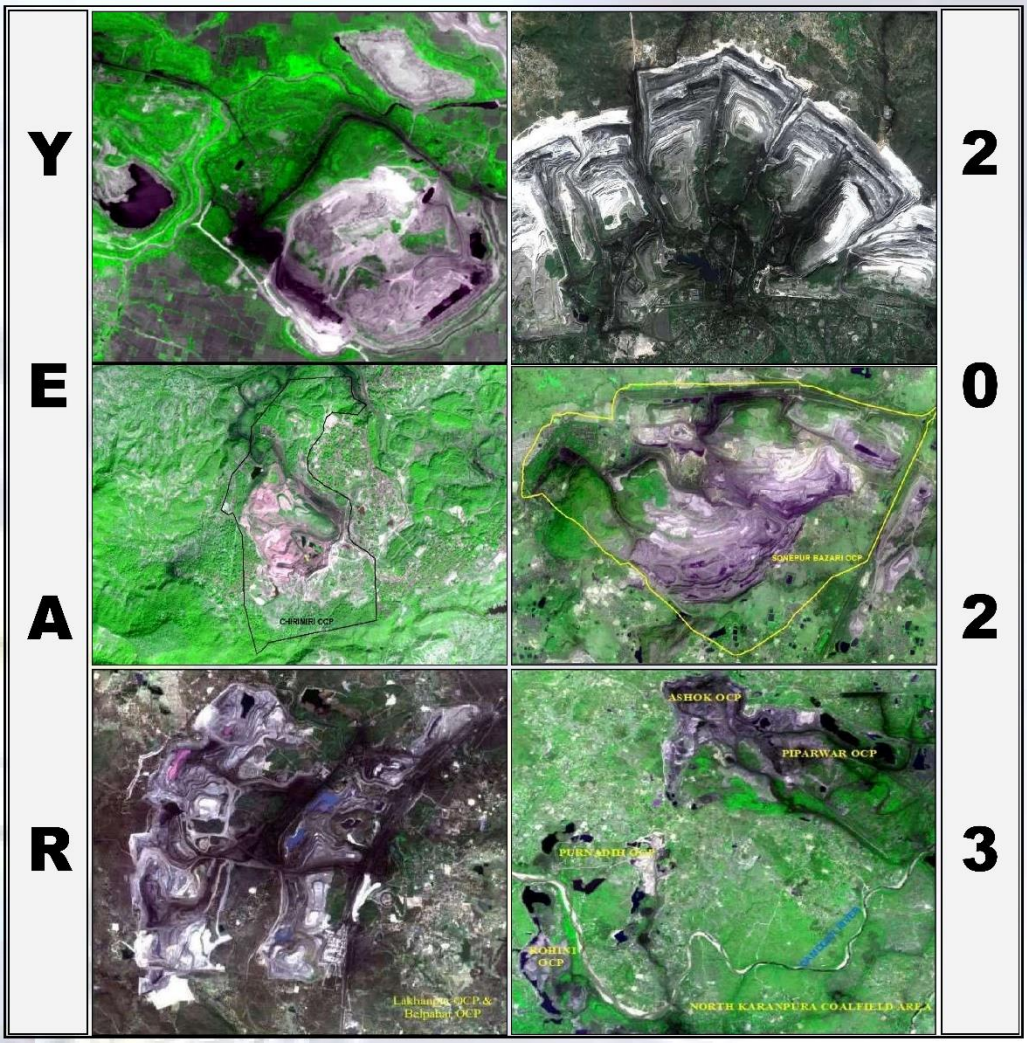
कोल इंडिया लिमिटेड के ५ मिलियन घन मीटर (कोल+ अधिभार) से अधिक उत्पादन क्षमता वाले ७६ खुली खदानों के भूमि पुनरुद्धार हेतु वर्ष २०२३ के उपग्रह डाटा के आधार पर निगरानी का वार्षिक प्रतिवेदन

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 2023



कोल इंडिया लिमिटेड के ५ मिलियन घन मीटर (कोल+ अधिभार) से अधिक उत्पादन क्षमता वाले ७६ खुली खदानों के भूमि पुनरुद्धार हेतु वर्ष २०२३ के उपग्रह डाटा के आधार पर निगरानी का वार्षिक प्रतिवेदन

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 2023

March- 2024

Remote Sensing Cell
Geomatics Division
CMPDI, Ranchi

CONTENTS

कार्यकारी सारांश

१.० प्रोजेक्ट

कोल इंडिया लिमिटेड के विभिन्न सहायक कंपनियों से संबंधित ५ मिलियन घन मीटर (कोल+ अधिभार) से अधिक उत्पादन क्षमता वाले ७६ खुली खदानों के भूमि पुनरुद्धार हेतु वर्ष २०२३ के उपग्रह डाटा के आधार पर वार्षिक निगरानी।

२.० उद्देश्य

भूमि पुनरुद्धार (लैंड रिक्लेमेशन) का उद्देश्य पट्टाक्षेत्र में बैकफील, वृक्षारोपण, सामाजिक वानिकी, सक्रिय उत्खनन क्षेत्र, जल निकाय (वाटर ड्रेनेज) बंजर भूमि, कृषि भूमि और जंगल के विभिन्न प्रकार के वितरण प्रणाली के क्षेत्र का आकलन करने के लिए है। यह अध्ययन न केवल उपरोक्त सभी खुली खदानों के भूमि पुनरुद्धार (लैंड रिक्लेमेशन) का निगरानी के प्रगति का आकलन में मदद करेगा बल्कि पर्यावरण संरक्षण के लिए आवश्यक उपचारात्मक उपायों को क्रियान्वित करने में भी सहायता करेगा।

३.० मुख्य निष्कर्ष

- कोल इंडिया द्वारा चयनित विभिन्न खदानों के निगरानी हेतु वर्ष २०२३ में कुल ७६ परियोजनयों को कोल इंडिया लिमिटेड के कार्यदेश के अनुसार उपग्रह डाटा के आधार पर भूमि पुनरुद्धार की निगरानी हेतु चुना गया।

- ७६ खुली खदानें जिनका वर्ष २०२३ के उपग्रह डाटा के आधार पर भूमि पुनरुद्धार की निगरानी हेतु चयनित किया गया है उनका कुल पट्टा क्षेत्र ८६७.३६ वर्ग किलोमीटर है तथा उत्खनन क्षेत्र ३३१.८३ वर्ग किलोमीटर है। जिसमे ५८.०६ वर्ग किलोमीटर (१७.५० %) क्षेत्र में जैविक पुनरुद्धार किया गया है, १५०.७० वर्ग किलोमीटर (४५.४१ %) क्षेत्र में तकनीकी पुनरुद्धार कार्य प्रगति पर है तथा शेष १२३.०७ वर्ग किलोमीटर (३७.०९%) क्षेत्र सक्रिय खनन के अंतर्गत आता है। उपग्रह डाटा के विश्लेषण से स्पष्ट है कि ७६ खुली खदानों के कुल उत्खनन क्षेत्र ३३१.८३ वर्ग किलोमीटर के २०८.७६ वर्ग किलोमीटर (६२.९१ %) क्षेत्र में कुल भूमि पुनरुद्धार का कार्य किया गया है । परियोजनानुसार विवरण तालिका-१ और चित्र -१ में प्रदर्शित किया गया है।

- वर्ष २०२३-२४ में विभिन्न कोयला कंपनियों के चयनित ७६ खुली खदानों का भूमि पुनरुद्धार के तुलनात्मक विश्लेषण वर्ष २०२२-२३ के सापेक्ष में करने पर पता चलता कि भूमि पुनरुद्धार का क्षेत्र वर्ष २०२२-२३ के १९९.४७ वर्ग किलोमीटर की तुलना में वर्ष २०२३-२४ में बढ़कर २०८.७६ वर्ग किलोमीटर हो गया है। कुल भूमि पुनरुद्धार में जैविक और तकनीकी पुनरुद्धार दोनों ही शामिल है। वर्ष २०२३-२४ में कुल भूमि पुनरुद्धार में ९.२९ वर्ग किलोमीटर की यह वृद्धि पर्यावरण संरक्षण की दिशा में कोल

इंडिया के विभिन्न सहायक कम्पनियों द्वारा पर्यावरण सरंक्षण की दिशा में किए गए सतत प्रयास का परिणाम है। जिनका परियोजनानुसार विवरण चित्र -२ में दर्शाया गया है।

- यह देखा गया है कि कोल इंडिया के प्रायः: सभी सहायक कंपनियों के उत्खनन क्षेत्र में तकनीकी पुनरुद्धार के बढ़ते हुए रुझान का पता चलता है। वर्ष २०२२ और वर्ष २०२३ के उपग्रह डाटा के तुलनात्मक विश्लेषण से यह पता चलता है कि वर्ष २०२३ में तकनीकी पुनरुद्धार के क्षेत्र में कुल समग्र वृद्धि ६.५५ वर्ग किलोमीटर का आकलन किया गया है।

- वर्ष २०२३ के उपग्रह डाटा के विश्लेषण से यह पता चलता है कि वर्ष २०२२ -२३ में डब्लूसीएल, एसईसीएल, एनसीएल, सीसीएल और ई.सी.एल. में वर्ष २०२२-२३ की तुलना में जैविक पुनरुद्धार के अंतर्गत क्षेत्र में वृद्धि पाई गई। एमसीएल में जैविक पुनरुद्धार के अंतर्गत क्षेत्र में थोड़ी कमी पाई गई, जो कि तालिका-१ से पूर्णतः स्पष्ट हो जाता है।

- यह भी पाया गया है कि कोल इंडिया की सहायक कंपनियाँ डब्लूसीएल, एनसीएल, सीसीएल और ईसीएल के पट्टाक्षेत्र में कुल वृक्षारोपण (हरित क्षेत्र) जिसमें बैकफील, अधिभार डंपिंग क्षेत्र में वृक्षारोपण तथा सामाजिक वानिकी के अंतर्गत वृक्षारोपण सम्माहित है इनमें वृद्धि दर्ज किया गया है। जबकि एसईसीएल और एमसीएल के कुल हरित क्षेत्र में थोड़ी कमी का मुख्य कारण अधिभार का हरित क्षेत्र पर डालना या डम्पिंग, नए रोड बनना इत्यादि हो सकता है। विश्लेषण के अनुसार २०२३ -२४ में कोल इंडिया के सभी सहायक कोयला कंपनियों के तहत आनेवाले परियोजनाओं के कुल पट्टाक्षेत्र में १९.२१ प्रतिशत हरित क्षेत्र (कुल बृक्षा रोपण) के अंतर्गत पाया गया है।

- वर्ष २०२३ के उपग्रह डाटा के विश्लेषण से यह पता चलता है कि कोल इंडिया के प्रायः सभी सहायक कंपनियों के भूमि पुनरुद्धार मे बढ़ोतरी हुई है। वर्ष २०२३-२४ में विभिन्न कोयला कंपनियों के चयनित ७६ खुली खदानों का भूमि पुनरुद्धार के तुलनात्मक विश्लेषण वर्ष २०२२-२३ से करने पर पता चलता कि भूमि पुनरुद्धार का क्षेत्र वर्ष २०२२ के १९९.४७ (६३.१४ %) वर्ग किलोमीटर की तुलना में वर्ष २०२३ में बढ़कर २०८.७६ (६२.९१ %) वर्ग किलोमीटर हो गया ।

  वर्ष २०२३ के उपग्रह डाटा के आधार पर चयनित खुली खदानों के वार्षिक निगरानी से संबन्धित विश्लेषण, पाई चार्ट के माध्यम से चित्र – १ में दर्शाया गया है। २०२३ में कोल इंडिया की सहायक कंपनियों में भूमि पुनरुद्धार की स्थिति बार चार्ट के द्वारा चित्र – २ में दर्शाया गया है। २०२१ से २०२३ के वर्षों में भूमि पुनरुद्धार और हरित क्षेत्र की स्थिति को बार चार्ट के द्वारा क्रमश: चित्र – ३ और ४ में दर्शाया गया है।

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 2023, amongst projects of different subsidiaries of Coal India Ltd. taken up 76 opencast mines for monitoring.

- Out of the total mine leasehold area of 867.36 Km^2 of the 76 OC projects considered for monitoring during 2023-24; total excavated area is 331.83 Km^2; out of which 150.70 Km^2 area (45.41%) is under backfilling (Technical Reclamation), 58.06 Km^2 area (17.50%) has been planted (Biologically Reclaimed) and 123.07 Km^2 area (37.09%) is under active mining. It is evident from the analysis that 208.76 Km^2 (62.91%) area out of the total excavated area of 331.83 Km^2 of the 76 OC projects is already under reclamation and balance 123.07 Km^2 (37.09%) 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 2022-23 with respect to year 2023-24 in the 76 Opencast projects of different CIL subsidiaries, it is evident from the analysis that area under land reclamation has increased from 199.47 Km^2 (Yr. 2022-23) to 208.76 Km^2 (Yr. 2023-24), which includes both area under plantation (Biological Reclamation) and areas under backfilling (Technical Reclamation). This increase of 9.29 Km^2 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 2022, it has been found that there has been an overall increase of 6.55 Km^2 in area under technical reclamation commutatively in the year 2023.

- It has been observed that in WCL, SECL, NCL, CCL & ECL area under biological reclamation has increased in comparison to previous year. In MCL biological reclamation has marginally reduced. (Refer Table-1).

- In has been also observed that in subsidiaries like WCL, 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 SECL and MCL, there has been marginal decrease in area under green cover due to fresh dumping activities, construction of roads and mine advancement in some projects. All these factors have contributed for decrease in Green Cover in SECL and MCL projects.

  Overall 19.21% 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 2023.

- Analysis of the results based on satellite data of the year 2023 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 199.47 Km^2 (63.14%) in 2022 to 208.76 Km^2 (62.91%) in the year 2023.

  Commutative Status of Land Reclamation monitoring based on satellite data of the year 2023 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 2023 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 2022 to 2023 has been shown in form of Bar- Chart in Fig 3.

Table-1

Subsidiaries wise Land Reclamation Status in OC projects of CIL based on Satellite Data of year 2023

(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, Avanue Plantation Etc.									
1	*2*	*3*		*4*		*5*		*6*		*7*		*8*		*9 (=4+5+8)*		*10 (=5+6+7)*		*11(=4+5)*	
		2022	***2023***	***2022***	***2023***	***2022***	***2023***	***2022***	***2023***	***2022***	***2023***	***2022***	***2023***	***2022***	***2023***	***2022***	***2023***	***2022***	***2023***
1	**WCL (14)**	150.99	150.99	11.87	12.26	4.23	4.24	14.99	15.91	10.26	10.55	21.07	22.79	37.17	39.29	29.48	30.70	16.10	16.50
				31.93%	31.20%	11.38%	10.79%					56.69%	58.00%			19.52%	20.33%	43.31%	42.00%
2	**SECL (19)**	199.51	199.51	36.51	38.20	19.75	19.82	11.89	11.22	9.57	9.56	22.29	24.39	78.55	82.41	41.21	40.60	56.26	58.02
				46.48%	46.35%	25.14%	24.05%					28.38%	29.60%			20.66%	20.35%	71.62%	70.40%
3	**NCL (10)**	184.18	184.18	37.54	38.20	11.84	14.43	19.00	20.17	23.71	21.64	31.62	32.22	81.00	84.85	54.55	56.24	49.38	52.63
				46.35%	45.02%	14.62%	17.01%					39.04%	37.97%			29.62%	30.54%	60.96%	62.03%
4	**MCL (16)**	179.75	182.12	29.58	32.89	8.06	7.94	3.24	3.05	3.99	3.83	25.61	27.68	63.25	68.51	15.29	14.82	37.64	40.83
				46.77%	48.01%	12.74%	11.59%					40.49%	40.40%			8.51%	8.14%	59.51%	59.60%
5	**CCL (15)**	113.86	109.87	18.68	18.74	8.43	8.60	5.19	5.18	4.83	4.78	10.88	10.81	37.99	38.15	18.45	18.56	27.11	27.34
				49.17%	49.12%	22.19%	22.54%					28.64%	28.34%			16.20%	16.89%	71.36%	71.66%
6	**ECL (02)**	40.69	40.69	9.97	10.41	3.01	3.03	0.91	1.02	1.58	1.62	4.98	5.18	17.96	18.62	5.50	5.67	12.98	13.44
				55.51%	55.91%	16.76%	16.27%					27.73%	27.82%			13.52%	13.93%	72.27%	72.18%
	TOTAL (76)	**868.98**	**867.36**	**144.15**	**150.70**	**55.32**	**58.06**	**55.22**	**56.55**	**53.94**	**51.98**	**116.45**	**123.07**	**315.92**	**331.83**	**164.48**	**166.59**	**199.47**	**208.76**
				45.63%	**45.41%**	**17.51%**	**17.50%**					**36.86%**	**37.09%**			**18.93%**	**19.21%**	**63.14%**	**62.91%**

(% 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.

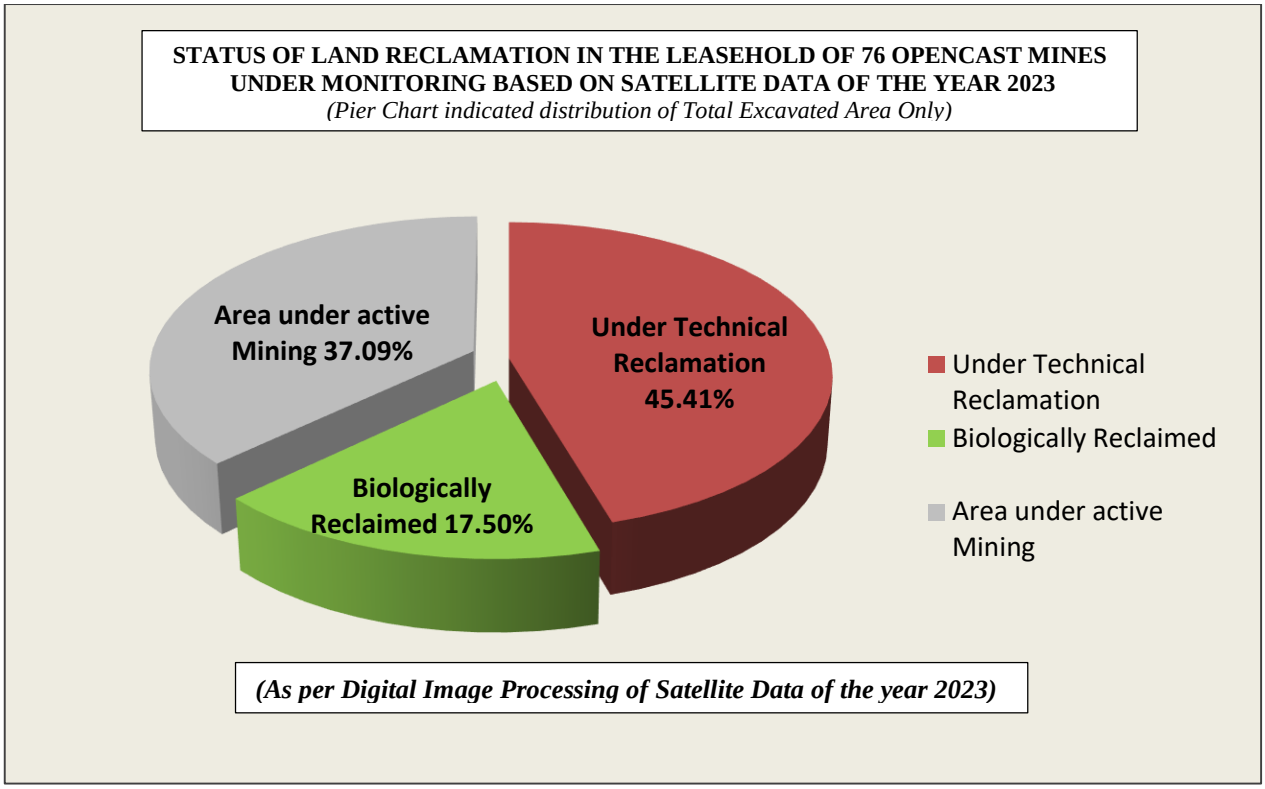


Fig.1 : **Pie Chart showing Status of Land Reclamation in CIL Subsidiaries**

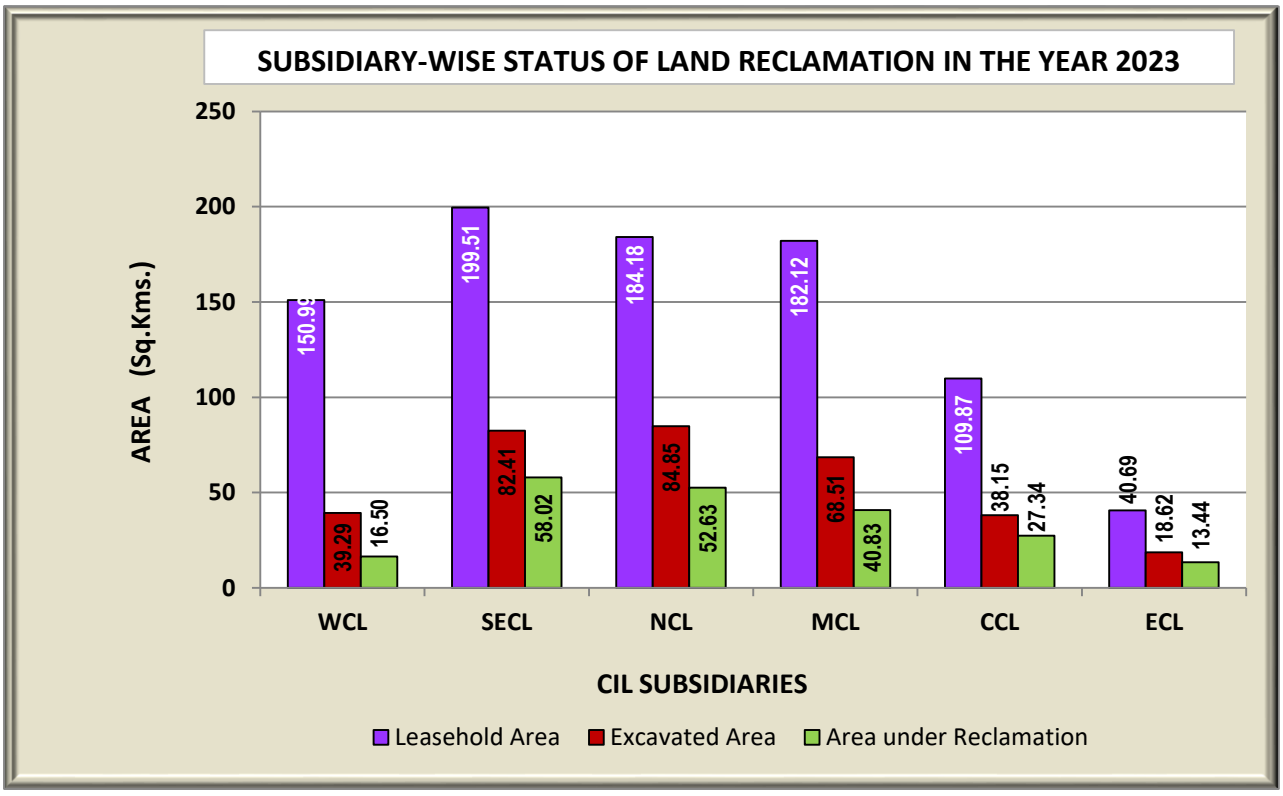


Fig. 2 : **Company wise Land Reclamation Status in the Year 2023**

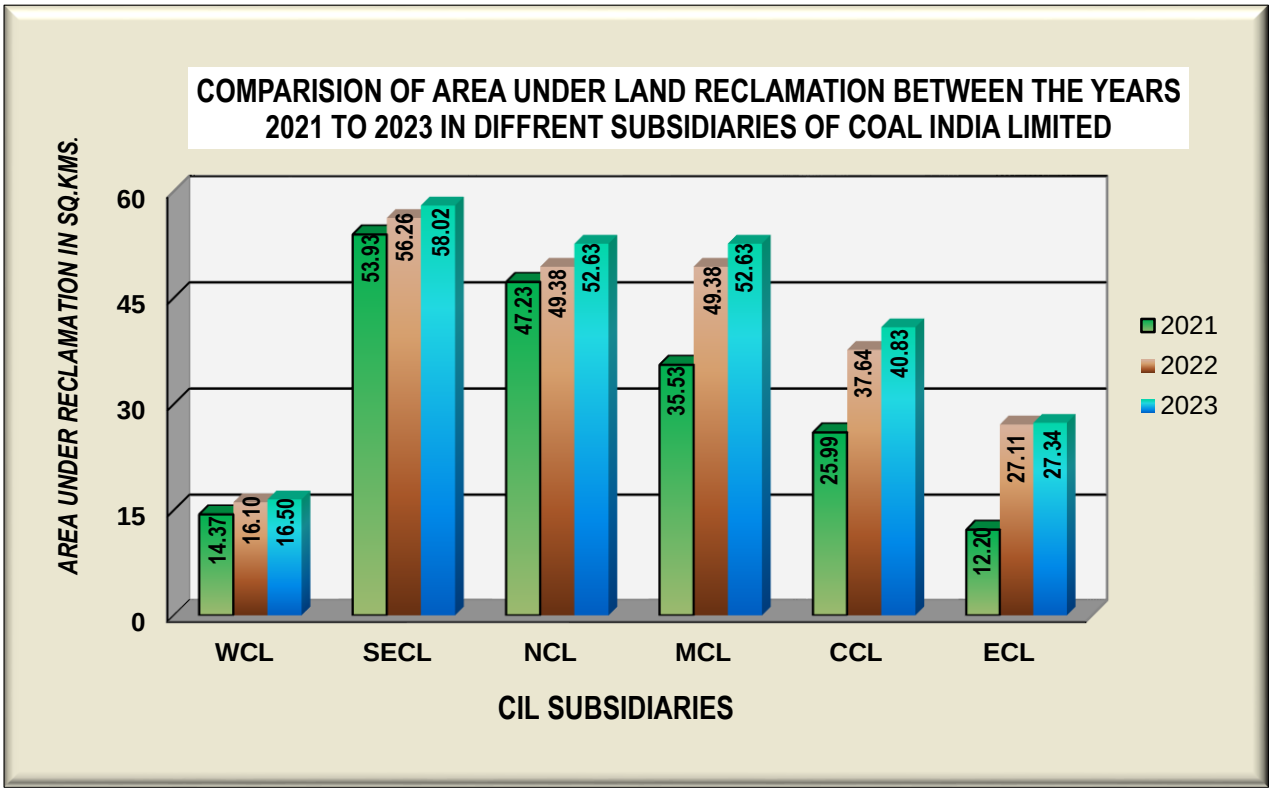


Fig. 3 : **Comparision for Area under Land Reclamation between 2021 to 2023**

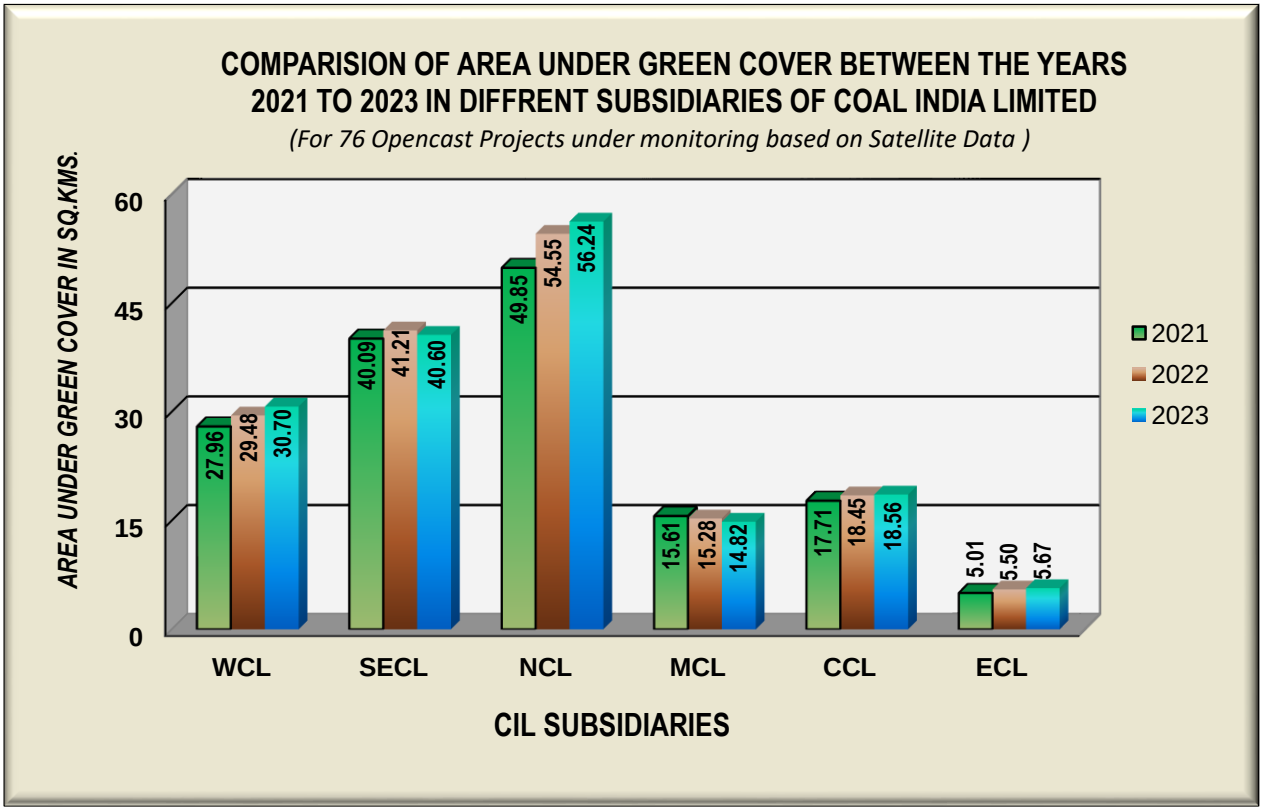


Fig. 4 : **Comparision for Area under Green Cover in subsidiaries between 2021 to 2023**

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 m^3 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/ENVT/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 2023-24. 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.

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, 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:

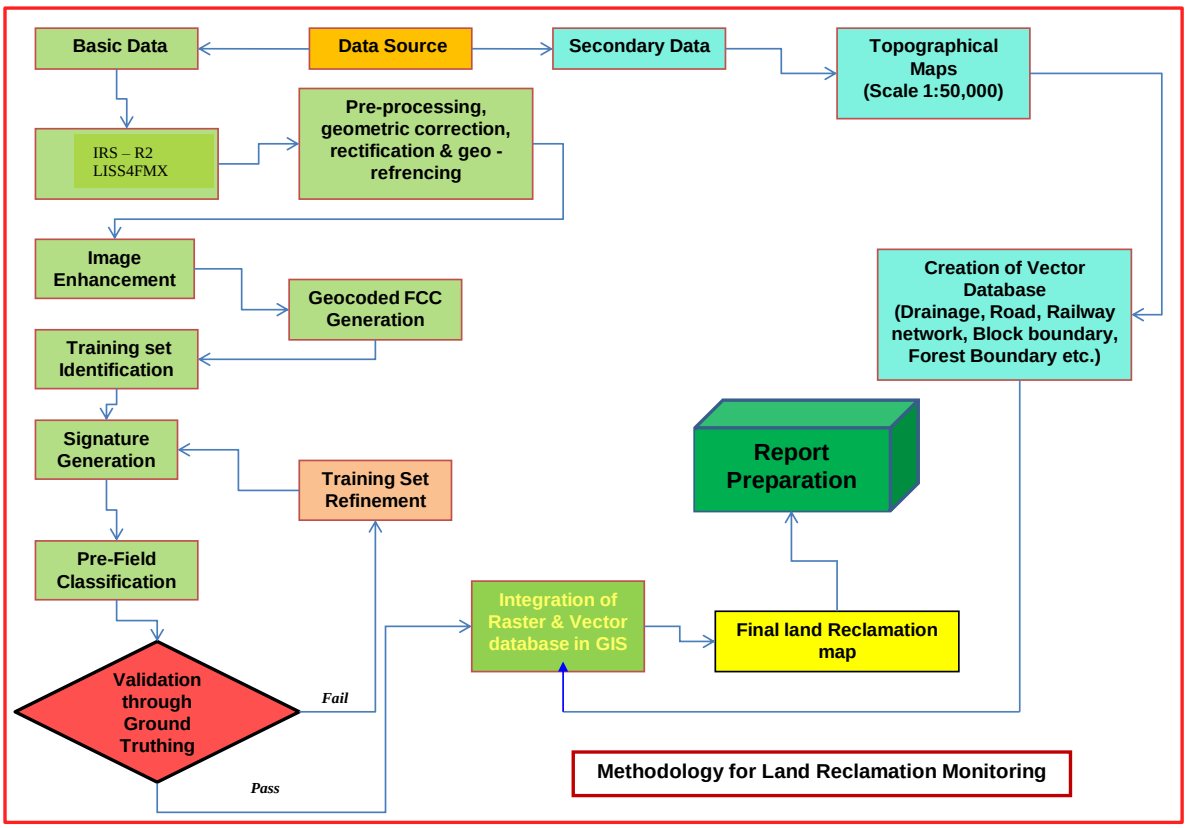


Fig.3: Methodology for Land Reclamation Monitoring

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 v 2022 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 SoI (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 v 2022 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 v 2022 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 2023-24 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, Bishrampur, Sohagpur, 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 2023 is given in table below:

Subsidiary *(No. of Projects)*	**Opencast Projects** *(5 million Cu.m. Coal +OB or more per annum)*
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 Dhori
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 2023 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 2023:

- 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 2023 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 2023 are shown in the Table - 5.2. 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 16.50 Km^2 (42.00%) of excavated area has been under reclamation in the above-mentioned mines of WCL out of which 4.24 Km^2 (10.79%) area has been revegetated and 12.26 Km^2 (31.20%) area is under backfilling. There is an overall

increase of 0.40 Km^2 in area under reclamation in WCL in the year 2023 with respect to the year 2022, out of which there is an increase of 0.39 Km^2 in area under technical reclamation (Area Under Backfilling) and an increase of 0.01 Km^2 in area under biological reclamation (Plantation on Backfilled Areas) (Refer Table 5.1). In Sasti OC project, plantation on OB has been reduced by 0.02 Km^2 on account of OB dumping on vegetated OB dump area due to constraint of dumping space and plantation on backfilled area has also been reduced by 0.10 Km^2 on account of tree felling for the purpose of coal mining. In New Majri OC project, plantation on OB has been reduced by 0.27 Km^2 on account of OB dumping on vegetated OB dump area due to constraint of dumping space and plantation on backfilled area has also been reduced by 0.12 Km^2 on account of tree felling for the purpose of coal mining.

5.4 Analysis of satellite data also indicates that total area under active mining has increased from 21.07 Km^2 (Yr.2022) to 22.79 Km^2 (Yr.2023). In Padmapur OC project area under active mining has reduced due to increase in area under backfilling.

5.5 After comparing the satellite data of year 2023 vs. 2022 study reveals that area under backfilling has increased from 11.87 Km^2 (Yr. 2022) to 12.26 Km^2 (Yr. 2023).

5.6 Total area under biological reclamation has increased from 4.23 Km^2 (Yr. 2022) to 4.24 Km^2 (Yr. 2023). There is no biological reclamation in Yekona-I & II (Amal.), New Majri UG to OC, Pauni-II (Expn.), MKD-I and MKD-III OC & Penganga OC.

5.7 Analysis of satellite data also indicates that total area under plantation (Green Cover) has increased from 29.48 Km^2 (Yr. 2022) to 30.70 Km^2 (Yr. 2023). The increase of 1.22 Km^2 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 2023 vs. 2022, it is evident that total area under plantation (Green Cover) in Padmapur, Durgapur, Mugoli, Umrer, Ukni, Niljai, Makardhokra-III, Penganga, New Majri UG to OC and Pauni-II(Expn.) 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.

5.9 On comparing the status of land reclamation for the year 2023 with respect to the year 2022 in different projects, it is evident that the total area under reclamation has increased from 16.10 Km^2 (Yr. 2022) to 16.50 Km^2 (Yr. 2023).

5.10 Out of 14 projects of WCL, maximum area under reclamation is in Sasti Opencast Project (87.34%) followed by Umrer OC (65.01%) and Mugoli OC (46.58%).

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 2023)

(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, Avanue Plantation Etc.									
1	*2*	*3*		*4*		*5*		*6*		*7*		*8*		*9 (=4+5+8)*		*10 (=5+6+7)*		*11(=4+5)*	
		2022	*2023*	*2022*	*2023*	*2022*	*2023*	*2022*	*2023*	*2022*	*2023*	*2022*	*2023*	*2022*	*2023*	*2022*	*2023*	*2022*	*2023*
1	Sasti	9.20	9.20	2.62	2.72	0.83	0.73	1.70	1.68	0.67	0.68	0.35	0.50	3.80	3.95	3.20	3.09	3.45	3.45
				68.95%	68.86%	21.84%	18.48%					9.21%	12.66%			34.78%	33.59%	90.79%	87.34%
2	Padmapur	8.29	8.29	0.59	0.65	0.28	0.28	2.14	2.21	0.83	0.83	1.18	1.12	2.05	2.05	3.25	3.32	0.87	0.93
				28.78%	31.71%	13.66%	13.66%					57.56%	54.63%			39.20%	40.05%	42.44%	45.37%
3	Durgapur	15.50	15.50	1.17	1.04	0.93	1.06	2.72	2.81	1.19	1.19	2.53	2.57	4.63	4.67	4.84	5.06	2.10	2.10
				25.27%	22.27%	20.09%	22.70%					54.64%	55.03%			31.23%	32.65%	45.36%	44.97%
4	Mugoli	12.55	12.55	1.46	1.53	0.14	0.17	1.81	1.90	0.56	0.61	1.85	1.95	3.45	3.65	2.51	2.68	1.60	1.70
				42.32%	41.92%	4.06%	4.66%					53.62%	53.42%			20.00%	21.35%	46.38%	46.58%
5	Umrer	9.45	9.45	1.50	1.51	1.58	1.63	1.45	1.45	2.31	2.32	1.72	1.69	4.80	4.83	5.34	5.40	3.08	3.14
				31.25%	31.26%	32.92%	33.75%					35.83%	34.99%			56.51%	57.14%	64.17%	65.01%
6	Ukni	12.85	12.85	0.52	0.54	0.00	0.00	1.66	1.74	0.86	0.91	1.94	2.15	2.46	2.69	2.52	2.65	0.52	0.54
				21.14%	20.07%	0.00%	0.00%					78.86%	79.93%			19.61%	20.62%	21.14%	20.07%
7	Niljai	17.61	17.61	1.44	1.46	0.11	0.13	2.04	2.11	1.23	1.25	2.84	2.99	4.39	4.58	3.38	3.49	1.55	1.59
				32.80%	31.88%	2.51%	2.84%					64.69%	65.28%			19.19%	19.82%	35.31%	34.72%
8	New Majri	7.74	7.74	1.52	1.64	0.36	0.24	1.24	0.97	1.47	1.47	2.10	2.22	3.98	4.10	3.07	2.68	1.88	1.88
				38.19%	40.00%	9.05%	5.85%					52.76%	54.15%			39.66%	34.63%	47.24%	45.85%
9	MKD-III	9.23	9.23	0.37	0.41	0.00	0.00	0.00	0.00	0.07	0.12	1.01	1.09	1.38	1.50	0.07	0.12	0.37	0.41
				26.81%	27.33%	0.00%	0.00%					73.19%	72.67%			0.76%	1.30%	26.81%	27.33%
10	Penganga	7.63	7.63	0.67	0.75	0.00	0.00	0.00	0.49	0.49	0.55	0.90	1.25	1.57	2.00	0.49	1.04	0.67	0.75
				42.68%	37.50%	0.00%	0.00%					57.32%	62.50%			6.42%	13.63%	42.68%	37.50%
11	Yekona-I&II(Amal)	16.79	16.79	0.01	0.01	0.00	0.00	0.00	0.00	0.03	0.03	1.11	1.29	1.12	1.30	0.03	0.03	0.01	0.01
				-	0.77%	-	0.00%					-	99.23%			0.18%	0.18%	0.89%	0.77%
12	New Majri UG to OC	7.06	7.06	0.00	0.00	0.00	0.00	0.00	0.27	0.37	0.37	1.03	1.06	1.03	1.06	0.37	0.64	0.00	0.00
				-	0.00%	-	0.00%					-	100.00%			5.24%	9.07%	0.00%	0.00%
13	Pauni -II (Expn)	10.95	10.95	0.00	0.00	0.00	0.00	0.13	0.18	0.18	0.22	1.17	1.34	1.17	1.34	0.31	0.40	0.00	0.00
				-	0.00%	-	0.00%					-	100.00%			2.83%	3.65%	0.00%	0.00%
14	MKD -1 (Expn) OC	6.14	6.14	0.00	0.00	0.00	0.00	0.10	0.10	0.00	0.00	1.34	1.57	1.34	1.57	0.10	0.10	0.00	0.00
				-	0.00%	-	0.00%					-	100.00%			1.63%	1.63%	0.00%	0.00%
	Total	**150.99**	**150.99**	**11.87**	**12.26**	**4.23**	**4.24**	**14.99**	**15.91**	**10.26**	**10.55**	**21.07**	**22.79**	**37.17**	**39.29**	**29.48**	**30.70**	**16.10**	**16.50**
				31.93%	31.20%	11.38%	10.79%					56.69%	58.00%			19.52%	20.33%	43.31%	42.00%

Note: **In reference of the above Table 5.1, 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.

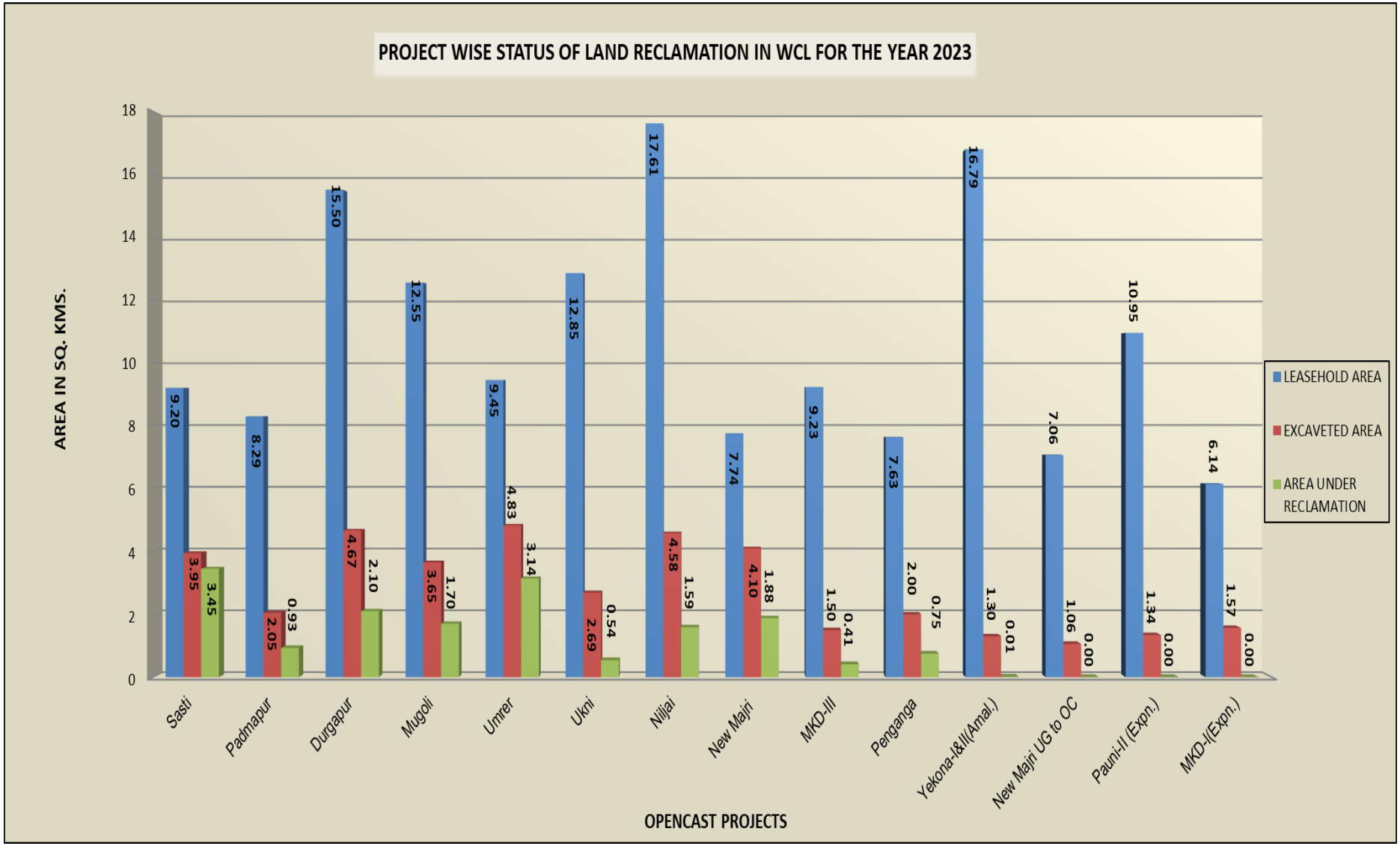


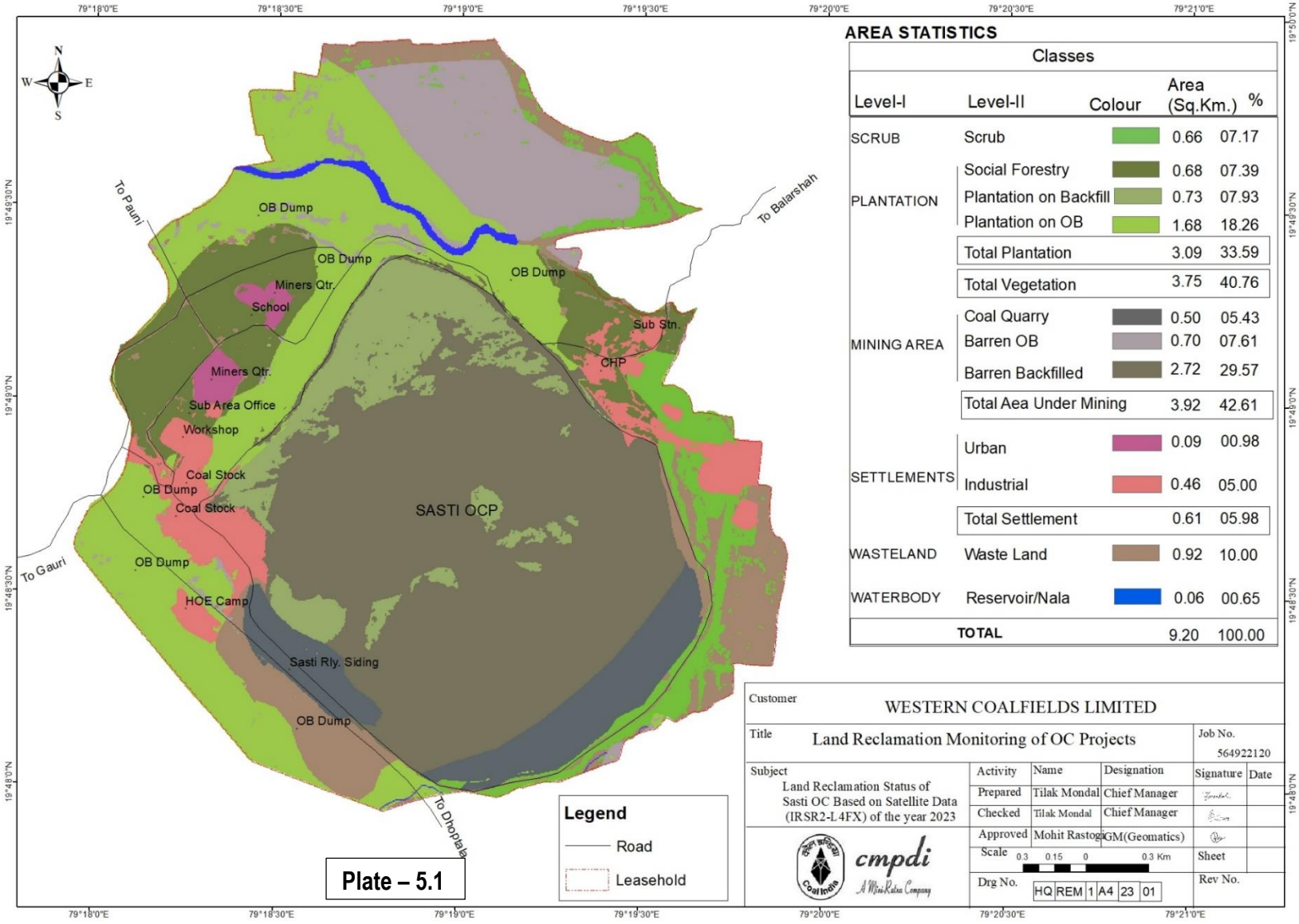
Figure : **5.1 Land reclamation status in 14 OC projects of WCL for the year 2023**

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 2023

(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	
		Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%
FORESTS	Dense Forest	0.00	0.00	0.00	0.00	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	1.27	0.84
	Open Forest	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	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**	**0.00**	**1.27**	**0.84**
SCRUBS	Scrubs	**0.66**	**7.17**	**0.69**	**8.32**	**0.51**	**3.29**	**1.78**	**14.18**	**0.00**	**0.00**	**1.68**	**13.07**	**1.56**	**8.86**	**0.06**	**0.78**	**0.55**	**5.96**	**1.09**	**14.29**	**2.44**	**14.53**	**0.72**	**11.73**	**0.74**	**10.48**	**1.11**	**10.14**	**13.59**	**9.00**
PLANTATION	Social Forestry	0.68	7.39	0.83	10.01	1.19	7.68	0.61	4.86	2.32	24.55	0.91	7.08	1.25	7.10	1.47	18.99	0.12	1.30	0.55	7.21	0.03	0.18	0.00	0.00	0.37	5.24	0.22	2.01	10.55	6.99
	Plantation on OB Dump	1.68	18.26	2.21	26.66	2.81	18.13	1.90	15.14	1.45	15.34	1.74	13.54	2.11	11.98	0.97	12.53	0.00	0.00	0.00	0.00	0.00	0.00	0.10	1.63	0.27	3.82	0.18	1.64	15.42	10.21
	Plantation on Backfill (Biological Reclamation)	0.73	7.93	0.28	3.38	1.06	6.84	0.17	1.35	1.63	17.25	0.00	0.00	0.13	0.74	0.24	3.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.24	2.81
	Total Plantation	**3.09**	**33.59**	**3.32**	**40.05**	**5.06**	**32.65**	**2.68**	**21.35**	**5.40**	**57.14**	**2.65**	**20.62**	**3.49**	**19.82**	**2.68**	**34.63**	**0.12**	**1.30**	**0.55**	**7.21**	**0.03**	**0.18**	**0.10**	**1.63**	**0.64**	**9.07**	**0.40**	**3.65**	**30.21**	**20.01**
	Total Vegetation	**3.75**	**40.76**	**4.01**	**48.37**	**6.84**	**44.13**	**4.46**	**35.54**	**5.40**	**57.14**	**4.33**	**33.70**	**5.05**	**28.68**	**2.74**	**35.40**	**0.67**	**7.26**	**1.64**	**21.49**	**2.47**	**14.71**	**0.82**	**13.36**	**1.38**	**19.55**	**1.51**	**13.79**	**45.07**	**29.85**
ACTIVE MINING	Coal Quarry	0.50	5.43	0.91	10.98	2.07	13.35	1.95	15.54	1.58	16.72	1.99	15.49	2.78	15.79	2.10	27.13	1.09	11.81	1.02	13.37	1.12	6.67	1.46	23.78	1.03	14.59	1.18	10.78	20.78	13.76
	Coal Dump	0.00	0.00	0.00	0.00	0.05	0.32	0.00	0.00	0.10	1.06	0.10	0.78	0.11	0.62	0.00	0.00	0.00	0.00	0.23	3.01	0.17	1.01	0.00	0.00	0.05	0.71	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	0.00	0.00	0.00	0.00	0.00
	Quarry Filled With Water	0.00	0.00	0.21	2.53	0.45	2.90	0.00	0.00	0.01	0.11	0.06	0.47	0.10	0.57	0.12	1.55	0.00	0.00	0.00	0.00	0.00	0.00	0.11	1.79	0.00	0.00	0.00	0.00	1.06	0.70
	Total Area under *Active Mining*	**0.50**	**5.43**	**1.12**	**13.51**	**2.57**	**16.58**	**1.95**	**15.54**	**1.69**	**17.88**	**2.15**	**16.73**	**2.99**	**16.98**	**2.22**	**28.68**	**1.09**	**11.81**	**1.25**	**16.38**	**1.29**	**7.68**	**1.57**	**25.57**	**1.08**	**15.30**	**1.34**	**12.24**	**22.81**	**15.11**
	Barren OB Dump	0.70	7.61	1.75	21.11	1.83	11.81	2.19	17.45	0.12	1.27	3.57	27.78	3.89	22.09	0.61	7.88	2.63	28.49	1.72	22.54	1.87	11.14	0.64	10.42	0.93	13.17	2.49	22.74	24.94	16.52
	Barren Backfilled Area (Technical Reclamation)	2.72	29.57	0.65	7.84	1.04	6.71	1.53	12.19	1.51	15.98	0.54	4.20	1.46	8.29	1.64	21.19	0.41	4.44	0.75	9.83	0.01	0.06	0.00	0.00	0.00	0.00	0.00	0.00	12.26	8.12
	Total Area	**3.42**	**37.17**	**2.40**	**28.95**	**2.87**	**18.52**	**3.72**	**29.64**	**1.63**	**17.25**	**4.11**	**31.98**	**5.35**	**30.38**	**2.25**	**29.07**	**3.04**	**32.94**	2.47	32.37	1.88	11.20	0.64	10.42	0.93	13.17	2.49	22.74	37.20	24.64
	Total Area Under Mine Operation	**3.92**	**42.61**	**3.52**	**42.46**	**5.44**	**35.10**	**5.67**	**45.18**	**3.32**	**35.13**	**6.26**	**48.72**	**8.34**	**47.36**	**4.47**	**57.75**	**4.13**	**44.75**	**3.72**	**48.75**	**3.17**	**18.88**	**2.21**	**35.99**	**2.01**	**28.47**	**3.83**	**34.98**	**60.01**	**39.74**
WASTELANDS	Waste Lands	0.92	10.00	0.35	4.22	1.36	8.77	0.29	2.31	0.27	2.86	0.93	7.24	1.40	7.95	0.14	1.81	0.59	6.39	1.45	19.00	1.01	6.02	0.16	2.61	0.48	6.80	0.60	5.48	9.95	6.59
	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	0.06	0.98	0.05	0.71	0.05	0.46	0.16	0.11
	Total Wasteland	**0.92**	**10.00**	**0.35**	**4.22**	**1.36**	**8.77**	**0.29**	**2.31**	**0.27**	**2.86**	**0.93**	**7.24**	**1.40**	**7.95**	**0.14**	**1.81**	**0.59**	**6.39**	**1.45**	**19.00**	**1.01**	**6.02**	**0.22**	**3.58**	**0.53**	**7.51**	**0.65**	**5.94**	**10.11**	**6.70**
WATERBODIES	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	0.00	0.00	0.12	1.57	0.12	0.71	0.09	1.47	0.03	0.42	0.23	2.10	1.06	0.70
	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**	**0.00**	**0.00**	**0.12**	**1.57**	**0.12**	**0.71**	**0.09**	**1.47**	**0.03**	**0.42**	0.23	2.10	1.06	0.70
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	0.00	0.90	9.75	0.00	0.00	3.32	19.77	0.54	8.79	0.94	13.31	0.51	4.66	6.21	4.11
	Fallow Lands	0.00	0.00	0.00	0.00	1.22	7.87	1.80	14.34	0.00	0.00	1.13	8.79	1.76	9.99	0.00	0.00	2.73	29.58	0.55	7.21	6.65	39.61	2.26	36.81	2.09	29.60	4.13	37.72	24.32	16.11
	Total Agriculture	**0.00**	**0.00**	**0.00**	**0.00**	**1.22**	**7.87**	**1.80**	**14.34**	**0.00**	**0.00**	**1.13**	**8.79**	**1.76**	**9.99**	**0.00**	**0.00**	**3.63**	**39.33**	**0.55**	**7.21**	**9.97**	**59.38**	**2.80**	**45.60**	**3.03**	**42.92**	**4.64**	**42.37**	**30.53**	**20.22**
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	0.00	0.01	0.06	0.00	0.00	0.07	0.99	0.02	0.18	1.53	1.01
	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	0.39	0.03	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.36	0.24
	Industrial Settlement	0.46	5.00	0.29	3.50	0.15	0.97	0.18	1.43	0.11	1.16	0.18	1.40	0.49	2.78	0.04	0.52	0.21	2.28	0.12	1.57	0.01	0.06	0.00	0.00	0.01	0.14	0.07	0.64	2.32	1.54
	Total Settlement	**0.55**	**5.98**	**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**	**1.97**	**0.05**	**0.30**	**0.00**	**0.00**	0.08	**1.13**	0.09	0.82	4.21	2.79
	Grand Total	**9.20**	**100.00**	**8.29**	**100.00**	**15.50**	**100.00**	**12.55**	**100.00**	**9.45**	**100.00**	**12.85**	**100.00**	**17.61**	**100.00**	**7.74**	**100.00**	**9.23**	**100.00**	**7.63**	**100.00**	**16.79**	**100.00**	**6.14**	**100.00**	**7.06**	**100.00**	**10.95**	**100.00**	**150.99**	**100.00**



AREA STATISTICS

Classes				
Level-I	Level-II	Colour	Area (Sq.Km.)	%
SCRUB	Scrub		0.66	07.17
PLANTATION	Social Forestry		0.68	07.39
	Plantation on Backfill		0.73	07.93
	Plantation on OB		1.68	18.26
	Total Plantation		3.09	33.59
	Total Vegetation		3.75	40.76
MINING AREA	Coal Quarry		0.50	05.43
	Barren OB		0.70	07.61
	Barren Backfilled		2.72	29.57
	Total Aea Under Mining		3.92	42.61
SETTLEMENTS	Urban		0.09	00.98
	Industrial		0.46	05.00
	Total Settlement		0.61	05.98
WASTELAND	Waste Land		0.92	10.00
WATERBODY	Reservoir/Nala		0.06	00.65
	TOTAL		9.20	100.00

Customer	WESTERN COALFIELDS LIMITED				
Title	Land Reclamation Monitoring of OC Projects			Job No.	564922120
Subject	Land Reclamation Status of Sasti OC Based on Satellite Data (IRSR2-L4FX) of the year 2023	Activity	Name	Designation	Signature / Date
		Prepared	Tilak Mondal	Chief Manager	
		Checked	Tilak Mondal	Chief Manager	
		Approved	Mohit Rastogi	GM(Geomatics)	
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		Drg No.	HQ REM 1 A4 23 01		Rev No.

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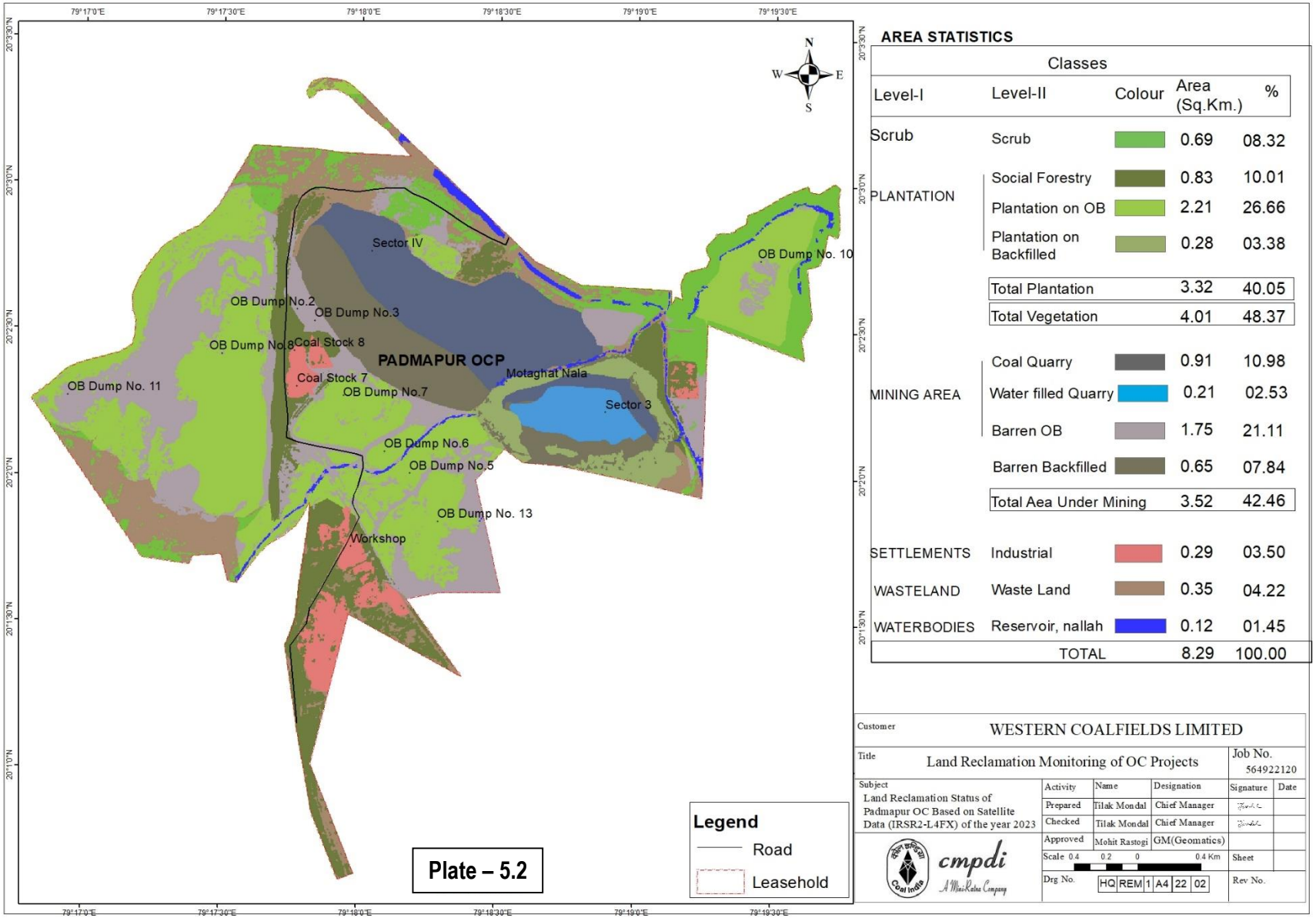

AREA STATISTICS

Classes				
Level-I	Level-II	Colour	Area (Sq.Km.)	%
Scrub	Scrub		0.69	08.32
PLANTATION	Social Forestry		0.83	10.01
	Plantation on OB		2.21	26.66
	Plantation on Backfilled		0.28	03.38
	Total Plantation		3.32	40.05
	Total Vegetation		4.01	48.37
MINING AREA	Coal Quarry		0.91	10.98
	Water filled Quarry		0.21	02.53
	Barren OB		1.75	21.11
	Barren Backfilled		0.65	07.84
	Total Aea Under Mining		3.52	42.46
SETTLEMENTS	Industrial		0.29	03.50
WASTELAND	Waste Land		0.35	04.22
WATERBODIES	Reservoir, nallah		0.12	01.45
	TOTAL		8.29	100.00

Customer	WESTERN COALFIELDS LIMITED					
Title	Land Reclamation Monitoring of OC Projects				Job No. 564922120	
Subject	Activity	Name	Designation	Signature	Date	
Land Reclamation Status of Padmapur OC Based on Satellite Data (IRSR2-L4FX) of the year 2023	Prepared	Tilak Mondal	Chief Manager			
	Checked	Tilak Mondal	Chief Manager			
	Approved	Mohit Rastogi	GM(Geomatics)			
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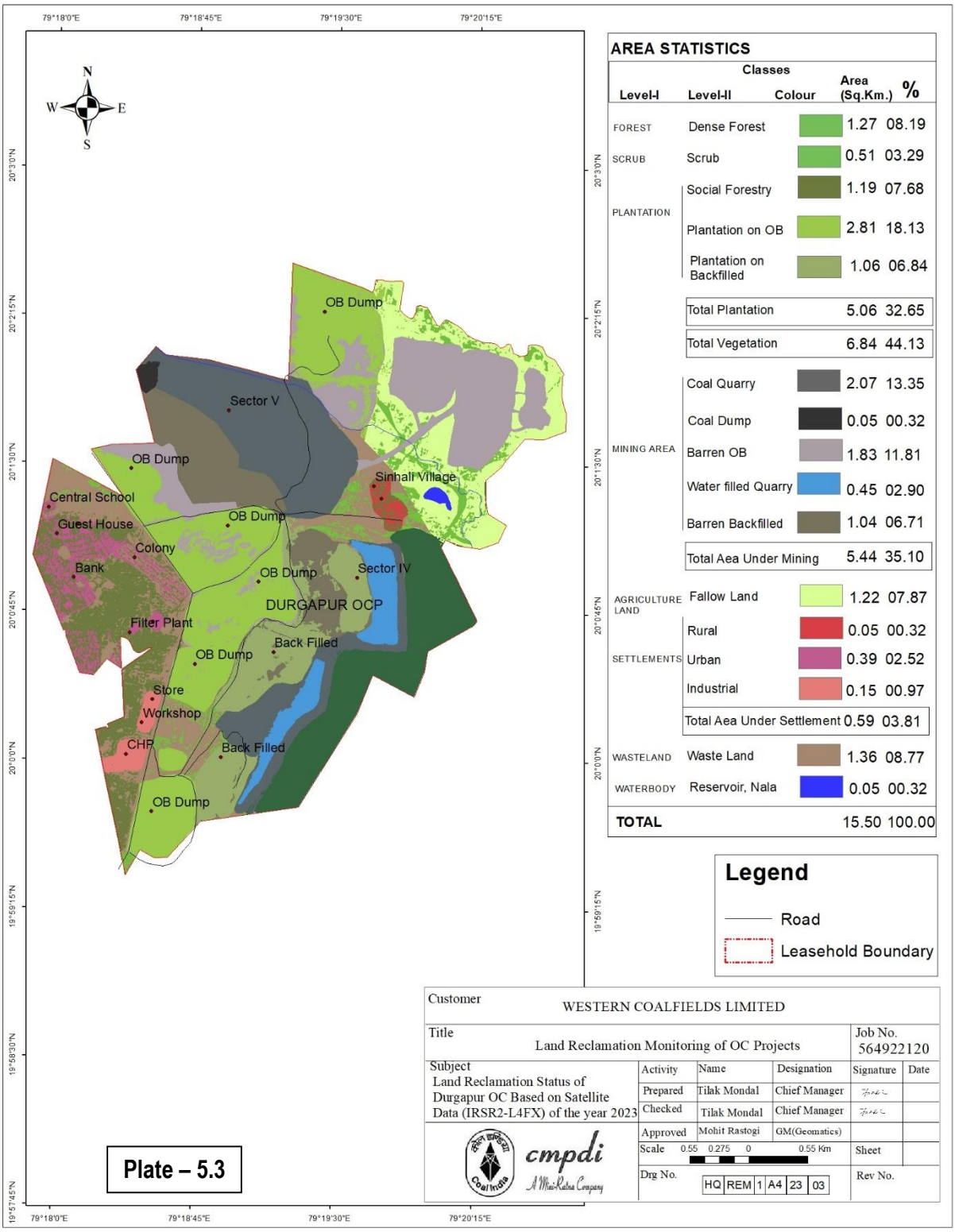
	Drg No. HQ REM 1 A4 22 02			Rev No.		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19°57'45"N
N
W
E
S
OB Dump
Sector V
OB Dump
Sinhali Village
Central School
Guest House
OB Dump
Colony
Bank
OB Dump
Sector IV
DURGAPUR OCP
Filter Plant
Back Filled
OB Dump
Store
Workshop
CHP
Back Filled
OB Dump
AREA STATISTICS
Classes
Level-I
Level-II
Colour
Area (Sq.Km.)
%
FOREST
Dense Forest
1.27 08.19
SCRUB
Scrub
0.51 03.29
PLANTATION
Social Forestry
1.19 07.68
Plantation on OB
2.81 18.13
Plantation on Backfilled
1.06 06.84
Total Plantation 5.06 32.65
Total Vegetation 6.84 44.13
MINING AREA
Coal Quarry
2.07 13.35
Coal Dump
0.05 00.32
Barren OB
1.83 11.81
Water filled Quarry
0.45 02.90
Barren Backfilled
1.04 06.71
Total Aea Under Mining 5.44 35.10
AGRICULTURE LAND
Fallow Land
1.22 07.87
SETTLEMENTS
Rural
0.05 00.32
Urban
0.39 02.52
Industrial
0.15 00.97
Total Aea Under Settlement 0.59 03.81
WASTELAND
Waste Land
1.36 08.77
WATERBODY
Reservoir, Nala
0.05 00.32
TOTAL
15.50 100.00
Legend
Road
Leasehold Boundary
Customer
WESTERN COALFIELDS LIMITED
Title
Land Reclamation Monitoring of OC Projects
Job No.
564922120
Subject
Land Reclamation Status of Durgapur OC Based on Satellite Data (IRSR2-L4FX) of the year 2023
Activity
Name
Designation
Signature
Date
Prepared
Tilak Mondal
Chief Manager
Checked
Tilak Mondal
Chief Manager
Approved
Mohit Rastogi
GM(Geomatics)
Scale
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Drg No.
HQ REM 1 A4 23 03
Rev No.
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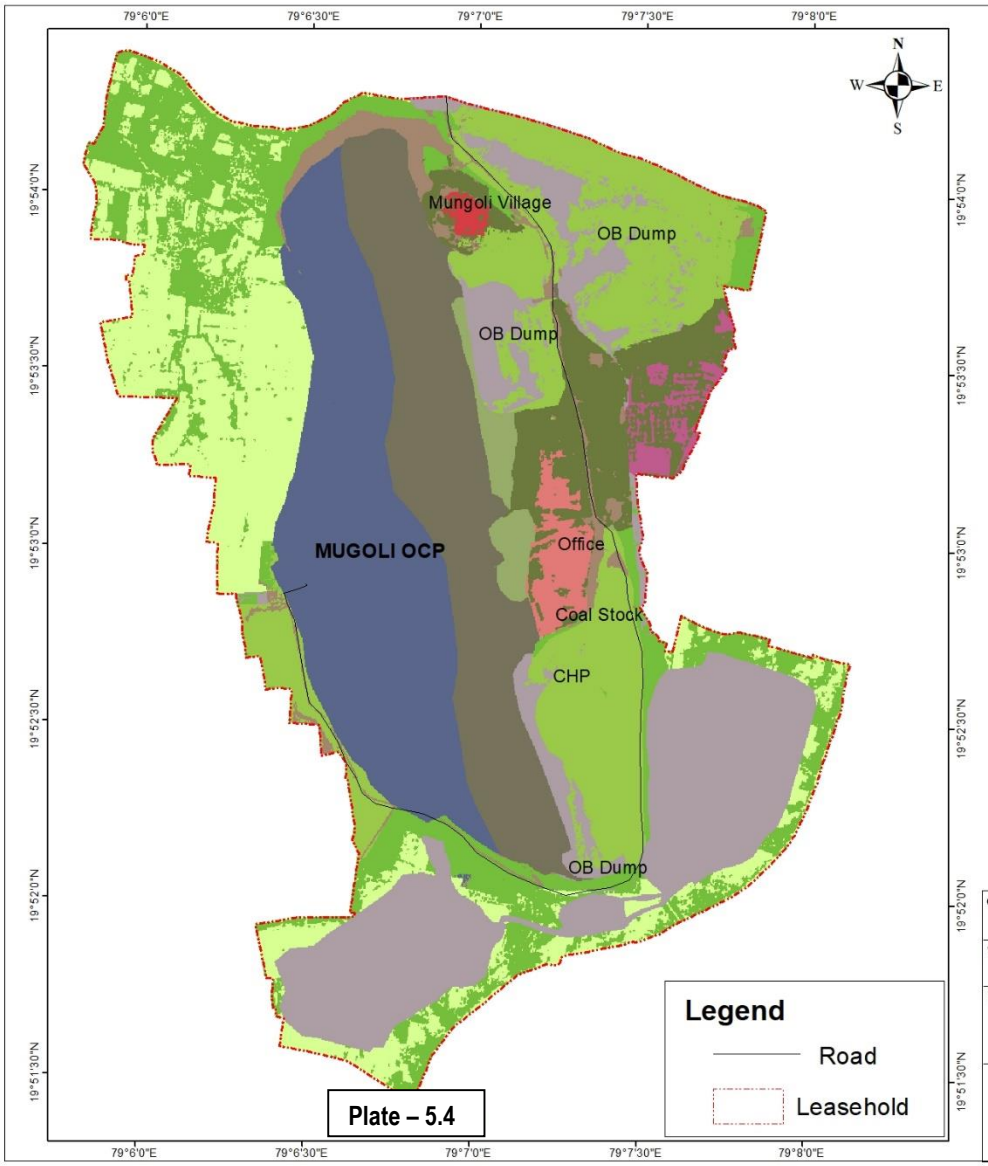
Plate – 5.3



AREA STATISTICS

Classes				
Level-I	Level-II	Colour	Area (Sq.Km.)	%
SCRUB	Scrub		1.78	14.18
PLANTATION	Social Forestry		0.61	04.86
	Plantation on OB		1.90	15.14
	Plantation on Backfill		0.17	01.35
	Total Plantation		2.68	21.35
	Total Vegetation		4.46	35.54
MINING AREA	Coal Quarry		1.95	15.54
	Barren Backfilled		1.53	12.19
	Barren OB		2.19	17.45
	Total Aea Under Mining		5.67	45.18
AGRICULTURE	Fallow Land		1.80	14.34
WASTELAND	Waste Land		0.29	02.31
SETTLEMENTS	Rural		0.03	00.24
	Urban		0.12	00.96
	Industrial		0.18	01.43
	Total Settlement		0.33	02.63
	TOTAL		12.55	100.00

Customer	WESTERN COALFIELDS LIMITED				
Title	Land Reclamation Monitoring of OC Projects			Job No. 564922120	
Subject	Activity	Name	Designation	Signature	Date
Land Reclamation Status of Mugolii OC based on Satellite Data (IRSR2-L4FX) of the year 2023	Prepared	Tilak Mondal	Chief Manager		
	Checked	Tilak Mondal	Chief Manager		
	Approved	Mohit Rastogi	GM(Geomatics)		
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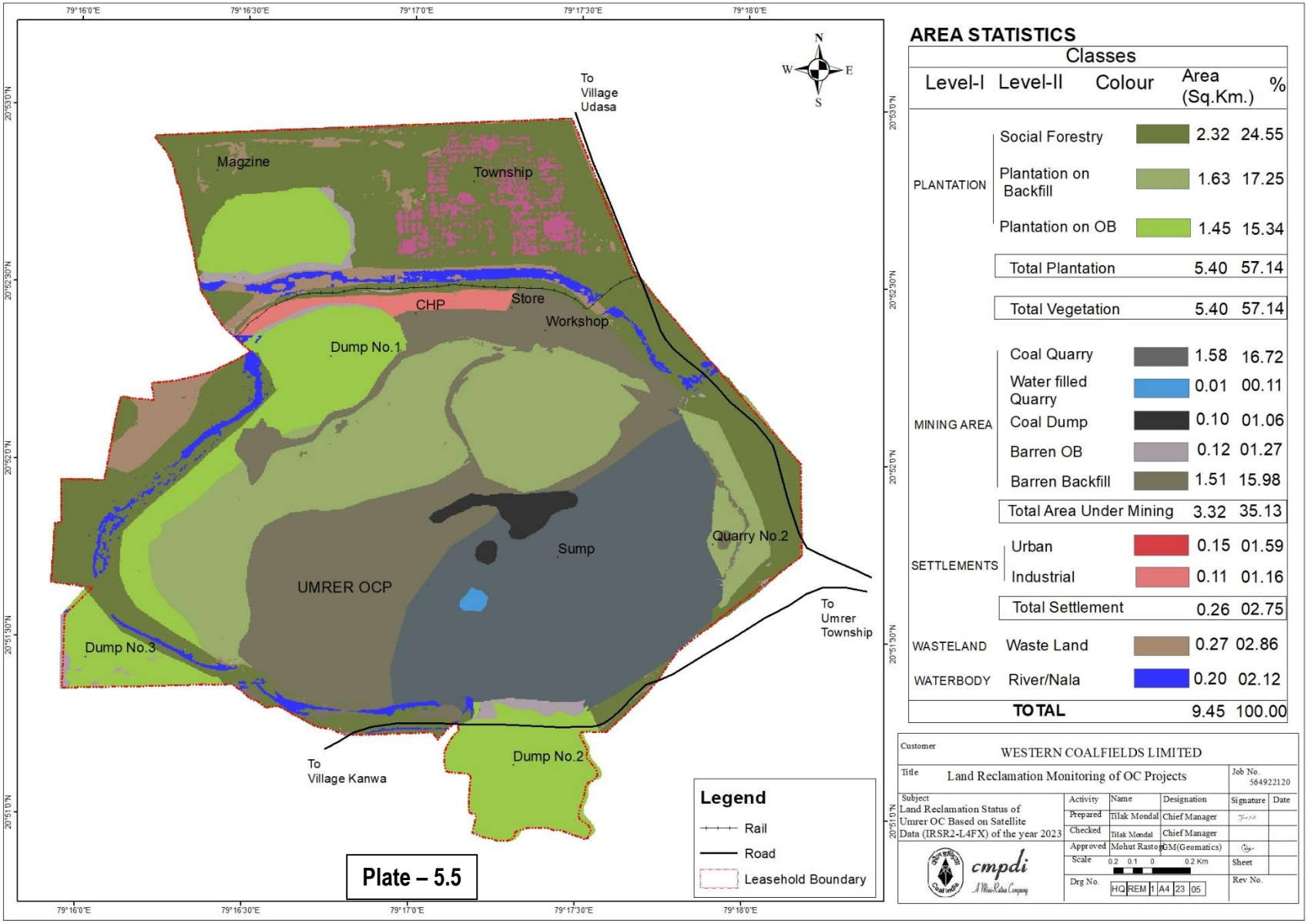

AREA STATISTICS

Classes				
Level-I	Level-II	Colour	Area (Sq.Km.)	%
PLANTATION	Social Forestry		2.32	24.55
	Plantation on Backfill		1.63	17.25
	Plantation on OB		1.45	15.34
	Total Plantation		5.40	57.14
	Total Vegetation		5.40	57.14
MINING AREA	Coal Quarry		1.58	16.72
	Water filled Quarry		0.01	00.11
	Coal Dump		0.10	01.06
	Barren OB		0.12	01.27
	Barren Backfill		1.51	15.98
	Total Area Under Mining		3.32	35.13
SETTLEMENTS	Urban		0.15	01.59
	Industrial		0.11	01.16
	Total Settlement		0.26	02.75
WASTELAND	Waste Land		0.27	02.86
WATERBODY	River/Nala		0.20	02.12
	TOTAL		9.45	100.00

Customer	WESTERN COALFIELDS LIMITED				
Title	Land Reclamation Monitoring of OC Projects			Job No. 564922120	
Subject	Activity	Name	Designation	Signature	Date
Land Reclamation Status of Umrer OC Based on Satellite Data (IRSR2-L4FX) of the year 2023	Prepared	Tilak Mondal	Chief Manager		
	Checked	Tilak Mondal	Chief Manager		
	Approved	Mohut Raster	GM(Geomatics)		
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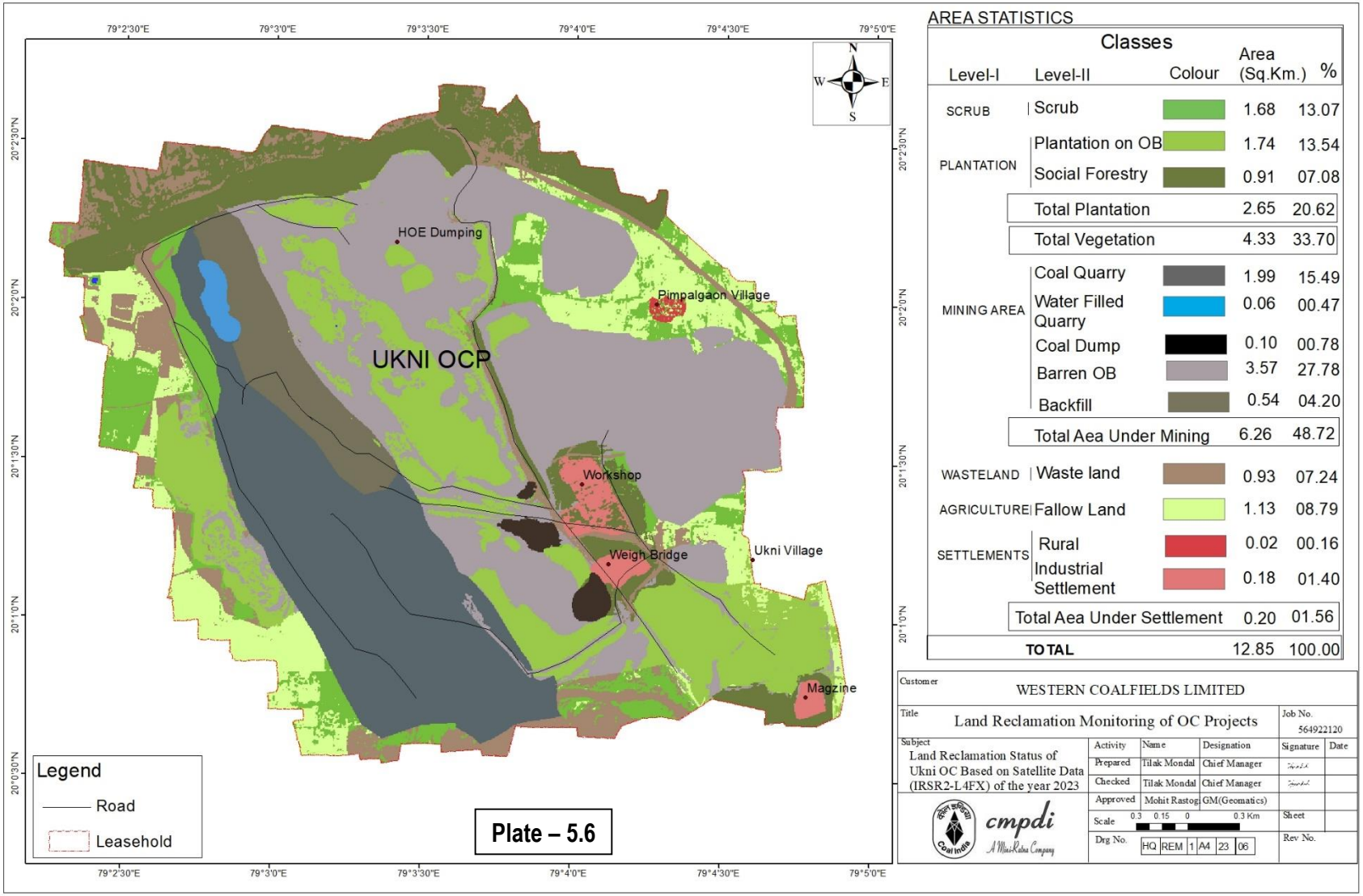

AREA STATISTICS

Level-I	Level-II	Colour	Area (Sq.Km.)	%
SCRUB	Scrub		1.68	13.07
PLANTATION	Plantation on OB		1.74	13.54
	Social Forestry		0.91	07.08
	Total Plantation		2.65	20.62
	Total Vegetation		4.33	33.70
MINING AREA	Coal Quarry		1.99	15.49
	Water Filled Quarry		0.06	00.47
	Coal Dump		0.10	00.78
	Barren OB		3.57	27.78
	Backfill		0.54	04.20
	Total Aea Under Mining		6.26	48.72
WASTELAND	Waste land		0.93	07.24
AGRICULTURE	Fallow Land		1.13	08.79
SETTLEMENTS	Rural		0.02	00.16
	Industrial Settlement		0.18	01.40
	Total Aea Under Settlement		0.20	01.56
	TOTAL		12.85	100.00

Customer	WESTERN COALFIELDS LIMITED				
Title	Land Reclamation Monitoring of OC Projects			Job No. 564922120	
Subject	Land Reclamation Status of Ukni OC Based on Satellite Data (IRSR2-L4FX) of the year 2023	Activity	Name	Designation	Signature / Date
		Prepared	Tilak Mondal	Chief Manager	
		Checked	Tilak Mondal	Chief Manager	
		Approved	Mohit Rastogi	GM(Geomatics)	
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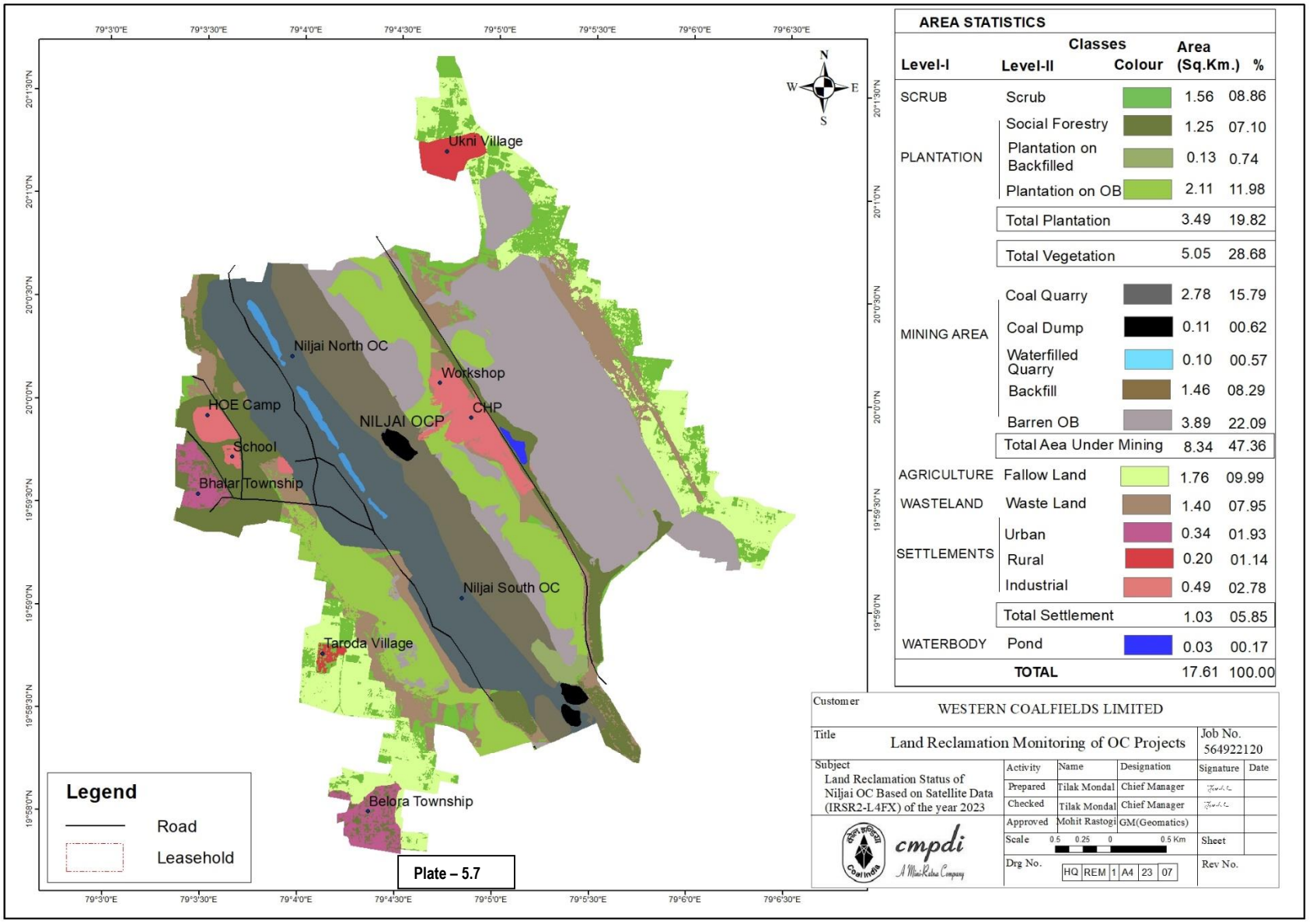

AREA STATISTICS

Level-I	Level-II	Classes Colour	Area (Sq.Km.)	%
SCRUB	Scrub		1.56	08.86
PLANTATION	Social Forestry		1.25	07.10
	Plantation on Backfilled		0.13	0.74
	Plantation on OB		2.11	11.98
	Total Plantation		3.49	19.82
	Total Vegetation		5.05	28.68
MINING AREA	Coal Quarry		2.78	15.79
	Coal Dump		0.11	00.62
	Waterfilled Quarry		0.10	00.57
	Backfill		1.46	08.29
	Barren OB		3.89	22.09
	Total Aea Under Mining		8.34	47.36
AGRICULTURE	Fallow Land		1.76	09.99
WASTELAND	Waste Land		1.40	07.95
SETTLEMENTS	Urban		0.34	01.93
	Rural		0.20	01.14
	Industrial		0.49	02.78
	Total Settlement		1.03	05.85
WATERBODY	Pond		0.03	00.17
	TOTAL		17.61	100.00

Customer	WESTERN COALFIELDS LIMITED				
Title	Land Reclamation Monitoring of OC Projects			Job No. 564922120	
Subject: Land Reclamation Status of Niljai OC Based on Satellite Data (IRSR2-L4FX) of the year 2023	Activity	Name	Designation	Signature	Date
	Prepared	Tilak Mondal	Chief Manager		
	Checked	Tilak Mondal	Chief Manager		
	Approved	Mohit Rastogi	GM(Geomatics)		
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	Drg No. HQ REM 1 A4 23 07			Rev No.	

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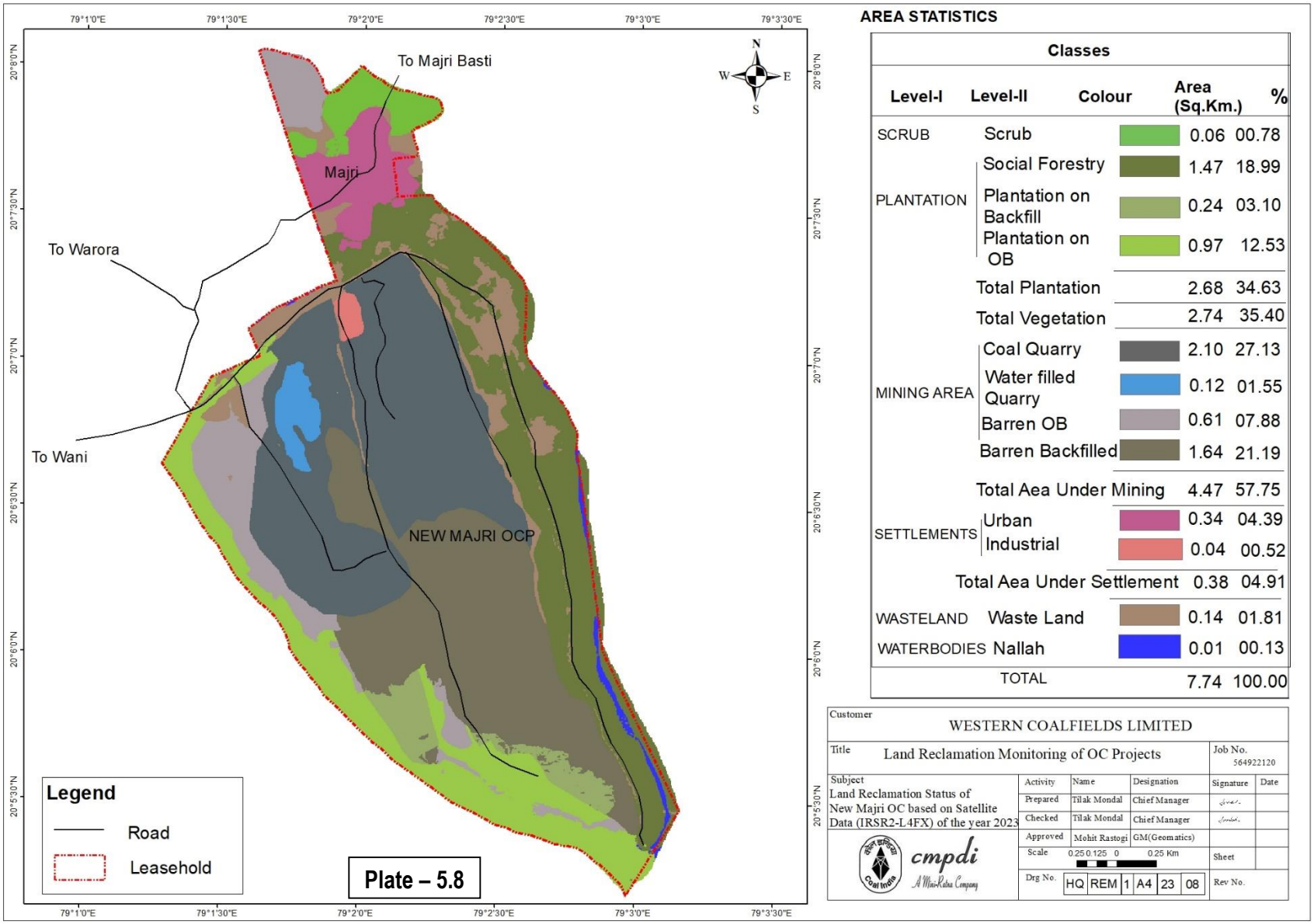

AREA STATISTICS

Classes				
Level-I	Level-II	Colour	Area (Sq.Km.)	%
SCRUB	Scrub		0.06	00.78
PLANTATION	Social Forestry		1.47	18.99
	Plantation on Backfill		0.24	03.10
	Plantation on OB		0.97	12.53
	Total Plantation		2.68	34.63
	Total Vegetation		2.74	35.40
MINING AREA	Coal Quarry		2.10	27.13
	Water filled Quarry		0.12	01.55
	Barren OB		0.61	07.88
	Barren Backfilled		1.64	21.19
	Total Aea Under Mining		4.47	57.75
SETTLEMENTS	Urban		0.34	04.39
	Industrial		0.04	00.52
	Total Aea Under Settlement		0.38	04.91
WASTELAND	Waste Land		0.14	01.81
WATERBODIES	Nallah		0.01	00.13
	TOTAL		7.74	100.00

Customer	WESTERN COALFIELDS LIMITED				
Title	Land Reclamation Monitoring of OC Projects			Job No. 564922120	
Subject	Activity	Name	Designation	Signature	Date
Land Reclamation Status of New Majri OC based on Satellite Data (IRSR2-L4FX) of the year 2023	Prepared	Tilak Mondal	Chief Manager		
	Checked	Tilak Mondal	Chief Manager		
	Approved	Mohit Rastogi	GM(Geomatics)		
cmpdi A Mini Ratna Company	Scale 0.25 0.125 0 0.25 Km			Sheet	
	Drg No. HQ REM 1 A4 23 08			Rev No.	

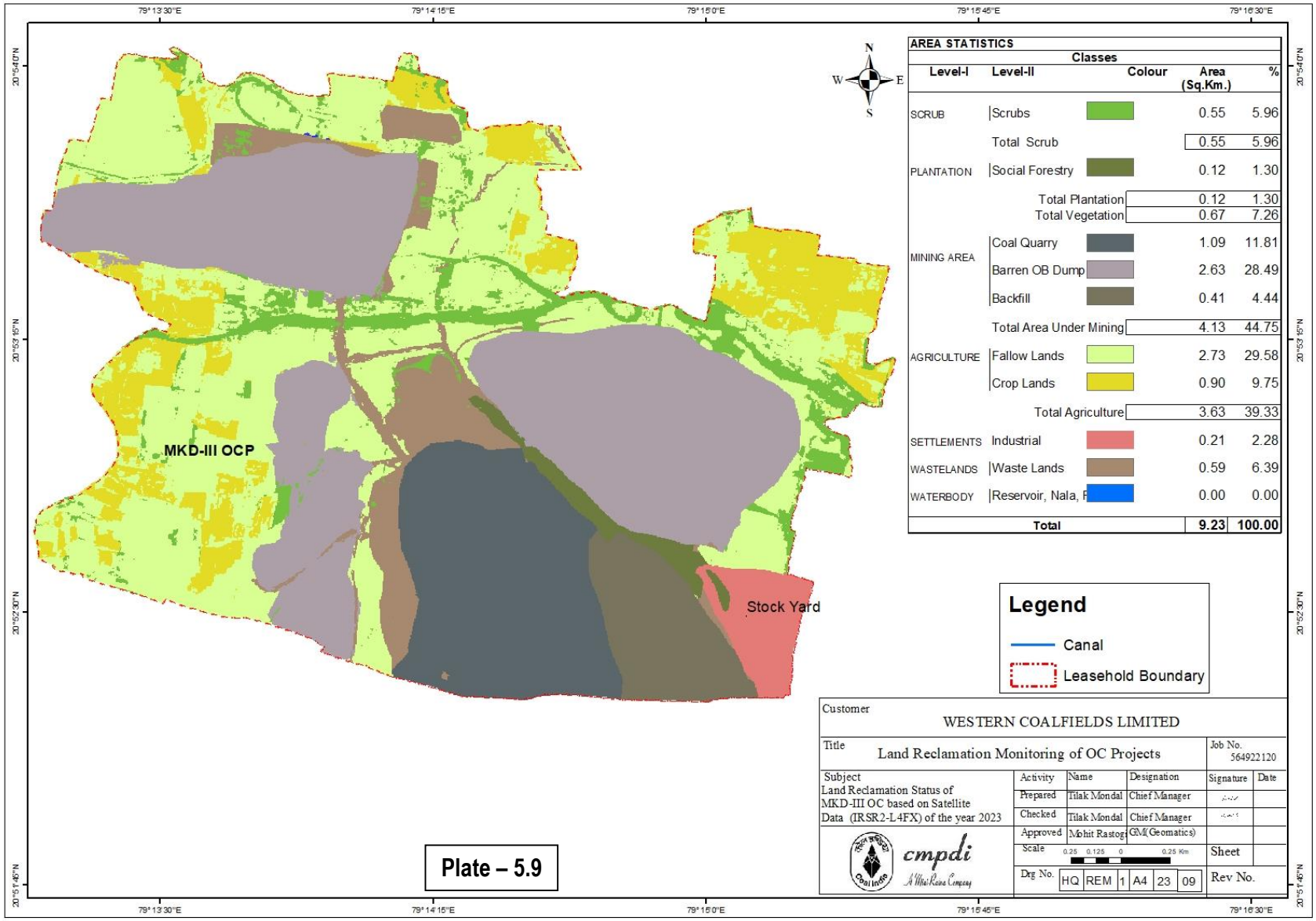
79°13'30"E
79°14'15"E
79°15'0"E
79°15'45"E
79°16'30"E
20°54'0"N
20°53'15"N
20°52'30"N
20°51'45"N
N
W
E
S
MKD-III OCP
Stock Yard
AREA STATISTICS
Classes
Level-I | Level-II | Colour | Area (Sq.Km.) | %
SCRUB | Scrubs | 0.55 | 5.96
Total Scrub | 0.55 | 5.96
PLANTATION | Social Forestry | 0.12 | 1.30
Total Plantation | 0.12 | 1.30
Total Vegetation | 0.67 | 7.26
MINING AREA | Coal Quarry | 1.09 | 11.81
Barren OB Dump | 2.63 | 28.49
Backfill | 0.41 | 4.44
Total Area Under Mining | 4.13 | 44.75
AGRICULTURE | Fallow Lands | 2.73 | 29.58
Crop Lands | 0.90 | 9.75
Total Agriculture | 3.63 | 39.33
SETTLEMENTS | Industrial | 0.21 | 2.28
WASTELANDS | Waste Lands | 0.59 | 6.39
WATERBODY | Reservoir, Nala, | 0.00 | 0.00
Total | 9.23 | 100.00
Legend
Canal
Leasehold Boundary
Customer
WESTERN COALFIELDS LIMITED
Title
Land Reclamation Monitoring of OC Projects
Job No. 564922120
Subject
Land Reclamation Status of MKD-III OC based on Satellite Data (IRSR2-L4FX) of the year 2023
Activity | Name | Designation | Signature | Date
Prepared | Tilak Mondal | Chief Manager
Checked | Tilak Mondal | Chief Manager
Approved | Mohit Rastogi | GM(Geomatics)
Scale 0.25 0.125 0 0.25 Km
Sheet
Drg No. HQ REM 1 A4 23 09
Rev No.
cmpdi
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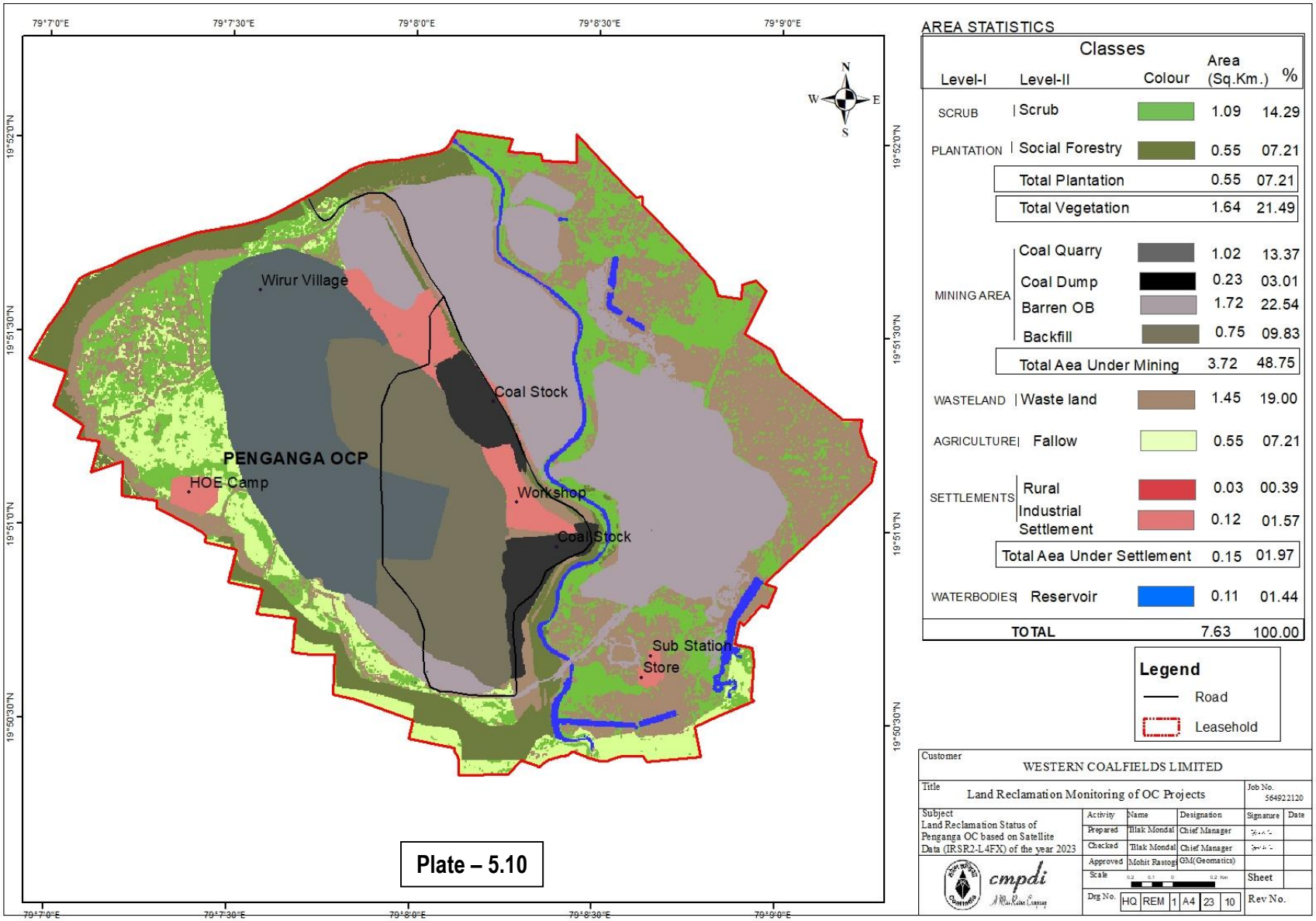
Plate – 5.9



AREA STATISTICS

Level-I	Level-II	Colour	Area (Sq.Km.)	%
SCRUB	Scrub		1.09	14.29
PLANTATION	Social Forestry		0.55	07.21
	Total Plantation		0.55	07.21
	Total Vegetation		1.64	21.49
MINING AREA	Coal Quarry		1.02	13.37
	Coal Dump		0.23	03.01
	Barren OB		1.72	22.54
	Backfill		0.75	09.83
	Total Aea Under Mining		3.72	48.75
WASTELAND	Waste land		1.45	19.00
AGRICULTURE	Fallow		0.55	07.21
SETTLEMENTS	Rural		0.03	00.39
	Industrial Settlement		0.12	01.57
	Total Aea Under Settlement		0.15	01.97
WATERBODIES	Reservoir		0.11	01.44
	TOTAL		7.63	100.00

Legend
Road
Leasehold

Customer: WESTERN COALFIELDS LIMITED

Title: Land Reclamation Monitoring of OC Projects

Job No. 564922120

Subject: Land Reclamation Status of Penganga OC based on Satellite Data (IRSR2-L4FX) of the year 2023

Activity	Name	Designation	Signature	Date
Prepared	Tilak Mondal	Chief Manager		
Checked	Tilak Mondal	Chief Manager		
Approved	Mohit Rastogi	GM(Geomatics)		

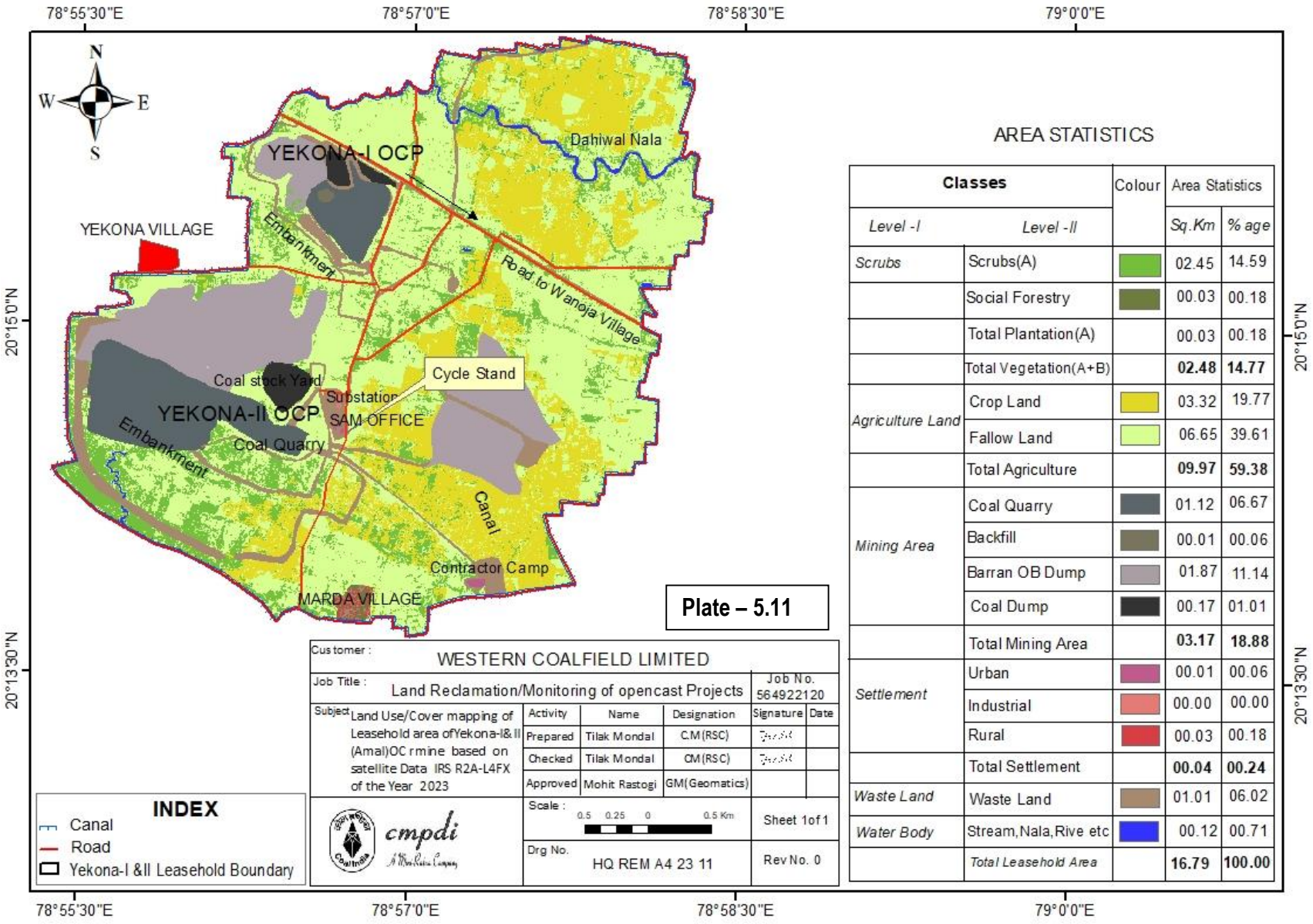
cmpdi

Scale

Sheet

Drg No. HQ REM 1 A4 23 10

Rev No.



