KENYA IRON ORE GEOLOGICAL ASSESSSMENT SURVEY

The project targeted to review, locate and delineate the presence and continuity of iron ore deposits at Taveta County and West Pokot County.

REPORT PREPARED FOR

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IMPORTANT NOTICE

This report was commissioned by DILOTIKO COMPANY LIMITED and GATHONI MUCHAI INVESTMENTS LIMITED, and was prepared by Geol Mr. Winston Nnko.

The author is a qualified and independent geologist specialising in iron ore deposits in East Africa.

The author has at least five years relevant experience in the estimation, assessment, and evaluation of the type of iron ore mineral deposits under consideration in this report.

The author has visited the project areas that are the subject of this report.

The author is responsible for all sections of this report.

The author is independent of DILOTIKO COMPANY LIMITED and GATHONI MUCHAI INVESTMENTS LIMITED, its directors, senior management and advisers.

The author was requested by DILOTIKO COMPANY LIMITED and GATHONI MUCHAI INVESTMENTS LIMITED to undertake a review of all available historical data and work carried out on the project area and make an assessment of the hematite and magnetite iron ore resources on the project licence areas.

ACKNOWLEDGEMENT

This acknowledgement recognizes all individuals and organizations who provided support and assistance in undertaking of the geological reconnaissance work for the proposed Iron ore Project in Taveta county and west Pokot County in Kenya.

I acknowledge the management team from DILOTIKO LTD and GATHONI MUCHAI INVESTMENTS for permitting me to conduct these geological professional and assessment studies and for providing all technical assistance during the field work.

I acknowledge the support provided by all local communities that accompanied the team in moving through various parts of the villages helping in the preparation of this report.

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1.0 INTRODUCTION

In recent years the exploration and exploitation of iron ore in Kenya has grown to a great extent. This is due to the development of steel as well as the cement industries (Simonson, 2011).

Kenya is endowed with several historically defined and well explored deposits of iron ore mineral resources though many are still underexplored and underexploited.

The exploration and exploitation of iron ore in Kenya is rising to meet the demands of expanding Kenya's economy and the establishment of several steel manufacturing plants.

Iron deposits are known to be located within the Archean craton, and Neo-Proterozoic Mozambique belt.

From the assessment survey conducted in Taveta county and West Pokot County, Taita Taveta indicated significant availability of reefs of magnetite iron ore bodies, as well as the observation of major areas of shallow hosted hematite iron ores.

The Taveta prospects are located approximately 310 kilometers from Nairobi County, the surveyed prospects include, Mngama, Mwachabo Kasigau, Choke ranch and the Wanjala Mine situated in Kishushe area.

The Mngama Block, is on a single ridge striking SW-NE, the 2 sample pits (Pit 1 Fe 57.06% and pit 2 Fe 62.63%) where the samples were collected in the previous work are aligned in a North-South direction within the Mngama project block with a sample separation of 0.8 km/ 800 m. this demonstrates good continuity.

The Kasigau Block lies south east of the Mngama Block and is trending in a NW-SE direction. At the centrr of this block sample number 6 was collected in the previous work with **Fe 58%** from results.

The Sinai/Mwachabo Blocks lie just east of Mngama Block. The Sinai block lies in NNW-SSE trend, three samples collected from this block are sample 4 from Mwachabo in the Northern end of the block with **Fe 52%** and sample 5 from Mkengereni in the Southern end of the block with **Fe 18.6%.** Sample 3 from Sinai in the Western end of the block with **Fe 62.85%**

The west Pokot prospects are located at Kapenguria approximately 417 kilometers from Nairobi County, in Mbaru village and Murkoria village. The iron ore found in Mbaru village provided a potential viability for further exploration to define the resource.

West Pokot County indicates the viability of magnetite iron ore mineralization at Mbaru village, the area still remains unexplored and unexploited, whereas the major mining operations ongoing in the region include artisanal mining but at a very local scale.

1.1 OBJECTIVES

1.1.1 Main objective

The main objective of the assessment survey conducted was to ascertain the presence of iron ore deposit in Taita Taveta and west Pokot County.

1.1.2 Specific objectives

- To conduct a reconnaissance and assessment survey, for the proposed prospects, where historical exporation and the previous sampling program was conducted.
- To assessment the geological formations in relation to iron ore deposition.
- To conduct a brief geological recconaissance mapping program, to show the lithology contacts.
- To collect samples for further characterization of the ores.

1.2 METHODOLOGY

Assessment survey work was conducted through site visit for ground truthing of the viewed data and information on secondary material. The visit included the use of a handheld Garmin GPS for spatial data reference including location coordinates and elevation of the area, A magnetic pencil which was used to detect the magnetism in rocks, a hand-held geological hammer which was used to break up rocks for clear observations, and a notebook and a pen for documenting.

Relation of the geological contacts and geological mapping was conducted using a handheld GPS for locating boundaries and contacts of the lithologies as observed on surface, a magnetic geological BRUNTON compass for measuring the dip and strikes of geological formations.

Geological maps were prepared using a GIS software ArcMap (Arc GIS version 10.7) and a report was prepared using Microsoft packages.

Samples are to be characterized for multielement presence using X Ray Fluorescence so as to understand the chemical composition of the ore in terms of major and minor elements.

