

## Reclamation plan

### INTRODUCTION

The Rajbar E & D Coal Mine has been allotted to M/s TVNL vide Allotment Order No. 103/19/2015/NA dated 30-06-2015. The coal mine block is located in Auranga Coalfield, in the State of Jharkhand. The coal produced from the block is for use in the proposed extension of the thermal power station of M/s TVNL near Lalpania village adjacent to Tenughat Reservoir area, in the State of Jharkhand. TVNL is a State Govt. Undertaking. Any surplus coal from the block shall be disposed as per the then Central Government's guidelines.

### Location

The proposed coal project is located in revenue villages of Jerang, Rajbar, Lejang, Renchi, Darea & Serak. They lie in Balumath, Chandwa & Latehar revenue Anchals of Latehar District, in the State of Jharkhand. The nearest railhead is Chetar Railway Station on the Gomoh-Barkakana-Dehri on Sone loop line of East Central Railway. The block falls in the Survey of India toposheet No.-F45A9.

### Land Uses of the project area in three stages of Mining

The proposed project area covers 1351 ha of surface area. However, 1320 ha of coal bearing area is for mining rights and 31 ha is for surface rights. The present land uses, will undergo changes for carrying out the mining and other associated activities. However, during active mine life itself, land reclamation will be started and will continue in the sterile dump areas. Green belts will be developed in the initial years of project life. These activities form part of progressive closure as they dovetail into final closure land uses. Then, after cessation of the coal winning, the changed land forms will be subjected to final reclamation activities. After completion of these post mining final reclamation steps, the post mining land uses would get firmed up.

  
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The present & envisaged land uses, covering the three stages of mine life, is shown below.

### Land Uses of the project area in three stages of Mining

All area in ha

Present Land Uses		Proposed Land Uses		Land Uses	
Type of Land	Area	Type of Use	Land Area	End of Mine Life	Post Closure after Reclamation
Tenancy	542.17	Excavation Area	1262.00		
Govt. NF	243.93	Backfilled Area		982.00	
Forest		Excavated Void		280.00	
Reserve		Top Soil Dump			
Protected	535.45	External Dump			
C-J-B-J	29.48	Infrastructure	33.90	33.90	
		Agricultural			506.48
		Plantation Area	28.90	28.90	537.12
		Water Body			269.00
		Public/ Com Use	11.00	11.00	37.40
		Other Use	14.20	14.20	
		Undisturbed/ MR for UG	1.00	1.00	1.00
<b>Total</b>	<b>1351.00</b>	<b>Total</b>	<b>1351.00</b>	<b>1351.00</b>	<b>1351.00</b>

## MINE DESCRIPTION

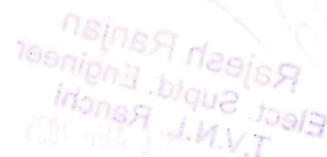
### Geology

The Rajbar E & D Coal Mine is situated in the north eastern part of Auranga Coalfield. The allotted block area to the proponent is spread over 1487 ha comprising formations of Lower Gondwana Group, unconformably overlying the Pre-Cambrian rocks.

The Barakar is the principal coal bearing formation in the block. However, the Ranigunj formation also contains two seams and this adds to the coal reserves. There are seven coal seams lying in Barakar formation. These are designated as I to VII. The 2 seams of Ranigunj formation are named R1 & R2. Most of the coal seams are inter-banded in nature and exhibit split section development pattern both in strike and dip directions. There are variations in

  
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thickness and lithological characters of inter-seam partings. In total, there are 19 coal horizons, 17 in Barakar measures & 2 layers in Ranigunj.

### **Coal Reserves**

Reserve of all the 19 coal horizons have been placed in "Proved" category as per ISP norms. Total reserve has been assessed within coal bearing area of 1487 ha. Total geological reserves have been estimated at 706.03 Mt. Of this, reserves in Seam I & II, envisaged to be worked by underground mining comes to 131.17 Mt. Balance 574.86 Mt from Seam III Bottom and above has been assessed for opencastability.


### **Method of Mining**

With a view to maximize coal extraction percentage and meet the requirement of End Use Plant, opencast mining method has been selected. In order to extract 420.22 Mt of coal, upto Seam III Bottom, an annual targeted capacity of 10 MTPA has been envisaged. Even with high capacity of 10 MTPA, for this difficult mine, productive mine life goes up to 48 years. 2119 Mbcm rock waste would have to be removed at annual rate of about 50 Mbcm. The average stripping ratio comes to 1:5.04.

