

MINERAL EXPLORATION PROJECT PROPOSAL (MEPP)

FOR

**G-4 LEVEL WORKS FOR KYANITE IN
KALLAHALLI KYANITE BLOCK
(KIOCL_15_KA_KKB),
MYSORE District, KARNATAKA.**



Date of Submission: 29th Oct, 2020

Submitted by:

**KIOCL LIMITED,
(Notified Exploration Agency)
BLOCK II, KORAMANGALA,
SARJAPURA ROAD,
BANGALURU 560 034.
(www.kioclltd.in)**

To:

**THE CHAIRMAN,
TECHNICAL AND COST COMMITTEE
(NMET),
MISSION II A, CENTRAL REGION,
GSI COMPLEX,
SEMINARY HILLS, NEAR TV TOWER,
NAGPUR, MAHARASHTRA- 440006**



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LIST OF PLATES

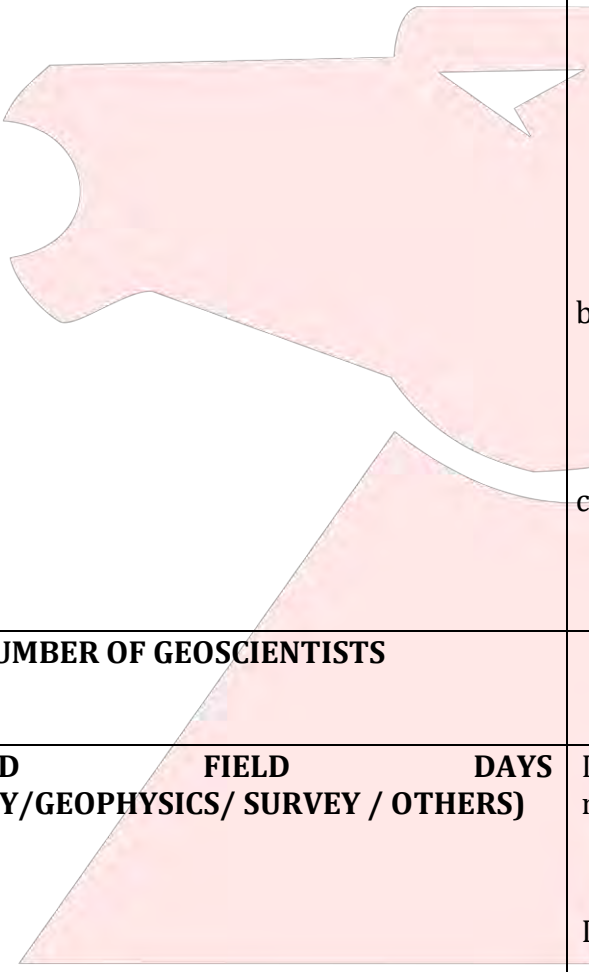
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SUMMARY

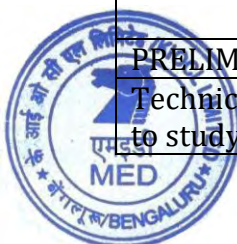
BLOCK ID	KIOCL_15_KA_KKB
TITLE OF THE PROJECT	G-4 LEVEL MINERAL EXPLORATION WORKS FOR KYANITE IN KALLAHALLI KYANITE BLOCK
CURRENT EXPLORATION AGENCY	KIOCL LIMITED, BANGALORE; <i>Notified Exploration Agency</i>
STATUS OF VARIOUS CLEARANCES (LOCAL/ FOREST / OTHERS)	UNDER THE PROVISIONS OF MINES AND MINERALS (DEVELOPMENT AND REGULATION) ACT, 1957 AND MINERALS (EVIDENCE OF CONTENTS) RULES 2015 AND MINERAL CONCESSION RULES, 1960, DEPTMENT OF MINING AND GEOLOGY, GOVERNMENT OF KARNATAKA PERMITTED KIOCL LIMITED TO PREPARE AND SUBMIT THE MINERAL EXPLORATION PROJECT PROPOSAL FOR G4 LEVEL OF EXPLORATION IN THE BLOCK (UNDER NMET FUNDING) ON BEHALF OF STATE GOVERNMENT VIDE LETTER NO.DMG- 17013/6/2019-20/4922 DTD.14 th JAN 2020 COPY OF THE CONSENT LETTER RECEIVED FROM DEPT OF MINES AND GEOLOGY, GOVT. OF KARNATAKA IS ENCLOSED @ ANNEXURE 05
PREVIOUS EXPLORATION AGENCY	GSI
GEOLOGICAL REPORTS	G. R. DEVADU, Geologist (Jr.), GSI carried out (1977-78) DETAILED INVESTIGATION FOR KYANITE in parts of toposheet 57 D/08, MALLESWARANABETTA AREA, HEGGADADEVANAKOTE TALUK, MYSORE DISTRICT, KARNATAKA
MINERALS TO BE EXPLORED	KYANITE AND ASSOCIATED MINERALS
MINERAL BELT	SARGUR SCHIST BELT, HEGGADA DEVANA KOTE TALUK, MYSORE DISTRICT, KARNATAKA
TIME SCHEDULE	12 MONTHS
OBJECTIVE	CARRY OUT MINERAL EXPLORATION WORKS AS PER MINERALS (EVIDENCE OF MINERAL CONTENTS) RULE- 2015, MINERAL (AUCTION) RULES-2015 AND MMDR AMENDMENT ACT- 2015 IN TURN TO ESTABLISH POTENTIAL MINERAL BEARING AREA TO FACILITATE THE



		GOVERNMENT OF KARNATAKA FOR AUCTIONING OF THE BLOCK
		a. BY LARGE SCALE GEOLOGICAL MAPPING IN 1:12,500 SCALE WITH - BED ROCK SAMPLING - TRENCH/ PIT SAMPLING, - CHEMICAL AND PHYSICAL ANALYSIS OF SAMPLES - PETROGRAPHIC STUDIES - ESTABLISH POSSIBLE EXTENTS OF ENRICHED ORE ZONES BY SCOUT DRILLING b. DEMARCATe ZONE OF VARIOUS GRADES OF KYANITE AND ESTIMATE GRADE WISE RESOURCES IN THE STUDY AREA AS PER UNFC NORMS FROM G-4 LEVEL OF EXPLORATION.
		c. ON LOCATING POTENTIAL AREAS BASED ON G-4 LEVEL ME WORKS, FURTHER RECOMMENDATIONS FOR G-3 LEVEL SHALL BE PROPOSED.
NAME/NUMBER OF GEOSCIENTISTS		THREE (03) Nos and more from MINERAL EXPLORATION DEPARTMENT, KIOCL LIMITED, BANGALORE
EXPECTED FIELD DAYS (GEOLOGY/GEOPHYSICS/ SURVEY / OTHERS)		LARGE SCALE GEOLOGICAL MAPPING (03 months) - Geologist Party Days – 125 days - Survey Party Days – 25 days DRILLING (05 months) - Geologist Party Days – 110 days - Core Sampling Party Days – 45 days
LOCATION (KEY MAP @ PLATE No. 01)		
CO-ORDINATES OF THE BLOCK BOUNDARY POINTS		ANNEXURE 04
VILLAGES		Hampapura, Kallahalli, Maddur, Bettahalli, Chunjirayanahundi & Melleshvaran Betta
TALUKA		Heggada Devanakote
DISTRICT		Mysore
STATE		Karnataka
AREA		
BLOCK AREA		KALLAHALLI KYNITE BLOCK (KIOCL_15_KA_KKB) : 26.67 sq km
FOREST AREA		DEEMED FOREST AREA : 3.5 sq km
GOVERNMENT LAND		-
PRIVATE LAND		23.17 sq km



ACCESSIBILITY	
NEAREST RAIL HEAD	Mysore Railway Station
ROAD	SH 57 (Mysore – Hampapura) passes through Kallahalli Village All weather road Kallahalli Village to the BLOCK (around 06.0km)
AIRPORT	NEAREST AIRPORT TO THE BLOCK - MYSORE (around 36km).
HYDROGRAPHY	
LOCAL SURFACE DRIANAGE PATTERN CHANNELS / RIVERS / STREAMS	Radial pattern Kabini River flowing easterly (around 09.0km from the Block in the South)
CLIMATE	
MEAN ANNUAL RAINFALL	800mm
TEMPERATURE	WINTER: Around 19.1°C SUMMER: Around 30.2°C
TOPOGRAPHY	
TOPOSHEET NO	57D/08 BLOCK MARKED ON TOPOSHEET – PLATE NO. 02
MORPHOLOGY OF THE AREA	Hilly Slope with elevation between 851 m to 734m above MSL
AVAILABILITY OF THE BASELINE GEOSCIENCE DATA	
GEOLOGICAL MAP (1:50 k)	AVAILABLE
GEOCHEMICAL MAP	NOT AVAILABLE
GEOPHYSICAL MAP (Aero/ Ground, Regional/ Local scale)	Aero Geophysical Map available
JUSTIFICATION FOR TAKING UP G24 LEVEL OF MINERAL EXPLORATION	
PREVIOUS WORK:	G. R. DEVADU, Geologist (Jr.), GSI carried out (1977-78) DETAILED INVESTIGATION FOR KYANITE in parts of toposheet 57 D/08, MALLESWARANABETTA AREA, HEGGALADEVANAKOTE TALUK, MYSORE DISTRICT, KARNATAKA; Block is contiguous to the Active Mining lease (ML No. 2286) in the vicinity of the proposed Block with Average production of 30,000 tonnes per annum holding the total reserve of 10,93,500 tonnes of Kyanite.
PRELIMINARY FIELD INSPECTION BY KIOCL:	
Technical Team of KIOCL visited the various parts around Kallahalli Kyanite Block on 22 nd Nov 2019 to study the site conditions.	



