केवल नागपुर कोर्ट के अधिकार में

Under Jurisdiction of Nagpur Court Only

वेस्टर्न कोलफील्ड्स लिमिटेड

WESTERN COALFIELDS LIMITED

(मिनीरत्न कंपनी) (A Miniratna Company)
(कोल इंडिया लि. की अनुषंगी कंपनी)
(A Subsidiary of Coal India Limited

स्वच्छ भारत
एक कदम स्वच्छता की ओर

उपक्षेत्रिय प्रबन्धक का कार्यालय
कोलारपिंपरी-पिम्पलगांव उपक्षेत्र

कोलारपिंपरी- पिम्पलगांव उपक्षेत्र, वणी नॉर्थ क्षेत्र
Kolarpimpri-Pimpalgaon Sub Area,
Wani North Area

Office of the Sub Area Manager
Kolarpimpri-Pimpalgaon Sub Area.
www.westerncoal.nic.in

पंजी॰का: पो.रासा, तह. वनी, जि. यवतमाल (महाराष्ट्र)-445304/ Regd. Off Po. Ukni, Tah Wani , Dist. Yavatmal Mah- 445304

संदर्भ संख्या / Ref. No. WCL/WNA/KPOC-PPGSA/SAM/2019-20/ 377 Date: 30.11.2019

To,

Addl. Principal Chief Conservator of Forests,
Ministry of Environment, Forest & Climate Change,
Regional Office (WCZ),
Ground Floor, East Wing,
"New Secretariat Building",
Civil Lines, Nagpur – 440 001 (M.S.)

Sub: Six Monthly Compliance Report of Conditions Stipulated in Environmental Clearance for **Kolar Pimpri Open Cast Mine (1.50 MTPA)** of Wani North Area, WCL for the period **April 2019 to September 2019**

Dear Sir,

With reference to above subject matter, please find enclosed herewith the Six Monthly Compliance Report of Conditions Stipulated in Environmental Clearance for **Kolar Pimpri Open Cast Mine (1.50 MTPA)** of Wani North Area, WCL for the period **April 2019 to September 2019** for your kind information please.

Thanking you Sir.

Yours faithfully

30/11/19

Sub Area Manager
Kolarpimpri-Pimpalgaon Sub Area

Copy:

1. AGM, WNA
2. GM Env/HOD, WCL HQ, Nagpur
3. Regional Officer, MPCB, 1st Floor, Udyog Bhawan, Railway Station Road, Chandrapur - 442401
4. ANO(Env), WNA
5. Office Copy

SIX MONTHLY COMPLIANCE REPORT OF CONDITIONS STIPULATED IN ENVIRONMENTAL CLEARANCE

(April 2019 to September 2019)

KOLARPIMPRI OPENCAST COAL MINE

(Production Capacity 1.50 MTPA)

(EC Letter No.: J-11015/928/2007-IA.II (M) dated 29th April, 2010)

WESTERN COALFIELDS LIMITED

(A Mini Ratna-Cat.I, Govt. of India Undertaking, Subsidiary of Coal India Ltd.)

Office of the Sub Area Manager, Kolarpimpri-Pimpalgaon Sub Area,
Post- Bhalar, Teh.- Wani, Distt.- Yavatmal, Maharashtra -445304

CONTENTS

STATUS OF COMPLIANCE OF ENVIRONMENTAL CLEARANCE CONDITIONS

(For the period April 2019 to September 2019)

Name of the Project : Kolarpimpri Extension Open Cast Mine (for production capacity from 1.05 MTPA to 1.50 MTPA

EC Letter No.: MoEF&CC vide letter no.J-11015/928/2007-IA.II(M) dated 29.04.2010

A. Special Conditions:-

Sr. No.	Conditions	Compliance
i)	The embankment constructed along the river boundary shall be of suitable dimensions and stabilized with plantation so as to withstand the peak water flow and prevent mine inundation.	The embankment has been constructed along river boundary after taking due permission from Directorate General of Mines Safety (DGMS) and the height above the HFL is maintained as per the provisions of Coal Mines Regulation, 1957 and allied Technical Circulars issued by DGMS. The dimension and construction of embankment takes into account the peak water flow to prevent any danger to the mine from inundation due to inrush of surface water. Further, to increase the strength and stability of the embankment, plantation has been done to stabilize the embankment.
ii)	The mining operations shall not extend in the balance 961 ha of the lease area until the R& R for all the villages has been completed and compensation paid to land oustees as per norms not less than that laid out under the National R&R Policy.	The mining operation shall be extended in the balance 961 Ha land only after the R&R for all the villages is completed and compensation is paid to land oustees as per R&R policy.
iii)	OB shall be stacked at four earmarked external OB dumpsite(s) only covering an area of 641.98 ha and shall not exceed the max. height of 65m consisting of benches of 15m each. The ultimate slope of the dump shall not exceed 28 degree. Monitoring and management of the reclaimed dumpsites shall continue until the vegetation becomes self-sustaining. Compliance status shall be submitted to the Ministry of Environment & Forests and its Regional office located at Bhopal on yearly basis.	Overburden will be dumped at earmarked sites only. The maximum height of internal OB dump will not exceed 65 m above ground level. The maximum slope of the dump shall not exceed 28 degrees. Monitoring and management of reclaimed dump sites shall continue till the vegetation becomes self-sustaining and compliance status shall be submitted to MoEF and its Regional Office on yearly basis.
iii)	Catch drains and siltation ponds of appropriate size shall be constructed to arrest silt and sediment flows from soil, OB and mineral dumps. The water so collected shall be utilized for watering the mine area, roads, green belt development, etc. The drains shall be regularly desilted and maintained properly. Garland drains (size, gradient and length) and sump capacity shall be designed keeping 50% safety margin over and above the peak sudden	Catch drain of size 3.5 m x 2 m has been provided around the periphery of OB dumps as well as soil dumps to arrest silt and sediment flows from the respective dump site. In case of OB benches in the quarry, cross drainage has been provided which carry silt and sediments into the main sump made at floor of the seam in the Block No. I, II, III, IV and Aagasi. The capacity of these sump are as under: $\text{Block No. I \& II} = 1810 \times 44 \times \frac{(0+17)}{2} = 676940\text{m}3$ $\text{Block No. III} = 580 \times 52 \times \frac{(0+15)}{2} = 226200\text{m}3$

	rainfall and maximum discharge in the area adjoining the mine site. Sump capacity shall also provide adequate retention period to allow proper setting of silt material.	Block No.IV = $\frac{1570 \times 180 \times (30+0)}{2}$ = 4239000m3 Agasi Block = $350 \times \frac{(0+30)}{2} \times 16 = 84000\ m3$ These sumps accumulate all the silts and act as a primary stage of silting pond. Then the water is pumped out on the surface and discharge to surface sedimentation tank which is of size **40 x 16 x 1.5 mtr**. The clear water from the sedimentation tank is discharged to nallah which ultimately discharge to the Wardha river, some part of the water is used for watering mine roads, surface roads by sprinkler and green vegetation. The catch drain around the OB dumps regularly desilted by departmental machines before and during the monsoon. In addition, garland drain of size **4 x 2.5 mtr**. Also made around periphery of the excavation area which carry the surface waters and these drains are regularly desilted.
iv)	Dimension of the retaining wall at the toe of the dumps and OB benches within the mine to check run-off and siltation shall be based on the rainfall data.	As indicated above, the run off from the OB dumps are collected in the catch drains made around the periphery of the dumps (dimensions of catch drains given above). For collecting run off and siltation from OB benches, mine sump as detailed out above, is in operation and acts as main settling / siltation pond. The capacity of this sump has been made to cater the entire peak rainfall in the catchment area .
v)	Crushers at the CHP of adequate capacity for the expansion project shall be operated with high efficiency bag filters, water sprinkling system shall be provided to check fugitive emissions from crushing operations, conveyor system, haulage roads, transfer points, etc.	Crusher of adequate capacity is provided with water sprinkling system to check fugitive emissions from crushing operation etc.
vi)	Drills shall be wet operated.	Drills have been provided with dust extractors. Drills are operated only during day time.
vii)	The project authorities shall ensure that the roads used for mineral transportation are black topped and properly maintained. A 3-tier green belt comprising of a mix of native species shall be developed all along the major approach roads, and major haul roads.	The main approach road has been black topped and is being maintained properly. Total 2,40,680 nos. plants have been planted in the mining areas.
viii)	Controlled blasting shall be practiced with use of delay detonators and only during daytime. The mitigative measures for control of ground vibrations and to arrest the fly rocks and boulders shall be implemented.	Controlled blasting is carried out after due permission from DGMS so as to control ground vibrations and arrest fly rocks and strictly as per conditions laid down by DGMS. The blasting is carried out only in day time.
ix)	A progressive afforestation plan shall be implemented covering an area not less than 902.28 ha, which includes reclaimed external OB dump (674.55ha), backfilled area (88.73ha), along ML boundary, along roads and	External OB dump is still active and as such biological reclamation is yet to be taken up. From 1994-95 to 2018-19 total 96.27 Ha area have been planted by 2,40,680 plants in embankment, dumps and non dumps area with the density of trees 2500 plants per hectare.

	infrastructure (5 ha), embankment (55 ha) and within vacant land (356.22 ha) and in township located outside the lease by planting native species in consultation with the local DFO / Agriculture Department. The density of the trees shall be around 2500 plants per ha. Massive plantation shall be carried out in open spaces in and around the mine and avenue plantation along the main approach roads to the mine.	The practice of plantation will be taken up as a due responsibility in the future also.
x)	Of the total quarry area of 357.65 ha, the backfilled quarry area of 88.73 ha shall be reclaimed with plantation and a void of 268.90 ha which is proposed to be converted into a water body shall be gently sloped and the upper benches shall be terraced and stabilized with plantation/afforestation by planting native plant species in consultation with the local DFO / Agriculture Department. The density of the trees shall be around 2500 plants per ha.	Agreed and will be taken up due course of time
xi)	No groundwater shall be used for mining operations.	No ground water is being used for the mining operations.
xii)	Monitoring of ground water regime and river flow conjunctively on regular and long term basis shall be undertaken in view that the mine site is in the proximity of the river Wardha, through a close network of observation wells / piezometers & river gauging. Similarly, the hydro geological impact on account of proposed expansion should also to be monitored regularly on long term perspectives.	Regular monitoring of ground water level and quality is being carried out by RI-IV Nagpur, CMPDIL four times in a year in pre-monsoon (May), monsoon(August), post-monsoon (November) and winter (January) and for quality in May. Data is being submitted regularly.
xiii)	A comprehensive 'Ground Water Monitoring Plan' shall be submitted within a period of three months of grant of EC. The plan shall incorporate information on details of piezometer / well (depth, locations) site characteristic, monitoring parameters (quality and quality), time frame of implementation and budgetary provisions etc. Monitoring for quantity shall be done four times a year in pre-monsoon (May), monsoon (August), post-monsoon (November) and winter (January) seasons and for quality in May. Data thus collected shall be submitted to the Ministry of	Agreed. Monitoring of Ground water level and quality is being monitored regularly by the CMPDIL, Nagpur and data is being submitted regularly.

	Environment & Forests and to the Central Pollution Control Board quarterly within one month of monitoring.	
xiv)	The Company shall put up artificial groundwater recharge measures for augmentation of groundwater resource in case monitoring indicates a decline in water table. The project authorities shall meet water requirement of nearby village(s) in case the village wells go dry due to dewatering of mine.	Water from mine discharge is passed through sedimentation tank (size of 40.0 m x 16.0 m x 1.5 m) & after proper settling the same is fed into local nullahs / streams to be used by nearby villagers for their agriculture etc. If wells in nearby village go dry, project authorities will supply water from the mine through water tankers as a prior responsibility.
xv)	Sewage treatment plant shall be installed in the existing colony. ETP shall also be provided for workshop and CHP wastewater.	For treatment of domestic sewage individual Septic tank and soak pits have been provided. ETP equipped with oil skimmer, flash mixture, dozing chamber etc. is provided for workshop.
xvi)	Besides carrying out regular periodic healthy check up of their workers, 10% of the workers identified from workforce engaged in active mining operations shall be subjected to health check up for occupational diseases and hearing impairment, if any, through an agency such as NIOH, Ahmedabad within a period of one year and the results reported to this Ministry and to DGMS.	Periodical medical examination/health checkup of workers are regularly done in WCL hospital.
xvii)	For monitoring land use pattern and for post mining land use, a time series of land use maps, based on satellite imagery (on a scale of 1: 5000) of the core zone and buffer zone, from the start of the project until end of mine life shall be prepared once in 3 years (for any one particular season which is consistent in the time series), and the report submitted to MOEF and its Regional office at Bhopal.	It is being complied. Land Restoration - Reclamation Monitoring based on Satellite Data carried out by CMPDIL, Ranchi.
xviii)	A Final Mine Closure Plan along with details of Corpus Fund shall be submitted to the Ministry of Environment & Forests within six months from date of environmental clearance for approval.	Mine closure plan has been prepared and duly approved by WCL Board. The corpus fund has been deposited in following escrow account: Bank & Branch : Oriental Bank of Commerce, Jaripatka, Nagpur Escrow Acc. No. : 8973161007626 (Renewed) Balance as on 31.03.2019: Rs. 39,06,65,306.00/-
xix)	The project authorities shall in consultation with the panchayat of the local villages identify socio-economic and welfare measures under CSR to be carried out over the balance life of	The socio – economic developmental as well as welfare activities are being taken up under CSR through consultation with the neighboring villages. Similar works will be carried out during the balance life also.

	the mine. A budgetary provision of Rs. 5 per tone of coal shall be earmarked for CSR activities.	As per CSR policy of Coal India Limited Rs. 2/tonne of coal produced or 2% of the average net profits of the company made during the three immediately preceding financial years whichever is more is spent on Corporate Social Responsibility works

B. General Conditions :-

<table>
<tr><th>Sr. No.</th><th>Conditions</th><th>Compliance</th></tr>
<tr><td>i)</td><td>No change in mining technology and scope of working shall be made without prior approval of the Ministry of Environment and Forests.</td><td>Noted.
No change in mining technology and scope has been made</td></tr>
<tr><td>ii)</td><td>No change in the calendar plan including excavation, quantum of mineral coal and waste shall be made.</td><td>Noted, The year wise production data are as follows :
<table>
<tr><th>Year</th><th>Coal Production (tons)</th></tr>
<tr><td>2015-16</td><td>1293510.00</td></tr>
<tr><td>2016-17</td><td>131330.00</td></tr>
<tr><td>2017-18</td><td>0.00</td></tr>
<tr><td>2018-19</td><td>13,18,374.00</td></tr>
</table></td></tr>
<tr><td>iii)</td><td>Four ambient air quality monitoring stations shall be established in the core zone as well as in the buffer zone for PM10, PM2.5, SO2 and NOx monitoring. Location of the stations shall be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets in consultation with the State Pollution Control Board.</td><td>Following four ambient air quality monitoring stations have been established in the core zone and buffer zone for PM10, PM2.5 SO_2 and NO_x monitoring:-

1. Water filter plant (Pr. Nagar) : W_NKOA-1
2. Sub-Station Kolar Pimpri : W_NKOA-2
3. Rest shelter Kolar Pimpri OCM : W_NKOA -3
4. Pimpri village : W_NKOA -4

These stations are also shown on the enclosed plan.
Reports are submitted regularly. Environmental Monitoring reports from April 2019 to September 2019 are enclosed with this report.</td></tr>
<tr><td>iv)</td><td>Fugitive dust emissions (PM10 and PM 2.5) from all the sources shall be controlled regularly monitored and data recorded properly. Water spraying arrangement on haul roads, wagon loading, dump trucks (loading and unloading) points shall be provided and properly maintained.</td><td>Fugitive dust emissions (PM10 and PM 2.5) is being monitored at following locations:
1. Weigh bridge, 2. CHP, 3. Wani Railway siding
Fugitive Dust Emission from OB dumps have been controlled significantly by developing thick green belt/vegetation cover the OB dumps.
Similarly, dust emissions from other sources are being controlled by regular water spraying through installation of fixed type rain guns and mobile water tankers.</td></tr>
<tr><td>v)</td><td>Data on ambient air quality (PM10, PM2.5 and SO_2 and NO_x) shall be regularly submitted to the Ministry including its Regional Office at Bhopal and to the State Pollution Control Board and the</td><td>Data on ambient air quality (TPM, PM 10, NOx, SOx and PM 2.5) is regularly submitted to MoEF&CC & its Regional Office at Nagpur along with six monthly report on compliance of EC conditions.
The reports from April 2019 to September 2019 are enclosed with this report.</td></tr>
</table>

	Central Pollution Control Board once in six months.	
vi)	Adequate measures shall be taken for control of noise levels below 85 dBA in the work environment. Workers engaged in blasting and drilling operations, operations of HEMM, etc shall be provided with ear plugs / muffs.	In order to control excessive noise during operations regular maintenance of all HEMM as well as supply of protective gears namely. Ear Plugs and Muffs are carried out. In addition, regular monitoring on every fortnight is being done as per Environment Protection Amendment rule 2000 and data recorded and submitted. Reports from **April 2019 to September 2019** are enclosed with this report. Noise Quality Monitoring Station. 1) CHP : W_NKON-1 2) Pragati Nagar : W_NKON-2
vii)	Industrial waste water (workshop and waste water from the mine) shall be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19tyh May 1993 and 31st December 1993 or as amended from time to time before discharge. Oil and grease trap shall be installed before discharge of workshop effluents.	Mine pumped out water after initial sedimentation in the mine sump is collected into surface sedimentation pond for further settlement. The quality of treated effluent from sedimentation point is monitored every fortnight and the parameters are well within the permissible limits. Similarly, the effluents from the workshop are treated in ETP fitted with oil and grease trap and Clear-water is also regularly monitored and the results indicate that parameters are well within the limit. It may be mentioned here that there is no discharge of effluent from workshop into any surface water body.
viii)	Vehicular emissions shall be kept under control and regularly monitored. Vehicles used for transporting the mineral shall be covered with tarpaulins and optimally loaded.	All the vehicles which are directly or indirectly related to the mining activity are having valid PUC Certificate from the authorized agencies.
ix)	Environmental laboratory shall be established with adequate number and type of pollution monitoring and analysis equipment in consultation with the State Pollution Control Board.	Monitoring of environmental quality parameters is being carried out by RI-IV Nagpur, CMPDIL. A fully fledged Environmental laboratory (An ISO 9000:2000 certified) and NABL accredited already exists at CMPDI, Nagpur with qualified Engineers along with adequate number of field staff for carrying out all the environmental monitoring of WCL projects.
x)	Personnel working in dusty areas shall wear protective respiratory devices and they shall also be provided with adequate training and information on safety and health aspects. Occupational health surveillance programme of the workers shall be undertaken periodically to observe any contractions due to exposure to dust and to take corrective measures, if needed and re cords maintained thereof.	Protective health & safety gears are provided to workmen exposed to dust. The workers are regularly given training on safety & health aspects (Statutory requirement under Mines Act). Periodical medical examination is carried out for each employee once in every 5 year to detect any disease so that, appropriate action can be taken.
xi)	A separate environmental management cell with suitable	At project level, environmental management cell is headed by Sub Area Manager and is assisted directly by project Nodal

	qualified personnel shall be set up under the control of a Senior Executive, who will report directly to the Head of the company.	Officer (Environment). At Area level, AGM heads the cell assisted by GM (Operation) and ANO (Environment). GM (Environment) heads the Environment Department at HQ / Corporate level with a multidisciplinary team of qualified engineers, who directly report to DT, WCL.
xii)	The funds earmarked for environmental protection measures shall be kept in separate account and shall not be diverted for other purpose. Year-wise expenditure shall be reported to this Ministry and its Regional Office at Bhopal.	The funds earmarked for environmental protection measures are not used for any other purpose. The expenditure both under capital & revenue for the current year as well as progressive is given in the Expenditure Statement. It is regularly reported to Regional Office, MoEF & CC along with Six Monthly Report.
xiii)	The Regional Office of the Ministry located at Bhopal shall monitor compliance of the stipulated conditions. The Project authorities shall extend full cooperation to the office(s) of the Regional Office by furnishing the requisite date / information / monitoring reports.	Six monthly reports on compliance to environmental clearance conditions are regularly submitted to RO, MoEF & CC, Nagpur & full cooperation is being extended to them as and when they visit.
xiv)	A copy of the will be marked to concerned Panchayat / local NGO, if any, from whom any suggestion / representation has been received while processing the proposal.	A copy of environmental clearance letter has been sent to concern Sarpanch of village Panchayat.
xv)	State Pollution Control Board shall display a copy of the clearance letter at the Regional Office, District Industry Centre and Collector's Office / Tehsildar's Office for 30 days.	Not applicable.
xvi)	The Project authorities shall advertise at least in two local newspapers widely circulated around the project, one of which shall be in the vernacular language of the locality concerned within seven days 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 may also be seen at the website of the ministry of Environment & Forest at http://envfor.nic.in.	Complied.
3	The Ministry or any other competent authority may stipulate any further conditions	Noted.

	for environmental protection.	
4	Failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract the provisions of the Environment(Protection) Act, 1986	Noted.
5	The above conditions will be enforced inter-alia, under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986 and the Public Liability Insurance Act, 1991 along with their amendments and Rules.	Noted.

30/11/19

Sr. Survey Officer
Kolar Pimpri OCM

30/11/19

Sub-ordinate Engineer (Civil)
Kolar Pimpri-Pimpalgaon Sub Area

30/11/19

Mine Manager
Kolar Pimpri OCM

30/11/19

Sub Area Manager
Kolar Pimpri-Pimpalgaon Sub Area

No.J-11015/928/2007-IA.II(M)
Government of India
Ministry of Environment & Forests

Paryavaran Bhawan,
C.G.O.Complex,
New Delhi -110510.

Dated: 29th April 2010

To
Head of Department Env./CE(Civil),
M/s Western Coalfields Ltd.,
Coal Estate, Civil Lines,
NAGPUR – 440001.

Sub: Kolar Pimpri Extension OCP (Expansion from 511 ha to 1488.42 ha and production capacity from 1.05 MTPA to 1.50 MTPA) of M/s Western Coalfields Ltd. located in dist. Yavatmal, Maharashtra - environmental clearance – reg.

Sir,

This has reference to letter No. 43011/106/2007-CPAM dated 23.08.2007 of Ministry of Coal forwarding your application for Terms of Reference and this Misnitry's grant of TOR vide letter dated 17.12.2007 and your application vide letter No. CIL/DLI/ENV/1681 dated 13.01.2010 and dated 07.01.2010 on the above-mentioned subject. The Ministry of Environment & Forests has considered the application. It is noted that the existing Kolar Pimpri Opencast Project of 1.05 MTPA capacity in an ML area of 511 ha was granted EC on 20.05.2005 and the present proposal is for **expansion of the Kolar Pimpri Extension Opencast Coalmine Project from 1.05 MTPA to 1.50 MTPA production capacity and expansion in ML area from 511 ha to 1488.42 ha**. Of the total ML area, 1438.38 ha consist of agricultural land and 50.04 ha consist of wasteland. No forestland is involved. Of the ML area of 1438.38 ha, 479.46 ha of the ML is under possession and the balance 961 ha is yet to be acquired. Of the total lease area, area for excavation is 357.65 ha, 674.55 ha is for OB dumps, 5 ha is for infrastructure, 55 ha is for embankment, 356.22 ha is for danger zone, rationalisation area, roads and for diversion of nala. There are no National Parks, Wildlife Sanctuary, Biosphere Reserves found in the 15 km buffer zone. River Wardha flows at distance of 100m from the ML. Major part of the ML is below the HFL of River Wardha (186.20mRL). An embankment has been constructed. The project involves modification of the natural drainage by diversion of a nala. Mining is opencast by mechanised method involving shovel-dumper. Mineral transportation of **4545 TPD** of coal is by road. Ultimate working depth of the mine is 200m below ground level (bgl). Present working depth is 95m bgl. Water table is in the range of 3.49-16.97m bgl during pre-monsoon and 1-9.34m bgl during post monsoon. Peak water requirement is 390 m3/d, which is met from mine pit water. No fresh source of water is proposed for use in the project operations. The estimated total OB generation over the life of mine is 282.303 Mm3 of which 37.337 Mm3 would be backfilled and the balance 244.964 Mm3 of OB is being dumped in 4 external OB dumps of a max. height of 60m of benches of 15m each, backfilling has begun from first year of mining operation. At the post mining stage, an area of 902.28 ha would be developed with plantation and a water body of 268.9 ha would be left in the decolaed void. R&R involves 512 PAFs to be displaced from 4 villages – Gowari, Aheri, Kolera and Pimpri of which Aheri, Kolera and Pimpri are yet to be resettled. Land oustees from the balance 961 ha of agricultural land yet to be acquired are to be enumerated. Balance life of the mine at 1.50 MTPA rated capacity is 27 years. Public Hearing was held on 23.12.2008. The project has been approved by M/s WCL on 14.07.2006. Capital cost of the project is **Rs. 7289.84 lakhs**.

2. The Ministry of Environment & forests hereby accords environmental clearance for the above-mentioned **expansion of the Kolar Pimpri Extension Opencast Coalmine Project from 1.05 MTPA to 1.50 MTPA production capacity and expansion in ML area from 511 ha to 1488.42 ha** under the Environmental Impact Assessment Notification,

File - II-D

2006 and subsequent amendments and Circulars thereto subject to the compliance of the terms and conditions mentioned below:

A. Specific Conditions

(i) The embankment constructed along the river boundary shall be of suitable dimensions and stabilised with plantation so as to withstand the peak water flow and prevent mine inundation.

(ii) The mining operations shall not extend in the balance 961 ha of the lease area until the R&R for all the villages has been completed and compensation paid to land oustees as per norms not less than that laid out under the National R&R Policy,

(iii) OB shall be stacked at four earmarked external OB dumpsite(s) only covering an area of 641.98 ha and shall not exceed the max. height of 65m consisting of benches of 15m each. The ultimate slope of the dump shall not exceed 28°. Monitoring and management of the reclaimed dumpsites shall continue until the vegetation becomes self-sustaining. Compliance status shall be submitted to the Ministry of Environment & Forests and its Regional office located at Bhopal on yearly basis.

(iii) Catch drains and siltation ponds of appropriate size shall be constructed to arrest silt and sediment flows from soil, OB and mineral dumps. The water so collected shall be utilised for watering the mine area, roads, green belt development, etc. The drains shall be regularly desilted and maintained properly.

Garland drains (size, gradient and length) and sump capacity shall be designed keeping 50% safety margin over and above the peak sudden rainfall and maximum discharge in the area adjoining the mine site. Sump capacity shall also provide adequate retention period to allow proper settling of silt material.

(iv) Dimension of the retaining wall at the toe of the dumps and OB benches within the mine to check run-off and siltation shall be based on the rainfall data.

(v) Crushers at the CHP of adequate capcity for the expansion project shall be operated with high efficiency bag filters, water sprinkling system shall be provided to check fugitive emissions from crushing operations, conveyor system, haulage roads, transfer points, etc.

(vi) Drills shall be wet operated.

(vii) The project authorities shall ensure that the roads used for mineral transportation are black topped and properly maintained. A 3-tier green belt comprising of a mix of native species shall be developed all along the major approach roads, and major haul roads.

(viii) Controlled blasting shall be practiced with use of delay detonators and only during daytime. The mitigative measures for control of ground vibrations and to arrest the fly rocks and boulders shall be implemented.

(ix) A progressive afforestation plan shall be implemented covering an area not less than 902.28 ha, which includes reclaimed external OB dump (674.55 ha), backfilled area (88.73 ha), along ML boundary, along roads and infrastructure (5 ha), embankment (55 ha) and within vacant land (356.22 ha) and in township located outside the lease by planting native species in consultation with the local DFO/Agriculture Department. The density of the trees shall be around 2500 plants per ha. Massive plantation shall be carried out in open spaces in and around the mine and avenue plantation along the main approach roads to the mine.

(x) Of the total quarry area of 357.65 ha, the backfilled quarry area of 88.73 ha shall be reclaimed with plantation and a void of 268.90 ha which is proposed to be converted into a water body shall be gently sloped and the upper benches shall be terraced and stabilised with plantation/afforestation by planting native plant species in consultation with the local DFO/Agriculture Department. The density of the trees shall be around 2500 plants per ha.

(xi) No groundwater shall be used for mining operations.

(xii) Monitoring of ground water regime and river flow conjunctively on regular and long term basis shall be undertaken in view that the mine site is in the proximity of the river Wardha, through a close network of observation wells/piezometers & river gauging. Similarly, the hydrogeological impact on account of proposed expansion should also to be monitored regularly on long term perspectives.

(xiii) A comprehensive 'Ground Water Monitoring Plan' shall be submitted within a period of three months of grant of EC. The plan shall incorporate information on details of piezometer/well (depth, locations) site characteristics, monitoring parameters (quality and quality), time frame of implementation and budgetary provisions etc. Monitoring for quantity shall be done four times a year in pre-monsoon (May), monsoon (August), post-monsoon (November) and winter (January) seasons and for quality in May. Data thus collected shall be submitted to the Ministry of Environment & Forests and to the Central Pollution Control Board quarterly within one month of monitoring.

(xiv) The Company shall put up artificial groundwater recharge measures for augmentation of groundwater resource in case monitoring indicates a decline in water table. The project authorities shall meet water requirement of nearby village(s) in case the village wells go dry due to dewatering of mine.

(xv) Sewage treatment plant shall be installed in the existing colony. ETP shall also be provided for workshop and CHP wastewater.

(xvi) Besides carrying out regular periodic health check up of their workers, 10% of the workers identified from workforce engaged in active mining operations shall be subjected to health check up for occupational diseases and hearing impairment, if any, through an agency such as NIOH, Ahmedabad within a period of one year and the results reported to this Ministry and to DGMS.

(xvii) For monitoring land use pattern and for post mining land use, a time series of landuse maps, based on satellite imagery (on a scale of 1: 5000) of the core zone and buffer zone, from the start of the project until end of mine life shall be prepared once in 3 years (for any one particular season which is consistent in the time series), and the report submitted to MOEF and its Regional office at Bhopal.

(xviii) A Final Mine Closure Plan along with details of Corpus Fund shall be submitted to the Ministry of Environment & Forests within six months from date of environmental clearance for approval.

(xix) The project authorities shall in consultation with the panchayat of the local villages identify socio-economic and welfare measures under CSR to be carried out over the balance life of the mine. A budgetary provision of Rs 5 per tonne of coal shall be earmarked for CSR activities.

B. General Conditions

(i) No change in mining technology and scope of working shall be made without prior approval of the Ministry of Environment and Forests.

(ii) No change in the calendar plan including excavation, quantum of mineral coal and waste shall be made.

(iii) Four ambient air quality monitoring stations shall be established in the core zone as well as in the buffer zone for PM10, PM2.5, SO2 and NOx monitoring. Location of the stations shall be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets in consultation with the State Pollution Control Board.

(iv) Fugitive dust emissions (PM10 and PM 2.5) from all the sources shall be controlled regularly monitored and data recorded properly. Water spraying arrangement on haul roads, wagon loading, dump trucks (loading and unloading) points shall be provided and properly maintained.

(v) Data on ambient air quality (PM10, PM 2.5, SO2 and Nox) shall be regularly submitted to the Ministry including its Regional Office at Bhopal and to the State Pollution Control Board and the Central Pollution Control Board once in six months.

(vi) Adequate measures shall be taken for control of noise levels below 85 dBA in the work environment. Workers engaged in blasting and drilling operations, operation of HEMM, etc shall be provided with ear plugs/muffs.

(vii) Industrial wastewater (workshop and wastewater from the mine) shall be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19th May 1993 and 31st December 1993 or as amended from time to time before discharge. Oil and grease trap shall be installed before discharge of workshop effluents.

(viii) Vehicular emissions shall be kept under control and regularly monitored. Vehicles used for transporting the mineral shall be covered with tarpaulins and optimally loaded.

(ix) Environmental laboratory shall be established with adequate number and type of pollution monitoring and analysis equipment in consultation with the State Pollution Control Board.

(x) Personnel working in dusty areas shall wear protective respiratory devices and they shall also be provided with adequate training and information on safety and health aspects.

Occupational health surveillance programme of the workers shall be undertaken periodically to observe any contractions due to exposure to dust and to take corrective measures, if needed and records maintained thereof.

(xi) A separate environmental management cell with suitable qualified personnel shall be set up under the control of a Senior Executive, who will report directly to the Head of the company.

(xii) The funds earmarked for environmental protection measures shall be kept in separate account and shall not be diverted for other purpose. Year-wise expenditure shall be reported to this Ministry and its Regional Office at Bhopal.

(xiii) The Regional Office of this Ministry located at Bhopal shall monitor compliance of the stipulated conditions. The Project authorities shall extend full cooperation to the office(s) of the Regional Office by furnishing the requisite data/ information/monitoring reports.

(xiv) A copy of the will be marked to concerned Panchayat/ local NGO, if any, from whom any suggestion/representation has been received while processing the proposal.

(xv) State Pollution Control Board shall display a copy of the clearance letter at the Regional Office, District Industry Centre and Collector's Office/Tehsildar's Office for 30 days.

(xvi) The Project authorities shall advertise at least in two local newspapers widely circulated around the project, one of which shall be in the vernacular language of the locality concerned within seven days 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 may also be seen at the website of the ministry of Environment & Forests at http://envfor.nic.in.

3. The Ministry or any other competent authority may stipulate any further condition for environmental protection.

4. Failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract the provisions of the Environment (Protection) Act, 1986.

5. The above conditions will be enforced *inter-alia*, under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986 and the Public Liability Insurance Act, 1991 along with their amendments and Rules.

(Dr.T.Chandini)
Director

Copy to:

1. Secretary, Ministry of Coal, New Delhi.
2. Secretary, Department of Environment, Government of Maharashtra, 15th Floor, New Admn. Bldg., Madam Cama Road, MUMBAI – 400032..
3. Chief Conservator of Forests, Regional office (EZ), Ministry of Environment & Forests, E-2/240 Arera Colony, Bhopal – 462016.
4. Chairman, Maharsashtra State Pollution Control Board, Kalapataru Point, 3rd & 4th Floors, Sion, Matunga Scheme Road No. 8, Opp. Cine Planet Cinema, Near Sion Circle, Sion (E), Mumbai – 400002.
5. Chairman, Central Pollution Control Board, CBD-cum-Office Complex, East Arjun Nagar, New Delhi -110032.
6. Member-Secretary, Central Ground Water Authority, Ministry of Water Resources, Curzon Road Barracks, A-2, W-3 Kasturba Gandhi Marg, New Delhi.
7. Shri M.K. Shukla, CGM, Coal India Limited, SCOPE Minar, Core-I, 4t Floor, Vikas Marg, Laxminagar, New Delhi.
8. District Collector, Yavatmal, Government of Maharashtra.
9. Monitoring File 10. Guard File 11. Record File.

