



**ANDHRA PRADESH MINERAL DEVELOPMENT
CORPORATION LIMITED (APMDC)**

**PRE-FEASIBILITY REPORT
OF
MADANPUR SOUTH COAL MINE**
Hasdo-Arand Coalfield, District Korba, Chhattisgarh



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INDIA**



1.0 INTRODUCTION

This Pre Feasibility Report (PFR) has been prepared as part of the application for grant of Terms of Reference (ToR) for carrying out Environmental Impact Assessment and Environmental Management (EIA/EMP) studies for 5.4 MTPA Madanpur South coal mine of M/s. Andhra Pradesh Mineral Development Corporation Limited (APMDC). The project area is located within Hasdeo-Arand Coalfield in Morga and Ketma villages under Katghora tehsil of Korba district, Chhattisgarh.

Madanpur South Coal Block has been allocated by Ministry of Coal (MOC) to APMDC for commercial mining vide order no. F.No 103/9/2016/NA dated 29th September 2016. APMDC, a Government of Andhra Pradesh State Undertaking involved in exploration and scientific exploitation of mineral deposits of Andhra Pradesh since its inception.

In pursuance of Government of India policy vide Environment (Protection) Act, 1986 new projects or expansion of any existing plant necessitates statutory prior Environmental Clearance in accordance with the objectives of National Environmental Policy as approved by the Union Cabinet on 18th May, 2006 and MoEF&CC's EIA Notification dated 14.09.2006, by preparing a EIA/EMP report. As part of the process of scoping for the EIA/EMP studies, the project proponent has to submit an online application to MoEF&CC in the prescribed format (Form I) along with a Pre Feasibility Report.

While taking necessary actions prescribed by MoEF&CC, APMDC has decided to submit an application to MoEF&CC and has engaged the services of MECON Limited, a Public Sector Undertaking under the Ministry of Steel, Govt. of India to prepare a Pre-Feasibility Report as the first step for seeking Environmental Clearance for the Madanpur South Coal mine. This report contains information on the proposed coal mining project.

The report including this introduction chapter includes:

- Introduction of the Project / Background Information
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ACKNOWLEDGEMENT

MECON wishes to place on record its deep appreciation for the trust reposed in MECON by APMDC and for the active interest and help extended by APMDC officials.



2.0 INTRODUCTION OF THE PROJECT / BACKGROUND INFORMATION:

2.1 IDENTIFICATION OF PROJECT AND PROJECT PROPONENT:

The Andhra Pradesh Mineral Development Corporation Ltd. (APMDC), was incorporated on 24th Feb., 1961 as a wholly owned undertaking of the Government of Andhra Pradesh for development of mineral resources and promotion of mineral based industries in Andhra Pradesh including exploration, exploitation, conservation, processing, beneficiation and conversion into value added products. APMDC Ltd. is registered under the Companies Act 1956 with full participation by Government of Andhra Pradesh. The Authorized capital has increased, over time, to Rs. 10 Crores while the paid up capital is Rs. 6.30 Crores.

Madanpur South Coal Block and Suliyari Coal Block have been allotted to M/s APMDC under the allotment of Coal Mines of State Government Companies of States other than Coal bearing host states for sale of Coal under the provisions of the Coal Mines (Special Provisions) Act 2015.

After allocation of the coal block, APMDC desires to submit a fresh ToR application to MoEF&CC for consideration. This Pre Feasibility Report (PFR) is a part of the application for grant of Terms of Reference (ToR) for carrying out EIA/EMP for the coal project.

Application for Forestry Clearance (FC) was made by prior allottee to MoEF&CC through State Govt. The proposal was pending till cancellation of allocation of coal block. Now, a fresh application shall be made by APMDC for FC. Site Specific Wildlife Conservation Plan for Madanpur South Coal Block was prepared by prior allottee but it was not signed by Chief wild life warden. A fresh wild life conservation plan for Madanpur South Coal Block is required to be prepared by APMDC.

The block is a virgin coal block with proposed annual rated production capacity of 5.4 Mt by opencast method of mining. Mining plan for 5.4 Mt capacity has been approved by Ministry of Coal vide letter no. Ni.13016/34/2005-CA-I dated 16th June 2008. Mine closure plan for the block was under advanced stage of approval from Ministry of Coal (MoC) prior to de-allocation of the block. Fresh Mine Closure Plan needs to be approved. The estimated project cost is Rs. 2740.67 crores (*APMDC - 672.45 crores and MDO - 2068.22 crores*). The overall life of the mine is expected to be for more than 30 years.

