COST BENEFIT ANALYSIS

WITHOUT COMPROMISING THE ENVIRONMENTAL IMPLICATION AND RECALCULATION OF THE RATED CAPACITY OF COAL PRODUCTION BY ADOPTING ENVIRONMENTAL PROTECTION MEASURES

FOR

SAHAPUR EAST UNDERGROUND COAL MINE PROJECT

AT
VILLAGES – KHAMARIYA KHURD, KHAMARIYA KALAN, KATHOTIYA, CHUNIYA, KHOLHAD AND SENDURI; TEHSIL – SOHAGPUR, PALI, DISTRICT – SHAHDOL & UMARIA, STATE – MADHYA PRADESH.

ML AREA: 659 HA (658.83 HA AS PER CMPDIL SURVEY REPORT)
PEAK RATED CAPACITY (PRC) OF COAL: 0.70 MTPA

APPLICANT

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For UGM MINING PRIVATE LIMITED

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Authorised Signatory

I N D E X

1. INTRODUCTION OF SAHAPUR EAST COAL MINE:

1.1. BACKGROUND:

The Ministry of Coal, Government of India, through Vesting Order No. NA-104/12/2025-NA dated 29.05.2025, has allotted the Sahapur East Coal Mine to M/s Mineware Advisors Pvt. Ltd. under Rule 22E of MCR 1960.

The mine covers 659 ha (658.83 ha as per CMPDIL) across Sohagpur and Pali Tehsils of Shahdol and Umaria districts, Madhya Pradesh, for underground coal extraction. It has a peak rated capacity of 0.70 MTPA, with an expected mine life of 40 years, and coal will be used for commercial sale.

The block contains G7 grade coal to be extracted through fully mechanized underground mining using continuous miner–shuttle car technology.

Sahapur East is a virgin geological block in the Sohagpur Coalfield. It falls under Survey of India Topo Sheets 64 E/7 & 64 E/8, within the coordinates: Lat 23°14'21" N to 23°15'37" N and Long 81°18'48" E to 81°20'28" E.

1.2. COMMUNICATION:

Table – 1: Details of Coal Block

S.N.	Item	Description
1.	Nearest Town	Shahdol is located at 12 Km.
2.	Nearest Road	Chunia-Shahdol metal road passes through the block.
3.	National highways	National highway No. 78 passes through Shahdol at 12 Km.
4.	Connection to the State Capital	500 km by State highway No. 9 and National highway No. 45.
5.	Nearest Railhead	Shahdol is located at 12 Km. south-eastof the block on Anuppur-Chirimiri & Bilaspur-Katni broad gauge line of South- Eastern Railways.
6.	Nearest Airport	Jabalpur is located 250 Km.

1.3. TOPOGRAPHY, DRAINAGE AND CLIMATE:

The Sohagpur Coalfield landscape is shaped by various Gondwana formations. Talchir rocks form low plains (450–500 m), while northern areas rise above 1000 m. Barakar formations create gently undulating terrain, with sandstone ridges where capped by dolerite. Upper Gondwana rocks form prominent ridges and plateaus connecting to the Sonhat plateau.

The Son River is the main drainage channel, supported by several north-flowing tributaries. The eastern part drains through the Kewai river and smaller nalas such as Jhiria and Kulharia.

In Shahpur East Block, elevation ranges from 470–490 m. Drainage is mainly through the north-flowing Ghinachunia nala, with several small ponds.

The climate has three seasons:

- Summer (Mar–Jun): 25°C–46°C
- Monsoon (Jun–Sep)
- Winter (Oct–Feb): 7°C–31°C

Average annual rainfall is 1000–1700 mm. Land use includes limited eucalyptus plantations and predominantly cultivated land, mainly under paddy.

2. GEOLOGY:

2.1. BASIC DETAILS:

Sohagpur Coalfield forms the central part of the Rewa Gondwana Basin, with beds trending WNW–ESE and dipping gently (1°–4°) northwards, though local dip variations and rolls occur near faults.

