

COMMODITY: Lithium and Associated Mineralization

**PRELIMINARY EXPLORATION FOR LITHIUM AND ASSOCIATED MINERALIZATION IN
TUKUPAKHNA BLOCK, JASHPUR DISTRICT, CHHATTISGARH**

**BY
GEOLOGICAL SURVEY OF INDIA
STATE UNIT, RAIPUR**

**PLACE: RAIPUR
DATE: JUNE 2026**

Summary of the Block for G3 Level Exploration

GENERAL INFORMATION ABOUT THE BLOCK

Feature	Details
Block ID	TUKUPAKHNA BLOCK
Exploration Agency	Geological Survey of India, State Unit, Raipur
Commodity	Lithium and associated Mineralization
Mineral Belt / Geological Domain	Chhotanagpur Gneissic Complex
Block Area	01 sq. km
Completion Period	One year
Objectives	To delineate the potential zones of lithium, caesium and tantalum mineralization
Projected Outcome	Preliminary exploration data for resource appraisal and further advancement of the block.
Personnel	Two geoscientists
Expected Field Days	Officer-1: 100 days; Officer-2: 100 days; Supervisory Officer: 07 days
Toposheet / Degree Sheet	64 N/10
Tehsil	Pathalgaon
District / State	Jashpur / Chhattisgarh

1. Location

BLOCK

Cardinal Points	Latitude	Longitude
A	22°36'4" N	83°30'58" E
B	22°36'4" N	83°31'44" E
C	22°35'40" N	83°31'44" E
D	22°35'40" N	83°30'58" E

2. Area

Block Area	1 sq. km.
Forest Area	NA
Government Land Area	Data not available

Private Land Area	Data not available
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3. Accessibility

Nearest town	Pathalgaon town, about 16 km to the South-west
District headquarters	Jashpur, about 100 km North-east of Tukupakhna block
Nearest Rail head	Ambikapur about 95 km northwest of Tukupakhna block
Nearest Airport	Ambikapur, 95 km

4. Hydrography: Small seasonal streams

5. Climate: Sub tropical to Tropical

6. Topography: Undulating Hill alternating with plains.

7. Availability of baseline geoscience data

Geological map	Large-scale geological mapping and earlier G4 investigations by GSI in and around the block
Geochemical data	Kabi et al. (2014-15)
Geophysical data	NGPM. NAGMP

8. Justification for taking up G3 level exploration

Kumar et. al. (Field Season 2022-23) during the G4 stage investigation reported Li values; 2100 to 2400 ppm in the bedrocks of pegmatite-aplite veins in Mirzapur area. Based on reported high Li values of composite stream sediment samples in NGCM and BRS values in G4 lithium of FS 2022-23, Mishra and Badapanda in the Field Season 2024-25 carried out reconnaissance survey (G4 stage) for lithium, REE and associated mineralisation in Chaurama-Shekharapur area. Mishra and Badapanda (FS: 2024-25), reported 27 Nos. of rare element (REL) class-Li type pegmatites in west of Raghunathpur, Tukupakhna and east of Diwanpur area. According to them these pegmatites dykes and lenses intrudes NNE-SSW joint planes in granodiorite and gabbro in the western part of the study area. Their thickness varies from 15cm to 2m; strike length ranges from 5m to 230m. Tapering of the individual bodies at one or either end is common. Pegmatites strike N 10°-30° E and dips at steep angle towards the east and few branch occupy NE-SW and NW-SE joint planes. They established a 3 km long and 1 km wide mineralised zone of Li and associated rare metals. Keeping in view of the occurrence of complex REL pegmatite hosting lithium and associated rare metals in LCT pegmatite, G-3 stage project was proposed.

PRELIMINARY EXPLORATION FOR LITHIUM AND ASSOCIATED MINERALIZATION IN TUKUPAKHNA BLOCK, JASHPUR DISTRICT, CHHATTISGARH (G-3)

1.1.0 INTRODUCTION

The Tukupakhana block is situated precisely in the west extremity of Chaurama-Shekharapur block and around 16 km to the east of Pathalgaon area, adjacent to Raghunathpur area. The Tukupakhna block (FS: 2026-27), bounded by latitudes 22°36'4" N to 22°35'40" N and longitudes 83°30'58" E to 83°30'58" E, covers an area of 01 sq km and falls in part of Survey of India toposheet No. 64N/10. The proposed programme is designed to generate the geological, geochemical, and drilling data required for preliminary resource appraisal and to guide subsequent exploration.

