

Proposal
for
Reconnaissance survey (G4) for Graphite Around Lakshmipur, Sikabarhi and
Barha Kachapai, Rayagada District, Odisha

**(Basemetals/ Ferrous/ Non-Ferrous/ Industrial/
Strategic & Critical/ Precious metals etc.)**

Prepared by



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NMEDT Proposal (For G4 exploration)
Lakshmipur, Sikabarhi and Barha Kachapai Graphite Block
Rayagada District, Odisha

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1. General Information

	Features	Details
	Block ID	Lakshmipur, Sikabarhi, Barha Kachapai Graphite Block
	Exploration Agency	United Exploration India Pvt. Ltd. (UEIPL)
	Commodity	Graphite
	Mineral Belt	Eastern Ghat Mobile Belt
	Completion Period with entire Time schedule to complete the project	10 months
	Objectives	Exploration for Graphite is governed by industrial demand. Demand for minerals is increasing day by day for various industrial uses. Based on the evaluation of geological and geochemical data available, the present exploration program has been formulated to fulfill the following objectives. - Geological & Structural mapping on 1:12500 scale to delineate graphite bands and other lithological units in the area. - Delineation of the potential subsurface mineralized zones by Geophysical Surveys (SP survey). - Pitting/Trenching will be carried out at suitable intervals in the anomalous zones marked by geophysical survey to establish the continuity of the mineralization along strike directions which is covered by the soil. - To know the subsurface extension of ore body 10 nos of boreholes will be drilled upto 450 m based on the analytical results of surface samples. - Collection surface (Bedrock/stream sediment/soil) samples & analyses for Graphite and decide further course of Exploration program. - To estimate reconnaissance resources as per UNFC norms and Minerals (Evidence of Mineral Contents) Rule-2015 at G-4 level

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	Features	Details
		mineral exploration. vii. Based on the exploration work, demarcate potential area for graphite for further course of Exploration program.
	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	UEIPL and its associates
	Name/ Number of Geoscientists	4 geoscientists will involve (2 Field Geologist, 1 Headquarter Geologist, 1 GIS specialists)
	Expected Field days (Geology) Geological Party Days	60 days
1.	Location	
	The coordinates of the corner points of the proposed Graphite Block are as follows:	
	Block Boundary Co-ordinates of Odisha Graphite (G4) Block, District - Rayagada, Odisha, Area 29.0 sq. km, (Toposheet No. 65M/11)	
	Points	Latitude Longitude
	1	19° 17'25.984"N 83° 31' 27.780" E
	2	19° 18'17.397"N 83° 33' 22.450" E
	3	19° 19'44.172"N 83° 33' 10.340" E
	4	19° 19'49.612"N 83° 34' 19.471" E
	5	19° 17'13.220"N 83° 34' 45.263" E
	6	19° 16'56.063"N 83° 33' 38.713" E
	7	19° 17'25.984"N 83° 34' 14.032" E
	8	19° 17'25.984"N 83° 32' 14.072" E
	Villages	Sikabarhi, Lakshmipur and Barha Kachapai
	Tehsil/ Taluk	
	District	Rayagada
	State	Odisha
2.	Area (hectares/ square kilometres)	
	Block Area	29 sq.km
	Forest Area	
	Government Land Area	Data Not Available
	Private Land Area	Data Not Available

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	Features	Details
3.	Accessibility	
	Nearest Rail Head	Rayagada
	Road	NH-326 is located approximately 0.18 km southeast of the southern boundary of the block.
	Airport	Visakhapatnam Airport (180 km)
4.	Hydrography	
	Local Surface Drainage Pattern (Channels)	The overall drainage pattern shows dendritic to sub-parallel type drainage pattern.
	Rivers/ Streams	The eastern half has only first-order streams, no nalas were there; while the western half is drained by the perennial Aribi Nala and its tributaries, fed by numerous short streams from the eastern highlands.
5.	Climate	
	Mean Annual Rainfall	1500mm
	Temperature (December)(Minimum) Temperatures (June)(Maximum)	Temperatures range from about 10°C in winter (December–January) to around 40°C in peak summer (May–June). The monsoon sets in by mid-June and lasts until September, with an average annual rainfall of 1500 mm.
6.	Topography	
	Toposheet Number	65M/11
	Morphology of the Area	The terrain is rugged, with continuous forested mountain ranges in the east and comparatively plain but rocky terrain in the west. A narrow valley trends N–S from Kapaldal to Rorhangi and extends westward to Rayagada. Isolated hillocks occur within the valley, with Bhagurhi Hill (1032 m MSL) as the highest point. Valleys lie at 300–350 m contours, sloping westward.
7.	Availability of baseline geoscience data	
	Geological Map (1:50K/25K)	Available (1:25000)
	Geochemical Map	Not Available
	Geophysical Map (Aeromagnetic, ground geophysical, Regional as well as local scale GP maps)	NGPM Data is available in NGDR portal

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	Features	Details
8.	Justification for taking up Reconnaissance Survey / Regional Exploration	This block was identified based on work carried out by the Directorate of Mines & Geology (DMG), Odisha, within the proposed area. Proximate analysis of graphite samples from different blocks shows variation of Fixed Carbon (F.C.) content from 7.86% to 46.25. Block-wise variation stated below: 1. The Barha Kachapai exhibits 27.48–45.43% F.C. 2. The Sikabarhi graphite deposit is estimated to contain about 8,375 tonnes of graphite with 8.41–46.25% F.C., 3. The Lakshmipur deposit may contain approximately 590 tonnes with 7.86–10.88% F.C. The analytical results indicate that the Lakshmipur, Sikabarhi and Barha Kachapai block hold significant potential for economic graphite mineralization. The findings underscore the necessity for detailed exploration.