AREA STATISTICS

Classes		Colour	Area Statistics	
Level -I	*Level -II*		*Sq.Km*	*% age*
Scrubs	Scrubs(A)		02.45	14.59
	Social Forestry		00.03	00.18
	Total Plantation(A)		00.03	00.18
	Total Vegetation(A+B)		**02.48**	**14.77**
Agriculture Land	Crop Land		03.32	19.77
	Fallow Land		06.65	39.61
	Total Agriculture		**09.97**	**59.38**
Mining Area	Coal Quarry		01.12	06.67
	Backfill		00.01	00.06
	Barran OB Dump		01.87	11.14
	Coal Dump		00.17	01.01
	Total Mining Area		**03.17**	**18.88**
Settlement	Urban		00.01	00.06
	Industrial		00.00	00.00
	Rural		00.03	00.18
	Total Settlement		**00.04**	**00.24**
Waste Land	Waste Land		01.01	06.02
Water Body	Stream,Nala,Rive etc		00.12	00.71
	Total Leasehold Area		**16.79**	**100.00**

Customer : WESTERN COALFIELD LIMITED

Job Title : Land Reclamation/Monitoring of opencast Projects — Job No. 564922120

Subject: Land Use/Cover mapping of Leasehold area ofYekona-I&II (Amal)OC rmine based on satellite Data IRS R2A-L4FX of the Year 2023

Activity	Name	Designation	Signature	Date
Prepared	Tilak Mondal	C.M(RSC)		
Checked	Tilak Mondal	CM(RSC)		
Approved	Mohit Rastogi	GM(Geomatics)		

Scale : 0.5 0.25 0 0.5 Km — Sheet 1of1

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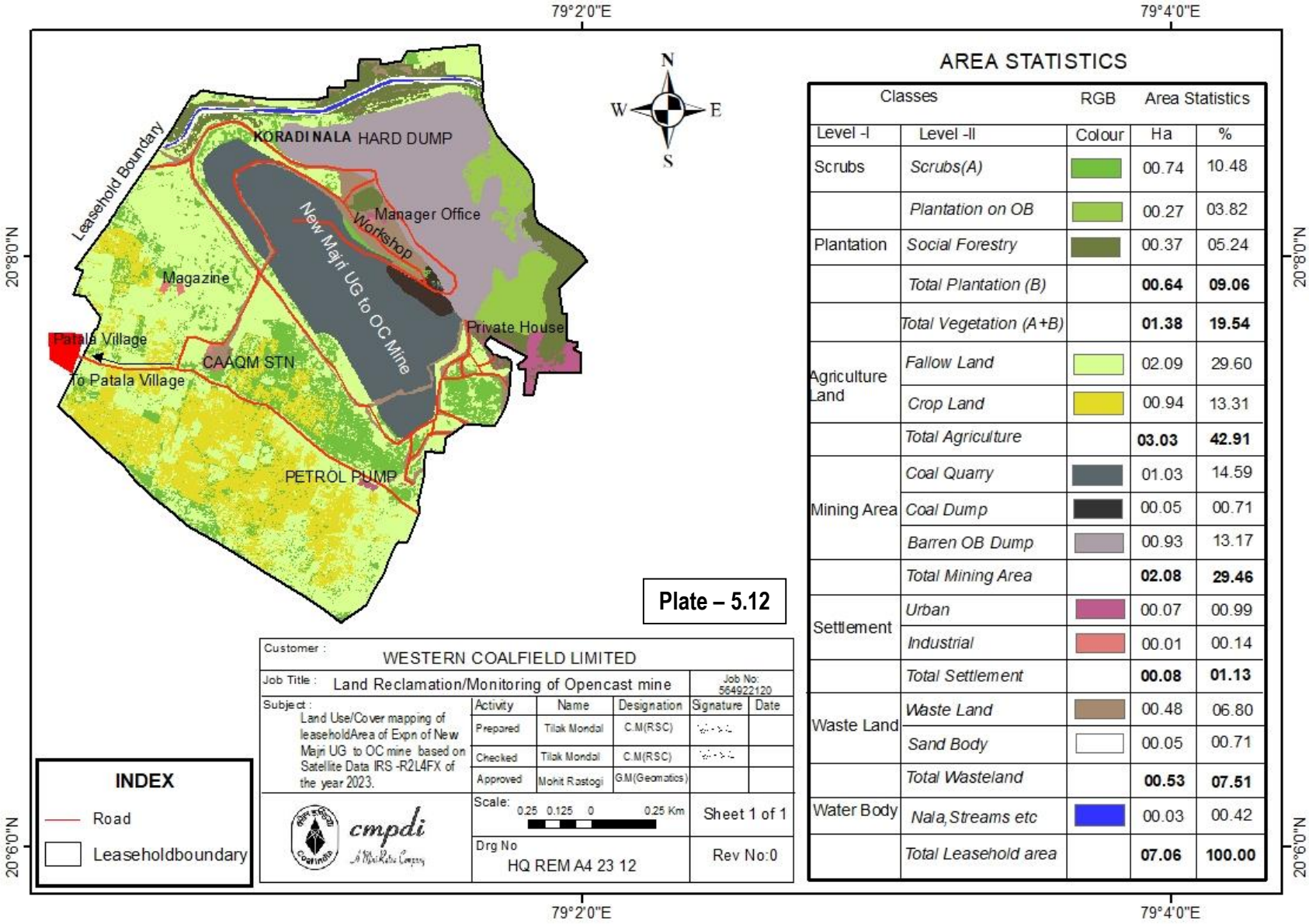
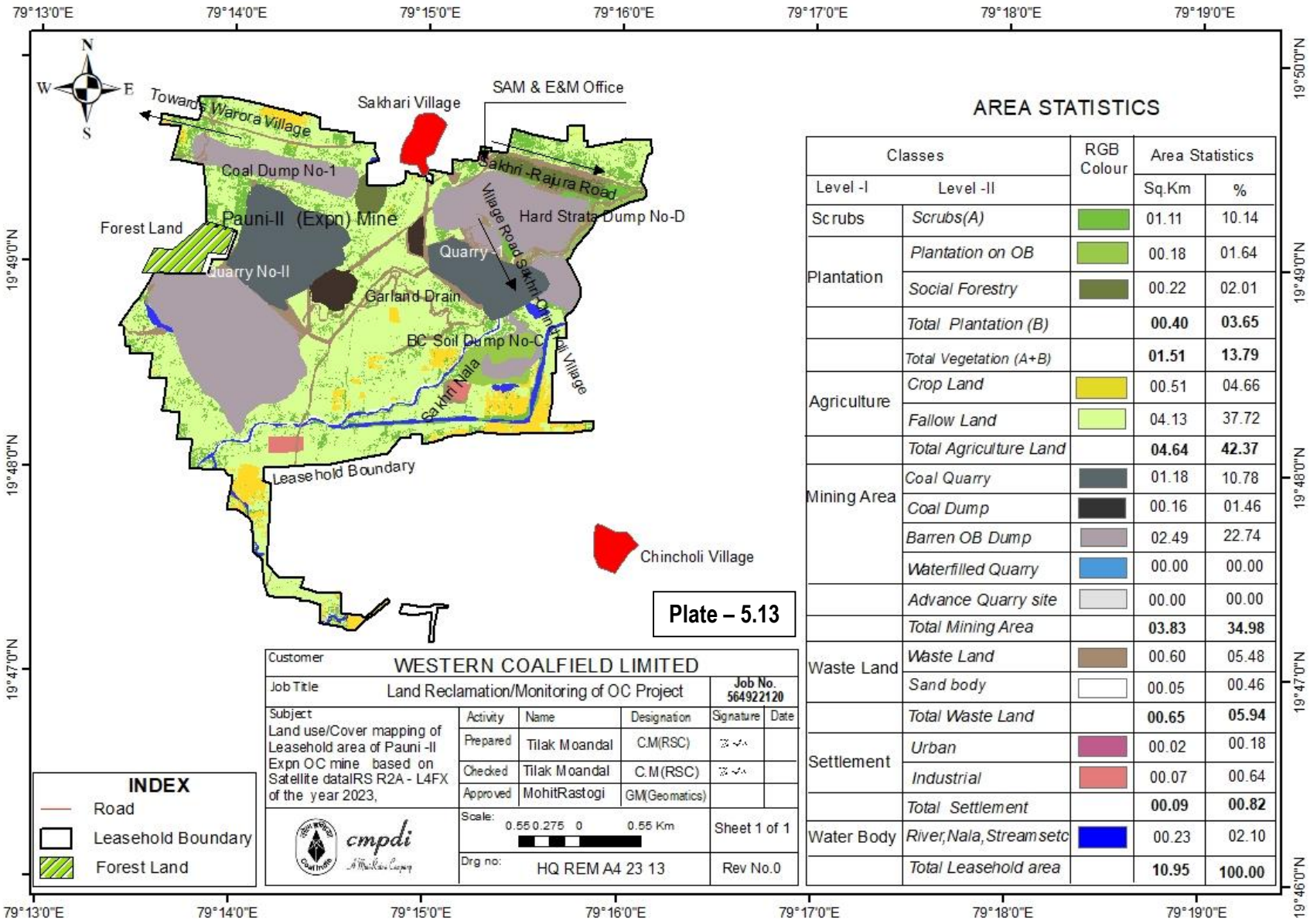


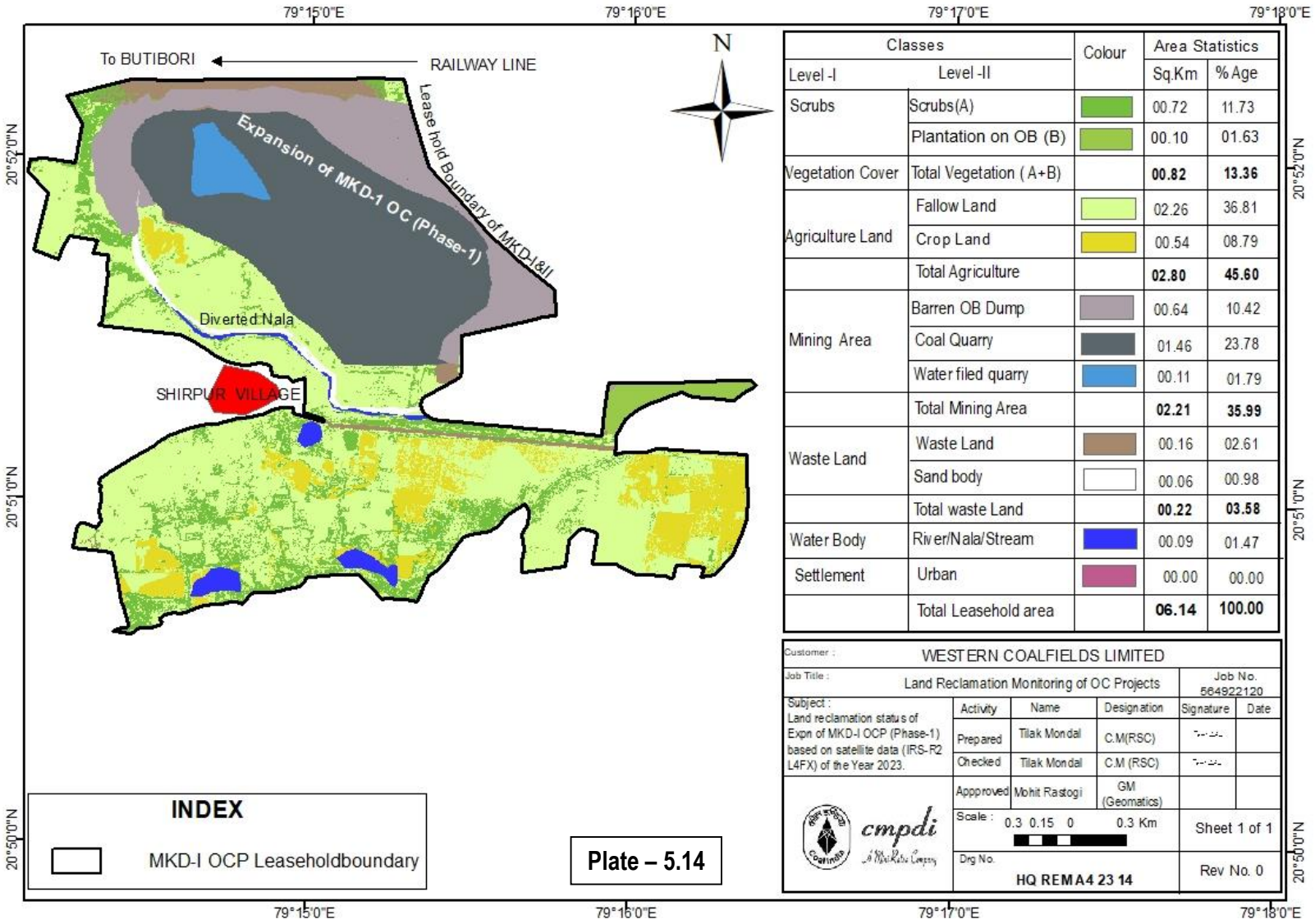
AREA STATISTICS

Classes		RGB	Area Statistics	
Level -I	Level -II	Colour	Ha	%
Scrubs	*Scrubs(A)*		00.74	10.48
	Plantation on OB		00.27	03.82
Plantation	*Social Forestry*		00.37	05.24
	Total Plantation (B)		**00.64**	**09.06**
	Total Vegetation (A+B)		**01.38**	**19.54**
Agriculture Land	*Fallow Land*		02.09	29.60
	Crop Land		00.94	13.31
	Total Agriculture		**03.03**	**42.91**
Mining Area	*Coal Quarry*		01.03	14.59
	Coal Dump		00.05	00.71
	Barren OB Dump		00.93	13.17
	Total Mining Area		**02.08**	**29.46**
Settlement	*Urban*		00.07	00.99
	Industrial		00.01	00.14
	Total Settlement		**00.08**	**01.13**
Waste Land	*Waste Land*		00.48	06.80
	Sand Body		00.05	00.71
	Total Wasteland		**00.53**	**07.51**
Water Body	*Nala,Streams etc*		00.03	00.42
	Total Leasehold area		**07.06**	**100.00**



AREA STATISTICS

Classes		RGB Colour	Area Statistics	
Level -I	Level -II		Sq.Km	%
Scrubs	*Scrubs(A)*		01.11	10.14
Plantation	*Plantation on OB*		00.18	01.64
	Social Forestry		00.22	02.01
	Total Plantation (B)		**00.40**	**03.65**
	Total Vegetation (A+B)		**01.51**	**13.79**
Agriculture	*Crop Land*		00.51	04.66
	Fallow Land		04.13	37.72
	Total Agriculture Land		**04.64**	**42.37**
Mining Area	*Coal Quarry*		01.18	10.78
	Coal Dump		00.16	01.46
	Barren OB Dump		02.49	22.74
	Waterfilled Quarry		00.00	00.00
	Advance Quarry site		00.00	00.00
	Total Mining Area		**03.83**	**34.98**
Waste Land	*Waste Land*		00.60	05.48
	Sand body		00.05	00.46
	Total Waste Land		**00.65**	**05.94**
Settlement	*Urban*		00.02	00.18
	Industrial		00.07	00.64
	Total Settlement		**00.09**	**00.82**
Water Body	*River,Nala,Streamsetc*		00.23	02.10
	Total Leasehold area		**10.95**	**100.00**



Classes		Colour	Area Statistics	
Level -I	Level -II		Sq.Km	% Age
Scrubs	Scrubs(A)		00.72	11.73
	Plantation on OB (B)		00.10	01.63
Vegetation Cover	Total Vegetation (A+B)		**00.82**	**13.36**
Agriculture Land	Fallow Land		02.26	36.81
	Crop Land		00.54	08.79
	Total Agriculture		**02.80**	**45.60**
Mining Area	Barren OB Dump		00.64	10.42
	Coal Quarry		01.46	23.78
	Water filed quarry		00.11	01.79
	Total Mining Area		**02.21**	**35.99**
Waste Land	Waste Land		00.16	02.61
	Sand body		00.06	00.98
	Total waste Land		**00.22**	**03.58**
Water Body	River/Nala/Stream		00.09	01.47
Settlement	Urban		00.00	00.00
	Total Leasehold area		**06.14**	**100.00**

Customer :	WESTERN COALFIELDS LIMITED			
Job Title :	Land Reclamation Monitoring of OC Projects		Job No. 564922120	
Subject : Land reclamation status of Expn of MKD-I OCP (Phase-1) based on satellite data (IRS-R2 L4FX) of the Year 2023.	Activity	Name	Designation	Signature / Date
	Prepared	Tilak Mondal	C.M(RSC)	
	Checked	Tilak Mondal	C.M (RSC)	
	Appproved	Mohit Rastogi	GM (Geomatics)	
cmpdi	Scale : 0.3 0.15 0 0.3 Km			Sheet 1 of 1
	Drg No. HQ REMA4 23 14			Rev No. 0

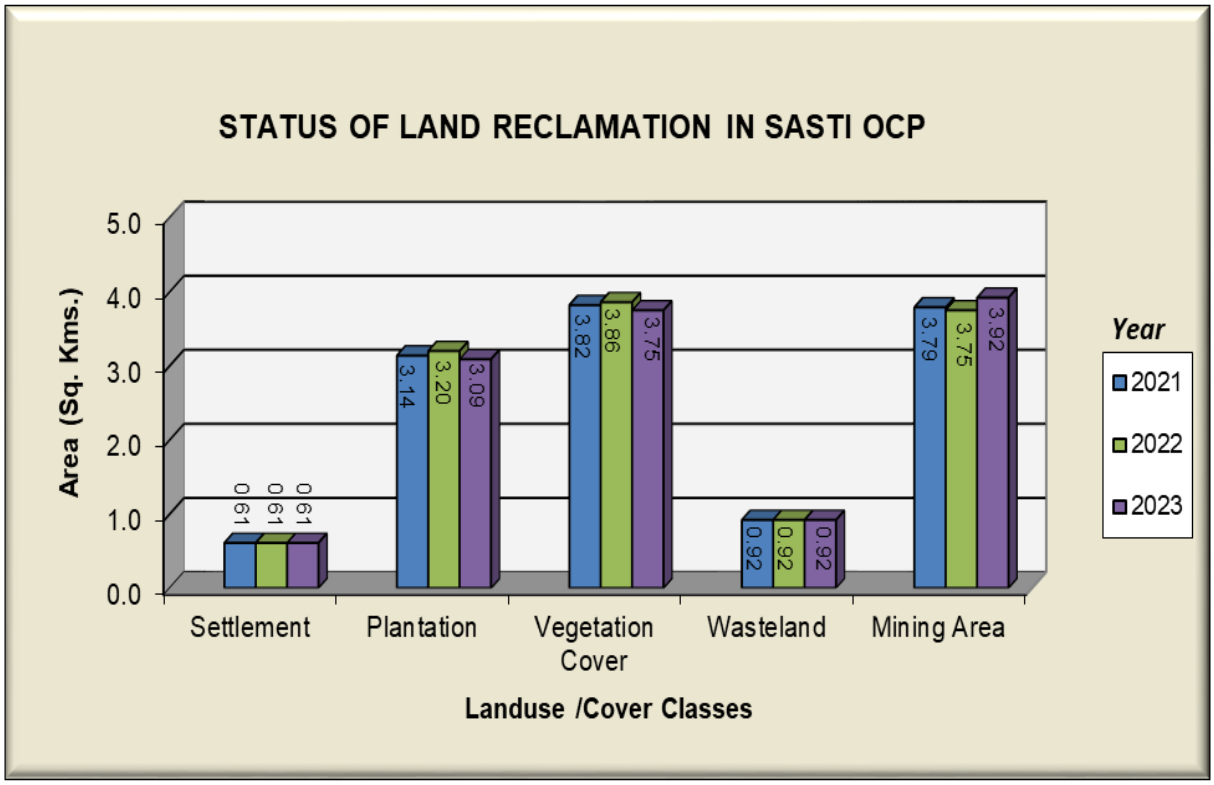


Figure - 5.2

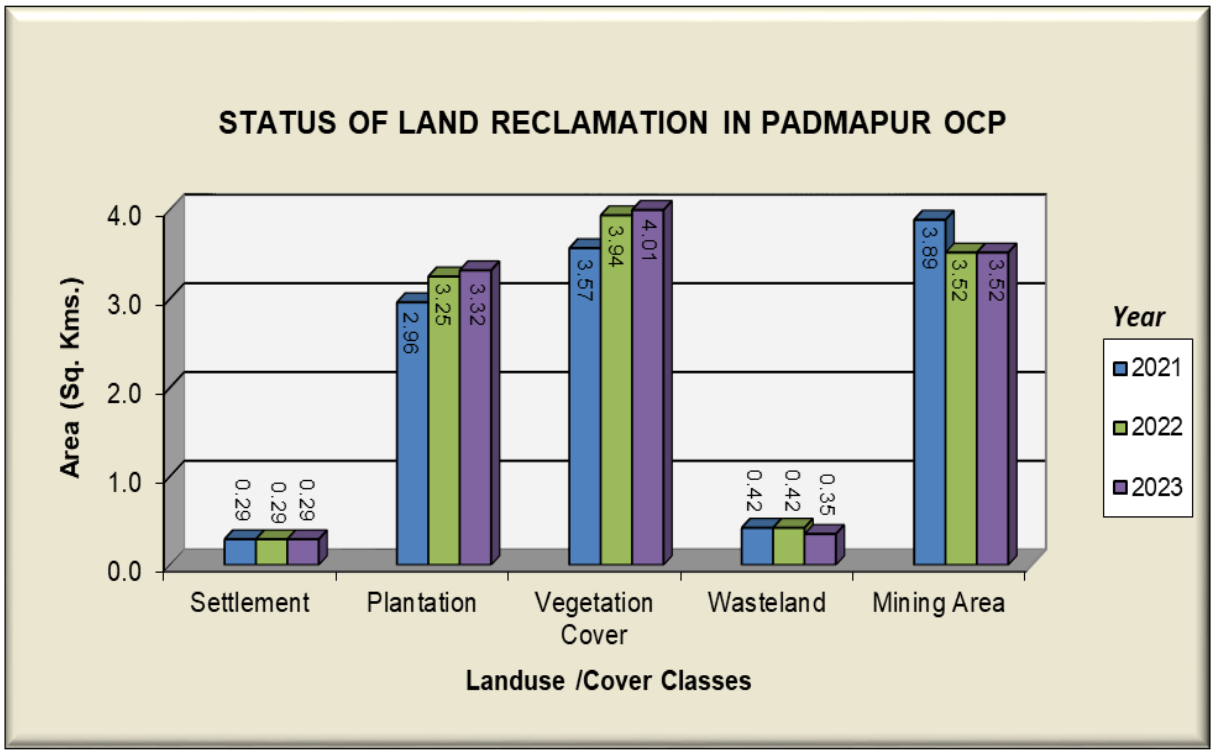


Figure - 5.3

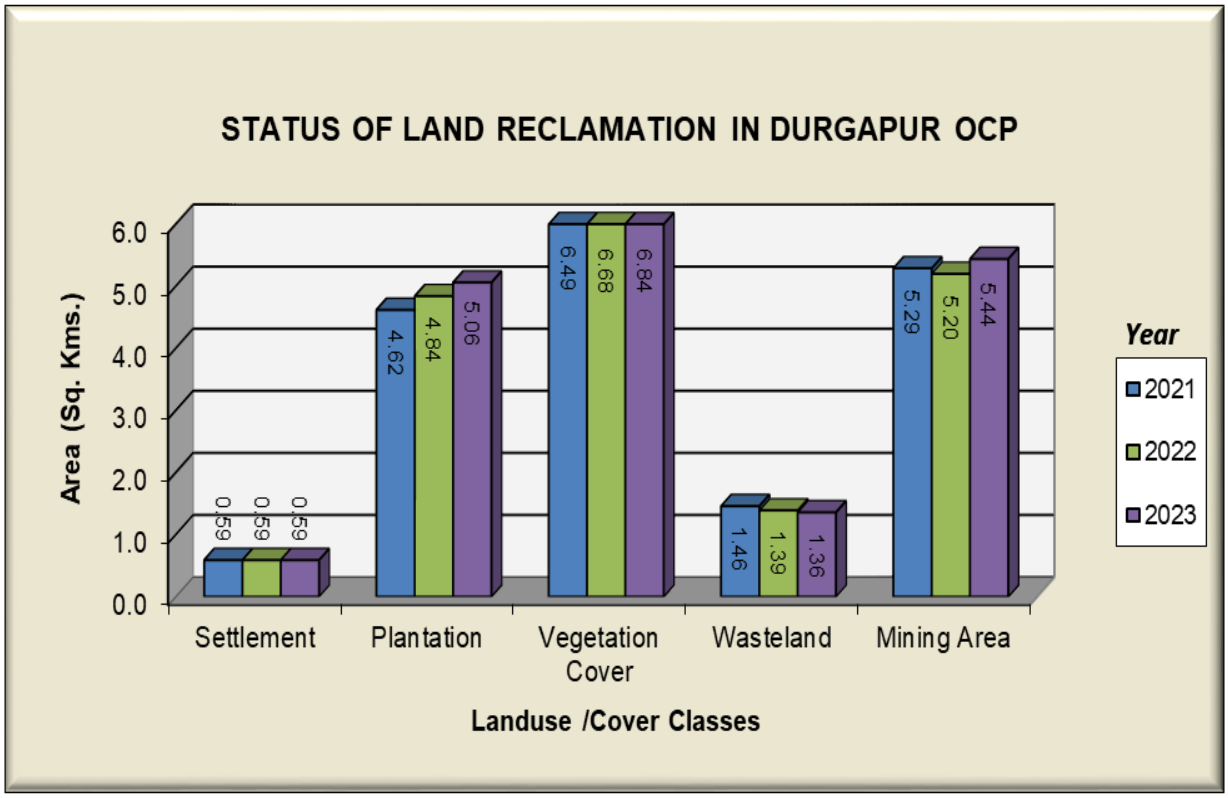


Figure - 5.4

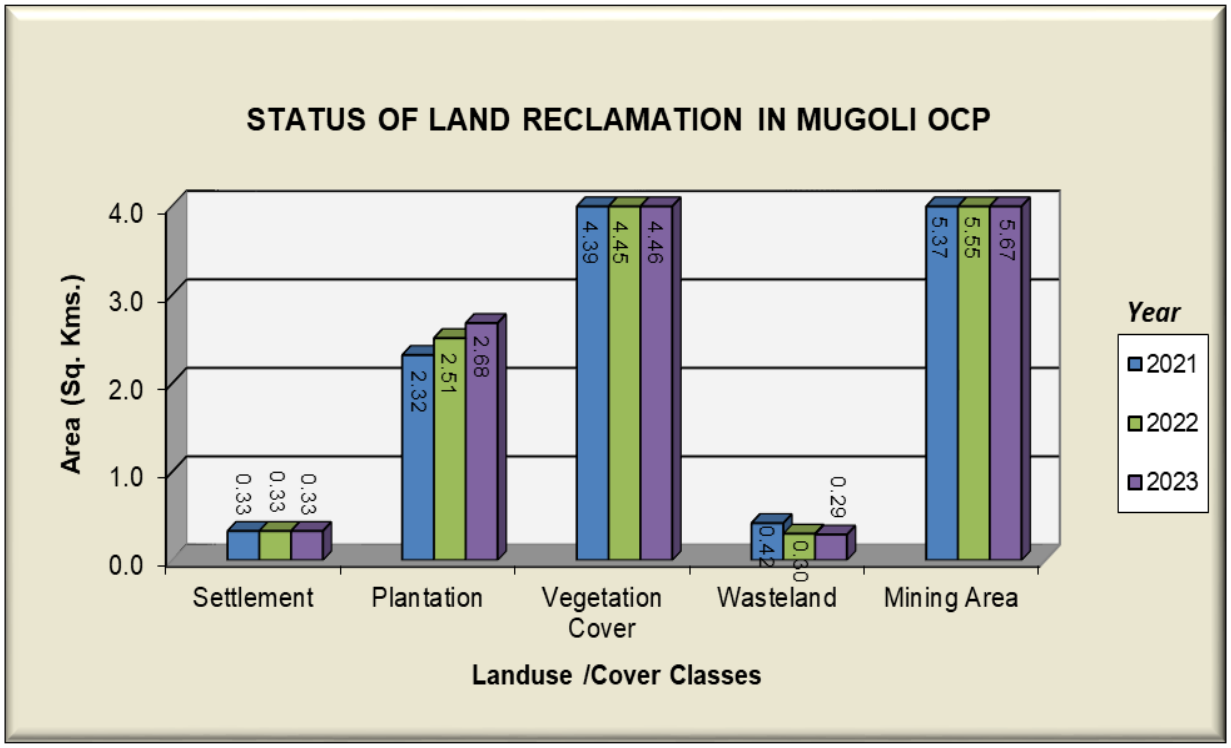


Figure - 5.5

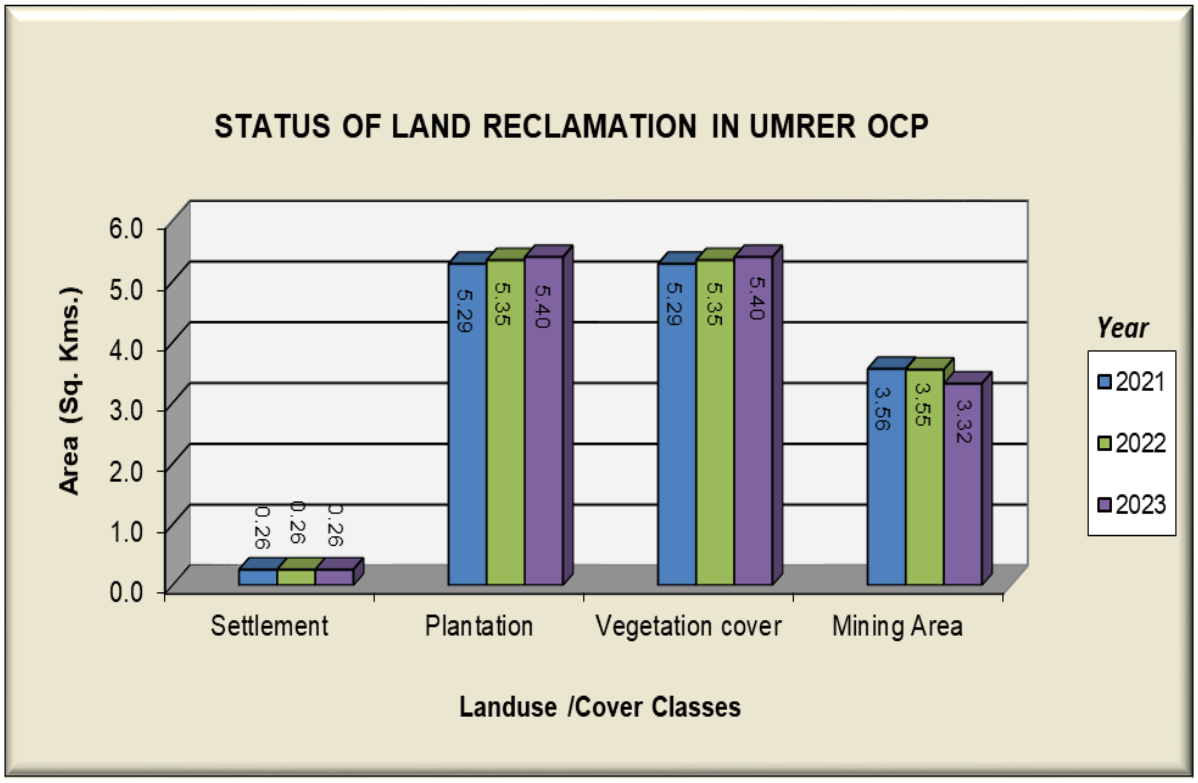


Figure - 5.6

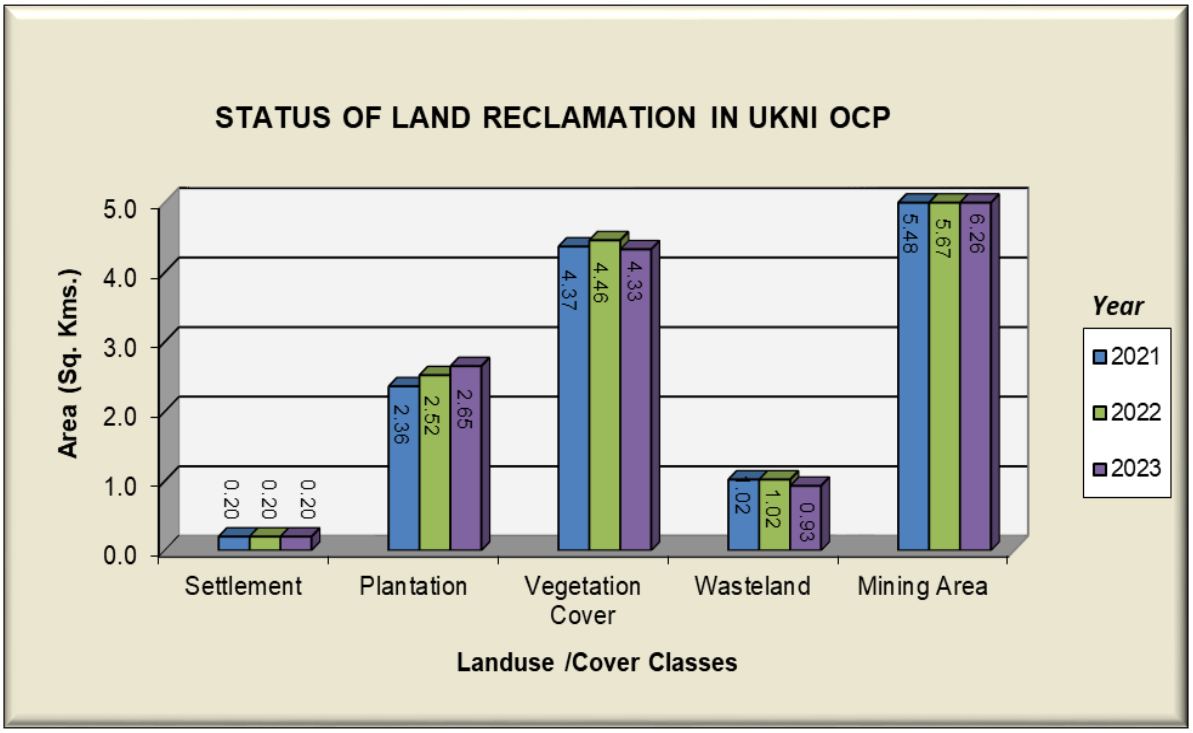


Figure - 5.7

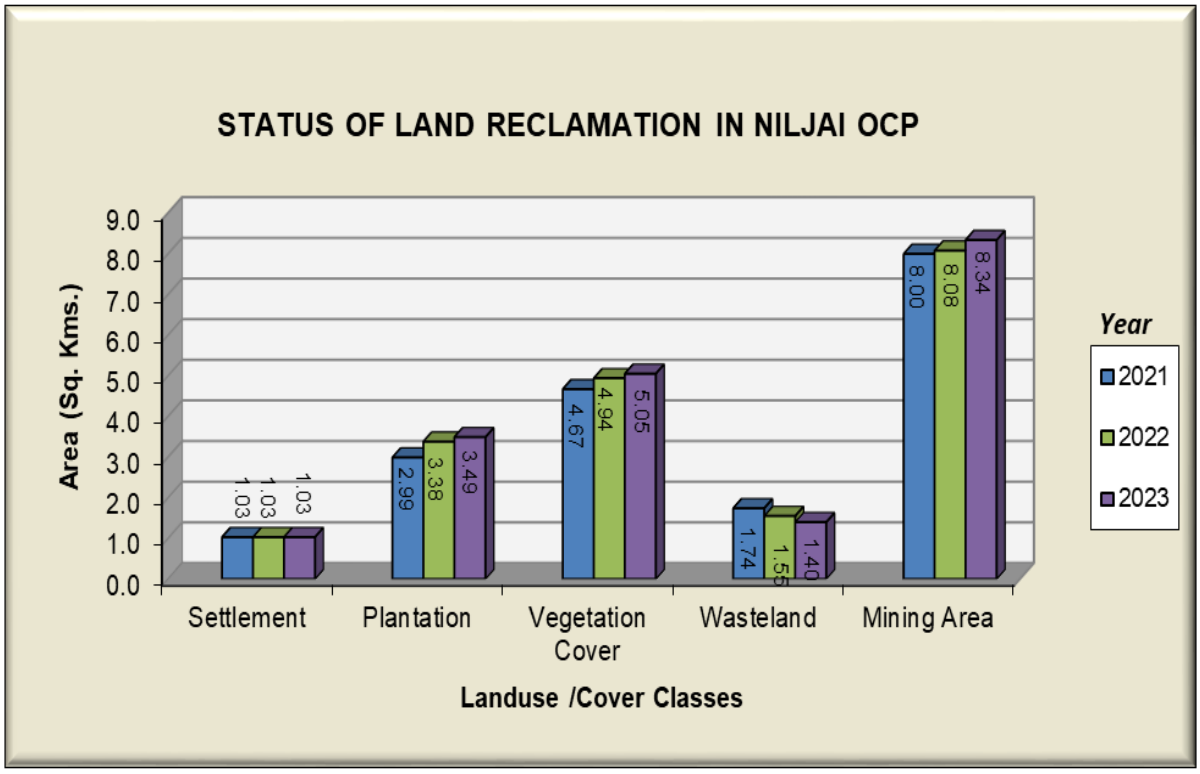


Figure - 5.8

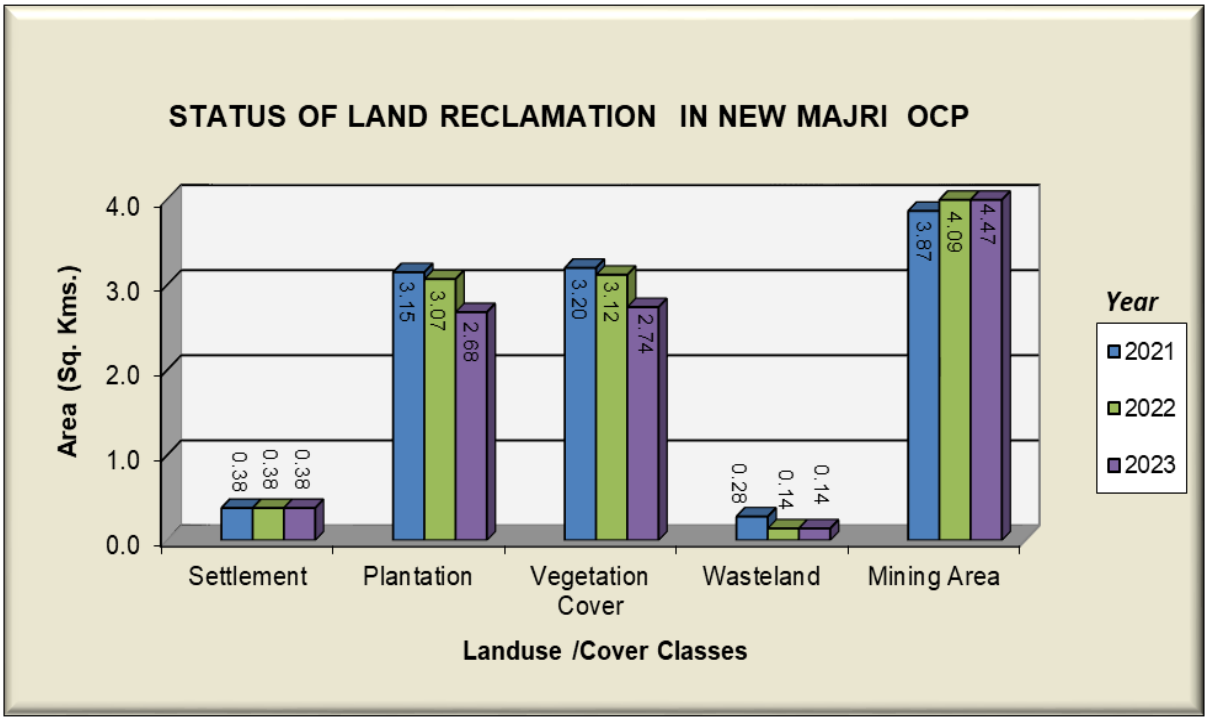


Figure - 5.9

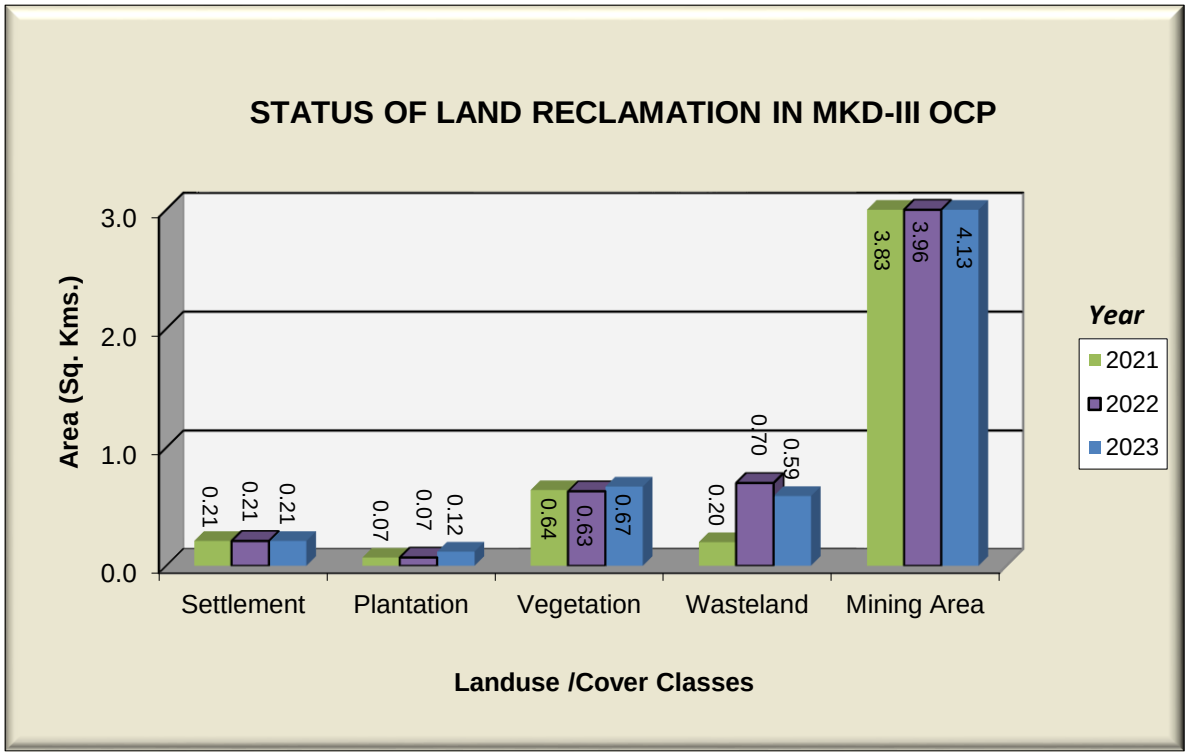


Figure – 5.10

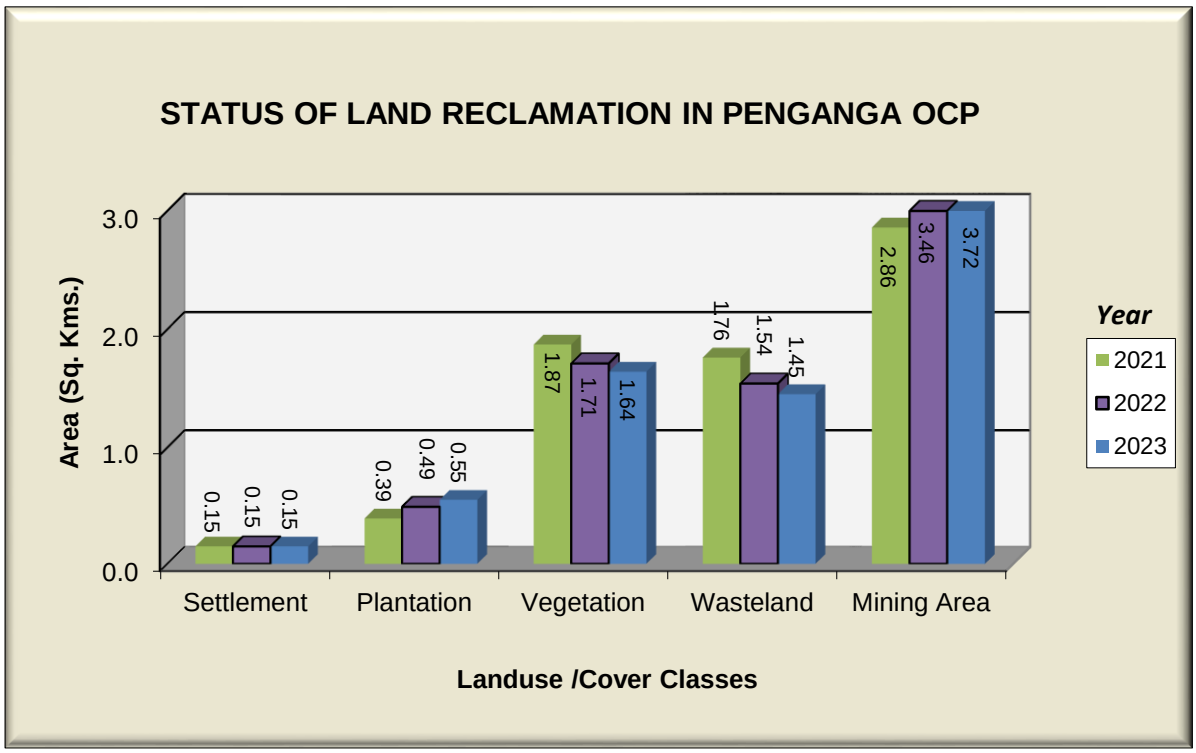


Figure - 5.11

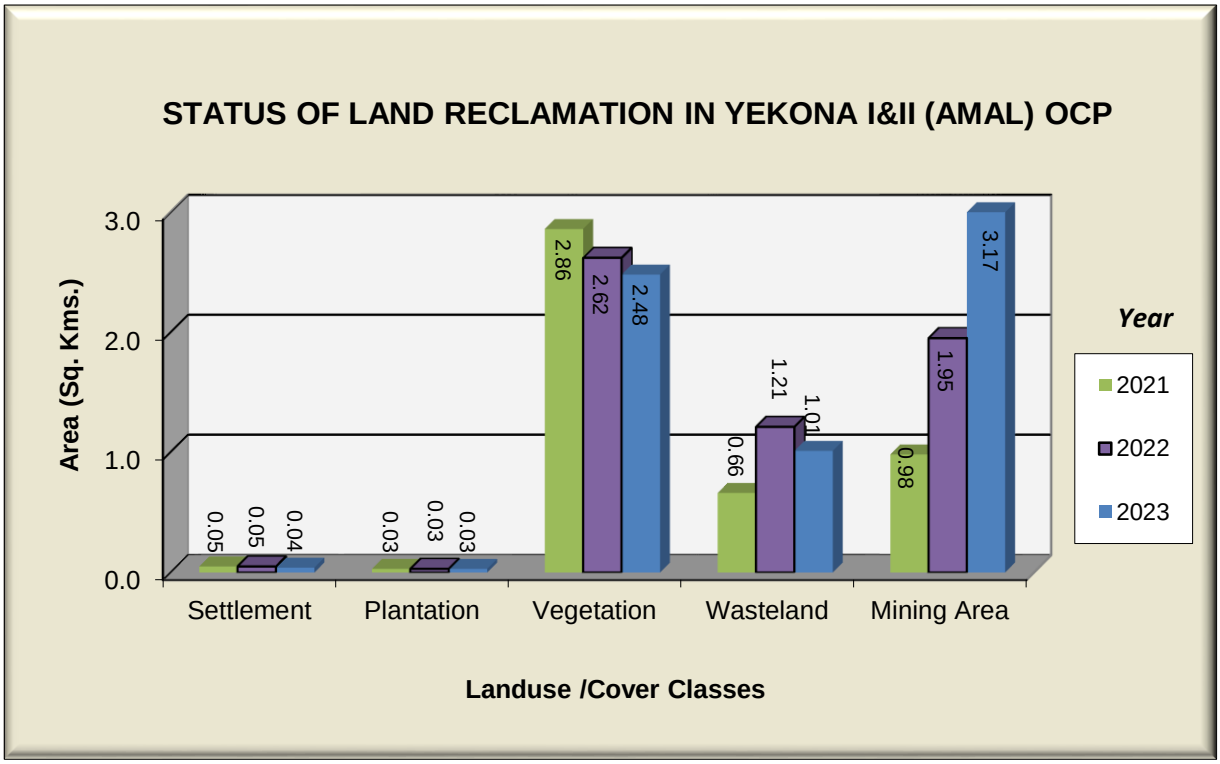


Figure - 5.12

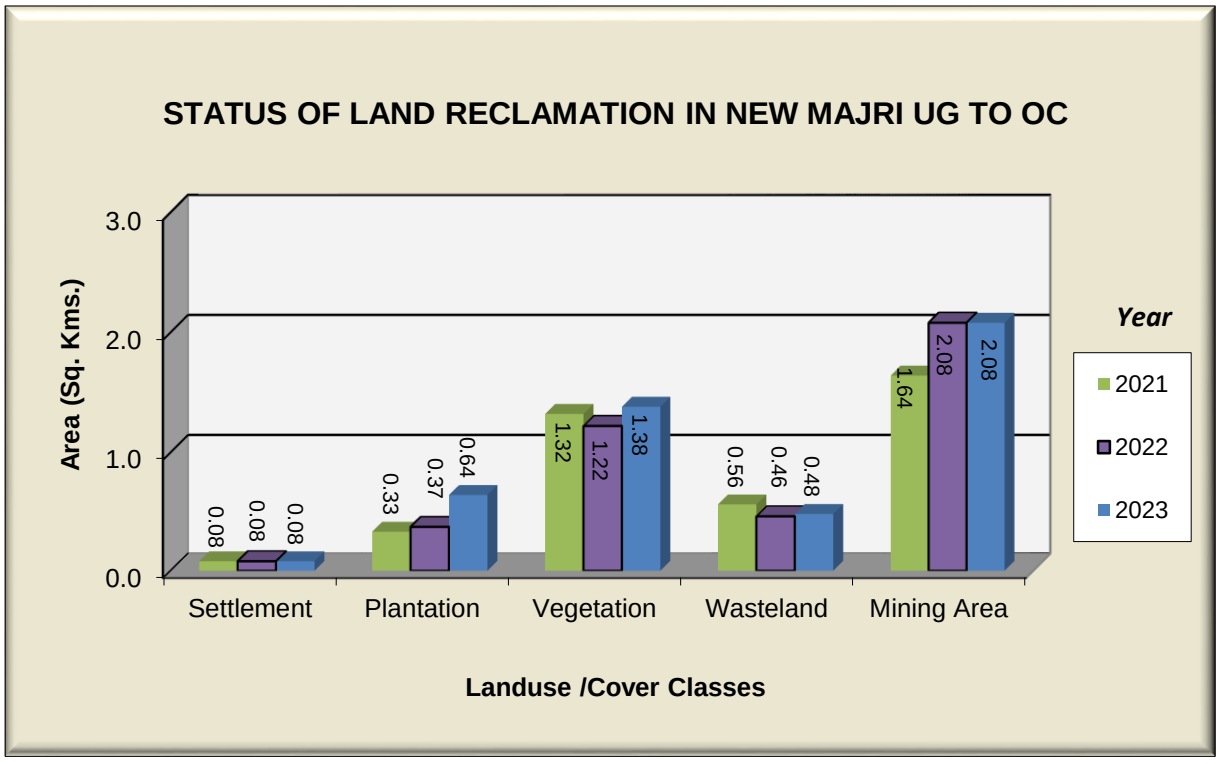


Figure - 5.13

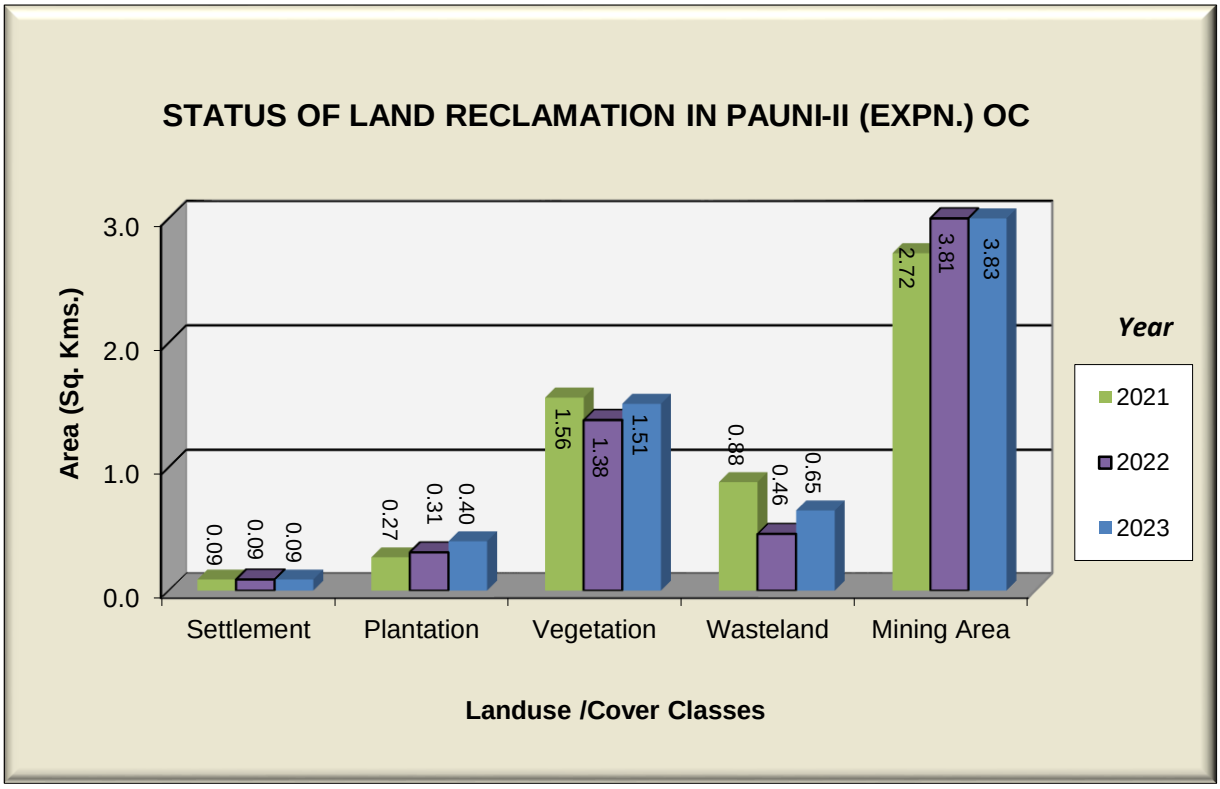


Figure - 5.14

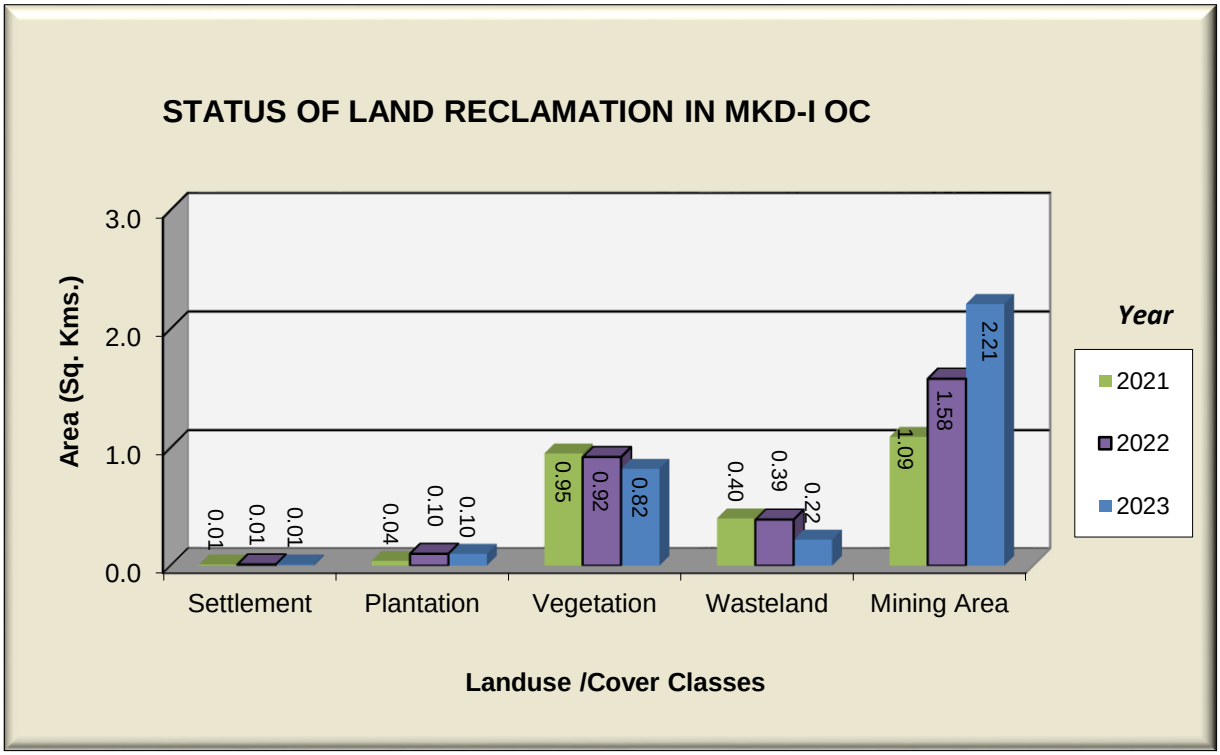


Figure - 5.15

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

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

Photograph – 5.3: **Avenue Plantation (Durgapur OCP)**

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

Photograph – 5.5: **Plantation on Internal OB Dump in Umrer OCP**

Photograph – 5.6: **Plantation on External OB dump (Ukni OCP)**

Photograph – 5.7: **Social Forestry (Niljai OCP)**

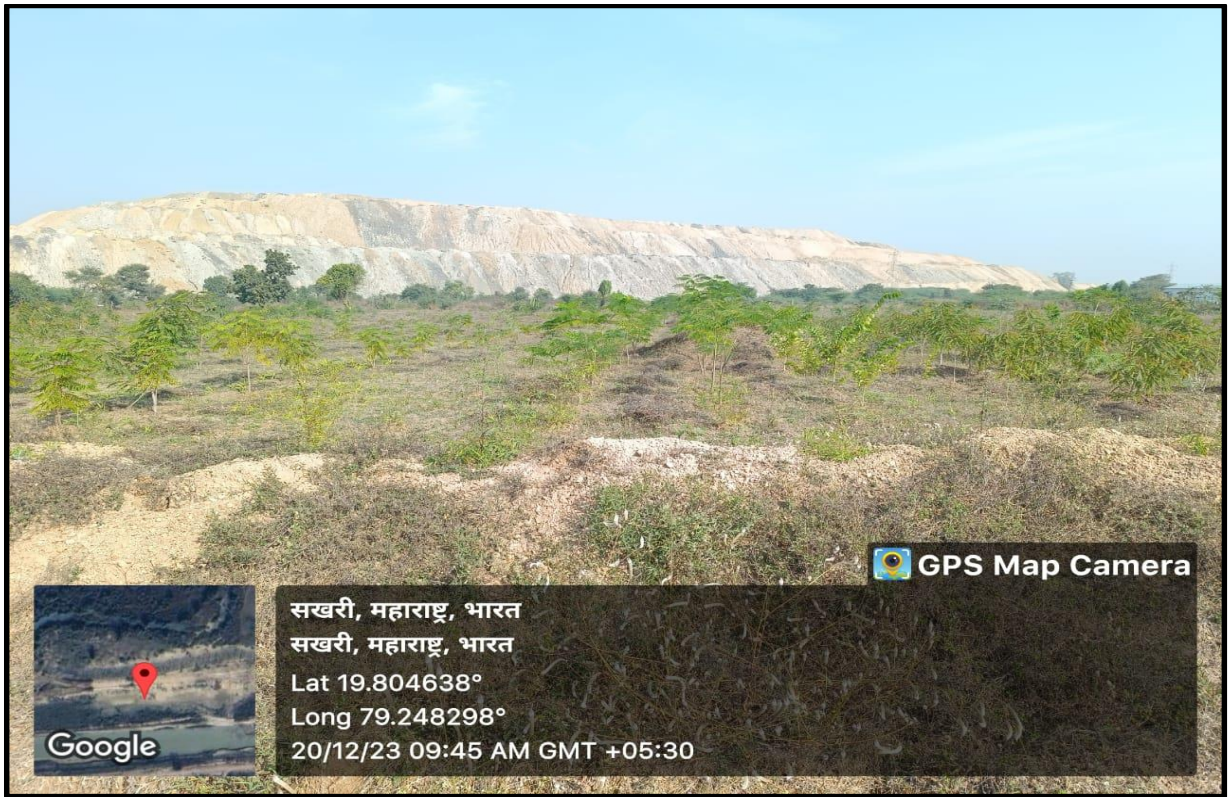
Photograph – 5.8: **Plantation on Embankment (New Majri OCP)**

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

Photograph – 5.10: **Plantation on OB dump (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 (19) 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 2023-24:

- 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 2023 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 2023 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 82.41 Km^2 excavated area; 58.02 Km^2 area (70.40%) is under reclamation, out of which 38.20 Km^2 (46.35%) area is under technical reclamation and 19.82 Km^2 (24.05%) area is already under biological reclamation.

6.4 After analyzing the satellite data of the year 2023, it is evident that area under land reclamation for the 19 projects of SECL (Table 6.1) has increased from 56.26 Km^2 (71.62%) in the year 2022 to 58.02 Km^2 (70.40%) in the year 2023 in a period of one year. There is an increase of 1.76 Km^2 of area under reclamation, out of which 1.69 Km^2 area is under technical reclamation and 0.07 Km^2 area is under Biological reclamation.

6.5 It has been also observed that although there has been overall an increase of 1.69 Km^2 of area under technical reclamation (Barren Backfilling) for the mines during the year 2023, but for projects like Chhal, Rajnagar, Chirimiri, Amera & Jamuna OCPs, area under technical reclamation has gone down slightly as compared to the year 2023 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 0.07 Km^2 of area under Biological reclamation (Plantation on Backfilled areas) for the mines during the year 2023-24. All the projects showed either an increasing or a static trend for Biological reclamation except for projects like Gevra, Kusmunda, Dhanpuri Amlai Group of mines where more areas have come under backfilling.

6.7 Plantation on external OB dump has increased from 11.89 Km^2 in the year 2022 to 11.22 Km^2 in the year 2023. The projects showed either a slight increase or static trend during the year 2023 except for Gevra, Kusmunda, Manikpur, Baroud OCPs due to

dumping of OB on vegetated areas owing to constrain in availability of dumping areas and new infrastructure development.

6.8 Plantation under social forestry has increased from 9.57 Km^2 in the year 2022 to 9.56 Km^2 in the year 2023. The projects showed either a slight increase or static trend during the year 2023 except for Kusmunda where social forestry decreased from 1.49 Km^2 (Yr. 2022) to 1.40 Km^2 (Yr 2023) due to mine advance and other associated reasons.

6.9 Total Green Cover generated in the leasehold of the nineteen projects has decreased from 41.21 Km^2 (20.66%) in the year 2022 to 40.60 Km^2 (20.35%) in the year 2023 in a period of one year. There has been a decrease of 0.61 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 2023-24 except for Gevra, Kusmunda, Manikpur, Baroud and Dhanpuri Amlai Group of Mines. The decrease in the total green cover of these projects is due to advancement of mining and in some cases dumping of OB on vegetated areas owing to constrain in availability of dumping areas.

6.10 Out of 19 projects of SECL, Chirimiri OCP ranks on top for land reclamation (89.60%) followed by Jamuna OCP (88.08%) and Rajnagar OCP (83.82%) in the year 2023-24.

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 2023

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		Other Plantation											
				Area under Backfilling		Plantation on Excavated/ Backfilled		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)	
		2022	2023	2022	2023	2022	2023	2022	2023	2022	2023	2022	2023	2022	2023	2022	2023	2022	2023
1	Dipka	19.99	19.99	4.15	4.21	1.01	1.06	1.84	1.91	1.67	1.65	2.48	2.49	7.64	7.76	4.52	4.62	5.16	5.27
				54.32%	54.25%	13.22%	13.66%					32.46%	32.09%			22.61%	23.11%	67.54%	67.91%
2	Gevra	41.84	41.84	9.22	9.50	2.67	2.26	4.28	4.14	3.28	3.31	5.76	6.74	17.65	18.50	10.23	9.71	11.89	11.76
				52.24%	51.35%	15.13%	12.22%					32.63%	36.43%			24.45%	23.21%	67.37%	63.57%
3	Kusmunda	16.72	16.72	4.05	4.43	1.35	1.20	1.96	1.80	1.49	1.40	2.64	2.62	8.04	8.25	4.80	4.40	5.40	5.63
				50.37%	53.70%	16.79%	14.55%					32.84%	31.76%			28.71%	26.32%	67.16%	68.24%
4	Manikpur	10.20	10.20	1.56	1.61	0.79	0.80	1.31	0.90	0.38	0.38	2.02	2.01	4.37	4.42	2.48	2.08	2.35	2.41
				35.70%	36.43%	18.08%	18.10%					46.22%	45.48%			24.31%	20.39%	53.78%	54.52%
5	Saraipali	2.79	2.79	0.04	0.31	0.00	0.00	0.00	0.00	0.02	0.02	0.37	0.48	0.41	0.79	0.02	0.02	0.04	0.31
				9.76%	39.24%	0.00%	0.00%					90.24%	60.76%			0.72%	0.72%	9.76%	39.24%
6	Ambika	1.34	1.34	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%			2.24%	2.24%	0.00%	0.00%
7	Jampali	5.83	5.83	1.11	1.32	0.27	0.27	0.00	0.00	0.01	0.01	1.20	1.18	2.58	2.77	0.28	0.28	1.38	1.59
				43.02%	47.65%	10.47%	9.75%					46.51%	42.60%			4.80%	4.80%	53.49%	57.40%
8	Baroud	11.11	11.11	2.07	2.15	0.61	0.67	0.34	0.26	0.15	0.15	0.72	1.17	3.40	3.99	1.10	1.08	2.68	2.82
				60.88%	53.88%	17.94%	16.79%					21.18%	29.32%			9.90%	9.72%	78.82%	70.68%
9	Bijari	2.73	2.73	0.25	0.37	0.00	0.01	0.00	0.01	0.04	0.04	0.33	0.38	0.58	0.76	0.04	0.06	0.25	0.38
				43.10%	48.68%	0.00%	1.32%					56.90%	50.00%			1.47%	2.20%	43.10%	50.00%
10	Chhal	12.07	12.07	2.13	2.11	0.17	0.19	0.00	0.01	0.43	0.44	0.88	1.09	3.18	3.39	0.60	0.64	2.30	2.30
				66.98%	62.24%	5.35%	5.60%					27.67%	32.15%			4.97%	5.30%	72.33%	67.85%
11	Dhanpuri Amlai Group of Mines	14.59	14.59	3.76	3.97	2.52	2.43	1.80	1.80	0.18	0.18	1.18	1.35	7.46	7.75	4.50	4.41	6.28	6.40
				50.40%	51.23%	33.78%	31.35%					15.82%	17.42%			30.84%	30.23%	84.18%	82.58%
12	Rajnagar	7.30	7.30	1.94	1.69	3.24	3.49	0.00	0.00	0.26	0.26	0.96	1.00	6.14	6.18	3.50	3.75	5.18	5.18
				31.60%	27.35%	52.77%	56.47%					15.64%	16.18%			47.95%	51.37%	84.36%	83.82%
13	Chirimiri	5.44	5.44	1.54	1.49	1.13	1.18	0.00	0.00	0.15	0.15	0.23	0.31	2.90	2.98	1.28	1.33	2.67	2.67
				53.10%	50.00%	38.97%	39.60%					7.93%	10.40%			23.53%	24.45%	92.07%	89.60%
14	Mahan II	2.97	2.97	1.00	1.01	0.53	0.54	0.05	0.05	0.04	0.07	0.69	0.69	2.22	2.24	0.62	0.66	1.53	1.55
				45.05%	45.09%	23.87%	24.11%					31.08%	30.80%			20.88%	22.22%	68.92%	69.20%
15	Jagannathpur	6.62	6.62	0.58	1.11	0.00	0.02	0.00	0.00	0.15	0.17	0.90	0.88	1.48	2.01	0.15	0.19	0.58	1.13
				39.19%	55.22%	0.00%	1.00%					60.81%	43.78%			2.27%	2.87%	39.19%	56.22%
16	Amadand	13.05	13.05	1.49	1.49	0.00	0.04	0.23	0.26	0.65	0.66	0.84	0.86	2.33	2.39	0.88	0.96	1.49	1.53
				63.95%	62.34%	0.00%	1.67%	-				36.05%	35.98%			6.74%	7.36%	63.95%	64.02%
17	Batura	9.43	9.43	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.05	0.00	0.05	0.00	0.05	0.05	0.05	0.00	0.00
				0.00%	0.00%	0.00%	0.00%					0.00%	100.00%			0.53%	0.53%	0.00%	0.00%
18	Amera	6.64	6.64	0.95	0.89	0.30	0.36	0.08	0.08	0.44	0.44	0.30	0.30	1.55	1.55	0.82	0.88	1.25	1.25
				61.29%	57.42%	19.35%	23.23%					19.35%	19.35%			12.35%	13.25%	80.65%	80.65%
19	Jamuna	8.85	8.85	0.67	0.54	5.16	5.30	0.00	0.00	0.15	0.15	0.79	0.79	6.62	6.63	5.31	5.45	5.83	5.84
				10.12%	8.14%	77.95%	79.94%					11.93%	11.92%			60.00%	61.58%	88.07%	88.08%
Total SECL (MT5 - 19)		199.51	199.51	36.51	38.20	19.75	19.82	11.89	11.22	9.57	9.56	22.29	24.39	78.55	82.41	41.21	40.60	56.26	58.02
				46.48%	46.35%	25.14%	24.05%					28.38%	29.60%			20.66%	20.35%	71.62%	70.40%

(% is calculated with respect 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., 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".*

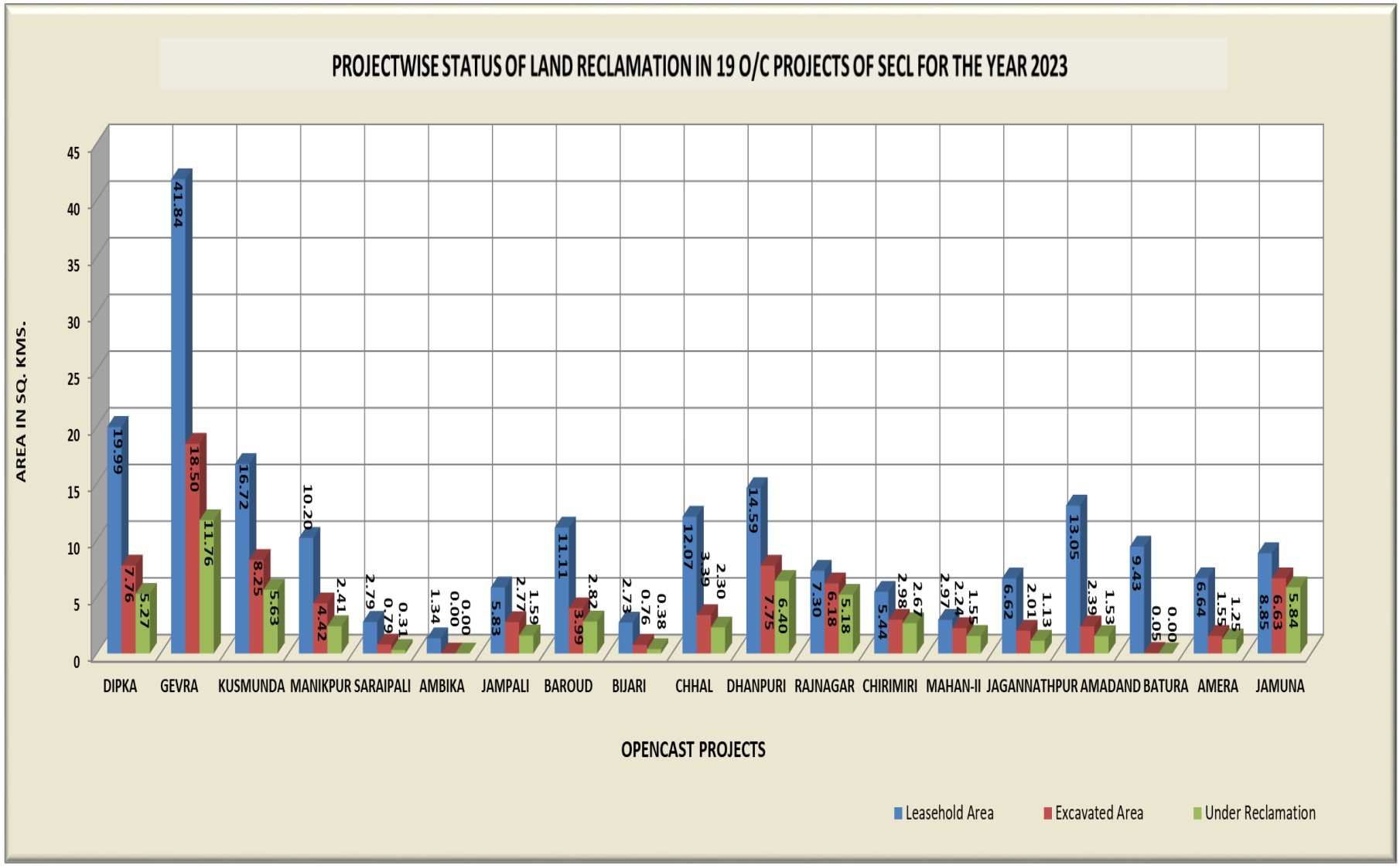


Fig.6.1: ***Project wise Land reclamation status in OC projects of SECL in the year-2023***

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 2023

(Area in sq km)

	LAND USE / COVER CLASSES	CLR CODE	DIPKA		GEVRA		KUSMUNDA		MANIKPUR		SARAIPALI		AMBIKA		JAMPALI		BAROUD		BIJARI	
			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	0.55	9.43	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	0.09	3.23	0.03	2.24	0.76	13.04	1.20	10.80	0.00	0.00
	Total Forest (A)		**0.01**	**0.05**	**0.00**	**0.00**	**0.00**	**0.00**	**0.08**	**0.78**	**0.09**	**3.23**	**0.03**	**2.24**	**1.31**	**22.47**	**1.20**	**10.80**	**0.00**	**0.00**
GREEN COVER	Scrubs (B)		2.14	10.69	3.30	7.89	0.81	4.84	0.72	7.06	0.15	5.38	0.13	9.70	0.24	4.12	1.90	17.10	0.53	19.41
	Social Forestry (C)		1.65	8.26	3.31	7.91	1.40	8.35	0.38	3.74	0.02	0.72	0.03	2.24	0.01	0.17	0.15	1.35	0.04	1.47
	Plantation on External OB Dump		1.91	9.56	4.14	9.89	1.80	10.76	0.90	8.83	0.00	0.00	0.00	0.00	0.00	0.00	0.26	2.34	0.01	0.40
	Plantation over Backfilled Areas ***(Biological Reclamation)***		1.06	5.32	2.26	5.40	1.20	7.19	0.80	7.85	0.00	0.00	0.00	0.00	0.27	4.63	0.67	6.03	0.01	0.33
	Total Area under Plantation (Green Cover) (D)		**4.63**	**23.14**	**9.71**	**23.20**	**4.40**	**26.30**	**2.08**	**20.42**	**0.02**	**0.72**	**0.03**	**2.24**	**0.28**	**4.80**	**1.08**	**9.72**	**0.06**	**2.20**
	Total Vegetation (A to D)		**6.77**	**33.88**	**13.01**	**31.09**	**5.21**	**31.14**	**2.88**	**28.26**	**0.26**	**9.33**	**0.19**	**14.18**	**1.83**	**31.39**	**4.18**	**37.62**	**0.59**	**21.61**
AREA UNDER ACTIVE MINING	Coal Quarry		1.79	8.96	5.50	13.15	1.98	11.84	1.83	17.95	0.24	8.60	0.00	0.00	0.92	15.78	0.49	4.41	0.24	8.79
	Coal Dump		0.51	2.55	0.18	0.43	0.32	1.89	0.08	0.78	0.07	2.51	0.00	0.00	0.19	3.26	0.12	1.08	0.04	1.47
	Advance Quarry Site		0.02	0.10	0.24	0.57	0.18	1.06	0.01	0.10	0.16	5.73	0.00	0.00	0.07	1.20	0.14	1.26	0.03	1.10
	Quarry Filled With Water		0.17	0.85	0.82	1.96	0.14	0.82	0.09	0.88	0.01	0.36	0.00	0.00	0.00	0.00	0.42	3.78	0.07	2.56
	Total Area under Active Mining (F)		**2.49**	**12.46**	**6.74**	**16.11**	**2.61**	**15.61**	**2.01**	**19.71**	**0.48**	**17.20**	**0.00**	**0.00**	**1.18**	**20.24**	**1.17**	**10.53**	**0.38**	**13.92**
	Barren OB Dump (G)		0.45	2.25	0.58	1.39	0.10	0.57	1.39	13.63	0.44	15.77	0.00	0.00	0.28	4.80	0.37	3.29	0.14	5.13
TECHNICAL RECLAMATION	Area under Barren Backfilling		4.21	21.06	9.50	22.71	4.43	26.49	1.61	15.79	0.31	11.11	0.00	0.00	1.32	22.64	2.15	19.35	0.37	13.55
	Total Area under *Technical Reclamation (H)*		**4.21**	**21.06**	**9.50**	**22.71**	**4.43**	**26.49**	**1.61**	**15.79**	**0.31**	**11.11**	**0.00**	**0.00**	**1.32**	**22.64**	**2.15**	**19.35**	**0.37**	**13.55**
	Total Area under Mining Activity (F+G+H)		**7.15**	**35.77**	**16.82**	**40.21**	**7.14**	**42.67**	**5.01**	**49.13**	**1.23**	**44.08**	**0.00**	**0.00**	**2.78**	**47.68**	**3.69**	**33.17**	**0.89**	**32.60**
WASTELANDS	Waste Lands		2.30	11.50	4.62	11.04	1.55	9.27	0.66	6.49	0.17	6.09	0.03	2.24	0.48	8.23	0.46	4.14	0.15	5.49
	Sand Body		0.00	0.00	0.00	0.00	0.10	0.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.09	0.00	0.00
	Total Wasteland (I)		**2.30**	**11.50**	**4.62**	**11.04**	**1.65**	**9.88**	**0.66**	**6.49**	**0.17**	**6.09**	**0.03**	**2.24**	**0.48**	**8.23**	**0.47**	**4.23**	**0.15**	**5.49**
WATERBODIES	Reservoir, nallah, ponds		0.40	2.00	0.24	0.57	0.20	1.22	0.20	1.97	0.10	3.58	0.02	1.49	0.02	0.26	0.14	1.26	0.01	0.37
	Total Waterbodies (J)		**0.40**	**2.00**	**0.24**	**0.57**	**0.20**	**1.22**	**0.20**	**1.97**	**0.10**	**3.58**	**0.02**	**1.49**	**0.02**	**0.26**	**0.14**	**1.26**	**0.01**	**0.37**
AGRICULTURE	Crop Lands		0.06	0.30	0.44	1.05	0.40	2.39	0.05	0.49	0.10	3.58	0.17	12.69	0.00	0.00	0.24	2.16	0.05	1.83
	Fallow Lands		1.19	5.95	3.47	8.29	1.00	5.95	0.87	8.55	0.91	32.62	0.90	67.16	0.71	12.18	2.18	19.62	1.00	36.63
	Total Agriculture (K)		**1.25**	**6.25**	**3.91**	**9.34**	**1.40**	**8.35**	**0.92**	**9.04**	**1.01**	**36.20**	**1.07**	**79.85**	**0.71**	**12.18**	**2.42**	**21.78**	**1.05**	**38.46**
SETTLEMENTS	Urban Settlement		0.56	2.80	0.91	2.18	0.17	0.99	0.06	0.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Rural Settlement		0.67	3.35	0.89	2.13	0.27	1.63	0.13	1.28	0.01	0.36	0.03	2.24	0.02	0.26	0.11	0.99	0.04	1.47
	Industrial Settlement		0.89	4.45	1.44	3.44	0.69	4.12	0.33	3.24	0.01	0.36	0.00	0.00	0.00	0.00	0.11	0.95	0.00	0.00
	Total Settlement (L)		**2.12**	**10.60**	**3.24**	**7.75**	**1.13**	**6.74**	**0.52**	**5.11**	**0.02**	**0.72**	**0.03**	**2.24**	**0.02**	**0.26**	**0.22**	**1.94**	**0.04**	**1.47**
	Grand Total (A to L)		**19.99**	**100.00**	**41.84**	**100.00**	**16.72**	**100.00**	**10.20**	**100.00**	**2.79**	**100.00**	**1.34**	**100.00**	**5.83**	**100.00**	**11.11**	**100.00**	**2.73**	**100.00**

Table 6.2 (B)

	LAND USE / COVER CLASSES	CLR CODE	CHHAL		DHANPURI		RAJNAGAR		CHIRIMIRI		MAHAN-II		JAGANNATHPUR		AMADAND		BATURA		AMERA		JAMUNA		TOTAL	
			Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%
FORESTS	Dense Forest		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.55	0.28
	Open Forest		1.70	14.08	0.78	5.35	0.00	0.00	0.76	13.97	0.06	2.02	0.07	1.06	0.00	0.00	0.20	2.12	0.00	0.00	0.00	0.00	5.74	2.88
	Total Forest (A)		**1.70**	**14.08**	**0.78**	**5.35**	**0.00**	**0.00**	**0.76**	**13.97**	**0.06**	**2.02**	**0.07**	**1.06**	**0.00**	**0.00**	**0.20**	**2.12**	**0.00**	**0.00**	**0.00**	**0.00**	**6.29**	**3.15**
GREEN COVER	Scrubs (B)		1.92	15.91	1.89	12.95	0.23	3.15	0.84	15.44	0.24	8.08	0.33	4.98	0.27	2.07	1.65	17.50	0.13	1.96	0.51	5.76	**17.93**	**8.99**
	Social Forestry (C)		0.44	3.65	0.18	1.23	0.26	3.56	0.15	2.76	0.07	2.36	0.17	2.57	0.66	5.06	0.05	0.53	0.44	6.63	0.15	1.69	**9.56**	**4.79**
	Plantation on External OB Dump		0.01	0.08	1.80	12.34	0.00	0.00	0.00	0.00	0.05	1.68	0.00	0.00	0.26	1.99	0.00	0.00	0.08	1.20	0.00	0.00	11.22	5.62
	Plantation over Backfilled Areas ***(Biological Reclamation)***		0.19	1.57	2.43	16.66	3.49	47.81	1.18	21.69	0.54	18.18	0.02	0.30	0.04	0.31	0.00	0.00	0.36	5.42	5.30	59.89	19.83	9.94
	Total Area under Plantation (Green Cover) (D)		**0.64**	**5.30**	**4.41**	**30.23**	**3.75**	**51.37**	**1.33**	**24.45**	**0.66**	**22.22**	**0.19**	**2.87**	**0.96**	**7.36**	**0.05**	**0.53**	**0.88**	**13.25**	**5.45**	**61.58**	**40.61**	**20.35**
	Total Vegetation (A to D)		**4.26**	**35.29**	**7.08**	**48.53**	**3.98**	**54.52**	**2.93**	**53.86**	**0.96**	**32.32**	**0.59**	**8.91**	**1.23**	**9.43**	**1.90**	**20.15**	**1.01**	**15.21**	**5.96**	**67.34**	**64.83**	**32.49**
AREA UNDER ACTIVE MINING	Coal Quarry		0.71	5.88	0.39	2.67	0.40	5.48	0.13	2.39	0.39	13.13	0.59	8.91	0.44	3.37	0.00	0.00	0.00	0.00	0.00	0.00	16.04	8.04
	Coal Dump		0.16	1.33	0.11	0.75	0.00	0.00	0.09	1.65	0.16	5.39	0.07	1.06	0.08	0.61	0.00	0.00	0.00	0.00	0.00	0.00	2.18	1.09
	Advance Quarry Site		0.00	0.00	0.27	1.85	0.06	0.82	0.07	1.29	0.00	0.00	0.22	3.32	0.10	0.77	0.05	0.53	0.00	0.00	0.00	0.00	1.62	0.81
	Quarry Filled With Water		0.22	1.82	0.58	3.98	0.54	7.40	0.02	0.37	0.14	4.71	0.00	0.00	0.24	1.84	0.00	0.00	0.30	4.52	0.79	8.93	4.55	2.28
	Total Area under Active Mining (F)		**1.09**	**9.03**	**1.35**	**9.25**	**1.00**	**13.70**	**0.31**	**5.70**	**0.69**	**23.23**	**0.88**	**13.29**	**0.86**	**6.59**	**0.05**	**0.53**	**0.30**	**4.52**	**0.79**	**8.93**	**24.38**	**12.22**
	Barren OB Dump (G)		0.67	5.55	0.28	1.92	0.00	0.00	0.00	0.00	0.05	1.68	0.00	0.00	0.80	6.13	0.02	0.21	0.02	0.30	0.00	0.00	5.58	2.80
TECHNICAL RECLAMATION	Area under Barren Backfilling		2.11	17.48	3.97	27.21	1.69	23.15	1.49	27.39	1.01	o 34.01	1.11	16.77	1.49	11.42	0.00	0.00	0.89	13.40	0.54	6.10	38.20	19.15
	Total Area under *Technical Reclamation (H)*		**2.11**	**17.48**	**3.97**	**27.21**	**1.69**	**23.15**	**1.49**	**27.39**	**1.01**	**34.01**	**1.11**	**16.77**	**1.49**	**11.42**	**0.00**	**0.00**	**0.89**	**13.40**	**0.54**	**6.10**	**38.20**	**19.15**
	Total Area under Mining Activity (F+G+H)		**3.87**	**32.06**	**5.60**	**38.38**	**2.69**	**36.85**	**1.80**	**33.09**	**1.75**	**58.92**	**1.99**	**30.06**	**3.15**	**24.14**	**0.07**	**0.74**	**1.21**	**18.22**	**1.33**	**15.03**	**68.16**	**34.16**
WASTELANDS	Waste Lands		0.85	7.04	0.88	6.03	0.43	5.89	0.55	10.11	0.13	4.38	0.38	5.74	1.31	10.04	0.44	4.67	0.23	3.39	0.49	5.54	16.11	8.07
	Sand Body		0.02	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.21	0.00	0.00	0.00	0.00	0.15	0.08
	Total Wasteland (I)		**0.87**	**7.21**	**0.88**	**6.03**	**0.43**	**5.89**	**0.55**	**10.11**	**0.13**	**4.38**	**0.38**	**5.74**	**1.31**	**10.04**	**0.46**	**4.88**	**0.23**	**3.39**	**0.49**	**5.54**	**16.26**	**8.15**
WATERBODIES	Reservoir, nallah, ponds		0.20	1.66	0.01	0.07	0.02	0.27	0.03	0.55	0.01	0.34	0.07	1.06	0.08	0.61	0.17	1.80	0.05	0.68	0.01	0.11	1.97	0.99
	Total Waterbodies (J)		**0.20**	**1.66**	**0.01**	**0.07**	**0.02**	**0.27**	**0.03**	**0.55**	**0.01**	**0.34**	**0.07**	**1.06**	**0.08**	**0.61**	**0.17**	**1.80**	**0.05**	**0.68**	**0.01**	**0.11**	**1.97**	**0.99**
AGRICULTURE	Crop Lands		0.31	2.57	0.24	1.64	0.01	0.14	0.00	0.00	0.00	0.00	0.55	8.31	1.19	9.12	0.16	1.70	0.40	6.02	0.00	0.00	4.37	2.19
	Fallow Lands		2.36	19.55	0.63	4.32	0.06	0.82	0.00	0.00	0.09	3.03	2.92	44.11	5.77	44.21	6.59	69.88	3.58	53.92	0.92	10.40	35.15	17.62
	Total Agriculture (K)		**2.67**	**22.12**	**0.87**	**5.96**	**0.07**	**0.96**	**0.00**	**0.00**	**0.09**	**3.03**	**3.47**	**52.42**	**6.96**	**53.33**	**6.75**	**71.58**	**3.98**	**59.94**	**0.92**	**10.40**	**39.52**	**19.81**
SETTLEMENTS	Urban Settlement		0.13	1.08	0.09	0.62	0.08	1.10	0.07	1.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.07	1.04
	Rural Settlement		0.03	0.25	0.00	0.00	0.01	0.14	0.05	0.92	0.01	0.34	0.10	1.51	0.24	1.84	0.08	0.85	0.16	2.41	0.09	1.02	2.93	1.47
	Industrial Settlement		0.04	0.33	0.06	0.41	0.02	0.27	0.01	0.18	0.02	0.67	0.02	0.30	0.08	0.61	0.00	0.00	0.01	0.15	0.05	0.56	3.77	1.89
	Total Settlement (L)		**0.20**	**1.66**	**0.15**	**1.03**	**0.11**	**1.51**	**0.13**	**2.39**	**0.03**	**1.01**	**0.12**	**1.81**	**0.32**	**2.45**	**0.08**	**0.85**	**0.17**	**2.56**	**0.14**	**1.58**	**8.77**	**4.40**
	Grand Total (A to L)		**12.07**	**100.00**	**14.59**	**100.00**	**7.30**	**100.00**	**5.44**	**100.00**	**2.97**	**100.00**	**6.62**	**100.00**	**13.05**	**100.00**	**9.43**	**100.00**	**6.64**	**100.00**	**8.85**	**100.00**	**199.51**	**100.00**

Area Statistics (Area in Sq. Kms)

Land Use / Cover Classes		Colour Code	Area	%
Level - I	Level - II			
Forests	Dense Forests		0.00	0.00
	Open Forests		0.01	0.07
	Total Forest (A)		*0.01*	*0.07*
Scrubs	Scrubs (B)		*2.13*	*10.63*
Plantation	Social Forestry		1.65	8.28
	Plantation on OB Dump		1.91	9.57
	Plantation on Backfill		1.06	5.32
	Total Plantation (C)		*4.63*	*23.17*
	Total Vegetation (A+B+C)		*6.77*	*33.87*
Mining Area	Coal Quarry		1.79	9.06
	Advance Quarry Site		0.02	0.09
	Barren OB Dump		0.45	2.23
	Barren Backfilled area		4.21	21.06
	Coal Dump		0.51	2.53
	Quarry Filled with Water		0.16	0.83
	Total Area under Mining (D)		*7.14*	*35.71*
Waste Lands	Waste Land w/ wo Scrubs		2.29	11.48
	Fly Ash / Sludge Pond		0.00	0.00
	Gullied Land		0.00	0.00
	Sand Body		0.00	0.00
	Total Wasteland (E)		*2.29*	*11.48*
Waterbodies	Reservior, Nallah, Ponds (F)		0.40	2.01
Agriculture	Crop Lands		0.06	0.31
	Fallow Lands		1.20	6.02
	Total Agriculture Land (G)		*1.26*	*6.33*
Settlement	Urban Settlement		0.56	2.81
	Rural Settlement		0.66	3.33
	Industrial Settlement		0.89	4.46
	Total Settlement (H)		*2.12*	*10.60*
	Grand Total (A to H)		19.99	100.00

All figures are adjusted to two decimal places

Legend

- Settlement
- Roads
- Rail
- Dipka OCP Leasehold Boundary (37.5 MTY)

Customer: **South Eastern Coalfields Limited**

Job Title: Land Reclamation Monitoring of Leasehold Area of Dipka OCP — Job No. 564922120

Subject: Land Use/ Cover Map of Dipka OCP (37.5 MTY) based on Satellite Data (IRS-1D-L4FX) of the Year 2023

Activity	Name	Designation	Signature
Prepared	Kumud Ranjan	Manager (Systems)	
Checked	Rakesh Ranjan	GM (Excvn.)	
Approved	Mohit Rastogi	GM (Geomatics)	

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Scale: 0 0.1 0.2 0.4 0.6 0.8 Kms.