Field Photographs



Exposure of Kyanite bearing bands in Western part of proposed Block



Active Kyanite mining area (ML No. 2286) in the western part of the Block



Active Kyanite mining area (ML No. 2286) in the western part of the Block

Observations:

- Two major bands of Kyanite-rich quartz schist with the strike direction of North- South with steeply dipping (75° to 80°) are observed in the western part of the Block.
- Active Kyanite mining lease (ML No. 2286) in the western part of the Block is observed with total Geological Reserve 10,93,500 tonnes and annual production capacity of 30,000 tonnes per year
- 11 nos of Bed rock samples collected from the major bands of Kyanite-rich quartz schist and working mines situated in the vicinity of the Block. Analysis results are provided below;

Sl.No	Sample	Al ₂ O ₃ %	Fe ₂ O ₃ %	LOI %	SiO ₂ %
1	KKB - 1	22.64	1.96	1.35	55.00
2	KKB - 2	27.13	1.96	3.85	50.20
3	KKB - 3	38.25	5.16	4.67	35.28
4	KKB - 4	38.45	1.50	4.73	38.32
5	KKB - 5	52.02	1.29	1.00	33.32
6	KKB - 6	34.52	2.57	4.59	45.52
7	KKB - 7	29.78	2.69	4.83	42.24
8	KKB - 8	54.67	3.98	0.80	34.40
9	KKB - 8A	33.46	2.05	3.96	49.36
10	KKB - 9	35.50	2.26	1.48	53.88
11	KKB-10	36.52	1.36	4.45	43.08

DETAILED DESCRIPTIONS:

1. BLOCK SUMMARY:

1.1 Physiography:

The proposed area- Kallahalli Kyanite Block is mapped under Toposheet 57 D/8.

Kallahalli Kyanite Block, of 26.67 sq km area, is having an undulating topography with low dissected structural hills (prominent in the north western part) with pediments and pediplains. The maximum elevation observed in the dissected structural hill is MSL 850 msl, and varies upto MSL 750. The lowest elevation point will be MSL 706. The lithology is mostly covered with Neoproterozoic basic intrusive and schists of upper amphibolite to lower granulitic facies under intermediate pressure condition. Mudukerre Canal is one among the prominent water body within the boundary which flows predominantly southwards. The Kabani river flows within a proximity of 1.5 km from the boundary of the area.

The proposed area is well connected to Mysore by road, and the nearest airport Mysore at a distance of 36km. Mysore is the nearest city and administrative headquarters around 34km from the proposed block. Power, Water, Fuel, Communication are available in vicinity of the proposed block **(Plate-01- Key Map)**.

1.2 Back Ground Geology & Regional Geology of the Block:

The proposed area comes under the Western Dharwar craton, Dharwar craton has been divided tectonically into Western Dharwar Craton (WDC) and Eastern Dharwar Craton (EDC) by Ramakrishnan et al (1976) and Swami Nath et al (1976), separated by the Closepet Granite Batholith, based on lithological differences and inferred metamorphic and magmatic events.

WDC is an ancient terrain distinguished by an older Sargur Orogeny involving the lithological assemblage of komatiite-tholeiite-BIF with minor quartzite-marble-pelite (Sargur Group, 3000-3300 Ma) enclosed in the TTG type Peninsular Gneiss (3000-3400). The orogeny culminated in profuse invasion by trondhjemite-granodiorite plutons (3000 Ma), leading to the stabilization on the Mesoarchaeon crust. This event was succeeded by the deposition of

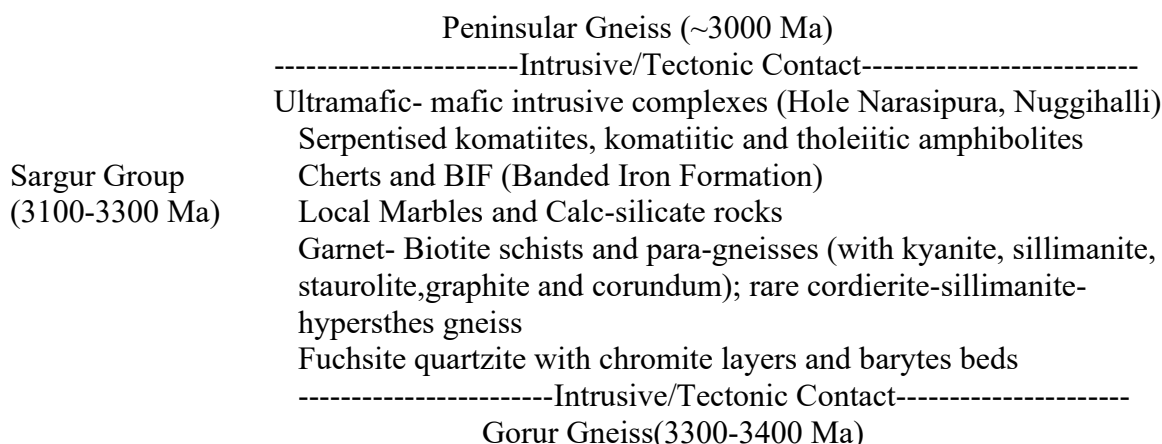


Dharwar Supergroup (2550-2800 Ma) on a peneplaned basement of Peninsular Gneiss (3000-3400 Ma) with Sargur Group. Angular unconformities over Peninsular Gneiss and Sargur Group, marked by basal oligomict conglomerate, quartz arenite-basalt cycles and Algoma-type BIF formed the lower Bababudan Group, overlain by polymict conglomerate-quartzite carbonate-pelite-MnF and BIF, capped by basalt-rhyolite-greywacke-BIF association of the upper Chitradurga Group of Dharwar Supergroup. The Dharwar Supergroup and its basement gneiss is involved in Dharwar Orogeny which culminated in sporadic intrusion of ~ 2600 Ma potassic granites and final cratonization in end-Archaeon.

Three generations of volcanic-sedimentary greenstone granite sequences are present in the WDC: the 3.1–3.3 Ga Sargur Group, the 2.6–2.9 Ga Dharwar Supergroup and 2.5–2.6 Ga calc-alkaline to high potassic granitoids, the largest of which is the Closepet Granite.

The WDC shows an increase in regional metamorphic grade from greenschist to amphibolite facies in the north and granulite facies in the south. The metamorphic grade increase corresponds to a paleopressure increase from 3 to 4 kbar in the amphibolite facies to as much as 9–10 kbar (35 km paleodepth) in the highest-grade granulite-transition zone along the southern margin of the craton. Rocks of Sargur complex have undergone upper amphibolite-grade metamorphism at $700 \pm 30^\circ\text{C}$ and 8.6 ± 0.8 kBar and its basic –ultrabasic components converted to a schistose assemblage.

Composite Stratigraphy of Sargur Group (after Vishwanatha and Ramakrishna)



Brief regional geology outlining the broad geological and structural frame work

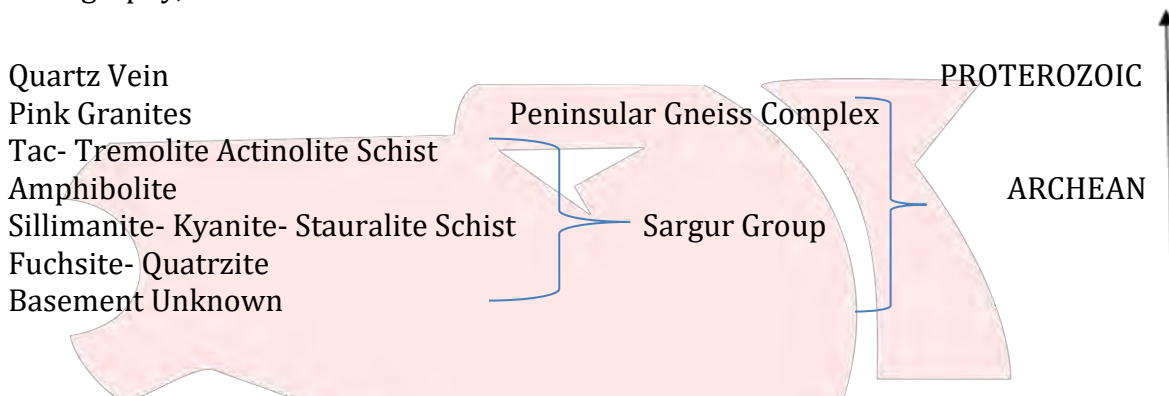
From 1971 to 1976 Viswanatha, Ramakrishnan and Swaminath have studied the Sargur groups of rocks and they are of the opinion that these high-grade schists forming linear belts and "enclaves" older than the Dharwar green stone belts. M.N.Viswanatha (1975-76) of the Geological Survey of India who has later on mapped the east and north east of Sargur village and has given the name "Sargur schist complex" to these linear bands and enclaves of high grade schist/gneiss and suggested that the Sargur schist complex is having the base of unclassified gneissic complex (Tonalitic) with enclaves of mafic and ultramafic rocks and including unrecognisable earlier cycle of supracrustal sequence (part of sialic crust ?).

