

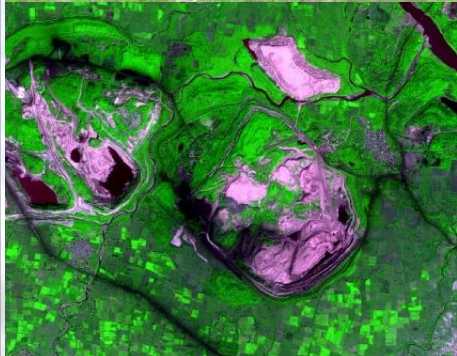





**Land Restoration / Reclamation Monitoring of 76 Opencast Coal Mines
Projects of CIL producing more than 5 mcm (Coal + OB) annually
based on Satellite Data for the Year 2022**

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Submitted to
Coal India Limited

MARCH 2023



**Land Restoration / Reclamation Monitoring of 76 Opencast Coal Mines
Projects of CIL producing more than 5 mcm (Coal+OB) annually
based on Satellite Data for the Year 2022**

March- 2023



**Remote Sensing Cell
Geomatics Division
CMPDI, Ranchi**

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Executive Summary

- 1.0 Project** Land restoration / reclamation monitoring of 76 opencast coal mines in different subsidiaries of Coal India Ltd. (CIL) producing 5 million cu.m. and more (Coal+OB) per annum based on satellite data on annual basis.
- 2.0 Objective** Objective of the land restoration / reclamation monitoring is to assess the area under backfilling, plantation, social forestry, active mining area, water bodies, distribution of wasteland, agricultural land and forest in the leasehold area of the projects. 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**
- In the year 2022, amongst projects of different subsidiaries of Coal India Ltd. taken up 76 opencast mines for monitoring.
 - Out of the total mine leasehold area of 868.98 Km² of the 76 OC projects considered for monitoring during 2022-23; total excavated area is 315.91 Km²; out of which 144.15 Km² area (45.63%) is under backfilling (Technical Reclamation), 55.31 Km² area (17.51%) has been planted (Biologically Reclaimed) and 116.44 Km² area (36.86%) is under active mining. It is evident from the analysis that 199.46 Km² (63.14%) area out of the total excavated area of 315.91 Km² of the 76 OC projects is already under reclamation and balance 116.44 Km² (36.86%) area is under active mining. Company wise details are given in Table - 1 & Fig-1.
 - On comparing the status of land reclamation carried out in year 2021-22 with respect to years 2022-23 in the 76 Opencast projects of different CIL subsidiaries, it is evident from the analysis of the satellite data of the year 2022 that area under land reclamation has increased from 189.25 Km² (Yr. 2021-22) to 199.46 Km² (Yr. 2022-23), which includes both area under plantation (Biological Reclamation) and areas under backfilling (Technical Reclamation). This increase of 10.21 Km² area of land reclamation in last one year is the result of the efforts made by CIL's subsidiary companies towards land reclamation. Year wise comparison in land reclamation in different subsidiaries is given in Fig.2.

- It has been observed that in all the subsidiaries of Coal India Limited (CIL), technical reclamation has shown an increasing trend. As compared to the analysis done in the year 2021, it has been found that there has been an overall increase of 7.92 Km² in area under technical reclamation commutatively in the year 2022.
- It has been observed that in WCL, SECL, NCL, CCL, ECL & MCL area under biological reclamation has increased in comparison to previous year. (Refer Table-1).
- It has been also observed that in subsidiaries like WCL, SECL, NCL, CCL & ECL, total area under plantation (Green Cover) which includes plantation over backfill, plantation over overburden dumps and plantation done under social forestry etc. has increased as compared to previous year.

However, in MCL, there has been marginal decrease in area under green cover due to fresh backfilling activities, construction of roads and mine advancement in some projects. All these factors have contributed for decrease in Green Cover in MCL projects.

Overall 18.93% of the total leasehold area of all the subsidiaries of CIL commutatively is under Green Cover as per the analysis of satellite data of the year 2022.

- Analysis of the results based on satellite data of the year 2022 also indicate that all subsidiaries of CIL, whose projects were under monitoring indicate an increasing trend for area under reclamation. It has been observed that total area under reclamation has increased from 189.25 Km² (62.53%) in 2021 to 199.46 Km² (63.14%) in the year 2022.

Commutative Status of Land Reclamation monitoring based on satellite data of the year 2022 is indicated in the Pie Chart in the Fig. 1. Subsidiary wise status of Land Reclamation Monitoring of the projects monitored based on satellite data of the year 2022 is shown in form of Bar Chart at Fig 2. Comparison of Area under Reclamation in different subsidiaries of Coal India Limited between the years 2021 to 2022 has been shown in form of Bar- Chart in Fig 3.

Table-1**Company wise Land Reclamation Status in OC projects of CIL based on Satellite Data of year 2022***(Projects producing more than 5 mcm of Coal+OB annually)**(Area in Sq. km)*

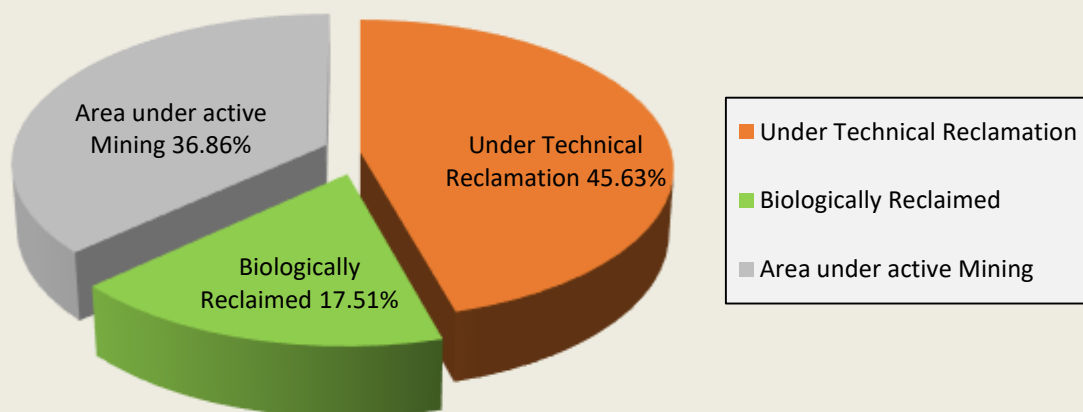
| Sl. No. | Project (Nos.) | Total Leasehold Area | | Reclamation Activities under Progress | | | | | | | | Area under Active Mining | | Total Excavated Area | | Total Area under Plantation (% Green Cover Generated in Leasehold) | | Total Area under Reclamation | |
|---------|----------------|----------------------|--------|---------------------------------------|--------|--------------------------------|--------|---------------------------------|-------|---|-------|--------------------------|--------|----------------------|--------|---|--------|------------------------------|--------|
| | | | | Technical Reclamation | | Biological Reclamation | | Other Plantations | | | | | | | | | | | |
| | | | | Area under Backfilling | | Plantation on Backfilled Areas | | Plantation on External OB Dumps | | Social Forestry, Avamue Plantation Etc. | | | | | | | | | |
| 1 | 2 | 3 | | 4 | | 5 | | 6 | | 7 | | 8 | | 9 (=4+5+8) | | 10 (=5+6+7) | | 11(=4+5) | |
| | | 2021 | 2022 | 2021 | 2022 | 2021 | 2022 | 2021 | 2022 | 2021 | 2022 | 2021 | 2022 | 2021 | 2022 | 2021 | 2022 | 2021 | 2022 |
| 1 | WCL (14) | 150.99 | 150.99 | 10.53 | 11.87 | 3.84 | 4.23 | 14.37 | 14.99 | 9.75 | 10.26 | 20.63 | 21.07 | 35.00 | 37.17 | 27.96 | 29.48 | 14.37 | 16.10 |
| | | | | 30.09% | 31.93% | 10.97% | 11.38% | | | | | 58.94% | 56.69% | | | 18.52% | 19.52% | 41.06% | 43.31% |
| 2 | SECL (19) | 199.51 | 199.51 | 35.10 | 36.51 | 18.83 | 19.75 | 11.70 | 11.89 | 9.56 | 9.57 | 21.46 | 22.29 | 75.39 | 78.56 | 40.09 | 41.21 | 53.93 | 56.26 |
| | | | | 46.56% | 46.47% | 24.98% | 25.14% | | | | | 28.47% | 28.37% | | | 20.09% | 20.66% | 71.53% | 71.61% |
| 3 | NCL (10) | 179.03 | 184.18 | 36.00 | 37.54 | 11.23 | 11.84 | 18.17 | 19.00 | 20.45 | 23.71 | 32.44 | 31.62 | 79.67 | 81.00 | 49.85 | 54.55 | 47.23 | 49.38 |
| | | | | 45.19% | 46.35% | 14.10% | 14.62% | | | | | 40.72% | 39.04% | | | 27.84% | 29.62% | 59.28% | 60.96% |
| 4 | MCL (16) | 179.75 | 179.75 | 27.29 | 29.58 | 8.24 | 8.05 | 3.30 | 3.24 | 4.07 | 3.99 | 23.49 | 25.6 | 59.02 | 63.23 | 15.61 | 15.28 | 35.53 | 37.63 |
| | | | | 46.24% | 46.78% | 13.96% | 12.73% | | | | | 39.80% | 40.49% | | | 8.68% | 8.50% | 60.20% | 59.51% |
| 5 | CCL (15) | 113.86 | 113.86 | 18.01 | 18.68 | 7.98 | 8.43 | 5.04 | 5.19 | 4.69 | 4.83 | 10.50 | 10.88 | 36.49 | 37.99 | 17.71 | 18.45 | 25.99 | 27.11 |
| | | | | 49.36% | 49.17% | 21.87% | 22.19% | | | | | 28.78% | 28.64% | | | 15.55% | 16.20% | 71.22% | 71.36% |
| 6 | ECL (02) | 40.69 | 40.69 | 9.30 | 9.97 | 2.90 | 3.01 | 0.61 | 0.91 | 1.50 | 1.58 | 4.88 | 4.98 | 17.08 | 17.96 | 5.01 | 5.50 | 12.20 | 12.98 |
| | | | | 54.45% | 55.51% | 16.98% | 16.76% | | | | | 28.57% | 27.73% | | | 12.31% | 13.52% | 71.43% | 72.27% |
| | TOTAL (76) | 863.83 | 868.98 | 136.23 | 144.15 | 53.02 | 55.31 | 53.19 | 55.22 | 50.02 | 53.94 | 113.40 | 116.44 | 302.65 | 315.91 | 156.23 | 164.47 | 189.25 | 199.46 |
| | | | | 45.01% | 45.63% | 17.52% | 17.51% | | | | | 37.47% | 36.86% | | | 18.09% | 18.93% | 62.53% | 63.14% |

*(% is calculated with respected to Excavated Area as applicable)***Note:** In reference of the above Table, different parameters are classified as follows:

1. Area under Biological Reclamation includes areas under plantation done on backfilled area only.
2. Area under Technical Reclamation includes area under barren backfilled only
3. Area under Active mining includes coal quarry site, quarry filled with water etc.
4. Social Forestry and Plantation on external OB dump are not included in Biological Reclamation and are put under separate categories as shown in the table.
5. (%) calculated in the above table is in respect of total excavated area except for "Total area under plantation" where (%) is calculated in terms of leasehold area.

**STATUS OF LAND RECLAMATION IN THE LEASEHOLD OF 76 OPENCAST MINES
UNDER MONITORING BASED ON SATELLITE DATA OF THE YEAR 2022**

(Pie Chart indicated distribution of Total Excavated Area Only)



(As per Digital Image Processing of Satellite Data of the year 2022)

Fig.1 : Pie Chart showing Status of Land Reclamation in CIL Subsidiaries

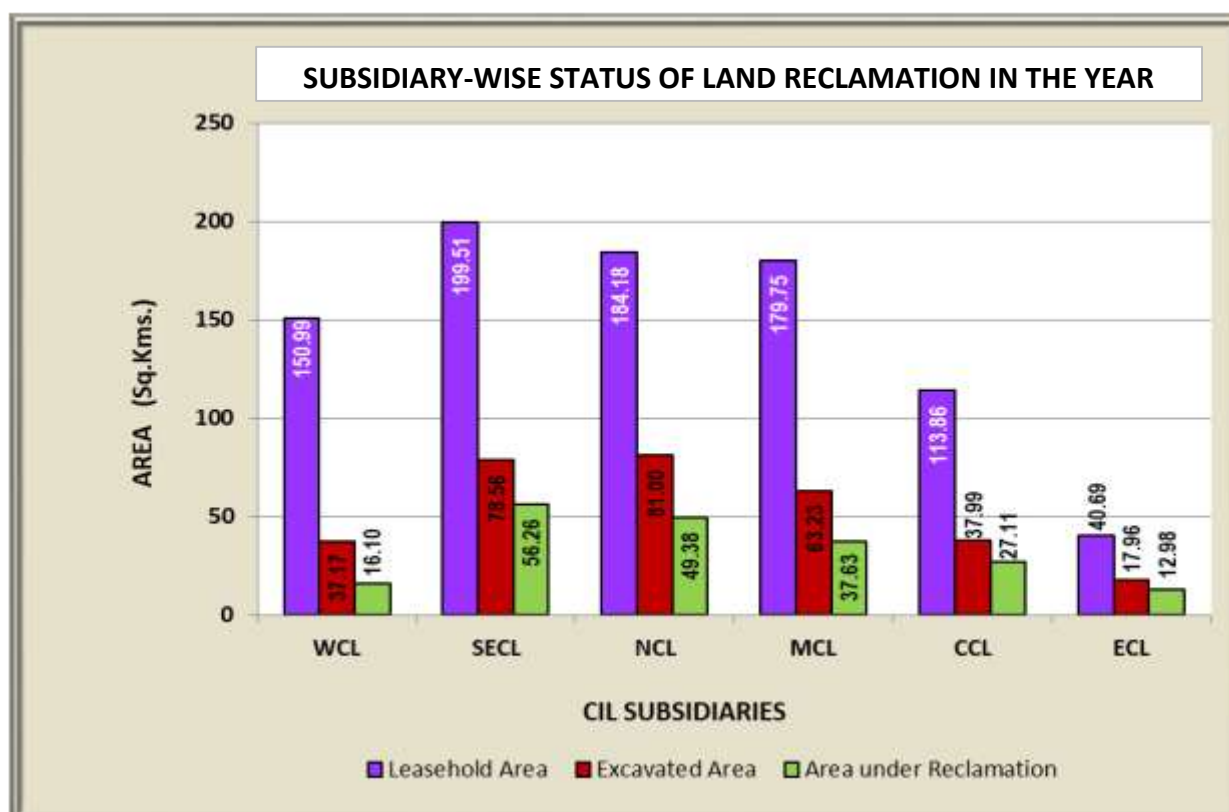


Fig. 2 : Company wise Land Reclamation Status in the Year 2022

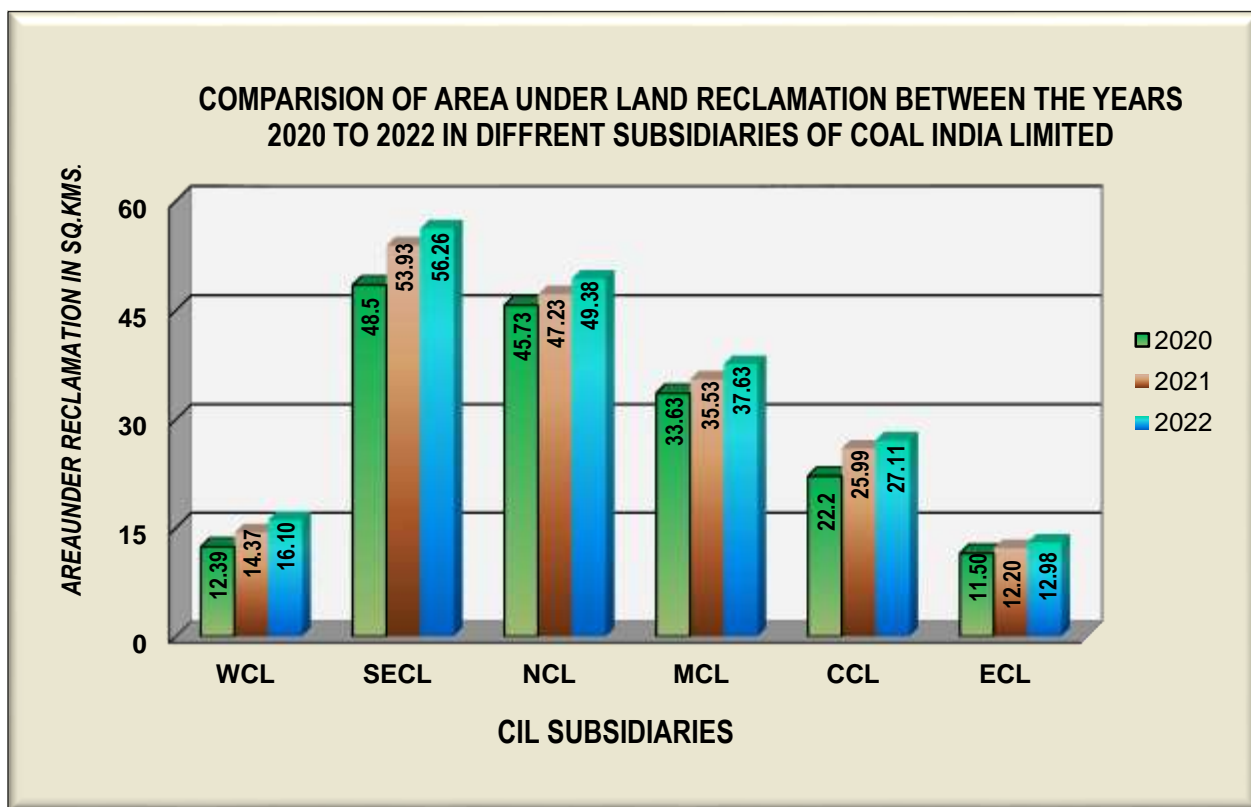


Fig. 3 : Comparison fo Area under Land Reclamation between 2020 to 2022

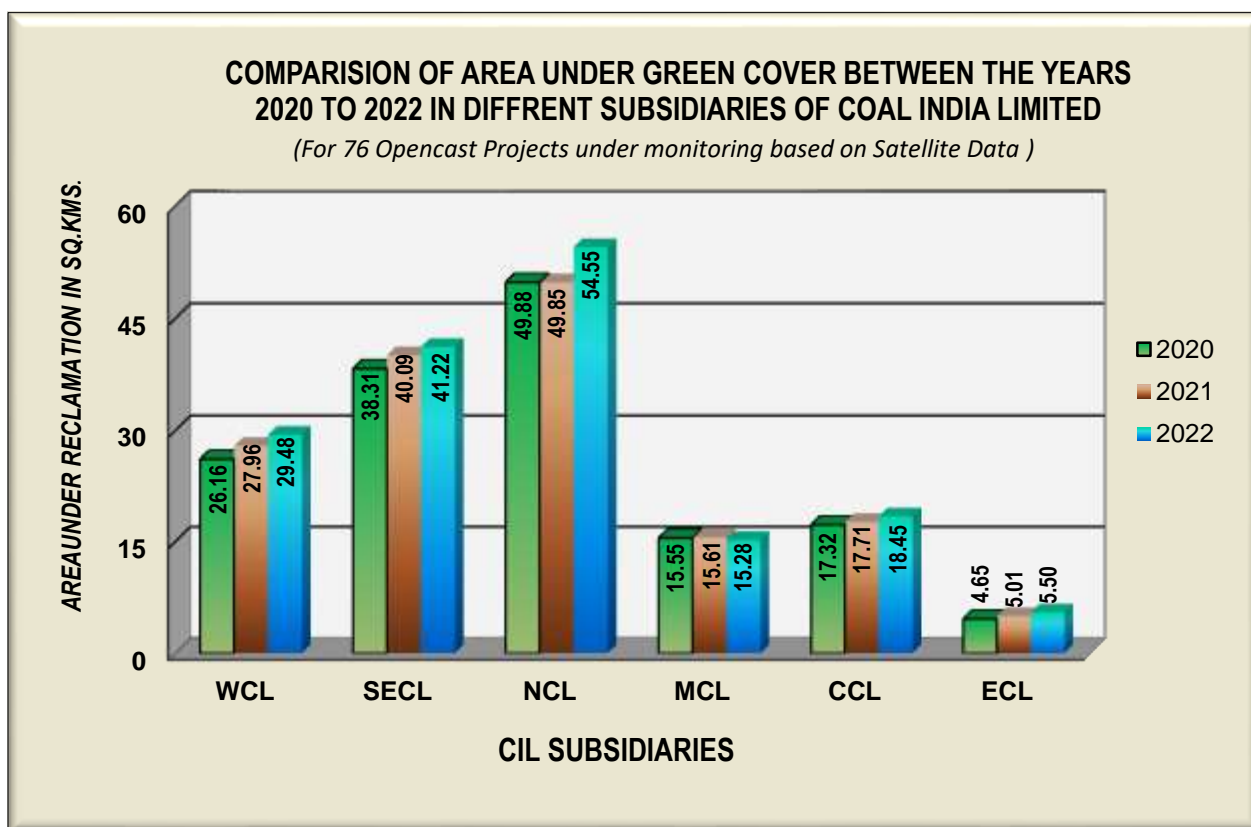


Fig. 4 : Comparison fo Area under Green Cover in subsidiaries between 2020 to 2022

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 scarcest 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.

Keeping above in view, Coal India Ltd. (CIL) issued a work order vide letter no. CIL/WBP/Env/2009/2428 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 more than 5 million m³ per annum (coal + OB taken together per annum) based on remote sensing satellite data, regularly on annual basis 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 Limited for the period 2012-13 to 2016-17 which was subsequently followed by another work order vide letter no. CIL/WBP/Env/2017/DP/8477 dated 21.09.2017 from Coal India Limited for the period 2017-18 to 2021-22. The latest work order from Coal India Limited vide CIL/ENV/2022-23/W.O./10899 dated 06.07.2022 is for land reclamation monitoring of 109 opencast projects and vegetation cover monitoring of 13 major coalfields for the period 2022-2024. According to this work order, all mines in CIL with output capacity of 5 million cu. m (coal +OB) shall be monitored every year and all mines below this capacity shall be monitored at an interval of 3 years. All coalfields in CIL shall also be monitored at an interval of 3 years as per a defined plan. 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.

- 1.2** Land reclamation monitoring of all opencast coal mining projects would also comply the statutory requirements of Ministry of Environment, Forest & Climate Change (MoEF&CC), GoI (Government of India). 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.
- 1.3** CMPDI undertook the above study and the present report is embodying the findings in nutshell carrying out for the 76 opencast projects of different subsidiaries producing 5 million cubic m. coal +OB or more in the year 2022-23. This study is being carried out in since year 2008 on annual basis and progressive changes in the status of land reclamation have been assessed. It is to be noted that BCCL was excluded from previous year for more than 5 Million Cubic m. (Coal+OB) monitoring category.

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 fig 3. Following steps are involved in land reclamation /restoration monitoring:

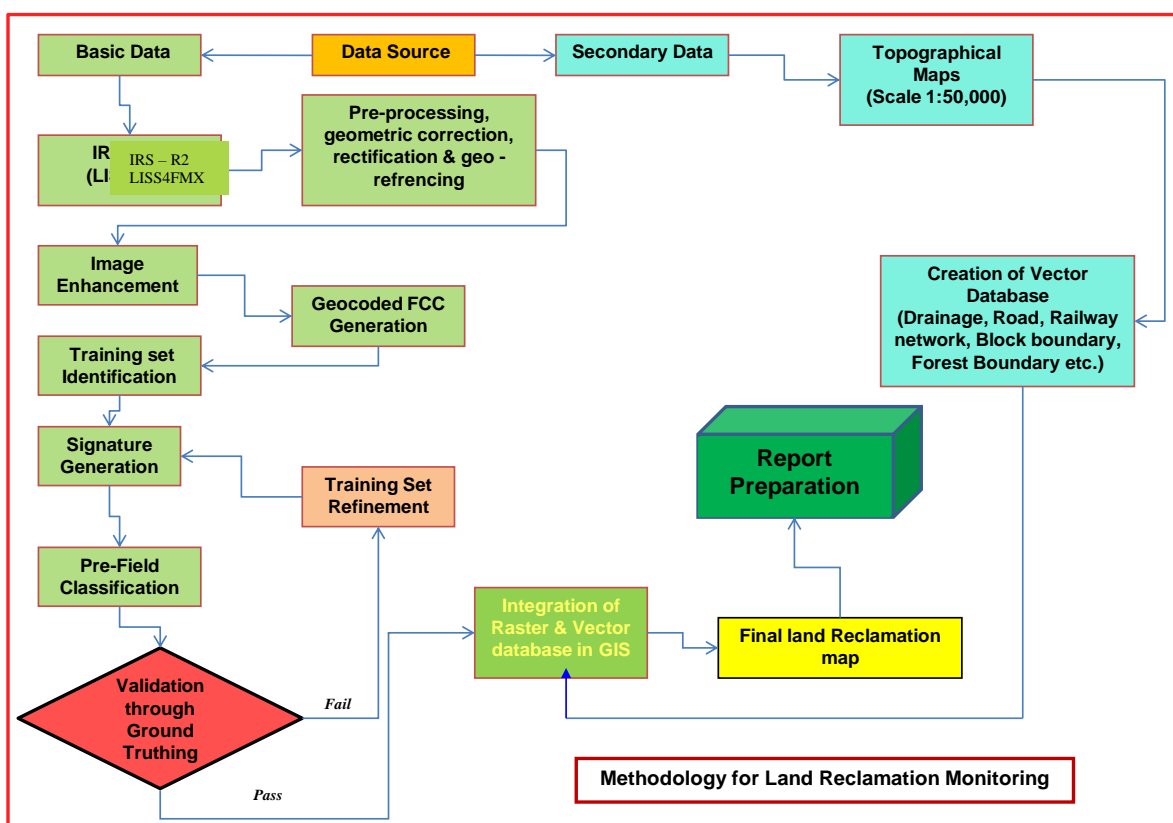


Fig.3: Methodology for Land Reclamation Monitoring

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 Professional v2022 s/w / PCI Geomatica digital 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 Sol (Survey of India) Topo-sheet.

- **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 Professional v2022 / PCI Geomatica digital image processing s/w and enhance the image quality for proper 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 Professional v2022/ PCI Geomatica digital image processing s/w.

- **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 results.

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-off dates.

4.0 Work Plan

4.1 Total 76 opencast projects producing 5 million cubic m. and more (Coal + OB together) during the year 2022-23 were taken up for the study. Based on the *RESOURCESAT-2* satellite data, land reclamation / mine closure monitoring was carried out using ERDAS IMAGINE digital image processing s/w and Arc-Info GIS. Baseline data on reclamation of these OC projects of CIL's subsidiaries have been generated and the same has been annually updated since year 2008.

4.2 Besides project wise land reclamation monitoring, coalfield wise vegetation cover monitoring on regional scale has also been planned for the major 13 coalfields of India at regular interval of three years using remote sensing satellite data to assess the regional impact of coal mining and associated industrialization on the land use and vegetation cover in the coalfield. Geo-environmental baseline data for Raniganj, Jharia, East Bokaro, West Bokaro, Karanpura, Singrauli (Moher Sub-basin), Korba, Bistrampur, Shohagpur, Mand-Raigarh, Talcher, Ib Valley, Wardha Valley, Bander,

Kamptee, Umrer, Pench Kanhan and Makum coalfields based on the satellite data have been generated and will be monitored regularly at three years' interval.

- 4.3** The list of subsidiary wise 76 opencast projects taken up for Land Reclamation Monitoring based on satellite data of year 2022 is given in table below:

| Subsidiary <i>(No. of Projects)</i> | Opencast Projects <i>(5 million Cu.m. Coal +OB or more per annum)</i> |
|---|---|
| WCL (14) | Sasti, Padmapur, Durgapur, Mugoli, Umrer, Ukni, Niljai, New Majri, MKD- III, Penganga, Yekona-I &II (Amal.), New Majri UG to OC, Pauni-II (Expn.), MKD-I (Expn.) |
| SECL (19) | Dipka, Gevra, Kusmunda, Manikpur, Saraipalli, Ambika, Jampali, Baroud, Bijari, Chhal, Dhanpuri Amlai Group of Mines, Rajnagar, Chirimiri, Mahan-II, Jagannathpur, Amadand, Batura, Amera & Jamuna |
| NCL (10) | Amlohri, Nigahi, Jayant, Dudhichua, Khadia, Krishnashila, Bina, Kakri, Jhingurdah, Block-B |
| MCL (16) | Ananta, Balram, Lingraj, Bharatpur, Bhubaneswari, Jagannath, Hingula, Kaniha, Belpahar, Lakhanpur, Samleswari, Lajkura, Siarmal, Basundhara West Extension, Garjanbahal & Kulda |
| CCL (15) | Ashok, Piparwar, KDH, Amrapali, Magadh, Rohini, Purnadih, North Urimari, Rajrappa, Parej East, Tapin North, Kathara, Karo, Konar Expansion & Selected Dhor |
| ECL (02) | Sonepur Bazari, Rajmahal |
| TOTAL (76) | |

- 4.4** Subsidiary wise report on land reclamation status of the above mentioned 76 OC projects derived through Digital Image Processing of Satellite Data for the year 2022 are given in the following pages:

WESTERN COALFIELDS LIMITED

5.0 Land Reclamation Status in Western Coalfields Ltd.

5.1 Following 14 OC projects producing more than 5 million cubic m. (Coal + OB together) of Western Coalfields Ltd. have been taken up for land reclamation monitoring based on Satellite Data of the year 2022:

- Sasti
- Padmapur
- Durgapur
- Mugoli
- Umrer
- Ukni
- Niljai
- New Majri
- MKD-III
- Penganga
- Yekona-I&II (Amal.)
- New Majri UG to OC
- Pauni-II (Expn.)
- MKD-I(Expn.)

5.2 Project wise Land Reclamation status in WCL for the year 2022 is given in Table 5.1 and also shown graphically in Fig 5.1. Area statistics of different land use class present in the mine leasehold boundaries of the above projects for the year 2022 are shown in the Table - 5.2. It is important to mention here that leasehold boundaries of Yekona-I&II (Amal), New Majri UG to OC and MKD-I (Expn.) projects have been modified as per latest EC. Land use maps derived from satellite data are shown in Plate 5.1-5.14. Year wise changes in the different land use classes based on satellite data are depicted in Bar Charts in Fig. 5.2 - 5.15 for the last three years only.

- 5.3** Study reveals that 16.10 Km² (43.31%) of excavated area has been under reclamation in the above mentioned mines of WCL out of which 4.23 Km² (11.38%) area has been revegetated and 11.87 Km² (31.93%) area is under backfilling. There is an overall increase of 1.73 Km² in area under reclamation in WCL in the year 2022 with respect to the year 2021, out of which there is an increase of 1.34 Km² in area under technical reclamation (Barren Backfilling) and an increase of 0.39 Km² in area under biological reclamation (Plantation on Backfilled Areas) (Refer Table 5.1). In New Majri OC project plantation on OB has been reduced by 0.08 Km² on account of tree felling for the purpose of coal mining. In Umrer OC plantation on OB dump has been reduced 0.13 Km² on account of OB dumping on vegetated OB dump area due to constraint of dumping space.
- 5.4** Analysis of satellite data also indicates that total area under active mining has increased from 20.63 Km² (Yr.2021) to 21.07 Km² (Yr.2022). In some OC project area under active mining has reduced due to increase in area under backfilling.
- 5.5** After comparing the satellite data of year 2022 vs. 2021 study reveals that area under backfilling has increased from 10.53 Km² (Yr.2021) to 11.87 Km² (Yr.2022).
- 5.6** Total area under biological reclamation has increased from 3.84 Km² (Yr.2021) to 4.23 Km² (Yr.2022). There is no biological reclamation in Yekona-I & II (Amal.), New Majri UG to OC, Pauni-II (Expn.), MKD-I and MKD-III OC
- 5.7** Analysis of satellite data also indicates that total area under plantation (Green Cover) has increased from 27.96 Km² (Yr.2021) to 29.48 Km² (Yr.2022). The increase of 1.52 Km² area under Green Cover areas may be attributed to continuous effort of WCL towards environmental protection).
- 5.8** After comparing the satellite data of year 2022 vs. 2021, it is evident that total area under plantation (Green Cover) in Sasti, Padmapur, Durgapur, Mugoli, Niljai,

Makardhokra-III and Penganga Opencast Projects has increased. It has been also observed in some of the projects natural vegetation has also started growing on stabilized old backfilled areas and overburden dumps due to high soil fertility.

- 5.9** On comparing the status of land reclamation for the year 2022 with respect to the year 2021 in different projects, it is evident that the total area under reclamation has increased from 14.37 Km² (Yr. 2021) to 16.10 Km² (Yr. 2022).
- 5.10** Out of 14 projects of WCL, maximum area under reclamation is in Sasti Opencast Project (90.79%) followed by Umrer OC (64.17%) and Mugoli OC (46.38%).

Table 5.1
Project wise Land Reclamation Status in Opencast Projects of WCL
(> 5 million Cu. M. of Coal+OB) based on Satellite Data of the Year 2022)

(Area in Sq Km)

| Sl. No. | Project | Total Leasehold Area | | Technical Reclamation | | Plantation | | | | | | Area under Active Mining | | Total Excavated 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, Avenue Plantation Etc. | | | | | | | | | |
| 1 | 2 | 3 | | 4 | | 5 | | 6 | | 7 | | 8 | | 9 (=4+5+8) | | 10 (=5+6+7) | | 11(=4+5) | |
| | | 2021 | 2022 | 2021 | 2022 | 2021 | 2022 | 2021 | 2022 | 2021 | 2022 | 2021 | 2022 | 2021 | 2022 | 2021 | 2022 | 2021 | 2022 |
| 1 | Sasti | 9.20 | 9.20 | 2.46 | 2.62 | 0.79 | 0.83 | 1.70 | 1.70 | 0.65 | 0.67 | 0.55 | 0.35 | 3.80 | 3.80 | 3.14 | 3.20 | 3.25 | 3.45 |
| | | | | 64.74% | 68.95% | 20.79% | 21.84% | | | | | 14.47% | 9.21% | | | 34.13% | 34.78% | 85.53% | 90.79% |
| 2 | Padmapur | 8.29 | 8.29 | 0.61 | 0.59 | 0.20 | 0.28 | 1.95 | 2.14 | 0.81 | 0.83 | 1.22 | 1.18 | 2.03 | 2.05 | 2.96 | 3.25 | 0.81 | 0.87 |
| | | | | 30.05% | 28.78% | 9.85% | 13.66% | | | | | 60.10% | 57.56% | | | 35.71% | 39.20% | 39.90% | 42.44% |
| 3 | Durgapur | 15.50 | 15.50 | 0.85 | 1.17 | 0.84 | 0.93 | 2.59 | 2.72 | 1.19 | 1.19 | 2.93 | 2.53 | 4.62 | 4.63 | 4.62 | 4.84 | 1.69 | 2.10 |
| | | | | 18.40% | 25.27% | 18.18% | 20.09% | | | | | 63.42% | 54.64% | | | 29.81% | 31.23% | 36.58% | 45.36% |
| 4 | Mugoli | 12.55 | 12.55 | 1.34 | 1.46 | 0.14 | 0.14 | 1.71 | 1.81 | 0.47 | 0.56 | 1.88 | 1.85 | 3.36 | 3.45 | 2.32 | 2.51 | 1.48 | 1.60 |
| | | | | 39.88% | 42.32% | 4.17% | 4.06% | | | | | 55.95% | 53.62% | | | 18.49% | 20.00% | 44.05% | 46.38% |
| 5 | Umrer | 9.45 | 9.45 | 1.68 | 1.50 | 1.40 | 1.58 | 1.58 | 1.45 | 2.31 | 2.31 | 1.71 | 1.72 | 4.79 | 4.80 | 5.29 | 5.34 | 3.08 | 3.08 |
| | | | | 35.07% | 31.25% | 29.23% | 32.92% | | | | | 35.70% | 35.83% | | | 55.98% | 56.51% | 64.30% | 64.17% |
| 6 | Ukni | 12.85 | 12.85 | 0.48 | 0.52 | 0.00 | 0.00 | 1.64 | 1.66 | 0.72 | 0.86 | 1.97 | 1.94 | 2.45 | 2.46 | 2.36 | 2.52 | 0.48 | 0.52 |
| | | | | 19.59% | 21.14% | 0.00% | 0.00% | | | | | 80.41% | 78.86% | | | 18.37% | 19.61% | 19.59% | 21.14% |
| 7 | Niljai | 17.61 | 17.61 | 1.34 | 1.44 | 0.11 | 0.11 | 1.65 | 2.04 | 1.23 | 1.23 | 2.94 | 2.84 | 4.39 | 4.39 | 2.99 | 3.38 | 1.45 | 1.55 |
| | | | | 30.52% | 32.80% | 2.51% | 2.51% | | | | | 66.97% | 64.69% | | | 16.98% | 19.19% | 33.03% | 35.31% |
| 8 | New Majri | 7.74 | 7.74 | 1.13 | 1.52 | 0.36 | 0.36 | 1.32 | 1.24 | 1.47 | 1.47 | 2.28 | 2.10 | 3.77 | 3.98 | 3.15 | 3.07 | 1.49 | 1.88 |
| | | | | 29.97% | 38.19% | 9.55% | 9.05% | | | | | 60.48% | 52.76% | | | 40.70% | 39.66% | 39.52% | 47.24% |
| 9 | MKD-III | 9.23 | 9.23 | 0.31 | 0.37 | 0.00 | 0.00 | 0.00 | 0.00 | 0.07 | 0.07 | 1.02 | 1.01 | 1.33 | 1.38 | 0.07 | 0.07 | 0.31 | 0.37 |
| | | | | 23.31% | 26.81% | 0.00% | 0.00% | | | | | 76.69% | 73.19% | | | 0.76% | 0.76% | 23.31% | 26.81% |
| 10 | Penganga | 7.63 | 7.63 | 0.33 | 0.67 | 0.00 | 0.00 | 0.00 | 0.00 | 0.39 | 0.49 | 1.00 | 0.90 | 1.33 | 1.57 | 0.39 | 0.49 | 0.33 | 0.67 |
| | | | | 24.81% | 42.68% | 0.00% | 0.00% | | | | | 75.19% | 57.32% | | | 5.11% | 6.42% | 24.81% | 42.68% |
| 11 | Yekona-I&II(Amal) | 16.79 | 16.79 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.03 | 0.54 | 1.11 | 0.54 | 1.12 | 0.03 | 0.03 | 0.00 | 0.01 |
| | | | | - | 0.89% | - | 0.00% | | | | | - | 99.11% | | | 0.18% | 0.18% | 0.00% | 0.89% |
| 12 | New Majri UG to OC | 7.06 | 7.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.33 | 0.37 | 0.75 | 1.03 | 0.75 | 1.03 | 0.33 | 0.37 | 0.00 | 0.00 |
| | | | | - | 0.00% | - | 0.00% | | | | | - | 100.00% | | | 4.67% | 5.24% | 0.00% | 0.00% |
| 13 | Pauni -II (Expn) | 10.95 | 10.95 | 0.00 | 0.00 | 0.00 | 0.00 | 0.19 | 0.13 | 0.08 | 0.18 | 0.87 | 1.17 | 0.87 | 1.17 | 0.27 | 0.31 | 0.00 | 0.00 |
| | | | | - | 0.00% | - | 0.00% | | | | | - | 100.00% | | | 2.47% | 2.83% | 0.00% | 0.00% |
| 14 | MKD -1 (Expn) OC | 6.14 | 6.14 | 0.00 | 0.00 | 0.00 | 0.00 | 0.04 | 0.10 | 0.00 | 0.00 | 0.97 | 1.34 | 0.97 | 1.34 | 0.04 | 0.10 | 0.00 | 0.00 |
| | | | | - | 0.00% | - | 0.00% | | | | | - | 100.00% | | | 0.65% | 1.63% | 0.00% | 0.00% |
| | Total | 150.99 | 150.99 | 10.53 | 11.87 | 3.84 | 4.23 | 14.37 | 14.99 | 9.75 | 10.26 | 20.63 | 21.07 | 35.00 | 37.17 | 27.96 | 29.48 | 14.37 | 16.10 |
| | | | | 30.09% | 31.93% | 10.97% | 11.38% | | | | | 58.94% | 56.69% | | | 18.52% | 19.52% | 41.06% | 43.31% |

Note: In reference of the above Table, different parameters are classified as follows:

1. Area under Biological Reclamation includes areas under plantation done on backfilled area only.
2. Area under Technical Reclamation includes area under barren backfilled only
3. Area under Active mining includes coal quarry site, quarry filled with water. Area of Coal Dump has been excluded from Area under Active Mining in this table.
4. Social Forestry and Plantation on external OB dump are not included in Biological Reclamation and are put under separate categories as shown in the table.
5. (%) calculated in the above table is in respect of total excavated area except for "Total area under plantation" where (%) is in terms of leasehold area.
6. Leasehold Boundaries of Durgapur, Mugoli, Ukni and Niljai Opencast projects have been modified as per latest ECs.

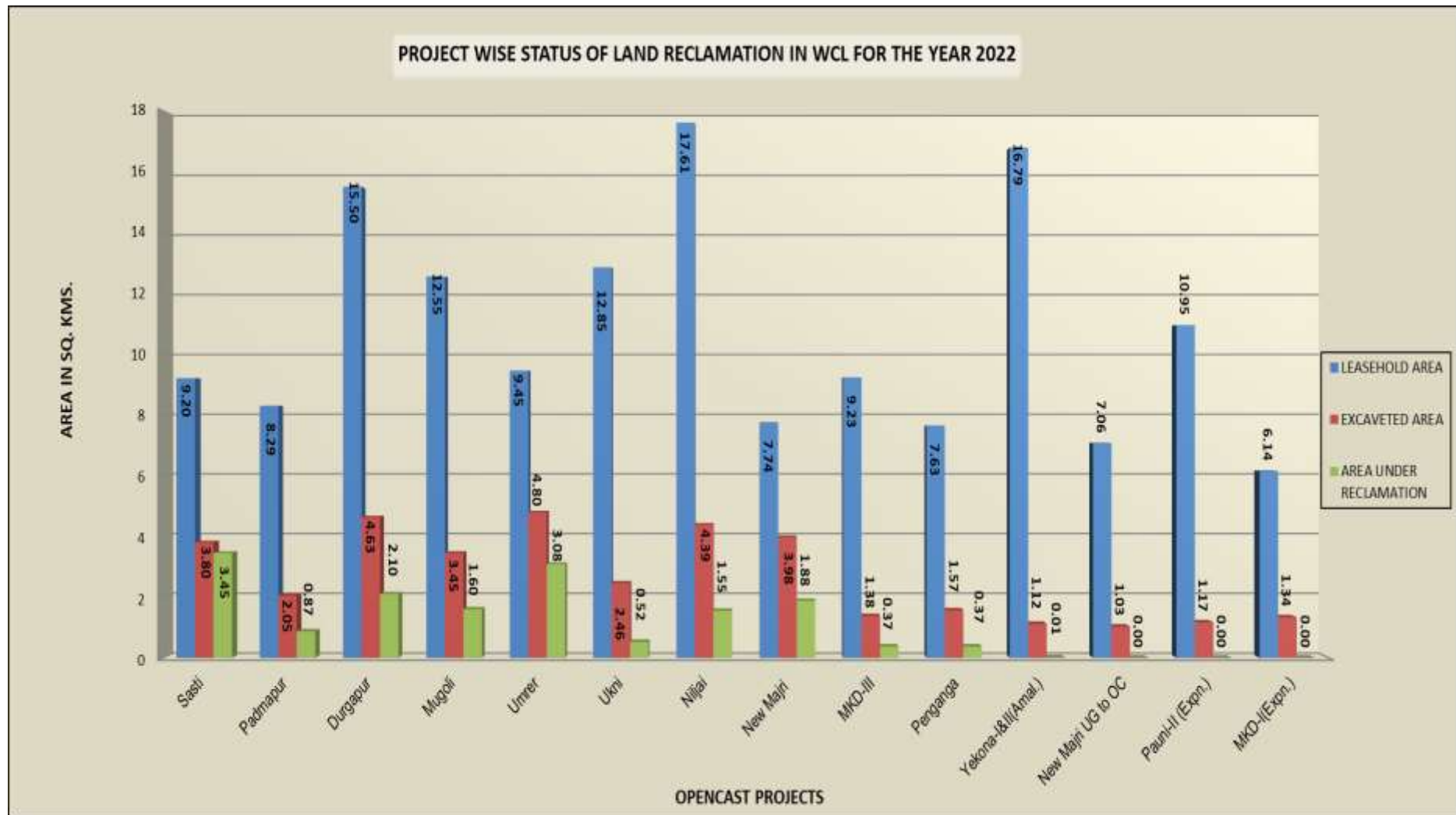



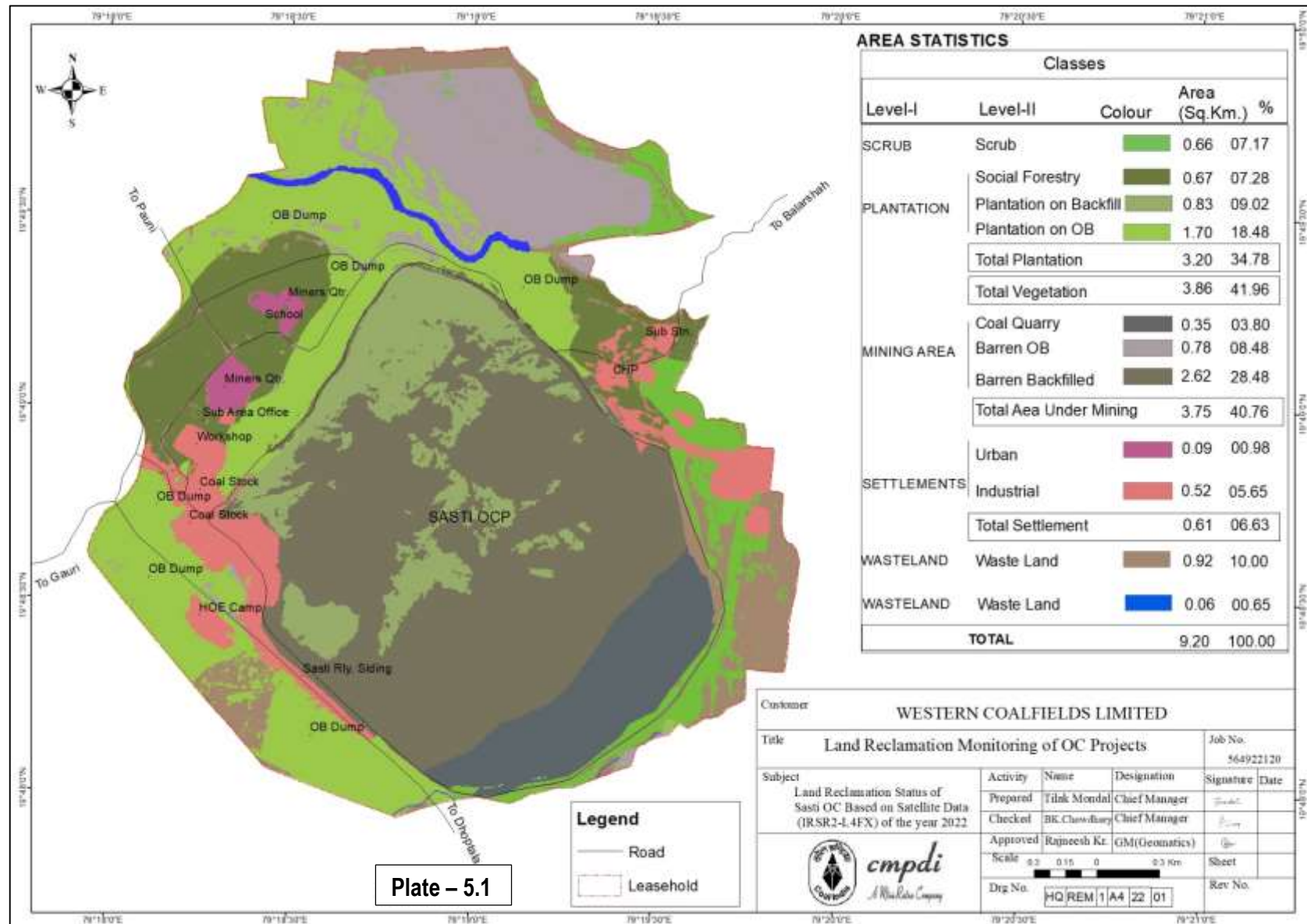
Figure : 5.1 Land reclamation status in 14 OC projects of WCL for the year 2022

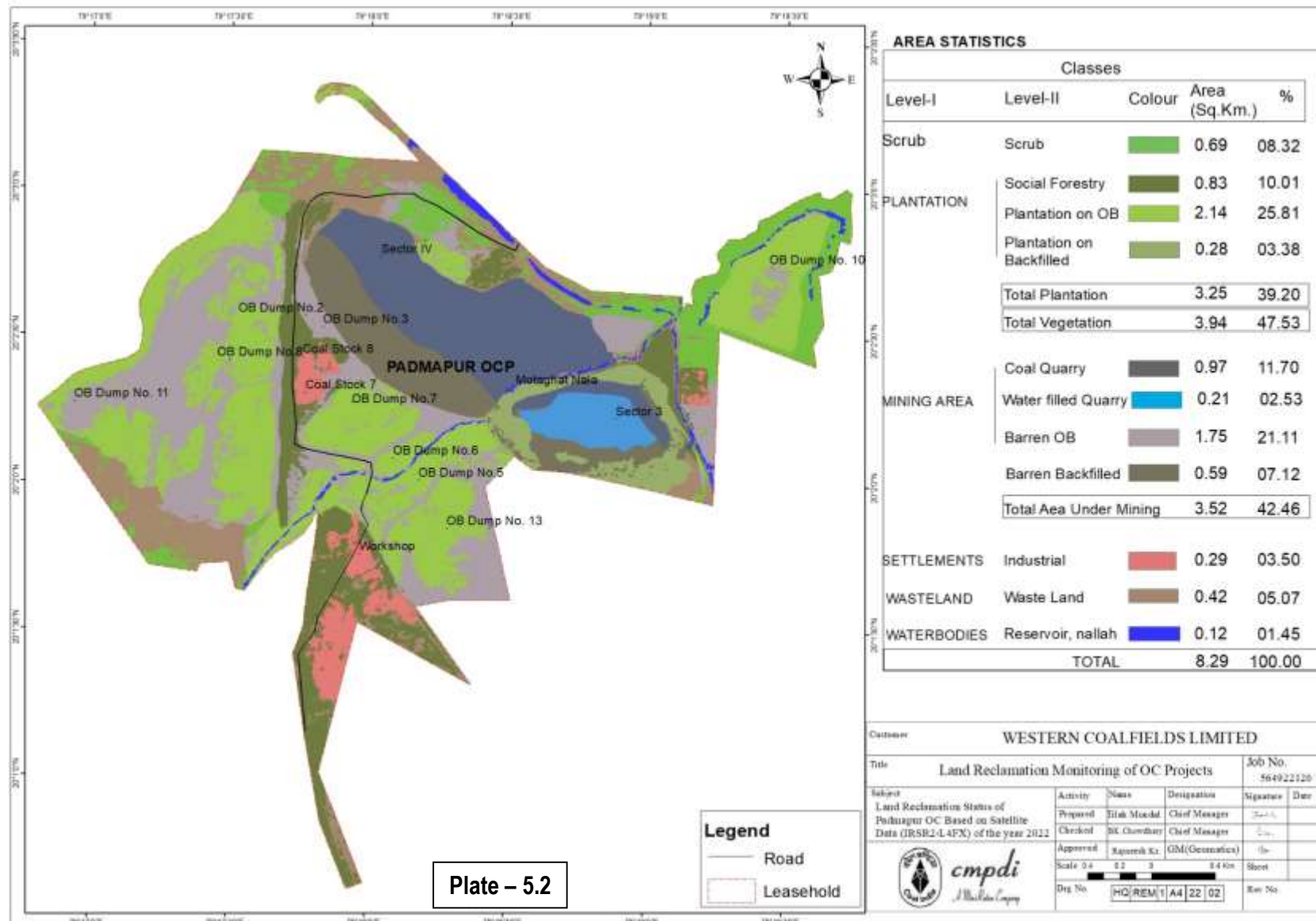
Table 5.2

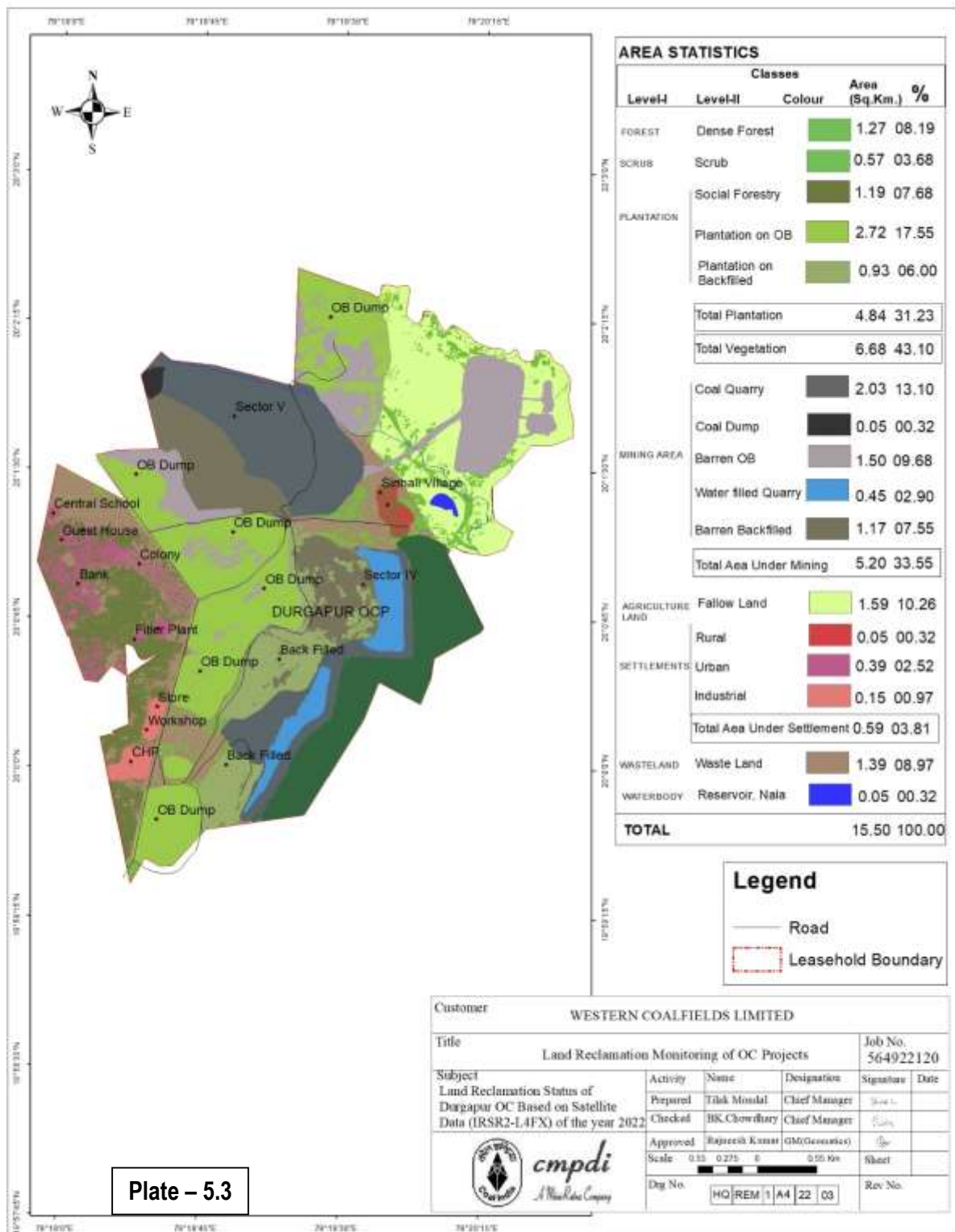
Project wise Area Statistics of Land Use / Cover in OC Mines (> 5 mcu.m.) of WCL based on Satellite data of the Year 2022

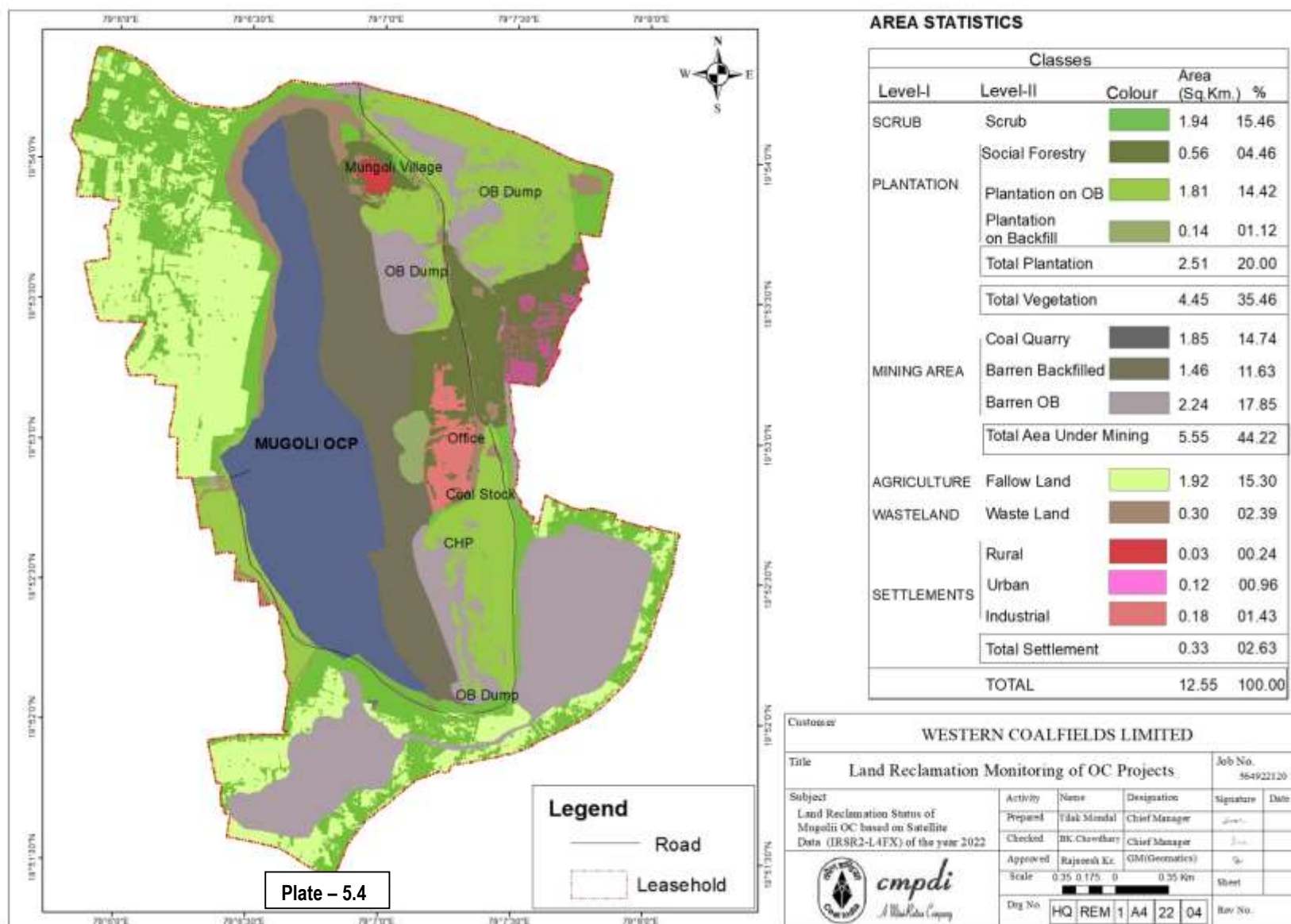
(Area in Sq.Km)

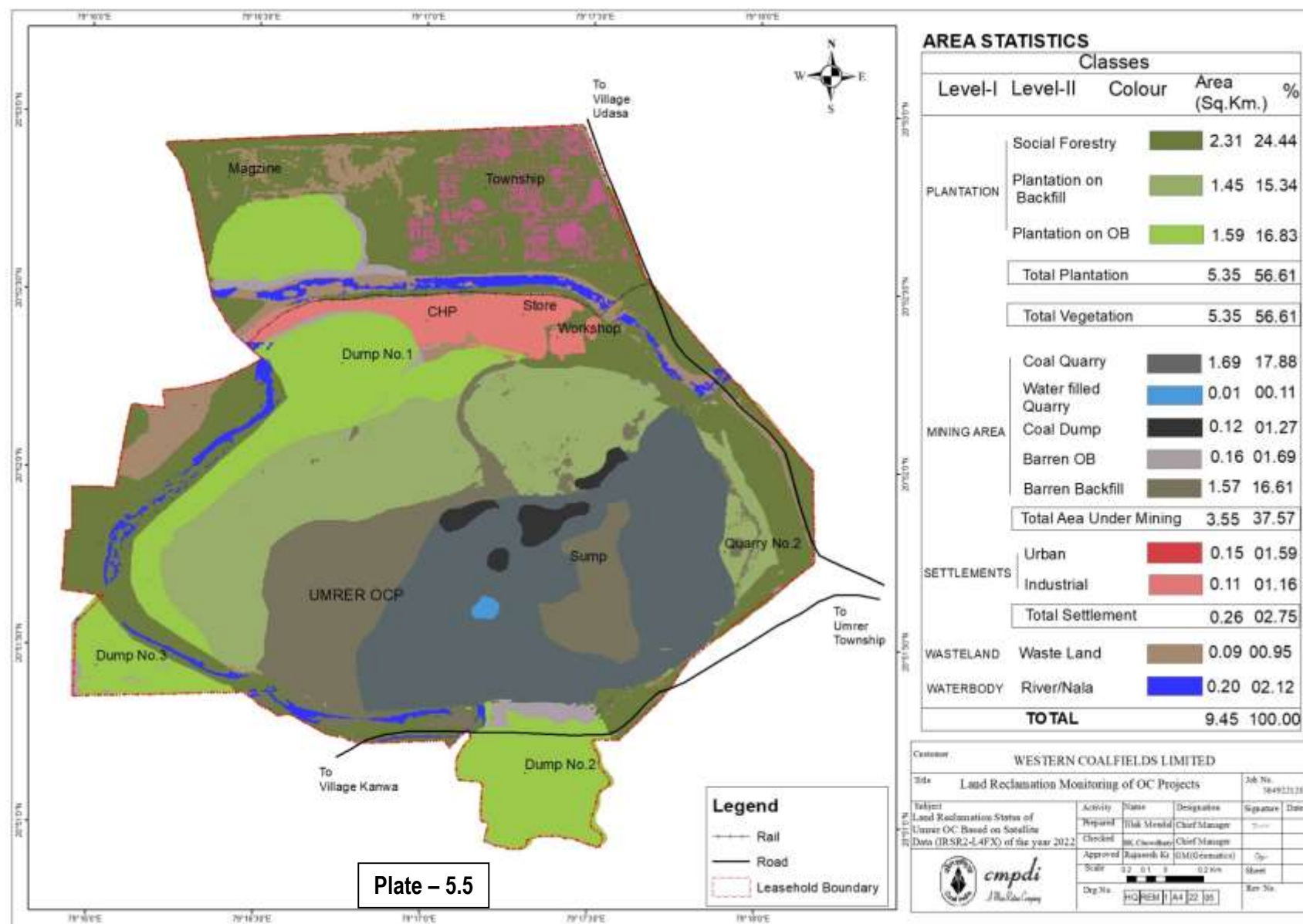
| | | | Sasti | | Padmapur | | Durgapur | | Mugoli | | Umrer | | Ukni | | Niljai | | New Majri | | MKD-III | | Penganga | | Yekona-I&II (Amal) | | MKD-I (Expn.) | | New Majri Ug to OC | | Pauni -II (Expn) | | Total | | |
|---------------------------------|---|---|-------|--------|----------|--------|----------|--------|--------|--------|-------|--------|-------|--------|--------|--------|-----------|--------|---------|--------|----------|--------|--------------------|--------|---------------|--------|--------------------|--------|------------------|--------|--------|--------|------|
| FORESTS | Dense Forest |  | Area | % | Area | % | Area | % | Area | % | Area | % | Area | % | Area | % | Area | % | Area | % | Area | % | Area | % | Area | % | Area | % | Area | % | Area | % | |
| | | | 0.00 | 0.00 | 0.00 | 0.00 | 1.27 | 8.19 | 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 | 1.27 | 0.84 |
| | | | 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 | |
| Total Forest | | | 0.00 | 0.00 | 0.00 | 0.00 | 1.27 | 8.19 | 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 | 1.27 | 0.84 | | |
| SCRUBS | Scrubs | | 0.66 | 7.17 | 0.69 | 8.32 | 0.57 | 3.68 | 1.94 | 15.46 | 0.00 | 0.00 | 1.94 | 15.10 | 1.56 | 8.86 | 0.05 | 0.65 | 0.56 | 6.07 | 1.22 | 16.49 | 2.58 | 15.37 | 0.82 | 13.36 | 0.85 | 12.09 | 1.07 | 9.77 | 14.51 | 9.63 | |
| | Social Forestry | | 0.67 | 7.28 | 0.83 | 10.01 | 1.19 | 7.68 | 0.56 | 4.46 | 2.31 | 24.47 | 0.86 | 6.69 | 1.23 | 6.98 | 1.47 | 18.99 | 0.07 | 0.76 | 0.49 | 6.62 | 0.03 | 0.18 | 0.00 | 0.00 | 0.37 | 5.26 | 0.18 | 1.64 | 10.26 | 6.81 | |
| PLANTATION | Plantation on OB Dump | | 1.70 | 18.48 | 2.14 | 25.81 | 2.72 | 17.55 | 1.81 | 14.42 | 1.45 | 15.36 | 1.66 | 12.92 | 2.04 | 11.58 | 1.24 | 16.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.10 | 1.63 | 0.00 | 0.00 | 0.13 | 1.19 | 14.99 | 9.95 | | |
| | Plantation on Backfill (Biological Reclamation) | | 0.83 | 9.02 | 0.28 | 3.38 | 0.93 | 6.00 | 0.14 | 1.12 | 1.58 | 16.74 | 0.00 | 0.00 | 0.11 | 0.62 | 0.36 | 4.65 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.23 | 2.81 | | |
| | Total Plantation | | 3.20 | 34.78 | 3.25 | 39.20 | 4.84 | 31.23 | 2.51 | 20.00 | 5.34 | 56.57 | 2.52 | 19.61 | 3.38 | 19.19 | 3.07 | 39.66 | 0.07 | 0.76 | 0.49 | 6.62 | 0.03 | 0.18 | 0.10 | 1.63 | 0.37 | 5.26 | 0.31 | 2.83 | 29.48 | 19.56 | |
| | Total Vegetation | | 3.86 | 41.96 | 3.94 | 47.53 | 6.68 | 43.10 | 4.45 | 35.46 | 5.34 | 56.57 | 4.46 | 34.71 | 4.94 | 28.05 | 3.12 | 40.31 | 0.63 | 6.83 | 1.71 | 23.11 | 2.61 | 15.54 | 0.92 | 14.98 | 1.22 | 17.35 | 1.38 | 12.60 | 45.26 | 30.03 | |
| ACTIVE MINING | Coal Quarry | | 0.35 | 3.80 | 0.97 | 11.70 | 2.03 | 13.10 | 1.85 | 14.74 | 1.60 | 16.95 | 1.73 | 13.46 | 2.52 | 14.31 | 1.98 | 25.58 | 1.01 | 10.94 | 0.90 | 12.16 | 0.94 | 5.60 | 1.30 | 21.17 | 1.03 | 14.65 | 0.84 | 7.67 | 19.05 | 12.64 | |
| | Coal Dump | | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.32 | 0.00 | 0.00 | 0.12 | 1.27 | 0.10 | 0.78 | 0.11 | 0.62 | 0.00 | 0.00 | 0.00 | 0.00 | 0.23 | 3.11 | 0.17 | 1.01 | 0.00 | 0.00 | 0.03 | 0.43 | 0.16 | 1.46 | 0.97 | 0.64 | |
| | Advance Quarry Site | | 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 | 0.16 | 1.46 | 0.16 | 0.11 | | |
| | Quarry Filled With Water | | 0.00 | 0.00 | 0.21 | 2.53 | 0.45 | 2.90 | 0.00 | 0.00 | 0.01 | 0.11 | 0.11 | 0.86 | 0.21 | 1.19 | 0.12 | 1.55 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.04 | 0.65 | 0.00 | 0.00 | 0.01 | 0.09 | 1.16 | 0.77 | | |
| | Total Area under Active Mining | | 0.35 | 3.80 | 1.18 | 14.23 | 2.53 | 16.32 | 1.85 | 14.74 | 1.72 | 18.33 | 1.94 | 15.10 | 2.84 | 16.13 | 2.10 | 27.13 | 1.01 | 10.94 | 0.90 | 15.27 | 1.11 | 6.61 | 1.34 | 21.82 | 1.03 | 15.08 | 1.17 | 10.68 | 21.07 | 13.98 | |
| RECLAIMED | Barren OB Dump | | 0.78 | 8.48 | 1.75 | 21.11 | 1.50 | 9.68 | 2.24 | 17.85 | 0.15 | 1.59 | 3.21 | 24.98 | 3.80 | 21.58 | 0.47 | 6.07 | 2.58 | 27.95 | 1.66 | 22.43 | 0.84 | 5.00 | 0.24 | 3.91 | 1.02 | 14.51 | 2.64 | 24.11 | 22.88 | 15.18 | |
| | Barren Backfilled Area (Technical Reclamation) | | 2.62 | 28.48 | 0.59 | 7.12 | 1.17 | 7.55 | 1.46 | 11.63 | 1.50 | 15.89 | 0.52 | 4.05 | 1.44 | 8.18 | 1.52 | 19.64 | 0.37 | 4.01 | 0.67 | 9.05 | 0.01 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 11.87 | 7.88 | | |
| | Total Area | | 3.40 | 36.96 | 2.34 | 28.23 | 2.67 | 17.23 | 3.70 | 29.48 | 1.65 | 17.48 | 3.73 | 29.03 | 5.24 | 29.76 | 1.99 | 25.71 | 2.95 | 31.96 | 2.33 | 31.49 | 0.85 | 5.06 | 0.24 | 3.91 | 1.02 | 14.51 | 2.64 | 24.11 | 34.75 | 23.06 | |
| Total Area Under Mine Operation | | 3.75 | 40.76 | 3.52 | 42.46 | 5.20 | 33.55 | 5.55 | 44.22 | 3.37 | 35.81 | 5.67 | 44.12 | 8.08 | 45.88 | 4.09 | 52.84 | 3.96 | 42.90 | 3.23 | 46.76 | 1.96 | 11.67 | 1.58 | 25.73 | 2.05 | 29.59 | 3.81 | 34.79 | 55.82 | 37.04 | | |
| WASTELANDS | Waste Lands | | 0.92 | 10.00 | 0.42 | 5.07 | 1.39 | 8.97 | 0.30 | 2.39 | 0.27 | 2.86 | 1.02 | 7.94 | 1.55 | 8.80 | 0.14 | 1.81 | 0.70 | 7.58 | 1.54 | 20.81 | 1.21 | 7.21 | 0.33 | 5.37 | 0.41 | 5.83 | 0.46 | 4.20 | 10.66 | 7.07 | |
| | Fly Ash Pond / Sand Body | | 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 | 0.06 | 0.98 | 0.05 | 0.71 | 0.15 | 1.37 | 0.26 | 0.17 | | |
| WATERBODIES | Total Wasteland | | 0.91 | 10.00 | 0.42 | 5.07 | 1.39 | 8.97 | 0.30 | 2.39 | 0.27 | 2.86 | 1.02 | 7.94 | 1.55 | 8.80 | 0.14 | 1.81 | 0.70 | 7.58 | 1.54 | 20.81 | 1.21 | 7.21 | 0.39 | 6.35 | 0.46 | 6.54 | 0.61 | 5.57 | 10.91 | 7.24 | |
| | Reservoir, nallah, ponds | | 0.06 | 0.65 | 0.12 | 1.45 | 0.05 | 0.32 | 0.00 | 0.00 | 0.20 | 2.12 | 0.00 | 0.00 | 0.03 | 0.17 | 0.01 | 0.13 | 0.03 | 0.33 | 0.11 | 1.49 | 0.12 | 0.71 | 0.04 | 0.65 | 0.03 | 0.43 | 0.33 | 3.01 | 1.13 | 0.75 | |
| | Total Waterbodies | | 0.06 | 0.65 | 0.12 | 1.45 | 0.05 | 0.32 | 0.00 | 0.00 | 0.20 | 2.12 | 0.00 | 0.00 | 0.03 | 0.17 | 0.01 | 0.13 | 0.03 | 0.33 | 0.11 | 1.49 | 0.12 | 0.71 | 0.04 | 0.65 | 0.03 | 0.43 | 0.33 | 3.01 | 1.13 | 0.75 | |
| AGRICULTURE | Crop Lands | | 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 | 0.85 | 9.21 | 0.00 | 0.00 | 4.76 | 28.35 | 0.68 | 11.07 | 0.94 | 13.37 | 0.51 | 4.66 | 7.74 | 5.14 | | |
| | Fallow Lands | | 0.00 | 0.00 | 0.00 | 0.00 | 1.59 | 10.26 | 1.92 | 15.30 | 0.00 | 0.00 | 1.50 | 11.67 | 1.98 | 11.24 | 0.00 | 0.00 | 2.85 | 30.88 | 0.66 | 8.92 | 6.08 | 36.21 | 2.52 | 41.04 | 2.25 | 32.01 | 4.22 | 38.54 | 25.57 | 16.97 | |
| | Total Agriculture | | 0.00 | 0.00 | 0.00 | 0.00 | 1.59 | 10.26 | 1.92 | 15.30 | 0.00 | 0.00 | 1.50 | 11.67 | 1.98 | 11.24 | 0.00 | 0.00 | 3.70 | 40.09 | 0.66 | 8.92 | 10.84 | 64.56 | 3.20 | 52.12 | 3.19 | 45.38 | 4.73 | 43.20 | 33.31 | 22.10 | |
| SETTLEMENTS | Urban Settlement | | 0.09 | 0.98 | 0.00 | 0.00 | 0.39 | 2.52 | 0.12 | 0.96 | 0.15 | 1.59 | 0.00 | 0.00 | 0.34 | 1.93 | 0.34 | 4.39 | 0.00 | 0.00 | 0.00 | 0.01 | 0.06 | 0.01 | 0.16 | 0.07 | 1.00 | 0.02 | 0.18 | 1.54 | 1.02 | | |
| | Rural Settlement | | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.32 | 0.03 | 0.24 | 0.00 | 0.00 | 0.02 | 0.16 | 0.20 | 1.14 | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.41 | 0.03 | 0.18 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.36 | 0.24 | | |
| | Industrial Settlement | | 0.52 | 5.65 | 0.29 | 3.50 | 0.15 | 0.97 | 0.18 | 1.43 | 0.11 | 1.17 | 0.18 | 1.40 | 0.49 | 2.78 | 0.04 | 0.52 | 0.21 | 2.28 | 0.12 | 1.62 | 0.01 | 0.06 | 0.00 | 0.00 | 0.01 | 0.14 | 0.07 | 0.64 | 2.38 | 1.58 | |
| | Total Settlement | | 0.61 | 6.63 | 0.29 | 3.50 | 0.59 | 3.81 | 0.33 | 2.63 | 0.26 | 2.75 | 0.20 | 1.56 | 1.03 | 5.85 | 0.38 | 4.91 | 0.21 | 2.28 | 0.15 | 2.03 | 0.05 | 0.30 | 0.01 | 0.16 | 0.08 | 1.14 | 0.09 | 0.82 | 4.28 | 2.84 | |
| Grand Total | | | 9.20 | 100.00 | 8.29 | 100.00 | 15.50 | 100.00 | 12.55 | 100.00 | 9.44 | 100.11 | 12.85 | 100.00 | 17.61 | 100.00 | 7.74 | 100.00 | 9.23 | 100.00 | 7.40 | 103.11 | 16.79 | 100.00 | 6.14 | 100.00 | 7.03 | 100.43 | 10.95 | 100.00 | 150.71 | 100.00 | |

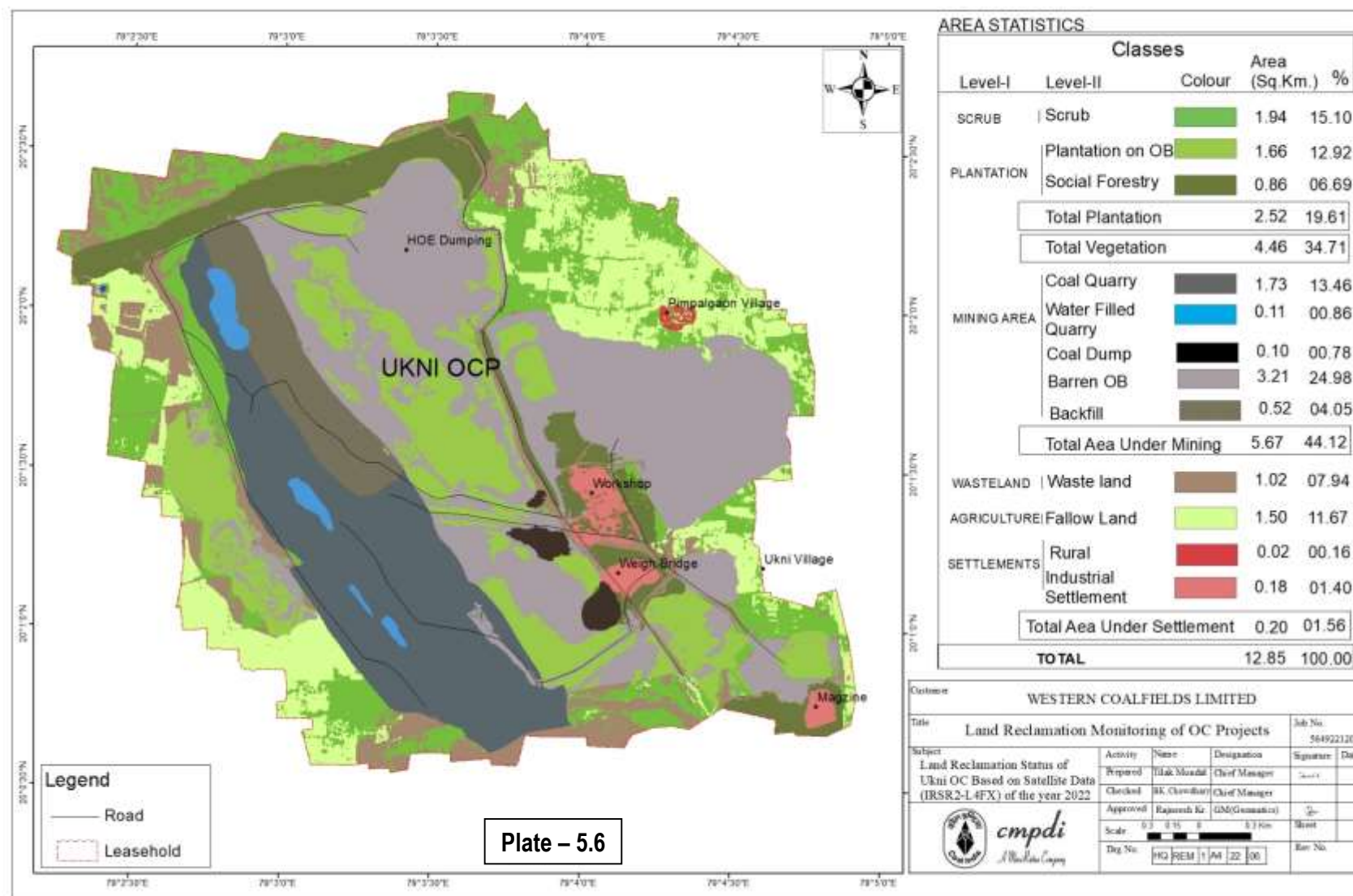


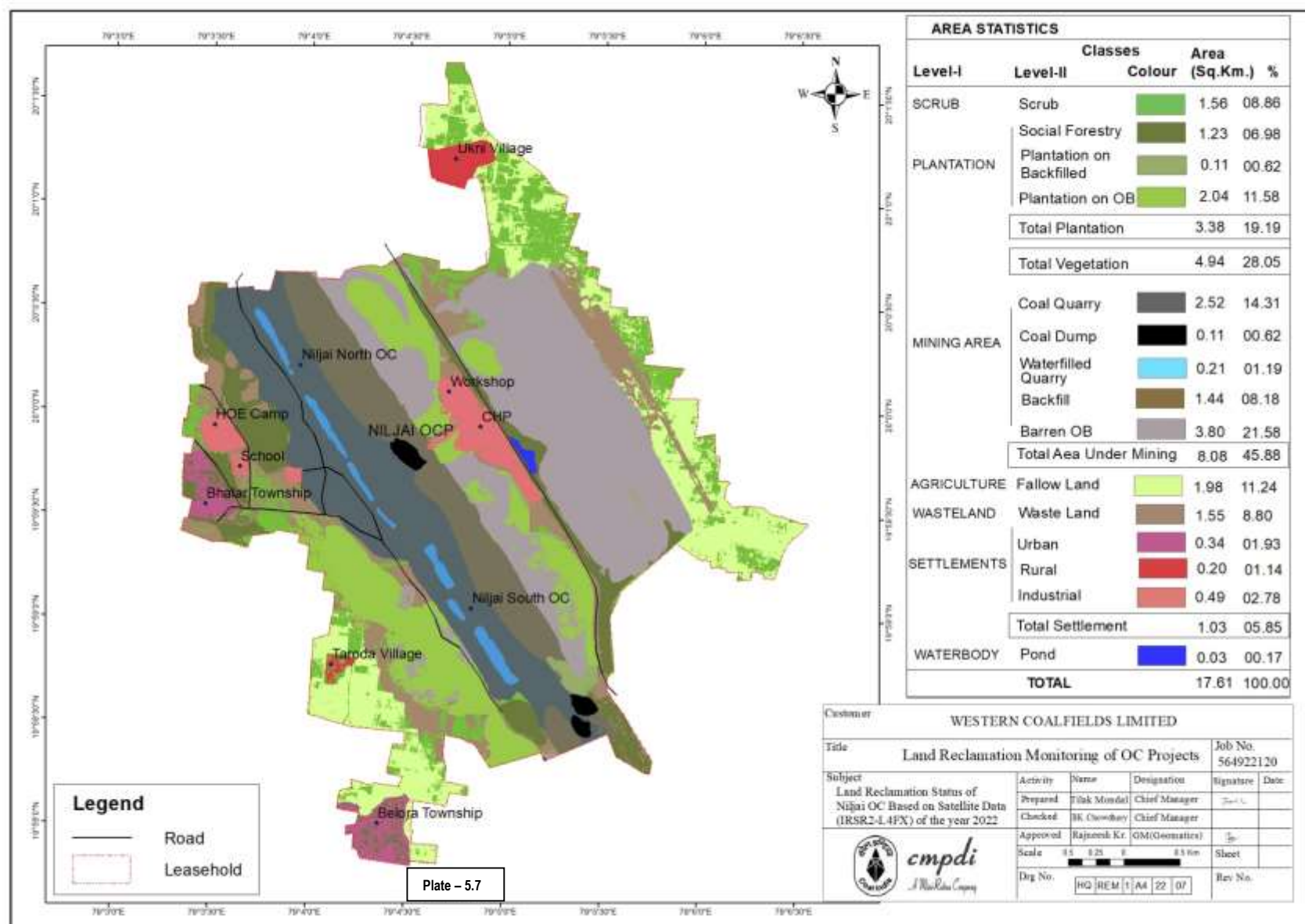














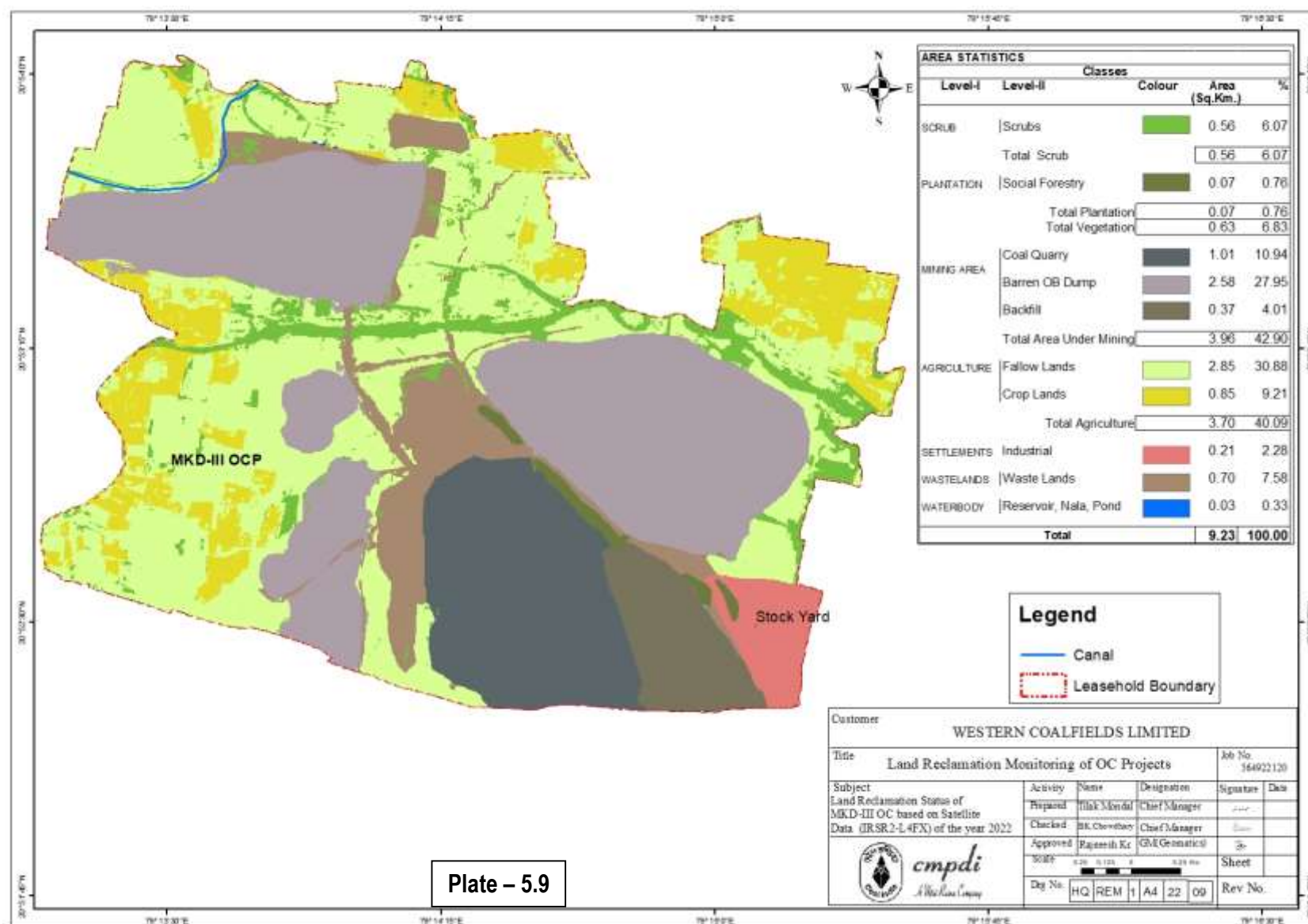
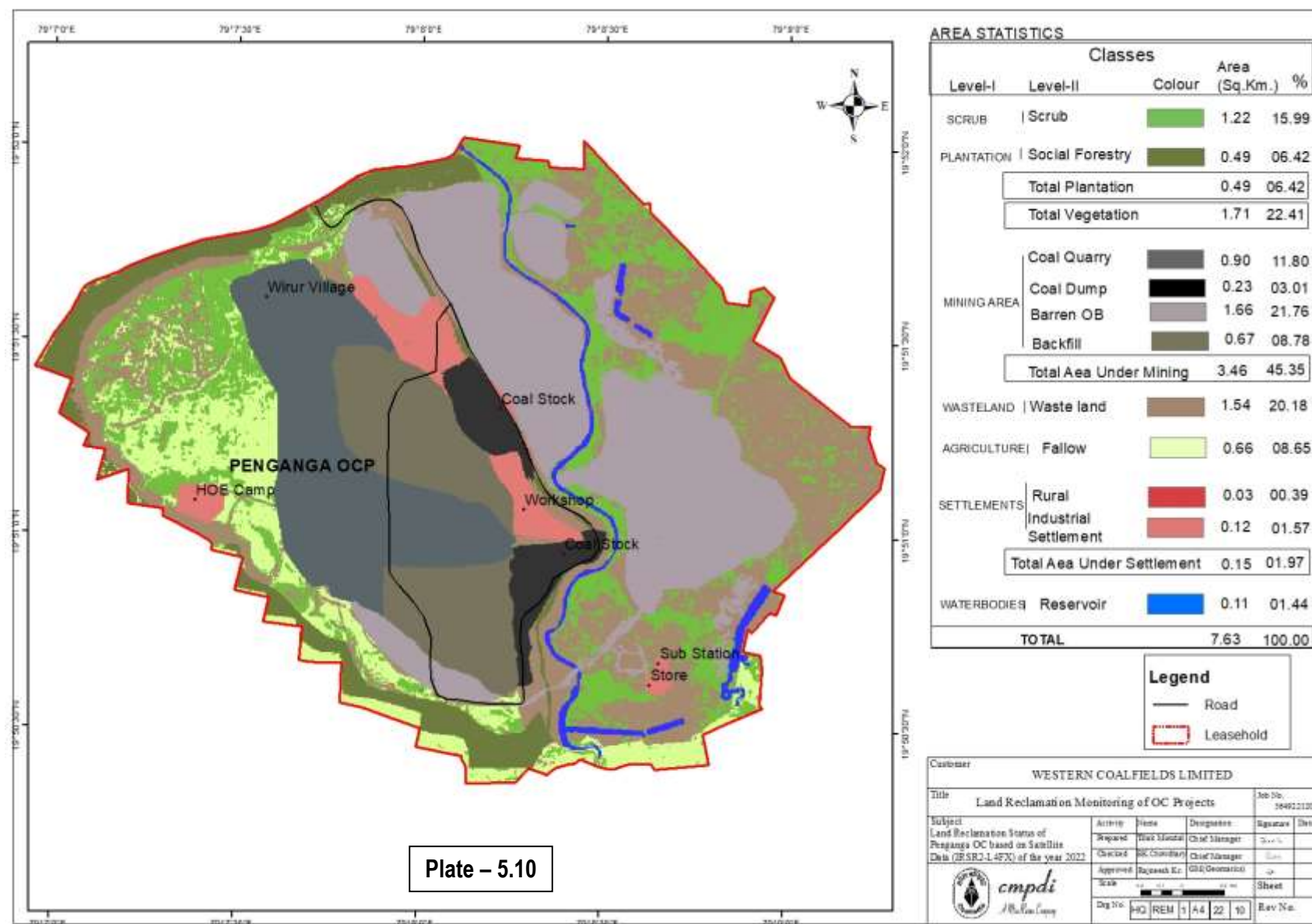
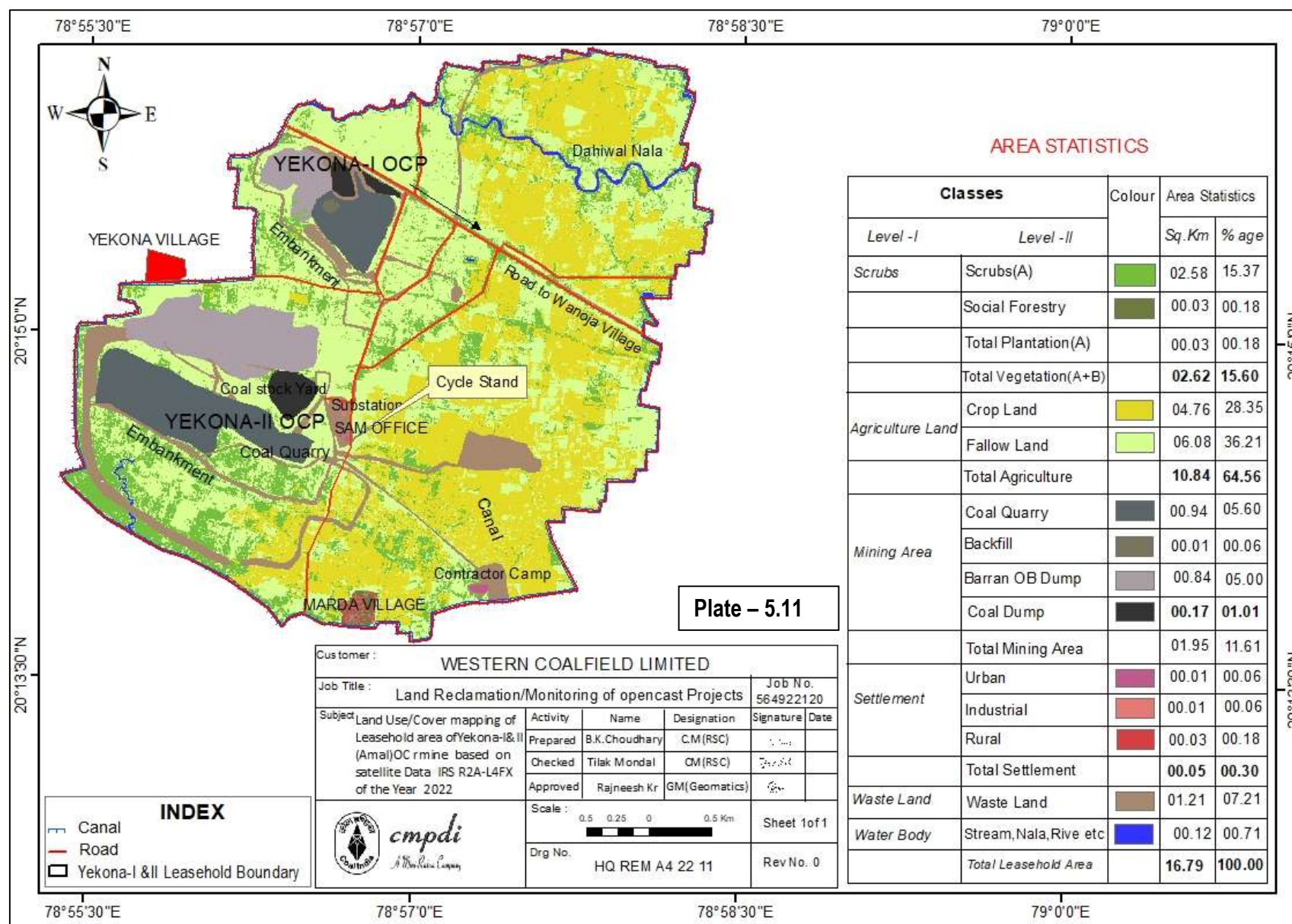
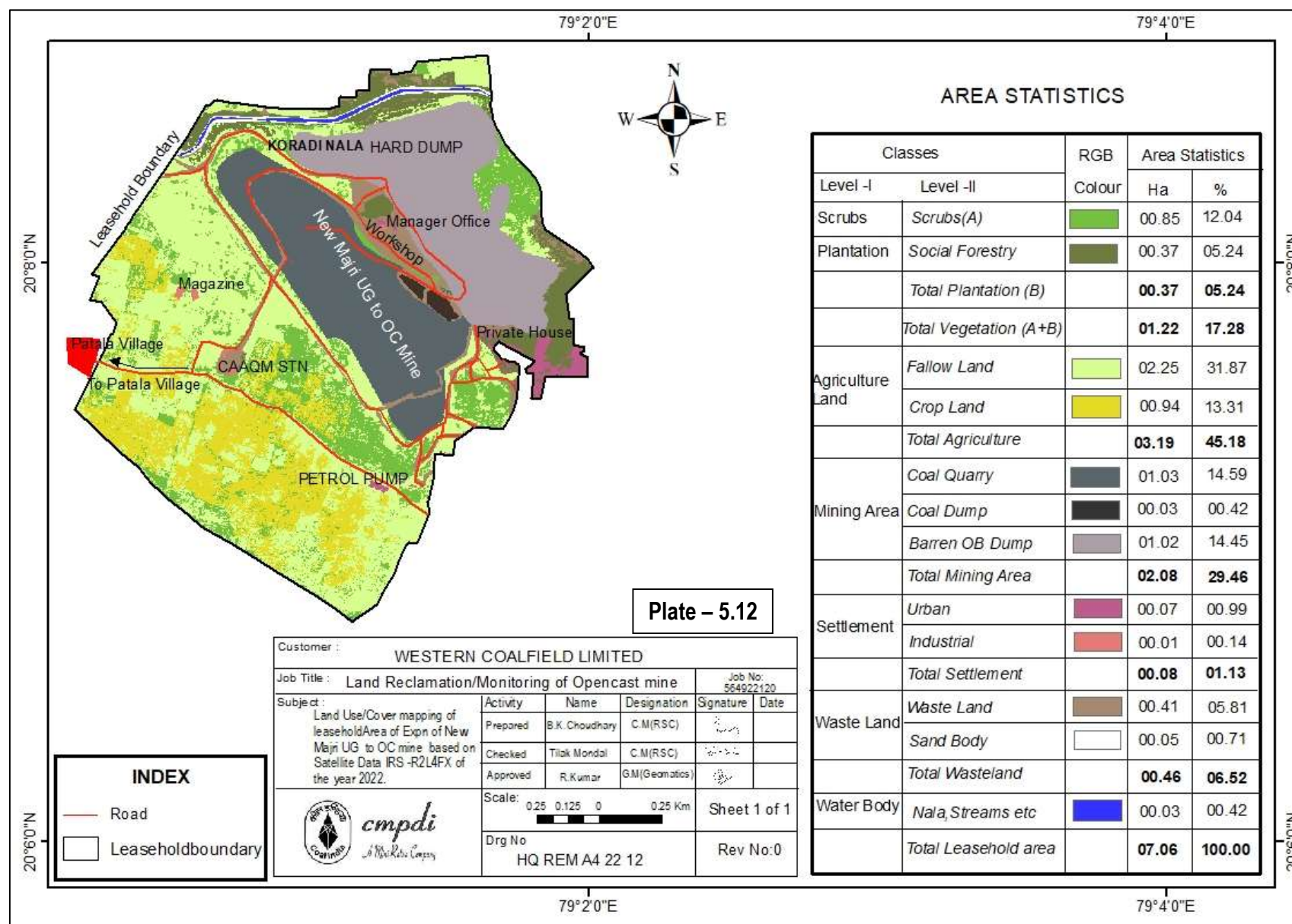
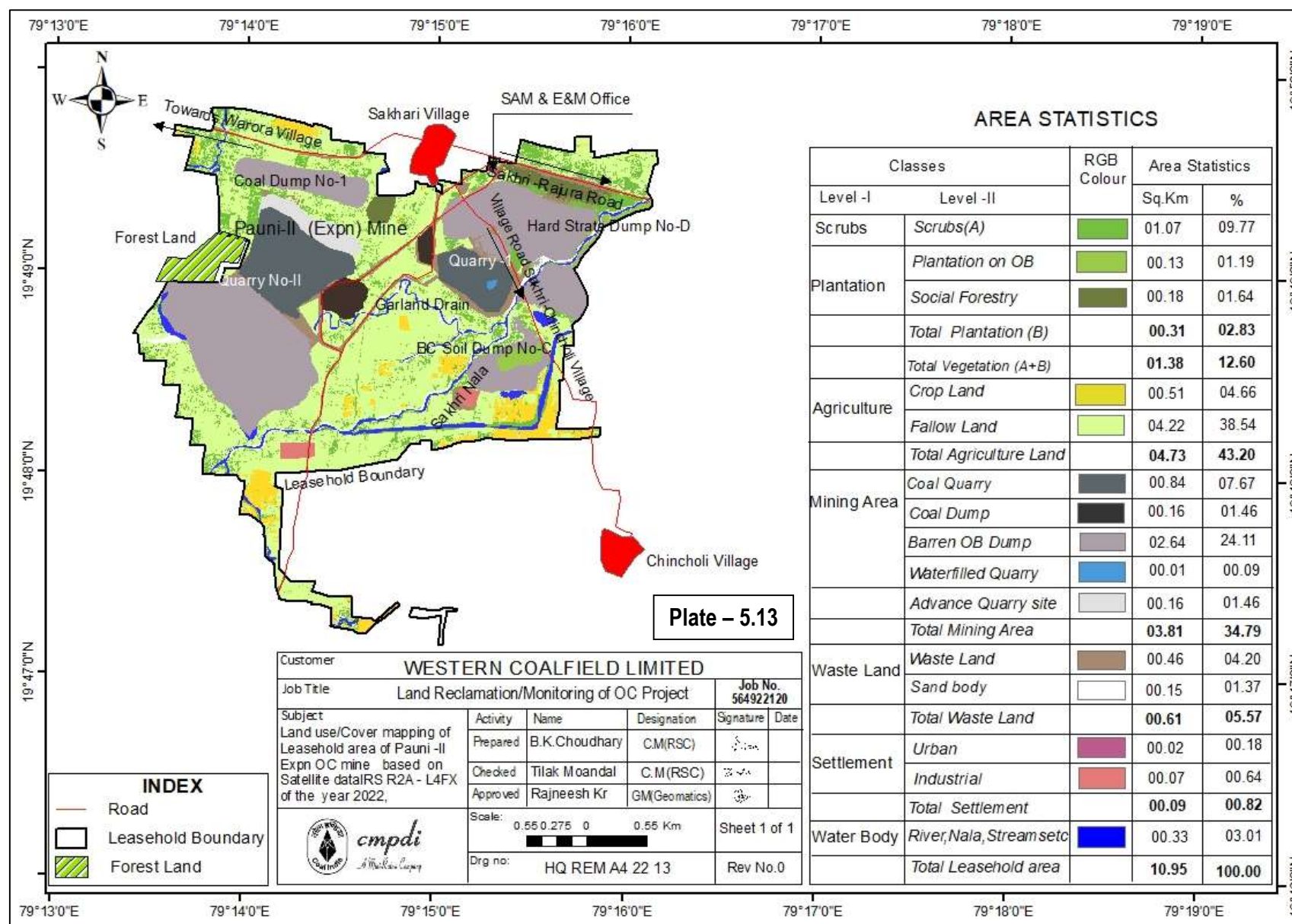