2.2 BRIEF INFORMATION OF THE PROJECT:

The project falls under Category 'A' [Sl.no. 1(a) of Schedule: "List of project or activities requiring prior Environmental Clearance"] of MoEF&CC notification dated 14th September, 2006, Amendment Nov.-2009 & April -2011 of the Ministry of Environment, Forest and Climate Change, New Delhi.



The lease has been allocated by Ministry of Coal to APMDC for commercial mining vide order no. F.No 103/9/2016/NA dated 29.09.2016 over an area of 713.952 ha. Out of which, 660.260 ha land is forest land (490.902 ha is Protected Forest and 169.358 ha is Revenue Forest) and 53.692 ha area is private land (53.408 ha land is agricultural land and 0.284 ha is communal land). Entire block area has been explored by GSI and MECL. Geological Report has been prepared by MECL in Feb. 1992 (Bisrar Block) and Jan. 1993 (Madanpur Block).

The total make up water requirement for the proposed plant is estimated at 195 m³/h. The water for initial two years shall be sourced from Bisrar nalla through intake pumping system proposed to be installed near Bisrar nalla. After two years of coal mining, water requirement can be met from proposed quarry with pumping system installed near mines.

2.3 NEED FOR THE PROJECT AND ITS IMPORTANCE TO THE COUNTRY OR REGION:

Coal is the primary source of energy supply in India. About 55% of the current commercial energy use is met by coal. Rising demand for energy and coal as the primary energy source make it a significant resource in the country.

Opening of Madanpur South coal mine will have the following benefits:

- Increase supply of coal for India's power programme.
- Reduces power shortages hindering growth, foreign investment and productivity.
- Generate additional employment, both direct and indirect which will lead to economic growth of the industrial sector as well as country.
- Quality of life of local populace in villages shall improve due to company's community development programmes.

2.4 DEMAND AND SUPPLY GAP:

The demand for coal for 2016-17, was estimated to be 884.87 million tonnes (Mt), whereas the domestic availability was estimated at 724.71 million tonnes (Mt).

2.5 IMPORT VS INDIGENOUS PRODUCTION:

In the recent years, coal production has failed to match the demand for coal. As a result, India's coal imports have risen from 20.5 million tonnes (Mt) in 2002-03 to 200 million tonnes (Mt) in 2015-16. In 2016-17, the gap of 160.16 million tonnes (Mt) was projected to be met through import.

2.6 EXPORT POSSIBILITIES:

India does not export coal as demand is much more than availability.



2.7 DOMESTIC / EXPORT MARKET:

As the block has been allocated by ministry of mines for commercial mining, coal extracted from the same shall be used for commercial purpose.

2.8 EMPLOYMENT GENERATION:

Total manpower required for Madanpur South Coal Block for 5.4 Mt/yr coal production along with corresponding overburden removal is 1034. Out of which, Manpower of APMDC is 168 whereas manpower proposed to be deployed by MDO is 866.

Majority of the unskilled and semiskilled workers will be local persons. The officers, supervisors and rest of the workers will be housed in APMDC's townships.

3.0 PROJECT DESCRIPTION

3.1 TYPE OF PROJECT INCLUDING INTERLINKED AND INTER-DEPENDENT PROJECT

The project falls under Category 'A' [Sl.no. 1(a) and 2 (b) of Schedule: "List of project or activities requiring prior Environmental Clearance"] of MoEF&CC's notification dated 14th September, 2006 in connection with Environment (Protection) Rules 1986.

3.2 LOCATION:

The lease is located in Hasdo-Arand Coalfields, Village: Morga, Tahsil: Katghora, Korba district of Chhattisgarh State. It is bounded by longitudes $82^{\circ}38'02''E$ to $82^{\circ}40'22''E$ and latitude $22^{\circ}45'19''N$ to $22^{\circ}47'09''N$ and is covered by the Survey of India Toposheet no. 64J/9 (R.F 1: 50000).

