Proposal for "Tin, Lithium, Niobium, Tantalum & RM Minerals in and Around Mundwal-Puspal-Marjum Block, Sukhma, Baster and Dakshin Bastar Dantewada District, Chhattisgarh" for Reconnaissance Survey (G4 Stage) under NMET.

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

By

SIDDHARTH GEO CONSULTANT

621/3, First Floor, Behind Life Worth Hospital,
Samta Colony, Ramkund,
Raipur, Chhattisgarh, 492001

Place: Raipur
Date: 05/01/2026

Summary of the Block for Reconnaissance Survey (G4 tage)

GENERAL INFORMATION ABOUT THE BLOCK

	Features	Details
	Block ID	SGC/NMET/0001
	Exploration Agency	SIDDHARTH GEO CONSULTANT
	Commodity	Tin, Lithium, Niobium, Tantalum & REE Minerals
	Mineral Belt	Metapla- Tongpal-Govindval Pegmatite belts
	Completion Period with entire Time schedule to complete the project	18 months
	Objectives	To collect the previous data available with respect to Geology, Exploration and Tectonics and plan a field investigation to delineate the Mineralized Pegmatites in relation to Tin, Lithium, Niobium, Tantalum & RM Minerals and estimation of its resources.
	Whether the work will be carried out by the proposed agency or through outsourcing and details there of Components to be outsourced and name of the outsource agency	Complete work will be carried out by Siddharth Geo Consultant apart from Lab Studies like: 1. Petrographic and Mineralogical Studies by National Institute of Technology. 2. Chemical analysis of Bedrock samples and Core samples for various radicals would be outsourced to NABL accredited BSS Lab, Jabalpur and SHIVA Labs, Banglore.
	Name/ Number of Geoscientists	Senior Geologist – 1 Junior Geologist - 2 Geophysicist – 1 Remote sensing - 1
	Expected Field days (Geology) Geological Party Days	13 months
1.	**Location**	
	Latitude	18° 46' 10.891" -18° 38' 28.2"
	Longitude	81° 44' 20.167" - 81° 57' 22.101"
	Villages	Mundwal-Puspal_Marjum
	Tehsil/ Taluk	Dakshin Bastar Dantewada-Sukma-Bastar
	District	Dakshin Bastar Dantewada-Sukma-Bastar
	State	Chhattisgarh
2.	**Area (hectares/ square kilometres)**	
	Block Area	151.00 sq.km.
	Forest Area	Partially in forest area
	Government Land Area	Not available
	Private Land Area	Not available
3.	**Accessibility**	
	Nearest Rail Head	Jagdalpur (45 km)
	Road	NH-30 is passing through the proposed block boundary

	Airport	Maa Danteswari Airport, Jagdalpur (44 km)
4.	**Hydrography**	
	Local Surface Drainage Pattern (Channels)	The drainage pattern is dendritic to sub dendritic with moderate drainage density.
	Rivers/ Streams	There are three major drainage system, with various tributaries of higher order forming a dendritic pattern, with flow towards south and South-east forming a confluence near Puspal. Three drainage system that mark the proposed area are Bhimsen-Baru-Murgel.
5.	**Climate**	
	Mean Annual Rainfall	1386.77 mm.
	Temperatures (December) (Minimum) Temperature s (June) (Maximum)	This region has a Tropical wet and dry or Savana Climate. The yearly temperature is 27.69ºC (81.84ºF) and it is 1.72% higher than India's averages
6.	**Topography**	
	Toposheet Number	64F9, 64F10, 64F13, 64F14
	Morphology of the Area	Area proposed for exploration (G4) comprise of mainly Pediment Pediplain Complex and Moderately Dissected Denudational Hills and Valleys. Hills form the northern boundary of the block under investigation extending E-W and slopes towards south. Maximum elevation of the area is around 605m above MSL and minimum is been 225m which is towards the south of the block proposed. Hill section are Dense forest while the pediments have scarce vegetation and is mainly covered with farm lands. There are three major drainage system, with various tributaries of higher order forming a dendritic pattern, with flow towards south and South-east forming a confluence near Puspal. Three drainage system that mark the proposed area are Bhimsen-Baru-Murgel.
7	**Availability of baseline geoscience data**	
	Geological Map (1:50K/ 25K)	**1:50000**
	Geochemical Map	**Available / Not Available**
	Geophysical Map (Aeromagnetic, ground geophysical, Regional as well as local scale GP maps)	**Available / Not Available**

8.	**Justification for taking up Reconnaissance Survey / Regional Exploration** Geological: Lithounits exposed in the area are mainly of Bengpal group of rocks that has shown various degree of of Sn, Ta, Nb and Li mineralization ranging from 50 to >1000 ppm in various locations according to the pervious exploration works. Regions resemble a typical combination of hosts and genetic rocks for mineralization with primary three units that hosts mineralization's are Quartz-sericite-schist, Pegmatites and Quartz veins intudest and oriented towards the regional structural trend of NNE-SSW. Secondary cover (alluvial and colluvial) over these rocks has shown heavy mineral concentration with Sn, Nb and Ta weight percent of more than 1000ppm. Which is majorly the result of the drainage system of the area that shows a regional flow from NN E-SSW and N-S orientation. Alluvial covers near major drainage channels of higher order shows result at places upto 22000ppm for Sn. Colluvial regions over weather pegmatites and Sericite schist with higher concentration of heavy minerals indicates correlating factors to be considered for defining a Primary high concentration mineralized host rocks. On Going Auction for critical mineral: According to the current Tranche VI NIT notification dated 16 September 2025 by Ministry of mines for critical minerals block auction, Block 4 "Chittalnar-Kumakoleng Tin ore block" is been introduced for auction as Composite License with about 1500 tons of Tin ore. This block is adjoining to proposed "Kumakuleng-Kukawad-Badegadma block" and Secondary mineralized zones has the same drainage definition on the basis of which current proposed block should be considered for G4. Previous work: Exploration activity in this region was confined to FY 1975-1978 according to the data available in various Geoscience data Portal. Various agencies have tried to demarcate the zones of mineralization and showed some positive high concentration values within this block which indicates a high probability to be defined into economic standard for exploitation. Though maximum of the data available cannot be overlaid completely on the ground, hence to define the prospect of the area with the background knowledge of previous work, it is required that it be achieved by initiating a G4 Reconnaissance Survey followed by G3 Preliminary Exploration.

1. Block Summary

1.1 Physiography

Area proposed for exploration (G4) comprise of mainly Pediment Pediplain Complex and Moderately Dissected Denudational Hills and Valleys. Hills form the northern boundary of the block under investigation extending E-W and slopes towards south. Maximum elevation of the area is around 605m above MSL and minimum is been 225m which is towards the south of the block proposed. Hill section are Dense forest while the pediments have scarce vegetation and is mainly covered with farm lands. There are three major drainage system, with various tributaries of higher order forming a dendritic pattern, with flow towards south and South-east forming a confluence near Puspal. Three drainage system that mark the proposed area are Bhimsen-Baru-Murgel.

1.2 Background Geology

1.2.1 Regional Setting and Extent

The **Bastar Craton** forms one of the most significant Archean crustal nuclei of the Indian shield, occupying much of southern **Chhattisgarh** and adjoining parts of **Odisha**, **Telangana**, and **Maharashtra**. It extends roughly between latitudes 18°–20° N and longitudes 80°–83° E, bounded by the **Eastern Ghats Mobile Belt** to the east, the **Godavari Rift** to the south, and the **Central Indian Tectonic Zone (CITZ)** to the north and west. It represents a stable continental crustal segment that preserves the evolutionary history of the Indian Peninsula from early Archean crustal growth to Proterozoic tectonic reworking.

1.2.2. Lithological Domains

The Bastar Craton is geologically divisible into three main lithological and structural provinces:

1. **Sukma–Bijapur–Kontai Gneissic Complex (Southern Bastar):** This is dominated by tonalite–trondhjemite–granodiorite (TTG) gneisses, amphibolites, and supracrustal enclaves of schistose and banded iron formations (BIF). These represent the oldest (3.5–3.2 Ga) crustal segments.
2. **Bhopalpatnam–Kondagaon–Jagdalpur Greenstone–Granite Belt (Central Bastar):** The “Bastar Granite–Greenstone Terrain” is characterized by metavolcanic–metasedimentary sequences of komatiitic, basaltic, and rhyolitic compositions interleaved with BIF, quartzite, and carbonaceous schists. These rocks are enclosed within granitic plutons of tonalitic to granodioritic composition, later intruded by younger granites (~2.6 Ga).
3. **North Bastar–Dongargarh–Dalli–Rajhara Granite–Gneissic Complex (Northern Bastar):** This area records multiple generations of granites (Dongargarh Supergroup, Dongargarh Granite), felsic volcanics, and mafic intrusives, marking the late Archean to early Proterozoic crustal reworking phase.

1.2.3 Stratigraphic Succession

A generalized **stratigraphic succession of the Bastar Craton** is given below, based on correlation of litho-stratigraphic units described in *Geology of India* and GSI Memoirs.

Eon / Era	Group / Complex	Lithology	Remarks / Age
Neoproterozoic – Mesoproterozoic	**Chhattisgarh Supergroup** (Unconformable over Bastar Craton)	Quartzite, shale, limestone; stromatolitic carbonates	~1.4–0.9 Ga; represents platformal cover sequence
Paleoproterozoic	**Dongargarh Supergroup**	Felsic volcanics, rhyolite, tuff, quartzite, conglomerate	2.1–1.8 Ga; post-Archean crustal reworking
	Indravati Basin / Supergroup	Quartz arenite, shale, dolomite, minor volcanics	1.7–1.5 Ga; intracratonic sedimentary basin
Late Archean	**Sukma and Bengpal Groups** (Greenstone–Granite belt)	Komatiitic basalt, BIF, quartzite, chert, pelitic schist	2.7–2.6 Ga; metavolcanic–metasedimentary association
	TTG Gneissic Complex	Tonalite, trondhjemite, granodiorite, amphibolite, minor ultramafics	3.4–2.8 Ga; basement complex
Archean	**Older Metamorphics and Migmatites**	Migmatitic gneiss, granitic leucosomes, amphibolite, enclaves of BIF	Earliest crustal nucleus (>3.4 Ga)

Thus, the **Bastar Craton basement** is dominated by TTG gneisses with enclaves of greenstone belts (Bengpal, Sukma, Kontai), succeeded by late Archean granitoids (Dongargarh granites) and overlain unconformably by Proterozoic cover sequences (Indravati & Chhattisgarh Supergroups).

