

PROPOSAL FOR GENERAL EXPLORATION (G2 STAGE) FOR COAL

MARWATOLA SECTOR-III & IV BLOCK

SOHAGPUR COALFIELD

DISTRICT- UMARIA, MADHYA PRADESH



सेन्ट्रल माईन प्लानिंग एण्ड डिजाइन इन्स्टीच्यूट लिमिटेड
(कोल इण्डिया लिमिटेड की अनुषंगी कम्पनी / भारत सरकार का एक लोक उपक्रम)
गोन्दवाना प्लेस, कान्के रोड, राँची - 834 031, झारखंड (भारत)
Central Mine Planning & Design Institute Limited
(A Subsidiary of Coal India Limited / Govt. of India Public Sector Undertaking)
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CORPORATE IDENTITY NUMBER - U14292.TH1975GOI001223

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**PROPOSAL FOR GENERAL EXPLORATION (G2 STAGE) FOR COAL
IN MARWATOLA SECTOR III & IV BLOCK
SOHAGPUR COALFIELD DISTRICT– UMARIA, MADHYA PRADESH**

1.0 INTRODUCTION

- 1.1 The Sohagpur Coalfield is the main coal bearing area of South Rewa. It is located in the northern belt of son-mahanadi basin and is a part of large sediment filled gondwana trough in the drainage basin of the son. The peninsular Gondwanas are characteristically developed along well defined long, narrow zones of Precambrian platform. The narrow zones have suffered maximum fracturing compared to rest of peninsula and perhaps because of inherent weakness, these zones have controlled the deposition of Gondwana sediments. The western extension marks Satpura area further west coincides with Narmada rift. The eastern and north-eastern boundaries merge imperceptibly with the Sonhat-Jhilimili coalfields. Towards north the boundary with the Upper Gondwana formations defines the limit of the exposed coal measure. Towards west, post barakar sediments cover the area between Sohagpur and Johilla coalfields while towards SW, the coal measures are separated from the Deccan Trap of Maikal range by narrow outcrop of Lameta beds. The coalfield exhibit a general E-W trend with general northerly dip.
- 1.2 The Sohagpur Coalfield basin bounded by Latitudes N- 23°15' & 23°30' and Longitudes E-81°13' & 82°12' covering an area of approximately 3000 Sq.Km. is the largest coalfields of Madhya Pradesh.
- 1.3 MECL carried out regional exploration in the Marwatola Block and drilled 78 boreholes of MSM series under Central Sector Scheme of MoC. The data of the MECL boreholes shows that there are 13 correlatable seams occurring in the block .The Raniganj Seams have been designated as R-V to R-I and Barakar Seams have been designated as Seam IV to I, Seam III and Seam II splitted in two sections (Top & Bottom) and Seam-I into three sections (IB, IA and I) in descending order. The Marwatola III & IV block has been carved out from larger regionally explored Marwatola Block. 24 boreholes regional exploration (MSM series) fall in the block having total drilled meterage of 6912.50m
- 1.4 Central Mine Planning and Design Institute (CMPDI) have proposed to carry out General Exploration (G2 stage) exploration for coal in Marwatola Sec- III & IV Block, Sohagpur Coalfield. Accordingly for G2 stage of exploration for coal in Marwatola Sec- III & IV Block, involves **4750.00 m** of drilling in **15** boreholes. The boreholes have been proposed at 800 m × 800 m grid with 2D Seismic Survey of 90 Line Km.

2.0 OBJECTIVES

- 2.1 The G2 stage exploration is proposed to fulfill following objectives:
1. To prove the existence and continuity of coal seams occurring in the Marwatola Sec- III & IV Block.
 2. To establish the lay, disposition and potentiality of coal seams.
 3. To assess the coal resource in G2 stage of exploration of the block.

3.0 LOCATION AND ACCESSIBILITY

- 3.1 The Marwatola Sector-III & IV block covering an area of about **24 sq.km** is located west of West of Shahdol, its Northern Boundary consists of Arjuni East and Arjuni West Block, eastern boundary has Marwatola sec I & II block while the southern boundary has Marwatola sec VI & VII block of the Sohagpur coalfield in the district of Umari of Madhya Pradesh state. The area falls in the Survey of India Toposheet Nos. 64E/3 & 64 E/7 (RF 1:50,000) and falls within the geographical co-ordinates mentioned underneath:

Latitudes: **23°17'21.950" N to 23°21'39.024" N**

Longitude: **81°12'51.601" E to 81°17'19.228" E**

- 3.2 The block is bounded by Cardinal points are deciphered in Table-I:

Table – I

CARDINAL POINTS	COAL GRID		WGS- 84	
	EASTING	NORTHING	latitude	longitude
1	2718942.688	1040098.82	23° 20' 38.858" N	81° 14' 51.601" E
2	2718848.198	1034754.05	23° 17' 44.991" N	81° 14' 51.807" E
3	2719081.889	1034732.56	23° 17' 44.435" N	81° 15' 0.049" E
4	2719582.165	1034765.673	23° 17' 45.817" N	81° 15' 17.640" E
5	2720061.772	1034295.397	23° 17' 30.815" N	81° 15' 34.834" E
6	2720759.696	1034015.377	23° 17' 22.133" N	81° 15' 59.589" E
7	2721224.104	1034001.097	23° 17' 21.950" N	81° 16' 15.947" E
8	2722019.846	1034242.458	23° 17' 30.280" N	81° 16' 43.803" E
9	2722727.701	1034395.229	23° 17' 35.675" N	81° 17' 8.624" E
10	2722964.566	1034486.062	23° 17' 38.771" N	81° 17' 16.904" E
11	2723001.115	1034499.553	23° 17' 39.232" N	81° 17' 18.182" E
12	2723031.896	1034556.197	23° 17' 41.092" N	81° 17' 19.228" E
13	2723124.797	1040024.264	23° 20' 38.968" N	81° 17' 18.938" E
14	2721251.902	1040060.727	23° 20' 39.024" N	81° 16' 12.953" E
15	2720831.285	1040067.688	23° 20' 38.995" N	81° 15' 58.135" E

- 3.3 The area is well connected by metalled road with a distance of approximately 12 km from Shahdol town, the district headquarter. Shahdol is the nearest railway station, situated in Bilaspur - Katni section of SEC Railway. Fair weather roads connect many

small villages located in and around Marwatola Sec- III & IV block. Forest cover in the area is about 50%:

4.0 PHYSIOGRAPHY AND DRAINAGE

- 4.1 The land form of Sohagpur Coalfield is controlled by the lithological contrast of different formations. The Talchir rocks have formed low lying plains with the average altitude of 450m to 500m above MSL. The area of the north rises to an elevation of over 1000m with successive escarpments. The barakar strata with their undulatory to low dips have given rise to a feature less rolling topography. However, the barakar sandstones stand out prominently against the surrounding plains, wherever they are capped by basic sills. To the east of Singara, one prominent ridge is noted. Marwatola Sec- III & IV block is characterised by rugged and hilly topography of dolerite.
- 4.2 The Block is marked by dendritic pattern of drainage system by a number northward flowing nalas such as Jamuniha Hundraha and Semartha nala in the eastern part, Basar nala and Baruha Nala in the north east, Ghinauchicha, Tanki, Garnaha, Garuha nala in the south, Bagaiha, Kollarha, Patpariha nala and Arar nadi in the central part, Basar and Jamuniha river are the main drainage channel in the block which flow from northward all along from west to east through the central part of the block.

