

**DETAILED PROJECT PROPOSAL ON
PRELIMINARY EXPLORATION (G3) FOR BASE METALS
AND ASSOCIATED MINERALS IN NARVAKATIPALLE
BLOCK, Y.S.R KADAPA DISTRICT, ANDHRA PRADESH.**

COMMODITY: Base Metals and Associated Minerals

AREA: 4.76 Sq. Km

TOPOSHEET NO: 57 J/15

Submitted to

**NATIONAL MINERAL EXPLORATION AND DEVELOPMENT TRUST
(NMEDT)**

MINISTRY OF MINES, GOVERNMENT OF INDIA



Submitted by



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June 2025

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SUMMARY OF BLOCK FOR PRELIMINARY EXPLORATION (G3)

General information of the block

S.No.	Features	Details
I	Block ID	GEO/NMEDT/AP/05/2026-27
II	Exploration Agency	GeoExpOre private Limited
III	Present Project Stage	Preliminary Exploration – G3 Stage
IV	Previous Exploration Agency	G4 stage by GSI
V	G4 Stage geological Report (Previous stage Geological report)	REPORT ON “RECONNAISSANCE SURVEY FOR BASE METAL MINERALIZATION IN SIDDHAVATTAM AND VONTIMITTA AREAS OF CUDDAPAH SUPERGROUP, KADAPA DISTRICT, ANDHRA PRADESH” (STAGE: G-4) Item Code: M2AFGBM/MEP/NC/SR/SU-AP/2019/28215 Enclosed as Annexure - I
VI	Commodity	Base Metal
VII	Mineral belt	Cumbum formation of Nallamalai fold belt in Cuddapah Basin
VIII	Completion Period with entire time schedule to complete the project	Narvakatipalle Block (4.76 Sq. Km) 12 months
IX	Objectives	1. To Carry out geological and structural mapping on 1:2,000 Scale for demarcation of Dolomites bands which hosts Base metals with structural features to identify the surface manifestations and lateral continuity of mineralized zones.

		2. To collect surface samples (Bedrock & Channel samples) and subsurface (Trenching & Boreholes) to analyze for base metals and decide the further course of exploration program. 3. To carry out Ground geophysical survey with Electrical resistivity along with Induced Polarization (IP) to demarcate the depth of mineralisation zones in closed intervals. 4. To drill to 10 boreholes with total meterage of 800 m to prove the strike and depth persistence of dolomite hosts in the area. 5. To estimate base metals ore resources along with any accessory elements (if any) as per UNFC norms and minerals (evidence of mineral contents) rules – 2015 at the G-3 level.
X	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	All the mapping, surface and subsurface mineral exploration (drilling) activities by the proposed agency GeoExpOre Pvt. Ltd. The chemical analysis will be done through empaneled agencies by NMEDT (NABL / QCI NABET accredited) Lab Test: Shiva Analyticals (India) Private Limited, Hoskote, Bangalore. And or any other competent agency, Govt labs will be used whenever required (IISc, HGML, IBM, NGRI, IIMT (CSIR) & GSI)
XI	Name / No. of Geoscientists	Senior Geologist: 1 (Field) + 1 (HQ) Junior geologist: 2 (Field)
XII	Expected Field days (Geology, Geophysics, Surveyor)	Geologists: 40 days (HQ) + 140 days (Field) Surveyor: 40 days
XIII	Approved in PSC (No.)	Proposal ID: ME/IND/G3/AP/P/26-27/011 12th PSC Meeting dated 12.09.2026 (F. No.: 117/1/2025-NMET/555)

1	Location	Around Narvakatipalle area, Y.S.R Kadapa district of Andhra Pradesh			
	Latitude & Longitude (Decimal Degree)		Cardinal Points	Latitude	Longitude
			A	14.381245	78.972665
			B	14.388557	78.983233
			C	14.361174	78.999213
			D	14.354027	78.989299
	Villages	Narvakatipalle, Jowkulapalle, Taraf Manjali (OG)			
	Tehsil / Taluk	Sidhout			
2	District	Y.S.R Kadapa			
	State	Andhra Pradesh			
	Area (Hectares / Square Kilometers)	4.76 Sq. Km 476 Hectares			
	Block Area	4.76 Sq. Km			
	Forest Area	0 %			
	Govt. land Area	70 %			
3	Private land Area	30 % Private land			
	Accessibility	Narvakatipalle is situated 6 km away from the Vontimitta sub-district headquarters and is 40 kilometers from the district headquarters kapada.			
	Nearest railway station	Vontimitta Railway station is located 6 km away from the block, is the nearest railway station			

	Nearest Airport	Kadapa Airport located 39 km away from the block is the nearest Airport.
4	Hydrography	The major river Penna is located 8 km from the block
	Local Surface Drainage pattern (Channels)	Local Surface Drainage pattern is mainly dendritic to sub-dendritic, with some trellis influence in structurally controlled areas. The streams develop over relatively homogeneous crystalline rocks and gently sloping terrain. Tributaries branch irregularly like tree branches.
	Rivers/ Streams	Penna River - The main stream starts in Nandi Hills in of Karnataka, flowing to the north and east through several mountains and plains, draining into the Bay of Bengal in Nellore district of Andhra Pradesh. The river is seasonal, its main source of the water being from rains.
5	Climate	The climate here is considered a local steppe climate. Anantapur does not receive much rainfall throughout the year. This climate is classified as BSh according to the Köppen-Geiger climate classification. The average annual temperature in Anantapur is 27.5 °C, according to available data.
	Mean Annual rainfall	594 mm
	Temperature	17.7° C (Minimum Temperature during Winter) 37.7° C (Maximum Temperature during Summer)
6	Topography	Undulating topography with maximum elevation 356 m above Mean Sea level
	Toposheet Number	57 J/15
	Morphology of the Area	Undulating Topography

7	Availability of baseline Geoscience data	Available details were mentioned in GSI report titled “REPORT ON “RECONNAISSANCE SURVEY FOR BASE METAL MINERALIZATION IN SIDDHAVATTAM AND VONTIMITTA AREAS OF CUDDAPAH SUPERGROUP, KADAPA DISTRICT, ANDHRA PRADESH” (STAGE: G-4) Item Code: M2AFGBM/MEP/NC/SR/SU-AP/2019/28215 Enclosed as Annexure-I
	Geological Map (1:50,000 / 1:25,000)	1:25,000 Map
	Geochemical Map, Geophysical Map (Aeromagnetic, Ground geophysical, Regional as well as local scale Geophysical maps)	Geochemical Map – Soil Sediment Ground Geophysics – Bouguer Anomaly, Gravity and Magnetic Aeromagnetic Geophysics – NAGMP Block – 11
8	Justification for taking Preliminary Exploration under G3	During FS: 2019-20, Geological Survey of India, State Unit: Andhra Pradesh has carried out Reconnaissance survey (G4) for Base Metal entitled “Report on Reconnaissance survey for base metal mineralization in Siddhavattam and Vontimitta areas of Cuddapah supergroup, Kadapa district, Andhra Pradesh” (Stage: G-4)” Item Code: M2AFGBM/MEP/NC/SR/SU-AP/2019/28215 During this investigation, Area of 100 Sq. Km was explored in large Scale Mapping of 1:12,500 scale along with Sampling. A total of 278 Bedrock Samples, 22 Channel Samples, 50 Cu. m of trenching and 10 Petrochemical samples were collected and analysed for Cu, Pb, Zn, Au, Ag, Sn, W, Co, Mo, As and Ni elements. Large scale geological mapping has led to identify the potential mineralized dolomite bands ranging from 200 m to 2.8 km in NNW-SSE direction and show low to steep dip towards both east and west directions due to folding. The cumulative strike length of dolomite

	bands is more than 19 km in Siddhavattam and Vontimitta area. The width of the dolomite bands is varying from 10 to 40 m. Based on the Analytical results dolomite bands have been divided into 4 blocks namely, 1. Mittapalle block (1.2 sq. km) 2. Jaukulapalle block (1.0 sq. km) 3. Balayya Kunta block (2.50 sq. km) 4. Narvakatipalle block (4.76 sq. km). Based on GSI investigation during FS, GeoExpOre Pvt Ltd corverd out Narvakatipalle block of 4.76 Sq. Km, Within the Proposed block 9 Bedrock samples and 5 Channel Samples were collected and analysed for Cu, Pb, Zn, Au, Ag, Sn, W, Co, Mo, As and Ni elements. In Narvakatipalle block, Total 12 prospective dolomite bands have been identified by GSI. From the Analytical results of 9 Bedrock samples - The value of Pb varies from 100 ppm to 51288 ppm (5.13%) with an average of 2.1%. The value of Zn varies from 290 ppm to 44100 ppm (4.41%). Combined values of Pb + Zn has an average of 3.66%. From the results of 5 Channel samples – The value of Pb varies from 40 ppm to 8800 ppm (0.88%) with average of 0.2%. The value of Zn varies from 120 ppm to 75800 ppm (7.58%) with an average of 2.58%. The channel samples include dolomite & intercalation of dolomite and phyllite. The less average values are due to intercalation of dolomite and phyllite. If we consider those 2 channel samples which were taken from the dolomite alone, the average of Pb shows 0.44% and values of Zn shows 6.42%. Both combined Pb + Zn shows an average of 6.87% which crosses the economic cut-off grade of 2.5%. Further, GSI has recommended from above, 4 blocks initially 2 most prospective and feasible blocks (Mittapalle and Jaukulapalle blocks) can be taken up for G-3 stage exploration work for FS: 2020-21. During the FS: 2020-21, the two G3 block along with a
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		G2 Jaukulappale block has been completely explored and their respective report has been submitted which shows way more encouraging values of Pb and Zn. Based on these values, GeoExpOre has carved out the Narvakatipalle block for further G3 exploration which has shown promising mineralisation. The main objective of this study is to delineate the base metals mineralization through various methods such as surface and subsurface investigation and geophysical methods. The Resource estimation will be calculated along with accessory elements (if any) as per UNFC norms and minerals (evidence of mineral contents) rules – 2015.
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1. Introduction

Base metals, particularly lead (Pb) and zinc (Zn), are indispensable to modern industrial growth and technological advancement due to their wide-ranging applications in galvanization, batteries, alloys, chemicals, construction materials, transportation, telecommunications, renewable energy systems and defence sectors. India possesses significant lead-zinc resources; however, the continuously increasing demand from infrastructure development, manufacturing industries and emerging clean-energy technologies necessitates sustained exploration for augmentation of domestic mineral resources. Consequently, the Government of India has accorded high priority to the exploration of strategic and critical mineral commodities, including base metals, to ensure long-term resource security and reduce dependence on imports.

At present, a substantial portion of the country's lead and zinc production is derived from a limited number of mining districts, emphasizing the need for identification of additional resources in prospective geological terrains. Although several lead-zinc deposits have been established across India, discoveries of new economically viable deposits capable of supporting future industrial requirements have remained relatively limited during the last few decades. Nevertheless, a number of promising mineralized blocks are presently under different stages of exploration and evaluation.

In the backdrop of amendments to the MMDR Act and the continued support of the National Mineral Exploration and Development Trust (NMEDT), renewed emphasis is being placed on systematic exploration aimed at identifying feasible deposits that can be economically developed through modern mining and beneficiation technologies.

The Narvakatipalle Block, covering an area of 4.76 sq. km within the cumbum formation of Nallamalai Fold Belt of the Cuddapah Basin, represents one such prospective area for lead-zinc mineralization. The block is underlain by dolomitic units of the Cumbum Formation, which are known to host stratabound base-metal mineralization and constitute an established lead-zinc occurrence within the basin. Geological investigations carried out in the region have indicated favourable lithological and structural controls for mineralization, highlighting the potential for establishing further lead-Zinc resource. Recognizing the mineral potential of the area, the Narvakatipalle Block has been taken up for G3-stage exploration programme with the objective of delineating the extent, continuity and grade characteristics of the lead-zinc mineralization hosted within the dolomitic horizons of the Cumbum Formation.

2. Block Summary

2.1. Physiography

The proposed block is located in the Survey of India Toposheet No. 57 J/15 (Scale 1:50,000) covering an area of 4.76 Sq. Km near Narvakatipalle, Sidhout Tehsil, Y.S.R Kadapa district, Andhra Pradesh. The land use / land cover analysis shows that the area consists of 70% Govt. land and 30% Private land. The Terrain is undulating with folds and sub-dendritic to dendritic drainage flowing from west to east ending in Bay of Bengal. The region experiences the hot local steppe climate with minimum temperature of 17.7° C and maximum temperature of 37.7° C The average annual rainfall is ~594mm.

2.2. Background Geology

2.2.1. Aerial Reconnaissance

No Aerial Reconnaissance survey has been carried out during GSI FS: 2019-20.