1.2.4. Structural and Metamorphic Framework

The Bastar Craton exhibits a polyphase deformation history:

- **D_1–D_2 Deformation:** Associated with early Archean folding and regional metamorphism under amphibolite facies conditions. Gneissic banding and isoclinal folds developed during this phase.
- **D_3–D_4 Deformation:** Late Archean ductile shearing, granite emplacement, and migmatisation.

- **D_5 (Proterozoic Reactivation):** Basin development and rifting events (Indravati, Dongargarh, and Chhattisgarh) due to intracratonic extension. Major lineaments such as the **Bailadila–Kutru–Kondagaon shear zone** and **Sukma shear zone** mark zones of crustal weakness later reactivated during Proterozoic rifting.

  Metamorphism ranges from greenschist facies in greenstone belts to upper amphibolite facies in gneissic terrains. Retrograde metamorphism is observed near shear zones and basin margins.

1.2.5. Geochronological Evolution

- **3.5–3.2 Ga:** Crustal accretion by TTG magmatism; stabilization of the early Bastar nucleus.
- **2.9–2.6 Ga:** Greenstone volcanism, BIF deposition, and granite emplacement; development of Bengpal–Sukma–Kontai belts.
- **2.5–2.1 Ga:** Crustal reworking and emplacement of Dongargarh felsic volcanics.
- **1.8–1.4 Ga:** Formation of Indravati and Chhattisgarh sedimentary basins; intracratonic rifting and stabilization.

This evolutionary pattern parallels that of other Archean cratons of Peninsular India (Dharwar, Singhbhum, Aravalli–Bundelkhand), marking Bastar as a key piece in reconstructing the Indian shield's assembly.

1.2.6. Economic Geology and Mineralization

The Bastar Craton is endowed with significant mineral resources, including:

- **BIF-hosted Iron ore deposits** at **Bailadila**, **Dalli–Rajhara**, and **Rowghat** — part of the late Archean banded iron formations metamorphosed under greenschist–amphibolite conditions.
- **Tin and tungsten mineralization** within pegmatites and quartz veins around **Kolaras, Darba, and Balenga–Gopalpur** regions, associated with late granitic intrusions.
- **Manganese and base metals** in schist belts (Sukma–Bengpal).
- **Bauxite and laterite** along the Indravati Basin margins, formed through tropical weathering of Archean–Proterozoic basement. These mineral systems reflect multiple metallogenic episodes tied to magmatism, metamorphism, and basin development.

1.2.7. Tectonic Evolution

The tectonic framework evolved through several key stages:

1. **Archean Crustal Growth (3.5–2.6 Ga):** Island-arc magmatism produced TTG suites and greenstone volcanics. Accretion of smaller terranes led to crustal thickening and regional metamorphism.
2. **Cratonization (2.6–2.4 Ga):** Consolidation of gneissic and greenstone belts, emplacement of syn- to post-tectonic granites, and formation of stable continental crust.

3. **Proterozoic Extension (2.0–1.4 Ga):** Development of intracratonic rift basins (Dongargarh, Indravati, Chhattisgarh). These record extensional tectonics following crustal stabilization.
4. **Neoproterozoic Reactivation (1.0–0.9 Ga):** Gentle warping and regional uplift linked with Eastern Ghats tectonothermal events. The Bastar Craton remained largely stable afterward, serving as a basement to younger Gondwana basins.

1.2.8. Correlation and Regional Significance

Comparatively, the Bastar Craton shares similarities with:

- **Western Dharwar Craton**, in terms of TTG–greenstone association and age spectrum.
- **Singhbhum Craton**, regarding lateritic and BIF iron ore development.
- **Central Indian Tectonic Zone (CITZ)**, which marks its northern suture against the Bundelkhand Craton — representing a major Paleoproterozoic collisional boundary.

Thus, Bastar plays a vital role in understanding the **assembly of the Indian Shield**, representing the southernmost Archean nucleus of central India.

1.2.9. Summary

The **Bastar Craton** represents a complete evolutionary archive of the Indian continental crust — from Archean TTG formation and greenstone volcanism to Proterozoic basin development. Its stratigraphy, structural grain, and metamorphic history reflect multiple cycles of **crustal growth, deformation, and reworking**. Economically, it hosts India's richest iron ore deposits and strategic tin–tungsten mineralization, making it both scientifically and industrially significant.

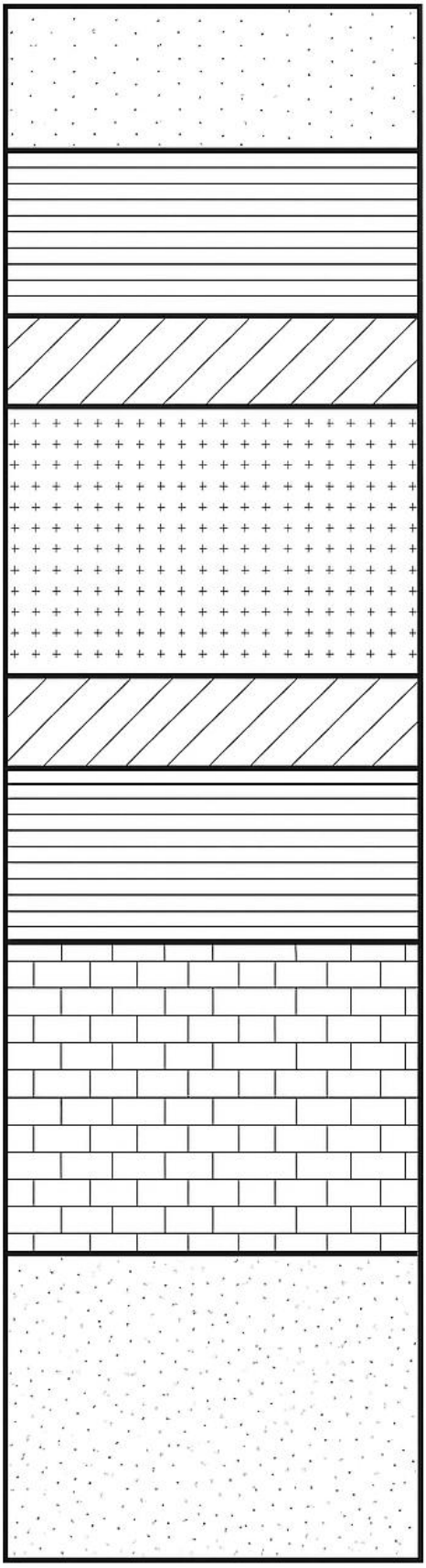
1.2.10 Simplified Stratigraphic Succession of Bastar Craton

NEOPROTEROZOIC–MESOPROTEROZOIC
└── Chhattisgarh Supergroup – Quartzite, shale, limestone (platform cover)

PALEOPROTEROZOIC
├── Indravati Supergroup – Quartz arenite, dolomite, shale (inland basin)
└── Dongargarh Supergroup – Felsic volcanics, rhyolite, tuff (crustal reworking)

LATE ARCHEAN
├── Sukma / Bengpal Groups – Komatiitic basalt, BIF, quartzite, schist
└── Granite–Greenstone Complex – Tonalite, trondhjemite, granodiorite (TTG)

EARLY ARCHEAN
└── Migmatitic Gneiss Complex – Oldest crustal nucleus (>3.4 Ga)



Quartzite, shale, limestone

Indravati Supergroup

Quartz arenite, dolomite shale

Dongargarh Supergroup

Felsic volcanics, rhyolite stuff

Sukma/ Bengpal Groups

Komatiitic basalt, BIF, quartzite, schist

Granite-Greenstone Complex

Tonalite, trondhjemite, granodiorite (TTG)

Migmatitic Gneiss Complex

Oldest crustal nucleus

1.2.11 Block Geology:

The oldest litho-units encountered in the area under report, falling within parts of proposed area, belong to the Bengpal metasedimentary sequence (Tulsi Dongar Group). These are represented by sericite quartzite, quartz–sericite schist, garnet–staurolite gneiss, and andalusite schist, among others. The Bengpal rocks were intruded by basic sills of epidioritic to gabbroid composition (Murti, K.S. et al., 1979). Subsequently, these formations were intruded by granites (Darba and Paliam), along with pegmatites, quartz veins, and basic dykes. The stanniferous pegmatites present in the area are considered to be genetically linked to the syn- to post-kinematic phases of the Darba/Paliam granitic intrusions. These older formations are overlain by Late Precambrian sedimentary sequences of the Indravati and Sukma Groups, consisting mainly of conglomerates, siltstones, and limestones.

