

GEOLOGICAL REPORT ON PRELIMINARY EXPLORATION (G3) FOR MANGANESE ORE IN

DHAVALAPUR BLOCK

DISTRICT: NAGPUR, MAHARASHTRA

(TEXT, ANNEXURES AND PLATES)



MINERAL EXPLORATION AND CONSULTANCY LIMITED
(Formerly known as Mineral Exploration Corporation Limited)

A Government of India Enterprise
CORPORATE OFFICE, NAGPUR

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MAHARASHTRA**

SALIENT FEATURES

1.	Name of the block	Dhavalapur Block, Tahsil - Parseoni District – Nagpur, State – Maharashtra
2.	Mineral	Manganese
3.	Total Area	2.00 sq.km.
4.	Period of Exploration	June 2024 to September 2024
5.	Meterage drilled by MECL	Nil
6.	No. of Boreholes drilled by MECL	N/A
7.	Thickness of Different Grades of Manganese Ore	Average thickness 7m, Average Grade 25.23% of Mn.
8.	Cut-off grade	As per end use grade classification recommended by Indian Bureau of Mines (IBM). Manganese Ore: Mn 10% (Min)
9.	Resources	82460 Tonnes with an average Grade of 25.23% Mn.
10.	Grade	Psilomelane
11.	UNFC Category	334
12.	Report Submission	September 2025

मैंगनीज अयस्क हेतु प्रारंभिक गवेषण (जी3) पर भूवैज्ञानिक रिपोर्ट
धवलापुर ब्लॉक, जिला: नागपुर, महाराष्ट्र

अध्याय 1

1.1.0 कार्यकारी सारांश

- 1.2.0 धवलापुर ब्लॉक का प्रस्ताव महाराष्ट्र सरकार के भूविज्ञान एवं खनन निदेशालय द्वारा चिन्हित व्यपगत पट्टा क्षेत्रों के आधार पर किया गया है, जो मूल रूप से एमएमडीआर अधिनियम, 2015 की धारा 10A(2)(b) के तहत प्रदान किए गए थे। हालाँकि, अधिनियम में 2021 के संशोधन के बाद, ऐसी सभी पूर्वक्षण लाइसेंस (पीएल) रिपोर्टों को अयोग्य घोषित कर दिया गया, जिससे नीलामी के माध्यम से आवंटन अनिवार्य हो गया। इसके अलावा, खनिज (खनिज सामग्री के साक्ष्य) नियम, 2015 के प्रावधानों के अनुसार खनिज साक्ष्य (जी4, जी3, आदि) के स्तर की पुष्टि के लिए इन पीएल रिपोर्टों का मूल्यांकन किया जाना आवश्यक है।
- 1.3.0 भूविज्ञान और खनन निदेशालय (डीजीएम), महाराष्ट्र सरकार ने पत्र संख्या तक./1848/2023/3938, दिनांक 22/12/2023 के माध्यम से एमईसीएल से व्यपगत 10A(2)(b) खनन पट्टा क्षेत्रों में गवेषण करने का अनुरोध किया।
- 1.4.0 एमईसीएल ने महाराष्ट्र के नागपुर जिले की पारसिवनी तहसील के धवलापुर क्षेत्र के लिए एक गवेषण प्रस्ताव तैयार किया है। इस योजना में 1:2000 पैमाने पर भूवैज्ञानिक मानचित्रण, 14 बोरहोल में कुल 1,000 मीटर की ड्रिलिंग, और जी3 गवेषण स्तर पर भू-रासायनिक और कोर नमूना विश्लेषण शामिल हैं।
- 1.5.0 गवेषण प्रस्ताव (जी3) के लिए धवलापुर ब्लॉक (2.00 वर्ग किमी) था प्रस्तुत और 25, 29 और 30 अप्रैल, 2024 को आयोजित 64^{वीं} टीसीसी-1 बैठक में इस पर विचार-विमर्श किया गया। समिति ने 10A(2)(b) मामलों और एमईसीएल के माध्यम से इन पीएल क्षेत्रों के गवेषण के लिए महाराष्ट्र सरकार के अनुरोध को नोट किया। तदनुसार, 64^{वीं} टीसीसी-1 समिति अनुशंसित परियोजना प्रस्ताव का शीर्षक "धवलापुर ब्लॉक (2.00 वर्ग किमी), नागपुर जिला, महाराष्ट्र में मैंगनीज अयस्क के लिए प्रारंभिक गवेषण (जी3 स्तर)" है।
- 1.6.0 64^{वीं} टीसीसी-1 की सिफारिश पर, 35^{वीं} कार्यकारी समिति (ईसी), एनएमईडीटी की बैठक 16 मई, 2024 को हुई और पत्र संख्या एफ.सं. 23/458/2024-एनएमईटी/121, दिनांक 10 जून, 2024 के तहत 231.60 लाख रुपये की लागत वाली परियोजना को मंजूरी दी गई।
- 1.7.0 महाराष्ट्र के नागपुर जिले में स्थित गवेषण ब्लॉक 2.00 वर्ग किलोमीटर क्षेत्र में फैला हुआ है, जो अक्षांश 21°33'02.99" उत्तर से 21°33'33.48" उत्तर और देशांतर 79°06'08.39" पूर्व से 79°07'47.02" पूर्व तक घिरा हुआ है और टोपोशीट संख्या 55 O/2 के अंतर्गत आने वाले तहसील पारसिवनी के धवलापुर, सवांगी, नरहर, अंबाझरी और बनेरा गांवों को शामिल करता है।
- 1.8.0 एनएमईडीटी से अनुमोदन की रशीद के बाद, एमईसीएल ने 1:2000 पैमाने पर भूवैज्ञानिक मानचित्रण और भू-रासायनिक नमूनाकरण किया है। मैंगनीज अयस्क निकायों की सतह की निरंतरता को रेखांकित करने के लिए 23 बेड रॉक नमूनों का विश्लेषण किया गया। ट्रेचिंग और ड्रिलिंग गतिविधियाँ शुरू नहीं

की जा सकीं क्योंकि आवश्यक वन मंजूरी नहीं मिली थी, इसलिए कि ब्लॉक क्षेत्र पेंच टाइगर रिजर्व के अंतर्गत आता है, जिस पर जुलाई 2025 में आयोजित 79^{वाँ} टीसीसी बैठक में चर्चा की गई थी, जहाँ समिति ने पूरी की गई गवेषण गतिविधियों के आधार पर भूवैज्ञानिक रिपोर्ट प्रस्तुत करने की सिफारिश की थी।