5.0 FLORA AND FAUNA

- 5.1 In Marwatola Sec-III & IV Block area is covered by Sohagpur Reserve forest, the common species being Sal (*Shorea Robusta*), Mahua (*Madhuka Latifolia*), Palas (*Butea Mansperma*) etc. The remaining part is under cultivation, Paddy is the main annual crop in this area. The area is infested by wild animals like bear, leopard, hyena etc.

6.0 BROAD GEOLOGICAL SET UP

6.1 Regional Geology

The extensive occurrences of Deccan traps, Lameta Beds, Supra-Barakar, Barakar, Talchir and pre-cambrian rocks are spanned between latitudes 23° 05' to 23° 30' and longitudes 81° 13' to 82° 12' which constitutes Sohagpur coalfield. The rocks of Sohagpur Coalfields located within son valley exhibit a general E-W trend with low Northernly dip. It is located in the Shahdol & Umaria districts of Madhya Pradesh and a small area Surguja district.

The Southern margin of Sohagpur Coalfield runs close to junction of Kewai and Tipon rivers with the Son. The E and NE boundaries merge imperceptibly with the Sonhat-Jhilimili coalfields. Towards north the boundary with the Upper Gondwana formations defines the limit of the exposed coal measure. Towards west, post barakar sediments cover the area between Sohagpur and Johilla coalfields while towards SW, the coal

measures are separated from the Deccan Trap of Maikal range by narrow outcrop of Lameta beds.

The generalized stratigraphy of Sohagpur coalfield is enumerated below in Table-II.

TABLE-II
Generalized Stratigraphic Succession

Age	Formation	Lithology (Thickness)
Recent	—	Soil & Alluvial
----- Unconformity -----		
Eocene to Upper Cretaceous	Deccan Trap	Effusive and Intrusive rocks, mostly basalt and dolerite.
----- Unconformity -----		
Upper Cretaceous	Lameta Beds	Reddish to Greyish sandstone and nodular limestones.
----- Unconformity -----		
Upper Triassic Upper Gondwana	Supra Barakar/Mahadeva	Pink, buff red sandstone, red shale etc.
----- Unconformity -----		
Lower Permian	Barakar	Coarse to medium grained sandstone, subordinate shales and coal seams (320 m+).
Lower Permian to Upper Carboniferous	Talchir	Diamictite, sandstone, siltstones & needle shales(430m+).
----- Unconformity -----		
Precambrian	Metamorphics	Porphyritic granite-gneiss with aplite and pegmatite veins.

6.2 Geology of the block

The geological succession of the block as worked out from the boreholes drilled and exploration from nearby blocks.

The stratigraphic succession established in **Marwatola Sec-III & IV** block from the subsurface exploration is furnished in Table-III.

TABLE-III
STRATIGRAPHIC SUCCESSION IN MARWATOLA SEC-III & IV BLOCK

Age	Formation	Lithology (Thickness)
Recent	—	Soil & Alluvial
----- Unconformity -----		
Upper Cretaceous	Lameta Beds	Reddish to Greyish sandstone and claystone.
----- Unconformity -----		

Upper Permian	Raniganj	Sandstone, shale and coal seams.
Middle Permian	Barren Measure	Pink, buff red sandstone, red shale etc.
Lower Permian	Barakar	Coarse to medium grained sandstone, subordinate shales and coal seams (320 m+).
Lower Permian to Upper Carboniferous	Talchir	Diamictite, sandstone, siltstones & needle shales(430m+)
----- Unconformity -----		
Precambrian	Metamorphics	Porphyritic granite-gneiss with aplite and pegmatite veins

6.3 Regional Structure

The Sohagpur coalfield constitutes of the middle segment of the Rewa Gondwana basin and has a regional east-west elongation in conformity and the alignment of the basin belt. The beds have a general WNW-ESE to E-W trend and dip at very low angles (1° to 4°) towards NNE and North. Considerable variation in the direction and amount of dip have been observed near fault planes.

The Sohagpur basin is composed of three well defined sub-basinal structures. These include Jhagrakhand sub-basin to the east, Kotma-Jamuna sub-basin in the middle and the Burhar-Amlai sub-basin to the west. Basinal evolution in the three sectors was probably controlled by greater subsidence in comparison to the adjoining areas with shallow barakar cover. The prominent structural feature of the Sohagpur basin in the system of ENE-WSW to E-W trending sub-parallel faults. The most important of these faults, which runs along the middle part of the coalfield. From Barmi to Patgaua, the fault east-west. Further east upto Bargaua, its position is concealed by the thick sill. From there onwards it swerves to ENE and continues upto Thanagaon. Westwards, the fault is traced north of Balehi in Dhanpuri area. The fault fades towards north and, at places at places, drag on the beds is well seen. A salient feature is the emplacement of a dolerite sill and dykes along this fault zone. The throw of this fault is yet to be ascertained precisely but is likely to be 400m in places. In addition to this major fault, there are number of E-W or ENE-WSW trending faults. Two more sets of faults trend NW-SE and NE-SW, but the frequency of these faults is low. It can be summarized that the E-W trending faults were active periodically during sedimentation and the fault movement might have taken place over a protracted period of time. The NW-SE and NE-SW trending faults may be related to the major fault faulting along the E-W line.

6.4 Local Geological Structure:

The Strike of the beds in the block is observed to have almost NNW-SSE and NNE-SSW in the eastern part, the strike takes a swing to become almost E-W in the north eastern part of the block.

The block is traversed by a total of three faults designated as F1-F1, F2-F2 & F5-F5 from north to south. All these faults were deciphered on the basis of the difference in seam floor level. The faults are of low to high intensity as the throw ranges from 20 m to 90 m westerly (F1-F1). Fault F2-F2 have northerly throws and fault F5-F5 is have southerly throws. Structurally one graben is formed due to effects of faults F2-F2 and F5-F5 respectively.

6.5 Sequence and quality of coal seams:

The presence of a total of 8 seams/carbonaceous horizons have been established by drilling in the area. These seams have been designated as in Barakar Formation in descending order.

Of the 8 coal seams/carbonaceous horizons encountered in area, viz. Seams IV, III-TOP, III-BOT, II-TOP, II-BOT, IB, IA, I are persistently developed and have attained workable thickness over sizable area.

The general strike of the coal seams as revealed from the floor contour plans varies from almost NNW-SSE and NNE-SSW in the eastern part, the strike takes a swing to become almost E-W in the north eastern part of the block. The coal beds exhibit gentle to flat dip varying from 2° to 6.