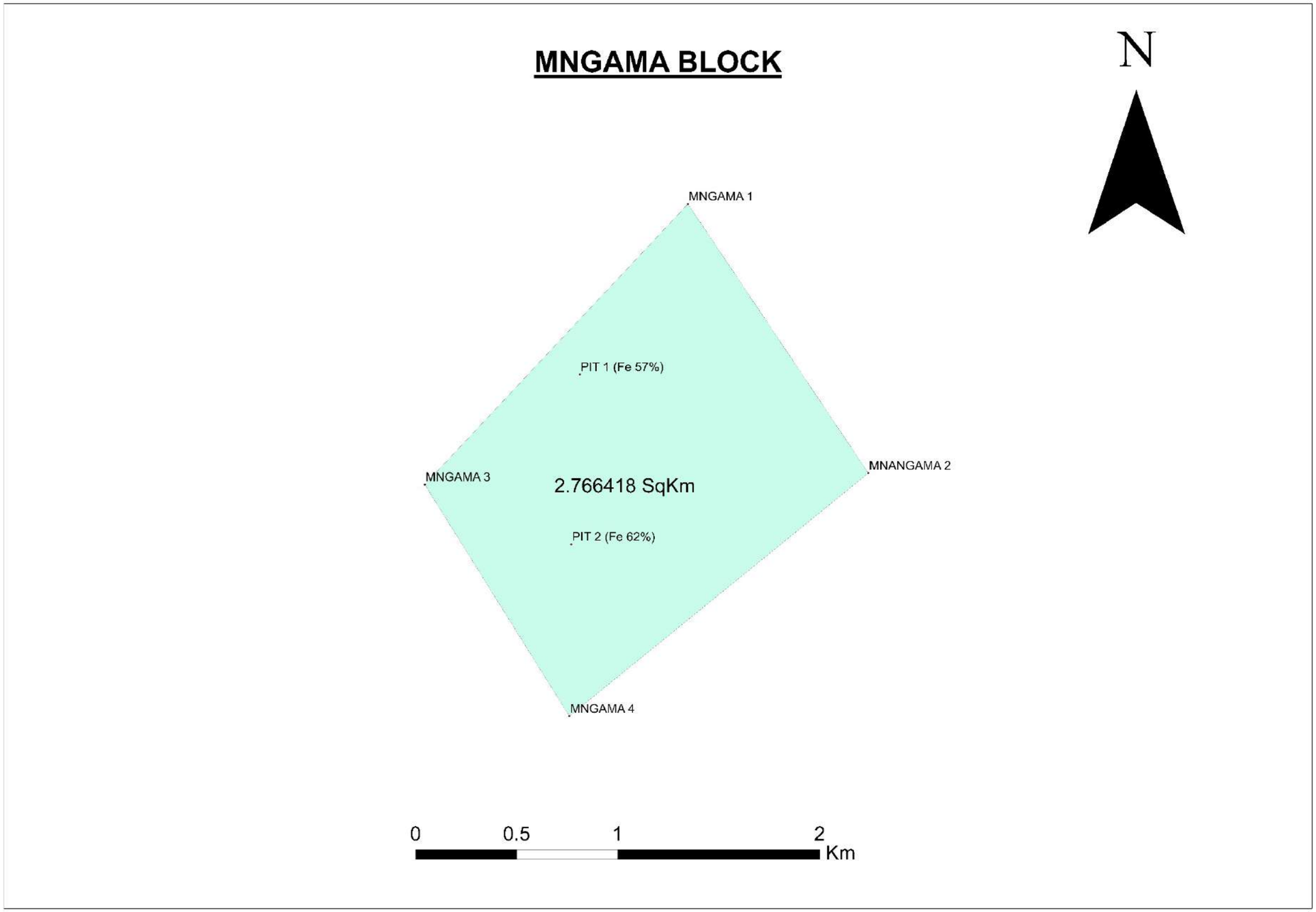

Figure 1:A Shape map of Mngama project area with size parameters and the sample pit locations