- 1.9.0 भूवैज्ञानिकीय दृष्टि से यह क्षेत्र सौसर समूह के मानसर संरचना का हिस्सा है, जो सौसर सुपरक्रस्टल बेल्ट का एक भाग है। सौसर वलित बेल्ट (SFB), मध्य भारतीय विवर्तनिक क्षेत्र (CITZ) के दक्षिणी किनारे पर दक्षिणी उत्तलता वाली एक महत्वपूर्ण मेसोप्रोटरोज़ोइक वलित बेल्ट है, जो पूर्व-पश्चिम से उत्तर-पूर्व-पश्चिम-पश्चिम की ओर लगभग 20 से 40 किमी चौड़ी और 300 से 350 किमी लंबी है। सौसर वलित बेल्ट (SFB) में दो प्रमुख लिथोटेक्टोनिक समूह शामिल हैं, अर्थात् तिरोड़ी बायोटाइट नाइस (TBG) और मेटासेडिमेंटरी सौसर समूह।
- 1.10.0 यह ब्लॉक डोलोमाइटिक संगमरमर, ग्रेनाइट नीस, क्वार्टजाइट, खोंडालाइट और मैंगनीज युक्त गोंडाइट की लिथो इकाइयों को उजागर करता है, जो सौसर समूह के मानसर फॉर्मेशन से संबंधित है। मैंगनीज अयस्क गोंडाइट के साथ पाया जाता है, जिसका उल्लेख सतह पर और पिछले पट्टेदार के पुराने खनन कार्यों में भी मिलता है। क्षेत्रीय शल्कन की प्रवृत्ति पश्चिम-उत्तर-पूर्व दक्षिण-पूर्व से पूर्व-पश्चिम की ओर है, जिसमें मैंगनीज खनिजकरण पश्चिम-उत्तर-पूर्व दक्षिण-पूर्व के अनुरूप है और लगभग 50° दक्षिण की ओर नति है। गोंडाइट मुख्य पोषक है, जो क्वार्ट्ज और गार्नेट के साथ मैंगनीज खनिजों से बना है।
- 1.11.0 कुल 23 बेडरॉक नमूने एकत्र किए गए और 6 मूलकों अर्थात् Mn, SiO₂, P₂O₅, Fe₂O₃, MnO₂ और अघुलनशील पदार्थों के लिए उनका विश्लेषण किया गया।
- 1.12.0 कुल 82460 टन गवेषण संसाधनों का अनुमान लगाया गया, जिसका औसत ग्रेड 25.23% Mn था।
- 1.13.0 यह ब्लॉक महाराष्ट्र के प्रमुख मैंगनीज बेल्ट में एक पारिस्थितिकी-संवेदनशील क्षेत्र के निकट स्थित है।
- 1.14.0 निष्पादित गवेषण कार्य, गोंडाइट संरचनाओं के मानचित्रण और नमूने के आधार पर, पश्चिम-उत्तर-पूर्व में 190 मीटर से अधिक की ऊँचाई और 7 मीटर की औसत चौड़ाई वाली इन संरचनाओं में मैंगनीज खनिजीकरण की संभावना है। यह खनिजीकरण अयस्क पिंड के नति के साथ जारी रह सकता है, जिसे भू-भौतिकीय सर्वेक्षण और उसके बाद ड्रिलिंग द्वारा स्थापित करने की आवश्यकता है। इसलिए, विस्तृत गवेषण की अनुशंसा की जाती है।

GEOLOGICAL REPORT ON PRELIMINARY EXPLORATION (G3) FOR MANGANESE ORE IN DHAVALAPUR BLOCK, DISTRICT: NAGPUR, MAHARASHTRA

CHAPTER-1

1.0.0 EXECUTIVE SUMMARY

- 1.1.0 The Dhavalapur block has been proposed on the basis of lapsed lease areas identified by the Directorate Geology and Mining, State Government of Maharashtra, which were originally granted under Section 10A(2)(b) of the MMDR Act, 2015. However, following the 2021 amendment to the Act, all such Prospecting License (PL) reports were declared ineligible, mandating allocation through auction. Further, these PL reports are required to be evaluated to confirm the level of mineral evidence (G4, G3, etc.) as per the provisions of the Minerals (Evidence of Mineral Contents) Rules, 2015.
- 1.2.0 The Directorate of Geology and Mining (DGM), Government of Maharashtra requested MECL to take up the exploration in lapsed 10A(2)(b) mining lease areas vide letter no. Tech/1848/2023/3938, Dated 22/12/2023.
- 1.3.0 MECL has prepared an exploration proposal for the Dhavalapur area, Tehsil Parseoni, District Nagpur, Maharashtra. The plan includes geological mapping at a 1:2000 scale, drilling a total of 1,000 meters across 14 boreholes, and conducting geochemical as well as core sample analyses at the G3 exploration level
- 1.4.0 Exploration Proposal (G3) for Dhavalapur Block (2.00 sq.km) was submitted and deliberated in 64th TCC-1 meeting held on 25th, 29th & 30th April 2024. Committee, noted 10A(2)(b) cases and request of Govt. of Maharashtra for exploration of these PL areas through MECL. Accordingly, 64th TCC-1 committee recommended the project proposal titled as “Preliminary Exploration (G3 Level) for Manganese Ore in Dhavalapur Block (2.00 sq.km), Nagpur District, Maharashtra”.
- 1.5.0 On recommendation of 64th TCC-1, 35th Executive committee (EC), NMEDT meeting held on 16th May 2024 and approved the block, vide letter no F.No. 23/458/2024-NMEDT/121, Dated 10th June, 2024 approved the project with cost of INR 231.60 lakhs.
- 1.6.0 The exploration block, located in Nagpur district of Maharashtra, spans over 2.00 sq.km area, is bounded by Latitude 21°33'02.99" N to 21°33'33.48" N and Longitude

79°06'08.39" E to 79°07'47.02" E and encompasses the villages of Dhavalapur, Sawangi, Narhar, Ambazari and Banera in Tehsil Parseoni falling within Toposheet No. 55 O/2.

