 |
| 25 | Zinc (Zn) | mg/l | 5.00 | 15.00 |
| 26 | Iron (Fe) | mg/l | 0.30 | 1.00 |
| 27 | Fluoride (F) | mg/l | 1.00 | 1.50 |
| 28 | Mercury (Hg) | mg/l | 0.001 | 0.001 |
| 29 | Selenium (Se) | mg/l | 0.01 | 0.01 |
| 30 | Arsenic (As) | mg/l | 0.05 | 0.05 |
| 31 | Cyanide (Cn) | mg/l | 0.05 | 0.05 |
| 32 | Boron (B) | mg/l | 1.00 | 5.00 |



Recognised by Ministry of Environment, Forest & Climate Change (MoEF) Govt. of India and ISO/IEC 17025:2005 (NABL), ISO 9001:2015 and OHSAS 18001:2007 Certified Company

Domestic Effluent Analysis Report

| | | | |
|---------------------------------|--|-----------------------|------------|
| Report No. | GESEC/PRO/2019-20/12/458 | Date of Report | 10/12/2019 |
| Name of Client | Equinox Environments (I) Pvt. Ltd., Kolhapur, Maharashtra. | | |
| Project Name and Address | M/s. Hindalco Industries Limited, (Dhangarwadi Bauxite Mine), A/P. Dhangarwadi Village, Tahsil. Shahuwadi, District. Kolhapur, State. Maharashtra. | | |
| Sample Collected By | Green EnviroSafe Engineers & Consultant Pvt. Ltd, Pune, Maharashtra. | | |
| Date of Sampling | 21/10/2019 | | |
| Sample Location | Canteen waste water | | |

Domestic Effluent Analysis

| Sl.No | Unit | Parameter | Result | MPCB Standards | Analysis Method |
|-------|------|------------------------|--------|----------------|--------------------------|
| 1 | mg/l | Total Suspended Solids | 56.23 | 100 | APHA 2540-D |
| 2 | mg/l | Total Dissolved Solids | 725.60 | 2100 | IS : 3025 (Part 16):1984 |
| 3 | mg/l | COD | 59.32 | 250 | APHA 5220 B |
| 4 | mg/l | BOD for 3 days at 27°C | 23.89 | 100 | APHA 5210 B |
| 5 | mg/l | Total Solids | 781.83 | ----- | IS3025(part 16):1984 |
| 6 | mg/l | Oil and Grease | <5 | 10 | APHA 5520 B |

ANALYZED BY

AUTHORIZED SIGNATORY






Terms and conditions

- The report is refer only to the sample tested and not applies to the bulk.
- The results shown in this test report may differ based on various factors including temperature, humidity, pressure, retention time etc.
- The test report cannot be reproduced wholly or in part and cannot be used for promotional or publicity purpose without the written consent of laboratory, GESEC.
- Samples will be retained for a period of seven (7) days after completion of analysis. Longer retention periods can be arranged, on request of the customer
- We strictly maintain the confidentiality of all test result of sample(s) collected by us/ supplied by customer and not revel to third party unless required by the statutory or legal requirement
- MoEF approved Lab by Govt. of India. From date 09/02/2017 to 08/02/2022.



Recognised by Ministry of Environment, Forest & Climate Change (MoEF) Govt. of India and ISO/IEC 17025:2005 (NABL), ISO 9001:2015 and OHSAS 18001:2007 Certified Company

| Domestic Effluent Analysis Report | | | | | |
|---|--|------------------------|---|----------------|-----------------|
| Report No. | GESEC/PRO/2019-20/12/459 | Date of Report | 10/12/2019 | | |
| Name of Client | Equinox Environments (I) Pvt. Ltd., Kolhapur, Maharashtra. | | | | |
| Project Name and Address | M/s. Hindalco Industries Limited, (Dhangarwadi Bauxite Mine), A/P. Dhangarwadi Village, Tahsil. Shahuwadi, District. Kolhapur, State. Maharashtra. | | | | |
| Sample Collected By | Green EnviroSafe Engineers & Consultant Pvt. Ltd, Pune, Maharashtra. | | | | |
| Date of Sampling | 18/11/2019 | | | | |
| Sample Location | Canteen waste water | | | | |
| Domestic Effluent Analysis | | | | | |
| Sl.No | Unit | Parameter | Result | MPCB Standards | Analysis Method |
| 1 | mg/l | Total Suspended Solids | 61.02 | 100 | APHA 2540-D |
| 2 | mg/l | Total Dissolved Solids | 844.97 | 2100 | IS : 3025 (Part |
| 3 | mg/l | COD | 69.32 | 250 | APHA 5220 B |
| 4 | mg/l | BOD for 3 days at 27°C | 25.68 | 100 | APHA 5210 B |
| 5 | mg/l | Total Solids | 905.99 | ----- | IS3025(part |
| 6 | mg/l | Oil and Grease | <5 | 10 | APHA 5520 B |
| ANALYZED BY | | | AUTHORIZED SIGNATORY | | |
|  | | |  | | |
|  | | | | | |

Terms and conditions

1. The report is refer only to the sample tested and not applies to the bulk.
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4. Samples will be retained for a period of seven (7) days after completion of analysis. Longer retention periods can be arranged, on request of the customer
5. We strictly maintain the confidentiality of all test result of sample(s) collected by us/ supplied by customer and not revel to third party unless required by the statutory or legal requirement
6. MoEF approved Lab by Govt. of India. From date 09/02/2017 to 08/02/2022.

DOMESTIC EFFLUENT ANALYSIS

There is only source of waste water on site is canteen effluent. All the employees daily have their two meals in this canteen according to their shifts. Sample was collected two times from outlet and analyzed. Results are given below.

DOMESTIC EFFLUENT ANALYSIS

Sample Location: Canteen water waste

Date of Sampling: 21/10/2019

| Sr. No | Unit | Parameter | Result | MPCB Standards |
|--------|------|------------------------|--------|----------------|
| 1 | mg/l | Total Suspended Solids | 56.23 | 100 |
| 2 | mg/l | Total Dissolved Solids | 725.60 | 2100 |
| 3 | mg/l | COD | 59.32 | 250 |
| 4 | mg/l | BOD for 3 days at 27°C | 23.89 | 100 |
| 5 | mg/l | Total Solids | 781.83 | -- |
| 6 | mg/l | Oil and Grease | <5.00 | 10 |

Sample location: Canteen water waste

Date of Sampling: 18/11/2019

| Sr. No | Unit | Parameter | Result | MPCB Standards |
|--------|------|------------------------|--------|----------------|
| 1 | mg/l | Total Suspended Solids | 61.02 | 100 |
| 2 | mg/l | Total Dissolved Solids | 844.97 | 2100 |
| 3 | mg/l | COD | 69.32 | 250 |
| 4 | mg/l | BOD for 3 days at 27°C | 25.68 | 100 |
| 5 | mg/l | Total Solids | 905.99 | -- |
| 6 | mg/l | Oil and Grease | <5.00 | 10 |

Note:

- mg/l: milligram per liter

Remark:

All the parameters of the canteen waste water samples collected are well below the desirable standard prescribed in consent given by the Maharashtra Pollution Control Board.

SOIL QUALITY

The normal mineral composition of plants is affected by alteration in soil condition. It is essential to determine the potential of soil in the area and identify the impacts of mining activity on soil quality. So soil sample has been collected from different villages around the lease area during study period. In order to study the soil profile of the region, sampling locations were selected to assess the existing soil conditions around the project area representing various land use conditions.

The physico-chemical and heavy metal concentrations were determined. The soil sample was prepared in accordance with IS: 2720 (Part-I)-1983 for various tests. The sampling locations have been identified to determine the baseline soil characteristics of study area.

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

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

SAMPLING DETAILS







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

SOIL QUALITY MONITORING LOCATIONS

| Code | Name of Sampling Station | Direction w.r.t. Mines Lease Area |
|------|--------------------------|-----------------------------------|
| S-1 | Dhangarwadi village | N |
| S-2 | Thanewadi village | ESW |
| S-3 | Pandapniwadi village | S |



LEGEND

-  **MINE LEASE**
-  **RIVER**
-  **NALLAH**
-  **ROAD**
-  **FOREST BOUNDARY**
-  **SOIL MONITORING LOCATION**

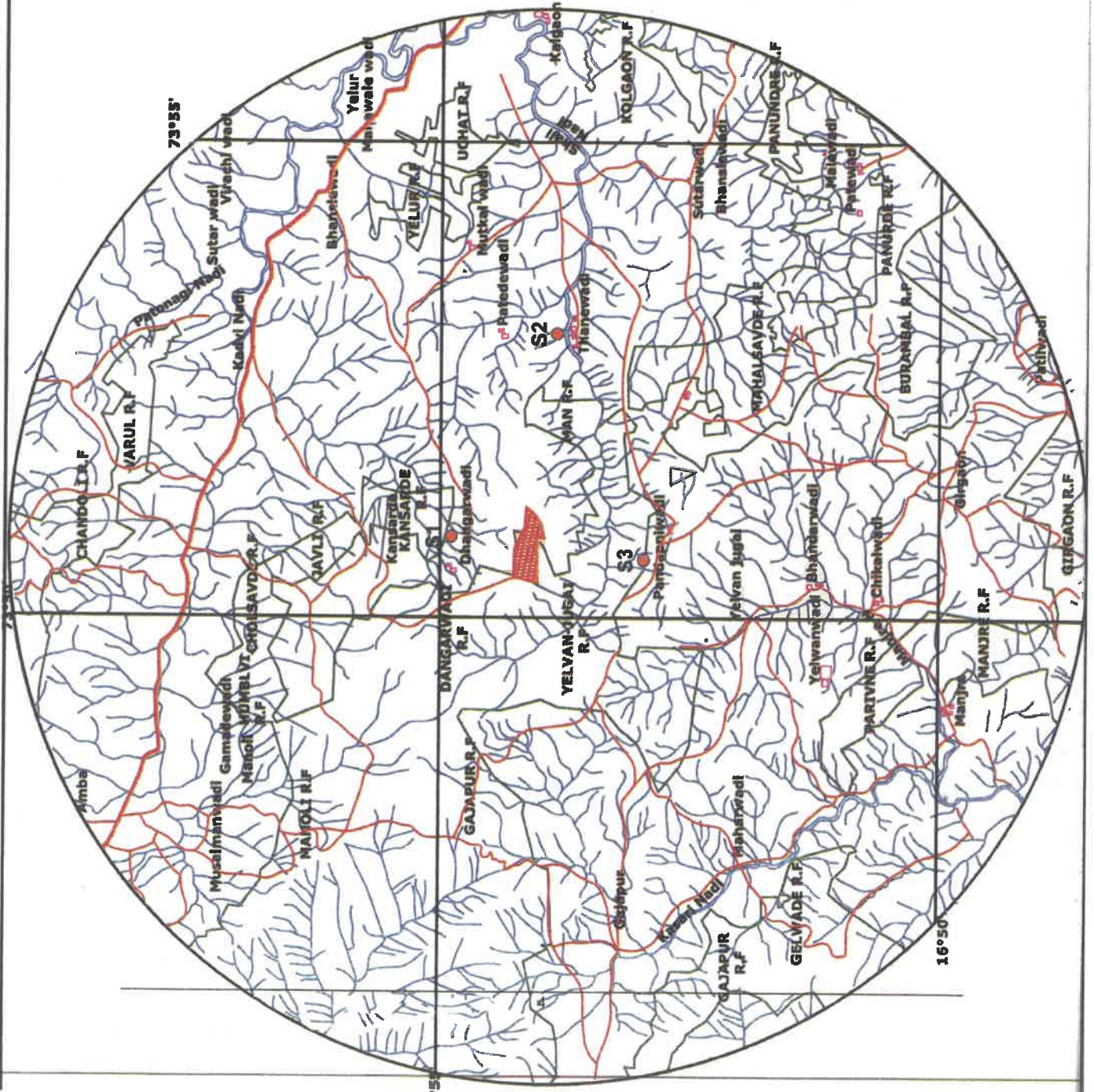


PROJECT : DHANGARWADI BAUXITE MINES

CLIENT : HINDALCO INDUSTRIES LIMITED

TITLE : SOIL MONITORING LOCATIONS MAP

**PREPARED BY
EQUINOX ENVIRONMENTS INDIA PVT. LTD.,
KOLHAPUR**





Recognised by Ministry of Environment, Forest & Climate Change (MoEF) Govt. of India and ISO/IEC 17025:2005 (NABL), ISO 9001:2015 and OHSAS 18001:2007 Certified Company

TEST CERTIFICATE

| | | | |
|---|---|----------------------|--|
| Client Name: | Equinox Environments (I) Pvt. Ltd., Kolhapur, Maharashtra. | Report Number | GESEC/PRO/2019- 20/12/454-456 |
| Project Name and Address: M/s. Hindalco Industries Limited (Dhangarwadi Bauxite Mine) A/P. Dhangarwadi village, Tahsil. Shahuwadi, District. Kolhapur, State. Maharashtra. | Date of Report | 10/12/2019 | |
| | Nature of sample | Soil | |
| | Date of Sampling | 18/11/2019 | |
| | Date of Sample Received | 19/11/2019 | |
| | Date of Sample Analysis | 19/11/2019 | |
| Sample Collected & Analyzed By : | Green EnviroSafe Engineers & Consultant Pvt. Ltd., Pune, Maharashtra | | |

| Sr.No. | Test Parameters | Locations | | |
|--------|---|-------------------------------|-----------------------------|--------------------------------|
| | | S1- Dhangarwadi Village | S2- Thanewadi Village | S3- Pandapniwadi Village |
| 1 | pH (1:5Aq. Extraction) | 7.81 | 8.15 | 7.89 |
| 2 | E.C. (μ s)(1:5 Aq. Suspension) | 2.78 | 2.96 | 2.84 |
| 3 | Nitrates (mg/kg) | 45.02 | 70.78 | 53.01 |
| 4 | Available Phosphorus as P ₂ O ₅ (mg/kg) | 11.03 | 57.83 | 33.69 |
| 5 | Potassium as K ₂ O (mg/kg) | 25.81 | 84.01 | 53.92 |
| 6 | Available Sodium as Na ₂ O (mg/kg) | 0.23 | 0.98 | 0.63 |
| 7 | Ex. Calcium (mg/kg) | 459.12 | 568.41 | 539.87 |
| 8 | Ex. Magnesium (mg/kg) | 249.37 | 300.12 | 268.51 |
| 9 | Water Soluble Chlorides as Cl (mg/kg) | 250.01 | 289.17 | 276.94 |
| 10 | Organic Carbon (%) | 1.56 | 1.92 | 1.86 |
| 11 | Texture | Sandy Soil | Sandy Soil | Sandy |
| | a) Sand (%) | 61.32 | 58.02 | 57.94 |
| | b) Silt (%) | 9.14 | 12.96 | 10.33 |
| | c) Clay (%) | 29.54 | 29.02 | 31.73 |
| 12 | Total Soluble Salts (mg/kg) | 1862.40 | 1986.37 | 1900.24 |

White

Lab Chemist



Handi

Authorized Signatory

SOIL QUALITY

| Sr. No. | Test Parameters | Locations | | |
|---------|--|-------------------------------|-----------------------------|--------------------------------|
| | | S-1 Dhangarwadi Village | S-2 Thanewadi Village | S-3 Pandapniwadi Village |
| 1 | pH (1:5Aq. Extraction) | 7.81 | 8.15 | 7.89 |
| 2 | E.C. (μ s)(1:5 Aq. Suspension) | 2.78 | 2.96 | 2.84 |
| 3 | Nitrates (mg/kg) | 45.02 | 70.78 | 53.01 |
| 4 | Available Phosphorus as P_2O_5 (mg/kg) | 11.03 | 57.83 | 33.69 |
| 5 | Potassium as K_2O (mg/kg) | 25.81 | 84.01 | 53.92 |
| 6 | Available Sodium as Na_2O (mg/kg) | 0.23 | 0.98 | 0.63 |
| 7 | Ex. Calcium (mg/kg) | 459.12 | 568.41 | 539.87 |
| 8 | Ex. Magnesium (mg/kg) | 249.37 | 300.12 | 268.51 |
| 9 | Water Soluble Chlorides as Cl (mg/kg) | 250.01 | 289.17 | 276.94 |
| 10 | Organic Carbon (%) | 1.56 | 1.92 | 1.86 |
| 11 | Texture | Sandy Soil | Sandy Soil | Sandy |
| | a) Sand (%) | 61.32 | 58.02 | 57.94 |
| | b) Silt (%) | 9.14 | 12.96 | 10.33 |
| | c) Clay (%) | 29.54 | 29.02 | 31.73 |
| 12 | Total Soluble Salts (mg/kg) | 1862.40 | 1986.37 | 1900.24 |

DHANGARWADI BAUXITE MINE

**TAHSIL: SHAHUWADI, DISTRICT: KOLHAPUR,
STATE: MAHARASHTRA**

OF

M/s HINDALCO INDUSTRIES LTD.

ENVIRONMENTAL QUALITY MONITORING REPORT

SEASON - WINTER 2019-20

DECEMBER, JANUARY, FEBRUARY

PREPARED BY



EQUINOX ENVIRONMENTS (I) PVT. LTD.,

**ENVIRONMENTAL; CIVIL & CHEMICAL ENGINEERS, CONSULTANTS & ANALYSTS,
KOLHAPUR (MS)**

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An ISO 9001:2015 & QCI NABET ACCREDITED ORGANIZATION



2019 - 2020

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PREFACE

M/s. Hindalco Industries Limited entrusted environmental quality monitoring at **Dhangarwadi Bauxite Mine** situated in Dhangarwadi village, Shahuwadi Tahsil, Kolhapur District, Maharashtra to **Equinox Environments (India) Pvt. Ltd.** during winter season of the year 2019-20.