GSI conducted regional exploration in the western Sohagpur Coalfield from 1994–1999. NMDC was allotted Sahapur East and West in 2007 and tasked MECL to carry out detailed exploration, completed in 2009 with a Geological Report. After winning the block in 2020, CCPL conducted a drone survey in April 2021 to validate surface topography. Summary of Exploration details are given below:

Table – 2: Details of Explorations

Regional Assessment of Large-scale mapping	GSI	December 1979
Regional exploration	GSI	1994-1999
Detailed exploration program	MECL	2009
Drone Survey by CCPL	CCPL	2021

Shahpur East Block lies in the northwestern Sohagpur Coalfield, mostly covered by sandy soil, with limited Barren Measure sandstone exposures along the Ghinachunia Nallah and two interpreted dolerite dykes in the south. The geological succession established in the block from the exploration data is given below:

Table – 3: Geological succession established in the block

Age	Formation	Lithology
Recent	Soil	Soil & Alluvium
Mid. Permian	Barren Measures	Pink, buff, red sandstone, red shale etc.
Lower Permian	Barakar	Coarse to medium grained sand-stone subordinate shale sand coal seams
Lower Permian to Up. Carboniferous	Talchir	Greenish sandstone & siltstones with pebbles of Granite.
U n c o n f o r m i t y		
Pre-Cambrian	Metamorphics	Porphyritic

As the block is entirely covered by Barren Measures, the structure has been interpreted from exploration data, floor contours, and geological cross-sections for major seams (IV, L2, IIIA, IIIB, II & L1). No major faults are present, though minor faults (<5 m throw) and local dip fluctuations are noted in a few borehole areas.

2.2. SEQUENCE OF COAL SEAMS AND INTERVENING PARTING:

Table – 4: Sequence of Coal Seams

Sequence of Seam / Parting	Range of Seam Thickness (m)		No. of full inter-sections	Dominant thickness (m)
	Minimum	Maximum		
IV	0.03	2.85	59	1.00 – 2.00
	(MSSE-46)	(MSSE-15)		
Parting	33.95	57		-
	(MSSE-27)	(MSSE-39)		
L2	0.02	2.28	58	0.50 – 2.20
	(MSSE-18)	(SSH-14)		
Parting	5.42	26.53		-
	(SSH-14)	(MSSE-15)		

Sequence of Seam / Parting	Range of Seam Thickness (m)		No. of full inter-sections	Dominant thickness (m)
	Minimum	Maximum		
III A	0.3	5.49	61	0.50 – 2.00
	(MSSE-30)	(MSSE-13)		
Parting	0.34	3.6		-
	(MSSE-53)	(SSH-8)		
III B	0.42	4.76	28	0.50 – 1.20
	(MSSE-10)	(MSSE-31)		
Parting	0.77	4.17	-	-
	(MSSE-37)	(MSSE-53)		
III L	0.5	1.05	10	0.05 – 1.00
	(MSSE-11)	(MSSE-14)		
Parting	14.07	22.12	-	-
	(MSSE-15)	(SSH-8)		
II	0.15	4.55	62	2.50 – 4.50
	(MSSE-25)	(MSSE-31)		
Parting	16.3	45.1	-	-
	(SSH-13)	(MSSE-39)		
I	0.05	0.6	21	0.40–0.50
	(MSSE-5)	(MSSE-29)		
Parting	16.88	38.7	-	-
	(MSSE-19)	(MSSE-5)		
L1	0.05	0.9	48	<0.50-0.90

2.3. SEAM WISE COAL RESOURCE WITH INDICATED GCV AND QUALITY VALUES:

Table – 5: Seam wise Coal Resource with indicated GCV and quality values

Seam Name	Net Proved Geological Reserve (Mt)	Extractable Reserve (Mt)	Ash (%)	Fixed Carbon (%)	Volatile Matter (%)	Moisture (%)	GCV (kcal/kg)
IV	10.864	4.446	19.50	50.10	24.00	6.30	5,650
L2	8.781	3.802	26.00	46.40	21.50	5.90	5,390
IIIA	11.316	4.186	32.50	39.90	22.60	6.20	4,900
IIIB	5.619	-	32.20	39.30	22.50	5.20	4,790
IIIL	0.356	-	29.39	40.98	24.18	5.46	5330
II	24.988	13.881	25.60	46.40	22.20	5.70	5,280
L1	1.439	-	28.20	39.53	21.69	5.71	5130
Sub-Total Net Measured Resource	**63.363**	**26.315**	**26.30**	**45.40**	**22.50**	**5.90**	**5,260**

3. MINING TECHNOLOGY:

3.1. SEAMS TO BE WORKED:

Seam-IV, L2, IIIA and II are considered to be worked by Underground Mining, where seam thickness attained >1.2 m.