A.S. Ramiengar et. al (1978) of Geological Survey of India have discovered a small enclave of fuchsite quartzite similar to the Sargur in Banavara area of Hassan district, with layers of chromite and heavy minerals like magnetite tourmaline rutile and zircon. They are of the opinion that the opaque and non-opaque heavy mineral suite is suggestive of a source region rich in sialic components with subordinate ultramafic rocks.

Airborne mineral surveys and exploration wing of GSI (1981) had carried out magnetic studies in Toposheet 57 D/8 and pegmatites, granite and gneisses are observed. This closed magnetic feature may be due to pyroxenites exposed within the gneisses. Apart from that, Serpentinised ultramafic rocks and quartz-sillimanite gneisses and quartz veins are reported. Thin section studies of the ultramafic rock reveal the presence of flakes of antogorite, chlorite and numerous grains of magnetite. No relict olivine or proxenes could be seen. GSI has mapped the proposed area in and around the proposed Kallahalli Kyanite Block and presented in GSI BHUKOSH database.



Litho units present in the proposed block is chronologically arranged based on established stratigraphy, is as follows:



The Sargur high- grade supracrustal sequence occurs as synformal or antiformal hinges? amidst Peninsular Gneiss Complex. The Peninsular Gneiss and the high grade supracrustal sequence of the Sargur Group show complicated deformation pattern wherein three periods of distinct episode could be deciphered (Chadwick et al 1978). The proposed block is having a plunging syncline and anticline in the north western side, adjacent to the plunging syncline there is a minor fault with roughly NE SW trend, which dissects the Archean Amphibolites as well as Sill-Str-Kyanite. A minor lineament is also observed in the north western proximity of the proposed block.

1.3 Mineral Potentiality based on Geology, Geophysics and Ground Geo Chemistry etc:

Recommendations of earlier investigation works

1.3.1 G. R. DEVADU, Geologist (Jr.), GSI carried out (1977-78) DETAILED INVESTIGATION FOR KYANITE in parts of toposheet 57 D/08, MALLESWARANABETTA AREA, HEGGALADEVANAKOTE TALUK, MYSORE DISTRICT, KARNATAKA and Gist of Investigation are provided below;

- Area of 0.35 sq.km was mapped on 1:1000 scale with 363 cubic metres of trench and pitting to examine the continuity of kyanite bearing bands along the strike and as well as depth persistence.
- Possible reserve of 0.43 million tones of in situ ore and 20,000 tonnes of float ore with about 60% kyanite concentration within the rock from the northern part of Malleswarana betta has been estimated.
- Quality is likely to be of refractory grade as they are having megascopic similarity to the material already mined near Sargur.



➤ Recommendations :

- ❖ Southern extension of the present exploration block contain sizeable reserves of in situ ore as well as float ore.
- ❖ Recommended for Detailed Mineral Exploration with few diamond drill holes to depth of 100 metres to establish the depth continuity of kyanite bands as well as for delineating the synformal structure.

1.3.2 Active Mining lease (ML No. 2286) in the vicinity of the proposed Block with Average production of 30,000 tonnes per annum holding the total reserve of 10,93,500 tonnes of Kyanite with the below indicated grade of the ore

➤ Al ₂ O ₃	: 55.88 %
➤ SiO ₂	: 35.13 %
➤ Fe ₂ O ₃	: 3.53 %
➤ TiO ₂	: 3.34 %,
➤ Na ₂ O	: 0.40%
➤ Loss on Ignition	: 10.64 %

1.3.3 Geological Map (1: 25,000 Scale) of the proposed area showing the occurrence of SILLIMANITE - STAUROLITE KYANITE-SCHIST (source for Kyanite Mineralization) is enclosed @ Plate 03 for perusal and records.

1.3.4 IBM GUIDELINES

In view of the changing market dynamics and availability of new technologies for upgrading the low grade resources, IBM has revised the THRESHOLD VALUE for the KYANITE & SILLIMANITE minerals under provision of Rule 12(7) of "Mineral Conservation and Development Rules, 2017" (MCDR, 2017), vide Notification No: C -284 / 03 / CMG / 2017 dated 25th April 2018, as under:

(6) THRESHOLD VALUE OF MINERALS

Sl No (7) Kyanite & Sillimanite - **35%** (Min.) Kyanite /* Sillimanite content

(All resources shall be assessed up to the threshold value and the resources between the threshold value and the cut-off grade shall be reported separately. There will however be no restrictions in estimating resources below the threshold value if there is a ready market of such mineral/ore either directly or after beneficiation)

1.4 Scope for proposed Exploration:

To assess the mineralization of Kyanite and associated minerals in proposed area in order to carve out a potential mineralization of Kyanite and associated minerals for carrying out G3/G2



level of Mineral exploration works and for auctioning the block for generating revenue to Government exchequer.

1.5 Recommendations of G4 level Mineral Exploration Reports:

No G4 works are carried out.

1.6 Objectives:

- a. To carryout Large Scale Geological mapping in 1:12500 scale.
- b. To delineate strike continuity and structural behaviour of Kyanite-rich quartz schist by sampling (bed rock / pit / trench)
- c. Carry out scout drilling to establish possible extents of enriched / potential ore zones.
- d. On locating potential areas, to bring the area at G3 level ME Works shall be proposed.
- e. ME Works shall be confirming to
 - ✓ MMDR Amendment Act-2015
 - ✓ Minerals (Evidence of Mineral Contents) Rule- 2015,
 - ✓ Mineral (Auction) Rules-2015
 - ✓ IBM GUIDELINES

2. PREVIOUS WORK:

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- Quality is likely to be of refractory grade as they are having megascopic similarity to the material already mined near sargur.
- Recommendations :
 - ❖ Southern extension of the present exploration block contain sizeable reserves of in situ ore as well as float ore.



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- Fe₂O₃ : 3.53 %
- TiO₂ : 3.34 %,
- Na₂O : 0.40%
- Loss on Ignition : 10.64 %

3. BLOCK DESCRIPTION:

The boundary coordinates of the proposed block are given in table @ Annexure 01.

4. PLANNED METHODOLOGY

4.1. LARGE SCALE (1: 12500) GEOLOGICAL MAPPING (LSM):

- a. Study and interpretation of available Aero Geo – physical, NGPM, NGCM data and maps of the areas including previous Study Reports (if any, to be obtained from GSI or other agencies) for creating a geological Base Map of the Blocks.
- b. LSM by traversing (total 26.67 sqkm), to identify and mark the anomalies of Kyanite-rich quartz schist in the Block.
- c. Total 100 nos of Bed Rock Samples, 100 nos of Pit/ Trench samples are proposed for collection and analysis which may vary depending on the site conditions for proving mineralization/otherwise and geological structures.
- d. Sampling on Bed Rock on the outcrops / ore body out crops shall be done by collecting fresh rock samples.
- e. Pit /Trench sampling dimensions
 - On defining the anomalies and geological structures, detailed pitting / trenching, will be carried out.



- Trenches will be carried out on the peripheral boundaries of the lithounits to establish the lateral extents. However, Trenches / pits will be planned to establish subsurface continuity.
- Tentatively the pits/ trenches shall be upto 1m depth
- f. Insitu Bluk Density Test will be carried out @ site as per IS : 5842 - 1986 BIS adopted for Kyanite and overburden @ size 15-80 mm.
- g. All the geological features / details, sample analysis data recorded will be plotted.
- h. Interpretation of observed details and other inputs shall be used in drawing Geological Map and locating mineralised /potential target areas.
- i. Generate a detailed Geological Map along with recommendations for taking up Scout Drilling in the enriched / potential zones.

4.2. SURVEY WORKS:

- a. RL's and co-ordinates of DGM works, observation points will be marked using handheld GPS units.
- b. DGPS / Total Station Survey will be carried out for fixing up Boreholes points and Geophysical layout points on the ground (by establishing Block Base Station using SOI Ground Control Points / Bench Marks and Triangulation Ref Points etc).

4.3. GROUND GEOPHYSICAL WORKS

Ground Geophysics is planned to be executed in the target area using Magnetic and Gravity methods for delineating the subsurface ore continuity. Tentative quantum of Magnetic and Gravity methods proposed for execution are provided below.

Gravity & Magnetic:

- Parameters
 - o Line interval : 100m,
 - o Station interval (sampling interval) : 50m,
 - o Line Direction – approximately perpendicular to strike direction of the Zone/Band/ Ore body.
- Quantities
 - o Total number of Probe Points : 1500 points
 - o Total length : 75 line km



4.4. EXPLORATORY DRILLING:

- Present Exploration scheme proposes 500 m of Scout Drilling (05 nos , inclined OR Vertical)
- Scout Drilling will be carried out with reference to LSM (1:12,500 scale@ suiting to multiples of 800m X 800m grid) with a view to firm up the grade and resources of Kyanite at G-4 level of exploration across the length & breadth of Blocks.
- Boreholes will be planned for 100 m depth with the first level of intersection of 30 m and 3 m of drilling in basement.
- Core drilling with double tube core barrel shall be deployed to ensure maximum core recovery.