2.1.0 BACKGROUND INFORMATION

The Tukupakhana block is situated precisely in the west extremity of Chaurama-Shekharapur block and around 16 km to the east of Pathalgaon area. The Tukupakhna block (FS: 2026-27), bounded by latitudes 22°36'4" N to 22°35'40" N and longitudes 83°30'58" E to 83°30'58" E, covers an area of 01 sq km and falls in part of Survey of India toposheet No. 64N/10.

The study area forms part of the southwestern sector of the Chotanagpur Granite Gneiss Complex (CGC), situated to the north of the Bilaspur–Raigarh Metamorphic Belt in the Jashpur district of Chhattisgarh, and has recently emerged as a highly prospective lithium-bearing domain. Geologically, the area is characterized by a complex assemblage of granitoids, metamorphic rocks, and mafic intrusives. The principal lithological units include biotite granite and gneiss, hornblende granite, porphyritic granite, porphyroblastic biotite granite, muscovite granite and gneiss, granodiorite, quartzite, chlorite schist, tremolite-actinolite schist, biotite schist, and amphibolite. Enclaves of schist and quartzite occur within the granitoids, while amphibolite xenoliths form isolated mounds within the granitic terrain. The granitoids and metamorphic rocks are intruded by numerous quartz and pegmatite veins, and are traversed by metagabbro, pyroxenite, and dolerite dykes. Lateritic capping is locally developed over the biotite granite, indicating prolonged weathering under tropical climatic conditions. The area has a long history of geological investigations. During field seasons 1966–67 and 1967–68, K. Srinivasa Rao carried out systematic geological mapping around Dharamjaigarh and Jashpur tehsils in Toposheet No. 64N/10 on 1:63,360 scale. His work documented compositional variations within the granite gneiss complex ranging from granite to diorite and identified several field variants including biotite granite, muscovite granite, microcline-biotite granite, granodiorite, and gneiss. Talc schist, chlorite schist, quartzite, and amphibolite enclaves were also recorded. Importantly, pegmatite veins near Diwanpur were reported to contain minor lepidolite, though the occurrence was not considered economically significant at the time.

Subsequent exploration efforts revived interest in the area. During the National Geochemical Mapping programme in field season 2014–15, Kabi et al. reported anomalous lithium values exceeding 100 ppm in composite stream sediment samples from the Raghunathpur–Tamta area. Encouraged by these geochemical anomalies, a G4 stage lithium exploration programme was initiated during field season 2022–23. Kumar et al. subsequently identified lithium concentrations ranging from 2100 to 2400 ppm in pegmatite-aplite veins in the Mirzapur area, leading to the upgradation of the project to G3 stage exploration. Further reconnaissance surveys carried out by Mishra and Badapanda during field season 2024–25 in the Chaurama–Shekharapur area revealed 27 rare-element lithium-type pegmatites west of Raghunathpur, Tukupakhna, and east of Diwanpur. These pegmatites occur as dykes and lenses intruding NNE–SSW trending joint planes within granodiorite and gabbro. Mineralogically, they contain economically important rare-metal-bearing minerals such as lepidolite, spodumene, elbaite, pollucite, and tantalite-group minerals, indicating LCT-type pegmatite affinity. The exploration established a mineralized zone approximately 3 km long and 1 km wide with significant lithium, cesium, rubidium, and tantalum values in both bedrock and channel samples. Owing to the promising mineralization, a G3 stage preliminary exploration programme has been proposed for the Tukupakhna Block with objectives of delineating subsurface continuity of pegmatite bodies and estimating lithium and associated rare-

metal resources through detailed mapping, trenching, channel sampling, and exploratory drilling.

3.1.0 LOCATION AND ACCESSIBILITY

Tukupakhna Block is located in the Pathalgaon tehsil of Jashpur district, Chhattisgarh and falls in part of Survey of India toposheet No. 64 N/10. The field area is well connected by roads passing through villages. The district headquarter is at a distance of about 100 km to the North from the study area. Ambikapur is the nearest railway head which is well connected by NH-43. Present area of exploration can be approached by NH-43 from Ambikapur via Deviganj road, connecting Karmitikra village and the field area.