3.2. CHOICE OF MINING METHOD:

- Eight seams are present, but only four (IV, L2, IIIA, II) have workable thickness within 39–194 m depth.
- With a stripping ratio>20:1, opencast mining is uneconomical; hence underground mining is required.
- Available options: Longwall or Bord & Pillar.
- Longwall is unsuitable due to irregular seam continuity, multiple seams in patches, and non-uniform geology.
- Bord & Pillar is flexible, widely used in India, suited for moderate PRC, and matches the geological conditions of Sahapur East.
- The preferred system is Continuous Miner with Shuttle Car/Coal Hauler for better safety and productivity.
- Depillaring will follow straight-line extraction with controlled slicing; no depillaring will occur under villages, nalas, infrastructure, mine entries, inter-seam drifts, or within ~200 m of pit bottoms.

3.3. SEQUENCE OF MINING:

- Mine access will be through two inclines down to Seam-II, intersecting Seams IV and IIIA. Seam L2 will be reached separately via three drifts from Seam IV due to its patchy nature.
- Seam patches thicker than 1.2 m will be mined using a Continuous Miner.
- Mining will proceed from upper to lower seams in the order: IV → L2 → IIIA → II.

3.4. RESERVE:

Table – 6: Seam wise Reserves

Seam	Geological Reserve (MT)	Blocked Reserve (MT)	Mineable Reserve (MT)	Mining Losses (MT)	Extractable Reserve (MT)		
					Development	Depillaring	Total
IV	10.8640	4.9220	5.9420	1.4960	1.887	2.559	4.446
L2	8.7810	3.1747	5.6060	1.8050	1.781	2.021	3.802
IIIA	11.3160	5.3020	6.0140	1.8280	1.910	2.276	4.186
IIIB	5.6190	4.6050	1.0140	1.0140	-	-	-
IIIL	0.3560	0.3560	-	-	-	-	-
II	24.9880	5.0174	19.9710	6.0890	6.342	7.539	13.881
I	-	-	-	-	-	-	-
L1	1.4390	1.4390	-	-	-	-	-
Total	**63.3630**	**24.8161**	**38.5470**	**12.2320**	**11.920**	**14.395**	**26.3150**

4. MINE CLOSING OPERATION:

- Sahapur East Underground Mine will be closed after the exhaustion of the coal reserve.
- The total extractable coal is 26.315 MT.
- Life of the Mine = 40 years + 3 years (Post Mining Closure) + 2 years (Post Closure Monitoring) = 45 years

5. TARGETED OUTPUT, LIFE, RESERVE & PRODUCTION SCHEDULE:

- The proposed project has been planned for a production capacity of 0.70 MTPA.
- The project will sustain mine life for a period of 40 years of mining operations.
- Coal is to be mined at the rate 0.70 MTPA out of the available extractable coal reserves of 26.315 MT.

Table – 7: Calendar Program of Production

Stage	Calendar	Production (MT)		Stage	Calendar	Production (MT)
1	2029-30	0.045		**21**	2049-50	0.70
2	2030-31	0.491		**22**	2050-51	0.70
3	2031-32	0.70		**23**	2051-52	0.70
4	2032-33	0.70		**24**	2052-53	0.70
5	2033-34	0.70		**25**	2053-54	0.70
6	2034-35	0.70		**26**	2054-55	0.70
7	2035-36	0.70		**27**	2055-56	0.70
8	2036-37	0.70		**28**	2056-57	0.70
9	2037-38	0.70		**29**	2057-58	0.70
10	2038-39	0.70		**30**	2058-59	0.70
11	2039-40	0.70		**31**	2059-60	0.70
12	2040-41	0.70		**32**	2060-61	0.70
13	2041-42	0.70		**33**	2061-62	0.70
14	2042-43	0.70		**34**	2062-63	0.70
15	2043-44	0.70		**35**	2063-64	0.70
16	2044-45	0.70		**36**	2064-65	0.70
17	2045-46	0.70		**37**	2065-66	0.70
18	2046-47	0.70		**38**	2066-67	0.70
19	2047-48	0.70		**39**	2067-68	0.45
20	2048-49	0.70		**40**	2068-69	0.129

6. LAND REQUIREMENT:

Land Details of Lease hold area (Summary of Land – Sahapur East Coal Mine) as preapproved mining plan.