Madanpur village is located at a distance of around 3.5 km from the block. Ketma village is located in the south-western side of the block at a distance of around 2 km. The State Highway No. SH-5 (Now NH 130) joining Bilaspur and Ambikapur runs on the southern part of the block. The nearest Tehsil town Katghora is connected by NH -130 and it is located at a distance of around 30 km from Morga village. Bilaspur is located at a distance of about 120 km from the block in the South-west and Ambikapur is located at a distance of about 80 km NE of Morga village. Rail heads are located at a distance of 70 to 90 km from the block. Korba railway station is located at a distance of about 70 km south from the block and can be approached Katghora. Bishrampur and Chirimiri railway stations are located at a distance of 90 km in north east and 100 km in north from the block respectively.

The location map of the area has been presented at drawing no. **MEC/11/16/Q7E0/PFR/01.**



3.3 DETAILS OF ALTERNATE SITE:

Since the project envisages opening of an opencast mine and mining is a site specific activity guided by deposit geology and mineralization, the question of any alternate site does not arise.

3.4 SIZE AND MAGNITUDE OF OPERATION:

Madanpur South Coal Block is a virgin coal block of 713.952 ha area having 5.4 Mt annual production capacity. Rated capacity of mines has been planned to be envisaged in 6th year of mining operation. Since the coal produced from mines will be of (-)100 mm size, no crushing facility has been envisaged so far. As entire coal produced from the mine will be sold to long term buyers therefore, mechanized coal handling plant inclusive of stacking & reclaiming of coal, stockpiling, automatic In-Motion Truck loading system have been envisaged for selling of coal to external buyers.

3.5 MINE DESCRIPTION

3.5.1 Geology

General

Geologically the area is situated in the south-western part of the Kadapa Basin, close to the Archean basement and lies within Vampelle formation of Papaghni Group of Kadapa Super Group.

Total 9 coal seams are present in the block namely Seam V, Seam IV, Seam III, Seam II, Seam IIT, Seam II B, Seam I, Seam IT, and Seam IB. Out of the above seams, seam III is divided into 4 splits i.e. Seam III Top 1, Seam III Top2, Seam III M and Seam IIIB.

Status of exploration

Madanpur South Coal Block geologically comprises of the Bissar block in the southern side and Madanpur Block in the northern side. Entire block area has been explored by GSI and MECL. Geological Report has been prepared by MECL in Feb. 1992 (Bissar Block) and Jan 1993 (Madanpur Block).

Thickness of Coal Seam

Thickness of the coal seam in the block area is varying from 0.4 m to 4.51 m. Seam V is the thinnest seam whereas seam III is thickest seam with combined thickness of seam III is 12.61 m.



Dip of the seam

Seams lying in Madanpur South Coal Block is almost flat with maximum seam gradient of 50°. Seams are dipping from north to south.

Presence of Geological Disturbances

The seams of Madanpur South Coal Block are almost free from geological disturbances. Only two localized normal faults i.e. Fault F2-F2 and F3-F3 is present in the north western part of the block. Throw of fault F2-F2 is 10 – 20 m whereas, that of fault F3-F3 is 10 m. Average dip of fault plane is 600.

Depth of Seam

Seam II, III, IV and Seam V incrops in the near Bissar nalla in the northern part of the block. Seam V is the topmost seam which is lying at a depth of 19.7 to 106.78 m from the surface. Bottom most seam IB is lying at a depth of 48.89 m to 298 m from surface.

Hydro-geological Condition

It reveals from the study report of Central Ground Water Board and the present working mines in the nearby area that ground water level of the area varies from 5-10m from the surface. Therefore mine dewatering is a critical factor for development of Madanpur South Coal Mines.

Nature of Roof & Floor Strata

Roof and floor of seams are mostly fined to medium grained sandstone and shale.

3.5.2 Mineral Reserves:

Total mineable reserve of Madanpur South Coal Block upto Seam I B is 158.921Mt. Summary of Mineable reserve, waste generation and stripping ratio is given below:

Summary of Mineable reserve, waste generation and stripping ratio

Parameters	Details
Mineable Reserve	158.921 Mt
Waste Generation	962.45 Mcu. m
Stripping Ratio	6.06 cu. m/t of Coal

Seam-wise mineable reserve and quality of coal at Madanpur South Coal Block is given below.