2 DETAILED DESCRIPTION OF THE PROPOSAL

2.1 Block Summary:

2.1.1 PHYSIOGRAPHY:

The terrain exhibits rugged topography characterized by high mountain ranges and intervening valleys. The eastern sector comprises continuous, densely forested hill ranges with scattered hamlets located at higher elevations. In contrast, the western part is relatively flat but remains inaccessible due to rocky slopes and intersecting nalas. A narrow N–S trending valley extends from Kapaldal in the north to Rorhangi in the south, further opening westward towards Rayagada through a narrow passage. Isolated hillocks occur within this valley. Bhagurhi Hill, located in the southeastern corner, marks the highest elevation at 1032 m above MSL. Valley floors generally lie between 300–350 m and slope westward.

2.1.2 DRAINAGE:

The drainage pattern is predominantly dendritic to sub-parallel. The eastern half is drained only by first-order streams, whereas the western part is controlled by the Aribi Nala and its tributaries. Numerous short streams descending from the eastern highlands sustain the perennial nature of the Aribi Nala.

2.1.3 Background Geology (Regional Geology & Geology of the Block):

2.1.3.1 Regional Geology:

The area forms part of the Eastern Ghat Supergroup in Odisha. The lithological assemblage is dominated by quartz–feldspar–garnet–sillimanite–graphite schist/gneiss (khondalite), granite gneiss, quartzite, calc-granulite, migmatite, and basic to intermediate granulites.

Khondalite and granite gneiss constitute the major rock units, with the eastern and central sectors being predominantly khondalitic, while the relatively flatter western part is chiefly occupied by granite gneiss. Local interbanding of khondalite and granite gneiss is observed, with contact migmatites developed along their margins. These migmatitic zones are variably folded and intruded by pegmatite and quartz-feldspar veins.

Graphite mineralization is primarily associated with migmatite, with quartz, feldspar, garnet, sillimanite and biotite as the principal gangue minerals, along with minor muscovite, chlorite, molybdenite and apatite.

Based on the field studies and earlier works of various eminent geoscientists (Ramakrishna et al, 1998) the regional stratigraphy can be enumerated as follows:

Table 1: The broad stratigraphic framework of Eastern Ghats Super Group postulated by Ramakrishnan et al (1998) is as follows.

AGE	EVENTS AND LITHOLOGY
800-900 Ma	Alkaline rocks, granitoids -----Eastern Ghats Orogeny-----
1000-1100 Ma	Development of Eastern Ghats 'Front' of upgraded cratonic rocks Incipient and massive charnockite and garnet-hornblende-biotite gneisses and garnetiferous gneiss with biotite and sillimanite
1300-1400 Ma	Emplacements of alkaline rocks (feldspathoidal gneisses) and anorthosites
Khondalite Group (WKZ, CMZ & EKZ)	Garnet-sillimanite-graphite gneisses Cordierite-sapphirine-spinel rocks Calc-silicate rocks and rare marbles Quartzite rich in garnet (and some sillimanite) (The whole suite interleaved with charnockites)
1600-1800 Ma	Evolution of Purana basins
2600-2800Ma	Charnockites with enclaves of basic granulites, high grade (WCZ) schists including BIF, and layered basic complexes, representing original cratonic basement in 'migmatitic' amphibolite facies
3000 Ma	Vestigial events

Khondalite:

The eastern high mountain ranges are mainly composed of khondalite rocks. Khondalite also appears on a few isolated hillocks and mounds within the valleys. The rock shows a wide variation in mineral composition, ranging from arenaceous types to quartz–feldspar–garnet–sillimanite-rich khondalite with graphite as an accessory mineral. The common minerals in both arenaceous and argillaceous types are highly strained quartz, feldspar, garnet, sillimanite and minor graphite. Khondalite is often injected by granitic material and quartz veins, and in many places, it is folded into complex patterns. Strong weathering is observed in khondalite exposures within the valleys and foothill regions.

Granite Gneiss:

Granite gneiss extensively occupies the western part of the terrain, covering areas such as Maridi, Pittadanger, Khilapadar, Chinnagumarha and Alrada. Isolated patches of Granite Gneiss are also present in the central and eastern regions around Badakachapai, Gatineli, Sundaramati and Bhagurhi. These rocks occur on low hills, mounds and within valley regions. The Granite Gneiss is generally fine to medium grained, well-sorted and well-foliated. It is often highly siliceous and garnetiferous, with the siliceous varieties containing abundant biotite and hornblende.

Quartzite:

Quartzite occurs only in limited patches within the area. Narrow, elongated exposures forming mounds and ridges are found near Nangalpai, Sikabarhi, Pittadangu and Khilapadar. The quartzite is generally metamorphosed and recrystallised, showing a granulose texture with well-developed stratification. Garnetiferous varieties are observed in places, and in some zones, it grades into feldspathic quartzite, particularly near contacts with Granite Gneiss.

Quartz-Feldspar Rock:

These are coarse-grained recrystallised neosomes, mostly associated with migmatised khondalite. They occur as narrow bands following the foliation of the host rock and are closely interbanded with low-grade graphite occurrences. Their presence is a characteristic indicator of graphite mineralisation in the area.

Migmatite:

Narrow and elongated migmatite patches occur in central and western lowlands, mainly at contacts between khondalite and granite gneiss, and within khondalite itself. Extensive migmatite patches are noted near Kusunapadar, Pittadangu, Tiggi, and Laks Mipur. Their mineralogical, textural, and structural characteristics differ near granite gneiss margins, they are fine-grained, granulitic, and siliceous with biotite and garnet; near khondalite margins, they show fine banding with alternating khondalitic and granitic material, containing feldspar augens and lenses. At quartzite contacts (e.g., Nangalpai), migmatites are well-stratified with thin alternating bands of quartz and granite and exhibit ptigmatic folding.