4.1.0 PHYSIOGRAPHY, DRAINAGE AND CLIMATE

The present area in general has an undulating hill topography with elevation varying between 540 m to 600 m from Mean Sea Level. The area is drained by few small nalas. The area is close to the tropic of cancer and enjoys a typical tropical climate with hot dry summer (April to June) and cold pleasant winter (December to February). The area experiences cold and dry winter when the temperature falls down to about 8°C. Average annual rainfall is approximately 1600 mm.. Most of the area is used as agricultural land.

5.1.0 PREVIOUS WORK

The area covered under Toposheet No. 64N/10 in the Jashpur region of Chhattisgarh has been extensively investigated by several workers over the past decades for geological mapping, mineral exploration, geochemical studies, and assessment of critical and precious metals such as gold, tungsten, platinum group elements (PGE), rare earth elements (REE), and lithium. Early geological work was initiated by A.K. Dey during 1935–36, followed by studies by Nandi (1953) and J. Narayan Murthy (1955), who provided preliminary accounts of the regional geology around Baghbahar and Dharamjaigarh. Systematic Geological Mapping on 1:63,360 scale was later carried out by S.K. Srivastava and K. Srinivasa Rao during field season 1965–66 in parts of Toposheet Nos. 64N/6 and 64N/7. They identified Archaean rocks comprising chlorite schist, talc schist, biotite gneiss, and granites, overlain unconformably by Talchir and Barakar sedimentary formations, and also reported occurrences of bauxite, galena, lepidolite, mica, and vein quartz. During field seasons 1966–67 and 1967–68, K. Srinivasa Rao mapped the Dharamjaigarh and Jashpur areas of T.S. No. 64N/10 and described the terrain as dominantly composed of granite gneiss with enclaves of talc schist, chlorite schist, quartzite, and amphibolite. He recognized several granitic variants including biotite granite, porphyroblastic biotite granite, muscovite granite, granodiorite, and microcline-biotite granite, and reported quartz and pegmatite veins intruding the schist and gneiss. A pegmatite near Diwanpur containing minor lepidolite was also documented. Subsequent investigations by various workers mapped additional lithologies including metamorphics, basic and ultrabasic bodies, aplites, pegmatites, quartz-tourmaline reefs, and shear zones. Exploration activities led to the identification of gold-bearing silicified shear zones, tungsten mineralization associated with scheelite and ferberite-bearing tourmalinites, PGE-bearing ultramafic rocks near Mayurnacha and Jamjhor, and beryl-bearing pegmatites around Baneya. More recent geochemical mapping by Kabi et al. during 2014–15 revealed anomalous lithium values in stream sediment samples around Kilkila and adjoining areas. Further reconnaissance surveys during 2022–23 by Kumar and Satyarthi identified lithium-rich pegmatite-aplite veins intruding hornblende biotite granite, with lithium values ranging from 2100 to 2400 ppm. These pegmatites contain purple polyolithionite, lepidolite mica, and euhedral spodumene crystals, indicating significant potential for lithium and associated rare-element mineralization in the region. Recent studies by Mishra and Badapanda in the Field Season 2024-25 carried out reconnaissance survey (G4 stage) for lithium, REE and associated mineralization in Chaurama-Shekharapur area where 27 Nos. of rare element (REL) class-Li type pegmatites were recorded in west of Raghunathpur, Tukupakhna and east of Diwanpur area which marks as the potential source of REE.

6.1.0 GEOLOGY OF THE AREA

The present area of exploration occupies the western part of Chhottanagpur Gneissic Complex (CGC) and constitute the eastern sector of the CITZ. The area is bounded by two shear zones viz. GTSZ and CISZ. Granodiorite constitute the major lithology of the area with minor Gabbro and Chlorite-schist bodies intervened

with mineralized pegmatite bodies and quartz veins.

7.1.0 OBJECTIVES OF THE PROPOSED EXPLORATION PROGRAMME

The present exploration programme has been formulated with the following objectives:

- i) To delineate the potential zones of lithium, caesium and tantalum mineralization.

8.1.0 PROPOSED SCHEME OF EXPLORATION

The proposed G3 exploration programme comprises geological mapping (1:1000), drilling, sample collection, processing, and laboratory studies. A total of 14 or 15 **inclined** boreholes are proposed (12 first-level and 02 second-level) based on potentiality and continuity of the pegmatite with a spacing of 100 m and intersection at 30 m vertical depth (First-level, TD: 50m) and 60m (second-level, TD: 100m) conforming to MEMCR 2015 for irregular bodies.