- 1.7.0 After receipt of approval from NMEDT, MECL has carried out geological mapping and geochemical sampling on 1:2000 scale with analysis of 23 no. of bed rock samples to delineate surface continuity of Manganese ore body. Since the block area falls within buffer area of the Pench Tiger Reserve, Trenching and drilling activities could not be undertaken as forest clearance was not granted, same was discussed in the 79th TCC-I meeting held in the month of July 2025, where committee recommended to submit geological report based on the exploration activities completed.
- 1.8.0 Geologically the area belongs to Mansar Formation of Sausar Group, which is a part of Sausar Supracrustal Belt. The Sausar Fold Belt (SFB), an important mesoproterozoic fold belt with southern convexity on the southern margin of the Central Indian Tectonic Zone (CITZ) trends E-W to ENE-WSW with about 20 to 40 km wide and 300 to 350km long. The Sausar Fold Belt (SFB) comprises of two major lithotectonic assemblages, viz. Tirodi Biotite Gneiss (TBG) and metasedimentary Sausar Group.
- 1.9.0 The block exposes litho units of dolomitic marble, granite gneiss, quartzite, khondalite, and manganese-bearing gondite belongs to Mansar Formation of the Sausar Group. Manganese ore occurs in association with gondite, which has recorded both on surface and in old workings. The regional foliation trends WNW–ESE to E–W, manganese mineralization conforming to WNW–ESE strike and dipping ~50° due south. Gondite constitutes the principal host rock, composed of manganese minerals along with quartz and garnet.
- 1.10.0 Total of 23 no. of bedrock samples collected from manganese mineralization which trend in WNW-ESE over 190m with an average width of 7m and analysed for 6 radicals i.e. Mn, SiO₂, P₂O₅, Fe₂O₃, MnO₂ and Insolubles.
- 1.11.0 A total 82460 Tonnes of reconnaissance resources were estimated under 334 category with an average grade of 25.23% Mn.
- 1.12.0 The block lies near an eco-sensitive zone.
- 1.13.0 All lithological formations in the area have been systematically mapped during the exploration work, Manganese mineralization has been identified within the Gondite

formation, trending WNW–ESE over a strike length of approximately **190 m** with an average width of **7 m**. The mineralization appears to extend along the dip of the ore body, indicating potential for continuity at depth.

- 1.14.0 To confirm the subsurface continuity and extent of the manganese mineralization, it is recommended to undertake a **Ground Geophysical Survey**, followed by a **detailed drilling program**. Based on the encouraging surface indications, the area is **recommended for detailed exploration**.

CHAPTER – 2

2.0.0 DETAILS OF THE QUALIFIED PERSON(S) / EXPLORATION AGENCY

2.1.0 INVESTIGATING AGENCY

MINERAL EXPLORATION & CONSULTANCY LIMITED

(A Govt. of India Enterprise Miniratna PSE)

Dr. Babasaheb Ambedkar Bhavan, High Land Drive Road, Seminary Hills, Nagpur-440006.

PERSONNEL ASSOCIATED WITH PRELIMINARY EXPLORATION (G3 STAGE)
FOR MANGANESE ORE IN DHAVALAPUR BLOCK, DISTRICT: NAGPUR,
MAHARASHTRA.

1	Overall guidance	Shri Shrikant Sharma, HOD (Exploration) Shri P. Ravindran, GM (Exploration) Rtd.
2	Overall Planning, Co-ordination & Supervision	Shri Shrikant Sharma, HOD (Exploration) Shri P. Ravindran, GM (Exploration) Rtd. Shri Naveen Kumar Pala, Sr. Manager (Geology)
3	Project Management	Shri Lakshmanarao Kaddala, Sr. Manager (Geology) /OIC
4	Physical Execution of work	
	Geology	Shri Lakshmanarao Kaddala, Sr. Manager (Geology)
5	Sample Processing	Shri Ankush Haridas Wagh, Sr. Tech. (Sampling) Shri Pushpraj Tiwari, Tech. (Sampling)
6	Chemical Laboratory	Shri Shrikant Sharma, HOD (Exploration)
		Shri Rohit Sharma, Manager (Chemical Lab)
		Dr Deepti Rahangdale, Manager (Chemical Lab)
7	Petrographic Studies	Shri Sayantan Pal, Manager (Geology)
8	Documentation	Shri Naveen Kumar Pala, Sr. Manager (Geology)
		Shri Lakshmanarao Kaddala, Sr. Manager (Geology)
		Ms. Akshyata Sahoo, Executive Trainee (Geology)
9	Non-Coal Geological Report Cell	Shri N C S Reddy, Console Operator
		Shri Uday Patil, Sr. Computer Operator
10	Reprography and Printing	Shri Pradeep Negi, Assistant Survey & Map Officer
		Shri Durgesh Devarshee, Assistant Survey & Map Officer

CHAPTER – 3

3.0.0 TITLE OF THE REPORT & OWNERSHIP

TITLE OF THE REPORT

3.1.0 Geological Report on Preliminary Exploration (G3) for Manganese Ore in Dhavalapur Block, District: Nagpur, Maharashtra.

Ownership: Directorate of Geology and Mining, Government of Maharashtra.

3.2.0 DETAILS ABOUT PERIOD OF PROSPECTING

3.2.1 The exploratory work in the block has commenced on 15.06.2024 with the geological mapping on 1:2,000 scale over 2.00 sq.km area. The analytical / laboratory studies for bed rock samples were also carried out simultaneously at laboratories of MECL in Nagpur.

3.3.0 DETAILS OF EXPLORATION AGENCY, QUALIFICATION, AND EXPERIENCE OF ASSOCIATED TECHNICAL PERSONS ENGAGED IN EXPLORATION

Exploration Agency	Mineral Exploration and Consultancy Limited (Formerly Mineral Exploration Corporation Limited) A Govt. of India Enterprise – Mini Ratna – 1 CPSE
Qualification	M.Sc. / M. Sc. Tech. (Geology)
Experience	Professionals have more than 20 years of experience with inception of MECL since 1972
Address of the Prospector	Dr. Babasaheb Ambedkar Bhavan, High Land Drive Road, Seminary Hills, Nagpur, Pin- 440006
Email	cmd@gov.in; gm-exploration@mecl.gov.in
Phone No	0712-2510289; 0712-2511829

Sl.No.	Name of the Person	Designation	Qualification	Experience
1	Shri Shrikant Sharma	HOD (Exploration)	M.Sc., Geology	23 Years
2	Shri P. Ravindran	GM (Exploration) Rtd.	M.Sc., Geology	35 Years
3	Shri Naveen Kumar Pala	Sr. Manager (Geology)	M.Sc. (Tech.), Applied Geology	20 Years
4	Shri Lakshmanarao Kaddala	Sr. Manager (Geology)	M.Sc. (Tech.), Applied Geology	19 Years
5	Shri Rohit Kumar Sharma	Manager (Chemical Lab)	M.Sc., Chemistry	15 Years

CHAPTER – 4

4.0.0 DETAILS OF THE AREA

4.1.0 LOCATION OF THE BLOCK

- 4.1.1 The Dhavalapur Block, located in Nagpur District of Maharashtra, spans over 2.00 sq.km area, is bounded by latitude 21°33'02.99" N to 21°33'33.48" N and Longitude 79°06'08.39" E to 79°07'47.02" E and encompasses the villages of Dhavalapur, Sawangi, Narhar, Ambazari, Banera in Tehsil Parseoni, falling within Toposheet No. 55 O/2.
- 4.1.2 The block area is well connected to the district headquarters, Nagpur, by an all-weather metalled road via Parseoni, through NH-07, NH-47 and SH-247.
- 4.1.3 The nearest railhead is Nagpur, located approximately 70 km away, while the nearest railway station is Koradih, about 30 km from the block. The nearest airport is Dr. Babasaheb Ambedkar International Airport; Nagpur (located about 75 km from the block).