MAHARASHTRA POLLUTION CONTROL BOARD

Phone : 4010437/4020781
/4037124/4035273
Fax : 24044532/4024068 /4023516
Email : enquiry@mpcb.gov.in
Visit At : http://mpcb.gov.in

Kalpataru Point, 3rd & 4th floor, Sion- Matunga Scheme Road No. 8, Opp. Cine Planet Cinema, Near Sion Circle, Sion (E), Mumbai - 400 022

Consent order No:-BO/JD(APC)/EIC No: CH-1491-13/O/CC-4320 Date: ~~/02/2016~~ 29/03/2016

To,
M/s. Western Coalfield Ltd (WCL),
Kolar Pimpri Open Cast Project,
A/p: Ukni, Tal: Wani, Dist: Yavatmal.

Subject: Consent to Operate (Renewal) with Expansion in RED /LSI Category.
Ref: 1. Earlier Consent granted vide no: BO/PCI-II/EIC No: CH-0222-10/R/CC-337, dt: 08/07/2010.
2. Minutes of CC meeting held on dt: 03/02/2016.

Your application No: CR1401000310, Dated: 07/02/2015.

For: Consent to Operate (Renewal) with Expansion under Section 26 of the Water (Prevention & Control of Pollution) Act, 1974 & under Section 21 of the Air (Prevention & Control of Pollution) Act, 1981 and Authorization under Rule 5 of the Hazardous Wastes (M, H & T M) Rules 2008 is considered and the consent is hereby granted subject to the following terms and conditions and as detailed in the schedule I, II, III & IV annexed to this order:

1. **The Consent to Operate is granted for period upto: 31/03/2018.**

2. **The expected capital investment of the industry is Rs. 65.87 Crs. (As per affidavit on Rs. 100/- stamp paper of Sub area manager submitted along with application).**

3. **The Consent is valid for the manufacture of –**

Sr. No.	Product / By-Product Name	Maximum Quantity
1.	Coal Mining (Mining lease area of 1488.42 Ha)	1.5 MTPA

4. **Conditions under Water (P&CP), 1974 Act for discharge of effluent:**

Sr. no.	Description	Permitted quantity of discharge (CMD)	Standards to be achieved	Disposal
1.	Trade effluent (including mine water discharge)	4148	As per Schedule –I	Spraying mine pits & fire fighting
2.	Domestic effluent (Sewage)	100.0	As per Schedule –I	On land for gardening

5. **Conditions under Air (P& CP) Act, 1981 for air emissions:**

Sr. no.	Description of stack / source	Number of Stack	Standards to be achieved
1.	Nil		

6. Conditions about Non Hazardous Wastes:

Sr. no.	Type Of Waste	Quantity & UoM	Treatment	Disposal
The Waste i.e Over burden shall be disposed for means of backfilling				

7. Conditions under Hazardous Waste (MH & TM) Rules, 2008 for treatment and disposal of hazardous waste:

Sr. No.	Type Of Waste	Category	Quantity	Disposal
1	Used / Spent Oil	5.1	4500 Ltrs/A	CPCB/SPCB authorized reprocessor/ recycler
2	Chemical sludge from ETP	34.3	30 kg/month	CHWTSDF

8. The Board reserves the right to review, amend, suspend, revoke etc. this consent and the same shall be binding on the industry.

9. The activity shall comply with the condition of Environmental Clearance granted by MoEF, GOI vide No: J-11015/928/2007-IA.II (M), dtd: 29/04/2010.

10. This consent should not be construed as exemption from obtaining necessary NOC/permission from any other Government authorities.

11. The industry shall comply with the restart directions issued by the Board vide no: 0781, dt: 23/02/2016 and submit the bank guarantees as per BG Regime of coal mine approved in Boards CAC Meeting dt: 03/11/2015 drawn in favour of RO-MPCB, Chandrapur within 15-days valid for one year period. BG regime enclosed at Schedule-V.

For and on behalf of the
Maharashtra Pollution Control Board

(Dr. P. Anbalagan, IAS)
Member Secretary

Received Consent fee of –

Sr. No.	Amount (Rs.)	DD. No.	Date	Drawn On
1.	19,00,000/-	767822	25/10/2013	State Bank of India
2.	11,91,767/-	777055	18/01/2016	
3.	30,000/-	777154	02/02/2016	

Copy to:

1. Regional Officer – Chandrapur and Sub - Regional Officer - Chandrapur MPCB, Chandrapur - They are directed to ensure the compliance of the consent conditions.
2. Chief Accounts Officer, MPCB, Mumbai.
3. CC/CAC desk- for record & website updation purposes.

Schedule-I

Terms & conditions for compliance of Water Pollution Control:

1) A] As per your application, you have provided sedimentation tanks for the mine discharge treatment.

B] The Applicant shall operate the effluent treatment plant (ETP) to treat the trade effluent so as to achieve the following standards prescribed by the Board or under EP Act, 1986 and Rules made there under from time to time, whichever is stringent.

Sr. No.	Parameters	Standards prescribed by Board (If any)
01	pH	5.5 to 9.0
02	Oil & Grease	20
03	BOD (3 days 27oC)	100
04	Total Dissolved Solids	2100
05	Phenolics (C6H5OH)	1.00
06	Suspended Solids	100
07	COD	250
08	Chloride	600
09	Sulphate	1000

C) The treated effluent shall be used for spraying mine pits to the maximum extent & excess shall be used on land for gardening

2) A] As per your consent application, you have provided septic tank followed by Soak pit for domestic effluent treatment.

B] The applicant shall operate the sewage treatment system to threat the sewage so as to achieve the following standards/ prescribed under EPA ct 1986 and Rules made Three under from time to time, whichever is stringent.

1) Suspended Solids. Not to exceed 50 mg/1.
2) BOD 3 days 27oC. Not to exceed 30 mg/1.
3) COD. Not to exceed 100 mg/1.

C] The treated sewage shall be disposed on land for gardening/irrigation

3) The Applicant shall comply with the provisions of the Water (Prevention & Control of Pollution) Cess Act, 1977 and as amended, by installing water meters, filing water cess returns in Form-I and other provisions as contained in the said act.

Sr. no.	Purpose for water consumed	Water consumption quantity (CMD)
1.	Industrial Cooling, spraying in mine pits or boiler feed	50.0
2.	Domestic purpose	130.0
3.	Processing whereby water gets polluted & pollutants are easily biodegradable	4518
4.	Processing whereby water gets polluted & pollutants are not easily biodegradable and are toxic	N.A

4) The Applicant shall provide Specific Water Pollution control system as per the conditions of EP Act, 1986 and rule made there under from time to time/ Environmental Clearance / CREP guidelines.

Schedule-II

Terms & conditions for compliance of Air Pollution Control:

1. As per your application, you have provided the Air pollution control (APC)system and also erected following stack (s) to observe the following fuel pattern-

Sr. No.	Stack Attached To	APC System	Height in Mtrs.	Type of Fuel	Quantity & UoM	S %	SO_2 Kg/Day
..NA..							

2. The Applicant shall provide Specific Air Pollution control equipments as per the conditions of EP Act, 1986 and rule made there under from time to time / Environmental Clearance / CREP guidelines. (Concern section shall mention specific control equipments).

3. The applicant shall operate and maintain above mentioned air pollution control system, so as to achieve the level of pollutants to the following standards:

Particulate matter	Not to exceed	150 mg/Nm^3.

4. The Applicant shall obtain necessary prior permission for providing additional control equipment with necessary specifications and operation thereof or alteration or replacement/alteration well before its life come to an end or erection of new pollution control equipment.

5. The Board reserves its rights to vary all or any of the condition in the consent, if due to any technological improvement or otherwise such variation (including the change of any control equipment, other in whole or in part is necessary).

6. Control Equipments
   a) Coal handling plant provided with dust collector & automatic water sprinkler shall be operated
   b) Scientific spraying of water on all working area, dump area, stock piles with the help of appropriate dust suppression system.
   c) Coal shall be properly covered during transportation.
   d) The applicant shall carry out tree plantation along road side, around dumps or compulsory afforestation as per proposal approved by Forest Department. The tree plantation programme shall be taken up well in advance of the actual mining activity, so that green belt of sufficient width & height is developed between mining area/road and surrounding environment.
   e) Black topped metal roads provided shall be well maintained to prevent dust formation.
   f) Overloading of dumpers shall be avoided to prevent spillages.
   g) Correct type & quantity of explosive shall be used to avoid excess dust formation & vibration in the surrounding area.
   h) The slope of the over burden shall have slope not more than 28 degree to the horizontal. The overburden shall be properly covered by vegetation for stabilization.
   i) Coal transportation shall be done by installing conveyors wherever possible & mechanically covered closed trucks shall be used for transportation.

7. **Standards for Ambient Air Pollutants:**

(i)	Suspended Particulate Matter [SPM]	Not to exceed	500 ug/m^3
(ii)	Respirable Particulate Matter [RSPM] [Size less than 10 micrometer]	Not to exceed	250 ug/m^3
(iii)	Sulphur Dioxide (SO_2)	Not to exceed	120 ug/m^3
(iv)	Oxides of Nitrogen (NOx)	Not to exceed	120 ug/m^3.

8. The applicant shall provide minimum three ambient air quality monitoring stations within mining area which should be monitored for SPM, RSPM, SO_2, NOx, HC, CO etc. The Annual Arithmetic Mean of minimum 104 measurements in a year taken twice a week 24 hourly at uniform interval shall conform to the National Ambient Air Quality Standards prescribed under Air (Prevention and Control of Pollution) Act, 1981 and Environment (Protection) Act, 1986. The records of results of continuous monitoring done shall be made available for inspection to the officers of the Board.

9. **The applicant shall take adequate measures for control of noise levels from its own sources as follows:**

Sr. No	Location	Permissible Norms [in dB (a)]	Desired minimum thickness of green belt (m)
1	Along Road side	65 (Commercial Area)	20
2	In colonies	55 (Residential Area)	20
3	Near Opencast Mines	75 (Industrial Area)	10 (*40)
4	Near CHPs	75	30
5	Near Shaft	75	20
6	Near Mine exhaust fan	75	>50

*** The Opencast Mine needs to be surrounded by a green belt of sufficient width as per the guidelines of Design Institute Ltd. [A subsidiary of Coal India Ltd.] if the residential complexes are very close**

10. **Other conditions:**

(i) Whenever due to any accident or other unforeseen act or even, such emissions occur or is apprehended to occur in excess standards laid down, such information shall be forthwith reported to Board, concerned Police station, office of Directorate of Health services, Dept. of explosives, Inspectorate of Factories & Local Body. In case of failure of pollution control equipments, the production process connected to it shall be stopped.

(ii) If Coal Washeries are installed, then follow the conditions of the MoEF, GOI's Notification No: Q15017/13/9 CPW, dtd 27.01.1999 strictly.

Schedule-III

Details of Bank Guarantees:

Sr.No.	Consent	Amt of BG Imposed	Submission Period	Purpose of BG	Compliance Period	Validity Date
1	C to O (R)	..	15-Days	As per BG Regime of coal mine approved in Boards CAC Meeting dt: 03/11/2015	31/03/2018	31/07/2018

Schedule-IV

General Conditions:

1) The applicant shall provide facility for collection of environmental samples and samples of trade and sewage effluents, air emissions and hazardous waste to the Board staff at the terminal or designated points and shall pay to the Board for the services rendered in this behalf.
2) Industry should monitor effluent quality, stack emissions and ambient air quality monthly/quarterly.
3) Whenever due to any accident or other unforeseen act or even, such emissions occur or is apprehended to occur in excess of standards laid down, such information shall be forthwith Reported to Board, concerned Police Station, office of Directorate of Health Services, Department of Explosives, Inspectorate of Factories and Local Body. In case of failure of pollution control equipments, the production process connected to it shall be stopped.
4) The applicant shall provide an alternate electric power source sufficient to operate all pollution control facilities installed to maintain compliance with the terms and conditions of the consent. In the absence, the applicant shall stop, reduce or otherwise, control production to abide by terms and conditions of this consent.
5) The firm shall submit to this office, the 30th day of September every year , the Environmental Statement Report for the financial year ending 31st March in the prescribed Form-V as per the provisions of rule 14 of the Environment (Protection) (Second Amendment) Rules, 1992.
6) The industry shall recycle/reprocess/reuse/recover Hazardous Waste as per the provision contain in the HW(MH&TM) Rules 2008, which can be recycled
7) /processed/reused/recovered and only waste which has to be incinerated shall go to incineration and waste which can be used for land filling and cannot be recycled/reprocessed etc should go for that purpose, in order to reduce load on incineration and landfill site/environment.
8) The industry should comply with the Hazardous Waste (MH & TM) Rules, 2008 and submit the Annual Returns as per Rule 5(6) & 22(2) of Hazardous Waste (MH & TM) Rules, 2008 for the preceding year April to March in Form-IV by 30th June of every year.
9) An inspection book shall be opened and made available to the Board's officers during their visit to the applicant.
10) **The applicant shall make an application for renewal of the consent at least 60 days before the date of the expiry of the consent.**
11) Industry shall strictly comply with the Water (P&CP) Act, 1974, Air (P&CP) Act,1981 and Environmental Protection Act,1986 and industry specific standard under EP Rules 1986 which are available on MPCB website(www.mpcb.gov.in).
12) The industry shall constitute an Environmental cell with qualified staff/personnel/agency to see the day to day compliance of consent condition towards Environment Protection.
13) Separate drainage system shall be provided for collection of trade and sewage effluents. Terminal manholes shall be provided at the end of the collection system with arrangement for measuring the flow. No effluent shall be admitted in the pipes/sewers downstream of the terminal manholes. No effluent shall find its way other than in designed and provided collection system.
14) Neither storm water nor discharge from other premises shall be allowed to mix with the effluents from the factory.
15) The applicant shall install a separate meter showing the consumption of energy for operation of domestic and industrial effluent treatment plants and air pollution control system. A register showing consumption of chemicals used for treatment shall be maintained.
16) Conditions for D.G. Set

a) Noise from the D.G. Set should be controlled by providing an acoustic enclosure or by treating the room acoustically.
b) Industry should provide acoustic enclosure for control of noise. The acoustic enclosure/ acoustic treatment of the room should be designed for minimum 25 dB (A) insertion loss or for meeting the ambient noise standards, whichever is on higher side. A suitable exhaust muffler with insertion loss of 25 dB (A) shall also be provided. The measurement of insertion loss will be done at different points at 0.5 meters from acoustic enclosure/room and then average.

c) Industry should make efforts to bring down noise level due to DG set, outside industrial premises, within ambient noise requirements by proper sitting and control measures.
d) Installation of DG Set must be strictly in compliance with recommendations of DG Set manufacturer.
e) A proper routine and preventive maintenance procedure for DG set should be set and followed in consultation with the DG manufacturer which would help to prevent noise levels of DG set from deteriorating with use.
f) D.G. Set shall be operated only in case of power failure.
g) The applicant should not cause any nuisance in the surrounding area due to operation of D.G. Set.
h) The applicant shall comply with the notification of MoEF dated 17.05.2002 regarding noise limit for generator sets run with diesel

17) The industry should not cause any nuisance in surrounding area.
18) The industry shall take adequate measures for control of noise levels from its own sources within the premises so as to maintain ambient air quality standard in respect of noise to less than 75dB(A) during day time and 70dB(A) during night time. Day time is reckoned in between 6 am and 10 pm and night time is reckoned between 10 pm and 6 am
19) The applicant shall maintain good housekeeping.
20) The applicant shall bring minimum 33% of the available open land under green coverage/ plantation. The applicant shall submit a statement on available open plot area, number of trees surviving as on 31st March of the year and number of trees planted by September end, with the Environment Statement.
21) The non-hazardous solid waste arising in the factory premises, sweepings, etc. be disposed of scientifically so as not to cause any nuisance / pollution. The applicant shall take necessary permissions from civic authorities for disposal of solid waste.
22) The applicant shall not change or alter the quantity, quality, the rate of discharge, temperature or the mode of the effluent/emissions or hazardous wastes or control equipments provided for without previous written permission of the Board. The industry will not carry out any activity, for which this consent has not been granted/without prior consent of the Board.
23) The industry shall ensure that fugitive emissions from the activity are controlled so as to maintain clean and safe environment in and around the factory premises.
24) The industry shall submit quarterly statement in respect of industries' obligation towards consent and pollution control compliance's duly supported with documentary evidences (format can be downloaded from MPCB official site).
25) The industry shall submit official e-mail address and any change will be duly informed to the MPCB.
26) The industry shall achieve the National Ambient Air Quality standards prescribed vide Government of India, Notification dt. 16.11.2009 as amended.
27) The project authorities shall obtain consent for their railway siding operation.
28) The project authorities shall submit an action plan for using closed coal conveyor belt system in place of truck transportation, wherever the coal transportation distances is less than 3-Kms initially, within 3-months.
29) This consent is valid along with the Environmental Clearance granted to the mine.
30) The applicant shall install continuous automatic ambient air and micrometeorological monitoring station at location indicated by State Board to be set up and operate at its own cost measure SO2, NOx and particulate matter as per the condition of Environmental clearance to be obtained. These CAAQMS shall also have necessary provision of networking to the Air Quality Monitoring network of MPCB.
31) The Board reserves its rights to review plans, specifications or other data relating to plant setup for the treatment of waterworks for the purification thereof & the system for the disposal of sewage or trade effluent or in connection with the grant of any consent conditions. The Applicant shall obtain prior consent of the Board to take steps to establish the unit or establish any treatment and disposal system or and extension or addition thereto.
32) The industry shall ensure replacement of pollution control system or its parts after expiry of its expected life as defined by manufacturer so as to ensure the compliance of standards and safety of the operation thereof.

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महाराष्ट्र प्रदूषण नियंत्रण मंडळ

Industries

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My Applications

Sr No.	UAN No.	Application Name	Application IIN	Application Date	Amount	Documents
1	MPCB-CONSENT-0000046227 **Status: In Process**	CONSENT	100015602100	31-03-2018	Rs 7500	Documents Payments Download
2	MPCB-CONSENT-0000040280 **Status: In Process**	CONSENT	100015602000	15-01-2018	Rs 4595580	Documents Payments Download

Maharashtra Pollution Control Board

महाराष्ट्र प्रदूषण नियंत्रण मंडळ

FORM V

Environmental Audit Report for the financial Year ending the 31st March 2019

Unique Application Number	Submitted Date
MPCB-ENVIRONMENT_STATEMENT-0000020079	26-09-2019

Company Information

Company Name	Application UAN number
Western Coalfields Limited, Kolar Pimpri Open Cast Mine	-

Address

Office of the Sub Area Manager, Kolar Pimpri-Pimpalgaon Sub Area, Po. - Ukni, Tal.- Wani, Distt. - Yavatmal

Plot no	Taluka	Village
79	Wani	Aheri
Capital Investment (In lakhs)	**Scale**	**City**
30079.3	L.S.I.	Yavatmal
Pincode	**Person Name**	**Designation**
445304	R.K.Prasad	Sub Area Manager, Kolarpimpri-Pimpalgaon Sub Area
Telephone Number	**Fax Number**	**Email**
7447339316	07239241357	wclsamkolarpimpri@gmail.com
Region	**Industry Category**	**Industry Type**
SRO-Chandrapur	Red	R35 Mining and ore beneficiation
Last Environmental statement submitted online	**Consent Number**	**Consent Issue Date**
yes	BO/JD(APC)/EICNo.CH-1491-13/O/CC-4320	29.03.2016

Consent Valid Upto

31.03.2018

Product Information

Product Name	Consent Quantity	Actual Quantity	UOM
Coal	1.50	1.31	MT/A

By-product Information

By Product Name	Consent Quantity	Actual Quantity	UOM
-	-	-	Ton/Y

1) Water Consumption in m3/day

Water Consumption for	Consent Quantity in m3/day	Actual Quantity in m3/day
Process	4568	800
Cooling	-	-
Domestic	130	130
All others	-	-

Total	4698	930

1) Effluent Generation in CMD / MLD

Particulars	Consent Quantity	Actual Quantity	UOM
Daily Trade Effluent	4148	3558	CMD

2) Product Wise Process Water Consumption (cubic meter of process water per unit of product)

Name of Products (Production)	During the Previous financial Year	During the current Financial year	UOM
Coal (Cubic Meter/Tonnes)	-	0.221	CMD

3) Raw Material Consumption (Consumption of raw material per unit of product)

Name of Raw Materials	During the Previous financial Year	During the current Financial year	UOM
Explosives (Kg/Tonnes)	-	1.11	Kg/Annum

4) Fuel Consumption

Fuel Name	Consent quantity	Actual Quantity	UOM
High Speed diesel	-	113.691	KL/A

Pollution discharged to environment/unit of output (Parameter as specified in the consent issued)

[A] Water

Pollutants Detail	Quantity of Pollutants discharged (kL/day)	Concentration of Pollutants discharged(Mg/Lit) Except PH,Temp,Colour	Percentage of variation from prescribed standards with reasons		
	Quantity	Concentration	%variation	Standard	Reason
-	-	-	-	-	-

[B] Air (Stack)

Pollutants Detail	Quantity of Pollutants discharged (kL/day)	Concentration of Pollutants discharged(Mg/NM3)	Percentage of variation from prescribed standards with reasons		
	Quantity	Concentration	%variation	Standard	Reason
-	-	-	-	-	-

HAZARDOUS WASTES

1) From Process

Hazardous Waste Type	Total During Previous Financial year	Total During Current Financial year	UOM
5.1 Used or spent oil	0	0.6	KL/A

2) From Pollution Control Facilities

Hazardous Waste Type	Total During Previous Financial year	Total During Current Financial year	UOM
0	0	0	Ton/Y

SOLID WASTES

1) From Process

Non Hazardous Waste Type	Total During Previous Financial year	Total During Current Financial year	UOM
-	-	-	Ton/Y

2) From Pollution Control Facilities

Non Hazardous Waste Type	Total During Previous Financial year	Total During Current Financial year	UOM
-	-	-	Ton/Y

3) Quantity Recycled or Re-utilized within the unit

Waste Type	Total During Previous Financial year	Total During Current Financial year	UOM
0	-	-	Ton/Y

Please specify the characteristics(in terms of concentration and quantum) of hazardous as well as solid wastes and indicate disposal practice adopted for both these categories of wastes.

1) Hazardous Waste

Type of Hazardous Waste Generated	Qty of Hazardous Waste	UOM	Concentration of Hazardous Waste
5.1 Used or spent oil	0.6	KL/A	-

2) Solid Waste

Type of Solid Waste Generated	Qty of Solid Waste	UOM	Concentration of Solid Waste
-	-	Ton/Y	-

Impact of the pollution Control measures taken on conservation of natural resources and consequently on the cost of production.

Description	Reduction in Water Consumption (M3/day)	Reduction in Fuel & Solvent Consumption (KL/day)	Reduction in Raw Material (Kg)	Reduction in Power Consumption (KWH)	Capital Investment(in Lacs)	Reduction in Maintenance(in Lacs)
Impact of the pollution control measures taken	-	0.094	-	-	-	-

Additional measures/investment proposal for environmental protection abatement of pollution, prevention of pollution.

[A] Investment made during the period of Environmental Statement

Detail of measures for Environmental Protection	Environmental Protection Measures	Capital Investment (Lacks)
Capital Expenditure	-	-5
Revenue Expenditure	-	10.61

[B] Investment Proposed for next Year

Detail of measures for Environmental Protection	Environmental Protection Measures	Capital Investment (Lacks)
Capital Expenditure	-	86
Revenue Expenditure	-	26.81

Any other particulars in respect of environmental protection and abatement of pollution.

Particulars

-

Name & Designation

Sub Area Manager, Kolar Pimpri-Pimpalgaon Sub Area

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ENVIRONMENTAL MONITORING REPORT

KOLAR PIMPRI EXTN. OC

(WANI NORTH AREA)

WESTERN COALFIELDS LTD.

(JOB No. 8000002)

APRIL-2019

Environment Laboratory
NABL Accredited vide Cert. No. TC-7102
CMPDI
REGIONAL INSTITUTE-IV, KASTURBA NAGAR,
JARIPATKA, NAGPUR, PIN – 440 014

AN ISO 9001:2015 COMPANY

INDEX

INTRODUCTION

Location :

Kolar-Pimpri Opencast Project is located on the right bank of Wardha river in Wani Tahsil of Yeotmal district of Maharashtra State. It is administered by Wani North Area of Western Coalfields Limited.

Communication :

The project is connected by a fair weathered road with Wani town via Bhalar village in North-west and Ghughus colliery via Ukni village in south. Wani is connected to state highway 84 via Warora. Ghughus railway station is 12 km away and Wani railway station is 14 km away from the project.

Drainage : Wardha river serves as the main drainage of the area.

Climate :

The climate of this area is tropical with maximum and minimum temperature 48^{O}C in summer and 10^{O}C in winter respectively. The average annual rainfall is about 1200 mm.

Industry :

Besides other coalmines, there are a lot of lime kiln and fire bricks industries near the project area.Transportation roads, agricultural and local activities ,vehicular traffic etc also contributes to the pollution.

Pollution due to other sources :

The above-mentioned industries are also expected to contribute in increasing the pollution load of the area.

Sampling Locations :

Ambient Air Quality Monitoring locations :

S.No.	Location Details		Location Code
1.	Pimpri village	-	W_NKOA-1
2.	Rest Shelter	-	W_NKOA-2
3.	Substation-Kolarpimpri	-	W_NKOA-3
4.	Water filter plant - Pragati nagar	-	W_NKOA-4

Fugitive Dust Monitoring Location:

S.No.	Location Details		Location Code
1.	Weigh Bridge	-	W_NKOAF-1
2.	CHP		W_NKOAF-2
3.	Wani Rly. Sidding		W_NKOAF-3

Water Quality Monitoring location :

S.No.	Location Details		Location Code
1.	Mine water discharge	-	W_NKOW-1
2.	Workshop water discharge	-	W_NKOW-2

Noise Level Monitoring location :

S.No.	Location Details		Location Code
1.	CHP	-	W_NKON-1
2.	Colony (Pragati Nagar)	-	W_NKON-2

Frequency of Monitoring :

Air : Frequency of monitoring is as per the Env. (Protection) Amendment Rules published vide Gazette dt. 25.9.2000.

Water : Water quality is monitored on fortnightly basis.

Noise : Noise level is monitored on fortnightly basis.

Methodology of Sampling and Analysis :

Air : 24 hourly air samples are collected with Respirable Dust Sampler at selected locations to monitor ambient air quality w.r.t. Suspended particulate matter (TPM), Respirable Particulate Matter (PM-10), Sulphur di-oxide (SO_2) and Oxides of nitrogen (NO_X) etc.

SPM : Ambient air laden with suspended particulates enters the Respirable Dust Sampler through the inlet pipe of sampler by means of a high flow rate blower. As the air passes through the cyclone, coarse, non-respirable dust (size >10 µ) is separated from the air stream by centrifugal forces acting on the solid particles. These separated particles fall through the cyclone's conical hopper and collect in the sampling bottle placed at bottom. The fine dust forming the respirable fraction (size<10 µ) of the Total Suspended Particulates passes through the cyclone and is carried by the air stream to the Glass Micro Fiber Filter Paper. The Respirable dust (PM-10) is retained by the filter and the carrier air exhausted from the system through the blower. The mass concentration (µg/m^3) of Suspended Particulate Matter (non-respirable dust and respirable dust) and Respirable Particulate Matter in the ambient air is computed by measuring the mass of collected particulates and the volume of air sampled.

PM-2.5 Ambient air enters the Fine dust sampler through an omni-directional air inlet designed to provide a clear aerodynamic cut point for particles greater than 10 microns. Particles in the air stream finer than 10 microns proceed to a second impactor that has an aerodynamic cut point at 2.5 microns. The air sample and fine particulates exiting from the PM 2.5 impactor are passed through a 47 mm diameter Teflon filter membrane that retains the PM-2.5. The mass concentrations (µg/m^3) of PM-2.5 in the ambient air are computed by measuring the mass of collected particulates and the volume of air sampled.

NO_X : Determination of oxides of Nitrogen is based on the procedure of "Jacobs and Hochheiser method". In this method the air sample is collected 24 hourly in the field and analysed in the laboratory using spectronic 20 D+ Spectrophotometer. Nitrogen oxides as Nitrogen di-oxide are collected by bubbling air through a Sodium hydroxide solution to form a stable solution of Sodium nitrite. The nitrite ion produced during sampling is determined colorimetrically (with the help of Spectrophotometer, measuring absorbance at 540 nm) by reacting the exposed absorbing reagent with Phosphoric acid, Sulphanilamide and N(1-naphthyl) ethylenediamine dihydrochloride. The interference of Sulphur di-oxide is eliminated by converting it to Sulphuric acid with Hydrogen peroxide before analysis.

SO_2 : Determination of SO_2 is based on the procedure of West and Gaeke method. Sulphur di-oxide from the air stream is absorbed in a Sodium tetrachloromercurate solution to form a stable solution of Dichlorosulphitomercurate. The amount of Sulphur dioxide is then estimated by the colour produced when P-Rosaniline

hydrochloride is added to the solution. The colour is estimated by a reading of absorbance at 560 nm in the Spectrophotometer.

Water : Water samples are collected on fortnightly basis in plastic zaricane and are transported to the laboratory for analysis. As per the Env. (Protection) Amendment Rules published vide Gazette dt. 25.9.2000, water samples are analysed fortnightly for the parameters - pH, TSS, Oil & Grease and COD and once in a year for all parameters as per Schedule VI, Env. Protection rule.

Noise : Noise level data are recorded fortnightly.

Environment Laboratory CMPDI, RI IV, Nagpur	**Test Report**	TC - 7102

Test Report NO : RIN/TR/APRIL-19/W-48 Date of Issue : 15/06/2019
Name of the Customer: WCL,Nagpur
Customer letter Ref. No. : WCL/HQ/ENV/17-K/520-522 DATED-18.04.19
Sample Description : Air sample
No. of pages : 2

. Test Required : IS-5182 [PM-10(04:1999), NOx(06:2006), SO_2(02:2001)],PM-2.5 & SPM*

AIR QUALITY MONITORING DATA

NAME OF THE COMPANY : WCL YEAR : 2019
NAME OF THE AREA : WANI NORTH MONTH. : APRIL
NAME OF THE PROJECT : KOLAR-PIMPRI OCP

Pimpri village					
DATE OF SAMPLING	**Parameters (24 hourly values in µg/m3)**				
	SPM*	**PM-10**	**PM-2.5**	**NOx**	**SOx**
29/04/2019	124	35	29	6	4
Permissible Limits	**200**	**100**	**60**	**80**	**80**
Rest shelter					
DATE OF SAMPLING	**Parameters (24 hourly values in µg/m3)**				
	SPM*	**PM-10**	**PM-2.5**	**NOx**	**SOx**
28/04/2019	235	120	44	19	13
TLV as per Env.(Protection) Amendment Rule 2000	**600**	**300**	**60**	**120**	**120**
Substation-Kolarpimpri					
DATE OF SAMPLING	**Parameters (24 hourly values in µg/m3)**				
	SPM*	**PM-10**	**PM-2.5**	**NOx**	**SOx**
22/04/2019	102	58	57	9	7
TLV as per Env.(Protection) Amendment Rule 2000	**600**	**300**	**60**	**120**	**120**

 # - Above Std. Value

Water filter plant - Pragati nagar					
DATE OF SAMPLING	**Parameters (24 hourly values in µg/m3)**				
	SPM*	**PM-10**	**PM-2.5**	**NOx**	**SOx**
30/04/2019	96	78	39	12	9
Permissible Limits	**200**	**100**	**60**	**80**	**80**

 # - Above Std. Value

FUGITIVE DUST MONITORING DATA

WEIGHT BRIDGE.			
DATE OF SAMPLING	**Parameters (24 hourly values in µg/m3)**		
	SPM*	**PM-10**	**PM2.5**
-	-	-	-

CHP.			
DATE OF SAMPLING	**Parameters (24 hourly values in µg/m3)**		
	SPM*	**PM-10**	**PM2.5**
-	-	-	-

Wani Rly. Siding			
DATE OF SAMPLING	**Parameters (24 hourly values in µg/m3)**		
	SPM*	**PM-10**	**PM2.5**
-	-	-	-

Deepanshu Sahu
(Scientific Assistant) ***(Authorized Signatory)***

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Environment Laboratory CMPDI, RI IV, Nagpur	**Test Report**	TC - 7102

Test Report NO : RIN/TR/APRIL-19/W-48 Date of Issue :15/06/19
Name of the Customer: WCL,Nagpur
Customer letter Ref. No. : WCL/HQ/ENV/17-K/520-522 DATED-18.04.19
Sample Description: watersample
No. of pages :1

EFFLUENT WATER QUALITY REPORT

NAME OF THE COMPANY : WCL YEAR : 2019
NAME OF THE AREA : WANI NORTH MONTH : APRIL
NAME OF THE PROJECT : KOLAR-PIMPRI OC

Mine water discharge				
Date of Sample Collection	Analysis Results			
	pH IS-3025/11:1983	COD (mg/l) APHA-Closed reflux	TSS (mg/l) IS-3025/17:1984	O & G (mg/l) IS-3025/39:1991
Below Detection Limit	0.2	4	10	2
28/04/2019	7.3	24	14	<2
TLV as per Env.(Protection) Amendment rule 2000	**5.5 - 9.0**	**250**	**100**	**10**

E.T.P.(Workshop)Treated Water				
Date of Sample Collection	Analysis Results			
	pH IS-3025/11:1983	COD (mg/l) APHA-Closed reflux	TSS (mg/l) IS-3025/17:1984	O & G (mg/l) IS-3025/39:1991
Below Detection Limit	0.2	4	10	2
28/04/2019	77	20	12	<2
TLV as per Env.(Protection) Amendment rule 2000	**5.5 - 9.0**	**250**	**100**	**10**

Deepanshu Sahu
(Scientific Assistant) ***(Authorized Signatory)***

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Environment Laboratory CMPDI, RI IV, Nagpur	**Test Report**	TC - 7102

Test Report NO : RIN/TR/APRIL-19/W-48A Date of Issue : 15/06/2019
Name of the Customer: WCL, Nagpur
Customer letter Ref. No. : WCL/HQ/ENV/17-K/520-522 DATED-18.04.19
Sample Description : Water sample
No. of pages : 2

Test Required : IS 10500:2012

DRINKING WATER QUALITY MONITORING DATA

NAME OF THE COMPANY : WCL YEAR : 2019
NAME OF THE AREA WANI MONTH : APRIL
NAME OF THE PROJECT MUGOLI OC Sampling Date : 24/04/2019
NAME OF LOCATION : DRINKING WATER FROM FILTER PLANT(P NAGAR)

Sl. No	**Parameters**	**Test Method**	**Limits of Detection**	**Analysis Result**	**Standard (IS : 10500 : 2012)**	
					Desirable limit	**PLV in the absence of alternate source**
1	Colour (Hz)	APHA, 22nd Edition Platinum Cobalt	1	2	5	15
2	Odour	IS 3025 /05:1983,Physical, Qualitative	Qualitative	Agreeable	Agreeable	Agreeable
3	Turbidity (NTU)	IS-3025/10:1984 Nephelometric	1.0	3	1	5
4	pH Value	IS-3025/11:1983 Electrometric	2	8.10	6.5 to 8.5	No relaxation
5	Total Hardness as $CaCO_3$ -	IS-3025/21:1983 EDTA	4.0	368	200	600
6	Iron (as Fe) -mg/l	IS-3025/53:2003 AAS-Flame	0.06	<0.06	0.3	No relaxation
7	Chlorides (as Cl)- mg/l	IS-3025/32:1988, Argentometric	2.0	58	250	1000
8	Residual Chlorine -mg/l (min.)	APHA, 22nd Edition DPD	0.02	0.03	0.2	1
9	Fluoride (as F)- mg/l	APHA, 22nd Edition SPADNS	0.02	0.52	1.0	1.5
10	TDS -mg/l	IS-3025/16:1984 Gravimetric	25.0	820	500	2000
11	Calcium (as Ca) -mg/l	IS-3025/40:1991 EDTA	1.6	100	75	200
12	Magnesium (as Mg) -mg/l*	IS-3025/40:1991 EDTA	3	30	30	100
13	Copper as(Cu) -mg/l	IS-3025/42:1992 AAS-Flame	0.03	3.036	0.05	1.5
14	Manganese as (Mn)- mg/l	APHA, 22nd Edition AAS-Flame	0.02	<0.02	0.1	0.3
15	Sulphate (as SO_4) -mg/l	APHA, 22nd Edition Turbidity	2.0	179	200	400
16	Nitrates (as NO_3) - mg/l	IS-3025/34:1988Nesseler's	0.5	7.831	45	No relaxation

.