Seam-wise mineable reserve and quality of coal

Seam/ Parting	Mineable Reserve, Mt	Coal Quality						Waste Generation, Mcu. m	Cumulative Stripping Ratio, cu. m/t
		Ash %	Volatile Matter %	Moisture %	Fixed Carbon %	GCV, kcal/kg	UHV, kcal/kg		
OB								135.47	
Seam V	2.13	40.16	23.09	5.55	34.33	3994	2671		63.75
IB								63.22	
Seam IV	7.84	40.51	22.09	4.88	32.52	3993	2627		19.93



Pre-Feasibility Report
5.4 MTPA Madanpur South Coal Mine
in Katghora tehsil, Korba district, Chhattisgarh of M/s. APMDC



Seam/ Parting	Mineable Reserve, Mt	Coal Quality						Waste Generation, Mcu. m	Cumulative Stripping Ratio, cu. m/t
		Ash %	Volatile Matter %	Moisture %	Fixed Carbon %	GCV, kcal/kg	UHV, kcal/kg		
IB								300.30	
Seam III Top1	28.50	29.92	24.42	5.63	40.03	4978	4094		12.97
IB								1.45	
Seam III Top2	16.15	29.57	24.56	5.57	39.18	5016	4135		9.16
IB								2.23	
Seam III M	9.74	29.63	24.58	5.57	38.82	5025	4157		7.81
IB								2.50	
Seam III B	35.89	27.66	25.79	5.53	40.84	5174	4374		5.04
IB								104.31	
Seam II	18.94	27.93	26.46	5.8	40.4	5060	4267		5.11
IB								73.51	
Seam II T	10.00	27.6	26.66	5.55	40.19	5100	4338		5.29
IB								2.08	
Seam II B	3.31	27.65	22.26	9.31	40.6	5084	4291		5.17
IB								269.47	
Seam I	10.84	29.66	24.37	5.76	40.21	4981	4038		6.66
IB								1.81	
Seam I T	6.23	34.23	22.09	5.64	37.97	4648	3587		6.39
IB								6.09	
Seam I B	9.35	24.70	24.93	6.16	44.21	5461	4809		
Total	158.92	29.48	23.57	7.02	39.77	5002	4132	962.45	6.06

3.5.3 Mining:

Proposal has been made to develop entire mineable area through opencast mining by developing horizontal benches from top to bottom upto 250 m depth.

Mine Design Parameter

Overburden and inter-burden of Madanpur South Coal Block is mostly sandstone and shale. Hydraulic excavators of 10 m³ capacity has been proposed to be deployed for overburden and inter-burden excavation therefore bench height has been considered as 10 m for overburden/inter-burden to commensurate with excavator's digging reach. In coal seams, bench height has been restricted to the thickness of seams.

25 m working width of bench has been proposed considering berm width and drains. Surface miner has been proposed to be deployed for extraction of coal. Minimum exposure requirement for optimum utilization of surface miner is 50 m wide bench with 200-300 m face length. Same has been proposed for coal benches.



In the absence of any geo-technical investigation report for the block, slope of individual bench has been considered as 70° based on the existing practice in the nearby mines. A haul road from mines to Coal Handling Plant (CHP) having 25 m width has been planned at a gradient of 1 in 16. Besides, another approach road to workshop area with 25 m width has been also proposed.

Sl. No.	Parameters	Details
1	Average Bench Height	10 m
2	Minimum Bench Width	25 m
3	Average Bench Slope	70°
4	Width of Haul Road	25 m
5	Haul Road Gradient	1 in 16
6	Inter Bench Ramp Width	25 m
7	Inter Bench Ramp Gradient	1 in 16

Production Planning

As per approved mining plan rated capacity of Madanpur South coal mine is 5.4 Mt per annum. Rated capacity of mine has been planned to be achieved in phases as follows.

Year	Coal Production, Mt
Construction Period –C1	Nil
Construction Period –C2	Nil
1 st Year	0.38
2 nd Year	1.14
3 rd Year	2.63
4 th Year	3.5
5 th Year	4.5
6 th Year	5.4

Drilling & Blasting

Since Surface miner has been planned to be deployed for extraction of coal, no drilling & blasting is required for coal benches.