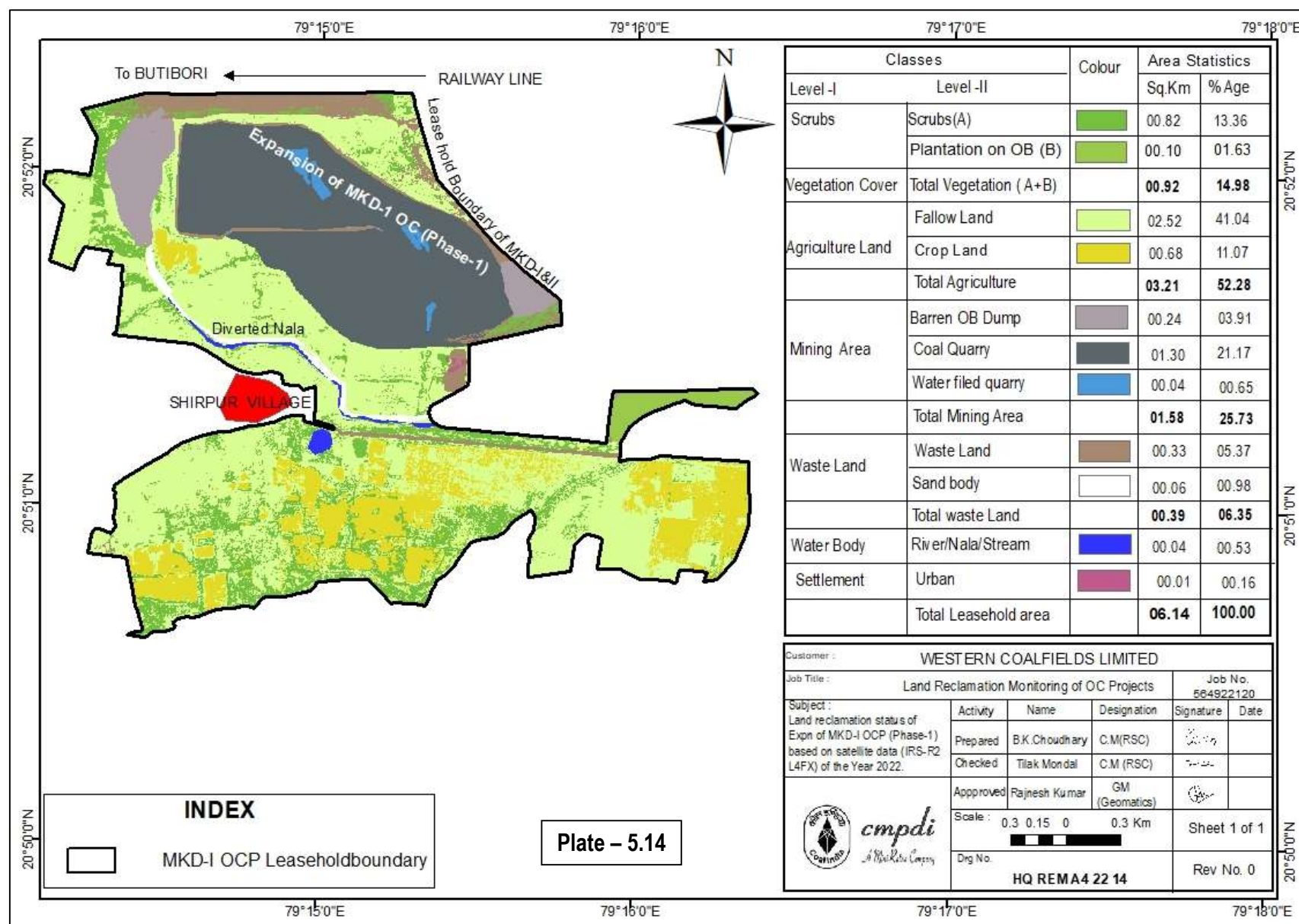
Plate – 5.9











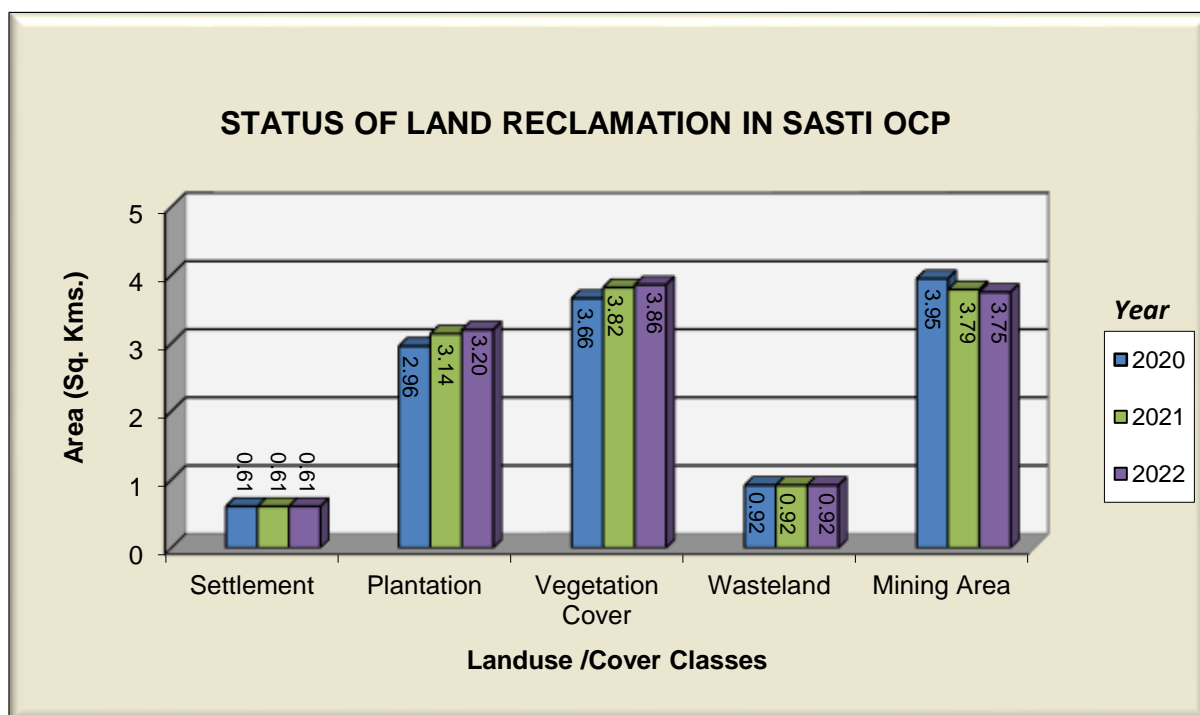


Figure - 5.2

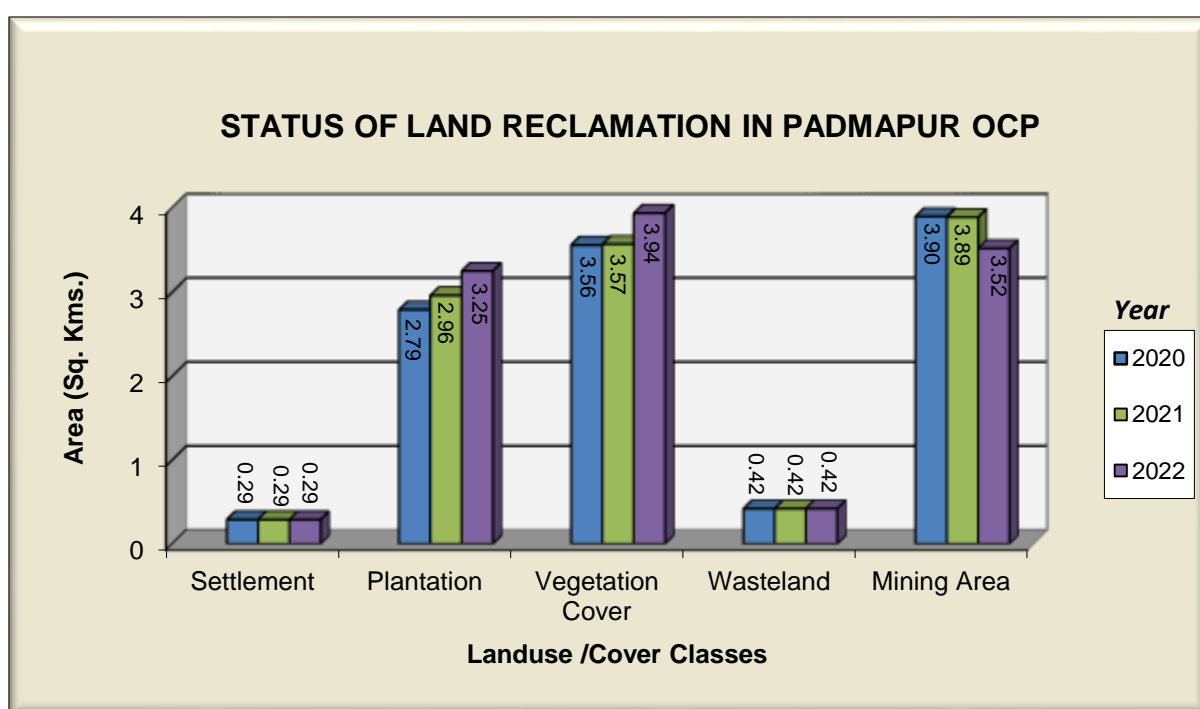


Figure - 5.3

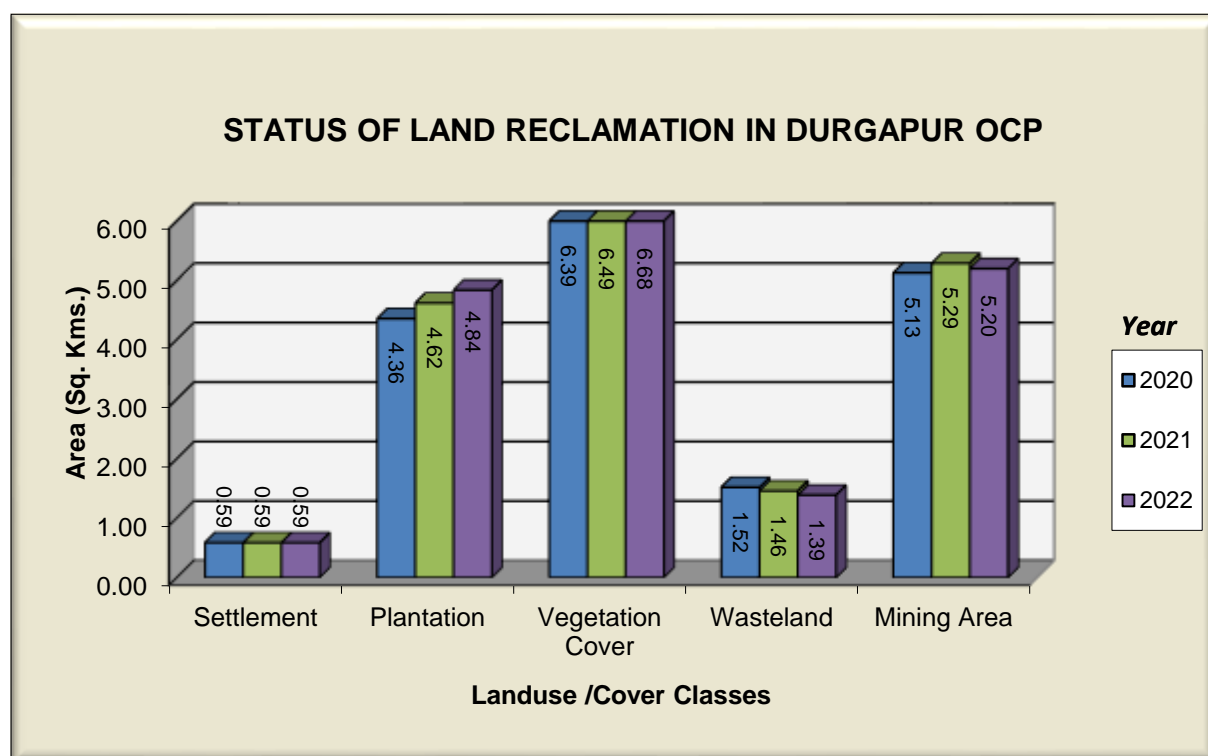


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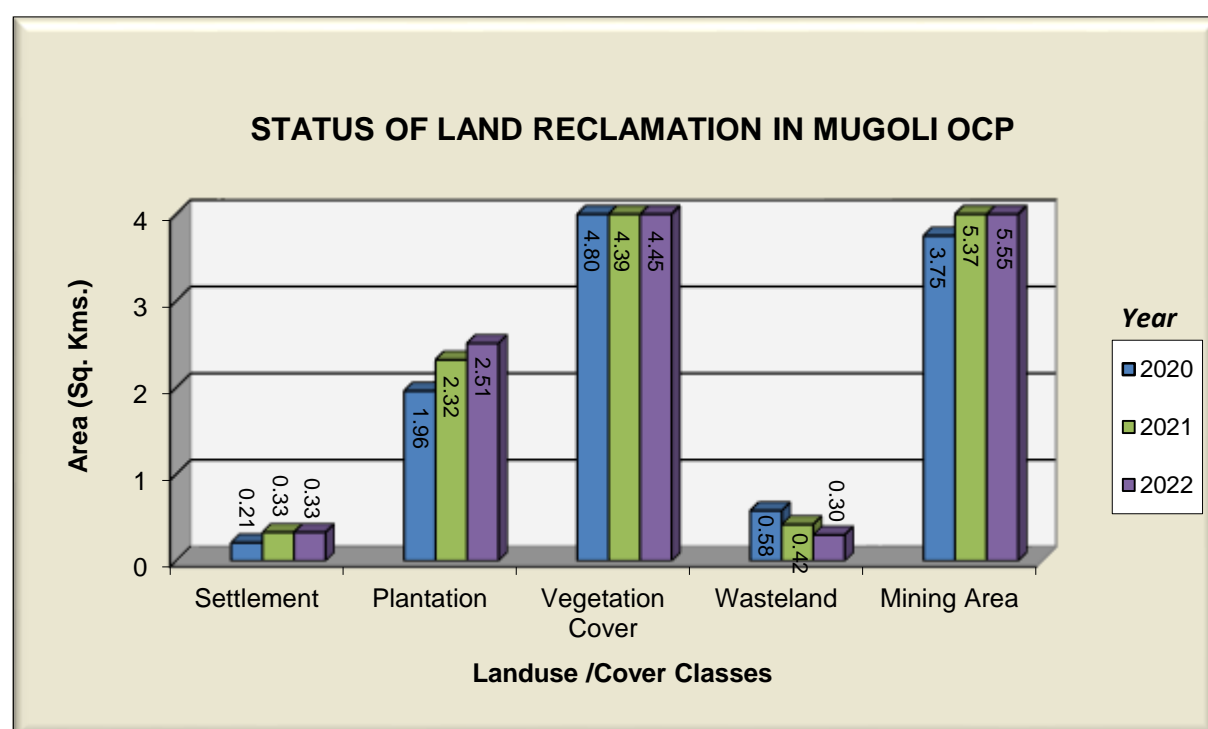


Figure - 5.5

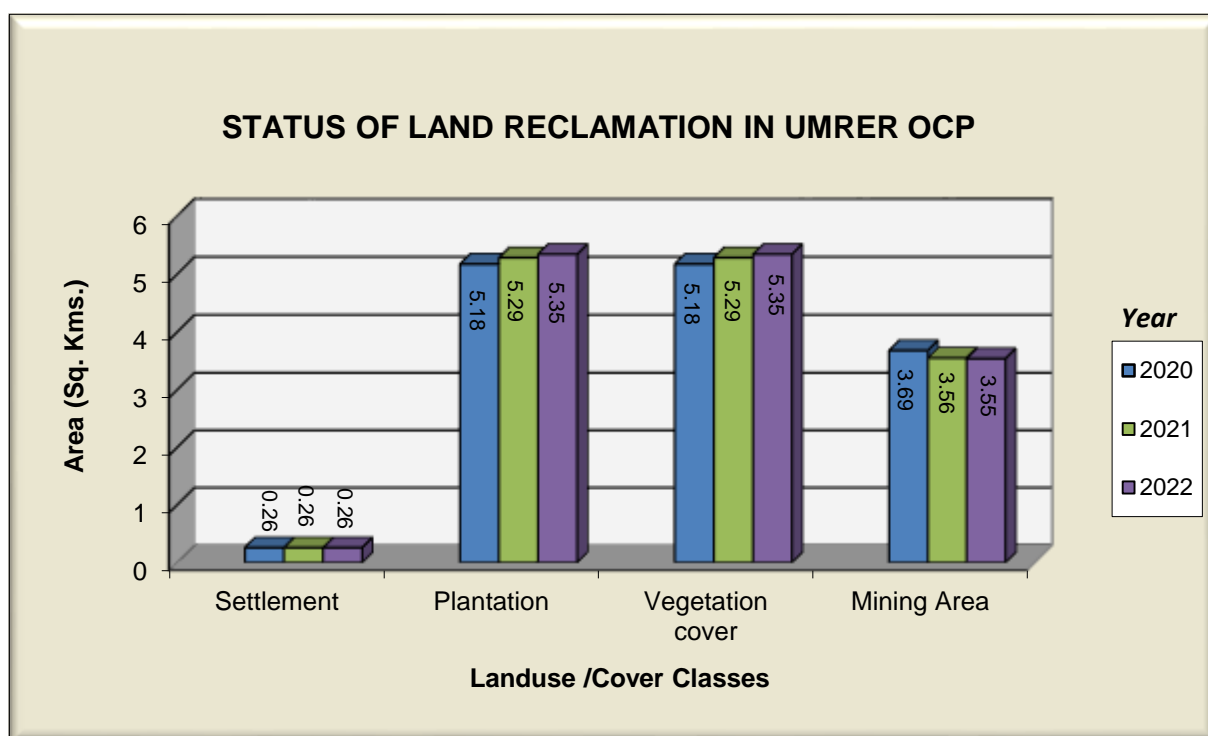


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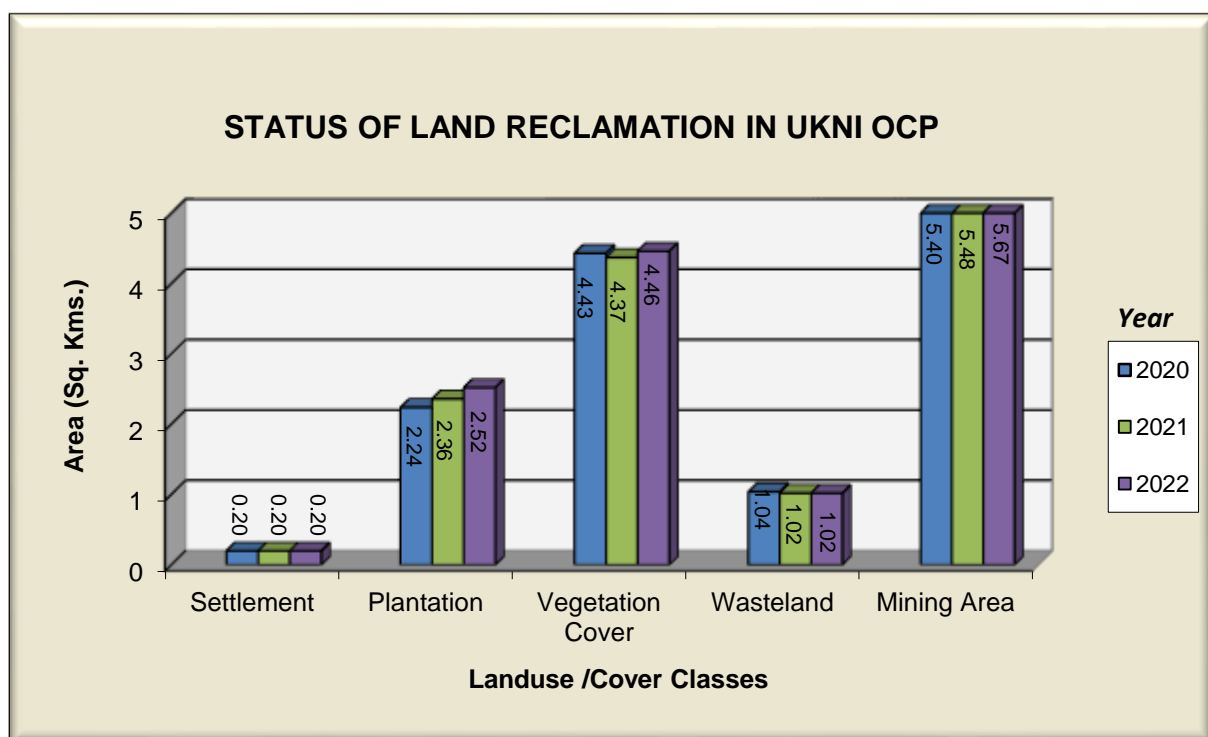


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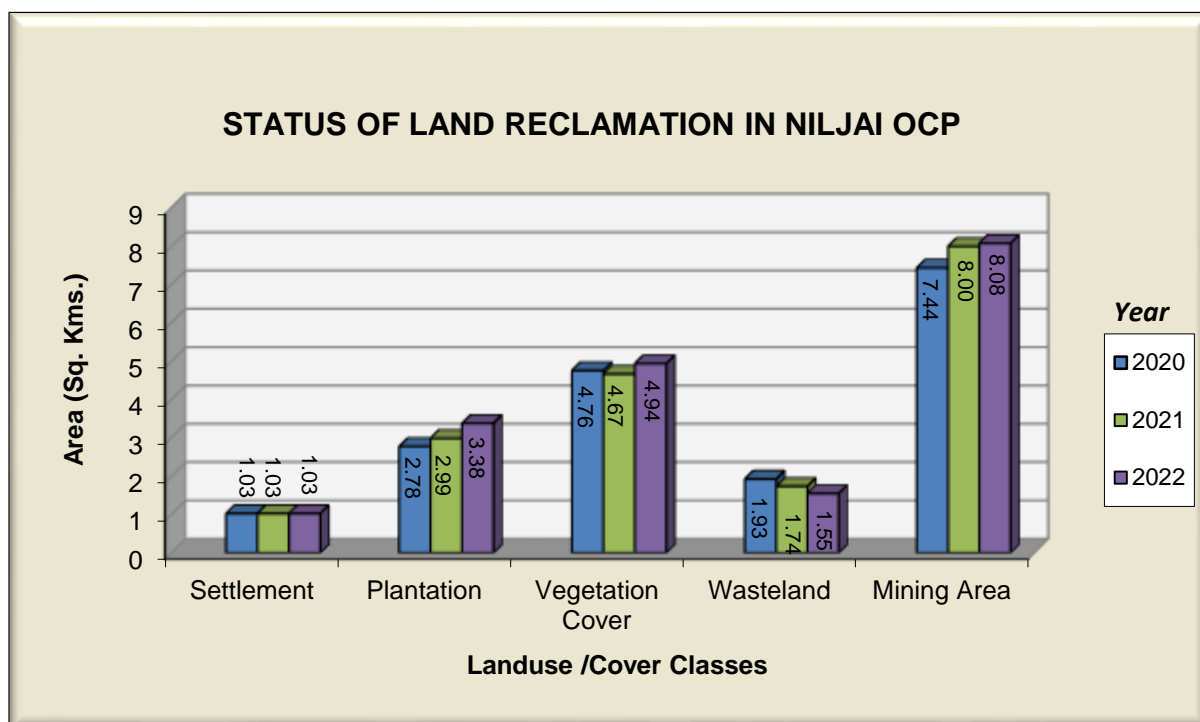


Figure - 5.8

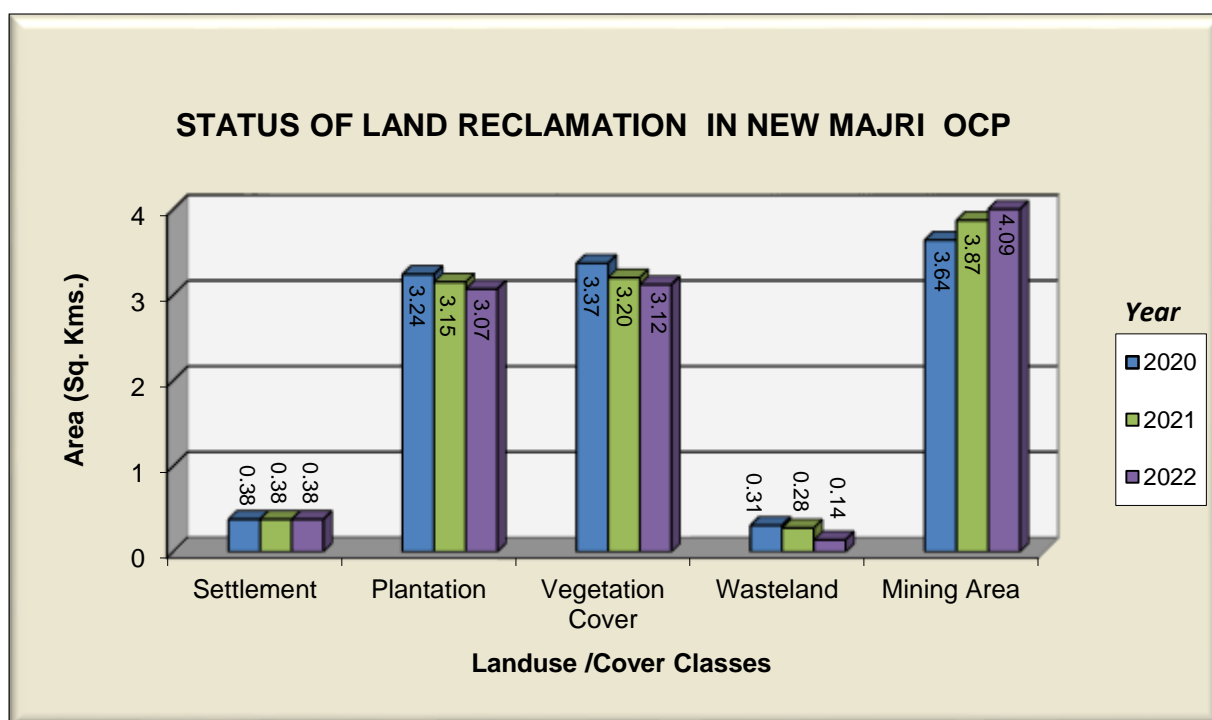


Figure - 5.9

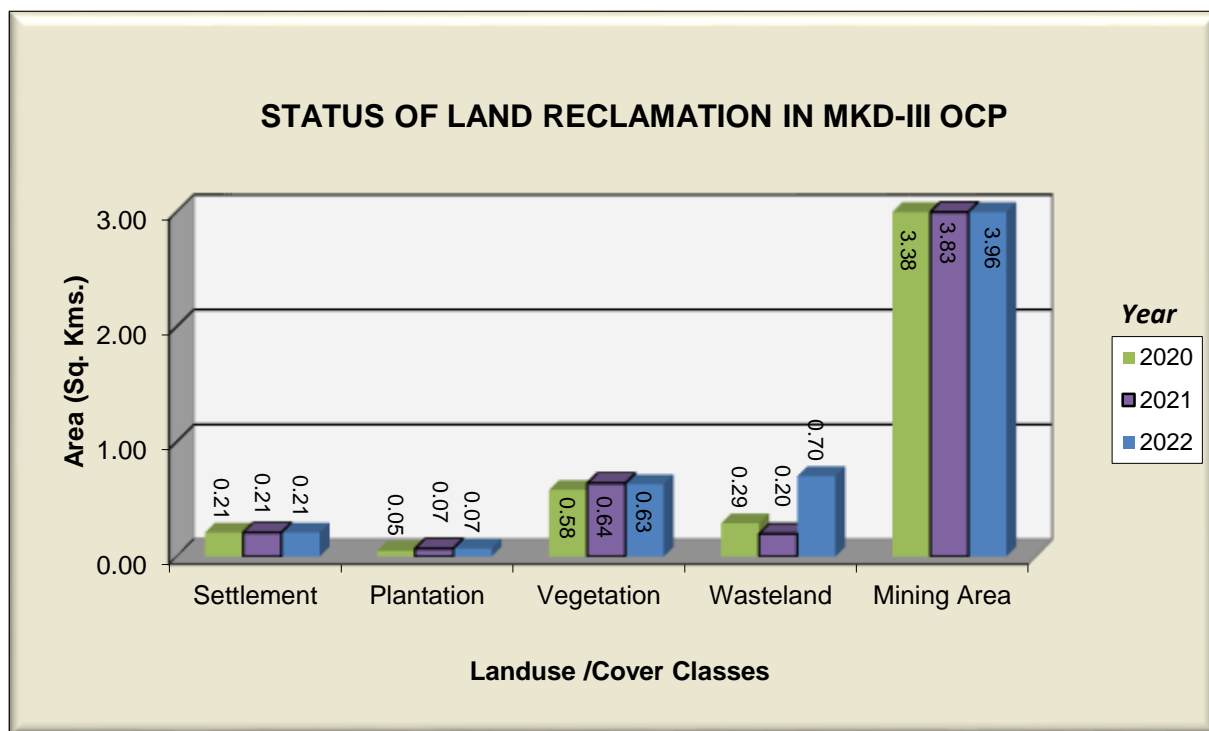


Figure – 5.10

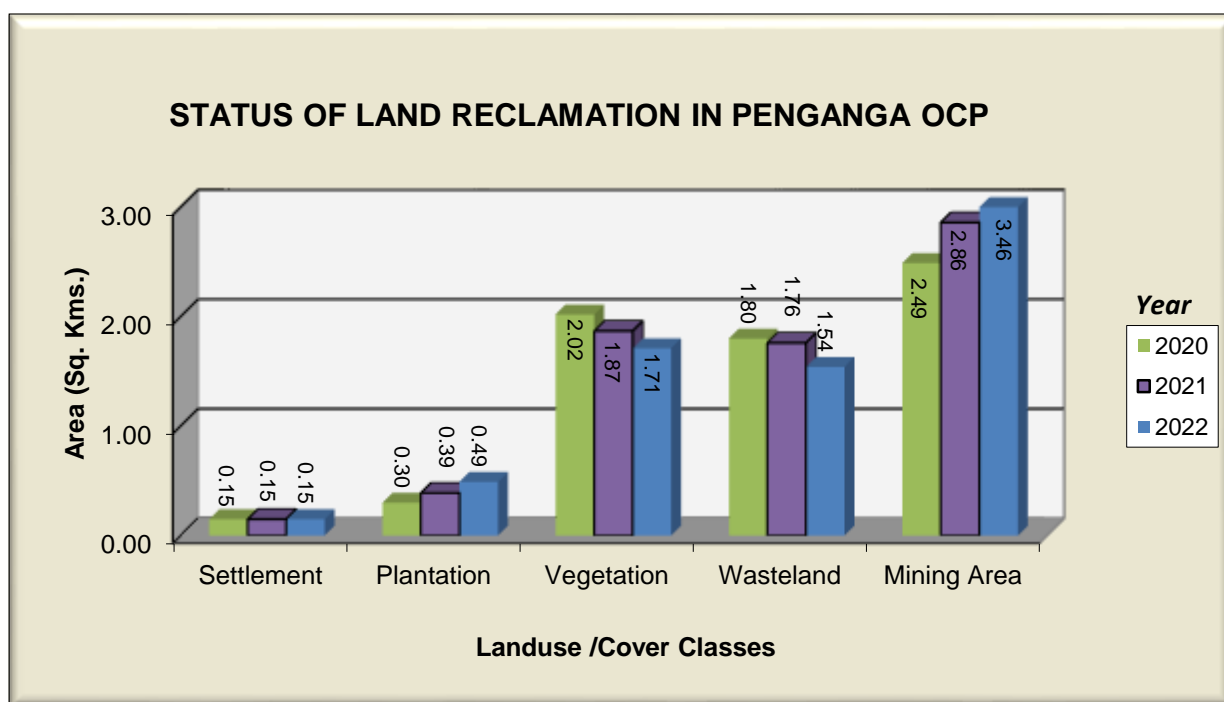


Figure - 5.11

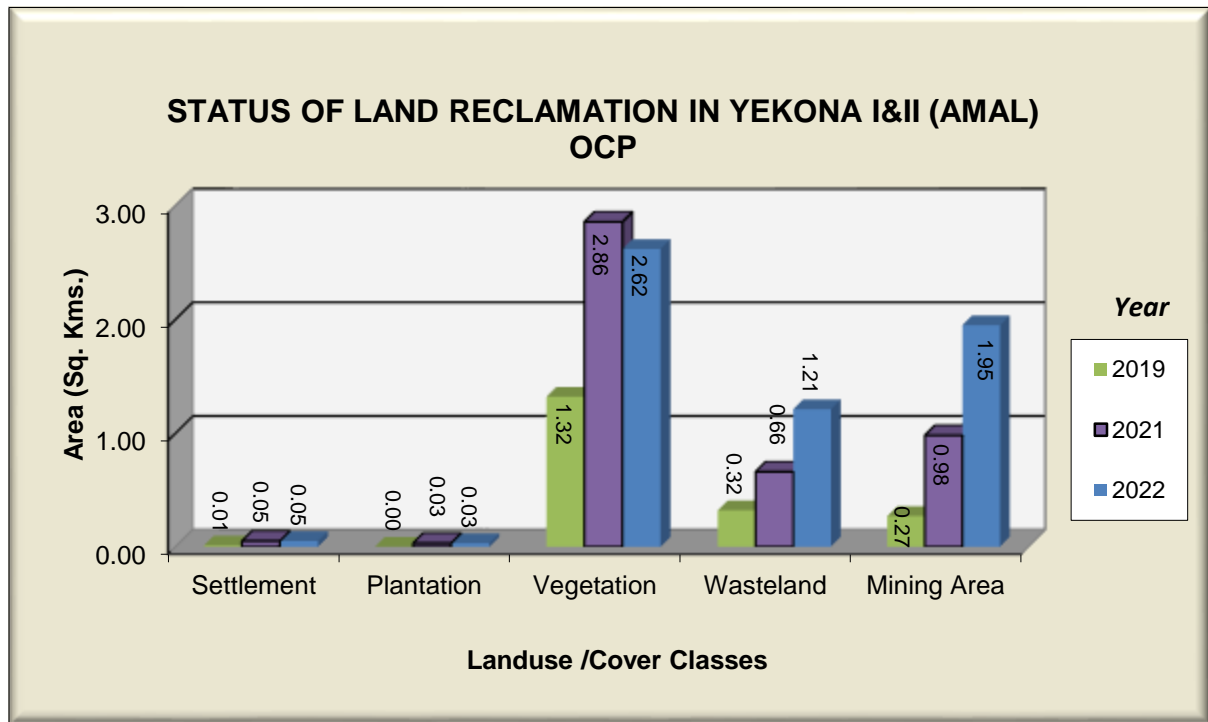


Figure - 5.12

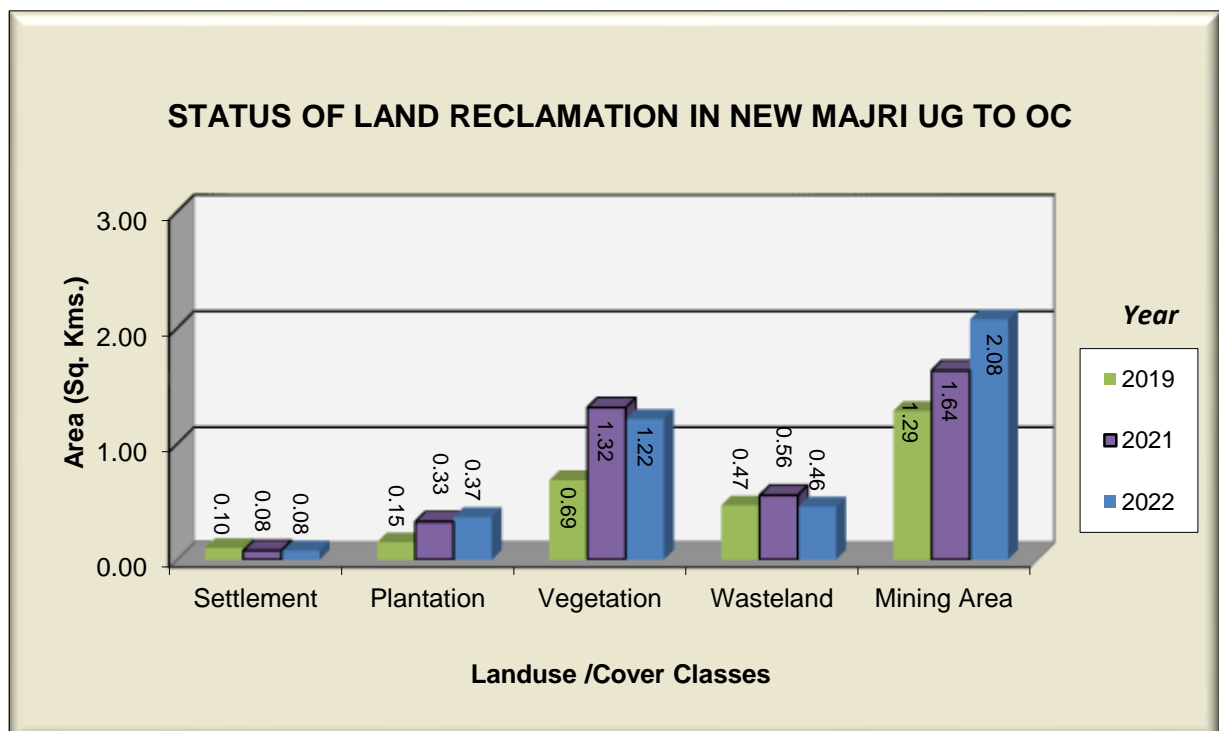


Figure - 5.13

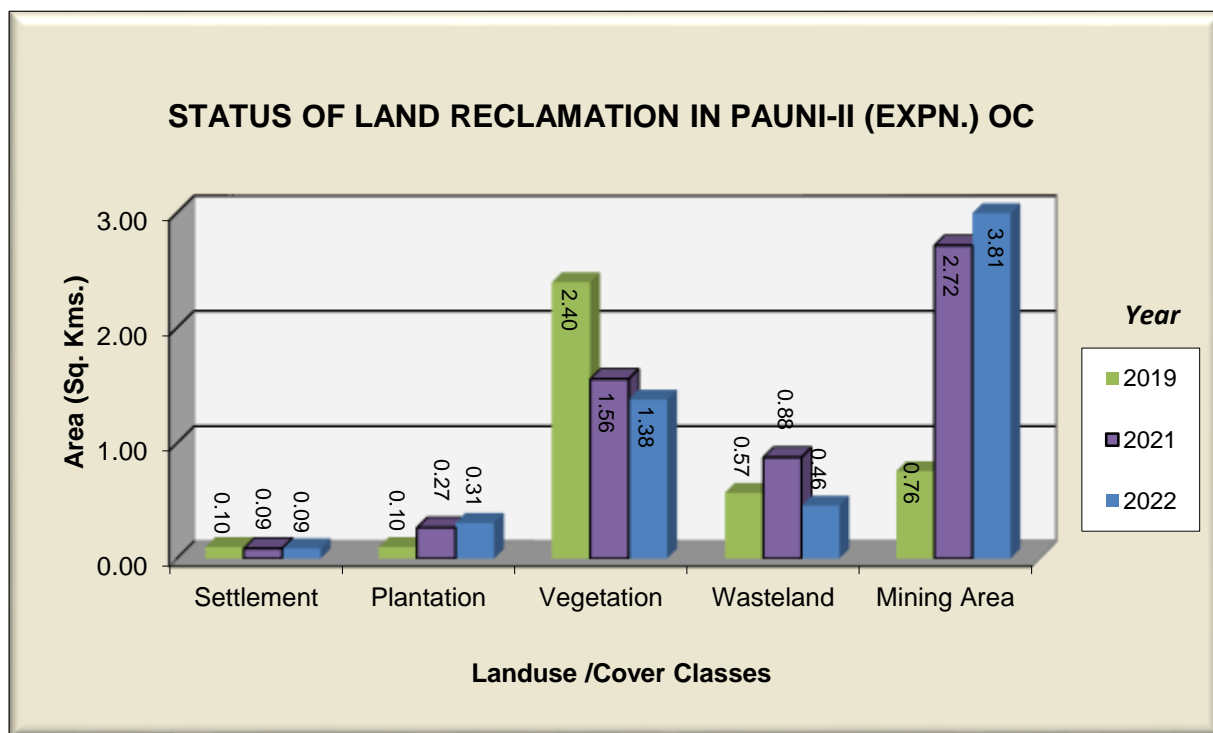


Figure - 5.14

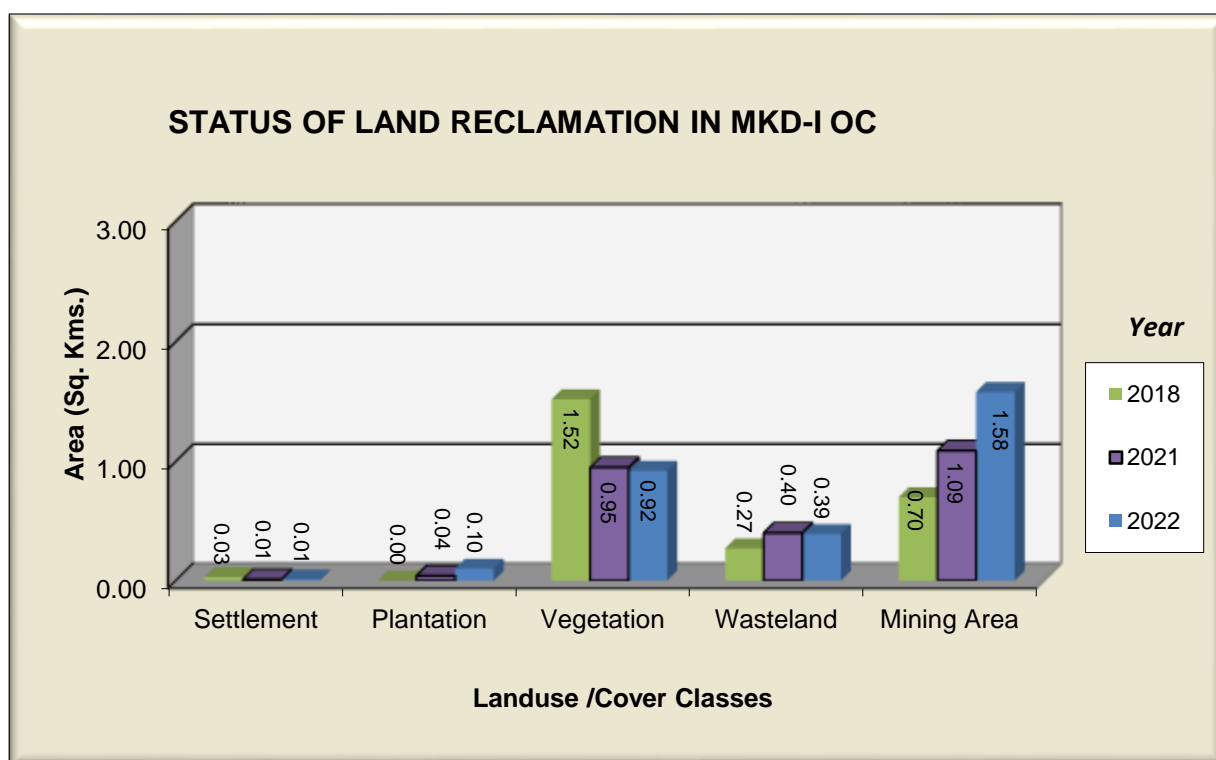


Figure - 5.15



Photograph -5.1: **Plantation on Internal OB/Backfill (Sasti OCP)**



Photograph – 5.2: **Plantation on External OB dump (Padmapur OCP)**



Photograph – 5.3: **Plantation on External OB dump of (Durgapur OCP)**



Photograph – 5.4: **Plantation on Embankment (Mugoli OCP)**



Photograph – 5.5: Plantation on External OB Dump in Umrer OCP



Photograph – 5.6: Social Forestry (Ukni OCP)



Photograph – 5.7: Social Forestry (Niljai OCP)



Photograph – 5.8: Plantation on OB Dump in New Majri OCP



Photograph – 5.9: Avenue Plantation (Makardhokra-III OCP)



Photograph – 5.10: Social Forestry (Penganga OCP)



Photograph – 5.11: Social Forestry (Yekona-I&II (Amal.) OCP)



Photograph – 5.12: Social Forestry (New Majri UG to OC)



Photograph – 5.13: Social Forestry (Pauni-II (Expn.) OCP)



Photograph – 5.14: Social Forestry (MKD-I OCP)

SOUTH EASTERN COALFIELDS LIMITED

6.0 Land Reclamation Status in South Eastern Coalfields Limited

6.1 Following nineteen opencast projects of SECL producing 5 million cubic m. or more (Coal+OB) together were taken up for land reclamation monitoring based on satellite data during the year 2022-23:

- Dipka
- Gevra
- Kusmunda
- Manikpur
- Chirimiri
- Rajnagar
- Dhanpuri
- Jamuna
- Saraipali
- Bijari
- Chhal
- Mahan- II
- Amadand
- Amera
- Batura
- Jampali
- Ambika
- Jagannathpur

6.2 Project wise Land Reclamation status of the above 19 projects of SECL for the year 2022 is given in Table 6.1 and also shown graphically in Fig 6.1. Area statistics of different land use cover / class present in the mine leasehold boundaries of the above projects for the year 2022 are shown in the Table – 6.2 (A) & 6.2 (B). Land use / cover maps derived from satellite data are shown in Plate 6.1 - 6.19. Year wise changes in the different land use / cover classes in last three years based on satellite data are depicted in Bar Charts in Fig. 6.2 - 6.20.

- 6.3** Study reveals that in the above mentioned 19 projects of SECL under more than 5 mcm (Coal+OB) per annum category, out of total 78.55 Km² excavated area; 56.26 Km² area (71.62%) is under reclamation, out of which 36.51 Km² (46.48%) area is under technical reclamation and 19.75 Km² (25.14%) area is already under biological reclamation.
- 6.4** After analyzing the satellite data of the year 2022, it is evident that area under land reclamation for the 19 projects of SECL (Table 6.1) has increased from 53.93 Km² (71.53%) in the year 2021 to 56.26 Km² (71.62%) in the year 2022 in a period of one year. There is an increase of 2.33 Km² of area under reclamation, out of which 1.41 Km² area is under technical reclamation and 0.92 Km² area is under Biological reclamation.
- 6.5** It has been also observed that although there has been overall an increase of 1.41 Km² of area under technical reclamation (Barren Backfilling) for the mines during the year 2022, but for projects like Baroud, Dhanpuri Amlai group of mines, Rajnagar, Mahan II, Amera & Jamuna OCPs, area under technical reclamation has gone down slightly as compared to the year 2022 as more areas are coming under Biological Reclamation. Mining operations are yet to start in Ambika whereas in Batura project mining has just started, hence there was no technical reclamation done in those two projects.
- 6.6** Similarly, there has been overall increase of 0.92 Km² of area under Biological reclamation (Plantation on Backfilled areas) for the mines during the year 2022, it has been also observed that in projects like Dipka, Manikpur, Chirimiri and Rajnagar the area under Biological Reclamation has been slightly increased by 0.01 Km² whereas Jamuna and Chhal showed a static trend.
- 6.7** Plantation on external OB dump has increased from 11.70 Km² in the year 2021 to 11.89 Km² in the year 2022. The projects showed either a slight increase or static trend during the year 2022.

- 6.8** Plantation under social forestry has increased from 9.56 Km² in the year 2021 to 9.57 Km² in the year 2022. The projects showed either a slight increase or static trend during the year 2022 except for Kusmunda where social forestry decreased from 1.58 Km² (Yr. 2021 to 1.49 Km² (Yr 2022) due to mine advance and other associated reasons.
- 6.9** Total Green Cover generated in the leasehold of the nineteen projects has increased from 40.09 Km² (20.09%) in the year 2021 to 41.21 Km² (20.66%) in the year 2022 in a period of one year. There has been an increase of 1.12 Km² of Green Cover in the leasehold of the nineteen projects. All the projects showed either a positive or static trend for total green cover during the year 2022-23.
- 6.10** Out of 19 projects of SECL, Chirimiri OCP ranks on top for land reclamation (92.07%) followed by Jamuna OCP (88.07%) and Rajnagar OCP (84.36%) in the year 2022-23.

Table – 6.1

**Project wise Land Reclamation Status in Opencast Projects of SECL
(> 5 million Cu. M. of Coal+OB) based on Satellite Data of the Year 2022**

| Sl. No. | Name of the Project | Total Leasehold Area | | Technical Reclamation | | Plantation | | | | | | Area Under Active Mining | | Total Excavated Area | | Total Area under Plantation in the leaseholds (%Green Cover Generated) | | Total Area Under Reclamation | |
|-----------------------|-------------------------------|----------------------|--------|------------------------|--------|--|--------|--------------------------------|-------|---|------|--------------------------|--------|----------------------|-------|--|--------|------------------------------|--------|
| | | | | | | Biological Reclamation | | Other Plantation | | | | | | | | | | | |
| | | | | Area under Backfilling | | Plantation on Excavated/ Backfilled Area | | Plantation on External OB Dump | | Social Forestry, Avenue Plantation Etc. | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | | 6 | | 7 | | 8 | | 9 | | 10(=5+6+9) | | 11(=6+7+8) | | 12(=5+6) | |
| | | 2021 | 2022 | 2021 | 2022 | 2021 | 2022 | 2021 | 2022 | 2021 | 2022 | 2021 | 2022 | 2021 | 2022 | 2021 | 2022 | 2021 | 2022 |
| 1 | Dipka | 19.99 | 19.99 | 3.69 | 4.15 | 1.00 | 1.01 | 1.81 | 1.84 | 1.67 | 1.67 | 2.92 | 2.48 | 7.61 | 7.64 | 4.48 | 4.52 | 4.69 | 5.16 |
| | | | | 48.49% | 54.32% | 13.14% | 13.22% | | | | | 38.37% | 32.46% | | | 22.41% | 22.61% | 61.63% | 67.54% |
| 2 | Gevra | 41.84 | 41.84 | 9.19 | 9.22 | 2.55 | 2.67 | 4.28 | 4.28 | 3.18 | 3.28 | 5.35 | 5.76 | 17.09 | 17.65 | 10.01 | 10.23 | 11.74 | 11.89 |
| | | | | 53.77% | 52.24% | 14.92% | 15.13% | | | | | 31.30% | 32.63% | | | 23.92% | 24.45% | 68.70% | 67.37% |
| 3 | Kusmunda | 16.72 | 16.72 | 3.72 | 4.05 | 1.27 | 1.35 | 1.92 | 1.96 | 1.58 | 1.49 | 2.78 | 2.64 | 7.77 | 8.04 | 4.77 | 4.80 | 4.99 | 5.40 |
| | | | | 47.88% | 50.37% | 16.34% | 16.79% | | | | | 35.78% | 32.84% | | | 28.53% | 28.71% | 64.22% | 67.16% |
| 4 | Manikpur | 10.20 | 10.20 | 1.55 | 1.56 | 0.78 | 0.79 | 1.26 | 1.31 | 0.37 | 0.38 | 1.99 | 2.02 | 4.32 | 4.37 | 2.41 | 2.48 | 2.33 | 2.35 |
| | | | | 35.88% | 35.70% | 18.06% | 18.08% | | | | | 46.06% | 46.22% | | | 23.63% | 24.31% | 53.94% | 53.78% |
| 5 | Saraipali | 2.79 | 2.79 | 0.00 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.02 | 0.20 | 0.37 | 0.20 | 0.41 | 0.01 | 0.02 | 0.00 | 0.04 |
| | | | | 0.00% | 9.76% | 0.00% | 0.00% | | | | | 100.00% | 90.24% | | | 0.36% | 0.72% | 0.00% | 9.76% |
| 6 | Ambika | 1.34 | 1.34 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.00 | 0.00 |
| | | | | 0.00% | 0.00% | 0.00% | 0.00% | | | | | 0.00% | 0.00% | | | 0.00% | 2.24% | 0.00% | 0.00% |
| 7 | Jampali | 5.83 | 5.83 | 0.87 | 1.11 | 0.19 | 0.27 | 0.00 | 0.00 | 0.19 | 0.01 | 0.97 | 1.20 | 2.03 | 2.58 | 0.38 | 0.28 | 1.06 | 1.38 |
| | | | | 42.86% | 43.02% | 9.36% | 10.47% | | | | | 47.78% | 46.51% | | | 6.52% | 4.80% | 0.00% | 53.49% |
| 8 | Baroud | 11.11 | 11.11 | 2.13 | 2.07 | 0.44 | 0.61 | 0.34 | 0.34 | 0.03 | 0.15 | 0.65 | 0.72 | 3.22 | 3.40 | 0.81 | 1.10 | 2.57 | 2.68 |
| | | | | 66.15% | 60.88% | 13.66% | 17.94% | | | | | 20.19% | 21.18% | | | 7.29% | 9.90% | 79.81% | 78.82% |
| 9 | Bijari | 2.73 | 2.73 | 0.15 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.04 | 0.04 | 0.32 | 0.33 | 0.47 | 0.58 | 0.04 | 0.04 | 0.15 | 0.25 |
| | | | | 31.91% | 43.10% | 0.00% | 0.00% | | | | | 68.09% | 56.90% | | | 1.47% | 1.47% | 31.91% | 43.10% |
| 10 | Chhal | 12.07 | 12.07 | 2.12 | 2.13 | 0.17 | 0.17 | 0.00 | 0.00 | 0.43 | 0.43 | 0.76 | 0.88 | 3.05 | 3.18 | 0.60 | 0.60 | 2.29 | 2.30 |
| | | | | 69.51% | 66.98% | 5.57% | 5.35% | | | | | 24.92% | 27.67% | | | 4.97% | 4.97% | 75.08% | 72.33% |
| 11 | Dhanpuri Amlai Group of Mines | 14.59 | 14.59 | 3.87 | 3.76 | 2.40 | 2.52 | 1.80 | 1.80 | 0.18 | 0.18 | 1.05 | 1.18 | 7.32 | 7.46 | 4.38 | 4.50 | 6.27 | 6.28 |
| | | | | 52.87% | 50.40% | 32.79% | 33.78% | | | | | 14.34% | 15.82% | | | 30.02% | 30.84% | 85.66% | 84.18% |
| 12 | Rajnagar | 7.30 | 7.30 | 1.95 | 1.94 | 3.23 | 3.24 | 0.00 | 0.00 | 0.26 | 0.26 | 0.96 | 0.96 | 6.14 | 6.14 | 3.49 | 3.50 | 5.18 | 5.18 |
| | | | | 31.76% | 31.60% | 52.61% | 52.77% | | | | | 15.64% | 15.64% | | | 47.81% | 47.95% | 84.36% | 84.36% |
| 13 | Chirimiri | 5.44 | 5.44 | 1.34 | 1.54 | 1.12 | 1.13 | 0.00 | 0.00 | 0.15 | 0.15 | 0.44 | 0.23 | 2.90 | 2.90 | 1.27 | 1.28 | 2.46 | 2.67 |
| | | | | 46.21% | 53.10% | 38.62% | 38.97% | | | | | 15.17% | 7.93% | | | 23.35% | 23.53% | 84.83% | 92.07% |
| 14 | Mahan II | 2.97 | 2.97 | 1.09 | 1.00 | 0.37 | 0.53 | 0.03 | 0.05 | 0.03 | 0.04 | 0.76 | 0.69 | 2.22 | 2.22 | 0.43 | 0.62 | 1.46 | 1.53 |
| | | | | 49.10% | 45.05% | 16.67% | 23.87% | | | | | 34.23% | 31.08% | | | 14.48% | 20.88% | 65.77% | 68.92% |
| 15 | Jagannathpur | 6.62 | 6.62 | 0.22 | 0.58 | 0.00 | 0.00 | 0.00 | 0.00 | 0.15 | 0.15 | 0.49 | 0.90 | 0.71 | 1.48 | 0.15 | 0.15 | 0.22 | 0.58 |
| | | | | 30.99% | 39.19% | 0.00% | 0.00% | | | | | 69.01% | 60.81% | | | 2.27% | 2.27% | 30.99% | 39.19% |
| 16 | Amadand | 13.05 | 13.05 | 1.44 | 1.49 | 0.00 | 0.00 | 0.18 | 0.23 | 0.64 | 0.65 | 0.73 | 0.84 | 2.17 | 2.33 | 0.82 | 0.88 | 1.44 | 1.49 |
| | | | | 66.36% | 63.95% | 0.00% | 0.00% | - | | | | 33.64% | 36.05% | | | 6.28% | 6.74% | 66.36% | 63.95% |
| 17 | Batura | 9.43 | 9.43 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.05 | 0.00 | 0.00 |
| | | | | 0.00% | 0.00% | 0.00% | 0.00% | | | | | 0.00% | 0.00% | | | 0.53% | 0.53% | 0.00% | 0.00% |
| 18 | Amera | 6.64 | 6.64 | 1.10 | 0.95 | 0.15 | 0.30 | 0.08 | 0.08 | 0.45 | 0.44 | 0.30 | 0.30 | 1.55 | 1.55 | 0.68 | 0.82 | 1.25 | 1.25 |
| | | | | 70.97% | 61.29% | 9.68% | 19.35% | | | | | 19.35% | 19.35% | | | 10.24% | 12.35% | 80.65% | 80.65% |
| 19 | Jamuna | 8.85 | 8.85 | 0.67 | 0.67 | 5.16 | 5.16 | 0.00 | 0.00 | 0.15 | 0.15 | 0.79 | 0.79 | 6.62 | 6.62 | 5.31 | 5.31 | 5.83 | 5.83 |
| | | | | 10.12% | 10.12% | 77.95% | 77.95% | | | | | 11.93% | 11.93% | | | 60.00% | 60.00% | 88.07% | 88.07% |
| Total SECL (MT5 - 19) | | 199.51 | 199.51 | 35.10 | 36.51 | 18.83 | 19.75 | 11.70 | 11.89 | 9.56 | 9.57 | 21.46 | 22.29 | 75.39 | 78.55 | 40.09 | 41.21 | 53.93 | 56.26 |
| | | | | 46.56% | 46.48% | 24.98% | 25.14% | | | | | 28.47% | 28.38% | | | 20.09% | 20.66% | 71.53% | 71.62% |

Note: In reference of the above Table, different parameters are classified as follows:

1. Area under **Biological Reclamation** includes Areas under Plantation done on Backfilled Area Only.
2. Area under **Technical Reclamation** includes Area under Barren Backfilling only
3. Area under Active Mining Includes Coal Quarry, Advance Quarry Site, Quarry filled with water etc., if any.
4. Social Forestry and Plantation on External OB Dumps are not included in Biological Reclamation and are put under separate categories as shown in the Table above.
5. (%) calculated in the above Table is in respect to Total Excavated Area except for "" Total Area under Plantation"" where % is in terms of "Leasehold Area".

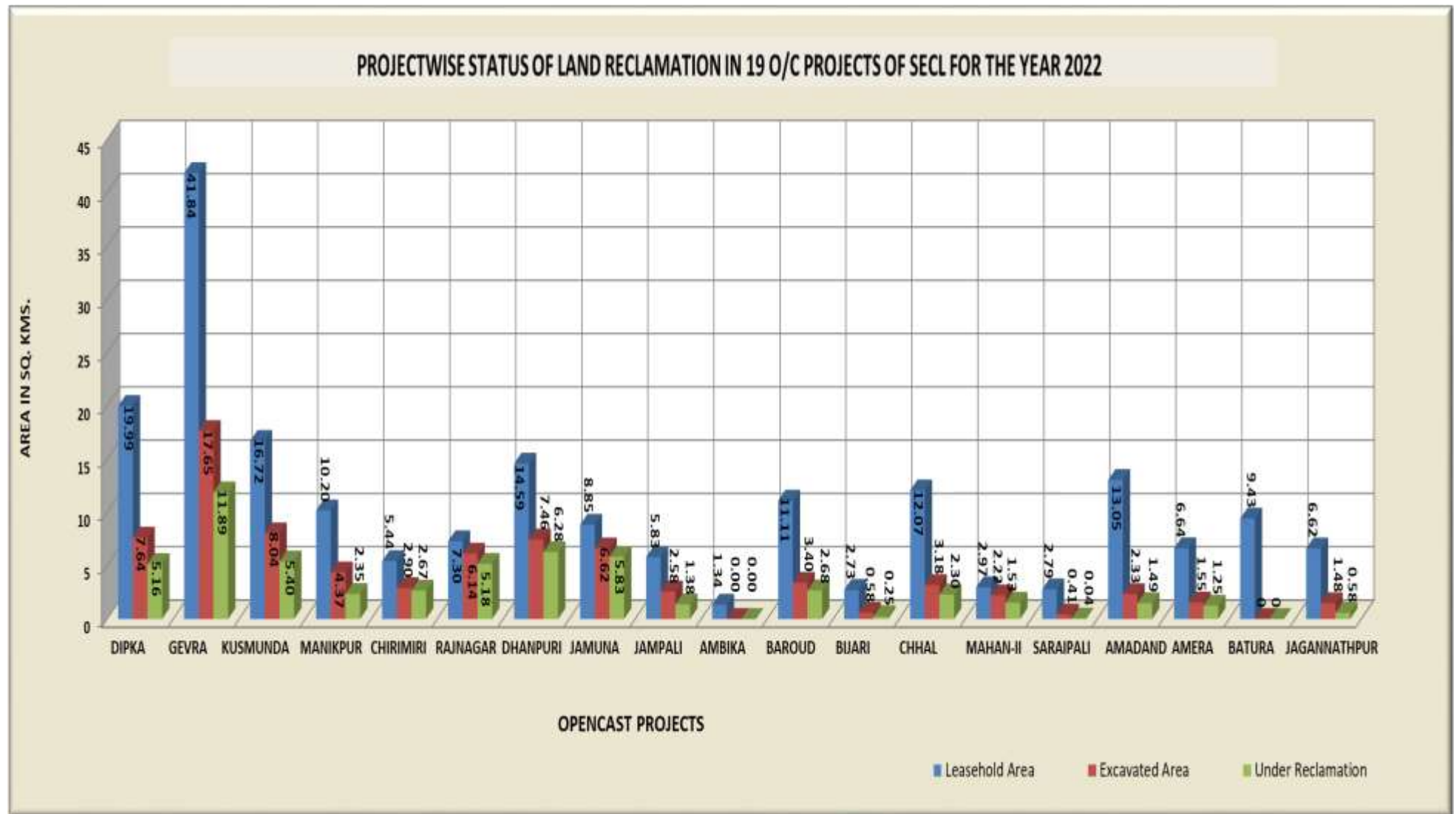


Fig.6.1: *Project wise Land reclamation status in OC projects of SECL in the year-2022*

Table – 6.2 (A)

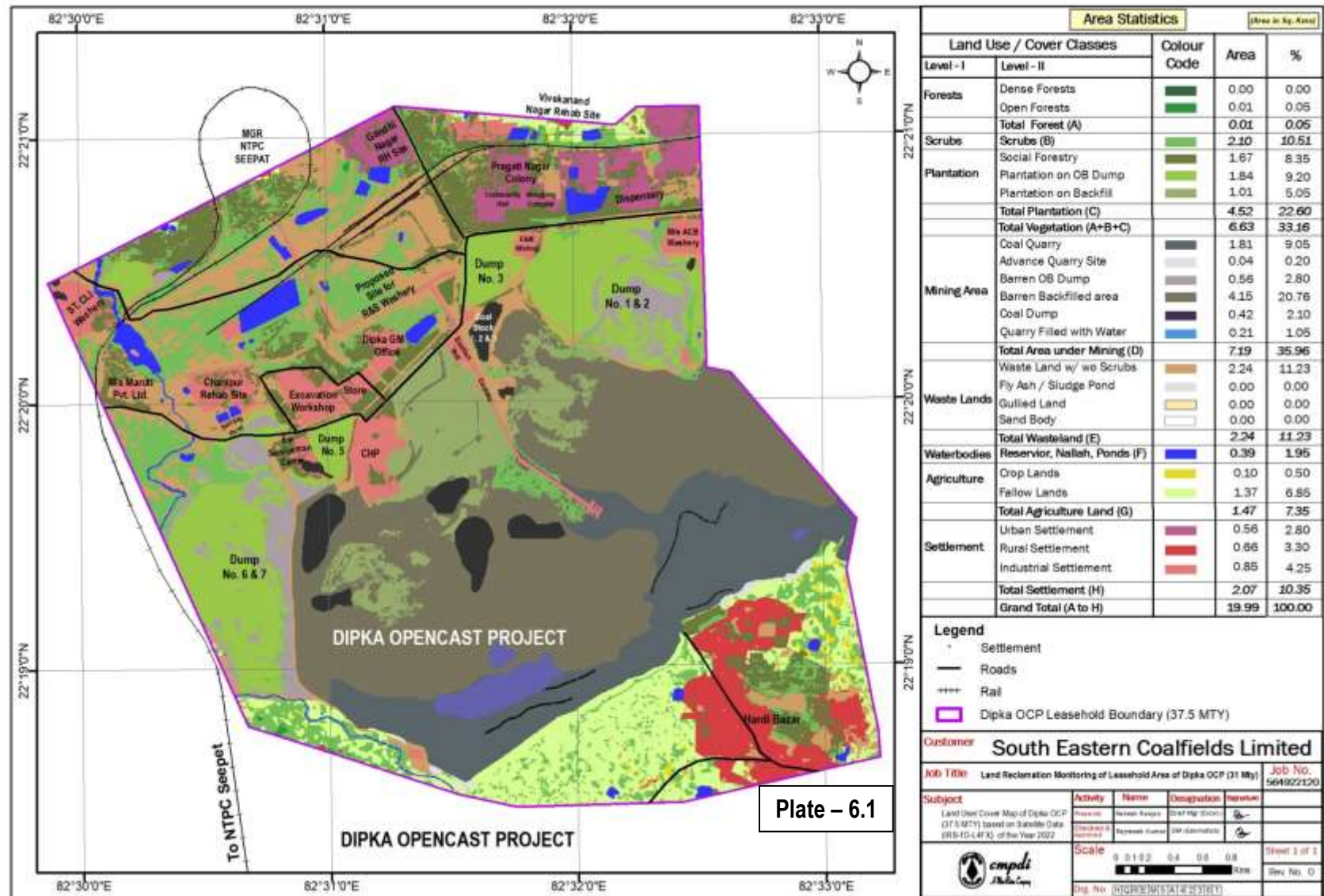
Project wise Area Statistics of Land Use / Cover in OC Mines (> 5 mcu.m.) of SECL based on Satellite data of the Year 2022

(Area in sq km)

| LAND USE / COVER CLASSES | | CLR. CODE | DIPKA | | GEVRA | | KUSMUNDA | | MANIKPUR | | CHIRIMIRI | | RAJNAGAR | | DHANPURI | | JAMUNA | | SARAIPALI | | BAROUD | |
|--------------------------|--|-----------|-------|--------|-------|--------|----------|--------|----------|--------|-----------|--------|----------|--------|----------|--------|--------|--------|-----------|--------|--------|--------|
| FORESTS | | | Area | % | Area | % | Area | % | Area | % | Area | % | Area | % | Area | % | Area | % | Area | % | Area | % |
| | 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 |
| | Open Forest | | 0.01 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.08 | 0.78 | 0.76 | 13.97 | 0.00 | 0.00 | 0.78 | 5.35 | 0.00 | 0.00 | 0.10 | 3.58 | 1.36 | 12.24 |
| | Total Forest (A) | | 0.01 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.08 | 0.78 | 0.76 | 13.97 | 0.00 | 0.00 | 0.78 | 5.35 | 0.00 | 0.00 | 0.10 | 3.58 | 1.36 | 12.24 |
| | Scrubs (B) | | 2.10 | 10.51 | 3.37 | 8.05 | 0.90 | 5.38 | 0.75 | 7.36 | 0.86 | 15.81 | 0.27 | 3.70 | 2.01 | 13.78 | 0.54 | 6.10 | 0.19 | 6.81 | 2.09 | 18.82 |
| PLANTATION | Social Forestry (C) | | 1.67 | 8.35 | 3.28 | 7.84 | 1.49 | 8.91 | 0.38 | 3.68 | 0.15 | 2.76 | 0.26 | 3.56 | 0.18 | 1.23 | 0.15 | 1.69 | 0.02 | 0.72 | 0.15 | 1.35 |
| | Plantation on External OB Dump | | 1.84 | 9.20 | 4.28 | 10.23 | 1.96 | 11.72 | 1.31 | 12.85 | 0.00 | 0.00 | 0.00 | 0.00 | 1.80 | 12.34 | 0.00 | 0.00 | 0.00 | 0.00 | 0.34 | 3.10 |
| | Plantation on Backfill / Excavated Area (Biological Reclamation) | | 1.01 | 5.05 | 2.67 | 6.38 | 1.35 | 8.07 | 0.79 | 7.75 | 1.13 | 20.77 | 3.24 | 44.36 | 2.52 | 17.27 | 5.16 | 58.31 | 0.00 | 0.00 | 0.61 | 5.52 |
| | Total Area under Plantation (Green Cover) (D) | | 4.52 | 22.60 | 10.23 | 24.45 | 4.80 | 28.70 | 2.48 | 24.28 | 1.28 | 23.53 | 3.50 | 47.92 | 4.50 | 30.84 | 5.31 | 60.00 | 0.02 | 0.72 | 1.11 | 9.97 |
| | Total Vegetation (A to D) | | 6.63 | 33.16 | 13.60 | 32.50 | 5.70 | 34.08 | 3.31 | 32.42 | 2.90 | 53.31 | 3.77 | 51.62 | 7.29 | 49.97 | 5.85 | 66.10 | 0.31 | 11.11 | 4.56 | 41.03 |
| AREA UNDER ACTIVE MINING | Coal Quarry | | 1.81 | 9.05 | 4.21 | 10.06 | 1.79 | 10.71 | 1.81 | 17.75 | 0.12 | 2.21 | 0.41 | 5.62 | 0.29 | 1.99 | 0.00 | 0.00 | 0.28 | 10.04 | 0.15 | 1.35 |
| | Coal Dump | | 0.42 | 2.10 | 0.33 | 0.79 | 0.46 | 2.75 | 0.08 | 0.78 | 0.09 | 1.65 | 0.00 | 0.00 | 0.14 | 0.96 | 0.00 | 0.00 | 0.07 | 2.51 | 0.15 | 1.35 |
| | Advance Quarry Site | | 0.04 | 0.20 | 0.30 | 0.72 | 0.06 | 0.36 | 0.01 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.23 | 1.58 | 0.00 | 0.00 | 0.02 | 0.72 | 0.10 | 0.90 |
| | Quarry Filled With Water | | 0.21 | 1.05 | 0.92 | 2.20 | 0.33 | 1.97 | 0.12 | 1.18 | 0.02 | 0.37 | 0.55 | 7.53 | 0.52 | 3.56 | 0.79 | 8.93 | 0.00 | 0.00 | 0.32 | 2.88 |
| | Total Area under Active Mining (F) | | 2.48 | 12.40 | 5.76 | 13.77 | 2.64 | 15.79 | 2.02 | 19.81 | 0.23 | 4.23 | 0.96 | 13.15 | 1.18 | 8.09 | 0.79 | 8.93 | 0.37 | 13.27 | 0.72 | 6.48 |
| TECHNICAL RECLAMATION | Barren OB Dump (G) | | 0.56 | 2.80 | 0.69 | 1.65 | 0.10 | 0.60 | 0.92 | 9.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.28 | 1.92 | 0.00 | 0.00 | 0.36 | 12.90 | 0.11 | 0.99 |
| | Area under Barren Backfilling (Technical Reclamation) | | 4.15 | 20.76 | 9.22 | 22.04 | 4.05 | 24.22 | 1.56 | 15.30 | 1.54 | 28.31 | 1.94 | 26.56 | 3.76 | 25.77 | 0.67 | 7.57 | 0.04 | 1.43 | 2.07 | 18.64 |
| | Total Area under Technical Reclamation (H) | | 4.15 | 20.76 | 9.22 | 22.04 | 4.05 | 24.22 | 1.56 | 15.30 | 1.54 | 28.31 | 1.94 | 26.56 | 3.76 | 25.77 | 0.67 | 7.57 | 0.04 | 1.43 | 2.07 | 18.64 |
| | Total Area under Mining Activity (F+G+H) | | 7.19 | 35.96 | 15.67 | 37.46 | 6.79 | 40.61 | 4.50 | 44.13 | 1.77 | 32.54 | 2.90 | 39.71 | 5.22 | 35.78 | 1.46 | 16.50 | 0.77 | 27.60 | 2.90 | 26.11 |
| | | | | | | | | | | | | | | | | | | | | | | |
| WASTELANDS | Waste Lands | | 2.24 | 11.23 | 4.61 | 11.02 | 1.37 | 8.19 | 0.73 | 7.16 | 0.61 | 11.21 | 0.44 | 6.02 | 1.04 | 7.13 | 0.46 | 5.20 | 0.19 | 6.81 | 0.55 | 4.95 |
| | Fly Ash Pond / Sand Body | | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.30 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.09 | |
| | Total Wasteland (I) | | 2.24 | 11.23 | 4.61 | 11.02 | 1.42 | 8.49 | 0.73 | 7.16 | 0.61 | 11.21 | 0.44 | 6.02 | 1.04 | 7.13 | 0.46 | 5.20 | 0.19 | 6.81 | 0.56 | 5.04 |
| WATERBODIES | Reservoir, nallah, ponds | | 0.39 | 1.95 | 0.23 | 0.55 | 0.16 | 0.96 | 0.20 | 1.96 | 0.04 | 0.74 | 0.02 | 0.27 | 0.02 | 0.13 | 0.01 | 0.11 | 0.15 | 5.38 | 0.17 | 1.53 |
| | Total Waterbodies (J) | | 0.39 | 1.95 | 0.23 | 0.55 | 0.16 | 0.96 | 0.20 | 1.96 | 0.04 | 0.74 | 0.02 | 0.27 | 0.02 | 0.13 | 0.01 | 0.11 | 0.15 | 5.38 | 0.17 | 1.53 |
| | | | | | | | | | | | | | | | | | | | | | | |
| AGRICULTURE | Crop Lands | | 0.10 | 0.50 | 0.59 | 1.41 | 0.47 | 2.81 | 0.05 | 0.49 | 0.00 | 0.00 | 0.01 | 0.14 | 0.21 | 1.44 | 0.00 | 0.00 | 0.12 | 4.30 | 0.28 | 2.52 |
| | Fallow Lands | | 1.37 | 6.85 | 4.12 | 9.85 | 1.20 | 7.18 | 0.90 | 8.83 | 0.00 | 0.00 | 0.06 | 0.82 | 0.66 | 4.52 | 0.93 | 10.51 | 1.24 | 44.44 | 2.50 | 22.51 |
| | Total Agriculture (K) | | 1.47 | 7.35 | 4.71 | 11.26 | 1.67 | 9.99 | 0.95 | 9.32 | 0.00 | 0.00 | 0.07 | 0.96 | 0.87 | 5.96 | 0.93 | 10.51 | 1.36 | 48.74 | 2.78 | 25.03 |
| SETTLEMENTS | Urban Settlement | | 0.56 | 2.80 | 0.91 | 2.18 | 0.23 | 1.38 | 0.06 | 0.54 | 0.06 | 1.10 | 0.08 | 1.10 | 0.09 | 0.62 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Rural Settlement | | 0.66 | 3.30 | 0.84 | 2.01 | 0.19 | 1.14 | 0.13 | 1.28 | 0.05 | 0.92 | 0.004 | 0.05 | 0.00 | 0.00 | 0.09 | 1.02 | 0.00 | 0.00 | 0.11 | 0.99 |
| | Industrial Settlement | | 0.85 | 4.25 | 1.27 | 3.02 | 0.56 | 3.35 | 0.33 | 3.19 | 0.01 | 0.18 | 0.02 | 0.27 | 0.06 | 0.41 | 0.05 | 0.56 | 0.01 | 0.36 | 0.03 | 0.27 |
| | Total Settlement (L) | | 2.07 | 10.35 | 3.02 | 7.21 | 0.98 | 5.87 | 0.51 | 5.01 | 0.12 | 2.20 | 0.10 | 1.42 | 0.15 | 1.03 | 0.14 | 1.58 | 0.01 | 0.36 | 0.14 | 1.26 |
| Grand Total (A to L) | | | 19.99 | 100.00 | 41.84 | 100.00 | 16.72 | 100.00 | 10.20 | 100.00 | 5.44 | 100.00 | 7.30 | 100.00 | 14.59 | 100.00 | 8.85 | 100.00 | 2.79 | 100.00 | 11.11 | 100.00 |