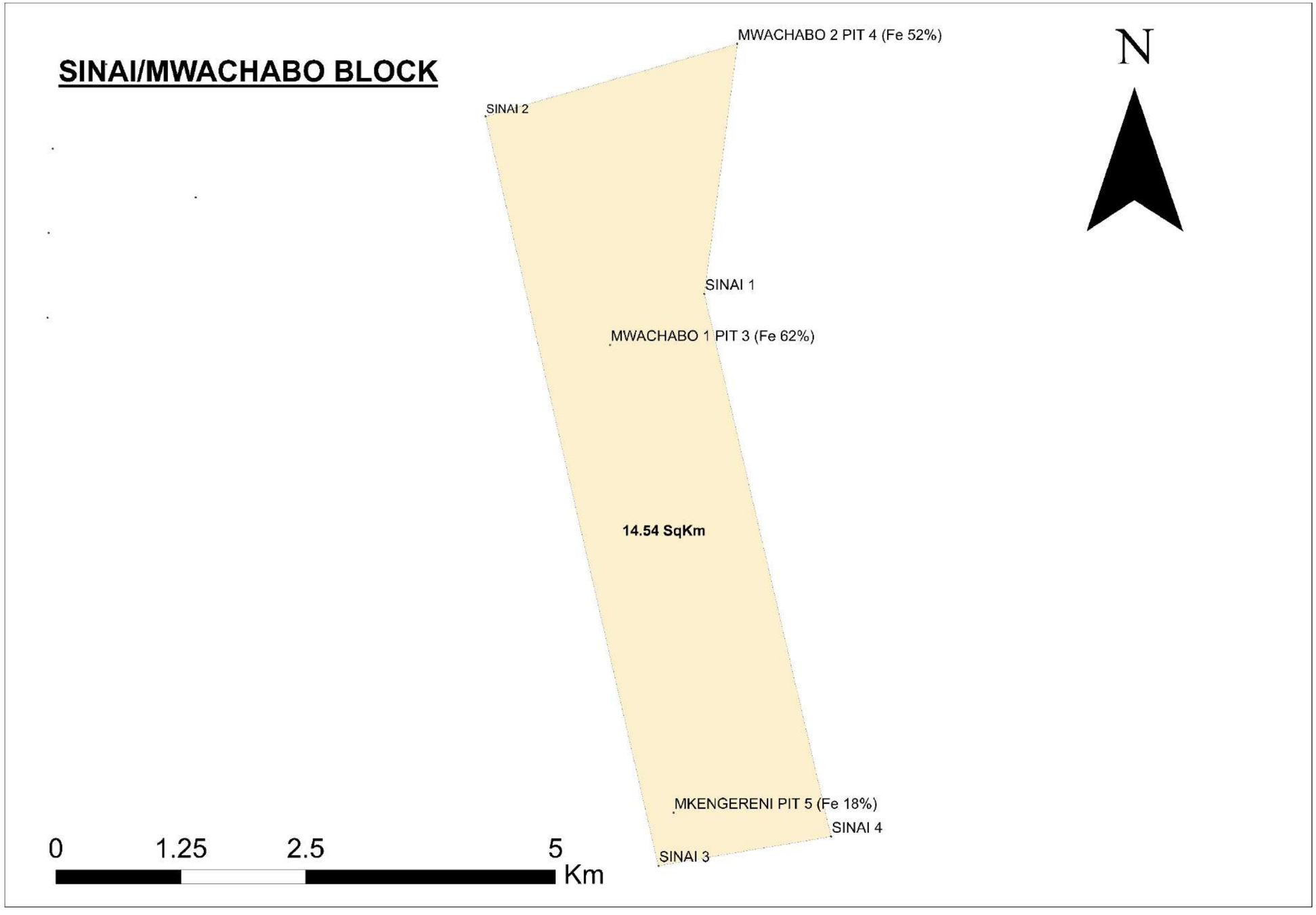

Figure 2: Sinai and Mwachabo shape, map indicating size and sample pit locations together with sample results