Calc-Granulite:

Occurrence of calc-granulite is very rare in this terrain. Excepting Kusumpadar, Redangi and Alrada area, calc-granulite outcrops are never reported in any part of the terrain. It occurs as small outcrops along foothill regions. The rock is typically fine to medium grained, equigranular and often traversed by quartz veins.

Quartz–Hornblende Granulite:

This lithounit occurs extensively south of Barha Kachapai and Kachapai villages. It is chiefly composed of quartz and hornblende, with accessory feldspar and biotite. The rock is generally fine grained in the southern part, with grain size gradually increasing northward. Northeast of Sana Kachapai, it displays a glomeroporphyritic texture with very coarse hornblende crystals.

Basic Granulites:

Small outcrops of basic granulite occur within khondalite and Granite Gneiss near Chitikapangu, Lakshmipur, Raina Sikabahi and Barha Kachapai villages. The rock is fine to medium grained and well sorted, composed mainly of hypersthene and hornblende with accessory feldspar.

Pegmatite:

Pegmatite veins are observed near Chitikapangu, Gatineli and Kapakhal villages. They are simple in composition, consisting of quartz, feldspar, tourmaline, biotite and iron oxides. A notable vein located about 250 m west of Chitikapangu is 5–6 m wide and lies beneath a thin soil cover; it additionally contains phlogopite and muscovite mica. Apart from these major veins, numerous thin and discontinuous pegmatite veins are associated with almost all graphite occurrences.

Vein Quartz:

Quartz veins are recorded near Sanakachapai, Kusumpadar, Nangalpai, Sikabarhi and Chitikapangu villages. The former one includes a 25 m long, 6 m wide vein at Chitikapangu and the later one includes a 40 m long vein that reaches 8 m width and at the middle, it gradually thinning out to both the ends. The quartz in these two veins is semi-transparent and suitable for ferro-silicon industry use. In contrast, the vein southeast of Sikabarhi is highly weathered and friable, with intermittent remnants over 45 m, consisting of greenish grey to smoky quartz with impurities.

Structure:

Foliation is the most dominant structural feature in the metasediments, accompanied by lineations, slickensided surfaces and local folding. The structural trend varies from NNW–SSE to E–W, with dips towards the west and south. The western part of the terrain is comparatively less disturbed, maintaining a consistent NNW–SSE to N–S foliation with westerly dip. In contrast, khondalite and migmatite in the eastern part display clear evidence of structural disturbances. Strong deformation is observed in the northeastern sector near Kachapai, marked by sheared quartzite, slickensided khondalite boulders, silicified surfaces, complex local folds and

frequent shifts in foliation trend from W–E to E–W. The adjoining rocks are highly sheared, crudely folded and jointed, with two prominent joint sets — one strike-parallel and another oblique in NE–SW direction — which appear to control the development of rills and gullies.

2.1.3.2 Local Geology:

Graphite mineralization in the Sikabarhi, Laxmipur, and Barha Kachapai blocks occurs within khondalite, granite-gneiss, and migmatite formations, displaying variable structural trends and grades.

In Sikabarhi, three distinct graphite bands have been identified- the first mineralized zone extends for over 500 m with a thickness of 6–8 m; a second band, located about 400 m northwest of the village, extends laterally for 100 m with 4–5 m cumulative thickness; and a third band, exposed along a nala about 200 m northwest of the village, is about 3 m wide. Graphite occurs as discontinuous bands, and pockets along the sheared and migmatized contact between khondalite and granite-gneiss, trending N25°W–S25°E with a 69°–70° westerly dip, and contains 8,375 tonnes of crystalline flaky graphite assaying 8.41–46.25% fixed carbon.

In Lakshmipur, graphite mineralization is restricted to migmatite following an N40°W–S40°E foliation trend, interbanded with red quartzite and quartz-feldspathic material, and dipping steeply east. The mineralized zone, averaging 2.5 m in cumulative thickness over a 7 m width, contains 7.86–10.88% fixed carbon.

And in Barha Kachapai, two distinct graphite bands have been identified- one located about 250 m north and another 600 m west of the village. Graphite occurs as thin veins and stringers within sheared quartzite and granite-gneiss, trending E–W and N–S with dips up to 75° E. The veins, 30–40 cm thick, yield 27.48–45.43% fixed carbon, indicating moderate-grade mineralization associated with khondalite–granite-gneiss contacts.

2.1.4 MINERAL POTENTIALITY BASED ON GEOLOGY, GEOPHYSICS, GROUND GEOCHEMISTRY:

Mineral Investigation Report for Graphite around Khilapadar, part of Eastern Ghat Mobile Belt of Koraput District, Orissa was carried out Sri B.C. Mohanty, (Geologist) Sri K. Pathnaik, (Geologist) in 1989-1990.

This block has been identified based on their analytical results of the Geochemical data. Proximate analysis of graphite samples from different blocks indicates a wide range of Fixed Carbon (F.C.) content, varying from 7.86% to 46.25%. The Barha Kachapai exhibits 27.48–45.43% fixed carbon. The Sikabarhi graphite deposit is likely to contain 8,375 tonnes of graphite with 8.41 to 46.25% fixed carbon

and Lakshmipur graphite deposit is likely to contain 590 tonnes of graphite 7.86–10.88% fixed carbon.

The analytical results suggest that the investigated area holds substantial potential for economic graphite mineralization and requires further detailed exploration and resource evaluation.

