

**Proposal for Iron Ore in Rowghat area of
District Kanker, Chhattisgarh for
Reconnaissance Survey (G-4 stage) under
NMET**

(Ferrous metals)

By



**Directorate of Geology and Mining,
Chhattisgarh**

Place- Raipur

Date- 25.01.2021

Summary of the Block for Reconnaissance Survey (G4 Stage)
GENERAL INFORMATION ABOUT THE BLOCK

	Features	Details
	Block ID	- 2
	Exploration Agency	Diretorate of Geology and Mining, Chhattisgarh
	Commodity	Iron Ore
	Mineral Belt	Rowghat Iron Ore Belt, District Kanker
	Completion Period with entire Time schedule to complete the project	12 months (given in table no. 2)
	Objectives	Demarcation and Assessment of Iron Ore deposits
	Whether the work will be carried out by the proposed agency or through Outsourcing and details thereof. Components to be outsourced and name of the outsource agency	DGM Chhattisgarh (Through Outsourcing)
	Name/ Number of Geoscientists	3 Geologist
	Expected Field days (Geology) Geological Party Days	500 days.
1.	Location	
	Latitude & Longitude of 100 Sq.km. for mapping (1:12,500 scale)	C1. 81°02'30.18" - 19°53'31.13" C2. 81°07'10.20" - 19°59'59.76" C3. 81°08'28.63" - 19°59'59.71" C4. 81°10'58.92" - 19°58'51.19" C5. 81°07'28.92" - 19°47'05.91" C6. 81°05'40.94" - 19°47'11.22"
	Latitude & Longitude of 54.00 Sq.km. (thrust area)	A. 81°09'11.88" - 19°55'39.72" B. 81°02'48.35" - 19°53'52.63" C. 81°05'35.80" - 19°56'54.14" D. 81°07'15.67" - 19°59'22.22" E. 81°07'33.93" - 20°00'00.00" F. 81°08'28.63" - 20°00'00.00" G. 81°08'41.47" - 19°59'15.06" H. 81°10'26.52" - 19°57'40.62" I. 81°10'14.71" - 19°57'25.41" J. 81°08'08.00" - 19°59'13.05" K. 81°07'26.37" - 19°58'48.73" L. 81°06'09.02" - 19°56'01.36" M. 81°07'06.90" - 19°55'05.51" N. 81°06'36.59" - 19°48'40.97" O. 81°07'59.20" - 19°49'09.32" P. 81°07'31.26" - 19°47'55.27" Q. 81°06'44.03" - 19°47'14.72" R. 81°05'31.12" - 19°47'43.18" S. 81°05'56.08" - 19°54'29.03" T. 81°05'48.64" - 19°55'53.26" U. 81°05'41.14" - 19°56'18.62" V. 81°03'48.43" - 19°54'09.84" W. 81°03'32.29" - 19°53'01.87"
	Villages	Kolar, Tekapani, Rowghat, Phulpad, Hurtarai
	Tehsil/ Taluk	Antagarh
	District	Kanker
	State	Chhattisgarh
2.	Area (hectares/ square kilometres)	
	Block Area	200 Sq KM (thrust area 54.00 Sq.km.)
	Forest Area	-
	Government Land Area	-
	Private Land Area	-