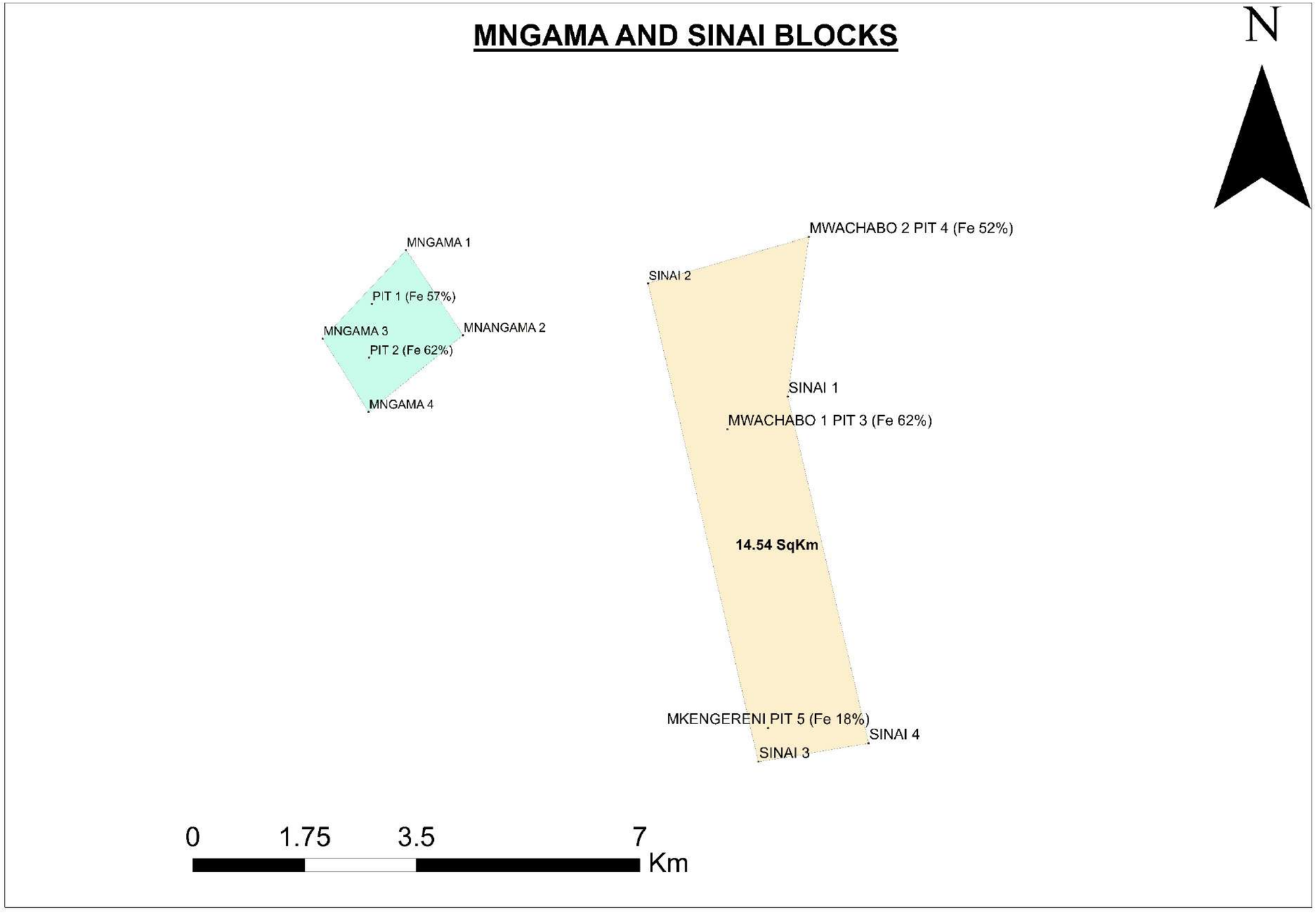

Figure 3: A shape map indicating Mngama and Sinai block spatial relation.

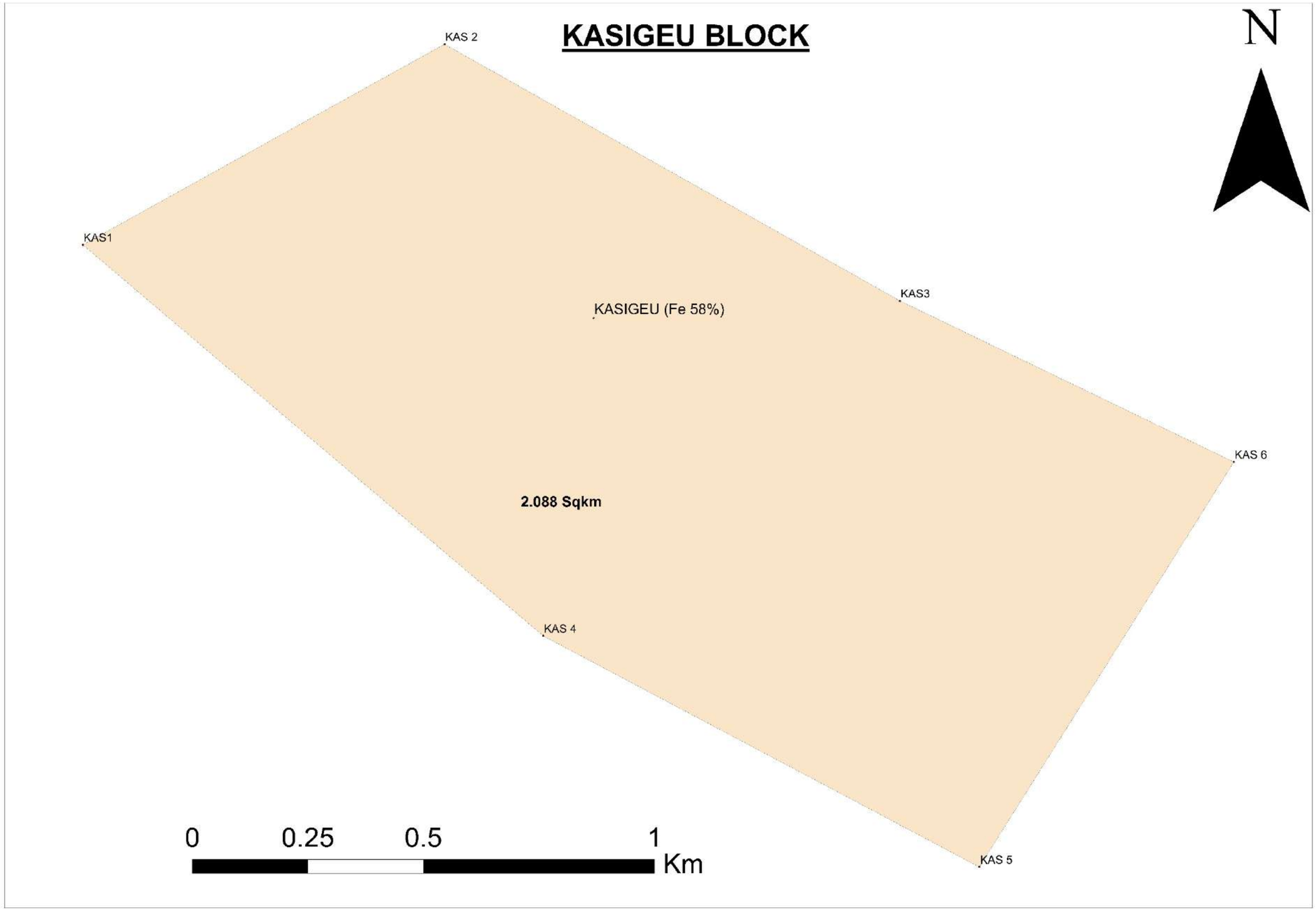

Figure 4: A figure showing the Kasigau block, The block trend NW-SE.

