Report On

PRELIMINARY EXPLORATION OF VANADIUM AND GALLIUM BEARING ALUMINOUS LATERITE IN MUNDALLI BLOCK (4.754 SQ KM), UTTARA KANNADA DISTRICT, KARNATAKA

By

GEO MARINE SOLUTIONS PVT LTD
15-17-909/9, 5th Cross
Shivabagh, Kadri, Mangalore-575005,
Karnataka, INDIA
Email: mail@geomarinesolutions.in
www.geomarine.in

For

National Mineral Exploration and Development Trust (NMEDT)
Ministry of Mines
Wing-F, Room No. 325 & 326, Udyog Bhawan,
Rafi Ahmed Kidwai Marg,
Rajpath Area, Central Secretariat
New Delhi-110011

Ref. No: 23/526/2024-NMET/616 dated 30th Dec 2024

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1.0 Executive Summary

The project titled "Preliminary Exploration of Vanadium and Gallium bearing Aluminous Laterite in Mundalli block, Uttara Kannada District, Karnataka State" was carried out by the NPEA Geo Marine Solutions Private limited.

The block is situated towards the SW of Bhatkal town. The explored area comprises of Government and private lands and it is devoid of forest area. It occurs as a plateau top and is very well accessible.

DGPS assisted topographic mapping and geological mapping were carried out over an area of 4.754 sq.km on a scale of 1:4000. The area consists of hard laterite duricrust and soil cover patches on the top. On the surface, laterite is black to brownish black in colour. But on the exposed sections like couple of quarry excavations, laterite is light brown to red in colour. It has tubular or irregular cavities; usually, these cavities are filled by secondary quartz. Under microscope these laterite shows grains of gibbsite, free quartz and opaques which are mostly limonite and hematite and or goethite embedded in a ferruginous matrix.

Core drilling was carried out in the block and 15 boreholes were drilled on a 400mX400m spacing and a total meterage of 257m drilling was completed. Out of 15 drilled boreholes 09 boreholes were drilled to a depth ranging from 15m to 26m below which a sand horizon was encountered and drilling beyond the sand pocket had to be abandoned due to borehole collapse. Remaining 06 boreholes were drilled up to a depth of 9m - 11m, to make up for the total approved meterage of 257m. Average core recovery in the ore zones, i.e., the laterite and clay horizons was 70%.

Based on the visual observations, drilled cores were broadly classified as laterite & lateritic soil, clayey laterite, lateritic clay and clay, clayey soil, slush and sand. Run-wise and lithology-wise sampling was carried out and a total of 187 samples were analyzed for major oxides and LOI using XRF. Minor and Trace elements and REE were analyzed by ICP-OES and ICP-MS for 83 samples; out of these 83 samples, 43 samples were composite samples. A total of 19 and 8 Samples were analyzed by XRF and ICPMS respectively as check samples.

On the basis of chemical composition, the lithology groups which were identified during the borehole logging, were regrouped using the following guidelines MoM Gazette notification on Bauxite and IBM classification of Laterites.

a) Bauxite: $Al_2O_3 \geq 30.00\%$ AND $SiO_2 \leq 7.00\%$
b) Aluminous Laterite: Fe_2O_3: $Al_2O_3 < 1$ AND SiO_2:$Al_2O_3 < 1.33$
c) Ferruginous Laterite: Fe_2O_3: $Al_2O_3 > 1$ AND SiO_2:Fe2O3 < 1.33

The remaining lithology which could not be placed in the above categories was grouped as shown below.

d) Aluminous Clayey Laterite: Fe_2O_3: $Al_2O_3 < 1$ AND SiO_2:$Al_2O_3 > 1.33$
e) Ferruginous Clayey Laterite: Fe_2O_3: $Al_2O_3 > 1$ AND SiO_2:$Fe_2O_3 > 1.33$
f) Clay: Grouped based solely on observable physical properties

In bauxite,

- Al_2O_3 ranges from 35.21%-40.48%
- Fe_2O_3 ranges from 26.86%-34.49%.
- SiO_2 ranges from 5.01%-6.49%.
- V_2O_5 varies from 0.06%-0.17%
- TiO_2 ranges from 2.23-2.92.

In aluminous laterite,

- Al_2O_3 ranges from 28.33%-44.24%
- Fe_2O_3 ranges from 3.53%-32.06%.
- SiO_2 ranges from 13.26%-34.60%.
- V_2O_5 varies from 0.04%-0.12%
- TiO_2 ranges from 1.42%-2.98%.

In ferruginous laterite,

- Al_2O_3 is ranging from 21.18%-29.54%
- Fe_2O_3 ranges from 29.32%-44.07%.
- SiO_2 ranges from 12.89%-34.70%.
- V_2O_5 varies from 0.03%-0.19%
- TiO_2 ranges from 1.12%-2.46%.

The ICPMS analysis shows Gallium values ranging from 6.90-70ppm; no other minor, trace, REE values are significant and cannot be considered for further exploration in future.

The resource estimation was made using GEOVIA SURPAC 2025 3D modelling software and the resource was estimated for Bauxite, Aluminous laterite, Ferruginous laterite, Aluminous clayey laterite, Ferruginous clayey laterite and V_2O_5 on a G3 level (UNFC code:333); for Gallium the resource estimation was calculated on a G4 (UNFC code: 334) level and the results are presented in the table below.

Table 1.1: Gross and Net In-situ Resource calculated for bauxite and different types of laterites present in Mundalli area.

	Gross Resource	**Net Resource**	
Mineralization zone	Tonnage	By considering 15% reduction factor	By considering 30% reduction factor
	MMT	**MMT**	**MMT**
Bauxite	0.856	0.728	0.599
Aluminous Laterite	12.393	10.534	8.675
Ferruginous Laterite	21.631	18.386	15.142
Aluminous Clayey laterite	9.046	7.689	6.332
Ferruginous Clayey laterite	2.481	2.109	1.737
Clay	3.369	2.864	2.358
	49.776	**42.310**	**34.843**
A Net resource of **42.310 MMT and 34.843 MMT** has been estimated by considering **reduction factor of 15% and 30%** respectively, to account for the reduced core recovery of 70%.			

Table1.2: Vanadium bearing resource (Gross Resource) with V_2O_5 at Cut-Off 0.1%

	Volume	TOTAL Resource (MMT)	Resource Above 0.1% V2O5 (MMT)	AVG grade (%) of V2O5	Contained V2O5 (MT)	UNFC Resource Category
Bauxite	447187.5	0.856	0.844	0.191	1615.83	333
Aluminous Laterite	6471562.5	12.393	2.624	0.128	3364.23	
Ferruginous Laterite	11295625	21.631	13.989	0.138	19340.13	
Aluminous Clayey laterite	4723750	9.046	0.103	0.101	104.46	
Ferruginous Clayey laterite	1295468.75	2.481	0.206	0.115	236.86	
Clay	2929687.5	3.369	0.295	0.110	325.47	
	Total	**49.776**	**18.061**	**0.138**	**24986.986**	

Table 1.3: Total Resource Estimation above Gallium (Gross Resource) at Cut-Off 30ppm, 50ppm

	At Cut-Off – Ga 30ppm	Avg. Ga	At Cut-Off – Ga 50ppm	Avg. Ga	UNFC Resource Category
	MMT	ppm	**MMT**	**ppm**	
Bauxite	0.844	38.445	0.262	53.657	**334**
Aluminous Laterite	2.586		0.452		
Ferruginous Laterite	13.556		0.343		
Aluminous Clayey laterite	0.103		0.000		
Ferruginous Clayey laterite	0.206		0.024		
Clay	0.204		0.000		
Total	**17.499**		**1.081**		

सारांश

"कर्नाटक राज्य के उत्तर कन्नड़ जिले के मुंडल्ली ब्लॉक में वैनेडियम और गैलियम युक्त एल्युमिनस लैटेराइट की प्रारंभिक अन्वेषण" परियोजना एनपीईए जियो मरीन सॉल्यूशंस प्राइवेट लिमिटेड द्वारा की गई।

यह ब्लॉक भटकल शहर के दक्षिण-पश्चिम में स्थित है। अन्वेषण क्षेत्र में सरकारी और निजी भूमि है और यह वन क्षेत्र से रहित है। यह एक पठारी क्षेत्र है और यहाँ पहुँचना सुगम है।

डीजीपीएस की सहायता से स्थलाकृतिक मानचित्रण और भूवैज्ञानिक मानचित्रण 1:4000 के पैमाने पर 4.754 वर्ग किलोमीटर क्षेत्र में किया गया। इस क्षेत्र में लैटेराइट ड्यूरिक्रस्ट और कुछ स्थानों में ऊपरी सतह पर मृदा आवरण हैं। सतह पर, लैटेराइट का रंग काले से लेकर भूरा-काला है। लेकिन खदानों में उजागर हुए हिस्सों में, लैटेराइट का रंग हल्के भूरे से लेकर लाल रंग का है। इसमें नलिकाकार या अनियमित गुहाएँ हैं; आमतौर पर, ये गुहाएँ द्वितीयक क्वार्ट्ज़ से भरी हैं। सूक्ष्मदर्शी में देखने पर, इन लैटेराइट में गिब्साइट, फ्री क्वार्ट्ज़ और ओपेक दिखाई देते हैं, जो अधिकतर लिमोनाइट, हेमेटाइट और/या गोएथाइट के हैं जो फेरुजिनस मैट्रिक्स में अंतर्निहित हैं।

ब्लॉक में कोर ड्रिलिंग की गई और 400 मीटर x 400 मीटर के अंतराल पर 15 बोरहोल ड्रिल किए गए और कुल 257 मीटर की ड्रिलिंग पूरी हुई। ड्रिल किए गए 15 बोरहोल में से 09 बोरहोल में 15 मीटर से 26 मीटर की गहराई तक ड्रिल किए गए, जिसके नीचे रेत का एक होराइजन मिला और जिसमें बोरहोल ढहने के कारण आगे की ड्रिलिंग रोकनी पड़ी। शेष 06 बोरहोल में 9 मीटर से 11 मीटर की गहराई तक ड्रिल किए गए, ताकि कुल स्वीकृत 257 मीटर की ड्रिलिंग पूरी हो सके। अयस्क जोनो अर्थात् लेटराइट और क्ले होराइजनो में औसत कोर रिकवरी 70% हुई।

अवलोकन के आधार पर, ड्रिल कोर को मोटे तौर पर लैटेराइट, लैटरिटिक मिट्टी, क्ले युक्त लैटेराइट, लैटरिटिक क्ले, क्ले, क्ले युक्त मिट्टी, स्लश और रेत के रूप में वर्गीकृत किया गया। रन-वार और लिथोलॉजी-वार नमूनाकरण किया गया और कुल 187 नमूनों का प्रमुख ऑक्साइड और LOI के लिए XRF द्वारा विश्लेषण किया गया। 83 नमूनों का ICP-OES और ICP-MS द्वारा गौण और सूक्ष्म तत्वों और आरईई के लिए विश्लेषण किया गया; इन 83 नमूनों में से 43 नमूने मिश्रित नमूने थे। कुल 19 और 8 नमूनों का क्रमशः XRF और ICP-MS द्वारा जाँच नमूनों के रूप में विश्लेषण किया गया।

रासायनिक संरचना के आधार पर, बोरहोल लॉगिंग के दौरान पहचाने गए लिथोलॉजी समूहों को बॉक्साइट पर खान मंत्रालय (MoM) के राजपत्र अधिसूचना और लैटेराइट के वर्गीकरण पर IBM के दिशानिर्देशों का उपयोग करके पुनः समूहीकृत किया गया:

a) बॉक्साइट: $Al_2O_3 \geq 30.00\%$ और $SiO_2 \leq 7.00\%$

b) एल्युमिनस लैटेराइट: Fe_2O_3: Al_2O_3 <1 और SiO_2: Al_2O_3 <1.33

c) फेरुजिनस लैटेराइट: Fe_2O_3: Al_2O_3 >1 और SiO_2: Fe2O3 <1.33

शेष लिथोलॉजी, जिन्हें उपरोक्त श्रेणियों में नहीं रखा जा सका, को नीचे दर्शाए अनुसार समूहीकृत किया गया।

d) एल्युमिनस क्लेय लैटेराइट: Fe_2O_3: Al_2O_3 <1 और SiO_2: Al_2O_3 >1.33

e) फेरुजिनस क्लेय लैटेराइट: Fe_2O_3: Al_2O_3 >1 और SiO_2: Al_2O_3 >1.33

f) क्ले: केवल अवलोकनीय भौतिक गुणों के आधार पर समूहीकृत

बॉक्साइट में,

- Al_2O_3 35.21% से 40.48% तक।
- Fe_2O_3 26.86% से 34.49% तक।
- SiO_2 5.01% से 6.49% तक।
- V_2O_5 0.06% से 0.17% तक।
- TiO_2 2.23 से 2.92 तक।

एल्युमिनस लैटेराइट में,

- Al_2O_3 28.33% से 44.24% तक।
- Fe_2O_3 3.53% से 2.06% तक।
- SiO_2 13.26% से 34.60% तक।
- V_2O_5 0.04% से 0.12% तक।
- TiO_2 1.42% से 2.98% तक।

फेरुजिनस लैटेराइट में,

- Al_2O_3 21.18% से 29.54% तक।
- Fe_2O_3 29.32% से 44.07% तक।
- SiO_2 12.89% से 34.70% तक।
- V_2O_5 0.03% से 0.19% तक।
- TiO_2 1.12% से 2.46% तक।

आईसीपीएमएस विश्लेषण गैलियम का मान 6.90 पीपीएम से 70 पीपीएम के बीच मिला; कोई अन्य माइनर, ट्रेस, आरईई मान महत्वपूर्ण नहीं हैं और भविष्य में आगे की खोज के लिए उन पर विचार करने की आवश्यकता नहीं है।

GEOVIA SURPAC 2025 3D मॉडलिंग सॉफ्टवेयर का उपयोग करके संसाधन का अनुमान किया गया और बॉक्साइट, एल्युमिनस लेटराइट, फेरुजिनस लेटराइट, एल्युमिनस क्लेय लेटराइट, फेरुजिनस क्लेय लेटराइट और V_2O_5 के लिए G3 स्तर (UNFC कोड: 333) पर संसाधन का अनुमान लगाया गया; गैलियम के लिए संसाधन अनुमान की गणना G4 (UNFC कोड: 334) स्तर पर की गई।

तालिका 1.1: मुंडल्ली क्षेत्र में मौजूद बॉक्साइट और विभिन्न प्रकार के लेटराइट के लिए सकल और **नेट** इन-सीटू संसाधन की गई गणना

	सकल संसाधन	नेट संसाधन	
खनिजीकरण क्षेत्र	टनज	15% रिडक्शन फैक्टर के आधार पर	30% रिडक्शन फैक्टर के आधार पर
	MMT	**MMT**	**MMT**
बॉक्साइट	0.856	0.728	0.599
एल्युमिनस लेटराइट	12.393	10.534	8.675
फेरुजिनस लेटराइट	21.631	18.386	15.142
एल्युमिनस क्लेय लेटराइट	9.046	7.689	6.332
फेरुजिनस क्लेय लेटराइट	2.481	2.109	1.737
क्ले	3.369	2.864	2.358
कुल	**49.776**	**42.310**	**34.843**
70% की कोर रिकवरी के लिए क्रमशः 15% और 30% की रिडक्शन फैक्टर को ध्यान में रखते हुए **42.310** एमएमटी और **34.843** एमएमटी का नेट संसाधन अनुमानित किया गया है।			

तालिका 1.2: 0.1% कट-ऑफ V_2O_5 के साथ वैनेडियम युक्त संसाधन (सकल संसाधन)

	आयतन	कुल संसाधन (MMT)	0.1% V_2O_5 से ऊपर संसाधन (MMT)	औसत ग्रेड (%) V_2O_5	निहित V_2O_5 (MT)	UNFC संसाधन श्रेणी
बॉक्साइट	447187.5	0.856	0.844	0.191	1615.83	333
एल्युमिनस लेटराइट	6471562.5	12.393	2.624	0.128	3364.23	
फेरुजिनस लेटराइट	11295625	21.631	13.989	0.138	19340.13	
एल्युमिनस क्लेय लेटराइट	4723750	9.046	0.103	0.101	104.46	
फेरुजिनस क्लेय लेटराइट	1295468.75	2.481	0.206	0.115	236.86	
क्ले	2929687.5	3.369	0.295	0.110	325.47	
	कुल	**49.776**	**18.061**	**0.138**	**24986.986**	

तालिका 1.3: 30 पीपीएम, 50 पीपीएम कट-ऑफ पर गैलियम का कुल संसाधन अनुमान

	30 पीपीएम कट-ऑफ पर गैलियम	औसत ग्रेड	50 पीपीएम कट-ऑफ पर गैलियम	औसत ग्रेड	UNFC संसाधन श्रेणी
	MMT	**ppm**	**MMT**	**ppm**	
बॉक्साइट	0.844	38.445	0.262	53.657	**334**
एल्युमिनस लेटराइट	2.586		0.452		
फेरुजिनस लेटराइट	13.556		0.343		
एल्युमिनस क्लेय लेटराइट	0.103		0.000		
फेरुजिनस क्लेय लेटराइट	0.206		0.024		
क्ले	0.204		0.000		
कुल	**17.499**		**1.081**		

2.0 INTRODUCTION

Laterite

Laterite (from the Latin word "later", meaning "brick" or "tile") is a surface formation that is enriched in iron and aluminum. Found mainly in hot, wet tropical areas, it develops by intensive and long-lasting weathering of the underlying parent rock. The mineralogical & chemical composition of laterite depends on its parent rock. The term 'laterite' was originally used for highly ferruginous deposits, first observed in Malabar Region of coastal Kerala and Dakshina Kannada & other parts of Karnataka. It is a highly weathered material, rich in secondary oxides of iron, aluminum or both. It is either hard or capable of hardening on exposure to moisture and drying. Laterite gradually passes into bauxite with decrease in iron oxide and increases in aluminum oxide. Laterite and bauxite show a tendency to occur together. In laterite and bauxite regions, aluminous laterite and ferruginous bauxites are quite common. The most common impurity in both is silica.

Laterite is also considered as polymetallic ore as it is not only the essential repository for aluminum, but also a source of iron, manganese, cobalt, nickel and chromium. Furthermore, it also contains several trace elements like gallium and vanadium which can be extracted as by-products.

Vanadium:

Vanadium is a scarce element, hard, silvery grey, ductile and malleable transition metal with good structural strength. It is a versatile metal with melting point of 1910 °C. Vanadium metal and its compounds are gaining tremendous importance in the rapidly advancing field of science & technology. It occurs naturally in about 65 different minerals among which some are patronite, vanadinite, roscoelite and carnotite. It is also present in bauxite and in fossil fuel deposits. It occurs in association with titaniferous magnetite and is recovered as a by-product during iron & steel manufacture. Vanadium is also concentrated in many end-products of organic material including coal, crude oil, shale and tar sands. It is also found in meteorites. In addition, vanadium present in bauxite can also be recovered as vanadium sludge from red mud after the production of alumina. Vanadium is widely used in green technology applications, especially in battery technology. Vanadium has the property to increase the tensile strength of steel.

Its high strength to weight ratio meets fuel efficiency requirements in the automotive and aerospace industries.

Gallium:

Gallium is a soft, silvery-white strategic metal predominantly used in electronics. There is no primary source of gallium in the country. Gallium does not occur as a free element in nature. It usually occurs as trace component in zinc & bauxite ores. It is generally recovered from sodium aluminate liquors obtained in Bayer's alumina process during aluminum production and from residues obtained during zinc processing. It can also be extracted from polymetallic ores by leaching and also from coal ash and coal. Gallium is also recycled from scrap generated from industries that manufacture Gallium arsenide (GaAs) and Gallium nitride (GaN) based devices. Though India is endowed with bauxite ores in abundance due to limitation in the viability of economically producing gallium, no major production has been reported in the recent past.

2.1 Details of the Project

Current project was initiated by Department of Mines and Geology, Karnataka State. To estimate the concentration of Aluminous laterite, and also the associated Trace and REE elements, if any, which may be present in the laterite at Mundalli plateau and to expand this prospect to a deposit scale. The project which was based on the earlier work carried out by them in the field seasons 1962-63 and 1964-67 (the details of their studies is described in detail in the previous work section of this report) was allocated to the current investigation agency (M/s Geo Marine Solutions Private Limited).

2.2 Investigating Agency

M/s. Geo Marine Solutions Pvt. Ltd (CIN U74900KL2011PTC28241) is a Notified Private Exploration Agency (NPEA), Science and Technology Services Company with a vision to take proactive role in nation building by providing latest scientific knowledge and technological services in the field of Earth System Science. The company draws its inspiration and ability to undertake challenging projects from team leaders in different disciplines of Earth Sciences who are former scientists from prestigious organizations like Geological Survey of India, National institute of

Oceanography etc. Each team leader of Geo Marine Solutions is a leading scientist in his / her area of expertise (domain experts) and brings in more than three decades of experience in Offshore- and Onshore-Geo Scientific Survey and Exploration.

Name and address of the NPEA
Geo Marine Solutions Pvt Ltd
15-17-909/9, 5th Cross, Shivabagh Kadri, Mangalore-575005, Karnataka, INDIA
Mobile No: +91-9038534560, +91-8277363919
E-Mail id: mail@geomarinesolutions.in, oed@geomarinesolutions.in

2.3 Objectives of Investigation

- The objective of the investigation is G3 level mineral prospecting, to carry out exploration of aluminous laterite which occurs as irregular pockets in the laterite plateau at Mundalli and also for critical minerals that are associated with viz. Vanadium and Gallium.
- To estimate the resources of aluminous laterite, vanadium and gallium within the block and to recommend the feasibility for further level of exploration/auction.

2.4 Basis for taking up investigation

A detailed investigation of Mundalli block was carried out by DMG, Karnataka during 1963-64 and 17.16lakh tons of aluminous laterite having 40- 50% Al_2O_3 reserve has been estimated. SiO_2 values varied between 1 t o19%. The average SiO_2 ranges 8-10%. The report was titled by "**Aluminous Laterite deposits of Talgod & Mundalli in the neighborhood of Bhatkal, North Kanara District, Karnataka State.**" by G H Nagaraja and G L Nagaraja chetty,

DMG Karnataka recommended this block for G3 exploration. After joint field inspection by DMG and GSI officials, it was decided to carve out bigger area and take up G3 stage exploration under NMET to put up this block for auction as ML. And with this objective, DMG Karnataka has allotted this block to Geo Marine Solutions Pvt Ltd (NPEA) for exploration through NMET funding.

A reconnaissance field work was conducted in Mundalli Block by Geo Marine Solutions Pvt Ltd in October 2024 and three grab samples were collected for analysis. The samples showed Al_2O_3 ranging between 22% to 30%; Gallium values ranged between 51 to 75 ppm and V_2O_5 values between 1100 ppm to 1500 ppm. The values of

Gallium and Vanadium (critical minerals) were significant. It is also pointed out that two Stream Sediments samples data from the NGCM database of GSI within the proposed Mundalli block boundary, reported Gallium content of 31ppm and 34 ppm.

2.5 Details on nature & quantum of work proposed vs achievement

Quantum of work and targets achieved the exploration for vanadium and gallium in Aluminous Laterite in Mundalli Block (G3) with are given in Table-2.1

Table 2.1: The nature and quantum of work proposed vs achievement

Sl. No.	Nature of work*	Target assigned	Target Achieved	Remarks
1	DGPS Survey-(1:4000 Scale) (DGPS/Total Station Survey) (sq km)	4.754 sq. Km.	4.838 sq.Km.	Topographic survey is completed
2	Geological Mapping-(1:4000 Scale) (LSM/DM) (sq km)	4.754 sq.Km.	4.838 sq.Km.	Geological mapping is completed
3	Geophysical Surveys (Gravity, Magnetic Stn), Nos	NA	NA	NA
4	(a) Surface exploration-Pitting/trenching (cu m)	0** CUM	NIL	Pitting Task Removed
	(b) Sub Surface exploration-Drilling (m)	257** M	257 M	Drilling of 257m for 15 Boreholes completed
5	(a) Preparation of Thin sections (Nos.)	10	10	Preparation of 10 thin sections completed
	(b) Preparation of polished sections (Nos.)	10	10	Preparation of 10 polished sections completed
	(d) Petrographic/Ore Microscopic study (Nos.)	20	20	Petrographic/Ore Microscopic study completed for 20 samples
	(e) XRD	NA	NA	
	(f) Sp. Gravity	NA	06	04 Samples of Laterite and 2 Samples of Clay for Specific gravity completed
6	(a) Primary +10% Check Sample for Oxides an LOI by XRF technique	275	206	187 Primary Samples and 19 Check samples is Completed

Sl. No.	Nature of work*	Target assigned	Target Achieved	Remarks
	(b) Primary + check Samples including composite samples for REE, Ga, V and Other Trace elements: by ICPMS	85**	91	83 Primary Samples and 8 Check Samples is Completed
	(C) Composite samples	NA	NA	NA
7	Core Preservation	257** M	257 M	257 m core preserved
8	Geological Report Writing	5 Hard copies with soft copy		Geological Report writing Completed
***The list of work components (Nature of work) will be as per the approved project proposal by NMET.**				
**** ReviseA1:E18d Units as Suggested by 77th TCC.**				

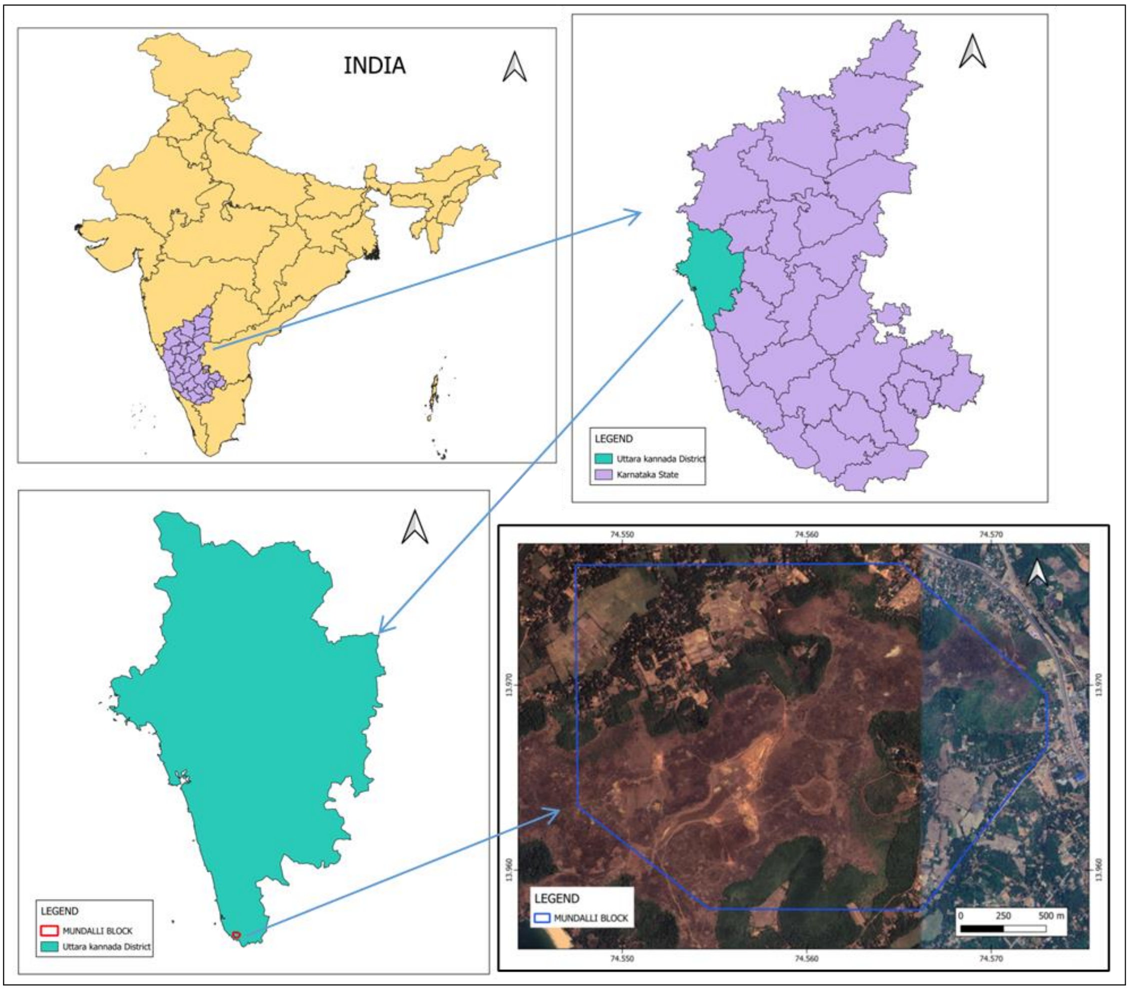

Fig 2.1: Location map of the Mundalli Block

2.6 Technical personnel involved in the project

Table 2.2 Details of technical Personnel involved in the project

Table 2.2: Details of Technical persons engaged in exploration				
Sl. no	**Name**	**Qualification**	**Designation**	**Main contributions**
01	**Dr. Fareeduddin**	PhD in Geology with 41 years of experience in Mineral Exploration and Geological mapping	Former director in GSI, Principal Consultant- Geo Marine Solutions Pvt Ltd. and NABET approved Project coordinator	Guidance throughout the field season, sample processing, analysis and report writing
02	**P. Praveen Kumar**	M.Sc. (Tech.) Applied Geology, with 30 years of experience in Mineral Exploration and Geological mapping.	Former Director, GSI, Nodal Officer, Geo Marine Solutions Pvt Ltd and NABET accredited Technical Area Expert (Geology) for Mineral Exploration.	Guidance throughout the field season, sample processing, analysis and report writing
03	**A.C Dinesh**	M.Sc. Marine Geology, with 36 years of experience in Mineral Exploration and Geological mapping.	Former Director, GSI and Chief Technology Officer, Geo Marine Solutions Pvt. Ltd.	Guidance throughout the field season, sample processing, analysis and report writing
04	**Dr. A. V. Keshava Prasad**	PhD in Geology with 35 years of experience in Mineral Exploration and Geological mapping	Chief Geologist (Lead) Exploration, Geo Marine Solutions Pvt. Ltd.	Supervision and guidance in geological mapping, topographic survey, core drilling, selection of samples for chemical analysis, and interpretation of data, map preparation, ore modelling analysis and report writing.
05	**Dr. B. M. Thanmaya.**	PhD. in Earth Science, with 06 years of experience	Geologist, M/s. Geo Marine Solutions Pvt. Ltd.	core drilling, selection of samples for chemical analysis, and interpretation of data, map preparation, ore modelling analysis and report writing.

06	**Guruprasad S.**	M.Sc. Geology with 06 years of experience	Geologist, M/s. Geo Marine Solutions Pvt. Ltd.	Interpretation of data, map preparation, ore modelling analysis and report writing.
07	**Abhilash A Divatagi**	M.Sc. Applied Geology with 01-year experience	Geologist, M/s. Geo Marine Solutions Pvt. Ltd.	Geological mapping, topographic survey, core drilling, selection of samples for chemical analysis, and interpretation of data, map preparation, ore modelling analysis and report writing.
08	**Nagarjun Patil**	M.Sc. Applied Geology with 01-year experience	Geologist, M/s. Geo Marine Solutions Pvt. Ltd.	Geological mapping, topographic survey, core drilling.
09	**Vidya Vincent**	M.Sc. Marine Geology with 04 years of experience	Geologist, M/s. Geo Marine Solutions Pvt. Ltd.	Geological mapping, topographic survey. selection of samples for chemical analysis.
10	**Rishi Rajgor**	M.Sc. Geology with 03 years of Experience	Geologist, M/s. Geo Marine Solutions Pvt. Ltd.	core drilling

2.7 Mode of operation of different work components and associated agencies

During this investigation, the work was executed in three different stages, namely pre-field studies, field studies and post-field studies. The different components and procedures followed in each stage are discussed below.

A. Pre-field studies: This stage included preliminary desktop research of available literature in the different data repositories like GSI Portal, NGDR, NMEDT and Bhukosh on laterite and bauxite exploration projects; compiling a database of toposheet(43K/09), geological maps, and previous reports related to the geology.

B. Field studies: The field studies were undertaken between the period from January 2025 to June 2025.

a. Reconnaissance survey was conducted initially to assess the actual conditions of roads, accessibility in different parts of the area, communication links therein, hydrography (drainage pattern and nearby streams) and climatic conditions.

b. Topographic survey in the study area was carried out with three sets of Geomate Real Time Kinematic–Global positioning system (RTK-GPS) receivers.

c. A total of 4.838 sq.km area was covered by systematic Geological mapping on 1:4000 scale.

d. Core drilling of boreholes on a 400x400m grid pattern as per MEMC (2021) rule was carried out and the total meterage achieved was 257m.

e. Detailed core logging of all the 15 Boreholes

C. Post field studies: The post field study included (i) data compilation, (ii) Core log data analysis (iii) sample preparation for XRF,ICP-MS/OES, bulk density (Lab-based) and Petrography and Ore-Microscopy (iv) processing and interpretation of the laboratory result data & QA-QC (v) preparation of resource Model, Block modelling and estimation of Resource using Surpac module, vi) finalization of maps and preparation of report.

2.7.1 Other agencies involved in the project

All field components like geological mapping, topographic survey, core drilling, sample collection as well as post field components like, sample preparation, resource estimation, block modelling and petrographic studies were done in-house. To carry out the laboratory analysis such as XRF, ICP-MS, Bulk density, other agencies were used. The details are given below.

a) Shiva Analyticals (India) Private Ltd., Hoskote, Bangalore-562114 (NABL accredited)

Founded in 1997, Shiva Analyticals is NABL accredited company and is a leading analytical testing laboratory in India, based in Bangalore. Specializing in diverse sectors such as pharmaceuticals, food & agriculture, ores & minerals, petroleum, environmental, and materials testing, Shiva Analytical offers comprehensive solutions using advanced instrumentation and expert analysis. With a focus on regulatory compliance, quality control, and innovative testing methods, the lab supports clients in ensuring product safety and efficacy, while also contributing valuable insights to the mining industry and addressing environmental and industrial hygiene concerns. As part of the Cotecna Group (Switzerland), Shiva Analytical is committed to enhancing service delivery and customer satisfaction in a dynamic market.

Chemical analysis of 187 samples for major oxide using WDXRF followed by lithium- borate fusion bead, and 83 samples for niobium, Gallium, scandium, REE and other trace element analysis by ICP-MS/OES were carried out at Shiva Analyticals.

b) M/s. Bureau of Veritas, Inspectorate Griffith India Pvt. Ltd., Plot No 73, Sector 11, GIDC Gandhidham-370201, Kutch, Gujarat.

IGI is a NABL accredited analytical laboratory, offers biological, chemical and mechanical testing services along with validations, research and failure investigations. Bureau Veritas is a world leading inspection and testing organization for the growing commodities industry. Inspectorate Griffith India is the core of the Bureau Veritas Commodities Division in India. All the 27 check samples 19 for XRF and 08 for IC OES-MS were analyzed by Bureau of Veritas, Inspectorate Griffith India Pvt. Ltd.

c) **Matter Material Testing & Research Laboratory (P) Ltd.** Mini Bypass Road, Thiruvannur Nada (PO), Thiruvannur, Kozhikode Kerala, 673029.

Matter Laboratory is exceptionally well equipped with a group of Engineers and Technical Professionals committed to provide best in class Engineering & Technical solutions across the region for construction and other industries through material testing, inspection and consultancy services.

Activities of Matter Laboratory include wide range of construction materials testing, chemical analysis &microbiological examination of water, food & food products, environmental testing, metallurgical (steel) testing, non-destructive concrete testing and forensic investigation of concrete structures.

Bulk density determination of 4 drill core Laterite samples and one crushed aggregate laterite sample was carried out by Matter Material Testing and Research laboratory using Test Method BS: 1377(Part 1):1990.

3.0 PROPERTY DESCRIPTION

3.1 Details of the area (Village name, District, State)

Block name	**:**	**Mundalli Block**
Villages	**:**	**Mundalli, Chavathani, Hadin, Purvarga**
Taluk	**:**	**Bhatkal Taluk**
District	**:**	**Uttara Kannada**
State	**:**	**Karnataka**

The area under investigation is a plateau comprising of laterite capping in and around Mundalli village. The block covers an area of 4.754 sq km, location map of the study area is shown in (Fig 2.1).

3.2 Survey of India toposheet No.

The Mundalli block is situated in Uttara Kannada district, Bhatkal taluk and falls in the toposheet No. 48K/09 (Fig.3.1).

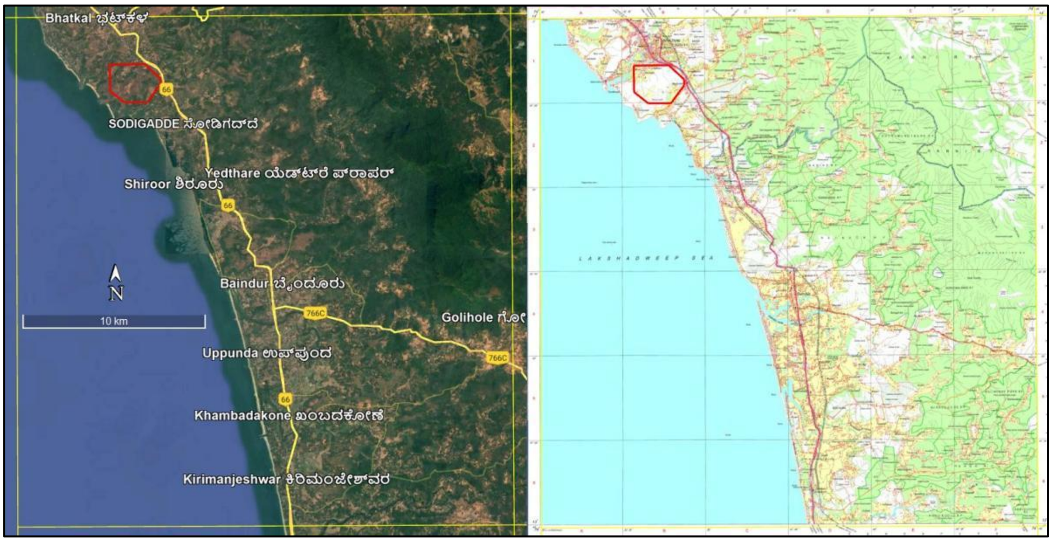

Fig 3.1: Block area on toposheet no.48K/09 and on the google earth imagery.

3.3 Geo- Coordinates of the block area

The block boundary coordinates are shown in the table 3.1; it is also provided in *Annexure – 01*

Table 3.1: Coordinates of Mundalli block

Boundary Point	Latitude (DD)	Longitude (DD)
1	13.9579	74.5547
2	13.95786	74.56625
3	13.96673	74.57304
4	13.9695	74.57301
5	13.97657	74.5651
6	13.97649	74.54747
7	13.96347	74.54758

3.4 Location and Accessibility

Mundalli block is situated to the south of Bhatkal town. Highway NH-66 passes through, on the eastern side of the block. The nearest Railway station is Bhatkal Railway Station which is situated 1.5 km away from the block. Nearest airport is Mangalore international airport which is located at a distance of 150km. Bhatkal town is connected with other localities in the region with a well-connected road network.

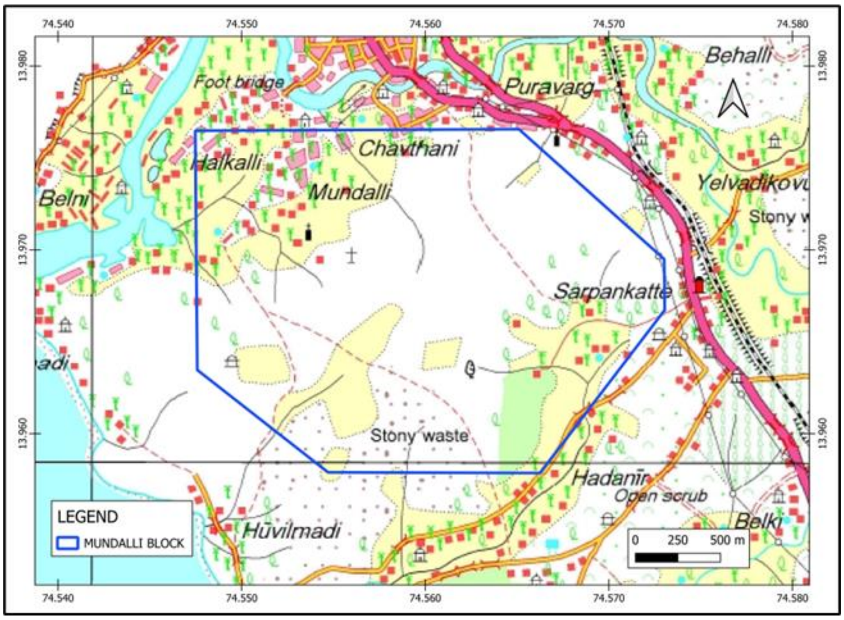

Fig 3.2: Accessibility map of Mundalli block.

3.5 Cadastral details, land use/ cover, forest with type of forest, free hold/lease hold details

Major portion of the block area is under government land. There are no records of leasehold area; there are patches of private land area within the block; the block doesn't have any forest area within it.

Table 3.2: Details of land ownership inside Mundalli block.

Sl.No.	Survey No.	Village	Owner Type
1	80	Hadina	Govt/Pvt
2	205-4/1	Mundalli	Govt
3	208	Mundalli	Govt/Pvt
4	212	Mundalli	Govt/Pvt
5	44	Chavthani	Govt
6	68/A	Puravarga	Pvt
7	381	Mundalli	Pvt
8	397	Mundalli	Pvt
9	81	Hadina	Pvt
10	53	Chavthani	Govt
11	147	Mundalli	Pvt
12	307	Mundalli	Pvt
13	41	Chavthani	Pvt
14	68	Hadina	Govt/Pvt
15	77	Hadina	Pvt
16	57	Hadina	Pvt
17	211/A	Mundalli	Govt/Pvt
18	210	Mundalli	Govt
19	399	Mundalli	Pvt
20	394	Mundalli	Pvt

3.6 Climate

Bhatkal town, Uttara Kannda district is situated on the western coast line of India, west of the Western Ghats. The Climate in this region is humid tropical and has wet and dry seasons. The region receives abundant rainfall during the wet season between June and September, the annual precipitation being about 3800mm. Mean annual rainfall is 2887 mm. Minimum temperature of 16°C is observed in the month of December and maximum temperature is 37°C in the month of June**.**

3.7 Regional Flora/Fauna

Uttara Kannada district is rich in biodiversity, hosting a variety of flora such as evergreen and deciduous forests, with species including Lager stromia lanceolata, Adina cordifolia, and common crops like coconut, cashew, and pepper. Uttara Kannada's mangrove forests consist of fringing patches along the 15 West-flowing rivers, supporting 35 species of associated plants, including mangroves. The region's mangroves are vital for coastal protection and support biodiversity.

The fauna in the region is equally diverse, with the Kali Tiger Reserve (situated 175km to the north of Project area) being home to tigers, elephants, gaurs, and the black panther, as well as endangered species like the Malabar giant squirrel and lion-tailed macaque. The district also supports a wide array of birds, including the Malabar trogon and great hornbill, and various reptiles and amphibians.

3.8 Regional Geomorphology

Uttara Kannada district consists of low-lying coastal plane and flat-topped laterite plateau having an elevation of 60m to 150 m above mean sea level. The region between coastline and the western ghats is well dissected, leaving out linear patches of flat-topped laterite plateau separated by narrow valleys. The high and mountainous terrain to the east which are the Western Ghats raising to heights of over 1050m above sea level.

The hills and mounds are cut up by numerous streams and streamlets which swell to form the major streams Bhatkal (Sharabi) and Venkatapur rivers. The low-lying flat-topped plateau are devoid of vegetation while the high and mountainous terrain further interior is covered with thick forest.

3.9 Local Infrastructure

Bhatkal town is located in North of Mundalli Block. Bhatkal Railway station and Bhatkal KSRTC Bus Stand are about 5km from the project area. Bhatkal Lighthouse (ALOL No: 06482) is situated to the north west of the block.5 km distance by road). Nearest hospital is Welfare hospital Bhatkal situated at 2.5 km. The Anjuman Institute of Technology and Management (AITM) is located 5.0 km from Northern boundary of Mundalli Block. And all other Government offices such as Tahsildar office, Forest department, Police stations, Post office and other offices are within 6 km distance from the Mundalli Block.

3.10 Population

As per Census 2011 data, Uttara Kannada has population of 1,437,169 of which male and female were 726,256 and 710,913 respectively. In 2001 census, Uttara Kannada had a population of 1,353,644 of which males were 686,876 and remaining 666,768 were females.

Uttara Kannada Literacy Rate

Average literacy rate of Uttara Kannada in 2011 were 84.06 compared to 84.06 of 2001. If things are looked out at gender wise, male and female literacy were 89.63 and 78.39 respectively. For 2001 census, same figures stood at 84.53 and 68.47 in Uttara Kannada District. Total literate in Uttara Kannada District was 1,081,906 of which male and female were 582,099 and 499,807 respectively.

Uttara Kannada Sex Ratio

With regards to Sex Ratio in Uttara Kannada, it stood at 979 per 1000 male compared to 2001 census figure of 971. The average national sex ratio in India is 940 as per latest reports of Census 2011 Directorate. In 2011 census, child sex ratio is 955 girls per 1000 boys compared to figure of 946 girls per 1000 boys of 2001 census data.

3.11 Archaeological & Historical sites

There are no Archaeological & Historical sites in the vicinity of the Project area. The Columnar Basalt of St. Mary Island – a National geological Monument is situated at 90 km south of the block.

3.12 National parks and Environmental settings of the area

There are no national parks in the vicinity of the study area. Sharavati Valley Wildlife Sanctuary, is at a distance of 80 km from the study area.

4.0 PREVIOUS WORK

4.1 Details of previous exploration/ investigation carried out by other agencies/ parties

- Department of Mines and Geology, Karnataka had conducted a preliminary survey in the field season 1962-63, to identify the aluminous laterites in parts of Bhatkal and Honnavara taluk.
- GSI had carried systematic geological mapping (1967) on a scale of 1:63000 scale in parts of North Kanara District, Mysore covering the toposheet numbers 48 J/8+12, J/15, J/16, J/14, N/3 and K/9 bounded by N. Lat, 13^0 55' and $14^0$35' and E. Long.$74^0$30' and $75^0$00'.

4.2 A brief note on previous work on geology, geophysics, geochemistry.

a) Department of Mines and Geology, Government of Karnataka

Department of Mines and Geology, Karnataka had conducted a preliminary survey in the field season 1962-63, to identify the aluminous laterites in parts of Bhatkal and Honnavar taluk. Four locations of laterites were identified along the west coast of Bhatkal and Honnavar at Talgod, Mundalli, Mugali, Nittadagi areas. A few surface samples were collected and the analysis of the same showed Al2O3 values more than 50%.

Based on these results, a detailed exploration titled **"Aluminous laterite deposits of Talgod & Mundalli in the neighbourhood of Bhatkal, North Kanara Dist. Karnataka state"** was taken up in the areas of Mundalli and Talgod at Bhatkal taluk in the field season 1963-64.

The major litho-units identified were granitic gneiss, which are cut across by the doleritic dykes. Above the gneisses, laterite capping with patches of soil and alluvium are seen. The granitic gneisses are fine to medium grained and are made up of quartz, feldspar and mica. These rocks are covered by yellowish loam in the valleys and by lateritic cover on the ridges and plains. Lithomarge consisting of variegated clays of different shades and thickness are seen above the granitic gneiss and below the laterites. The laterite capping has a thickness of 6m-12m and is characterized vertical tubular cavities. Brown to pink colour clay material is seen as a filling in the cavity.

A detailed prospecting was carried out in Mundalli by Geological mapping in a scale of 1:4000 delimiting the boundaries of laterite plateau. Then the block was divided into 100mX100m grid and an unspecified number of boreholes with a diameter of 15cm were drilled to a depth of 1.2m; samples of top 0.60m and bottom 0.60m were collected and analysed for alumina and moisture content. Based on the results, the entire Mundalli area of 7.7 Sq.km was divided into 03 different patches as A, B and C. In all, 320 boreholes were drilled (Auger?; No data available in their report, type of drilling not given).

In Patch A, 04 pits were dug to a depth of 2.4m to 4.8m and aluminous laterite was encountered in all pits. The analysed samples show Al_2O_3 values from 38.42%-46.34% and SiO_2 ranging from 4.76%-13.44%.

Patch B of Mundalli area covers an area of 10 hectares; four pits of 1.5m x 1.5mx2.4m spaced 300m apart were made. Here aluminous laterite was encountered in 03 pits up to a depth of 1.5m. The analysed samples show Al_2O_3 values ranging from 31.02%-53.32% and SiO_2 values are 5.56%-15.80%.

The Patch C area covering 24 hectares, is the largest of the 3 patches and falls in the central and northern part of Mundalli plateau. Here the aluminous laterite has 0.9m-1.2m ferruginous material as overburden. 06 pits of 1.5m x1.5m were made and in all the 06 pits aluminous laterite was seen from 1.2m-2.4m.

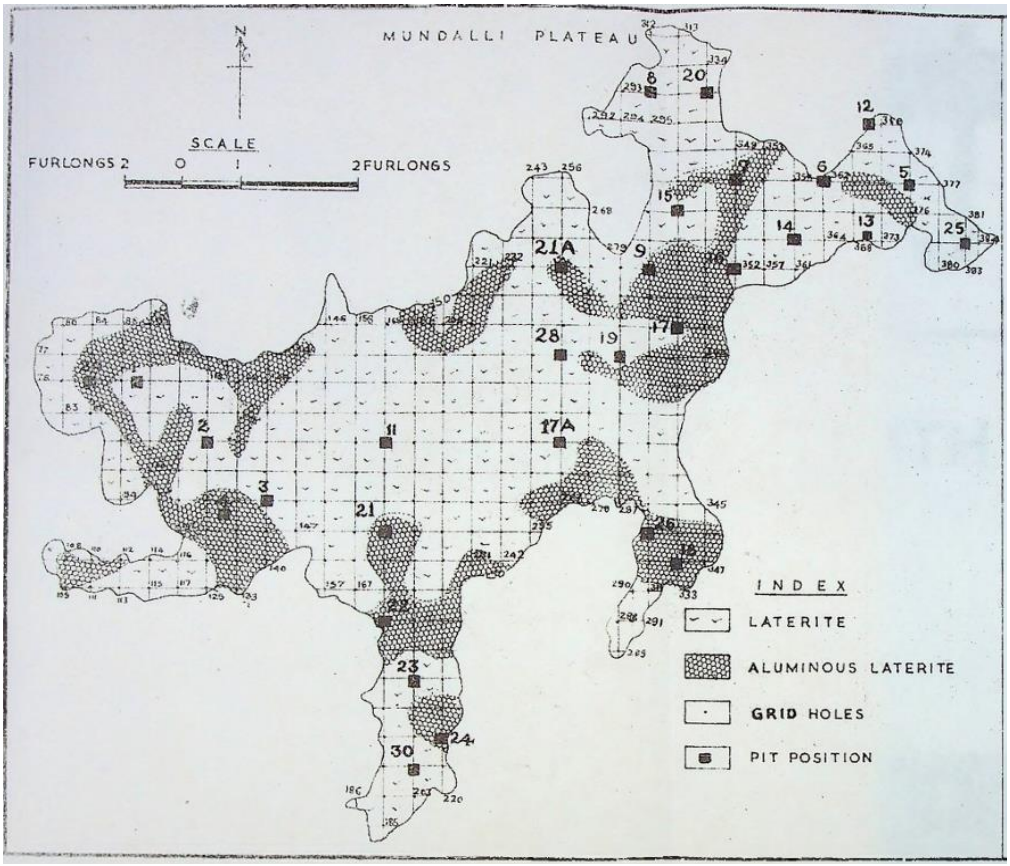

Fig. 4.1: Geological Map of Mundalli plateau given by DMG, Karnataka.

Resource estimation

1.71 million tonnes reserve was estimated in 55 hectares on Mundalli plateau with Al_2O_3 range of 40%-55%. However, it is important to mention here that, regarding the above 1962-63 work carried out by DMG, Karnataka, except for the text report, no other details as to – i) Geological Map Plate which could have been geo-referenced, ii) the location coordinates of pits and boreholes (auger holes?) are available. In the absence of these details, dove-tailing of the data in this report was not possible during the present study.

b) Geological Survey of India

GSI had carried out systematic geological mapping in 1967, on a scale of 1:63000 scale in parts of North Kanara District, Mysore covering the toposheet numbers 48 J/8+12, J/15, J/16, J/14, N/3 and K/9 bounded by N. Lat, 13^0 55' and $14^0$35' and E. Long.$74^0$30' and $75^0$00'; the total area covered was 750 sq.km.

The systematic mapping identified that the coastal area consists of migmatites at the base. It is over laid by Shirali granite and in turn, it is succeeded by laterite. The migmatites are restricted to a thin zone abutting the sea. Exposures are seen near Murdeshwar, Bailur, Talgod, Mundalli, Jali and Gorta along the coast. Thick capping of laterite is restricted to the coastal belt.

All the knolls along the coast are flat topped and the thickness of the laterite cover on them is of the order of 10 to 25 metres. Numerous nullahs draining the laterite terrain have dissected the plateaux and these valleys are the only means to decipher the bed rock geology. Outcrops are rarely present even in these valleys. The laterite plateau abut against the sea near Bhatkal and Mundalli and cliffs have formed due to wave action.

The top most portions of the laterite are ferruginous in composition and are composed of coarse to fine cellular reddish-brown material full of vug like cavities. These cavities are lined by dark brown to reddish of limonitic matter and filled with quartz. Further down, the laterite is aluminous in patches, buff to red and white. Below this layer occurs a thin zone of lithomarge, white and clayey. The lithomarge layer overlies the bed rock. The laterite capping seen over the areas of Mundalli, Nuz, Byandur, Talgod, Bhatkal, Shirali and to the south of Konar are aluminous in composition.

The plateaux near Nuz, south of Konar, west of Byandur and east of Shirali and the eastern portions of Bhatkal plateau are aluminous laterite. Test samples collected from the face and cliff sides were analysed in the Chemical Laboratory of Mysore Circle. The alumina content (Al2O3) ranges from 28% to 39%. Further detailed work was recommended in these areas to evaluate the nature of the laterite.

Presently, Laterite is being used as building stones in the region. They are cut into sized rectangular or square blocks and used for construction activities. Quarries of laterite exist 2 km north of Bhatkal, near Jali and north of Kaikini.

5.0 GEOLOGY OF THE AREA

5.1 Aerial Reconnaissance

Not Applicable.

5.2 Regional geological set up of the area with stratigraphy

The study area falls in the region of coastal Karnataka; comprises of migmatised granitic gneisses (Gopal Rao,1969; Balasubrahmanyan,1974). This gneissic complex reportedly has a K/Ar, U/Pb age of 3200 M.Y (Balasubrahmanyan,1974). The granitic body which is known as Kanara batholith has an Rb/Sr age of 2681±236 M.Y (Balasubrahmanyan et al., 1982). The migmatites are seen as patches in granite and show ptygmatic folds. Quartzo- feldspathic veins have intruded into the migmatites in the later stages. The migmatite exposures are seen in the areas of Murdeshwar, Bailur, Talgod, Mundalli, Jali and Gorta along the coast.

The granite gneiss occurs as sheeted and highly jointed out crops. It is grey in colour, medium to coarse grained. It carries rafts of migmatite. It is homogenous and devoid of banding. Tongues and apophyses are seen along the contact with the schists. It intrudes along the foliation planes of the schists giving rise to banded gneiss near the contact as observed near Adkar and on the hill .1393 east of Bailur. Porphyritic types were observed part of Belke and to the north of Shirali. Well-formed crystals of felspars are embedded in a fine to medium grained in nature.

Thick capping of laterite is restricted to the coastal belt. All the knolls along the coast are flat topped and the laterite cover on them is of the order of 10 to 25m. Numerous nullahs draining the laterite terrain have dissected the plateau and these valleys are the only means to decipher the bed rock geology. Outcrops are rarely present even in these valleys. The laterite plateau abuts against the sea near Bhatkal and Mundalli and cliffs have formed due to wave action. The top most portions of the laterite are ferruginous in composition in general. Further down the laterite is a light coloured, buff to red and white. Below this layer occurs a thin zone of lithomarge, white and clayey. The lithomarge layer overlies the bed rock.

Stratigraphic succession of the area:

Gopal Rao (1969) has presented the stratigraphic succession of the area as shown in table 5.1. where the Migmatites forms the base which is overlaid by the Shirali granites and it over lain by the laterite and soil cover.

Table 5.1: Stratigraphic succession of the area given by Gopal Rao (1969)

Laterite and Soil
Granite (Shirali Granite)
Migmatites

Local Geology

Stratigraphic succession given by Nagaraja and Nagarajachetty (1974) is shown in the table 5.2, where Granitic gneiss occurs as the basement rock which is later intrude by the dykes that are doleritic in composition. These are further succeeded by the laterite capping and it is overlain by soil and alluvium.

Table 5.2: Stratigraphy of the area after Nagaraja and Nagarajachetty (1974)

Soil and alluvium
Laterite
Dykes
Granitic Gneisses

6.0 GEOSCIENCE INVESTIGATION

6.1 Geological Mapping and Topographic Survey

Detailed Geological Mapping was carried out in 1:4000 scale as per the MEMC 2015 guidelines. In the present study, the mapping was carried out along with DGPS topographic survey team. Accordingly, east-west traverses were taken along the 40mX40m grid, and by and field data was collected by making observations at each grid points. Later, the field data was processed using the GIS module of QGIS software and the detailed Geological map of the study area was prepared. Detailed topographic map and geological map (Fig6.1 and 6.2) are attached as Annexure 2b & Annexure 3 in true scale respectively.

DGPS based topographic survey was carried out in the study area on a prescribed scale of 1:4000 scale as per the NMET SOP. Four temporary bench mark stations were setup across the block boundary and the DGPS base was kept under observation for 24 hours in order to assure the amount of deflection and to attain the maximum accuracy. The mean sea level data was obtained from two permanent bench marks i.e., Bhatkal railway station situated towards NE of the block and Bhatkal Light house, which is situated at the NW of our block. Later, these data were transferred and corelated with our DGPS. To ensure the highest accuracy. Rovers (Fig 6.4) were taken along the planned traverses on a 40mX40m grid and the topographic mapping was completed by incorporating all the mappable geographical features present within the block. Upon completion of the topographic survey, the obtained data was again correlated with the CORS-Survey of India to ensure the highest accuracy in the survey. The topographic map with a contour interval of 5.0m was prepared using AutoCAD software.

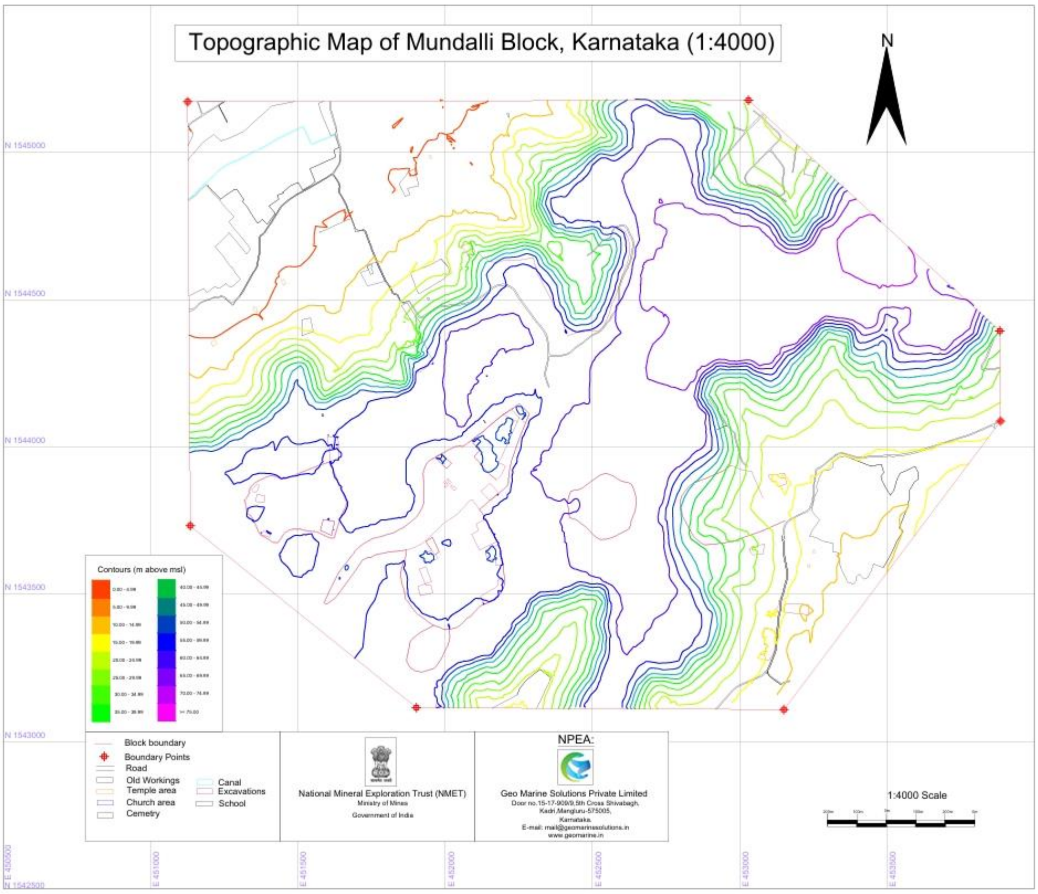

Fig 6.1: Topographic map prepared by Geo Marine Solutions Pvt. Ltd

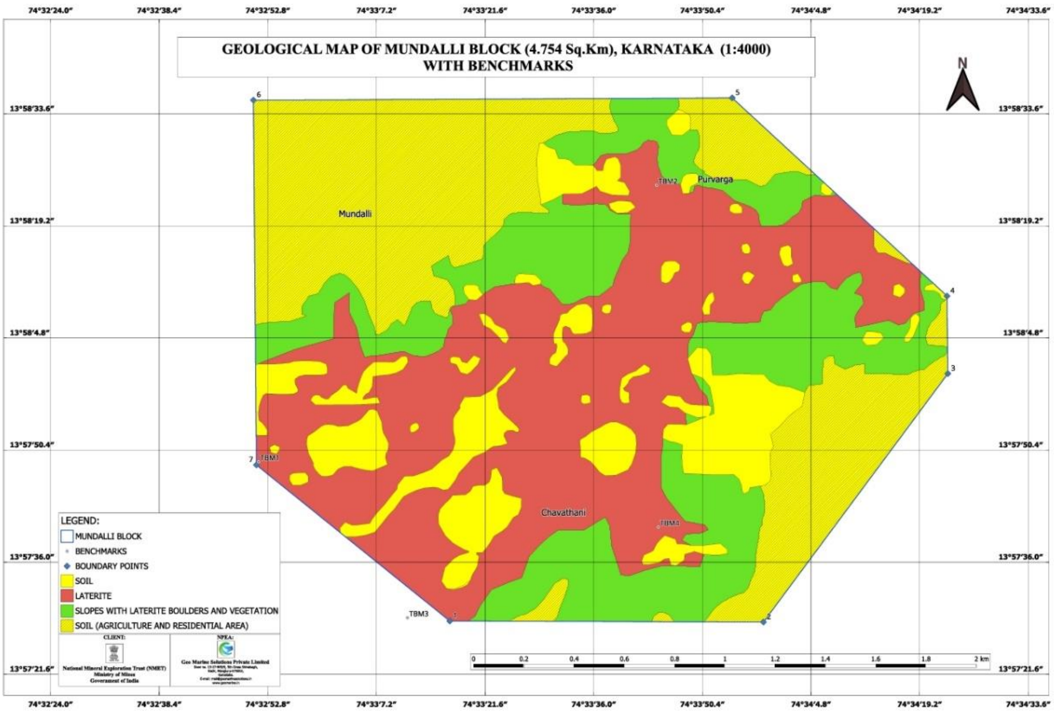

Fig 6.2: Geological map prepared by Geo Marine Solutions Pvt Ltd.

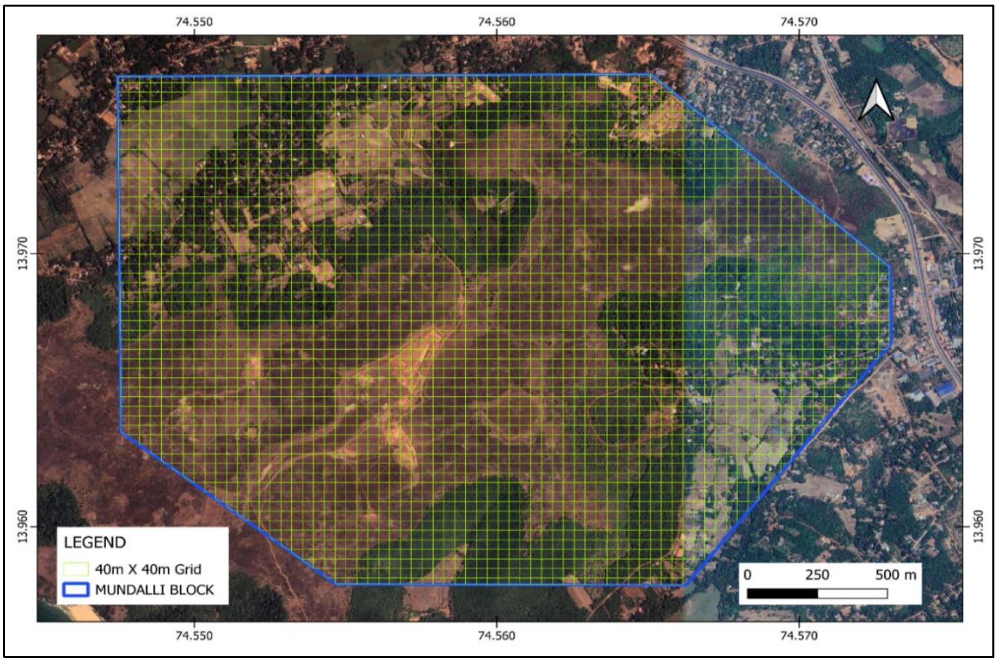

Fig 6.3: 40mX40m grids shown on the google earth imagery.

Fig 6.4: Field photographs during topographic survey.

6.2 Description of Rock types

Entire Mundalli block is composed of hard laterite duricrust (Fig 6.5), which shows black-brownish black colour. The laterite has tubular cavities and at places these cavities are filled by quartz.

Fig 6.5: Laterite exposed on the Mundalli plateau.

6.3 Petrographic Studies:

As a part of NQT, 10 Thin sections and 10 ore section were prepared and studied under the microscope at Geo Marine Solutions Pvt. Ltd, Mangalore.

Under the microscope these bauxites show pisolitic structure, and are mainly composed of gibbsite, hematite, limonite, goethite and quartz. The small rounded to subrounded pale yellow pisolites are seen in Fig 6.6A; the white portions in the figure represent the secondary quartz present in the bauxite. Under crossed nicols (Fig 6.6B) hematite and goethite, grains of gibbsite and free quartz are seen. Fig 6.6D, shows the ore section of the bauxite where the gibbsite and limonite is present, Fig 6.6F represent gibbsite filled with quartz in PPL.

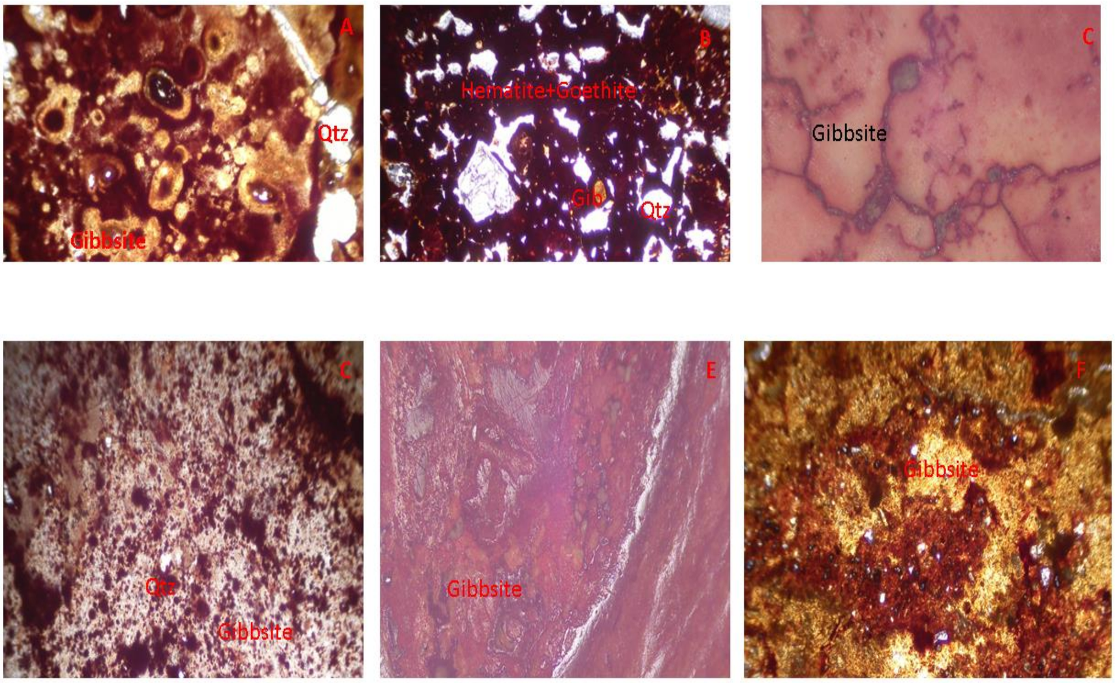

Fig 6.6 (A-F): Photomicrograph of Bauxite and laterites all photos are taken in 4x

Fig 6.6 A) showing the rounded to subrounded pisole structure along with gibbsite and quartz. B) shows the presence of free quartz, gibbsite and iron oxide (hematite and Goethite). C) Gibbsite as seen under the reflected light. D) Gibbsite and free quartz seen under PPL. E) Gibbsite and Limonite as seen under the reflected light. F) Gibbsite and Fe-oxide filled with quartz seen in PPL.