3.	Accessibility	
	Nearest Rail Head	Keoti Rly Station on Keoti-Raipur rail line
	Road	Nearest state highway is Bhanupratappur-Narayanpur road. Nearest NH is Raipur-Jagdapur
	Airport	Raipur Airport is approxmetaly 200 km from the block
4.	Hydrography	
	Local Surface Drainage Pattern (Channels)	Dendritic to subdendritic pattern of drainage is prevalent in the area. The drainage in the southern part is mainly controlled by Mendaki river which flows in South-eastern direction and acts as tributary to Indrawati River.
	Rivers/ Streams	Mendaki river is the main river of area.
5.	Climate	
	Mean Annual Rainfall	1492 mm
	Temperatures (December) (Minimum)	10 to 28
	Temperatures (June) (Maximum)	28 to 40
6.	Topography	
	Toposheet Number	65 E/1
	Morphology of the Area	The block area in general is of undulating terrain. Iron ore is occurring as discontinuous small isolated mounds as well as in float bouldery form. The highest peak of 917 m from mean sea level is at southern part of block and lowest point of is 355 m msl at junction point of Mendaki river and Taroki Nala near village Kosronda.
7	Availability of baseline geoscience data	
	Geological Map (1:50K/ 25K)	1:50K Geological Map available
	Geochemical Map	Not available
	Geophysical Map (Aeromagnetic, ground geophysical, Regional as well as local scale GP maps)	Not available
8	Justification for taking up Reconnaissance Survey / Regional Exploration	i) In view of MMDR Amendments & Mineral Auction Rule, 2015, DGM Chhattisgarh has identified this block for exploration of iron ore to take up the work under NMET funding. ii) In the proposed study area, there are various mineralized zones, which are presented by formational contact, ferruginous capping and old workings/pits available as guide for localization of the presence of ore bodies. The exploration will be helpful in estimation reconnaissance resources of Iron ore in the block area. iii) In case the results of the reconnaissance survey are positive, it will help in planning of general exploration programme, which in turn will facilitate the state govt. for auctioning of block.

Detailed description of the block

1. Block summary:

a. Physiography:

The block area in general is of undulating terrain. Iron ore is occurring as discontinuous small isolated mounds as well as in float bouldery form. The highest peak of 917 m from mean sea level is at southern part of block and lowest point of is 355 m msl at junction point of Mendaki river and Taroki Nala near village Kosronda.

b. Background Geology:

i. Regional Geology:

Regional Geology and structure of the area. The Litho units exposed in and

around the region of the block are represented by quartz mica schist, banded magnetite quartzite (BMQ) and granite gneiss of Bengal Group and banded haematite quartzite (BHQ) of Bailadila Group intruded by acid and basic dykes. The Regional Stratigraphic sequence of lithounits (after GSI) is given below.

Lithology	Stratigraphic status	Age	Nature and Characteristics
	Group		
Soil/ Laterite	-	Cainozoic	Dark grey, dark brown, pale yellow to Yellowish brown.
Basic Dyke	-	Meso Proterozoic	Greyish to greenish black, medium to coarse grain, massive, hard and compact rock.
Quartz reef/ vein	-	Paleo to Meso Proterozoic	Quartz reef/vein; White to grayish white pink, medium to coarse-grained rock.
Granite	Dongargarh Granite	Paleo to Proterozoic	Pink grey fine to very coarse grained, massive, hard and compact rock. Composition varies from biotite granite, amphibole granite to leucogranite.
Banded Haematite Quartzite (BHQ)/Banded Haematite Jasper (BHJ)	Bailadila Group	Archaean to Palaeo Proterozoic	Consist of alternate pinkish to buff colour layers of quartzite / Jasper and dark grey to steel grey metallic layers of iron ore.
Granite gneiss, migmatite, paragenesis streaky gneiss, augen gneiss, Hornblende gneiss & biotite gneiss (Gneissic complex)	Bengal Group	Archaean	Gneisses; Light grey to greenish grey, fine to coarse grained, well foliated, hard and compact rock. Migmatite; Comprises leucosome bands of quartz feldspar and melanosome bands of biotite, hornblende.
Banded magnetite Quartzite(BMQ) Banded Grunerite Quartzite(GMQ)			BMQ; Medium to coarse grained, banded; consist of alternate band of quartzite and magnetite with Grunerite and actinolite as accessories. GMQ; Medium to coarse grained, banded; consist of alternate band of quartzite and Grunerite, magnetite.
Amphibolite, hornblende schist, metabasics, meta – Ultramafic & talc - tremolite schist Andalusite schist, tremolite schist and quartz mica schist.			Amphibolite; Dark green to greenish black medium to coarse grained, banded foliated rock and grade to hornblende schist. Meta-basic; Dark green to greenish green, fine grained, massive to foliated rock and grades to hornblende schist, Meta-ultramafic; Grey, medium to coarse grained, schistose, hard and compact rock. Talc–tremolite schist; Grey, fine to coarse-grained rock with soapy feeling and radiating crystal. Andalusite schist; Greyish white, medium to coarse grained, well foliated rock. Tremolite schist; Greenish grey, medium grained, radiating, hard and compact rock. Quartz –mica schist; Dirty white to silvery white, medium grained rock. (G.S.I. 2005)

ii. Geology of the block:

Bengpal Group

The oldest rock formation of the surveyed area has represented by granite gneiss, which forms about 3/4 part of the surveyed area. Granite gneisses are marked in vicinity of villages Gohara, Kulanar, Nayanar, Mainpur, west Chheribera, Talabera, Kolar, Barchi, Khudpader, Dongaripara, and Jhaburdih.

Rock is hard, compact, medium to coarse grained, grey, dull brown to pinkish in colour and porphyritic texture. Under microscope, the rock shows quartz, microcline, acid plagioclase, biotite and perthite. Acid plagioclase shows closely spaced albite twinning and completely kaolinized. Biotite are dark brown, shows pleochroism, from dark to light brown and altered to green chlorite at few places.

Quartz mica schist is seen at about 16.5 Km. north of Narayanpur on Narayanpur-Antagarh road. Rocks is hard, compact, fine grained, and grey to brown colour, shows weak schistosity. Under microscope, the rock shows quartz, muscovite and sericite. All the minerals aligned parallel to the plane of schistosity.

Banded magnetite quartzite (BMQ) marked at East of Taroki, south - east of Aturbeda villages. It is hard, compact, fine grained, reddish brown to grayish brown colour. The rock consists of alternate bands of quartzite and magnetite.

Bailadila Group

Bailadila Group of rocks are represented by hematite and quartzite, occupying the northern part of the surveyed area, which is situated about 3 km south east of Aturbeda village and about 16 km north of Narayanpur on Narayanpur-Antagarh road. Hematite is occurring as discontinuous, small isolated mounds as well as in float bouldery form, in association with quartzite. S

The iron ore occurrence is just adjacent to "F" deposit of well-known Rowghat Iron ore deposit. It is marked left side of Narayanpur-Antagarh road, a small patch also occurs in left side of the road, near kilometer stone No. 16.

Hematite is very hard, compact, fine grained, massive as well as laminated, steel grey to dark blue colour, metallic luster and dark cherry red streak.

Quartzite is hard, compact, medium to coarse grained, white to dull white colour, well - sorted, siliceous cementing material, consists of quartz and iron oxides.

Basic Intrusive

Numerous Basic intrusions recorded in the surveyed area in vicinity of villages south - west of Aturbeda, east of Temrugaon, north of Guriya, Karlakha, Mahaka, north of Remawand, east of Benur. These occur in small to large sized outcrops, about 10 m to 4 km in length and 5 m to 50 m in width. Rock is very hard, compact, medium to fine grained and grayish green to dark green in colour.

Acidic Intrusive

Frequent occurrences of quartz in reef form are marked in the surveyed area. They occur as discontinuous bodies and showing pinching and swelling properties. They are striking in E-W and NW-SE directions. Rock is weathered, bouldery, composed of white to dull white colour. Milky

white colour with vitreous luster noticed at North -West of sarandi, and Mainpur villages and 12 km north of Narayanpur, on Narayanpur-Antagarh road.