2.0 PROJECT REVIEW AND ASSESSMENT WORK

2.1 SINAI/MWACHABO SITE WORK

The Mwachabo block was surveyed, whereas the sample pit locations were visited and general geology layout was assessed in the area, the block is underlain by basement rocks of Proterozoic metamorphic rocks, including Gneiss and schists which are widely exposed on the elevated mountainous terrain.

The Schists found in the block are black-dark grey colour with weak magnetism indicating presence of ferrous minerals as iron in their makeup, of which when exposed to water and air forms a corrosion appearing like iron ore.

The geological setup looks the same all the way from Mwachabo Northern side to the South at Mkengereni.

Sample pits assessment

Sample pit number 3 which falls in the midst of the concession appear to be a small river channel where hematite iron ore floats where found on surface indicating that the area has been worked upon in the past for the extraction of the seen iron ore.

Figure 5: Iron ore rich material at the bottom of the pit, surrounded by basement rock material.

Figure 6: A picture of the basement rock (graphitic gneiss) found at the bottom of the artisanal pit (sample pit 3)

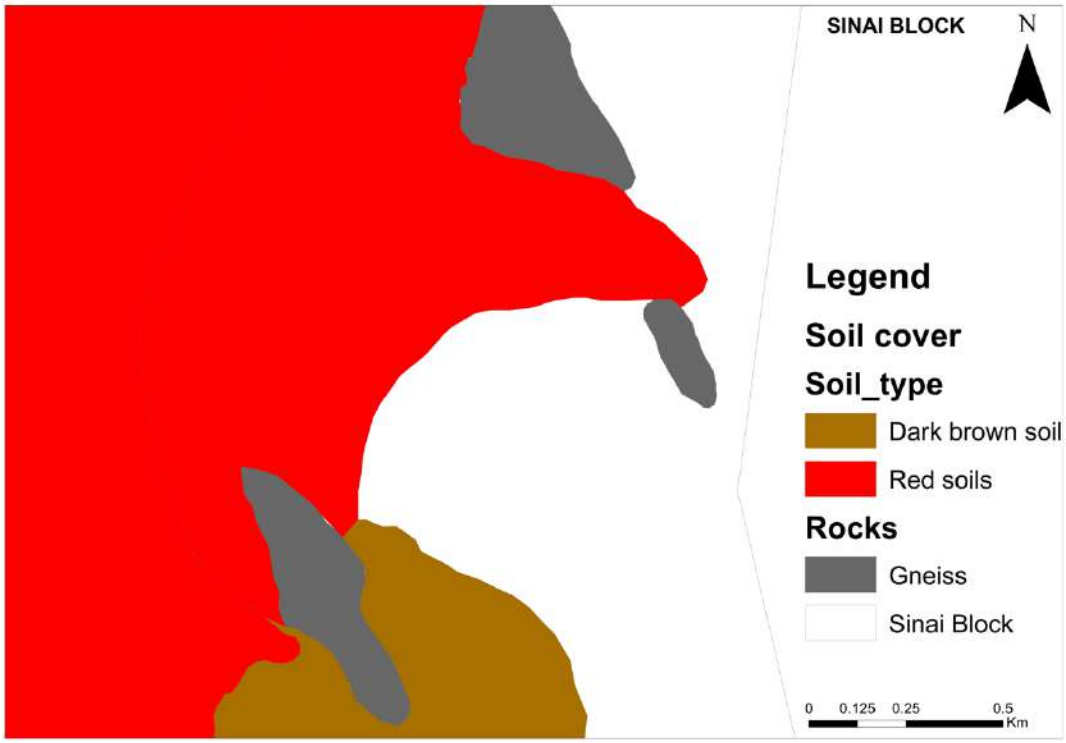

Figure 7: A brief geological survey map indicating general geological look of Mwachabo area

2.2 CHOKE RANCH SITE RECONNAISSANCE

A survey was conducted in Choke Ranch site South of Mwachabo block and South East of Mngama block, North of Kasigau block, the area is covered with a massive peneplain terrain with small risen ridges striking in a North-North West South-South East (NNW-SSE) direction.

A thorough assessment of the area was done where the pits were assessed of validity of information provided, the available ore was keenly observed of its characteristics and possibility of commercial viability for further exploration and future exploitations.

Site assessment.

Geological Setting and Mineralization: Site reconnaissance documented in-situ iron ore mineralization manifesting as outcropping hematite. **The material exhibits competent, high-grade characteristics with visual grade estimates surpassing 65% Fe.**

Supergene enrichment processes are evident from the pervasive development of secondary limonite (forming a gossan cap), indicative of near-surface weathering. The most significant exposure was observed within a pre-existing, abandoned artisanal mining cut, which provides a valuable cross-sectional view of the near-surface ore body.

Figure 8: Lithological exposure in an artisanal pit showing unweathered high-grade hematite (grey) and zones of limonite alteration (yellow-brown)

Figure 9: The abandoned pit, elongation of 20 m and wide by 15 m with an overburden soil material about 3 m thick.

The area is characterized by hematite-rich ferruginous soils and a well-developed dispersion train of hematite floats. Sub-cropping and outcropping hematite are common, with evidence of small-scale, non-mechanized historical prospecting activities indicated by randomly distributed minor trenches and pits.