6.4 Structure and metamorphism

Laterite is the only lithology exposed in the block and there are no bed rock exposures within the block; thus, no mappable structural features were seen.

Metamorphism

Laterites are seen as duricrusts in the block. No metamorphic features are seen within the block area. Only notable metamorphic feature that can be seen is outside the south-western boundary of the block, a little further below the cliff on the sea shore where gneissic exposures are seen (Fig 6.7).

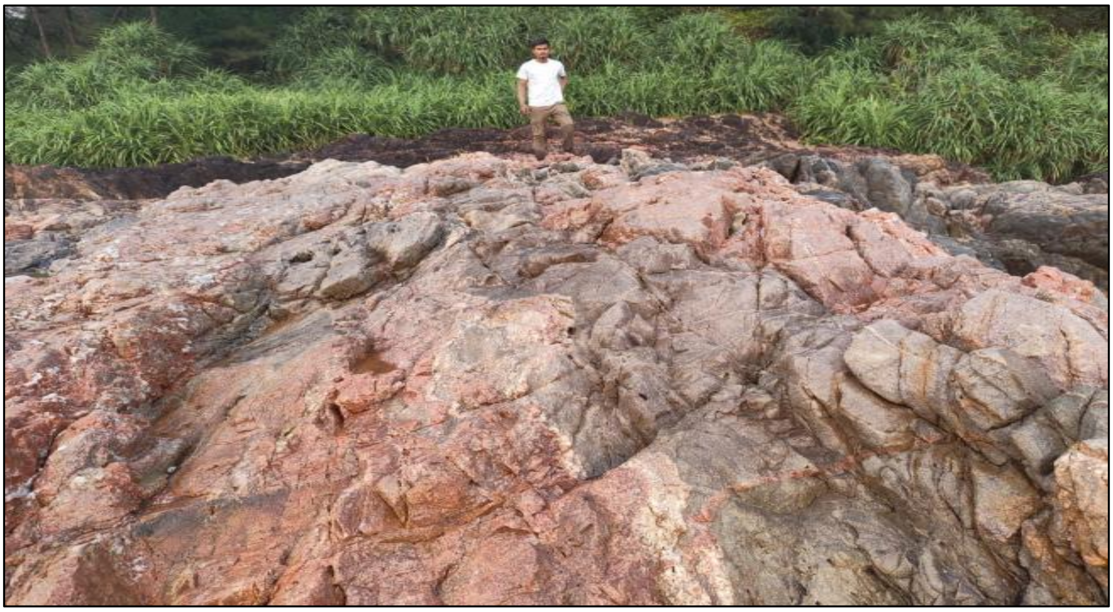

Fig 6.7: Gneissic exposure on the sea shore, which is outside western side of the block

6.5 Pitting and trenching

Attempts to excavate pits as part of NQT were made (fig6.8). But the laterite duricrust was very hard and the attempts made were unsuccessful. Pitting using heavy machinery was more expensive than approved SoC of NMEDT. This was communicated to TCC-1 during the May-2025 in the 78th TCC review meeting and on the advice of TCC, the pitting and trenching activity was removed from the NQT. Trenching was not a part of NQT.

Fig 6.8: Pitting work being attempted in the Field.

6.6 Geophysical Exploration

Geophysical exploration was not carried out as it wasn't a part of approved NQT.

6.7 Geochemical Exploration

Geochemical exploration was not carried out as it wasn't a part of approved NQT.

7.0 INTEGRATION OF GEOLOGY, GEOPHYSICS AND GEOCHEMICAL EXPLORATION DATA AND THE INTERPRETATION

Not required for Bauxite and laterites hence the same wasn't carried out

8.0 MINERAL PROSPECT

8.1 Surface Indication

In Mundalli Project, the mineral prospect is aluminous laterite occurring as irregular zones within the ferruginous laterite. On the surface such aluminous laterite zones are not identifiable; the laterite looks black to dark brownish red in colour and forms a hard duricrust (Fig 8.1). At places the tubular and irregular-shaped cavities within laterites are filled with white crystalline quartz A thin soil cover occurs in small patches at shallow depressions on the surface of the duricrust. The soil is brown to greyish in colour.

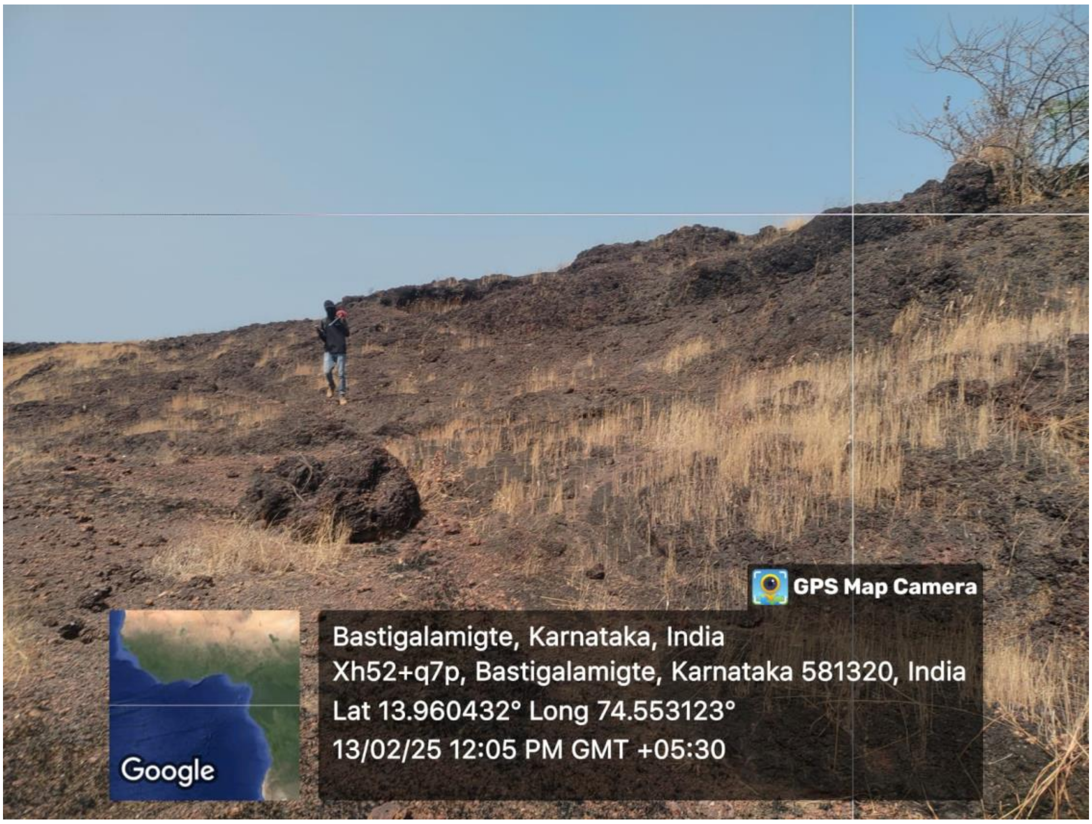

Fig 8.1: Laterites exposed in Mundalli plateau

8.2 Mode of Occurrence and strike length of the body

The laterite occupies the top surface of the flat-topped hill, forming a plateau. The extent of this laterite is confined to the plateau top which is about 2.5km along NE-SW directions and 1.2km along NW-SE direction. The total extent of laterite plateau inside the block boundary is 2.10 sq km.

8.3 Alteration Zones

No alteration zones are encountered in the area, as the entire area is made up of laterites and soil cover.

8.4 Genesis of Mineralization

Presently, the project area falls under a tropical humid climatic region, where there are rich vegetation and very high rainfall. Lateritization – a process of "selective leaching and enrichment" occurs when a region is subjected to intense weathering under favorable climatic conditions, the pre-existing rocks are transformed to laterite; the complete profile is usually - unaltered bed rock at the bottom of the profile, followed by a weathered zone / saprolite, a lithomarge layer which is rich in clay and topped by the hard duricrust of laterites of varying compositions.

During the exploration drilling activity, 10 of the 15 boreholes were drilled beyond 11m, all of them intersected laterite and clay horizons. However, below the clay horizon in 9 of those 10 boreholes, a huge pocket of alluvial sand was encountered. Attempts were made to drill through such sand pockets but were unsuccessful as the sand was loose and led to the collapse of the boreholes. Thus, no borehole was drilled up to the bedrock.

The alluvial sand pocket encountered below the clay horizons is indeed surprising because no such occurrence was reported in any of the lateritic terrains. Along the west coast of India, there are a few locations in the coastal regions of Kerala where laterite has developed over ferruginous clastic and argillaceous sediments of Varkala Formation or Warkalli Formation of Cenozoic age. In those sections, weathered sandstone could be seen below the laterite profile. How ever in the case of the present project at Mudalli Laterite Plateau, it was loose alluvial sand which was encountered below the laterite and clay horizons. And when efforts were made to drill through the sand pockets, the unconsolidated nature of such sand pockets resulted in borehole collapse and forced borehole closure.

Since investigation of reasons and genesis of these sand pockets below the laterite profile was not in the scope of present study, no further studies were attempted in the direction of unravelling the issue of sand pockets.

9.0 EXPLORATION SYTEMATIC DRILLING

9.1 Spacing of Boreholes

As per the approved NQT and MEMC, 2015 (Amended on 2021) guidelines for a G3 project for a prospect of this type of deposit, 16 boreholes were planned to drill across the Mundalli plateau, in such a way that it spans all over the area. As the aluminous laterite occurs as an irregular pocket in the plateau, it was decided to drill at a spacing of 400mX400m spacing. Out of the 16 boreholes, BH-01 was not drilled as it was not accessible.

9.2 Methodology and type of drilling and details of drilling

The surface of Mundalli plateau is made up of thin soil cover in patches and laterite crust on the flat-topped hill. The exposed laterite is dark brownish black to red colour and very hard in nature. The best drilling method to ensure representative sampling would have been Air Core Drilling or RC drilling. But Auction Rules do not permit any other type of drilling except Diamond Core drilling. Accordingly, core drilling was opted in this project.

Core drilling in the area was carried out by Voltas-320 core drilling rig.All boreholes were vertical holes, using HQ rods and NX size barrels. For maximum core recovery, several combinations were used while drilling such as,

1. Selecting the type and length the barrel for each run
2. To use water or not

   These two conditions were monitored for every single run that was drilled in each borehole. Based on the lithology core recovery in each run, the drill conditions were altered accordingly for subsequent runs, to optimize for the maximum recovery.

During drilling, three different types of drill barrels were used -

a) Single tube barrel of 0.5m length
b) Double tube barrel of 1.0m length
c) Triple tube barrel of 1.50m length

The hard laterite exposed on the surface and top soil was drilled by wet drilling for first 1.5m, using single tube of 0.5m length at a lower rpm rate to get the maximum recovery; then on detailed observation of obtained cores and recovery percentage, the drilling conditions were changed accordingly, using different combinations mentioned above. On an average the first three runs were drilled using single tube barrel with water; when the obtained core recovery was more, for the next few runs triple tube barrel of 1.5m length with water was used. When the recovery percentage on an average was nearly 50% or less when drilled with triple tube, the subsequent runs were drilled with single tube barrel of 0.5m in dry condition (without using water).

In general, the single tube dry drilling was carried out in maximum possible runs in all the boreholes, as the lithology encountered were - mottled laterite, clay, clayey laterite, lateritic soil. Wherever the hard laterites were seen i.e., in the top 6 - 8m and in the later run lengths, triple tube wet drilling was used as the recovery percentage obtained was good.

During the beginning of the drilling program, it was planned to one or two boreholes up to the bedrock, when the same was carried out in the first drilled borehole i.e., BH-09 we encountered the sand from 22.5m-24.0m. Then in the next borehole at BH-11 again the sand was encountered. This was communicated to TCC-1 in the review meeting of April,2025. Based on the directions given by TCC-1 we carried out drilling till we encountered the sand pockets.

9.3 Borehole Planning

Borehole planning was done in the study area in such a way that the entire Mundalli plateau area of 2.78sq.km is covered to ensure the continuity of the lithology and also as per the MEMC Rules 2015. As, the project is of G3 level and the laterite in the study area occurred as irregular pockets, the boreholes were planned on a 400mX400m grid. Totally 16 boreholes were planned across the study area out of which 15 boreholes were drilled. Borehole number 01 which was located in the south eastern end of the plateau wasn't drilled as it was on the slope and was not accessible.

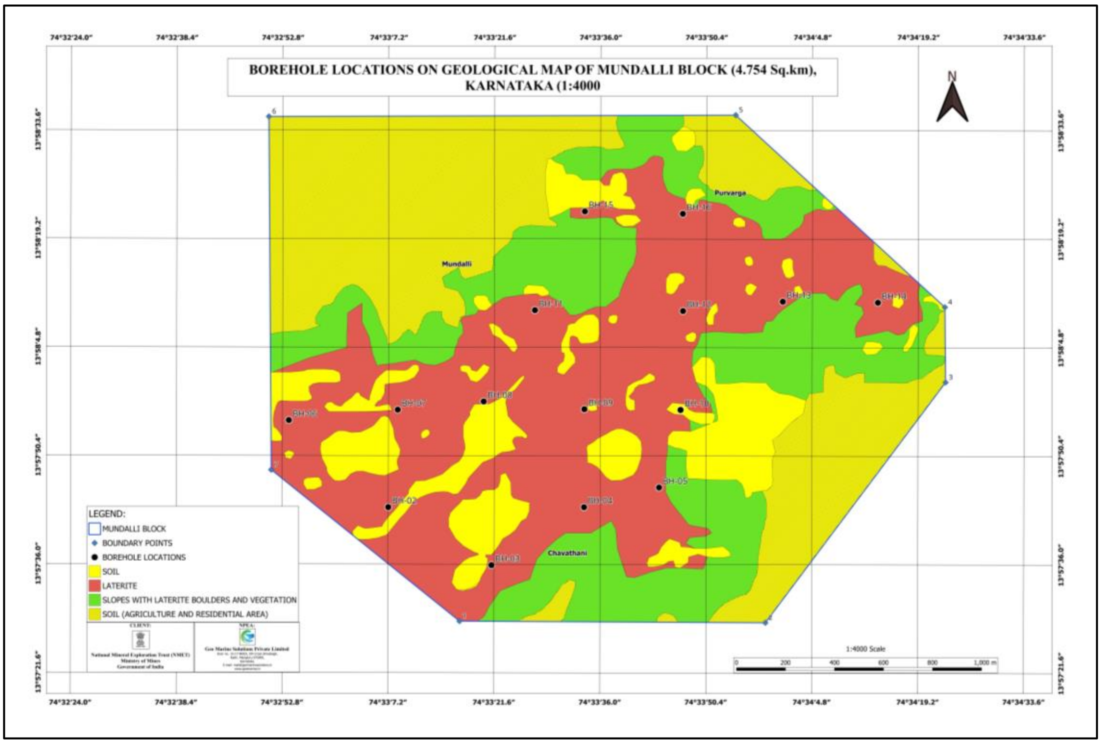

Fig. 9.1: Borehole locations on geological map

Table 9.1: Borehole Co-ordinates and Collar details.

Sl.No	BH NO.	Latitude (DMS)	Longitude (DMS)	COLLAR RL (m)
1	BH-02	13°57′43.55836″	74°33′07.19927″	51.48
2	BH-03	13°57′35.87922″	74°33′21.24903″	58.66
3	BH-04	13°57′43.58857″	74°33′33.82298″	59.62
4	BH-05	13°57′46.21468″	74°33′44.01300″	62.98
5	BH-06	13°57′55.08379″	74°32′53.66792″	54.53
6	BH-07	13°57′56.48826″	74°33′08.47102″	57.29
7	BH-08	13°57′57.59894″	74°33′20.16157″	53.32
8	BH-09	13°57′56.59388″	74°33′33.84523″	61.51
9	BH-10	13°57′56.51608″	74°33′46.92016″	64.53
10	BH-11	13°58′09.72604″	74°33′27.09909″	61.19
11	BH-12	13°58′09.64395″	74°33′47.23082″	66.24
12	BH-13	13°58′10.90426″	74°34′00.79694″	67.67
13	BH-14	13°58′10.78787″	74°34′13.73055″	68.59
14	BH-15	13°58′22.84171″	74°33′33.86816″	56.46
15	BH-16	13°58′22.54835″	74°33′47.18620″	65.75

9.3.1 Borehole Logging

Drill core obtained in every run was carefully examined in the field and a detailed description of cores was made as per the format given by NMET in the SOP. Based on the observations, the following lithocodes were assigned to the lithology to broadly classify the obtained the cores.

- **a) Laterite & Lateritic soil**
- **b) Clay & Lateritic clay**
- **c) Clayey soil, silt**
- **d) Clayey Laterite**
- **e) Slush & sand**
- **f) Soil**

Laterite & Lateritic soil: This group includes the reddish ferruginous laterite, pinkish to red with white patches showing the aluminous laterite, the powdery ferruginous and aluminous laterite in the soil form is considered as soil.

Clayey Laterite: This appears to be a mottled laterite but it is softer and stickier.

Clay and Lateritic clay: This broad lithocode includes the reddish ferruginous clay; pinkish to white clay of alumina and in a single run where the laterite composition is minimum and clay is more it is termed as lateritic clay.

Clayey soil: when it is seen physically, it appears to be as a soil which is very sticky in nature showing the characteristics of clayey soil.

Slush & Sand: The slush is having more slurry mud and sand appears to be coarse river sand with high siliceous content.

Soil: Completely weathered rock in the powder form showing typical soil characteristics. The detailed borehole logs are given in the following pages.

Later, the litho-codes used for borehole logging were validated with analytical results and then regrouped as shown below to construct borehole logs for each borehole.

a) Bauxite: $Al2O3 \geq 30.00\%$ AND $SiO2 \leq 7.00\%$
b) Aluminous Laterite: Fe_2O_3: $Al_2O_3 < 1$ and SiO_2:$Al_2O_3 < 1.33$
c) Ferruginous Laterite: Fe_2O_3: $Al_2O_3 > 1$ and SiO_2:$FeO_3 < 1.33$
d) Aluminous Clayey Laterite: Fe_2O_3: $Al_2O_3 < 1$ and SiO_2:$Al_2O_3 > 1.33$
e) Ferruginous Clayey Laterite: Fe_2O_3: $Al_2O_3 > 1$ and SiO_2:$FeO_3 > 1.33$
f) Clay: Grouped based on observable physical properties.

The core log diagrams of each borehole based on detailed visual observations (of drill cores at the drilling site) are given along with the interpreted Core logs with re-grouped lithocodes stated above, are given in Annexure-9

9.3.2 Core Recovery

In all, fifteen boreholes were drilled with a total meterage of 257m. The overall core recovery, which could be achieved in the ore zone i.e., Laterite and Clay horizons was 70%. Details of the same are given in the table below.

Table 9.2: Borehole wise Core recovery percentage

Borehole No.	Total length (m)	Core Recovery %
BH02	17.0	79
BH03	23.5	73
BH04	26.0	78
BH05	10.0	61
BH06	18.5	75
BH07	11.0	73
BH08	15.0	69
BH09	24.5	63
BH10	10.0	66
BH11	18.5	68
BH12	10.0	57
BH13	21.5	68
BH14	24.0	72
BH15	10.5	70
BH16	17.0	64

Reasons for the core loss during drilling are discussed below.

The lithological column in Mundalli Block Laterite Plateau consisted of the following Horizons

1. Thin soil cover
2. Ferruginous Laterite
3. Aluminous Laterite
4. Clay Horizons
5. Voids indicated by water loss while drilling
    a. Such horizons were encountered in six (6) boreholes.
    b. The thickness of such void pockets ranged from 0.5m to 2.5m.
    c. Total thickness of such zero recovery zones was 8.0m.

6. Thick Sand layer after different depths ranging from as shallow as 11.5m to 21m.
    a. This situation was encountered in nine (9) boreholes.
    b. The thickness of such pockets ranged from 1.0m to 3.5m.
    c. Total thickness of such zero recovery zones was 18.0m

And the laterite horizons varied in hardness from very hard to brittle and extremely friable as indicated by the maximum RQD of 53 for such horizons.

In order to overcome these challenges, Geo Marine Solutions employed best possible procedures

- Single, Double barrels and Tripple Tube Techniques.
- Dry and wet drilling based on the lithology requirements.
- Drilling of 148 m out of 257 m was carried out by dry drilling method, to achieve the best possible core recovery
- Very slow drilling.
- Short runs from 0.5m to 1.5m.

With these measures, the final core recovery in Mundalli Block is as stated below:

1. 7 out of 15 Boreholes had a Core Recovery % ranging from 70% to 79%.
2. 7 out of 15 Boreholes had a Core Recovery % ranging from 61% to 69%.
3. 1 out of 15 Boreholes had a Core Recovery % of 57%.

Given the rheology of the lithological set up at Mundalli Block, the achieved core recovery is the best possible under the given circumstances.

9.4 Sample preparation

During borehole logging, the following lithocodes were used to broadly classify the drill cores

1. Laterite & Lateritic soil
2. Clay & Lateritic clay
3. Clayey soil
4. Clayey Laterite
5. Slush & sand
6. Soil

a. Sampling of drill cores was based on a combination of run-length and lithology
    - If entire run length was composed of same lithology, then sample-length was 1m or the total run length.
    - If a single run had two different lithology, then sample lengths were reduced or increased as the case may be.

After sample marking as per the above procedure. The cores were split into two equal halves using a core splitter as shown in fig 9.2 & 9.3. One portion of the split core was returned to the core box and the other half of the core was used for laboratory analysis purpose.

Crushing and pulverising

- All the split core samples designated for laboratory studies were crushed using a jaw crusher to 1cm to <20cm, and the crushed samples were coned and quartered; about 500 g of each sample was then sent to the laboratory for further pulverising and analysis.
- At the lab, the whole sample was pulverised to a -200 mesh size and two packets of pulp samples of approximately 250 g were prepared.
- One set of pulp samples were used for analysis in the primary lab, and the other set was used to prepare composite samples and to select check samples.

Fig 9.2: Cut split cores introduced Jaw crusher

Fig 9.3: Jaw crushed samples prepared for pulverizing

Samples for Analysis of Major oxides and LOI using XRF.

187 samples were prepared as discussed in the previous section and were analysed by XRF. **Samples for analysis of Minor, trace and REE using ICPMS/OES**

- For analysis of minor, trace and REE by ICP OES/MS, only 85 samples were approved in the NQT. In the first phase of the drilling program project, 40 samples based on run and lithology wise were analysed with ICPMS. Therefore, composite sampling was opted for preparing remaining samples. Composite samples were prepared so as to represent all the regrouped lithologies.

Check Samples

After receiving the analysis results of XRF and ICPMS from the primary lab, the samples were selected in such a way that they represented all the regrouped lithocodes. The samples were drawn from the pulp sample duplicates that were stored in the repository and 19 check samples were prepared for XRF analysis, and 8 check samples for ICPMS.

The check sample details are as follows

For XRF check samples, a total of 19 check samples were selected from 187 XRF samples, of which 12 check samples are from Aluminous Laterite, 1 check sample from Bauxite samples, 2 check samples from Ferruginous Laterite samples and 4 check samples from Clay samples.

For ICP-MS check samples, a total of 8 check samples were selected from 83 ICP-MS samples, of which 5 check samples are from Aluminous Laterite, 1 check sample from Bauxite samples, 1 check sample from Ferruginous Laterite samples and 1 check sample from Clay samples.

9.5 Chemical analysis and laboratory Procedure

XRF analysis of the primary samples were carried out at Shiva Labs, Bangalore (NABL accredited) using fused beads and SOP/OM/103, 105 was the procedure code, and for ICP- MS, the SOP/OM/051, 052 was followed.

The procedures adopted for XR, ICP-OES and ICP-MS analysis of check samples at the secondary lab (Inspectorate of Griffith, Gandhidam) are stated below:

IGI/GDM/LAB/TPM/048 & LOI as per IBM

9.6 Results and Discussion

Analysis of major oxides and LOI was done by XRF for 187 samples. Analysis of Minor and Trace elements and REE were carried out by ICP OES/MS for 83 samples. The analysis results and interpretation are presented in this section.

The major oxides analysis results were used to regroup the different lithologies encountered in each borehole. The revised lithological groups and the basis for such re-grouping are as follows.

Definitions of various lithologies in the project

As per the gazette notification. C-284/3/CMG/2017-1 dated 25/04/2018 Bauxite and bauxite-associated aluminous laterite are defined as follows.

- Bauxite: $Al_2O_3 \geq 30.00\%$ Minimum, and $SiO_2 < 7.00\%$
- For aluminous laterite: Al_2O_3- 20% Minimum

In a dominantly lateritic environment, the Indian Bureau of Mines- classification of laterites is based on the major extractable minerals in it-

a) Aluminous laterite (Bauxite)
b) Ferruginous laterite (Iron ore)
c) And other laterites including manganiferous, nickeliferous, chromiferous laterites.

As the Aluminous laterite ad Ferruginous Laterite in the present project were in a dominantly lateritic environment, they were further constrained based on the following ratios:

- Aluminous Laterite: Fe_2O_3: $Al_2O_3 < 1$ AND SiO_2:$Al_2O_3 < 1.33$
- Ferruginous Laterite: Fe_2O_3: $Al_2O_3 > 1$ AND SiO_2: $Fe_2O_3 < 1.33$

Those laterite variations which did not fall in either aluminous laterite or ferruginous laterite because of excess silica, they were further grouped as stated below:

- Aluminous Clayey Laterite: Fe_2O_3: $Al_2O_3 < 1$ AND SiO_2:$Al_2O_3 > 1.33$
- Ferruginous Clayey Laterite: Fe_2O_3: $Al_2O_3 > 1$ AND SiO_2: $Fe_2O_3 > 1.33$
- The lithology clay was based on visual characteristics and observable physical properties.

The analytical results were interpreted based on the above classification and discussed below.

The descriptive statistical analysis for the bauxite samples indicates that the Al_2O_3 content is ranging from 32.11%- 41.60%, Fe_2O_3 ranges from 26.86%-38.74%, SiO_2ranges from 3.39%-6.62% and V_2O_5 ranges from 0.06%-0.21%.

Table 9.3: Descriptive statistics of Bauxite

Data	Al_2O_3	Fe_2O_3	V_2O_5	SiO_2	TiO_2	LOI
Mean	37.6968	31.3308	0.14772	5.6568	2.39228	22.154
Standard Error	1.694217	2.053444	0.02604	0.586534	0.166689	0.532622
Median	38.296	30.228	0.1612	5.907	2.4292	22.22
Mode	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Standard Deviation	3.788383	4.591641	0.058226	1.311529	0.372729	1.190979
Sample Variance	14.35185	21.08316	0.00339	1.720109	0.138927	1.41843
Kurtosis	-0.28023	1.797055	1.072498	3.733457	-0.115	0.944776
Skewness	-0.74873	1.283694	-0.6883	-1.87158	0.35838	-0.40646
Range	9.486	11.889	0.1576	3.236	0.9763	3.25
Minimum	32.114	26.86	0.06	3.39	1.9437	20.42
Maximum	41.6	38.749	0.2176	6.626	2.92	23.67
Count	5	5	5	5	5	5

The descriptive statistical analysis of aluminous laterite shows that Al_2O_3 content is ranging from 26.21% - 50.69%, Fe_2O_3 ranges from 3.53% - 33.32%, SiO_2 is from 3.39% - 42.45% and V_2O_5 ranges from 0.04% - 0.21%.

Table 9.4: Descriptive statistics of aluminous laterites

Data	**Al_2O_3**	**Fe_2O_3**	**V_2O_5**	**SiO_2**	**TiO_2**	**LOI**
Mean	34.2576	22.1842	0.08704	22.5333	2.52375	17.7227
Standard Error	0.78413	0.97858	0.0052	1.53701	0.0521	0.59091
Median	32.578	22.489	0.0778	25.563	2.5185	16.43
Mode	#N/A	#N/A	0.049	#N/A	2.41	13.45
Standard Deviation	5.5998	6.98843	0.03717	10.9764	0.37208	4.21994
Sample Variance	31.3578	48.8381	0.00138	120.482	0.13844	17.8079
Kurtosis	0.56977	0.53907	2.52617	-1.3618	1.83532	-1.2112
Skewness	1.03089	-0.7613	1.54398	-0.2868	0.2321	0.44889
Range	24.481	29.787	0.1686	39.061	2.1725	14.05
Minimum	26.216	3.533	0.049	3.39	1.5845	12.24
Maximum	50.697	33.32	0.2176	42.451	3.757	26.29
Count	51	51	51	51	51	51

Ferruginous laterite shows that Al_2O_3 content is ranging from 4.21% - 33.04%, Fe_2O_3 ranges from 27.73% - 70.69%, SiO_2 ranges from 1.74% - 38.815% and V_2O_5 ranges from 0.049%-0.34%.

Table 9.5: Descriptive statistics of ferruginous laterites

Data	Al_2O_3	Fe_2O_3	V_2O_5	SiO_2	TiO_2	LOI
Mean	25.5385	38.5893	0.1328	18.4633	1.84001	14.7777
Standard Error	0.53352	0.85713	0.00661	0.89204	0.05386	0.32274
Median	25.9085	37.0825	0.12	17.139	1.87795	14.475
Mode	#N/A	#N/A	0.14	#N/A	1.52	16.26
Standard Deviation	4.5895	7.37335	0.05689	7.67363	0.46336	2.77632
Sample Variance	21.0636	54.3663	0.00324	58.8846	0.2147	7.70796
Kurtosis	6.32825	3.97105	1.35027	-0.2936	1.49204	1.10234
Skewness	-1.7816	1.48886	1.00605	0.34155	-0.8327	-0.6186
Range	28.839	42.96	0.291	37.075	2.6197	15.06
Minimum	4.21	27.73	0.049	1.74	0.18	5.36
Maximum	33.049	70.69	0.34	38.815	2.7997	20.42
Count	74	74	74	74	74	74

Descriptive statistical analysis aluminous clayey laterite shows Al_2O_3 content is ranging from 6.55% - 30.27%, Fe_2O_3 ranges from 0.45% - 18.88%, SiO_2 ranges from 42.56% - 88.87%, V2O5 ranges from 0.04% - 0.08%.

Table 9.6: Descriptive statistics of aluminous clayey laterite

Data	Al2O3	Fe2O3	V2O5	SiO2	TiO2	LOI
Mean	15.9453	6.29767	0.0546	69.494	1.06765	6.59583
Standard Error	1.96843	1.56307	0.00329	3.93893	0.17087	0.87561
Median	16.0235	4.701	0.049	70.7935	1.05645	6.48
Mode	#N/A	#N/A	0.049	#N/A	#N/A	#N/A
Standard Deviation	6.81885	5.41464	0.01138	13.6448	0.59191	3.03319
Sample Variance	46.4967	29.3183	0.00013	186.182	0.35036	9.20024
Kurtosis	0.16055	1.17798	3.7969	0.32402	1.21173	0.32444
Skewness	0.64163	1.11753	2.08435	-0.7763	0.59958	0.74297
Range	23.72	18.432	0.0352	46.31	2.311	10.47
Minimum	6.55	0.45	0.049	42.56	0.049	2.58
Maximum	30.27	18.882	0.0842	88.87	2.36	13.05
Count	12	12	12	12	12	12

Similarly, the descriptive statistics of Ferruginous clayey laterite shows Al_2O_3 content is ranging from 3.40%- 17.03%, Fe_2O_3 ranges from 6.08%-18.011%, SiO2 ranges from 54.51%-88.37%, V2O5 ranges from 0.04%-0.05%.

Table 9.7: Descriptive statistics of Ferruginous clayey laterite

	Al_2O_3	Fe_2O_3	V_2O_5	SiO_2	TiO_2	LOI
Mean	9.6714	11.3024	0.04956	73.1746	0.65194	4.678
Standard Error	2.452043	2.127475	0.00056	5.98004	0.198238	1.13577
Median	10.98	12.429	0.049	69.81	0.6822	5.06
Mode	#N/A	#N/A	0.049	#N/A	#N/A	#N/A
Standard Deviation	5.482934	4.757179	0.001252	13.37178	0.443274	2.539659
Sample Variance	30.06256	22.63075	1.57E-06	178.8044	0.196492	6.44987
Kurtosis	-1.17691	-0.65942	5	-0.68266	1.052897	-0.48992
Skewness	0.18292	0.399835	2.236068	-0.33189	1.005489	0.384006
Range	13.638	11.931	0.0028	33.853	1.1343	6.49
Minimum	3.4	6.08	0.049	54.517	0.21	1.77
Maximum	17.038	18.011	0.0518	88.37	1.3443	8.26
Count	5	5	5	5	5	5

The 39 clay samples indicated high moisture content; they show Al_2O_3 content ranging from 3.71% - 35.20%, Fe_2O_3 ranges from 1.05% - 43.86%, SiO_2 is seen varying from 22.15% - 91.80% and V_2O_5 ranges from 0.049% - 0.11%.

Distribution Trend of Major Oxide

Selective major oxide concentration distribution trend is studied in this section to get a broad idea on the elemental distribution pattern throughout the Mundalli plateau.

Distribution trend in each Borehole

The depth wise major oxide distribution pattern for individual boreholes is discussed below. This discussion is based on the 187 samples that were analysed for major oxide using XRF analysis.

In borehole number 02, the vertical distribution pattern of major oxides such as Al_2O_3, Fe_2O_3, SiO_2, V_2O_5, TiO_2 observed (fig 9.4) indicates that; for the first 4.50m from the top $Fe_2O_3$is dominant than Al_2O_3, with an average of 34.70% Fe_2O_3 later from 4.50-12.50 Al_2O_3, content is more than Fe_2O_3. Where Al_2O_3 shows an average of 27.74% and Fe_2O_3 shows an average of 18.48%; and for the last one run from 12.50-13.00m Fe_2O_3 (34.50%) is more than Al_2O_3 (24.63). When the distribution pattern of V_2O_5% is in general increasing where Fe_2O_3 is more and less where Al_2O_3 concentration is high. Similarly, the patterns of TiO_2 and SiO_2 shows and anomalous distribution pattern.

BH02						
From	To	Al2O3	Fe2O3	SiO2	V2O5	TiO2
Scale		100.00	100.00	100.00	0.50	10.00
0.00	1.50	20.26	35.43	32.72	0.08	1.38
1.50	3.00	28.51	38.41	12.28	0.20	1.38
3.00	3.50	30.07	31.67	16.88	0.15	1.66
3.50	4.50	31.47	33.30	12.95	0.16	1.63
4.50	6.50	26.84	13.04	43.32	0.05	1.59
8.00	9.50	20.54	15.67	52.35	0.08	1.68
9.50	10.00	30.22	20.64	33.09	0.13	2.67
10.00	11.50	30.22	20.11	33.68	0.09	2.54
11.50	12.50	30.90	17.52	35.38	0.07	2.48
12.50	13.00	24.63	34.50	25.38	0.07	2.04

Fig 9.4: Vertical distribution pattern of major oxides in Borehole no. 2

Major oxide distribution pattern in borehole number 03 (Fig. 9.5) shows that Al_2O_3 is very low for the first 1.5m with 6.55% and later from 1.50m-23.50m it is having an overall average of 26.72% ranging from 20.76% - 31.73%. Fe_2O_3 shows very minimal concentration for top 1.5m with 1.65%, and from 1.50m-23.50m it ranges from 3.30%-43.23% with an average concentration of 27.83%. SiO_2 concentration is very high in the top horizon with 88.87% and at the bottom from 23.0-23.50m with 58.05, overall SiO_2 from 1.50m-23.0m ranges from 11.93%-33.22% with an average value of 26.05%. V_2O_5 ranges from 0.05% to 0.20% with an average of 0.10%. TiO_2 ranges from 1.64%-3.75% with an average of 2.32%.

BH03						
From	To	Al2O3	Fe2O3	SiO2	V2O5	TiO2
Scale		100.00	100.00	100.00	0.50	10.00
0.00	1.50	6.55	1.65	88.87	<0.05	<0.05
1.50	3.00	26.91	42.50	11.93	0.20	2.20
3.00	4.50	24.38	43.23	15.51	0.18	1.69
4.50	6.50	20.76	35.84	29.66	0.12	1.64
6.50	7.50	25.98	30.71	27.07	0.11	2.27
7.50	8.50	25.57	32.55	25.38	0.09	2.39
8.50	9.50	25.37	35.86	21.65	0.09	2.50
9.50	10.50	31.73	18.69	31.68	0.07	2.83
10.50	11.50	29.17	24.67	28.71	0.08	2.54
11.50	12.50	31.30	16.44	32.39	<0.05	3.76
12.50	13.50	30.36	18.34	33.22	0.07	2.88
13.50	15.50	29.15	21.64	32.46	0.05	2.52
15.50	17.00	28.13	24.60	29.97	0.06	2.33
17.00	17.50	22.31	38.73	20.28	0.13	1.79
17.50	18.50	24.43	35.91	23.31	0.09	1.94
21.00	23.00	26.22	22.26	27.52	0.06	2.14
23.00	23.50	25.83	3.30	58.05	<0.05	1.80

Fig 9.5: Vertical distribution pattern of major oxides in Borehole no. 3

In borehole number 04 (Fig. 9.6) it is observed that the Al_2O_3 concentration is ranging from 5.14%-35.07% for up to 24.50m from the surface, with an average value of 23.37%. Fe_2O_3 ranges from 4.76%-40.62% with an average value of 22.03%. SiO_2 is ranging from 8.42%-83.71% with an average value of 39.84%. wherever, the silica enrichment has happened there is a significant decrease in the concentrations of remaining elements. V_2O_5 is ranging from 0.04%-0.24% with an average value of 0.12%. TiO_2 varies from 0.32%-2.76%.

BH04						
From	To	Al2O3	Fe2O3	SiO2	V2O5	TiO2
Scale		100.00	100.00	100.00	0.50	10.00
0.00	1.50	25.25	35.82	20.78	0.19	1.23
1.50	3.00	30.84	39.43	8.42	0.25	1.88
3.00	4.50	28.37	38.54	13.67	0.20	1.80
4.50	6.00	27.37	40.62	13.84	0.15	2.15
6.00	7.50	30.96	30.09	13.88	0.18	2.14
7.50	8.50	33.32	24.80	21.14	0.09	2.30
8.50	10.00	14.38	9.83	67.57	0.05	0.86
10.00	11.50	29.71	19.77	34.10	0.08	2.25
11.50	12.50	27.75	27.61	27.84	0.11	2.38
12.50	13.50	25.48	32.40	26.74	0.12	2.02
13.50	14.50	17.04	18.01	54.52	0.05	1.34
14.50	15.50	27.346	22.431	33.502	0.0684	2.5026
15.50	16.00	14.03	14.28	62.78	0.07	1.01
16.00	17.00	21.51	18.88	47.61	0.08	1.58
17.50	19.50	35.07	5.13	41.93	<0.05	2.76
19.50	20.50	18.32	5.93	65.48	<0.05	1.39
20.50	22.00	17.19	4.76	69.19	<0.05	1.23
22.00	23.00	9.92	8.98	75.43	<0.05	0.70
23.00	24.00	5.149	7.392	83.715	<0.05	0.3232
24.00	24.50	28.58	36.06	14.78	0.23	1.52

Fig 9.6: Vertical distribution pattern of major oxides in Borehole no. 4

Borehole number 05 which is drilled for only 10mtrs (Fig. 9.7) shows a considerable variation in the distribution of elements for the 10m depth. The Al_2O_3 concentration is depleting towards the end of the borehole, at the starting it has a value of 32.11% and at the bottom from 9-10m it shows less concentration of 20.72%. The average Al_2O_3 Concentration in this borehole is 30.43%. Fe_2O_3 is shows high value of 43.86% at 9.0m-10m and is minimum at 25.16% at 4.5-5.0m. The average Fe_2O_3 concentration is 33.36%. SiO_2 is very minimal at two depths i.e., from 0 to 1.5m and from 3-4.5m with the values of 5.87% & 5.91% respectively. The minimum and maximum range for SiO_2 is 5.87% to 26.04% with an average value of 16.38%. The V_2O_5 values are more than the cutoff value of 0.05% ranging from 0.07%- 0.26% with an average of 0.12%. TiO_2 ranges from 1.55%-2.81% with an average of 2.24%.

BH05						
From	To	Al2O3	Fe2O3	SiO2	V2O5	TiO2
Scale		100.00	100.00	100.00	0.50	10.00
0.00	1.50	32.114	38.749	5.871	0.1612	1.9437
1.50	3.00	29.00	41.90	9.07	0.26	1.99
3.00	4.50	38.30	30.23	5.91	0.17	2.52
4.50	5.50	38.52	25.16	11.07	0.10	2.67
5.50	6.50	34.36	25.62	19.31	0.08	2.81
6.50	7.50	27.93	32.09	23.13	0.07	2.33
7.50	8.00	26.71	31.72	24.95	0.08	2.27
8.00	9.00	26.30	31.00	26.04	0.07	2.09
9.00	10.00	20.72	43.86	22.15	0.11	1.55

Fig 9.7: Vertical distribution pattern of major oxides in Borehole no. 5

The distribution pattern in borehole number 06 (Fig. 9.8) indicates that Al_2O_3 is ranging from 3.40%-32.34% with an average of 24.43%. Fe_2O_3 is ranging from 6.08%-48.60% with an average of 30.42%. SiO_2 is ranging from 12.65%-88.37% with an average value of 29.56%, at a depth 6.0-7.5m the SiO_2 is of 88.37% which is significantly affecting the concentration of other elements. V_2O_5 shows a significant enrichment compared to other boreholes, however there are very minimal concentration at few depths, in general V_2O_5 is ranging from 0.05%-0.22%. TiO_2 ranges from 0.21%-2.91%.

BH06						
From	To	Al2O3	Fe2O3	SiO2	V2O5	TiO2
Scale		100.00	100.00	100.00	0.50	10.00
0.00	1.50	26.96	38.46	17.01	0.14	1.88
1.50	3.00	25.03	42.75	15.63	0.20	1.74
3.00	4.50	23.70	46.47	13.02	0.22	1.72
4.50	6.00	22.74	48.60	12.65	0.15	1.79
6.00	7.50	3.40	6.08	88.37	<0.05	0.21
7.50	8.50	25.02	38.33	20.88	0.13	2.03
8.50	9.50	32.35	16.83	32.95	0.08	2.92
9.50	11.00	28.17	24.30	30.27	0.06	2.47
11.00	12.00	29.16	23.83	30.12	0.08	2.17
12.00	12.50	27.79	28.84	22.49	0.21	1.64
12.50	14.50	24.82	33.98	25.99	0.1	2.02
14.50	17.00	24.07	16.63	45.40	<0.05	1.98

Fig 9.8: Vertical distribution pattern of major oxides in Borehole no. 6

Borehole number 07 (Fig 9.9) indicates shows a good concentration of Al_2O_3 ranging from 15.67%- 44.24% with an average value of 29.71%. Fe_2O_3 shows very minimal concentrations at depths of 6.0m-7.50m with values ranging from 0.45%-3.53%. The minimum and maximum values of Fe_2O_3 ranges from 0.45%-39.46% with an average of 20.55%. SiO2 is ranging from 9.42%-64.99% with an average value of 30.86%. TiO2 ranges from 1.16%-2.97%.

BH07						
From	To	Al2O3	Fe2O3	SiO2	V2O5	TiO2
Scale		100.00	100.00	100.00	0.50	10.00
0.00	1.50	29.957	34.191	14.157	0.1171	2.0045
1.50	3.00	28.60	38.35	13.18	0.12	2.23
3.00	4.50	33.05	34.95	9.43	0.13	2.39
4.50	6.00	29.22	39.46	11.52	0.11	2.24
6.00	6.50	44.24	3.53	26.11	<0.05	2.98
6.50	7.00	34.36	1.05	45.98	<0.05	2.22
7.00	7.50	22.67	0.45	64.99	<0.05	1.57
7.50	8.50	15.67	16.01	58.33	<0.05	1.16
8.50	9.50	33.42	9.79	39.05	<0.05	2.94
9.50	10.50	25.94	27.73	25.94	0.05	2.24

Fig 9.9: Vertical distribution pattern of major oxides in Borehole no. 7

In borehole number 08 (Fig 9.10), Al_2O_3 ranges from 4.45%-32.71% with an average of 21.17% and Fe_2O_3 ranges from 1.25%-41.50% with an average of 23.43% and SiO_2 ranges from 13.26%-91.80% with an average value of 41.71%. TiO_2 is ranging from 0.28%-2.31% with an average value of 1.31%. V_2O_5 ranges from 0.05%-0.10%. with an average value of 0.08%.

BH08						
From	To	Al2O3	Fe2O3	SiO2	V2O5	TiO2
Scale		100.00	100.00	100.00	0.50	10.00
0.00	1.50	26.97	35.01	19.32	0.09	0.99
1.50	3.00	32.72	32.06	13.26	0.09	1.66
3.00	6.00	21.51	41.50	22.02	0.10	1.40
6.00	8.00	30.07	18.84	33.44	0.07	2.31
8.00	9.00	23.08	33.69	28.26	0.09	1.88
9.00	10.50	9.43	1.68	83.91	<0.05	0.67
10.50	11.50	4.45	1.25	91.80	<0.05	0.28

Fig 9.10: Vertical distribution pattern of major oxides in Borehole no. 8

Borehole number 09 (Fig9.11) shows that the Al_2O_3 concentration is varying between 9.74%-45.36% with an average of 28.80%, Fe_2O_3 is ranging from 1.88%-52.52% with an average of 23.65%, V_2O_5 is ranging from 0.05%-0.15%, TiO_2 is ranging from 0.70%-2.92%. SiO_2 is ranging from 6.49%-82.85% with an average of 30.14%. The depletion in the concentrations of all elements is seen in the zones where the enrichment of SiO_2 is more.

BH09						
From	To	Al2O3	Fe2O3	SiO2	V2O5	TiO2
Scale		100.00	100.00	100.00	0.50	10.00
0.00	1.00	37.82	26.31	10.47	0.09	2.16
1.00	2.00	43.03	21.22	7.89	0.08	2.50
2.00	3.00	45.36	18.90	7.07	0.05	2.73
3.00	4.50	29.12	38.45	12.72	0.15	2.47
4.50	6.00	36.75	31.66	7.64	0.13	2.59
6.00	7.50	40.48	26.86	6.49	0.06	2.92
7.50	9.00	30.54	41.69	7.29	0.12	2.22
9.00	10.50	29.26	23.21	31.50	0.05	2.38
10.50	12.00	26.31	29.17	28.81	0.1	2.03
12.00	13.50	18.40	52.52	16.00	0.09	1.31
13.50	14.00	15.06	1.88	75.57	<0.05	0.98
14.00	14.50	10.98	12.60	69.81	<0.05	0.70
14.50	15.00	28.81	22.27	32.45	0.10	2.41
15.00	16.50	26.37	26.72	31.86	0.09	2.16
16.50	17.50	29.27	21.64	33.38	0.05	2.41
17.50	18.50	27.93	25.03	32.06	0.08	2.20
18.50	19.50	31.72	15.43	36.3	0.06	2.51
20.00	21.00	30.27	11.08	42.56	0.07	2.36
21.00	22.00	9.74	2.81	82.85	<0.05	0.73

Fig 9.11: Vertical distribution pattern of major oxides in Borehole no. 9

Borehole number 10 (Fig 9.12) shows that Al_2O_3 ranges from 24.75%-50.70% with an average of 36.32%, Fe_2O_3 is ranging from 7.22%- 36.52% with an average of 21.04%, SiO_2 shows values from 7.81%-29.66% with an average of 20.08%. V_2O_5 is ranging from 0.05%-0.12% with an average of 0.08%. TiO_2 is ranging from 2.22%-3.09% with an average of 2.557%.

BH10						
From	To	Al2O3	Fe2O3	SiO2	V2O5	TiO2
Scale		100.00	100.00	100.00	0.50	10.00
0.00	1.50	39.621	25.861	8.427	0.1241	2.2289
1.50	3.00	47.53	15.74	7.81	0.07	2.54
3.00	4.50	50.70	9.08	10.59	<0.05	2.50
4.50	5.50	40.02	7.22	29.66	<0.05	2.24
5.50	6.00	36.51	15.85	25.48	0.07	2.74
6.00	7.50	32.85	19.20	27.70	0.06	3.09
7.50	8.50	24.75	36.52	21.63	0.10	2.37
8.50	9.50	26.50	32.07	23.88	0.08	2.56
9.50	10.00	28.433	27.883	25.563	0.0544	2.7538

Fig 9.12: Vertical distribution pattern of major oxides in Borehole no. 10

Borehole number 11 (Fig9.13) indicates that Al_2O_3 is ranging from 3.71%-32.60% with an average of 20.25%, Fe_2O_3 is ranging from 2.00%-53.60% with an average of 27.04%. SiO_2 is showing values from 5.43%-87.70% with an average of 39.89%. V_2O_5 ranges from 0.05%-0.20% with an average of 0.11%. TiO_2 indicates 0.20%-2.33% with an average of 1.44%. The distribution trend in this borehole indicates that as the depth increases the SiO_2 values are increasing, which is significantly decreasing the concentrations of Fe_2O_3.

BH11						
From	To	Al2O3	Fe2O3	SiO2	V2O5	TiO2
Scale		100.00	100.00	100.00	0.50	10.00
0.00	1.50	24.24	53.6	5.43	0.14	1.52
1.50	3.00	26.24	37.88	16.75	0.12	1.64
3.00	4.50	21.73	44.86	17.27	0.17	1.47
4.50	6.00	29.58	36.17	13.91	0.16	2.07
6.00	7.50	25.15	44.07	14.01	0.20	1.84
7.50	9.00	23.00	43.27	18.97	0.06	2.33
9.00	10.50	19.12	48.63	18.52	0.06	1.73
10.50	11.50	32.61	3.84	47.81	0.08	2.24
11.50	12.50	18.983	2.006	69.825	<0.05	1.2372
12.50	13.00	16.99	6.44	67.93	<0.05	1.13
13.00	14.00	3.71	16.4	76.23	<0.05	0.2
14.O	15.00	17.70	9.18	64.28	0.06	1.16
15.00	16.50	4.28	5.22	87.70	<0.05	0.23

Fig 9.13: Vertical distribution pattern of major oxides in Borehole no. 11

Borehole number 12 (Fig 9.14) shows the values of Al_2O_3 ranging from 24.88%-34.74%, with an average of 29.83%. Fe_2O_3 ranges from 20.83%-40.91% with an average of 30.67%. SiO_2 concentration varies between 13.51%-25.00% with an average value of 19.85%. V_2O_5 shows value from 0.05% - 0.16% with an average of 0.098%. TiO_2 ranges from 1.31%-2.93% with an average value of 2.06%.

BH12						
From	To	Al2O3	Fe2O3	SiO2	V2O5	TiO2
Scale		100.00	100.00	100.00	0.50	10.00
0.00	1.50	27.024	32.751	20.676	0.0636	1.3112
1.50	3.00	31.52	31.26	15.55	0.07	1.58
3.00	4.50	32.39	32.73	13.51	0.13	2.02
4.50	6.00	25.69	32.44	25.00	0.11	1.72
6.00	7.50	24.88	40.91	16.76	0.16	2.03
7.50	8.50	34.74	20.83	23.87	0.06	2.84
8.50	10.00	32.58	23.82	23.61	<0.05	2.93

Fig 9.14: Vertical distribution pattern of major oxides in Borehole no. 12

Borehole number 13 (Fig 9.15) indicates the Al_2O_3 values from 4.21%-41.60% with an average of 27.18%. Fe_2O_3 is ranging from 1.68%-70.69% with an average of 24.51%. SiO_2 is ranging from 3.39%-85.90% with an average of 31.92%. V_2O_5 is ranging from 0.05%-0.24% with an average of 0.14%. TiO_2 is showing values between 0.18%-2.97%, with an average of 2.01%.

BH13						
From	To	Al2O3	Fe2O3	SiO2	V2O5	TiO2
Scale		100.00	100.00	100.00	0.50	10.00
0.00	1.50	41.6	28.62	3.39	0.13	2.15
1.50	3.00	35.99	32.20	6.63	0.22	2.43
3.00	4.50	27.75	35.76	17.82	0.21	2.01
4.50	6.00	28.13	42.07	10.62	0.24	2.02
6.00	7.50	31.46	36.50	12.53	0.12	2.49
7.50	8.50	35.58	4.30	42.45	<0.05	2.62
8.50	9.50	32.25	16.34	33.55	0.08	2.58
9.50	11.00	30.19	22.49	30.06	0.09	2.53
11.00	11.50	4.21	70.69	19.1	0.12	0.18
11.50	13.00	26.87	28.18	28.46	0.08	2.29
13.00	15.00	23.71	16.04	47.15	<0.05	1.88
15.00	16.50	35.20	4.15	42.43	<0.05	2.97
16.50	18.00	19.35	4.14	66.91	<0.05	1.42
18.00	19.50	8.28	1.68	85.90	<0.05	0.57

Fig 9.15: Vertical distribution pattern of major oxides in Borehole no. 13

Borehole number 14 (Fig 9.16) shows that Al_2O_3 values from 5.18%-42.49% with an average of 22.22%. Fe_2O_3 is ranging from 1.82%-53.95% with an average of 23.18%. SiO_2 is ranging from 1.74%-86.16% with an average of 40.87%. V_2O_5 is ranging from 0.05%-0.34% with an average of 0.12%. tiO_2 is ranging from 0.23%-3.02% with an average of 1.66%. there is a significant change in the concentration of other elements when it is corelated with SiO_2, the higher concentration of Al_2O_3 and Fe_2O_3 is seen when SiO_2 is showing lower values, and it is showing a vice versa trend when SiO_2 values are increasing.

BH14						
From	To	Al2O3	Fe2O3	SiO2	V2O5	TiO2
Scale		100.00	100.00	100.00	0.50	10.00
0.00	1.50	25.71	53.95	1.74	0.34	1.57
1.50	3.00	34.79	33.32	7.22	0.15	2.18
3.00	4.50	42.49	21.84	7.98	0.10	3.02
4.50	6.00	32.77	36.23	9.07	0.13	2.80
6.00	7.50	31.63	30.66	18.79	0.15	2.18
7.50	8.50	31.46	29.15	20.14	0.08	2.90
8.50	9.00	25.06	37.64	21.69	0.10	2.32
9.00	10.00	27.71	30.00	25.59	0.08	2.37
10.00	11.00	25.876	32.433	25.943	0.0904	2.2202
11.00	11.50	34.20	12.05	36.85	0.08	2.75
11.50	12.00	10.92	47.39	33.42	0.08	0.70
12.00	12.50	28.86	22.81	31.92	0.10	2.30
12.50	13.50	8.76	11.65	74.22	<0.05	0.46
13.50	15.50	8.89	5.82	80.54	<0.05	0.48
15.50	17.00	9.20	2.21	83.89	<0.05	0.56
17.00	18.50	8.11	1.82	86.16	<0.05	0.44
18.50	20.50	8.46	1.91	85.53	<0.05	0.43
20.50	21.50	5.18	6.49	84.99	<0.05	0.23

Fig 9.16: Vertical distribution pattern of major oxides in Borehole no. 14

Borehole number 15 (Fig 9.17) shows the values of Al_2O_3 ranging from 17.19%-34.05% with an average of 22.28%, Fe_2O_3 is ranging from 12.89%-36.49% with an average of 26.95%. SiO_2 is ranging from 15.96%-51.31% having an average of 35.59%. V_2O_5 shows values from 0.05%-0.11% with an average of 0.095%. TiO_2 is ranging from 0.81%-1.93% with an average of 1.14%.

BH15						
From	To	Al2O3	Fe2O3	SiO2	V2O5	TiO2
Scale		100.00	100.00	100.00	0.50	10.00
0.00	1.50	34.054	27.508	15.965	0.082	1.9343
1.50	3.00	24.59	36.49	21.37	0.11	1.41
3.00	4.00	22.91	28.27	32.31	<0.05	1.34
4.00	5.00	19.21	33.95	33.10	<0.05	1.02
5.00	5.50	17.19	31.55	38.82	<0.05	0.81
6.50	7.00	19.91	28.24	37.67	<0.05	1.05
7.00	8.00	18.67	20.77	47.94	<0.05	0.93
8.00	9.00	21.46	22.97	41.89	<0.05	0.94
9.00	10.50	22.608	12.89	51.313	<0.05	0.9068

Fig 9.17: Vertical distribution pattern of major oxides in Borehole no. 15

In Borehole number 16 (Fig 9.18) the values of Al_2O_3 are ranging from 6.58%-33.94% with an average of 19.79%. Fe_2O_3 is ranging from 1.16%-55.28% with an average of 22.59%. SiO_2 is ranging from 6.88%-88.49% with an average of 45.66%. V_2O_5 ranges from 0.05%-0.18% with an average of 0.13%. TiO_2 ranges from 0.38%-3.18% with an average of 1.43.

BH16						
From	To	Al2O3	Fe2O3	SiO2	V2O5	TiO2
Scale		100.00	100.00	100.00	0.50	10.00
0.00	1.50	20.56	55.28	10.19	0.14	1.63
1.50	3.00	26.02	41.25	14.67	0.18	1.67
3.00	4.50	22.77	46.56	14.91	0.12	1.95
4.50	6.00	25.63	44.38	12.54	0.12	1.79
6.00	7.50	26.45	28.06	31.11	0.11	1.84
7.50	8.50	11.79	12.43	69.46	<0.05	0.68
8.50	9.00	12.31	9.25	71.76	<0.05	0.65
9.00	10.50	33.94	3.67	44.66	<0.05	3.18
10.50	11.50	19.94	2.16	67.45	<0.05	1.76
11.50	12.50	9.65	2.96	82.25	<0.05	0.67
12.50	13.00	13.25	1.16	79.24	<0.05	0.82
13.00	13.50	28.44	45.15	6.88	0.15	1.56
13.50	15.50	6.58	1.46	88.49	<0.05	0.38

Fig 9.18: Vertical distribution pattern of major oxides in Borehole no.16

Major oxide trends in different Lithology groups

Weighted averages of major oxides were calculated for the samples which fall under bauxite, aluminous laterite and ferruginous laterite from all the boreholes

Bauxite

Bauxite could be delineated based on the chemical composition and such pockets were encountered in only 3 boreholes – BH-05, BH-09 and BH-13. Weighted average of major oxides in bauxite (Fig 9.19) shows that Al_2O_3 is ranging from 35.21%-40.48% with an average of 38.16%. Fe_2O_3 ranges from 26.86%-34.49%. SiO_2 ranges from 5.01%-6.49%, the V_2O_5 varies from 0.06%-0.17% with an average value of 0.13% and TiO_2 ranges from 2.23-2.92.

Bauxite					
Borehole	Al2O3	Fe2O3	SiO2	V2O5	TiO2
Scale	100.00	100.00	100.00	0.50	10.00
BH05	35.21	34.49	5.89	0.17	2.23
BH09	40.48	26.86	6.49	0.06	2.92
BH13	38.80	30.41	5.01	0.17	2.29

Fig 9.19: Weighted average of Bauxite

Aluminous Laterite

Weighted average of major oxides from all boreholes (Fig9.20) shows that Al_2O_3 is ranging from 28.33%-44.24% with an average of 33.57%. Fe_2O_3 ranges from 3.53%-32.06%. SiO_2 ranges from 13.26%-34.60%, the V_2O_5 varies from 0.04%-0.12% with and TiO_2 ranges from 1.42%-2.98%.

Aluminous Laterite					
Borehole	Al2O3	Fe2O3	SiO2	V2O5	TiO2
Scale	100.00	100.00	100.00	0.50	10.00
BH02	30.45	19.33	34.15	0.09	2.54
BH03	29.16	20.44	30.17	0.06	2.71
BH04	29.97	26.66	22.96	0.12	2.31
BH05	36.44	25.39	15.19	0.09	2.74
BH06	30.75	20.33	31.53	0.08	2.54
BH07	44.24	3.53	26.11	<0.05	2.98
BH08	32.72	32.06	13.26	0.09	1.66
BH09	33.46	23.82	22.72	0.08	2.40
BH10	41.07	16.74	17.12	0.06	2.57
BH12	32.72	25.86	20.65	0.04	2.40
BH13	32.32	15.53	34.60	0.06	2.57
BH14	34.82	26.97	16.23	0.12	2.54
BH15	28.33	20.20	33.64	0.04	1.42

Fig 9.20: Weighted average of aluminous laterite

Ferruginous Laterite

Weighted average of major oxides from all boreholes (Fig 9.21) shows that Al_2O_3 is ranging from 21.18%-29.54% with an average of 25.75%. Fe_2O_3 ranges from 29.32%-44.07%. SiO_2 ranges from 12.89%-34.70%, the V_2O_5 varies from 0.03%-0.19% with and TiO_2ranges from 1.12%-2.46%.

Ferruginous Laterite					
Borehole	Al2O3	Fe2O3	SiO2	V2O5	TiO2
Scale	100.00	100.00	100.00	0.50	10.00
BH02	26.40	35.43	20.32	0.14	1.53
BH03	24.31	37.33	21.90	0.13	2.01
BH04	27.67	37.61	15.89	0.19	1.78
BH05	29.54	37.54	12.89	0.17	2.08
BH06	24.88	42.29	15.94	0.17	1.81
BH07	27.86	33.02	19.59	0.10	2.09
BH08	23.28	38.31	22.42	0.10	1.38
BH09	26.09	40.46	16.21	0.12	2.01
BH10	25.63	34.30	22.76	0.09	2.46
BH11	24.15	44.07	14.98	0.13	1.80
BH12	27.50	34.71	18.99	0.11	1.77
BH13	26.62	41.37	14.20	0.18	1.98
BH14	26.55	40.04	15.88	0.16	2.11
BH15	21.18	29.32	34.70	0.03	1.12
BH16	24.54	43.23	16.07	0.13	1.76

Fig 9.21: Weighted average of Ferruginous laterites from all boreholes

Clayey Laterite

This group includes both Aluminous Claye Laterite and Ferruginous Clayey Laterite. Weighted average of major oxides from all boreholes (Fig) shows that Al_2O_3 is ranging from 03.40%-22.66% with an average of 13.25%. Fe_2O_3 ranges from 0.45%-13.31%. SiO_2 ranges from 64.99%-88.87%, the V_2O_5 varies from <0.05%-0.03% with and TiO_2 ranges from 0.21%-1.56%.

Clayey Laterite					
Borehole	Al2O3	Fe2O3	SiO2	V2O5	TiO2
Scale	100.00	100.00	100.00	0.50	10.00
BH03	6.55	1.65	88.87	<0.05	<0.05
BH04	13.40	13.32	65.32	0.03	0.99
BH06	3.40	6.08	88.37	<0.05	0.21
BH07	22.67	0.45	64.99	<0.05	1.57
BH09	17.68	7.04	66.03	0.02	1.31
BH11	18.07	5.76	67.23	0.02	1.19
BH16	11.04	8.01	75.04	0.00	0.67

Fig 9.22: Weighted average of Clayey Laterite in all boreholes

Minor, trace and REE analysis using ICPMS

The minor trace and REE analysis were carried for 83 selected primary samples, where the main objective was to understand the concentration of Gallium and all other Minor, Trace and Rare Earth Elements which may be present in these laterites.

The analysed samples show gallium values ranging from 6.90ppm -70.70ppm. Other than Gallium, all other Minor and Trace Elements such as Cu, Ni, Pb, Sr, Zn, Zr, Li, Be, B, Sc, Co, Ga, Ge, Sc, Rb, Y, Nb, Mo, Cd, In, Sn, Sb, Te, Cs, Hf, Ta, W, Tl, Bi, Th, U and REEs - La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, returned very low values closer to their crustal abundances values. Therefore, no further analysis of remaining samples was done. The analysis of Minor, trace and REE is given in Annexure (5b)

9.7 Primary and check samples analysis result comparison

The check samples were analysed in the NABL accredited lab at Inspectorate of Griffith at Gandhidam and the results were compared with the results obtained from the primary lab and the same is discussed below

Comparison of XRF results.

The XRF analysis of Primary and check samples are shown in the figure below.

from the comparative analysis of primary and check samples shows very minimal deviation (Al_2O_3, Fe_2O_3, TiO_2, and V_2O_5) hence the results are validated.