The O.C. pit will be opened from Seam III Bottom seam. To provide accommodation for rock waste within backfill area, a strategy has been adopted to create two level backfill. Further, the mine will be opened more or less,  $20^{\circ}$  to  $30^{\circ}$  off, from the strike and parallel to metamorphic North-South edge. This will allow early backfilling. The first layer of usual backfill waste would be from the floor of Seam III Bottom upto ground level i.e. **bgl** dump. The second upper layer of backfill would follow it with a horizontal gap of 60 m. This layer goes up to 90 m above ground level i.e. as **agl** dump. Due to high stripping ratio, temporary dumping of waste has to be done, in the mine life upto 22<sup>nd</sup> years. This temporarily dumped waste would be rehandled from 23<sup>rd</sup> year onwards & continue up to 39<sup>th</sup> year of mine life, thereby ensuring clear space for unhindered mining during total mine life.

### **MINE CLOSURE PLAN**

The total mine life has three distinct spans. First is the construction period of about 2 years before waste removal and coal production starts. Second is

  
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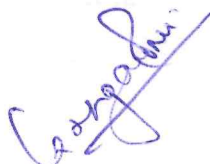
productive mine life. In this project, the production phase is envisaged to cover about 48 years. Third is the period covering final mine closure activities after cessation of coal winning. The final mine closure span is considered immediately after cessation of coal winning. For this mine, the final mine closure activities are planned over 3 yrs. However, during productive mine life also, some activities of land management, green belt development and bio/ agro reclamation of sterile dump areas are carried out. These ultimately dovetail into final land uses of the project. The land management activities, undertaken during constructive and productive mine life, is termed as progressive closure activities. Besides, water quality and air quality management, drain making, top soil management etc. would also be considered. Thus a Mine Closure Plan (MCP) will have Progressive Closure Activities (PCA) executed during productive mine life and Final Closure Activities (FCA) to be carried out after cessation of mining.

#### 15.3.1 Progressive Closure Activities (PCA)

Various items of progressive closure activities are detailed below:

- Mined out Land
- Water quality management
- Air quality management
- Waste management
- Top Soil Management
- Barbed wire fencing around temporary dump
- Barbed wire fencing around the Project Area
- Filling of Void – Rehandling of Crown Dump
- A. Technical and Agro Reclamation of Mined out land
- B. Technical and Bio Reclamation of Mined out land
- Plantation over virgin area including green belt
- Manpower Cost and supervision
- Toe Wall around the temporary dump
- A. Garland drain around Project Area
- B. Peripheral road, gates & View points for the mine
- Greening of temporary dumps

  
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## Mined Out Land

### Reclamation of Excavated Area

The project is planned to cover 1351 ha of surface area. Of this 1262 ha would be excavated for coal winning.

This 1262 ha mined out area shall be reclaimed, as follows, as final land uses.

#### Reclamation of Excavation Area (1262 ha)

Sl. No.	Final Land Uses	Area in ha	Non Forest	Forest
1.	Plantation Area	495.52	164.76	330.76
2.	Agriculture Area	497.48	497.48	0
3.	Water Body	269.00	135.81	133.19
<b>Total</b>		<b>1262</b>	<b>798.05</b>	<b>463.95</b>

### Reclamation of Project Area

The project area of 1351 ha shall have 88 ha of disturbed land for infra and other services. This 88 ha will be reclaimed as suggested below in table. One ha area remains undisturbed under this OC project area.

#### Reclamation of Project Area (1351 ha)

Sl. No.	Final Land Uses	Area in ha			
		Excavated Area	Infra & Other	Green Belting	Total
1.	Plantation Area	495.52	12.70	28.90	537.12
2.	Agriculture Area	497.48	9.00	0.00	506.48
3.	Water Body	269.00	0.00	0.00	269.00
4.	Public & Other uses		37.40	0.00	37.40
<b>Total</b>		<b>1262.00</b>	<b>59.10</b>	<b>28.90</b>	<b>1350.00</b>
5.	Undisturbed (Incline area)	0	1		1
<b>Total</b>		<b>1262</b>	<b>(59.1+28.9+1.0) = 89</b>		<b>1351</b>

### Reclamation as Plantation Area & Agriculture Areas

These land reclamation activities proceed during productive mine life and get finalized in final closure period. details of stage wise (5 years stage) land degraded, technically reclaimed and biologically reclaimed respectively are given below.

