DETAILED PROPOSAL REPORT (DPR)

RECONNAISSANCE SURVEY (G4) FOR REE & RM MINERALIZATION IN SEETHARAMPURAM AREA, BHADRADRI KOTHAGUDEM DISTRICT, TELANGANA

COMMODITY: REE & RM Mineralization

By

M/S GMMCO Technology Services Ltd (GTS)

Hyderabad, Telangana

CKA Birla Group | GTS

FOR SUBMITTING PROPOSAL FOR UNDERTAKING PRELIMNARY EXPLORATION

From:	To:
Dr. Akkala Surendra Babu	The Director & HoD
Chief of Technical Services	National Mineral Exploration Trust, Secretariat, Ministry of Mines,
GMMCO Technology Services Ltd ("GTS")	Room No-325 & 326, Wing-F, Udyog Bhawan,
9th Floor (9A/2), Vaishnavi Cymbol, Puppalaguda, Gandipet Mandal,	Rajpath Area, Central secretariat
Rangareddy District, Hyderabad – 500089	New Delhi – 110011.

1. Name and address of the Applicant		
(a)	Name	GMMCO Technology Services Ltd ("GTS")
(b)	Postal address	GTS Ltd, 9th Floor (9A/2), Vaishnavi Cymbol, Puppalaguda, Gandipet Mandal, Rangareddy District, Hyderabad, Telangana, India– 500089
(c)	Telephone No(Office)	+91-7032711678
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(e)	Mobile No	+91-7032711678
(f)	Telephone No(Residence)	
(g)	E-mail address	pundarikarao.d@gts-india.com

2. Detail of Accreditation as Private Exploration Agencies and Notification under the Provision to Section 4(1) of the MMDR Act.		
(a)	Date of accreditation granted by QCI-NABET	20th May - 2024
(b)	Date of expiry of accreditation	15th May - 2027
(c)	Date of Notification under the provision to Section 4(1) of the MMDR Act.	13th September - 2024
(d)	Date of expiry of notification	12th September - 2027
(e)	Category of the Exploration agency (Category A or B) under Notification	Category – A
3. Location details of the area proposed		
(a)	State	Telangana
(b)	District (s)	Bhadradri Kothagudem
(c)	Nearby village (s)	Seetharampuram, Mahadevpuram, Turubaka
(d)	Survey of India (SOI) Toposheet No(s)	65C/13
(e)	Area in Sq. Km	84

(f) Boundary co-ordinates of the Proposed Block (in Decimal Degree)

Corner Points	**Latitude**	**Longitude**
A	17.750375	80.899742
B	17.793631	80.828342
C	17.878148	80.868798
D	17.826031	80.932142

4. Mineral Potential of the area		
(a)	Name of Mineral(s) identified/expected in the area/block	REE and RM mineralization
(b)	Title of the Project	Reconnaissance Survey (G4) for REE & RM mineralization in Seetharampuram area, Bhadradri Kothagudem District of Telangana (84 Sq. Km)
(c)	Stage of Exploration	G-4
(d)	Basis on which mineral potential of the area has been identified	Please refer enclosed "Summary proposal"
5. Documents enclosed with the application		
(i)	Location of the proposed block demarcated on Survey of India (SOI) Toposheet No. 65C/13	
(ii)	Documents mentioned in item 4(d) above.	

Signature of the applicant

Dr. Akkala Surendra Babu
Chief of Technical Services
GMMCO Technology Services Ltd
Mobile: 9630459992
Email: surendrababu.a@gts-india.com

Place: Hyderabad
Date: 18.06.2026

Summary of the Block

Reconnaissance Survey for REE & RM mineralization in Seetharampuram area, Bhadradri Kothagudem district, Telangana (84 Sq.Km, G4-stage)

<table>
<tr><th>S.No</th><th>Features</th><th>Details</th></tr>
<tr><td></td><td>Block ID</td><td>Seetharampuram Block</td></tr>
<tr><td></td><td>Exploration Agency</td><td>M/s GMMCO Technology Services Limited Hyderabad, India.</td></tr>
<tr><td></td><td>Commodity</td><td>REE and RM</td></tr>
<tr><td></td><td>Mineral Belt</td><td>Bengpal Gneissic Complex of Baster Craton</td></tr>
<tr><td></td><td>Completion Period with entire Time schedule to complete the project</td><td>Ten (10) months</td></tr>
<tr><td></td><td>Objectives</td><td>1. To target younger granites and pegmatites of Bengpal Gneissic Complex of Baster Craton and PGC, for delineation of Rare Earth Element (REE) and Rare Metal (RM) mineralized zones.
2. To assess and establish G-4 category (UNFC code 334) reconnaissance level prospects for REE & REE within the block, in accordance with UNFC norms.</td></tr>
<tr><td></td><td>Whether the work will be carried out by the proposed agency</td><td>M/s GMMCO Technology Services Limited Hyderabad, India</td></tr>
<tr><td></td><td>Name/Number of Geoscientists</td><td>Two Senior Geologists</td></tr>
<tr><td></td><td>Expected Field days(Geology)Geological Party Days</td><td>Two Senior Geologists: 200 days (2x100 days)</td></tr>
<tr><td>1.</td><td>Location</td><td></td></tr>
<tr><td></td><td>Latitude and Longitude</td><td>
<table>
<tr><th>Corner Points</th><th>Latitude</th><th>Longitude</th></tr>
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</table>
</td></tr>
<tr><td></td><td>Villages</td><td>Seetharampuram, Mahadevpuram, Turubaka</td></tr>
<tr><td></td><td>Tehsil /Taluk</td><td>Dummugudem Mandal</td></tr>
<tr><td></td><td>District</td><td>Bhadradri Kothagudem</td></tr>
<tr><td></td><td>State</td><td>Telangana</td></tr>
<tr><td>2.</td><td>Area(hectares/square kilometers)</td><td></td></tr>
<tr><td></td><td>Block Area</td><td>84 Sq. Km</td></tr>
<tr><td></td><td>Forest Area</td><td>Plain area</td></tr>
<tr><td></td><td>Government Land Area</td><td>Data not available</td></tr>
<tr><td></td><td>Private Land Area</td><td>Data not available</td></tr>
<tr><td>3.</td><td>Accessibility</td><td></td></tr>
</table>

	Nearest Rail Head	Kothagudem Railway station
	Road	Seetharampuram is a Village in Dummugudem Mandal in Kothagudem District of Telangana State. It is located 30 KM towards north of Badrachalam.
	Airport	The nearest airport is Rajiv Gandhi International Airport (RGIA), Hyderabad
4.	**Hydrography**	
	Local Surface Drainage Pattern (Channels)	Low-lying pedeplain occupying the central part of the area along both the right and left banks of the Godavari River.
	Rivers/Streams	Godavari River
5.	**Climate**	
	Mean Annual Rainfall	The mean annual rainfall in Bhadradri Kothagudem, generally ranges between over 860 mm and 1183 mm
	Temperatures (December) (Minimum) Temperatures (June) (Maximum)	Tropical climate with hot summers, mild winters, and southwest monsoon rainfall.
6.	**Topography**	
	Toposheet Number	65C/13
	Morphology of the Area	The proposed area is gentle undulations and low lying areas
7	**Availability of baseline geosciences data**	
	Geological Map (1:50K/25K)	Regional Geological Map - GSI (1:50000 scale)
	Geochemical Map	NGCM data available
	Geophysical Map (Aeromagnetic, ground geophysical, Regional as well also Local scale GP maps)	NGDR
8.	**Justification for taking up Reconnaissance Survey / Regional Exploration**	Previous investigations by the Geological Survey of India (Sundarlingam et al., STM, 2018) have reported significant enrichment of Total Rare Earth Elements (TREE) within feldspathic and younger granites, recording TREE values of **3452 ppm** and **3387 ppm**, respectively, and recommended detailed exploration. In view of the significant TREE enrichment, the Seetharampuram block is proposed for G4 (Reconnaissance) stage investigation. The proposed programme aims to evaluate the REE and Rare Metal (RM) potential of younger granites and associated pegmatites of the Neoarchean – Palaeo-proterozoic Peninsular Gneissic Complex-II (PGC-II) and Palaeo-proterozoic rocks of the Bastar Craton. The block occupies a geologically strategic position along the tectonic contact between the Bastar Craton and the