Sheet 1 of 1

Rev. No. 0

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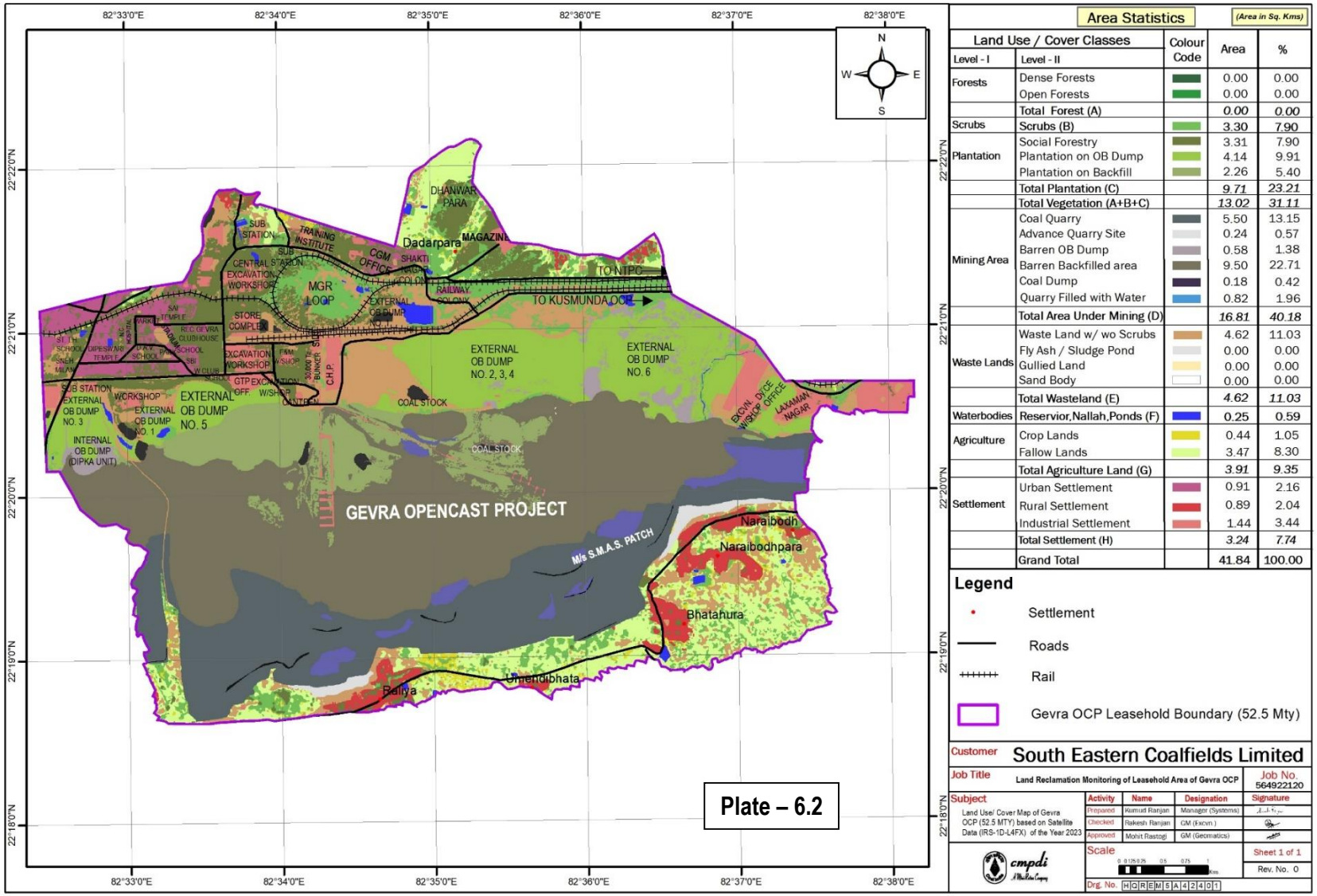

Area Statistics (Area in Sq. Kms)

Land Use / Cover Classes		Colour Code	Area	%
Level - I	Level - II			
Forests	Dense Forests		0.00	0.00
	Open Forests		0.00	0.00
	Total Forest (A)		0.00	0.00
Scrubs	Scrubs (B)		3.30	7.90
Plantation	Social Forestry		3.31	7.90
	Plantation on OB Dump		4.14	9.91
	Plantation on Backfill		2.26	5.40
	Total Plantation (C)		9.71	23.21
	Total Vegetation (A+B+C)		13.02	31.11
Mining Area	Coal Quarry		5.50	13.15
	Advance Quarry Site		0.24	0.57
	Barren OB Dump		0.58	1.38
	Barren Backfilled area		9.50	22.71
	Coal Dump		0.18	0.42
	Quarry Filled with Water		0.82	1.96
	Total Area Under Mining (D)		16.81	40.18
Waste Lands	Waste Land w/ wo Scrubs		4.62	11.03
	Fly Ash / Sludge Pond		0.00	0.00
	Gullied Land		0.00	0.00
	Sand Body		0.00	0.00
	Total Wasteland (E)		4.62	11.03
Waterbodies	Reservior,Nallah,Ponds (F)		0.25	0.59
Agriculture	Crop Lands		0.44	1.05
	Fallow Lands		3.47	8.30
	Total Agriculture Land (G)		3.91	9.35
Settlement	Urban Settlement		0.91	2.16
	Rural Settlement		0.89	2.04
	Industrial Settlement		1.44	3.44
	Total Settlement (H)		3.24	7.74
	Grand Total		41.84	100.00

Legend

- Settlement
- Roads
- Rail
- Gevra OCP Leasehold Boundary (52.5 Mty)

Customer: South Eastern Coalfields Limited

Job Title: Land Reclamation Monitoring of Leasehold Area of Gevra OCP

Job No. 564922120

Subject: Land Use/ Cover Map of Gevra OCP (52.5 MTY) based on Satellite Data (IRS-1D-L4FX) of the Year 2023

Activity	Name	Designation	Signature
Prepared	Kumud Ranjan	Manager (Systems)	
Checked	Rakesh Ranjan	GM (Excvn.)	
Approved	Mohit Rastogi	GM (Geomatics)	

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Sheet 1 of 1

Rev. No. 0

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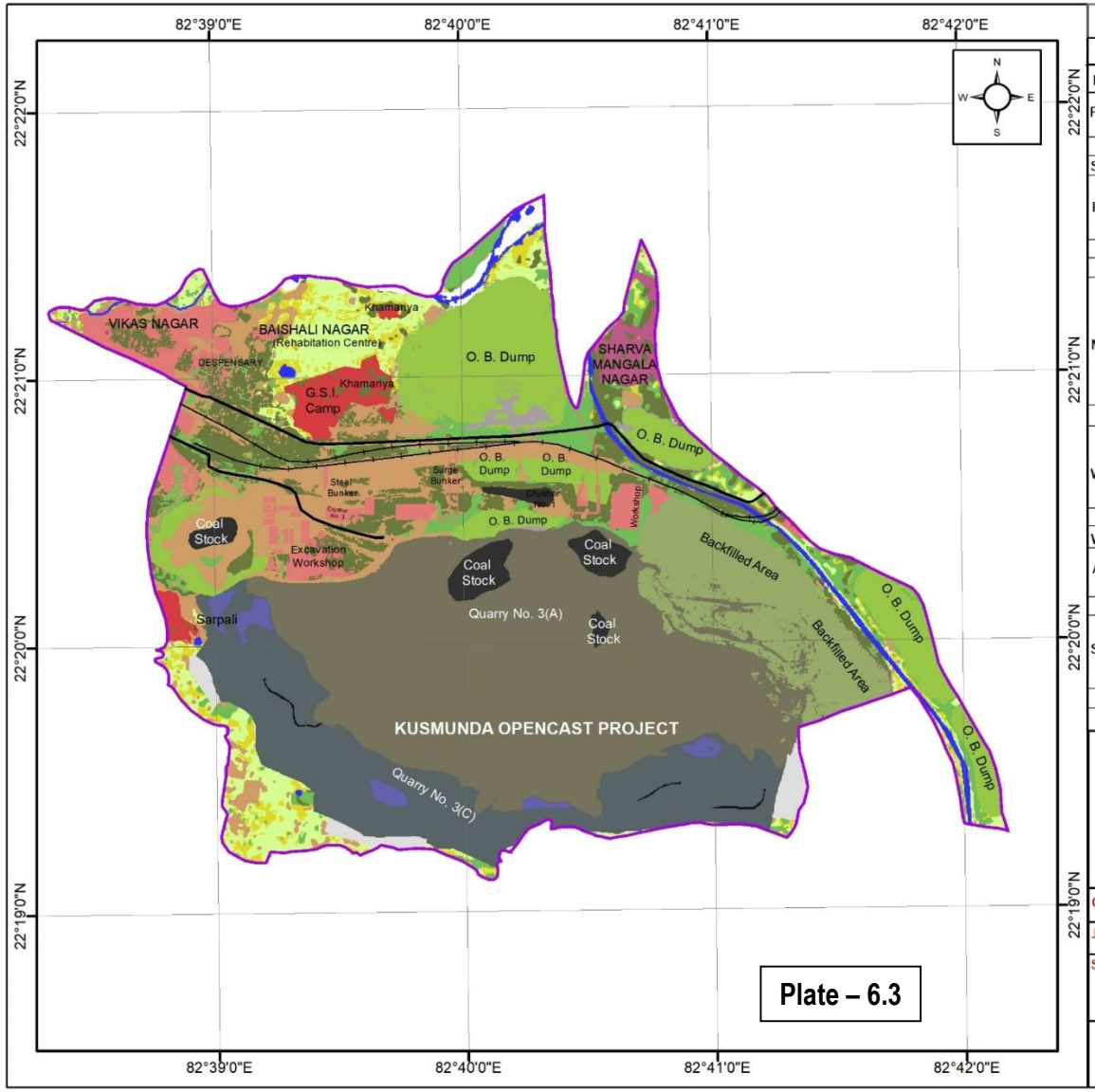

Area Statistics (Area in Sq. Kms)

Land Use / Cover Classes		Colour Code	Area	%
Level - I	Level - II			
Forests	Dense Forests		0.00	0.00
	Open Forests		0.00	0.00
	Total Forest (A)		0.00	0.00
Scrubs	Scrubs (B)		0.81	4.84
Plantation	Social Forestry		1.40	8.35
	Plantation on OB Dump		1.80	10.76
	Plantation on Backfill		1.20	7.18
	Total Plantation (C)		4.40	26.29
	Total Vegetation (A+B+C)		5.21	31.13
Mining Area	Coal Quarry		1.98	11.83
	Advance Quarry Site		0.18	1.06
	Barren OB Dump		0.10	0.57
	Barren Backfilled area		4.43	26.51
	Coal Dump		0.32	1.89
	Quarry Filled with Water		0.14	0.82
	Total Area Under Mining (D)		7.15	42.80
Waste Lands	Waste Land w/wo Scrubs		1.55	9.27
	Fly Ash / Sludge Pond		0.00	0.00
	Gullied Land		0.00	0.00
	Sand Body		0.10	0.61
	Total Wasteland (E)		1.65	9.88
Waterbodies	Reservior,Nallah,Ponds (F)		0.20	1.22
Agriculture	Crop Lands		0.40	2.39
	Fallow Lands		1.00	5.95
	Total Agriculture Land (G)		1.40	8.35
Settlement	Urban Settlement		0.17	0.99
	Rural Settlement		0.27	1.63
	Industrial Settlement		0.69	4.12
	Total Settlement (H)		1.13	6.74
	Grand Total		16.72	100.00

Legend

- Settlement
- Roads
- Rail
- Kusmunda OCP Leasehold Boundary (50 Mty)

Customer: South Eastern Coalfields Limited

Job Title: Land Reclamation Monitoring of Leasehold Area of Kusmunda OCP — Job No. 564922120

Subject: Land Use/ Cover Map of Kusmunda OCP (50 MTY) based on Satellite Data (IRS-1D-L4FX) of the Year 2023

Activity	Name	Designation	Signature
Prepared	Kumud Ranjan	Manager (Systems)	
Checked	Rakesh Ranjan	GM (Excvn.)	
Approved	Mohit Rastogi	GM (Geomatics)	

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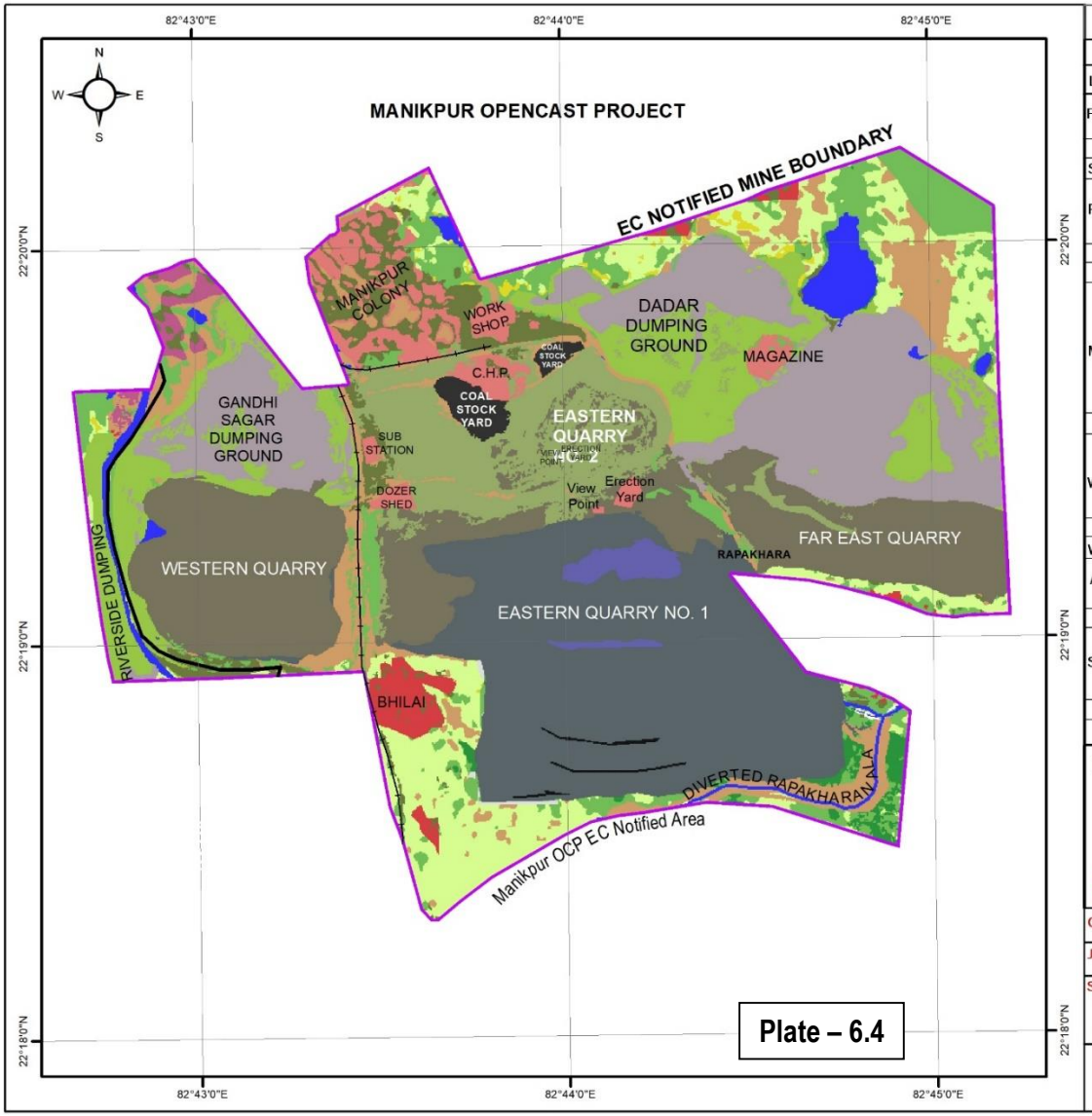
Scale: 0 0.1 0.2 0.4 0.6 0.8 Kms

Sheet 1 of 1

Rev. No. 0

Drg. No. HQREM5A42401



Area Statistics (Area in Sq. Kms)

Land Use / Cover Classes		Colour Code	Area	%
Level - I	Level - II			
Forests	Dense Forests		0.00	0.00
	Open Forests		0.08	0.75
	Total Forest (A)		0.08	0.75
Scrubs	Scrubs (B)		0.73	7.18
Plantation	Social Forestry		0.38	3.71
	Plantation on OB Dump		0.90	8.78
	Plantation on Backfill		0.80	7.81
	Total Plantation (C)		2.08	20.30
	Total Vegetation (A+B+C)		2.89	28.23
Mining Area	Coal Quarry		1.82	17.96
	Advance Quarry Site		0.01	0.08
	Barren OB Dump		1.39	13.59
	Barren Backfilled area		1.61	15.76
	Coal Dump		0.08	0.79
	Quarry Filled with Water		0.09	0.87
	Total Area Under Mining (D)		5.00	49.05
Waste Lands	Waste Land w/ wo Scrubs		0.68	6.70
	Fly Ash / Sludge Pond		0.00	0.00
	Gullied Land		0.00	0.03
	Sand Body		0.00	0.00
	Total Wasteland (E)		0.68	6.73
Waterbodies	Reservior, Nallah, Ponds (F)		0.20	1.99
Agriculture	Crop Lands		0.04	0.35
	Fallow Lands		0.88	8.61
	Total Agriculture Land (G)		0.92	8.96
Settlement	Urban Settlement		0.06	0.57
	Rural Settlement		0.13	1.27
	Industrial Settlement		0.33	3.20
	Total Settlement (H)		0.52	5.04
	Grand Total		10.20	100.00

Legend

- Settlement
- Roads
- Rail
- Manikpur OCP EC Notified Area

Customer: South Eastern Coalfields Limited

Job Title: Land Reclamation Monitoring of Leasehold Area of Manikpur OCP — Job No. 564922120

Subject: Land Use/ Cover Map of Manikpur OCP (5.25 MTY) based on Satellite Data (IRS-1D-L4FX) of the Year 2023

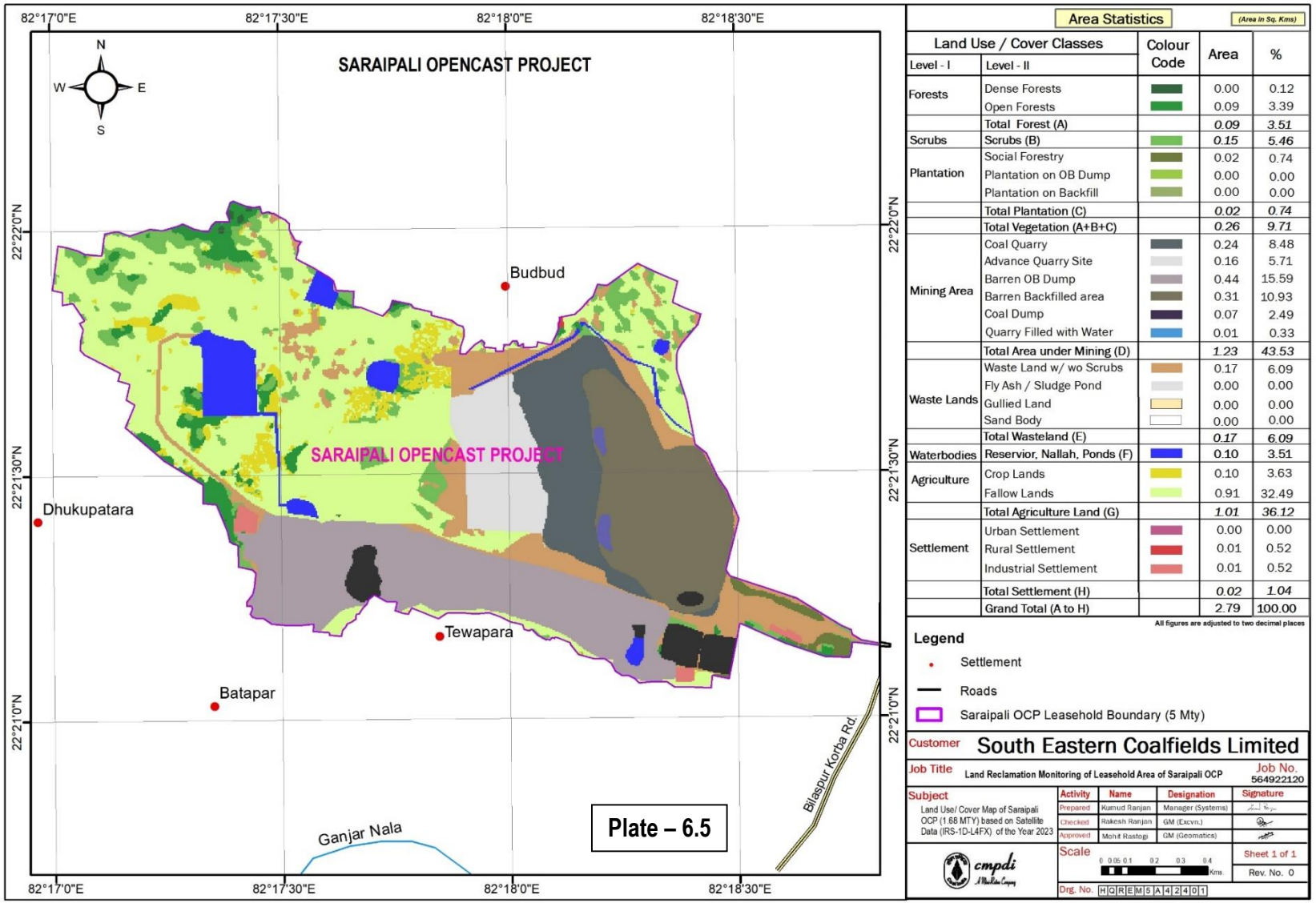
Activity	Name	Designation	Signature
Prepared	Kumud Ranjan	Manager (Systems)	
Checked	Rakesh Ranjan	GM (Excvn.)	
Approved	Mohit Rastogi	GM (Geomatics)	

Scale: 0 0.075 0.15 0.3 0.45 0.6 Kms.

Sheet 1 of 1

Rev. No. 0

Drg. No. HQREM5A4240 1



Area Statistics (Area in Sq. Kms)

Land Use / Cover Classes		Colour Code	Area	%
Level - I	Level - II			
Forests	Dense Forests		0.00	0.12
	Open Forests		0.09	3.39
	Total Forest (A)		*0.09*	*3.51*
Scrubs	Scrubs (B)		*0.15*	*5.46*
Plantation	Social Forestry		0.02	0.74
	Plantation on OB Dump		0.00	0.00
	Plantation on Backfill		0.00	0.00
	Total Plantation (C)		*0.02*	*0.74*
	Total Vegetation (A+B+C)		*0.26*	*9.71*
Mining Area	Coal Quarry		0.24	8.48
	Advance Quarry Site		0.16	5.71
	Barren OB Dump		0.44	15.59
	Barren Backfilled area		0.31	10.93
	Coal Dump		0.07	2.49
	Quarry Filled with Water		0.01	0.33
	Total Area under Mining (D)		*1.23*	*43.53*
Waste Lands	Waste Land w/ wo Scrubs		0.17	6.09
	Fly Ash / Sludge Pond		0.00	0.00
	Gullied Land		0.00	0.00
	Sand Body		0.00	0.00
	Total Wasteland (E)		*0.17*	*6.09*
Waterbodies	Reservior, Nallah, Ponds (F)		0.10	3.51
Agriculture	Crop Lands		0.10	3.63
	Fallow Lands		0.91	32.49
	Total Agriculture Land (G)		*1.01*	*36.12*
Settlement	Urban Settlement		0.00	0.00
	Rural Settlement		0.01	0.52
	Industrial Settlement		0.01	0.52
	Total Settlement (H)		*0.02*	*1.04*
	Grand Total (A to H)		2.79	100.00

All figures are adjusted to two decimal places

Legend

- Settlement
- Roads
- Saraipali OCP Leasehold Boundary (5 Mty)

Customer: **South Eastern Coalfields Limited**

Job Title: Land Reclamation Monitoring of Leasehold Area of Saraipali OCP — Job No. 564922120

Subject: Land Use/ Cover Map of Saraipali OCP (1.68 MTY) based on Satellite Data (IRS-1D-L4FX) of the Year 2023

Activity	Name	Designation	Signature
Prepared	Kumud Ranjan	Manager (Systems)	
Checked	Rakesh Ranjan	GM (Excvn.)	
Approved	Mohit Rastogi	GM (Geomatics)	

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Scale: 0 0.05 0.1 0.2 0.3 0.4 Kms.

Sheet 1 of 1

Rev. No. 0

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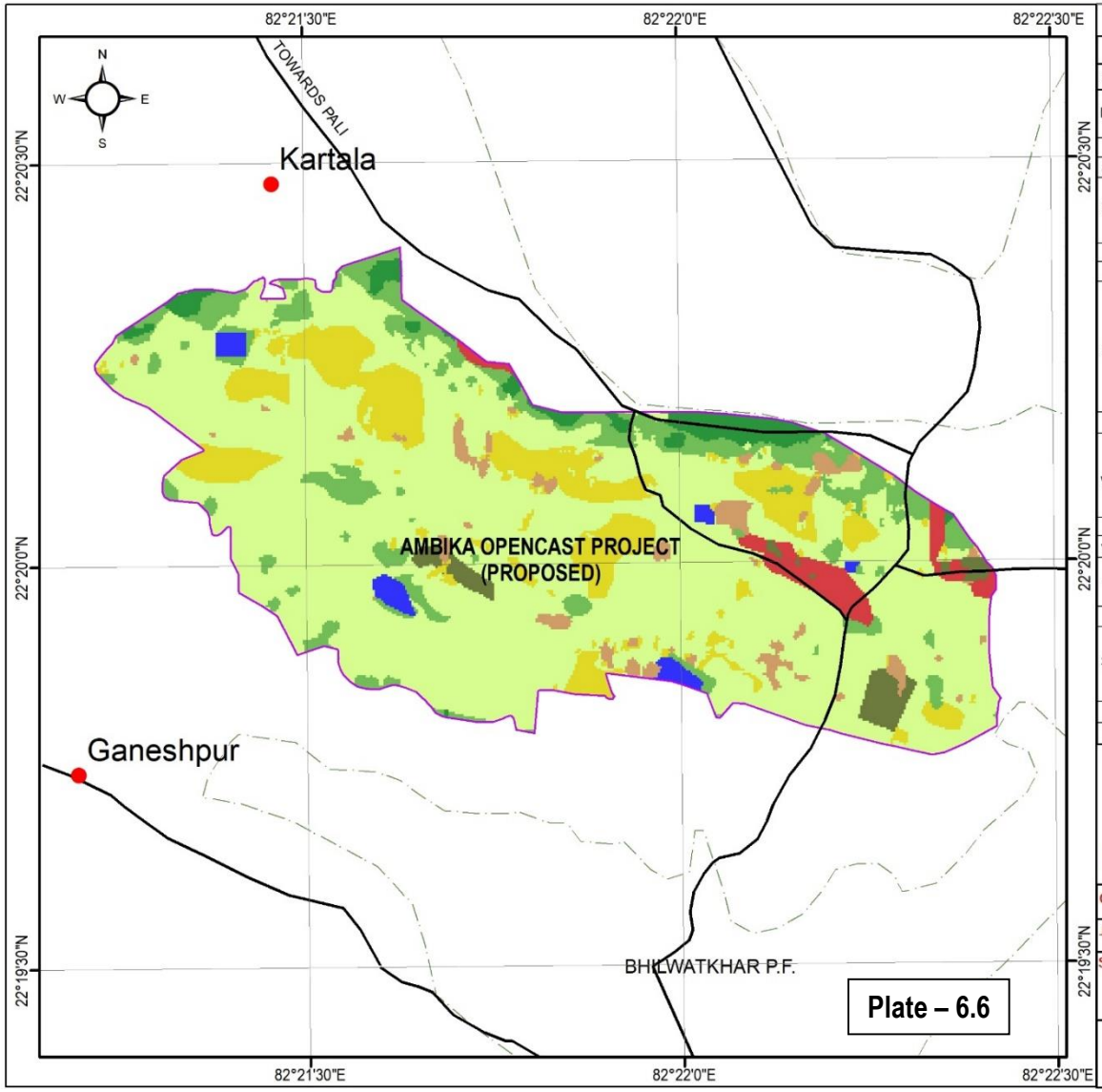


Area Statistics (Area in Sq. Kms)

Land Use / Cover Classes		Colour Code	Area	%
Level - I	Level - II			
Forests	Dense Forests		0.00	0.00
	Open Forests		0.04	2.92
	Total Forest (A)		*0.04*	*2.92*
Scrubs	Scrubs (B)		*0.12*	*9.34*
Plantation	Social Forestry		0.02	1.79
	Plantation on OB Dump		0.00	0.00
	Plantation on Backfill		0.00	0.00
	Total Plantation (C)		*0.02*	*1.79*
	Total Vegetation (A+B+C)		*0.18*	*14.05*
Mining Area	Coal Quarry		0.00	0.00
	Advance Quarry Site		0.00	0.00
	Barren OB Dump		0.00	0.00
	Barren Backfilled area		0.00	0.00
	Coal Dump		0.00	0.00
	Quarry Filled with Water		0.00	0.00
	Total Area under Mining (D)		*0.00*	*0.00*
Waste Lands	Waste Land w/ wo Scrubs		0.03	2.12
	Fly Ash / Sludge Pond		0.00	0.00
	Gullied Land		0.00	0.00
	Sand Body		0.00	0.00
	Total Wasteland (E)		*0.03*	*2.12*
Waterbodies	Reservior, Nallah, Ponds (F)		0.02	1.21
Agriculture	Crop Lands		0.17	12.91
	Fallow Lands		0.90	67.27
	Total Agriculture Land (G)		*1.07*	*80.18*
Settlement	Urban Settlement		0.00	0.00
	Rural Settlement		0.03	2.43
	Industrial Settlement		0.00	0.00
	Total Settlement (H)		*0.03*	*2.44*
	Grand Total (A to H)		1.34	100.00

All figures are adjusted to two decimal places

Legend

- Settlement
- Roads
- Ambika OCP Leasehold Boundary

Customer: South Eastern Coalfields Limited

Job Title: Land Reclamation Monitoring of Leasehold Area of Ambika OCP — Job No. 564922120

Subject: Land Use/ Cover Map of Ambika OCP (5.0 MTY) based on Satellite Data (IRS-1D-L4FX) of the Year 2023

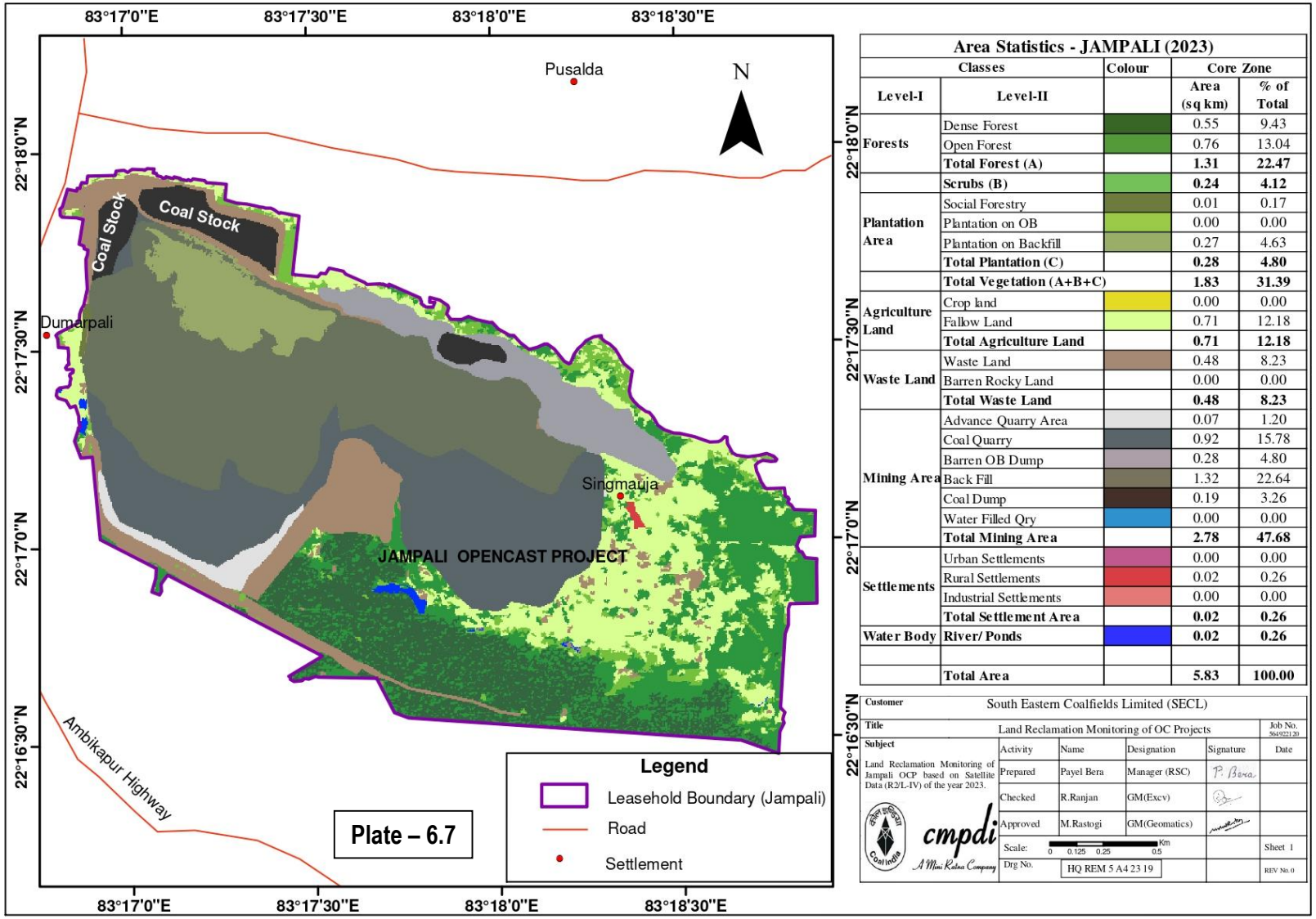
Activity	Name	Designation	Signature
Prepared	Kumud Ranjan	Manager (Systems)	
Checked	Rakesh Ranjan	GM (Excvn.)	
Approved	Mohit Rastogi	GM (Geomatics)	

Scale: 0 0.04 0.08 0.16 0.24 0.32 Kms.

Sheet 1 of 1

Rev. No. 0

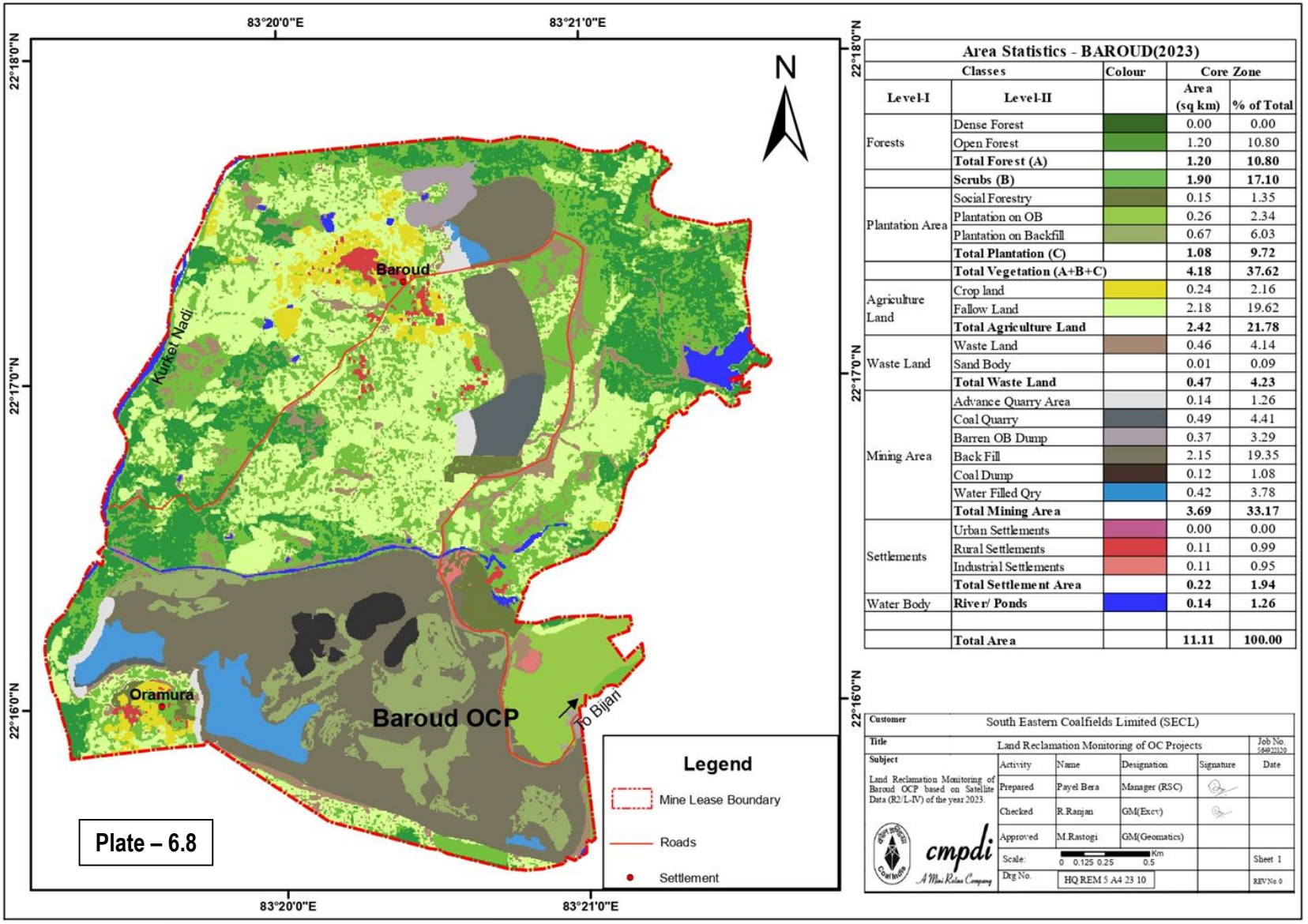
Drg. No. HQREM5A424001



Area Statistics - JAMPALI (2023)

Classes		Colour	Core Zone	
Level-I	Level-II		Area (sq km)	% of Total
Forests	Dense Forest		0.55	9.43
	Open Forest		0.76	13.04
	Total Forest (A)		**1.31**	**22.47**
	Scrubs (B)		**0.24**	**4.12**
Plantation Area	Social Forestry		0.01	0.17
	Plantation on OB		0.00	0.00
	Plantation on Backfill		0.27	4.63
	Total Plantation (C)		**0.28**	**4.80**
	Total Vegetation (A+B+C)		**1.83**	**31.39**
Agriculture Land	Crop land		0.00	0.00
	Fallow Land		0.71	12.18
	Total Agriculture Land		**0.71**	**12.18**
Waste Land	Waste Land		0.48	8.23
	Barren Rocky Land		0.00	0.00
	Total Waste Land		**0.48**	**8.23**
Mining Area	Advance Quarry Area		0.07	1.20
	Coal Quarry		0.92	15.78
	Barren OB Dump		0.28	4.80
	Back Fill		1.32	22.64
	Coal Dump		0.19	3.26
	Water Filled Qry		0.00	0.00
	Total Mining Area		**2.78**	**47.68**
Settlements	Urban Settlements		0.00	0.00
	Rural Settlements		0.02	0.26
	Industrial Settlements		0.00	0.00
	Total Settlement Area		**0.02**	**0.26**
Water Body	River/ Ponds		**0.02**	**0.26**
	Total Area		**5.83**	**100.00**

Customer	South Eastern Coalfields Limited (SECL)				
Title	Land Reclamation Monitoring of OC Projects				Job No. 564922120
Subject	Activity	Name	Designation	Signature	Date
Land Reclamation Monitoring of Jampali OCP based on Satellite Data (R2/L-IV) of the year 2023.	Prepared	Payel Bera	Manager (RSC)	P. Bera	
	Checked	R.Ranjan	GM(Excv)		
	Approved	M.Rastogi	GM(Geomatics)		
cmpdi A Mini Ratna Company	Scale: 0 0.125 0.25 0.5 Km				Sheet 1
	Drg No. HQ REM 5 A4 23 19				REV No. 0



Area Statistics - BAROUD(2023)

Classes		Colour	Core Zone	
Level-I	Level-II		Area (sq km)	% of Total
Forests	Dense Forest		0.00	0.00
	Open Forest		1.20	10.80
	Total Forest (A)		**1.20**	**10.80**
	Scrubs (B)		**1.90**	**17.10**
Plantation Area	Social Forestry		0.15	1.35
	Plantation on OB		0.26	2.34
	Plantation on Backfill		0.67	6.03
	Total Plantation (C)		**1.08**	**9.72**
	Total Vegetation (A+B+C)		**4.18**	**37.62**
Agriculture Land	Crop land		0.24	2.16
	Fallow Land		2.18	19.62
	Total Agriculture Land		**2.42**	**21.78**
Waste Land	Waste Land		0.46	4.14
	Sand Body		0.01	0.09
	Total Waste Land		**0.47**	**4.23**
Mining Area	Advance Quarry Area		0.14	1.26
	Coal Quarry		0.49	4.41
	Barren OB Dump		0.37	3.29
	Back Fill		2.15	19.35
	Coal Dump		0.12	1.08
	Water Filled Qry		0.42	3.78
	Total Mining Area		**3.69**	**33.17**
Settlements	Urban Settlements		0.00	0.00
	Rural Settlements		0.11	0.99
	Industrial Settlements		0.11	0.95
	Total Settlement Area		**0.22**	**1.94**
Water Body	**River/ Ponds**		**0.14**	**1.26**
	Total Area		**11.11**	**100.00**

Customer	South Eastern Coalfields Limited (SECL)				Job No. 564922120
Title	Land Reclamation Monitoring of OC Projects				
Subject	Activity	Name	Designation	Signature	Date
Land Reclamation Monitoring of Baroud OCP based on Satellite Data (R2/L-IV) of the year 2023.	Prepared	Payel Bera	Manager (RSC)		
	Checked	R.Ranjan	GM(Excv)		
	Approved	M.Rastogi	GM(Geomatics)		
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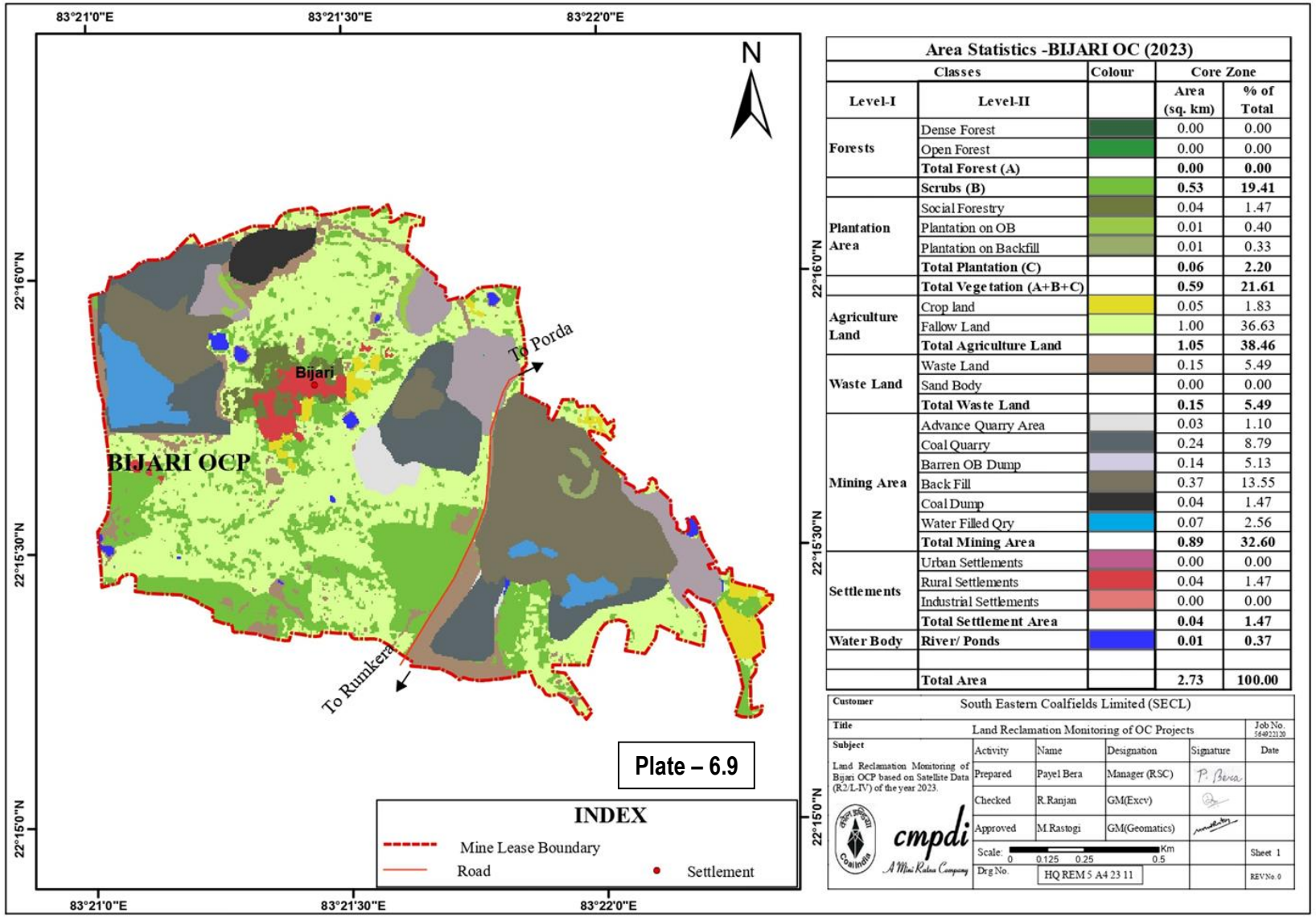
	Drg No.	HQ REM 5 A4 23 10			REV No. 0

cmpdi — A Mini Ratna Company



Area Statistics -BIJARI OC (2023)

Classes		Colour	Core Zone	
Level-I	Level-II		Area (sq. km)	% of Total
Forests	Dense Forest		0.00	0.00
	Open Forest		0.00	0.00
	Total Forest (A)		**0.00**	**0.00**
	Scrubs (B)		**0.53**	**19.41**
Plantation Area	Social Forestry		0.04	1.47
	Plantation on OB		0.01	0.40
	Plantation on Backfill		0.01	0.33
	Total Plantation (C)		**0.06**	**2.20**
	Total Vegetation (A+B+C)		**0.59**	**21.61**
Agriculture Land	Crop land		0.05	1.83
	Fallow Land		1.00	36.63
	Total Agriculture Land		**1.05**	**38.46**
Waste Land	Waste Land		0.15	5.49
	Sand Body		0.00	0.00
	Total Waste Land		**0.15**	**5.49**
Mining Area	Advance Quarry Area		0.03	1.10
	Coal Quarry		0.24	8.79
	Barren OB Dump		0.14	5.13
	Back Fill		0.37	13.55
	Coal Dump		0.04	1.47
	Water Filled Qry		0.07	2.56
	Total Mining Area		**0.89**	**32.60**
Settlements	Urban Settlements		0.00	0.00
	Rural Settlements		0.04	1.47
	Industrial Settlements		0.00	0.00
	Total Settlement Area		**0.04**	**1.47**
Water Body	River/ Ponds		0.01	0.37
	Total Area		2.73	100.00

Customer	South Eastern Coalfields Limited (SECL)				
Title	Land Reclamation Monitoring of OC Projects				Job No. 564922120
Subject	Activity	Name	Designation	Signature	Date
Land Reclamation Monitoring of Bijari OCP based on Satellite Data (R2/L-IV) of the year 2023.	Prepared	Payel Bera	Manager (RSC)	P. Bera	
	Checked	R.Ranjan	GM(Excv)		
	Approved	M.Rastogi	GM(Geomatics)		
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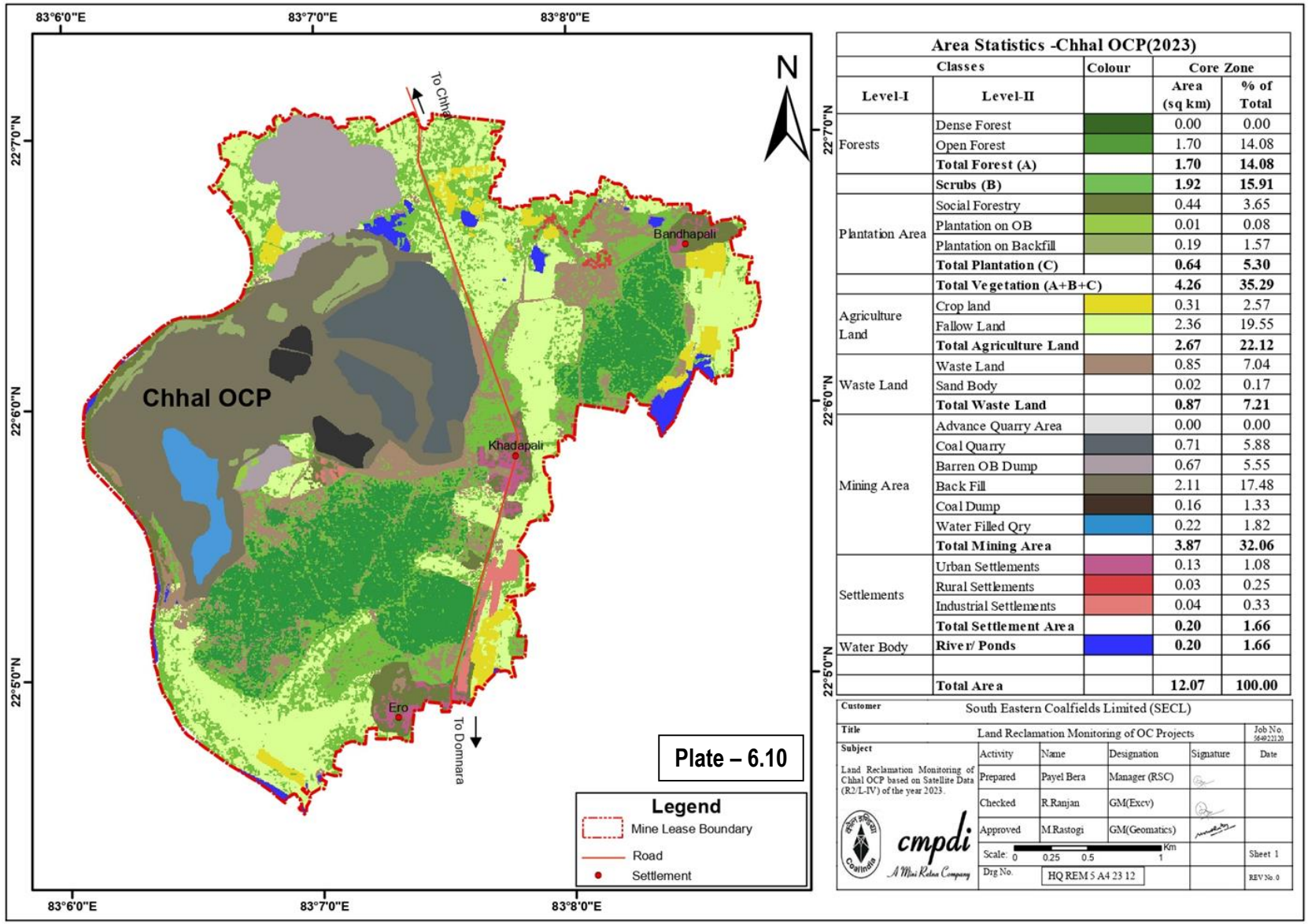

Area Statistics -Chhal OCP(2023)

Classes		Colour	Core Zone	
Level-I	Level-II		Area (sq km)	% of Total
Forests	Dense Forest		0.00	0.00
	Open Forest		1.70	14.08
	Total Forest (A)		**1.70**	**14.08**
	Scrubs (B)		**1.92**	**15.91**
Plantation Area	Social Forestry		0.44	3.65
	Plantation on OB		0.01	0.08
	Plantation on Backfill		0.19	1.57
	Total Plantation (C)		**0.64**	**5.30**
	Total Vegetation (A+B+C)		**4.26**	**35.29**
Agriculture Land	Crop land		0.31	2.57
	Fallow Land		2.36	19.55
	Total Agriculture Land		**2.67**	**22.12**
Waste Land	Waste Land		0.85	7.04
	Sand Body		0.02	0.17
	Total Waste Land		**0.87**	**7.21**
Mining Area	Advance Quarry Area		0.00	0.00
	Coal Quarry		0.71	5.88
	Barren OB Dump		0.67	5.55
	Back Fill		2.11	17.48
	Coal Dump		0.16	1.33
	Water Filled Qry		0.22	1.82
	Total Mining Area		**3.87**	**32.06**
Settlements	Urban Settlements		0.13	1.08
	Rural Settlements		0.03	0.25
	Industrial Settlements		0.04	0.33
	Total Settlement Area		**0.20**	**1.66**
Water Body	**River/ Ponds**		**0.20**	**1.66**
	Total Area		**12.07**	**100.00**

Customer	South Eastern Coalfields Limited (SECL)				
Title	Land Reclamation Monitoring of OC Projects				Job No. 564922120
Subject	Activity	Name	Designation	Signature	Date
Land Reclamation Monitoring of Chhal OCP based on Satellite Data (R2/L-IV) of the year 2023.	Prepared	Payel Bera	Manager (RSC)		
	Checked	R.Ranjan	GM(Excv)		
	Approved	M.Rastogi	GM(Geomatics)		
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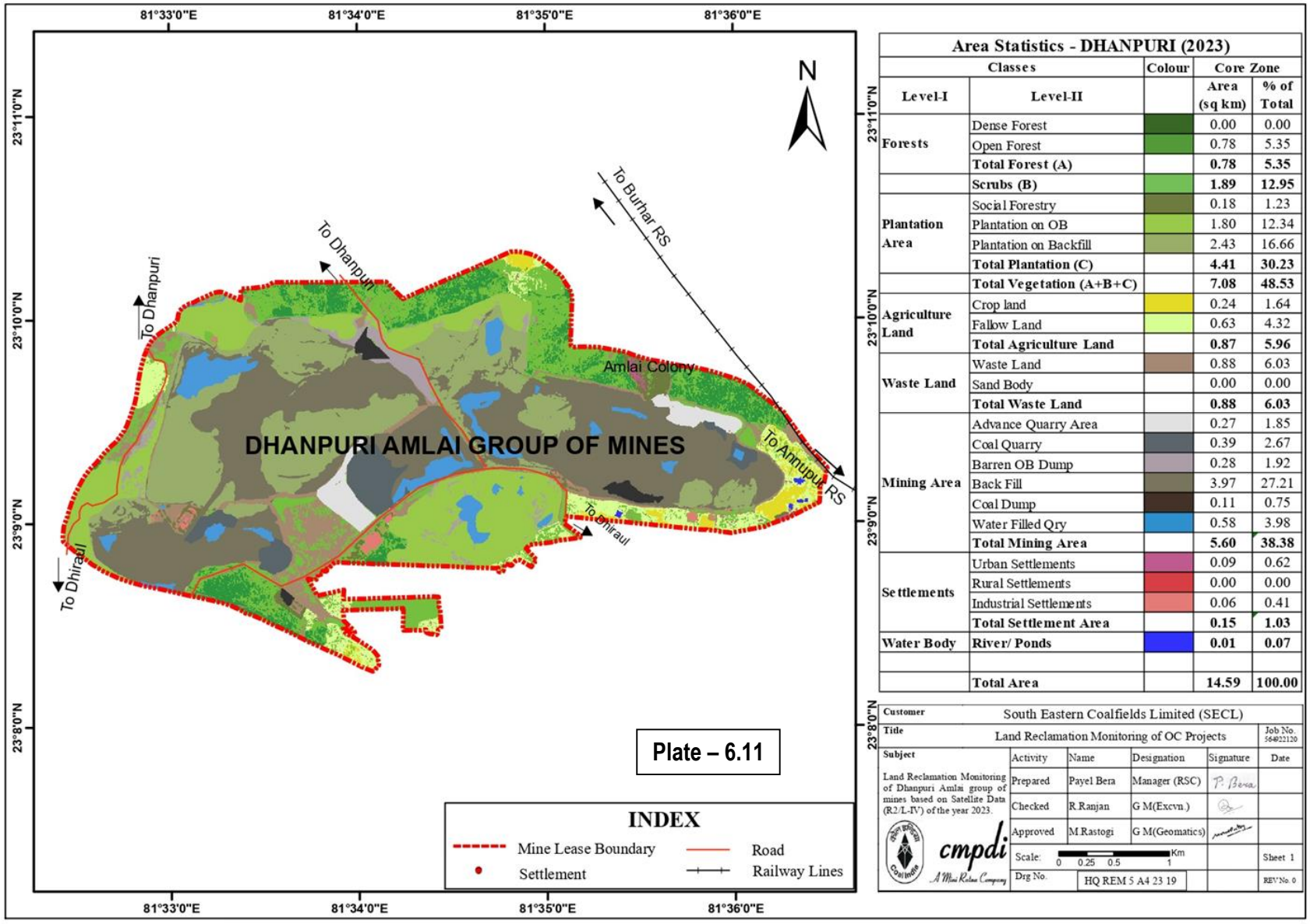
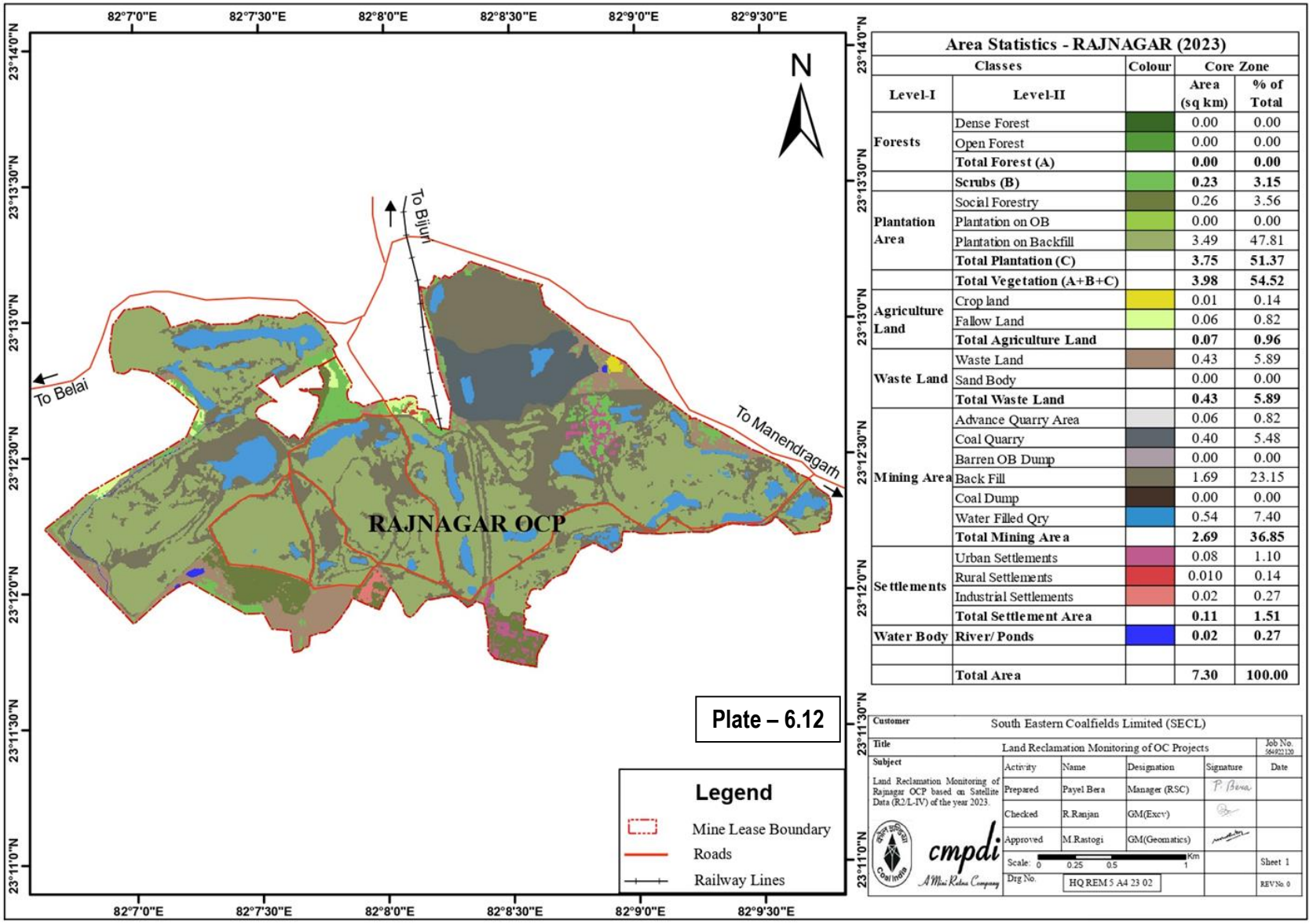


Area Statistics - DHANPURI (2023)

Classes		Colour	Core Zone	
Level-I	Level-II		Area (sq km)	% of Total
Forests	Dense Forest		0.00	0.00
	Open Forest		0.78	5.35
	Total Forest (A)		**0.78**	**5.35**
	Scrubs (B)		**1.89**	**12.95**
Plantation Area	Social Forestry		0.18	1.23
	Plantation on OB		1.80	12.34
	Plantation on Backfill		2.43	16.66
	Total Plantation (C)		**4.41**	**30.23**
	Total Vegetation (A+B+C)		**7.08**	**48.53**
Agriculture Land	Crop land		0.24	1.64
	Fallow Land		0.63	4.32
	Total Agriculture Land		**0.87**	**5.96**
Waste Land	Waste Land		0.88	6.03
	Sand Body		0.00	0.00
	Total Waste Land		**0.88**	**6.03**
Mining Area	Advance Quarry Area		0.27	1.85
	Coal Quarry		0.39	2.67
	Barren OB Dump		0.28	1.92
	Back Fill		3.97	27.21
	Coal Dump		0.11	0.75
	Water Filled Qry		0.58	3.98
	Total Mining Area		**5.60**	**38.38**
Settlements	Urban Settlements		0.09	0.62
	Rural Settlements		0.00	0.00
	Industrial Settlements		0.06	0.41
	Total Settlement Area		**0.15**	**1.03**
Water Body	**River/ Ponds**		**0.01**	**0.07**
	Total Area		**14.59**	**100.00**

Customer	South Eastern Coalfields Limited (SECL)				
Title	Land Reclamation Monitoring of OC Projects				Job No. 564922120
Subject		Activity	Name	Designation	Signature	Date
Land Reclamation Monitoring of Dhanpuri Amlai group of mines based on Satellite Data (R2/L-IV) of the year 2023.		Prepared	Payel Bera	Manager (RSC)	P. Bera	
		Checked	R.Ranjan	G M(Excvn.)		
		Approved	M.Rastogi	G M(Geomatics)		
cmpdi A Mini Ratna Company		Scale: 0 0.25 0.5 1 Km				Sheet 1
		Drg No.	HQ REM 5 A4 23 19			REV No. 0



Area Statistics - RAJNAGAR (2023)

Classes		Colour	Core Zone	
Level-I	Level-II		Area (sq km)	% of Total
Forests	Dense Forest		0.00	0.00
	Open Forest		0.00	0.00
	Total Forest (A)		**0.00**	**0.00**
	Scrubs (B)		**0.23**	**3.15**
Plantation Area	Social Forestry		0.26	3.56
	Plantation on OB		0.00	0.00
	Plantation on Backfill		3.49	47.81
	Total Plantation (C)		**3.75**	**51.37**
	Total Vegetation (A+B+C)		**3.98**	**54.52**
Agriculture Land	Crop land		0.01	0.14
	Fallow Land		0.06	0.82
	Total Agriculture Land		**0.07**	**0.96**
Waste Land	Waste Land		0.43	5.89
	Sand Body		0.00	0.00
	Total Waste Land		**0.43**	**5.89**
Mining Area	Advance Quarry Area		0.06	0.82
	Coal Quarry		0.40	5.48
	Barren OB Dump		0.00	0.00
	Back Fill		1.69	23.15
	Coal Dump		0.00	0.00
	Water Filled Qry		0.54	7.40
	Total Mining Area		**2.69**	**36.85**
Settlements	Urban Settlements		0.08	1.10
	Rural Settlements		0.010	0.14
	Industrial Settlements		0.02	0.27
	Total Settlement Area		**0.11**	**1.51**
Water Body	**River/ Ponds**		**0.02**	**0.27**
	Total Area		**7.30**	**100.00**

Customer	South Eastern Coalfields Limited (SECL)				
Title	Land Reclamation Monitoring of OC Projects				Job No. 564922120
Subject		Activity	Name	Designation	Signature	Date
Land Reclamation Monitoring of Rajnagar OCP based on Satellite Data (R2/L-IV) of the year 2023.		Prepared	Payel Bera	Manager (RSC)		
		Checked	R.Ranjan	GM(Excv)		
		Approved	M.Rastogi	GM(Geomatics)		
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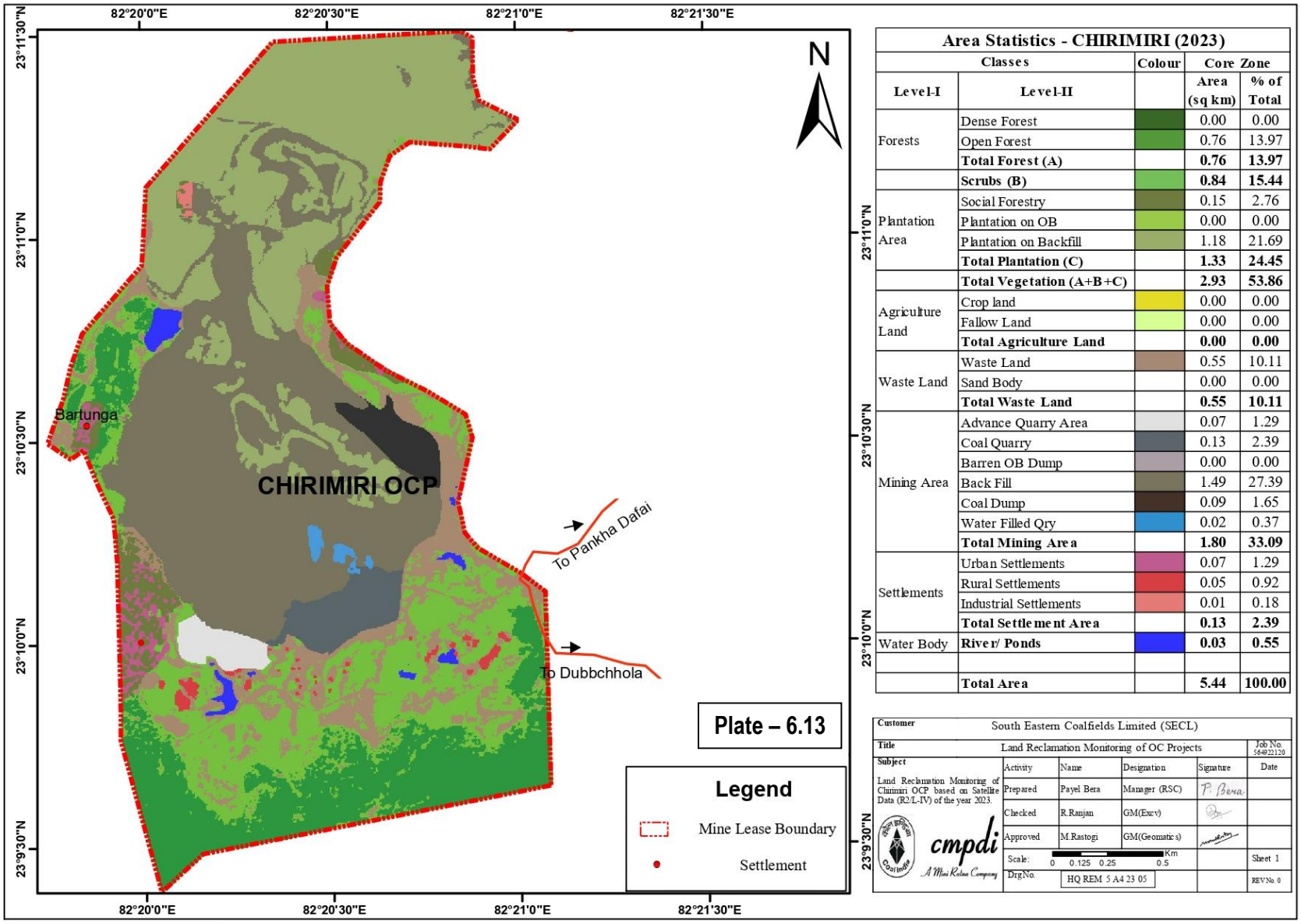

Area Statistics - CHIRIMIRI (2023)

Classes		Colour	Core Zone	
Level-I	Level-II		Area (sq km)	% of Total
Forests	Dense Forest		0.00	0.00
	Open Forest		0.76	13.97
	Total Forest (A)		**0.76**	**13.97**
	Scrubs (B)		**0.84**	**15.44**
Plantation Area	Social Forestry		0.15	2.76
	Plantation on OB		0.00	0.00
	Plantation on Backfill		1.18	21.69
	Total Plantation (C)		**1.33**	**24.45**
	Total Vegetation (A+B+C)		**2.93**	**53.86**
Agriculture Land	Crop land		0.00	0.00
	Fallow Land		0.00	0.00
	Total Agriculture Land		**0.00**	**0.00**
Waste Land	Waste Land		0.55	10.11
	Sand Body		0.00	0.00
	Total Waste Land		**0.55**	**10.11**
Mining Area	Advance Quarry Area		0.07	1.29
	Coal Quarry		0.13	2.39
	Barren OB Dump		0.00	0.00
	Back Fill		1.49	27.39
	Coal Dump		0.09	1.65
	Water Filled Qry		0.02	0.37
	Total Mining Area		**1.80**	**33.09**
Settlements	Urban Settlements		0.07	1.29
	Rural Settlements		0.05	0.92
	Industrial Settlements		0.01	0.18
	Total Settlement Area		**0.13**	**2.39**
Water Body	**River/ Ponds**		**0.03**	**0.55**
	Total Area		**5.44**	**100.00**

Customer	South Eastern Coalfields Limited (SECL)				
Title	Land Reclamation Monitoring of OC Projects				Job No. 564922120
Subject		Activity	Name	Designation	Signature / Date
Land Reclamation Monitoring of Chirimiri OCP based on Satellite Data (R2/L-IV) of the year 2023.		Prepared	Payel Bera	Manager (RSC)	
		Checked	R.Ranjan	GM(Excv)	
		Approved	M.Rastogi	GM(Geomatics)	
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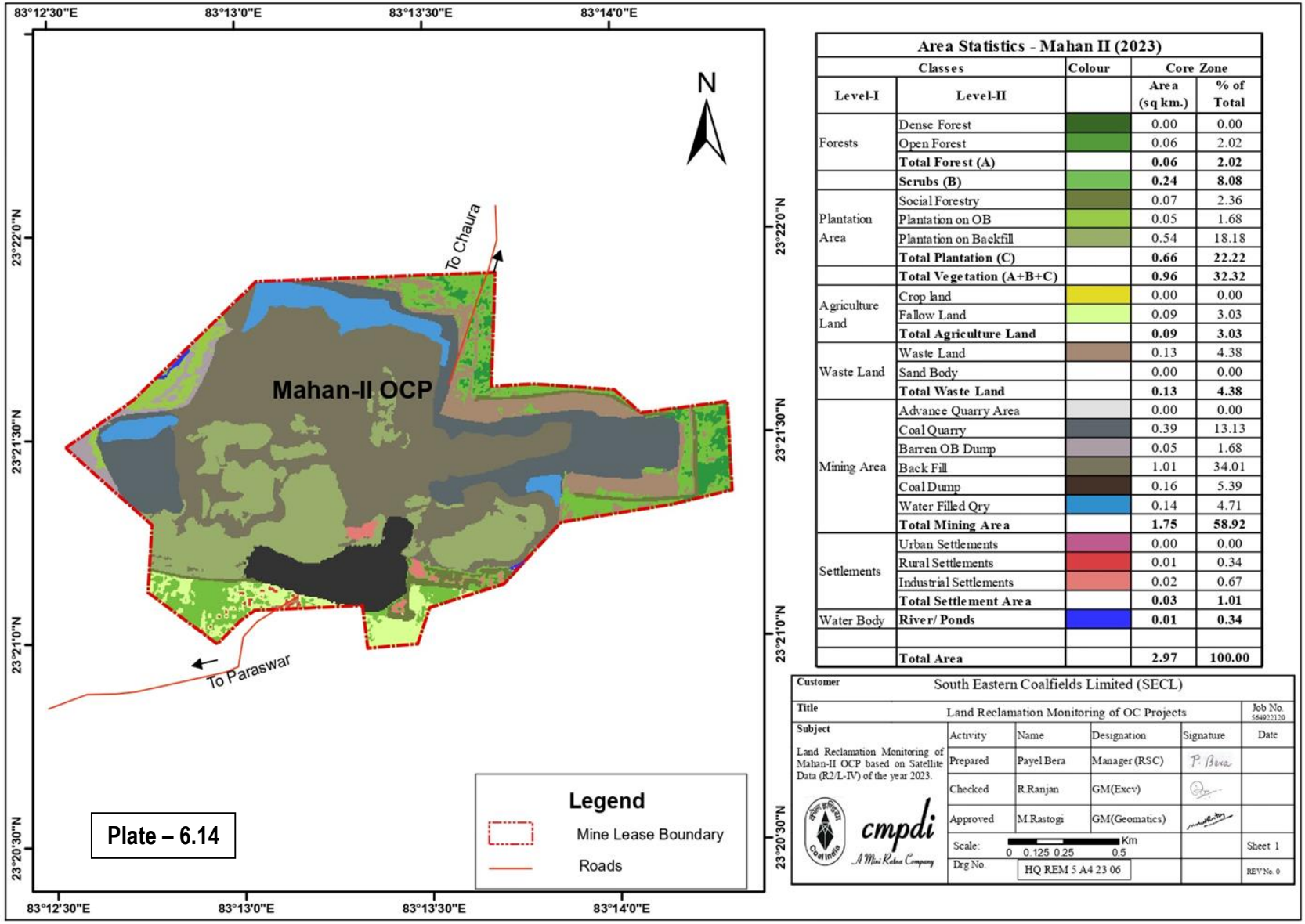

Area Statistics - Mahan II (2023)

Classes		Colour	Core Zone	
Level-I	Level-II		Area (sq km.)	% of Total
Forests	Dense Forest		0.00	0.00
	Open Forest		0.06	2.02
	Total Forest (A)		**0.06**	**2.02**
	Scrubs (B)		**0.24**	**8.08**
Plantation Area	Social Forestry		0.07	2.36
	Plantation on OB		0.05	1.68
	Plantation on Backfill		0.54	18.18
	Total Plantation (C)		**0.66**	**22.22**
	Total Vegetation (A+B+C)		**0.96**	**32.32**
Agriculture Land	Crop land		0.00	0.00
	Fallow Land		0.09	3.03
	Total Agriculture Land		**0.09**	**3.03**
Waste Land	Waste Land		0.13	4.38
	Sand Body		0.00	0.00
	Total Waste Land		**0.13**	**4.38**
Mining Area	Advance Quarry Area		0.00	0.00
	Coal Quarry		0.39	13.13
	Barren OB Dump		0.05	1.68
	Back Fill		1.01	34.01
	Coal Dump		0.16	5.39
	Water Filled Qry		0.14	4.71
	Total Mining Area		**1.75**	**58.92**
Settlements	Urban Settlements		0.00	0.00
	Rural Settlements		0.01	0.34
	Industrial Settlements		0.02	0.67
	Total Settlement Area		**0.03**	**1.01**
Water Body	**River/ Ponds**		**0.01**	**0.34**
	Total Area		**2.97**	**100.00**

Customer	South Eastern Coalfields Limited (SECL)				
Title	Land Reclamation Monitoring of OC Projects				Job No. 564922120
Subject	Activity	Name	Designation	Signature	Date
Land Reclamation Monitoring of Mahan-II OCP based on Satellite Data (R2/L-IV) of the year 2023.	Prepared	Payel Bera	Manager (RSC)	P. Bera	
	Checked	R.Ranjan	GM(Excv)		
	Approved	M.Rastogi	GM(Geomatics)		
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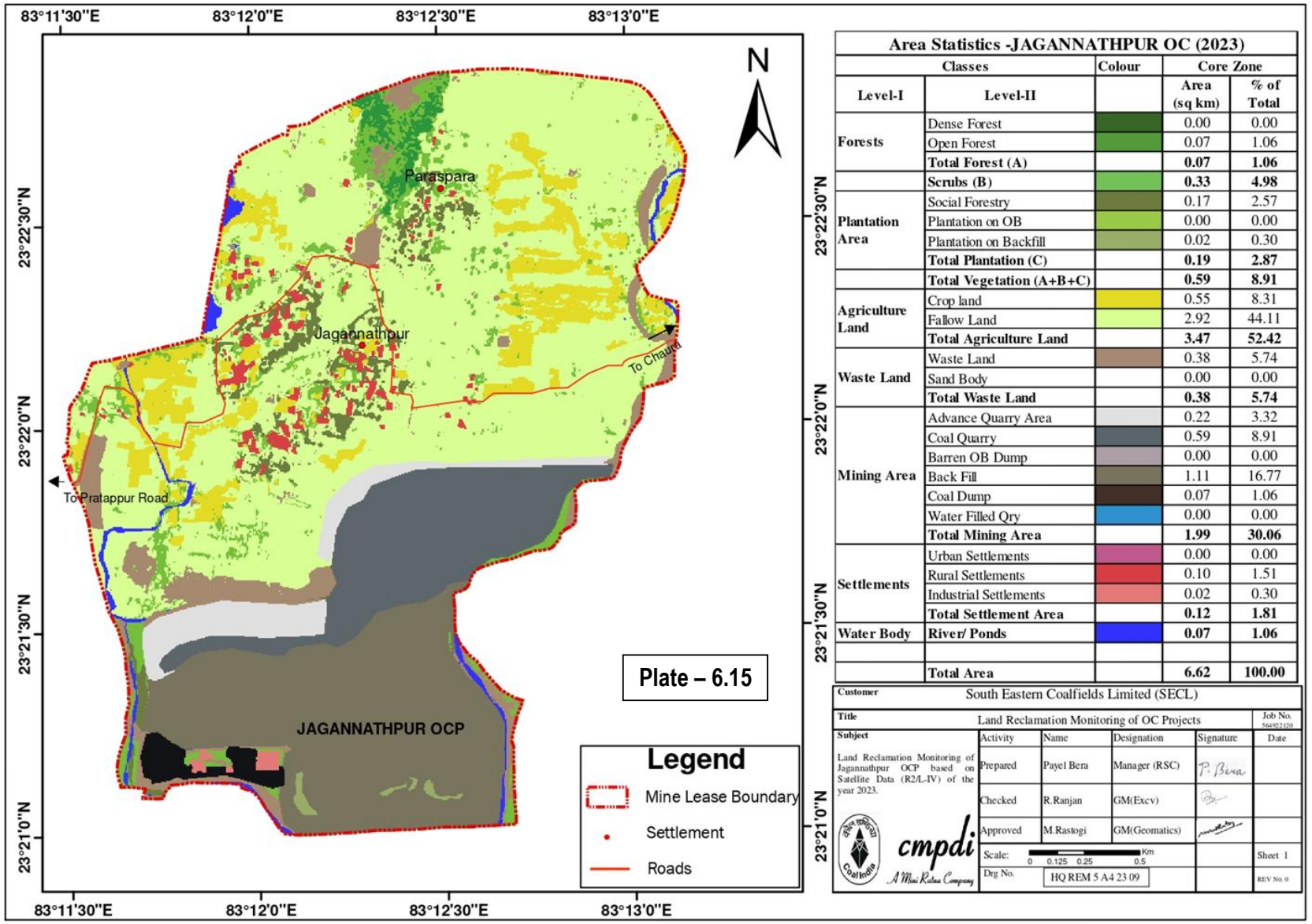

Area Statistics -JAGANNATHPUR OC (2023)

Classes		Colour	Core Zone	
Level-I	Level-II		Area (sq km)	% of Total
Forests	Dense Forest		0.00	0.00
	Open Forest		0.07	1.06
	Total Forest (A)		**0.07**	**1.06**
	Scrubs (B)		**0.33**	**4.98**
Plantation Area	Social Forestry		0.17	2.57
	Plantation on OB		0.00	0.00
	Plantation on Backfill		0.02	0.30
	Total Plantation (C)		**0.19**	**2.87**
	Total Vegetation (A+B+C)		**0.59**	**8.91**
Agriculture Land	Crop land		0.55	8.31
	Fallow Land		2.92	44.11
	Total Agriculture Land		**3.47**	**52.42**
Waste Land	Waste Land		0.38	5.74
	Sand Body		0.00	0.00
	Total Waste Land		**0.38**	**5.74**
Mining Area	Advance Quarry Area		0.22	3.32
	Coal Quarry		0.59	8.91
	Barren OB Dump		0.00	0.00
	Back Fill		1.11	16.77
	Coal Dump		0.07	1.06
	Water Filled Qry		0.00	0.00
	Total Mining Area		**1.99**	**30.06**
Settlements	Urban Settlements		0.00	0.00
	Rural Settlements		0.10	1.51
	Industrial Settlements		0.02	0.30
	Total Settlement Area		**0.12**	**1.81**
Water Body	**River/ Ponds**		**0.07**	**1.06**
	Total Area		**6.62**	**100.00**

Customer	South Eastern Coalfields Limited (SECL)				
Title	Land Reclamation Monitoring of OC Projects				Job No. 564922120
Subject	Activity	Name	Designation	Signature	Date
Land Reclamation Monitoring of Jagannathpur OCP based on Satellite Data (R2/L-IV) of the year 2023.	Prepared	Payel Bera	Manager (RSC)	P. Bera	
	Checked	R.Ranjan	GM(Excv)		
	Approved	M.Rastogi	GM(Geomatics)		
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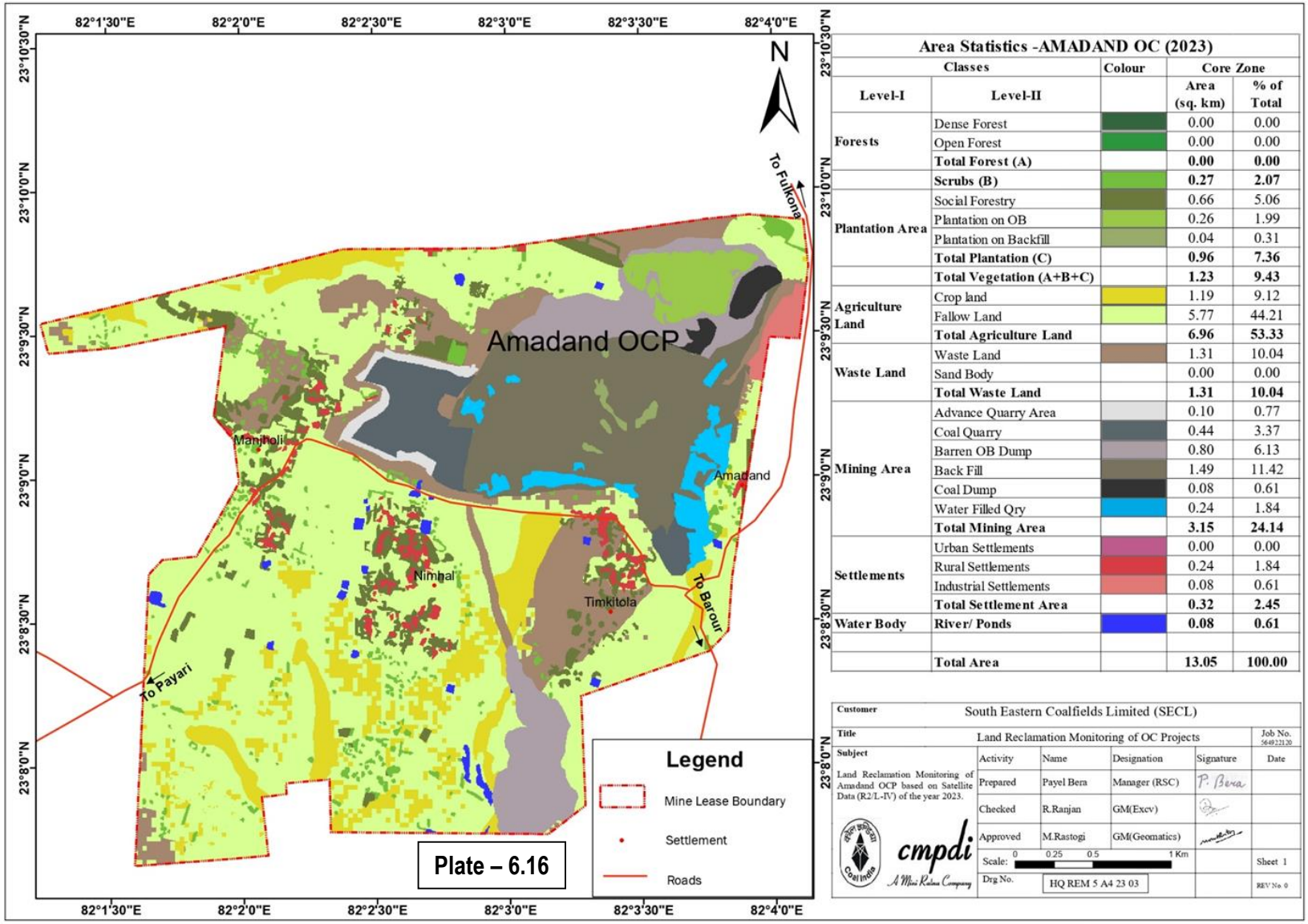

Plate – 6.16

Area Statistics -AMADAND OC (2023)

Classes		Colour	Core Zone	
Level-I	Level-II		Area (sq. km)	% of Total
Forests	Dense Forest		0.00	0.00
	Open Forest		0.00	0.00
	Total Forest (A)		**0.00**	**0.00**
	Scrubs (B)		**0.27**	**2.07**
Plantation Area	Social Forestry		0.66	5.06
	Plantation on OB		0.26	1.99
	Plantation on Backfill		0.04	0.31
	Total Plantation (C)		**0.96**	**7.36**
	Total Vegetation (A+B+C)		**1.23**	**9.43**
Agriculture Land	Crop land		1.19	9.12
	Fallow Land		5.77	44.21
	Total Agriculture Land		**6.96**	**53.33**
Waste Land	Waste Land		1.31	10.04
	Sand Body		0.00	0.00
	Total Waste Land		**1.31**	**10.04**
Mining Area	Advance Quarry Area		0.10	0.77
	Coal Quarry		0.44	3.37
	Barren OB Dump		0.80	6.13
	Back Fill		1.49	11.42
	Coal Dump		0.08	0.61
	Water Filled Qry		0.24	1.84
	Total Mining Area		**3.15**	**24.14**
Settlements	Urban Settlements		0.00	0.00
	Rural Settlements		0.24	1.84
	Industrial Settlements		0.08	0.61
	Total Settlement Area		**0.32**	**2.45**
Water Body	**River/ Ponds**		**0.08**	**0.61**
	Total Area		**13.05**	**100.00**

Customer	South Eastern Coalfields Limited (SECL)				
Title	Land Reclamation Monitoring of OC Projects				Job No. 564922120
Subject	Activity	Name	Designation	Signature	Date
Land Reclamation Monitoring of Amadand OCP based on Satellite Data (R2/L-IV) of the year 2023.	Prepared	Payel Bera	Manager (RSC)	P. Bera	
	Checked	R.Ranjan	GM(Excv)		
	Approved	M.Rastogi	GM(Geomatics)		
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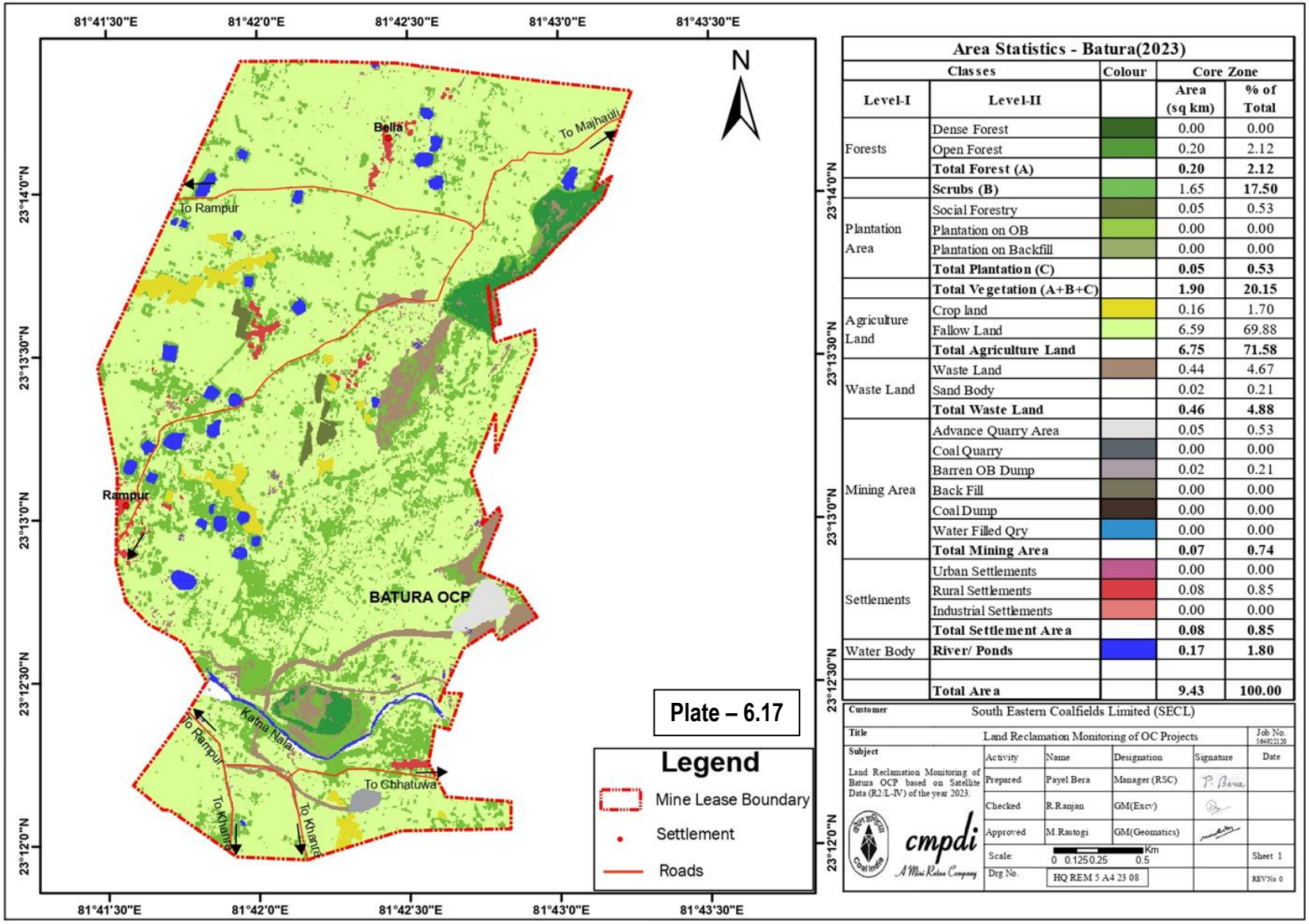
	Drg No.	HQ REM 5 A4 23 03			REV No. 0



Area Statistics - Batura(2023)

Classes		Colour	Core Zone	
Level-I	Level-II		Area (sq km)	% of Total
Forests	Dense Forest		0.00	0.00
	Open Forest		0.20	2.12
	Total Forest (A)		**0.20**	**2.12**
	Scrubs (B)		1.65	**17.50**
Plantation Area	Social Forestry		0.05	0.53
	Plantation on OB		0.00	0.00
	Plantation on Backfill		0.00	0.00
	Total Plantation (C)		**0.05**	**0.53**
	Total Vegetation (A+B+C)		**1.90**	**20.15**
Agriculture Land	Crop land		0.16	1.70
	Fallow Land		6.59	69.88
	Total Agriculture Land		**6.75**	**71.58**
Waste Land	Waste Land		0.44	4.67
	Sand Body		0.02	0.21
	Total Waste Land		**0.46**	**4.88**
Mining Area	Advance Quarry Area		0.05	0.53
	Coal Quarry		0.00	0.00
	Barren OB Dump		0.02	0.21
	Back Fill		0.00	0.00
	Coal Dump		0.00	0.00
	Water Filled Qry		0.00	0.00
	Total Mining Area		**0.07**	**0.74**
Settlements	Urban Settlements		0.00	0.00
	Rural Settlements		0.08	0.85
	Industrial Settlements		0.00	0.00
	Total Settlement Area		**0.08**	**0.85**
Water Body	**River/ Ponds**		**0.17**	**1.80**
	Total Area		**9.43**	**100.00**

Customer	South Eastern Coalfields Limited (SECL)				
Title	Land Reclamation Monitoring of OC Projects				Job No. 564922120
Subject		Activity	Name	Designation	Signature / Date
Land Reclamation Monitoring of Batura OCP based on Satellite Data (R2/L-IV) of the year 2023.		Prepared	Payel Bera	Manager (RSC)	
		Checked	R.Ranjan	GM(Excv)	
		Approved	M.Rastogi	GM(Geomatics)	
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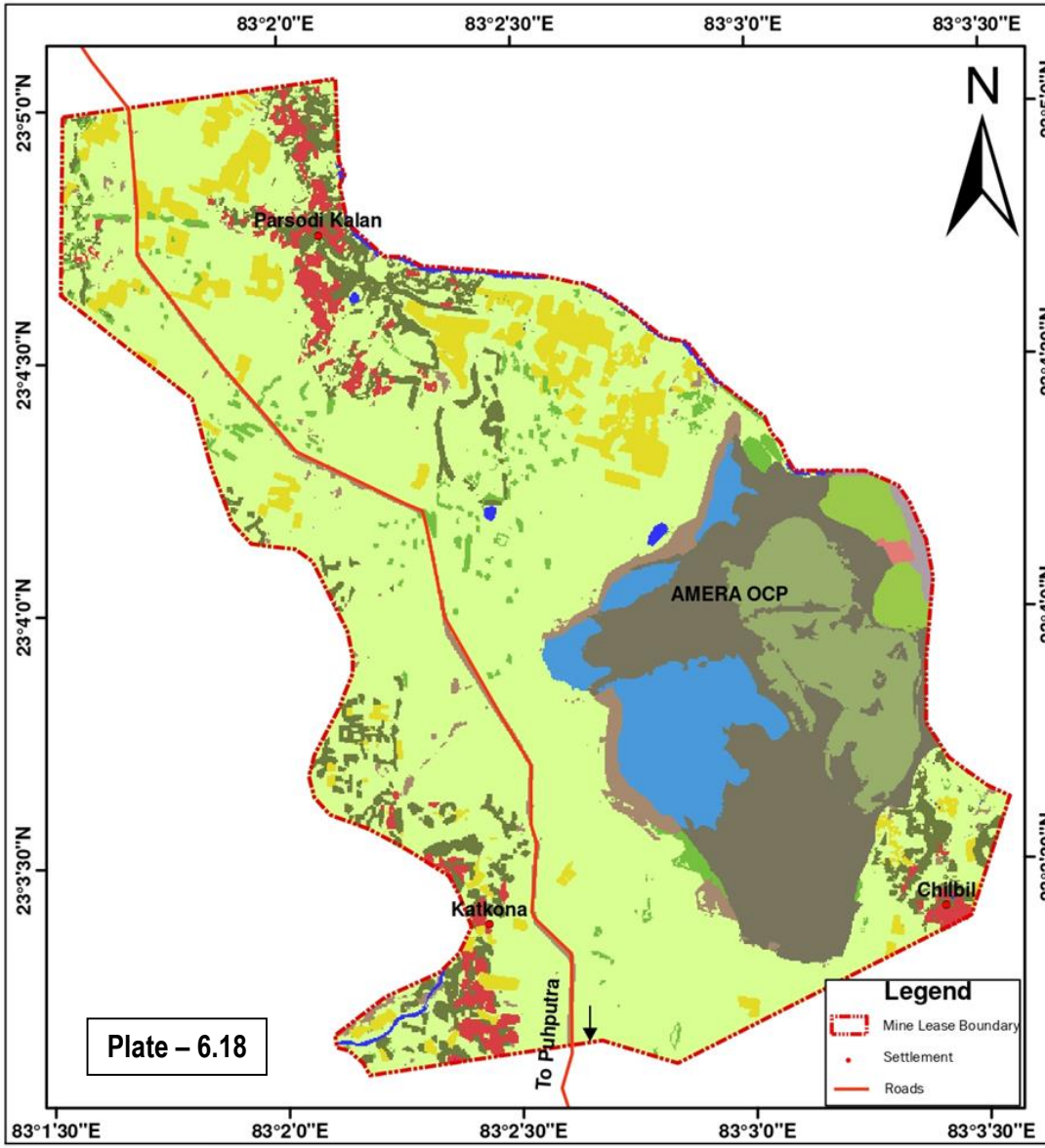

Area Statistics -AMERA OC (2023)

Classes		Colour	Core Zone	
Level-I	Level-II		Area (sq km.)	% of Total
Forests	Dense Forest		0.00	0.00
	Open Forest		0.00	0.00
	Total Forest (A)		**0.00**	**0.00**
	Scrubs (B)		**0.13**	**1.96**
Plantation Area	Social Forestry		0.44	6.63
	Plantation on OB		0.08	1.20
	Plantation on Backfill		0.36	5.42
	Total Plantation (C)		**0.88**	**13.25**
	Total Vegetation (A+B+C)		**1.01**	**15.21**
Agriculture Land	Crop land		0.40	6.02
	Fallow Land		3.58	53.92
	Total Agriculture Land		**3.98**	**59.94**
Waste Land	Waste Land		0.23	3.39
	Sand Body		0.00	0.00
	Total Waste Land		**0.23**	**3.39**
Mining Area	Advance Quarry Area		0.00	0.00
	Coal Quarry		0.00	0.00
	Barren OB Dump		0.02	0.30
	Back Fill		0.89	13.40
	Coal Dump		0.00	0.00
	Water Filled Qry		0.30	4.52
	Total Mining Area		**1.21**	**18.22**
Settlements	Urban Settlements		0.00	0.00
	Rural Settlements		0.16	2.41
	Industrial Settlements		0.01	0.15
	Total Settlement Area		**0.17**	**2.56**
Water Body	**River/ Ponds**		**0.05**	**0.68**
	Total Area		**6.64**	**100.00**

Customer	South Eastern Coalfields Limited (SECL)				
Title	Land Reclamation Monitoring of OC Projects				Job No. 564922120
Subject	Activity	Name	Designation	Signature	Date
Land Reclamation Monitoring of Amera OCP based on Satellite Data (R2/L-IV) of the year 2023.	Prepared	Payel Bera	Manager (RSC)	P. Bera	
	Checked	R.Ranjan	GM(Excv)		
cmpdi A Mini Ratna Company	Approved	M.Rastogi	GM(Geomatics)		
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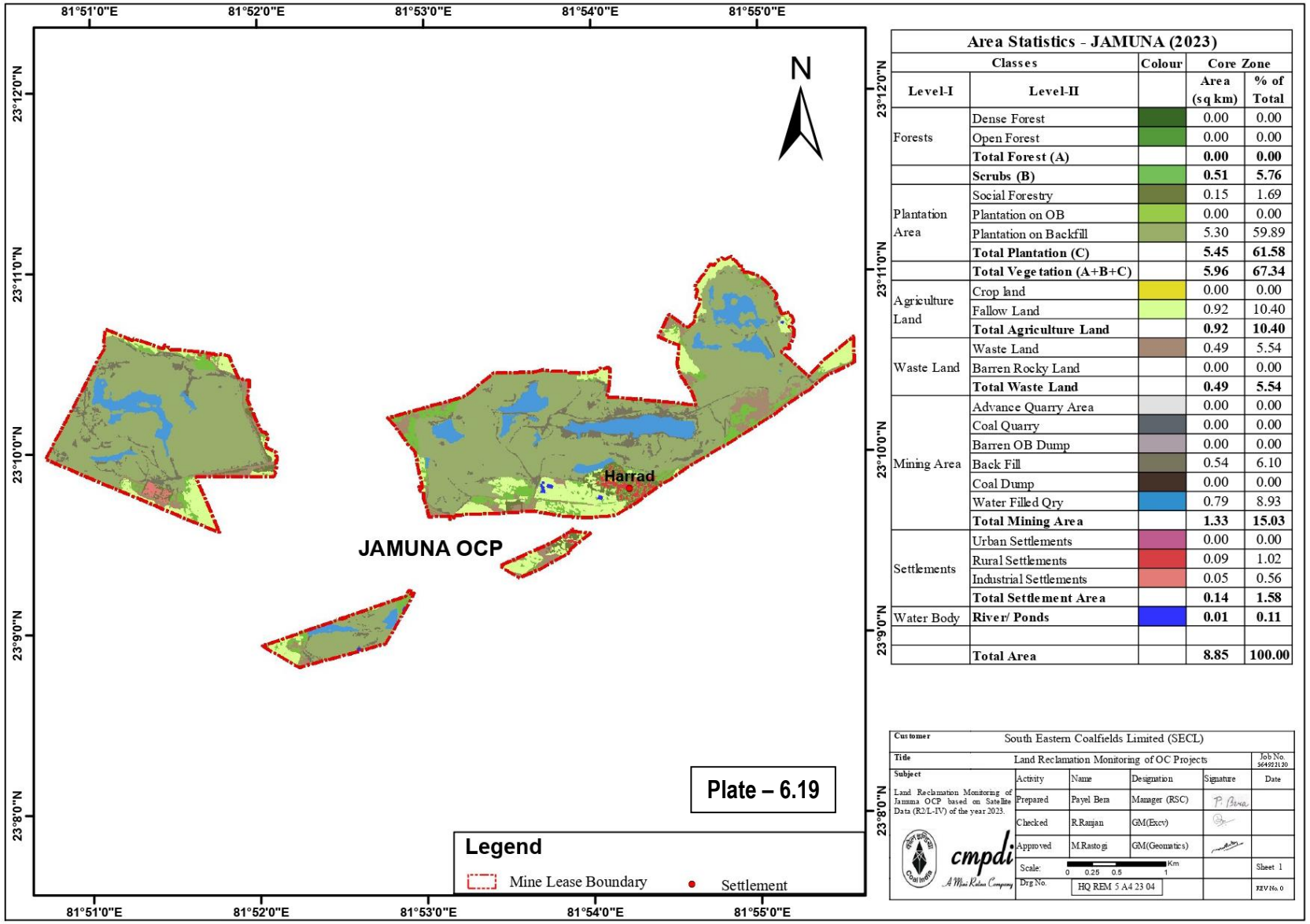
	Drg No. HQ REM 5 A4 23 07				REV No. 0



Area Statistics - JAMUNA (2023)

Classes		Colour	Core Zone	
Level-I	Level-II		Area (sq km)	% of Total
Forests	Dense Forest		0.00	0.00
	Open Forest		0.00	0.00
	Total Forest (A)		**0.00**	**0.00**
	Scrubs (B)		**0.51**	**5.76**
Plantation Area	Social Forestry		0.15	1.69
	Plantation on OB		0.00	0.00
	Plantation on Backfill		5.30	59.89
	Total Plantation (C)		**5.45**	**61.58**
	Total Vegetation (A+B+C)		**5.96**	**67.34**
Agriculture Land	Crop land		0.00	0.00
	Fallow Land		0.92	10.40
	Total Agriculture Land		**0.92**	**10.40**
Waste Land	Waste Land		0.49	5.54
	Barren Rocky Land		0.00	0.00
	Total Waste Land		**0.49**	**5.54**
Mining Area	Advance Quarry Area		0.00	0.00
	Coal Quarry		0.00	0.00
	Barren OB Dump		0.00	0.00
	Back Fill		0.54	6.10
	Coal Dump		0.00	0.00
	Water Filled Qry		0.79	8.93
	Total Mining Area		**1.33**	**15.03**
Settlements	Urban Settlements		0.00	0.00
	Rural Settlements		0.09	1.02
	Industrial Settlements		0.05	0.56
	Total Settlement Area		**0.14**	**1.58**
Water Body	**River/ Ponds**		**0.01**	**0.11**
	Total Area		**8.85**	**100.00**

Customer	South Eastern Coalfields Limited (SECL)				
Title	Land Reclamation Monitoring of OC Projects				Job No. 564922120
Subject	Activity	Name	Designation	Signature	Date
Land Reclamation Monitoring of Jamuna OCP based on Satellite Data (R2/L-IV) of the year 2023.	Prepared	Payel Bera	Manager (RSC)	P. Bera	
	Checked	R.Ranjan	GM(Excv)		
	Approved	M.Rastogi	GM(Geomatics)		
	Scale: 0 0.25 0.5 1 Km				Sheet 1
	Drg No. HQ REM 5 A4 23 04				REV No. 0

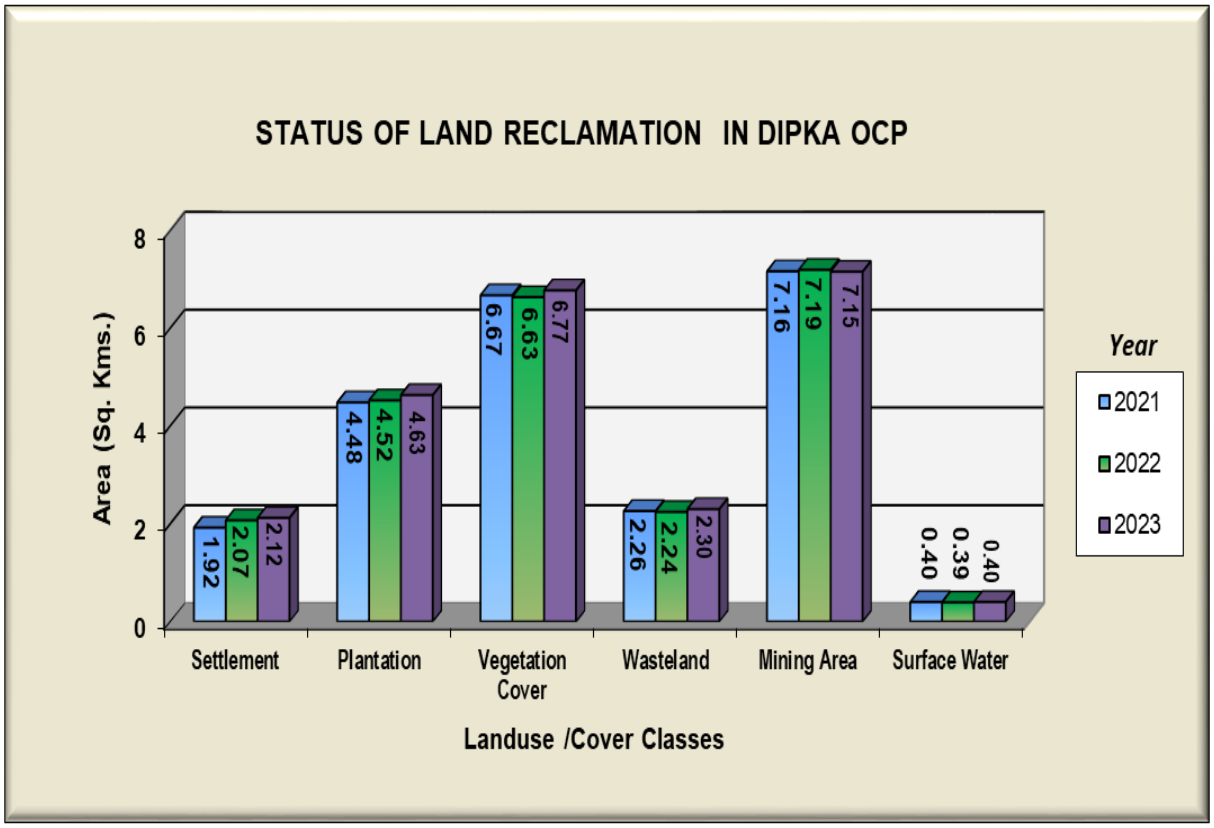
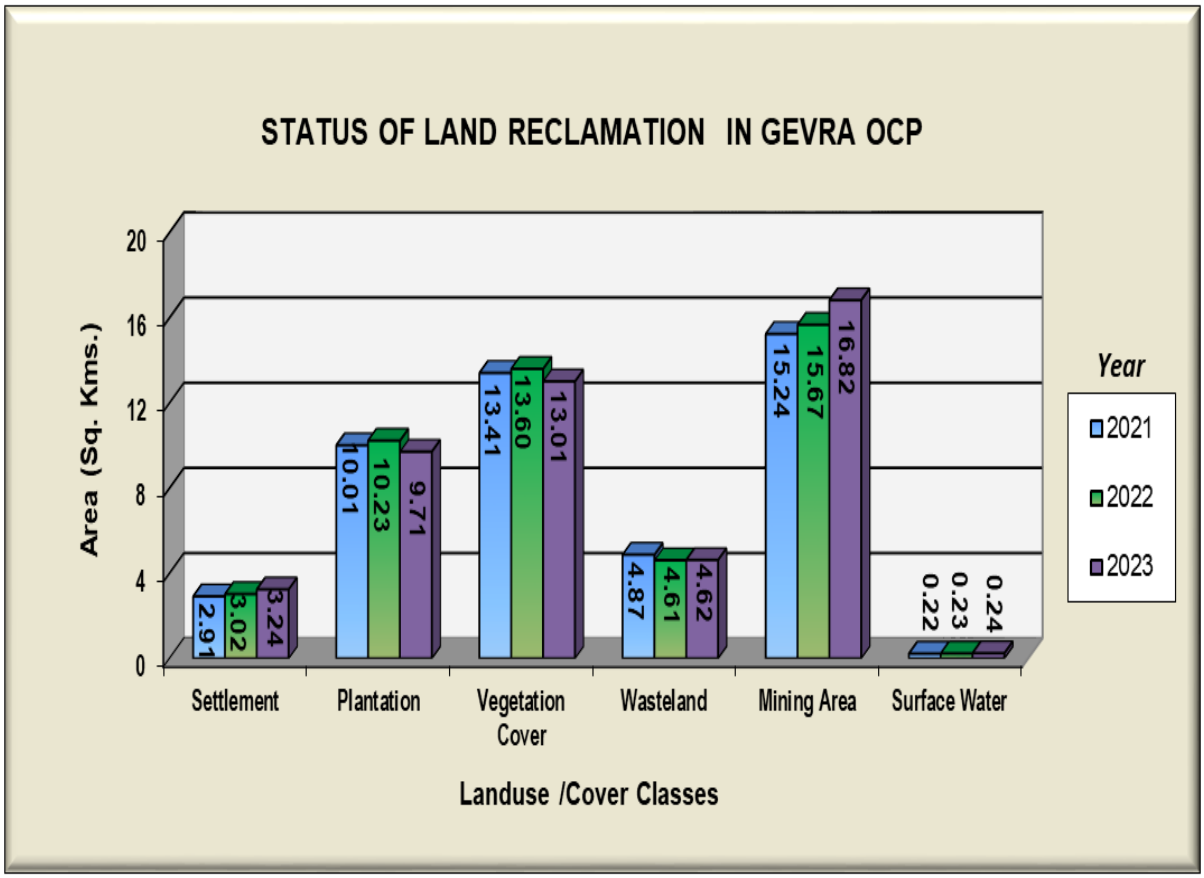