Alluvium/Laterite

Alluvium and Laterite are the recent formation of the area. Alluvium occurs mostly in the plain areas, which is black or dark brown colour, at places yellowish colour soil have also been noticed in the area. Laterite occurs on elevated landforms.

c. Mineral Potentiality:

This block is a part of Rowghat Iron Ore deposit. The main Rowghat block is an explored and proved Iron Ore deposit. Bhilai Steel Plant (SAIL) has lease of Iron Ore in this block. The BSP's mine is in development stage. This block being adjacent to block of BSP has got good potential for Iron Ore occurrence.

d. Scope for proposed exploration:

The block is situated in dense forest area. Accessibility in the block for mapping, survey, drilling etc. will be a bit difficult task. Work will be carried out with the help of district administration and local people. Survey, mapping, surface sampling can be completed as per the targets and guidelines. Only possible hurdle during exploration will be getting permission from forest department. Law and order problem will also be an important issue during exploration.

e. Observation and recommendations of previous work: Given in below point.

2. Previous Work

P.N. Bose (1890-1900) was first to carry out geological survey in Bastar region. Crookshank and Ghosh (1932-38) mapped the southern part of the Bastar. Crookshank (1963) classified the metamorphics of south Bastar into Sukma, Bengpal and Bailadila Groups.

In recent years a number of workers have carried out detailed study in various parts of the district, viz. Dutta (1956-57), Prasad and Banerjee (1962), Krupanidhi (1960-62), Ramakrishna and Dutta (1970), Narain, Pandhare and Pal (1972), Mishra, Dutta, Kanchan and Sisodiya (1970). As a result of these recent studies the metasediments of the Bastar have been classified into a composite Bengpal Group and Bailadila Group.

The first geological account of the Rowghat area has been given by D.K. Chatterjee (1949), who established the geological succession of the area and described the six major iron ore deposits (A, B, C, D, E and F) for the first time, indicating that the deposit "F" is the largest among these. He estimated a reserve of 740 million tonnes of iron ore (including 496 million tonnes from "F" deposit) with average 64% Fe.

Seetha Ramaiah (1960) examined the deposit "F", selected A and B blocks for detailed exploration and estimated the grade of the deposit as 64.37% Fe. The "F" deposit has been explored in detail by Yewale, Subramanian (1971-1973), Yewale and Narain (1974)

Satyanarayan and Choubey (1974) carried out geological, geomorphological and structural study of the area.

The area adjacent to Rowghat in the Toposheet No. 65 E and 65 A, were mapped by various workers viz. S. Singh, U. Prasad, A.K. Banerjee and S. Sen (1961-62 & 1963), four iron ore bodies were located by S. Singh et. al.

V. K. Saxena and C. S. Bhardwaj (2006-07) and S.K. Tiwari and V.K. Saxena (2007-2008) of DGM Chhattisgarh carried out the survey of Iron ore in Rowghat area

Chemical analysis results of samples of Rowghat area are given as below-

S. No	Sample No. (as per GR)	SiO ₂ %	Fe ₂ O ₃ %	Al ₂ O ₃ %	P %	S %	LOI	Total	Fe %
1	T-26	1.10	96.00	0.32	Traces	Traces	2.26	99.680	67.14
2	T-27	1.86	85.50	0.50	0.002	Traces	11.61	99.472	59.80
3	T-28	1.28	91.50	1.10	0.004	Traces	5.23	99.114	64.00
4	T-29	2.40	94.50	0.10	Traces	Traces	2.73	99.730	66.09
5	T-58	1.20	95.00	1.12	traces	traces	1.69	99.51	66.79
6	T-59	1.58	99.50	1.36	traces	traces	0.98	99.42	69.59
7	T-60	2.34	92.50	2.78	traces	traces	1.72	99.34	64.69
8	T-61	0.70	94.30	1.12	traces	traces	2.94	99.18	65.95
9	T-62	0.66	98.00	0.46	traces	traces	0.28	99.40	68.54
10	T-63	1.12	94.00	1.06	traces	traces	3.40	99.58	65.74
11	T-64	0.90	95.00	1.23	traces	traces	2.31	99.44	66.44
12	T-71	53.26	42.90	1.15	Traces	Traces	1.90	99.21	30.00
13	T-72	54.46	41.60	0.36	Traces	Traces	2.81	99.23	20.09
14	T-73	0.98	95.20	1.08	Traces	Traces	2.01	99.27	66.58
15	T-74	1.36	94.40	2.22	Traces	Traces	1.15	99.13	66.02
16	T-75	2.36	90.70	4.31	Traces	Traces	2.00	99.37	63.43
17	T-76	5.12	73.80	9.10	Traces	Traces	11.16	99.18	51.61
18	T-77	0.80	91.80	3.43	Traces	Traces	3.14	99.17	64.20