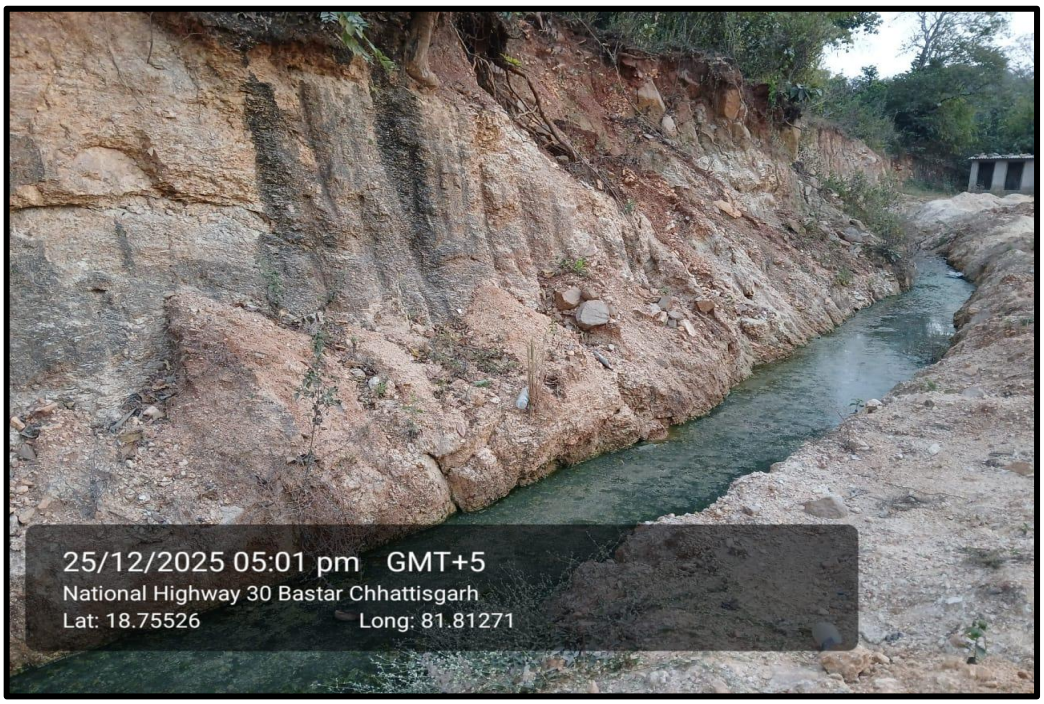
The region extending from Puspal to Darba appears to constitute a major east–west trending synform, with the Darbaghat area representing its northern limb. The terrain has undergone polyphase deformation, and several minor to major faults with N–S and ENE–WSW trends are observed. The northeast–southwest course of the Sabari River near Nathanar and the north–south alignment of the Bhimsen River, along with the scarps of Kukrimetta Hill, are possibly controlled by faulting.

The presence of cordierite, andalusite, and quartz indicates low-grade hornfels facies contact metamorphism, while the assemblage of garnet, staurolite, biotite, and quartz points to almandine–amphibolite facies regional metamorphism (Murti et al., 1979).

Geologist of Siddharth geo consultant visited the site on December 2025. Field observation with images are as follows:

Location 1: Pegmatites intrusion with in Darbha Granite of Tulsi Dongar Group. Pegmatite and Granite are of similar composition varying in size but composing mainly Quartz-feldspar-muscovite. Few crystals of amphiboles are also evident.

Location 2: This location is near road section and is exposed by highly weathered Pegmatite along the section in a length of about 40 meters. Due to intensity of weathering it was not clear but on observing some section of the outcrop indicates Zoning with in this pegmatite.

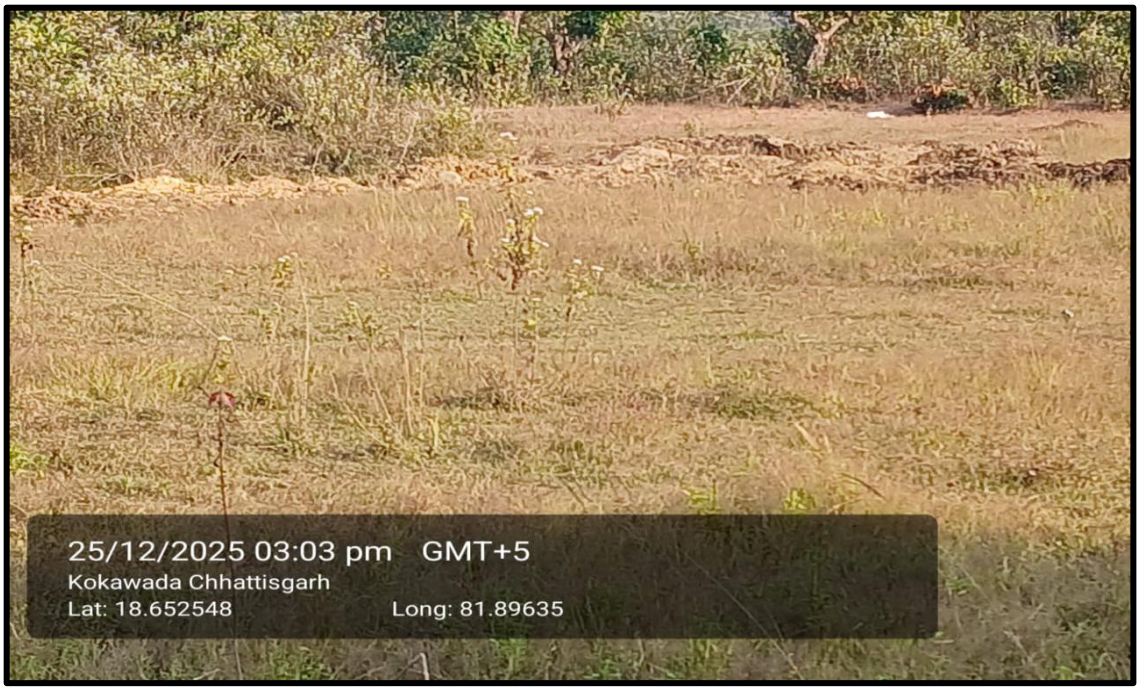


Location 3: This location is near Tongpal village. Exposed out crop is highly weathered Zoned Pegmatite trending N-S. This location is used by artisanal miners for extracting Cassiterite. Zoned section is irregular and are marked by Blue Quartz zone and Greisen feldspar zone which host the cassiterite crystals and is mined by artisanal miners. Few small crystals of Cassiterite was seen together with large size Beryl crystals.

Location 4: This location is exposed by Quartz reef which is highly fractured and milky in nature trending N40º. Within this reef there are small pockets that exhibits well develop quarts crystals. With in this region Sn mineralization is associated with intrusive quartz as well hence outcrop of these lithounits is of importance.

Location 5: This location is near farmland and is exposed by laterite with angular quartz pebbles.

Location 6: Abandoned artisanal mining pit. This location is near Mundawal Village towards north of E-W trending hills. This Location is known for high concentration of Cassiterite and lots of pits are by locals to mine it out.

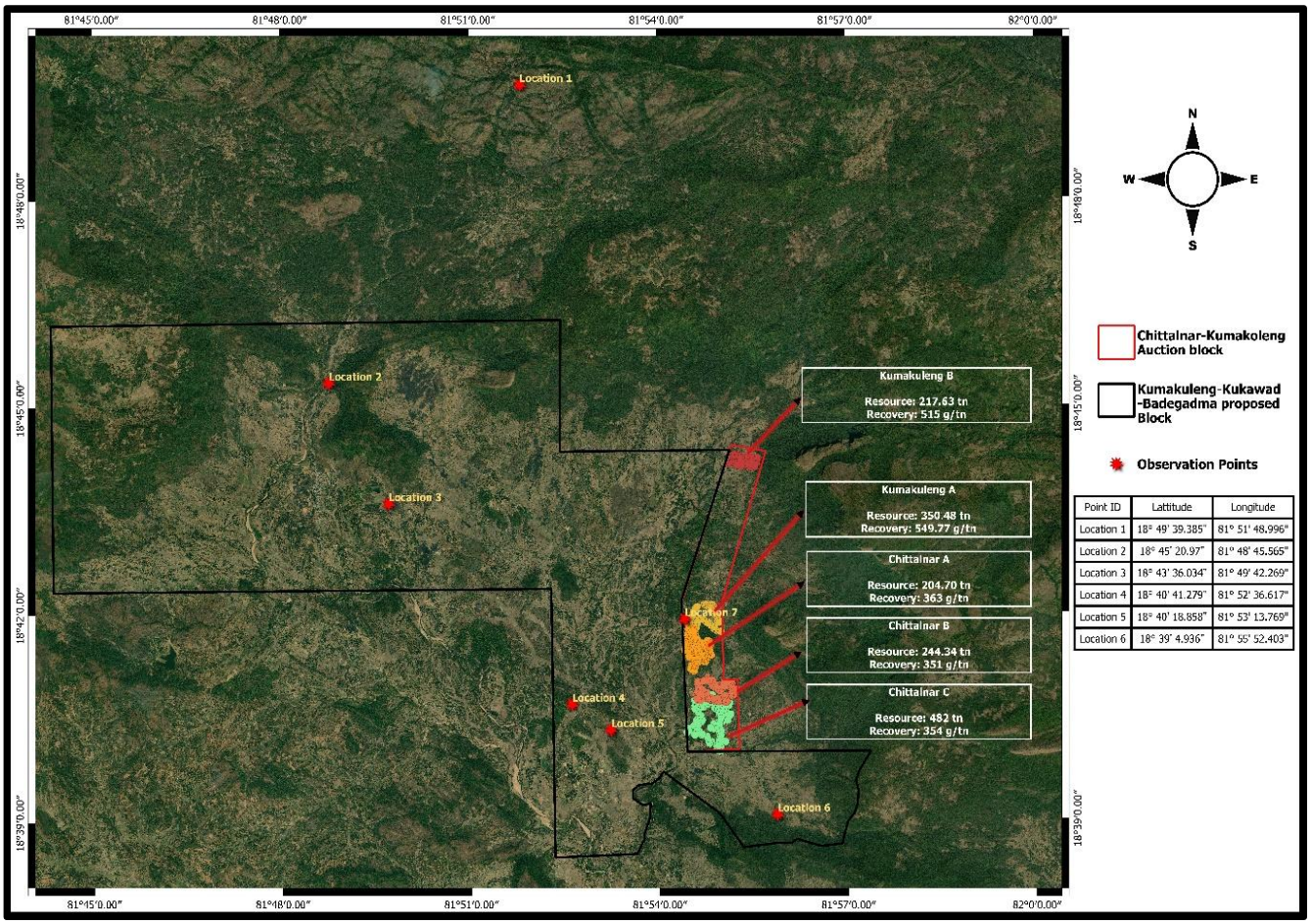


Location 7: This location is the abandoned mine near Berikuply Village and is adjoining to this proposed block. Pegmatite body cannot be seen in this area as the pit is now covered with soil but in the excavated dump large lepidolite was discovered to with cookite which are lithium bearing micas. The extension of the pits is NNW which aligned with the regional trend of Sn bearing Quartz and Pegmatite Intrusive.