		Archaean Peninsular Gneissic Complex of the Eastern Dharwar Craton, marked by a prominent NE-SW trending regional shear zone that has facilitated emplacement of granites and localisation of REE mineralisation. As per the recommendations of the committee during the 91st (TTC1) meeting, GMMCO Technology Services Limited, Hyderabad carried out field work in and around Reguballi, Narsapuram and Seethrampuram areas of the proposed block. The bedrock samples were collected from the granite (Porphyritic nature), Calcsilicate rocks and allanite bearing pegmatites Bengpal Gneissic Complex and which were, analyzed at Chemical Laboratory, Geological Survey of India, Hyderabad. The analytical results indicate significant TREE concentrations, ranging from 241 to 4081.8 ppm (n=4) and Table no…. These findings indicate promising potential for undertaking G4-stage exploration. Analysis report is attached in Annexure-1 and sample locations are shown in plate -6.

Reconnaissance Survey for REE & RM mineralization in Seetharampuram Area, Bhadradri Kothagudem district, Telangana (84 Sq.Km, G4-stage)

Contents

Block Summary

1. Introduction

The proposed Seetharampuram block is located in a geologically complex terrain comprising Neoarchaean–Palaeoproterozoic rocks of the Peninsular Gneissic Complex-II (PGC-II) and Palaeo-proterozoic rocks of the Bastar Craton. The area occupies a strategic position along the tectonic contact between the Bastar Craton and the Archaean Peninsular Gneissic Complex of the Eastern Dharwar Craton, marked by a prominent NE–SW trending regional shear zone. This structural corridor has facilitated emplacement of younger granites and pegmatites and provides favourable conditions for localisation and enrichment of REE and RM mineralisation.

The proposed block falls in Survey of India toposheet No. 65C/13 within the administrative jurisdiction of Dummugudem Mandal, BhadradriKothagudem District, Telangana State (Plate-1). The area is easily accessible through Bhadrachalam, a well-known pilgrimage town, which also serves as the administrative headquarters of the taluk. Bhadrachalam is situated on the left bank of the Godavari River in the newly formed BhadradriKothagudem District, Telangana State.

Physiography

The area exhibits three major physiographic units, of which the dominant one is the low-lyingpeneplain developed in the central part of the area along both the right and left banks of the Godavari River. In this stretch, the Godavari flows from north to south and takes an easterly turn immediately after Bhadrachalam. This physiographic unit is largely underlain by basement rocks.

Regional Geological setup

The study area lies in the south-eastern part of the tri-junction of the Bastar Craton, DharwarCraton and Pranhita-Godavari (P-G) Basin (Plate-2). The Bastar Craton, bounded by the Godavari and Mahanadi grabens, CITZ, Eastern Ghats Mobile Belt and Deccan Traps, comprises gneissic complexes, granulite belts, granitoids, mafic dyke swarms and Proterozoic Purana basins. The Dharwar Craton, one of the best-studied terrains of Peninsular India, is divided into the Western and Eastern Dharwar Cratons separated by the Chitradurga Shear Zone, and is characterized by greenstone belts, gneisses, charnockites and younger granites.

Geology of the Block

The proposed block area comprises three litho-tectonic units: The Archaean Bengpal Group of the Bastar Craton, Proterozoic meta-sedimentary rocks of the Pakhal Supergroup, and Phanerozoic sediments of the Lower Gondwana Group. The Bengpal Group occupies a major part of the area and displays peneplain topography, while Pakhal rocks form low hillocks in the western part. The Godavari River traverses the central area, exposing basement rocks such as biotite gneiss, amphibolite and banded amphibole–magnetite-quartzite. Elsewhere, soil cover

dominates and lithology is inferred from sparse outcrops. Lower Gondwana Talchir Formation occurs as isolated outliers in the northern and east-central parts of the area.

Table 1: Generalized stratigraphy of the area (Source: Compiled 50 K Geological Map, GSI)

<table>
<tr><td>Palaeozoic (Late carboniferous to Early Permian)</td><td>Gondwana Super group</td><td>Lower Gondwana</td><td>Talchir Formation</td><td>Intercalation of sandstone and shale</td></tr>
<tr><td colspan="5">----------Unconformity/ Fault----------</td></tr>
<tr><td rowspan="3">Mesoproterozoic - Neoproterozoic</td><td rowspan="3">Pakhal Supergroup</td><td rowspan="3">Mallampalli Group</td><td colspan="2">Quartz Vein</td></tr>
<tr><td>Pandikunta Formation</td><td>Phyllite and Quartzite</td></tr>
<tr><td>Bollapalli Formation</td><td>Dolomitic Marble, Phyllite and Quartzite</td></tr>
<tr><td colspan="5">---------- Unconformity/Fault----------</td></tr>
<tr><td rowspan="8">Archaean</td><td colspan="3" rowspan="8">Bengpal Group</td><td>Younger intrusives</td></tr>
<tr><td>Meta-Gabbro/Dolerite</td></tr>
<tr><td>Calc-silicate Amphibolite</td></tr>
<tr><td>Banded Gneiss</td></tr>
<tr><td>Banded amphibole/ pyroxene-magnetite and quartzite</td></tr>
<tr><td>Quartzite/Brecciated Quartzite</td></tr>
<tr><td>Garnet-mica/sericite-quartz-schist</td></tr>
</table>

Scope for proposed exploration

The proposed G4 (Reconnaissance) level exploration aims to assess the potential for Rare Earth Element (REE) and Rare Metal (RM) mineralisation within younger granites, pegmatites and associated structural zones of the proposed block. The area occupies a favourable geological setting along a major regional shear zone at the tectonic contact between the Bastar and Eastern Dharwar cratons. The scope includes identification of favourable lithological units, reconnaissance geochemical sampling, assessment of structural controls and limited subsurface investigation to generate baseline data and prioritise targets for subsequent G3-level exploration. The exploration will generate baseline geological, geochemical, mineralogical, and analytical data to identify promising zones, establish G-4 category (UNFC code 334) prospects, and provide a scientific basis for subsequent G-3 stage detailed exploration.

Mineral Potentiality based on Geology

The proposed block is situated in a geologically favourable terrain marked by the tectonic contact between the Bastar Craton and the Eastern Dharwar Craton,

represented by a prominent NE-SW trending regional shear zone. Such shear-controlled corridors are known to facilitate emplacement of younger granites and pegmatites and act as favourable loci for concentration of Rare Earth Elements (REE) and Rare Metals (RM). The presence of Neoarchaean–Palaeoproterozoic granitic gneisses, younger granites and pegmatitic intrusives within the area enhances the mineral potential.Previous geological and geochemical observations have indicated significant enrichment of REE within feldspathic and younger granites. The association of granitic bodies with structural zones, coupled with limited erosion and preservation of primary mineralogical features, suggests favourable conditions for REE and RM mineralisation. On the basis of the regional geological setting, lithological associations and structural framework, the area is considered to possess moderate to good potential for REE and RM mineralisation, warranting systematic G4-level reconnaissance exploration.