Table – 4.1
Co-ordinates of Cardinal Points of the block boundary, Dhavalapur Block,
Dist - Nagpur, Maharashtra

Corner Point	Latitude DMS	Longitude DMS	Northing UTM	Easting UTM
A	21°33'31.55"	79°06'08.39"	2385185.73	303494.45
B	21°33'32.40"	79°06'13.45"	2385209.95	303640.34
C	21°33'33.48"	79°06'23.46"	2385239.83	303928.80
D	21°33'32.21"	79°06'31.47"	2385197.79	304158.83
E	21°33'28.27"	79°06'45.93"	2385071.76	304573.24
F	21°33'26.78"	79°06'55.41"	2385022.54	304845.34
G	21°33'25.42"	79°07'07.10"	2384976.72	305181.28
H	21°33'17.08"	79°07'47.02"	2384706.22	306326.81
I	21°33'02.99"	79°07'46.02"	2384273.44	306292.87
J	21°33'03.62"	79°06'09.13"	2384326.53	303505.15

4.2.0 CADASTRAL DETAILS OF THE AREA WITH LAND USE

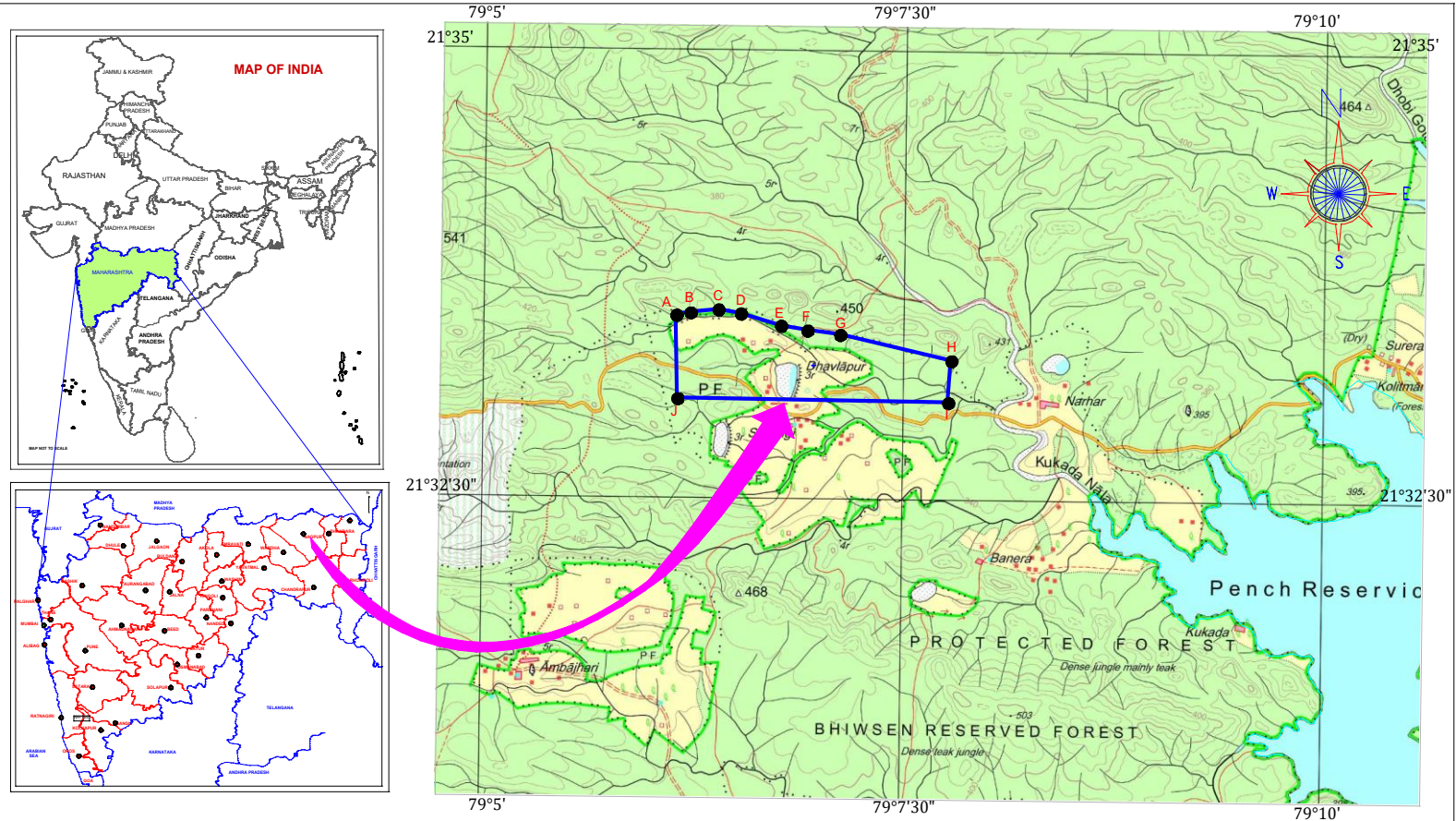
Cadastral details are not available for the study area, however indicative data collected from NGDR portal, which is being given below:

Dhavalapur Block area falls in buffer zone of Pench Tiger Reserve Forest, Nagalwadi Range, Nagpur Division, Nagpur Circle and remaining area falls in Non-Forest Land (revenue and private land).

There are no major / minor mineral concession granted inside the block.

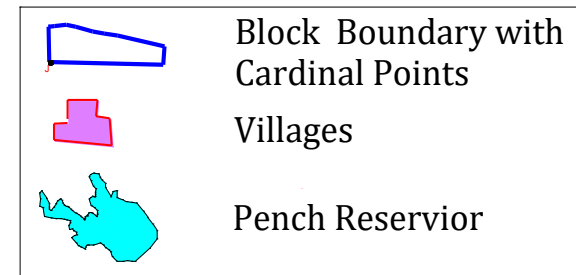
4.3.0 MINERAL(S) UNDER INVESTIGATION: MANGANESE ORE.