PS: The position extent and number of boreholes shall be based on the recommendations of LSM works.

4.5. LABORATORY STUDIES

a. Chemical Analysis:

- All the Primary samples will be analysed at Mineral Exploration laboratory, KIOCL Limited(BFU), Panambur, Mangaluru,. Details of samples to be analysed are provided below.

Sl	Samples	Nos
1	Primary Samples - 100%	700
2	Internal Check sample analysis 05%	35
3	Composite Sample Analysis 10%	70
4	Total	805

- Sample Analysis will be as per laid down standards.
- Samples shall be analyzed for radicals- Al₂O₃, SiO₂, Fe₂O₃, TiO₂, CaO, MgO, Na₂O, K₂O and LOI (09 radicals)
- 10% of primary samples will be subjected to analysis at a NABL certified external laboratory as Check Samples.
- 5 nos of samples will be analysed for PGE.



b. Physical Analysis

- Petrological studies like Preparation and study of Polished Thin Section will be done on BRS/Core samples.
- In situ Bulk Density Tests at site for Over Burden and Ore Body
- Moisture absorption & Specific Gravity will be determined on BRS/ Drill core samples (lab scale).

4.6. EXPLORATION REPORT:

- Generate a detailed Report (Final G4 Report) along with a Geological Map identifying and establishing OBVIOUS GEOLOGICAL POTENTIAL (OGP) Areas with quantity and quality of resources worthy of further exploration to realize an AUCTIONABLE BLOCK.
- Data generated from G-4 level works, and earlier data if any shall be presented in the Report as per the guidelines laid down in provisions of MINERAL (EVIDENCE OF CONTENTS) RULES 2015 in the NMET prescribed format for Peer Review.

5. NATURE, QUANTUM AND TARGET

Quantum of work proposed is provided @ Annexure No - 02.

6. TIME LINES

Total period proposed for G4 level Mineral Exploration works is 12 months

Time Schedule Chart is provided @ Annexure No – 01

7. BREAKUP OF EXPENDITURE:

Total estimated cost is Rs. 3,25,74,997/- (including GST @ 18%). (Say Rs.326 Lakhs)

Cost estimate is provided @ Annexure No – 03

8. TERMS OF PAYMENT

- 8.1. KIOCL shall raise invoice for the quantum work executed and completed in accordance with the approved MEPP, as per NMET guidelines, for payment.
- 8.2. Projected cost estimates are based on the SOC of NMET circulated vide Office Memorandum Dtd. 31st Mar 2020. However, cost of execution will be claimed with appropriate escalation as per procedure.



TIME SCHEDULE CHART (G4 Level)

Sl	Details of Works	Duration in months	1	2	3	4	5	6	7	8	9	10	11	12	Cumulative mandays
1	CAMP SETTING	01	↔												
2	LARGE SCALE GEOLOGICAL MAPPING (Includes 26.67 sq km of LSM + 100 nos of BRS + 100 cum Pitting/ Trenching + Insitue BD test 10 cum)	03		↔											
	2.1 Geologist Party days (01 Party)	105 days													105
	2.2 Survey Party days (01 Party)	25 days													25
	2.4 Laboratory Works	02				↔									
						Parallel									
3	Ground Geophysics works (02 party)	20 days						↔							
	3.1 Survey Party days for Ground Geophysics	20 days						↔							20
4	Survey Works														
	4.1 Survey party days fir DGPS survey (10 pts) - 01 party	05 days								↔					5
5	Surface Drilling (02 rigs)	03								↔					
	5.1 Geologist Party days (02 Party)	110													110
	5.2 Core sampling Party days (04 Party)	45													45
	5.3 Laboratory Works	03									↔				
											Parallel				
6	Camp Winding	01											↔		
7	Preparation of Reports and Maps	02											↔		
8	Total	12													310

Annexure - 02

QUANTUM OF WORK

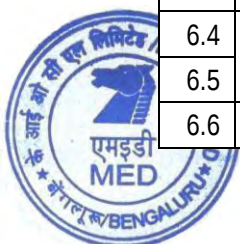
Block No				Qty	
Sl	Stage	Components		Unit	
1	01 - Large Scale Geological Mapping (1:12,500)	Extent		sq km	26.670
2		Large Scale Geological Mapping (1:12500 Scale)		sq km	26.670
3		Collection of Bed Rock Samples		nos	100
4		Pitting/Trenching works (10m X 1m X 1m X 10 nos)		cum	100
				nos	10
5	02 - Drilling works	Insitue Bulk Density Test		cum	10
6		No of Bore Holes		nos	5
7		DGPS Survey for fixing up of borehole points (Includes SOI Ground Control Point and Base stations)		nos	10
8		Approach Road making		km	3
9		Drilling depth		m	100
10		Core Drilling (NQ series @ 100 m per borehole)		m	500
11		Detailed core/ sample logging including supply of core/ sample boxes		m	500
12		Shifting of Sample / Core boxes from site to Core shed (350 km one way & 500 m core in 01 trip) (KIOCL Core repository)		km	700
13	Lab Works for Stage 01 & 02	Primary Analysis (09 radicals)	BRS	nos	100
14			Pit/ Trench samples	nos	100
15			Drill Core	nos	500
16		Internal Check sample analysis (5%)	BRS	nos	5
17			Trench samples	nos	5
18			Drill Core	nos	25
19		Composite sample analysis (10%)	BRS	nos	10
20			Trench samples	nos	10
21			Drill Core	nos	50
22		External Check sample analysis (10%)	BRS	nos	10
23			Trench samples	nos	10
24			Drill Core	nos	50
25		Sample preparation & handling		nos	875
26		Moisture absorption & Specific Gravity determination		nos	3
27		Analysis of PGE by ICPMS method		nos	5
28	Petro studies	Preparation of Thin Section		nos	10
29		Petrographic studies		nos	10
30		Mineragrapphic Studies		nos	10
31		Photomicrographs		nos	10
33	Report preparation			nos	1



Annexure – 03

COST ESTIMATES

S.N	Item of Work		Unit	SOC Item No	Qty	Unit Prices as per SOC	Departmental execution	
							Amount (Rs)	
(a)	(b)		(c)	(d)	(e)	(f)	(g)=(e)*(f)	(h)
1	AERO GEOPHYSICAL DATA INTERPRETATION							
1.1	Geological Mandays for aerogeophysical data interpretation		days	1.1 (b)	5	9,000	45,000	45,000
2	LARGE SCALE GEOLOGICAL MAPPING WORKS (1:12500 scale :26.67 sq km)							17,19,100
2.1	Geologist Party days (1 party)	FIELD	days	1.2	90	11,000	9,90,000	
		HQ		1.2	10	9,000	90,000	
2.2	Semi skilled labours (2 labours per party : Rs.695 * 2 nos = Rs 1390/-)		days	5.7	60	1,390	83,400	
3	PITTING WORKS							
3.1	Pitting works		cum	2.1.2	100	3,800	3,80,000	
3.2	Pitting for Insitu Bulk Density		cum	2.1.2	10	3,800	38,000	
3.3	Semi skilled labours (2 labours per party : Rs.695 * 2 nos = Rs 1390/-)		days	5.7	20	1,390	27,800	
4	SURVEY WORKS							
4.1	Fixation of borehole and determination of Co-ordinates and RL by DGPS		days	1.6.2	5	19,200	96,000	
4.2	Semi skilled labours (2 labours per party : Rs.695 * 2 nos = Rs 1390/-)		days	5.7	10	1,390	13,900	
5	GROUND GEOPHYSICS							71,63,800
5.1	Gravity & Magnetic Survey		nos	3.1b	1,500	4,500	67,50,000	
5.2	Monitoring in case of outsourcing		days	3.19	20	11,000	2,20,000	
5.3	Survey party days		days	1.6.1a	20	8,300	1,66,000	
5.4	Semi skilled labours (2 labours per party : Rs.695 * 2 nos = Rs 1390/-)		days	5.7	20	1,390	27,800	
6	DRILLING							85,74,200
6.1	Surface Drilling (02 rigs)		m.	2.2.1.4a	500	11,500	57,50,000	
6.2	Transportation of drill rigs (02 units x 800 km)		Km.	2.2.8	1,600	36.0	57,600	
6.3	Drilling camp setting cost		per drill	2.2.9a	2	2,50,000	5,00,000	
6.4	Monthly accomadation	First Drill	monthly basis	2.2.9	3	50,000	1,50,000	
6.5	charges for drilling camp	Second Drill		2.2.9	3	50,000	1,50,000	
6.6	Drilling camp winding cost		per drill	2.2.9b	2	2,50,000	5,00,000	