  
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## Land Degraded & Technically Reclaimed Area

Area in ha

Production Stage Years	Land Degraded				Technically Reclaimed Area				
	Excavation	Dump (Extn + Top Soil)	Infra/ others	Total	Back- filled	Dump (Extn + Top Soil)	Infra & Others	Green Belting	Total
1	2	3	4	5	6	7	8	9	10
Y-1	20	No external dumping of Waste Rock or Top soil is proposed.	88	108		Not required as explained in Column 3.	59.1		59.1
Y-3	96		88	184			59.1		59.1
Y-5	153		88	241	48		59.1	28.9 ha	136.0
Y-10	439		88	527	117		59.1	28.9 ha	205.0
Y-15	535		88	623	174		59.1	28.9 ha	262.0
Y-20	617		88	705	222		59.1	28.9 ha	310.0
Y-25	772		88	860	318		59.1	28.9 ha	406.0
Y-30	916		88	1004	406		59.1	28.9 ha	494.0
Y-35	1034		88	1122	525		59.1	28.9 ha	613.0
Y-40	1138		88	1226	639		59.1	28.9 ha	727.0
Y-45	1195		88	1283	795		59.1	28.9 ha	883.0
Y-48	1262		88	1350	982		59.1	28.9 ha	1070.0
Post Closure Y-51					982		59.1 + 280 = 339.1 ha	28.9 ha	1350.0 *
Undisturbed				1					1
				1351					1351

- Infrastructure to be retained – 37.4 ha
  - Infra Others to be dismantled – 21.7 ha
- } 59.1 ha + Green Belt – 28.9 ha  
= 59.1 + 28.9 = 88 ha

- Backfilled – 982 ha
  - Void – 280 ha
    - ❖ Water Body – 269 ha
    - ❖ Slant Plantation – 11 ha
  - Infra & Others – 88 ha
    - ❖ Infra & Others – 59.1 ha
    - ❖ Green Belting – 28.9 ha
- Total – 1350 ha**
- Undisturbed – 01 ha
- Total Project Area – 1351 ha**

  
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## Waste Management

### Quantity of Waste & Dumping Schedule

The waste quantity totals to 2119 Mm<sup>3</sup>. The annual schedule of waste and its disposal/ management and Waste generation and its technical reclamation schedule are given below

**Annual Dumping Schedule (Figure in Mbcm)**

Years	Total Waste Generated		Disposal details of Generated Waste					
			Temporary Dumping		Rehandling		Internal Dumping	
	Annual Waste in Mbcm	Cum Waste in Mbcm	Annual Waste in Mbcm	Cum Waste in Mbcm	Annual Waste in Mbcm	Cum Waste in Mbcm	Annual Waste in Mbcm	Cum Waste in Mbcm
	1	2	3	4	5	6	7	8
<u>Y-1</u>	5.5	5.5	5.5	5.5				
Y-2	11	16.5	11	16.5				
<u>Y-3</u>	22	38.5	22	38.5				
Y-4	38.5	77	38.5	77				
<u>Y-5</u>	44	121	19	96			25	25
Y-6	44	165	10	106			34	59
Y-7	50	215	10	116			40	99
Y-8	55	270	10	126			45	144
Y-9	55	325	10	136			45	189
<u>Y-10</u>	54	379	10	146			44	233
Y-11	52	431	7	153			45	278
Y-12	52	483	7	160			45	323
Y-13	52	535	7	167			45	368
Y-14	52	587	7	174			45	413
<u>Y-15</u>	52	639	7	181			45	458
Y-16	52	691	7	188			45	503
Y-17	52	743	7	195			45	548
Y-18	52	795	7	202			45	593
Y-19	52	847	7	209			45	638
<u>Y-20</u>	52	899	5	214			47	685
Y-21	50	949	9	223			41	726
Y-22	50	999	6	229			44	770
Y-23	50	1049			5	5	50	825
Y-24	50	1099			7	12	50	882
<u>Y-25</u>	50	1149			10	22	50	942
Y-26	50	1199			10	32	50	1002
Y-27	50	1249			12	44	50	1064
Y-28	50	1299			12	56	50	1126
Y-29	50	1349			14	70	50	1190
<u>Y-30</u>	50	1399			14	84	50	1254