Table 2: Proximate Analysis of Graphite Samples of 250m North of Barha Kachapai

Sample No	% Moist	%V.M	%Ash	%F.C
GID-601	0.72	5.46	49.18	44.64
GID-602	1.63	7.71	62.95	27.71
GID-603	1.52	7.62	62.88	27.98
GID-604	0.82	5.62	48.13	45.43

Table 3: Proximate Analysis of Graphite Samples of 600m West of Barha Kachapai

Sample No	% Moist	%V.M	%Ash	%F.C
GID-605	0.65	5.43	51.16	42.76
GID-606	1.67	7.63	63.22	27.48
GID-607	1.80	7.50	62.60	28.10
GID-608	1.92	7.28	62.14	28.66

Table 4: Proximate Analysis of Graphite Samples of 400m NW of Sikabarhi

Sample No	% Moist	%V.M	%Ash	%F.C
GID-609	0.84	5.57	84.26	9.53
GID-610	1.68	4.21	84.72	9.39
GID-611	0.64	3.50	82.26	13.60
GID-612	1.22	7.26	81.28	10.24
GID-613	0.52	5.18	80.68	13.62
GID-614	0.33	1.74	78.47	19.46
GID-615	0.40	4.20	82.38	13.02
GID-616	0.42	9.08	81.78	8.72

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GID-617	0.56	5.75	83.10	10.59
GID-618	0.42	4.25	82.51	12.82
GID-619	0.35	2.97	38.27	8.41
GID-620	0.70	4.02	81.36	13.92
GID-621	0.20	1.77	77.33	20.70

Table 5: Proximate Analysis of Graphite Samples of 500m North of Sikabarhi

Sample No	% Moist	%V.M	%Ash	%F.C
GID-622	0.94	5.10	51.44	42.52
GID-623	0.90	5.10	51.37	42.63
GID-624	1.20	5.94	47.28	45.58
GID-625	0.80	5.43	50.86	42.91
GID-626	0.84	5.65	47.26	46.25

Table 6: Proximate Analysis of Graphite Samples of Lakshmipur

Sample No	% Moist	%V.M	%Ash	%F.C
GID-631	0.20	0.38	91.56	7.86
GID-632	0.20	0.32	91.28	8.20
GID-633	0.28	0.36	88.48	10.88
GID-634	0.26	0.36	89.40	9.98

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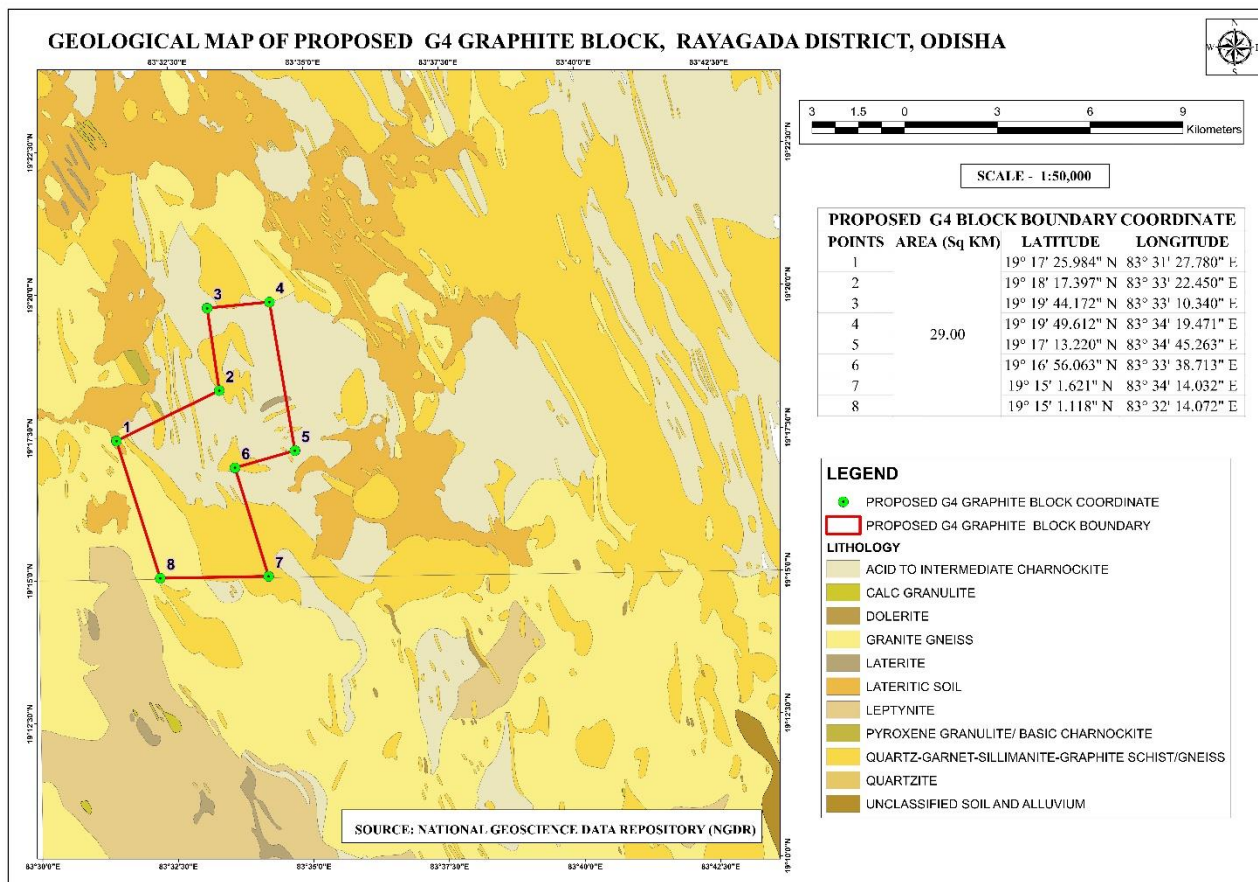


Figure 1 Geological Map in and around Proposed Block

2.1.5 SCOPE FOR THE EXPLORATION:

- a. Large Scale Geological mapping on 1:12,500 scale
- b. Surface Sampling
- c. Geophysical investigation (Self Potential survey)
- d. Pitting and trenching
- e. Scout Drilling up to 450 m
- f. Petrographic study
- g. Chemical analysis
- h. Geological report preparation

2.1.6 OBSERVATION AND RECOMMENDATIONS OF PREVIOUS WORK:

The investigation has established the southward extension of the Tumudibandh graphite belt into the Koraput district, delineating graphite-bearing zones between Bissamcuttack and Gunupur, extending up to Sikabarhi in the south. Graphite mineralization occurs both as low-grade bedded schist/gneiss and as sporadic vein-type deposits. While the veins are discontinuous and of limited economic significance, the bedded graphite schists and gneisses are extensive and hold good economic potential after suitable beneficiation.