Table 9.8: Primary and check samples analysis values of Al_2O_3

Sl. No	Primary sample	Check sample	10% difference	Difference
1	28.37	29.57	2.84	-1.21
2	22.74	23.29	2.27	-0.55
3	26.02	27.40	2.60	-1.39
4	32.72	34.46	3.27	-1.74
5	30.22	30.88	3.02	-0.66
6	29.17	29.99	2.92	-0.82
7	25.88	26.52	2.59	-0.64
8	38.52	40.61	3.85	-2.09
9	26.50	26.89	2.65	-0.39
10	25.69	26.24	2.57	-0.55
11	29.96	30.31	3.00	-0.36
12	28.81	28.67	2.88	0.14
13	19.12	18.64	1.91	0.48
14	19.91	19.81	1.99	0.10
15	35.99	39.24	3.60	-3.25
16	18.32	18.63	1.83	-0.31
17	4.28	4.10	0.43	0.18
18	26.84	28.16	2.68	-1.32
19	8.11	7.94	0.81	0.18

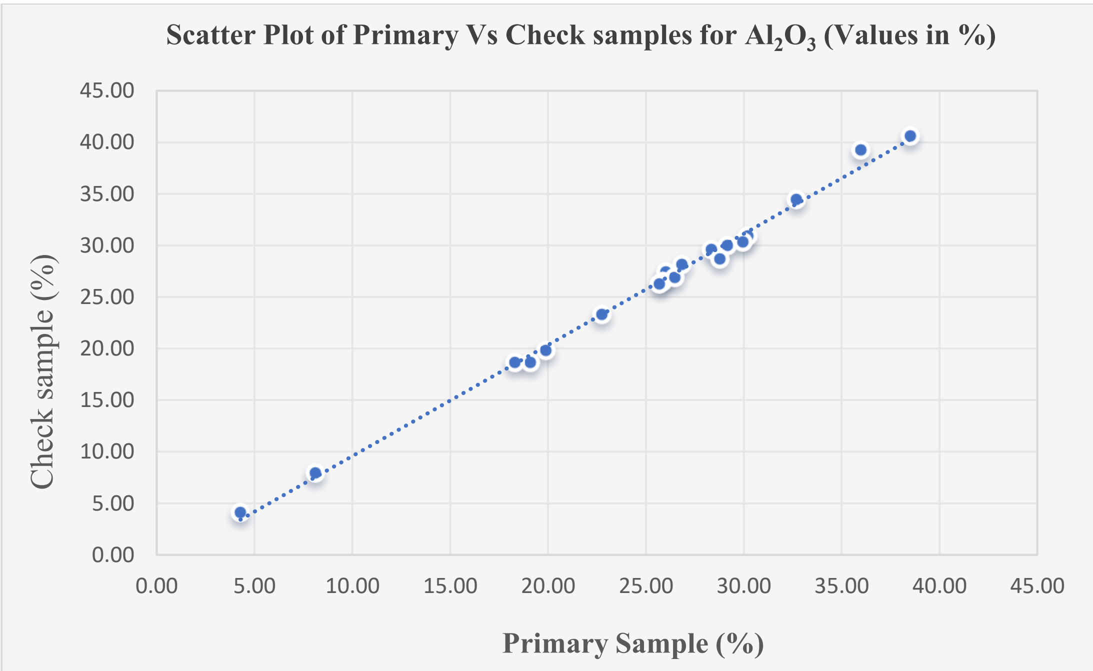

Fig 9.23: Scatter Plot of Primary Vs Check samples for Al_2O_3 (Values in %)

Table 9.9: Primary and check samples analysis values of Fe_2O_3

Sl.No	Primary	Check	10% difference	Difference
1	38.54	37.31	3.8542	1.23
2	48.60	47.56	4.8597	1.04
3	41.25	39.52	4.1251	1.73
4	32.06	30.96	3.2055	1.09
5	20.64	19.88	2.064	0.76
6	24.67	23.85	2.467	0.82
7	32.43	31.22	3.2433	1.22
8	25.16	24.46	2.516	0.70
9	32.07	32.70	3.207	-0.63
10	32.44	32.74	3.2435	-0.30
11	34.19	35.15	3.4191	-0.96
12	22.27	22.50	2.227	-0.23
13	48.63	49.05	4.8627	-0.43
14	28.24	29.61	2.8239	-1.37
15	32.20	30.93	3.2197	1.26
16	5.93	6.04	0.593	-0.11
17	5.22	5.09	0.522	0.13
18	13.04	12.83	1.304	0.21
19	1.82	1.87	0.182	-0.05

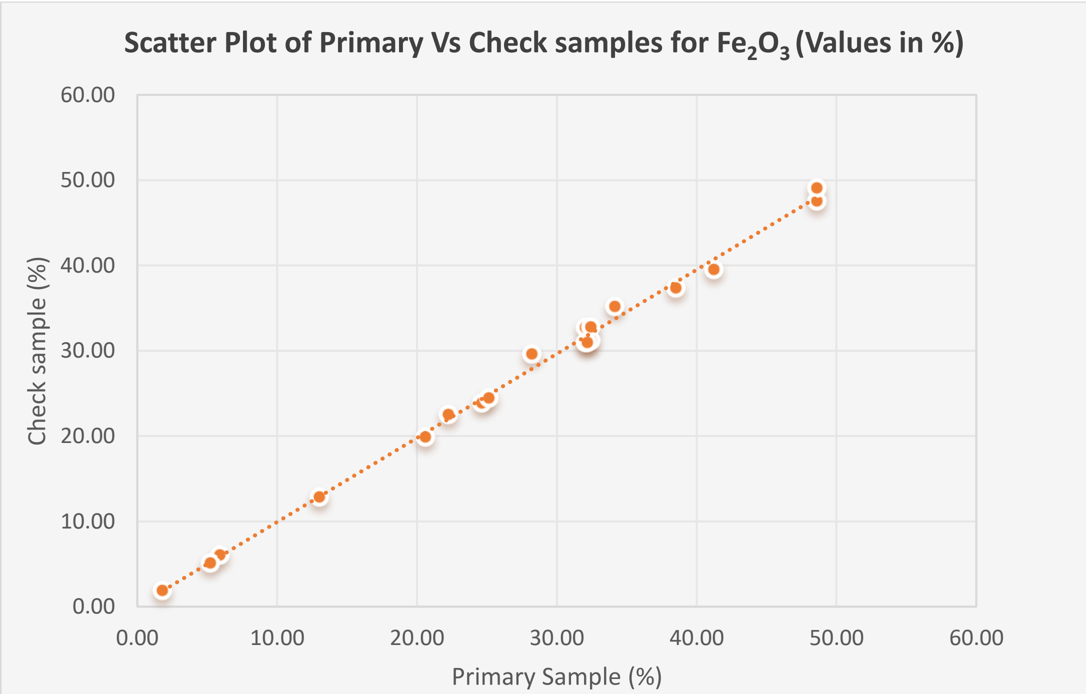

Fig 9.24: Scatter Plot of Primary Vs Check samples for Fe_2O_3

Table 9.10: Primary and check samples analysis values of V_2O_5

Sl. No	Primary sample	Check sample	10% difference	Difference
1	0.20	0.237	0.0201	-0.036
2	0.15	0.188	0.01522	-0.036
3	0.18	0.204	0.01767	-0.027
4	0.09	0.115	0.00864	-0.029
5	0.13	0.155	0.01293	-0.026
6	0.08	0.109	0.00828	-0.026
7	0.09	0.113	0.00904	-0.023
8	0.10	0.129	0.00976	-0.031
9	0.08	0.139	0.00783	-0.061
10	0.11	0.167	0.01068	-0.060
11	0.12	0.194	0.01171	-0.077
12	0.10	0.139	0.01	-0.039
13	0.06	0.128	0.0063	-0.065
14	0.03	0.095	0.0025	-0.070
15	0.22	0.253	0.02176	-0.035
16	0.03	0.039	0.0025	-0.014
17	0.03	0.007	0.0025	0.018
18	0.05	0.082	0.005	-0.032
19	0.03	0.012	0.0025	0.013

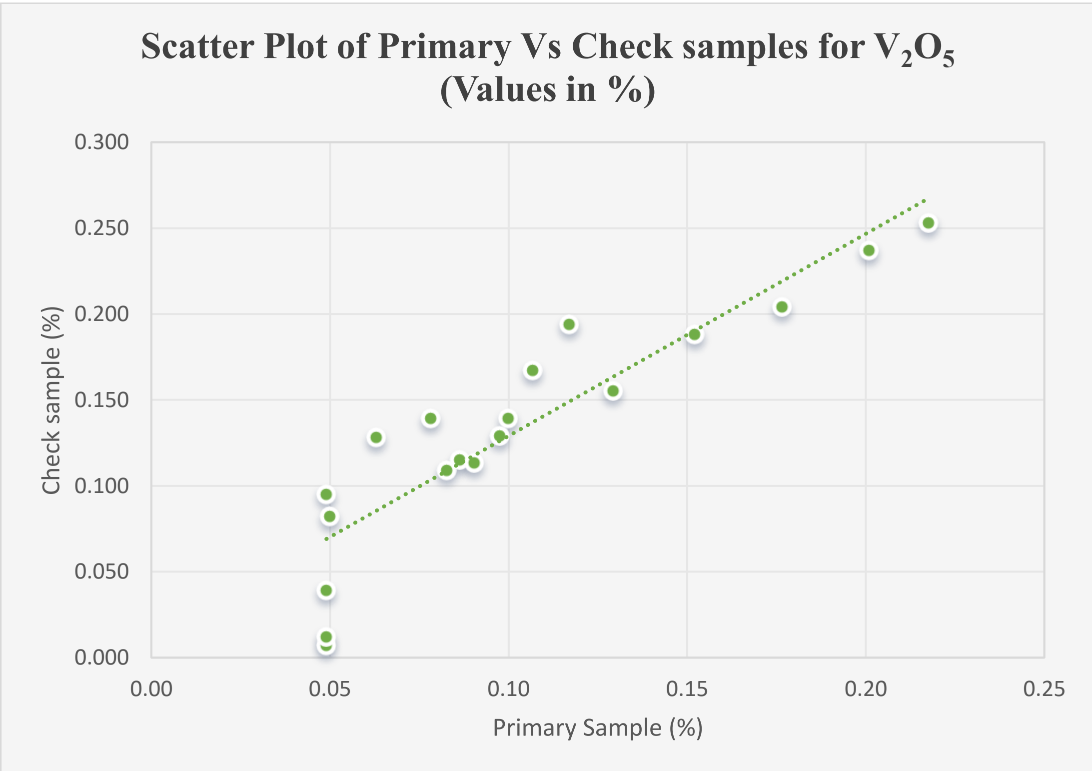

Fig 9.25: Scatter Plot of Primary Vs Check samples for V_2O_5

Table 9.11: Primary and check samples analysis values of TiO_2

Sl. No	Primary sample	Check sample	10%	Difference
1	1.80	1.76	0.17977	0.04
2	1.79	1.77	0.17934	0.02
3	1.67	1.62	0.167	0.05
4	1.66	1.61	0.16639	0.05
5	2.67	2.53	0.26728	0.14
6	2.54	2.40	0.2542	0.14
7	2.22	2.09	0.22202	0.14
8	2.67	2.55	0.26684	0.12
9	2.56	2.34	0.25585	0.22
10	1.72	1.57	0.17207	0.15
11	2.00	1.90	0.20045	0.10
12	2.41	2.51	0.241	-0.09
13	1.73	1.60	0.17282	0.13
14	1.05	1.00	0.10526	0.05
15	2.43	2.38	0.24292	0.05
16	1.39	1.42	0.139	-0.03
17	0.23	0.22	0.023	0.01
18	1.59	1.60	0.159	-0.01
19	0.44	0.42	0.044	0.02

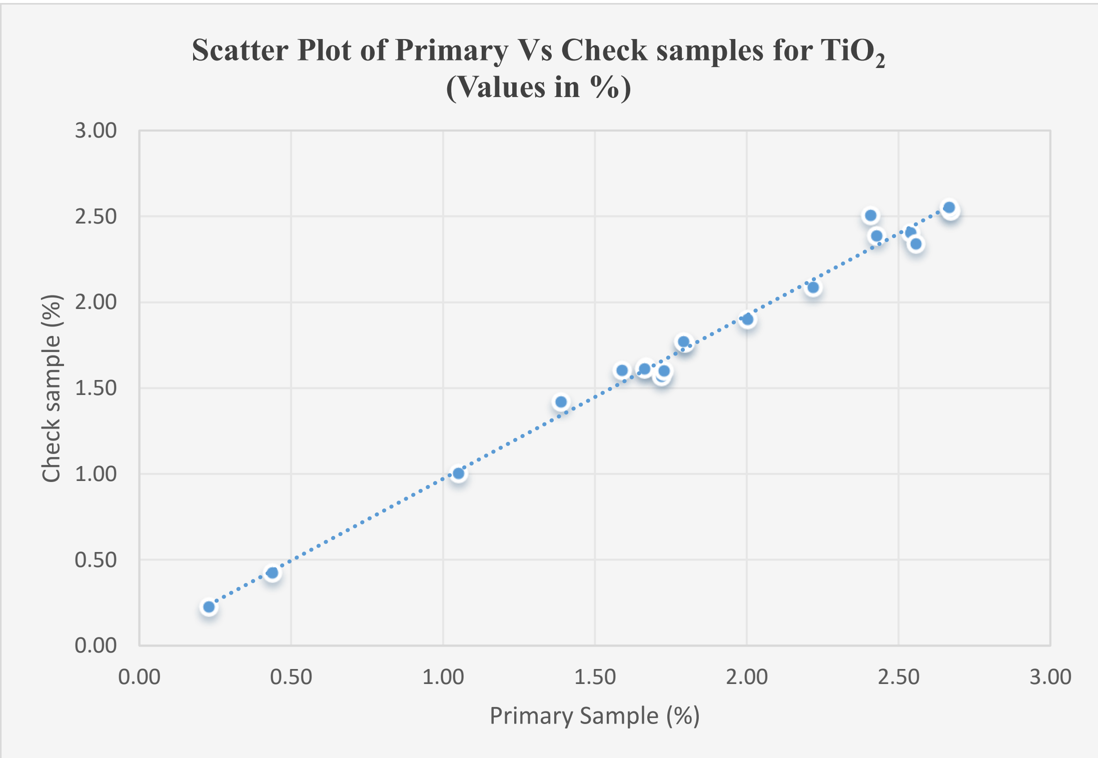

Fig9.26: Scatter Plot of Primary Vs Check samples for TiO_2

Table 9.12: Primary and check samples analysis values of SiO_2

Sl. No	Primary sample	Check sample	10% difference	Difference
1	13.67	14.17	1.3672	-0.50
2	12.65	13.50	1.2651	-0.85
3	14.67	15.61	1.4671	-0.94
4	13.26	13.70	1.3261	-0.44
5	33.09	33.68	3.3093	-0.59
6	28.71	29.36	2.8711	-0.64
7	25.94	26.83	2.5943	-0.89
8	11.07	11.31	1.1068	-0.24
9	23.88	24.24	2.3879	-0.36
10	25.00	25.16	2.4999	-0.16
11	14.16	14.44	1.4157	-0.28
12	32.45	32.66	3.245	-0.21
13	18.52	19.64	1.8523	-1.11
14	37.67	37.59	3.7666	0.07
15	6.63	6.63	0.6626	-0.01
16	65.48	65.88	6.548	-0.40
17	87.70	88.49	8.77	-0.79
18	43.32	43.23	4.332	0.09
19	86.16	86.31	8.616	-0.15

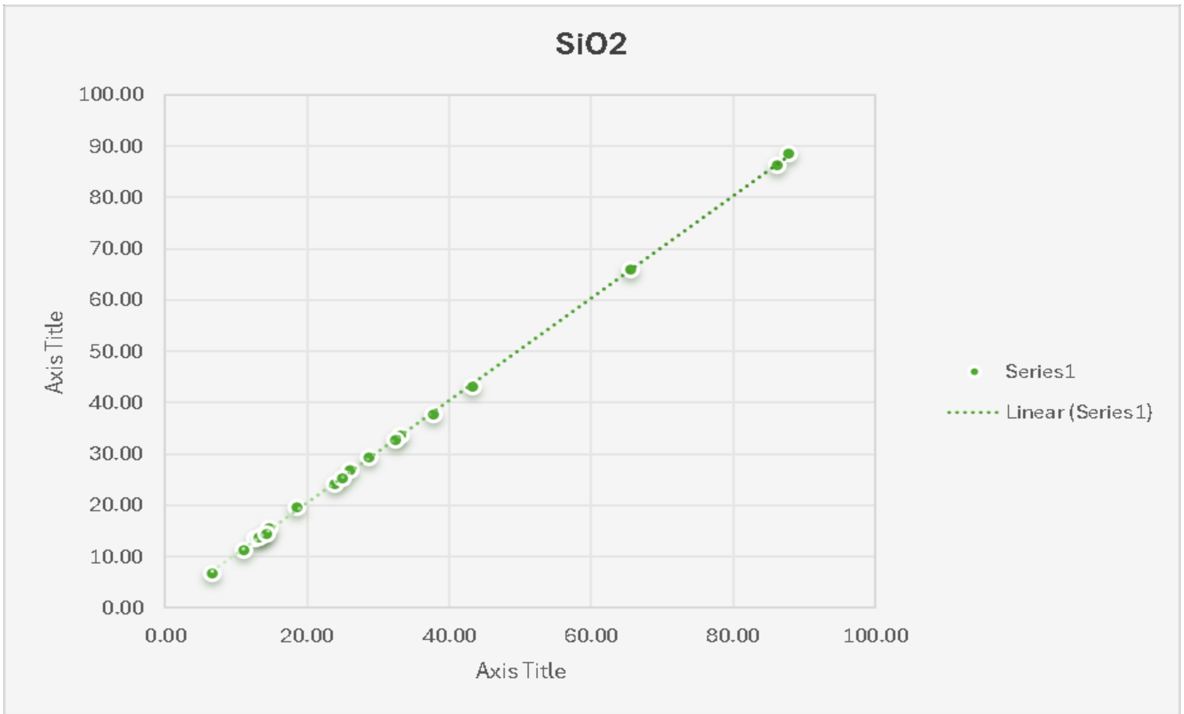

Fig 9.27: primary vs check sample analysis SiO_2

Gallium: when the primary and check sample results are compared, more than 10% deviation is seen. This deviation could be because of the low concentration of gallium and also the samples analysed were composite samples.

Table 9.13: Primary and check sample values of Gallium

Sl.No	Primary Sample	Check Sample	10% difference	Actual Deviation
1	39.70	65.23	3.97	-25.53
2	30.90	60.26	3.09	-29.36
3	32.80	66.79	3.28	-33.99
4	16.70	19.54	1.67	-2.84
5	16.70	19.61	1.67	-2.91
6	33.10	64.15	3.31	-31.05
7	12.30	41.69	1.23	-29.39
8	54.10	66.41	5.41	-12.31
9	19.60	32.28	1.96	-12.68

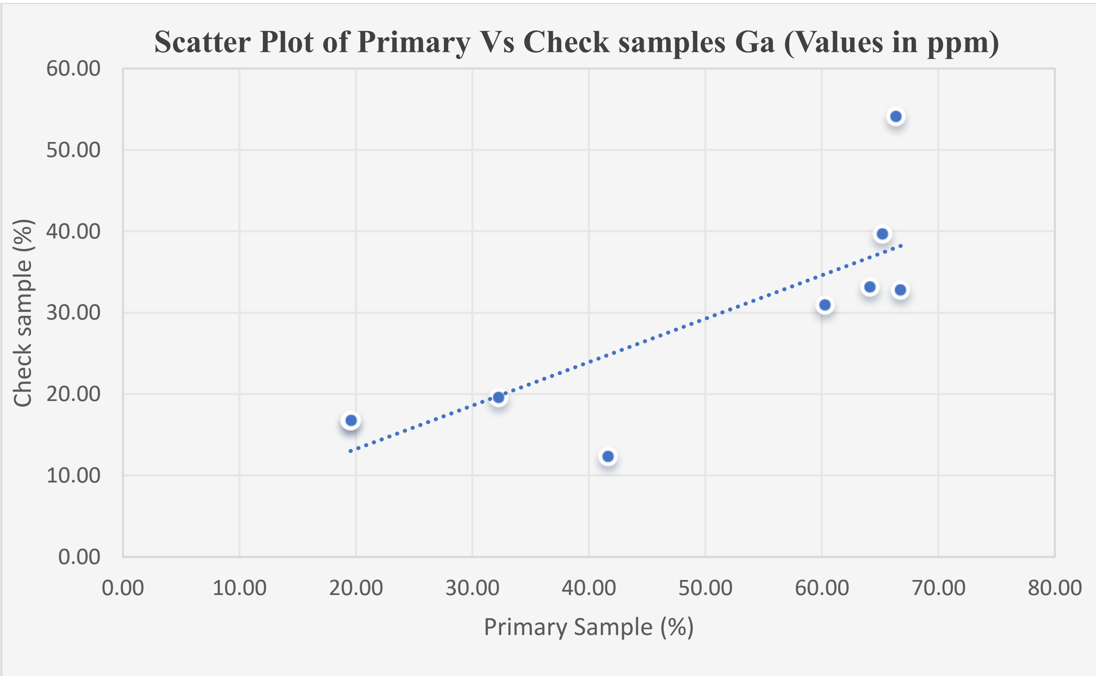

Fig 9.28: Primary vs Check sample analysis of gallium

9.8 Depth of ground water condition

15 boreholes were drilled in the study area, out of which nine boreholes were drilled up to the sand pockets and 6 boreholes were drilled only for 10m. Groundwater wasn’t encountered in any of the drilled boreholes.

10.0 GEOTECHNICAL STUDIES ON BOREHOLE CORE SAMPLES OF MINERSLISED ZONE, HANGING WALL AND FOOTWALL SIDE

Not carried out as it wasn’t a part of approved NQT

11.0 RESOURCE ESTIMATION

11.1 Introduction

The total area of Mundalli block is 4.75 sq. km. The laterite deposit in block occurs as a blanket type crust over the plateau, over an area of 2.10 sq. km. A total of 15 bore holes were drilled on 400X400m grid spacing covering the plateau.

The topographic survey map and Digital Elevation Model created using the survey data reveals that relief is ranging from minimum of 0.39m to maximum of 73.55m. above msl. The minimum depth of bore hole is 10.0m (BH 5, 10,12) and maximum depth of borehole is 26.0 m (BH04). All the boreholes were encountered with ore zone i.e., laterite with patches of clay. The analytical results including, XRF data for 187 no. of samples & ICPOES/MS finish for 83 no. of samples are considered during estimation. which represents all the 15 boreholes are considered for resource estimation. 3d geological modelling and resource estimation was carried out using GEOVIA Surpac 2025 software. Sections were created by considering the borehole litholog and collar data. The solid model for each lithology was created and Final resource estimation was done by block modelling using Inverse Distance Weightage (IDW) method. Based on the IBM cut of the Resource estimation was carried out as different domains.

It is also important to mention here that, regarding the above 1962-63 work carried out by DMG, Karnataka, except for the text report, no other details as to – 1) Geological Map Plate which could have been geo-referenced, 2) the location coordinates of pits and boreholes (auger holes?) are available. In the absence of these details, the analysis results data of the previous work was not used in the present resource estimation exercise.

11.2 Detailed description of ore zones

Classification of ore zones and grade have been fixed according to IBM Year book 2020 for Aluminous laterite and Bauxite (As per Ministry of Mines Notification dated 25th April 2018, the threshold value of bauxite mineral). The classification of different lithologies used for resource estimation with the reference is given in table 11.1

All the boreholes intersected with the ore body viz. aluminous laterite category (ie., >20% of Al_2O_3, Fe_2O_3:Al_2O_3 <1 and SiO_2:Al_2O_3 < 1.33). The run-wise or meter-wise analysis of all lithological domains for major oxides including V_2O_5 and selected composite samples by ICP-MS / OES reported significant values of V_2O_5 and Ga.

For Resource Estimation of V_2O_5 the cut-off grade of above 1000 ppm (0.1%) has been considered. for resource estimation of V_2O_5.

For Resource estimation of Ga, two cut of grades - 30 ppm and 50 ppm were used.

Table 11.1: Resource Domains

Resource Domains	Criteria	Reference
Bauxite	Al_2O_3– 30% (min.) and SiO_2 (Total) –7% (max.)	Ministry of Mines Notification dated 25th April 2018
Aluminous Laterite	Fe_2O_3:Al_2O_3 ratio less than one and SiO_2:Al_2O_3 ratio less than 1.33	Indian Minerals Yearbook 2020 (Part- III: Mineral Reviews) 59th Edition minor minerals 30.14 laterite
Ferruginous Laterite	Fe_2O_3:Al_2O_3 ratio more than one, and SiO_2:Fe_2O_3 ratio less than 1.33	
Aluminous Clayey laterite	Fe_2O_3:Al_2O_3 ratio less than one and SiO_2:Al_2O_3 ratio more than 1.33	
Ferruginous Clayey laterite	Fe_2O_3:Al_2O_3 ratio more than one, and SiO_2:Fe_2O_3 ratio more than 1.33	
Clay	Based on the visual observation	-

11.3 Cut-off grade and minimum stopping width consideration

After the block modelling, the classification of resource domains based on the cut-off criteria is given in the Table 11.1.

Apart from the ore zone vis-à-vis Resource domains, there were some areas with very less or null core recovery due to very loose and weathered zone, which are washed out during the drilling operation. Such portions are marked as slush (Zero% Recovery). Out of 15 boreholes 9 are terminated in the **'Sand',** whose details are given in the Section 9.

Since the resource estimation is carried out in Surpac software with the user block dimension of 100x100x1m and sub block dimension as 25x25x.025m. No additional stopping width is considered.

11.4 Description and correlation of lodes

The entire laterite deposit with all its variation in the Plateau of Mundalli block can be considered as blanket type.

11.5 Preparation of Sections and Level Plans

The Resource estimation was done using GEOVIA Surpac software (3d modelling and resource estimation software). Four sections (Fig. 11.1) are created in E-W direction. The boreholes falling in each section is given in below table.

Table 11.2: LV sections of Mundalli Block

	Section Name	Boreholes	No. of BH
1	Section-1	BH-02, 03, 04 & 05	4
2	Section-2	BH-06, 07, 08, 09 & 10	5
3	Section-3	BH-11, 12, 13 & 14	4
4	Section-4	BH-15 & 16	2
			TOTAL =15

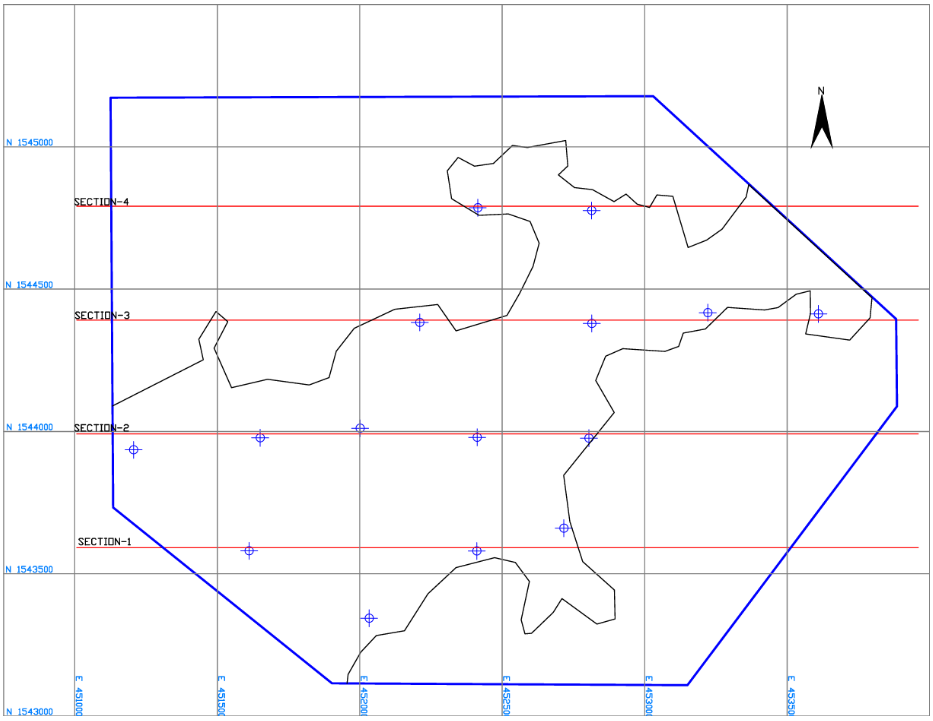

Fig. 11.1 Map showing E-W sections

11.6 Specific gravity/bulk density calculation

A total of 6 samples is subjected to bulk density from Matter Material Lab, Kozhikode. The bulk density of 4 samples different laterite samples ranged from 1.77g/cc to 2.02g/cc; hence an average of 1.915 g/cc for Laterite/Bauxite was used in Resource estimation.

Similarly, the 2 clay samples gave unconsolidated bulk density of 1.1 and 1.2g/cc; hence 1.15 g/cc for Clay samples is considered for the Resource estimation. The details of the bulk density samples are given below

Table 11.3 Bulk density of Laterite

Sl no.	Sample no.	Bulk density (g/cc)	Average Bulk density (g/cc)
1	AL-01 (Aluminous laterite)	1.95	1.915
2	AL-02 (Aluminous laterite)	2.02	
3	AL-03 (Aluminous laterite)	1.77	
4	BX-01 (Bauxite)	1.92	
5	Clay Sample 1	1.1	1.15
6	Clay Sample 2	1.2	

11.7 Assumption for resource estimation

11.7.1 Dimensions of block

3D block modelling and resource estimation is carried out using Surpac software 2025. During the resource estimation, the unit blocks are considered with dimension of 100mx100m size and 1m vertical thickness, since the borehole sampling was done at 400mx400m interval. The unit blocks are further divided in to sub blocks having dimension 25mx25mx0.25m to get full coverage along the block boundary.

11.7.2 Topography

Topographic digital terrain model (DTM) was created using the elevation data collected during topographic survey. The reference for the elevation is mean sea level (msl). As per the topographic survey data, the lowest elevation within the block is 0.39m and the highest elevation is 73.55m with respect to msl. The DTM is considered as one of the constrain during modelling in which, the estimation was done only below the topographic DTM.

11.7.3 Buffer area/Plateau boundary area

The total area of Mundalli block is 4.75 sq. km. A flat-topped plateau is demarcated by topographic survey with an area of 2.10 sq, km. All the 15 boreholes are spaced in 400mx400m grid spacing with in the plateau. Hence the resource estimation is restricted to the plateau itself.

11.7.4 Solid modelling

Out of 15 boreholes 9 bore hole are terminated in the sand horizon whereas all other 6 boreholes closed within the aluminous laterite zone. In that case the thickness of the ore body is considered either till the total depth of borehole (if it terminated with in Aluminous zone) or else till the depth when sand patch encounters. Depth of Boreholes Range from 10.0 m to 24.5 m excluding sand pocket

11.7.5 Distribution of mineralization.

The distribution of mineralization is assumed to be as continues and linear, hence inverse distance weightage (IDW) method was adopted for interpolation.

11.8 Resource estimation methodology

In the initial stage of the modelling, the data base created were Collar, Survey, Assay and Geology in software format. Later, the connectivity of similar lithologies in adjacent boreholes were established by manual digitization in section view. The four sections were drawn in such a way that it can cover entire fifteen boreholes (section 11.5). Once all sections digitization is completed, solid model has been created for each type of lithologies by connecting the similar kind of lithologies in adjacent section. In both ends the solid were extrapolated till 200m (half of grid spacing distance) or till boundary, whichever is closer.

During the block modelling, $1/4^{th}$ of the horizontal grid spacing were used for one block dimension in X & Y direction, whereas vertical dimension is considered as sub sampling range i.e., 1.0m. Using the unit blocks having 100mX100xX1m dimension and sub blocks having 25mX25mX0.25m dimension the entire orebody model has been created. Since the composition variation of laterite in Mundalli block is continuous and linear with some patches of clay, bauxite as well as slush, IDW metho has been adopted for the interpolation. The horizontal radius of influence was given as 600m and 400m for first and second level of interpolation respectively, whereas vertical radius is given as 2.0m & 1.5m for first and second level respectively.

The statistical table as per the database created based on the XRF results of 187 samples are given in table below.

The statistical table as per the block modelling is given below

Table 11.4: Statistics of 3D Modelling

Mineralization zone	**Al_2O_3 (%)**		**Fe_2O_3 (%)**		**SiO_2 (%)**		**TiO_2 (%)**		**V_2O_5 (%)**		**Ga (ppm)**	
	min	**max**	**min**	**max**	**min**	**max**	**min**	**max**	**min**	**max**	**min**	**max**
Bauxite	30.124	40.909	29.644	45.617	3.154	6.890	1.790	2.570	0.09	0.268	40.257	56.849
Aluminous Laterite	25.043	47.167	10.708	34.380	7.007	38.982	1.576	3.055	0.04	0.200	18.114	66.916
Ferruginous Laterite	16.455	34.801	25.700	53.247	3.110	38.622	0.942	2.656	.040	0.292	20.488	58.752
Aluminous Clayey laterite	6.94	31.974	1.465	25.264	33.284	87.855	0.313	2.524	0.04	0.104	8.165	62.523
Ferruginous Clayey laterite	5.358	25.263	6.074	28.974	34.099	85.145	0.322	2.131	0.040	0.146	14.705	60.943
Clay	5.383	32.286	1.465	39.632	17.155	87.855	0.322	2.845	0.040	0.152	8.165	39.777

Table 11.5: Total Resource Estimation

	Volume	Density	Tonnage	Al2o3	Fe2o3	Sio2	Tio2	V2O5	Ga
	(cu. m)	**g/cc**	**MMT**	**%**	**%**	**%**	**%**	**%**	**ppm**
Bauxite	447187.5		0.856	35.674	35.392	4.82	2.122	0.19	47.311
Aluminous Laterite	6471562.5		12.393	31.202	24.669	24.622	2.365	0.087	36.983
Ferruginous Laterite	11295625	1.915	21.631	26.816	34.892	20.563	1.928	0.119	35.113
Aluminous Clayey laterite	4723750		9.046	22.658	15.516	48.497	1.744	0.062	25.764
Ferruginous Clayey laterite	1295468.75		2.481	18.976	22.201	47.071	1.322	0.072	26.139
Clay	2929687.5	1.15	3.369	23.483	18.552	43.948	1.795	0.067	25.273
	Total		**49.7761**						

Table 11.6: Vanadium bearing resource (Gross) with V_2O_5 at Cut-Off 0.1%

	Volume	**TOTAL Resource (MMT)**	**Resource Above 0.1% V2O5 (MMT)**	**AVG grade (%) of V2O5**	**Contained V2O5 (MT)**	**UNFC Resource Category**
Bauxite	447187.5	0.856	0.844	0.191	1615.83	333
Aluminous Laterite	6471562.501	12.393	2.624	0.128	3364.23	
Ferruginous Laterite	11295625	21.631	13.989	0.138	19340.13	
Aluminous Clayey laterite	4723750	9.046	0.103	0.101	104.46	
Ferruginous Clayey laterite	1295468.75	2.481	0.206	0.115	236.86	
Clay	2929687.5	3.369	0.295	0.110	325.47	
	Total	**49.776**	**18.061**	**0.138**	**24986.986**	

Table 11.7: Gross Resource Estimation above Ga at Cut-Off 30ppm & 50ppm

	Ga at 30ppm Cut-Off	**Avg. Ga**	**Ga at 50ppm Cut-Off**	**Avg. Ga**	**UNFC Resource Category**
	MMT	ppm	**MMT**	**ppm**	
Bauxite	0.844	38.445	0.262	53.657	334*
Aluminous Laterite	2.586		0.452		
Ferruginous Laterite	13.556		0.343		
Aluminous Clayey laterite	0.103		0.000		
Ferruginous Clayey laterite	0.206		0.024		
Clay	0.204		0.000		
Total	**17.499**		**1.081**		

* The Ga Resource has been categorized as 334 because the samples used for Ga and other elements analysis using ICP-MS were composite samples and not detailed run-wise or meter-wise samples.

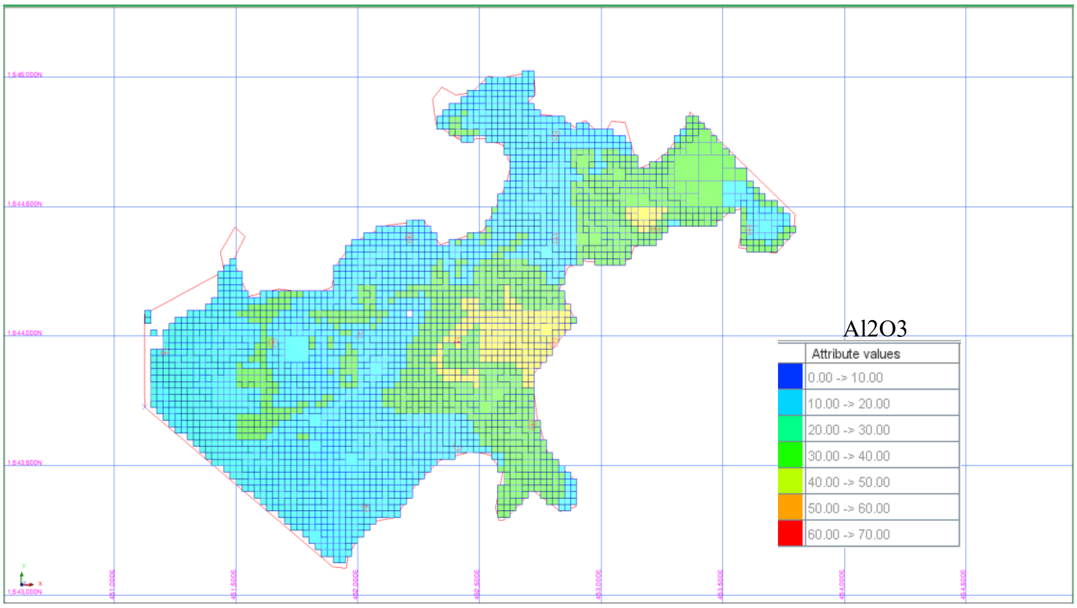

Fig.11.2: Top View of Block model in Surpac with Mineralization.

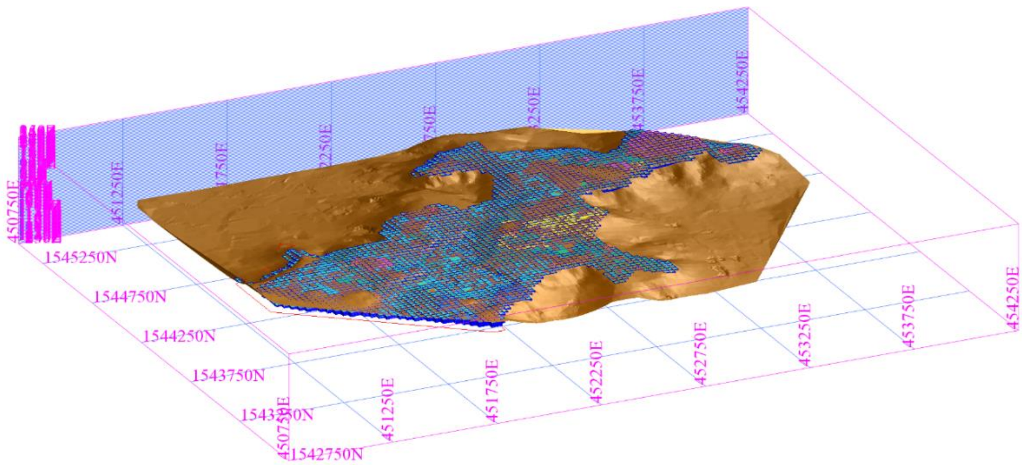

Fig 11.3: 3D view of the block model in Surpac with Digital Elevation Model (DEM)

In addition to the Block Modelling of the ore body, 10 slice plans of 1m each below the surface DEM were created to visualize the distribution of different Resource / Litho-Domains, V2O5 and Ga. The 10 slice plans are given in Annexure – 10. This exercise reveals that the accumulation of V2O5 in various resource domains decreases with depth. But the accumulation of Ga is seen to be more or less persistent with the depths in these slices. However, it may be noted that uniform distribution of Ga may also be due to the fact that composite samples were used for Ga analysis with ICP-MS while in the case of V2O5, meter-wise and run-wise samples were used for V2O5 analysis with XRF. Therefore, we are of the opinion that for a more realistic visualization of Ga over different Resource / Litho-domains and over depth, a more detailed sampling procedure needs to be adopted in the next stage of exploration. Therefore, the estimated Resource for Ga has been categorized as 334.

Implications of Reduced Core Recovery on Resource Estimation

In general, a reduced core recovery during a diamond core drilling operation will affect the resource estimation in the following aspects:

Implications of Poor Core Recovery:

1. Biased Grade Estimates: If the lost core material has a higher grade than the recovered material, it leads to an underestimation of the ore zone's grade and thickness. Conversely, if the lost material is lower grade, the ore zone might be overestimated.

- In Mundalli Project, the ore body is Aluminous Laterite which is defined as all laterite with Al_2O_3>20%, SiO_2/Al_2O_3<1.33.
- Given the above definition, the grade of the recovered core does not vary much from the grade of non-recovered portion of the core within a run of 1.5m.
- Therefore, any bias in the Grade differences is minimal to non-existent at the present scale of investigation.

2. Inaccurate Bulk Density: Bulk density can be affected by core loss. If density is measured on the recovered core, an assumption is made about no change in density for the lost core.

- In Mundalli Project, sample pieces of solid cores drawn from different boreholes were sent to the laboratory for bulk density determinations.
  - For the two clay samples, the values obtained were 1.1 g/cc and 1.2g/cc.
  - For the 4 laterite samples, the values obtained were 1.77g/cc, 1.92g/cc, 1.95g/cc and 2.02g/cc.
  - Therefore, for laterites, we considered the average of bulk densities of 4 determinations – 1.915g/cc for resource estimation.
  - Likewise, for clay, average of 2 determinations - 1.15g/cc, as representative Bulk density was used for resource estimation calculations.

3. Unreliable Ore Body Model: Poor recovery makes it difficult to recognize changes in grade and accurately define the boundaries of the ore body, directly impacting the reliability of the resource estimate.

- In Mundalli Project, since the entire laterite crust is an ore body; boundary between Aluminous Laterite and Ferruginous Laterite is not a sharp contact but a continuous transition from one to another. In fact, this nature is inherent to laterite deposits.
- In this project, resource model and resource estimation is carried out using the Surpac software (GEOVIA Surpac 2025).
- Unlike the other resource estimations usually employed graphical methods like Cross-section Method, LV section Method, Slice Plan Method or irregular polygon method which use two-dimensional interpolation of data, The Surpac software uses multi-dimensional interpolation for each data point.

Thus, it is seen that any core loss in the present study did not result in a “grade-loss” significantly. Therefore, it can be confidently stated that the resource model and resource estimate being done in this report is realistic for the scale of investigation (G3) carried out. To account for the core loss vis-à-vis volume loss and any other geological uncertainties make a conservative resource statement, reduction factors of 15% and 30% have been considered to account for reduced core recovery. The reduced resource estimate is given in the table below. The 30% reduction estimation is the most conservative estimate based on the core recovery achieved (70% core recovery). The 15% reduction estimation was taken as a mid-point.

Table 11.8: Gross and Net resource estimation

	Gross Resource	Net Resource	
Mineralization zone	Tonnage	By considering 15% reduction factor	By considering 30% reduction factor
	MMT	**MMT**	**MMT**
Bauxite	0.856	0.728	0.599
Aluminous Laterite	12.393	10.534	8.675
Ferruginous Laterite	21.631	18.386	15.142
Aluminous Clayey laterite	9.046	7.689	6.332
Ferruginous Clayey laterite	2.481	2.109	1.737
Clay	3.369	2.864	2.358
	49.776	**42.310**	**34.843**

11.9 Category of resources as per MEMC 2015 along with UNFC Classification

The resource estimation was carried out based on the XRF analysis for 187 samples, which represent the entire orebody in horizontal and vertical extend. Surpac 2025, software is used for the resource estimation. The work carried out is as per UNFC classification under G-3 stage of geological axis and the resource comes under category 333 (For Aluminous laterite and V2O5) and under 334 (For Gallium) category is also calculated.

12.0 CORE PRESERVATION

The extracted drilled cores were placed in galvanized aluminium core boxes. The cores were arranged in book pattern and directions were marked; by putting an arrow mark from top left to bottom right; indicating the top and bottom directions of the core. Run separators (Gutkhas) were placed in between the two runs by marking the end meterage on them. Whenever there was no recovery then two gutkhas were placed marking the run meterage. The run number, from & to meterage and the recovery percentage is recorded in the form of a table along with the borehole number and box number on the inside part of the lid. Complete title of the project along with toposheet number, borehole number and box number is written on the top surface of the core boxes. The sides of the core boxes are marked with the borehole number and box number.

Before the core was taken out for sampling, each core box has been photographed, borehole wise and box-wise photographs are arranged and presented in Annexure No. 8

After core splitting and sampling, the remaining portion of the cores was returned to the core box and returned to their original positions in each core box.

Fig 12.1: Preservation of the cores obtained from BH-09, Box-01

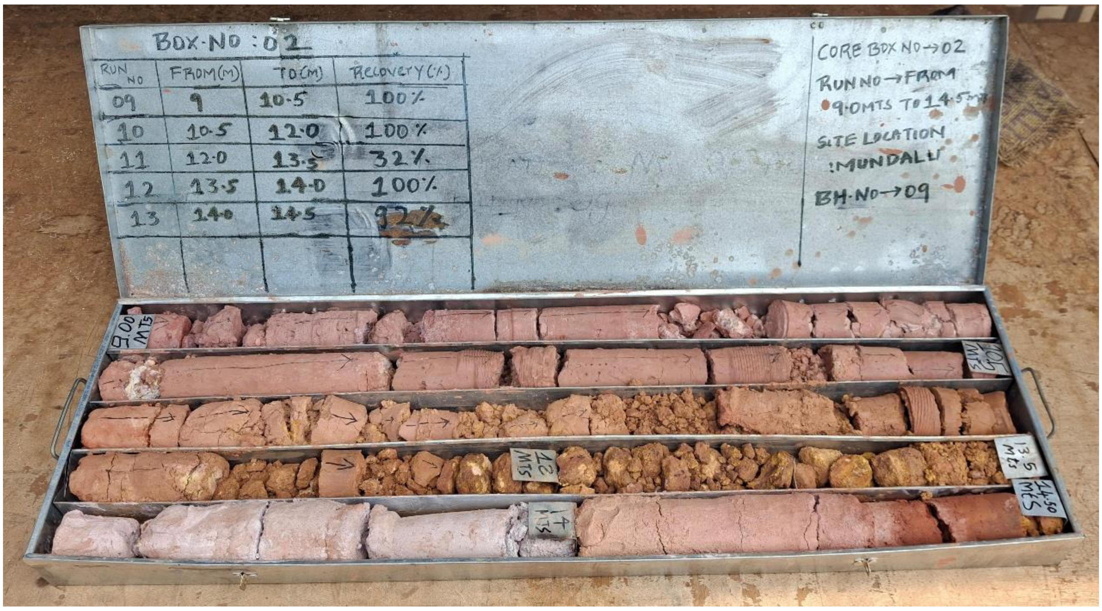

Fig 12.2: Preservation of the cores obtained from BH-09, Box-02

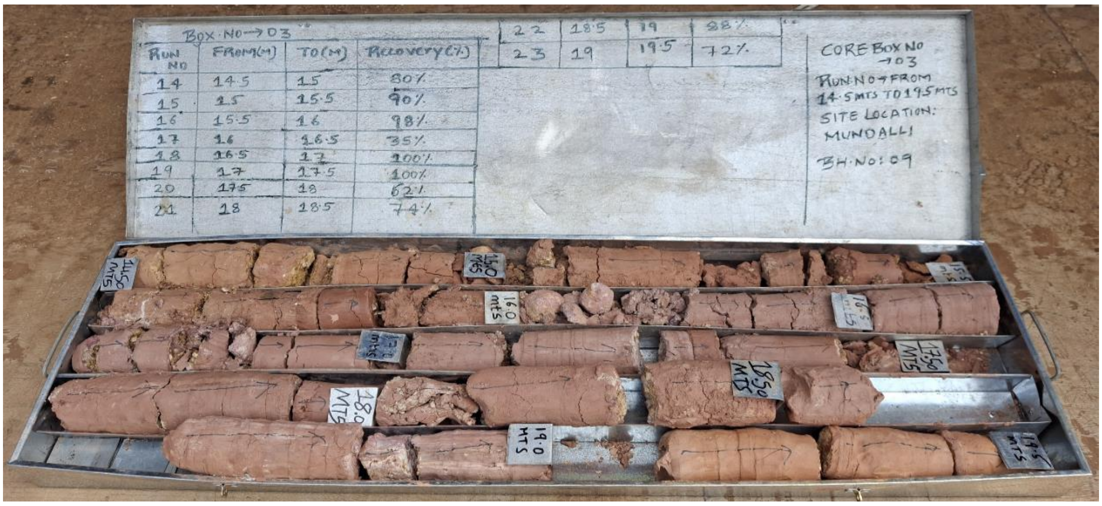

Fig 12.3: Preservation of the cores obtained from BH-09, Box-03

Fig 12.4: Preservation of the cores obtained from BH-09, Box-04

13.0 CONCLUSION AND RECOMMENDATIONS

13.1 Conclusion

Detailed topographical and geological mapping carried out on a scale of 1:4000; reveals that the Mundalli plateau is completely made up of dark brownish black colour laterite.

Fifteen boreholes were planned and drilled on a 400mX 400m grid, out of these 15 boreholes, in 9 boreholes, sand pockets were encountered and drilling could not be continued further. Hence no borehole was drilled up to the bed rock. Remaining 06 borehole were drilled only up to 10-11mts.

A total of 257 m core drilling was completed spanning 15 boreholes and 148m out of 257 meters were by dry drilling, in order to achieve maximum core recovery. The obtained cores were broadly grouped into the lithocodes as Laterite & Lateritic soil, Clay & Lateritic clay, Clayey soil, Clayey Laterite, Slush & sand, Soil.

Run wise and lithocode wise sampling was done and the analysis of major oxides and LOI was done by XRF for 187 samples. Analysis of Minor trace element and REE were carried out by ICPMS for 83 samples.

The obtained analysis results were classified using Gazette Notification of Ministry of Mines on threshold for bauxite and IBM classification of laterites resulted in 05 samples of bauxite, samples of aluminous laterite, 77 samples of ferruginous laterite, 12 samples of aluminous clayey laterite, 05 samples of ferruginous clayey laterite; and 39 samples were grouped as clay, based on visually observable clay characteristics.

The weighted average of major oxides in bauxite from all boreholes shows Al_2O_3 is ranging from 35.21%-40.48% with an average of 38.16%. Fe_2O_3 ranges from 26.86%-34.49%. SiO_2 ranges from 5.01%-6.49%, the V_2O_5 varies from 0.06%-0.17% with an average value of 0.13% and TiO_2 ranges from 2.23-2.92.

The weighted average of major oxides in aluminous laterite from all boreholes shows Al_2O_3 is ranging from 28.33%-44.24% with an average of 33.57%. Fe_2O_3 ranges from 3.53%-32.06%. SiO_2 ranges from 13.26%-34.60%, the V_2O_5 varies from 0.04%-0.12% with and TiO2 ranges from 1.42%-2.98%.

The weighted average of major oxides in ferruginous laterite from all boreholes shows Al_2O_3 is ranging from 21.18%-29.54% with an average of 25.75%. Fe_2O_3 ranges from 29.32%-44.07%. SiO_2 ranges from 12.89%-34.70%, the V_2O_5 varies from 0.03%-0.19% with and TiO_2 ranges from 1.12%-2.46%.

The weighted average of major oxides in clayey laterite from all boreholes Al2O3 is ranging from 03.40%-22.66% with an average of 13.25%. Fe2O3 ranges from 0.45%-13.31%. SiO2 ranges from 64.99%-88.87%, the V_2O_5 varies from <0.05%-0.03% with and TiO2 ranges from 0.21%-1.56%.

The Minor, Trace and REE analysis were carried for 83 selected primary samples, where the main objective was to understand the concentration of Gallium and all other Minor, Trace and Rare Earth Elements which may be present in these laterites.

The analyzed samples show gallium values ranging from 6.90ppm -70.70ppm. Other than Gallium, all other Minor and Trace Elements such as Cu, Ni, Pb, Sr, Zn, Zr, Li, Be, B, Sc, Co, Ga, Ge, Sc, Rb, Y, Nb, Mo, Cd, In, Sn, Sb, Te, Cs, Hf, Ta, W, Tl, Bi, Th, U and REEs - La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, returned very low values closer to their crustal abundances values. Therefore, no further analysis of remaining samples was done. The analysis of Minor, trace and REE is given in Annexure (5b)

Resource was estimated using Geovia Surpac 2025, at G3 level (333) for Bauxite, Aluminous laterite, Ferruginous laterite, Aluminous clayey laterite, Ferruginous clayey laterite. Net resource was calculated by applying 15% and 30% reduction factor respectively (data is shown in the table below). The 30% reduction estimation is the most conservative estimate based on the core recovery achieved (70% core recovery). The 15% reduction estimation was taken as a mid-point.

	Gross Resource	Net Resource	
Mineralization zone	Tonnage	By considering 15% reduction factor	By considering 30% reduction factor
	MMT	**MMT**	**MMT**
Bauxite	0.856	0.728	0.599
Aluminous Laterite	12.393	10.534	8.675
Ferruginous Laterite	21.631	18.386	15.142
Aluminous Clayey laterite	9.046	7.689	6.332
Ferruginous Clayey laterite	2.481	2.109	1.737
Clay	3.369	2.864	2.358
	49.776	**42.310**	**34.843**

Resource for Vanadium (V_2O_5) was calculated on a G3 level (UNFC code:333) and 18.061 MMT is estimated by considering 0.1% V2O5 as cutoff grade.

Resource for Gallium (Ga) was calculated on a G4 level (UNFC code:334) and 17.499 MMT of Ga is estimated at 30ppm cutoff and 1.081MMT is estimated by considering Ga cut off at 50ppm and above.

13.2 RECOMMENDATIONS

Mundalli plateau is enriched with Bauxite, Aluminous laterites, Ferruginous laterites, Aluminous clayey laterites, Ferruginous clayey laterites, Vanadium and significant Gallium concentrations.
The estimated Resources of different types of Laterites and V2O5 have been categorized under UNFC 333. However estimated Resources of Ga which is similarly present in all resource domains, has been categorized as 334 because the samples analyzed were composite samples from each borehole and not run-wise or meter-wise samples as in the case of laterites and V2O5. Therefore, we are of the opinion that for a more realistic estimation of Ga over different Resource / Litho-domains and over depth, a more detailed sampling procedure needs to be adopted in the next stage of exploration.

The present study has brought out the presence of V2O5 and Ga, apart from different laterite variations.

- Vanadium and Gallium are classified as Critical Elements by the Government of India.
- Therefore, any reported Resources which contain V2O5 and Ga need to be explored in detail and a robust Resource Estimation, Reserve Calculation, along with possible beneficiation and extraction studies is the need of the hour.
- Therefore, this block can be considered for a G2 level exploration for the Critical Elements Vanadium and Gallium along with commodities such as Bauxite, Aluminous laterites, Ferruginous laterites, Aluminous clayey laterites, Ferruginous clayey laterites, for better monetization of the resource potential in subsequent auction process.

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https://uttarakannada.nic.in/en/about-district-2/

15.0 LOCALITY INDEX

Place name	LATITUDE (DD MM SS)	LONGITUDE (DD MM SS)
Bhatkal	14 00 00	74 32 27
Mundalli	13 58 38	74 32 51
Hadin Eco Beach	13 57 13	73 32 57
Purvarga	13 58 33	74 34 04
Chavathani	13 57 46	74 33 26
Sarpankatte	13 57 48	74 34 35

List of Annexures

Sl. No	Annexure
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02b	**Topographic Map of Mundalli Block in true scale**
03	**Geological Map of Mundalli Block in true scale**
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05	**Borehole Log sheets**
06a	**Borehole wise sample ID with Depth for XRF analysis**
06b	**List of Samples for ICP-MS/OES**
07a	**Borehole wise XRF analysis result**
07b	**Borehole wise ICPMS analysis result**
08	**Core Box Photos**
09	**Borehole log (Visual observation and analysed data)**
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ANNEXURE-1

Boundary Co-ordinates of Mundalli block

Annexure-1: Boundary Co-ordinates of Mundalli Block

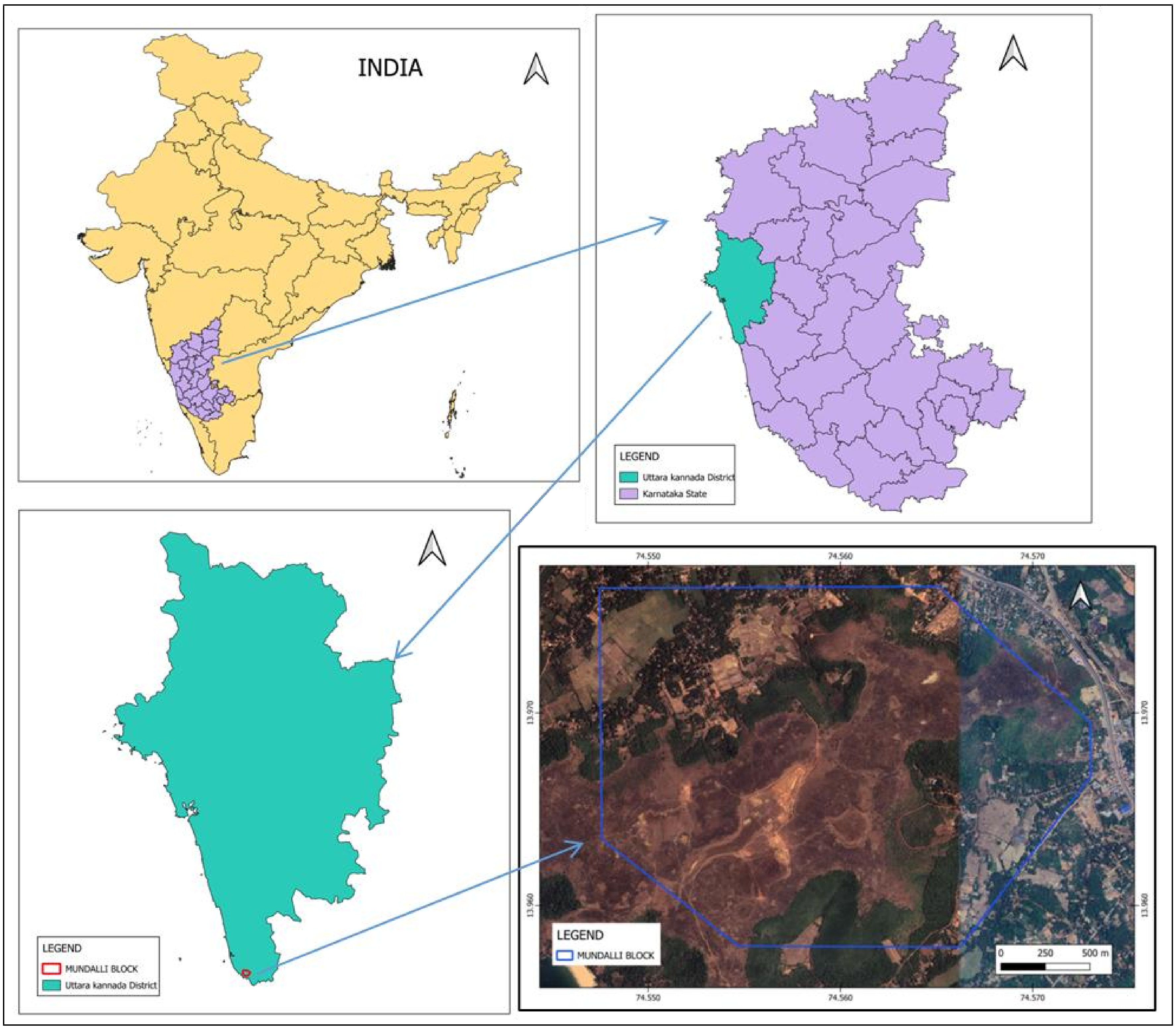
Boundary Point	Latitude (DD)	Longitude (DD)
1	13.9579	74.5547
2	13.95786	74.56625
3	13.96673	74.57304
4	13.9695	74.57301
5	13.97657	74.5651
6	13.97649	74.54747
7	13.96347	74.54758

ANNEXURE-2a

Location Map of Mundalli Block

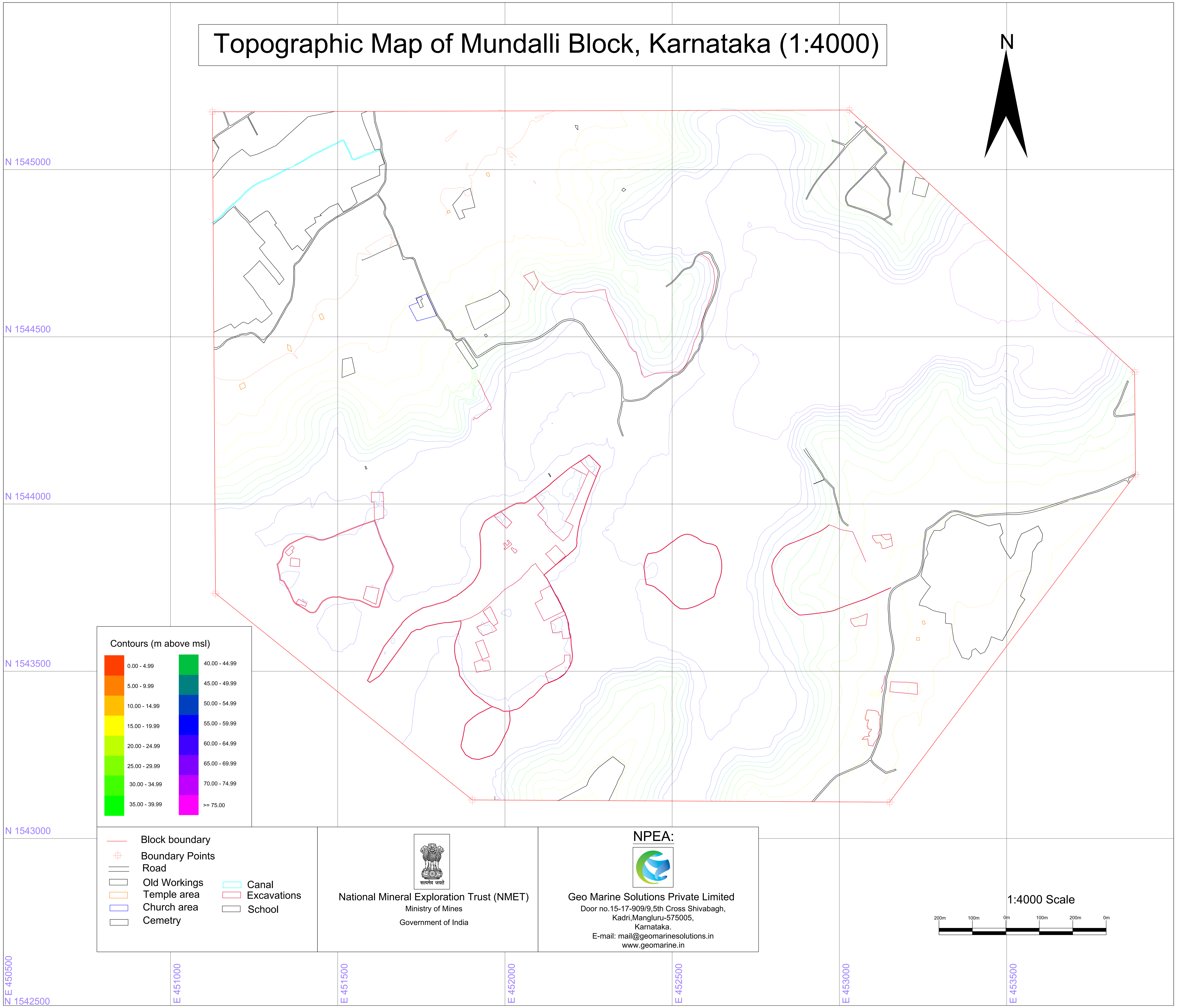
Annexure - 2a

Location map of the Mundalli Block



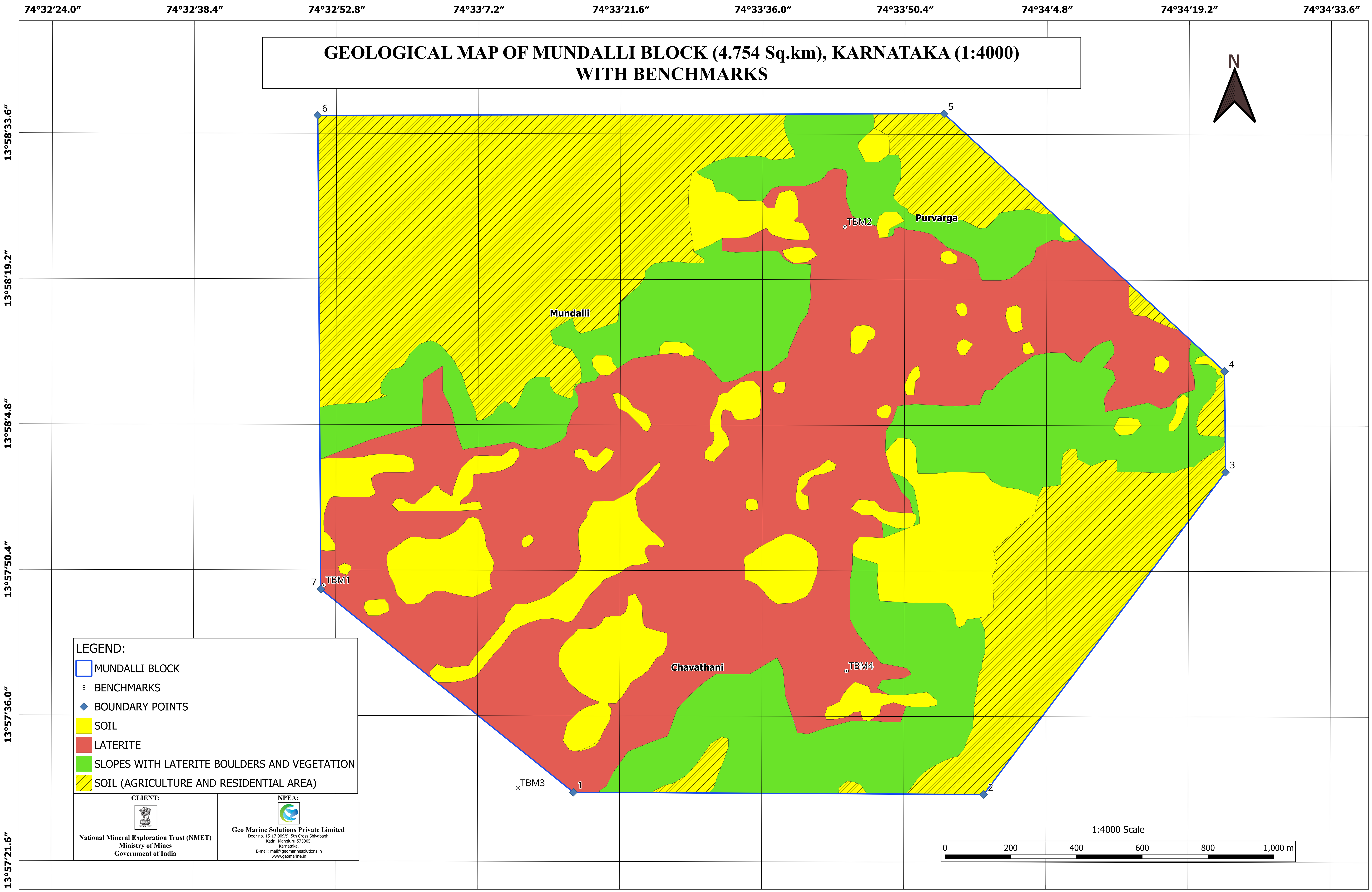
ANNEXURE-2b

Topographic map of Mundalli block, Karnataka (1:4000)


Topographic Map of Mundalli Block, Karnataka (1:4000)
N
N 1545000
N 1544500
N 1544000
N 1543500
N 1543000
N 1542500
E 450500
E 451000
E 451500
E 452000
E 452500
E 453000
E 453500
Contours (m above msl)
0.00 - 4.99
5.00 - 9.99
10.00 - 14.99
15.00 - 19.99
20.00 - 24.99
25.00 - 29.99
30.00 - 34.99
35.00 - 39.99
40.00 - 44.99
45.00 - 49.99
50.00 - 54.99
55.00 - 59.99
60.00 - 64.99
65.00 - 69.99
70.00 - 74.99
>= 75.00
Block boundary
Boundary Points
Road
Old Workings
Temple area
Church area
Cemetry
Canal
Excavations
School
National Mineral Exploration Trust (NMET)
Ministry of Mines
Government of India
NPEA:
Geo Marine Solutions Private Limited
Door no.15-17-909/9,5th Cross Shivabagh,
Kadri,Mangluru-575005,
Karnataka.
E-mail: mail@geomarinesolutions.in
www.geomarine.in
1:4000 Scale
200m
100m
0m
100m
200m
0m

ANNEXURE-3

Geological Map of Mundalli block, Karnataka (1:4000)


GEOLOGICAL MAP OF MUNDALLI BLOCK (4.754 Sq.km), KARNATAKA (1:4000)
WITH BENCHMARKS
N
74°32′24.0″
74°32′38.4″
74°32′52.8″
74°33′7.2″
74°33′21.6″
74°33′36.0″
74°33′50.4″
74°34′4.8″
74°34′19.2″
74°34′33.6″
13°58′33.6″
13°58′19.2″
13°58′4.8″
13°57′50.4″
13°57′36.0″
13°57′21.6″
Mundalli
Purvarga
Chavathani
TBM1
TBM2
TBM3
TBM4
1
2
3
4
5
6
7
LEGEND:
MUNDALLI BLOCK
BENCHMARKS
BOUNDARY POINTS
SOIL
LATERITE
SLOPES WITH LATERITE BOULDERS AND VEGETATION
SOIL (AGRICULTURE AND RESIDENTIAL AREA)
CLIENT:
सत्यमेव जयते
National Mineral Exploration Trust (NMET)
Ministry of Mines
Government of India
NPEA:
Geo Marine Solutions Private Limited
Door no. 15-17-909/9, 5th Cross Shivabagh,
Kadri, Mangluru-575005,
Karnataka.
E-mail: mail@geomarinesolutions.in
www.geomarine.in
1:4000 Scale
0
200
400
600
800
1,000 m

ANNEXURE-4a

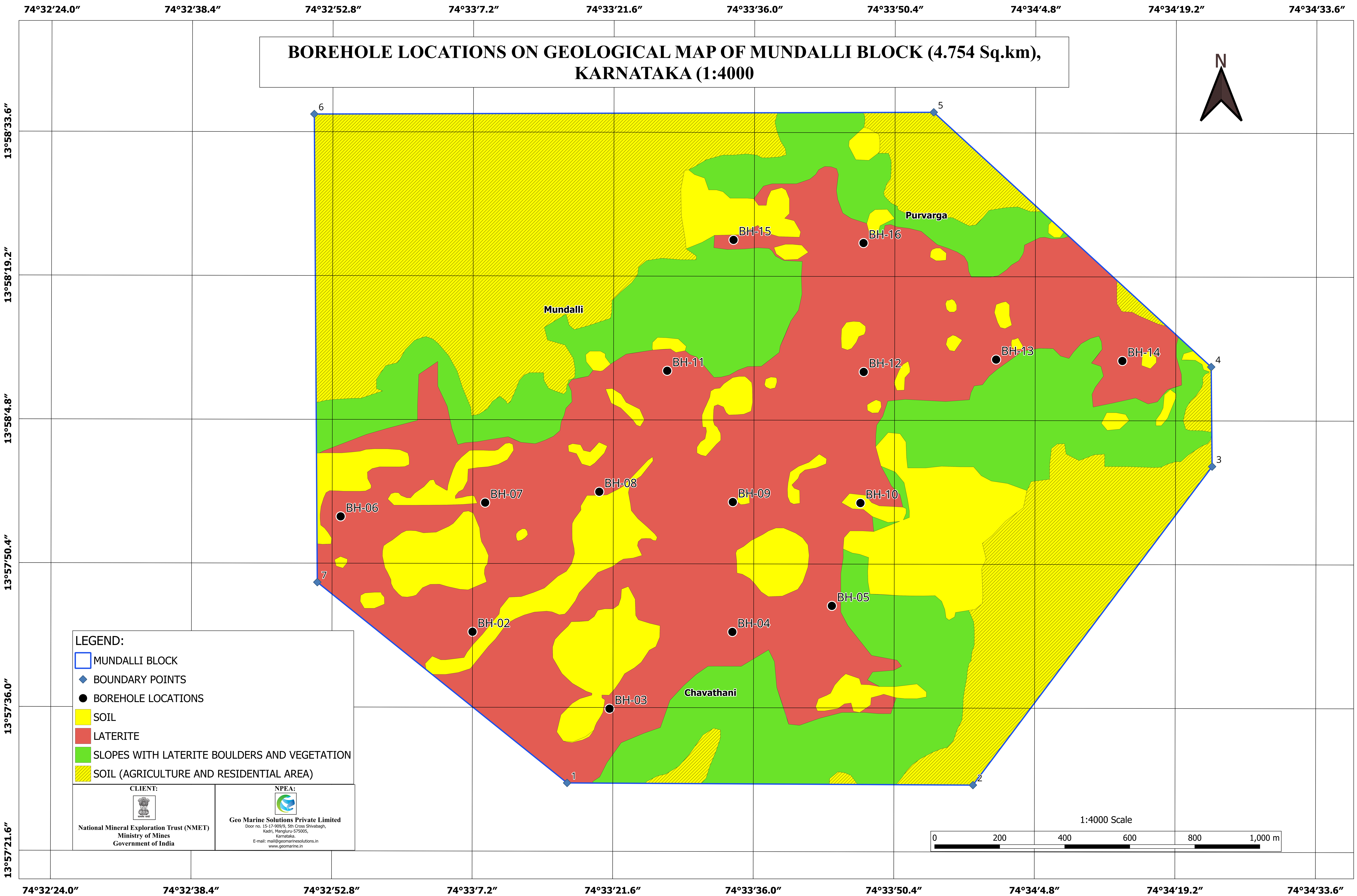
Borehole Coordinates with Collar RL, Mundalli Block