Table – 8: Details of Land in ML Area

S.N.	Village Name	Forest Land (Ha)	Revenue Land (Govt.) (Ha)	Pvt. Land (Ha)	Grand Total (Ha)
1	Khamriya Khurd	0.000	25.674	25.339	51.013
2	Khamriya Kalan	0.340	4.766	22.642	27.748
3	Kathotiya	3.825	7.111	126.449	137.385
4	Chuniya	0.521	16.328	227.860	244.709
5	Kholhad	4.997	7.040	80.489	92.526
6	Senduri	3.050	10.592	91.807	105.449
Total (Ha)		**12.733**	**71.511**	**574.586**	**658.830 (~ 659.000)**

7. WATER DEMAND AND SUPPLY ARRANGEMENT:

Industrial water required for washing, sprinkling on mine roads for dust suppression and for watering the mine site plantation will be supplied by pumping installation at mine sump and surface reservoir.

Table – 9: Requirement of Water

Requirement of Water (cum/day)	Y-1 to Y-2	Y-3 to Y40
2 x CM equipment packages = 130 x 2 cum/day		260
2 x Roadheaders = 45 x 2 cum/day	90	
UG water spray for dust suppression = 10 cum/day		10
Dust Suppression in the 1 km Haul Road = 50 cum/day	50	50
Washing of Vehicles @2cum/vehicle for 10 vehicles considering 50% recirculation = 10 cum/day	10	10

Requirement of Water (cum/day)	Y-1 to Y-2	Y-3 to Y40
Plantation @15cum/Ha	90	90
Office @25 LPD for 460 heads	12	12
Residential @100 LPD for ~400 head	40	40
Peripheral Villages = 20 cum/day	20	20
Overall requirement of water for the project (cum/day)	**312**	**492**

The water requirement projected above can be easily met from the Mine Water (after treatment as required) after the mine is adequately developed. However, during the initial stage of a few years, the water requirement will have to be met from the ground water through bore wells.

8. PUMPING AND DRAINAGE:

The lease area lies within the Son River catchment and is drained by the northerly flowing Murna and Basar streams, along with several ponds. Underground water will be collected in sumps, allowed to settle, and then pumped to a surface reservoir for mine use. Any surplus, after minimal required treatment, will be discharged into the Ghinachunia Nala to the west.

9. MINED OUT LAND & PROPOSED FINAL LAND USE:

The land-use due to underground mining is disturbed mainly due to construction of the surface facilities, like – Mine Entries, haul roads, settling ponds, Mine site office, workshop, etc.

Table – 10: Land Use Details

Type	Land use (Proposed) (Ha)	Land Use (End of Life) (Ha)	Land Use (Post Closure) (Ha)					
			Plantation	Water Body	Public / Company Use	Forest Land (Returned)	Undisturbed	Total
Top Soil Dump	0.50	0.50	0.50					**0.50**
External Dump	0.60	0.60	0.60					**0.60**
Safety Zone	0.30	0.30	0.30					**0.30**
Settling pond	0.20	0.20		0.20				**0.20**
Road and Infrastructure area	8.40	8.40			8.40			**8.40**
Rationalization area								**-**
Garland drains	0.60	0.60	0.60					**0.60**
Embankment								**-**
Green Belt	5.90	5.90	5.90					**5.90**
Water Reservoir near pit								**-**
UG entry	0.40	0.40	0.40					**0.40**
Undisturbed / Mining right for UG	641.93	641.93				12.73	629.20	**641.93**
Total (Ha)	**658.83**	**658.83**	**8.30**	**0.20**	**8.40**	**12.73**	**629.20**	**658.83**
	(~659.00)	**(~659.00)**						**(~659.00)**

No depillaring shall be undertaken below built-up areas, roads, power line poles, villages, nala etc. and sufficient safety barrier shall be kept against them w.r.t. Angle of Draw, Depth and other Subsidence Parameter. Since the Mine will be worked by the Underground method, there will be less chance of subsidence. Hence, the detailed Subsidence Study and Site Scientific Investigation (SSI) to be done during operation of the mine and shall be worked as per conditions laid down in DGMS permission.