According to MoU dt. 1st September 2018, The **Equinox Environments (India) Pvt. Ltd.** has availed the various monitoring services by lab viz. **Green Envirosafe Engineers & Consultant Pvt. Ltd.** which is recognized and duly approved by the **Ministry of Environment, Forests & Climate Change (MoEFCC); New Delhi** (through Notification No. S.O. 1174 (E) dated 18.07.2007 as amended vide Notification No. S.O. 388 (E) dated 10.02.2017) and NABL (ISO/IEC 17025:2005 vide certificate number TC-8061 dated 03.11.2018) has also received certifications namely ISO 9001:2015 and OHSAS 18001: 2007 from Crescent Quality Certification Pvt. Ltd.

The environmental monitoring for water quality was carried out in core zone and buffer zone during the months of December–2019, January & February 2020. The data obtained was complied to assess the current environmental status of the mining as well as the surrounding villages in the study area for following environmental parameters.

- ❖ Micro-meteorology
- ❖ Ambient air quality
- ❖ Ambient noise level quality
- ❖ Water quality
- ❖ DG set Stack monitoring

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

Equinox Environments India Pvt. Ltd. gratefully acknowledges the cooperation extended by management and staff of M/s. Hindalco industries Limited and village people to the field staff.

EXECUTIVE SUMMARY

Dhangarwadi Bauxite Mine of M/s. Hindalco Industries Limited includes the study of the ambient air quality, noise level quality and water quality in core zone and buffer zone in and around the mine lease area during the winter season of the year 2019-20.

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 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 producers of aluminum in the country. The company business involves bauxite mining to alumina refining. Alumina to 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.

As per the directions of the Government of Maharashtra the mining plan was prepared for the entire lease area of 41.80 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 in the revenue land and The Environmental Clearance was obtained for the production of 0.6 million TPA of bauxite over the entire area. The mining lease was executed by the collector of Kolhapur over the area on 05/05/2008 and the lease expires on 04/05/2038.

MINE DETAIL

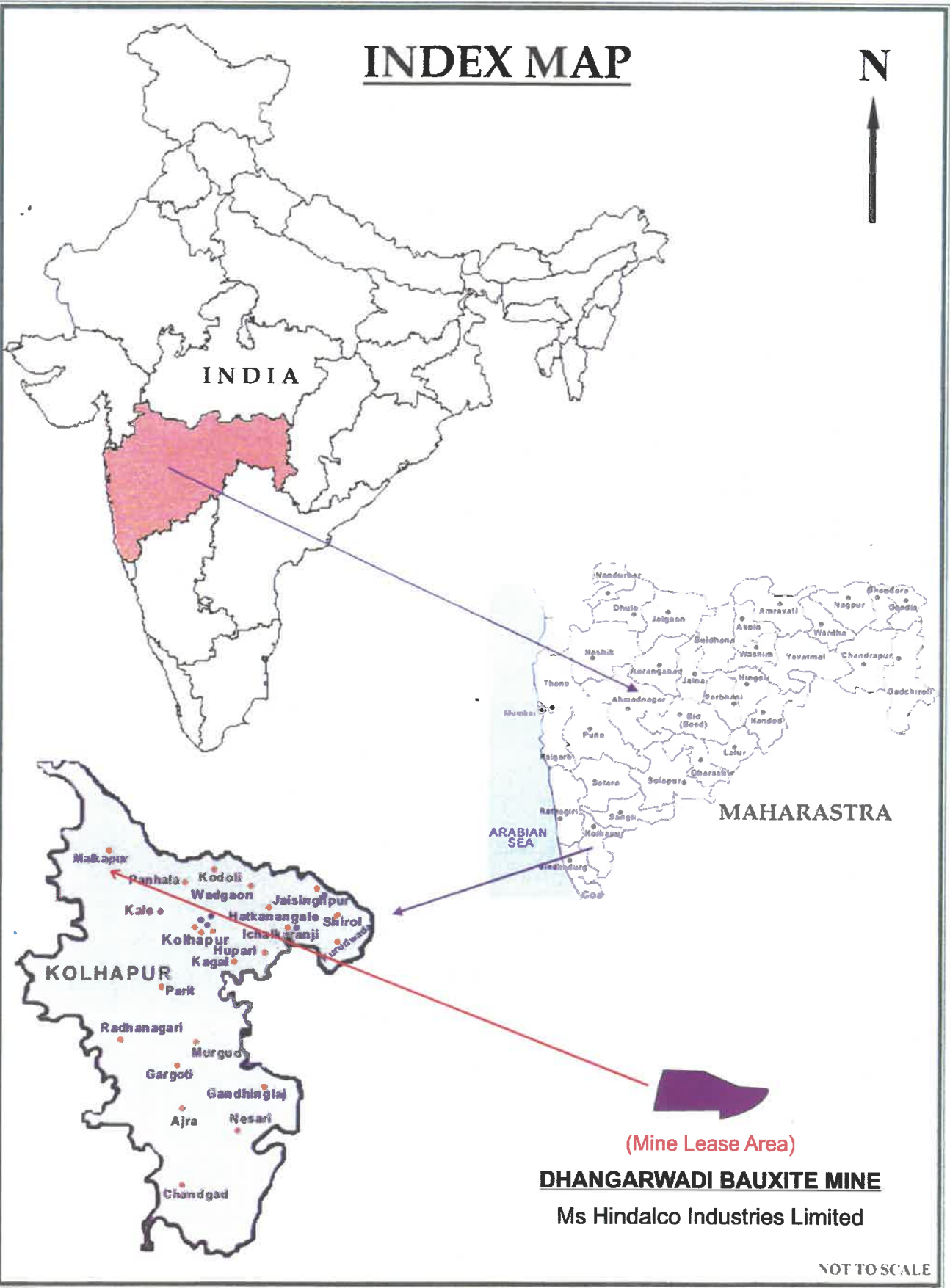
Dhangarwadi bauxite mine is located near Dhangarwadi village of Shahuwadi Tahsil of Kolhapur District in Maharashtra state.

GEOGRAPHICAL DETAILS

Latitude: 16.0°54.0'0.0"
Longitude: 73.0°49.0'5.0"
MSL: 1020 m

INDEX MAP

N



NOT TO SCALE

DETAILS OF LEASE AREA

The following table gives the details of the area in terms of District, Tahsil, Village, Gat no. and Area granted in hecters.

| District | Tahsil | Village | Gat No. | Area Granted (ha) |
|----------|-----------|--------------|--------------|-------------------|
| Kolhapur | Shahuwadi | Dhangarwadi | 45 | 12.32 |
| | | | 46 (p) | 6.53 |
| | | | 50(p) | 2.17 |
| | | | 52 | 10.58 |
| | | | 53(p) | 5.09 |
| | | | 56(p) | 2.76 |
| | | Ainwadi | 106(p) | 2.35 |
| | | Total | 41.80 | |

| DHANGARWADI BAUXITE MINE (M/s. Hindalco Industries Limited) | |
|--|---|
| DETAILS | |
| State | Maharashtra |
| District | Kolhapur |
| Tahsil | Shahuwadi |
| Village | Dhangarwadi |
| Latitude | 16°54'0.0" |
| Longitude | 73°49'5.0" |
| Nature of the area | Plateau terrain |
| Toposheet no. | 47 H/13. |
| GENERAL CLIMATIC CONDITIONS | |
| Maximum temperature | 40.0° C |
| Minimum temperature | 16.0° C |
| ACCESSIBILITY | |
| Road connectivity | Approached by road connecting Dhopeswar Junction which is at a distance of 8 kms, located 6 kms from Malkapur Town on Ratnagiri-Nagpur National Highway (NH-204). |
| Rail connectivity | Kolhapur railway station (56 km) |
| Airport | Kolhapur (60 km) |
| Sea Port | Ratnagiri (95 km) |
| Biosphere reserve | Not any |
| Sanctuary | Chandoli wild life sanctuary is situated at about 20 kms. |



LEGEND

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

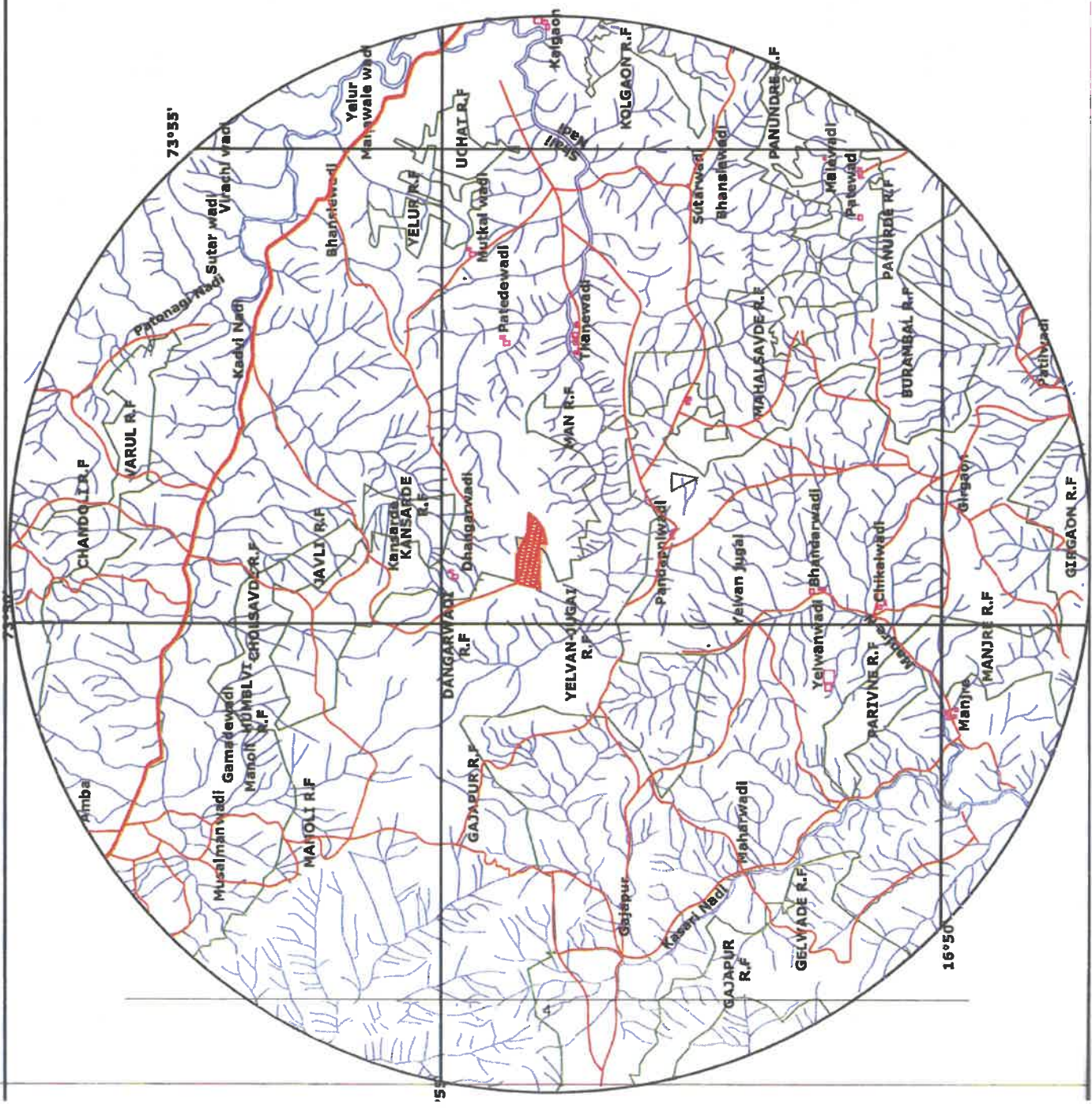


PROJECT: DHANGARWADI BAUXITE MINES

CLIENT :HINDALCO INDUSTRIES LIMITED

TITLE: TOPOGRAPHICAL MAP OF THE STUDY AREA

Prepared By
Equinox Environments India Pvt. Ltd.,
Kolhapur



MICRO-METEOROLOGY

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

PRIMARY / BASIC METEOROLOGICAL PARAMETERS

- Wind Speed (Km/h)
- 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
- Humidity

| Meteorological Data December - 2019 | | | | | | | |
|-------------------------------------|----------------------|-----|---------|-----------------|-----|---------|----------------|
| Date | Temperature/Humidity | | | Wind Speed Km/h | | | Wind Direction |
| | MIN | MAX | AVERAGE | MIN | MAX | AVERAGE | |
| 02.12.2019 | 18 | 30 | 65 | 0 | 8 | 4.0 | E, SE, W |
| 03.12.2019 | 19 | 33 | 67 | 0 | 10 | 5.0 | E, SE, W |
| 09.12.2019 | 17 | 31 | 71 | 0 | 13 | 6.5 | E, SE, W |
| 10.12.2019 | 18 | 32 | 56 | 0 | 12 | 6.0 | E, SE, W |
| 16.12.2019 | 19 | 32 | 58 | 0 | 11 | 5.5 | E, SE, W |
| 17.12.2019 | 17 | 34 | 62 | 0 | 14 | 7.0 | E, SE, W |
| 23.12.2019 | 17 | 32 | 58 | 0 | 10 | 5.5 | E, SE, W |
| 24.12.2019 | 19 | 30 | 62 | 0 | 13 | 7.0 | E, SE, W |

| Meteorological Data January - 2020 | | | | | | | |
|------------------------------------|----------------------|-----|---------|-----------------|-----|---------|----------------|
| Date | Temperature/Humidity | | | Wind Speed Km/h | | | Wind Direction |
| | MIN | MAX | AVERAGE | MIN | MAX | AVERAGE | |
| 06.01.2020 | 17 | 32 | 62 | 0 | 7 | 3.5 | E,W,SE |
| 07.01.2020 | 19 | 34 | 59 | 0 | 10 | 5.0 | E,W,SE |
| 13.01.2020 | 18 | 31 | 60 | 0 | 9 | 4.5 | E,W,SE |
| 14.01.2020 | 17 | 32 | 61 | 0 | 7 | 3.5 | E,W,SE |
| 20.01.2020 | 17 | 34 | 58 | 0 | 12 | 6.0 | E,W,SE |
| 21.01.2020 | 18 | 32 | 59 | 0 | 14 | 7.0 | E,W,SE |
| 27.01.2020 | 19 | 35 | 61 | 0 | 10 | 5.0 | E,W,SE |
| 28.01.2020 | 17 | 34 | 60 | 0 | 11 | 5.5 | E,W,SE |

| Meteorological Data February - 2020 | | | | | | | |
|-------------------------------------|----------------------|-----|---------|-----------------|-----|---------|----------------|
| Date | Temperature/Humidity | | | Wind Speed Km/h | | | Wind Direction |
| | MIN | MAX | AVERAGE | MIN | MAX | AVERAGE | |
| 03.02.2020 | 16 | 32 | 58 | 0 | 8 | 4.0 | W,E,NW |
| 04.02.2020 | 17 | 31 | 60 | 0 | 11 | 5.5 | W,E,NW |
| 10.02.2020 | 16 | 34 | 59 | 0 | 10 | 5.0 | W,E,NW |
| 11.02.2020 | 18 | 35 | 61 | 0 | 11 | 5.5 | W,E,NW |
| 17.02.2020 | 19 | 33 | 60 | 0 | 9 | 4.5 | W,E,NW |
| 18.02.2020 | 18 | 32 | 57 | 0 | 11 | 5.5 | W,E,NW |
| 24.02.2020 | 16 | 34 | 59 | 0 | 8 | 4.0 | W,E,NW |
| 25.02.2020 | 18 | 35 | 60 | 0 | 12 | 6.0 | W,E,NW |

ENVIRONMENTAL QUALITY

Environmental quality monitoring at Dhangarwadi Bauxite Mine of M/s. Hindalco Industries Limited at Dhangarwadi village of Shahuwadi Tahsil, Kolhapur district, Maharashtra includes monitoring of various environmental components like air, noise and soil water quality status within core zone and buffer zone in and 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

Ambient Fine Dust Sampler was used for monitoring particulate matter (PM₁₀), particulate matter (PM_{2.5}) and other gaseous pollutants.

| Sr. No. | Instrument Name | Ambient Fine Dust Sampler |
|---------|-----------------------------|---|
| 1. | Model No. | IPM-FDS-M 2.5 μ /10 μ Fine Dust Sampler |
| 2. | Serial No. | FDSM/2018-19/368-1 |
| 3. | Calibration Details | From 02/08/2019 To 02/07/2020 |
| 4. | Calibration Certificate No. | IPM-FDS/18-19/368-1 |

METHOD FOR TESTING PM₁₀/ PM_{2.5}

| Sr. No. | Content | Details |
|---------|-------------------|--|
| 1. | Name of Pollutant | PM ₁₀ / PM _{2.5} |
| 2. | Medium | Air |
| 3. | Instrument | Respirable Dust Sampler / Fine Particulate Sampler |
| 4. | Duration | 24 hourly |
| 5. | Mode | Continuous |
| 6. | Unit | $\mu\text{g}/\text{m}^3$ |
| 7. | Method | Gravimetric |

METHOD FOR TESTING

| Sr. No. | Name of Pollutant | Sulphur Dioxide | Oxides of Nitrogen | Carbon monoxide |
|---------|-------------------|------------------------------|---|------------------------|
| 1. | Method | Modified West & Geake Method | Modified Jacob & Hochheiser Modified (Na-Arsenite) Method | NDIR Method |
| 2. | Frequency | 24 hourly | 24 hourly | 24 hourly |
| 3. | Mode | Continuous | Continuous | Continuous |
| 4. | Unit | $\mu\text{g}/\text{m}^3$ | $\mu\text{g}/\text{m}^3$ | mg/m^3 |
| 5. | Procedure | AS Per IS 5182 (Part II) | AS Per IS 5182 (Part IV) | NDIR Method |

Monitoring Location Details

Respirable dust sampler and Fine particulate sampler were 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 PM₁₀, PM_{2.5}, SO₂, NO_x, CO and HC collected during winter







season of the year 2019-20 are presented in annexure and are summarized in the following table.