2.2.2. Regional Geology

The study area forms part of the Nallamalai Fold Belt (NFB) which is an arcuate belt of intense folding, faulting and thrusting in the eastern half of the Proterozoic Cuddapah basin. Cuddapah Basin is a crescent shaped, easterly concave, N-S trending basin in Dharwar Craton. The arcuate north, south, and western boundary of the Cuddapah Basin marks the profound angular unconformity (Eoparchaeon unconformity) on basement gneisses enclosing eastern greenstone belts of Kadiri, Veligallu and Tsundupalle in the south and Raichur, Gadwal, Peddavuru in the north. The arcuate eastern margin is marked by a thrust, which is parallel to the Nellore schist belt. The lithostratigraphy of Cuddapah Basin comprises Papaghani, Chitravati and Nallamalai Groups, and Srisailam quartzite, separated by unconformities and are included under Cuddapah Supergroup. A younger sequence called Kurnool Group unconformably overlies the Cuddapah Supergroup in the Kurnool and Palnad sub-basin (Figure 2.2.1). The western half of basin is undeformed and consists of four sub basins of Papaghani, Kurnool, Srisailam and Palnad. The sub-basins are geographically interlinked, but were sites of deposition at different times. Cuddapah basin is characterized by quartzite-carbonate-shale cycles having an aggregate thickness that is estimated to vary between 6 and 12 km. The lower sedimentary units of the basin are interspersed with basic volcanics and sills, felsic volcanics and tuffs at various horizons. The

study area is the southern extension of the Zangamrajupalle-Varikunta belt of Nallamalai Group of Cuddapah Supergroup. The area is exposed with rock units of Cumbum Formation represented by shale, phyllite, slate with thick and thin intercalations of quartzite and dolomites at various stratigraphic levels. Dolomite with chert intercalations is known to host lead and zinc mineralization in the area. Cumbum Formation is conformably overlain by Bairenkonda Formation. The regional strike of the lithounits exposed in the area is N-S to N20°W - S20°E with local variations in amount of dip from 20° to 30° due to presence of a series of low amplitude folds.

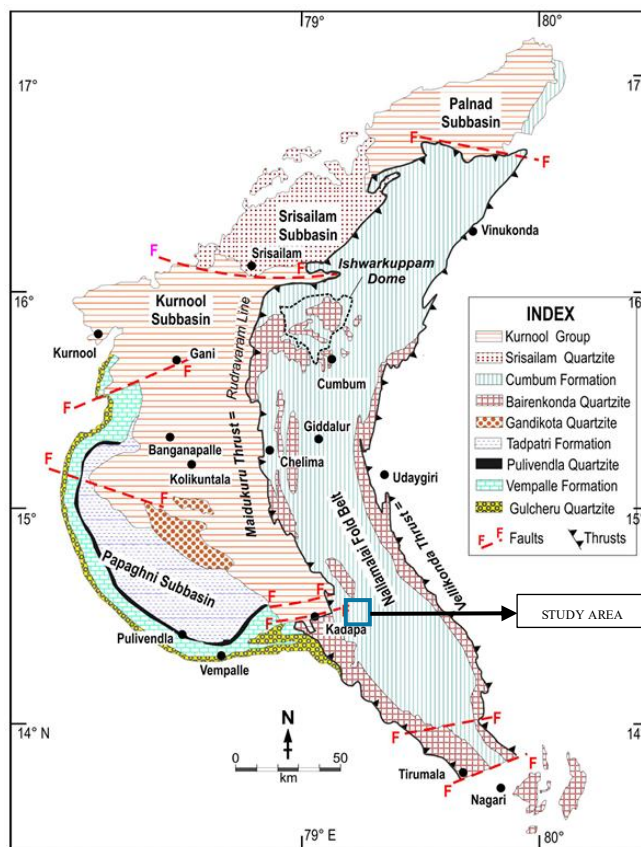


Figure 2.2.1: Geological map of the Cuddapah Supergroup, Nallamalai Group, and Kurnool Group depicting the subbasinal configuration. Source: Tripathy, Vikash, and Dr. Vivek Kale. “Cuddapah Basin, India: A Collage of Proterozoic Subbasins and Terranes.” Proceedings Indian National Science Academy, 2020

2.2.3. Regional Stratigraphy

Earliest geological studies on Cuddapah Basin were carried out by King (1872) who divided the major lithounits of the basin into older Cuddapah and younger Kurnool Formations. Narayanaswami (1966) proposed a five-fold classification of Cuddapah Formation comprising Papaghani, Chitravati, Cheyair,

Nallamalai and Kistna Groups. Sen and Narasimha Rao (1967) identified various igneous activities in Cuddapah Basin including granitic intrusion, basalt, acidic flows, dolerite sills and dykes. Dutt (1975) reported a disconformity at base of Paniam quartzite and also identified Kurnool as a Supergroup. He excluded Srisailam Quartzite from the Cuddapah Supergroup and listed it as a separate Formation. Nagaraja Rao and Ramalingaswamy (1987) proposed a revised stratigraphic sequence in which Cuddapah Supergroup is divided into three groups, with Kurnool Group as the youngest. A generalized lithostratigraphic sequence of Cuddapah Supergroup is given in Table 2.1.

Table 2.1: Regional stratigraphic sequence of Cuddapah Basin (after Nagaraja Rao et al., 1987).

	GROUP	FORMATION	LITHOLOGY	AGE
	Kurnool Group	Nandyal Shale	Shale	Neoproterozoic
		Koilkuntla Limestone	Limestone	
		Paniam Quartzite	Quartzite	
		Owk Shale	Shale	
		Narji Limestone	Limestone	
		Banganapalle Quartzite	Quartzite, Conglomerate	
CUDDAPAH SUPERGROUP		Srisailam Formation	Quartzite, Shale	
	Nallamalai Group	Cumbum Formation	Shale / Phyllite, Quartzite, Dolomite, Chert	Mesoproterozoic
		Bairenkonda Quartzite	Quartzite, Shale, Conglomerate	
	Chitravathi Group	Gandikota Quartzite	Quartzite, Shale	Mesoproterozoic
		Tadpatri Formation	Shale, Quartzite, Dolomite	
		Pulivendla Quartzite	Quartzite, Conglomerate	
	Papaghni Group	Vempalle Formation	Dolostone, Mudstone, Quartzite	Palaeoproterozoic
		Gulcheru Quartzite	Quartzite, Conglomerate	
Dharwar Craton		Granite / Gneiss / Greenstone		

2.2.4. Regional Metamorphism and Structure

The rocks of the Cumbum Formation comprise slate and phyllite with a mineral assemblage of muscovite + chlorite + quartz, indicating predominantly low greenschist facies metamorphism across the Nallamalai Fold Belt (NFB). However, the western margin records anchizone to prehnite–pumpellyite facies metamorphism. Illite crystallinity studies suggest that the Cumbum rocks experienced low-grade burial metamorphism at temperatures of 200-250°C, later overprinted by cleavage-forming tectonic metamorphism during deformation. Chlorite porphyroblasts in phyllites indicate temperatures below 300°C under intermediate pressure conditions typical of Barrovian metamorphism (Mukherjee, 2003; Bucher and Frey, 2002).

The Cuddapah Supergroup exhibits varying degrees of deformation, with the eastern part of the basin showing greater deformation than the western part. The Nallamalai Group, consisting of shale-siltstone-quartzite-dolomite sequences, is highly deformed but only weakly metamorphosed. Regional strike trends N-S to NNW-SSE, and folding intensity increases eastward. Primary structures include bedding, laminations, and ripple marks, while secondary structures comprise cleavage/foliation, folds, joints, lineations, and faults.

In the Siddhavattam-Vontimitta area, deformation occurred in three phases (D1-D3). D1 produced tight to isoclinal F1 folds with weakly developed S1 foliation. D2 formed the dominant structural grain of the NFB, characterized by NNW-SSE trending F2 folds with ENE-dipping axial planes and associated S2 axial planar cleavage. D3 generated inclined F3 folds with ENE-WSW axial trends and steep SSE dipping axial surfaces (Basu et al., 2012).

2.2.5. Regional Mineralisation

The Cuddapah Basin represents an important Proterozoic metallogenic province of India, hosting diverse mineralisation controlled by lithology, structures, unconformities, and igneous activity. Major economic minerals include uranium, Pb-Zn-Cu sulphides, baryte, limestone, dolomite, asbestos, and diamond-bearing horizons. Uranium is the most significant mineral commodity and occurs in stratabound, fracture-controlled, and unconformity-related settings.

The Vempalle Formation of the Papaghni Group hosts carbonate-associated uranium mineralisation, notably at Tummalapalle, where uranium occurs within dolostones and phosphatic carbonate horizons under structural and lithological control. Fracture- and shear-controlled uranium mineralisation is also reported from the Gulcheru Quartzite and basement granitoids along fault and shear zones. In the

Kurnool Group, unconformity related uranium mineralisation occurs near the basement-cover interface, particularly in the Banganapalle Quartzite.

Besides uranium, Pb-Zn-Cu mineralisation is associated with carbonate horizons and structurally controlled zones within the basin. Significant baryte deposits, such as Mangampeta, and extensive limestone and dolomite resources are also present. Kimberlitic and lamproitic intrusions along basin margins indicate diamond potential. Overall, mineralisation in the Cuddapah Basin reflects strong lithological, structural, and hydrothermal controls operating during multiple tectono-magmatic events.

2.3. Geology of the block

2.3.1. Block Geology

The block area forms a part of Nallamalai Group of the Cuddapah Supergroup and is represented by the Mesoproterozoic Cumbum Formation. The lithological succession comprises predominantly Quartzite, Chert intercalated with Phyllite, Dolomite, Phyllite-Dolomite intercalations, and Phyllite. The lithological assemblage and structural disposition of the block suggest a sedimentary sequence subsequently modified by low-grade metamorphism and tectonic deformation associated with the evolution of the Nallamalai Fold Belt.

2.3.2. Block Stratigraphy

The stratigraphic succession is represented by Quartzite, Chert intercalated with Phyllite, Dolomite, Phyllite-Dolomite intercalations, and Phyllite. Quartzite occurs as resistant ridges, while Phyllite and Cherty horizons occupy comparatively low-lying areas. Dolomite and Phyllite-dolomite intercalations indicate deposition under varying shallow marine sedimentary conditions. The rocks are affected by deformation, resulting in the development of foliation, folding, and joint systems, particularly within the phyllitic units. The lithological assemblage and structural disposition of the block suggest a sedimentary sequence subsequently modified by low-grade metamorphism and tectonic deformation associated with the evolution of the Nallamalai Fold Belt. Litho-Stratigraphy of the Proposed area is given in Table 2.2.

Table 2.2: Litho-Stratigraphy of the Proposed area

SUPER GROUP	GROUP	FORMATION	LITHOLOGY	AGE
Cuddapah Supergroup	Nallamalai group	Cumbum Formation	Quartzite	Mesoproterozoic
			Chert with Phyllite	
			Dolomite	
			Phyllite and Dolomite intercalation	
			Phyllite	

2.4. Description of rocks

2.4.1. Phyllite

Phyllite is a fine-grained low-grade metamorphic rock with dark grey to light grey, greenish reddish and purple colour (Figure 2.4.1). The rock shows fissility. The fissility is defined by the cleavage which in turn is defined by the preferred orientation of the elongated minerals like chlorite. The protolith of phyllite is pelitic suggesting that it was deposited in calm and quiet environment at deeper parts of the basin. The argillite is dominated in cumbum sedimentary facies indicates the deep-water depositional setting (G. Lakshminarayana, 2002). The phyllite becomes more calcareous and arenaceous near the contact of carbonate and arenaceous lithounits. The contact of phyllite with adjoining rock is gradational. In Phyllite specks of pyrite and rarely chalcopyrite can be seen. Phyllite exposed is described as purple pink and yellowish brown phyllites. These rocks, by virtue of their oldest stratigraphic position, often occupy the core of the antiformal structures in the area. Phyllites in the area are well foliated and give a clear picture of the deformation due to its mineralogical composition as because development of fabric depends on the mineralogical and competency contrast. Three sets of cleavages are observed in this rock. The bedding and slaty cleavage (S1) are almost parallel ($S0 \parallel S1$) to each other, while spaced cleavage (S2) dips in ENE direction at moderate to steep dip (35° to 80°) in the block.



Figure 2.4.1



Figure 2.4.2

Figure 2.4.1: Reddish brown colour Phyllite (Source: GSI FS: 2019-20)

Figure 2.4.2: Reddish brown colour Phyllite showing variation in colour banding (Source: GSI FS: 2019-20)

2.4.2. Phyllite and dolomite intercalation

They are exposed in the vicinity of Narvakatipalle and Nekanapuram villages respectively. They occur as alternate bands of dolomite and phyllite (Figure 2.4.3). The dolomite at places shows cryptic and rhythmic layering. Dolomite is dull brown coloured and phyllite is greyish brown colour. These dolomite bands do not show any good indication of sulphide mineralization apart from few fine disseminations of pyrite. They are interpreted to be formed in frequently changing environment of the basin during deposition. Thickness of dolomite and phyllite bands is varied from place to place and form the ribs and furrows type structure on the surface.



Figure 2.4.3

Figure 2.4.3: Intercalation of Phyllite (Dark grey) and Dolomite (Yellowish) (Source: GSI FS: 2019-20)

2.4.3. Dolomite

The dolomite horizon is seen underlying the buff-coloured chert. They are colourless, brown to dark brown, grey and sometimes pale pinkish yellow in colour. The dolomite is having chert bands of few cm which are positioned parallel to dolomite (Figure 2.2.4) along with quartz veins also later on due to deformation some quartz veins are cutting across dolomite but they are not mineralised. The dolomite horizon is thin as compared to other lithologies, but consistent and it could be traced over a distance of 8 km. Individual dolomite bands are ranging from 200 m to more than 2.8 km in strike length. It is observed that the lead and zinc mineralisation show affinity to dolomite and occur almost sub-parallel to bedding. It shows bedding parallel mineralization of Sphalerite within it (Figure 2.4.5) and in some places with Galena (Figure 2.4.6). Dolomite bands in the area are disposed as linear, interlayered sequence with adjoining rock and have a gradational contact with the adjoining rocks. Mostly they occupy the small hills and formed doubly plunging synformal and antiformal structures with variable plunge towards north and south. This may be the one reason that these rocks are settled as detached outcrops in the area. Due to deformation (F3) dolomite shows pinching and swelling nature.