Block description

200.00 Sq.km. (thrust area) (1:12,500 scale)

- C1. 81°02'30.18" - 19°53'31.13"
- C2. 81°07'10.20" - 19°59'59.76"
- C3. 81°08'28.63" - 19°59'59.71"
- C4. 81°10'58.92" - 19°58'51.19"
- C5. 81°07'28.92" - 19°47'05.91"
- C6. 81°05'40.94" - 19°47'11.22"

53.00 Sq.km. (thrust area) (1:12,500 scale)

- A. 81°09'11.88" - 19°55'39.72"
- B. 81°02'48.35" - 19°53'52.63"
- C. 81°05'35.80" - 19°56'54.14"
- D. 81°07'15.67" - 19°59'22.22"
- E. 81°07'33.93" - 20°00'00.00"
- F. 81°08'28.63" - 20°00'00.00"
- G. 81°08'41.47" - 19°59'15.06"
- H. 81°10'26.52" - 19°57'40.62"
- I. 81°10'14.71" - 19°57'25.41"
- J. 81°08'08.00" - 19°59'13.05"
- K. 81°07'26.37" - 19°58'48.73"
- L. 81°06'09.02" - 19°56'01.36"
- M. 81°07'06.90" - 19°55'05.51"
- N. 81°06'36.59" - 19°48'40.97"
- O. 81°07'59.20" - 19°49'09.32"
- P. 81°07'31.26" - 19°47'55.27"
- Q. 81°06'44.03" - 19°47'14.72"
- R. 81°05'31.12" - 19°47'43.18"
- S. 81°05'56.08" - 19°54'29.03"
- T. 81°05'48.64" - 19°55'53.26"
- U. 81°05'41.14" - 19°56'18.62"
- V. 81°03'48.43" - 19°54'09.84"
- W. 81°03'32.29" - 19°53'01.87"

3. Planned Methodology:

4. Work will start with detailed mapping of the block on 1:12,500 scale. Simultaneously topographical survey will be done in the block. Surface sampling along with Groove sampling (at 250 metres interval) will be done during the course of detailed mapping. Chemical analysis of all the samples will be done from departmental laboratory as well as NABL accredited laboratories. These activities will be followed by data interpretation and report writing work.

5. Nature Quantum and Target

Table No. 1 Nature and Quantum of work proposed-

Components	G4 Stage	Proposed Quantum
Aerial reconnaissance	Remote sensing, airborne geophysical survey etc.	Nil
Geological Survey	i) 1.25K/ 12.5K ii) Assessment of lithology, structure, surface mineralisation and analysis of old history of mining, if any.	Detailed mapping on 12.5K scale – 54 Sq. K.M.
Geochemical Survey	i) Regional Grab / chip / Stream Sediment / Soil Sampling ii) Recording of broad geomorphology, drainage, etc.	Nil

Geophysical Survey	Aero-geophysical / Regional ground geophysical survey (Refer another table below)	Nil
Pitting/ Trenching	Five to ten to expose mineralised zone. The location of Pitting and trenching should be judiciously planned to cover the entire mineralised body, to delineate the strike extension and also for planning scout boreholes. Sample length to be specified	Nil
Scout drilling / Systematic drilling	Few boreholes if required along the positive profiles delineated by surface sampling/pitting trenching	600 m (06 boreholes)
Groove Sampling /Grab and Chip Sampling	A few samples from bed rock (few representative samples from all the exposed rocks in the area for first-hand information and more samples from rocks which host the mineralisation). Few representatives' samples to be subjected to Davis tube recovery test in case of BMQ.	1000
Core sample	Sample from mineralised zones as well as hanging wall/footwall Side to be collected. Sample length to be specified	300 Nos.
Petrographic and mineragraphic studies	Principal rock types, mineral assemblage, identification of minerals of interest	15 Nos. each
Synthesis of all available data	i) Integration of regional geophysical, geological and geochemical data. ii) Synthesis of all available data and Report writing	As require