6.7	Approach road making for Rugged - Hilly terrain	Km	2.2.10b	3	32,200	96,600	
6.8	Construction of Concrete pillar (12"X 12"X30")	per borehole	2.2.7a	5	2,000	10,000	
6.9	Borehole plugging by cement	per m	2.2.7b	15	150	2,250	
6.10	Land/Crop compensation	per borehole	5.6	5	20,000	1,00,000	
6.11	Geologist Party days (1 party)	FIELD	days	1.2	90	11,000	9,90,000
		HQ	days	1.2	20	9,000	1,80,000
6.12	Semi skilled labours for core logging works (2 labours per party : Rs.695 * 2 nos = Rs 1390/-)	days	5.7	45	1,390	62,550	
6.13	Transportation ((350 km one way & 500 m core in 01 trip) (KIOCL Core repository)	km	2.2.8	700	36.0	25,200	
7	LABORATORY STUDIES						
7.1	Sample processing works (875 nos)	Sampler charges	days	1.5.2	45	5,100	2,29,500
7.2		Semi skilled labours	days	5.7	30	1,390	41,700
7.3	Analysis of alumino-silicate rock (Silimanite / Kyanite)	Primary	per sample	4.1.2	700	8,796	61,57,200
7.4		Internal Check (5%)		4.1.2	35	8,796	3,07,860
7.5		Composite (10%)		4.1.2	70	8,796	6,15,720
7.6		External Check (10%)		4.1.2	70	8,796	6,15,720
7.7	Drill core preservation	per m	5.3	500	1,590	7,95,000	
7.8	Insitue Bulk Density	nos	4.10	5	3,540	17,700	8,17,515
7.9	Specific Gravity determination	nos	4.8.1	3	1,605	4,815	
7.10	Petro studies	Preparation of Polished Section.	nos	4.3.1	10	2,353	23,530
7.11		Complete Petrological Report of rock sample	nos	4.3.4	10	4,232	42,320
7.12	Analysis of PGE by fire assay method	nos	4.1.5d	5	11,800	59,000	
8	Preparation of Exploration Project Proposal	lumpsum	5.1	1	3,80,000	3,80,000	3,80,000
9	GRAND TOTAL (1 to 8)						267,92,165
10	EXPLORATION REPORT						8,03,765
11	PEER REVIEW OF REPORTS	lumpsum					10,000
12	GRAND TOTAL (1 to 7)						276,05,930
13	GST 18%						49,69,067
14	Grand total (with GST 18%)						325,74,997

Note :

Procurement of Aero geophysical maps, Data, Fees & Levies on actual to be reimbursed.



Annexure – 04

Boundary Co-Ordinates of the Block

SL No.	BP	UTM	
		EASTING	NORTHING
1	KB-01	657728	1347584
2	KB-02	662526	1348355
3	KB-03	663162	1348474
4	KB-04	663169	1347778
5	KB-05	662277	1347143
6	KB-06	661139	1346730
7	KB-07	661286	1346415
8	KB-08	661106	1346387
9	KB-09	661214	1343083
10	KB-10	662593	1342847
11	KB-11	662747	1341824
12	KB-12	663214	1341621
13	KB-13	663219	1340688
14	KB-14	659799	1340612
15	KB-15	658482	1343121
16	KB-16	657895	1344652
17	KB-17	657827	1345180
18	KB-18	658303	1345215
19	KB-19	658277	1345609
20	KB-20	657756	1345597
21	KB-21	657673	1346904

KUDREMUKH



Annexure – 05

Consent letter received from Dept of Geology & Mining, GoK



GOVERNMENT OF KARNATAKA

No. DMG-17013/6/2019-20

Office of the Director,
Department of Mines and Geology,
Khanija Bhavan, Race Course Road,
Bangalore-1, dated: 14.01.2020.

To
KIOCL Limited
(A Government of India Enterprises)
II Block, Koramangala
Bengaluru- 560 034.

Sir,

Sub: Permissions for carrying out G4 exploration works in Kallahalli Kyanite Block (KKB), Heggadadevana Kote (TQ), Mysore District. - reg.

Ref: Your letter No. KIOCL/MED/953 dated: 30.09.2019.

With reference to the above subject and as per the request made by you under reference, you are hereby informed to prepare and submit the exploration proposal for G4 level of exploration in the following Kyanite block to NMET Technical Committee, Government of India on behalf of State Government of Karnataka after verifying the reports of state DMG, GSI and other agencies.

Sl. No	Block details	Area (sqkm)	Proposed level of Exploration	Minerals for investigation
1	Kallahalli Kyanite Block (KKB)	30.01	G4	Kyanite and associated Minerals

This is for your kind information and further needful in the matter.

Yours faithfully,



DIRECTOR

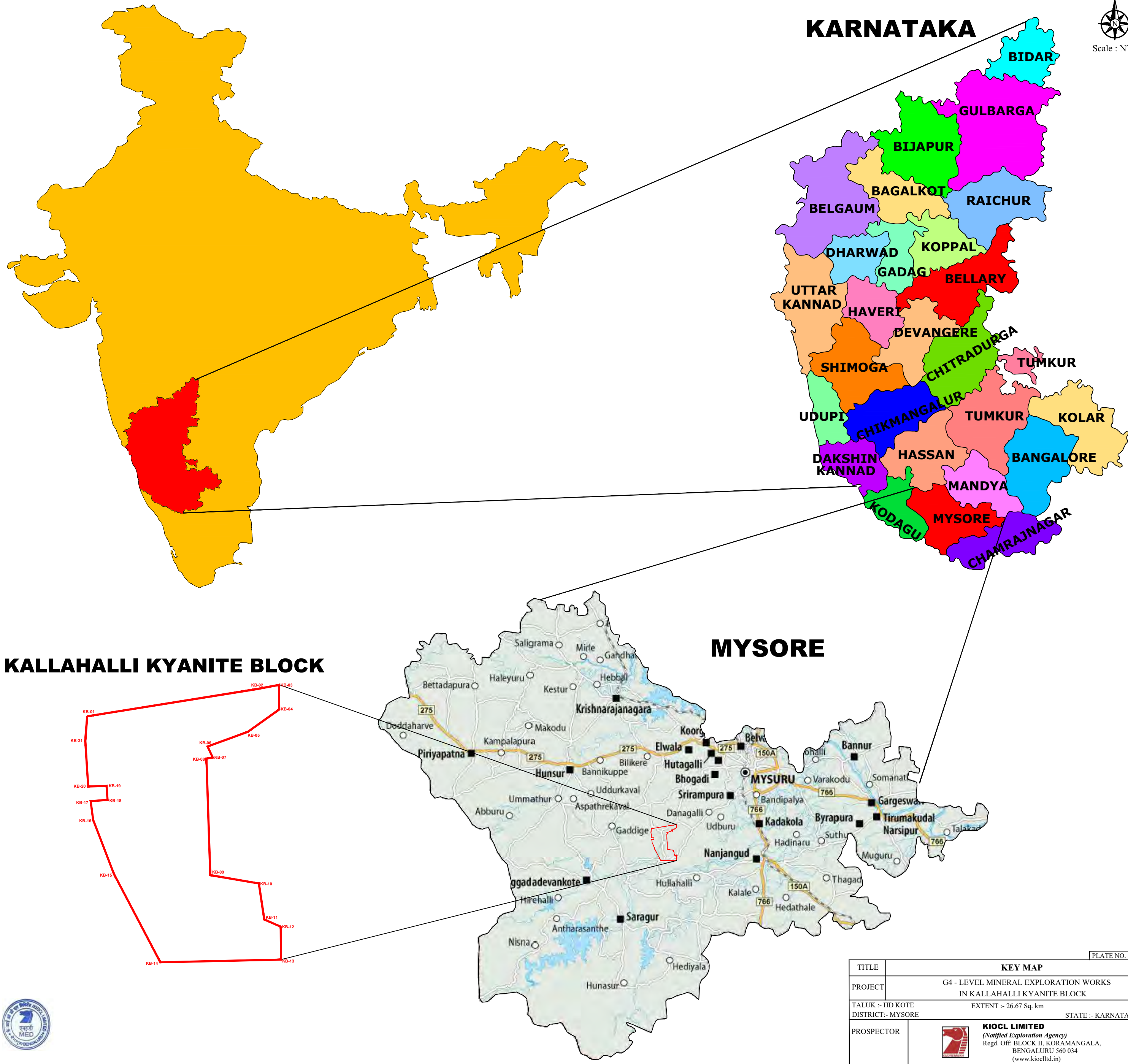




MINERAL EXPLORATION PROJECT PROPOSAL FOR CARRYING OUT G4 LEVEL OF MINERAL EXPLORATION WORKS FOR
KYANITE & ASSOCIATED MINERALS IN KALLAHALLI KYANITE BLOCK (BLOCK ID: KIOCL_15_KA_KKB)



Scale : NTS



TITLE		KEY MAP	
PROJECT		G4 - LEVEL MINERAL EXPLORATION WORKS IN KALLAHALLI KYANITE BLOCK	
TALUK :- HD KOTE		EXTENT :- 26.67 Sq. km	
DISTRICT:- MYSORE		STATE :- KARNATAKA	
PROSPECTOR		 KIOCL LIMITED (Notified Exploration Agency) Regd. Off: BLOCK II, KORAMANGALA, BENGALURU 560 034 (www.kiocltd.in)	





MINERAL EXPLORATION PROJECT PROPOSAL FOR CARRYING OUT G4 LEVEL OF MINERAL EXPLORATION WORKS FOR KYANITE & ASSOCIATED MINERALS IN KALLAHALLI KYANITE BLOCK (BLOCK ID: KIOCL_15_KA_KKB)