1.3 Mineral potentiality based on geology, geophysics, ground geochemistry etc.

Systematic mapping is been carried out in this region in the financial year from 1975 to 1980 by various authors from organizations like geological survey of India, Directorate General of mines Madhyaparadesh / Chhattisgarh and UNDP. Various data indicates occurrences of cassiterite in considerable proportion (>1000ppm) in majority of the samples together with other critical elements like Nb-Ta, Ag, Li and rare metals. These occurrences are defined in primary as well as secondary deposits. Primary deposits are confined to Pegmatites and Quartz-Sericite schist of Bengpal Group of rocks and Secondary deposits are mainly colluvial and alluvial types with main concentration in A and B horizon of the profiles that are evident on the basis of Geochemical data available in reports of NGDR portal. Thickness of these secondary concentration zones varies from 2 to 4 meters in depth.

Present block is adjoining to the auction block named “Chittalnar-Kumakoleng Tin Ore Block” according to tranche VI NIT by Ministry of mines notice dated 16 September 2025. The resource evaluation in summary of the block is mentioned according to the mine plan prepared by Mr. Arvind Singh of Chhattisgarh Mineral Development corporation, who is also Project coordinator for Siddharth Geo Consultant. Geologist of Siddharth Geo Consultant went to find the indication of major lithounits that encompasses the mineralization.



1.4 Observation and Recommendations of previous work.

Based on the data available in NGDR portal and Research papers of the work carried out in exploring the potential of Tin mineralization in proposed blocks by Geological Survey of India and other organization it is evident that the area under consideration is a high target zone to define mineralization to an economical stage for exploitation. The Adjoining auction block (Chittalnar-Kumakoleng Tin Ore Block) has already exhibited that proposed block could have the similar occurrences of mineral under consideration. Together with this the southern section also has presence of Lepidolite which is a Lithium bearing mica to a considerable proportion that can be defined to an economical deposit under proper and scientific exploration work. This puts the proposed block under OGP zone.

Previous reports and data available for this region cannot be delineated to the ground because of non-reference nature of data. Plates available in majority of reports shows values of good concentration but cannot be pinpointed to its location because of non-availability of it coordinates. However in some cases georeferenced data are available to demarcate the sample locations but their assay values cannot be connected to the reports. Hence, all the available data resembles presence of Tin and REE mineralization in the proposed block but it is hard to delineate these zones.

Its our opinion that, since the probability to define the mineralization of these minerals in the proposed block is high and could be defined to economically exploitable stage, Its should be brought under G4 stage of exploration followed by G3**.**

2. Previous Work

The block was selected on the basis of information on stanniferous pegmatites delineated by Murti K. S. et al. (1975–76), considering the likelihood of detrital cassiterite concentration produced by weathering and erosional processes within the major Pawade belt, which trends along the southern flanks of the principal east–west–oriented basic body (Ellinger Hill). Reconnaissance geological mapping in the Bengpal–Ellingnar block was undertaken on a 4-inch to 1-mile scale (1:15,840), followed by detailed investigations in selected zones through large-scale mapping at 1:5,000 scale, pitting, bulk sampling, and gravity concentration by manual panning and sluicing techniques. An initial area of 25.3 sq. km was covered under preliminary survey, resulting in the delineation of promising sectors aggregating 5.7 sq. km within the adjoining Kudripal, Jangarpal, Murgel, Chidpal–Kankapal, and Tongpal–Marjur blocks.

The Geological Survey of India (GSI) worked in association with AMD mainly for analytical evaluation of samples from two localities, namely Kudripal and Murgel. While GSI independently executed the assessment surveys, AMD personnel participated on a part-time basis during sample collection. Chemical analyses for Li, SnO_2, Nb_2O_5, and Ta_2O_5 were carried out by AMD.

Pegmatites emplaced within the meta-basic lithounits have been reported to host lithium mineralization (Yamuna Singh and Rai, 1986). These pegmatites are significantly enriched in lepidolite and amblygonite, exhibiting lithium concentrations ranging approximately from 3,100 ppm to 36,000 ppm, along with cassiterite containing 45.36–74.85% SnO_2 and

associated minor niobium–tantalum phases with Ta_2O_5 values between 4.36% and 14.45%.

The block and adjoining regions were first mapped by Brook Shank during 1932–37, followed by Murti et al. (1976–77), who prepared a geological map at a scale of 1:63,360 with emphasis on delineating cassiterite-bearing pegmatites. Subsequently, the Geological Survey of India undertook detailed mapping at a scale of 1:5,000 during 1978–79 to explore lithium, tin, niobium, and tantalum mineralization over an area of about 3.5 sq. km located at the southern foot of the hill along the northern margin of toposheet No. 65 F/14.

The hill, extending in an east–west direction, is dominantly composed of meta-diorite intruded by numerous pegmatite bodies. These pegmatites generally strike ENE–WSW or NE–SW and vary in thickness from a few centimeters up to 20 meters. Several of these bodies contain cassiterite along with niobium and tantalum oxides. Three principal mineralized pegmatite bodies have been identified, each measuring approximately 15–20 meters in width and extending discontinuously for nearly one kilometer along the ENE–WSW trend.

The colluvial deposits surrounding these pegmatites are notably rich in cassiterite grains. Pitting operations have been conducted over an area of about 2.5 sq. km following a grid pattern of 100 × 100 meters and, in certain locations, 100 × 50 meters. Pit depths range from 0.1 to 2 meters, depending upon the thickness of the colluvial cover. Roughly 20 kg of material was collected from each pit by channel sampling along the four walls and subsequently processed by panning and sluicing for heavy mineral recovery. The proportion of heavy minerals obtained varies between 0.1% and 1.5% by weight.

Based on semi-quantitative analytical data from nearly 400 samples, a prospective zone covering about 1 sq. km was delineated. A substantial number of samples from this zone recorded tin values exceeding 1,000 ppm, with niobium and tantalum also present in several cases. XRF analytical results for tin from approximately 108 samples indicate a potential area of nearly 0.9 sq. km occurring as discrete patches. The Sn values range from 0.41% to 30.12%. The total inferred tin metal resource for the Bengpal–Ellingnar block is estimated to be around 230 tonnes.

Stream sediment samples collected from minor drainage channels within the block indicate heavy mineral contents ranging from 0.2% to 3%, averaging about 0.9%. XRF analyses reveal tin values varying from 0.69% to 51.48%, Nb_2O_5 contents between 0.16% and 4.3%, and Ta_2O_5 values from 0.15% to 3.71%. The average Nb_2O_5 and Ta_2O_5 contents are approximately 1.31% and 1.04% respectively, indicating relatively higher niobium enrichment. The estimated tin content within the stream sediments is about 7.5 tonnes, considering a depth of one meter in the stream bed.

3. Block description

Boundary Coordinates

POINT ID	NORTHING	EASTING
KU1	18° 46' 10.891"	81° 44' 20.167"
KU2	18° 46' 14.885"	81° 52' 26.981"
KU3	18° 44' 20.497"	81° 52' 26.14"
KU4	18° 44' 21.265"	81° 55' 8.027"
KU5	18° 42' 11.033"	81° 54' 21.514"
KU6	18° 39' 59.56"	81° 54' 26.75"
KU7	18° 39' 59.784"	81° 57' 22.101"
KU8	18° 39' 42.395"	81° 57' 10.609"
KU9	18° 39' 33.925"	81° 57' 7.572"
KU10	18° 39' 25.554"	81° 57' 9.785"
KU11	18° 39' 13.875"	81° 57' 8.955"
KU12	18° 39' 5.152"	81° 57' 5.585"
KU13	18° 38' 58.976"	81° 56' 59.771"
KU14	18° 38' 45.791"	81° 56' 55.91"
KU15	18° 38' 39.244"	81° 56' 54.446"
KU16	18° 38' 37.548"	81° 56' 39.19"
KU17	18° 38' 37.39"	81° 56' 32.745"
KU18	18° 38' 43.469"	81° 56' 10.789"
KU19	18° 38' 39.994"	81° 56' 5.97"
KU20	18° 38' 40.181"	81° 55' 53.747"
KU21	18° 38' 36.373"	81° 55' 20.128"
KU22	18° 39' 5.933"	81° 54' 57.167"
KU23	18° 39' 42.286"	81° 54' 3.809"
KU24	18° 39' 36.688"	81° 53' 59.579"
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KU28	18° 39' 19.202"	81° 53' 34.556"
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KU30	18° 39' 14.907"	81° 53' 51.387"
KU31	18° 39' 2.056"	81° 53' 50.526"
KU32	18° 38' 48.181"	81° 53' 45.24"
KU33	18° 38' 44.111"	81° 53' 45.596"
KU34	18° 38' 30.966"	81° 53' 38.199"
KU35	18° 38' 28.2"	81° 52' 20.218"
KU36	18° 42' 21.409"	81° 52' 17.33"
KU37	18° 42' 19.365"	81° 44' 21.781"

4. Planned Methodology

4.1 General

The exploration program aligns with the objectives outlined for the reconnaissance survey (G-4) of the block. Exploration activities will adhere to the Minerals (Evidence of Mineral Contents) Rules-2015. To meet these objectives, the following exploration scheme has been developed. Details of the planned activities are outlined in the subsequent paragraphs.

4.2 Objectives of Proposed Exploration

In accordance with the Minerals (Evidence of Mineral Contents) Rules-2015 (as amended through 2021), the proposed exploration program is designed to fulfill the following objectives:

i. Undertake geological mapping at 1:12,500 scale to delineate the distribution and characteristics of rock types within the Bengpal Group of Rocks.

ii. Establish the geochemical and petrographic signatures through comprehensive major oxide and trace element analysis to identify petrogenetic evolution and metallogenic potential.

iii. Establish the provenance and source regions of Tin and associated elements (Tungsten, Molybdenum, Hafnium, Zirconium) through targeted follow-up stream sediment and bedrock sample analysis, forming the foundation for G-3 level preliminary exploration.