Proximate analysis of graphite samples from different blocks indicates a wide range of Fixed Carbon (F.C.) content, varying from 7.86% to 46.25. The Barha Kachapai exhibits 27.48–45.43% fixed carbon. The Sikabarhi graphite deposit is estimated to contain about 8,375 tonnes of graphite with 8.41–46.25% fixed carbon, while the Lakshmipur deposit may contain approximately 590 tonnes of graphite with 7.86–10.88% fixed carbon. Therefore, the proposed block is very much potential for Graphite mineralization.

The study shows that an extensive mineralised zone exists between Sikabarhi and Lakshmipur, with intermittent graphite exposures that require systematic investigation. Detailed geological mapping on a 1:4,000 scale, supported by trial excavations and geophysical surveys, is recommended to delineate known occurrences and identify concealed veins or pockets.

2.2 Previous Work

Mineral Investigation Report for Graphite around Khilapadar, part of Eastern Ghat Mobile Belt of Koraput District, Orissa was carried out Sri B.C. Mohanty, (Geologist) Sri K. Pathnaik, (Geologist) in 1989-1990.

The block was delineated based on analytical evaluation of geochemical data. Proximate analysis of graphite samples from various blocks revealed a wide variation in Fixed Carbon (F.C.) content, ranging from 7.86% to 46.25. The Barha Kachapai exhibits 27.48–45.43% fixed carbon. The Sikabarhi graphite deposit is estimated to contain approximately 8,375 tonnes of graphite with 8.41–46.25% fixed carbon, while the Lakshmipur deposit is likely to contain around 590 tonnes with 7.86–10.88% fixed carbon.

The analytical results collectively indicate that the Lakshipur, Sikabarhi and Barha Kachapai blocks possess significant potential for economic graphite mineralization. The findings underscore the necessity for detailed exploration.

2.3 Block Boundary:

The block falls in survey of India toposheet no 65M/11 of Odisha and covers 29.00 Sq. Km area in and around Lakhimpur, Sikabarhi and Barha Kachapai area, Rayagada district, Odisha. The Co-ordinates of the corner points of the proposed block area are given below.

Table 7: Coordinates of corner points of the proposed Lakshmipur, Sikabarhi and Barha kachapai block, Rayagada District, Odisha

Sl No.	Points	Area (sq. km)	Latitude	Longitude
1	1	29	19° 17' 25.984" N	83° 31' 27.780" E
	2		19° 18' 17.397" N	83° 33' 22.450" E
	3		19° 19' 44.172" N	83° 33' 10.340" E
	4		19° 19' 49.612" N	83° 34' 19.471" E
	5		19° 17' 13.220" N	83° 34' 45.263" E
	6		19° 16' 56.063" N	83° 33' 38.713" E
	7		19° 15' 1.621" N	83° 34' 14.032" E
	8		19° 15' 1.118" N	83° 32' 14.072" E

2.4 Planned Methodology:

The exploration program is proposed in accordance with the objective set for reconnaissance survey (G-4) of the block. The Exploration shall be carried out as per Minerals (Evidence of Mineral Contents) Rule-2015. Accordingly, the following scheme of exploration is formulated to achieve the objectives. The details of different activities to be carried out are presented in subsequent paragraphs.

- i) **Detailed Geological Mapping:** Geological mapping will be done in the entire area on 1:12,500 scale. Rock types, their contact, structural features will be mapped. Surface manifestations of mineralization, along with their surface disposition will be marked on map.
- ii) **Geochemical Survey:** Regional grab/ stream sediment/soil sampling to be carried out at regular intervals.
 - a. **Grab Sampling:** During Geological mapping, bed rock samples shall be collected for identifying various litho units.
 - b. **Soil Sampling:** Soil samples will be carried out in entire area to delineate mineralized zone.

- c. Stream Sediment Sampling:** Stream Sediment samples will be carried out in entire area to delineate mineralized zone.
- iii) Geophysical Survey:** Based on the geology of the area, Self Potential survey will be conducted covering an approximate traverse length of 20-line km.
- iv) Pitting/Trenching:** Shallow trenching/Pits (Excavation) shall be carried out in the potential zones identified based on the results of geological mapping and geophysical survey.
- v) Drilling:** Based on Geological Mapping, Geochemical Sampling, and Geophysical investigation, the extension of the mineralized zones (ore bodies) will be demarcated. To find out the potentiality of mineralized zones in strike & dip direction, 5 no boreholes involving 100m of drilling will be carried out for intersection of mineralized zones
- vi) Geochemical Analysis:** All samples need to analyse for Fixed carbon content. Also, major and trace elements will be analysed by ICPMS, including analysis for Vanadium.
- vii) Petrographic study:** Thin sections will be done to identify targeted minerals.
- viii) Data verification and Quality Check:** Standard reporting of resources is classified and estimated by using two types of data. Data acquired from previous exploration and data generated by exploring the block. Data verification and Gap analysis are interpretive or indirect methods. Interpretive Data may include results from mapping, seismic, magnetic, gravity and other geophysical and geological surveys. Interpretive Data may be used in conjunction with Explored Data to improve confidence levels.
QA/QC will be strictly followed during the collection, recording and storage of any of the data ultimately used in the geological report preparation. This program should be concerned with, but not limited to, data verification, drill sample recovery, sample size, sample preparation, analytical methods, the use of duplicates/blanks/standards, effects of multiple periods of data acquisition and consistency of interpretation in three dimensions.