LOCATION MAP OF DHAVALAPUR BLOCK (Extent 2.00 sq.km.) DISTRICT - NAGPUR, MAHARASHTRA



Sl.No.	Points	UTM Zone - 44 (m)		GCS (DD)	
		EASTING	NORTHING	LATITUDE	LONGITUDE
1	A	303494.45	2385185.73	21° 33' 31.5515"	79° 06' 08.3918"
2	B	303640.34	2385209.95	21° 33' 32.3966"	79° 06' 13.4514"
3	C	303928.80	2385239.83	21° 33' 33.4820"	79° 06' 23.4631"
4	D	304158.83	2385197.79	21° 33' 32.2061"	79° 06' 31.4746"
5	E	304573.24	2385071.76	21° 33' 28.2723"	79° 06' 45.9289"
6	F	304845.34	2385022.54	21° 33' 26.7793"	79° 06' 55.4053"
7	G	305181.28	2384976.72	21° 33' 25.4217"	79° 07' 07.0988"
8	H	306326.81	2384706.22	21° 33' 17.0762"	79° 07' 47.0199"
9	I	306292.87	2384273.44	21° 33' 02.9938"	79° 07' 46.0209"
10	J	303505.15	2384326.53	21° 33' 03.6247"	79° 06' 09.1270"

TEXT FIGURE-1



CHAPTER - 5

5.0.0 PHYSIOGRAPHY AND ENVIRONMENT

5.1.0 RELIEF OF THE AREA WITH MINIMUM AND MAXIMUM ELEVATION, DRAINAGE PATTERN, NATURAL WATER COURSES, RESERVOIRS ETC.

5.1.1 The proposed block area encompasses a mix of undulating terrain, including both hilly and flat landscapes, with a gentle slope towards the east. The hilly regions are covered with forest, while the flat areas are predominantly agricultural land. The elevation ranges from 380m to 410m above MSL, featuring knolls and hillocks. The general slope of the land directs water towards the east, where drainage is collected by the southerly flowing Pench River, situated to the east of the block.

5.2.0 ROADS, RAILWAY TRACK, ELECTRIC TRANSMISSION LINE, TELEPHONE LINE ETC.

5.2.1 The block is well connected to Nagpur by an all-weather metalled road via Parseoni, NH-07, NH-47, and SH-247.

5.2.2 The nearest railhead is Nagpur (70 km), with Koradih Railway Station located 30 km away.

5.2.3 There is no major electrical line passing through the block.

5.3.0 HOST POPULATION (LOCAL TRIBES), HUMAN SETTLEMENTS WITHIN AND NEARBY THE AREA

5.3.1 There are a total 1603 no. of people are living in the villages, viz Dhavalapur, Sawangi, Narhar, Ambazari and Banera, which are falling in and around the part of explored block. Out of the total population, 808 numbers are Male and 795 numbers are female.

5.4.0 SOCIO DEMOGRAPHIC PROFILE OF THE AREA AND NEARBY

5.4.1 Out of the total population in villages lying as given in para no. 5.3.1, total 1107 number of people are working in agriculture as owner, co-owner and labourers, as the main occupation is agriculture.

5.4.2 Out of the total 1603 no of populations 27 numbers belong to Scheduled caste and 1427 number belong to Scheduled tribe community.

5.5.0 HISTORICAL SITES AND ARCHAEOLOGICAL MONUMENTS, PLACES OF WORSHIP, PUBLIC UTILITIES ETC. WITHIN OR NEARBY

5.5.1 No Site belonging to Archaeological survey of India present inside the block.
The block area falls in buffer zone of Pench Tiger Reserve Forest and Pench National

Park of Wildlife Sanctuary.

No Eco Sensitive Zone inside the block.

No Monument falls inside the block.

5.6.0 FOREST, SANCTUARIES, NATIONAL PARK AND WILD LIFE SANCTUARY

Part of the block is covered in buffer zone of Pench Tiger Reserve Forest, Range Nagalwadi, Nagpur Division & Circle, Maharashtra.

5.7.0 FLORA AND FAUNA

5.7.0 Parseoni Tehsil of Nagpur district is rich in biodiversity, with a variety of plant and animal species thriving in its forests and landscapes. The district has about 18.53% forest cover, which supports a diverse range of flora and fauna.

5.7.1 The area supports a diverse range of flora and fauna due to its varied physical features. Dominant forest species include Teak (*Tectona grandis*), Mahua (*Madhuca longifolia*), Babul (*Acacia arabica*), Bamboo (*Bambusa bambos*), Tendu (*Diospyros exsculpta*), along with various shrubs. Wildlife includes wild boar (*Sus cristatus*), panther (*Felis pardus*), antelope, deer (*Cervus duvaucelii*), fox, wolf, monkeys, hare (*Lepus ruficaudatus*), and several species of snakes, both venomous and non-venomous. Common bird species observed are myna, parrot, sparrow, cuckoo and owl.

5.8.0 WATER BODIES SUCH AS RIVER, NALA, STREAM, RESERVOIR, ETC.

Pench river is the major river flowing in the area, Kukada & Dhobi Gota are Nalas in the block area. The southerly and south-easterly flowing drainages are merged into southernly flowing Pench River. The area has got dendritic pattern of drainage. Pench Reservoir is located in east to the block area.

5.9.0 CLIMATIC CONDITIONS

5.9.1 The area experiences moderately dry and wet climate. The temperature rises from March onwards, reaching maximum up to 45°C during April-May. The winter sets from November and lasts upto February. Winter is moderate, temperature dropping below 10°C with occasional colder days. The monsoon sets in July and continues up to September, most of the rainfall occurs during the months of July and August. The annual rainfall is about 100 cm.

CHAPTER - 6

6.0.0 INFRASTRUCTURE

6.1.0 LOCAL INFRASTRUCTURE DETAILS

6.1.1 Following public utilities available in the vicinity of the block area, which are listed below:

Facility	Location	Distance from the block (Appx.)
Police station	Parseoni	27 km
Bank facility	State Bank of India, Parseoni	27 km
Hospital	Parseoni	27 km
Bus Stop	Dhavalapur	1 km
Upper Primary School	Dhavalapur	1 km
High School	Kolitmara	6 km
Post Office	Kheri	17 km

6.1.2 The nearest railhead is Nagpur of Central Railways which is about 70 km north of the block and nearest railway station is Koradi, it is connected to the Itwari–Nagbhid Narrow Gauge line. Koradi railway station primarily serves the Koradi Thermal Power Station (KTPS). The station is located on a single electric line within the South East Central Railway zone.

6.1.3 Nagpur district is located in the eastern part of Maharashtra, India known as Vidarbha region. Nagpur district's infrastructure is undergoing major upgrades, driven by its strategic location at the geographic center of India. Key projects include the Multi-modal International Cargo Hub and Airport at Nagpur (MIHAN), the fully operational Nagpur Metro, and ongoing initiatives under the Smart Cities Mission. Key industries in the district include manufacturing, mining, textiles and IT with several large and medium-scale public sector and private enterprises. And also, Nagpur district is moderately rich in mineral resources with deposits of Coal, Manganese and Limestone, which fuel industrial activities. The Nagpur district has coal mines and power plants.