Borehole logging, core sampling and laboratory analyses will support interpretation and preliminary resource appraisal. Selected samples will be subjected to REE & Trace elements studies.

9.1.0 QUANTUM OF WORK

Item of Work	Unit	Proposed Quantum
Large Scale Mapping (1:1,000)	Sq. Km	01
Subsurface exploration: drilling	m	700
Chemical Analysis (Core samples, BRS, PTS, PCS, Channel samples)	nos.	300 nos.
Resources Assessment	nos.	14/15 boreholes

10.1.0 COST

Summary of the Cost estimates are estimated for 700m inclined borehole drilling (14 to 15 nos.)

Sl. No.	Item	Total Estimated Cost (Rs.)	Funding
1	Geology and Survey	0	By GSI
2	Drilling	70,00,000/-	NMEDT
3	Survey work	0	By GSI
4	Laboratory studies	0	By GSI
5	Geologist at HQ	0	By GSI
	Sub Total (1to 4)	70,00,000/-	
6	Exploration Report Preparation	0	By GSI
7	Proposal Preparation	0	By GSI
8	Peer review charges	0	By GSI
9	Sub Total (1to8)	70,00,000/-	By GSI
10	GST18%	12,60,000/-	
	Total:	82,60,000/-	
	Rs. In Lakh	82.60	

COST CALCULATION

Item of Work			Unit	SoC-Item -Sl No. NMEDT	Rates as per NMET SoC 2025		Estimated Cost	
							Qty.	Total Amount (Rs)
D. Drilling - OUT SOURCED								
18.a	DRILLING	Drilling in/ Drilling in Soft rock/ Strata: HQ size borehole up to 400m Depth and NQ Size beyond 400m depth in case of NQ size drilling is done before 400m depth, the rate shall decrease by 20%	m	2.2.1.1c		5,500.00		₹ 0.00
18.b		Drilling in/ Drilling in Hard rock/ Strata: HQ size borehole up to 400m Depth and NQ Size beyond 400m depth in case of NQ size drilling is done before 400m depth, the rate shall decrease by 20%	m	2.2.1.1d		10,000.00	700	₹ 70,00,000.00
18.c		Drilling in/ Drilling in Very Hard rock/ Strata: HQ size borehole up to 400m Depth and NQ Size beyond 400m depth in case of NQ size drilling is done before 400m depth, the rate shall decrease by 20%	m	2.2.1.1e		12,650.00	0	₹ 0.00
18.d		Drilling for Lignite	m	2.2.1.1a		4,783.00	0	₹ 0.00
18.e		Drilling for Coal	m	2.2.1.1b		7,975.00	0	₹ 0.00
18.a		Mechanised Auger Drilling for soft strata up to 30m depth	m	2.2.2.1		4,760.00	0	₹ 0.00
18.b		Hand Auger drilling in soft strata up to 30 m depth	m	2.2.2.2		3,808.00	0	₹ 0.00
18.c		RC Drilling	m	2.2.3		8,870.00	0	₹ 0.00
18.d		Non coring drilling	m	2.2.4		4,000.00	0	₹ 0.00
19	DRILLING RELATED EXPENDITURE HEADS	Borehole Deviation Survey by Multishot survey tool (interval 6m; azimuth and inclination to be recorded)	per shot	2.2.5		330.00	0	₹ 0.00
20		Land / Crop Compensation (in case the BH falls in agricultural Land)	per BH	5.6		30,000.00	0	₹ 0.00
21		Construction of concrete Pillar (12"x12"x30")	per borehole	2.2.7a		2,000.00	0	₹ 0.00
22		Borehole plugging with cement	per borehole	2.2.8		10,000.00	0	₹ 0.00
23		Miscellaneous Charges (Transportation of Drilling Rig, accommodation for Drilling Camp, Camp setting and winding, construction of approach road)	Lumpsum	0	2.2.9.4	For Drilling cost >2 Cr: 10 % of the Drilling Cost with a maximum ceiling of Rs.25 Lkh	0	₹ 0.00

24		Drill Core Preservation- One complete BH plus mineralised cores of all the BHs of the block/ prospect to be preserved in GI Core boxes and subsequently transported to the notified core repository.	per m	X		1,590.00	0	₹ 0.00
Total Cost D- outsourced								₹ 70,00,000.00
Total (Drilling)								₹ 70,00,000.00
GST 18%								₹ 12,60,000.00
Total Fund Required inclusive of 18% GST								₹ 82,60,000.00
								~0.826 Cr

11.1.0 TIME SCHEDULE (Tentative)

The work programme is proposed for FS 2026–27, with field, laboratory, reporting, and circulation milestones as summarized below.