AMBIENT AIR QUALITY MONITORING STATION

| Sl. No. | Station Code | Name Of The Sampling Station | Direction W.R.T. Mines Lease Area |
|----------------|---------------------|-------------------------------------|--|
| 1 | A-1 | Near Mine Working Area | --- |
| 2 | A-2 | Near Dump Site | --- |
| 3 | A-3 | Near Haulage Road | --- |
| 4 | A-4 | Near Mines Office /DG Set | --- |
| 5 | A-5 | Dhangarwadi Village | N |
| 6 | A-6 | Thanewadi Village | ESW |
| 7 | A-7 | Pandapniwadi Village | S |
| 8 | A-8 | Gajapur Village | WSW |



LEGEND

-  **MINE LEASE**
-  **RIVER**
-  **NALLAH**
-  **ROAD**
-  **FOREST BOUNDARY**
-  **AIR MONITORING LOCATIONS**

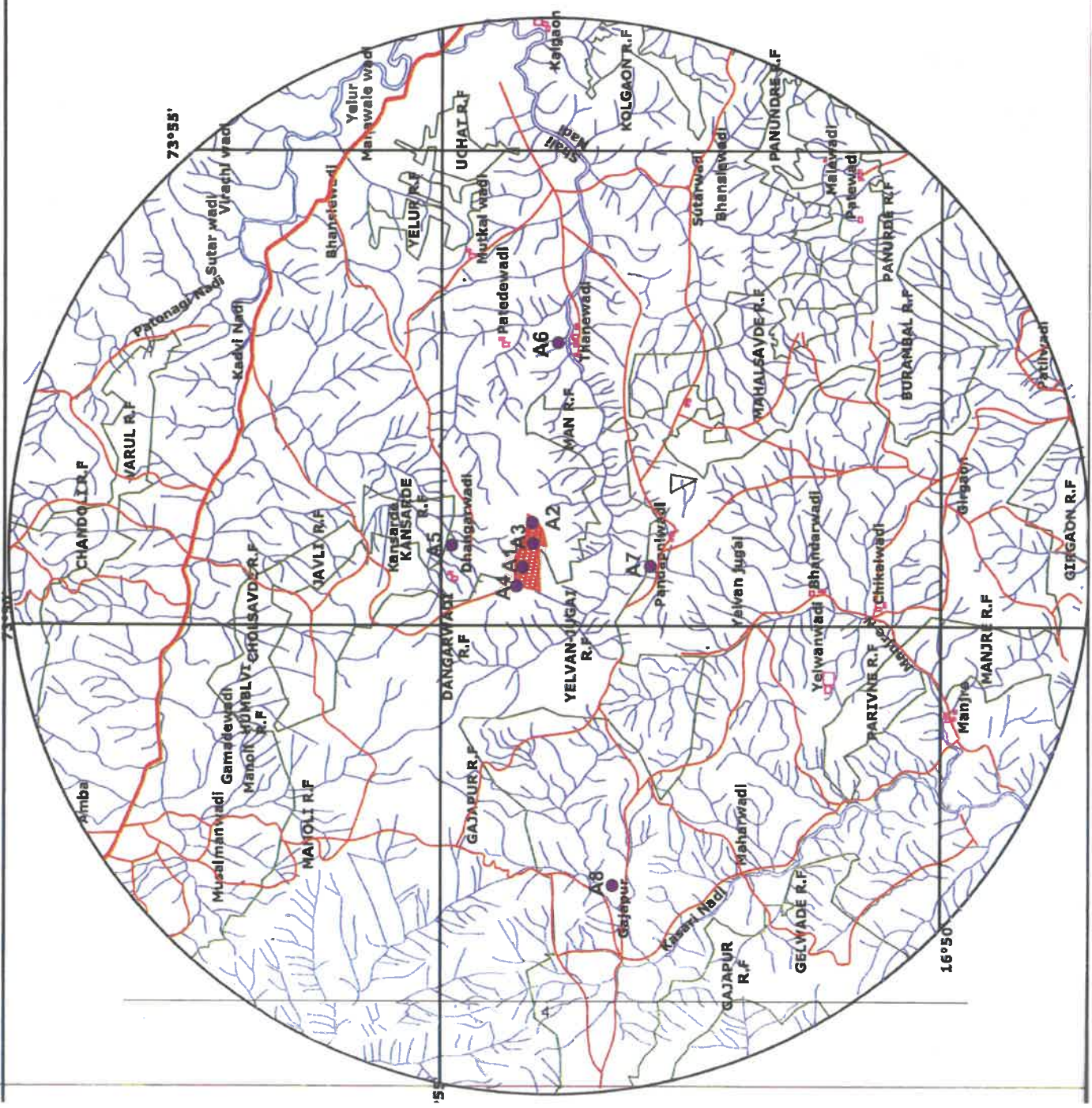


PROJECT: DHANGARWADI BAUXITE MINES

CLIENT :HINDALCO INDUSTRIES LIMITED

TITLE : AIR MONITORING LOCATIONS MAP

**PREPARED BY
EQUINOX ENVIRONMENTS INDIA PVT. LTD.,
KOLHAPUR**





Recognised by Ministry of Environment, Forest & Climate Change (MoEF) Govt. of India and ISO/IEC 17025:2005 (NABL), ISO 9001:2015 and OHSAS 18001:2007 Certified Company

GESEC

Ambient Air Quality Monitoring Report

| | | | |
|---|--|---------------------|----------------------|
| Report No- | GESEC/PRO/2019-20/03/460-483 | Date of Report | 11/03/2020 |
| Name of Client | Equinox Environments (I) Pvt- Ltd-, Kolhapur, Maharashtra | | |
| Project Name & Address | M/s. Hindalco Industries Limited (Dhangarwadi Bauxite Mine) A/P. Dhangarwadi village, Tahsil. Shahuwadi, District. Kolhapur, State. Maharashtra | | |
| Sample Collected and Analyzed by | Green EnviroSafe Engineers & Consultant Pvt- Ltd, Pune, Maharashtra | | |
| Name Of Instrument& Calibration Details | Make | Date of calibration | Calibration Due Date |
| Ambient Fine Dust | Instrumex | 13/04/2019 | 12/04/2020 |
| Calibration Certificate No- TECH/CAL/2019/AP/9 | | | |

NAME OF LOCATION- Station: A1, Near Mine Working Area

| Sampling Date | Date of Sample Registration | Parameter | PM10 µg/m3 | PM2-5 µg/m3 | SO2 µg/m3 | NOX µg/m3 | CO mg/m3 | Hydro-Carbon N.S (µg/m3) |
|------------------------|-----------------------------|-----------|---|--|---|---|---------------------------------|--------------------------------|
| Limit | | | 100 (µg/m3) IS: 5181 (Part-23) 2006 | 60 (µg/m3) IS: 5181 (Part-23) 2006 | 80 (µg/m3) Modified West & Gaeke Method | 80 (µg/m3) Jacob & Hocheiser's Method | 04 (mg/m3) NDIR Method | GC Method |
| December - 2019 | | | | | | | | |
| 02.12.2019 | 04.12.2019 | Week-1 | 51.2 | 17.3 | 09.2 | 13.5 | 0.06 | 0.04 |
| 03.12.2019 | 04.12.2019 | Week-1 | 57.5 | 19.1 | 10.8 | 17.5 | 0.05 | 0.03 |
| 09.12.2019 | 11.12.2019 | Week-2 | 55.4 | 21.0 | 12.5 | 14.8 | 0.02 | 0.05 |
| 10.12.2019 | 11.12.2019 | Week-2 | 56.7 | 18.1 | 10.8 | 16.6 | 0.04 | 0.03 |
| 16.12.2019 | 18.12.2019 | Week-3 | 54.7 | 19.6 | 11.3 | 19.2 | 0.06 | 0.04 |
| 17.12.2019 | 18.12.2019 | Week-3 | 57.7 | 17.7 | 12.2 | 19.4 | 0.08 | 0.02 |
| 23.12.2019 | 25.12.2019 | Week-4 | 54.4 | 21.1 | 13.2 | 20.8 | 0.09 | 0.03 |
| 24.12.2019 | 25.12.2019 | Week-4 | 53.9 | 18.8 | 10.9 | 16.9 | 0.07 | 0.04 |
| January - 2020 | | | | | | | | |
| 06.01.2020 | 08.01.2020 | Week-2 | 54.2 | 20.2 | 08.1 | 17.0 | 0.05 | 0.04 |
| 07.01.2020 | 08.01.2020 | Week-2 | 54.4 | 18.8 | 09.7 | 20.3 | 0.04 | 0.02 |
| 13.01.2020 | 15.01.2020 | Week-3 | 57.7 | 17.1 | 09.8 | 15.8 | 0.03 | 0.05 |
| 14.01.2020 | 15.01.2020 | Week-3 | 56.5 | 16.9 | 13.5 | 16.1 | 0.06 | 0.04 |
| 20.01.2020 | 22.01.2020 | Week-4 | 55.2 | 20.5 | 10.8 | 18.4 | 0.02 | 0.02 |
| 21.01.2020 | 22.01.2020 | Week-4 | 61.2 | 19.4 | 11.0 | 15.7 | 0.01 | 0.04 |
| 27.01.2020 | 29.01.2020 | Week-5 | 60.9 | 20.5 | 10.5 | 14.6 | 0.05 | 0.02 |
| 28.01.2020 | 29.01.2020 | Week-5 | 59.6 | 21.0 | 09.7 | 15.3 | 0.06 | 0.03 |
| February - 2020 | | | | | | | | |
| 03.02.2020 | 05.02.2020 | Week-1 | 53.6 | 17.7 | 11.8 | 18.8 | 0.08 | 0.04 |
| 04.02.2020 | 05.02.2020 | Week-1 | 57.3 | 16.9 | 12.4 | 18.5 | 0.07 | 0.05 |
| 10.02.2020 | 12.02.2020 | Week-2 | 62.2 | 19.8 | 14.3 | 19.4 | 0.09 | 0.05 |
| 11.02.2020 | 12.02.2020 | Week-2 | 51.7 | 20.1 | 12.7 | 20.9 | 0.04 | 0.03 |
| 17.02.2020 | 19.02.2020 | Week-3 | 57.8 | 20.4 | 15.5 | 21.7 | 0.06 | 0.05 |
| 18.02.2020 | 19.02.2020 | Week-3 | 56.5 | 22.1 | 14.6 | 18.1 | 0.05 | 0.04 |
| 24.02.2020 | 26.02.2020 | Week-4 | 55.2 | 20.6 | 13.7 | 18.6 | 0.03 | 0.05 |
| 25.02.2020 | 26.02.2020 | Week-4 | 55.1 | 19.5 | 14.1 | 19.3 | 0.09 | 0.02 |

Remark: All Parameters are within NAAQS Standards.

N.S. - Not Specified

Lab Chemist



Authorized Signatory



Recognised by Ministry of Environment, Forest & Climate Change (MoEF) Govt. of India and ISO/IEC 17025:2005 (NABL), ISO 9001:2015 and OHSAS 18001:2007 Certified Company

Ambient Air Quality Monitoring Report

| | | | | |
|--|--|---------------------|----------------------|-----------------------------|
| Report No- | GESEC/PRO/2019-20/03/484-507 | | Date of Report | 11/03/2020 |
| Name of Client | Equinox Environments (I) Pvt- Ltd-, Kolhapur, Maharashtra | | | |
| Project Name & Address | M/s. Hindalco Industries Limited (Dhangarwadi Bauxite Mine) A/P. Dhangarwadi village, Tahsil. Shahuwadi, District. Kolhapur, State. Maharashtra | | | |
| Sample Collected and Analyzed by | Green EnviroSafe Engineers & Consultant Pvt- Ltd, Pune, Maharashtra- | | | |
| Name Of Instrument & Calibration Details | Make | Date of calibration | Calibration Due Date | Calibration Certificate No- |
| Ambient Fine Dust | Instrumex | 13/04/2019 | 12/04/2020 | TECH/CAL/2019/AP/9 |

NAME OF LOCATION- Station: A2, Near Dump Site

| Sampling Date | Date of Sample Registration | Parameter | 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 | Hydro-Carbon N.S (µg/m ³) |
|------------------------|-----------------------------|-----------|--|---|--|--|--|---|
| | | Limit | 100 (µg/m ³) IS: 5181 (Part-23) 2006 | 60 (µg/m ³) IS: 5181 (Part-23) 2006 | 80 (µg/m ³) (Modified West & Gaeke Method) | 80 (µg/m ³) (Jacob & Hocheiser's Method) | 04 (mg/m ³) NDIR Method | GC Method |
| December - 2019 | | | | | | | | |
| 02.12.2019 | 04.12.2019 | Week-1 | 51.7 | 17.6 | 14.2 | 18.9 | 0.05 | 0.04 |
| 03.12.2019 | 04.12.2019 | Week-1 | 57.4 | 18.4 | 13.8 | 16.4 | 0.08 | 0.05 |
| 09.12.2019 | 11.12.2019 | Week-2 | 61.2 | 18.2 | 14.9 | 17.8 | 0.03 | 0.02 |
| 10.12.2019 | 11.12.2019 | Week-2 | 58.8 | 16.7 | 15.5 | 20.5 | 0.08 | 0.05 |
| 16.12.2019 | 18.12.2019 | Week-3 | 52.5 | 15.6 | 14.2 | 19.6 | 0.05 | 0.02 |
| 17.12.2019 | 18.12.2019 | Week-3 | 53.2 | 18.8 | 16.1 | 20.7 | 0.04 | 0.02 |
| 23.12.2019 | 25.12.2019 | Week-4 | 57.8 | 17.4 | 14.0 | 19.9 | 0.03 | 0.01 |
| 24.12.2019 | 25.12.2019 | Week-4 | 54.5 | 19.5 | 15.5 | 20.0 | 0.06 | 0.05 |
| January - 2020 | | | | | | | | |
| 06.01.2020 | 08.01.2020 | Week-2 | 52.1 | 18.8 | 14.1 | 18.8 | 0.04 | 0.05 |
| 07.01.2020 | 08.01.2020 | Week-2 | 54.5 | 19.6 | 12.7 | 16.1 | 0.03 | 0.03 |
| 13.01.2020 | 15.01.2020 | Week-3 | 57.2 | 17.8 | 14.5 | 18.6 | 0.02 | 0.04 |
| 14.01.2020 | 15.01.2020 | Week-3 | 56.1 | 20.1 | 15.1 | 19.5 | 0.06 | 0.05 |
| 20.01.2020 | 22.01.2020 | Week-4 | 53.5 | 19.5 | 13.9 | 20.7 | 0.08 | 0.05 |
| 21.01.2020 | 22.01.2020 | Week-4 | 51.6 | 17.5 | 17.2 | 21.5 | 0.09 | 0.05 |
| 27.01.2020 | 29.01.2020 | Week-5 | 54.3 | 18.4 | 15.3 | 19.9 | 0.07 | 0.05 |
| 28.01.2020 | 29.01.2020 | Week-5 | 53.0 | 19.7 | 14.7 | 18.4 | 0.06 | 0.02 |
| February - 2020 | | | | | | | | |
| 03.02.2020 | 05.02.2020 | Week-1 | 54.3 | 17.6 | 14.5 | 19.6 | 0.08 | 0.05 |
| 04.02.2020 | 05.02.2020 | Week-1 | 52.8 | 18.5 | 15.3 | 21.1 | 0.05 | 0.03 |
| 10.02.2020 | 12.02.2020 | Week-2 | 54.2 | 16.8 | 12.7 | 18.8 | 0.04 | 0.04 |
| 11.02.2020 | 12.02.2020 | Week-2 | 53.3 | 19.6 | 14.3 | 20.8 | 0.06 | 0.02 |
| 17.02.2020 | 19.02.2020 | Week-3 | 52.6 | 21.1 | 13.8 | 19.6 | 0.01 | 0.05 |
| 18.02.2020 | 19.02.2020 | Week-3 | 51.3 | 17.8 | 14.3 | 21.4 | 0.05 | 0.03 |
| 24.02.2020 | 26.02.2020 | Week-4 | 54.1 | 19.6 | 15.2 | 21.0 | 0.05 | 0.05 |
| 25.02.2020 | 26.02.2020 | Week-4 | 57.4 | 20.4 | 14.1 | 20.5 | 0.06 | 0.05 |

Remark: All Parameters are within NAAQS Standards.