Figure 2.4.4



Figure 2.4.5



Figure 2.4.6

Figure 2.4.4: Dolomite with bedding parallel Chert (Source: GSI FS: 2019-20)

Figure 2.4.5: Bedding parallel mineralization of Sphalerite in Dolomite (Source: GSI FS: 2019-20)

Figure 2.4.6: Galena Mineralization with reddish brown alteration in Dolomite (Source: GSI FS: 2019-20)

2.4.4. Chert with phyllite

Chert is a hard, fine-grained sedimentary rock composed of microcrystalline (or cryptocrystalline) crystals of quartz, the mineral form of silicon dioxide (SiO_2). Chert varies greatly in colour (from white to black), but most often manifests as grey, brown, greyish brown and light green to rusty red. It is a shallow, linear band resting conformably over dolomite and phyllite in various places (Figure 2.4.7). It is fine to medium-grained, dirty white to greenish grey in colour, hard and compact rock with thin to thick bands of phyllite with thin quartz ramification. At places, it contains specks of pyrite, which on leaching produce a pitted appearance.



Figure 2.4.7

Figure 2.4.7: Dirty white coloured Chert with thin and thick bands of Phyllite (Source: GSI FS: 2019-20)

2.4.5. Quartzite

Quartzites are dirty white to brown in colour and occur at the top of hilly part of the area and the youngest in stratigraphy. Quartzite has sub-horizontal to low dips and forms the linear to round and oval shaped outcrop pattern due to occurrence at the top of the hills. Ferruginous quartzite occurs in association with purple phyllite, shaly dolomite, phyllite dolomite intercalation (Figure 2.4.8). Contact of quartzite with adjoining rock is gradational. The metallic grey and botryoidal form of iron hydroxide (goethite) is observed in quartzite. These features are localized and does not persist in significant strike

length. Grey and milky white coloured quartz veins are often seen traversing the quartzite. According to earlier literatures ENE trending contractional faults are demarcated in the area. In north-west of Siddhavattam village, quartzite lies on hilly area and shows different strike towards NE-SW direction with respect to the regional strike that is NW-SE.



Figure 2.4.8

Figure 2.4.8: Fractured Ferruginous Quartzite (Source: GSI FS: 2019-20)

2.5. Structural framework of the block

The study area forms part of the Nallamalai Fold Belt (NFB) within the eastern sector of the Cuddapah Basin, a Proterozoic sedimentary basin characterized by polyphase deformation and low-grade metamorphism. Structurally, the basin displays an increase in deformation intensity from west to east, with the Nallamalai succession showing well-developed folding, cleavage, and faulting. The lithounits within the block generally strike N-S to NNW-SSE, with dips ranging between 20° and 35° towards both east and west due to repeated folding.

The structural framework of the block is marked by low-amplitude antiforms and synforms, accompanied by prominent cleavage/foliation, joints, lineations, and faults. Cleavage generally trends NNW-SSE and dips moderately to steeply east, commonly representing the axial planar fabric of folds. Structural studies from the Siddhavattam-Vontimitta region indicate that the area has undergone three phases of deformation (D1-D3). The D1 phase produced tight to isoclinal F1 folds with weakly developed S1 foliation, whereas D2 deformation established the dominant structural grain through NNW-SSE trending F2 folds associated with penetrative S2 axial planar cleavage. Subsequent D3 deformation generated superposed ENE-WSW trending folds, modifying earlier structures. The overall

structural configuration of the block plays a significant role in controlling lithological disposition and localization of Mineralisation, particularly within dolomite and phyllitic horizons.

2.6. Mineral potentiality based on Geology, Geophysics, ground geochemistry

The Mineralized zones are confined with Dolomite which are exposed in several locations in the block area. The dolomites are aligned along the axial trace of Antiform and Synform present in the block. This strongly indicates that the host rock is structurally controlled.

Base metal mineralization is predominantly associated with dolomite which has varying strike length of 200 m to 1.6 Km trending towards NNW-SSE with width varying from 18 m upto 80 m. The dolomite bodies are dipping with $\sim 40^\circ$ in both East and West sides due to presence of intense folding like antiform and synform in the area.

Based on sensor Aero geophysical survey under the NAGMP project over OGP Block-11 (87,429 sq. km) covering parts of Andhra Pradesh, Telangana, Karnataka, and Tamil Nadu to promote mineral exploration and geological mapping. The proposed area

Out of 278 Bedrock Samples, 9 Samples falls in Narvakatipalle block. The Chemical analysis shows the value of Pb varies from 100 ppm to 51288 ppm (5.13%) with an average of 2.1%. The value of Zn varies from 290 ppm to 44100 ppm (4.41%). Combined values of Pb + Zn has an average of 3.66%.

Further, From the results of 5 Channel samples – The value of Pb varies from 40 ppm to 8800 ppm (0.88%) with average of 0.2%. The value of Zn varies from 120 ppm to 75800 ppm (7.58%) with an average of 2.58%. The channel samples include Dolomite and Dolomite-Phyllite intercalation. The less average values are due to Dolomite-Phyllite intercalation. If we consider those 2 channel samples which were taken from the dolomite alone, the average of Pb shows 0.44% and values of Zn shows 6.42%. Both combined Pb + Zn shows an average of 6.87% which crosses the economic cut-off grade of 2.5%.

Considering the cut-off grade for Pb + Zn combined as 2.5%, 8 out of 11 samples collected from dolomite crosses the economic cut-off grade. These analytical results shows that Narvakatipalle block holds more potential for further G-3 Level exploration, which will provide a more accurate assessment of depth continuity and resource persistence of Base metal mineralisation.

2.7. Scope for proposed Exploration

This project proposes a preliminary survey at the G-3 stage consisting of Surface investigation - detailed geological and structural mapping of a 4.76 sq. km. area on 1:2,000 scale; Subsurface investigation - Geophysical investigation by Resistivity cum. IP Method ; Sample collection: surface - Bed rock sampling, Sample collection through Channels & Trenches; Drilling of 10 Boreholes With depth of 80 m each with total meterage of 800 metres; Geochemical Analysis of Dolomite which is a host for Base Metal mineralisation and other litho-units; Petrological analysis and Resource estimation under G3 category and report preparation.

2.8. Objectives of Exploration

- 1) To carry out Detailed geological and structural mapping in an area of 4.76 Sq. Km on a 1:2,000 Scale to demarcate the Dolomite which is Base metal mineralized.
- 2) To carry out subsurface exploration by carrying out trenches in potential zones and to find the lateral extension and depth persistence of the mineralized body.
- 3) To carry out Ground Geophysical Methods of Resistivity cum. IP to know the depth persistence of the mineralized body with 200 m traverse interval and 20 m station interval.
- 4) To drill 10 BH with total meterage of 800 m with depth of 80 m each which will be carried out in 2nd Phase.
- 5) To estimate Preliminary Base Metal mineral resources along with any accessory elements (if any) as per UNFC norms and Minerals (evidence of mineral contents) rules – 2015 at the G-3 level.

2.9. Observations and recommendation from previous work

Out of 278 Bed rock samples, 9 samples which are collected from dolomite lithology falls in the proposed Narvakatipalle block. Geochemical analysis of those bedrock samples shows Pb Values ranging from 100 ppm to 51288 ppm (5.13%) with an average of 2.1%, Zn shows values ranging from 290 ppm to 42321 ppm (4.23%) with an average of 1.56%, Both Pb + Zn shows an average of 3.66%.

Similarly, out of 22 Channel Samples, 5 Channel samples collected from both dolomite and Dolomite-Phyllite intercalation fall in the proposed block. Geochemical analysis of these channel samples (Considering only 2 channel samples collected from dolomite lithologies which is a main host), Pb

values ranging from 40 ppm to 8800 (0.88%) with an average of 0.44%, Zn values ranging from 52500 ppm (5.25%) to 75800 ppm (7.58%) with an average of 6.87%.

Based on the encouraging analytical results for Base Metal (Pb + Zn) and other trace elements, The Geological Survey of India (GSI) has recommended 4 feasible blocks. GeoExpOre has taken on of those blocks which covers an area of 4.76 Sq. Km for further G3 Exploration based on the potentiality of Mittapalle and Jaukulapalle blocks explored for G3 by GSI during FS: 2020-21.

2.10. Previous work

2.10.1. Previous Exploration details in the proposed block area

2.10.1.1. Baseline Geological and Geochemical Data

The earliest reference to the Cuddapah Basin is found in the writings of the French traveller Tavernier (1639-67). Initial geological investigations were carried out by Oldham, King and Foote, followed by a long gap in detailed studies between 1872 and 1932. Subsequently, the Geological Survey of India (GSI) undertook systematic investigations, leading to continuous geological studies of the basin. Narayanswamy (1966) proposed the tectonic framework and revised five-fold classification of the basin, while Dutt (1952), Janawar (1961), Nagaraja Rao (1972-76), and Ramalinga Swamy (1975-79) conducted regional geological mapping in parts of the basin.

Mehdi and Nagaraja Rao (1969-70) carried out geological mapping in the Razampet Taluk area and reported minor occurrences of galena and sphalerite associated with dolomites of the Cumbum Formation. Mineralisation was observed in association with quartz, dolomite, chert, pyrite, and chalcopyrite, particularly near Rachagudipalle and surrounding areas, indicating localized base metal enrichment.

Raghupathi Rao et al. (1988-91) investigated the Polubuchchayyagaripalle-Yerrakonda-Vontimitta area, reporting lead-zinc sulphide mineralisation in the form of disseminations, stringers, and specks of galena and sphalerite. Geochemical anomalies showed values up to 1000 ppm Zn and 400 ppm Pb, while drilling intersected 2.20-3.00% Zn in favorable dolomite horizons. Mineralisation was found to be low grade and limited in strike continuity, commonly associated with cherty dolomite and carbonaceous shale contacts, suggesting syngenetic stratiform deposition.

The exposed lithologies in the area include calcareous shale, argillaceous dolomite, dolomite, cherty dolomite, and carbonaceous shale, with N-S to NNW-SSE strike and 20°-35° dips due to folding.

Structurally, the area comprises broad anticlines and synclines, including the Javusenkonda anticline and associated synformal troughs. Sulphide mineralisation mainly occurs as sphalerite and galena, accompanied by minor chalcopyrite and pyrite, generally concentrated along bedding planes and dolomite-carbonaceous shale contacts.

Reddy (1997) reported the occurrence of ultrapotassic volcanic rocks within shales of the Pullampet Formation near Naiduvaripalle, while Satyanarayana et al. (1997-99) carried out specialized thematic mapping in the Cuddapah-Vontimitta-Siddhavattam region. Their studies identified high-potash phyllites and basalts, quartz veins with baryte, dolomite bodies, and sporadic base metal mineralisation, emphasizing the role of volcanism and structure in mineralisation.

Nagdeote et al. (2016-17) reported significant geochemical anomalies with values up to 787 ppm Pb and 1807 ppm Zn associated with phyllitic dolomite bands near Jaukulapalle village. Similarly, Barman et al. (2016-17) identified sulphide-bearing dolomite bands around Vontimitta and Salapadu, recording anomalous Cu, Pb, and Zn values in bedrock and stream sediment samples.

Yadav et al. (2019) carried out regional gravity and magnetic surveys under the National Geophysical Mapping Programme (NGPM), revealing characteristic geophysical responses over lithological units and structural contacts. Distinct gravity gradients and low magnetic anomaly zones with NW–SE elongation were interpreted to indicate subsurface lithological variations and possible basement-controlled structural features within the Cuddapah Basin.

Dirsti Tanwar & Shivam Sachan, During FS:2019-20, Based on these GSI has investigated the Siddhavattam and Vontimitta areas of Cuddapah supergroup for Base metal mineralisation for an area of 100 Sq. Km in 1:12,500 Scale in Toposheet No. 57 J/15 & 57 N/03. During this investigation 278 BRS, 22 Channel samples and 50 cu. m of Trenching has been done and those samples were analyzed for Cu, Pb, Zn, Au, Ag, Sn, W, Co, Mo, As and Ni elements. The geochemical data analyses show that Zinc (Zn) values range from 15 ppm to 15.34% with a mean value of 1.84% and lead (Pb) values ranges from 5 ppm to 19.67% with a mean value of 0.77%. The (Pb+Zn) values ranges from 20 ppm to 21.75% with a mean value of 2.62% in the Siddhavattam and Vontimitta area. Based on dolomite bands which is the host for Base metals, GSI have been divided the area into four blocks. (I) Mittapalle block (1.2 sq. km) (II) Jaukulapalle block (1.0 sq. km) (III) Balayya Kunta block (2.50 sq. km) (IV) Narvakatipalle block (4.76 sq. km).

Based on the encouraging values GeoExpOre Pvt. Ltd. Has taken up Narvakatipalle Block of 4.76 Sq. Km for further G3 Exploration.