Interpretation of Aeromagnetic Spectral Data (Plate-5)

The aeromagnetic spectral map of Block-6 exhibits pronounced magnetic heterogeneity characterised by linear highs and lows, reflecting lithological variations within the granitic basement and associated structural discontinuities. The proposed G-4 REE block is situated within a moderate to low magnetic intensity domain and along magnetic gradient zones, bounded by comparatively higher magnetic responses. Such subdued magnetic signatures are indicative of altered granitic–pegmatitic rocks and zones of intense weathering and lateritisation, wherein primary ferromagnetic minerals have undergone oxidation and breakdown, leading to the development of aluminous and ferruginous profiles favourable for residual REE enrichment. The spatial association of the block with NE–SW to ENE–WSW trending linear to curvilinear magnetic features suggests the presence of basement lineaments and fracture-controlled zones, which are inferred to have facilitated magma emplacement, fluid migration, and prolonged chemical weathering. The observed magnetic contrasts, structural complexity, and alteration signatures collectively support favourable conditions for REE mineralisation in the granitic terrain and justify systematic G-4 stage reconnaissance exploration involving detailed geological mapping, geochemical sampling, laterite profiling and scout drilling under UNFC norms.

Interpretation of Geochemical Data (Plate-3)

Geochemical analysis of sample SV-583, SV-584 (GSI Sundarlingam et al., STM, 2018) indicates very high total rare earth element (TREE) contents ranging from 3387 to 3452 ppm, reflecting strong REE enrichment. The REE distribution is dominated by LREEs, with La (906-955 ppm), Ce (1373- 460 ppm) and Nd (~188–189 ppm) constituting the major proportion of the TREE content. Europium shows moderate enrichment (685-702 ppm), while Sm and Gd occur in subordinate but significant concentrations. The HREEs (Dy–Lu) are comparatively depleted, though present in measurable amounts, indicating clear LREE-enriched fractionation patterns typical of granitic–pegmatitic and their weathered derivatives. The consistently high TREE values and repeatability between analyses suggest a homogeneous REE-enriched source, likely related to granitic/pegmatitic protoliths

and/or their residual concentration during weathering. The geochemical signature corroborates the aeromagnetic and geological evidence and substantiates the REE fertility of the area, justifying systematic G-4 stage reconnaissance exploration.

Bedrock samples of granite (GSI, 2018) form Seetharampuram area are:

Sample No.	La	Ce	Nd	Eu	Sm	Tb	Gd	Dy	Ho	Er	Tm	Yb	Lu	TREE (ppm)
SV-583	955	1460	189	685	14	76.2	5	41	17	5	0.6	3.6	0.5	3452
SV-584	906	1373	188	702	19	89.9	7	54	28	3.9	9.2	1.2	6.9	3387

2. Previous Work

Crook shank (1932-38) provided a detailed classification of rocks in the Bastar District. Subsequent investigations by P. Subramanium and Sivadas (1961) focused on surrounding localities for base metal mineralisation. During the 1984–85 field season, GSI geologists Mishra, V.P., D. Bhattacharjee, D. Mukherjee, T. Venkateswarlu, B.K. Lakshmana, P.K. Parui, and A. Kumar carried out systematic geological mapping at 1:50,000 scale in SOI toposheets 65B/6, 10, 15, 16, 65G/1 and 65C/13.

Their work confirmed the southern extension of high-grade Bengpal Group rocks, including the charnockitic suite. The Bengpal Group was classified into metasedimentary rocks, meta-igneous enclaves, gneisses, migmatites, and minor younger intrusives, unconformably overlain by thick undeformed sediments of the Pakhal and Sullavai Groups.

Sunderlingam et al. (2018) mapped an area of 350 sq. km at 1:25,000 scale as part of specialized thematic studies on supracrustals, Bijapur Gneissic Complex, and Pakhal Supergroup. The work aimed to characterise deformational features, contact relationships, metamorphism, and zones of base-metal and associated mineralisation. Significant enrichment of Total Rare Earth Elements (TREE) was reported in feldspathic and younger granites, with TREE values of 3452 ppm and 3387 ppm, respectively, leading to the recommendation for detailed exploration.

2. Field work by GMMCO

As per the recommendations of the Committee, GMMCO, Hyderabad carried out field investigations in the Seetharamapuram Block. During the course of fieldwork, a total of four bedrock samples were collected, comprising one granite, two calc-silicate rocks, and one pegmatite belonging to the Bengpal Gneissic Complex.

A porphyritic potassic granite is exposed to the west of Narsapur village. In addition, a younger phase of granite is observed along a prominent N-S trending shear zone, which represents the tectonic contact between the Gondwana Supergroup and the Bengpal Gneissic Complex (Fig.1).

Two calc-silicate rock samples collected from the Reguballi area have yielded significant analytical results, with total rare earth element (TREE) values of 3784 ppm and 4081 ppm (Fig.2).

These samples also show elevated thorium concentrations, reaching up to 761 ppm. The geochemical characteristics of these rocks indicate favourable conditions for rare earth element (REE) and rare metal (RM) mineralisation in the area.

Further, N-S trending allanite-bearing pegmatite bodies have been delineated in the block. These pegmatites range in size from 20 cm to 100 m in length and up to 2 m in width. Geochemical analysis of the pegmatite sample indicates a TREE value of 614 ppm, suggesting additional potential for REE mineralisation.

Overall, the integrated geological and geochemical data suggest that the Seetharamapuram Block is a promising target for REE and RM exploration.

S. No	Rock Type	Latitude	Longitude	Rb	TREE	Th
				ppm		
1	Calc silicate	17°47'11.73"N	80°52'26.53"E	240.66	3784.88	244.44
2	Pink Granite	17°47'48.08"N	80°52'44.00"E	265.49	2777.17	761.24
3	Calc silicate	17°47'34.43"N	80°52'39.08"E	315.19	4081.8	253.40
4	Pegmatite	17°46'24.03"N	80°51'41.06"E	103.84	241.07	614.04

Figure. 1 Field photograph of Pinkgranite at Narsapuram area (sample No.2) (17°47'48.08"N; 80°52'44.00"E)

Figure. 2 Field photograph of Calc silicate at Reguballi village (sample No.3) (17°47'34.43"N ; 80°52'39.08"E)

Figure. 3 Outcrop of Calc-Silicate rock at Reguballi village (17°47'34.43"N; 80°52'39.08"E)

3. Block description

Corner Points	Latitude	Longitude
A	17.750375	80.899742
B	17.793631	80.828342
C	17.878148	80.868798
D	17.826031	80.932142

4. Planned Methodology

The proposed G4 (Reconnaissance) level exploration aims to systematically assess the potential for Rare Earth Element (REE) and Rare Metal (RM) mineralisation within younger granites, pegmatites, and associated litho-structural zones of the Seetharampuram block. The methodology will involve geological, geochemical, and limited subsurface investigations, as outlined below:

Geological Mapping: Detailed mapping will be carried out at 1:12,500 scale, focusing on lithological contacts, younger granites, pegmatites, alteration zones, and structural features such as shear zones, lineaments and fractures.

Geochemical Sampling: Systematic bedrock, channel, trench and composite samples will be collected across pegmatites and mineralised granites. Samples will

be analysed for REE, RM and associated trace elements to evaluate enrichment patterns and spatial continuity.

Sub-surface Exploration (Core Drilling): Four (4) exploratory boreholes of 45 m depth each are planned at geochemically and structurally favourable locations to test the depth persistence and grade continuity of REE-bearing pegmatites and granites. Core recovery will be logged for lithology, structure, alteration, and mineralisation, and representative samples will be analysed for geochemical and petro-mineralogical studies.

Petrographic and Mineralogical Studies: Representative samples from pegmatites and granites will be examined to identify REE-bearing minerals such as allanite, monazite and zircon, and to understand their mode of occurrence and paragenesis.

Data Integration: Geological, geochemical, structural, and drilling data will be integrated using GIS and thematic mapping to delineate priority REE and RM zones and recommend follow-up advanced-stage exploration.