Table No. 2: Time Schedule (in month) for exploration programme -

Time Shedule (in month) For exploration programme in Rowghat area of Kanker District																		
Item of work	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Geological mapping	←					→												
Drilling		←							→									
Sample preparation		←							→									
Geologist party days for drilling sampling and report work	←											→						
Analytical work Drill core sample		←												→				
Camp winding												←	→					
Geological report														←				→

6. Manpower deployment: As required.

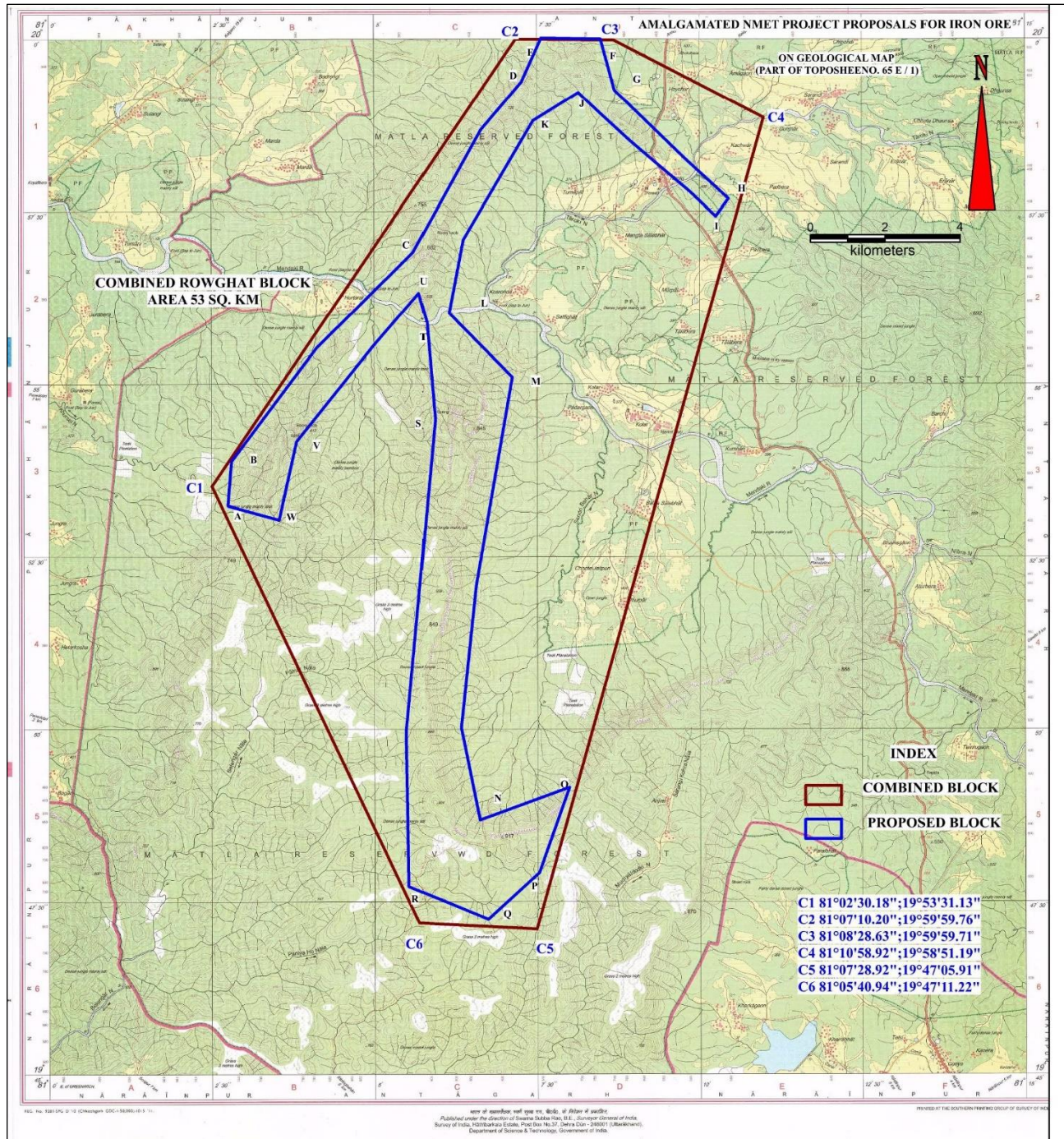
7. Break-up of expenditure: Given below

COST ESTIMATION FOR G-4 EXPLORATION IRON ORE BLOCK (AMALGAMATED)								
SL. No.	Item of work	Unit	Base	Financial Year (2020-21)			Total	
			Rate	Esc. Rate	Qty.	Amount	Qty	Amount
			1.4.90	(Rs)		(Rs)		(Rs)
A	GEOLOGICAL WORK							
1	Survey Party Days (1 party)	day	1180	8300	1000	8300000	1000	8300000
2	Geologist Party Days (1 Party)	day	1541	11000	1000	11000000	1000	11000000
3	Core Sampling Party days (2 parties)	day	525	5100	500	2550000	500	2550000
4	Reconnaissance Geological					0	0	0
	Sub Total A					21850000		21850000
B	DRILLING							
1	Surface Drilling (2 Rigs)	per m.	1714	11500	0	0	0	0
2	Road making (Flat Terrain)	per Km.	7800	22020	0	0	0	0
3	Transportation	per Km	8.8	36	0	0	0	0