2.10.2. Baseline Geophysical Data

The Geological Survey of India conducted a multi-sensor Aerogeophysical survey under the NAGMP project over OGP Block-11 (87,429 sq. km) covering parts of Andhra Pradesh, Telangana, Karnataka, and Tamil Nadu to promote mineral exploration and geological mapping. The survey, executed by McPhar International Pvt. Ltd. (with partners), involved airborne magnetic gradiometer and gamma-ray spectrometric (radiometric) surveys using three aircrafts flying at 80 m terrain clearance, with 300 m traverse line spacing and 3000 m control line spacing. A total of 3,20,488-line km of data was acquired by March 2020, supported by GPS-based high-accuracy positioning and magnetic base stations for data correction.

3. Block description

3.1. GSI G4 investigation area

The coordinates of the Cardinal points of the GSI (G4) Investigation area covering an area of 100 Sq. Km are given in Table 3.1

Table 3.1: Coordinates of the GSI (G4) investigated area

GSI (G4) Investigation Area (100 Sq. Km)		
Cardinal Points	Latitude	Longitude
P1	14.400523	78.943013
P2	14.472889	78.961092
P3	14.417436	78.077237
P4	14.350649	78.984734

3.2. Proposed G3 investigation area

The Proposed area falls in Survey of India Toposheet no. 57 J/15 and covers an area of 4.76 Sq. km. Localities in the area include Narvakatipalle area, Y.S.R Kadapa District, Andhra Pradesh. The coordinates of Cardinal points of the proposed block are given in Table 3.2 and the location map of the proposed block in Toposheet is shown in the Figure 3.2.1.

Table 3.2: Coordinates of the Proposed (G3) Block

Proposed GeoExpOre (G3) Block (4.76 Sq. Km)		
Cardinal Points	Latitude	Longitude
A	14.381245	78.972665
B	14.388557	78.983233
C	14.361174	78.999213
D	14.354027	78.989299

PLATE - 1
LOCATION MAP OF PROPOSED BLOCK ON TOPOSHEET OF PRELIMINARY EXPLORATION (G3 STAGE)
FOR BASEMETAL AND ASSOCIATED MINERALS IN AND AROUND NARVAKATIPALLE BLOCK,
Y.S.R KADAPA DISTRICT, ANDHRA PRADESH

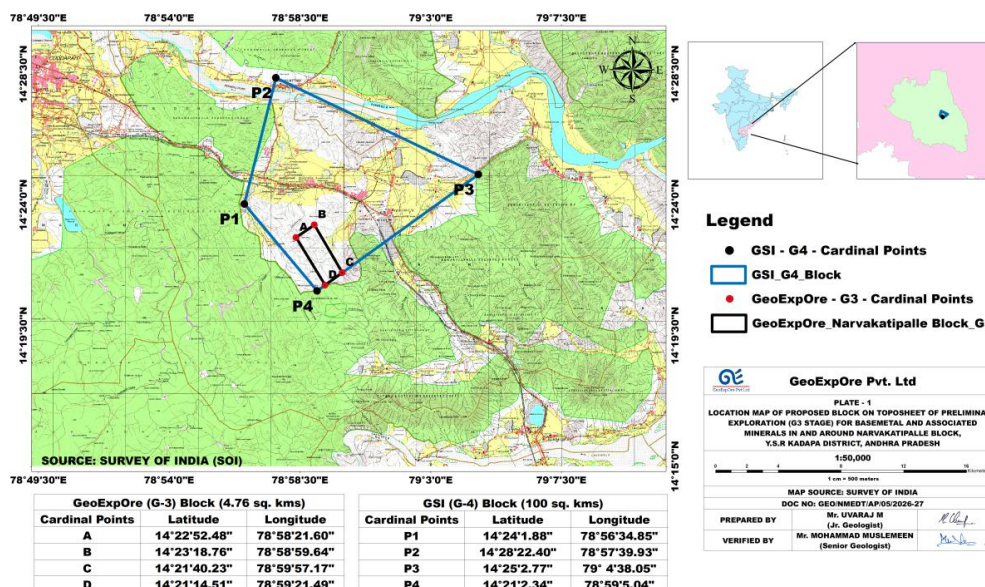


Figure 3.2.1: Location Map of Proposed Block on Toposheet

4. Planned Methodology

The proposed exploration programme has been designed in accordance with the objectives of Preliminary Exploration (G3) for the block. The exploration activities will be carried out as two phases with drilling activities in the 2nd phase. The exploration activities shall be undertaken in compliance with the provisions of the Minerals (Evidence of Mineral Contents) Rules, 2015 and the Minerals (Evidence of Mineral Contents) Amendment Rules, 2021. Accordingly, a systematic scheme of

exploration has been formulated to achieve the envisaged objectives, and the details of the proposed activities are presented in the following sections.

1st Phase

4.1. Detailed Geological Mapping (1:2,000 Scale)

Detailed Geological Mapping will be conducted across the whole area of 4.76 Sq. Km at 1:2,000 Scale. The study aims to delineate rock types and their contacts, identify Base metal hosted dolomite lithologies and preparation of maps associated with mineralization bearing formations along with structural features will be examined to assess surface manifestations and the lateral extent of mineralized zones.

4.2. Geochemical Sampling (Bedrock, Channel & Trench Sampling)

During the course of Geochemical Sampling, Bedrock samples will be collected from the outcrops. A total of 100 nos. of Primary samples from bedrock samples and from Channel samples will be collected and be analyzed for Cu, Pb, Zn, Au, Ag, Sn, W, Co, Mo, As and Ni elements ICP MS Method and associated mineralization in the area.

Further, 100 cu. m of trenching will be done across the strike of the lithology to know the lateral extension of host body and 80 nos. of samples will be collected from Trench and the same will be analyzed for the same.

4.3. Survey

The block boundary will be surveyed using DGPS, with total station measurements referenced to the WGS-84 datum for precise demarcation of the proposed area boundary points. The survey team will also map surface features and conduct contouring within the project area, supporting geological activities such as locating outcrops and sample collection. These sample locations will be accurately plotted on the map to facilitate proper interpretation of the data. Additionally, during the drilling program, the survey team will be responsible for borehole positioning, determining reduced levels, and recording borehole coordinates. 14 nos. of observation points along with boundary coordinates required for DGPS survey to carry out drilling activity.

4.4. Geophysical Survey

Ground Geophysical survey including Resistivity along with Induced Polarization (IP) and Magnetic geophysical Method will be conducted in the proposed block. A total of approximately 23 L. Km is planned for Resistivity cum. I.P to identify the subsurface presence of dolomite which is mineralized of Base metals. The Geophysical method will be done in 200m traverse interval and 20m Station interval by traversing perpendicular to the strike of the host rock. The basemap for Geophysical survey is shown in the Figure 4.4.1.

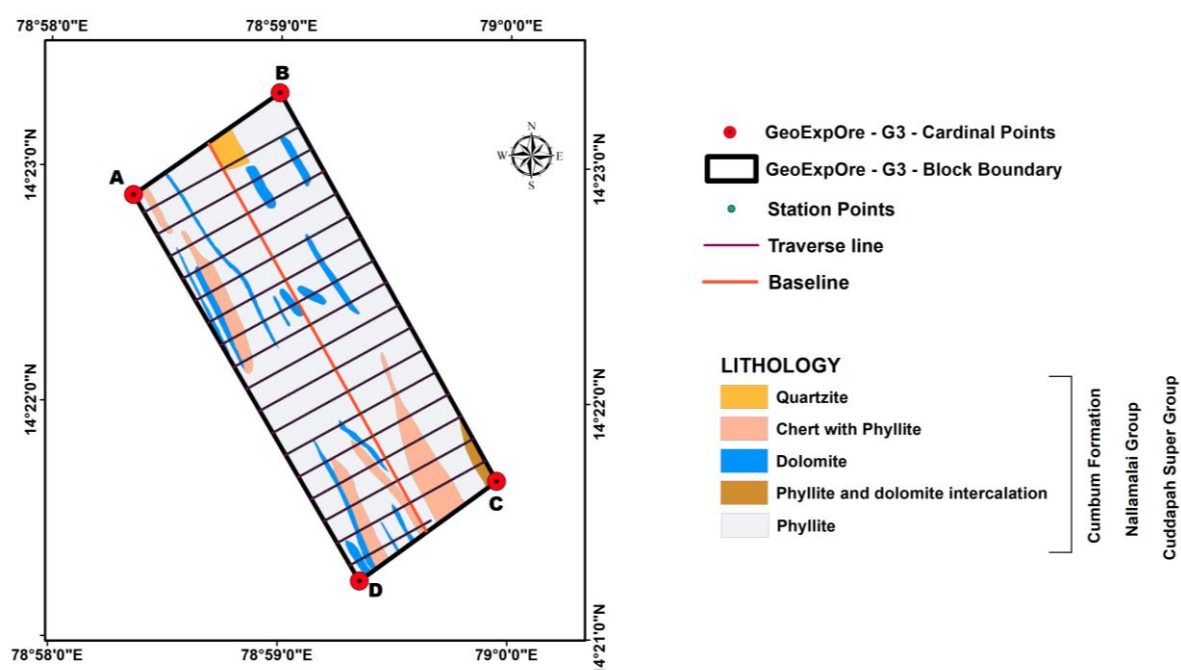


Figure 4.4.1: Geophysical grid map on Geological map

4.5. Core drilling

Based on the results of surface exploration, including geological mapping, geophysical, and geochemical surveys over a 4.76 Sq. Km area, Exploratory Boreholes will be drilled in targeted mineralized zones as shown in Figure 4.5.1. The objective is to determine the continuity of mineralized zones along the strike and dip and to assess the subsurface disposition and orientation of dolomite which host Base metal mineralization. A total of approximately 800 meters of drilling across 10 nos. of Boreholes with depth of 80 m each. The locations of the Boreholes will be confirmed after detailed geological mapping and sampling. The tentative Borehole locations are shown in the Figure below along with its hypothetical sections of those Boreholes.

TENTATIVE BOREHOLE LOCATION FOR PRELIMINARY EXPLORATION (G3) FOR BASE METALS AND ASSOCIATED MINERALS IN AND AROUND NARVAKATIPALLE BLOCK, Y.S.R KADAPA DISTRICT, ANDHRA PRADESH

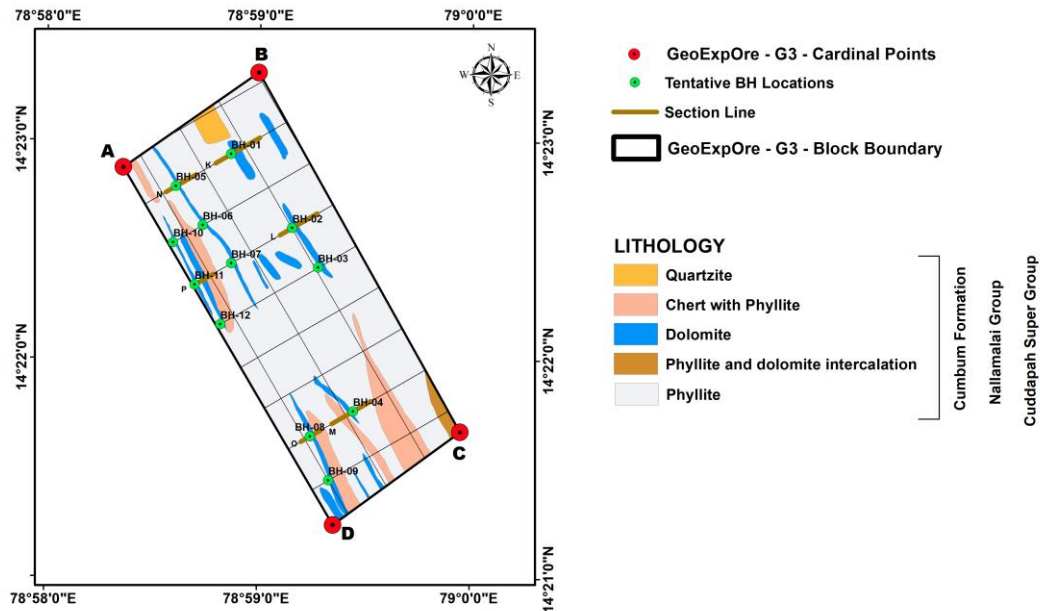


Figure 4.5.1: Tentative Borehole location on Geological Map

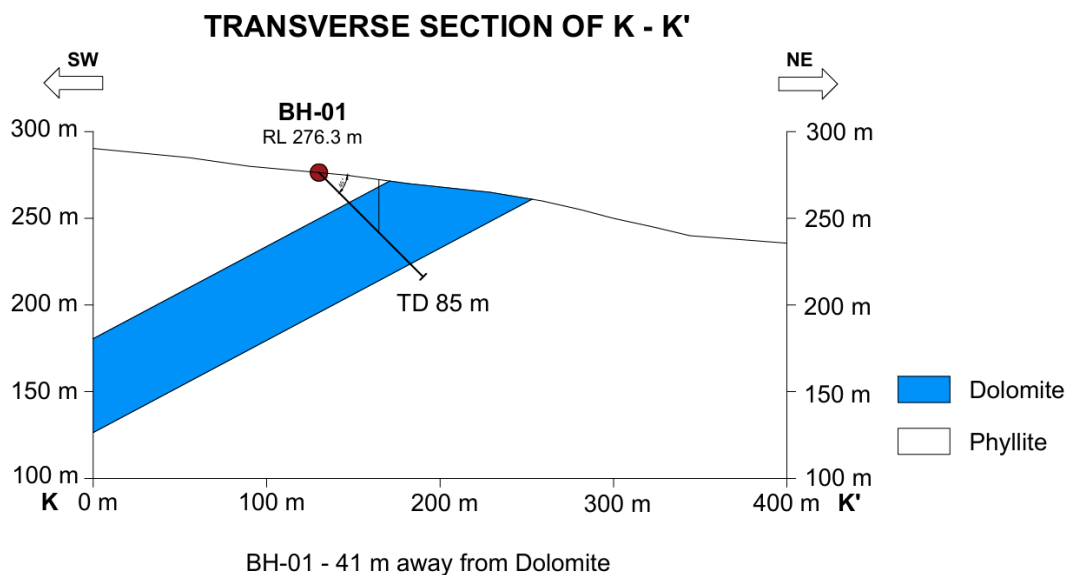


Figure 4.5.2: Hypothetical Transverse section of K - K'