Table 6.2 (B)

| LAND USE / COVER CLASSES | | | CLR. CODE | BIJARI | | CHHAL | | MAHAN-II | | AMERA | | AMADAND | | BATURA | | AMBIKA | | JAMPALI | | JAGANNATHPUR | | TOTAL | |
|--------------------------|---|------|-----------|--------|-------|--------|------|----------|------|--------|-------|---------|------|--------|------|--------|------|---------|------|--------------|--------|--------|--|
| | | 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 | 0.56 | 9.61 | 0.00 | 0.00 | 0.56 | 0.28 | |
| | Open Forest | | 0.00 | 0.00 | 1.70 | 14.08 | 0.06 | 2.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.21 | 2.23 | 0.03 | 2.24 | 0.77 | 13.21 | 0.07 | 1.06 | 5.93 | 2.97 | |
| | Total Forest (A) | | 0.00 | 0.00 | 1.70 | 14.08 | 0.06 | 2.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.21 | 2.23 | 0.03 | 2.24 | 1.33 | 22.82 | 0.07 | 1.06 | 6.49 | 3.25 | |
| SCUB | Scrubs (B) | | 0.62 | 22.70 | 2.02 | 16.74 | 0.26 | 8.75 | 0.08 | 1.20 | 0.31 | 2.38 | 1.74 | 18.45 | 0.10 | 7.46 | 0.43 | 7.38 | 0.33 | 4.98 | 18.97 | 9.51 | |
| | Social Forestry (C) | | 0.04 | 1.52 | 0.43 | 3.56 | 0.04 | 1.35 | 0.44 | 6.63 | 0.65 | 4.98 | 0.05 | 0.53 | 0.03 | 2.24 | 0.01 | 0.17 | 0.15 | 2.27 | 9.57 | 4.80 | |
| | Plantation on External OB Dump | | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 1.68 | 0.08 | 1.20 | 0.23 | 1.76 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 11.89 | 5.96 | |
| PLANTATION | Plantation on Backfill / Excavated Area (Biological Reclamation) | | 0.00 | 0.00 | 0.17 | 1.41 | 0.53 | 17.95 | 0.30 | 4.52 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.27 | 4.63 | 0.00 | 0.00 | 19.75 | 9.90 | |
| | Total Area under Plantation (Green Cover) (D) | | 0.04 | 1.52 | 0.60 | 4.97 | 0.62 | 20.98 | 0.82 | 12.35 | 0.88 | 6.74 | 0.05 | 0.53 | 0.03 | 2.24 | 0.28 | 4.80 | 0.15 | 2.27 | 41.21 | 20.66 | |
| | Total Vegetation (A to D) | | 0.66 | 24.22 | 4.32 | 35.79 | 0.94 | 31.75 | 0.90 | 13.55 | 1.19 | 9.12 | 2.00 | 21.21 | 0.16 | 11.94 | 2.04 | 35.00 | 0.55 | 8.31 | 66.67 | 33.42 | |
| AREA UNDER ACTIVE MINING | Coal Quarry | | 0.21 | 7.51 | 0.52 | 4.31 | 0.43 | 14.48 | 0.00 | 0.00 | 0.38 | 2.91 | 0.00 | 0.00 | 0.00 | 0.00 | 0.85 | 14.58 | 0.57 | 8.61 | 13.83 | 6.93 | |
| | Coal Dump | | 0.04 | 1.52 | 0.08 | 0.66 | 0.16 | 5.39 | 0.00 | 0.00 | 0.08 | 0.61 | 0.00 | 0.00 | 0.00 | 0.00 | 0.10 | 1.72 | 0.07 | 1.06 | 2.27 | 1.14 | |
| | Advance Quarry Site | | 0.04 | 1.52 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.14 | 1.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.16 | 2.74 | 0.24 | 3.63 | 1.34 | 0.67 | |
| | Quarry Filled With Water | | 0.04 | 1.52 | 0.28 | 2.32 | 0.10 | 3.37 | 0.30 | 4.52 | 0.24 | 1.84 | 0.00 | 0.00 | 0.00 | 0.00 | 0.09 | 1.54 | 0.02 | 0.30 | 4.85 | 2.43 | |
| | Total Area under Active Mining (F) | | 0.33 | 12.07 | 0.88 | 7.29 | 0.69 | 23.24 | 0.30 | 4.52 | 0.84 | 6.43 | 0.00 | 0.00 | 0.00 | 0.00 | 1.20 | 20.58 | 0.90 | 13.60 | 22.29 | 11.17 | |
| TECHNICAL RECLAMATION | Barren OB Dump (G) | | 0.15 | 5.49 | 0.08 | 0.66 | 0.05 | 1.68 | 0.02 | 0.30 | 0.81 | 6.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.16 | 2.74 | 0.00 | 0.00 | 4.29 | 2.15 | |
| | Area under Barren Backfilling (Technical Reclamation) | | 0.25 | 9.15 | 2.13 | 17.65 | 1.00 | 33.67 | 0.95 | 14.31 | 1.49 | 11.42 | 0.00 | 0.00 | 0.00 | 0.00 | 1.11 | 19.04 | 0.58 | 8.76 | 36.51 | 18.30 | |
| | Total Area under Technical Reclamation (H) | | 0.25 | 9.15 | 2.13 | 17.65 | 1.00 | 33.67 | 0.95 | 14.31 | 1.49 | 11.42 | 0.00 | 0.00 | 0.00 | 0.00 | 1.11 | 19.04 | 0.58 | 8.76 | 36.51 | 18.30 | |
| | Total Area under Mining Activity (F+G+H) | | 0.73 | 26.71 | 3.09 | 25.60 | 1.74 | 58.59 | 1.27 | 19.13 | 3.14 | 24.06 | 0.00 | 0.00 | 0.00 | 0.00 | 2.47 | 42.36 | 1.48 | 22.36 | 63.09 | 31.62 | |
| WASTE LANDS | Waste Lands | | 0.18 | 6.59 | 1.13 | 9.36 | 0.17 | 5.62 | 0.26 | 3.92 | 1.39 | 10.65 | 0.41 | 4.35 | 0.02 | 1.49 | 0.43 | 7.38 | 0.21 | 3.17 | 16.44 | 8.24 | |
| | Fly Ash Pond / Sand Body | | 0.00 | 0.00 | 0.02 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.10 | 0.05 | | |
| | Total Wasteland (I) | | 0.18 | 6.59 | 1.15 | 9.53 | 0.17 | 5.62 | 0.26 | 3.92 | 1.39 | 10.65 | 0.43 | 4.56 | 0.02 | 1.49 | 0.43 | 7.38 | 0.21 | 3.17 | 16.54 | 8.29 | |
| WATERBODIES | Reservoir, nallah, ponds | | 0.01 | 0.37 | 0.20 | 1.66 | 0.01 | 0.17 | 0.04 | 0.60 | 0.04 | 0.31 | 0.13 | 1.38 | 0.02 | 1.49 | 0.01 | 0.17 | 0.07 | 1.06 | 1.91 | 0.96 | |
| | Total Waterbodies (J) | | 0.01 | 0.37 | 0.20 | 1.66 | 0.01 | 0.17 | 0.04 | 0.60 | 0.04 | 0.31 | 0.13 | 1.38 | 0.02 | 1.49 | 0.01 | 0.17 | 0.07 | 1.06 | 1.91 | 0.96 | |
| AGRICULTURE | Crop Lands | | 0.05 | 1.83 | 0.40 | 3.31 | 0.00 | 0.00 | 0.39 | 5.87 | 1.20 | 9.20 | 0.09 | 0.95 | 0.03 | 2.24 | 0.00 | 0.00 | 0.36 | 5.44 | 4.35 | 2.18 | |
| | Fallow Lands | | 1.06 | 38.82 | 2.74 | 22.70 | 0.09 | 3.03 | 3.61 | 54.37 | 5.77 | 44.21 | 6.70 | 71.05 | 1.08 | 80.60 | 0.86 | 14.75 | 3.83 | 57.85 | 38.72 | 19.41 | |
| | Total Agriculture (K) | | 1.11 | 40.65 | 3.14 | 26.01 | 0.09 | 3.03 | 4.00 | 60.24 | 6.97 | 53.41 | 6.79 | 72.00 | 1.11 | 82.84 | 0.86 | 14.75 | 4.19 | 63.29 | 43.07 | 21.59 | |
| SETTLEMENTS | Urban Settlement | | 0.00 | 0.00 | 0.13 | 1.08 | 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 | 2.12 | 1.06 | | |
| | Rural Settlement | | 0.04 | 1.46 | 0.03 | 0.25 | 0.01 | 0.17 | 0.16 | 2.41 | 0.24 | 1.84 | 0.08 | 0.85 | 0.03 | 2.24 | 0.02 | 0.34 | 0.10 | 1.51 | 2.78 | 1.39 | |
| | Industrial Settlement | | 0.00 | 0.00 | 0.01 | 0.08 | 0.02 | 0.67 | 0.01 | 0.15 | 0.08 | 0.61 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.30 | 3.32 | 1.66 | |
| | Total Settlement (L) | | 0.04 | 1.46 | 0.17 | 1.41 | 0.03 | 0.84 | 0.17 | 2.56 | 0.32 | 2.45 | 0.08 | 0.85 | 0.03 | 2.24 | 0.02 | 0.34 | 0.12 | 1.81 | 8.22 | 4.12 | |
| Grand Total (A to L) | | | 2.73 | 100.00 | 12.07 | 100.00 | 2.97 | 100.00 | 6.64 | 100.00 | 13.05 | 100.00 | 9.43 | 100.00 | 1.34 | 100.00 | 5.83 | 100.00 | 6.62 | 100.00 | 199.51 | 100.00 | |



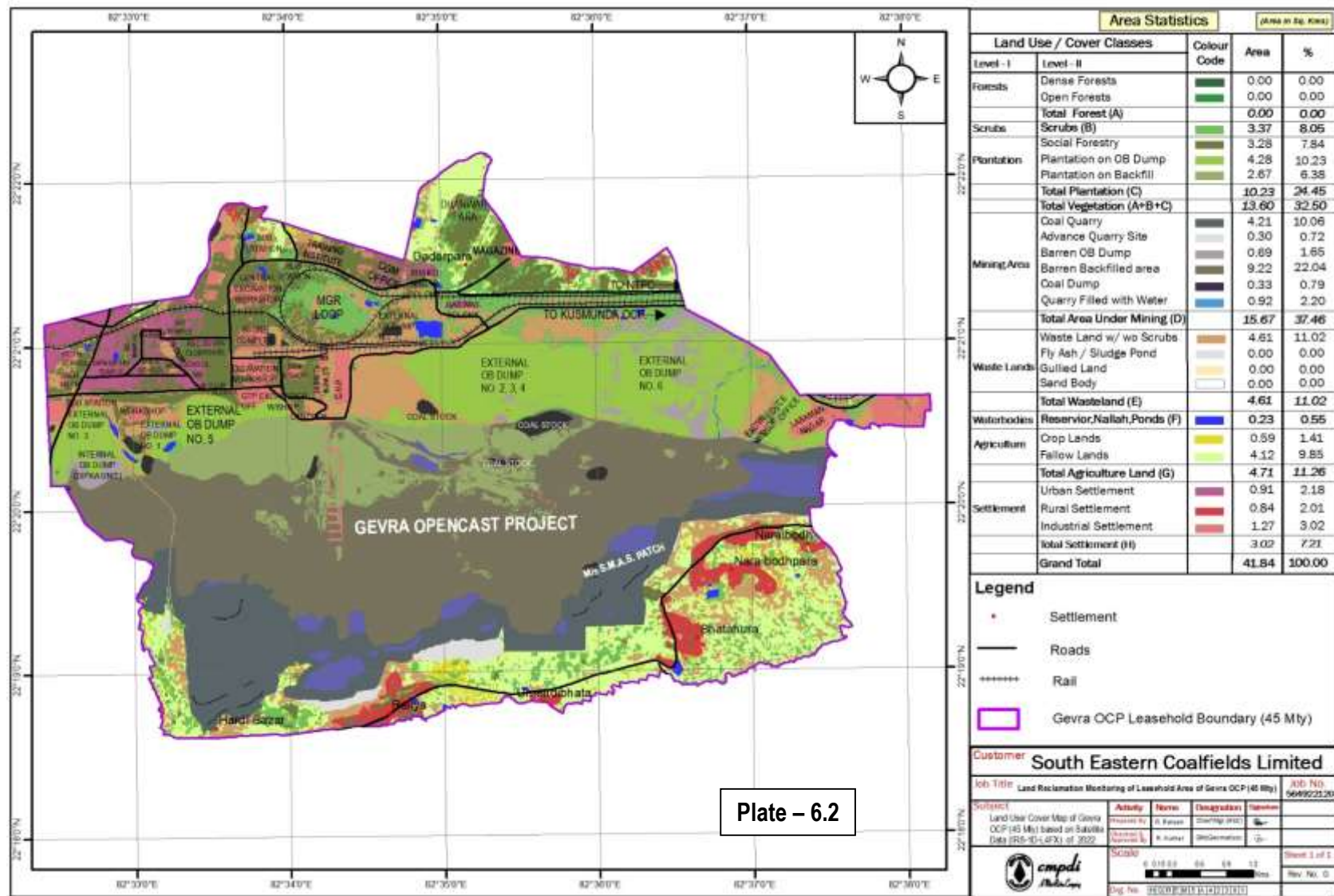


Plate - 6.2



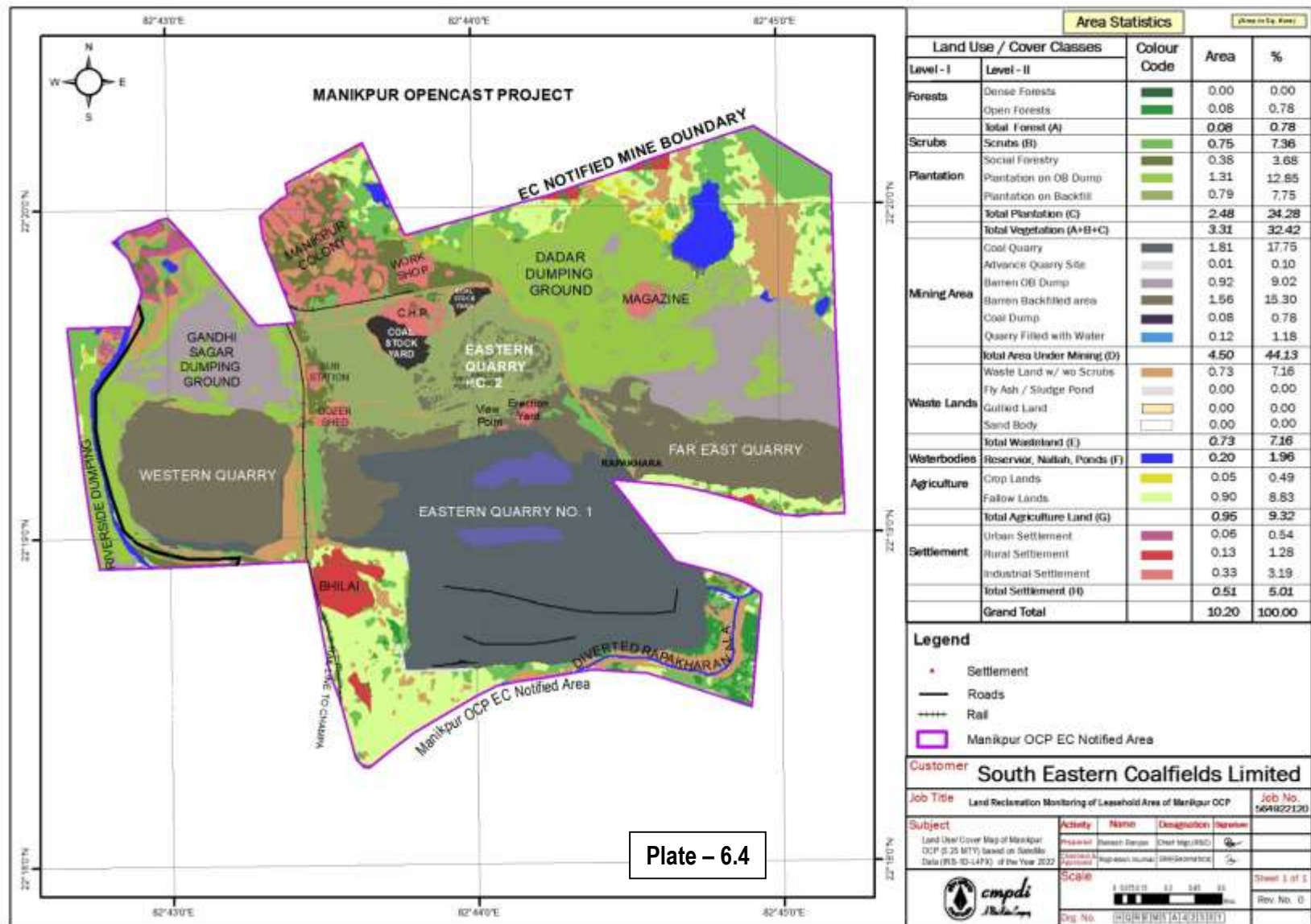
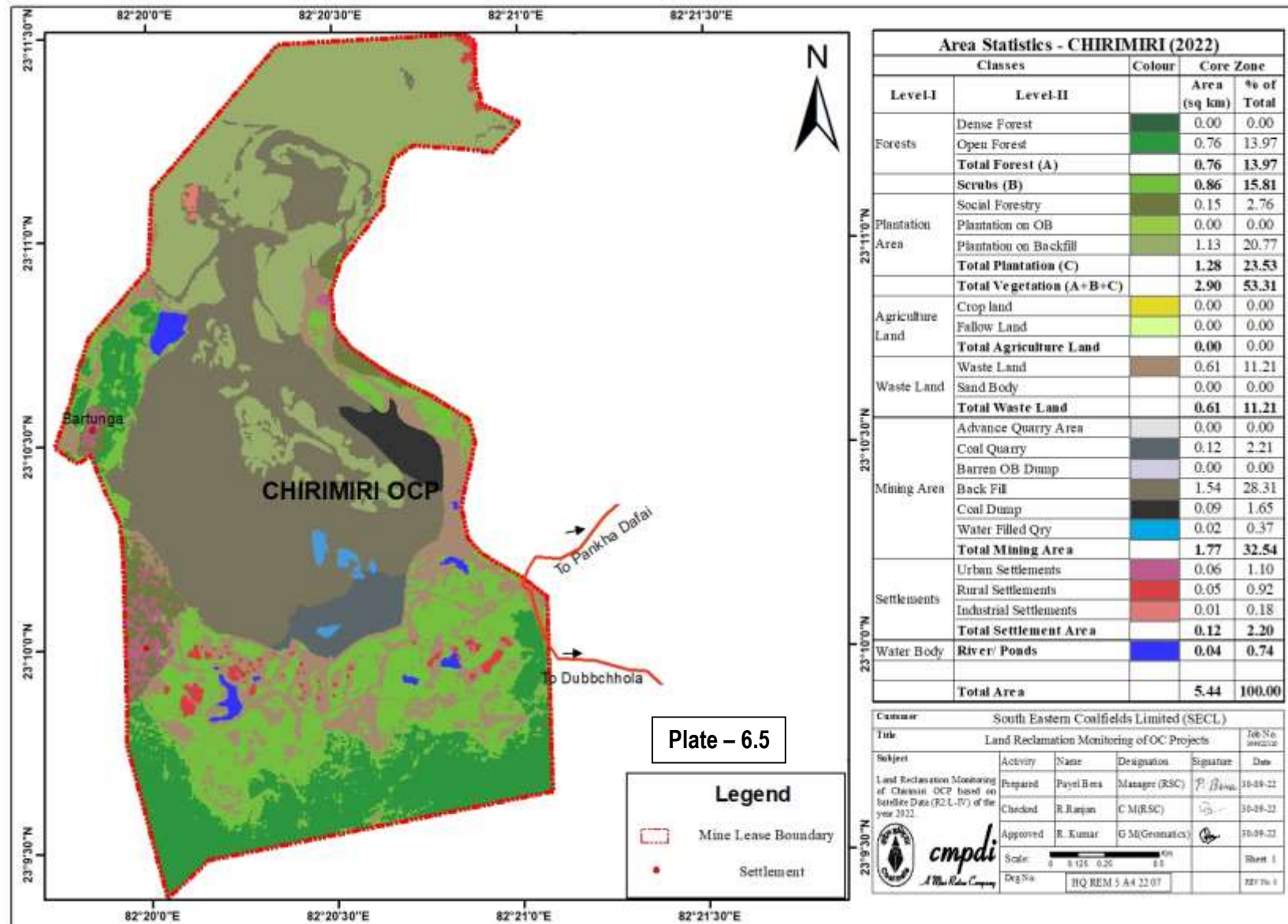
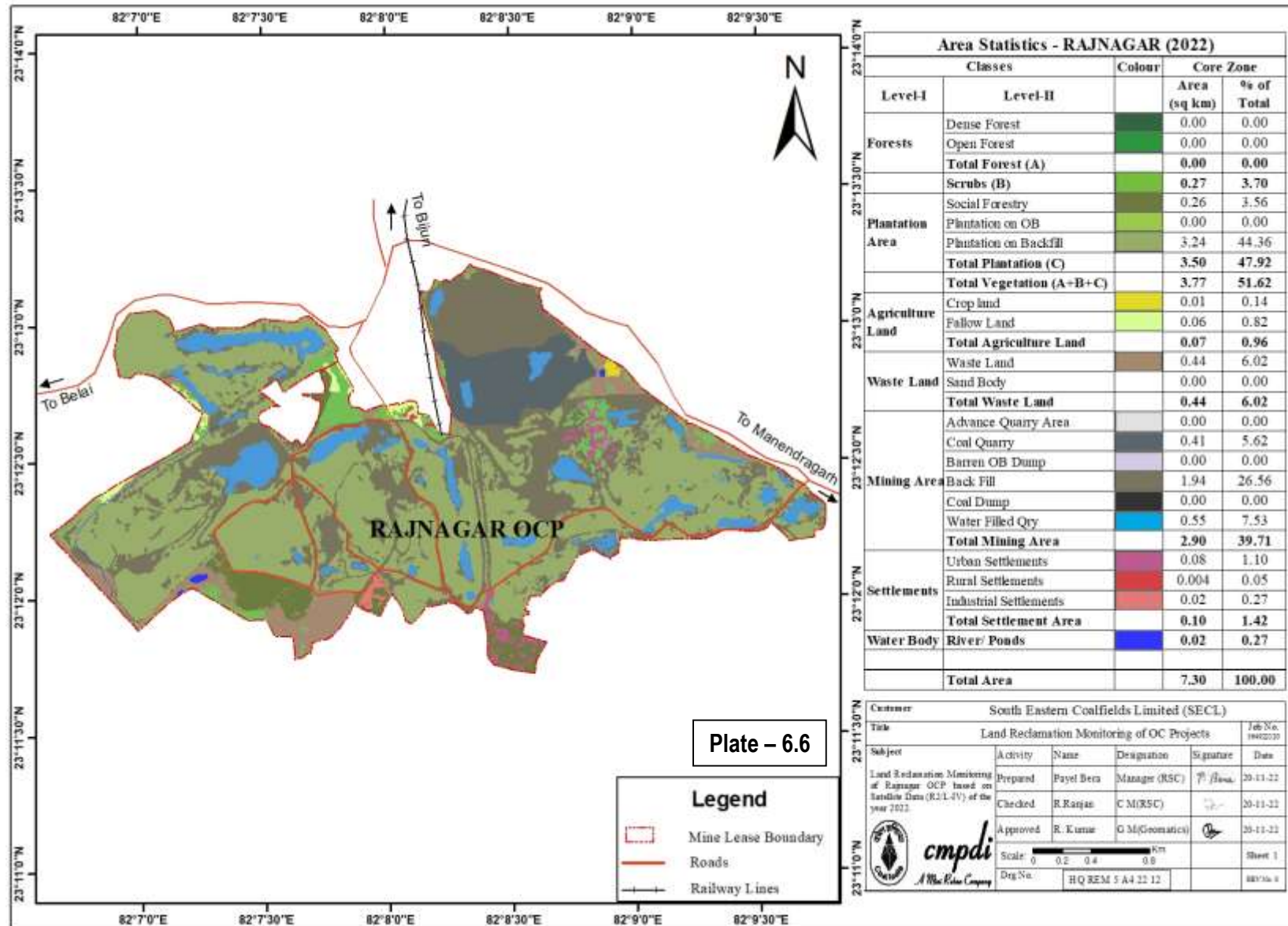
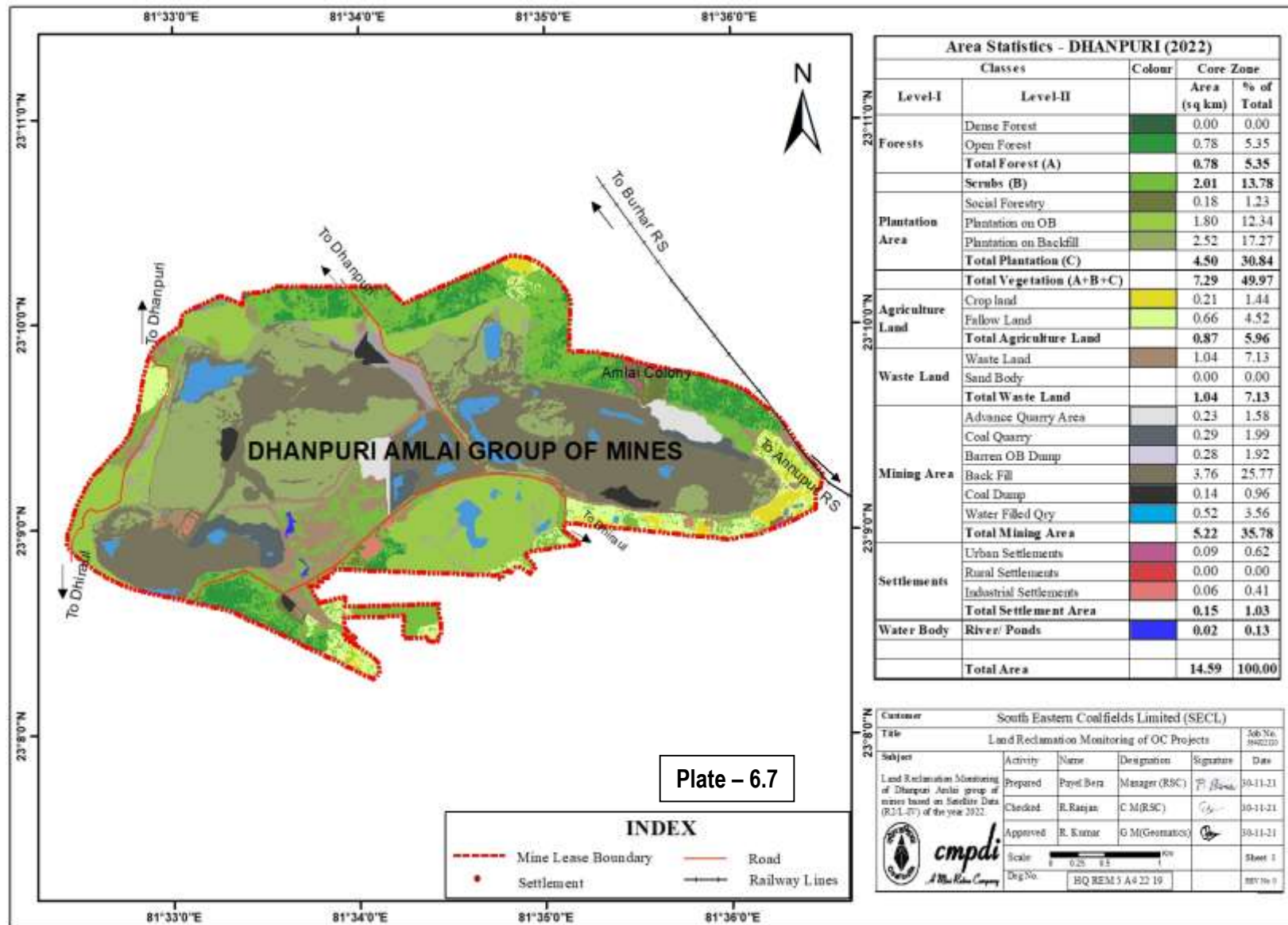
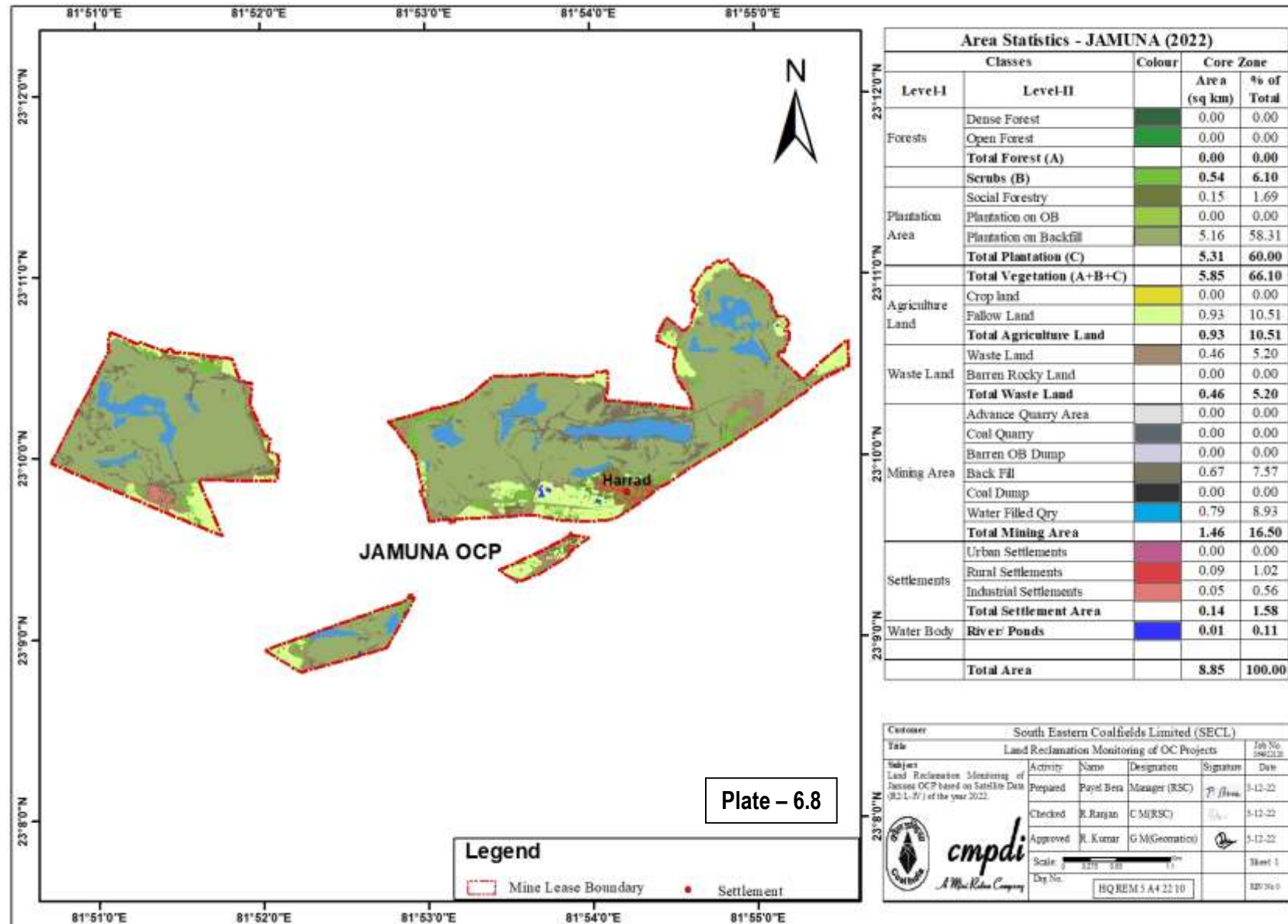


Plate - 6.4

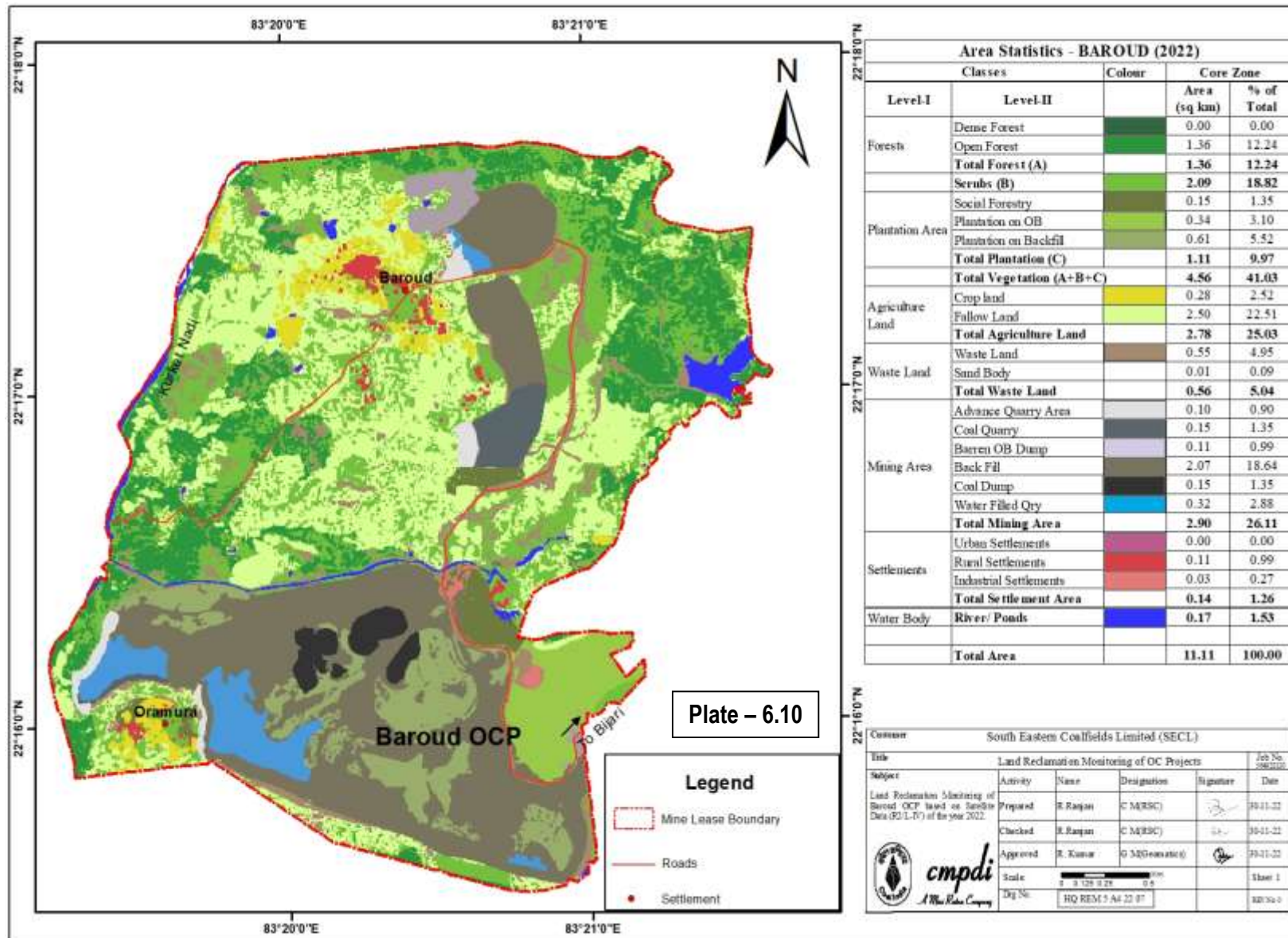


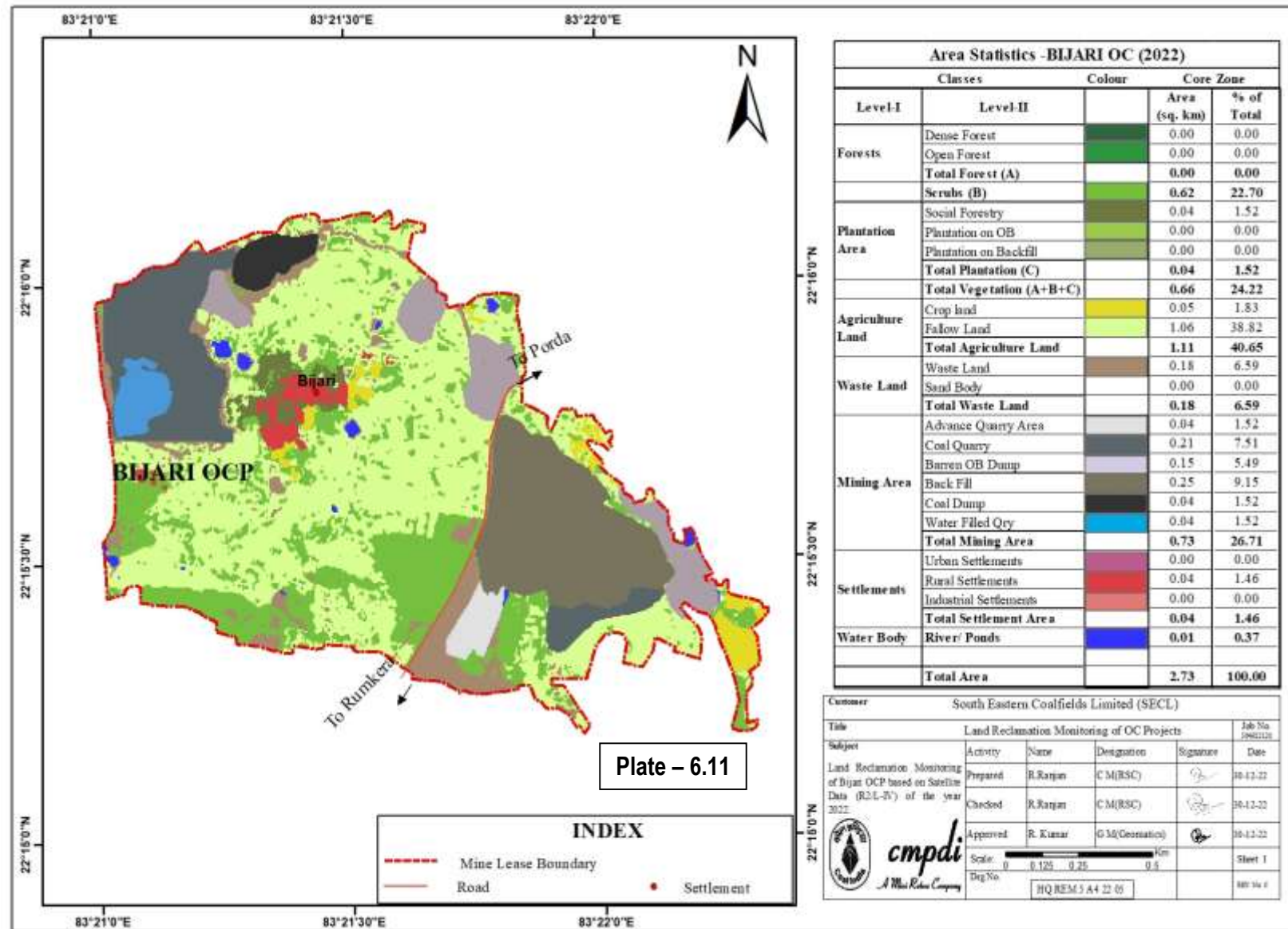


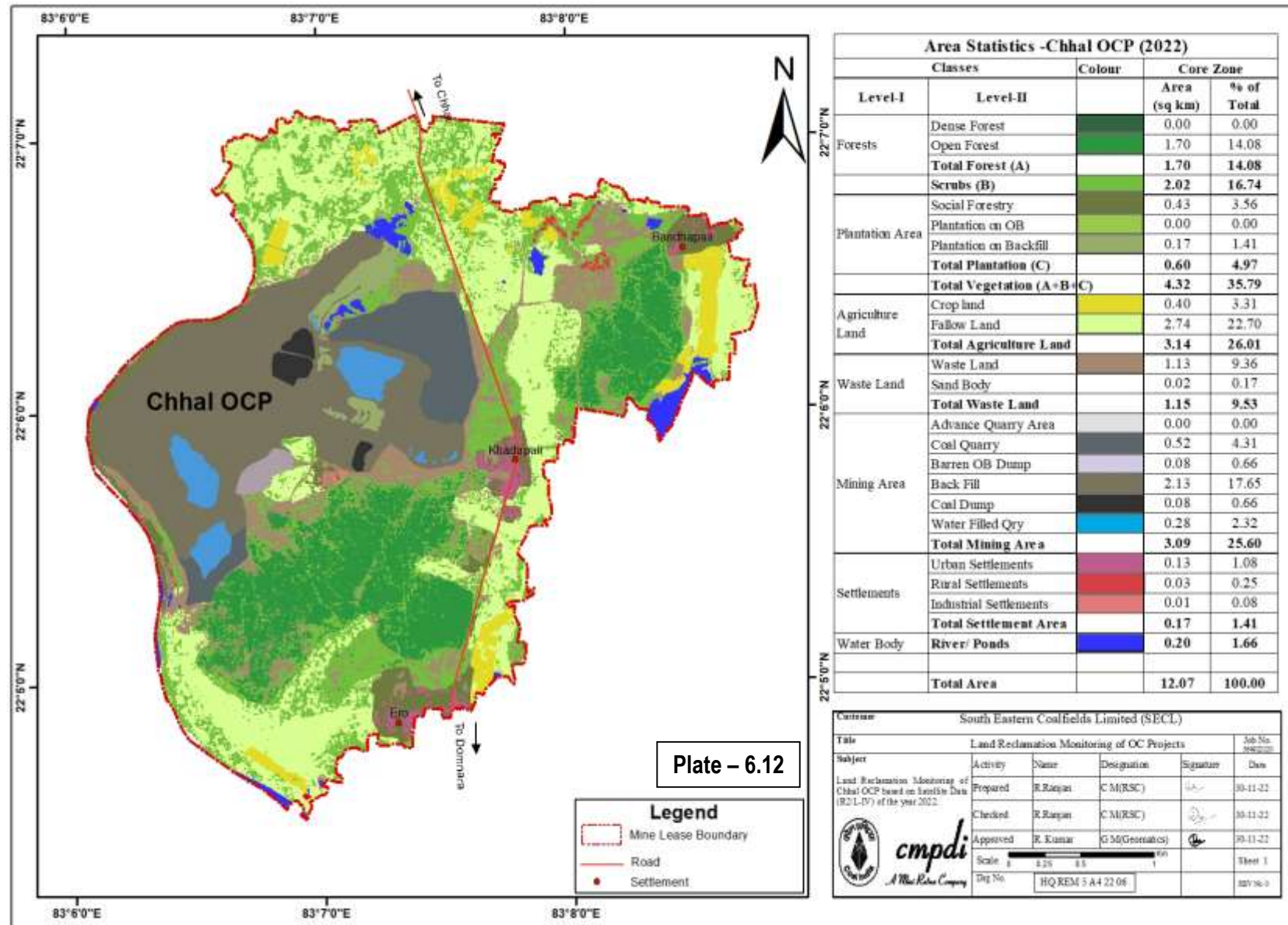


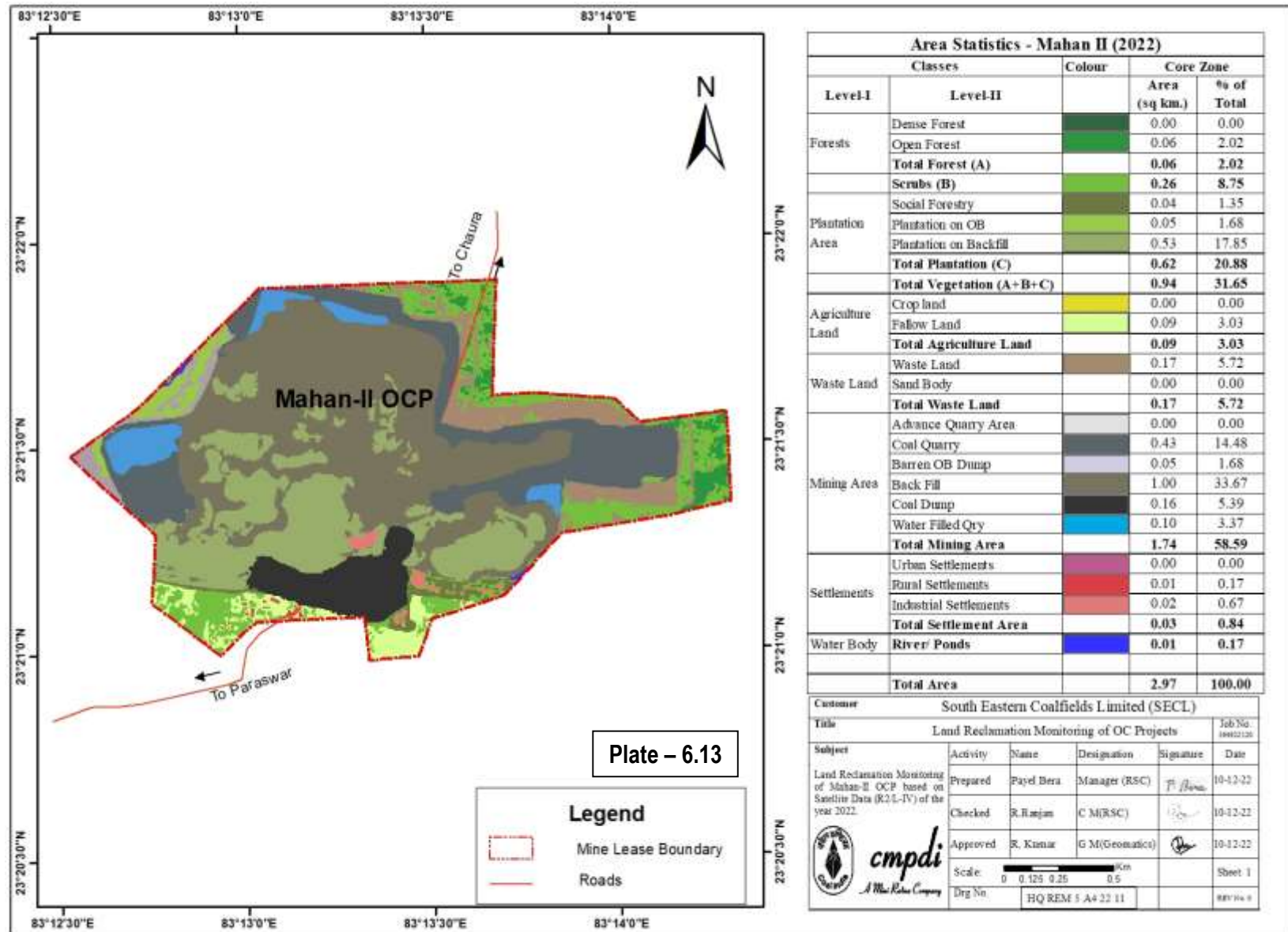


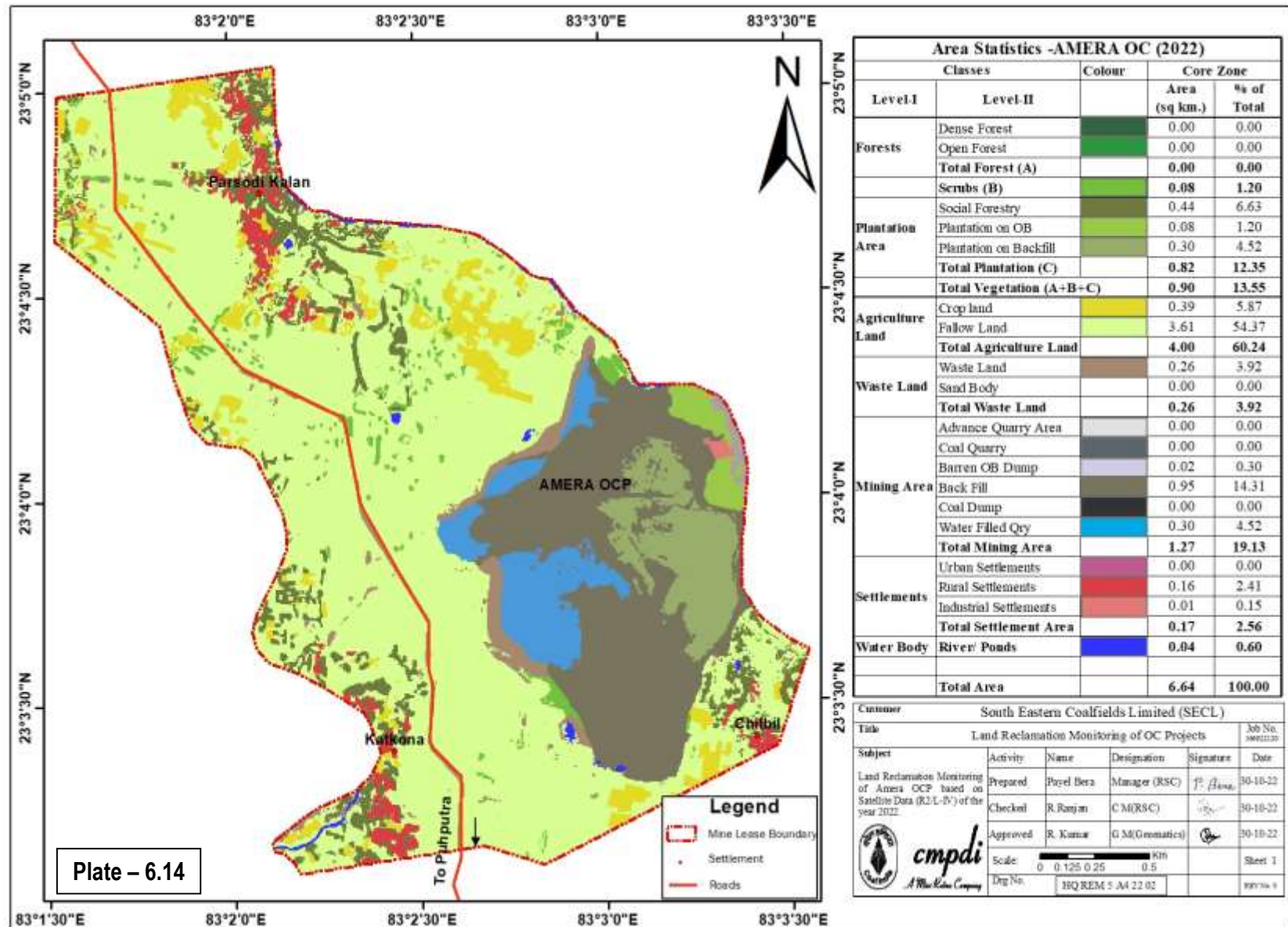


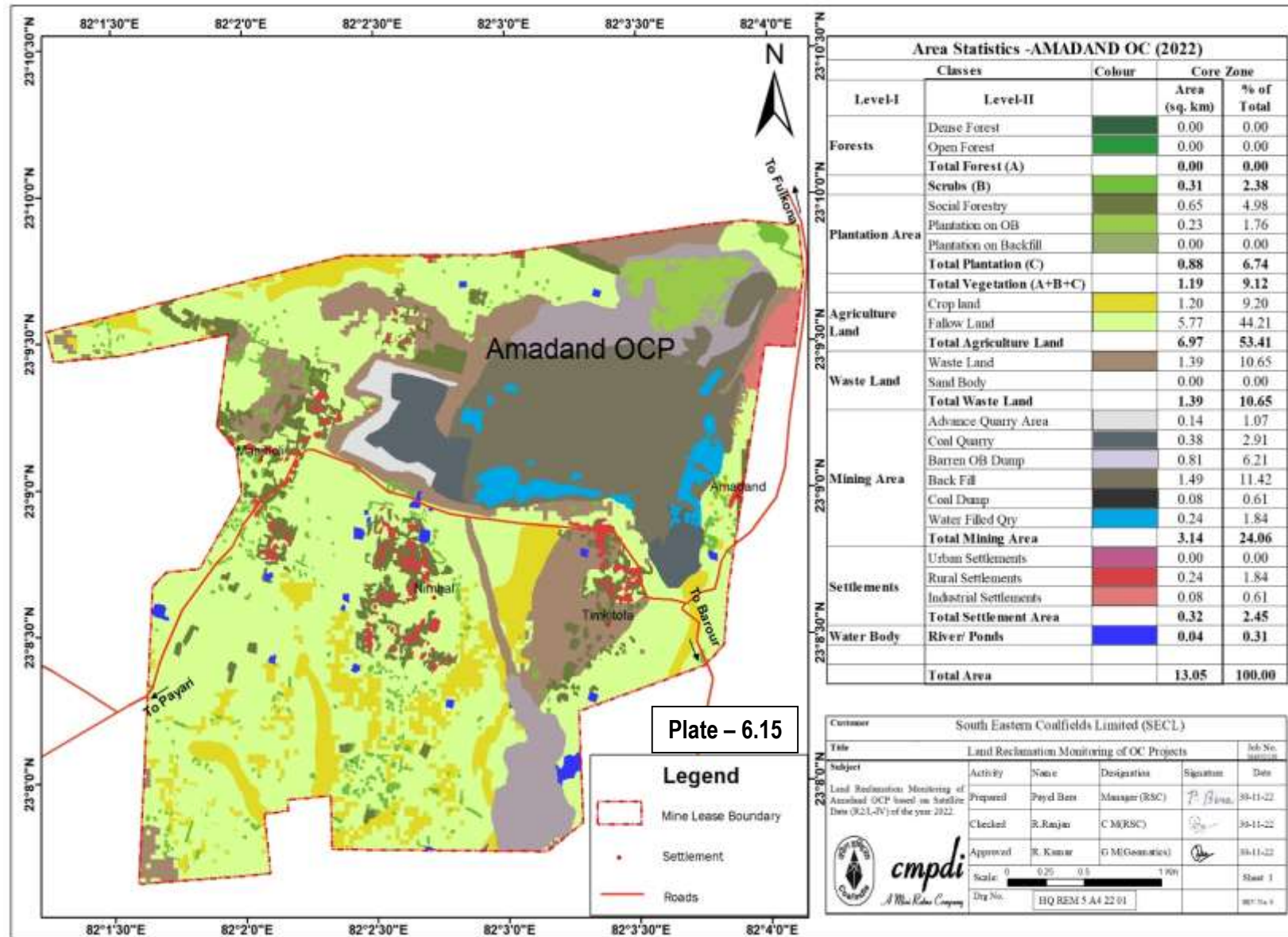


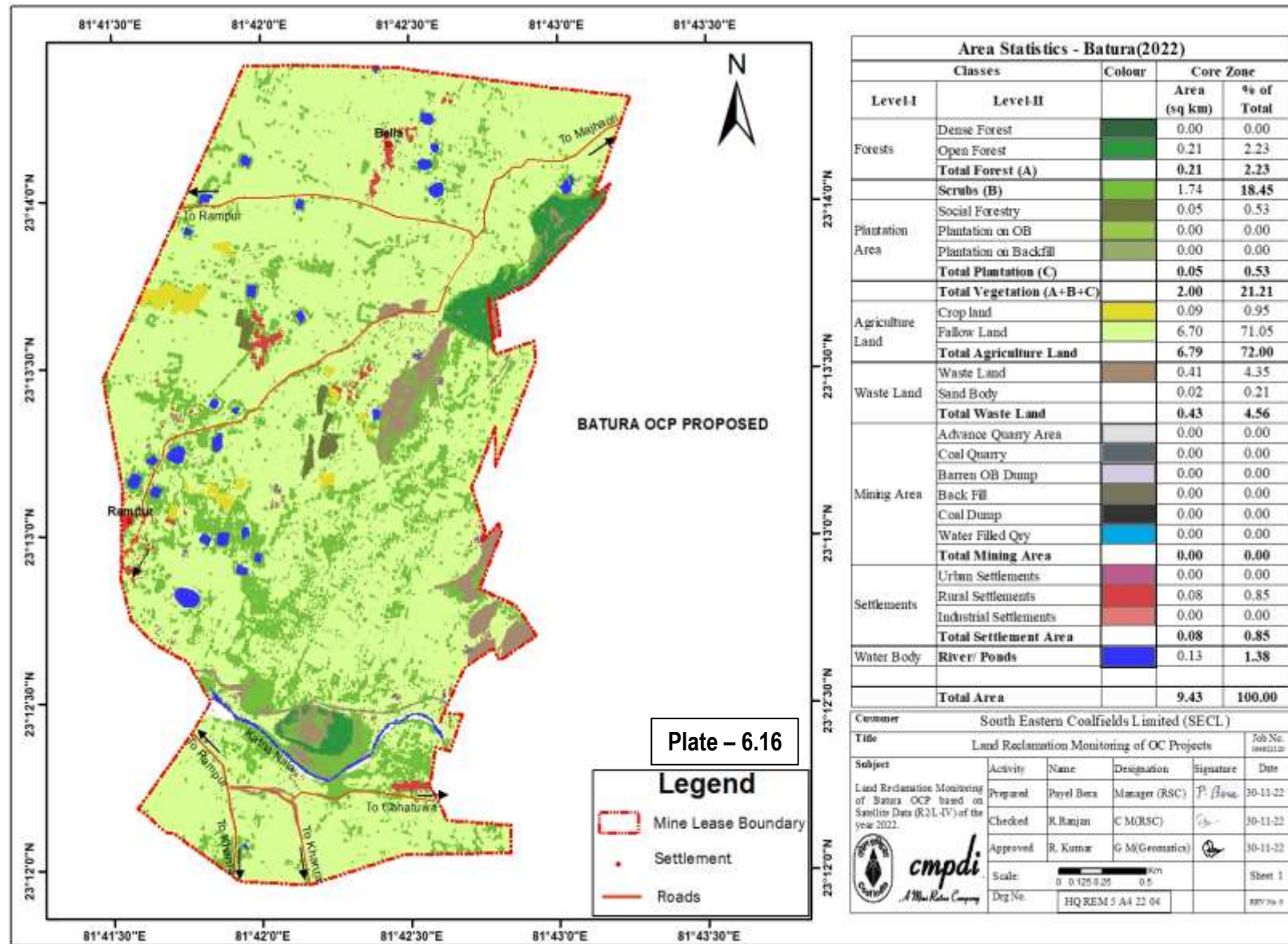


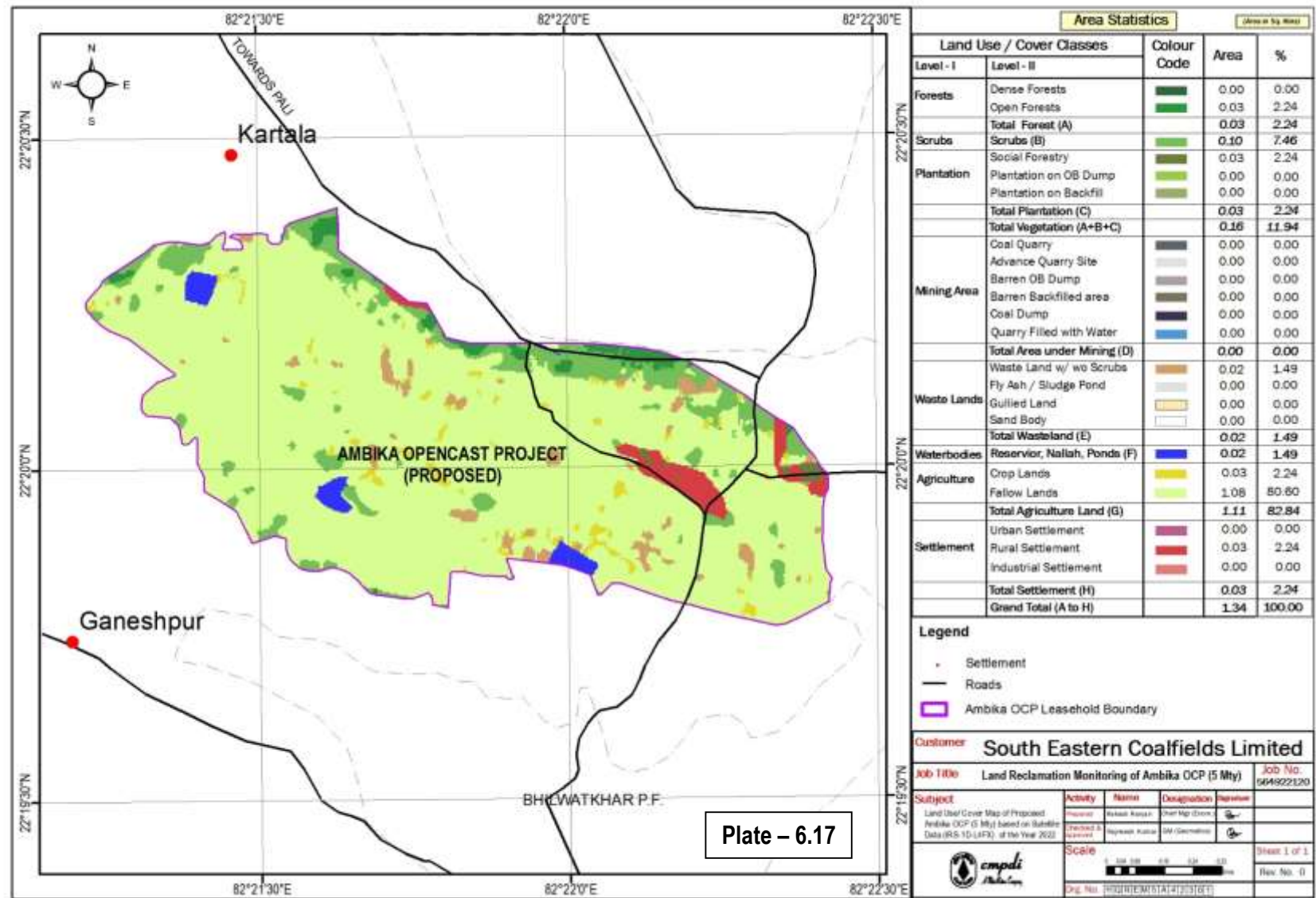


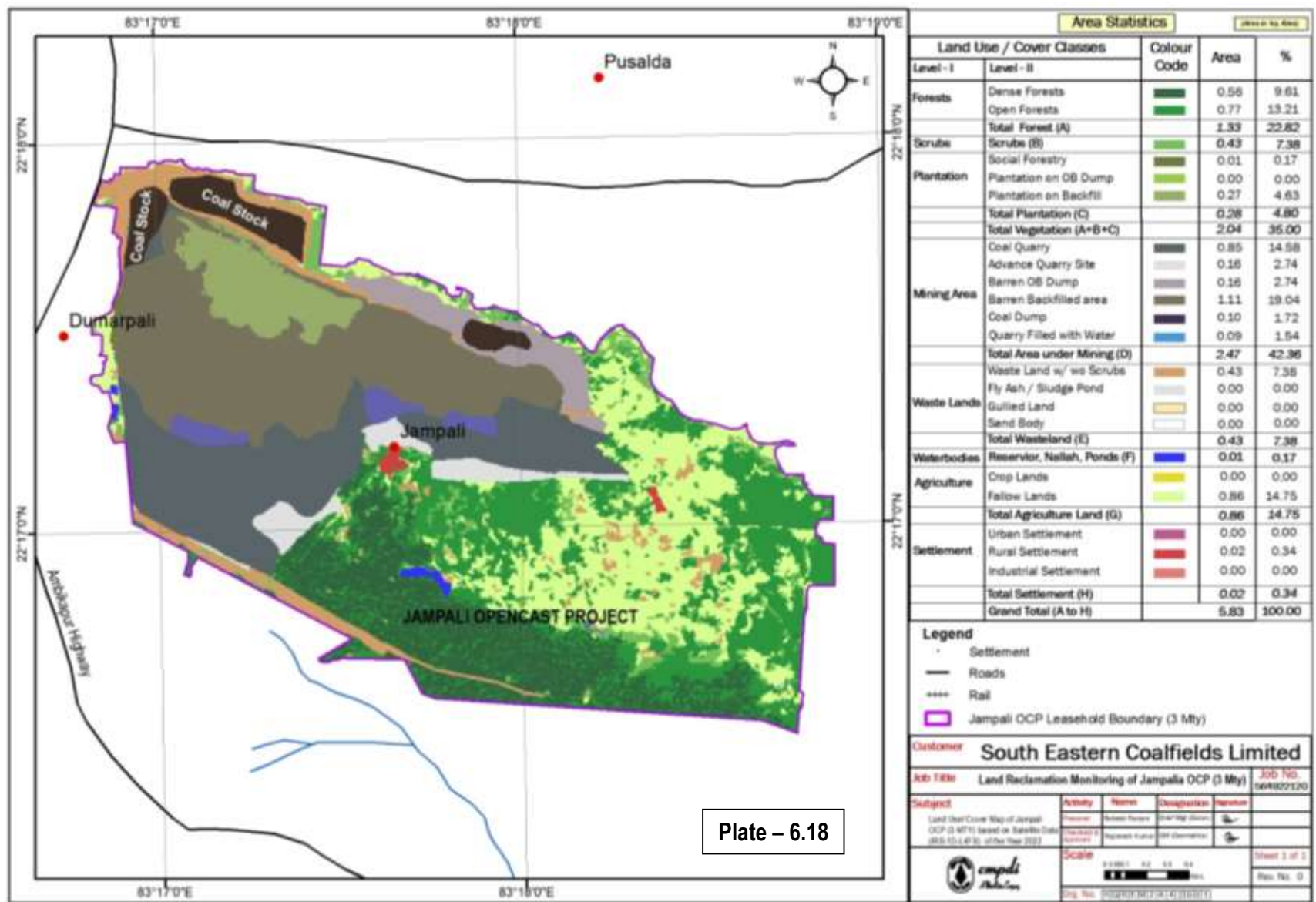


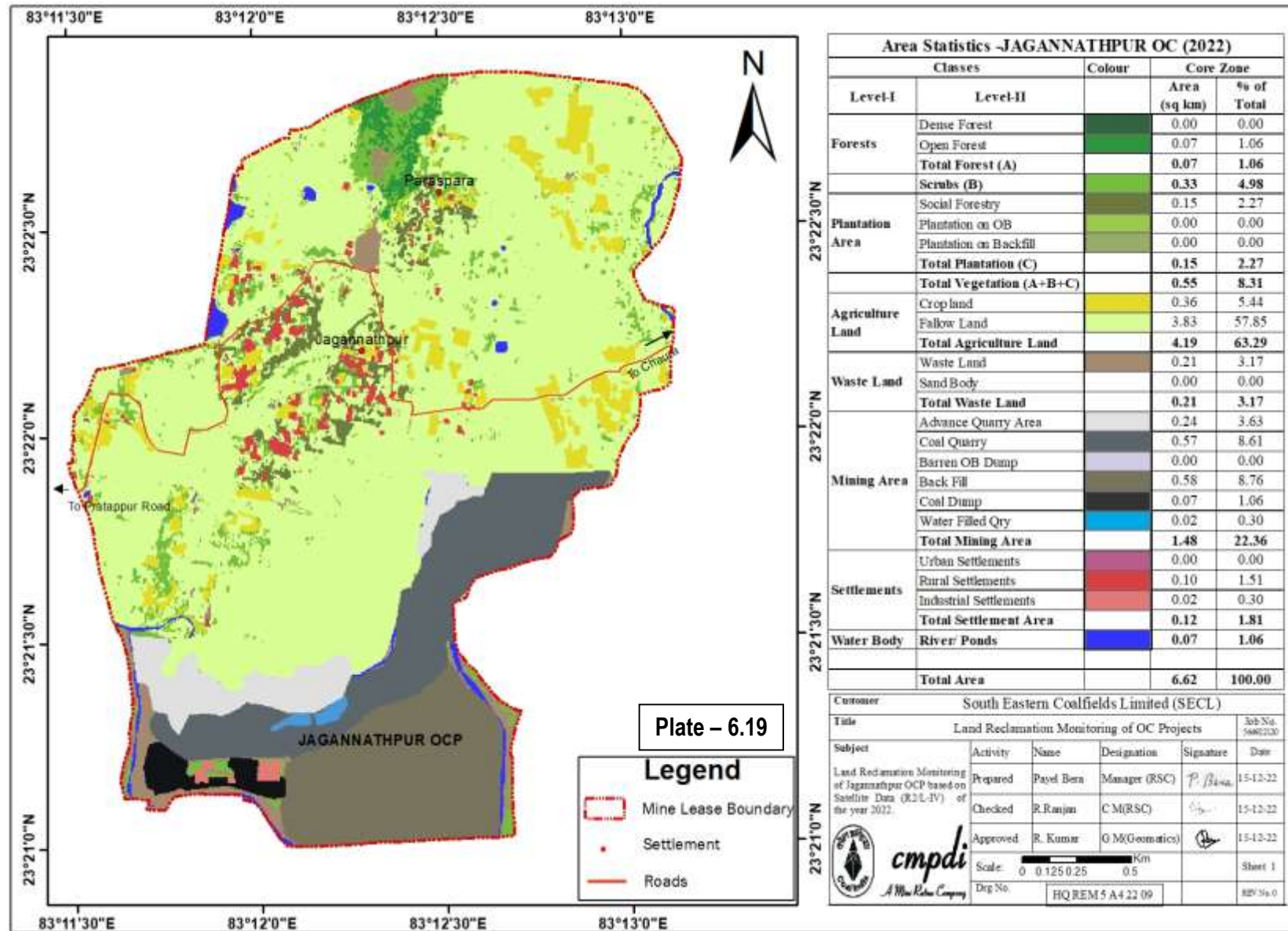












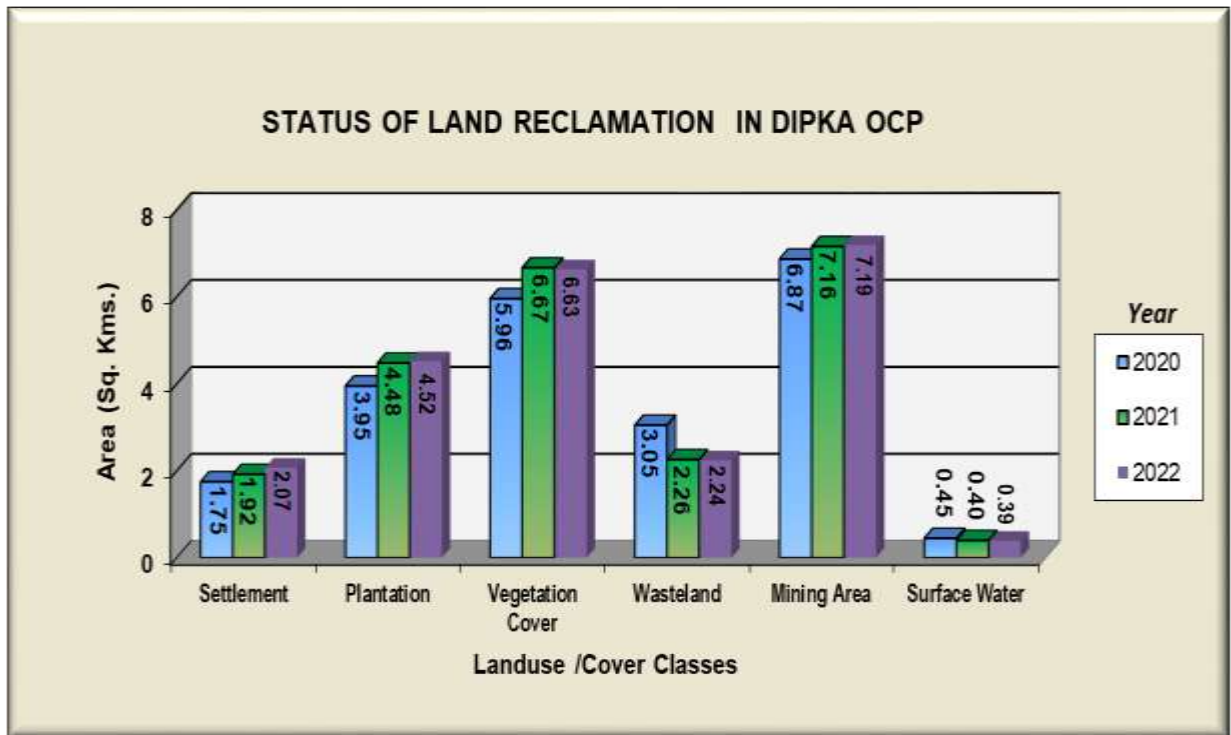


Figure 6.2

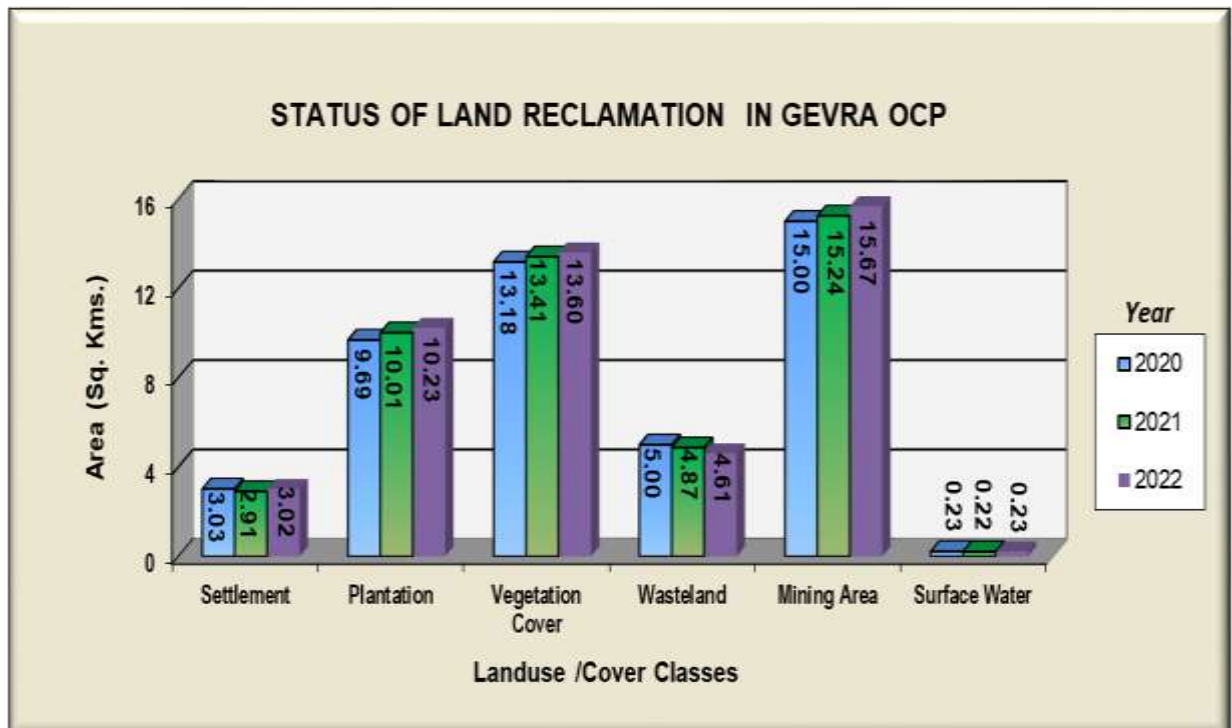


Figure 6.3

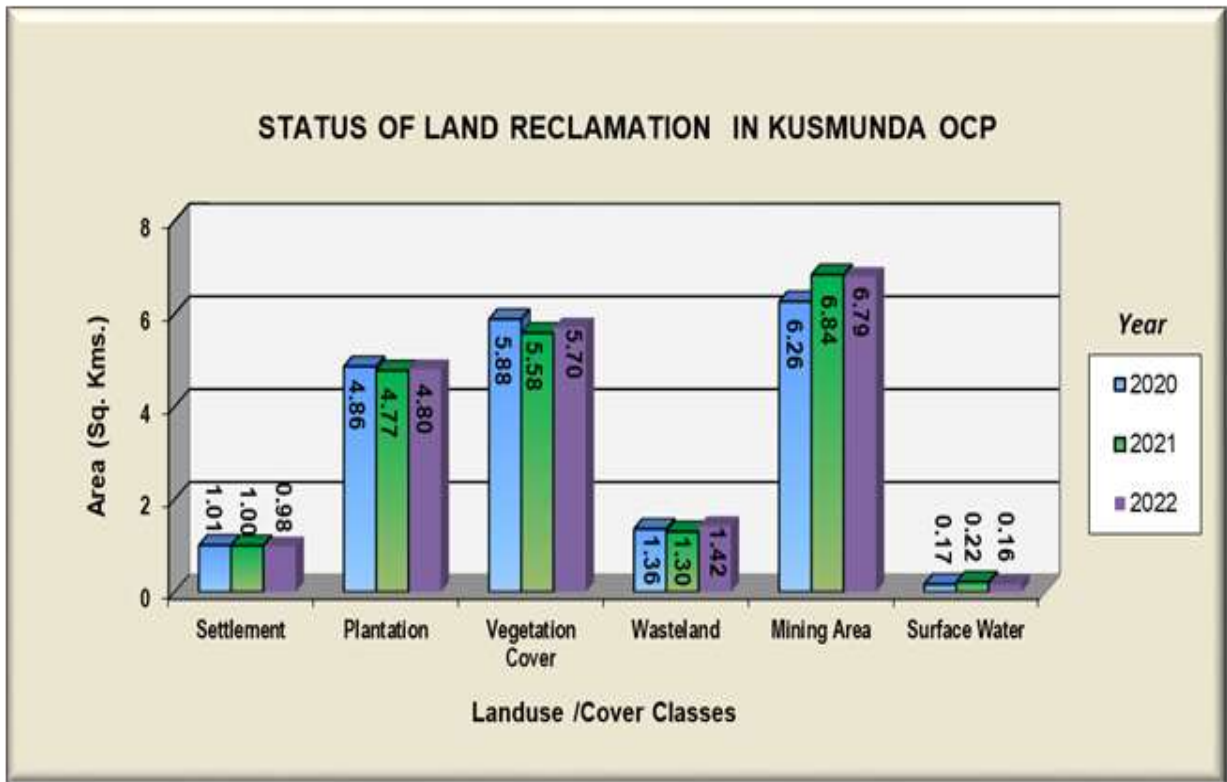


Figure 6.4

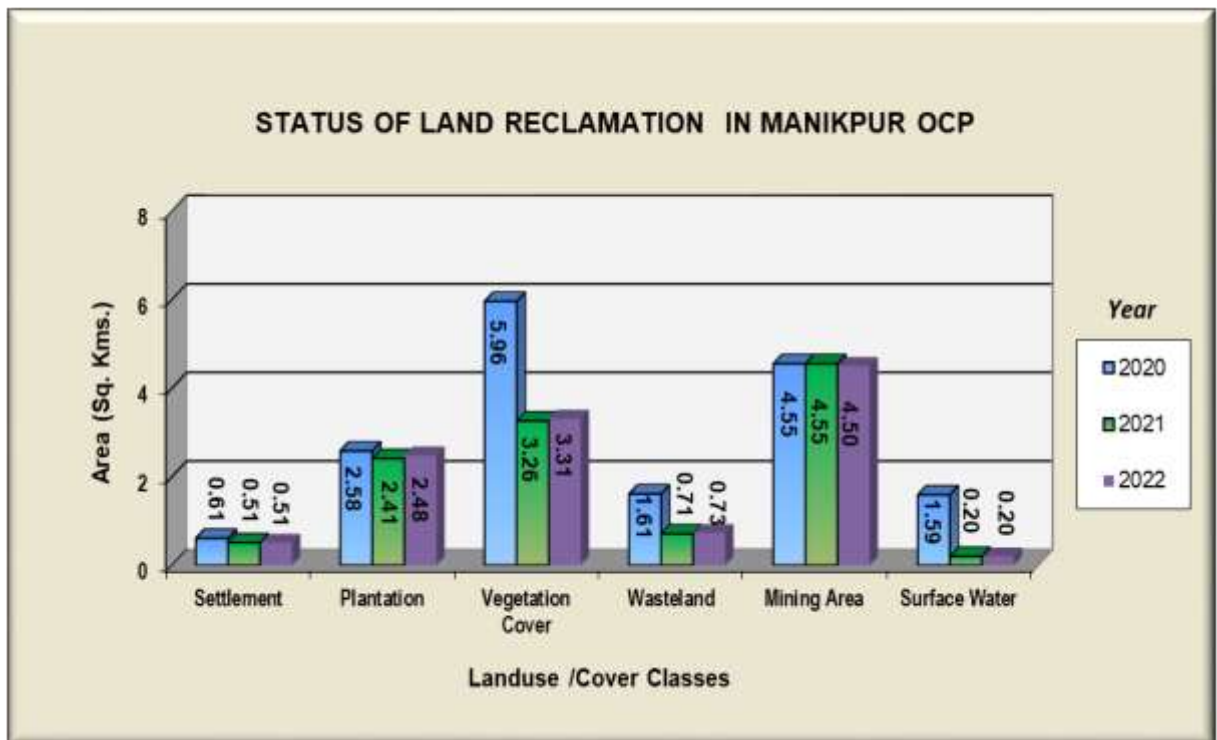


Figure 6.5

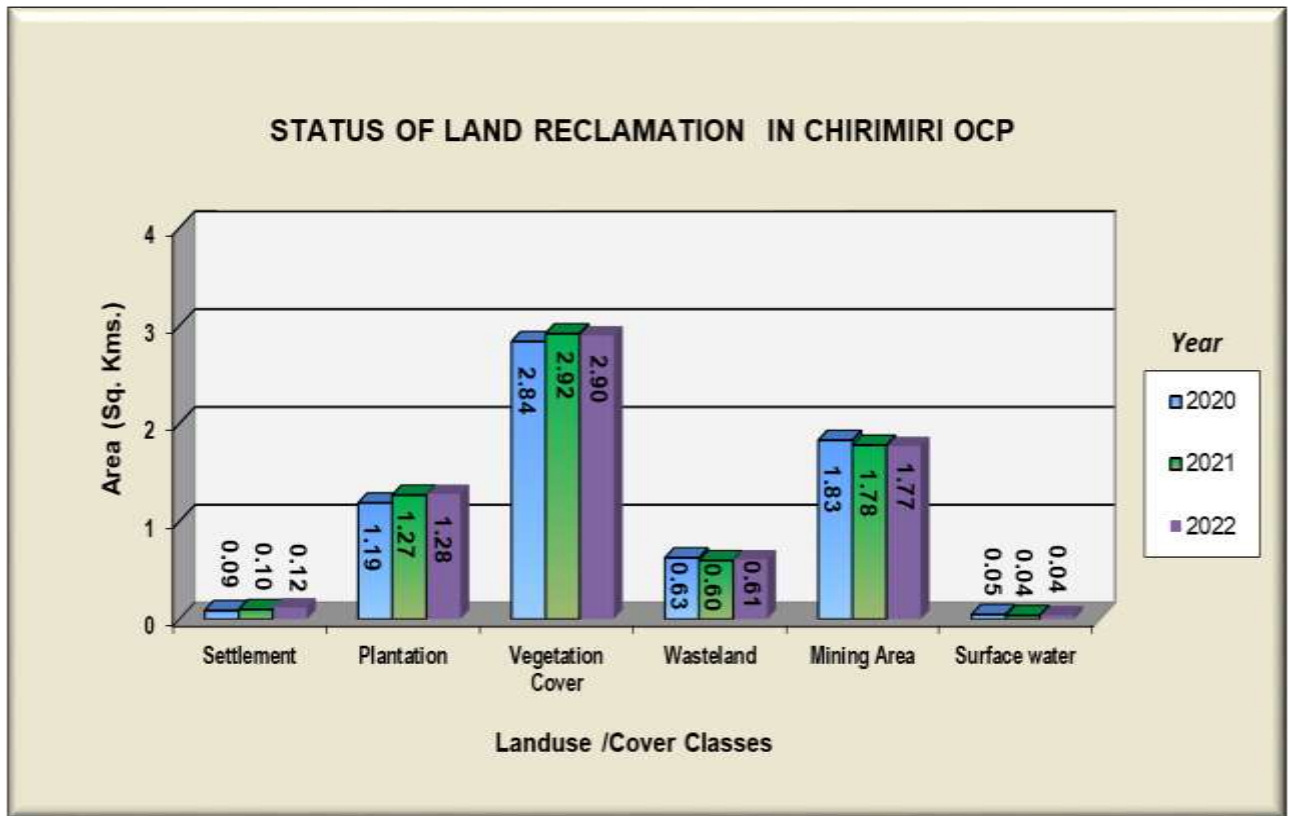


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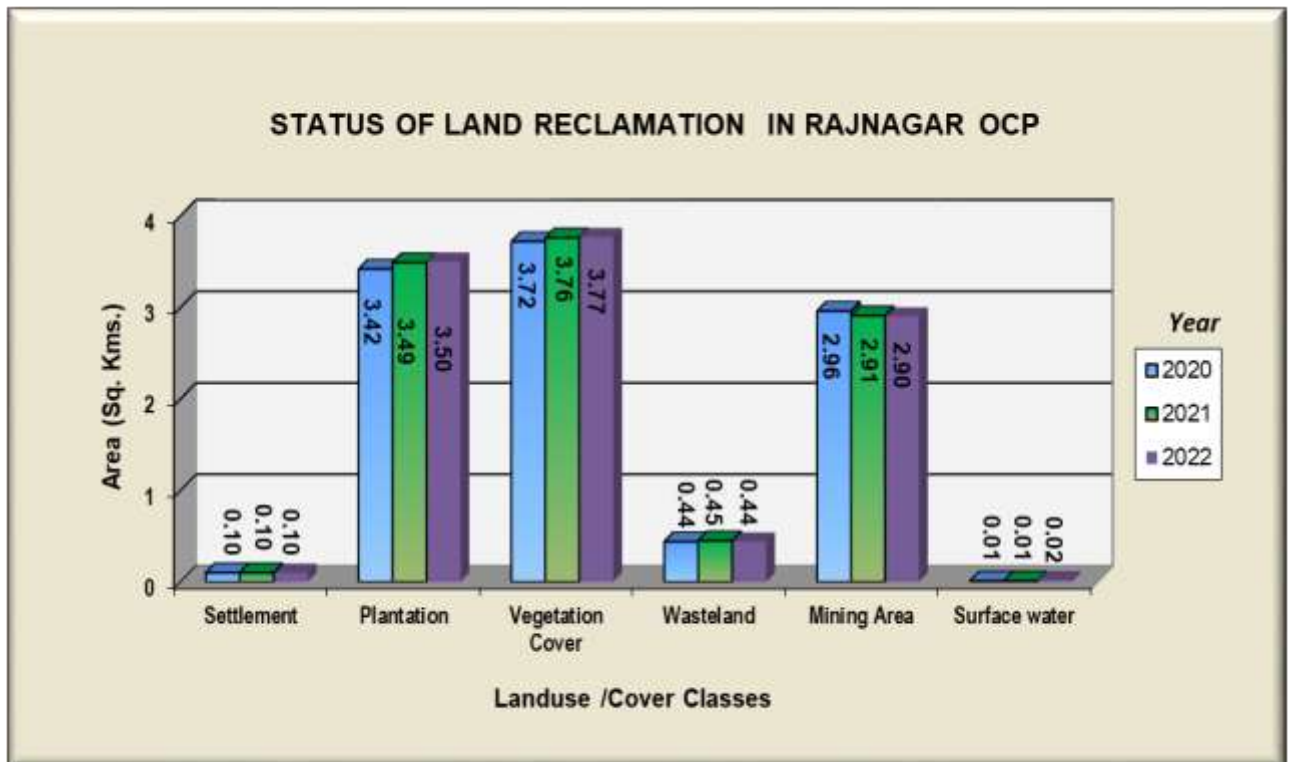


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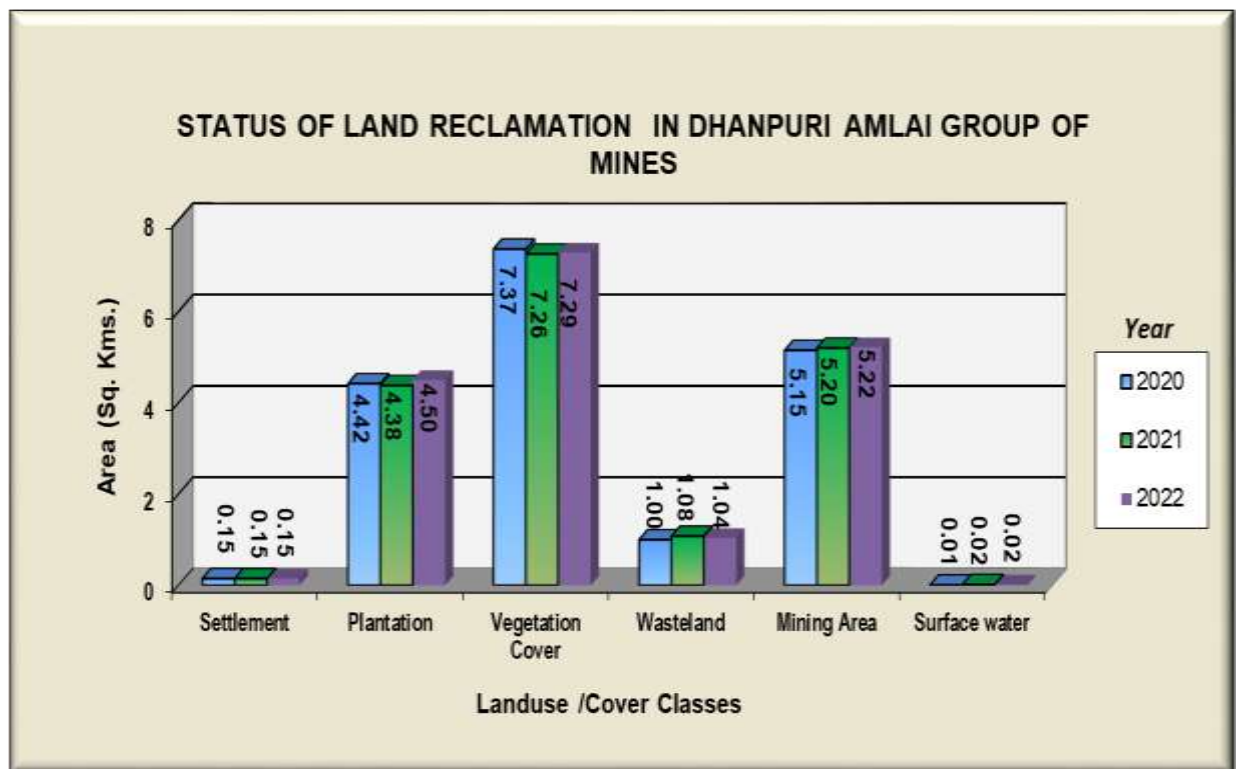