4	Monthly Accommodation charges for drilling camp	monthly basis	50000 per month	50000	0	0	0	0
5	Camp Establishment cost	Per Drill	68606	250000	0	0	0	0
6	Camp winding	Per Drill	68606	250000	0	0	0	0
7	GI core boxes	Nos.	lump sum	2000	0	0	0	0
8	Transportation charges of core boxes	Km	8.8	36	0	0	0	0
	Sub Total B					0		0
C	LABORATORY STUDIES							
a	Sp. Gravity test	Per sample	-	1605	0	0	0	0
b	Chemical Analysis					0		
1	Primary + Check Samples					0		

	(i) for Primary Samples 6 radicals (Fe%, Mn%, SiO ₂ %, Al ₂ O ₃ %, P%, S%)	Nos	490	4200	1000	4200000	2180	9156000
	(ii) for Composite Samples 6 radicals (Fe%, Mn%, SiO ₂ %, Al ₂ O ₃ %, P%, S%)	Nos	414	4200	100	420000	218	915600
	(iii) for Check Samples 6 radicals (Fe%, Mn%, SiO ₂ %, Al ₂ O ₃ %, P%, S%)	Nos	414	4200	100	420000	218	915600
	Thin Section Preparation	Nos	100	2353	15	35295	15	35295
	Polished Section Preparation	Nos	100	1549	15	23235	15	23235
	Mineralographic Studies	Nos	364	4232	15	63480	35	63480
	Sub Total C					5162010		5162010
D	land/Crop compensation	Nos	-	20000	0	0	0	0
	Total A+B+C+D					27012010		27012010
E	Geological Report Writing	Nos	-	-	1	810360.3	1	810360.3
	(03 % of total value of work which ever is higher) As per NMET SOC							
	Total A to E					27822370.3		27822370.3
F	GST 18%							5008026.654
	Grand Total: with GST 18%							32830396.95
				Total in Lacs(Rs)				328.3