5. Nature Quantum and Target

The following work components are proposed for the reconnaissance (G-4) stage exploration programme in the Seetharampuram block:

S. No	Activities	Unit	Proposed Target
1	Reconnaissance Survey (Sq. Km) (1: 12,500)	Sq. Km	84
2	Pitting /Trenching	Cu m	75
3	**Drilling** (5 bore holes, 40 m depth each)	m	200
	a) Core logging	m	200
4	**Sampling**		
	a) Bed Rock Samples	Nos.	100
	b) PTS	Nos.	50
	c) Core samples (Core Samples will be collected at 5m interval)	Nos.	100
	d) Check Sampling	Nos.	25
	e) Preparation of thin polished section	Nos.	15
	f) Study of thin section	Nos.	15
	g) EPMA	Nos.	05
5	Chemical analysis		275
6	**Report Preparation& Peer review**		

6. Manpower deployment

The following manpower is proposed for systematic execution of the G-4 stage exploration programme in the Seetharampuram block:

S.No	Category	Number	Role / Responsibility
1	Senior Geologists	2	Overall supervision, planning and execution of geological mapping, structural studies, and data integration
	Field Labour	4	Collection, labelling, preparation, and dispatch of bedrock, trench and pit
3	Sampler	1	Collection, labelling, preparation, and dispatch of bedrock, trench, pit, and core samples.
4	Supporting Labour for core Sampling	2	Assist sampler in sample collection, handling, and processing.
5	Surveyor	1	DGPS Survey for BH fixation & RL determination

7. Time Schedule for Reconnaissance Survey (G-4 stage)

The proposed G-4 stage exploration programme in the Seetharampuram block is planned to be completed within a period of Ten (10) months.

Reconnaissance Survey (G4) for REE & RM mineralization in Seetharampuram block, Badradi Kothagudem District, Telangana. Area-84 sq. km, Scout boreholes: Total drilling meterage: 200m; No. of BH's: 05, (40m depth each); Schedule timeline: Ten (10) months.
Implementing Agency: GMMCO Technology Services Limited

S. No	Activity	Unit	Months										
			1	2	3	4	Review-1	5	6	7	8	Review-2	9	10
1	Camp Establishment	Months												
2	Geological mapping	Months												
3	Sampling (BRS, Pitting/Trenching)	Months												
4	Sampling analysis (BRS, Pitting/Trenching)	Months												
5	Survey (Boundary points and Drill collars)	Months												
6	Scout Drilling	Months												
7	Core logging & sampling	Months												
8	Sampling analysis (Drill core samples)	Months												
9	Laboratory analysis (Petrography & SEM)	Months												
10	Camp winding	Months												
11	Report preparation and submission	Months												

8. Break-up of expenditure

Cost Estimate - Reconnaissance Survey for REE & RM mineralization in Seetharampuram area, Badradi Kothagudem District, Telangana 84 sq. km, No. of BH:05 , Total Drilling: 200 m; Borehole depth 40m each; Schedule timeline: 10 months; Review after 4 and 8 months		
S. No	**Item of Work ***	**Estimated Cost Total Amount (Rs)**
A	Geological Mapping Other Geological Work	31,31,436
B	Survey work	1,20,000
C	Trenching/Pitting	3,24,375
D	Drilling (after review)	27,58,750
E	Laboratory Studies	21,41,500
F	Geological Report Preparation	2,50,000
G	Peer review charges	30,000
H	Preparation of Exploration Proposal	1,69,521
I	Total Estimated Cost without GST	**89,25,582**
J	Provision for GST (18% of I)	16,06,604.8
K	Total Estimated Cost with GST	**1,05,32,187**
	Say Rs. In Lakhs	**105.32**

9. Detail Break-up of expenditure

Cost Estimate - Reconnaissance Survey for REE & RM mineralization in Paladugu Block, Khammam District, Telangana, 100 sq. km, No. of BH:05, Borehole depth range-200 m; Schedule timeline: Eight (8) months						
S. No.	**Item of Work ***	**Unit ***	**Rates as per NMET SoC 2025**		**Estimated Cost of the Proposal**	
			SoC-Item No. *	**Rates as per SoC * (a)**	**Qty (b)**	**Total Amount (Rs) (a*b)**
A	LSM (1:12,500) Other Geological Work & Surveying					
a	Geological mapping, (1:12,500 scale) & Trenching , drilling work	Sq.km	1.1	18,300	84	15,37,200
b	Charges for Geologist per day (Field) for geological mapping & trenching work, drilling work	day	1.2.1a	14,500	60	8,70,000
c	Labours		5.8	556	120	66,720
d	Charges for Geologist per day (HQ)	day	1.2.1a	10,500	30	3,15,000

e	Charges for one Sampler per day (1 Party)	one sampler per day	1.2.1b	7,850	34	2,66,900
f	Labours (sampler)	day	1.5.2	556	136	75,616
	Sub Total- A					**31,31,436**
B	Survey work					
a	Charges of Surveyor for boundary demarcation	one surveyor per day	1.3.1	10,500	0	0
b	DGPS Survey for BH fixation & RL determination	Per Point of observation	1.3.2	24,000	5	1,20,000
c	Labours Charges for survey work	day	1.5.2	541	0	0
	Sub-Total B					**1,20,000**
C	**Trenching/Pitting**					
	a)Trenching	per cu.m	2.1.2	4,125	50	2,06,250
	b) Excavation of Pitting	per cu.m	2.1.1	4,725	25	1,18,125
	Sub-Total C					**3,24,375**
D	**Drilling (after review)**					
a	Core drilling :5 points (each 40 m deep) 5*40 in granite hard rock terrain	m	2.2.1.1e	10,000	200	20,00,000
b	Construction of concrete Pillar (12"x12"x30")	per borehole	2.2.7	2,000	5	10,000
c	Borehole Plugging by cement	per borehole	2.2.8	10,000	5	50,000
d	Miscellaneous Charges (Transportation, Accommodation, Camp Setting, Camp Winding and drill core preservation	Lump sum	2.2.9	25% of the Drilling cost	5 Shiftings	5,00,000
e	Drill core preservation		5.3	1590	125	1,98,750
	Sub Total D					**27,58,750**
E	**Laboratory Studies**					
1	Chemical Analysis					
a	BRS (Channel samples) (ICPMS sequential Technique)	Per Sample	4.1.15	7,400	100	7,40,000
b	Drill Core samples	Per Sample	4.1.15	7,400	100	7,40,000
c	Trench/Pit samples	Per Sample	4.1.15	7,400	50	3,70,000
d	Check samples (10%)	Per Sample	4.1.15	7,400	25	1,85,000
						20,35,000
2	Physical & Petrological Studies					
a	Preparation of thin polished section	Per sample	4.3.1	800	15	12,000
b	Study of thin section	Per sample	4.3.4	2,800	15	42,000

c	EPMA	Per day	4.4.1	10,500	5	52,500
						1,06,500
	Sub Total E (1+2)					**21,41,500**
F	**Total A to E**					**84,76,061**
G	Geological Report Preparation	5 Hard copies with a soft copy	5.2	5.2		2,50,000
H	Peer review Charges		As per EC decision			30,000
I	Preparation of Exploration Proposal (5 Hard copies with a soft copy)	5 Hard copies with a soft copy	5.1	2% of the Cost or Rs. 5.0 Lakhs whichever is less		1,69,521
K	**Total Estimated Cost without GST**					**89,25,582**
L	**Provision for GST (18% of K)**					**16,06,605**
M	**Total Estimated Cost with GST**					**1,05,32,187**

References

Appavadhanulu, K. and Subba Raju, V. (1970). Investigation for Copper Ore in Mailaram Area, Khammam District, Telangana, Geological Survey of India, Unpublished Report, GSI, Hyderabad.

Crookshank, D.J. (1932–38). Geology of Bastar District, Geological Survey of India, Memoir Series.