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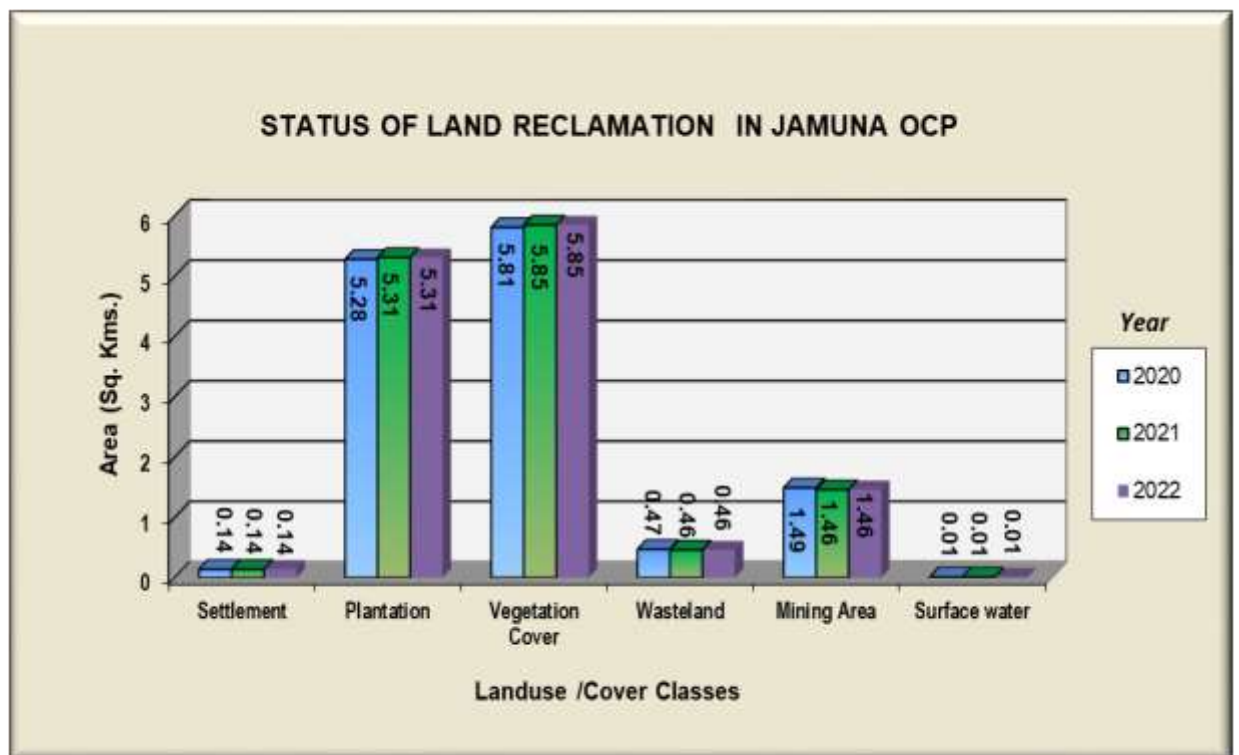


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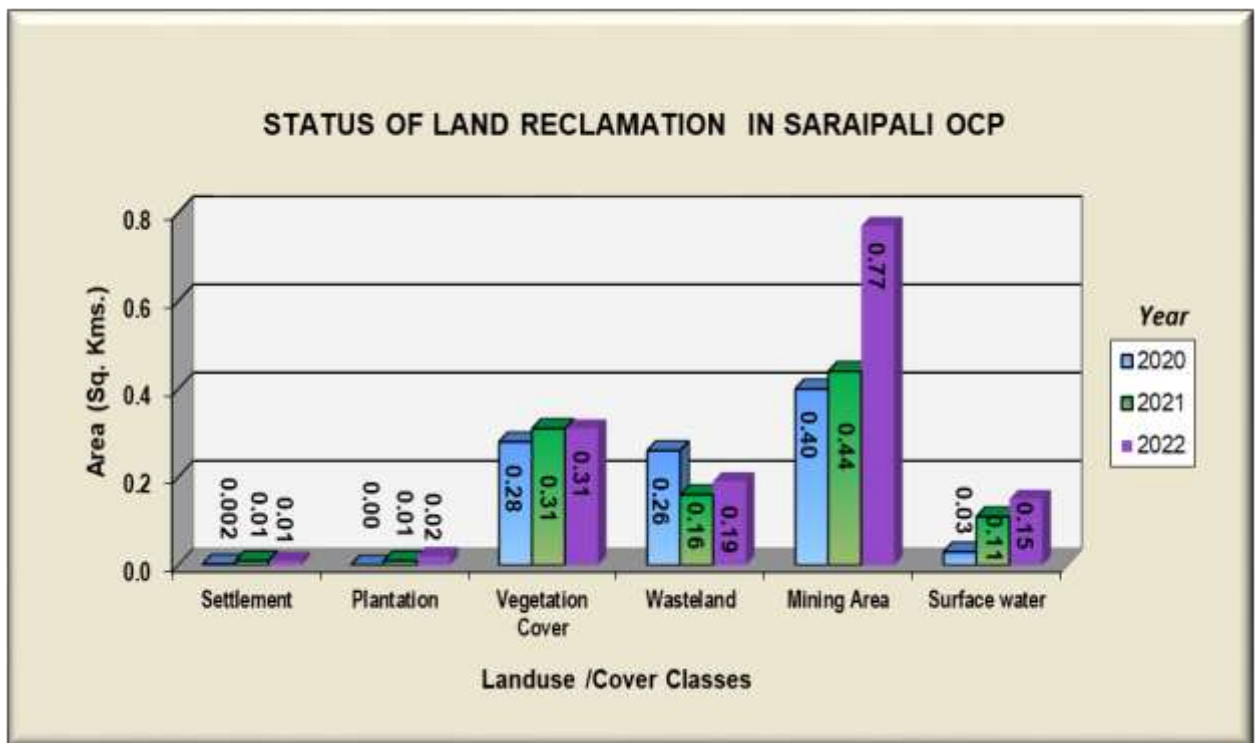


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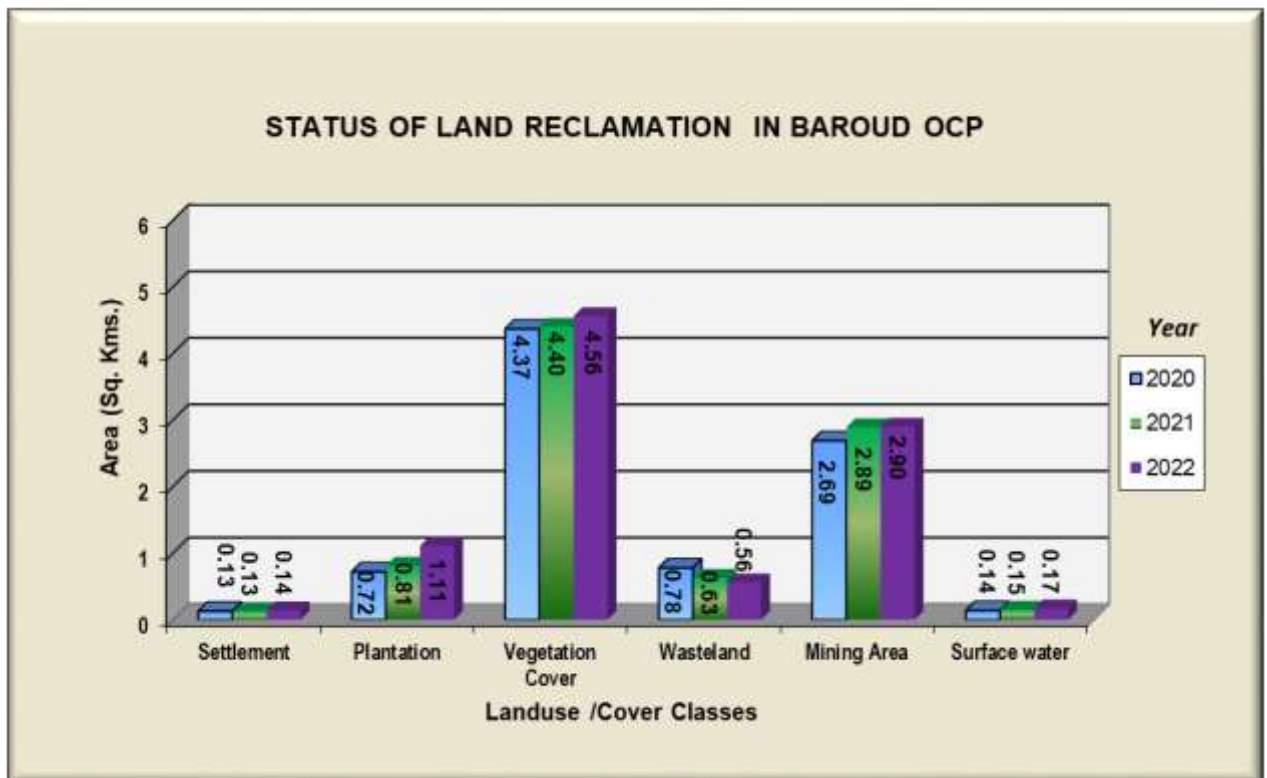


Figure 6.11

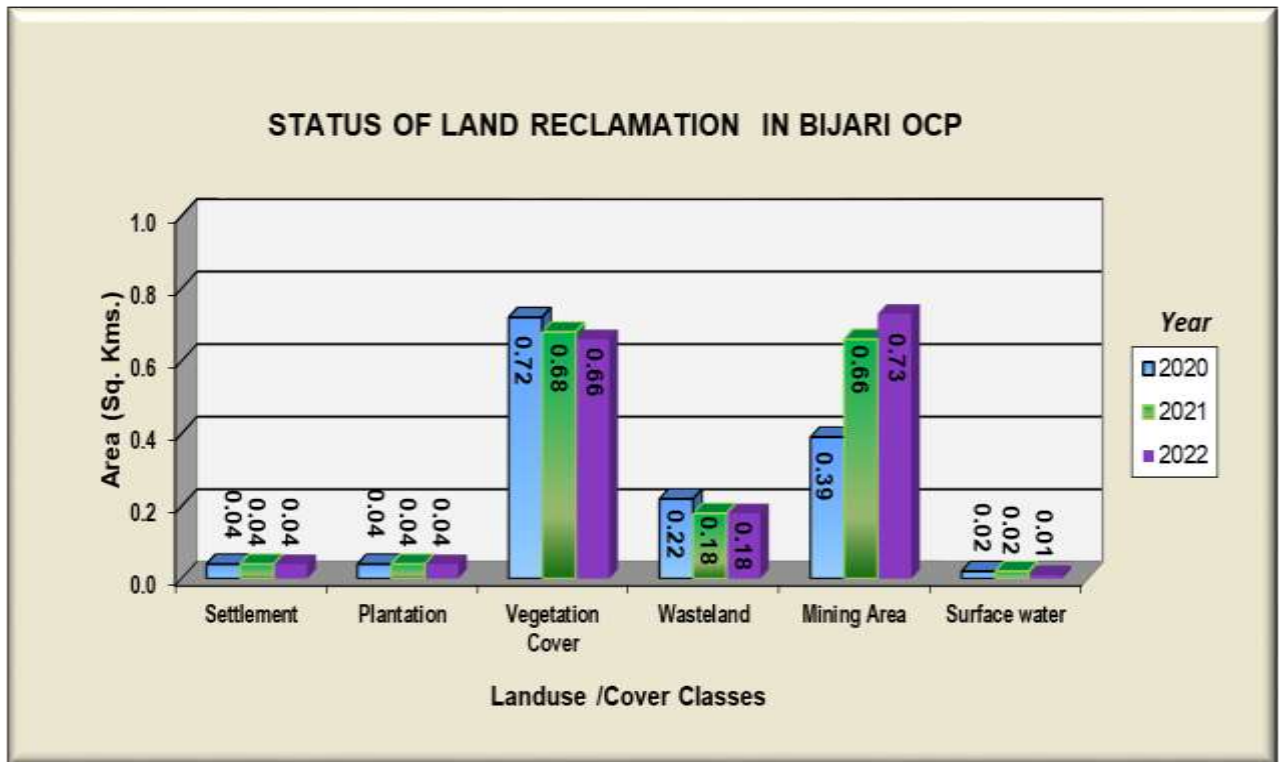


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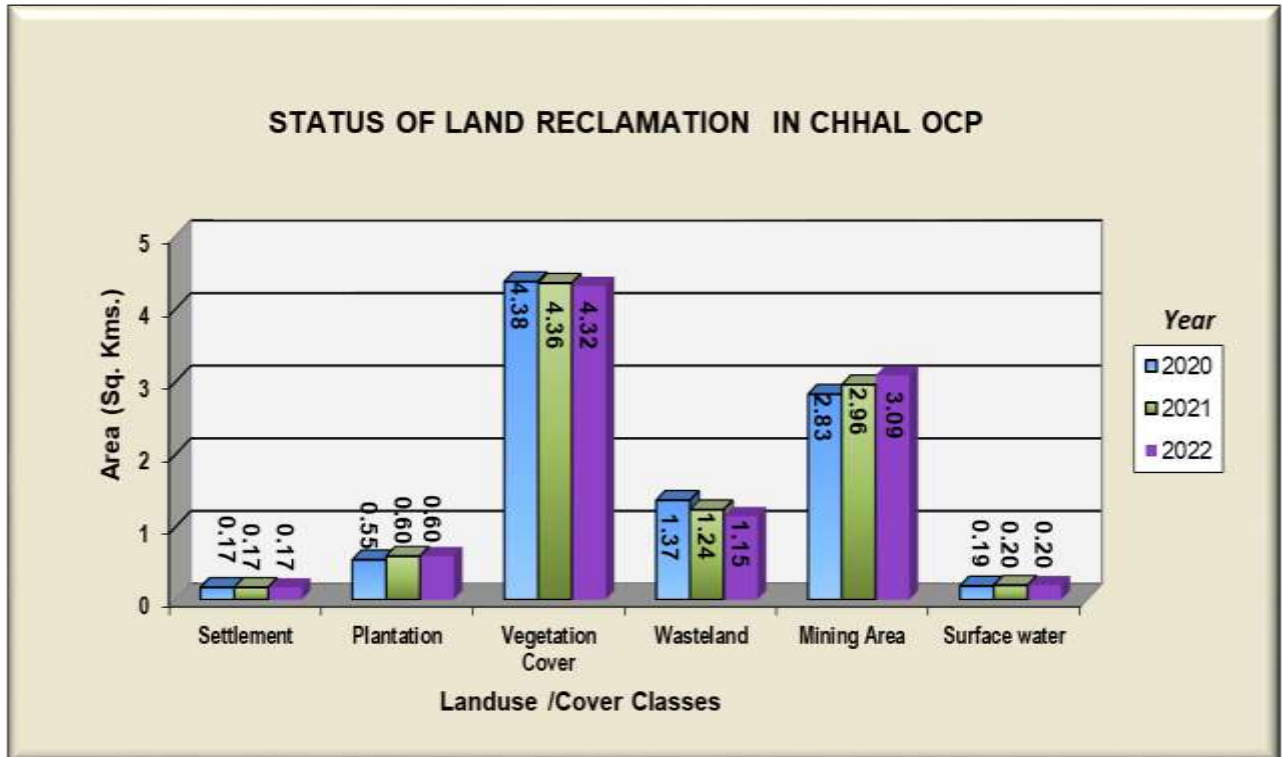


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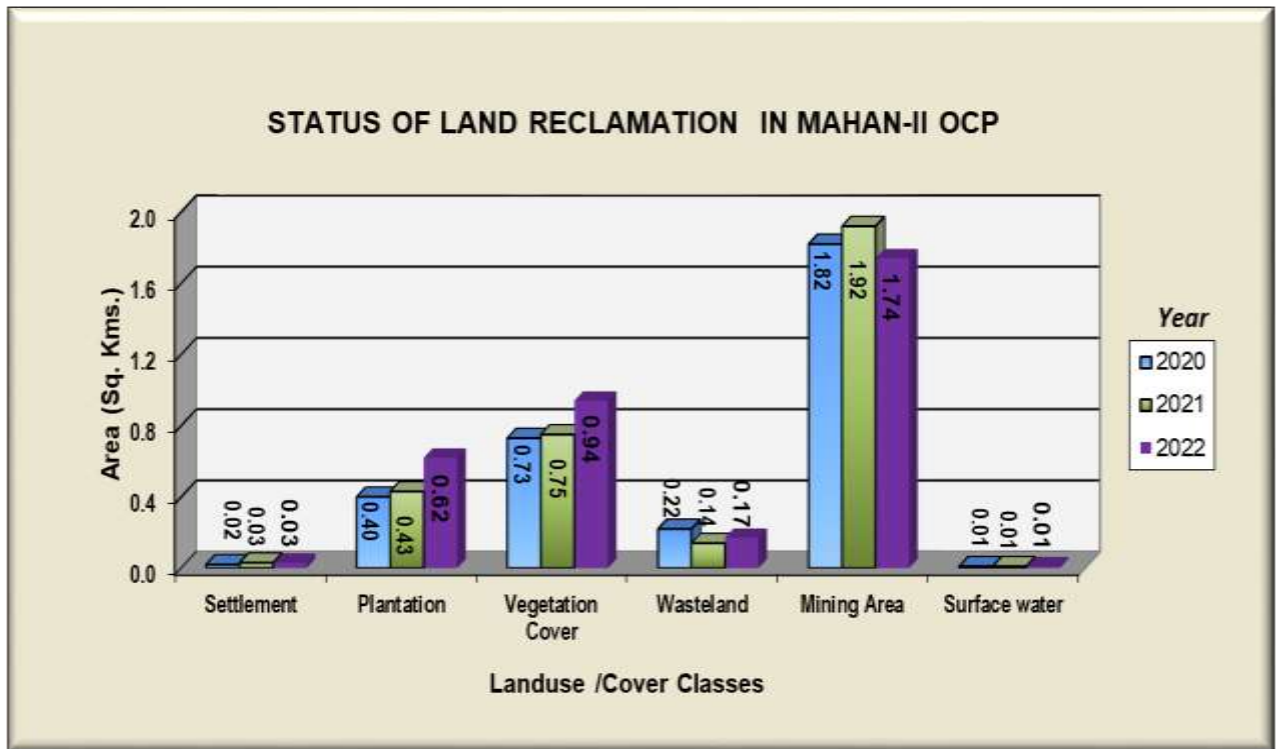


Figure 6.14

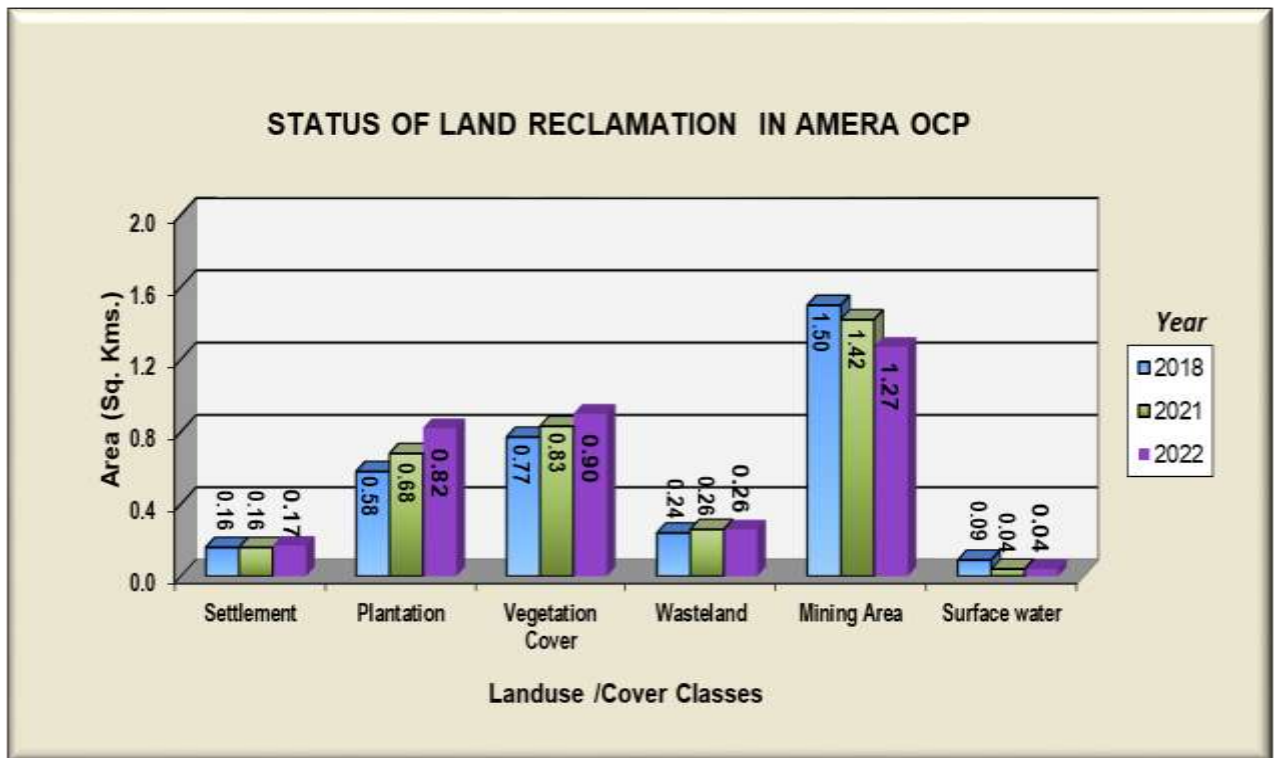


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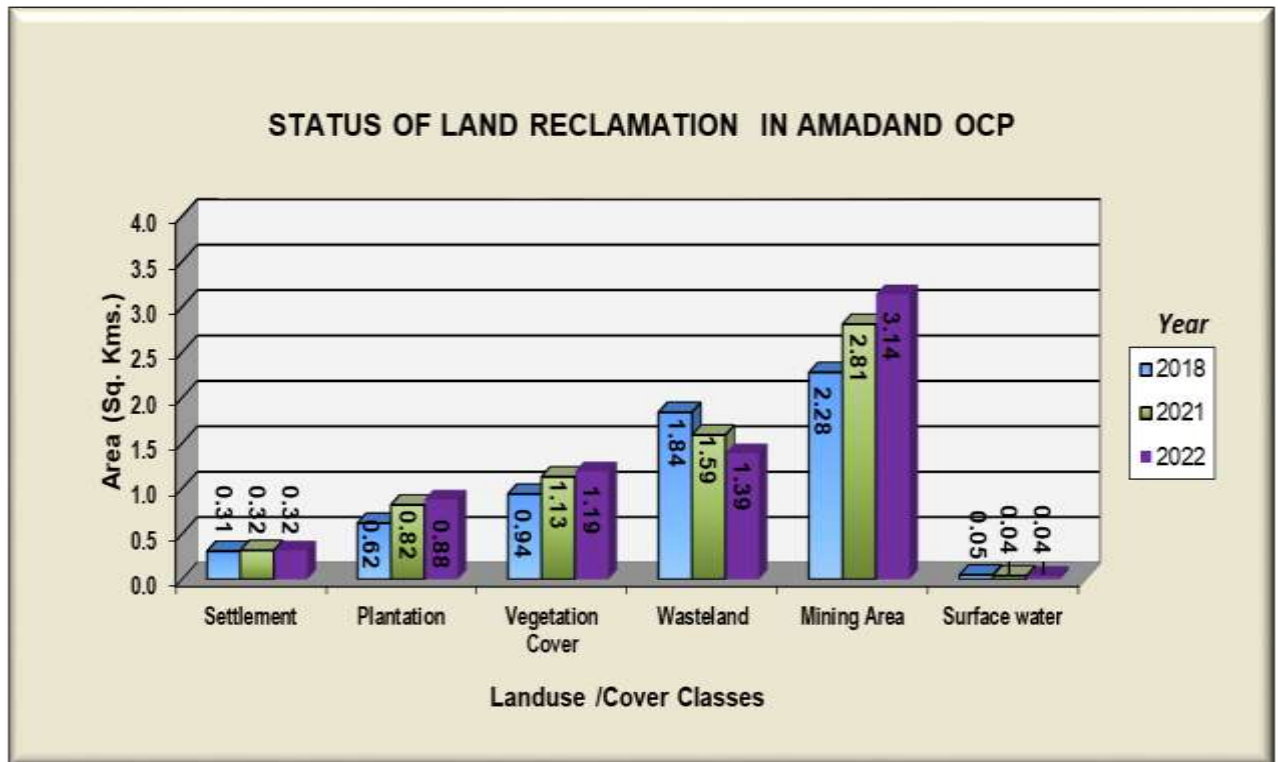


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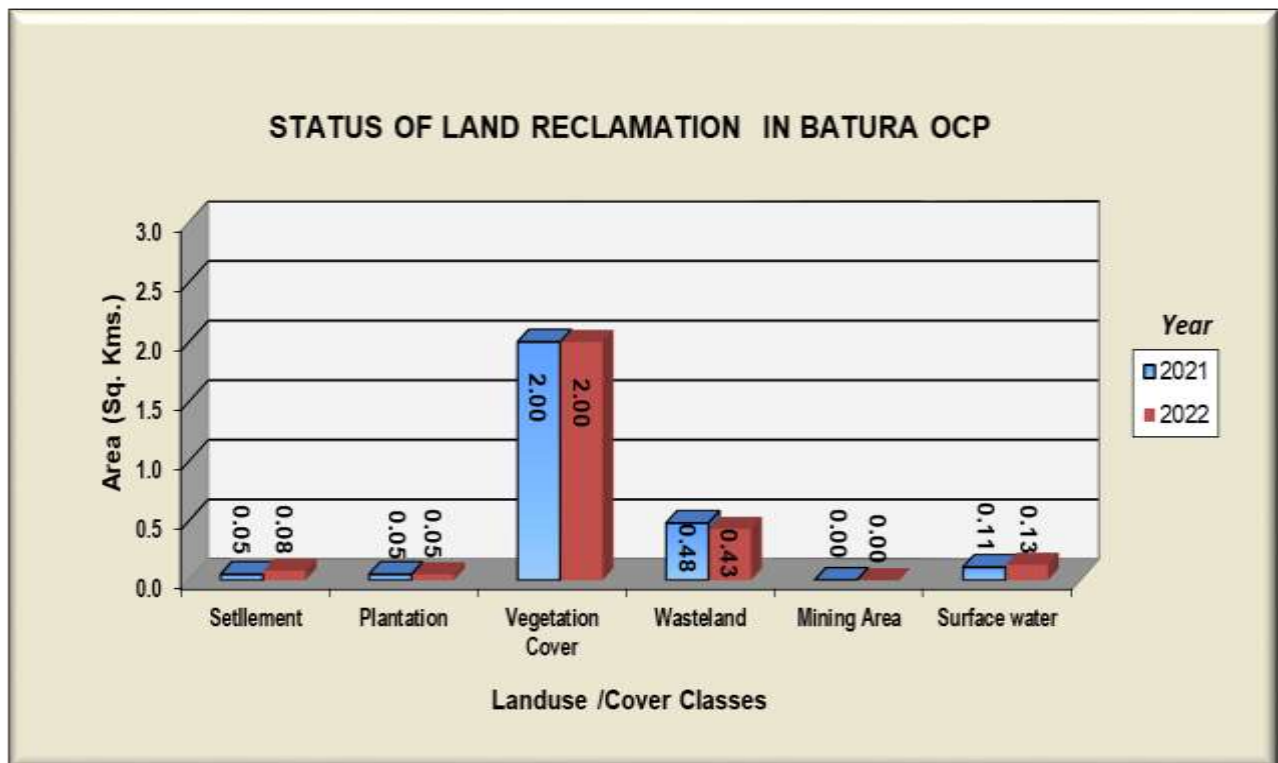


Figure 6.17

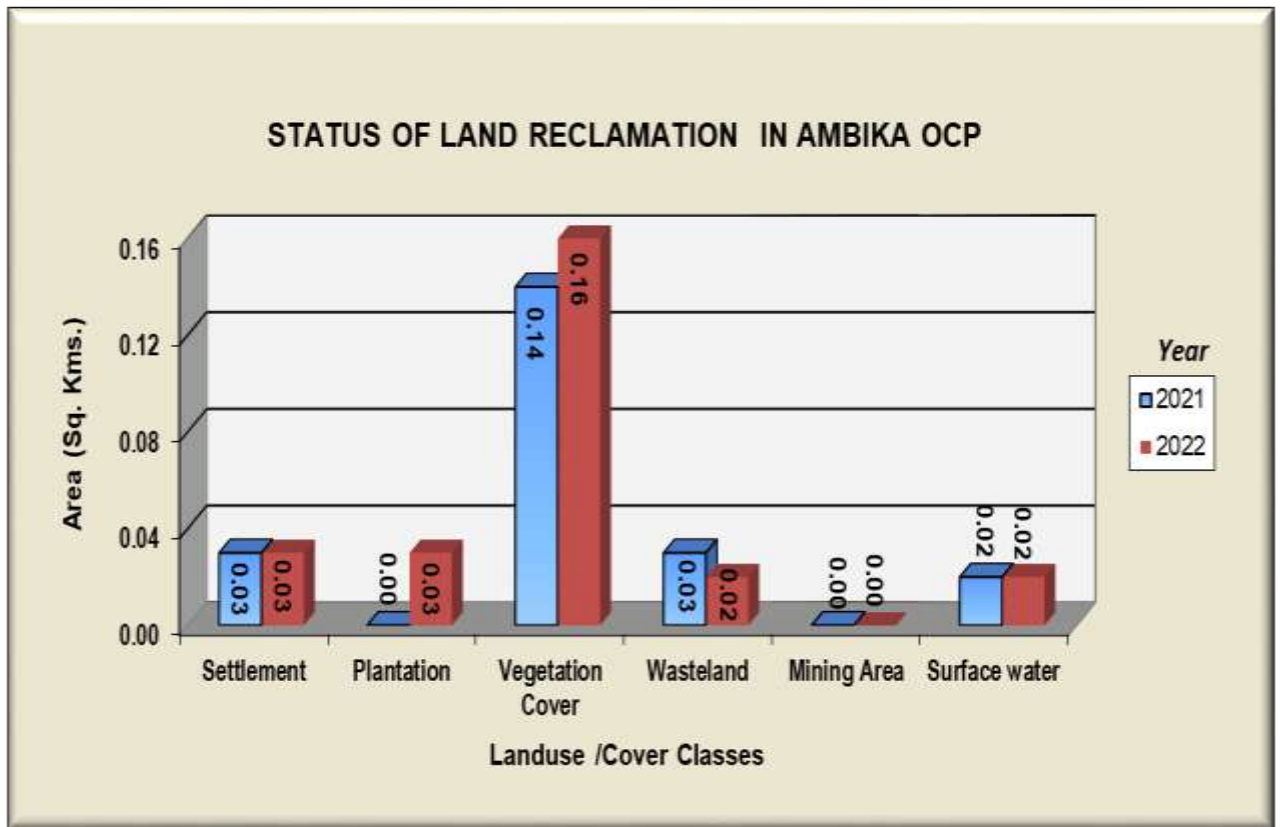


Figure 6.18

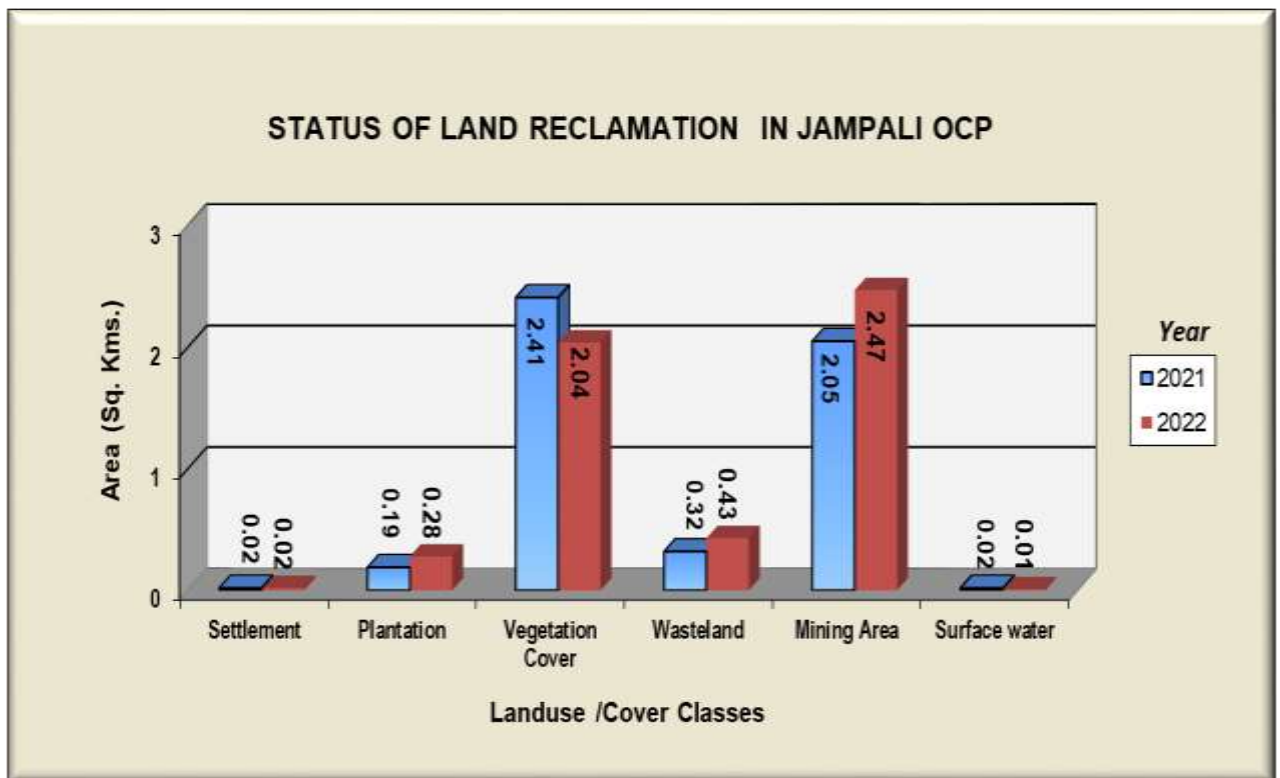


Figure 6.19

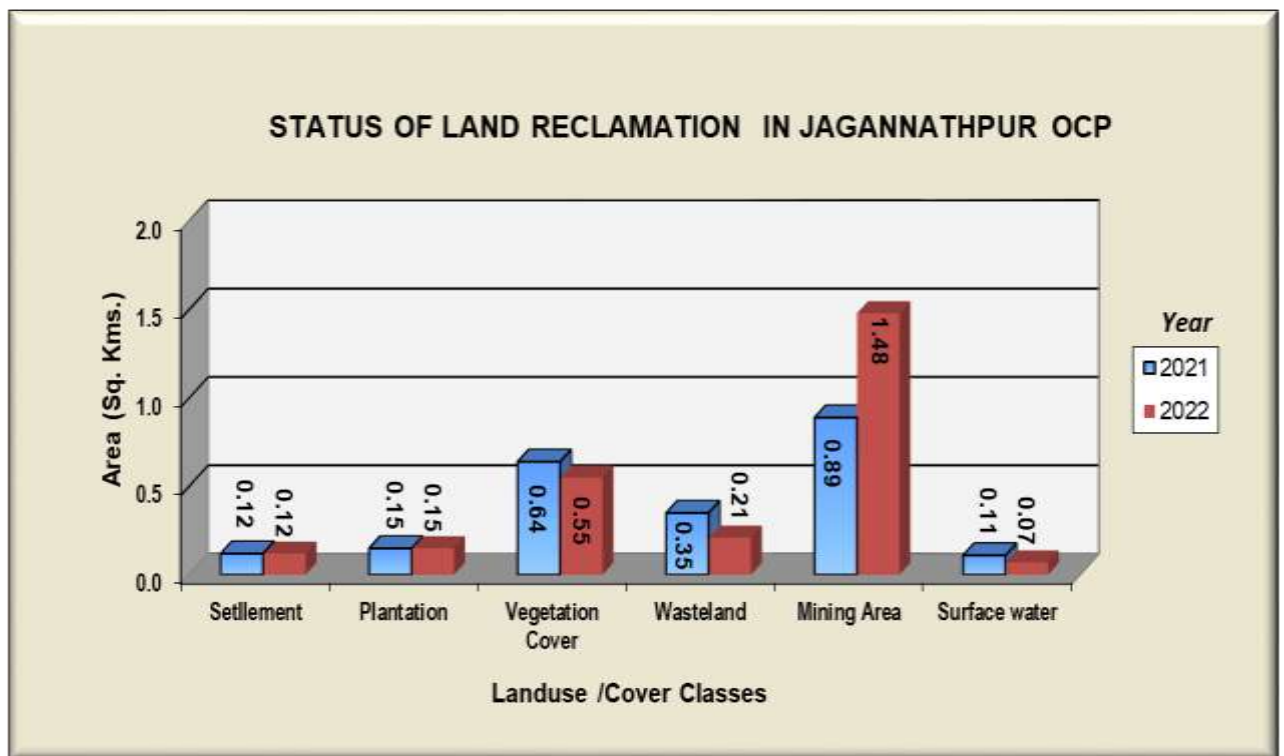


Figure 6.20



Photograph – 6.1: **Backfilling in Dipka Opencast Project**



Photograph – 6.2: **Plantation on Backfilled/OB Dumps in Dipka Opencast Project**



Photograph – 6.3: **Backfilling in Gevra Opencast Project**



Photograph – 6.4: **New Plantation in Gevra Opencast Project**



Photograph – 6.5: **Backfilling in Kusmunda Opencast Project**



Photograph – 6.6: **Roadside Plantation in Kusmunda Opencast Project**



Photograph –6.7: **Overview of Manikpur Opencast Project**



Photograph – 6.8: **Plantation on OB Dumps in Manikpur Opencast Project**



Photograph – 6.9: **Overview of Chirimiri Opencast Project**



Photograph – 6.10: **Plantation in Chirimiri Opencast Project**



Photograph – 6.11: ***Plantation in Rajnagar Opencast Project***



Photograph – 6.12: ***Plantation in Dhanpuri Opencast Project***



Photograph – 6.13: **Overview of Dhanpuri Amlai group of mines Project**



Photograph – 6.14: **Plantation in Jamuna Opencast Project**



Photograph – 6.15: *Mine overview of Saraipali Opencast Project*



Photograph – 6.16: *Plantation in Saraipali Opencast Project*



Photograph – 6.17: *Plantation in Baroud Opencast Project*



Photograph – 6.18: *OB Dump in Bijari Opencast Project*



Photograph – 6.19: **Overview of Chhal Opencast Project**



Photograph – 6.20: **Plantation in Chhal Opencast Project**



Photograph – 6.21: *Mahan- II Opencast Project*



Photograph – 6.22: *Plantation on Backfill of Mahan- II Opencast Project*



Photograph – 6.23: *Plantation in Amera Opencast Project*



Photograph – 6.24: *Plantation in Amadand Opencast Project*



Photograph – 6.25: *Plantation in Amadand Opencast Project*



Photograph – 6.26: *Natural Vegetation in Proposed Batura Opencast Project*



Photograph – 6.27: *Backfilling in Jampali Opencast Project*



Photograph – 6.28: *Plantation in Jampali Opencast Project*



Photograph – 6.29: *Plantation in Jagannathpur Opencast Project*



Photograph – 6.30: *Overview of Jagannathpur Opencast Project*

NORTHERN COALFIELDS LIMITED

7.0 Land Reclamation Status in Northern Coalfields Ltd.

7.1 Following 10 OC projects producing more than 5 million cubic m. (Coal + OB together) of Northern Coalfields Ltd. have been taken up for land reclamation monitoring based on satellite data of the year 2022:

- Amlohri
- Nigahi
- Jayant
- Dudhichua
- Khadia
- Krishnashila
- Bina
- Kakri
- Jhingurdah
- Block-B

7.2 Project wise Land Reclamation status in NCL for the year 2022 is given in Table 7.1 and also shown graphically in Fig 7.1. Area statistics of different land use / cover classes present in the mine leasehold of the above projects for the year 2022 are shown in the Table – 7.2. Land use/cover maps derived from satellite data are shown in Plate 7.1 – 7.10. Land reclamation status of the above mentioned 10 projects were prepared regularly since 2008. Year wise changes in the different land use classes based on satellite data for the last three years are depicted in Bar Charts in Fig. 7.2 to 7.11.

7.3 Study reveals that out of total excavated area of 81.00 Km², 49.38 Km² (60.96%) of area is under reclamation out of which 37.54 Km² (46.35%) area is under backfilling (Technical Reclamation) and 11.84 Km² (14.62%) area has been revegetated (Biological Reclamation). There is an increase of 1.54 Km² for area under reclamation in NCL in the year 2022 with respect to the year 2021. This increase is due to effort towards environment by NCL.

- 7.4** After analyzing the satellite data of year 2022 vs. 2021, it is evident that area under plantation (biological reclamation) has increased from 11.23 km² in 2021 to 11.84 km² in 2022, while reduced marginally in Bina projects due to new CHP establishment.
- 7.5** Study also reveal that area under barren backfilling (Technical Reclamation) has increased from 36.00 km² in 2021 to 37.54 km² in 2022. All the 10 projects of NCL selected for monitoring are showing an increasing trend in technical reclamation except Khadia, Dudhichua and Block B due to change in barren backfilled to planted backfilled class.
- 7.6** It was also observed that total area under plantation (Green Cover) has increased from 49.85 km² in 2021 to 54.55 km² in 2022. In the projects of NCL selected for monitoring all projects are showing an increasing trend in Green Cover in their leasehold.
- 7.7** Projects under UP state i.e. Khadia, Krishnashila, Bina & Kakri have adopted new Miyawaki Plantation method in which each Hectare covers 35000 plants for dense forest growth. This method shows several species of trees which were planted together in sequence manner closely.
- 7.8** Study also reveals that area under active mining is reduced from 32.44 Km² (Year 2021) to 31.62 Km² (Year 2022). In Jhingurdah project some mining area has become naturally vegetated and mining is going for deeper seams while in Kakri, Bina and Krishnashila the backfilling advances in active mining area. In these projects, mining of upper seam is near to complete and deeper seams are being excavated. Same situation is in Amlohri project is arising as backfilling is advancing over active mining area.
- 7.9** Out of 10 projects of NCL, maximum land reclamation has been carried out in Khadia (67.84%) followed by Jayant (66.73%) and Krishnashila (66.06%).

Table 7.1

Summarized Land Reclamation Status in Opencast Projects of NCL based on Satellite Data of the year 2022

(Area in Sq. Kms.)

| (Area in Sq. Kms.) | | | | | | | | | | | | | | | | | | | |
|--|--------------|----------------------------|----------------------------|------------------------|--------|---|--------|--|-------|--|-------|--------------------------|---------|----------------------|--------|--|--------|------------------------------|--------|
| Sl. No. | Project | Total Leasehold Area(2021) | Total Leasehold Area(2022) | Technical Reclamation | | Plantation | | | | | | Area under Active Mining | | Total Excavated Area | | Total Area under Plantation (% Green Cover Generated in Leasehold) | | Total Area under Reclamation | |
| | | | | | | Biological | | Other Plantations | | | | | | | | | | | |
| | | | | Area under Backfilling | | Plantation on Excavated / Backfilled Area | | Plantation on External Over Burden Dumps | | Social Forestry, Avaneue Plantation Etc. | | | | | | | | | |
| 1 | 2 | 3 | | 4 | | 5 | | 6 | | 7 | | 8 | | 9 (=4+5+8) | | 10 (=5+6+7) | | 11(=4+5) | |
| | | | | 2021 | 2022 | 2021 | 2022 | 2021 | 2022 | 2021 | 2022 | 2021 | 2022 | 2021 | 2022 | 2021 | 2022 | 2021 | 2022 |
| 1 | Amlohri | 21.75 | 21.75 | 4.05 | 4.30 | 0.73 | 0.79 | 1.04 | 1.39 | 3.77 | 4.78 | 4.23 | 3.81 | 9.01 | 8.90 | 5.54 | 6.96 | 4.78 | 5.09 |
| | | | | 44.95% | 48.31% | 8.10% | 8.88% | | | | | 46.95% | 42.81% | | | 25.47% | 32.00% | 53.05% | 57.19% |
| 2 | Nigahi | 30.11 | 30.18 | 5.38 | 5.72 | 1.95 | 2.00 | 3.01 | 3.08 | 3.64 | 4.78 | 4.78 | 4.73 | 12.11 | 12.45 | 8.60 | 9.86 | 7.33 | 7.72 |
| | | | | 44.43% | 45.94% | 16.10% | 16.06% | | | | | 39.47% | 37.99% | | | 28.56% | 32.67% | 60.53% | 62.01% |
| 3 | Jayant | 27.04 | 31.77 | 6.06 | 6.75 | 3.49 | 3.60 | 3.48 | 3.48 | 3.83 | 4.38 | 5.56 | 5.16 | 15.11 | 15.51 | 10.80 | 11.46 | 9.55 | 10.35 |
| | | | | 40.11% | 43.52% | 23.10% | 23.21% | | | | | 36.80% | 33.27% | | | 39.94% | 36.07% | 63.20% | 66.73% |
| 4 | Dudhichua | 23.62 | 23.91 | 5.74 | 5.73 | 1.31 | 1.39 | 1.78 | 1.89 | 0.42 | 0.42 | 4.71 | 4.84 | 11.76 | 11.96 | 3.51 | 3.70 | 7.05 | 7.12 |
| | | | | 48.81% | 47.91% | 11.14% | 11.62% | | | | | 40.05% | 40.47% | | | 14.86% | 15.47% | 59.95% | 59.53% |
| 5 | Khadia | 16.39 | 16.40 | 5.33 | 5.25 | 0.60 | 0.70 | 0.70 | 0.62 | 2.10 | 2.12 | 2.50 | 2.82 | 8.43 | 8.77 | 3.40 | 3.44 | 5.93 | 5.95 |
| | | | | 63.23% | 59.86% | 7.12% | 7.98% | | | | | 29.66% | 32.16% | | | 20.74% | 20.98% | 70.34% | 67.84% |
| 6 | Krishnashila | 8.51 | 8.52 | 2.12 | 2.41 | 0.51 | 0.51 | 1.30 | 1.41 | 0.06 | 0.06 | 1.78 | 1.50 | 4.41 | 4.42 | 1.87 | 1.98 | 2.63 | 2.92 |
| | | | | 48.07% | 54.52% | 11.56% | 11.54% | | | | | 40.36% | 33.94% | | | 21.97% | 23.24% | 59.64% | 66.06% |
| 7 | Bina | 17.98 | 17.98 | 4.75 | 4.85 | 1.73 | 1.67 | 1.05 | 1.05 | 3.33 | 3.48 | 3.40 | 3.51 | 9.88 | 10.03 | 6.11 | 6.20 | 6.48 | 6.52 |
| | | | | 48.08% | 48.35% | 17.51% | 16.65% | | | | | 34.41% | 35.00% | | | 33.98% | 34.48% | 65.59% | 65.00% |
| 8 | Kakri | 8.27 | 8.28 | 1.35 | 1.47 | 0.54 | 0.55 | 1.34 | 1.52 | 1.55 | 1.90 | 1.56 | 1.50 | 3.45 | 3.52 | 3.43 | 3.97 | 1.89 | 2.02 |
| | | | | 39.13% | 41.76% | 15.65% | 15.63% | | | | | 45.22% | 42.61% | | | 41.48% | 47.95% | 54.78% | 57.39% |
| 9 | Jhingurdah | 11.97 | 12.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3.56 | 3.66 | 1.53 | 1.51 | 1.38 | 1.21 | 1.38 | 1.21 | 5.09 | 5.17 | 0.00 | 0.00 |
| | | | | 0.00% | 0.00% | 0.00% | 0.00% | | | | | 100.00% | 100.00% | | | 42.52% | 43.08% | 0.00% | 0.00% |
| 10 | Block-B | 13.39 | 13.39 | 1.22 | 1.06 | 0.37 | 0.63 | 0.91 | 0.90 | 0.22 | 0.28 | 2.54 | 2.54 | 4.13 | 4.23 | 1.50 | 1.81 | 1.59 | 1.69 |
| | | | | 29.54% | 25.06% | 8.96% | 14.89% | | | | | 61.50% | 60.05% | | | 11.20% | 13.52% | 38.50% | 39.95% |
| | TOTAL | 179.03 | 184.18 | 36.00 | 37.54 | 11.23 | 11.84 | 18.17 | 19.00 | 20.45 | 23.71 | 32.44 | 31.62 | 79.67 | 81.00 | 49.85 | 54.55 | 47.23 | 49.38 |
| | | | | 45.19% | 46.35% | 14.10% | 14.62% | | | | | 40.72% | 39.04% | 44.50% | 43.98% | 27.84% | 29.62% | 59.28% | 60.96% |
| (% is calculated with respected to Excavated Area as applicable) | | | | | | | | | | | | | | | | | | | |

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

Note: In reference of the above Table, different parameters are classified as follows:

1. Area under **Biological Reclamation** includes Areas under Plantation done on Backfilled Area Only.
2. Area under **Technical Reclamation** includes Area under Barren Backfilling only
3. Area under Active Mining Includes Coal Quarry, Advance Quarry Site, Quarry filled with water etc..
4. Social Forestry and Plantation on External OB Dumps are not included in Biological Reclamation and are put under separate categories as shown in the Table above..
5. (%) calculated in the above Table is in respect to Total Excavated Area except for "Total Area under Plantation" where % is in terms of "Leasehold Area".

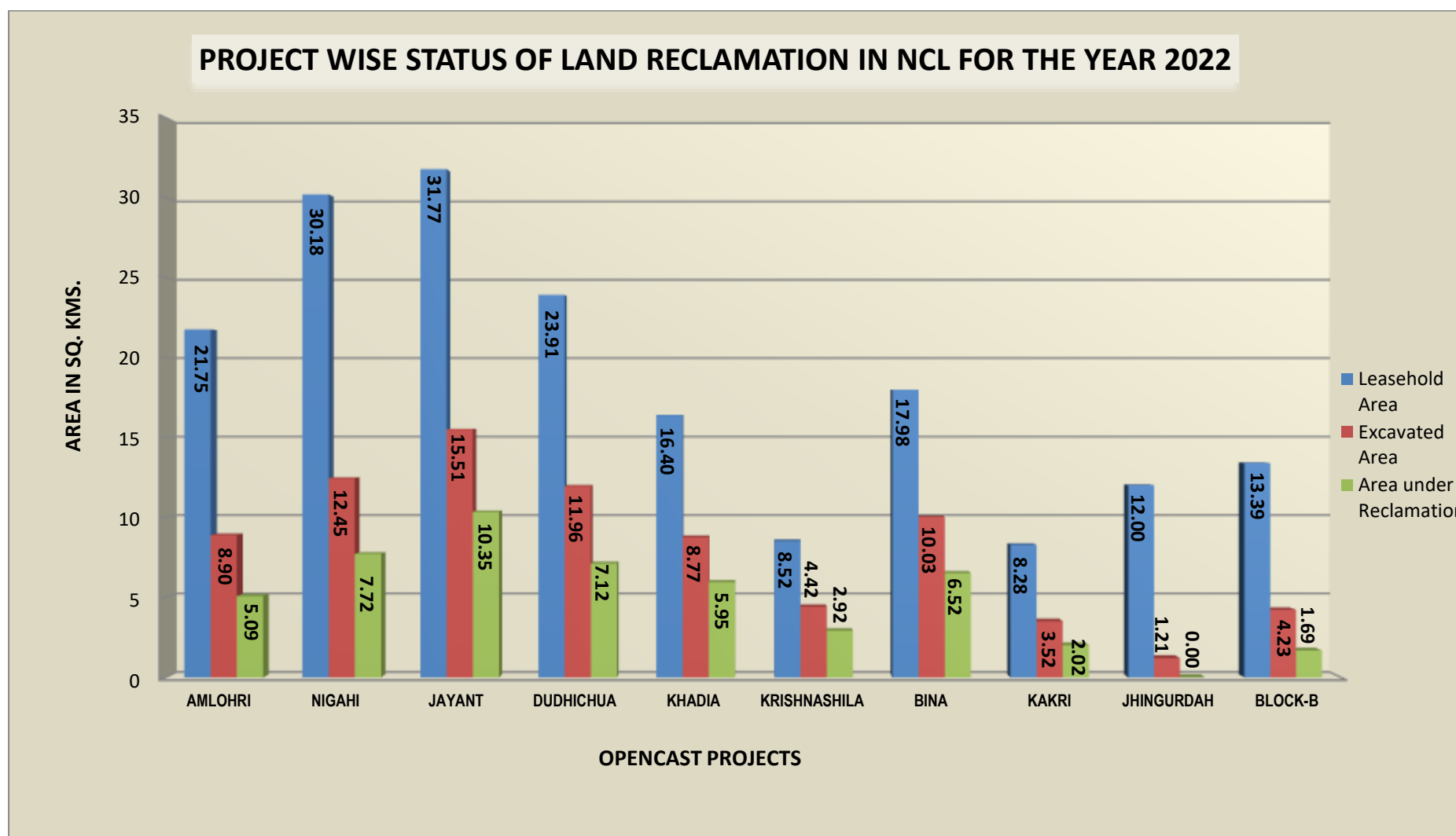
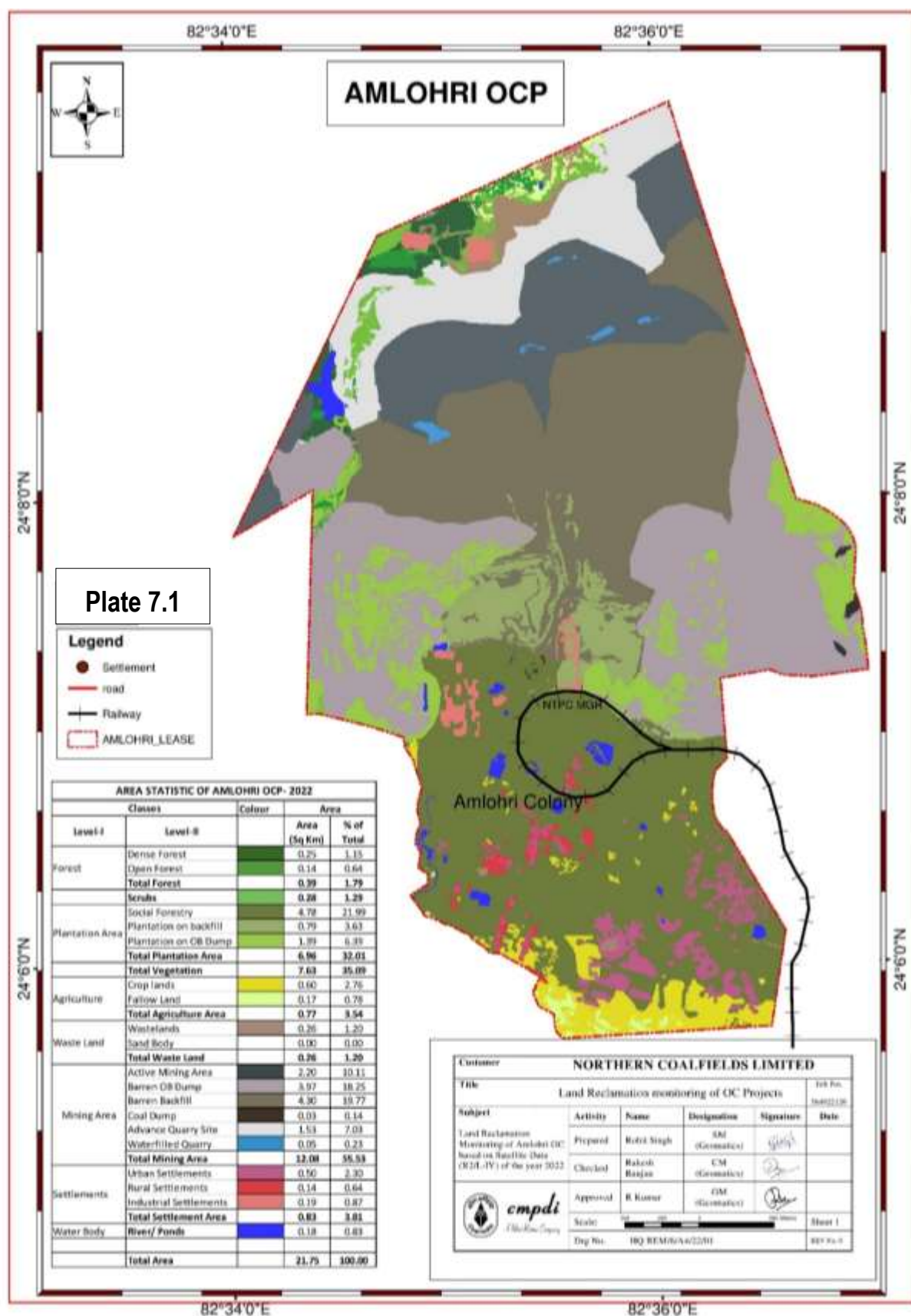
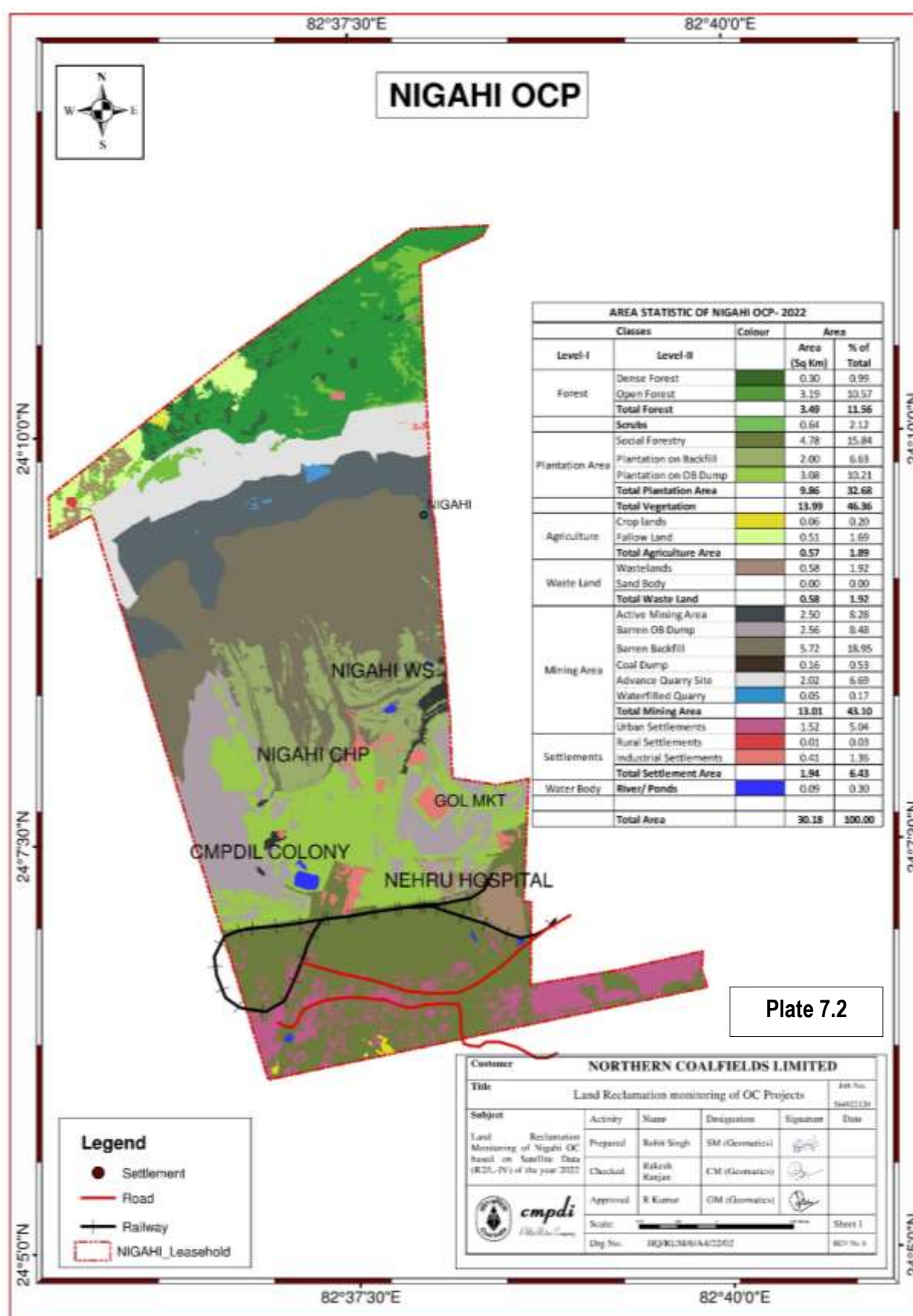


Fig.7.1: Land reclamation status in Opencast Projects of NCL in the Year 2022

Table 7.2
Project wise Area Statistics of Land Use / Cover in OC Mines (> 5 mcu.m.) of NCL based on Satellite data of the Year 2022

| TABLE -2 | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|---------|--------|-------|--------|--------|--------|-----------|--------|--------|--------|--------------|--------|-------|--------|-------|--------|------------|--------|---------|--------|--------|--------|
| Status of Land Use / Reclamation in OC Mines producing more than 5 mcm (Coal+OB) annually of Northern Coalfields Ltd. based on Satellite data of the Year 2022 | | | | | | | | | | | | | | | | | | | | | | | |
| | | AMLOHRI | | NIGAH | | JAYANT | | DUDHICHUA | | KHADIA | | KRISHNASHILA | | BINA | | KAKRI | | JHINGURDAH | | BLOCK-B | | TOTAL | |
| | | Area | % | Area | % | Area | % | Area | % | Area | % | Area | % | Area | % | Area | % | Area | % | Area | % | Area | % |
| FORESTS | Dense Forest | 0.25 | 1.15 | 0.30 | 0.99 | 0.05 | 0.16 | 1.64 | 6.86 | 0.21 | 1.28 | 0.24 | 2.82 | 0.35 | 1.95 | 0.00 | 0.00 | 0.08 | 0.67 | 0.09 | 0.67 | 3.21 | 1.74 |
| | Open Forest | 0.14 | 0.64 | 3.19 | 10.57 | 0.55 | 1.74 | 2.58 | 10.79 | 1.37 | 8.35 | 0.65 | 7.63 | 0.94 | 5.23 | 0.01 | 0.12 | 0.75 | 6.25 | 0.66 | 4.93 | 10.84 | 5.89 |
| | Total Forest | 0.39 | 1.79 | 3.49 | 11.56 | 0.60 | 1.90 | 4.22 | 17.65 | 1.58 | 9.63 | 0.89 | 10.45 | 1.29 | 7.18 | 0.01 | 0.12 | 0.83 | 6.92 | 0.75 | 5.60 | 14.05 | 7.63 |
| SCRUBS | Scrubs | 0.28 | 1.29 | 0.64 | 2.12 | 2.06 | 6.49 | 2.47 | 10.33 | 0.08 | 0.49 | 0.31 | 3.64 | 0.44 | 2.44 | 0.09 | 1.09 | 1.16 | 9.67 | 1.24 | 9.26 | 8.77 | 4.76 |
| | Social Forestry | 4.78 | 21.99 | 4.78 | 15.84 | 4.38 | 13.79 | 0.42 | 1.76 | 2.12 | 12.93 | 0.06 | 0.70 | 3.48 | 19.35 | 1.90 | 22.95 | 1.51 | 12.58 | 0.28 | 2.09 | 23.71 | 12.87 |
| PLANTATION | Plantation on External OB Dump | 1.39 | 6.39 | 3.08 | 10.21 | 3.48 | 10.95 | 1.89 | 7.90 | 0.62 | 3.78 | 1.41 | 16.55 | 1.05 | 5.84 | 1.52 | 18.36 | 3.66 | 30.50 | 0.90 | 6.72 | 19.00 | 10.32 |
| | Plantation on Backfill / Excavated Area (Biological Reclamation) | 0.79 | 3.63 | 2.00 | 6.63 | 3.60 | 11.33 | 1.39 | 5.81 | 0.70 | 4.27 | 0.51 | 5.99 | 1.67 | 9.29 | 0.55 | 6.64 | 0.00 | 0.00 | 0.63 | 4.71 | 11.84 | 6.43 |
| | Total Area under Plantation (Green Cover) | 6.96 | 32.01 | 9.86 | 32.68 | 11.46 | 36.07 | 3.70 | 15.47 | 3.44 | 20.98 | 1.98 | 23.24 | 6.20 | 34.48 | 3.97 | 47.95 | 5.17 | 43.08 | 1.81 | 13.52 | 54.55 | 29.62 |
| | Total Vegetation | 7.63 | 35.09 | 13.99 | 46.36 | 14.12 | 44.46 | 10.39 | 43.45 | 5.10 | 31.10 | 3.18 | 37.33 | 7.93 | 44.10 | 4.07 | 49.16 | 7.16 | 59.67 | 3.80 | 28.38 | 77.37 | 42.01 |
| AREA UNDER ACTIVE MINING | Coal Quarry | 2.20 | 10.11 | 2.50 | 8.28 | 4.29 | 13.50 | 3.79 | 15.85 | 1.19 | 7.26 | 0.69 | 8.10 | 2.10 | 11.68 | 1.09 | 13.16 | 1.06 | 8.83 | 1.79 | 13.35 | 20.70 | 11.24 |
| | Coal Dump | 0.03 | 0.14 | 0.16 | 0.53 | 0.30 | 0.94 | 0.04 | 0.17 | 0.17 | 1.04 | 0.02 | 0.23 | 0.06 | 0.33 | 0.02 | 0.24 | 0.01 | 0.08 | 0.28 | 2.09 | 1.09 | 0.59 |
| | Advance Quarry Site | 1.53 | 7.03 | 2.02 | 6.69 | 0.36 | 1.13 | 0.96 | 4.02 | 1.42 | 8.66 | 0.73 | 8.57 | 1.33 | 7.40 | 0.35 | 4.23 | 0.00 | 0.00 | 0.40 | 2.99 | 9.10 | 4.94 |
| | Quarry Filled With Water | 0.05 | 0.23 | 0.05 | 0.17 | 0.21 | 0.66 | 0.05 | 0.21 | 0.04 | 0.24 | 0.06 | 0.70 | 0.02 | 0.13 | 0.04 | 0.48 | 0.14 | 1.17 | 0.07 | 0.52 | 0.73 | 0.40 |
| | Total Area under Active Mining | 3.81 | 17.51 | 4.73 | 15.67 | 5.16 | 16.23 | 4.84 | 20.25 | 2.82 | 17.20 | 1.50 | 17.60 | 3.51 | 19.54 | 1.50 | 18.11 | 1.21 | 10.08 | 2.54 | 18.95 | 31.62 | 17.17 |
| TECHN. RECLAMATION | Barren OB Dump | 3.97 | 18.25 | 2.56 | 8.48 | 0.68 | 2.14 | 1.28 | 5.35 | 1.13 | 6.89 | 0.83 | 9.74 | 0.26 | 1.45 | 0.37 | 4.47 | 2.86 | 23.83 | 3.22 | 24.06 | 17.16 | 9.32 |
| | Area under Barren Backfilling (Technical Reclamation) | 4.30 | 19.77 | 5.72 | 18.95 | 6.75 | 21.25 | 5.73 | 23.96 | 5.25 | 32.01 | 2.41 | 28.28 | 4.85 | 26.97 | 1.47 | 17.75 | 0.00 | 0.00 | 1.06 | 7.92 | 37.54 | 20.38 |
| | Total Area under Technical Reclamation | 4.30 | 19.77 | 5.72 | 18.95 | 6.75 | 21.25 | 5.73 | 23.96 | 5.25 | 32.01 | 2.41 | 28.28 | 4.85 | 26.97 | 1.47 | 17.75 | 0.00 | 0.00 | 1.06 | 7.92 | 37.54 | 20.38 |
| Total Area under Mining Operations | | 12.08 | 55.53 | 13.01 | 43.10 | 12.59 | 39.62 | 11.85 | 49.56 | 9.20 | 56.10 | 4.74 | 55.62 | 8.62 | 47.96 | 3.34 | 40.33 | 4.07 | 33.91 | 6.82 | 50.93 | 86.32 | 46.87 |
| WASTELANDS | Waste Lands | 0.26 | 1.20 | 0.58 | 1.92 | 0.81 | 2.55 | 0.93 | 3.89 | 0.47 | 2.87 | 0.35 | 4.11 | 0.40 | 2.22 | 0.11 | 1.33 | 0.39 | 3.25 | 1.06 | 7.92 | 5.36 | 2.91 |
| | Fly Ash Pond / Sand Body | 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 |
| | Total Wasteland | 0.26 | 1.20 | 0.58 | 1.92 | 0.81 | 2.55 | 0.93 | 3.89 | 0.47 | 2.87 | 0.35 | 4.11 | 0.40 | 2.22 | 0.11 | 1.33 | 0.39 | 3.25 | 1.06 | 7.92 | 5.36 | 2.91 |
| WATERBODIES | Reservoir, nallah, ponds | 0.18 | 0.83 | 0.09 | 0.30 | 0.50 | 1.57 | 0.06 | 0.25 | 0.02 | 0.12 | 0.04 | 0.47 | 0.14 | 0.78 | 0.01 | 0.12 | 0.02 | 0.17 | 0.07 | 0.52 | 1.13 | 0.61 |
| | Total Waterbodies | 0.18 | 0.83 | 0.09 | 0.30 | 0.50 | 1.57 | 0.06 | 0.25 | 0.02 | 0.12 | 0.04 | 0.47 | 0.14 | 0.78 | 0.01 | 0.12 | 0.02 | 0.17 | 0.07 | 0.52 | 1.13 | 0.61 |
| AGRICULTURE | Crop Lands | 0.60 | 2.76 | 0.06 | 0.20 | 0.56 | 1.76 | 0.13 | 0.54 | 0.01 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.08 | 0.97 | 0.09 | 0.75 | 0.16 | 1.19 | 1.69 | 0.92 |
| | Fallow Lands | 0.17 | 0.78 | 0.51 | 1.69 | 0.55 | 1.73 | 0.25 | 1.05 | 0.01 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.36 | 0.03 | 0.25 | 1.25 | 9.34 | 2.80 | 1.52 |
| | Total Agriculture | 0.77 | 3.54 | 0.57 | 1.89 | 1.11 | 3.49 | 0.38 | 1.59 | 0.02 | 0.12 | 0.00 | 0.00 | 0.00 | 0.00 | 0.11 | 1.33 | 0.12 | 1.00 | 1.41 | 10.53 | 4.49 | 2.44 |
| SETTLEMENTS | Urban Settlement | 0.50 | 2.30 | 1.52 | 5.04 | 1.85 | 5.82 | 0.03 | 0.13 | 1.26 | 7.68 | 0.05 | 0.59 | 0.47 | 2.61 | 0.53 | 6.40 | 0.14 | 1.17 | 0.02 | 0.15 | 6.37 | 3.46 |
| | Rural Settlement | 0.14 | 0.64 | 0.01 | 0.03 | 0.46 | 1.45 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.33 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.67 | 0.36 | |
| | Industrial Settlement | 0.19 | 0.87 | 0.41 | 1.36 | 0.33 | 1.04 | 0.27 | 1.13 | 0.33 | 2.01 | 0.16 | 1.88 | 0.36 | 2.00 | 0.11 | 1.33 | 0.10 | 0.83 | 0.21 | 1.57 | 2.47 | 1.34 |
| Total Settlement | | 0.83 | 5.80 | 1.94 | 6.43 | 2.64 | 8.31 | 0.30 | 1.26 | 1.59 | 9.69 | 0.21 | 2.47 | 0.89 | 4.94 | 0.64 | 7.73 | 0.24 | 2.00 | 0.23 | 1.72 | 9.51 | 5.16 |
| Grand Total | | 21.75 | 100.00 | 30.18 | 100.00 | 31.77 | 100.00 | 23.91 | 100.00 | 16.40 | 100.00 | 8.52 | 100.00 | 17.98 | 100.00 | 8.28 | 100.00 | 12.00 | 100.00 | 13.39 | 100.00 | 184.18 | 100.00 |





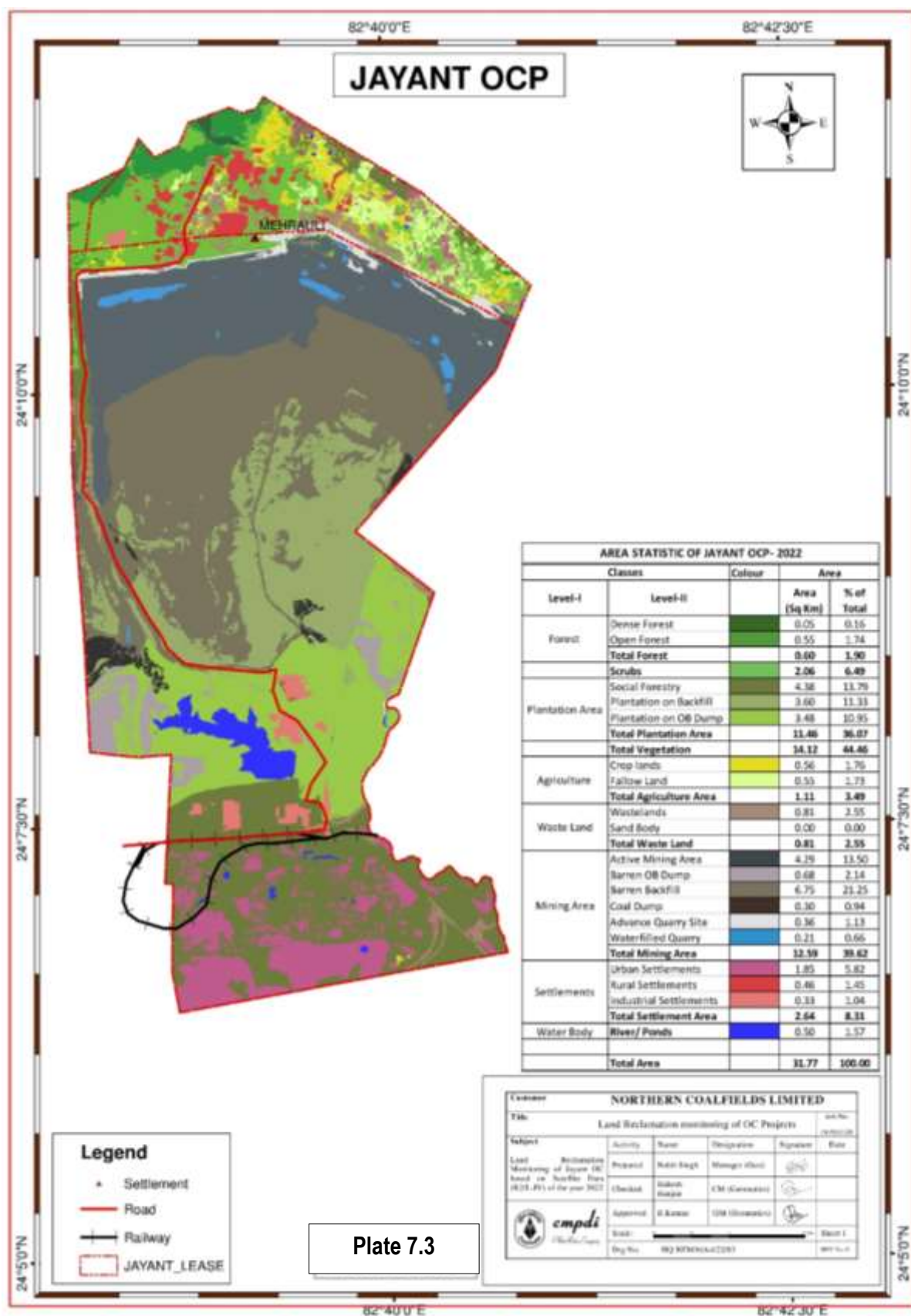
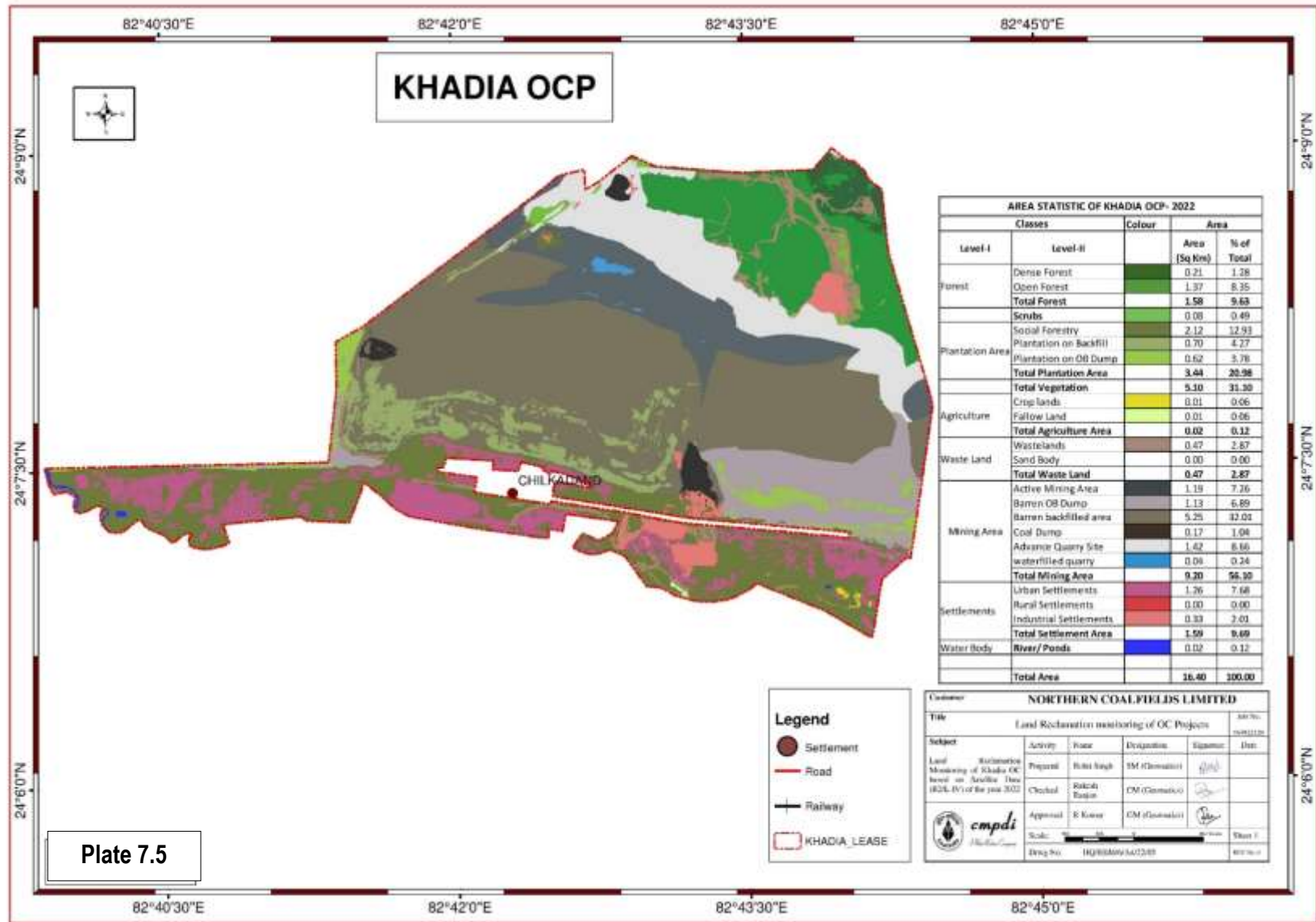
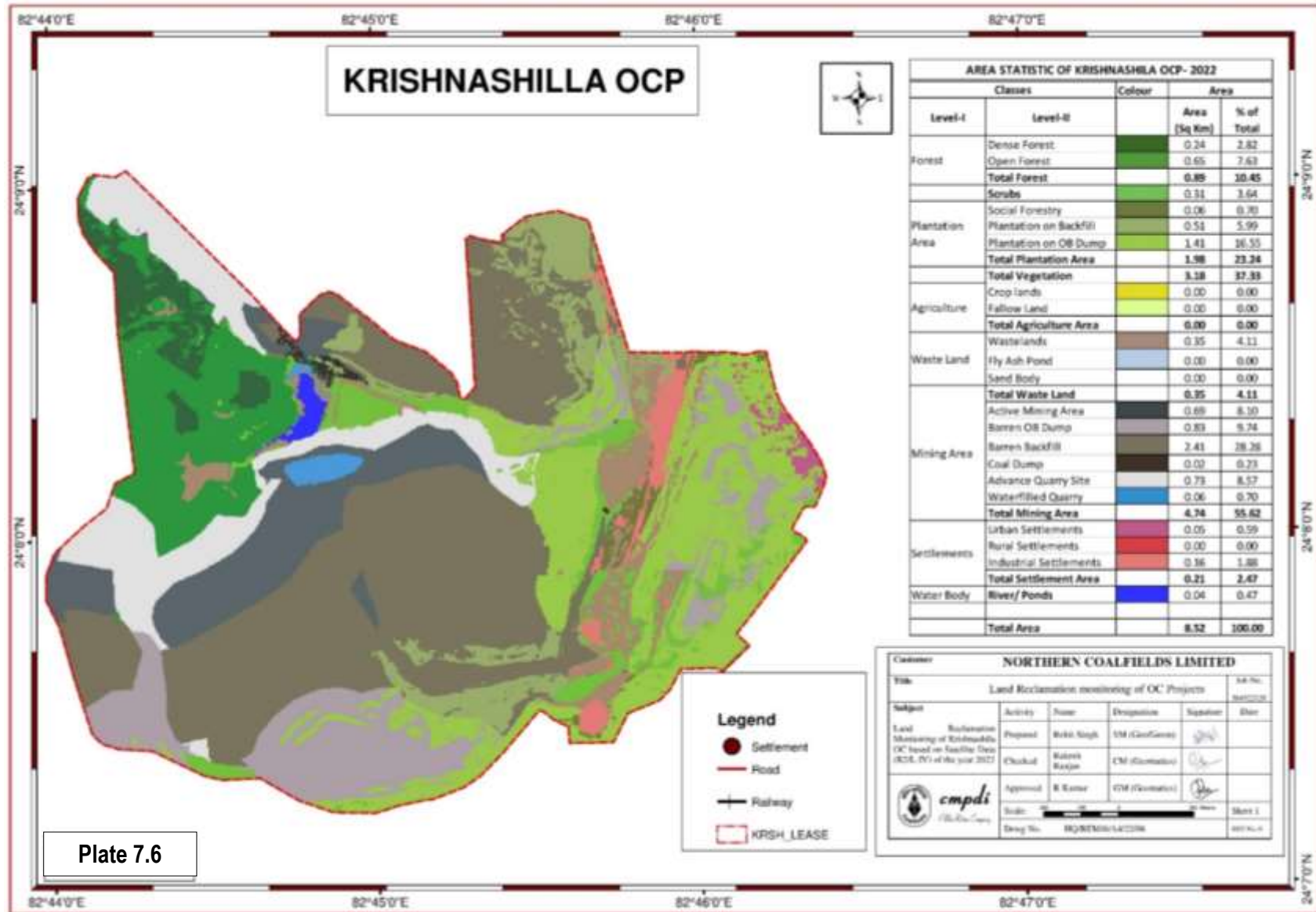
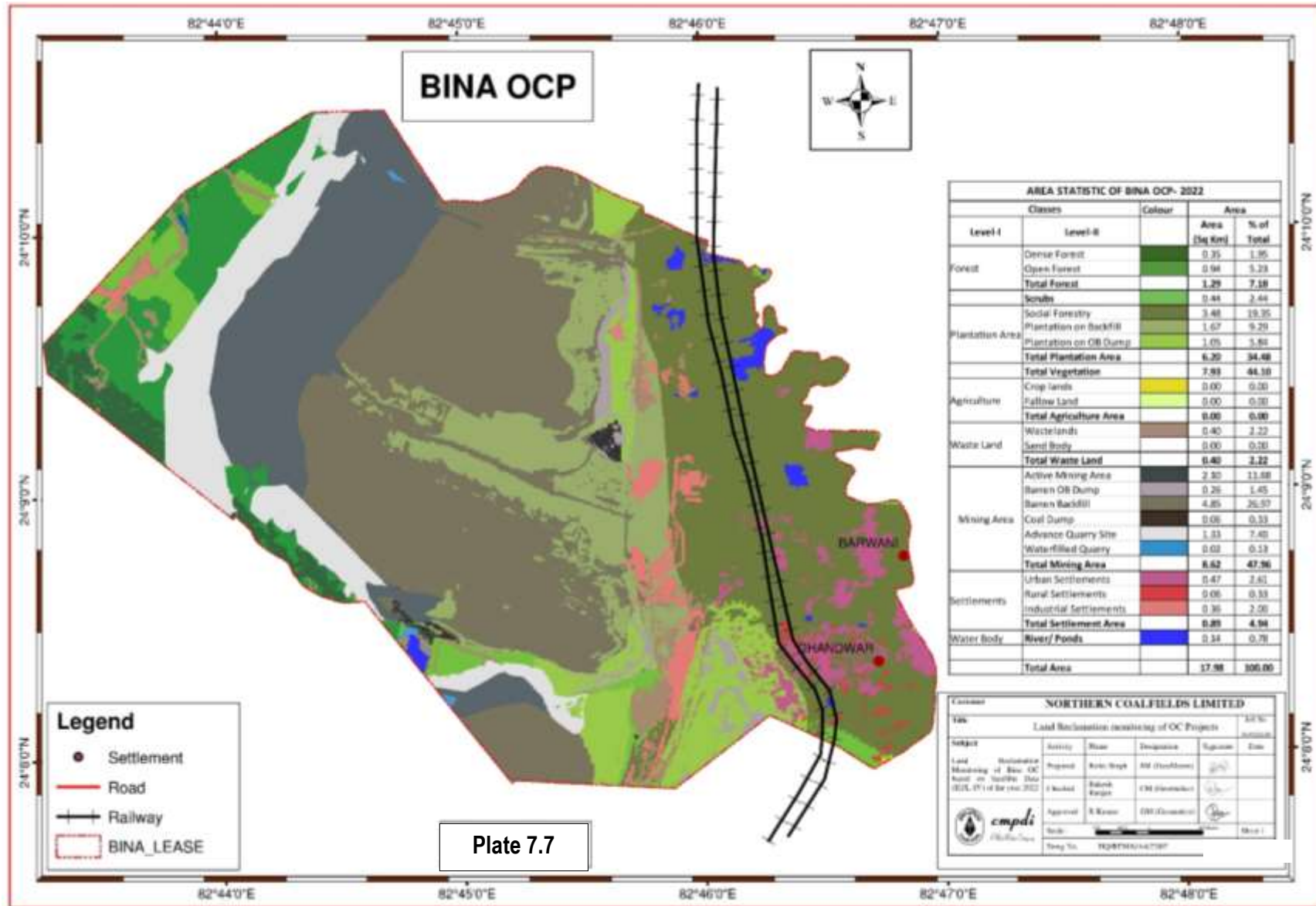
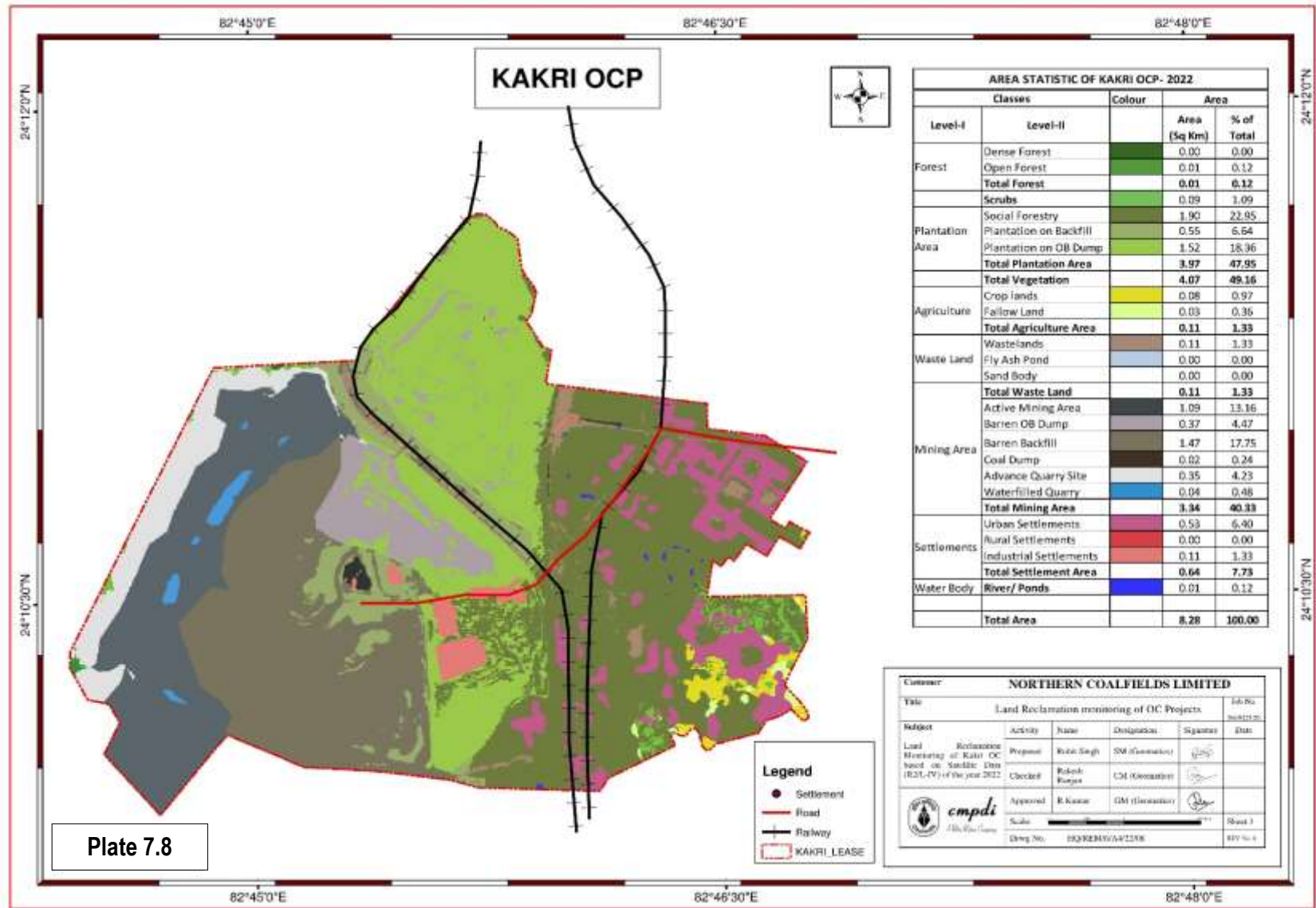