The proposed exploration programme is planned in such a way that all the activities like drilling, logging, core sampling and associated geological work and laboratory work will be completed within 6 months. Report writing will take 4 months with 2 months overlapping with laboratory analysis. Thus, the total duration of the project for completion of the above exploration will be 12 months from the date of project commencement.

SCHEDULED TIME FOR THE PROPOSED G-3 LEVEL EXPLORATION													
S.No.	Activities	APR 2026	MAY2026	JUN 2026	JUL 2026	AUG2026	SEP 2026	OCT2026	NOV2026	DEC2026	JAN 2027	FEB 2027	MAR 2027
		1	2	3	4	5	6	7	8	9	10	11	12
1	Detailed Geological Mapping (1:1000)												
2	Subsurface exploration: Core Drilling												
3	Surface Sample collection (BRS, PTS, PCS & Channel)												
4	Core sample (CS) collection												

***Time loss on account of monsoon/agricultural activity/forest clearance/ local law & order problems will be addition to above time line.**

The time schedule may change depending on the recurring availability of funding

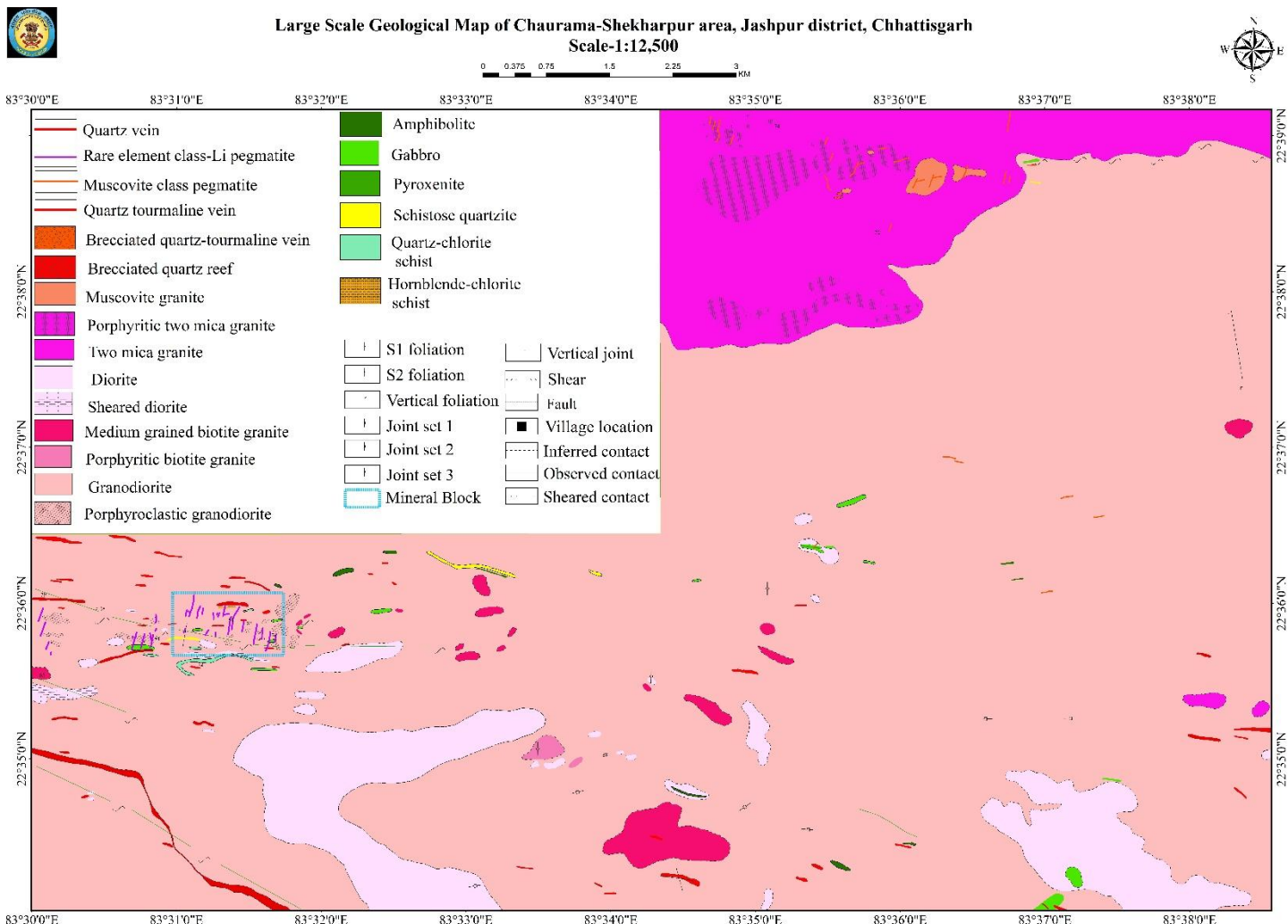


Fig 1: G3 block of Tukupakhna (mineral block) in G4 block, Jashpur District, Chhattisgarh