Test Report No: RIN/TR/APRIL-19/W-48A

Sl. No	Parameters	Test Method	Limits of Detection	Analysis Result	Standard (IS : 10500 : 2012)	
					Desirable limit	PLV in the absence of alternate source
17	Cadmium as (Cd)- mg/l	APHA, 22nd Edition AAS-GTA	0.005	<0.005	0.003	No relaxation
18	Lead as (Pb) -mg/l	APHA, 22nd Edition AAS-GTA	0.005	<0.005	0.01	No relaxation
19	Selenium (Se) –mg/l	APHA, 22nd Edition AAS-VGA	0.005	<0.005	0.01	No relaxation
20	Arsenic (Ar)-mg/l	APHA, 22nd Edition AAS-VGA	0.005	<0.005	0.05	No relaxation
21	Zinc as (Zn) -mg/l	IS-3025/49:1994 AAS-Flame	0.01	0.013	5	15
22	Total Chromium -mg/l	IS 3025 (Part 52) : 2003 AAS-Flame	0.01	<0.01	0.05	No relaxation
23	Boron as (B) -mg/l	APHA, 22nd EditionCarmine	0.2	<0.2	0.5	1.0
24	Alkalinity -mg/l	IS-3025/23:1986, Titration	4.0	148	200	600
25	Nickel-mg/l	IS 3025 (Part 54) : 2003, AAS-Flame	0.02	<0.02	0.02	No relaxation
26	Aluminum (Al)-mg/l	APHA, 22nd Edition AAS-VGA	0.005	<0.005	0.1	0.2

(Scientific Assistant)

Deepanshu Sahu
(Authorized Signatory)

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NOISE LEVEL DATA

NAME OF THE COMPANY : WCL YEAR : 2019
NAME OF THE AREA : WANI NORTH MONTH : APRIL
NAME OF THE PROJECT : KOLAR-PIMRPI OCP

Name of the Location : CHP - W_NKON-1

Month	Date of Data collection	Noise Level in dB(A) Day Time
APRIL.2019	20/04/2019	61.2
Noise Level Standard as per Env. (Protection) Amendment rule 2000		**75**

Name of the Location : Colony (Pragati Nagar) - W_NKON-2

Month	Date of Data collection	Noise Level in dB(A) Day Time
APRIL.2019	29/04/2019	43.0
Permissible Limit		**55**

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ENVIRONMENTAL MONITORING REPORT

KOLAR PIMPRI EXTN. OC

(WANI NORTH AREA)

WESTERN COALFIELDS LTD.

(JOB No. 8000002)

MAY-2019

Environment Laboratory
NABL Accredited vide Cert. No. TC-7102
CMPDI
REGIONAL INSTITUTE-IV, KASTURBA NAGAR,
JARIPATKA, NAGPUR, PIN – 440 014

AN ISO 9001:2015 COMPANY

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INTRODUCTION

Location :

Kolar-Pimpri Opencast Project is located on the right bank of Wardha river in Wani Tahsil of Yeotmal district of Maharashtra State. It is administered by Wani North Area of Western Coalfields Limited.

Communication :

The project is connected by a fair weathered road with Wani town via Bhalar village in North-west and Ghughus colliery via Ukni village in south. Wani is connected to state highway 84 via Warora. Ghughus railway station is 12 km away and Wani railway station is 14 km away from the project.

Drainage : Wardha river serves as the main drainage of the area.

Climate :

The climate of this area is tropical with maximum and minimum temperature 48^{O}C in summer and 10^{O}C in winter respectively. The average annual rainfall is about 1200 mm.

Industry :

Besides other coalmines, there are a lot of lime kiln and fire bricks industries near the project area.Transportation roads, agricultural and local activities ,vehicular traffic etc also contributes to the pollution.

Pollution due to other sources :

The above-mentioned industries are also expected to contribute in increasing the pollution load of the area.

Sampling Locations :

Ambient Air Quality Monitoring locations :

S.No.	Location Details		Location Code
1.	Pimpri village	-	W_NKOA-1
2.	Rest Shelter	-	W_NKOA-2
3.	Substation-Kolarpimpri	-	W_NKOA-3
4.	Water filter plant - Pragati nagar	-	W_NKOA-4

Fugitive Dust Monitoring Location:

S.No.	Location Details		Location Code
1.	Weigh Bridge	-	W_NKOAF-1
2.	CHP		W_NKOAF-2
3.	Wani Rly. Sidding		W_NKOAF-3

Water Quality Monitoring location :

S.No.	Location Details		Location Code
1.	Mine water discharge	-	W_NKOW-1
2.	Workshop water discharge	-	W_NKOW-2

Noise Level Monitoring location :

S.No.	Location Details		Location Code
1.	CHP	-	W_NKON-1
2.	Colony (Pragati Nagar)	-	W_NKON-2

Frequency of Monitoring :

Air : Frequency of monitoring is as per the Env. (Protection) Amendment Rules published vide Gazette dt. 25.9.2000.

Water : Water quality is monitored on fortnightly basis.

Noise : Noise level is monitored on fortnightly basis.

Methodology of Sampling and Analysis :

Air : 24 hourly air samples are collected with Respirable Dust Sampler at selected locations to monitor ambient air quality w.r.t. Suspended particulate matter (TPM), Respirable Particulate Matter (PM-10), Sulphur di-oxide (SO_2) and Oxides of nitrogen (NO_X) etc.

SPM : Ambient air laden with suspended particulates enters the Respirable Dust Sampler through the inlet pipe of sampler by means of a high flow rate blower. As the air passes through the cyclone, coarse, non-respirable dust (size >10 µ) is separated from the air stream by centrifugal forces acting on the solid particles. These separated particles fall through the cyclone's conical hopper and collect in the sampling bottle placed at bottom. The fine dust forming the respirable fraction (size<10 µ) of the Total Suspended Particulates passes through the cyclone and is carried by the air stream to the Glass Micro Fiber Filter Paper. The Respirable dust (PM-10) is retained by the filter and the carrier air exhausted from the system through the blower. The mass concentration (µg/m^3) of Suspended Particulate Matter (non-respirable dust and respirable dust) and Respirable Particulate Matter in the ambient air is computed by measuring the mass of collected particulates and the volume of air sampled.

PM-2.5 Ambient air enters the Fine dust sampler through an omni-directional air inlet designed to provide a clear aerodynamic cut point for particles greater than 10 microns. Particles in the air stream finer than 10 microns proceed to a second impactor that has an aerodynamic cut point at 2.5 microns. The air sample and fine particulates exiting from the PM 2.5 impactor are passed through a 47 mm diameter Teflon filter membrane that retains the PM-2.5. The mass concentrations (µg/m^3) of PM-2.5 in the ambient air are computed by measuring the mass of collected particulates and the volume of air sampled.

NO_X : Determination of oxides of Nitrogen is based on the procedure of "Jacobs and Hochheiser method". In this method the air sample is collected 24 hourly in the field and analysed in the laboratory using spectronic 20 D+ Spectrophotometer. Nitrogen oxides as Nitrogen di-oxide are collected by bubbling air through a Sodium hydroxide solution to form a stable solution of Sodium nitrite. The nitrite ion produced during sampling is determined colorimetrically (with the help of Spectrophotometer, measuring absorbance at 540 nm) by reacting the exposed absorbing reagent with Phosphoric acid, Sulphanilamide and N(1-naphthyl) ethylenediamine dihydrochloride. The interference of Sulphur di-oxide is eliminated by converting it to Sulphuric acid with Hydrogen peroxide before analysis.

SO_2 : Determination of SO_2 is based on the procedure of West and Gaeke method. Sulphur di-oxide from the air stream is absorbed in a Sodium tetrachloromercurate solution to form a stable solution of Dichlorosulphitomercurate. The amount of Sulphur dioxide is then estimated by the colour produced when P-Rosaniline

hydrochloride is added to the solution. The colour is estimated by a reading of absorbance at 560 nm in the Spectrophotometer.

Water : Water samples are collected on fortnightly basis in plastic zaricane and are transported to the laboratory for analysis. As per the Env. (Protection) Amendment Rules published vide Gazette dt. 25.9.2000, water samples are analysed fortnightly for the parameters - pH, TSS, Oil & Grease and COD and once in a year for all parameters as per Schedule VI, Env. Protection rule.

Noise : Noise level data are recorded fortnightly.

Environment Laboratory CMPDI, RI IV, Nagpur	**Test Report**	TC - 7102

TEST REPORT NO. : RIN/TR/MAY-19/A-48 DATE OF ISSUE : 10.07.19
NAME OF CUSTOMER: WCL, NAGPUR SAMPLE DESCRIPTION: AIR SAMPLE
CUSTOMER LETTER REF. NO. : WCL/HQ/ENV/17-K/520-522 DATED-18.04.19
NO. OF PAGES: 2
TEST REQUIRED:IS-5182 [PM-10(04:1999), NOx (06:2006), SO2 (02:2001)], SPM*, PM-2.5 (USEPA METHOD)

AIR QUALITY MONITORING DATA

NAME OF THE COMPANY : WCL YEAR : 2019
NAME OF THE AREA : WANI NORTH MONTH. : MAY
NAME OF THE PROJECT : KOLAR-PIMPRI OCP

Pimpri village					
DATE OF SAMPLING	**Parameters (24 hourly values in µg/m3)**				
	SPM*	**PM-10**	**PM-2.5**	**NOx**	**SOx**
07/05/19	65	43	20	39	20
21/05/19	124	49	21	21	10
Permissible Limits	**200**	**100**	**60**	**80**	**80**
Rest shelter					
DATE OF SAMPLING	**Parameters (24 hourly values in µg/m3)**				
	SPM*	**PM-10**	**PM-2.5**	**NOx**	**SOx**
14/05/19	326	178	51	25	31
2905/19	285	160	55	21	27
TLV	**600**	**300**	**60**	**120**	**120**
Substation-Kolarpimpri					
DATE OF SAMPLING	**Parameters (24 hourly values in µg/m3)**				
	SPM*	**PM-10**	**PM-2.5**	**NOx**	**SOx**
08/05/19	552	285	47	22	22
22/05/19	90	33	13	19	19
TLV	**600**	**300**	**60**	**120**	**120**

 # - Above Std. Value

Water filter plant - Pragati nagar

DATE OF SAMPLING	Parameters (24 hourly values in µg/m3)				
	SPM*	PM-10	PM-2.5	NOx	SOx
16/05/19	192	95	47	15	11
31/05/19	177	81	38	20	15
Permissible Limits	**200**	**100**	**60**	**80**	**80**

 # - Above Std. Value

FUGITIVE DUST MONITORING DATA

WEIGHT BRIDGE.			
DATE OF SAMPLING	Parameters (24 hourly values in µg/m3)		
	SPM*	PM-10	PM2.5
-	-	-	-

CHP.			
DATE OF SAMPLING	Parameters (24 hourly values in µg/m3)		
	SPM*	PM-10	PM2.5
-	-	-	-

Wani Rly. Siding			
DATE OF SAMPLING	Parameters (24 hourly values in µg/m3)		
	SPM*	PM-10	PM2.5
-	-	-	-

Deepanshu Sahu
(Scientific Assistant) ***(Authorized Signatory)***

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Environment Laboratory CMPDI, RI IV, Nagpur	**Test Report**	TC - 7102

TEST REPORT NO. : RIN/TR/MAY-19/W-48 DATE OF ISSUE : 10.07.2019
NAME OF CUSTOMER: WCL, NAGPUR SAMPLE DESCRIPTION: WATER SAMPLE
CUSTOMER LETTER REF. NO. : WCL/HQ/ENV/17-K/520-522 DATED-18.04.19
NO. OF PAGES: 1

EFFLUENT WATER QUALITY MONITORING DATA

NAME OF THE COMPANY : WCL YEAR : 2019
NAME OF THE AREA : WANI NORTH MONTH : MAY
NAME OF THE PROJECT : KOLAR-PIMPRI OC

Mine water discharge				
Date of Sample Collection	Analysis Results			
	pH IS-3025/11:1983	COD (mg/l) APHA-Closed reflux	TSS (mg/l) IS-3025/17:1984	O & G (mg/l) IS-3025/39:1991
Below Detection Limit	0.2	4	10	2
14/05/2019	7.70	36	24	<2
28/05/2019	8.00	32	26	<2
TLV as per Env.(Protection) Amendment rule 2000	**5.5 - 9.0**	**250**	**100**	**10**

E.T.P.(Workshop)Treated Water				
Date of Sample Collection	Analysis Results			
	pH IS-3025/11:1983	COD (mg/l) APHA-Closed reflux	TSS (mg/l) IS-3025/17:1984	O & G (mg/l) IS-3025/39:1991
Below Detection Limit	0.2	4	10	2
14/05/2019	7.50	24	18	<2
28/05/2019	7.60	24	20	<2
TLV as per Env.(Protection) Amendment rule 2000	**5.5 - 9.0**	**250**	**100**	**10**

(Scientific Assistant) ***Deepanshu Sahu***
(Authorized Signatory)

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3) * - Test parameter not under NABL scope.

NOISE LEVEL DATA

NAME OF THE COMPANY : WCL YEAR : 2019
NAME OF THE AREA : WANI NORTH MONTH : MAY
NAME OF THE PROJECT : KOLAR-PIMRPI OCP

Name of the Location : CHP - W_NKON-1

Month	Date of Data collection	Noise Level in dB(A) Day Time
MAY.2019	06/05/2019	62.4
MAY.2019	20/05/2019	62.0
Noise Level Standard as per Env. (Protection) Amendment rule 2000		**75**

Name of the Location : Colony (Pragati Nagar) - W_NKON-2

Month	Date of Data collection	Noise Level in dB(A) Day Time
MAY.2019	15/05/2019	42.5
MAY.2019	31/05/2019	42.6
Permissible Limit		**55**

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ENVIRONMENTAL MONITORING REPORT

KOLAR PIMPRI EXTN. OC

(WANI NORTH AREA)

WESTERN COALFIELDS LTD.

(JOB No. 8000002)

JUNE-2019

Environment Laboratory
NABL Accredited vide Cert. No. TC-7102
CMPDI
REGIONAL INSTITUTE-IV, KASTURBA NAGAR,
JARIPATKA, NAGPUR, PIN – 440 014

AN ISO 9001:2015 COMPANY

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INTRODUCTION

Location :

Kolar-Pimpri Opencast Project is located on the right bank of Wardha river in Wani Tahsil of Yeotmal district of Maharashtra State. It is administered by Wani North Area of Western Coalfields Limited.

Communication :

The project is connected by a fair weathered road with Wani town via Bhalar village in North-west and Ghughus colliery via Ukni village in south. Wani is connected to state highway 84 via Warora. Ghughus railway station is 12 km away and Wani railway station is 14 km away from the project.

Drainage : Wardha river serves as the main drainage of the area.

Climate :

The climate of this area is tropical with maximum and minimum temperature 48^{O}C in summer and 10^{O}C in winter respectively. The average annual rainfall is about 1200 mm.

Industry :

Besides other coalmines, there are a lot of lime kiln and fire bricks industries near the project area.Transportation roads, agricultural and local activities ,vehicular traffic etc also contributes to the pollution.

Pollution due to other sources :

The above-mentioned industries are also expected to contribute in increasing the pollution load of the area.

Sampling Locations :

Ambient Air Quality Monitoring locations :

S.No.	Location Details		Location Code
1.	Pimpri village	-	W_NKOA-1
2.	Rest Shelter	-	W_NKOA-2
3.	Substation-Kolarpimpri	-	W_NKOA-3
4.	Water filter plant - Pragati nagar	-	W_NKOA-4

Fugitive Dust Monitoring Location:

S.No.	Location Details		Location Code
1.	Weigh Bridge	-	W_NKOAF-1
2.	CHP		W_NKOAF-2
3.	Wani Rly. Sidding		W_NKOAF-3

Water Quality Monitoring location :

S.No.	Location Details		Location Code
1.	Mine water discharge	-	W_NKOW-1
2.	Workshop water discharge	-	W_NKOW-2

Noise Level Monitoring location :

S.No.	Location Details		Location Code
1.	CHP	-	W_NKON-1
2.	Colony (Pragati Nagar)	-	W_NKON-2

Frequency of Monitoring :

Air : Frequency of monitoring is as per the Env. (Protection) Amendment Rules published vide Gazette dt. 25.9.2000.

Water : Water quality is monitored on fortnightly basis.

Noise : Noise level is monitored on fortnightly basis.

Methodology of Sampling and Analysis :

Air : 24 hourly air samples are collected with Respirable Dust Sampler at selected locations to monitor ambient air quality w.r.t. Suspended particulate matter (TPM), Respirable Particulate Matter (PM-10), Sulphur di-oxide (SO_2) and Oxides of nitrogen (NO_X) etc.

SPM : Ambient air laden with suspended particulates enters the Respirable Dust Sampler through the inlet pipe of sampler by means of a high flow rate blower. As the air passes through the cyclone, coarse, non-respirable dust (size >10 µ) is separated from the air stream by centrifugal forces acting on the solid particles. These separated particles fall through the cyclone's conical hopper and collect in the sampling bottle placed at bottom. The fine dust forming the respirable fraction (size<10 µ) of the Total Suspended Particulates passes through the cyclone and is carried by the air stream to the Glass Micro Fiber Filter Paper. The Respirable dust (PM-10) is retained by the filter and the carrier air exhausted from the system through the blower. The mass concentration (µg/m^3) of Suspended Particulate Matter (non-respirable dust and respirable dust) and Respirable Particulate Matter in the ambient air is computed by measuring the mass of collected particulates and the volume of air sampled.

PM-2.5 Ambient air enters the Fine dust sampler through an omni-directional air inlet designed to provide a clear aerodynamic cut point for particles greater than 10 microns. Particles in the air stream finer than 10 microns proceed to a second impactor that has an aerodynamic cut point at 2.5 microns. The air sample and fine particulates exiting from the PM 2.5 impactor are passed through a 47 mm diameter Teflon filter membrane that retains the PM-2.5. The mass concentrations (µg/m^3) of PM-2.5 in the ambient air are computed by measuring the mass of collected particulates and the volume of air sampled.

NO_X : Determination of oxides of Nitrogen is based on the procedure of "Jacobs and Hochheiser method". In this method the air sample is collected 24 hourly in the field and analysed in the laboratory using spectronic 20 D+ Spectrophotometer. Nitrogen oxides as Nitrogen di-oxide are collected by bubbling air through a Sodium hydroxide solution to form a stable solution of Sodium nitrite. The nitrite ion produced during sampling is determined colorimetrically (with the help of Spectrophotometer, measuring absorbance at 540 nm) by reacting the exposed absorbing reagent with Phosphoric acid, Sulphanilamide and N(1-naphthyl) ethylenediamine dihydrochloride. The interference of Sulphur di-oxide is eliminated by converting it to Sulphuric acid with Hydrogen peroxide before analysis.

SO_2 : Determination of SO_2 is based on the procedure of West and Gaeke method. Sulphur di-oxide from the air stream is absorbed in a Sodium tetrachloromercurate solution to form a stable solution of Dichlorosulphitomercurate. The amount of Sulphur dioxide is then estimated by the colour produced when P-Rosaniline

hydrochloride is added to the solution. The colour is estimated by a reading of absorbance at 560 nm in the Spectrophotometer.

Water : Water samples are collected on fortnightly basis in plastic zaricane and are transported to the laboratory for analysis. As per the Env. (Protection) Amendment Rules published vide Gazette dt. 25.9.2000, water samples are analysed fortnightly for the parameters - pH, TSS, Oil & Grease and COD and once in a year for all parameters as per Schedule VI, Env. Protection rule.

Noise : Noise level data are recorded fortnightly.

Environment Laboratory CMPDI, RI IV, Nagpur	**Test Report**	TC - 7102

TEST REPORT NO. : RIN/TR/JUNE-19/A44 DATE OF ISSUE: 05.08.19
NAME OF CUSTOMER: WCL, NAGPUR SAMPLE DESCRIPTION: AIR SAMPLE
CUSTOMER LETTER REF. NO. : WCL/HQ/ENV/17-K/520-522 DATED-18.04.19
NO. OF PAGES: 2
TEST REQUIRED:IS-5182 [PM-10(04:1999), NOx (06:2006), SO2 (02:2001)], SPM*, PM-2.5 (USEPA METHOD)

AIR QUALITY MONITORING DATA

NAME OF THE COMPANY : WCL YEAR : 2019
NAME OF THE AREA : WANI NORTH MONTH. : JUNE
NAME OF THE PROJECT : KOLAR-PIMPRI OCP

Pimpri village					
DATE OF SAMPLING	**Parameters (24 hourly values in µg/m3)**				
	SPM*	**PM-10**	**PM-2.5**	**NOx**	**SOx**
10/06/2019	262	182	55	17	18
21/06/2019	222	83	25	19	19
Permissible Limits	**200**	**100**	**60**	**80**	**80**
Rest shelter					
DATE OF SAMPLING	**Parameters (24 hourly values in µg/m3)**				
	SPM*	**PM-10**	**PM-2.5**	**NOx**	**SOx**
10/06/2019	152	98	41	20	24
24/06/2019	87	40	35	21	22
TLV	**600**	**300**	**60**	**120**	**120**
Substation-Kolarpimpri					
DATE OF SAMPLING	**Parameters (24 hourly values in µg/m3)**				
	SPM*	**PM-10**	**PM-2.5**	**NOx**	**SOx**
10/06/2019	131	112	27	19	21
22/06/2019	173	131	52	19	12
TLV	**600**	**300**	**60**	**120**	**120**
# - Above Std. Value					

Water filter plant - Pragati nagar					
DATE OF SAMPLING	**Parameters (24 hourly values in µg/m3)**				
	SPM*	**PM-10**	**PM-2.5**	**NOx**	**SO_X**
08/06/2019	361	229	58	21	16
23/06/2019	146	59	37	23	30
Permissible Limits	**200**	**100**	**60**	**80**	**80**

 # - Above Std. Value

FUGITIVE DUST MONITORING DATA

WEIGHT BRIDGE.			
DATE OF SAMPLING	**Parameters (24 hourly values in µg/m3)**		
	SPM*	**PM-10**	**PM2.5**
22/06/2019	697	385	84

CHP.			
DATE OF SAMPLING	**Parameters (24 hourly values in µg/m3)**		
	SPM*	**PM-10**	**PM2.5**
22/06/2019	435	125	52

Wani Rly. Siding			
DATE OF SAMPLING	**Parameters (24 hourly values in µg/m3)**		
	SPM*	**PM-10**	**PM2.5**
20/06/2019	530	268	86

Deepanshu Sahu
(Scientific Assistant) ***(Authorized Signatory)***

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Environment Laboratory CMPDI, RI IV, Nagpur	**Test Report**	TC - 7102

TEST REPORT NO. : RIN/TR/JUNE-19/W44 DATE OF ISSUE: 05.08.2019
NAME OF CUSTOMER: WCL, NAGPUR SAMPLE DESCRIPTION: WATER SAMPLE
CUSTOMER LETTER REF. NO. : WCL/HQ/ENV/17-K/520-522 DATED-18.04.19
NO. OF PAGES: 1

EFFLUENT WATER QUALITY MONITORING DATA

NAME OF THE COMPANY : WCL YEAR : 2019
NAME OF THE AREA : WANI NORTH MONTH : JUNE
NAME OF THE PROJECT : KOLAR-PIMPRI OC

Mine water discharge				
Date of Sample Collection	Analysis Results			
	pH IS-3025/11:1983	COD (mg/l) APHA-Closed reflux	TSS (mg/l) IS-3025/17:1984	O & G (mg/l) IS-3025/39:1991
Below Detection Limit	0.2	4	10	2
09/06/2019	6.40	28	20	<2
21/06/2019	7.10	32	24	<2
TLV	**5.5 - 9.0**	**250**	**100**	**10**

E.T.P.(Workshop)Treated Water				
Date of Sample Collection	Analysis Results			
	pH IS-3025/11:1983	COD (mg/l) APHA-Closed reflux	TSS (mg/l) IS-3025/17:1984	O & G (mg/l) IS-3025/39:1991
Below Detection Limit	0.2	4	10	2
09/06/2019	7.30	40	28	<2
21/06/2019	6.40	24	18	<2
TLV	**5.5 - 9.0**	**250**	**100**	**10**

(Scientific Assistant) ***Deepanshu Sahu***
(Authorized Signatory)

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NOISE LEVEL DATA

NAME OF THE COMPANY : WCL YEAR : 2019
NAME OF THE AREA : WANI NORTH MONTH : JUNE
NAME OF THE PROJECT : KOLAR-PIMRPI OCP

Name of the Location : CHP - W_NKON-1

Month	Date of Data collection	Noise Level in dB(A)	
		Day Time	Night Time
JUNE.2019	09/06/2019	64.9	64.2
JUNE.2019	19/06/2019	65.3	64.8
Noise Level Standard as per Env. (Protection) Amendment rule 2000		**75**	**70**

Name of the Location : Colony (Pragati Nagar) - W_NKON-2

Month	Date of Data collection	Noise Level in dB(A)	
		Day Time	Night Time
JUNE.2019	07/06/2019	44.6	43.8
JUNE.2019	19/06/2019	42.6	41.6
Permissible Limit		**55**	**45**

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ENVIRONMENTAL MONITORING REPORT

KOLARPIMPRI OC

WANI NORTH AREA

WESTERN COALFIELDS LTD.

JOB NO. 8000003

JULY 2019

Environment Laboratory

NABL Accredited vide Cert. No. TC-7102

CMPDI

REGIONAL INSTITUTE-IV, KASTURBA NAGAR,
JARIPATKA, NAGPUR, PIN – 440 014

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INTRODUCTION

Kolar-Pimpri Opencast Project is located on the right bank of Wardha river in Wani Tahsil of Yeotmal district of Maharashtra State. It is administered by Wani North Area of Western Coalfields Limited.Wardha river serves as the main drainage of the area.The climate of this area is tropical.The above-mentioned industries are also expected to contribute in increasing the pollution load of the area.

Sampling Location:

Ambient Air Quality Monitoring locations:

SL. NO.	LOCATION DETAIL	LOCATION CODE
1	SUBSTATION KOLARPIMPRI:	WNKOA1
2	REST SHELTER:	WNKOA2
3	PIMPRI VILLAGE:	WNKOA3
4	WATER FILTER PLANT PRAGATI NAGAR:	WNKOA4

Fugitive Dust Monitoring locations:

SL. NO.	LOCATION DETAIL	LOCATION CODE
1	WEIGHT BRIDGE:	WNKOF1
2	CHP:	WNKOF2
3	WANI.RLY. SIDING	WNKOF3

Water Quality Monitoring location:

SL. NO.	LOCATION DETAIL	LOCATION CODE
1	MINE WATER DISCHARGE:	WNKOW1
2	ETP (TREATED):	WNKOW2

Noise Level Monitoring location :

SL. NO.	LOCATION DETAIL	LOCATION CODE
1	CHP:	WNKON1
2	COLONY PRAGATI NAGAR:	WNKON2

Frequency of Monitoring:

AIR: Frequency of monitoring is as per the Env. (Protection) Amendment Rules published vide Gazette dt. 25.9.2000.

WATER: Water quality is monitored on fortnightly basis

NOISE: Noise level is monitored on fortnightly basis.

Environment Laboratory CMPDI RI-IV, NAGPUR	Test Report Air quality monitoring data	TC-7102

TSET REPORT NO.	RIN/TR/JULY-19/A50	DATE OF ISSUE	31.08.19
NAME OF CUSTOMER	WCL, NAGPUR	SAMPLE DESCRIPTION	AIR SAMPLE
CUSTOMER LETTER REFERENCE NO.	WCL/HQ/ENV/17-K/520-522 DATED: 18.04.19		
TEST REQUIRED	IS-5182 [PM-10(04:1999), NOx(06:2006), SO2(02:2001)],PM-2.5 & SPM*		
NAME OF AREA	WANI NORTH AREA	YEAR	2019
NAME OF PROJECT	KOLARPIMPRI OC	MONTH	JULY

SUBSTATION KOLARPIMPRI: WNKOA1					
DATE OF SAMPLING	PARAMETERS				
	SPM*	**PM_{10}**	**$PM_{2.5}$**	**NO_X**	**SO_2**
DETECTION LIMIT	5	5	2	6	10
11-07-19	83	76	22	17	18
22-07-19	78	64	33	19	25
TLV	**600**	**300**	**60**	**120**	**120**

REST SHELTER: WNKOA2					
DATE OF SAMPLING	PARAMETERS				
	SPM*	**PM_{10}**	**$PM_{2.5}$**	**NO_X**	**SO_2**
DETECTION LIMIT	5	5	2	6	10
11-07-19	69	50	35	26	11
22-07-19	106	70	45	22	22
TLV	**600**	**300**	**60**	**120**	**120**

PIMPRI VILLAGE: WNKOA3					
DATE OF SAMPLING	PARAMETERS				
	SPM*	**PM_{10}**	**$PM_{2.5}$**	**NO_X**	**SO_2**
DETECTION LIMIT	5	5	2	6	10
11-07-19	102	73	45	22	13
21-07-19	126	43	26	20	18
TLV	**200**	**100**	**60**	**80**	**80**

WATER FILTER PLANT PRAGATI NAGAR: WNKOA4					
DATE OF SAMPLING	PARAMETERS				
	SPM*	**PM_{10}**	**$PM_{2.5}$**	**NO_X**	**SO_2**
DETECTION LIMIT	5	5	2	6	10
06-07-19	86	52	27	25	20
20-07-19	125	60	31	21	22
TLV	**200**	**100**	**60**	**80**	**80**

DEEPANSHU SAHU

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Environment Laboratory CMPDI RI-IV, NAGPUR	Test Report Effluent water quality monitoring data	TC-7102

TSET REPORT NO.	RIN/TR/JULY-19/W50	DATE OF ISSUE	31.08.19
NAME OF CUSTOMER	WCL, NAGPUR	SAMPLE DESCRIPTION	WATER SAMPLE
CUSTOMER LETTER REFERENCE NO.	WCL/HQ/ENV/17-K/520-522 DATED: 18.04.19		
TEST REQUIRED	IS 3025 (Part 11):1983, IS 3025 (Part 17):1984, IS 3025(Part 58):2006 & IS 3025(Part 39):1991		
NAME OF AREA	WANI NORTH AREA	YEAR	2019
NAME OF PROJECT	KOLARPIMPRI OC	MONTH	JULY

MINE WATER DISCHARGE: WNKOW1				
DATE OF SAMPLE COLLECTION	ANALYSIS RESULTS			
	pH	COD	TSS	O & G
DETECTION LIMIT	0.2	4	10	2
00-01-00	6.6	28	20	<2
21-07-19	7.1	116	84	<2
TLV	5.5 - 9.0	250	100	10

ETP (TREATED): WNKOW2				
DATE OF SAMPLE COLLECTION	ANALYSIS RESULTS			
	pH	COD	TSS	O & G
DETECTION LIMIT	0.2	4	10	2
10-07-19	7.4	36	24	<2
21-07-19	7.3	24	18	<2
TLV	5.5 - 9.0	250	100	10

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Environment Laboratory CMPDI RI-IV, NAGPUR	Test Report Drinking water quality monitoring data	TC-7102

TSET REPORT NO.	RIN/TR/JULY-19/DW50	DATE OF ISSUE	31.08.19
NAME OF CUSTOMER	WCL, NAGPUR	SAMPLE DESCRIPTION	WATER SAMPLE
CUSTOMER LETTER REFERENCE NO.	WCL/HQ/ENV/17-K/520-522 DATED: 18.04.19		
TEST REQUIRED	IS 10500:2012		
NAME OF AREA	WANI NORTH AREA	YEAR	2019
NAME OF PROJECT	KOLARPIMPRI OC	MONTH	JULY
DATE OF SAMPLING	19-07-19		

NAME OF LOCATION:	DRINKING WATER FROM FILTER PLANT (PRAGATI NAGAR)					
SL NO.	**PARAMETER**	**TEST METHOD**	**DETECTION LIMIT**	**ANALYSIS RESULT**	**DESIRABLE LIMIT**	**PLV IN THE ABSENCE OF ALTERNATE SOURCE**
1	Colour (Hz)	IS 3025 Part-4	1	4	5	15
2	Odour	IS 3025 Part-5	Qualitative	Agreeable	Agreeable	Agreeable
3	Turbidity (NTU)	IS 3025 Part-10	1	1	1	5
4	pH Value	IS 3025 Part-11	2	7.6	6.5 to 8.5	No relaxation
5	Total Hardness as CaCO3 - mg/l	IS 3025 Part-21	4	128	200	600
6	Iron (as Fe) -mg/l	IS 3025 Part-53	0.06	BDL	0.3	No relaxation
7	Chlorides (as Cl)- mg/l	IS 3025 Part-32	2	28	250	1000
8	Residual Chlorine -mg/l	APHA, 22nd Edition DPD	0.02	BDL	0.2	1
9	Fluoride (as F)- mg/l	APHA, 22nd Edition SPADNS	0.02	0.56	1	1.5
10	TDS -mg/l	IS 3025 Part-16	25	250	500	2000
11	Calcium (as Ca) -mg/l	IS 3025 Part-40	1.6	38	75	200
12	Magnesium (as Mg) -mg/l*	IS-3025/40: 1991 EDTA	3	9	30	100
13	Copper as(Cu) -mg/l	IS 3025 Part-42	0.03	BDL	0.05	1.5
14	Manganese as (Mn)- mg/l	IS 3025 Part-59	0.02	BDL	0.1	0.3
15	Sulphate (as SO4) -mg/l	APHA (22nd Edition) 4500E Turbidity Method	2	42	200	400

16	Nitrates (as NO3) - mg/l	IS-3025/34:1988 Nesseler's method	0.5	10	45	No relaxation
17	Cadmium as (Cd)- mg/l	APHA, 22nd Edition AAS-GTA	0.005	BDL	0.003	No relaxation
18	Lead as (Pb) -mg/l	APHA, 22nd Edition AAS-GTA	0.005	BDL	0.01	No relaxation
19	Selenium (Se) –mg/l	APHA, 22nd Edition AAS-VGA	0.005	BDL	0.01	No relaxation
20	Arsenic (Ar)-mg/l	APHA, 22nd Edition AAS-VGA	0.005	BDL	0.05	No relaxation
21	Zinc as (Zn) -mg/l	IS 3025 Part-49	0.01	BDL	5	15
22	Total Chromium -mg/l	IS 3025 Part-52	0.01	BDL	0.05	No relaxation
23	Boron as (B) -mg/l	APHA, 22nd Edition Carmine	0.2	BDL	0.5	1
24	Alkalinity -mg/l	IS 3025 Part-23	4	128	200	600
25	Nickel-mg/l	IS 3025 Part-54	0.02	BDL	0.02	No relaxation
26	Aluminum (Al)-mg/l	APHA (22nd Edition) 3114B AAS-VGA	0.005	BDL	0.1	0.2

BDL: BELOW DETECTION LIMIT

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NOISE LEVEL DATA

NAME OF AREA: WANI NORTH AREA **YEAR: 2019**
NAME OF PROJECT: KOLARPIMPRI OC **MONTH: JULY**

CHP: WNKON1			
MONTH	DATE OF DATA COLLECTION	NOISE LEVEL IN dB(A)	
		DAY TIME	NIGHT TIME
JULY 2019	09-07-19	61.2	60
JULY 2019	19-07-19	64.5	63.7
TLV		**75**	**70**

COLONY PRAGATI NAGAR: WNKON2			
MONTH	DATE OF DATA COLLECTION	NOISE LEVEL IN dB(A)	
		DAY TIME	NIGHT TIME
JULY 2019	05-07-19	44.6	43.8
JULY 2019	19-07-19	43.8	42.9
TLV		**55**	**45**

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ENVIRONMENTAL MONITORING REPORT

KOLARPIMPRI OC

WANI NORTH AREA

WESTERN COALFIELDS LTD.