Years	Total Waste Generated		Disposal details of Generated Waste					
			Temporary Dumping		Rehandling		Internal Dumping	
	Annual Waste in Mbcm	Cum Waste in Mbcm	Annual Waste in Mbcm	Cum Waste in Mbcm	Annual Waste in Mbcm	Cum Waste in Mbcm	Annual Waste in Mbcm	Cum Waste in Mbcm
Y-31	50	1449			16	100	50	1320
Y-32	50	1499			16	116	50	1386
Y-33	50	1549			18	134	50	1454
Y-34	50	1599			18	152	50	1522
<u>Y-35</u>	50	1649			16	168	50	1588
Y-36	50	1699			16	184	50	1654
Y-37	50	1749			16	200	50	1720
Y-38	50	1799			16	216	50	1786
Y-39	47	1846			13	229	47	1846
<u>Y-40</u>	47	1893					47	1893
Y-41	47	1940					47	1940
Y-42	45	1985					45	1985
Y-43	40	2025					40	2025
Y-44	40	2065					40	2065
<u>Y-45</u>	26	2091					26	2091
Y-46	16	2107					16	2107
Y-47	10	2117					10	2117
<u>Y-48</u>	2	2119					2	2119

### Rock Waste Stabilization

Rajbar E & D Coal Mine cannot dispose waste as external dump. For the first 4 years entire excavated waste is planned to be dumped over coal bearing area on the West side forming a 3-layer temporary dump being 90 m high. This dump will have 25 m wide berm and 30 m height for each layer. From 5<sup>th</sup> year onwards till 22<sup>nd</sup> year part of waste would go to temporary dump and the rest to de-coaled area. From 23<sup>rd</sup> year onwards entire waste generated would go to backfill. In addition, some waste from temporary waste dump would be rehandled to be accommodated in the de-coaled area which would by then have enough space to accommodate waste from both the sources.

As the temporary waste dump has 25 m berm and 30 m height, it would have an overall slope of 24.8° well within safety angle of 28°. This design along with drainage arrangement for rain water would ensure stability of temporary dump.

### Prevention of Siltation, Erosion and Dust Generation from Dumps

Temporary dump would have a toe wall all around the dump to arrest rolling stones. It would also arrest water to be guided to garland drain for final



disposal into Sukri River. This dump would have temporary barbed wire fencing all around to prevent inadvertent entry of mine workers. Toe wall and drain at the base of dump would arrest silt. Greening of inactive part of dump would arrest dust from polluting the mine atmosphere. Internal dump or backfill would also have toe wall to arrest rolling stone. The top of the dump would have mild slope in direction opposite to mine progress for being collected into drain at base at surface level. It would be guided to garland drain for final disposal into Sukri River. Rain water and silt flowing with it on the advancing side of backfill would flow into mine sump for pumping and regular cleaning through backhoes. Inactive and sterile top of back fill would be technically reclaimed. Top soil would be spread over it and plantation done as progressive measure of reclamation.

### **Top Soil Management**

Sufficient thickness of top soil is available at Rajbar E & D excavation area of 1262 ha. Top soil upto a depth of 0.4 m is proposed to be collected and spread over backfill or stored over a temporary soil dump as the situation of reclamation demands. North-West part of the block has been earmarked for top soil temporary storage over an area of 20 ha. This location would change after 40<sup>th</sup> year to backfilled area.


### **Preservation of Top Soil**

It is proposed to preserve top soil stored in temporary dump over 20 ha. Fodder grasses or leguminous crops would be planted to hold top soil from its erosion and loss. These grass type plants would also preserve the fertility of stored top soil.