10. MANPOWER:

Total manpower requirement is envisaged at 458 nos.

Table – 11: Details of Proposed Manpower for 2 nos. CM Packages

S.N.	DESIGNATION	RELAY-1	RELAY-2	RELAY-3	TOTAL
A	Statutory Manpower	30	12	11	53
B	Face Manpower	44	44	43	131
C	Common Services	36	26	26	88
D	Surface Manpower	41	29	24	94
Total A+B+C+D		**151**	**111**	**104**	**366**
25% for absenteeism					**92**
Grand Total					**458**

11. POWER SUPPLY:

The 6.0 MW power at 33 KV will be drawn from nearest sub-station to the local sub-station from where the power will be supplied to the mine and other functional buildings. An emergency arrangement for power supply has been made by providing a set of 1x1000 KVA and 2x500 KVA DG sets which will take care of ventilation and pumping.

11.1. HV CIRCUIT BREAKER:

- Circuit Breaker
- Offload Isolator (ON/OFF/EARTH)
- Static overload and short circuit transformation protection
- Voltage and current display.

11.2. POWER TRANSFORMER SPECIFICATION:

- Rating 1500 kVA at 40°C ambient.
- Offload ratio 3300/1130V
- Tappings ±5%, ±10%
- Impedance 3-4% (Typical)

11.3. LOAD CENTRE SPECIFICATION:

- Transformer secondary 1100V earth fault protection
- 1100V, 1200Amp circuit breaker with short circuit tripping function
- 1100V Test switch
- 5 kVA 120V lighting transformer with 4 switched outlets
- 3.5 kVA 110V 3 phase drill transformers with 2 outlets
- 2 off 400A vacuum contactors feeding 350 Amp 1100V restrained Victor sockets
- 8 off 160A vacuum contactors feeding 200 Amp 1100V restrained Victor sockets
- Individual pilot circuit control on all outgoing motor drives sockets
- Individual short circuit protection on all 1100V motor drives
- Individual overload protection on all 1100V motor drives
- Earth fault protection on all 1100V motor drives
- Loss of vacuum protection on all 1100V motor drives
- Indication of voltage, current and power for all 1100V socket outlets.

11.4. BRIEF DESCRIPTION ON UNDER GROUND ELECTRICAL LAYOUT:

Power will be supplied at 3.3 kV through main feed cables along the central roadway to district transformers. An installed capacity of 1500 kVA is required for mechanized Bord & Pillar districts. Face equipment will run on 1100 V, supported by a CM electrical package (3.3/1.1 kV transformer, switchgear, cables, sockets, etc.). Separate HT cables and isolators will be provided between the district transformer, face transformer, and face switchgear.

12. COAL HANDLING & DESPATCH ARRANGEMENT:

Coal from the incline will be conveyed to 4 × 100-tonne surface bunkers, then loaded into trucks; some may be ground-stacked and rehandled by FELs. All coal will be dispatched by road or rail, with road transport to the nearest stations—Singpur (6 km) and Bandhwara (4 km)—for onward rail movement to consumers. No coal beneficiation process is proposed at the

pit head by the company.

Target output of the mine	**:**	0.70 MTPA
Life of Mine	**:**	Construction Period = 1.5 Years UG Mining Operation Period = 38.5 Years **Total Mining Period = 40 Years** Post Mining Closure Period = 3 Years Post Closure Monitoring Period = 2 Years **Total Life of Mine = 45 years**
Mine operation	**:**	3 shifts/day
CHP operation	**:**	3 shifts/day
Quality of coal	**:**	G7 Grade Coal
Product size	**:**	(-) 100 mm
Customer	**:**	Nearest end use plants
Surface Bunker	**:**	4 x 100 Tonne & capacity

13. INFRASTRUCTURE DETAILS:

Complete facilities near to the site is very important for Coal production. It is imperative to develop core infrastructure like power, road, telecommunication, housing service buildings viz office, store, first aid, canteen etc. for a large number of employees for the project.