N.S. Not Specified

Lab Chemist




Authorized Signatory

Recognised by Ministry of Environment, Forest & Climate Change (MoEF) Govt. of India and ISO/IEC 17025:2005 (NABL), ISO 9001:2015 and OHSAS 18001:2007 Certified Company

Ambient Air Quality Monitoring Report

| Report No- | | GESEC/PRO/2019-20/03/508-531 | | Date of Report | | 11/03/2020 | | |
|--|-----------------------------|--|--|---|--|--|--|--|
| Name of Client | | Equinox Environments (I) Pvt- Ltd-, Kolhapur, Maharashtra | | | | | | |
| Project Name & Address | | M/s. Hindalco Industries Limited (Dhangarwadi Bauxite Mine) A/P. Dhangarwadi village, Tahsil. Shahuwadi, District. Kolhapur, State. Maharashtra | | | | | | |
| Sample Collected and Analyzed by | | Green Envirosafe Engineers & Consultant Pvt- Ltd, Pune, Maharashtra- | | | | | | |
| Name Of Instrument & Calibration Details | Make | Date of calibration | Calibration Due Date | | Calibration Certificate No- | | | |
| Ambient Fine Dust | Instrumex | 13/04/2019 | 12/04/2020 | | TECH/CAL/2019/AP/9 | | | |
| NAME OF LOCATION- Station: A3, Near Haulage Road | | | | | | | | |
| Sampling Date | Date of Sample Registration | Parameter | 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 | Hydro-Carbon µg/m ³ |
| | | Limit | 100 (µg/m ³) IS: 5181 (Part-23) 2006 | 60 (µg/m ³) IS: 5181 (Part-23) 2006 | 80 (µg/m ³) (Modified West & Gaeke Method) | 80 (µg/m ³) (Jacob & Hocheiser's Method) | 04 (mg/m ³) NDIR Method | N.S (µg/m ³) GC Method |
| December - 2019 | | | | | | | | |
| 02.12.2019 | 04.12.2019 | Week-1 | 51.8 | 18.7 | 12.7 | 19.5 | 0.06 | 0.05 |
| 03.12.2019 | 04.12.2019 | Week-1 | 56.2 | 20.4 | 13.4 | 16.4 | 0.03 | 0.03 |
| 09.12.2019 | 11.12.2019 | Week-2 | 58.5 | 17.8 | 15.1 | 20.1 | 0.04 | 0.01 |
| 10.12.2019 | 11.12.2019 | Week-2 | 52.7 | 19.5 | 14.2 | 18.3 | 0.02 | 0.04 |
| 16.12.2019 | 18.12.2019 | Week-3 | 55.3 | 20.6 | 12.5 | 19.5 | 0.05 | 0.04 |
| 17.12.2019 | 18.12.2019 | Week-3 | 56.1 | 17.5 | 16.1 | 20.7 | 0.06 | 0.05 |
| 23.12.2019 | 25.12.2019 | Week-4 | 54.5 | 19.1 | 13.9 | 21.8 | 0.07 | 0.03 |
| 24.12.2019 | 25.12.2019 | Week-4 | 57.3 | 20.0 | 14.5 | 17.9 | 0.08 | 0.02 |
| January - 2020 | | | | | | | | |
| 06.01.2020 | 08.01.2020 | Week-2 | 55.2 | 18.3 | 12.8 | 21.4 | 0.09 | 0.03 |
| 07.01.2020 | 08.01.2020 | Week-2 | 52.8 | 20.4 | 14.2 | 18.8 | 0.08 | 0.05 |
| 13.01.2020 | 15.01.2020 | Week-3 | 59.2 | 17.8 | 13.2 | 17.5 | 0.06 | 0.05 |
| 14.01.2020 | 15.01.2020 | Week-3 | 52.1 | 18.5 | 14.3 | 19.9 | 0.04 | 0.03 |
| 20.01.2020 | 22.01.2020 | Week-4 | 51.7 | 20.8 | 14.4 | 17.5 | 0.05 | 0.05 |
| 21.01.2020 | 22.01.2020 | Week-4 | 54.5 | 17.7 | 15.0 | 20.2 | 0.07 | 0.02 |
| 27.01.2020 | 29.01.2020 | Week-5 | 55.1 | 20.0 | 13.7 | 21.0 | 0.08 | 0.03 |
| 28.01.2020 | 29.01.2020 | Week-5 | 56.7 | 19.5 | 14.6 | 19.4 | 0.05 | 0.01 |
| February - 2020 | | | | | | | | |
| 03.02.2020 | 05.02.2020 | Week-1 | 55.1 | 18.3 | 15.5 | 18.6 | 0.06 | 0.03 |
| 04.02.2020 | 05.02.2020 | Week-1 | 56.4 | 17.4 | 17.0 | 21.0 | 0.04 | 0.05 |
| 10.02.2020 | 12.02.2020 | Week-2 | 57.2 | 20.8 | 13.6 | 18.2 | 0.05 | 0.02 |
| 11.02.2020 | 12.02.2020 | Week-2 | 54.5 | 17.4 | 14.2 | 17.8 | 0.03 | 0.04 |
| 17.02.2020 | 19.02.2020 | Week-3 | 54.4 | 18.8 | 15.3 | 16.5 | 0.07 | 0.05 |
| 18.02.2020 | 19.02.2020 | Week-3 | 54.3 | 20.0 | 13.2 | 19.7 | 0.08 | 0.05 |
| 24.02.2020 | 26.02.2020 | Week-4 | 51.8 | 18.8 | 12.4 | 20.4 | 0.05 | 0.04 |
| 25.02.2020 | 26.02.2020 | Week-4 | 57.6 | 20.5 | 15.5 | 19.6 | 0.09 | 0.03 |

Remark: All Parameters are within NAAQS Standards.
N.S. Not Specified


Lab Chemist





Authorized Signatory



Recognised by Ministry of Environment, Forest & Climate Change (MoEF) Govt. of India and ISO/IEC 17025:2005 (NABL), ISO 9001:2015 and OHSAS 18001:2007 Certified Company

Ambient Air Quality Monitoring Report

| | | | |
|----------------------------------|--|----------------|------------|
| Report No- | GESEC/PRO/2019-20/03/532-555 | Date of Report | 11/03/2020 |
| Name of Client | Equinox Environments (I) Pvt- Ltd-, Kolhapur, Maharashtra | | |
| Project Name & Address | M/s. Hindalco Industries Limited (Dhangarwadi Bauxite Mine) A/P. Dhangarwadi village, Tahsil. Shahuwadi, District. Kolhapur, State. Maharashtra | | |
| Sample Collected and Analyzed by | Green EnviroSafe Engineers & Consultant Pvt- Ltd, Pune, Maharashtra- | | |

| Name Of Instrument & Calibration Details | Make | Date of calibration | Calibration Due Date | Calibration Certificate No- |
|--|-----------|---------------------|----------------------|-----------------------------|
| Ambient Fine Dust | Instrumex | 13/04/2019 | 12/04/2020 | TECH/CAL/2019/AP/9 |

NAME OF LOCATION- Station: A4, Near Mines Office /DG Set

| Sampling Date | Date of Sample Registration | Parameter | 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 | Hydro-Carbon µg/m ³ |
|------------------------|-----------------------------|-----------|---------------------------------------|--|--------------------------------------|--------------------------------------|----------------------------|-----------------------------------|
| | | Limit | 100 (µg/m ³) | 60 (µg/m ³) | 80 (µg/m ³) | 80 (µg/m ³) | 04 (mg/m ³) | N.S (µg/m ³) |
| Analysis Method | | | IS: 5181 (Part-23) 2006 | IS: 5181 (Part-23) 2006 | (Modified West & Gaeke Method) | (Jacob & Hocheiser's Method) | NDIR Method | GC Method |
| December - 2019 | | | | | | | | |
| 04.12.2019 | 06.12.2019 | Week-1 | 57.4 | 17.2 | 14.2 | 17.6 | 0.07 | 0.05 |
| 05.12.2019 | 06.12.2019 | Week-1 | 55.5 | 16.8 | 12.6 | 19.2 | 0.06 | 0.02 |
| 11.12.2019 | 13.12.2019 | Week-2 | 54.2 | 19.5 | 14.6 | 21.0 | 0.04 | 0.03 |
| 12.12.2019 | 13.12.2019 | Week-2 | 57.7 | 18.7 | 15.7 | 19.8 | 0.05 | 0.03 |
| 18.12.2019 | 20.12.2019 | Week-3 | 52.9 | 16.3 | 15.1 | 17.7 | 0.03 | 0.05 |
| 19.12.2019 | 20.12.2019 | Week-3 | 54.2 | 18.7 | 16.4 | 18.5 | 0.02 | 0.05 |
| 25.12.2019 | 27.12.2019 | Week-4 | 56.3 | 16.5 | 14.2 | 19.3 | 0.05 | 0.03 |
| 26.12.2019 | 27.12.2019 | Week-4 | 57.1 | 17.6 | 15.6 | 21.6 | 0.09 | 0.02 |
| January - 2020 | | | | | | | | |
| 08.01.2020 | 10.01.2020 | Week-2 | 55.2 | 18.2 | 15.4 | 18.9 | 0.05 | 0.04 |
| 09.01.2020 | 10.01.2020 | Week-2 | 57.5 | 19.6 | 13.6 | 21.5 | 0.04 | 0.05 |
| 15.01.2020 | 17.01.2020 | Week-3 | 52.8 | 18.8 | 16.3 | 20.8 | 0.03 | 0.05 |
| 16.01.2020 | 17.01.2020 | Week-3 | 54.2 | 17.6 | 12.1 | 19.7 | 0.03 | 0.03 |
| 22.01.2020 | 24.01.2020 | Week-4 | 53.6 | 18.5 | 13.4 | 17.6 | 0.06 | 0.03 |
| 23.01.2020 | 24.01.2020 | Week-4 | 56.2 | 18.4 | 14.5 | 19.5 | 0.04 | 0.03 |
| 29.01.2020 | 31.01.2020 | Week-5 | 56.1 | 20.1 | 16.6 | 15.2 | 0.05 | 0.05 |
| 30.01.2020 | 31.01.2020 | Week-5 | 52.5 | 17.8 | 17.6 | 19.4 | 0.07 | 0.05 |
| February - 2020 | | | | | | | | |
| 05.02.2020 | 07.02.2020 | Week-1 | 57.4 | 17.5 | 12.0 | 18.2 | 0.06 | 0.05 |
| 06.02.2020 | 07.02.2020 | Week-1 | 55.7 | 16.8 | 16.5 | 17.7 | 0.04 | 0.04 |
| 12.02.2020 | 14.02.2020 | Week-2 | 54.3 | 18.6 | 17.1 | 19.6 | 0.05 | 0.05 |
| 13.02.2020 | 14.02.2020 | Week-2 | 53.5 | 19.0 | 14.4 | 18.1 | 0.02 | 0.03 |
| 19.02.2020 | 21.02.2020 | Week-3 | 55.9 | 17.7 | 15.4 | 19.5 | 0.03 | 0.02 |
| 20.02.2020 | 21.02.2020 | Week-3 | 52.2 | 18.4 | 16.2 | 21.3 | 0.04 | 0.05 |
| 26.02.2020 | 28.02.2020 | Week-4 | 53.8 | 17.9 | 14.6 | 20.1 | 0.06 | 0.04 |
| 27.02.2020 | 28.02.2020 | Week-4 | 56.6 | 18.4 | 15.5 | 19.0 | 0.01 | 0.03 |

Remark: All Parameters are within NAAQS Standards.
N.S. Not Specified

Lab Chemist



Authorized Signatory



Recognised by Ministry of Environment, Forest & Climate Change (MoEF) Govt. of India and ISO/IEC 17025:2005 (NABL), ISO 9001:2015 and OHSAS 18001:2007 Certified Company

GESEC

Ambient Air Quality Monitoring Report

| | | | | |
|--|--|---------------------|----------------------|-----------------------------|
| Report No- | GESEC/PRO/2019-20/03/556-579 | | Date of Report | 11/03/2020 |
| Name of Client | Equinox Environments (I) Pvt- Ltd-, Kolhapur, Maharashtra | | | |
| Project Name & Address | M/s. Hindalco Industries Limited (Dhangarwadi Bauxite Mine) A/P. Dhangarwadi village, Tahsil. Shahuwadi, District. Kolhapur, State. Maharashtra | | | |
| Sample Collected and Analyzed by | Green EnviroSAFE Engineers & Consultant Pvt- Ltd, Pune, Maharashtra- | | | |
| Name Of Instrument & Calibration Details | Make | Date of calibration | Calibration Due Date | Calibration Certificate No- |
| Ambient Fine Dust | Instrumex | 13/04/2019 | 12/04/2020 | TECH/CAL/2019/AP/9 |

NAME OF LOCATION- Station: A 5, Dhangarwadi Village

| Sampling Date | Date of Sample Registration | Parameter | 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 | Hydro-Carbon N.S (µg/m ³) |
|------------------------|-----------------------------|-----------|---------------------------------------|--|--------------------------------------|--------------------------------------|----------------------------|---|
| Limit | | | 100 (µg/m ³) | 60 (µg/m ³) | 80 (µg/m ³) | 80 (µg/m ³) | 04 (mg/m ³) | |
| Analysis Method | | | IS: 5181 (Part-23) 2006 | IS: 5181 (Part-23) 2006 | (Modified West & Gaeke Method) | (Jacob & Hocheiser's Method) | NDIR Method | GC Method |
| December - 2019 | | | | | | | | |
| 04.12.2019 | 06.12.2019 | Week-1 | 45.8 | 14.4 | 11.5 | 15.1 | 0.06 | 0.03 |
| 05.12.2019 | 06.12.2019 | Week-1 | 47.2 | 15.0 | 12.8 | 16.8 | 0.08 | 0.05 |
| 11.12.2019 | 13.12.2019 | Week-2 | 44.8 | 14.8 | 10.4 | 17.7 | 0.03 | 0.03 |
| 12.12.2019 | 13.12.2019 | Week-2 | 48.1 | 14.8 | 11.2 | 18.0 | 0.04 | 0.01 |
| 18.12.2019 | 20.12.2019 | Week-3 | 47.2 | 15.3 | 10.4 | 14.6 | 0.06 | 0.04 |
| 19.12.2019 | 20.12.2019 | Week-3 | 47.7 | 16.5 | 12.8 | 17.5 | 0.07 | 0.03 |
| 25.12.2019 | 27.12.2019 | Week-4 | 45.5 | 13.6 | 09.6 | 15.4 | 0.08 | 0.02 |
| 26.12.2019 | 27.12.2019 | Week-4 | 46.4 | 14.2 | 12.5 | 17.9 | 0.05 | 0.03 |
| January - 2020 | | | | | | | | |
| 08.01.2020 | 10.01.2020 | Week-2 | 45.2 | 12.6 | 11.4 | 14.6 | 0.04 | 0.04 |
| 09.01.2020 | 10.01.2020 | Week-2 | 45.8 | 13.4 | 12.3 | 16.7 | 0.08 | 0.02 |
| 15.01.2020 | 17.01.2020 | Week-3 | 46.7 | 14.8 | 13.3 | 17.1 | 0.06 | 0.04 |
| 16.01.2020 | 17.01.2020 | Week-3 | 47.4 | 15.4 | 10.5 | 14.8 | 0.04 | 0.05 |
| 22.01.2020 | 24.01.2020 | Week-4 | 45.4 | 14.0 | 15.7 | 13.3 | 0.09 | 0.05 |
| 23.01.2020 | 24.01.2020 | Week-4 | 46.2 | 13.5 | 13.0 | 16.5 | 0.02 | 0.03 |
| 29.01.2020 | 31.01.2020 | Week-5 | 46.4 | 14.9 | 10.4 | 14.5 | 0.05 | 0.03 |
| 30.01.2020 | 31.01.2020 | Week-5 | 46.2 | 15.7 | 12.5 | 16.3 | 0.09 | 0.02 |
| February - 2020 | | | | | | | | |
| 05.02.2020 | 07.02.2020 | Week-1 | 46.7 | 13.6 | 10.6 | 15.8 | 0.08 | 0.02 |
| 06.02.2020 | 07.02.2020 | Week-1 | 45.5 | 12.8 | 12.3 | 13.1 | 0.04 | 0.04 |
| 12.02.2020 | 14.02.2020 | Week-2 | 47.3 | 14.1 | 13.5 | 12.5 | 0.03 | 0.05 |
| 13.02.2020 | 14.02.2020 | Week-2 | 43.3 | 11.7 | 10.5 | 14.7 | 0.05 | 0.03 |
| 19.02.2020 | 21.02.2020 | Week-3 | 44.5 | 12.6 | 12.1 | 15.5 | 0.02 | 0.03 |
| 20.02.2020 | 21.02.2020 | Week-3 | 45.6 | 15.4 | 11.4 | 12.6 | 0.06 | 0.02 |
| 26.02.2020 | 28.02.2020 | Week-4 | 46.8 | 14.5 | 11.6 | 14.9 | 0.04 | 0.05 |
| 27.02.2020 | 28.02.2020 | Week-4 | 43.3 | 13.9 | 10.3 | 15.3 | 0.03 | 0.01 |

Remark: All Parameters are within NAAQS Standards.