JOB NO. 8000003

AUGUST 2019

Environment Laboratory

NABL Accredited vide Cert. No. TC-7102

CMPDI

REGIONAL INSTITUTE-IV, KASTURBA NAGAR,
JARIPATKA, NAGPUR, PIN – 440 014

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INTRODUCTION

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Sampling Location:

Ambient Air Quality Monitoring locations:

SL. NO.	LOCATION DETAIL	LOCATION CODE
1	SUBSTATION KOLARPIMPRI:	WNKOA1
2	REST SHELTER:	WNKOA2
3	PIMPRI VILLAGE:	WNKOA3
4	WATER FILTER PLANT PRAGATI NAGAR:	WNKOA4

Fugitive Dust Monitoring locations:

SL. NO.	LOCATION DETAIL	LOCATION CODE
1	WEIGHT BRIDGE:	WNKOF1
2	CHP:	WNKOF2
3	WANI.RLY. SIDING	WNKOF3

Water Quality Monitoring location:

SL. NO.	LOCATION DETAIL	LOCATION CODE
1	MINE WATER DISCHARGE:	WNKOW1
2	ETP (TREATED):	WNKOW2

Noise Level Monitoring location :

SL. NO.	LOCATION DETAIL	LOCATION CODE
1	CHP:	WNKON1
2	COLONY PRAGATI NAGAR:	WNKON2

Frequency of Monitoring:

AIR: Frequency of monitoring is as per the Env. (Protection) Amendment Rules published vide Gazette dt. 25.9.2000.

WATER: Water quality is monitored on fortnightly basis

NOISE: Noise level is monitored on fortnightly basis.

Environment Laboratory CMPDI RI-IV, NAGPUR	Test Report Air quality monitoring data	TC-7102

TSET REPORT NO.	RIN/TR/AUGUST-19/A50	DATE OF ISSUE	31.09.19
NAME OF CUSTOMER	WCL, NAGPUR	SAMPLE DESCRIPTION	AIR SAMPLE
CUSTOMER LETTER REFERENCE NO.	WCL/HQ/ENV/17-K/520-522 DATED: 18.04.19		
TEST REQUIRED	IS-5182 [PM-10(04:1999), NOx(06:2006), SO2(02:2001)],PM-2.5 & SPM*		
NAME OF AREA	WANI NORTH AREA	YEAR	2019
NAME OF PROJECT	KOLARPIMPRI OC	MONTH	AUGUST

SUBSTATION KOLARPIMPRI: WNKOA1					
DATE OF SAMPLING	PARAMETERS				
	SPM*	**PM_{10}**	**$PM_{2.5}$**	**NO_X**	**SO_2**
DETECTION LIMIT	5	5	2	6	10
11-08-19	39	29	22	12	13
20-08-19	73	63	30	22	22
TLV	**600**	**300**	**60**	**120**	**120**

REST SHELTER: WNKOA2					
DATE OF SAMPLING	PARAMETERS				
	SPM*	**PM_{10}**	**$PM_{2.5}$**	**NO_X**	**SO_2**
DETECTION LIMIT	5	5	2	6	10
11-08-19	137	80	26	14	15
20-08-19	83	54	35	20	15
TLV	**600**	**300**	**60**	**120**	**120**

PIMPRI VILLAGE: WNKOA3					
DATE OF SAMPLING	PARAMETERS				
	SPM*	**PM_{10}**	**$PM_{2.5}$**	**NO_X**	**SO_2**
DETECTION LIMIT	5	5	2	6	10
12-08-19	104	58	18	22	24
20-08-19	76	52	27	21	19
TLV	**200**	**100**	**60**	**80**	**80**

WATER FILTER PLANT PRAGATI NAGAR: WNKOA4					
DATE OF SAMPLING	PARAMETERS				
	SPM*	**PM_{10}**	**$PM_{2.5}$**	**NO_X**	**SO_2**
DETECTION LIMIT	5	5	2	6	10
13-08-19	230	140	25	20	24
22-08-19	77	55	31	22	24
TLV	**200**	**100**	**60**	**80**	**80**

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CHP: WNKOF2			
DATE OF SAMPLING	PARAMETERS		
	SPM*	**PM10**	**$PM_{2.5}$**
DETECTION LIMIT	5	5	2
11-08-19	235.51	84.06	12.95

WANI.RLY. SIDING WNKOF3			
DATE OF SAMPLING	PARAMETERS		
	SPM*	**PM10**	**$PM_{2.5}$**
DETECTION LIMIT	5	5	2
11-08-19	424.13	216.97	48.59

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Environment Laboratory CMPDI RI-IV, NAGPUR	Test Report Effluent water quality monitoring data	TC-7102

TSET REPORT NO.	RIN/TR/AUGUST-19/W50	DATE OF ISSUE	31.09.19
NAME OF CUSTOMER	WCL, NAGPUR	SAMPLE DESCRIPTION	WATER SAMPLE
CUSTOMER LETTER REFERENCE NO.	WCL/HQ/ENV/17-K/520-522 DATED: 18.04.19		
TEST REQUIRED	IS 3025 (Part 11):1983, IS 3025 (Part 17):1984, IS 3025(Part 58):2006 & IS 3025(Part 39):1991		
NAME OF AREA	WANI NORTH AREA	YEAR	2019
NAME OF PROJECT	KOLARPIMPRI OC	MONTH	AUGUST

MINE WATER DISCHARGE: WNKOW1				
DATE OF SAMPLE COLLECTION	ANALYSIS RESULTS			
	pH	TSS	COD	O & G
DETECTION LIMIT	0.2	10	4	2
10-08-19	6.6	24	32	<2
19-08-19	7.8	40	60	<2
TLV	5.5 - 9.0	100	250	10

ETP (TREATED): WNKOW2				
DATE OF SAMPLE COLLECTION	ANALYSIS RESULTS			
	pH	TSS	COD	O & G
DETECTION LIMIT	0.2	10	4	2
10-08-19	6.8	26	36	<2
19-08-19	6.4	24	32	<2
TLV	5.5 - 9.0	100	250	10

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NOISE LEVEL DATA

NAME OF AREA: WANI NORTH AREA **YEAR: 2019**
NAME OF PROJECT: KOLARPIMPRI OC **MONTH: AUGUST**

CHP: WNKON1			
MONTH	DATE OF DATA COLLECTION	NOISE LEVEL IN dB(A)	
		DAY TIME	NIGHT TIME
AUGUST 2019	11-08-19	59	60.2
AUGUST 2019	20-08-19	64.6	63.5
TLV		**75**	**70**

COLONY PRAGATI NAGAR: WNKON2			
MONTH	DATE OF DATA COLLECTION	NOISE LEVEL IN dB(A)	
		DAY TIME	NIGHT TIME
AUGUST 2019	12-08-19	42	43.2
AUGUST 2019	22-08-19	44.5	43.6
TLV		**55**	**45**

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ENVIRONMENTAL MONITORING REPORT

KOLARPIMPRI OC

WANI NORTH AREA

WESTERN COALFIELDS LTD.

JOB NO. 8000003

SEPTEMBER 2019

Environment Laboratory

NABL Accredited vide Cert. No. TC-7102

CMPDI

REGIONAL INSTITUTE-IV, KASTURBA NAGAR,
JARIPATKA, NAGPUR, PIN – 440 014

AN ISO 9001:2015 COMPANY

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INTRODUCTION

Kolar-Pimpri Opencast Project is located on the right bank of Wardha river in Wani Tahsil of Yeotmal district of Maharashtra State. It is administered by Wani North Area of Western Coalfields Limited.Wardha river serves as the main drainage of the area.The climate of this area is tropical.The above-mentioned industries are also expected to contribute in increasing the pollution load of the area.

Sampling Location:

Ambient Air Quality Monitoring locations:

SL. NO.	LOCATION DETAIL	LOCATION CODE
1	SUBSTATION KOLARPIMPRI:	WNKOA1
2	REST SHELTER:	WNKOA2
3	PIMPRI VILLAGE:	WNKOA3
4	WATER FILTER PLANT PRAGATI NAGAR:	WNKOA4

Fugitive Dust Monitoring locations:

SL. NO.	LOCATION DETAIL	LOCATION CODE
1	WEIGHT BRIDGE:	WNKOF1
2	CHP:	WNKOF2
3	WANI.RLY. SIDING	WNKOF3

Water Quality Monitoring location:

SL. NO.	LOCATION DETAIL	LOCATION CODE
1	MINE WATER DISCHARGE:	WNKOW1
2	ETP (TREATED):	WNKOW2

Noise Level Monitoring location :

SL. NO.	LOCATION DETAIL	LOCATION CODE
1	CHP:	WNKON1
2	COLONY PRAGATI NAGAR:	WNKON2

Frequency of Monitoring:

AIR: Frequency of monitoring is as per the Env. (Protection) Amendment Rules published vide Gazette dt. 25.9.2000.

WATER: Water quality is monitored on fortnightly basis

NOISE: Noise level is monitored on fortnightly basis.

Environment Laboratory CMPDI RI-IV, NAGPUR	Test Report Air quality monitoring data	TC-7102

TSET REPORT NO.	RIN/TR/SEPTEMBER-19/A50	DATE OF ISSUE	31.10.19
NAME OF CUSTOMER	WCL, NAGPUR	SAMPLE DESCRIPTION	AIR SAMPLE
CUSTOMER LETTER REFERENCE NO.	WCL/HQ/ENV/17-K/520-522 DATED: 18.04.19		
TEST REQUIRED	IS-5182 [PM-10(04:1999), NOx(06:2006), SO2(02:2001)],PM-2.5 & SPM*		
NAME OF AREA	WANI NORTH AREA	YEAR	2019
NAME OF PROJECT	KOLARPIMPRI OC	MONTH	SEPTEMBER

SUBSTATION KOLARPIMPRI: WNKOA1					
DATE OF SAMPLING	PARAMETERS				
	SPM*	**PM_{10}**	**$PM_{2.5}$**	**NO_X**	**SO_2**
DETECTION LIMIT	5	5	2	6	10
12-09-19	38	27	15	11	<10
30-09-19	202	96	53	39	20
TLV	**600**	**300**	**60**	**120**	**120**

REST SHELTER: WNKOA2					
DATE OF SAMPLING	PARAMETERS				
	SPM*	**PM_{10}**	**$PM_{2.5}$**	**NO_X**	**SO_2**
DETECTION LIMIT	5	5	2	6	10
14-09-19	48	26	14	10	<10
30-09-19	117	68	37	27	14
TLV	**600**	**300**	**60**	**120**	**120**

PIMPRI VILLAGE: WNKOA3					
DATE OF SAMPLING	PARAMETERS				
	SPM*	**PM_{10}**	**$PM_{2.5}$**	**NO_X**	**SO_2**
DETECTION LIMIT	5	5	2	6	10
12-09-19	26	13	7	<6	<10
27-09-19	46	11	6	<6	<10
TLV	**200**	**100**	**60**	**80**	**80**

WATER FILTER PLANT PRAGATI NAGAR: WNKOA4					
DATE OF SAMPLING	PARAMETERS				
	SPM*	**PM_{10}**	**$PM_{2.5}$**	**NO_X**	**SO_2**
DETECTION LIMIT	5	5	2	6	10
12-09-19	32	20	11	8	<10
27-09-19	27	16	9	6	<10
TLV	**200**	**100**	**60**	**80**	**80**

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Environment Laboratory CMPDI RI-IV, NAGPUR	Test Report Effluent water quality monitoring data	TC-7102

TSET REPORT NO.	RIN/TR/SEPTEMBER-19/W50	DATE OF ISSUE	31.10.19
NAME OF CUSTOMER	WCL, NAGPUR	SAMPLE DESCRIPTION	WATER SAMPLE
CUSTOMER LETTER REFERENCE NO.	WCL/HQ/ENV/17-K/520-522 DATED: 18.04.19		
TEST REQUIRED	IS 3025 (Part 11):1983, IS 3025 (Part 17):1984, IS 3025(Part 58):2006 & IS 3025(Part 39):1991		
NAME OF AREA	WANI NORTH AREA	YEAR	2019
NAME OF PROJECT	KOLARPIMPRI OC	MONTH	SEPTEMBER

MINE WATER DISCHARGE: WNKOW1				
DATE OF SAMPLE COLLECTION	ANALYSIS RESULTS			
	pH	TSS	COD	O & G
DETECTION LIMIT	0.2	10	4	2
11-09-19	7	44	32	<2
27-09-19	7	38	28	<2
TLV	5.5 - 9.0	100	250	10

ETP (TREATED): WNKOW2				
DATE OF SAMPLE COLLECTION	ANALYSIS RESULTS			
	pH	TSS	COD	O & G
DETECTION LIMIT	0.2	10	4	2
11-09-19	7	48	36	<2
27-09-19	7	32	32	<2
TLV	5.5 - 9.0	100	250	10

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NOISE LEVEL DATA

NAME OF AREA: WANI NORTH AREA **YEAR: 2019**
NAME OF PROJECT: KOLARPIMPRI OC **MONTH: SEPTEMBER**

CHP: WNKON1			
MONTH	DATE OF DATA COLLECTION	NOISE LEVEL IN dB(A)	
		DAY TIME	NIGHT TIME
SEPT 2019	11-09-19	63.5	62
SEPT 2019	26-09-19	65.5	62.9
TLV		**75**	**70**

COLONY PRAGATI NAGAR: WNKON2			
MONTH	DATE OF DATA COLLECTION	NOISE LEVEL IN dB(A)	
		DAY TIME	NIGHT TIME
SEPT 2019	11-09-19	43.2	42.6
SEPT 2019	26-09-19	43.7	40.9
TLV		**55**	**45**

Environment Laboratory CMPDI, RI IV, Nagpur	**Test Report**	T - 2969

Test Report No. : RIN/TR/HYDRO/W-191&192 Date of Issue : 25/03/2019
Name of the Customer : Hydro-geology,CMPDI,Nagpur Sampling method : By the party
Customer letter Ref. No. : WCL/HQ/ENV/17-V1/ 1159-1182 Dated: 19.09.2018
Sample Description : Water sample No. of pages : 2
Test Required : IS 10500:2012

GROUND WATER QUALITY ANALYSIS RESULT

NAME OF THE COMPANY : WCL YEAR : 2018-19
NAME OF THE AREA : WANI NORTH

Sl. No	Parameters	Test Method	Limits of Detection	Analysis Result Sampling Code, Location & Sample collection date		Standard (IS : 10500 : 2012)	
				NAIGAON KHURD, WN-4 26/11/18	KOLAR WN-5 22/11/2018	Desirable limit	PLV in the absence of alternate source
1	Colour Hz)	IS 3025 /04:1983, Platinum Cobalt	1	2	1	5	15
2	Odour	IS 3025 /05:1983, Physical, Qualitative	Qualitative	Agreeable	Agreeable	Agreeable	Agreeable
3	Turbidity (NTU)	IS-3025/10:1984 Nephelometric	1.0	1	1	1	5
4	pH Value	IS-3025/11:1983 Electrometric	0.2	6.6	6.7	6.5 to 8.5	No relaxation
5	Total Hardness as $CaCO_3$ -mg/l	IS-3025/21:2009 EDTA	4.0	492	468	200	600
6	Iron -mg/l	IS-3025/53:2003 AAS-Flame	0.06	<006	<0.06	0.3	No relaxation
7	Chlorides - mg/l	IS-3025/32:1988, Argentometric	2.0	262	164	250	1000
8	Residual Chlorine -mg/l (min.)	APHA, 22nd Edition DPD	0.02	<0.02	<0.02	0.2	1
9	Fluoride- mg/l	APHA, 22nd Edition SPADNS	0.02	1.57	2.86	1.0	1.5
10	TDS -mg/l	IS-3025/16:1984 Gravimetric	25.0	1050	820	500	2000
11	Calcium -mg/l	IS-3025/40:1991 EDTA	1.6	100	92	75	200
12	Magnesium -mg/l*	APHA, 22nd Edition-Calculation EDTA	3	58	57	30	100
13	Copper -mg/l	IS-3025/42:1992 AAS-Flame	0.03	0.035	<0.03	0.05	1.5

TABLE-IV-B

14	Manganese - mg/l	IS-3025/59:2006 AAS-Flame	0.02	<0.02	<0.02	0.1	0.3
15	Sulphate -mg/l	APHA, 22nd Edition Turbidity	2.0	231	146	200	400
16	Nitrates - mg/l	APHA, 22nd Edition UV-Spectrophotometric Turbidity Nesseler's	0.5	16	14	45	No relaxation
17	Cadmium - mg/l	APHA, 22nd Edition AAS-GTA	0.0005	<0.0005	<0.0005	0.003	No relaxation
18	Lead -mg/l	APHA, 22nd Edition AAS-GTA	0.005	<0.005	<0.005	0.01	No relaxation
19	Selenium –mg/l*	APHA, 22nd Edition AAS-VGA	0.005	<0.005	<0.005	0.01	No relaxation
20	Total Arsenic -mg/l*	APHA, 22nd Edition AAS-VGA	0.005	<0.005	<0.005	0.01	0.05
21	Zinc -mg/l	IS-3025/49:1994 AAS-Flame	0.01	<0.01	<0.01	5	15
22	Total Chromium -mg/l	IS 3025 (Part 52) : 2003 AAS-Flame	0.01	<0.01	<0.01	0.05	No relaxation
23	Boron -mg/l	APHA, 22nd Edition Carmine	0.2	<0.02	<0.2	0.5	1.0
24	Alkalinity -mg/l	IS-3025/23:1986, Titration	4.0	272	204	200	600
25	Nickel-mg/l	IS 3025 (Part 54) : 2003, AAS-Flame Method	0.02	<0.02	<0.02	0.02	No relaxation
26	Aluminum -mg/l*	APHA, 22nd Edition AAS-GTA	0.03	<0.005	<0.005	0.1	0.2

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Environment Laboratory CMPDI, RI IV, Nagpur	Test Report	T - 2969

Test Report No. : RIN/TR/HYDRO/W-192&193 Date of Issue : 25/03/2019
Name of the Customer : Hydro-geology,CMPDI,Nagpur Sampling method : By the party
Customer letter Ref. No. : WCL/HQ/ENV/17-V1/ 1159-1182 Dated: 19.09.2018
Sample Description : Water sample No. of pages : 2
Test Required : IS 10500:2012

GROUND WATER QUALITY ANALYSIS RESULT

NAME OF THE COMPANY : WCL YEAR : 2018-19
NAME OF THE AREA : WANI NORTH

Sl. No	Parameters	Test Method	Limits of Detection	Analysis Result Sampling Code, Location & Sample collection date		Standard (IS : 10500 : 2012)	
				NILAPUR, WN-6 22/11/2018	BORGAON WN-9b 22/11/18	Desirable limit	PLV in the absence of alternate source
1	Colour Hz)	IS 3025 /04:1983, Platinum Cobalt	1	1	2	5	15
2	Odour	IS 3025 /05:1983, Physical, Qualitative	Qualitative	Agreeable	Agreeable	Agreeable	Agreeable
3	Turbidity (NTU)	IS-3025/10:1984 Nephelometric	1.0	1	1	1	5
4	pH Value	IS-3025/11:1983 Electrometric	0.2	7.2	7.0	6.5 to 8.5	No relaxation
5	Total Hardness as $CaCO_3$ -mg/l	IS-3025/21:2009 EDTA	4.0	280	300	200	600
6	Iron -mg/l	IS-3025/53:2003 AAS-Flame	0.06	<0.06	<0.06	0.3	No relaxation
7	Chlorides - mg/l	IS-3025/32:1988, Argentometric	2.0	130	92	250	1000
8	Residual Chlorine -mg/l (min.)	APHA, 22nd Edition DPD	0.02	<0.02	<0.02	0.2	1
9	Fluoride- mg/l	APHA, 22nd Edition SPADNS	0.02	1.20	1.57	1.0	1.5
10	TDS -mg/l	IS-3025/16:1984 Gravimetric	25.0	624	597	500	2000
11	Calcium -mg/l	IS-3025/40:1991 EDTA	1.6	54	45	75	200
12	Magnesium -mg/l*	APHA, 22nd Edition-Calculation EDTA	3	35	46	30	100
13	Copper -mg/l	IS-3025/42:1992 AAS-Flame	0.03	0.057	0.045	0.05	1.5

TABLE-IV-B

14	Manganese - mg/l	IS-3025/59:2006 AAS-Flame	0.02	<0.02	<0.02	0.1	0.3
15	Sulphate -mg/l	APHA, 22nd Edition Turbidity	2.0	175	161	200	400
16	Nitrates - mg/l	APHA, 22nd Edition UV-Spectrophotometric Turbidity Nesseler's	0.5	16	17	45	No relaxation
17	Cadmium - mg/l	APHA, 22nd Edition AAS-GTA	0.0005	<0.0005	<0.0005	0.003	No relaxation
18	Lead -mg/l	APHA, 22nd Edition AAS-GTA	0.005	<0.005	<0.005	0.01	No relaxation
19	Selenium –mg/l*	APHA, 22nd Edition AAS-VGA	0.005	<0.005	<0.005	0.01	No relaxation
20	Total Arsenic - mg/l*	APHA, 22nd Edition AAS-VGA	0.005	<0.005	<0.005	0.01	0.05
21	Zinc -mg/l	IS-3025/49:1994 AAS-Flame	0.01	<0.01	0.0880	5	15
22	Total Chromium - mg/l	IS 3025 (Part 52) : 2003 AAS-Flame	0.01	<0.01	<0.01	0.05	No relaxation
23	Boron -mg/l	APHA, 22nd Edition Carmine	0.2	<0.2	<0.2	0.5	1.0
24	Alkalinity -mg/l	IS-3025/23:1986, Titration	4.0	168	396	200	600
25	Nickel-mg/l	IS 3025 (Part 54) : 2003, AAS-Flame Method	0.02	<0.02	<0.02	0.02	No relaxation
26	Aluminum -mg/l*	APHA, 22nd Edition AAS-GTA	0.03	<0.005	<0.005	0.1	0.2

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Environment Laboratory CMPDI, RI IV, Nagpur	**Test Report**	T - 2969

Test Report No. : RIN/TR/HYDRO/W-195 Date of Issue : 25/03/2019
Name of the Customer : Hydro-geology,CMPDI,Nagpur Sampling method : By the party
Customer letter Ref. No. : WCL/HQ/ENV/17-V1/ 1159-1182 Dated: 19.09.2018
Sample Description : Water sample No. of pages : 2
Test Required : IS 10500:2012

GROUND WATER QUALITY ANALYSIS RESULT

NAME OF THE COMPANY : WCL YEAR : 2018-19
NAME OF THE AREA : WANI NORTH

Sl. No	Parameters	Test Method	Limits of Detection	Analysis Result Sampling Code, Location & Sample collection date	Standard (IS : 10500 : 2012)	
				KESURLI, WN-13 22/11/18	Desirable limit	PLV in the absence of alternate source
1	Colour Hz)	IS 3025 /04:1983, Platinum Cobalt	1	2	5	15
2	Odour	IS 3025 /05:1983, Physical, Qualitative	Qualitative	Agreeable	Agreeable	Agreeable
3	Turbidity (NTU)	IS-3025/10:1984 Nephelometric	1.0	2	1	5
4	pH Value	IS-3025/11:1983 Electrometric	0.2	6.7	6.5 to 8.5	No relaxation
5	Total Hardness as $CaCO_3$ -mg/l	IS-3025/21:2009 EDTA	4.0	548	200	600
6	Iron -mg/l	IS-3025/53:2003 AAS-Flame	0.06	<0.06	0.3	No relaxation
7	Chlorides - mg/l	IS-3025/32:1988, Argentometric	2.0	180	250	1000
8	Residual Chlorine -mg/l (min.)	APHA, 22nd Edition DPD	0.02	<0.02	0.2	1
9	Fluoride- mg/l	APHA, 22nd Edition SPADNS	0.02	0.38	1.0	1.5
10	TDS -mg/l	IS-3025/16:1984 Gravimetric	25.0	926	500	2000
11	Calcium -mg/l	IS-3025/40:1991 EDTA	1.6	136	75	200
12	Magnesium -mg/l*	APHA, 22nd Edition- Calculation EDTA	3	50	30	100
13	Copper -mg/l	IS-3025/42:1992 AAS-Flame	0.03	<0.03	0.05	1.5

TABLE-IV-B

14	Manganese - mg/l	IS-3025/59:2006 AAS-Flame	0.02	<0.02	0.1	0.3
15	Sulphate -mg/l	APHA, 22nd Edition Turbidity	2.0	140	200	400
16	Nitrates - mg/l	APHA, 22nd Edition UV-Spectrophotometric Turbidity Nesseler's	0.5	19	45	No relaxation
17	Cadmium - mg/l	APHA, 22nd Edition AAS-GTA	0.0005	<0.0005	0.003	No relaxation
18	Lead -mg/l	APHA, 22nd Edition AAS-GTA	0.005	<0.005	0.01	No relaxation
19	Selenium –mg/l*	APHA, 22nd Edition AAS-VGA	0.005	<0.005	0.01	No relaxation
20	Total Arsenic -mg/l*	APHA, 22nd Edition AAS-VGA	0.005	<0.005	0.01	0.05
21	Zinc -mg/l	IS-3025/49:1994 AAS-Flame	0.01	<0.01	5	15
22	Total Chromium - mg/l	IS 3025 (Part 52) : 2003 AAS-Flame	0.01	<0.01	0.05	No relaxation
23	Boron -mg/l	APHA, 22nd Edition Carmine	0.2	<0.2	0.5	1.0
24	Alkalinity -mg/l	IS-3025/23:1986, Titration	4.0	140	200	600
25	Nickel-mg/l	IS 3025 (Part 54) : 2003, AAS-Flame Method	0.02	<0.02	0.02	No relaxation
26	Aluminum -mg/l*	APHA, 22nd Edition AAS-GTA	0.03	<0.005	0.1	0.2

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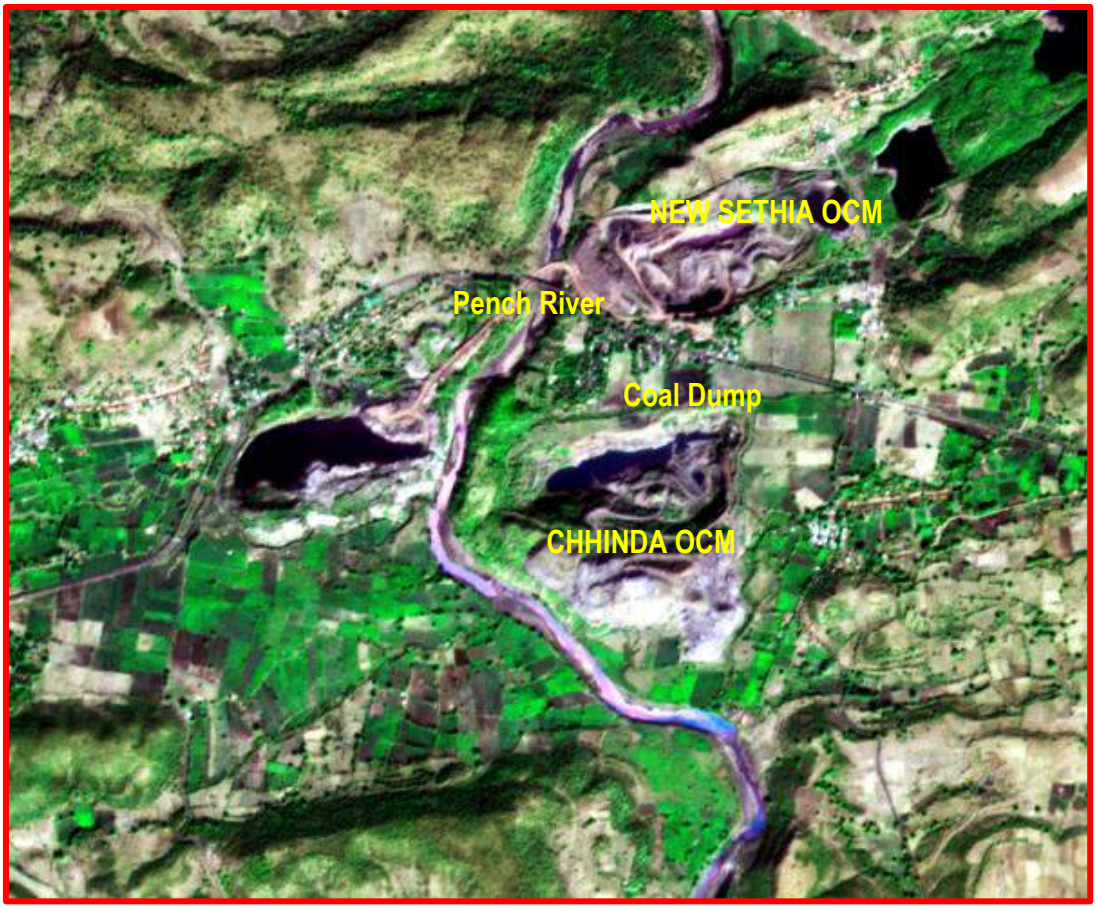
Land Restoration / Reclamation Monitoring of less than 5 million Cu. M. (Coal+OB) Capacity Opencast Coal Mines of Western Coalfields Limited based on Satellite Data for the Year 2017



Submitted to

WESTERN COALFIELDS LIMITED

cmpdi

A Mini Ratna Company

Land Restoration / Reclamation Monitoring of less than 5 million Cu. M. (Coal+OB) Capacity Opencast Coal Mines of Western Coalfields Limited based on Satellite Data for the Year 2017

March-2018

Remote Sensing Cell
Geomatics Division
CMPDI, Ranchi

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Executive Summary

1.0 Project

Land restoration / reclamation monitoring of 14 opencast coal mines of Western Coalfields Ltd. (WCL) producing less than 5 million cu.m. (Coal+OB) per year based on satellite data, regularly basis at an interval of three years.

2.0 Objective

Objective of the land restoration / reclamation monitoring is to assess the area of backfilled, plantation, social forestry, active mining area, water bodies, and distribution of wasteland, agricultural land and forest in the leasehold area of the project. This will help in assessing the progressive status of mined land reclamation and to take up remedial measures, if any, required for environmental protection.