NMEDT Proposal (For G4 exploration)
Lakshmipur, Sikabarhi and Barha Kachapai Graphite Block
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Components		Unit	Quantum of Work
Geological Mapping (1:12500)		sq.km	29
Geophysical Survey (SP Survey)		Line km	20
Trenching		Cu.m	50
Core Drilling		m	10 BH, 45 m each =450 Total 450 m
Laboratory Studies	Proximate Analysis	Nos	110
	Geochemical Analysis	Nos	ICPMS: 22 XRF: 22
Petrological Studies		Nos	10
Bulk Density Determination		Nos	10
Report Preparation		Nos	1

Reference

Sri B.C. Mohanty and Sri K. Pathani, Report on the Investigation for Graphite Around Khilapadar of Koraput District Orissa Field Season: 1989-90, DGM Odisha.

NMEDT Proposal (For G4 exploration)
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Rayagada District, Odisha

2.5 Project Schedule

Sl. No.	Particulars	Month-1	Month-2	Month-3	Month-4		Month-5	Month-6	Month-7	Month-8		Month-9	Month-10
1	Camp Setting/ mobilization												
2	Geological Mapping												
4	Geophysical survey												
5	Pitting/ Trenching												
7	Drilling												
8	Sample Preparation												
9	Petrographic study												
10	Laboratory Studies												
11	Report Preparation												

NMEDT Proposal (For G4 exploration)
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Rayagada District, Odisha

2.6 Cost of the Project

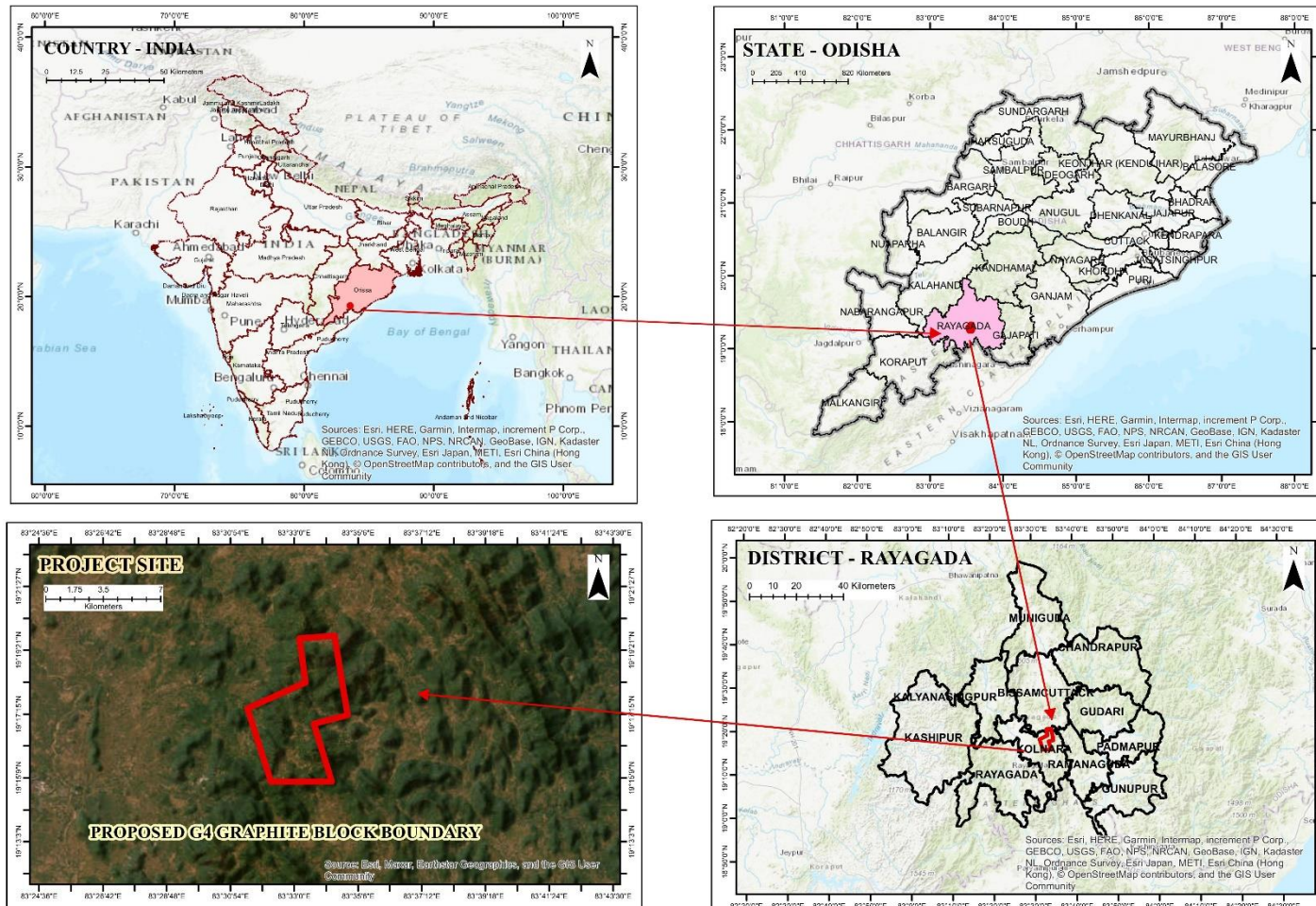
Reconnaissance survey (G4) for Graphite around Lakshmipur, Sikabarhi and Barha Kachapai Area, Rayagada District, Odisha; Total Area: 29 sq.km; Period of Completion- 10 months; Drilling: 450m; Review: 4 months and 8 months							
S. No.	Item of Work	Unit	Rates as per NMEDT SoC 2025		Estimated Cost of the Proposal		Remarks
			SoC-Item -Sl No.	Rates as per SoC	Qty.	Amount (Rs)	
Phase-I							
A	GEOLOGICAL WORK						
1	Large scale Geological Mapping (1:12500)	per sq.km	1.1	18,300	29.00	530700	
i	Charges for Geologist-Field	day	1.2.1a	14,500	60	870000	
ii	Charges for one Geologist - HQ	day	1.2.1a	10,500	20	210000	
iii	Labours Charges; Base rate	day	5.8	556	120	66720	
2	Geophysical Survey						
	Self-Potential (8-20 line km)	Line Km	3.3a	62140	20	1242800	
3	Trenching						
	Trenching	cu.m	2.1.1	4125	50	206250	
4	Samples Preparation						
i	Charges for one Sampler per day	one sampler per day	1.2.1b	7,850	19	149150	
ii	Labours Charges; Base rate	day	5.8	556	76	42256	
6	LABORATORY STUDIES						
1	Chemical Analysis						
i	Primary & Check samples for Graphite						
	Proximate analysis of Graphite	Nos	4.1.18	3,614	100	361400	
	b-External(10%) Check samples	Nos	4.1.8	3,614	10	36140	
	Major oxides (WD XRF)- (oxides +traces - 24 elements)	Nos	4.1.17a	4,200	20	84000	
	b-External(10%) Check samples	Nos	4.1.17a	4,200	2	8400	
ii	ICPMS for Trace elements						
	Analysis of one rock/ soil sample for quantitative analysis of 14 REE elements +9 trace element (U, Ta, Ge, Be, Hf, Sn, As, Rb,	Nos	4.1.15	7,400	20	148000	