Drilling in the overburden and inter-burden benches will be carried out using 250 mm diameter drills. For thin partings 160 mm diameter drills have been envisaged. Holes will be drilled in staggered pattern with average burden and spacing of 6 m and 6.5 m respectively. Considering 10% subgrade drilling, total hole depth will be 11 m. Proposed stemming length is 6.25 m with a deck length of 1.25 m. Average charge length is 3.5 m. Drilled holes will be charged using SME/SMS explosives and initiated using NONEL. Wide V cut firing pattern has been proposed for initiation as it will provide more free face for holes of subsequent rows.



3.5.4 Coal Handling Plant

Rated capacity of mines has been planned to be envisaged in 6th year of mining operation. Since the coal produced from mines will be of (-)100 mm size, no crushing facility has been envisaged. Entire coal produced from mines will be sold to long term buyers therefore, mechanized coal handling plant (CHP) inclusive of stacking & reclaiming of coal, stockpiling, automatic In Motion Truck loading system have been envisaged for selling of coal to external buyers.

The ROM coal having (-)100mm size will be transported by 35 t capacity dumpers upto the truck unloading station of the CHP and unloaded to 4 nos. of underground hopper each having 60 cu.m. capacity. These hoppers will be equipped with rod gate and apron feeder below the hopper for smooth flow of coal and discharge in a common belt conveyor in the bottom most floor. From this conveyor, coal will be fed to either of the two connecting conveyors by means of flap gate/ diverter gate. Coal will thus be conveyed to succeeding transfer houses. The rated capacity of belt conveyor for the CHP plant has been considered as 1200 tonnes per hour.

To control the fugitive dust generated during handling of coal in Coal Handling Plant and to maintain work zone dust concentration within the environmental norms, Dust Suppression Systems have been envisaged. The various premises of the Coal Handling Plant considered for Dust Suppression (DS) Systems are as follows:

1. Transfer Points
2. Truck unloading Station
3. Truck Loading Silo
4. Plain water sprinkling system has been envisaged for the stock piles.

3.5.5 Transportation

Loaded coal from mines head shall be transported by dumpers up to Coal Handling Plant. Subsequently, coal will be unloaded in a ground hopper.

Overburden and inter-burden will be loaded by 10 m³ capacity hydraulic excavators into 100 t capacity dumpers which will be transported to either external dump or backfilled areas.

3.5.7 Life of the Project

Considering 158.92 Mt of Mineable reserve and 5.4 Mt of annual rated production capacity, mine life has been estimated to be 32.18 Years.



3.6 Raw Materials

It is envisaged that the blasting operation will be carried out by SME (Site mixed Emulsion)/SMS (Site Mix Slurry) explosives and will be transported to the mine site by the explosive suppliers.

Therefore, one no. of 10t capacity magazine has been envisaged for storing NONEL, detonating fuses, detonators etc. and other explosives for secondary blasting if necessary.

3.7 Resource Optimization / Recycling and Resource

Waste dumped in the proposed site will be subsequently re-handled & backfilled in the mined-out voids from 14th year onwards.

After two years of coal mining, industrial water requirement can be met from proposed quarry with pumping system installed near mines.

3.8 SITE SERVICES

3.8.1 Water Requirement:

The total make up water requirement for the proposed plant is estimated at 195 m³/h (approx.). Details of makeup water requirement are given below in **Table 6**.

Table 6: Water Requirement

Sl. No.	Description	Make up water Requirement m³/h
1.	Dust suppression for CHP	145
2.	Pithead Bath	1
3.	Mining equipment	3
4.	Equipment washing at work shop	2
5.	Haul Road water sprinkling	3
6.	Drinking water (Plant complex)	10
7.	Drinking water (Township)	15
8.	Fire fighting system	10
9.	Green belt development, Miscellaneous	6
	Total	195

The water for initial two years shall be sourced from Bissar nalla through intake pumping system proposed to be installed near Bissar nalla. After two years of coal mining, water requirement can be met from proposed quarry with pumping system installed near mines.



3.8.2 Power Requirement

The estimated power requirement of the proposed coal mining complex of Madanpur South Coal Block are as follows:

Maximum Demand : 9 MVA
Annual Energy Consumption : 45 MU

Electrical power requirement for the proposed Mining Plant shall be met from proposed 33/11 KV substation of CSPDCL proposed to be located at Morga village. Power supply to MRS shall be made by extension of 02 nos. of bay at proposed 33/11 KV sub-station and through 2 km 33 kv double circuit line overhead line with wolf conductor up to Main Receiving Station.