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Subramanium, P. and Sivadas, (1961). Investigation for Base Metal Mineralisation in Bastar District, Geological Survey of India, Unpublished Report, GSI, Hyderabad.

Whitney, D.L. and Evans, B.W. (2010). Abbreviations for rock-forming minerals. American Mineralogist, 95, pp. 185–187.

Plate -1: Location map of the proposed block with SOI Toposhhet No: 65C/13 (Source: SOI)

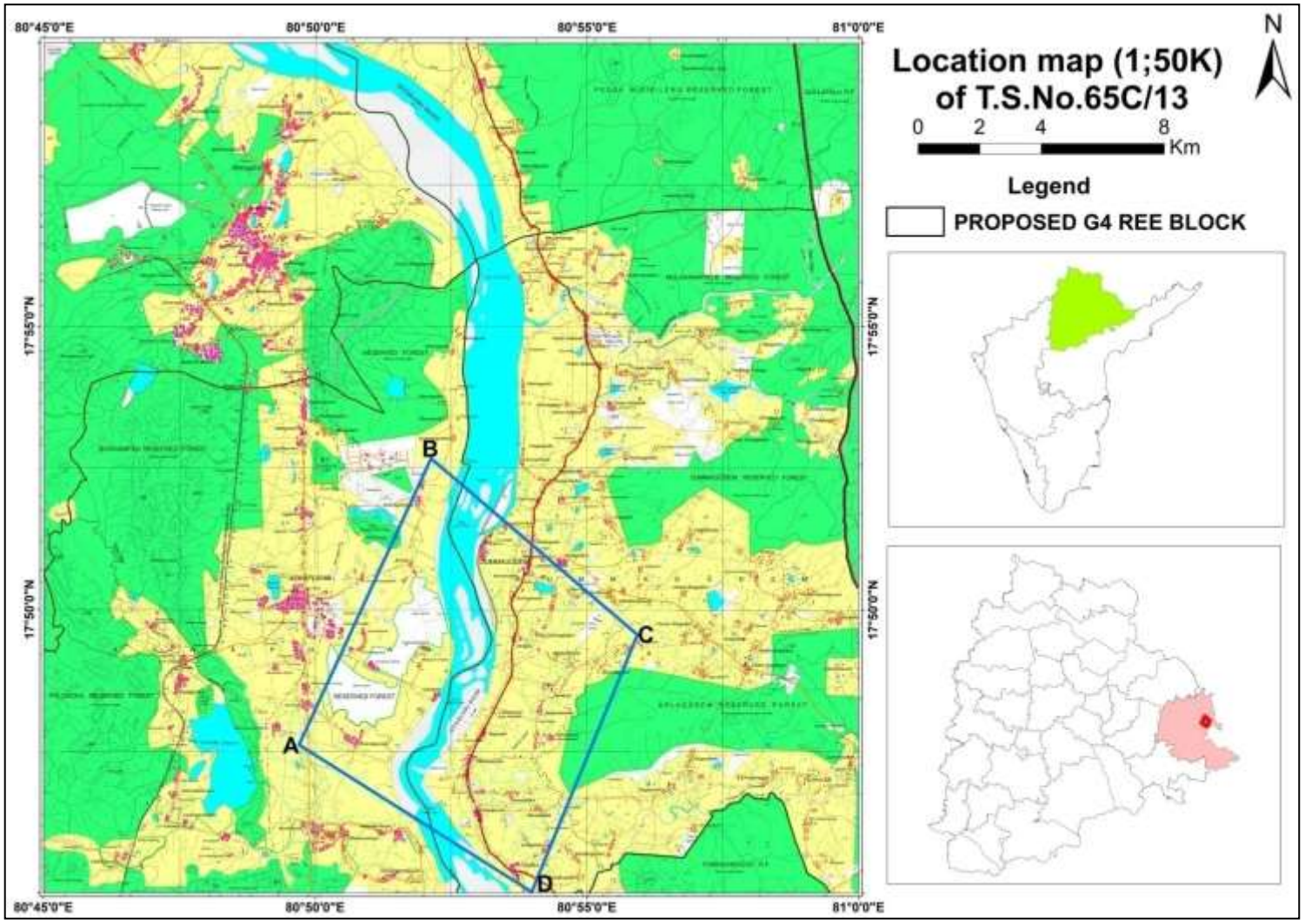


Plate -2: Geological map of 1:50000 Scale, with proposed block (Source: NGDR)

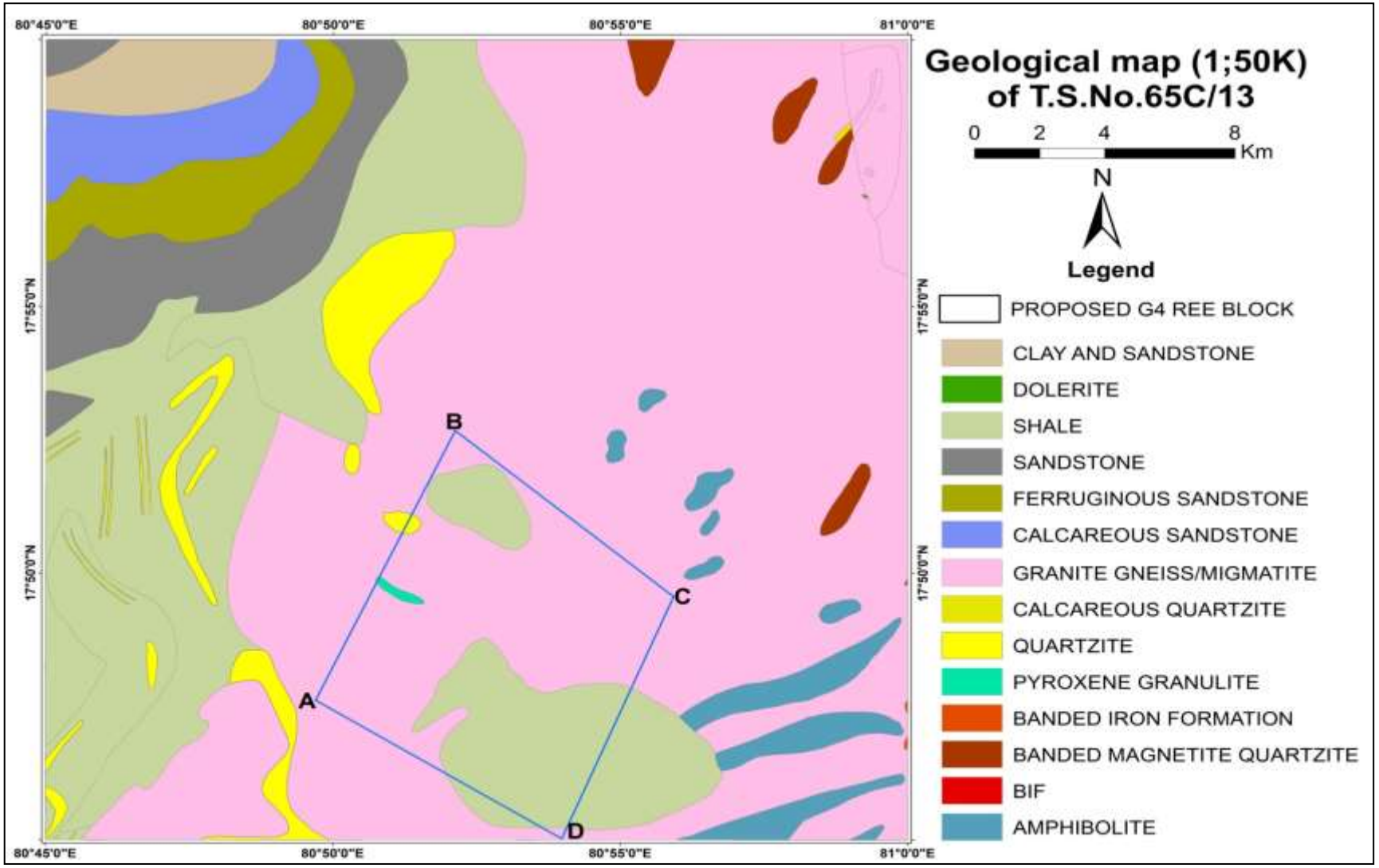


Plate-3 Geological map (1:25000 scale) of proposed block (Source: NGDR)