Figure 6.2



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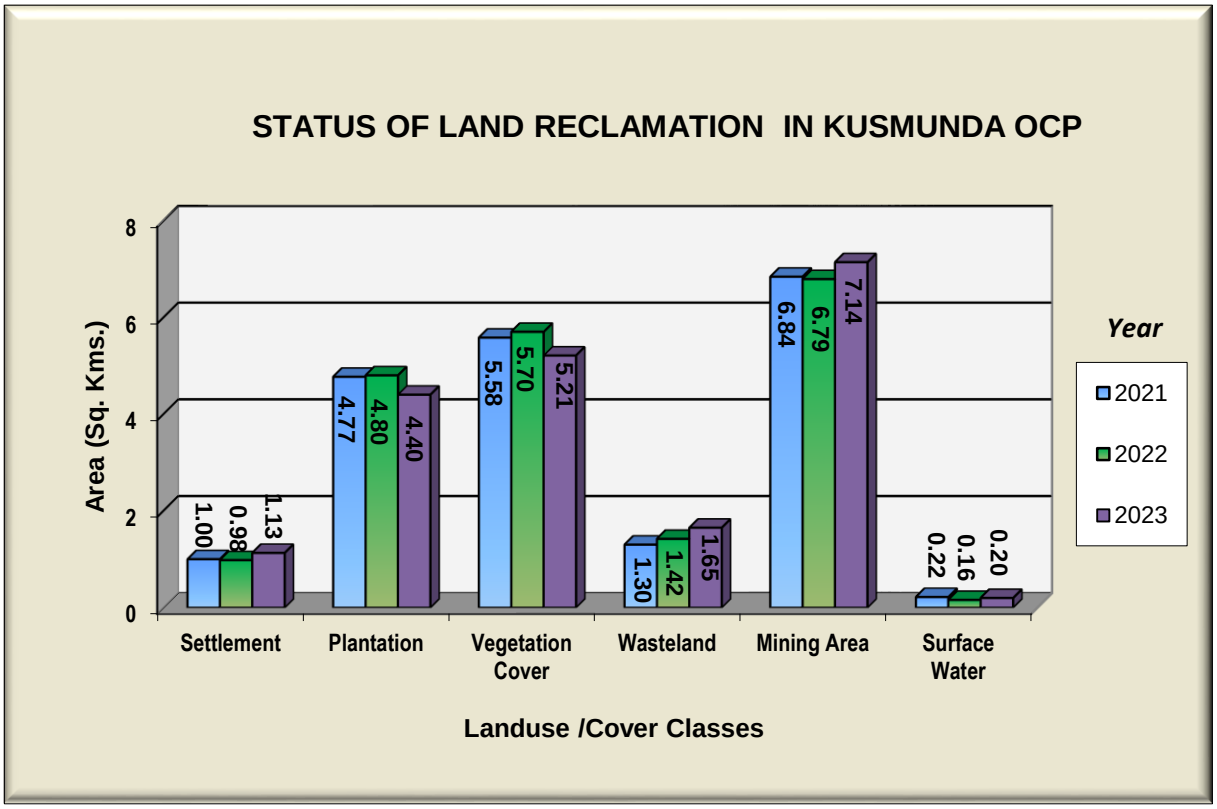

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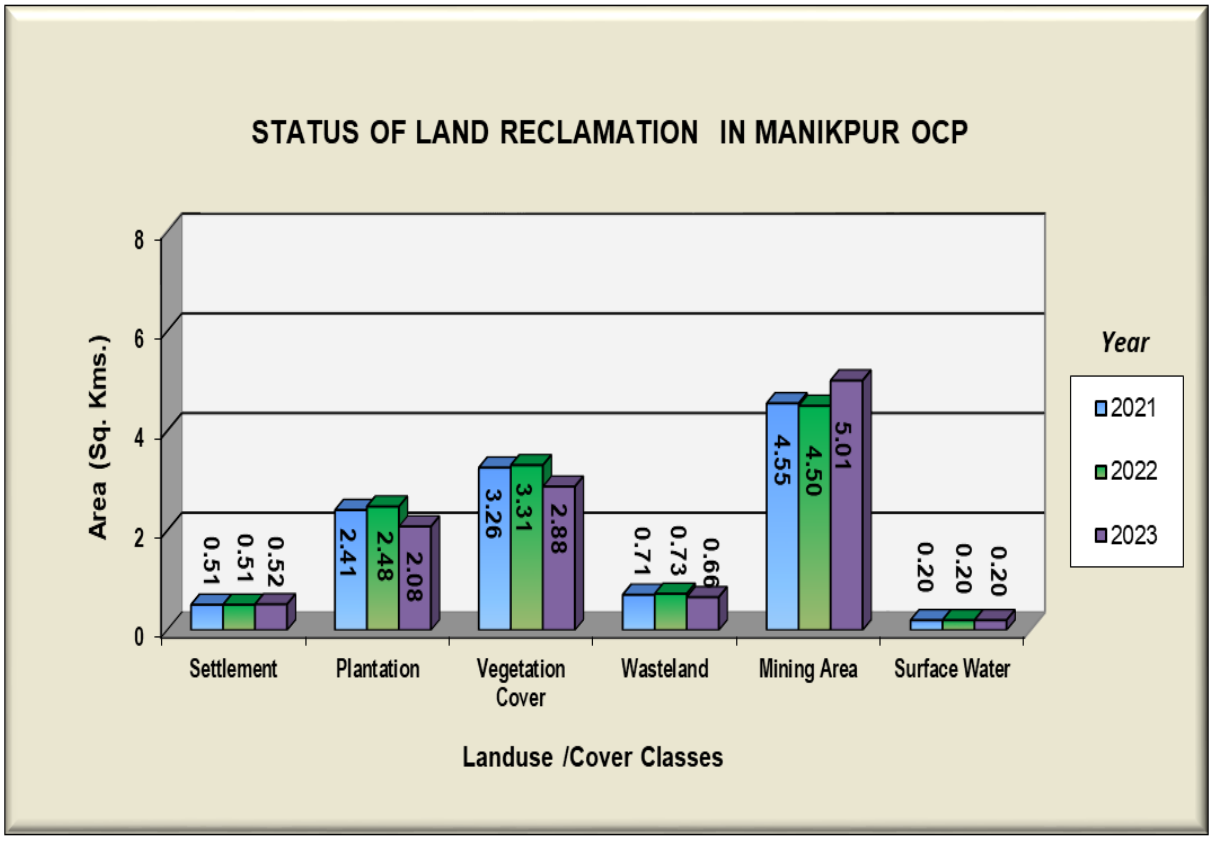


Figure 6.5

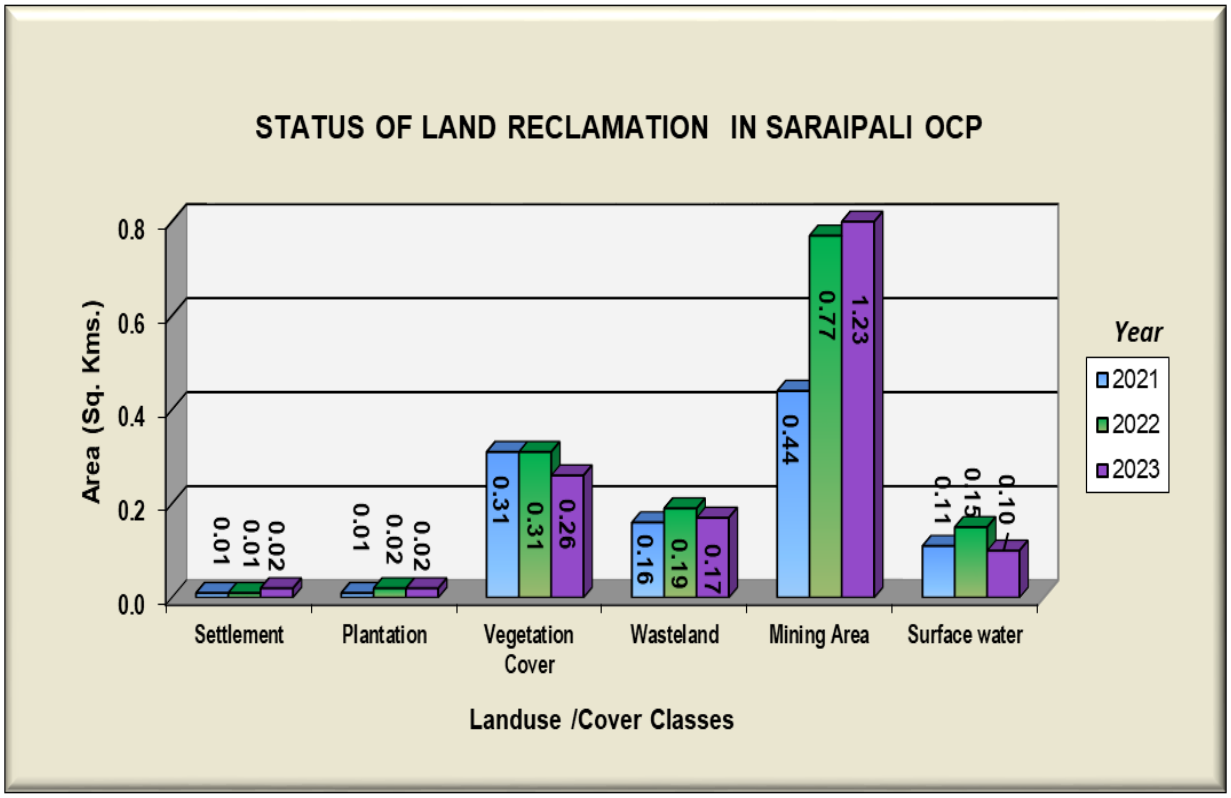


Figure 6.6

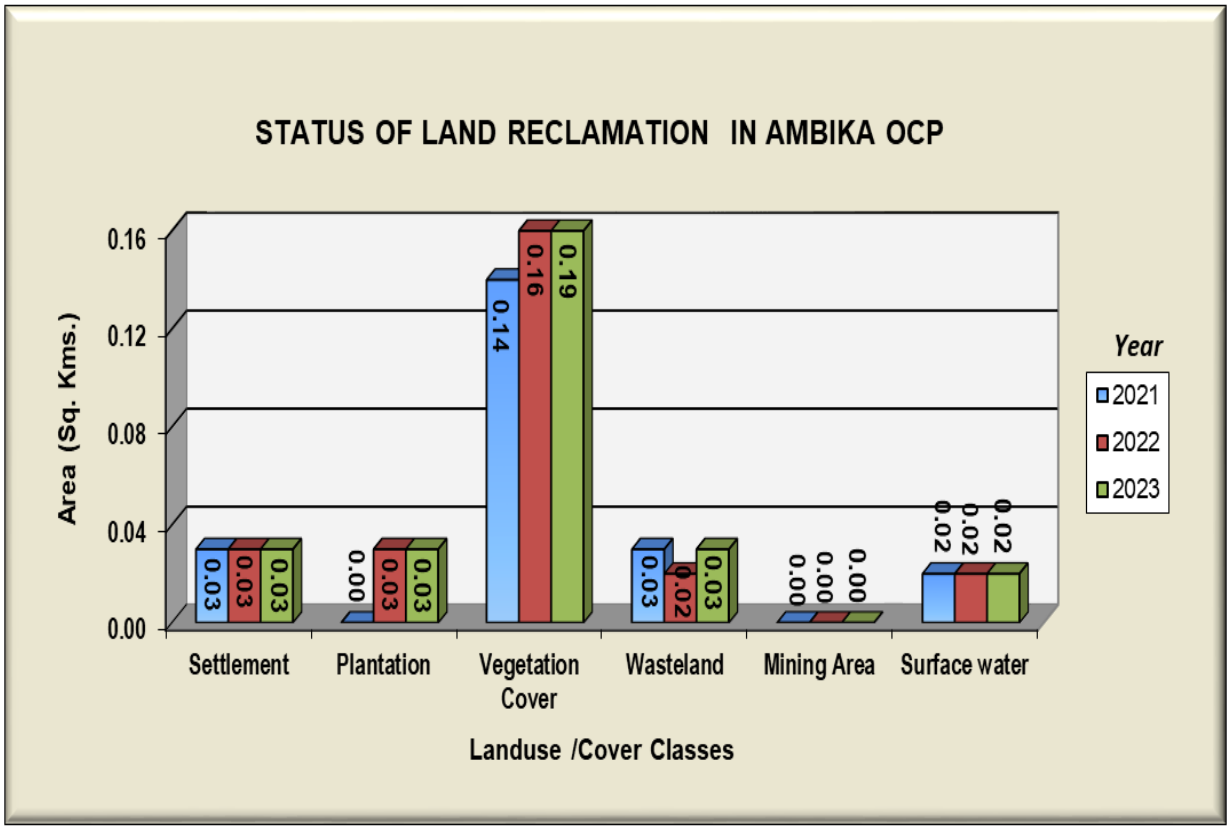


Figure 6.7

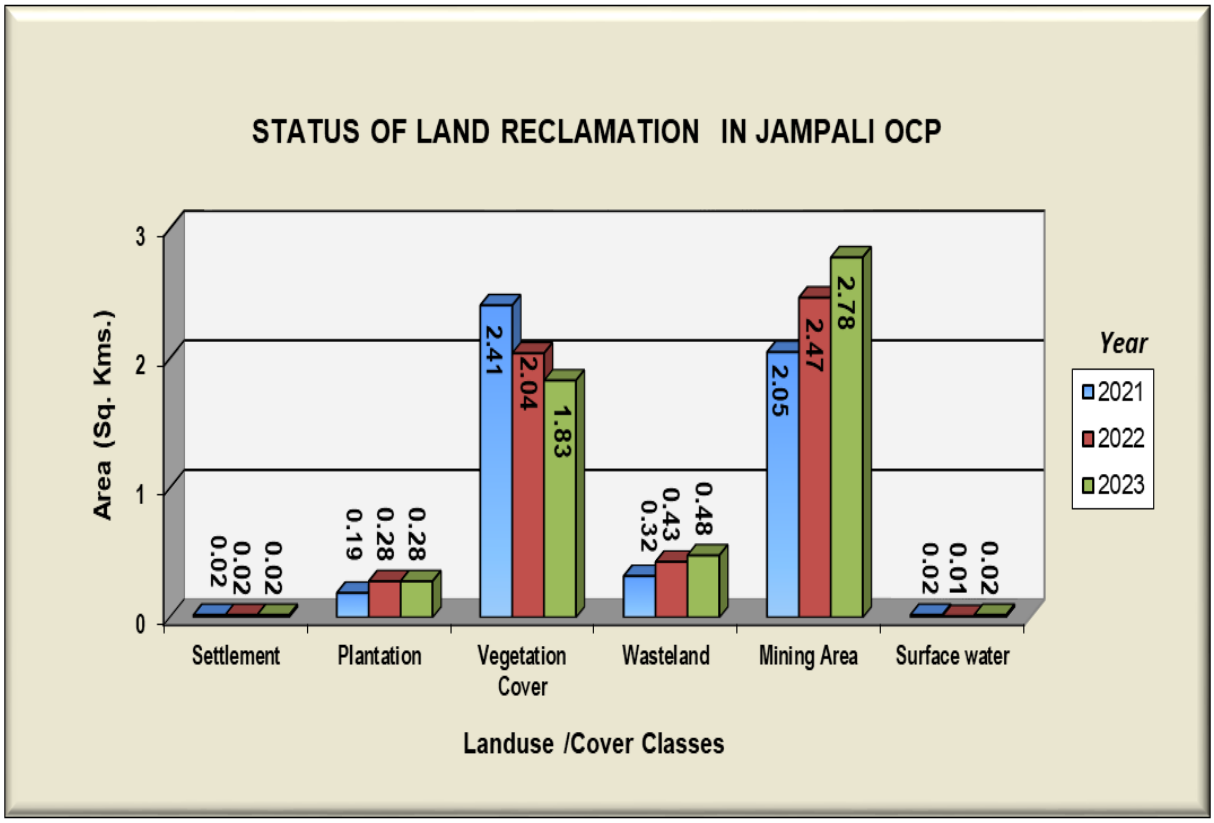


Figure 6.8

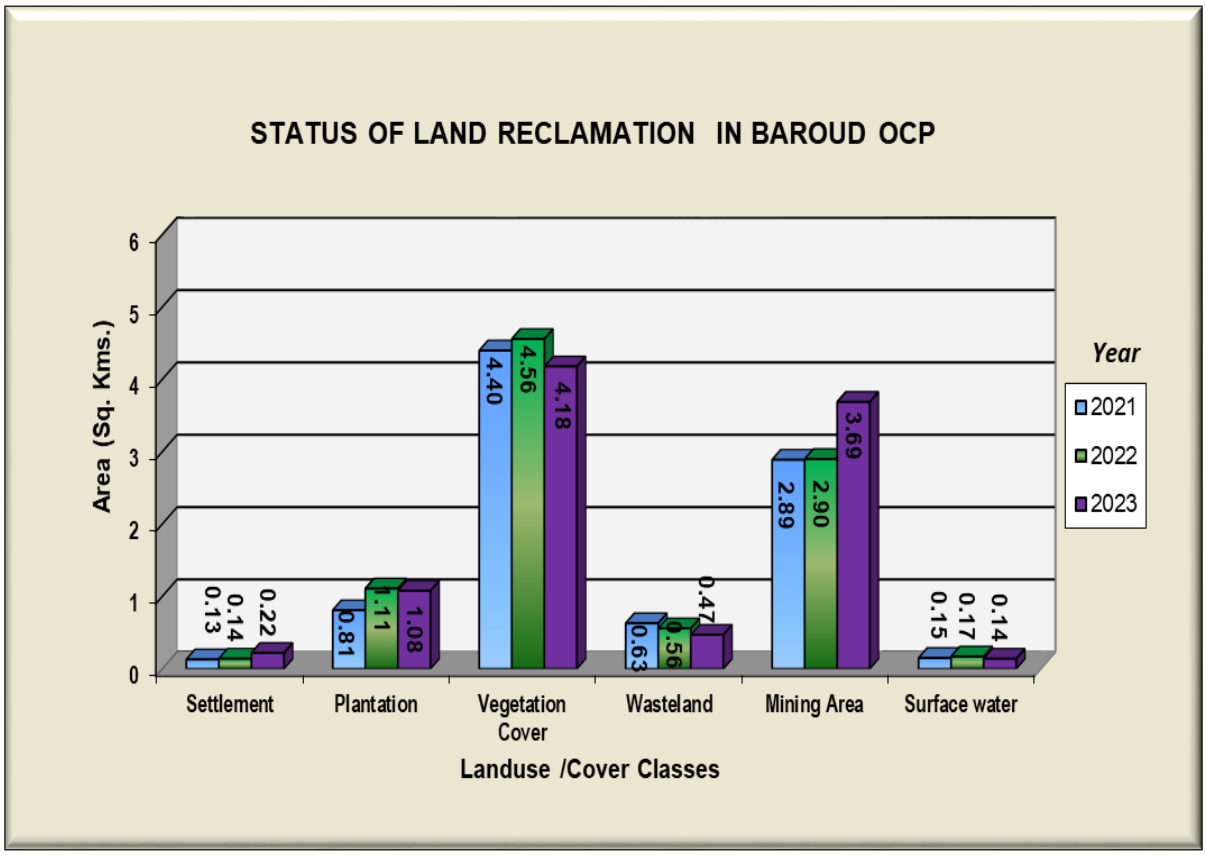


Figure 6.9

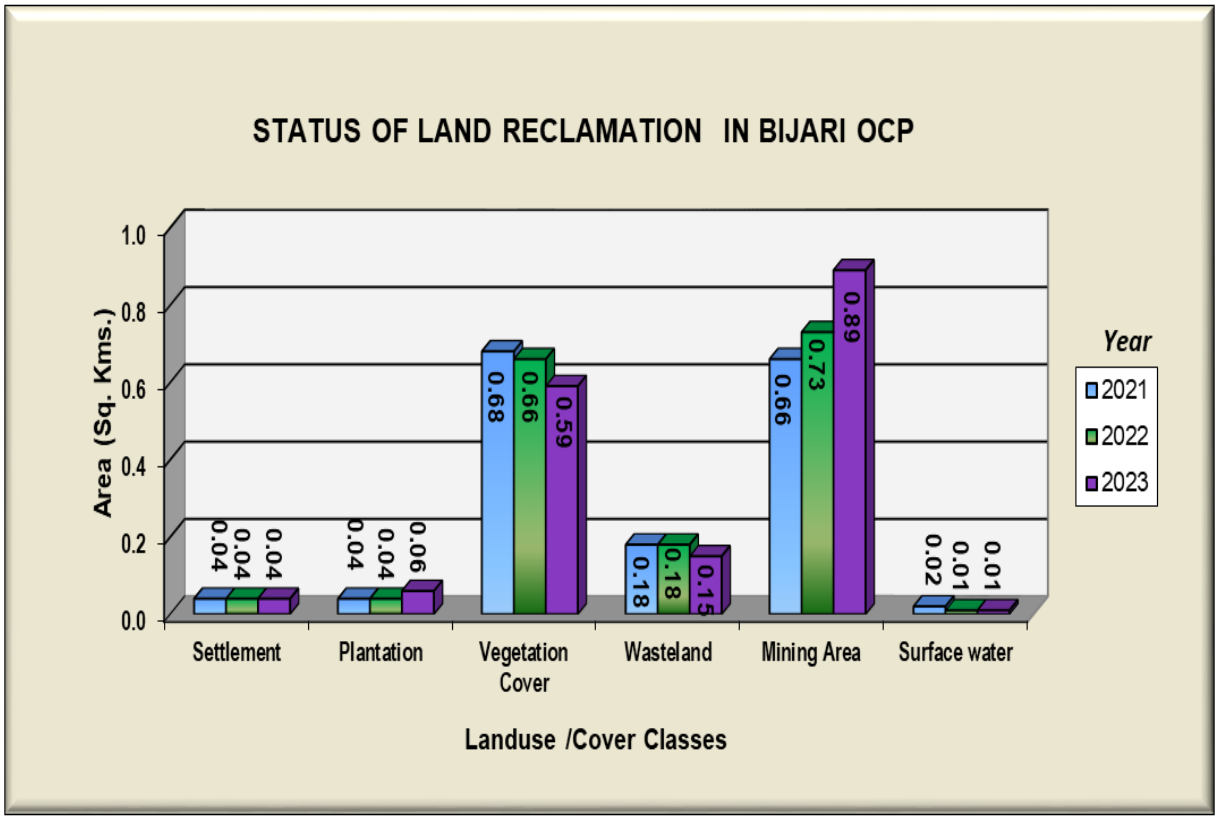


Figure 6.10

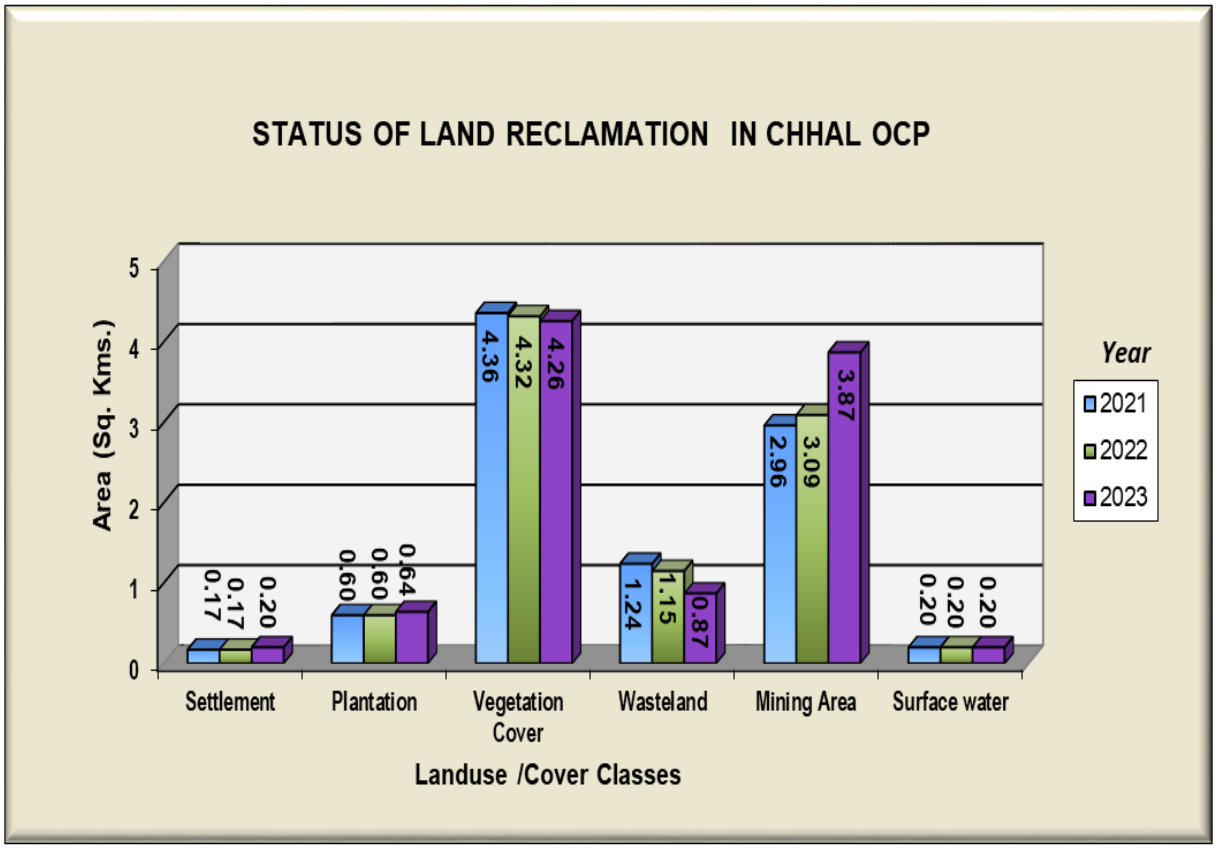


Figure 6.11

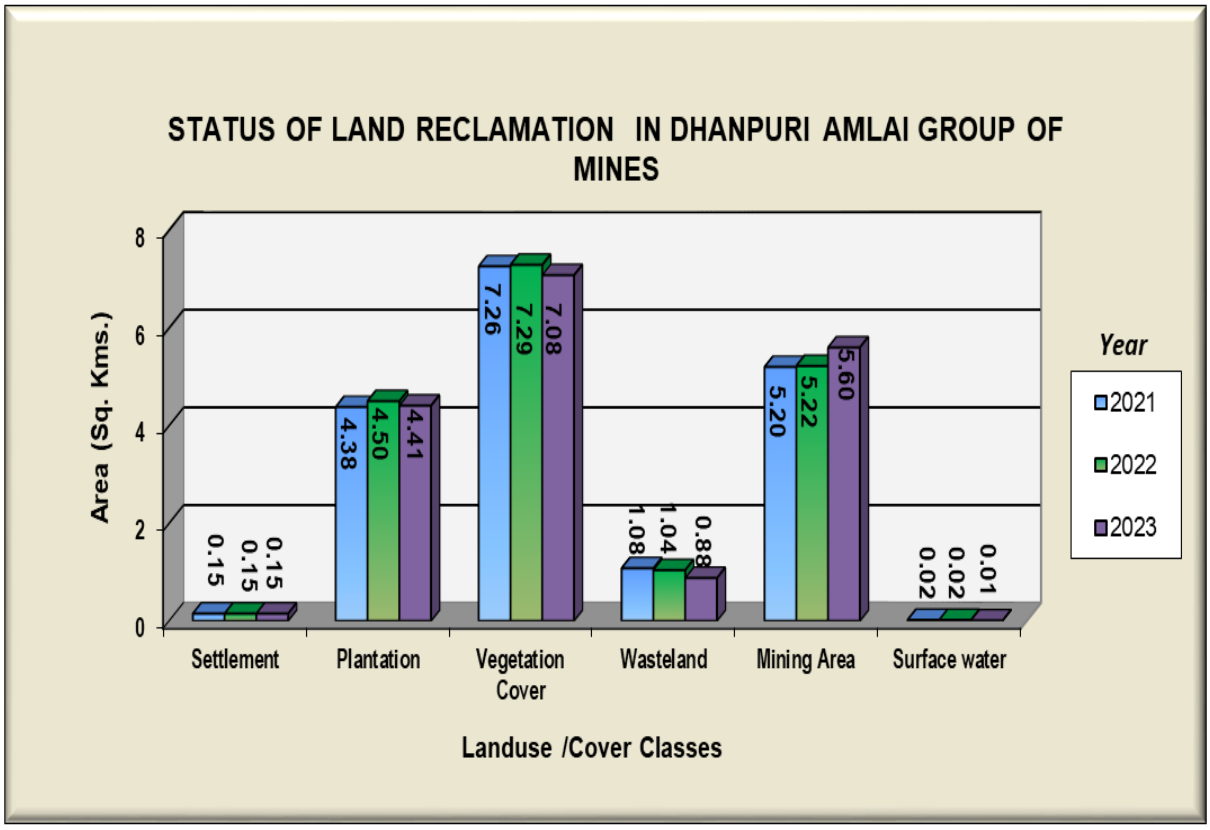


Figure 6.12

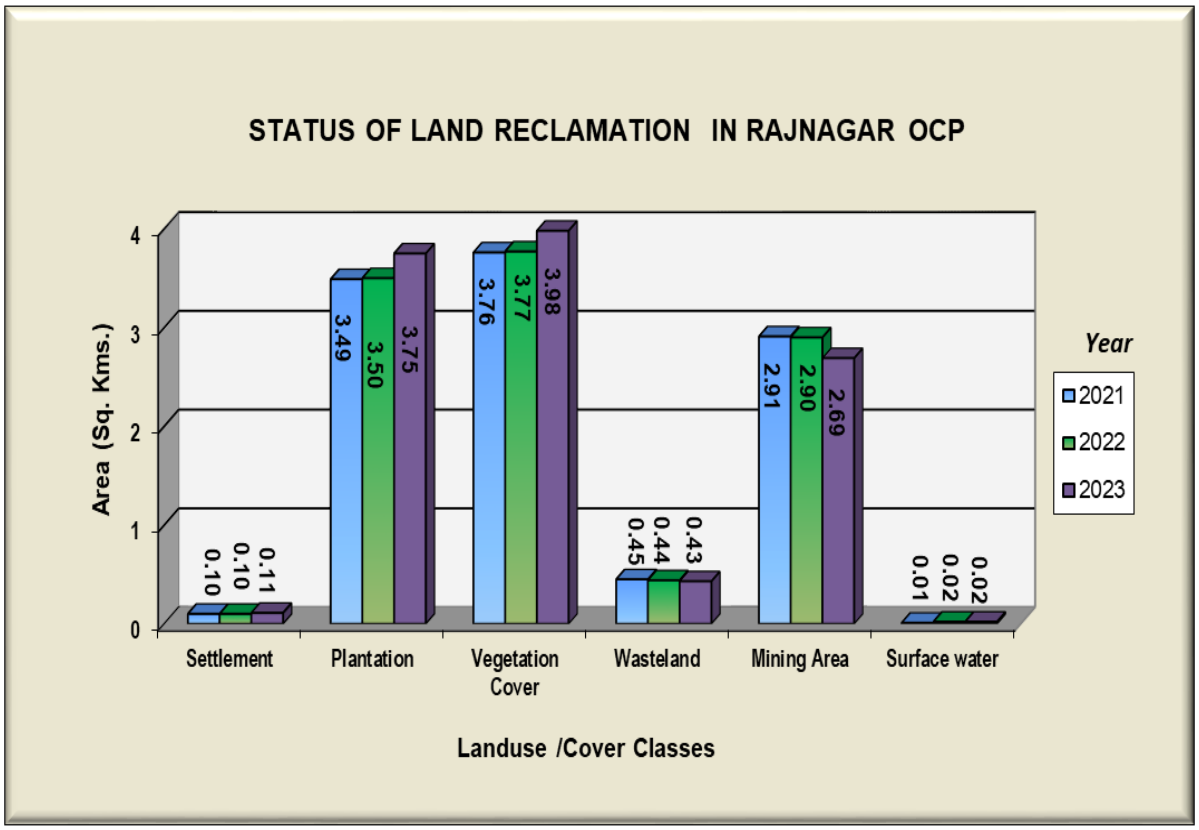
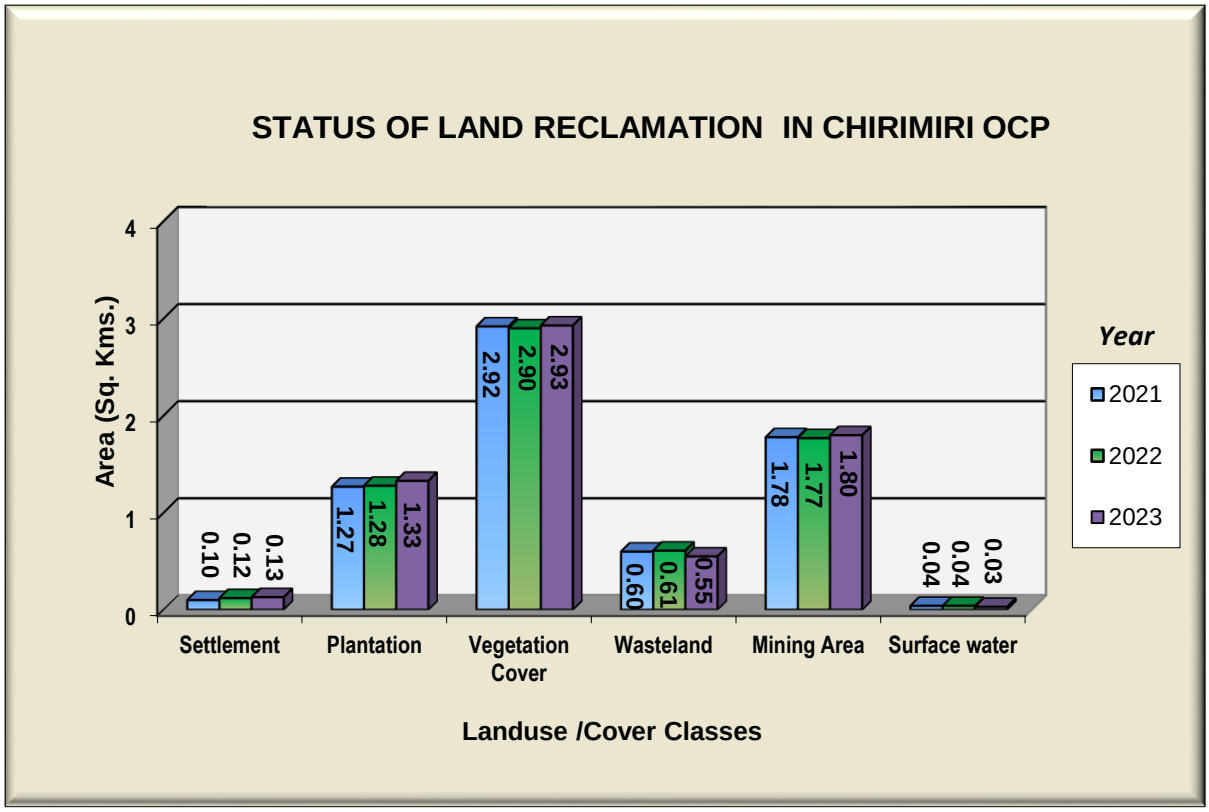


Figure 6.13



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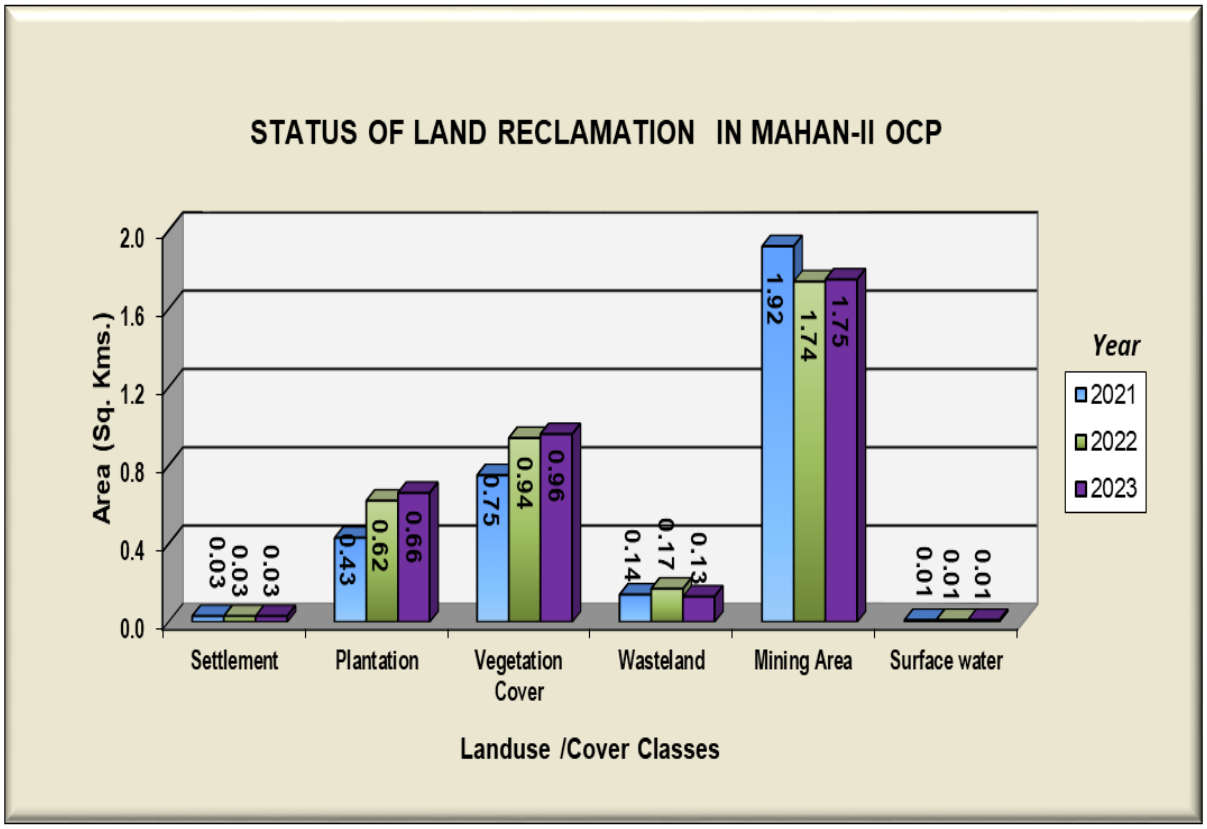


Figure 6.15

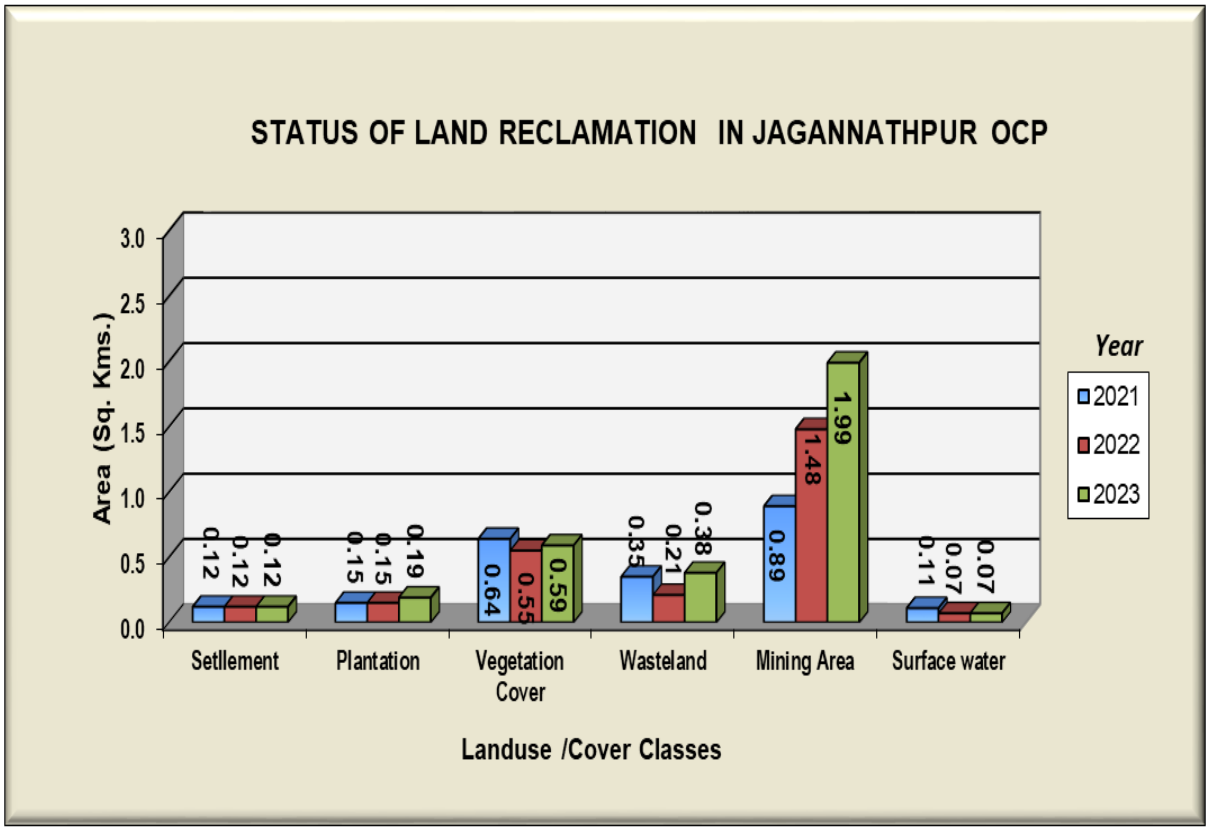
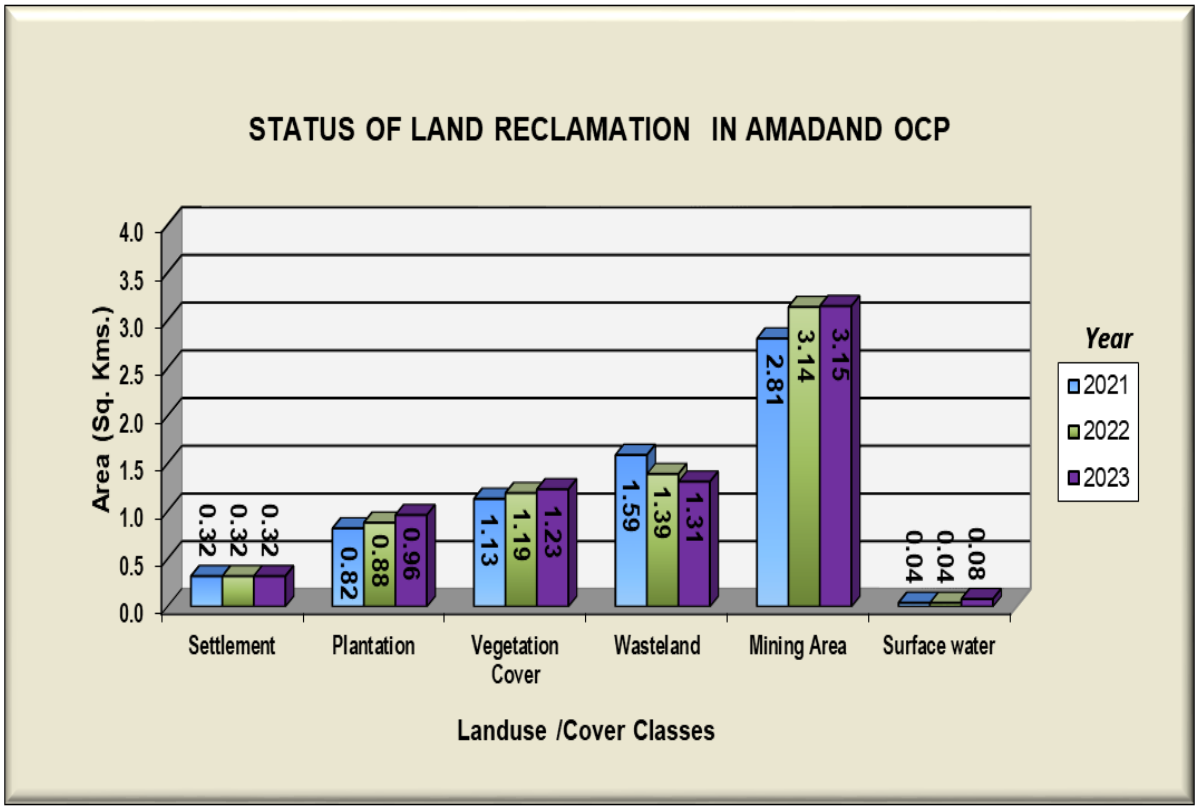


Figure 6.16



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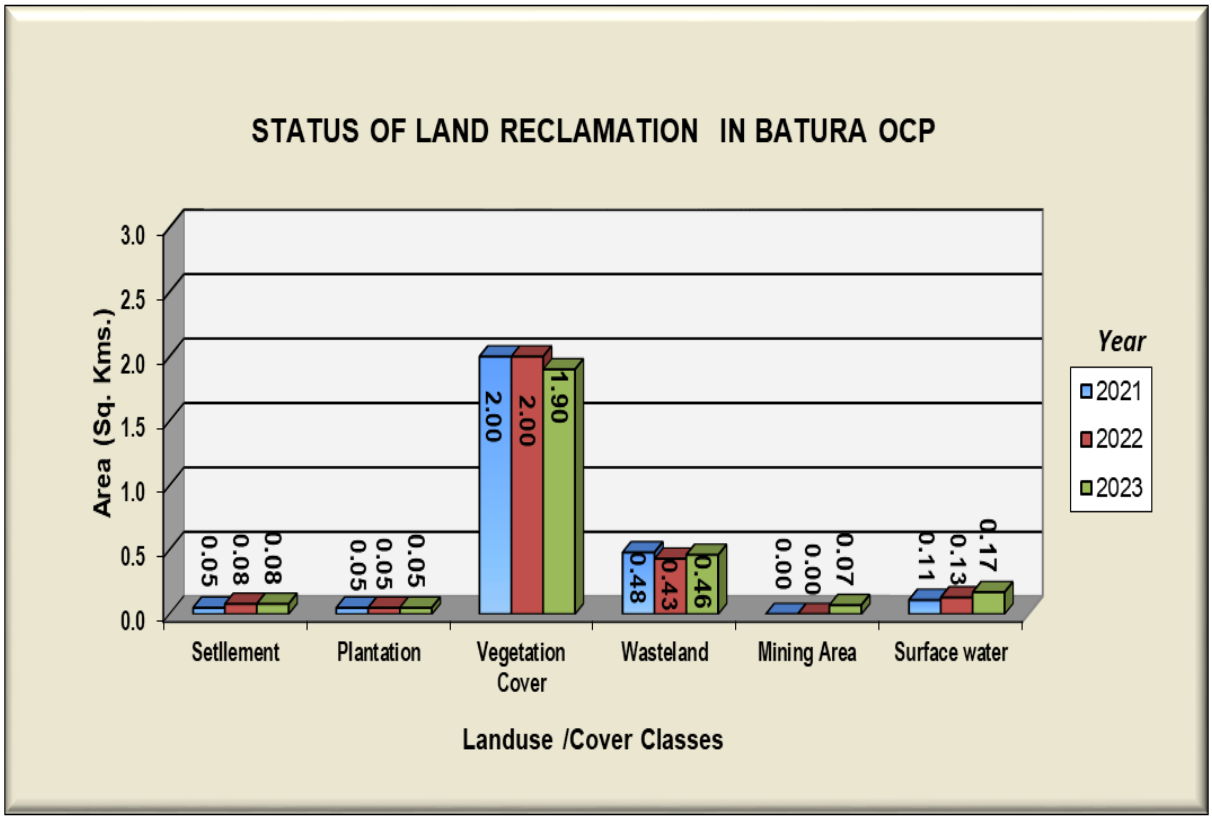

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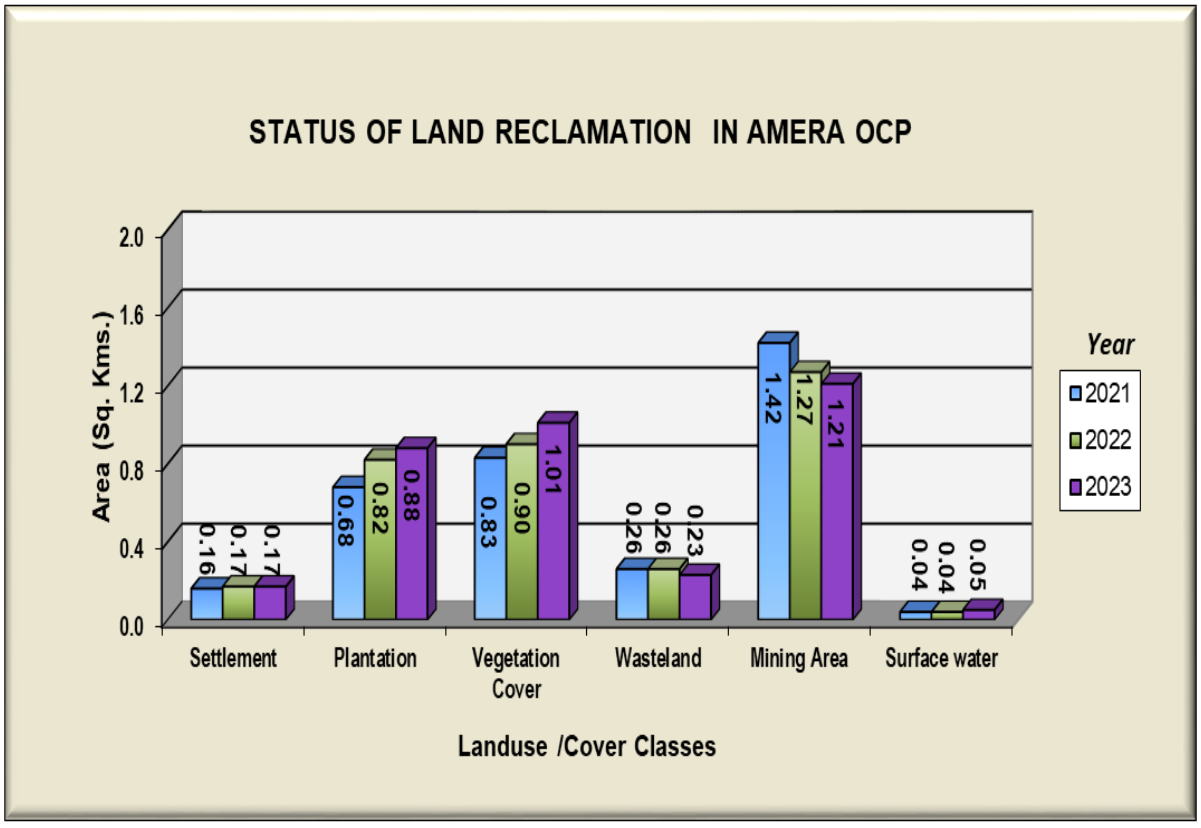


Figure 6.19

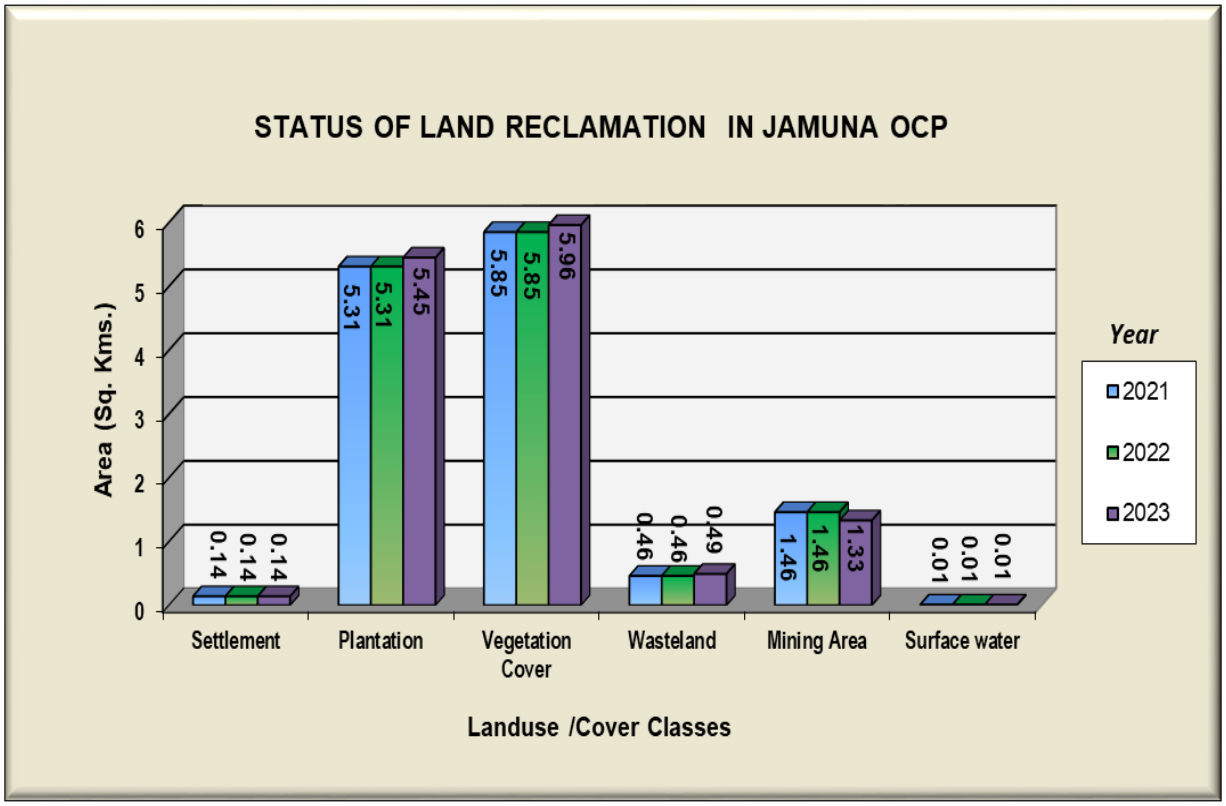

STATUS OF LAND RECLAMATION IN JAMUNA OCP
Area (Sq. Kms.)
0
1
2
3
4
5
6
0.14
0.14
0.14
5.31
5.31
5.45
5.85
5.85
5.96
0.46
0.46
0.49
1.46
1.46
1.33
0.01
0.01
0.01
Settlement
Plantation
Vegetation Cover
Wasteland
Mining Area
Surface water
Landuse /Cover Classes
Year
2021
2022
2023

Figure 6.20

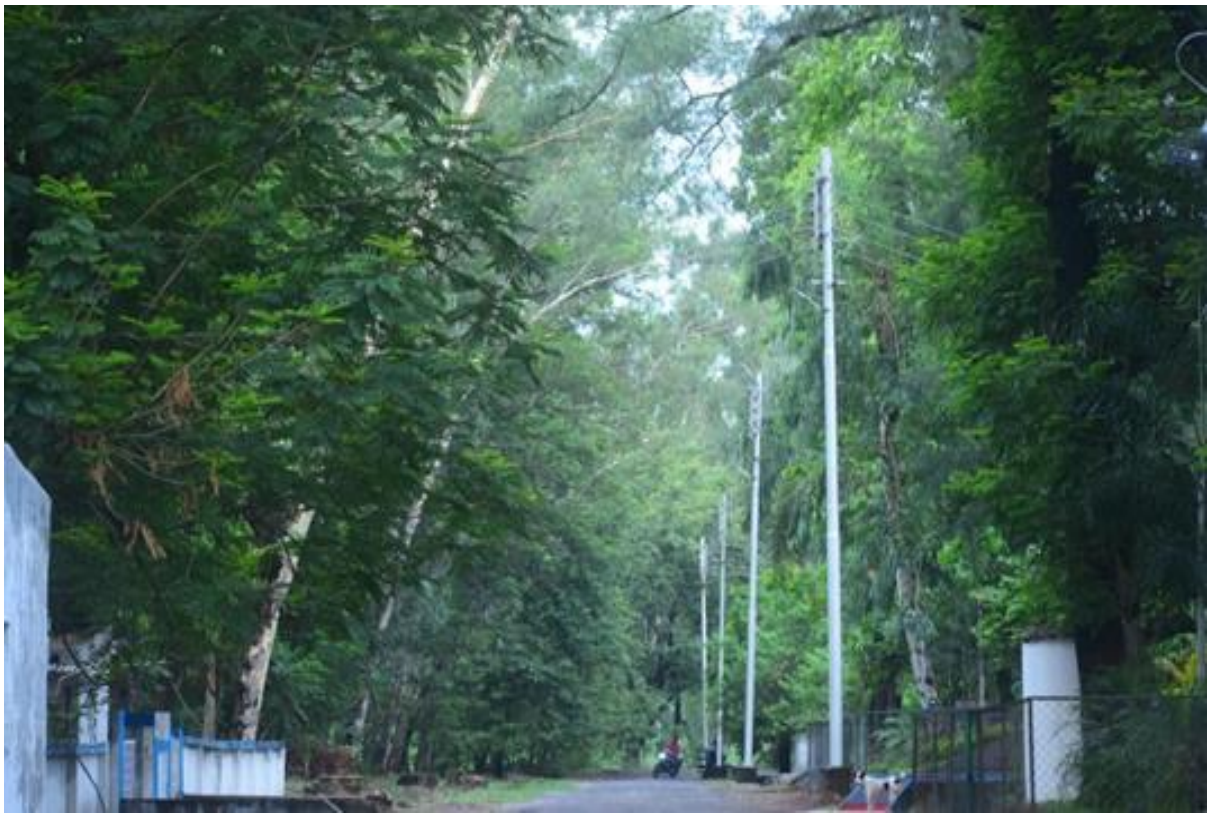
Photograph – 6.1: ***Plantation in Dipka Opencast Project***

Photograph – 6.2: ***Plantation in Dipka Opencast Project***

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

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

Photograph – 6.5: ***Overview of 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 Saraipali Opencast Project***

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

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

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

Photograph – 6.13: ***Overview of Baroud Opencast Project***

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

Photograph – 6.15: ***Overview of Bijari Opencast Project***

Photograph – 6.16: ***Overview of Chhal Opencast Project***

Photograph – 6.17: ***Plantation in Chhal Opencast Project***

Photograph – 6.18: ***Plantation in Dhanpuri Opencast Project***

Photograph – 6.19: ***Overview of Dhanpuri Amlai group of mines Project***

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

Photograph – 6.21: ***Plantation in Chirimiri Opencast Project***

Photograph – 6.22: ***Overview of Chirimiri Opencast Project***

Photograph – 6.23: ***Overview of Mahan- II Opencast Project***

Photograph – 6.24: ***Plantation on Backfill of Mahan- II Opencast Project***

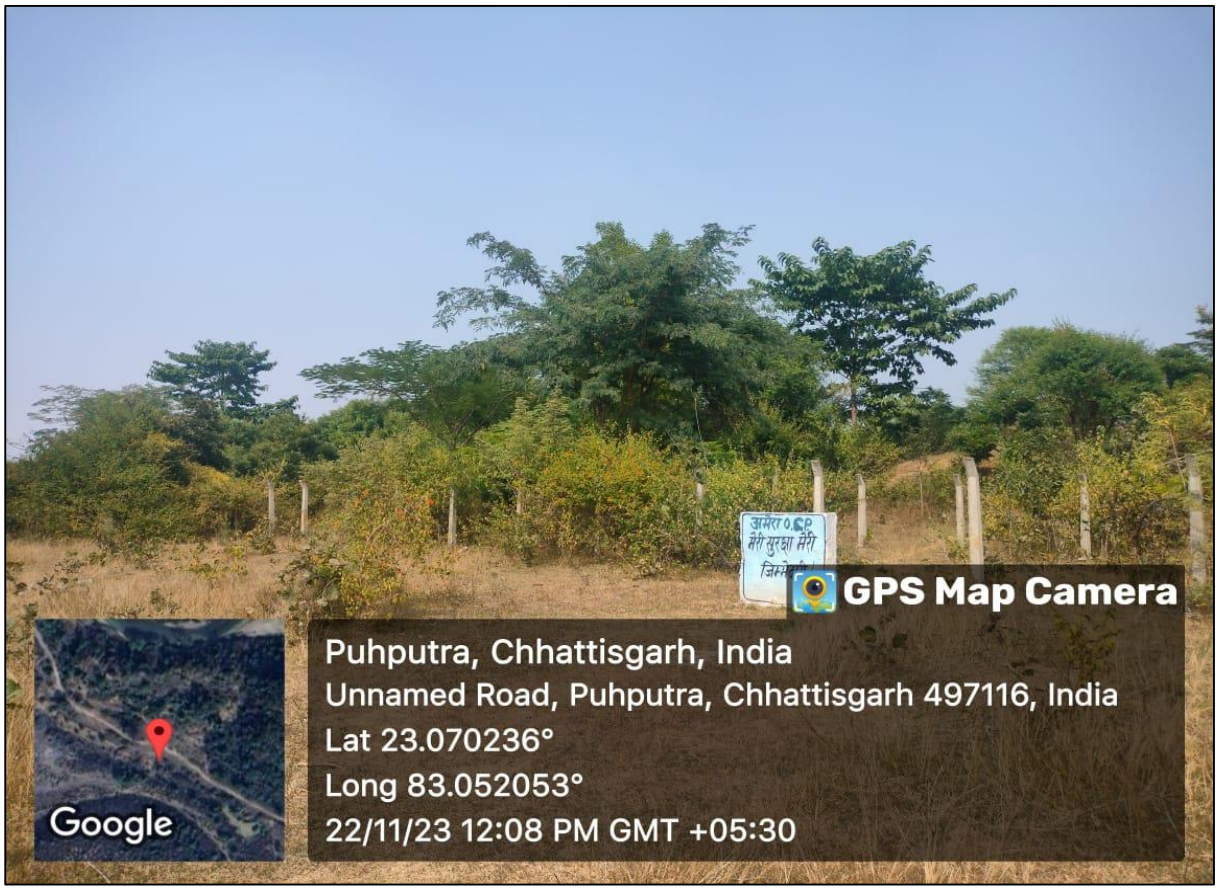
Photograph – 6.25: ***Plantation in Jagannathpur Opencast Project***

Photograph – 6.26: ***Plantation in Jagannathpur Opencast Project***

Photograph – 6.27: ***Plantation in Amadand Opencast Project***

Photograph – 6.28: ***Plantation in Batura Opencast Project***

Photograph – 6.29: ***Plantation in Amera 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 2023:

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

7.2 Project wise Land Reclamation status in NCL for the year 2023 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 2023 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 84.85 Km^2, 52.63 Km^2 (62.03%) of area is under reclamation out of which 38.20 Km^2 (45.02%) area is under backfilling (Technical Reclamation) and 14.43 Km^2 (17.01%) area has been revegetated (Biological Reclamation). There is an increase of 3.25 Km^2 for area under reclamation in NCL in the year 2023 with respect to the year 2022. This increase is due to effort towards environment by NCL.

7.4 After analyzing the satellite data of year 2023 vs. 2022, it is evident that area under plantation (biological reclamation) has increased from 11.84 km^2 in 2022 to 14.43 km^2 in 2023, 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 37.54 km^2 in 2022 to 38.20 km^2 in 2023. 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 54.55 km^2 in 2022 to 56.24 km^2 in 2023. 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 increased from 31.62 Km^2 (Year 2022) to 32.22 Km^2 (Year 2023). 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 Jayant (66.02%) followed by Krishnshilla (65.98%) and Khadia (63.82%).

Table 7.1

Summarized Land Reclamation Status in Opencast Projects of NCL based on Satellite Data of the year 2023

(Area in Sq. Kms.)

Sl. No.	Project	Total Leasehold Area(2022)	Total Leasehold Area(2023)	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, Avanue Plantation Etc.									
1	*2*	*3*		*4*		*5*		*6*		*7*		*8*		*9 (=4+5+8)*		*10 (=5+6+7)*		*11(=4+5)*	
				2022	*2023*	*2022*	*2023*	*2022*	*2023*	*2022*	*2023*	*2022*	*2023*	*2022*	*2023*	*2022*	*2023*	*2022*	*2023*
1	Amlohri	21.75	21.75	4.30	4.85	0.79	0.80	1.39	1.97	4.78	4.80	3.81	3.86	8.90	9.51	6.96	7.57	5.09	5.65
				48.31%	51.00%	8.88%	8.41%					42.81%	40.59%			32.00%	34.80%	57.19%	59.41%
2	Nigahi	30.18	30.18	5.72	5.46	2.00	2.50	3.08	3.48	4.78	2.90	4.73	4.82	12.45	12.78	9.86	8.88	7.72	7.96
				45.94%	42.72%	16.06%	19.56%					37.99%	37.72%			32.67%	29.42%	62.01%	62.28%
3	Jayant	31.77	31.77	6.75	6.26	3.60	4.58	3.48	3.71	4.38	4.31	5.16	5.58	15.51	16.42	11.46	12.60	10.35	10.84
				43.52%	38.12%	23.21%	27.89%					33.27%	33.98%			36.07%	39.66%	66.73%	66.02%
4	Dudhichua	23.91	23.91	5.73	6.09	1.39	1.77	1.89	2.23	0.42	0.42	4.84	4.69	11.96	12.55	3.70	4.42	7.12	7.86
				47.91%	48.53%	11.62%	14.10%					40.47%	37.37%			15.47%	18.49%	59.53%	62.63%
5	Khadia	16.40	16.40	5.25	4.77	0.70	1.05	0.62	0.42	2.12	2.25	2.82	3.30	8.77	9.12	3.44	3.72	5.95	5.82
				59.86%	52.30%	7.98%	11.51%					32.16%	36.18%			20.98%	22.68%	67.84%	63.82%
6	Krishnashila	8.52	8.52	2.41	2.58	0.51	0.64	1.41	1.30	0.06	0.06	1.50	1.66	4.42	4.88	1.98	2.00	2.92	3.22
				54.52%	52.87%	11.54%	13.11%					33.94%	34.02%			23.24%	23.47%	66.06%	65.98%
7	Bina	17.98	17.98	4.85	4.80	1.67	1.85	1.05	0.97	3.48	3.23	3.51	3.83	10.03	10.48	6.20	6.05	6.52	6.65
				48.35%	45.80%	16.65%	17.65%					35.00%	36.55%			34.48%	33.65%	65.00%	63.45%
8	Kakri	8.28	8.28	1.47	1.49	0.55	0.47	1.52	1.52	1.90	1.95	1.50	1.49	3.52	3.45	3.97	3.94	2.02	1.96
				41.76%	43.19%	15.63%	13.62%					42.61%	43.19%			47.95%	47.58%	57.39%	56.81%
9	Jhingurdah	12.00	12.00	0.00	0.00	0.00	0.00	3.66	3.70	1.51	1.53	1.21	1.26	1.21	1.26	5.17	5.23	0.00	0.00
				0.00%	0.00%	0.00%	0.00%					100.00%	100.00%			43.08%	43.58%	0.00%	0.00%
10	Block-B	13.39	13.39	1.06	1.90	0.63	0.77	0.90	0.87	0.28	0.19	2.54	1.73	4.23	4.40	1.81	1.83	1.69	2.67
				25.06%	43.18%	14.89%	17.50%					60.05%	39.32%			13.52%	13.67%	39.95%	60.68%
	TOTAL	**184.18**	**184.18**	**37.54**	**38.20**	**11.84**	**14.43**	**19.00**	**20.17**	**23.71**	**21.64**	**31.62**	**32.22**	**81.00**	**84.85**	**54.55**	**56.24**	**49.38**	**52.63**
				46.35%	45.02%	14.62%	17.01%					39.04%	37.97%	43.98%	46.07%	29.62%	30.54%	60.96%	62.03%

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

Note: *In reference of the above Table-7.1, 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".*

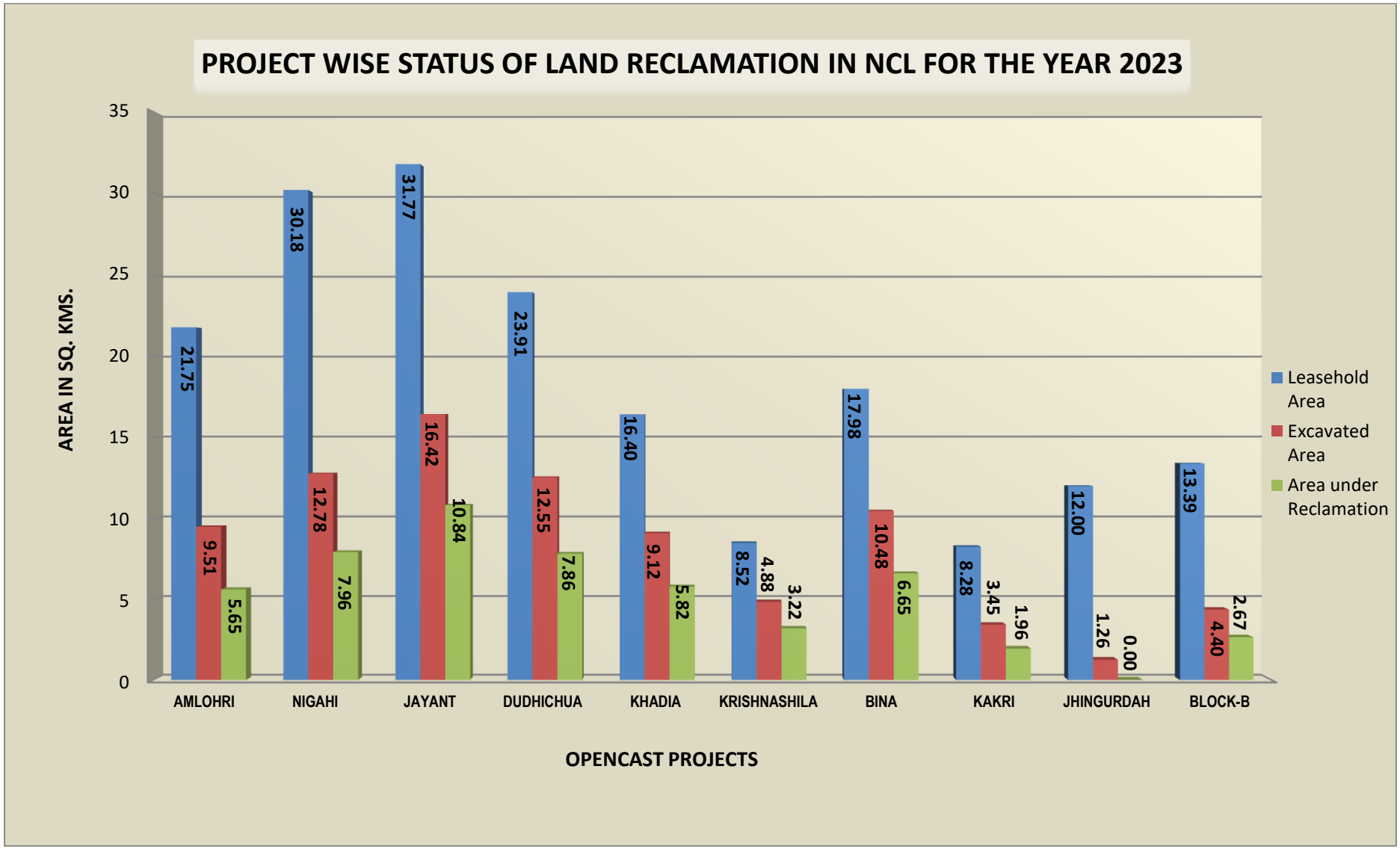
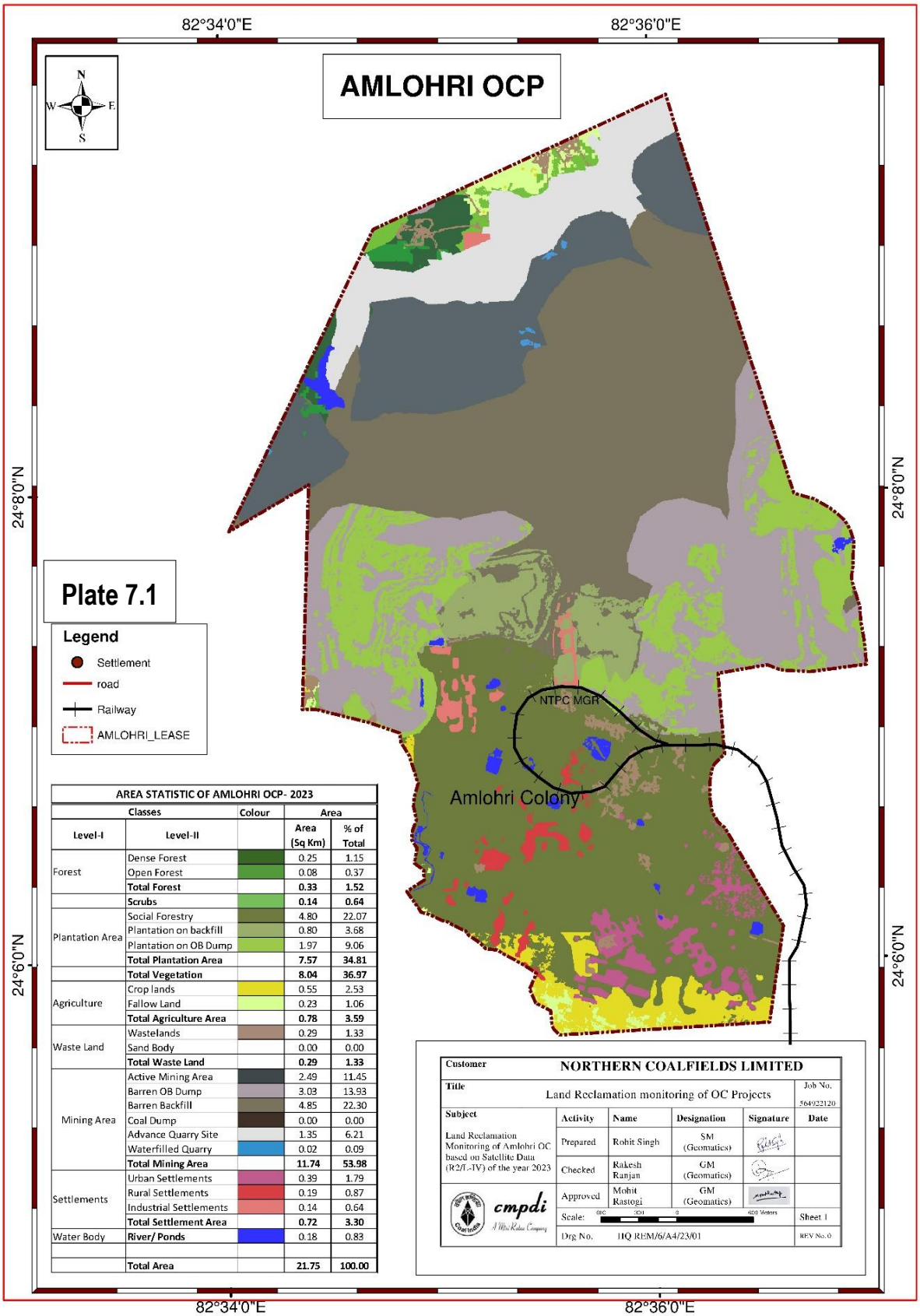


Fig.7.1: ***Land reclamation status in Opencast Projects of NCL in the Year 2023***

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 2023

(Area in Sq Km)

		AMLOHRI		NIGAHI		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	0.27	0.89	0.05	0.16	1.67	6.98	0.14	0.85	0.12	1.41	0.41	2.28	0.00	0.00	0.03	0.25	0.09	0.67	3.03	1.65
	Open Forest	0.08	0.37	2.96	9.81	0.54	1.70	2.49	10.41	1.19	7.26	0.56	6.57	0.80	4.46	0.00	0.00	0.17	1.42	0.58	4.33	9.37	5.09
	Total Forest	**0.33**	**1.52**	**3.23**	**10.70**	**0.59**	**1.86**	**4.16**	**17.39**	**1.33**	**8.11**	**0.68**	**7.98**	**1.21**	**6.74**	**0.00**	**0.00**	**0.20**	**1.67**	**0.67**	**5.00**	**12.40**	**6.73**
SCRUBS	Scrubs	0.14	0.64	0.48	1.59	1.60	5.04	2.08	8.70	0.09	0.55	0.28	3.29	0.42	2.34	0.09	1.09	1.75	14.58	1.09	8.14	8.02	4.35
SF	Social Forestry	4.80	22.07	2.90	9.61	4.31	13.57	0.42	1.76	2.25	13.72	0.06	0.70	3.23	17.96	1.95	23.55	1.53	12.75	0.19	1.42	21.64	11.75
PLANTATION	Plantation on External OB Dump	1.97	9.06	3.48	11.53	3.71	11.68	2.23	9.33	0.42	2.56	1.30	15.26	0.97	5.39	1.52	18.36	3.70	30.83	0.87	6.50	20.17	10.95
	Plantation on Backfill / Excavated Area (Biological Reclamation)	0.80	3.68	2.50	8.28	4.58	14.43	1.77	7.40	1.05	6.40	0.64	7.51	1.85	10.29	0.47	5.68	0.00	0.00	0.77	5.75	14.43	7.83
	Total Area under Plantation (Green Cover)	7.57	34.81	8.88	29.42	12.60	39.68	4.42	18.49	3.72	22.68	2.00	23.47	6.05	33.64	3.94	47.59	5.23	43.58	1.83	13.67	56.24	30.54
	Total Vegetation	**8.04**	**36.97**	**12.59**	**41.71**	**14.79**	**46.58**	**10.66**	**44.58**	**5.14**	**31.34**	**2.96**	**34.74**	**7.68**	**42.72**	**4.03**	**48.68**	**7.18**	**59.83**	**3.59**	**26.81**	**76.66**	**41.62**
AREA UNDER ACTIVE MINING	Coal Quarry	2.49	11.45	2.83	9.39	4.55	14.32	3.69	15.43	1.68	10.24	1.00	11.74	2.39	13.29	1.07	12.92	1.11	9.25	1.03	7.69	21.84	11.86
	Coal Dump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.17	0.02	0.24	0.00	0.00	0.00	0.00	0.05	0.03
	Advance Quarry Site	1.35	6.21	1.94	6.43	0.96	3.02	0.98	4.10	1.58	9.63	0.63	7.39	1.37	7.62	0.34	4.11	0.00	0.00	0.58	4.33	9.73	5.28
	Quarry Filled With Water	0.02	0.09	0.05	0.17	0.07	0.22	0.02	0.08	0.04	0.24	0.03	0.35	0.04	0.22	0.06	0.72	0.15	1.25	0.12	0.90	0.60	0.33
	Total Area under *Active Mining*	**3.86**	**17.75**	**4.82**	**15.99**	**5.58**	**17.56**	**4.69**	**19.61**	**3.30**	**20.11**	**1.66**	**19.48**	**3.83**	**21.30**	**1.49**	**17.99**	**1.26**	**10.50**	**1.73**	**12.92**	**32.22**	**17.49**
TECHN. RECLAIMATION	Barren OB Dump	3.03	13.93	2.17	7.19	0.44	1.38	1.03	4.31	1.11	6.77	0.78	9.15	0.25	1.39	0.37	4.47	2.82	23.50	3.18	23.75	15.18	8.24
	Area under Barren Backfilling (Technical Reclamation)	4.85	22.30	5.46	18.09	6.26	19.70	6.09	25.47	4.77	29.10	2.58	30.28	4.80	26.70	1.49	17.99	0.00	0.00	1.90	14.19	38.20	20.74
	Total Area under *Technical Reclamation*	**4.85**	**22.30**	**5.46**	**18.09**	**6.26**	**19.70**	**6.09**	**25.47**	**4.77**	**29.10**	**2.58**	**30.28**	**4.80**	**26.70**	**1.49**	**17.99**	**0.00**	**0.00**	**1.90**	**14.19**	**38.20**	**20.74**
	Total Area under Mining Operations	**11.74**	**53.98**	**12.45**	**41.27**	**12.28**	**38.64**	**11.81**	**49.39**	**9.18**	**55.98**	**5.02**	**58.91**	**8.88**	**49.39**	**3.35**	**40.45**	**4.08**	**34.00**	**6.81**	**50.86**	**85.60**	**46.48**
WASTELANDS	Waste Lands	0.29	1.33	1.30	4.31	0.57	1.79	0.77	3.22	0.45	2.74	0.32	3.76	0.38	2.11	0.14	1.69	0.37	3.08	1.26	9.41	5.85	3.18
	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	**0.29**	**1.33**	**1.30**	**4.31**	**0.57**	**1.79**	**0.77**	**3.22**	**0.45**	**2.74**	**0.32**	**3.76**	**0.38**	**2.11**	**0.14**	**1.69**	**0.37**	**3.08**	**1.26**	**9.41**	**5.85**	**3.18**
WATERBODIES	Reservoir, nallah, ponds	0.18	0.83	0.13	0.43	0.50	1.57	0.06	0.25	0.02	0.12	0.01	0.12	0.09	0.50	0.01	0.12	0.02	0.17	0.06	0.45	1.08	0.59
	Total Waterbodies	**0.18**	**0.83**	**0.13**	**0.43**	**0.50**	**1.57**	**0.06**	**0.25**	**0.02**	**0.12**	**0.01**	**0.12**	**0.09**	**0.50**	**0.01**	**0.12**	**0.02**	**0.17**	**0.06**	**0.45**	**1.08**	**0.59**
AGRICULTURE	Crop Lands	0.55	2.53	0.06	0.20	0.48	1.51	0.10	0.42	0.01	0.06	0.00	0.00	0.01	0.06	0.08	0.97	0.09	0.75	0.11	0.82	1.49	0.81
	Fallow Lands	0.23	1.06	0.43	1.42	0.47	1.48	0.21	0.88	0.01	0.06	0.00	0.00	0.00	0.00	0.03	0.36	0.02	0.17	1.32	9.86	2.72	1.48
	Total Agriculture	**0.78**	**3.59**	**0.49**	**1.62**	**0.95**	**2.99**	**0.31**	**1.30**	**0.02**	**0.12**	**0.00**	**0.00**	**0.01**	**0.06**	**0.11**	**1.33**	**0.11**	**0.92**	**1.43**	**10.68**	**4.21**	**2.29**
SETTLEMENTS	Urban Settlement	0.39	1.79	2.66	8.81	1.84	5.79	0.03	0.13	1.18	7.20	0.04	0.47	0.43	2.39	0.53	6.40	0.14	1.17	0.02	0.15	7.26	3.94
	Rural Settlement	0.19	0.87	0.01	0.03	0.44	1.38	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	0.00	0.70	0.38
	Industrial Settlement	0.14	0.64	0.55	1.82	0.40	1.26	0.27	1.13	0.41	2.50	0.17	2.00	0.45	2.50	0.11	1.33	0.10	0.83	0.22	1.64	2.82	1.53
	Total Settlement	**0.72**	**5.80**	**3.22**	**10.66**	**2.68**	**8.43**	**0.30**	**1.26**	**1.59**	**9.70**	**0.21**	**2.47**	**0.94**	**5.22**	**0.64**	**7.73**	**0.24**	**2.00**	**0.24**	**1.79**	**10.78**	**5.85**
	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**



AREA STATISTIC OF AMLOHRI OCP- 2023				
Classes		Colour	Area	
Level-I	Level-II		Area (Sq Km)	% of Total
Forest	Dense Forest		0.25	1.15
	Open Forest		0.08	0.37
	Total Forest		**0.33**	**1.52**
	Scrubs		**0.14**	**0.64**
Plantation Area	Social Forestry		4.80	22.07
	Plantation on backfill		0.80	3.68
	Plantation on OB Dump		1.97	9.06
	Total Plantation Area		**7.57**	**34.81**
	Total Vegetation		**8.04**	**36.97**
Agriculture	Crop lands		0.55	2.53
	Fallow Land		0.23	1.06
	Total Agriculture Area		**0.78**	**3.59**
Waste Land	Wastelands		0.29	1.33
	Sand Body		0.00	0.00
	Total Waste Land		**0.29**	**1.33**
Mining Area	Active Mining Area		2.49	11.45
	Barren OB Dump		3.03	13.93
	Barren Backfill		4.85	22.30
	Coal Dump		0.00	0.00
	Advance Quarry Site		1.35	6.21
	Waterfilled Quarry		0.02	0.09
	Total Mining Area		**11.74**	**53.98**
Settlements	Urban Settlements		0.39	1.79
	Rural Settlements		0.19	0.87
	Industrial Settlements		0.14	0.64
	Total Settlement Area		**0.72**	**3.30**
Water Body	**River/ Ponds**		0.18	0.83
	Total Area		**21.75**	**100.00**

Customer	NORTHERN COALFIELDS LIMITED				
Title	Land Reclamation monitoring of OC Projects				Job No. 564922120
Subject	Activity	Name	Designation	Signature	Date
Land Reclamation Monitoring of Amlohri OC based on Satellite Data (R2/L-IV) of the year 2023	Prepared	Rohit Singh	SM (Geomatics)		
	Checked	Rakesh Ranjan	GM (Geomatics)		
cmpdi A Mini Ratna Company	Approved	Mohit Rastogi	GM (Geomatics)		
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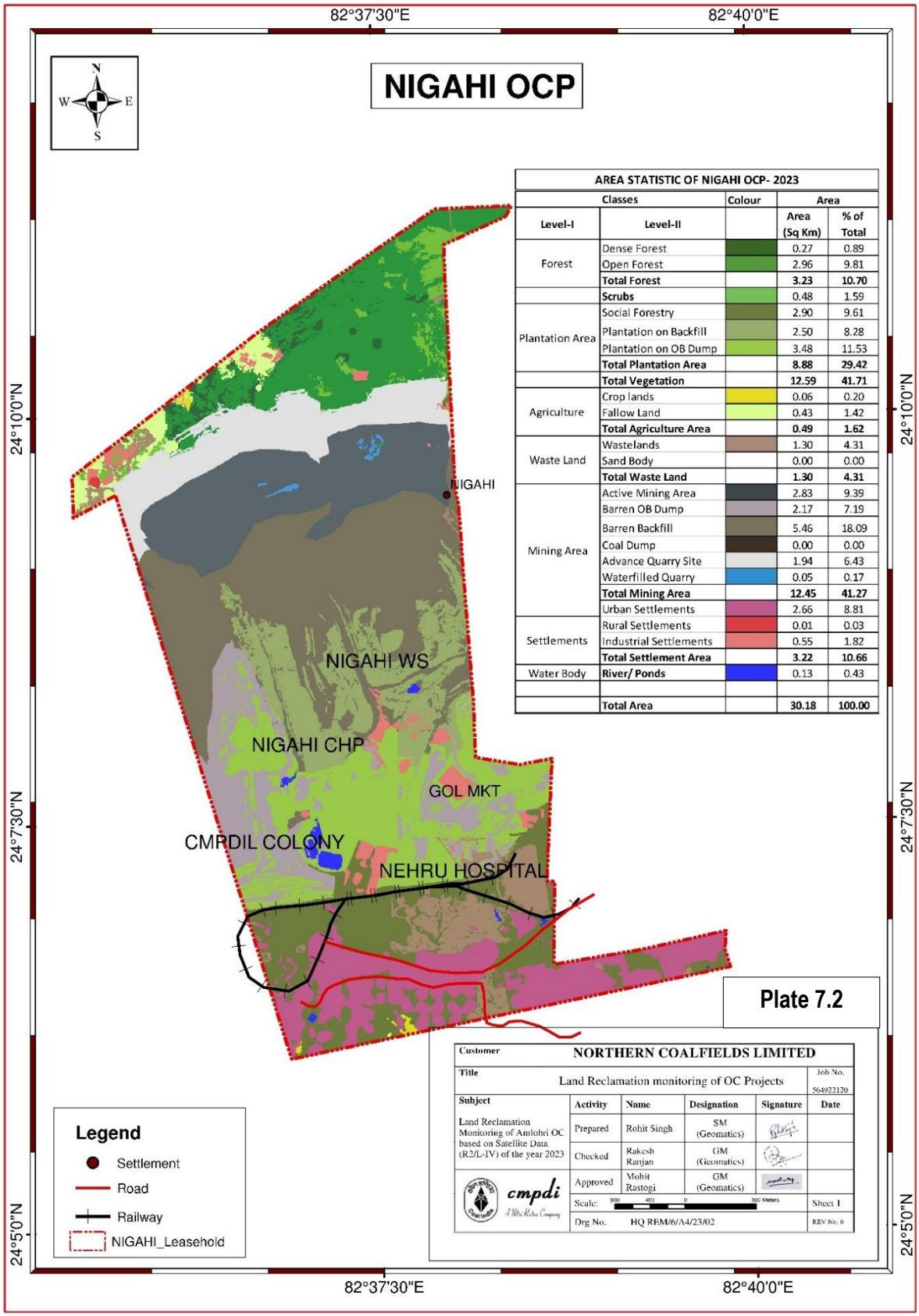
	Drg No. HQ REM/6/A4/23/01				REV No. 0



AREA STATISTIC OF NIGAHI OCP- 2023

Classes		Colour	Area	
Level-I	Level-II		Area (Sq Km)	% of Total
Forest	Dense Forest		0.27	0.89
	Open Forest		2.96	9.81
	Total Forest		**3.23**	**10.70**
	Scrubs		0.48	1.59
Plantation Area	Social Forestry		2.90	9.61
	Plantation on Backfill		2.50	8.28
	Plantation on OB Dump		3.48	11.53
	Total Plantation Area		**8.88**	**29.42**
	Total Vegetation		**12.59**	**41.71**
Agriculture	Crop lands		0.06	0.20
	Fallow Land		0.43	1.42
	Total Agriculture Area		**0.49**	**1.62**
Waste Land	Wastelands		1.30	4.31
	Sand Body		0.00	0.00
	Total Waste Land		**1.30**	**4.31**
Mining Area	Active Mining Area		2.83	9.39
	Barren OB Dump		2.17	7.19
	Barren Backfill		5.46	18.09
	Coal Dump		0.00	0.00
	Advance Quarry Site		1.94	6.43
	Waterfilled Quarry		0.05	0.17
	Total Mining Area		**12.45**	**41.27**
Settlements	Urban Settlements		2.66	8.81
	Rural Settlements		0.01	0.03
	Industrial Settlements		0.55	1.82
	Total Settlement Area		**3.22**	**10.66**
Water Body	**River/ Ponds**		0.13	0.43
	Total Area		**30.18**	**100.00**

Plate 7.2

Customer	NORTHERN COALFIELDS LIMITED				
Title	Land Reclamation monitoring of OC Projects				Job No. 564922120
Subject	Activity	Name	Designation	Signature	Date
Land Reclamation Monitoring of Amlohri OC based on Satellite Data (R2/L-IV) of the year 2023	Prepared	Rohit Singh	SM (Geomatics)		
	Checked	Rakesh Ranjan	GM (Geomatics)		
cmpdi	Approved	Mohit Rastogi	GM (Geomatics)		
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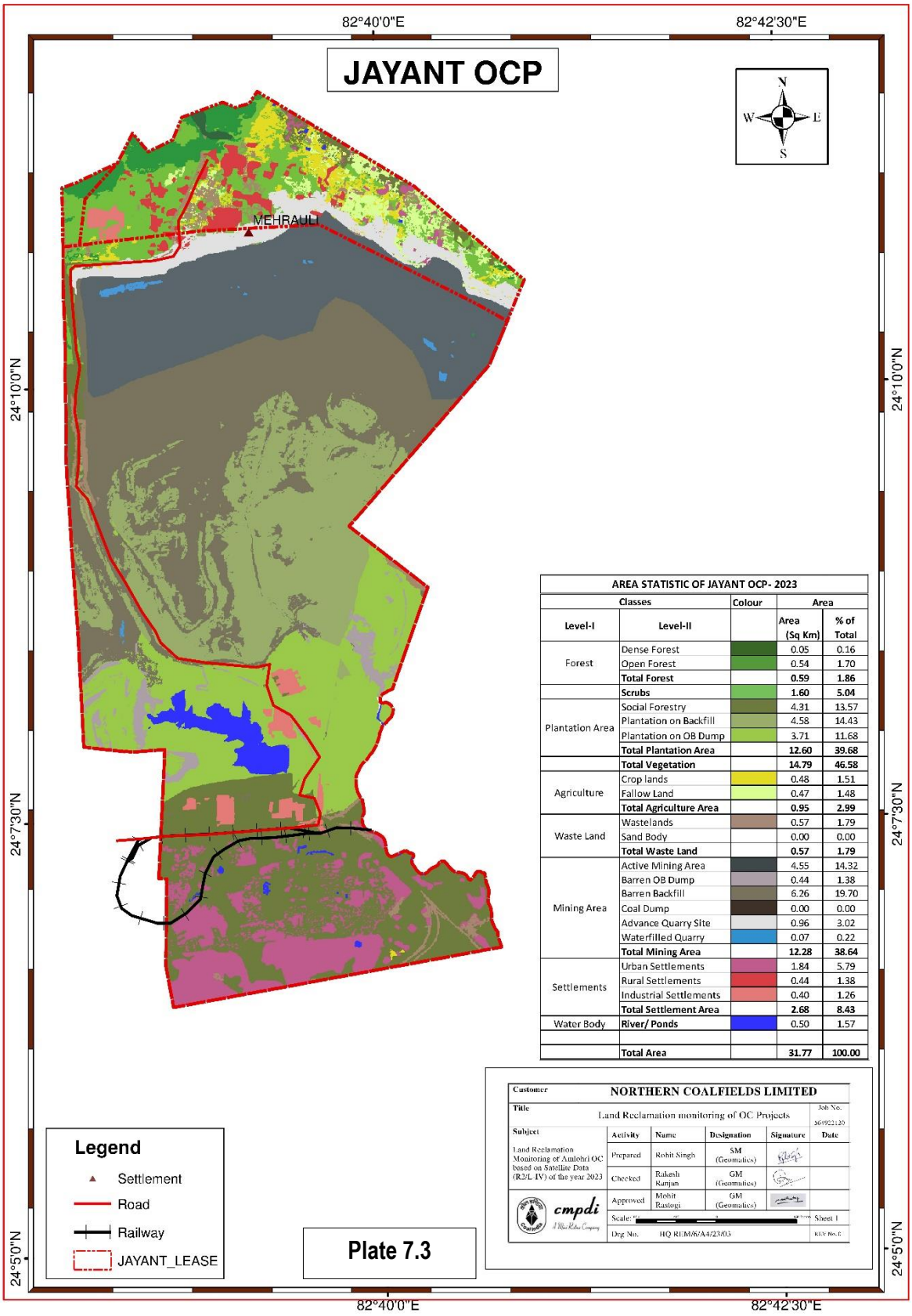

AREA STATISTIC OF JAYANT OCP- 2023

Classes		Colour	Area	
Level-I	Level-II		Area (Sq Km)	% of Total
Forest	Dense Forest		0.05	0.16
	Open Forest		0.54	1.70
	Total Forest		**0.59**	**1.86**
	Scrubs		**1.60**	**5.04**
Plantation Area	Social Forestry		4.31	13.57
	Plantation on Backfill		4.58	14.43
	Plantation on OB Dump		3.71	11.68
	Total Plantation Area		**12.60**	**39.68**
	Total Vegetation		**14.79**	**46.58**
Agriculture	Crop lands		0.48	1.51
	Fallow Land		0.47	1.48
	Total Agriculture Area		**0.95**	**2.99**
Waste Land	Wastelands		0.57	1.79
	Sand Body		0.00	0.00
	Total Waste Land		**0.57**	**1.79**
Mining Area	Active Mining Area		4.55	14.32
	Barren OB Dump		0.44	1.38
	Barren Backfill		6.26	19.70
	Coal Dump		0.00	0.00
	Advance Quarry Site		0.96	3.02
	Waterfilled Quarry		0.07	0.22
	Total Mining Area		**12.28**	**38.64**
Settlements	Urban Settlements		1.84	5.79
	Rural Settlements		0.44	1.38
	Industrial Settlements		0.40	1.26
	Total Settlement Area		**2.68**	**8.43**
Water Body	**River/ Ponds**		0.50	1.57
	Total Area		**31.77**	**100.00**

Customer	NORTHERN COALFIELDS LIMITED				
Title	Land Reclamation monitoring of OC Projects				Job No. 564922120
Subject	Activity	Name	Designation	Signature	Date
Land Reclamation Monitoring of Amlohri OC based on Satellite Data (R2/L IV) of the year 2023	Prepared	Rohit Singh	SM (Geomatics)		
	Checked	Rakesh Ranjan	GM (Geomatics)		
cmpdi A Mini Ratna Company	Approved	Mohit Rastogi	GM (Geomatics)		
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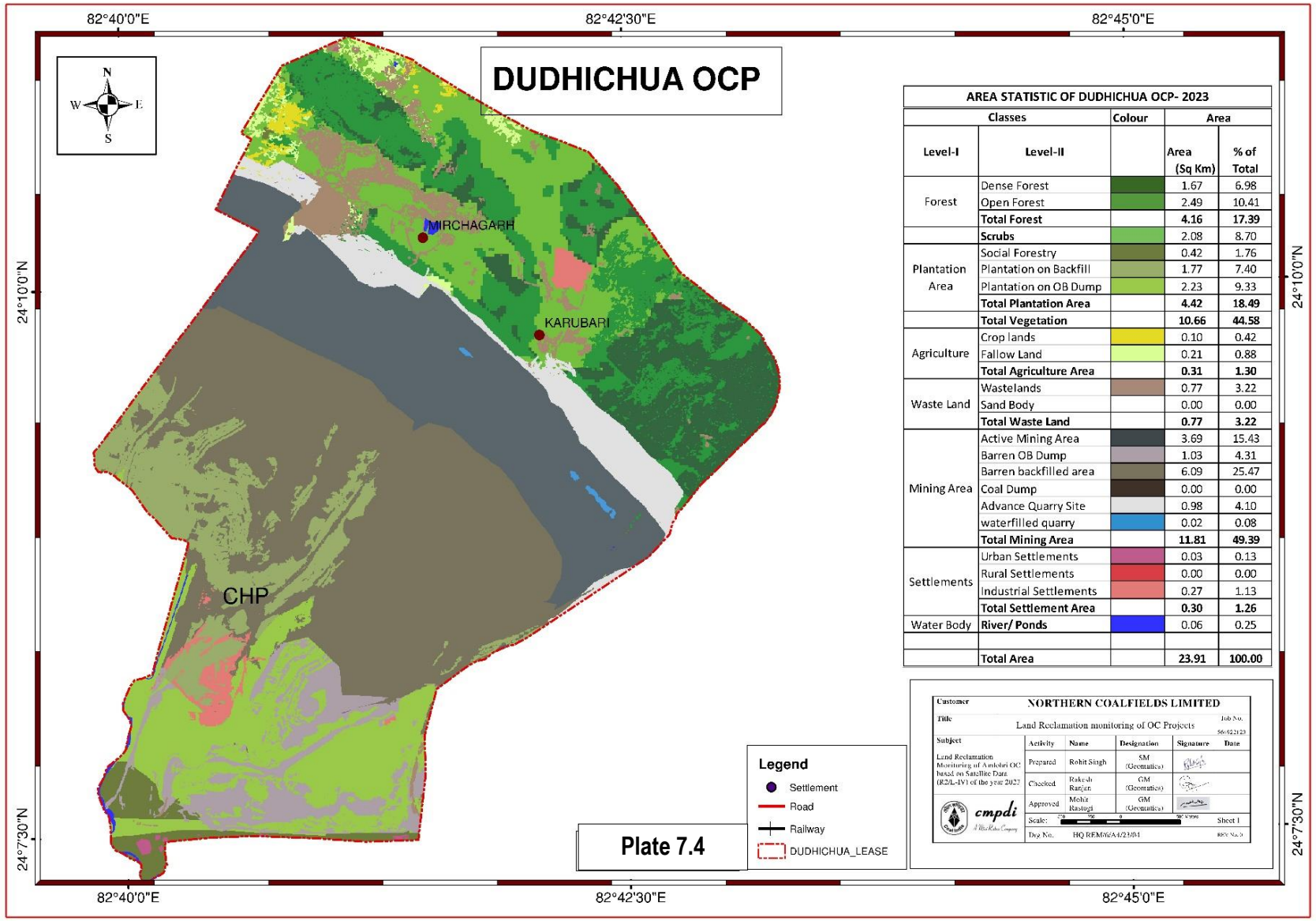
	Drg No.	HQ/REM/6/A4/23/03			Rev No. 0



AREA STATISTIC OF DUDHICHUA OCP- 2023

Classes		Colour	Area	
Level-I	Level-II		Area (Sq Km)	% of Total
Forest	Dense Forest		1.67	6.98
	Open Forest		2.49	10.41
	Total Forest		**4.16**	**17.39**
	Scrubs		2.08	8.70
Plantation Area	Social Forestry		0.42	1.76
	Plantation on Backfill		1.77	7.40
	Plantation on OB Dump		2.23	9.33
	Total Plantation Area		**4.42**	**18.49**
	Total Vegetation		**10.66**	**44.58**
Agriculture	Crop lands		0.10	0.42
	Fallow Land		0.21	0.88
	Total Agriculture Area		**0.31**	**1.30**
Waste Land	Wastelands		0.77	3.22
	Sand Body		0.00	0.00
	Total Waste Land		**0.77**	**3.22**
Mining Area	Active Mining Area		3.69	15.43
	Barren OB Dump		1.03	4.31
	Barren backfilled area		6.09	25.47
	Coal Dump		0.00	0.00
	Advance Quarry Site		0.98	4.10
	waterfilled quarry		0.02	0.08
	Total Mining Area		**11.81**	**49.39**
Settlements	Urban Settlements		0.03	0.13
	Rural Settlements		0.00	0.00
	Industrial Settlements		0.27	1.13
	Total Settlement Area		**0.30**	**1.26**
Water Body	**River/ Ponds**		0.06	0.25
	Total Area		**23.91**	**100.00**