3.8.3 Amenities

The mine has a site office. Rest shelters with drinking water facilities, toilets, bathing and washing facilities and canteen are also in place. There is a First Aid Centre with an ambulance always available. Other amenities and infrastructure, such as township, hospital, stores, workshop, community centre, schools etc. are being constructed over Ketma village and will be located on the western side of the road connecting Morga village with Dhajag. Township for APMDC (9.5 ha) & MDO (33.56 ha) has been planned at Ketma village and will be located on the western side of the road connecting Morga village with Dhajag. A total of 168 nos. of manpower of APMDC and 866 nos. of manpower of MDO have been proposed to be accommodated in the township. A township of ~265 dwelling unit has been envisaged.

3.9 WASTES

A total of 962.45 Mm³ waste will be generated from Madanpur South Coal Block upto the conceptual period. Out of which, 71.23 Mm³ waste will be generated during 1st five years of mining operation.

Year-wise and block year-wise waste generation from Madanpur South Coal Block is given below.

Year-Wise & Block Year-wise Waste Generation

Year	Waste Generation, Million cu. m
1 st Year	1.87
2 nd year	2.94
3 rd year	6.32
4 th year	26.10
5 th year	34.00



Total 1st – 5th year	71.23
6 th – 10 th year	160.65
11 th – 15 th year	155.70
16 th – 20 th year	156.75
21 st – 25 th year	164.15
26 th -Conceptual	253.97
Grand Total	962.45

Due to non-availability of non-coal bearing non forest land within the block, initial dumping of waste has been planned in the coal bearing area in the north western part of the block. The waste dumped in the proposed site will be subsequently re-handled & backfilled in the mined-out voids from 14th year onwards. The area selected for waste dumping are relatively flat and no river/nalla passes over the proposed dumps. However, suitable environmental measured with network of garland drains, settling pits, retaining wall check dams etc. have been envisaged to prevent wash-off in downstream Bissar nalla.

Top Soil Generation

Total of 6.15 Mm³ top soil will be generated upto the conceptual stage. Out of which 1.63 Mm³ top soil will be generated during 1st five years of operation. During 6th -10th year, 11th-15th year, 16th -20th year and 21st -25th year 0.44 Mm³ , 0.52 Mm³ , 0.28 Mm³ and 0.14 Mm³ top soil will be respectively generated.

4.0 SITE ANALYSIS

4.1 CONNECTIVITY

The State Highway No. SH-5 (Now NH 130) joining Bilaspur and Ambikapur runs on the southern part of the block. The nearest Tehsil town Katghora is connected by NH -130 and it is located at a distance of around 30 km from Morga village.

Rail heads are located at a distance of 70 to 90 km from the block. Korba railway station is located at a distance of about 70 km south from the block and can be approached via Katghora, Pendra road. Bishrampur and Chirimiri railway stations are located at a distance of 90 km in north east and 100 km in north from the block respectively.

4.2 LAND FORM, LAND USE, OWNERSHIP

The project area comprises of total 713.952 Ha. Out of which, 660.260 Ha. Land is forest land (490.902 Ha is protected forest & 169.358 Ha. Is revenue forest) and



53.692 Ha. Area is private land (53.408 Ha. Land is agricultural land and 0.284 Ha. is communal land).

4.3 TOPOGRAPHY

The block area has undulating and rolling topography. The general slope of the ground is towards north with local undulations. The slope is gentle in the southern part and becomes steeper towards north. In southern part of the lease minimum elevation of 405.24 mRL is noticed in northern part near borehole MG-205 and maximum elevation of 457.42 mRL near borehole MG 106. In the northern part maximum elevation of 478.50 mRL has been indicated near borehole MG 119 with minimum elevation of 424.27 near borehole MG-94 located in the western side of lease.

Minimum elevation in the lease area is 405 m whereas maximum elevation is 480 m on the northern part of the lease.

The block has dendritic to sub-dendritic drainage pattern. The drainage of the block is controlled by Bissar nalla located in the northern periphery of the block. It flows westwards and finally joins the Hasdeo river located at a distance of 15 km from the block.