### **Action Plan for Top Soil Management**

Collection and storage of top soil would take place before taking up mine excavation in any area. Therefore, top soil would be removed from the mining area for first 5 years. Backfilling would start in the 5<sup>th</sup> year. After two years of backfilling, around 7<sup>th</sup> year reclamation of internal dump would commence. The top soil required would be rehandled from the temporary dump of top soil stacked over 20 ha. From 10<sup>th</sup> year onwards collection of top soil and its spreading over backfill area would go on simultaneously. Surplus top soil only would be stacked over 20 ha top soil temporary dump. This process would continue till the entire top soil is rehandled for biological reclamation. The top soil would be stacked temporarily and would be regularly used and stacked. The top soil dump would be created in North-West segment of excavation

  
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area. By 20<sup>th</sup> year, it is covering about 20 ha area. The soil would be stacked during initial 5 years and then only unused soil gets accumulated after concurrent uses. The soil dump would be greened with grass for retaining the microbes of the soil. The details of top soil generated every five years besides its distribution and spreading over internal dump/ backfilling and details for the area of embankment, internal dump and green belt besides quantity of soil consumed in spreading over these areas are given below. The estimated cost is ₹ 0.20 crores at the rate of ₹ 1.00 lakh/ha for greening generation, storage & utilization of top soil management.

#### Waste Management covering Top Soil Management (Figures in Mm<sup>3</sup>)

Year/ Stage	Cumulative OB Removal			Temporary Dump (Cumulative)		Internal Dump/ Backfilling (Cumulative)		Embankment & Green Belt (Cumulative)	
	Top Soil	OB	Total Waste	OB	Top Soil	OB	Top Soil	OB	Top Soil
1 <sup>st</sup> Year	0.1	5.4	5.5	5.0	—	—	—	0.4	0.05
3 <sup>rd</sup> Year	0.4	38.1	38.5	38.15	0.25	—	—	—	0.10
5 <sup>th</sup> Year	0.6	120.4	121	96	0.45	25	—	—	—
10 <sup>th</sup> Year	1.8	377.2	379	146	1.45	232.8	0.2	—	—
15 <sup>th</sup> Year	2.1	636.9	639	181	1.58	457.5	0.5	—	—
20 <sup>th</sup> Year	2.5	896.5	899	214	1.70	684.2	0.8	—	—
25 <sup>th</sup> Year	3.1	1145.9	1149	207	1.85	940.8	1.2	—	—
30 <sup>th</sup> Year	3.7	1395.3	1399	84	2.00	1252.3	1.7	—	—
35 <sup>th</sup> Year	4.1	1644.9	1649	61	1.95	1585.8	2.2	—	—
40 <sup>th</sup> Year	4.6	1888.4	1893	—	1.90	1890.0	2.7	—	—
45 <sup>th</sup> year	4.8	2086.2	2091	—	1.45	2087.7	3.3	—	—
48 <sup>th</sup> Year	5.0	2114.0	2119	—	1.00	2114.0	4.0	—	—

#### Top Soil Management – (Including Action plan for Top Soil management)

Year/ Stage	Top Soil Removal “Mm <sup>3</sup> ” (Cumulative)	Top Soil Used “Mm <sup>3</sup> ”								Total utilized Top Soil (Cumulative)
		Embankment		Spreading over the Backfilling Area in Sq. Km. (Cumulative)		Spreading over the OB Dump Area in Sq. Km.		Using for Green Belt Area (Cumulative)		
		Area (Sq. Km.)	Top Soil (Mm <sup>3</sup> )	Area (Sq. Km.)	Top Soil (Mm <sup>3</sup> )	Area (Sq. Km.)	Top Soil (Mm <sup>3</sup> )	Area (Sq. Km.)	Top Soil (Mm <sup>3</sup> )	
1 <sup>st</sup> Year	0.08	0.065	0.020					0.10	0.030	0.050



Year/ Stage	Top Soil Removal “Mm <sup>3</sup> ” (Cumulative)	Top Soil Used “Mm <sup>3</sup> ”								Total utilized Top Soil (Cumulative)
		Embankment		Spreading over the Backfilling Area in Sq. Km. (Cumulative)		Spreading over the OB Dump Area in Sq. Km.		Using for Green Belt Area (Cumulative)		
		Area (Sq. Km.)	Top Soil (Mm <sup>3</sup> )	Area (Sq. Km.)	Top Soil (Mm <sup>3</sup> )	Area (Sq. Km.)	Top Soil (Mm <sup>3</sup> )	Area (Sq. Km.)	Top Soil (Mm <sup>3</sup> )	
3 <sup>rd</sup> Year	0.384							0.317	0.0951	0.1151
5 <sup>th</sup> Year	0.612									0.1151
10 <sup>th</sup> Year	1.756			0.42	0.1768					0.2919
15 <sup>th</sup> Year	2.112			0.93	0.4248					0.5399
20 <sup>th</sup> Year	2.468			1.44	0.6728					0.7879
25 <sup>th</sup> Year	3.066			1.8055	1.1571					1.2722
30 <sup>th</sup> Year	3.664			2.171	1.6414					1.7565
35 <sup>th</sup> Year	4.108			3.5955	2.0876					2.2027
40 <sup>th</sup> Year	4.552			5.02	2.5338					2.6489
45 <sup>th</sup> Year	4.408			6.21	3.2485					3.3636
48 <sup>th</sup> Year	5.048			7.40	3.9632					4.0783
Post Mining			0.020	9.93	4.7878			0.417	0.1251	5.0480