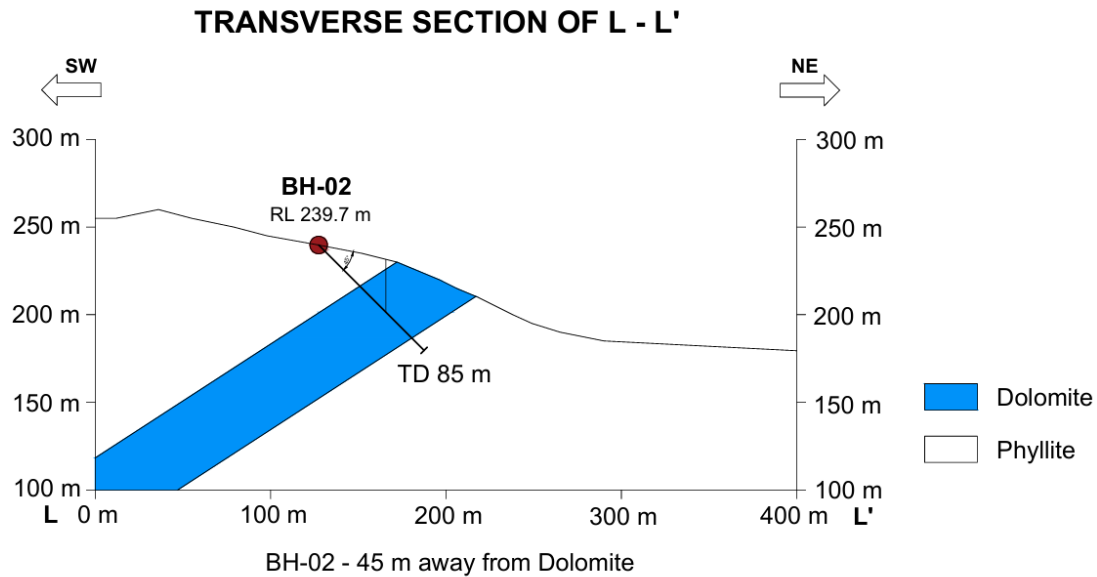


Figure 4.5.3: Hypothetical Transverse section of L - L'

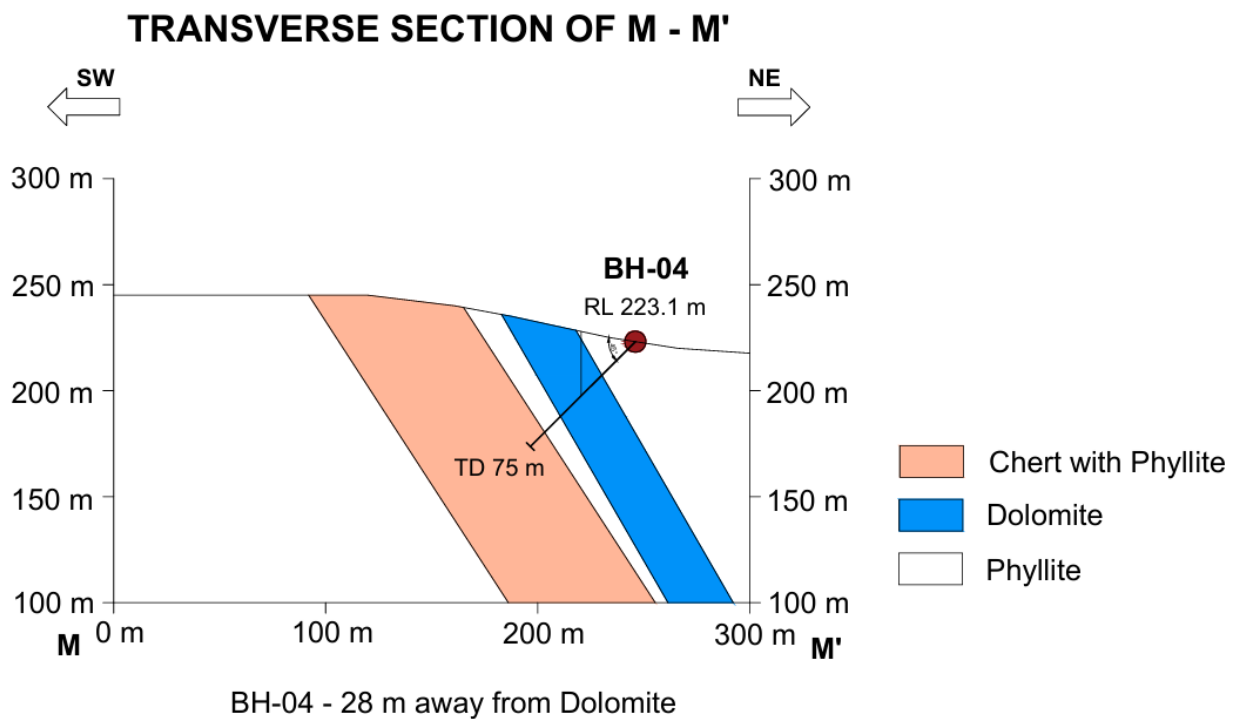
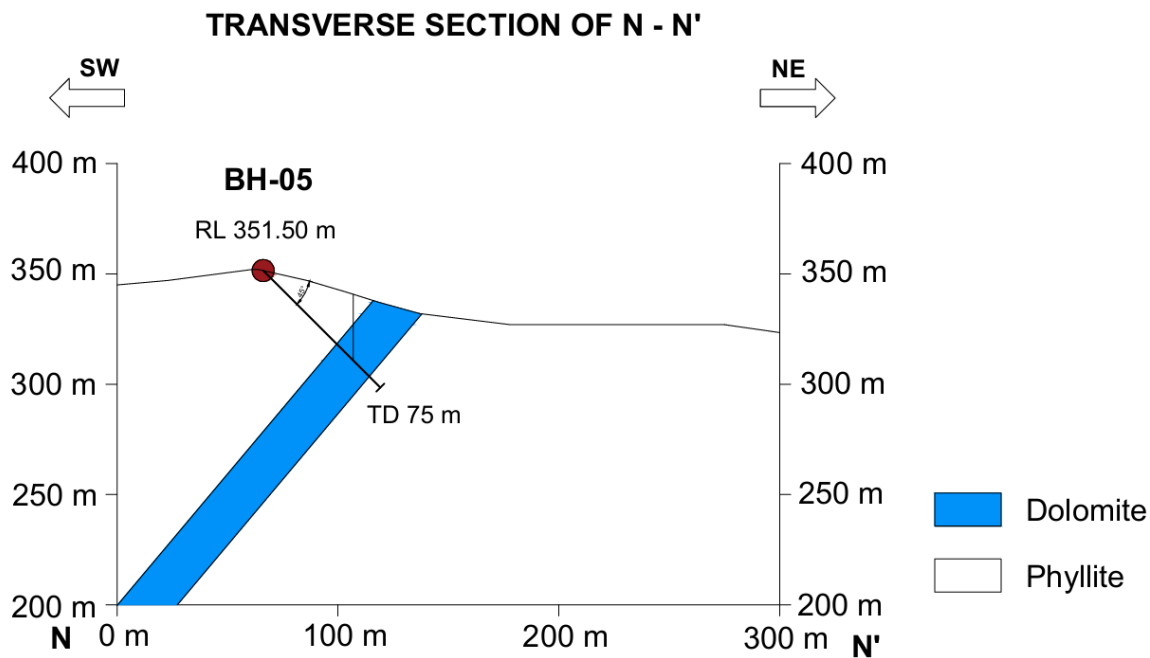
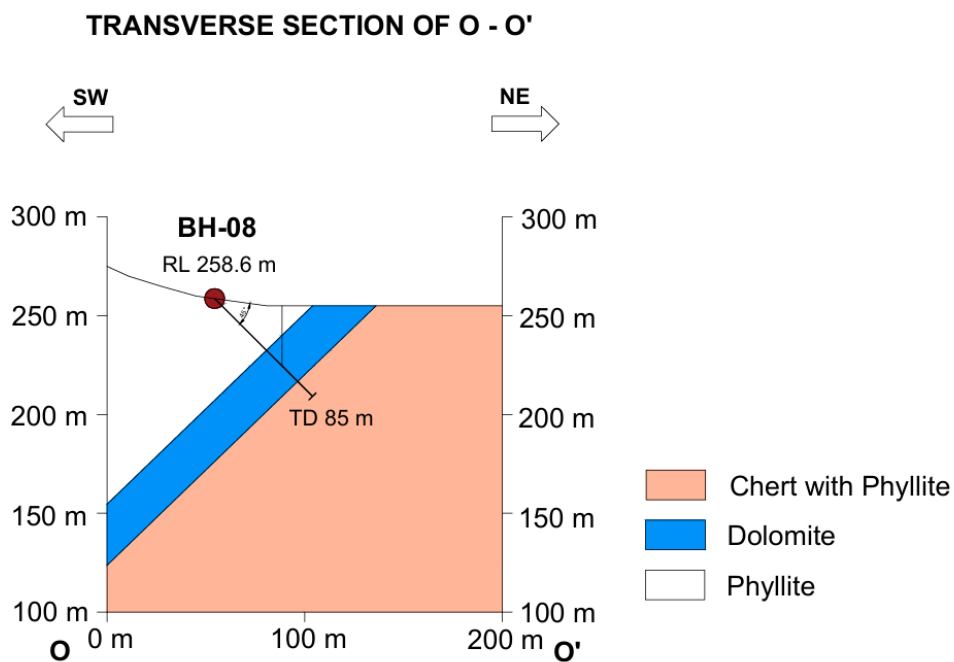


Figure 4.5.4: Hypothetical Transverse section of M - M'



BH-05 - 52 m away from Dolomite

Figure 4.5.5: Hypothetical Transverse section of N - N'



BH-08 - 50 m away from Dolomite

Figure 4.5.6: Hypothetical Transverse section of O - O'

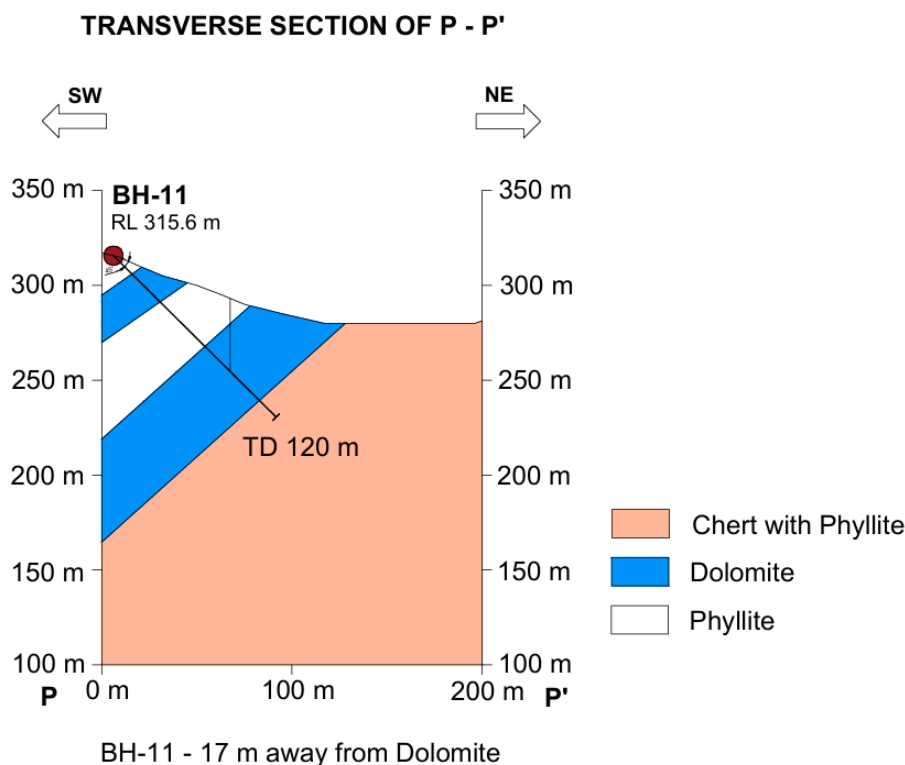


Figure 4.5.7: Hypothetical Transverse section of P - P'

4.6. Core logging

The borehole cores will be systematically logged, documenting details of lithological units, colour, structural features, texture, and mineralization. Additionally, core recovery and rock quality designation (RQD) for Base metal will be recorded to ensure a comprehensive assessment of the subsurface characteristics.