CHAPTER - 7

7.0.0 GEOLOGY OF THE AREA

7.1.0 REGIONAL GEOLOGY

- 7.1.1 The central part of the Indian Precambrian Shield exhibits the presence of two distinct crustal provinces: the Northern Crustal Province, encompassing the Bundelkhand region, and the Southern Crustal Province, known as Bastar. Within the Northern Crustal Province, there exists a subdivision comprising the Bundelkhand cratonic area and a broader zone of accretion to its south, following an WNW-ESE trend, identified as the Central Indian Tectonic Zone (CITZ).
- 7.1.2 The study area is part of CITZ, the exposed lithology belongs to Mansar Formation of Sausar Group, which is a part of Sausar Supracrustal Belt. The Sausar Group of rocks constitute as important constituent of CITZ lying in the Central Indian Peninsular Shield at the southern fringe of Satpura Province comprises a lithotectonic assemblage of strongly folded and metamorphosed non volcanic psamo-pelitic and chemogenic manganese rich matasedimentary package lying over Tirodi Biotite Gneiss with a tectonised contact. A Large-scale southerly convergent recumbent fold causes possible reversal of stratigraphic sequence due to which Sausar stratigraphy has remained problematic on various counts (Khan et al. 2002).
- 7.1.3 The Sausar Fold Belt (SFB), an important mesoproterozoic fold belt with southern convexity on the southern margin of the Central Indian Tectonic Zone (CITZ) trends E-W to ENE-WSW with about 20 to 40 km wide and 300 to 350km long. The Sausar Fold Belt (SFB) comprises of two major litho tectonic assemblages, viz. Tirodi Biotite Gneiss (TBG) and metasedimentary Sausar Group.
- 7.1.4 India's richest manganese ore deposits are found primarily in the quartz-muscovite-schists of the Mansar Formation, with smaller occurrences in the carbonate horizons of the Lohangi Formation within the Sausar Group.
- 7.1.5 The stratigraphic sequence of various formations of the region and as per Khan et al., 2002 generalised sequence of Sausar Group of rocks of this area is given below in Table 7.1:

Table -7.1
Generalized Stratigraphy of the area (Khan et al., 2002)

Group	Formation	Lithology
Quaternary	Recent Deposits	Alluvium & soils
		Laterite
	Intrusives	Massive potassic granite, pegmatite and quartz veins
		Foliated potassic granite
SAUSAR GROUP	Bichua Formation	White dolomitic marble \pm red and yellow chert
	Chorbaoli Formation	Coarse grained, garnetiferous quartz-mica schist with local development of magnetite and garnet.
	Mansar Formation	Fine grained garnetiferous mica schist and quartz-mica schist with thin chert and quartzite and thick horizon of Mn ore and Gondite
	Lohangi Formation	Calc silicate rocks, calc gneiss with subordinate pink calcite marble and minor Mn ore horizons.
	Sitasaongi Formation	Meta grit and micaceous quartzite.
Tectonised Contact		
Pre Sausar Basement (Archaean)	Amgaon Gneiss	Granite gneiss/migmatite
	Tirodi Biotite Gneiss	Multicomponent gneiss e.g. biotite gneiss, migmatitic gneiss, felsic gneiss with small metabasic & mafic granulite enclaves.

7.1.6 The metasedimentary rocks in the area represent the western extension of the Sausar Group. Based on lithological variations, mineral assemblages, structural features, and the grade of metamorphism, the Sausar Group in this region is subdivided into four distinct formations: Tirodi, Lohangi, Mansar and Bichua. A brief description of each formation is provided below:

7.1.7 Tirodi Formation:

The Tirodi Formation comprises biotite gneiss, augen gneiss, and migmatites with enclaves of biotite schist, biotite quartzite, amphibolite, and meta-pyroxenite. It is prominently exposed east of Kelod, Kawtha, Baregaon, and around Ghat Kukda and Dhavalapur. The terrain is rugged with hills and ridges, especially near Dhavalapur and

Kotitmara, while peneplanation dominates around Baregaon, except for an isolated granite hill.

Outcrops are often discontinuous due to weathering and soil cover, especially between Baregaon and Khapa, where exposures appear in nalas (1–10 m long, 0.5–1 m wide). Around Kawtha, outcrop dimensions vary from 28–500 m in length and 10–50 m in width.

East of the Kanhan River (Ghat Kukda), distinct banding of mafic and felsic components is observed, while to the west, intense feldspathisation (with abundant pink feldspar) gives the gneiss a schist-like appearance. Feldspar porphyroblasts (1 mm–5 cm) form augen textures. Good exposures occur near Dudhala Khurd, Hatrisa, and Dhavalapur. Sharp contacts with the Lohangi and Mansar Formations are observed near Narhar and south of Ghat Kukda.

Previously termed Composite Gneiss, the formation is a banded/folded migmatite with granitic to pegmatitic neosomes and melanosomes of biotite and hornblende. Restites (5–20 m long) include biotite schist, quartzite, and amphibolite. Minor meta-ultramafic enclaves (talc–tremolite schist) occur near Kawtha and the Chawalpur–Angalwadi road.

7.1.8 **Lohangi Formation:**

The Lohangi Formation consists mainly of calc-silicate gneiss, diopside epidote bearing marble, dolomitic and pink calcitic marble, magnetite epidote quartzite, and quartz biotite schist. These rocks are well exposed north of Kolutmara, between Ghat Kukda and Ghat Pindri, and extend up to Totladoh. Marble bands also occur south of Kawtha, Dudhala Khurd and near Dhavalapur.

The calc-silicate rocks are medium- to coarse-grained, banded, and commonly exhibit mushroom structures from mineral flow during deformation. Banding is formed by alternating layers of diopside, epidote, garnet, calcite, pink feldspar, and quartz.

Microscopically, the rocks show granoblastic and polygonal textures, with dominant assemblages of epidote, diopside, garnet, calcite, and quartz, along with feldspars, sphene, and apatite. Variations include epidote magnetite quartzites and localized development of anthophyllite, and scapolite, suggesting contact metamorphism near granite intrusions.

7.1.9 **Mansar Formation:**

The Mansar Formation comprises garnetiferous quartz–muscovite–biotite schist, muscovite–biotite schist and quartz schist, locally associated with Mn ore horizons. It is exposed east of Kelod, west of Khapa, around Baregaon, Saleghat, Dhavalapur, Ghat Kukda, and the Totladoh dam area. The formation shows close spatial association with the Tirodi and Lohangi Formations and often appears reddish-brown due to ferruginous staining.

Schists frequently contain interbands of quartzite, vein quartz, and pegmatite, with gonditic Mn ore bodies near Kelod and Kawtha. Near Khapa Khangaon, quartz–muscovite schists with micaceous quartzite lenses form low ridges. The formation typically occupies the core of macrofolds and shows lateral grading into biotite–muscovite schists.