3.0 Salient Findings

- *Out of the total mine leasehold area of 7289.16 Hectare of the 14 projects Viz. Kolegaon, Naigaon, Ghonsa, Ballarpur, Junad Extn, Urdhan, Telwasa,Gauri I &II (Amalgamated) , Bhatadi , Gondegaon,Kolarpimpri, Chhinda ,Gauri deep and Juna kunada considered for monitoring during year-2017-18; total excavated area is only 1275.29 Ha (17.50%) out of which 60.35Ha area (4.73%) has been planted on backfill (Biologically Reclamed) and337.31 Ha area (26.45%) is under backfilling (Technically Reclamed).It is evident from the analysis that 31.18% area of the above OC projects have already been reclaimed (biologically and technically) and balance 877.63 Ha (68.82%) area is under active mining. Project wise details are given in Table-1 & bar chart Fig-1.*

- *On comparing the status of land reclamation for the year 2017 with respect to the year 2014 in different projects taken for reclamation in the year 2017-18, it is evident from the analysis that area under land reclamation has increased from 342.14 Ha. (Yr. 2014) to 397.66 Ha (Yr. 2017).*

  Out of 14 projects of WCL, maximum land reclamation has been carried out in Ballarpur OCP (72.86%) followed by Gauri I & II (Amalgamated) OCP (60.94%) Telwasa (41.44%), Junad Extn (39.53%) and Bhatadi Opencast Project (27.34%).

- *From analysis it is revealed that Area under biological reclamation (plantation on Backfill) has increased to 60.35 Ha (4.73%) in the year 2017 as compared to 46.82 Ha (4.22%) in the Year 2014 and Area under technical reclamation(backfilling) has also increased from 295.32 Ha (Yr 2014) to 337.31 Ha (Yr 2017). The increase of 13.53 Ha with respect to area of plantation on backfill (Biological Reclamation) is the result of sincere effort taken by Western coalfield Limited towards environmental protection. Project wise details are given in Table - 1 & Fig - 1.*

- *Total leasehold area of 14 project has increased from 5323.57 Ha (Yr 2014) to 7289.16 Ha (Yr 2017) due to major change in leasehold area of Bhatadi and Kolarpimpri and Ballarpur OCP. Percentage calculation of total area under plantation/green cover generated has been carried out with respect to total leasehold area of respective Year. Hence minor decrease in percentage in green cover generated area i,e 0.78% in the year 2017 is observed. Green cover generated has gone up to 993.35 Ha in year 2017 with respect to 767.15Ha in Year 2014.whereas excavated area has also increased from 1110.44 Ha (Yr 2014) to 1275.29 Ha (Yr 2017).*

- *In Kolegaon OCP ,there is minor decrease in area of active mine in year 2017 with respect to the year 2014 i.e from 43.30 Ha (Year 2014) to 39.26 (Year 2017) as such mine is not in operation since last three year and backfilling is not in progress, Whereas total vegetated area has increased from 47.19Ha (Yr2014) to 59.64 Ha (Yr2017) .*

- *In Kolarpimpri OCP ,backfilling area has decreased from 15.36 Ha in the year 2014 to 7.54 Ha in the year 2017.Active area of mine in the year 2017 has been increased from 122.10 (Year 2014) to 137.70 Ha (Year2017). Whereas total vegetated area (Area under plantation) has increased from 89.20Hectare (Yr2014) to 92.96 Hectare (Yr2017) .*

- *This study will again be carried out at an interval of three year to assess the land reclamation status in the above projects.*

Table-1

Status of Land Reclamation in Western Coalfields Limited based on Satellite Data for the Year 2017

(Projects producing less than 5 mcm of Coal+OB annaully)

(Area in Hectare.)

Sl. No.	Project	Total Leasehold Area(Hectare)		Technical Reclamation		Plantation						Area under Active Mining		Total Excavated/ Mined out Area		Total Area under Plantation (% Green Cover Generated in Leasehold)		Total Area under Reclamation	
						Biological Reclamation		Other Plantations											
				Area under Backfilling		Plantation on Excavated / Backfilled Area		Plantation on External Over Burden Dumps		Social Forestry, Avanue Plantation Etc.									
1	*2*	*3*		*4*		*5*		*6*		*7*		*8*		*9 (=4+5+8)*		*10 (=5+6+7)*		*11(=4+5)*	
		2014	*2017*	*2014*	*2017*	*2014*	*2017*	*2014*	*2017*	*2014*	*2017*	*2014*	*2017*	*2014*	*2017*	*2014*	*2017*	*2014*	*2017*
1	*Kolegaon*	349.00	349.00	0.00	0.00	0.00	0.00	36.37	37.41	10.82	22.23	43.30	39.26	43.30	39.26	47.19	59.64	0.00	0.00
				0.00%	0.00%	0.00%	0.00%					100.00%	100.00%			13.52%	17.09%	0.00%	0.00%
2	*Naigaon*	398.66	398.66	43.83	8.81	6.01	9.81	21.76	21.87	0.49	28.94	66.66	122.24	116.50	140.86	28.26	60.62	49.84	18.62
				37.62%	6.25%	5.16%	6.96%					57.22%	86.78%			7.09%	15.21%	42.78%	13.22%
3	*Ghonsa*	293.64	278.68	16.11	0.00	0.00	0.00	2.47	2.10	0.54	4.65	48.42	46.87	64.53	46.87	3.01	6.75	16.11	0.00
				24.97%	0.00%	0.00%	0.00%					75.03%	100.00%			1.03%	2.42%	24.97%	0.00%
4	*Ballarpur*	242.64	549.64	41.90	67.87	11.21	12.99	46.17	67.73	6.53	14.03	28.12	30.12	81.23	110.98	63.91	94.75	53.11	80.86
				51.58%	61.16%	17.54%	13.71%					34.62%	27.14%			26.34%	17.24%	65.38%	72.86%
5	*Junad Extenion*	163.64	420.97	3.50	34.51	0.35	2.45	18.41	36.14	5.20	26.86	30.71	56.54	34.56	93.50	23.96	65.45	3.85	36.96
				10.13%	36.91%	1.01%	2.62%					88.86%	60.47%			14.64%	15.55%	11.14%	39.53%
6	*Urdhan*	315.00	315.00	0.00	0.00	0.00	0.00	3.50	3.34	0.40	0.00	16.21	21.46	16.21	21.46	3.90	3.34	0.00	0.00
				0.00%	0.00%	0.00%	0.00%					100.00%	100.00%			1.24%	1.06%	0.00%	0.00%
7	*Telwasa*	271.91	271.91	45.58	44.61	2.84	4.68	30.73	34.20	5.12	23.62	73.93	69.64	122.35	118.93	38.69	62.50	48.42	49.29
				37.25%	37.51%	2.32%	3.94%					60.43%	58.56%			14.23%	22.99%	39.57%	41.44%
8	*Gauril&II (Amalgamated)*	676.53	676.53	78.90	106.57	26.41	28.56	148.43	118.61	62.07	96.11	85.80	86.60	191.11	221.73	236.91	243.28	105.31	135.13
				41.29%	48.06%	13.82%	12.88%					44.90%	39.06%			35.02%	35.96%	55.10%	60.94%
9	*Bhatadi*	398.66	838.14	16.27	21.27	0.00	0.00	11.86	13.28	38.78	45.63	57.04	56.52	73.31	77.79	50.64	58.91	16.27	21.27
				22.19%	27.34%	0.00%	0.00%					77.81%	72.66%			12.70%	7.03%	22.19%	27.34%
10	*Gondegaon*	917.00	917.00	27.46	32.88	0.00	0.00	40.46	52.00	82.01	84.03	104.84	101.71	132.30	134.59	122.47	136.03	27.46	32.88
				20.76%	24.43%	0.00%	0.00%					79.24%	75.57%			13.36%	14.83%	20.76%	24.43%
11	*Kolarpimpri*	508.23	1484.97	15.36	7.54	0.00	1.86	82.89	83.36	6.31	7.74	122.10	137.70	137.46	147.10	89.20	92.96	15.36	9.40
				11.17%	5.13%	0.00%	1.26%					88.83%	93.61%			17.55%	6.26%	11.17%	6.39%
12	*Chhinda*	106.68	106.68	0.00	0.00	0.00	0.00	20.01	20.44	2.80	2.80	20.07	22.78	20.07	22.78	22.81	23.24	0.00	0.00
				0.00%	0.00%	0.00%	0.00%					100.00%	100.00%			21.38%	21.78%	0.00%	0.00%
13	*Gauri Deep*	356.11	356.11	0.00	0.00	0.00	0.00	4.32	0.00	0.90	6.19	24.97	44.29	24.97	44.29	5.22	6.19	0.00	0.00
				0.00%	0.00%	0.00%	0.00%					100.00%	100.00%			1.47%	1.74%	0.00%	0.00%
14	*Juna Kunada*	325.87	325.87	6.41	13.25	0.00	0.00	30.98	35.98	0.00	43.71	46.13	41.90	52.54	55.15	30.98	79.69	6.41	13.25
				12.20%	24.03%	0.00%	0.00%					87.80%	75.97%			9.51%	24.45%	12.20%	24.03%
TOTAL		**5323.57**	**7289.16**	**295.32**	**337.31**	**46.82**	**60.35**	**498.36**	**526.46**	**221.97**	**406.54**	**768.30**	**877.63**	**1110.44**	**1275.29**	**767.15**	**993.35**	**342.14**	**397.66**
				26.59%	26.45%	4.22%	4.73%					69.19%	68.82%	20.86%	17.50%	14.41%	13.63%	30.81%	31.18%

(% is calculated with respected to Excavated Area as applicable)

NOTE: ***In reference to above table ,different parameters are classified as follows:***

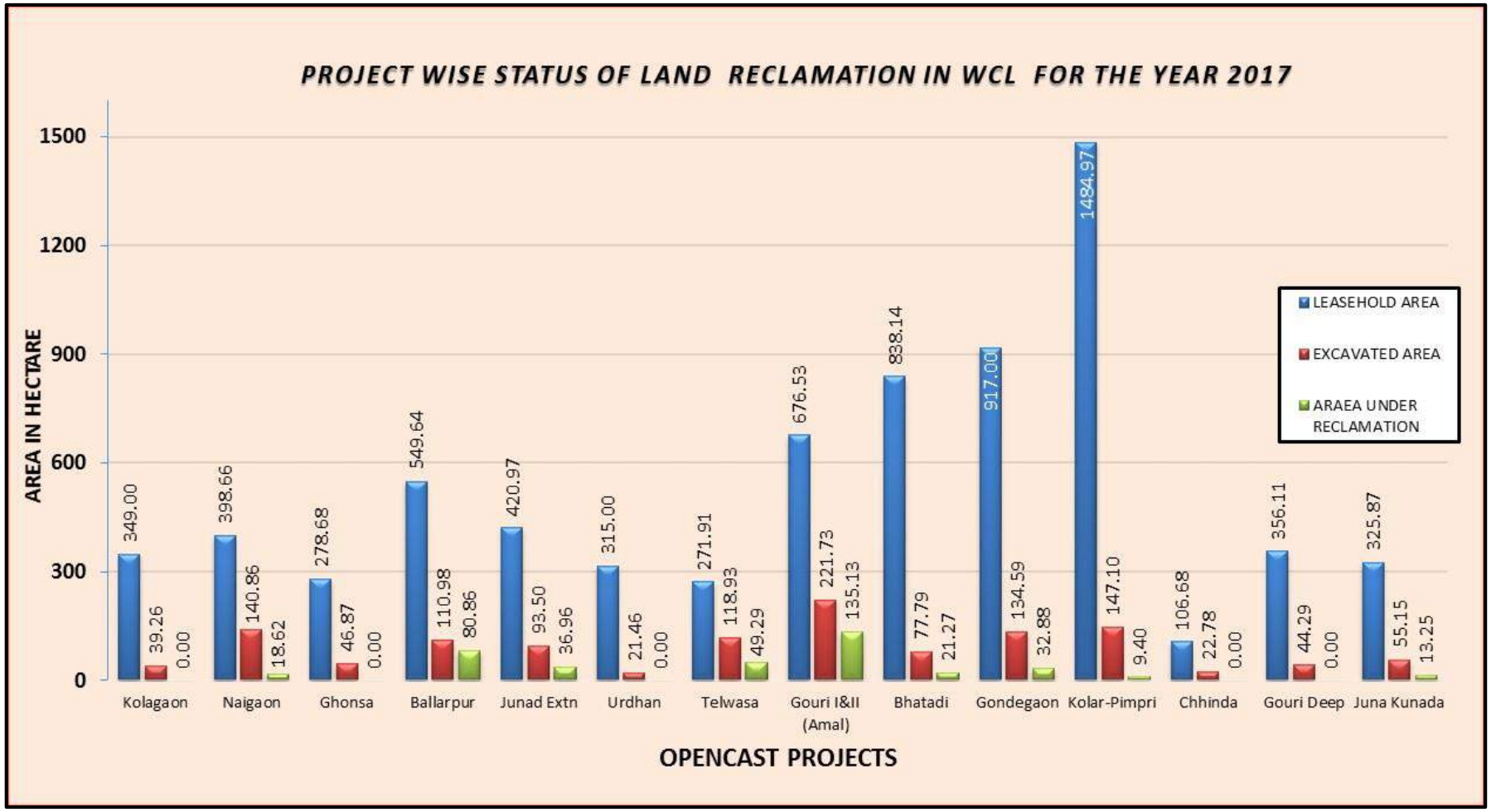
1 *Area under Biological Reclamation includes plantation done on Backfill only.*

2 *Area unde Technical Reclamation includes area under Barren Backfilling only*

3 *Area under active mining includes coal quarry, advance quarry & quarry filled with water etc Area of coal dump has been excluded from Area under active mining in this table.*

4 *Social Forestry and plantation on External Dump are not included in Biological Reclamation and are put under separate categories as shown in the Table above.*

5 *% calculated in above table is in respect of Total Excavated area except for "Total area under plantation "where % is in terms of "leasehold area"*



Flg.1: Land Reclamation Status in OC projects producing less than 5mcm (Coal +OB) of WCL in the Year 2017

1.0 Background

1.1 Land is the most important natural resource which embodies soil, water, flora fauna and total ecosystem. All human activities are based on the land which is the most scarce natural resource in our country. Mining is a site specific industry and it could not be shifted anywhere else from the location where mineral occurs. It is a fact that surface mining activities do effect the land environment due to ground breaking. Therefore, there is an urgent need to reclaim and restore the mined out land for its productive use for sustainable development of mining. This will not only mitigate environmental degradation, but would also help in creating a more congenial environment for land acquisition by coal companies in future.

1.2 Keeping above in view, Coal India Ltd. (CIL) issued a work order vide letter no. CIL/WBP/Env/2009/2478 dated 29.12.2009 to Central Mine Planning & Design Institute (CMPDI), Ranchi, for monitoring land reclamation status of all the opencast coal mines having production of less than 5 million m^3 per annum (coal + OB taken together per annum) based on remote sensing satellite data regularly on annual basis and less than 5 million m^3 per annum (coal + OB taken together per annum) at interval of three years based on remote sensing satellite data, for sustainable development of mining. Further a revised work order was issued vide letter no.CIL /WBP/Env/2011/4706 dated 12.10.2012 from Coal India Ltd for the period 2012-13 to 2016-2017.which was subsequently followed by another work order vide letter no: CIL /WBP/Env/2017/DP/8477 dated 21.09.2017from coal India ltd for period 2017—18 to 2021-22. The result of land reclamation status of all such mines to be put on the website of CIL, (www.coalindia.in), CMPDI (www.cmpdi.co.in) and the concerned coal companies in public domain. Detail report to be submitted to Coal India and respective subsidiaries.

1.3 Land reclamation monitoring of all opencast coal mining projects would also comply the statutory requirements of Ministry of Environment & Forest (MoEF).Such

monitoring would not only facilitate in taking timely mitigation measures against environmental degradation, but would also enable coal companies to utilize the reclaimed land for larger socio-economic benefits in a planned way.

1.4 Present report is embodying the finding of the study based on satellite data of the year 2014 and 2017 carried out for all the OC projects producing less than 5 mcm (Coal+OB) for Western Coalfields Ltd.

2.0 Objective

Objective of the land reclamation/restoration monitoring is to assess the area of backfilled, plantation, OB dumps, social forestry, active mining area, settlements and water bodies, distribution of wasteland, agricultural land and forest land in the leasehold area of the project. This is an important step taken up for assessing the progressive status of mined land reclamation and for taking up remedial measures, if any, required for environmental protection.

3.0 Methodology

There are number of steps involved between raw satellite data procurement and preparation of final map. National Remote Sensing Centre (NRSC) Hyderabad, being the nodal agency for satellite data supply in India, provides only raw digital satellite data, which needs further digital image processing for extracting the information and map preparation before uploading the same in the website. Methodology for land reclamation monitoring is given in given in figure-2. Following steps are involved in land reclamation /restoration monitoring:

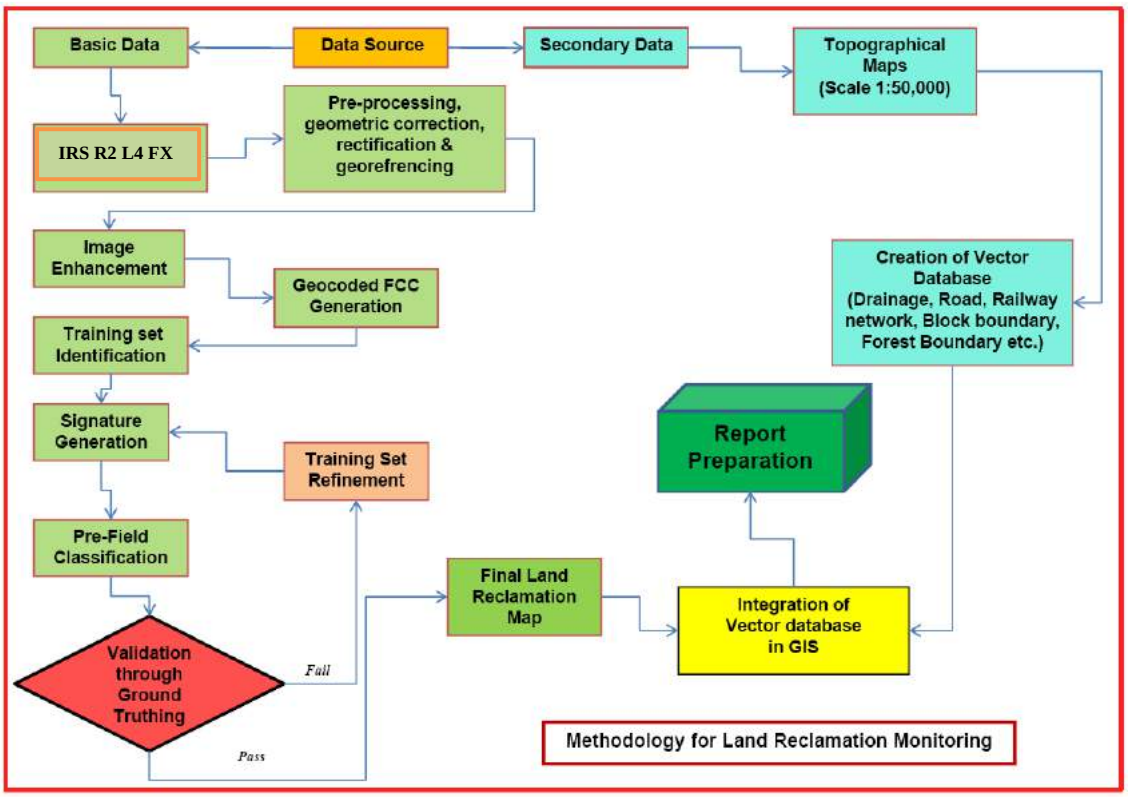


Figure :2 Methodology for Land Reclamation Monitoring

3.1 Data Procurement: After browsing the data quality and date of pass on internet, supply order for data is placed to NRSC. Secondary data like leasehold boundary, topo sheets are procured for creation of vector database.

3.2 Satellite Data Processing: Satellite data are processed using ERDAS IMAGINE version 2014digital image processing s/w. Methodology involves the following major steps:

- **Rectification & Geo-referencing:** Inaccuracies in digital imagery may occur due to 'systematic errors' attributed to earth curvature and rotation as well as 'non-systematic errors' attributed to satellite receiving station itself. Raw digital images contain geometric distortions, which make them unusable as maps. Therefore, geo-

referencing is required for correction of image data using ground control points (GCP) to make it compatible to SoI toposheet.

- **Image enhancement:**

  To improve the interpretability of the raw data, image enhancement is necessary. local operations modify the value of each pixel based on brightness value of neighbouring pixels using ERDAS IMAGINE 2014 s/w. and enhance the image quality for interpretation.

- **Training set selection**

  Training set requires to be selected, so that software can classify the image data accurately. The image data are analysed based on the interpretation keys. These keys are evolved from certain fundamental image-elements such as tone/colour, size, shape, texture, pattern, location, association and shadow. Based on the image-elements and other geo-technical elements like land form, drainage pattern and physiography; training sets were selected/identified for each land use/cover class. Field survey was carried out by taking selective traverses in order to collect the ground information (or reference data) so that training sets are selected accurately in the image. This was intended to serve as an aid for classification.

- **Classification and Accuracy assessment**

  Image classification is carried out using the maximum likelihood algorithm. The classification proceeds through the following steps: (a) calculation of statistics [i.e. signature generation] for the identified training areas, and (b) the decision boundary of maximum probability based on the mean vector, variance, covariance and correlation matrix of the pixels. After evaluating the statistical parameters of the training sets, reliability test of training sets is conducted by measuring the statistical separation between the classes that resulted from computing divergence matrix. The overall accuracy of the classification was finally assessed with reference to ground truth data.

- **Area calculation**

  The area of each land use class in the leasehold is determined using ERDAS IMAGINE v. 2014 software.

- **Overlay of Vector data base**

  Vector data base created based on secondary data. Vector layer like drainage, railway line, leasehold boundary, forest boundary etc. are superimposed on the image as vector layer in the Arc GIS database.

- **Pre-field map preparation**

  Pre-field map is prepared for validation of the classification result

3.3 Ground Truthing:

Selective ground verification of the land use classes are carried out in the field and necessary corrections if required, are incorporated before map finalization.

3.4 Land reclamation database on GIS:

Land reclamation database is created on GIS platform to identify the temporal changes identified from satellite data of different cut-of dates.

4.0 Land Reclamation Status in Western Coalfields Ltd.

4.1 *Following Fourteen opencast projects producing less than 5 million cubic m. (Coal + OB together) of Western Coalfields Ltd. have been taken up for land reclamation monitoring during the year 2017-18:*

- *Kolegaon*
- *Naigaon*
- *Ghonsa*
- *Ballarpur*
- *Junad Extension*
- *Urdhan*
- *Telwasa*
- *Gauri I&II (Amalgamated)*
- *Bhatadi*
- *Gondegaon*
- *Kolarpimpri*
- *Chhinda*
- *Gouri Deep*
- *Juna Kunda*

4.2 Area statistics of different land use class present in the mine leasehold of the above projects for the year 2017 are shown in the Table - 2. Land use maps derived from satellite data are shown in Plate 1 – 14. Land reclamation status of the above mentioned 14 opencast projects were also prepared for the year 2014and 2017. Year wise changes in the different land use classes based on satellite data are depicted in Bar Charts in Fig. 3 .1- 3.14.

4.3 Study reveals that 31.18% of mining area has already been under reclamation by WCL, Out of which 4.73% area has been revegetated and 26.45% area is under backfilling (Technically Reclamed). Balance area of 877.63 Ha (68.82%) is under active mining. While total area under reclamation in WCL in the year 2017 has

increased to 397.66 Ha in year 2014 as compared to 342.14 Ha in the year 2014 .Out of which 60.35 Hectare area has been biologically reclamed (Plantation on backfill) and 337.31Hectare area has been technically reclamed (backfilling). However, overall percentage of plantation / Green cover generated has decreased from 14.41 % in 2014 to 13.63% in 2017 due to increase in mining leasehold area of Bhatadi , Kolarpimpri and Ballarpur Projects. As such % calculation of green cover generated has been made with respect to leasehold area.

4.4 After analyzing the satellite data of year 2014 vs. 2017 it is evident that plantation carried out on backfilled area, OB dumps as well as under social forestry in all the mines of WCL has increased from 767.15 Hectare to 993.35 Hectare in span of last three year. This increase of 226.20 Hectare area of plantation in three year time is due to the sincere efforts of WCL towards mine land reclamation.

4.5 The increase in active mining area in Naigaon OCP from 66.66 Ha (Yr 2014) to 122.24 Ha (Yr2017) is due to expansion of aforesaid mine. In Junad Extension OCP, increase in active mining area from 30.71 Ha in year 2014 to 56.54 Ha in the year 2017 is due to further advancement of mine.

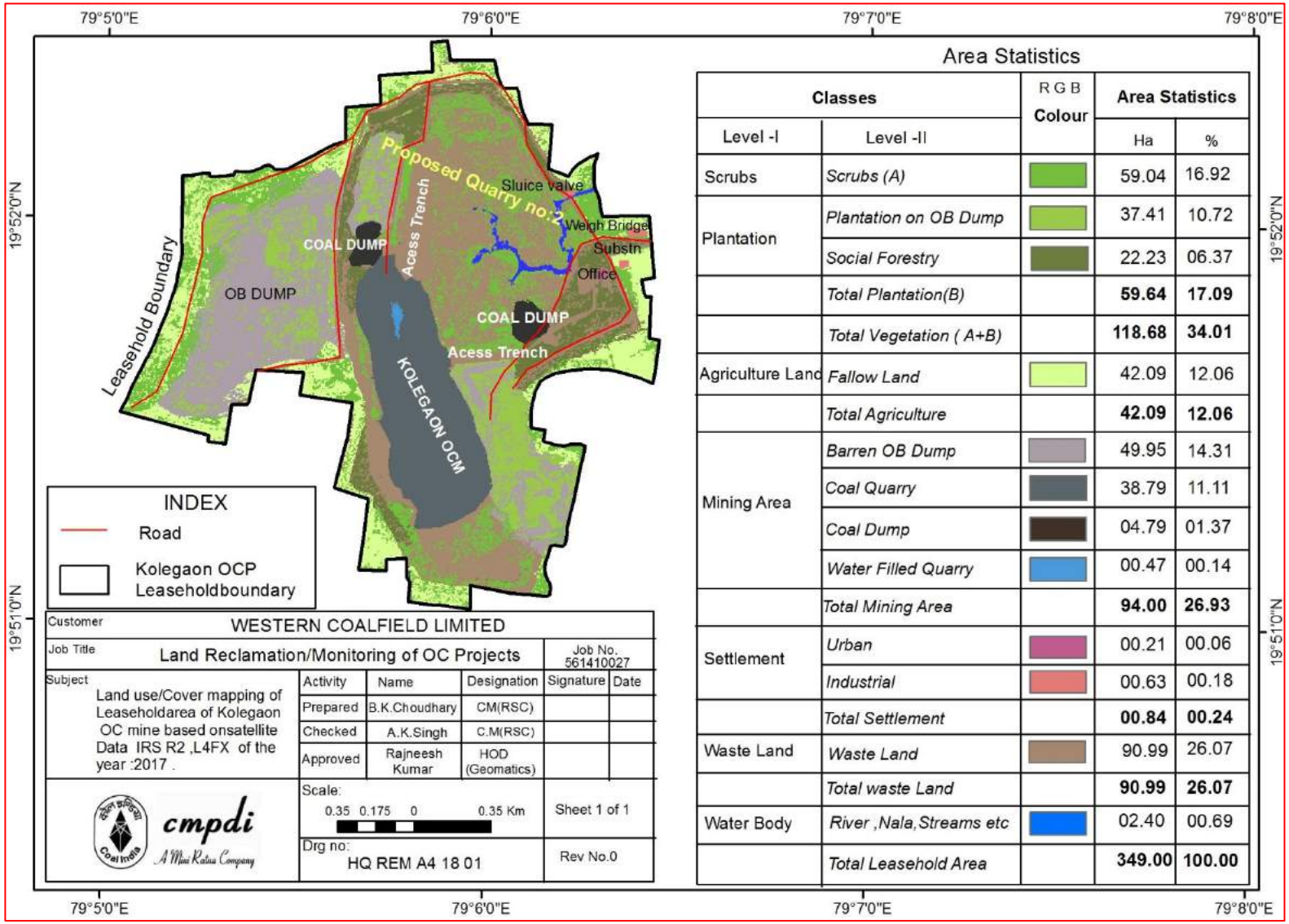
4.6 Ghonsa OCP was not in operation for the year 2017-18, hence minor decrease in active mine area i.e from 48.42 Ha in year 2014 to 46.87 Ha has been observed in the span of three year.

TABLE - 2

Status of Land Use / Reclamation in OC Mines(<5mcu.m) of Western Coalfields Ltd based on Satellite data of the Year 2017

(Area in Hq.)