Infrastructure Facilities	To be Retained for Public / Company Use (Ha)	To be Dismantled (Ha)
Road and Infrastructure Area	8.40	
Settling Pond	0.20	
Safety Zone		0.30
Topsoil Dump		0.50
External Dump		0.60
Garland Drains		0.60
UG Entry		0.40
Green Belt		5.90

14. ENVIRONMENTAL MONITORING:

Routine Environment monitoring will be done for the project. For air, water and noise pollution control measures, the samples will be collected and tested round the year with appropriate frequency at strategic places.

15. SUBSIDENCE MANAGEMENT:

No depillaring shall be undertaken below built-up areas, roads, power line poles, villages, nala etc. and sufficient safety barrier shall be kept against them w.r.t. Angle of Draw, Depth and other Subsidence Parameter. Since the Mine will be worked by the Underground method, there will be less chance of subsidence. Hence, the detailed Subsidence Study and Site Scientific Investigation (SSI) to be done during operation of the mine and shall be worked as per conditions laid down in DGMS permission.

16. SAFETY AND SECURITY ARRANGEMENT:

All surface openings to underground workings—inclines, shafts, boreholes and cuttings—will be sealed, capped, or filled to prevent any access or air ingress. Approach roads will be reclaimed and fenced/embanked as per regulations, while village roads will be retained.

Any subsidence impacts, identified after the ongoing study or through regular inspections, will be filled and restored to original condition. Cracks appearing during progressive or post-closure monitoring will be repaired immediately as per DGMS guidelines.

All electrical and mechanical installations (inclines, shafts, conveyors etc.) will be safely decommissioned. No coal will be left on the ground to prevent accidents or fires. Only

authorized personnel will carry out abandonment and monitoring activities.
Environmental monitoring for soil, air, water, and reclamation effectiveness will continue as required. Safety training will be provided for risks like landslides, falls, fire, and electric shock. During temporary discontinuance, security guards and temporary fencing with warning notices will be deployed to prevent entry of people or animals.

17. REHABILITATION AND RESETTLEMENT:

Number of PAFs are nil. So, no Rehabilitation and Resettlement plan is proposed. However, the land outsees will be given rehabilitation and resettlement benefits according to the Govt. of Madhya Pradesh policies and prevailing practices in industries in the vicinity.

18. PRESENT STATUS OF SAHAPUR EAST COAL MINE:

The process for obtaining various clearances / approvals / permissions etc. area undergoing. Out of total block area 659.00 Ha the area of revenue forest is 12.733 Ha. There are no other types of forest falls in the block area. The Forest clearance Proposal of the whole forest area has been submitted to Forest department and the proposal has been recommended by Regional Empowered Committee of MoEF&CC, IRO Bhopal and it is now pending at MoEF&CC-HO, New Delhi due to EDS raised regarding submission of Revised Mining Plan and Cost Benefit Analysis as per new NPV rates.

18.1. MINING LEASE:

The application for Mining Lease has been submitted to the Govt of Madhya Pradesh through Collectorate of dist. Shahdol and process at various stages are in progress. All NoCs have been obtained.

18.2. STATUS OF ENVIRONMENT CLEARANCE:

The project falls under Category A, Activity 1(a) of the EIA Notification, 2006. ToR was issued on 07.07.2021, and the Draft EIA was submitted to MPPCB. Two public hearings were completed, and the EIA–EMP was submitted to MoEF&CC.

In the 37th EAC meeting (17.11.2022), EC was deferred, and CCPL was asked to submit:

i) Approved Mining Plan & Mine Closure Plan
ii) Plan/undertaking for a solar plant within and outside the ML area
iii) Undertaking for no diversion of Ghinachunia Nala
iv) LoI from State Govt.
v) Clarification on the authority level conducting PH
vi) Signed company Environment Policy
vii) Traffic impact assessment with 40–50T trucks and chute-loading plan

Following this, CCPL sought validation of the mining plan (MoC letter 24.03.2023) and then began preparing a modified mining plan for 659 ha, now approved. Additional EAC conditions also required a solar-plant plan and undertaking on nala diversion.