N.S. Not Specified

Lab Chemist



Authorized Signatory



Recognised by Ministry of Environment, Forest & Climate Change (MoEF) Govt. of India and ISO/IEC 17025:2005 (NABL), ISO 9001:2015 and OHSAS 18001:2007 Certified Company

Ambient Air Quality Monitoring Report

| | | | |
|----------------------------------|--|----------------|------------|
| Report No- | GESEC/PRO/2019-20/03/580-603 | Date of Report | 11/03/2020 |
| Name of Client | Equinox Environments (I) Pvt- Ltd-, Kolhapur, Maharashtra | | |
| Project Name & Address | M/s. Hindalco Industries Limited (Dhangarwadi Bauxite Mine) A/P. Dhangarwadi village, Tahsil. Shahuwadi, District. Kolhapur, State. Maharashtra | | |
| Sample Collected and Analyzed by | Green EnviroSAFE Engineers & Consultant Pvt- Ltd, Pune, Maharashtra- | | |

| Name Of Instrument & Calibration Details | Make | Date of calibration | Calibration Due Date | Calibration Certificate No- |
|--|-----------|---------------------|----------------------|-----------------------------|
| Ambient Fine Dust | Instrumex | 13/04/2019 | 12/04/2020 | TECH/CAL/2019/AP/9 |

NAME OF LOCATION- Station: A6, Thanewadi Village

| Sampling Date | Date of Sample Registration | Parameter | 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 | Hydro-Carbon N.S (µg/m ³) |
|-----------------|-----------------------------|-----------|------------------------------------|-------------------------------------|-----------------------------------|-----------------------------------|-------------------------|---------------------------------------|
| | | Limit | 100 (µg/m ³) | 60 (µg/m ³) | 80 (µg/m ³) | 80 (µg/m ³) | 04 (mg/m ³) | |
| Analysis Method | | | IS: 5181 (Part-23) 2006 | IS: 5181 (Part-23) 2006 | (Modified West & Gaeke Method) | (Jacob & Hocheiser's Method) | NDIR Method | GC Method |

December - 2019

| | | | | | | | | |
|------------|------------|--------|------|------|------|------|------|------|
| 04.12.2019 | 06.12.2019 | Week-1 | 44.8 | 11.6 | 11.5 | 13.8 | 0.05 | 0.03 |
| 05.12.2019 | 06.12.2019 | Week-1 | 49.1 | 13.8 | 13.2 | 15.1 | 0.04 | 0.04 |
| 11.12.2019 | 13.12.2019 | Week-2 | 47.5 | 12.5 | 10.5 | 13.6 | 0.09 | 0.02 |
| 12.12.2019 | 13.12.2019 | Week-2 | 48.1 | 15.4 | 12.1 | 14.4 | 0.06 | 0.03 |
| 18.12.2019 | 20.12.2019 | Week-3 | 46.5 | 13.7 | 11.4 | 15.8 | 0.04 | 0.04 |
| 19.12.2019 | 20.12.2019 | Week-3 | 45.6 | 14.6 | 13.1 | 17.5 | 0.02 | 0.02 |
| 25.12.2019 | 27.12.2019 | Week-4 | 45.3 | 13.8 | 12.4 | 15.3 | 0.06 | 0.01 |
| 26.12.2019 | 27.12.2019 | Week-4 | 48.6 | 15.0 | 11.6 | 13.7 | 0.03 | 0.03 |

January - 2020

| | | | | | | | | |
|------------|------------|--------|------|------|------|------|------|------|
| 08.01.2020 | 10.01.2020 | Week-2 | 46.4 | 14.1 | 11.3 | 13.8 | 0.04 | 0.03 |
| 09.01.2020 | 10.01.2020 | Week-2 | 43.3 | 16.6 | 13.2 | 14.3 | 0.02 | 0.02 |
| 15.01.2020 | 17.01.2020 | Week-3 | 45.5 | 12.7 | 10.4 | 17.4 | 0.06 | 0.04 |
| 16.01.2020 | 17.01.2020 | Week-3 | 44.9 | 13.3 | 09.9 | 15.6 | 0.04 | 0.03 |
| 22.01.2020 | 24.01.2020 | Week-4 | 45.8 | 14.0 | 11.4 | 16.1 | 0.07 | 0.02 |
| 23.01.2020 | 24.01.2020 | Week-4 | 44.4 | 13.8 | 10.2 | 16.3 | 0.03 | 0.01 |
| 29.01.2020 | 31.01.2020 | Week-5 | 45.5 | 12.5 | 13.3 | 19.5 | 0.06 | 0.02 |
| 30.01.2020 | 31.01.2020 | Week-5 | 46.5 | 13.6 | 12.6 | 16.7 | 0.04 | 0.04 |

February - 2020

| | | | | | | | | |
|------------|------------|--------|------|------|------|------|------|------|
| 05.02.2020 | 07.02.2020 | Week-1 | 44.4 | 12.7 | 11.0 | 15.1 | 0.05 | 0.02 |
| 06.02.2020 | 07.02.2020 | Week-1 | 46.2 | 11.9 | 13.2 | 16.5 | 0.09 | 0.04 |
| 12.02.2020 | 14.02.2020 | Week-2 | 47.2 | 13.5 | 10.4 | 16.7 | 0.08 | 0.03 |
| 13.02.2020 | 14.02.2020 | Week-2 | 46.6 | 13.8 | 13.0 | 17.9 | 0.02 | 0.05 |
| 19.02.2020 | 21.02.2020 | Week-3 | 46.4 | 14.5 | 11.2 | 13.7 | 0.04 | 0.02 |
| 20.02.2020 | 21.02.2020 | Week-3 | 45.5 | 15.4 | 10.4 | 14.8 | 0.06 | 0.03 |
| 26.02.2020 | 28.02.2020 | Week-4 | 46.3 | 12.4 | 10.8 | 15.0 | 0.08 | 0.04 |
| 27.02.2020 | 28.02.2020 | Week-4 | 44.9 | 12.1 | 11.5 | 16.6 | 0.05 | 0.03 |

Remark: All Parameters are within NAAQS Standards.

N.S. Not Specified

Lab Chemist



Authorized Signatory



Recognised by Ministry of Environment, Forest & Climate Change (MoEF) Govt. of India and ISO/IEC 17025:2005 (NABL), ISO 9001:2015 and OHSAS 18001:2007 Certified Company

GESEC

Ambient Air Quality Monitoring Report

| | | | | | | | | |
|--|------------------------------------|--|---|--|--|--|----------------------------------|--|
| Report No- | | GESEC/PRO/2019-20/03/604-627 | | | Date of Report | | 11/03/2020 | |
| Name of Client | | Equinox Environments (I) Pvt- Ltd-, Kolhapur, Maharashtra | | | | | | |
| Project Name & Address | | M/s. Hindalco Industries Limited (Dhangarwadi Bauxite Mine) A/P. Dhangarwadi village, Tahsil. Shahuwadi, District. Kolhapur, State. Maharashtra | | | | | | |
| Sample Collected and Analyzed by | | Green EnviroSAFE Engineers & Consultant Pvt- Ltd, Pune, Maharashtra- | | | | | | |
| Name Of Instrument & Calibration Details | Make | Date of calibration | Calibration Due Date | | Calibration Certificate No- | | | |
| Ambient Fine Dust | Instrumex | 13/04/2019 | 12/04/2020 | | TECH/CAL/2019/AP/9 | | | |
| NAME OF LOCATION- Station: A7, Pandarpaniwadi Village | | | | | | | | |
| Sampling Date | Date of Sample Registration | Parameter | PM₁₀ µg/m³ | PM_{2.5} µg/m³ | SO₂ µg/m³ | NO_x µg/m³ | CO mg/m³ | Hydro-Carbon N.S (µg/m³) |
| | | Limit | 100 (µg/m³) | 60 (µg/m³) | 80 (µg/m³) | 80 (µg/m³) | 04 (mg/m³) | |
| Analysis Method | | | IS: 5181 (Part-23) 2006 | IS: 5181 (Part-23) 2006 | (Modified West & Gaeke Method) | (Jacob & Hocheiser's Method) | NDIR Method | GC Method |
| December - 2019 | | | | | | | | |
| 06.12.2019 | 09.12.2019 | Week-1 | 44.8 | 12.8 | 11.4 | 16.6 | 0.06 | 0.02 |
| 07.12.2019 | 09.12.2019 | Week-1 | 47.1 | 12.6 | 10.1 | 15.3 | 0.04 | 0.05 |
| 13.12.2019 | 16.12.2019 | Week-2 | 46.3 | 14.1 | 13.3 | 17.7 | 0.02 | 0.03 |
| 14.12.2019 | 16.12.2019 | Week-2 | 44.6 | 12.5 | 10.5 | 15.1 | 0.04 | 0.02 |
| 20.12.2019 | 23.12.2019 | Week-3 | 42.7 | 13.3 | 09.8 | 13.5 | 0.06 | 0.04 |
| 21.12.2019 | 23.12.2019 | Week-3 | 45.8 | 13.5 | 11.0 | 15.4 | 0.05 | 0.02 |
| 27.12.2019 | 30.12.2019 | Week-4 | 47.6 | 14.4 | 13.1 | 17.4 | 0.01 | 0.03 |
| 28.12.2019 | 30.12.2019 | Week-4 | 45.1 | 12.4 | 10.5 | 15.2 | 0.02 | 0.04 |
| January - 2020 | | | | | | | | |
| 03.01.2020 | 06.01.2020 | Week-1 | 44.4 | 14.2 | 12.4 | 16.2 | 0.06 | 0.02 |
| 04.01.2020 | 06.01.2020 | Week-1 | 45.4 | 13.8 | 09.9 | 15.8 | 0.08 | 0.04 |
| 10.01.2020 | 13.01.2020 | Week-2 | 47.0 | 14.4 | 13.5 | 17.6 | 0.05 | 0.03 |
| 11.01.2020 | 13.01.2020 | Week-2 | 45.3 | 12.5 | 12.3 | 16.5 | 0.06 | 0.01 |
| 17.01.2020 | 20.01.2020 | Week-3 | 46.1 | 13.7 | 11.8 | 15.5 | 0.04 | 0.03 |
| 18.01.2020 | 20.01.2020 | Week-3 | 46.4 | 12.5 | 10.2 | 14.4 | 0.09 | 0.02 |
| 24.01.2020 | 27.01.2020 | Week-4 | 44.3 | 13.4 | 10.2 | 13.5 | 0.04 | 0.02 |
| 25.01.2020 | 27.01.2020 | Week-4 | 47.8 | 14.3 | 09.7 | 14.2 | 0.08 | 0.03 |
| February - 2020 | | | | | | | | |
| 07.02.2020 | 10.02.2020 | Week-2 | 46.2 | 13.7 | 12.1 | 15.6 | 0.06 | 0.01 |
| 08.02.2020 | 17.02.2020 | Week-2 | 45.4 | 15.8 | 09.3 | 13.4 | 0.05 | 0.03 |
| 14.02.2020 | 17.02.2020 | Week-3 | 46.2 | 13.7 | 11.3 | 16.8 | 0.03 | 0.03 |
| 15.02.2020 | 17.02.2020 | Week-3 | 47.2 | 16.1 | 12.6 | 18.5 | 0.04 | 0.04 |
| 21.02.2020 | 24.02.2020 | Week-4 | 44.5 | 15.6 | 10.2 | 15.5 | 0.05 | 0.05 |
| 22.02.2020 | 24.02.2020 | Week-4 | 45.1 | 12.8 | 12.4 | 16.7 | 0.06 | 0.02 |
| 28.02.2020 | 02.03.2020 | Week-5 | 43.3 | 13.4 | 13.3 | 15.2 | 0.01 | 0.02 |
| 29.02.2020 | 02.03.2020 | Week-5 | 45.5 | 14.9 | 11.4 | 16.3 | 0.02 | 0.03 |

Remark: All Parameters are within NAAQS Standards.

N.S. Not Specified

Lab Chemist



Authorized Signatory



Recognised by Ministry of Environment, Forest & Climate Change (MoEF) Govt. of India and ISO/IEC 17025:2005 (NABL), ISO 9001:2015 and OHSAS 18001:2007 Certified Company

Ambient Air Quality Monitoring Report

| | | | | |
|---|--|----------------------------|-----------------------------|------------------------------------|
| Report No- | GESEC/PRO/2019-20/03/628-651 | | Date of Report | 11/03/2020 |
| Name of Client | Equinox Environments (I) Pvt- Ltd-, Kolhapur, Maharashtra | | | |
| Project Name & Address | M/s. Hindalco Industries Limited (Dhangarwadi Bauxite Mine) A/P. Dhangarwadi village, Tahsil. Shahuwadi, District. Kolhapur, State. Maharashtra | | | |
| Sample Collected and Analyzed by | Green EnviroSAFE Engineers & Consultant Pvt- Ltd, Pune, Maharashtra- | | | |
| Name Of Instrument & Calibration Details | Make | Date of calibration | Calibration Due Date | Calibration Certificate No- |
| Ambient Fine Dust | Instrumex | 13/04/2019 | 12/04/2020 | TECH/CAL/2019/AP/9 |

NAME OF LOCATION- Station: A 8, Gajapur Village

| Sampling Date | Date of Sample Registration | Parameter | 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 | Hydro-Carbon |
|------------------------|-----------------------------|--------------|---------------------------------------|--|--------------------------------------|--------------------------------------|-----------------------------------|------------------------------------|
| | | Limit | 100 (µg/m ³) | 60 (µg/m ³) | 80 (µg/m ³) | 80 (µg/m ³) | 04 (mg/m ³) | N.S (µg/m ³) |
| Analysis Method | | | IS: 5181 (Part-23) 2006 | IS: 5181 (Part-23) 2006 | (Modified West & Gaeke Method) | (Jacob & Hocheiser's Method) | NDIR Method | GC Method |
| December - 2019 | | | | | | | | |
| 06.12.2019 | 09.12.2019 | Week-1 | 44.7 | 13.6 | 11.3 | 15.5 | 0.05 | 0.03 |
| 07.12.2019 | 09.12.2019 | Week-1 | 46.2 | 14.4 | 12.6 | 14.7 | 0.03 | 0.01 |
| 13.12.2019 | 16.12.2019 | Week-2 | 45.3 | 12.5 | 10.5 | 16.4 | 0.04 | 0.04 |
| 14.12.2019 | 16.12.2019 | Week-2 | 46.8 | 14.5 | 09.4 | 15.8 | 0.06 | 0.03 |
| 20.12.2019 | 23.12.2019 | Week-3 | 47.5 | 12.6 | 13.1 | 17.4 | 0.03 | 0.02 |
| 21.12.2019 | 23.12.2019 | Week-3 | 46.1 | 14.0 | 11.8 | 17.0 | 0.04 | 0.02 |
| 27.12.2019 | 30.12.2019 | Week-4 | 45.1 | 15.1 | 13.3 | 18.3 | 0.06 | 0.03 |
| 28.12.2019 | 30.12.2019 | Week-4 | 47.5 | 13.7 | 10.2 | 19.6 | 0.04 | 0.01 |
| January - 2020 | | | | | | | | |
| 03.01.2020 | 06.01.2020 | Week-1 | 43.4 | 14.3 | 11.5 | 13.3 | 0.04 | 0.02 |
| 04.01.2020 | 06.01.2020 | Week-1 | 46.3 | 12.5 | 12.1 | 14.6 | 0.03 | 0.03 |
| 10.01.2020 | 13.01.2020 | Week-2 | 45.1 | 12.8 | 10.6 | 11.8 | 0.05 | 0.01 |
| 11.01.2020 | 13.01.2020 | Week-2 | 44.4 | 13.2 | 12.2 | 17.4 | 0.06 | 0.04 |
| 17.01.2020 | 20.01.2020 | Week-3 | 46.5 | 12.5 | 11.5 | 15.5 | 0.07 | 0.03 |
| 18.01.2020 | 20.01.2020 | Week-3 | 47.5 | 13.7 | 12.3 | 12.4 | 0.03 | 0.02 |
| 24.01.2020 | 27.01.2020 | Week-4 | 45.2 | 14.1 | 11.9 | 16.9 | 0.06 | 0.02 |
| 25.01.2020 | 27.01.2020 | Week-4 | 47.4 | 12.4 | 12.5 | 16.0 | 0.04 | 0.03 |
| February - 2020 | | | | | | | | |
| 07.02.2020 | 10.02.2020 | Week-2 | 46.6 | 13.6 | 09.8 | 13.8 | 0.04 | 0.02 |
| 08.02.2020 | 17.02.2020 | Week-2 | 47.4 | 12.8 | 13.2 | 15.1 | 0.03 | 0.03 |
| 14.02.2020 | 17.02.2020 | Week-3 | 51.1 | 14.2 | 10.6 | 16.5 | 0.05 | 0.04 |
| 15.02.2020 | 17.02.2020 | Week-3 | 46.3 | 12.4 | 12.3 | 17.5 | 0.04 | 0.03 |
| 21.02.2020 | 24.02.2020 | Week-4 | 48.5 | 12.6 | 10.4 | 15.6 | 0.05 | 0.02 |
| 22.02.2020 | 24.02.2020 | Week-4 | 44.1 | 13.4 | 11.4 | 16.5 | 0.03 | 0.04 |
| 28.02.2020 | 02.03.2020 | Week-5 | 46.3 | 15.8 | 10.8 | 14.7 | 0.06 | 0.04 |
| 29.02.2020 | 02.03.2020 | Week-5 | 45.5 | 12.5 | 12.7 | 15.4 | 0.09 | 0.05 |

Remark: All Parameters are within NAAQS Standards.