### Barbed Wire Fencing around Temporary Dump

The temporary dump of 229 Mm<sup>3</sup> has to be put over the open area of proposed mine in West side. This area has been fenced in North, South & West side. East side is open for movement of vehicles for dumping. The length covered comes to 6 Km.

### Barbed Wire Fencing around Project Area

This fencing is around the project area of 1351 ha. This fencing will ensure to prevent inadvertent entries to the project area. Length covered comes to about 18 Km.

### Filling of Void – Rehandling of Crown Dump

The Waste Management activity would not need any rehandling of crown dump. Temporary waste dumps have been rehandled as a routine mine operation for filling the routinely created voids in de-coaled area.

### Biological Reclamation of Mined out Land

During the operational mine life about 322 ha of land will get planted and thus reclaimed.

  
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### Plantation over Virgin area including Green Belt

During initial first 5 years green belting & plantation over other areas would cover 28.9 ha of land. This will cover mine boundary areas and areas around infrass etc.

### Manpower Cost and Supervision

Leveling and grading of waste dump is required for efficient movement of dump trucks and other mining equipment. Dozers, graders and water sprinklers are required for this work. These items fall under routine mining activity and the manpower cost engaged is estimated at 36 persons for this routine job out of total of 48 persons. The cost of remaining 12 persons has been booked under this head for mine closure.

### Toe Wall around the Temporary Dump

This activity is called for to ensure stability of dumps and preventing untoward movement of loose rocks from the waste dumps. It covers 17.4 Km around the temporary dump. Making toe wall around the temporary dump is a routine mining operation.

### Garland Drain around Project Area

This is a must for preventing entry of outside rain water into mining areas. This covers about 18 Km length around the mine.

### Peripheral road, gates & View Points

These activities will get covered in 1<sup>st</sup> 3 years of mine life.

### Greening of Temporary Dump

The temporary dumps are going to remain for more than 10 years before being rehandled. Hence these will be greened for betterment of ecology. The perennial greening schedule is given below:-

Sl. No.	—	Stage	—	Area Greened in ha
1.	—	6 <sup>th</sup> yr to 10 <sup>th</sup> yr	—	100 ha
2.	—	11 <sup>th</sup> yr to 20 <sup>th</sup> yr	—	250 ha
3.	—	21 <sup>st</sup> yr to 23 <sup>rd</sup> yr	—	60 ha

### Final Closure Activities

Activities to be covered for final closure of the mien are discussed below:

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## Management of Infrastructure Areas & Others

A. The following items of infrastructure and other areas would be retained for use by the local community for their public uses.

Infrastructure to be Dismantled		Non - Forest	Forest	Infrastructure to be retained		Non - Forest	Forest
Workshop	2.9	2.9	0	Garland Drain	4.3	2.09	2.21
Store	1.9	1.9	0	Embankment with Road at its top	9.5	3.52	5.98
Electrical Sub Station	2.0	2	0	Sedimentation Tank	0.6	0	0.6
CHP & Coal Storage	12.7	0	12.7				
<b>Total</b>	<b>19.5 ha</b>	<b>6.8 ha</b>	<b>12.7 ha</b>	<b>Total</b>	<b>14.4 ha</b>	<b>5.61 ha</b>	<b>8.79 ha</b>