Plate 7.3









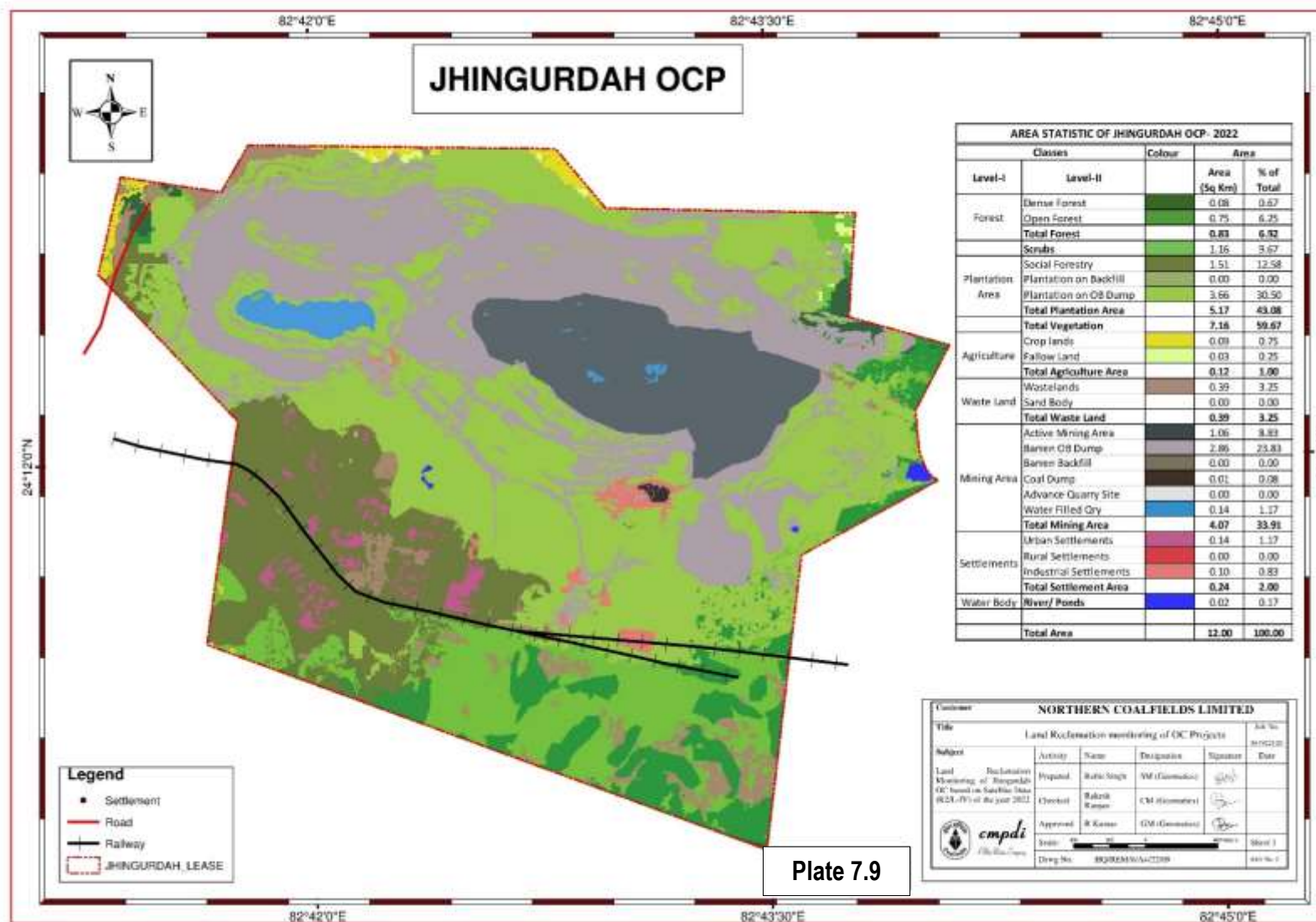
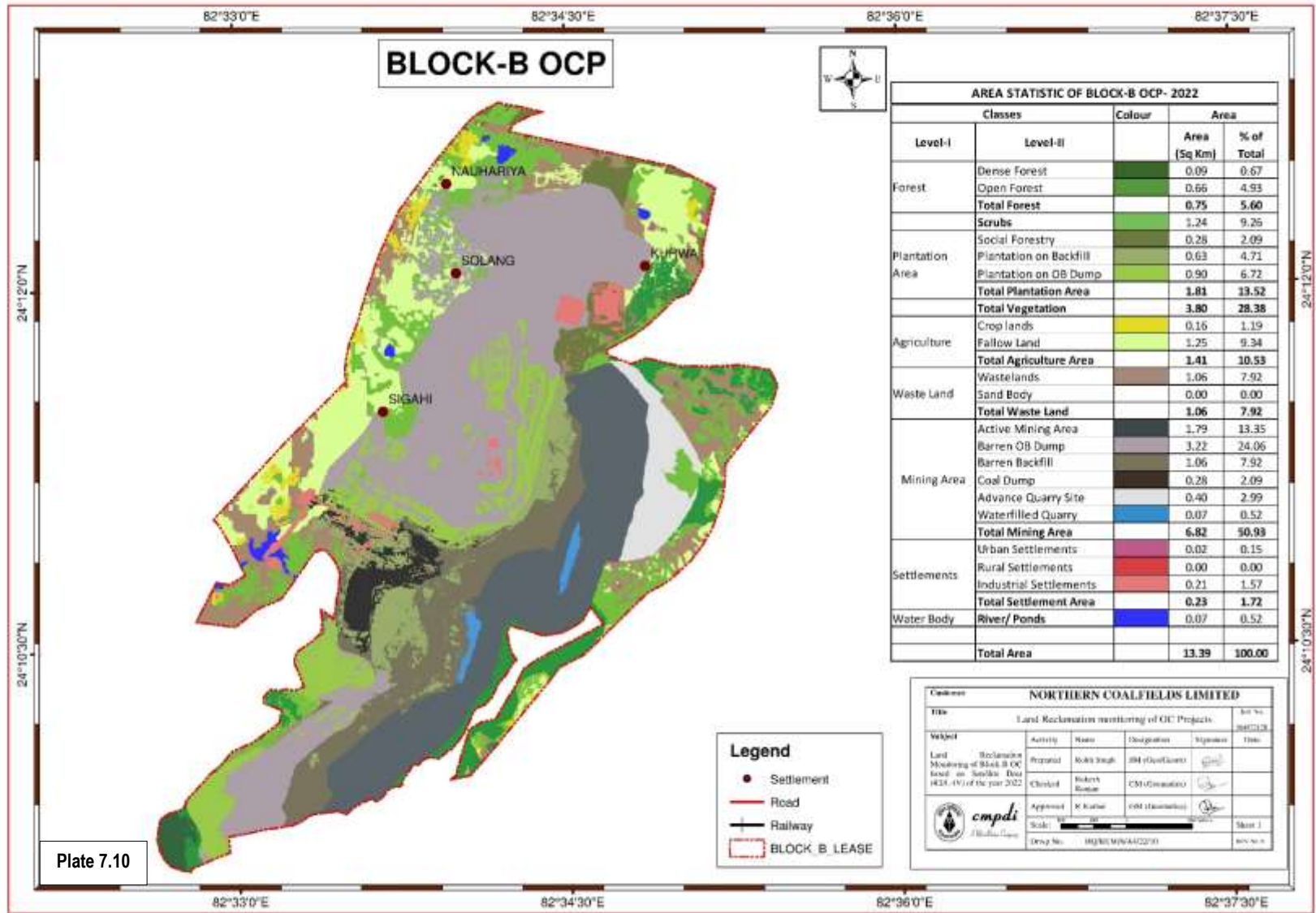


Plate 7.9



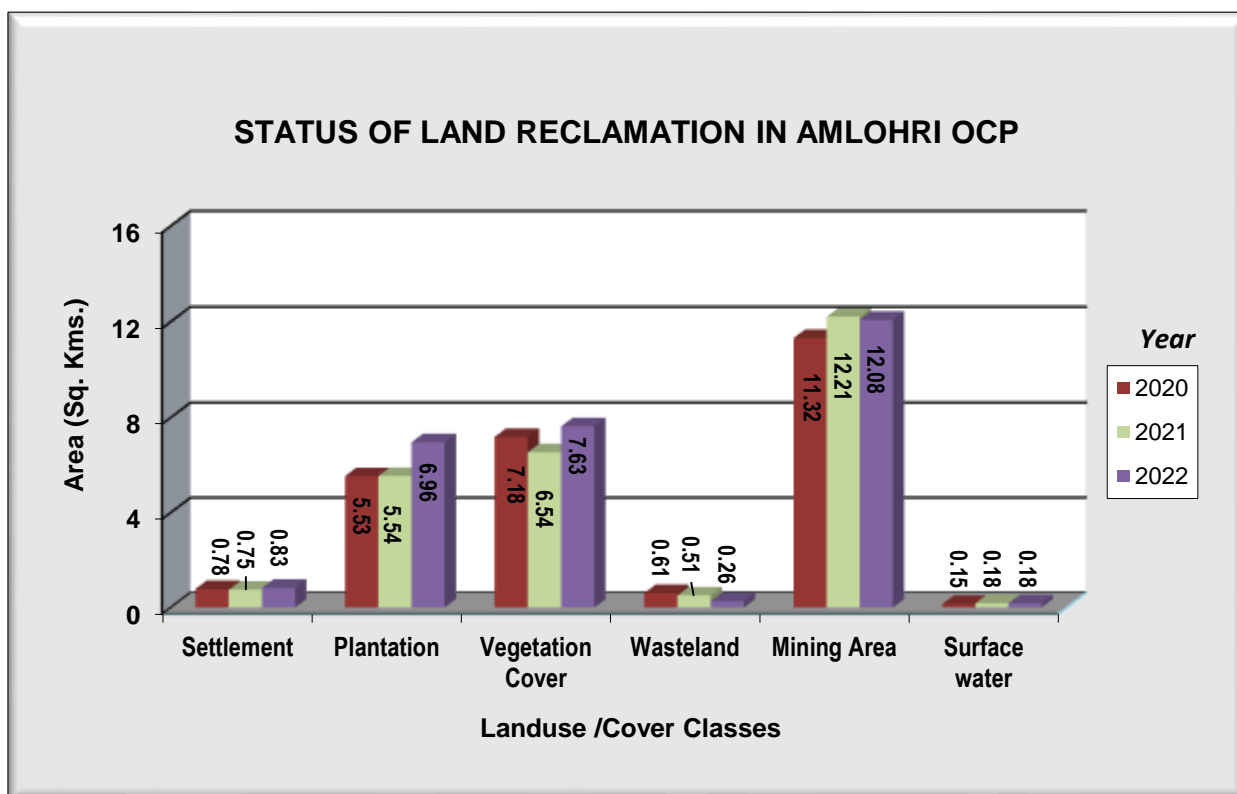


Figure 7.2

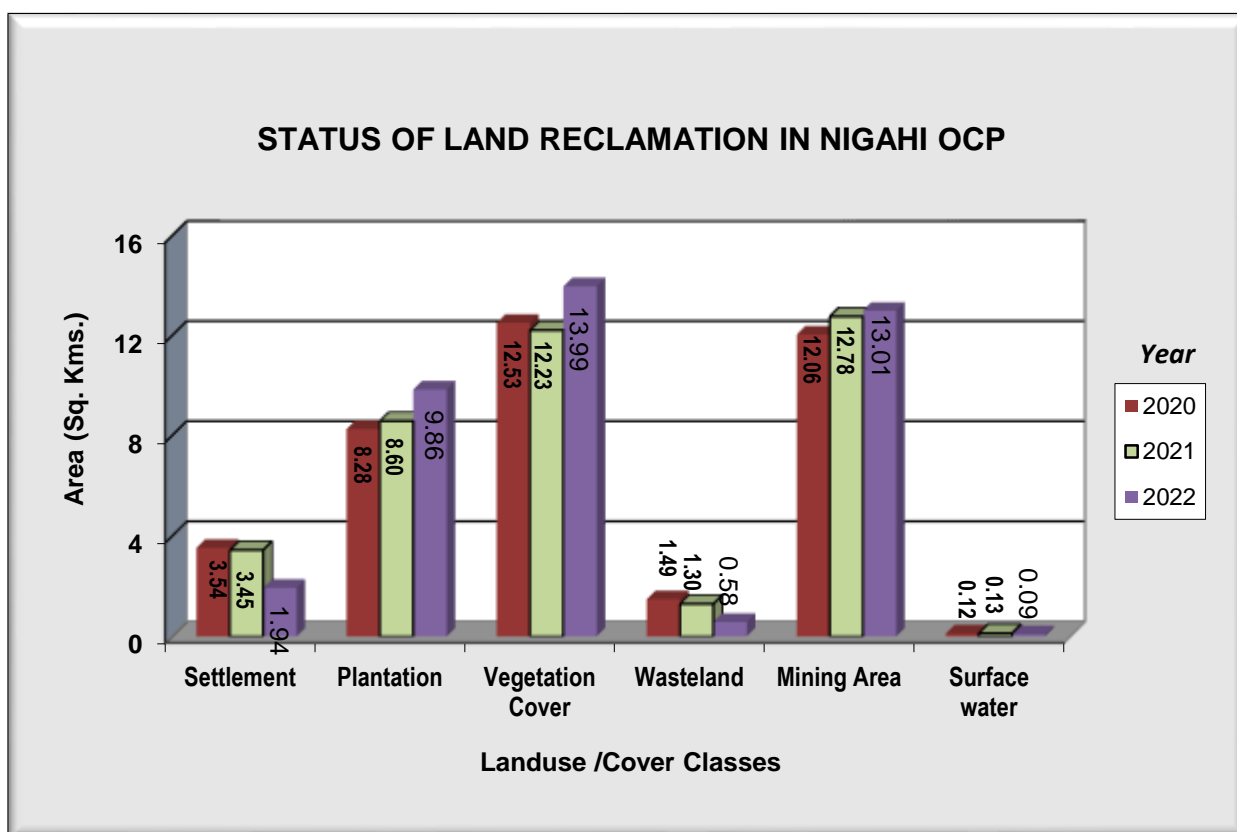


Figure 7.3

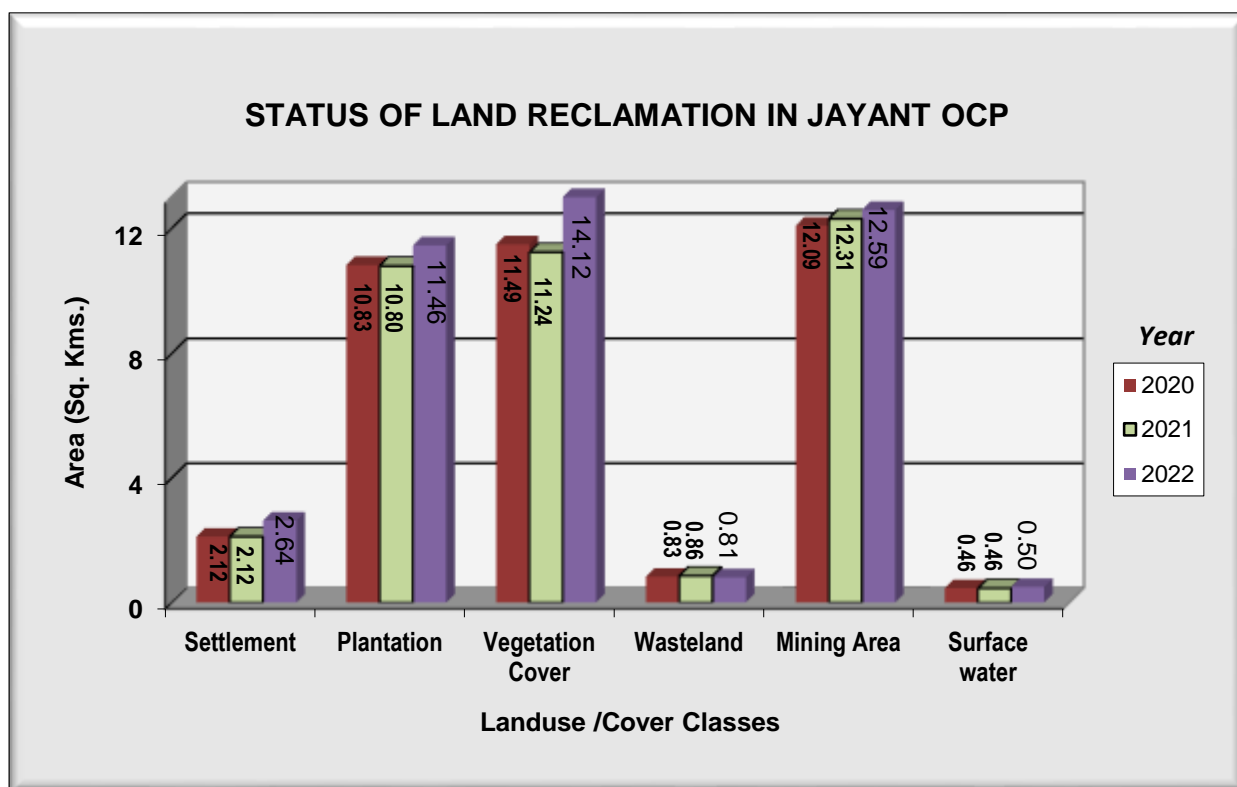


Figure 7.4

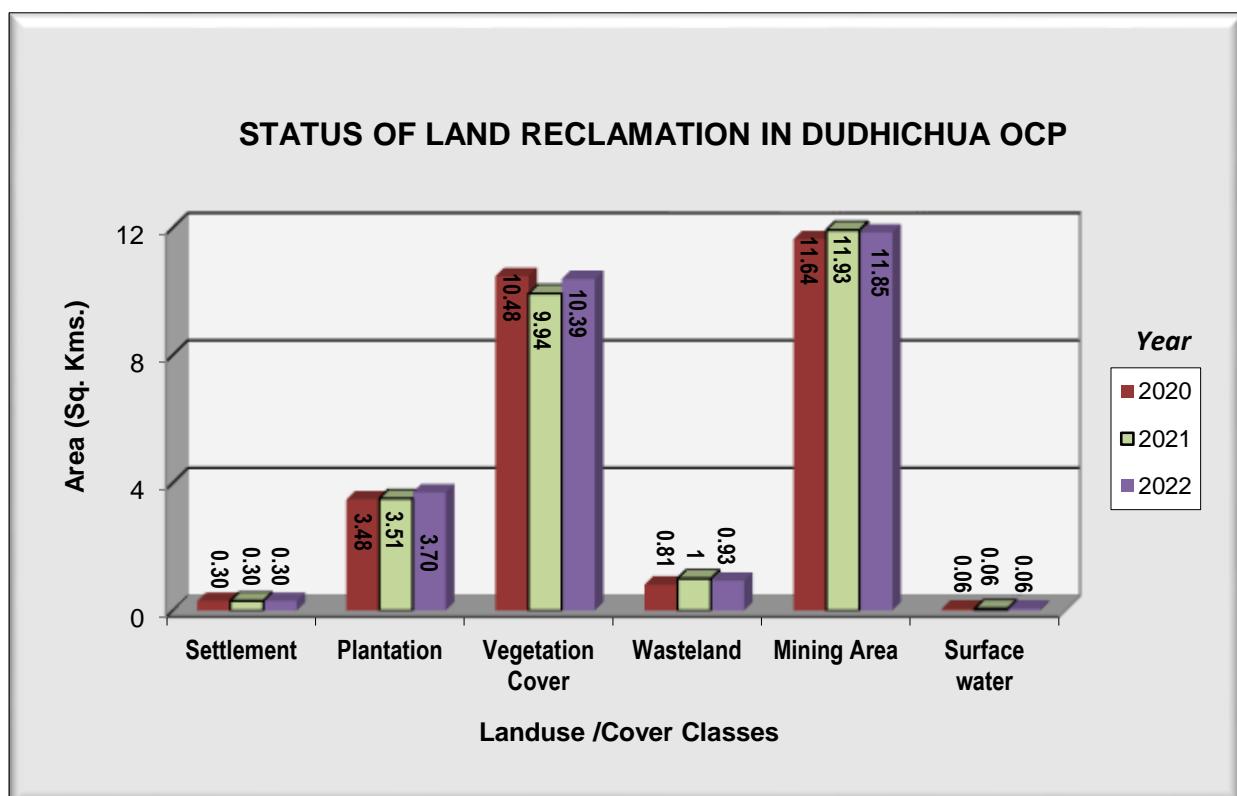


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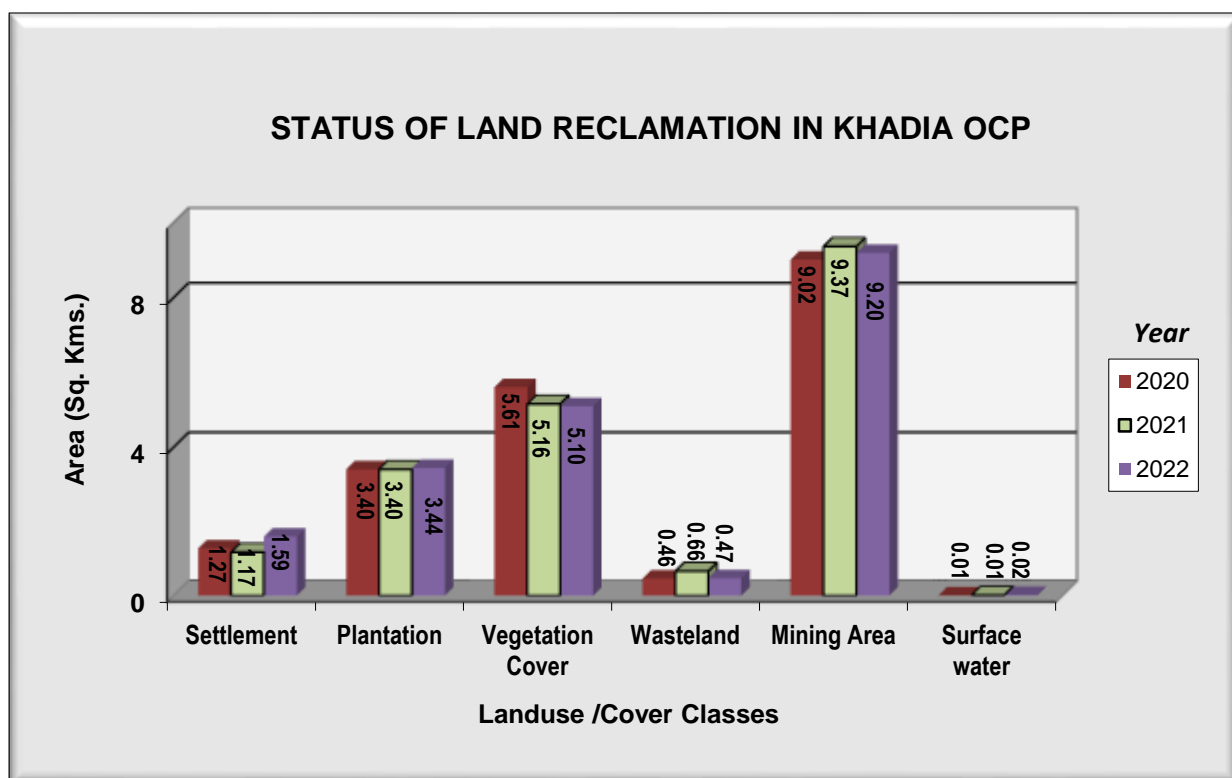


Figure 7.6

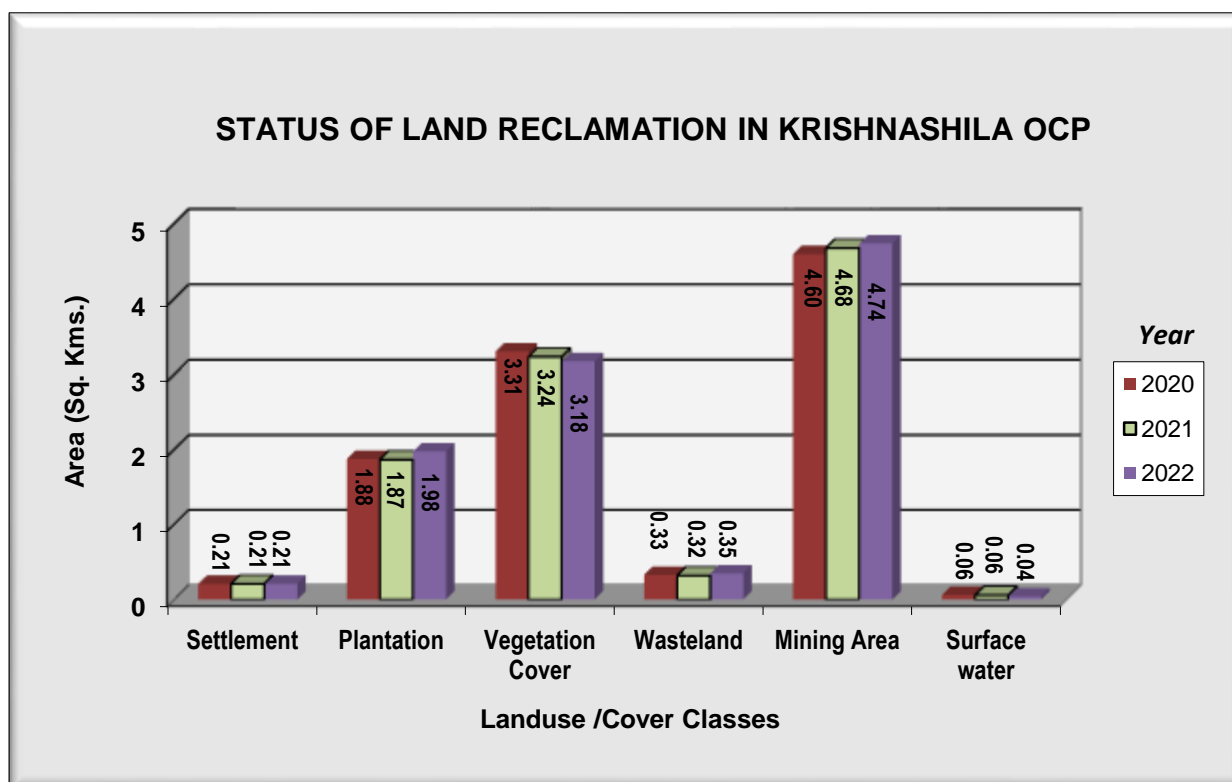


Figure 7.7

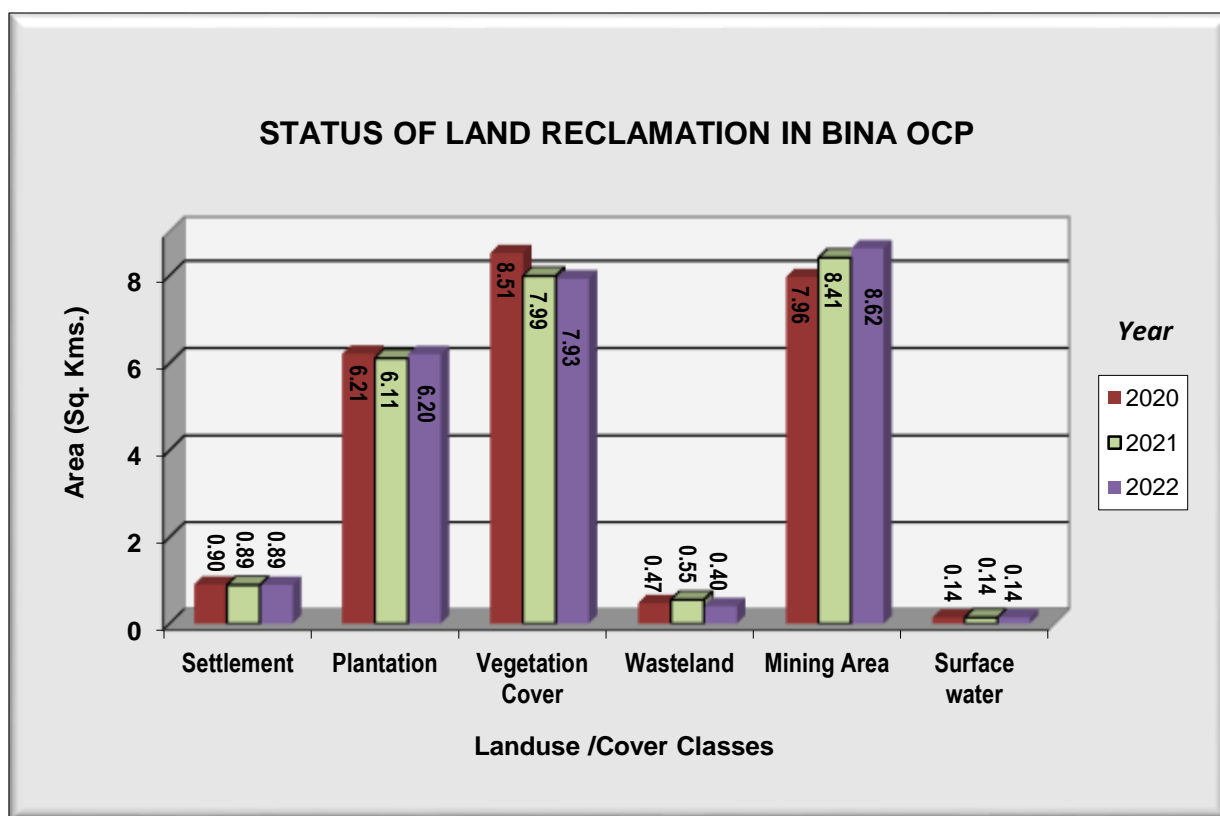


Figure 7.8

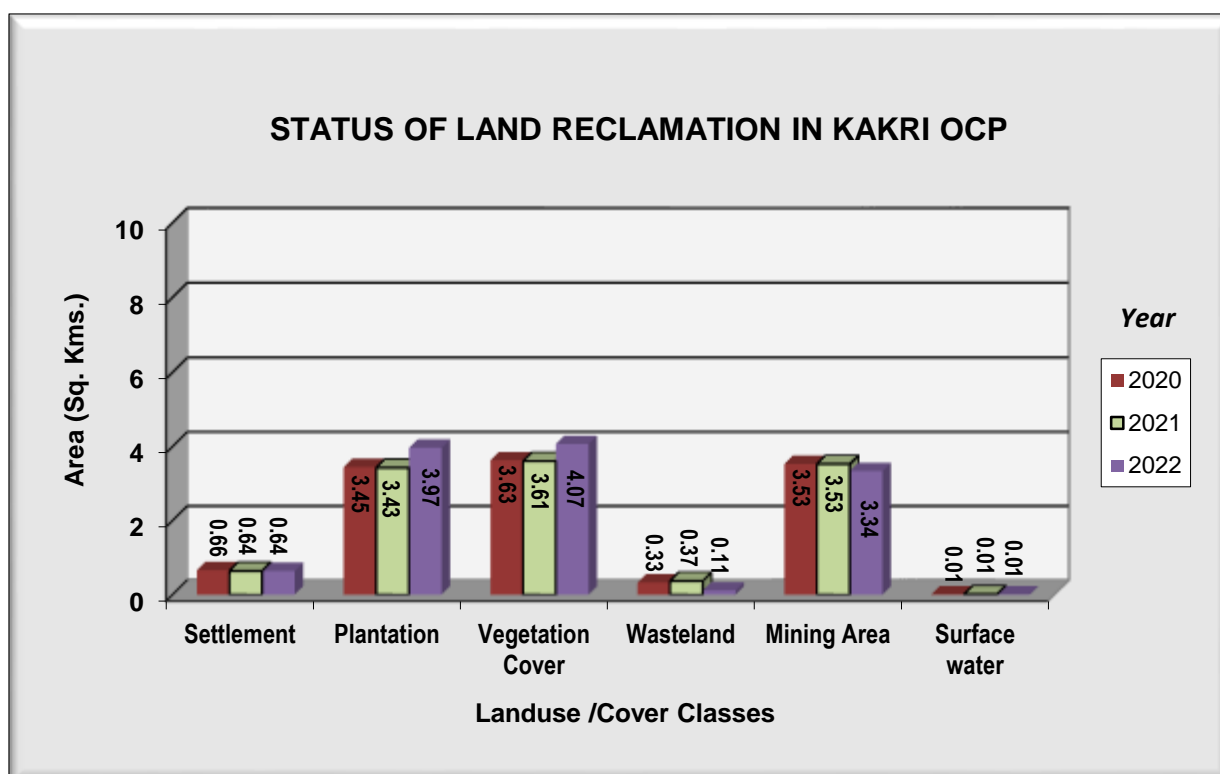


Figure 7.9

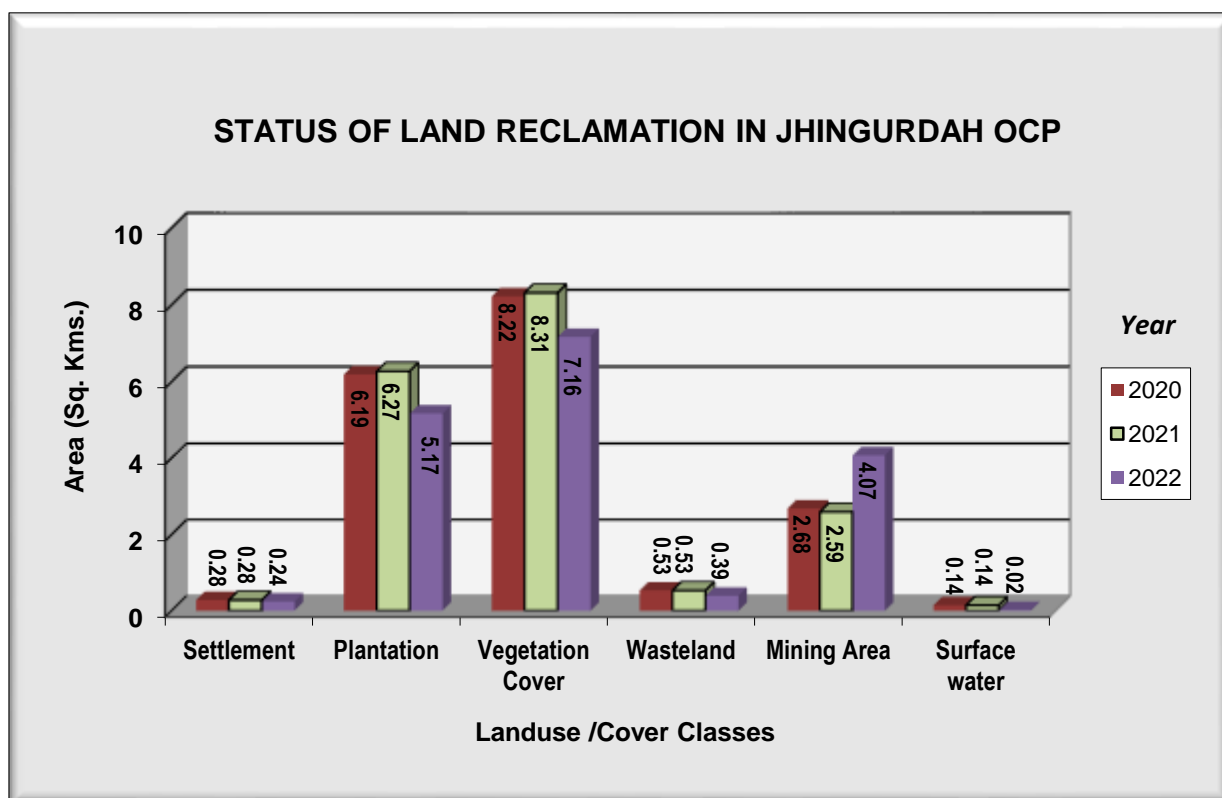


Figure 7.10

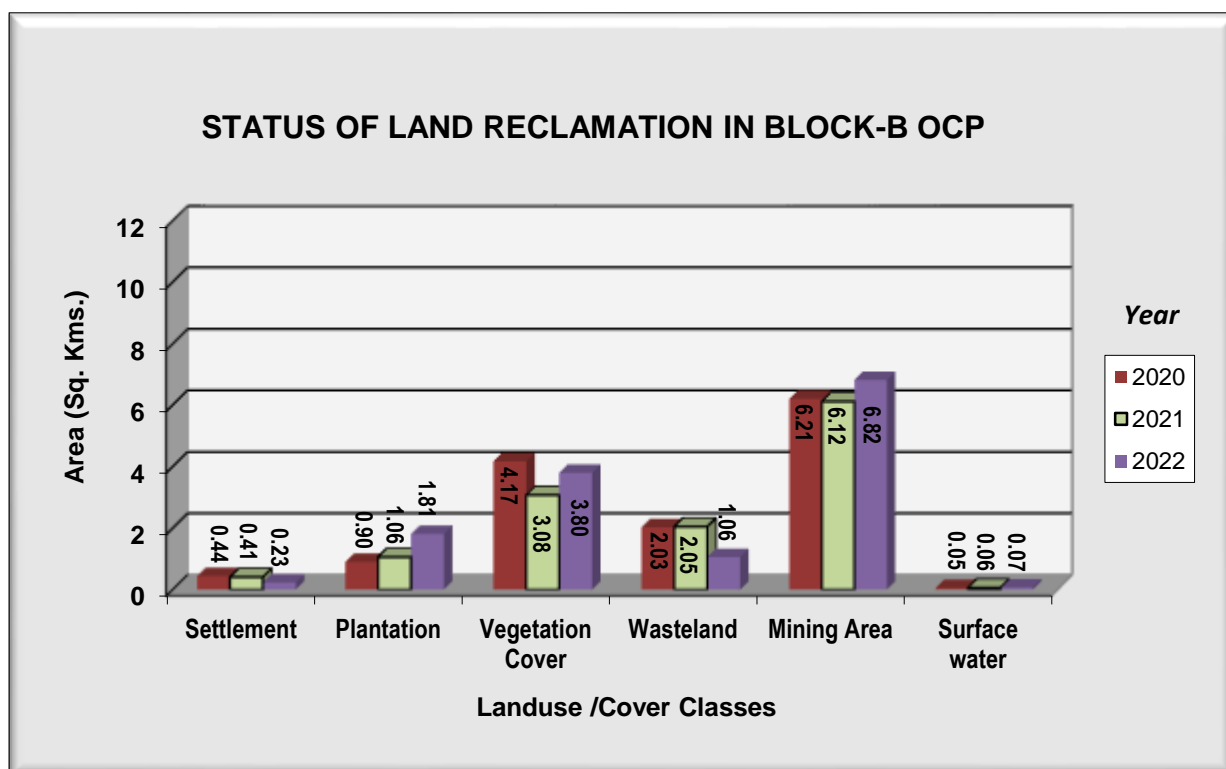


Figure 7.11



Photograph 7.1: Amlohri OCP- Newly Plantation growing on Backfill Area



Photograph 7.2: Nigahi OCP- Plantation growing on the Backfill



Photograph 7.3: **Jayant OCP- Plantation done on Jayant OCP**



Photograph 7.4: **Dudhichua OCP- Plantation done on Dudhichua OCP**



Photograph 7.5: Khadia OCP- Plantation done on KHADIA OCP



Photograph 7.6: Krishnashila OCP- Plantation done on Krishnashila OCP



Photograph 7.7: **Bina OCP- Plantation done on Bina OCP**



Photograph 7.8: **Kakri OCP- Miyawaki Plantation done in Kakri colony**



Photograph 7.9: **Planted area at Jhingurdah OCP on External Dump**



Photograph 7.10: **Block-B OCP- Plantation done on Block-B OCP**



Photograph 7.11: New OB to Sand Plant setup in Amlohri Project (Under Development)



Photograph 7.12: Miyawaki Plantation Adopted by UP laid NCL Mines (35k Plants/Ha)

MAHANADI COALFIELDS LIMITED

8.0 Land Reclamation Status in Mahanadi Coalfields Limited

8.1 Following Sixteen (16) opencast projects of MCL producing more than 5 million cubic meter and more (Coal + OB) were taken up for land reclamation monitoring based on satellite data of the year 2022.

- Ananta
- Balram
- Lingaraj
- Bharatpur
- Bhubaneswari
- Jagannath
- Hingula
- Kaniha
- Belpahar
- Lakhanpur
- Samleswari
- Lajkura
- Siarmal
- Basundhara West Extension
- Garjanbahal
- Kulda

8.2 Project wise Land Reclamation status in MCL for the year 2022 is given in Table 8.1 and also shown graphically in Fig 8.1(A) and 8.1(B). Area statistics of different land use / cover classes present in the mine leasehold of the above projects for the year 2022-23 are shown in the Table -8.2 (A &B). Land use maps derived from satellite data are shown in Plate 8.1 – 8.16. Year wise changes in the different land use classes based on satellite data are depicted in Bar Charts in Fig. 8.2–8.17 for the last three years only.

- 8.3** Study reveals that out of total 63.25 Km² excavated area; 37.64 Km² area (59.51%) is under reclamation. Out of which 8.06 Km² (12.74%) area has been re-vegetated and 29.58 Km² (46.77%) area is under backfilling.
- 8.4** Total Area under active mining has increased from 23.49 (Yr. 2021) to 25.61 (Yr. 2022).
- 8.5** Analysis of satellite data indicates that plantation on backfill has reduced in Balram, Bharatpur, Hingula and Belpahar because of fresh backfilling activities.
- 8.6** Plantation on External OB dump has marginally reduced in Hingula, Belpahar and Lajkura OCP due to construction of roads. Area of Social forestry has reduced marginally in some projects due to mine advancement.
- 8.7** Study also reveals that area under barren backfilling (Technical Reclamation) has increased from 27.29 Km² in 2021 to 29.58 Km² in 2022
- 8.8** It was observed that Green Cover has reduced in some projects of MCL due to reduction in plantation and social forestry in the leasehold areas resulted from mine advancement.
- 8.9** On comparing the status of land reclamation for the year 2022 with respect to the year 2021 in different projects, it is evident that area of land reclamation has increased from 35.53 Km² (Yr.2021) to 37.64 Km² (Yr.2022).
- 8.10** In Kulda, Samleswari, Lingaraj and Bharatpur OCP plantation has been done on internal OB dump but because of low height of the plants its signature is not available/visible in satellite image of 2022.
- 8.11** Out of 16 projects of MCL, Belpahar OC ranks on top for land reclamation (75.77%) followed by Samleswari OC (72.28%) and Bharatpur OC (71.70%).

Table – 8.1
Project wise Land Reclamation Status in Opencast Projects of MCL based on Satellite Data of the year 2022

| Sl. No. | Project | Total Leasehold Area 2020 | Total Leasehold Area 2021 | Technical Reclamation | | Plantation | | | | | | Area Under Active Mining | Total Excavated Area | | Total Area Under Plantation (%Green Cover Generated in Leasehold) | | Total Area Under Reclamation | | |
|---------|--------------------|---------------------------|---------------------------|------------------------|--------|---|--------|---|------|---|------|--------------------------|----------------------|------------|---|------------|------------------------------|----------|--------|
| | | | | | | Biological Reclamation | | Other Plantation | | | | | | | | | | | |
| | | | | Area under Backfilling | | Plantation on Excavated/Backfilled Area | | Plantation on External Over Burden Dump | | Social Forestry, Avenue Plantation Etc. | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | | 6 | | 7 | | 8 | | 9 | | 10(=5+6+9) | | 11(=6+7+8) | | 12(=5+6) | |
| | | | | 2021 | 2022 | 2021 | 2022 | 2021 | 2022 | 2021 | 2022 | 2021 | 2022 | 2021 | 2022 | 2021 | 2022 | 2021 | 2022 |
| 1 | Ananta | 14.20 | 14.20 | 2.46 | 2.62 | 1.05 | 1.05 | 0.10 | 0.10 | 0.22 | 0.22 | 1.60 | 1.95 | 5.11 | 5.62 | 1.37 | 1.37 | 3.51 | 3.67 |
| | | | | 48.14% | 46.62% | 20.55% | 18.68% | | | | | 31.31% | 34.70% | | | 9.65% | 9.65% | 68.69% | 65.30% |
| 2 | Balram | 13.09 | 13.09 | 2.78 | 2.98 | 1.04 | 0.98 | 0.22 | 0.22 | 0.35 | 0.35 | 1.40 | 1.58 | 5.22 | 5.54 | 1.61 | 1.55 | 3.82 | 3.96 |
| | | | | 53.26% | 53.79% | 19.92% | 17.69% | | | | | 26.82% | 28.52% | | | 12.30% | 11.84% | 73.18% | 71.48% |
| 3 | Lingaraj | 11.73 | 11.73 | 1.90 | 1.98 | 0.15 | 0.16 | 0.52 | 0.52 | 0.44 | 0.44 | 2.67 | 2.68 | 4.72 | 4.82 | 1.11 | 1.12 | 2.05 | 2.14 |
| | | | | 40.25% | 41.08% | 3.18% | 3.32% | | | | | 56.57% | 55.60% | | | 9.46% | 9.55% | 43.43% | 44.40% |
| 4 | Bharatpur | 9.27 | 9.27 | 2.66 | 2.83 | 1.65 | 1.63 | 0.45 | 0.45 | 0.16 | 0.16 | 1.75 | 1.76 | 6.06 | 6.22 | 2.26 | 2.24 | 4.31 | 4.46 |
| | | | | 43.89% | 45.50% | 27.23% | 26.21% | | | | | 28.88% | 28.30% | | | 24.38% | 24.16% | 71.12% | 71.70% |
| 5 | Bhubaneswari | 6.58 | 6.58 | 2.15 | 2.29 | 0.02 | 0.02 | 0.01 | 0.01 | 0.13 | 0.09 | 2.17 | 2.17 | 4.34 | 4.48 | 0.16 | 0.12 | 2.17 | 2.31 |
| | | | | 49.54% | 51.12% | 0.46% | 0.45% | | | | | 50.00% | 48.44% | | | 2.43% | 1.82% | 50.00% | 51.56% |
| 6 | Jagannath | 5.54 | 5.54 | 1.00 | 1.05 | 1.80 | 1.80 | 0.00 | 0.00 | 0.17 | 0.15 | 0.98 | 1.13 | 3.78 | 3.98 | 1.97 | 1.95 | 2.80 | 2.85 |
| | | | | 26.46% | 26.38% | 47.62% | 45.23% | | | | | 25.93% | 28.39% | | | 35.56% | 35.20% | 74.07% | 71.61% |
| 7 | Hingula | 15.75 | 15.75 | 1.50 | 1.69 | 0.06 | 0.04 | 0.21 | 0.18 | 0.29 | 0.29 | 2.25 | 2.47 | 3.81 | 4.20 | 0.56 | 0.51 | 1.56 | 1.73 |
| | | | | 39.37% | 40.24% | 1.57% | 0.95% | | | | | 59.06% | 58.81% | | | 3.56% | 3.24% | 40.94% | 41.19% |
| 8 | Kaniha | 7.18 | 7.18 | 0.31 | 0.36 | 0.00 | 0.00 | 0.00 | 0.00 | 0.07 | 0.07 | 1.24 | 1.48 | 1.55 | 1.84 | 0.07 | 0.07 | 0.31 | 0.36 |
| | | | | 20.00% | 19.57% | 0.00% | 0.00% | | | | | 80.00% | 80.43% | | | 0.97% | 0.97% | 20.00% | 19.57% |
| 9 | Belpahar | 14.44 | 14.44 | 2.71 | 3.50 | 0.82 | 0.66 | 0.51 | 0.48 | 0.52 | 0.50 | 1.29 | 1.33 | 4.82 | 5.49 | 1.85 | 1.64 | 3.53 | 4.16 |
| | | | | 56.22% | 63.75% | 17.01% | 12.02% | | | | | 26.76% | 24.23% | | | 12.81% | 11.36% | 73.24% | 75.77% |
| 10 | Lakhanpur | 22.40 | 22.40 | 4.66 | 4.76 | 0.86 | 0.89 | 0.59 | 0.59 | 0.40 | 0.38 | 3.58 | 3.99 | 9.10 | 9.64 | 1.85 | 1.86 | 5.52 | 5.65 |
| | | | | 51.21% | 49.38% | 9.45% | 9.23% | | | | | 39.34% | 41.39% | | | 8.26% | 8.30% | 60.66% | 58.61% |
| 11 | Samleswari | 13.35 | 13.35 | 3.03 | 3.12 | 0.64 | 0.66 | 0.49 | 0.49 | 0.48 | 0.48 | 1.29 | 1.45 | 4.96 | 5.23 | 1.61 | 1.63 | 3.67 | 3.78 |
| | | | | 61.09% | 59.66% | 12.90% | 12.62% | | | | | 26.01% | 27.72% | | | 12.06% | 12.21% | 73.99% | 72.28% |
| 12 | Lajkura | 7.21 | 7.21 | 1.24 | 1.32 | 0.15 | 0.16 | 0.20 | 0.19 | 0.16 | 0.16 | 1.02 | 1.07 | 2.41 | 2.55 | 0.51 | 0.51 | 1.39 | 1.48 |
| | | | | 51.45% | 51.76% | 6.22% | 6.27% | | | | | 42.32% | 41.96% | | | 7.07% | 7.07% | 57.68% | 58.04% |
| 13 | Siarmal | 22.90 | 22.90 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.60 | 0.61 | 0.00 | 0.00 | 0.00 | 0.00 | 0.60 | 0.61 | 0.00 | 0.00 |
| | | | | 0.00% | 0.00% | 0.00% | 0.00% | | | | | 0.00% | 0.00% | | | 2.62% | 2.66% | - | - |
| 14 | Basundhara W Extn. | 3.23 | 3.23 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.03 | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.03 | 0.00 | 0.00 |
| | | | | 0.00% | 0.00% | 0.00% | 0.00% | | | | | 0.00% | 0.00% | | | 0.93% | 0.93% | - | - |
| 15 | Garjanbahal | 6.54 | 6.54 | 0.14 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.03 | 0.58 | 0.79 | 0.72 | 0.96 | 0.03 | 0.03 | 0.14 | 0.17 |
| | | | | 19.44% | 17.71% | 0.00% | 0.00% | | | | | 80.56% | 82.29% | | | 0.46% | 0.46% | 19.44% | 17.71% |
| 16 | Kulda | 6.34 | 6.34 | 0.75 | 0.91 | 0.00 | 0.01 | 0.00 | 0.01 | 0.02 | 0.03 | 1.67 | 1.76 | 2.42 | 2.68 | 0.02 | 0.05 | 0.75 | 0.92 |
| | | | | 30.99% | 33.96% | 0.00% | 0.37% | | | | | 69.01% | 65.67% | | | 0.32% | 0.79% | 30.99% | 34.33% |
| | Total | 179.75 | 179.75 | 27.29 | 29.58 | 8.24 | 8.06 | 3.30 | 3.24 | 4.07 | 3.99 | 23.49 | 25.61 | 59.02 | 63.25 | 15.61 | 15.29 | 35.53 | 37.64 |
| | | | | 46.24% | 46.77% | 13.96% | 12.74% | | | | | 39.80% | 40.49% | | | 8.68% | 8.51% | 60.20% | 59.51% |

Note: In reference to the above Table-1, different parameters are classified as follows:

1. Area under **Biological Reclamation** includes Area under Plantation done on Backfilled Area only.
2. Area under **Technical Reclamation** includes Area under Barren Backfilling only.
3. Area under **Active Mining** includes Coal Quarry, Advance Quarry Site, Quarry Filled with Water, if any. Areas under coal dump have been excluded from Active Mining in this table.
4. Social Forestry and Plantation on External OB Dumps are not included in Biological Reclamation and are put under separate categories as shown in the Table above.
5. (%) calculated in the above Table is in respect to Total Excavated Area except for "Total Area under Plantation" where % is in terms of "Leasehold Area"

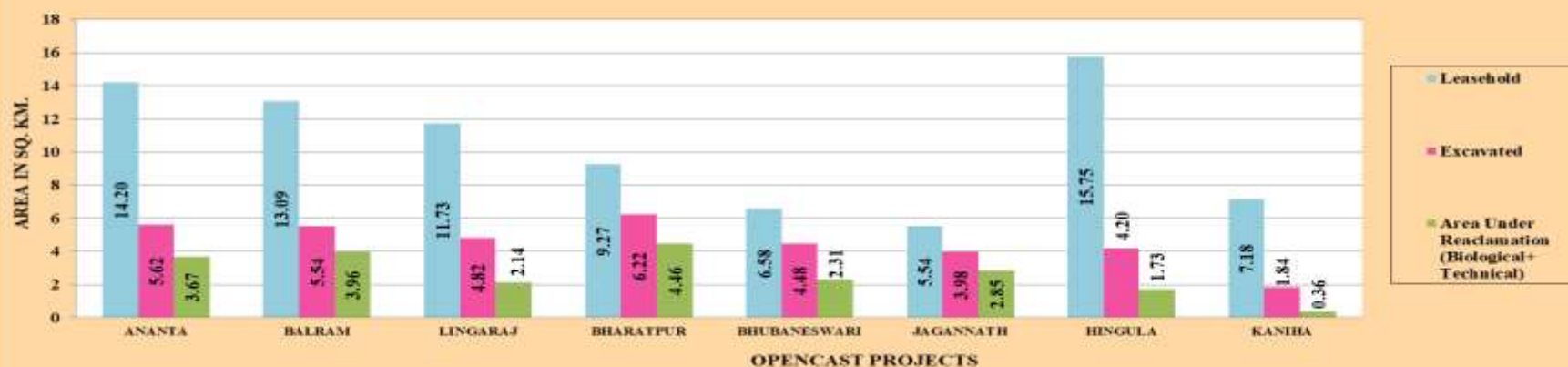
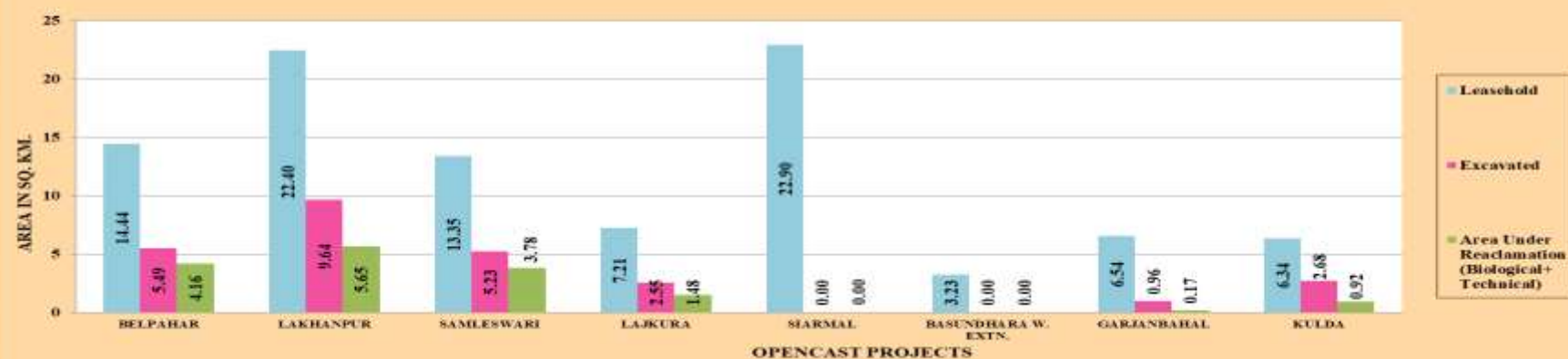
FIG 8.1A LAND RECLAMATION STATUS OF PROJECTS IN TALCHER CF, MCL, YEAR 2022**FIG 8.1B LAND RECLAMATION STATUS OF PROJECTS IN TALCHER CF, MCL, YEAR 2022****Fig.8.1A & 8.1B : Land reclamation status in OC projects of MCL in the year 2022**

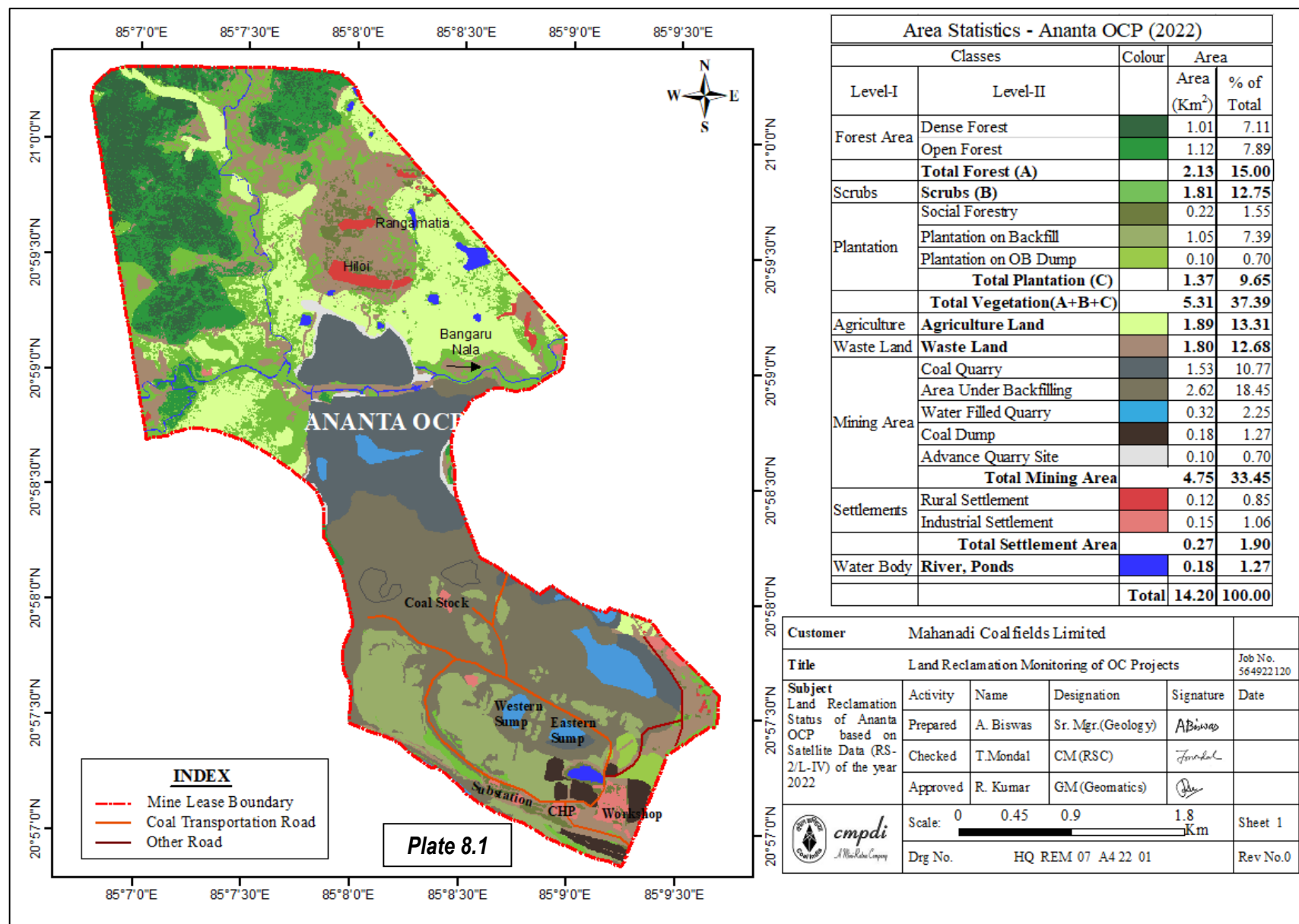
Table 8.2 (A)

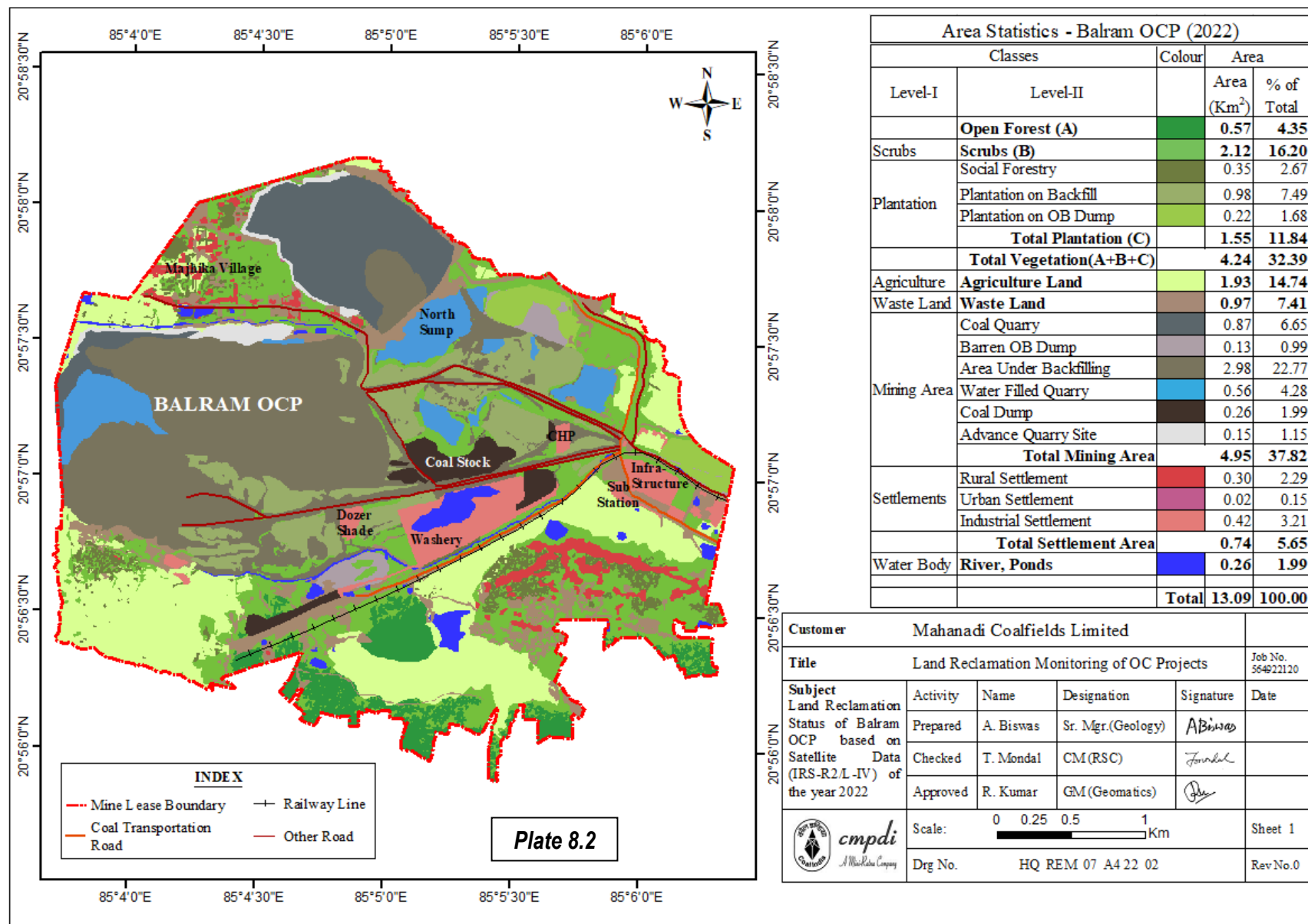
Project wise Area Statistics of Land Use / Cover in OC Mines (> 5 mcu.m.) of MCL based on Satellite data of the Year 2022

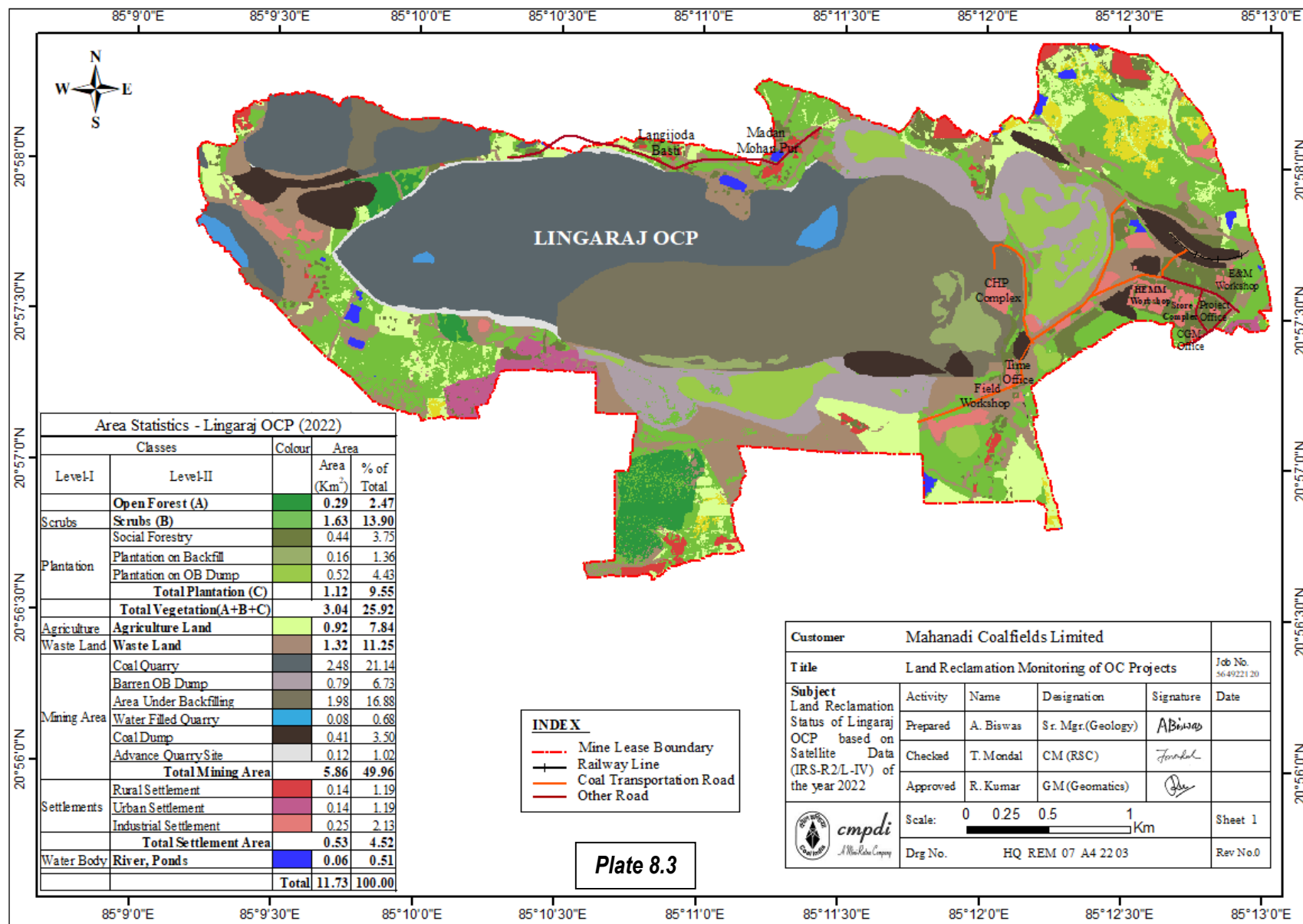
| | | (Area in Sq. Kms.) | | | | | | | | | | | | | | | | | |
|--------------------|---|--------------------|---------------|--------------|---------------|--------------|---------------|-------------|---------------|---------------|---------------|-------------|---------------|--------------|---------------|-------------|---------------|--------------|---------------|
| | | ANANTA | | BALRAM | | LINGARAJ | | BHARATPUR | | BHUBANESHWARI | | JAGANNATH | | HINGULA | | KANIHA | | TOTAL | |
| | | Area | % | Area | % | Area | % | Area | % | Area | % | Area | % | Area | % | Area | % | Area | % |
| FORESTS | Dense Forest | 1.01 | 7.11 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 1.13 | 7.17 | 0.00 | 0.00 | 2.15 | 2.58 |
| | Open Forest | 1.12 | 7.89 | 0.57 | 4.35 | 0.29 | 2.47 | 0.00 | 0.00 | 0.22 | 3.35 | 0.02 | 0.36 | 1.53 | 9.71 | 0.00 | 0.00 | 3.75 | 4.50 |
| | Total Forest (A) | 2.13 | 15.00 | 0.57 | 4.35 | 0.29 | 2.47 | 0.01 | 0.11 | 0.22 | 3.35 | 0.02 | 0.36 | 2.66 | 16.89 | 0.00 | 0.00 | 5.90 | 7.08 |
| SCRUBS | Scrubs (B) | 1.81 | 12.75 | 2.12 | 16.20 | 1.63 | 13.90 | 0.44 | 4.75 | 0.38 | 5.78 | 0.27 | 4.87 | 2.77 | 17.59 | 0.69 | 10.17 | 10.11 | 12.13 |
| PLANTATION | Social Forestry | 0.22 | 1.55 | 0.35 | 2.67 | 0.44 | 3.75 | 0.16 | 1.73 | 0.09 | 1.37 | 0.15 | 2.71 | 0.29 | 1.84 | 0.07 | 0.97 | 1.77 | 2.12 |
| | Plantation on External OB Dump | 0.10 | 0.70 | 0.22 | 1.68 | 0.52 | 4.43 | 0.45 | 4.85 | 0.01 | 0.08 | 0.00 | 0.00 | 0.18 | 1.14 | 0.00 | 0.00 | 1.48 | 1.77 |
| | Plantation on Backfill/Excavated Area(Biological Reclamation) | 1.05 | 7.39 | 0.98 | 7.49 | 0.16 | 1.36 | 1.63 | 17.58 | 0.02 | 0.30 | 1.80 | 32.49 | 0.04 | 0.25 | 0.00 | 0.00 | 5.68 | 6.82 |
| | Total Plantation (Green Cover) (C) | 1.37 | 9.65 | 1.55 | 11.84 | 1.12 | 9.55 | 2.24 | 24.16 | 0.12 | 1.75 | 1.95 | 35.20 | 0.51 | 3.24 | 0.07 | 0.97 | 8.93 | 10.71 |
| | Total Vegetation (A+B+C) | 5.31 | 37.39 | 4.24 | 32.39 | 3.04 | 25.92 | 2.69 | 29.02 | 0.72 | 10.87 | 2.24 | 40.43 | 5.94 | 37.71 | 0.76 | 11.14 | 24.94 | 29.92 |
| ACTIVE MINING | Coal Dump | 0.18 | 1.27 | 0.26 | 1.99 | 0.41 | 3.50 | 0.18 | 1.94 | 0.04 | 0.61 | 0.09 | 1.62 | 0.39 | 2.48 | 0.13 | 1.67 | 1.68 | 2.02 |
| | Coal Quarry | 1.53 | 10.77 | 0.87 | 6.65 | 2.48 | 21.14 | 1.02 | 11.00 | 1.74 | 26.46 | 0.42 | 7.58 | 1.28 | 8.13 | 1.36 | 16.29 | 10.70 | 12.84 |
| | Advance Quarry Site | 0.10 | 0.70 | 0.15 | 1.15 | 0.12 | 1.02 | 0.11 | 1.19 | 0.16 | 2.43 | 0.13 | 2.35 | 0.20 | 1.27 | 0.01 | 0.14 | 0.98 | 1.18 |
| | Quarry Filled with Water | 0.32 | 2.25 | 0.56 | 4.28 | 0.08 | 0.68 | 0.63 | 6.80 | 0.27 | 4.11 | 0.58 | 10.47 | 0.99 | 6.29 | 0.11 | 0.84 | 3.54 | 4.25 |
| | Total Area under Active Mining | 1.95 | 13.73 | 1.58 | 12.07 | 2.68 | 22.85 | 1.76 | 18.99 | 2.17 | 33.00 | 1.13 | 20.40 | 2.47 | 15.68 | 1.48 | 17.27 | 15.22 | 18.26 |
| | Barren OB dump | 0.00 | 0.00 | 0.13 | 0.99 | 0.79 | 6.73 | 0.05 | 0.54 | 0.79 | 12.02 | 0.00 | 0.00 | 0.74 | 4.70 | 0.42 | 5.85 | 2.92 | 3.50 |
| | Area Under Backfilling/Technical Reclamation) | 2.62 | 18.45 | 2.98 | 22.77 | 1.98 | 16.88 | 2.83 | 30.53 | 2.29 | 34.83 | 1.05 | 18.95 | 1.69 | 10.73 | 0.36 | 4.32 | 15.80 | 18.96 |
| | Total Area under Mine Operation | 4.75 | 33.45 | 4.95 | 37.82 | 5.86 | 49.96 | 4.82 | 52.00 | 5.29 | 80.46 | 2.27 | 40.97 | 5.29 | 33.59 | 2.39 | 29.11 | 35.62 | 40.73 |
| WASTELANDS | Waste Lands | 1.80 | 12.68 | 0.97 | 7.41 | 1.32 | 11.25 | 0.70 | 7.55 | 0.28 | 4.26 | 0.38 | 6.86 | 1.78 | 11.30 | 0.99 | 13.93 | 8.22 | 9.86 |
| | Fly Ash Pond/Sand Body | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.11 | 1.99 | 0.06 | 0.38 | 0.00 | 0.00 | 0.17 | 0.20 |
| | Total Wastelands | 1.80 | 12.68 | 0.97 | 7.41 | 1.32 | 11.25 | 0.70 | 7.55 | 0.28 | 4.26 | 0.49 | 8.84 | 1.84 | 11.68 | 0.99 | 13.93 | 8.39 | 10.07 |
| WATER | Reservoir, nallah, ponds etc. | 0.18 | 1.27 | 0.26 | 1.99 | 0.06 | 0.51 | 0.05 | 0.54 | 0.02 | 0.30 | 0.04 | 0.72 | 0.31 | 1.97 | 0.07 | 0.97 | 0.99 | 1.19 |
| | Total Waterbodies | 0.18 | 1.27 | 0.26 | 1.99 | 0.06 | 0.51 | 0.05 | 0.54 | 0.02 | 0.30 | 0.04 | 0.72 | 0.31 | 1.97 | 0.07 | 0.97 | 0.99 | 1.19 |
| AGRICULTURE | Crop Lands | 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 | 0.20 | 2.79 | 0.20 | 0.24 |
| | Fallow Lands | 1.89 | 13.31 | 1.93 | 14.74 | 0.92 | 7.84 | 0.73 | 7.87 | 0.22 | 3.35 | 0.35 | 6.32 | 2.14 | 13.59 | 2.46 | 37.74 | 10.64 | 12.77 |
| | Total Agriculture | 1.89 | 13.31 | 1.93 | 14.74 | 0.92 | 7.84 | 0.73 | 7.87 | 0.22 | 3.35 | 0.35 | 6.32 | 2.14 | 13.59 | 2.66 | 40.53 | 10.84 | 13.01 |
| SETTLEMENTS | Urban Settlement | 0.00 | 0.00 | 0.02 | 0.15 | 0.14 | 1.19 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.06 | 0.00 | 0.00 | 0.17 | 0.20 |
| | Rural Settlement | 0.12 | 0.85 | 0.30 | 2.29 | 0.14 | 1.19 | 0.04 | 0.43 | 0.04 | 0.61 | 0.04 | 0.72 | 0.19 | 1.21 | 0.25 | 3.48 | 1.12 | 1.34 |
| | Industrial Settlement | 0.15 | 1.06 | 0.42 | 3.21 | 0.25 | 2.13 | 0.24 | 2.59 | 0.01 | 0.15 | 0.11 | 1.99 | 0.03 | 0.19 | 0.06 | 0.84 | 1.27 | 1.52 |
| | Total Settlements | 0.27 | 1.90 | 0.74 | 5.65 | 0.53 | 4.52 | 0.28 | 3.02 | 0.05 | 0.76 | 0.15 | 2.71 | 0.23 | 1.46 | 0.31 | 4.32 | 2.56 | 3.07 |
| GRAND TOTAL | | 14.20 | 100.00 | 13.09 | 100.00 | 11.73 | 100.00 | 9.27 | 100.00 | 6.58 | 100.00 | 5.54 | 100.00 | 15.75 | 100.00 | 7.18 | 100.00 | 83.34 | 100.00 |

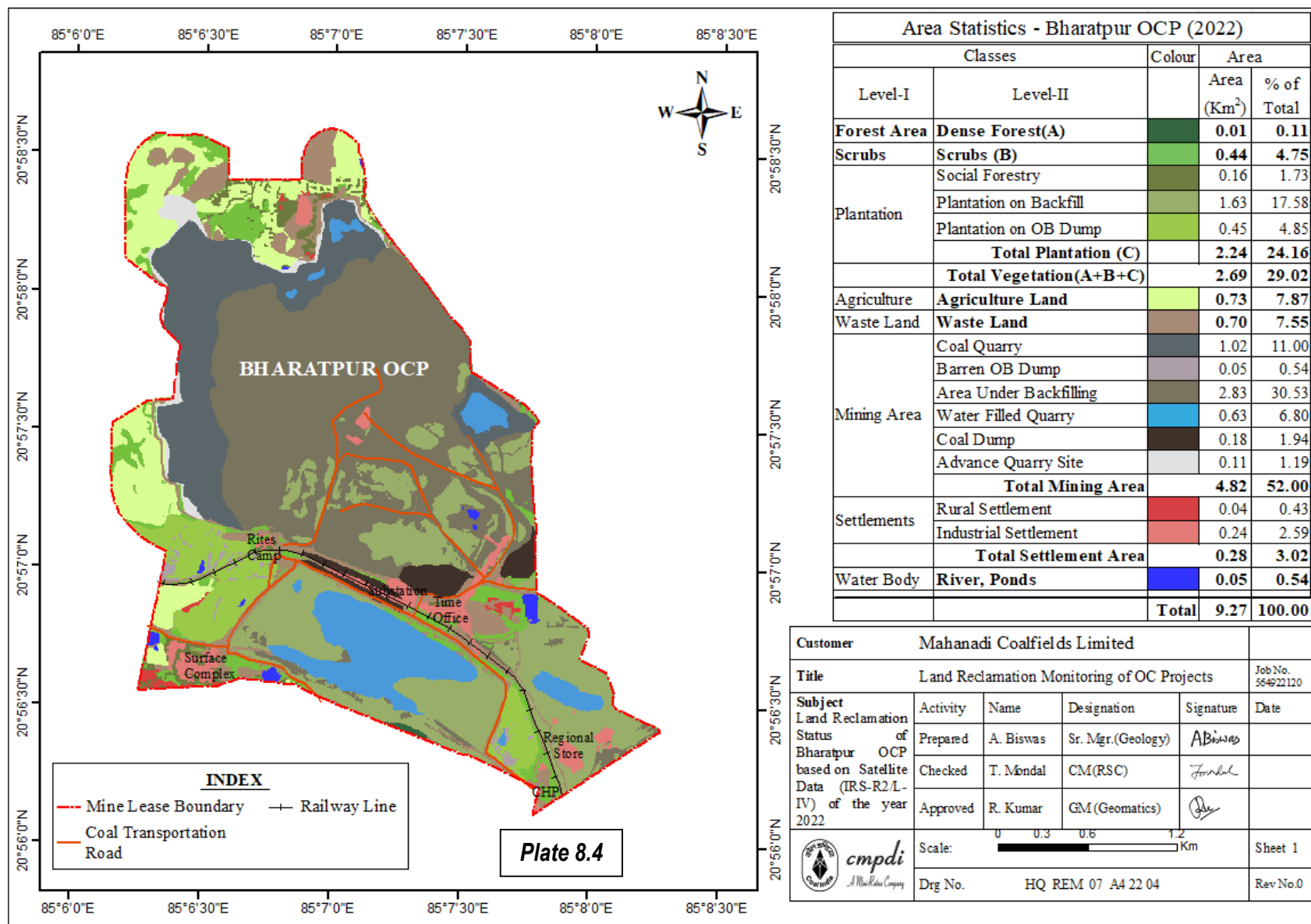
Table 8.2 (B)

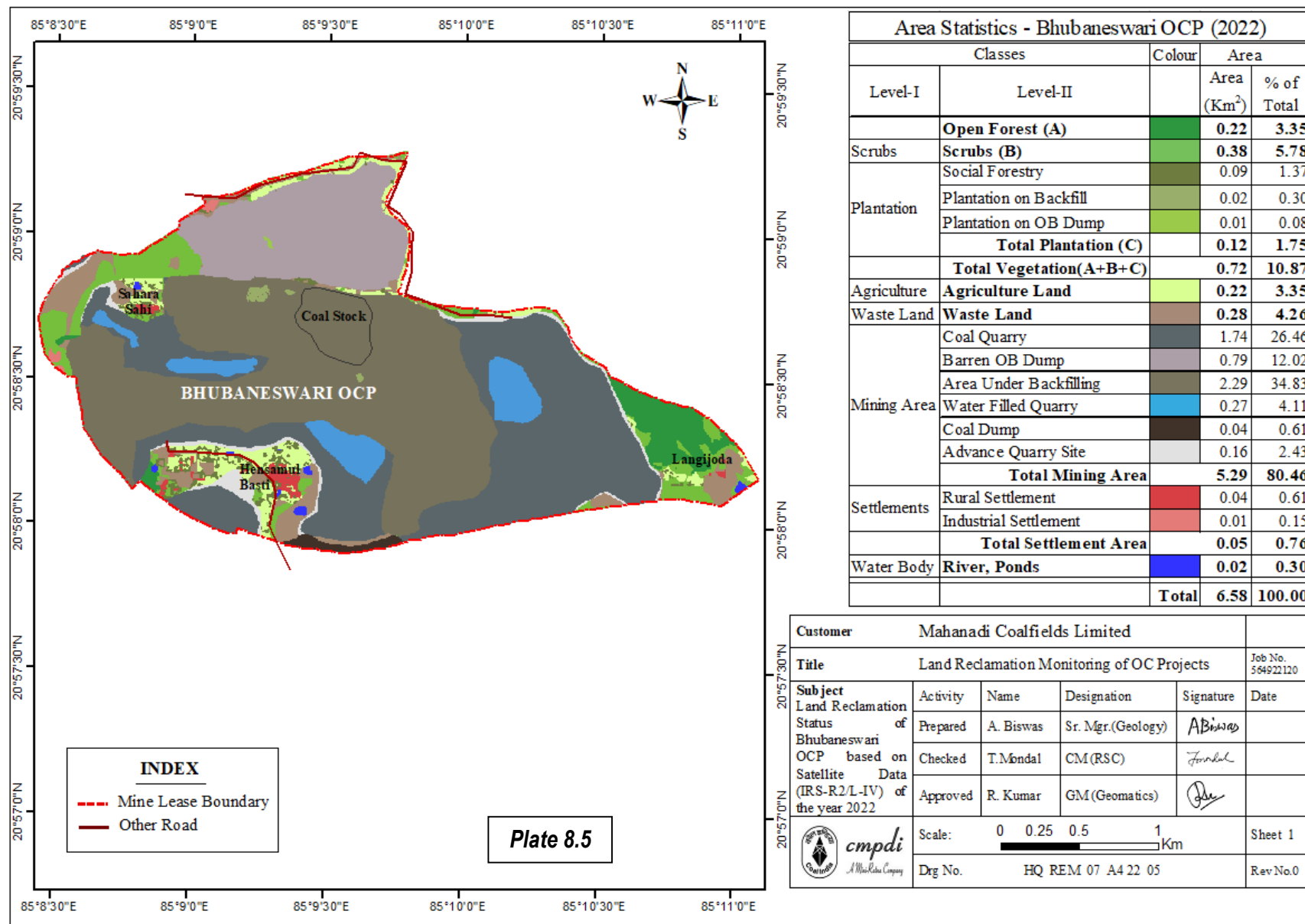
| (Area in Sq. Kms.) | | | | | | | | | | | | | | | | | | | | | |
|---------------------------------|---|----------|--------|-----------|--------|------------|--------|---------|--------|---------|--------|-------------------|--------|-------------|--------|-------|--------|-------|--------|-----------|--------|
| | | BELPAHAR | | LAKHANPUR | | SAMLESWARI | | LAJKURA | | SIARMAL | | BASUNDHARA W EXTN | | GARJANBAHAL | | KULDA | | TOTAL | | ALL TOTAL | |
| | | Area | % | Area | % | Area | % | Area | % | Area | % | Area | % | Area | % | Area | % | Area | % | Area | % |
| | | | | | | | | | | | | | | | | | | | | | |
| FORESTS | Dense Forest | 0.00 | 0.00 | 1.35 | 6.03 | 0.16 | 1.20 | 0.58 | 8.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.40 | 6.12 | 0.00 | 0.00 | 2.49 | 2.58 | 4.64 | 2.58 |
| | Open Forest | 0.91 | 6.30 | 2.36 | 10.54 | 0.53 | 3.97 | 0.60 | 8.32 | 0.87 | 3.80 | 0.79 | 24.46 | 0.64 | 9.79 | 0.05 | 0.79 | 6.75 | 7.00 | 10.50 | 5.84 |
| | Total Forest (A) | 0.91 | 6.30 | 3.71 | 16.56 | 0.69 | 5.17 | 1.18 | 16.37 | 0.87 | 3.80 | 0.79 | 24.46 | 1.04 | 15.90 | 0.05 | 0.79 | 9.19 | 9.58 | 15.09 | 8.40 |
| PLANTATION | Scrubs (B) | 3.09 | 21.40 | 2.50 | 11.16 | 2.52 | 18.87 | 0.91 | 12.62 | 7.18 | 31.35 | 1.35 | 41.80 | 1.08 | 16.51 | 1.20 | 18.93 | 19.83 | 20.57 | 29.94 | 16.66 |
| | Social Forestry | 0.50 | 3.46 | 0.38 | 1.70 | 0.48 | 3.59 | 0.16 | 2.22 | 0.61 | 2.66 | 0.03 | 0.93 | 0.03 | 0.46 | 0.03 | 0.47 | 2.22 | 2.30 | 3.99 | 2.22 |
| | Plantation on External OB Dump | 0.48 | 3.32 | 0.59 | 2.63 | 0.49 | 3.67 | 0.19 | 2.64 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.16 | 1.76 | 1.83 | 3.24 | 1.80 |
| | Plantation on Backfill/Excavated Area(Biological Reclamation) | 0.66 | 4.57 | 0.89 | 3.97 | 0.66 | 4.94 | 0.16 | 2.22 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.16 | 2.38 | 2.47 | 8.06 | 4.48 |
| | Total Plantation (Green Cover) (C) | 1.64 | 11.36 | 1.86 | 8.30 | 1.63 | 12.21 | 0.51 | 7.07 | 0.61 | 2.66 | 0.03 | 0.93 | 0.03 | 0.46 | 0.05 | 0.79 | 6.36 | 6.60 | 15.29 | 8.50 |
| Total Vegetation (A+B+C) | | 5.64 | 39.06 | 8.07 | 36.03 | 4.84 | 36.25 | 2.60 | 36.06 | 8.66 | 37.82 | 2.17 | 67.18 | 2.15 | 32.87 | 1.30 | 20.50 | 35.43 | 36.75 | 60.37 | 33.58 |
| ACTIVE MINING | Coal Dump | 0.11 | 0.76 | 0.12 | 0.54 | 0.19 | 1.42 | 0.07 | 0.97 | 0.00 | 0.00 | 0.00 | 0.00 | 0.25 | 3.82 | 0.08 | 1.26 | 0.82 | 0.85 | 2.50 | 1.39 |
| | Coal Quarry | 1.00 | 6.93 | 3.41 | 15.22 | 1.25 | 9.36 | 0.94 | 13.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.65 | 9.94 | 1.53 | 24.13 | 8.78 | 9.11 | 19.48 | 10.84 |
| | Advance Quarry Site | 0.18 | 1.25 | 0.41 | 1.83 | 0.08 | 0.60 | 0.11 | 1.53 | 0.00 | 0.00 | 0.00 | 0.00 | 0.12 | 1.83 | 0.05 | 0.79 | 0.95 | 0.99 | 1.93 | 1.07 |
| | Quarry Filled with Water | 0.15 | 1.04 | 0.17 | 0.76 | 0.12 | 0.90 | 0.02 | 0.28 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.31 | 0.18 | 2.84 | 0.66 | 0.68 | 4.20 | 2.34 |
| | Total Area under Active Mining | 1.33 | 9.21 | 3.99 | 17.81 | 1.45 | 10.86 | 1.07 | 14.84 | 0.00 | 0.00 | 0.00 | 0.00 | 0.79 | 12.08 | 1.76 | 27.76 | 10.39 | 10.78 | 25.61 | 14.25 |
| | Barren OB dump | 0.25 | 1.73 | 0.02 | 0.09 | 0.07 | 0.52 | 0.27 | 3.74 | 0.00 | 0.00 | 0.00 | 0.00 | 0.45 | 6.88 | 0.66 | 10.41 | 1.72 | 1.78 | 4.64 | 2.58 |
| | Area Under Backfilling(Technical Reclamation) | 3.50 | 24.24 | 4.76 | 21.25 | 3.12 | 23.37 | 1.32 | 18.31 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 2.60 | 0.91 | 14.35 | 13.78 | 14.29 | 29.58 | 16.46 |
| | Total Area under Mine Operation | 5.19 | 35.94 | 8.89 | 39.69 | 4.83 | 36.17 | 2.73 | 37.86 | 0.00 | 0.00 | 0.00 | 0.00 | 1.66 | 25.38 | 3.41 | 53.79 | 26.71 | 26.85 | 62.33 | 34.68 |
| WASTELANDS | Waste Lands | 2.35 | 16.27 | 1.33 | 5.94 | 1.93 | 14.45 | 1.03 | 14.29 | 1.95 | 8.52 | 0.60 | 18.58 | 0.39 | 5.96 | 0.59 | 9.31 | 10.17 | 10.55 | 18.39 | 10.23 |
| | Fly Ash Pond/Sand Body | 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 | 0.17 | 0.09 |
| | Total Wastelands | 2.35 | 16.27 | 1.33 | 5.94 | 1.93 | 14.45 | 1.03 | 14.29 | 1.95 | 8.52 | 0.60 | 18.58 | 0.39 | 5.96 | 0.59 | 9.31 | 10.17 | 10.55 | 18.56 | 10.33 |
| WATER | Reservoir, nallah, ponds etc. | 0.22 | 1.52 | 0.26 | 1.16 | 0.26 | 1.95 | 0.07 | 0.97 | 0.22 | 0.96 | 0.02 | 0.62 | 0.02 | 0.31 | 0.18 | 2.84 | 1.25 | 1.30 | 2.24 | 1.25 |
| | Total Waterbodies | 0.22 | 1.52 | 0.26 | 1.16 | 0.26 | 1.95 | 0.07 | 0.97 | 0.22 | 0.96 | 0.02 | 0.62 | 0.02 | 0.31 | 0.18 | 2.84 | 1.25 | 1.3 | 2.24 | 1.25 |
| AGRICULTURE | Crop Lands | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.73 | 7.55 | 0.00 | 0.00 | 0.00 | 0.00 | 0.26 | 4.10 | 1.99 | 2.06 | 2.19 | 1.22 |
| | Fallow Lands | 0.45 | 3.12 | 3.52 | 15.71 | 1.08 | 8.09 | 0.54 | 7.49 | 9.63 | 42.05 | 0.42 | 13.00 | 2.10 | 32.11 | 0.54 | 8.52 | 18.28 | 18.96 | 28.92 | 16.09 |
| | Total Agriculture | 0.45 | 3.12 | 3.52 | 15.71 | 1.08 | 8.09 | 0.54 | 7.49 | 11.36 | 49.61 | 0.42 | 13.00 | 2.10 | 32.11 | 0.80 | 12.62 | 20.27 | 21.02 | 31.11 | 17.31 |
| SETTLEMENTS | Urban Settlement | 0.02 | 0.14 | 0.00 | 0.00 | 0.003 | 0.02 | 0.08 | 1.11 | 0.02 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.12 | 0.13 | 0.29 | 0.16 |
| | Rural Settlement | 0.17 | 1.18 | 0.11 | 0.49 | 0.20 | 1.50 | 0.03 | 0.42 | 0.69 | 3.01 | 0.02 | 0.62 | 0.07 | 1.07 | 0.01 | 0.16 | 1.30 | 1.35 | 2.42 | 1.35 |
| | Industrial Settlement | 0.40 | 2.77 | 0.22 | 0.98 | 0.21 | 1.57 | 0.13 | 1.80 | 0.00 | 0.00 | 0.00 | 0.00 | 0.15 | 2.29 | 0.05 | 0.79 | 1.16 | 1.20 | 2.43 | 1.35 |
| | Total Settlements | 0.59 | 4.09 | 0.33 | 1.47 | 0.413 | 3.09 | 0.24 | 3.33 | 0.71 | 3.10 | 0.02 | 0.62 | 0.22 | 3.36 | 0.06 | 0.95 | 2.58 | 2.68 | 5.14 | 2.86 |
| GRAND TOTAL | | 14.44 | 100.00 | 22.40 | 100.00 | 13.35 | 100.00 | 7.21 | 100.00 | 22.90 | 100.00 | 3.23 | 100.00 | 6.54 | 100.00 | 6.34 | 100.00 | 96.41 | 100.00 | 179.75 | 100.00 |