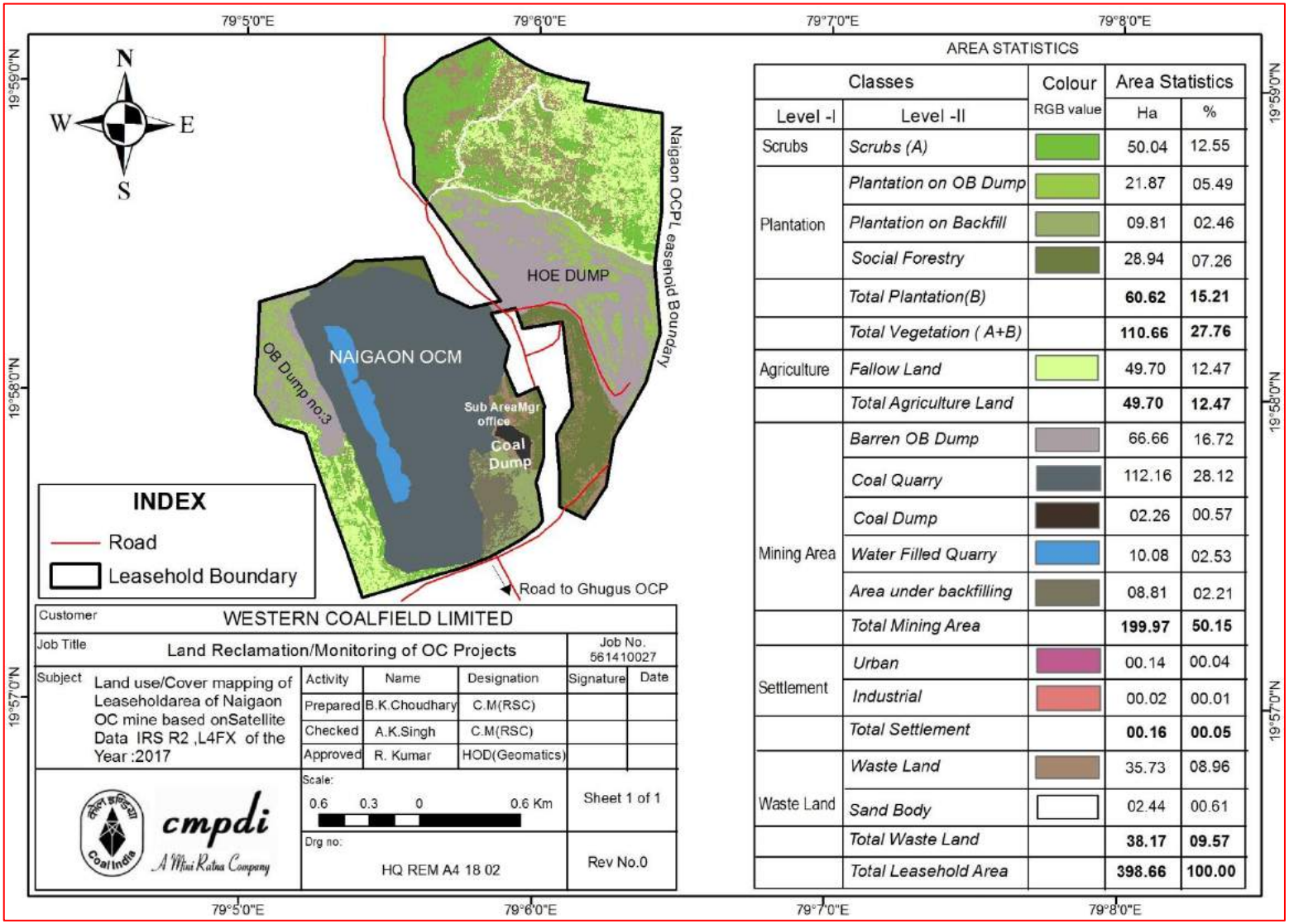
		Kolagaon		Naigaon		Ghonsa		Ballarpur		Junad Extn		Urdhan		Telwasa		Gouri -I&II		Bhatadi		Gondegaon		Kolar-Pimpri		Chhinda		Gouri Deep		Juna Kunada		Total	
		Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%
FORESTS	Dense Forest	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Open Forest	0.00	0.00	0.00	0.00	12.13	4.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.13	0.17
	Total Forest	**0.00**	**0.00**	**0.00**	**0.00**	**12.13**	**4.35**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**12.13**	**0.17**
SCRUBS	Scrubs	**59.04**	**16.92**	**50.04**	**12.55**	**59.50**	**21.35**	**47.42**	**8.63**	**36.94**	**8.77**	**21.51**	**6.83**	**6.95**	**2.55**	**23.04**	**3.41**	**97.09**	**11.58**	**79.29**	**8.65**	**186.63**	**12.57**	**2.88**	**2.70**	**38.84**	**10.91**	**29.64**	**9.10**	**738.81**	**10.14**
	Total Scrubs	**59.04**	**16.92**	**50.04**	**12.55**	**59.50**	**21.35**	**47.42**	**8.63**	**36.94**	**8.77**	**21.51**	**6.83**	**6.95**	**2.55**	**23.04**	**3.41**	**97.09**	**11.58**	**79.29**	**8.65**	**186.63**	**12.57**	**2.88**	**2.70**	**38.84**	**10.91**	**29.64**	**9.10**	**738.81**	**10.14**
PLANTATION	Social Forestry	22.23	6.37	28.94	7.26	4.65	1.67	14.03	2.55	26.86	6.38	0.00	0.00	23.62	8.69	96.11	14.21	45.63	5.44	84.03	9.16	7.74	0.52	2.80	2.62	6.19	1.74	43.71	13.41	406.54	5.58
	Total Social Forest	**22.23**	**6.37**	**28.94**	**7.26**	**4.65**	**1.67**	**14.03**	**2.55**	**26.86**	**6.38**	**0.00**	**0.00**	**23.62**	**8.69**	**96.11**	**14.21**	**45.63**	**5.44**	**84.03**	**9.16**	**7.74**	**0.52**	**2.80**	**2.62**	**6.19**	**1.74**	**43.71**	**13.41**	**406.54**	**5.58**
	Plantation on OB Dump	37.41	10.72	21.87	5.49	2.10	0.76	67.73	12.32	36.14	8.58	3.34	1.06	34.20	12.58	118.61	17.53	13.28	1.58	52.00	5.67	83.36	5.61	20.44	19.16	0.00	0.00	35.98	11.04	526.46	7.22
	Total Plantation on OB Dump	**37.41**	**10.72**	**21.87**	**5.49**	**2.10**	**0.76**	**67.73**	**12.32**	**36.14**	**8.58**	**3.34**	**1.06**	**34.20**	**12.58**	**118.61**	**17.53**	**13.28**	**1.58**	**52.00**	**5.67**	**83.36**	**5.61**	**20.44**	**19.16**	**0.00**	**0.00**	**35.98**	**11.04**	**526.46**	**7.22**
	Plantation on Backfill	0.00	0.00	9.81	2.46	0.00	0.00	12.99	2.36	2.45	0.58	0.00	0.00	4.68	1.72	28.56	4.22	0.00	0.00	0.00	0.00	1.86	0.13	0.00	0.00	0.00	0.00	0.00	0.00	60.35	0.83
	Total Plantation on backfill *(Biological Reclamation)*	**0.00**	**0.00**	**9.81**	**2.46**	**0.00**	**0.00**	**12.99**	**2.36**	**2.45**	**0.58**	**0.00**	**0.00**	**4.68**	**1.72**	**28.56**	**4.22**	**0.00**	**0.00**	**0.00**	**0.00**	**1.86**	**0.13**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**60.35**	**0.83**
	Total Green Cover generated	**59.64**	**17.09**	**60.62**	**15.21**	**6.75**	**2.43**	**94.75**	**17.23**	**65.45**	**15.55**	**3.34**	**1.06**	**62.50**	**22.99**	**243.28**	**35.96**	**58.91**	**7.02**	**136.03**	**14.83**	**92.96**	**6.26**	**23.24**	**21.78**	**6.19**	**1.74**	**79.69**	**24.45**	**993.35**	**12.80**
	Total Vegetation	**118.68**	**34.01**	**110.66**	**27.76**	**78.38**	**28.13**	**142.17**	**25.86**	**102.39**	**24.31**	**24.85**	**7.89**	**69.45**	**25.54**	**266.32**	**39.37**	**156.00**	**18.60**	**215.32**	**23.48**	**279.59**	**18.83**	**26.12**	**24.48**	**45.03**	**12.65**	**109.33**	**33.55**	**1744.29**	**23.94**
ACTIVE MINING	Coal Quarry	38.79	11.11	112.16	28.12	36.66	13.15	27.06	4.92	38.90	9.24	21.46	6.81	69.64	25.61	61.80	9.13	53.09	6.33	99.25	10.82	84.80	5.71	18.90	17.72	43.82	12.31	41.90	12.86	748.23	10.26
	Advance Quarry Site	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.05	3.34	0.00	0.00	0.00	0.00	5.81	0.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	19.86	0.27
	Quarry Filled With Water	0.47	0.14	10.08	2.53	10.21	3.67	3.06	0.56	3.59	0.85	0.00	0.00	0.00	0.00	18.99	2.81	3.43	0.41	2.46	0.27	52.90	3.56	3.88	3.64	0.47	0.13	0.00	0.00	109.54	1.50
	Coal Dump	4.79	1.37	2.26	0.57	1.34	0.48	3.65	0.66	2.25	0.53	6.17	1.96	2.52	0.93	2.07	0.31	9.20	1.10	6.13	0.67	1.02	0.07	0.30	0.28	6.99	1.96	2.61	0.80	51.30	0.70
	Total Area under *Active Mining*	**44.05**	**12.62**	**124.50**	**31.22**	**48.21**	**17.30**	**33.77**	**6.14**	**58.79**	**13.96**	**27.63**	**8.77**	**72.16**	**26.54**	**88.67**	**13.11**	**65.72**	**7.84**	**107.84**	**11.76**	**138.72**	**9.34**	**23.08**	**21.64**	**51.28**	**14.40**	**44.51**	**13.66**	**928.93**	**12.73**
RECLAMED	Barren OB Dump	49.95	14.31	66.66	16.72	24.69	8.86	32.68	5.94	87.58	20.80	77.45	24.59	41.55	15.28	131.38	19.42	107.26	12.80	120.23	13.11	288.70	19.44	22.84	21.40	81.07	22.77	57.62	17.68	1189.66	16.32
	Barren Backfilled Area	0.00	0.00	8.81	2.21	0.00	0.00	67.87	12.35	34.51	8.20	0.00	0.00	44.61	16.41	106.57	15.75	21.27	2.54	32.88	3.59	7.54	0.50	0.00	0.00	0.00	0.00	13.25	4.07	337.31	4.63
	Total Area under backfill*(Technical Reclamation)*	**0.00**	**0.00**	**8.81**	**2.21**	**0.00**	**0.00**	**67.87**	**12.35**	**34.51**	**8.20**	**0.00**	**0.00**	**44.61**	**16.41**	**106.57**	**15.75**	**21.27**	**2.54**	**32.88**	**3.59**	**7.54**	**0.50**	**0.00**	**0.00**	**0.00**	**0.00**	**13.25**	**4.07**	**337.31**	**4.63**
	Total Area Under Mine Operation	**94.00**	**26.93**	**199.97**	**50.15**	**72.90**	**26.16**	**134.32**	**24.43**	**180.88**	**42.96**	**105.08**	**33.36**	**158.32**	**58.23**	**326.62**	**48.28**	**194.25**	**23.18**	**260.95**	**28.46**	**434.96**	**29.28**	**45.92**	**43.04**	**132.35**	**37.17**	**115.38**	**35.41**	**2455.90**	**33.69**
WASTELANDS	Waste Lands	90.99	26.07	35.73	8.96	36.98	13.27	22.71	4.13	24.50	5.82	46.71	14.83	24.80	9.12	34.69	5.13	53.31	6.36	77.14	8.41	37.85	2.55	2.25	2.11	15.39	4.32	82.71	25.38	585.76	8.04
	Fly Ash Pond / Sand Body	0.00	0.00	2.44	0.61	0.00	0.00	41.39	7.53	0.00	0.00	1.03	0.33	1.53	0.57	17.10	2.53	8.43	1.01	7.02	0.77	0.00	0.00	0.51	0.48	0.00	0.00	0.89	0.27	80.34	1.10
	Total Wasteland	**90.99**	**26.07**	**38.17**	**9.57**	**36.98**	**13.27**	**64.10**	**11.66**	**24.50**	**5.82**	**47.74**	**15.16**	**26.33**	**9.69**	**51.79**	**7.66**	**61.74**	**7.37**	**84.16**	**9.18**	**37.85**	**2.55**	**2.76**	**2.59**	**15.39**	**4.32**	**83.60**	**25.65**	**666.1**	**9.14**
WATERBODIES	Reservoir, nallah, ponds	2.40	0.69	0.00	0.00	6.15	2.21	88.11	16.04	0.00	0.00	0.59	0.18	10.91	4.01	5.41	0.80	10.66	1.27	0.00	0.00	11.88	0.81	1.37	1.28	1.91	0.54	14.63	4.49	154.02	2.11
	Total Waterbodies	**2.40**	**0.69**	**0.00**	**0.00**	**6.15**	**2.21**	**88.11**	**16.04**	**0.00**	**0.00**	**0.59**	**0.18**	**10.91**	**4.01**	**5.41**	**0.80**	**10.66**	**1.27**	**0.00**	**0.00**	**11.88**	**0.81**	**1.37**	**1.28**	**1.91**	**0.54**	**14.63**	**4.49**	154.02	2.11
AGRICULTURE	Crop Lands	0.00	0.00	0.00	0.00	0.00	0.00	8.88	1.62	15.25	3.62	24.86	7.89	0.00	0.00	0.33	0.05	9.38	1.12	126.54	13.80	151.50	10.20	3.92	3.67	154.60	43.41	0.00	0.00	495.26	6.79
	Fallow Lands	42.09	12.06	49.70	12.47	83.40	29.92	110.20	20.05	96.04	22.81	109.93	34.90	5.25	1.93	23.12	3.41	399.52	47.67	222.94	24.31	554.31	37.33	25.41	23.82	6.27	1.76	0.00	0.00	1728.18	23.71
	Total Agriculture	**42.09**	**12.06**	**49.70**	**12.47**	**83.40**	**29.92**	**119.08**	**21.67**	**111.29**	**26.43**	**134.79**	**42.79**	**5.25**	**1.93**	**23.45**	**3.46**	**408.90**	**48.79**	**349.48**	**38.11**	**705.81**	**47.53**	**29.33**	**27.49**	**160.87**	**45.17**	**0.00**	**0.00**	**2223.44**	**30.50**
SETTLEMENTS	Urban Settlement	0.21	0.06	0.14	0.04	0.11	0.04	0.97	0.18	0.79	0.21	0.15	0.05	1.07	0.39	0.62	0.08	1.57	0.19	2.11	0.23	0.75	0.05	0.07	0.07	0.10	0.03	2.70	0.83	11.36	0.16
	Rural Settlement	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.83	0.26	0.00	0.00	0.27	0.04	3.71	0.44	3.54	0.39	3.59	0.24	1.11	1.05	0.00	0.00	0.00	0.00	13.05	0.18
	Industrial Settlement	0.63	0.18	0.02	0.01	0.76	0.27	0.89	0.16	1.12	0.27	0.97	0.31	0.58	0.21	2.05	0.31	1.31	0.16	1.44	0.15	10.54	0.71	0.00	0.00	0.46	0.12	0.23	0.07	21.00	0.29
	Total Settlement	**0.84**	**0.24**	**0.16**	**0.05**	**0.87**	**0.31**	**1.86**	**0.34**	**1.91**	**0.48**	**1.95**	**0.62**	**1.65**	**0.60**	**2.94**	**0.43**	**6.59**	**0.79**	**7.09**	**0.77**	**14.88**	**1.00**	**1.18**	**1.12**	**0.56**	**0.15**	**2.93**	**0.90**	**45.41**	0.63
	Grand Total	**349.00**	**100.00**	**398.66**	**100.00**	**278.68**	**100.00**	**549.64**	**100.00**	**420.97**	**100.00**	**315.00**	**100.00**	**271.91**	**100.00**	**676.53**	**100.00**	**838.14**	**100.00**	**917.00**	**100.00**	**1484.97**	**100.00**	**106.68**	**100.00**	**356.11**	**100.00**	**325.87**	**100.00**	**7289.16**	**100.00**



Area Statistics

Classes		RGB Colour	Area Statistics	
Level -I	Level -II		Ha	%
Scrubs	*Scrubs (A)*		59.04	16.92
Plantation	*Plantation on OB Dump*		37.41	10.72
	Social Forestry		22.23	06.37
	Total Plantation(B)		**59.64**	**17.09**
	Total Vegetation (A+B)		**118.68**	**34.01**
Agriculture Land	*Fallow Land*		42.09	12.06
	Total Agriculture		**42.09**	**12.06**
Mining Area	*Barren OB Dump*		49.95	14.31
	Coal Quarry		38.79	11.11
	Coal Dump		04.79	01.37
	Water Filled Quarry		00.47	00.14
	Total Mining Area		**94.00**	**26.93**
Settlement	*Urban*		00.21	00.06
	Industrial		00.63	00.18
	Total Settlement		**00.84**	**00.24**
Waste Land	*Waste Land*		90.99	26.07
	Total waste Land		**90.99**	**26.07**
Water Body	*River ,Nala,Streams etc*		02.40	00.69
	Total Leasehold Area		**349.00**	**100.00**

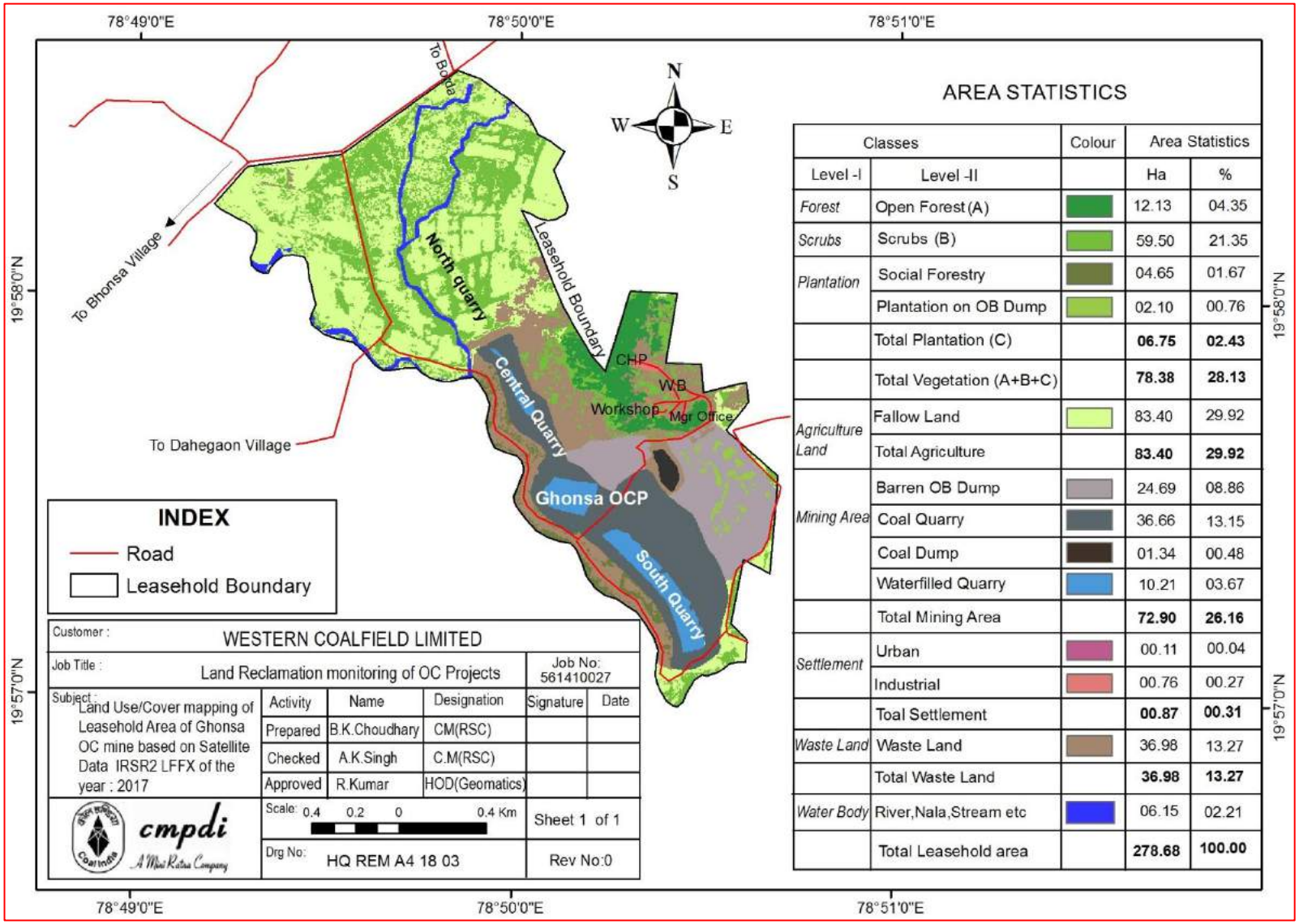
Plate-1



AREA STATISTICS

Classes		Colour	Area Statistics	
Level -I	Level -II	RGB value	Ha	%
Scrubs	*Scrubs (A)*		50.04	12.55
Plantation	*Plantation on OB Dump*		21.87	05.49
	Plantation on Backfill		09.81	02.46
	Social Forestry		28.94	07.26
	Total Plantation(B)		**60.62**	**15.21**
	Total Vegetation (A+B)		**110.66**	**27.76**
Agriculture	*Fallow Land*		49.70	12.47
	Total Agriculture Land		**49.70**	**12.47**
Mining Area	*Barren OB Dump*		66.66	16.72
	Coal Quarry		112.16	28.12
	Coal Dump		02.26	00.57
	Water Filled Quarry		10.08	02.53
	Area under backfilling		08.81	02.21
	Total Mining Area		**199.97**	**50.15**
Settlement	*Urban*		00.14	00.04
	Industrial		00.02	00.01
	Total Settlement		**00.16**	**00.05**
Waste Land	*Waste Land*		35.73	08.96
	Sand Body		02.44	00.61
	Total Waste Land		**38.17**	**09.57**
	Total Leasehold Area		**398.66**	**100.00**

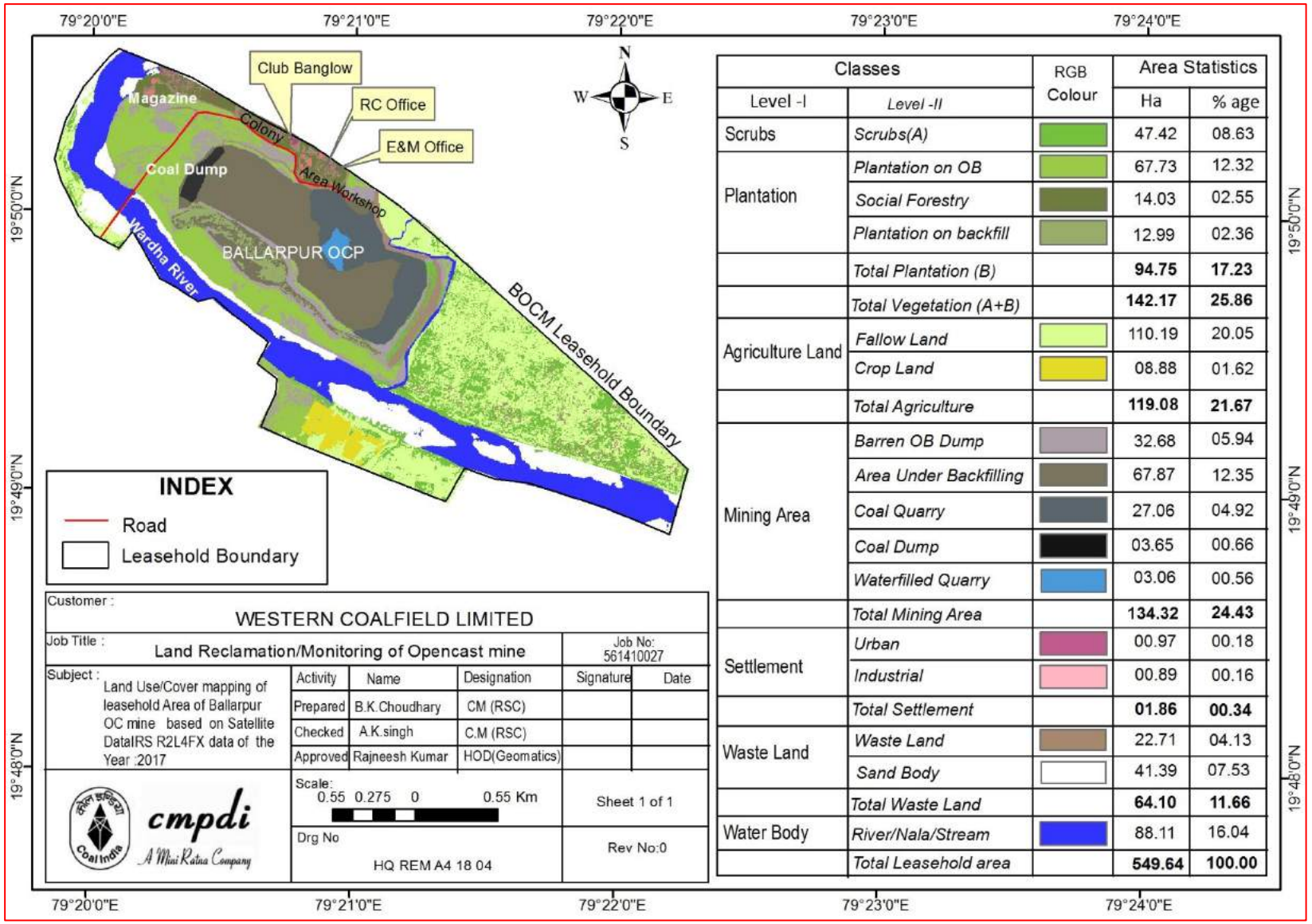
Plate-2



AREA STATISTICS

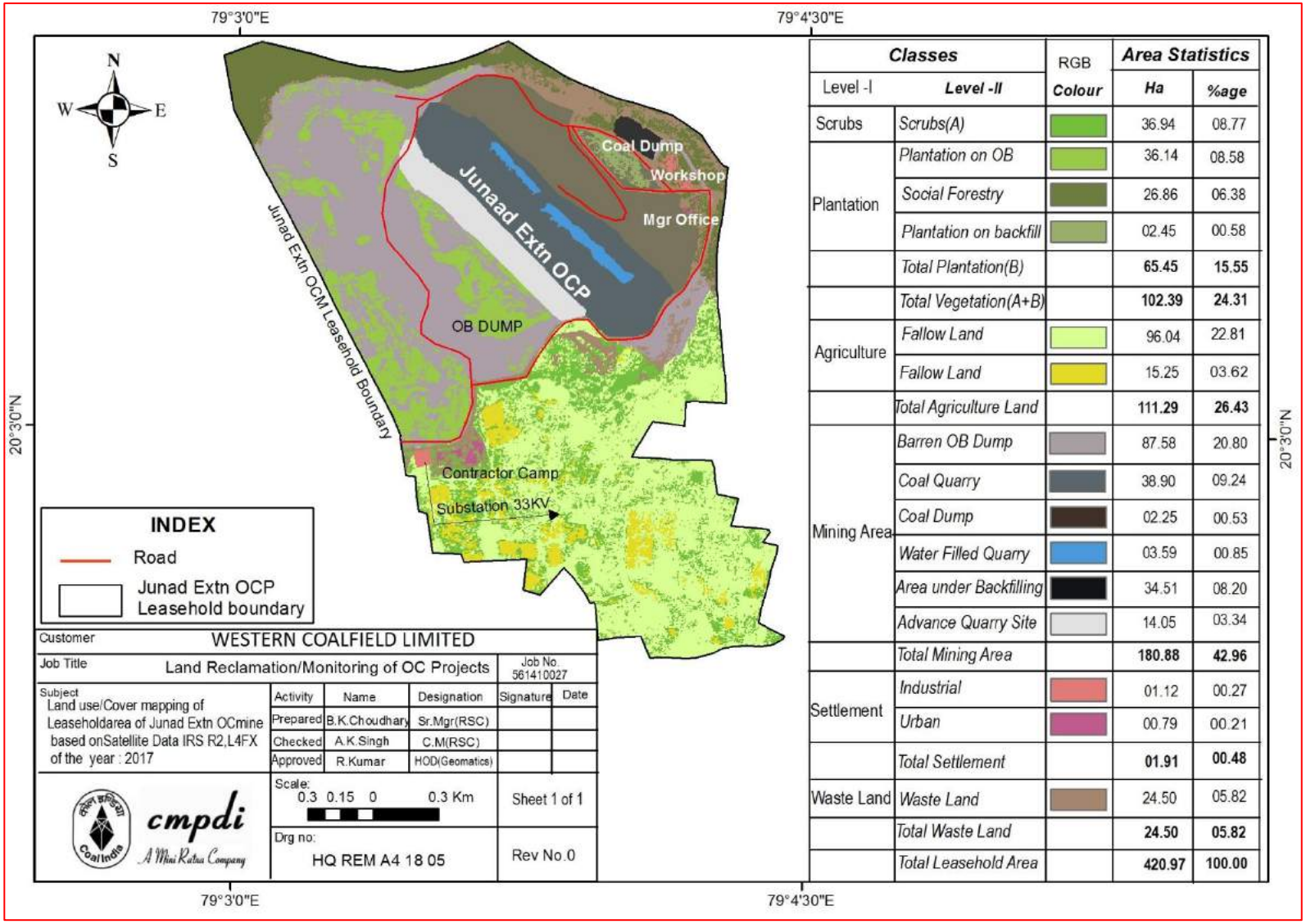
Classes		Colour	Area Statistics	
Level -I	Level -II		Ha	%
Forest	Open Forest (A)		12.13	04.35
Scrubs	Scrubs (B)		59.50	21.35
Plantation	Social Forestry		04.65	01.67
	Plantation on OB Dump		02.10	00.76
	Total Plantation (C)		**06.75**	**02.43**
	Total Vegetation (A+B+C)		**78.38**	**28.13**
Agriculture Land	Fallow Land		83.40	29.92
	Total Agriculture		**83.40**	**29.92**
Mining Area	Barren OB Dump		24.69	08.86
	Coal Quarry		36.66	13.15
	Coal Dump		01.34	00.48
	Waterfilled Quarry		10.21	03.67
	Total Mining Area		**72.90**	**26.16**
Settlement	Urban		00.11	00.04
	Industrial		00.76	00.27
	Toal Settlement		**00.87**	**00.31**
Waste Land	Waste Land		36.98	13.27
	Total Waste Land		**36.98**	**13.27**
Water Body	River,Nala,Stream etc		06.15	02.21
	Total Leasehold area		**278.68**	**100.00**

Plate-3



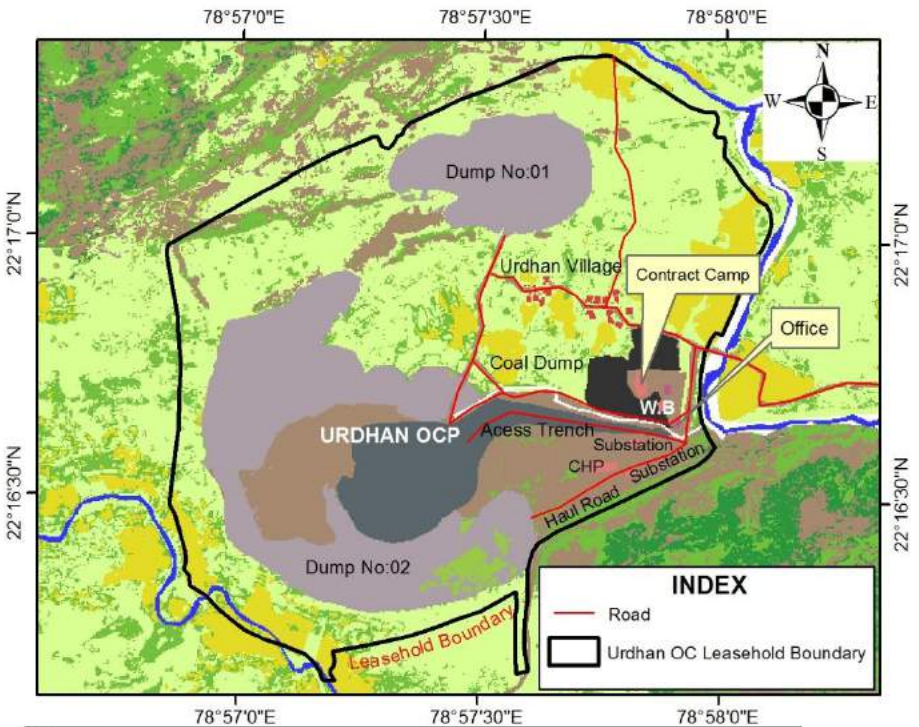
Classes		RGB Colour	Area Statistics	
Level -I	Level -II		Ha	% age
Scrubs	Scrubs(A)		47.42	08.63
Plantation	Plantation on OB		67.73	12.32
	Social Forestry		14.03	02.55
	Plantation on backfill		12.99	02.36
	Total Plantation (B)		**94.75**	**17.23**
	Total Vegetation (A+B)		**142.17**	**25.86**
Agriculture Land	Fallow Land		110.19	20.05
	Crop Land		08.88	01.62
	Total Agriculture		**119.08**	**21.67**
Mining Area	Barren OB Dump		32.68	05.94
	Area Under Backfilling		67.87	12.35
	Coal Quarry		27.06	04.92
	Coal Dump		03.65	00.66
	Waterfilled Quarry		03.06	00.56
	Total Mining Area		**134.32**	**24.43**
Settlement	Urban		00.97	00.18
	Industrial		00.89	00.16
	Total Settlement		**01.86**	**00.34**
Waste Land	Waste Land		22.71	04.13
	Sand Body		41.39	07.53
	Total Waste Land		**64.10**	**11.66**
Water Body	River/Nala/Stream		88.11	16.04
	Total Leasehold area		**549.64**	**100.00**

Plate-4



Classes		RGB	Area Statistics	
Level -I	Level -II	Colour	Ha	%age
Scrubs	Scrubs(A)		36.94	08.77
Plantation	Plantation on OB		36.14	08.58
	Social Forestry		26.86	06.38
	Plantation on backfill		02.45	00.58
	Total Plantation(B)		**65.45**	**15.55**
	Total Vegetation(A+B)		**102.39**	**24.31**
Agriculture	Fallow Land		96.04	22.81
	Fallow Land		15.25	03.62
	Total Agriculture Land		**111.29**	**26.43**
Mining Area	Barren OB Dump		87.58	20.80
	Coal Quarry		38.90	09.24
	Coal Dump		02.25	00.53
	Water Filled Quarry		03.59	00.85
	Area under Backfilling		34.51	08.20
	Advance Quarry Site		14.05	03.34
	Total Mining Area		**180.88**	**42.96**
Settlement	Industrial		01.12	00.27
	Urban		00.79	00.21
	Total Settlement		**01.91**	**00.48**
Waste Land	Waste Land		24.50	05.82
	Total Waste Land		**24.50**	**05.82**
	Total Leasehold Area		**420.97**	**100.00**

Plate-5



Customer :	WESTERN COALFIELD LIMITED
Job Title :	Land Reclamation monitoring of OC Projects
Job No:	561410027
Subject :	Land Use/Cover mapping of leasehold Area of Urdhan OC mine based on IRS R2,L4FX Satelite data of the year :2017

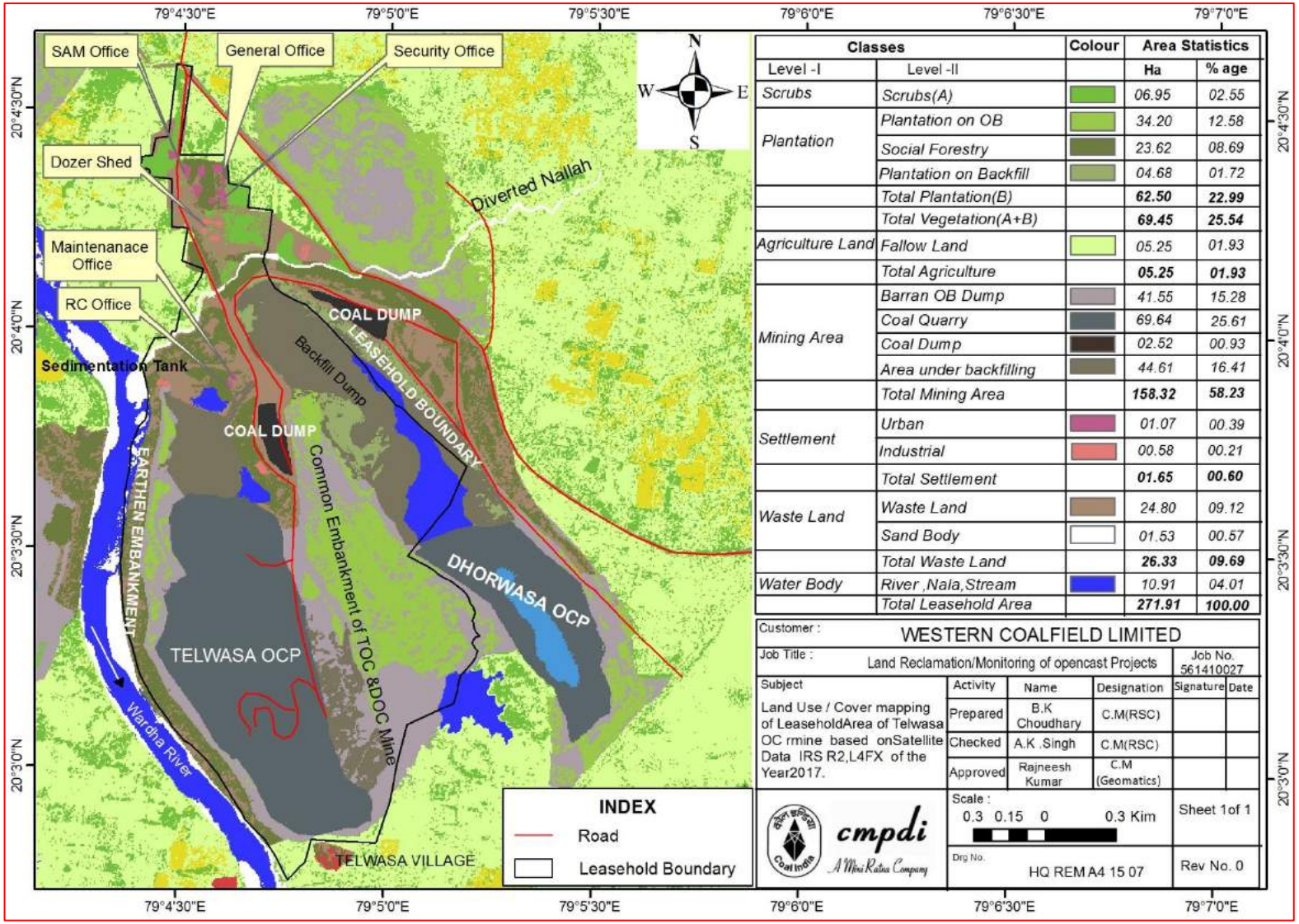
Activity	Name	Designation	Signature	Date
Prepared	B.K.Choudhary	C.M(RSC)		
Checked	A.K.Singh	C.M(RSC)		
Approved	Rajneesh Kumar	HOD (Geomatics)		
Scale: 0.35 0.175 0 0.35 Km			Sheet 1of1	
Drg No HQ REM A4 18 06			Rev No:0	

cmpdi — A Mini Ratna Company

AREA STATISTICS

Classes		RGB Colour	Area Statistics	
Level -I	Level -II		Ha	%
Scrubs	Scrubs(A)		21.51	06.83
Plantation	Plantation on OB		03.34	01.06
	Total Plantation (B)		**03.24**	**01.06**
	Total Vegetation (A+B)		**24.85**	**07.89**
Agriculture Land	Fallow Land		109.93	34.90
	Crop Land		24.86	07.89
	Total Agriculture		**134.79**	**42.79**
Mining Area	Barren OB Dump		77.45	24.59
	Coal Quarry		21.46	06.81
	Coal Dump		06.17	01.96
	Total Mining Area		**105.08**	**33.36**
Settlement	Rural		00.83	00.26
	Urban		00.15	00.05
	Industrial		00.97	00.31
	Total Settlement		**01.95**	**00.62**
Waste Land	Waste Land		46.71	14.83
	Sand Body		01.03	00.33
	Total Waste Land		**47.74**	**15.16**
Water Body	River,Nala,Stream etc		00.59	00.18
	Total Water Body		**00.59**	**00.18**
	Total Leasehold area		**315.00**	**100.00**

Plate-6



Classes		Colour	Area Statistics	
Level -I	Level -II		Ha	% age
Scrubs	Scrubs(A)		06.95	02.55
Plantation	Plantation on OB		34.20	12.58
	Social Forestry		23.62	08.69
	Plantation on Backfill		04.68	01.72
	Total Plantation(B)		**62.50**	**22.99**
	Total Vegetation(A+B)		**69.45**	**25.54**
Agriculture Land	Fallow Land		05.25	01.93
	Total Agriculture		**05.25**	**01.93**
Mining Area	Barran OB Dump		41.55	15.28
	Coal Quarry		69.64	25.61
	Coal Dump		02.52	00.93
	Area under backfilling		44.61	16.41
	Total Mining Area		**158.32**	**58.23**
Settlement	Urban		01.07	00.39
	Industrial		00.58	00.21
	Total Settlement		**01.65**	**00.60**
Waste Land	Waste Land		24.80	09.12
	Sand Body		01.53	00.57
	Total Waste Land		**26.33**	**09.69**
Water Body	River ,Nala,Stream		10.91	04.01
	Total Leasehold Area		**271.91**	**100.00**

Customer : WESTERN COALFIELD LIMITED

Job Title : Land Reclamation/Monitoring of opencast Projects — Job No. 561410027

Subject: Land Use / Cover mapping of LeaseholdArea of Telwasa OC rmine based onSatellite Data IRS R2,L4FX of the Year2017.