Customer	NORTHERN COALFIELDS LIMITED			
Title	Land Reclamation monitoring of OC Projects			Job No. 564922120
Subject	Activity	Name	Designation	Signature / Date
Land Reclamation Monitoring of Amlohri OC based on Satellite Data (R2/L-IV) of the year 2022	Prepared	Rohit Singh	SM (Geomatics)	
	Checked	Rakesh Ranjan	GM (Geomatics)	
cmpdi	Approved	Mohit Rastogi	GM (Geomatics)	
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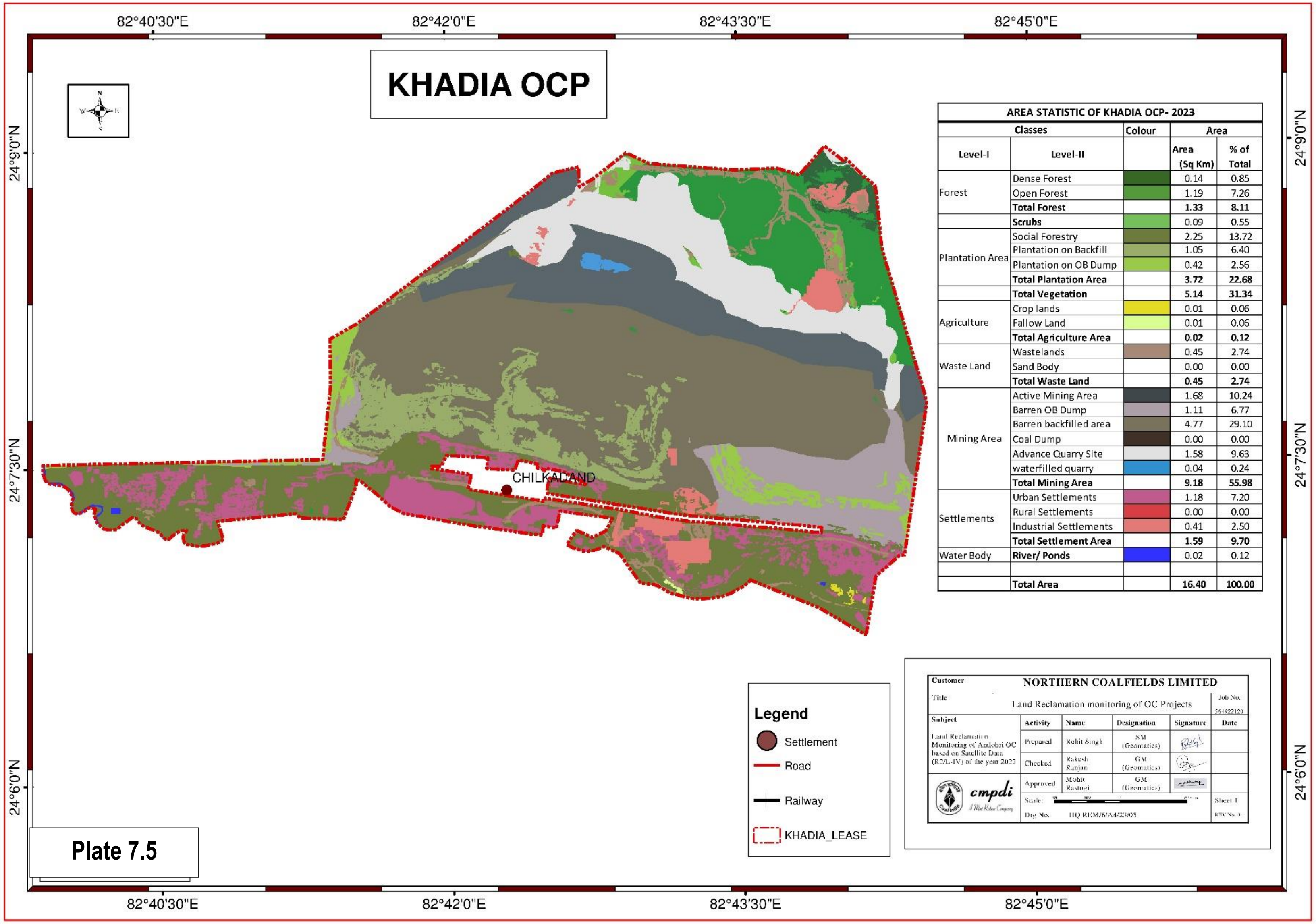
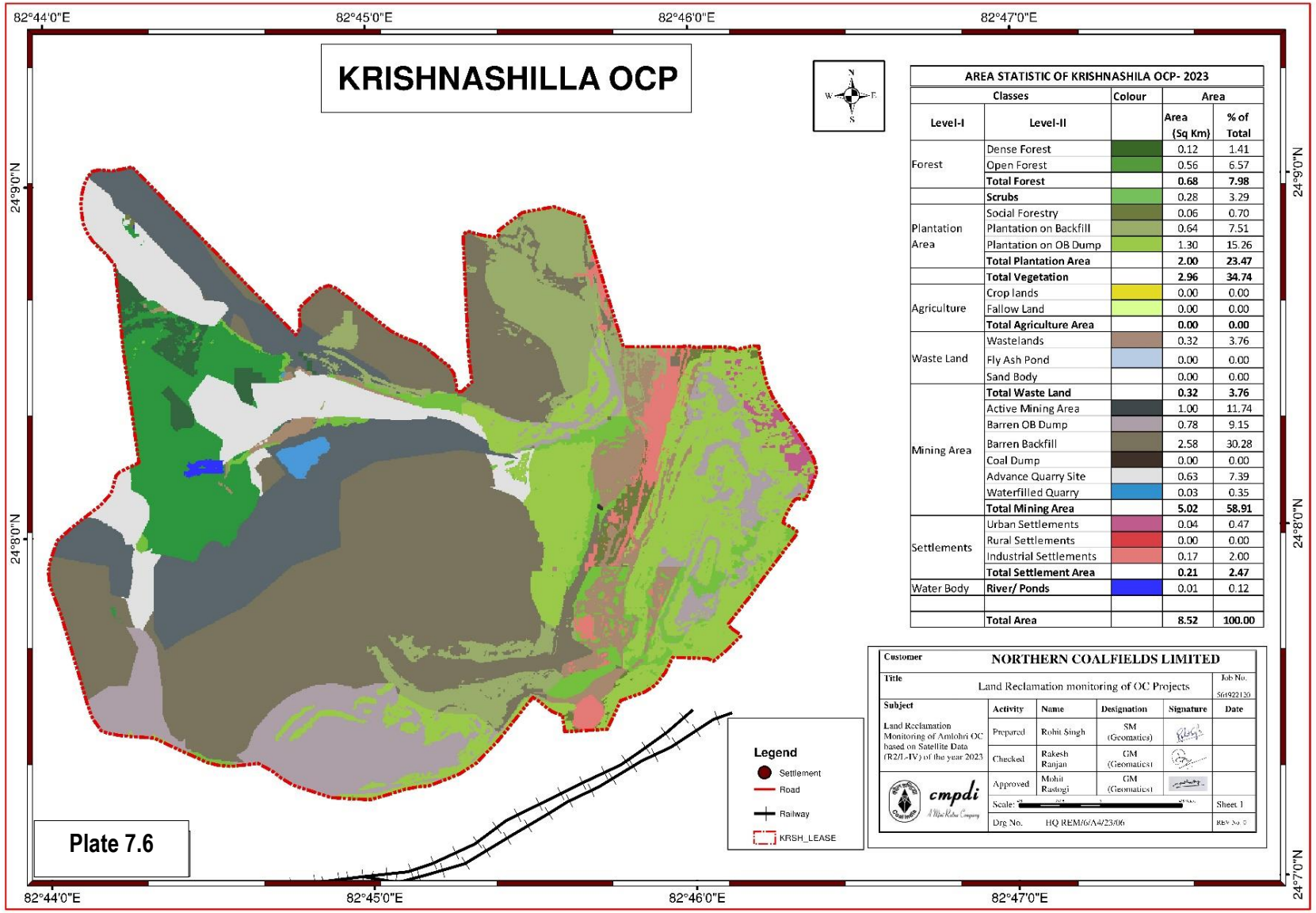
	Dept No.	HQ REM/6/A1/23/M1		REV No.:0



AREA STATISTIC OF KHADIA OCP- 2023

Classes		Colour	Area	
Level-I	Level-II		Area (Sq Km)	% of Total
Forest	Dense Forest		0.14	0.85
	Open Forest		1.19	7.26
	Total Forest		**1.33**	**8.11**
	Scrubs		0.09	0.55
Plantation Area	Social Forestry		2.25	13.72
	Plantation on Backfill		1.05	6.40
	Plantation on OB Dump		0.42	2.56
	Total Plantation Area		**3.72**	**22.68**
	Total Vegetation		**5.14**	**31.34**
Agriculture	Crop lands		0.01	0.06
	Fallow Land		0.01	0.06
	Total Agriculture Area		**0.02**	**0.12**
Waste Land	Wastelands		0.45	2.74
	Sand Body		0.00	0.00
	Total Waste Land		**0.45**	**2.74**
Mining Area	Active Mining Area		1.68	10.24
	Barren OB Dump		1.11	6.77
	Barren backfilled area		4.77	29.10
	Coal Dump		0.00	0.00
	Advance Quarry Site		1.58	9.63
	waterfilled quarry		0.04	0.24
	Total Mining Area		**9.18**	**55.98**
Settlements	Urban Settlements		1.18	7.20
	Rural Settlements		0.00	0.00
	Industrial Settlements		0.41	2.50
	Total Settlement Area		**1.59**	**9.70**
Water Body	**River/ Ponds**		0.02	0.12
	Total Area		**16.40**	**100.00**

Plate 7.5



AREA STATISTIC OF KRISHNASHILA OCP- 2023

Classes		Colour	Area	
Level-I	Level-II		Area (Sq Km)	% of Total
Forest	Dense Forest		0.12	1.41
	Open Forest		0.56	6.57
	Total Forest		**0.68**	**7.98**
	Scrubs		0.28	3.29
Plantation Area	Social Forestry		0.06	0.70
	Plantation on Backfill		0.64	7.51
	Plantation on OB Dump		1.30	15.26
	Total Plantation Area		**2.00**	**23.47**
	Total Vegetation		**2.96**	**34.74**
Agriculture	Crop lands		0.00	0.00
	Fallow Land		0.00	0.00
	Total Agriculture Area		**0.00**	**0.00**
Waste Land	Wastelands		0.32	3.76
	Fly Ash Pond		0.00	0.00
	Sand Body		0.00	0.00
	Total Waste Land		**0.32**	**3.76**
Mining Area	Active Mining Area		1.00	11.74
	Barren OB Dump		0.78	9.15
	Barren Backfill		2.58	30.28
	Coal Dump		0.00	0.00
	Advance Quarry Site		0.63	7.39
	Waterfilled Quarry		0.03	0.35
	Total Mining Area		**5.02**	**58.91**
Settlements	Urban Settlements		0.04	0.47
	Rural Settlements		0.00	0.00
	Industrial Settlements		0.17	2.00
	Total Settlement Area		**0.21**	**2.47**
Water Body	**River/ Ponds**		0.01	0.12
	Total Area		**8.52**	**100.00**

Customer	NORTHERN COALFIELDS LIMITED				
Title	Land Reclamation monitoring of OC Projects				Job No. 564922120
Subject	Activity	Name	Designation	Signature	Date
Land Reclamation Monitoring of Amlohri OC based on Satellite Data (R2/I-IV) of the year 2023	Prepared	Rohit Singh	SM (Geomatics)		
	Checked	Rakesh Ranjan	GM (Geomatics)		
cmpdi A Mini Ratna Company	Approved	Mohit Rastogi	GM (Geomatics)		
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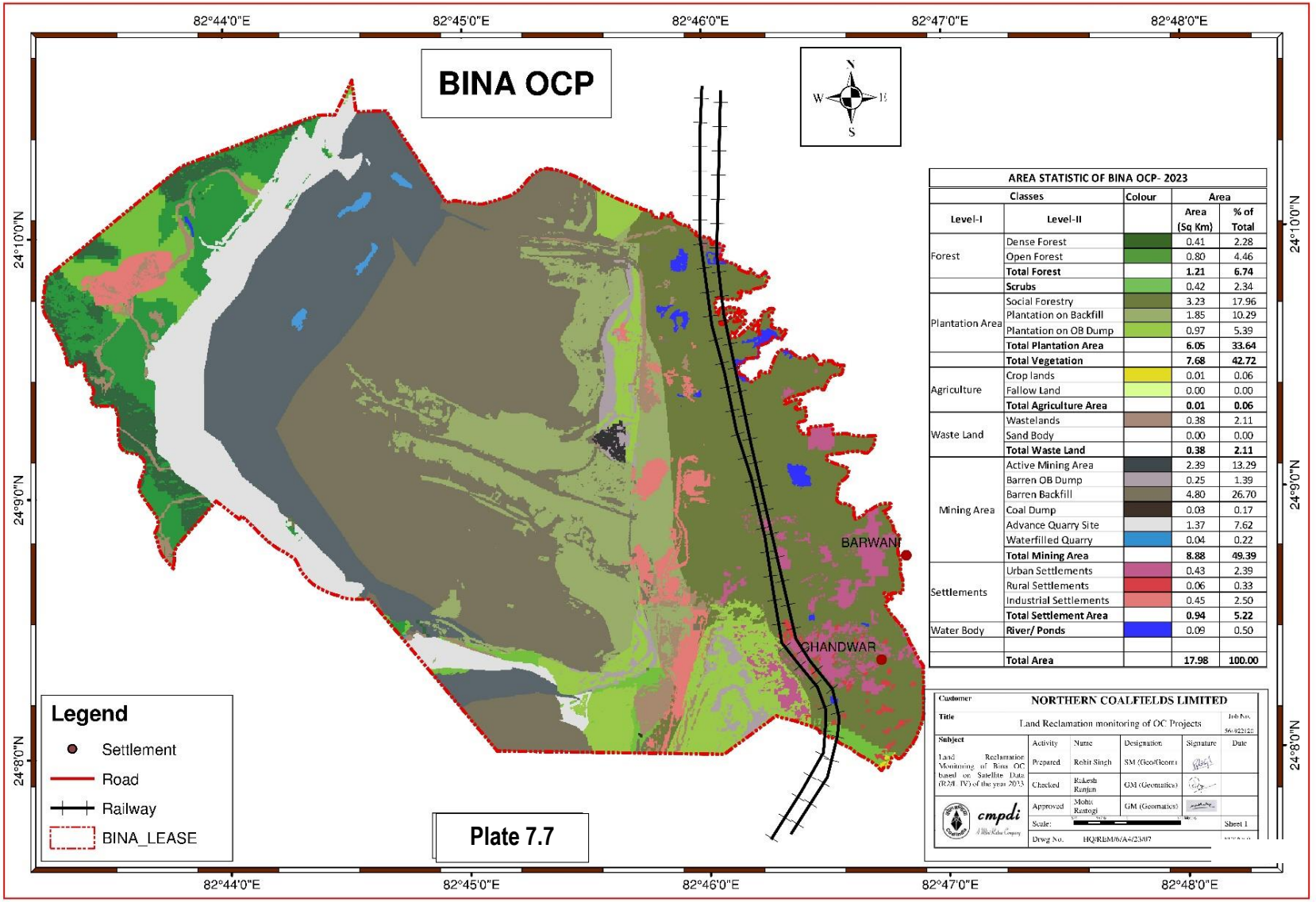

AREA STATISTIC OF BINA OCP- 2023

Classes		Colour	Area	
Level-I	Level-II		Area (Sq Km)	% of Total
Forest	Dense Forest		0.41	2.28
	Open Forest		0.80	4.46
	Total Forest		**1.21**	**6.74**
	Scrubs		0.42	2.34
Plantation Area	Social Forestry		3.23	17.96
	Plantation on Backfill		1.85	10.29
	Plantation on OB Dump		0.97	5.39
	Total Plantation Area		**6.05**	**33.64**
	Total Vegetation		**7.68**	**42.72**
Agriculture	Crop lands		0.01	0.06
	Fallow Land		0.00	0.00
	Total Agriculture Area		**0.01**	**0.06**
Waste Land	Wastelands		0.38	2.11
	Sand Body		0.00	0.00
	Total Waste Land		**0.38**	**2.11**
Mining Area	Active Mining Area		2.39	13.29
	Barren OB Dump		0.25	1.39
	Barren Backfill		4.80	26.70
	Coal Dump		0.03	0.17
	Advance Quarry Site		1.37	7.62
	Waterfilled Quarry		0.04	0.22
	Total Mining Area		**8.88**	**49.39**
Settlements	Urban Settlements		0.43	2.39
	Rural Settlements		0.06	0.33
	Industrial Settlements		0.45	2.50
	Total Settlement Area		**0.94**	**5.22**
Water Body	**River/ Ponds**		0.09	0.50
	Total Area		**17.98**	**100.00**

Customer	NORTHERN COALFIELDS LIMITED				
Title	Land Reclamation monitoring of OC Projects				Job No. 564922120
Subject	Activity	Name	Designation	Signature	Date
Land Reclamation Monitoring of Bina OC based on Satellite Data (R2fl, IV) of the year 2023	Prepared	Rohit Singh	SM (Geo/Geom)		
	Checked	Rakesh Ranjan	GM (Geomatics)		
cmpdi	Approved	Mohit Rastogi	GM (Geomatics)		
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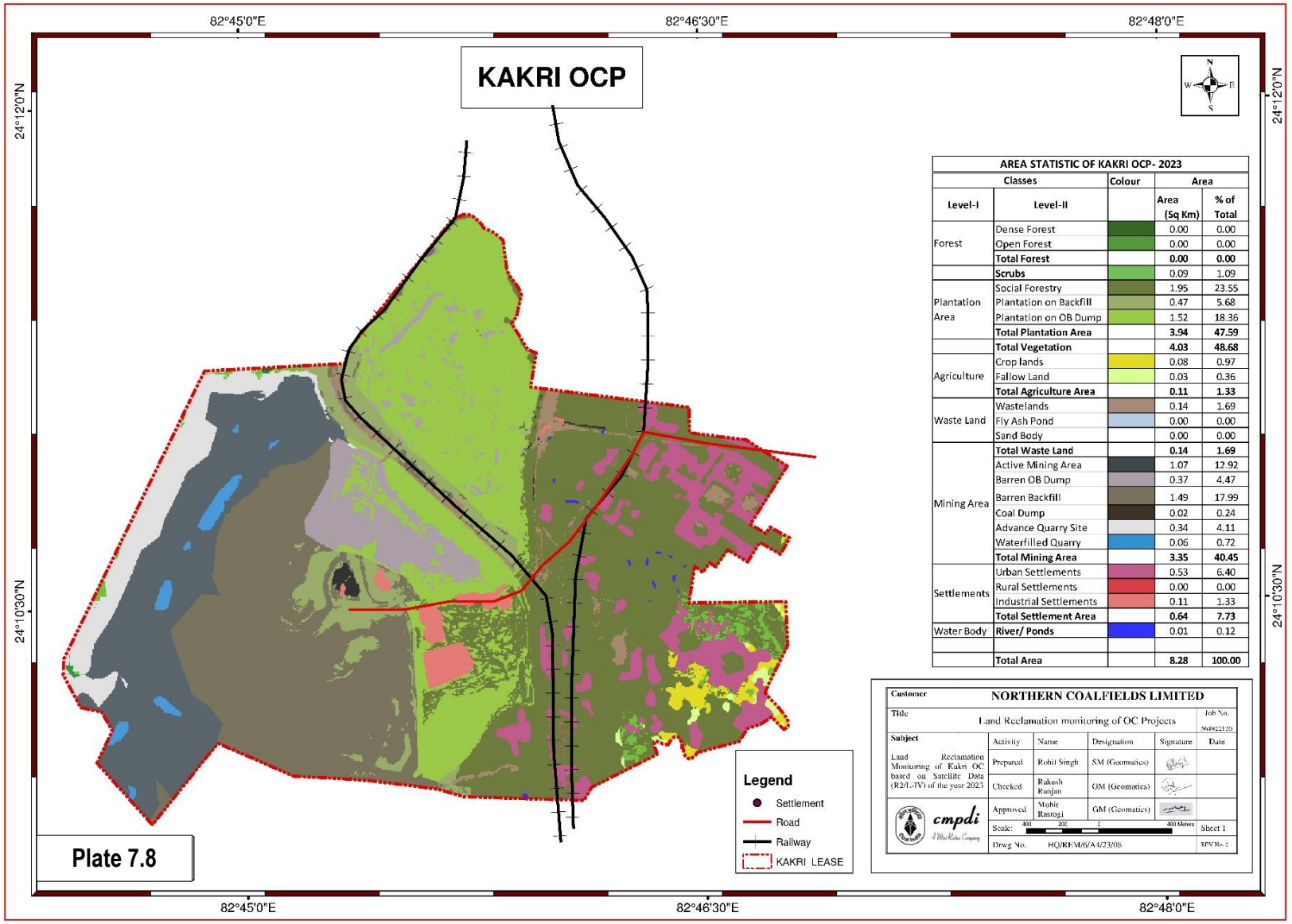

AREA STATISTIC OF KAKRI OCP- 2023

Classes		Colour	Area	
Level-I	Level-II		Area (Sq Km)	% of Total
Forest	Dense Forest		0.00	0.00
	Open Forest		0.00	0.00
	Total Forest		**0.00**	**0.00**
	Scrubs		0.09	1.09
Plantation Area	Social Forestry		1.95	23.55
	Plantation on Backfill		0.47	5.68
	Plantation on OB Dump		1.52	18.36
	Total Plantation Area		**3.94**	**47.59**
	Total Vegetation		**4.03**	**48.68**
Agriculture	Crop lands		0.08	0.97
	Fallow Land		0.03	0.36
	Total Agriculture Area		**0.11**	**1.33**
Waste Land	Wastelands		0.14	1.69
	Fly Ash Pond		0.00	0.00
	Sand Body		0.00	0.00
	Total Waste Land		**0.14**	**1.69**
Mining Area	Active Mining Area		1.07	12.92
	Barren OB Dump		0.37	4.47
	Barren Backfill		1.49	17.99
	Coal Dump		0.02	0.24
	Advance Quarry Site		0.34	4.11
	Waterfilled Quarry		0.06	0.72
	Total Mining Area		**3.35**	**40.45**
Settlements	Urban Settlements		0.53	6.40
	Rural Settlements		0.00	0.00
	Industrial Settlements		0.11	1.33
	Total Settlement Area		**0.64**	**7.73**
Water Body	**River/ Ponds**		0.01	0.12
	Total Area		**8.28**	**100.00**

Customer	NORTHERN COALFIELDS LIMITED				
Title	Land Reclamation monitoring of OC Projects				Job No. 564922120
Subject	Activity	Name	Designation	Signature	Date
Land Reclamation Monitoring of Kakri OC based on Satellite Data (R2/L-IV) of the year 2023	Prepared	Rohit Singh	SM (Geomatics)		
	Checked	Rakesh Ranjan	GM (Geomatics)		
cmpdi A Mini Ratna Company	Approved	Mohit Rastogi	GM (Geomatics)		
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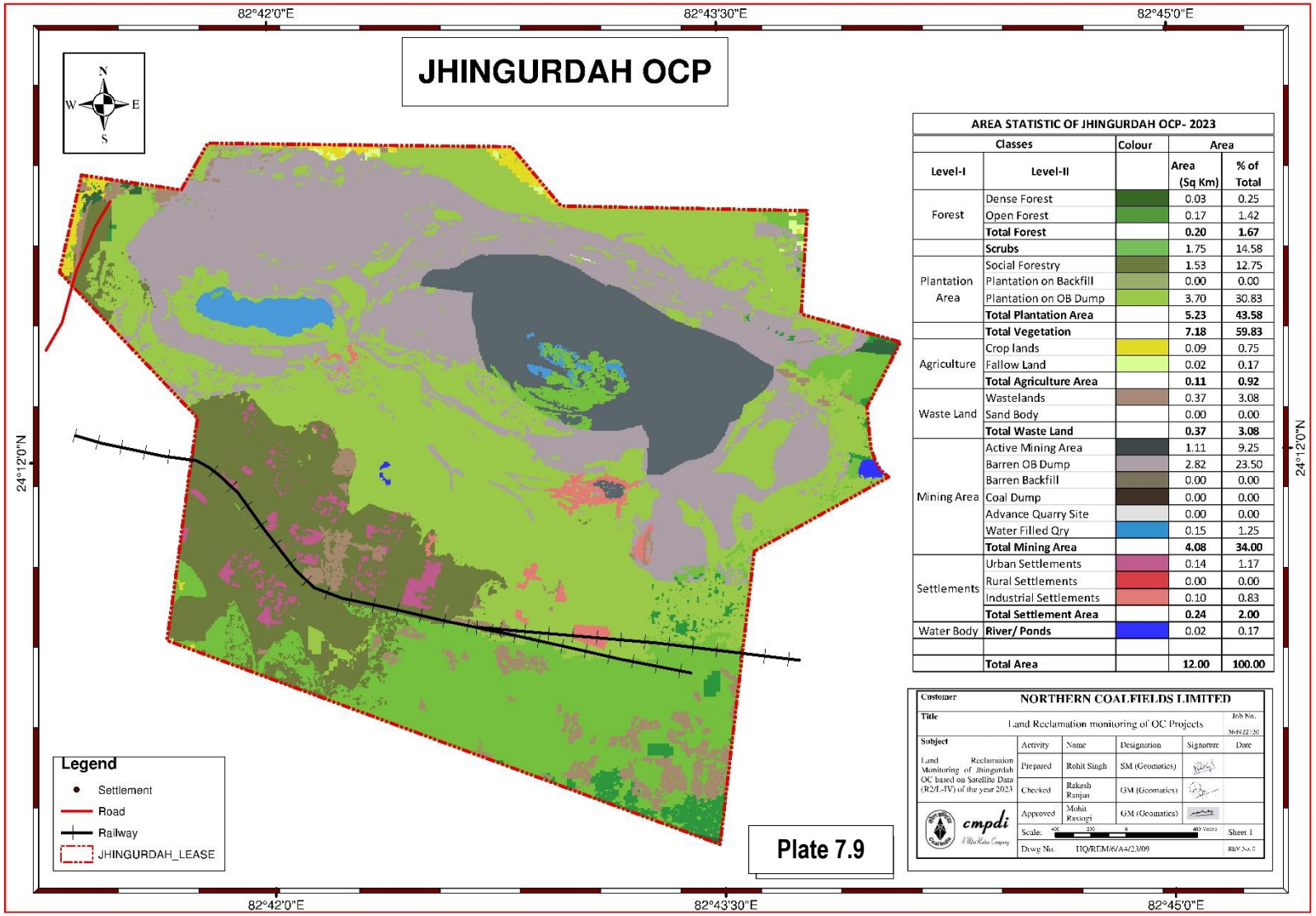

AREA STATISTIC OF JHINGURDAH OCP- 2023

Classes		Colour	Area	
Level-I	Level-II		Area (Sq Km)	% of Total
Forest	Dense Forest		0.03	0.25
	Open Forest		0.17	1.42
	Total Forest		**0.20**	**1.67**
	Scrubs		1.75	14.58
Plantation Area	Social Forestry		1.53	12.75
	Plantation on Backfill		0.00	0.00
	Plantation on OB Dump		3.70	30.83
	Total Plantation Area		**5.23**	**43.58**
	Total Vegetation		**7.18**	**59.83**
Agriculture	Crop lands		0.09	0.75
	Fallow Land		0.02	0.17
	Total Agriculture Area		**0.11**	**0.92**
Waste Land	Wastelands		0.37	3.08
	Sand Body		0.00	0.00
	Total Waste Land		**0.37**	**3.08**
Mining Area	Active Mining Area		1.11	9.25
	Barren OB Dump		2.82	23.50
	Barren Backfill		0.00	0.00
	Coal Dump		0.00	0.00
	Advance Quarry Site		0.00	0.00
	Water Filled Qry		0.15	1.25
	Total Mining Area		**4.08**	**34.00**
Settlements	Urban Settlements		0.14	1.17
	Rural Settlements		0.00	0.00
	Industrial Settlements		0.10	0.83
	Total Settlement Area		**0.24**	**2.00**
Water Body	**River/ Ponds**		0.02	0.17
	Total Area		**12.00**	**100.00**

Customer	NORTHERN COALFIELDS LIMITED				
Title	Land Reclamation monitoring of OC Projects				Job No. 564922120
Subject	Activity	Name	Designation	Signature	Date
Land Reclamation Monitoring of Jhingurdah OC based on Satellite Data (R2/L-IV) of the year 2023	Prepared	Rohit Singh	SM (Geomatics)		
	Checked	Rakesh Ranjan	GM (Geomatics)		
cmpdi	Approved	Mohit Rastogi	GM (Geomatics)		
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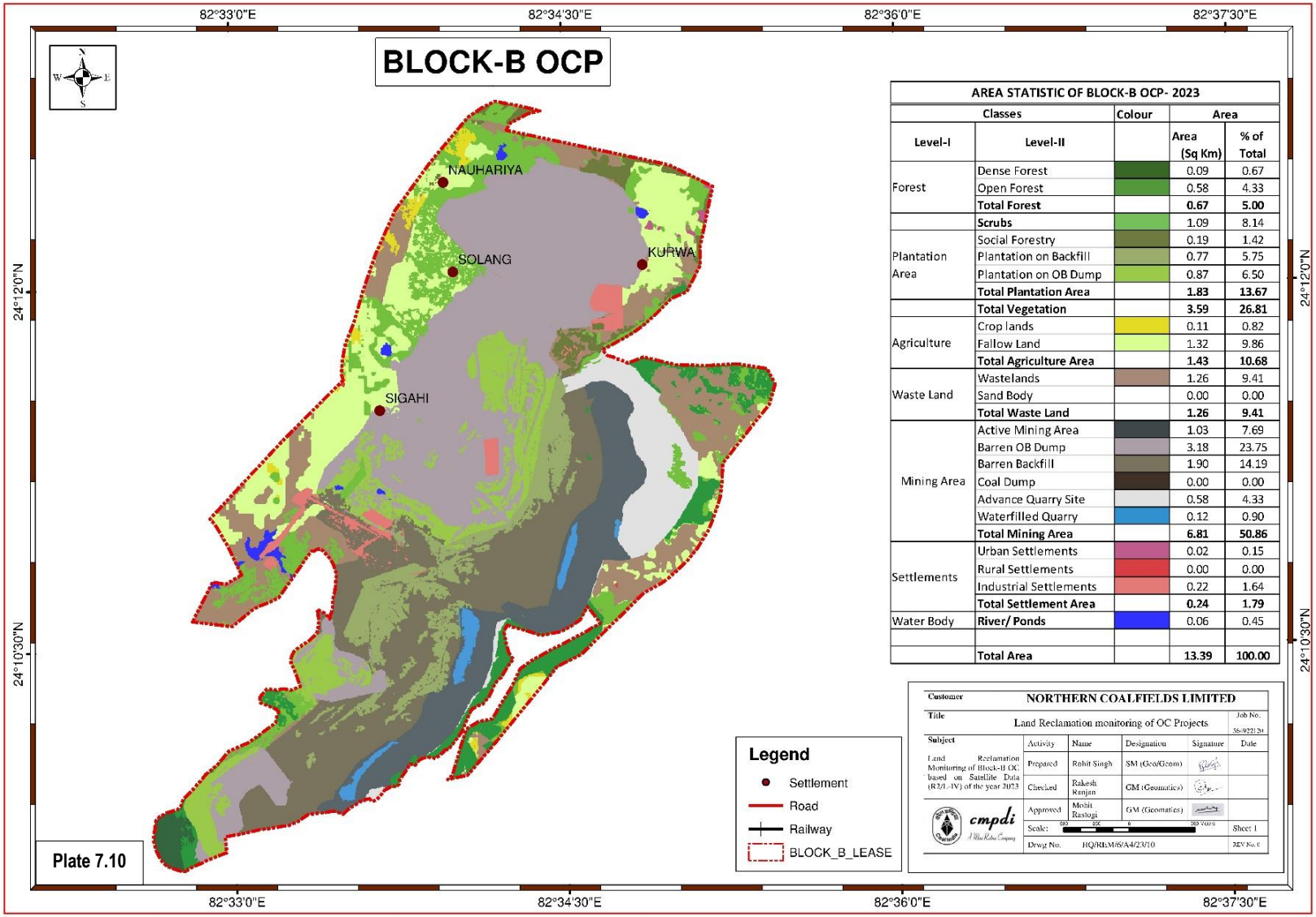

AREA STATISTIC OF BLOCK-B OCP- 2023

Classes		Colour	Area	
Level-I	Level-II		Area (Sq Km)	% of Total
Forest	Dense Forest		0.09	0.67
	Open Forest		0.58	4.33
	Total Forest		**0.67**	**5.00**
	Scrubs		1.09	8.14
Plantation Area	Social Forestry		0.19	1.42
	Plantation on Backfill		0.77	5.75
	Plantation on OB Dump		0.87	6.50
	Total Plantation Area		**1.83**	**13.67**
	Total Vegetation		**3.59**	**26.81**
Agriculture	Crop lands		0.11	0.82
	Fallow Land		1.32	9.86
	Total Agriculture Area		**1.43**	**10.68**
Waste Land	Wastelands		1.26	9.41
	Sand Body		0.00	0.00
	Total Waste Land		**1.26**	**9.41**
Mining Area	Active Mining Area		1.03	7.69
	Barren OB Dump		3.18	23.75
	Barren Backfill		1.90	14.19
	Coal Dump		0.00	0.00
	Advance Quarry Site		0.58	4.33
	Waterfilled Quarry		0.12	0.90
	Total Mining Area		**6.81**	**50.86**
Settlements	Urban Settlements		0.02	0.15
	Rural Settlements		0.00	0.00
	Industrial Settlements		0.22	1.64
	Total Settlement Area		**0.24**	**1.79**
Water Body	**River/ Ponds**		0.06	0.45
	Total Area		**13.39**	**100.00**

Customer	NORTHERN COALFIELDS LIMITED				
Title	Land Reclamation monitoring of OC Projects				Job No. 564922120
Subject	Activity	Name	Designation	Signature	Date
Land Reclamation Monitoring of Block-II OC based on Satellite Data (R2(I-IV) of the year 2023	Prepared	Rohit Singh	SM (Geo/Geom)		
	Checked	Rakesh Ranjan	CM (Geomatics)		
cmpdi	Approved	Mohit Rastogi	GM (Geomatics)		
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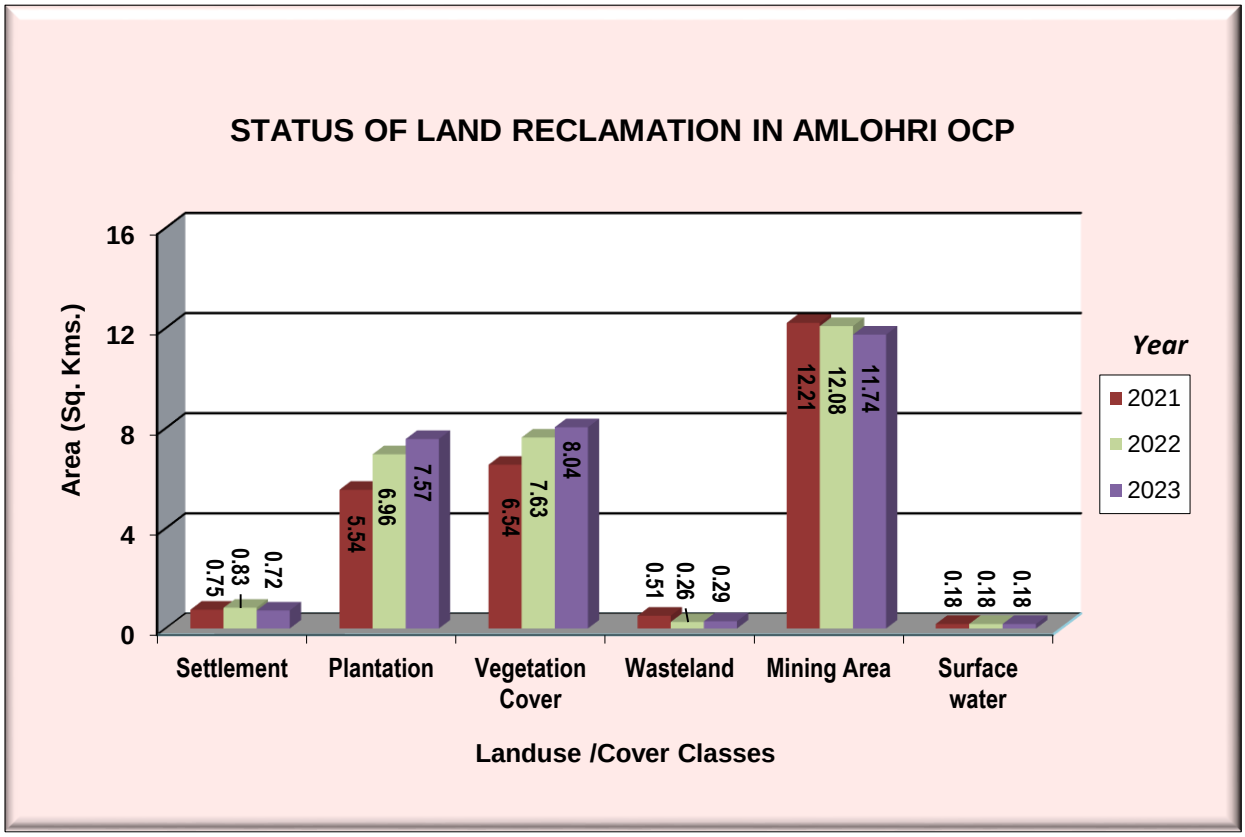


Figure 7.2

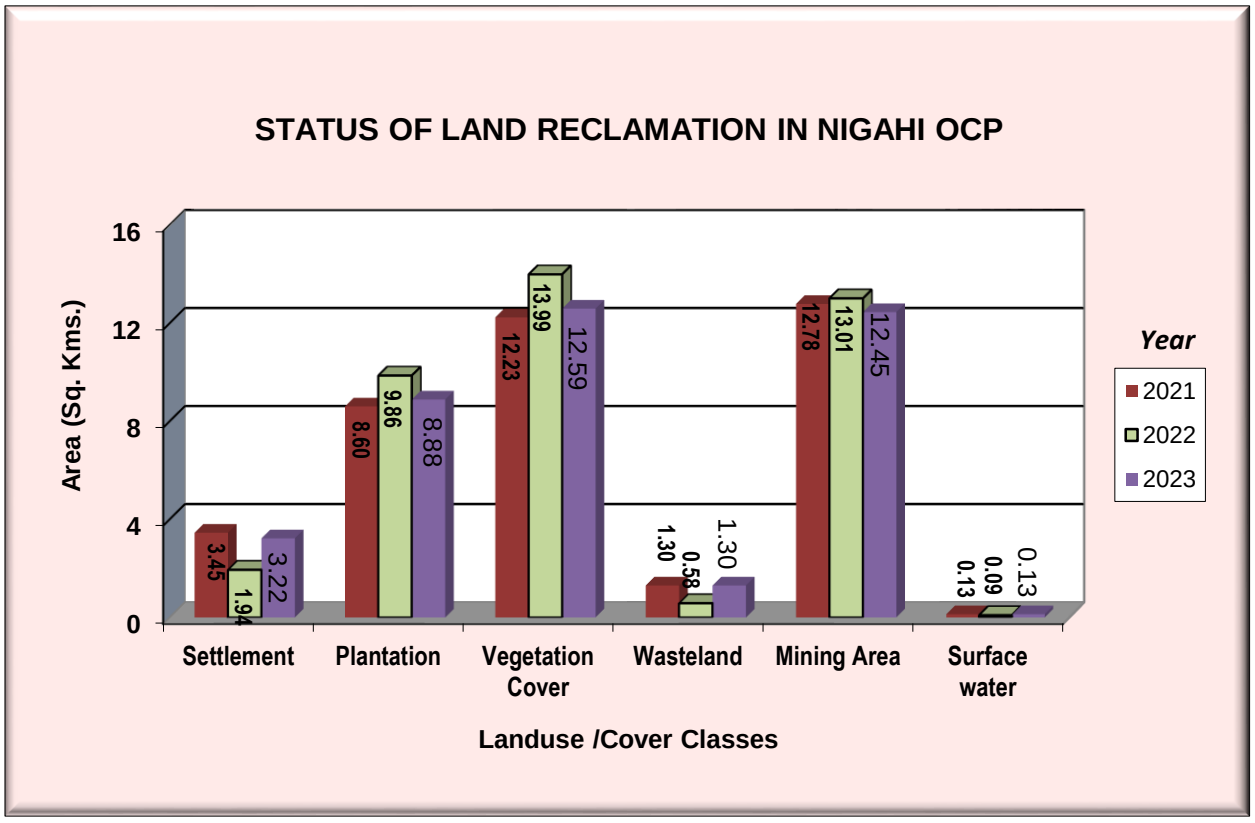


Figure 7.3

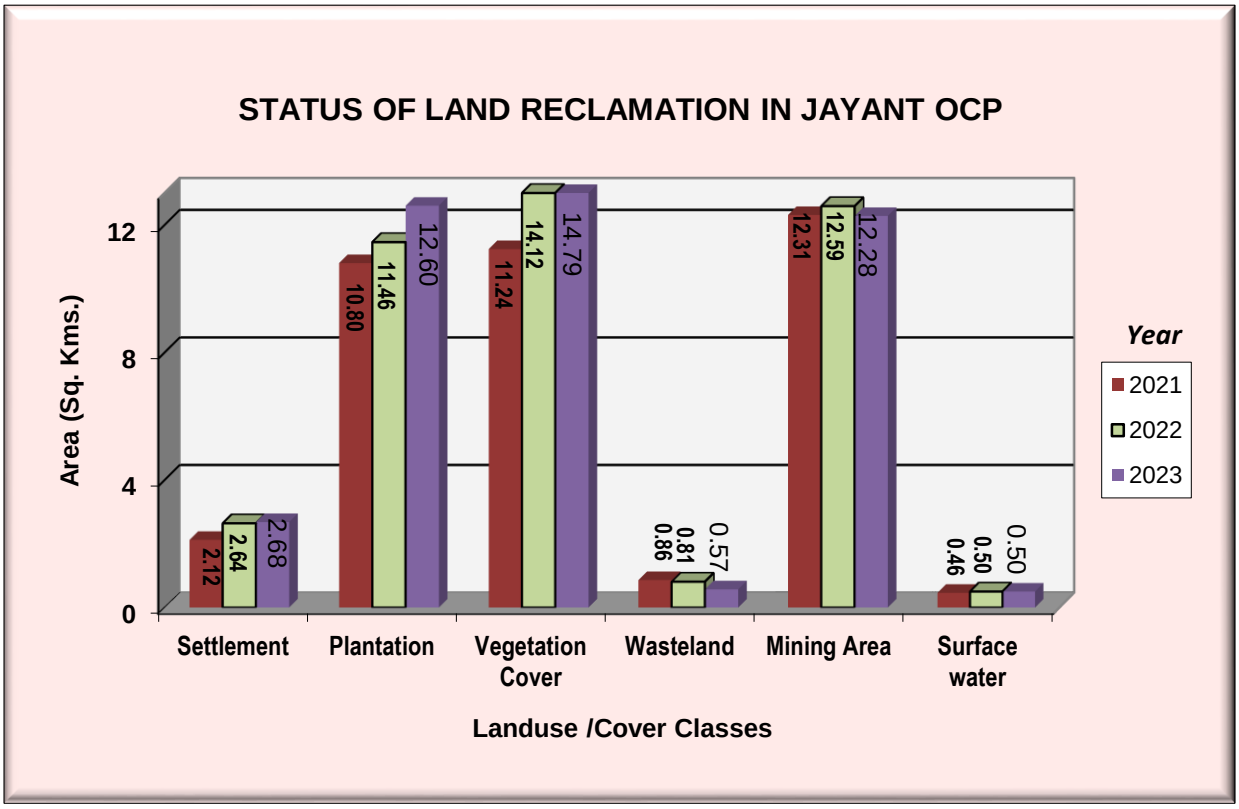


Figure 7.4

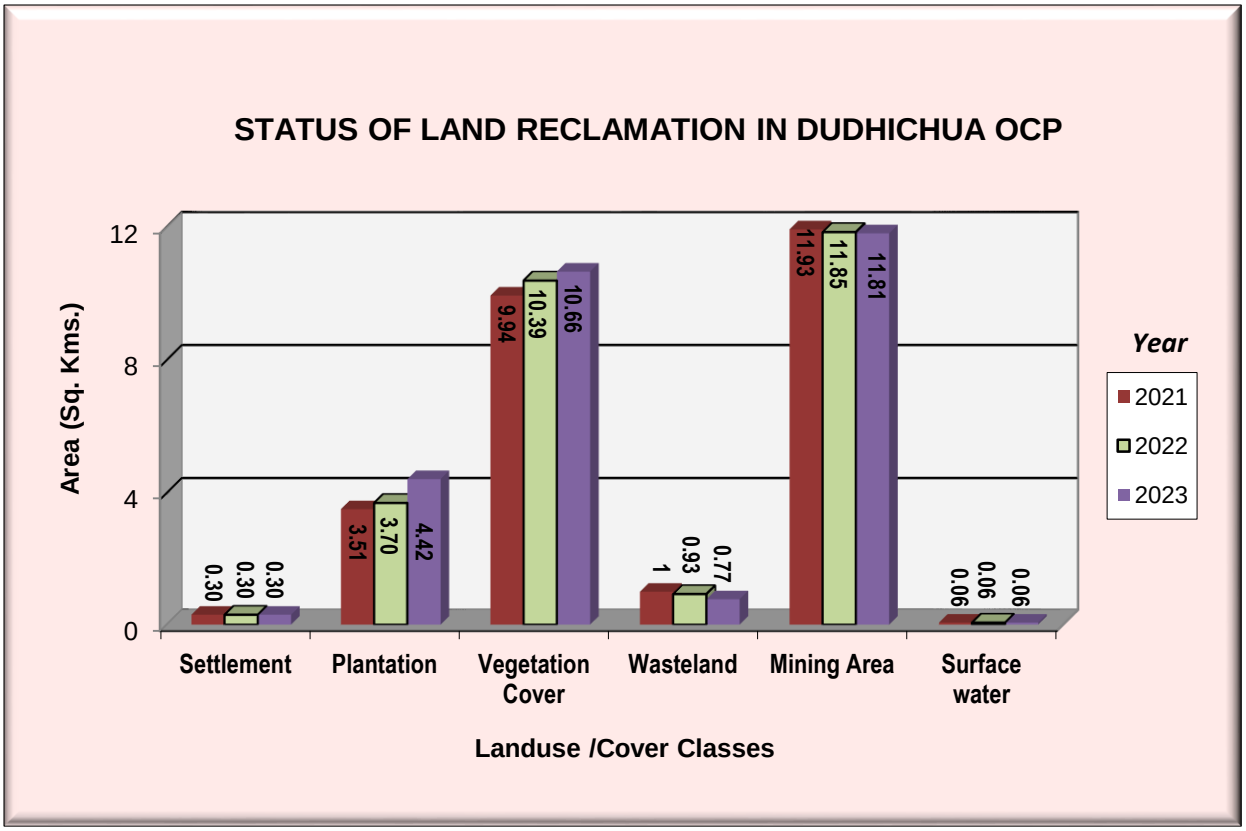


Figure 7.5

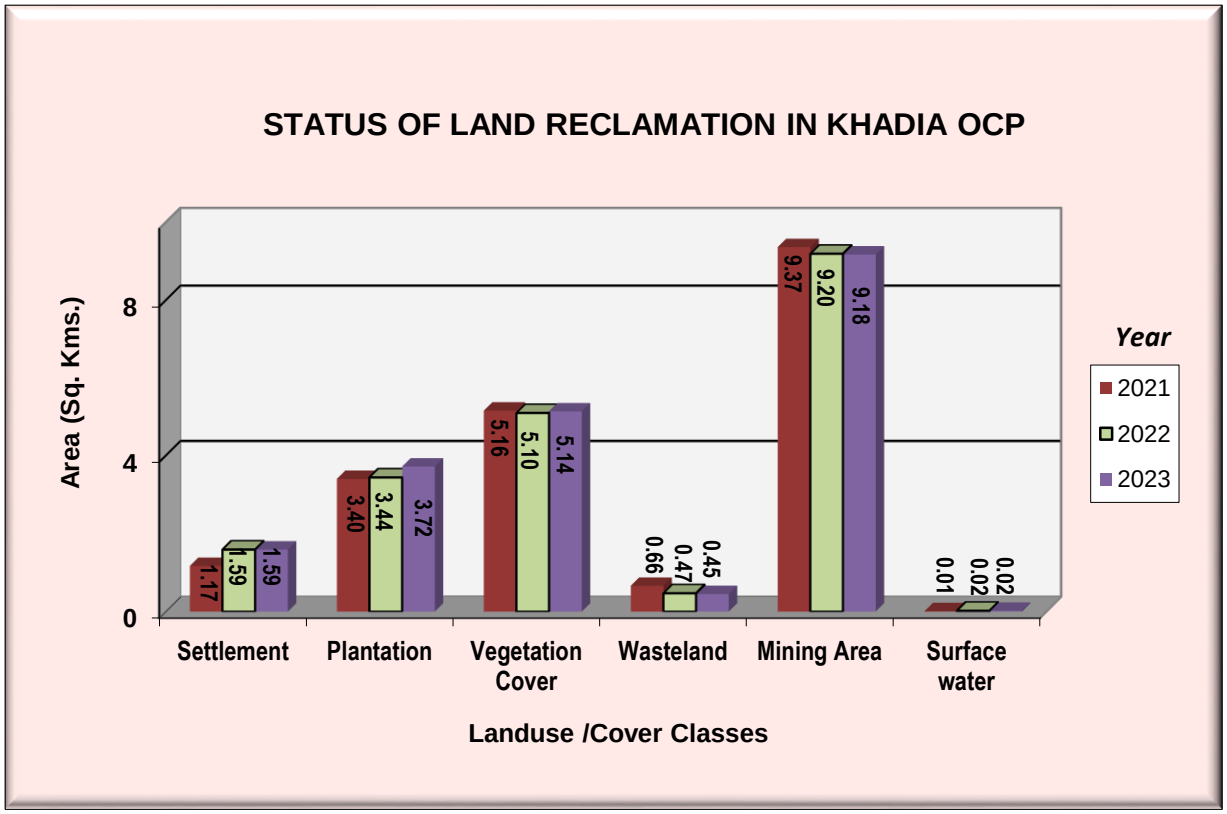


Figure 7.6

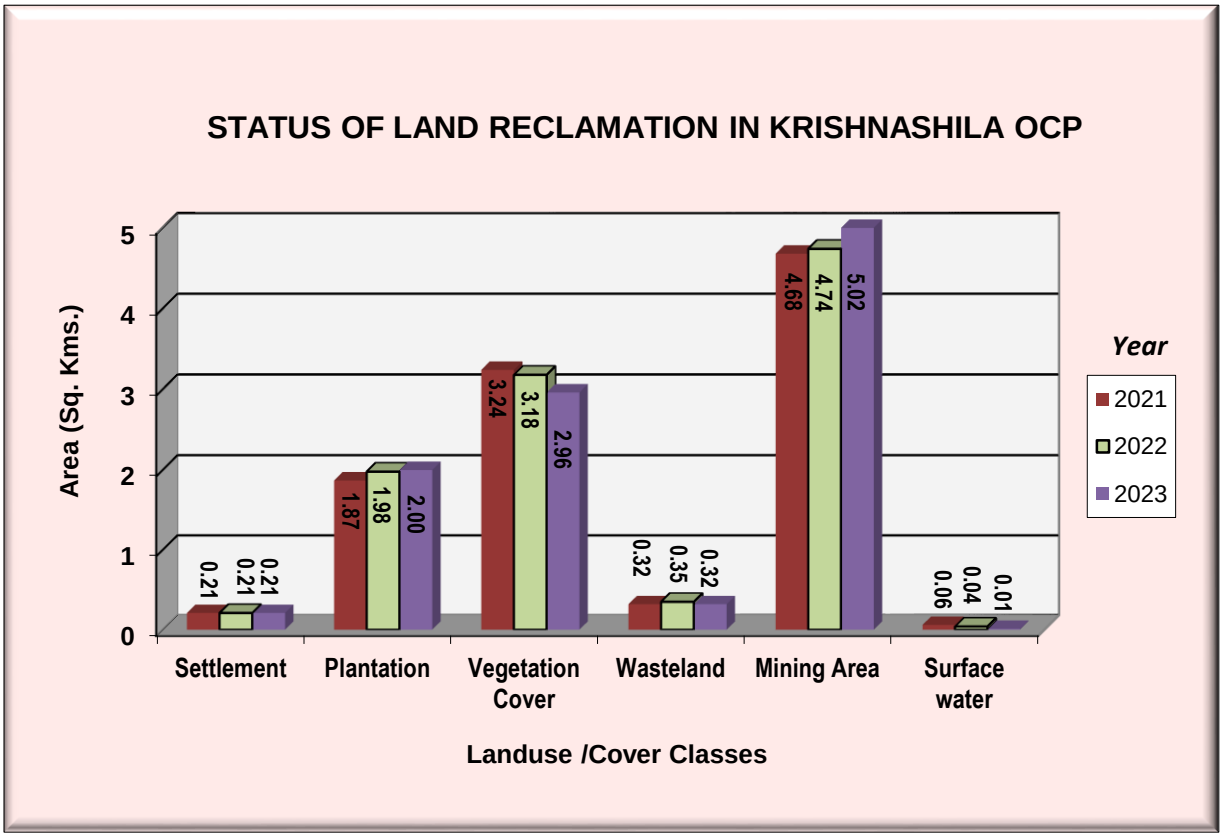


Figure 7.7

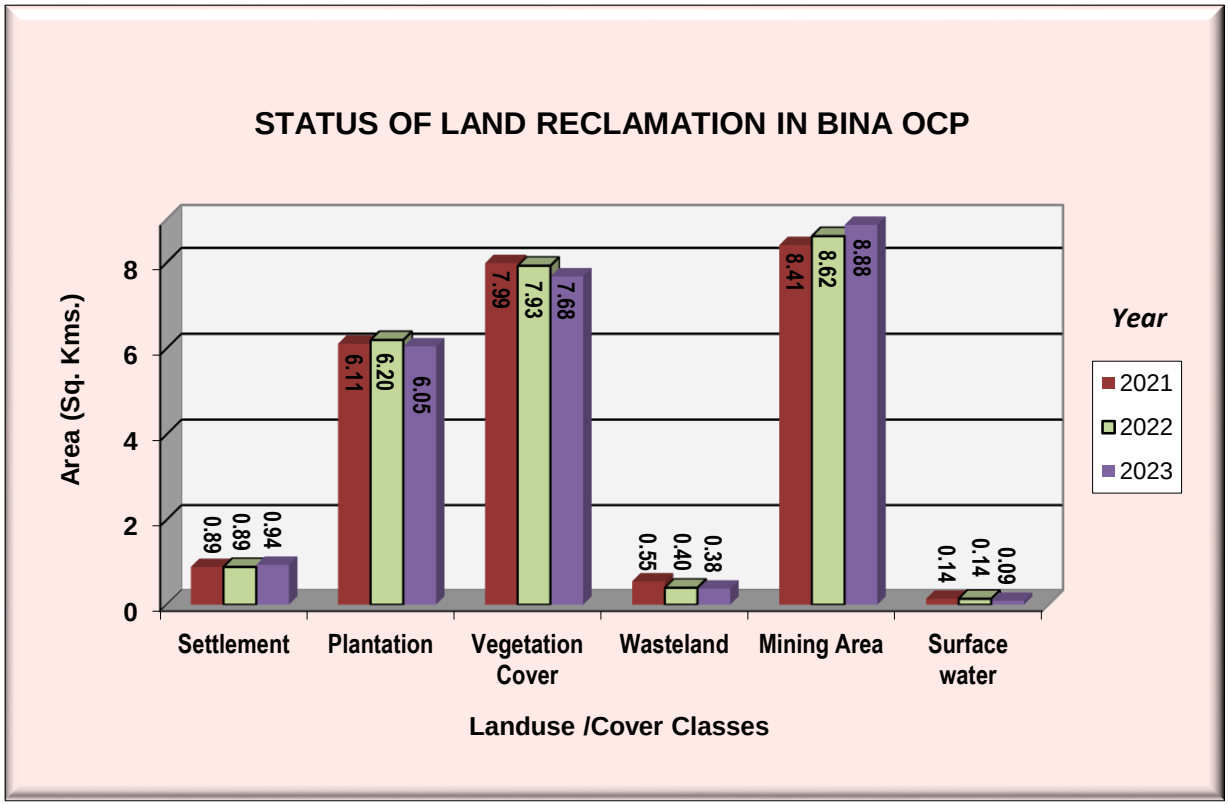


Figure 7.8

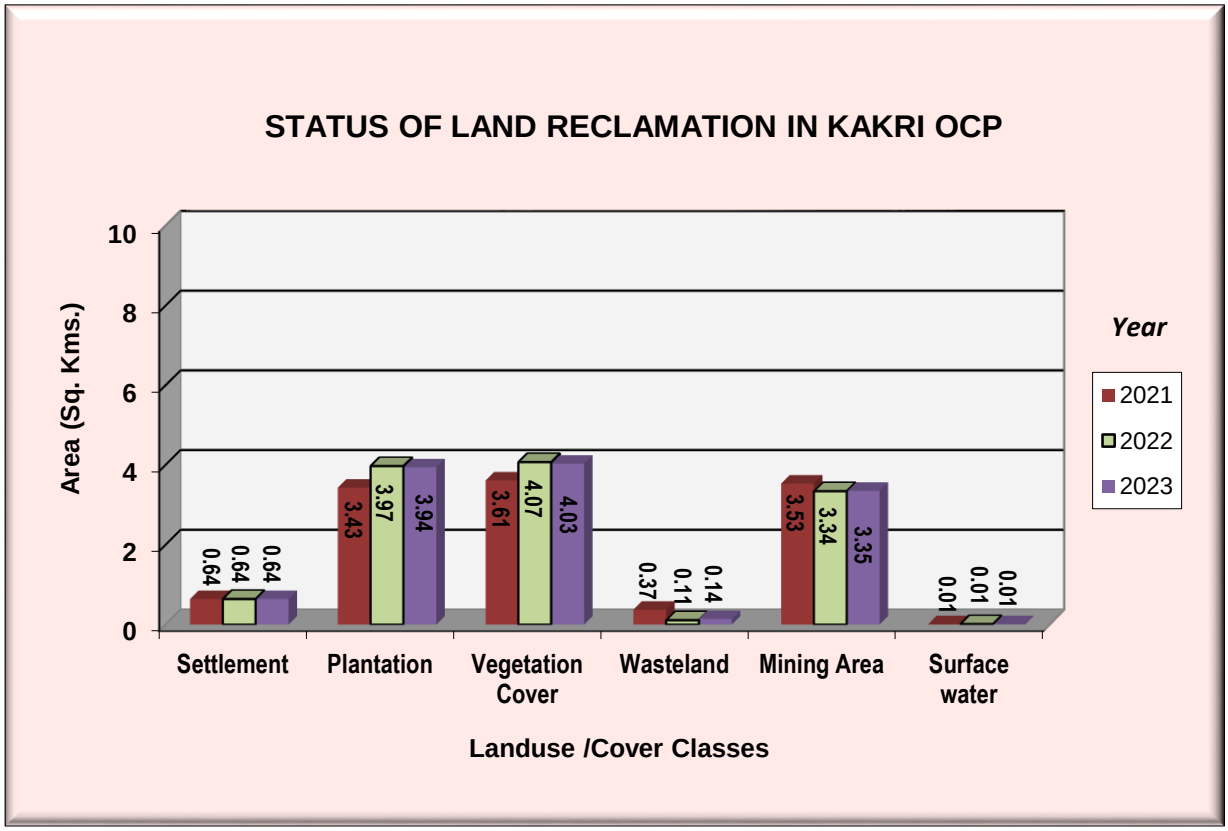


Figure 7.9

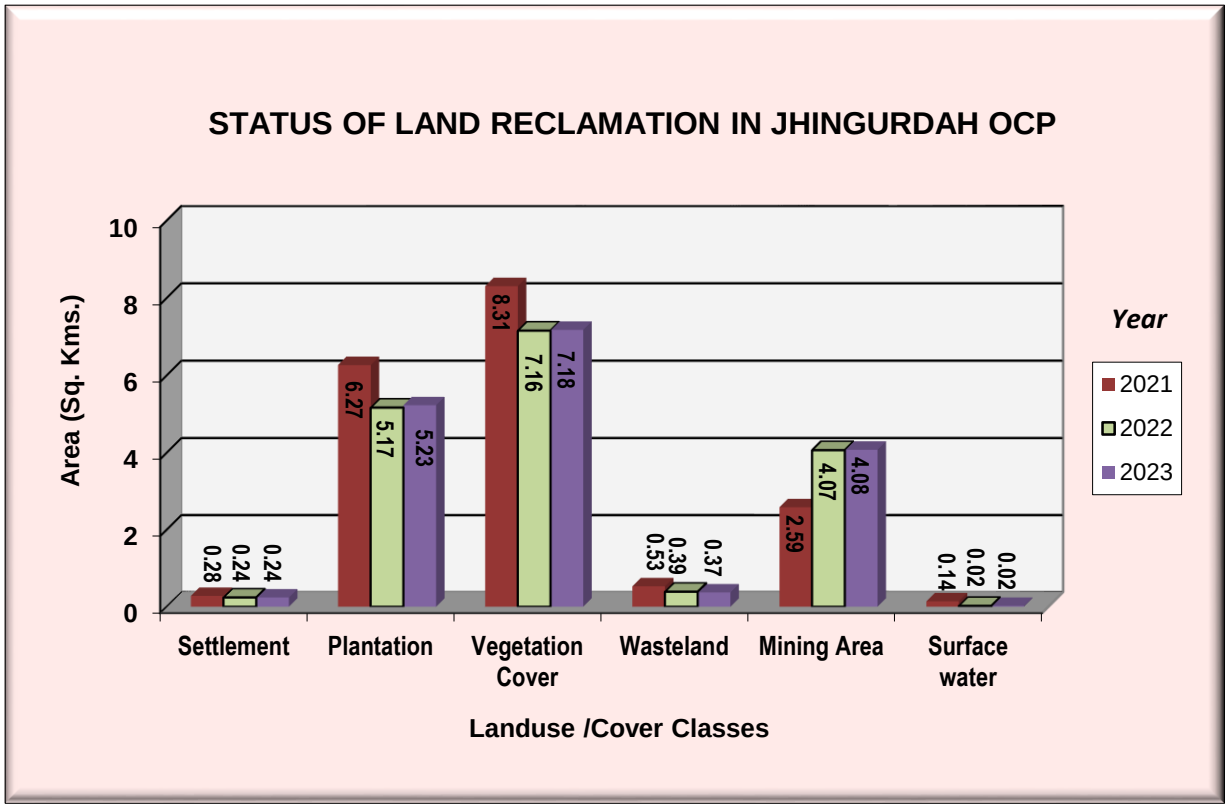


Figure 7.10

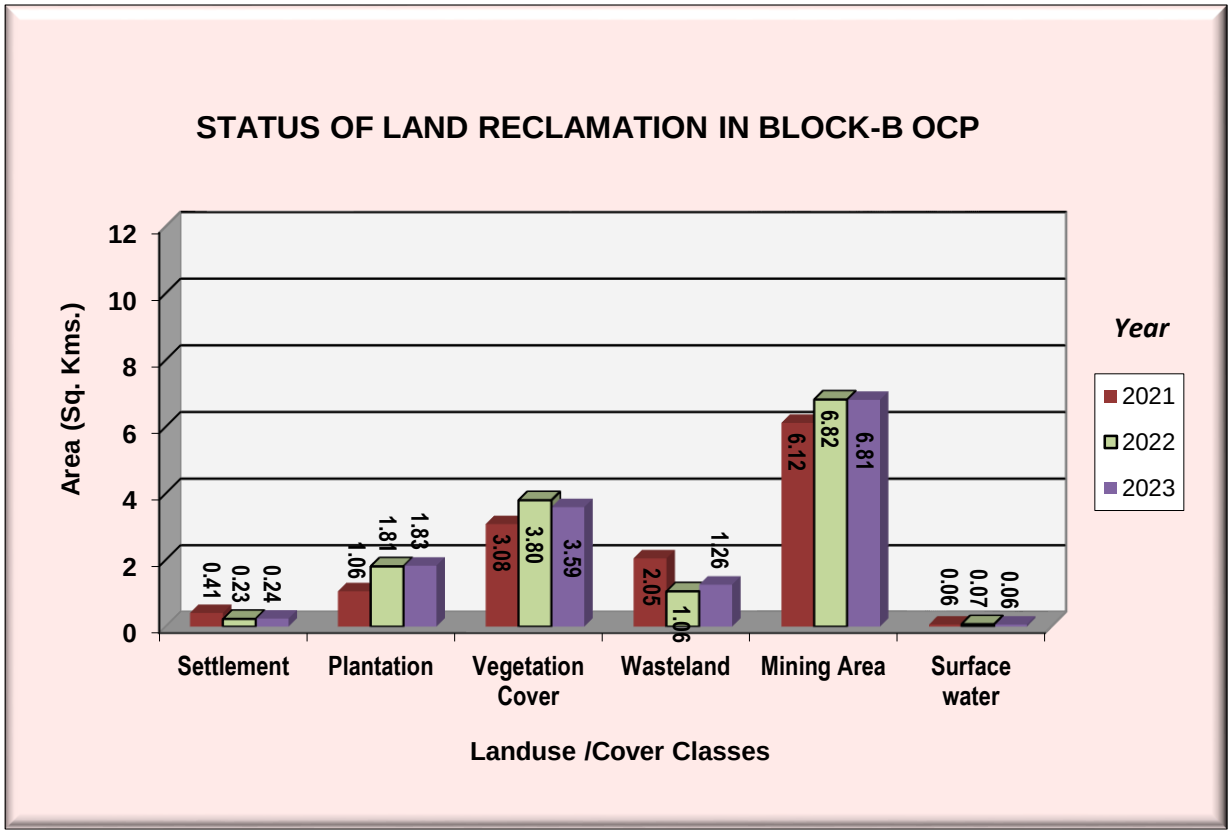


Figure 7.11

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**

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 2023.

- 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 2023 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 2023-24 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 68.51 Km^2 excavated area; 40.83 Km^2 area (59.60%) is under reclamation. Out of which 7.94 Km^2 (11.59%) area has been re-vegetated and 32.89 Km2 (48.01%) area is under backfilling.

8.4 Total Area under active mining has increased from 25.61 Km^2 (Yr. 2022) to 27.68 km^2 (Yr. 2023).

8.5 Analysis of satellite data indicates that plantation on backfill has reduced in some projects as Ananta, Balram, Jagannath, Belpahar, Samleswari and Lajkura for fresh backfilling activities and for construction of roads, camp, silo and Railway connectivity project.

8.6 Plantation on External OB dump has marginally reduced in Ananta, Hingula, Belpahar and Lajkura OCP due to construction of camp, silo and 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 29.58 Km^2 in 2022 to 32.89 Km^2 in 2023.

8.8 It was observed that Green Cover has reduced in some projects of MCL due to change in mine boundary and reduction in plantation and social forestry in the leasehold areas resulted from mining activities.

8.9 On comparing the status of land reclamation for the year 2023 with respect to the year 2022 in different projects, it is evident that area of land reclamation has increased from 37.64 Km^2 (Yr.2022) to 40.83 Km^2 (Yr.2023).

8.10 Out of 16 projects of MCL, Belpahar OC ranks on top for land reclamation (75.90%) followed by Balram OC (70.37%) and Samleswari OC (70.02%).

Table – 8.1
Project wise Land Reclamation Status in Opencast Projects of MCL based on Satellite Data of the year 2023

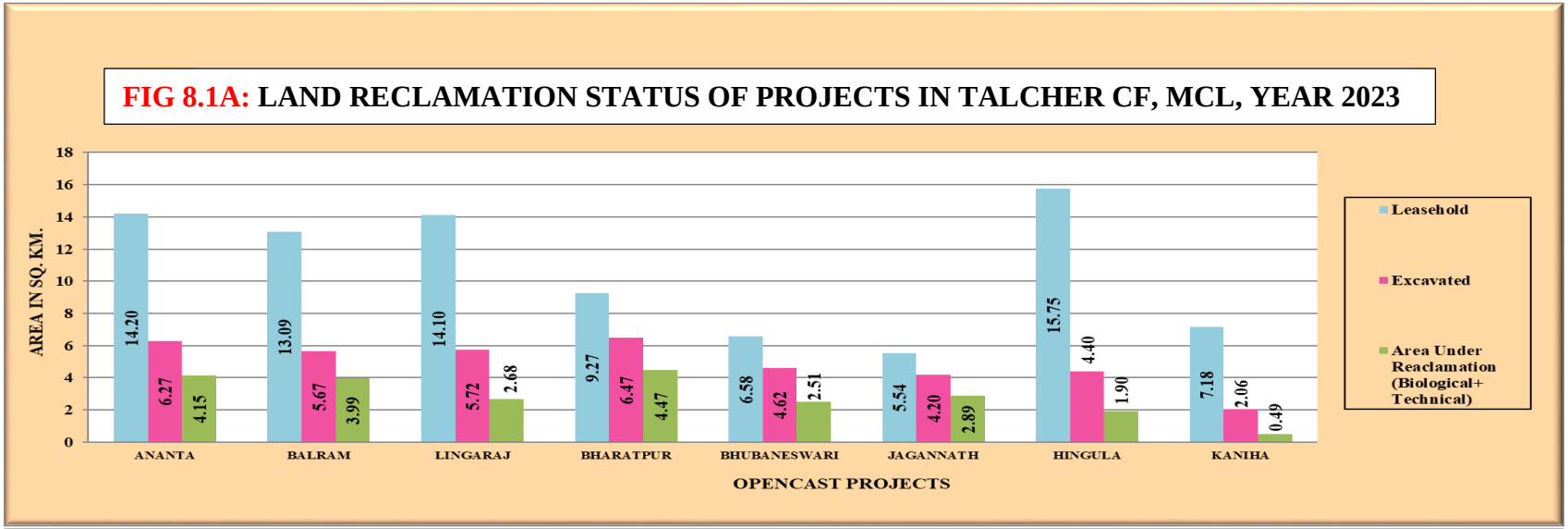
(Area in Sq.km)

Table 1: Project wise Land Reclamation Status in Opencast Projects of MCL based on Satellite Data of the year 2023 (Area in Sq.km.)

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)	
				2022	2023	2022	2023	2022	2023	2022	2023	2022	2023	2022	2023	2022	2023	2022	2023
1	Ananta	14.20	14.20	2.62	3.18	1.05	0.97	0.10	0.08	0.22	0.21	1.95	2.12	5.62	6.27	1.37	1.26	3.67	4.15
				46.62%	50.72%	18.68%	15.47%					34.70%	33.81%			9.65%	8.87%	65.30%	66.19%
2	Balram	13.09	13.09	2.98	3.05	0.98	0.94	0.22	0.22	0.35	0.32	1.58	1.68	5.54	5.67	1.55	1.48	3.96	3.99
				53.79%	53.79%	17.69%	16.58%					28.52%	29.63%			11.84%	11.31%	71.48%	70.37%
3	Lingaraj	11.73	14.10	1.98	2.52	0.16	0.16	0.52	0.56	0.44	0.45	2.68	3.04	4.82	5.72	1.12	1.17	2.14	2.68
				41.08%	44.06%	3.32%	2.80%					55.60%	53.15%			9.55%	8.30%	44.40%	46.85%
4	Bharatpur	9.27	9.27	2.83	2.84	1.63	1.63	0.45	0.45	0.16	0.15	1.76	2.00	6.22	6.47	2.24	2.23	4.46	4.47
				45.50%	43.89%	26.21%	25.19%					28.30%	30.91%			24.16%	24.06%	71.70%	69.09%
5	Bhubaneswari	6.58	6.58	2.29	2.45	0.02	0.06	0.01	0.01	0.09	0.06	2.17	2.11	4.48	4.62	0.12	0.13	2.31	2.51
				51.12%	53.03%	0.45%	1.30%					48.44%	45.67%			1.82%	1.98%	51.56%	54.33%
6	Jagannath	5.54	5.54	1.05	1.11	1.80	1.78	0.00	0.00	0.15	0.11	1.13	1.31	3.98	4.20	1.95	1.89	2.85	2.89
				26.38%	26.43%	45.23%	42.38%					28.39%	31.19%			35.20%	34.12%	71.61%	68.81%
7	Hingula	15.75	15.75	1.69	1.85	0.04	0.05	0.18	0.17	0.29	0.29	2.47	2.50	4.20	4.40	0.51	0.51	1.73	1.90
				40.24%	42.05%	0.95%	1.14%					58.81%	56.82%			3.24%	3.24%	41.19%	43.18%
8	Kaniha	7.18	7.18	0.36	0.49	0.00	0.00	0.00	0.00	0.07	0.09	1.48	1.57	1.84	2.06	0.07	0.09	0.36	0.49
				19.57%	23.79%	0.00%	0.00%					80.43%	76.21%			0.97%	1.25%	19.57%	23.79%
9	Belpahar	14.44	14.44	3.50	3.80	0.66	0.61	0.48	0.35	0.50	0.50	1.33	1.40	5.49	5.81	1.64	1.46	4.16	4.41
				63.75%	65.40%	12.02%	10.50%					24.23%	24.10%			11.36%	10.11%	75.77%	75.90%
10	Lakhanpur	22.40	22.40	4.76	5.26	0.89	0.99	0.59	0.59	0.38	0.35	3.99	4.48	9.64	10.73	1.86	1.93	5.65	6.25
				49.38%	49.02%	9.23%	9.23%					41.39%	41.75%			8.30%	8.62%	58.61%	58.25%
11	Samleswari	13.35	13.35	3.12	3.22	0.66	0.61	0.49	0.49	0.48	0.47	1.45	1.64	5.23	5.47	1.63	1.57	3.78	3.83
				59.66%	58.87%	12.62%	11.15%					27.72%	29.98%			12.21%	11.76%	72.28%	70.02%
12	Lajkura	7.21	7.21	1.32	1.52	0.16	0.13	0.19	0.12	0.16	0.16	1.07	1.14	2.55	2.79	0.51	0.41	1.48	1.65
				51.76%	54.48%	6.27%	4.66%					41.96%	40.86%			7.07%	5.69%	58.04%	59.14%
13	Siarmal	22.90	22.90	0.00	0.00	0.00	0.00	0.00	0.00	0.61	0.59	0.00	0.00	0.00	0.00	0.61	0.59	0.00	0.00
				0.00%	0.00%	0.00%	0.00%					0.00%	0.00%			2.66%	2.58%	–	–
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	0.17	0.43	0.00	0.00	0.00	0.00	0.03	0.02	0.79	0.98	0.96	1.41	0.03	0.02	0.17	0.43
				17.71%	30.50%	0.00%	0.00%					82.29%	69.50%			0.46%	0.31%	17.71%	30.50%
16	Kulda	6.34	6.34	0.91	1.17	0.01	0.01	0.01	0.01	0.03	0.03	1.76	1.71	2.68	2.89	0.05	0.05	0.92	1.18
				33.96%	40.48%	0.37%	0.35%					65.67%	59.17%			0.79%	0.79%	34.33%	40.83%
	Total	179.75	182.12	29.58	32.89	8.06	7.94	3.24	3.05	3.99	3.83	25.61	27.68	63.25	68.51	15.29	14.82	37.64	40.83
				46.77%	48.01%	12.74%	11.59%					40.49%	40.40%			8.51%	8.14%	59.51%	59.60%

***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"*



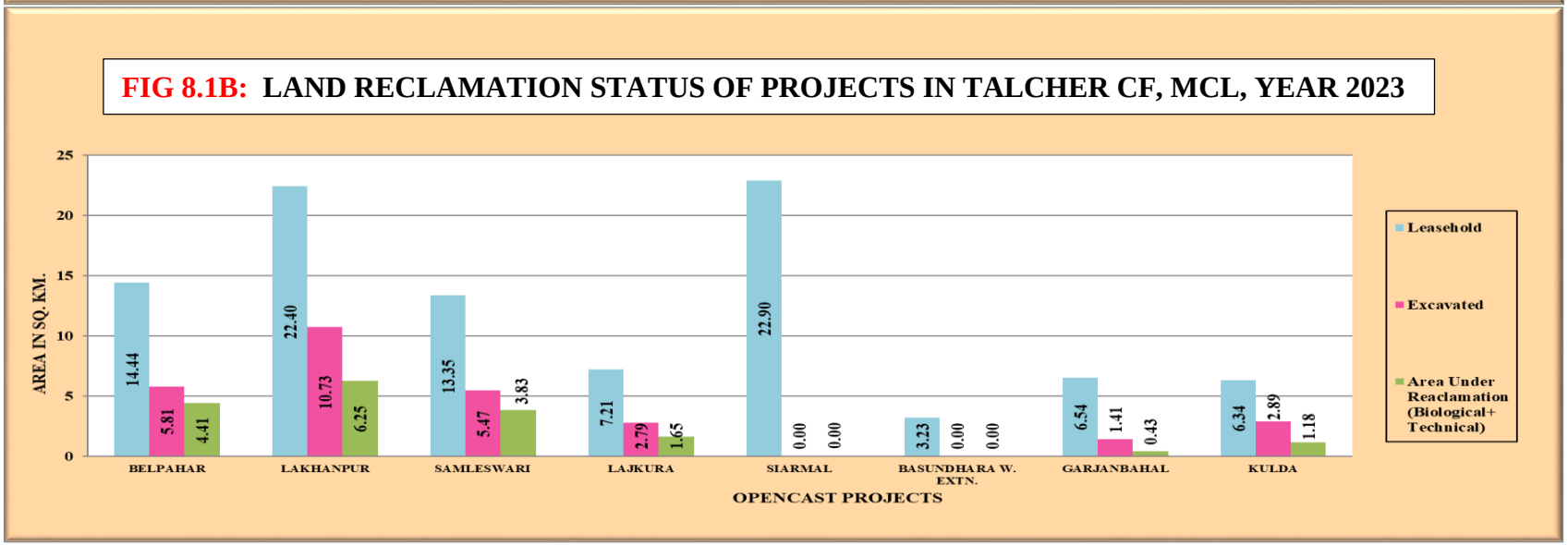


Fig.8.1A & 8.1B : Land reclamation status in OC projects of MCL (Talcher & IB valley CF) in the year 2023

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 2023

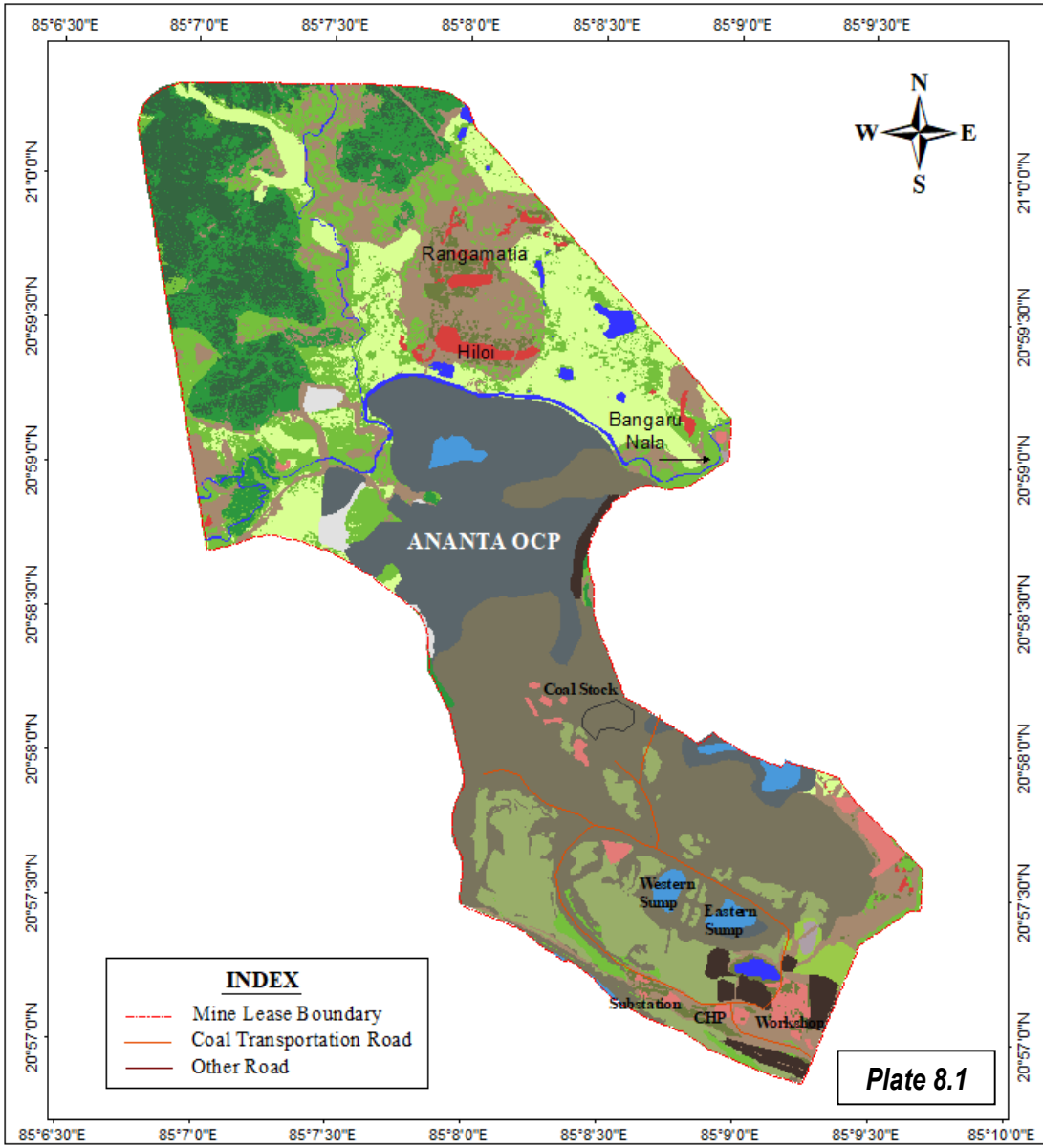
(Area in Sq. Kms.)

		ANANTA		BALRAM		LINGARAJ		BHARATPUR		BHUBANESHWARI		JAGANNATH		HINGULA		KANIHA		TOTAL	
		Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%			Area	%
FORESTS	Dense Forest	1.00	7.04	0.00	0.00	0.00	0.00	0.01	0.11	0.00	0.00	0.00	0.00	1.00	6.35	0.00	0.00	2.01	2.35
	Open Forest	1.06	7.46	0.57	4.35	0.31	2.20	0.00	0.00	0.20	3.04	0.02	0.36	1.51	9.59	0.00	0.00	3.67	4.28
	Total Forest (A)	2.06	14.51	0.57	4.35	0.31	2.20	0.01	0.11	0.20	3.04	0.02	0.36	2.51	15.94	0.00	0.00	5.68	6.63
SCRUBS	**Scrubs (B)**	1.55	10.92	2.00	15.28	1.96	13.90	0.39	4.21	0.33	5.02	0.24	4.33	2.72	17.27	0.65	10.17	9.84	11.48
PLANTATION	Social Forestry	0.21	1.48	0.32	2.44	0.45	3.19	0.15	1.62	0.06	0.91	0.11	1.99	0.29	1.84	0.09	0.97	1.68	1.96
	Plantation on External OB Dump	0.08	0.56	0.22	1.68	0.56	3.97	0.45	4.85	0.01	0.08	0.00	0.00	0.17	1.08	0.00	0.00	1.49	1.73
	Plantation on Backfill/Excavated Area(Biological Reclamation)	0.97	6.83	0.94	7.18	0.16	1.13	1.63	17.58	0.06	0.91	1.78	32.13	0.05	0.32	0.00	0.00	5.59	6.52
	Total Plantation (Green Cover) (C)	**1.26**	**8.87**	**1.48**	**11.31**	**1.17**	**8.30**	**2.23**	**24.06**	**0.13**	**1.90**	**1.89**	**34.12**	**0.51**	**3.24**	**0.09**	**0.97**	**8.76**	**10.22**
	Total Vegetation (A+B+C)	**4.87**	**34.30**	**4.05**	**30.94**	**3.44**	**24.40**	**2.63**	**28.37**	**0.66**	**9.96**	**2.15**	**38.81**	**5.74**	**36.44**	**0.74**	**11.14**	**24.28**	**28.32**
ACTIVE MINING	Coal Dump	0.22	1.55	0.28	2.14	0.36	2.55	0.18	1.94	0.06	0.91	0.09	1.62	0.40	2.54	0.18	1.67	1.77	2.07
	Coal Quarry	1.85	13.03	0.88	6.72	2.64	18.72	1.08	11.65	1.80	27.38	0.58	10.47	1.52	9.65	1.49	16.29	11.84	13.82
	Advance Quarry Site	0.09	0.63	0.22	1.68	0.20	1.42	0.16	1.73	0.13	1.98	0.14	2.53	0.13	0.83	0.03	0.14	1.10	1.29
	Quarry Filled with Water	0.18	1.27	0.58	4.43	0.20	1.42	0.76	8.20	0.18	2.74	0.59	10.65	0.85	5.40	0.05	0.84	3.39	3.96
	Total Area under *Active Mining*	**2.12**	**14.93**	**1.68**	**12.83**	**3.04**	**21.56**	**2.00**	**21.57**	**2.11**	**32.09**	**1.31**	**23.65**	**2.50**	**15.87**	**1.57**	**17.27**	**16.33**	**19.06**
	Barren OB dump	0.02	0.14	0.13	0.99	0.76	5.39	0.05	0.54	0.81	12.32	0.00	0.00	0.97	6.16	0.55	5.85	3.29	3.84
	Area Under Backfilling(Technical Reclamation)	3.18	22.39	3.05	23.30	2.52	17.87	2.84	30.64	2.45	37.26	1.11	20.04	1.85	11.75	0.49	4.32	17.49	20.41
	Total Area under Mine Operation	**5.54**	**39.01**	**5.14**	**39.27**	**6.68**	**47.38**	**5.07**	**54.69**	**5.43**	**82.59**	**2.51**	**45.31**	**5.72**	**36.32**	**2.79**	**29.11**	**38.88**	**43.31**
WASTELANDS	Waste Lands	1.70	11.97	0.97	7.41	2.05	14.54	0.64	6.90	0.21	3.19	0.36	6.50	1.62	10.29	0.90	13.93	8.45	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	**1.70**	**11.97**	**0.97**	**7.41**	**2.05**	**14.54**	**0.64**	**6.90**	**0.21**	**3.19**	**0.47**	**8.48**	**1.68**	**10.67**	**0.90**	**13.93**	**8.62**	**10.06**
WATER	Reservoir, nallah, ponds etc.	0.21	1.48	0.26	1.99	0.07	0.50	0.04	0.43	0.01	0.15	0.04	0.72	0.31	1.97	0.07	0.97	1.01	1.18
	Total Waterbodies	**0.21**	**1.48**	**0.26**	**1.99**	**0.07**	**0.50**	**0.04**	**0.43**	**0.01**	**0.15**	**0.04**	**0.72**	**0.31**	**1.97**	**0.07**	**0.97**	**1.01**	**1.18**
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	0.18	2.79	0.18	0.21
	Fallow Lands	1.52	10.70	1.95	14.90	0.80	5.67	0.60	6.47	0.17	2.59	0.23	4.15	2.07	13.14	2.19	37.74	9.53	11.12
	Total Agriculture	**1.52**	**10.70**	**1.95**	**14.90**	**0.80**	**5.67**	**0.60**	**6.47**	**0.17**	**2.59**	**0.23**	**4.15**	**2.07**	**13.14**	**2.37**	**40.53**	**9.71**	**11.33**
SETTLEMENTS	Urban Settlement	0.00	0.00	0.00	0.00	0.45	3.19	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.06	0.00	0.00	0.46	0.54
	Rural Settlement	0.15	1.06	0.30	2.29	0.24	1.70	0.04	0.43	0.04	0.61	0.03	0.54	0.19	1.21	0.25	3.48	1.24	1.45
	Industrial Settlement	0.21	1.48	0.42	3.21	0.37	2.62	0.25	2.70	0.06	0.91	0.11	1.99	0.03	0.19	0.05	0.84	1.50	1.75
	Total Settlements	**0.36**	**2.54**	**0.72**	**5.50**	**1.06**	**7.52**	**0.29**	**3.13**	**0.10**	**1.52**	**0.14**	**2.53**	**0.23**	**1.46**	**0.30**	**4.32**	**3.20**	**3.74**
	GRAND TOTAL	**14.20**	**100.00**	**13.09**	**100.00**	**14.10**	**100.00**	**9.27**	**100.00**	**6.58**	**100.00**	**5.54**	**100.00**	**15.75**	**100.00**	**7.18**	**100.00**	**85.70**	**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	1.19	5.31	0.16	1.20	0.48	6.66	0.00	0.00	0.00	0.00	0.18	2.75	0.00	0.00	2.01	2.08	4.02	2.21
	Open Forest	0.85	5.89	1.90	8.48	0.51	3.82	0.51	7.07	0.87	3.80	0.78	24.15	0.57	8.72	0.04	0.63	6.03	6.25	9.70	5.33
	Total Forest (A)	0.85	5.89	3.09	13.79	0.67	5.02	0.99	13.73	0.87	3.80	0.78	24.15	0.75	11.47	0.04	0.63	8.00	8.34	13.68	7.51
SCRUBS	**Scrubs (B)**	2.84	19.67	2.28	10.18	2.36	17.67	0.82	11.37	6.07	26.51	1.35	41.80	0.94	14.37	1.08	17.03	17.74	18.40	27.58	15.14
PLANTATION	Social Forestry	0.50	3.46	0.35	1.56	0.47	3.52	0.16	2.22	0.59	2.58	0.03	0.93	0.02	0.31	0.03	0.47	2.15	2.23	3.83	2.10
	Plantation on External OB Dump	0.35	2.42	0.59	2.63	0.49	3.67	0.12	1.66	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.16	1.56	1.62	3.05	1.67
	Plantation on Backfill/Excavated Area(Biological Reclamation)	0.61	4.22	0.99	4.42	0.61	4.57	0.13	1.80	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.16	2.35	2.44	7.94	4.36
	Total Plantation (Green Cover) (C)	**1.46**	**10.11**	**1.93**	**8.62**	**1.57**	**11.76**	**0.41**	**5.69**	**0.59**	**2.58**	**0.03**	**0.93**	**0.02**	**0.31**	**0.05**	**0.79**	**6.06**	**6.29**	**14.82**	**8.13**
	Total Vegetation (A+B+C)	**5.15**	**35.66**	**7.30**	**32.59**	**4.60**	**34.45**	**2.22**	**30.79**	**7.53**	**32.88**	**2.16**	**66.87**	**1.71**	**26.15**	**1.17**	**18.45**	**31.84**	**33.02**	**56.12**	**30.81**
ACTIVE MINING	Coal Dump	0.13	0.90	0.30	1.34	0.21	1.57	0.05	0.69	0.00	0.00	0.00	0.00	0.22	3.36	0.08	1.26	0.99	1.03	2.76	1.52
	Coal Quarry	1.04	7.20	3.39	15.13	1.36	10.19	0.91	12.62	0.00	0.00	0.00	0.00	0.71	10.86	1.44	22.71	8.85	9.18	20.69	11.36
	Advance Quarry Site	0.05	0.35	0.84	3.75	0.15	1.12	0.20	2.77	0.00	0.00	0.00	0.00	0.16	2.45	0.08	1.26	1.48	1.54	2.58	1.42
	Quarry Filled with Water	0.31	2.15	0.25	1.12	0.13	0.97	0.03	0.42	0.00	0.00	0.00	0.00	0.11	1.68	0.19	3.00	1.02	1.06	4.41	2.42
	Total Area under *Active Mining*	**1.40**	**9.70**	**4.48**	**20.00**	**1.64**	**12.28**	**1.14**	**15.81**	**0.00**	**0.00**	**0.00**	**0.00**	**0.98**	**14.98**	**1.71**	**26.97**	**11.35**	**11.77**	**27.68**	**15.20**
	Barren OB dump	0.30	2.08	0.16	0.71	0.14	1.05	0.51	7.07	0.00	0.00	0.00	0.00	0.46	7.03	0.62	9.78	2.19	2.27	5.48	3.01
	Area Under Backfilling(Technical Reclamation)	3.80	26.32	5.26	23.48	3.22	24.11	1.52	21.08	0.00	0.00	0.00	0.00	0.43	6.57	1.17	18.45	15.40	15.97	32.89	18.06
	Total Area under Mine Operation	**5.63**	**38.99**	**10.20**	**45.54**	**5.21**	**39.02**	**3.22**	**44.66**	**0.00**	**0.00**	**0.00**	**0.00**	**2.09**	**31.96**	**3.58**	**56.47**	**29.93**	**30.02**	**68.81**	**37.79**
WASTELANDS	Waste Lands	2.33	16.14	1.20	5.36	1.79	13.41	0.92	12.76	3.82	16.68	0.64	19.81	0.49	7.49	0.69	10.88	11.88	12.32	20.33	11.16
	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	**2.33**	**16.14**	**1.20**	**5.36**	**1.79**	**13.41**	**0.92**	**12.76**	**3.82**	**16.68**	**0.64**	**19.81**	**0.49**	**7.49**	**0.69**	**10.88**	**11.88**	**12.32**	**20.50**	**11.26**
WATER	Reservoir, nallah, ponds etc.	0.22	1.52	0.25	1.12	0.27	2.02	0.06	0.83	0.21	0.92	0.03	0.93	0.03	0.46	0.13	2.05	1.20	1.24	2.21	1.21
	Total Waterbodies	**0.22**	**1.52**	**0.25**	**1.12**	**0.27**	**2.02**	**0.06**	**0.83**	**0.21**	**0.92**	**0.03**	**0.93**	**0.03**	**0.46**	**0.13**	**2.05**	**1.20**	**1.24**	**2.21**	**1.21**
AGRICULTURE	Crop Lands	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.54	6.72	0.00	0.00	0.00	0.00	0.15	2.37	1.69	1.75	1.87	1.03
	Fallow Lands	0.52	3.60	3.08	13.75	1.07	8.01	0.47	6.52	9.14	39.91	0.38	11.76	2.00	30.58	0.57	8.99	17.23	17.87	26.76	14.69
	Total Agriculture	**0.52**	**3.60**	**3.08**	**13.75**	**1.07**	**8.01**	**0.47**	**6.52**	**10.68**	**46.64**	**0.38**	**11.76**	**2.00**	**30.58**	**0.72**	**11.36**	**18.92**	**19.62**	**28.63**	**15.72**
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	0.58	0.32
	Rural Settlement	0.17	1.18	0.10	0.45	0.19	1.42	0.03	0.42	0.64	2.79	0.02	0.62	0.07	1.07	0.01	0.16	1.23	1.28	2.47	1.36
	Industrial Settlement	0.40	2.77	0.27	1.21	0.22	1.65	0.21	2.91	0.00	0.00	0.00	0.00	0.15	2.29	0.04	0.63	1.29	1.34	2.79	1.53
	Total Settlements	**0.59**	**4.09**	**0.37**	**1.65**	**0.413**	**3.09**	**0.32**	**4.44**	**0.66**	**2.88**	**0.02**	**0.62**	**0.22**	**3.36**	**0.05**	**0.79**	**2.64**	**2.74**	**5.84**	**3.21**
	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**	**182.12**	**100.00**



Area Statistics - Ananta OCP (2023)

Classes		Colour	Area	
Level-I	Level-II		Area (Km^2)	% of Total
Forest Area	Dense Forest		1.00	7.04
	Open Forest		1.06	7.46
	Total Forest (A)		**2.06**	**14.51**
Scrubs	**Scrubs (B)**		**1.55**	**10.92**
Plantation	Social Forestry		0.21	1.48
	Plantation on Backfill		0.97	6.83
	Plantation on OB Dump		0.08	0.56
	Total Plantation (C)		**1.26**	**8.87**
	Total Vegetation(A+B+C)		**4.87**	**34.30**
Agriculture	**Agriculture Land**		**1.52**	**10.70**
Waste Land	**Waste Land**		**1.70**	**11.97**
Mining Area	Coal Quarry		1.85	13.03
	Area Under Backfilling		3.18	22.39
	Barren OB Dump		0.02	0.14
	Water Filled Quarry		0.18	1.27
	Coal Dump		0.22	1.55
	Advance Quarry Site		0.09	0.63
	Total Mining Area		**5.54**	**39.01**
Settlements	Rural Settlement		0.15	1.06
	Industrial Settlement		0.21	1.48
	Total Settlement Area		**0.36**	**2.54**
Water Body	**River, Ponds**		**0.21**	**1.48**
		Total	**14.20**	**100.00**

Customer	Mahanadi Coalfields Limited				
Title	Land Reclamation Monitoring of OC Projects				Job No. 564922120
Subject Land Reclamation Status of Ananta OCP based on Satellite Data (RS-2/L-IV) of the year 2023	Activity	Name	Designation	Signature	Date
	Prepared	A. Biswas	Sr. Mgr.(Geology)	ABiswas	
	Checked	R.Ranjan	GM (Excv.)		
	Approved	M.Rastogi	GM (Geomatics)		
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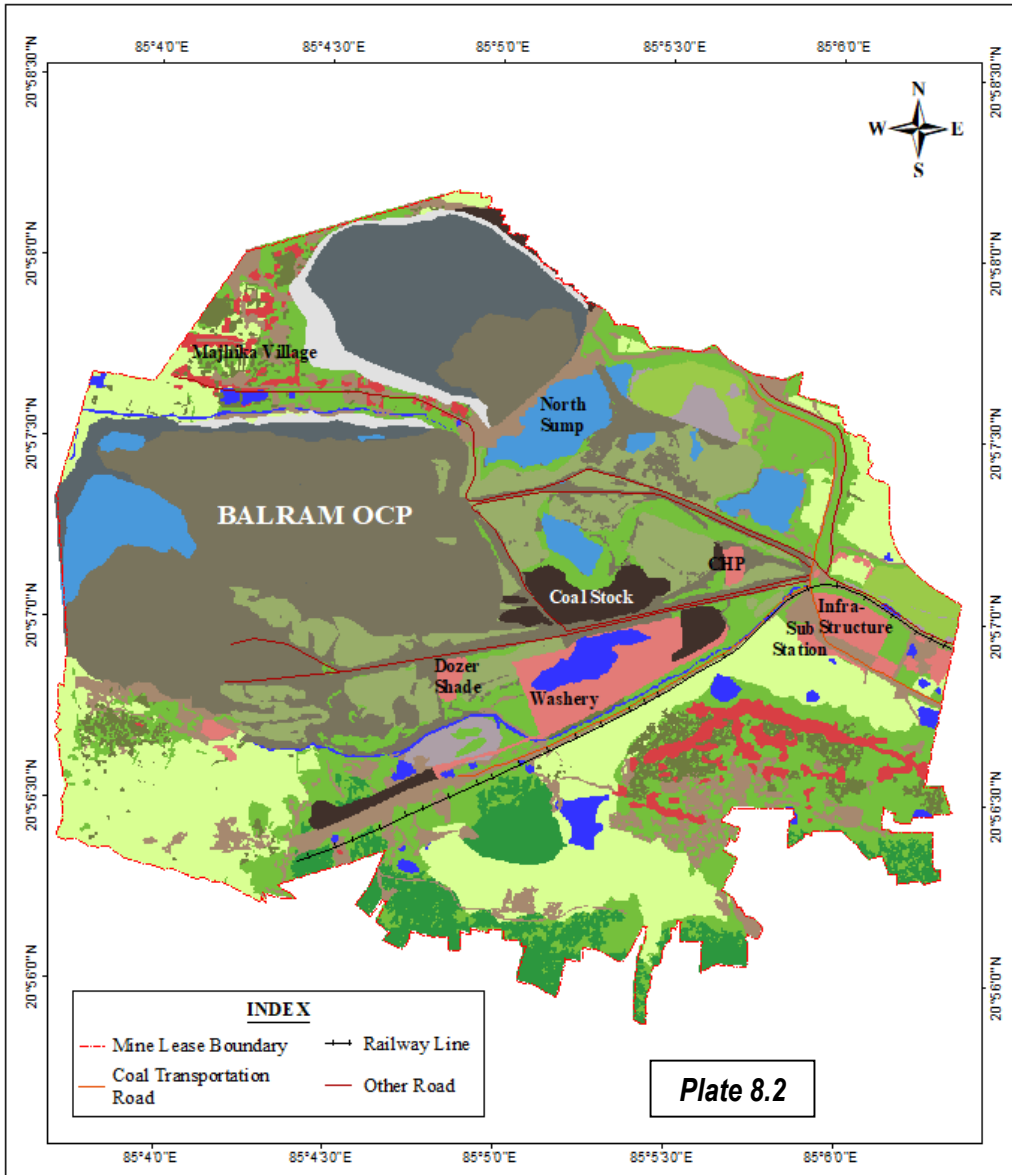

Area Statistics - Balram OCP (2023)				
Classes		Colour	Area	
Level-I	Level-II		Area (Km^2)	% of Total
	Open Forest (A)		**0.57**	**4.35**
Scrubs	**Scrubs (B)**		**2.00**	**15.28**
Plantation	Social Forestry		0.32	2.44
	Plantation on Backfill		0.94	7.18
	Plantation on OB Dump		0.22	1.68
	Total Plantation (C)		**1.48**	**11.31**
	Total Vegetation(A+B+C)		**4.05**	**30.94**
Agriculture	**Agriculture Land**		**1.95**	**14.90**
Waste Land	**Waste Land**		**0.97**	**7.41**
Mining Area	Coal Quarry		0.88	6.72
	Barren OB Dump		0.13	0.99
	Area Under Backfilling		3.05	23.30
	Water Filled Quarry		0.58	4.43
	Coal Dump		0.28	2.14
	Advance Quarry Site		0.22	1.68
	Total Mining Area		**5.14**	**39.27**
Settlements	Rural Settlement		0.30	2.29
	Urban Settlement		0.00	0.00
	Industrial Settlement		0.42	3.21
	Total Settlement Area		**0.72**	**5.50**
Water Body	**River, Ponds**		**0.26**	**1.99**
		Total	**13.09**	**100.00**

Customer	Mahanadi Coalfields Limited				
Title	Land Reclamation Monitoring of OC Projects				Job No. 564922120
Subject Land Reclamation Status of Balram OCP based on Satellite Data (IRS-R2/L-IV) of the year 2023	Activity	Name	Designation	Signature	Date
	Prepared	A. Biswas	Sr. Mgr.(Geology)	ABiswas	
	Checked	R.Ranjan	GM (Excv.)		
	Approved	M Rastogi	GM (Geomatics)		
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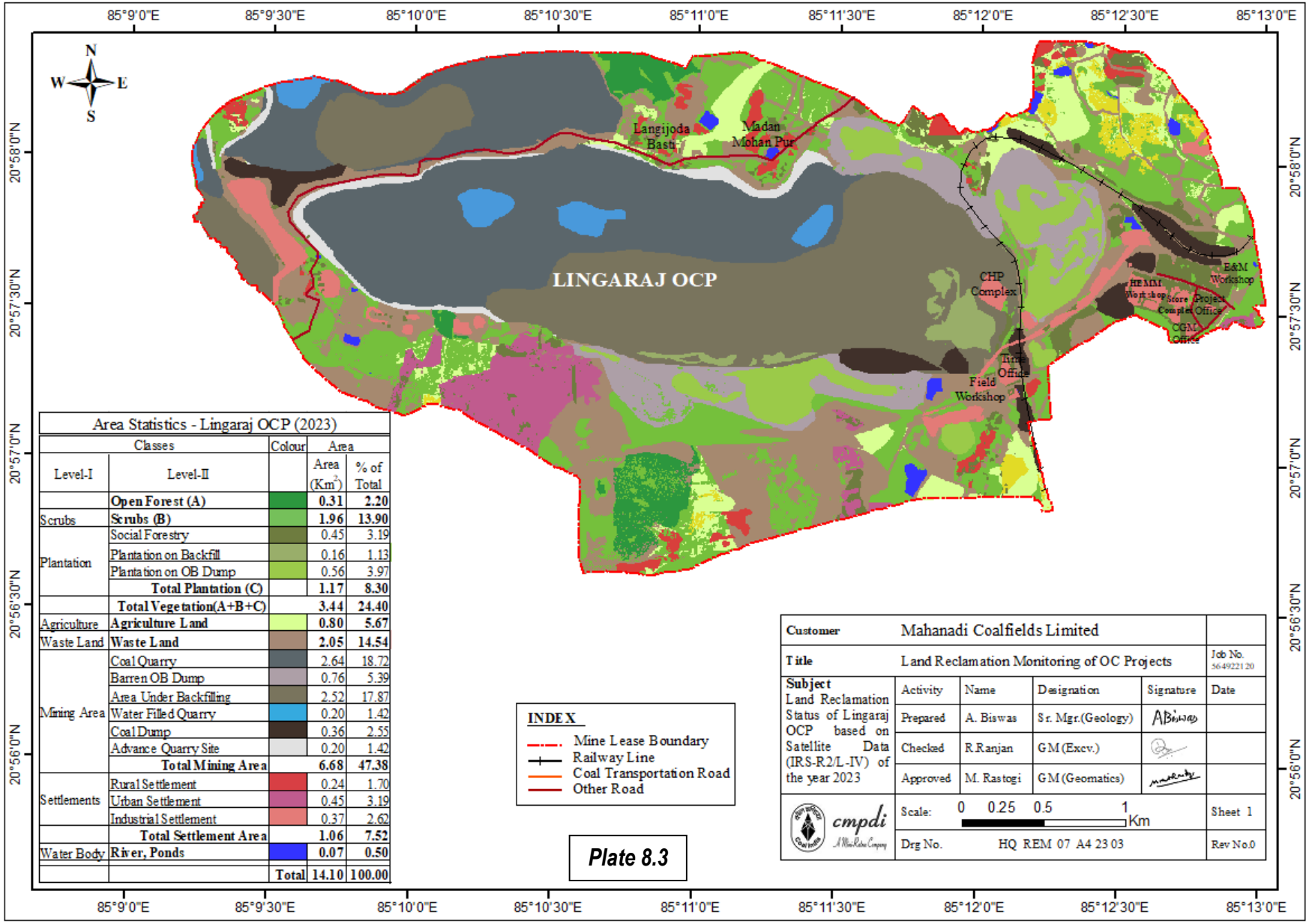


Area Statistics - Lingaraj OCP (2023)