NMEDT Proposal (For G4 exploration)
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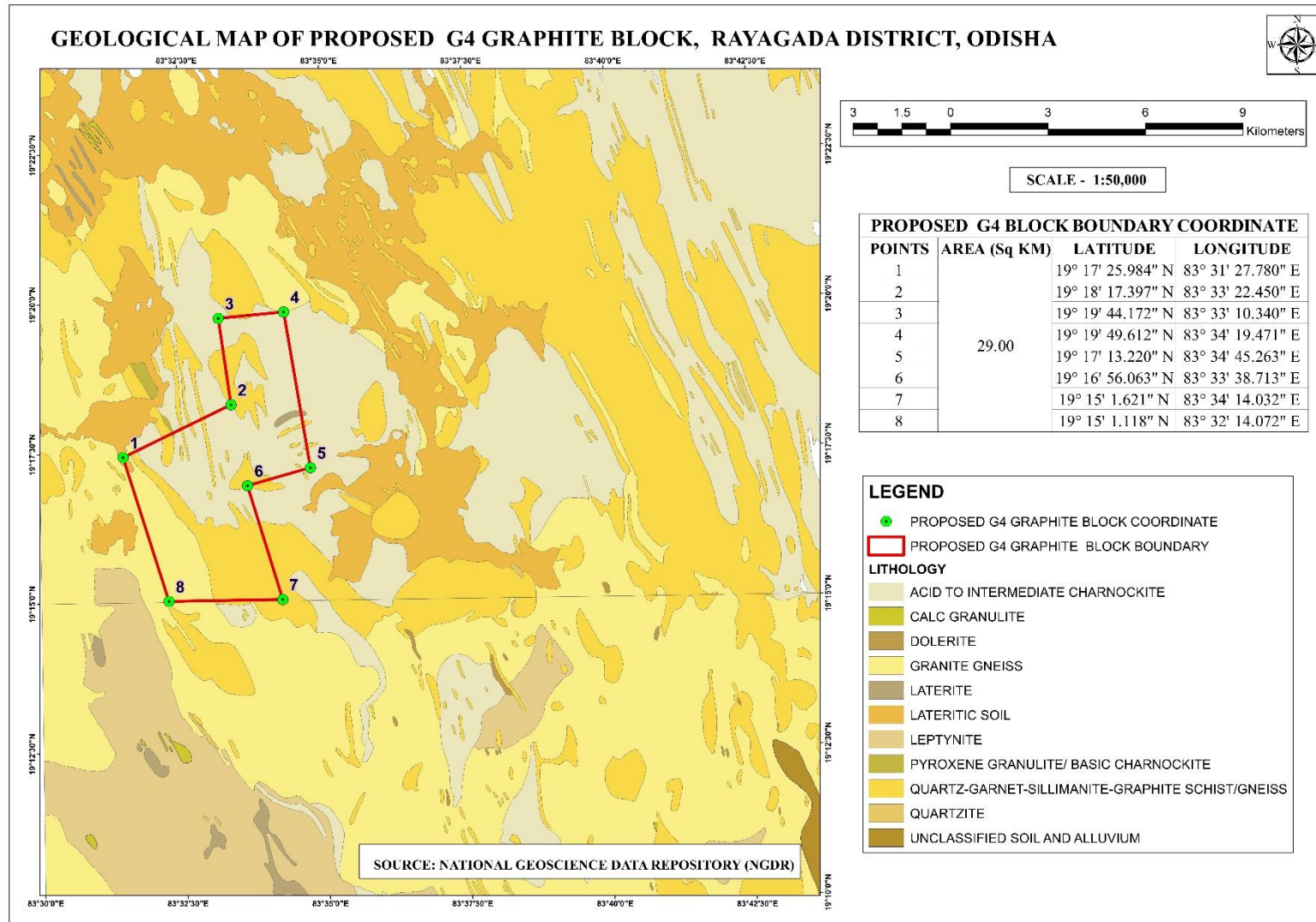
	Th) by ICP-MS (sequential technique)						
	Check samples	Nos	4.1.15	7,400	2	14800	
2	Physical & Petrological Studies						
i	Preparation of polished thin section	Nos	4.3.2	800	10	8000	
ii	Complete petrographic study report	Nos	4.3.4	2,800	10	28000	
	Sub Total A					4006616	
B	DRILLING						
i	Drilling upto 300m (Hard Rock) (1 rig)- HQ	m	2.2.1.1d	10,000	450	45,00,000.00	
ii	Land / Crop Compensation	per BH	5.6	30,000	10	300000	
iii	Construction of concrete Pillar (12"x12"x30")	per borehole	2.2.7	2,000	10	20000	
iv	Misc Charges (Transportation of drilling rig, accommodation for Drill Camp, Camp setting and winding, construction of Approach rod and Drill core preservation	Lumsum	2.2.9.3	15,00,000.00	1	11,25,000.00	For drilling cost less than 50 lakhs: 25% of the Drilling Cost.
v	Core Preservation: One complete borehole plus mineralised cores of all the remaining Bhs	m	5.3	1,590	150	238500	
	Sub Total- B					61,83,500.00	
D	Sub Total A + Sub Total B					1,01,90,116.00	
E	Geological Report Preparation		5.2.iii	exploration with cost of work exceeding ₹ 50 lakh: ₹1.50 lakh		2,50,000.00	
F	Peer review Charges		As per EC decision			30000	
G	Preparation of Exploration Proposal (5 Hard copies with a soft copy)	5 Hard copies with a soft copy	5.1	2% of the Cost or Rs. 5 Lakhs whichever is lower		2,03,802	
H	Total Estimated Cost without GST					1,06,73,918.32	
I	Provision for GST (18% of H)					19,21,305.30	
J	Total Estimated Cost with GST					1,25,95,223.62	or Say Rs.125.95 Lakh