Activity	Name	Designation	Signature	Date
Prepared	B.K Choudhary	C.M(RSC)		
Checked	A.K .Singh	C.M(RSC)		
Approved	Rajneesh Kumar	C.M (Geomatics)		

Scale : 0.3 0.15 0 0.3 Kim

Sheet 1of 1

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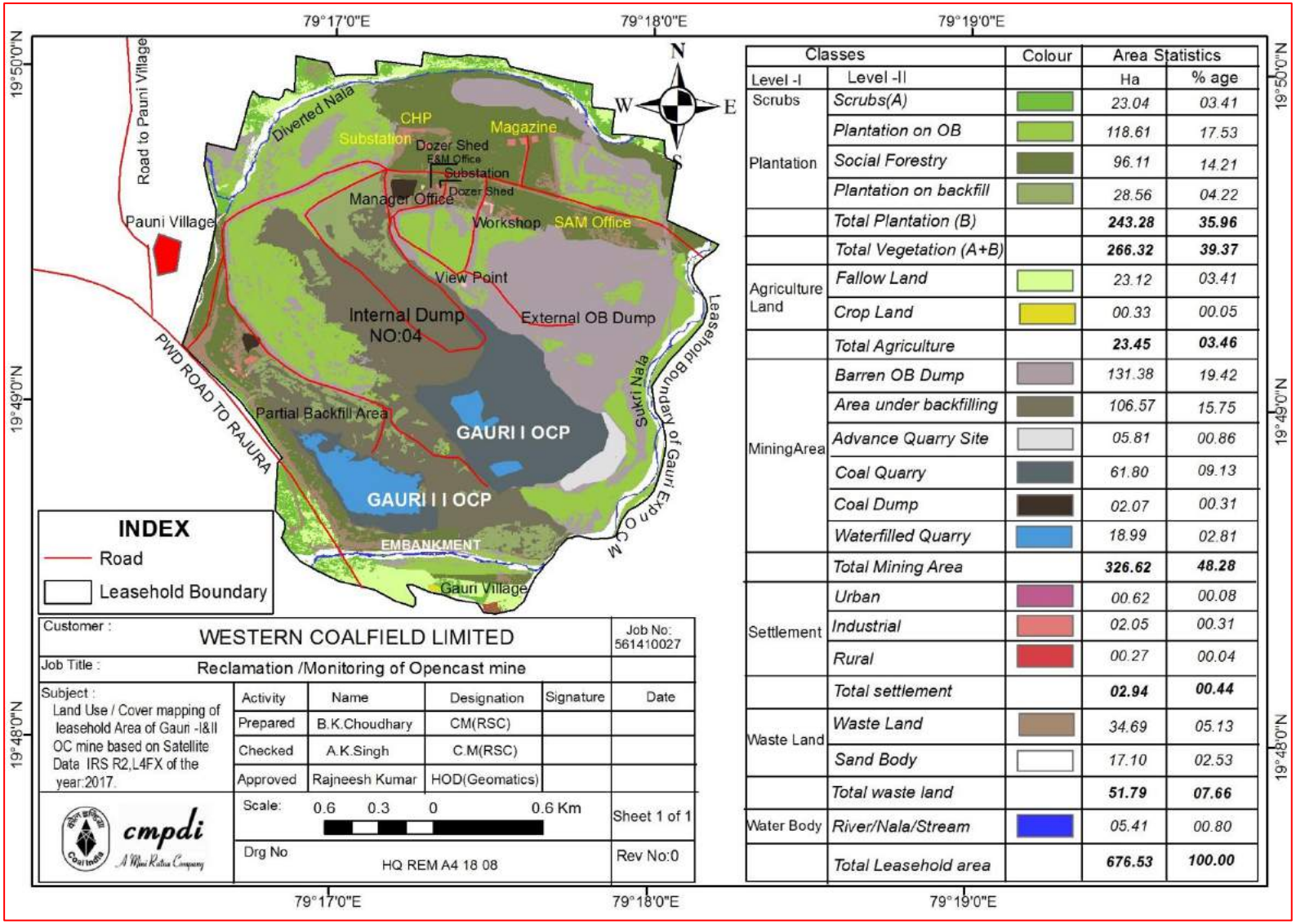
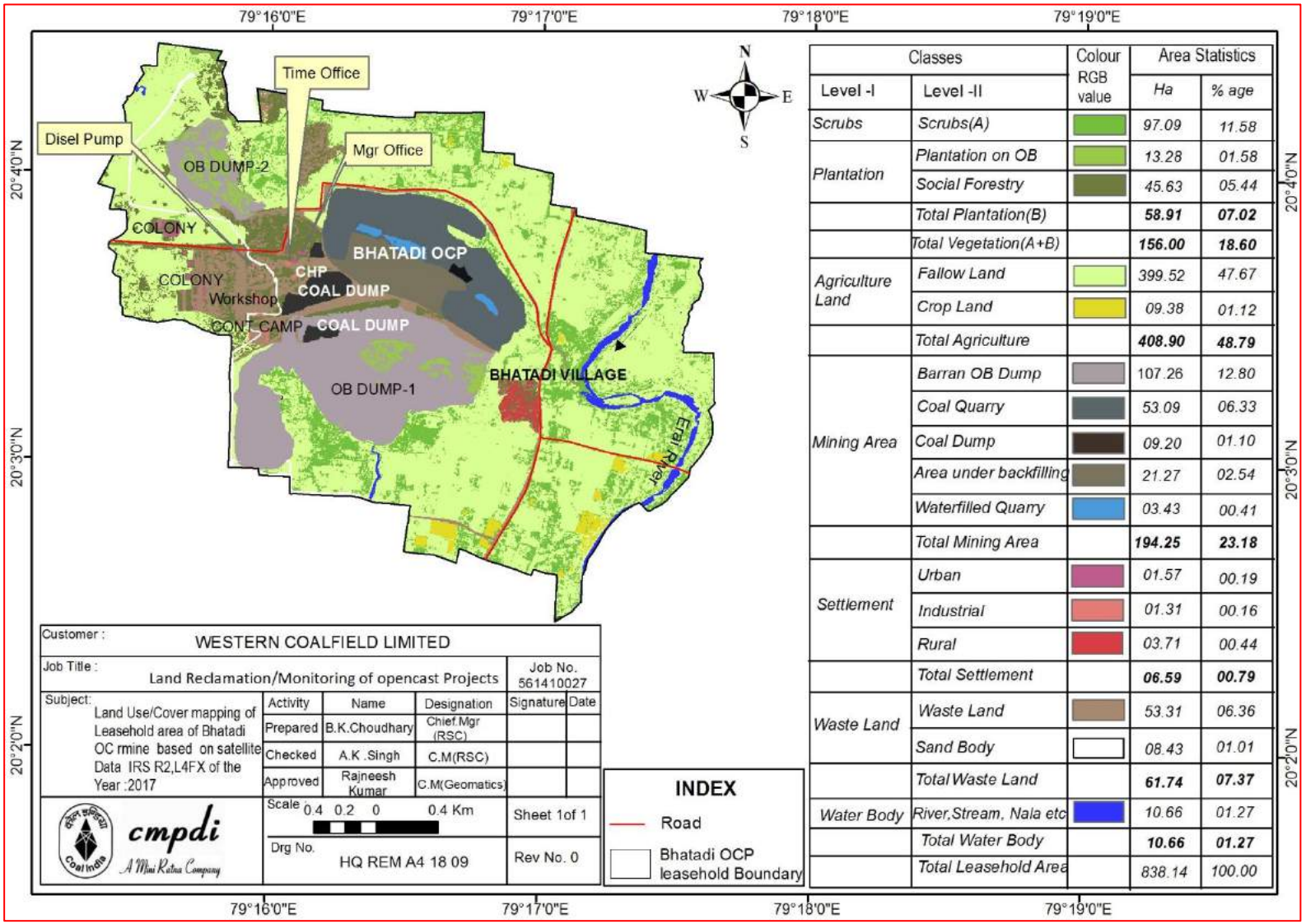
Rev No. 0

Plate-7



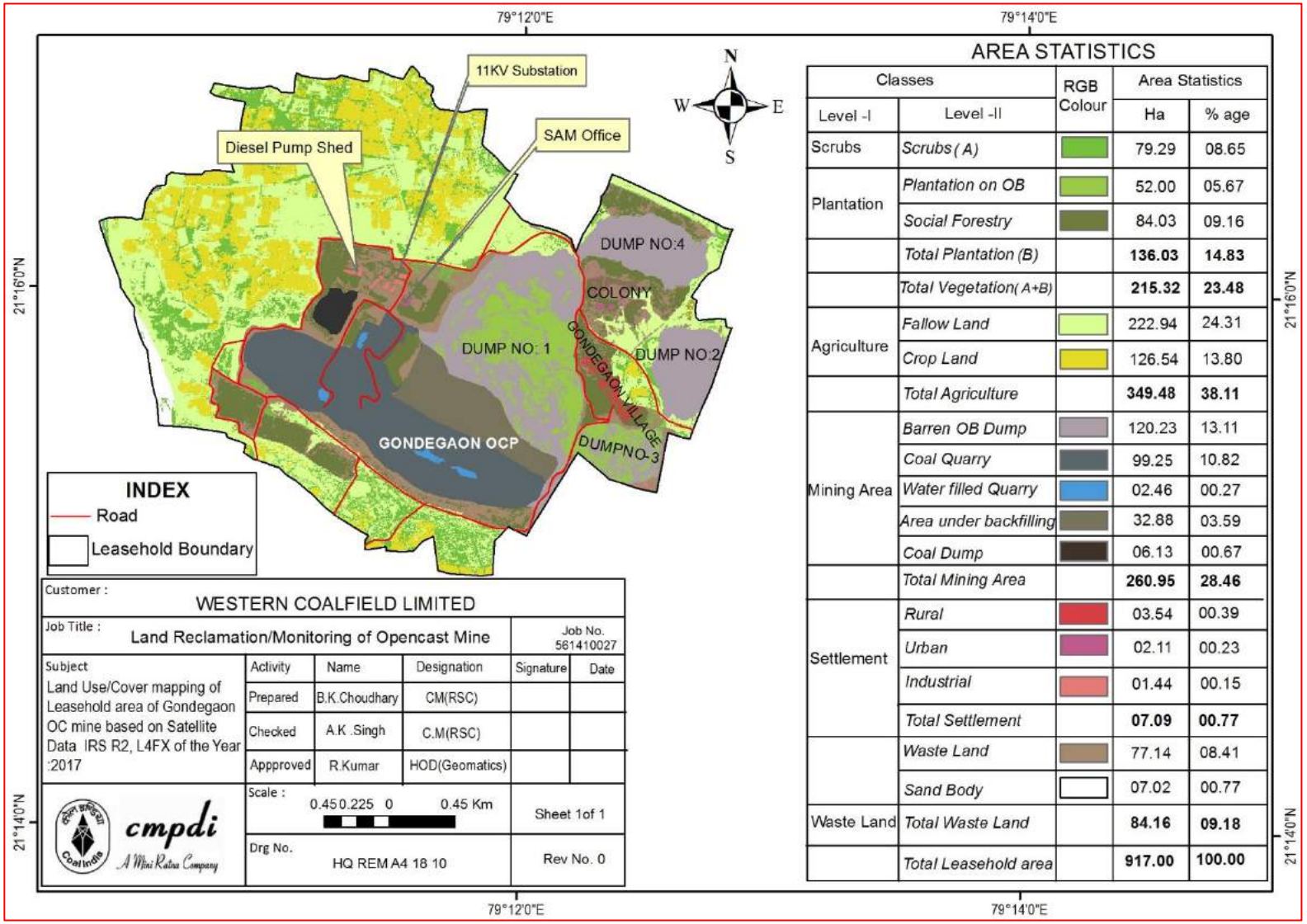
Classes		Colour	Area Statistics	
Level -I	Level -II		Ha	% age
Scrubs	*Scrubs(A)*		*23.04*	*03.41*
Plantation	*Plantation on OB*		*118.61*	*17.53*
	Social Forestry		*96.11*	*14.21*
	Plantation on backfill		*28.56*	*04.22*
	Total Plantation (B)		***243.28***	***35.96***
	Total Vegetation (A+B)		***266.32***	***39.37***
Agriculture Land	*Fallow Land*		*23.12*	*03.41*
	Crop Land		*00.33*	*00.05*
	Total Agriculture		***23.45***	***03.46***
MiningArea	*Barren OB Dump*		*131.38*	*19.42*
	Area under backfilling		*106.57*	*15.75*
	Advance Quarry Site		*05.81*	*00.86*
	Coal Quarry		*61.80*	*09.13*
	Coal Dump		*02.07*	*00.31*
	Waterfilled Quarry		*18.99*	*02.81*
	Total Mining Area		***326.62***	***48.28***
Settlement	*Urban*		*00.62*	*00.08*
	Industrial		*02.05*	*00.31*
	Rural		*00.27*	*00.04*
	Total settlement		***02.94***	***00.44***
Waste Land	*Waste Land*		*34.69*	*05.13*
	Sand Body		*17.10*	*02.53*
	Total waste land		***51.79***	***07.66***
Water Body	*River/Nala/Stream*		*05.41*	*00.80*
	Total Leasehold area		***676.53***	***100.00***

Plate-8



Classes		Colour RGB value	Area Statistics	
Level -I	Level -II		Ha	% age
Scrubs	Scrubs(A)		97.09	11.58
Plantation	Plantation on OB		13.28	01.58
	Social Forestry		45.63	05.44
	Total Plantation(B)		**58.91**	**07.02**
	Total Vegetation(A+B)		**156.00**	**18.60**
Agriculture Land	Fallow Land		399.52	47.67
	Crop Land		09.38	01.12
	Total Agriculture		**408.90**	**48.79**
Mining Area	Barran OB Dump		107.26	12.80
	Coal Quarry		53.09	06.33
	Coal Dump		09.20	01.10
	Area under backfilling		21.27	02.54
	Waterfilled Quarry		03.43	00.41
	Total Mining Area		**194.25**	**23.18**
Settlement	Urban		01.57	00.19
	Industrial		01.31	00.16
	Rural		03.71	00.44
	Total Settlement		**06.59**	**00.79**
Waste Land	Waste Land		53.31	06.36
	Sand Body		08.43	01.01
	Total Waste Land		**61.74**	**07.37**
Water Body	River,Stream, Nala etc		10.66	01.27
	Total Water Body		**10.66**	**01.27**
	Total Leasehold Area		838.14	100.00

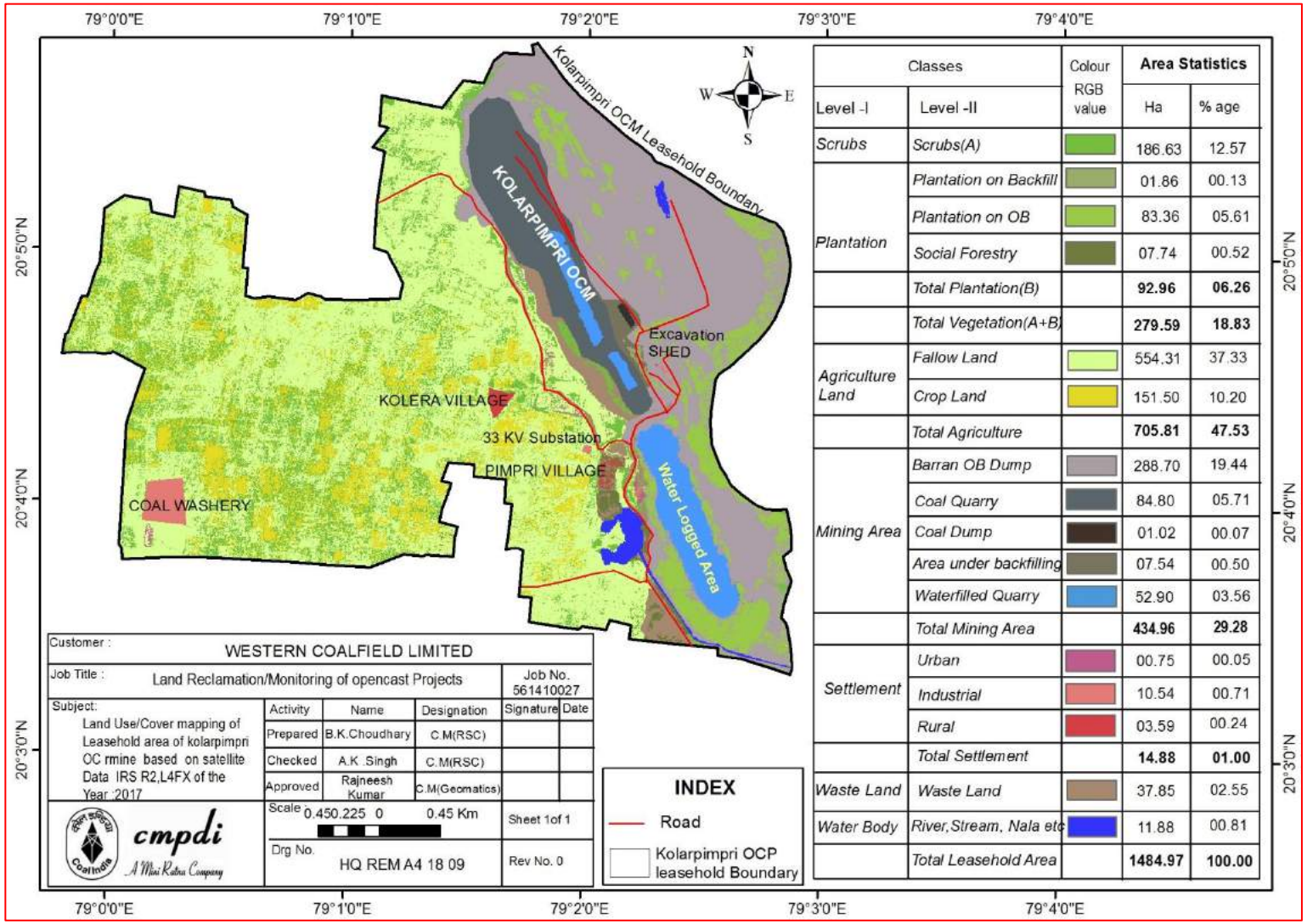
Plate-9



AREA STATISTICS

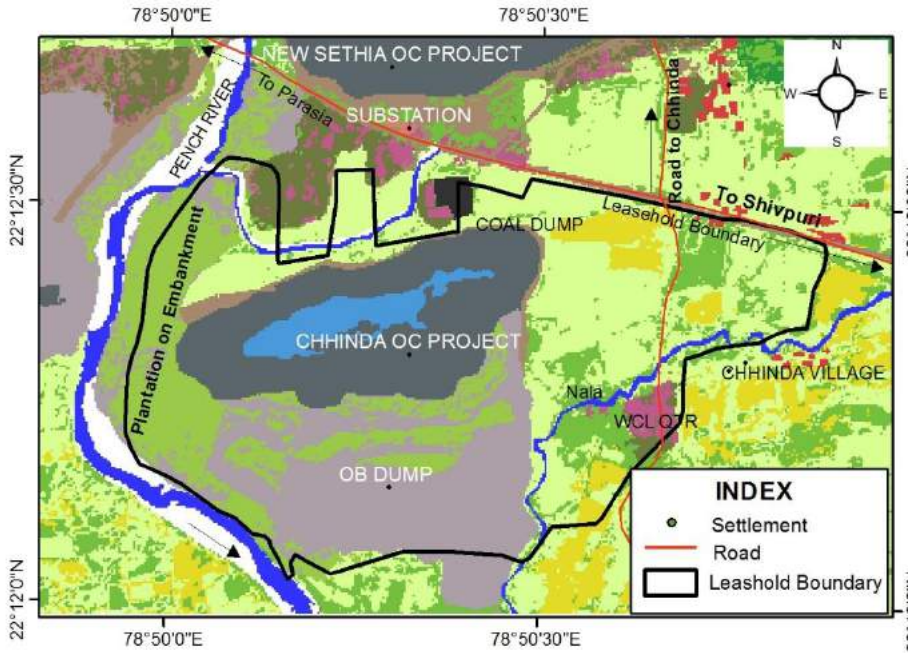
Classes		RGB Colour	Area Statistics	
Level -I	Level -II		Ha	% age
Scrubs	*Scrubs (A)*		79.29	08.65
Plantation	*Plantation on OB*		52.00	05.67
	Social Forestry		84.03	09.16
	Total Plantation (B)		**136.03**	**14.83**
	Total Vegetation(A+B)		**215.32**	**23.48**
Agriculture	*Fallow Land*		222.94	24.31
	Crop Land		126.54	13.80
	Total Agriculture		**349.48**	**38.11**
Mining Area	*Barren OB Dump*		120.23	13.11
	Coal Quarry		99.25	10.82
	Water filled Quarry		02.46	00.27
	Area under backfilling		32.88	03.59
	Coal Dump		06.13	00.67
	Total Mining Area		**260.95**	**28.46**
Settlement	*Rural*		03.54	00.39
	Urban		02.11	00.23
	Industrial		01.44	00.15
	Total Settlement		**07.09**	**00.77**
	Waste Land		77.14	08.41
	Sand Body		07.02	00.77
Waste Land	*Total Waste Land*		**84.16**	**09.18**
	Total Leasehold area		**917.00**	**100.00**

Plate-10



Classes		Colour RGB value	Area Statistics	
Level -I	Level -II		Ha	% age
Scrubs	Scrubs(A)		186.63	12.57
Plantation	Plantation on Backfill		01.86	00.13
	Plantation on OB		83.36	05.61
	Social Forestry		07.74	00.52
	Total Plantation(B)		**92.96**	**06.26**
	Total Vegetation(A+B)		**279.59**	**18.83**
Agriculture Land	Fallow Land		554.31	37.33
	Crop Land		151.50	10.20
	Total Agriculture		**705.81**	**47.53**
Mining Area	Barran OB Dump		288.70	19.44
	Coal Quarry		84.80	05.71
	Coal Dump		01.02	00.07
	Area under backfilling		07.54	00.50
	Waterfilled Quarry		52.90	03.56
	Total Mining Area		**434.96**	**29.28**
Settlement	Urban		00.75	00.05
	Industrial		10.54	00.71
	Rural		03.59	00.24
	Total Settlement		**14.88**	**01.00**
Waste Land	Waste Land		37.85	02.55
Water Body	River,Stream, Nala etc		11.88	00.81
	Total Leasehold Area		**1484.97**	**100.00**

Plate-11

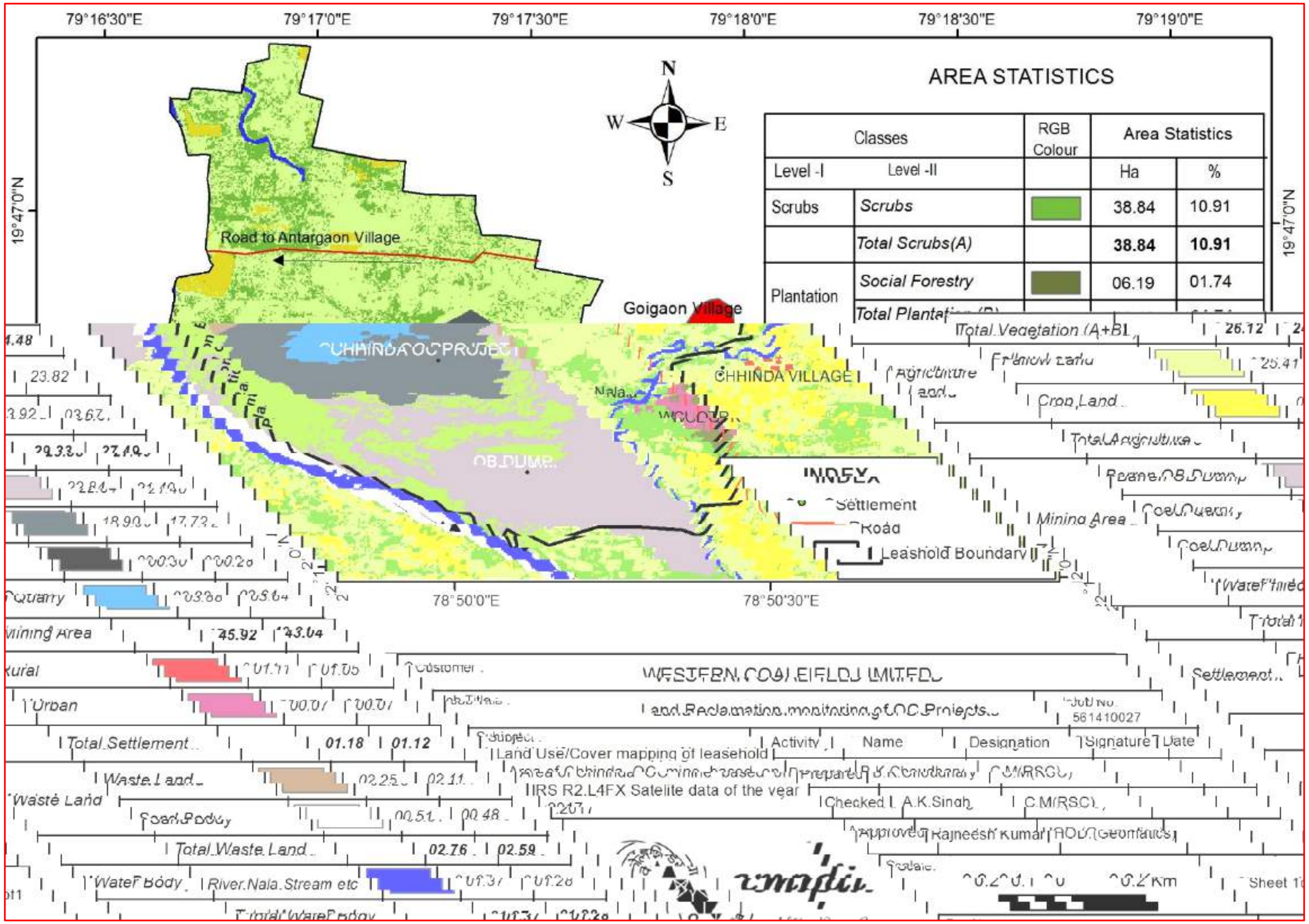


AREA STATISTICS

Classes		RGB Colour	Area Statistics	
Level -I	Level -II		Ha	% age
Scrubs	*Scrubs (A)*		*02.88*	*02.70*
Plantation	*Plantation on OB*		*20.44*	*19.16*
	Social Forestry		*02.80*	*02.62*
	Total Plantation (B)		***23.24***	***21.78***
	Total Vegetation (A+B)		***26.12***	***24.48***
Agriculture Land	*Fallow Land*		*25.41*	*23.82*
	Crop Land		*03.92*	*03.67*
	Total Agriculture		***29.33***	***27.49***
Mining Area	*Barren OB Dump*		*22.84*	*21.40*
	Coal Quarry		*18.90*	*17.72*
	Coal Dump		*00.30*	*00.28*
	Water filled Quarry		*03.88*	*03.64*
	Total Mining Area		***45.92***	***43.04***
Settlement	*Rural*		*01.11*	*01.05*
	Urban		*00.07*	*00.07*
	Total Settlement		***01.18***	***01.12***
Waste Land	*Waste Land*		*02.25*	*02.11*
	Sand Body		*00.51*	*00.48*
	Total Waste Land		***02.76***	***02.59***
Water Body	*River,Nala,Stream etc*		*01.37*	*01.28*
	Total Water Body		***01.37***	***01.28***
	Total Leasehold area		***106.68***	***100.00***

Customer :	WESTERN COALFIELD LIMITED			
Job Title :	Land Reclamation monitoring of OC Projects			Job No: 561410027
Subject : Land Use/Cover mapping of leasehold Area of Chhinda OC mine based on IRS R2,L4FX Satelite data of the year :2017	Activity	Name	Designation	Signature / Date
	Prepared	B.K.Choudhary	C.M(RSC)	
	Checked	A.K.Singh	C.M(RSC)	
	Approved	Rajneesh Kumar	HOD.(Geomatics)	
cmpdi A Mini Ratna Company	Scale: 0.2 0.1 0 0.2 Km			Sheet 1of1
	Drg No HQ REM A4 18 12			Rev No:0

Plate-12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79°17'0"E
79°17'30"E
79°18'0"E
79°18'30"E
79°19'0"E
19°47'0"N
N
W
E
S
AREA STATISTICS
Classes
RGB Colour
Area Statistics
Level -I
Level -II
Ha
%
Scrubs
Scrubs
38.84
10.91
Total Scrubs(A)
38.84
10.91
Plantation
Social Forestry
06.19
01.74
Road to Antargaon Village
Goigaon Village
CHHINDA VILLAGE
Settlement
Road
Leashold Boundary
78°50'0"E
78°50'30"E
WESTERN COALFIELDS LIMITED
Job No.
561410027
Activity
Name
Designation
Signature
Date
Land Use/Cover mapping of leasehold
IRS R2 L4FX Satelite data of the year
Checked
A.K.Singh
C.M(RSC)
Rajneesh Kumar
Total Settlement
Total Waste Land
Water Body
River,Nala,Stream etc
Mining Area
45.92
43.04
01.18
01.12
02.76
02.59