Figure 10: View of in-situ hematite outcrop in the survey area.

If further exploration is to be considered a few trenches should be excavated at the proposed locations where iron ore outcrops were observed, this will provide clarity for further works.

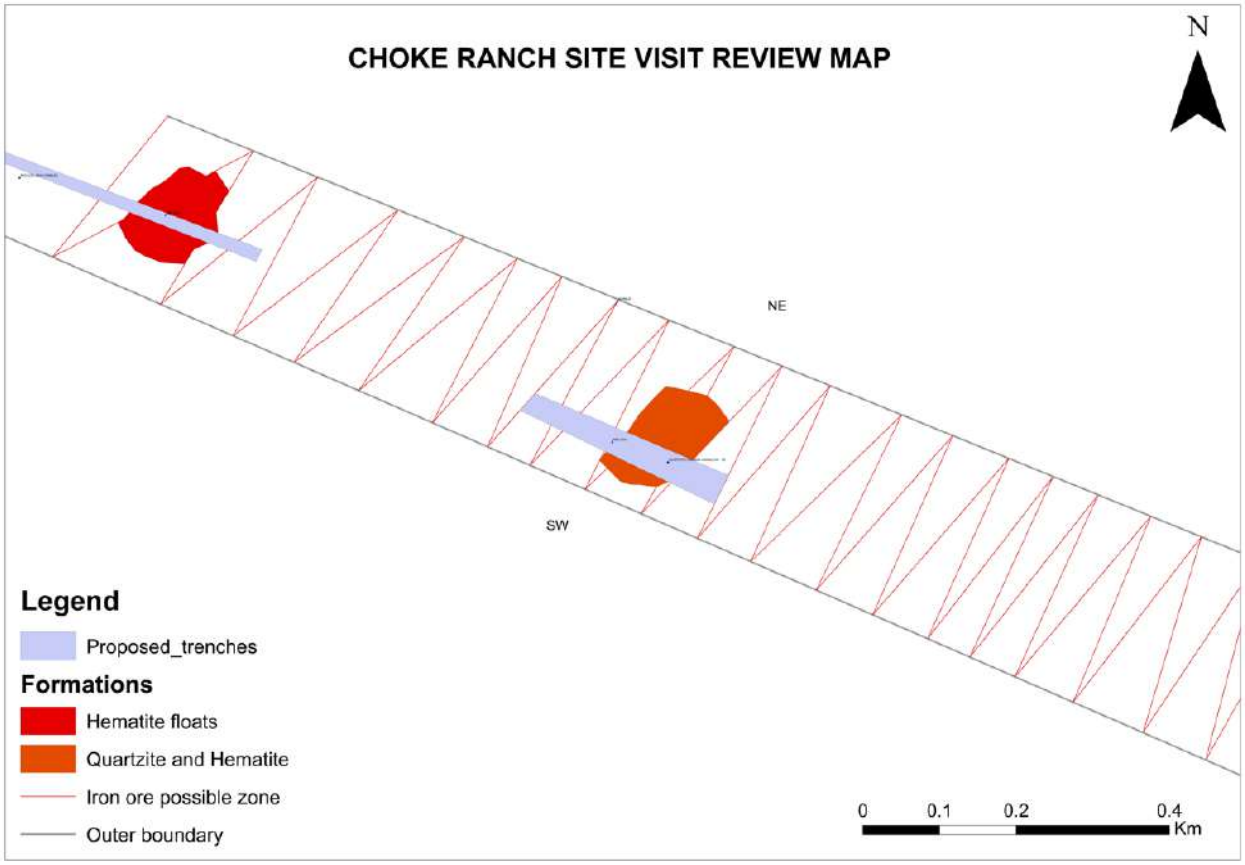

Figure 11: Location and the direction of proposed trenches at Choke ranch site.

2.3 KASIGAU SITE RECCONNAISANCE

Kasigau lies approximately 40 Km of Mwachabo and Mngama blocks, the block visited covers, 8 kilometers by length and 4 kilometers by width.

The Kasigau prospect is underlain by basement of metamorphic rocks including schists and gneiss which are seen to outcrop on the red soils and brown soils on various parts, striking in a NNW-SSE direction, the area is also covered by carbonate rocks of young age, which include Limestone (sedimentary) and dolomites of which are both of sedimentary precipitation origin.

The schist found in the area is also weakly magnetized and corroded hence the confusion with iron ore.

Local scale mining activities are ongoing in the Kasigau Prospect where people are in search of gem stones. The Dolomite observed in the area is of industrial grade, and it seem to be of varying thickness towards the basement.

Figure 12: A picture of Dolomite taken on a gemstone mining site.

Figure 13: A hanging wall indicating dolomite formation.