N.S. Not Specified

Lab Chemist



Authorized Signatory

Summary of Ambient Air Quality

| S. No. | Location | | 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) | HC (µg/m ³) |
|--------|---------------------------|-----------------|--|---|---|---|----------------------------|----------------------------|
| 1 | Near Mine Working Area | Min | 51.20 | 16.90 | 08.10 | 13.50 | 0.01 | 0.02 |
| | | Max | 62.20 | 22.10 | 15.50 | 21.70 | 0.09 | 0.05 |
| | | Mean | 56.28 | 19.34 | 11.80 | 17.80 | 0.05 | 0.04 |
| | | 10th percentile | 53.69 | 17.16 | 09.70 | 14.95 | 0.02 | 0.02 |
| | | 30th percentile | 54.67 | 18.73 | 10.80 | 16.55 | 0.04 | 0.03 |
| | | 50th percentile | 55.95 | 19.55 | 11.55 | 18.25 | 0.06 | 0.04 |
| | | 95th percentile | 61.16 | 21.09 | 14.56 | 20.89 | 0.09 | 0.05 |
| | | 98th percentile | 61.74 | 21.64 | 15.09 | 21.33 | 0.09 | 0.05 |
| 2 | Near Dump Site | Min | 51.30 | 15.60 | 12.70 | 16.10 | 0.01 | 0.01 |
| | | Max | 61.20 | 21.10 | 17.20 | 21.50 | 0.09 | 0.05 |
| | | Mean | 54.56 | 18.54 | 14.58 | 19.59 | 0.05 | 0.04 |
| | | 10th percentile | 51.82 | 16.98 | 13.80 | 17.98 | 0.03 | 0.02 |
| | | 30th percentile | 52.18 | 17.78 | 14.10 | 18.89 | 0.04 | 0.03 |
| | | 50th percentile | 54.15 | 18.45 | 14.40 | 19.75 | 0.05 | 0.05 |
| | | 95th percentile | 58.65 | 20.36 | 16.01 | 21.36 | 0.08 | 0.05 |
| | | 98th percentile | 60.10 | 20.78 | 16.69 | 21.45 | 0.09 | 0.05 |
| 3 | Near Haulage Road | Min | 51.70 | 17.40 | 12.40 | 16.40 | 0.02 | 0.01 |
| | | Max | 59.20 | 20.80 | 17.00 | 21.80 | 0.09 | 0.05 |
| | | Mean | 55.04 | 19.11 | 14.22 | 19.24 | 0.06 | 0.04 |
| | | 10th percentile | 51.89 | 17.56 | 12.73 | 17.50 | 0.03 | 0.02 |
| | | 30th percentile | 54.39 | 18.30 | 13.58 | 18.29 | 0.05 | 0.03 |
| | | 50th percentile | 55.10 | 18.95 | 14.20 | 19.50 | 0.06 | 0.04 |
| | | 95th percentile | 58.37 | 20.77 | 16.01 | 21.34 | 0.09 | 0.05 |
| | | 98th percentile | 58.88 | 20.80 | 16.59 | 21.62 | 0.09 | 0.05 |
| 4 | Near Mines Office /DG Set | Min | 52.20 | 16.30 | 12.00 | 15.20 | 0.01 | 0.02 |
| | | Max | 57.70 | 20.10 | 17.60 | 21.60 | 0.09 | 0.05 |
| | | Mean | 55.12 | 18.11 | 14.98 | 19.20 | 0.05 | 0.04 |
| | | 10th percentile | 52.83 | 16.80 | 12.84 | 17.63 | 0.02 | 0.02 |
| | | 30th percentile | 54.16 | 17.60 | 14.38 | 18.47 | 0.04 | 0.03 |
| | | 50th percentile | 55.35 | 18.30 | 15.25 | 19.35 | 0.05 | 0.04 |
| | | 95th percentile | 57.49 | 19.59 | 17.03 | 21.47 | 0.07 | 0.05 |
| | | 98th percentile | 57.61 | 19.87 | 17.37 | 21.55 | 0.08 | 0.05 |
| 5 | Dhangarwadi Village | Min | 43.30 | 11.70 | 09.60 | 12.50 | 0.02 | 0.01 |
| | | Max | 48.10 | 16.50 | 15.70 | 18.00 | 0.09 | 0.05 |
| | | Mean | 46.04 | 14.23 | 11.78 | 15.47 | 0.05 | 0.03 |
| | | 10th percentile | 44.59 | 12.66 | 10.40 | 13.16 | 0.03 | 0.02 |
| | | 30th percentile | 45.50 | 13.60 | 10.59 | 14.69 | 0.04 | 0.03 |
| | | 50th percentile | 46.20 | 14.30 | 11.55 | 15.35 | 0.05 | 0.03 |
| | | 95th percentile | 47.66 | 15.66 | 13.47 | 17.87 | 0.09 | 0.05 |
| | | 98th percentile | 47.92 | 16.13 | 14.69 | 17.95 | 0.09 | 0.05 |
| 6 | Thanewadi | Min | 43.30 | 11.60 | 09.90 | 13.60 | 0.02 | 0.01 |

| | | | | | | | | |
|-----------------|--------------------------|-----------------|-------|-------|-------|-------|------|------|
| | Village | Max | 49.10 | 16.60 | 13.30 | 19.50 | 0.09 | 0.05 |
| | | Mean | 46.05 | 13.64 | 11.65 | 15.63 | 0.05 | 0.03 |
| | | 10th percentile | 44.52 | 12.19 | 10.40 | 13.73 | 0.02 | 0.02 |
| | | 30th percentile | 45.48 | 12.70 | 10.98 | 14.76 | 0.04 | 0.02 |
| | | 50th percentile | 46.00 | 13.75 | 11.45 | 15.45 | 0.05 | 0.03 |
| | | 95th percentile | 48.53 | 15.40 | 13.20 | 17.84 | 0.09 | 0.04 |
| | | 98th percentile | 48.87 | 16.05 | 13.25 | 18.76 | 0.09 | 0.05 |
| 7 | Pandapniwa di Village | Min | 42.70 | 12.40 | 09.30 | 13.40 | 0.01 | 0.01 |
| | | Max | 47.80 | 16.10 | 13.50 | 18.50 | 0.09 | 0.05 |
| | | Mean | 45.59 | 13.77 | 11.35 | 15.75 | 0.05 | 0.03 |
| | | 10th percentile | 44.33 | 12.50 | 09.83 | 13.71 | 0.02 | 0.02 |
| | | 30th percentile | 45.07 | 13.25 | 10.20 | 15.20 | 0.04 | 0.02 |
| | | 50th percentile | 45.45 | 13.70 | 11.35 | 15.55 | 0.05 | 0.03 |
| | | 95th percentile | 47.54 | 15.77 | 13.30 | 17.69 | 0.08 | 0.05 |
| 8 | Gajapur Village | 98th percentile | 47.71 | 15.96 | 13.41 | 18.13 | 0.09 | 0.05 |
| | | Min | 44.10 | 12.40 | 09.40 | 13.80 | 0.03 | 0.01 |
| | | Max | 51.10 | 15.80 | 13.30 | 19.60 | 0.09 | 0.05 |
| | | Mean | 46.70 | 13.54 | 11.44 | 16.04 | 0.05 | 0.03 |
| | | 10th percentile | 44.82 | 12.50 | 09.92 | 14.70 | 0.03 | 0.02 |
| | | 30th percentile | 46.04 | 12.60 | 10.59 | 15.37 | 0.04 | 0.02 |
| | | 50th percentile | 46.30 | 13.50 | 11.35 | 15.70 | 0.04 | 0.03 |
| 95th percentile | 50.71 | 15.70 | 13.20 | 18.18 | 0.09 | 0.05 | | |
| | | 98th percentile | 51.10 | 15.80 | 13.25 | 19.00 | 0.09 | 0.05 |

Remark:

All the obtained air quality values in core zone and buffer zone as compared with the air quality standards prescribed by Central Pollution Control Board 2009 are found to be within the limit.



Recognised by Ministry of Environment, Forest & Climate Change (MoEF) Govt. of India and ISO/IEC 17025:2005 (NABL), ISO 9001:2015 and OHSAS 18001:2007 Certified Company

Stack Analysis Report

| | | | |
|--|--|----------------------|-----------------------------|
| Report No. | GESEC/PRO/2019-20/03/670 | Date of Report | 11/03/2020 |
| Name of Client | Equinox Environments (I) Pvt. Ltd., Kolhapur, Maharashtra. | | |
| Project Name and Address | M/s. Hindalco Industries Limited, (Dhangarwadi Bauxite Mine), A/P. Dhangarwadi Village, Tahsil. Shahuwadi, District. Kolhapur, State. Maharashtra. | | |
| Sample Collected By | Green EnviroSafe Engineers & Consultant Pvt. Ltd, Pune, Maharashtra. | | |
| Date of Sampling | 16/12/2019 | | |
| Name of Instrument & Calibration Details | Date of calibration | Calibration Due Date | Calibration Certificate No. |
| Stack Monitoring Kit | 22/11/2019 | 21/11/2020 | POLLTECH/F/SMS/11-19/119 |
| Analysis Method | Emission testing Methodology for Air Pollution-EPA | | |

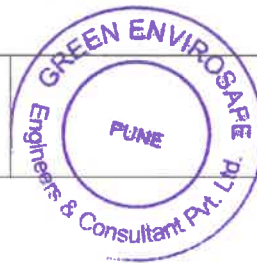
Stack Details

| | | | |
|----------------------------------|--------------------|--|------------|
| Stack –attached to | DG (45 KVA) [-II-] | I.D. of stack at port (m)D | 0.10 |
| Crossection of the stack | Round | Stack crossectional area (m ²) | 0.0079 |
| Height of stack above ground (m) | 5.50 | Consumption of fuel (l/hr) | 3.00 |
| Fuel used | HSD | Load on the system | Approx.90% |

Emission details

| Sr. No. | Particulars | Value |
|---------|--|--------|
| 1 | Temperature (°C) | 125.00 |
| 2 | Differential Pressure | 0.60 |
| 3 | Velocity of the gas (m/sec) | 2.95 |
| 4 | Gas flow rate at NTP (Nm ³ /hr) | 61.80 |
| 5 | Particulate matter | 24.70 |
| 6 | SO ₂ (Kg/Hr) | 0.0053 |

ANALYZED BY



AUTHORIZED SIGNATORY-

Terms and conditions

- The report is refer only to the sample tested and not applies to the bulk.
- The results shown in this test report may differ based on various factors including temperature, humidity, pressure, retention time etc.
- The test report cannot be reproduced wholly or in part and cannot be used for promotional or publicity purpose without the written consent of laboratory, GESEC.
- Samples will be retained for a period of seven (7) days after completion of analysis. Longer retention periods can be arranged, on request of the customer.
- We strictly maintain the confidentiality of all test result of sample(s) collected by us/ supplied by customer and not revel to third party unless required by the statutory or legal requirement
- MoEF approved Lab by Govt. of India. From date 09/02/2017 to 08/02/2022.

| Stack Analysis Report | | | | |
|------------------------------|--|--|----------------------------|------------|
| Stack Details | | | | |
| Stack –attached to | DG (45 KVA) [-II-] | | I.D. of stack at port (m)D | 0.10 |
| Crossection of the stack | Round | | Stack crossectional area | 0.0079 |
| Height of stack above ground | 5.50 | | Consumption of fuel (l/hr) | 3.0 |
| Fuel used | HSD | | Load on the system | Approx.90% |
| Emission details | | | | |
| Sr. No. | Particulars | | Value | |
| 1 | Temperature (°C) | | 125.00 | |
| 2 | Differential Pressure | | 0.60 | |
| 3 | Velocity of the gas (m/sec) | | 2.95 | |
| 4 | Gas flow rate at NTP (Nm ³ /hr) | | 61.80 | |
| 5 | Particulate matter | | 24.70 | |
| 6 | SO ₂ (Kg/Hr) | | 0.0053 | |

Remark:

The obtained stack monitoring results as compared with the values standards prescribed in consents given by Maharashtra Pollution Control Board 2009 are found to be within the limit.

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

| SI. No. | Station Code | Name Of The Sampling Station | Direction W.R.T. Mines Lease Area |
|---------|--------------|------------------------------|-----------------------------------|
| 1 | A-1 | Near Mine Working Area | --- |
| 2 | A-2 | Near Dump Site | --- |
| 3 | A-3 | Near Haulage Road | --- |
| 4 | A-4 | Near Mines Office /DG Set | --- |
| 5 | A-5 | Dhangarwadi Village | N |
| 6 | A-6 | Thanewadi Village | ESW |
| 7 | A-7 | Pandapniwadi Village | S |
| 8 | A-8 | Gajapur Village | WSW |

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:

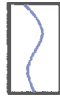
1. Day time is reckoned in between 6 am and 9 pm.
2. Night time is reckoned in between 9 pm and 6 am.
3. Silence zone is defined as area up to 100 meters around such premises as hospitals, educational institutions and courts. The silence zones are to be declared by the Competent Authority.
4. Mixed categories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



LEGEND



MINE LEASE



RIVER



NALLAH



ROAD



FOREST BOUNDARY



NOISE MONITORING LOCATIONS

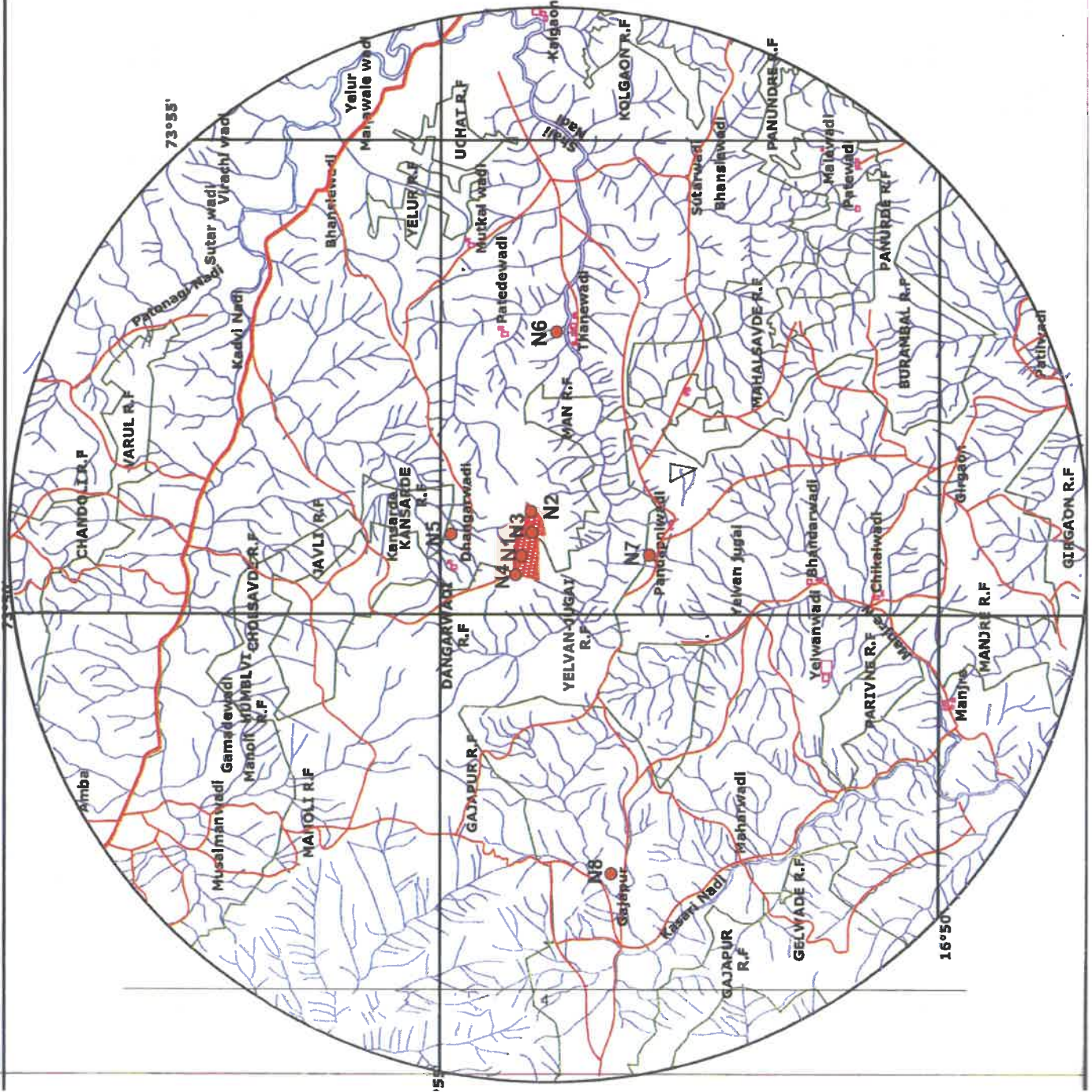


PROJECT: DHANGARWADI BAUXITE MINES

CLIENT :HINDALCO INDUSTRIES LIMITED

TITLE : NOISE LEVEL MONITORING LOCATIONS MAP

**PREPARED BY
EQUINOX ENVIRONMENTS INDIA PVT. LTD.,
KOLHAPUR**





Recognised by Ministry of Environment, Forest & Climate Change (MoEF) Govt. of India and ISO/IEC 17025:2005 (NABL), ISO 9001:2015 and OHSAS 18001:2007 Certified Company