4.3 Methodology

The G-4 reconnaissance exploration program for Tin and associated minerals in the Mundwal-Puspal-Marjum block has been designed to achieve the above objectives in full compliance with MEMC Rules-2015 (amended 2021). The methodology is structured as follows:

4.3.2 Geological Mapping

Detailed geological mapping will be conducted across the entire 150 sq km area at a 1:12,500 scale. Rock type classification, lithological contacts, and structural architecture (foliation, fracturing, lineation's) will be systematically documented. The spatial distribution, orientation, and character of different granitoid phases (including pegmatite-bearing zones) will be delineated on thematic geological maps to guide geochemical sampling and identify zones of pegmatite-hosted or greisen-associated mineralization.

4.3.3 Geochemical Sampling

A multi-tiered geochemical sampling program will be executed to identify tin mineralization sources and trace element pathfinders:

Stream Sediment Analysis: Stream sediment samples will be collected from 1st-order and 2nd-order drainage systems upstream of anomalous zones. These samples will be analyzed for a 34-element suite including tin (Sn), tungsten (W), molybdenum (Mo), hafnium (Hf), and zirconium (Zr) via Inductively Coupled Plasma Mass Spectrometry (ICP-MS). Stream sediments are particularly effective in tin exploration for detecting secondary dispersion halos from primary ore bodies and identifying pathfinder element

associations (Sn–W–Mo–Ta correlations).

Bedrock and Soil Sampling: A complementary program of bedrock and soil samples will be collected from mapped lithounits exhibiting favorable geochemical or structural characteristics. These samples will be analyzed for the same 34-element package to identify primary mineralization zones and establish their spatial distribution patterns.

Quality Assurance/Quality Control: A total of 100 primary samples will undergo analysis. QA/QC protocols will include 15 check samples (10% external replicates) to assess analytical precision and accuracy.

Petrographic Characterization: A subset of bedrock samples representing various lithological units and mineralization styles will be subjected to whole-rock analysis of major oxides and trace elements to establish the petrogenetic classification, degree of fractionation, and its magmatic evolution. This data is critical for identifying tin-fertile magma series and pegmatite-host relationships.

4.3.4 Petrological and Mineralogical Studies

During geological mapping and borehole logging, representative samples from distinct lithological units from surface exposures will be selected for optical microscopy to characterize mineral assemblages, trace mineral phases, and alteration textures (greisenization, albitization, lepidolitization) diagnostic of pegmatite evolution.

An additional sample will be subjected to ore microscopy (ore petrography) and reflectance microscopy to identify tin-bearing mineral phases (e.g., cassiterite, stannite, wolframite) and document their textural relationships and paragenesis

4.3.5 Geophysical Studies

Guided by Geological Mapping, analytical results of Geochemical samples of streams, soil and Bed Rocks will define the zones of target for magnetic survey which will be performed to delineate pegmatite mineralization zones and electrical resistivity to delineate the buried channels for placer deposits.

4.3.4 Trenching and Pitting

Shallow trenching and/or pitting (excavation) will be conducted in zones of anomalous geochemical or structural significance identified from geological mapping and geochemical surveys. A total excavation volume of 200 cubic meters is budgeted. Trenches and pits will be excavated to depths of 2.0–2.5 meters following removal of soil and weathered regolith to expose fresh mineralized bedrock. Pit and trench locations will be determined by field geologists based on integrated field observations and geochemical data.

The exposed walls of each trench/pit will be systematically mapped at 1:200 scale to document lithological variation, alteration patterns, and mineralization distribution. Channel samples (100 primary samples + 15 check samples using 5% internal + 10% external protocols) will be collected across mineralized intervals and analyzed for Sn, W, Mo, Hf, and Zr via Atomic Absorption Spectroscopy (AAS).

5. Work Quantum and Target

Components	G-4 Level	Description	Quantum of Work	Unit	Total Expected Output
Geological Mapping	1:12,500 Scale	Geological mapping and lithological assessment, structure, surface mineralization and mining history analysis	150	sq.km	Geological map at 1:12,500 scale Geochemical anomaly map
Geochemical Survey	Regional Sampling	BRS (Bed Rock) / Chip / Grab Sample	200	Samples	Primary mineralization identification Secondary dispersion patterns
		Stream Sediment Sample	400	Samples	
		Soil Sample	1000	Samples	
Geophysical Survey	Magnetic Survey	Ground Magnetic Survey	10000	station points	Magnetic intensity contour map
Petrographic & Mineralogical Studies	Chemical Analysis	Whole Rock Analysis (Major oxides and Trace elements)XRF Analysis (Major oxide and trace element)	220	samples	Elemental composition data
		Gochemical Samples (Primary + Check) for 34 Elements by ICPMS	1760	samples	Multi-element trace analysis
	Physical Analysis	Sample preparation and thin section petrography	150	samples	Mineralogy and alteration assessment
Synthesis of Available Data	Data Integration	Integration of regional geophysical, geological and geochemical data			
	Report Writing	Synthesis of all available data and comprehensive report preparation	5	Hard copies	Integrated G-4 exploration report (5 hard copies)

6. Time Line

TIME SCHEDULE / ACTION PLAN FOR EXPLORATION																					
S.No.	ACTIVITIES		1	2	3	4	5	6	First review	7	8	9	10	11	12	Second Review	13	14	15	16	17	18
1	Camp Setting	Month																				
2	Geological Mapping	Month																				
3	Sampling	Kg/Cu.m																				
4	Geophysical Studies	m																				
5	Geologist Party days (1Party)	Party days																				
6	Geophysical Party days (1 party)	Party days																				
7	Pitting/Trenching	Month																				
8	Laboratory Studies	Month																				
9	Camp Winding	Month																				
10	Report Writing with Peer Review	Month																				
* Commencement of project will be reckoned from the day the exploration acreage is available along with all statutory clearances.																						
*Time loss on account of monsoon/agricultural activity/forest clearance/local law and order problems will be addition to above time line.																						

7. Manpower deployment

Task	No. of personal	Remarks	Region
Administrative	5	1 Project Coordinator	Head Quarter
		1 Senior Geologist	Head Quarter
		1 Geophysicist	Head Quarter
		1 Remote sensing	Head Quarter
		1 Accountant/HR	Head Quarter
Geological mapping	4	1 Geologist	On Field
		2 Unskilled workers	On Field
		1 Vehicle Operator	On Field
Geochemical Sampling	5	1 Geologist	On Field
		1 Sampler	On Field
		1 Vehicle Operator	On Field
		2 Unskilled worker	On Field
Geophysical work	5	1 Geophysicist	On Field
		4 Unskilled worker	On Field
Pitting and Trenching	5	1 Geologist	On Field
		1 Sampler	On Field
		1 Vehicle Operator	On Field
		2 Unskilled workers	On Field

8. Break-up of expenditure

S.No.	Item of Work *	Unit *	Rates as per NMET SoC 2020-21		Estimated Cost of the Proposal		Remarks
			SoC Item No.*	Rates as per SoC* (a)	Qty. (b)	Total Amount (Rs) (a*b)	
1	**Geological mapping and sampling**						
1a	Geological mapping 1:125000	Per sq. km	1.1	18300	150	2745000	
1b	Charges for Geologist per day in field (without labour)	per day	1.2.1a	14500	420	6090000	2 geologist for 7 months period 1 geologist for 2 months period
1c	Charges for one sampler per day	per day	1.2.1b	7850	420	3297000	2 sampler for 7 months 1 sampler for 2 months
1d	Labour charges	per day	5.8	550	840	462000	4 labours for 7 months
					SUB- TOTAL 1	**12594000**	
2	**Ground Geophysical Survey**						
2a	Magnetic Surveys	per station	3.2a	1800	10000	18000000	
2c	Labour charges	per day	5.8	550	360	198000	4 labours for 3 month
					SUB- TOTAL 2	**18198000**	
3	**Pitting and trenching**						
3a	Pits/trenching	per cu. m.	2.1.3	6662	400	2664800	
3b	Charges for one sampler per day	per day	1.2.1b	7850	60	471000	1 sampler for 2 months
3c	Labour charges	per day	5.8	550	120	66000	2 labours for 2 months
3d	Charges for Geologist per day in field (without labour)	per day	1.2.1a	14500	60	870000	
					SUB- TOTAL 3	**4071800**	
					SUB TOTAL 1 to 3	**34863800**	
	As the block is in LWE affected area (SUB- TOTAL 1-3 *1.5)					**52295700**	
4	**Laboratory study**						
4a.	**Stream sediment sample analysis**						
4a.i	Primary sample	per sample	4.1.15	7400	400	2960000	ICPMS
4a.ii	Check sample	per sample	4.1.15	7400	40	296000	ICPMS
4b.	**Soil sample analysis**						
4b.i	Primary sample	per sample	4.1.15	7400	1000	7400000	ICPMS
4b.ii	Check sample	per sample	4.1.15	7400	100	740000	ICPMS
4c.	**Bed rock sample analysis**						
4c.i	Primary sample	per sample	4.1.15	7400	200	1480000	ICPMS
4c.ii	Check sample	per sample	4.1.15	7400	20	148000	ICPMS
4c.iii	Primary sample	per sample	4.1.17a	4200	200	840000	XRF major oxides and Trace Elements
4c.iv	Check sample	per sample	4.1.17a	4200	20	84000	XRF major oxides and Trace Elements
4d	**Pitting and trenching**						
4d.i	Primary sample	per sample	4.1.15	7400	200	1480000	ICPMS
4d.ii	Check sample	per sample	4.1.15	7400	20	148000	ICPMS
					SUB- TOTAL 4	**15576000**	
5	**Petrological studies**						
5a	Preparation of standard thin section of rock	per sample	4.3.1	500	50	25000	
5b	Preparation of polished thin section of rock	per sample	4.3.2	800	50	40000	
5c	Complete petrographic /ore microscopic study report of rock sample (along with 5 nos digital photo micrographs)	per sample	4.3.4	2800	100	280000	
					SUB- TOTAL 5	**345000**	
6	**Geological activities in HQ**						
6a	Charges for one Geologist per day at HQ	per day	1.2.1a	10500	90	945000	
6b	Charges for one Geophysicist per day at HQ	per day	1.2.1a	10500	60	630000	
					SUB- TOTAL 6	**1575000**	
7	**Miscellaneous Charges**						
8	**Preparation of Exploration Proposal**	5 hard copies with soft copies	5.1			**500000**	
9	**Geological Report Preparation**	5 hard copies with soft copies	5.2(iii)			**750000**	
10	**Peer review Charges**		As per EC discussion			**30000**	
11					**Total Estimated Cost without GST**	**71071700**	
12					**Total Estimated Cost with GST 18%**	**83864606**	