4.7. Core Sampling

The Base metal mineralized zones of drill core will be sampled as primary samples. The sample length within the mineralized zone will be maintained at 1.00 m, depending on the thickness of dolomite which is the host. Primary core samples will be Analyzed for Trace Elements including Pb, Zn, Cu by ICP MS Method.

Sampling at 1.0 m interval will be conducted where feasible, considering factors such as mineralization intensity, lithological changes and core recovery.

a) A total of 350 primary core samples will be analyzed for Trace Elements using ICP MS Method.

4.8. Whole rock Analysis

Whole rock analysis will be calculated from the sample analysis results of major oxides which is used to determine the chemical composition and variation of rock types. The analysis will include major oxides and radicals such as SiO₂, Al₂O₃, Fe₂O₃, TiO₂, MnO, CaO, Na₂O, K₂O, MgO, P₂O₅, CO₂, and S to be analyzed for 10 primary bedrock samples. This assessment will provide valuable insights into the lithological characteristics and geochemical variations within the study area.

4.9. Base metal elemental Analysis

The samples collected as Bedrock Samples, Channel Samples, Trench Samples and Core samples will be analyzed for Trace Elements including Pb, Zn, Cu by ICP MS method. In total, 100 Bedrock & Channel Samples, 80 Trench Samples and 350 Core samples.

4.10. Analysis for Gold (Au):

Further, 5 Samples will be analysed for precious metals (Gold) by Fire Assay method as it may be associated with Base metals mineralisation.

4.11. External check samples

To ensure the quality and reliability of analytical results, a Quality Assurance and Quality Control Analysis shall be done, for 10% of the analyzed samples from bedrock & Chennel samples (10 nos.), trench samples (8 nos.) and Borehole core samples (350 nos.). Those will be selected for check analysis at independent QCI–NABET accredited laboratories/institutions, such as IISc, HGML, IBM, NGRI, IIMT (CSIR) & GSI. This cross-verification will help assess the accuracy, precision, and reproducibility of analytical data and ensure reliable results for interpretation and evaluation.

4.12. Petrological & Ore Mineralogical Studies

During geochemical sampling and core logging, 10 samples from various lithological units will be examined through petrographic studies in thin cum polished sections to determine their mineralogical

and textural characteristics, ore mineral assemblages, their distribution, alteration patterns, and enrichment processes. These studies will provide critical insights into the geological and metallogenic evolution of the deposit.

4.13. XRD

Along with these Geochemical studies, selected representative samples will be subjected to X-Ray Diffraction (XRD) analysis to determine the mineralogical composition and crystalline phases present in the samples. The analysis will be carried out for identification of ore and gangue minerals, alteration assemblages, and mineral associations relevant to mineralisation and host lithology. In total, 10 nos. of samples will be analyzed through XRD.

4.14. EPMA Studies

Further, The Samples will be analyzed for exact elemental composition by the use of Electron Probe Micro-Analyzer for approximately 10 hours.

4.15. Bulk density Determination

Bulk density measurements will be conducted on 5 samples from the mineralized zones intersected in the boreholes. This analysis will provide essential data for resource estimation and help assess the tonnage potential of the Base metal mineralization.

4.16. Resource Estimation

The resource estimation will be carried out in accordance with the United Nations Framework Classification (UNFC) norms and the Minerals (Evidence of Mineral Contents) Rules, 2015 (MEMC Rules, 2015) at the G-3 (Prospecting) level. The estimation process will incorporate geological, geophysical, geochemical, and drilling data to delineate the mineralized zones and evaluate their continuity, grade, and tonnage.

5. Nature, Quantum and target

5.1. Timeline chart of the Project

Time Schedule for Preliminary Exploration (G3) for Base Metals and Associated minerals in Narvakatipalle Block, Y.S.R Kadapa District, Andhra Pradesh																				
S. No	Nature of Work		1	2	3	REVIEW	4	5	6	REVIEW	7	8	9	REVIEW	10	11	12			
1	Camp Setting	Months																		
2	Geological Mapping (1:2000 Scale)	Days																		
3	Bed rock & Channel Sampling	Days																		
4	Trenching	L.Km																		
5	Laboratory Studies	Days																		
6	I.P Geophysical Survey	Months																		
7	Exploratory Drilling	Days																		
8	Geologist Party Days (HQ)	Months																		
9	Camp Winding	Days																		
10	Geological Report Writing with Peer Review and submission	Months																		

6. Cost Estimation

Cost Estimate - Title on "Preliminary Exploration (G3 Stage) for Base Metals and Associated Minerals in Narvakatipalle Block, Y.S.R Kadapa District, Andhra Pradesh"							
Area of 4.76 Sq. Km, Scale: 1:2,000, No. of BH:10 nos., Borehole depth: 80 m ; Total drilling - 800 m; Schedule timeline - 12 months Review: After 3,6 and 9 Months							
S. No.	Item of Work *	Unit *	Rates as per NMET SoC 2025-26		Estimated Cost of the Proposal		Remarks
			SoC-Item No. *	Rates as per SoC * (a)	Qty. (b)	Total Amount (Rs) (a*b)	
	1st Phase						
A	Geological Mapping, Other Geological Work & Surveying						
i	Geological mapping, (1:2,000 scale) & Trenching, drilling work	Per sq. km	1.1	18,300	4.76	87,108	
ii	Charges for Geologist per day (Field) for geological mapping & trenching work	day	1.2.1a	14,500	140	20,30,000	For Mapping, Trenching and Drilling
iii	Labours Charges (2 Nos.); Base rate	day	5.8	556	280	1,55,680	
iv	Charges for Geologist per day (HQ)	day	1.2.1a	10,500	40	4,20,000	
v	Charges for surveyor for mapping	Day	1.3.1	10,500	40	4,20,000	
vi	Labours for Surveyor (4 Nos.)	Day	5.8	556	160	88,960	
vii	Charges for one Sampler per day	one sampler per day	1.2.1b	7,850	68	5,33,800	

viii	Labours (4 Nos) (for sample processing)	day	5.8	556	272	1,51,232	
	Sub Total – A					38,86,780	
B	Ground Geophysical Survey						
i	Induced Polarisation	L. Km	3.4a	69950	20	13,99,000	
	Sub Total – B					13,99,000	
C	Trenching/Pitting						
i	Excavation of Trenches	per cu. m	2.1.1	4,125	100	4,12,500	10 Trenches (10*1*1)
	Sub Total – C					4,12,500	
D	Survey work						
i	DGPS Survey for BH fixation & RL determination	Per Point of observation	1.3.2	24,000	14	3,36,000	10 Boreholes + 4 Cardinal points = 15
	Sub Total – D					3,36,000	
E	LABORATORY STUDIES						
1	Chemical Analysis						
i)	Geochemical Sampling-Surface samples (Bedrock/Soil/SS)						
a)	BRS / Channel Base metal elemental analysis – Trace by ICP MS Method	Nos.	4.1.16 f	7,400	100	7,40,000	Surface bedrock & channel samples
ii)	Surface Check samples (10% External)						
a)	BRS / Channel Base metal elemental analysis – Trace by ICP MS Method	Nos.	4.1.16 f	7,400	10	74,000	10 % of the Primary samples
iii)	Trench & Check Samples from Trench						
	Trench Samples						
a)	Base metal elemental analysis – Trace by ICP MS Method	Nos.	4.1.16 f	7,400	80	5,92,000	
iv)	Trench Check samples (10% External)						

a)	Trench Samples - Base metal elemental analysis – Trace by ICP MS Method	Nos.	4.1.16 f	7,400	8	59,200	10 % of the Primary samples
	Sub Total – E					14,65,200	
	2 nd Phase						
F	Geological Work						
	Drilling (in-House) (After Review)						
i	Drilling (Very Hard rock) (HQ size)	Per m	2.2.1.1d	10,000	800	80,00,000	
ii	Land / Crop compensation (in case the BH falls in agricultural Land)	Per BH	5.6	30,000	10	3,00,000	As per actuals as certified by local authorities subject to a maximum of 30,000 per bore hole
iii	Construction of concrete pillar (12” x 12” x 30”)	Per BH	2.2.7	2,000	10	20,000	As per actuals
iv	Borehole plugging by cement	Lumpsum per BH	2.2.8	10,000	10	1,00,000	per borehole
v	Drill Core Preservation	per m	5.3	1,590	400	6,36,000	(400 m to be preserved, 1 complete BH + mineralised zones from other boreholes
vi	Transportation of Drill rig & Truck associated per drill (2 Rigs)	Lumpsum	2.2.9	Miscellaneous charges (Transportation of Drilling Rig, Accommodation for Drill camp, Camp setting and winding construction of Approach Road and Drill core preservation)		15,00,000	For Drilling cost more than 1 Crore and less than 2 Crores: 15% of the Drilling Cost with a maximum ceiling of ₹ 20 lakh.
vii	Monthly Accommodation charges for drilling camp (up to 2 rigs)						
viii	Drilling camp setting cost						
ix	Drilling camp winding up cost						
x	Road making (Flat Terrain)						

	Sub Total - F					1,05,56,000	
G	LABORATORY STUDIES						
1	Chemical Analysis						
v)	BH Core samples						
a)	Base metal elemental analysis – Trace by ICP MS Method	Nos.	4.1.16 f	7,400	350	25,90,000	
vi)	BH Core samples (10%External)						
a)	Base metal elemental analysis – Trace by ICP MS Method	Nos.	4.1.16 f	7,400	35	2,59,000	10 % of the Primary samples
b)	XRD Studies	Nos.	4.5.2	4,000	10	40,000	
d)	Major oxides (WD XRF) – (oxides + Traces -24 elements)	Nos.	4.1.17 a	4,200	10	42,000	
e)	Analysis for Au by Fire Assay method	Nos.	4.1.5a	3,500	5	17,500	
2	Physical & Petrological Studies						
i	Preparation of Polished cum. thin section	Nos	4.3.1	800	10	8,000	
ii	Complete petrographic /ore microscopic study/mineragraphic report of rock sample (along with 5 nos. digital photo micrographs)	Nos	4.3.4	2,800	10	28,000	
iii	Bulk Density	Nos	4.8.3	2,500	5	12,500	
iv	EPMA studies	per hour	4.4.1	10,500	10	1,05,000	
	Sub Total - G					31,02,000	
H	Total A to G					2,11,57,480	
I	Preparation of Exploration Proposal		5.1	2% of the Cost or Rs. 5.0 Lakhs whichever is less		4,23,150	

J	Geological Report Preparation (5 Hard copies with a soft copy)	Cost per 5 Hard copies with a soft copy	5.2	5.2 (iii)		7,50,000	Total cost of the project exceeding ₹150 lakh ₹7.5 lakh
K	Peer review Charges		As per EC decision			30,000	
L	Total Estimated Cost without GST					2,23,60,630	
M	Provision for GST (18% of L)					40,24,913	GST will be reimbursed as per actual and as per notified prescribed rate
N	Total Estimated Cost with GST					2,63,85,543	
				or Say Rs. In Lakhs		263.86 Lakhs	
Note:							
1	Strict adherence to the Ministry of Finance's and GFR guidelines is mandatory. Every transaction must adhere to GFR rule 21.						
2	In case of delay/non- performance, the appropriate action will be taken by competent authority against delinquent agency as per prevailing govt. of India rules/guidelines on procurement.						
3	If any part of the project is outsourced, the amount will be reimbursed as per the Paragraph 6 of NMEDT SoC. In case of execution of the project by NEA/NPEA on its own, a Certificate regarding non outsourcing of any component/project is required.						
4	Necessary efforts should be made to minimize any adverse impact on the environment during exploration activities.						
5	Any item of work not mentioned above shall be added as per SoC.						
6	All the Geological Reports and data are to be uploaded on NGDR as per MERT template by the agency.						

7. References

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Dirsti Tanwar, Shivam Sachan, 2019-20: Report on “Reconnaissance Survey for Base metal mineralization in Siddhavattam and Vontimitta areas of Cuddapah supergroup, Kadapa district, Andhra Pradesh” (Stage: G-4). Item Code: M2AFGBM/MEP/NC/SR/SU-AP/2019/28215.