### B. Others

Infrastructure to be Dismantled		Non-Forest	Forest	Infrastructure to be retained		Non-Forest	Forest
ETP	1.2	0	1.2	Road	11	6.12	4.88
Magazine	1.0	0	1.0	Township (Colony)	10.1	6.13	3.97
				Office Building	1.9	1.9	0
<b>Total</b>	<b>2.2 ha</b>	<b>1.1 ha</b>	<b>1.1 ha</b>	<b>Total</b>	<b>23.0 ha</b>	<b>14.15 ha</b>	<b>8.85 ha</b>

- The Workshop, Store, Sub Station, Magazine and ETP are as compared, clean areas, covering about 9 ha. These areas will be cleaned & restored as agro-land.
- The CHP and coal storage area covering about 12.7 ha shall be reclaimed as plantation area.
- The Garland Drain, Road, Sedimentation Tank, Residential Township shall be refurbished for use of general public and society unless needed for future coal mines.

## Disposal of Mining Machineries

The main production equipment i.e. Shovel/ Dumpers/ Surface Minor/ Belt Conveyors would have been replaced during envisaged mine life of 48 years. All mining machine would belong to MDO and these would be taken care by them.

## Technical and Bio Reclamation of Mined Out Area and OB Dump

At end of mining activities i.e. after 48 years, the following activities shall be taken up as post closure activities to reclaim the mined areas.

- Reclaiming 59.48 ha of mined out area as agro-land.



Rajesh Ranjan  
Elect. Suptd. Engineer  
T.V.N.L. Ranchi

28 AUG 2025

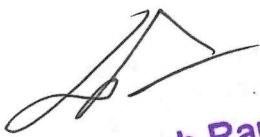


- Reclaiming 215.12 ha of mined out area as plantation area.

This will get completed in period of 3 years.

- Cemented steps on bank of water lagoon – To use water lagoon as resource, approach will be made. This will be completed as a final closure activity.