However, a tentative correlation of the coal seams, their thickness ranges and range of intervening parting between the seams in previously drilled Marwatola Sec- III & IV Block are summarised in the Table no. – IV

TABLE – IV

SEQUENCE OF COAL SEAMS OBSERVED IN MARWATOLA SEC-III & IV BLOCK

Formation	Seam Name with sequence	Variation in parting thickness (m)	Coal thickness variation(m)
Barakar	IV		0.10-1.60 MSM-32-MSM-33
	Parting	33.77-53.53 MSM-10-MSM-53	
	III TOP		0.30-1.32 MSM-76-MSM-35
	Parting	7.00-25.33 MSM-7-MSM-12	
	III BOT		0.12-3.20 MSM-13-MSM-76
	Parting	20.78-53.14 MSM-5-MSM-33	
	IITOP		0.05-0.84 MSM-76-MSM-36
	Parting	0.62-18.31 MSM-33-MSM-5	
	IIBOT		0.07-3.06 MSM-10-MSM-36
	Parting	16.40-36.38 MSM-35-MSM-12	

Formation	Seam Name with sequence	Variation in parting thickness (m)	Coal thickness variation(m)
	IB		0.10-1.70 MSM-3-MSM-4
	Parting	7.10-19.55 MSM-32-MSM-53	
	IA		0.10-1.06 MSM-8-MSM-10
	Parting	6.45-24.19 MSM-33-MSM-13	
	I		0.08-1.07 MSM-30-MSM-5

The Grade of the Seams in the proposed block varies from G2 to G10

7.0 EXPLORATION SCHEME

7.1 **Drilling:** Drilling of 4750m in 15 boreholes of P-series has been proposed in 800m x 800m grid for the Marwatola Sec- III & IV block. The depth of intersection for Seam-I has been proposed from 80 m to 490 m at minimum to maximum range. P-4 and P-14 are proposed to drill upto Talchir. List of Proposed Borehole is given Table No. VI.

7.2 **Surface Geophysical Survey & Geophysical logging:** In case of G2 stage of coal exploration, 2D Seismic survey with grid size 400m (along the dip)*800m (along the strike) can be followed which helps to find out the lay, disposition and continuity of coal seams in the area. Surface seismic profile lines are planned along the borehole positions in order to utilise the geophysical logging parameters as Density, Sonic, Gamma etc. for interpreting the seismic sections and for converting time information to depth information. Synthetic seismograms generated using density and sonic logs acts as the platform between time and depth domains in seismic depth modelling. The forest cover in Marwatola III & IV block, Sohagpur CF is around 50 % and area of the same is around 24 sq. km. Total quantum of seismic work is 90 line km and keeping in view of the forest cover & guidelines of MoEF in conducting seismic survey in forest area, the appropriate Seismic source for the block is Accelerated Weight Drop (AWD), having capacity to investigate depth upto 1000m.

7.3 **Quantum of Work Proposed:** Details of proposed work for detailed exploration for coal in Marwatola Sector- III & IV block is given below in Table-V.

TABLE-V
QUANTUM OF WORK

Sr. No.	Activity	Quantity
1.	Geological Mapping	24 Sq. Km.
2.	Drilling	
	i) Boreholes	15 BHs.

	ii) Meterage	4750 m
3.	i) Levelling and Triangulation	As per requirement
	ii) RL and Co-ordinates	15 BHs.
4.	Drill Core Logging	4750 m
5	2 D Seismic Survey	90 LKM
6.	Geophysical Logging	4750 m (100% of the boreholes)
7.	Chemical Analysis	
	i) Band by Band	15BHs (All seams)
	ii) Overall	50% of the drilled bhs
	iii) Calorific Value	50% of the drilled bhs
8.	Special Tests	10% of the BHs drilled.
9.	Physico-mechanical Studies	1 BH

Timeline of Completion of the project- 18 months from the sanctioned of the project

8.0 LIMITATIONS

- 8.1 The meterage required to be drilled in the block has been assessed considering the target seam as Seam-I.
- 8.2 The Seam-I has been encountered with thickness range from 0.12m to 1.97m in boreholes drilled by MECL. The target seam may subject to change based on the Talchir boreholes, which is to be drilled initially. Hence, the meterage assessed may change proportionately.