9. References

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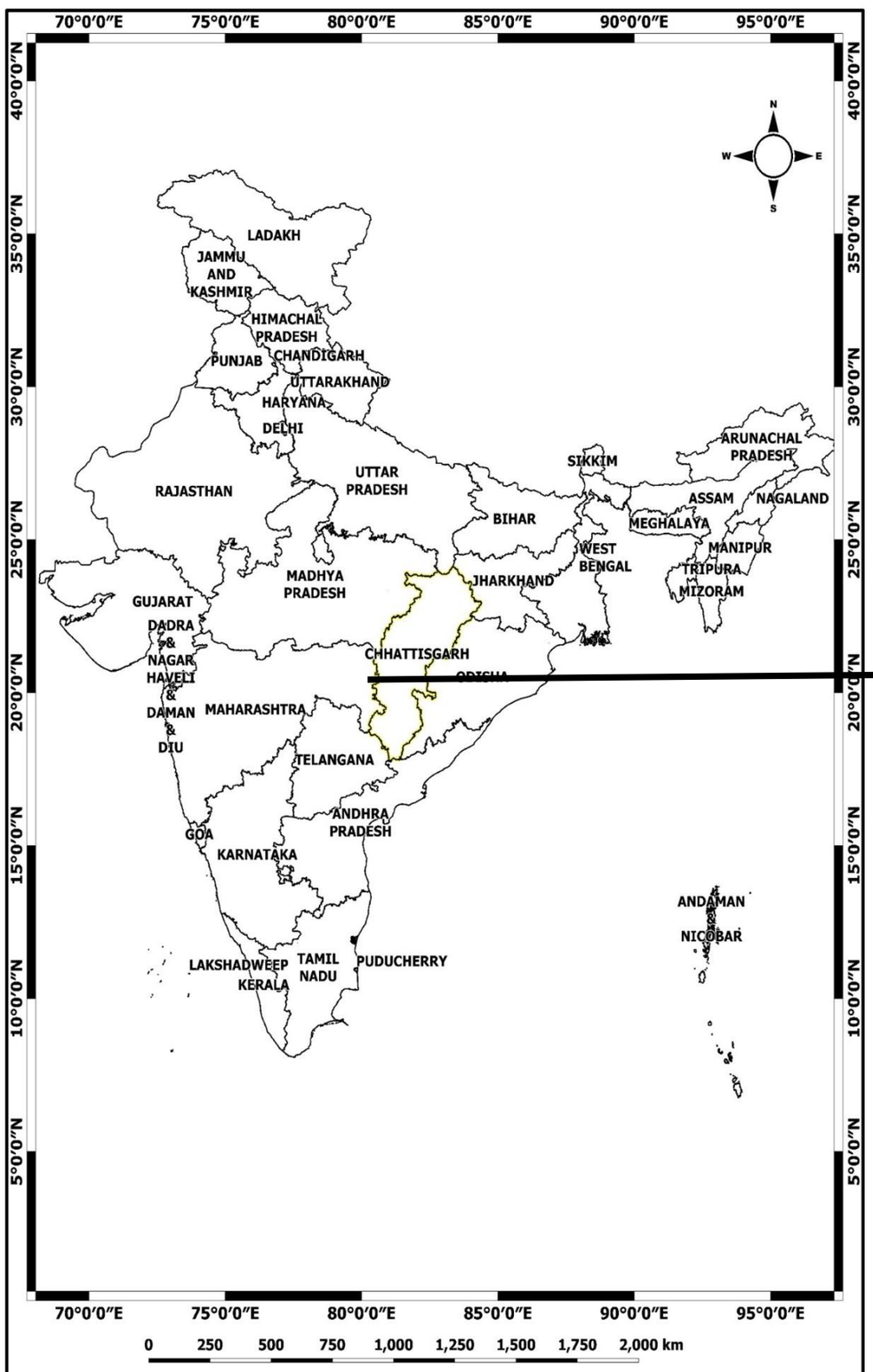
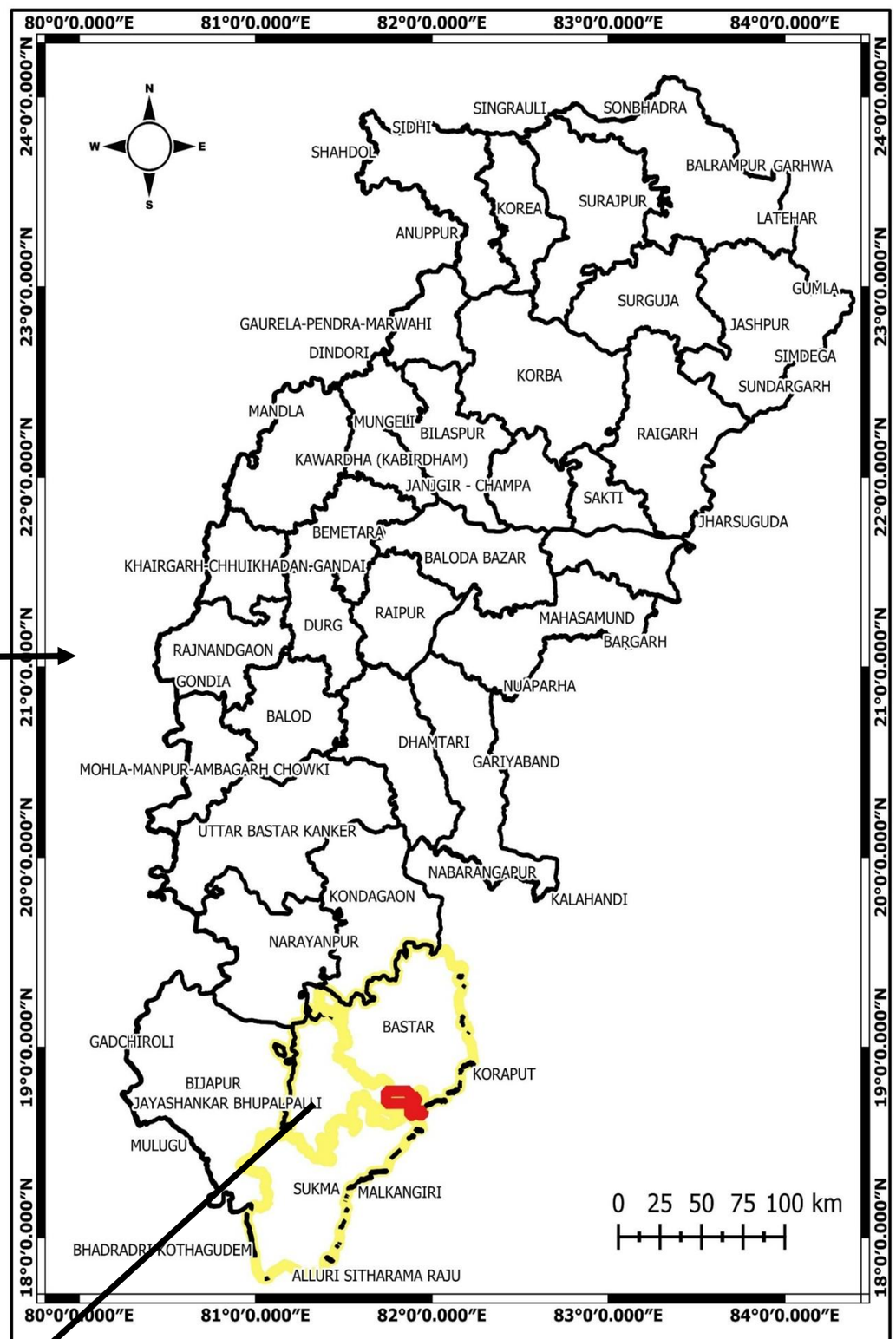
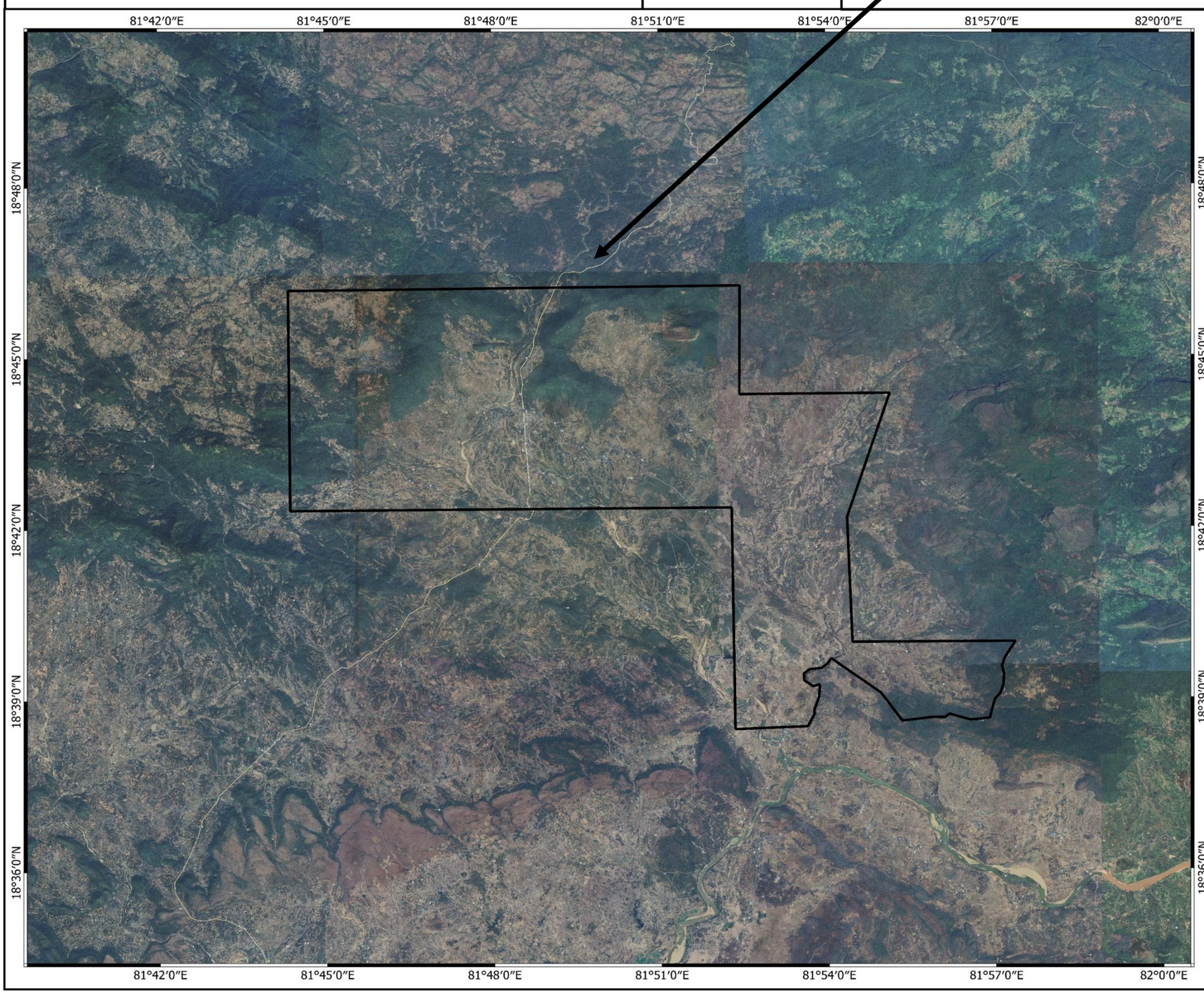
10. Plates