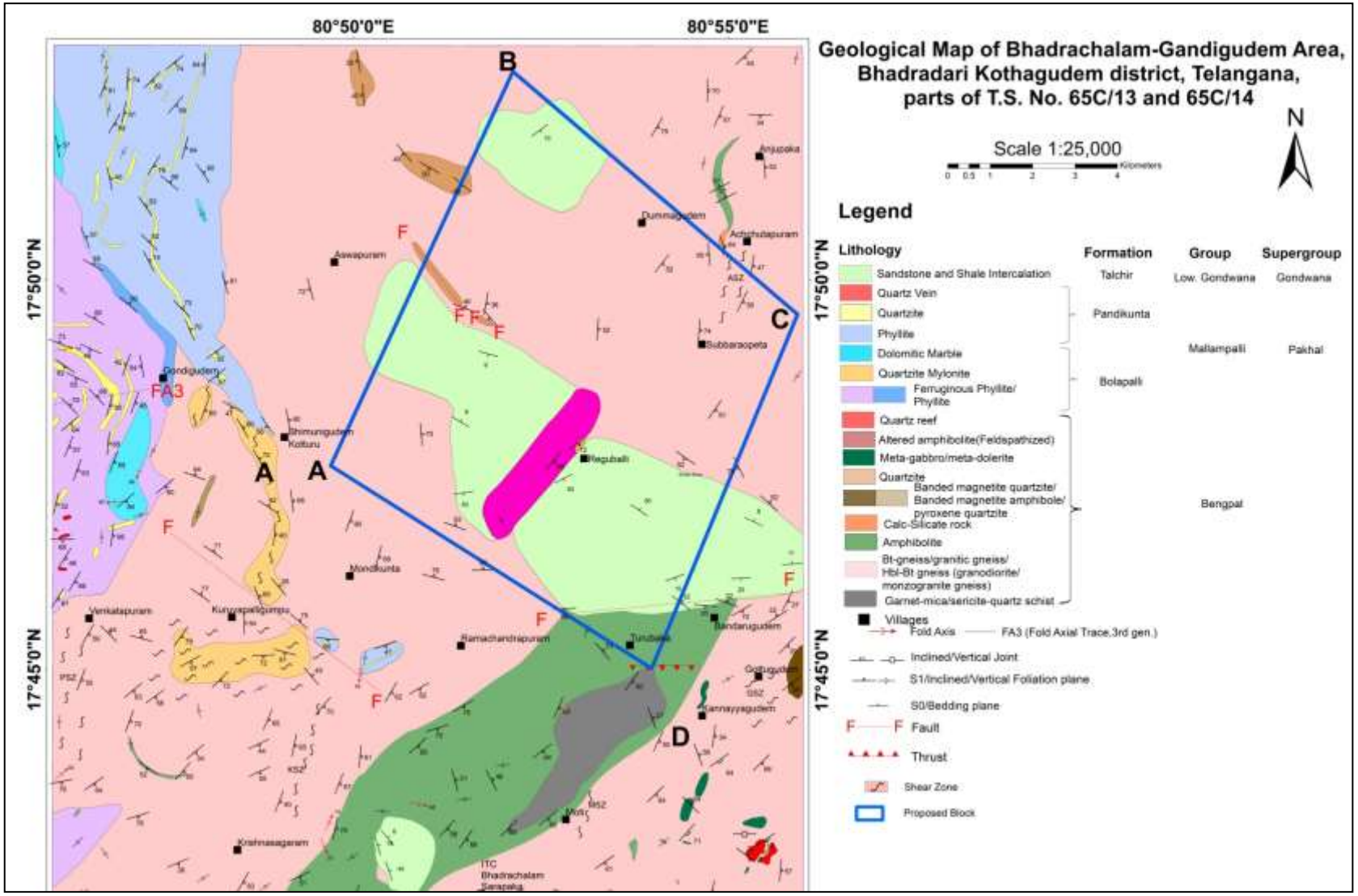


Plate -4: Geological Map (1:50,000 Scale), Showing TREE Distribution map and Proposed G-4 REE Block (Source: NGDR)

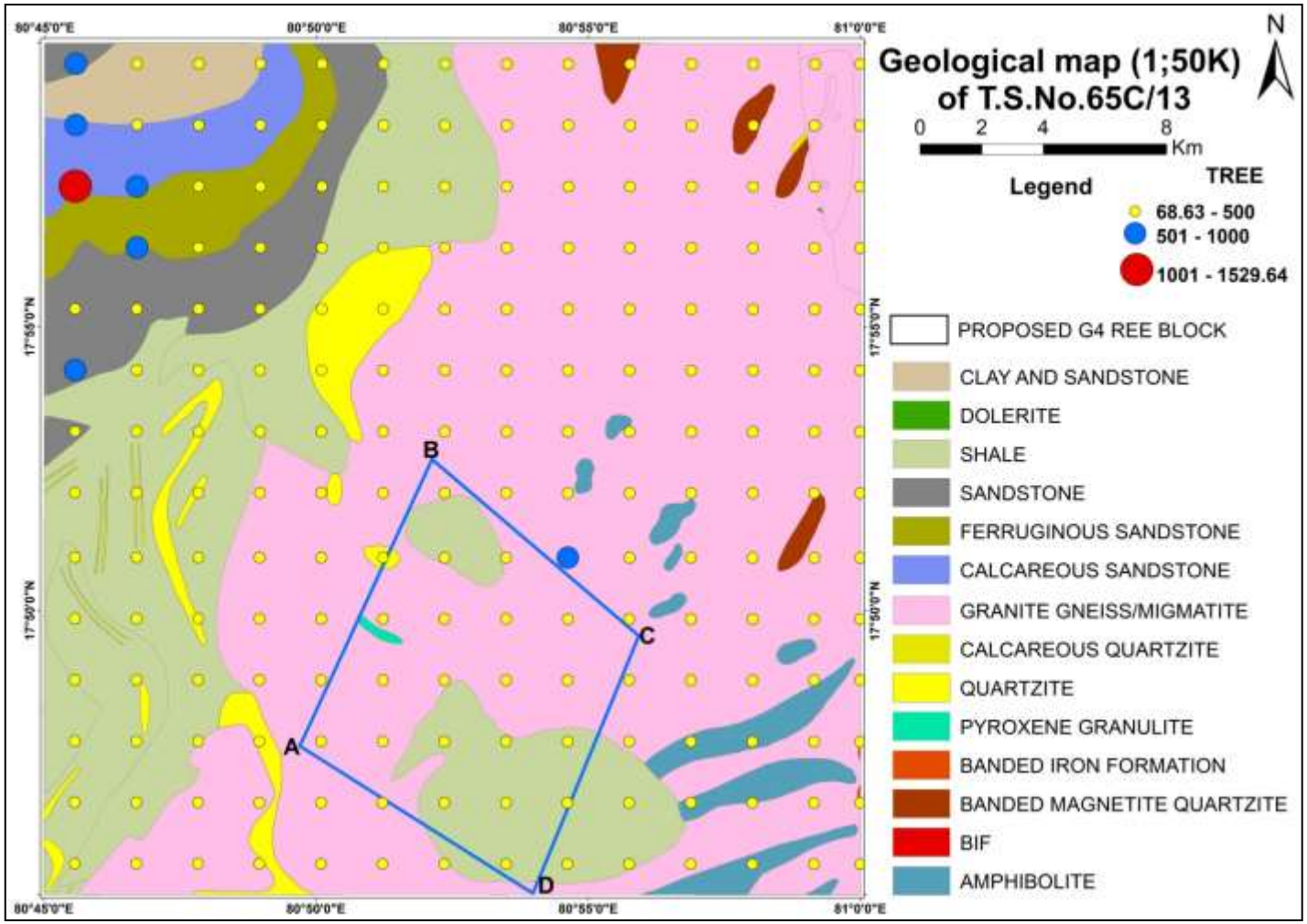


Plate- 5. Aeromagnetic Spectral map and Proposed G-4 REE Block (Source: NGDR)