Plate-13

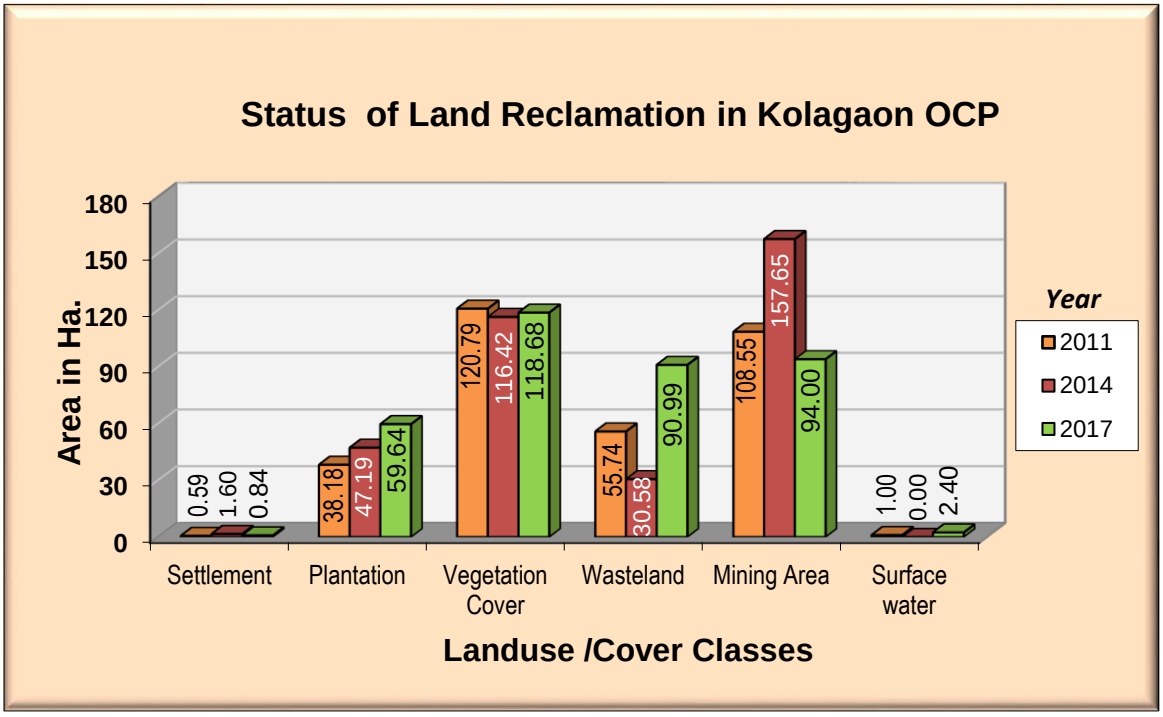

Figure-1

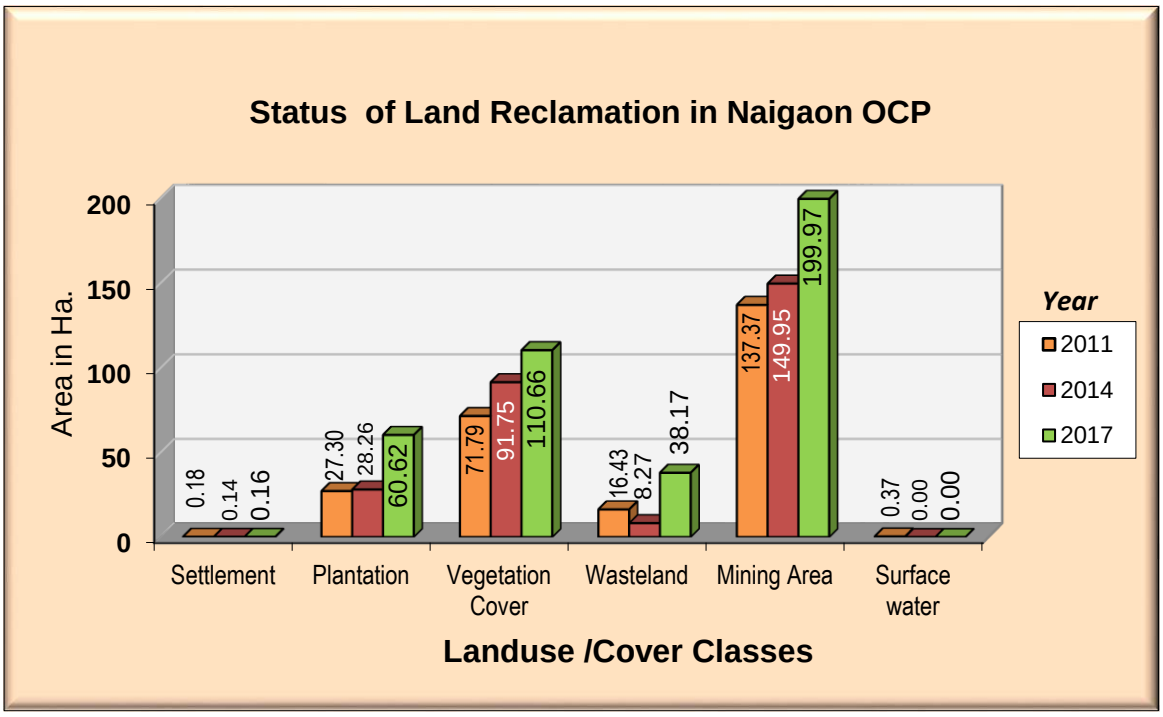

Figure-2

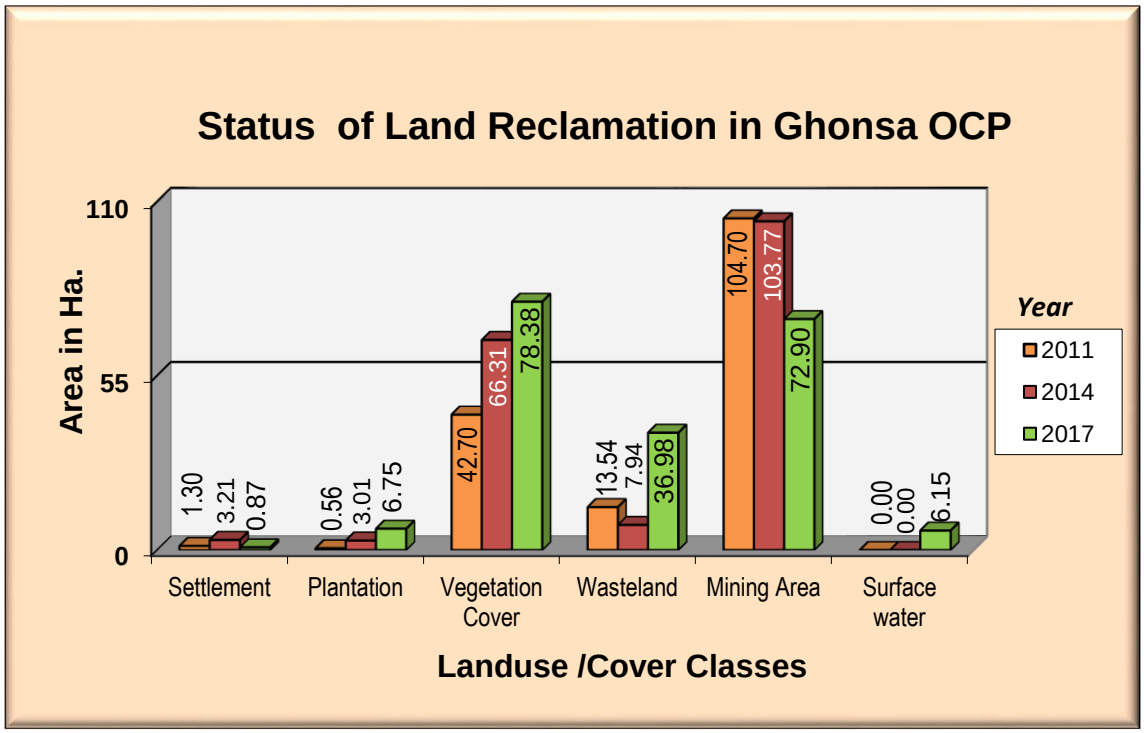

Figure-3

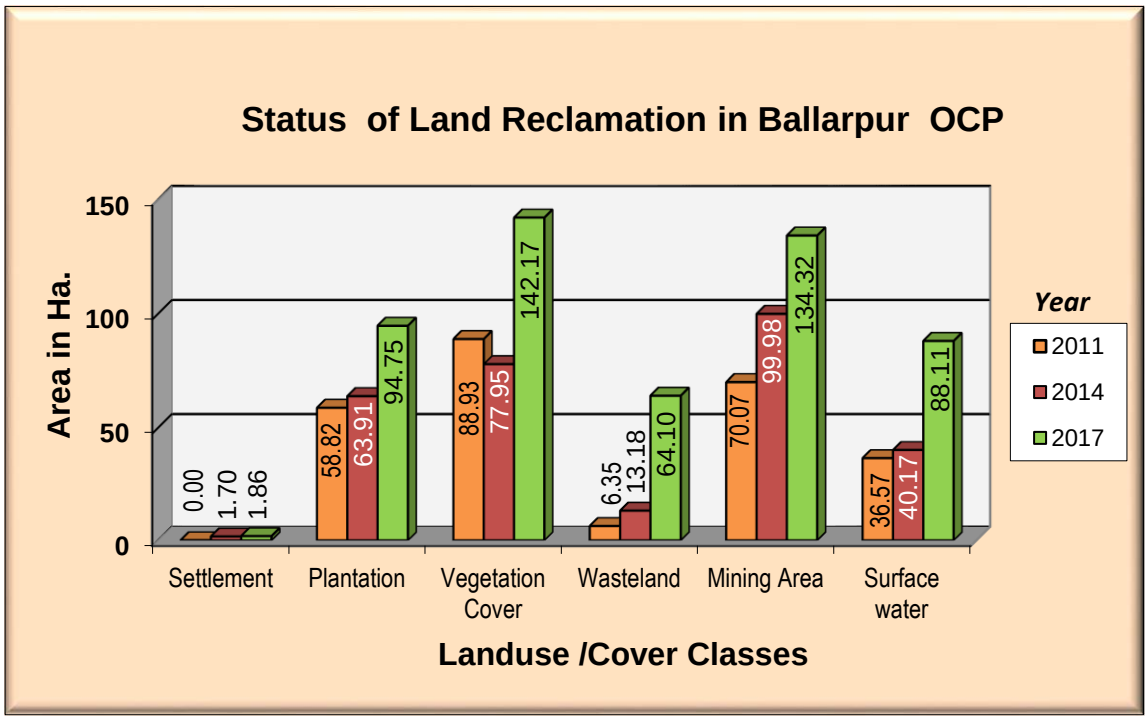

Figure-4

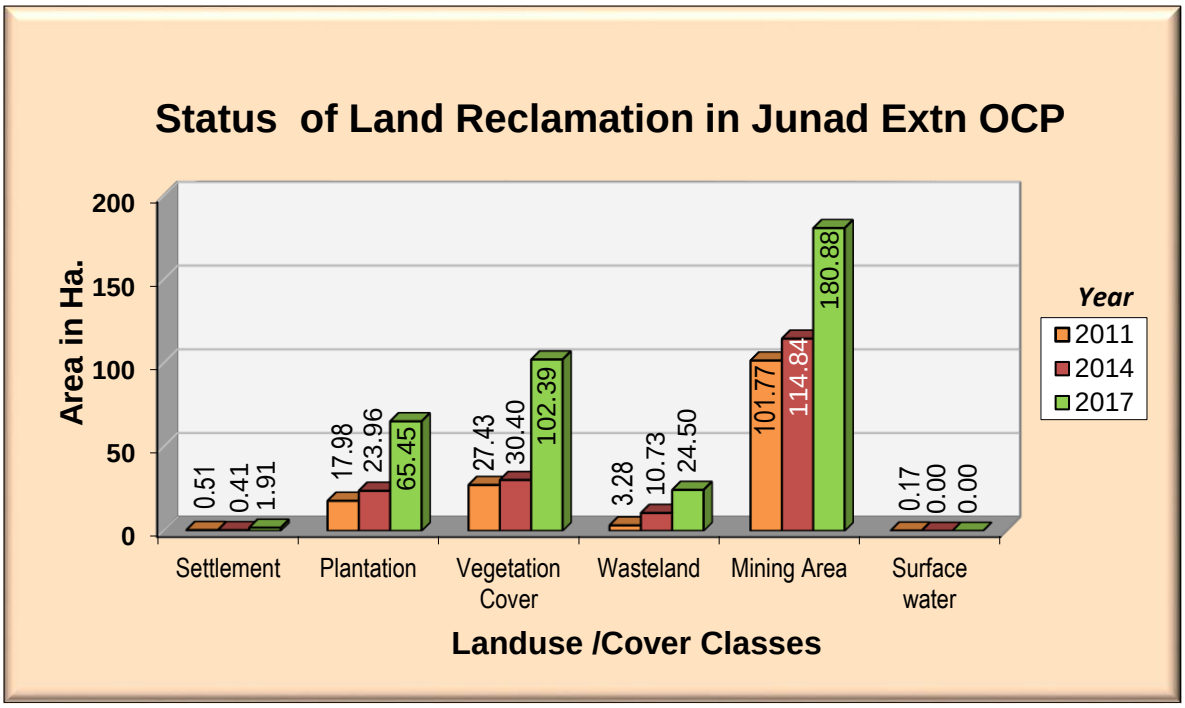

Figure-5

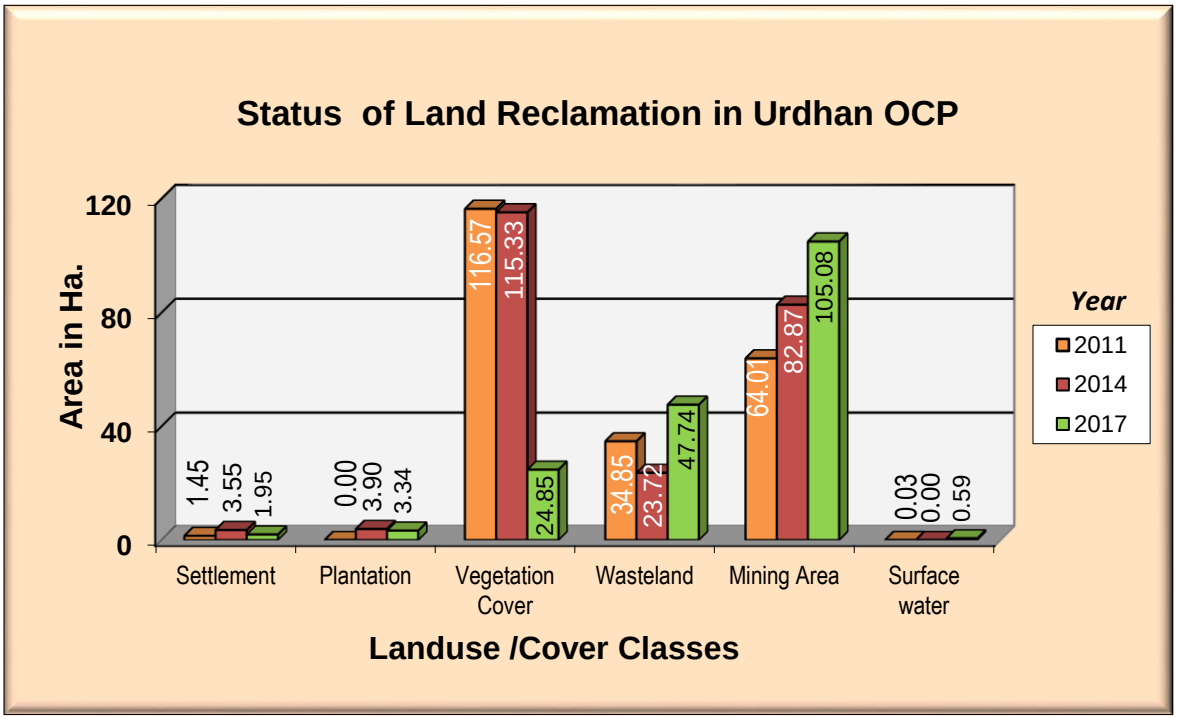

Figure-6

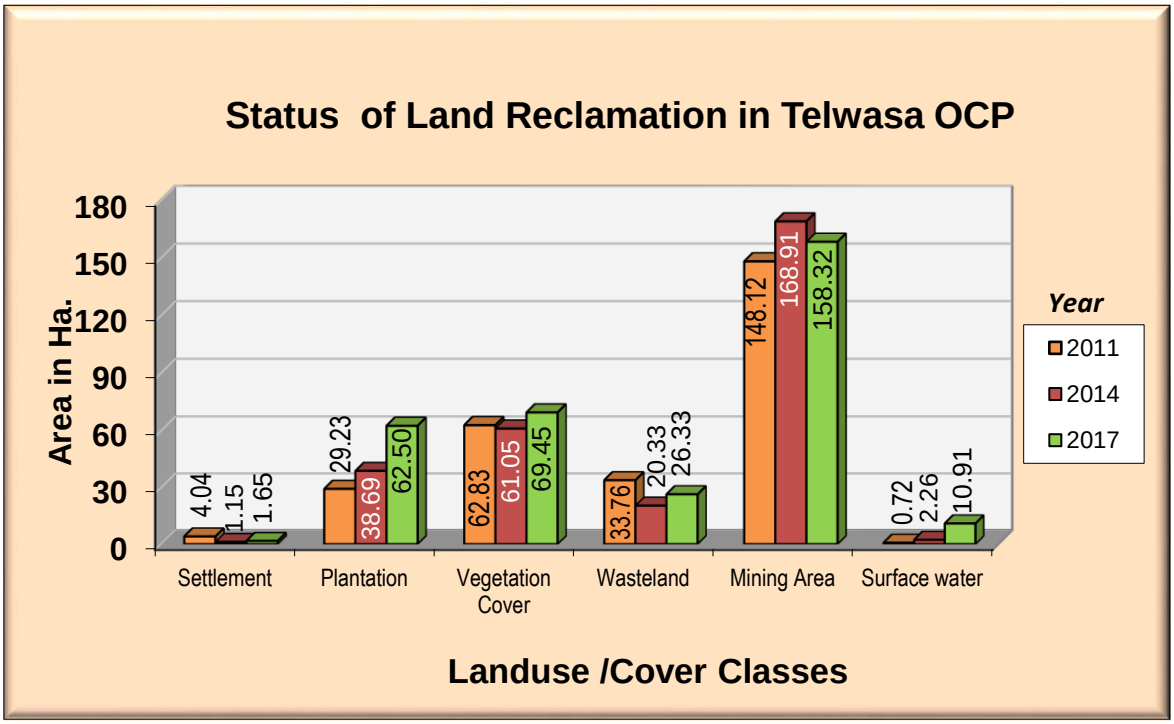

Figure-7

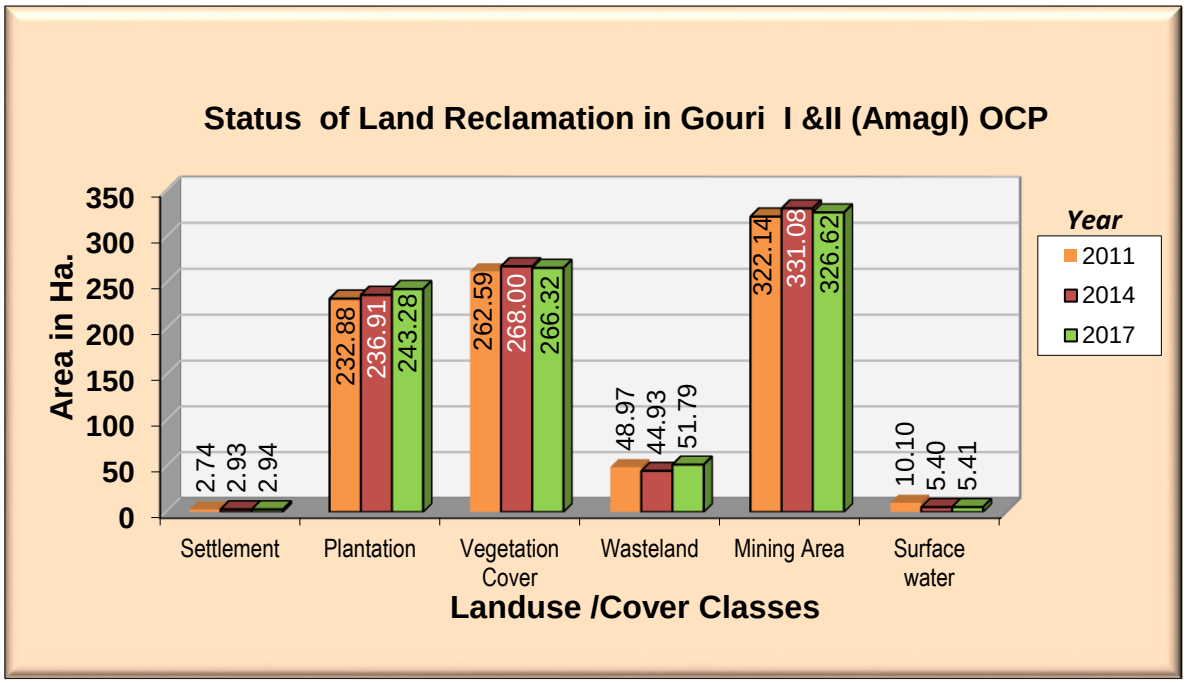

Figure-8

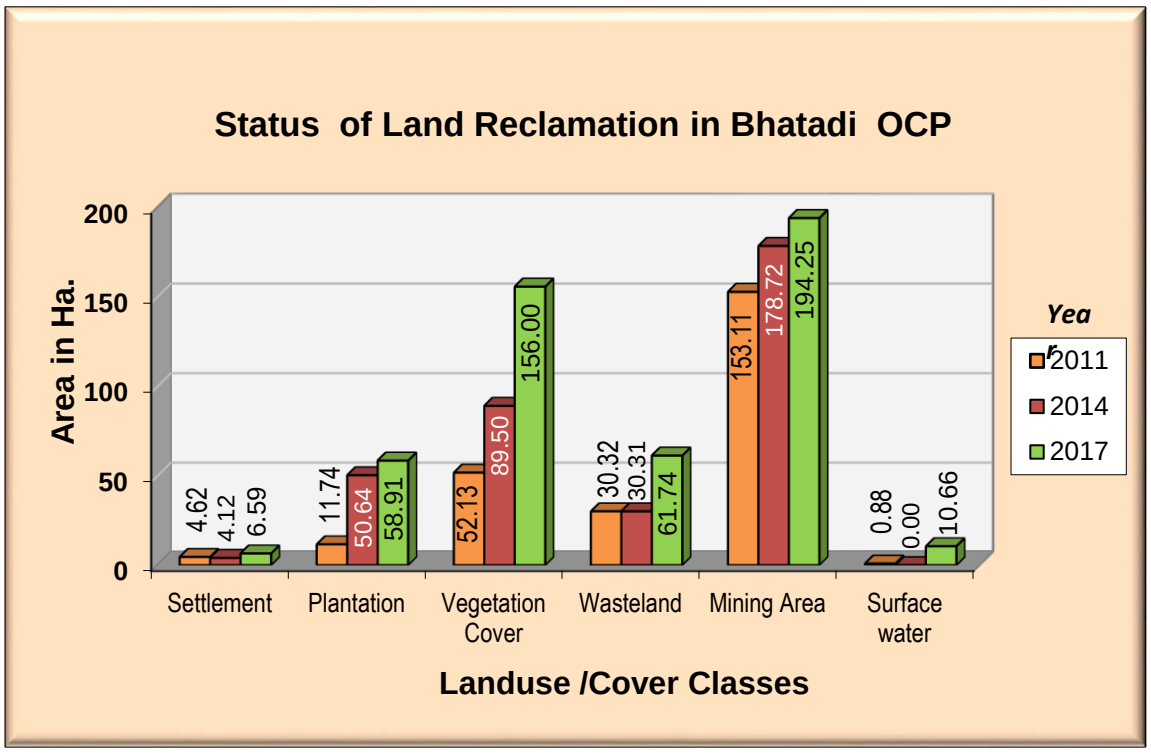

Figure -9

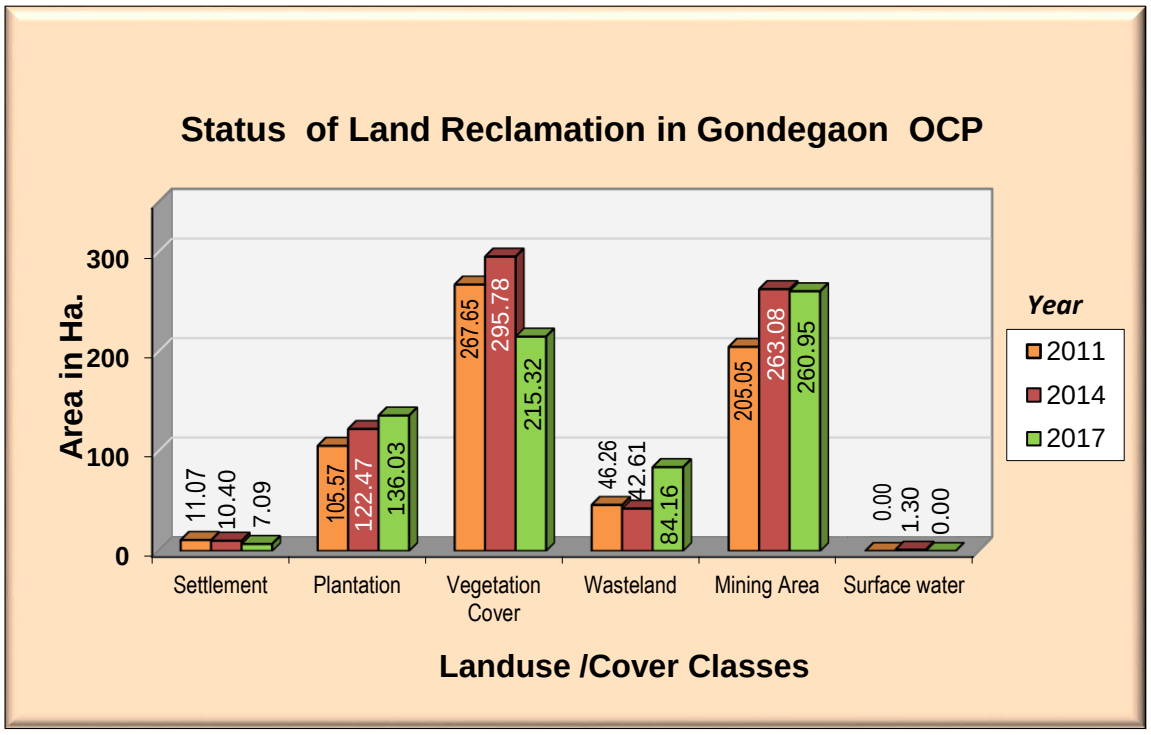

Figure-10

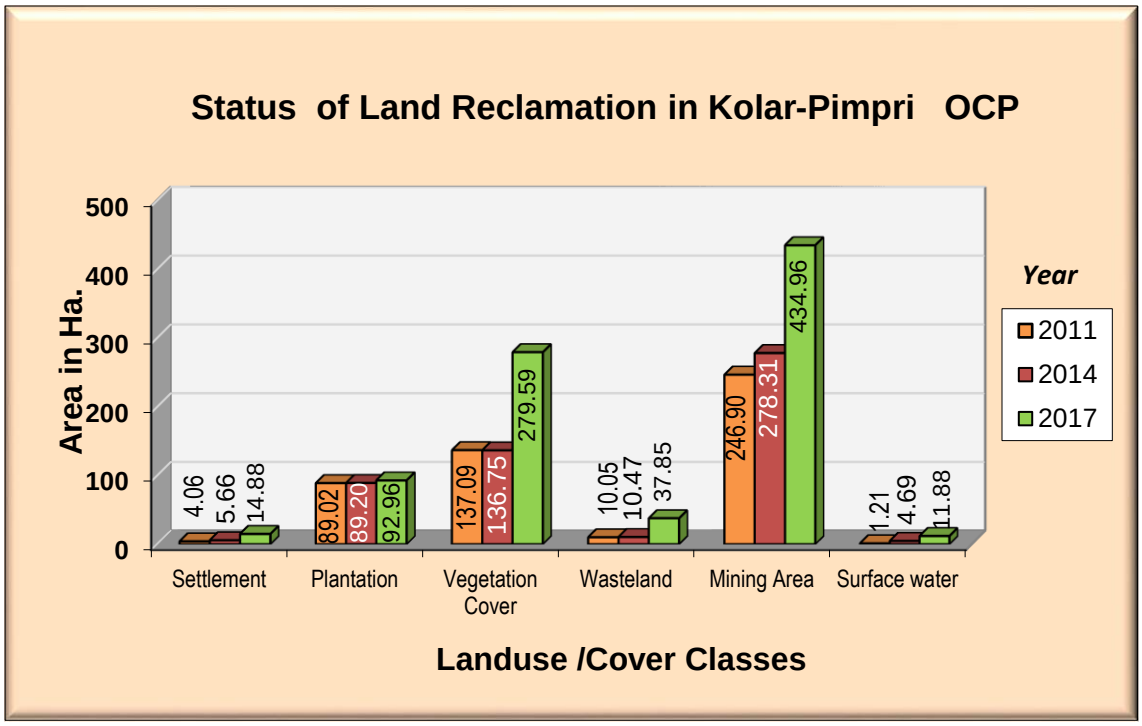

Figure-11

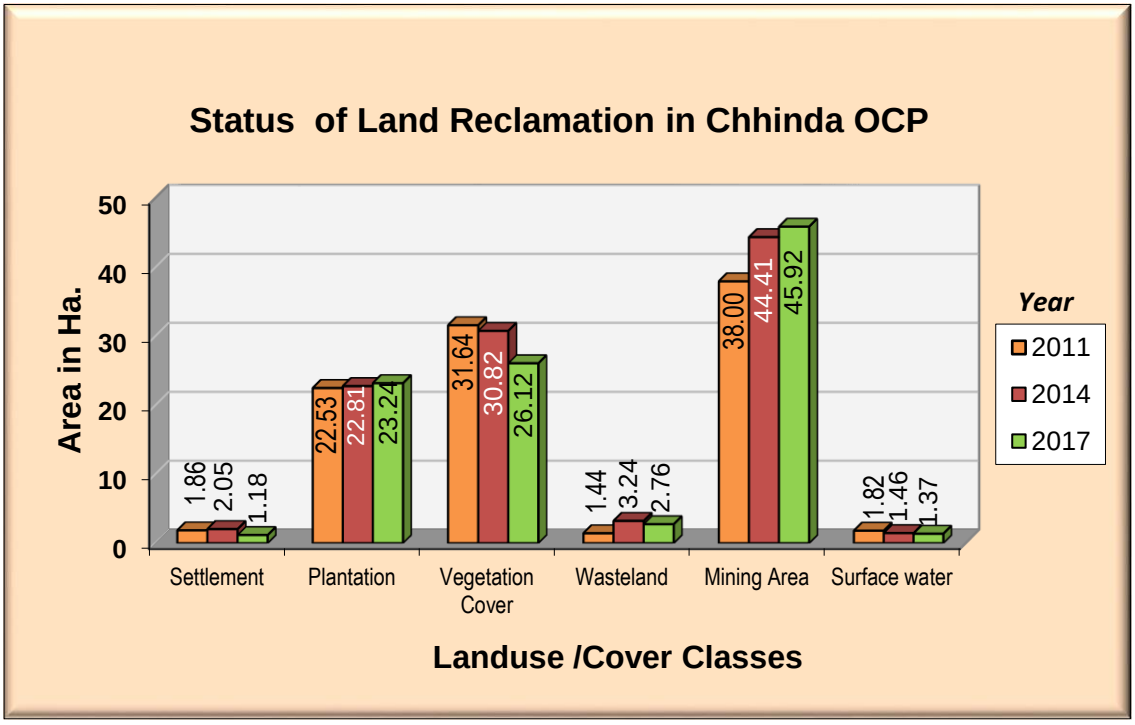

Figure -12

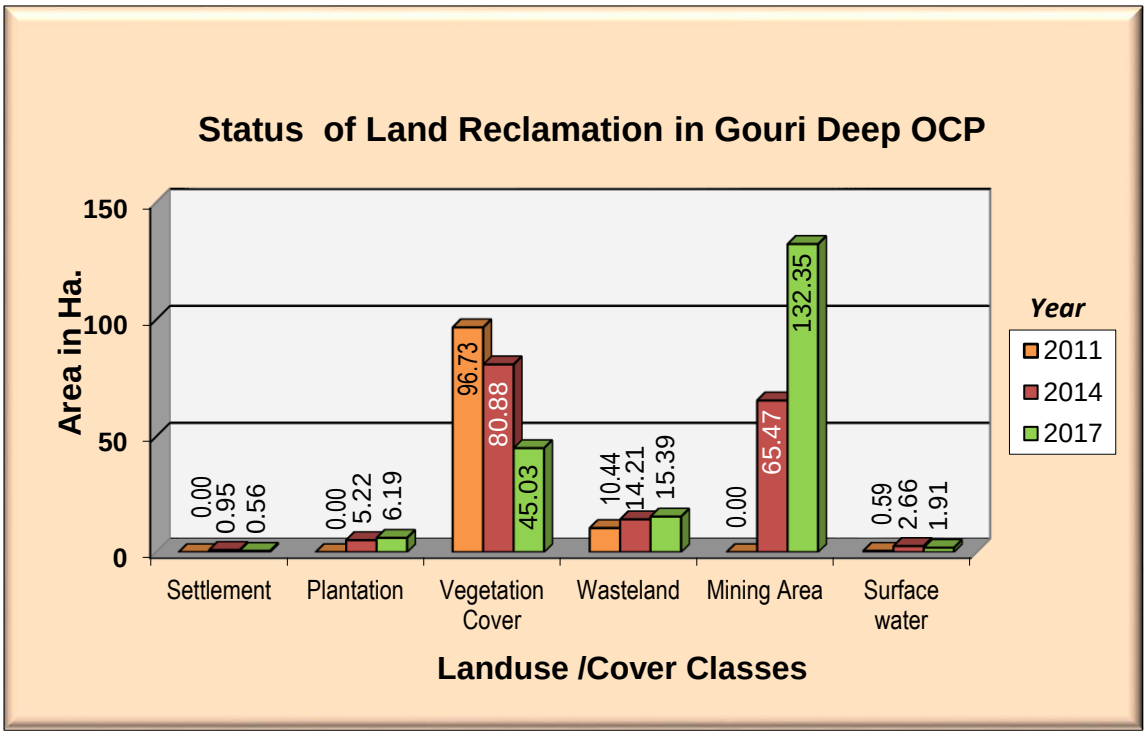

Figure -13

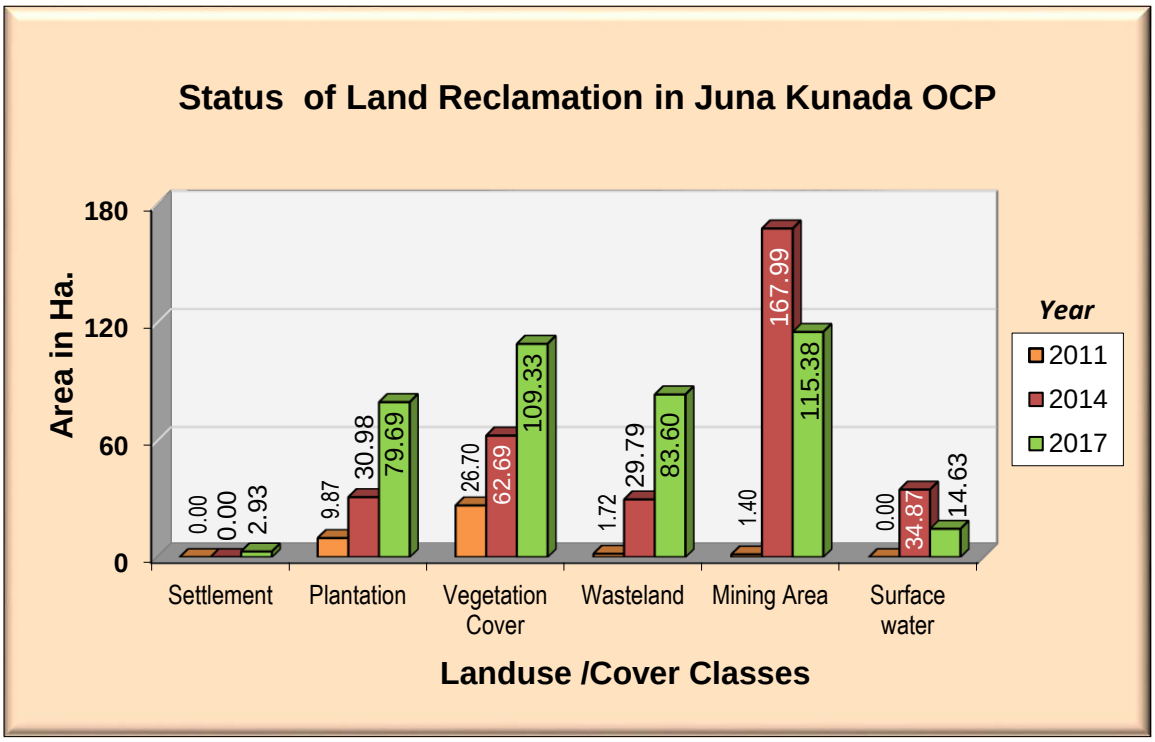

Figure -14

Photograph 1: Plantation under social forestry in Gondegaon OCP

Photograph 2: Plantation on OB Dump in Junad Extension OCP

Photograph 3: Plantation on Barren OB Dump in Kolarpimpri OCP

Photograph 4: Plantation under social forestry in Kolegaon OCP

Photograph 5- Plantation on Barren OB Dump in Naigaon OCP

Photograph 6- Plantation on Barren OB Dump in Ballarpur OCP

Photograph 7- Plantation on Barren OB Dump in Gauri I&II OCP

Photograph 8- Plantation under social forestry in Juna-kunada OCP

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