Plate 1

Location Map of Proposed Mundwal-Puspal-Marjum Block for G4







POINT ID	NORTHING	EASTING
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KU2	18° 46' 14.885"	81° 52' 26.981"
KU3	18° 44' 20.497"	81° 52' 26.14"
KU4	18° 44' 21.265"	81° 55' 8.027"
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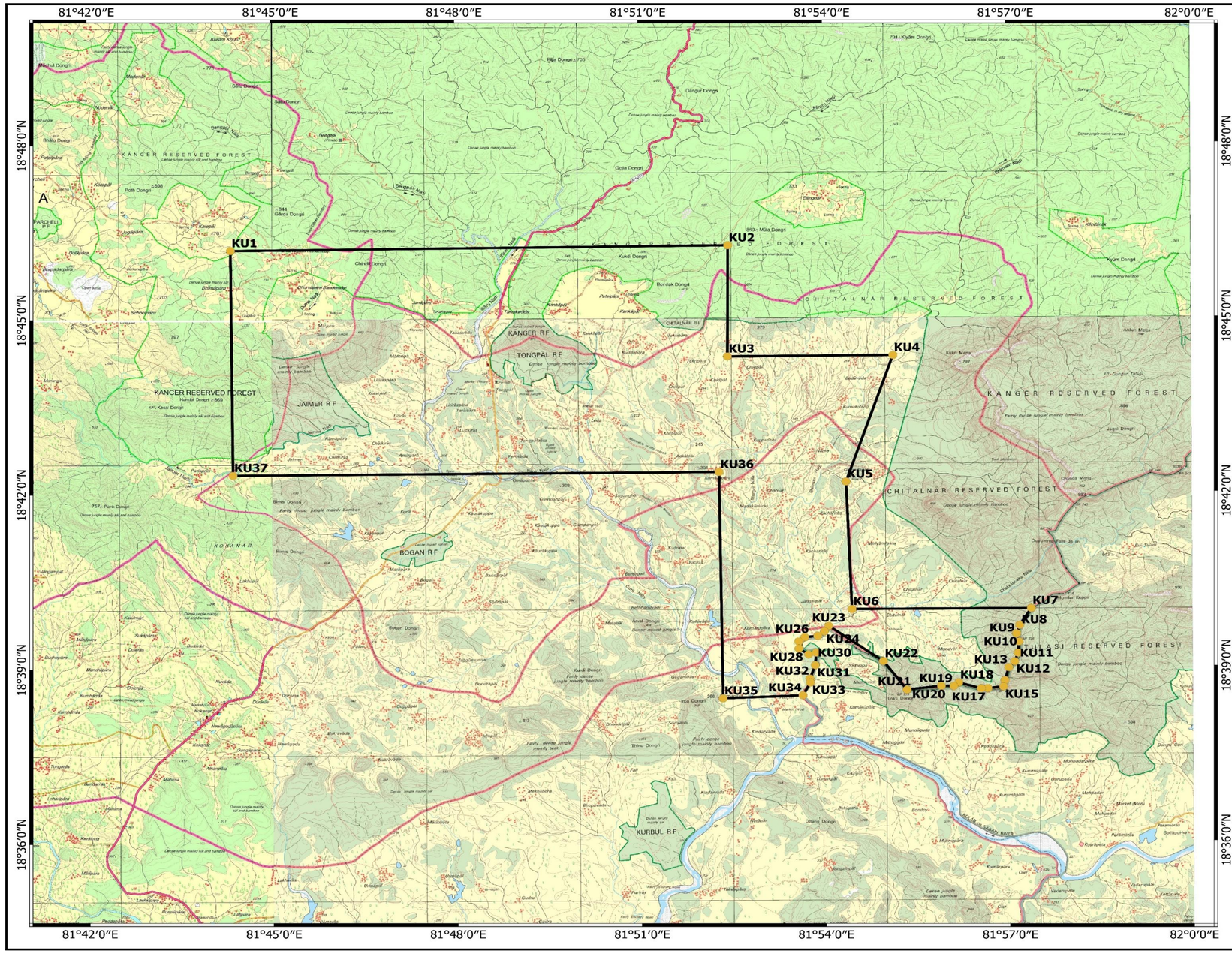
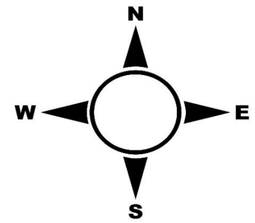
Plate 2

Boundary Location of Proposed Mundwal-Puspal-Marjum Block for G4 over Topsheet No.: 64F9, 64F10, 64F13, 64F14





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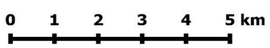
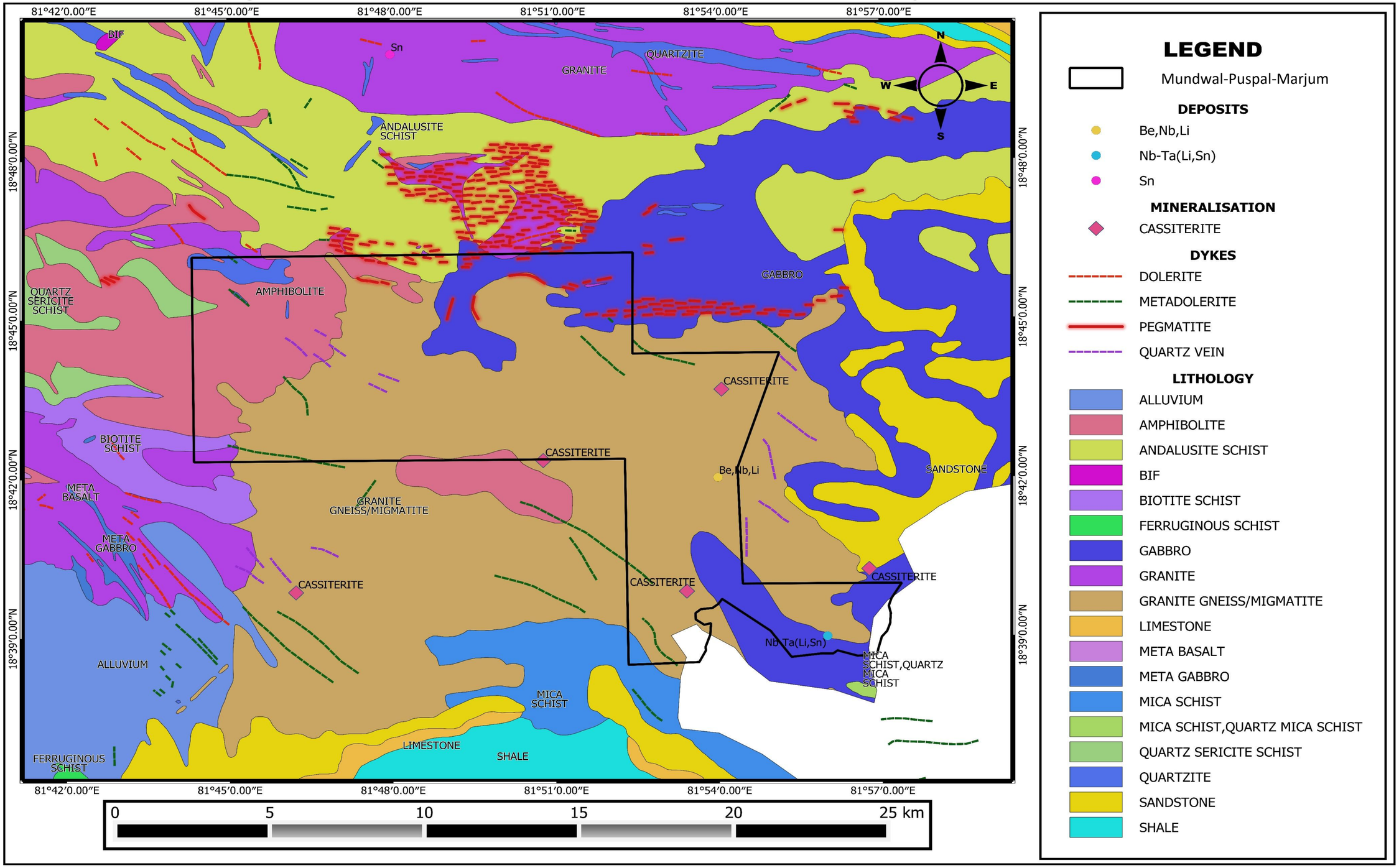