Annexure-4a: Borehole Coordinates with Collar RL, Depth and Dates in Mundalli Block

#	BH NO.	COLLAR RL (m)	Latitude	Longitude	Date of Commencement	Date of Completion	Total Depth (m)
1	BH-02	51.48	13°57’43.55836”	74°33’07.19927”	25/04/2025	26/04/2025	17.00
2	BH-03	58.66	13°57’35.87922”	74°33’21.24903”	29/04/2025	30/04/2025	23.50
3	BH-04	59.62	13°57’43.58857”	74°33’33.82298”	1/05/2025	4/05/2025	26.00
4	BH-05	62.98	13°57’46.21468”	74°33’44.01300”	28/05/2025	29/05/2025	10.00
5	BH-06	54.53	13°57’55.08379”	74°32’53.66792”	6/05/2025	8/05/2025	18.50
6	BH-07	57.29	13°57’56.48826”	74°33’08.47102”	7/06/2025	8/06/2025	11.00
7	BH-08	53.32	13°57’57.59894”	74°33’20.16157”	24/04/2025	24/04/2025	15.00
8	BH-09	61.51	13°57’56.59388”	74°33’33.84523”	14/04/2025	18/04/2025	24.50
9	BH-10	64.53	13°57’56.51608”	74°33’46.92016”	31/05/2025	1/06/2025	10.00
10	BH-11	61.19	13°58’09.72604”	74°33’27.09909”	19/04/2025	23/04/2025	18.50
11	BH-12	66.24	13°58’09.64395”	74°33’47.23082”	2/06/2025	3/06/2025	10.00
12	BH-13	67.67	13°58’10.90426”	74°34’00.79694”	15/05/2025	17/05/2025	21.50
13	BH-14	68.59	13°58’10.78787”	74°34’13.73055”	11/05/2025	14/05/2025	24.00
14	BH-15	56.46	13°58’22.84171”	74°33’33.86816”	5/06/2025	6/06/2025	10.50
15	BH-16	65.75	13°58’22.54835”	74°33’47.18620”	9/05/2025	10/05/2025	17.00

ANNEXURE-4b

Borehole Location Map on Geological Map (1:4000), Mundalli Block


BOREHOLE LOCATIONS ON GEOLOGICAL MAP OF MUNDALLI BLOCK (4.754 Sq.km), KARNATAKA (1:4000
N
74°32'24.0"
74°32'38.4"
74°32'52.8"
74°33'7.2"
74°33'21.6"
74°33'36.0"
74°33'50.4"
74°34'4.8"
74°34'19.2"
74°34'33.6"
13°58'33.6"
13°58'19.2"
13°58'4.8"
13°57'50.4"
13°57'36.0"
13°57'21.6"
1
2
3
4
5
6
7
Mundalli
Purvarga
Chavathani
BH-02
BH-03
BH-04
BH-05
BH-06
BH-07
BH-08
BH-09
BH-10
BH-11
BH-12
BH-13
BH-14
BH-15
BH-16
LEGEND:
MUNDALLI BLOCK
BOUNDARY POINTS
BOREHOLE LOCATIONS
SOIL
LATERITE
SLOPES WITH LATERITE BOULDERS AND VEGETATION
SOIL (AGRICULTURE AND RESIDENTIAL AREA)
CLIENT:
National Mineral Exploration Trust (NMET)
Ministry of Mines
Government of India
NPEA:
Geo Marine Solutions Private Limited
1:4000 Scale
0
200
400
600
800
1,000 m

ANNEXURE-5

Borehole Core log (15No.s)

Annexure-5: Borehole Core log

Block	Mundalli Block	**Location- Village**	**Mundalli**
Bore Hole ID	BH-02	**S.O.I. Toposheet**	**48K/09**
Azimuth	NA	**Latitude**	13°57′43.55836″
Inclination	NA	**longitude**	74°33′07.19927″
RL-Collar	51.478 m	**Date of Commencement**	25/04/2025
Total depth of BH	17 m	**Date of Completion**	26/04/2025

Sl. No	Bore Hole	Run (in Meters)		Run Length (m)	True Length (m)	Recovery Length (m)	Recovery in %	Lithocode	Lithology	Box No.
		From	To							
1	BH-02	0.00	0.50	0.50	0.50	0.47	**94**	**Lateritic soil**	Brown soil at the beginning then Red Lateritic Soil with some weathered laterite	1
2	BH-02	0.50	1.00	0.50	1.00	0.5	**100**	**Lateritic soil**	Red soil and weathered Laterite rock fragments or cobbles	1
3	BH-02	1.00	1.50	0.50	1.50	0.29	**58**	**Laterite**	Ferruginous Laterite moderate weathering	1
4	BH-02	1.50	2.50	1.00	2.50	0.34	**34**	**Laterite**	Ferruginous Laterite moderate weathering	1
5	BH-02	2.50	3.00	0.50	3.00	0.5	**100**	**Lateritic soil**	Red soil and Laterite pebbles and cobbles	1
6	BH-02	3.00	3.50	0.50	3.50	0.5	**100**	**Clayey Soil**	Soil and Clay, more of soil material	1
7	BH-02	3.50	4.00	0.50	4.00	0.5	**100**	**Lateritic soil**	Soil and Clay with some laterite rock fragments	1
8	BH-02	4.00	4.50	0.50	4.50	0.4	**80**	**Lateritic soil**	Laterite Rock fragments (Pebbles and Cobbles) and soil with	1
9	BH-02	4.50	5.00	0.50	5.00	0.5	**100**	**Clayey Soil**	Soil in the from 4.50 m and Clay in the end 5.00 m	1
10	BH-02	5.00	5.50	0.50	5.50	0.4	**80**	**Clay**	Yellowish white clay and with red clay patches	1
11	BH-02	5.50	6.00	0.50	6.00	0.44	**86**	**Clayey Soil**	Soil with Clay	2
12	BH-02	6.00	6.50	0.50	6.50	0.08	**16**	**Clay**	Sub solid (Slurry or Paste like) and Red clay	2
13	BH-02	6.50	7.00	0.50	7.00	0	**0**	**Slush**	Sub Solid Clay (Paste Like) Red in colour	2
14	BH-02	7.00	7.50	0.50	7.50	0	**0**	**Slush**	Sub Solid Clay (Paste Like) Red in colour	2
15	BH-02	7.50	8.00	0.50	8.00	0	**0**	**Slush**	Sub Solid Clay (Paste Like) Red in colour	2
16	BH-02	8.00	8.50	0.50	8.50	0.36	**72**	**Clay**	Clay with Silica or secondary Quartz	2
17	BH-02	8.50	9.00	0.50	9.00	0.46	**92**	**Clay**	Yellowish and Red Clay material	2
18	BH-02	9.00	9.50	0.50	9.50	0.42	**84**	**Clay**	Yellowish and Red Clay material	2
19	BH-02	9.50	10.00	0.50	10.00	0.39	**78**	**Laterite**	Highly weathered Aluminous Laterite	2
20	BH-02	10.00	10.50	0.50	10.50	0.37	**74**	**Clayey Laterite**	Yellowish and white mix Clay with Laterite rock fragment in it	3
21	BH-02	10.50	11.50	1.00	11.50	0.82	**82**	**Clayey Laterite**	Bands of Yellowish white and Red colour Clay with the Laterite rock fragments or cobbles	3
22	BH-02	11.50	12.00	0.50	12.00	0.5	**100**	**Clayey Laterite**	White and Purple Colour Clay with some Laterite cobbles or rock fragments in it and also Limonatised yellowish clay near 12.00 m end	3
23	BH-02	12.00	12.50	0.50	12.50	0.4	**80**	**Clay**	Mixed Colous Clay (Yellowish White and also Purple Clay) and with few Red Clay patches, highly weathered	3
24	BH-02	12.50	13.00	0.50	13.00	0.39	**76**	**Clayey Laterite**	Mixed Clay (Yellowish white and Purple) with some Laterite rock fragments, Highly weathered.	3
25	BH-02	13.00	15.00	2.00	15.00	0.3	**15**	**Slush**	Slush or Paste like Red Clay material and with Silica in the 15.00m end	3
26	BH-02	15.00	17.00	2.00	17.00	0	**0**	**Sand**	Sand Pocket	3

Block	Mundalli Block	**Location- Village**	**Mundalli**
Bore Hole ID	BH-03	**S.O.I. Toposheet**	**48K/09**
Azimuth	NA	**Latitude**	13°57′35.87922″
Inclination	NA	**longitude**	74°33′21.24903″
RL-Collar	58.66 m	**Date of Commencement**	29/04/2025
Total depth of BH	23.5 m	**Date of Completion**	30/04/2025

Sl. No	Bore Hole	Run (in Meters)		Run Length (m)	True Length (m)	Recovery Length (m)	Recovery in %	Lithocode	Lithology	Box No.
		From	To							
1	BH-03	0.00	0.50	0.50	0.50	0.37	**74**	**Laterite**	Ferrugenous Laterite high weathering contain voids	1
2	BH-03	0.50	1.00	0.50	1.00	0.43	**86**	**Laterite**	Slightly Aluminous Laterite high weathering contain voids	1
3	BH-03	1.00	1.50	0.50	1.50	0.22	**44**	**Laterite**	Aluminous Laterite moderate to high weathering	1
4	BH-03	1.50	3.00	1.50	3.00	1.50	**100**	**Laterite**	Aluminous Laterite and moderate weathering	1
5	BH-03	3.00	4.50	1.50	4.50	1.13	**75**	**Laterite**	Ferrugenous Laterite moderately weathered and slight;y Aluminous towards 4.50 m	1
6	BH-03	4.50	6.00	1.50	6.00	0.32	**21.3**	**Laterite**	Aluminous Laterite highly weathered	1
7	BH-03	6.00	6.50	0.50	6.50	0.50	**100**	**Clayey Laterite**	Clay with sand from 6.00 m then Laterite towards 6.50 m	1
8	BH-03	6.50	7.00	0.50	7.00	0.46	**92**	**Clayey Laterite**	Aluminous Laterite with Clay	2
9	BH-03	7.00	7.50	0.50	7.50	0.43	**86**	**Clayey Laterite**	Aluminous Laterite with Clay	2
10	BH-03	7.50	8.00	0.50	8.00	0.50	**100**	**Clayey Laterite**	Laterite Silica rich in near 7.50 m and Clay material towards 8.00 m	2
11	BH-03	8.00	8.50	0.50	8.50	0.50	**100**	**Clayey Laterite**	Clay from 8.00 m then Laterite rock fragments and a little Aluminous/ Bauxitic type near 8.50 m	2
12	BH-03	8.50	9.00	0.50	9.00	0.50	**100**	**Clayey Laterite**	Aluminous Laterite with Clay, moderate weathering	2
13	BH-03	9.00	9.50	0.50	9.50	0.36	**72**	**Clayey Laterite**	Clay with Little Laterite rock fragments	2
14	BH-03	9.50	10.00	0.50	10.00	0.35	**70**	**Clay**	Yellowish and white Clay	2
15	BH-03	10.00	10.50	0.50	10.50	0.38	**76**	**Clayey Laterite**	Yellowish and red Clay with Laterite granules in it	3
16	BH-03	10.50	11.00	0.50	11.00	0.42	**84**	**Clayey Soil**	Yellowish white and brown Clayey Soil with some Laterite granules	3
17	BH-03	11.00	11.50	0.50	11.50	0.39	**78**	**Clayey Laterite**	Yellowish white, Red and Brown colour Mix clay with few Laterite granules	3
18	BH-03	11.50	12.00	0.50	12.00	0.46	**92**	**Clayey Soil**	Yellowish white and Light brown in Colour Clay with Soil	3
19	BH-03	12.00	12.50	0.50	12.50	0.26	**52**	**Clayey Laterite**	Highly weathered Laterite, very fine laterite particles inside the clay, which is Yellowish and red in colour	3
20	BH-03	12.50	13.00	0.50	13.00	0.40	**80**	**Clayey Laterite**	Yellowish and red Clay mix with Granules and Pebbles of Laterite	3
21	BH-03	13.00	13.50	0.50	13.50	0.38	**76**	**Clayey Laterite**	Highly weathered Laterite, very fine laterite particles with clay, which is White, Red and Brown mix colour	3

Block	Mundalli Block
Bore Hole ID	BH-03
Azimuth	NA
Inclination	NA
RL-Collar	58.66 m
Total depth of BH	23.5 m

Location- Village	**Mundalli**
S.O.I. Toposheet	**48K/09**
Latitude	13°57′35.87922″
longitude	74°33′21.24903″
Date of Commencement	29/04/2025
Date of Completion	30/04/2025

Sl. No	**Bore Hole**	**Run (in Meters)**		**Run Length (m)**	**True Length (m)**	**Recovery Length (m)**	**Recovery in %**	**Lithocode**	**Lithology**	**Box No.**
		From	**To**							
22	BH-03	13.50	14.00	0.50	14.00	0.41	**82**	**Clayey Soil**	Brown and Reddish white Clay with weathered Laterite mix with Soil	3
23	BH-03	14.00	14.50	0.50	14.50	0.44	**88**	**Clayey Soil**	Reddish and Brown Clay with soil mixed, Highly weathered material	3
24	BH-03	14.50	15.00	0.50	15.00	0.35	**70**	**Clay**	Reddish white and Brown Clay Material, Highly weathered	3
25	BH-03	15.00	15.50	0.50	15.50	0.16	**32**	**Clay**	Yellowish white Clay, Highly weathered	3
26	BH-03	15.50	16.50	1.00	16.50	0.41	**41**	**Clayey Soil**	Reddish Brown Slush like Clayey Soil	3
27	BH-03	16.50	17.00	0.50	17.00	0.34	**68**	**Clay**	Very fine Yellowish Clay, Highly weathered	4
28	BH-03	17.00	17.50	0.50	17.50	0.42	**84**	**Clayey Laterite**	Fine Clay Yellowish in Colour Highly weathered and with some Laterite Granules	4
29	BH-03	17.50	18.00	0.50	18.00	0.31	**62**	**Clayey Laterite**	Reddish Brown Clay with the Granules of Laterite Limonatised, Highly weathered	4
30	BH-03	18.00	18.50	0.50	18.50	0.33	**66**	**Clayey Laterite**	Reddish Brown Clay with the Granules of Laterite, Highly weathered	4
31	BH-03	18.50	21.00	2.50	21.00	0	**0**	**Slush**	Clayey Soil Slush Like	4
32	BH-03	21.00	21.50	0.50	21.50	0.50	**100**	**Clayey Laterite**	Yellowish white, Red and Brown colour Mix clay with few Laterite granules	4
33	BH-03	21.50	22.00	0.50	22.00	0.50	**100**	**Clayey Laterite**	Yellowish white and Red clay highly weatehred and with very less Laterite granules	4
34	BH-03	22.00	23.00	1.00	23.00	0.63	**63**	**Clayey Laterite**	Yellowish and Red Clay Layers with very Little Laterite granules and Highly weathered	4
35	BH-03	23.00	23.50	0.50	23.50	0.37	**74**	**Clay**	Very fine White and Red mix Clay and Sand at the end (23.50 m)	4

Block	Mundalli Block
Bore Hole ID	BH-04
Azimuth	NA
Inclination	NA
RL-Collar	59.62
Total depth of BH	26

Location- Village	**Mundalli**
S.O.I. Toposheet	**48K/09**
Latitude	13°57′43.58857″
longitude	74°33′33.82298″
Date of Commencement	1/05/2025
Date of Completion	4/05/2025

Sl. No	**Bore Hole**	**Run (in Meters)**		**Run Length (m)**	**True Length (m)**	**Recovery Length (m)**	**Recovery in %**	**Lithocode**	**Lithology**	**Box No.**
		From	**To**							
1	BH-04	0.00	0.50	0.50	0.50	**0.14**	**28**	**Laterite**	Weathered hard laterite pegs Fe rich filled with quartz	1
2	BH-04	0.50	1.00	0.50	1.00	**0.17**	**34**	**Laterite**	Weathered hard fe laterite with small Al patch and limonotized zo	1
3	BH-04	1.00	1.50	0.50	1.50	**0.19**	**38**	**Laterite**	Moderately weathered laterite filled with white patch (Al)	1
4	BH-04	1.50	3.00	1.50	3.00	**1.4**	**93.33**	**Laterite**	Moderately weathered laterite filled with white patch (Al)	1
5	BH-04	3.00	4.50	1.50	4.50	**1.2**	**80**	**Laterite**	Laterite (Limonotized & filled with white patches)	1
6	BH-04	4.50	5.00	0.50	5.00	**0.31**	**62**	**Laterite**	Ferruginous laterite	1
7	BH-04	5.00	6.00	1.00	6.00	**1**	**100**	**Laterite**	Ferruginous laterite	1
8	BH-04	6.00	7.50	1.50	7.50	**0.6**	**40**	**Laterite**	Weathered laterite More of Pebble like	2
9	BH-04	7.50	8.00	0.50	8.00	**0.43**	**86**	**Laterite**	Weathered laterite filled with quartz	2
10	BH-04	8.00	8.50	0.50	8.50	**0.42**	**84**	**Laterite**	Highly weathered laterite slightly clay	2
11	BH-04	8.50	9.00	0.50	9.00	**0.5**	**100**	**Clay**	Ferruginous clay sticky type	2
12	BH-04	9.00	9.50	0.50	9.50	**0.5**	**100**	**Clayey Soil**	Ferruginous Clayey soil with quartz	2
13	BH-04	9.50	10.00	0.50	10.00	**0.5**	**100**	**Clay**	Ferruginous Clayey soil with quartz	2
14	BH-04	10.00	10.50	0.50	10.50	**0.48**	**96**	**Clayey soil**	Limonotized weathered clay laterite quartz rich	2
15	BH-04	10.50	11.00	0.50	11.00	**0.39**	**76**	**Clay**	highly weathered Feruginous to limonitic Clayey laterite	2
16	BH-04	11.00	11.50	0.50	11.50	**0.34**	**68**	**Clay**	Ferruginous clay	2
17	BH-04	11.50	12.00	0.50	12.00	**0.29**	**58**	**Clayey Laterite**	Weathered limontic to aluminous Clayey laterite	2
18	BH-04	12.00	12.50	0.50	12.50	**0.5**	**100**	**Clayey Laterite**	Limonotized weathered clay laterite	3
19	BH-04	12.50	13.00	0.50	13.00	**0.43**	**86**	**Clayey Soil**	friable Ferruginous Clayey coarse soil type	3
20	BH-04	13.00	13.50	0.50	13.50	**0.46**	**92**	**Clayey Laterite**	Limonotized Clayey latertite yellow to brown	3
21	BH-04	13.50	14.00	0.50	14.00	**0.39**	**78**	**Lateritic Clayey Soil**	Limonotized yellow colour coarsed grained soil type with seconda r	3
22	BH-04	14.00	14.50	0.50	14.50	**0.34**	**68**	**Lateritic Clay**	Limonotized coarse grained clay	3
23	BH-04	14.50	15.00	0.50	15.00	**0.5**	**100**	**Lateritic Clay**	Limonotized coarse grained clay	3
24	BH-04	15.00	15.50	0.50	15.50	**0.48**	**96**	**Clay**	Limonitic clay	3
25	BH-04	15.50	16.00	0.50	16.00	**0.44**	**88**	**Clayey Soil**	Coarse grained sticky quartz rich soil	3
26	BH-04	16.00	16.50	0.50	16.50	**0.2**	**40**	**Lateritic Clay**	More of Clay type Fe>	3
27	BH-04	16.50	17.00	0.50	17.00	**0.5**	**100**	**Clayey laterite**	Quartz rich Clay to hard laterite	3
28	BH-04	17.00	17.50	0.50	17.50	**0**	**0**	**Slush**	Clayey Slush Brown Colour	3
29	BH-04	17.50	18.00	0.50	18.00	**0.47**	**94**	**Clay**	Aluminous	3

Block	Mundalli Block		**Location- Village**	**Mundalli**
Bore Hole ID	BH-04		**S.O.I. Toposheet**	**48K/09**
Azimuth	NA		**Latitude**	13°57′43.58857″
Inclination	NA		**longitude**	74°33′33.82298″
RL-Collar	59.62		**Date of Commencement**	1/05/2025
Total depth of BH	26		**Date of Completion**	4/05/2025

Sl. No	Bore Hole	Run (in Meters)		Run Length (m)	True Length (m)	Recovery Length (m)	Recovery in %	Lithocode	Lithology	Box No.
		From	To							
30	BH-04	18.00	18.50	0.50	18.50	0.44	**88**	**Clay**	More Aluminous	4
31	BH-04	18.50	19.50	1.00	19.50	0.74	**74**	**Clay**	More Aluminous slight limonitic	4
32	BH-04	19.50	20.00	0.50	20.00	0.5	**100**	**Clay**	Limonitic to ferruginous (Yellow to red)	4
33	BH-04	20.00	20.50	0.50	20.50	0.5	**100**	**Clay**	Clay with silica, Yellow and white	4
34	BH-04	20.50	21.00	0.50	21.00	0.34	**68**	**Clay**	Slight Pink Al.Clay	4
35	BH-04	21.00	21.50	0.50	21.50	0.38	**76**	**Clay**	Slight Pink Al.Clay	4
36	BH-04	21.50	22.00	0.50	22.00	0.41	**82**	**Clay**	Brownish ferruginous clay	4
37	BH-04	22.00	22.50	0.50	22.50	0.34	**68**	**Laterite**	Yellowish brown Limontic Soil type highly weathered	4
38	BH-04	22.50	23.00	0.50	23.00	0.38	**76**	**Laterite**	highly weatheredCoarse grained Red Soil type Slight clay	4
39	BH-04	23.00	23.50	0.50	23.50	0.39	**78**	**Laterite**	highly weathered Yellowish limonitic soil type	4
40	BH-04	23.50	24.00	0.50	24.00	0.33	**66**	**Laterite**	Highly weathered limonitic laterite	5
41	BH-04	24.00	24.50	0.50	24.50	0.36	**72**	**Laterite**	Reddish colour coarse grained Fe Soil type	5
42	BH-04	24.50	26.00	1.50	26.00	0	**0**	**Sand**	Paleo river Sand	5

Block	Mundalli Block	**Location- Village**	**Mundalli**
Bore Hole ID	BH-05	**S.O.I. Toposheet**	**48K/09**
Azimuth	NA	**Latitude**	13°57′46.21468″
Inclination	NA	**longitude**	74°33′44.01300″
RL-Collar	62.9845 m	**Date of Commencement**	28/05/2025
Total depth of BH	10.0 m	**Date of Completion**	29/05/2025

Sl. No	Bore Hole	Run (in Meters)		Run Length (m)	True Length (m)	Recovery Length (m)	Recovery in %	Lithocode	Lithology	Box No.
		From	To							
1	BH-05	0.00	0.50	0.50	0.50	0.20	**40**	**Laterite**	More Reddish Ferruginous Laterite with some white patches and with voids also Limonatised	1
2	BH-05	0.50	1.00	0.50	1.00	0.12	**24**	**Laterite**	Reddish in colour with some Yellow Limonatised Patches, Ferruginous Laterite with Voids	1
3	BH-05	1.00	1.50	0.50	1.50	0.14	**28**	**Laterite**	Reddish in Colour Highly weathered Ferruginous Laterite	1
4	BH-05	1.50	3.00	1.50	3.00	0.58	**38.66**	**Laterite**	Reddish in Colour with Moderate white patches and also limonatised laterite	1
5	BH-05	3.00	4.50	1.50	4.50	0.68	**45.33**	**Clayey Laterite**	Reddish soil and Clay mix in the First 20cm then Reddish with more white Patches Aluminous Laterite	1
6	BH-05	4.50	5.00	0.50	5.00	0.44	**88**	**Clayey Laterite**	Very fine Reddish Clay with Granules of Laterite Moderately weathered	1
7	BH-05	5.00	5.50	0.50	5.50	0.33	**66**	**Clayey Laterite**	Redish mix Clay with the Laterite Granules with some white Patches	1
8	BH-05	5.50	6.00	0.50	6.00	0.34	**68**	**Clayey Soil**	Redish and Purple Colour Clay with Soil materite, Highly weathered	1
9	BH-05	6.00	6.50	0.50	6.50	0.49	**98**	**Clayey Laterite**	White , Red and Purple Layers of fine Clay with very few Laterite Granules	1
10	BH-05	6.50	7.00	0.50	7.00	0.47	**94**	**Clayey Laterite**	Reddish and white Patches Aluminous Laterite with Clay, Moderetely weathered	1
11	BH-05	7.00	7.50	0.50	7.50	0.49	**98**	**Clayey Laterite**	White and Purple Clay in the 7.00 m then Yellowish and red clay near 7.5 m with Laterite Granules	1
12	BH-05	7.50	8.00	0.50	8.00	0.43	**86**	**Clayey Laterite**	Yellowish white and Reddish Clay mix with Laterite Pebbles and granules	2
13	BH-05	8.00	8.50	0.50	8.50	0.45	**90**	**Clayey Soil**	Yellowish Clay mix with Brown soil and Pebbles of Laterite	2
14	BH-05	8.50	9.00	0.50	9.00	0.28	**56**	**Clayey Soil**	Yellowish and Brown clay with Soil, Highly weathered	2
15	BH-05	9.00	9.50	0.50	9.50	0.17	**34**	**Clay**	Reddish fine Clay, Highly weathered	2
16	BH-05	9.50	10.00	0.50	10.00	0.50	**100**	**Clayey Soil**	Reddish Brown Clayey Soil, Highly weathered	2

Block	Mundalli Block
Bore Hole ID	BH-06
Azimuth	NA
Inclination	NA
RL-Collar	54.527 m
Total depth of BH	18.5 m

Location- Village	Mundalli
S.O.I. Toposheet	48K/09
Latitude	13°57′55.08379″
longitude	74°32′53.66792″
Date of Commence	n6/05/2025
Date of Completion	8/05/2025

Sl. No	Bore Hole	Run (in Meters)		Run Length (m)	True Length (m)	Recovery Length (m)	Recovery in %	Lithocode	Lithology	Box No.
		From	To							
1	BH-06	0.00	0.50	0.50	0.50	0.21	**42**	**Laterite**	Laterite with more Silica	1
2	BH-06	0.50	1.00	0.50	1.00	0.14	**28**	**Laterite**	Weathered laterite	1
3	BH-06	1.00	1.50	0.50	1.50	0.14	**28**	**Laterite**	Al rich laterite	1
4	BH-06	1.50	3.00	1.50	3.00	1.5	**100**	**Laterite**	Al rich laterite Moderately weathered	1
5	BH-06	3.00	4.50	1.50	4.50	1.39	**92.6**	**Laterite**	Laterite (Fe to Al)	1
6	BH-06	4.50	6.00	0.50	6.00	1.01	**67.33**	**Laterite**	Al laterite Moderately Weathered	1
7	BH-06	6.00	7.50	1.50	7.50	0.9	**60**	**Laterite**	Al laterite white puplish colour	2
8	BH-06	7.50	8.00	0.50	8.00	0.41	**82**	**Laterite**	Weathered Al.laterite	2
9	BH-06	8.00	8.50	0.50	8.50	0.3	**60**	**Laterite**	Weathered Al.laterite	2
10	BH-06	8.50	9.00	0.50	9.00	0.47	**94**	**Laterite**	Limonotized laterite	2
11	BH-06	9.00	9.50	0.50	9.50	0.31	**62**	**Laterite**	Limonotized & Reddish Laterite	2
12	BH-06	9.50	10.00	0.50	10.00	0.45	**90**	**Clayey soil**	Limonotized clay soil	2
13	BH-06	10.00	10.50	0.50	10.50	0.42	**84**	**Clayey soil**	Limonotized clay soil	2
14	BH-06	10.50	11.00	0.50	11.00	0.38	**76**	**Clay**	Clay and Al.Latertie towards 11m	2
15	BH-06	11.00	11.50	0.50	11.50	0.36	**72**	**Laterite**	Highly Weathered laterite	2
16	BH-06	11.50	12.00	0.50	12.00	0.35	**70**	**Clayey Laterite**	Highly Weathered laterite with little clay	2
17	BH-06	12.00	12.50	0.50	12.50	0.41	**82**	**Weathered laterite**	Highly Weathered laterite reddish & Limonitic	3
18	BH-06	12.50	13.00	0.50	13.00	0.35	**70**	**Clayey Soil**	Ferruginous & Limonitic clay soil	3
19	BH-06	13.00	13.50	0.50	13.50	0.36	**72**	**Clayey Soil**	Ferruginous & Limonitic clay material	3
20	BH-06	13.50	14.00	0.50	14.00	0.32	**64**	**Clay**	yellow and reddish clay material	3
21	BH-06	14.00	14.50	0.50	14.50	0.38	**76**	**Clay**	yellowish clay material	3
22	BH-06	14.50	15.00	0.50	15.00	0.5	**100**	**Clay**	Limonotized clay material	3
23	BH-06	15.00	15.50	0.50	15.50	0.4	**80**	**Clay**	Clay with laterite rock fragments	3
24	BH-06	15.50	16.00	0.50	16.00	0.48	**96**	**Clay**	yellowish and whitish clay	3
25	BH-06	16.00	16.50	0.50	16.50	0.5	**100**	**Clay**	White and reddish clay	3
26	BH-06	16.50	17.00	0.50	17.00	0.22	**44**	**Clay**	White and reddish clay (yellowish towards 16.5)	3
27	BH-06	17.00	17.50	0.50	17.50	0.42	**84**	**sand**	**Limonitic sandy soil**	3
28	BH-06	17.50	18.00	0.50	18.00	0	**0**	**Sand**	Sand	3
29	BH-06	18.00	18.50	0.50	18.50	0	**0**	**Sand**	Sand	3

Block	Mundalli Block		**Location- Village**	**Mundalli**
Bore Hole ID	BH-07		**S.O.I. Toposheet**	**48K/09**
Azimuth	NA		**Latitude**	13°57′56.48826″
Inclination	NA		**longitude**	74°33′08.47102″
RL-Collar	57.287 m		**Date of Commencement**	7/06/2025
Total depth of BH	11.00 m		**Date of Completion**	8/06/2025

Sl. No	Bore Hole	Run (in Meters)		Run Length (m)	True Length (m)	Recovery Length (m)	Recovery in %	Lithocode	Lithology	Box No.
		From	To							
1	BH-07	0.00	0.50	0.50	0.50	0.19	**38**	**Laterite**	Red in colour Ferruginous Laterite with Limonatised Yellow Patches, Moderately weathered with the free Silica	1
2	BH-07	0.50	1.00	0.50	1.00	0.12	**24**	**Laterite**	Red in colour , Ferruginous Laterite with Yellow Patches with free Silica	1
3	BH-07	1.00	1.50	0.50	1.50	0.12	**24**	**Laterite**	Red in colour , Ferruginous Laterite with White Patches Aluminous Laterite with free Silica	1
4	BH-07	1.50	3.00	1.50	3.00	0.93	**12.6**	**Laterite**	Reddish in colour more of Ferruginous Laterite from	1
5	BH-07	3.00	4.50	1.50	4.50	1.27	**84.6**	**Laterite**	Red in Colour, with the white Patches, Aluminous Laterite, slightly Limonatised and moderately weathered	1
6	BH-07	4.50	6.00	1.50	6.00	0.87	**87**	**Laterite**	Red, Ferruginous Laterite with some white patches and also limonatised, Moderately weathered	1
7	BH-07	6.00	6.50	0.50	6.50	0.40	**80**	**Clayey Laterite**	Laterite in First 5 cm then White fine Clay, Highly weathered	1
8	BH-07	6.50	7.00	0.50	7.00	0.45	**90**	**Clay**	Very fine White, Pinkish white Clay, Highly weathered	1
9	BH-07	7.00	7.50	0.50	7.50	0.50	**100**	**Clayey Laterite**	White Clay with the free Quartz and the Clayey Laterite in the end 7.5m depth	2
10	BH-07	7.50	8.00	0.50	8.00	0.40	**20**	**Lateritic Soil**	Red Laterite soil with the Laterite Granules and with free Quartz Highly weathered	2
11	BH-07	8.00	8.50	0.50	8.50	0.48	**96**	**Clayey Soil**	Red Lateritic soil with the Purplish Clay in the end	2
12	BH-07	8.50	9.00	0.50	9.00	0.41	**82**	**Clay**	Very fine Purplish Clay material Highly weathered	2
13	BH-07	9.00	9.50	0.50	9.50	0.49	**98**	**Clayey Soil**	Yellowish Limonatised Clay with the yellow colour Soil	2
14	BH-07	9.50	10.00	0.50	10.00	0.50	**100**	**Clayey Soil**	Yellowish Limonatised Clay with the yellow colour Soil with some Laterite granules in the end	2
15	BH-07	10.00	10.50	0.50	10.50	0.48	**96**	**Clayey Laterite**	Reddish Brown Clay with the Red Ferruginous Laterite Granules Highly Weathered	2
16	BH-07	10.50	11.00	0.50	11.00	0.38	**74**	**Clayey Soil**	Yellowish Brown Clay and with Brown soil mix, Highly weathered	2

Block	Mundalli Block
Bore Hole ID	BH-08
Azimuth	NA
Inclination	NA
RL-Collar	53.318 m
Total depth of BH	15 m

Location- Village	**Mundalli**
S.O.I. Toposheet	**48K/09**
Latitude	13°57′57.59894″
longitude	74°33′20.16157″
Date of Commencement	24/04/2025
Date of Completion	24/04/2025

Sl. No	Bore Hole	Run (in Meters)		Run Length (m)	True Length (m)	Recovery Length (m)	Recovery in %	Lithocode	Lithology	Box No.
		From	To							
1	BH-08	0.00	0.50	0.50	0.50	0.45	**90**	**Lateritic soil**	Red Lateritic Soil	1
2	BH-08	0.50	1.00	0.50	1.00	0.16	**32**	**Laterite**	Ferrugenous Laterite Moderate weathering	1
3	BH-08	1.00	1.50	0.50	1.50	0.1	**20**	**Laterite**	Ferrugenous Laterite Moderate weathering	1
4	BH-08	1.50	3.00	1.50	3.00	1.22	**81.33**	**Laterite**	Slightly Aluminous Laterite and moderate weathering	1
5	BH-08	3.00	4.50	1.50	4.50	1.11	**74**	**Laterite**	Ferrugenous Laterite weathered	1
6	BH-08	4.50	6.00	1.50	6.00	0.23	**15.33**	**Laterite**	Laterite Rock fragments	1
7	BH-08	6.00	6.50	0.50	6.50	0.49	**98**	**Clay**	Yellowish (Limonatised) to white Clay	1
8	BH-08	6.50	7.50	1.00	7.50	0.82	**82**	**Clay**	Clay material Fe rich clay and more of White clay, Aluminous rich clay material at 7.5 m end	1
9	BH-08	7.50	8.00	0.50	8.00	0.48	**96**	**Clay**	Yellowish clay from 7.5 m and Fe rich Clay material at 8.0 m end	2
10	BH-08	8.00	8.50	0.50	8.50	0.44	**88**	**Clayey Laterite**	Yellowish Clay material with Fe rich red patches	2
11	BH-08	8.50	9.00	0.50	9.00	0.41	**82**	**Clayey Laterite**	Reddish clay with rock fragments (Pebbles)	2
12	BH-08	9.00	10.00	1.00	10.00	0.75	**74**	**Clay**	White or Purple colour Clay from 9.0 m and sand in the end 10.0 m	2
13	BH-08	10.00	10.50	0.50	10.50	0.42	**84**	**Clayey soil**	Clayey soil yellowish with silica	3
14	BH-08	10.50	11.00	0.50	11.00	0.48	**96**	**Clayey soil**	Yellowish white clay with Silica	3
15	BH-08	11.00	11.50	0.50	11.50	0.3	**60**	**Soil**	Clay initially then highly weathered gneissic soil with more silica	3
16	BH-08	11.50	15.00	3.5	15.00	0	**0**	**Sand**	**Sand pocket Borehole Collapsed**	3

Block	Mundalli Block		**Location- Village**	Mundalli
Bore Hole ID	BH-09		**S.O.I. Toposheet**	48K/09
Azimuth	NA		**Latitude**	13°57′56.59388″
Inclination	NA		**longitude**	74°33′33.84523″
RL-Collar	61.51 m		**Date of Commencement**	14/04/2025
Total depth of BH	24.50 m		**Date of Completion**	18/04/2025

Sl. No	**Bore Hole**	**Run (in Meters)**		**Run Length (m)**	**True Length (m)**	**Recovery Length (m)**	**Recovery in %**	**Lithocode**	**Lithology**	**Box No.**
		From	**To**							
1	BH-09	0.00	0.50	0.50	0.50	0.32	65.00	Laterite	More Ferrogenous Laterite	**1**
2	BH-09	0.50	1.00	0.50	1.00	0.32	65.00	Laterite	More Ferrogenous Laterite moderately weathered	**1**
3	BH-09	1.00	2.00	1.00	2.00	0.28	28.00	Laterite	Less Ferrogenous Laterite moderately weathered	**1**
4	BH-09	2.00	3.00	1.00	3.00	0.33	33.00	Laterite	Less Ferrogenous and Alumina content is increasing	**1**
5	BH-09	3.00	4.50	1.50	4.50	1.5	100.00	Laterite	Alumina content is increasing and moderate weathering	**1**
6	BH-09	4.50	6.00	1.50	6.00	0.74	49.50	Laterite	Alumina content is increasing and moderate weathering	**1**
7	BH-09	6.00	7.50	1.50	7.50	0.6	40.00	Laterite	Pinkish Red colour more of Alumina rich Laterite moderately weathered	**1**
8	BH-09	7.50	9.00	1.50	9.00	0.25	16.60	Laterite	Fe rich towards 9th meters and Al rich near 7.5 meters	**1**
9	BH-09	9.00	10.50	1.50	10.50	0.5	100.00	Laterite	Moderate lateritization throughout the core. From 9 to 9.75 laterite dominated by iron with white and purple clay associated with it. From 9.75 to 10.50 meters laterite dominated by iron with white and yellow clay associated with it.	**2**
10	BH-09	10.50	12.00	1.50	12.00	1.44	96.00	Laterite	Weak lateritization From 10.50 to 11 meters laterite dominated by iron and yellow clay material associated with it. From 11 to 11.80 meters fine to medium grained pale red to yellow soil observed. Moderate latetization From 11.80 to 12 meters the laterite dominated by the iron with yellow clay.	**2**
11	BH-09	12.00	13.50	1.50	13.50	0.48	32.00	Laterite	Loose Laterite material Yellowish and red colour	**2**
12	BH-09	13.50	14.00	0.50	14.00	0.5	100.00	Clay	Clay Horizone Purplish white colour with more silica	**2**
13	BH-09	14.00	14.50	0.50	14.50	0.46	92.00	Clay	Fe content Increasing and Clay material	**2**
14	BH-09	14.50	15.00	0.50	15.00	0.4	80.00	Lateritic Clay	More weathered Clay	**3**
15	BH-09	15.00	15.50	0.50	15.50	0.45	90.00	Laterite	Moderately lateritized and pisolitic textured red-mottled laterite.	**3**
16	BH-09	15.50	16.00	0.50	16.00	0.49	98.00	Clay	Weak lateritization: Soft doughly Laterite or lithomarge. soft compaction with yellowish red in colour	**3**

Block	Mundalli Block	**Location- Village**	**Mundalli**
Bore Hole ID	BH-09	**S.O.I. Toposheet**	**48K/09**
Azimuth	NA	**Latitude**	13°57′56.59388″
Inclination	NA	**longitude**	74°33′33.84523″
RL-Collar	61.51 m	**Date of Commencement**	14/04/2025
Total depth of BH	24.50 m	**Date of Completion**	18/04/2025

Sl. No	**Bore Hole**	**Run (in Meters)**		**Run Length (m)**	**True Length (m)**	**Recovery Length (m)**	**Recovery in %**	**Lithocode**	**Lithology**	**Box No.**
		From	**To**							
17	BH-09	16.00	16.50	0.50	16.50	0.35	70.00	Laterite	The red-brown and fine-grained limonite horizon followed by pisolitic textured Ferruginous Laterite with white and yellow clay associated with it. The diameter of these pisoles varies from few millimetres to two centimetres.	**3**
18	BH-09	16.50	17.00	0.50	17.00	0.46	92.00	Laterite	Moderate lateritization: Ferruginous Laterite with 3 cm Iron rich gravels continued by Aluminous laterite cemented by the ferruginous matrix.	**3**
19	BH-09	17.00	17.50	0.50	17.50	0.5	100.00	**Clay**	Strong lateritazation: Aluminous laterite or bauxite with very small quartz crystal with ferruginous laterite cemented by white and pinkish clay.	**3**
20	BH-09	17.50	18.00	0.50	18.00	0.31	62.00	Laterite	Moderately Lateralised ferruginous laterite cemented by yellow and pale white clay matrix.	**3**
21	BH-09	18.00	18.50	0.50	18.50	0.37	74.00	Laterite	Al laterite weathered	**3**
22	BH-09	18.50	19.00	0.50	19.00	0.44	88.00	Laterite	Al laterite moderately weathered	**3**
23	BH-09	19.00	19.50	0.50	19.50	0.36	72.00	Laterite	Bauxitic yellowish and red in color	**3**
24	**BH-09**	**19.50**	**20.00**	0.50	**20.00**	0	**0.00**	**No recovery**	**No recovery**	**4**
25	BH-09	20.00	20.50	0.50	20.50	0.5	100.00	Clay	Soil with Clay	**4**
26	BH-09	20.50	21.00	0.50	21.00	0.5	100.00	Clay	Clay	**4**
27	BH-09	21.00	21.50	0.50	21.50	0.32	64.00	Clay	Brown soil and Clay	**4**
28	BH-09	21.50	22.00	0.50	22.00	0.4	80.00	Clay	Soil clay whitish Quartz vein powder	**4**
29	**BH-09**	**22.00**	**22.50**	0.50	**22.50**	0	0	**Sand Pocket encountered borehole collapsed (Fine Sand , Paleo channel?)**	Alluvial Sand	**5**
30	**BH-09**	**22.50**	**23.00**	0.50	**23.00**	0	0		Alluvial Sand	**5**
31	**BH-09**	**23.00**	**23.50**	0.50	**23.50**	0	0		Alluvial Sand	**5**
32	**BH-09**	**23.50**	**24.00**	0.50	**24.00**	0	0		Alluvial Sand	**5**
33	**BH-09**	**24.00**	**24.50**	0.50	**24.50**	0	0		Alluvial Sand	**5**

Block	Mundalli Block	**Location- Village**	**Mundalli**
Bore Hole ID	BH-10	**S.O.I. Toposheet**	**48K/09**
Azimuth	NA	**Latitude**	13°57′56.51608″
Inclination	NA	**longitude**	74°33′46.92016″
RL-Collar	64.5305 m	**Date of Commencement**	31/05/2025
Total depth of BH	10.00 m	**Date of Completion**	1/06/2025

Sl. No	Bore Hole	Run (in Meters)		Run Length (m)	True Length (m)	Recovery Length (m)	Recovery in %	Lithocode	Lithology	Box No.
		From	To							
1	BH-10	0.00	0.50	0.50	0.50	0.35	**70**	**Laterite**	Whitish Pink in Colour Aluminous Laterite with fe and free Silica	1
2	BH-10	0.50	1.00	0.50	1.00	0.3	**60**	**Laterite**	Ferruginous Laterite with Soil and Slightly Aluminous with free Silica	1
3	BH-10	1.00	1.50	0.50	1.50	0.3	**60**	**Lateritic Soil**	Slightly Aluminous Laterite with Fe and Free Slica and also mixed with Lateritic Soil	1
4	BH-10	1.50	3.00	1.50	3.00	0.76	**50.66**	**Laterite**	Aluminous Rich Laterite (More White colour) and with Fe also limonatised Moderately weathered with free Quartz	1
5	BH-10	3.00	4.50	1.50	4.50	0.68	**45.33**	**Laterite**	Aluminous Laterite More White Colour Patches and Limonatised and towards 4.5 m fe rich with free Silica, Moderately weathered	1
6	BH-10	4.50	5.00	0.50	5.00	0.46	**92**	**Lateritic Soil**	Reddish Soil, Limonatied Aluminous Laterite granules in it, Moderately weathered.	1
7	BH-10	5.00	5.50	0.50	5.50	0.42	**84**	**Lateritic Soil**	Lateritic Soil (Reddish brown), Limonatised Yellow patches, Highly weathered	1
8	BH-10	5.50	6.00	0.50	6.00	0.5	**100**	**Lateritic Soil**	Red Lateritic soil, Slightly Limonatised, more Reddish, Moderately weathered	1
9	BH-10	6.00	7.00	1.00	7.00	0.48	**48**	**Clayey Soil**	Reddish Clayey Soil, Slightly Limonatised Moderate weathering	1
10	BH-10	7.00	7.50	0.50	7.50	0.4	**80**	**Clayey Laterite**	Reddish Clay Material with the Limonatised Fe Laterite, Moderate weathering	1
11	BH-10	7.50	8.00	0.50	8.00	0.36	**72**	**Clayey Laterite**	Red, Yellow and White mix Clay with Laterite granules and Limonatised.	2
12	BH-10	8.00	8.50	0.50	8.50	0.41	**82**	**Clayey Laterite**	Reddish Brown Clay, also Limonatised with the laterite Granules and Pebbles	2
13	BH-10	8.50	9.00	0.50	9.00	0.33	**66**	**Clayey Laterite**	Red, yellow Clay mixed with Aluminous Laterite Granules, also Limonatised	2
14	BH-10	9.00	9.50	0.50	9.50	0.36	**72**	**Clayey Laterite**	Ferruginous Laterite Slightly Limonatised and with Clay in the end	2
15	BH-10	9.50	10.00	0.50	10.00	0.45	**90**	**Laterite**	Ferruginous Laterite, Limonatised and also with some white Patches of Al.	2

Block	Mundalli Block		**Location- Village**	**Mundalli**
Bore Hole ID	BH-11		**S.O.I. Toposheet**	**48K/09**
Azimuth	NA		**Latitude**	13°58′09.72604″
Inclination	NA		**longitude**	74°33′27.09909″
RL-Collar	61.186		**Date of Commencement**	19/04/2025
Total depth of BH	18.5 m		**Date of Completion**	23/04/2025

Sl. No	Bore Hole	Run (in Meters)		Run Length (m)	True Length (m)	Recovery Length (m)	Recovery in %	Lithocode	Lithology	Box No.
		From	To							
1	BH-11	0.00	0.50	0.50	0.50	0.34	**68**	**Laterite**	Fe laterite and Moderate weathering	1
2	BH-11	0.50	1.00	0.50	1.00	0.08	**16**	**Laterite**	Fe laterite and Moderate weathering	1
3	BH-11	1.00	1.50	0.50	1.50	0.43	**86**	**Laterite**	Fe laterite and Moderate weathering	1
4	BH-11	1.50	3.00	1.50	3.00	1.5	**100**	**Laterite**	Fe laterite with free Quartz and Moderate weathering	1
5	BH-11	3.00	4.50	1.50	4.50	0.42	**28**	**Laterite**	Fe laterite with free Quartz and Moderate weathering	1
6	BH-11	4.50	6.00	1.50	6.00	0.9	**60**	**Laterite**	Aluminous Laterite Moderately weathered	1
7	BH-11	6.00	7.50	1.50	7.50	1.23	**82**	**Laterite**	Laterite Slightly Alumionous with Limonite and Moderately weathered and hard	1
8	BH-11	7.50	9.00	1.50	9.00	1.14	**76**	**Laterite**	Laterite less weathered with patches of Al and clay	2
9	BH-11	9.00	10.50	1.50	10.50	0.59	**39.33**	**Clayey Laterite**	Yellow and White clay with slight Fe laterite	2
10	BH-11	10.50	11.00	0.50	11.00	0.5	**100**	**Clay**	Purple Clay lump Highly weathered	2
11	BH-11	11.00	11.50	0.50	11.50	0.42	**84**	**Clay**	Highly weathered purple clay with Quartz in it	2
12	BH-11	11.50	12.00	0.50	12.00	0.5	**100**	**Laterite**	Highly Weathered Fe Laterite	2
13	BH-11	12.00	12.50	0.50	12.50	0.38	**76**	**Laterite**	Aluminous Laterite	2
14	BH-11	12.50	13.00	0.50	13.00	0.34	**68**	**Clayey Laterite**	Fe Laterite Highly weathered with yellow clay	2
15	BH-11	13.00	14.00	1.00	14.00	0.54	**54**	**Clay**	Highly Weathered yellow clay	2
16	BH-11	14.00	15.00	1.00	15.00	0.69	**69**	**Clayey Laterite**	Fe laterite with clay and yellow clay at 15.00 m end	3
17	BH-11	15.00	15.50	0.50	15.50	0.43	**86**	**Clay**	Yellowish clay with Quartz crystals	3
18	BH-11	15.50	16.00	0.50	16.00	0.33	**66**	**Clay**	Yellowish clay with Quartz crystals	3
19	BH-11	16.00	16.50	0.50	16.50	0.5	**100**	**Clay**	Reddish brown Clay with Quartz crystals	3
20	BH-11	16.50	18.50	2.00	18.50	0	**0**	**Sand**	**Sand BH Collapsed**	3

Block	Mundalli Block
Bore Hole ID	BH-12
Azimuth	NA
Inclination	NA
RL-Collar	66.2435 m
Total depth of BH	10.00 m

Location- Village	**Mundalli**
S.O.I. Toposheet	**48K/09**
Latitude	13°58′09.64395″
longitude	74°33′47.23082″
Date of Commencement	2/06/2025
Date of Completion	3/06/2025

Sl. No	Bore Hole	Run (in Meters)		Run Length (m)	True Length (m)	Recovery Length (m)	Recovery in %	Lithocode	Lithology	Box No.
		From	To							
1	BH-12	0.00	0.50	0.50	0.50	0.23	**46**	**Laterite**	Red in Colour Ferruginous Laterite with more free Silica and Limonatised, Moderate Weathering	1
2	BH-12	0.50	1.00	0.50	1.00	0.16	**32**	**Laterite**	Ferruginous Laterite with free Silica and Limonatised, Moderate Weathering	1
3	BH-12	1.00	1.50	0.50	1.50	0.15	**30**	**Laterite**	Ferruginous Laterite Slightly Limonatised with free Silica, Moderate Weathering	1
4	BH-12	1.50	3.00	1.50	3.00	0.4	**26.6**	**Laterite**	Ferruginous Laterite Limonatised, with the Lateritic soil and secondary silica	1
5	BH-12	3.00	4.50	1.50	4.50	0.86	**57.3**	**Laterite**	Red in Colour with White patches, Aluminous Laterite and also Limonatised	1
6	BH-12	4.50	5.00	0.50	5.00	0.5	**100**	**Lateritic Soil**	Red Lateritic soil and Ferruginous Laterite, Limonatised Yellow patches	1
7	BH-12	5.00	6.00	1.00	6.00	0.44	**44**	**Laterite**	Ferruginous Laterite, Highly weathered and with Limonatised White patches	1
8	BH-12	6.00	6.50	0.50	6.50	0.39	**78**	**Lateritic Soil**	Reddish Clayey soil, wwith the Ferruginous Laterite, Highly weathered	1
9	BH-12	6.50	7.50	1.00	7.50	0.46	**46**	**Laterite**	Red in Colour Ferruginous Laterite, Limonatised and High Weathering	1
10	BH-12	7.50	8.00	0.50	8.00	0.47	**94**	**Clayey Laterite**	Yellowish white and Red Clay with some Laterite Granules and Highly weathered	1
11	BH-12	8.00	8.50	0.50	8.50	0.5	**100**	**Clayey Laterite**	Reddish white Clay with the Aluminous Laterite and Moderately weathered	1
12	BH-12	8.50	9.00	0.50	9.00	0.44	**88**	**Clayey Laterite**	Yellowish white and Red bands of Highly weathered Clay with the Laterite Granules	2
13	BH-12	9.00	9.50	0.50	9.50	0.31	**62**	**Clayey Laterite**	Reddish and White Clay with the Aluminous Laterite Moderately weathered	2
14	BH-12	9.50	10.00	0.50	10.00	0.36	**72**	**Clayey Laterite**	Yellowish White and Red Clay mix with some Laterite Granules Highly weathered.	2

Block	Mundalli Block
Bore Hole ID	BH-13
Azimuth	NA
Inclination	NA
RL-Collar	67.67 m
Total depth of BH	21.5 m

Location- Village	**Mundalli**
S.O.I. Toposheet	**48K/09**
Latitude	13°58′10.90426″
longitude	74°34′00.79694″
Date of Commencement	15/05/2025
Date of Completion	17/05/2025

Sl. No	**Bore Hole**	**Run (in Meters)**		**Run Length (m)**	**True Length (m)**	**Recovery Length (m)**	**Recovery in %**	**Lithocode**	**Lithology**	**Box No.**
		From	**To**							
1	BH-13	0.00	0.50	0.50	0.50	0.15	**30**	**Laterite**	Weathered laterite with white patches	1
2	BH-13	0.50	1.00	0.50	1.00	0.17	**34**	**Laterite**	Weathered fe laterite rock fragments	1
3	BH-13	1.00	1.50	0.50	1.50	0.36	**72**	**Laterite**	fe laterite moderate and limonitised	1
4	BH-13	1.50	3.00	1.50	3.00	1.20	**80**	**Laterite**	aluminous laterite with small patches of limonitsed content and weathered portion of laterite	1
5	BH-13	3.00	4.50	1.50	4.50	0.50	**33.3**	**Laterite**	aluminous laterite with little weathering	1
6	BH-13	4.50	6.00	1.50	6.00	0.79	**52.6**	**Laterite**	aluminous laterite with limonite patches little weathering	1
7	BH-13	6.00	6.50	0.50	6.50	0.45	**90**	**Laterite**	laterite less aluminous with fe limonitised patches and less silica	1
8	BH-13	6.50	7.00	0.50	7.00	0.23	**46**	**Laterite**	weathered clayey laterite less aluminous laterite	1
9	BH-13	7.00	7.50	0.50	7.50	0.49	**98**	**Laterite**	clayey laterite limonatised fe more and less aluminous	1
10	BH-13	7.50	8.00	0.50	8.00	0.35	**70**	**Laterite**	aluminous clayey laterite	1
11	BH-13	8.00	8.50	0.50	8.50	0.50	**100**	**Laterite**	lateritic clay aluminous and little limonitised	2
12	BH-13	8.50	9.00	0.50	9.00	0.35	**70**	**Laterite**	initially aluminous clayey then limonitic clayey laterite	2
13	BH-13	9.00	9.50	0.50	9.50	0.37	**74**	**Laterite**	clay containing fe al and limonite	2
14	BH-13	9.50	10.00	0.50	10.00	0.39	**78**	**Lateritic soil**	highly weathered lateritic soil with limonite	2
15	BH-13	10.00	10.50	0.50	10.50	0.48	**96**	**Lateritic soil**	limonitised lateritic soil	2
16	BH-13	10.50	11.00	0.50	11.00	0.50	**100**	**Lateritic soil**	weathered limonitic lateritic soil	2

Block	Mundalli Block	**Location- Village**	**Mundalli**
Bore Hole ID	BH-13	**S.O.I. Toposheet**	**48K/09**
Azimuth	NA	**Latitude**	13°58′10.90426″
Inclination	NA	**longitude**	74°34′00.79694″
RL-Collar	67.67 m	**Date of Commencement**	15/05/2025
Total depth of BH	21.5 m	**Date of Completion**	17/05/2025

Sl. No	Bore Hole	Run (in Meters)		Run Length (m)	True Length (m)	Recovery Length (m)	Recovery in %	Lithocode	Lithology	Box No.
		From	To							
17	BH-13	11.00	11.50	0.50	11.50	0.50	**100**	**Lateritic soil**	weathered limonitic lateritic soil	2
18	BH-13	11.50	12.00	0.50	12.00	0.45	**90**	**clayey soil**	limonitised clayey laterite	2
19	BH-13	12.00	12.50	0.50	12.50	0.49	**98**	**clayey soil**	limonitised clayey laterite	2
20	BH-13	12.50	13.00	0.50	13.00	0.42	**84**	**clayey soil**	limonitised clayey laterite	2
21	BH-13	13.00	13.50	0.50	13.50	0.47	**94**	**clayey soil**	limonitised clayey laterite	3
22	BH-13	13.50	14.00	0.50	14.00	0.34	**68**	**clayey soil**	clayey laterite initially and ending with clay	3
23	BH-13	14.00	14.50	0.50	14.50	0.43	**86**	**Clay**	fe clay with quartz crystal	3
24	BH-13	14.50	15.00	0.50	15.00	0.32	**64**	**Clay**	initially clay with weathered soil material purple in colour	3
25	BH-13	15.00	15.50	0.50	15.50	0.47	**94**	**Clay**	reddish clay with some white patches	3
26	BH-13	15.50	16.00	0.50	16.00	0.39	**77**	**Clay**	purple coloured clay	3
27	BH-13	16.00	16.50	0.50	16.50	0.37	**74**	**Clay**	light purple clay slightly limoitised yellowish clay	3
28	BH-13	16.50	18.00	1.50	18.00	0.39	**26**	**Clay**	clay light purplish and limonitised clay in the end	3
29	BH-13	18.00	18.50	0.50	18.50	0.39	**78**	**clayey soil**	weathered zone more quartz and clayey soil	3
30	BH-13	18.50	19.00	0.50	19.00	0.33	**66**	**clayey soil**	highly weathered clayey soil	3
31	BH-13	19.00	19.50	0.50	19.50	0.25	**50**	**clayey soil**	highly weathered clayey soil	3
32	BH-13	19.50	21.50	1.00	21.50	0	**0**	**Sand**	**sand**	3

Block	Mundalli Block	**Location- Village**	**Mundalli**
Bore Hole ID	BH-14	**S.O.I. Toposheet**	**48K/09**
Azimuth	NA	**Latitude**	13°58′10.78787″
Inclination	NA	**longitude**	74°34′13.73055″
RL-Collar	68.586 m	**Date of Commencement**	11/05/2025
Total depth of BH	24 m	**Date of Completion**	14/05/2025

Sl. No	Bore Hole	Run (in Meters)		Run Length (m)	True Length (m)	Recovery Length (m)	Recovery in %	Lithocode	Lithology	Box No.
		From	To							
1	BH-14	0.00	0.50	0.50	0.50	0.45	**90**	**Lateritic soil**	First 19cm Laterite Soil, with small patches of laterite Reddish Brown colour, after that upto 0.50m ferruginous laterite with limonitization and white patch and secondary quartz.	1
2	BH-14	0.50	1.00	0.50	1.00	0.32	**64**	**Laterite**	Ferruginous Laterite with moderate weathering, white patch and secondary quartz	1
3	BH-14	1.00	1.50	0.50	1.50	0.15	**30**	**Laterite**	Moderately weathered Laterite with white patches and secondary Quartz.	1
4	BH-14	1.50	3.00	1.50	3.00	0.6	**40**	**Laterite**	Ferruginous Laterite Limonatized and moderately	1
5	BH-14	3.00	4.50	1.50	4.50	1.14	**76**	**Laterite**	Weathered Laterite Limonatised and with white Patches	1
6	BH-14	4.50	6.00	1.50	6.00	0.46	**30.66**	**Laterite**	Weathered Aluminous Laterite Limonatised and with white Patches	1
7	BH-14	6.00	6.50	0.50	6.50	0.34	**68**	**Laterite**	Ferrous to Aluminous Laterite Moderate weathering	1
8	BH-14	6.50	7.00	0.50	7.00	0.39	**78**	**Laterite**	Weathered Aluminous Laterite and Limonatised	1
9	BH-14	7.00	7.50	0.50	7.50	0.21	**42**	**Laterite**	Limonatised Ferrous to Aluminous Laterite Moderate weathering	1
10	BH-14	7.50	8.00	0.50	8.00	0.39	**78**	**Laterite**	Limonatised Aluminous laterite with secondary Quartz in less quantity	1
11	BH-14	8.00	8.50	0.50	8.50	0.41	**82**	**Laterite**	Limonatised Aluminous laterite	2
12	BH-14	8.50	9.00	0.50	9.00	0.36	**72**	**Clayey Laterite**	Ferruginous Laterite with Clayey soil	2
13	BH-14	9.00	9.50	0.50	9.50	0.33	**66**	**Laterite**	Ferrugious Laterite with small white patches	2
14	BH-14	9.50	10.00	0.50	10.00	0.32	**64**	**Clayey Laterite**	Clayey Laterite, Limonatised and Slightly Aluminous.	2
15	BH-14	10.00	10.50	0.50	10.50	0.4	**80**	**Laterite**	Ferruginous and limonatised Laterite. Highly weathered	2
16	BH-14	10.50	11.00	0.50	11.00	0.4	**80**	**Clay**	Clay, Limonatied and Ferruginous	2
17	BH-14	11.00	11.50	0.50	11.50	0.39	**78**	**Clayey Laterite**	Ferruginous clay, Clayey laterite	2
18	BH-14	11.50	12.00	0.50	12.00	0.43	**86**	**Lateritic soil**	Lateritic soil with secondary Quartz	2
19	BH-14	12.00	12.50	0.50	12.50	0.28	**56**	**Lateritic soil**	Ferruginous Laterite with soil, moderate weathering.	2
20	BH-14	12.50	13.00	0.50	13.00	0.42	**84**	**Clayey Soil**	First 20 cm only Silica and then Clay with quartz.	2
21	BH-14	13.00	13.50	0.50	13.50	0.48	**96**	**Clay**	Reddish clay with silica and Limonatised towards 13.50 m end.	2
22	BH-14	13.50	14.00	0.50	14.00	0.36	**72**	**Clayey Soil**	Yellowish Clay with more quartz or silica, Soil like.	2

Block	Mundalli Block		**Location- Village**	**Mundalli**
Bore Hole ID	BH-14		**S.O.I. Toposheet**	**48K/09**
Azimuth	NA		**Latitude**	13°58′10.78787″
Inclination	NA		**longitude**	74°34′13.73055″
RL-Collar	68.586 m		**Date of Commencement**	11/05/2025
Total depth of BH	24 m		**Date of Completion**	14/05/2025

Sl. No	Bore Hole	Run (in Meters)		Run Length (m)	True Length (m)	Recovery Length (m)	Recovery in %	Lithocode	Lithology	Box No.
		From	To							
23	BH-14	14.00	14.50	0.50	14.50	0.41	**82**	**Clayey Soil**	Yellowish Clay with more quartz or silica, Soil like. highly weathered	3
24	BH-14	14.50	15.00	0.50	15.00	0.49	**98**	**Clayey Soil**	Yellowish Clay with more quartz or silica, Soil like. highly weathered	3
25	BH-14	15.00	15.50	0.50	15.50	0.35	**70**	**Clayey Soil**	Yellowish Clay with more quartz or silica, Soil like.	3
26	BH-14	15.50	16.00	0.50	16.00	0.43	**86**	**Clayey Soil**	Yellowish Clay with more quartz or silica, Soil like.	3
27	BH-14	16.00	16.50	0.50	16.50	0.42	**84**	**Clayey Silt**	Yellow in Colour with silica weathered zone, Soil like	3
28	BH-14	16.50	17.00	0.50	17.00	0.43	**86**	**Clayey Silt**	Weathered zone with Silica soil and little Clay	3
29	BH-14	17.00	17.50	0.50	17.50	0.5	**100**	**Clayey Soil**	Yellowish white Clay with more silica	3
30	BH-14	17.50	18.00	0.50	18.00	0.41	**82**	**Clayey Silt**	Weathered zone with Silica soil and little Clay	3
31	BH-14	18.00	18.50	0.50	18.50	0.37	**74**	**Clayey Silt**	Weathered zone more silica and less clay	3
32	BH-14	18.50	19.00	0.50	19.00	0.47	**94**	**Clay**	Yellowish and brown Clay with silica	3
33	BH-14	19.00	19.50	0.50	19.50	0.45	**90**	**Clay**	Yellowish white Clay with silica	3
34	BH-14	19.50	20.00	0.50	20.00	0.49	**98**	**Clay**	Yellowish Clay with silica	4
35	BH-14	20.00	20.50	0.50	20.50	0.4	**80**	**Clay**	Yellowish and Red Clay with silica	4
36	BH-14	20.50	21.00	0.50	21.00	0.5	**100**	**Clayey Silt**	Soil and silica mixed and weathered zone	4
37	BH-14	21.00	21.50	0.50	21.50	0	**0**	**Clayey Silt**	Weathered zone more silica, Soil	4
38	BH-14	21.50	24.00	2.5	24.00	0	**0**	**Sand**	**Pinkish White Sand BH collapsed**	4

Block	Mundalli Block
Bore Hole ID	BH-15
Azimuth	NA
Inclination	NA
RL-Collar	56.46 m
Total depth of BH	10.50 m

Location- Village	**Mundalli**
S.O.I. Toposheet	**48K/09**
Latitude	13°58′22.84171″
longitude	74°33′33.86816″
Date of Commencement	5/06/2025
Date of Completion	6/06/2025

Sl. No	**Bore Hole**	**Run (in Meters)**		**Run Length (m)**	**True Length (m)**	**Recovery Length (m)**	**Recovery in %**	**Lithocode**	**Lithology**	**Box No.**
		From	**To**							
1	BH-15	0.00	0.50	0.50	0.50	0.37	**74**	**Lateritic Soil**	First 12cm Black Soil then Red in Colour Ferruginous Laterite with some White patches	1
2	BH-15	0.50	1.00	0.50	1.00	0.20	**40**	**Laterite**	Reddish and with White Patches Aluminous Laterite with the Secondary Quartz, Moderately weathered	1
3	BH-15	1.00	1.50	0.50	1.50	0.17	**34**	**Laterite**	Alumionous Laterite in the initial then Ferruginous Laterite in the end with free Silica and Slightly Limonatised	1
4	BH-15	1.50	3.00	1.50	3.00	0.19	**12.6**	**Laterite**	Red and Yellow in Colour Ferruginous Laterite, Limonatised and with free Quartz, Moderate weathering	1
5	BH-15	3.00	3.50	0.50	3.50	0.50	**100**	**Lateritic Soil**	Red Lateritic soil with the Ferruginous Laterite and Limonatised	1
6	BH-15	3.50	4.00	0.50	4.00	0.45	**90**	**Lateritic Soil**	Red Lateritic Soil , Limonatised and presence of Ferruginous Laterite Pebbles and Granules	1
7	BH-15	4.00	4.50	0.50	4.50	0.47	**94**	**Lateritic Soil**	Red Lateritic Soil, Limonatised and with Ferruginous Laterite with free Silica	1
8	BH-15	4.50	5.00	0.50	5.00	0.48	**96**	**Lateritic Soil**	Red Lateritic Soil and with Ferruginous Laterite Pebbles and Granules, Highly weathered	1
9	BH-15	5.00	5.50	0.50	5.50	0.39	**78**	**Lateritic Soil**	Red Lateritic Soil and with Pebbles and Granules of Aluminous Laterite, Highly weathered	1
10	BH-15	5.50	6.50	1.00	6.50	0.00	**0**	**SLUSH**	Red Slush like soil (Recovered from water coming out)	1

Block	Mundalli Block		**Location- Village**	**Mundalli**
Bore Hole ID	BH-15		**S.O.I. Toposheet**	**48K/09**
Azimuth	NA		**Latitude**	13°58′22.84171″
Inclination	NA		**longitude**	74°33′33.86816″
RL-Collar	56.46 m		**Date of Commencement**	5/06/2025
Total depth of BH	10.50 m		**Date of Completion**	6/06/2025

Sl. No	Bore Hole	Run (in Meters)		Run Length (m)	True Length (m)	Recovery Length (m)	Recovery in %	Lithocode	Lithology	Box No.
		From	To							
11	BH-15	6.50	7.00	0.50	7.00	0.50	**100**	**Lateritic Soil**	Limonatised and Red Lateritic Soil and with Aluminous Laterite pebbles at 7.00 m depth	1
12	BH-15	7.00	7.50	0.50	7.50	0.28	**56**	**Lateritic Soil**	Red Silty, Lateritic soil with the Granules and Pebbles of Laterite, Highly weathered	1
13	BH-15	7.50	8.00	0.50	8.00	0.30	**60**	**Lateritic Soil**	Red Soil with Limonatised Yellow Patches and presence of Laterite Granules and Pebbles	1
14	BH-15	8.00	8.50	0.50	8.50	0.39	**78**	**Clayey Laterite**	Yellowish white and Red Clay with the Laterite Pebbles and Cobbles, Limonatised	2
15	BH-15	8.50	9.00	0.50	9.00	0.50	**100**	**Lateritic Soil**	Red soil Lateratised and limonatised with the Ferruginous Laterite, Highly weathered	2
16	BH-15	9.00	9.50	0.50	9.50	0.50	**100**	**Clayey Laterite**	Yellowish white and red colour clay bands with few Laterite granules Highly weathered	2
17	BH-15	9.50	10.00	0.50	10.00	0.50	**100**	**Clayey Laterite**	Yellowish white and red clay with the Laterite granules highly weathered	2
18	BH-15	10.00	10.50	0.50	10.50	0.44	**88**	**Clayey Laterite**	Yellowish white and red clay with the Laterite pebbles and granules	2