Independent studies showed:

- No barren land inside ML; surrounding 15 km is coal-bearing and unsuitable for permanent solar installation.
- Solar plant cost ~₹64 Cr (≈16% of project cost).
- Relocation risk may disrupt power supply and mine productivity.
- CCPL committed to considering solar installation during future mine expansion.
- Techno-economic studies also showed that nala straightening improves safety with no hydrological impact, while non-diversion causes 10–15% loss of reserves.

All detailed responses with reports were submitted to EAC.

The proposal was again considered in the 46th EAC meeting (26.06.2023). EC was again deferred with requirements to submit:

i) A tree-plantation plan for 20% of project area (within ML and outside)
ii) Cost–benefit analysis and recalculated production considering environmental safeguards
iii) Eco-biodiversity study on stream diversion and protective measures without diversion
iv) Transport plan with 20% clean-fuel, ≥40T trucks

v) Revised Mining Plan/MCP incorporating EAC measures

Accordingly, CCPL initiated all required studies and updated plans; the modified mining plan was approved on 20.11.2025. The ToR transfer (from CCPL to Mineware Advisors Pvt. Ltd.) was granted on 06.07.2025. The EC application was filed on the Parivesh Portal on 15.09.2025, and the first EDS was issued on 26.09.2025.

19. THE SUMMARY OF THE REPORT AS ASSESSED BY THE CONSULTANT M/S UGM MINING PRIVATE LIMITED:

To meet the EAC requirement of planting on 20% of the project area, UGM assessed land availability within and around the ML area using satellite imagery and field surveys. Four options were examined: roadside land, forest land (inside/outside ML), cremation grounds, Khal Khaddar areas, and land around water bodies.

Findings:

- Roadside land (~134.56 ha) is the only feasible option—adequate area, accessible, and manageable.
- Revenue/community forests in nearby villages (Senduri & Padri) total ~163 ha, but only ~10% is free, with the rest under plantation or encroachment.
- Around water bodies, only ~28 ha is suitable (rest under water).
- Forest land within the ML (12.733 ha) has low density but is fully encroached, making plantation impractical.

Plantation Plan:

- Density: 2500 plants/ha (trees + shrubs); ~3.3 lakh saplings required.
- Plantation in pits after first monsoon; soil refilling, fertilizer, watering, monitoring, and replacement of dead plants included.
- Estimated cost: ₹133.7 crore, with supervision as per DFO/state guidelines.
- Roadside plantation outside the ML requires authority approval; if land is unavailable, land purchase may be needed (current rate ~₹3.5 lakh/ha).

20. COST BENEFIT ANALYSIS:

Based on the plantation cost assessed by UGM and the observations of EAC, MoEF&CC, a revised Cost Benefit Analysis (CBA) has been prepared. Before EAC's queries, the CAPEX for the life of mine was ₹390 Cr. In line with the Cost Benefit Analysis Guidelines for Forest Land Diversion, 2023, the updated CBA has been compiled and presented in the tables below:

Table – 14: Cost Benefit Ratio

Particulars	Monetary Equivalent of Cost (Rs. Lakhs)
Impact	
Loss of livelihood due to land acquisition	-
Psychological Impacts due to Resettlement and Rehabilitation	-
Loss of agricultural opportunities due to land degradation	636.43
Loss of forest land and associated ecological services (Break-up given in Table - 15)	303.35
Occupational Health Issues due to enhanced pollution levels	517.09
Degradation of Air Quality	-
Degradation of Quality / Extraction of Groundwater	483.99
Total Estimated Costs	**1,940.86**
Benefit	
Economic Benefits of the Project to the Government in terms of Royalty, Other Taxes and Revenue Sharing	6,65,229.16
Social Benefit (CSR)	654.00
Environmental Benefit	15,960.00
Economic Benefits due to Direct & In-Direct Employment	81,180.00
Economic Benefits due to Net Increase in Productivity	79,580.64
Total Estimated benefits	**8,42,603.80**
Estimated Costs towards the Project	1,940.86
Estimated Benefits from the Project	8,42,603.80
Cost Benefit Ratio	**434.139**