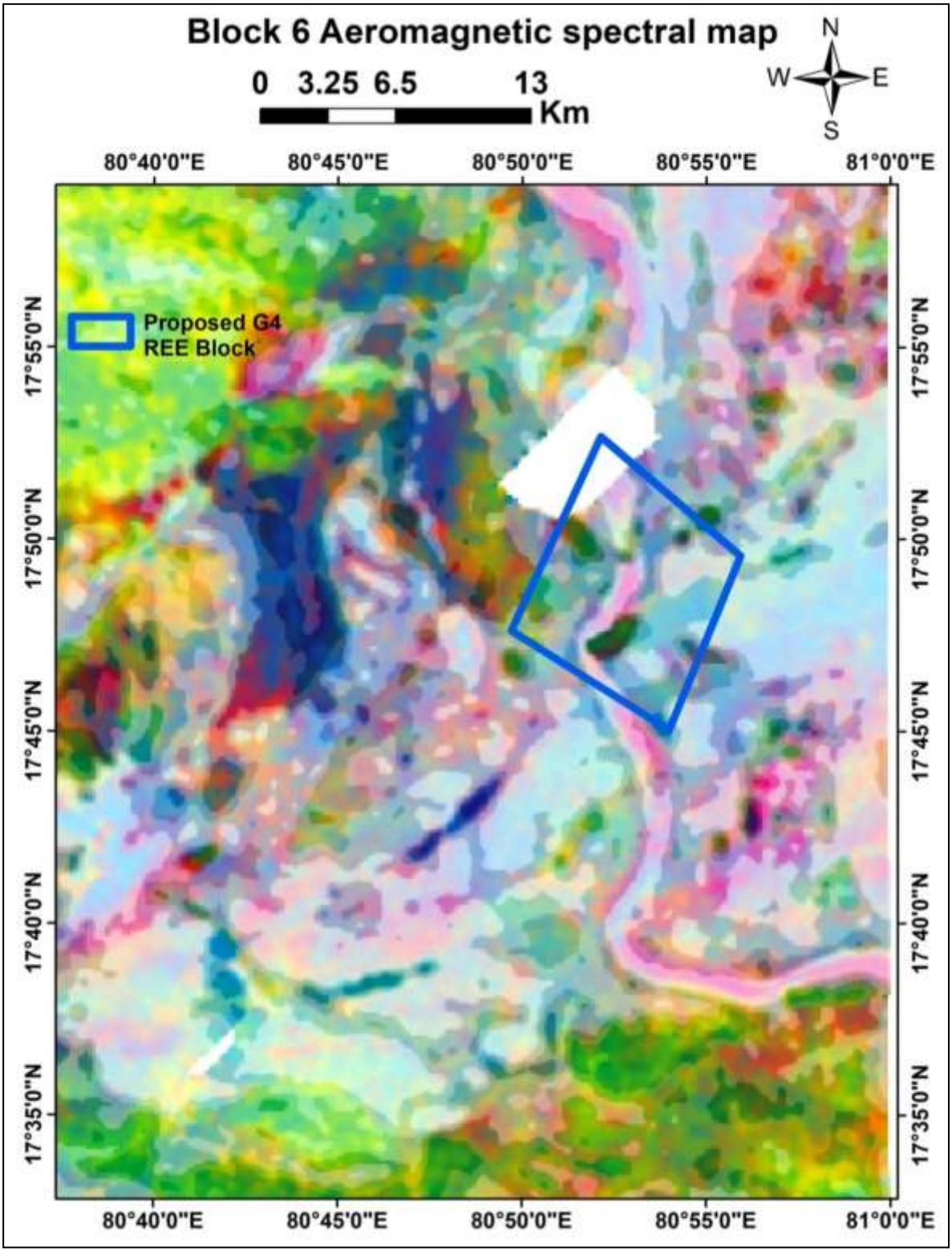
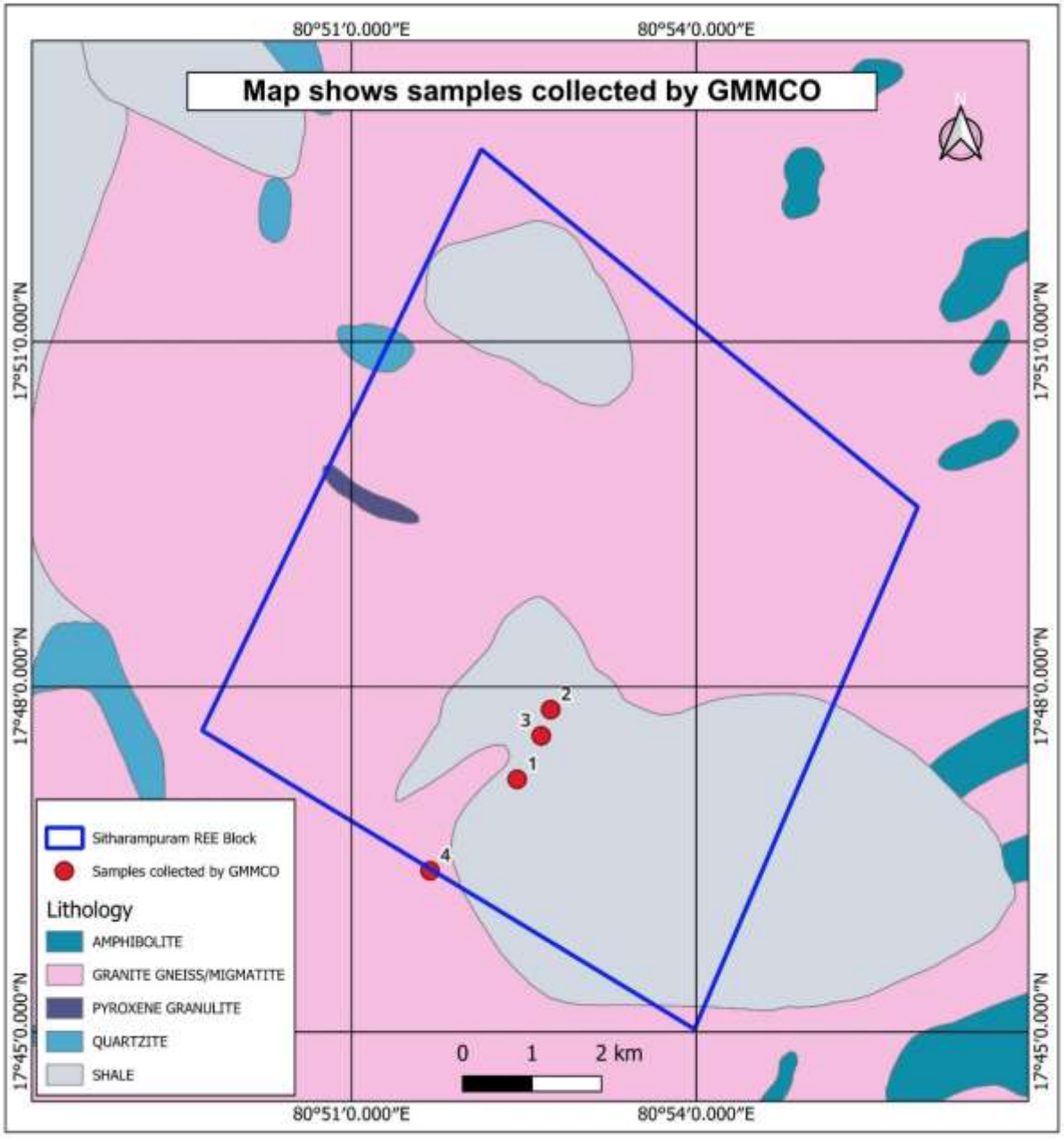


Plate- 6. Map shows the samples collected by GMMCO



Annexure-1: Analysis Results from Geological Survey of India (GSI) laboratory, Hyderabad.