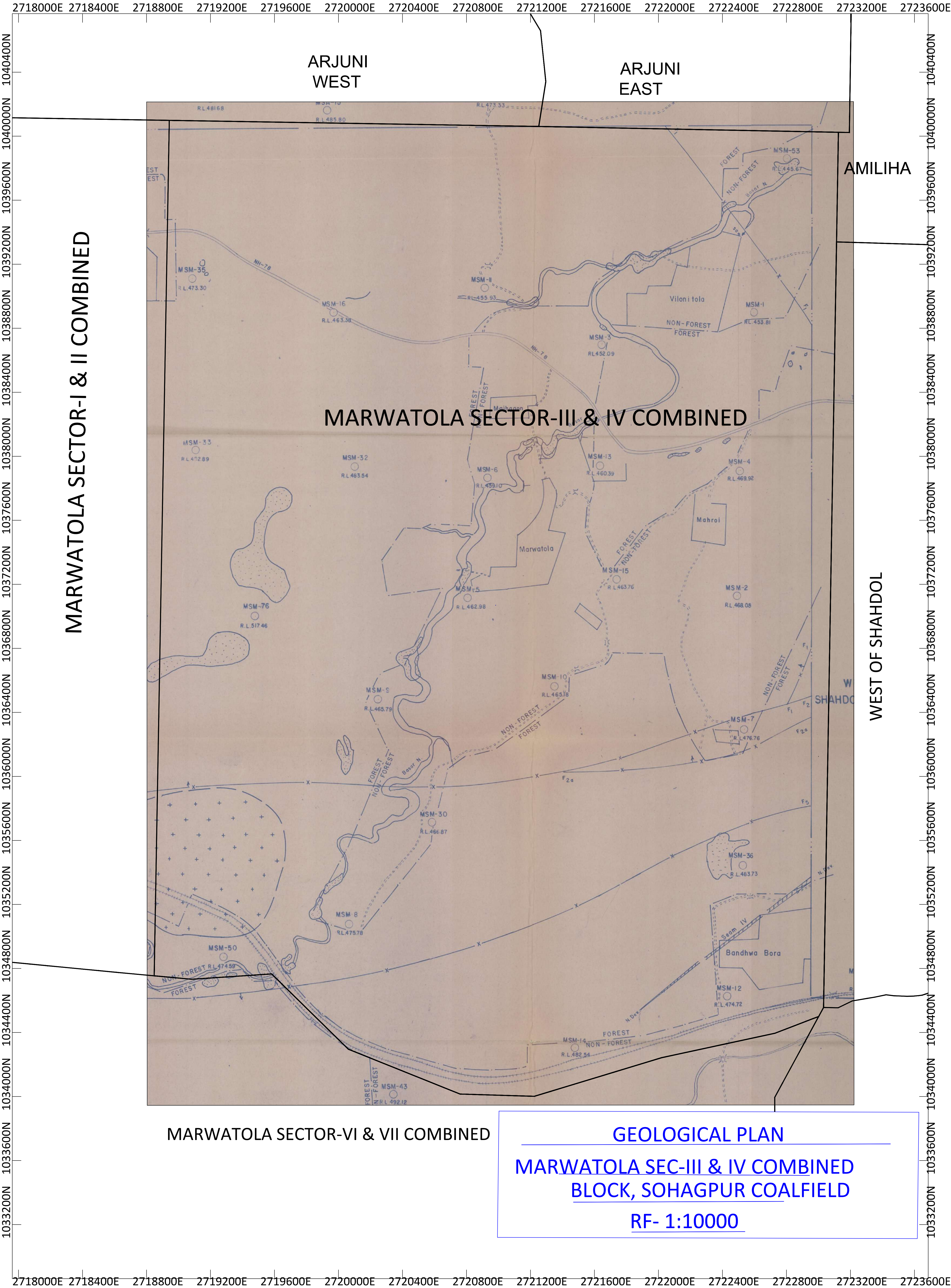
9.0 LIST OF PLATES

- 9.1 Following plates are enclosed with the proposal:
- I. Block Location Map.
 - II. Geological Map
 - III. Borehole Location Plan with Floor contour of the bottom most seam on RF 1:10,000
 - IV. Map showing 2D seismic profile lines
 - V. Graphic logs of boreholes drilled by MECL in Marwatola Sec-III & IV Block (R.F. 1:500) alongwith Short logs