7.1.10 **Bichua Formation**

The Bichua Formation is primarily composed of dolomitic marble, best exposed at Khapa Pardiwar and Baregaon, where it is actively mined. It occurs in association with Mansar Schist and occupies the core of macrofold closures east of Baregaon, extending about 1 km eastward. The marble reaches maximum thickness near Khapa Pardiwar, likely due to fold closure. The rock is coarse-grained, typically white, with white to dark grey banding. Local serpentinization is observed north of Baregaon and near the 400 m hill.

7.2.0 **REGIONAL STRUCTURE**

7.2.1 The Sausar Group rocks have been deformed and metamorphosed through several stages. The folds in general are overturned to the north, and axial planes are steeply dipping (60° – 80°) to the south in the southern region of the belt.

7.2.2 Regional structure of the Sausar Group is categorized into four distinct belts (Narayanswamy et al., 1962):

- a) Southern Belt – Isoclinal folding (tight, parallel folds).
- b) Northern Belt – Exhibits recumbent folds, thrust blocks, and nappe structures (large-scale thrust-displaced sheets of rocks).
- c) Central Belt – Consists of gneissic bodies interspersed by thin folded bands of

schists.

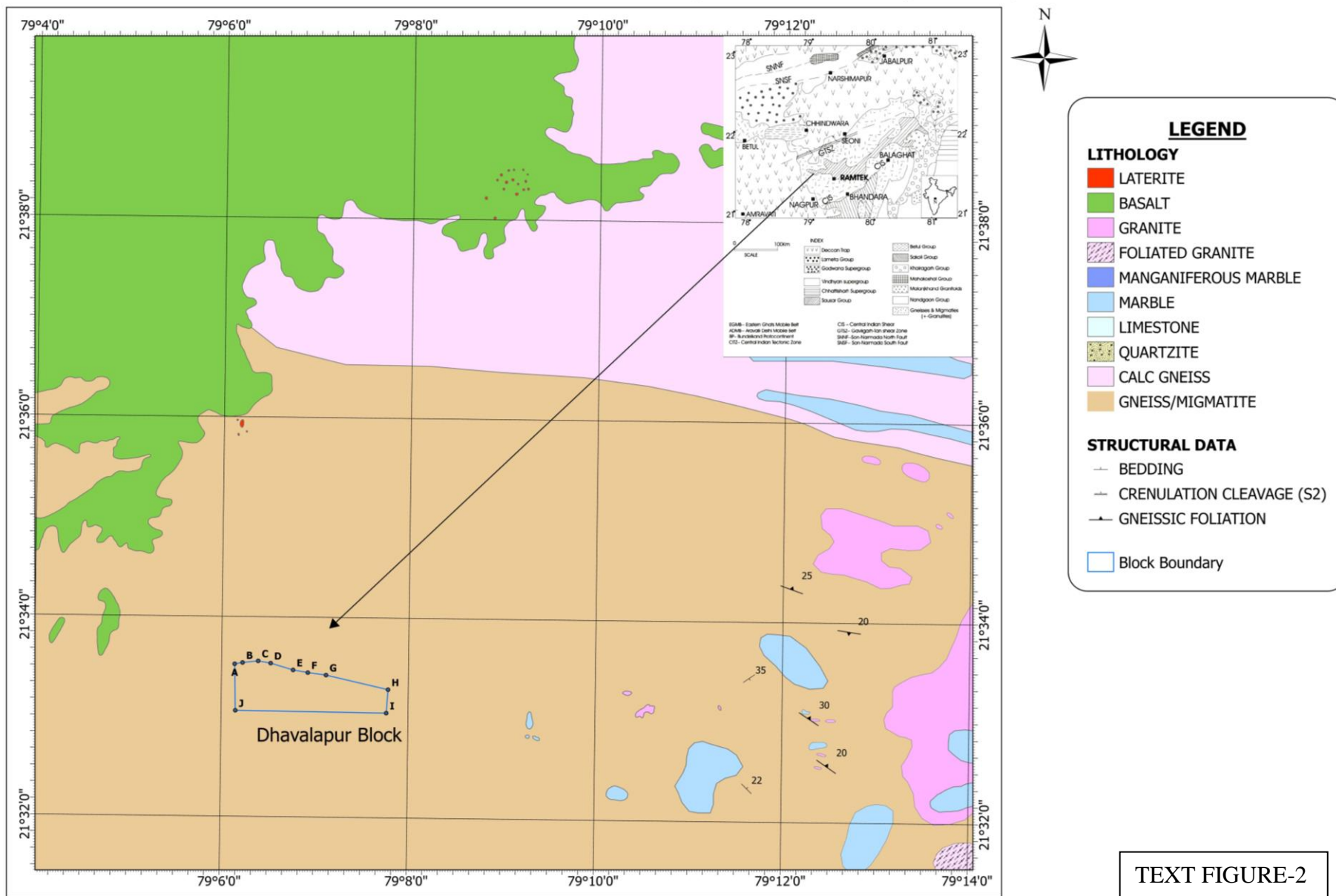
- d) Cross-Folding and Refolding Regions – Regions in which previous fold structures have been overprinted by subsequent folding movements.

7.2.3 The east-west structural trend of the Sausar Fold Belt (SFB) is a product of three principal deformation phases (D1, D2, and D3). D1 was associated with low-angle thrusting that resulted in intermixing of basement and supracrustal rocks (Chattopadhyay et al., 2001, 2003). This phase was also responsible for the generation of small-scale, tightly folded folds (F1), isoclinal to recumbent and reclined, with an associated axial planar foliation (S1). The second folding (D2) created steeply to upright, non-cylindrical folds (F2), folding the previous thrust planes as well. The third deformation (D3) created gently east-plunging upright folds (F3), further folding the previously deformed L2 lineation. A small fourth deformation (D4) episode formed weak cross-folds (F4) on a north-south trending axial plane (Chattopadhyay et al., 2003).

7.3.0 METAMORPHISM IN THE REGION

- 7.3.1 The Sausar supracrustal rocks show a metamorphic grade of greenschist-upper amphibolite facies with metamorphic intensity increasing from the east-southeast toward the northwest (Narayanswamy et al., 1963). Gneissic rocks bordering the Sausar Group from the north and south contain enclaves of pelitic and basic granulites through which is covered with low-grade amphibolite facies (Bhowmik et al., 1999).
- 7.3.2 The Sausar supracrustal rocks show a metamorphic grade of greenschist-upper amphibolite facies with metamorphic intensity increasing from the east-southeast toward the northwest (Narayanswamy et al., 1963). Gneissic rocks bordering the Sausar Group from the north and south contain enclaves of pelitic and basic granulites through which is covered with low-grade amphibolite facies (Bhowmik et al., 1999).
- 7.3.3 Geochronological studies of the Sausar Fold Belt indicate that a tectono thermal event has taken place in the time range of 850-950 Ma, as indicated by Rb-Sr whole-rock and mineral isochron dating (Roy et al., 2006). This event imprinted an upper amphibolite facies fabric obliquely across older (~1100 MA) granulite-grade foliations in the high-grade quartzo-feldspathic gneisses of the Tirodi Biotite Gneiss (TBG) suite. Thus, the Sausar Belt is the last tectonothermal event broadly related to Grenvillian in the Central Indian Tectonic Zone (CITZ), vital in reconstructing Rodinia Supercontinent.