4.4 FLORA & FAUNA

Forest land covers 660.260 ha. of total block area. Block is covered by deciduous forest. Forest is dominated by Sal (*Shorea Robusta*). Besides, Tendu, Mahua, Palash, Khair, Bair, Neem, Amla, Simul, Sisiu, Karanj etc. are predominantly floras seen within the study area.

Pigeon, House Crow, Myna, Quail, Cheel, Rat Snake, Dhamana, Toddy cat, Jungle Cat, Jackal, Rat, Rohu, Katla, Mrigal etc. fauna are found in the study area. The core and buffer provide a safe habitat to few wildlife belonging to Schedule I. Within this category there is species like Sloth Bear, Common Leopard, Indian Pangolin and Wolf are occasionally available in the region. Asian Elephant being the seasonal visitor can be seen sometimes in the region. There is no national park, biosphere reserve, tiger reserve present in the area.

4.5 LAND USE

The leasehold area consists of forest land (660.260 ha) and non-forest land (53.692 ha). The existing land utilization in the project area is as follows:

Sl. No.	Land Type	Area in Ha
1	Forest Land	
a	Protected Forest	490.902
b	Revenue Forest	169.358
	Total Forest Land	660.260



Sl. No.	Land Type	Area in Ha
2	Non Forest Land	
a	Agricultural Land	53.408
b	Communal Land	0.284
	Total Non-Forest Land	53.692
	Grand Total	713.952

4.6 INFRASTRUCTURE

Mine office, time office, rest rooms, Area for Field maintenance facilities, Sub-station building, and Switch gear rooms, Vehicle maintenance facilities, Canteen and rest shelter, Site office, DG room, coal laboratory, environmental lab and WTP has been envisaged for the project. Other amenities and infrastructure, such as township, hospital, stores, workshop, community centre, schools etc. are also being proposed to be constructed.

4.7 SOIL CLASSIFICATION

The soil is lateritic, typical of the area. The thickness of the top soil varies from nil (due to outcropping of iron ore to maximum of 60 cm).

4.8 CLIMATE

Climate of the block is tropical to semi tropical monsoon type with summer falling between March to June when average day temperature varies from 35⁰C to 46⁰C and the night temperature varies from 18⁰C to 24⁰C. Mid-June to September is rainy season. Winter starts from October and average day temperature during winter varies from 26⁰-31⁰C and night temperature varies from 6⁰-32⁰C. Wind speed varies from 1.5-2.8 km/h. Predominant wind direction varies from North-West/West & south-west. Relative humidity in winter varies from 20 – 36% in the winter while it reaches upto 100% in the rainy season.

Rainfall in the area varies from 1300 mm to 1800 mm with an average annual rainfall of 1525 mm. Maximum daily rainfall recorded in the area is 206 mm. Average number of rainy days is around 120. Nearly 80% of rainfall is received between June to September.

4.9 SOCIAL INFRASTRUCTURE AVAILABLE

The nearest town, Katghora has all necessary social infrastructure. In addition, APMDC is also building its own township which will have all the necessary facilities for its employees.



5.0 **PLANNING BRIEF:**

5.1 **PLANNING CONCEPT:**

The proposed project envisages opening an opencast coal mine having annual rated capacity of 5.4 MTPA.

5.2 **LAND USE PLANNING:**

The existing land use and the land use at the end of the project's life are as follows:

Activity	Land Category	Land Requirement, ha	
		Till 5th Year	Till Conceptual Stage
Mining	Forest Land	127.24	593.70
	Non Forest Land	8.4896	48.59
	Sub Total	135.7257	642.2918
Waste Dumping	Forest Land	61.9200	Nil
	Non Forest Land	0.4153	Nil
	Sub Total	62.3353	Nil
Top Soil Storage	Forest Land	11.4640	Nil
	Non Forest Land	0.0000	Nil
	Sub Total	11.4640	Nil
Coal Handling Plant	Forest Land	22.7437	Nil
	Non Forest Land	2.2263	Nil
	Sub Total	24.9700	Nil
Roads	Forest Land	28.8688	Nil
	Non Forest Land	3.8337	Nil
	Sub Total	32.7025	Nil
Infrastructure*	Forest Land	23.9020	23.9020
	Non Forest Land	4.1408	4.1408
	Sub Total	28.0428	28.0428
Safety Zone	Forest Land	42.6535	42.6535
	Non Forest Land	0.9639	0.9639
	Sub Total	43.6174	43.6174
Undisturbed Area	Forest Land	281.4719	Nil
	Non Forest Land	33.6224	Nil
	Sub Total	315.0943	Nil
Total Land Requirement	Forest Land	318.7881	660.2600
	Non Forest Land	20.0696	53.6920
	Total	338.8577	713.9520