TABLE- VI

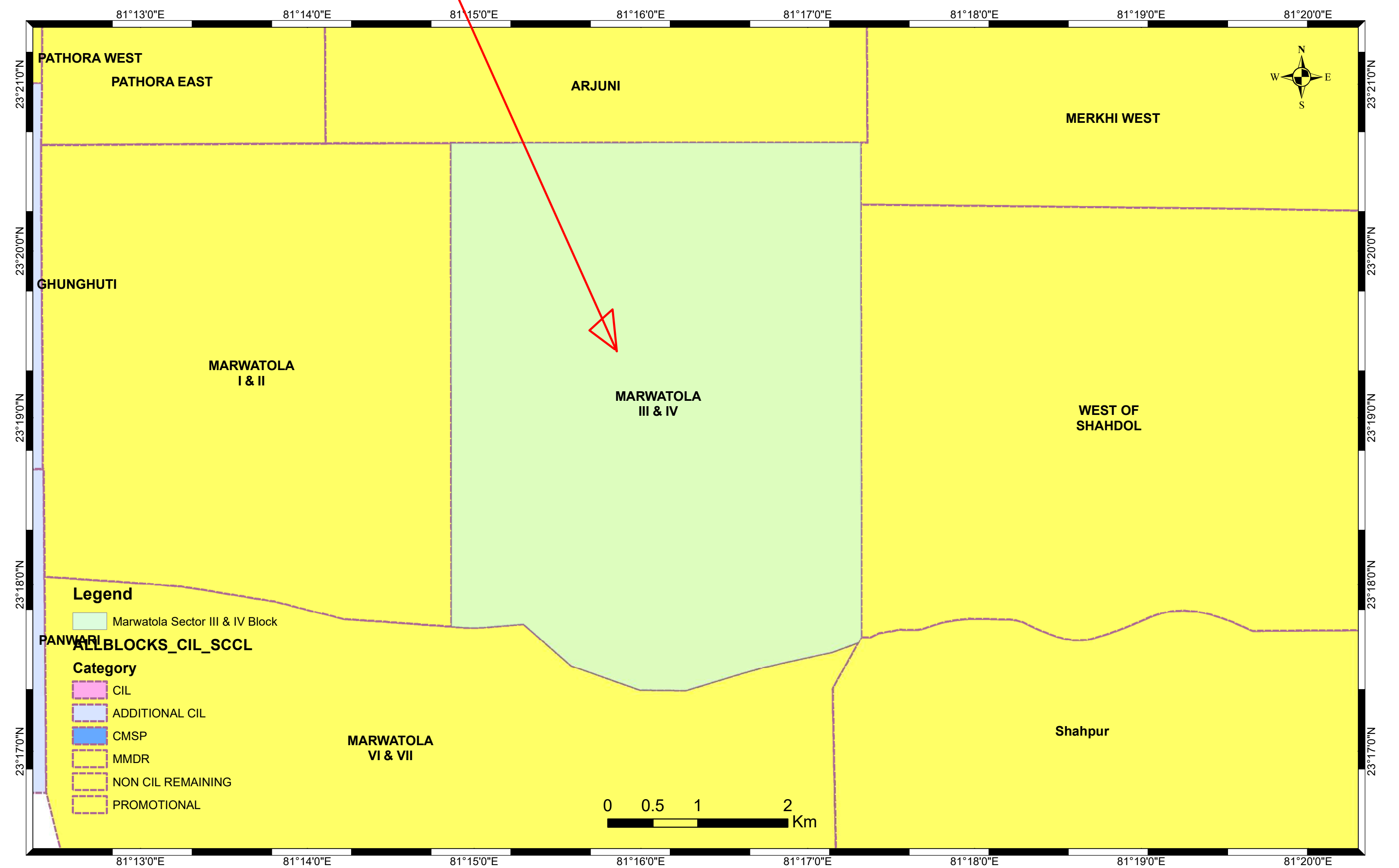
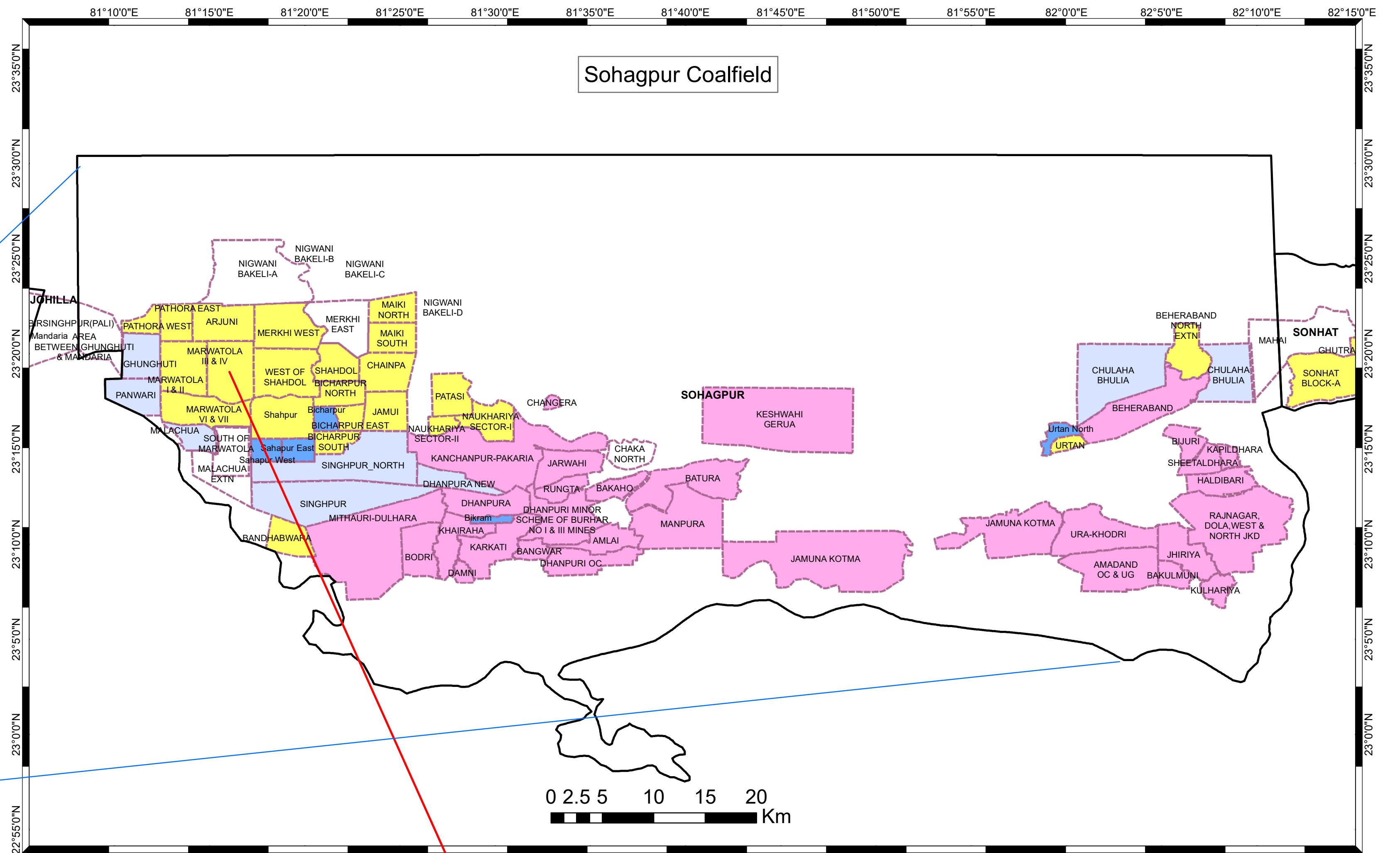
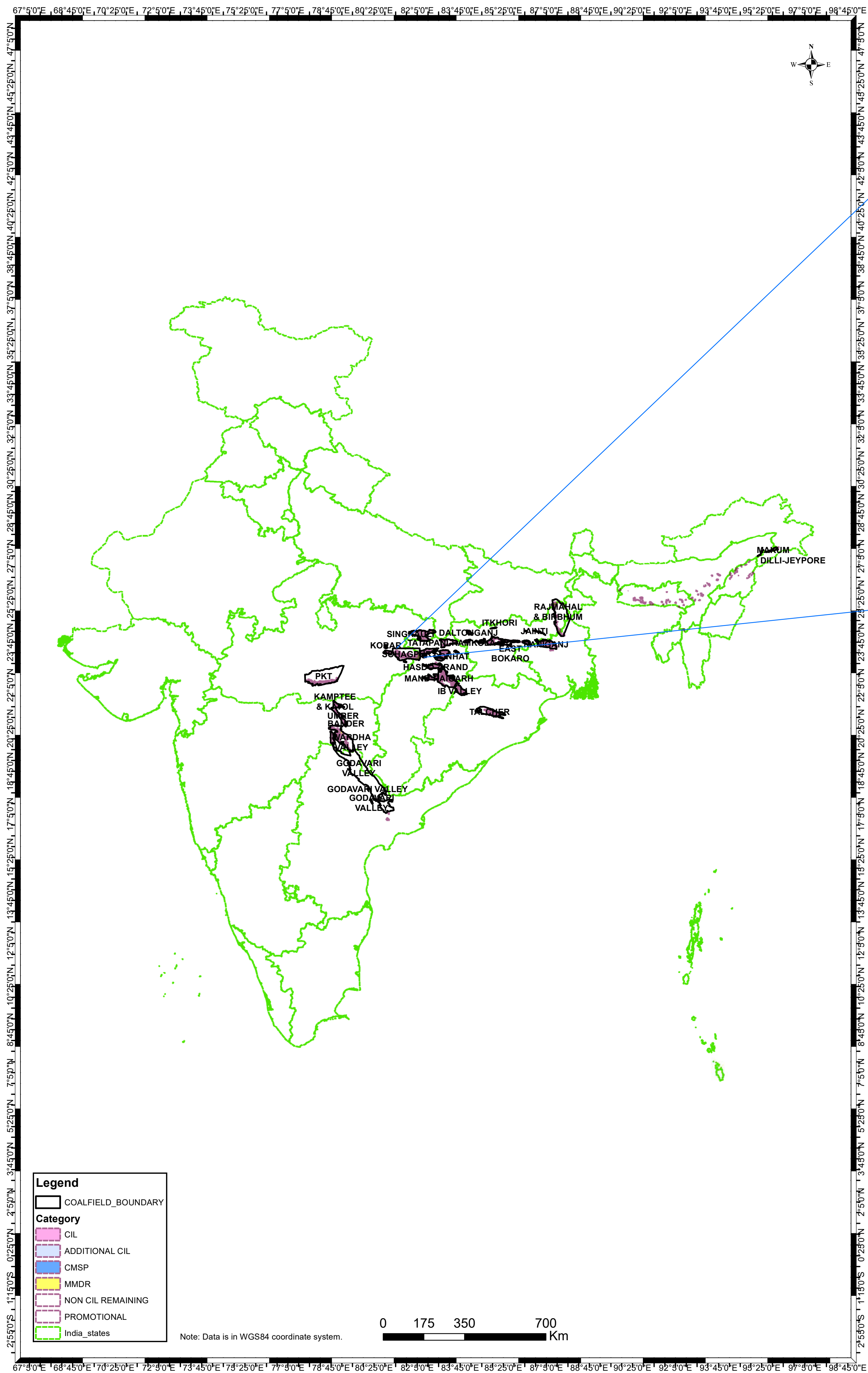
**STATEMENT SHOWING PROPOSED POINTS ALONG WITH THE EXPECTED
DEPTH IN MARWATOLA SEC-III & IV BLOCK, SOHAGPUR COALFIELD,
DISTRICT-UMARIA, MADYA PRADESH**