Table – 15: Loss of forest land and associated ecological services

Parameters	Guidelines	Calculations	Cost (Rs.)
Ecosystem Services losses due to proposed forest diversion	Economic value of loss of ecosystem services due to diversion of forests shall be net present value (NPV) of the forest land being diverted as prescribed by Central Government (MoEF&CC)	Economic Value of lossof ecosystem Services due to proposed diversion of Forest shall be Rs 957780/- HA (NPV rate as per ECO value of Class III (c) Forest as per Guideline of MoEF & CC, GoI dated 06-01-2022) Since the maximum surface strain for Sahapur East Coal Block as predicted by IIT BHU through 3-D subsidence prediction model is 9.7mm/m ,10% of the NPV will be pplicable and hence the amount so determined is calculated as under Total Forest area: 12.733 Ha Environment loss: 12.733 x Rs.9,57,780 = Rs.1,21,95,413.00 **10% of NPV = Rs.12,19,541.00**	1,21,95,412.74
Loss of animal husbandry productivity including loss of fodder	To be quantified and expressed in monetary terms or 10% of NPV applicable, whichever is maximum	(A) As per NPV As per calculation 10% of NPV is = Rs. 12,19,541.00 (B) Quantified Calculation Estimated quantity of fodder /grasses = Average production fodder / grasses in MT X Area applied (baesd on assumption that on closer an area is capable of yielding an average of 2 to 4 MT of grass per Ha (MT) = 3 MT x 12.733 = 38.199 MT Value of fodder = Estimated quantity X Market Rate = 38.199 MT x 4,800 per MT = Rs. 1,83,355.20 Hence, 10% of NPV is considered maximum than Quantified amount.	12,19,541.27
Cost of human resettlement	To be quantified and expressed in monetary terms as per approved R&R Plan	Actual cost of human resettlement as per R&R Plan	-
Loss of Public Facilities and administrative infrastructure (Roads, buildings, schools, dispensaries, electric line, railways etc.) on forest land which would require forest land if these facilities were diverted due to the project	To be quantified and expressed in monetary terms on actual cost basis at the time of diversion.	No Public Facilities and administrative infrastructure (Roads, buildings, schools, dispensaries, electric line, railways etc.) on forest land. Therefore, loss on the above causes would be **NIL**	-
Possession value of Forest land diverted	30% of environmental cost (NPV) due to loss of forest or Circle rate of adjoining area in the district should be added as a cost component as Possession value of forest land, whichever is maximum	(a) Circle rate of adjoining area in district as a component as possession value of forest value has arrived as Rs.7,00,000 x 12.733 Ha = Rs. 89,13,100.00 (Circle rate of Village Senduri is considered higher in all nearby villages) (b) 30% of Environmental cost (NPV) due to loss of Forest Rs.1,21,95,413 x 0.30 = Rs.36,58,624.00 (c) Since, amount determined based on calculation considering the circle rate is higher than 30% value of NPV, it has been considered toward possession value of the Forest land diverted.	1,08,22,668.00
Cost of suffering to outsees	The social cost of Rehabilitation of outsees (in addition to the cost likely to be incurred in providing residence,	There will not be any loss on this account as diversion of the forest land to this project will not affect any evacuation of houses or structure or human settlement in forest area.	-

Parameters	Guidelines	Calculations	Cost (Rs.)
	occupation and social services as per R&R plan) to be worked out as 1.5 times of what outsees should have earned in two years had they not been shifted.		
Habitat fragmentation cost	"While the relation between fragmentation and forest goods and services is complex, for the sake of simplicity the cost due to fragmentation has been pegged at 50% of NPV applicable as a thumb rule."	The cost due to fragmentation has been determined as 50% of the NPV amount, as per standard industry practice i.e. Rs. 1,21,95,413 x 0.50 = Rs. 60,97,707.00	60,97,706.37
Compensatory afforestation and soil and moisture conservation cost	The actual cost of the compensatory afforestation and soil and moisture conservation and its maintenance in future at present discounted value	Not applicable, as no forest land will be diverted for mining purposes; hence, compensatory afforestation and associated soil and moisture conservation costs are not required.	-
Total			**3,03,35,328.38**