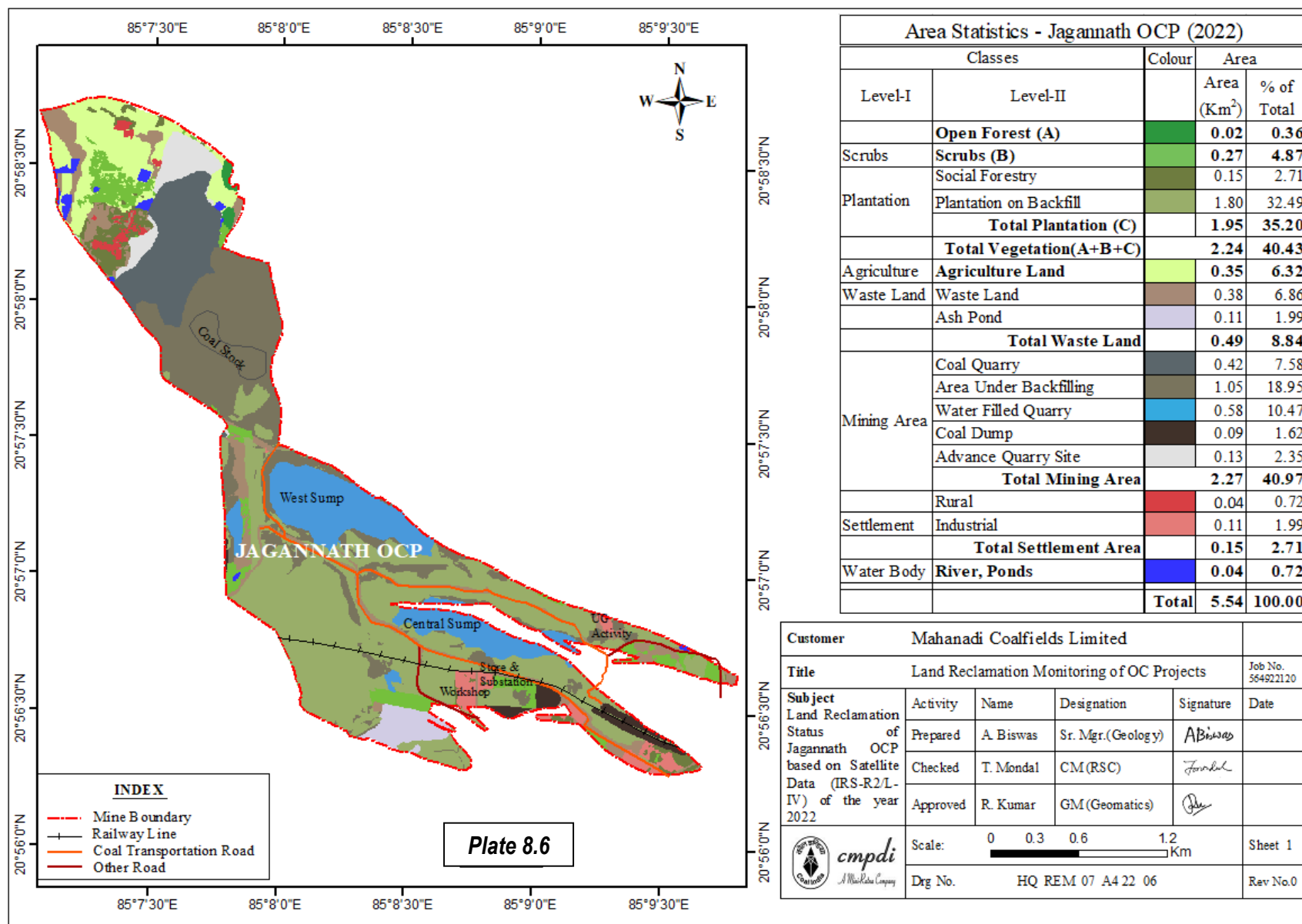


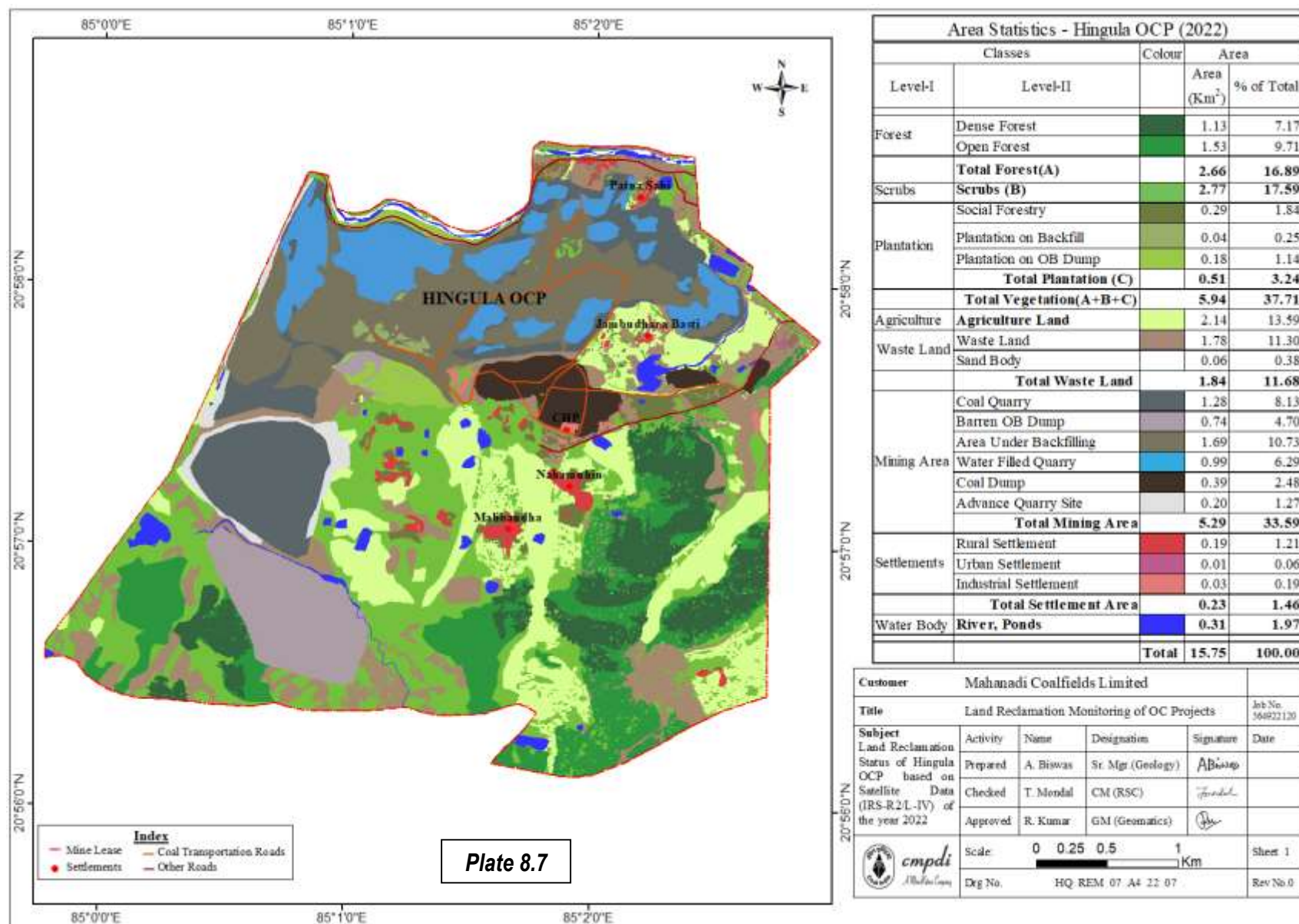


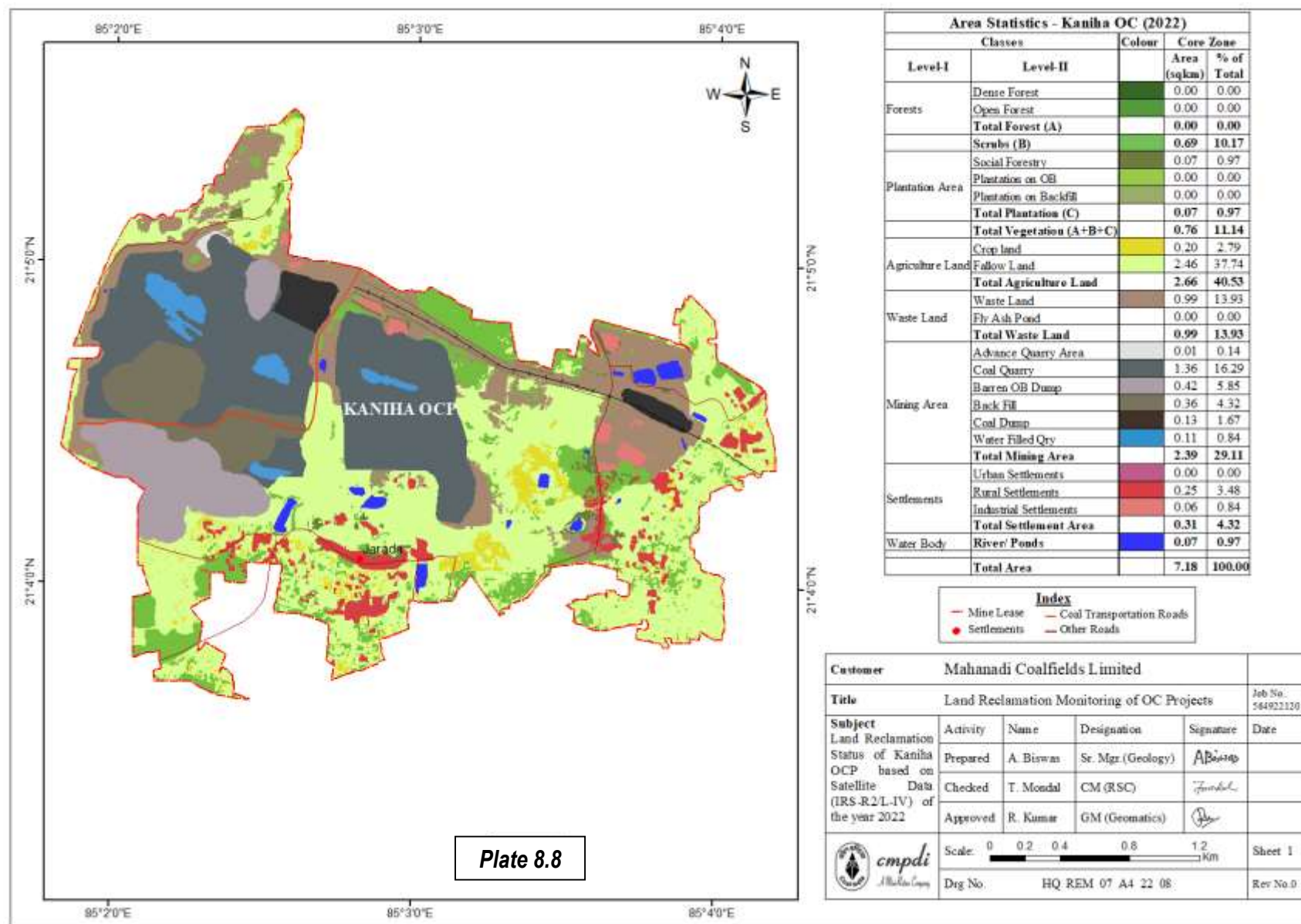


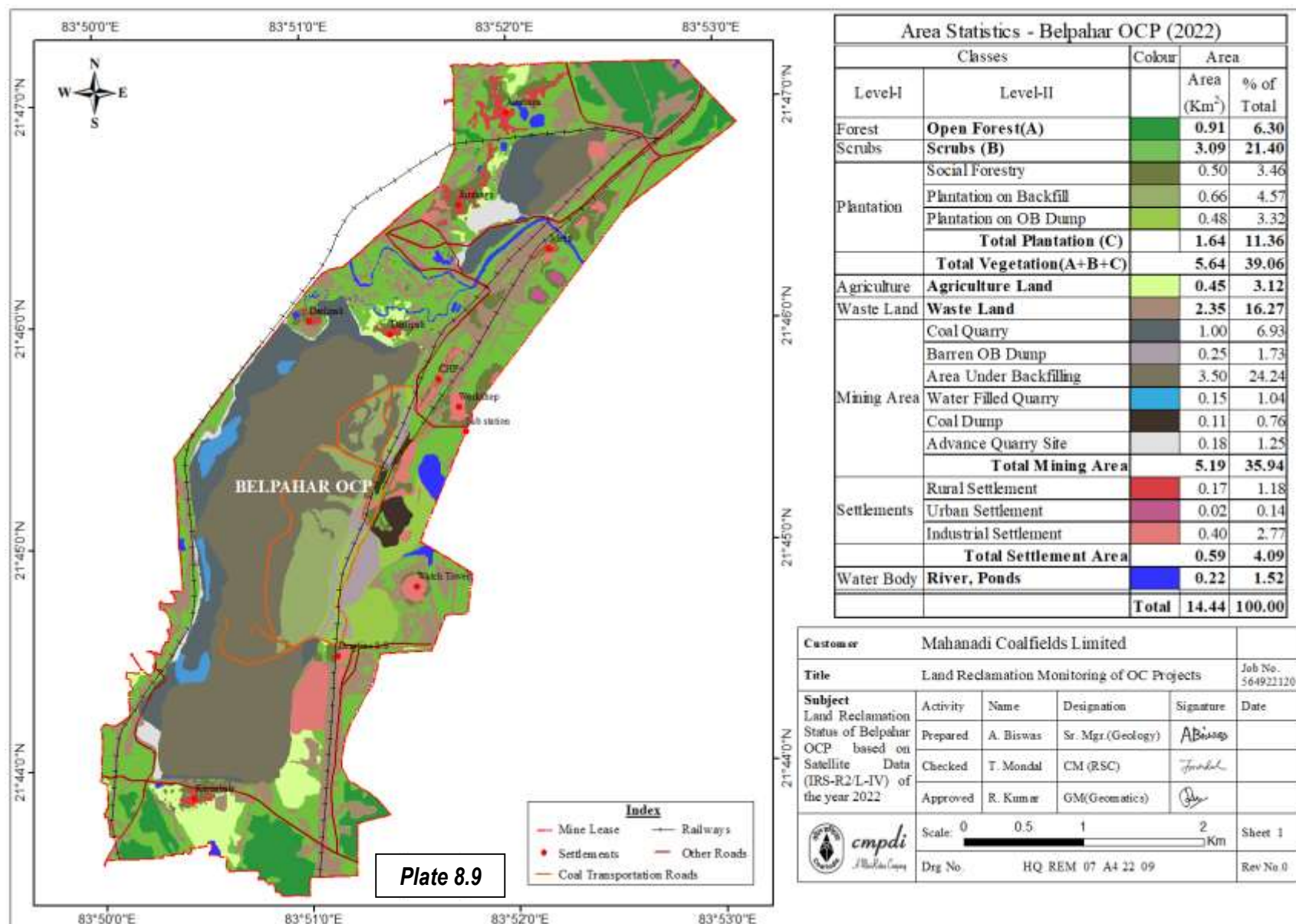


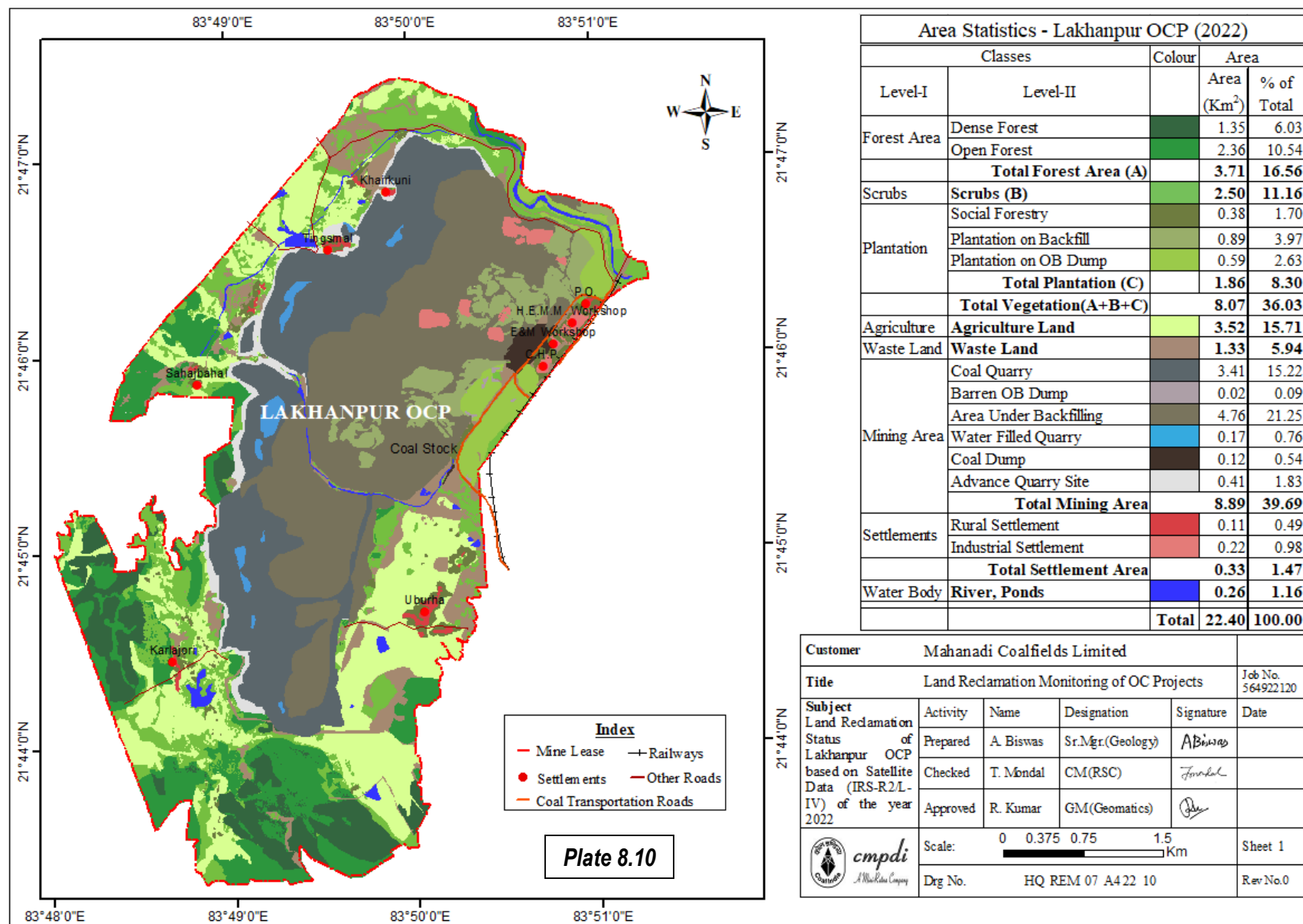


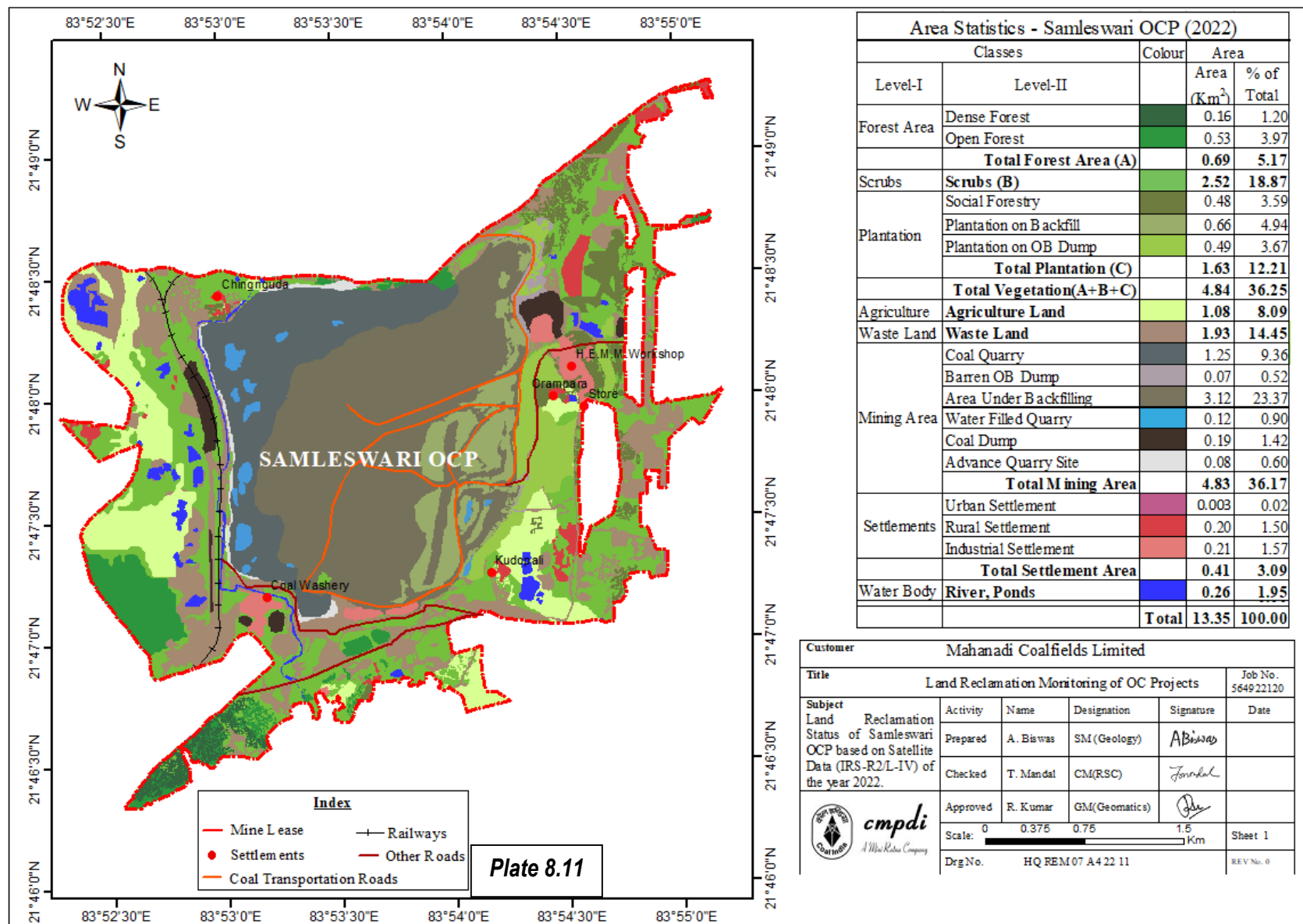


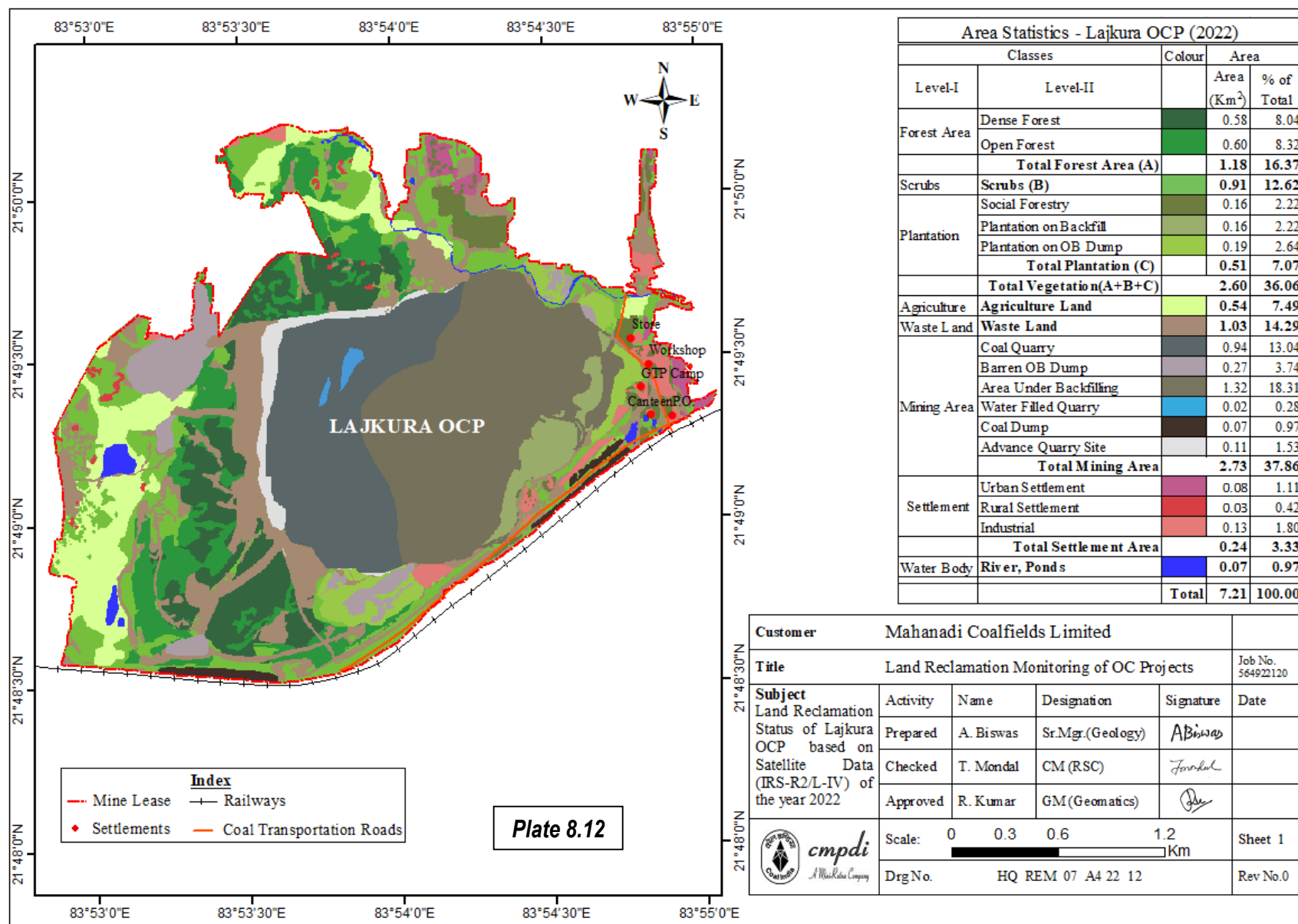


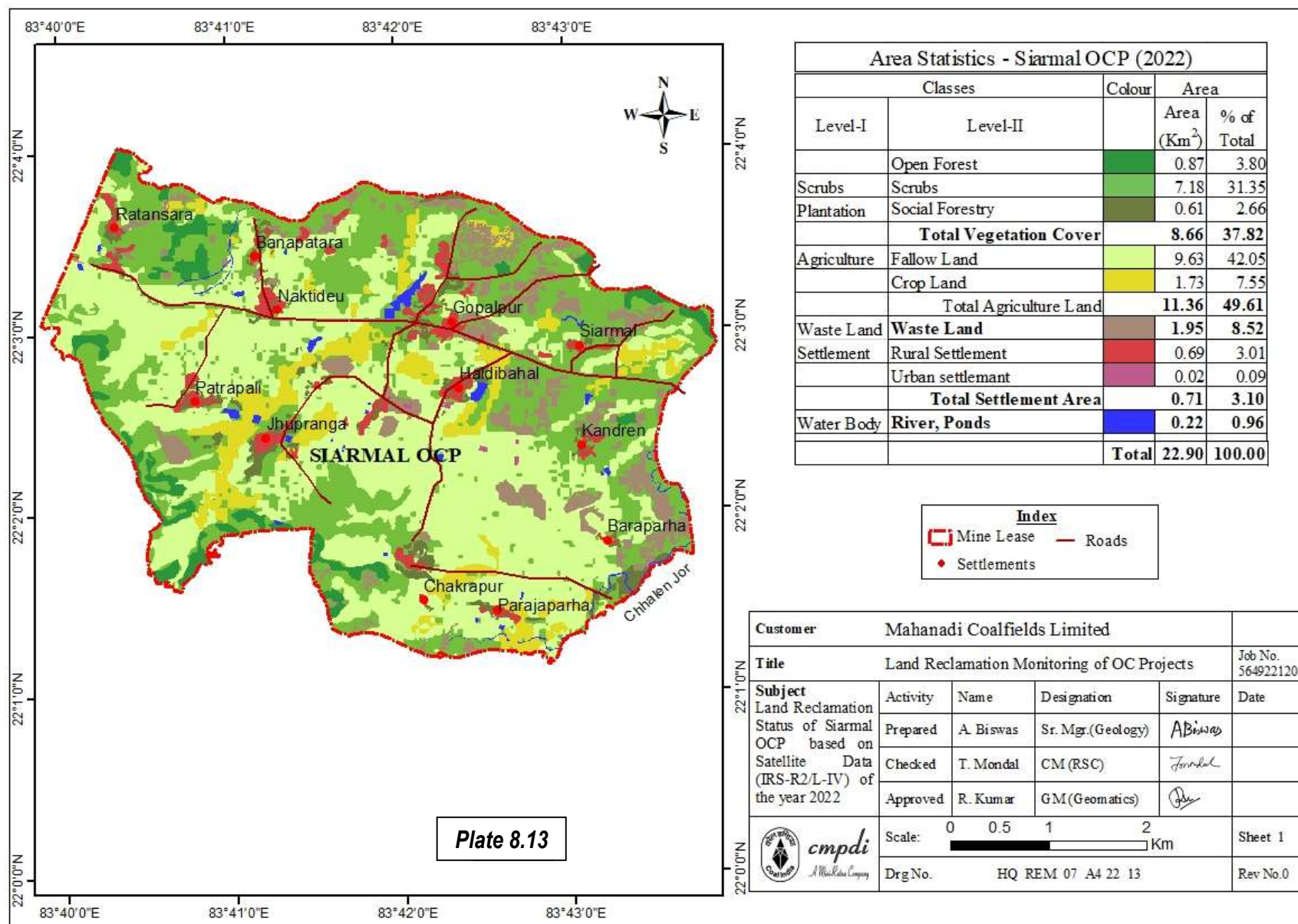


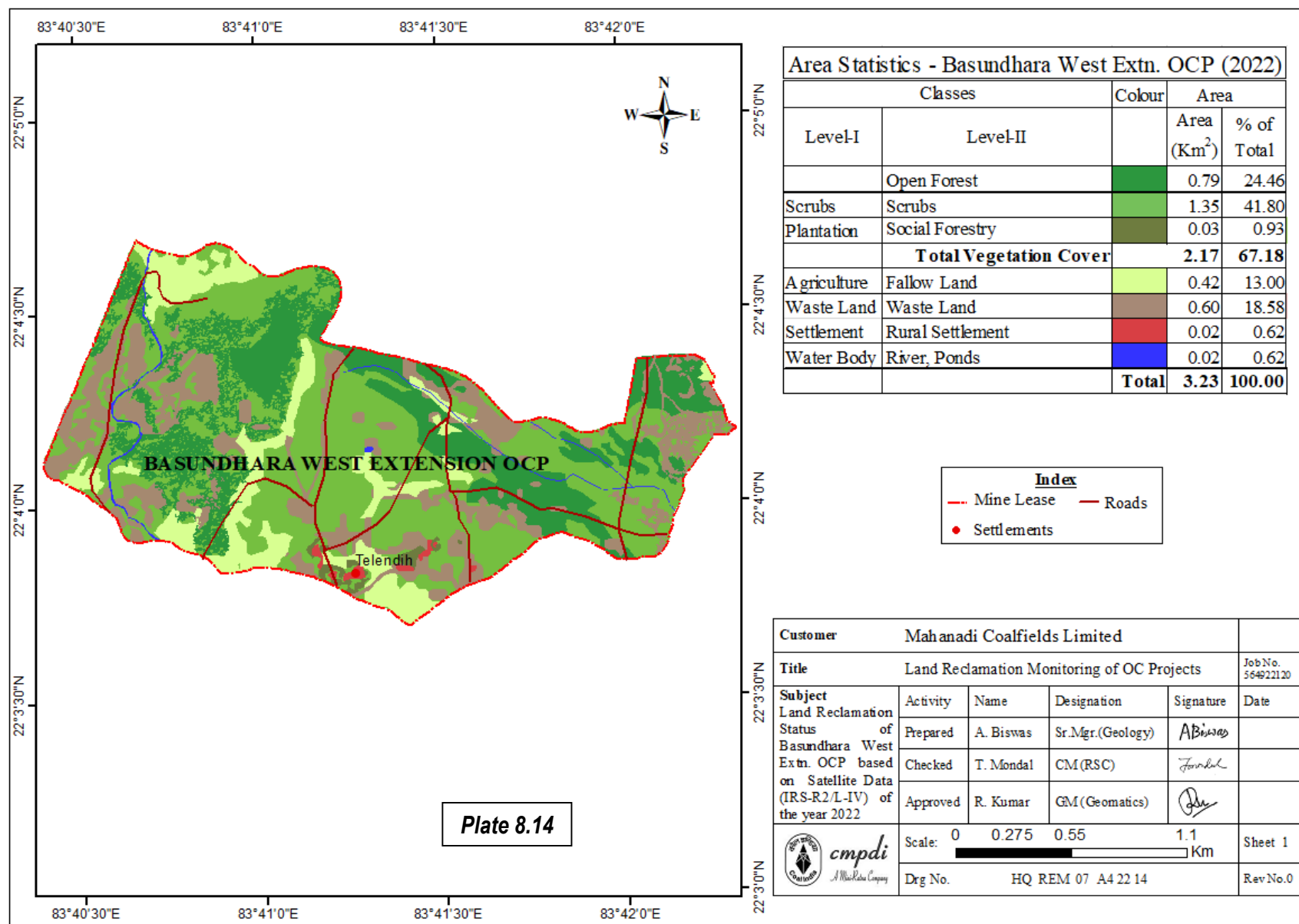


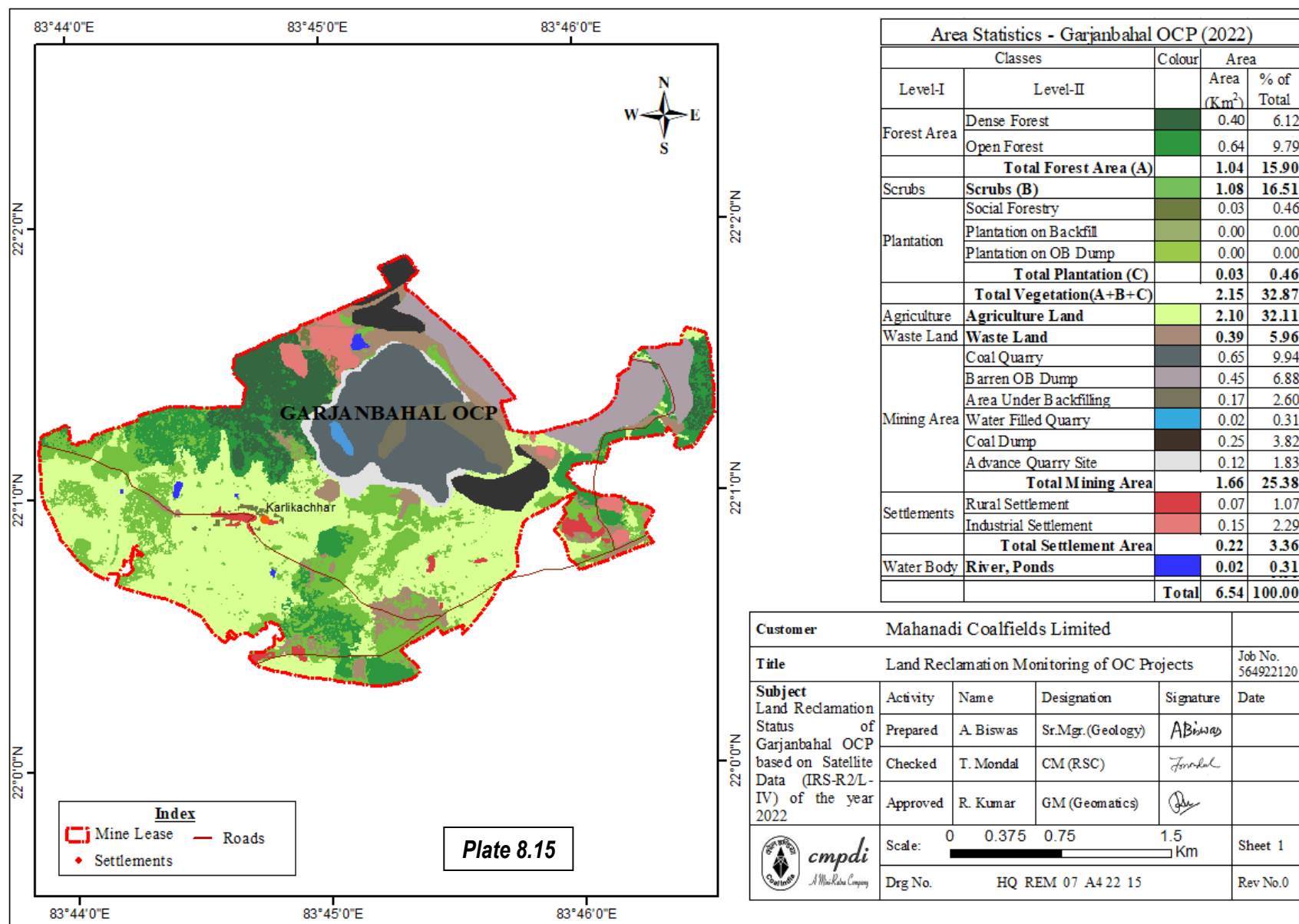


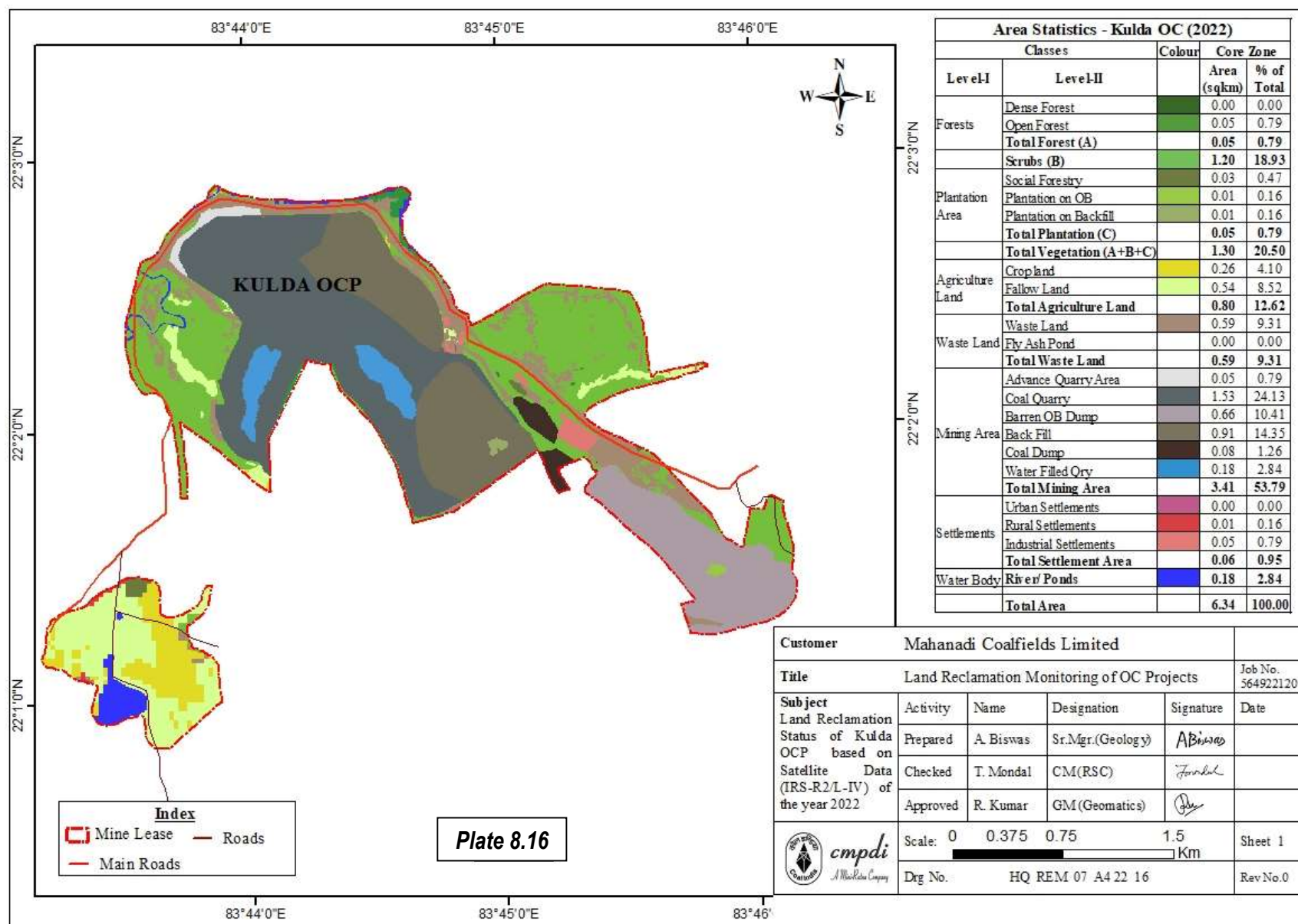












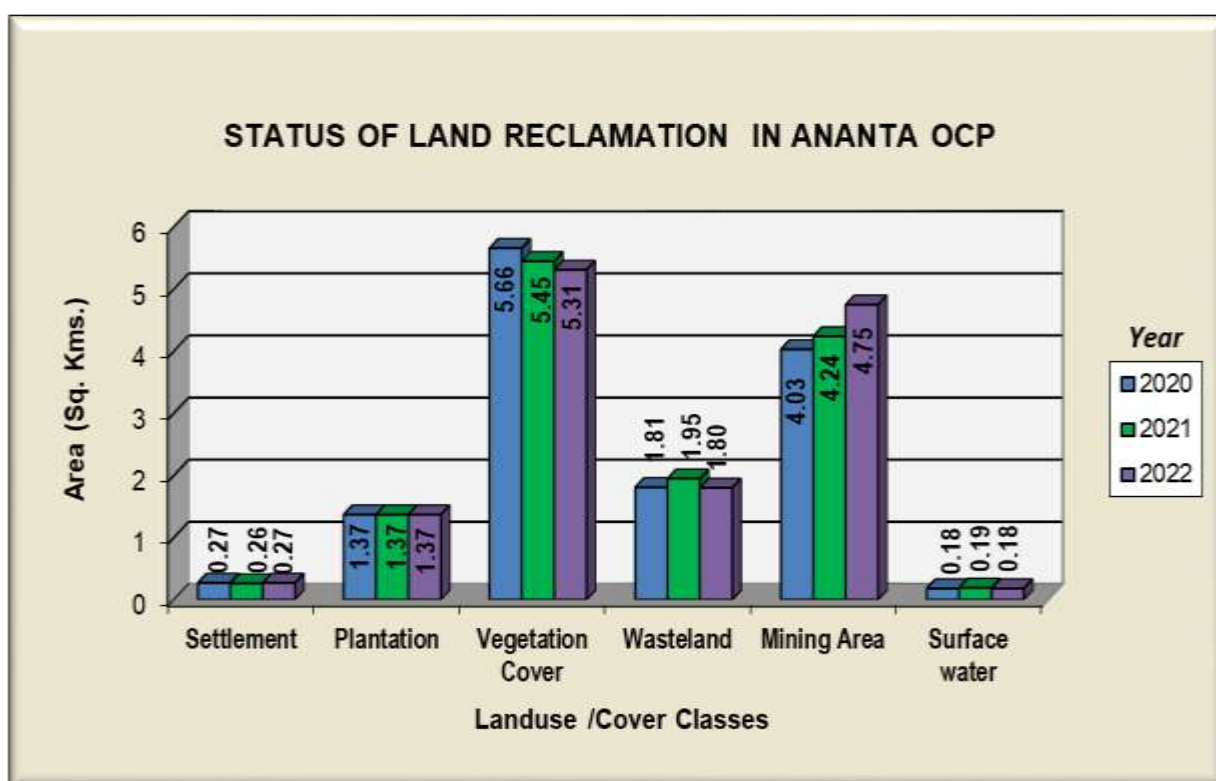


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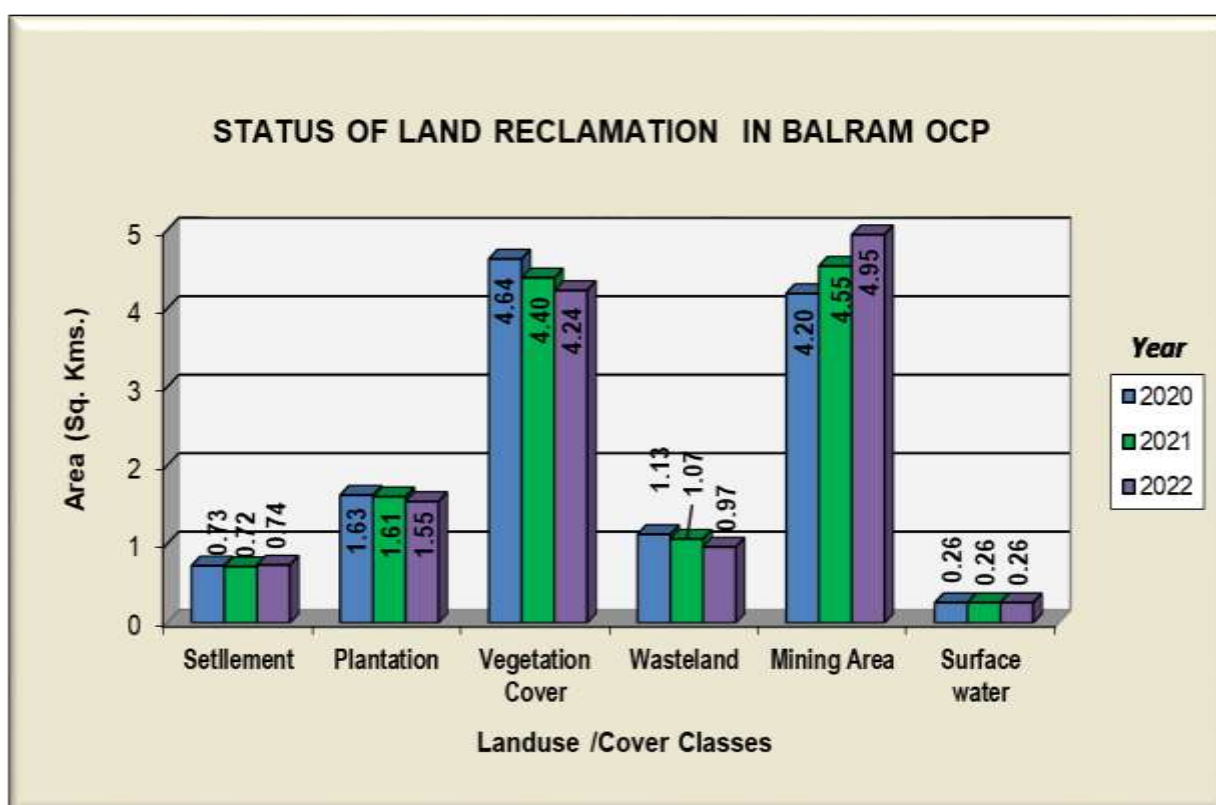


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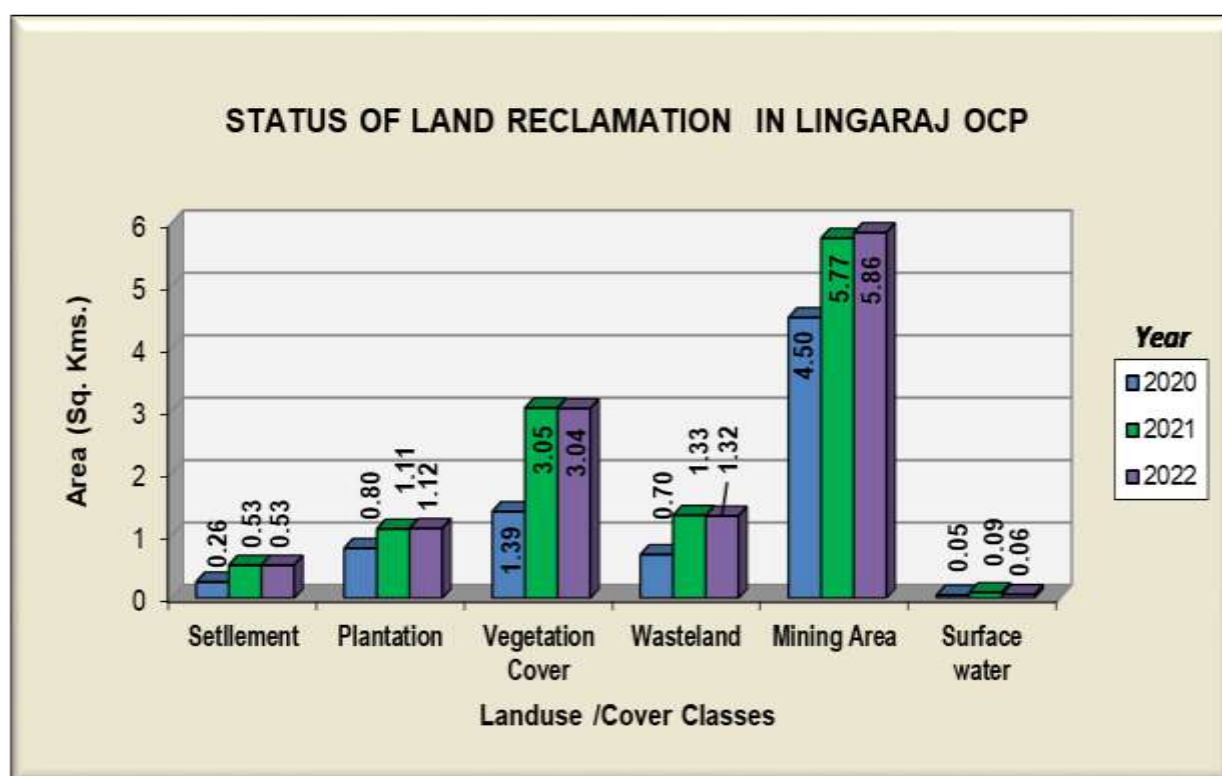


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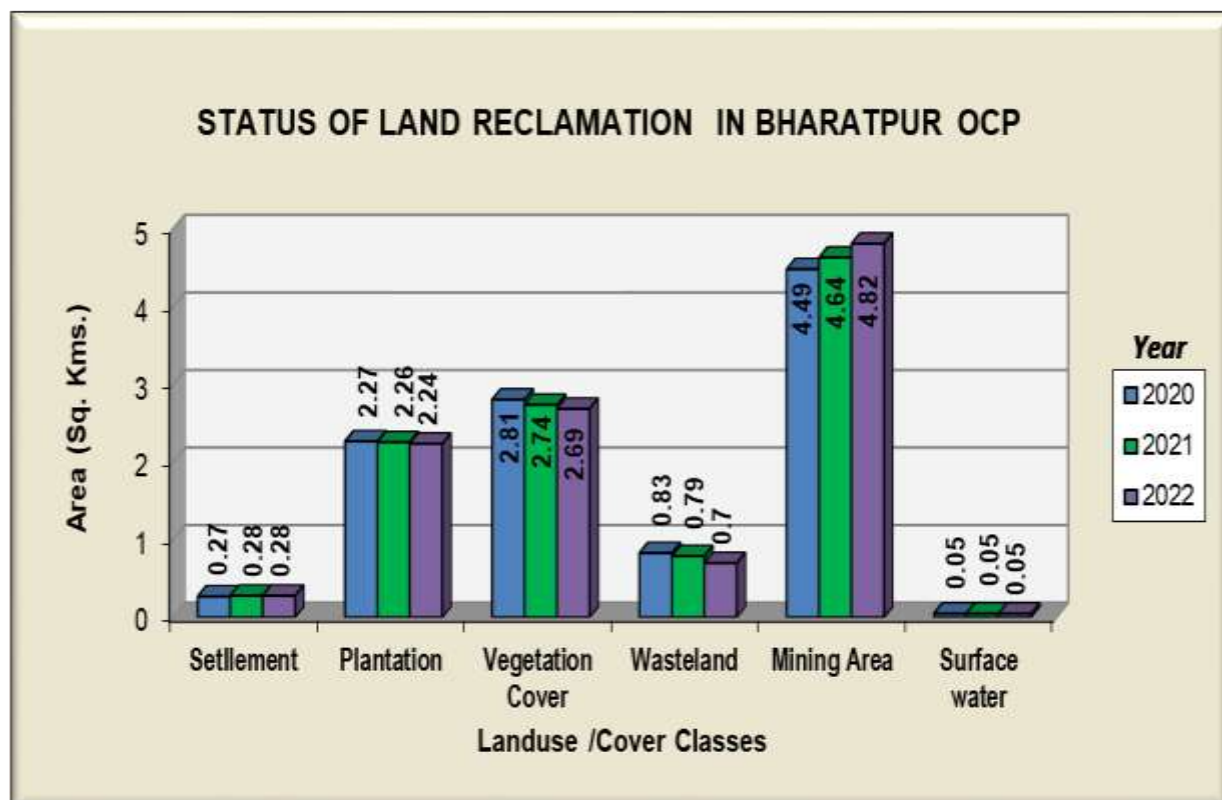


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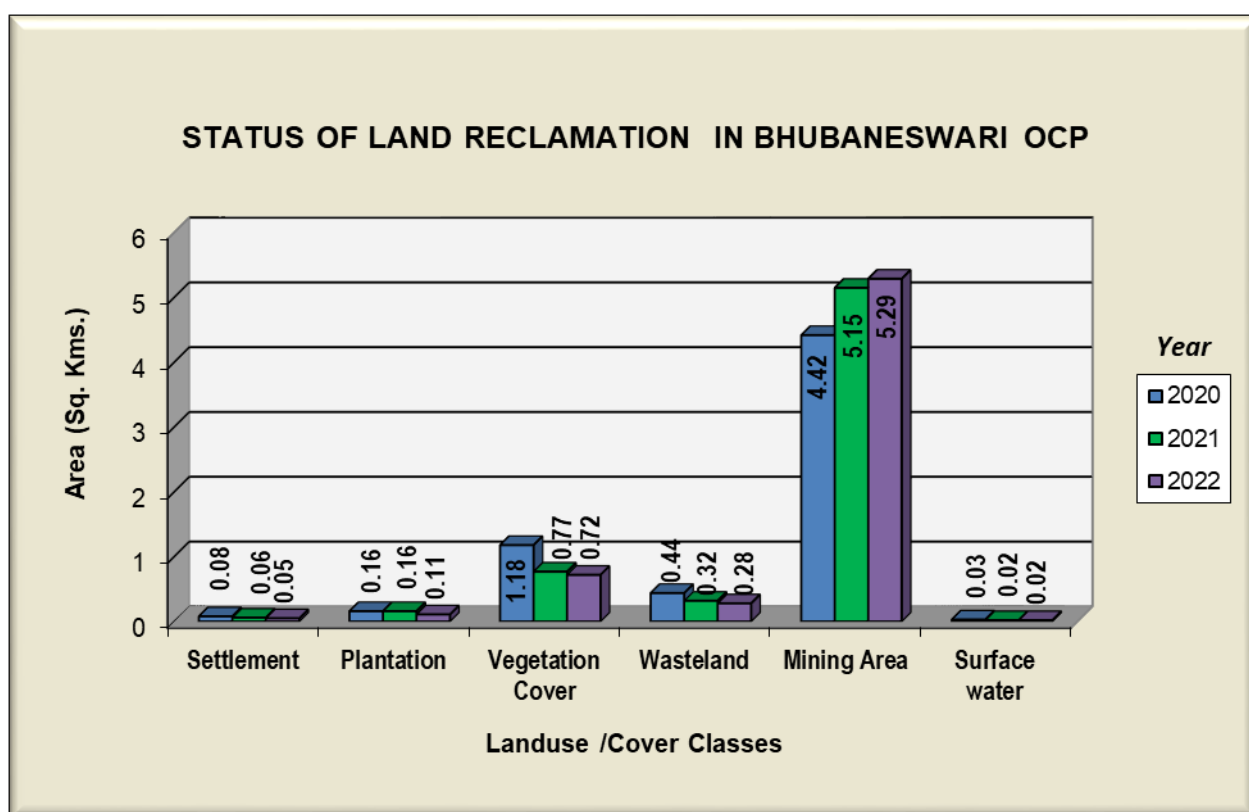


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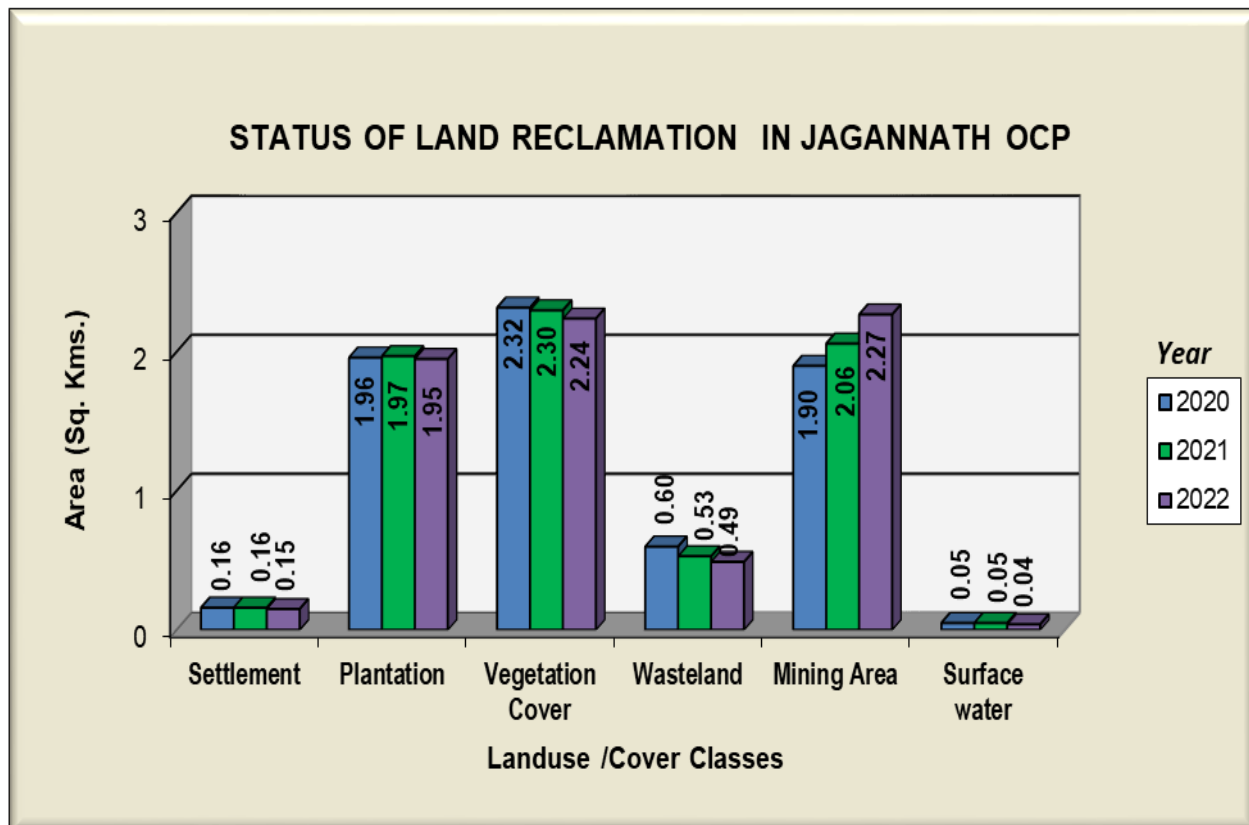


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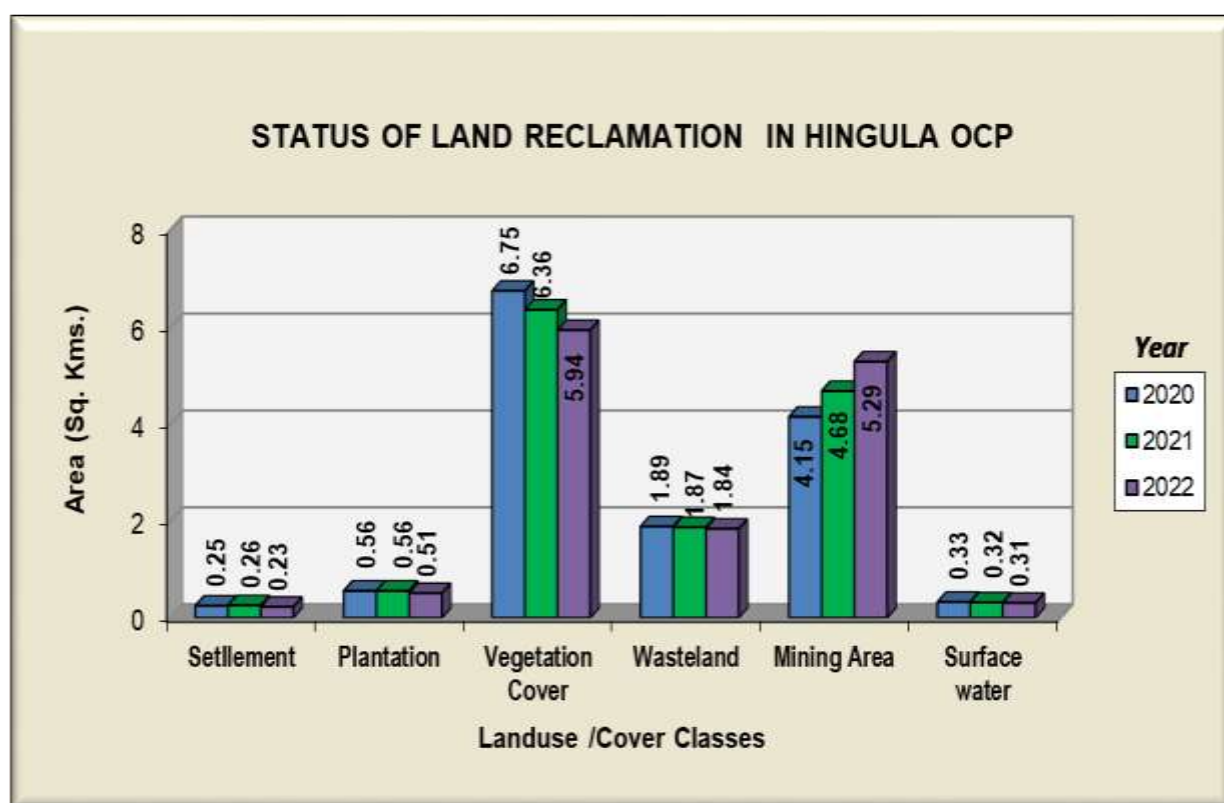


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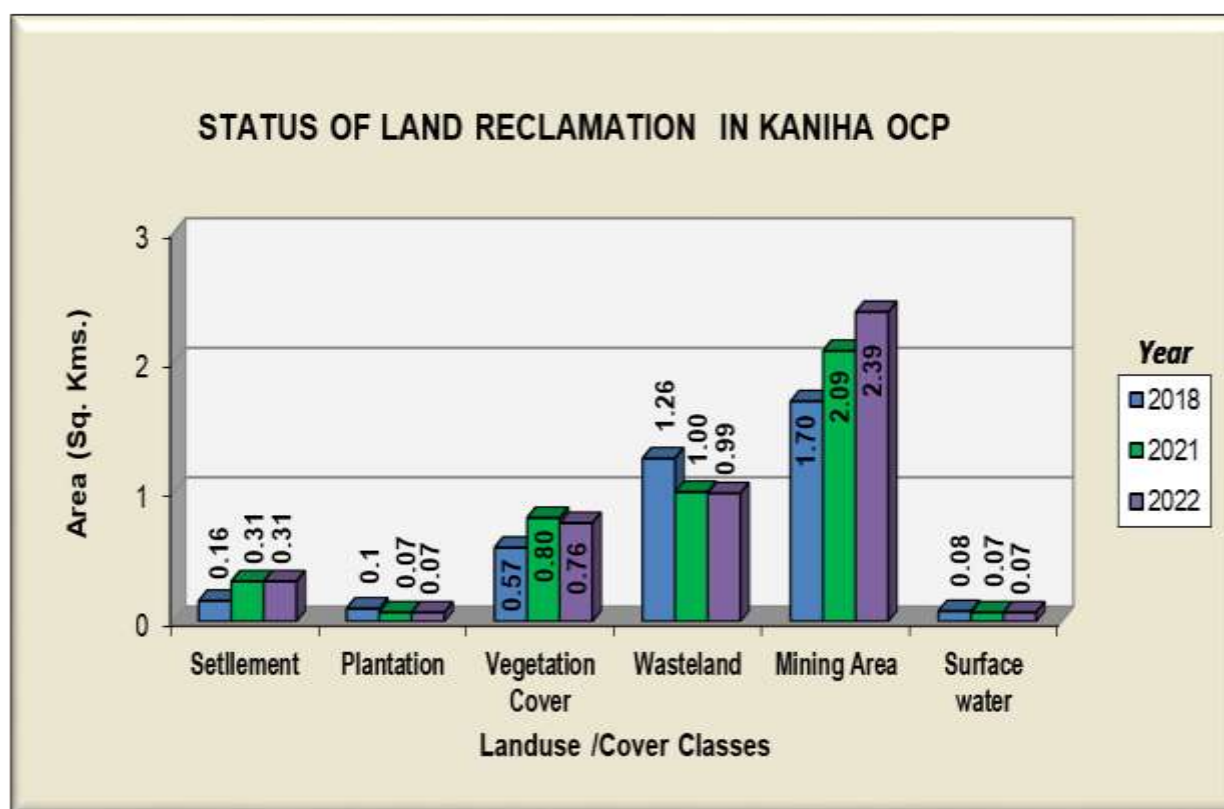


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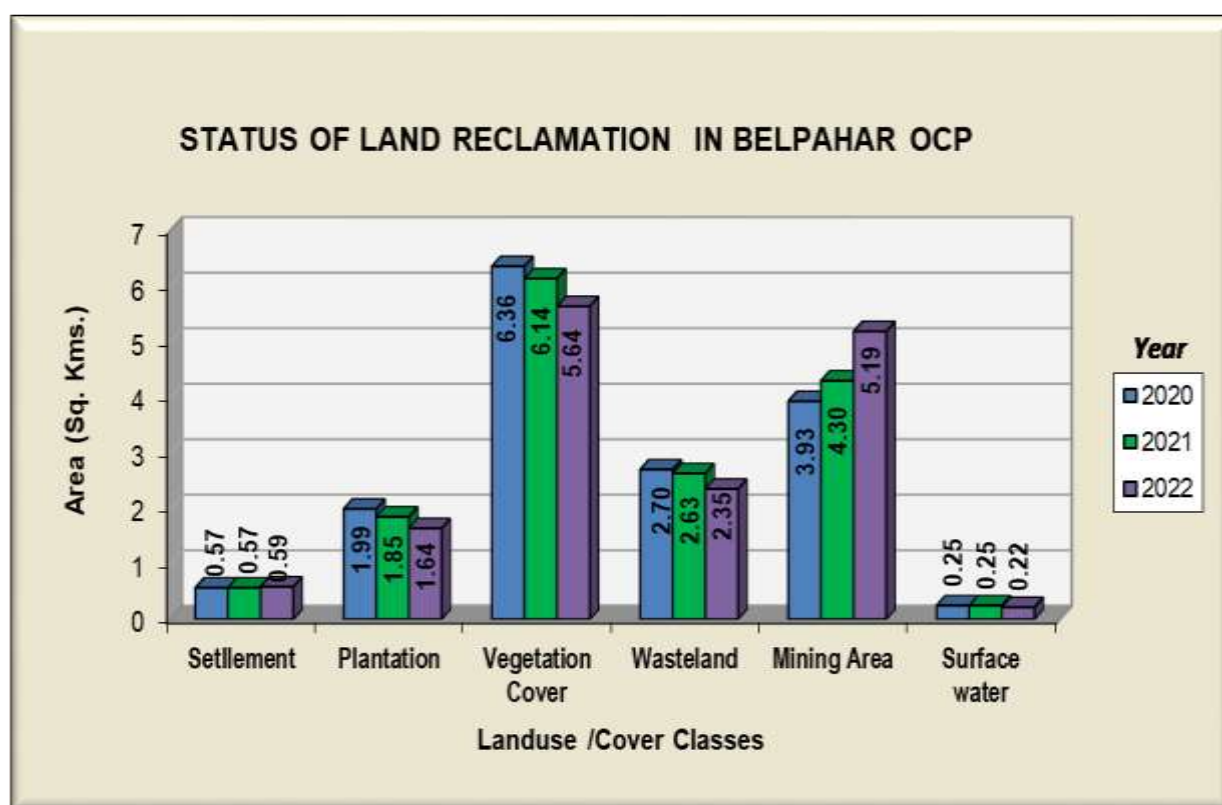


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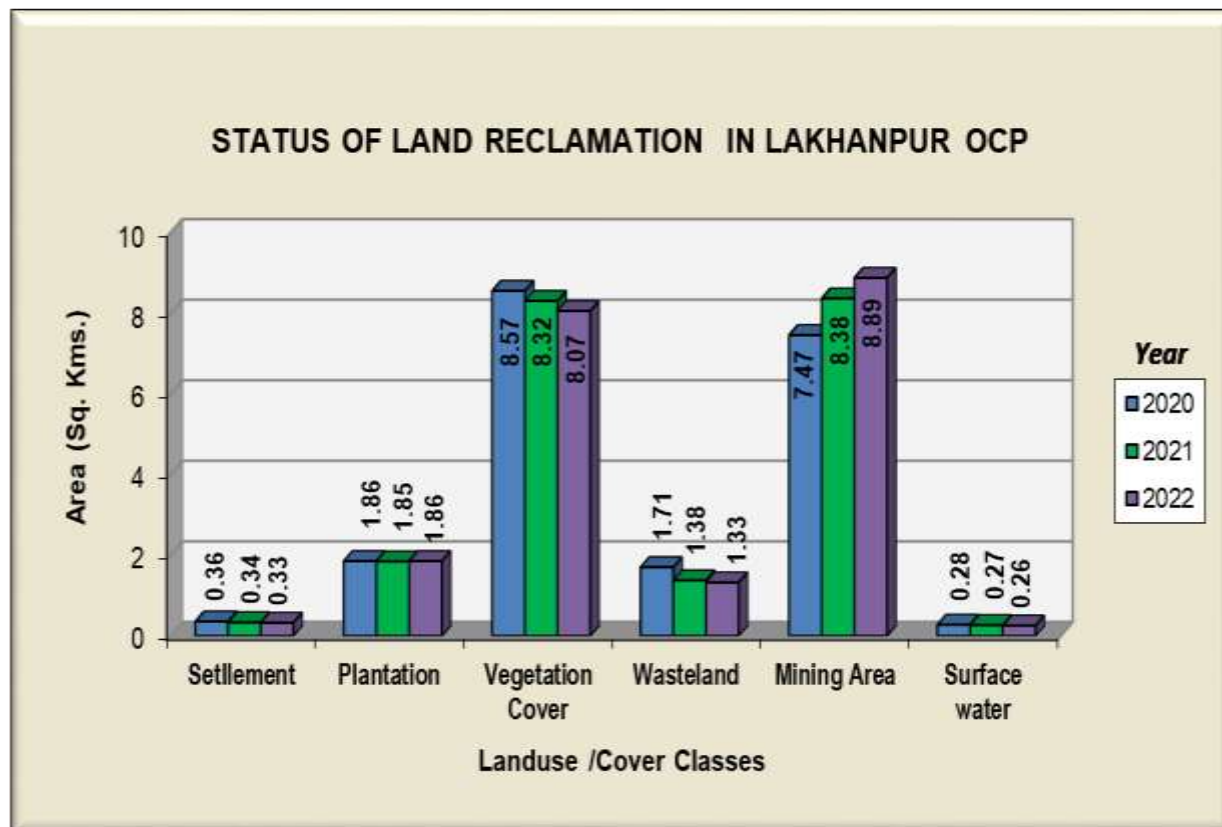


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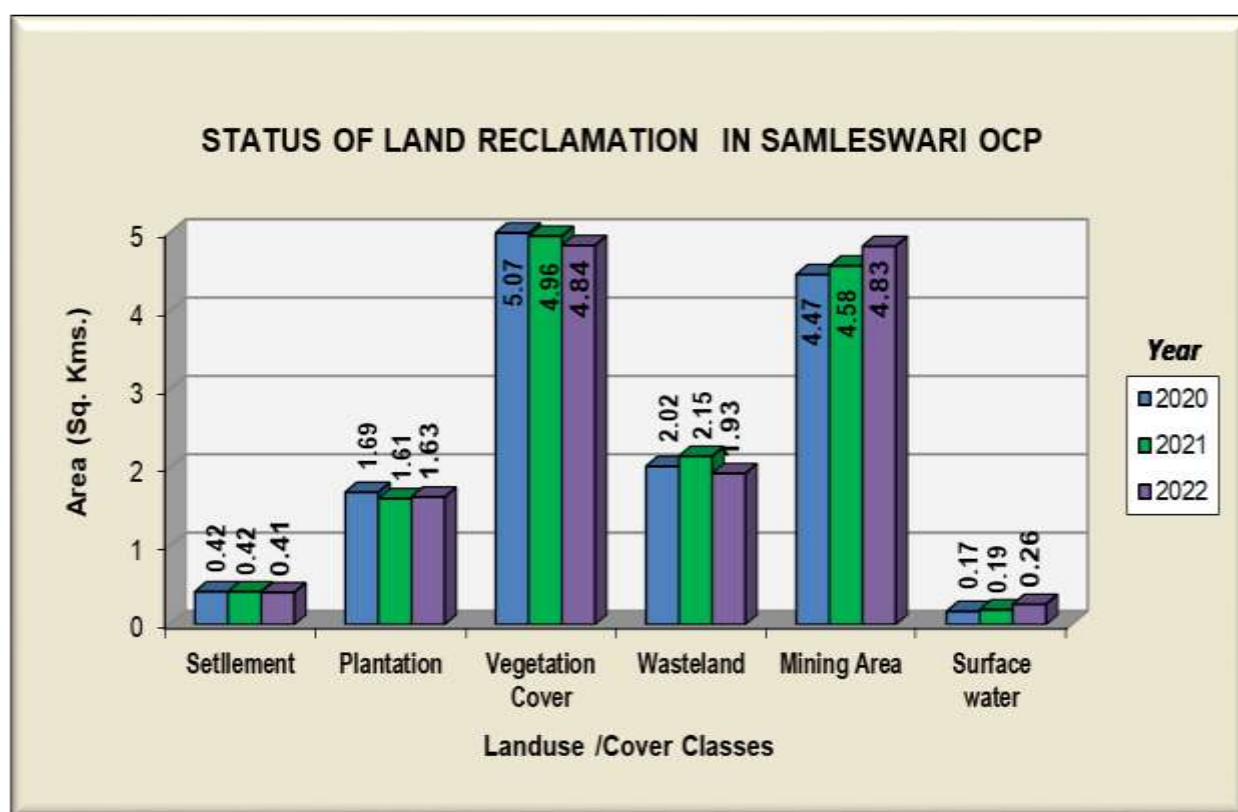


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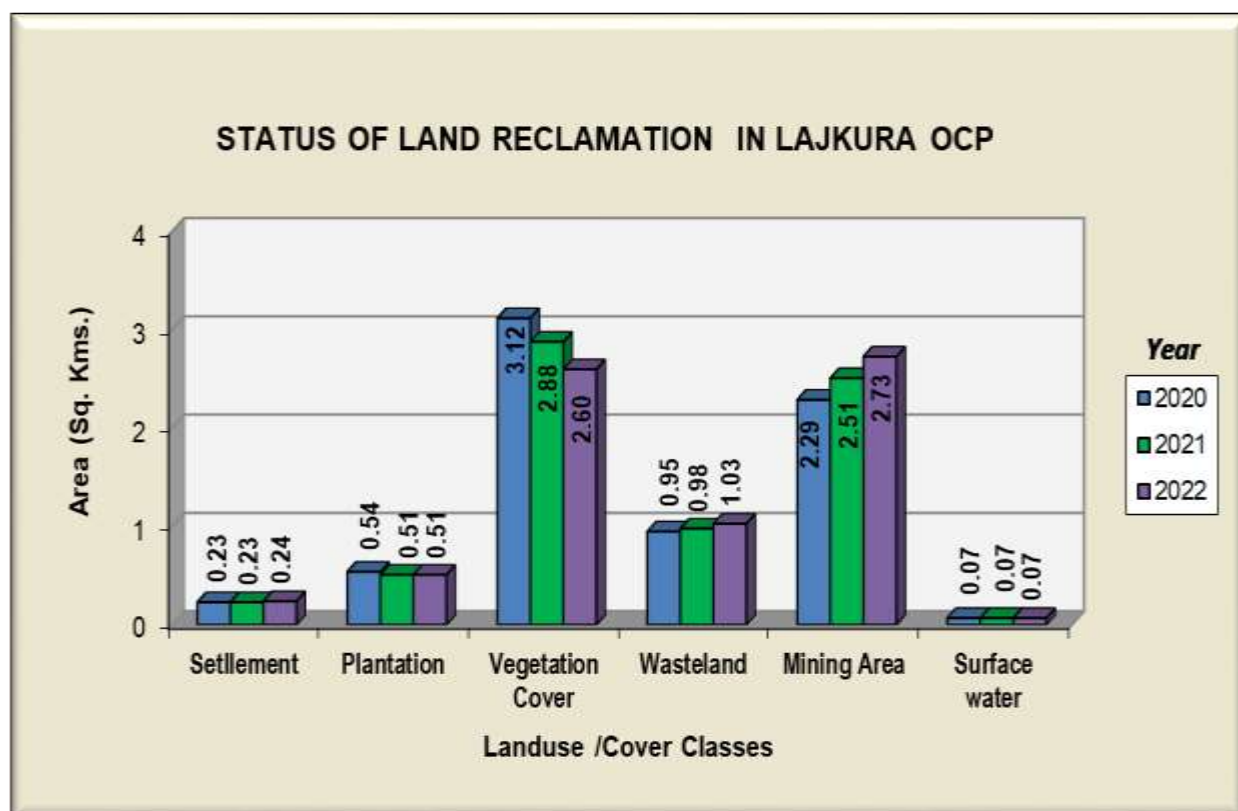


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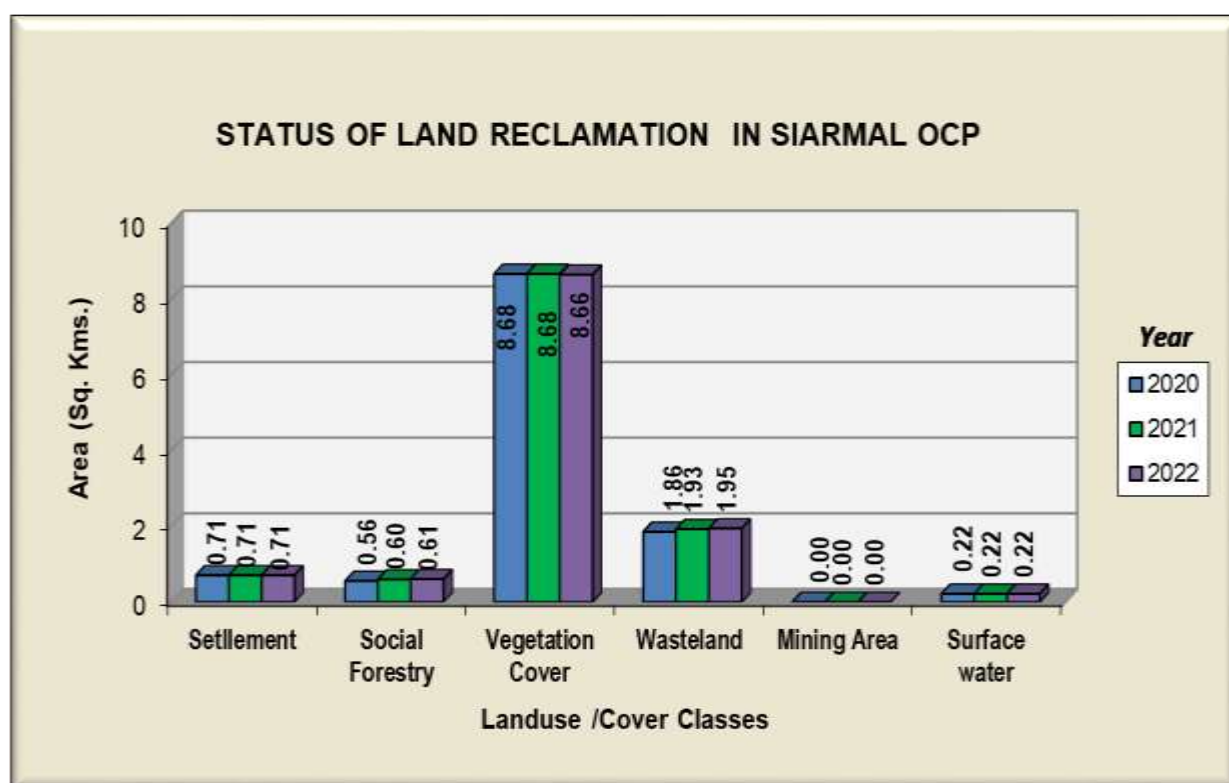


Figure 8.14

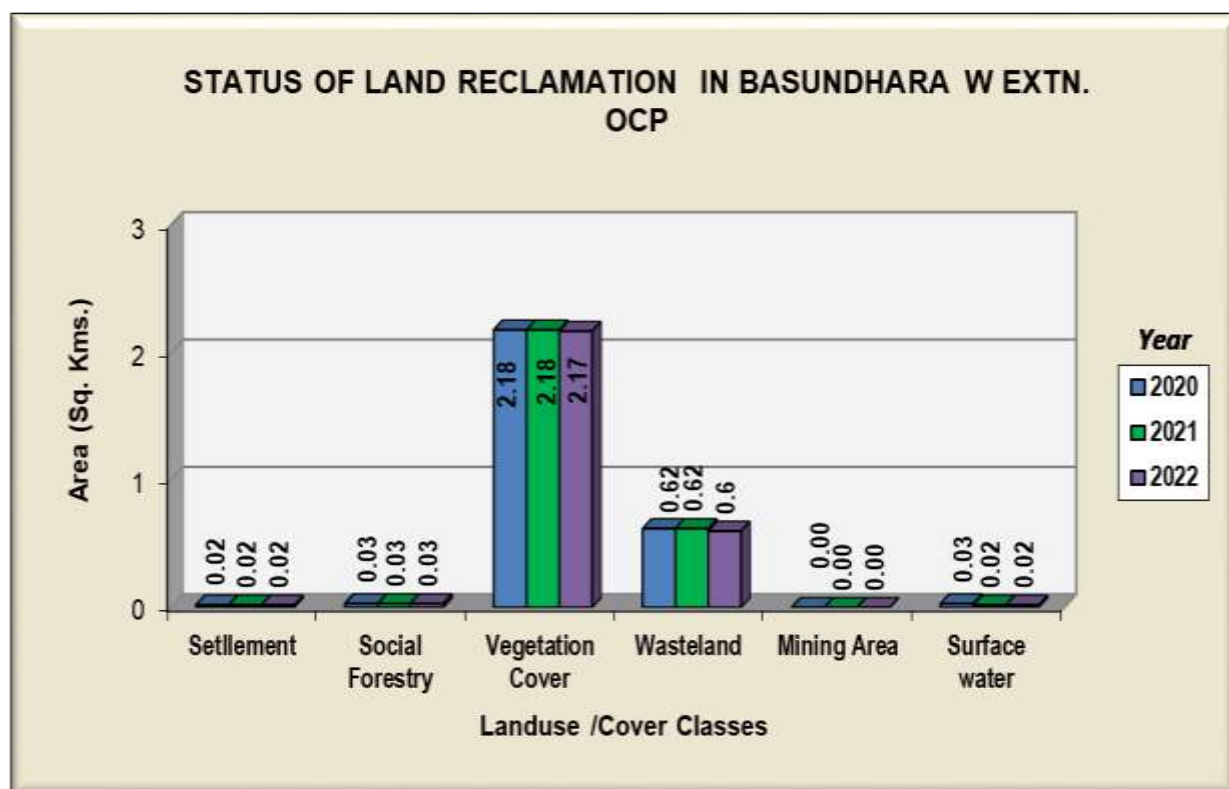


Figure 8.15

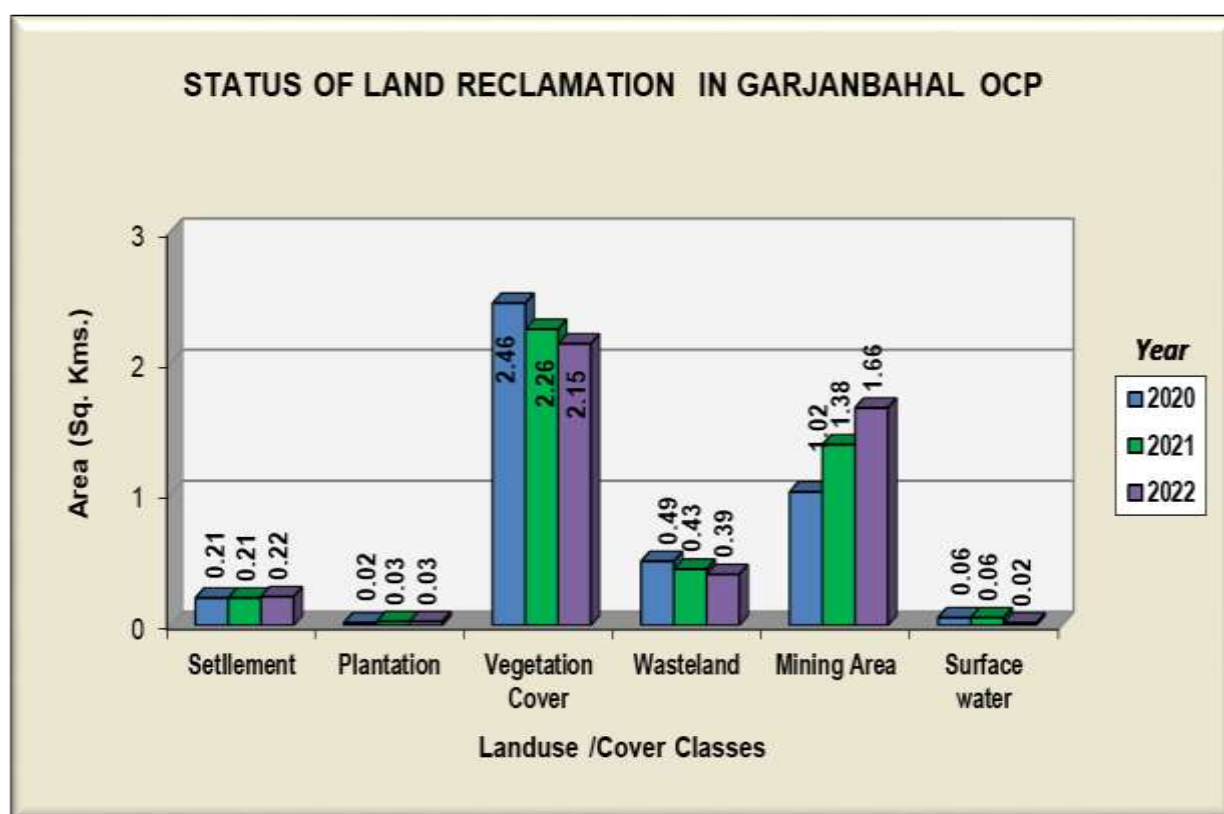


Figure 8.16

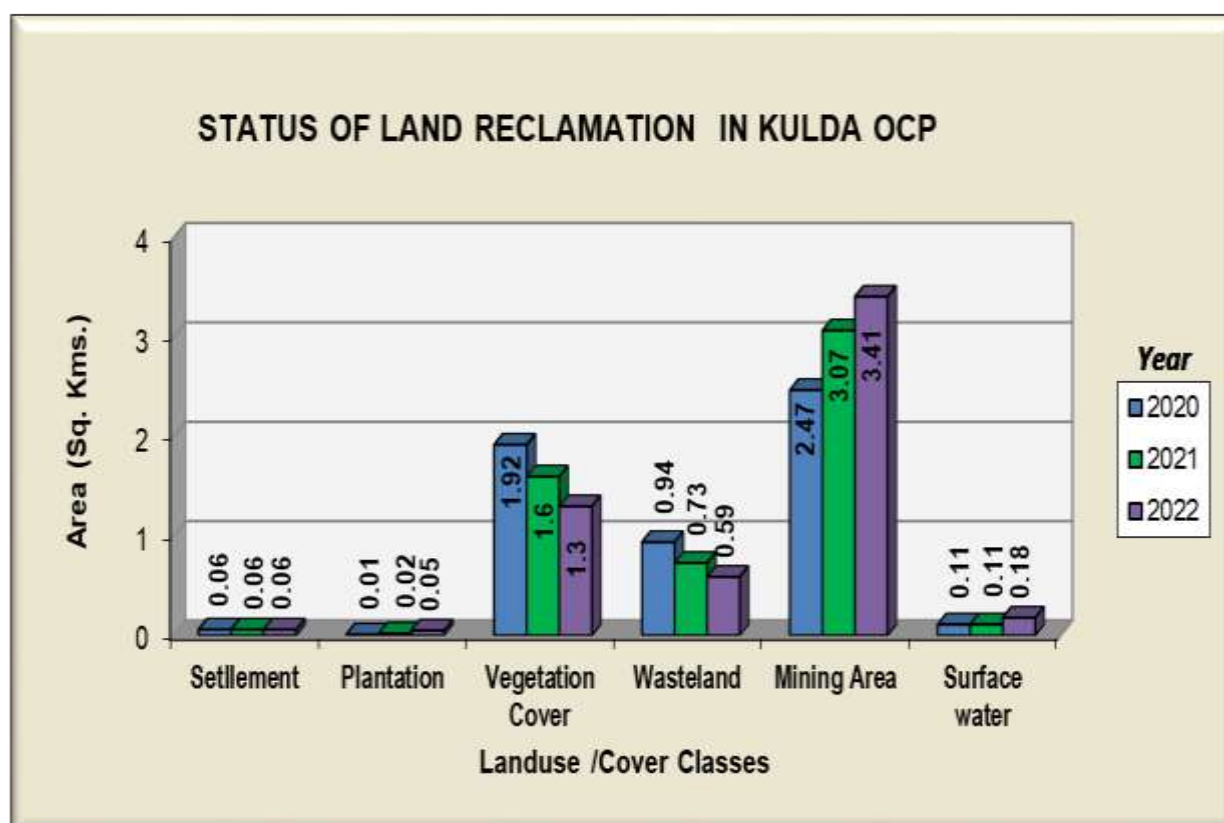


Figure 8.17



Photograph – 8.1: **Plantation on Internal OB/Backfill (Ananta OC mine)**



Photograph – 8.2: **Plantation on Internal OB/Backfill (Balram OC Mine)**



Photograph – 8.3: Plantation on Internal OB/Backfill (Lingaraj OC Mine)



Photograph – 8.4: Plantation on Internal OB/Backfill (Bharatpur OC Mine)



Photograph – 8.5: **Plantation on Internal OB/Backfill (Bhubaneswari OC Mine)**



Photograph – 8.6: **Plantation on Internal OB/Backfill (Jagannath OC Mine)**



Photograph – 8.7: **Plantation on Internal OB/Backfill (Hingula OC Mine)**



Photograph – 8.8: **Avenue Plantation of Kaniha OC Mine**



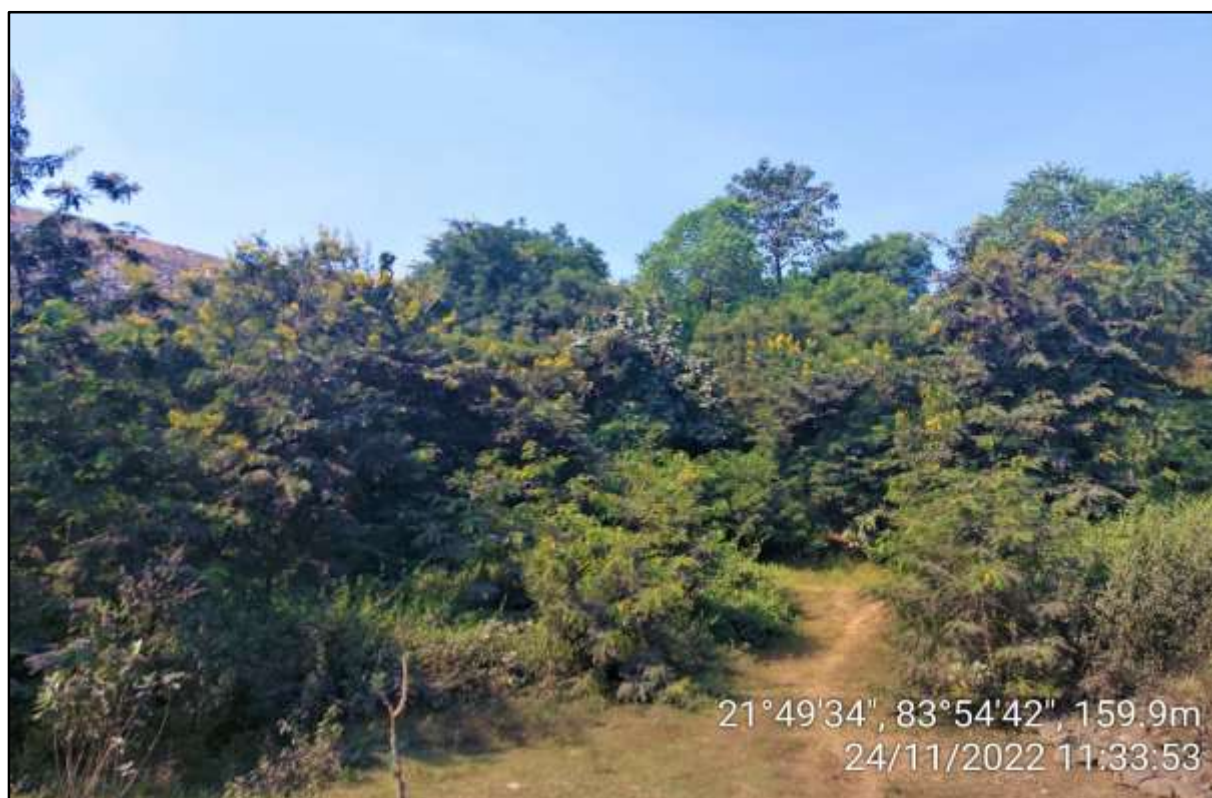
Photograph-8.9: Plantation on Internal OB/Backfill (Belpahar OC Mine)



Photograph-8.10: Plantation on Internal OB/Backfill (Lakhanpur OC Mine)



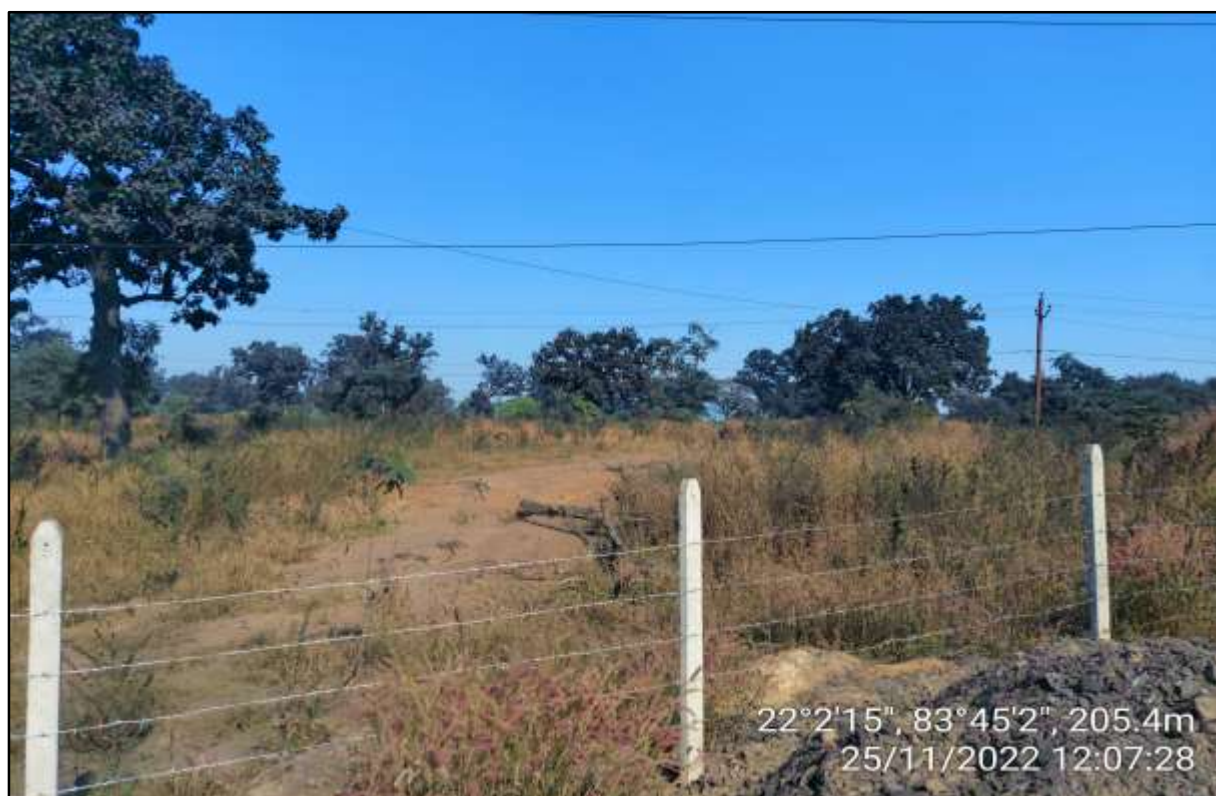
Photograph-8.11: **Plantation on Internal OB/Backfill (Samleswari OC Mine)**



Photograph-8.12: **Plantation on Internal OB/Backfill (Lajkura OC Mine)**



Photograph-8.13: **Plantation on Internal OB/Backfill (Kulda OC Mine)**



Photograph-8.14: **Plantation under Social Forestry (Kulda OC Mine)**

CENTRAL COALFIELDS LIMITED

9.0 Land Reclamation Status in Central Coalfields Ltd.

9.1 The following **15 OC** projects of Central Coalfields Ltd. producing more than 5 million m³. (Coal + OB) annually, have been taken up for land reclamation monitoring based on Satellite data of the year 2022.

| No. | Name of OC Project | Coalfield Name |
|-----|--------------------|-----------------------------|
| 1 | Ashok | North Karanpura (NK) |
| 2 | Piparwar | |
| 3 | KDH | |
| 4 | Amrapali | |
| 5 | Magadh | |
| 6 | Rohini | |
| 7 | Purnadih | |
| 8 | North Urimari | South Karanpura (SK) |
| 9 | Rajrappa | Ramgarh |
| 10 | Parej East | West Bokaro (WB) |
| 11 | Tapin North | |
| 12 | Kathara | East Bokaro (EB) |
| 13 | Karo | |
| 14 | Konar Expansion | |
| 15 | Selected Dhor | |

9.2 Area statistics of different land use/ cover classes present in the leasehold area of the above 15 projects of CCL for the year 2022 are shown in Table 9.1. Land use/ cover maps derived from satellite data are shown in Plate 9.1 – 9.15. Year wise changes in different land use/ cover classes in the last three years based on satellite data are shown in Bar charts in Fig. 9.2 – 9.16.