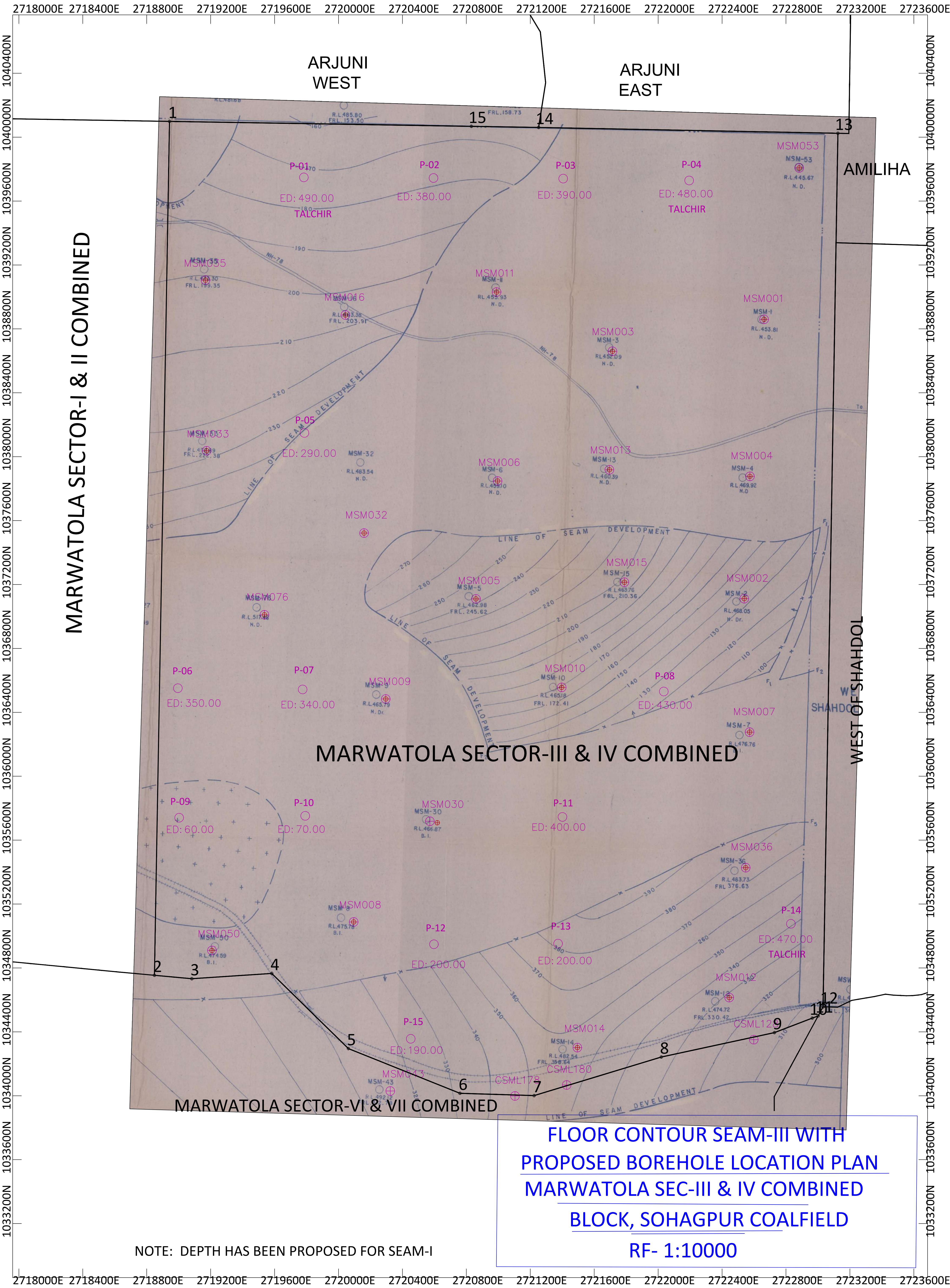
Sl No.	Proposed Points	Estimated Depth(m)	Target Seam
1	P-1	490.00	Seam-I
2	P-2	380.00	Seam-I
3	P-3	390.00	Seam-I
4	P-4	480.00	Talchir
5	P-5	290.00	Seam-I
6	P-6	350.00	Seam-I
7	P-7	340.00	Seam-I
8	P-8	430.00	Seam-I
9	P-9	60.00	Seam-I
10	P-10	70.00	Seam-I
11	P-11	400.00	Seam-I
12	P-12	200.00	Seam-I
13	P-13	200.00	Seam-I
14	P-14	470.00	Talchir
15	P-15	200.00	Seam-I
Total		4750 m	