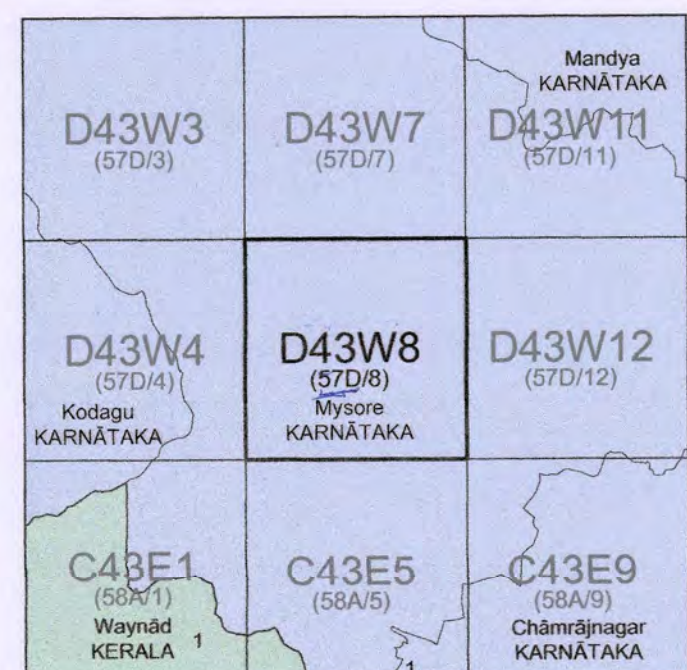


Scale 1:50,000



No. D43W8

Scale 1:50,000



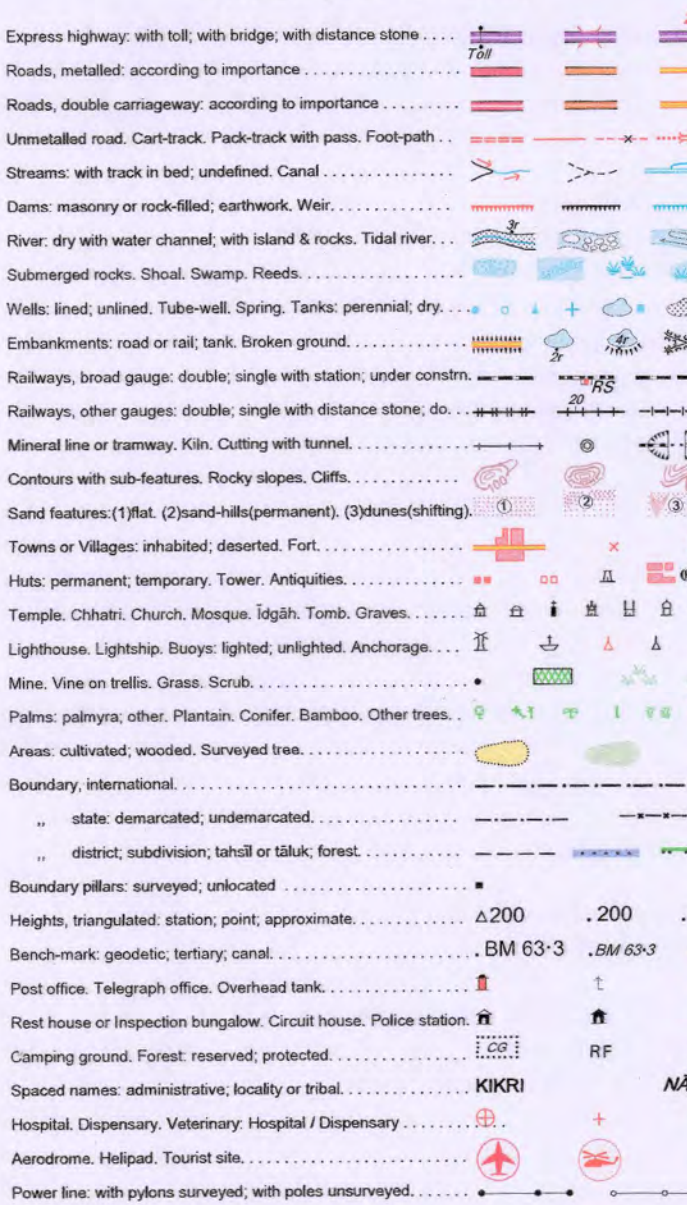
भारतीय सर्वेक्षण विभाग

SURVEY OF INDIA

1st Edition 2011.

Price: Rs. 70/-

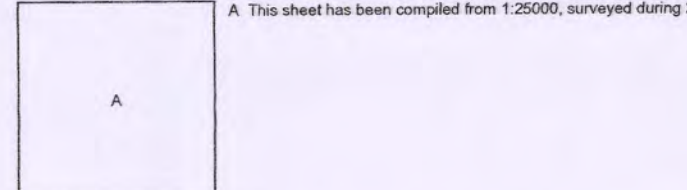
CONVENTIONAL SYMBOLS



NOTES

1. Heights are in metres and above Indian mean sea level.
Contours are approximate.
A relative height, e.g., 50, represents the approximate height, in metres, between the top and bottom of a steep slope.
Tanks shown dry in the area usually contain water from June to February.
Tube-wells are numerous throughout the sheet, some have been drilled.
Unsettled roads are indicated and cart tracks generally passable in dry season.
Permission to use the roads and cart tracks along the canal is required from the irrigation authorities.
Bundled trees are shown thus:

COMPILED INDEX



Projection - UTM Datum - WGS 84

Magnetic Variation from True North about 2° West in 2005.

1:50,000

500 m to 1 cm

2 cm to 1 km

CONTOUR INTERVAL 20 METRES

For further details about this map, please contact

Director

Karnataka Geo-Spatial Data Centre

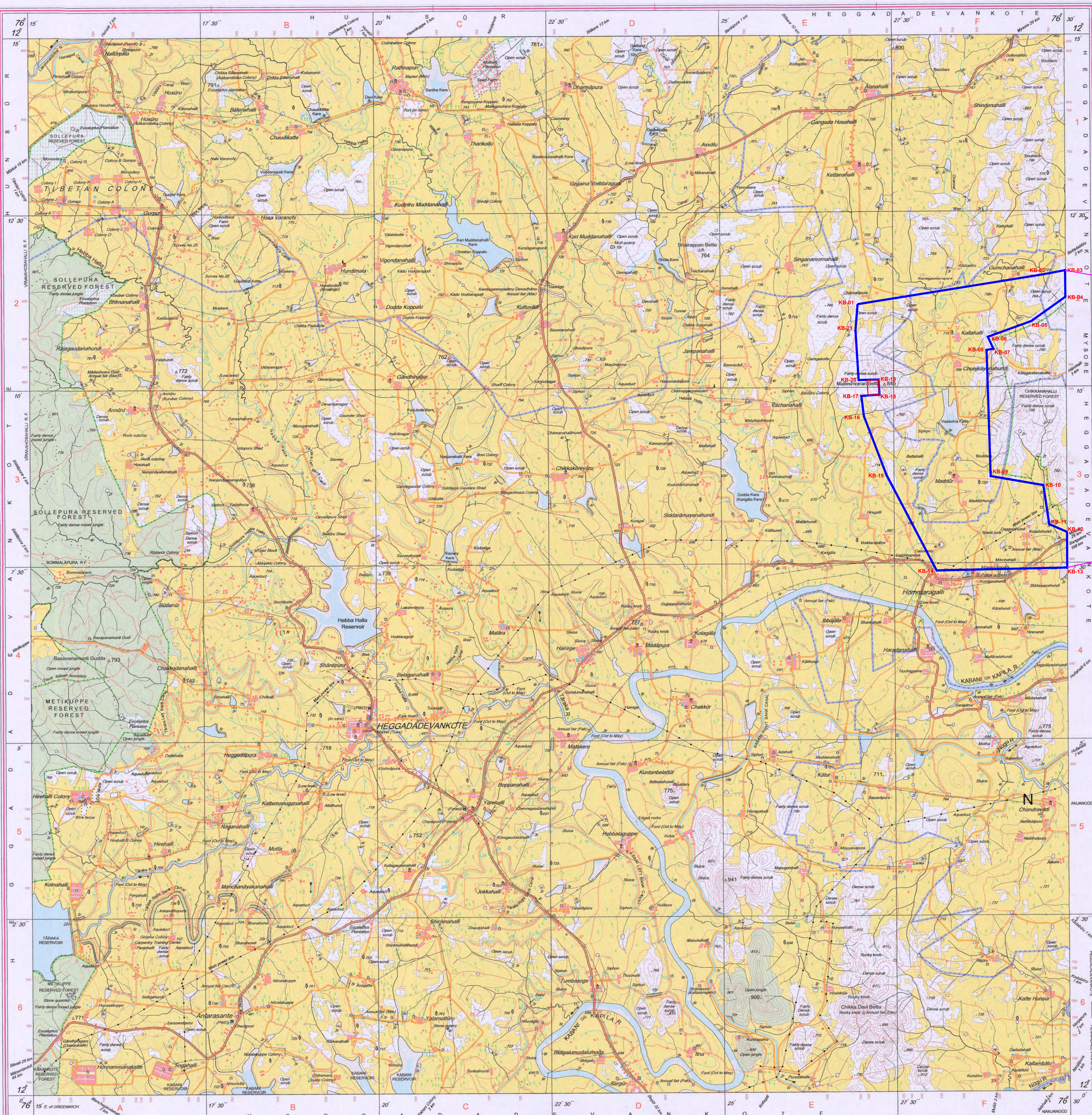
Survey of India, Koramangala II Block

Bangalore.