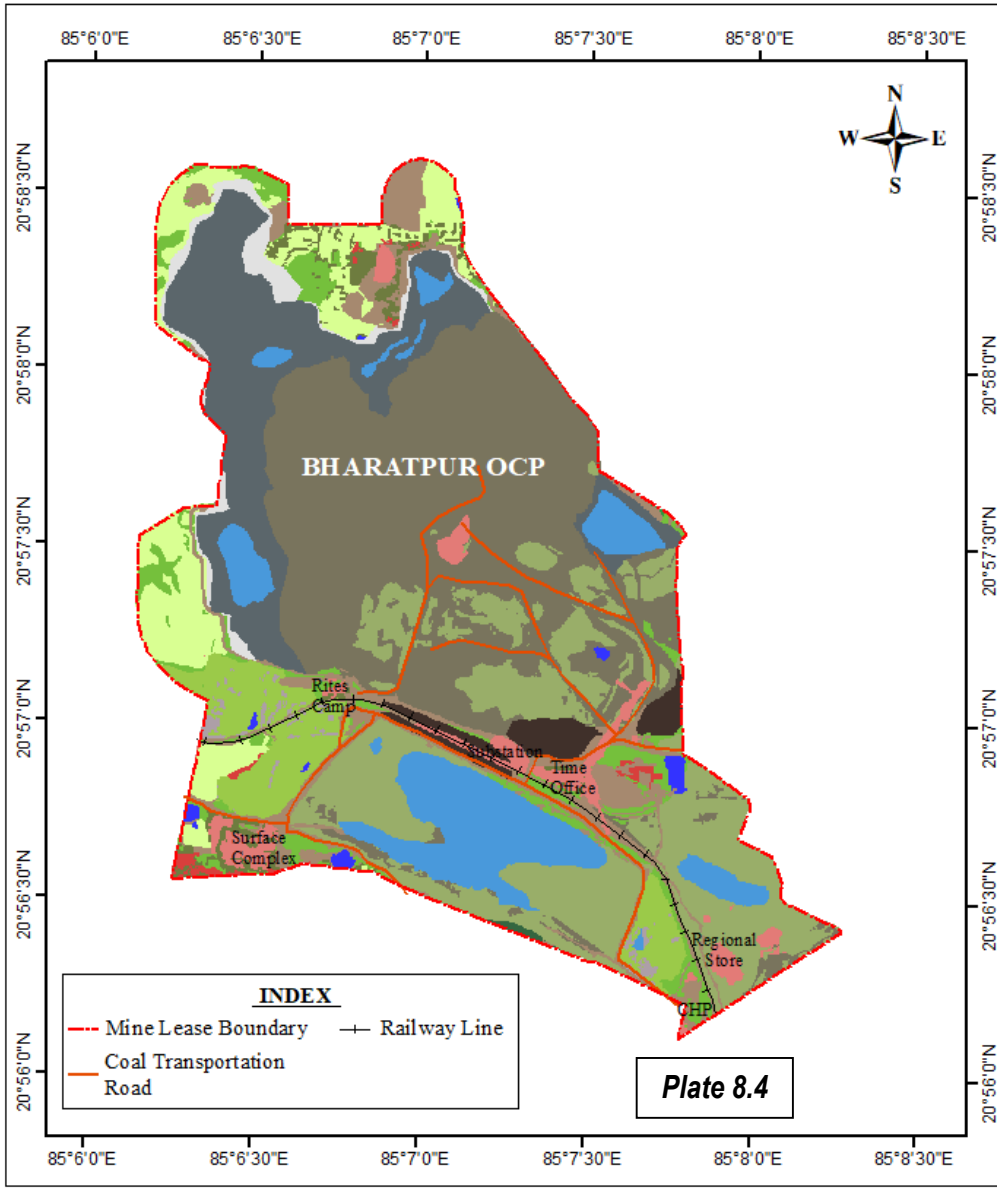
Classes		Colour	Area	
Level-I	Level-II		Area (Km^2)	% of Total
	Open Forest (A)		**0.31**	**2.20**
Scrubs	**Scrubs (B)**		**1.96**	**13.90**
Plantation	Social Forestry		0.45	3.19
	Plantation on Backfill		0.16	1.13
	Plantation on OB Dump		0.56	3.97
	Total Plantation (C)		**1.17**	**8.30**
	Total Vegetation(A+B+C)		**3.44**	**24.40**
Agriculture	**Agriculture Land**		**0.80**	**5.67**
Waste Land	**Waste Land**		**2.05**	**14.54**
Mining Area	Coal Quarry		2.64	18.72
	Barren OB Dump		0.76	5.39
	Area Under Backfilling		2.52	17.87
	Water Filled Quarry		0.20	1.42
	Coal Dump		0.36	2.55
	Advance Quarry Site		0.20	1.42
	Total Mining Area		**6.68**	**47.38**
Settlements	Rural Settlement		0.24	1.70
	Urban Settlement		0.45	3.19
	Industrial Settlement		0.37	2.62
	Total Settlement Area		**1.06**	**7.52**
Water Body	**River, Ponds**		**0.07**	**0.50**
		Total	**14.10**	**100.00**

INDEX

- Mine Lease Boundary
- Railway Line
- Coal Transportation Road
- Other Road

Customer	Mahanadi Coalfields Limited				
Title	Land Reclamation Monitoring of OC Projects				Job No. 564922120
Subject Land Reclamation Status of Lingaraj OCP based on Satellite Data (IRS-R2/L-IV) of the year 2023	Activity	Name	Designation	Signature	Date
	Prepared	A. Biswas	Sr. Mgr.(Geology)		
	Checked	R.Ranjan	GM (Excv.)		
	Approved	M. Rastogi	GM (Geomatics)		
cmpdi	Scale: 0 0.25 0.5 1 Km				Sheet 1
	Drg No. HQ REM 07 A4 23 03				Rev No.0

Plate 8.3



Area Statistics - Bharatpur OCP (2023)

Classes		Colour	Area	
Level-I	Level-II		Area (Km^2)	% of Total
Forest Area	**Dense Forest(A)**		**0.01**	**0.11**
Scrubs	**Scrubs (B)**		**0.39**	**4.21**
Plantation	Social Forestry		0.15	1.62
	Plantation on Backfill		1.63	17.58
	Plantation on OB Dump		0.45	4.85
	Total Plantation (C)		**2.23**	**24.06**
	Total Vegetation(A+B+C)		**2.63**	**28.37**
Agriculture	**Agriculture Land**		**0.60**	**6.47**
Waste Land	**Waste Land**		**0.64**	**6.90**
Mining Area	Coal Quarry		1.09	11.76
	Barren OB Dump		0.05	0.54
	Area Under Backfilling		2.83	30.53
	Water Filled Quarry		0.76	8.20
	Coal Dump		0.18	1.94
	Advance Quarry Site		0.16	1.73
	Total Mining Area		**5.07**	**54.69**
Settlements	Rural Settlement		0.04	0.43
	Industrial Settlement		0.25	2.70
	Total Settlement Area		**0.29**	**3.13**
Water Body	**River, Ponds**		**0.04**	**0.43**
		Total	**9.27**	**100.00**

Customer	Mahanadi Coalfields Limited				
Title	Land Reclamation Monitoring of OC Projects				Job No. 564922120
Subject Land Reclamation Status of Bharatpur OCP based on Satellite Data (IRS-R2/L-IV) of the year 2023	Activity	Name	Designation	Signature	Date
	Prepared	A. Biswas	Sr. Mgr.(Geology)	ABiswas	
	Checked	T. Mondal	CM(RSC)	Tondal	
	Approved	M Rastogi	GM(Geomatics)		
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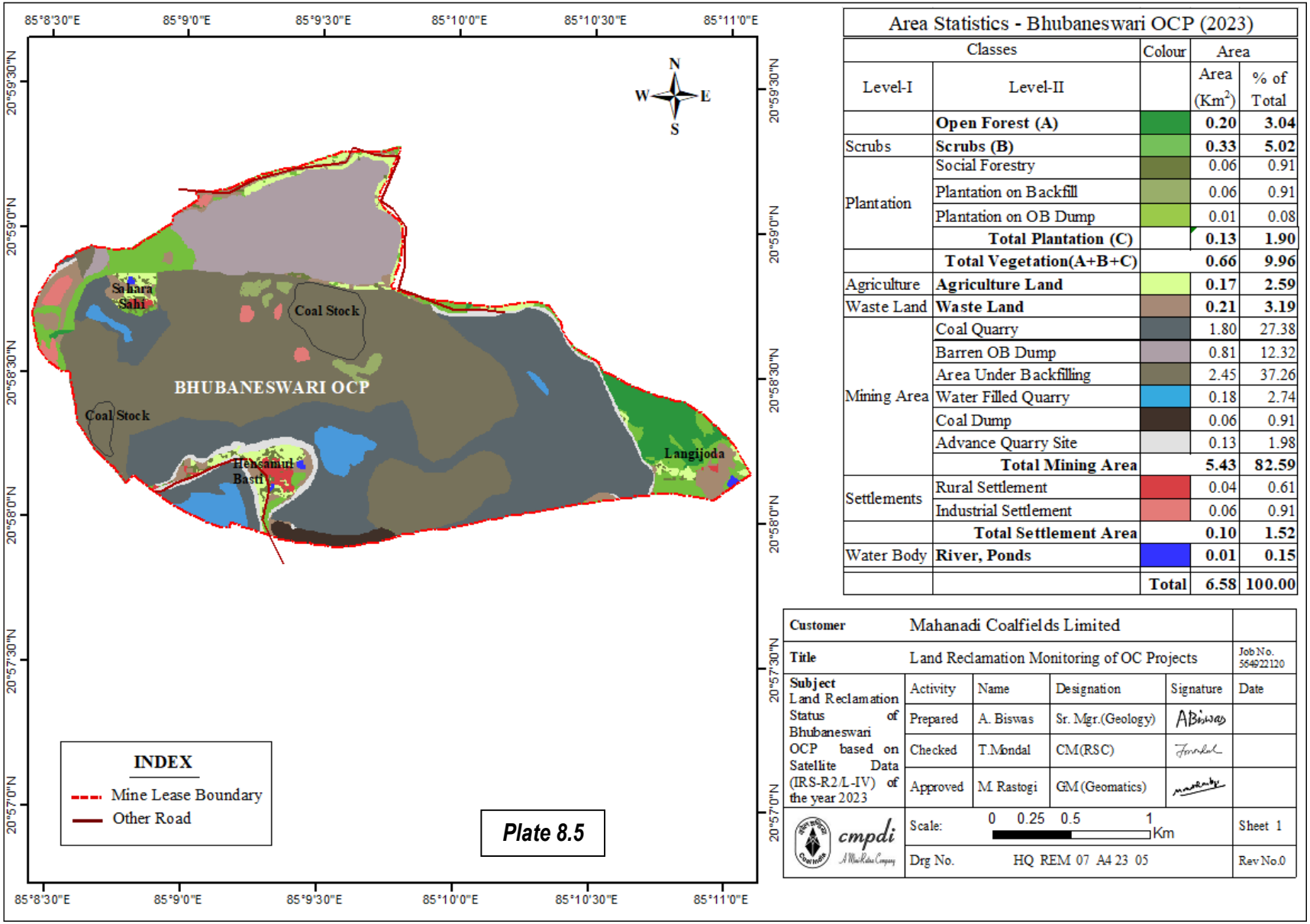

Area Statistics - Bhubaneswari OCP (2023)

Classes		Colour	Area	
Level-I	Level-II		Area (Km^2)	% of Total
	Open Forest (A)		**0.20**	**3.04**
Scrubs	**Scrubs (B)**		**0.33**	**5.02**
Plantation	Social Forestry		0.06	0.91
	Plantation on Backfill		0.06	0.91
	Plantation on OB Dump		0.01	0.08
	Total Plantation (C)		**0.13**	**1.90**
	Total Vegetation(A+B+C)		**0.66**	**9.96**
Agriculture	**Agriculture Land**		**0.17**	**2.59**
Waste Land	**Waste Land**		**0.21**	**3.19**
Mining Area	Coal Quarry		1.80	27.38
	Barren OB Dump		0.81	12.32
	Area Under Backfilling		2.45	37.26
	Water Filled Quarry		0.18	2.74
	Coal Dump		0.06	0.91
	Advance Quarry Site		0.13	1.98
	Total Mining Area		**5.43**	**82.59**
Settlements	Rural Settlement		0.04	0.61
	Industrial Settlement		0.06	0.91
	Total Settlement Area		**0.10**	**1.52**
Water Body	**River, Ponds**		**0.01**	**0.15**
		Total	**6.58**	**100.00**

Customer	Mahanadi Coalfields Limited				
Title	Land Reclamation Monitoring of OC Projects				Job No. 564922120
Subject Land Reclamation Status of Bhubaneswari OCP based on Satellite Data (IRS-R2/L-IV) of the year 2023	Activity	Name	Designation	Signature	Date
	Prepared	A. Biswas	Sr. Mgr.(Geology)	ABiswas	
	Checked	T.Mondal	CM(RSC)		
	Approved	M. Rastogi	GM (Geomatics)		
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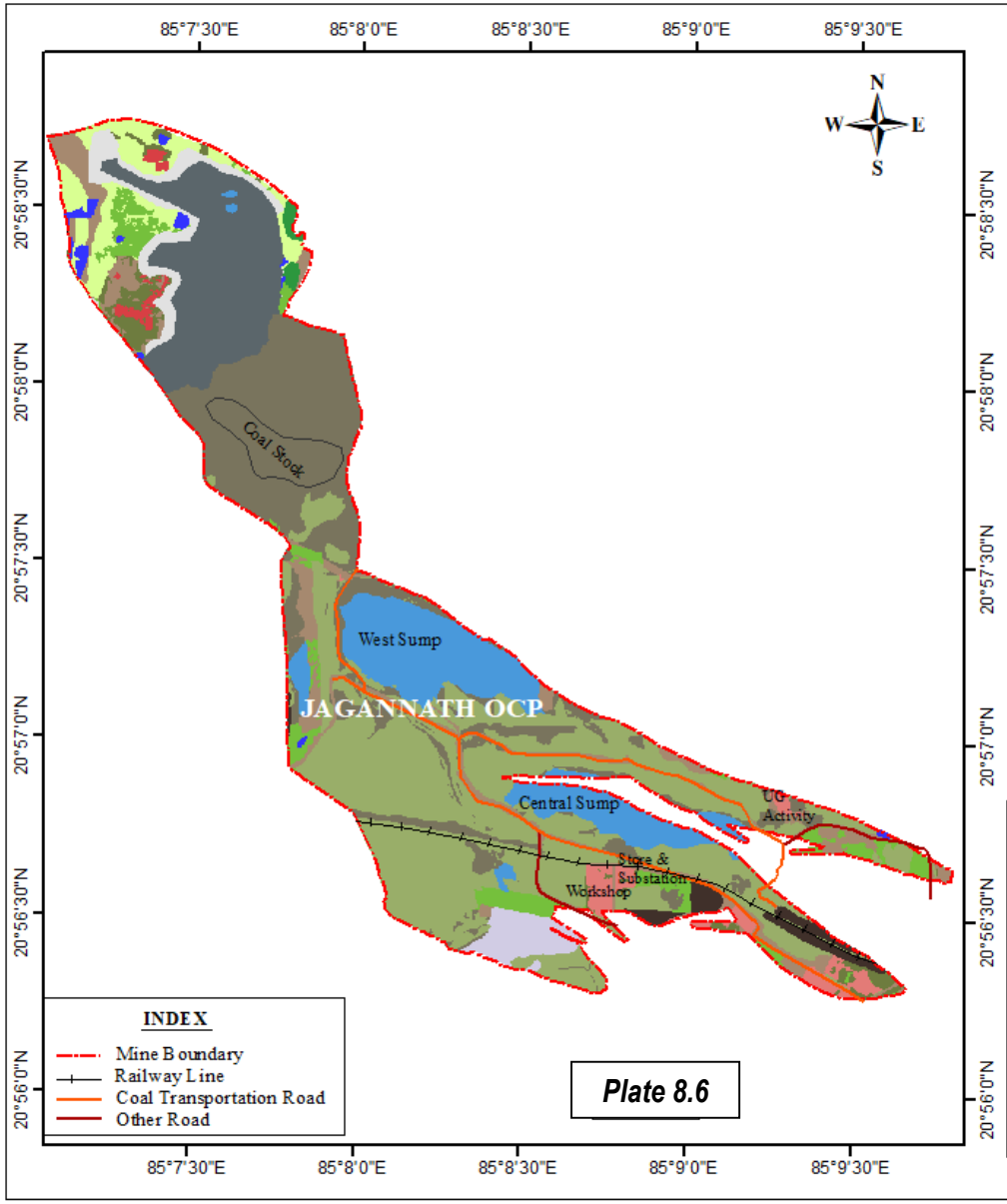

Area Statistics - Jagannath OCP (2023)

Classes		Colour	Area	
Level-I	Level-II		Area (Km^2)	% of Total
	Open Forest (A)		**0.02**	**0.36**
Scrubs	**Scrubs (B)**		**0.24**	**4.33**
Plantation	Social Forestry		0.11	1.99
	Plantation on Backfill		1.78	32.13
	Total Plantation (C)		**1.89**	**34.12**
	Total Vegetation(A+B+C)		**2.15**	**38.81**
Agriculture	**Agriculture Land**		**0.23**	**4.15**
Waste Land	Waste Land		0.36	6.50
	Ash Pond		0.11	1.99
	Total Waste Land		**0.47**	**8.48**
Mining Area	Coal Quarry		0.58	10.47
	Area Under Backfilling		1.11	20.04
	Water Filled Quarry		0.59	10.65
	Coal Dump		0.09	1.62
	Advance Quarry Site		0.14	2.53
	Total Mining Area		**2.51**	**45.31**
	Rural		0.03	0.54
Settlement	Industrial		0.11	1.99
	Total Settlement Area		**0.14**	**2.53**
Water Body	**River, Ponds**		**0.04**	**0.72**
		Total	**5.54**	**100.00**

Customer	Mahanadi Coalfields Limited				
Title	Land Reclamation Monitoring of OC Projects				Job No. 564922120
Subject Land Reclamation Status of Jagannath OCP based on Satellite Data (IRS-R2/L-IV) of the year 2023	Activity	Name	Designation	Signature	Date
	Prepared	A. Biswas	Sr. Mgr.(Geology)	ABiswas	
	Checked	T. Mondal	CM(RSC)		
	Approved	M. Rastogi	GM(Geomatics)		
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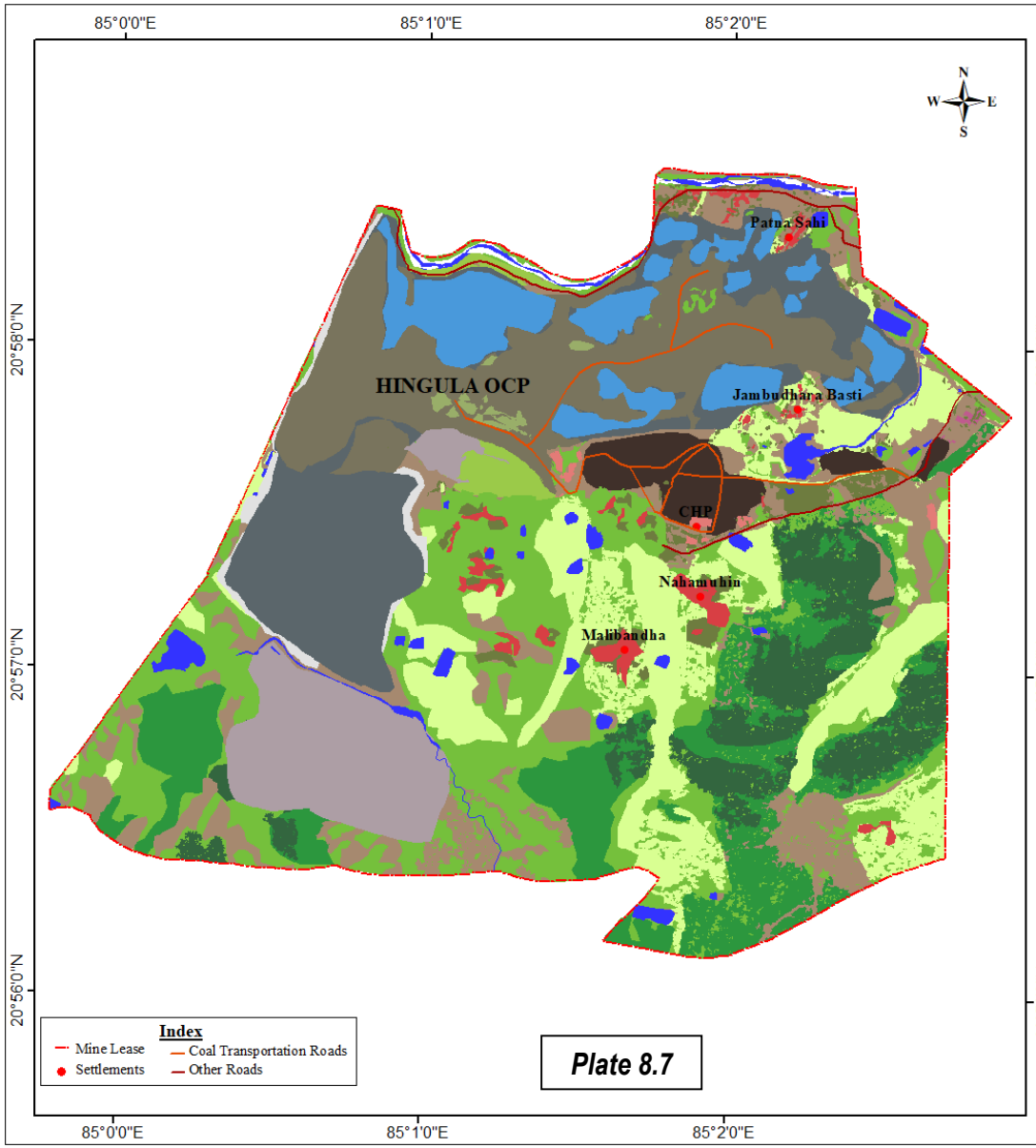

Area Statistics - Hingula OCP (2023)				
Classes		Colour	Area	
Level-I	Level-II		Area (Km^2)	% of Total
Forest	Dense Forest		1.00	6.35
	Open Forest		1.51	9.59
	Total Forest(A)		**2.51**	**15.94**
Scrubs	**Scrubs (B)**		**2.72**	**17.27**
Plantation	Social Forestry		0.29	1.84
	Plantation on Backfill		0.05	0.32
	Plantation on OB Dump		0.17	1.08
	Total Plantation (C)		**0.51**	**3.24**
	Total Vegetation(A+B+C)		**5.74**	**36.44**
Agriculture	**Agriculture Land**		2.07	13.14
Waste Land	Waste Land		1.62	10.29
	Sand Body		0.06	0.38
	Total Waste Land		**1.68**	**10.67**
Mining Area	Coal Quarry		1.52	9.65
	Barren OB Dump		0.97	6.16
	Area Under Backfilling		1.85	11.75
	Water Filled Quarry		0.85	5.40
	Coal Dump		0.40	2.54
	Advance Quarry Site		0.13	0.83
	Total Mining Area		**5.72**	**36.32**
Settlements	Rural Settlement		0.19	1.21
	Urban Settlement		0.01	0.06
	Industrial Settlement		0.03	0.19
	Total Settlement Area		**0.23**	**1.46**
Water Body	**River, Ponds**		**0.31**	**1.97**
		Total	**15.75**	**100.00**

Customer	Mahanadi Coalfields Limited				
Title	Land Reclamation Monitoring of OC Projects				Job No. 564922120
Subject Land Reclamation Status of Hingula OCP based on Satellite Data (IRS-R2/L-IV) of the year 2023	Activity	Name	Designation	Signature	Date
	Prepared	A. Biswas	Sr. Mgr.(Geology)	ABiswas	
	Checked	T. Mondal	CM (RSC)		
	Approved	M. Rastogi	GM (Geomatics)		
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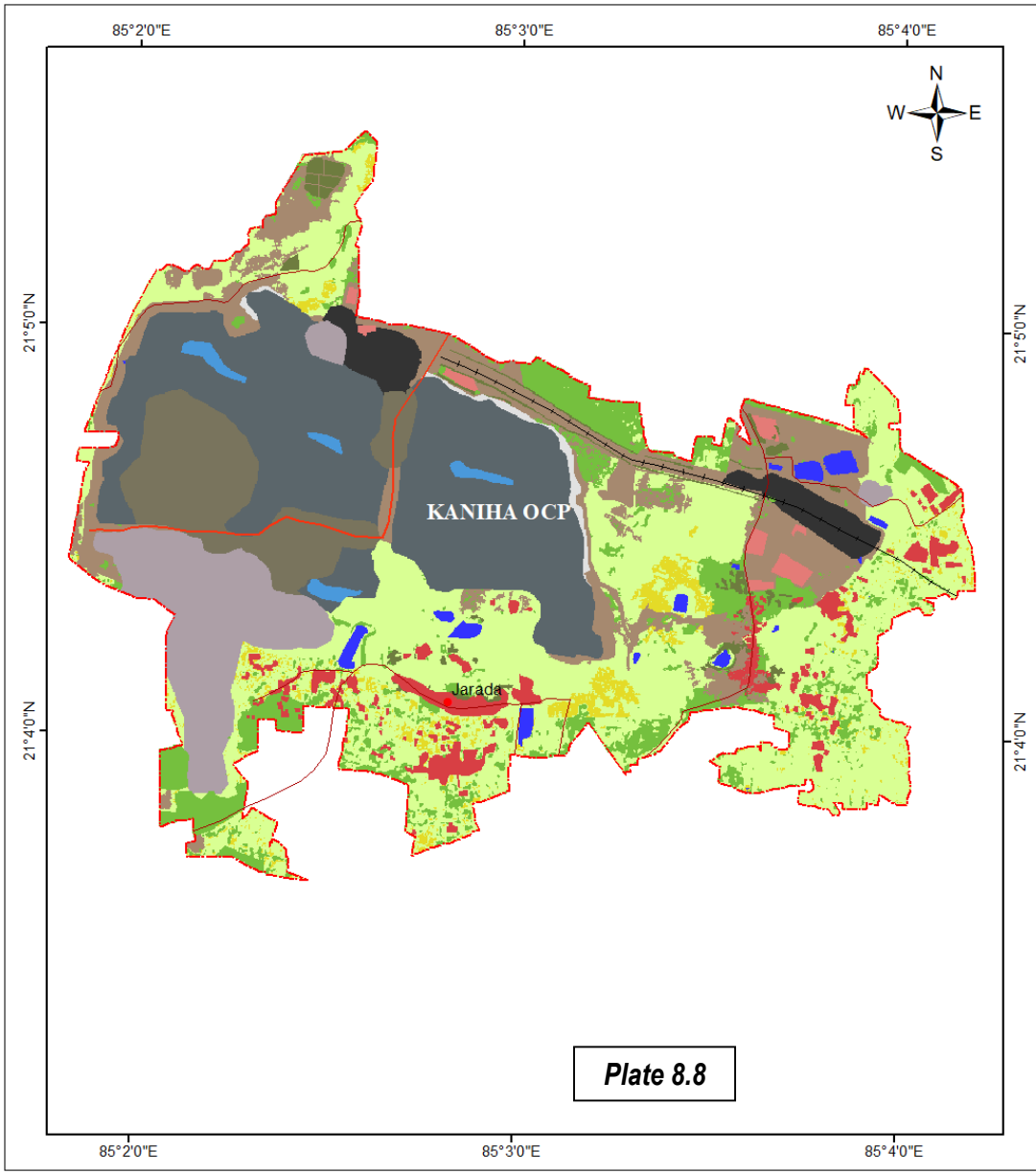

Area Statistics - Kaniha OC (2023)				
Classes		Colour	Core Zone	
Level-I	Level-II		Area (sqkm)	% of Total
Forests	Dense Forest		0.00	0.00
	Open Forest		0.00	0.00
	Total Forest (A)		**0.00**	**0.00**
	Scrubs (B)		**0.65**	**10.17**
Plantation Area	Social Forestry		0.09	0.97
	Plantation on OB		0.00	0.00
	Plantation on Backfill		0.00	0.00
	Total Plantation (C)		**0.09**	**0.97**
	Total Vegetation (A+B+C)		**0.74**	**11.14**
Agriculture Land	Crop land		0.18	2.79
	Fallow Land		2.19	37.74
	Total Agriculture Land		**2.37**	**40.53**
Waste Land	Waste Land		0.90	13.93
	Fly Ash Pond		0.00	0.00
	Total Waste Land		**0.90**	**13.93**
Mining Area	Advance Quarry Area		0.03	0.14
	Coal Quarry		1.49	16.29
	Barren OB Dump		0.55	5.85
	Back Fill		0.49	4.32
	Coal Dump		0.18	1.67
	Water Filled Qry		0.05	0.84
	Total Mining Area		**2.79**	**29.11**
Settlements	Urban Settlements		0.00	0.00
	Rural Settlements		0.25	3.48
	Industrial Settlements		0.05	0.84
	Total Settlement Area		**0.30**	**4.32**
Water Body	**River/ Ponds**		**0.07**	**0.97**
	Total Area		**7.18**	**100.00**

Index

Mine Lease — Coal Transportation Roads

Settlements — Other Roads

Customer	Mahanadi Coalfields Limited				
Title	Land Reclamation Monitoring of OC Projects				Job No. 564922120
Subject Land Reclamation Status of Kaniha OCP based on Satellite Data (IRS-R2/L-IV) of the year 2023	Activity	Name	Designation	Signature	Date
	Prepared	A. Biswas	Sr. Mgr.(Geology)	ABiswas	
	Checked	R.Ranjan	GM (Excv.)		
	Approved	M. Rastogi	GM (Geomatics)		
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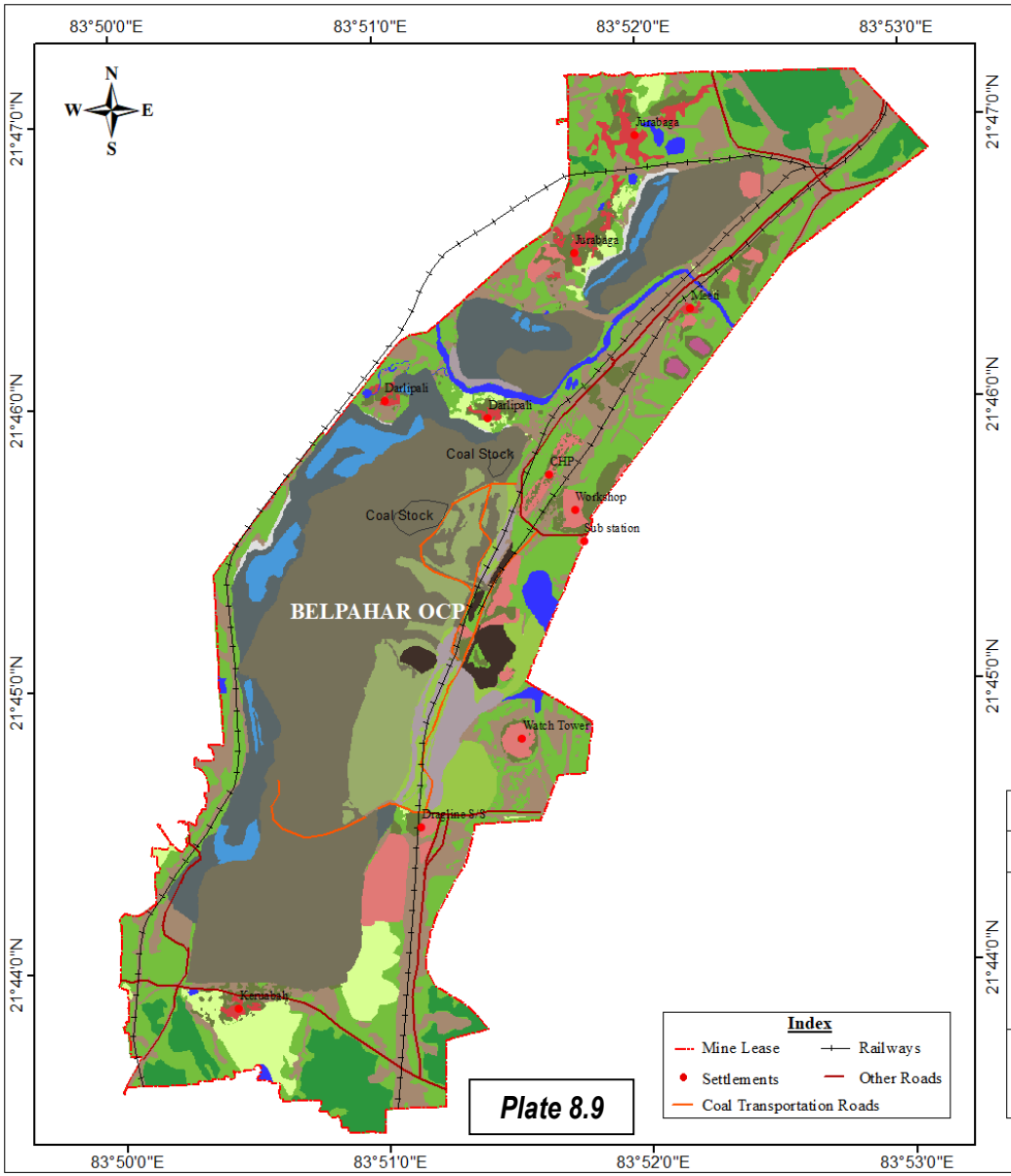

Area Statistics - Belpahar OCP (2023)				
Classes		Colour	Area	
Level-I	Level-II		Area (Km^2)	% of Total
Forest	**Open Forest(A)**		**0.85**	**5.89**
Scrubs	**Scrubs (B)**		**2.84**	**19.67**
Plantation	Social Forestry		0.50	3.46
	Plantation on Backfill		0.61	4.22
	Plantation on OB Dump		0.35	2.42
	Total Plantation (C)		**1.46**	**10.11**
	Total Vegetation(A+B+C)		**5.15**	**35.66**
Agriculture	**Agriculture Land**		**0.52**	**3.60**
Waste Land	**Waste Land**		**2.33**	**16.14**
Mining Area	Coal Quarry		1.04	7.20
	Barren OB Dump		0.30	2.08
	Area Under Backfilling		3.80	26.32
	Water Filled Quarry		0.31	2.15
	Coal Dump		0.13	0.90
	Advance Quarry Site		0.05	0.35
	Total Mining Area		**5.63**	**38.99**
Settlements	Rural Settlement		0.17	1.18
	Urban Settlement		0.02	0.14
	Industrial Settlement		0.40	2.77
	Total Settlement Area		**0.59**	**4.09**
Water Body	**River, Ponds**		**0.22**	**1.52**
		Total	**14.44**	**100.00**

Customer	Mahanadi Coalfields Limited				
Title	Land Reclamation Monitoring of OC Projects				Job No. 564922120
Subject Land Reclamation Status of Belpahar OCP based on Satellite Data (IRS-R2A/L-IV) of the year 2023	Activity	Name	Designation	Signature	Date
	Prepared	A. Biswas	Sr. Mgr.(Geology)	ABiswas	
	Checked	T. Mondal	CM (RSC)		
	Approved	M. Rastogi	GM(Geomatics)		
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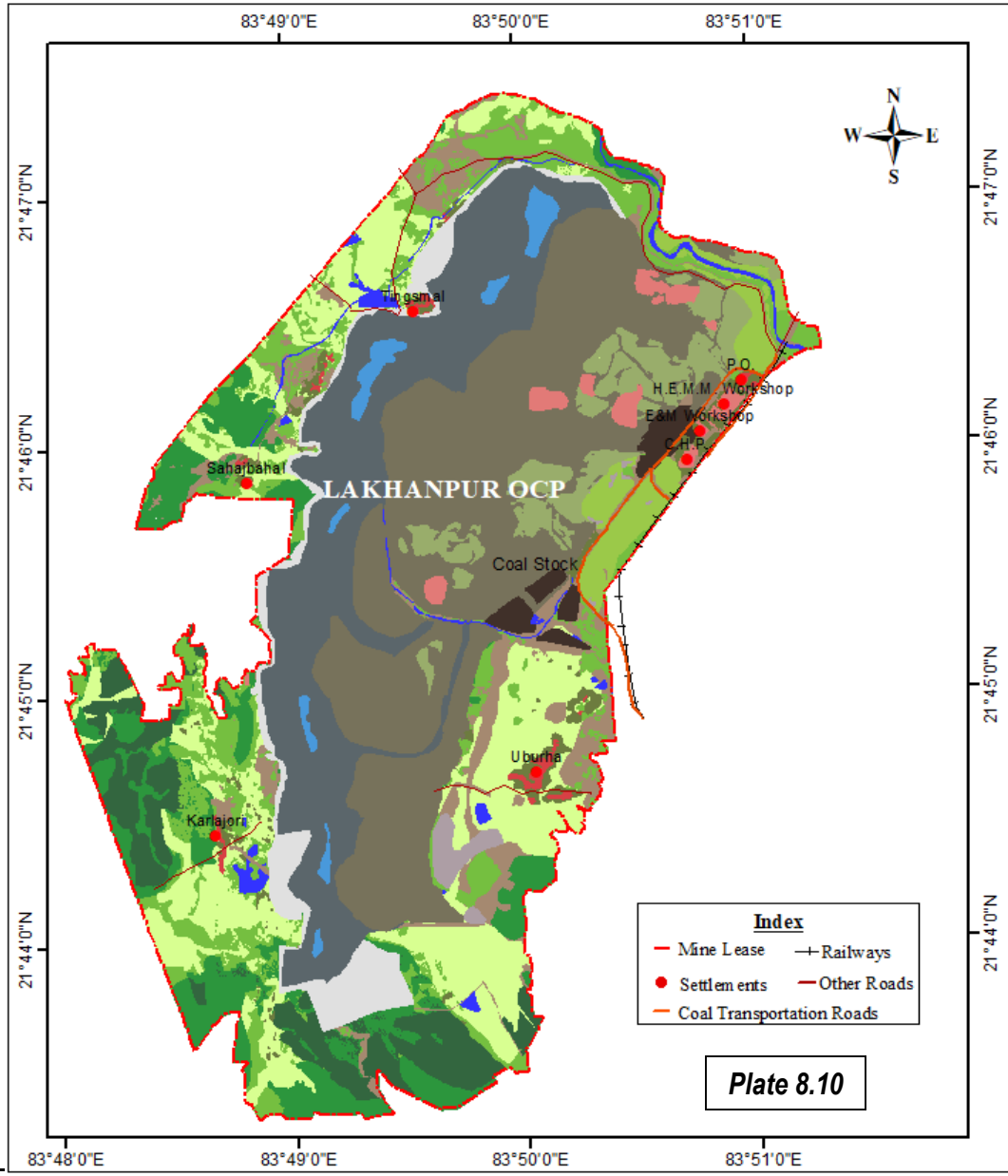
	Drg No. HQ REM 07 A4 23 09				Rev No.0



Area Statistics - Lakhanpur OCP (2023)

Classes		Colour	Area	
Level-I	Level-II		Area (Km^2)	% of Total
Forest Area	Dense Forest		1.19	5.31
	Open Forest		1.90	8.48
	Total Forest Area (A)		**3.09**	**13.79**
Scrubs	**Scrubs (B)**		**2.28**	**10.18**
Plantation	Social Forestry		0.35	1.56
	Plantation on Backfill		0.99	4.42
	Plantation on OB Dump		0.59	2.63
	Total Plantation (C)		**1.93**	**8.62**
	Total Vegetation(A+B+C)		**7.30**	**32.59**
Agriculture	**Agriculture Land**		**3.08**	**13.75**
Waste Land	**Waste Land**		**1.20**	**5.36**
Mining Area	Coal Quarry		3.39	15.13
	Barren OB Dump		0.16	0.71
	Area Under Backfilling		5.26	23.48
	Water Filled Quarry		0.25	1.12
	Coal Dump		0.30	1.34
	Advance Quarry Site		0.84	3.75
	Total Mining Area		**10.20**	**45.54**
Settlements	Rural Settlement		0.10	0.45
	Industrial Settlement		0.27	1.21
	Total Settlement Area		**0.37**	**1.65**
Water Body	**River, Ponds**		**0.25**	**1.12**
		Total	**22.40**	**100.00**

Customer	Mahanadi Coalfields Limited				
Title	Land Reclamation Monitoring of OC Projects				Job No. 564922120
Subject Land Reclamation Status of Lakhanpur OCP based on Satellite Data (IRS-R2A/L-IV) of the year 2023	Activity	Name	Designation	Signature	Date
	Prepared	A. Biswas	Sr.Mgr.(Geology)	ABiswas	
	Checked	R. Ranjan	GM(Excv.)		
	Approved	M Rastogi	GM(Geomatics)		
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	Drg No. HQ REM 07 A4 23 10				Rev No.0

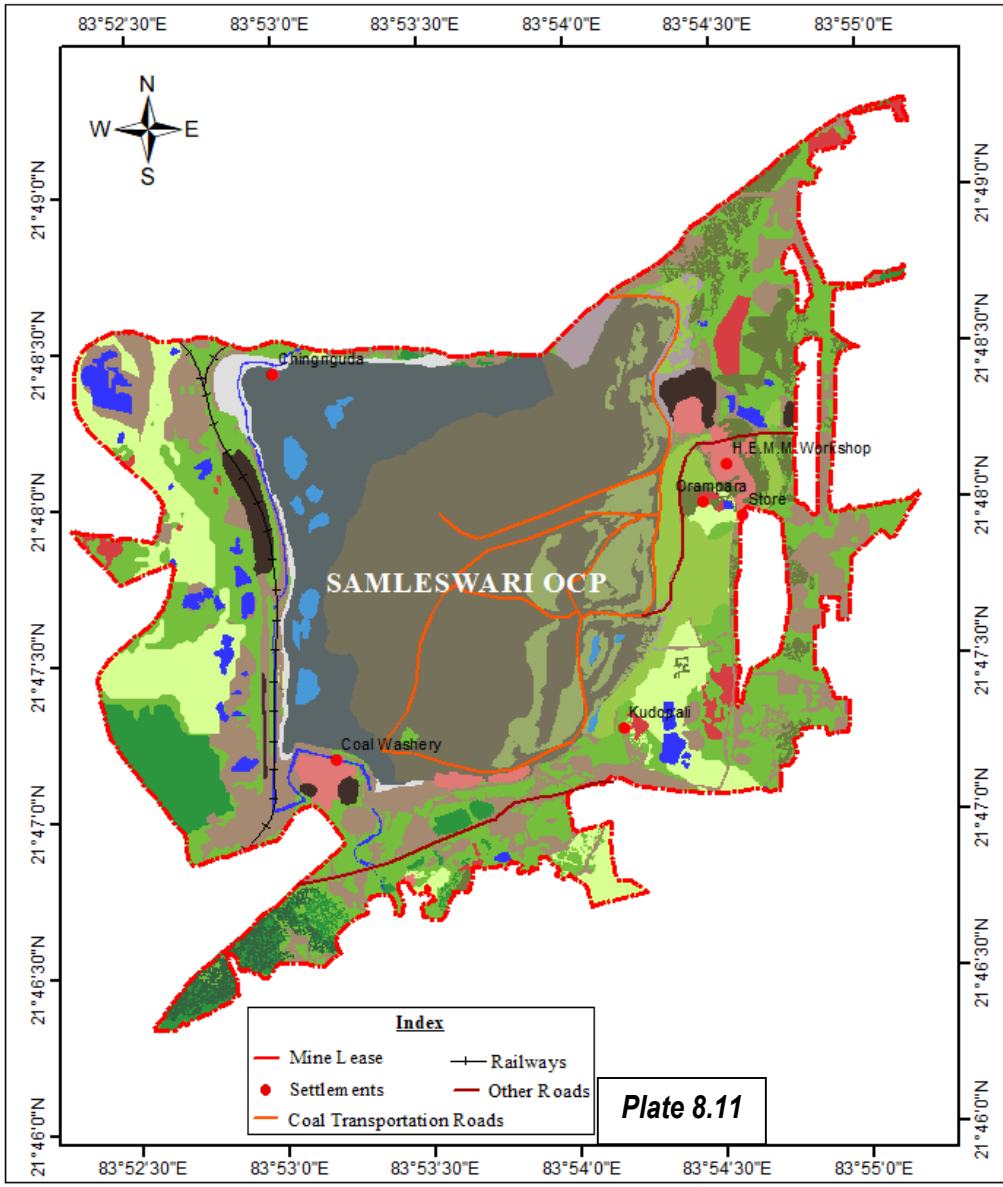

Plate 8.11

Area Statistics - Samleswari OCP (2023)

Classes		Colour	Area	
Level-I	Level-II		Area (Km^2)	% of Total
Forest Area	Dense Forest		0.16	1.20
	Open Forest		0.51	3.82
	Total Forest Area (A)		**0.67**	**5.02**
Scrubs	**Scrubs (B)**		**2.36**	**17.67**
Plantation	Social Forestry		0.47	3.52
	Plantation on Backfill		0.61	4.57
	Plantation on OB Dump		0.49	3.67
	Total Plantation (C)		**1.57**	**11.76**
	Total Vegetation(A+B+C)		**4.60**	**34.45**
Agriculture	**Agriculture Land**		**1.07**	**8.01**
Waste Land	**Waste Land**		**1.79**	**13.41**
Mining Area	Coal Quarry		1.36	10.19
	Barren OB Dump		0.14	1.05
	Area Under Backfilling		3.22	24.11
	Water Filled Quarry		0.13	0.97
	Coal Dump		0.21	1.57
	Advance Quarry Site		0.15	1.12
	Total Mining Area		**5.21**	**39.02**
Settlements	Urban Settlement		0.003	0.02
	Rural Settlement		0.19	1.42
	Industrial Settlement		0.22	1.65
	Total Settlement Area		**0.41**	**3.09**
Water Body	**River, Ponds**		**0.27**	**2.02**
		Total	**13.35**	**100.00**

Customer	Mahanadi Coalfields Limited				
Title	Land Reclamation Monitoring of OC Projects				Job No. 564922120
Subject: Land Reclamation Status of Samleswari OCP based on Satellite Data (IRS-R2A/L-IV) of the year 2023.	Activity	Name	Designation	Signature	Date
	Prepared	A. Biswas	SM (Geology)	ABiswas	
	Checked	R. Ranjan	GM(Excv.)		
cmpdi	Approved	M. Rastogi	GM(Geomatics)		
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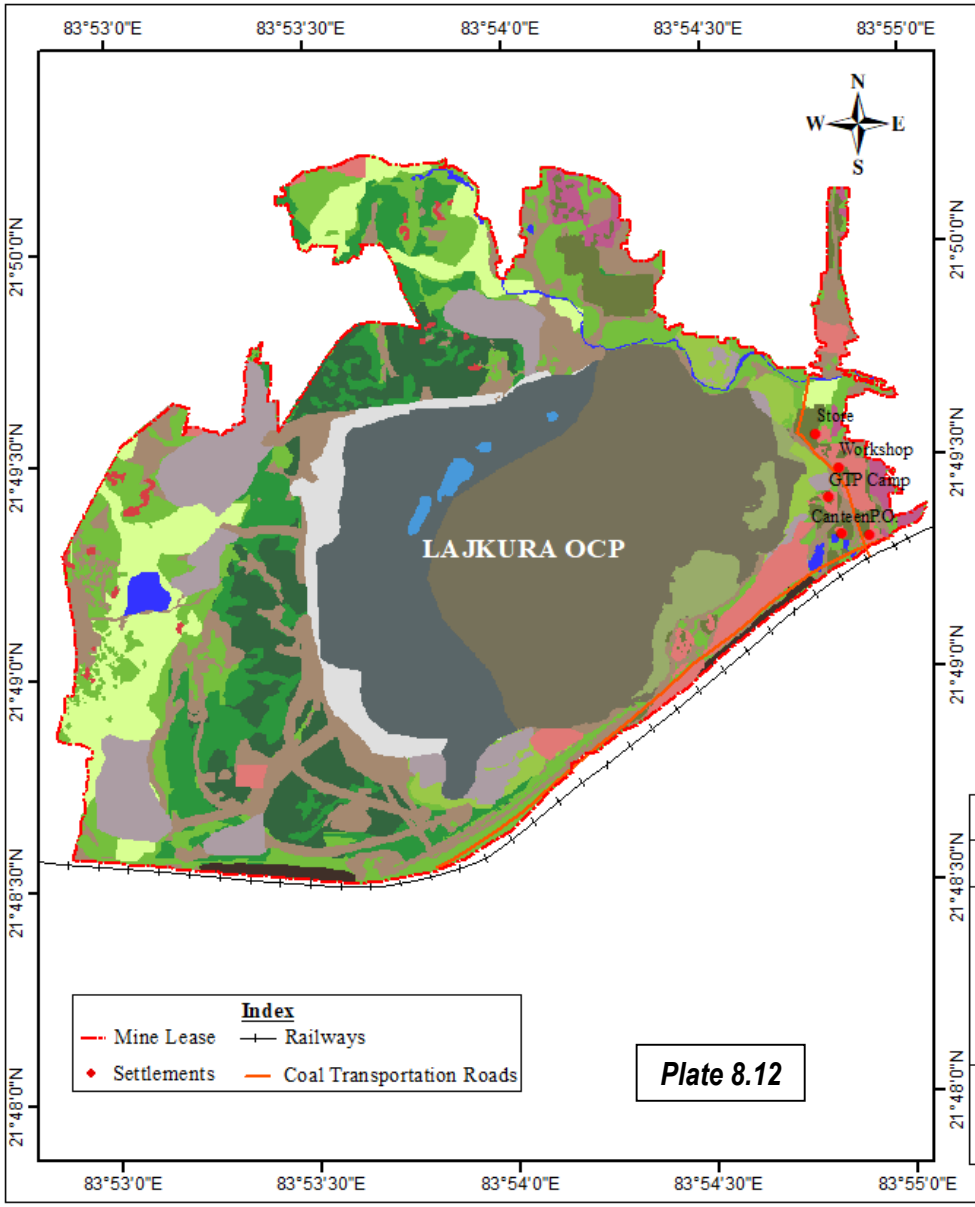

Plate 8.12

Area Statistics - Lajkura OCP (2023)

Classes		Colour	Area	
Level-I	Level-II		Area (Km^2)	% of Total
Forest Area	Dense Forest		0.48	6.66
	Open Forest		0.51	7.07
	Total Forest Area (A)		**0.99**	**13.73**
Scrubs	**Scrubs (B)**		**0.82**	**11.37**
Plantation	Social Forestry		0.16	2.22
	Plantation on Backfill		0.13	1.80
	Plantation on OB Dump		0.12	1.66
	Total Plantation (C)		**0.41**	**5.69**
	Total Vegetation(A+B+C)		**2.22**	**30.79**
Agriculture	**Agriculture Land**		**0.47**	**6.52**
Waste Land	**Waste Land**		**0.92**	**12.76**
Mining Area	Coal Quarry		0.91	12.62
	Barren OB Dump		0.51	7.07
	Area Under Backfilling		1.52	21.08
	Water Filled Quarry		0.03	0.42
	Coal Dump		0.05	0.69
	Advance Quarry Site		0.20	2.77
	Total Mining Area		**3.22**	**44.66**
Settlement	Urban Settlement		0.08	1.11
	Rural Settlement		0.03	0.42
	Industrial		0.21	2.91
	Total Settlement Area		**0.32**	**4.44**
Water Body	**River, Ponds**		**0.06**	**0.83**
		Total	**7.21**	**100.00**

Customer	Mahanadi Coalfields Limited				
Title	Land Reclamation Monitoring of OC Projects				Job No. 564922120
Subject Land Reclamation Status of Lajkura OCP based on Satellite Data (IRS-R2A/L-IV) of the year 2023	Activity	Name	Designation	Signature	Date
	Prepared	A. Biswas	Sr.Mgr.(Geology)	ABiswas	
	Checked	T. Mondal	CM(RSC)		
	Approved	M. Rastogi	GM (Geomatics)		
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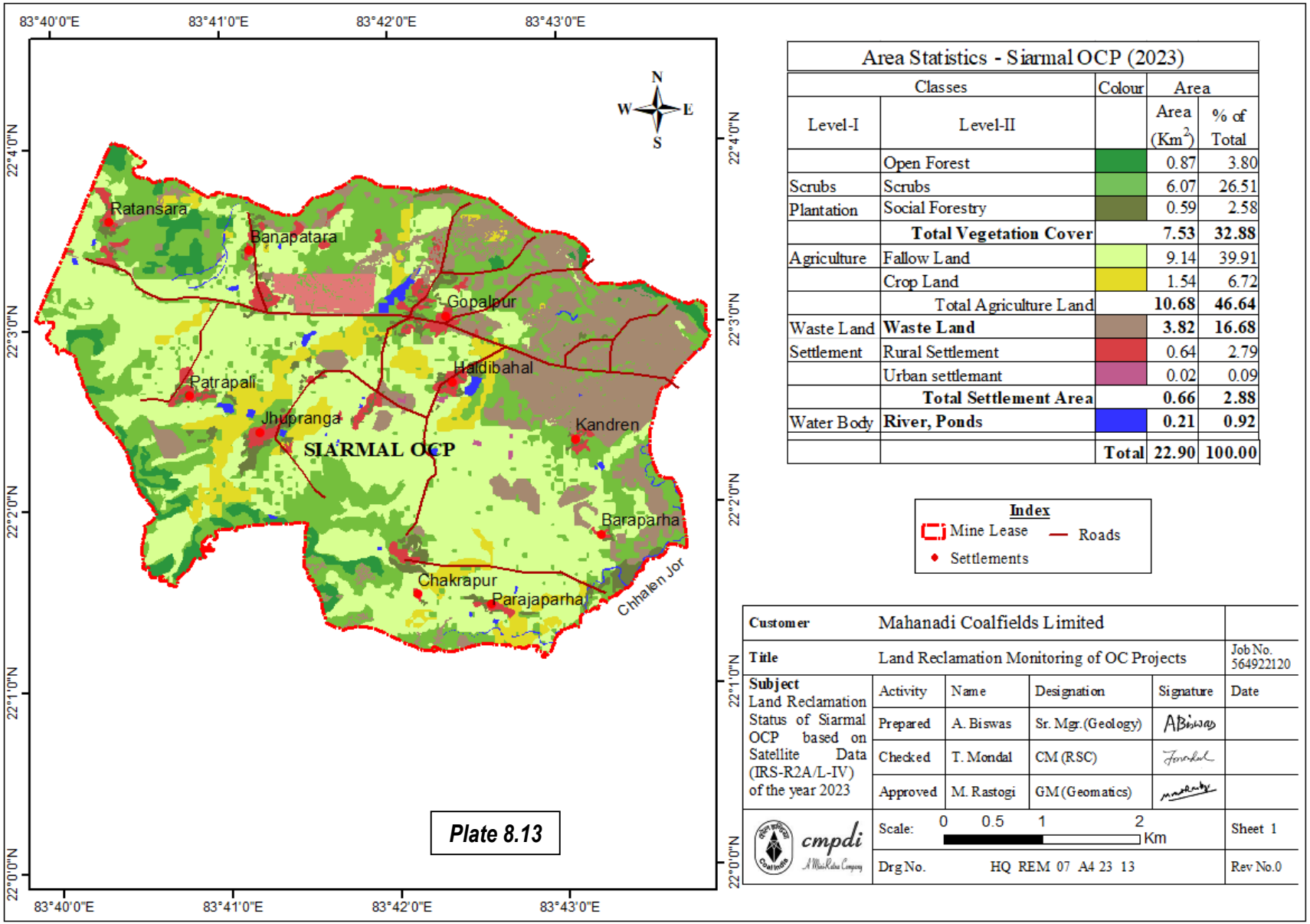

Plate 8.13

Area Statistics - Siarmal OCP (2023)

Classes		Colour	Area	
Level-I	Level-II		Area (Km^2)	% of Total
	Open Forest		0.87	3.80
Scrubs	Scrubs		6.07	26.51
Plantation	Social Forestry		0.59	2.58
	Total Vegetation Cover		**7.53**	**32.88**
Agriculture	Fallow Land		9.14	39.91
	Crop Land		1.54	6.72
	Total Agriculture Land		**10.68**	**46.64**
Waste Land	**Waste Land**		**3.82**	**16.68**
Settlement	Rural Settlement		0.64	2.79
	Urban settlemant		0.02	0.09
	Total Settlement Area		**0.66**	**2.88**
Water Body	**River, Ponds**		**0.21**	**0.92**
		Total	**22.90**	**100.00**

Index

Mine Lease — Roads

Settlements

Customer	Mahanadi Coalfields Limited				
Title	Land Reclamation Monitoring of OC Projects				Job No. 564922120
Subject Land Reclamation Status of Siarmal OCP based on Satellite Data (IRS-R2A/L-IV) of the year 2023	Activity	Name	Designation	Signature	Date
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	Checked	T. Mondal	CM (RSC)		
	Approved	M. Rastogi	GM (Geomatics)		
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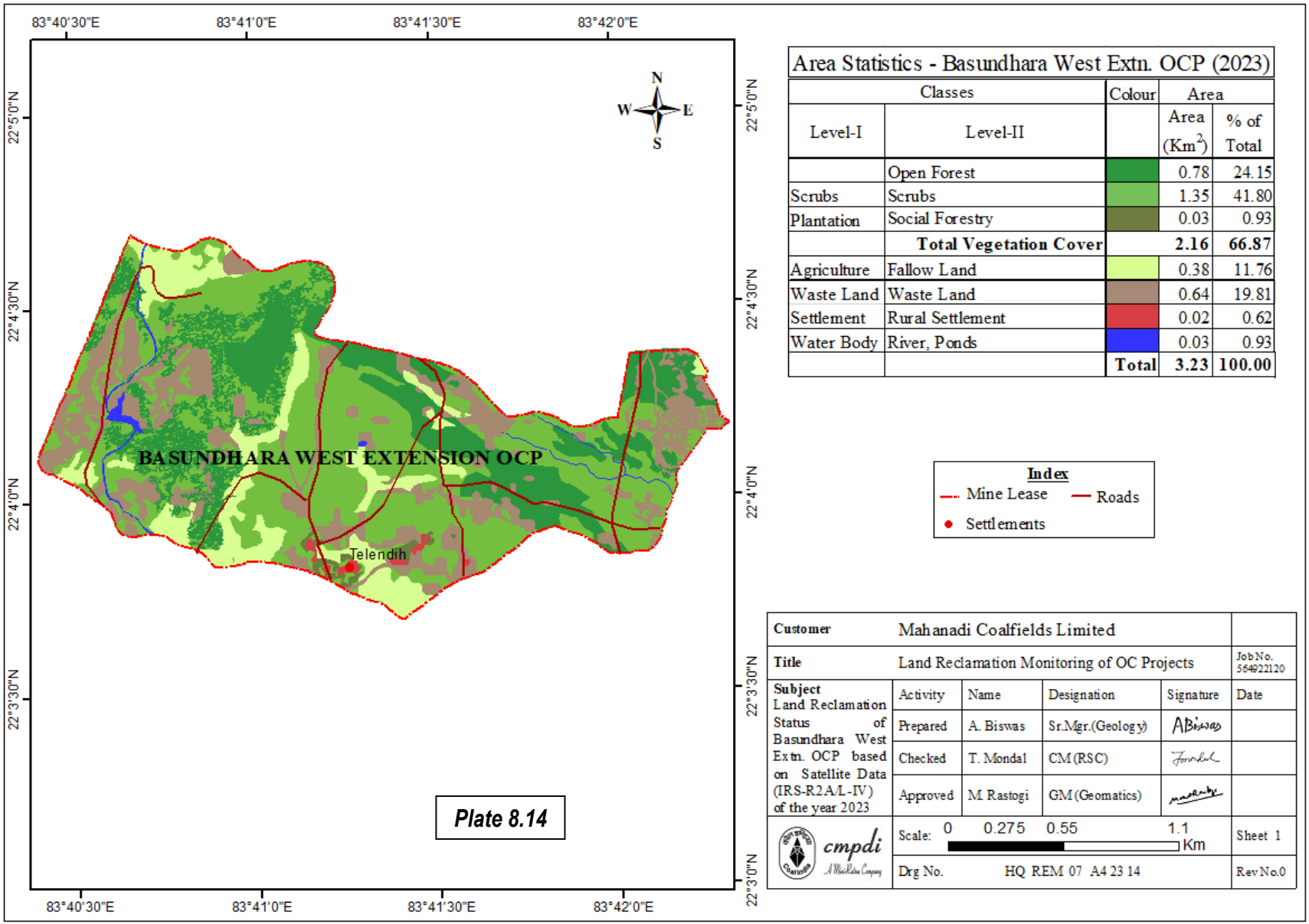

Area Statistics - Basundhara West Extn. OCP (2023)

Classes		Colour	Area	
Level-I	Level-II		Area (Km^2)	% of Total
	Open Forest		0.78	24.15
Scrubs	Scrubs		1.35	41.80
Plantation	Social Forestry		0.03	0.93
	Total Vegetation Cover		**2.16**	**66.87**
Agriculture	Fallow Land		0.38	11.76
Waste Land	Waste Land		0.64	19.81
Settlement	Rural Settlement		0.02	0.62
Water Body	River, Ponds		0.03	0.93
		Total	**3.23**	**100.00**

Index

Mine Lease — Roads

Settlements

Customer	Mahanadi Coalfields Limited				
Title	Land Reclamation Monitoring of OC Projects				Job No. 564922120
Subject Land Reclamation Status of Basundhara West Extn. OCP based on Satellite Data (IRS-R2A/L-IV) of the year 2023	Activity	Name	Designation	Signature	Date
	Prepared	A. Biswas	Sr.Mgr.(Geology)	ABiswas	
	Checked	T. Mondal	CM(RSC)		
	Approved	M Rastogi	GM(Geomatics)		
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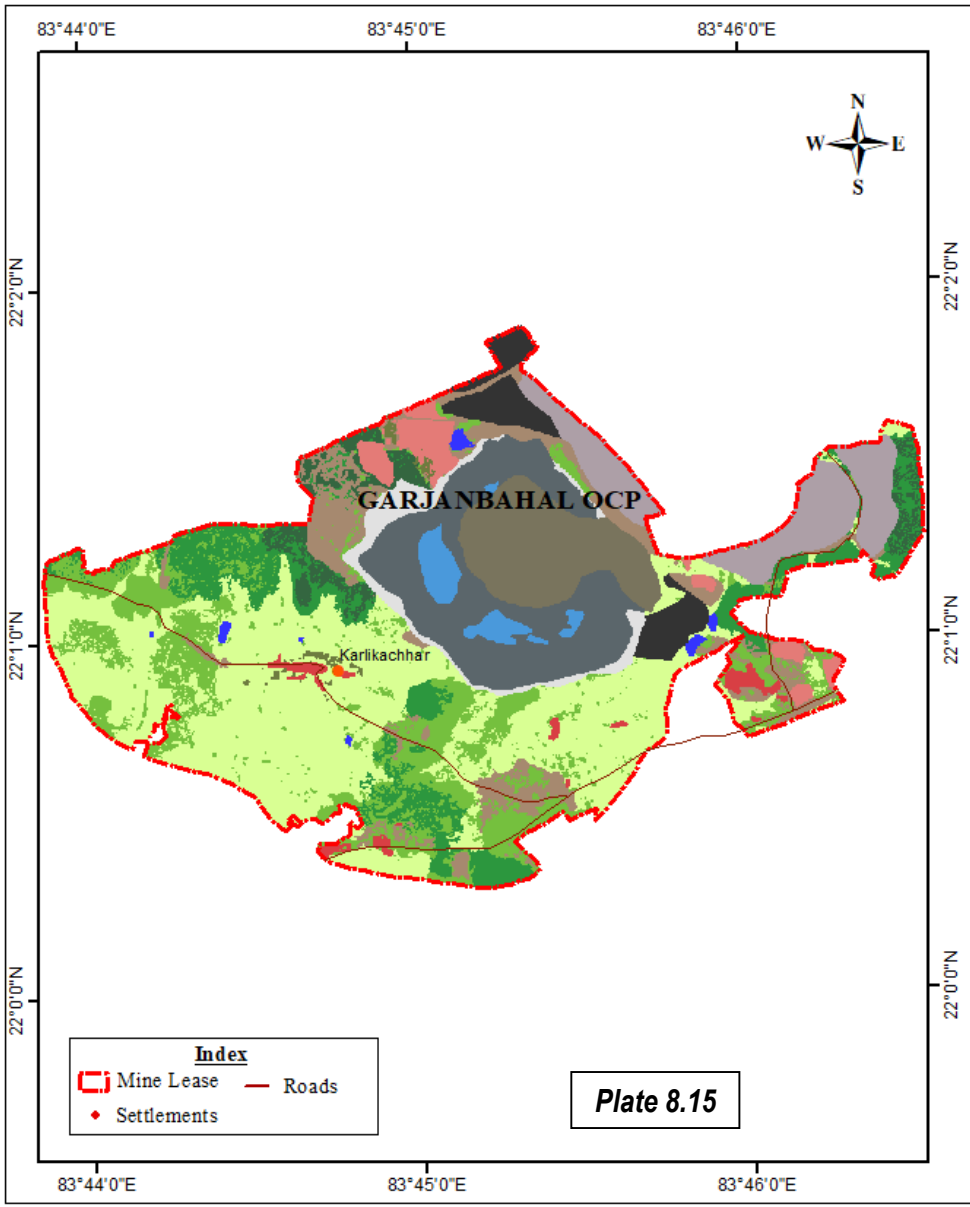

Area Statistics - Garjanbahal OCP (2023)

Classes		Colour	Area	
Level-I	Level-II		Area (Km^2)	% of Total
Forest Area	Dense Forest		0.18	2.75
	Open Forest		0.57	8.72
	Total Forest Area (A)		**0.75**	**11.47**
Scrubs	**Scrubs (B)**		**0.94**	**14.37**
Plantation	Social Forestry		0.02	0.31
	Plantation on Backfill		0.00	0.00
	Plantation on OB Dump		0.00	0.00
	Total Plantation (C)		**0.02**	**0.31**
	Total Vegetation(A+B+C)		**1.71**	**26.15**
Agriculture	**Agriculture Land**		**2.00**	**30.58**
Waste Land	**Waste Land**		**0.49**	**7.49**
Mining Area	Coal Quarry		0.71	10.86
	Barren OB Dump		0.46	7.03
	Area Under Backfilling		0.43	6.57
	Water Filled Quarry		0.11	1.68
	Coal Dump		0.22	3.36
	Advance Quarry Site		0.16	2.45
	Total Mining Area		**2.09**	**31.96**
Settlements	Rural Settlement		0.07	1.07
	Industrial Settlement		0.15	2.29
	Total Settlement Area		**0.22**	**3.36**
Water Body	**River, Ponds**		**0.03**	**0.46**
		Total	**6.54**	**100.00**

Customer	Mahanadi Coalfields Limited				
Title	Land Reclamation Monitoring of OC Projects				Job No. 564922120
Subject Land Reclamation Status of Garjanbahal OCP based on Satellite Data (IRS-R2A/L-IV) of the year 2023	Activity	Name	Designation	Signature	Date
	Prepared	A. Biswas	Sr.Mgr.(Geology)	ABiswas	
	Checked	T. Mondal	CM (RSC)		
	Approved	M. Rastogi	GM (Geomatics)		
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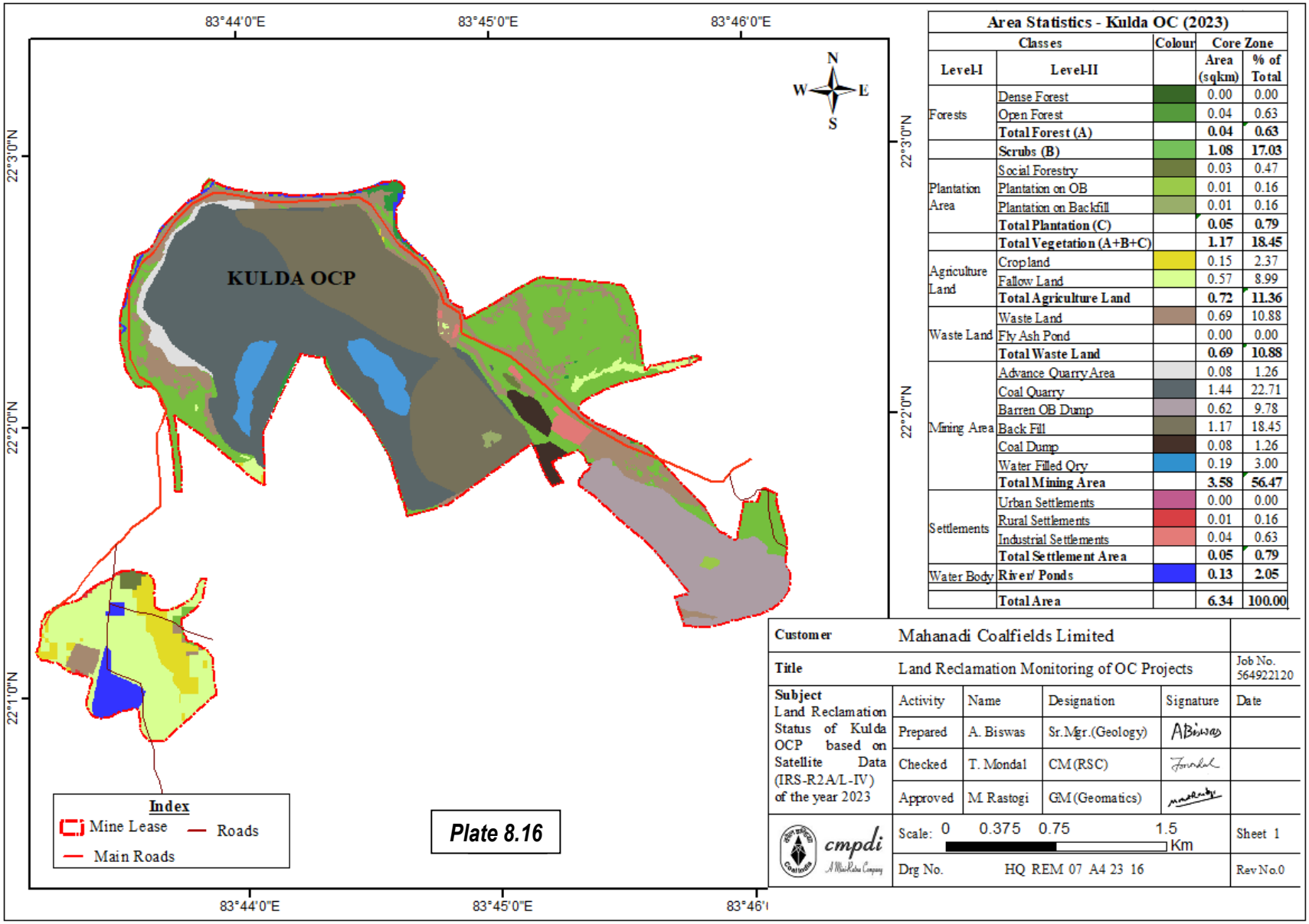

Area Statistics - Kulda OC (2023)

Classes		Colour	Core Zone	
Level-I	Level-II		Area (sqkm)	% of Total
Forests	Dense Forest		0.00	0.00
	Open Forest		0.04	0.63
	Total Forest (A)		**0.04**	**0.63**
	Scrubs (B)		**1.08**	**17.03**
Plantation Area	Social Forestry		0.03	0.47
	Plantation on OB		0.01	0.16
	Plantation on Backfill		0.01	0.16
	Total Plantation (C)		**0.05**	**0.79**
	Total Vegetation (A+B+C)		**1.17**	**18.45**
Agriculture Land	Cropland		0.15	2.37
	Fallow Land		0.57	8.99
	Total Agriculture Land		**0.72**	**11.36**
Waste Land	Waste Land		0.69	10.88
	Fly Ash Pond		0.00	0.00
	Total Waste Land		**0.69**	**10.88**
Mining Area	Advance Quarry Area		0.08	1.26
	Coal Quarry		1.44	22.71
	Barren OB Dump		0.62	9.78
	Back Fill		1.17	18.45
	Coal Dump		0.08	1.26
	Water Filled Qry		0.19	3.00
	Total Mining Area		**3.58**	**56.47**
Settlements	Urban Settlements		0.00	0.00
	Rural Settlements		0.01	0.16
	Industrial Settlements		0.04	0.63
	Total Settlement Area		**0.05**	**0.79**
Water Body	**River/ Ponds**		**0.13**	**2.05**
	Total Area		**6.34**	**100.00**

Customer	Mahanadi Coalfields Limited				
Title	Land Reclamation Monitoring of OC Projects				Job No. 564922120
Subject Land Reclamation Status of Kulda OCP based on Satellite Data (IRS-R2A/L-IV) of the year 2023	Activity	Name	Designation	Signature	Date
	Prepared	A. Biswas	Sr.Mgr.(Geology)	ABiswas	
	Checked	T. Mondal	CM(RSC)		
	Approved	M Rastogi	GM(Geomatics)		
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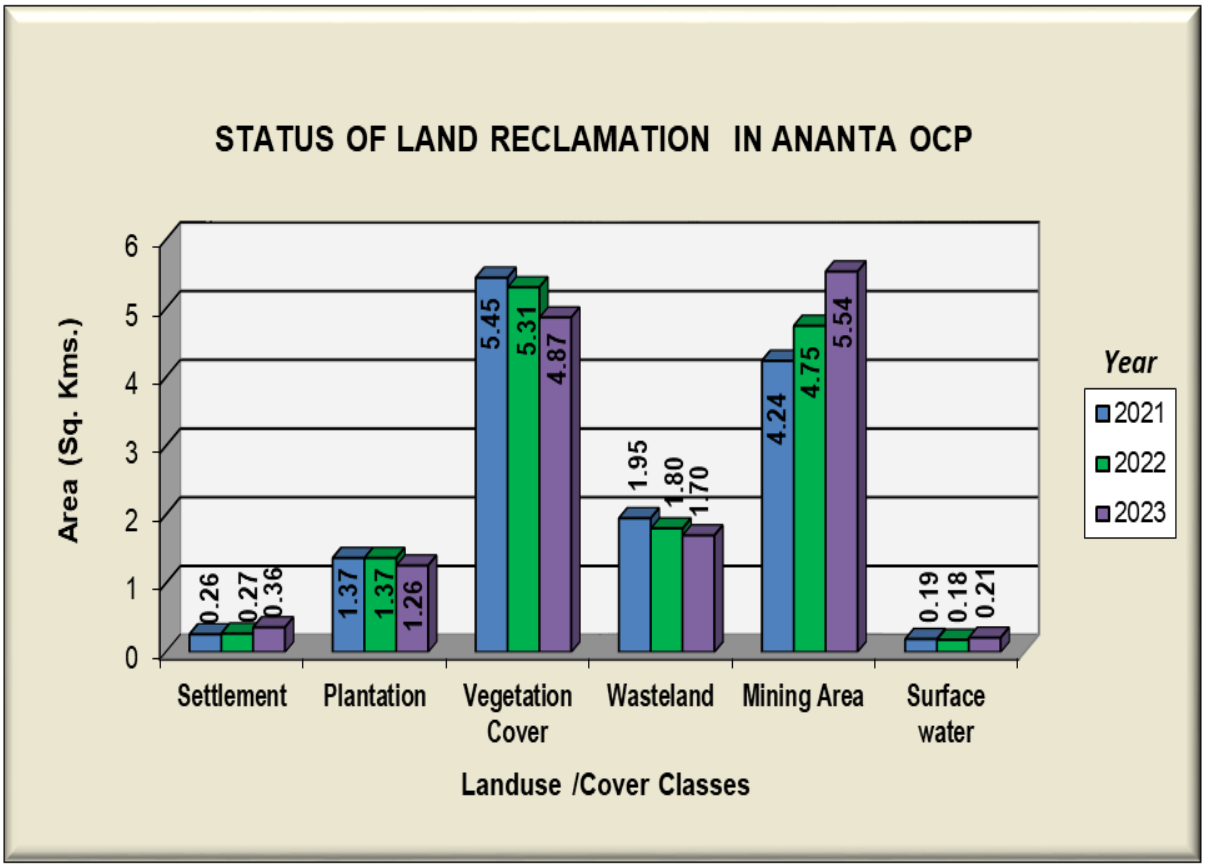
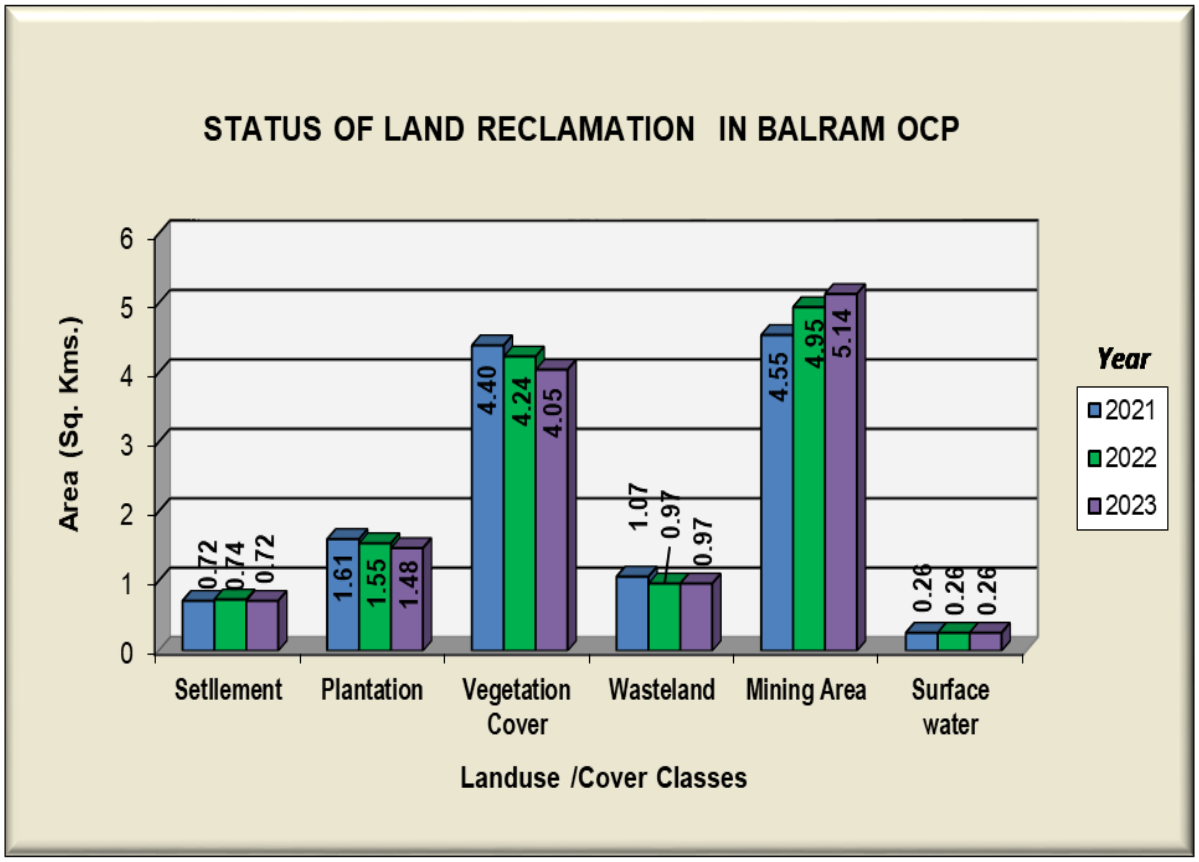


Figure 8.2



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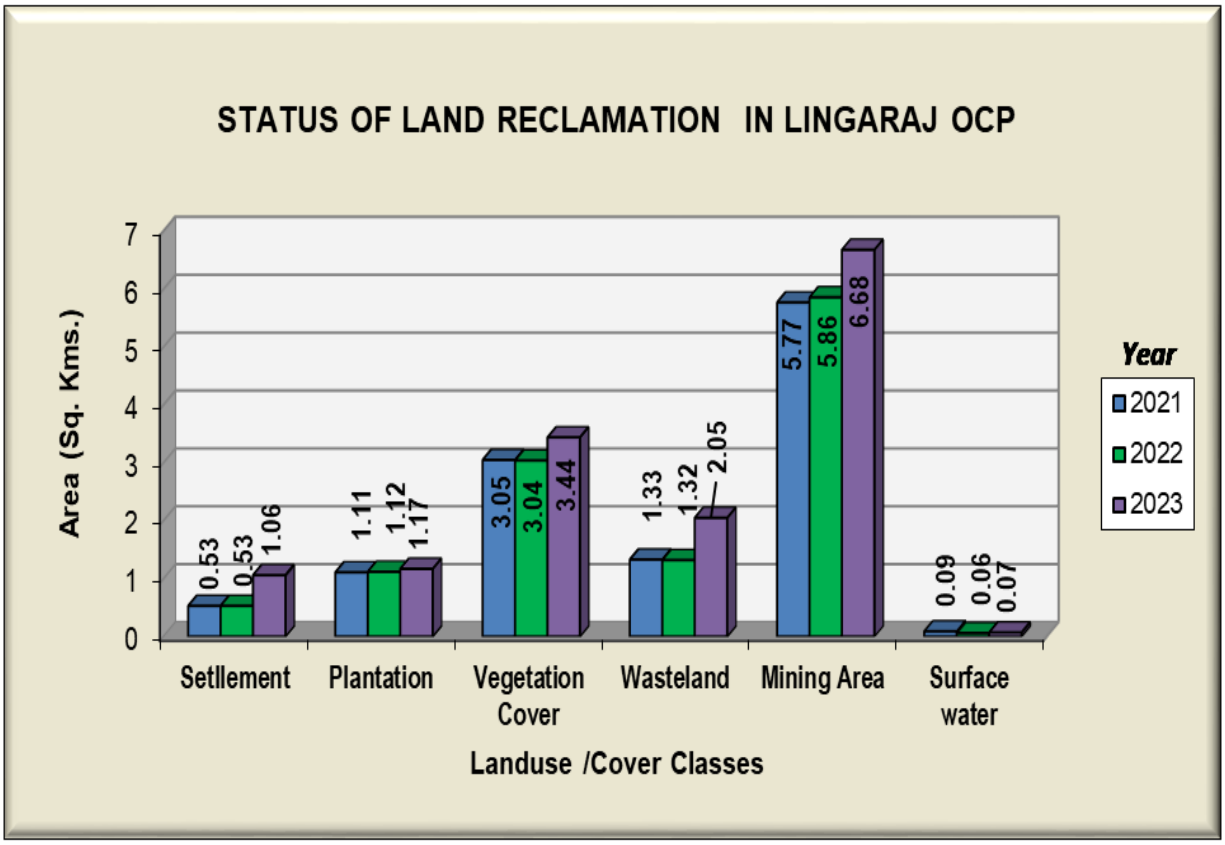
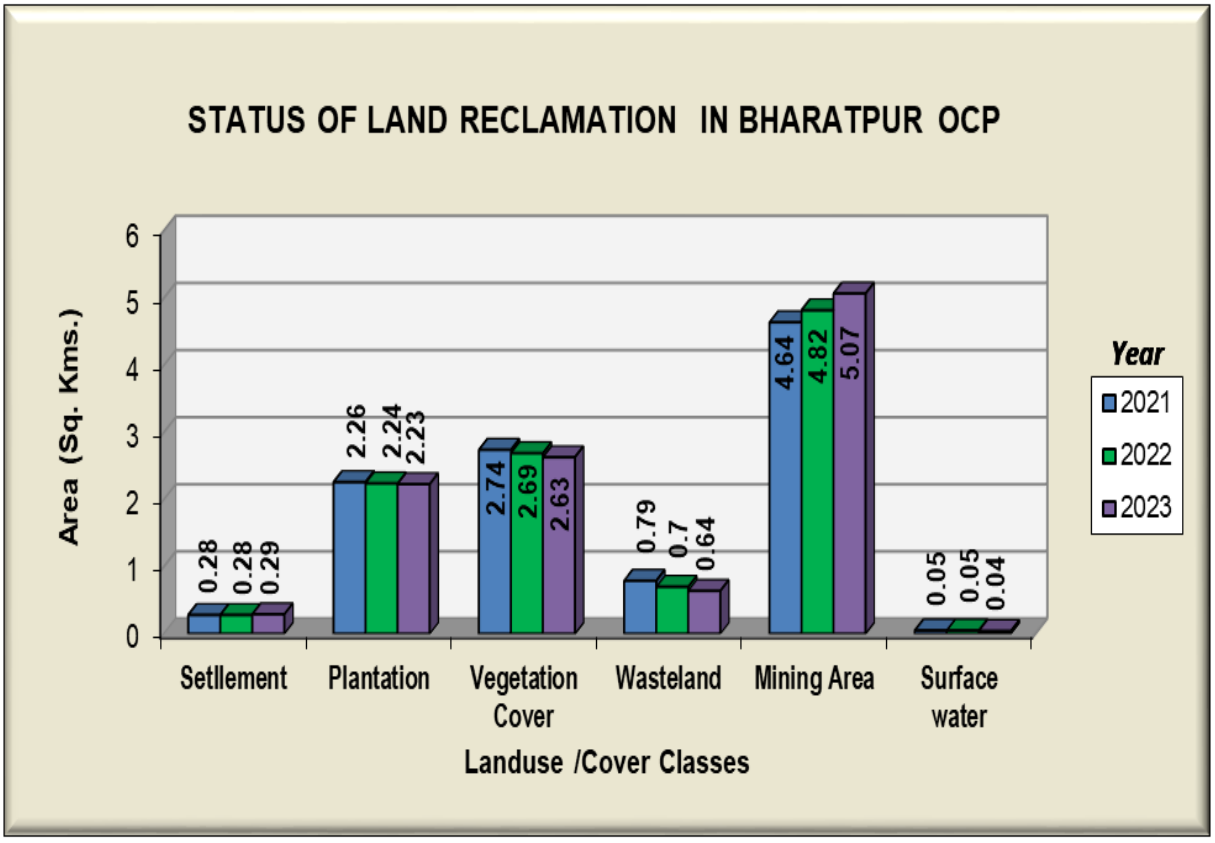


Figure 8.4



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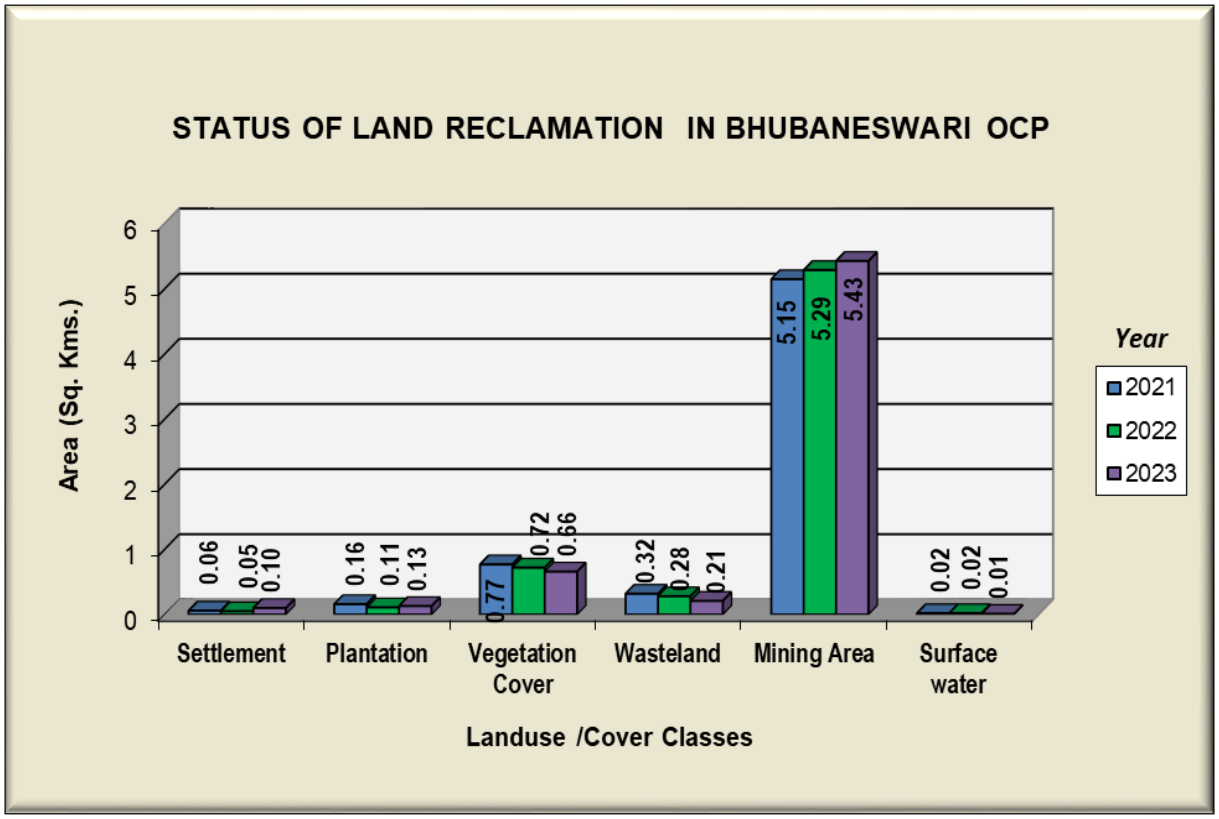

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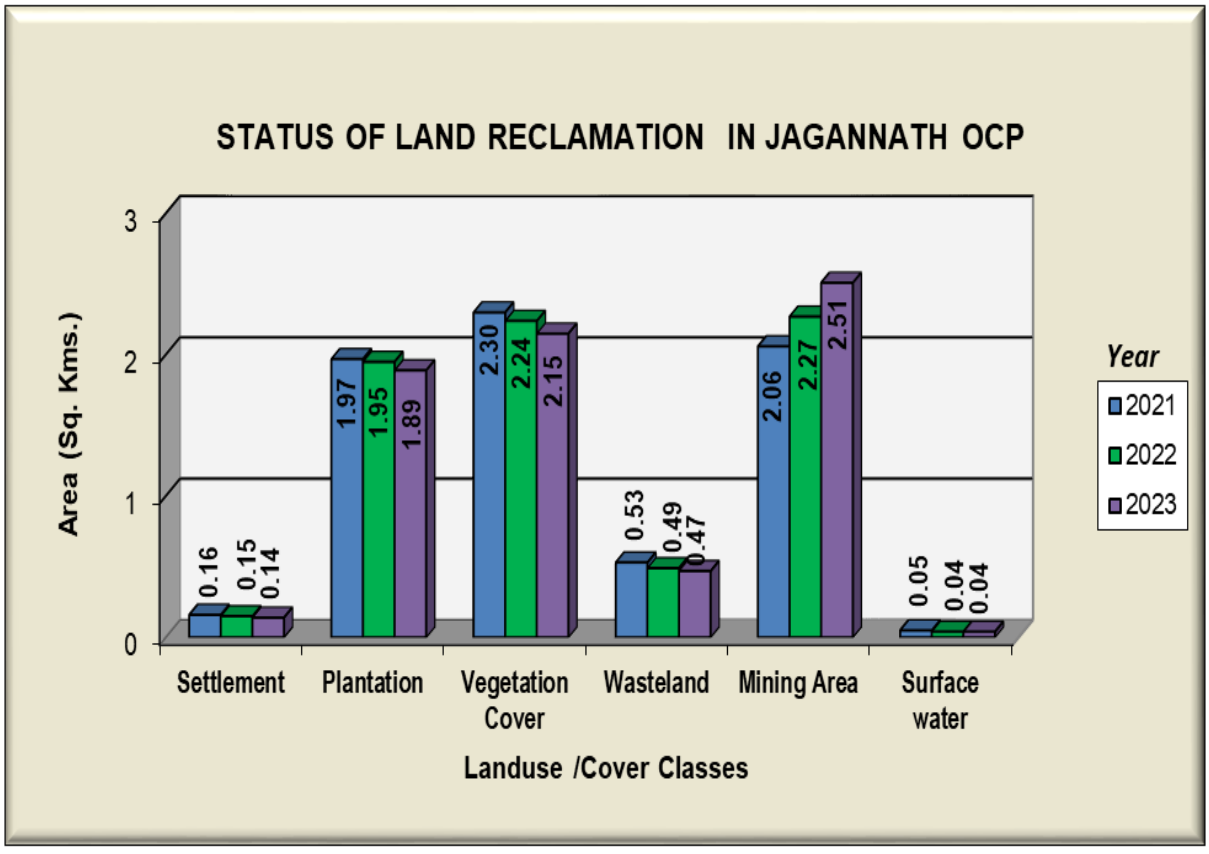

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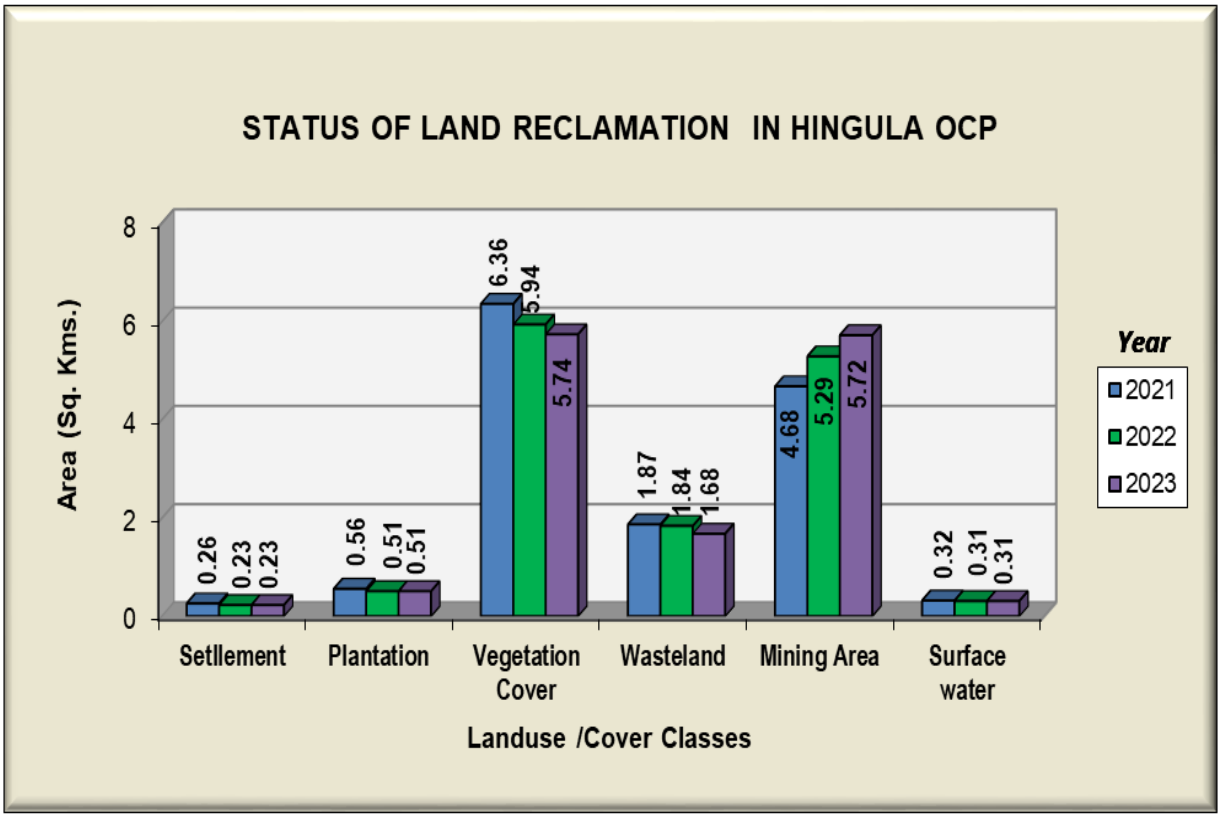

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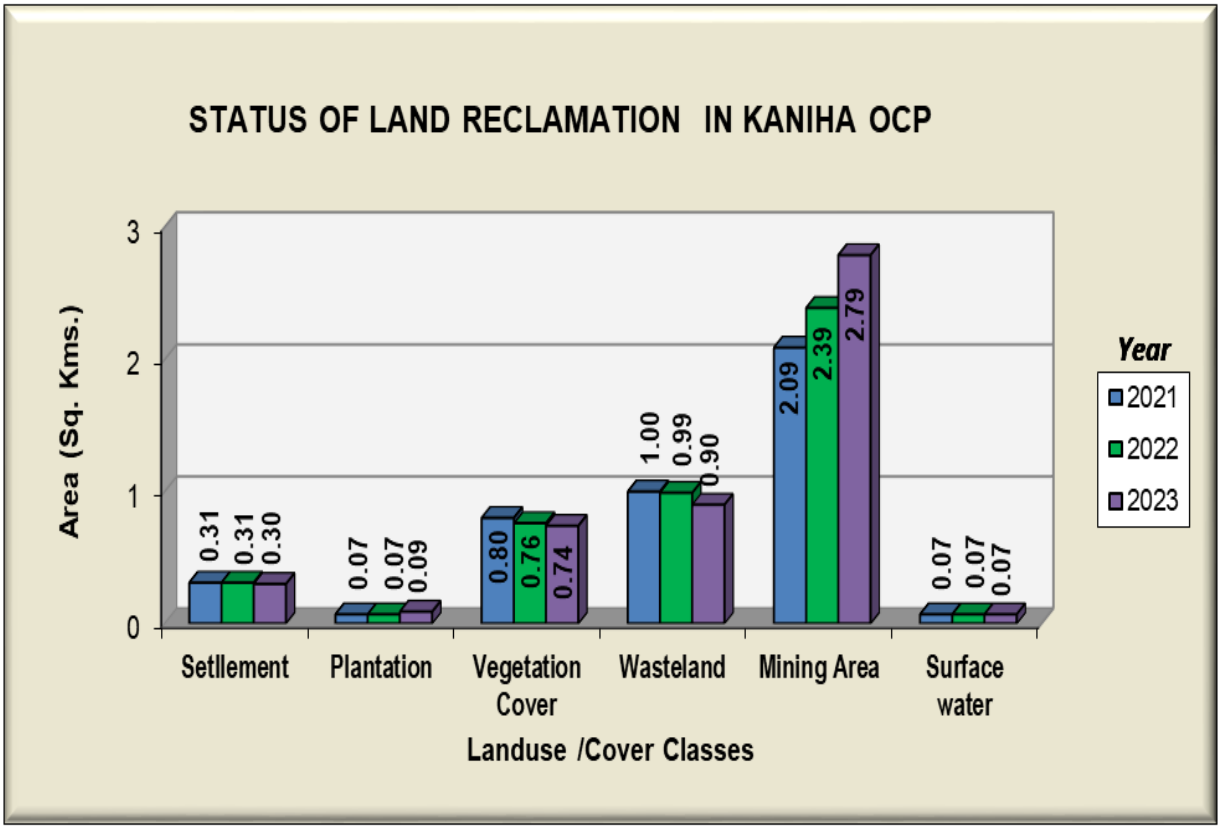

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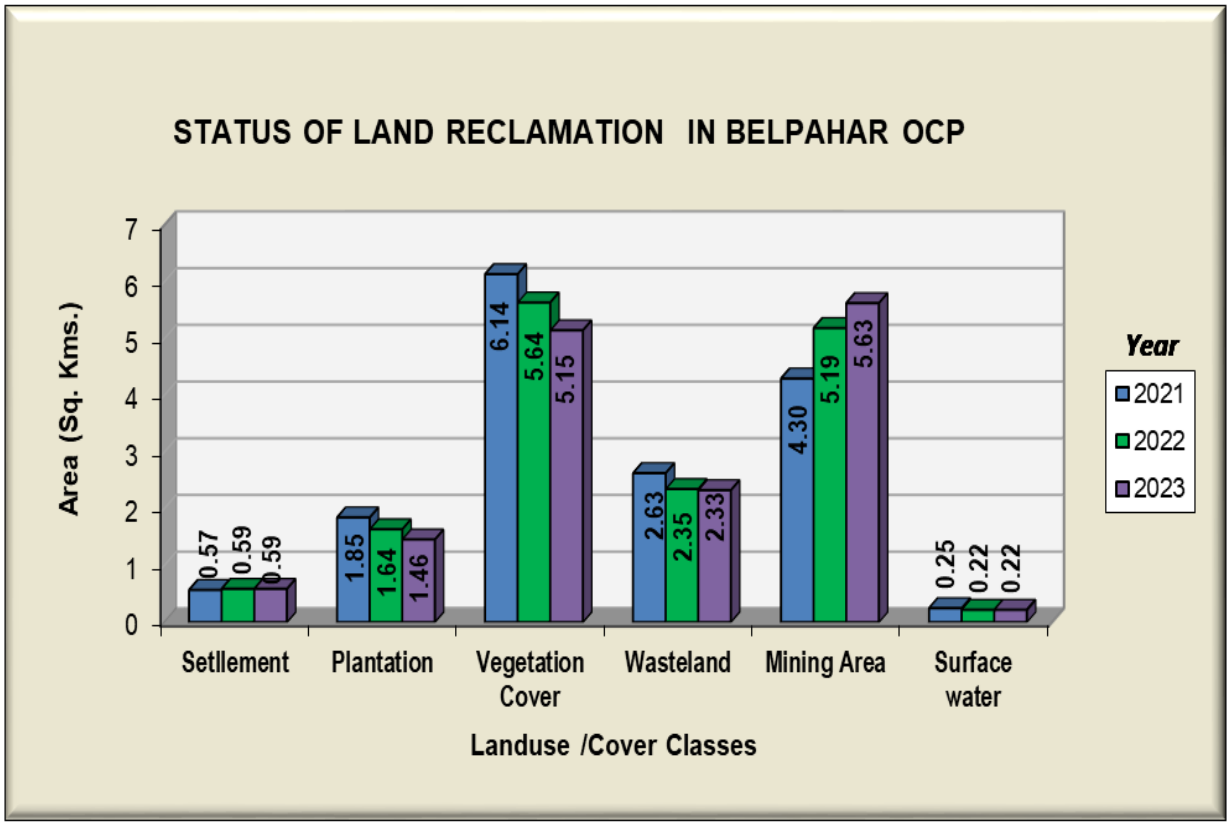

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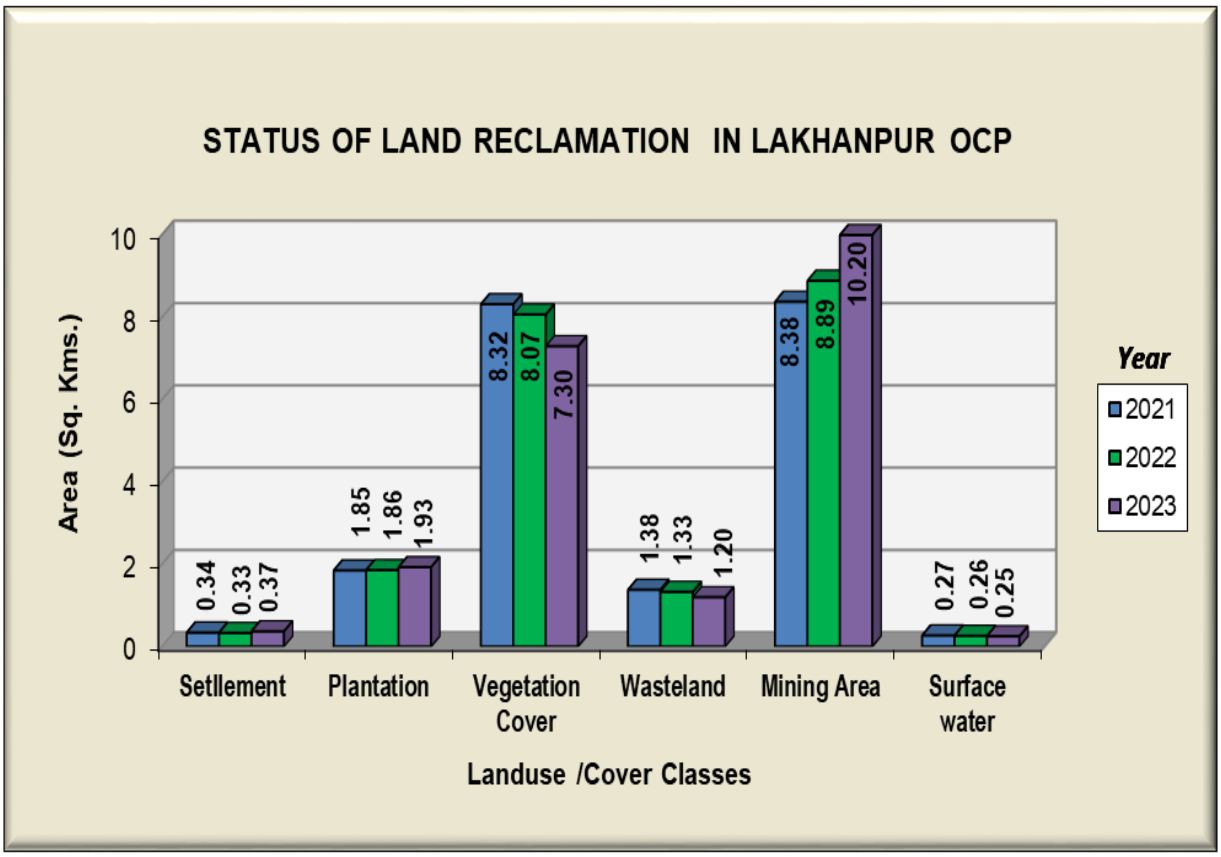

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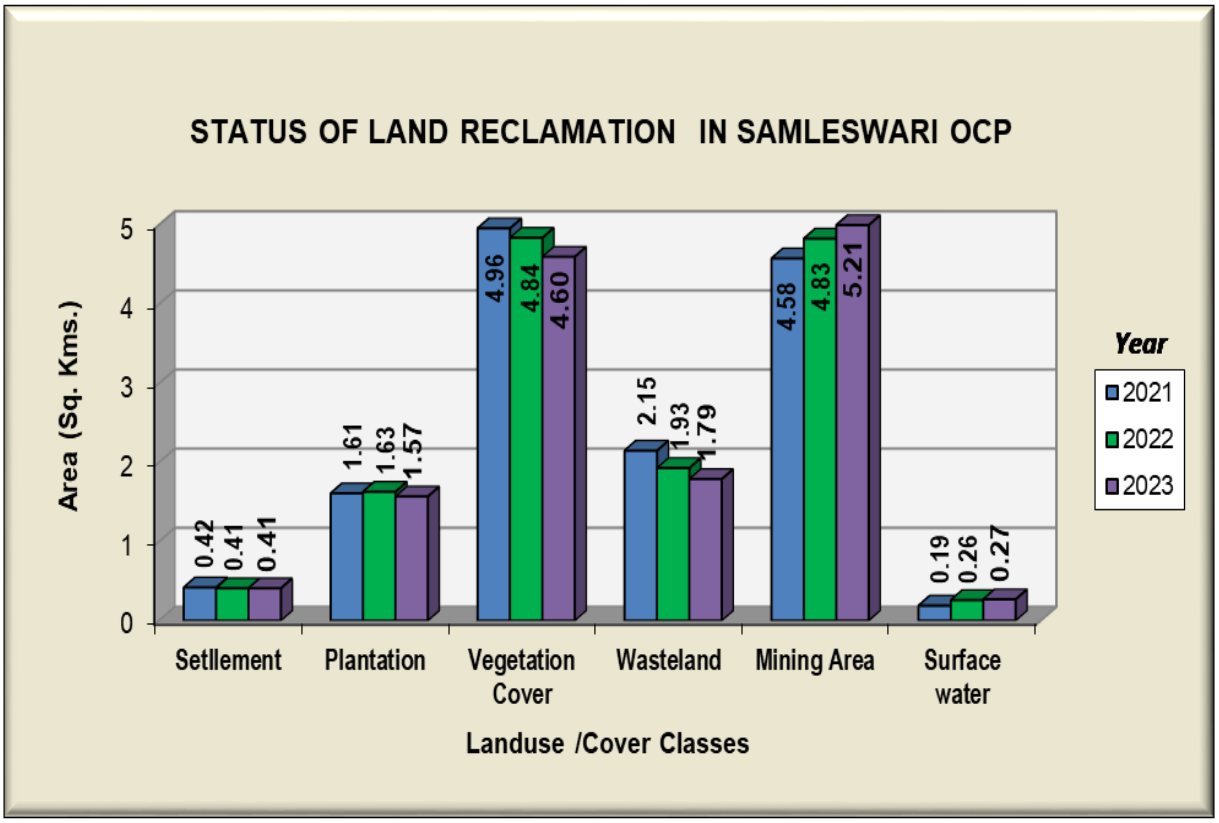