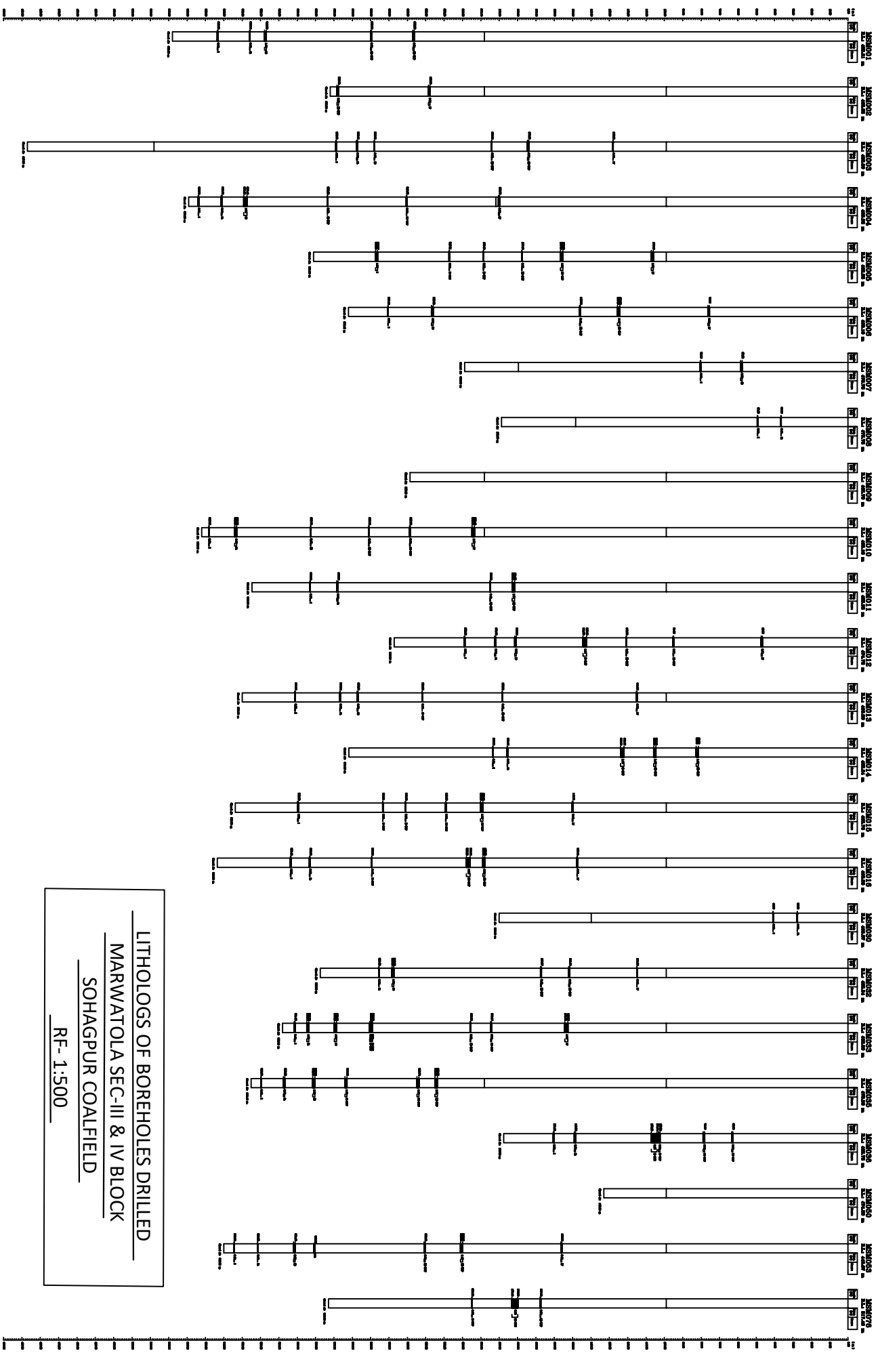


Location Plan of Marwatola Sector III & IV Block, Sohagpur Coalfield

FOR INTERNAL/RESTRICTED USE ONLY







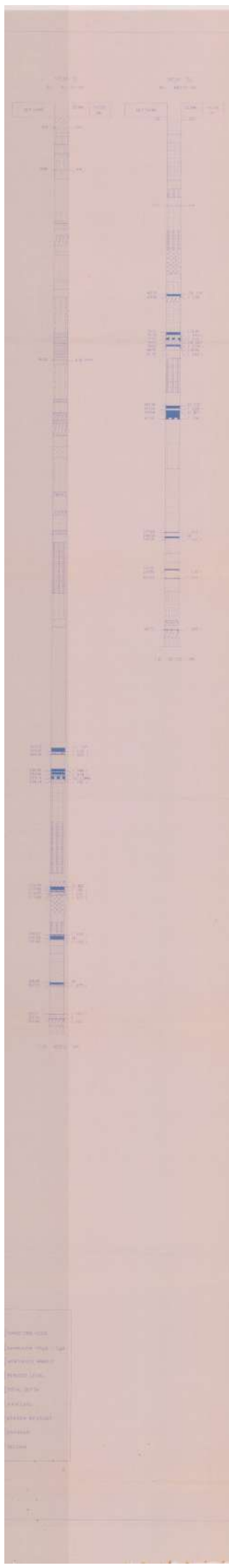
LITHOLOGS OF BOREHOLES DRILLED
MARWATOLA SEC-III & IV BLOCK
SOHAGPUR COALFIELD
RF- 1:500

MSH-20
SL. 10.57 00

DEPTH	SL. 10.57 00	SL. 10.57 00
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10.57 00



Legend

- Unconformity
- Deposition
- Erosion
- Metamorphism
- Igneous Intrusion
- Sedimentation
- Diagenesis
- Burial
- Exhumation
- Unroofing

MCM-50

R.L. 474.50 (M)

Rise (M)	DEPTH (M)	SEAM	THICK (M)

4.00

SON

100.00

WR

130.00

BARA TA

T.D. 133.00 (M)

MEU-53

PL. 443.67.00

DEPTH (M) STRAT THICK (M)

0.00 0.00

0.00 0.00

0.00 0.00

100.00 100.00

100.00 100.00

100.00 100.00

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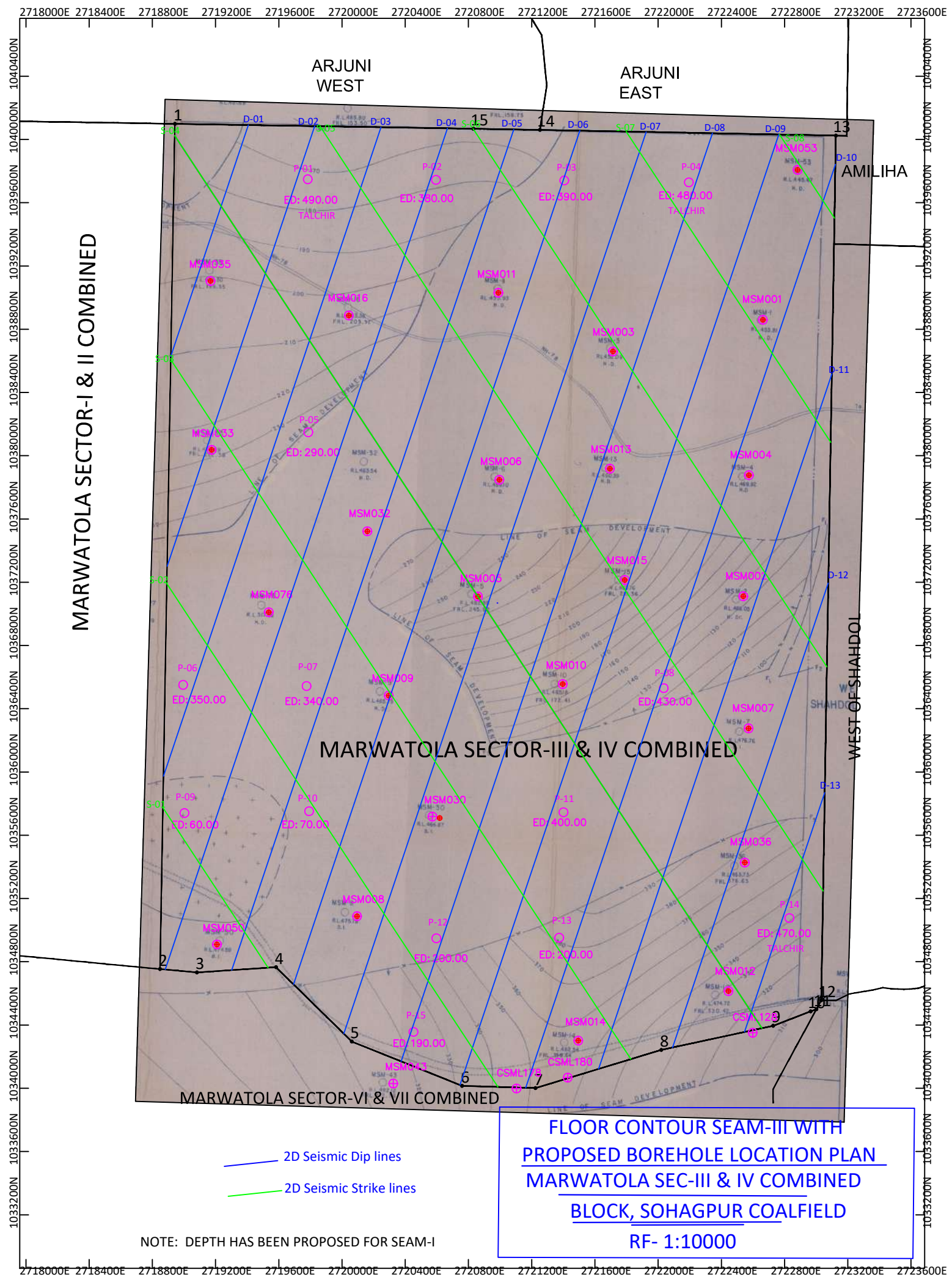
100.00 100.00

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MARWATOLA SECTOR-I & II COMBINED

ARJUNI WEST

ARJUNI EAST

AMILIHA

WEST OF SHAHDOL

MARWATOLA SECTOR-III & IV COMBINED

MARWATOLA SECTOR-VI & VII COMBINED

FLOOR CONTOUR SEAM-III WITH
PROPOSED BOREHOLE LOCATION PLAN
MARWATOLA SEC-III & IV COMBINED
BLOCK, SOHAGPUR COALFIELD
RF- 1:10000