8. List of Plates

- I. PLATE – 1: Location of the Proposed Block on SOI Toposheet
- II. Documents mentioned in item 4(d) above
 - a) PLATE – 2: Location of the block demarcated in Regional Geological Map
 - b) PLATE – 3: Geological Map of GSI G4 Block
 - c) PLATE – 4: Bedrock Sample locations incorporated in Narvakatipalle block
 - d) PLATE – 5: Channel Sample locations incorporated in Narvakatipalle Block
 - e) PLATE – 6: Location of Proposed block demarcated on Google Earth

PLATE – 1: LOCATION OF THE PROPOSED BLOCK ON SOI TOPOSHEET

PLATE - 1
LOCATION MAP OF PROPOSED BLOCK ON TOPOSHEET OF PRELIMINARY EXPLORATION (G3 STAGE)
FOR BASEMETAL AND ASSOCIATED MINERALS IN AND AROUND NARVAKATIPALLE BLOCK,
Y.S.R KADAPA DISTRICT, ANDHRA PRADESH

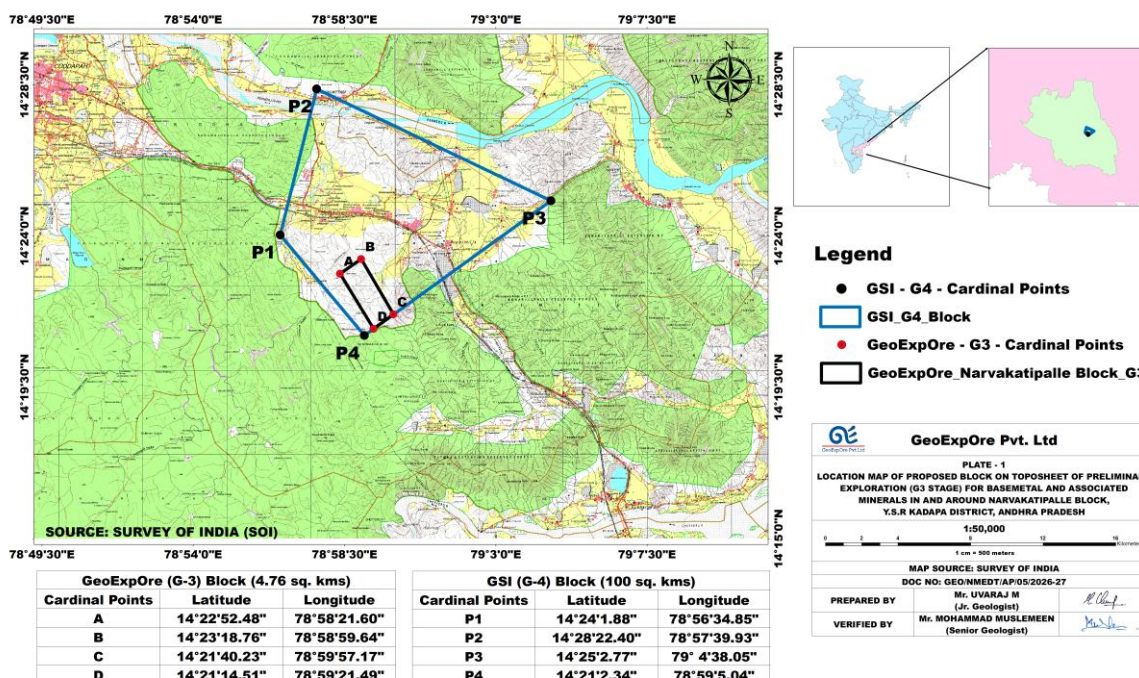


PLATE – 2: LOCATION OF THE BLOCK DEMARCATED IN REGIONAL MAP

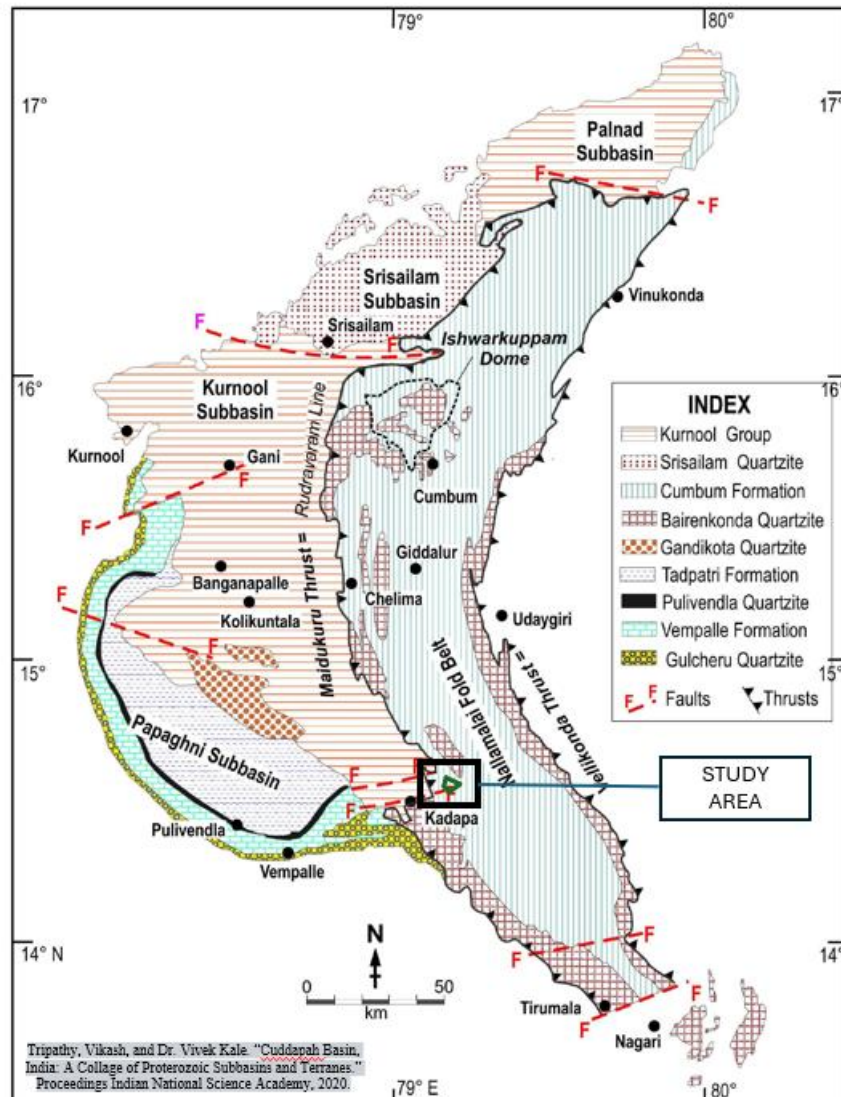


PLATE – 3: GEOLOGICAL MAP OF GSI G4 BLOCK

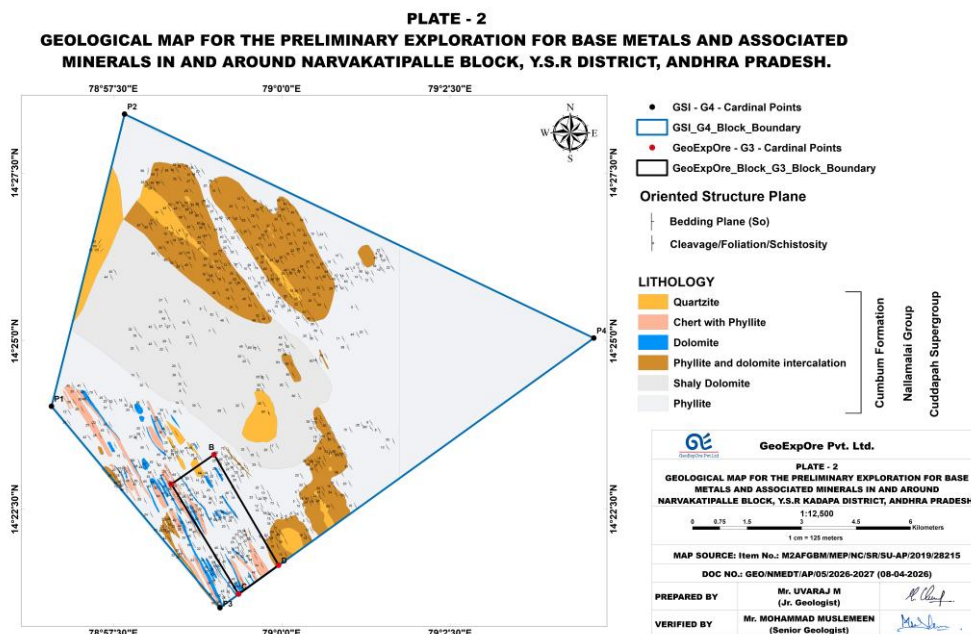


PLATE – 4: BEDROCK SAMPLE LOCATIONS INCORPORATED IN NARVAKATIPALLE BLOCK

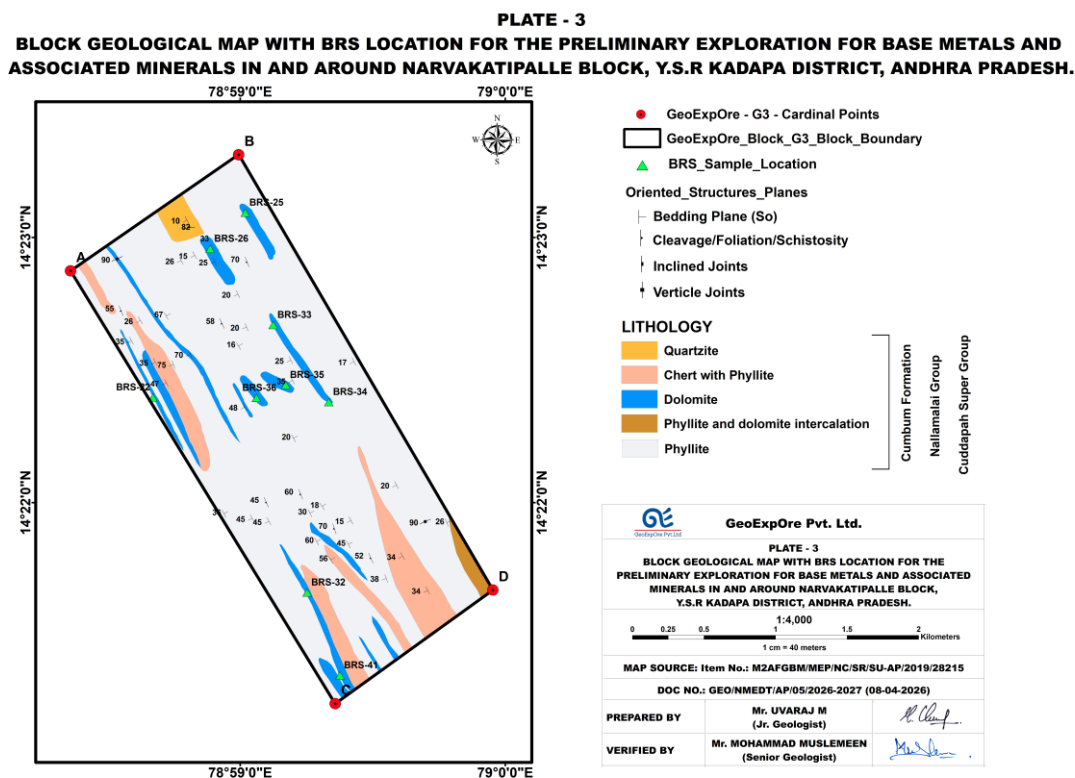


PLATE – 5: CHANNEL SAMPLE LOCATIONS INCORPORATED IN NARVAKATIPALLE BLOCK

PLATE - 3
BLOCK GEOLOGICAL MAP FOR THE PRELIMINARY EXPLORATION FOR BASE METALS AND ASSOCIATED MINERALS IN AND AROUND NARVAKATIPALLE BLOCK, Y.S.R KADAPA DISTRICT, ANDHRA PRADESH.

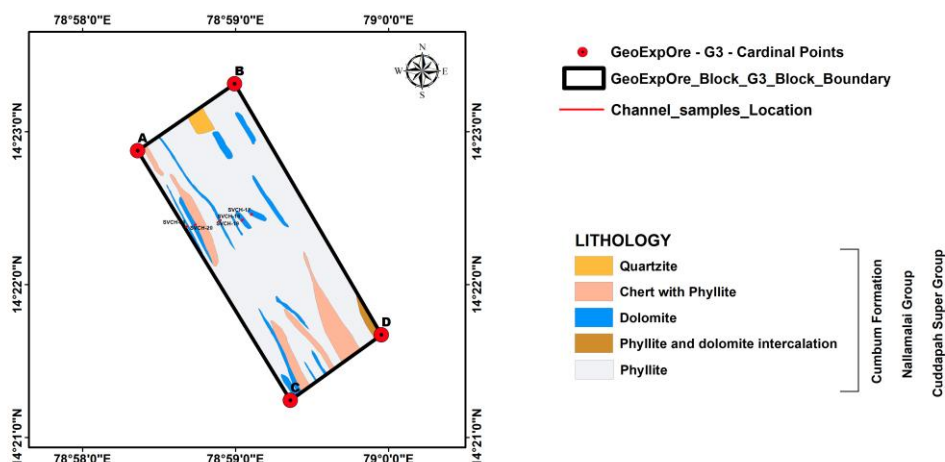


PLATE – 6: LOCATION OF THE PROPOSED BLOCK DEMARCATED ON GOOGLE EARTH



9. Checklist for exploration agencies for submission of exploration project proposals

Name of Project/Block: Preliminary Exploration (G3 Stage) for Base Metals and Associated minerals in Narvakatipalle block, Y.S.R Kadapa district, Andhra Pradesh.