Figure 14: A schist basement rock formation (sample number 6 was taken from this geology, the rock is weakly magnetized)

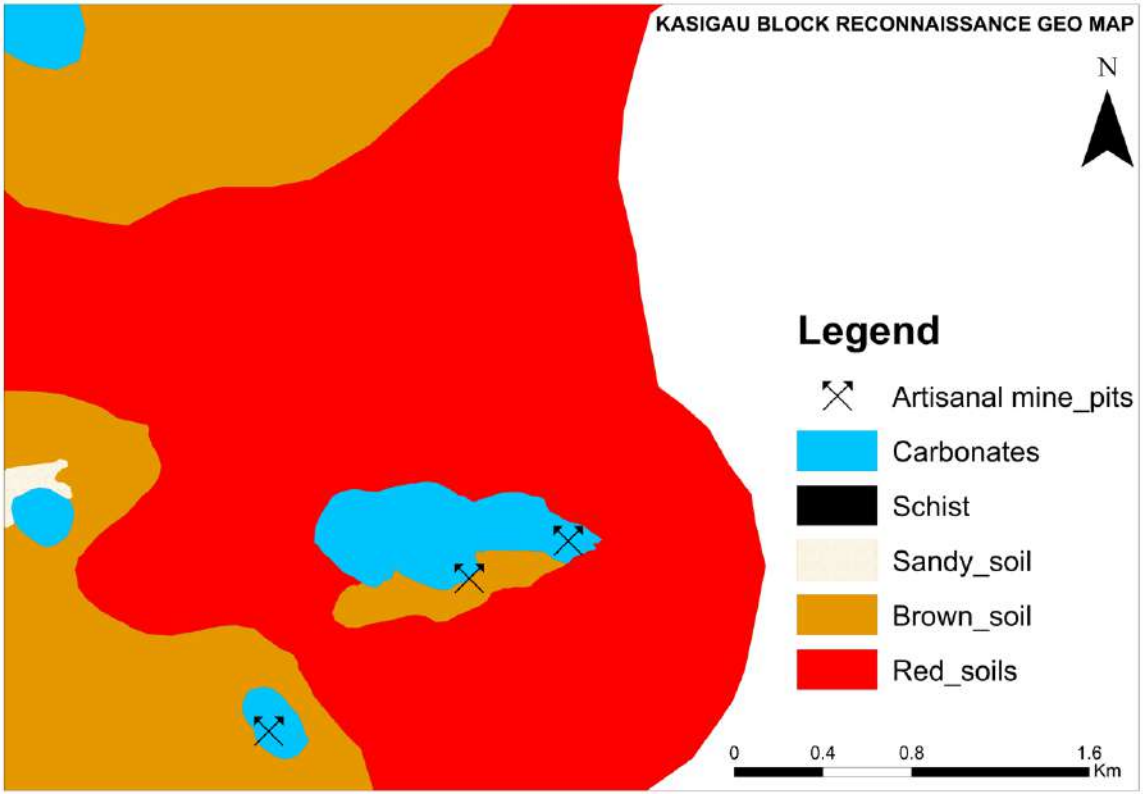

Figure 15: A brief geological survey map of the Kasigau block.

2.4 KISHUSHE SITE RECONNAISSANCE (WANJALA MINE)

The Wanjala mine is situated on the extension of the great basement rock formations that seem to compose the Taita highlands, and in this area the formations are cross cut by the Titaniferous Magnetite load/ reef deposits, ranging in average of 20 m thick, sandwiched by schist rocks on both the hanging wall and footwall.

The Wanjala mining have been operating mostly in extracting most of the iron ore from alluvial deposition while separating iron ore content from quartz materials, and in a small quantity of iron ore being extracted from the iron ore reef bodies,

In the case of Wanjala mine, the strip ratio for given assumed parameters will be;

Height from surface to the ore intersection=5m

Specific gravity of meta basement rock (s/g) = 2.61

Width of ore=20m

Specific gravity (s/g) of magnetite ore=5.2

Assumed lateral width=500m

Assumed Lateral length=500m

Calculation of tonnages

Waste: Length*width*S/g*Height (values of the assumed waste material)

500*500*5*2.61= 3,262,500 tonnes

For the iron ore: length*width*s/g

500*500*20*5.2= 26,000,000 tonnes

Figure 16: Images taken from site indicating a wide load of iron ore material.

2.5 WEST POKOT GOLD AND IRON ORE RECONNAISSANCE

A reconnaissance survey was conducted in West Pokot County, located approximately 419 kilometers from Nairobi County. The area is easily accessible by road, through old Nairobi Road to Eldoret-Nakuru road, through Eldoret-Kitale road all the way to Kitale to Kapenguria road.

1.5.1 Gold site.

The gold site prospect is located in Murkoria village which is approximately 130 kilometers from Kapenguria town center, it is fairly accessible by road.

2.5.2 Geology of the area.

The greater part of the rocks exposed in the area consists of gneisses and schists of the Basement System, including both paragneisses of sedimentary origin-semi-pelitic gneisses, together with quartzites and crystalline-limestones and orthogneisses of volcanic origin with which

orthogneisses of intrusive origin are associated. Semi-pelitic gneisses and amphibolites predominate over all other types. Most of the amphibolites are believed to-be of eruptive origin, though coarse-textured orthogneisses accompanying them are 'believed to be derived from gabbroic and granitoid intrusions, and have 'been accordingly separated from the Basement System (McCall, 1964).

The rocks of the Basement System have in part a pronounced north-south regional strike but there are important deviations; dips are predominantly eastwards. Age determinations made on pegmatites that have invaded the system indicate that it is older than Paleozoic.