Block	Mundalli Block
Bore Hole ID	BH-16
Azimuth	NA
Inclination	NA
RL-Collar	65.75 m
Total depth of BH	17 m

Location- Village	Mundalli
S.O.I. Toposheet	48K/09
Latitude	13°58′22.54835″
longitude	74°33′47.18620″
Date of Commencement	9/05/2025
Date of Completion	10/05/2025

Sl. No	Bore Hole	Run (in Meters)		Run Length (m)	True Length (m)	Recovery Length (m)	Recovery in %	Lithocode	Lithology	Box No.
		From	To							
1	BH-16	0.00	0.50	0.50	0.50	0.08	**16**	**Laterite**	Weathered limonotized laterite filled with secondary quartz	1
2	BH-16	0.50	1.00	0.50	1.00	0.09	**18**	**Laterite**	Weathered limonotized laterite	1
3	BH-16	1.00	1.50	0.50	1.50	0.09	**18**	**Laterite**	Weathered limonotized laterite filled with secondary quartz	1
4	BH-16	1.50	3.00	1.50	3.00	0.61	**40.66**	**Laterite**	Weathered limonotized laterite, hard in the beginning , highly weathered from middle to end	1
5	BH-16	3.00	3.50	0.50	3.50	0.5	**100**	**Laterite**	very little quantity Fe Clayey soil in the beginning later hard weathered laterite	1
6	BH-16	3.50	4.50	1.00	4.50	1.5	**100**	**Laterite**	First 10cm Fe Clayey soil, later laterite with white Bauxite patch	1
7	BH-16	4.50	6.00	1.50	6.00	0.49	**32.66**	**Laterite**	Fe laterite with White Bauxite Patch	1
8	BH-16	6.00	6.50	0.50	6.50	0.32	**62**	**Laterite**	Fe laterite	1
9	BH-16	6.50	7.00	0.50	7.00	0.28	**56**	**Lateritic soil**	Fe Lateritic Soil	1
10	BH-16	7.00	7.50	0.50	7.50	0.33	**66**	**Lateritic soil**	Fe Lateritic Soil, Slight pink colour	1
11	BH-16	7.50	8.00	0.50	8.00	0.3	**60**	**Lateritic soil**	Pinkish Lateritic soil	1
12	BH-16	8.00	8.50	0.50	8.50	0.36	**72**	**Lateritic soil**	Pinkish Lateritic soil	2
13	BH-16	8.50	9.00	0.50	9.00	0.5	**100**	**Lateritic soil**	Highly weathered Lateritic Soil with minor clay	2
14	BH-16	9.00	9.50	0.50	9.50	0.38	**76**	**Clay**	Pinkish Clay (inside white colour)	2
15	BH-16	9.50	10.00	0.50	10.00	0.37	**74**	**Clay**	Pinkish Clay (inside white colour)	2
16	BH-16	10.00	10.50	0.50	10.50	0.49	**98**	**Clay**	Fe to Al Clay (Red to Pink)	2
17	BH-16	10.50	11.00	0.50	11.00	0.41	**82**	**Clay**	Pink to Pinkish white	2
18	BH-16	11.00	11.50	0.50	11.50	0.42	**84**	**Clay**	White Al rich clay at the end it is silica rich towards 11.5	2
19	BH-16	11.50	12.00	0.50	12.00	0.41	**82**	**Clayey Soil**	Pink quartz rich clay, more of soil type	2
20	BH-16	12.00	12.50	0.50	12.50	0.41	**82**	**Lateritic soil**	Limonitic to Ferruginous soil	2
21	BH-16	12.50	13.00	0.50	13.00	0.39	**78**	**Clay**	Quartz rich pink clay	2
22	BH-16	13.00	13.50	0.50	13.50	0.39	**78**	**Lateritic soil**	Coarse grained quartz rich pink soil material , with high silica content	2
23	BH-16	13.50	14.00	0.50	14.00	0.46	**92**	**Clayey Soil**	Coarse grained quartz rich pink Clayey soil	3
24	BH-16	14.00	15.50	0.50	15.50	0.29	**58**	**Clay**	Quartz rich pink clay	3
25	BH-16	15.50	17.00	1.5	17.00	0	0	**Sand**	**Pinkish White Sand BH collapsed**	3

ANNEXURE-6a

Borehole wise Sample ID with Depth for XRF

Annexure-6a: Borehole wise Sample ID with Depth for XRF

BOREHOLE NO. 02		
Sample ID	**FROM**	**TO**
GEMDBH0201	0.00	1.50
GEMDBH02S01	1.50	3.00
GEMDBH02S02	3.00	3.50
GEMDBH02S03	3.50	4.50
GEMDBH02S08	4.50	6.50
GEMDBH02S09	8.00	9.50
GEMDBH02S04	9.50	10.00
GEMDBH02S05	10.00	11.50
GEMDBH02S06	11.50	12.50
GEMDBH02S07	12.50	13.00

BOREHOLE NO. 03		
Sample ID	**FROM**	**TO**
GEMDBH0301	0.00	1.50
GEMDBH03S01	1.50	3.00
GEMDBH03S02	3.00	4.50
GEMDBH03S03	4.50	6.50
GEMDBH03S04	6.50	7.50
GEMDBH03S05	7.50	8.50
GEMDBH03S06	8.50	9.50
GEMDBH03S07	9.50	10.50
GEMDBH03S08	10.50	11.50
GEMDBH03S09	11.50	12.50
GEMDBH03S10	12.50	13.50
GEMDBH03S14	13.50	15.50
GEMDBH03S15	15.50	17.00
GEMDBH03S11	17.00	17.50
GEMDBH03S12	17.50	18.50
GEMDBH03S13	21.00	23.00
GEMDBH03S16	23.00	23.50

BOREHOLE NO. 04		
Sample ID	**FROM**	**TO**
GEMDBH0401	0.00	1.50
GEMDBH04S01	1.50	3.00
GEMDBH04S02	3.00	4.50
GEMDBH04S03	4.50	6.00
GEMDBH0402	6.00	7.50
GEMDBH04S04	7.50	8.50
GEMDBH04S12	8.50	10.00
GEMDBH04S13	10.00	11.50
GEMDBH04S05	11.50	12.50
GEMDBH04S06	12.50	13.50
GEMDBH04S07	13.50	14.50
GEMDBH04S08	14.50	15.50
GEMDBH04S14	15.50	16.00
GEMDBH04S09	16.00	17.00
GEMDBH04S15	17.50	19.50
GEMDBH04S16	19.50	20.50
GEMDBH04S17	20.50	22.00
GEMDBH04S10	22.00	23.00
GEMDBH04S11	23.00	24.00
GEMDBH0403	24.00	24.50

BOREHOLE NO. 05		
Sample ID	**FROM**	**TO**
GEMDBH05S01	0.00	1.50
GEMDBH05S02	1.50	3.00
GEMDBH05S03	3.00	4.50
GEMDBH05S04	4.50	5.50
GEMDBH05S05	5.50	6.50
GEMDBH05S06	6.50	7.50
GEMDBH05S07	7.50	8.00
GEMDBH05S08	8.00	9.00
GEMDBH05S09	9.00	10.00

(yellow)	Samples for Check Sample Analysis

Borehole wise Sample ID with Depth for XRF

BOREHOLE NO. 06		
Sample ID	**FROM**	**TO**
GEMDBH0601	0.00	1.50
GEMDBH06S01	1.50	3.00
GEMDBH06S02	3.00	4.50
GEMDBH06S03	4.50	6.00
GEMDBH0602	6.00	7.50
GEMDBH06S04	7.50	8.50
GEMDBH06S05	8.50	9.50
GEMDBH06S07	9.50	11.00
GEMDBH06S06	11.00	12.00
GEMDBH0603	12.00	12.50
GEMDBH06S08	12.50	14.50
GEMDBH06S09	14.50	17.00

BOREHOLE NO. 07		
Sample ID	**FROM**	**TO**
GEMDBH07S01	0.00	1.50
GEMDBH07S02	1.50	3.00
GEMDBH07S03	3.00	4.50
GEMDBH07S04	4.50	6.00
GEMDBH07S05	6.00	6.50
GEMDBH07S09	6.50	7.00
GEMDBH07S06	7.00	7.50
GEMDBH07S07	7.50	8.50
GEMDBH07S10	8.50	9.50
GEMDBH07S08	9.50	10.50

BOREHOLE NO. 08		
Sample ID	**FROM**	**TO**
GEMDBH0801	0.00	1.50
GEMDBH08S01	1.50	3.00
GEMDBH08S02	3.00	6.00
GEMDBH08S04	6.00	8.00
GEMDBH08S03	8.00	9.00
GEMDBH08S05	9.00	10.50
GEMDBH08S06	10.50	11.50

BOREHOLE NO. 09		
Sample ID	**FROM**	**TO**
GEMDBH0901	0.00	1.00
GEMDBH0902	1.00	2.00
GEMDBH0903	2.00	3.00
GEMDBH0904	3.00	4.50
GEMDBH0905	4.50	6.00
GEMDBH0906	6.00	7.50
GEMDBH0907	7.50	9.00
GEMDBH0908	9.00	10.50
GEMDBH0909	10.50	12.00
GEMDBH0910	12.00	13.50
GEMDBH0911	13.50	14.00
GEMDBH0912	14.00	14.50
GEMDBH0913	14.50	15.00
GEMDBH0914	15.00	16.50
GEMDBH0915	16.50	17.50
GEMDBH0916	17.50	18.50
GEMDBH0917	18.50	19.50
GEMDBH0918	20.00	21.00
GEMDBH0919	21.00	22.00

(highlighted)	Samples for Check Sample Analysis

Borehole wise Sample ID with Depth for XRF

BOREHOLE NO. 10		
Sample ID	FROM	TO
GEMDBH10S01	0.00	1.50
GEMDBH10S02	1.50	3.00
GEMDBH10S03	3.00	4.50
GEMDBH10S04	4.50	5.50
GEMDBH10S05	5.50	6.00
GEMDBH10S06	6.00	7.50
GEMDBH10S07	7.50	8.50
GEMDBH10S08	8.50	9.50
GEMDBH10S09	9.50	10.00

BOREHOLE NO. 11		
Sample ID	FROM	TO
GEMDBH1101	0.00	1.50
GEMDBH11S01	1.50	3.00
GEMDBH11S02	3.00	4.50
GEMDBH11S03	4.50	6.00
GEMDBH1102	6.00	7.50
GEMDBH11S04	7.50	9.00
GEMDBH11S05	9.00	10.50
GEMDBH11S08	10.50	11.50
GEMDBH11S06	11.50	12.50
GEMDBH11S07	12.50	13.00
GEMDBH11S09	13.00	14.00
GEMDBH1103	14.O	15.00
GEMDBH11S10	15.00	16.50

BOREHOLE NO. 12		
Sample ID	FROM	TO
GEMDBH12S01	0.00	1.50
GEMDBH12S02	1.50	3.00
GEMDBH12S03	3.00	4.50
GEMDBH12S04	4.50	6.00
GEMDBH12S05	6.00	7.50
GEMDBH12S06	7.50	8.50
GEMDBH12S07	8.50	10.00

BOREHOLE NO. 13		
Sample ID	FROM	TO
GEMDBH1301	0.00	1.50
GEMDBH13S01	1.50	3.00
GEMDBH13S02	3.00	4.50
GEMDBH13S03	4.50	6.00
GEMDBH1302	6.00	7.50
GEMDBH13S04	7.50	8.50
GEMDBH13S05	8.50	9.50
GEMDBH13S06	9.50	11.00
GEMDBH1303	11.00	11.50
GEMDBH13S07	11.50	13.00
GEMDBH13S08	13.00	15.00
GEMDBH13S09	15.00	16.50
GEMDBH13S10	16.50	18.00
GEMDBH13S11	18.00	19.50

(yellow)	Samples for Check Sample Analysis

Borehole wise Sample ID with Depth for XRF

BOREHOLE NO. 14		
Sample ID	**FROM**	**TO**
GEMDBH1401	0.00	1.50
GEMDBH14S01	1.50	3.00
GEMDBH14S02	3.00	4.50
GEMDBH14S03	4.50	6.00
GEMDBH1402	6.00	7.50
GEMDBH14S04	7.50	8.50
GEMDBH14S05	8.50	9.00
GEMDBH14S06	9.00	10.00
GEMDBH14S07	10.00	11.00
GEMDBH14S08	11.00	11.50
GEMDBH14S09	11.50	12.00
GEMDBH1403	12.00	12.50
GEMDBH14S10	12.50	13.50
GEMDBH14S11	13.50	15.50
GEMDBH14S12	15.50	17.00
GEMDBH14S13	17.00	18.50
GEMDBH14S14	18.50	20.50
GEMDBH14S15	20.50	21.50

BOREHOLE NO. 16		
Sample ID	**FROM**	**TO**
GEMDBH1601	0.00	1.50
GEMDBH16S01	1.50	3.00
GEMDBH16S02	3.00	4.50
GEMDBH16S03	4.50	6.00
GEMDBH1602	6.00	7.50
GEMDBH16S04	7.50	8.50
GEMDBH16S05	8.50	9.00
GEMDBH16S07	9.00	10.50
GEMDBH16S08	10.50	11.50
GEMDBH16S06	11.50	12.50
GEMDBH16S09	12.50	13.00
GEMDBH1603	13.00	13.50
GEMDBH16S10	13.50	15.50

BOREHOLE NO. 15		
Sample ID	**FROM**	**TO**
GEMDBH15S01	0.00	1.50
GEMDBH15S02	1.50	3.00
GEMDBH15S03	3.00	4.00
GEMDBH15S04	4.00	5.00
GEMDBH15S05	5.00	5.50
GEMDBH15S06	6.50	7.00
GEMDBH15S07	7.00	8.00
GEMDBH15S08	8.00	9.00
GEMDBH15S09	9.00	10.50

(yellow)	Samples for Check Sample Analysis

ANNEXURE-6b

List of Samples for ICP-MS/OES

Annexure-6b: List of Samples for ICP-MS/OES

Sample ID	FROM	TO
GEMDBH0401	0.00	1.50
GEMDBH0402	6.00	7.50
GEMDBH0403	24.00	24.50
GEMDBH0601	0.00	1.50
GEMDBH0602	6.00	7.50
GEMDBH0603	12.00	12.50
GEMDBH1601	0.00	1.50
GEMDBH1602	6.00	7.50
GEMDBH1603	13.00	13.50
GEMDBH1101	0.00	1.50
GEMDBH1102	6.00	7.50
GEMDBH1103	14.00	15.00
GEMDBH1401	0.00	1.50
GEMDBH1402	6.00	7.50
GEMDBH1403	12.00	12.50
GEMDBH1301	0.00	1.50
GEMDBH1302	6.00	7.50
GEMDBH1303	11.00	11.50
GEMDBH0801	0.00	1.50
GEMDBH0201	0.00	1.50
GEMDBH0301	0.00	1.50

Sample ID	FROM	TO
GEMDBH0901	0.00	1.00
GEMDBH0902	1.00	2.00
GEMDBH0903	2.00	3.00
GEMDBH0904	3.00	4.50
GEMDBH0905	4.50	6.00
GEMDBH0906	6.00	7.50
GEMDBH0907	7.50	9.00
GEMDBH0908	9.00	10.50
GEMDBH0909	10.50	12.00
GEMDBH0910	12.00	13.50
GEMDBH0911	13.50	14.00
GEMDBH0912	14.00	14.50
GEMDBH0913	14.50	15.00
GEMDBH0914	15.00	16.50
GEMDBH0915	16.50	17.50
GEMDBH0916	17.50	18.50
GEMDBH0917	18.50	19.50
GEMDBH0918	20.00	21.00
GEMDBH0919	21.00	22.00

List of Composits for ICP-MS/OES

Borehole no. 02	
Sample ID	**Composite Sample ID**
GEMDBH02S01	BH02-C1
GEMDBH02S07	
GEMDBH02S02	BH02-C2
GEMDBH02S03	
GEMDBH02S04	
GEMDBH02S05	
GEMDBH02S06	
GEMDBH02S08	BH02-C3
GEMDBH02S09	

Borehole no. 03	
Sample ID	**Composite Sample ID**
GEMDBH03S01	BH03-C1
GEMDBH03S02	
GEMDBH03S03	
GEMDBH03S04	
GEMDBH03S05	
GEMDBH03S06	
GEMDBH03S08	
GEMDBH03S11	
GEMDBH03S12	
GEMDBH03S13	
GEMDBH03S07	BH03-C2
GEMDBH03S09	
GEMDBH03S10	
GEMDBH03S14	BH03-C3
GEMDBH03S15	
GEMDBH03S16	

Borehole no. 04	
Sample ID	**Composite Sample ID**
GEMDBH04S01	BH04-C1
GEMDBH04S04	
GEMDBH04S02	BH04-C2
GEMDBH04S03	
GEMDBH04S05	
GEMDBH04S06	
GEMDBH04S08	
GEMDBH04S09	
GEMDBH04S07	BH04-C3
GEMDBH04S10	BH04-C4
GEMDBH04S11	
GEMDBH04S12	
GEMDBH04S13	
GEMDBH04S14	
GEMDBH04S15	
GEMDBH04S16	
GEMDBH04S17	

Borehole no. 05	
Sample ID	**Composite Sample ID**
GEMDBH05S01	BH05-C1
GEMDBH05S03	
GEMDBH05S04	
GEMDBH05S05	
GEMDBH05S02	BH05-C2
GEMDBH05S06	
GEMDBH05S07	
GEMDBH05S08	BH05-C3
GEMDBH05S09	

Borehole no. 06	
Sample ID	**Composite Sample ID**
GEMDBH06S01	BH06-C1
GEMDBH06S02	
GEMDBH06S03	
GEMDBH06S04	
GEMDBH06S06	
GEMDBH06S05	BH06-C2
GEMDBH06S07	BH06-C3
GEMDBH06S08	
GEMDBH06S09	

Borehole no. 07	
Sample ID	**Composite Sample ID**
GEMDBH07S01	BH07-C1
GEMDBH07S02	
GEMDBH07S04	
GEMDBH07S06	
GEMDBH07S08	
GEMDBH07S03	BH07-C2
GEMDBH07S05	
GEMDBH07S07	BH07-C3
GEMDBH07S09	BH07-C4
GEMDBH07S10	

Borehole no. 08	
Sample ID	**Composite Sample ID**
GEMDBH08S01	BH08-C1
GEMDBH08S02	BH08-C2
GEMDBH08S03	
GEMDBH08S04	BH08-C3
GEMDBH08S05	
GEMDBH08S06	

Borehole no. 10	
Sample ID	**Composite Sample ID**
GEMDBH10S01	BH10-C1
GEMDBH10S02	
GEMDBH10S03	
GEMDBH10S04	
GEMDBH10S05	
GEMDBH10S06	
GEMDBH10S07	BH10-C2
GEMDBH10S08	
GEMDBH10S09	

Borehole no. 11	
Sample ID	**Composite Sample ID**
GEMDBH11S01	BH11-C1
GEMDBH11S02	
GEMDBH11S03	
GEMDBH11S04	
GEMDBH11S05	BH11-C2
GEMDBH11S06	BH11-C3
GEMDBH11S07	
GEMDBH11S08	
GEMDBH11S09	
GEMDBH11S10	

Borehole no. 12	
Sample ID	**Composite Sample ID**
GEMDBH12S01	BH12-C1
GEMDBH12S04	
GEMDBH12S05	
GEMDBH12S02	BH12-C2
GEMDBH12S03	
GEMDBH12S06	
GEMDBH12S07	

Borehole no. 13	
Sample ID	**Composite Sample ID**
GEMDBH13S01	BH13-C1
GEMDBH13S04	
GEMDBH13S05	
GEMDBH13S06	
GEMDBH13S02	BH13-C2
GEMDBH13S03	
GEMDBH13S07	BH13-C3
GEMDBH13S08	
GEMDBH13S09	
GEMDBH13S10	
GEMDBH13S11	

Borehole no. 14	
Sample ID	**Composite Sample ID**
GEMDBH14S01	BH14-C1
GEMDBH14S02	
GEMDBH14S03	
GEMDBH14S04	
GEMDBH14S08	
GEMDBH14S05	BH14-C2
GEMDBH14S06	
GEMDBH14S07	
GEMDBH14S09	BH14-C3
GEMDBH14S10	BH14-C4
GEMDBH14S11	
GEMDBH14S12	
GEMDBH14S13	
GEMDBH14S14	
GEMDBH14S15	

Borehole no. 15	
Sample ID	**Composite Sample ID**
GEMDBH15S01	BH15-C1
GEMDBH15S04	BH15-C2
GEMDBH15S05	
GEMDBH15S06	
GEMDBH15S07	
GEMDBH15S02	BH15-C3
GEMDBH15S03	
GEMDBH15S08	
GEMDBH15S09	

Borehole no. 16	
Sample ID	**Composite Sample ID**
GEMDBH16S01	BH16-C1
GEMDBH16S02	
GEMDBH16S03	
GEMDBH16S06	BH16-C2
GEMDBH16S07	
GEMDBH16S08	
GEMDBH16S09	
GEMDBH16S10	
GEMDBH16S04	BH16-C3
GEMDBH16S05	

ANNEXURE-7a

Chemical Analysis results of XRF Studies

Annexure-7a: Borehole wise XRF Analysis result

Borehole No. 02

S.No.	Customer Code	FROM (m)	TO (m)	Al2O3 (%)	Fe2O3 (%)	SiO2 (%)	V2O5 (%)	TiO2 (%)	LOI (%)	BaO (%)	CaO (%)	Cr2O3 (%)	K2O (%)	MgO (%)	MnO (%)	Na2O (%)	P2O5 (%)	SO3 (%)
1	GEMDBH0201	0.00	1.50	20.26	35.43	32.72	0.08	1.38	9.77	<0.05	0.08	<0.05	0.06	<0.05	<0.05	<0.08	0.17	0.06
2	GEMDBH02S01	1.50	3.00	28.51	38.41	12.28	0.20	1.38	17.92	0.12	<0.05	0.13	0.24	0.16	<0.05	<0.08	0.53	0.08
3	GEMDBH02S02	3.00	3.50	30.07	31.67	16.88	0.15	1.66	18.00	0.14	<0.05	0.15	0.43	0.25	<0.05	<0.08	0.52	0.07
4	GEMDBH02S03	3.50	4.50	31.47	33.30	12.95	0.16	1.63	19.18	0.14	<0.05	0.12	0.25	0.16	<0.05	<0.08	0.56	0.06
5	GEMDBH02S08	4.50	6.50	26.84	13.04	43.32	0.05	1.59	14.14	<0.05	<0.05	0.08	0.30	0.15	<0.05	<0.08	0.26	0.07
6	GEMDBH02S09	8.00	9.50	20.54	15.67	52.35	0.08	1.68	9.22	<0.05	<0.05	0.07	0.06	0.06	<0.05	<0.08	0.08	<0.05
7	GEMDBH02S04	9.50	10.00	30.22	20.64	33.09	0.13	2.67	12.71	0.18	<0.05	0.11	<0.05	0.10	<0.05	<0.08	0.08	<0.05
8	GEMDBH02S05	10.00	11.50	30.22	20.11	33.68	0.09	2.54	12.84	0.20	<0.05	0.09	<0.05	0.10	<0.05	<0.08	0.07	<0.05
9	GEMDBH02S06	11.50	12.50	30.90	17.52	35.38	0.07	2.48	13.07	0.22	0.08	0.07	<0.05	0.11	<0.05	<0.08	0.07	<0.05
10	GEMDBH02S07	12.50	13.00	24.63	34.50	25.38	0.07	2.04	12.85	0.17	<0.05	<0.05	<0.05	0.06	<0.05	<0.08	0.18	<0.05

Borehole No. 03

S.No.	Customer Code	FROM (m)	TO (m)	Al2O3 (%)	Fe2O3 (%)	SiO2 (%)	V2O5 (%)	TiO2 (%)	LOI (%)	BaO (%)	CaO (%)	Cr2O3 (%)	K2O (%)	MgO (%)	MnO (%)	Na2O (%)	P2O5 (%)	SO3 (%)
1	GEMDBH0301	0.00	1.50	6.55	1.65	88.87	<0.05	<0.05	2.58	<0.05	<0.05	<0.05	0.06	<0.05	<0.05	<0.08	0.31	<0.05
2	GEMDBH03S01	1.50	3.00	26.91	42.50	11.93	0.20	2.20	15.74	0.08	<0.05	0.06	<0.05	0.07	<0.05	<0.08	0.15	0.12
3	GEMDBH03S02	3.00	4.50	24.38	43.23	15.51	0.18	1.69	14.44	0.14	<0.05	0.09	<0.05	0.05	<0.05	<0.08	0.13	0.11
4	GEMDBH03S03	4.50	6.50	20.76	35.84	29.66	0.12	1.64	11.58	0.13	<0.05	0.05	<0.05	<0.05	<0.05	<0.08	0.06	0.09
5	GEMDBH03S04	6.50	7.50	25.98	30.71	27.07	0.11	2.27	13.24	0.28	<0.05	0.12	<0.05	0.07	<0.05	<0.08	<0.05	0.10
6	GEMDBH03S05	7.50	8.50	25.57	32.55	25.38	0.09	2.39	13.35	0.20	<0.05	0.15	<0.05	0.08	<0.05	<0.08	0.06	0.12
7	GEMDBH03S06	8.50	9.50	25.37	35.86	21.65	0.09	2.50	14.00	0.12	<0.05	0.10	<0.05	0.07	<0.05	<0.08	0.06	0.13
8	GEMDBH03S07	9.50	10.50	31.73	18.69	31.68	0.07	2.83	14.44	0.16	<0.05	0.13	<0.05	0.10	<0.05	<0.08	<0.05	0.08
9	GEMDBH03S08	10.50	11.50	29.17	24.67	28.71	0.08	2.54	14.21	0.15	<0.05	0.11	<0.05	0.09	<0.05	<0.08	0.10	0.08
10	GEMDBH03S09	11.50	12.50	31.30	16.44	32.39	<0.05	3.76	15.27	0.29	<0.05	0.41	<0.05	<0.05	<0.05	<0.08	<0.05	<0.05
11	GEMDBH03S10	12.50	13.50	30.36	18.34	33.22	0.07	2.88	14.65	0.15	<0.05	0.09	<0.05	0.11	<0.05	<0.08	<0.05	0.06
12	GEMDBH03S14	13.50	15.50	29.15	21.64	32.46	0.05	2.52	13.66	<0.05	<0.05	<0.05	<0.05	0.06	<0.05	<0.08	0.11	0.08
13	GEMDBH03S15	15.50	17.00	28.13	24.60	29.97	0.06	2.33	14.22	<0.05	<0.05	0.06	0.09	0.08	<0.05	<0.08	0.17	0.09
14	GEMDBH03S11	17.00	17.50	22.31	38.73	20.28	0.13	1.79	16.26	0.12	<0.05	0.05	<0.05	<0.05	<0.05	<0.08	0.17	0.07
15	GEMDBH03S12	17.50	18.50	24.43	35.91	23.31	0.09	1.94	13.50	0.28	<0.05	0.32	<0.05	<0.05	<0.05	<0.08	0.10	0.07
16	GEMDBH03S13	21.00	23.00	26.22	22.26	27.52	0.06	2.14	21.21	0.17	<0.05	<0.05	0.09	0.08	<0.05	<0.08	0.12	<0.05
17	GEMDBH03S16	23.00	23.50	25.83	3.30	58.05	<0.05	1.80	10.36	<0.05	<0.05	0.07	0.19	0.10	<0.05	<0.08	<0.05	<0.05

Borehole No. 04

S.No.	Customer Code	FROM (m)	TO (m)	Al2O3 (%)	Fe2O3 (%)	SiO2 (%)	V2O5 (%)	TiO2 (%)	LOI (%)	BaO (%)	CaO (%)	Cr2O3 (%)	K2O (%)	MgO (%)	MnO (%)	Na2O (%)	P2O5 (%)	SO3 (%)
1	GEMDBH0401	0.00	1.50	25.25	35.82	20.78	0.19	1.23	15.69	<0.05	<0.05	0.07	0.29	<0.05	<0.05	<0.08	0.37	0.1
2	GEMDBH04S01	1.50	3.00	30.84	39.43	8.42	0.25	1.88	18.55	0.17	<0.05	0.08	<0.05	0.07	<0.05	<0.08	0.17	0.13
3	GEMDBH04S02	3.00	4.50	28.37	38.54	13.67	0.20	1.80	16.82	0.11	<0.05	0.10	<0.05	0.08	<0.05	<0.08	0.16	0.11
4	GEMDBH04S03	4.50	6.00	27.37	40.62	13.84	0.15	2.15	15.34	0.12	<0.05	0.10	<0.05	0.06	<0.05	<0.08	0.10	0.10
5	GEMDBH0402	6.00	7.50	30.96	30.09	13.88	0.18	2.14	22.35	<0.05	<0.05	0.08	<0.05	<0.05	<0.05	<0.08	0.2	0.12
6	GEMDBH04S04	7.50	8.50	33.32	24.80	21.14	0.09	2.30	17.54	0.29	<0.05	0.17	0.07	0.12	<0.05	<0.08	0.05	0.08
7	GEMDBH04S12	8.50	10.00	14.38	9.83	67.57	<0.05	0.86	6.88	<0.05	<0.05	0.05	0.08	0.10	<0.05	<0.08	<0.05	<0.05
8	GEMDBH04S13	10.00	11.50	29.71	19.77	34.10	0.08	2.25	13.57	<0.05	<0.05	<0.05	<0.05	0.07	<0.05	<0.08	0.11	0.10
9	GEMDBH04S05	11.50	12.50	27.75	27.61	27.84	0.11	2.38	13.71	0.14	<0.05	0.09	<0.05	0.09	<0.05	<0.08	0.16	0.07
10	GEMDBH04S06	12.50	13.50	25.48	32.40	26.74	0.12	2.02	12.68	0.16	<0.05	<0.05	0.05	0.07	<0.05	<0.08	0.14	0.06
11	GEMDBH04S07	13.50	14.50	17.04	18.01	54.52	0.05	1.34	8.26	0.29	<0.05	0.15	0.07	0.07	<0.05	<0.08	0.10	<0.05
12	GEMDBH04S08	14.50	15.50	27.35	22.43	33.50	0.07	2.50	13.51	0.15	<0.05	0.09	0.05	0.10	<0.05	<0.08	0.13	0.07
13	GEMDBH04S14	15.50	16.00	14.03	14.28	62.78	0.07	1.01	7.42	<0.05	<0.05	0.08	<0.05	<0.05	<0.05	<0.08	0.08	0.06
14	GEMDBH04S09	16.00	17.00	21.51	18.88	47.61	0.08	1.58	9.86	0.16	<0.05	0.12	<0.05	0.07	<0.05	<0.08	0.05	<0.05
15	GEMDBH04S15	17.50	19.50	35.07	5.13	41.93	<0.05	2.76	14.46	<0.05	<0.05	0.08	0.08	0.13	<0.05	<0.08	0.06	0.06
16	GEMDBH04S16	19.50	20.50	18.32	5.93	65.48	<0.05	1.39	8.31	<0.05	<0.05	0.07	0.15	0.06	<0.05	<0.08	0.07	<0.05
17	GEMDBH04S17	20.50	22.00	17.19	4.76	69.19	<0.05	1.23	7.05	<0.05	<0.05	0.07	0.20	0.07	<0.05	<0.08	<0.05	<0.05
18	GEMDBH04S10	22.00	23.00	9.92	8.98	75.43	<0.05	0.70	4.31	0.21	<0.05	0.19	0.17	<0.05	<0.05	<0.08	<0.05	<0.05
19	GEMDBH04S11	23.00	24.00	5.15	7.39	83.72	<0.05	0.32	2.77	0.23	<0.05	0.22	0.13	<0.05	<0.05	<0.08	<0.05	<0.05
20	GEMDBH0403	24.00	24.50	28.58	36.06	14.78	0.23	1.52	18.48	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.08	0.21	0.13

Borehole No. 05

S.No.	Customer Code	FROM (m)	TO (m)	Al2O3 (%)	Fe2O3 (%)	SiO2 (%)	V2O5 (%)	TiO2 (%)	LOI (%)	BaO (%)	CaO (%)	Cr2O3 (%)	K2O (%)	MgO (%)	MnO (%)	Na2O (%)	P2O5 (%)	SO3 (%)
1	GEMDBH05S01	0.00	1.50	32.11	38.75	5.87	0.16	1.94	20.42	0.12	<0.05	0.13	<0.05	0.08	<0.05	<0.08	0.24	0.15
2	GEMDBH05S02	1.50	3.00	29.00	41.90	9.07	0.26	1.99	17.19	0.16	<0.05	0.11	<0.05	0.07	<0.05	<0.08	0.13	0.12
3	GEMDBH05S03	3.00	4.50	38.30	30.23	5.91	0.17	2.52	22.22	0.15	<0.05	0.14	<0.05	0.11	<0.05	<0.08	0.12	0.09
4	GEMDBH05S04	4.50	5.50	38.52	25.16	11.07	0.10	2.67	21.43	0.24	<0.05	0.18	0.26	0.17	<0.05	<0.08	0.09	0.09
5	GEMDBH05S05	5.50	6.50	34.36	25.62	19.31	0.08	2.81	17.33	0.16	<0.05	0.10	<0.05	0.10	<0.05	<0.08	<0.05	0.07
6	GEMDBH05S06	6.50	7.50	27.93	32.09	23.13	0.07	2.33	13.99	0.12	<0.05	0.08	<0.05	0.08	<0.05	<0.08	0.05	0.08
7	GEMDBH05S07	7.50	8.00	26.71	31.72	24.95	0.08	2.27	13.72	0.14	<0.05	0.08	0.06	0.08	<0.05	<0.08	0.10	0.08
8	GEMDBH05S08	8.00	9.00	26.30	31.00	26.04	0.07	2.09	13.93	<0.05	<0.05	<0.05	<0.05	0.05	<0.05	<0.08	0.15	0.10
9	GEMDBH05S09	9.00	10.00	20.72	43.86	22.15	0.11	1.55	11.21	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.08	0.10	0.09

Borehole No. 06

S.No.	Customer Code	FROM (m)	TO (m)	Al2O3 (%)	Fe2O3 (%)	SiO2 (%)	V2O5 (%)	TiO2 (%)	LOI (%)	BaO (%)	CaO (%)	Cr2O3 (%)	K2O (%)	MgO (%)	MnO (%)	Na2O (%)	P2O5 (%)	SO3 (%)
1	GEMDBH0601	0.00	1.50	26.96	38.46	17.01	0.14	1.88	15.2	<0.05	<0.05	0.06	<0.05	<0.05	<0.05	<0.08	0.16	0.13
2	GEMDBH06S01	1.50	3.00	25.03	42.75	15.63	0.20	1.74	14.14	0.10	<0.05	0.05	<0.05	<0.05	<0.05	<0.08	0.18	0.12
3	GEMDBH06S02	3.00	4.50	23.70	46.47	13.02	0.22	1.72	14.30	0.18	<0.05	<0.05	<0.05	<0.05	<0.05	<0.08	0.18	0.13
4	GEMDBH06S03	4.50	6.00	22.74	48.60	12.65	0.15	1.79	13.55	0.10	<0.05	0.07	<0.05	<0.05	<0.05	<0.08	0.17	0.13
5	GEMDBH0602	6.00	7.50	3.4	6.08	88.37	<0.05	0.21	1.77	<0.05	<0.05	<0.05	0.1	<0.05	<0.05	<0.08	0.06	<0.05
6	GEMDBH06S04	7.50	8.50	25.02	38.33	20.88	0.13	2.03	13.01	0.17	<0.05	0.09	<0.05	0.06	<0.05	<0.08	0.11	0.11
7	GEMDBH06S05	8.50	9.50	32.35	16.83	32.95	0.08	2.92	14.20	0.19	<0.05	0.13	0.06	0.11	<0.05	<0.08	0.10	0.07
8	GEMDBH06S07	9.50	11.00	28.17	24.30	30.27	0.06	2.47	14.21	<0.05	<0.05	<0.05	<0.05	0.06	<0.05	<0.08	0.09	0.12
9	GEMDBH06S06	11.00	12.00	29.16	23.83	30.12	0.08	2.17	14.05	0.14	<0.05	0.11	<0.05	0.10	<0.05	<0.08	0.11	0.07
10	GEMDBH0603	12.00	12.50	27.79	28.84	22.49	0.21	1.64	18.58	<0.05	<0.05	0.08	<0.05	<0.05	<0.05	<0.08	0.22	0.15
11	GEMDBH06S08	12.50	14.50	24.82	33.98	25.99	0.10	2.02	12.57	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.08	0.19	0.08
12	GEMDBH06S09	14.50	17.00	24.07	16.63	45.40	<0.05	1.98	11.32	<0.05	<0.05	0.05	0.06	0.05	<0.05	<0.08	0.15	0.06

Borehole No. 07

S.No.	Customer Code	FROM (m)	TO (m)	Al2O3 (%)	Fe2O3 (%)	SiO2 (%)	V2O5 (%)	TiO2 (%)	LOI (%)	BaO (%)	CaO (%)	Cr2O3 (%)	K2O (%)	MgO (%)	MnO (%)	Na2O (%)	P2O5 (%)	SO3 (%)
1	GEMDBH07S01	0.00	1.50	29.96	34.19	14.16	0.12	2.00	18.69	0.33	<0.05	0.25	<0.05	<0.05	<0.05	<0.08	0.17	0.10
2	GEMDBH07S02	1.50	3.00	28.60	38.35	13.18	0.12	2.23	16.56	0.35	<0.05	0.35	0.05	<0.05	<0.05	<0.08	0.13	0.06
3	GEMDBH07S03	3.00	4.50	33.05	34.95	9.43	0.13	2.39	19.05	0.42	<0.05	0.29	<0.05	<0.05	<0.05	<0.08	0.19	<0.05
4	GEMDBH07S04	4.50	6.00	29.22	39.46	11.52	0.11	2.24	16.79	0.24	<0.05	0.18	<0.05	<0.05	<0.05	<0.08	0.15	0.05
5	GEMDBH07S05	6.00	6.50	44.24	3.53	26.11	<0.05	2.98	21.65	0.72	0.10	0.51	0.05	<0.05	<0.05	<0.08	<0.05	<0.05
6	GEMDBH07S09	6.50	7.00	34.36	1.05	45.98	<0.05	2.22	16.01	<0.05	<0.05	0.07	<0.05	0.07	<0.05	<0.08	<0.05	<0.05
7	GEMDBH07S06	7.00	7.50	22.67	0.45	64.99	<0.05	1.57	9.17	0.53	<0.05	0.54	<0.05	<0.05	<0.05	<0.08	<0.05	<0.05
8	GEMDBH07S07	7.50	8.50	15.67	16.01	58.33	<0.05	1.16	7.60	0.38	<0.05	0.59	0.08	<0.05	0.09	<0.08	0.06	<0.05
9	GEMDBH07S10	8.50	9.50	33.42	9.79	39.05	<0.05	2.94	14.17	<0.05	<0.05	0.07	<0.05	0.11	<0.05	<0.08	0.08	0.08
10	GEMDBH07S08	9.50	10.50	25.94	27.73	25.94	0.05	2.24	17.16	0.22	<0.05	0.54	<0.05	<0.05	<0.05	<0.08	0.09	<0.05

Borehole No. 08

S.No.	Customer Code	FROM (m)	TO (m)	Al2O3 (%)	Fe2O3 (%)	SiO2 (%)	V2O5 (%)	TiO2 (%)	LOI (%)	BaO (%)	CaO (%)	Cr2O3 (%)	K2O (%)	MgO (%)	MnO (%)	Na2O (%)	P2O5 (%)	SO3 (%)
1	GEMDBH0801	0.00	1.50	26.97	35.01	19.32	0.09	0.99	16.93	<0.05	0.05	0.1	0.06	<0.05	<0.05	<0.08	0.33	0.15
2	GEMDBH08S01	1.50	3.00	32.72	32.06	13.26	0.09	1.66	19.05	0.11	<0.05	0.15	0.30	0.17	<0.05	<0.08	0.29	0.10
3	GEMDBH08S02	3.00	6.00	21.51	41.50	22.02	0.10	1.40	12.61	0.17	<0.05	0.10	0.14	0.09	<0.05	<0.08	0.23	0.08
4	GEMDBH08S04	6.00	8.00	30.07	18.84	33.44	0.07	2.31	14.45	<0.05	<0.05	0.06	0.20	0.12	<0.05	<0.08	0.18	0.08
5	GEMDBH08S03	8.00	9.00	23.08	33.69	28.26	0.09	1.88	12.39	0.13	<0.05	0.07	0.07	0.09	<0.05	<0.08	0.20	<0.05
6	GEMDBH08S05	9.00	10.50	9.43	1.68	83.91	<0.05	0.67	3.88	<0.05	<0.05	0.07	0.05	0.07	<0.05	<0.08	<0.05	<0.05
7	GEMDBH08S06	10.50	11.50	4.45	1.25	91.80	<0.05	0.28	1.98	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.08	<0.05	<0.05

Borehole No. 09

S.No.	Customer Code	FROM (m)	TO (m)	Al2O3 (%)	Fe2O3 (%)	SiO2 (%)	V2O5 (%)	TiO2 (%)	LOI (%)	BaO (%)	CaO (%)	Cr2O3 (%)	K2O (%)	MgO (%)	MnO (%)	Na2O (%)	P2O5 (%)	SO3 (%)
1	GEMDBH0901	0.00	1.00	37.82	26.31	10.47	0.09	2.16	22.36	<0.05	0.07	0.10	<0.05	0.13	<0.05	0.06	0.16	0.17
2	GEMDBH0902	1.00	2.00	43.03	21.22	7.89	0.08	2.50	24.59	<0.05	<0.05	0.11	<0.05	0.12	<0.05	0.06	0.11	0.14
3	GEMDBH0903	2.00	3.00	45.36	18.90	7.07	0.05	2.73	25.16	<0.05	<0.05	0.11	0.05	0.12	<0.05	0.06	0.14	0.13
4	GEMDBH0904	3.00	4.50	29.12	38.45	12.72	0.15	2.47	16.52	<0.05	<0.05	0.06	<0.05	0.05	<0.05	0.07	0.14	0.13
5	GEMDBH0905	4.50	6.00	36.75	31.66	7.64	0.13	2.59	20.66	<0.05	<0.05	0.08	<0.05	0.07	<0.05	0.07	0.14	0.11
6	GEMDBH0906	6.00	7.50	40.48	26.86	6.49	0.06	2.92	22.65	<0.05	<0.05	0.07	<0.05	0.10	<0.05	0.06	0.11	0.10
7	GEMDBH0907	7.50	9.00	30.54	41.69	7.29	0.12	2.22	17.59	<0.05	<0.05	0.07	<0.05	0.05	<0.05	0.07	0.16	0.12
8	GEMDBH0908	9.00	10.50	29.26	23.21	31.50	0.05	2.38	13.17	<0.05	<0.05	<0.05	<0.05	0.06	<0.05	0.07	<0.05	0.08
9	GEMDBH0909	10.50	12.00	26.31	29.17	28.81	0.10	2.03	13.04	<0.05	<0.05	<0.05	<0.05	0.06	<0.05	0.07	0.11	0.09
10	GEMDBH0910	12.00	13.50	18.40	52.52	16.00	0.09	1.31	11.24	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.07	0.12	0.11
11	GEMDBH0911	13.50	14.00	15.06	1.88	75.57	<0.05	0.98	6.15	<0.05	<0.05	<0.05	0.07	<0.05	<0.05	0.08	<0.05	<0.05
12	GEMDBH0912	14.00	14.50	10.98	12.60	69.81	<0.05	0.70	5.53	<0.05	<0.05	0.06	<0.05	<0.05	<0.05	0.08	0.05	<0.05
13	GEMDBH0913	14.50	15.00	28.81	22.27	32.45	0.10	2.41	13.45	<0.05	<0.05	<0.05	<0.05	0.06	<0.05	0.07	0.13	0.07
14	GEMDBH0914	15.00	16.50	26.37	26.72	31.86	0.09	2.16	12.36	<0.05	<0.05	<0.05	<0.05	0.06	<0.05	0.07	0.10	0.06
15	GEMDBH0915	16.50	17.50	29.27	21.64	33.38	0.05	2.41	12.81	<0.05	<0.05	<0.05	<0.05	0.06	<0.05	0.07	0.09	0.06
16	GEMDBH0916	17.50	18.50	27.93	25.03	32.06	0.08	2.20	12.24	<0.05	<0.05	<0.05	<0.05	0.07	<0.05	0.07	0.09	0.06
17	GEMDBH0917	18.50	19.50	31.72	15.43	36.30	0.06	2.51	13.45	<0.05	<0.05	<0.05	<0.05	0.08	<0.05	0.07	0.11	0.05
18	GEMDBH0918	20.00	21.00	30.27	11.08	42.56	0.07	2.36	13.05	<0.05	<0.05	0.06	0.07	0.10	<0.05	0.07	0.13	<0.05
19	GEMDBH0919	21.00	22.00	9.74	2.81	82.85	<0.05	0.73	3.41	<0.05	<0.05	0.08	0.06	<0.05	<0.05	0.17	<0.05	<0.05

Borehole No. 10

S.No.	Customer Code	FROM (m)	TO (m)	Al2O3 (%)	Fe2O3 (%)	SiO2 (%)	V2O5 (%)	TiO2 (%)	LOI (%)	BaO (%)	CaO (%)	Cr2O3 (%)	K2O (%)	MgO (%)	MnO (%)	Na2O (%)	P2O5 (%)	SO3 (%)
1	GEMDBH10S01	0.00	1.50	39.62	25.86	8.43	0.12	2.23	22.91	0.16	<0.05	0.19	0.05	0.15	<0.05	<0.08	0.16	0.10
2	GEMDBH10S02	1.50	3.00	47.53	15.74	7.81	0.07	2.54	25.66	0.15	<0.05	0.15	<0.05	0.15	<0.05	<0.08	0.08	0.08
3	GEMDBH10S03	3.00	4.50	50.70	9.08	10.59	<0.05	2.50	26.29	0.21	<0.05	0.19	0.08	0.19	<0.05	<0.08	<0.05	0.07
4	GEMDBH10S04	4.50	5.50	40.02	7.22	29.66	<0.05	2.24	19.99	0.25	<0.05	0.17	0.14	0.16	<0.05	<0.08	<0.05	0.06
5	GEMDBH10S05	5.50	6.00	36.51	15.85	25.48	0.07	2.74	18.33	0.26	<0.05	0.15	0.29	0.17	<0.05	<0.08	0.06	0.08
6	GEMDBH10S06	6.00	7.50	32.85	19.20	27.70	0.06	3.09	16.13	0.46	<0.05	0.12	0.25	<0.05	<0.05	<0.08	<0.05	<0.05
7	GEMDBH10S07	7.50	8.50	24.75	36.52	21.63	0.10	2.37	13.86	0.42	<0.05	0.08	0.10	<0.05	<0.05	<0.08	0.06	0.08
8	GEMDBH10S08	8.50	9.50	26.50	32.07	23.88	0.08	2.56	14.15	0.39	<0.05	0.11	0.11	<0.05	<0.05	<0.08	<0.05	0.08
9	GEMDBH10S09	9.50	10.00	28.43	27.88	25.56	0.05	2.75	14.52	0.41	<0.05	0.11	0.13	<0.05	<0.05	<0.08	<0.05	0.08

Borehole No. 11

S.No.	Customer Code	FROM (m)	TO (m)	Al2O3 (%)	Fe2O3 (%)	SiO2 (%)	V2O5 (%)	TiO2 (%)	LOI (%)	BaO (%)	CaO (%)	Cr2O3 (%)	K2O (%)	MgO (%)	MnO (%)	Na2O (%)	P2O5 (%)	SO3 (%)
1	GEMDBH1101	0.00	1.50	24.24	53.6	5.43	0.14	1.52	14.62	<0.05	<0.05	0.08	<0.05	<0.05	<0.05	<0.08	0.19	0.18
2	GEMDBH11S01	1.50	3.00	26.24	37.88	16.75	0.12	1.64	16.73	0.13	<0.05	0.11	0.06	0.06	<0.05	<0.08	0.13	0.14
3	GEMDBH11S02	3.00	4.50	21.73	44.86	17.27	0.17	1.47	13.97	0.09	<0.05	0.13	<0.05	0.05	<0.05	<0.08	0.14	0.11
4	GEMDBH11S03	4.50	6.00	29.58	36.17	13.91	0.16	2.07	17.48	0.14	<0.05	0.10	<0.05	0.08	<0.05	<0.08	0.14	0.08
5	GEMDBH1102	6.00	7.50	25.15	44.07	14.01	0.2	1.84	14.38	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.08	0.17	0.16
6	GEMDBH11S04	7.50	9.00	23.00	43.27	18.97	0.06	2.33	11.85	0.27	<0.05	0.15	<0.05	<0.05	<0.05	<0.08	<0.05	0.06
7	GEMDBH11S05	9.00	10.50	19.12	48.63	18.52	0.06	1.73	10.82	0.52	<0.05	0.40	<0.05	<0.05	<0.05	<0.08	0.13	<0.05
8	GEMDBH11S08	10.50	11.50	32.61	3.84	47.81	0.08	2.24	12.94	<0.05	<0.05	0.07	<0.05	0.08	<0.05	<0.08	0.07	<0.05
9	GEMDBH11S06	11.50	12.50	18.98	2.01	69.83	<0.05	1.24	7.27	0.28	<0.05	0.20	0.06	0.08	<0.05	<0.08	<0.05	<0.05
10	GEMDBH11S07	12.50	13.00	16.99	6.44	67.93	<0.05	1.13	6.81	0.25	<0.05	0.24	0.08	0.07	<0.05	<0.08	<0.05	<0.05
11	GEMDBH11S09	13.00	14.00	3.71	16.40	76.23	<0.05	0.20	3.21	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.08	<0.05	<0.05
12	GEMDBH1103	14.O	15.00	17.7	9.18	64.28	0.06	1.16	7.47	<0.05	<0.05	<0.05	0.07	<0.05	<0.05	<0.08	0.09	<0.05
13	GEMDBH11S10	15.00	16.50	4.28	5.22	87.70	<0.05	0.23	2.34	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.08	<0.05	<0.05

Borehole No. 12

S.No.	Customer Code	FROM (m)	TO (m)	Al2O3 (%)	Fe2O3 (%)	SiO2 (%)	V2O5 (%)	TiO2 (%)	LOI (%)	BaO (%)	CaO (%)	Cr2O3 (%)	K2O (%)	MgO (%)	MnO (%)	Na2O (%)	P2O5 (%)	SO3 (%)
1	GEMDBH12S01	0.00	1.50	27.02	32.75	20.68	0.06	1.31	17.22	0.39	<0.05	0.11	0.09	<0.05	<0.05	<0.08	0.18	0.13
2	GEMDBH12S02	1.50	3.00	31.52	31.26	15.55	0.07	1.58	18.91	0.41	<0.05	0.19	0.21	<0.05	0.06	<0.08	0.12	0.12
3	GEMDBH12S03	3.00	4.50	32.39	32.73	13.51	0.13	2.02	18.26	0.43	<0.05	0.26	0.07	<0.05	<0.05	<0.08	0.10	0.06
4	GEMDBH12S04	4.50	6.00	25.69	32.44	25.00	0.11	1.72	14.21	0.45	<0.05	0.13	0.08	<0.05	<0.05	<0.08	0.08	0.06
5	GEMDBH12S05	6.00	7.50	24.88	40.91	16.76	0.16	2.03	14.51	0.39	<0.05	0.08	0.09	<0.05	<0.05	<0.08	0.07	0.09
6	GEMDBH12S06	7.50	8.50	34.74	20.83	23.87	0.06	2.84	16.81	0.48	<0.05	0.09	0.16	<0.05	<0.05	<0.08	0.06	<0.05
7	GEMDBH12S07	8.50	10.00	32.58	23.82	23.61	<0.05	2.93	16.43	0.36	<0.05	<0.05	0.15	<0.05	<0.05	<0.08	<0.05	<0.05

Borehole No. 13

S.No.	Customer Code	FROM (m)	TO (m)	Al2O3 (%)	Fe2O3 (%)	SiO2 (%)	V2O5 (%)	TiO2 (%)	LOI (%)	BaO (%)	CaO (%)	Cr2O3 (%)	K2O (%)	MgO (%)	MnO (%)	Na2O (%)	P2O5 (%)	SO3 (%)
1	GEMDBH1301	0.00	1.50	41.6	28.62	3.39	0.13	2.15	23.67	<0.05	<0.05	0.08	<0.05	<0.05	<0.05	<0.08	0.25	0.11
2	GEMDBH13S01	1.50	3.00	35.99	32.20	6.63	0.22	2.43	21.81	0.19	<0.05	0.14	<0.05	0.11	<0.05	<0.08	0.16	0.09
3	GEMDBH13S02	3.00	4.50	27.75	35.76	17.82	0.21	2.01	15.85	0.12	<0.05	0.14	<0.05	0.09	<0.05	<0.08	0.12	0.10
4	GEMDBH13S03	4.50	6.00	28.13	42.07	10.62	0.24	2.02	16.30	0.12	<0.05	0.13	<0.05	0.08	<0.05	<0.08	0.14	0.12
5	GEMDBH1302	6.00	7.50	31.46	36.5	12.53	0.12	2.49	16.57	<0.05	<0.05	0.07	<0.05	<0.05	<0.05	<0.08	0.16	0.11
6	GEMDBH13S04	7.50	8.50	35.58	4.30	42.45	<0.05	2.62	14.25	0.22	<0.05	0.18	0.11	0.16	<0.05	<0.08	<0.05	<0.05
7	GEMDBH13S05	8.50	9.50	32.25	16.34	33.55	0.08	2.58	14.51	0.18	<0.05	0.10	0.13	0.13	<0.05	<0.08	0.06	0.08
8	GEMDBH13S06	9.50	11.00	30.19	22.49	30.06	0.09	2.53	13.99	0.16	<0.05	0.10	0.08	0.11	<0.05	<0.08	0.06	0.11
9	GEMDBH1303	11.00	11.50	4.21	70.69	19.1	0.12	0.18	5.36	<0.05	<0.05	0.06	<0.05	<0.05	<0.05	<0.08	0.17	0.12
10	GEMDBH13S07	11.50	13.00	26.87	28.18	28.46	0.08	2.29	13.60	<0.05	<0.05	<0.05	0.05	0.06	<0.05	<0.08	0.06	0.13
11	GEMDBH13S08	13.00	15.00	23.71	16.04	47.15	<0.05	1.88	10.66	<0.05	<0.05	0.06	0.08	0.07	<0.05	<0.08	0.07	0.08
12	GEMDBH13S09	15.00	16.50	35.20	4.15	42.43	<0.05	2.97	14.65	<0.05	<0.05	0.08	0.05	0.09	<0.05	<0.08	0.08	0.07
13	GEMDBH13S10	16.50	18.00	19.35	4.14	66.91	<0.05	1.42	7.62	<0.05	<0.05	0.10	0.09	0.07	<0.05	<0.08	0.07	<0.05
14	GEMDBH13S11	18.00	19.50	8.28	1.68	85.90	<0.05	0.57	3.27	<0.05	<0.05	0.06	0.06	<0.05	<0.05	<0.08	<0.05	<0.05

Borehole No. 14

S.No.	Customer Code	FROM (m)	TO (m)	Al2O3 (%)	Fe2O3 (%)	SiO2 (%)	V2O5 (%)	TiO2 (%)	LOI (%)	BaO (%)	CaO (%)	Cr2O3 (%)	K2O (%)	MgO (%)	MnO (%)	Na2O (%)	P2O5 (%)	SO3 (%)
1	GEMDBH1401	0.00	1.50	25.71	53.95	1.74	0.34	1.57	16.26	<0.05	<0.05	0.07	<0.05	<0.05	<0.05	<0.08	0.21	0.16
2	GEMDBH14S01	1.50	3.00	34.79	33.32	7.22	0.15	2.18	21.31	0.21	<0.05	0.17	0.12	0.12	<0.05	<0.08	0.28	0.09
3	GEMDBH14S02	3.00	4.50	42.49	21.84	7.98	0.10	3.02	23.87	0.17	<0.05	0.17	<0.05	0.13	<0.05	<0.08	0.12	0.06
4	GEMDBH14S03	4.50	6.00	32.77	36.23	9.07	0.13	2.80	18.49	0.08	<0.05	0.12	<0.05	0.10	<0.05	<0.08	0.12	0.07
5	GEMDBH1402	6.00	7.50	31.63	30.66	18.79	0.15	2.18	16.02	<0.05	<0.05	0.06	0.19	0.07	<0.05	<0.08	0.15	0.11
6	GEMDBH14S04	7.50	8.50	31.46	29.15	20.14	0.08	2.90	15.73	0.14	<0.05	0.11	<0.05	0.10	<0.05	<0.08	0.06	0.08
7	GEMDBH14S05	8.50	9.00	25.06	37.64	21.69	0.10	2.32	12.71	0.14	<0.05	0.05	<0.05	0.06	<0.05	<0.08	0.09	0.09
8	GEMDBH14S06	9.00	10.00	27.71	30.00	25.59	0.08	2.37	13.78	0.14	<0.05	0.05	<0.05	0.08	<0.05	<0.08	0.10	0.08
9	GEMDBH14S07	10.00	11.00	25.88	32.43	25.94	0.09	2.22	12.97	0.16	<0.05	<0.05	<0.05	0.05	<0.05	<0.08	0.08	0.08
10	GEMDBH14S08	11.00	11.50	34.20	12.05	36.85	0.08	2.75	13.43	0.19	<0.05	0.10	0.13	0.12	<0.05	<0.08	<0.05	<0.05
11	GEMDBH14S09	11.50	12.00	10.92	47.39	33.42	0.08	0.70	6.98	0.13	<0.05	0.07	0.07	<0.05	0.10	<0.08	<0.05	<0.05
12	GEMDBH1403	12.00	12.50	28.86	22.81	31.92	0.1	2.3	13.82	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.08	0.12	0.07
13	GEMDBH14S10	12.50	13.50	8.76	11.65	74.22	<0.05	0.46	4.49	<0.05	<0.05	0.08	0.08	<0.05	<0.05	<0.08	0.10	<0.05
14	GEMDBH14S11	13.50	15.50	8.89	5.82	80.54	<0.05	0.48	3.91	<0.05	<0.05	0.06	0.11	<0.05	<0.05	<0.08	<0.05	<0.05
15	GEMDBH14S12	15.50	17.00	9.20	2.21	83.89	<0.05	0.56	3.74	<0.05	<0.05	0.07	0.10	<0.05	<0.05	<0.08	<0.05	<0.05
16	GEMDBH14S13	17.00	18.50	8.11	1.82	86.16	<0.05	0.44	3.14	<0.05	<0.05	0.06	0.08	<0.05	<0.05	<0.08	<0.05	<0.05
17	GEMDBH14S14	18.50	20.50	8.46	1.91	85.53	<0.05	0.43	3.33	<0.05	<0.05	0.08	0.08	<0.05	<0.05	<0.08	<0.05	<0.05
18	GEMDBH14S15	20.50	21.50	5.18	6.49	84.99	<0.05	0.23	2.73	<0.05	<0.05	0.06	0.06	<0.05	<0.05	<0.08	0.11	<0.05

Borehole No. 15

S.No.	Customer Code	FROM (m)	TO (m)	Al2O3 (%)	Fe2O3 (%)	SiO2 (%)	V2O5 (%)	TiO2 (%)	LOI (%)	BaO (%)	CaO (%)	Cr2O3 (%)	K2O (%)	MgO (%)	MnO (%)	Na2O (%)	P2O5 (%)	SO3 (%)
1	GEMDBH15S01	0.00	1.50	34.05	27.51	15.97	0.08	1.93	19.49	0.44	<0.05	0.19	0.14	<0.05	<0.05	<0.08	0.09	<0.05
2	GEMDBH15S02	1.50	3.00	24.59	36.49	21.37	0.11	1.41	15.14	0.37	<0.05	0.23	0.09	<0.05	<0.05	<0.08	0.11	0.07
3	GEMDBH15S03	3.00	4.00	22.91	28.27	32.31	<0.05	1.34	13.60	0.50	<0.05	0.24	0.58	<0.05	<0.05	<0.08	0.08	0.05
4	GEMDBH15S04	4.00	5.00	19.21	33.95	33.10	<0.05	1.02	11.74	0.38	<0.05	0.14	0.25	<0.05	<0.05	<0.08	0.08	0.07
5	GEMDBH15S05	5.00	5.50	17.19	31.55	38.82	<0.05	0.81	10.68	0.45	<0.05	0.19	0.13	<0.05	<0.05	<0.08	0.06	0.07
6	GEMDBH15S06	6.50	7.00	19.91	28.24	37.67	<0.05	1.05	11.66	0.39	<0.05	0.44	0.42	<0.05	<0.05	<0.08	0.09	0.06
7	GEMDBH15S07	7.00	8.00	18.67	20.77	47.94	<0.05	0.93	10.06	0.40	<0.05	0.43	0.59	<0.05	<0.05	<0.08	0.11	<0.05
8	GEMDBH15S08	8.00	9.00	21.46	22.97	41.89	<0.05	0.94	10.65	0.41	<0.05	0.35	1.03	0.14	<0.05	<0.08	0.10	<0.05
9	GEMDBH15S09	9.00	10.50	22.61	12.89	51.31	<0.05	0.91	9.73	0.69	0.05	0.34	1.25	0.20	<0.05	<0.08	<0.05	<0.05

Borehole No. 16

S.No.	Customer Code	FROM (m)	TO (m)	Al2O3 (%)	Fe2O3 (%)	SiO2 (%)	V2O5 (%)	TiO2 (%)	LOI (%)	BaO (%)	CaO (%)	Cr2O3 (%)	K2O (%)	MgO (%)	MnO (%)	Na2O (%)	P2O5 (%)	SO3 (%)
1	GEMDBH1601	0.00	1.50	20.56	55.28	10.19	0.14	1.63	11.88	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.08	0.18	0.14
2	GEMDBH16S01	1.50	3.00	26.02	41.25	14.67	0.18	1.67	15.49	0.12	<0.05	0.08	<0.05	0.06	<0.05	<0.08	0.31	0.12
3	GEMDBH16S02	3.00	4.50	22.77	46.56	14.91	0.12	1.95	13.10	0.14	<0.05	0.09	<0.05	0.05	<0.05	<0.08	0.19	0.11
4	GEMDBH16S03	4.50	6.00	25.63	44.38	12.54	0.12	1.79	15.01	0.13	<0.05	<0.05	<0.05	0.06	<0.05	<0.08	0.17	0.09
5	GEMDBH1602	6.00	7.50	26.45	28.06	31.11	0.11	1.84	12.18	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.08	0.16	0.09
6	GEMDBH16S04	7.50	8.50	11.79	12.43	69.46	<0.05	0.68	5.06	0.23	<0.05	0.18	0.06	<0.05	<0.05	<0.08	<0.05	<0.05
7	GEMDBH16S05	8.50	9.00	12.31	9.25	71.76	<0.05	0.65	5.17	0.40	<0.05	0.22	0.11	0.06	<0.05	<0.08	<0.05	<0.05
8	GEMDBH16S07	9.00	10.50	33.94	3.67	44.66	<0.05	3.18	13.94	<0.05	<0.05	0.08	<0.05	0.09	<0.05	<0.08	0.09	0.06
9	GEMDBH16S08	10.50	11.50	19.94	2.16	67.45	<0.05	1.76	8.14	<0.05	<0.05	0.10	0.07	0.06	<0.05	<0.08	0.05	<0.05
10	GEMDBH16S06	11.50	12.50	9.65	2.96	82.25	<0.05	0.67	3.90	0.24	<0.05	0.22	<0.05	<0.05	<0.05	<0.08	<0.05	<0.05
11	GEMDBH16S09	12.50	13.00	13.25	1.16	79.24	<0.05	0.82	5.15	<0.05	<0.05	0.07	0.08	<0.05	<0.05	<0.08	<0.05	<0.05
12	GEMDBH1603	13.00	13.50	28.44	45.15	6.88	0.15	1.56	17.34	<0.05	<0.05	0.06	0.07	<0.05	<0.05	<0.08	0.25	0.09
13	GEMDBH16S10	13.50	15.50	6.58	1.46	88.49	<0.05	0.38	2.79	<0.05	<0.05	0.06	0.07	<0.05	<0.05	<0.08	<0.05	<0.05

ANNEXURE-7b

Chemical Analysis results of ICPOES/MS Studies

Sl. No.	Method	SOP/OM/052	SOP/OM/052	SOP/OM/052	SOP/OM/052	SOP/OM/052	SOP/OM/052	SOP/OM/052	SOP/OM/052	SOP/OM/052	SOP/OM/052	SOP/OM/052	SOP/OM/052	SOP/OM/052	SOP/OM/052
	Units	ppm(mg/kg)	ppm(mg/kg)	ppm(mg/kg)	ppm(mg/kg)	ppm(mg/kg)	ppm(mg/kg)	ppm(mg/kg)	ppm(mg/kg)	ppm(mg/kg)	ppm(mg/kg)	ppm(mg/kg)	ppm(mg/kg)	ppm(mg/kg)	ppm(mg/kg)
	LOQ	0.5	0.5	5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
	Customer Code	Li	Be	B	Sc	Co	Ga	Ge	Se	Rb	Y	Nb	Mo	Cd	In
1	GEMDBH0201	13.8	1.2	<5	28.7	8.1	37.1	<0.5	4.2	20.4	5.9	8.3	<0.5	<0.5	<0.5
2	GEMDBH0301	<0.5	<0.5	<5	22.5	1.7	64.3	<0.5	5.0	0.8	6.0	19.1	<0.5	<0.5	<0.5
3	GEMDBH0401	<0.5	<0.5	<5	29.2	2.1	59.6	<0.5	3.9	1.2	5.5	12.1	<0.5	<0.5	<0.5
4	GEMDBH0402	1.4	<0.5	<5	31.2	3.9	49.0	<0.5	2.1	1.1	3.9	9.1	<0.5	<0.5	<0.5
5	GEMDBH0403	<0.5	<0.5	<5	34.0	4.7	57.9	<0.5	4.1	1.2	4.6	13.4	<0.5	<0.5	<0.5
6	GEMDBH0601	1.1	<0.5	<5	34.0	4.0	57.5	<0.5	4.9	1.1	5.3	12.3	<0.5	<0.5	<0.5
7	GEMDBH0602	0.7	<0.5	<5	36.8	4.8	35.8	<0.5	4.4	<0.5	2.8	5.7	<0.5	<0.5	<0.5
8	GEMDBH0603	2.7	<0.5	<5	30.1	8.2	39.2	<0.5	1.9	1.8	4.2	11.7	<0.5	<0.5	<0.5
9	GEMDBH0801	1.8	0.6	<5	27.6	2.9	50.0	<0.5	3.9	4.5	4.9	20.0	<0.5	<0.5	<0.5
10	GEMDBH1101	2.3	<0.5	<5	35.1	3.0	48.7	<0.5	4.9	2.9	3.9	2.6	<0.5	<0.5	<0.5
11	GEMDBH1102	2.6	<0.5	<5	34.0	3.2	44.0	<0.5	4.8	0.9	4.9	10.5	6.3	<0.5	<0.5
12	GEMDBH1103	1.3	<0.5	<5	26.3	7.5	22.6	<0.5	1.0	3.2	1.8	<0.5	<0.5	<0.5	<0.5
13	GEMDBH1301	1.1	<0.5	<5	51.9	3.3	45.9	<0.5	4.5	0.8	3.5	5.4	<0.5	<0.5	<0.5
14	GEMDBH1302	5.9	<0.5	<5	26.1	4.3	45.7	<0.5	3.3	11.1	5.3	13.3	<0.5	<0.5	<0.5
15	GEMDBH1303	5.5	<0.5	<5	52.5	10.2	44.0	<0.5	1.9	3.7	3.9	9.2	<0.5	<0.5	<0.5
16	GEMDBH1401	<0.5	<0.5	<5	29.5	2.1	64.8	<0.5	3.2	1.7	6.2	43.8	<0.5	<0.5	<0.5
17	GEMDBH1402	2.2	<0.5	<5	21.4	3.8	48.9	<0.5	4.8	3.2	3.6	16.2	<0.5	1.2	<0.5
18	GEMDBH1403	1.1	<0.5	<5	44.3	3.5	10.3	<0.5	3.2	1.7	1.6	<0.5	<0.5	<0.5	<0.5
19	GEMDBH1601	2.1	0.6	<5	34.3	4.1	41.2	<0.5	6.8	3.8	5.1	51.6	16.0	1.3	<0.5
20	GEMDBH1602	1.3	<0.5	<5	28.8	6.0	32.3	<0.5	3.2	3.0	3.8	<0.5	7.4	<0.5	<0.5
21	GEMDBH1603	0.8	<0.5	<5	<0.5	10.7	6.9	<0.5	0.5	2.7	1.3	<0.5	<0.5	<0.5	<0.5
22	GEMDBH0901	<0.5	<0.5	<5	19.4	1.9	67.1	<0.5	2.4	1.2	5.8	19.9	9.0	0.6	<0.5
23	GEMDBH0902	1.4	<0.5	<5	18.5	1.6	70.7	<0.5	2.0	2.2	6.8	22.8	7.4	<0.5	<0.5
24	GEMDBH0903	2.4	<0.5	<5	17.8	3.5	61.9	<0.5	1.7	2.4	8.0	25.5	5.6	0.7	<0.5
25	GEMDBH0904	1.5	<0.5	<5	25.2	3.2	50.1	<0.5	2.3	0.9	4.1	14.2	3.4	<0.5	<0.5
26	GEMDBH0905	0.6	<0.5	<5	21.7	3.9	59.8	<0.5	2.1	1.0	5.8	19.5	5.5	<0.5	<0.5
27	GEMDBH0906	<0.5	<0.5	<5	18.4	4.6	54.1	<0.5	3.3	<0.5	6.6	22.8	3.7	0.5	<0.5