Agency: GeoExpOre Private Limited

Nodal Personnel (Agency): Dr. Channamallikarjun B Patil

Date: 10/04/2026

Sl. No.	Items to be Verified by Agency	Yes/No	Page Number in submitted Document
1	Geospatial scrutiny completed using KML/coordinate dataset and AOI assessed (including exploration activities, mining areas, eco zones, dependencies).	Yes	49
2	Total Forest area in proposed block - with pic from PM Gatishakti portal. Type of forest (RF/PF/Sanctuary/National Reserve Forest) to be mentioned.	Yes	49
3	Overlap study of previous exploration work carried out in any exploration agencies/departments, or ongoing/proposed exploration work by any agencies/departments done	Yes	50
4	Baseline data availability (NGCM, NGPM, Geological Maps, Airborne geophysical data etc) on NGDR confirmed and reflected in comments.	Yes	50
5	Processing of Baseline Geoscience data (NGCM, NGPM, Geological Maps, Airborne geophysical data etc), legacy exploration data of proposed area, integration, analysis and interpretation presented in the project proposal/DPR	No	NA
6	Existing leases (ML/CL/EL etc.) in and around project area verified through NGDR/State DGM/Ministry of Mines	Yes	50
7	Whether the area falling within the buffer zone of International Boundary, Wildlife sanctuary, no-go zone, Biodiversity Park etc.	No	NA
8	Literature review and previous findings submitted by agency verified and reflected in DPR/In-principle	Yes	1

	<i>(Page number of the particular to be mentioned in Reference / Bibliography)</i>		
9	Whether the agency has carried out field work in the proposed area, collected samples and presented their findings with analytical data in project proposal/DPR	No	NA
10	Justification for proposed commodities and details of previous work included in DPR/In-principle. Reference to NMEDT's ongoing/completed projects verified and included in comments.	Yes	5

Other Information

Accreditation of Agency:

Date: March 23, 2025

Valid Upto: March 22, 2028

Notification of Agency:

Date: October 30, 2025

Valid Upto: October 29, 2030

Personnel Deployed

As per QCI NABET - 6

Current strength - 6 + 7 (Submitted to NABET for addition of employees is

Under Progress - QCI/NABET/AEA/0153/SUP.)

Total no. of Projects funded by NMEDT:

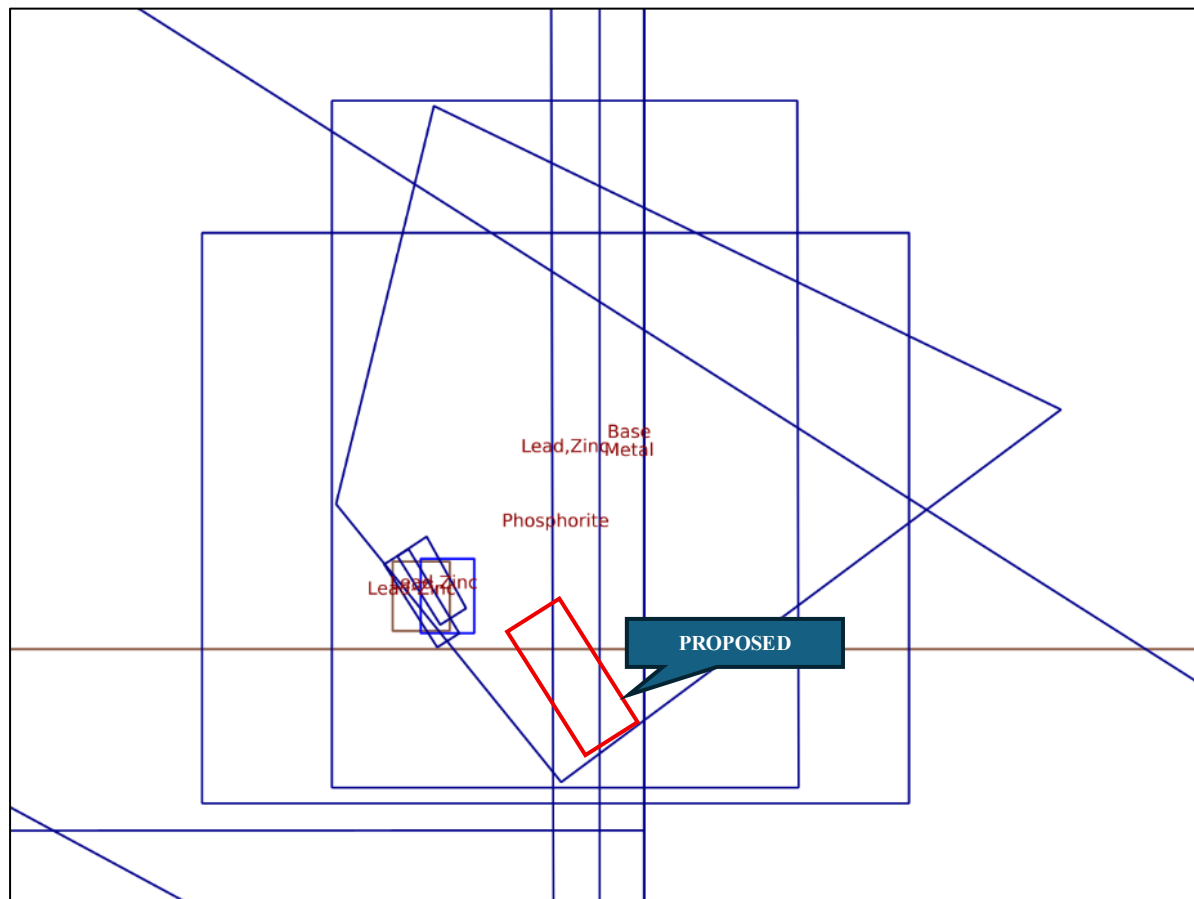
Approved – 9

Completed – 3

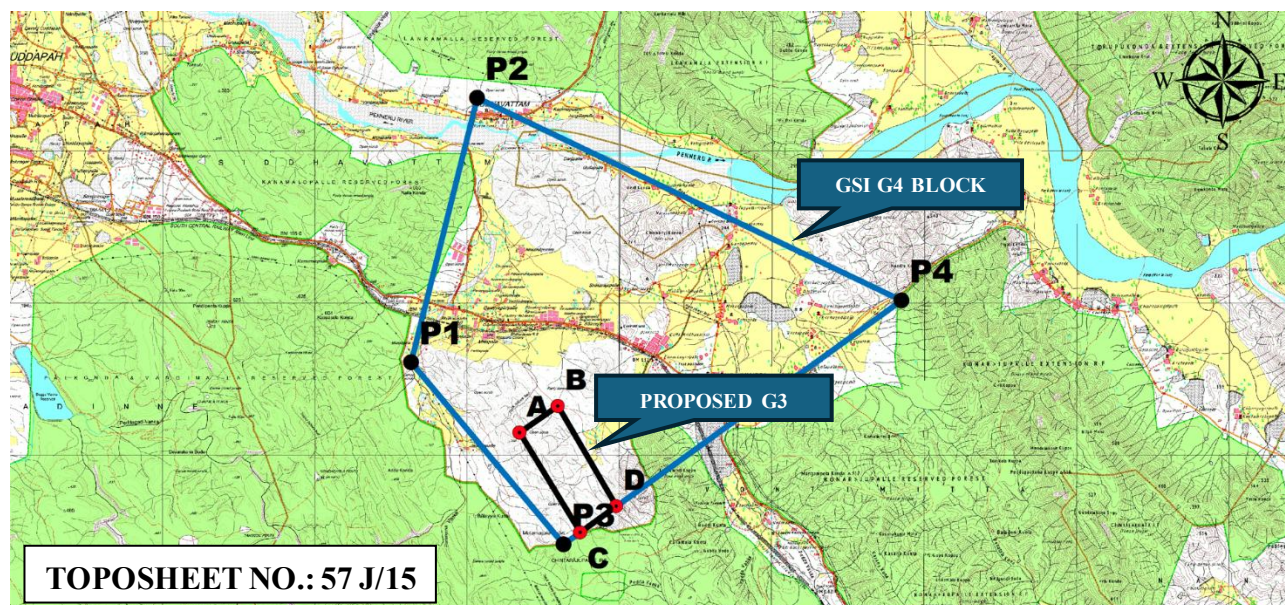
Ongoing – 6

Comments of Nodal Personnel (Agency), if any:

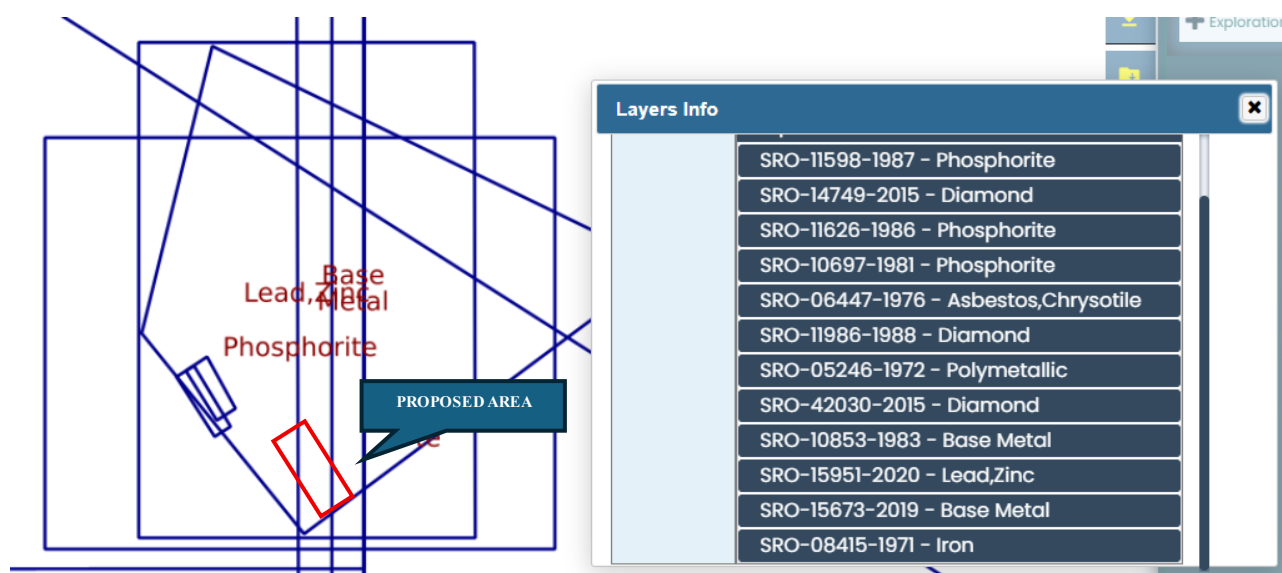
1. geospatial scrutiny for the proposed area has been checked in NGDR portal and reference photo has been attached.



2. No forest cover is present in the proposed area.



3. Details of overlap study of previous exploration work carried out by other agencies.

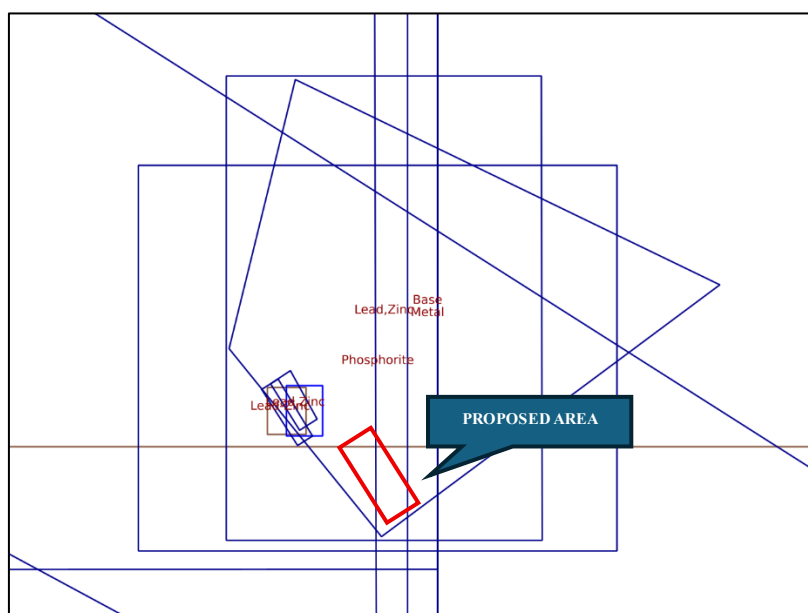


4. Details of the baseline data available in the proposed area.

Type of data	Availability
Geological data	Yes (1:50,000 & 1:25,000)
Geochemical data	Stream Sediment only
Geophysical data – Ground	No
Geophysical – Airborne	Yes
Geomorphological data	Yes

5. No processing of Baseline data has been done.

6. No existing lease is present in and around the proposed block area. Reference photo is attached.



7. The proposed area does not fall within the buffer zone of International Boundary, Wildlife sanctuary, no-go zone, Biodiversity Park etc.

8. Literature review and previous findings done by GSI is submitted in the other documents sections along with the Annexures.

9. No, The agency has not carried out field work in the proposed area, collected samples and presented their findings with analytical data in project proposal/DPR.

10. Justification for proposed commodities and details of previous work.

- The geochemical analysis of the proposed Narvakatipalle Block identified 12 potential dolomite bands trending NNW-SSE with a low to steep dip (E-W) from previous investigation done by GSI
- The cumulative strike of dolomite band is 6.82 kms with a width of 15-30 m.
- Geochemical Analysis result: From 9 BRS samples which falls in the block.
 - Zn: 15 ppm to 9.25% (Mean: 2.59%)
 - Pb: 5 ppm to 5.12% (Mean: 0.93%)
 - Pb+Zn: 20 ppm to 11% (Mean: 3.53%)
- Previous Work done by GSI:
 - REPORT ON “RECONNAISSANCE SURVEY FOR BASE METAL MINERALIZATION IN SIDDHAVATTAM AND VONTIMITTA AREAS OF CUDDAPAH SUPERGROUP, KADAPA DISTRICT, ANDHRA PRADESH” (STAGE: G-4). FS: 2019 – 20

- Item Code: M2AFGBM/MEP/NC/SR/SU-AP/2019/28215

Certification

I hereby certify that the above checklist has been duly completed and all verifications have been carried out as per the guidelines.

Signature of Nodal Personnel (Agency):



Name: Channamallikarjun B Patil

Designation: Director

Date: 10-04-2026