WEBSITE - www.surveyofindia.gov.in

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GENERAL INDEX	
	PROPOSED BLOCK
	WORKING MINES (ML No.2286) situated in the Vicinity of the Block
AREA:-26.67 Sqkm	AREA:-12.14 Ha

PROPOSED AREA BOUNDARY CO-ORDINATES (GPS READINGS) DATUM: WGS 84						
SL No.	BP	UTM	EASTING	NORTHING	DECREE MINUTE SECONDS	DECREE DECIMALS
1	KB-01	657728	1347584	12 11 10.9	76 26 59.2	12.18637 76.44978
2	KB-02	662526	1349355	12 11 5.2	76 29 38.1	12.19311 76.49391
3	KB-03	663162	1348414	12 11 38.9	76 29 59.1	12.19415 76.49976
4	KB-04	663169	1347778	12 11 16.3	76 29 59.2	12.18786 76.49979
5	KB-05	662277	1347143	12 10 56.8	76 29 29.6	12.18216 76.49156
6	KB-06	661139	1346750	12 10 42.6	76 28 51.9	12.17869 76.48198
7	KB-07	661286	1346415	12 10 32.3	76 28 56.7	12.17663 76.48213
8	KB-08	661206	1346387	12 10 31.4	76 28 50.8	12.17539 76.48076
9	KB-09	661214	1343083	12 08 43.8	76 28 53.7	12.14551 76.48159
10	KB-10	662593	1342847	12 08 35.9	76 29 39.3	12.14331 76.49435
11	KB-11	662717	1341825	12 08 21.6	76 29 44.2	12.13508 76.49561
12	KB-12	663214	1341621	12 07 55.9	76 29 59.6	12.1322 76.49989
13	KB-13	663219	1340688	12 07 25.5	76 29 59.6	12.12376 76.49989
14	KB-14	659799	1340672	12 07 23.7	76 28 06.5	12.12314 76.46847
15	KB-15	658482	1341211	12 06 45.6	76 27 23.4	12.11599 76.45609
16	KB-16	657895	1340652	12 09 35.5	76 27 04.2	12.11586 76.45117
17	KB-17	657827	1345180	12 09 52.7	76 27 02.1	12.11664 76.45057
18	KB-18	658393	1342915	12 09 53.7	76 27 17.8	12.11693 76.45496
19	KB-19	658277	1345059	12 10 06.6	76 27 17.0	12.11689 76.45473
20	KB-20	657756	1345597	12 10 06.3	76 26 59.8	12.11681 76.44934
21	KB-21	657673	1346904	12 10 48.8	76 26 57.3	12.11823 76.44924

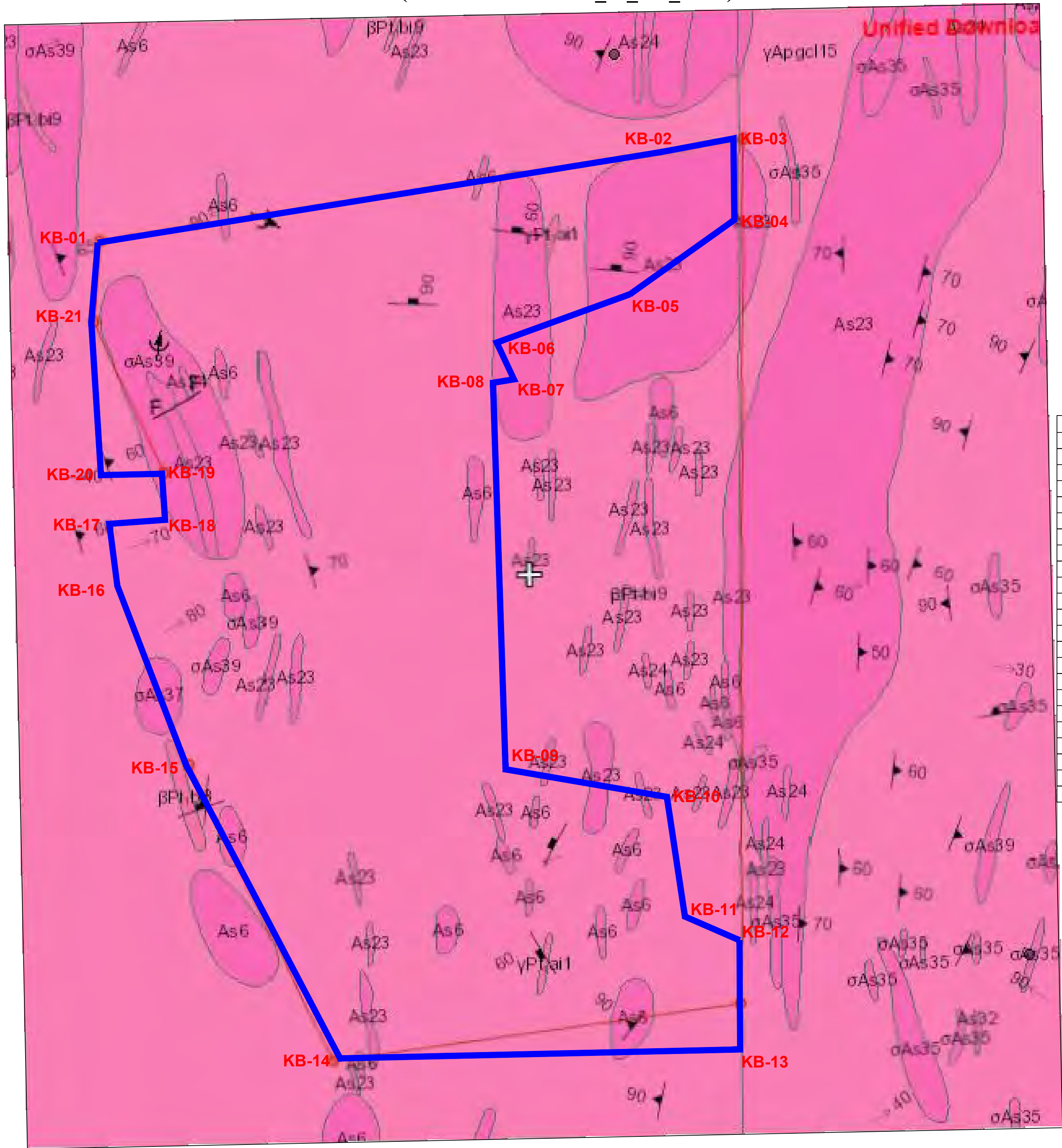
TITLE		BLOCK MARKED ON SOI TOPOSHEET NO. 57 D/08	
PROJECT	G4 - LEVEL MINERAL EXPLORATION WORKS	IN KALLAHALLI KYANITE BLOCK	
TALUK - HD KOTE	EXTENT :- 26.67 Sq. km	STATE - KARNATAKA	
DISTRICT - MYSORE			
PROSPECTOR	KIOCL LIMITED	(Notified Exploration Agency)	
	Regd. Off: BLOCK II, KORAMANGALA, BENGALURU 560 034	(www.kioclimin)	



MINERAL EXPLORATION PROJECT PROPOSAL FOR CARRYING OUT G4 LEVEL OF MINERAL EXPLORATION WORKS FOR KYANITE & ASSOCIATED MINERALS IN KALLAHALLI KYANITE BLOCK (BLOCK ID: KIOCL_15_KA_KKB)



Scale 1:25,000



PROPOSED AREA BOUNDARY CO-ORDINATES (GPS READINGS) DATUM-WGS-84							
SL No.	BP	UTM		DEGREE MINUTE SECONDS		DEGREE DECIMALS	
		EASTING	NORTHING	NORTHING	EASTING	LATITUDE	LONGITUDE
1	KB-01	657728	1347584	12 11 10.9	76 26 59.2	12.18637	76.44978
2	KB-02	662526	1348355	12 11 35.2	76 29 38.1	12.19311	76.49391
3	KB-03	663162	1348474	12 11 38.9	76 29 59.1	12.19415	76.49976
4	KB-04	663169	1347778	12 11 16.3	76 29 59.2	12.18786	76.49979
5	KB-05	662277	1347143	12 10 55.8	76 29 29.6	12.18216	76.49156
6	KB-06	661139	1346730	12 10 42.6	76 28 51.9	12.17849	76.48108
7	KB-07	661286	1346415	12 10 32.3	76 28 56.7	12.17563	76.48242
8	KB-08	661106	1346387	12 10 31.4	76 28 50.8	12.17539	76.48076
9	KB-09	661214	1343083	12 08 43.8	76 28 53.7	12.14551	76.48159
10	KB-10	662593	1342847	12 08 35.9	76 29 39.3	12.14331	76.49425
11	KB-11	662747	1341824	12 08 2.6	76 29 44.2	12.13406	76.49561
12	KB-12	663214	1341621	12 07 55.9	76 29 59.6	12.1322	76.49989
13	KB-13	663219	1340688	12 07 25.5	76 29 59.6	12.12376	76.49989
14	KB-14	659799	1340612	12 07 23.7	76 28 06.5	12.12324	76.46847
15	KB-15	658482	1343121	12 08 45.6	76 27 23.4	12.14599	76.45649
16	KB-16	657895	1344652	12 09 35.5	76 27 04.2	12.15986	76.45117
17	KB-17	657827	1345180	12 09 52.7	76 27 02.1	12.16464	76.45057
18	KB-18	658303	1345215	12 09 53.7	76 27 17.8	12.16493	76.45495
19	KB-19	658277	1345609	12 10 06.6	76 27 17.0	12.16849	76.45473
20	KB-20	657756	1345597	12 10 06.3	76 26 59.8	12.16841	76.44994
21	KB-21	657673	1346904	12 10 48.8	76 26 57.3	12.18023	76.44924