* incl. office, power line, water supply system, Laboratories, Canteen, Rest shelter, Magazine etc.

Topographical changes will occur due to the project. The land-use of the coal block area will change and come under excavated area, dumps, Coal Handling Plant,



Roads, other Infrastructure etc. Biological reclamation will be carried out in the vacant areas, land locked between other infrastructures, along the metalled roads etc.

When the reserves are exhausted, the mine will be shutdown as per the Approved Mine Closure Plan.

5.3 AMENITIES / FACILITIES

All the amenities viz. office, workshop, rest shelter, first aid room, rain water harvesting etc. will be developed within the ML area as discussed in detail at clause 3.8.3 above.

6.0 PROPOSED INFRASTRUCTURE:

The project sites are connected by road network. The State Highway No: 5 (SH-5 now NH-130) joining Bilaspur and Ambikapur runs on the southern part of the block.

Green Belt & Plantations: Green belt and plantation developed in and around the coal block area will increase vegetation cover. Before the lease is abandoned, plantations will be created over available areas.

CSR Activities:

APMDC is already doing jobs under Corporate Social Responsibility and jobs are taken up within villages that falls under 10 Km radius. Activities may be taken up are as follows:

- Holding of medical camps, supply of medicines to villagers.
- Computer training and distribution of books and Journals
- Scholarship for pursuing higher study
- Installation & maintenance of solar powered streetlights.

7.0 REHABILITATION & RESETTLEMENT (R&R) PLAN

Rehabilitation and Resettlement of Project Affected Persons (PAPs) is part of project implementation and is proposed to be done as per the provisions of LARR 2013. Although R&R scheme is to be formulated by district authority and accordingly compensation is to be paid to Project Affected Families (PAFs) but presently 90 nos. of PAFs as revealed from prior allottee are being considered. Average no. of persons per family has been considered as 5 based on dependent list of land records. However, comprehensive socio-economic survey to assess the actual R & R requirement during execution shall be done.



8.0 PROJECT SCHEDULE & COST ESTIMATE

8.1 Likely Date of Start of Construction and likely date of completion:

It has been envisaged to execute the project in 24 months' time from the "Start of the project" which has been reckoned as "Zero-date" of the project. The open cast mine will be developed to its 100 % capacity within five years in different stages, from the start of coal production from 24th month onwards. However the proposed schedule is subject to receipt of all statutory clearances required for the expansion.

It has been assumed that "Zero-date" i.e. start of the project, will commence after completion of preliminary works like land Identification, acquisition of Land, approval of EIA/EMP and other statutory clearances. Immediately after the clearance of EIA / EMP report by the MoEF&CC, mobilization and placement of orders for civil works, structural works and procurement activities for infrastructure facilities will be started so that the above facilities shall be completed well before the start of the mine development works.

8.2 Estimated Project Cost Along and Economic Viability of the Project

The estimated capital cost of the envisaged project is Rs. 274067 lakhs. The estimated production cost (including depreciation & interest) at 100% capacity utilization after proposed expansion will be ~Rs. 1418.8 per tonne of coal.

9.0 ANALYSIS OF PROPOSAL (FINAL RECOMMENDATION)

The project will have the following benefits:

- Increase the supply of coal to cater the need of India's increasing domestic demands
- In addition it will add to revenue generation of the District / State.
- It works to reduce paralyzing power shortages hindering growth, foreign investment and productivity.
- The mine will generate additional employment, both direct and indirect which will lead to economic growth of the industrial sector as well as country.
- APMDC shall provide, school buildings, bus shelters, medical facilities and other amenities to local villages under the company's community development programme.

Considering the above points of the opening of project has become necessary and important.