Plate 3

Geological Map of Proposed Mundwal-Puspal-Marjum Block for G4 over



LEGEND

Mundwal-Puspal-Marjum

DEPOSITS

- Be,Nb,Li
- Nb-Ta(Li,Sn)
- Sn

MINERALISATION

- CASSITERITE

DYKES

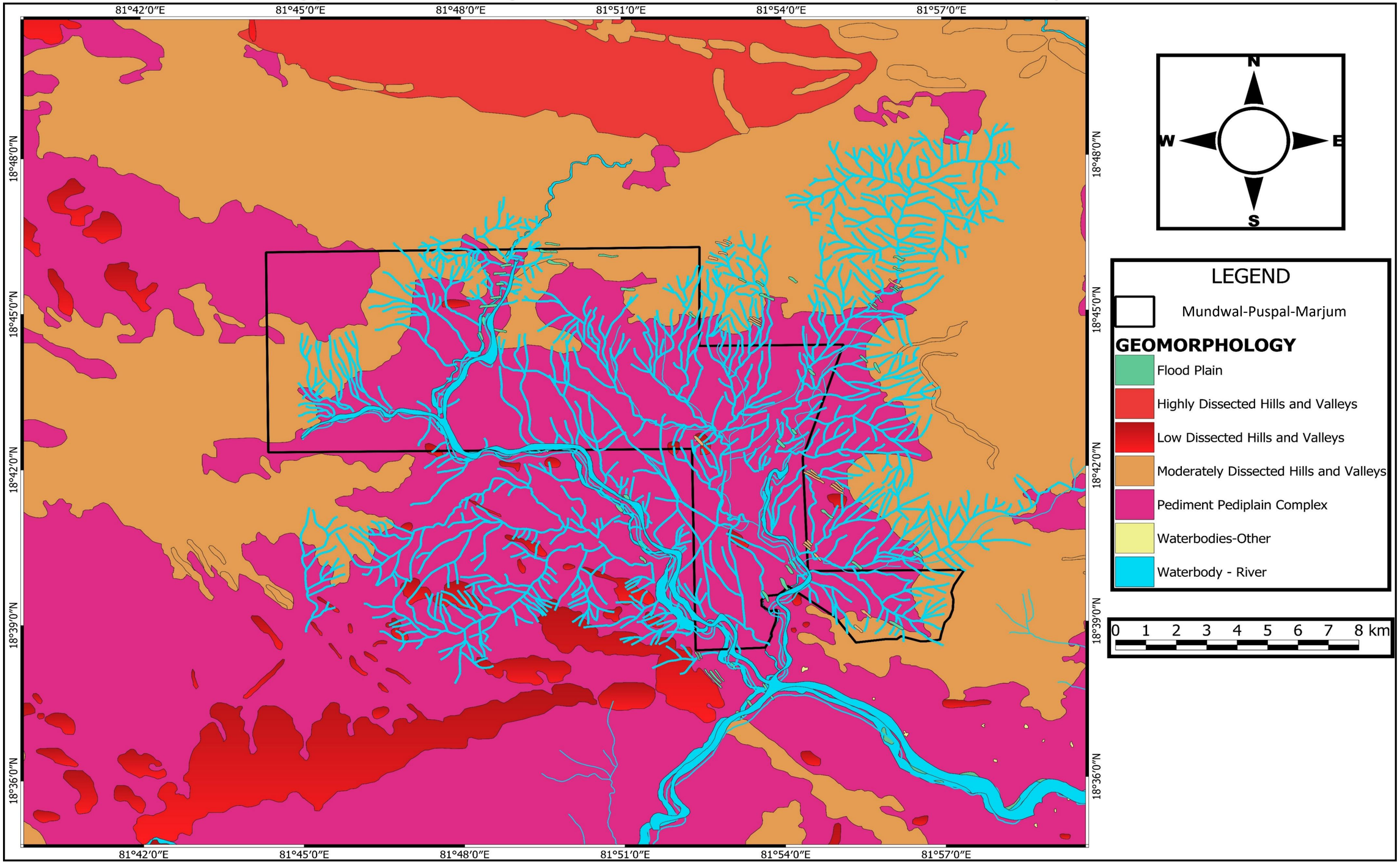
- DOLERITE
- METADOLERITE
- PEGMATITE
- QUARTZ VEIN

LITHOLOGY

- ALLUVIUM
- AMPHIBOLITE
- ANDALUSITE SCHIST
- BIF
- BIOTITE SCHIST
- FERRUGINOUS SCHIST
- GABBRO
- GRANITE
- GRANITE GNEISS/MIGMATITE
- LIMESTONE
- META BASALT
- META GABBRO
- MICA SCHIST
- MICA SCHIST,QUARTZ MICA SCHIST
- QUARTZ SERICITE SCHIST
- QUARTZITE
- SANDSTONE
- SHALE

Plate 4

Geomorphology and Drainage of Proposed Mundwal-Puspal-Marjum Block for G4



Gazette Notification

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REGD. No. D. L.-33004/99

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The Gazette of India

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असाधारण
EXTRAORDINARY

भाग II—खण्ड 3—उप-खण्ड (ii)
PART II—Section 3—Sub-section (ii)

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PUBLISHED BY AUTHORITY

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No. 5414] NEW DELHI, THURSDAY, DECEMBER 4, 2025/AGRAHAYANA 13, 1947

खान मंत्रालय

अधिसूचना

नई दिल्ली, 4 दिसम्बर, 2025

का.आ. 5602(अ).—केन्द्रीय सरकार, खान और खनिज (विकास और विनियमन) अधिनियम, 1957 (1957 का 67) की धारा 4 की उपधारा (1) के दूसरे परंतुक द्वारा प्रदत्त शक्तियों का प्रयोग करते हुए और भारतीय गुणवत्ता परिषद के राष्ट्रीय शिक्षा एवं प्रशिक्षण प्रत्यायन बोर्ड द्वारा उपबंधित प्रत्यायन के परिणामस्वरूप, भारत सरकार, खान मंत्रालय के तारीख 12 अगस्त, 2021 के आदेश संख्या एम.VI-16/15/2021-खान VI के *द्वारा* जारी प्रत्यायित निजी खोज अभिकरणों की अधिसूचना के लिए मार्गदर्शक सिद्धांतों के अनुसार "प्रवर्ग 'क' खोज अभिकरण" के अधीन मैसर्स सिद्धार्थ जियो. कंसल्टेंट को अधिसूचित करती है।

2. उक्त अभिकरण, उक्त मार्गदर्शक सिद्धांतों में विनिर्दिष्ट शर्तों के अनुपालन में पूर्वेक्षण संक्रियाएं कार्यान्वित करेगा।

3. यह अधिसूचना राजपत्र में इसके प्रकाशन की तारीख से पांच वर्ष की अवधि के लिए या अनुदत्त प्रत्यायन के अवसान तक या इसके समाप्त होने तक, जो भी पूर्वतर हो, प्रवृत्त रहेगी।

[फा. सं. एम.VI-16/22/2022-खान VI]

दिनेश माहुर, संयुक्त सचिव

MINISTRY OF MINES

NOTIFICATION

New Delhi, the 4th December, 2025

S.O. 5602(E).—In exercise of the powers conferred by the second proviso to sub-section (1) of section 4 of the Mines and Minerals (Development and Regulation) Act, 1957 (67 of 1957) and consequent upon accreditation provided by the National Accreditation Board for Education and Training of the Quality Council of India, the Central Government hereby notifies M/s Siddharth Geo. Consultant under "Category 'A' Exploration Agency" as per the guidelines for notification of accredited private exploration agencies issued by the Government of India, Ministry of Mines *vide* order No. M.VI-16/15/2021-Mines VI, dated the 12th August, 2021.

2. The said agency shall carry out prospecting operations in compliance with the conditions specified in the said guidelines.

3. This notification shall remain in force for a period of five years from the date of its publication in the Official Gazette or till the expiry or termination of the accreditation granted, whichever is earlier.

[F. No. M.VI-16/22/2022-Mines VI]

DINESH MAHUR, Jt. Secy.

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NABET Accreditation Certificate for

QUALITY COUNCIL OF INDIA

NABET

National Accreditation Board for Education and Training

World Trade Centre, K –100, First Floor, Nauroji Nagar, Safdarjung Enclave, New Delhi-110029

CERTIFICATE OF ACCREDITATION

Under the QCI-NABET Scheme for

Accreditation Of Exploration Agencies in Mineral Sector

Category A Exploration Agency

M/s Siddharth Geo. Consultant

621/3, First floor, Behind Life Worth Hospital, Samta Colony, Ramkund, Raipur, (Chhattisgarh), 492001

SCOPE COVERAGE
Preparation of Comprehensive Geological Report
• Bedded Stratiform & Tabular deposits • Lenticular composite veins • Gem-Stone and rare metal pegmatite, reefs and veins/pipes • Float & Placer deposits • Deep Seated deposits

Note: Names of approved Project Coordinators and Technical Area Experts are mentioned in IA AC Minutes dated August 13, 2025 on QCI-NABET website.

The Accreditation shall remain in force subject to continued compliance to the terms and conditions mentioned in NABET's letter of accreditation bearing no. QCI/NABET/AEA/ACO/25/029.
The accreditation needs to be renewed before the expiry date by M/s Siddharth Geo. Consultant following due process of assessment.

Issue Date
August 13, 2025

Certificate No.
NABET/AEA/25/021

Valid up to
August 12, 2028

Varinderkanwar

Prof. (Dr.) Varinder Singh Kanwar
Chief Executive Officer
NABET