GESEC

| Ambient Noise Monitoring Report | | | |
|--|--|----------------------|-----------------------------|
| Report No. | GESEC/PRO/2019-20/03/652-659 | Date of Report | 11/03/2020 |
| Name of Client | Equinox Environments (I) Pvt. Ltd., Kolhapur, Maharashtra. | | |
| Project Name and Address | M/s. Hindalco Industries Limited, (Dhangarwadi Bauxite Mine), A/P. Dhangarwadi Village, Tahsil. Shahuwadi, District. Kolhapur, State. Maharashtra. | | |
| Sample Collected By | Green EnviroSafe Engineers & Consultant Pvt. Ltd, Pune, Maharashtra. | | |
| Date of Sampling | December-2019 | | |
| Name of Instrument & Calibration Details | Date of calibration | Calibration Due Date | Calibration Certificate No. |
| Sound Level meter | 01/06/2019 | 31/05/2020 | TECH/CAL/2019/671/16 |
| Analysis Method | IS: 4758-1968 Reaff.2002. | | |

| Date | 02/12/2019 | 04/12/2019 | 06/12/2019 | 09/12/2019 | 11/12/2019 | 13/12/2019 | 16/12/2019 | 18/12/2019 |
|----------|------------------------|----------------|-------------------|---------------------------|---------------------|-------------------|----------------------|-----------------|
| Location | Near Mine Working Area | Near Dump Site | Near Haulage Road | Near Mines Office /DG Set | Dhangarwadi Village | Thanewadi Village | Pandapniwadi Village | Gajapur Village |
| Time | N1 | N2 | N3 | N4 | N5 | N6 | N7 | N8 |
| 6.00 | 51.3 | 55.4 | 52.8 | 50.5 | 49.2 | 49.9 | 50.4 | 51.7 |
| 7.00 | 58.4 | 56.4 | 58.3 | 55.6 | 46.2 | 46.9 | 47.2 | 48.3 |
| 8.00 | 60.0 | 58.3 | 60.0 | 57.7 | 47.1 | 48.4 | 48.7 | 49.5 |
| 9.00 | 61.9 | 60.5 | 59.2 | 53.6 | 48.5 | 47.1 | 47.8 | 48.6 |
| 10.00 | 61.9 | 62.3 | 60.9 | 55.6 | 49.4 | 49.4 | 51.1 | 51.0 |
| 11.00 | 62.4 | 62.8 | 61.9 | 56.4 | 50.4 | 49.5 | 47.5 | 48.8 |
| 12.00 | 63.6 | 57.3 | 62.4 | 58.3 | 50.0 | 49.8 | 48.4 | 48.6 |
| 13.00 | 61.8 | 62.3 | 60.7 | 56.1 | 50.2 | 49.7 | 48.4 | 48.4 |
| 14.00 | 61.8 | 61.9 | 60.2 | 55.6 | 50.7 | 50.8 | 48.5 | 50.4 |
| 15.00 | 60.1 | 60.7 | 58.6 | 53.9 | 49.9 | 49.0 | 46.5 | 48.1 |
| 16.00 | 58.5 | 59.3 | 59.4 | 52.6 | 50.5 | 48.2 | 49.8 | 50.9 |
| 17.00 | 62.2 | 57.6 | 59.2 | 51.5 | 50.5 | 43.5 | 50.0 | 48.4 |
| 18.00 | 61.4 | 56.6 | 62.4 | 56.7 | 51.1 | 50.3 | 49.9 | 49.8 |
| 19.00 | 60.8 | 55.5 | 58.6 | 56.4 | 46.0 | 45.3 | 45.0 | 45.2 |
| 20.00 | 57.5 | 51.1 | 54.3 | 52.0 | 40.7 | 40.2 | 45.1 | 46.1 |
| 21.00 | 52.0 | 53.6 | 57.1 | 54.4 | 40.9 | 40.4 | 40.8 | 41.8 |
| 22.00 | 46.7 | 48.4 | 51.5 | 48.3 | 41.4 | 40.8 | 41.1 | 41.9 |
| L10 | 51.7 | 52.6 | 53.7 | 51.1 | 41.2 | 40.6 | 43.4 | 43.9 |
| L50 | 60.8 | 57.6 | 59.2 | 55.6 | 49.4 | 48.4 | 48.4 | 48.6 |
| L90 | 62.3 | 62.3 | 62.1 | 57.1 | 50.6 | 50.1 | 50.2 | 50.9 |
| Lday | 62.7 | 59.2 | 60.4 | 56.2 | 50.9 | 49.9 | 49.2 | 49.4 |
| 23.00 | 47.8 | 45.5 | 48.9 | 48.6 | 39.6 | 39.9 | 38.6 | 39.8 |
| 24.00 | 47.5 | 45.9 | 49.2 | 48.8 | 39.4 | 39.5 | 38.6 | 39.8 |
| 1.00 | 47.7 | 45.9 | 49.5 | 49.2 | 39.9 | 38.9 | 37.9 | 39.0 |
| 2.00 | 48.6 | 46.1 | 50.2 | 49.5 | 39.3 | 38.7 | 39.2 | 38.8 |
| 3.00 | 48.6 | 46.8 | 50.7 | 49.9 | 39.2 | 38.7 | 40.2 | 39.7 |
| 4.00 | 44.5 | 42.5 | 45.9 | 45.6 | 40.7 | 40.1 | 40.5 | 39.1 |
| 5.00 | 44.0 | 41.9 | 45.8 | 45.4 | 39.8 | 40.7 | 41.4 | 38.6 |






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GESEC

| | | | | | | | | |
|----------|------|------|------|------|------|------|------|------|
| L10 | 44.3 | 42.3 | 45.9 | 45.5 | 39.3 | 38.7 | 38.3 | 38.7 |
| L50 | 47.7 | 45.9 | 49.2 | 48.8 | 39.6 | 39.5 | 39.2 | 39.1 |
| L90 | 48.6 | 46.4 | 50.4 | 49.7 | 40.2 | 40.3 | 40.9 | 39.8 |
| Lnight | 48.0 | 46.2 | 49.5 | 49.1 | 39.6 | 39.5 | 39.3 | 39.1 |
| Ldn | 61.4 | 58.3 | 60.1 | 57.5 | 50.4 | 49.8 | 49.2 | 49.3 |
| Avg L10 | 48.0 | 47.4 | 49.8 | 48.3 | 40.2 | 39.7 | 40.9 | 41.3 |
| Avg L 50 | 54.3 | 51.8 | 54.2 | 52.2 | 44.5 | 44.0 | 43.8 | 43.9 |
| Avg L 90 | 55.4 | 54.3 | 56.3 | 53.4 | 45.4 | 45.2 | 45.5 | 45.4 |


Lab Chemist




Authorized Signatory

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

| Date | 02/12/2019 | 04/12/2019 | 06/12/2019 | 09/12/2019 | 11/12/2019 | 13/12/2019 | 16/12/2019 | 18/12/2019 |
|---------------------|------------------------|----------------|-------------------|---------------------------|---------------------|-------------------|----------------------|-----------------|
| Location | Near Mine Working Area | Near Dump Site | Near Haulage Road | Near Mines Office /DG Set | Dhangarwadi Village | Thanewadi Village | Pandapniwadi Village | Gajapur Village |
| L ₁₀ | 51.7 | 52.6 | 53.7 | 51.1 | 41.2 | 40.6 | 43.4 | 43.9 |
| L ₅₀ | 60.8 | 57.6 | 59.2 | 55.6 | 49.4 | 48.4 | 48.4 | 48.6 |
| L ₉₀ | 62.3 | 62.3 | 62.1 | 57.1 | 50.6 | 50.1 | 50.2 | 50.9 |
| L _{day} | 62.7 | 59.2 | 60.4 | 56.2 | 50.9 | 49.9 | 49.2 | 49.4 |
| L ₁₀ | 44.3 | 42.3 | 45.9 | 45.5 | 39.3 | 38.7 | 38.3 | 38.7 |
| L ₅₀ | 47.7 | 45.9 | 49.2 | 48.8 | 39.6 | 39.5 | 39.2 | 39.1 |
| L ₉₀ | 48.6 | 46.4 | 50.4 | 49.7 | 40.2 | 40.3 | 40.9 | 39.8 |
| L _{night} | 48.0 | 46.2 | 49.5 | 49.1 | 39.6 | 39.5 | 39.3 | 39.1 |
| L _{dn} | 61.4 | 58.3 | 60.1 | 57.5 | 50.4 | 49.8 | 49.2 | 49.3 |
| Avg L ₁₀ | 48.0 | 47.4 | 49.8 | 48.3 | 40.2 | 39.7 | 40.9 | 41.3 |
| Avg L ₅₀ | 54.3 | 51.8 | 54.2 | 52.2 | 44.5 | 44.0 | 43.8 | 43.9 |
| Avg L ₉₀ | 55.4 | 54.3 | 56.3 | 53.4 | 45.4 | 45.2 | 45.5 | 45.4 |

Remark:

All the obtained noise level quality values in core zone and buffer zone as compared with the noise level standards prescribed by Central Pollution Control Board are found to be within the limit.

WATER QUALITY

Environmental quality monitoring at Dhangarwadi Bauxite Mine of M/s. Hindalco Industries Limited at Dhangarwadi village of Shahuwadi Tahsil, Kolhapur district, Maharashtra includes water monitoring of various environmental components viz. ground, surface and domestic waste water within core zone and buffer zone around the mine lease area.

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.

A total of 8 locations have selected, out of which 5 are for ground water and 3 are for surface water. Location of water quality monitoring stations is given below.

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. 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). Samples were collected in the winter season of the year 2019-20 as per the prescribed sample collecting methods and analyzed as per the IS standard procedures.

WATER QUALITY MONITORING LOCATIONS

| Code | Name of Sampling Station | Source of Water |
|-------------|---------------------------------|------------------------|
| W-1 | Mine Pit Water | Surface Water |
| W-2 | Shali Nadi (Up Stream) | Surface Water |
| W-3 | Shali Nadi (Down Stream) | Surface Water |
| W-4 | Pandapniwadi Village | Ground Water |
| W-5 | Thanewadi Village | Ground Water |
| W-6 | Dhangarwadi Village | Ground Water |
| W-7 | Patewadi Village | Ground Water |
| W-8 | Bhandarwadi Village | Ground Water |



LEGEND



MINE LEASE



RIVER



NALLAH



ROAD



FOREST BOUNDARY



WATER SAMPLING LOCATION

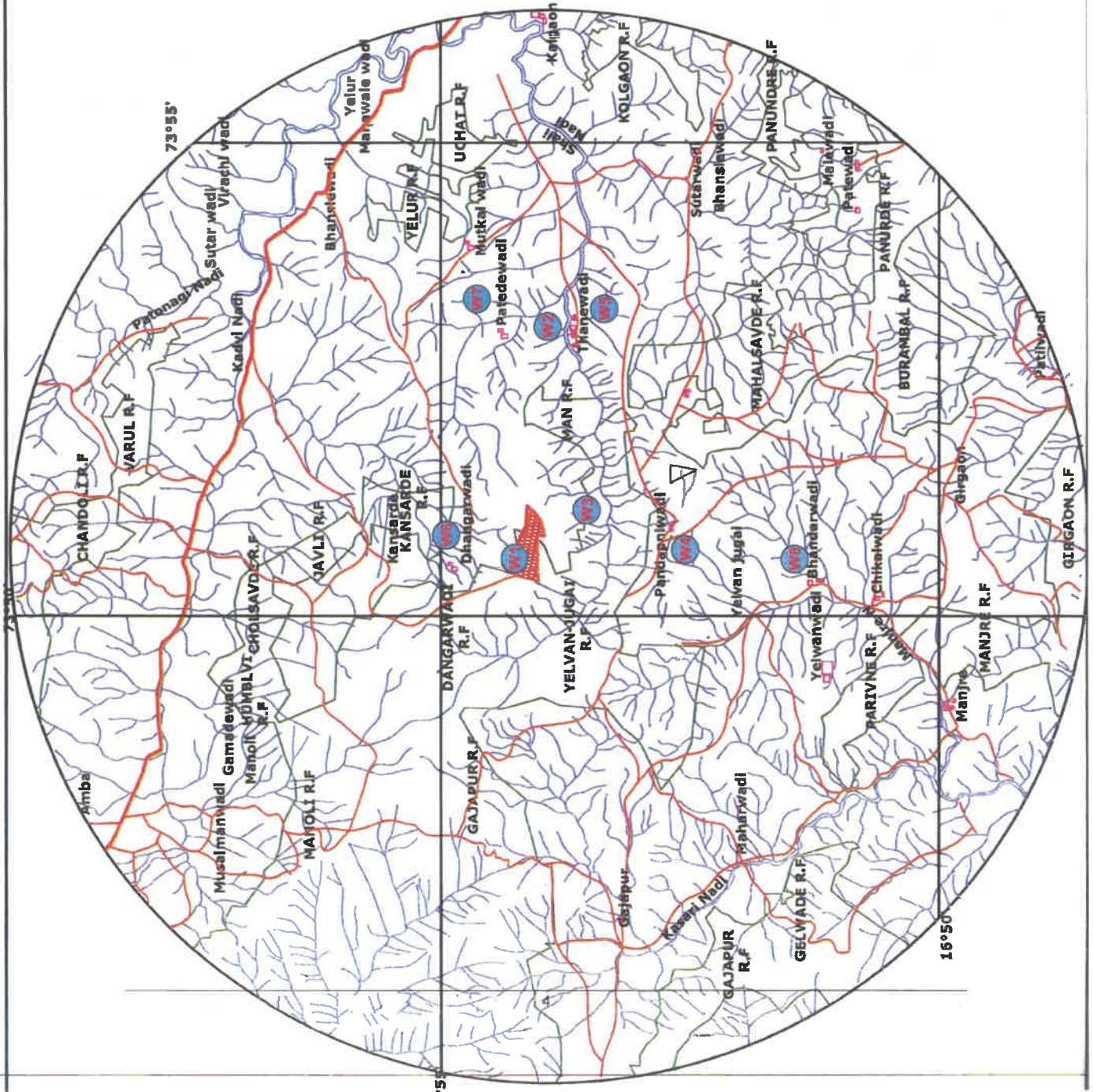


PROJECT : DHANGARWADI BAUXITE MINES

CLIENT : HINDALCO INDUSTRIES LIMITED

TITLE : WATER SAMPLING LOCATIONS MAP

**PREPARED BY
EQUINOX ENVIRONMENTS INDIA PVT. LTD.,
KOLHAPUR**





Recognised by Ministry of Environment, Forest & Climate Change (MoEF) Govt. of India and ISO/IEC 17025:2005 (NABL), ISO 9001:2015 and OHSAS 18001:2007 Certified Company

| Surface Water Analysis Report | | | | | |
|---|-------------------------------------|---|------------------------------------|--------------------------------|----------------------------------|
| Client Name: | | Equinox Environments (I) Pvt. Ltd., Kolhapur, Maharashtra. | | Report Number | GESEC/PRO/2019- 20/03/665-667 |
| Project Name and Address: M/s. Hindalco Industries Limited, Dhangarwadi Bauxite Mine, Dhangarwadi Village, Shahuwadi Taluka, Kolhapur District, Maharashtra. | | | | Date of Report | 11/03/2020 |
| | | | | Nature of sample | Surface Water |
| | | | | Date of Sampling | 16/12/2019 |
| | | | | Date of Sample Received | 17/12/2019 |
| Sample Collected & Analyzed By: Green EnviroSafe Engineers & Consultant Pvt. Ltd., Pune, Maharashtra. | | | | Date of Sample Analysis | 17/12/2019 |
| Sr. No. | Parameter | Unit(s) | Location | | |
| | | | W1 Near Mine Office Borewell | W-2 Shali Nadi Up Stream | W-3 Shali Nadi Down Stream |
| 1. | Odor | -- | Un-objectionable | Un-objectionable | Un-objectionable |
| 2. | Taste | -- | Agreeable | Agreeable | Agreeable |
| 3. | Color | Hazen | <5.00 | <5.00 | <5.00 |
| 4. | pH | -- | 7.79 | 7.66 | 7.85 |
| 5. | Turbidity | NTU | <5.00 | <5.00 | <5.00 |
| 6. | DO | mg/lit | 4.15 | 4.74 | 4.0 |
| 7. | TDS | mg/lit | 172.06 | 156.58 | 183.83 |
| 8. | TSS | mg/lit | 16.02 | 11.90 | 18.51 |
| 9. | BOD:3 days at 27°C | mg/lit | 4.43 | 3.34 | 5.15 |
| 10. | Alkalinity as CaCO ₃ | mg/lit | 11.02 | 8.74 | 14.41 |
| 11. | Total Hardness as CaCO ₃ | mg/lit | 62.15 | 48.23 | 71.88 |
| 12. | Nitrate as NO ₃ | mg/lit | 12.74 | 10.52 | 15.70 |
| 13. | Phosphorous as PO ₄ | mg/lit | 0.83 | 0.23 | 1.02 |
| 14. | Chlorides as Cl ⁻ | mg/lit | 20.17 | 16.83 | 24.70 |
| 15. | Sulphates as SO ₄ | mg/lit | 1.56 | 0.35 | 1.94 |
| 16. | Sodium as Na | mg/lit | 0.67 | 0.29 | 0.85 |
| 17. | Potassium as K | mg/lit | 1.95 | 2.35 | 0.70 |
| 18. | Calcium as Ca | mg/lit | 20.77 | 15.45 | 23.98 |
| 19. | Magnesium as Mg | mg/lit | 4.09 | 3.84 | 4.77 |
| 20. | Lead as Pb | mg/lit | BDL | BDL | BDL |
| 21. | Manganese as Mn | mg/lit | BDL | BDL | BDL |
| 22. | Cadmium as Cd | mg/lit | BDL | BDL | BDL |
| 23. | Chromium as Cr | mg/lit | BDL | BDL | BDL |
| 24. | Copper as Cu | mg/lit | BDL | BDL | BDL |
| 25. | Zinc as Zn | mg/lit | BDL | BDL | BDL |
| 26. | Iron as Fe | mg/lit | 0.07 | 0.03 | 0.11 |
| 27. | Fluorides as F ⁻ | mg/lit | BDL | BDL | BDL |
| 28. | Mercury as Hg | mg/lit | BDL | BDL | BDL |





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| | | | | | |
|-----|----------------|--------|-----|-----|-----|
| 29. | Selenium as Se | mg/lit | BDL | BDL | BDL |
| 30. | Arsenic as As | mg/lit | BDL | BDL | BDL |
| 31. | Cyanide as CN | mg/lit | BDL | BDL | BDL |
| 32. | Boron as B | mg/lit | BDL | BDL | BDL |

BDL: Below Detectable Limit

ANALYZED BY



AUTHORIZED SIGNATORY

SURFACE WATER QUALITY

| Sr. No. | Parameter | Unit (s) | Location | | |
|---------|-------------------------------------|----------|-----------------------|--------------------------------|----------------------------------|
| | | | W-1 Mine Pit Water | W-2 Shali Nadi Up Stream | W-3 Shali Nadi Down Stream |
| 1. | Odor | – | Un-objectionable | Un-objectionable | Un-objectionable |
| 2. | Taste | – | Agreeable | Agreeable | Agreeable |
| 3. | Color | Hazen | <5.00 | <5.00 | <5.00 |
| 4. | pH | – | 7.79 | 7.66 | 7.85 |
| 5. | Turbidity | NTU | <5.00 | <5.00 | <5.00 |
| 6. | DO | mg/lit | 4.15 | 4.74 | 4.0 |
| 7. | TDS | mg/lit | 172.06 | 156.58 | 183.83 |
| 8. | TSS | mg/lit | 16.02 | 11.90 | 18.51 |
| 9. | BOD:3 days at 27°C | mg/lit | 4.43 | 3.34 | 5.15 |
| 10. | Alkalinity as CaCO ₃ | mg/lit | 11.02 | 8.74 | 14.41 |
| 11. | Total Hardness as CaCO ₃ | mg/lit | 62.15 | 48.23 | 71.88 |
| 12. | Nitrate as NO ₃ | mg/lit | 12.74 | 10.52 | 15.70 |
| 13. | Phosphorous as PO ₄ | mg/lit | 0.83 | 0.23 | 1.02 |
| 14. | Chlorides as Cl | mg/lit | 20.17 | 16.83 | 24.70 |
| 15. | Sulphates as SO ₄ | mg/lit | 1.56 | 0.35 | 1.94 |
| 16. | Sodium as Na | mg/lit | 0.67 | 0.29 | 0.85 |
| 17. | Potassium as K | mg/lit | 1.95 | 2.35 | 0.70 |
| 18. | Calcium as Ca | mg/lit | 20.77 | 15.45 | 23.98 |
| 19. | Magnesium as Mg | mg/lit | 4.09 | 3.84 | 4.77 |
| 20. | Lead as Pb | mg/lit | BDL | BDL | BDL |
| 21. | Manganese as Mn | mg/lit | BDL | BDL | BDL |
| 22. | Cadmium as Cd | mg/lit | BDL | BDL | BDL |
| 23. | Chromium as Cr | mg/lit | BDL | BDL | BDL |
| 24. | Copper as Cu | mg/lit | BDL | BDL | BDL |
| 25. | Zinc as Zn | mg/lit | BDL | BDL | BDL |
| 26. | Iron as Fe | mg/lit | 0.07 | 0.03 | 0.11 |
| 27. | Fluorides as F | mg/lit | BDL | BDL | BDL |
| 28. | Mercury as Hg | mg/lit | BDL | BDL | BDL |
| 29. | Selenium as Se | mg/lit | BDL | BDL | BDL |
| 30. | Arsenic as As | mg/lit | BDL | BDL | BDL |
| 31. | Cyanide as CN | mg/lit | BDL | BDL | BDL |
| 32. | Boron as B | mg/lit | BDL | BDL | BDL |

Note:

- mg/l: milligram per liter
- BDL: Below Desirable Limit

Remark:

All the parameters of the surface water samples collected from various sites are well below the desirable limit and maximum permissible limit as per IS: 10500 Standard for Drinking Water.