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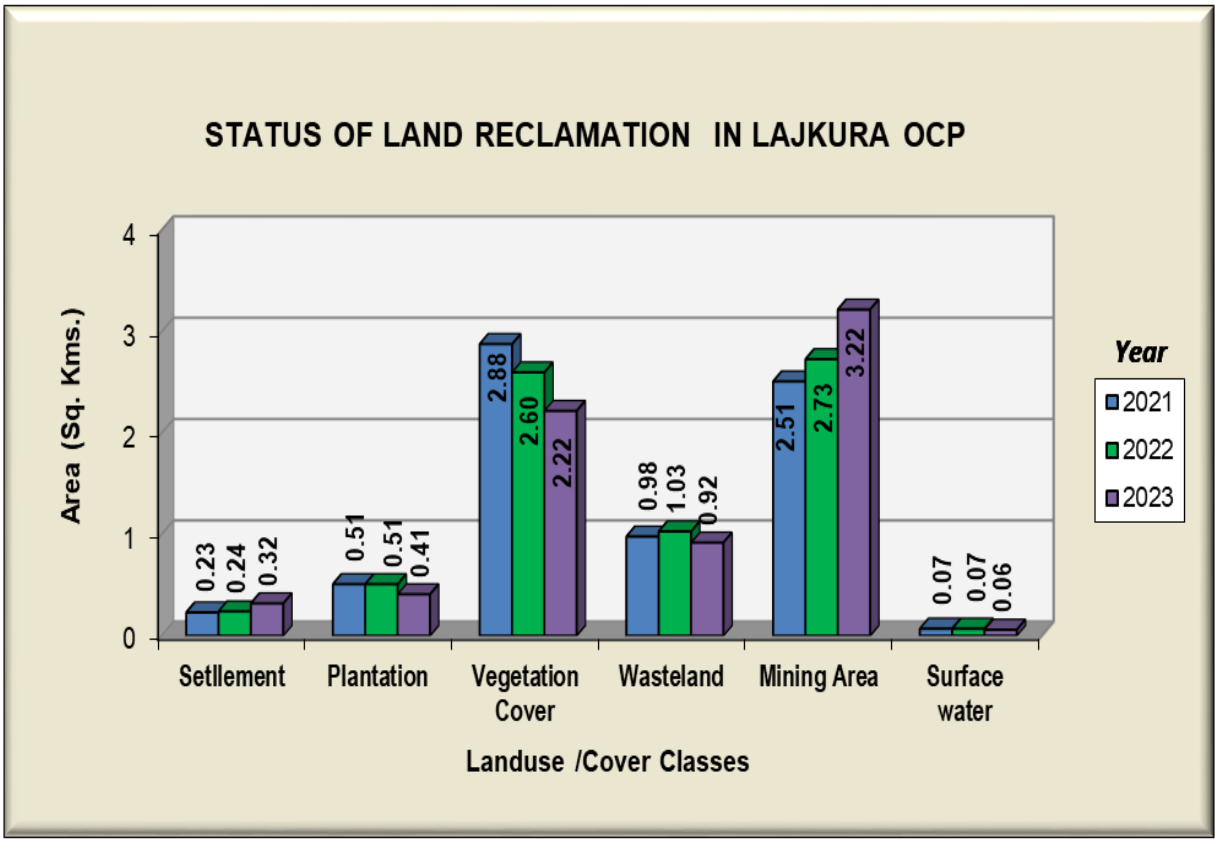

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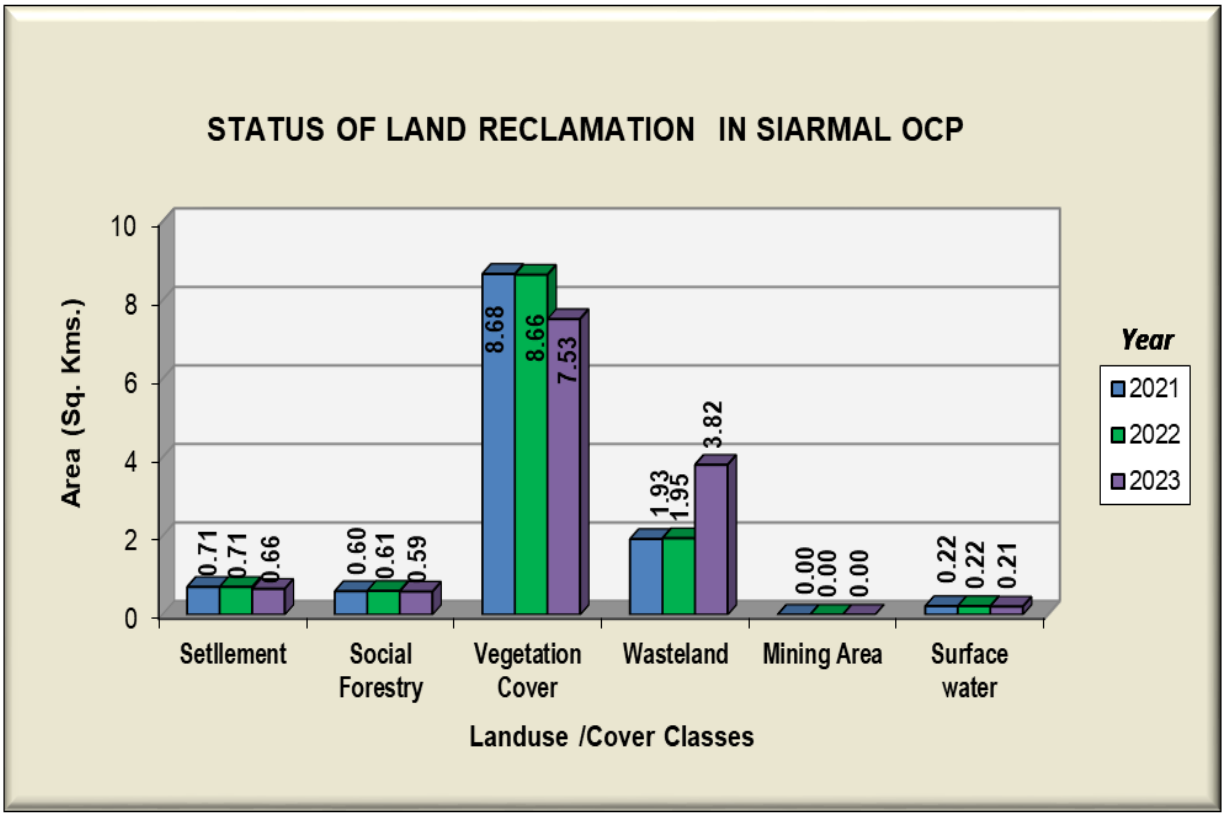

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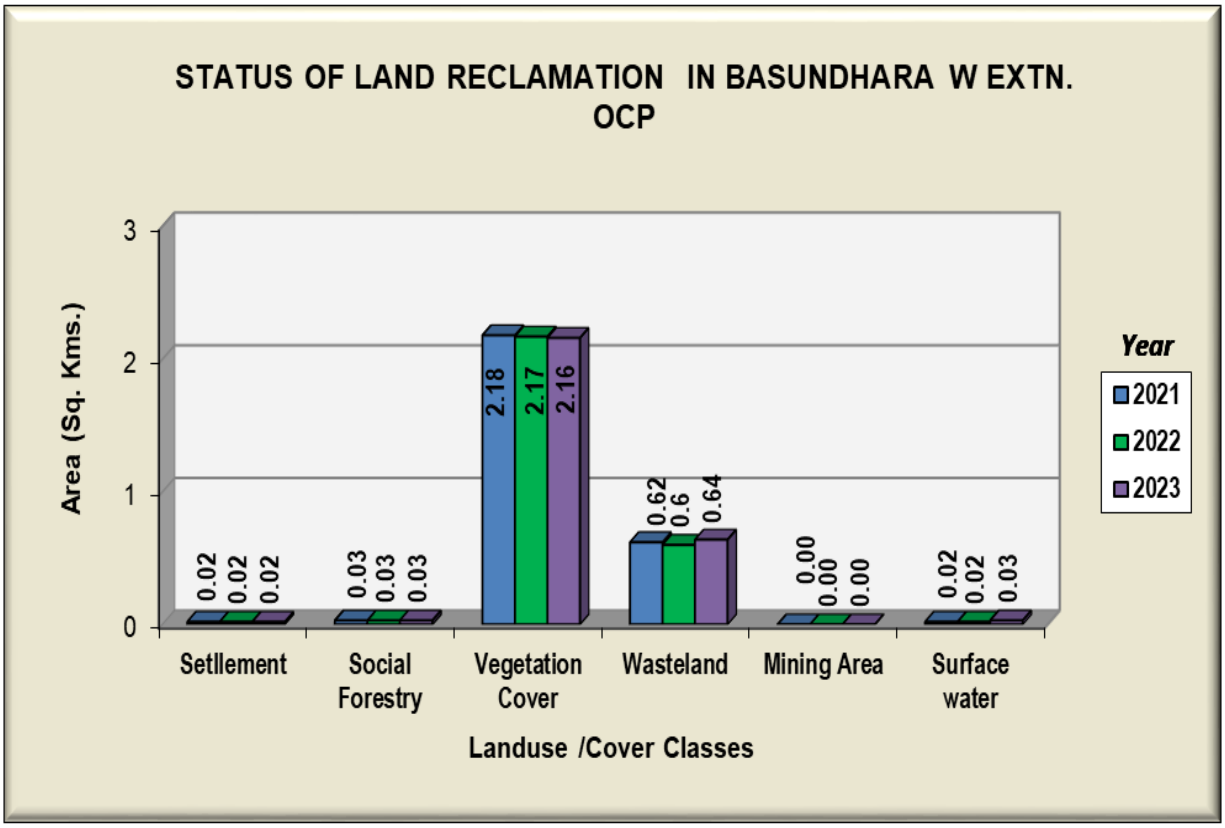

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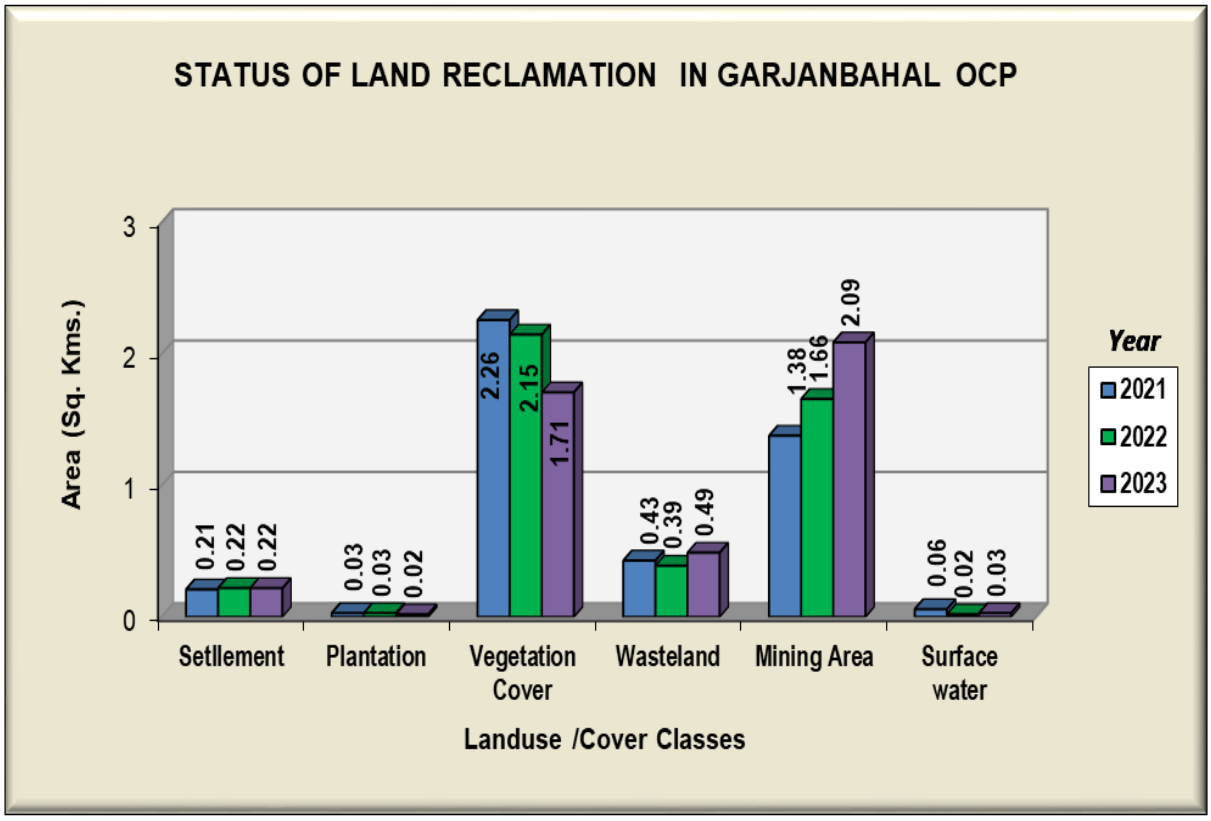

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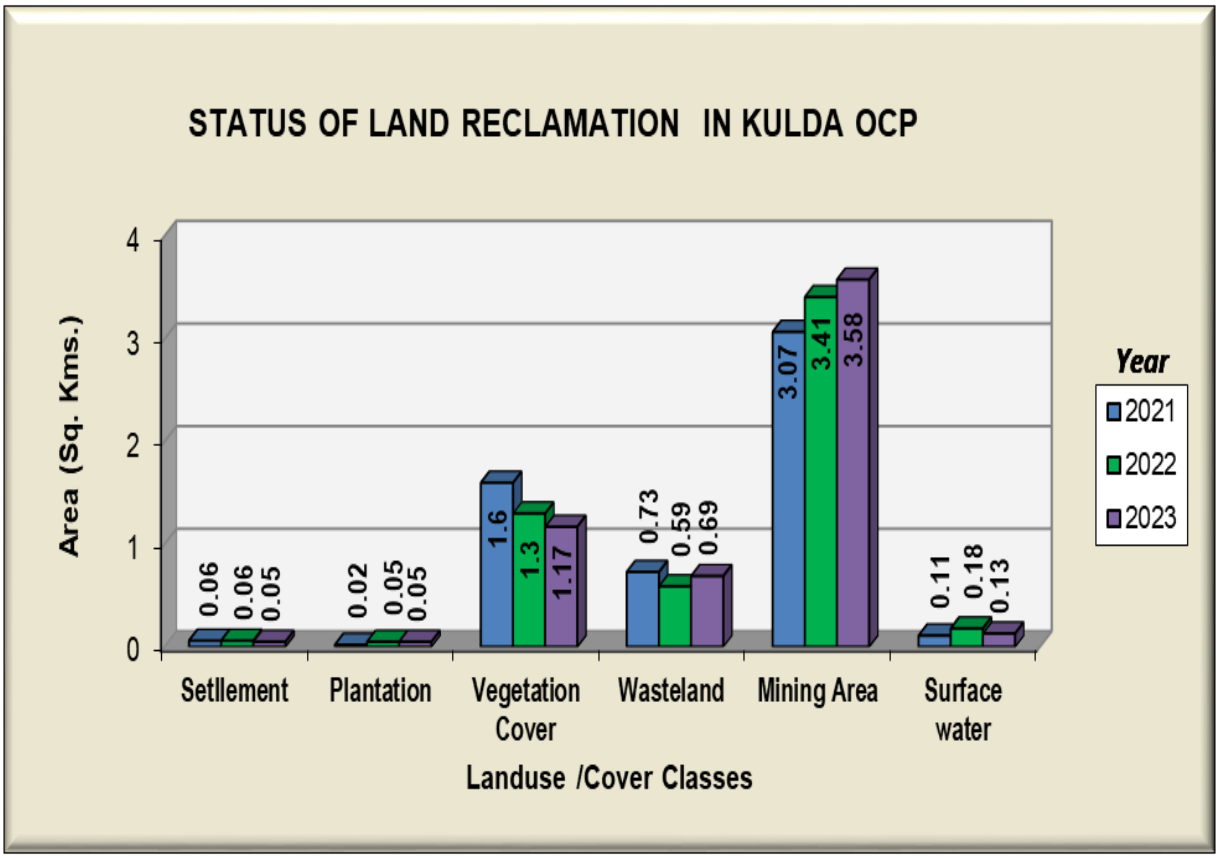
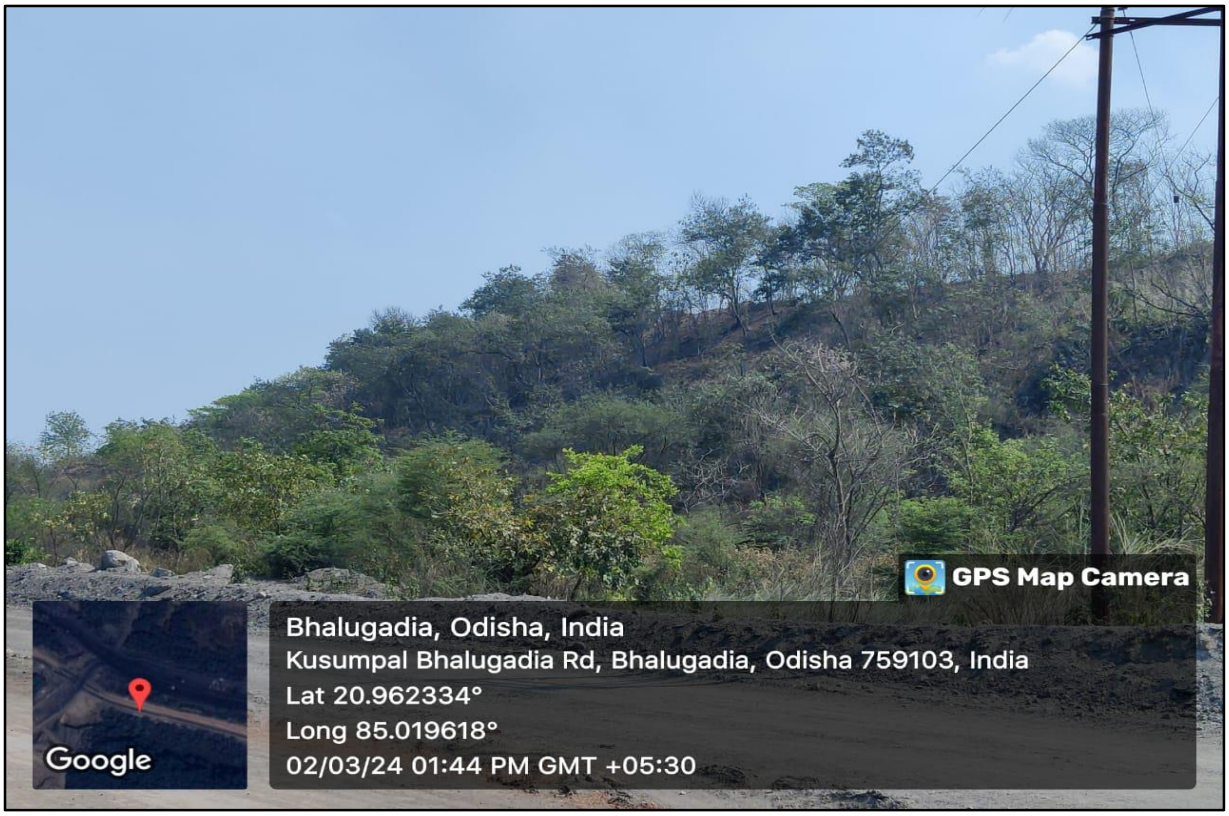


Figure 8.17

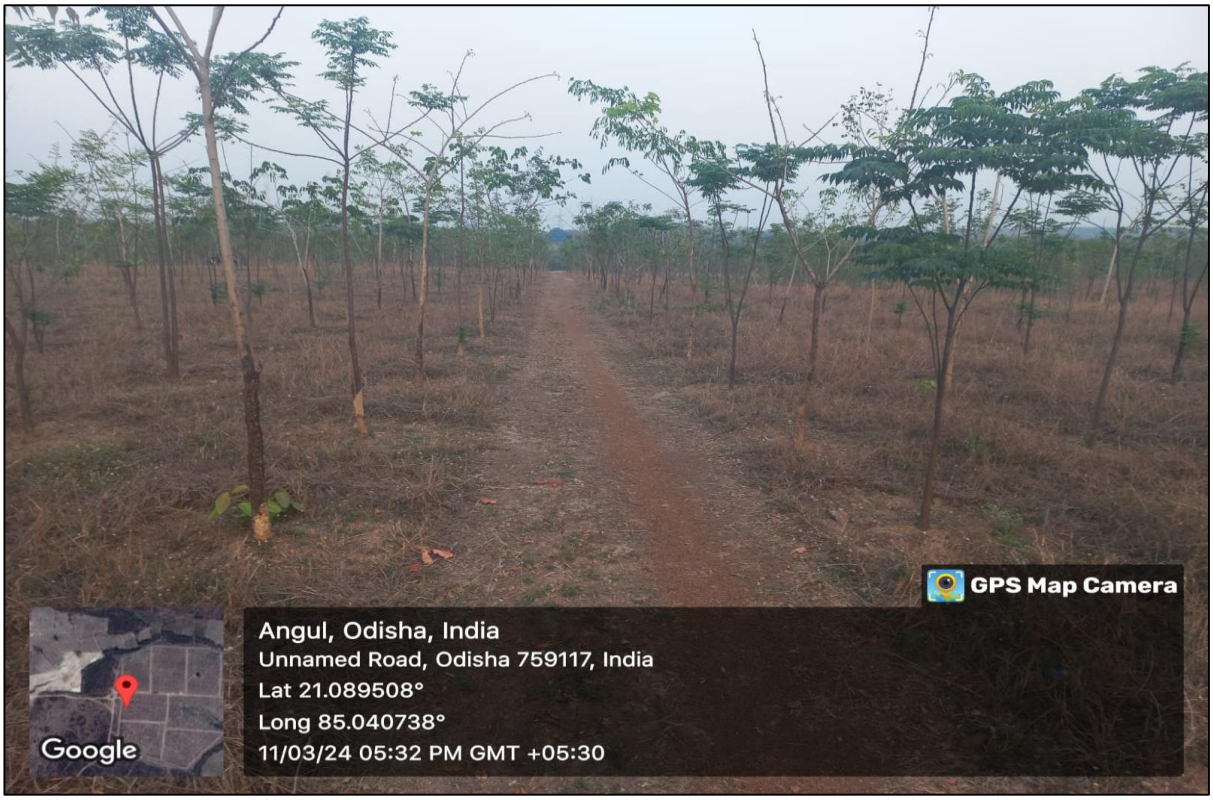
Photograph – 8.1**: Plantation on Internal OB/Backfill (Ananta OC mine)**

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

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

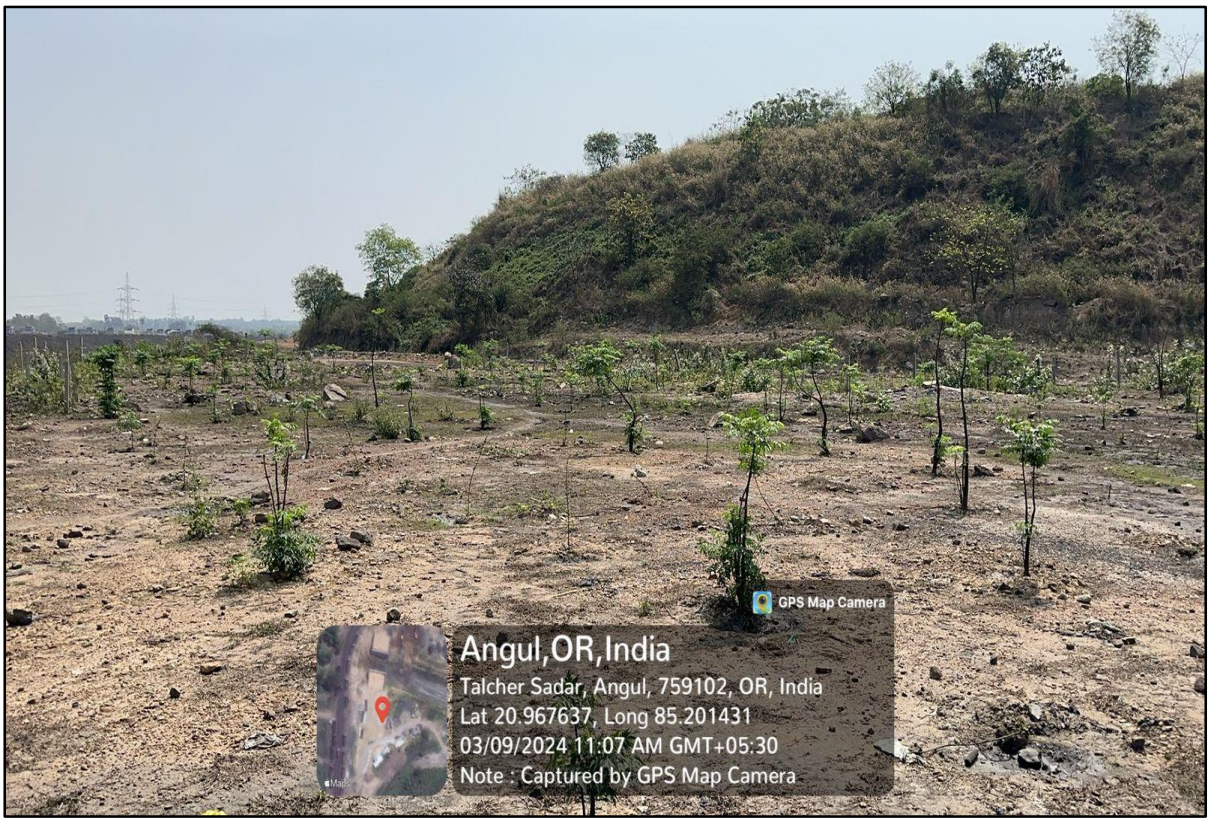


Photograph – 8.4**: Plantation on Internal OB/Backfill (Hingula OC Mine)**



Photograph – 8.5: **Plantation under Social Forestry (Kaniha OC Mine)**

Photograph – 8.6**: Plantation under Social Forestry (Kaniha OC Mine)**



Photograph – 8.7: **Plantation under Social Forestry (Lingaraj OC Mine)**

Photograph – 8.8: **Plantation on Internal OB/Backfill (Belpahar OC Mine)**

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

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

Photograph-8.11: **Plantation on External OB (Lajkura OC Mine)**

Photograph-8.12**: Plantation on External OB (Kulda OC Mine)**

Photograph-8.13**: Plantation on Internal OB/Backfill (Garjanbahal 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 m^3. (Coal + OB) annually, have been taken up for land reclamation monitoring based on Satellite data of the year 2023.

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 Dhori	

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 2023 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 2023 reveals that out of total excavated area of 38.15 km^2, 27.34 km^2 (71.66%) has come under reclamation in the above 15 OC projects of CCL taken together, out of which 18.74 km^2 (49.12%) area is under backfilling

(Technical Reclamation) and 8.60 km^2 (22.54%) area is under plantation (Biological Reclamation).

9.4 Study also reveals that the area under backfilling (Technical Reclamation) has increased from 18.68 km^2 in 2022 to 18.74 km^2 in 2023.

9.5 Analysis of satellite data also indicates that the area under plantation (Biological Reclamation) has increased from 8.43 km^2 (Yr. 2022) to 8.60 km^2 (Yr. 2023). 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 18.45 km^2 in the year 2022, to 18.56 km^2 in the year 2023.

9.7 The total area under reclamation also increased from 27.11 km^2 (71.36%) in 2022 to 27.34 km^2 (71.66%) in 2023.

9.8 A model for land restoration is visible at Piparwar area of CCL, where an eco-restoration park called "**Kayakalp Vatika**", has been developed and maintained over the reclaimed (backfilled) land.

9.9 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.

9.10 Out of 15 projects of CCL taken for land reclamation monitoring in 2022-23, **KDH** ranks on top for land reclamation (89.94%), followed by **Parej East** OC (87.86%), **Piparwar** OC (82.73%), Ashok OC (80.72%), and Rohini OC (80.35%).

TABLE – 9.1

Project wise Land Reclamation Status in OC projects of CCL based on Satellite Data of the Year 2023

*(Projects producing more than 5 mcm of **Coal + OB** annaully)* *(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	
				Area under Backfilling		Biological Reclamation		Other Plantations											
						Plantation on Excavated / Backfilled Area		Plantation on External Over Burden		Social Forestry, Avanue									
1	*2*	*3*		*4*		*5*		*6*		*7*		*8*		*9 (=4+5+8)*		*10 (=5+6+7)*		*11(=4+5)*	
		2022	*2023*	*2022*	*2023*	*2022*	*2023*	*2022*	*2023*	*2022*	*2023*	*2022*	*2023*	*2022*	*2023*	*2022*	*2023*	*2022*	*2023*
1	**Ashok**	7.93	7.93	2.52	2.54	1.25	1.27	0.00	0.00	0.17	0.15	0.86	0.91	4.63	4.72	1.42	1.42	3.77	3.81
				54.43%	53.81%	27.00%	26.91%					18.57%	19.28%			17.91%	17.91%	81.43%	80.72%
2	**Piparwar**	11.20	11.20	2.75	2.72	1.85	1.88	0.17	0.15	1.18	1.18	0.96	0.96	5.56	5.56	3.20	3.21	4.60	4.60
				49.46%	48.92%	33.27%	33.81%					17.27%	17.27%			28.57%	28.66%	82.73%	82.73%
3	**KDH**	*6.20*	4.89	1.77	1.56	1.39	1.39	0.03	0.03	0.21	0.18	0.52	0.33	3.68	3.28	1.63	1.60	3.16	2.95
				48.10%	47.56%	37.77%	42.38%					14.13%	10.06%			26.29%	32.72%	85.87%	89.94%
4	**Amrapali**	6.20	6.20	1.56	1.60	0.11	0.15	0.12	0.14	0.02	0.02	1.00	1.05	2.67	2.80	0.25	0.31	1.67	1.75
				58.43%	57.14%	4.12%	5.36%					37.45%	37.50%			4.03%	5.00%	62.55%	62.50%
5	**Magadh**	17.69	17.69	0.68	0.68	0.00	0.00	0.08	0.08	0.02	0.02	1.02	1.08	1.70	1.76	0.10	0.10	0.68	0.68
				40.00%	38.64%	0.00%	0.00%					60.00%	61.36%			0.57%	0.57%	40.00%	38.64%
6	**Parej East**	6.20	3.46	0.76	0.76	0.75	0.76	0.06	0.06	0.09	0.09	0.21	0.21	1.72	1.73	0.90	0.91	1.51	1.52
				44.19%	43.93%	43.60%	43.93%					12.21%	12.14%			26.01%	26.30%	87.79%	87.86%
7	**Rajrappa**	19.82	19.82	2.38	2.36	1.27	1.27	3.02	3.02	2.02	2.02	1.03	1.10	4.68	4.73	6.31	6.31	3.65	3.63
				50.85%	49.89%	27.14%	26.85%					22.01%	23.26%			31.84%	31.84%	77.99%	76.74%
8	**Rohini**	2.56	2.56	1.33	1.34	0.48	0.50	0.11	0.11	0.00	0.00	0.46	0.45	2.27	2.29	0.59	0.61	1.81	1.84
				58.59%	58.52%	21.15%	21.83%					20.26%	19.65%			23.05%	23.83%	79.74%	80.35%
9	**Purnadih**	*7.52*	7.52	1.03	1.07	0.23	0.25	0.12	0.12	0.03	0.04	0.53	0.54	1.79	1.86	0.38	0.41	1.26	1.32
				57.54%	57.53%	12.85%	13.44%					29.61%	29.03%			5.05%	5.45%	70.39%	70.97%
10	**North Urimari**	5.17	5.23	0.34	0.44	0.14	0.14	0.07	0.07	0.00	0.00	1.09	1.10	1.57	1.68	0.21	0.21	0.48	0.58
				21.66%	26.19%	8.92%	8.33%					69.43%	65.48%			4.06%	4.02%	30.57%	34.52%
11	**Tapin North**	3.04	3.04	0.93	0.95	0.00	0.00	0.12	0.12	0.00	0.00	0.72	0.74	1.65	1.69	0.12	0.12	0.93	0.95
				56.36%	56.21%	0.00%	0.00%					43.64%	43.79%			3.95%	3.95%	56.36%	56.21%
12	**Kathara**	7.71	7.71	0.68	0.68	0.32	0.32	1.08	1.08	0.80	0.80	0.68	0.68	1.68	1.68	2.20	2.20	1.00	1.00
				40.48%	40.48%	19.05%	19.05%					40.48%	40.48%			28.53%	28.53%	59.52%	59.52%
13	**Karo**	5.26	5.26	0.74	0.71	0.26	0.27	0.10	0.10	0.27	0.22	0.32	0.36	1.32	1.34	0.63	0.59	1.00	0.98
				56.06%	52.99%	19.70%	20.15%					24.24%	26.87%			11.98%	11.22%	75.76%	73.13%
14	**Konar Exp.**	4.71	4.71	0.86	0.95	0.35	0.35	0.04	0.03	0.01	0.03	0.81	0.70	2.02	2.00	0.40	0.41	1.21	1.30
				42.57%	47.50%	17.33%	17.50%					40.10%	35.00%			8.49%	8.70%	59.90%	65.00%
15	**Sel Dhori**	2.65	2.65	0.35	0.38	0.03	0.05	0.07	0.07	0.01	0.03	0.67	0.60	1.05	1.03	0.11	0.15	0.38	0.43
				33.33%	36.89%	2.86%	4.85%					63.81%	58.25%			4.15%	5.66%	36.19%	41.75%
	TOTAL	**113.86**	**109.87**	**18.68**	**18.74**	**8.43**	**8.60**	**5.19**	**5.18**	**4.83**	**4.78**	**10.88**	**10.81**	**37.99**	**38.15**	**18.45**	**18.56**	**27.11**	**27.34**
				49.17%	**49.12%**	**22.19%**	**22.54%**					**28.64%**	**28.34%**			**16.20%**	**16.89%**	**71.36%**	**71.66%**

(% 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. Dhori** 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.*

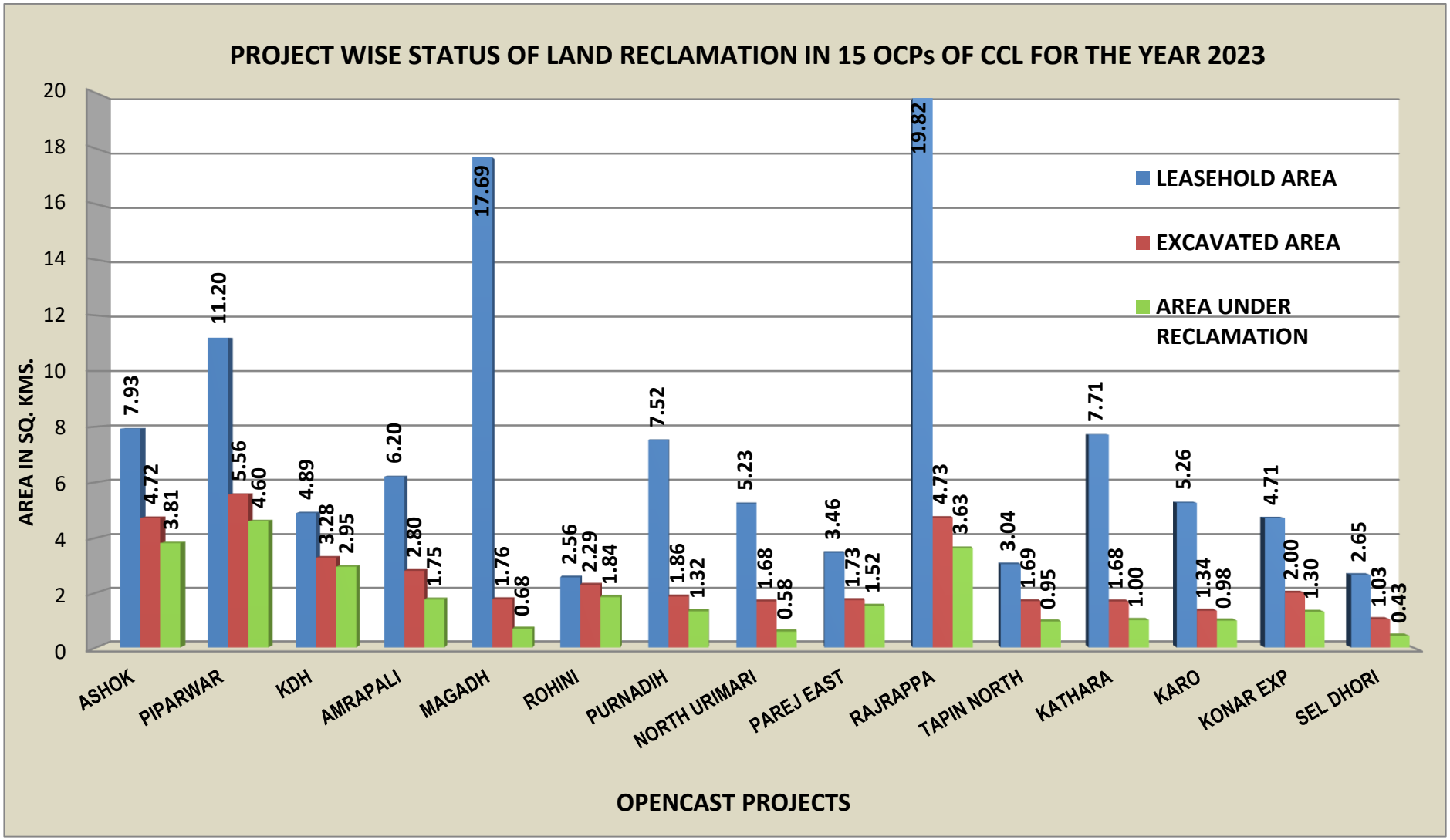


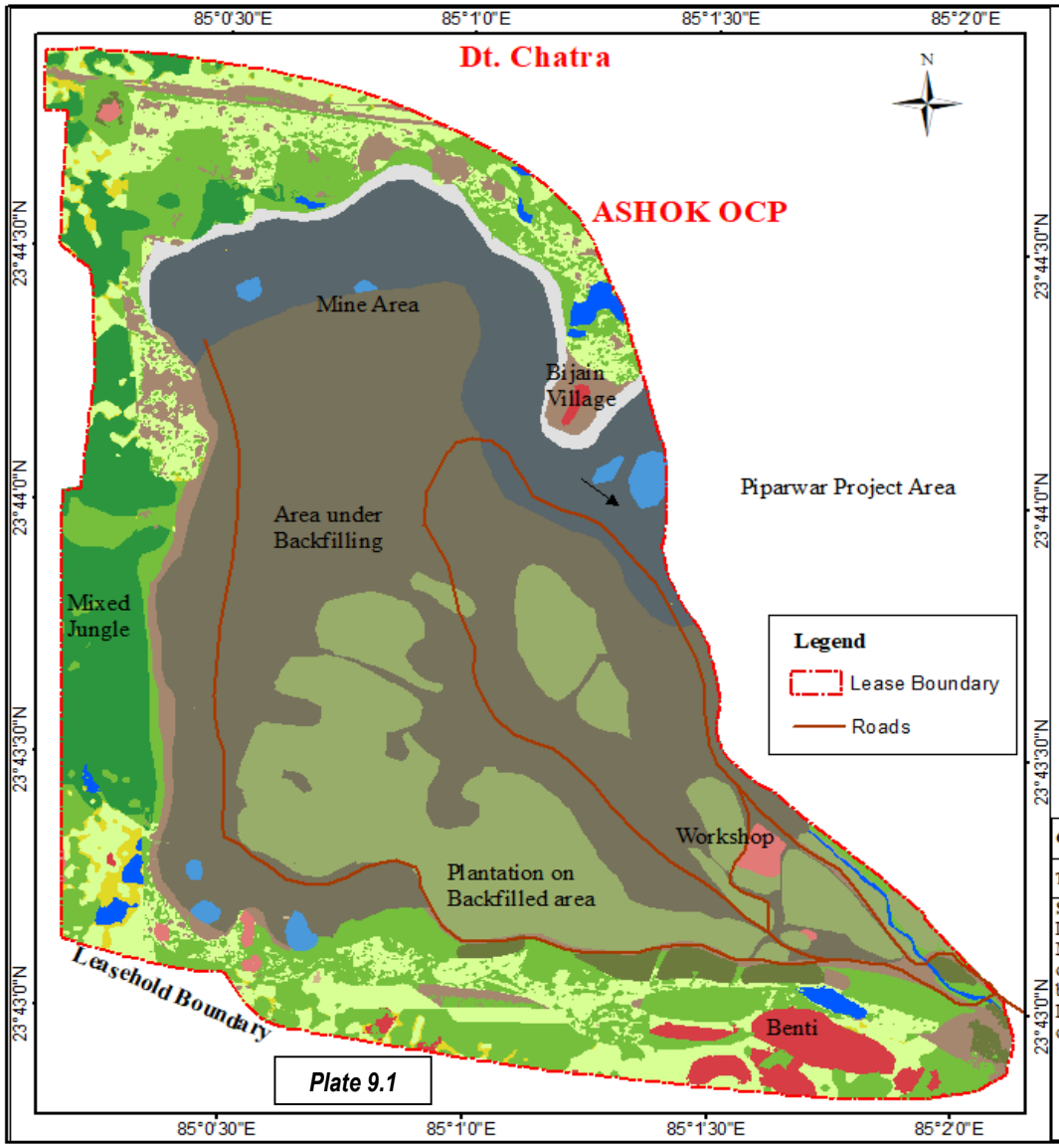
Fig. 9.1: **Land Reclamation Status in 15 OC Projects of CCL for the Year 2023**

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 2023 *(Area in Km²)*

(Area in Sq. Km)

		ASHOK		PIPARWAR		KDH		AMRAPALI		MAGADH		ROHINI		PURNADIH		NORTH URIMARI		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	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	0.50
	Open Forest	0.49	6.18	0.16	1.43	0.00	0.00	0.09	1.45	2.58	14.58	0.00	0.00	1.15	15.29	0.00	0.00	0.27	7.80	1.48	7.47	0.32	10.53	0.00	0.00	0.63	11.98	0.48	10.19	0.03	1.13	7.68	6.99
	Total Forest (A)	**0.49**	**6.18**	**0.16**	**1.43**	**0.00**	**0.00**	**0.09**	**1.45**	**2.58**	**14.58**	**0.00**	**0.00**	**1.15**	**15.29**	**0.00**	**0.00**	**0.27**	**7.80**	**1.48**	**7.47**	**0.32**	**10.53**	**0.00**	**0.00**	**1.18**	**22.43**	**0.48**	**10.19**	**0.03**	**1.13**	**8.23**	**7.49**
	Scrubs(B)	**1.07**	**13.49**	**1.25**	**11.16**	**0.59**	**12.07**	**0.58**	**9.35**	**2.69**	**15.21**	**0.09**	**3.52**	**1.88**	**25.00**	**1.09**	**20.84**	**0.72**	**20.81**	**4.49**	**22.65**	**0.29**	**9.54**	**0.72**	**9.34**	**1.22**	**23.19**	**0.89**	**18.90**	**0.30**	**11.32**	**17.87**	**16.26**
PLANTATION	Social Forestry	0.15	1.89	1.18	10.54	0.18	3.68	0.02	0.32	0.02	0.11	0.00	0.00	0.04	0.53	0.00	0.00	0.09	2.60	2.02	10.19	0.00	0.00	0.80	10.38	0.22	4.18	0.03	0.64	0.03	1.13	4.78	4.35
	Plantation on OB Dump	0.00	0.00	0.15	1.34	0.03	0.61	0.14	2.26	0.08	0.45	0.11	4.30	0.12	1.60	0.07	1.34	0.06	1.73	3.02	15.24	0.12	3.95	1.08	14.01	0.10	1.90	0.03	0.64	0.07	2.64	5.18	4.71
	Plantation on Backfill (Biological Reclamation)	1.27	16.02	1.88	16.79	1.39	28.43	0.15	2.42	0.00	0.00	0.50	19.53	0.25	3.32	0.14	2.68	0.76	21.97	1.27	6.41	0.00	0.00	0.32	4.15	0.27	5.13	0.35	7.43	0.05	1.89	8.60	7.83
	Total Plantation(C)	**1.42**	**17.91**	**3.21**	**28.66**	**1.60**	**32.72**	**0.31**	**5.00**	**0.10**	**0.57**	**0.61**	**23.83**	**0.41**	**5.45**	**0.21**	**4.02**	**0.91**	**26.30**	**6.31**	**31.84**	**0.12**	**3.95**	**2.20**	**28.53**	**0.59**	**11.22**	**0.41**	**8.70**	**0.15**	**5.66**	**18.56**	**16.89**
	Total Vegetation(A+B+C)	**2.98**	**37.58**	**4.62**	**41.25**	**2.19**	**44.79**	**0.98**	**15.81**	**5.37**	**30.36**	**0.70**	**27.34**	**3.44**	**45.74**	**1.30**	**24.86**	**1.90**	**54.91**	**12.28**	**61.96**	**0.73**	**24.01**	**2.92**	**37.87**	**2.99**	**56.84**	**1.78**	**37.79**	**0.48**	**18.11**	**44.66**	**40.65**
ACTIVE MINING	Coal Quarry	0.78	9.84	0.54	4.82	0.13	2.66	0.84	13.55	0.91	5.14	0.14	5.47	0.18	2.39	1.02	19.50	0.12	3.47	0.58	2.93	0.64	21.05	0.41	5.32	0.32	6.08	0.56	11.89	0.47	17.74	7.64	6.95
	Advance Quarry Site	0.08	1.01	0.00	0.00	0.04	0.82	0.07	1.13	0.04	0.23	0.01	0.39	0.03	0.40	0.08	1.53	0.03	0.87	0.18	0.91	0.01	0.33	0.00	0.00	0.03	0.57	0.14	2.97	0.00	0.00	0.74	0.67
	Quarry Filled With Water	0.05	0.63	0.42	3.75	0.16	3.27	0.08	1.29	0.13	0.73	0.30	11.72	0.33	4.39	0.00	0.00	0.06	1.73	0.34	1.72	0.09	2.96	0.27	3.50	0.01	0.19	0.00	0.00	0.13	4.91	2.37	2.16
	Total Area under *Active Mining(D)*	**0.91**	**11.48**	**0.96**	**8.57**	**0.33**	**6.75**	**0.99**	**15.97**	**1.08**	**6.10**	**0.45**	**17.58**	**0.54**	**7.18**	**1.10**	**21.03**	**0.21**	**6.07**	**1.10**	**5.56**	**0.74**	**24.34**	**0.68**	**8.82**	**0.36**	**6.84**	**0.70**	**14.86**	**0.60**	**22.65**	**10.75**	**9.78**
(E)	Coal Dump	0.00	0.00	0.00	0.00	0.02	0.41	0.04	0.65	0.29	1.64	0.00	0.00	0.06	0.80	0.04	0.76	0.00	0.00	0.04	0.20	0.08	2.63	0.06	0.78	0.08	1.52	0.06	1.27	0.06	2.26	0.83	0.76
	Barren OB Dump	0.00	0.00	0.00	0.00	0.00	0.00	0.68	10.97	1.07	6.05	0.00	0.00	0.15	1.99	0.98	18.74	0.18	5.20	0.67	3.38	0.01	0.33	1.46	18.94	0.06	1.14	0.41	8.70	0.74	27.92	6.41	5.83
	Area Under Backfilling (Technical Reclamation)	2.54	32.03	2.72	24.29	1.56	31.90	1.70	27.42	0.68	3.84	1.34	52.34	1.07	14.23	0.44	8.41	0.76	21.97	2.36	11.91	0.95	31.25	0.68	8.82	0.71	13.50	0.95	20.17	0.38	14.34	18.84	17.15
	Total Area under *Mine Operation(D+E)*	**3.45**	**43.51**	**3.68**	**32.86**	**1.91**	**39.06**	**3.41**	**55.01**	**3.12**	**17.64**	**1.79**	**69.92**	**1.82**	**24.20**	**2.56**	**48.94**	**1.15**	**33.24**	**4.17**	**21.04**	**1.78**	**58.55**	**2.88**	**37.36**	**1.21**	**23.00**	**2.12**	**45.00**	**1.78**	**67.17**	**36.83**	**33.52**
WASTELANDS	Waste Lands	0.38	4.79	0.91	8.13	0.26	5.32	0.98	15.81	1.92	10.85	0.03	1.17	0.43	5.72	0.38	7.27	0.14	4.05	1.11	5.60	0.31	10.20	0.39	5.06	0.66	12.55	0.44	9.34	0.23	8.68	8.57	7.80
	Fly Ash Pond / Sand Body	0.00	0.00	0.00	0.00	0.02	0.41	0.02	0.32	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	2.08	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.18
	Total Wasteland	**0.38**	**4.79**	**0.91**	**8.13**	**0.28**	**5.73**	**1.00**	**16.13**	**1.92**	**10.85**	**0.03**	**1.17**	**0.43**	**5.72**	**0.38**	**7.27**	**0.14**	**4.05**	**1.11**	**5.60**	**0.31**	**10.20**	**0.55**	**7.13**	**0.66**	**12.55**	**0.44**	**9.34**	**0.23**	**8.68**	**8.77**	**7.98**
WATERBODY	Reservoir, Nallah, Ponds	0.07	0.88	0.18	1.61	0.04	0.82	0.05	0.81	0.18	1.02	0.04	1.56	0.07	0.93	0.03	0.57	0.01	0.29	0.02	0.10	0.01	0.33	0.05	0.65	0.01	0.19	0.00	0.00	0.00	0.00	0.76	0.69
	Total Waterbodies	**0.07**	**0.88**	**0.18**	**1.61**	**0.04**	**0.82**	**0.05**	**0.81**	**0.18**	**1.02**	**0.04**	**1.56**	**0.07**	**0.93**	**0.03**	**0.57**	**0.01**	**0.29**	**0.02**	**0.10**	**0.01**	**0.33**	**0.05**	**0.65**	**0.01**	**0.19**	**0.00**	**0.00**	**0.00**	**0.00**	**0.76**	**0.69**
AGRICULTURE	Crop Lands	0.06	0.76	0.08	0.71	0.00	0.00	0.08	1.29	0.72	4.07	0.00	0.00	0.17	2.26	0.11	2.10	0.00	0.00	0.00	0.00	0.00	0.00	0.18	2.33	0.00	0.00	0.00	0.00	0.01	0.38	1.41	1.28
	Fallow Lands	0.80	10.09	0.89	7.95	0.21	4.29	0.49	7.90	6.01	33.97	0.00	0.00	1.46	19.41	0.67	12.81	0.04	1.16	1.12	5.65	0.18	5.92	0.47	6.10	0.22	4.18	0.11	2.34	0.02	0.75	12.69	11.55
	Total Agriculture	**0.86**	**10.84**	**0.97**	**8.66**	**0.21**	**4.29**	**0.57**	**9.19**	**6.73**	**38.04**	**0.00**	**0.00**	**1.63**	**21.68**	**0.78**	**14.91**	**0.04**	**1.16**	**1.12**	**5.65**	**0.18**	**5.92**	**0.65**	**8.43**	**0.22**	**4.18**	**0.11**	**2.34**	**0.03**	**1.13**	**14.10**	**12.83**
SETTLEMENTS	Urban Settlement	0.00	0.00	0.29	2.59	0.08	1.64	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.13	0.00	0.00	0.13	3.76	0.45	2.27	0.01	0.33	0.42	5.45	0.08	1.52	0.14	2.97	0.00	0.00	1.61	1.47
	Rural Settlement	0.15	1.89	0.18	1.61	0.02	0.41	0.05	0.81	0.31	1.75	0.00	0.00	0.08	1.06	0.10	1.91	0.06	1.73	0.33	1.66	0.02	0.66	0.04	0.52	0.06	1.14	0.09	1.91	0.05	1.89	1.54	1.40
	Industrial Settlement	0.04	0.50	0.37	3.30	0.16	3.27	0.14	2.26	0.06	0.34	0.00	0.00	0.04	0.53	0.08	1.53	0.03	0.87	0.34	1.72	0.00	0.00	0.20	2.59	0.03	0.57	0.03	0.64	0.08	3.02	1.60	1.46
	Total Settlements	**0.19**	**2.40**	**0.84**	**7.50**	**0.26**	**5.32**	**0.19**	**3.06**	**0.37**	**2.09**	**0.00**	**0.00**	**0.13**	**1.73**	**0.18**	**3.44**	**0.22**	**6.36**	**1.12**	**5.65**	**0.03**	**0.99**	**0.66**	**8.56**	**0.17**	**3.23**	**0.26**	**5.52**	**0.13**	**4.91**	**4.75**	**4.32**
	Grand Total	**7.93**	**100.00**	**11.20**	**100.00**	**4.89**	**100.00**	**6.20**	**100.00**	**17.69**	**100.00**	**2.56**	**100.00**	**7.52**	**100.00**	**5.23**	**100.00**	**3.46**	**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**	**109.87**	**100.00**



Area Statistics - Ashok OCP (2023)				
Classes		Colour	Area	
Level-I	Level-II		Area (Km²)	% of Total
Forest Area	Dense Forest		0.00	0.00
	Open Forest		0.49	6.18
	Total Forest Area		**0.49**	**6.18**
Scrubs	**Scrubs**		**1.07**	**13.49**
Plantation	Social Forestry		0.15	1.89
	Plantation on Backfill		1.27	16.02
	Plantation on OB Dump		0.00	0.00
	Total Plantation		**1.42**	**17.91**
	Total Vegetation Area		**2.98**	**37.58**
Agriculture	Crop Land		0.06	0.76
	Fallow Land		0.80	10.09
	Total Agriculture Area		**0.86**	**10.84**
Waste Land	Waste Land		0.38	4.79
	Total Waste Land		**0.38**	**4.79**
Mining Area	Coal Quarry		0.78	9.84
	Area Under Backfilling		2.54	32.03
	Water Filled Quarry		0.05	0.63
	Coal Dump		0.00	0.00
	Advance Quarry Site		0.08	1.01
	Total Mining Area		**3.45**	**43.51**
Settlements	Rural Settlement		0.15	1.89
	Urban Settlement		0.00	0.00
	Industrial Settlement		0.04	0.50
	Total Settlement Area		**0.19**	**2.40**
Water Body	**River, Ponds**		**0.07**	**0.88**
		Total	**7.93**	**100.00**

Customer	Central Coalfields Limited				
Title	Land Reclamation Monitoring of OC Projects				Job No. 564922120
Subject Land Reclamation Monitoring Status of Ashok OCP based on Satellite Data (RS-2/L-IV) of the year 2023	Activity	Name	Designation	Signature	
	Prepared	Hariharalal B	Ch. Mgr(System)		
	Checked	Rakesh Ranjan	GM(Exc/Geom))		
	Approved	Mohit Rastogi	GM(Geomatics)		
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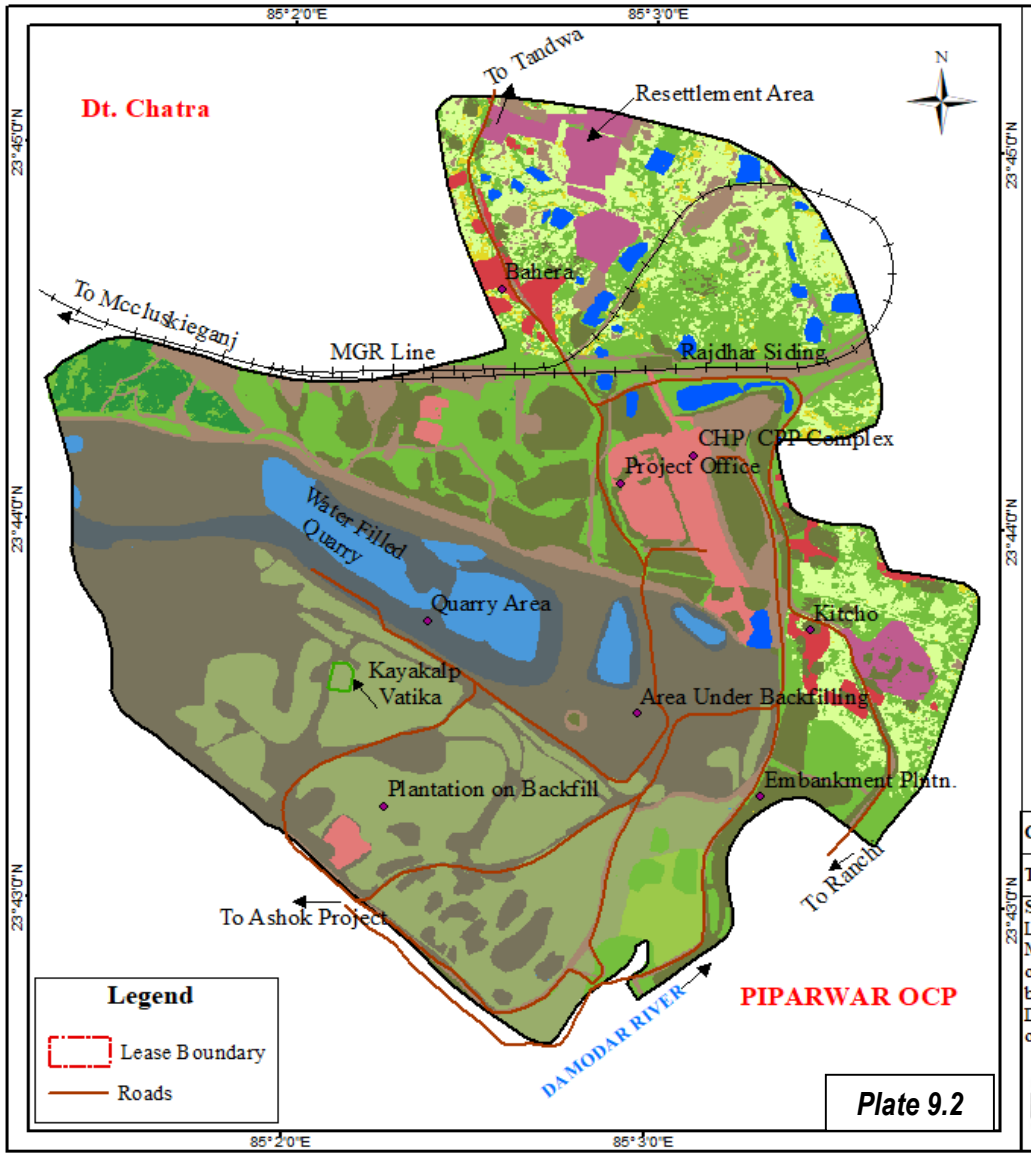
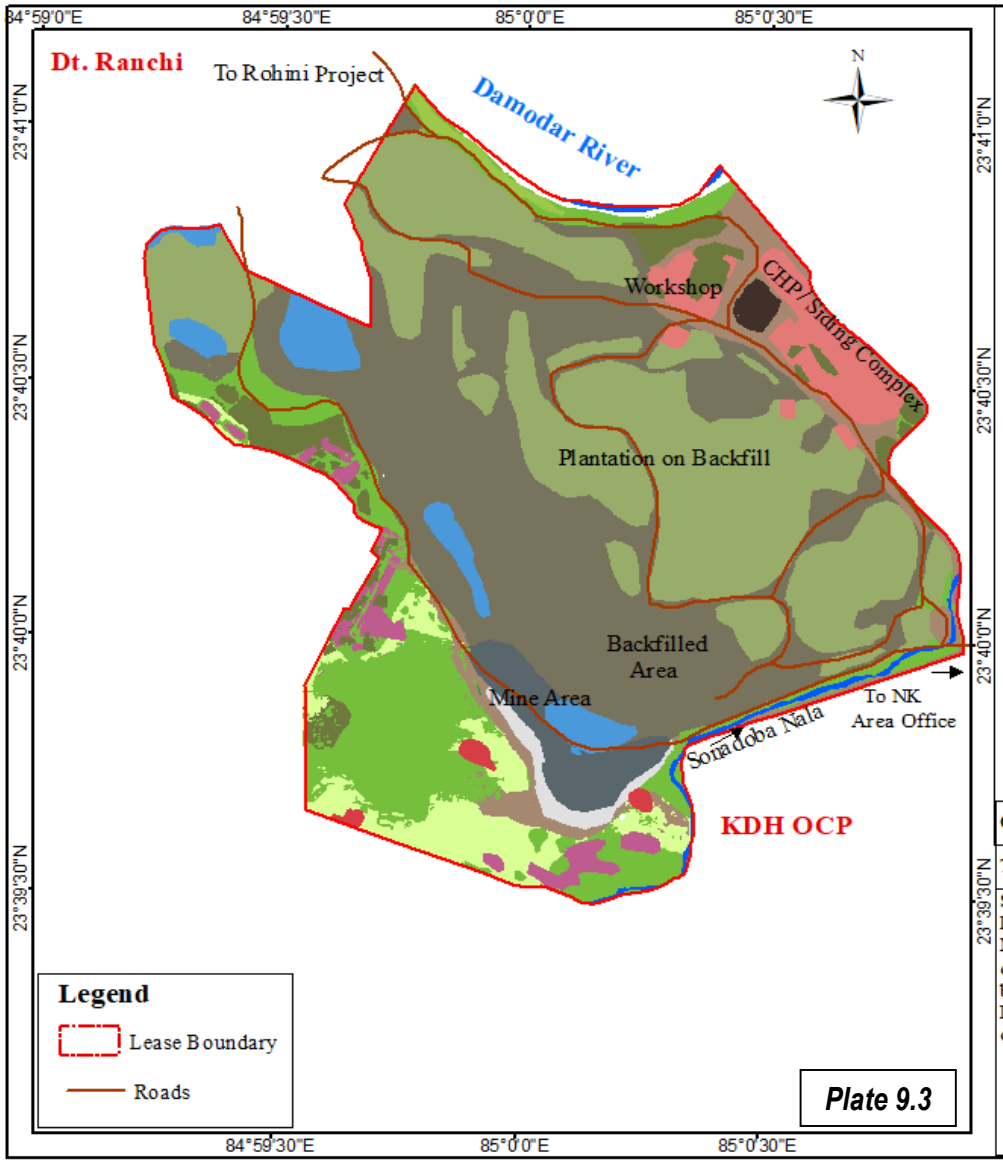
	Drg No. HQ REM 233 A4 01				Rev No.0



Area Statistics - Piparwar OCP (2023)

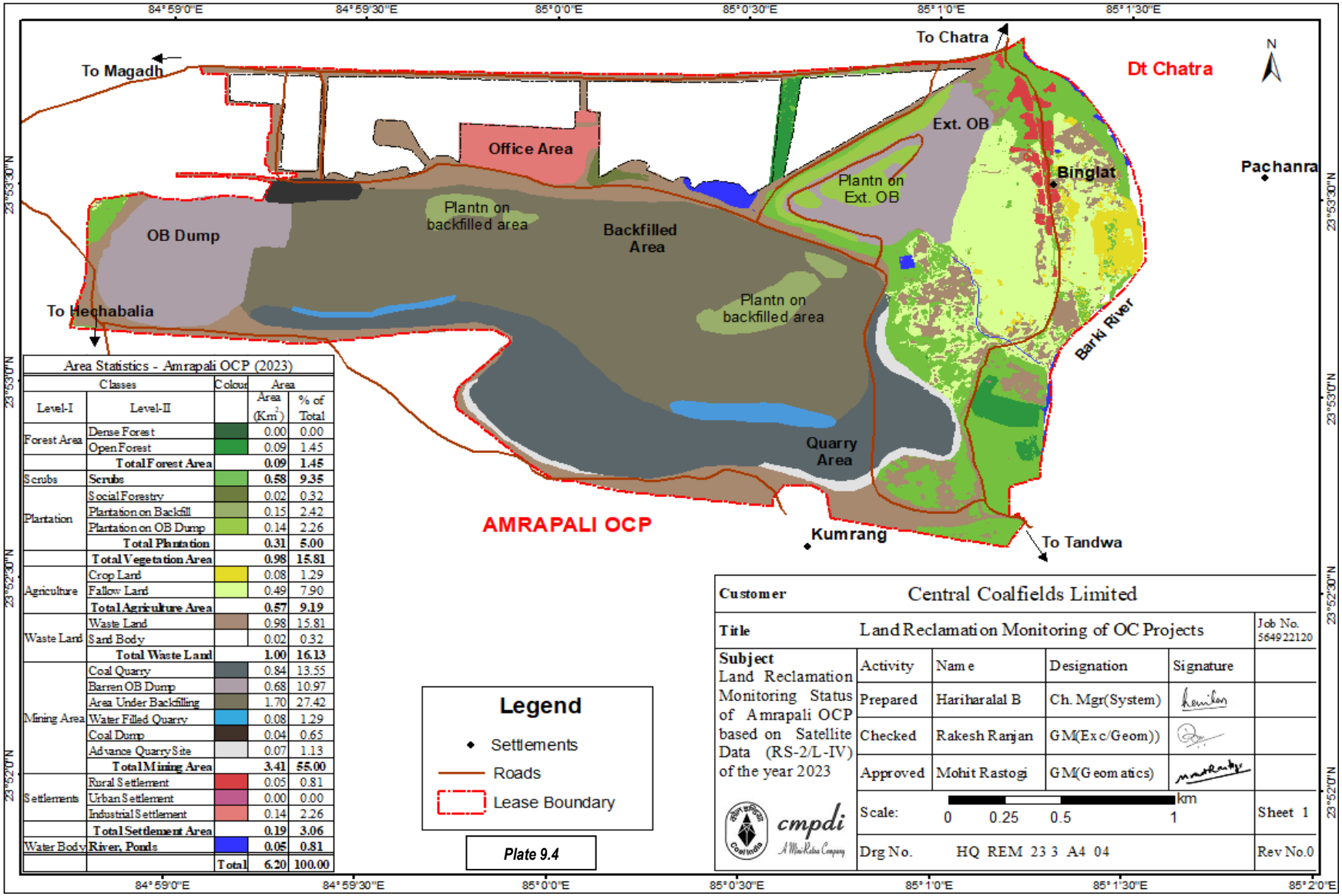
Classes		Colour	Area	
Level-I	Level-II		Area (Km^2)	% of Total
Forest Area	Dense Forest		0.00	0.00
	Open Forest		0.16	1.43
	Total Forest Area		**0.16**	**1.43**
Scrubs	**Scrubs**		**1.25**	**11.16**
Plantation	Social Forestry		1.18	10.54
	Plantation on Backfill		1.88	16.79
	Plantation on OB Dump		0.15	1.34
	Total Plantation		**3.21**	**28.66**
	Total Vegetation Area		**4.62**	**41.25**
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		2.72	24.29
	Water Filled Quarry		0.42	3.75
	Coal Dump		0.00	0.00
	Advance Quarry Site		0.00	0.00
	Total Mining Area		**3.68**	**32.86**
Settlements	Rural Settlement		0.18	1.61
	Urban Settlement		0.29	2.59
	Industrial Settlement		0.37	3.30
	Total Settlement Area		**0.84**	**7.50**
Water Body	**River, Ponds**		**0.18**	**1.61**
		Total	**11.20**	**100.00**

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 2023	Activity	Name	Designation	Signature	
	Prepared	Hariharalal B	Ch. Mgr(System)		
	Checked	Rakesh Ranjan	GM(Exc/Geom))		
	Approved	Mohit Rastogi	GM(Geomatics)		
cmpdi A Mini Ratna Company	Scale: 0 0.25 0.5 1 km				Sheet 1
	Drg No. HQ REM 233 A4 02				Rev No.0



Area Statistics - KDH OCP (2023)				
Classes		Colour	Area	
Level-I	Level-II		Area (Km^2)	% of Total
Forest Area	Dense Forest		0.00	0.00
	Open Forest		0.00	0.00
	Total Forest Area		**0.00**	**0.00**
Scrubs	**Scrubs**		**0.60**	**12.27**
Plantation	Social Forestry		0.18	3.68
	Plantation on Backfill		1.38	28.22
	Plantation on OB Dump		0.03	0.61
	Total Plantation		**1.59**	**32.52**
	Total Vegetation Area		**2.19**	**44.79**
Agriculture	Crop Land		0.00	0.00
	Fallow Land		0.21	4.29
	Total Agriculture Area		**0.21**	**4.29**
Waste Land	Waste Land		0.26	5.32
	Sand Body		0.02	0.41
	Total Waste Land		**0.28**	**5.73**
Mining Area	Coal Quarry		0.13	2.66
	Barren OB Dump		0.00	0.00
	Area Under Backfilling		1.56	31.90
	Water Filled Quarry		0.16	3.27
	Coal Dump		0.02	0.41
	Advance Quarry Site		0.04	0.82
	Total Mining Area		**1.91**	**39.06**
Settlements	Rural Settlement		0.02	0.41
	Urban Settlement		0.08	1.64
	Industrial Settlement		0.16	3.27
	Total Settlement Area		**0.26**	**5.32**
Water Body	**River, Ponds**		**0.04**	**0.82**
		Total	**4.89**	**100.00**

Customer	Central Coalfields Limited				
Title	Land Reclamation Monitoring of OC Projects				Job No. 564922120
Subject Land Reclamation Monitoring Status of KDH OCP based on Satellite Data (RS-2/L-IV) of the year 2023	Activity	Name	Designation	Signature	
	Prepared	Hariharalal B	Ch. Mgr(System)		
	Checked	Rakesh Ranjan	GM(Exc/Geom))		
	Approved	Mohit Rastogi	GM(Geomatics)		
cmpdi	Scale:	0 0.25 0.5 1 km			Sheet 1
	Drg No.	HQ REM 23 3 A4 03			Rev No.0



Area Statistics - Amrapali OCP (2023)

Classes		Colour	Area	
Level-I	Level-II		Area (Km^2)	% of Total
Forest Area	Dense Forest		0.00	0.00
	Open Forest		0.09	1.45
	Total Forest Area		**0.09**	**1.45**
Scrubs	**Scrubs**		**0.58**	**9.35**
Plantation	Social Forestry		0.02	0.32
	Plantation on Backfill		0.15	2.42
	Plantation on OB Dump		0.14	2.26
	Total Plantation		**0.31**	**5.00**
	Total Vegetation Area		**0.98**	**15.81**
Agriculture	Crop Land		0.08	1.29
	Fallow Land		0.49	7.90
	Total Agriculture Area		**0.57**	**9.19**
Waste Land	Waste Land		0.98	15.81
	Sand Body		0.02	0.32
	Total Waste Land		**1.00**	**16.13**
Mining Area	Coal Quarry		0.84	13.55
	Barren OB Dump		0.68	10.97
	Area Under Backfilling		1.70	27.42
	Water Filled Quarry		0.08	1.29
	Coal Dump		0.04	0.65
	Advance Quarry Site		0.07	1.13
	Total Mining Area		**3.41**	**55.00**
Settlements	Rural Settlement		0.05	0.81
	Urban Settlement		0.00	0.00
	Industrial Settlement		0.14	2.26
	Total Settlement Area		**0.19**	**3.06**
Water Body	River, Ponds		0.05	0.81
		Total	6.20	100.00

Legend

- Settlements
- Roads
- Lease Boundary

Plate 9.4

Customer	Central Coalfields Limited			
Title	Land Reclamation Monitoring of OC Projects			Job No. 564922120
Subject Land Reclamation Monitoring Status of Amrapali OCP based on Satellite Data (RS-2/L-IV) of the year 2023	Activity	Name	Designation	Signature
	Prepared	Hariharalal B	Ch. Mgr(System)	
	Checked	Rakesh Ranjan	GM(Exc/Geom))	
	Approved	Mohit Rastogi	GM(Geomatics)	
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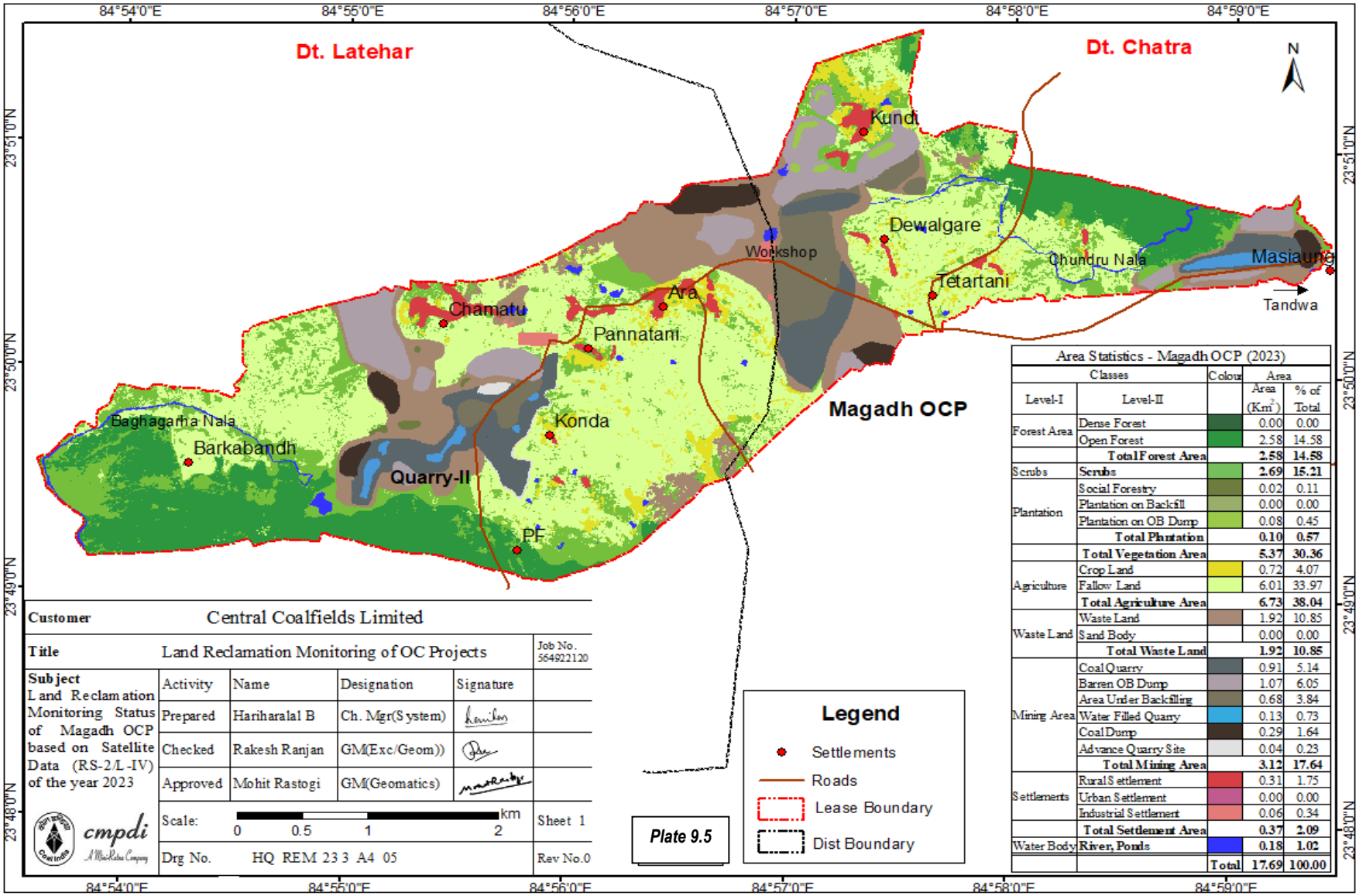
	Drg No. HQ REM 23 3 A4 04			Rev No.0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84°55'0"E
84°56'0"E
84°57'0"E
84°58'0"E
84°59'0"E
23°51'0"N
23°50'0"N
23°49'0"N
23°48'0"N
Dt. Latehar
Dt. Chatra
N
Kundi
Dewalgare
Workshop
Chundru Nala
Masiaune
Tetartani
Tandwa
Ara
Chamatu
Pannatani
Konda
Baghagarha Nala
Barkabandh
Quarry-II
PF
Magadh OCP
Customer
Central Coalfields Limited
Title
Land Reclamation Monitoring of OC Projects
Job No. 564922120
Subject
Land Reclamation Monitoring Status of Magadh OCP based on Satellite Data (RS-2/L-IV) of the year 2023
Activity
Name
Designation
Signature
Prepared
Hariharalal B
Ch. Mgr(System)
Checked
Rakesh Ranjan
GM(Exc/Geom))
Approved
Mohit Rastogi
GM(Geomatics)
Scale:
0
0.5
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Rev No.0
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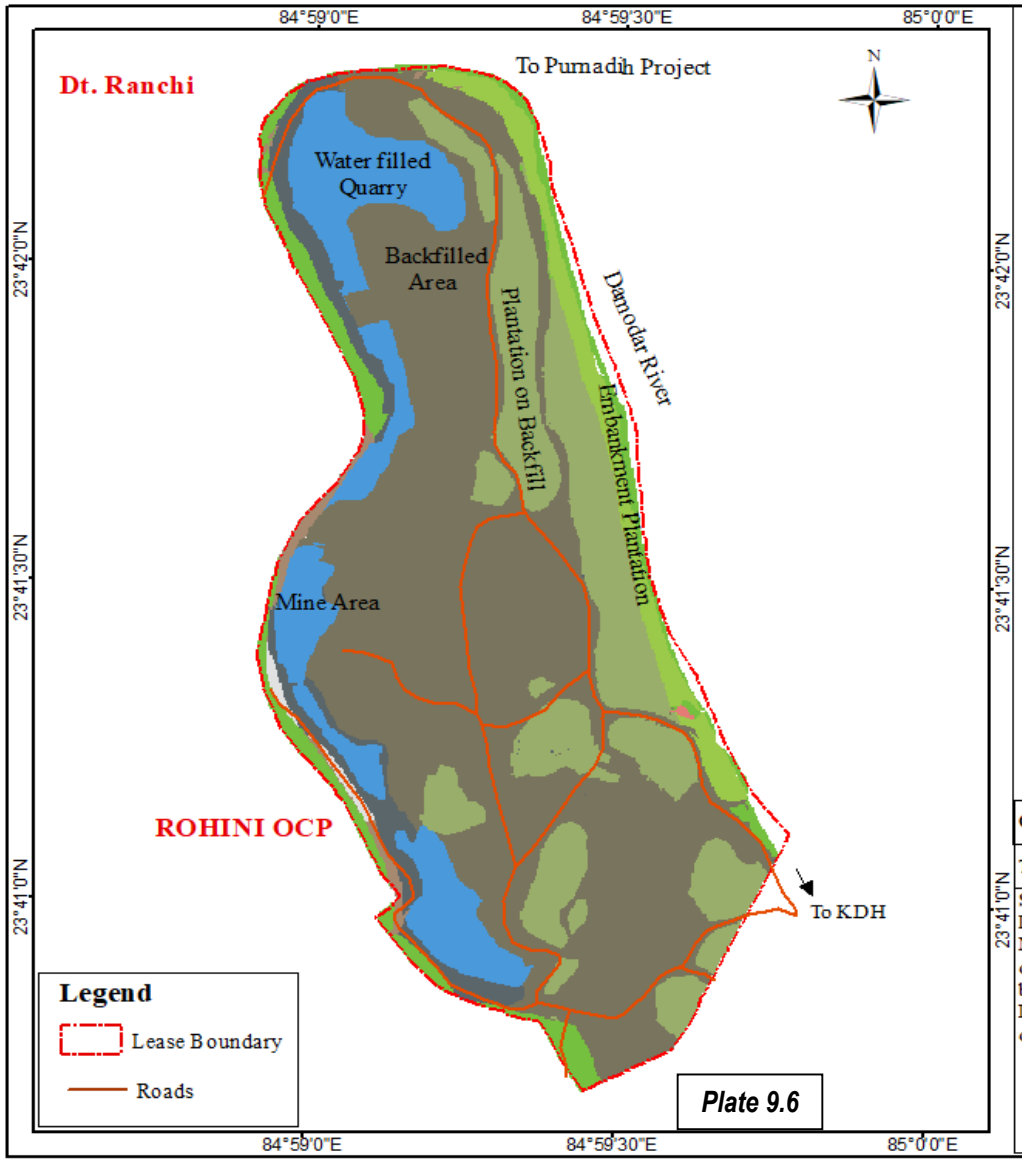
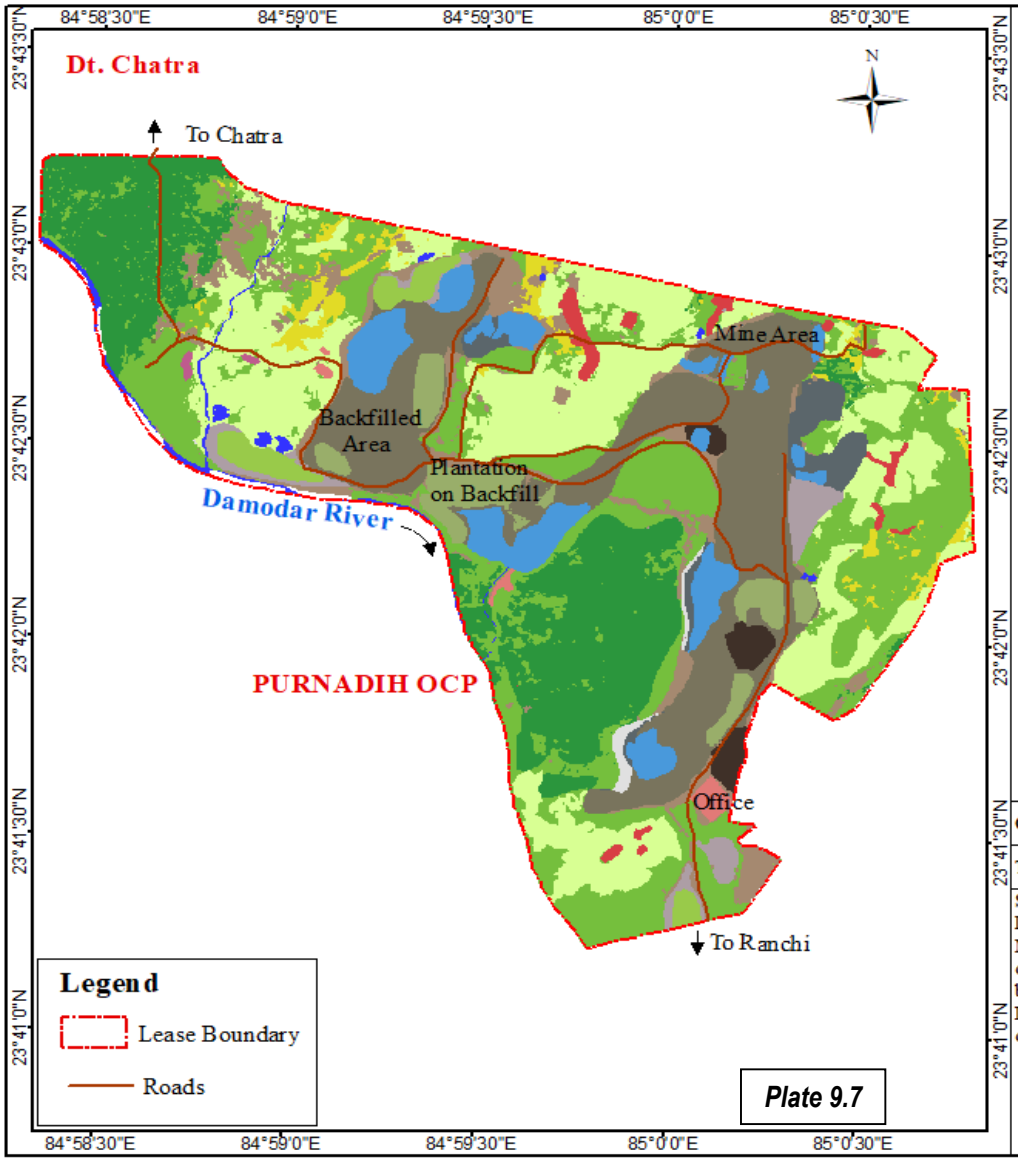
A Miniratna Company
Plate 9.5
Legend
Settlements
Roads
Lease Boundary
Dist Boundary
Area Statistics - Magadh OCP (2023)
Classes
Colour
Area
Level-I
Level-II
Area (Km²)
% of Total
Forest Area
Dense Forest
0.00
0.00
Open Forest
2.58
14.58
Total Forest Area
2.58
14.58
Scrubs
Scrubs
2.69
15.21
Plantation
Social Forestry
0.02
0.11
Plantation on Backfill
0.00
0.00
Plantation on OB Dump
0.08
0.45
Total Plantation
0.10
0.57
Total Vegetation Area
5.37
30.36
Agriculture
Crop Land
0.72
4.07
Fallow Land
6.01
33.97
Total Agriculture Area
6.73
38.04
Waste Land
Waste Land
1.92
10.85
Sand Body
0.00
0.00
Total Waste Land
1.92
10.85
Mining Area
Coal Quarry
0.91
5.14
Barren OB Dump
1.07
6.05
Area Under Backfilling
0.68
3.84
Water Filled Quarry
0.13
0.73
Coal Dump
0.29
1.64
Advance Quarry Site
0.04
0.23
Total Mining Area
3.12
17.64
Settlements
Rural Settlement
0.31
1.75
Urban Settlement
0.00
0.00
Industrial Settlement
0.06
0.34
Total Settlement Area
0.37
2.09
Water Body
River, Ponds
0.18
1.02
Total
17.69
100.00



Area Statistics - Rohini OCP (2023)				
Classes		Colour	Area	
Level-I	Level-II		Area (Km^2)	% of Total
Forest Area	Dense Forest		0.00	0.00
	Open Forest		0.00	0.00
	Total Forest Area		**0.00**	**0.00**
Scrubs	**Scrubs**		**0.09**	**3.52**
Plantation	Social Forestry		0.00	0.00
	Plantation on Backfill		0.50	19.53
	Plantation on OB Dump		0.11	4.30
	Total Plantation		**0.61**	**23.83**
	Total Vegetation Area		**0.70**	**27.34**
Agriculture	Crop Land		0.00	0.00
	Fallow Land		0.00	0.00
	Total Agriculture Area		**0.00**	**0.00**
Waste Land	Waste Land		0.03	**1.17**
	Total Waste Land		**0.03**	**1.17**
Mining Area	Coal Quarry		0.14	5.47
	Barren OB Dump		0.00	0.00
	Area Under Backfilling		1.34	52.34
	Water Filled Quarry		0.30	11.72
	Coal Dump		0.00	0.00
	Advance Quarry Site		0.01	0.39
	Total Mining Area		**1.79**	**69.92**
Settlements	Rural Settlement		0.00	0.00
	Urban Settlement		0.00	0.00
	Industrial Settlement		0.00	0.00
	Total Settlement Area		**0.00**	**0.00**
Water Body	**River, Ponds**		**0.04**	**1.56**
		Total	**2.56**	**100.00**

Customer	Central Coalfields Limited				
Title	Land Reclamation Monitoring of OC Projects				Job No. 564922120
Subject Land Reclamation Monitoring Status of Rohini OCP based on Satellite Data (RS-2/L-IV) of the year 2023	Activity	Name	Designation	Signature	
	Prepared	Hariharalal B	Ch. Mgr(System)		
	Checked	Rakesh Ranjan	GM(Exc/Geom))		
	Approved	Mohit Rastogi	GM(Geomatics)		
cmpdi A Miniratna Company	Scale: 0 125 250 500 Meters				Sheet 1
	Drg No. HQ REM 23 3 A4 06				Rev No.0



Area Statistics - Purnadih OCP (2023)

Classes		Colour	Area	
Level-I	Level-II		Area (Km^2)	% of Total
Forest Area	Dense Forest		0.00	0.00
	Open Forest		1.15	15.29
	Total Forest Area		**1.15**	**15.29**
Scrubs	**Scrubs**		**1.88**	**25.00**
Plantation	Social Forestry		0.04	0.53
	Plantation on Backfill		0.25	3.32
	Plantation on OB Dump		0.12	1.60
	Total Plantation		**0.41**	**5.45**
	Total Vegetation Area		**3.44**	**45.74**
Agriculture	Crop Land		0.17	2.26
	Fallow Land		1.46	19.41
	Total Agriculture Area		**1.63**	**21.68**
Waste Land	Waste Land		0.43	**5.72**
	Total Waste Land		**0.43**	**5.72**
Mining Area	Coal Quarry		0.18	2.39
	Barren OB Dump		0.15	1.99
	Area Under Backfilling		1.07	14.23
	Water Filled Quarry		0.33	4.39
	Coal Dump		0.06	0.80
	Advance Quarry Site		0.03	0.40
	Total Mining Area		**1.82**	**24.20**
Settlements	Rural Settlement		0.08	1.06
	Urban Settlement		0.01	0.13
	Industrial Settlement		0.04	0.53
	Total Settlement Area		**0.13**	**1.73**
Water Body	**River, Ponds**		**0.07**	**0.93**
		Total	**7.52**	**100.00**

Customer	Central Coalfields Limited				
Title	Land Reclamation Monitoring of OC Projects				Job No. 564922120
Subject Land Reclamation Monitoring Status of Purnadih OCP based on Satellite Data (RS-2/L-IV) of the year 2023	Activity	Name	Designation	Signature	
	Prepared	Hariharalal B	Ch. Mgr(System)		
	Checked	Rakesh Ranjan	GM(Exc/Geom))		
	Approved	Mohit Rastogi	GM(Geomatics)		
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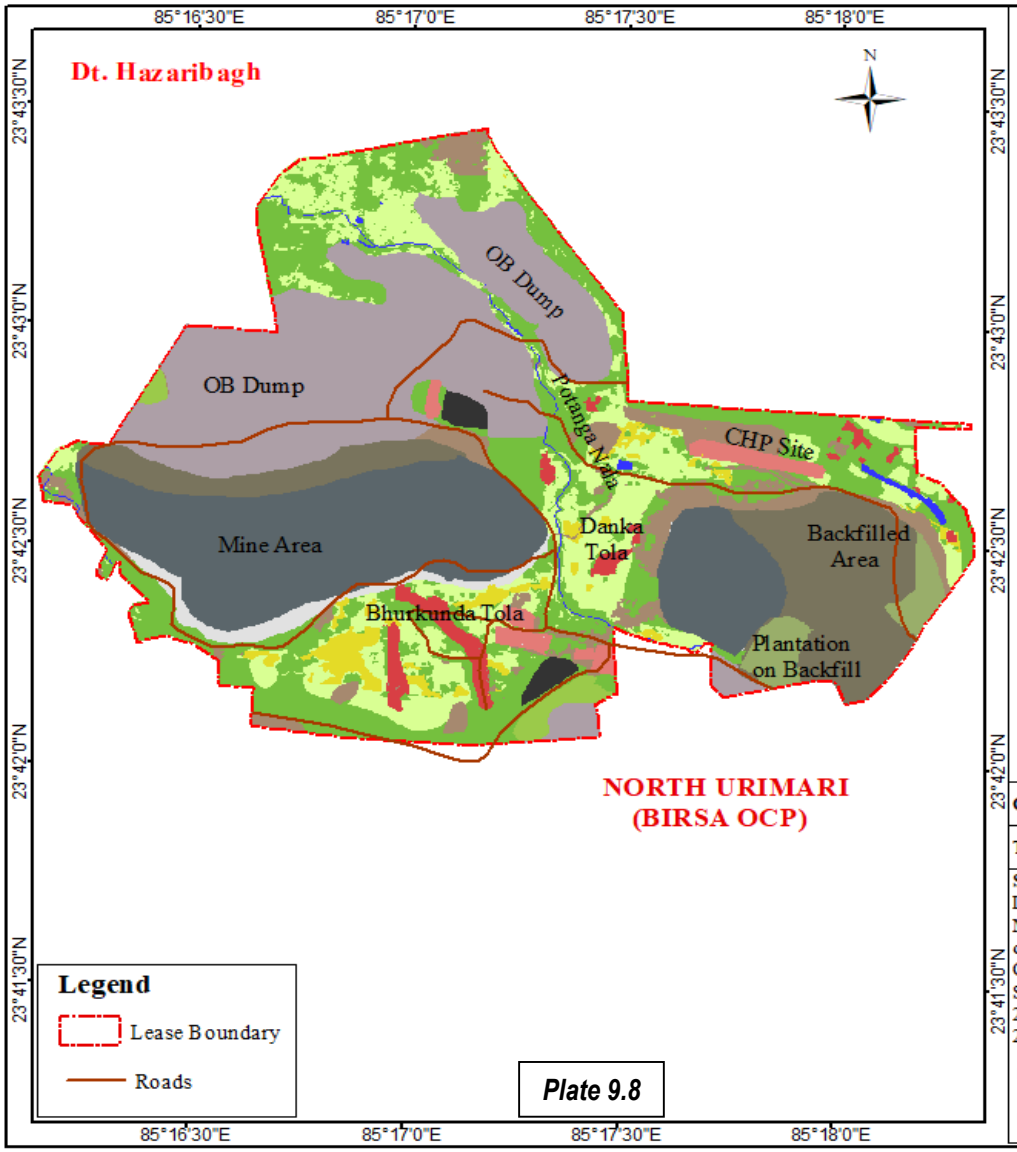

Area Statistics - North Urimari OCP (2023)

Classes		Colour	Area	
Level-I	Level-II		Area (Km^2)	% of Total
Forest Area	Dense Forest		0.00	0.00
	Open Forest		0.00	0.00
	Total Forest Area		**0.00**	**0.00**
Scrubs	**Scrubs**		**1.09**	**20.84**
Plantation	Social Forestry		0.00	0.00
	Plantation on Backfill		0.14	2.68
	Plantation on OB Dump		0.07	1.34
	Total Plantation		**0.21**	**4.02**
	Total Vegetation Area		**1.30**	**24.86**
Agriculture	Crop Land		0.11	2.10
	Fallow Land		0.67	12.81
	Total Agriculture Area		**0.78**	**14.91**
Waste Land	Waste Land		0.38	**7.27**
	Total Waste Land		**0.38**	**7.27**
Mining Area	Coal Quarry		1.02	19.50
	Barren OB Dump		0.98	18.74
	Area Under Backfilling		0.44	8.41
	Water Filled Quarry		0.00	0.00
	Coal Dump		0.04	0.76
	Advance Quarry Site		0.08	1.53
	Total Mining Area		**2.56**	**48.95**
Settlements	Rural Settlement		0.10	1.91
	Urban Settlement		0.00	0.00
	Industrial Settlement		0.08	1.53
	Total Settlement Area		**0.18**	**3.44**
Water Body	**River, Ponds**		**0.03**	**0.57**
		Total	**5.23**	**100.00**

Customer	Central Coalfields Limited				
Title	Land Reclamation Monitoring of OC Projects				Job No. 564922120
Subject Land Reclamation Monitoring Status of North Urimari OCP based on Satellite Data (RS-2/L-IV) of the year 2023	Activity	Name	Designation	Signature	
	Prepared	Hariharalal B	Ch. Mgr(System)		
	Checked	Rakesh Ranjan	GM(Exc/Geom))		
	Approved	Mohit Rastogi	GM(Geomatics)		
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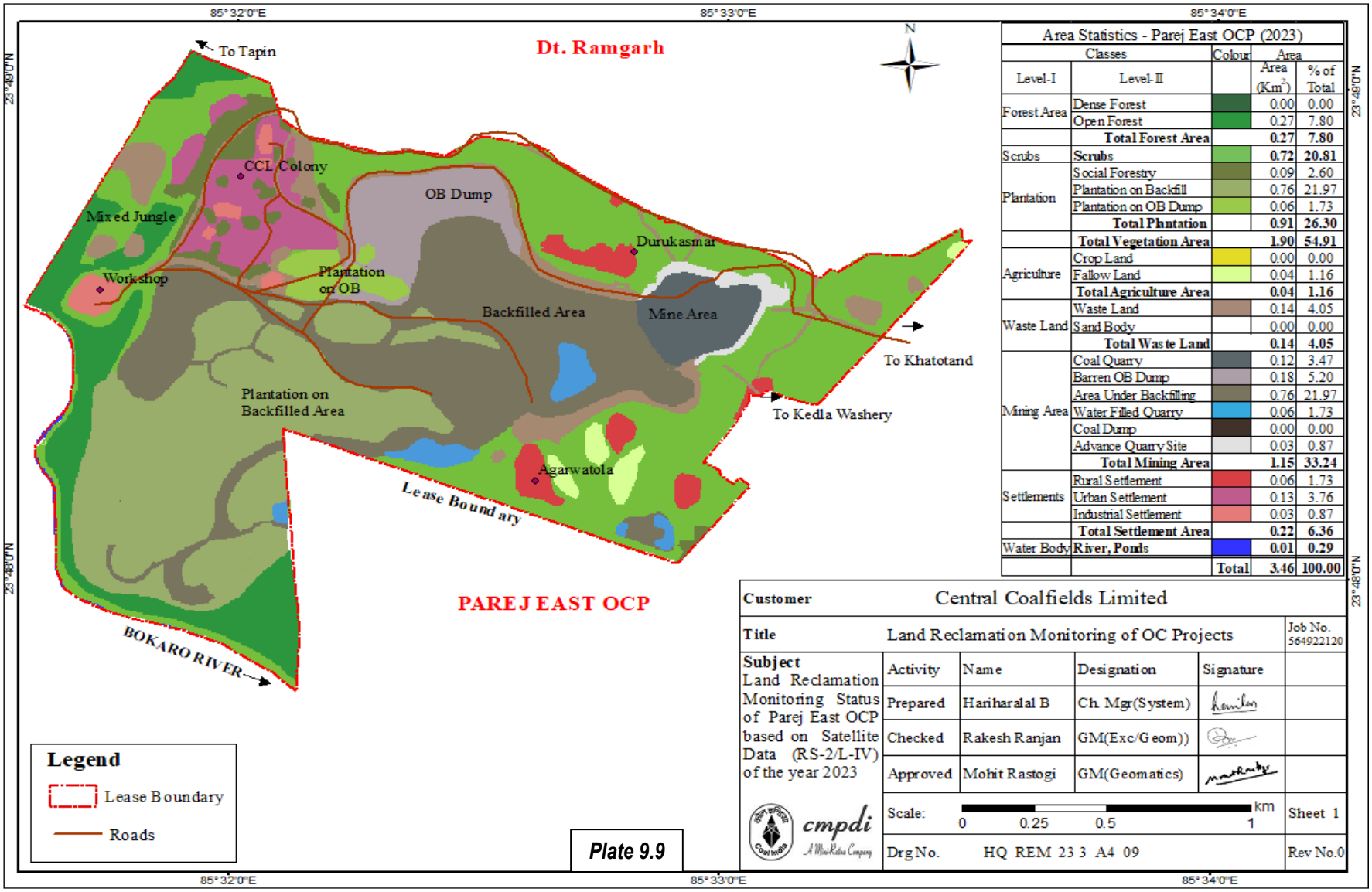
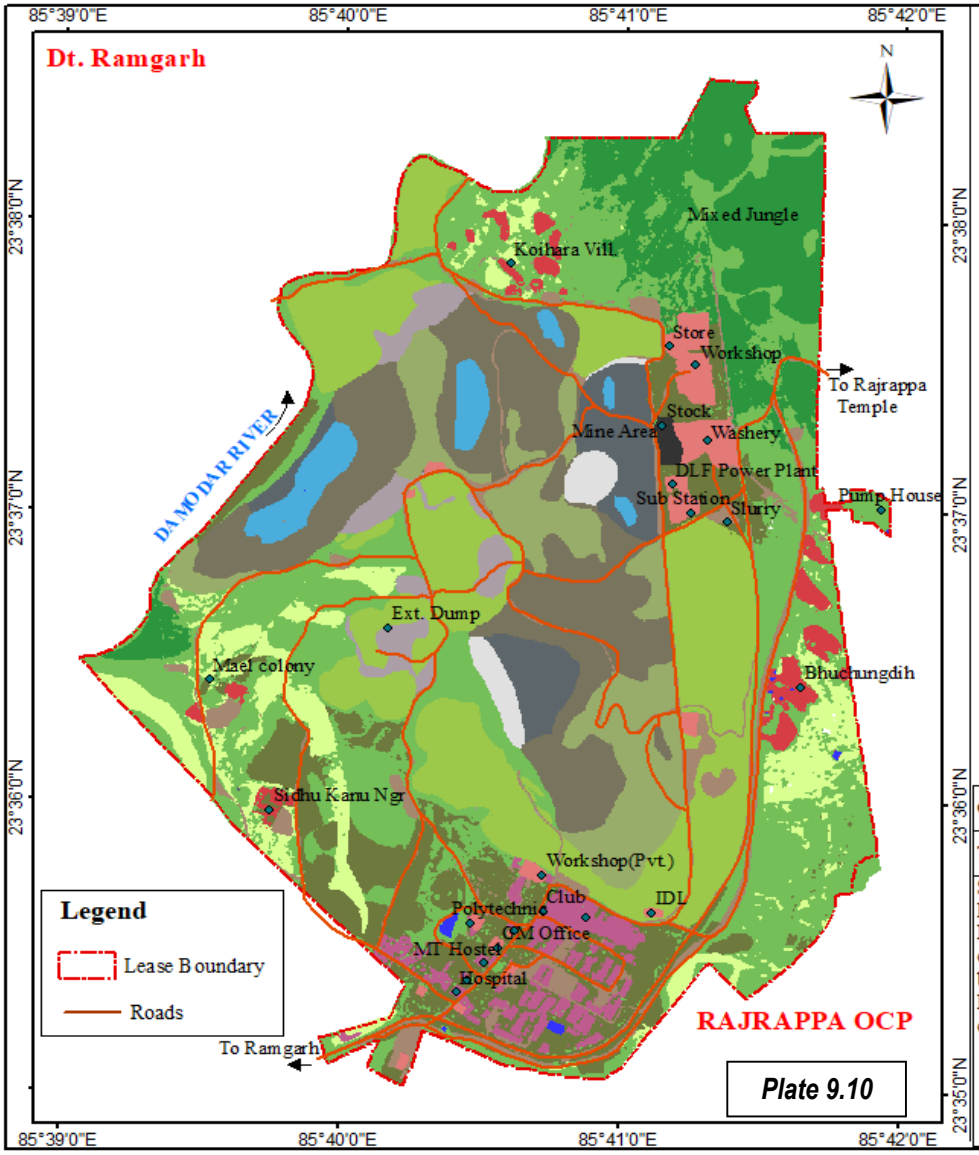
	Drg No. HQ REM 23 3 A4 08				Rev No.0



Area Statistics - Parej East OCP (2023)

Classes		Colour	Area	
Level-I	Level-II		Area (Km^2)	% of Total
Forest Area	Dense Forest		0.00	0.00
	Open Forest		0.27	7.80
	Total Forest Area		**0.27**	**7.80**
Scrubs	**Scrubs**		**0.72**	**20.81**
Plantation	Social Forestry		0.09	2.60
	Plantation on Backfill		0.76	21.97
	Plantation on OB Dump		0.06	1.73
	Total Plantation		**0.91**	**26.30**
	Total Vegetation Area		**1.90**	**54.91**
Agriculture	Crop Land		0.00	0.00
	Fallow Land		0.04	1.16
	Total Agriculture Area		**0.04**	**1.16**
Waste Land	Waste Land		0.14	4.05
	Sand Body		0.00	0.00
	Total Waste Land		**0.14**	**4.05**
Mining Area	Coal Quarry		0.12	3.47
	Barren OB Dump		0.18	5.20
	Area Under Backfilling		0.76	21.97
	Water Filled Quarry		0.06	1.73
	Coal Dump		0.00	0.00
	Advance Quarry Site		0.03	0.87
	Total Mining Area		**1.15**	**33.24**
Settlements	Rural Settlement		0.06	1.73
	Urban Settlement		0.13	3.76
	Industrial Settlement		0.03	0.87
	Total Settlement Area		**0.22**	**6.36**
Water Body	**River, Ponds**		**0.01**	**0.29**
		Total	**3.46**	**100.00**