9.3 Study based on Satellite data of the year 2022 reveals that out of total excavated area of 37.99 km², 27.11 km² (71.36%) has come under reclamation in the above 15 OC projects of CCL taken together, out of which 18.68 km² (49.17%) area is under backfilling

(Technical Reclamation) and 8.43 km² (22.19%) area is under plantation (Biological Reclamation).

- 9.4** Study also reveals that the area under backfilling (Technical Reclamation) has increased from 18.01 km² in 2021 to 18.68 km² in 2022.
- 9.5** Analysis of satellite data also indicates that the area under plantation (Biological Reclamation) has increased from 7.98 km² (Yr. 2021) to 8.43 km² (Yr. 2022). This increase in Biological Reclamation indicates continuous efforts on part of CCL in reclamation activities for environmental protection.
- 9.6** It is also seen that the total area under **Green Cover** which includes plantation carried out on backfilled area, OB dumps as well as plantation done under social forestry in all the 15 mines taken together of CCL has increased from 17.71 km² in the year 2021, to 18.45 km² in the year 2022.
- 9.7** The total area under reclamation also increased from 25.99 km² (71.22%) in 2021 to 27.11 km² (71.36%) in 2022.
- 9.8** “**Kayakalp Vatika**” at Piparwar area of CCL, was developed as an eco-restoration park over the reclaimed (backfilled) land.
- 9.9** Amrapali OCP has successfully carried out plantation on OB dumps, and on slopes of OB dumps through the method of seed ball throwing. Plantation on backfilled area also have started coming up.
- 9.10** Though plantation activities are being continued in Piparwar area, biotic interferences and suspected felling of plants/ trees have been observed at some places, which may be taken care of by the concerned authorities.

- 9.11** Out of 15 projects of CCL taken for land reclamation monitoring in 2022-23, **Parej East** OC ranks on top for land reclamation (87.79%) followed by **KDH** (85.87%), **Piparwar** OC (82.73%), Ashok OC (81.43%), and Rajrappa OC (77.99%).

TABLE – 9.1
Project wise Land Reclamation Status in OC projects of CCL based on Satellite Data of the Year 2022

(Projects producing more than 5 mcm of Coal + OB annually)

(Area in Sq. Kms.)

| Sl. No. | Project | Total Mine Leasehold Area | | Technical Reclamation | | Plantation | | | | | | Area under Active Mining | | Total Excavated 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 | | | | | | | | | |
| 1 | 2 | 3 | | 4 | | 5 | | 6 | | 7 | | 8 | | 9 (=4+5+8) | | 10 (=5+6+7) | | 11(=4+5) | |
| | | 2021 | 2022 | 2021 | 2022 | 2021 | 2022 | 2021 | 2022 | 2021 | 2022 | 2021 | 2022 | 2021 | 2022 | 2021 | 2022 | 2021 | 2022 |
| 1 | Ashok | 7.93 | 7.93 | 2.47 | 2.52 | 1.21 | 1.25 | 0.00 | 0.00 | 0.17 | 0.17 | 0.80 | 0.86 | 4.48 | 4.63 | 1.38 | 1.42 | 3.68 | 3.77 |
| | | | | 55.13% | 54.43% | 27.01% | 27.00% | | | | | 17.86% | 18.57% | | | 17.40% | 17.91% | 82.14% | 81.43% |
| 2 | Piparwar | 11.20 | 11.20 | 2.75 | 2.75 | 1.85 | 1.85 | 0.19 | 0.17 | 1.18 | 1.18 | 0.96 | 0.96 | 5.56 | 5.56 | 3.22 | 3.20 | 4.60 | 4.60 |
| | | | | 49.46% | 49.46% | 33.27% | 33.27% | | | | | 17.27% | 17.27% | | | 28.75% | 28.57% | 82.73% | 82.73% |
| 3 | KDH | 6.20 | 6.20 | 1.74 | 1.77 | 1.35 | 1.39 | 0.03 | 0.03 | 0.21 | 0.21 | 0.52 | 0.52 | 3.61 | 3.68 | 1.59 | 1.63 | 3.09 | 3.16 |
| | | | | 48.20% | 48.10% | 37.40% | 37.77% | | | | | 14.40% | 14.13% | | | 25.65% | 26.29% | 85.60% | 85.87% |
| 4 | Amrapali | 6.20 | 6.20 | 1.32 | 1.56 | 0.00 | 0.11 | 0.08 | 0.12 | 0.02 | 0.02 | 1.10 | 1.00 | 2.42 | 2.67 | 0.10 | 0.25 | 1.32 | 1.67 |
| | | | | 54.55% | 58.43% | 0.00% | 4.12% | | | | | 45.45% | 37.45% | | | 1.61% | 4.03% | 54.55% | 62.55% |
| 5 | Magadh | 17.69 | 17.69 | 0.60 | 0.68 | 0.00 | 0.00 | 0.10 | 0.08 | 0.00 | 0.02 | 0.92 | 1.02 | 1.52 | 1.70 | 0.10 | 0.10 | 0.60 | 0.68 |
| | | | | 39.47% | 40.00% | 0.00% | 0.00% | | | | | 60.53% | 60.00% | | | 0.57% | 0.57% | 39.47% | 40.00% |
| 6 | Parej East | 6.20 | 6.20 | 0.75 | 0.76 | 0.72 | 0.75 | 0.05 | 0.06 | 0.09 | 0.09 | 0.22 | 0.21 | 1.69 | 1.72 | 0.86 | 0.90 | 1.47 | 1.51 |
| | | | | 44.38% | 44.19% | 42.60% | 43.60% | | | | | 13.02% | 12.21% | | | 13.87% | 14.52% | 86.98% | 87.79% |
| 7 | Rajrappa | 19.82 | 19.82 | 2.40 | 2.38 | 1.27 | 1.27 | 3.02 | 3.02 | 2.02 | 2.02 | 0.94 | 1.03 | 4.61 | 4.68 | 6.31 | 6.31 | 3.67 | 3.65 |
| | | | | 52.06% | 50.85% | 27.55% | 27.14% | | | | | 20.39% | 22.01% | | | 31.84% | 31.84% | 79.61% | 77.99% |
| 8 | Rohini | 2.56 | 2.56 | 1.27 | 1.33 | 0.48 | 0.48 | 0.11 | 0.11 | 0.00 | 0.00 | 0.48 | 0.46 | 2.23 | 2.27 | 0.59 | 0.59 | 1.75 | 1.81 |
| | | | | 56.95% | 58.59% | 21.52% | 21.15% | | | | | 21.52% | 20.26% | | | 23.05% | 23.05% | 78.48% | 79.74% |
| 9 | Purnadih | 7.52 | 7.52 | 0.92 | 1.03 | 0.19 | 0.23 | 0.12 | 0.12 | 0.03 | 0.03 | 0.52 | 0.53 | 1.63 | 1.79 | 0.34 | 0.38 | 1.11 | 1.26 |
| | | | | 56.44% | 57.54% | 11.66% | 12.85% | | | | | 31.90% | 29.61% | | | 4.52% | 5.05% | 68.10% | 70.39% |
| 10 | North Urimari | 5.17 | 5.17 | 0.25 | 0.34 | 0.14 | 0.14 | 0.07 | 0.07 | 0.00 | 0.00 | 1.00 | 1.09 | 1.39 | 1.57 | 0.21 | 0.21 | 0.39 | 0.48 |
| | | | | 17.99% | 21.66% | 10.07% | 8.92% | | | | | 71.94% | 69.43% | | | 4.06% | 4.06% | 28.06% | 30.57% |
| 11 | Tapin North | 3.04 | 3.04 | 0.91 | 0.93 | 0.00 | 0.00 | 0.12 | 0.12 | 0.00 | 0.00 | 0.66 | 0.72 | 1.57 | 1.65 | 0.12 | 0.12 | 0.91 | 0.93 |
| | | | | 57.96% | 56.36% | 0.00% | 0.00% | | | | | 42.04% | 43.64% | | | 3.95% | 3.95% | 57.96% | 56.36% |
| 12 | Kathara | 7.71 | 7.71 | 0.65 | 0.68 | 0.33 | 0.32 | 0.96 | 1.08 | 0.83 | 0.80 | 0.62 | 0.68 | 1.60 | 1.68 | 2.12 | 2.20 | 0.98 | 1.00 |
| | | | | 40.63% | 40.48% | 20.63% | 19.05% | | | | | 38.75% | 40.48% | | | 27.50% | 28.53% | 61.25% | 59.52% |
| 13 | Karo | 5.26 | 5.26 | 0.55 | 0.74 | 0.14 | 0.26 | 0.14 | 0.10 | 0.12 | 0.27 | 0.39 | 0.32 | 1.08 | 1.32 | 0.40 | 0.63 | 0.69 | 1.00 |
| | | | | 50.93% | 56.06% | 12.96% | 19.70% | | | | | 36.11% | 24.24% | | | 7.60% | 11.98% | 63.89% | 75.76% |
| 14 | Konar Exp. | 4.71 | 4.71 | 0.88 | 0.86 | 0.30 | 0.35 | 0.01 | 0.04 | 0.01 | 0.01 | 0.85 | 0.81 | 2.03 | 2.02 | 0.32 | 0.40 | 1.18 | 1.21 |
| | | | | 43.35% | 42.57% | 14.78% | 17.33% | | | | | 41.87% | 40.10% | | | 6.79% | 8.49% | 58.13% | 59.90% |
| 15 | Sel Dhori | 2.65 | 2.65 | 0.55 | 0.35 | 0.00 | 0.03 | 0.04 | 0.07 | 0.01 | 0.01 | 0.52 | 0.67 | 1.07 | 1.05 | 0.05 | 0.11 | 0.55 | 0.38 |
| | | | | 51.40% | 33.33% | 0.00% | 2.86% | | | | | 48.60% | 63.81% | | | 1.89% | 4.15% | 51.40% | 36.19% |
| | TOTAL | 113.86 | 113.86 | 18.01 | 18.68 | 7.98 | 8.43 | 5.04 | 5.19 | 4.69 | 4.83 | 10.50 | 10.88 | 36.49 | 37.99 | 17.71 | 18.45 | 25.99 | 27.11 |
| | | | | 49.36% | 49.17% | 21.87% | 22.19% | | | | | 28.78% | 28.64% | | | 15.55% | 16.20% | 71.22% | 71.36% |

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

Note: In reference of the above **Table-1**, different parameters are classified as follows:

- 1 Lease area as per the environmental clearance (EC) of respective boundary
- 2 Yearly monitoring of **Eight (8)** projects namely, Rohini, **Purnadih, North Urimari, Kathara, Tapin North, Konar, Karo & Sel. Dhor**i started from the year 2021-22 only. Earlier these projects were monitored in the cycle of three years under Less than 5 MCM category.
- 3 Area under **Biological Reclamation** includes Area under Plantation done on Backfilled area only
- 4 Area under **Technical Reclamation** includes Area under Backfilling only
- 5 Area under **Active Mining** includes Coal Quarry, Quarry filled with water & Advance Quarry Site, if any. Coal dump is excluded
- 6 Social Forestry and Plantation on External OB dumps are not included in Biological Reclamation, and are put under separate categories
- 7 (%) calculated in the above table is in respect of total excavated area only, except for “**Total area under Plantation**” where % is in terms of Leasehold Area.

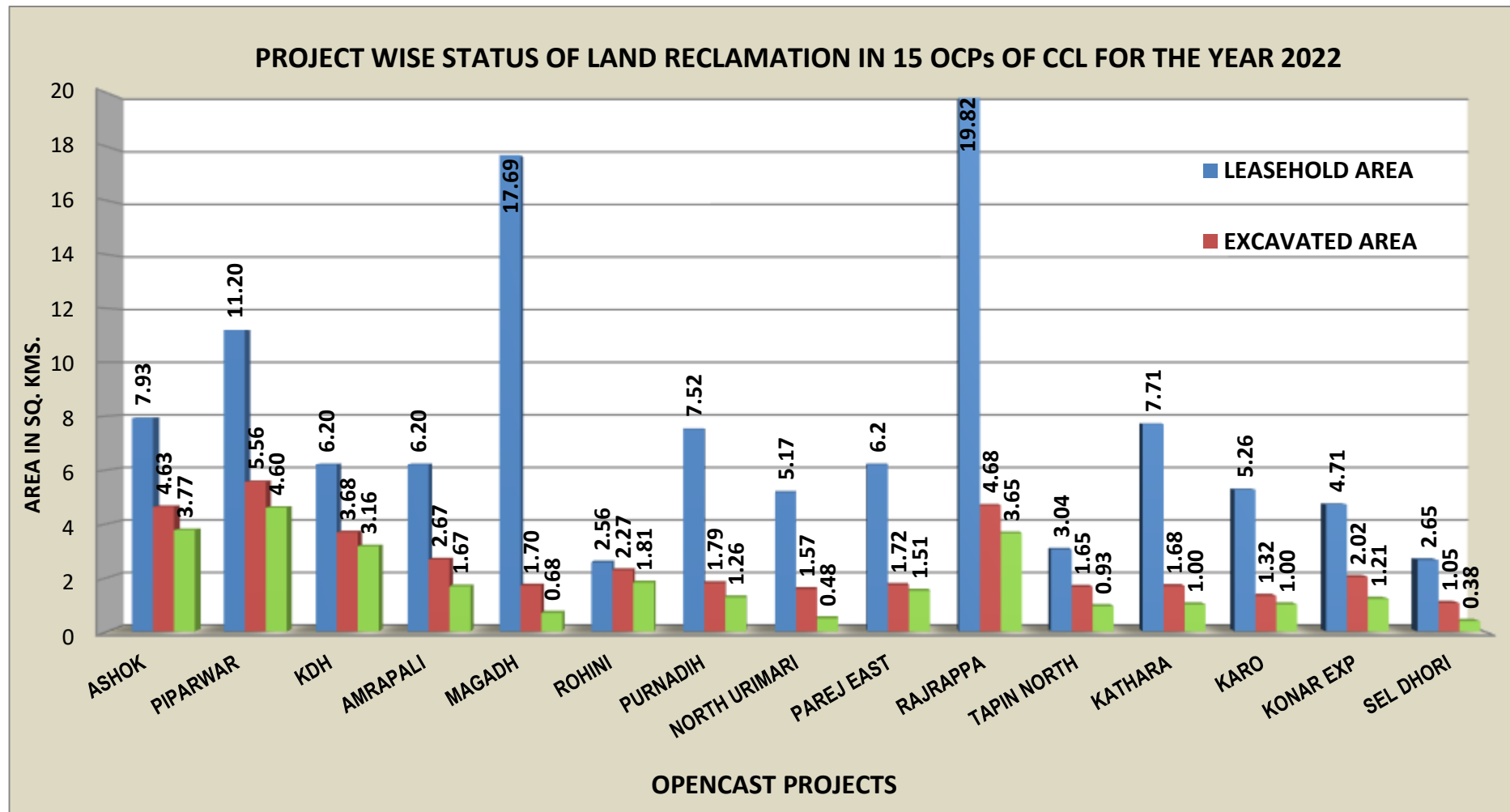
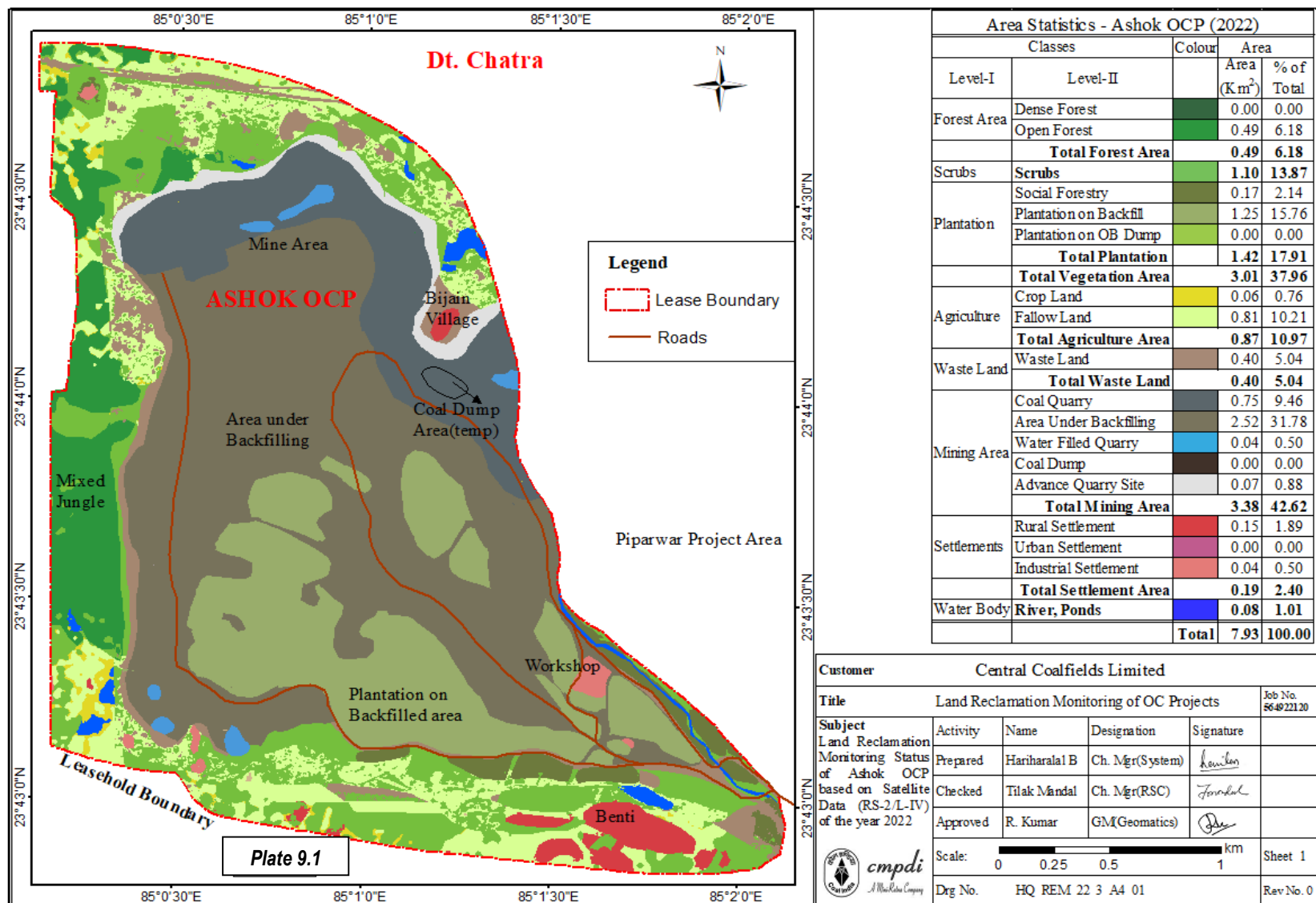
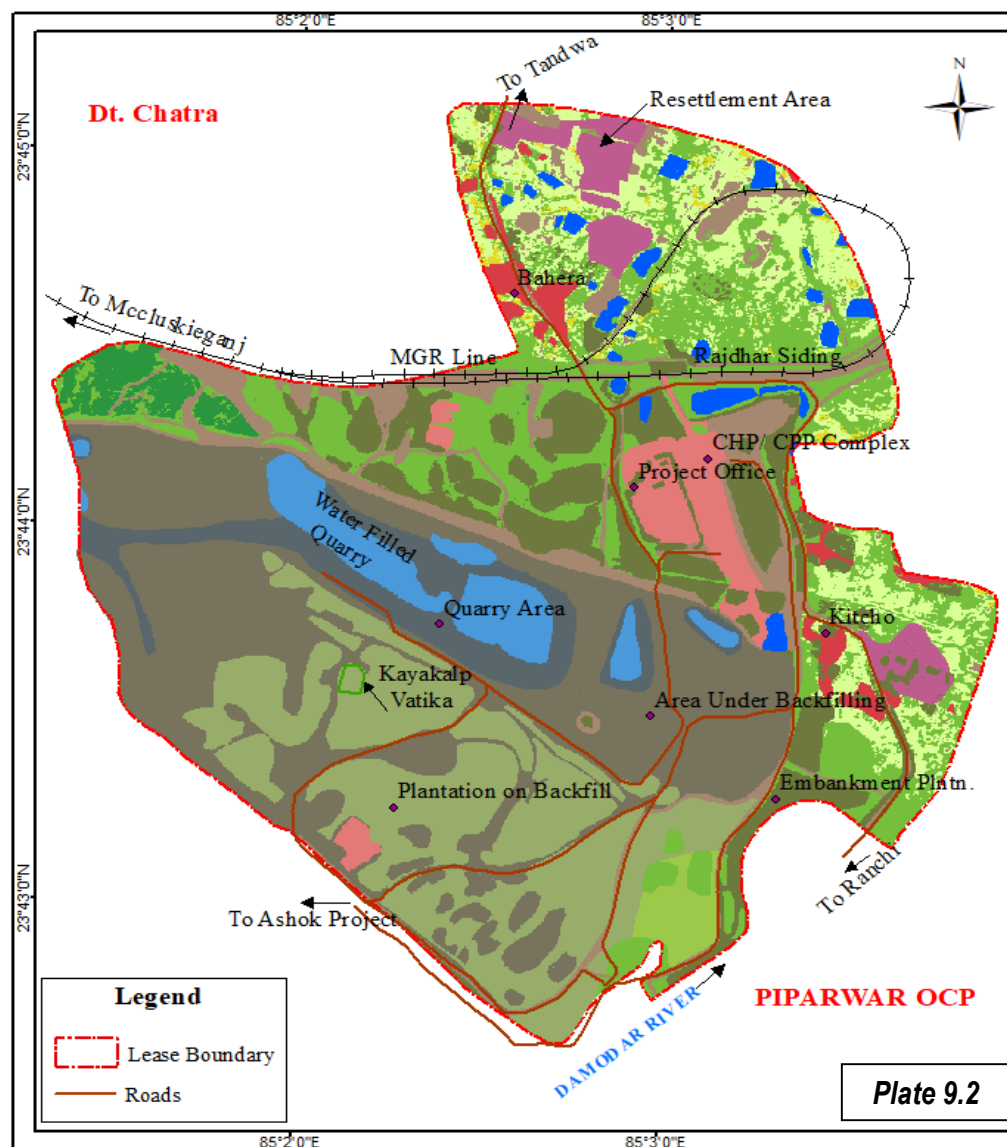


Fig. 9.1: Land Reclamation Status in 15 OC Projects of CCL for the Year 2022

Table 9.2
Project wise Area Statistics of Land Use / Cover in OC Mines (> 5 mcu.m.) of CCL based on Satellite data of the Year 2022 (Area in Km²)

| (Area in Sq. Km) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------------------------|---|-------------|------|----------|--------|-------|--------|----------|--------|--------|--------|--------|--------|----------|--------|--------------|--------|------------|--------|----------|--------|-------------|--------|---------|--------|-------|--------|-----------|--------|-----------|--------|-------|--------|--------|--------|
| | | ASHOK | | PIPARWAR | | KDH | | AMRAPALI | | MAGADH | | ROHINI | | PURNADIH | | NORTH URIMAR | | PAREJ EAST | | RAJRAPPA | | TAPIN NORTH | | KATHARA | | KARO | | KONAR EXP | | SEL DHORI | | TOTAL | | | |
| | | Area | % | Area | % | Area | % | Area | % | Area | % | Area | % | Area | % | Area | % | Area | % | Area | % | Area | % | Area | % | Area | % | Area | % | Area | % | Area | % | | |
| FORESTS | Dense Forest | <div></div> | 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 | 0.55 | 10.46 | 0.00 | 0.00 | 0.00 | 0.00 | 0.55 | 0.48 | |
| | Open Forest | <div></div> | 0.49 | 6.18 | 0.16 | 1.43 | 0.20 | 3.23 | 0.14 | 2.26 | 2.60 | 14.70 | 0.00 | 0.00 | 1.15 | 15.29 | 0.00 | 0.00 | 1.31 | 21.13 | 1.48 | 7.47 | 0.37 | 12.17 | 0.00 | 0.00 | 0.63 | 11.98 | 0.71 | 15.07 | 0.06 | 2.26 | 9.30 | 8.17 | |
| | Total Forest (A) | | | 0.49 | 6.18 | 0.16 | 1.43 | 0.20 | 3.23 | 0.14 | 2.26 | 2.60 | 14.70 | 0.00 | 0.00 | 1.15 | 15.29 | 0.00 | 0.00 | 1.31 | 21.13 | 1.48 | 7.47 | 0.37 | 12.17 | 0.00 | 0.00 | 1.18 | 22.43 | 0.71 | 15.07 | 0.06 | 2.26 | 9.85 | 8.65 |
| PLANTATION | Scrubs(B) | <div></div> | 1.19 | 15.01 | 1.23 | 10.98 | 0.75 | 12.10 | 0.81 | 13.06 | 2.75 | 15.55 | 0.11 | 4.30 | 2.03 | 26.99 | 1.25 | 24.18 | 1.84 | 29.68 | 4.52 | 22.81 | 0.34 | 11.18 | 0.53 | 6.87 | 1.25 | 23.76 | 1.02 | 21.66 | 0.34 | 12.83 | 19.96 | 17.53 | |
| | Social Forestry | <div></div> | 0.17 | 2.14 | 1.18 | 10.54 | 0.21 | 3.39 | 0.02 | 0.32 | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.40 | 0.00 | 0.00 | 0.09 | 1.45 | 2.02 | 10.19 | 0.00 | 0.00 | 0.83 | 10.77 | 0.12 | 2.28 | 0.01 | 0.21 | 0.01 | 0.38 | 4.69 | 4.12 | |
| | Plantation on OB Dump | <div></div> | 0.00 | 0.00 | 0.19 | 1.70 | 0.03 | 0.48 | 0.08 | 1.29 | 0.10 | 0.57 | 0.11 | 4.30 | 0.12 | 1.60 | 0.07 | 1.35 | 0.05 | 0.81 | 3.02 | 15.24 | 0.12 | 3.95 | 0.96 | 12.45 | 0.14 | 2.66 | 0.01 | 0.21 | 0.04 | 1.51 | 5.04 | 4.43 | |
| | Plantation on Backfill (Biological Reclamation) | <div></div> | 1.21 | 15.26 | 1.85 | 16.52 | 1.35 | 21.77 | 0.00 | 0.00 | 0.00 | 0.00 | 0.48 | 18.75 | 0.19 | 2.53 | 0.14 | 2.71 | 0.72 | 11.61 | 1.27 | 6.41 | 0.00 | 0.00 | 0.33 | 4.28 | 0.14 | 2.66 | 0.30 | 6.37 | 0.00 | 0.00 | 7.98 | 7.01 | |
| | Total Plantation(C) | | | 1.38 | 17.40 | 3.22 | 28.75 | 1.59 | 25.65 | 0.10 | 1.61 | 0.10 | 0.57 | 0.59 | 23.05 | 0.34 | 4.52 | 0.21 | 4.06 | 0.86 | 13.87 | 6.31 | 31.84 | 0.12 | 3.95 | 2.12 | 27.50 | 0.40 | 7.60 | 0.32 | 6.79 | 0.05 | 1.89 | 17.71 | 15.55 |
| Total Vegetation(A+B+C) | | | | 3.06 | 38.59 | 4.61 | 41.16 | 2.54 | 40.97 | 1.05 | 16.94 | 5.45 | 30.81 | 0.70 | 27.34 | 3.52 | 46.81 | 1.46 | 28.24 | 4.01 | 64.68 | 12.31 | 62.11 | 0.83 | 27.30 | 2.65 | 34.37 | 2.83 | 53.80 | 2.05 | 43.52 | 0.45 | 16.98 | 47.52 | 41.74 |
| ACTIVE MINING | Coal Quarry | <div></div> | 0.72 | 9.08 | 0.51 | 4.55 | 0.16 | 2.58 | 0.98 | 15.81 | 0.73 | 4.13 | 0.22 | 8.59 | 0.20 | 2.66 | 0.89 | 17.21 | 0.13 | 2.10 | 0.48 | 2.42 | 0.46 | 15.13 | 0.36 | 4.67 | 0.33 | 6.27 | 0.55 | 11.68 | 0.28 | 10.57 | 7.00 | 6.15 | |
| | Advance Quarry Site | <div></div> | 0.07 | 0.88 | 0.00 | 0.00 | 0.06 | 0.97 | 0.02 | 0.32 | 0.02 | 0.11 | 0.02 | 0.78 | 0.02 | 0.27 | 0.08 | 1.55 | 0.03 | 0.48 | 0.10 | 0.50 | 0.08 | 2.63 | 0.00 | 0.00 | 0.04 | 0.76 | 0.30 | 6.37 | 0.00 | 0.00 | 0.84 | 0.74 | |
| | Quarry Filled With Water | <div></div> | 0.01 | 0.13 | 0.45 | 4.02 | 0.30 | 4.84 | 0.10 | 1.61 | 0.17 | 0.96 | 0.24 | 9.38 | 0.30 | 3.99 | 0.03 | 0.58 | 0.06 | 0.97 | 0.36 | 1.82 | 0.12 | 3.95 | 0.26 | 3.37 | 0.02 | 0.38 | 0.00 | 0.00 | 0.24 | 9.06 | 2.66 | 2.34 | |
| | Total Area under Active Mining(D) | | | 0.80 | 10.09 | 0.96 | 8.57 | 0.52 | 8.39 | 1.10 | 17.74 | 0.92 | 5.20 | 0.48 | 18.75 | 0.52 | 6.92 | 1.00 | 19.34 | 0.22 | 3.55 | 0.94 | 4.74 | 0.66 | 21.71 | 0.62 | 8.04 | 0.39 | 7.41 | 0.85 | 18.05 | 0.52 | 19.63 | 10.50 | 9.22 |
| (E) | Coal Dump | <div></div> | 0.00 | 0.00 | 0.00 | 0.00 | 0.05 | 0.81 | 0.06 | 0.97 | 0.32 | 1.81 | 0.01 | 0.39 | 0.06 | 0.80 | 0.04 | 0.77 | 0.00 | 0.00 | 0.08 | 0.40 | 0.04 | 1.32 | 0.11 | 1.43 | 0.23 | 4.37 | 0.07 | 1.49 | 0.05 | 1.89 | 1.12 | 0.98 | |
| | Barren OB Dump | <div></div> | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.48 | 0.66 | 10.65 | 0.87 | 4.92 | 0.00 | 0.00 | 0.17 | 2.26 | 0.78 | 15.09 | 0.19 | 3.06 | 0.74 | 3.73 | 0.01 | 0.33 | 1.69 | 21.92 | 0.08 | 1.52 | 0.38 | 8.07 | 0.67 | 25.28 | 6.27 | 5.51 | |
| | Area Under Backfilling (Technical Reclamation) | <div></div> | 2.47 | 31.15 | 2.75 | 24.55 | 1.74 | 28.06 | 1.32 | 21.29 | 0.60 | 3.39 | 1.27 | 49.61 | 0.92 | 12.23 | 0.25 | 4.84 | 0.75 | 12.10 | 2.40 | 12.11 | 0.91 | 29.93 | 0.65 | 8.43 | 0.55 | 10.46 | 0.88 | 18.68 | 0.55 | 20.75 | 18.01 | 15.82 | |
| | Total Area under Mine Operation(D+E) | | | 3.27 | 41.24 | 3.71 | 33.12 | 2.34 | 37.74 | 3.14 | 50.65 | 2.71 | 15.32 | 1.76 | 68.75 | 1.67 | 22.21 | 2.07 | 40.04 | 1.16 | 18.71 | 4.16 | 20.99 | 1.62 | 53.29 | 3.07 | 39.82 | 1.25 | 23.76 | 2.18 | 46.29 | 1.79 | 67.55 | 35.90 | 31.53 |
| WASTELANDS | Waste Lands | <div></div> | 0.42 | 5.30 | 0.83 | 7.41 | 0.28 | 4.52 | 1.15 | 18.55 | 1.98 | 11.19 | 0.06 | 2.34 | 0.42 | 5.59 | 0.51 | 9.86 | 0.30 | 4.84 | 1.14 | 5.75 | 0.37 | 12.17 | 0.53 | 6.88 | 0.66 | 12.55 | 0.15 | 3.18 | 0.26 | 9.81 | 9.06 | 7.96 | |
| | Fly Ash Pond / Sand Body | <div></div> | 0.00 | 0.00 | 0.00 | 0.00 | 0.04 | 0.65 | 0.02 | 0.32 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.32 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.78 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.14 | 0.12 | | |
| | Total Wasteland | | | 0.42 | 5.30 | 0.83 | 7.41 | 0.32 | 5.16 | 1.17 | 18.87 | 1.98 | 11.19 | 0.06 | 2.34 | 0.42 | 5.59 | 0.51 | 9.86 | 0.32 | 5.16 | 1.14 | 5.75 | 0.37 | 12.17 | 0.59 | 7.65 | 0.66 | 12.55 | 0.15 | 3.18 | 0.26 | 9.81 | 9.20 | 8.08 |
| WATERBODIES | Reservoir, Nallah, Ponds | <div></div> | 0.09 | 1.13 | 0.18 | 1.61 | 0.07 | 1.13 | 0.05 | 0.81 | 0.13 | 0.73 | 0.04 | 1.56 | 0.07 | 0.93 | 0.03 | 0.58 | 0.05 | 0.81 | 0.02 | 0.10 | 0.00 | 0.00 | 0.05 | 0.65 | 0.07 | 1.33 | 0.01 | 0.21 | 0.00 | 0.00 | 0.86 | 0.76 | |
| | Total Waterbodies | | | 0.09 | 1.13 | 0.18 | 1.61 | 0.07 | 1.13 | 0.05 | 0.81 | 0.13 | 0.73 | 0.04 | 1.56 | 0.07 | 0.93 | 0.03 | 0.58 | 0.05 | 0.81 | 0.02 | 0.10 | 0.00 | 0.00 | 0.05 | 0.65 | 0.07 | 1.33 | 0.01 | 0.21 | 0.00 | 0.00 | 0.86 | 0.76 |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AGRICULTURE | Crop Lands | <div></div> | 0.06 | 0.76 | 0.08 | 0.71 | 0.00 | 0.00 | 0.08 | 1.29 | 0.79 | 4.47 | 0.00 | 0.00 | 0.19 | 2.53 | 0.12 | 2.32 | 0.03 | 0.48 | 0.00 | 0.00 | 0.01 | 0.33 | 0.19 | 2.46 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.38 | 1.56 | 1.37 | |
| | Fallow Lands | <div></div> | 0.84 | 10.59 | 0.94 | 8.39 | 0.62 | 10.00 | 0.52 | 8.39 | 6.30 | 35.61 | 0.00 | 0.00 | 1.51 | 20.08 | 0.80 | 15.47 | 0.27 | 4.35 | 1.06 | 5.35 | 0.18 | 5.92 | 0.48 | 6.23 | 0.22 | 4.18 | 0.11 | 2.34 | 0.03 | 1.13 | 13.88 | 12.19 | |
| | Total Agriculture | | | 0.90 | 11.35 | 1.02 | 9.11 | 0.62 | 10.00 | 0.60 | 9.68 | 7.09 | 40.08 | 0.00 | 0.00 | 1.70 | 22.61 | 0.92 | 17.79 | 0.30 | 4.84 | 1.06 | 5.35 | 0.19 | 6.25 | 0.67 | 8.69 | 0.22 | 4.18 | 0.11 | 2.34 | 0.04 | 1.51 | 15.44 | 13.56 |
| SETTLEMENTS | Urban Settlement | <div></div> | 0.00 | 0.00 | 0.29 | 2.59 | 0.11 | 1.77 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.13 | 0.00 | 0.00 | 0.16 | 2.58 | 0.47 | 2.37 | 0.01 | 0.33 | 0.40 | 5.19 | 0.16 | 3.04 | 0.20 | 4.25 | 0.02 | 0.75 | 1.83 | 1.61 | | |
| | Rural Settlement | <div></div> | 0.15 | 1.89 | 0.18 | 1.61 | 0.02 | 0.32 | 0.05 | 0.81 | 0.30 | 1.70 | 0.00 | 0.00 | 0.09 | 1.20 | 0.15 | 2.90 | 0.16 | 2.58 | 0.33 | 1.66 | 0.02 | 0.66 | 0.07 | 0.91 | 0.05 | 0.95 | 0.01 | 0.21 | 0.03 | 1.13 | 1.61 | 1.41 | |
| | Industrial Settlement | <div></div> | 0.04 | 0.50 | 0.38 | 3.39 | 0.18 | 2.90 | 0.14 | 2.26 | 0.03 | 0.17 | 0.00 | 0.00 | 0.04 | 0.53 | 0.03 | 0.58 | 0.04 | 0.65 | 0.33 | 1.66 | 0.00 | 0.00 | 0.21 | 2.72 | 0.02 | 0.38 | 0.00 | 0.00 | 0.06 | 2.26 | 1.50 | 1.32 | |
| | Total Settlements | | | 0.19 | 2.40 | 0.85 | 7.59 | 0.31 | 5.00 | 0.19 | 3.06 | 0.33 | 1.87 | 0.00 | 0.00 | 0.14 | 1.86 | 0.18 | 3.48 | 0.36 | 5.81 | 1.13 | 5.70 | 0.03 | 0.99 | 0.68 | 8.82 | 0.23 | 4.37 | 0.21 | 4.46 | 0.11 | 4.15 | 4.94 | 4.34 |
| Grand Total | | | | 7.93 | 100.00 | 11.20 | 100.00 | 6.20 | 100.00 | 6.20 | 100.00 | 17.69 | 100.00 | 2.56 | 100.00 | 7.52 | 100.00 | 5.17 | 100.00 | 6.20 | 100.00 | 19.82 | 100.00 | 3.04 | 100.00 | 7.71 | 100.00 | 5.26 | 100.00 | 4.71 | 100.00 | 2.65 | 100.00 | 113.86 | 100.00 |

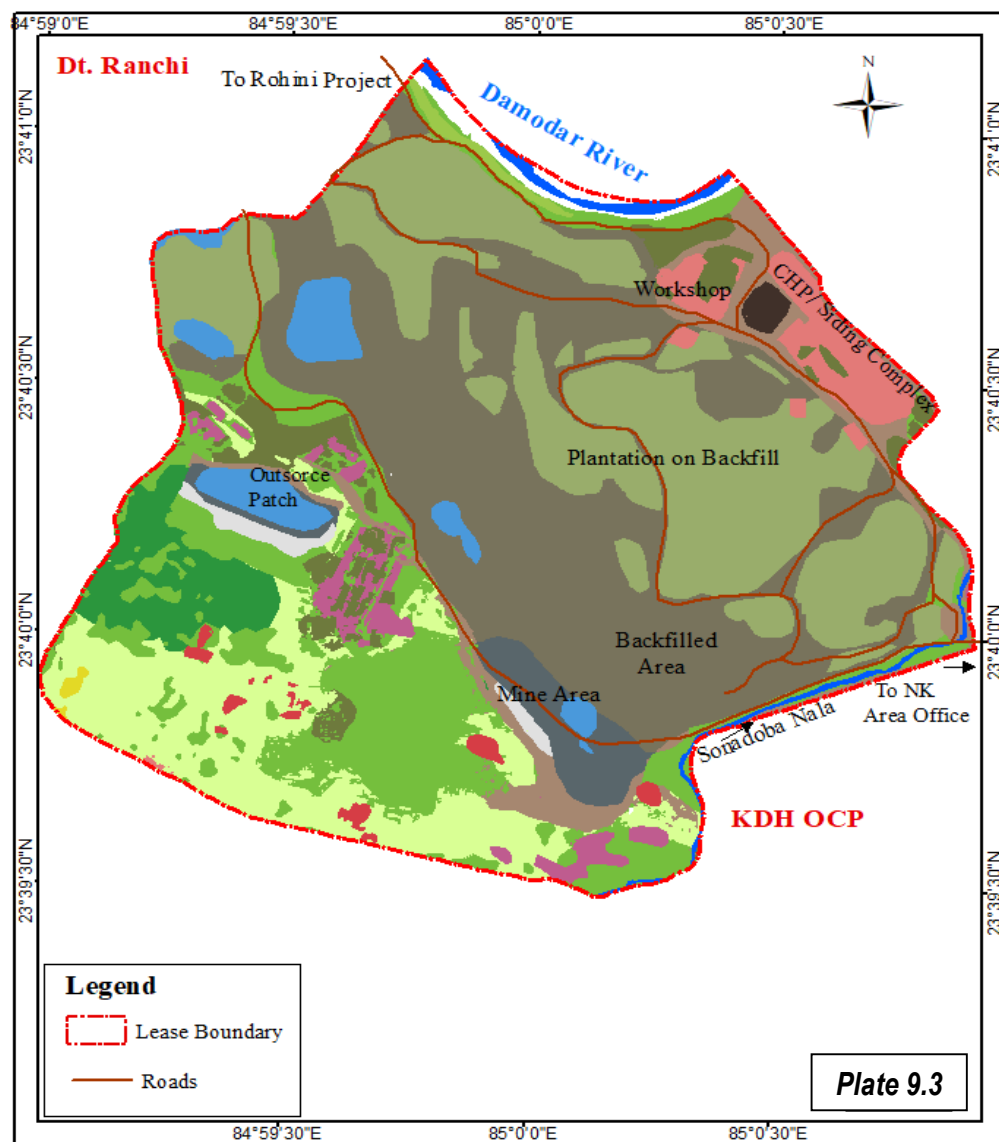




| Area Statistics - Piparwar OCP (2022) | | | | |
|---------------------------------------|-------------------------|--------|-------------------------|---------------|
| Classes | | Colour | Area | |
| Level-I | Level-II | | Area (Km ²) | % of Total |
| Forest Area | Dense Forest | | 0.00 | 0.00 |
| | Open Forest | | 0.16 | 1.43 |
| Total Forest Area | | | 0.16 | 1.43 |
| Scrubs | Scrubs | | 1.22 | 10.89 |
| | Social Forestry | | 1.18 | 10.54 |
| | Plantation on Backfill | | 1.85 | 16.52 |
| | Plantation on OB Dump | | 0.17 | 1.52 |
| Total Plantation | | | 3.20 | 28.57 |
| Total Vegetation Area | | | 4.58 | 40.89 |
| Agriculture | Crop Land | | 0.08 | 0.71 |
| | Fallow Land | | 0.89 | 7.95 |
| Total Agriculture Area | | | 0.97 | 8.66 |
| Waste Land | Waste Land | | 0.91 | 8.13 |
| | Total Waste Land | | 0.91 | 8.13 |
| Mining Area | Coal Quarry | | 0.54 | 4.82 |
| | Barren OB Dump | | 0.00 | 0.00 |
| | Area Under Backfilling | | 2.75 | 24.55 |
| | Water Filled Quarry | | 0.42 | 3.75 |
| | Coal Dump | | 0.00 | 0.00 |
| | Advance Quarry Site | | 0.00 | 0.00 |
| Total Mining Area | | | 3.71 | 33.13 |
| Settlements | Rural Settlement | | 0.18 | 1.61 |
| | Urban Settlement | | 0.29 | 2.59 |
| | Industrial Settlement | | 0.38 | 3.39 |
| Total Settlement Area | | | 0.85 | 7.59 |
| Water Body | River, Ponds | | 0.18 | 1.61 |
| Total | | | 11.20 | 100.00 |

NO. 4922120

| | | | | | |
|--|--|--|---------------|-------------------|-----------------------------|
| Customer | | Central Coalfields Limited | | | |
| Title | | Land Reclamation Monitoring of OC Projects | | | Job No. 564922120 |
| Subject Land Reclamation Monitoring Status of Piparwar OCP based on Satellite Data (RS-2/L-IV) of the year 2022 | | Activity | Name | Designation | Signature |
| | | Prepared | Hariharalal B | Ch. Mgr(System) | <i>[Signature]</i> |
| | | Checked | Tilak Mandal | Ch. Mgr(RSC) | <i>[Signature]</i> |
| | | Approved | R. Kumar | GM(Geomatics) | <i>[Signature]</i> |
| | | Scale: <div style="display: inline-block; width: 150px; height: 10px; background: linear-gradient(to right, black 40%, white 40%);"></div> km 0 0.25 0.5 1 | | | |
| <div style="display: flex; align-items: center;"> <div> cmpdi <i>A Bharat Company</i> </div> </div> | | Drg No. | | HQ REM 22 3 A4 02 | |
| | | Rev No.0 | | | |



| Area Statistics - KDH OCP (2022) | | | | |
|----------------------------------|-------------------------------|--------|--------------------|---------------|
| Classes | | Colour | Area | |
| Level-I | Level-II | | (Km ²) | % of Total |
| Forest Area | Dense Forest | | 0.00 | 0.00 |
| | Open Forest | | 0.20 | 3.23 |
| | Total Forest Area | | 0.20 | 3.23 |
| Scrubs | Scrubs | | 0.70 | 11.29 |
| | Social Forestry | | 0.21 | 3.39 |
| | Total Scrubs | | 0.91 | 14.68 |
| Plantation | Plantation on Backfill | | 1.39 | 22.42 |
| | Plantation on OB Dump | | 0.03 | 0.48 |
| | Total Plantation | | 1.63 | 26.29 |
| | Total Vegetation Area | | 2.53 | 40.81 |
| Agriculture | Crop Land | | 0.00 | 0.00 |
| | Fallow Land | | 0.62 | 10.00 |
| | Total Agriculture Area | | 0.62 | 10.00 |
| Waste Land | Waste Land | | 0.28 | 4.52 |
| | Sand Body | | 0.04 | 0.65 |
| | Total Waste Land | | 0.32 | 5.16 |
| Mining Area | Coal Quarry | | 0.16 | 2.58 |
| | Barren OB Dump | | 0.03 | 0.48 |
| | Area Under Backfilling | | 1.77 | 28.55 |
| | Water Filled Quarry | | 0.30 | 4.84 |
| | Coal Dump | | 0.05 | 0.81 |
| | Advance Quarry Site | | 0.06 | 0.97 |
| | Total Mining Area | | 2.37 | 38.23 |
| Settlements | Rural Settlement | | 0.03 | 0.48 |
| | Urban Settlement | | 0.11 | 1.77 |
| | Industrial Settlement | | 0.16 | 2.58 |
| | Total Settlement Area | | 0.30 | 4.84 |
| Water Body | River, Ponds | | 0.06 | 0.97 |
| | Total | | 6.20 | 100.00 |

Customer

Central Coalfields Limited

Title

Land Reclamation Monitoring of OC Projects

Job No.
564922120

Subject

Land Reclamation Status of KDH OCP based on Satellite Data (RS-2/L-IV) of the year 2022

Activity

Name

Designation

Signature

Prepared

Hariharalal B

Ch. Mgr(System)

hankar

Checked

Tilak Mandal

Ch. Mgr(RSC)

Tilak

Approved

R. Kumar

GM(Geomatics)

R. Kumar

Scale:

0

0.25

0.5

1


km

Sheet 1

DrgNo.

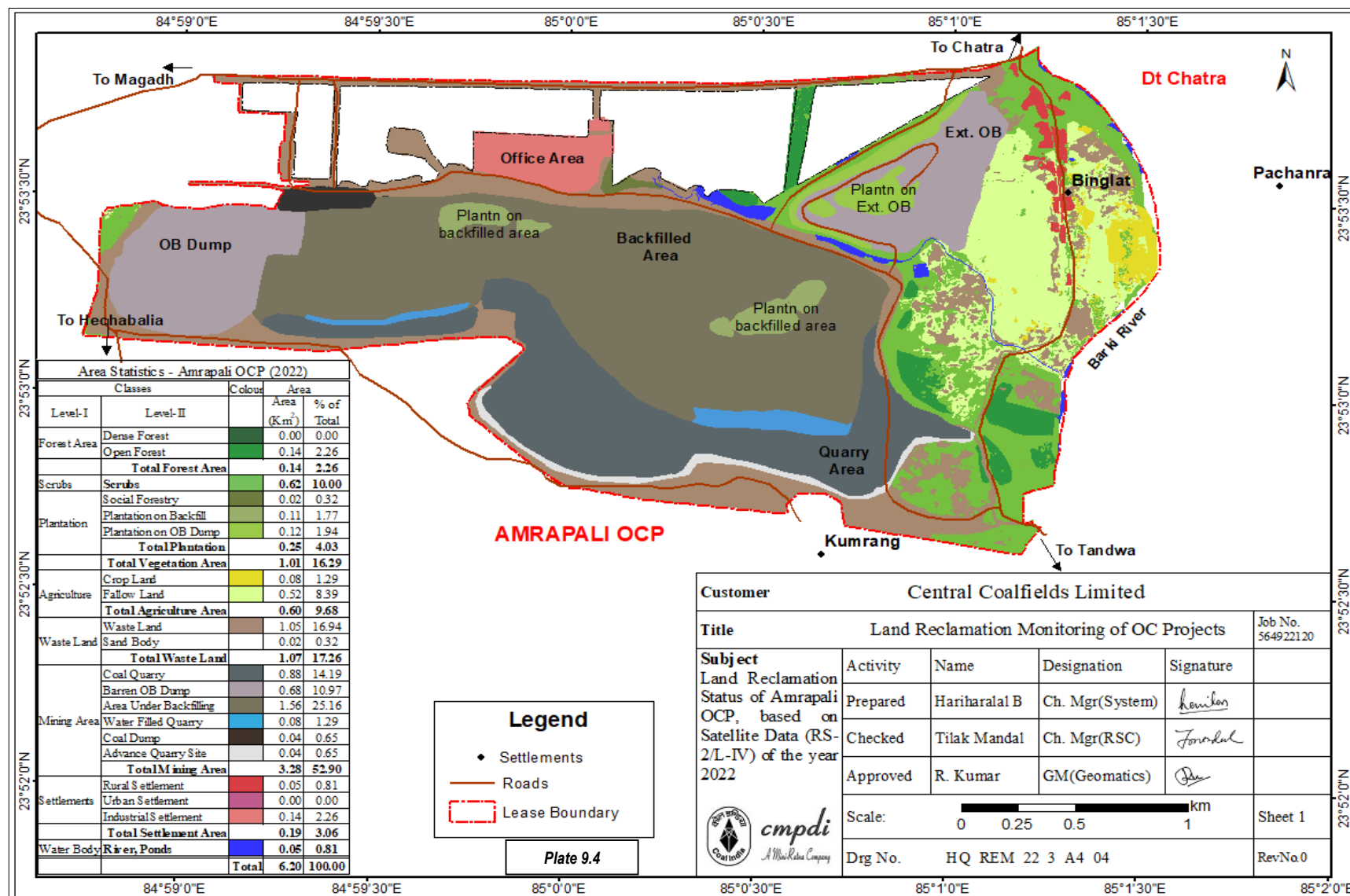
HQ REM 22 3 A4 03

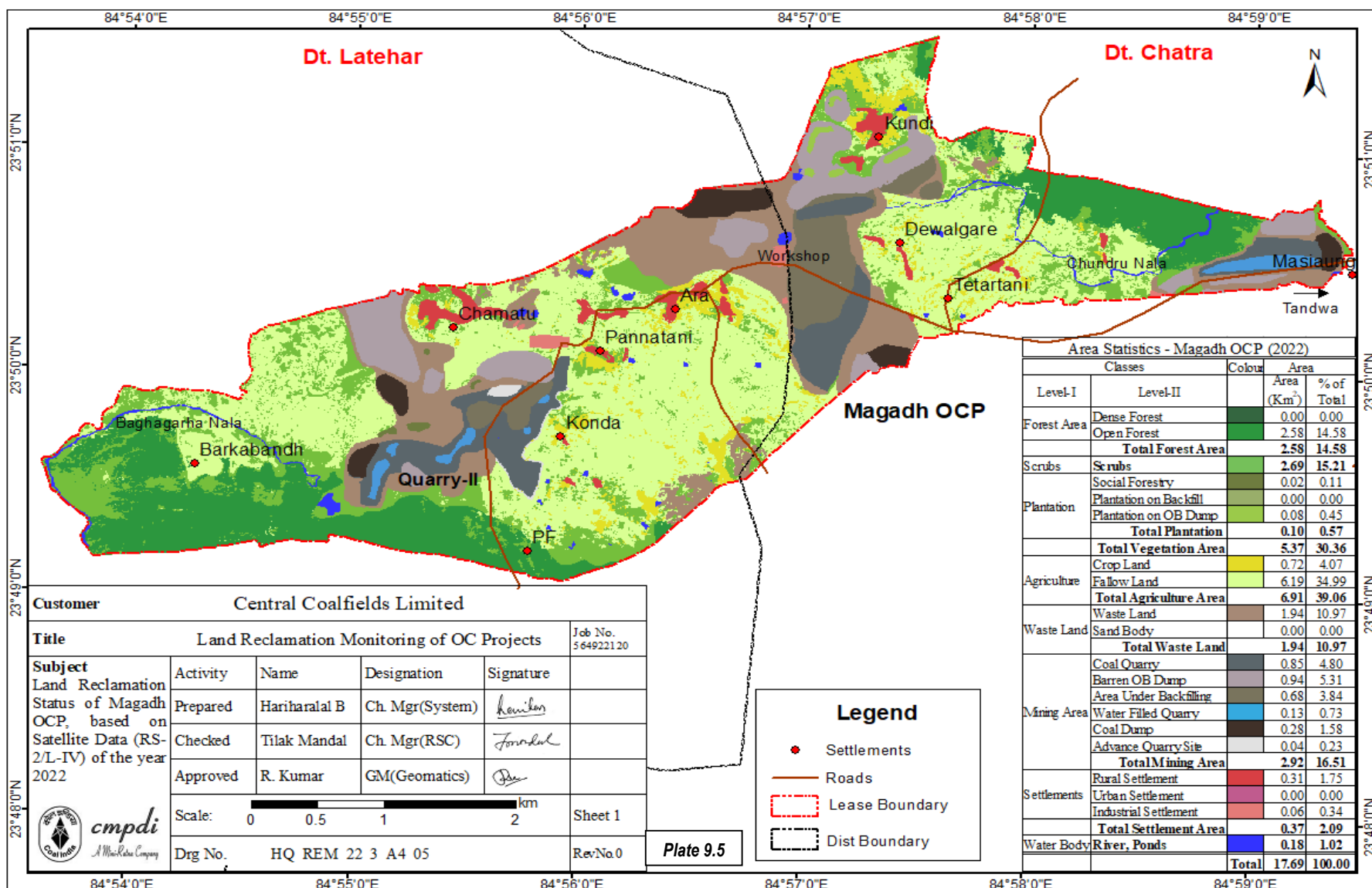
Rev No.0

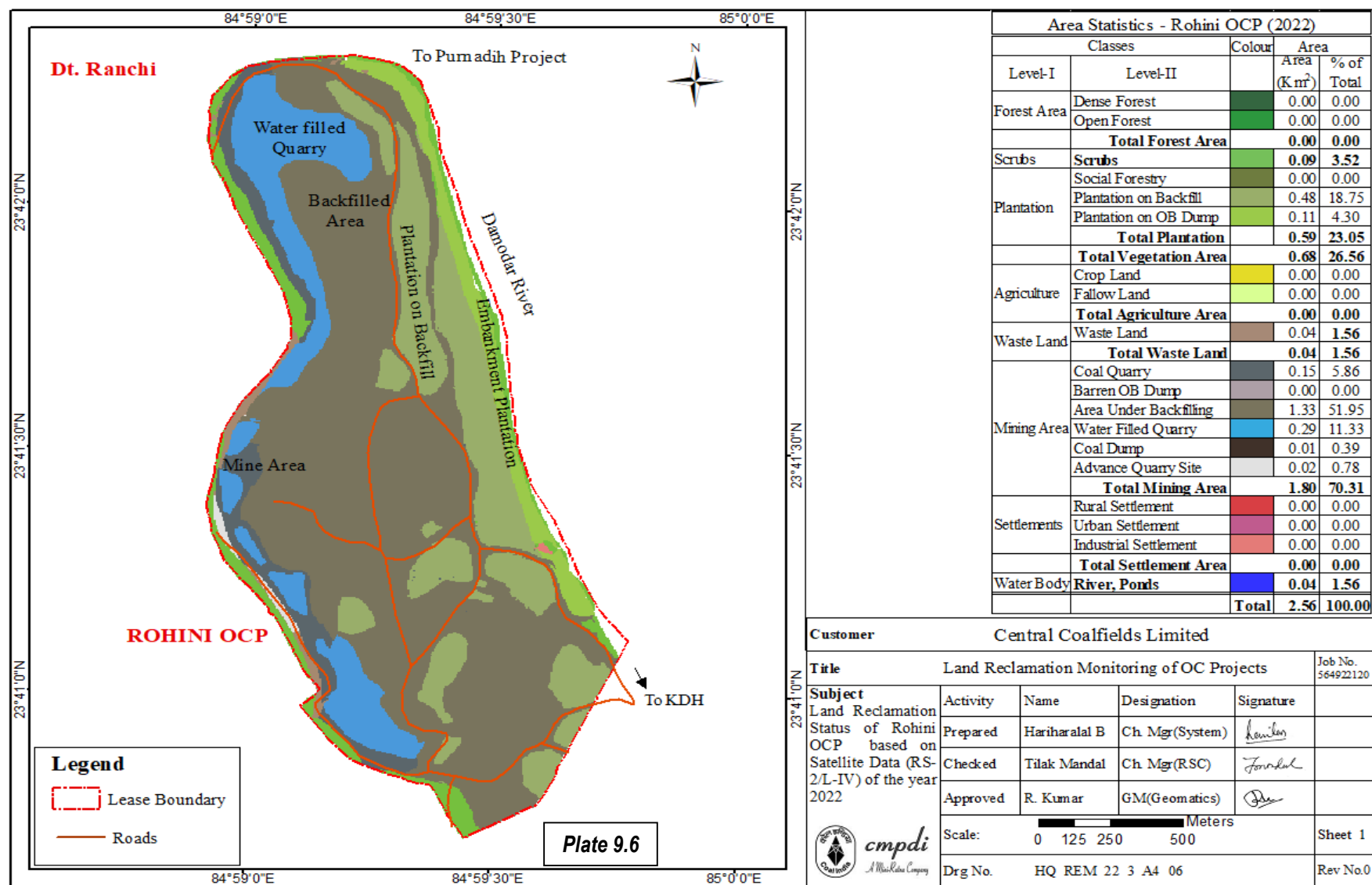


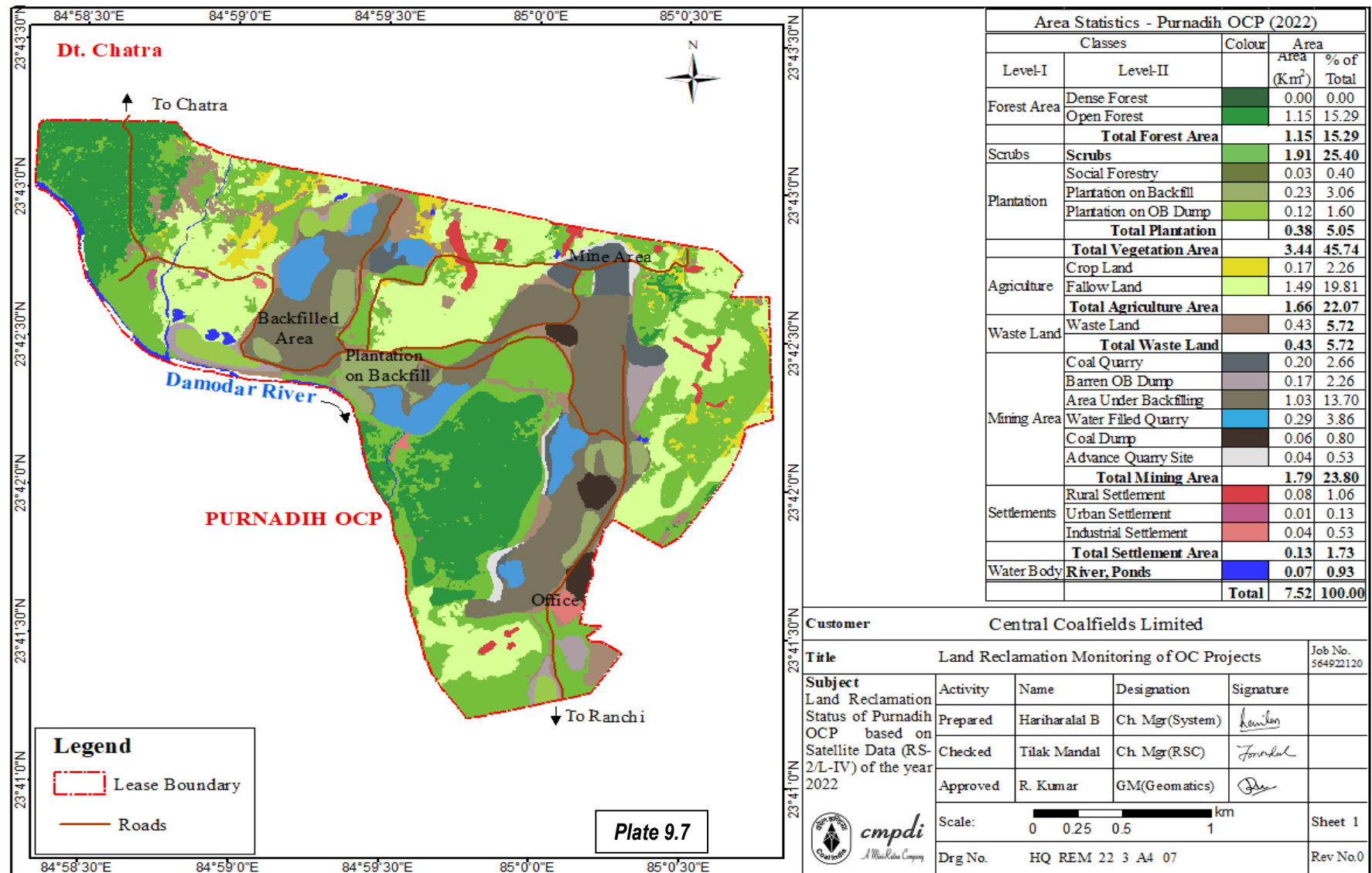
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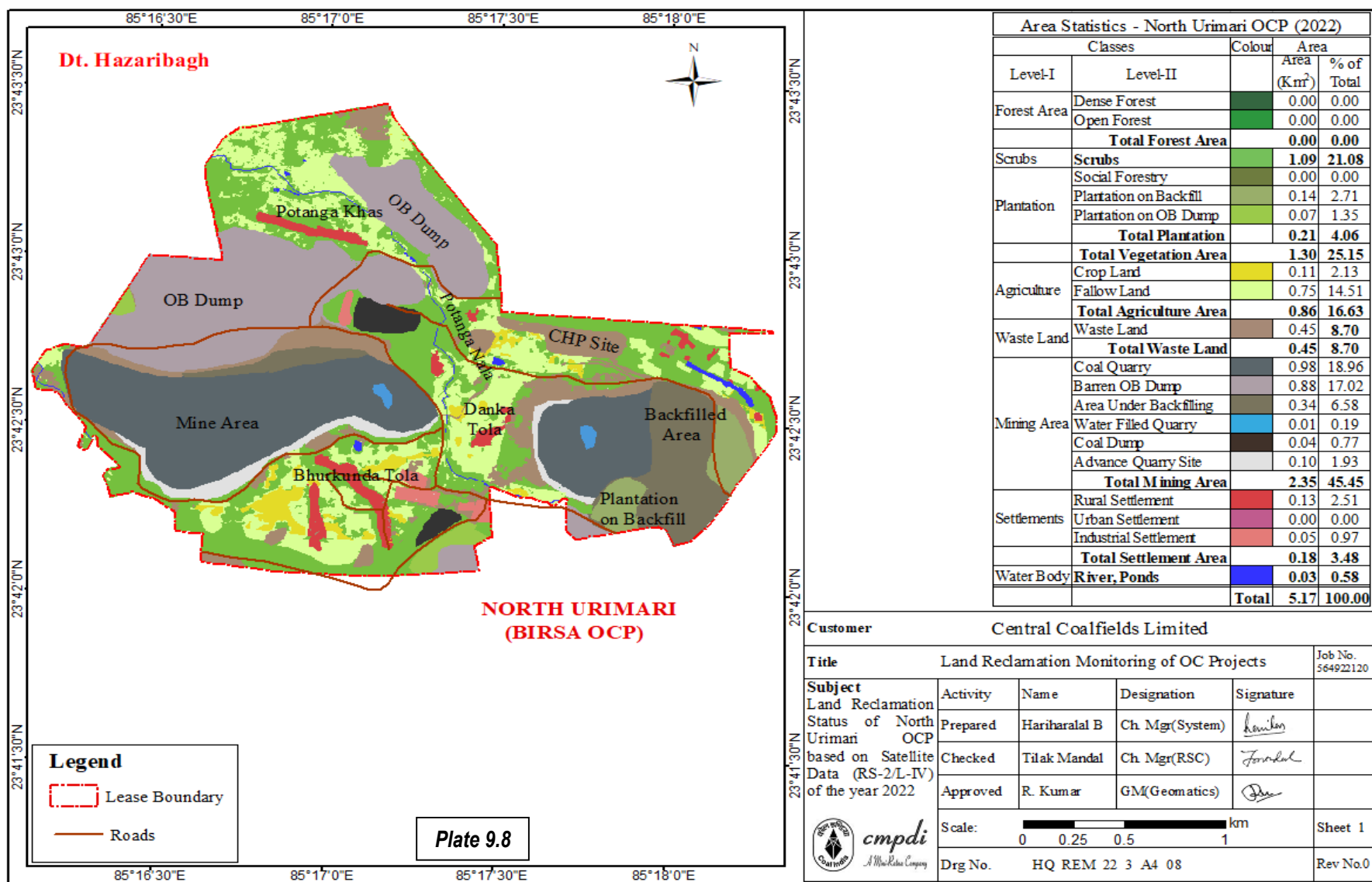
A Minotaur Company