Sl. No.	Method	SOP/OM/052	SOP/OM/052	SOP/OM/052	SOP/OM/052	SOP/OM/052	SOP/OM/052	SOP/OM/052	SOP/OM/052	SOP/OM/052	SOP/OM/052	SOP/OM/052	SOP/OM/052	SOP/OM/052	SOP/OM/052
	Units	ppm(mg/kg)	ppm(mg/kg)	ppm(mg/kg)	ppm(mg/kg)	ppm(mg/kg)	ppm(mg/kg)	ppm(mg/kg)	ppm(mg/kg)	ppm(mg/kg)	ppm(mg/kg)	ppm(mg/kg)	ppm(mg/kg)	ppm(mg/kg)	ppm(mg/kg)
	LOQ	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
	Customer Code	Sn	Sb	Te	Cs	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho
1	GEMDBH0201	<0.5	3.5	0.8	1.7	18.1	31.5	3.4	11.4	2.0	<0.5	3.5	<0.5	1.2	<0.5
2	GEMDBH0301	<0.5	1.6	<0.5	<0.5	21.9	39.9	4.0	14.3	2.3	<0.5	4.0	<0.5	1.1	<0.5
3	GEMDBH0401	<0.5	3.9	<0.5	<0.5	15.8	27.8	3.0	9.7	1.7	<0.5	2.9	<0.5	1.0	<0.5
4	GEMDBH0402	<0.5	1.6	<0.5	<0.5	13.8	26.1	2.4	8.0	1.1	<0.5	2.5	<0.5	0.8	<0.5
5	GEMDBH0403	<0.5	3.2	<0.5	<0.5	14.3	24.6	2.7	8.9	1.6	<0.5	2.4	<0.5	1.0	<0.5
6	GEMDBH0601	<0.5	2.9	<0.5	<0.5	17.9	31.8	3.3	11.1	1.8	<0.5	2.9	<0.5	0.9	<0.5
7	GEMDBH0602	<0.5	1.4	<0.5	<0.5	6.0	10.3	1.2	4.1	0.6	<0.5	1.2	<0.5	<0.5	<0.5
8	GEMDBH0603	<0.5	<0.5	<0.5	<0.5	17.2	29.6	2.4	6.6	1.1	<0.5	2.5	<0.5	0.8	<0.5
9	GEMDBH0801	0.8	0.8	<0.5	<0.5	14.5	25.5	2.6	8.5	1.3	<0.5	2.3	<0.5	1.0	<0.5
10	GEMDBH1101	<0.5	4.0	<0.5	<0.5	13.2	25.7	2.6	8.2	1.3	<0.5	2.4	<0.5	0.7	<0.5
11	GEMDBH1102	6.2	2.7	1.8	<0.5	12.3	23.0	2.7	8.7	1.4	<0.5	2.5	<0.5	1.0	<0.5
12	GEMDBH1103	1.7	3.6	<0.5	<0.5	17.1	23.5	2.4	7.4	1.0	<0.5	2.1	<0.5	<0.5	<0.5
13	GEMDBH1301	5.6	3.7	<0.5	<0.5	8.5	15.6	1.6	5.5	0.9	<0.5	1.6	<0.5	0.7	<0.5
14	GEMDBH1302	2.4	1.4	<0.5	1.0	28.0	52.4	5.3	17.1	2.8	0.5	4.9	<0.5	1.1	<0.5
15	GEMDBH1303	10.3	<0.5	0.8	<0.5	9.8	23.5	1.9	5.8	1.2	<0.5	2.1	<0.5	0.8	<0.5
16	GEMDBH1401	<0.5	1.2	<0.5	<0.5	16.7	29.4	3.4	10.6	1.6	<0.5	2.9	<0.5	1.0	<0.5
17	GEMDBH1402	<0.5	<0.5	<0.5	<0.5	11.3	25.8	2.0	6.6	1.1	<0.5	2.3	<0.5	0.7	<0.5
18	GEMDBH1403	7.0	<0.5	<0.5	<0.5	4.4	9.8	1.2	4.9	1.2	<0.5	1.3	<0.5	0.5	<0.5
19	GEMDBH1601	4.7	4.9	1.5	<0.5	31.3	52.8	4.7	14.0	1.8	<0.5	4.5	<0.5	1.1	<0.5
20	GEMDBH1602	<0.5	0.6	<0.5	<0.5	16.0	28.7	3.2	9.1	1.7	<0.5	2.6	<0.5	0.7	<0.5
21	GEMDBH1603	<0.5	<0.5	<0.5	<0.5	7.8	13.2	1.5	4.7	0.7	<0.5	1.3	<0.5	<0.5	<0.5
22	GEMDBH0901	<0.5	6.4	<0.5	<0.5	21.7	40.9	4.1	13.7	2.2	<0.5	1.9	<0.5	1.3	<0.5
23	GEMDBH0902	<0.5	5.1	<0.5	<0.5	22.7	42.7	4.3	14.6	2.3	0.5	2.1	<0.5	1.5	<0.5
24	GEMDBH0903	<0.5	3.7	<0.5	<0.5	24.5	45.1	4.5	15.1	2.4	<0.5	2.3	<0.5	1.6	<0.5
25	GEMDBH0904	<0.5	1.3	<0.5	<0.5	17.7	41.2	3.3	11.2	2.0	<0.5	1.9	<0.5	1.1	<0.5
26	GEMDBH0905	<0.5	2.6	<0.5	<0.5	24.0	50.7	4.5	15.1	2.6	0.5	2.2	<0.5	1.3	<0.5
27	GEMDBH0906	<0.5	2.2	<0.5	<0.5	32.7	60.8	6.4	21.4	3.1	0.6	2.6	<0.5	1.4	<0.5

Sl. No.	Method	SOP/OM/052	SOP/OM/052	SOP/OM/052	SOP/OM/052	SOP/OM/052	SOP/OM/052	SOP/OM/052	SOP/OM/052	SOP/OM/052	SOP/OM/052	SOP/OM/052	
	Units	ppm(mg/kg)	ppm(mg/kg)	ppm(mg/kg)	ppm(mg/kg)	ppm(mg/kg)	ppm(mg/kg)	ppm(mg/kg)	ppm(mg/kg)	ppm(mg/kg)	ppm(mg/kg)	ppm(mg/kg)	
	LOQ	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
	Customer Code	Er	Tm	Yb	Lu	Hf	Ta	W	Tl	Bi	Th	U	TREE
1	GEMDBH0201	0.9	<0.5	1.0	<0.5	4.1	2.5	1.0	<0.5	<0.5	14.5	4.0	73.9
2	GEMDBH0301	0.8	<0.5	1.1	<0.5	9.2	3.5	6.5	<0.5	2.8	18.3	3.0	91.5
3	GEMDBH0401	0.7	<0.5	0.9	<0.5	6.8	2.6	<0.5	<0.5	<0.5	18.9	3.1	66.4
4	GEMDBH0402	0.6	<0.5	0.6	<0.5	3.8	2.1	<0.5	<0.5	<0.5	15.2	2.0	60.0
5	GEMDBH0403	0.6	<0.5	0.7	<0.5	3.3	2.3	<0.5	<0.5	<0.5	17.2	2.7	61.9
6	GEMDBH0601	0.7	<0.5	0.9	<0.5	4.0	2.3	5.2	<0.5	<0.5	14.8	3.1	77.2
7	GEMDBH0602	<0.5	<0.5	0.6	<0.5	3.6	1.1	<0.5	<0.5	<0.5	7.7	1.6	31.0
8	GEMDBH0603	0.7	<0.5	0.7	<0.5	6.8	2.2	<0.5	<0.5	<0.5	8.0	1.3	69.6
9	GEMDBH0801	0.6	<0.5	0.8	<0.5	5.0	3.1	<0.5	<0.5	<0.5	14.0	2.4	66.0
10	GEMDBH1101	0.6	<0.5	0.7	<0.5	4.8	1.5	<0.5	<0.5	<0.5	13.2	2.4	65.4
11	GEMDBH1102	0.6	<0.5	0.9	<0.5	3.8	2.1	1.1	<0.5	0.6	12.8	2.1	64.2
12	GEMDBH1103	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	3.5	<0.5	65.5
13	GEMDBH1301	0.5	<0.5	0.6	<0.5	6.4	1.4	<0.5	<0.5	<0.5	15.9	2.4	48.5
14	GEMDBH1302	0.7	<0.5	0.8	<0.5	3.1	2.3	<0.5	<0.5	<0.5	14.9	2.0	127.7
15	GEMDBH1303	0.6	<0.5	0.8	<0.5	3.4	1.5	7.7	<0.5	12.1	9.3	1.8	61.5
16	GEMDBH1401	0.7	<0.5	1.1	<0.5	15.8	5.0	0.9	<0.5	<0.5	18.2	3.2	83.5
17	GEMDBH1402	<0.5	<0.5	0.8	<0.5	11.2	2.9	<0.5	<0.5	<0.5	11.4	1.6	67.5
18	GEMDBH1403	<0.5	<0.5	<0.5	<0.5	5.5	<0.5	<0.5	<0.5	<0.5	2.1	1.0	41.4
19	GEMDBH1601	0.7	<0.5	0.9	<0.5	4.4	9.3	1.3	<0.5	1.8	29.3	4.6	130.7
20	GEMDBH1602	0.6	<0.5	0.6	<0.5	1.1	0.8	<0.5	<0.5	<0.5	8.3	1.3	83.2
21	GEMDBH1603	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	62.4	<0.5	<0.5	1.0	<0.5	50.1
22	GEMDBH0901	0.9	<0.5	1.0	<0.5	7.2	2.5	3.4	<0.5	<0.5	11.1	3.1	109.7
23	GEMDBH0902	1.0	<0.5	1.1	<0.5	6.8	2.8	2.3	<0.5	<0.5	12.0	3.3	115.8
24	GEMDBH0903	1.2	<0.5	1.3	<0.5	8.4	2.9	2.1	<0.5	<0.5	14.4	4.0	122.0
25	GEMDBH0904	0.6	<0.5	0.7	<0.5	3.8	1.5	1.9	<0.5	<0.5	7.5	2.2	104.7
26	GEMDBH0905	0.8	<0.5	1.1	<0.5	5.4	2.1	0.8	<0.5	<0.5	10.7	3.0	128.8
27	GEMDBH0906	1.1	<0.5	1.2	<0.5	6.0	2.3	3.9	<0.5	<0.5	11.3	3.0	158.3

	Customer Code	Li	Be	B	Sc	Co	Ga	Ge	Se	Rb	Y	Nb	Mo	Cd	In
28	GEMDBH0907	<0.5	<0.5	<5	24.6	4.6	47.3	<0.5	5.7	<0.5	5.2	16.1	4.5	<0.5	<0.5
29	GEMDBH0908	4.0	<0.5	<5	20.8	6.6	37.4	<0.5	1.3	0.9	4.9	11.9	0.8	<0.5	<0.5
30	GEMDBH0909	2.4	<0.5	<5	33.9	8.4	29.4	<0.5	<0.5	0.5	5.7	8.6	<0.5	<0.5	<0.5
31	GEMDBH0910	<0.5	<0.5	<5	36.0	7.2	24.1	<0.5	2.0	0.8	3.9	5.4	<0.5	<0.5	<0.5
32	GEMDBH0911	1.2	<0.5	<5	9.5	15.5	18.1	<0.5	<0.5	2.2	3.6	3.2	<0.5	<0.5	<0.5
33	GEMDBH0912	<0.5	<0.5	<5	14.6	18.4	14.5	<0.5	<0.5	1.3	2.4	2.5	<0.5	<0.5	<0.5
34	GEMDBH0913	1.8	<0.5	<5	47.3	8.4	41.8	<0.5	0.9	0.7	6.9	10.5	<0.5	<0.5	<0.5
35	GEMDBH0914	1.5	<0.5	<5	36.4	6.8	37.9	<0.5	1.6	0.7	6.3	10.4	<0.5	<0.5	<0.5
36	GEMDBH0915	1.7	<0.5	<5	35.1	6.8	38.4	<0.5	1.3	<0.5	6.0	10.7	<0.5	<0.5	<0.5
37	GEMDBH0916	2.4	<0.5	<5	42.0	7.0	39.4	<0.5	1.0	1.1	6.1	9.3	<0.5	<0.5	<0.5
38	GEMDBH0917	1.8	<0.5	<5	55.5	10.4	44.4	<0.5	0.5	1.5	8.9	10.2	<0.5	<0.5	<0.5
39	GEMDBH0918	1.0	<0.5	<5	56.3	13.9	43.1	<0.5	1.3	2.4	15.0	9.5	0.9	<0.5	<0.5
40	GEMDBH0919	1.5	<0.5	<5	13.0	1967.2	12.3	<0.5	<0.5	1.3	5.2	0.6	<0.5	<0.5	<0.5
41	BH04-C1	1.5	<0.5	<5	24.6	4.7	43.0	<0.5	1.9	1.5	4.9	18.7	5.9	<0.5	<0.5
42	BH04-C2	2.3	<0.5	<5	39.6	9.2	32.5	<0.5	0.8	1.3	4.7	12.5	2.5	0.9	<0.5
43	BH04-C3	1.5	<0.5	<5	33.1	12.0	19.6	<0.5	<0.5	2.1	3.5	6.7	0.7	2.1	<0.5
44	BH04-C4	2.0	<0.5	<5	20.4	6.3	19.1	<0.5	<0.5	3.7	3.7	7.9	0.6	2.1	<0.5
45	BH06-C1	1.9	<0.5	<5	36.5	5.5	33.1	<0.5	2.2	1.0	3.1	11.8	2.7	1.5	<0.5
46	BH06-C2	3.9	<0.5	<5	30.3	14.4	36.6	<0.5	0.7	2.2	4.8	18.9	1.2	1.8	<0.5
47	BH06-C3	2.7	0.6	<5	39.7	9.2	27.5	<0.5	<0.5	1.3	5.1	10.3	0.9	2.2	<0.5
48	BH16-C1	1.4	<0.5	<5	32.8	3.5	31.6	<0.5	4.1	0.7	3.4	12.7	5.6	2.2	<0.5
49	BH16-C2	1.6	<0.5	<5	14.6	7.7	16.7	<0.5	<0.5	1.9	6.4	4.8	<0.5	2.2	<0.5
50	BH16-C3	1.0	<0.5	<5	8.9	8.3	10.9	<0.5	<0.5	2.8	1.8	3.3	<0.5	3.7	<0.5
51	BH11-C1	1.2	<0.5	<5	26.0	3.2	32.8	<0.5	2.1	0.7	4.5	15.0	5.7	1.7	<0.5
52	BH11-C2	2.0	<0.5	<5	22.6	5.1	23.8	<0.5	2.1	<0.5	4.4	9.1	2.9	1.4	<0.5
53	BH11-C3	2.3	<0.5	<5	14.3	5.7	17.1	<0.5	<0.5	1.2	3.1	6.4	0.6	2.7	<0.5
54	BH08-C1	5.4	0.9	<5	17.9	6.3	32.6	<0.5	2.8	14.1	7.4	19.7	9.6	0.6	<0.5
55	BH08-C2	3.1	<0.5	<5	32.8	6.5	24.2	<0.5	1.6	4.5	6.9	10.1	5.3	0.8	<0.5
56	BH08-C3	2.4	<0.5	<5	15.7	3.9	14.4	<0.5	<0.5	4.7	5.5	5.6	0.7	<0.5	<0.5
57	BH02-C1	2.7	0.7	<5	37.7	6.6	30.9	<0.5	3.4	4.6	6.6	12.9	6.7	2.4	<0.5
58	BH02-C2	5.1	0.5	<5	30.5	5.7	34.4	<0.5	1.2	7.2	6.8	15.9	5.0	3.5	<0.5
59	BH02-C3	4.7	<0.5	<5	23.4	5.0	27.3	<0.5	1.6	7.5	5.8	12.8	3.2	2.0	<0.5

	Customer Code	Sn	Sb	Te	Cs	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho
28	GEMDBH0907	<0.5	2.4	<0.5	<0.5	30.4	53.5	6.1	19.5	2.6	<0.5	2.2	<0.5	1.1	<0.5
29	GEMDBH0908	<0.5	<0.5	<0.5	<0.5	21.3	39.4	4.0	13.2	1.9	<0.5	1.8	<0.5	1.1	<0.5
30	GEMDBH0909	<0.5	<0.5	<0.5	<0.5	8.0	12.6	1.5	6.4	1.6	<0.5	1.6	<0.5	1.3	<0.5
31	GEMDBH0910	<0.5	<0.5	<0.5	<0.5	3.4	6.6	1.0	4.2	1.2	<0.5	1.1	<0.5	1.0	<0.5
32	GEMDBH0911	<0.5	<0.5	<0.5	<0.5	47.4	91.8	7.8	24.6	3.3	0.7	3.0	<0.5	1.0	<0.5
33	GEMDBH0912	<0.5	<0.5	<0.5	<0.5	12.3	40.7	3.1	12.0	2.3	0.5	2.0	<0.5	0.8	<0.5
34	GEMDBH0913	<0.5	<0.5	<0.5	<0.5	13.9	26.7	2.7	8.7	1.7	<0.5	1.8	<0.5	1.4	<0.5
35	GEMDBH0914	<0.5	<0.5	<0.5	<0.5	7.6	12.8	1.5	5.7	1.3	<0.5	1.4	<0.5	1.3	<0.5
36	GEMDBH0915	<0.5	<0.5	<0.5	<0.5	6.8	10.1	1.2	4.1	1.2	<0.5	1.2	<0.5	1.2	<0.5
37	GEMDBH0916	<0.5	2.7	<0.5	<0.5	5.8	8.1	1.1	3.6	1.0	<0.5	1.2	<0.5	1.3	<0.5
38	GEMDBH0917	<0.5	<0.5	<0.5	<0.5	10.2	18.0	2.6	10.6	2.6	0.7	2.5	<0.5	2.1	<0.5
39	GEMDBH0918	<0.5	<0.5	<0.5	<0.5	47.5	99.0	14.3	61.7	12.2	3.0	10.1	1.2	5.2	0.8
40	GEMDBH0919	<0.5	<0.5	<0.5	<0.5	21.5	45.1	6.0	24.8	4.8	1.1	3.9	<0.5	1.8	<0.5
41	BH04-C1	<0.5	4.4	0.5	<0.5	17.0	29.5	2.4	8.6	1.3	<0.5	1.3	<0.5	0.8	<0.5
42	BH04-C2	<0.5	1.0	0.8	<0.5	10.7	19.2	1.7	7.2	1.1	<0.5	1.2	<0.5	0.8	<0.5
43	BH04-C3	<0.5	<0.5	<0.5	<0.5	4.7	8.3	0.9	4.1	0.7	<0.5	0.9	<0.5	0.9	<0.5
44	BH04-C4	<0.5	<0.5	<0.5	<0.5	27.4	49.5	4.6	15.7	1.8	<0.5	2.3	<0.5	0.8	<0.5
45	BH06-C1	<0.5	0.8	<0.5	<0.5	11.7	18.0	1.5	5.1	0.8	<0.5	0.8	<0.5	0.6	<0.5
46	BH06-C2	<0.5	<0.5	<0.5	<0.5	26.5	33.5	2.4	7.7	1.0	<0.5	1.4	<0.5	0.9	<0.5
47	BH06-C3	<0.5	<0.5	<0.5	<0.5	12.8	24.7	2.9	12.8	2.1	0.6	2.0	<0.5	1.3	<0.5
48	BH16-C1	<0.5	2.2	<0.5	<0.5	18.6	30.2	2.9	10.5	1.7	<0.5	1.5	<0.5	0.8	<0.5
49	BH16-C2	<0.5	<0.5	<0.5	<0.5	21.5	35.6	4.4	20.8	3.6	1.0	3.6	<0.5	1.8	<0.5
50	BH16-C3	<0.5	<0.5	<0.5	<0.5	14.1	23.1	2.1	7.4	1.0	<0.5	1.1	<0.5	<0.5	<0.5
51	BH11-C1	<0.5	2.2	<0.5	<0.5	12.8	21.3	2.2	8.9	1.2	<0.5	1.1	<0.5	0.8	<0.5
52	BH11-C2	<0.5	0.9	<0.5	<0.5	18.4	34.3	3.8	15.9	2.6	0.7	2.2	<0.5	1.2	<0.5
53	BH11-C3	<0.5	<0.5	<0.5	<0.5	14.6	25.6	2.5	10.3	1.6	<0.5	1.6	<0.5	0.7	<0.5
54	BH08-C1	<0.5	4.6	<0.5	1.1	20.4	30.6	2.6	9.2	1.2	<0.5	1.4	<0.5	0.9	<0.5
55	BH08-C2	<0.5	1.6	<0.5	<0.5	12.3	23.3	2.9	12.5	1.9	0.5	1.8	<0.5	1.7	<0.5
56	BH08-C3	<0.5	<0.5	<0.5	<0.5	12.6	23.0	2.5	12.1	2.3	0.7	2.1	<0.5	1.3	<0.5
57	BH02-C1	<0.5	3.0	<0.5	<0.5	13.6	20.4	2.0	7.8	1.3	<0.5	1.5	<0.5	1.4	<0.5
58	BH02-C2	<0.5	2.0	<0.5	0.8	17.4	25.3	2.7	10.6	1.7	0.6	1.8	<0.5	1.4	<0.5
59	BH02-C3	<0.5	1.8	<0.5	0.8	27.4	42.0	5.0	18.8	2.4	0.6	3.0	<0.5	1.3	<0.5

	Customer Code	Er	Tm	Yb	Lu	Hf	Ta	W	Tl	Bi	Th	U	TREE
28	GEMDBH0907	0.8	<0.5	0.8	<0.5	5.5	1.5	<0.5	<0.5	<0.5	9.0	3.0	145.0
29	GEMDBH0908	0.7	<0.5	0.8	<0.5	3.6	1.1	8.0	<0.5	<0.5	5.1	1.2	113.2
30	GEMDBH0909	0.8	<0.5	0.9	<0.5	2.6	0.9	0.8	<0.5	<0.5	3.5	1.5	64.7
31	GEMDBH0910	0.6	<0.5	0.6	<0.5	1.3	0.5	<0.5	<0.5	<0.5	2.9	1.6	50.7
32	GEMDBH0911	<0.5	<0.5	<0.5	<0.5	1.6	0.6	103.5	<0.5	<0.5	1.8	<0.5	211.6
33	GEMDBH0912	<0.5	<0.5	<0.5	<0.5	1.5	<0.5	145.3	<0.5	<0.5	1.8	<0.5	106.7
34	GEMDBH0913	1.0	<0.5	1.0	<0.5	3.8	1.2	24.8	<0.5	<0.5	5.2	1.5	92.9
35	GEMDBH0914	0.9	<0.5	0.8	<0.5	2.5	1.1	22.3	<0.5	<0.5	3.6	1.4	68.3
36	GEMDBH0915	0.8	<0.5	0.9	<0.5	2.9	1.3	6.2	<0.5	<0.5	3.9	1.2	63.5
37	GEMDBH0916	0.8	<0.5	0.8	<0.5	2.7	1.0	2.3	<0.5	<0.5	3.8	1.2	60.7
38	GEMDBH0917	1.3	<0.5	1.1	<0.5	2.7	1.3	1.2	<0.5	<0.5	4.6	1.6	89.7
39	GEMDBH0918	2.1	<0.5	1.5	<0.5	5.4	1.2	3.0	<0.5	<0.5	3.8	1.5	297.6
40	GEMDBH0919	0.7	<0.5	<0.5	<0.5	1.7	<0.5	1941.0	<0.5	<0.5	1.1	<0.5	149.7
41	BH04-C1	0.8	<0.5	0.9	<0.5	4.1	1.1	2.3	<0.5	<0.5	15.5	2.3	62.5
42	BH04-C2	0.7	<0.5	0.8	<0.5	2.7	0.6	1.2	<0.5	<0.5	7.6	1.7	43.5
43	BH04-C3	0.6	<0.5	0.6	<0.5	1.1	<0.5	1.9	<0.5	<0.5	3.0	1.0	21.6
44	BH04-C4	0.6	<0.5	0.5	<0.5	2.4	<0.5	2.1	<0.5	<0.5	3.7	0.7	103.2
45	BH06-C1	0.5	<0.5	0.7	<0.5	2.1	0.6	1.3	<0.5	<0.5	7.2	1.8	39.6
46	BH06-C2	0.8	<0.5	0.9	<0.5	4.3	1.1	6.4	<0.5	<0.5	6.4	1.5	75.2
47	BH06-C3	0.8	<0.5	0.7	<0.5	1.5	<0.5	0.5	<0.5	<0.5	5.3	1.5	60.8
48	BH16-C1	0.7	<0.5	0.7	<0.5	2.5	0.7	1.4	<0.5	<0.5	9.6	2.3	67.6
49	BH16-C2	0.9	<0.5	0.6	<0.5	1.0	<0.5	14.6	<0.5	<0.5	2.6	<0.5	93.8
50	BH16-C3	<0.5	<0.5	<0.5	<0.5	0.9	<0.5	13.0	<0.5	<0.5	2.3	<0.5	48.7
51	BH11-C1	0.7	<0.5	0.8	<0.5	3.2	0.8	3.0	<0.5	<0.5	11.5	2.4	49.9
52	BH11-C2	0.7	<0.5	0.8	<0.5	1.5	<0.5	0.9	<0.5	<0.5	4.9	1.5	80.6
53	BH11-C3	<0.5	<0.5	<0.5	<0.5	1.1	<0.5	32.0	<0.5	<0.5	3.0	<0.5	57.0
54	BH08-C1	0.9	<0.5	0.7	<0.5	4.1	1.1	3.6	<0.5	<0.5	13.7	4.4	67.9
55	BH08-C2	1.2	<0.5	1.1	<0.5	1.8	0.6	6.4	<0.5	<0.5	6.0	2.5	59.1
56	BH08-C3	0.8	<0.5	0.6	<0.5	1.3	<0.5	5.2	<0.5	<0.5	3.3	0.8	58.1
57	BH02-C1	1.1	<0.5	1.0	<0.5	2.7	0.7	2.1	<0.5	<0.5	11.0	3.1	50.2
58	BH02-C2	1.1	<0.5	1.0	<0.5	3.2	0.9	2.5	<0.5	<0.5	11.1	2.6	63.7
59	BH02-C3	0.9	<0.5	0.8	<0.5	2.5	0.7	16.4	<0.5	<0.5	8.7	2.1	102.2

	Customer Code	Li	Be	B	Sc	Co	Ga	Ge	Se	Rb	Y	Nb	Mo	Cd	In
60	BH03-C1	1.4	<0.5	<5	31.4	7.1	31.4	<0.5	1.5	1.0	4.5	13.1	2.2	1.1	<0.5
61	BH03-C2	3.1	<0.5	<5	25.3	9.5	29.3	<0.5	1.0	0.8	5.9	17.4	0.9	2.4	<0.5
62	BH03-C3	3.3	<0.5	<5	30.7	13.4	30.3	<0.5	0.6	3.0	6.1	14.5	0.5	1.8	<0.5
63	BH14-C1	1.9	<0.5	<5	25.5	4.3	41.1	<0.5	2.1	2.4	6.4	21.1	3.5	4.1	<0.5
64	BH14-C2	2.2	<0.5	<5	39.8	7.1	31.1	<0.5	0.9	<0.5	3.4	12.0	1.5	3.8	<0.5
65	BH14-C3	1.5	<0.5	<5	21.7	20.4	12.3	<0.5	5.9	2.4	2.2	3.9	0.6	3.5	<0.5
66	BH14-C4	0.5	<0.5	<5	6.7	3.9	8.2	<0.5	<0.5	2.3	1.8	2.4	<0.5	3.1	<0.5
67	BH13-C1	3.6	<0.5	<5	27.2	5.5	37.4	<0.5	2.0	4.1	4.7	19.5	2.9	1.0	<0.5
68	BH13-C2	0.7	<0.5	<5	27.6	2.0	35.1	<0.5	2.8	0.8	4.2	17.9	7.5	2.8	<0.5
69	BH13-C3	2.2	<0.5	<5	29.0	7.3	28.2	<0.5	0.7	2.5	6.7	11.9	0.8	3.5	<0.5
70	BH05-C1	1.3	<0.5	<5	25.0	2.2	41.1	<0.5	2.4	2.6	5.8	22.2	5.5	0.5	<0.5
71	BH05-C2	2.0	<0.5	<5	26.9	4.5	37.0	<0.5	3.0	1.5	3.1	15.9	4.5	3.4	<0.5
72	BH05-C3	2.3	<0.5	<5	35.4	8.3	27.0	<0.5	1.2	1.1	3.2	12.0	1.7	1.0	<0.5
73	BH10-C1	2.7	<0.5	<5	16.8	2.4	45.2	<0.5	0.8	5.8	7.0	26.2	4.4	4.1	<0.5
74	BH10-C2	2.3	<0.5	<5	28.8	4.5	39.7	<0.5	2.2	4.3	3.6	17.6	3.6	<0.5	<0.5
75	BH12-C1	1.5	<0.5	<5	27.6	6.4	32.7	<0.5	2.5	3.0	3.1	13.1	6.1	<0.5	<0.5
76	BH12-C2	2.7	<0.5	<5	23.4	6.3	36.2	<0.5	2.0	5.0	6.1	20.9	5.6	<0.5	<0.5
77	BH15-C1	4.5	<0.5	<5	15.0	4.3	30.7	<0.5	1.9	8.2	5.9	16.6	6.4	<0.5	<0.5
78	BH15-C2	6.5	<0.5	<5	20.0	3.3	22.0	<0.5	1.2	16.4	3.5	10.4	7.8	<0.5	<0.5
79	BH15-C3	12.0	0.7	<5	14.0	4.4	22.7	<0.5	0.9	39.1	4.1	12.0	4.9	<0.5	<0.5
80	BH07-C1	1.3	<0.5	<5	25.2	4.2	33.3	<0.5	1.3	1.0	4.8	15.3	5.3	<0.5	<0.5
81	BH07-C2	0.8	<0.5	<5	19.7	1.8	46.3	<0.5	1.6	1.9	7.8	28.3	4.5	<0.5	<0.5
82	BH07-C3	2.2	<0.5	<5	17.5	14.8	19.5	<0.5	0.7	3.2	3.5	8.2	1.4	<0.5	<0.5
83	BH07-C4	2.8	<0.5	<5	19.8	7.7	31.9	<0.5	<0.5	1.1	7.8	20.9	<0.5	<0.5	<0.5

	Customer Code	Sn	Sb	Te	Cs	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho
60	BH03-C1	<0.5	0.8	<0.5	<0.5	13.1	21.1	2.0	7.9	1.3	<0.5	1.4	<0.5	1.0	<0.5
61	BH03-C2	<0.5	<0.5	<0.5	<0.5	11.1	16.0	1.5	7.3	1.2	<0.5	1.3	<0.5	1.1	<0.5
62	BH03-C3	<0.5	0.5	<0.5	<0.5	26.6	44.7	4.0	14.6	1.8	0.5	2.3	<0.5	1.2	<0.5
63	BH14-C1	<0.5	1.9	1.2	<0.5	22.8	42.3	4.2	18.6	3.3	0.9	3.1	<0.5	1.6	<0.5
64	BH14-C2	<0.5	<0.5	<0.5	<0.5	5.7	11.7	1.1	5.1	1.0	<0.5	0.9	<0.5	0.8	<0.5
65	BH14-C3	<0.5	<0.5	<0.5	<0.5	16.6	31.6	2.9	13.1	2.3	0.6	1.7	<0.5	0.8	<0.5
66	BH14-C4	<0.5	<0.5	<0.5	<0.5	15.3	20.7	2.3	8.7	1.3	<0.5	1.3	<0.5	0.6	<0.5
67	BH13-C1	<0.5	1.6	<0.5	<0.5	39.4	71.8	5.5	18.5	2.1	0.5	2.8	<0.5	0.9	<0.5
68	BH13-C2	<0.5	3.9	<0.5	<0.5	15.6	25.0	2.3	8.8	1.1	<0.5	1.3	<0.5	0.8	<0.5
69	BH13-C3	<0.5	<0.5	<0.5	<0.5	27.5	55.6	6.5	28.1	4.9	1.3	4.2	0.5	1.9	<0.5
70	BH05-C1	<0.5	2.2	0.8	<0.5	18.9	30.4	2.9	11.9	1.6	<0.5	1.7	<0.5	0.9	<0.5
71	BH05-C2	<0.5	1.4	<0.5	<0.5	12.4	18.8	2.0	8.2	1.0	<0.5	1.1	<0.5	0.7	<0.5
72	BH05-C3	<0.5	<0.5	<0.5	<0.5	6.3	10.5	0.9	4.0	0.7	<0.5	0.7	<0.5	0.7	<0.5
73	BH10-C1	<0.5	2.6	<0.5	0.5	31.2	50.1	4.3	15.2	2.1	<0.5	2.2	<0.5	1.1	<0.5
74	BH10-C2	<0.5	1.4	<0.5	<0.5	16.3	28.6	2.7	9.9	1.4	<0.5	1.5	<0.5	0.8	<0.5
75	BH12-C1	<0.5	3.1	<0.5	<0.5	17.6	34.9	2.4	8.8	1.3	<0.5	1.3	<0.5	0.8	<0.5
76	BH12-C2	<0.5	3.2	<0.5	<0.5	26.2	42.9	3.4	12.7	1.6	<0.5	2.0	<0.5	1.2	<0.5
77	BH15-C1	<0.5	4.5	0.6	0.8	20.1	34.4	3.0	11.7	1.9	0.5	2.1	<0.5	1.2	<0.5
78	BH15-C2	<0.5	3.5	<0.5	1.4	14.2	27.6	2.2	8.5	1.7	<0.5	1.5	<0.5	0.9	<0.5
79	BH15-C3	<0.5	1.8	<0.5	2.4	22.6	32.9	2.9	11.2	1.5	<0.5	1.6	<0.5	0.9	<0.5
80	BH07-C1	<0.5	2.5	<0.5	<0.5	14.5	24.9	2.5	10.1	1.5	<0.5	1.5	<0.5	1.0	<0.5
81	BH07-C2	<0.5	2.2	<0.5	<0.5	41.2	64.9	6.9	25.4	3.4	0.8	3.3	<0.5	1.4	<0.5
82	BH07-C3	<0.5	0.8	<0.5	<0.5	24.0	45.7	4.4	17.8	2.2	<0.5	2.3	<0.5	0.8	<0.5
83	BH07-C4	1.0	0.5	<0.5	<0.5	27.6	46.3	6.0	25.8	3.5	0.8	3.3	<0.5	1.6	<0.5

	Customer Code	Er	Tm	Yb	Lu	Hf	Ta	W	Tl	Bi	Th	U	TREE
60	BH03-C1	0.8	<0.5	0.7	<0.5	2.4	0.7	3.1	<0.5	<0.5	7.8	1.7	49.3
61	BH03-C2	0.8	<0.5	0.9	<0.5	5.2	0.9	1.9	<0.5	<0.5	6.1	1.5	41.3
62	BH03-C3	1.0	<0.5	1.0	<0.5	3.1	0.8	2.6	<0.5	<0.5	5.5	1.3	97.8
63	BH14-C1	1.0	<0.5	0.9	<0.5	4.0	1.2	1.9	<0.5	<0.5	12.6	2.5	98.8
64	BH14-C2	0.6	<0.5	0.6	<0.5	1.5	0.7	0.8	<0.5	<0.5	6.3	1.4	27.6
65	BH14-C3	<0.5	<0.5	<0.5	<0.5	1.1	<0.5	1.6	<0.5	<0.5	2.1	0.8	69.6
66	BH14-C4	<0.5	<0.5	<0.5	<0.5	0.8	<0.5	6.2	<0.5	<0.5	1.5	<0.5	50.1
67	BH13-C1	0.9	<0.5	0.9	<0.5	3.3	1.1	2.3	<0.5	<0.5	11.0	2.0	143.4
68	BH13-C2	0.7	<0.5	0.9	<0.5	3.6	1.0	2.8	<0.5	<0.5	13.0	2.5	56.5
69	BH13-C3	1.1	<0.5	0.9	<0.5	2.5	0.6	2.3	<0.5	<0.5	5.4	1.1	132.5
70	BH05-C1	0.8	<0.5	1.0	<0.5	3.9	1.2	3.1	<0.5	<0.5	15.9	2.8	70.1
71	BH05-C2	0.6	<0.5	0.6	<0.5	3.6	0.9	1.5	<0.5	<0.5	10.3	2.1	45.5
72	BH05-C3	0.6	<0.5	0.6	<0.5	2.5	0.7	1.1	<0.5	<0.5	6.0	1.8	25.1
73	BH10-C1	1.2	<0.5	1.1	<0.5	5.1	1.5	4.8	<0.5	<0.5	18.5	3.0	108.4
74	BH10-C2	0.7	<0.5	0.6	<0.5	2.9	1.0	2.2	<0.5	<0.5	12.4	2.1	62.5
75	BH12-C1	0.7	<0.5	0.6	<0.5	2.4	0.8	4.0	<0.5	<0.5	12.9	2.6	68.4
76	BH12-C2	0.9	<0.5	1.0	<0.5	4.1	1.1	2.5	<0.5	<0.5	14.5	3.0	91.8
77	BH15-C1	0.9	<0.5	0.9	<0.5	3.7	0.8	1.2	<0.5	<0.5	14.2	3.0	76.7
78	BH15-C2	0.6	<0.5	0.7	<0.5	2.2	0.6	7.3	<0.5	<0.5	10.7	2.7	57.9
79	BH15-C3	0.7	<0.5	0.6	<0.5	2.3	0.6	3.5	<0.5	<0.5	12.2	1.9	74.8
80	BH07-C1	0.9	<0.5	0.9	<0.5	3.1	0.8	2.5	<0.5	<0.5	10.8	2.4	57.7
81	BH07-C2	1.3	<0.5	1.3	<0.5	5.3	1.6	3.5	<0.5	<0.5	18.7	3.1	149.9
82	BH07-C3	0.6	<0.5	0.6	<0.5	1.9	<0.5	2.1	<0.5	<0.5	5.6	1.2	98.5
83	BH07-C4	1.2	<0.5	1.0	<0.5	3.8	1.1	2.3	<0.5	<0.5	10.1	1.6	117.2

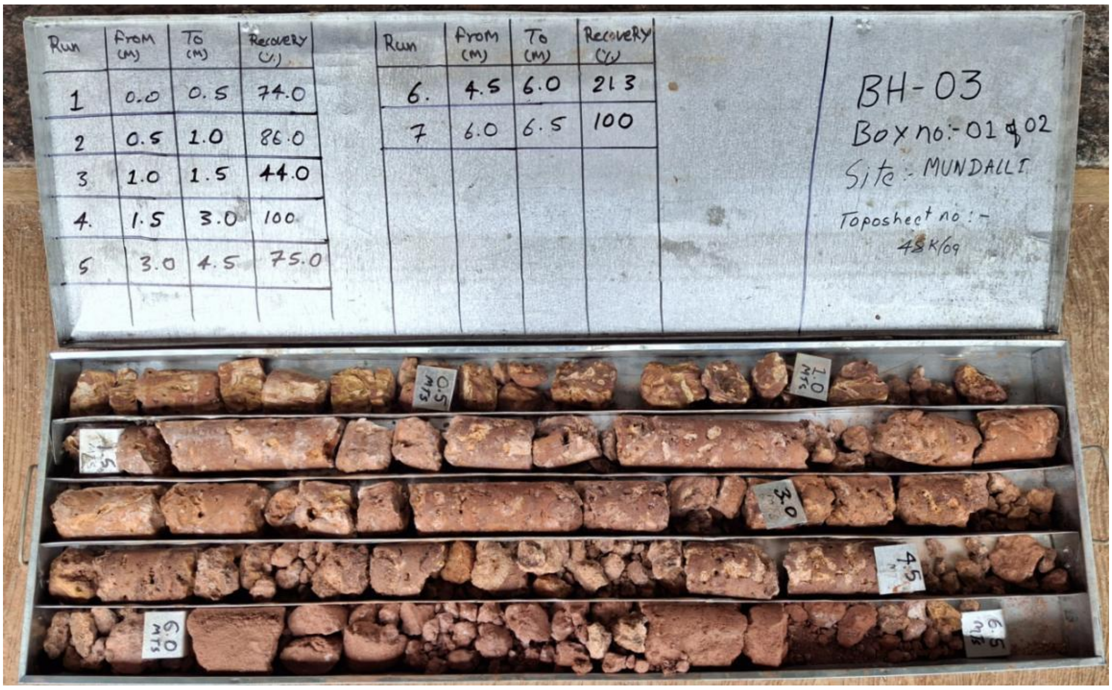
ANNEXURE-8
Core box Photographs

Annexure-8: Core Box Photos

Borehole No. 02, Box 01 of 03

Borehole No. 02, Box 02 of 03

Borehole No. 02, Box 03 of 03



Borehole No. 03, Box 01 of 04

Borehole No. 03, Box 02 of 04

Borehole No. 03, Box 03 of 04

Borehole No. 03, Box 04 of 04

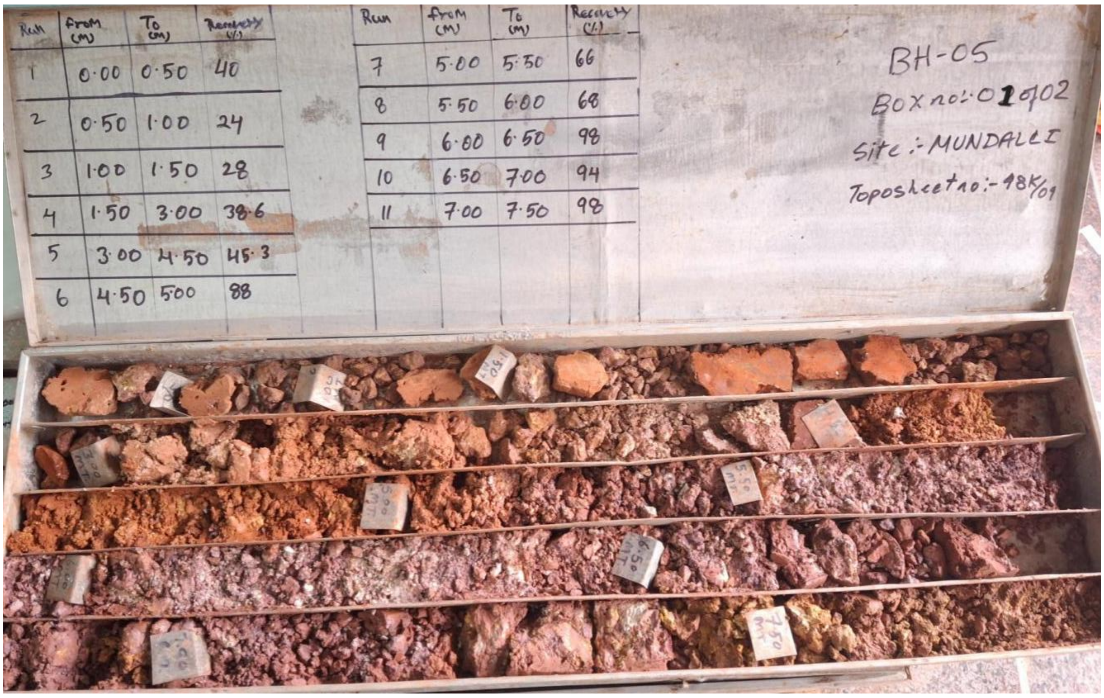
Borehole No. 04, Box 01 of 05

Borehole No. 04, Box 02 of 05

Borehole No. 04, Box 03 of 05

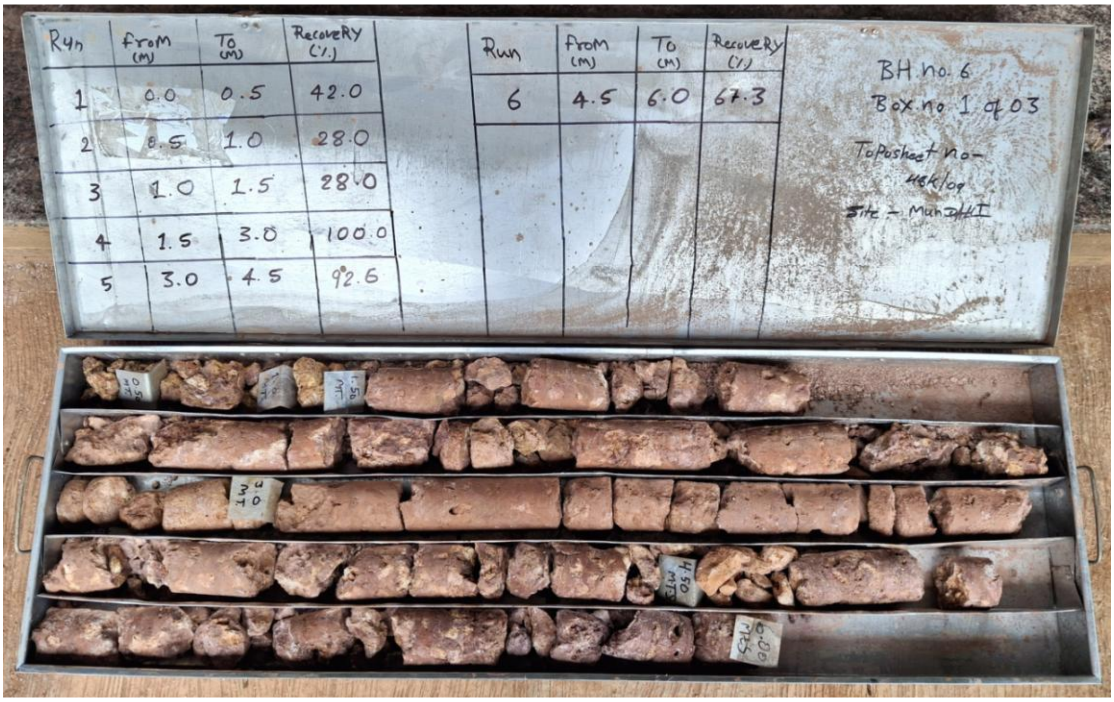
Borehole No. 04, Box 04 of 05

Borehole No. 04, Box 05 of 05



Borehole No. 05, Box 01 of 02

Borehole No. 05, Box 02 of 02



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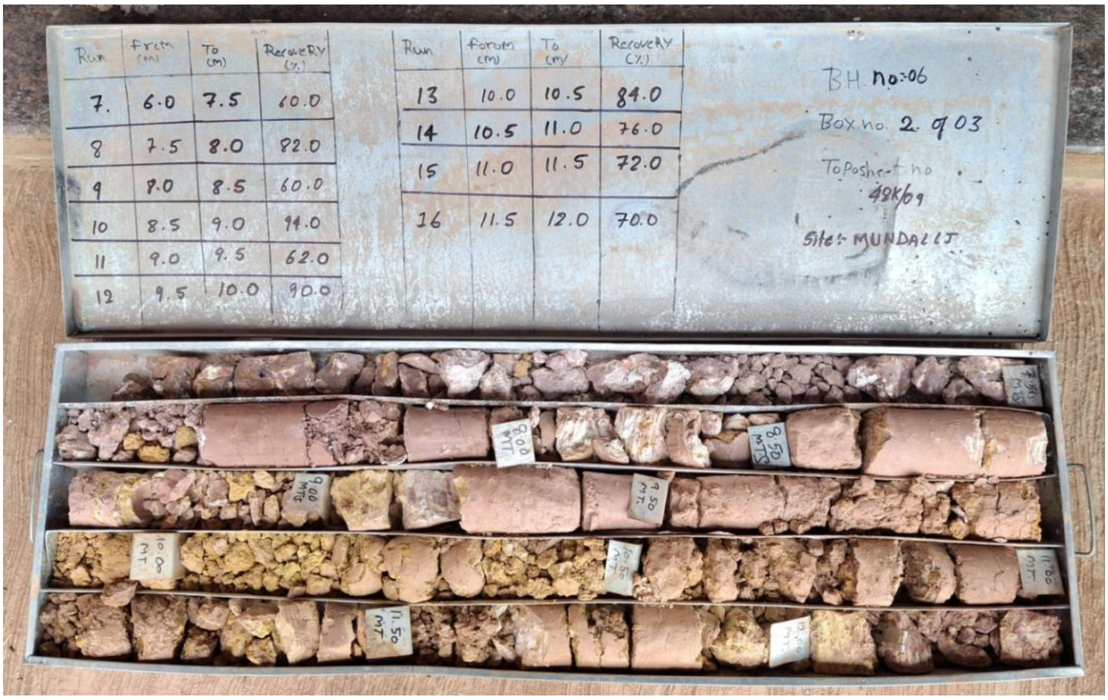
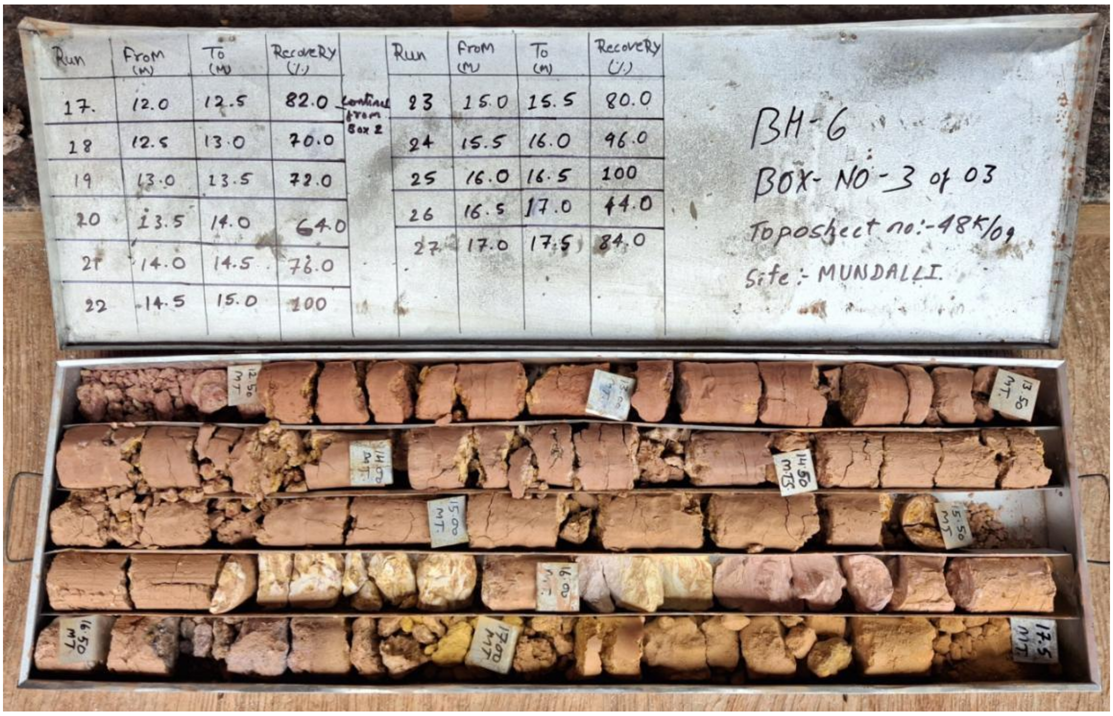
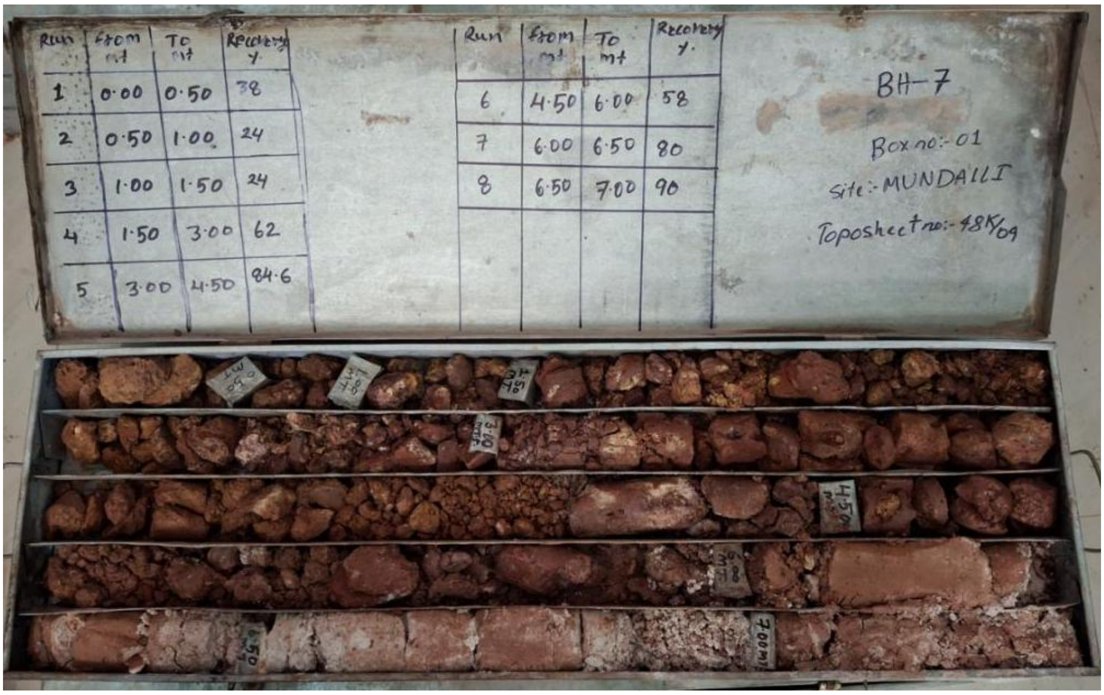


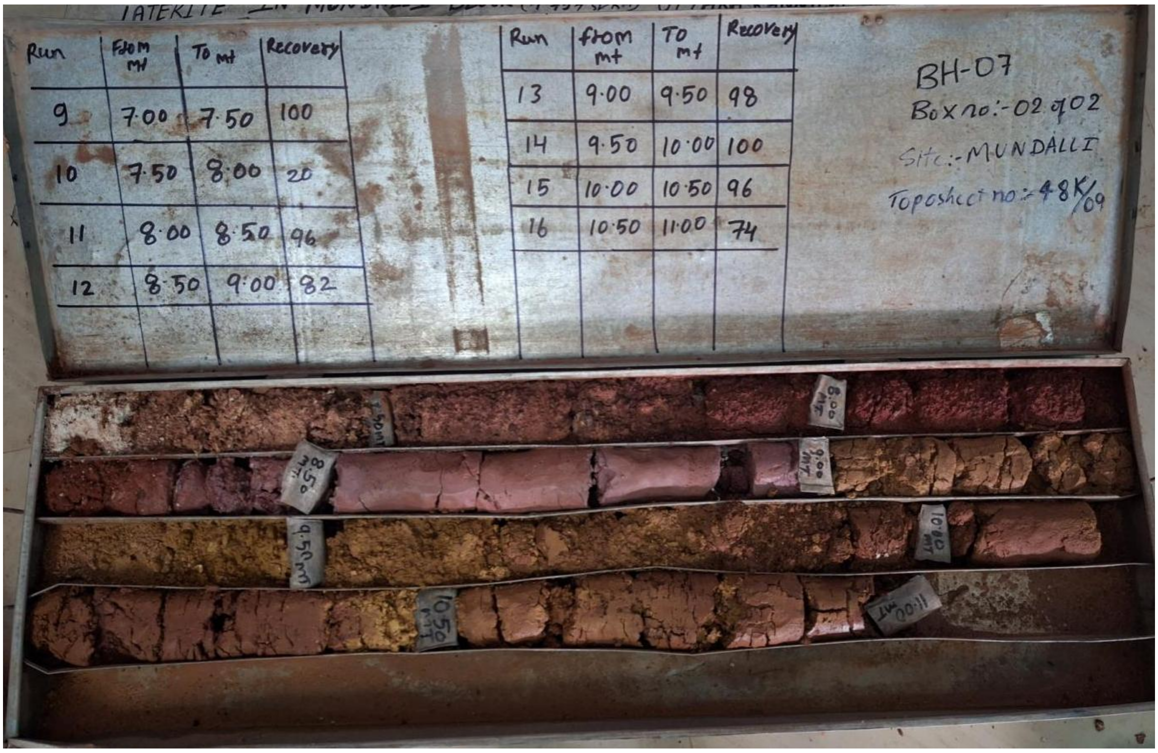
Borehole No. 06, Box 02 of 03



Borehole No. 06, Box 03 of 03



Borehole No. 07, Box 01 of 02



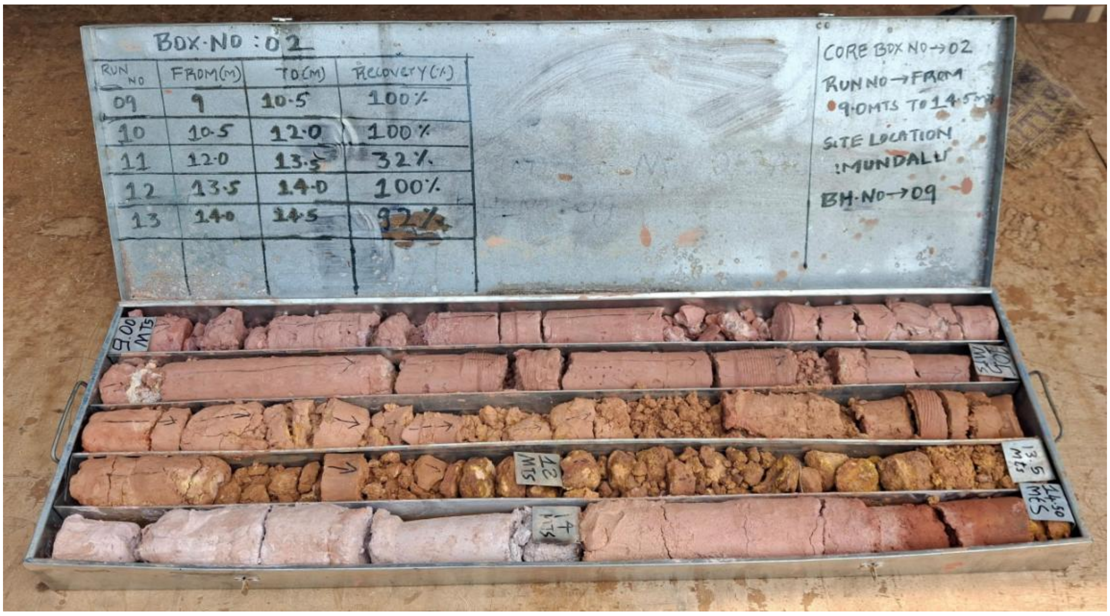
Borehole No. 07, Box 02 of 02

Borehole No. 08, Box 01 of 03

Borehole No. 08, Box 02 of 03

Borehole No. 08, Box 03 of 03

Borehole No. 09, Box 01 of 04



Borehole No. 09, Box 02 of 04

Borehole No. 09, Box 03 of 04

Borehole No. 09, Box 04 of 04

Borehole No. 10, Box 01 of 02

Borehole No.10 , Box 02 of 02

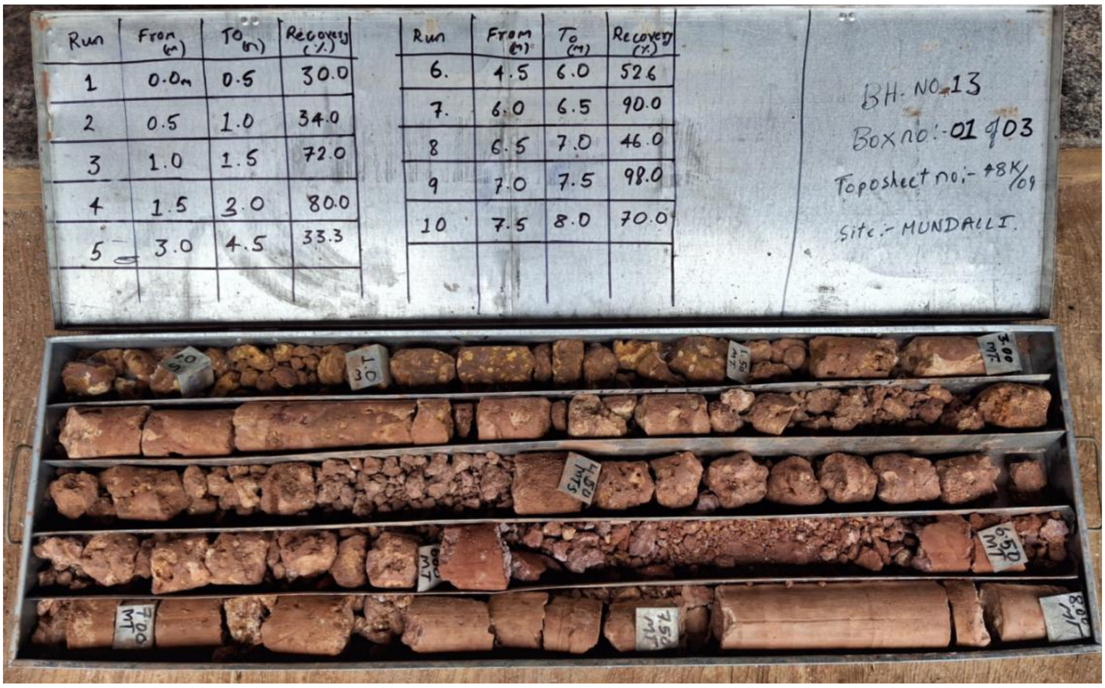
Borehole No.11 , Box 01 of 03

Borehole No.11 , Box 02 of 03

Borehole No.11 , Box 03 of 03

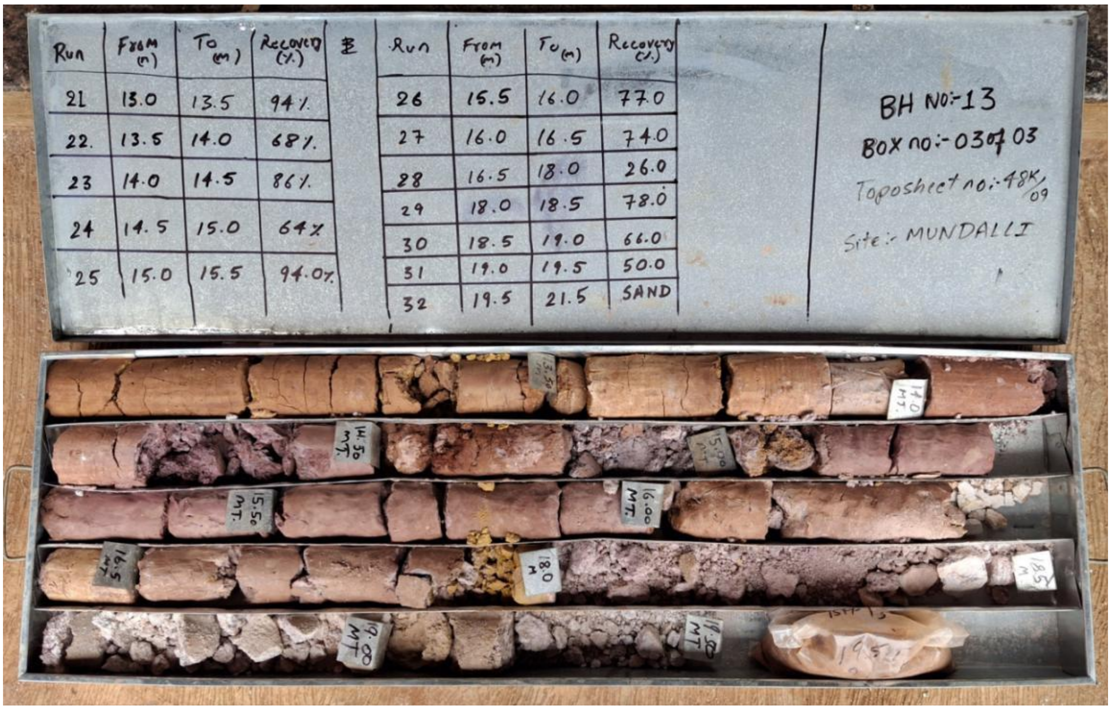
Borehole No.12 , Box 01 of 02

Borehole No.12 , Box 02 of 02

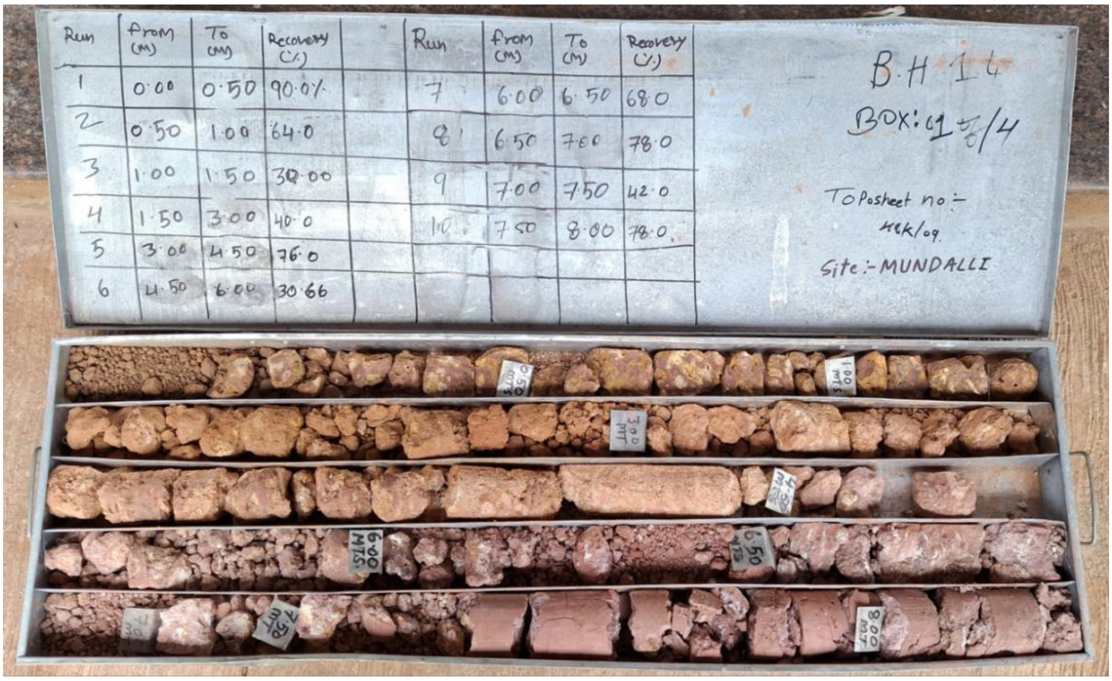


Borehole No.13 , Box 01 of 03

Borehole No.13 , Box 02 of 03



Borehole No.13 , Box 03 of 03

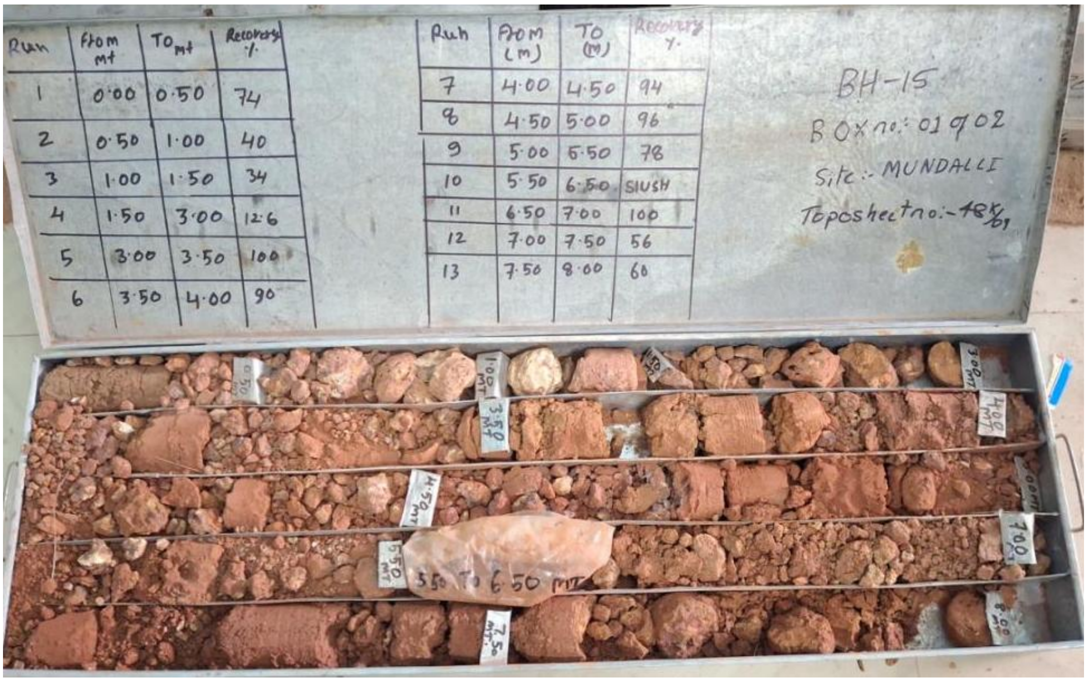


Borehole No.14 , Box 01 of 04

Borehole No.14 , Box 02 of 04

Borehole No.14 , Box 03 of 04

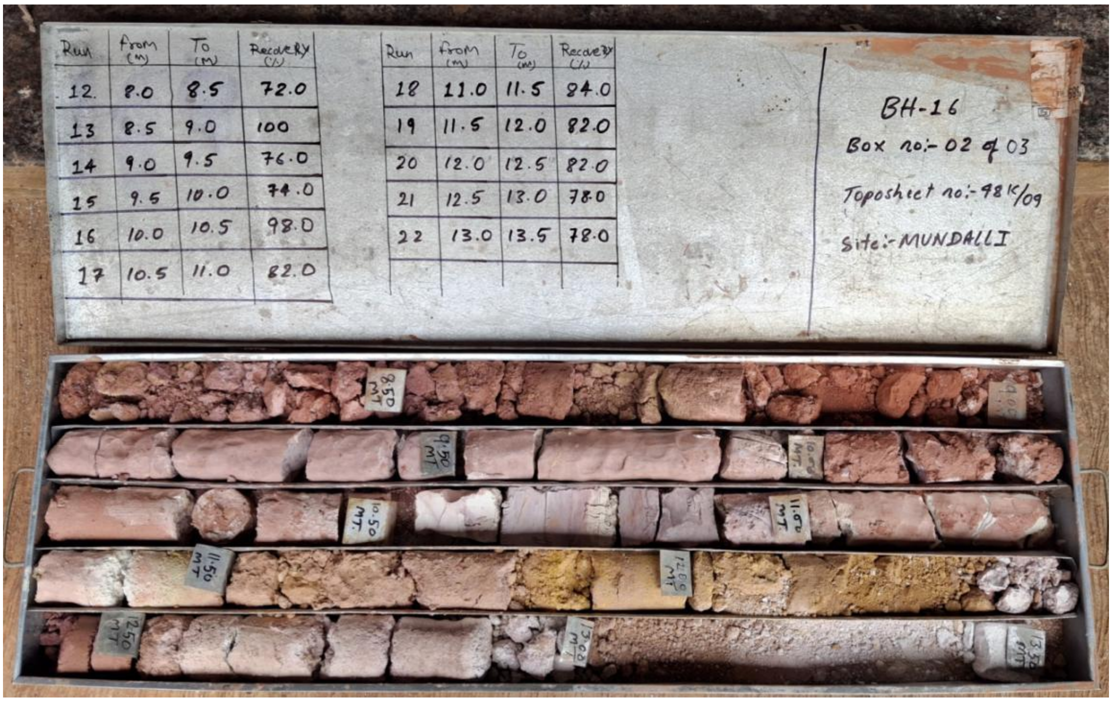
Borehole No.14 , Box 04 of 04



Borehole No.15 , Box 01 of 02

Borehole No.15 , Box 02 of 02

Borehole No.16 , Box 01 of 03\



Borehole No.16 , Box 02 of 03

Borehole No.16 , Box 03 of 03

ANNEXURE-9

Borehole log (Visual observation and analysed data)