NMEDT Proposal (For G4 exploration)
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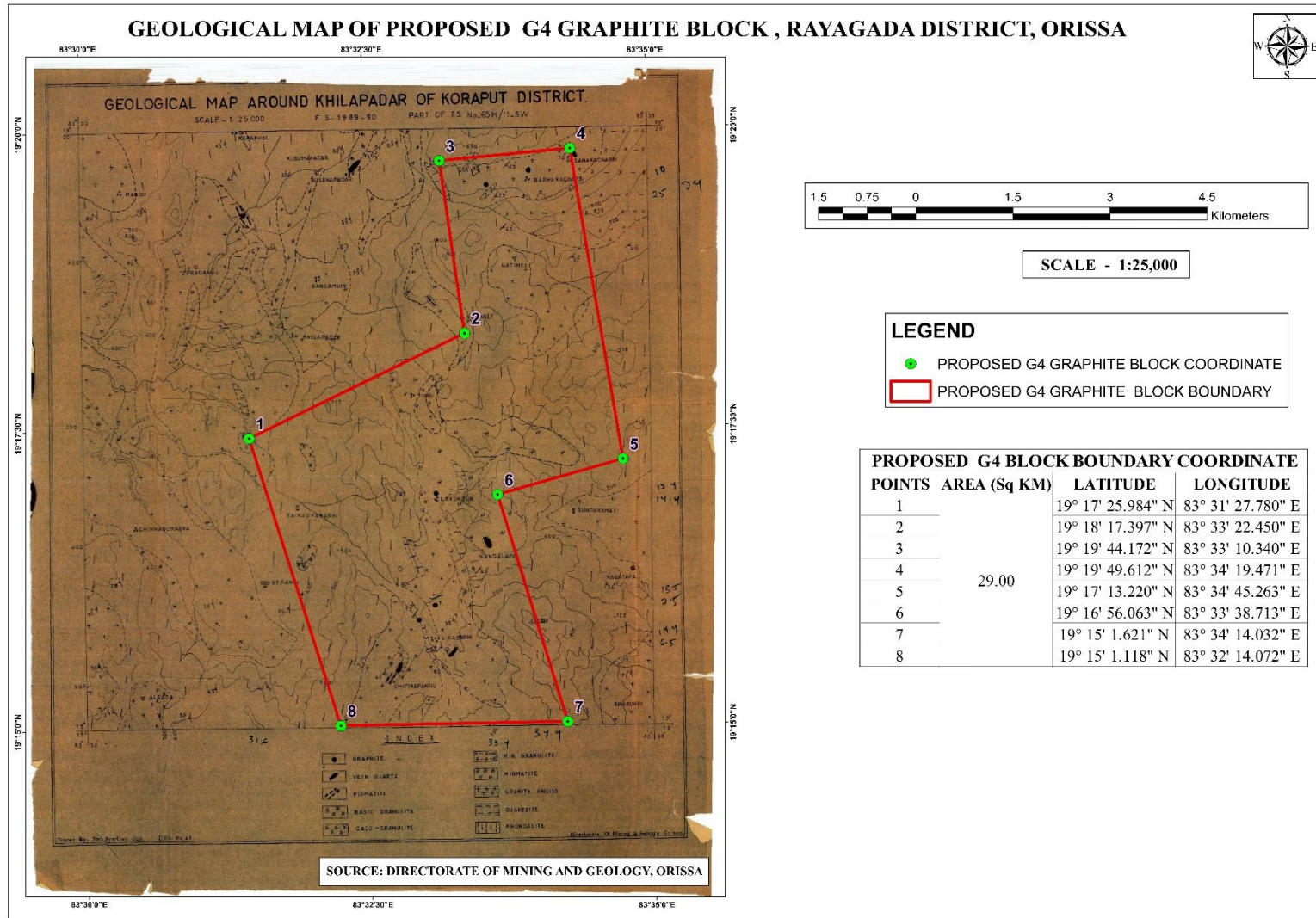
LOCATION MAP OF PROPOSED G4 GRAPHITE BLOCK, RAYAGADA DISTRICT, ODISHA



NMEDT Proposal (For G4 exploration)
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