- 2D Seismic Dip lines
- 2D Seismic Strike lines

NOTE: DEPTH HAS BEEN PROPOSED FOR SEAM-I

Project Cost Estimate for General Exploration (G2 Stage) of Coal in Marwatola Sect III & IV Block, Sohagpur Coalfield

Sl. No							
	Item Work	Item no in Soc	Unit	Rates as per SoC of NMET	Rate (Rs)	Qty.	Amount (Rs)
	I- Field operations (Outsourcing)						
A	DRILLING						
1	Drilling (As per MoC Rate 2020-21)	2.2.1.1b	m	5619	5619	4750	26690250
B	GEOPHYSICAL STUDIES						
1	Borehole Geophysical logging (As per MoC Rate 2020-21)	3.11	m	656	560	4750	2660000
2	2D Seismic Survey (as per actulas)	3.14 a	Lkm		500000	90	45000000
	Field operations Total (A+B)						74350250
	II- Field Work (Departmental)						
A	GEOLOGICAL WORK						
1	Survey Work (Field Work & Monitoring)	1.6.1b	Day	8300	8300	25	207500
2a	Geological Party days-Field (Field Work & Monitoring)	1.5.1b	Day	11000	11000	120	1320000
2b	Geological Party days-HQ (Data processing & Report Preparation)	1.5.1b	Day	9000	9000	45	405000
	Sub Total A						1932500
B	GEOPHYSICAL STUDIES						
2a	Geological Party days-Field (Field Work & Monitoring)	3.19	Day	11000	11000	75	825000
2b	Geological Party days-HQ (Data processing & Report Preparation)	3.19	Day	9000	9000	40	360000
	Sub Total B						1185000
	Field Work Total (A+B)						3117500
	III-Laboratory Studies (Departmental)						
1	Band By Band Analysis						
a	Ash+Moisture	4.2.6	per sample	700	700	100	70000
b	House Keeping	4.2.1	per sample	115	115	100	11500
2	Overall analysis						
a	Proximate analysis	4.2.7	per sample	935	935	50	46750
b	Moisture at 60% RH & 40C	4.2.8	per sample	1010	1010	50	50500
c	GCV	4.2.11	per sample	1505	1505	50	75250
d	Sample preparation & House Keeping	4.2.3	per sample	795	795	50	39750
3	Special Test						
a	Ultimate analysis	4.2.17	per sample	9945	9945	10	99450
b	Total Sulphur	4.2.14	per sample	1900	1900	10	19000
c	Distribution of Sulpher	4.2.15	per sample	3695	3695	10	36950
d	HGI including sample preparation	4.2.18	per sample	3805	3805	10	38050
e	AFT (Ash Fusion Temperature)	4.2.20	per sample	2745	2745	10	27450
f	Ash analysis	4.2.25	per sample	325	325	10	3250

4	Petrographic analysis						
a	Pellet preparation	4.3.14a	per sample	1160	1160	5	5800
b	Quantification of Maceral composition	4.3.14b	per sample	10060	10060	5	50300
c	Quantification of Microlithotype composition	4.3.14c	per sample	20000	20000	5	100000
d	Maceral Analysis (with photomicrography)	4.3.14e	per sample	25000	25000	5	125000
e	Microlithotype Analysis (with photomicrography)	4.3.14g	per sample	25000	25000	5	125000
e	Mean Ro%	4.3.14j	per sample	16345	16345	5	81725
5	Phsico Mechanical Studies (Geotechnical)	4.8	Per bh	3400000	3400000	1	3400000
6	Trace Element /REE Studies ICPMS (1 bh)	4.1.14	per sample	7731	7731	30	231930
	Laboratory Studies Total						4637655
	IV. Miscellaneous Charges (Departmental)						
a	Preparation of Exploration Proposal	5.1	lump sum	380000	380000		380000
b	Outsourcing process cost	2.3	lump sum	500000	500000		500000
c	Operational charges for CMPDI	Point 3 of SOC		1500000	1500000		1500000
d	Core Preservation (1 borehole)	5.3	Per m	1590	1590	480	763200
e	Geological Report preparation	5.2		200000	750000		750000
f	3 D ore body modelling using Minex software	5.4		250000	2500000		2500000
g	Peer review			10000	10000		10000
	Miscellaneous Charges Total						6403200
	Total (I- Field op +II .Foeld work+III Lab+ IV Misc)						88508605
	GST (@18%)						15931548.9
	Grand Total						104440154

Note- 1) Above rate of drilling, GPL, Chemical, Physicomechanical are budgeted rates.

2) There are numerous items in chemical anlysis.The CIMFR rates will be applied for actual payment.

3) For Physicomechanical studies, a lumpsum provision has been made. Actual may vary as per requirment. MoC/SoC pproved rates will apply.

4)For Drilling & Geophysical the approved rates of MoC for FY 2020-21 has been taken other rates are as per approved SoC rates.

5) GPL rates is Rs 656/- per meter of minimum 6 parameters, the break up is as follow

	Probe	SoC item No	Rate 2020-21 (in Rs)
1	Base Log	3.11a	162
2	Dual Density	3.11d	110
3	Natural Gamma	3.11h	96
4	Caliper	3.11g	20
5	SPR	3.11i	41
6	Sonic	3.11k	131
	Total		560

6) The rates for 2D seismic is Rs 4,75000/- per line km by AWD as per market survet & recent work awarded by CMPDI throgh open tendering

Time Schedule/Action Plan for Marwatola Sect III & IV Block, Sohagpur Coalfield																						
S. No	Activities																				Remarks	
		Months	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18		
1	Outsourcing	Months	←-----→																		3 Months	
2	Mobilising	Months				↔															1 months	
3	2D seismic Survey	Months					←-----→														90 Line km	
4	2D seismic Survey Report	Months								↔											1 months	
5	Drilling (Nos of rigs-3 rigs)	Months									←-----→										4750 in 15 Bh	
6	Borehole Geophysical logging	Days									←-----→										4750 in 15 Bh	
7	Survey Party days (1 Party)	Days					←---→				←-----→										25 Days	
8	Geologist Party days, Field (1 Party)	Days									←-----→										120 Days	
9	Geophysict Party days, Field (1 Party)	Days					←---→					←-----→									50 Days	
10	Laboratory Studies (Band By Band)	Nos.									←-----→										100 sample	
11	Laboratory Studies (Overall)	Nos.												←-----→							50 Sample	
12	Laboratory Studies (Special)	Nos.												←-----→							20 Sample	
13	Laboratory Studies (Petrography, Trace element	Nos.														↔					1 month	
14	Geologist Party days, HQ (1 Party)	Days															←-----→				60 Days	
15	Geophysict Party days, HQ (1 Party)									↔							←-----→				45 Days	
16	3 D Modiliing	Months															←-----→				2 Months	
17	Report Writing & Peer Review	Months															←-----→				4 Months	

Note: Please add activities accordingly and timeline (months)

Total Time Period of Completion of Project- 18 months from Sanction of Project