**Note : The above Reclamation Plan is part of approved Mining Plan (Including Mine Closure Plan).**



**Rajesh Ranjan**  
Elect. Suptd. Engineer  
T.V.N.L. Ranchi

26 AUG 2025

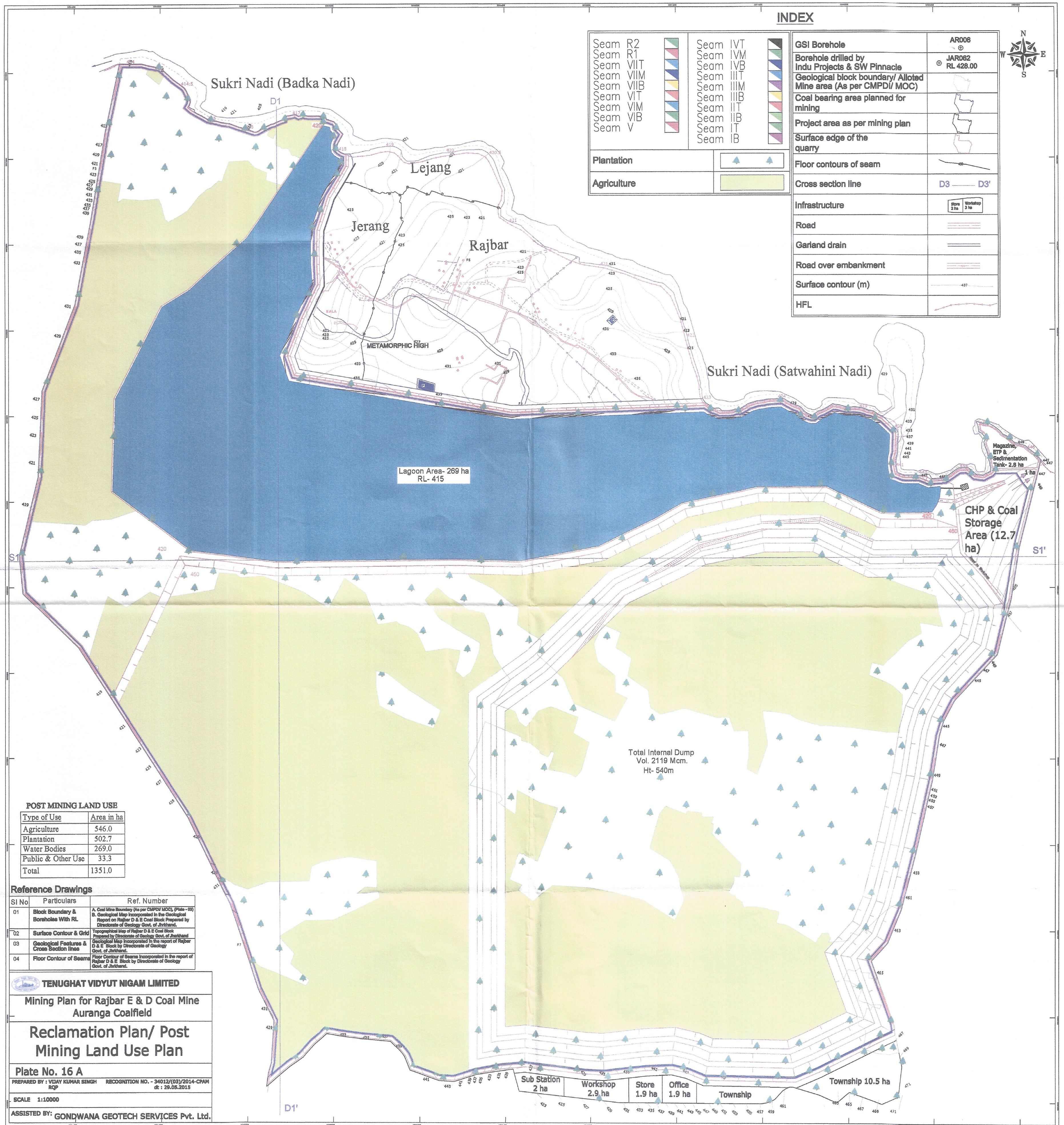




# INDEX

Seam R2	Seam IVT
Seam R1	Seam IVM
Seam VIIT	Seam IVB
Seam VIIM	Seam IIIT
Seam VIIB	Seam IIIM
Seam VIT	Seam IIB
Seam VIM	Seam IIT
Seam VIB	Seam IB
Seam V	Seam IB

GSI Borehole	AR006
Borehole drilled by	JAR062
Indu Projects & SW Pinnacle	RL 428.00
Geological block boundary/ Alloted	
Mine area (As per CMPDI/ MOC)	
Coal bearing area planned for	
mining	
Project area as per mining plan	
Surface edge of the	
quarry	
Floor contours of seam	
Cross section line	D3 — D3'
Infrastructure	Store 2 ha Workshop 3 ha
Road	
Garland drain	
Road over embankment	
Surface contour (m)	427
HFL	



## POST MINING LAND USE

Type of Use	Area in ha
Agriculture	546.0
Plantation	502.7
Water Bodies	269.0
Public & Other Use	33.3
Total	1351.0

## Reference Drawings

Sl No	Particulars	Ref. Number
01	Block Boundary & Boreholes With RL	A. Coal Mine Boundary (As per CMPDI/ MOC), (Plate - 60) B. Geological Map incorporated in the Geological Report on Rajbar D & E Coal Block Prepared by Directorate of Geology Govt. of Jharkhand.
02	Surface Contour & Grid	Topographical Map of Rajbar D & E Coal Block Prepared by Directorate of Geology Govt. of Jharkhand
03	Geological Features & Cross Section lines	Geological Map incorporated in the report of Rajbar D & E Block by Directorate of Geology Govt. of Jharkhand.
04	Floor Contour of Seam	Floor Contour of Seam incorporated in the report of Rajbar D & E Block by Directorate of Geology Govt. of Jharkhand.

**TENUGHAT VIDYUT NIGAM LIMITED**

Mining Plan for Rajbar E & D Coal Mine  
Auranga Coalfield

**Reclamation Plan/ Post Mining Land Use Plan**

Plate No. 16 A

PREPARED BY : VIJAY KUMAR SINGH  
RQP

RECOGNITION NO. - 34012/(03)/2014-CPAM  
dt: 29.05.2015

SCALE 1:10000

ASSISTED BY: GONDWANA GEOTECH SERVICES Pvt. Ltd.

Vijay Kumar Singh  
(Recognised Qualified Person)  
(Recognition No. 34012/(03)/2014-CPAM  
Dated- 29.05.2015)

ANANDA KUMAR MANDAL  
अनंद कुमार मण्डल  
Under Secretary  
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मुख्य सचिव / Govt. of India  
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Rajesh Ranjan  
Elect. Suptd. Engineer  
T.V.N.L. Ranchi  
27 DEC 2014