NO/2713

भारतीय भूवज्ञानिक सर्वेक्षण / GEOLOGICAL SURVEY OF INDIA
रसायन प्रभाग / CHEMICAL LABORATORY
दक्षिणी क्षेत्र / SOUTHERN REGION
बंडला गुडा, हैदराबाद / Bandlaguda, Hyderabad-500 068
रासायन विश्लेषण रिपोर्ट /Chemical Analysis Report
आइसीपी-एमएस रिपोर्ट /ICP-MS Test Report

1. प्रेषक का नाम / Name of the Sender:GTS Limited

2. प्रेषक का पता एवं दूरभाष नं / Address/contact of the Sender: No.9A, Ninth Floor, Vaishnavi's Cymbol, Survey No. 345/A, Puppalguda village, Gandipet Mandal, Ranga Reddy District, Hyderabad, Telangana-500008

3. संदर्भ पत्र सं / Reference Lr. No: 1246/Samples/SR/2025-26 dated:12/03/2026

4. पंजीकरण दिनांक Date of Registration: 13/03/2026

5. परियोजना/प्रभाग / Project/Division:NA

6.फील्ड सत्र कार्यक्रम / FSP:NA

7.फील्ड सत्र कार्यक्रम आइटम सं/ FSP Item No: NA

8. नमूना प्रकार / Nature of Sample:Rock

9. प्राथमिक रजिस्ट्रेशन सं / Preliminary Registration No: GTSL-1 (1-8)

10. विश्लेषण प्रकार / Method of Analysis: आइसीपी-एमएस फ्यूशन प्रणाली / ICP-MS Fusion Method (GSI/SR-HYD/CL/SOP/02A)

11. प्रयोग किया गया उपकरण / Instrument Used: आइसीपी-एमएस / ICP-MS (Agilent, 7700x)

12. इस पर कार्य करनेवाले रसायन प्रभाग के पदाधिकारी / Working group: Sri K. Sivasankar, Director (Chemistry)., Mr. Swamy Madapa, Mrs. Susmita Jana, Sr. Chemists, Dr. J.Md. Rafi, Mr. Sandipan Mandal, Mr. Somnath Majumdar, Chemists, Mr. Himanshu Singh, Asst. Chemist
के. शिव शंकर , निदेशक (रसायन); स्वामी मदप्पा, व. रसायनज्ञ; जे. मो. रफि, आलोलिका गगूलो, रसायनज्ञ, श्री उमा चक्रवर्ती सहायक रसायनज्ञ

13. विश्लेषण तिथि / Date of Analysis: March,2026

14. रिपोर्ट जारी होने की तिथि / Date of Issue of the Report: 25.03.2026

15. एआर सं / AR No.: 124/ICPMS/2026

पीआर सं / PR No.	नमूना संदर्भ सं / Sample Ref. No.	Be	Ge	As	Rb	Sn	La	Ce	Pr	Nd	Eu	Sm	Tb	Gd	Dy	Ho	Er	Tm	Yb	Lu	Hf	Ta	Th	U
		पीपीएम में संकेन्द्रण (एमजी/केजी) / Concentrations in ppm (mg/Kg)																						
		एलएनडी मात्रा / LLD Value																						
		0.3	0.05	1	3	5	1	2	0.1	0.3	0.02	0.1	0.03	0.05	0.03	0.01	0.02	0.02	0.02	0.01	0.5	0.2	4	0.5
GTSL-1-1	01/PL/R/26	2.45	1.04	2.99	275.25	<5	504.99	1017.05	104.31	365.24	12.14	54.43	3.53	30.11	14.16	2.05	5.06	0.69	3.98	0.65	9.81	<0.2	244.44	24.26
GTSL-1-2	02/PL/R/26	1.76	3.27	3.04	240.66	<5	760.70	1608.74	187.42	777.00	34.59	157.48	13.18	104.88	61.12	8.95	23.36	3.15	19.31	2.71	22.30	6.92	761.24	30.85
GTSL-1-3	03/PL/R/26	1.90	1.32	1.49	265.49	<5	596.56	1255.89	136.37	526.68	22.29	97.32	7.16	59.23	30.18	4.39	9.86	1.34	7.87	1.23	20.80	0.69	253.40	19.31
GTSL-1-4	04/PL/R/26	2.28	1.31	4.80	315.19	<5	987.34	1898.87	193.43	710.95	26.03	116.82	7.94	66.84	31.55	4.43	11.06	1.45	8.41	1.27	15.41	0.82	614.04	18.28
GTSL-1-5	01/SP/R/26	2.42	2.01	1.86	78.47	<5	750.98	1349.93	138.41	493.15	17.45	76.93	5.95	46.92	27.13	4.17	10.99	1.51	8.60	1.40	5.67	0.55	315.20	17.12
GTSL-1-6	02/SP/R/26	1.74	0.86	<1	103.84	<5	58.74	103.13	11.75	40.77	1.65	6.61	0.59	4.81	3.14	0.54	1.37	0.22	1.56	0.24	5.95	0.60	30.01	5.34
GTSL-1-7	03/SP/R/26	2.34	0.71	<1	122.16	<5	80.39	128.10	12.93	39.03	1.87	4.45	0.27	2.26	0.96	0.13	0.31	0.02	0.13	0.04	2.21	<0.2	30.76	4.91
GTSL-1-8	04/SP/R/26	3.00	1.04	<1	159.17	<5	49.14	105.56	15.01	62.72	2.59	12.36	1.19	8.79	5.95	1.04	2.65	0.42	2.06	0.33	21.57	0.67	9.15	6.06

नोट 1 विश्लेषणाधीन जांच नमूना भूवैज्ञानिक द्वारा नमूनाकृत किया गया तथा जैसा नमूना प्राप्त होता है परिणाम, उसी पर ला प्राप्त नमूने पर होगा
Note 1 : The Test item under consideration is sampled by the Geologist and the results apply to the sample as received
रसायन प्रभाग, द. क्षेत्र हैदराबाद के लिखित अनुमोदन के बिना यह रिपोर्ट पुन:उत्पादित नहीं किया जा सकता है
Note 2 : The report shall not be reproduced in full without written approval of the Chemical Laboratory, GSI, SR, Hyderabad
नोट : बताए गए परिणाम इस प्रयोगशाला द्वारा जांच गए आइटमों से ही संबंधित है
Note 3: The Results reported relate only to the items tested by the laboratory.

द्वारा रिपोर्ट किया गया / Reported by:
ज. मो. रफ़ी/Dr. J.Md. Rafi
रसायनज्ञ / Chemist

द्वारा समीक्षित / Reviewed by:
के. शिव शंकर , निदेशक (रसायन) / K. Sivasankar, Director (Chemistry)
निदेशक(रसायन) Director (Chemistry)

अधिकृत हस्ताक्षरकर्ता /Authorised Signatory:
पी.वी.वी.आर शर्मा / Sri. P. V. V.R. Sarma
निदेशक (रसायन) /Director (Chemistry)
प्रभारी अधिकारी, रसायन प्रभाग /OIC, Chemical Division
द. क्षेत्र / हैदराबाद /SR, HYDERABAD