Zoomed region of the Geological Map of Tukupakhna Area, Chhattisgarh

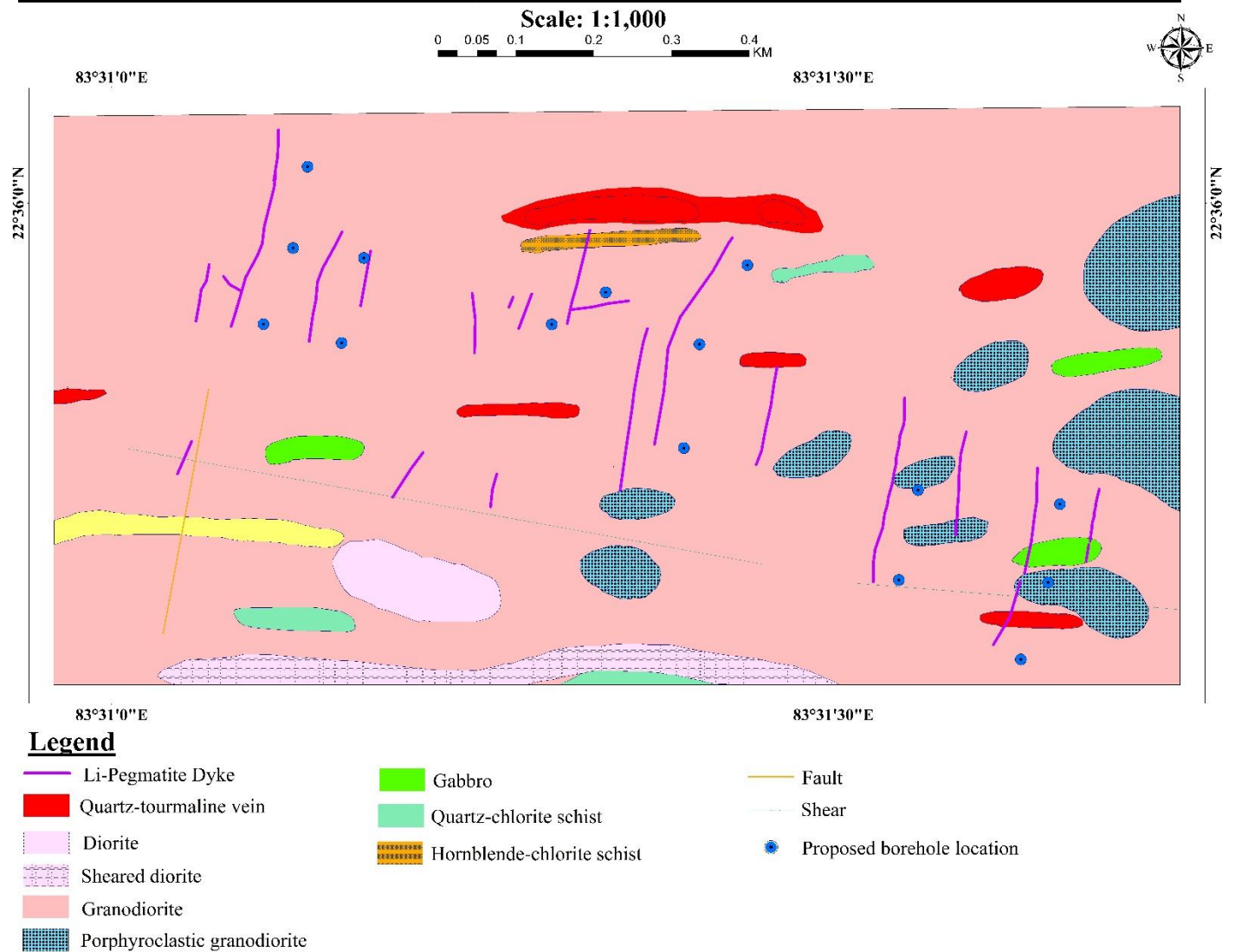


Fig 2: Status map of Tukupakhana Block, Jashpur District, Chhattisgarh