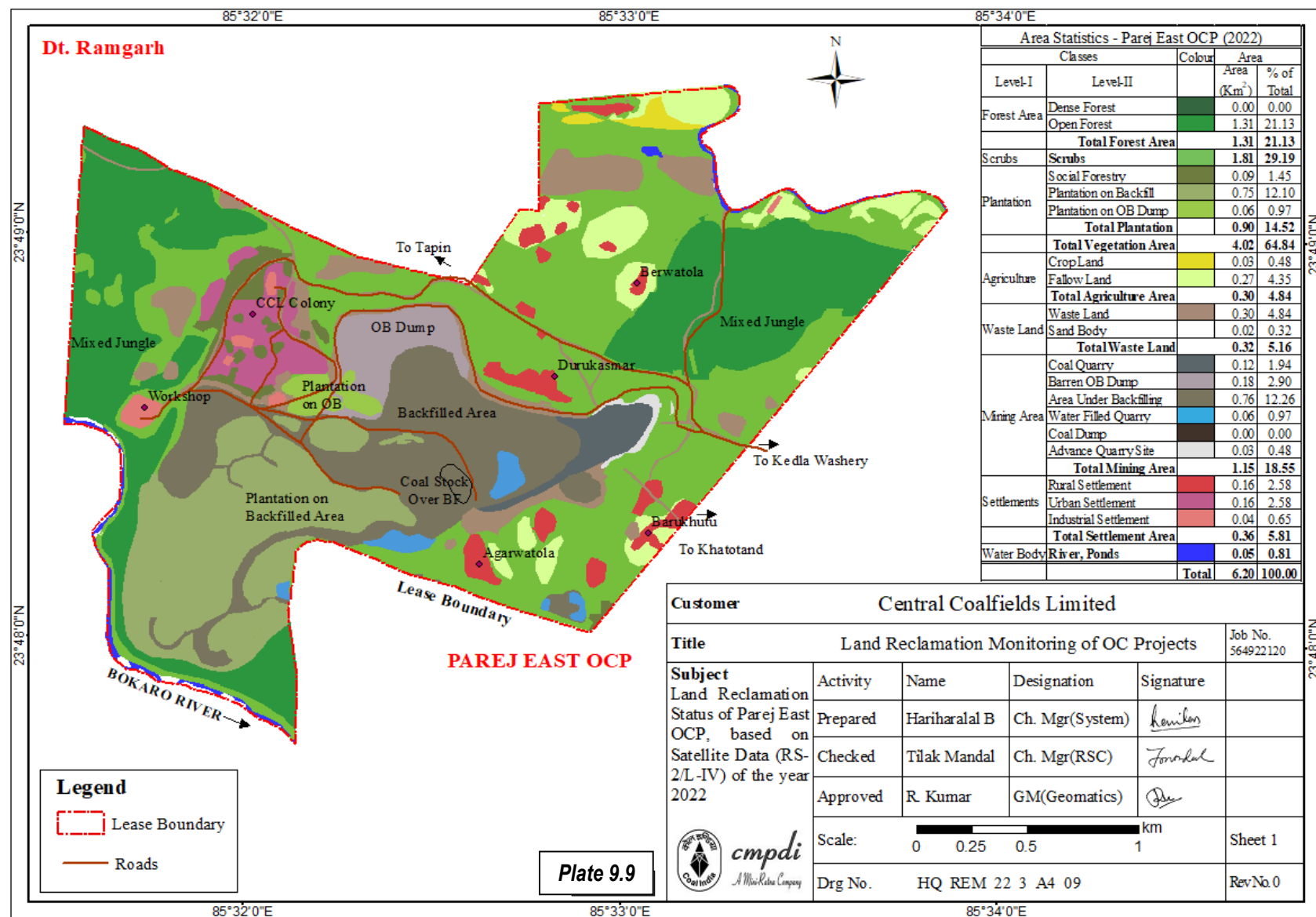


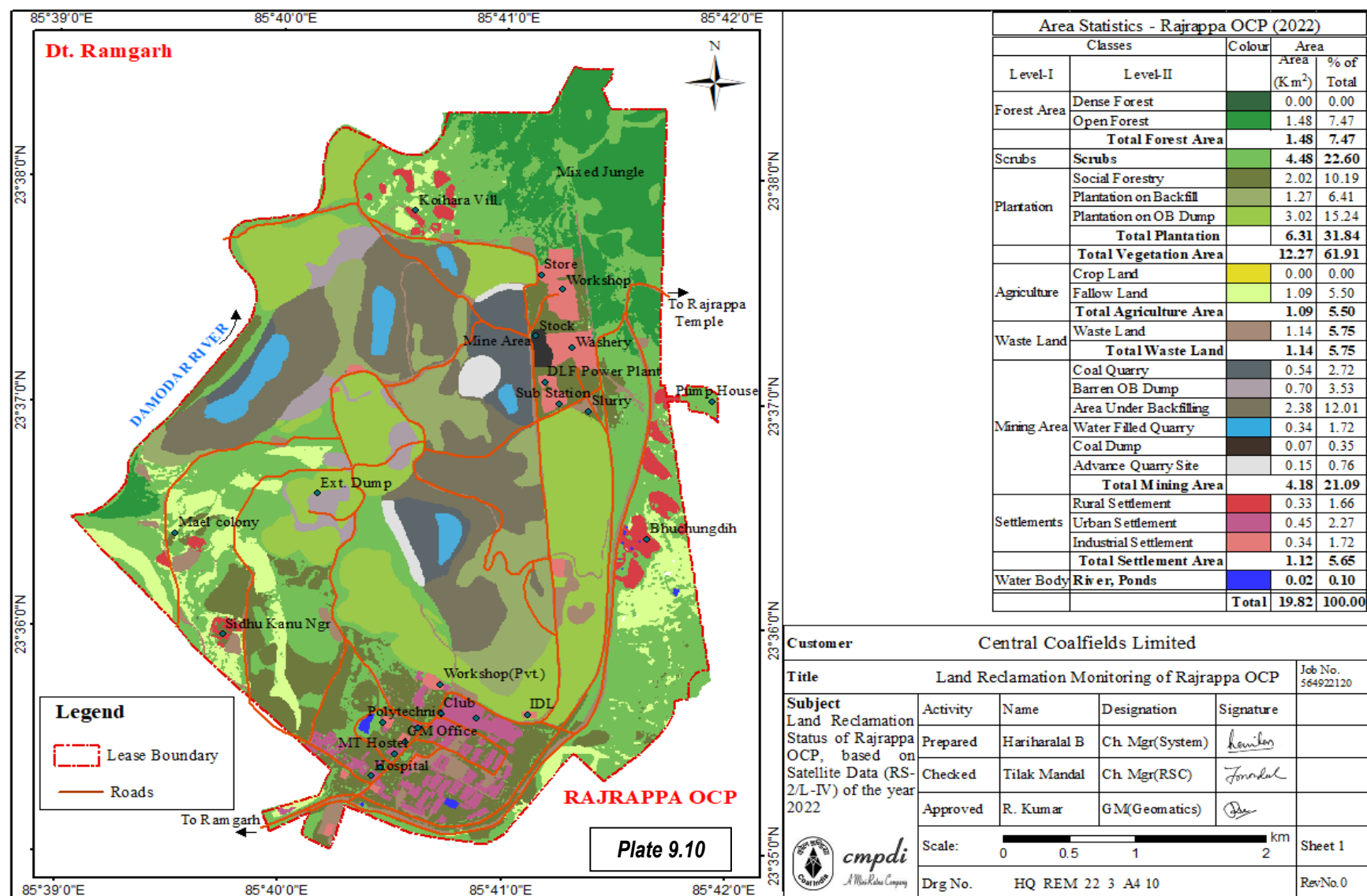


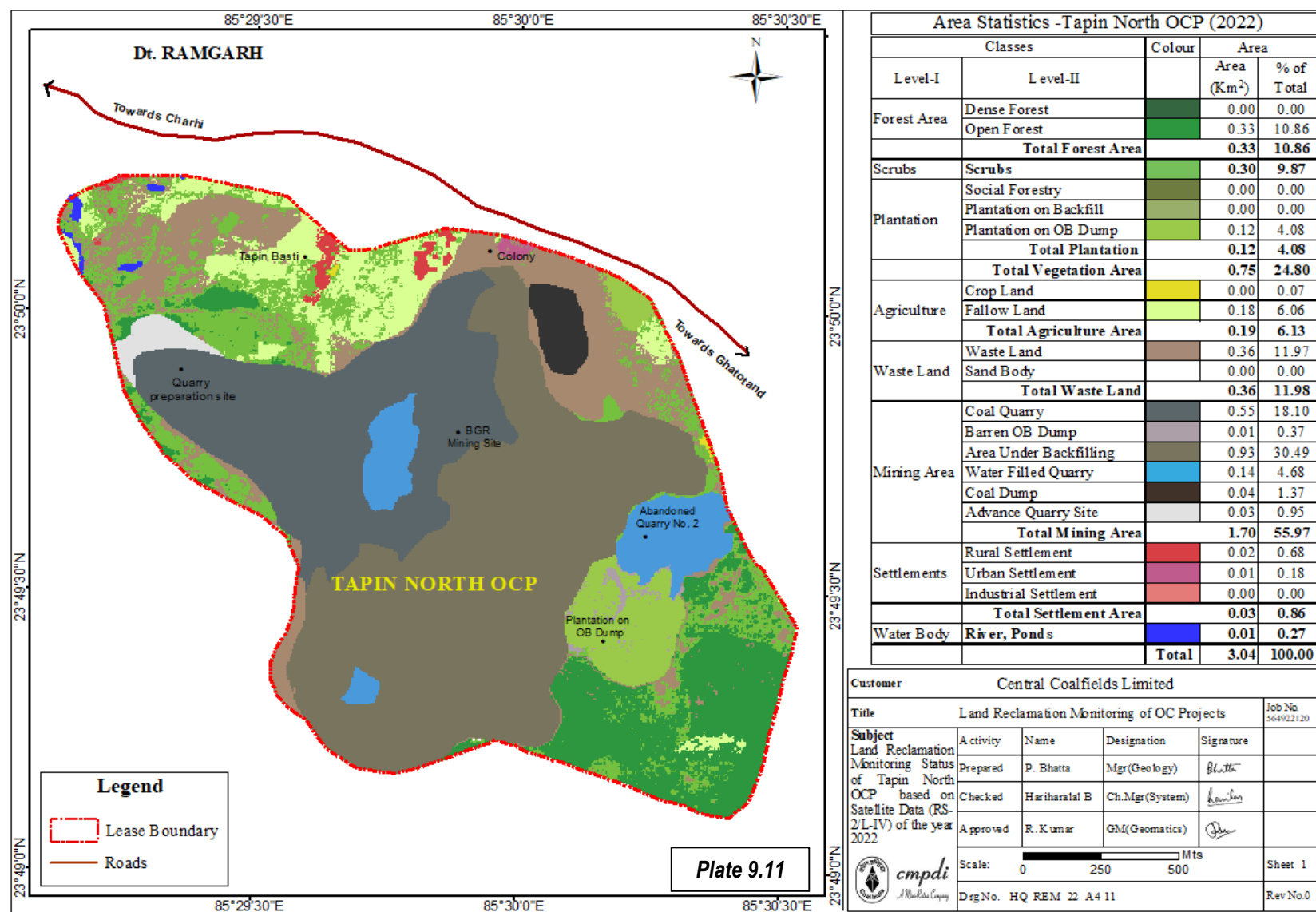


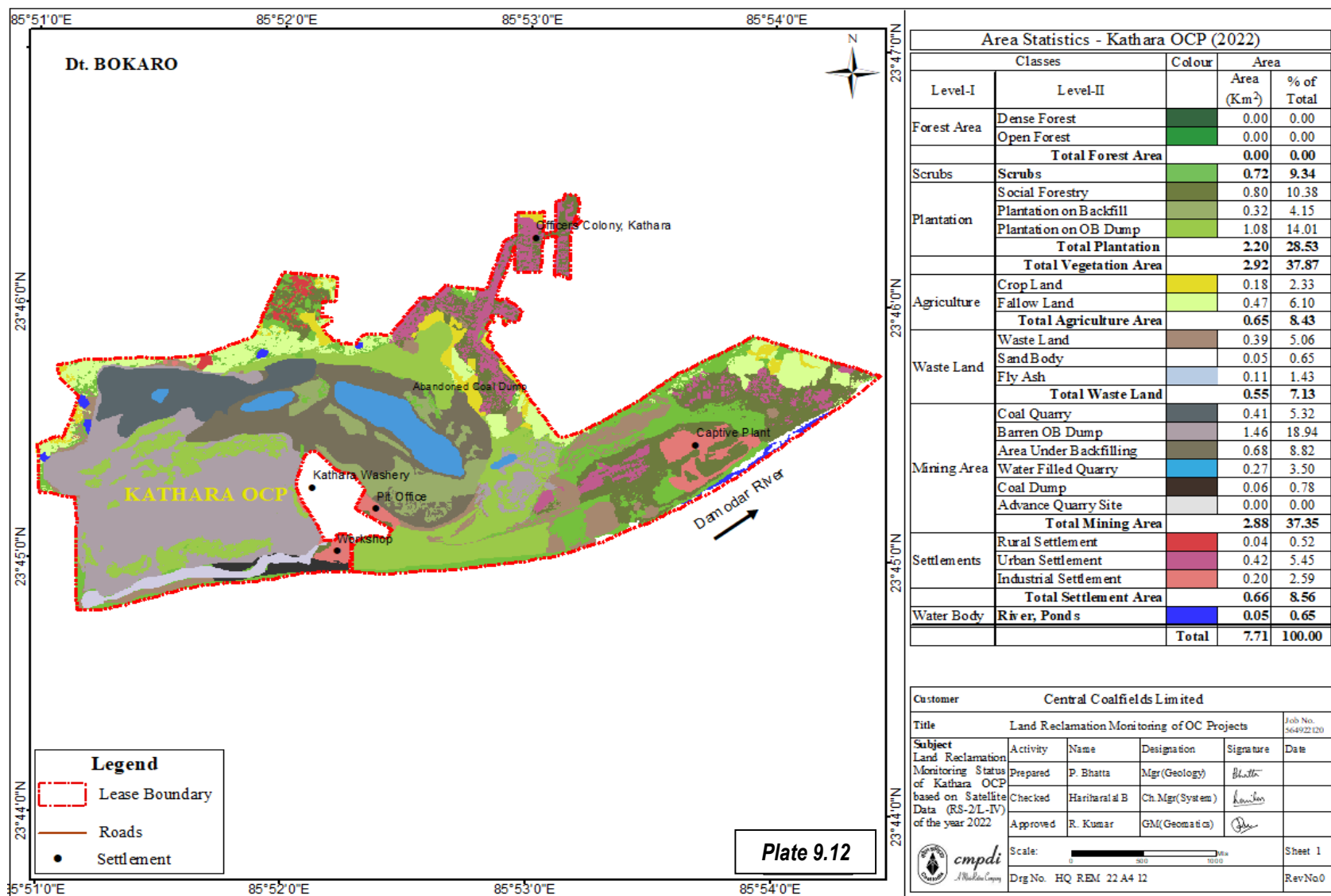


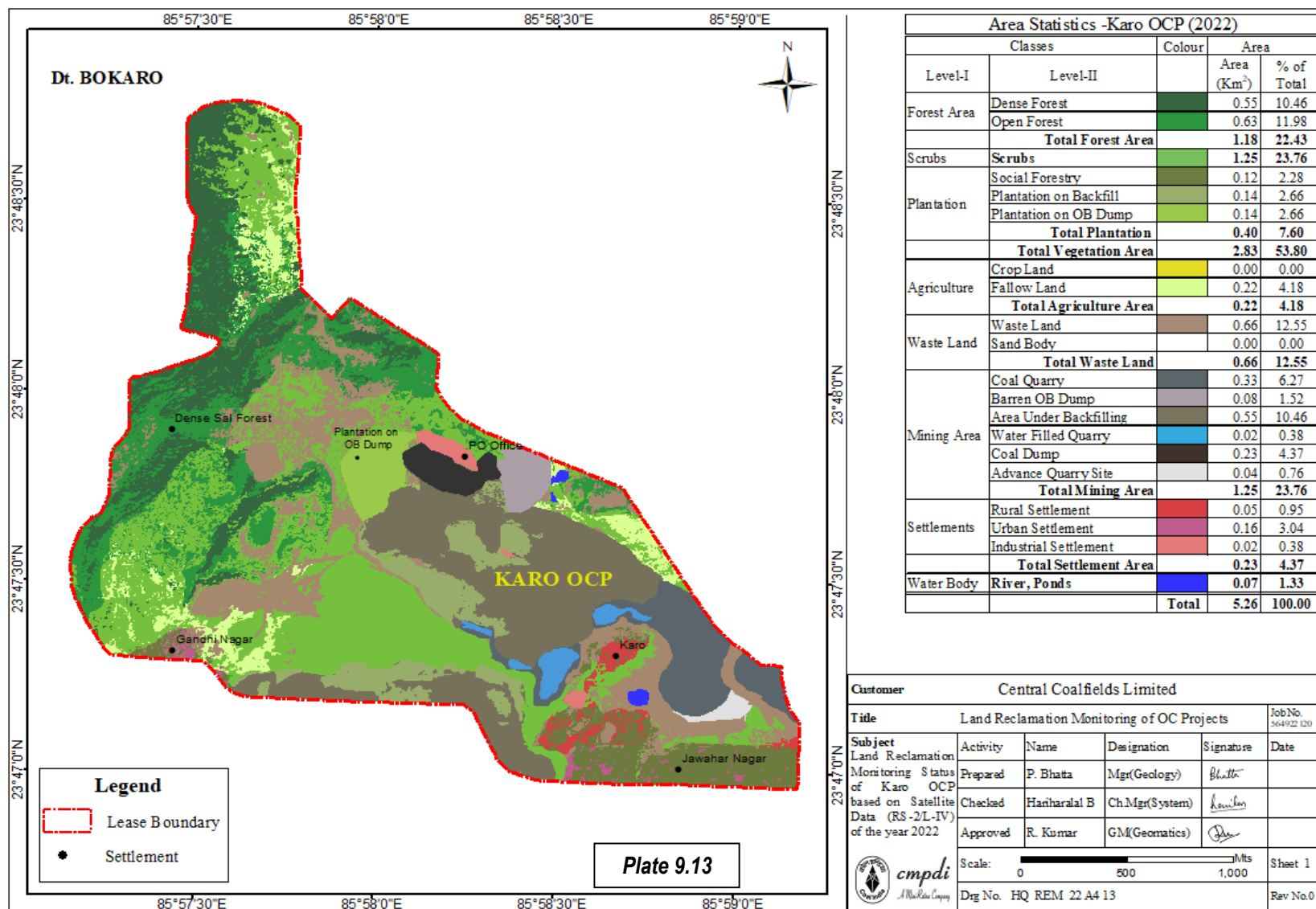


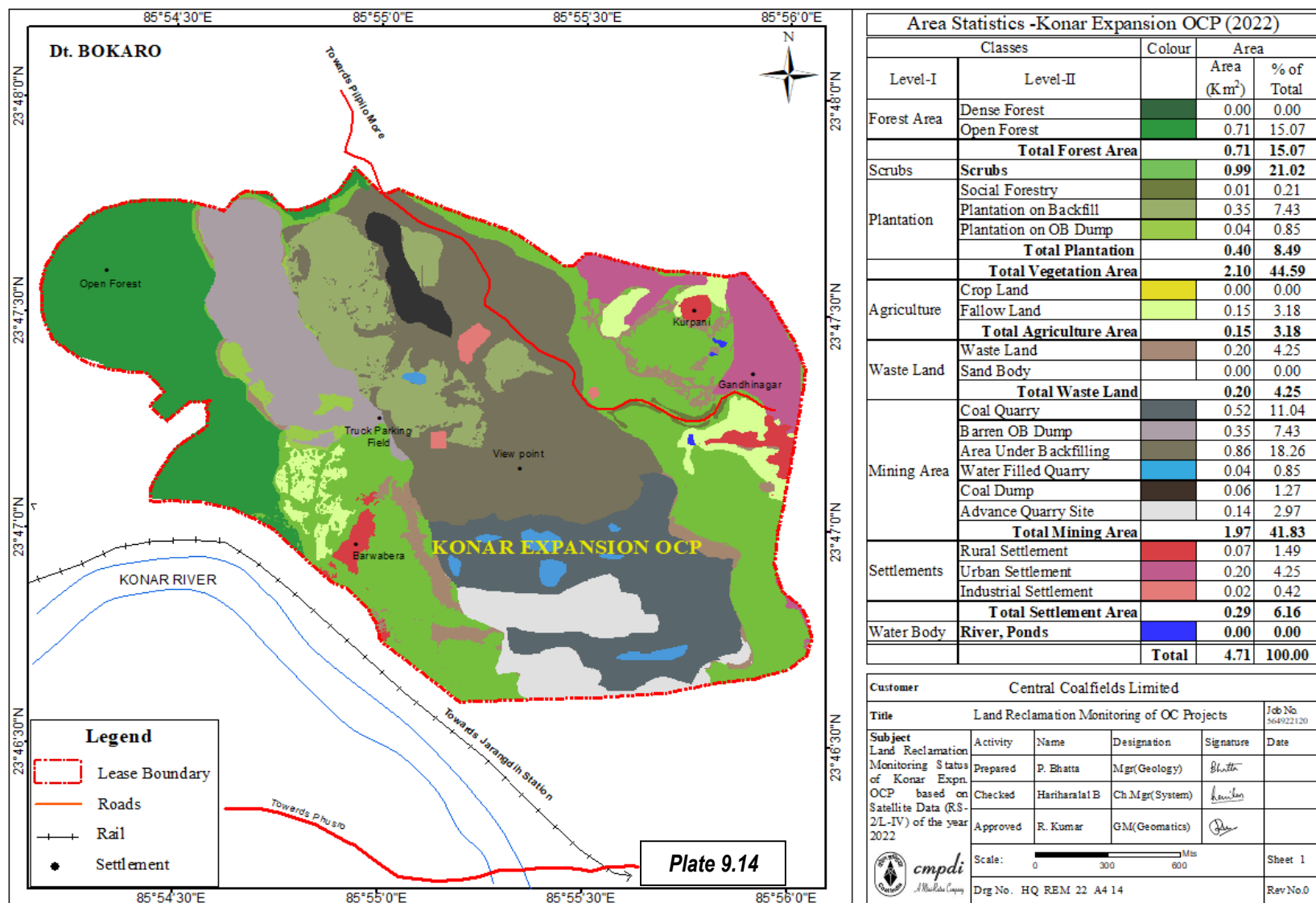


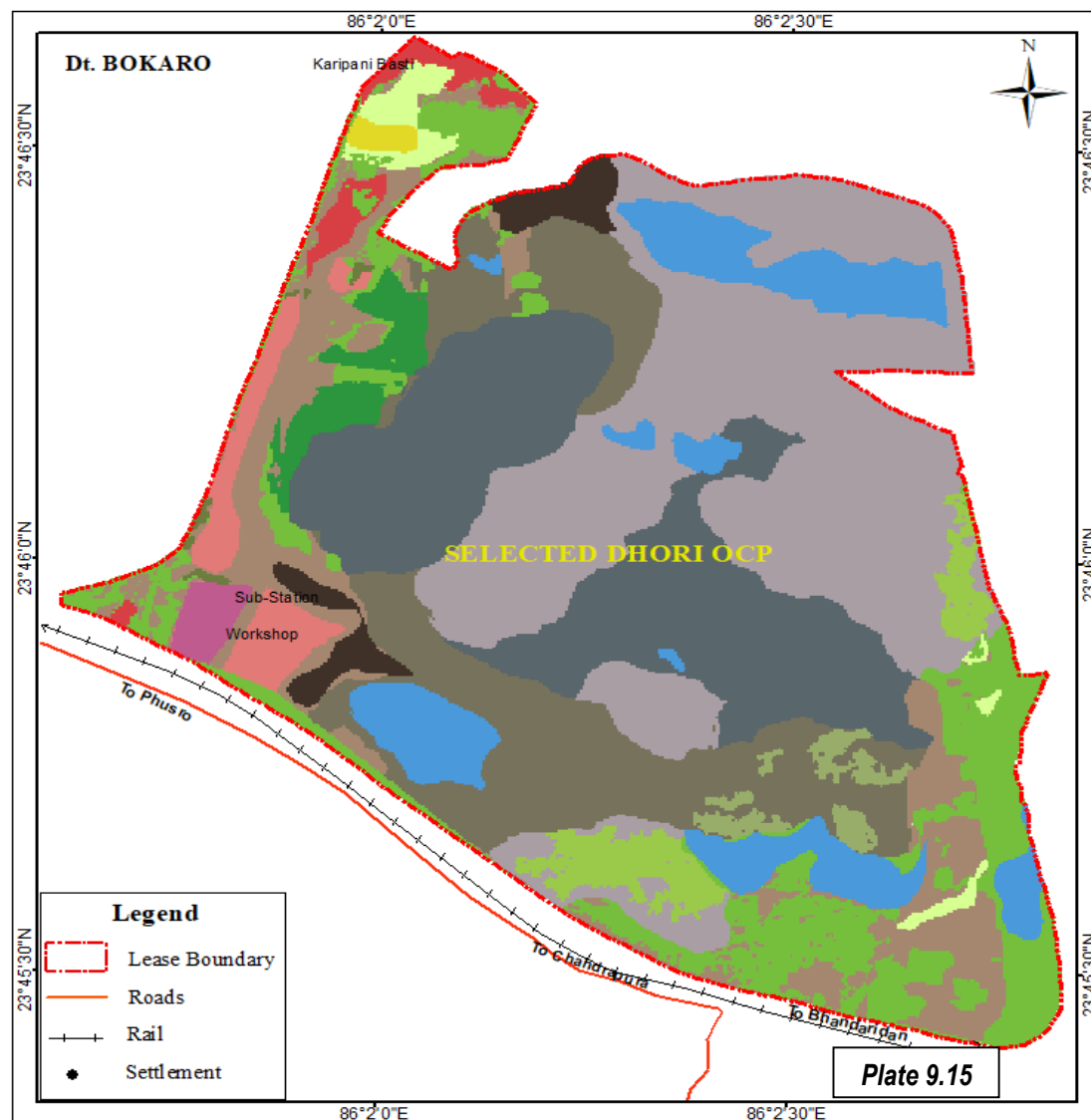












| Area Statistics - Selected Dhori OCP (2022) | | | | |
|---|------------------------|--------|-------------------------|---------------|
| Classes | | Colour | Area | |
| Level-I | Level-II | | Area (Km ²) | % of Total |
| Forest Area | Dense Forest | | 0.00 | 0.00 |
| | Open Forest | | 0.05 | 1.89 |
| Total Forest Area | | | 0.05 | 1.89 |
| Scrubs | Scrubs | | 0.31 | 11.70 |
| | Social Forestry | | 0.01 | 0.38 |
| | Plantation on Backfill | | 0.03 | 1.13 |
| | Plantation on OB Dump | | 0.07 | 2.64 |
| Total Plantation | | | 0.11 | 4.15 |
| Total Vegetation Area | | | 0.47 | 17.74 |
| Agriculture | Crop Land | | 0.01 | 0.38 |
| | Fallow Land | | 0.03 | 1.13 |
| Total Agriculture Area | | | 0.04 | 1.51 |
| Waste Land | Waste Land | | 0.26 | 9.81 |
| | Sand Body | | 0.00 | 0.00 |
| Total Waste Land | | | 0.26 | 9.81 |
| Mining Area | Coal Quarry | | 0.46 | 17.36 |
| | Barren OB Dump | | 0.70 | 26.42 |
| | Area Under Backfilling | | 0.35 | 13.21 |
| | Water Filled Quarry | | 0.21 | 7.92 |
| | Coal Dump | | 0.05 | 1.89 |
| | Advance Quarry Site | | 0.00 | 0.00 |
| Total Mining Area | | | 1.77 | 66.79 |
| Settlements | Rural Settlement | | 0.03 | 1.13 |
| | Urban Settlement | | 0.02 | 0.75 |
| | Industrial Settlement | | 0.06 | 2.26 |
| Total Settlement Area | | | 0.11 | 4.15 |
| Water Body | River, Ponds | | 0.00 | 0.00 |
| Total | | | 2.65 | 100.00 |

| Customer Central Coalfields Limited | | | | | |
|---|--|----------------|----------------|------------------|-------------------|
| Title | Land Reclamation Monitoring of OC Projects | | | | Job No. 564922120 |
| Subject Land Reclamation Monitoring Status of Selected Dhori OCP based on Satellite Data (RS-2/L-IV) of the year 2022 | Activity | Name | Designation | Signature | Date |
| | Prepared | P. Bhatta | Mgr(Geology) | <i>P. Bhatta</i> | |
| | Checked | Harihara Lal B | Ch.Mgr(System) | <i>H. Bhatta</i> | |
| | Approved | R. Kumar | GM(Geomatics) | <i>R. Kumar</i> | |
| Scale: 0 250 500 Mts | | | | | Sheet 1 |
| Drg No. HQ REM 22 A4 15 | | | | | Rev No.0 |

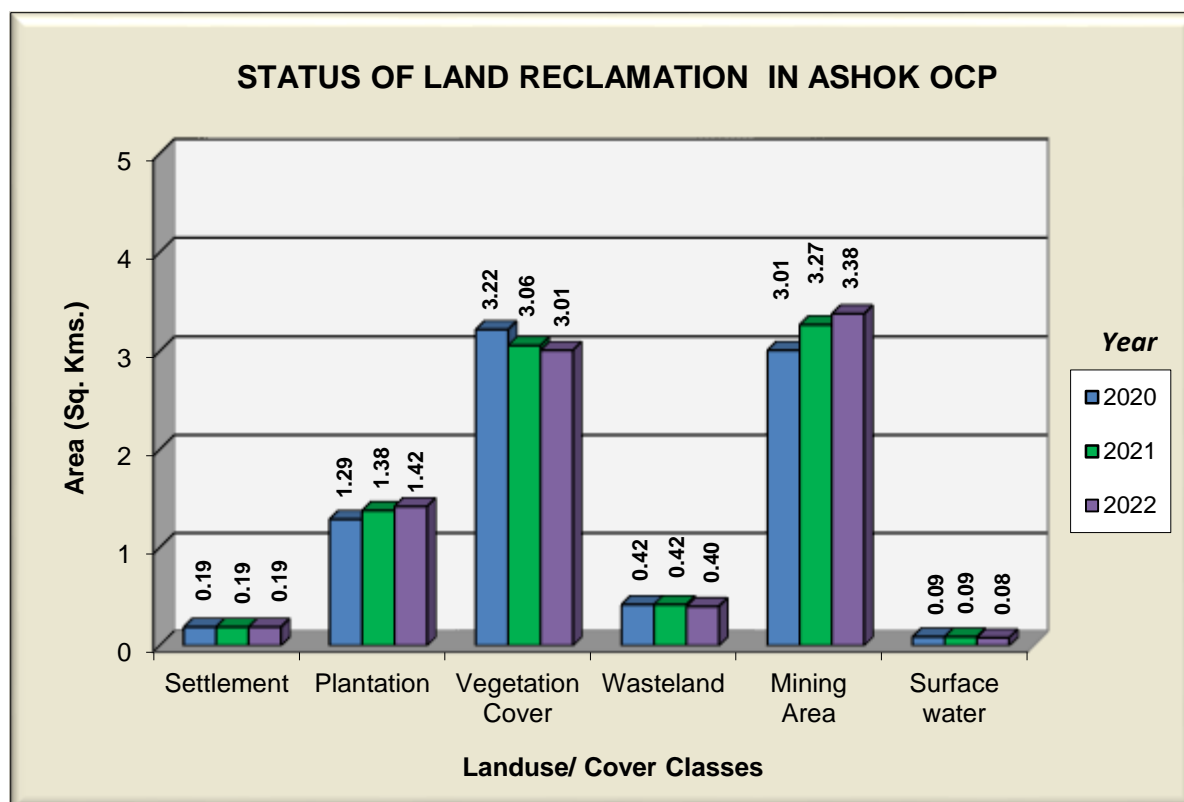


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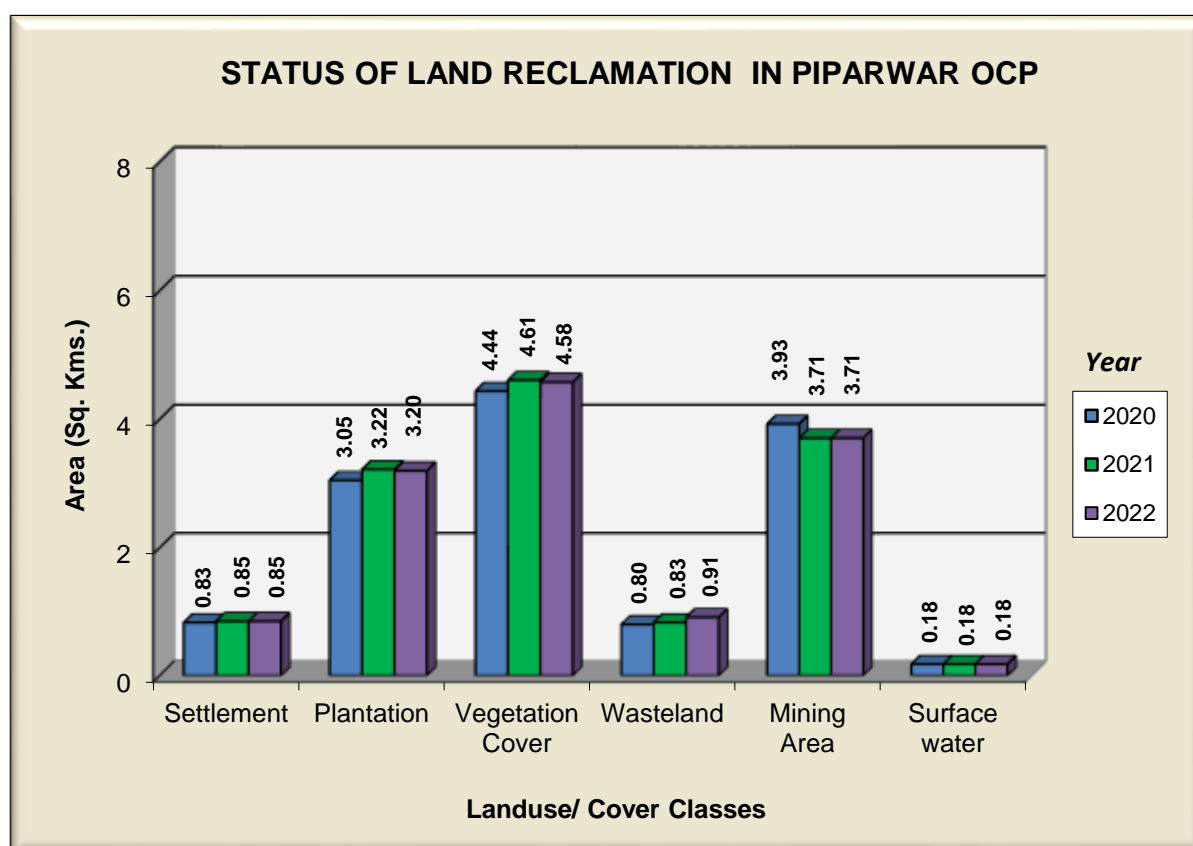


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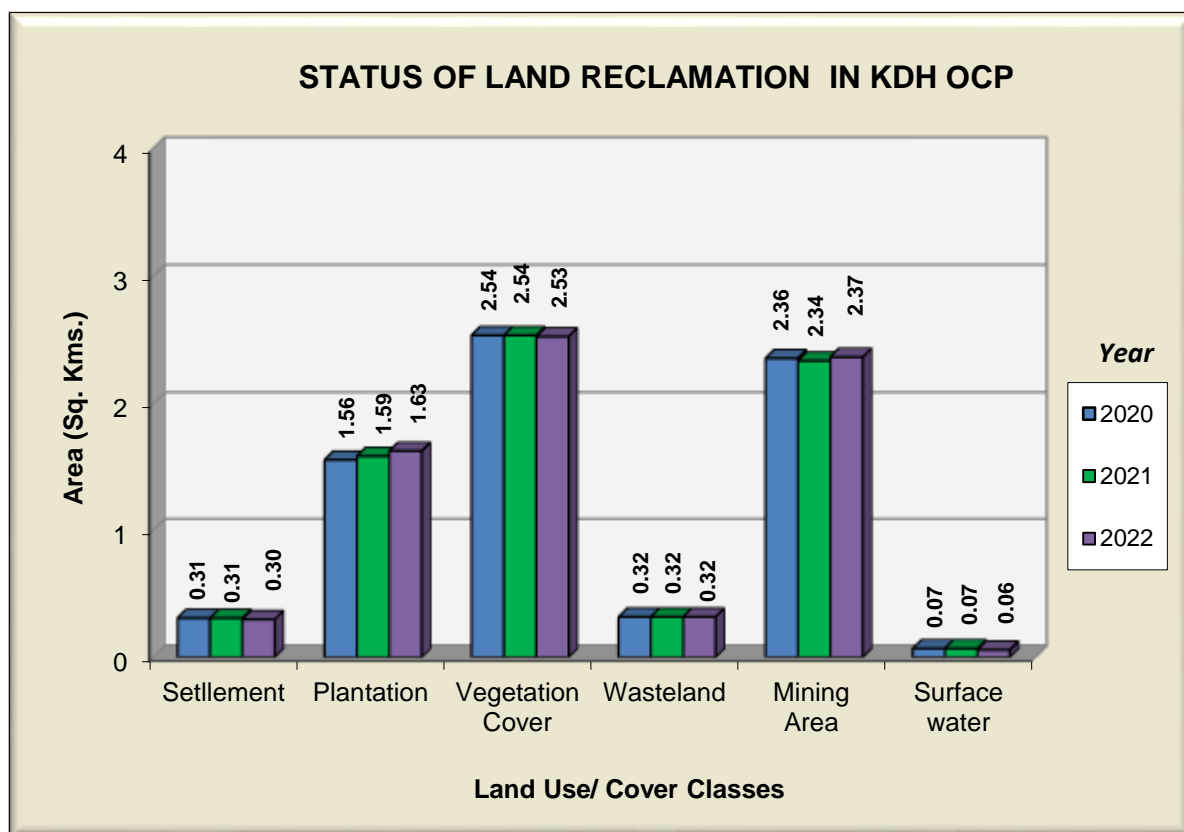


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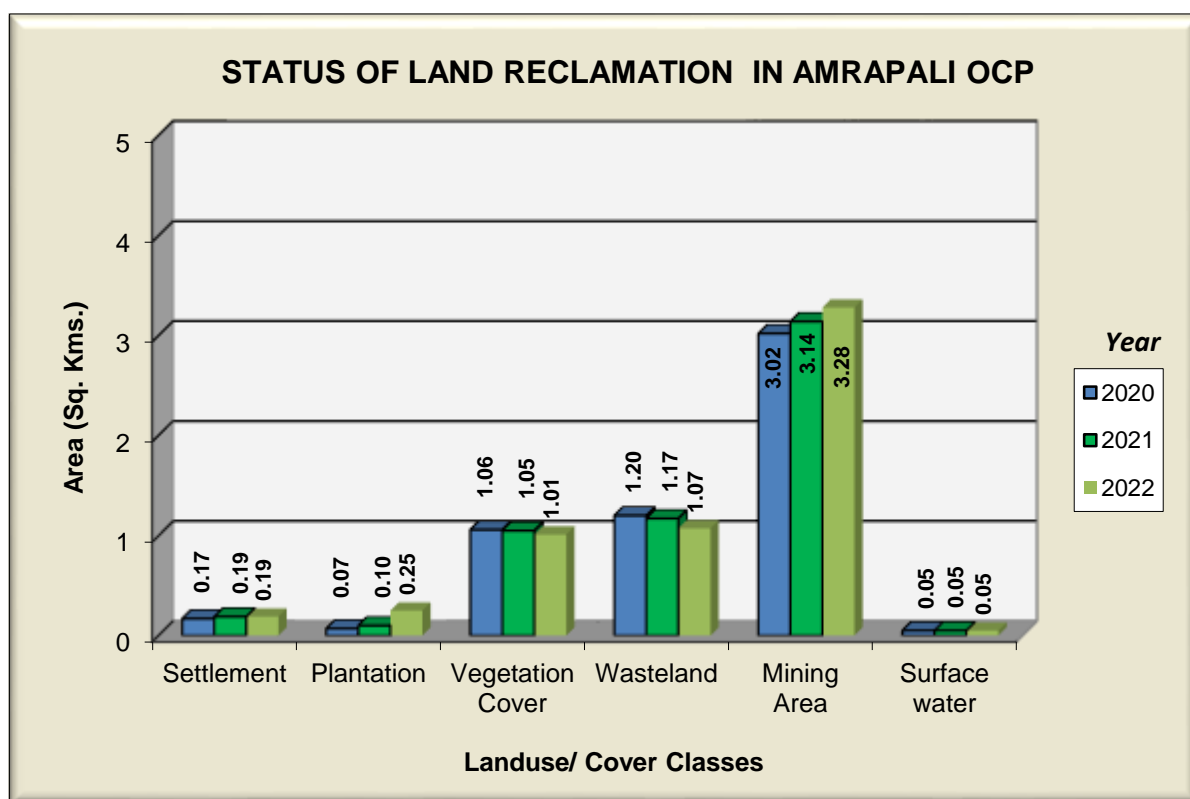


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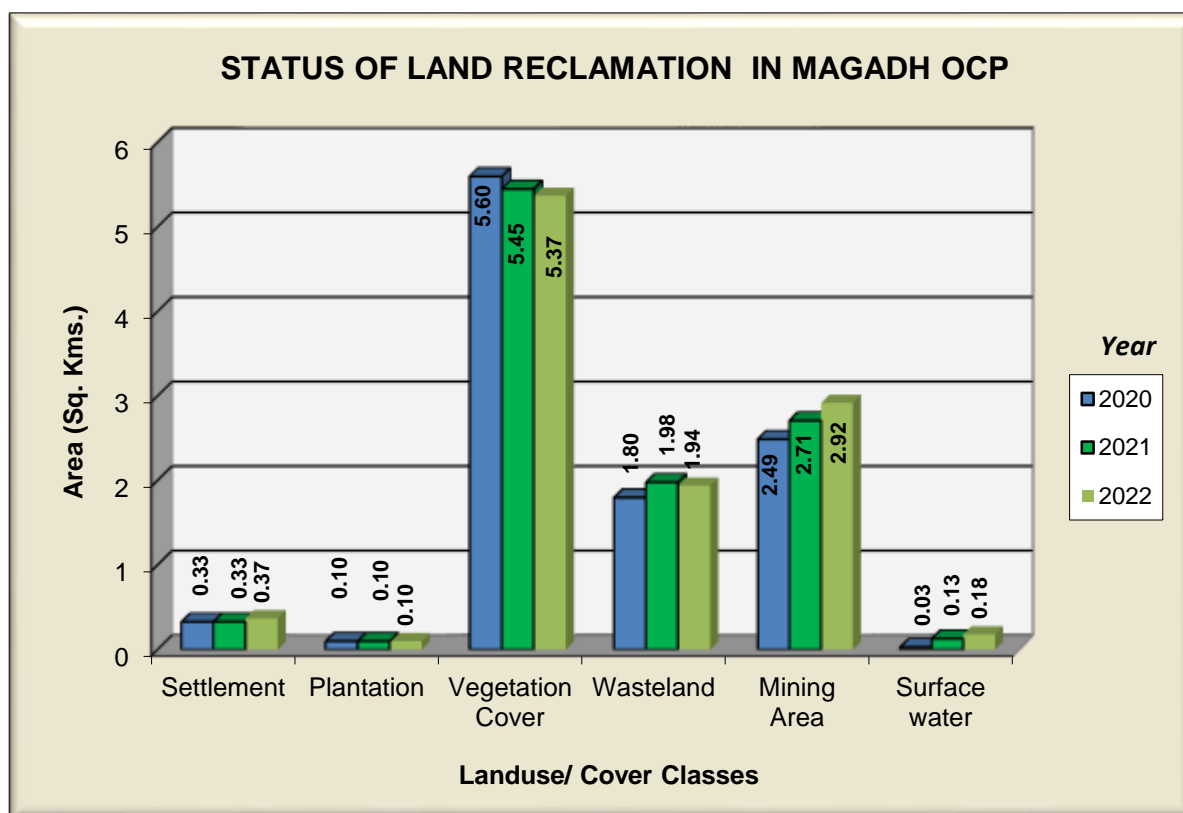


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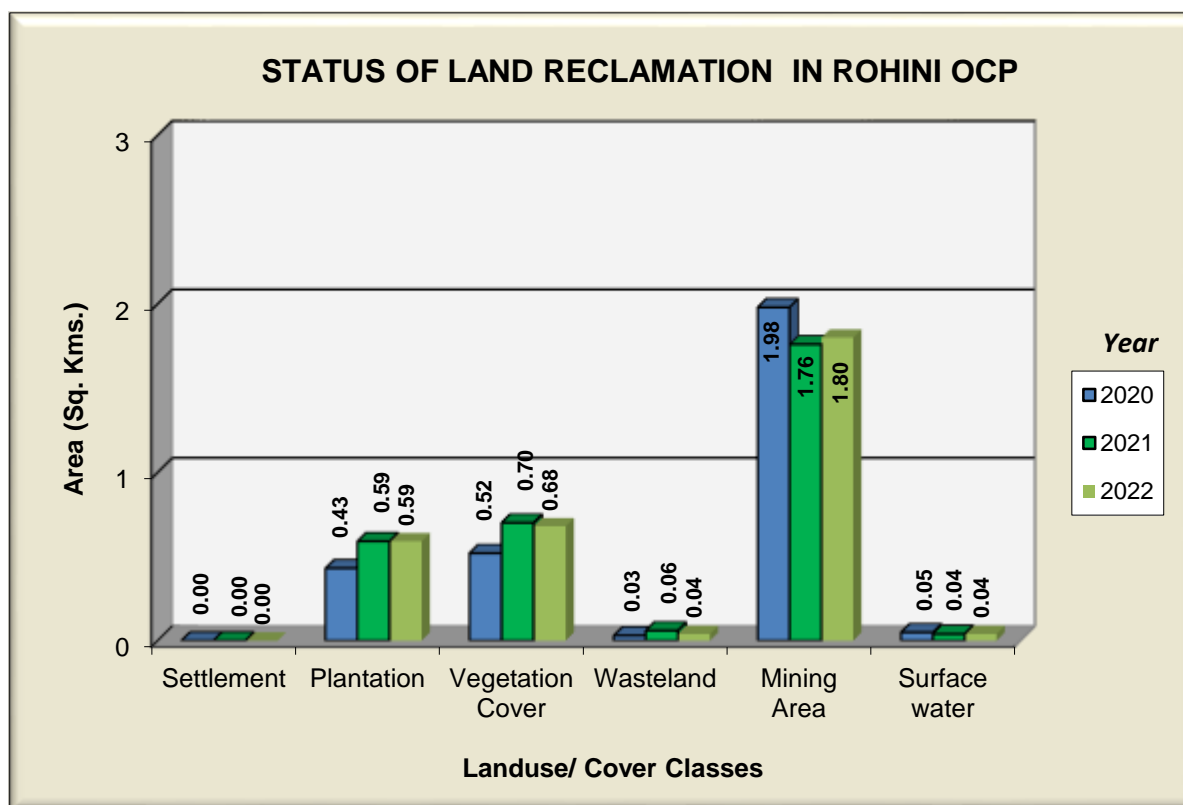


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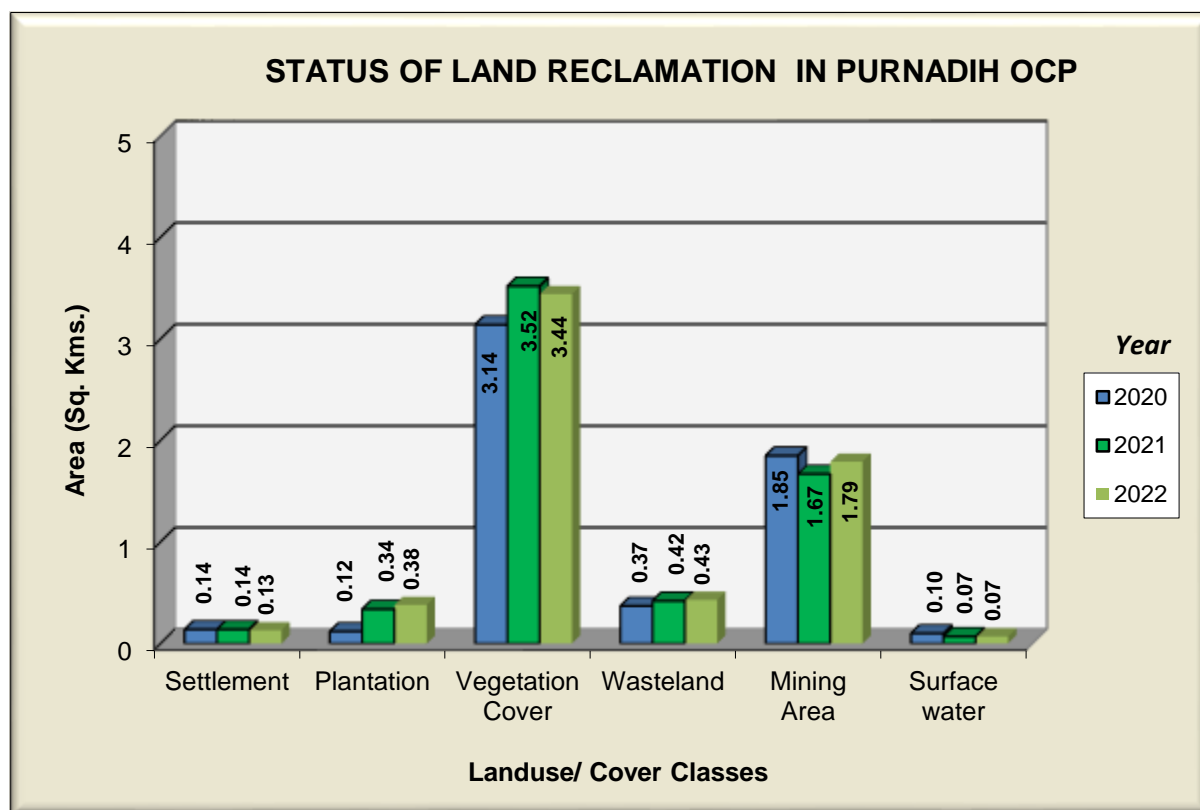


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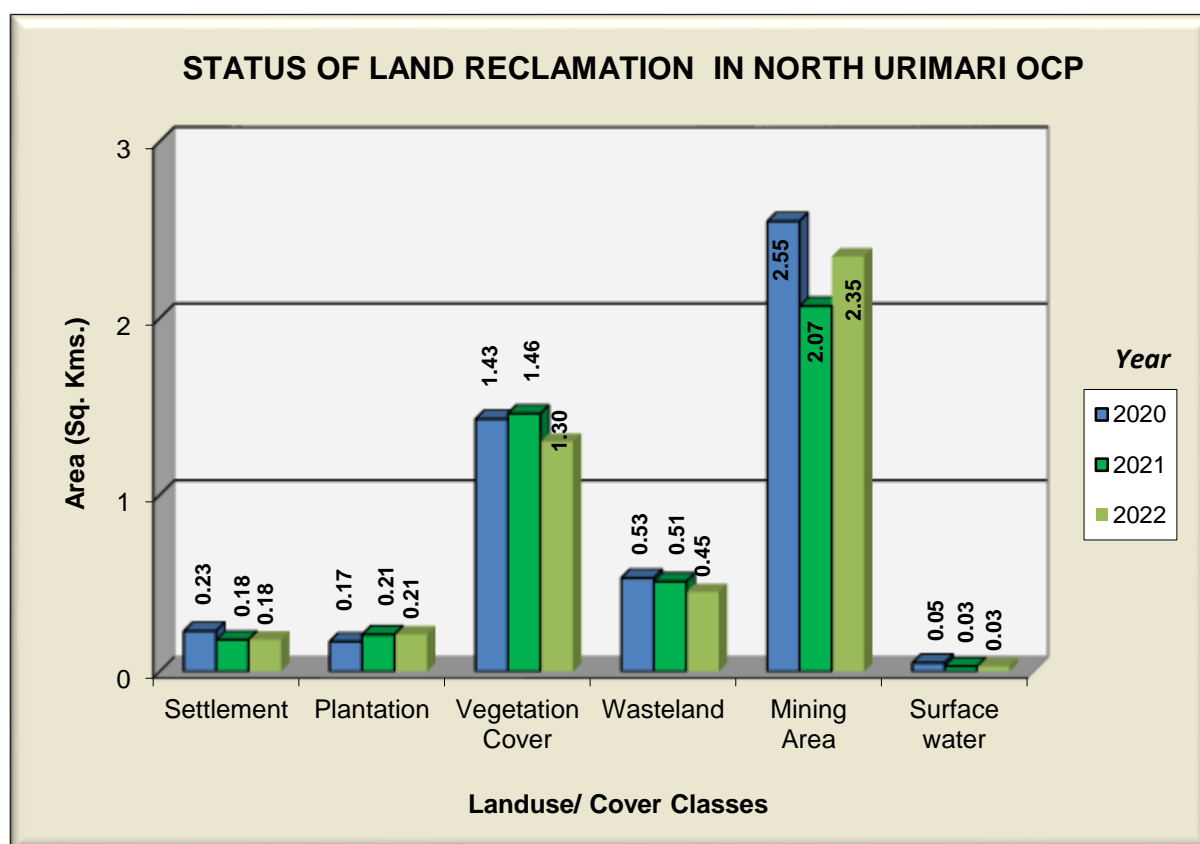


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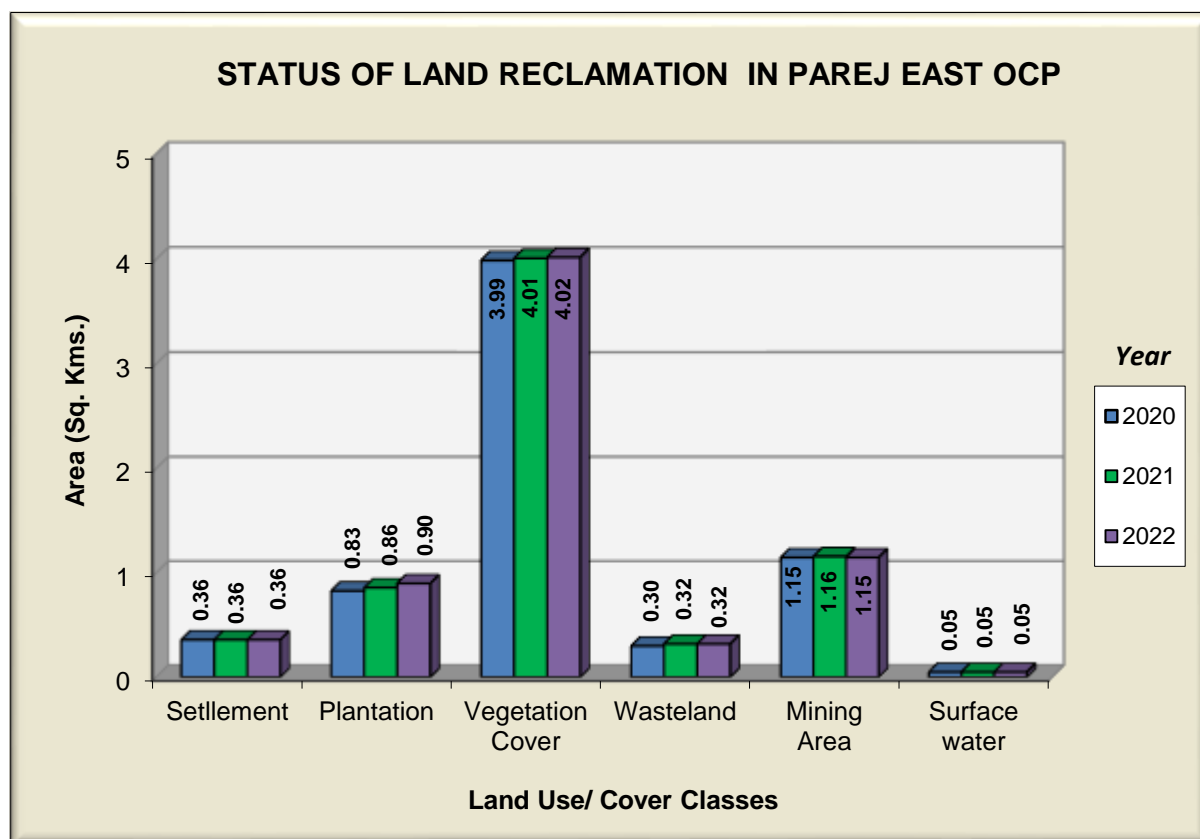


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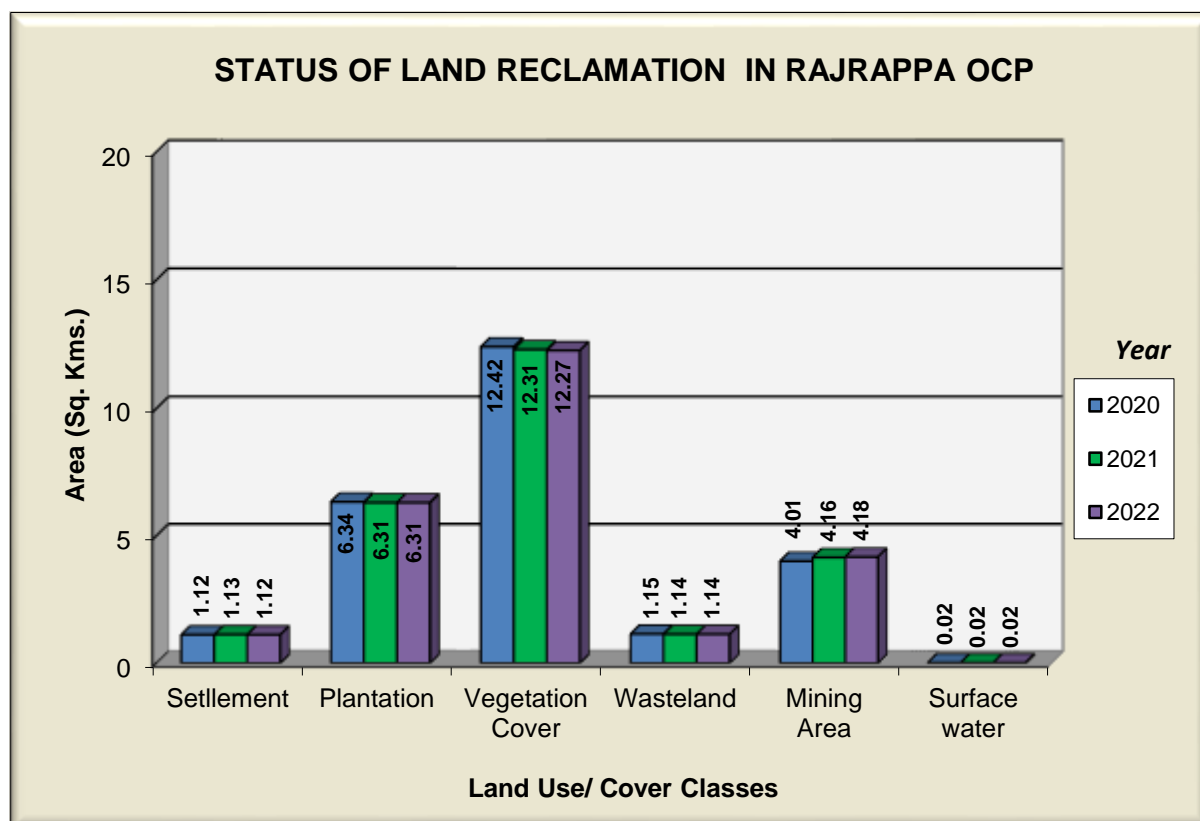


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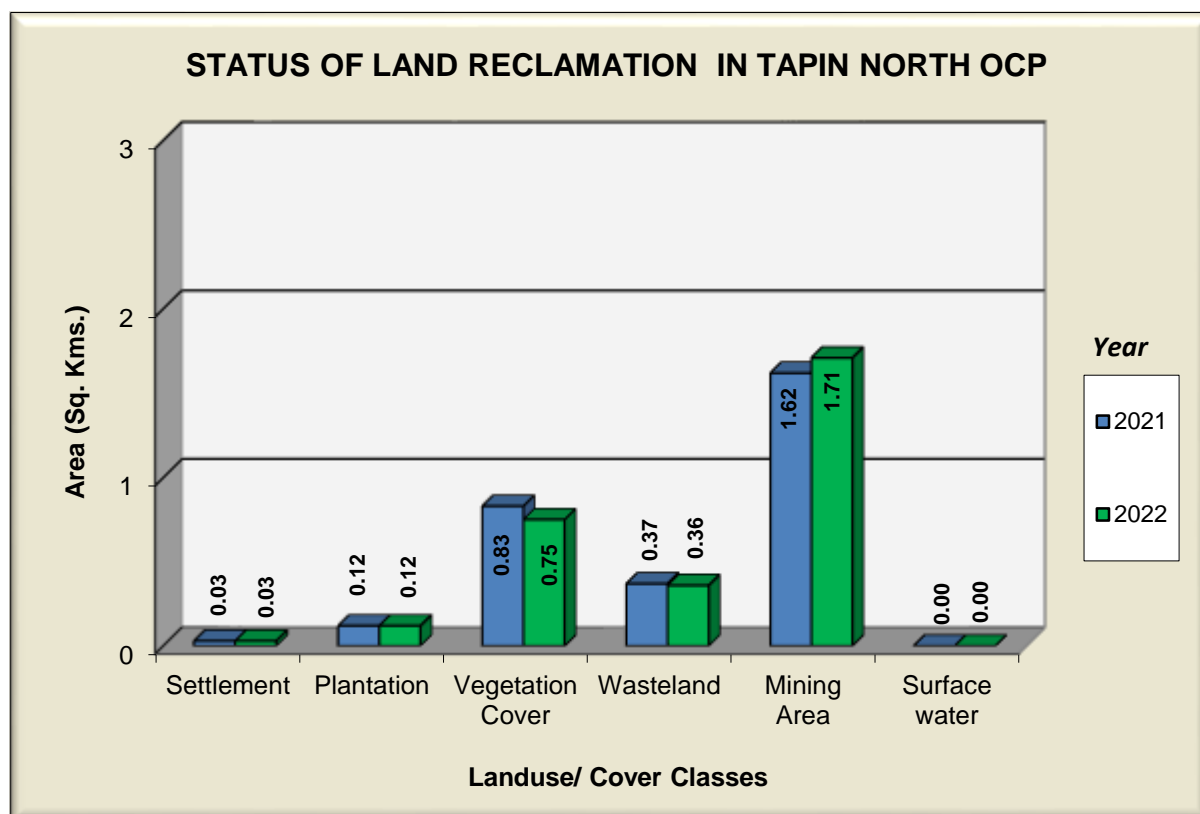


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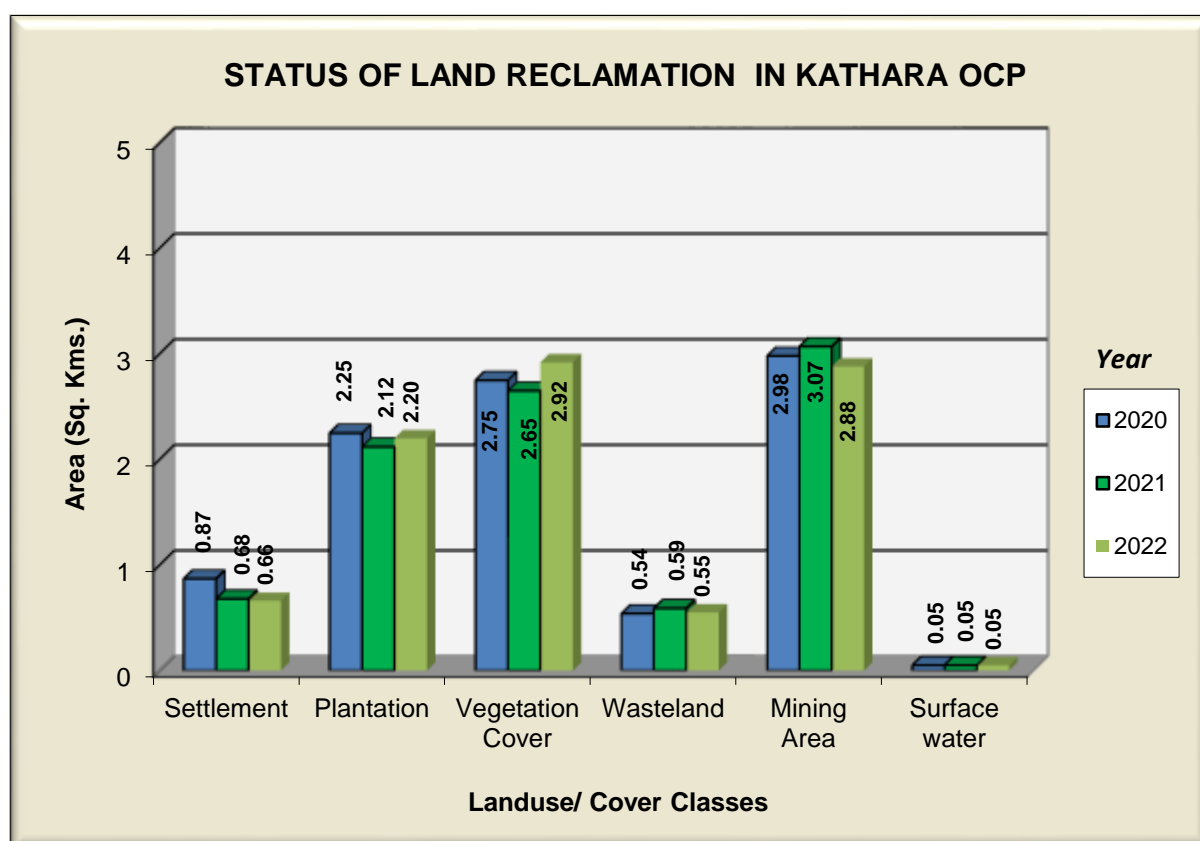


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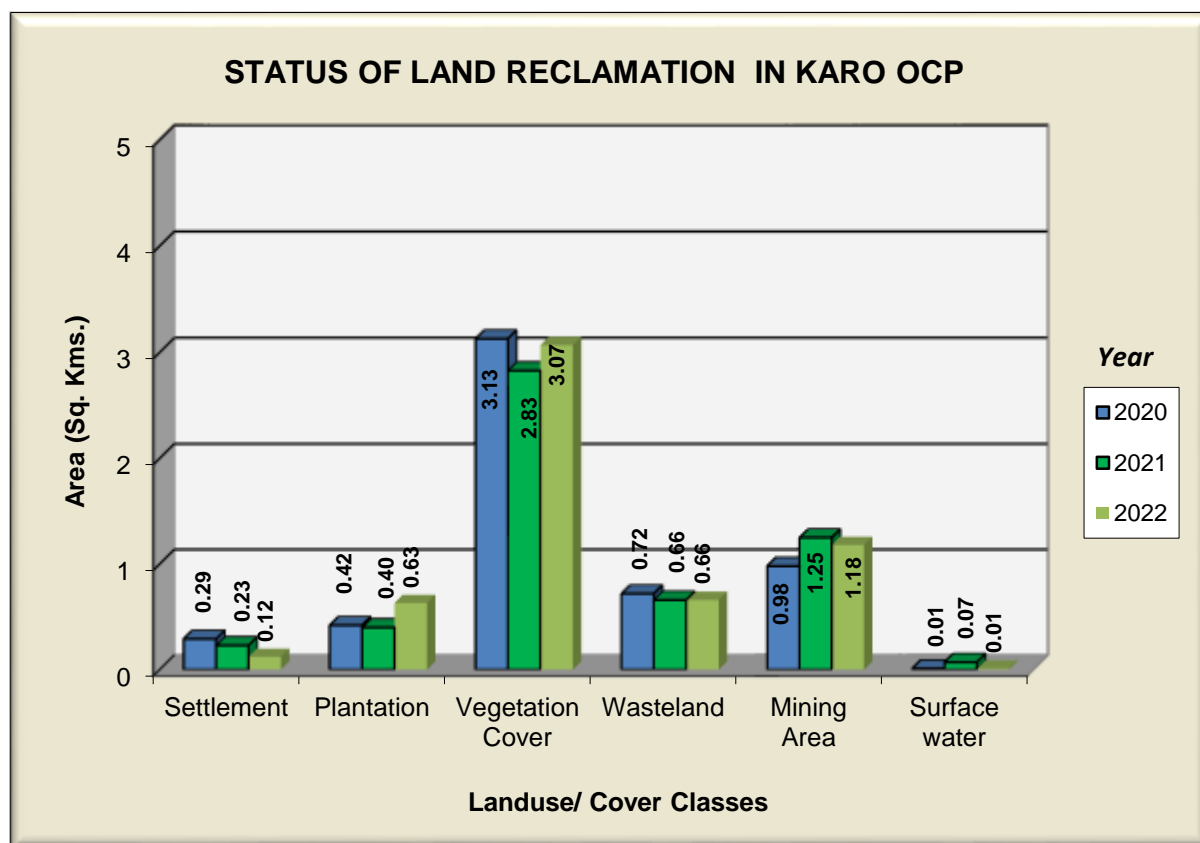


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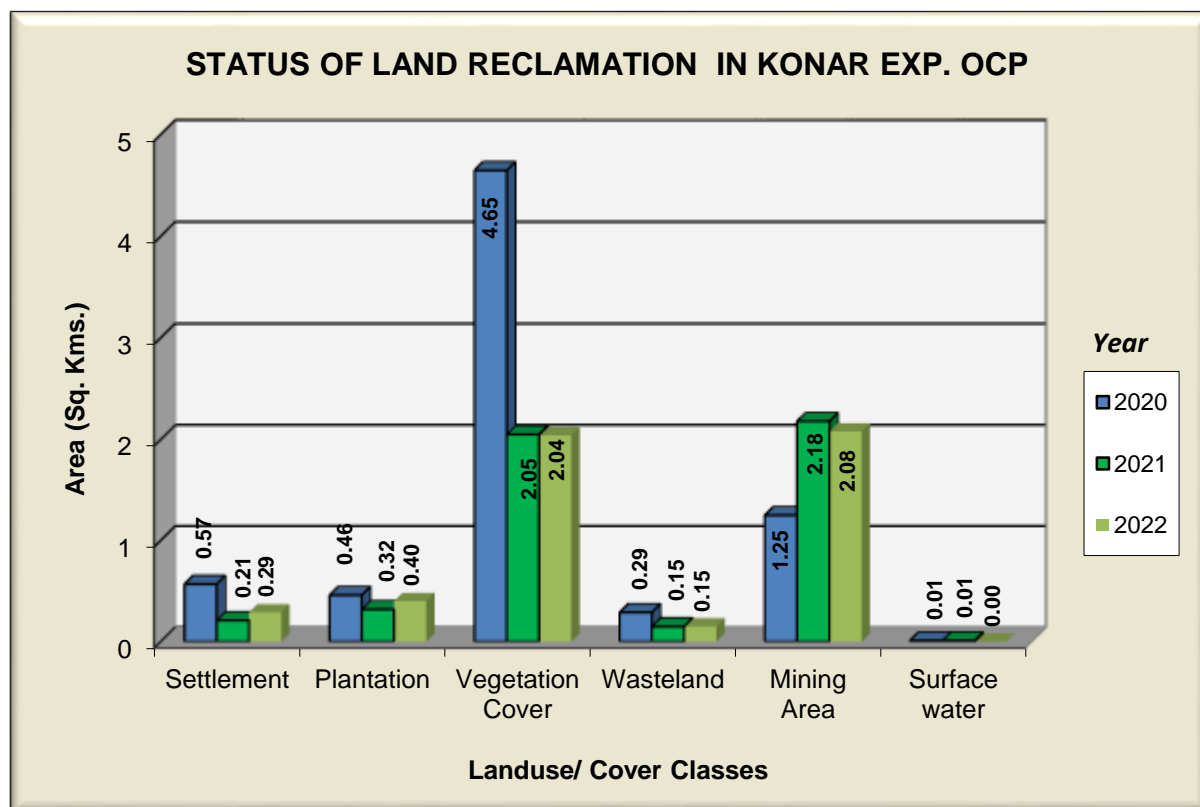
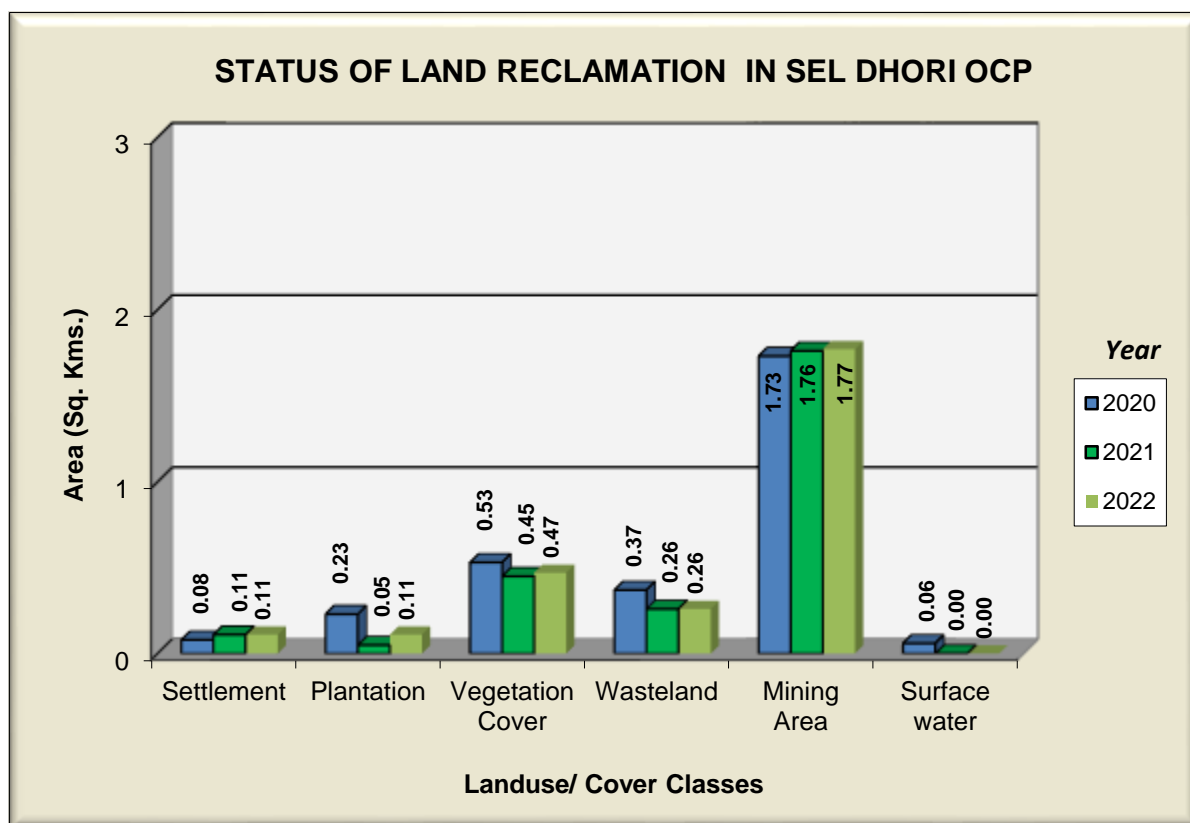


Figure 9.15

**Figure 9.16**



Photograph 9.1: **Plantation on Backfilled area - Piparwar OCP**



Photograph 9.2: **Kayakalp Vatika, Eco Restoration Park – Piparwar Area**



Photograph 9.3: **Plantation on Backfilled Area - Ashok OCP**



Photograph 9.4: **Plantation on Backfilled Area - Amarpali OCP**



Photograph 9.5: Plantation on OB Dump Area- Parej East OCP



Photograph 9.6: Plantation on Backfilled Area - Rajrappa OCP



Photograph 9.7: **Plantation on Backfilled Area- Rohini OCP**



Photograph 9.8: **Plantation on Backfilled Area- Purnadih OCP**



Photograph 9.9: **Plantation on OB Dump Area- North Urimari(Birsa) OCP**



Photograph 9.10: **Plantation on External OB Dump- Tapin North OCP**



Photograph 9.11: Social Forestry Plantation - Kathara OCP



Photograph 9.12: Plantation on Backfilled Area- Selected Dhori OCP

EASTERN COALFIELDS LIMITED

10.0 Land Reclamation Status in Eastern Coalfields Ltd.

- 10.1** Following two OC projects producing 5 million cubic m. or more (Coal + OB) annually of Eastern Coalfields Ltd. have been taken up for land reclamation based on Satellite Data of the year 2022.
- **Rajmahal OCP**
 - **Sonepur Bazari OCP**
- 10.2** Both the projects were monitored earlier during the period of 2021 also, on annual basis for assessing the progress of land reclamation.
- 10.3** Project wise Land Reclamation status in ECL for the year 2022 is given in Table-1 and shown graphically in Fig 11.1 Area statistics of different land classes present in OC projects for the year 2021 is given in Table 10.2. Land use/ cover maps derived using the satellite data are given in Plate no. 10.1 & 10.2. Changes in land use status are shown in Fig. 10.2 & 10.3.
- 10.4** Study based on Satellite data reveals that 12.98 km² (72.27%) of excavated area has come under reclamation in ECL, out of which 9.97 km² (55.51%) area is under backfilling (Technical Reclamation) and 3.01 km² (16.76%) area is under plantation (Biological Reclamation).
- 10.5** On comparing the status of land reclamation for the year 2022 with respect to the year 2021, it is seen from the analysis that the total area of land reclamation has increased from 12.20 km² (Yr. 2021) to 12.98 km² (Yr. 2022).
- 10.6** After analyzing the data of the year 2022, it is seen that the total area under plantation (Green Cover) which includes plantation carried out on backfilled area, OB dumps and plantation under social forestry/ avenue plantation in the leasehold area of two mines of ECL has increased from 5.01 km² (Yr. 2021) to 5.50 km² (Yr. 2022).
- 10.7** Of the two projects in ECL, Rajmahal OCP tops with 85.07% reclamation followed by Sonepur Bazari OCP with 60.92 % reclamation.

Table-10.1

**Project wise Land Reclamation Status in Opencast Projects of ECL based on Satellite Data
for the Year 2022**

(Projects producing more than 5 mcm of Coal+OB annually)

(Area in Sq. Kms.)

| Sl. No. | Project | Total/ Mine Lease hold Area | | Technical Reclamation | | Plantation | | | | | | Area under Active Mining | | Total Excavated Area | | Total Area under Plantation (% Green Cover Generated in Leasehold Area) | | Total Area under Reclamation | |
|---------|----------------|-----------------------------|-------|------------------------|--------|---|--------|--|------|--|------|--------------------------|--------|----------------------|-------|---|--------|------------------------------|--------|
| | | | | | | Biological Reclamation | | Other Plantations | | | | | | | | | | | |
| | | | | Area under Backfilling | | Plantation on Excavated / Backfilled Area | | Plantation on External Over Burden Dumps | | Social Forestry, Avaneue Plantation Etc. | | | | | | | | | |
| 1 | 2 | 3 | | 4 | | 5 | | 6 | | 7 | | 8 | | 9 (=4+5+8) | | 10 (=5+6+7) | | 11(=4+5) | |
| | | 2021 | 2022 | 2021 | 2022 | 2021 | 2022 | 2021 | 2022 | 2021 | 2022 | 2021 | 2022 | 2021 | 2022 | 2021 | 2022 | 2021 | 2022 |
| 1 | Rajmahal | 17.75 | 17.75 | 4.80 | 5.12 | 1.95 | 2.06 | 0.09 | 0.13 | 0.60 | 0.62 | 1.42 | 1.26 | 8.17 | 8.44 | 2.64 | 2.81 | 6.75 | 7.18 |
| | | | | 58.75% | 60.66% | 23.87% | 24.41% | | | | | 17.38% | 14.93% | | | 14.87% | 15.83% | 82.62% | 85.07% |
| 2 | Sonepur Bazari | 22.94 | 22.94 | 4.50 | 4.85 | 0.95 | 0.95 | 0.52 | 0.78 | 0.90 | 0.96 | 3.46 | 3.72 | 8.91 | 9.52 | 2.37 | 2.69 | 5.45 | 5.80 |
| | | | | 50.51% | 50.95% | 10.66% | 9.98% | | | | | 38.83% | 39.08% | | | 10.33% | 11.73% | 61.17% | 60.92% |
| | TOTAL | 40.69 | 40.69 | 9.30 | 9.97 | 2.90 | 3.01 | 0.61 | 0.91 | 1.50 | 1.58 | 4.88 | 4.98 | 17.08 | 17.96 | 5.01 | 5.50 | 12.20 | 12.98 |
| | | | | 54.45% | 55.51% | 16.98% | 16.76% | | | | | 28.57% | 27.73% | | | 12.31% | 13.52% | 71.43% | 72.27% |

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

Note: In reference to the above Table-1, different parameters are classified as follows:

1. Area under **Biological Reclamation** includes Area under Plantation done on Backfilled Area only.
2. Area under **Technical Reclamation** includes Area under Barren Backfilling only.
3. Area under **Active Mining** includes Coal Quarry, Advance Quarry Site, Quarry Filled with Water, if any. Coal Dump is excluded from Active Mining Area.
4. Social Forestry and Plantation on External OB Dumps are not included in Biological Reclamation and are put under separate categories as shown in the Table above.
5. (%) calculated in the above Table is in respect to Total Excavated Area except for "Total Area under Plantation" where % is in terms of "Leasehold Area".

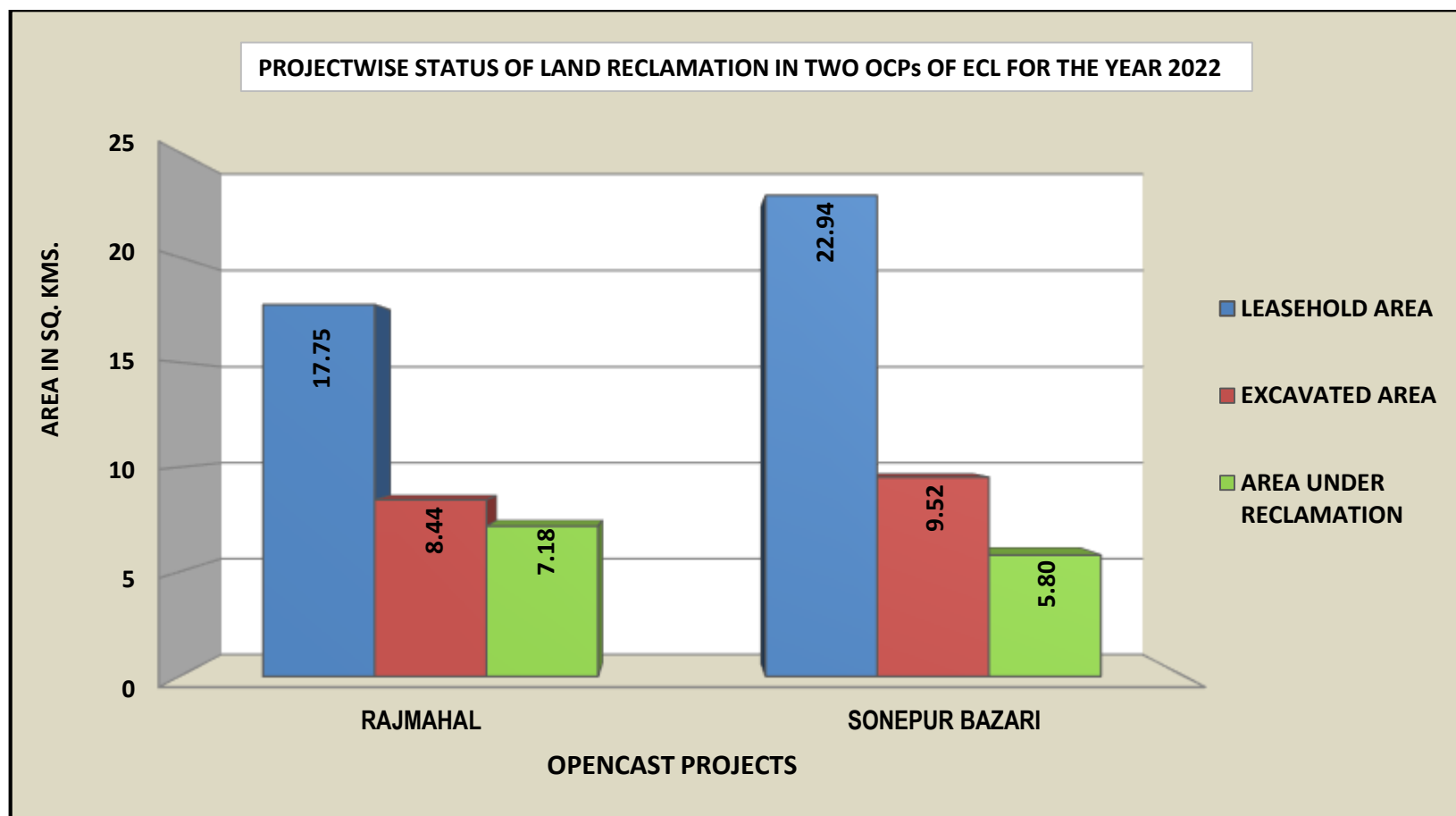
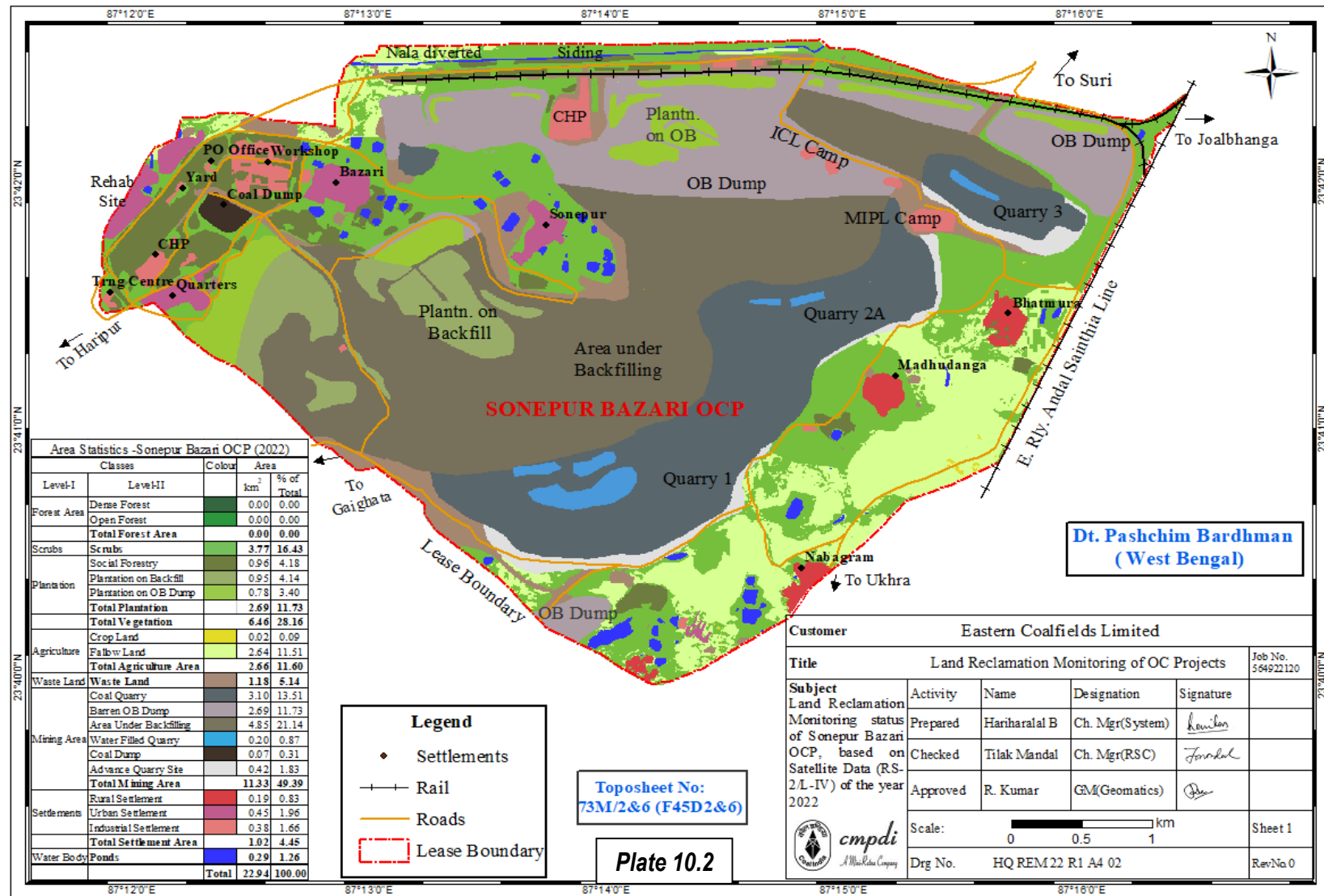


Fig. 10.1: Status of Land Reclamation in 2 OC Project of ECL - 2022

Table 10.2

**Project wise Area Statistics of Land Use / Cover in OC Mines
(> 5 mcu.m.) of ECL based on Satellite data of the Year 2022**

| (Area in Sq Km) | | | | | | | |
|-----------------|--|--------------|---------------|----------------|---------------|--------------|---------------|
| | | RAJMAHAL | | SONEPUR BAZARI | | TOTAL | |
| | | Area | % | Area | % | Area | % |
| FORESTS | Dense Forest | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Open Forest | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Total Forest(A) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Scrubs(B) | 2.35 | 13.24 | 3.77 | 16.43 | 6.12 | 15.04 |
| PLANTATION | Social Forestry | 0.62 | 3.49 | 0.96 | 4.18 | 1.58 | 3.88 |
| | Plantation on OB Dump | 0.13 | 0.73 | 0.78 | 3.40 | 0.91 | 2.24 |
| | Plantation on Backfill(Biological Reclamation) | 2.06 | 11.61 | 0.95 | 4.14 | 3.01 | 7.40 |
| | Total Plantation (C) | 2.81 | 15.83 | 2.69 | 11.73 | 5.50 | 13.52 |
| | Total Vegetation (A+B+C) | 5.16 | 29.07 | 6.46 | 28.16 | 11.62 | 28.56 |
| ACTIVE MINING | Coal Quarry | 0.72 | 4.06 | 3.10 | 13.51 | 3.82 | 9.39 |
| | Advance Quarry Site | 0.19 | 1.07 | 0.42 | 1.83 | 0.61 | 1.50 |
| | Quarry Filled With Water | 0.35 | 1.97 | 0.20 | 0.87 | 0.55 | 1.35 |
| | Area under Active Mining (D) | 1.26 | 7.10 | 3.72 | 16.21 | 4.98 | 12.24 |
| E | Coal Dump | 0.03 | 0.17 | 0.07 | 0.31 | 0.10 | 0.25 |
| | Barren OB Dump | 0.18 | 1.01 | 2.69 | 11.73 | 2.87 | 7.05 |
| | Area Under Backfilling(Technical Reclamation) | 5.12 | 28.85 | 4.85 | 21.14 | 9.97 | 24.50 |
| | Total Area under Mining Operation (D+E) | 6.59 | 37.13 | 11.33 | 49.39 | 17.92 | 44.04 |
| WASTELAND | Waste Lands | 1.32 | 7.44 | 1.18 | 5.14 | 2.50 | 6.14 |
| | Fly Ash Pond / Sand Body | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Total Wasteland | 1.32 | 7.44 | 1.18 | 5.14 | 2.50 | 6.14 |
| WATERBODIES | Reservoir, Nallah, Ponds | 0.08 | 0.45 | 0.29 | 1.26 | 0.37 | 0.91 |
| | Total Waterbodies | 0.08 | 0.45 | 0.29 | 1.26 | 0.37 | 0.91 |
| AGRICULTURE | Crop Lands | 0.65 | 3.66 | 0.02 | 0.09 | 0.67 | 1.65 |
| | Fallow Lands | 2.55 | 14.37 | 2.64 | 11.51 | 5.19 | 12.75 |
| | Total Agriculture Land | 3.2 | 18.03 | 2.66 | 11.60 | 5.86 | 14.40 |
| SETTLEMENTS | Urban Settlement | 0.44 | 2.48 | 0.45 | 1.96 | 0.89 | 2.19 |
| | Rural Settlement | 0.73 | 4.11 | 0.19 | 0.83 | 0.92 | 2.26 |
| | Industrial Settlement | 0.23 | 1.30 | 0.38 | 1.66 | 0.61 | 1.50 |
| | Total Settlement | 1.4 | 7.89 | 1.02 | 4.45 | 2.42 | 5.95 |
| | Grand Total | 17.75 | 100.00 | 22.94 | 100.00 | 40.69 | 100.00 |



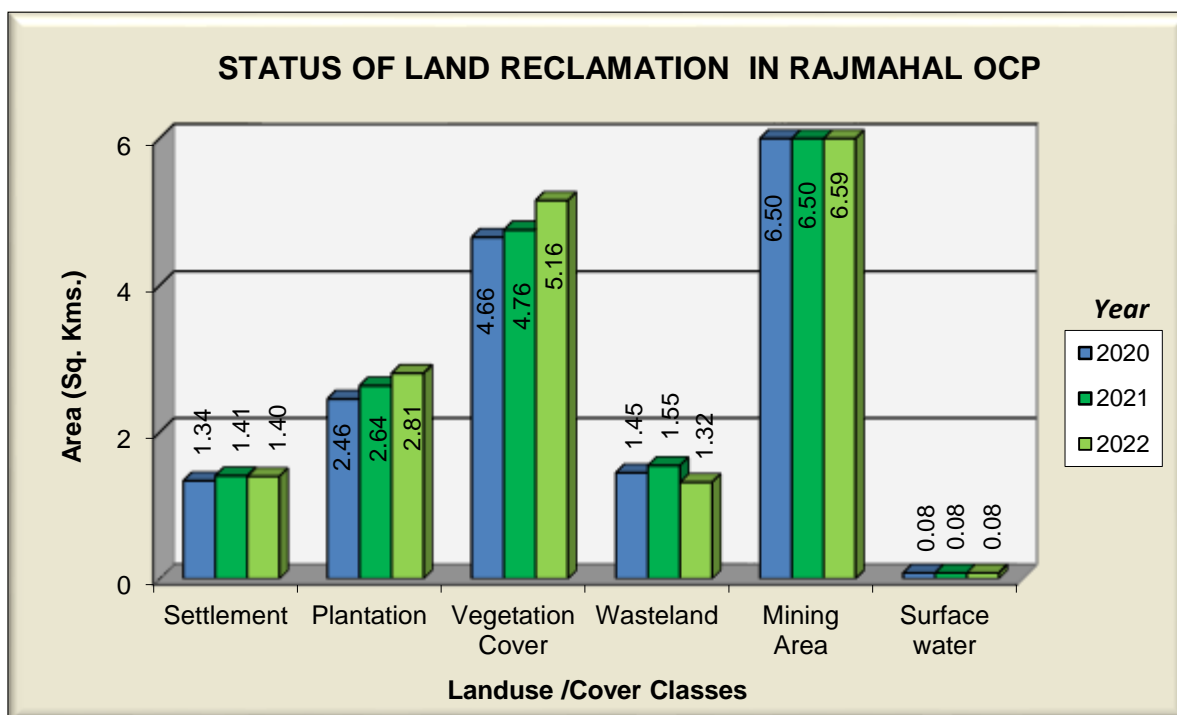


Figure 10.2

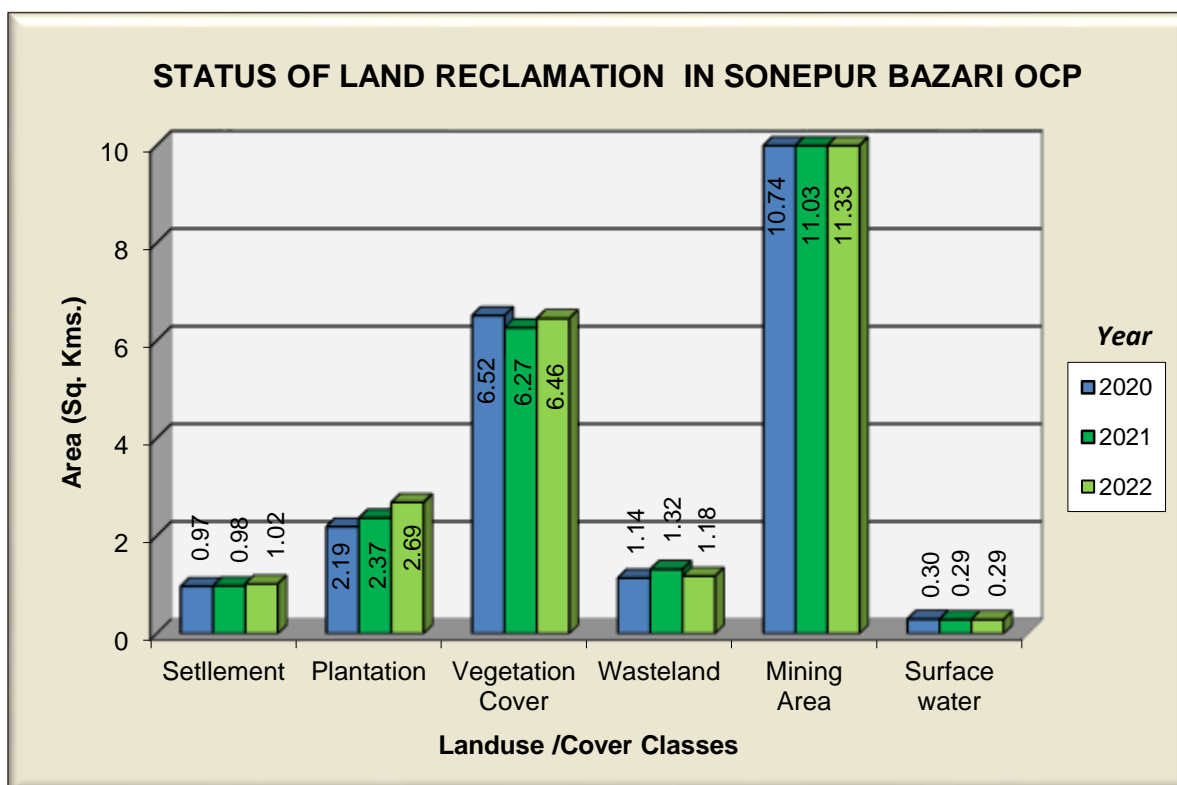


Figure 10.3



Photograph 10.1: **Plantation on Backfilled area in Rajmahal OCP, ECL**



Photograph 10.2: **Plantation on OB dump in Sonapur Bazari OCP, ECL**

ABBREVIATIONS

| | |
|-----------|--|
| Sol | Survey of India |
| MoEF & CC | Ministry of Environment, Forest & Climate Change |
| CIL | Coal India Limited |
| ECL | Eastern Coalfields Limited |
| BCCL | Bharat Coking Coal Limited |
| CCL | Central Coalfields Limited |
| WCL | Western Coalfields Limited |
| SECL | South Eastern Coalfields Limited |
| NCL | Northern Coalfields Limited |
| MCL | Mahanadi Coalfields Limited |
| NEC | North Eastern Coalfields |
| CMPDIL | Central Mine Planning & Design Institute Ltd |
| NRSC | National Remote Sensing Centre |
| R2/ R2A | ResourceSat Satellites |
| LISS - 4 | Linear Imaging and Self Scanning Sensor |
| FCC | False Colour Composite |
| OCP | Opencast Project |
| UGP | Underground Project |
| OB | Over Burden |
| GCP | Ground Control points |
| GIS | Geographic Information System |
| WGS-84 | World Geodetic System |
| UTM | Universal Transverse Mercator |

GLOSSARY

| Sl. | Term | Definition |
|-----|--------------------------|---|
| 1. | Land Reclamation | To manage, reclaim and restore mined out/ degraded land as close as possible to its original stage. |
| 2. | Over Burden | The material that lies above the coal seam/ deposit |
| 3. | Monitoring | A process of evaluation to check or keep record for a period of time. |
| 4. | Opencast Coal Mine | Open-pit mining, also known as opencast mining, is a surface mining technique that extracts minerals from an open pit in the ground. |
| 5. | Social Forestry | Social forestry is the management and protection of forests and afforestation of barren and deforested lands with the purpose of helping environmental, social and rural development. Plantation (Social/ Avenue or other) carried out outside mining area. |
| 6. | Biological Reclamation | Plantation on Backfilled areas (Stabilised Internal Dumps) |
| 7. | Technical Reclamation | Area under backfilling (Over burden dumped inside the mine voids) in mining area. |
| 8. | Green Cover Generated | Total Plantation carried out in the lease area of Project. This includes Plantation on Backfill, Plantation on OB and Social Forestry. |
| 9. | Leasehold Area | The area, for which lease is granted for the purpose of undertaking mining and allied operations. |
| 10. | Excavated area | Mined out area which includes active mining, area under backfilling and plantation on backfilled areas |
| 11. | Active Mining | Mining areas which include Coal Quarry, Advance Quarry, Quarry Filled with Water etc. |
| 12. | Environmental Protection | It is the practice of protecting the natural environment by individuals, organizations and governments. Its objectives are to conserve natural resources and the existing natural environment and, where possible, to mitigate damage and reverse trends. |
| 13. | Remedial Measure | Any measure or action required or undertaken to investigate, monitor, clean up, remove, treat, prevent, contain or otherwise remediate the presence or release of any hazardous substance or activity. |
| 14. | Systematic Error | Every measurement differing from the true measurement in the same direction, and even by the same amount in some cases. |

| | | |
|-----|-----------------------------------|---|
| 15. | Geometric Distortion | It refers to the improper positioning of any image with respect to their true geographic position when viewed in a properly scaled common image display plane. |
| 16. | Land Use/ Cover Class | Land cover is what covers the surface of the earth and land use describes how the land is used. |
| 17. | Accuracy | The closeness of agreement between a measured quantity value and a true quantity value. |
| 18. | Environmental Clearance | Environmental Clearance (EC) for any developmental projects like coal mining projects etc. has been made mandatory by the Ministry of Environment, Forests and Climate Change (MoEF & CC) through its Notification issued on 27.01.1994 under the provisions of Environment (Protection) Act, 1986. |
| 19. | Rectification and Geo-referencing | Geo-referencing is the assigning of absolute location of a data point or data points. Geo-rectification refers to the removal of geometric distortions between sets of data points, most often the removal of terrain, platform, and sensor induced distortions from remote sensing imagery. |
| 20. | Image Enhancement | It is the process of modifying digital images so that the results are more suitable for processing or further image analysis. |
| 21. | Training set selection | It is a portion of a data set used to fit or train a model for prediction or classification of values that are known in the training set, but unknown in other (future) data. |
| 22. | Image Classification | It refers to the task of extracting information classes from a multiband raster image. The resulting raster from image classification can be used to create thematic maps. |
| 23. | Temporal Changes | The 'temporal change' means the change in any entity with a period of time. |
| 24. | Ground Truthing | Collection of primary/ basic information from ground realities for satellite image interpretation and thematic mapping. |
| 25. | Cluster | Group of opencast and/ or underground mines clubbed together for administrative purposes. |
| 26. | Arc GIS | GIS Software used for Map preparation |
| 27. | ERDAS IMAGINE | Satellite Image Data Classification Software |



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