ANNEXURE-9: Borehole log (Visual and interpreted)

BH-02 (RL = 51.48m, Total Depth = 17.0m)						
Visual Observation Lithocodes		From	To		Sample Id	Assay values Classified Lithocodes
Lateritic soil		0.00	0.50		GEMDBH0201	Ferruginous Laterite
		0.50	1.00			
Laterite		1.00	1.50			
		1.50	2.50		GEMDBH02S01	
Lateritic soil		2.50	3.00			
Clayey Soil		3.00	3.50		GEMDBH02S02	
Lateritic soil		3.50	4.00		GEMDBH02S03	
		4.00	4.50			
Clayey Soil		4.50	5.00		GEMDBH02S08	Clay
Clay		5.00	5.50			
Clayey Soil		5.50	6.00			
Clay		6.00	6.50			
Slush		6.50	7.00		No Sample	Slush
		7.00	7.50			
		7.50	8.00			
Clay		8.00	8.50		GEMDBH02S09	Clay
		8.50	9.00			
		9.00	9.50			
Laterite		9.50	10.00		GEMDBH02S04	Aluminous Laterite
Clayey Laterite		10.00	10.50		GEMDBH02S05	
		10.50	11.50			
		11.50	12.00		GEMDBH02S06	
Clay		12.00	12.50			
Clayey Laterite		12.50	13.00		GEMDBH02S07	Ferruginous Laterite
Slush		13.00	15.00		No Sample	Slush
Sand		15.00	17.00			Sand

BH-03 (RL = 58.66m, Total Depth = 23.5 m)

Field Observation Lithocodes		From	To		Sample Id	Assay values Classified Lithocodes
Laterite		0.00	0.50		GEMDBH0301	**Aluminous Clayey Laterite**
		0.50	1.00			
		1.00	1.50			
		1.50	3.00		GEMDBH03S01	**Ferruginous Laterite**
		3.00	4.50		GEMDBH03S02	
		4.50	6.00		GEMDBH03S03	
Clayey Laterite		6.00	6.50			
		6.50	7.00		GEMDBH03S04	
		7.00	7.50			
		7.50	8.00		GEMDBH03S05	
		8.00	8.50			
		8.50	9.00		GEMDBH03S06	
		9.00	9.50			
Clay		9.50	10.00		GEMDBH03S07	**Aluminous Laterite**
Clayey Laterite		10.00	10.50			
Clayey Soil		10.50	11.00		GEMDBH03S08	
Clayey Laterite		11.00	11.50			
Clayey Soil		11.50	12.00		GEMDBH03S09	
Clayey Laterite		12.00	12.50			
		12.50	13.00		GEMDBH03S10	
		13.00	13.50			
Clayey Soil		13.50	14.00		GEMDBH03S14	**Clay**
		14.00	14.50			
Clay		14.50	15.00			
Clay		15.00	15.50			
Clayey Soil		15.50	16.50		GEMDBH03S15	
Clay		16.50	17.00			
Clayey Laterite		17.00	17.50		GEMDBH03S11	**Ferruginous Laterite**
		17.50	18.00		GEMDBH03S12	
		18.00	18.50			
Slush		18.50	21.00		No Sample	**Slush**
Clayey Laterite		21.00	21.50		GEMDBH03S13	**Aluminous Laterite**
		21.50	22.00			
		22.00	23.00			
Clay		23.00	23.50		GEMDBH03S16	**Clay**

BH-04 (RL = 59.62m, Total Depth = 26.0 m)						
Field Observation Lithocodes		From	To		Sample Id	Assay values Classified Lithocodes
Laterite		0.00	0.50		GEMDBH0401	Ferruginous Laterite
		0.50	1.00			
		1.00	1.50			
		1.50	3.00		GEMDBH04S01	
		3.00	4.50		GEMDBH04S02	
		4.50	5.00		GEMDBH04S03	
		5.00	6.00			
		6.00	7.50		GEMDBH0402	Aluminous Laterite
		7.50	8.00		GEMDBH04S04	
		8.00	8.50			
Clay		8.50	9.00		GEMDBH04S12	Clay
Clayey Soil		9.00	9.50			
Clay		9.50	10.00			
Clayey soil		10.00	10.50		GEMDBH04S13	
Clay		10.50	11.00			
		11.00	11.50			
Clayey Laterite		11.50	12.00		GEMDBH04S05	Aluminous Laterite
		12.00	12.50			
Clayey Soil		12.50	13.00		GEMDBH04S06	Ferruginous Laterite
Clayey Laterite		13.00	13.50			
Lateritic Clayey Soil		13.50	14.00		GEMDBH04S07	Ferruginous Clayey Laterite
Lateritic Clay		14.00	14.50			
		14.50	15.00		GEMDBH04S08	Aluminous Laterite
Clay		15.00	15.50			
Clayey Soil		15.50	16.00		GEMDBH04S14	Clay
Lateritic Clay		16.00	16.50		GEMDBH04S09	Aluminous Clayey Laterite
Clayey laterite		16.50	17.00			
Slush		17.00	17.50		No Sample	Slush
Clay		17.50	18.00		GEMDBH04S15	Clay
		18.00	18.50			
		18.50	19.50			
		19.50	20.00		GEMDBH04S16	
		20.00	20.50			
		20.50	21.00		GEMDBH04S17	
		21.00	21.50			
		21.50	22.00			
Laterite		22.00	22.50		GEMDBH04S10	Aluminous Clayey Laterite
		22.50	23.00			
		23.00	23.50		GEMDBH04S11	Ferruginous Clayey Laterite
		23.50	24.00			
		24.00	24.50		GEMDBH0403	Ferruginous Laterite
Sand		24.50	26.00		No Sample	Sand

<table>
<tr><th colspan="7">BH-05 (RL = 62.98m, Total Depth = 10.0 m)</th></tr>
<tr><th>Field Observation Lithocodes</th><th></th><th>From</th><th>To</th><th></th><th>Sample Id</th><th>Assay values Classified Lithocodes</th></tr>
<tr><td rowspan="4">Laterite</td><td rowspan="14"></td><td>0.00</td><td>0.50</td><td rowspan="14"></td><td rowspan="3">GEMDBH05S01</td><td rowspan="3">Bauxite</td></tr>
<tr><td>0.50</td><td>1.00</td></tr>
<tr><td>1.00</td><td>1.50</td></tr>
<tr><td>1.50</td><td>3.00</td><td>GEMDBH05S02</td><td>Ferruginous Laterite</td></tr>
<tr><td rowspan="3">Clayey Laterite</td><td>3.00</td><td>4.50</td><td>GEMDBH05S03</td><td>Bauxite</td></tr>
<tr><td>4.50</td><td>5.00</td><td rowspan="2">GEMDBH05S04</td><td rowspan="7">Ferruginous Laterite</td></tr>
<tr><td>5.00</td><td>5.50</td></tr>
<tr><td>Clayey Soil</td><td>5.50</td><td>6.00</td><td rowspan="2">GEMDBH05S05</td></tr>
<tr><td rowspan="4">Clayey Laterite</td><td>6.00</td><td>6.50</td></tr>
<tr><td>6.50</td><td>7.00</td><td rowspan="2">GEMDBH05S06</td></tr>
<tr><td>7.00</td><td>7.50</td></tr>
<tr><td>7.50</td><td>8.00</td><td>GEMDBH05S07</td></tr>
<tr><td rowspan="2">Clayey Soil</td><td>8.00</td><td>8.50</td><td rowspan="2">GEMDBH05S08</td><td rowspan="4">Clay</td></tr>
<tr><td>8.50</td><td>9.00</td></tr>
<tr><td>Clay</td><td></td><td>9.00</td><td>9.50</td><td></td><td rowspan="2">GEMDBH05S09</td></tr>
<tr><td>Clayey Soil</td><td></td><td>9.50</td><td>10.00</td><td></td></tr>
</table>

BH-06 (RL = 54.53m, Total Depth = 18.5 m)						
Field Observation Lithocodes		**From**	**To**		**Sample Id**	**Assay values Classified Lithocodes**
Laterite		0.00	0.50		GEMDBH0601	**Ferruginous Laterite**
		0.50	1.00			
		1.00	1.50			
		1.50	3.00		GEMDBH06S01	
		3.00	4.50		GEMDBH06S02	
		4.50	6.00		GEMDBH06S03	
		6.00	7.50		GEMDBH0602	Ferruginous Clayey Laterite
		7.50	8.00		GEMDBH06S04	**Ferruginous Laterite**
		8.00	8.50			
		8.50	9.00		GEMDBH06S05	**Aluminous Laterite**
		9.00	9.50			
Clayey soil		9.50	10.00		GEMDBH06S07	**Clay**
		10.00	10.50			
Clay		10.50	11.00			
Laterite		11.00	11.50		GEMDBH06S06	**Aluminous Laterite**
Clayey Laterite		11.50	12.00			
Weathered laterite		12.00	12.50		GEMDBH0603	**Ferruginous Laterite**
Clayey Soil		12.50	13.00		GEMDBH06S08	**Clay**
		13.00	13.50			
Clay		13.50	14.00			
		14.00	14.50			
		14.50	15.00		GEMDBH06S09	
		15.00	15.50			
		15.50	16.00			
		16.00	16.50			
		16.50	17.00			
sand		17.00	18.50		**No Sample**	**Sand**

BH-07 (RL = 57.29m, Total Depth = 11.0 m)

Field Observation Lithocodes		From	To		Sample Id	Assay values Classified Lithocodes
Laterite		0.00	0.50		GEMDBH07S01	Ferruginous Laterite
		0.50	1.00			
		1.00	1.50			
		1.50	3.00		GEMDBH07S02	
		3.00	4.50		GEMDBH07S03	
		4.50	6.00		GEMDBH07S04	
Clayey Laterite		6.00	6.50		GEMDBH07S05	Aluminous Laterite
Clay		6.50	7.00		GEMDBH07S09	Clay
Clayey Laterite		7.00	7.50		GEMDBH07S06	Aluminous Clayey Laterite
Lateritic Soil		7.50	8.00		GEMDBH07S07	Ferruginous Laterite
Clayey Soil		8.00	8.50			
Clay		8.50	9.00		GEMDBH07S10	Clay
Clayey Soil		9.00	9.50			
		9.50	10.00		GEMDBH07S08	Ferruginous Laterite
Clayey Laterite		10.00	10.50			
Slush		10.50	11.00		No Sample	Slush

BH-08 (RL = 53.32m, Total Depth = 15.0 m)

Field Observation Lithocodes		From	To		Sample Id	Assay values Classified Lithocodes
Lateritic soil		0.00	0.50		GEMDBH0801	Ferruginous Laterite
Laterite		0.50	1.00			
		1.00	1.50			
		1.50	3.00		GEMDBH08S01	Aluminous Laterite
		3.00	4.50		GEMDBH08S02	Ferruginous Laterite
		4.50	6.00			
Clay		6.00	6.50		GEMDBH08S04	Clay
		6.50	7.50			
		7.50	8.00			
Clayey Laterite		8.00	8.50		GEMDBH08S03	Ferruginous Laterite
		8.50	9.00			
Clay		9.00	10.00		GEMDBH08S05	Clay
Clayey soil		10.00	10.50			
		10.50	11.00		GEMDBH08S06	
Soil		11.00	11.50			
Sand		11.50	15.00		No Sample	Sand

BH-09 (RL = 61.51m, Total Depth = 24.5 m)						
Field Observation Lithocodes		**From**	**To**		**Sample Id**	**Assay values Classified Lithocodes**
Laterite		0.00	0.50		GEMDBH0901	**Aluminous Laterite**
		0.50	1.00			
		1.00	2.00		GEMDBH0902	
		2.00	3.00		GEMDBH0903	
		3.00	4.50		GEMDBH0904	**Ferruginous Laterite**
		4.50	6.00		GEMDBH0905	**Aluminous Laterite**
		6.00	7.50		GEMDBH0906	**Bauxite**
		7.50	9.00		GEMDBH0907	**Ferruginous Laterite**
		9.00	10.50		GEMDBH0908	**Aluminous Laterite**
		10.50	12.00		GEMDBH0909	**Ferruginous Laterite**
		12.00	13.50		GEMDBH0910	
Clay		13.50	14.00		GEMDBH0911	**Aluminous Clayey Laterite**
		14.00	14.50		GEMDBH0912	**Ferruginous Clayey Laterite**
Lateritic Clay		14.50	15.00		GEMDBH0913	**Aluminous Laterite**
Laterite		15.00	15.50		GEMDBH0914	
Clay		15.50	16.00			
Laterite		16.00	16.50			
		16.50	17.00		GEMDBH0915	
Clay		17.00	17.50			
Laterite		17.50	18.00		GEMDBH0916	
		18.00	18.50			
		18.50	19.00		GEMDBH0917	
		19.00	19.50			
Slush		19.50	20.00		**No Sample**	**Slush**
Clay		20.00	20.50		GEMDBH0918	**Aluminous Clayey Laterite**
		20.50	21.00			
		21.00	21.50		GEMDBH0919	
		21.50	22.00			
Sand		22.00	24.50		**No Sample**	**Sand**

BH-10 (RL = 64.53m, Total Depth = 10.0 m)

Field Observation Lithocodes		From	To		Sample Id	Assay values Classified Lithocodes
Laterite		0.00	0.50		GEMDBH10S01	**Aluminous Laterite**
		0.50	1.00			
Lateritic Soil		1.00	1.50			
Laterite		1.50	3.00		GEMDBH10S02	
		3.00	4.50		GEMDBH10S03	
Lateritic Soil		4.50	5.00		GEMDBH10S04	
		5.00	5.50			
		5.50	6.00		GEMDBH10S05	
Clayey Soil		6.00	7.00		GEMDBH10S06	
Clayey Laterite		7.00	7.50			
		7.50	8.00		GEMDBH10S07	**Ferruginous Laterite**
		8.00	8.50			
		8.50	9.00		GEMDBH10S08	
		9.00	9.50			
Laterite		9.50	10.00		GEMDBH10S09	**Aluminous Laterite**

BH-11 (RL = 61.19m, Total Depth = 18.5 m)						
Field Observation Lithocodes		**From**	**To**		**Sample Id**	**Assay values Classified Lithocodes**
Laterite		0.00	0.50		GEMDBH1101	**Ferruginous Laterite**
		0.50	1.00			
		1.00	1.50			
		1.50	3.00		GEMDBH11S01	
		3.00	4.50		GEMDBH11S02	
		4.50	6.00		GEMDBH11S03	
		6.00	7.50		GEMDBH1102	
		7.50	9.00		GEMDBH11S04	
Clayey Laterite		9.00	10.50		GEMDBH11S05	
Clay		10.50	11.00		GEMDBH11S08	**Clay**
		11.00	11.50			
Laterite		11.50	12.00		GEMDBH11S06	**Aluminous Clayey Laterite**
		12.00	12.50			
Clayey Laterite		12.50	13.00		GEMDBH11S07	
Clay		13.00	14.00		GEMDBH11S09	**Clay**
Clayey Laterite		14.00	15.00		GEMDBH1103	**Aluminous Clayey Laterite**
Clay		15.00	15.50		GEMDBH11S10	**Clay**
		15.50	16.00			
		16.00	16.50			
Sand		16.50	18.50		**No Sample**	**Sand**

BH-12 (RL = 66.24m, Total Depth = 10.0 m)						
Field Observation Lithocodes		**From**	**To**		**Sample Id**	**Assay values Classified Lithocodes**
Laterite		0.00	0.50		GEMDBH12S01	**Ferruginous Laterite**
		0.50	1.00			
		1.00	1.50			
		1.50	3.00		GEMDBH12S02	**Aluminous Laterite**
		3.00	4.50		GEMDBH12S03	**Ferruginous Laterite**
Lateritic Soil		4.50	5.00		GEMDBH12S04	
Laterite		5.00	6.00			
Lateritic Soil		6.00	6.50		GEMDBH12S05	
Laterite		6.50	7.50			
Clayey Laterite		7.50	8.00		GEMDBH12S06	**Aluminous Laterite**
		8.00	8.50			
		8.50	9.00		GEMDBH12S07	
		9.00	9.50			
		9.50	10.00			

BH-13 (RL = 67.67, Total Depth = 21.5 m)

Field Observation Lithocodes		From	To		Sample Id	Assay values Classified Lithocodes
Laterite		0.00	0.50		GEMDBH1301	**Bauxite**
		0.50	1.00			
		1.00	1.50			
		1.50	3.00		GEMDBH13S01	
		3.00	4.50		GEMDBH13S02	**Ferruginous Laterite**
		4.50	6.00		GEMDBH13S03	
		6.00	6.50		GEMDBH1302	
		6.50	7.00			
		7.00	7.50			
		7.50	8.00		GEMDBH13S04	**Aluminous Laterite**
		8.00	8.50			
		8.50	9.00		GEMDBH13S05	
		9.00	9.50			
Lateritic soil		9.50	10.00		GEMDBH13S06	
		10.00	10.50			
		10.50	11.00			
		11.00	11.50		GEMDBH1303	**Ferruginous Laterite**
clayey soil		11.50	12.00		GEMDBH13S07	**Clay**
		12.00	12.50			
		12.50	13.00			
		13.00	13.50		GEMDBH13S08	
		13.50	14.00			
Clay		14.00	14.50			
		14.50	15.00			
		15.00	15.50		GEMDBH13S09	
		15.50	16.00			
		16.00	16.50			
		16.50	18.00		GEMDBH13S10	
clayey soil		18.00	18.50		GEMDBH13S11	
		18.50	19.00			
		19.00	19.50			
Sand		19.50	21.50		**No Sample**	**Sand**

BH-14 (RL = 68.59m, Total Depth = 24.0 m)

Field Observation Lithocodes		From	To		Sample Id	Assay values Classified Lithocodes
Lateritic soil		0.00	0.50		GEMDBH1401	Ferruginous Laterite
Laterite		0.50	1.00			
		1.00	1.50			
		1.50	3.00		GEMDBH14S01	Aluminous Laterite
		3.00	4.50		GEMDBH14S02	
		4.50	6.00		GEMDBH14S03	Ferruginous Laterite
		6.00	6.50		GEMDBH1402	Aluminous Laterite
		6.50	7.00			
		7.00	7.50			
		7.50	8.00		GEMDBH14S04	
		8.00	8.50			
Clayey Laterite		8.50	9.00		GEMDBH14S05	Ferruginous Laterite
Laterite		9.00	9.50		GEMDBH14S06	
Clayey Laterite		9.50	10.00			
Laterite		10.00	10.50		GEMDBH14S07	
Clay		10.50	11.00			
Clayey Laterite		11.00	11.50		GEMDBH14S08	Aluminous Laterite
Lateritic soil		11.50	12.00		GEMDBH14S09	Ferruginous Laterite
		12.00	12.50		GEMDBH1403	Aluminous Laterite
Clayey Soil		12.50	13.00		GEMDBH14S10	Clay
Clay		13.00	13.50			
Clayey Soil		13.50	14.00		GEMDBH14S11	
		14.00	14.50			
		14.50	15.00			
		15.00	15.50			
		15.50	16.00		GEMDBH14S12	
Clayey Silt		16.00	16.50			
		16.50	17.00			
Clayey Soil		17.00	17.50		GEMDBH14S13	
Clayey Silt		17.50	18.00			
		18.00	18.50			
Clay		18.50	19.00		GEMDBH14S14	
		19.00	19.50			
		19.50	20.00			
		20.00	20.50			
Clayey Silt		20.50	21.00		GEMDBH14S15	
		21.00	21.50			
Sand		21.50	24.00		No Sample	Sand

BH-15 (RL = 56.46m, Total Depth = 10.50 m)						
Field Observation Lithocodes		**From**	**To**		**Sample Id**	**Assay values Classified Lithocodes**
Lateritic Soil		0.00	0.50		GEMDBH15S01	**Aluminous Laterite**
Laterite		0.50	1.00			
		1.00	1.50			
		1.50	3.00		GEMDBH15S02	**Ferruginous Laterite**
Lateritic Soil		3.00	3.50		GEMDBH15S03	
		3.50	4.00			
		4.00	4.50		GEMDBH15S04	
		4.50	5.00			
		5.00	5.50		GEMDBH15S05	
SLUSH		5.50	6.50		**No Sample**	**Slush**
Lateritic Soil		6.50	7.00		GEMDBH15S06	**Ferruginous Laterite**
		7.00	7.50		GEMDBH15S07	
		7.50	8.00			
Clayey Laterite		8.00	8.50		GEMDBH15S08	
Lateritic Soil		8.50	9.00			
Clayey Laterite		9.00	9.50		GEMDBH15S09	**Aluminous Laterite**
		9.50	10.00			
		10.00	10.50			

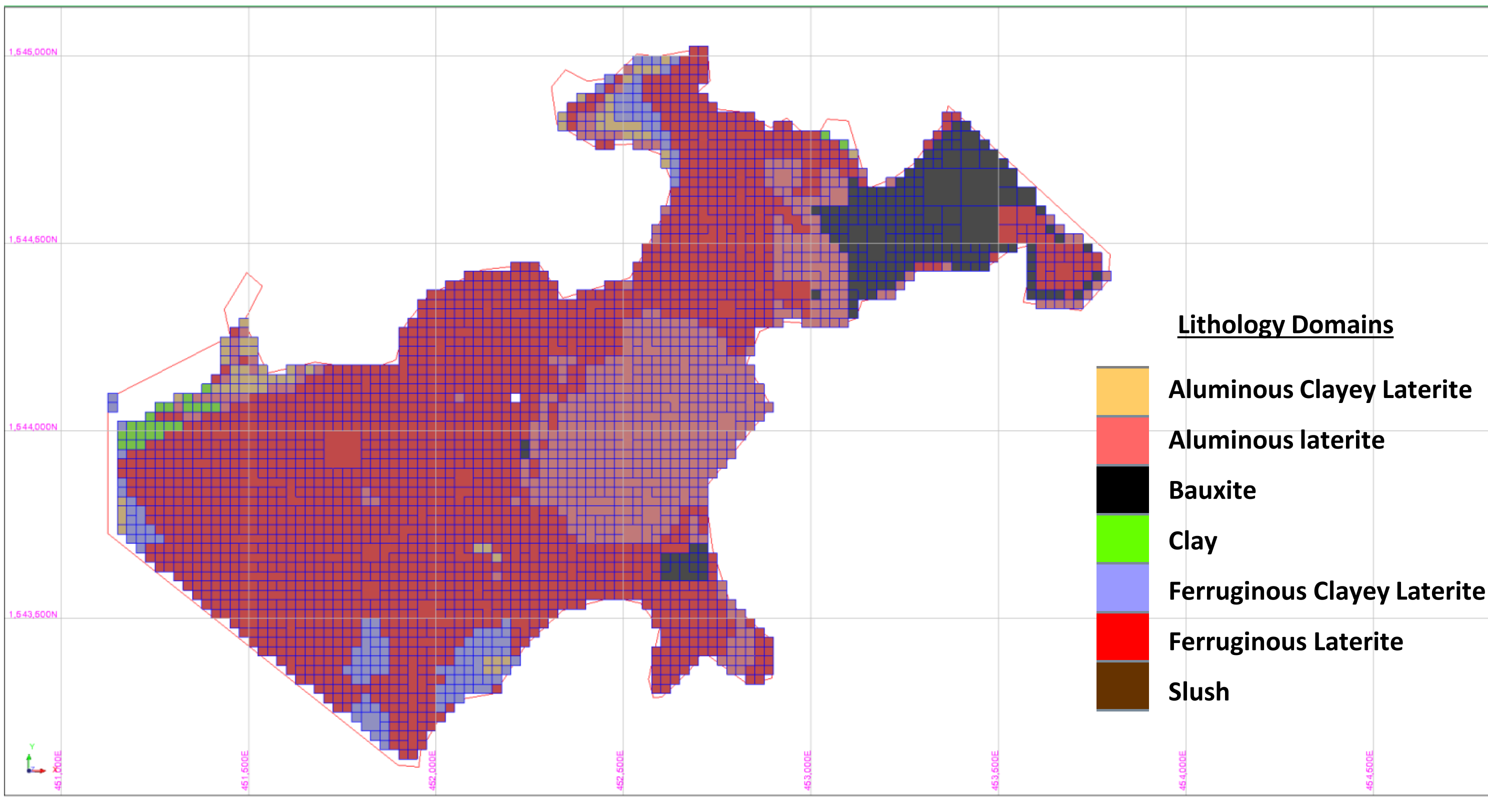
BH-16 (RL = 65.75m, Total Depth = 17.0 m)						
Field Observation Lithocodes		**From**	**To**		**Sample Id**	**Assay values Classified Lithocodes**
Laterite		0.00	0.50		GEMDBH1601	**Ferruginous Laterite**
		0.50	1.00			
		1.00	1.50			
		1.50	3.00		GEMDBH16S01	
		3.00	3.50		GEMDBH16S02	
		3.50	4.50			
		4.50	6.00		GEMDBH16S03	
		6.00	6.50		GEMDBH1602	
Lateritic soil		6.50	7.00			
		7.00	7.50			
		7.50	8.00		GEMDBH16S04	**Ferruginous Clayey Laterite**
		8.00	8.50			
		8.50	9.00		GEMDBH16S05	**Aluminous Clayey Laterite**
Clay		9.00	9.50		GEMDBH16S07	**Clay**
		9.50	10.00			
		10.00	10.50			
		10.50	11.00		GEMDBH16S08	
		11.00	11.50			
Clayey Soil		11.50	12.00		GEMDBH16S06	**Aluminous Clayey Laterite**
Lateritic soil		12.00	12.50			
Clay		12.50	13.00		GEMDBH16S09	**Clay**
Lateritic soil		13.00	13.50		GEMDBH1603	**Ferruginous Laterite**
Clayey Soil		13.50	14.00		GEMDBH16S10	**Clay**
Clay		14.00	15.50			
Sand		15.50	17.00		**No Sample**	**Sand**

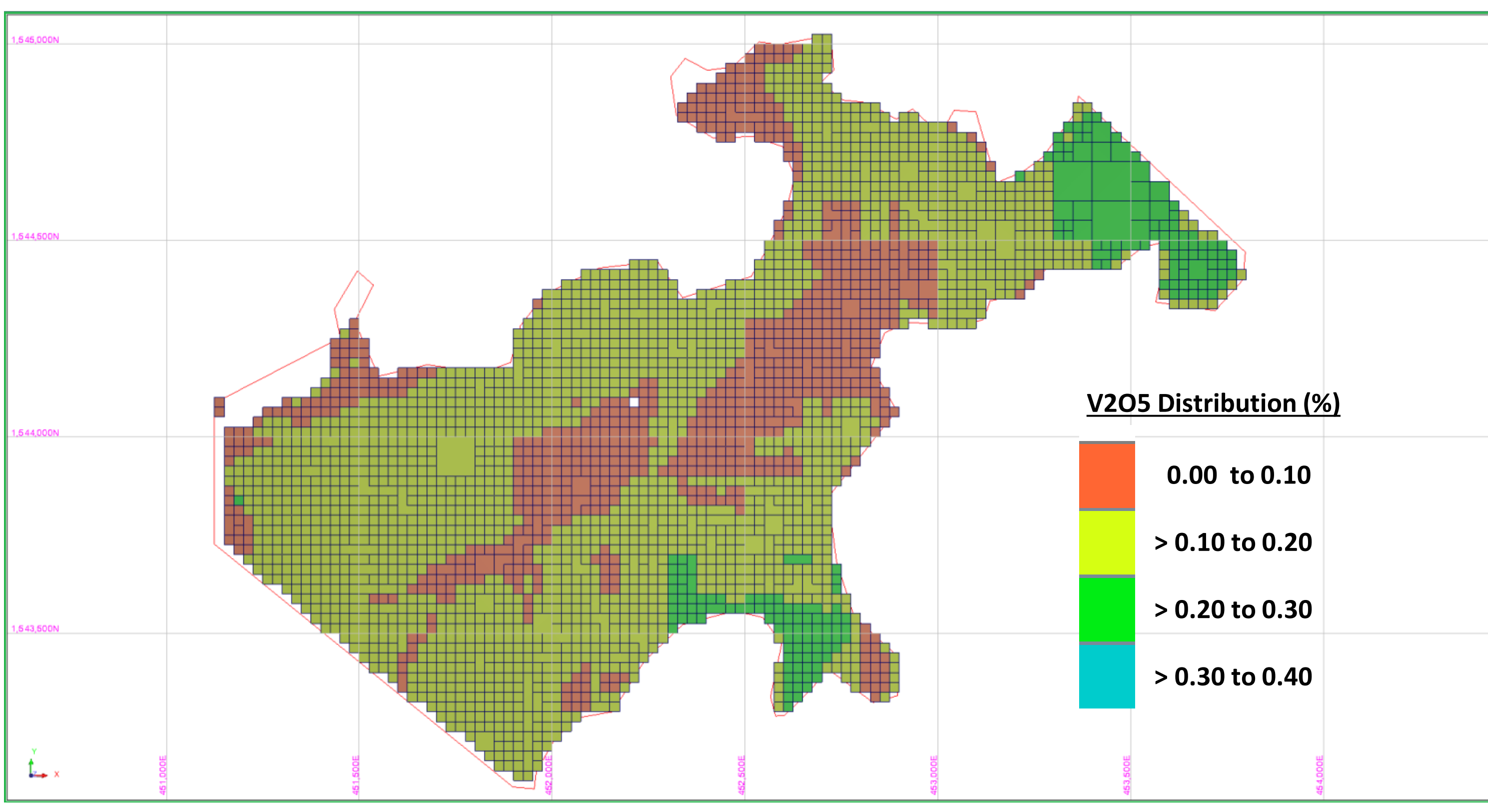
ANNEXURE-10

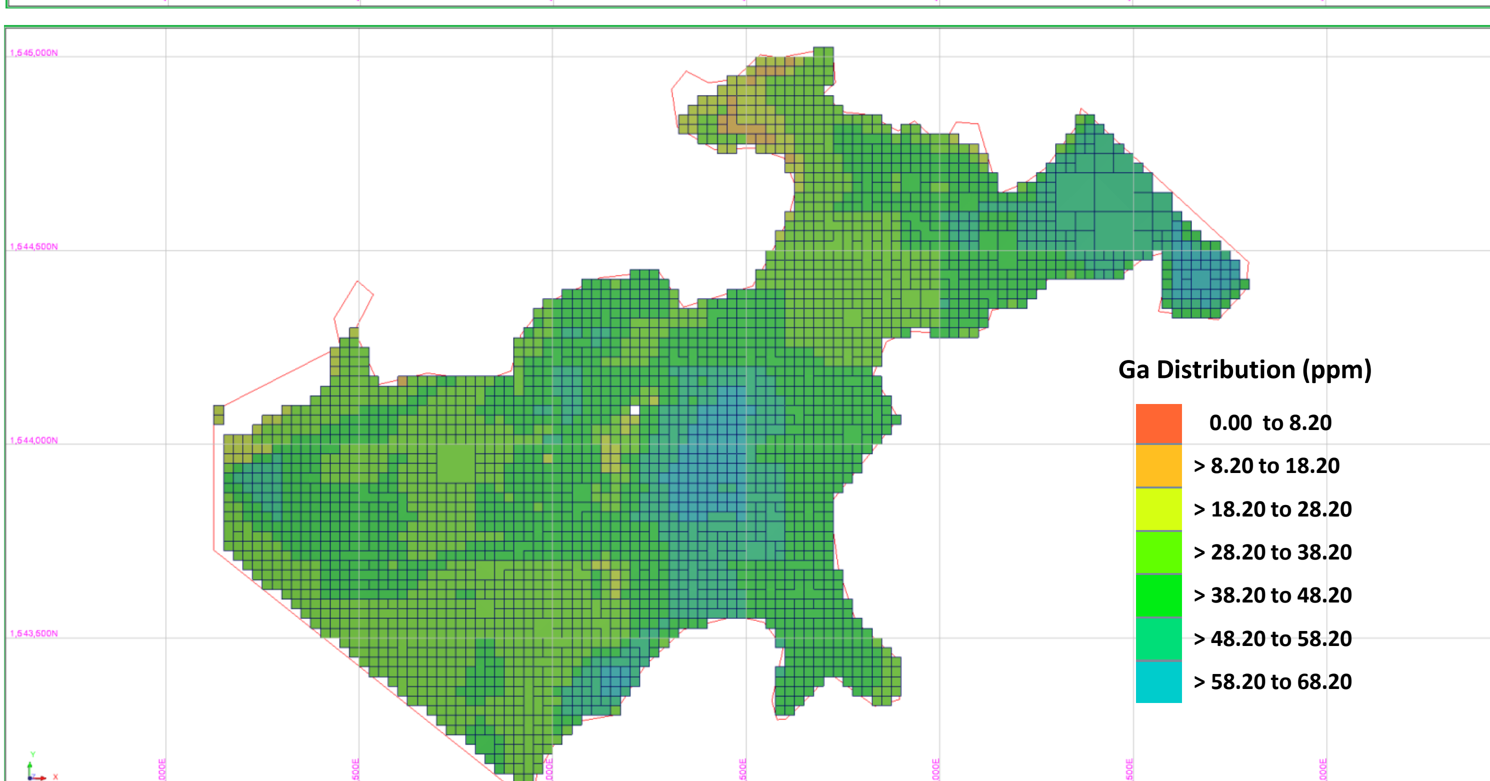
XY Sliced Views of Mundalli Block at 1.0 m interval up to 10.0 m depth

ANNEXURE-10: XY Sliced Views of Mundalli Block at 1.0 m interval up to 10.0m depth

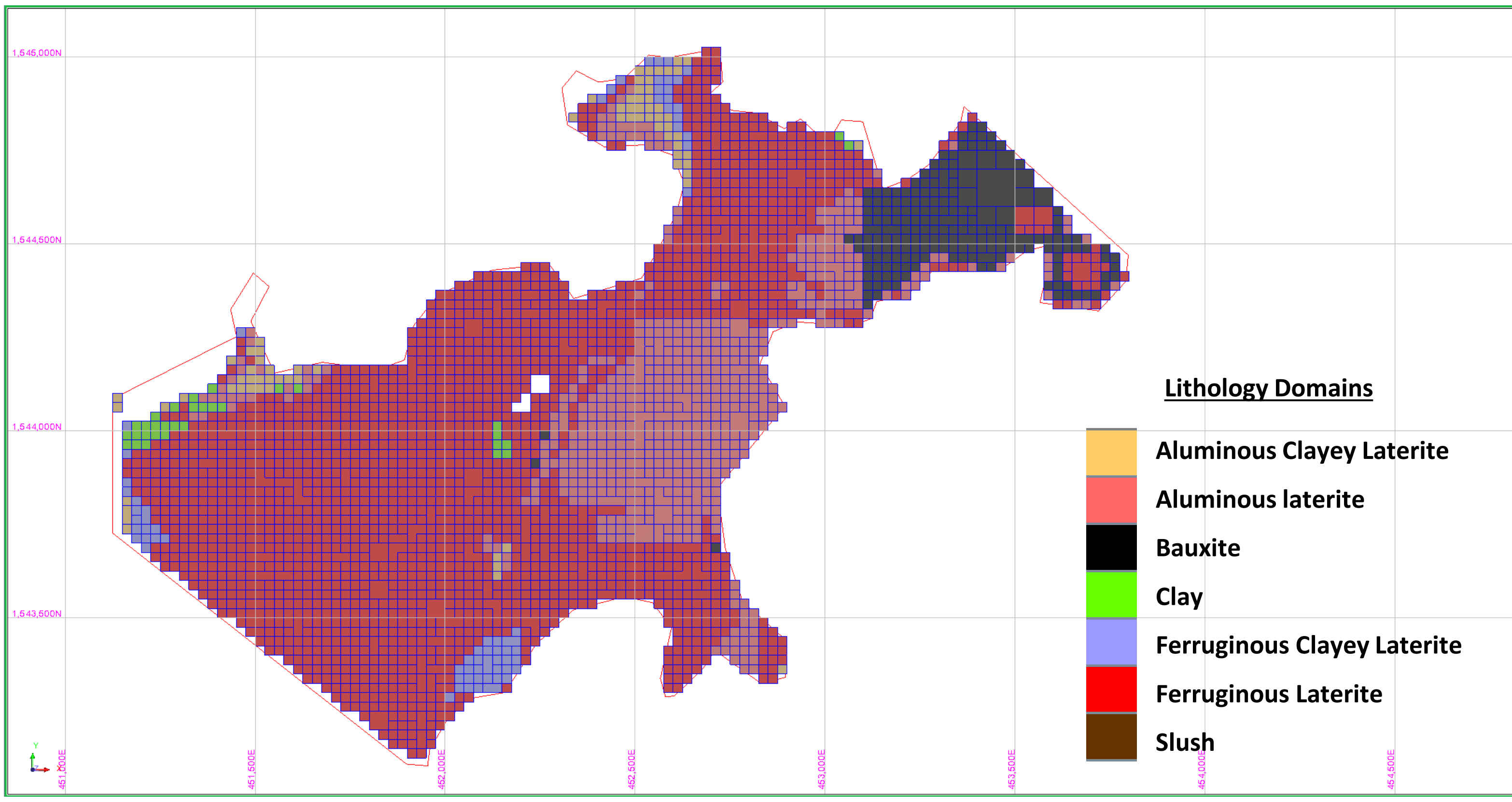
At DEM Surface

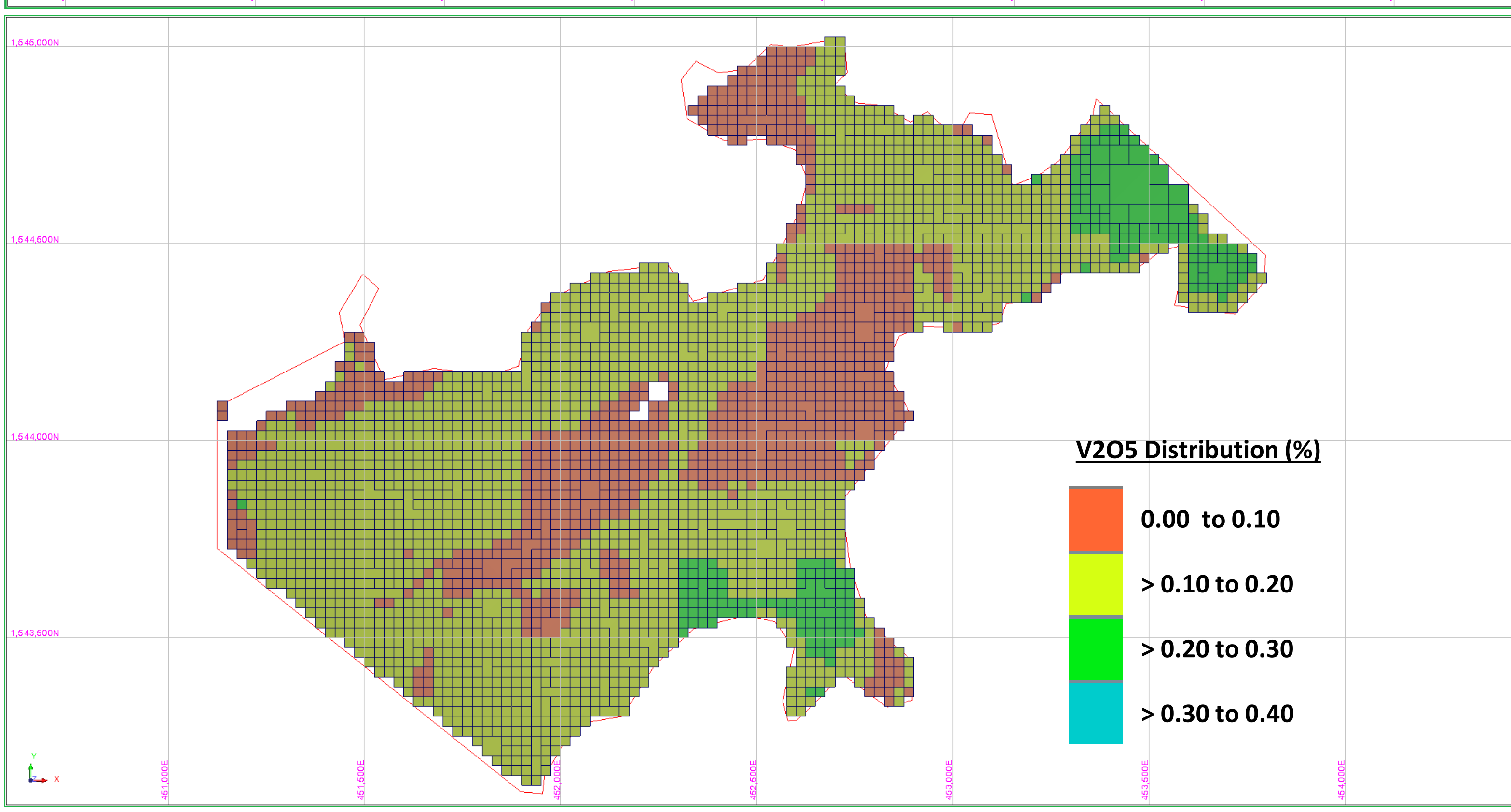


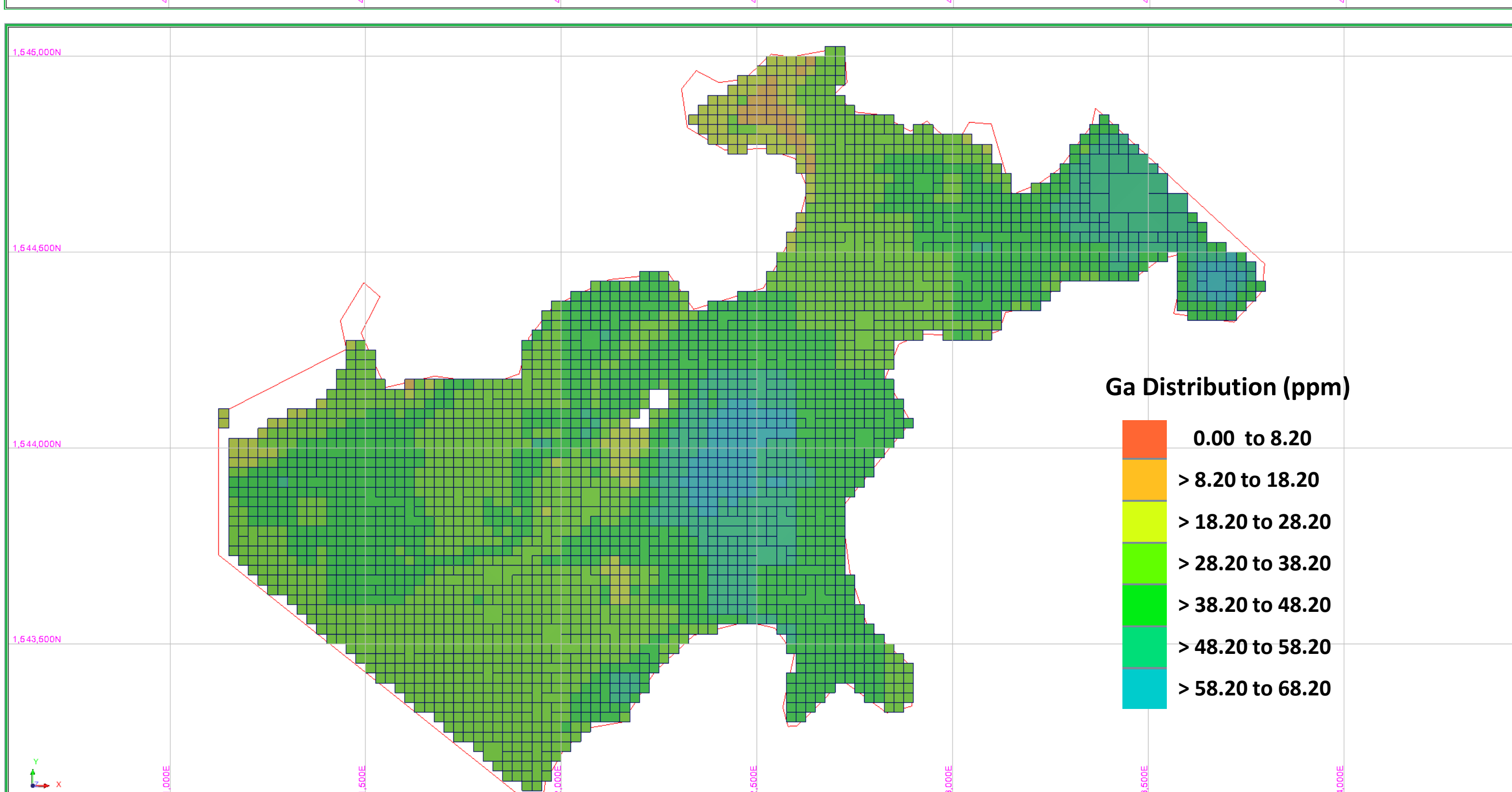




Below 1.0m Surface DEM







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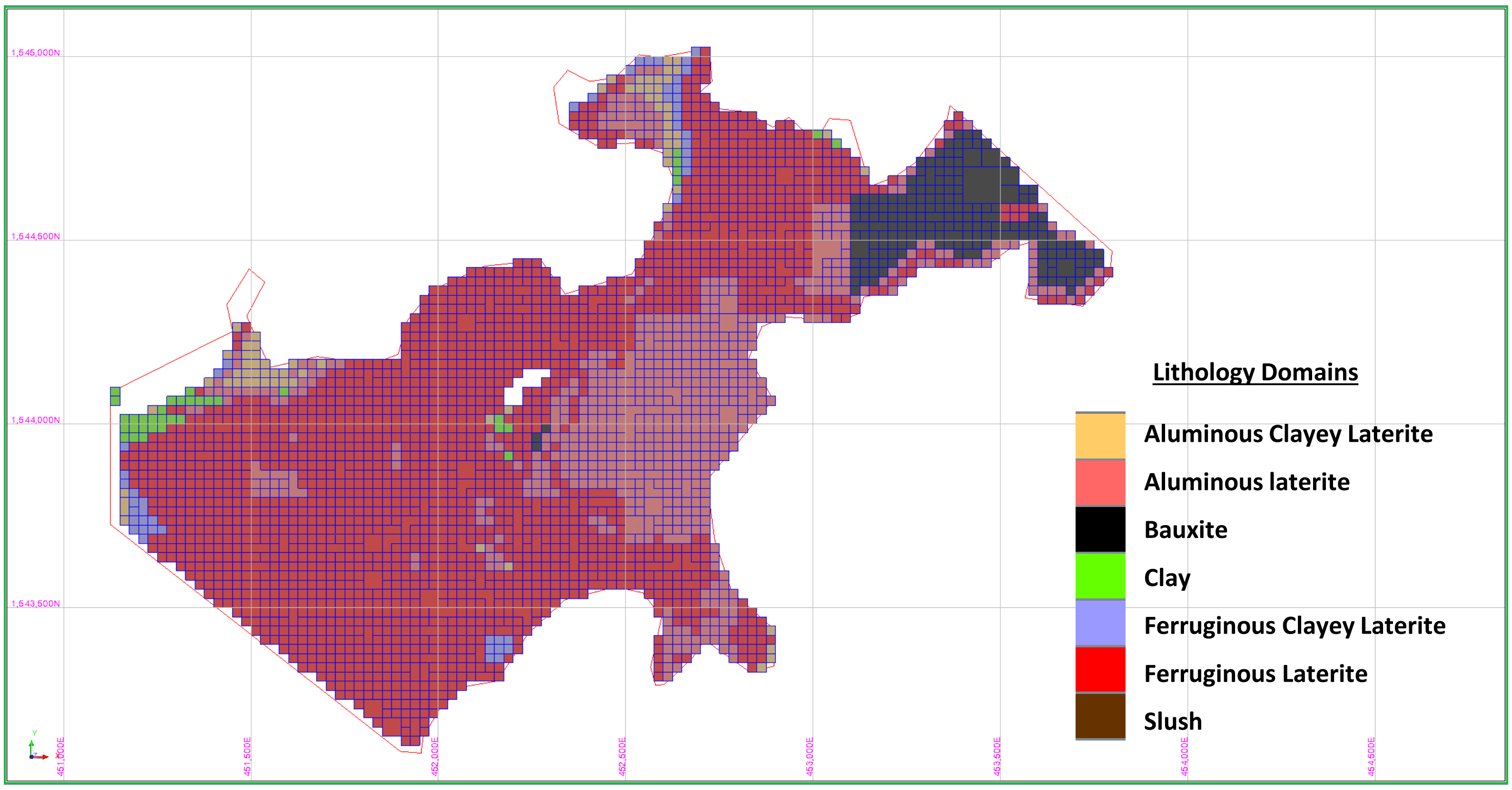

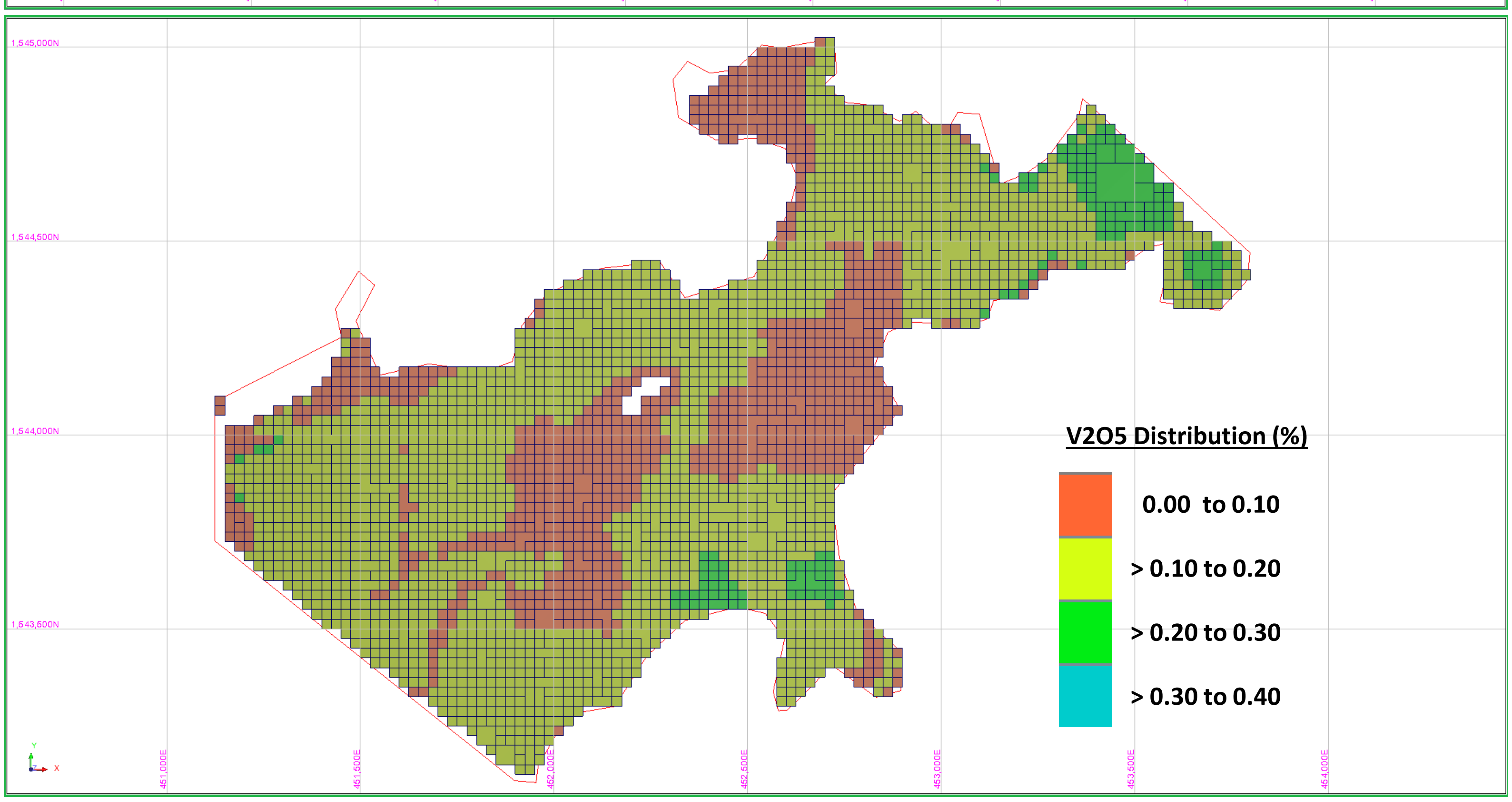

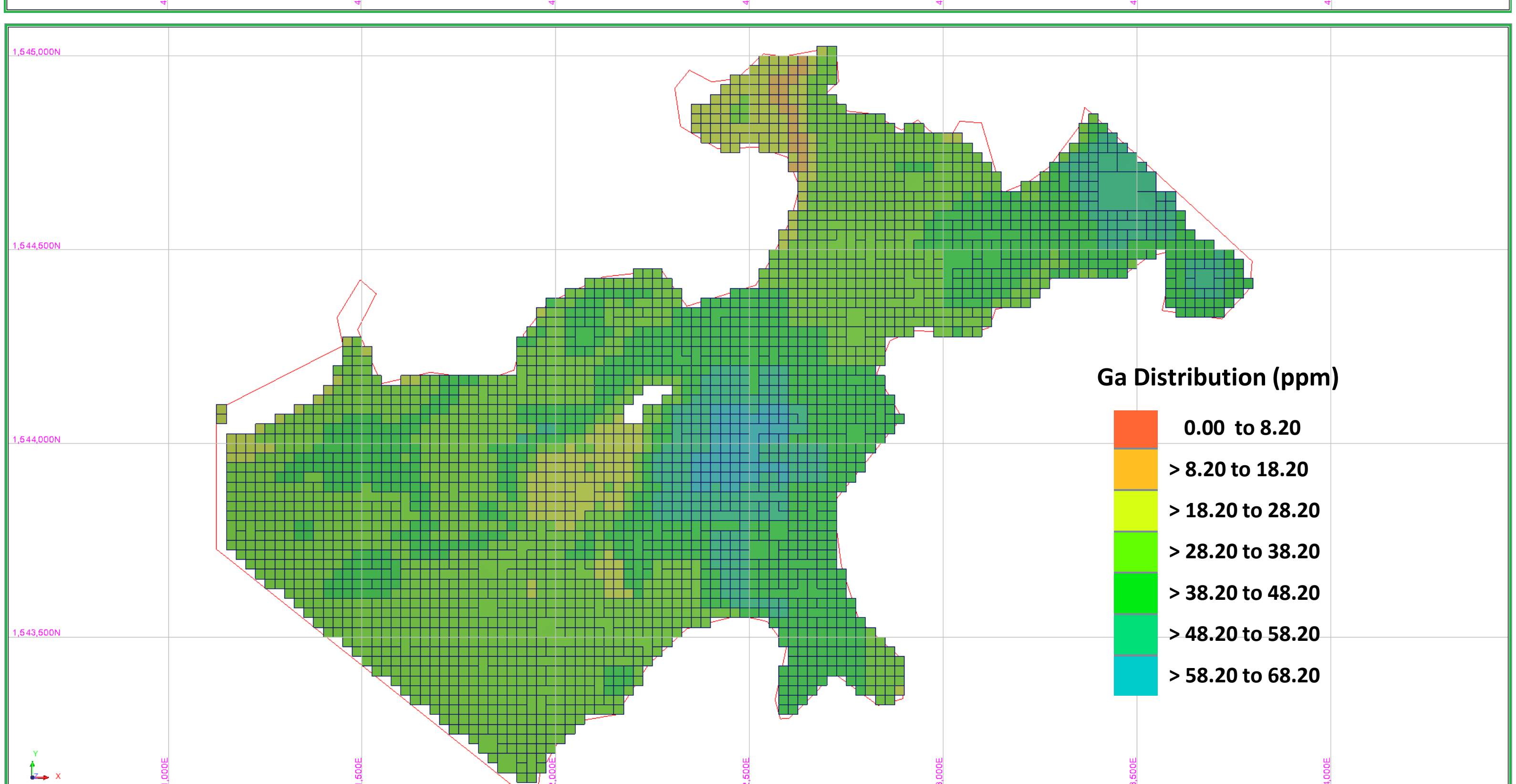

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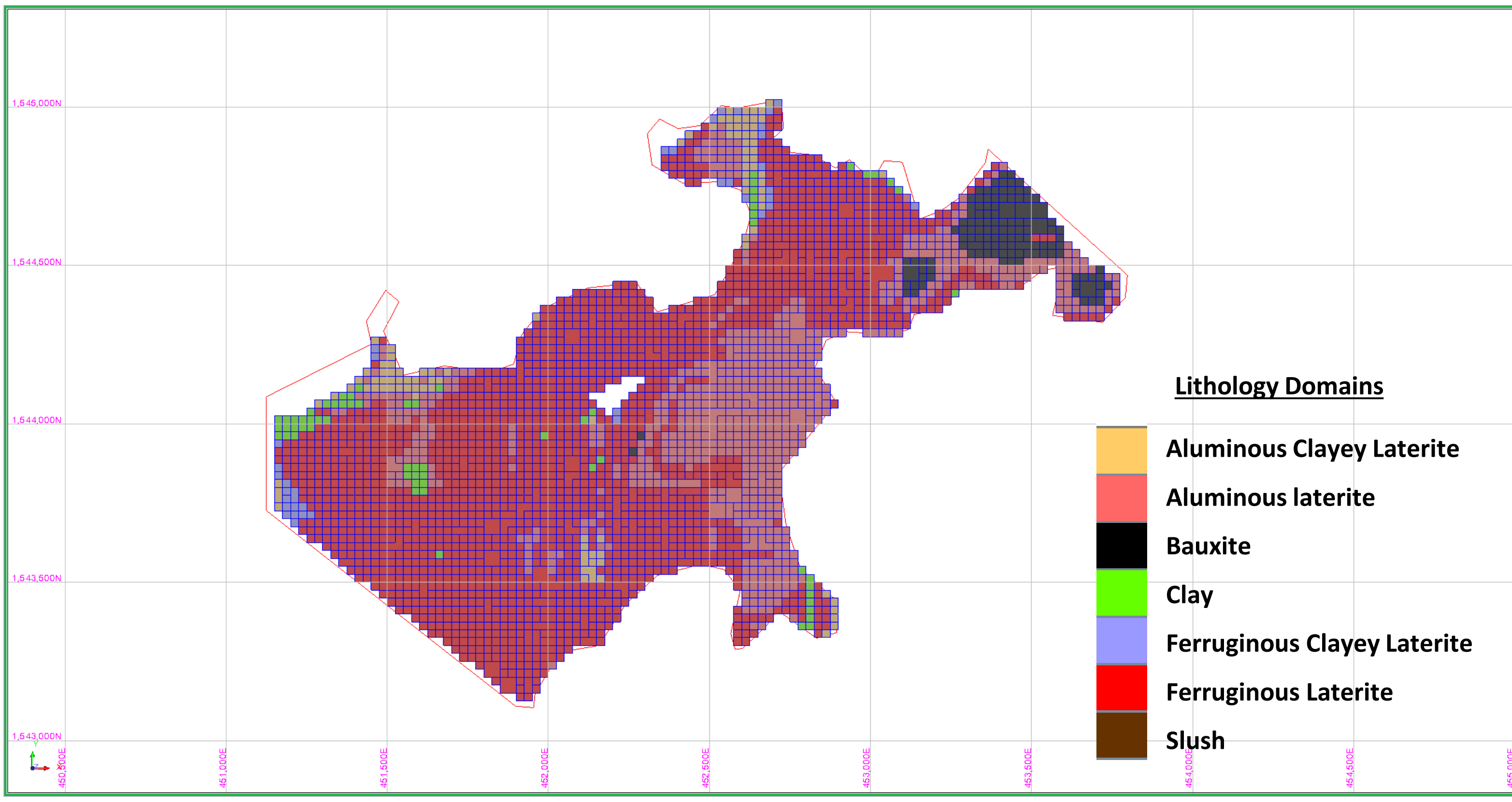

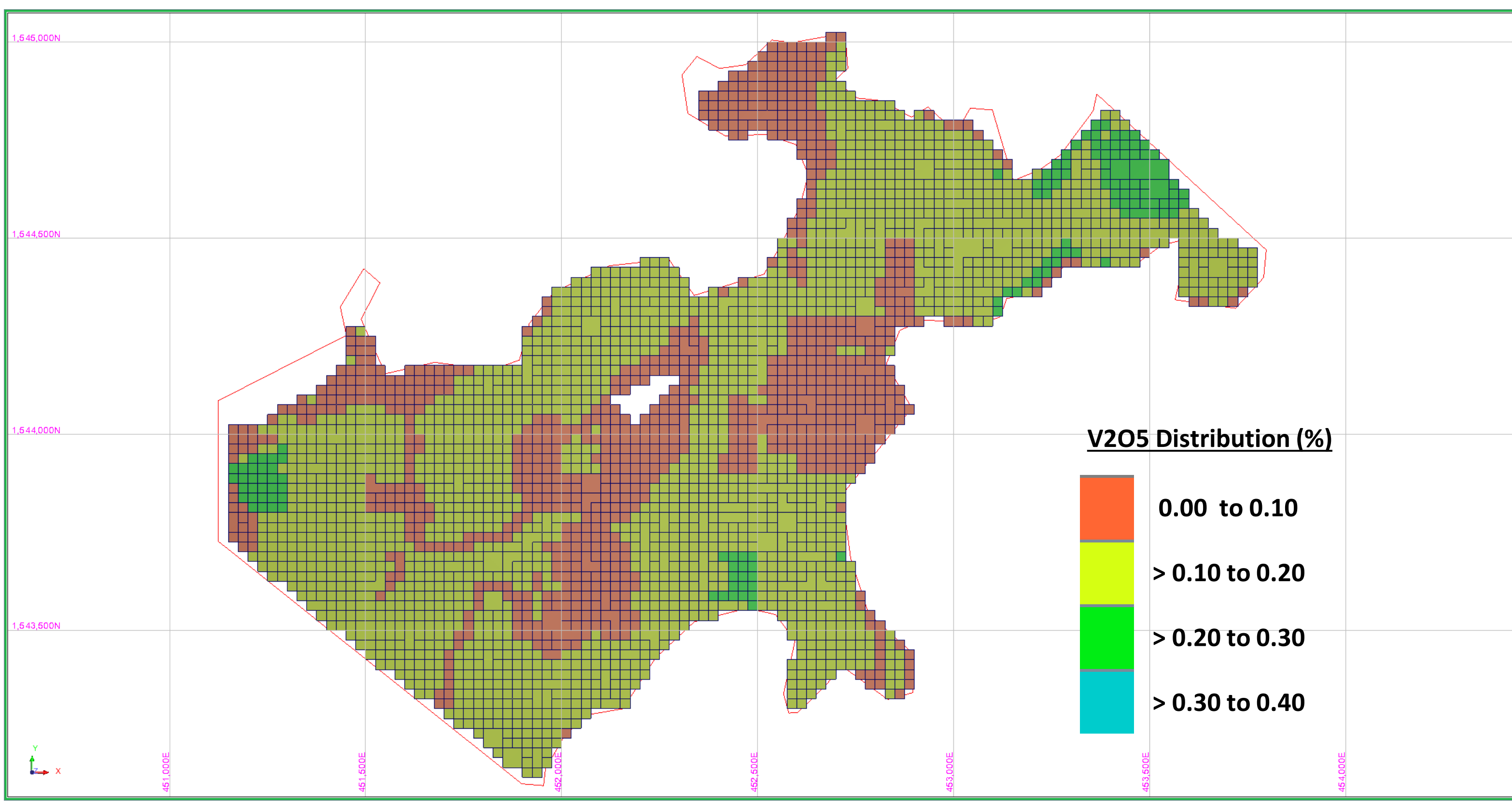

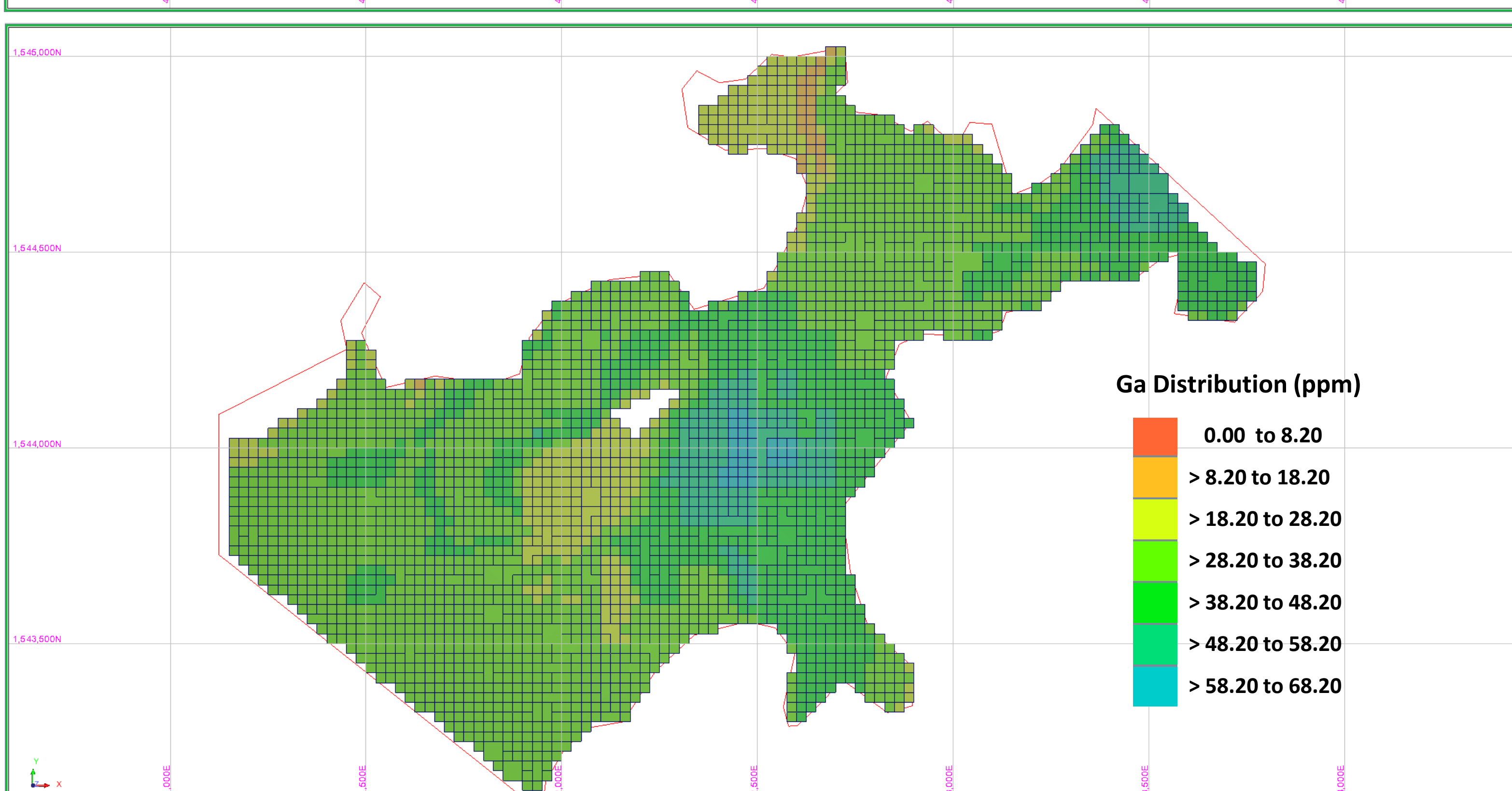

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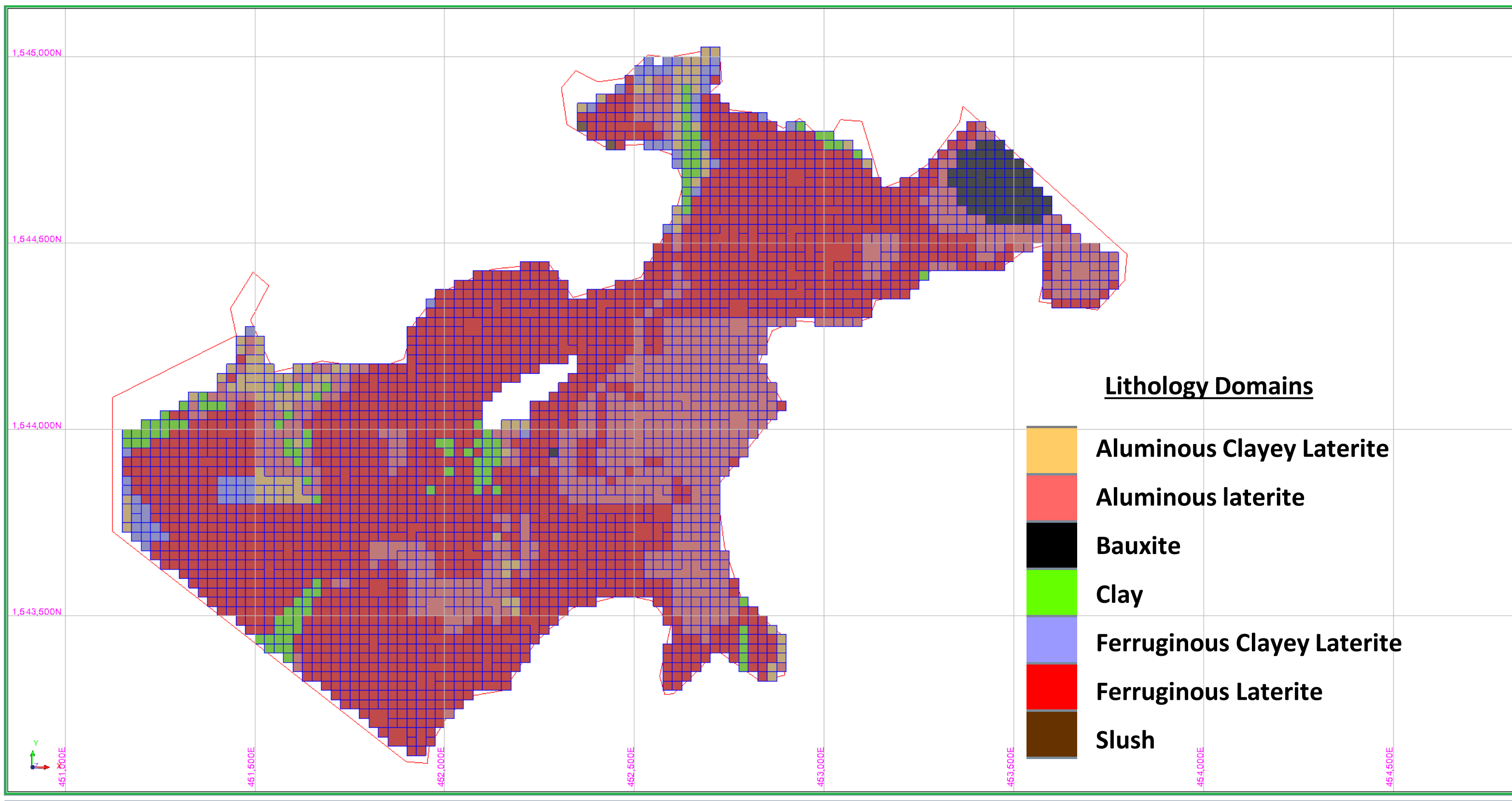