2.5.3 Local geology.

The area visited is covered by mainly gneiss and schist rocks, intruded by pegmatitic dykes, both formations striking in a NE-SW, a few hydrothermally formed quartz veins of few centimeters striking in the NE-SW direction as the basement system rocks.

2.5.4 Gold occurrence

Gold seems to be hosted in ferrous rock material with silicic and limonitic alterations, occurring as few millimeter nuggets.

The trend of gold mineralized zone is in the NNE-SSW with slight changes to NE-SW, following the major strike formation of the area.

2.5.5 Artisanal mining

A couple of artisanal mining pits are being operated on site where as the activities are done by digging long-hole shafts on the top of mountain and taking the rocks downhill, for crushing and processing.

Processing is conducted by local rock crushing using hard rocks and the crushed material is sluiced using a small basin to wash of the less dense material leaving gold at the bottom of sluicing basin since gold have a high density.

Two samples were collected from site for gold fire assay analysis, samples collected were **GS001** a rock sample collected from shaft mining pit, and sample **SS001** a soil sample collected from the crushed stock at the working camp.

Figure 17: Gold sample 1, a rock sample GS001 collected from the mining pit.

Figure 18: Gold sample 2 a soil sample SS001 collected from the crushed material at the crusher work area.

2.5.6 Iron ore site

A brief reconnaissance survey was conducted at Mbaru village a village approximately 150 kilometers North West of Kapenguria town center.

Geology of the area is mainly made up of metamorphic rocks including Gneiss, Schists, and marbles, intrusions of pegmatitic dykes is also observed in various places at site. The magnetite iron ore body was observed at the top of a small mountain striking in a NW-SE direction with a width of about 10 meters, the deposit is overlain by biotitic and graphitic schists.

Two sets of samples were collected from site, where one sample named **MB001** is to be taken to laboratory for multielement analysis, at a lab of company convenience and preference, set two included the samples, labelled **CS001** of which these samples were to be taken to laboratory for crushability tests and bulk density indexes, for processing measures.

Figure 19: A magnetic ore body in a NW-SE strike direction being surrounded by schists all striking in the same direction as the iron ore. Sample 1 MBOO1 and sample 2 CS001 were collected.

Figure 20: A picture of samples collected for the ore grade analysis and crushability tests, sample CS001.

3.1 Conclusion:

1. Geological Significance and Confirmed Mineralization:

The field surveys confirm the extension of significant iron ore mineralization within the region. The presence of titaniferous magnetite reef deposits at Wanjala Mine, structurally controlled within basement schists, indicates a primary, hard-rock source of iron ore. This is substantiated by the widespread observations of high-grade hematite outcrops and alluvial deposits at Mngama, Sinai, and Kasigau. The geological model suggests these occurrences are not isolated but are likely part of a larger mineralized system related to the basement formations of the Taita highlands.

2. Wanjala Mine: Quantified Resource and Operational Insight:

The preliminary resource calculation for the Wanjala reef deposit reveals a substantial tonnage:

- **Ore Tonnage:** 26,000,000 tonnes
- **Waste Tonnage:** 3,262,500 tonnes

- **Stripping Ratio (SR):** ~0.125:1 (3.26M / 26M). This is an **exceptionally low strip ratio**, indicating a very shallow overburden relative to the thick, high-grade ore body. This is a highly favorable economic factor, as it suggests low-cost, open-pit mining potential.

The current artisanal operations, focusing on alluvial (secondary) deposits and small-scale reef extraction, validate the presence of ore but highlight a significant opportunity for systematic, mechanized mining of the primary reef body.

3. Regional Potential and Recommended Actions:

The correlation between the Wanjala reef and the outcrops in Mngama, Sinai, and Kasigau suggests strong potential for additional mineralized zones along strike. The combination of primary reef deposits and extensive alluvial/secondary deposits presents a dual-target opportunity for exploration and resource development.

Gold mining operations in Murkoria village is done by extracting gold from the rocks, whose orientation is in the NW-SE direction, the depth at which the main vein is extracted being 30 feet from surface, the miners need to concentrate in a N-S direction as in a direction to move along while mining for gold, The samples collected will provide an insight on the concentration of gold in the rocks found at Murkoria village.

3.2 Recommendations:

- **Systematic Geological Mapping:** Conduct a detailed regional-scale mapping program to determine the continuity, strike length, and number of parallel reef structures.
- **Geophysical Surveys:** Employ ground magnetic surveys to accurately map the extent of the highly magnetic titaniferous magnetite reefs beneath superficial cover, linking the known outcrop areas.
- **Confirmatory Drilling:** Implement a targeted drill program at Wanjala and the new prospect areas (Mngama, Sinai, Kasigau) to confirm the depth, thickness, grade, and true tonnage of the mineralized reefs. This will allow for the calculation of JORC/NI 43-101 compliant resources.
- **Metallurgical test work:** Conduct mineralogical and beneficiation studies on both the magnetite and hematite ore types to develop optimal processing flow sheets and confirm the marketability of the final concentrate.

- Gold samples collected should be analyzed by fire assay for gold concentrations and a multi element analysis should be conducted to understand what minerals are associated with gold mineralization.
- Given that the gold fire assay results are good, more area should be acquired for a large resource.

References

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Simonson, B. (2011). *Iron Ore Deposits Associated with Precambrian Iron Formations. .*