SURFACE WATER QUALITY

Proper drainage system has prepared to drag the monsoon water into the mine pit area for harvesting rain water and overflow of the same is being channelized through series of check dams and settling tanks so as to reduce the water pollution. Buffer zones have seasonal nallahs which used to recharge the ground water table. A total of 3 locations have selected of which 1 from core zone and 2 from buffer zone.

GROUND WATER QUALITY



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

Assessment of water quality in the study area and in the mine area includes the quality assessment of parameters as per the Indian Standard IS 10500 (Drinking water standard). A total of 5 locations have selected from buffer zone.

| DHANGARWADI MINES | | | |
|--------------------------------|----------------------|------------------------------|---|
| Well Depths of Villages | | | |
| S.No. | Location | Total Depth in Meters | Water Level From Surface in Meters |
| 1 | Pandapniwadi Village | 6.00 | 1.24 |
| 2 | Dhangarwadi Village | 6.00 | 2.99 |



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| DHANGARWADI MINES | | | | |
|---|----------------------|---|---------------------------|--|
| WELL DEPTHS OF VILLAGES | | | | |
| DATE OF SAMPLING:16.12.2019 | | | | |
| Report No: GESEC/PRO/2019-20/03/671-672 | | | | |
| Sr. NO. | LOCATION | NAME OF THE MINE AREA | TOTAL DEPTH IN MTS | WATER LEVEL FROM SURFACE IN MTS |
| 1 | PANDAPNIWADI VILLAGE | DHANGARWADI | 6.00 | 1.24 |
| 2 | DHANGARWADI VILLAGE | DHANGARWADI | 6.00 | 2.99 |
| ANALYZED BY:  | | AUTHORIZED SIGNATORY:  | | |



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4. Samples will be retained for a period of seven (7) days after completion of analysis. Longer retention periods can be arranged, on request of the customer.
5. We strictly maintain the confidentiality of all test result of sample(s) collected by us/ supplied by customer and not revel to third party unless required by the statutory or legal requirement
6. MoEF approved Lab by Govt. of India. From date 09/02/2017 to 08/02/2022.



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Ground Water Analysis Report

| | | | |
|----------------------------------|---|--------------------------------|-------------------------------------|
| Client Name: | Equinox Environments (I) Pvt. Ltd., Kolhapur, Maharashtra. | Report Number | GESEC/PRO/2019-20/03/660-664 |
| Project Name and Address: | M/s. Hindalco Industries Limited (Dhangarwadi Bauxite Mine) A/P. Dhangarwadi village, Tahsil. Shahuwadi, District. Kolhapur, State. Maharashtra. | Date of Report | 11/03/2020 |
| | | Nature of sample | Ground water |
| | | Date of Sampling | 16/12/2019 |
| | | Date of Sample Received | 17/12/2019 |
| | | Date of Sample Analysis | 17/12/2019 |

| | | | | | |
|---|------------------------------|---------------------------|-----------------------------|-------------------------|-----------------------------|
| Sample Collected & Analyzed By : Green EnviroSafe Engineers & Consultant Pvt. Ltd, Pune, Maharashtra | Location | | | | |
| | PANDAPNIW ADI VILLAGE | THANEWA DI VILLAGE | DHANGARW ADI VILLAGE | PATEWADI VILLAGE | BHANDAR WADI VILLAGE |

| Sr. No. | Parameter | Unit(s) | W-4 | W-5 | W-6 | W-7 | W-8 |
|---------|-------------------------------------|-------------|------------------|------------------|------------------|------------------|------------------|
| 1. | Odour | -- | Un-objectionable | Un-objectionable | Un-objectionable | Un-objectionable | Un-objectionable |
| 2. | Taste | -- | Agreeable | Agreeable | Agreeable | Agreeable | Agreeable |
| 3. | Color | Hazen units | <5.00 | <5.00 | <5.00 | <5.00 | <5.00 |
| 4. | pH | -- | 7.88 | 7.61 | 7.63 | 7.68 | 7.71 |
| 5. | Turbidity | NTU | <5.00 | <5.00 | <5.00 | <5.00 | <5.00 |
| 6. | Dissolved Oxygen | mg/l | 2.55 | 2.92 | 2.84 | 2.69 | 2.60 |
| 7. | Total Dissolved solids | mg/l | 175.43 | 133.98 | 145.75 | 150.07 | 156.81 |
| 8. | Total Suspended solids | mg/l | 7.98 | 5.74 | 6.10 | 6.33 | 6.47 |
| 9. | B.O.D | mg/l | 5.11 | 3.69 | 3.94 | 4.78 | 4.93 |
| 10. | Alkalinity as CaCO ₃ | mg/l | 15.03 | 7.46 | 9.03 | 11.48 | 12.84 |
| 11. | Total Hardness as CaCO ₃ | mg/l | 84.85 | 44.47 | 60.23 | 67.87 | 73.71 |
| 12. | Nitrate as NO ₃ | mg/l | 17.89 | 8.97 | 10.43 | 12.96 | 15.1 |
| 13. | Phosphates as PO ₄ | mg/l | 0.96 | 0.51 | 0.65 | 0.78 | 0.88 |
| 14. | Chlorides as Cl | mg/l | 49.86 | 25.68 | 29.01 | 35.49 | 41.72 |
| 15. | Sulphates as SO ₄ | mg/l | 7.03 | 1.73 | 2.71 | 4.32 | 5.60 |
| 16. | Sodium as Na | mg/l | 2.14 | 1.65 | 1.84 | 1.95 | 2.03 |
| 17. | Potassium as K | mg/l | 6.07 | 3.11 | 3.20 | 3.48 | 5.44 |
| 18. | Calcium as Ca | mg/l | 23.08 | 13.34 | 18.01 | 20.67 | 22.71 |
| 19. | Magnesium as Mg | mg/l | 6.59 | 2.70 | 3.69 | 3.93 | 4.11 |
| 20. | Lead as Pb | mg/l | BDL | BDL | BDL | BDL | BDL |
| 21. | Manganese as Mn | mg/l | BDL | BDL | BDL | BDL | BDL |
| 22. | Cadmium as Cd | mg/l | BDL | BDL | BDL | BDL | BDL |
| 23. | Chromium as Cr | mg/l | BDL | BDL | BDL | BDL | BDL |
| 24. | Copper as Cu | mg/l | BDL | BDL | BDL | BDL | BDL |
| 25. | Zinc as Zn | mg/l | BDL | BDL | BDL | BDL | BDL |
| 26. | Iron as Fe | mg/l | 0.05 | 0.04 | 0.01 | 0.03 | 0.02 |
| 27. | Fluoride as F | mg/l | 0.02 | BDL | BDL | BDL | BDL |
| 28. | Mercury as Hg | mg/l | BDL | BDL | BDL | BDL | BDL |
| 29. | Selenium as Se | mg/l | BDL | BDL | BDL | BDL | BDL |
| 30. | Arsenic as As | mg/l | BDL | BDL | BDL | BDL | BDL |
| 31. | Cyanide as CN | mg/l | BDL | BDL | BDL | BDL | BDL |
| 32. | Boron as B | mg/l | BDL | BDL | BDL | BDL | BDL |

BDL: Below Detectable Unit

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ANALYZED BY



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| Sr. No. | Parameter | Unit (s) | Location | | | | |
|---------|-------------------------------------|-------------|--------------------------------|-----------------------------|-------------------------------|----------------------------|--------------------------------|
| | | | 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 | <5.00 | <5.00 | <5.00 | <5.00 | <5.00 |
| 4. | pH | -- | 7.88 | 7.61 | 7.63 | 7.68 | 7.71 |
| 5. | Turbidity | NTU | <5.00 | <5.00 | <5.00 | <5.00 | <5.00 |
| 6. | Dissolved Oxygen | mg/l | 2.55 | 2.92 | 2.84 | 2.69 | 2.60 |
| 7. | Total Dissolved solids | mg/l | 175.43 | 133.98 | 145.75 | 150.07 | 156.81 |
| 8. | Total Suspended solids | mg/l | 7.98 | 5.74 | 6.10 | 6.33 | 6.47 |
| 9. | B.O.D | mg/l | 5.11 | 3.69 | 3.94 | 4.78 | 4.93 |
| 10. | Alkalinity as CaCO ₃ | mg/l | 15.03 | 7.46 | 9.03 | 11.48 | 12.84 |
| 11. | Total Hardness as CaCO ₃ | mg/l | 84.85 | 44.47 | 60.23 | 67.87 | 73.71 |
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| 13. | Phosphates as PO ₄ | mg/l | 0.96 | 0.51 | 0.65 | 0.78 | 0.88 |
| 14. | Chlorides as Cl | mg/l | 49.86 | 25.68 | 29.01 | 35.49 | 41.72 |
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| 18. | Calcium as Ca | mg/l | 23.08 | 13.34 | 18.01 | 20.67 | 22.71 |
| 19. | Magnesium as Mg | mg/l | 6.59 | 2.70 | 3.69 | 3.93 | 4.11 |
| 20. | Lead as Pb | mg/l | BDL | BDL | BDL | BDL | BDL |
| 21. | Manganese as Mn | mg/l | BDL | BDL | BDL | BDL | BDL |
| 22. | Cadmium as Cd | mg/l | BDL | BDL | BDL | BDL | BDL |
| 23. | Chromium as Cr | mg/l | BDL | BDL | BDL | BDL | BDL |
| 24. | Copper as Cu | mg/l | BDL | BDL | BDL | BDL | BDL |
| 25. | Zinc as Zn | mg/l | BDL | BDL | BDL | BDL | BDL |
| 26. | Iron as Fe | mg/l | 0.05 | 0.04 | 0.01 | 0.03 | 0.02 |
| 27. | Fluoride as F | mg/l | 0.02 | BDL | BDL | BDL | BDL |
| 28. | Mercury as Hg | mg/l | BDL | BDL | BDL | BDL | BDL |
| 29. | Selenium as Se | mg/l | BDL | BDL | BDL | BDL | BDL |
| 30. | Arsenic as As | mg/l | BDL | BDL | BDL | BDL | BDL |
| 31. | Cyanide as CN | mg/l | BDL | BDL | BDL | BDL | BDL |
| 32. | Boron as B | mg/l | BDL | BDL | BDL | BDL | BDL |

Note:

- mg/l: milligram per liter
- BDL: Below Desirable Limit

Remark:

All the parameters of the surface water samples collected from various sites are well below the desirable limit and maximum permissible limit as per IS: 10500 Standard for Drinking Water.

DOMESTIC EFFLUENT ANALYSIS

There is only source of waste water on site is canteen effluent. All the employees daily have their two meals in this canteen according to their shifts. Sample was collected two times from outlet and analyzed. Results are given below.

DOMESTIC EFFLUENT ANALYSIS

Sample Location: Canteen water waste

Date of Sampling: 16/12/2019

| Sr. No | Unit | Parameter | Result | MPCB Standards |
|--------|------|------------------------|--------|----------------|
| 1 | mg/l | Total Suspended Solids | 45.12 | 100 |
| 2 | mg/l | Total Dissolved Solids | 802.31 | 2100 |
| 3 | mg/l | COD | 62.95 | 250 |
| 4 | mg/l | BOD for 3 days at 27°C | 25.74 | 100 |
| 5 | mg/l | Total Solids | 847.43 | -- |
| 6 | mg/l | Oil and Grease | <5.00 | 10 |

Sample location: Canteen water waste

Date of Sampling: 14/01/2020

| Sr. No | Unit | Parameter | Result | MPCB Standards |
|--------|------|------------------------|--------|----------------|
| 1 | mg/l | Total Suspended Solids | 61.02 | 100 |
| 2 | mg/l | Total Dissolved Solids | 844.97 | 2100 |
| 3 | mg/l | COD | 69.32 | 250 |
| 4 | mg/l | BOD for 3 days at 27°C | 25.68 | 100 |
| 5 | mg/l | Total Solids | 905.99 | -- |
| 6 | mg/l | Oil and Grease | <5.00 | 10 |

Note:

- mg/l: milligram per liter

Remark:

All the parameters of the canteen waste water samples collected are well below the desirable standard prescribed in consent given by the Maharashtra Pollution Control Board.



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Domestic Effluent Analysis Report

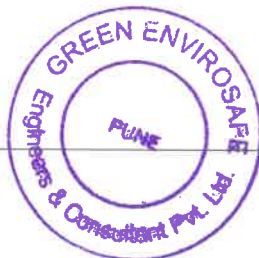
| | | | |
|--------------------------|--|----------------|------------|
| Report No. | GESEC/PRO/2019-20/03/668 | Date of Report | 11/03/2020 |
| Name of Client | Equinox Environments (I) Pvt. Ltd., Kolhapur, Maharashtra. | | |
| Project Name and Address | M/s. Hindalco Industries Limited, (Dhangarwadi Bauxite Mine), A/P. Dhangarwadi Village, Tahsil. Shahuwadi, District. Kolhapur, State. Maharashtra. | | |
| Sample Collected By | Green EnviroSafe Engineers & Consultant Pvt. Ltd, Pune, Maharashtra. | | |
| Date of Sampling | 16/12/2019 | | |
| Sample Location | Canteen waste water | | |
| Analysis Method | IS 3025 Method/APHA edition 2017 | | |

Domestic Effluent Analysis

| Sl.No | Unit | Parameter | Result | MPCB Standards |
|-------|------|------------------------|--------|----------------|
| 1 | mg/l | Total Suspended Solids | 45.12 | 100 |
| 2 | mg/l | Total Dissolved Solids | 802.31 | 2100 |
| 3 | mg/l | COD | 62.95 | 250 |
| 4 | mg/l | BOD for 3 days at 27°C | 25.74 | 100 |
| 5 | mg/l | Total Solids | 847.43 | ----- |
| 6 | mg/l | Oil and Grease | <5.00 | 10 |

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- We strictly maintain the confidentiality of all test result of sample(s) collected by us/ supplied by customer and not revel to third party unless required by the statutory or legal requirement
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Domestic Effluent Analysis Report

| | | | |
|---------------------------------|--|-----------------------|------------|
| Report No. | GESEC/PRO/2019-20/03/669 | Date of Report | 11/03/2020 |
| Name of Client | Equinox Environments (I) Pvt. Ltd., Kolhapur, Maharashtra. | | |
| Project Name and Address | M/s. Hindalco Industries Limited, (Dhangarwadi Bauxite Mine), A/P. Dhangarwadi Village, Tahsil. Shahuwadi, District. Kolhapur, State. Maharashtra. | | |
| Sample Collected By | Green Envirosafe Engineers & Consultant Pvt. Ltd, Pune, Maharashtra. | | |
| Date of Sampling | 14/01/2020 | | |
| Sample Location | Canteen waste water | | |
| Analysis Method | IS 3025 Method/APHA edition 2017 | | |

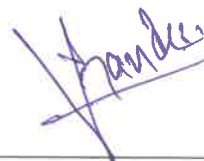
Domestic Effluent Analysis

| Sl.No | Unit | Parameter | Result | MPCB Standards |
|-------|------|------------------------|--------|----------------|
| 1 | mg/l | Total Suspended Solids | 61.02 | 100 |
| 2 | mg/l | Total Dissolved Solids | 844.97 | 2100 |
| 3 | mg/l | COD | 69.32 | 250 |
| 4 | mg/l | BOD for 3 days at 27°C | 25.68 | 100 |
| 5 | mg/l | Total Solids | 905.99 | ----- |
| 6 | mg/l | Oil and Grease | <5.00 | 10 |

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