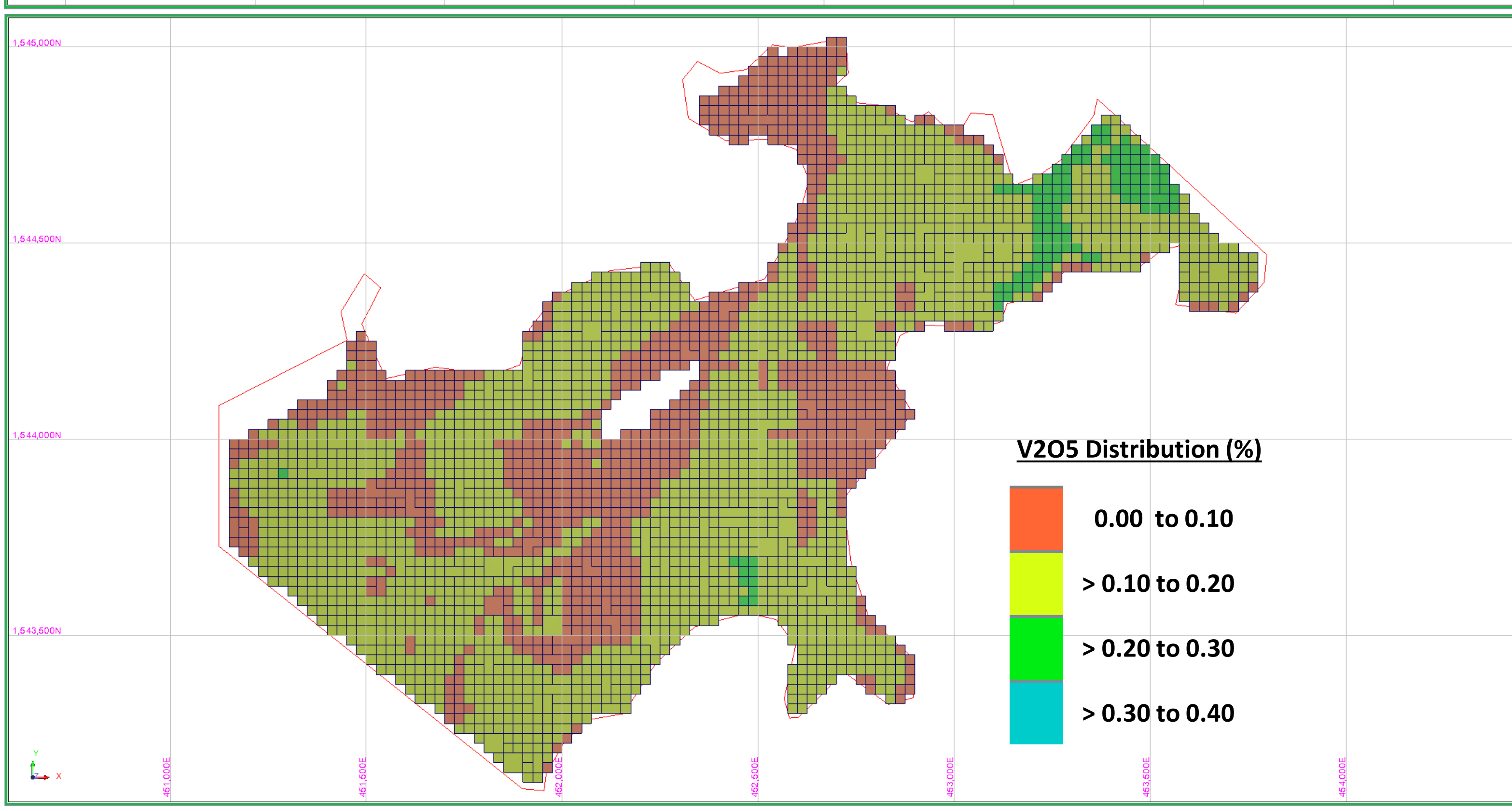

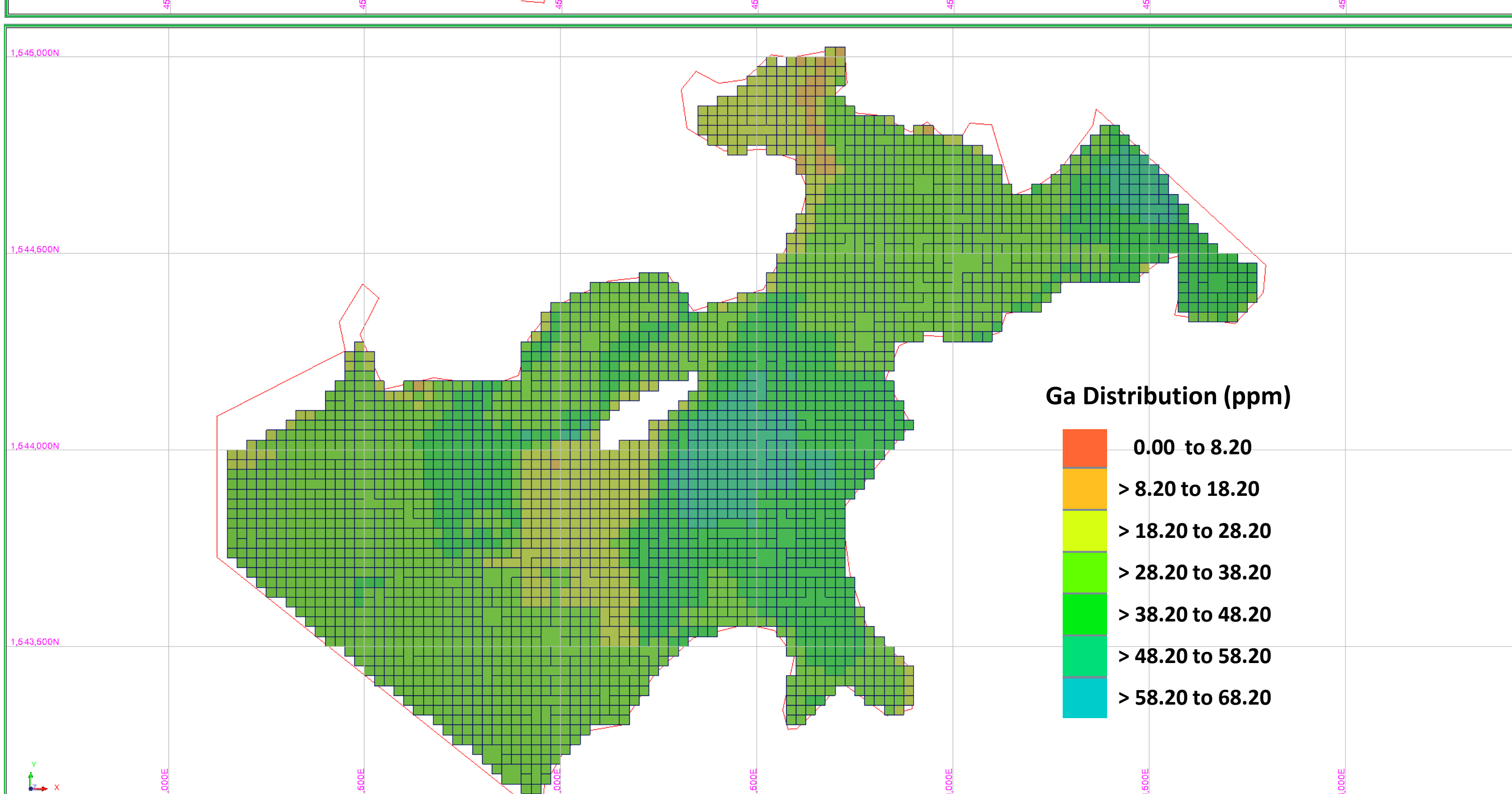

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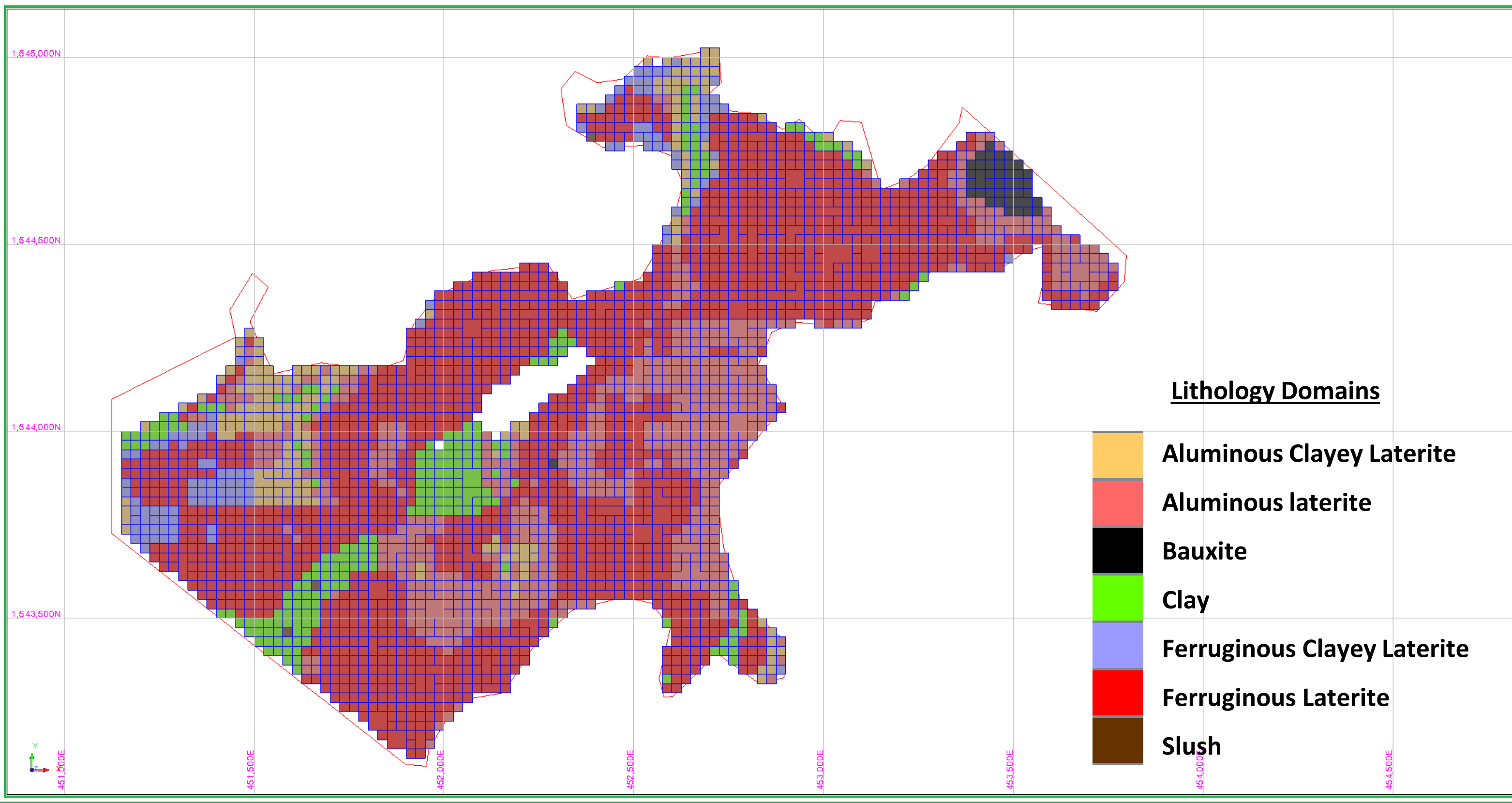

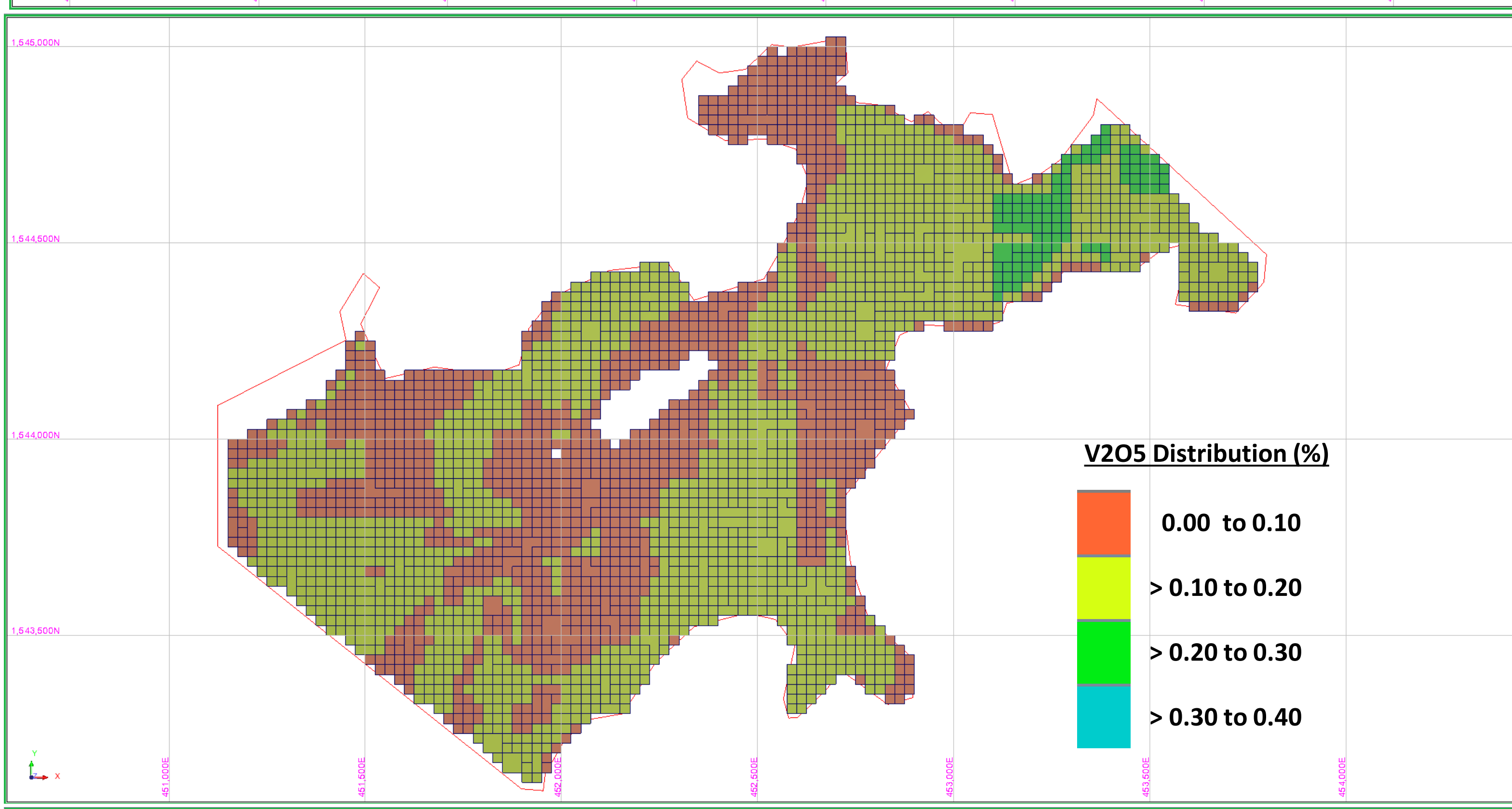

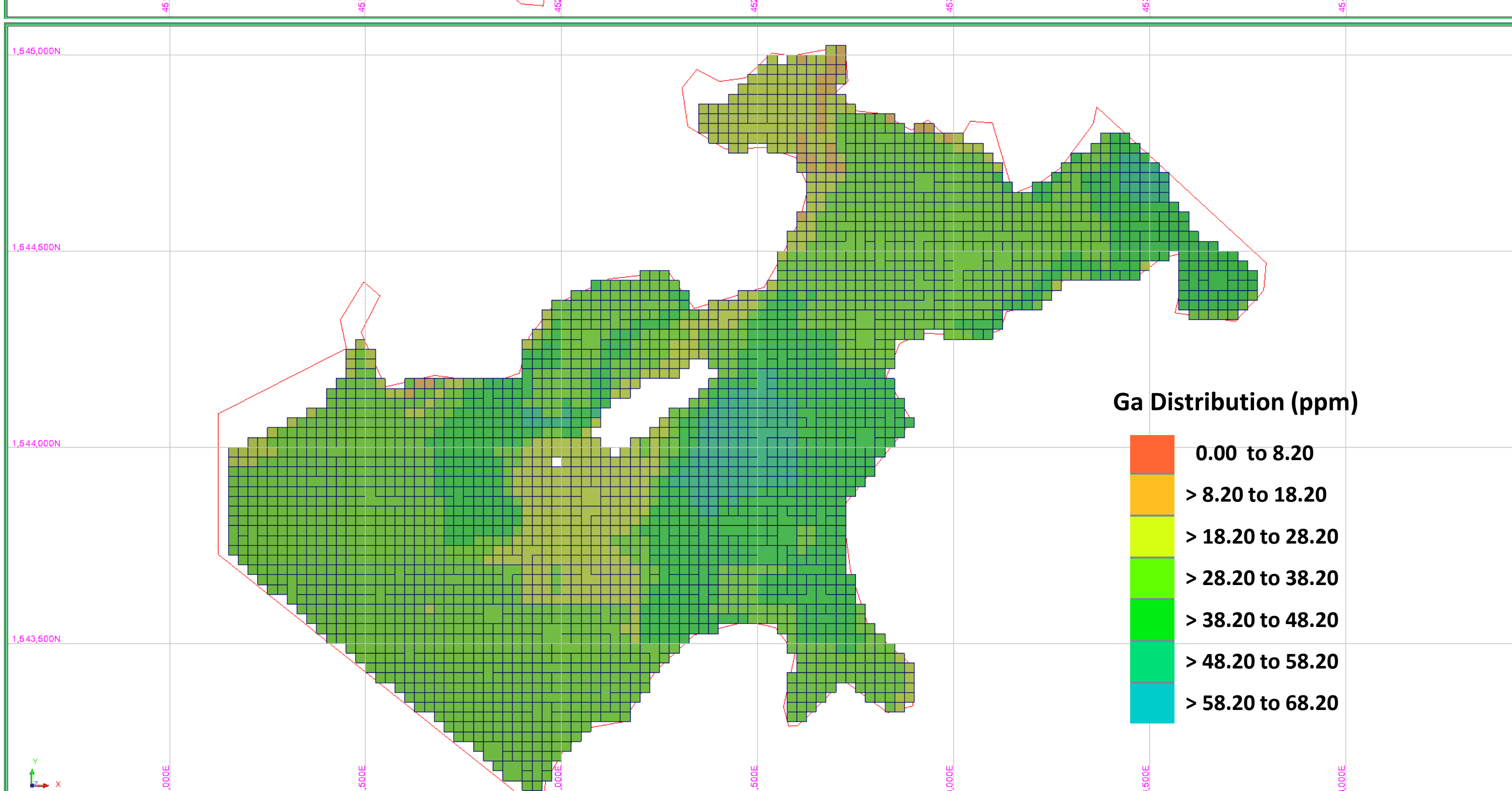

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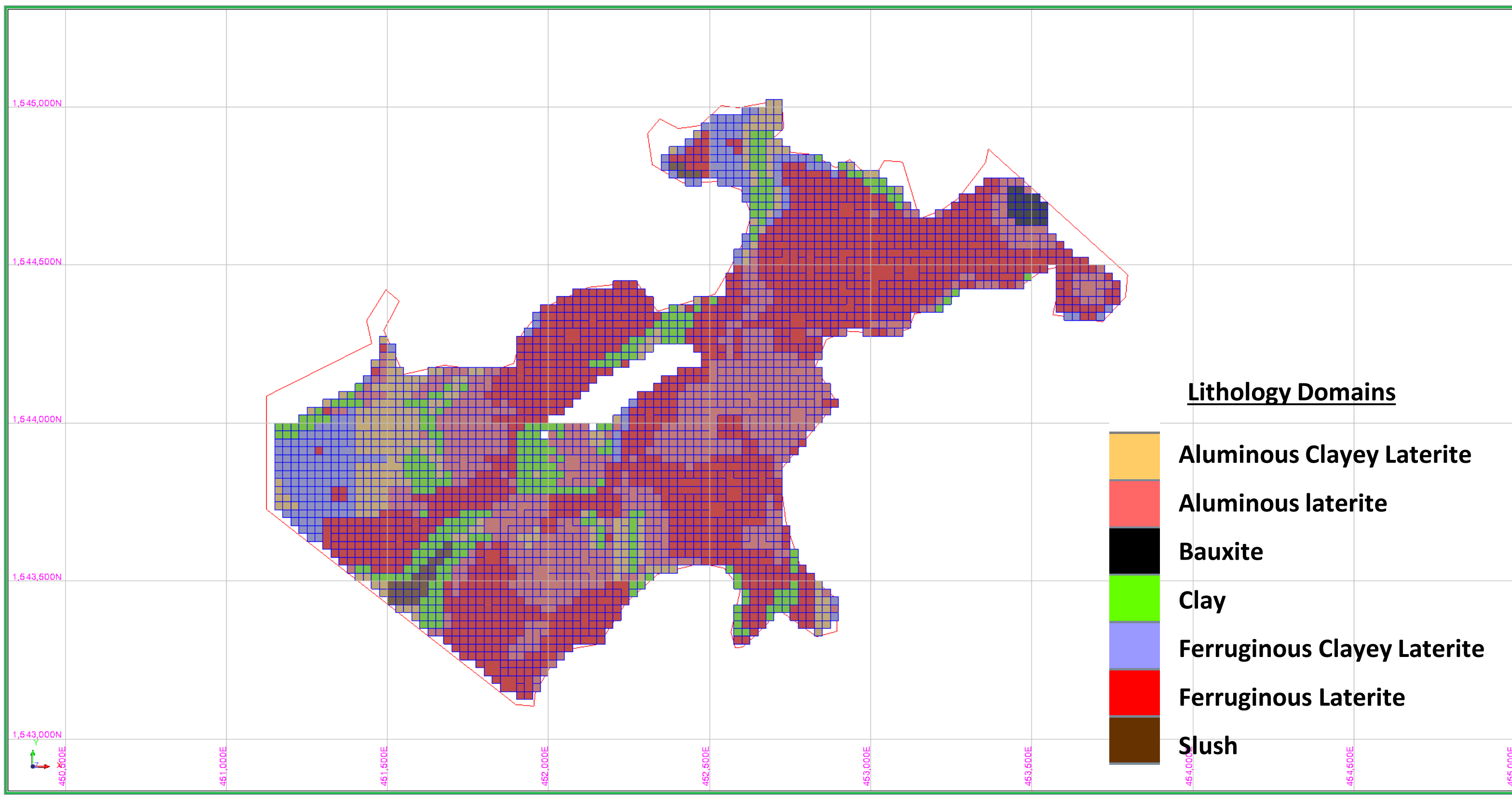

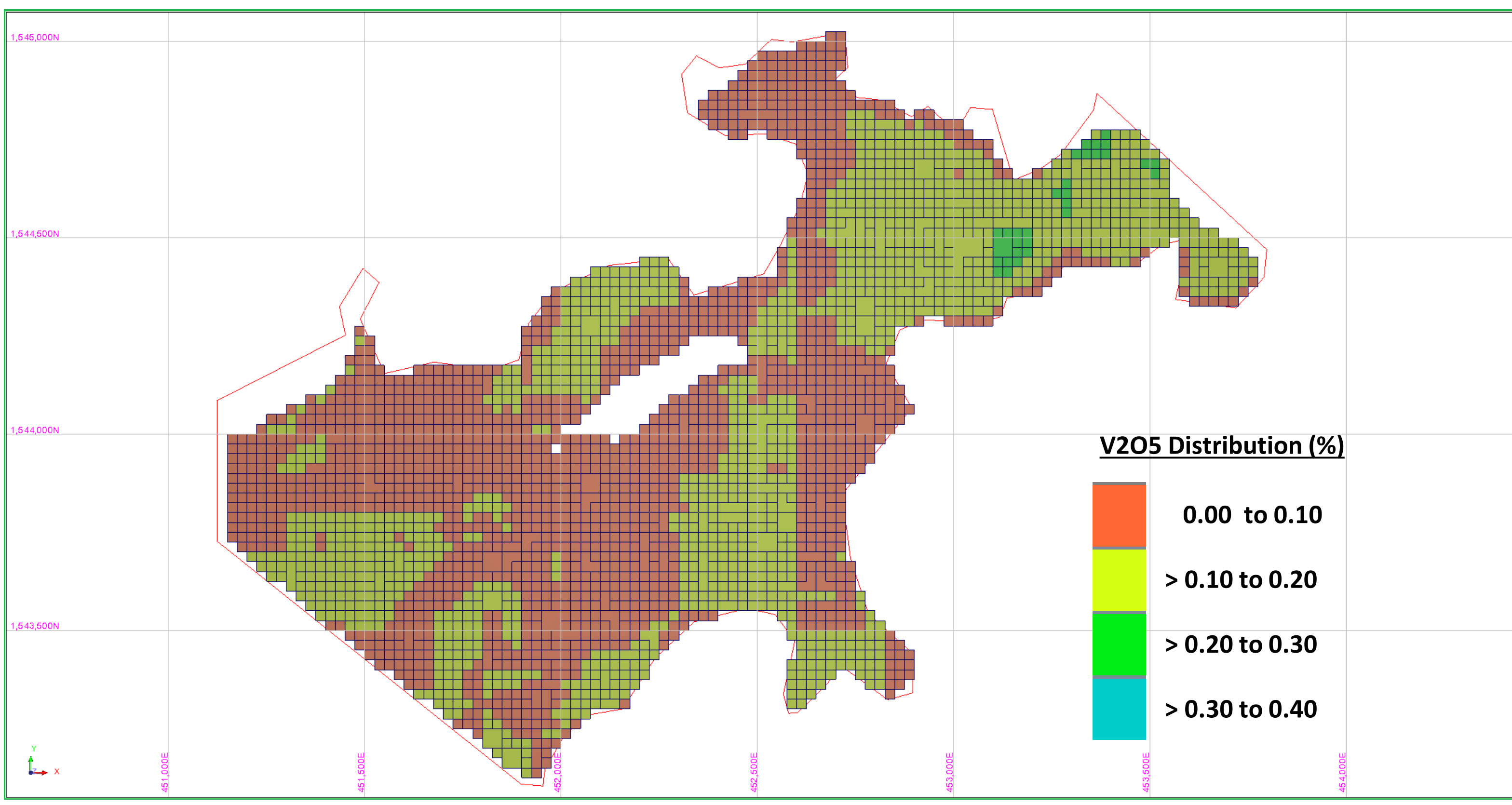

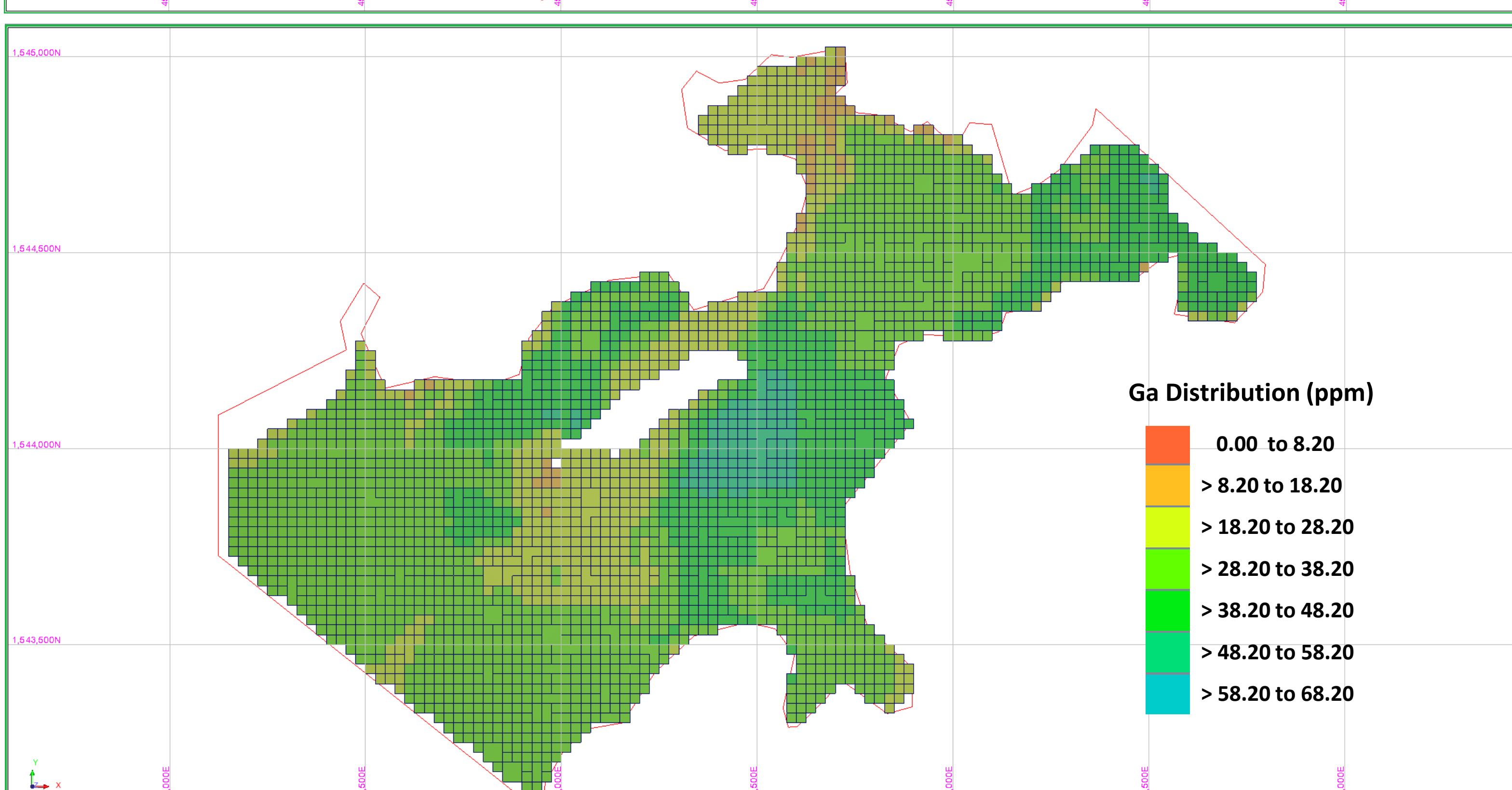

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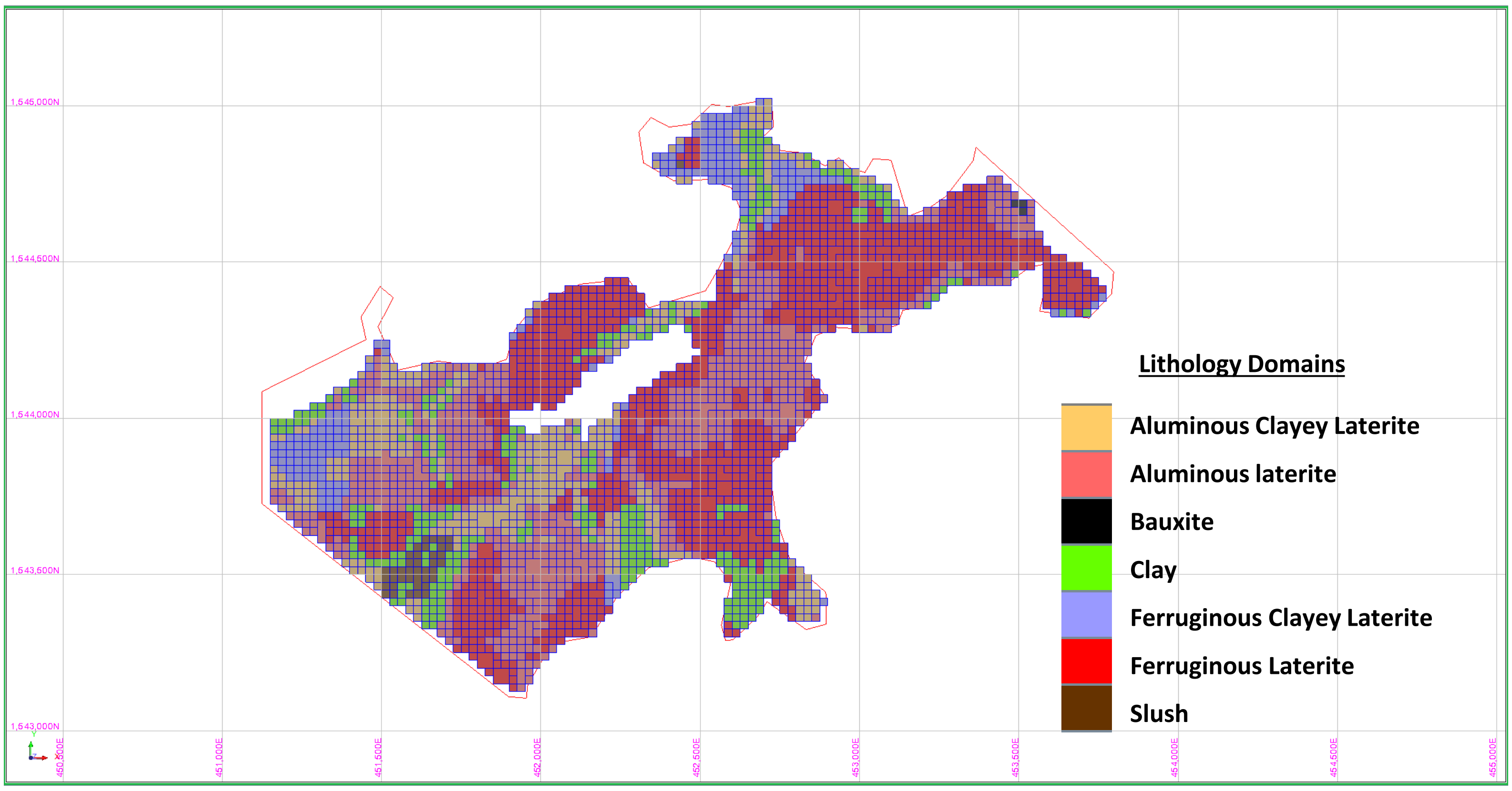

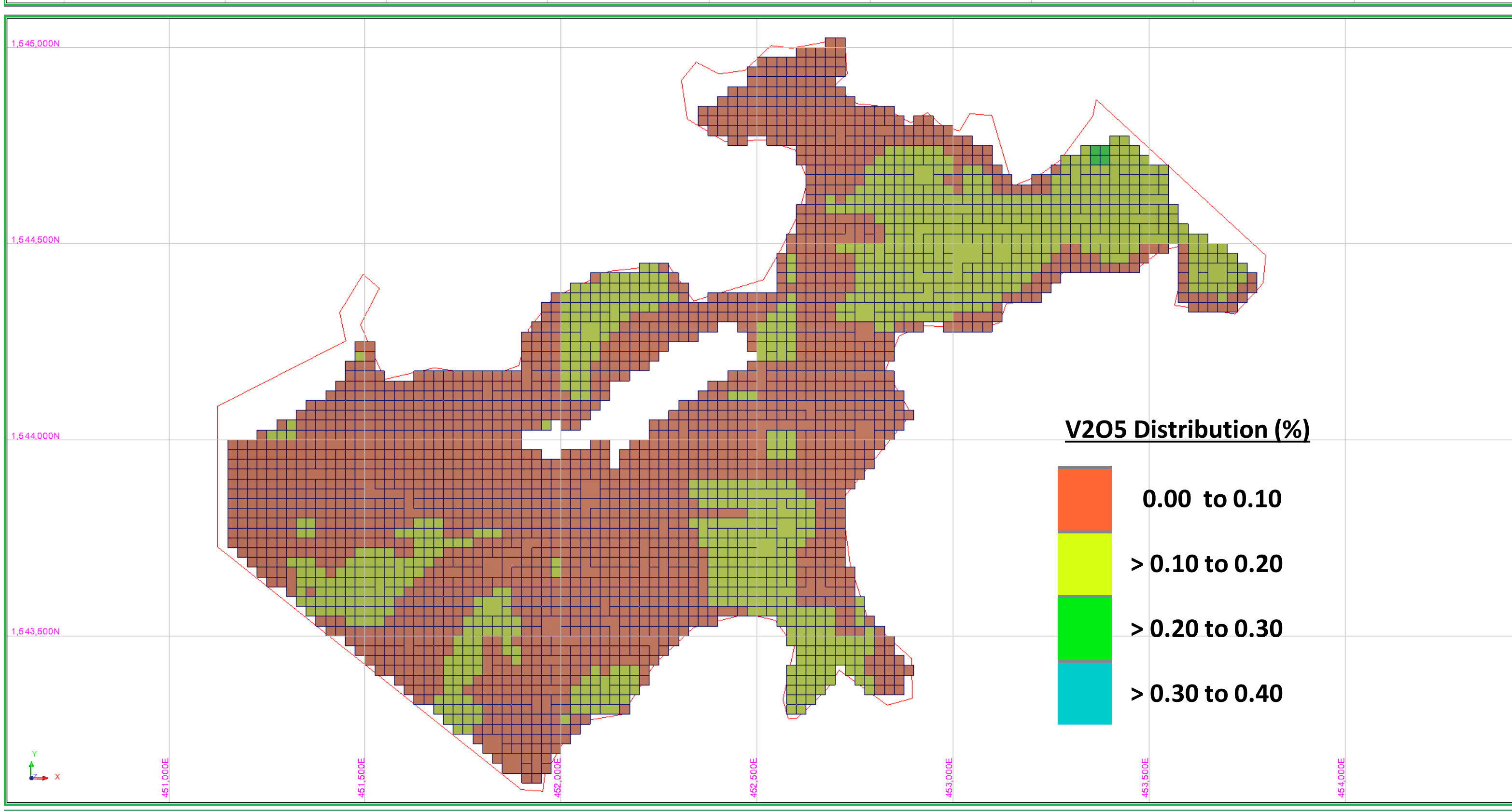

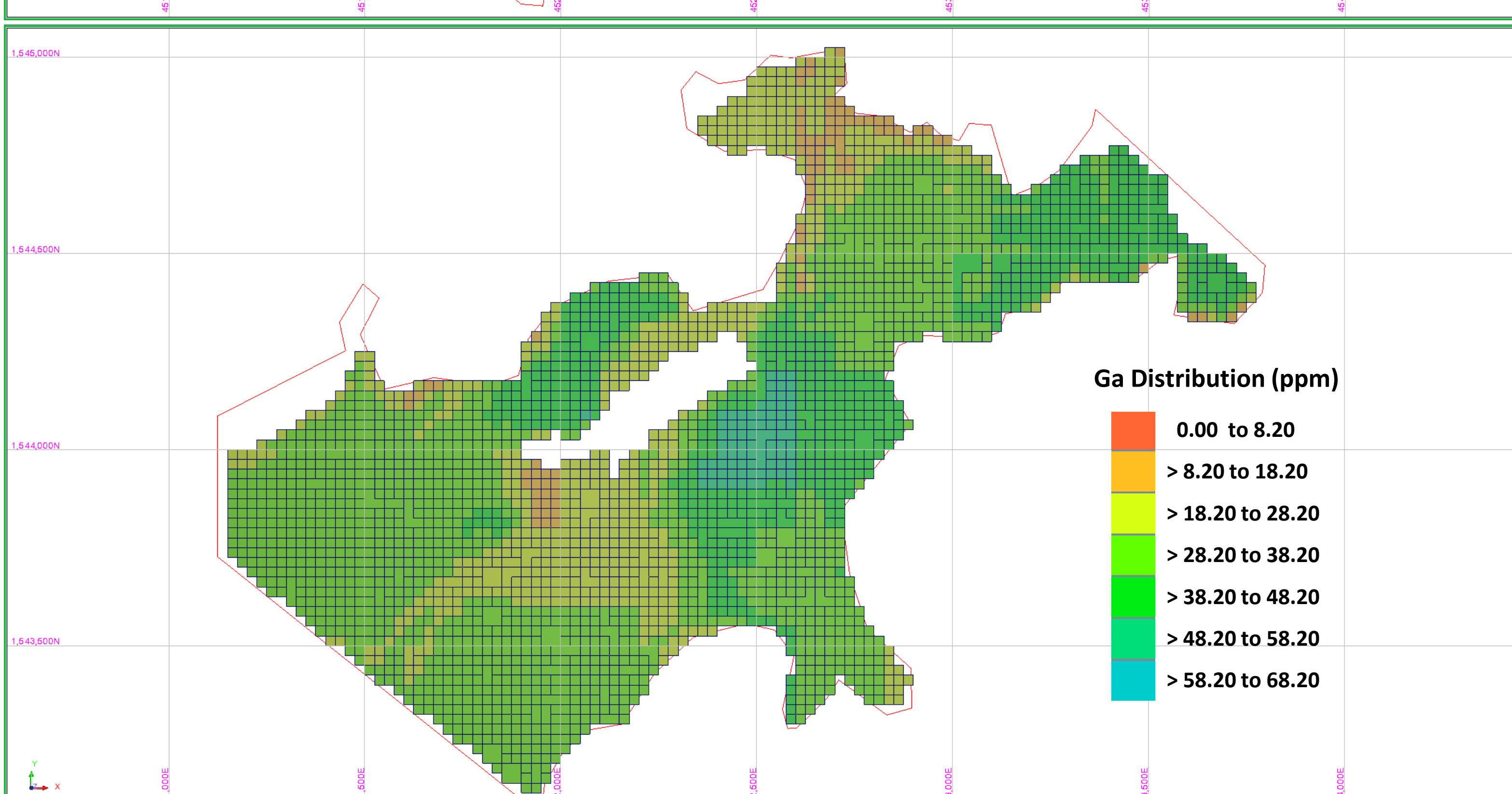

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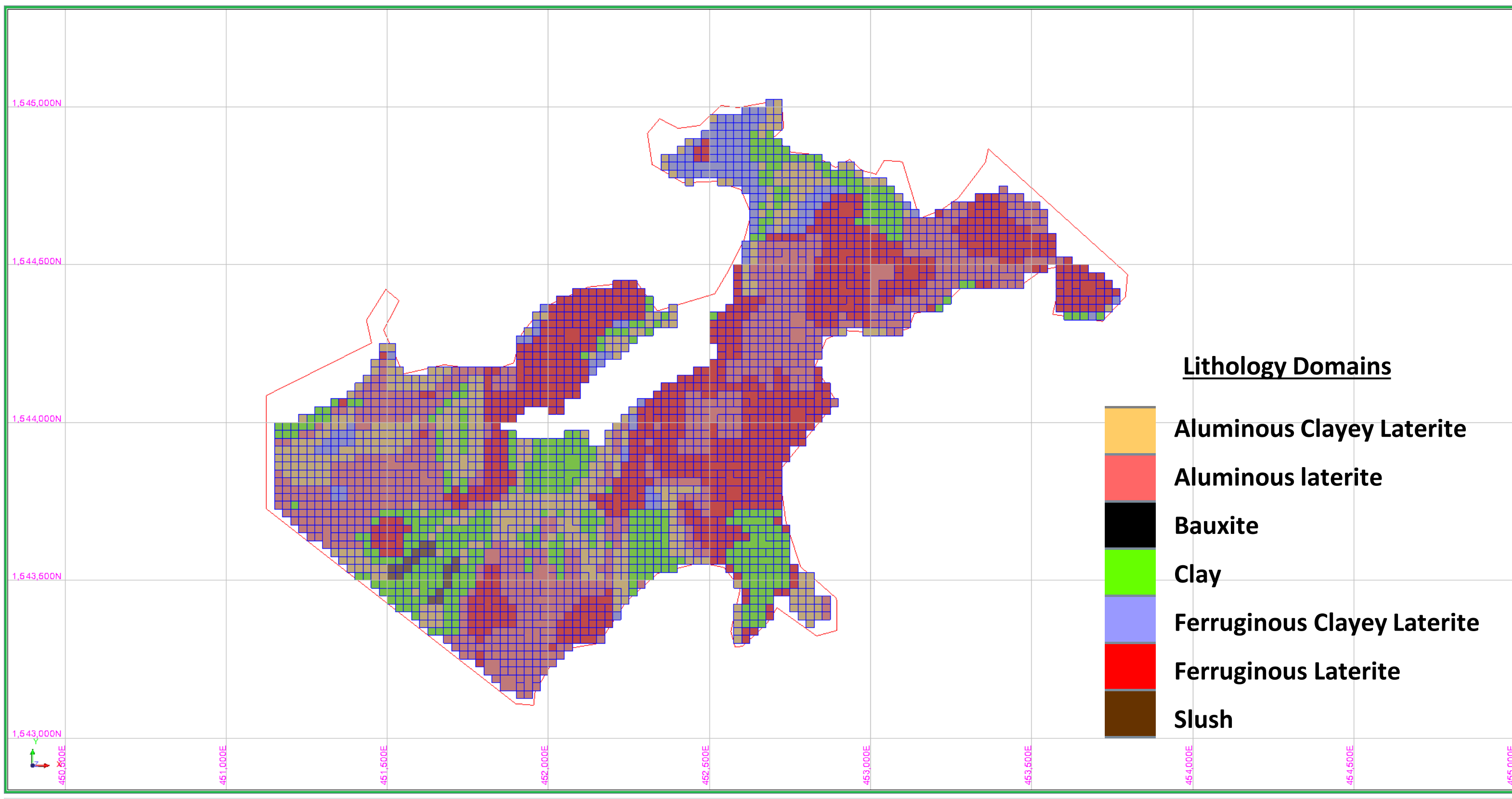

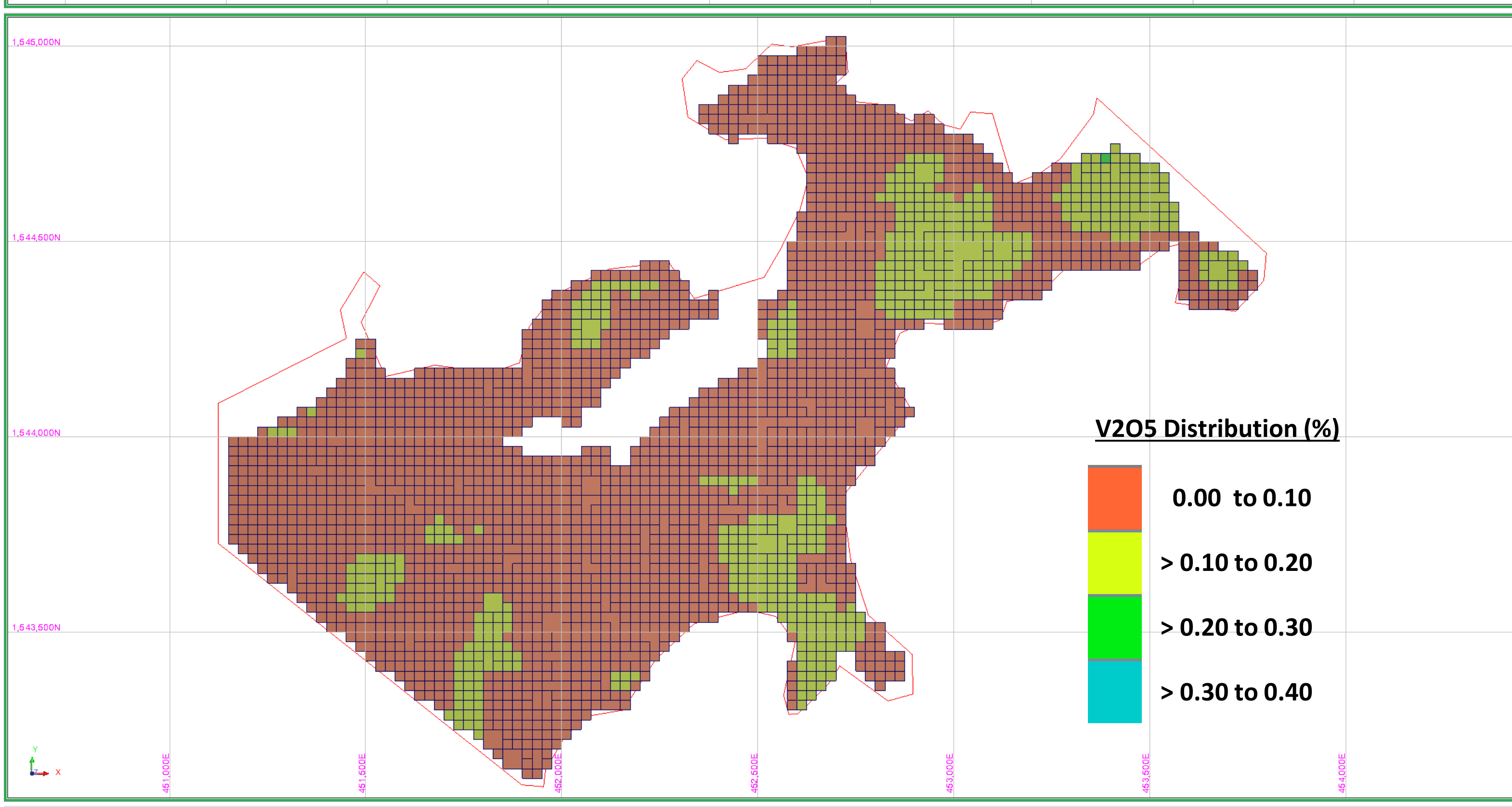

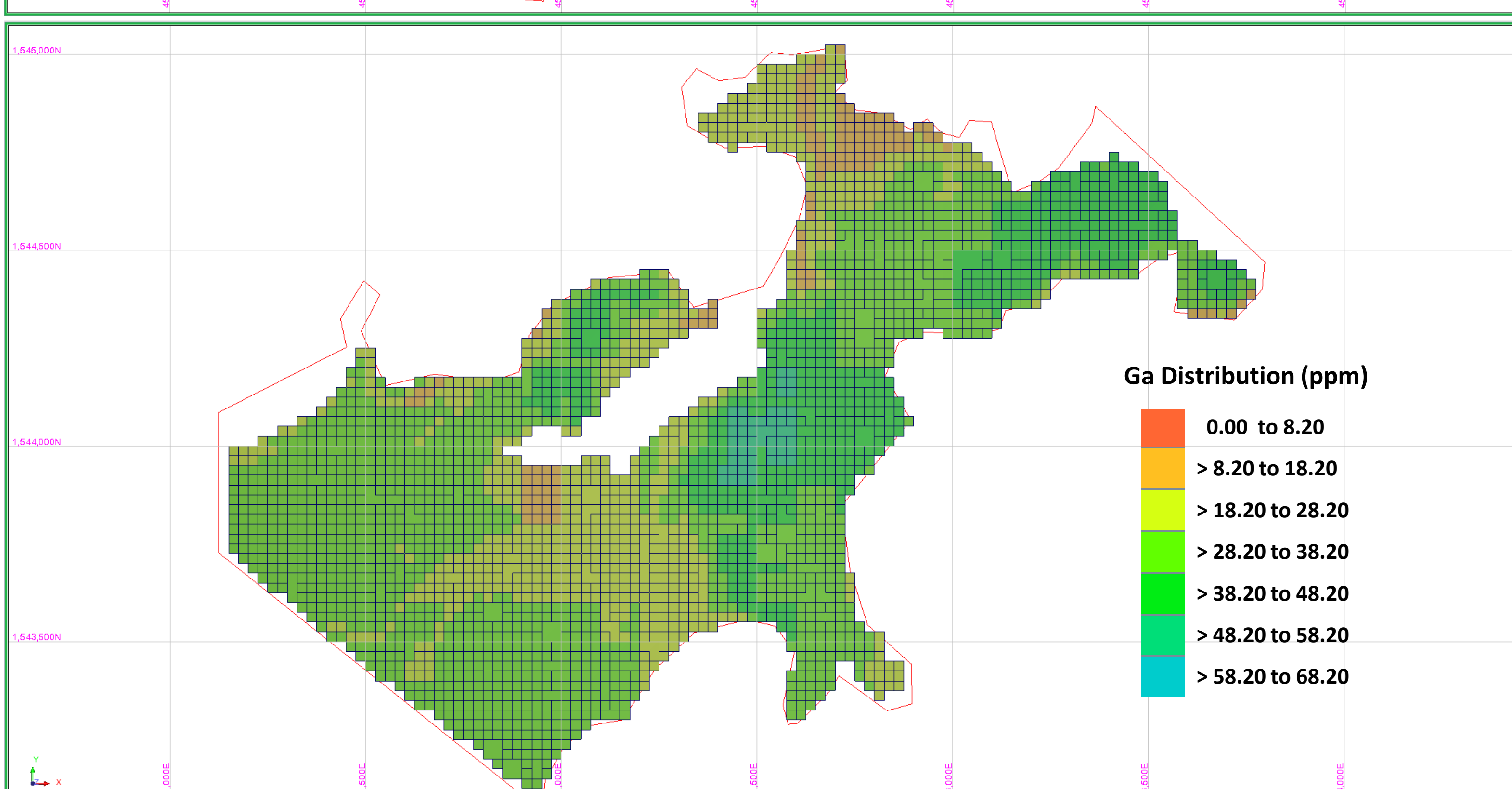

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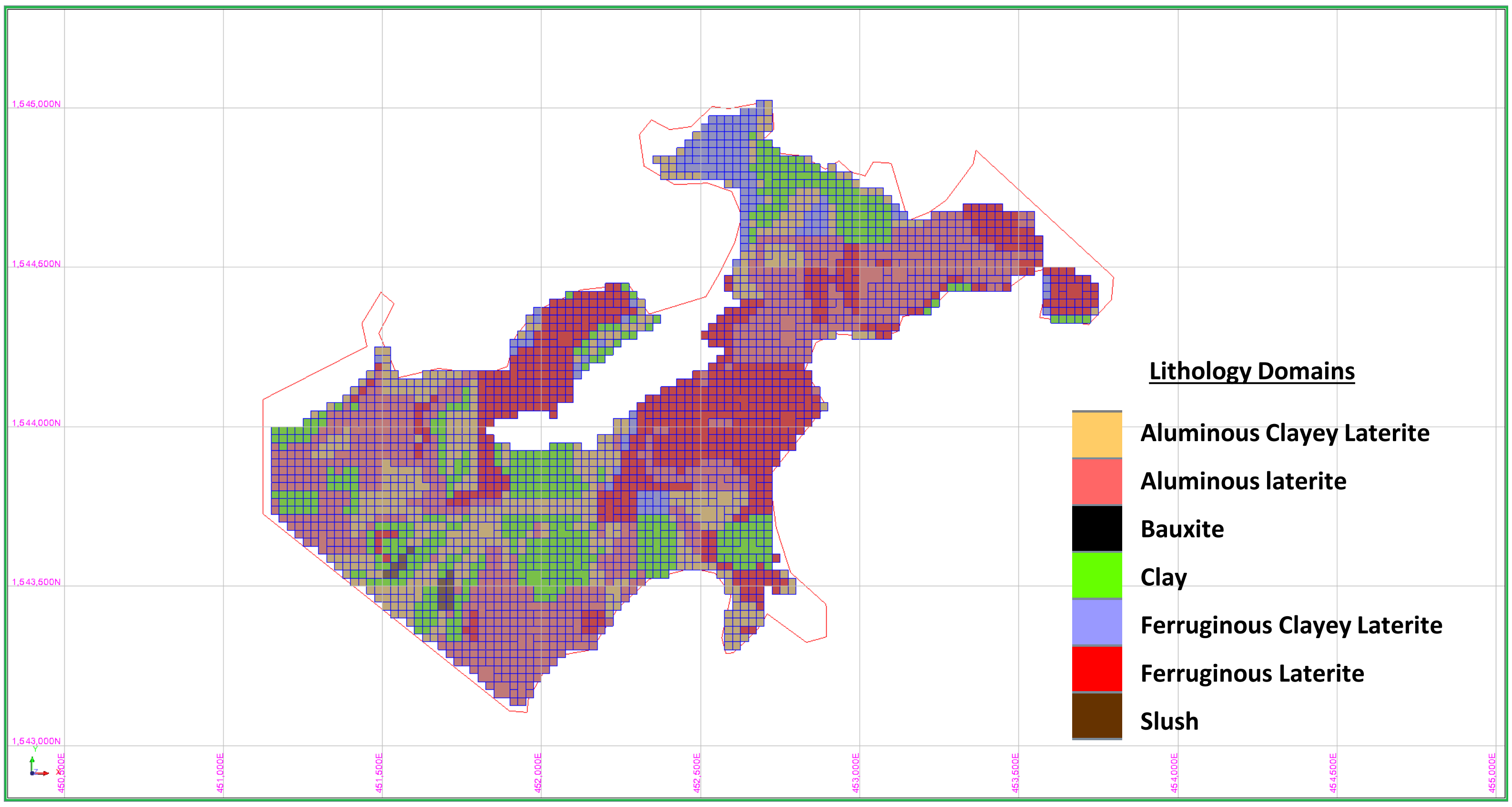

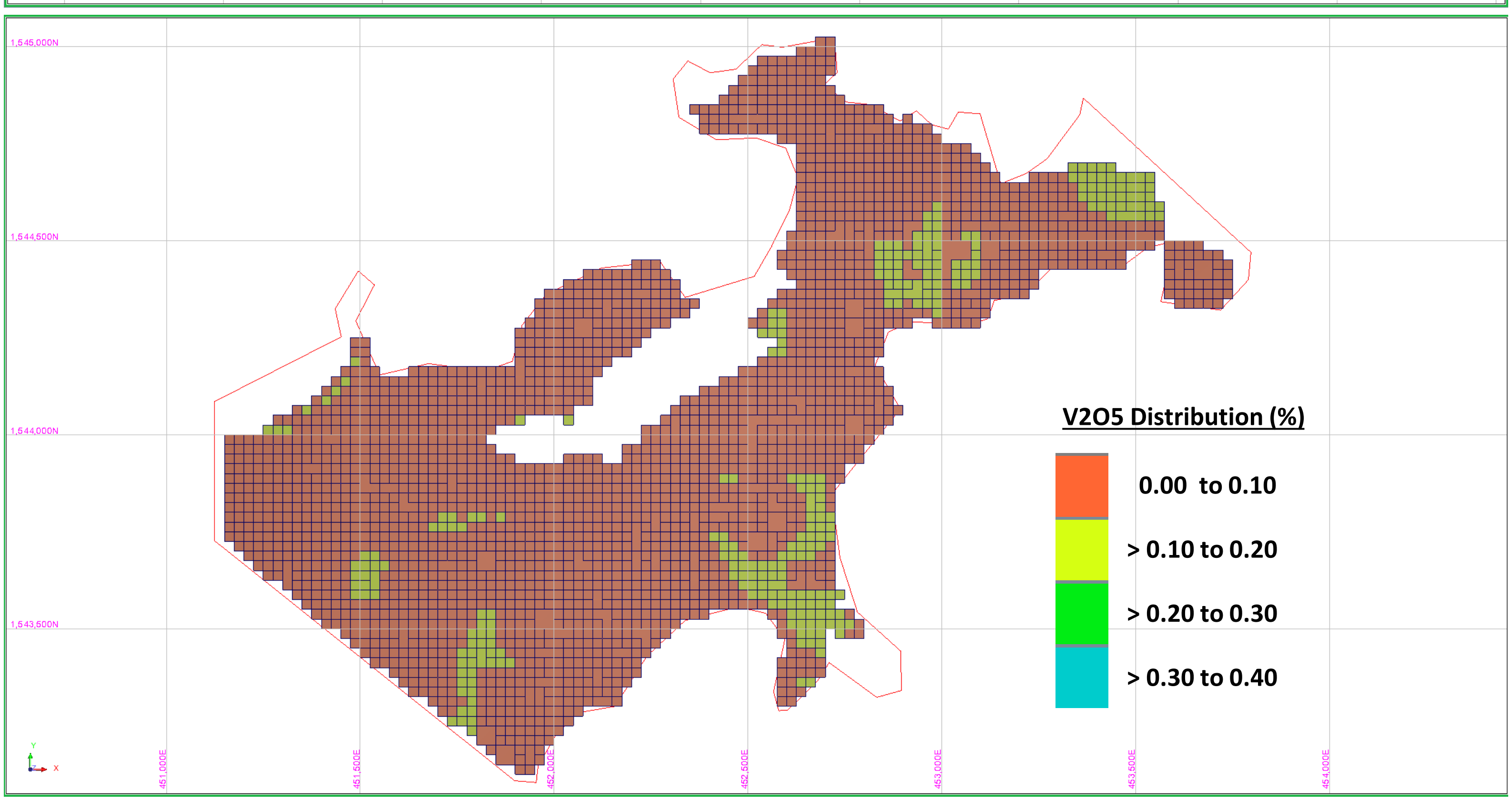

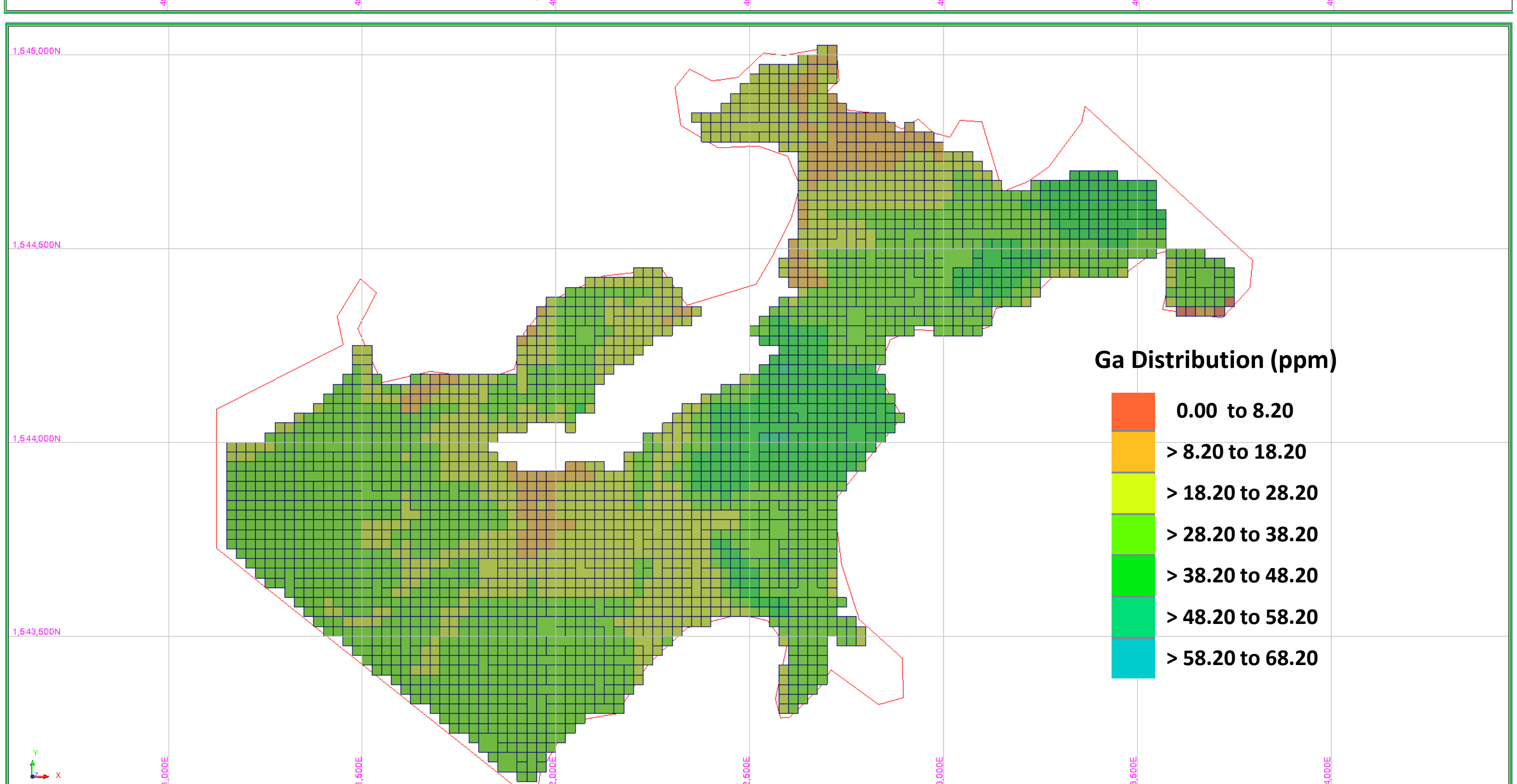

Below 10.0m Surface DEM