8. References: As given in previous work.

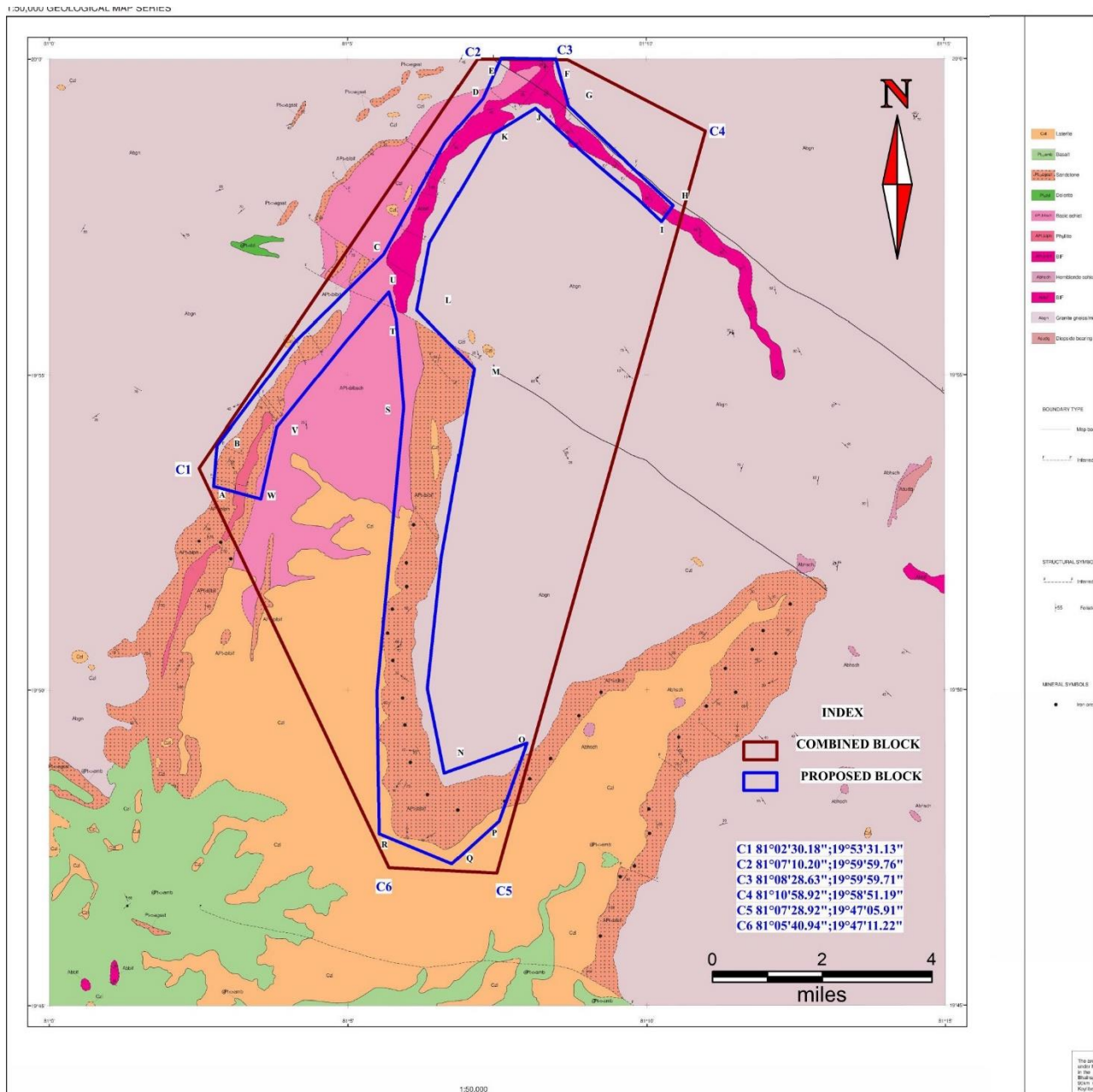
Map No. 1 Location Map



Map No. 2

Geological Map

**GEOLOGICAL MAP OF IRON ORE IN ROWGHAT AREA
DISTRICT-KANKER, CHHATTISGARH
PART OF TOPOSHEET NO. 65E/01**



Map No. 3

Proposed Groove lines and Sampling Points