PLATE NO. - 03

GENERAL INDEX

	Proposed Kyanite Block		Talc Tremolite Actinolite Schist
	Strike and Dip of Bedding		Amphibolite
	Fault line		Meta-Pyroxenite
	Archean Granite Gneiss		Sillimanite Fuchsite Quartzite
	Sillimanite-Stauroilite-Kyanite Schist		Quartz Vein/Reef

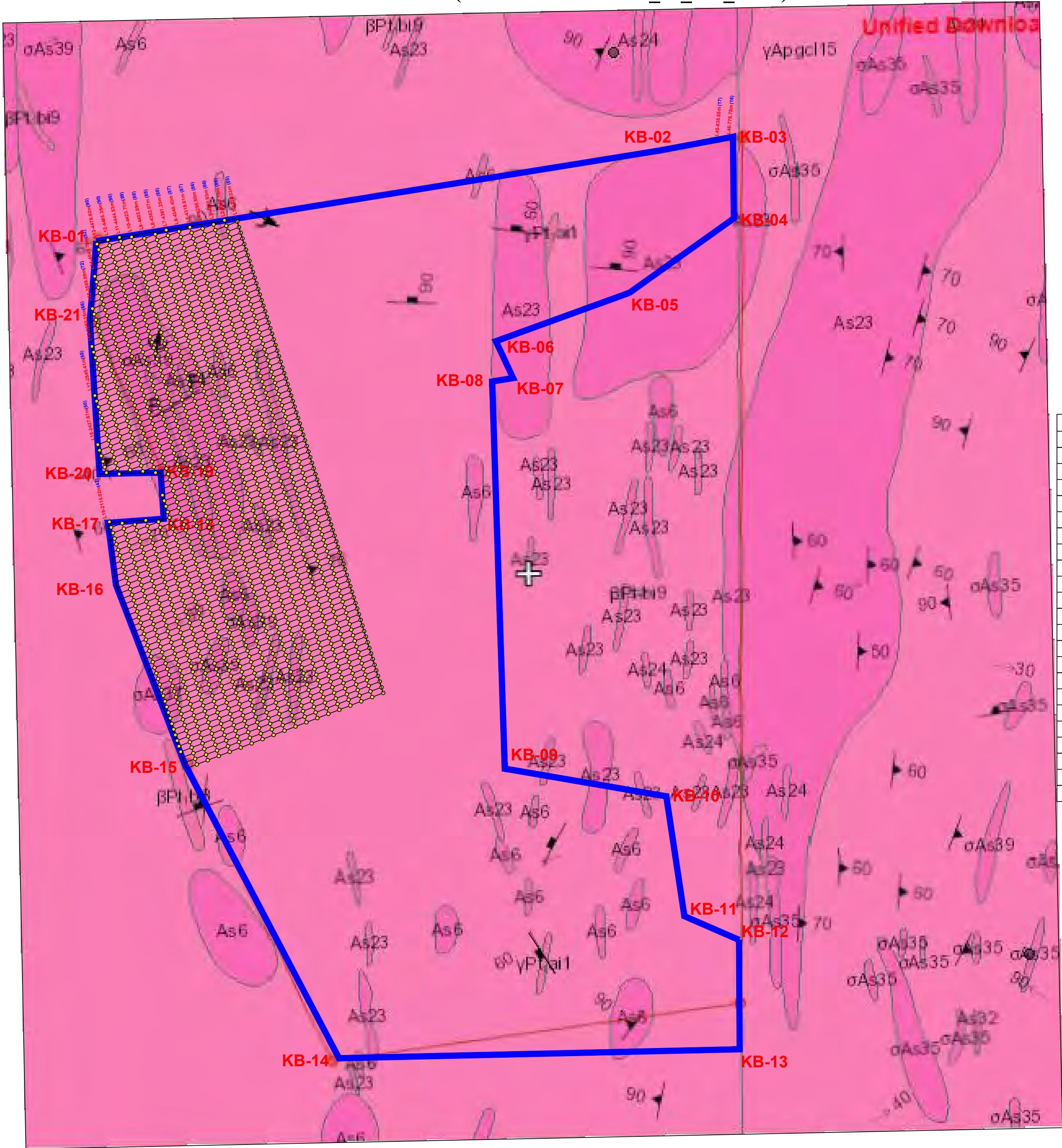
TITLE	BLOCK MARKED ON 1:50K GSI GEOLOGY		
PROJECT	G4 - LEVEL MINERAL EXPLORATION WORKS IN KALLAHALLI KYANITE BLOCK		
TALUK :- HD KOTE	EXTENT :- 26.67 Sq. km		STATE :- KARNATAKA
DISTRICT:- MYSORE			
PROSPECTOR	KIOCL LIMITED (Notified Exploration Agency) Regd. Off: BLOCK II, KORAMANGALA, BENGALURU 560 034 (www.kioclltd.in)		



MINERAL EXPLORATION PROJECT PROPOSAL FOR CARRYING OUT G4 LEVEL OF MINERAL EXPLORATION WORKS FOR KYANITE & ASSOCIATED MINERALS IN KALLAHALLI KYANITE BLOCK (BLOCK ID: KIOCL_15_KA_KKB)



Scale 1:25,000



PROPOSED AREA BOUNDARY CO-ORDINATES (GPS READINGS) DATUM-WGS-84							
SL No.	BP	UTM		DEGREE MINUTE SECONDS		DEGREE DECIMALS	
		EASTING	NORTHING	NORTHING	EASTING	LATITUDE	LONGITUDE
1	KB-01	657728	1347584	12 11 10.9	76 26 59.2	12.18637	76.44978
2	KB-02	662526	1348355	12 1135.2	76 29 38.1	12.19311	76.49391
3	KB-03	663162	1348474	12 11 38.9	76 29 59.1	12.19415	76.49976
4	KB-04	663169	1347778	12 11 16.3	76 29 59.2	12.18786	76.49979
5	KB-05	662277	1347143	12 10 55.8	76 29 29.6	12.18216	76.49156
6	KB-06	661139	1346730	12 10 42.6	76 28 51.9	12.17849	76.48108
7	KB-07	661286	1346415	12 10 32.3	76 28 56.7	12.17563	76.48242
8	KB-08	661106	1346387	12 10 31.4	76 28 50.8	12.17539	76.48076
9	KB-09	661214	1343083	12 08 43.8	76 28 53.7	12.14551	76.48159
10	KB-10	662593	1342847	12 08 35.9	76 29 39.3	12.14331	76.49425
11	KB-11	662747	1341824	12 08 2.6	76 29 44.2	12.13406	76.49561
12	KB-12	663214	1341621	12 07 55.9	76 29 59.6	12.1322	76.49989
13	KB-13	663219	1340688	12 07 25.5	76 29 59.6	12.12376	76.49989
14	KB-14	659799	1340612	12 07 23.7	76 28 06.5	12.12324	76.46847
15	KB-15	658482	1343121	12 08 45.6	76 27 23.4	12.14599	76.45649
16	KB-16	657895	1344652	12 09 35.5	76 27 04.2	12.15986	76.45117
17	KB-17	657827	1345180	12 09 52.7	76 27 02.1	12.16464	76.45057
18	KB-18	658303	1345215	12 09 53.7	76 27 17.8	12.16493	76.45495
19	KB-19	658277	1345609	12 10 06.6	76 27 17.0	12.16849	76.45473
20	KB-20	657756	1345597	12 10 06.3	76 26 59.8	12.16841	76.44994
21	KB-21	657673	1346904	12 10 48.8	76 26 57.3	12.18023	76.44924

Grid Pattern for Geo-Physical Station Points

Line Interval	100 m
Station Interval	50 m

GENERAL INDEX

	Proposed Kyanite Block		Talc Tremolite Actinolite Schist
	Strike and Dip of Bedding		Amphibolite
	Fault line		Meta-Pyroxenite
	Geo-Physical Station Points		Sillimanite Fuchsite Quartzite
	Archean Granite Gneiss		Quartz Vein/Reef
	Sillimanite-Staurolite-Kyanite Schist		

PLATE NO. - 04

TITLE	GEO-PHYSICAL LAYOUT PLAN MARKED ON 1:50K GSI GEOLOGY		
PROJECT	G4 - LEVEL MINERAL EXPLORATION WORKS IN KALLAHALLI KYANITE BLOCK		
TALUK :- HD KOTE		EXTENT :- 26.67 Sq. km	STATE :- KARNATAKA
DISTRICT:- MYSORE			
PROSPECTOR		KIOCL LIMITED (Notified Exploration Agency) Regd. Off: BLOCK II, KORAMANGALA, BENGALURU 560 034 (www.kioclltd.in)	