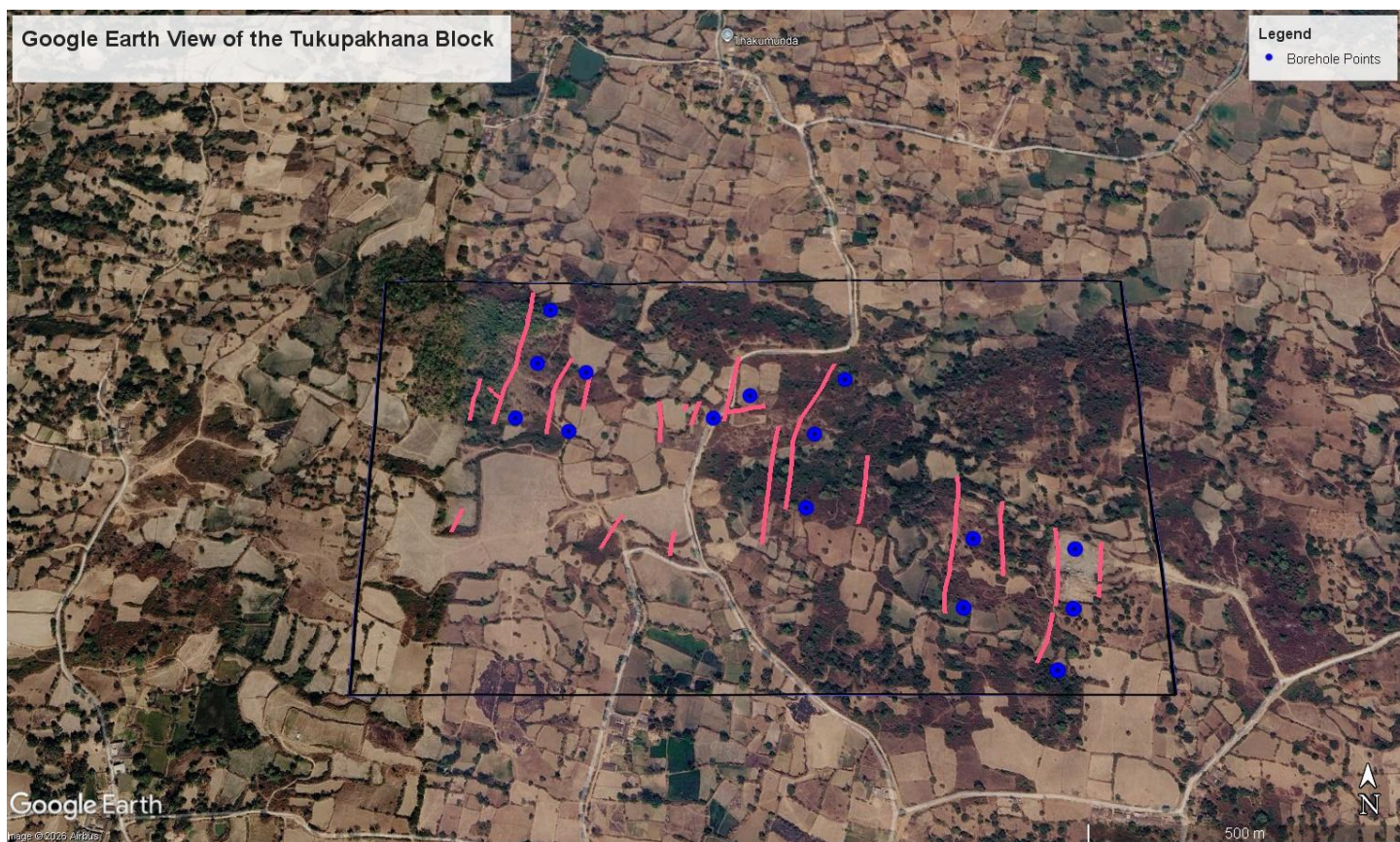


Fig 3: Satellite view of Tukupakhana Block along with the Borehole points, Jashpur District, Chhattisgarh