Customer	Central Coalfields Limited				
Title	Land Reclamation Monitoring of OC Projects				Job No. 564922120
Subject Land Reclamation Monitoring Status of Parej East OCP based on Satellite Data (RS-2/L-IV) of the year 2023	Activity	Name	Designation	Signature	
	Prepared	Hariharalal B	Ch. Mgr(System)		
	Checked	Rakesh Ranjan	GM(Exc/Geom))		
	Approved	Mohit Rastogi	GM(Geomatics)		
cmpdi A Miniratna Company	Scale: 0 0.25 0.5 1 km				Sheet 1
	Drg No. HQ REM 23 3 A4 09				Rev No.0



Area Statistics - Rajrappa OCP (2023)

Classes		Colour	Area	
Level-I	Level-II		Area (Km^2)	% of Total
Forest Area	Dense Forest		0.00	0.00
	Open Forest		1.48	7.46
	Total Forest Area		**1.48**	**7.46**
Scrubs	**Scrubs**		**4.49**	**22.64**
Plantation	Social Forestry		2.02	10.19
	Plantation on Backfill		1.27	6.40
	Plantation on OB Dump		3.02	15.23
	Total Plantation		**6.31**	**31.82**
	Total Vegetation Area		**12.28**	**61.93**
Agriculture	Crop Land		0.00	0.00
	Fallow Land		1.12	5.65
	Total Agriculture Area		**1.12**	**5.65**
Waste Land	Waste Land		1.12	**5.65**
	Total Waste Land		**1.12**	**5.65**
Mining Area	Coal Quarry		0.58	2.92
	Barren OB Dump		0.67	3.38
	Area Under Backfilling		2.36	11.90
	Water Filled Quarry		0.34	1.71
	Coal Dump		0.04	0.20
	Advance Quarry Site		0.18	0.91
	Total Mining Area		**4.17**	**21.03**
Settlements	Rural Settlement		0.33	1.66
	Urban Settlement		0.45	2.27
	Industrial Settlement		0.34	1.71
	Total Settlement Area		**1.12**	**5.65**
Water Body	**River, Ponds**		**0.02**	**0.10**
		Total	**19.83**	**100.00**

Customer	Central Coalfields Limited				
Title	Land Reclamation Monitoring of OC Projects				Job No. 564922120
Subject Land Reclamation Monitoring Status of Rajrappa OCP based on Satellite Data (RS-2/L-IV) of the year 2023	Activity	Name	Designation	Signature	
	Prepared	Hariharalal B	Ch. Mgr(System)		
	Checked	Rakesh Ranjan	GM(Exc/Geom))		
	Approved	Mohit Rastogi	GM(Geomatics)		
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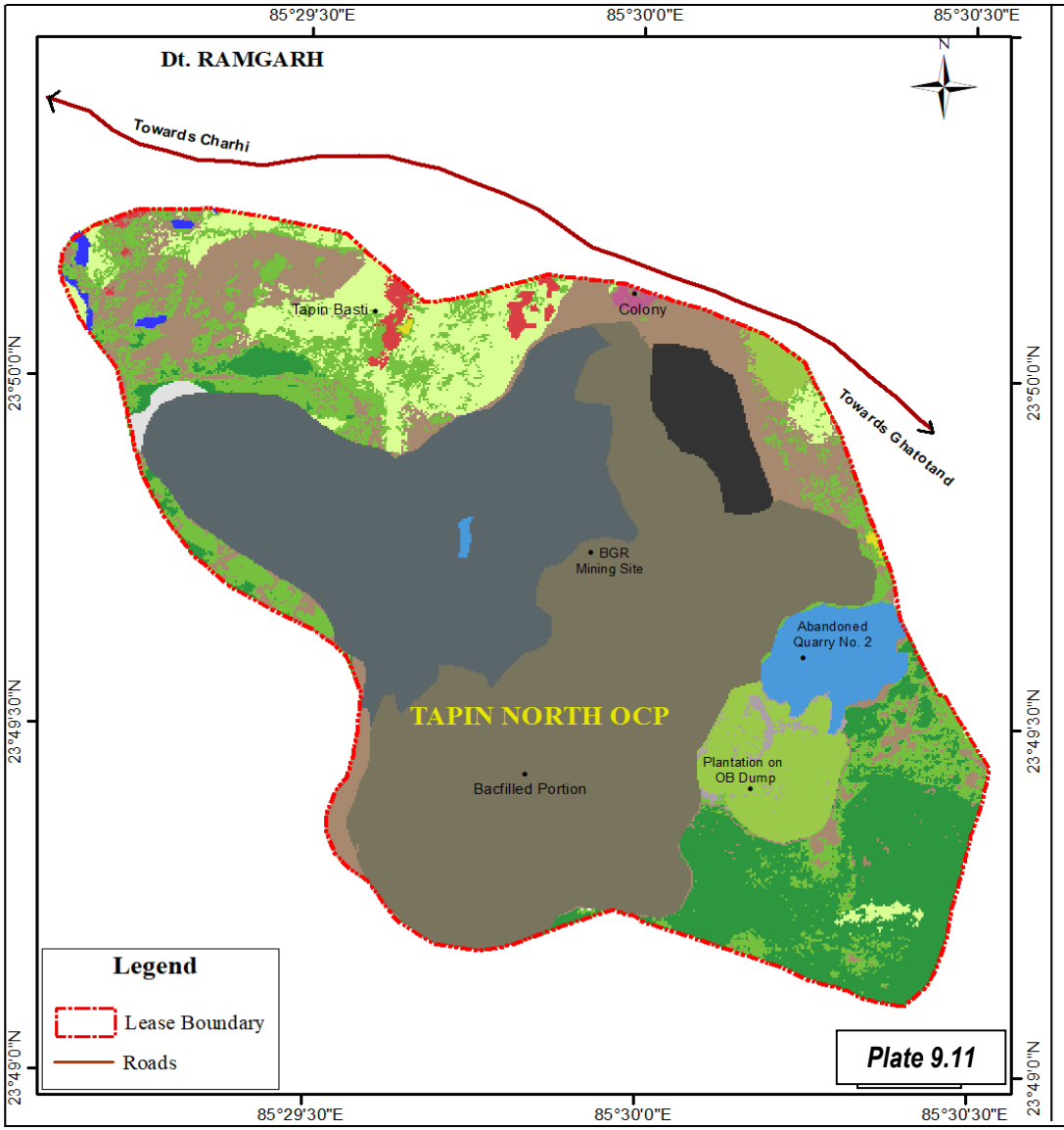
	Drg No.	HQ REM 23 3 A4 10			Rev No.0



Area Statistics -Tapin North OCP (2023)

Classes		Colour	Area	
Level-I	Level-II		Area (Km^2)	% of Total
Forest Area	Dense Forest		0.00	0.00
	Open Forest		0.32	10.53
	Total Forest Area		**0.32**	**10.53**
Scrubs	**Scrubs**		**0.29**	**9.54**
Plantation	Social Forestry		0.00	0.00
	Plantation on Backfill		0.00	0.00
	Plantation on OB Dump		0.12	3.95
	Total Plantation		**0.12**	**3.95**
	Total Vegetation Area		**0.73**	**24.01**
Agriculture	Crop Land		0.00	0.00
	Fallow Land		0.18	5.92
	Total Agriculture Area		**0.18**	**5.92**
Waste Land	Waste Land		0.31	10.20
	Sand Body		0.00	0.00
	Total Waste Land		**0.31**	**10.20**
Mining Area	Coal Quarry		0.64	21.05
	Barren OB Dump		0.01	0.33
	Area Under Backfilling		0.95	31.25
	Water Filled Quarry		0.09	2.96
	Coal Dump		0.08	2.63
	Advance Quarry Site		0.01	0.33
	Total Mining Area		**1.78**	**58.55**
Settlements	Rural Settlement		0.02	0.66
	Urban Settlement		0.01	0.33
	Industrial Settlement		0.00	0.00
	Total Settlement Area		**0.03**	**0.99**
Water Body	**River, Ponds**		**0.01**	**0.33**
		Total	**3.04**	**100.00**

Customer	Central Coalfields Limited				
Title	Land Reclamation Monitoring of OC Projects				Job No. 564922120
Subject Land Reclamation Monitoring Status of Tapin North OCP based on Satellite Data (RS-2/L-IV) of the year 2023	Activity	Name	Designation	Signature	
	Prepared	P. Bhatta	Mgr (Geology)		
	Checked	R. Ranjan	GM (Excav.)		
	Approved	M. Rastogi	GM (Geomatics)		
cmpdi A Mini Ratna Company	Scale: 0 250 500 Mts				Sheet 1
	Drg No. HQ REM 23 A4 11				Rev No.0

Area Statistics - Kathara OCP (2023)

Classes		Colour	Area	
Level-I	Level-II		Area (Km^2)	% of Total
Forest Area	Dense Forest		0.00	0.00
	Open Forest		0.00	0.00
	Total Forest Area		**0.00**	**0.00**
Scrubs	**Scrubs**		**0.72**	**9.34**
Plantation	Social Forestry		0.80	10.38
	Plantation on Backfill		0.32	4.15
	Plantation on OB Dump		1.08	14.01
	Total Plantation		**2.20**	**28.53**
	Total Vegetation Area		**2.92**	**37.87**
Agriculture	Crop Land		0.18	2.33
	Fallow Land		0.47	6.10
	Total Agriculture Area		**0.65**	**8.43**
Waste Land	Waste Land		0.39	5.06
	Sand Body		0.05	0.65
	Fly Ash		0.11	1.43
	Total Waste Land		**0.55**	**7.13**
Mining Area	Coal Quarry		0.41	5.32
	Barren OB Dump		1.46	18.94
	Area Under Backfilling		0.68	8.82
	Water Filled Quarry		0.27	3.50
	Coal Dump		0.06	0.78
	Advance Quarry Site		0.00	0.00
	Total Mining Area		**2.88**	**37.35**
Settlements	Rural Settlement		0.04	0.52
	Urban Settlement		0.42	5.45
	Industrial Settlement		0.20	2.59
	Total Settlement Area		**0.66**	**8.56**
Water Body	**River, Ponds**		**0.05**	**0.65**
		Total	**7.71**	**100.00**

Customer	Central Coalfields Limited				
Title	Land Reclamation Monitoring of OC Projects				Job No. 564922120
Subject Land Reclamation Monitoring Status of Kathara OCP based on Satellite Data (RS-2/L-IV) of the year 2023	Activity	Name	Designation	Signature	Date
	Prepared	P. Bhatta	Mgr (Geology)		
	Checked	R. Ranjan	GM (Excav.)		
	Approved	M. Rastogi	GM (Geomatics)		
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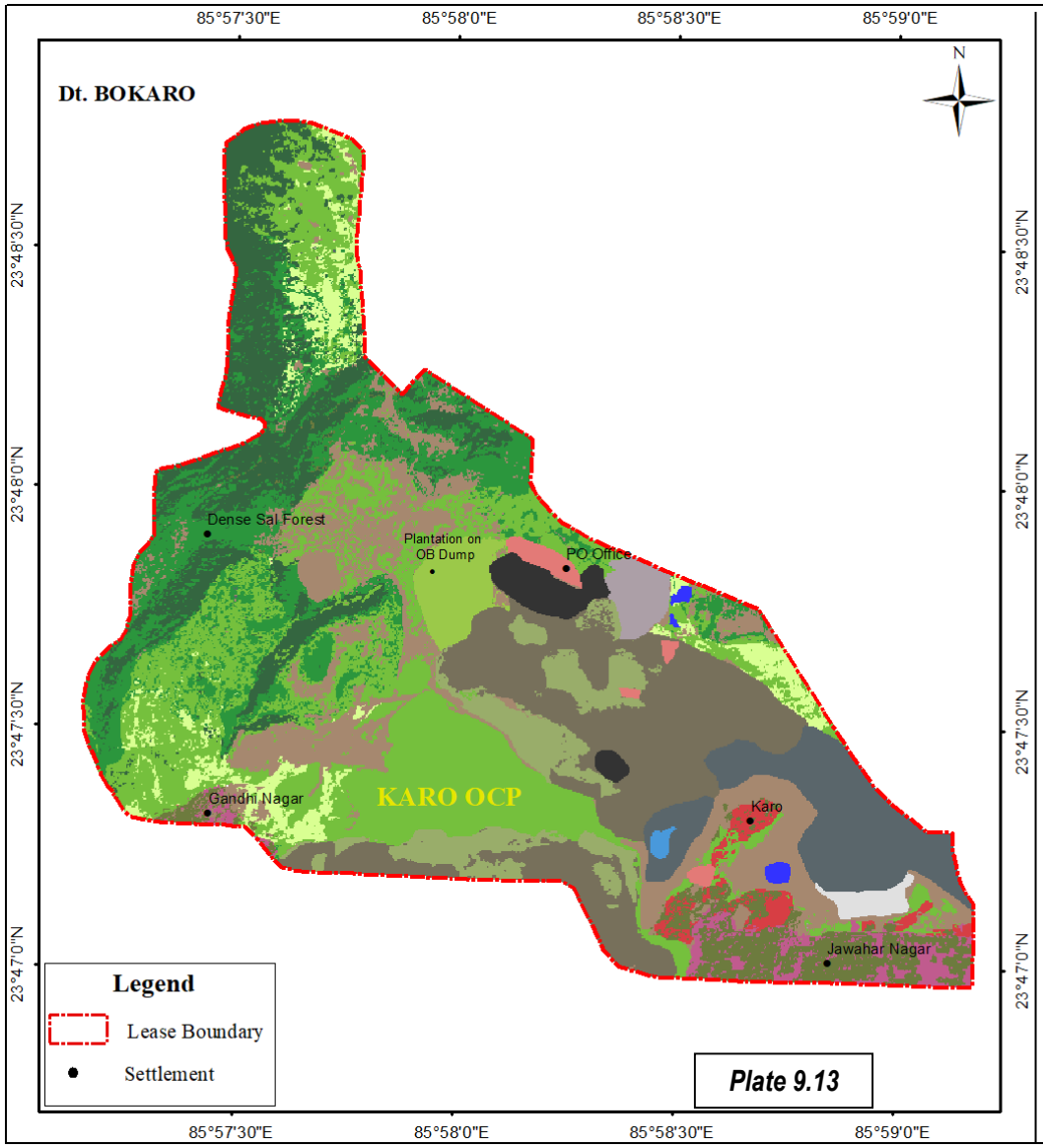

Area Statistics -Karo OCP (2023)

Classes		Colour	Area	
Level-I	Level-II		Area (Km^2)	% of Total
Forest Area	Dense Forest		0.55	10.46
	Open Forest		0.63	11.98
	Total Forest Area		**1.18**	**22.43**
Scrubs	**Scrubs**		**1.22**	**23.19**
Plantation	Social Forestry		0.22	4.18
	Plantation on Backfill		0.27	5.13
	Plantation on OB Dump		0.10	1.90
	Total Plantation		**0.59**	**11.22**
	Total Vegetation Area		**2.99**	**56.84**
Agriculture	Crop Land		0.00	0.00
	Fallow Land		0.22	4.18
	Total Agriculture Area		**0.22**	**4.18**
Waste Land	Waste Land		0.66	12.55
	Sand Body		0.00	0.00
	Total Waste Land		**0.66**	**12.55**
Mining Area	Coal Quarry		0.32	6.08
	Barren OB Dump		0.06	1.14
	Area Under Backfilling		0.71	13.50
	Water Filled Quarry		0.01	0.19
	Coal Dump		0.08	1.52
	Advance Quarry Site		0.03	0.57
	Total Mining Area		**1.21**	**23.00**
Settlements	Rural Settlement		0.06	1.14
	Urban Settlement		0.08	1.52
	Industrial Settlement		0.03	0.57
	Total Settlement Area		**0.17**	**3.23**
Water Body	**River, Ponds**		**0.01**	**0.19**
		Total	**5.26**	**100.00**

Customer	Central Coalfields Limited				
Title	Land Reclamation Monitoring of OC Projects				Job No. 564922120
Subject Land Reclamation Monitoring Status of Karo OCP based on Satellite Data (RS-2/L-IV) of the year 2023	Activity	Name	Designation	Signature	Date
	Prepared	P. Bhatta	Mgr (Geology)		
	Checked	R. Ranjan	GM (Excav.)		
	Approved	M. Rastogi	GM (Geomatics)		
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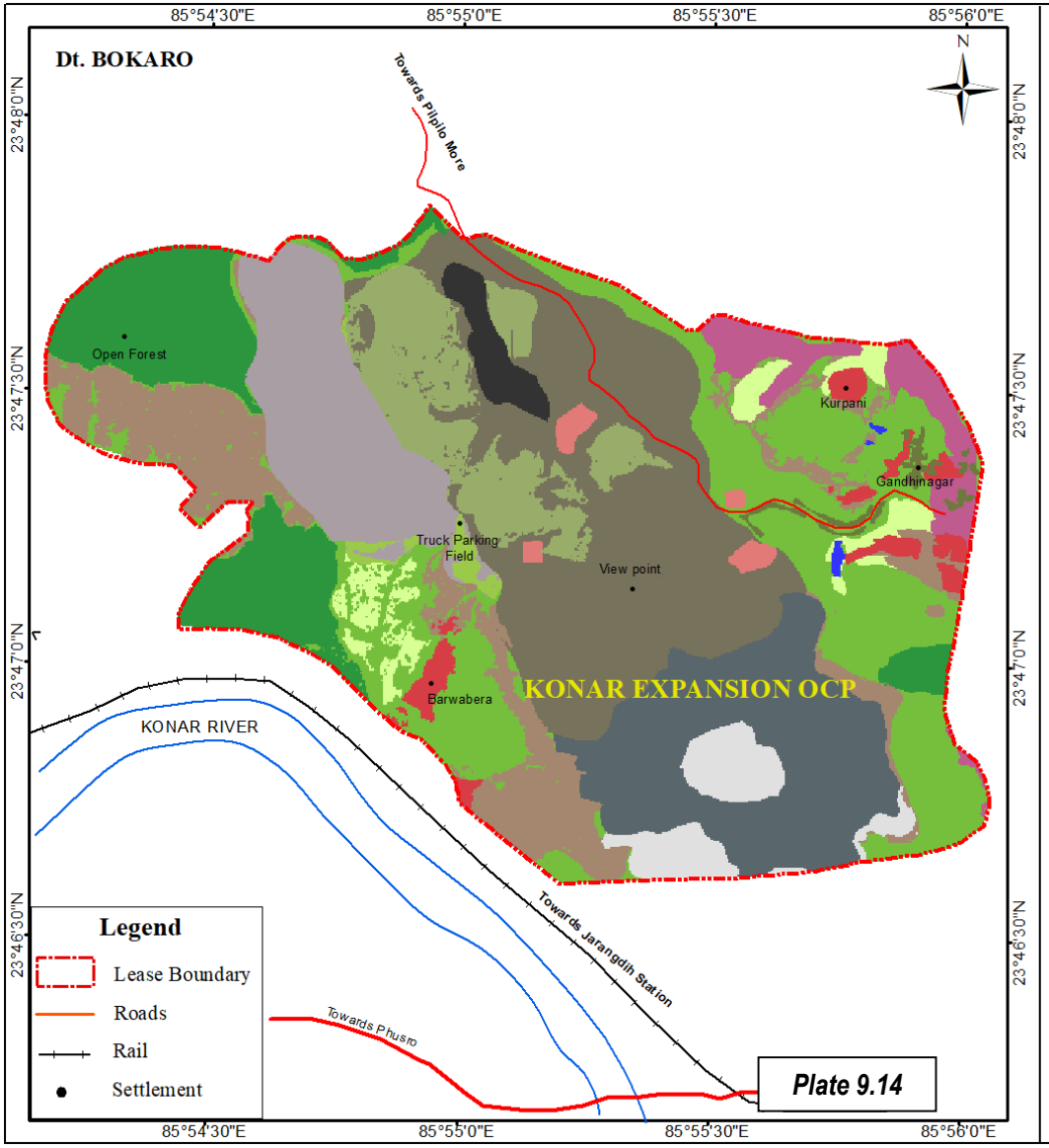

Area Statistics -Konar Expansion OCP (2023)

Classes		Colour	Area	
Level-I	Level-II		Area (Km^2)	% of Total
Forest Area	Dense Forest		0.00	0.00
	Open Forest		0.48	10.19
	Total Forest Area		**0.48**	**10.19**
Scrubs	**Scrubs**		**0.89**	**18.90**
Plantation	Social Forestry		0.03	0.64
	Plantation on Backfill		0.35	7.43
	Plantation on OB Dump		0.03	0.64
	Total Plantation		**0.41**	**8.70**
	Total Vegetation Area		**1.78**	**37.79**
Agriculture	Crop Land		0.00	0.00
	Fallow Land		0.11	2.34
	Total Agriculture Area		**0.11**	**2.34**
Waste Land	Waste Land		0.44	9.34
	Sand Body		0.00	0.00
	Total Waste Land		**0.44**	**9.34**
Mining Area	Coal Quarry		0.56	11.89
	Barren OB Dump		0.41	8.70
	Area Under Backfilling		0.95	20.17
	Water Filled Quarry		0.00	0.00
	Coal Dump		0.06	1.27
	Advance Quarry Site		0.14	2.97
	Total Mining Area		**2.12**	**45.01**
Settlements	Rural Settlement		0.09	1.91
	Urban Settlement		0.14	2.97
	Industrial Settlement		0.03	0.64
	Total Settlement Area		**0.26**	**5.52**
Water Body	**River, Ponds**		**0.00**	**0.00**
		Total	**4.71**	**100.00**

Customer	Central Coalfields Limited				
Title	Land Reclamation Monitoring of OC Projects				Job No. 564922120
Subject Land Reclamation Monitoring Status of Konar Expn. OCP based on Satellite Data (RS-2/L-IV) of the year 2023	Activity	Name	Designation	Signature	Date
	Prepared	P. Bhatta	Mgr (Geology)		
	Checked	R. Ranjan	GM (Excav.)		
	Approved	M. Rastogi	GM (Geomatics)		
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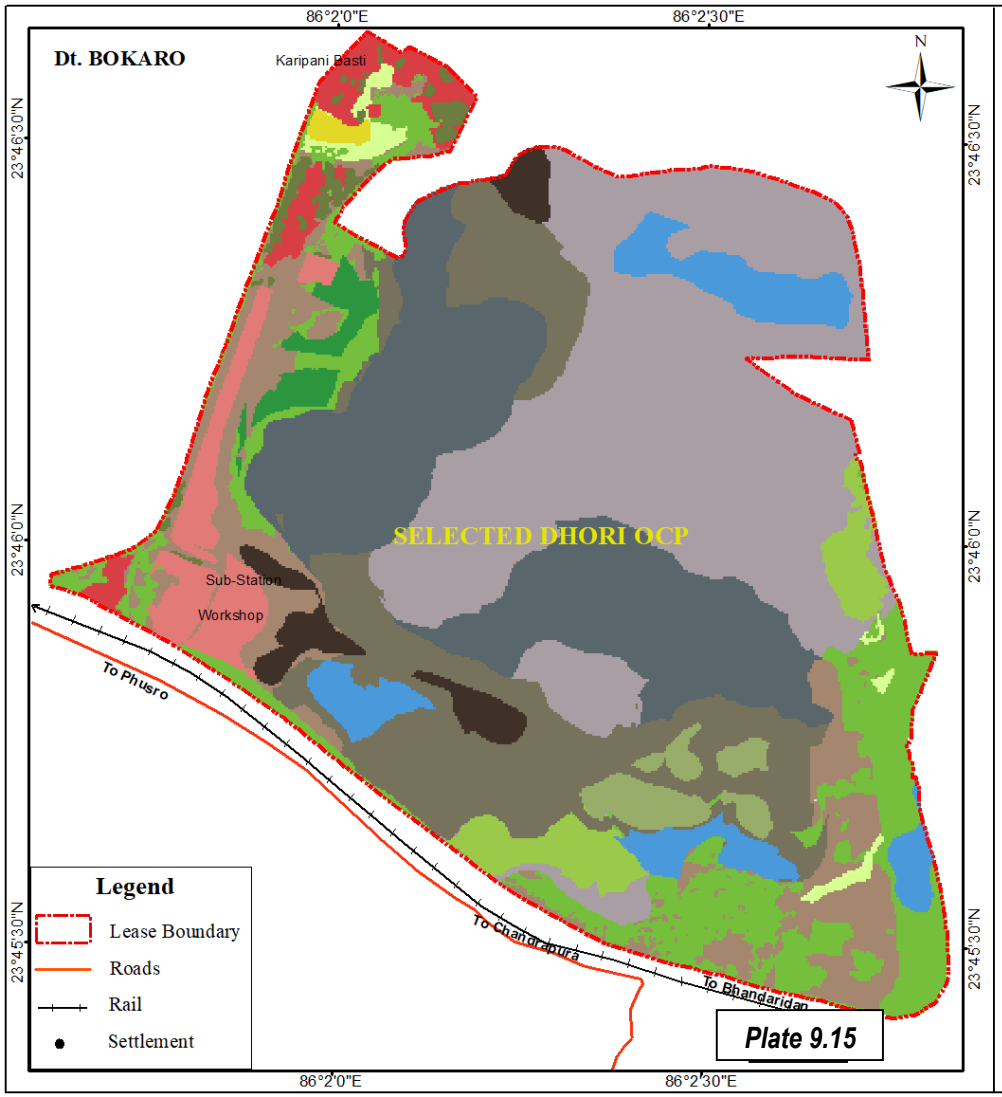

Area Statistics - Selected Dhori OCP (2023)

Classes		Colour	Area	
Level-I	Level-II		Area (Km^2)	% of Total
Forest Area	Dense Forest		0.00	0.00
	Open Forest		0.03	1.13
	Total Forest Area		**0.03**	**1.13**
Scrubs	**Scrubs**		**0.30**	**11.32**
Plantation	Social Forestry		0.03	1.13
	Plantation on Backfill		0.05	1.89
	Plantation on OB Dump		0.07	2.64
	Total Plantation		**0.15**	**5.66**
	Total Vegetation Area		**0.48**	**18.11**
Agriculture	Crop Land		0.01	0.38
	Fallow Land		0.02	0.75
	Total Agriculture Area		**0.03**	**1.13**
Waste Land	Waste Land		0.23	8.68
	Sand Body		0.00	0.00
	Total Waste Land		**0.23**	**8.68**
Mining Area	Coal Quarry		0.47	17.74
	Barren OB Dump		0.74	27.92
	Area Under Backfilling		0.38	14.34
	Water Filled Quarry		0.13	4.91
	Coal Dump		0.06	2.26
	Advance Quarry Site		0.00	0.00
	Total Mining Area		**1.78**	**67.17**
Settlements	Rural Settlement		0.05	1.89
	Urban Settlement		0.00	0.00
	Industrial Settlement		0.08	3.02
	Total Settlement Area		**0.13**	**4.91**
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 2023	Activity	Name	Designation	Signature	Date
	Prepared	P. Bhatta	Mgr (Geology)		
	Checked	R. Ranjan	GM (Excav.)		
	Approved	M. Rastogi	GM (Geomatics)		
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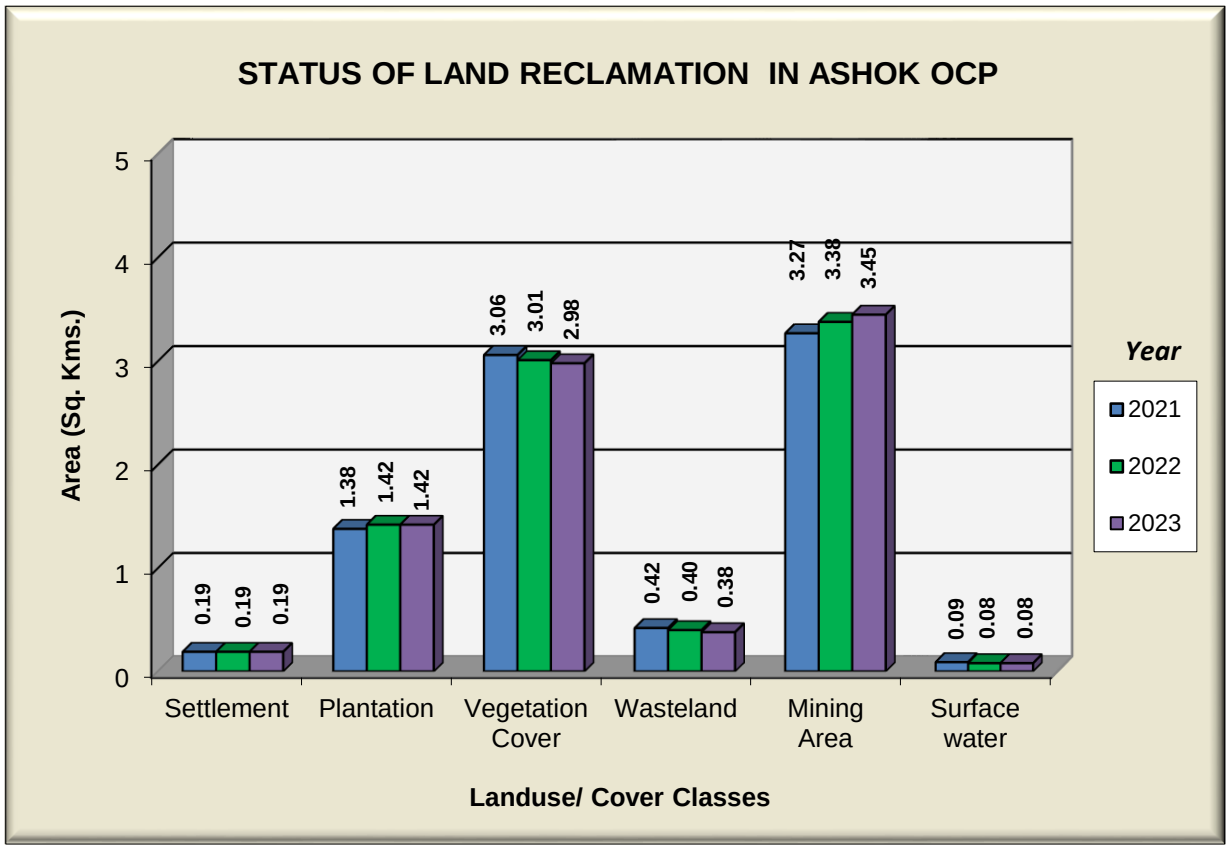


Figure 9.2

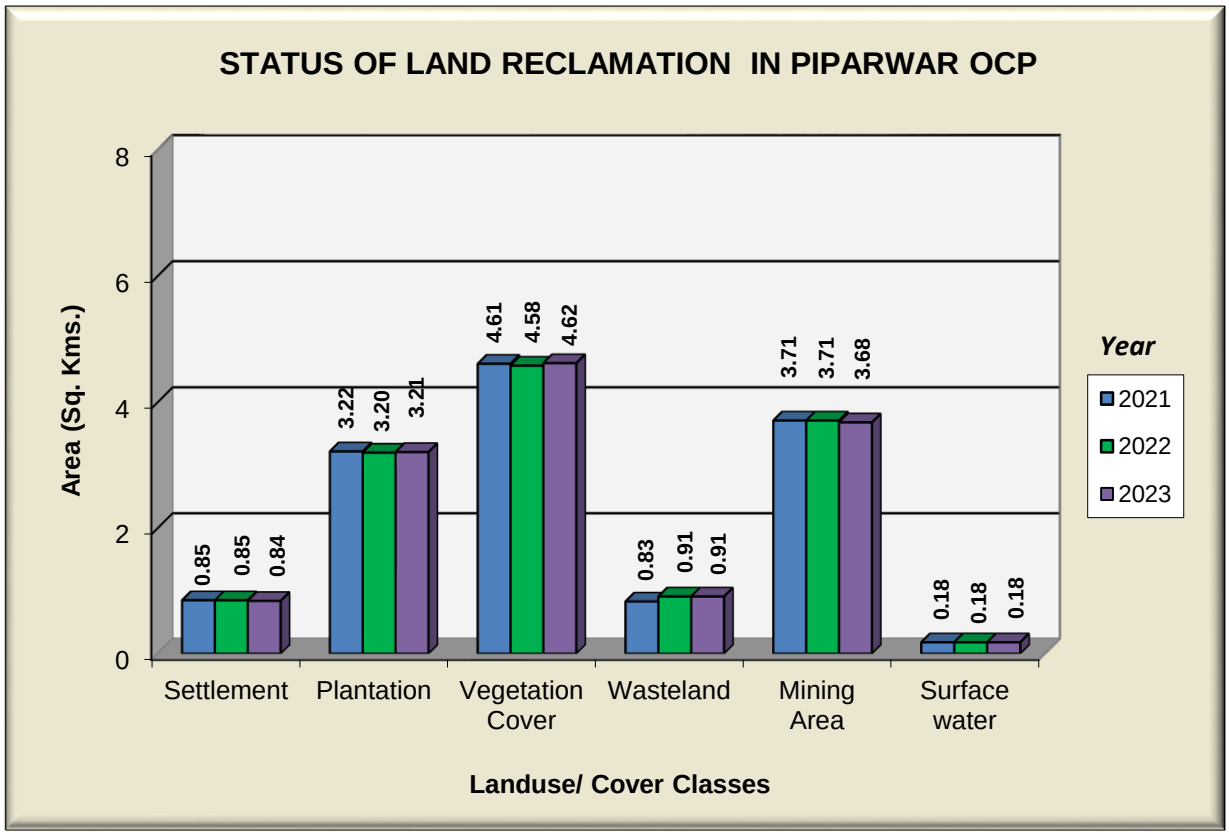


Figure 9.3

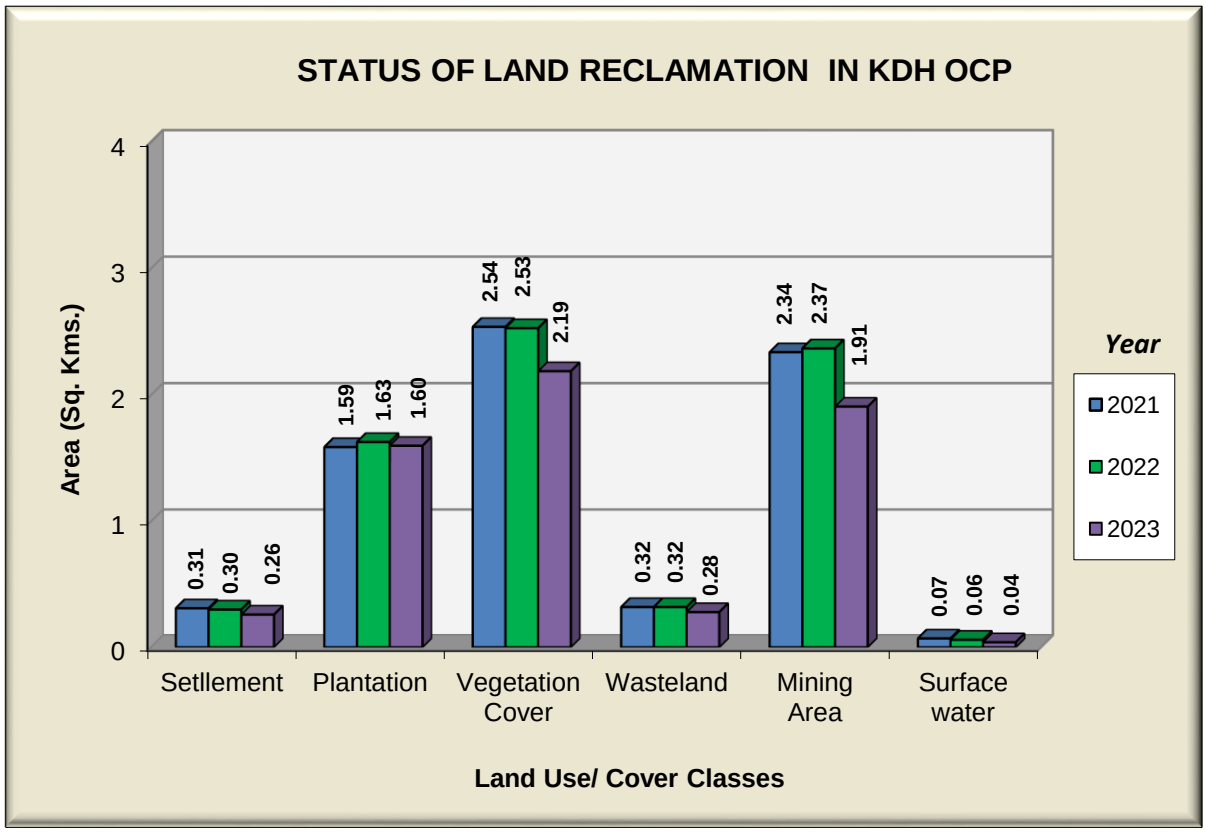


Figure 9.4

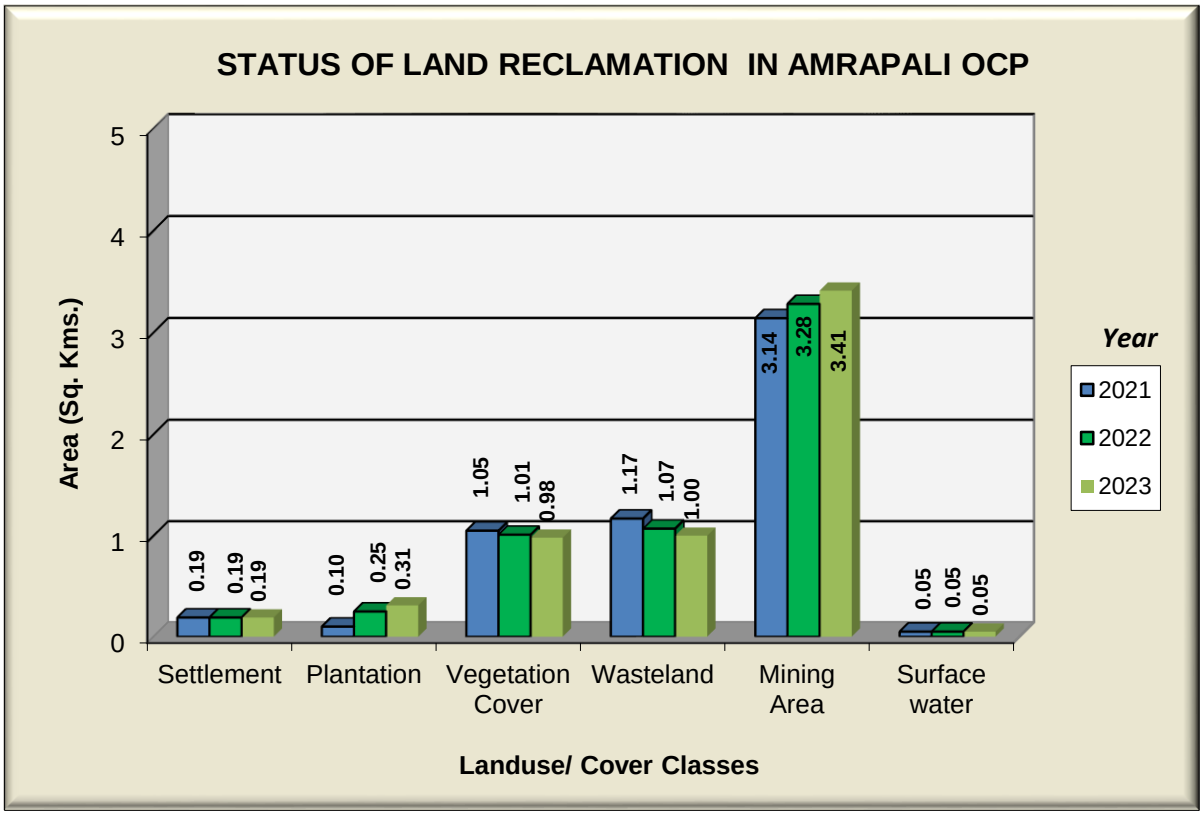


Figure 9.5

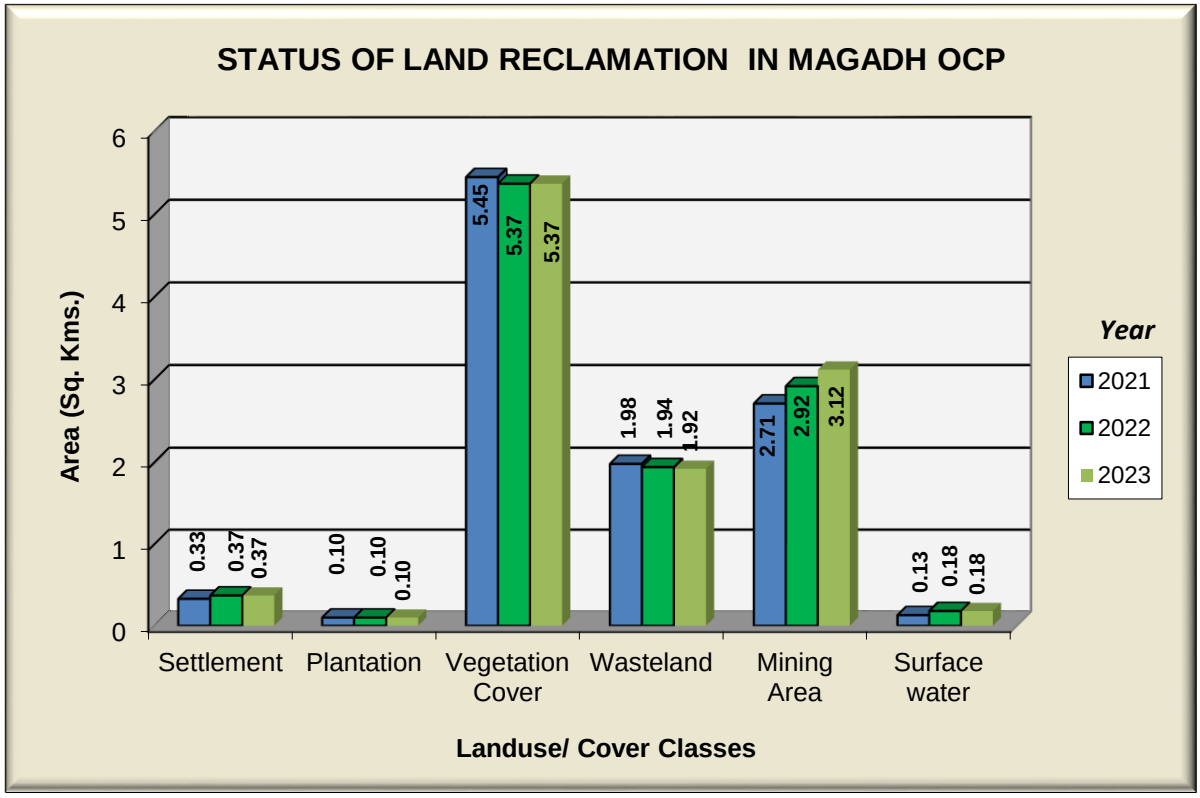


Figure 9.6

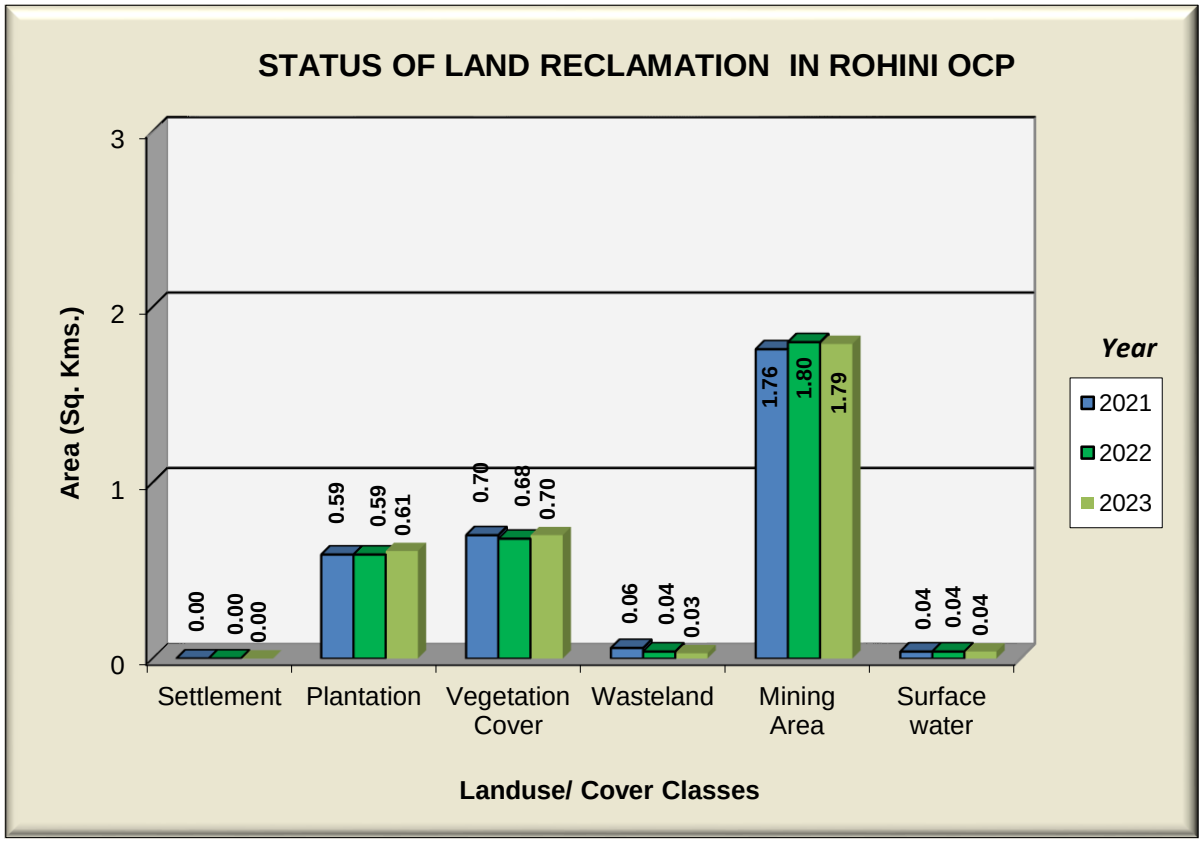
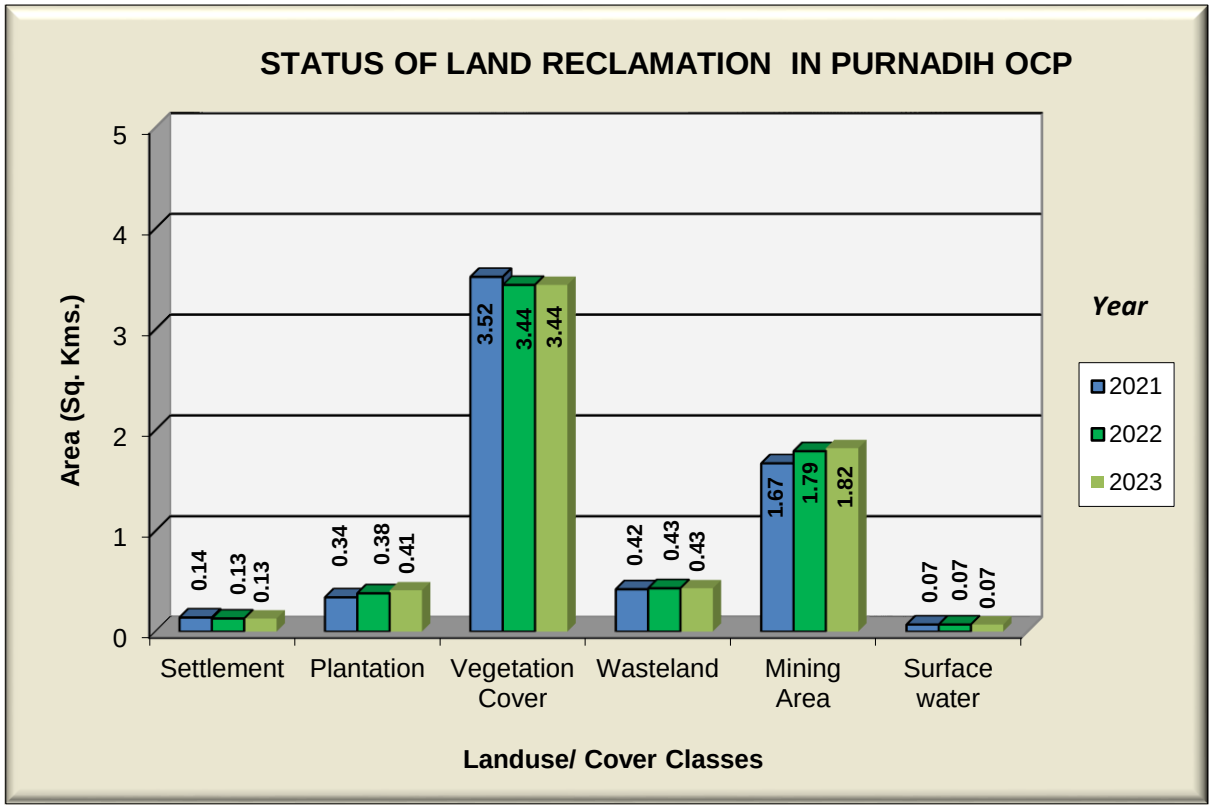


Figure 9.7



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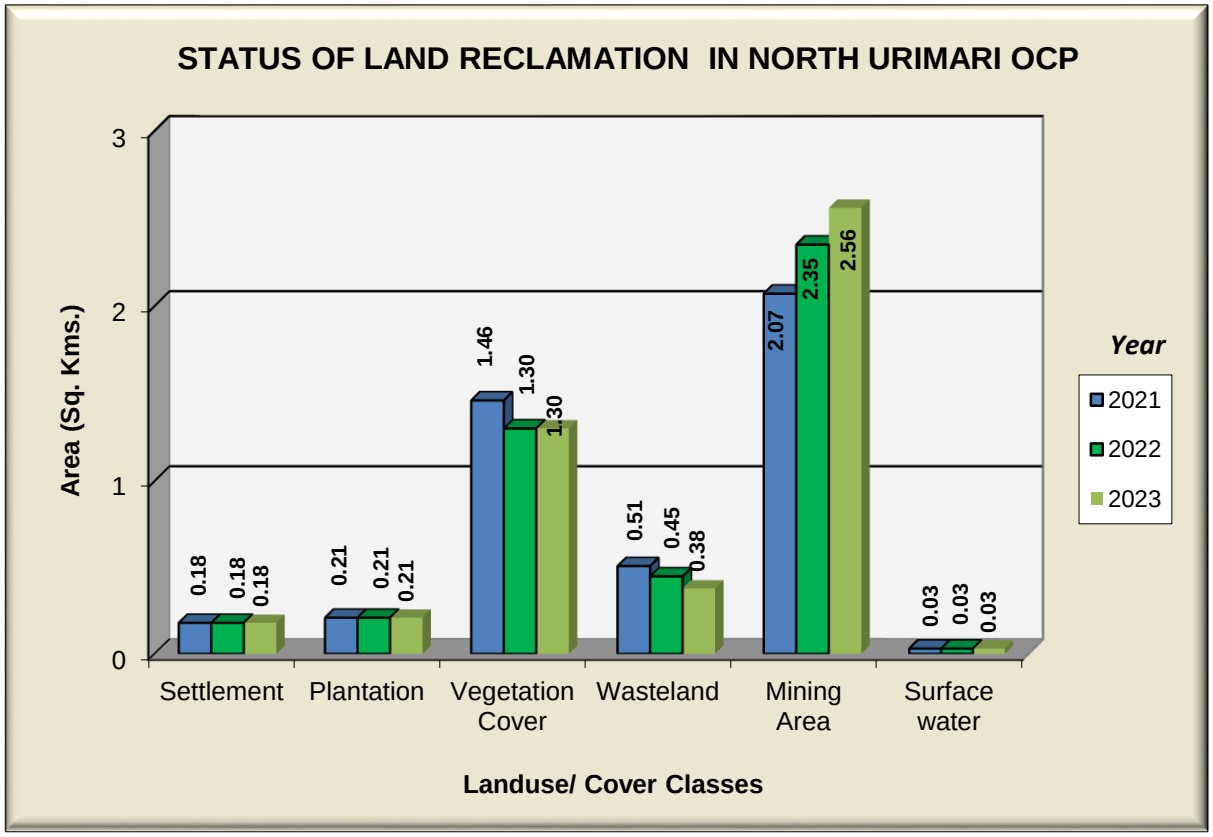

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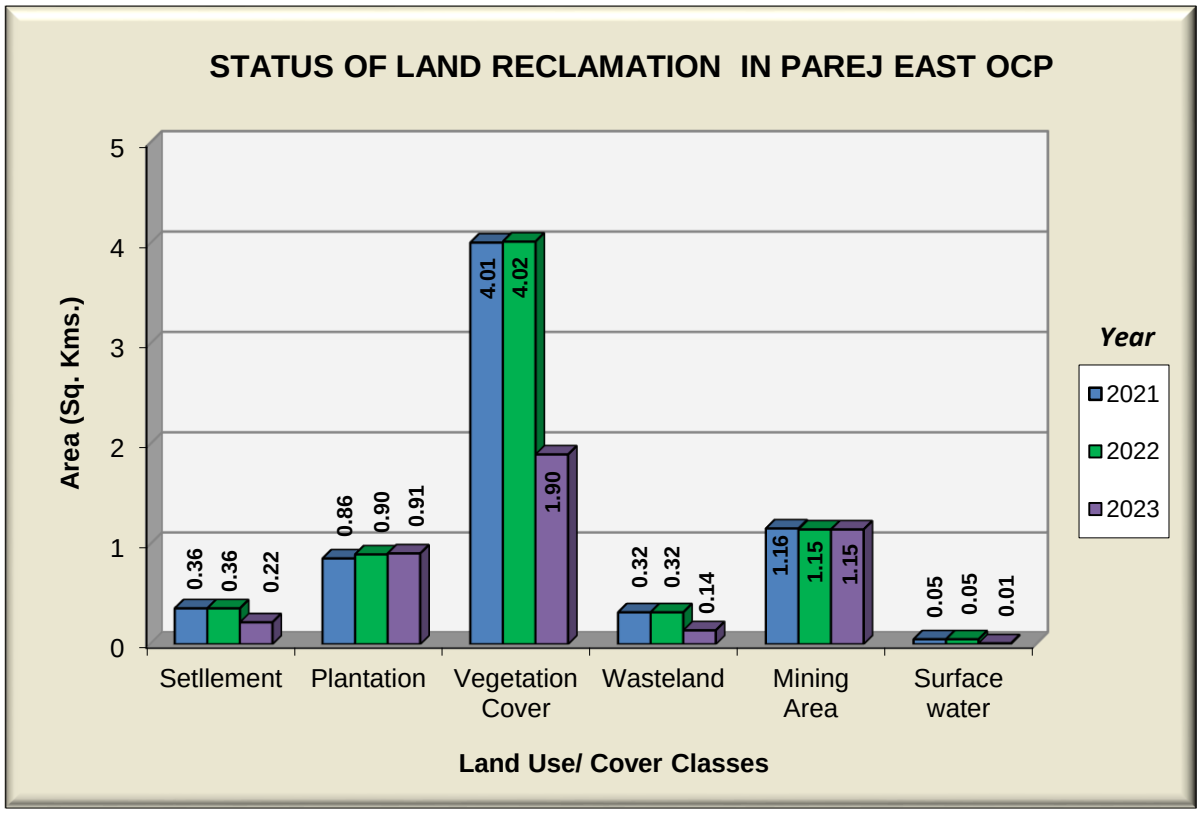
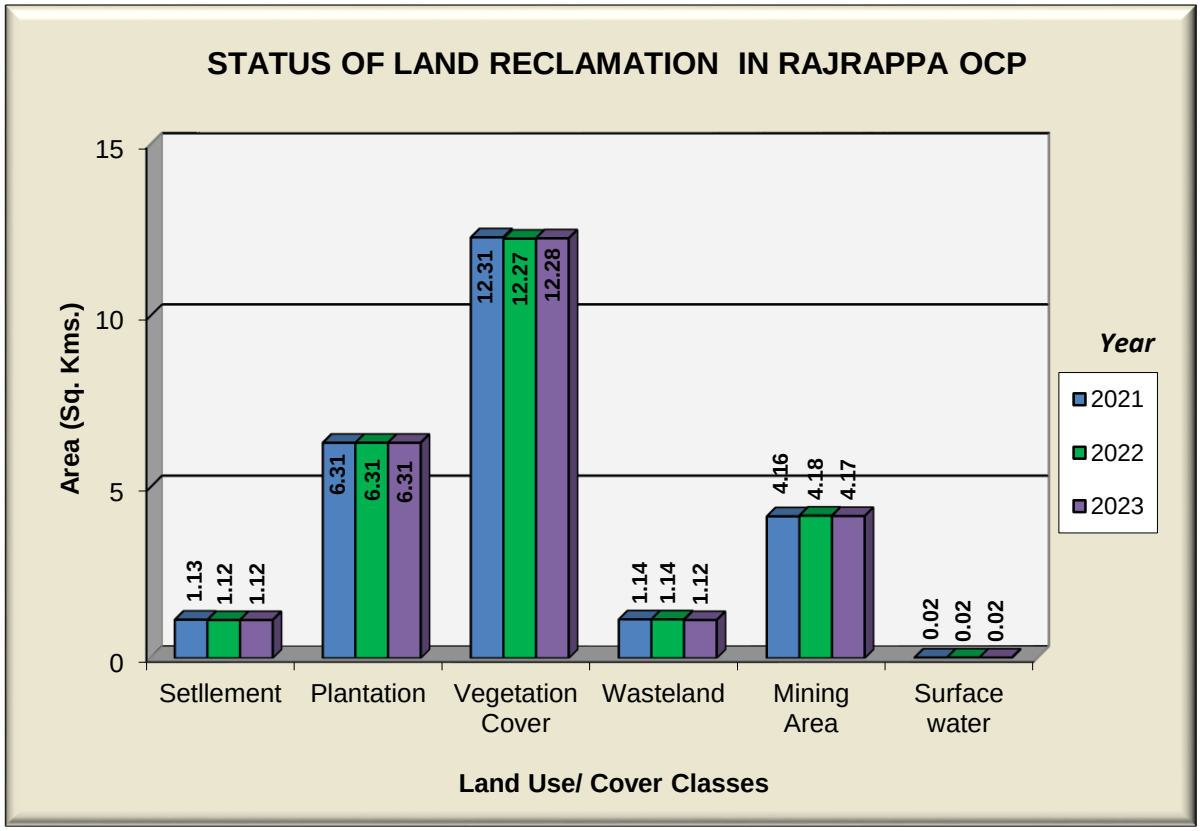


Figure 9.10



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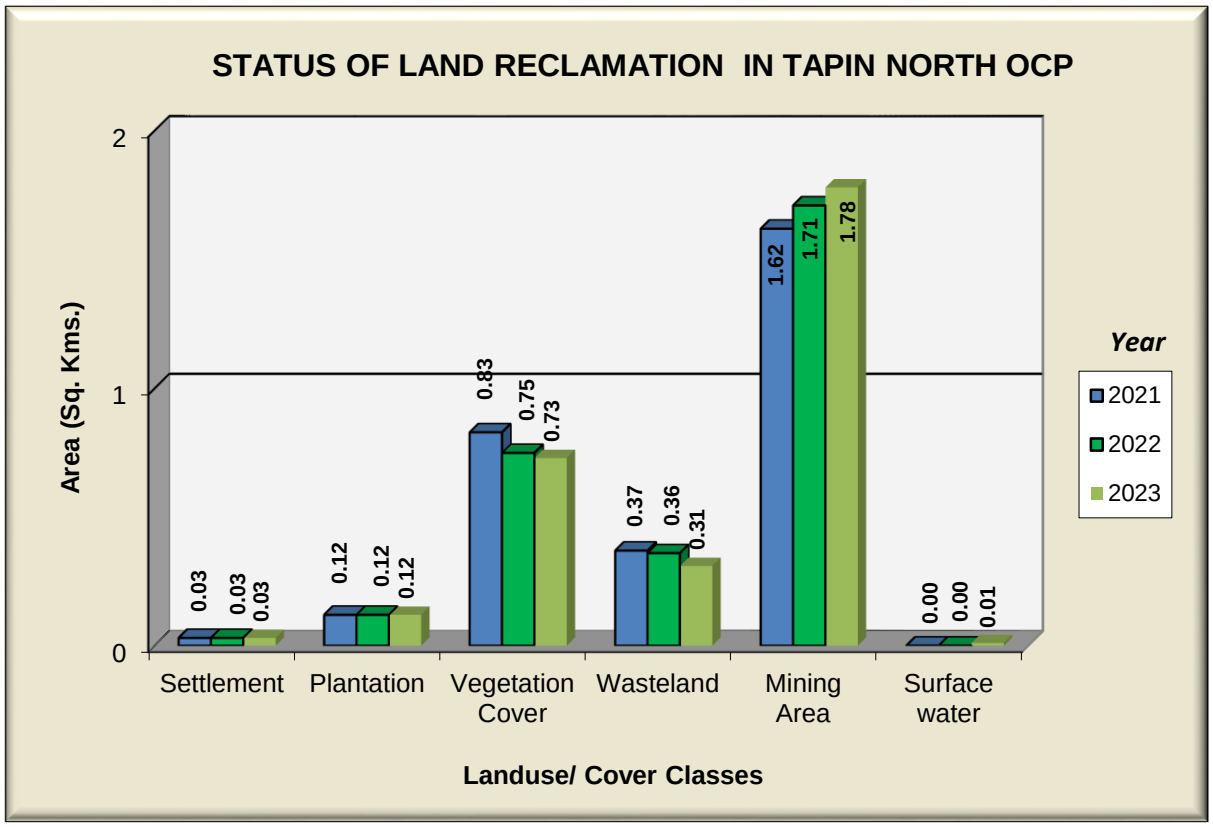


Figure 9.12

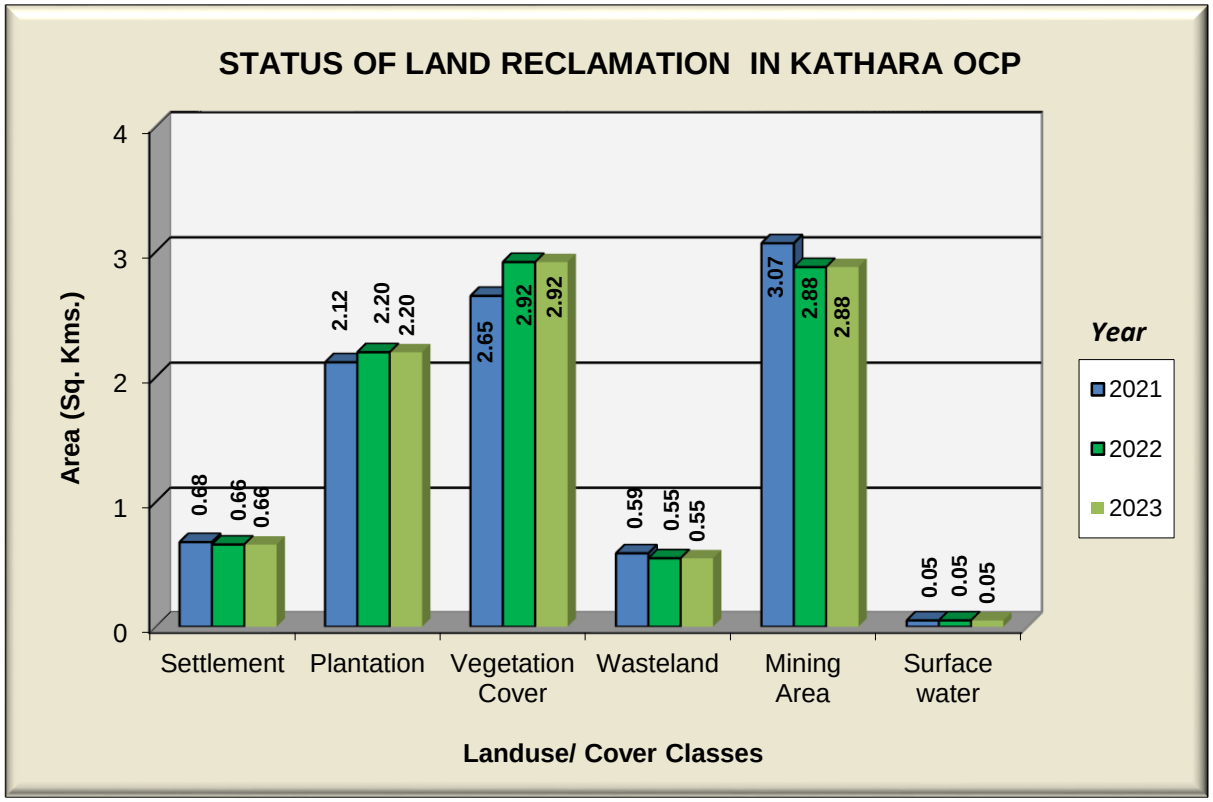


Figure 9.13

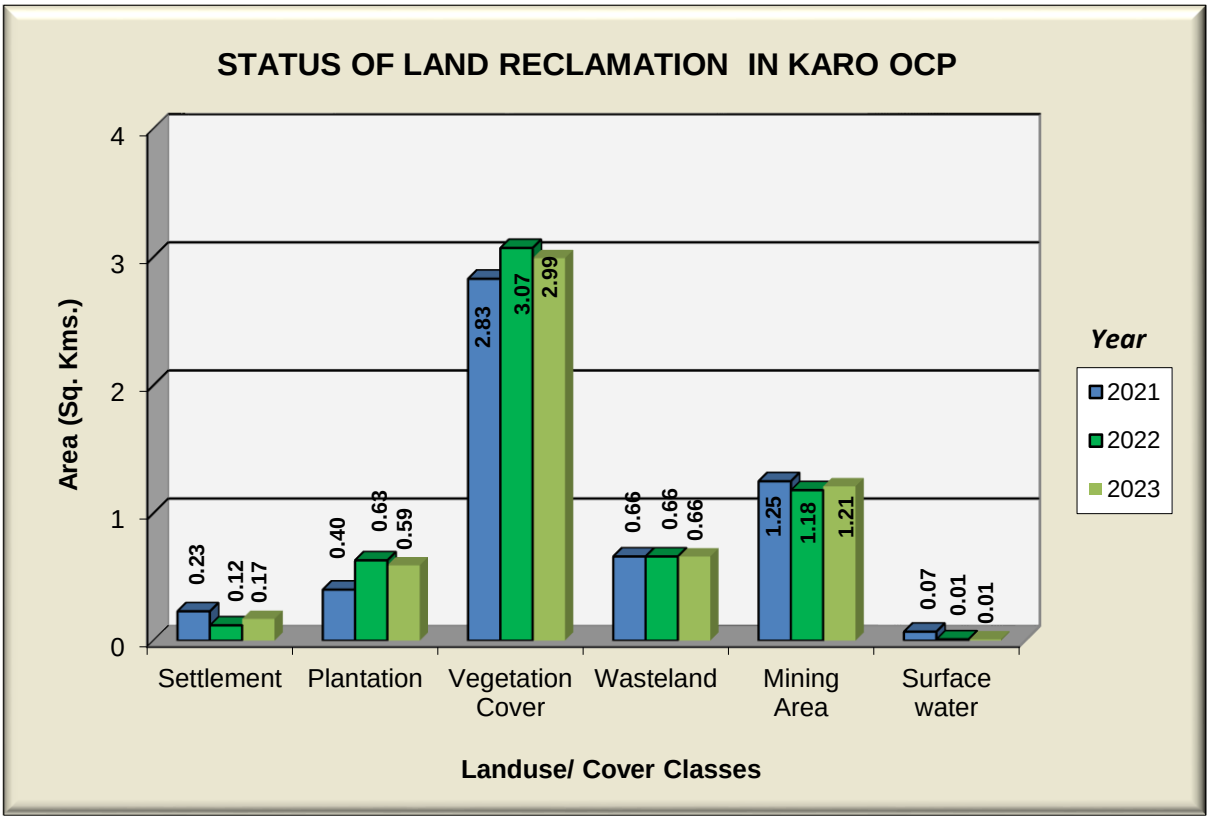


Figure 9.14

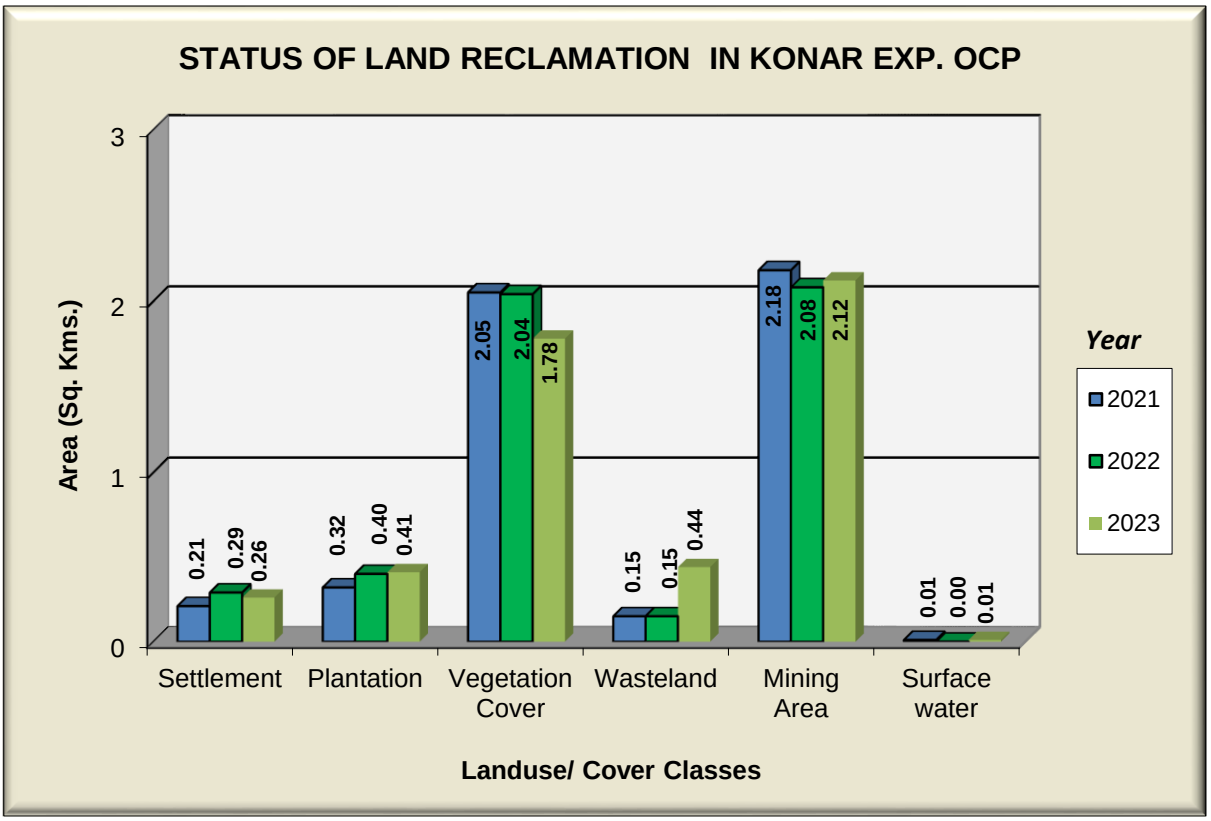


Figure 9.15

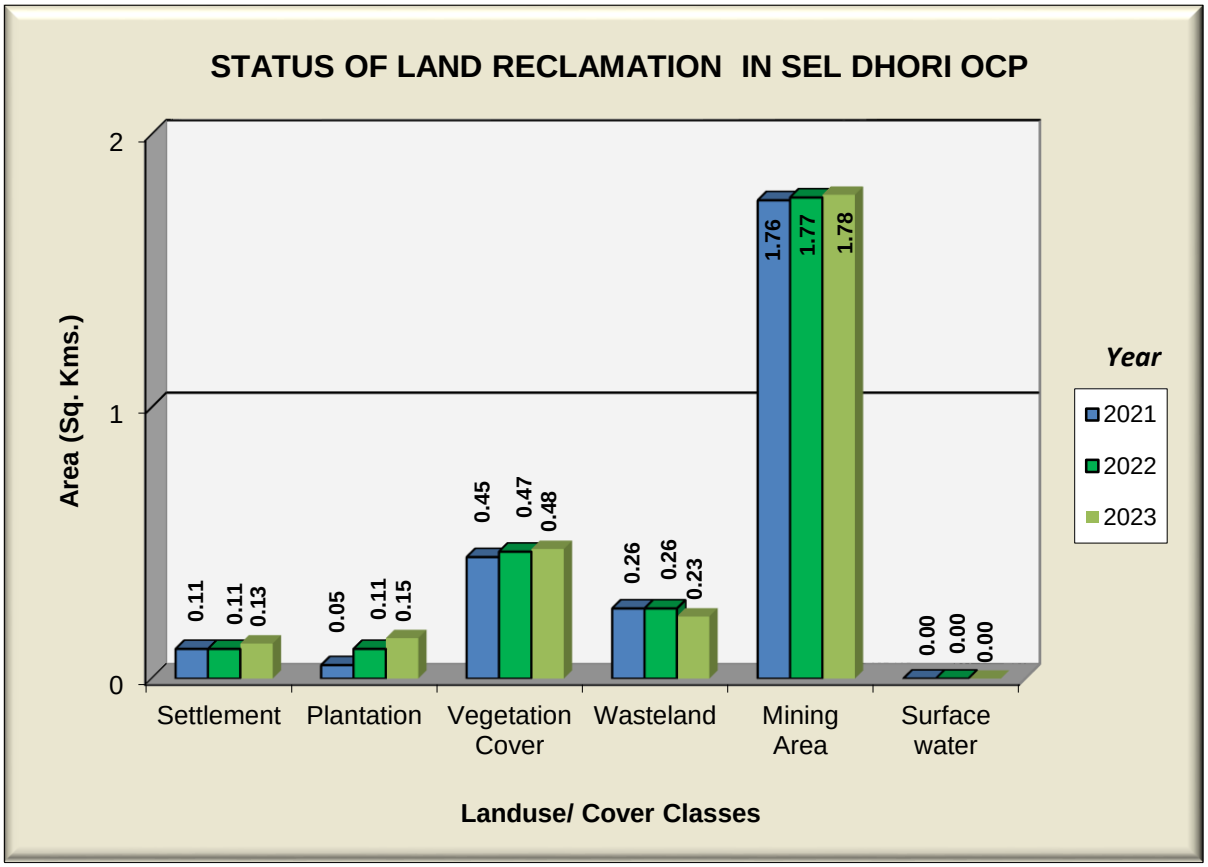

STATUS OF LAND RECLAMATION IN SEL DHORI OCP
Area (Sq. Kms.)
2
1
0
0.11
0.11
0.13
0.05
0.11
0.15
0.45
0.47
0.48
0.26
0.26
0.23
1.76
1.77
1.78
0.00
0.00
0.00
Settlement
Plantation
Vegetation Cover
Wasteland
Mining Area
Surface water
Landuse/ Cover Classes
Year
2021
2022
2023

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 2023.

- **Rajmahal OCP**
- **Sonepur Bazari OCP**

10.2 Both the projects were monitored earlier during the period of 2022 also, on annual basis for assessing the progress of land reclamation.

10.3 Project wise Land Reclamation status in ECL for the year 2023 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 2023 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 13.44 km^2 (72.18%) of excavated area has come under reclamation in ECL, out of which 10.41 km^2 (55.91%) area is under backfilling (Technical Reclamation) and 3.03 km^2 (16.27%) area is under plantation (Biological Reclamation).

10.5 On comparing the status of land reclamation for the year 2023 with respect to the year 2022, it is seen from the analysis that the total area of land reclamation has increased from 12.98 km^2 (Yr. 2022) to 13.44 km^2 (Yr. 2023).

10.6 After analyzing the data of the year 2023, 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 5.50 km^2 (Yr. 2022) to 5.67 km^2 (Yr. 2023).

10.7 Of the two projects in ECL, Rajmahal OCP tops with 85.48% reclamation followed by Sonepur Bazari OCP with 60.74 % reclamation.

Table–10.1

Project wise Land Reclamation Status in Opencast Projects of ECL based on Satellite Data for the Year 2023

(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, Avanue Plantation Etc.									
1	*2*	*3*		*4*		*5*		*6*		*7*		*8*		*9 (=4+5+8)*		*10 (=5+6+7)*		*11(=4+5)*	
		2022	*2023*	*2022*	*2023*	*2022*	*2023*	*2022*	*2023*	*2022*	*2023*	*2022*	*2023*	*2022*	*2023*	*2022*	*2023*	*2022*	*2023*
1	**Rajmahal**	17.75	**17.75**	5.12	5.28	2.06	2.08	0.13	0.15	0.62	0.62	1.26	1.25	8.44	8.61	2.81	2.85	7.18	7.36
				60.66%	61.32%	24.41%	24.16%					14.93%	14.52%			15.83%	16.06%	85.07%	85.48%
2	**Sonepur Bazari**	22.94	**22.94**	4.85	5.13	0.95	0.95	0.78	0.87	0.96	1.00	3.72	3.93	9.52	10.01	2.69	2.82	5.80	6.08
				50.95%	51.25%	9.98%	9.49%					39.08%	39.26%			11.73%	12.29%	60.92%	60.74%
	TOTAL	**40.69**	**40.69**	**9.97**	**10.41**	**3.01**	**3.03**	**0.91**	**1.02**	**1.58**	**1.62**	**4.98**	**5.18**	**17.96**	**18.62**	**5.50**	**5.67**	**12.98**	**13.44**
				55.51%	**55.91%**	**16.76%**	**16.27%**					**27.73%**	**27.82%**			**13.52%**	**13.93%**	**72.27%**	**72.18%**

(% 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".*

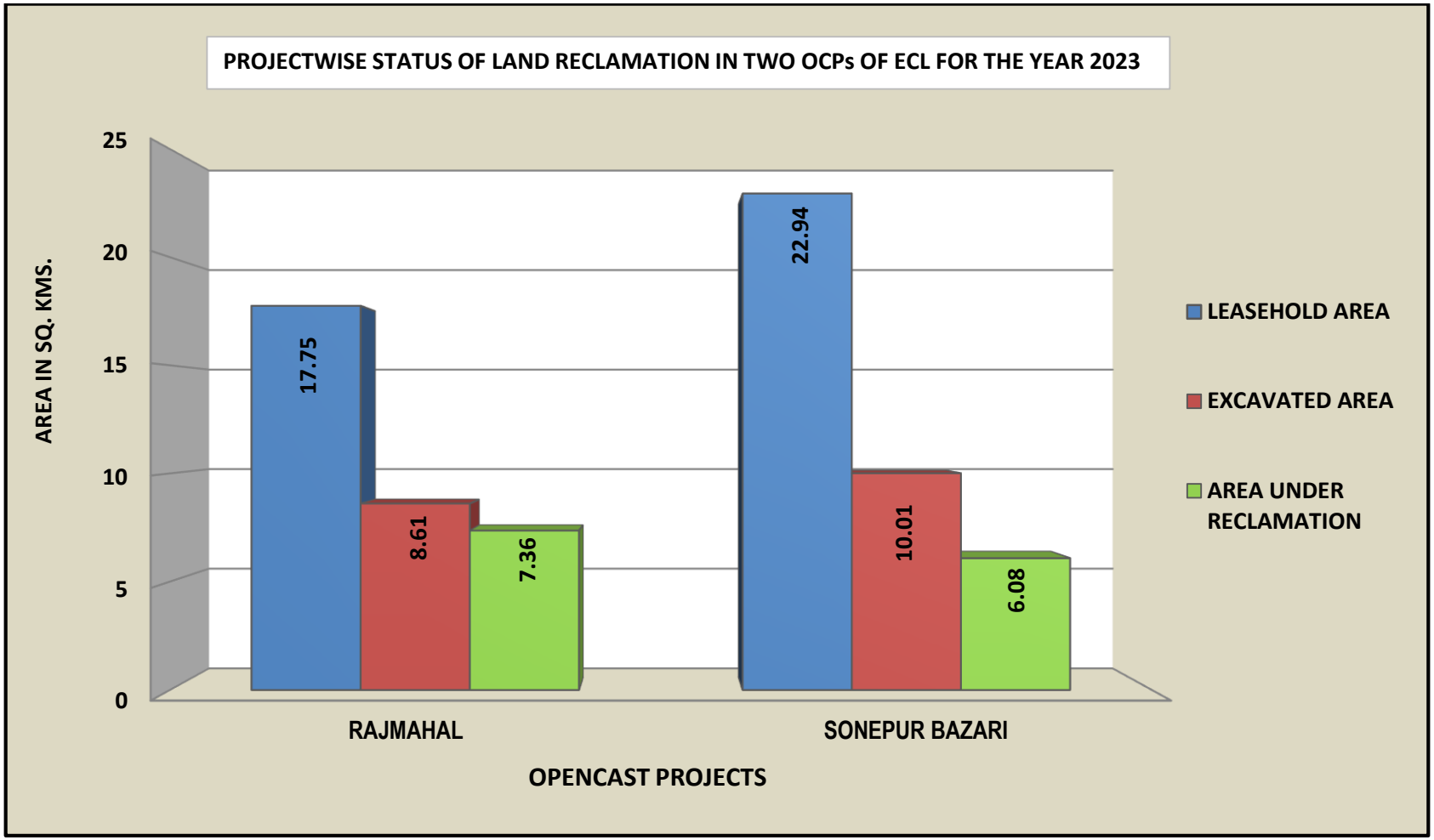


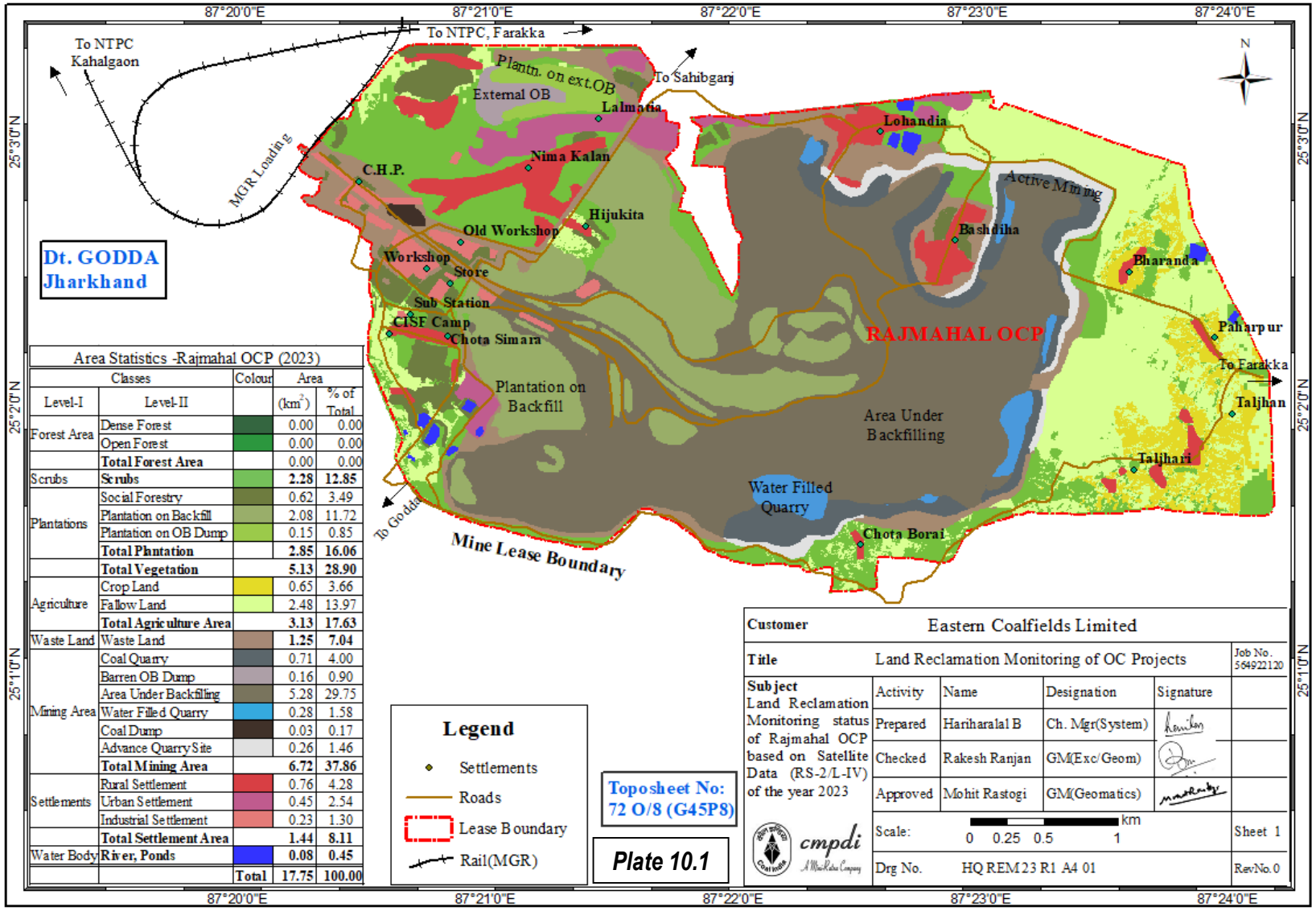
Fig. 10.1: **Status of Land Reclamation in 2 OC Project of ECL - 2023**

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 2023

(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)	2.28	12.85	3.47	15.13	5.75	14.13
PLANTATION	Social Forestry	0.62	3.49	1.00	4.36	1.62	3.98
	Plantation on OB Dump	0.15	0.85	0.87	3.79	1.02	2.51
	Plantation on Backfill(Biological Reclamation)	2.08	11.72	0.95	4.14	3.03	7.45
	Total Plantation *(C)*	2.85	16.06	2.82	12.29	5.67	13.93
	Total Vegetation (A+B+C)	**5.13**	**28.90**	**6.29**	**27.42**	**11.42**	**28.07**
ACTIVE MINING	Coal Quarry	0.71	4.00	3.36	14.65	4.07	10.00
	Advance Quarry Site	0.26	1.46	0.44	1.92	0.70	1.72
	Quarry Filled With Water	0.28	1.58	0.13	0.57	0.41	1.01
	Area under *Active Mining (D)*	**1.25**	**7.04**	**3.93**	**17.14**	**5.18**	**12.73**
E	Coal Dump	0.03	0.17	0.07	0.31	0.10	0.25
	Barren OB Dump	0.16	0.90	2.65	11.55	2.81	6.91
	Area Under Backfilling(Technical Reclamation)	5.28	29.75	5.13	22.36	10.41	25.58
	Total Area under *Mining Operation (D+E)*	**6.72**	**37.86**	**11.78**	**51.35**	**18.50**	**45.47**
WASTELAND	Waste Lands	1.25	7.04	1.16	5.06	2.41	5.92
	Fly Ash Pond / Sand Body	0.00	0.00	0.00	0.00	0.00	0.00
	Total Wasteland	**1.25**	**7.04**	**1.16**	**5.06**	**2.41**	**5.92**
WATERBODIE	Reservoir, Nallah, Ponds	0.08	0.45	0.26	1.13	0.34	0.84
	Total Waterbodies	**0.08**	**0.45**	**0.26**	**1.13**	**0.34**	**0.84**
AGRICULTUR	Crop Lands	0.65	3.66	0.02	0.09	0.67	1.65
	Fallow Lands	2.48	13.97	2.45	10.68	4.93	12.12
	Total Agriculture Land	**3.13**	**17.63**	**2.47**	**10.77**	**5.60**	**13.76**
SETTLEMENTS	Urban Settlement	0.45	2.54	0.42	1.83	0.87	2.14
	Rural Settlement	0.76	4.28	0.22	0.96	0.98	2.41
	Industrial Settlement	0.23	1.30	0.34	1.48	0.57	1.40
	Total Settlement	**1.44**	**8.11**	**0.98**	**4.27**	**2.42**	**5.95**
	Grand Total	**17.75**	**100.00**	**22.94**	**100.00**	**40.69**	**100.00**



Area Statistics -Rajmahal OCP (2023)

Classes		Colour	Area	
Level-I	Level-II		(km²)	% of Total
Forest Area	Dense Forest		0.00	0.00
	Open Forest		0.00	0.00
	Total Forest Area		0.00	0.00
Scrubs	**Scrubs**		**2.28**	**12.85**
Plantations	Social Forestry		0.62	3.49
	Plantation on Backfill		2.08	11.72
	Plantation on OB Dump		0.15	0.85
	Total Plantation		**2.85**	**16.06**
	Total Vegetation		**5.13**	**28.90**
Agriculture	Crop Land		0.65	3.66
	Fallow Land		2.48	13.97
	Total Agriculture Area		**3.13**	**17.63**
Waste Land	Waste Land		**1.25**	**7.04**
Mining Area	Coal Quarry		0.71	4.00
	Barren OB Dump		0.16	0.90
	Area Under Backfilling		5.28	29.75
	Water Filled Quarry		0.28	1.58
	Coal Dump		0.03	0.17
	Advance Quarry Site		0.26	1.46
	Total Mining Area		**6.72**	**37.86**
Settlements	Rural Settlement		0.76	4.28
	Urban Settlement		0.45	2.54
	Industrial Settlement		0.23	1.30
	Total Settlement Area		**1.44**	**8.11**
Water Body	**River, Ponds**		**0.08**	**0.45**
		Total	**17.75**	**100.00**

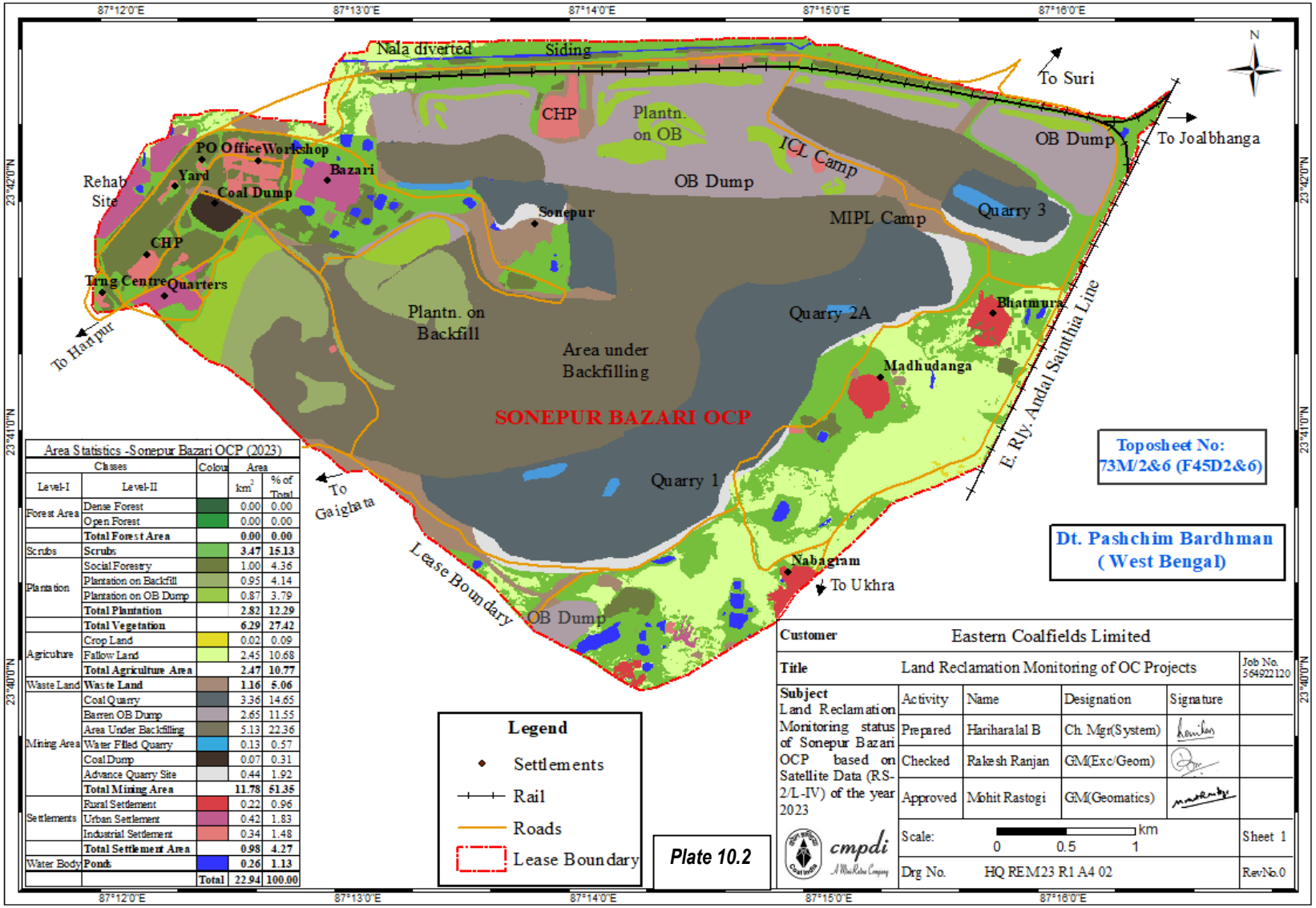
Legend

- Settlements
- Roads
- Lease Boundary
- Rail(MGR)

Toposheet No: 72 O/8 (G45P8)

Plate 10.1

Customer	Eastern Coalfields Limited			
Title	Land Reclamation Monitoring of OC Projects			Job No. 564922120
Subject Land Reclamation Monitoring status of Rajmahal OCP based on Satellite Data (RS-2/L-IV) of the year 2023	Activity	Name	Designation	Signature
	Prepared	Hariharalal B	Ch. Mgr(System)	
	Checked	Rakesh Ranjan	GM(Exc/Geom)	
	Approved	Mohit Rastogi	GM(Geomatics)	
	Scale: 0 0.25 0.5 1 km			Sheet 1
	Drg No. HQ REM 23 R1 A4 01			RevNo. 0



Area Statistics -Sonepur Bazari OCP (2023)

Classes		Colour	Area	
Level-I	Level-II		km²	% of Total
Forest Area	Dense Forest		0.00	0.00
	Open Forest		0.00	0.00
	Total Forest Area		**0.00**	**0.00**
Scrubs	**Scrubs**		**3.47**	**15.13**
Plantation	Social Forestry		1.00	4.36
	Plantation on Backfill		0.95	4.14
	Plantation on OB Dump		0.87	3.79
	Total Plantation		**2.82**	**12.29**
	Total Vegetation		**6.29**	**27.42**
Agriculture	Crop Land		0.02	0.09
	Fallow Land		2.45	10.68
	Total Agriculture Area		**2.47**	**10.77**
Waste Land	**Waste Land**		**1.16**	**5.06**
Mining Area	Coal Quarry		3.36	14.65
	Barren OB Dump		2.65	11.55
	Area Under Backfilling		5.13	22.36
	Water Filled Quarry		0.13	0.57
	Coal Dump		0.07	0.31
	Advance Quarry Site		0.44	1.92
	Total Mining Area		**11.78**	**51.35**
Settlements	Rural Settlement		0.22	0.96
	Urban Settlement		0.42	1.83
	Industrial Setdement		0.34	1.48
	Total Settlement Area		**0.98**	**4.27**
Water Body	**Ponds**		**0.26**	**1.13**
		Total	**22.94**	**100.00**

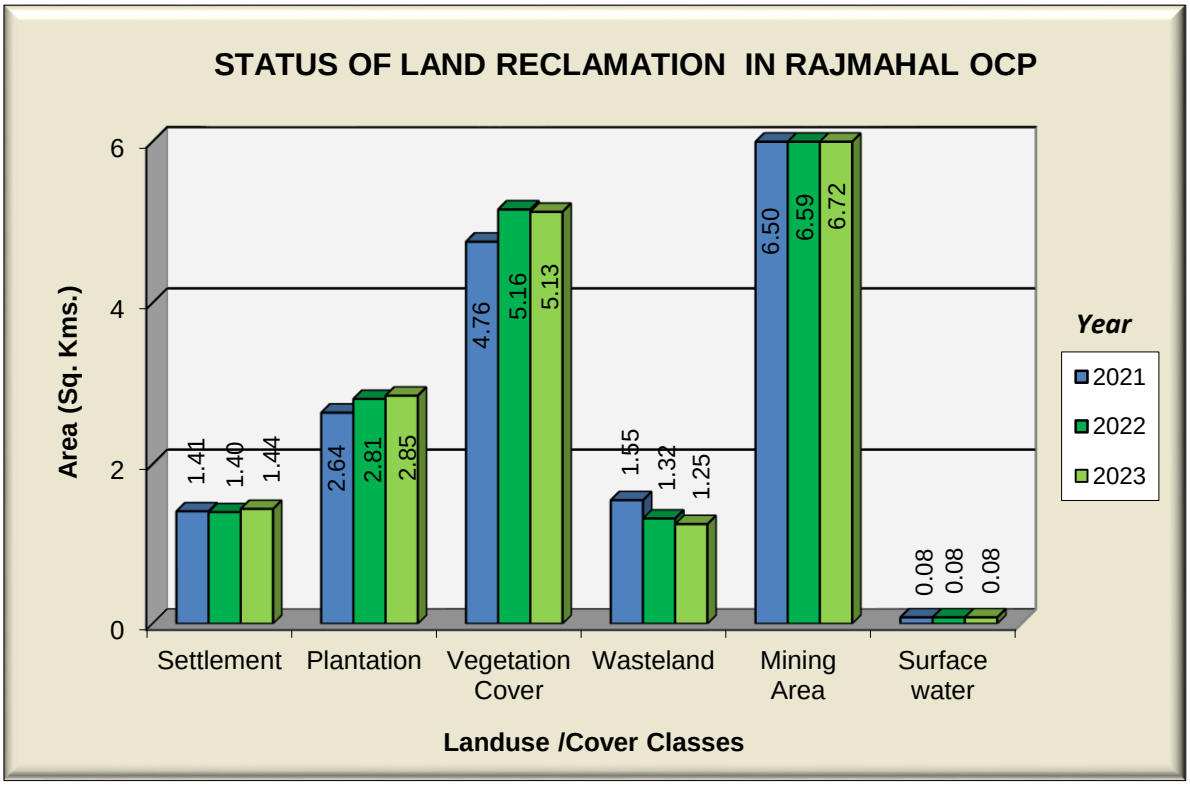


Figure 10.2

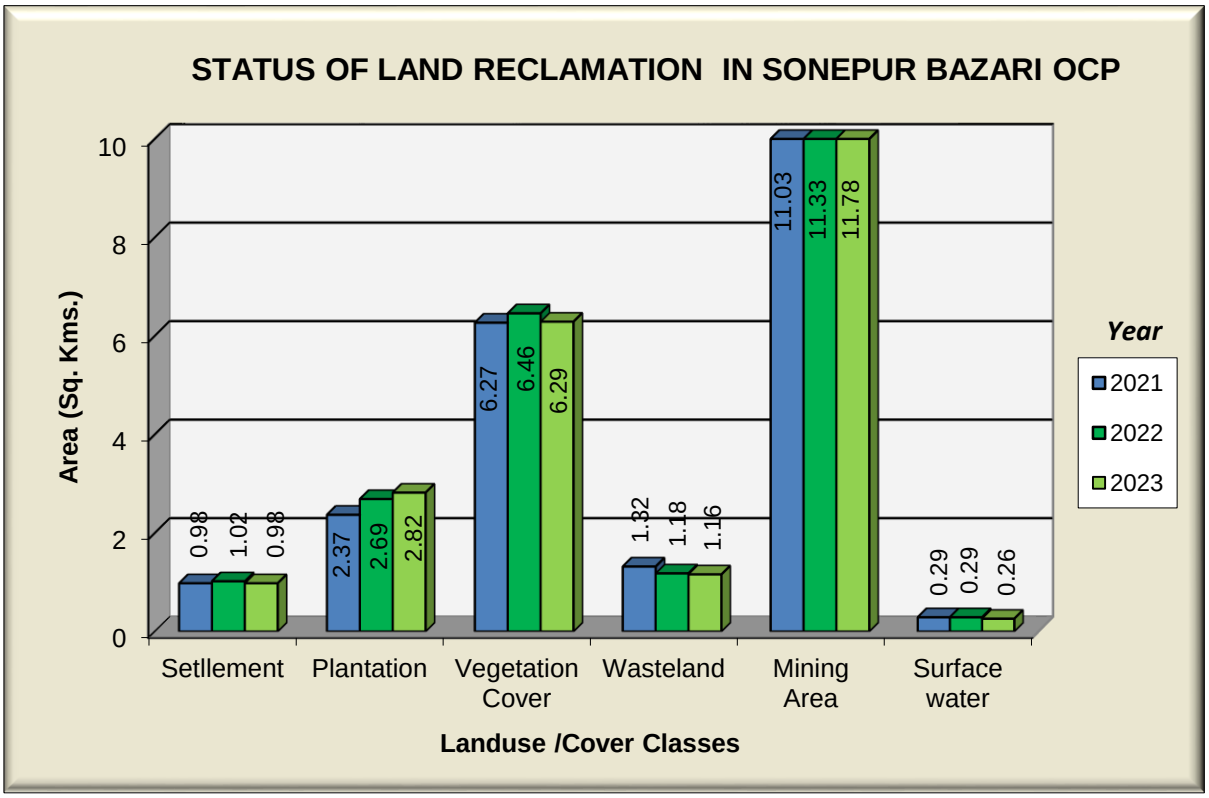


Figure 10.3

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

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

शब्द-कोष

1	Land Reclamation	भूमि पुनरुद्धार
2	Over Burden	अधिभार
3	Monitoring	निगरानी
4	Report	प्रतिवेदन
5	Executive Summary	कार्यकारी सारांश
6	Opencast Mine	खुली खदान
7	Objective	उद्देश्य
8	Methodology	कार्य प्रणाली अथवा प्रक्रिया
9	Table	तालिका
10	List of Tables	तालिकाओं की सूची
11	Map	मानचित्र
12	Social Forestry	सामाजिक वानिकी
13	Plantation	पौधारोपण
14	Million	घनमीटर
15	Background	पृष्टभूमि
16	Planning	योजनाबद्ध
17	Asses	आकलन
18	Status	स्थिति
19	Regularly	निरंतर
20	Satellite	उपग्रह
21	Subsidiary	अनुषांगिक
22	Production	उत्पादन
23	Biological Reclamation	जैविक पुनरुद्धार
24	Technical Reclamation	तकनिकी पुनरुधार

25	Leasehold Area	पट्टा क्षेत्र
26	Excavated Area	उत्खनन क्षेत्र
27	Active mining	सक्रिय खनन
28	Environmental Protection	पर्यावरण संरक्षण
29	Remedial Measure	उपचारात्मक उपाय
30	Interval	अंतराल
31	Systematic Error	व्यवस्थित त्रुटियँ।
32	Error	अशुद्धियाँ
33	Curvature	वक्रता
34	Geometric	ज्यामितिक
35	Distortion	विरुपण
36	Plantation	पौधारोपण
37	Capacity	क्षमता
38	Software	सॉफ्टवेयर
39	Class	वर्ग
40	Accuracy	सटीकता
41	Statistical Separation	सांख्यिकीय पृथक्करण
42	Cubic meter	घनमीटर
43	Depicted	दर्शाया गया
44	Percentage	प्रतिशत
45	Salient Findings	मुख्य निष्कर्ष
46	Methodology	पद्धति
47	Data Procurement	डाटा क्रय
48	Satellite data Processing	उपग्रह डेटा प्रसंस्करण
49	Rectification and geo-referencing	सुधार और भूसन्दर्भ-

50	Image enhancement	छविगुण - बृद्धि
51	Training set selection	प्रशिक्षण सेट का चयन
52	Classification and Accuracy assessment	वर्गीकरण और मूल्यांकन की सटीकता
53	Area calculation	क्षेत्र गणना
54	Temporal	लौकिक
55	Processing	प्रसंस्करण
56	Overlay of Vector data base	वेक्टर डेटा बेस का अरोपन
57	Pre-field map preparation	क्षेत्र जाने के पहले नक्शे की त्तैयारी
58	Ground Truthing	भू-सत्यापन
59	Ground Information	भू-सुचना
60	Interpretation	व्याख्या
61	Eco-system	पारिस्थितिकी तंत्र
62	Minor	मामुली
63	Water Drainage	जल निकाय
64	Interval	अंतराल
65	Maximum	अधिकतम
66	Coal field	कोयला क्षेत्र
67	Design	परिकल्पना
68	Superimpose	आरोपित
69	Update	अद्यतनीकरण/नवीनीकरण
70	Cumulative	संचयित
71	Embankment	तटबंध
72	Cluster	खुली तथा भूमिगत खदानों के समूह

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 (Stablised 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

ABBREVIATIONS

SoI	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

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