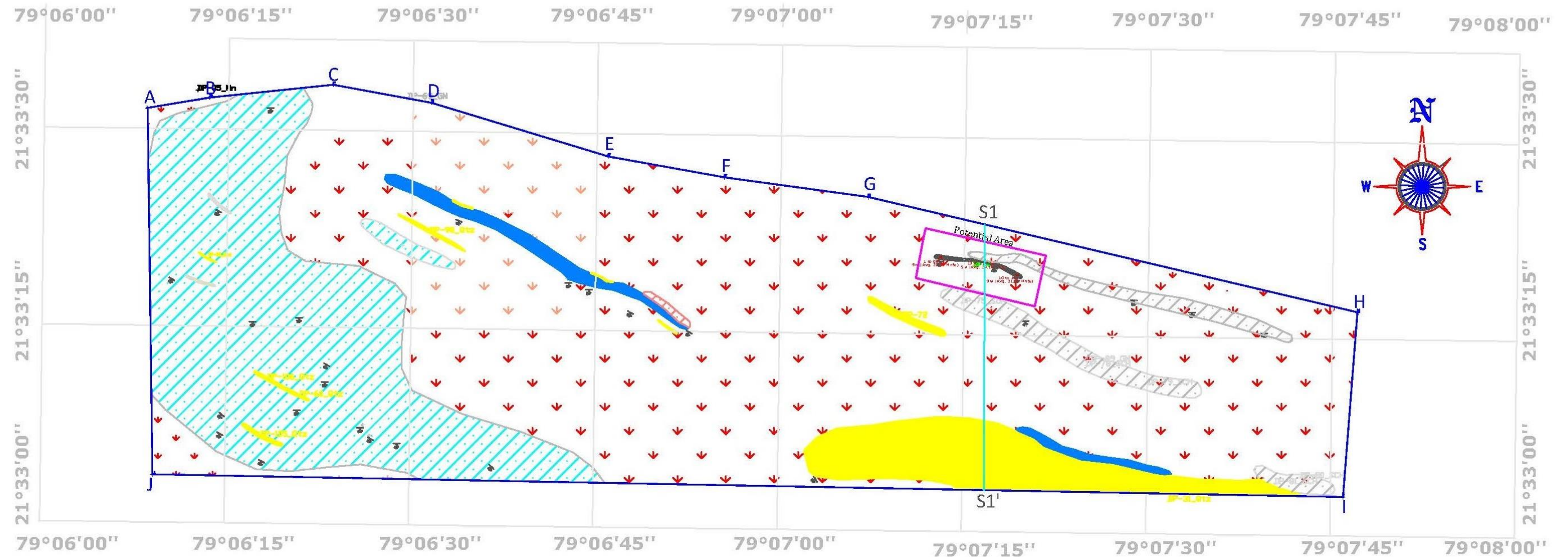
REGIONAL GEOLOGICAL MAP OF DHAVALAPUR BLOCK (2.00 Sq. Km.) FOR MANGANESE ORE (G3 STAGE), DISTRICT:- NAGPUR, MAHARASHTRA. (After GSI)















7.5.0 GEOLOGY OF THE BLOCK

- 7.5.1 The Dhavalapur Block, covering an area of 2.00 sq.km, was geologically mapped by MECL on 1:2000 scale. The majority of the area is blanketed by soil and with exposures of Granite gneiss, dolomitic marble, Quartzite and occasional Manganese Ore which belong to Mansar formation.
- 7.5.2 Generalized stratigraphy of explored block (after GSI) is given in below table 7.2. Geological map on 1:2000 scale is submitted as Plate-III and Text Figure-3.
- 7.5.3 The block is situated on the north side of Dhavalapur village. which is popularly known as Maharashtra-Madhya Pradesh manganese belt. The area is represented by cultivated land with scanty outcrops. Outcrops are seen along stream (nalla) cuttings, abandoned trench excavated in the area. The abandoned trench measures 9m x 2m x 1.5m.
- 7.5.4 The area is represented by Precambrian metasediments of sausar group which unconformably overlie the Tirodi gneisses, quartz mica schist belonging to Mansar formation along with quartz reef and manganese float are present. Also, thick soil and recent alluviums characterize the intervening areas.
- 7.5.5 The general trend of the rock in the area is WNW–ESE to E-W dips southwards. And manganese horizons also trending same WNW-ESE to E-W and southernly dipping with 40⁰-55⁰.

GEOLOGICAL MAP OF DHAVALAPUR BLOCK (OVER AN EXTENT OF 2.00 sq.km.)



INDEX			
	Block Boundary		Foliation
	Soil		Bedding
	Dolomitic Marble		Section Line
	Manganese Bearing Gondite		Potential Area
	Khondalite		
	Quartzite/Quartz vein		
	Quartz-Biotite-Schist		
	Granite Gneiss		

TEXT FIGURE-3

Table-7.2
Generalized stratigraphy of Dhavalapur Block,
Dist: Nagpur, Maharashtra.

<i>Age</i>	<i>Group</i>	<i>Lithology</i>	<i>Lithology Description</i>
Recent to Sub Recent			Alluvium/Soil
Mesoproterozoic	Intrusives	Post Sausar	Pegmatite and quartz veins
	Sausar Group	Mansar Formation	Muscovite-biotite-schist, Garnetiferous quartz biotite schist, felspathic at places. Altered Pyroxenite, Quartzite, Quartz-mica-schist, Mn ore and Gondite

7.6.0 DESCRIPTION OF ROCK TYPES

The Litho-units of Dhavalapur Block area is described below.

7.6.1 SOIL

About 60 percent of the block area is covered by soil. Soil cover within the block area varies in thickness from 1m to 5m, colour is light grey to black. The thickness of the soil is not uniform in entire block.

7.6.2 DOLOMITIC MARBLE

Regionally dolomitic marbles are part of the Sausar (also called Sausar Mobile) / Sakoli belt assemblage of central India (Precambrian to early Proterozoic mobile belt rocks) that includes metasediments, metavolcanics and intrusive bodies. The Sausar belt is recognized for calcitic and dolomitic marbles occurring as strata bound and structural lenses.

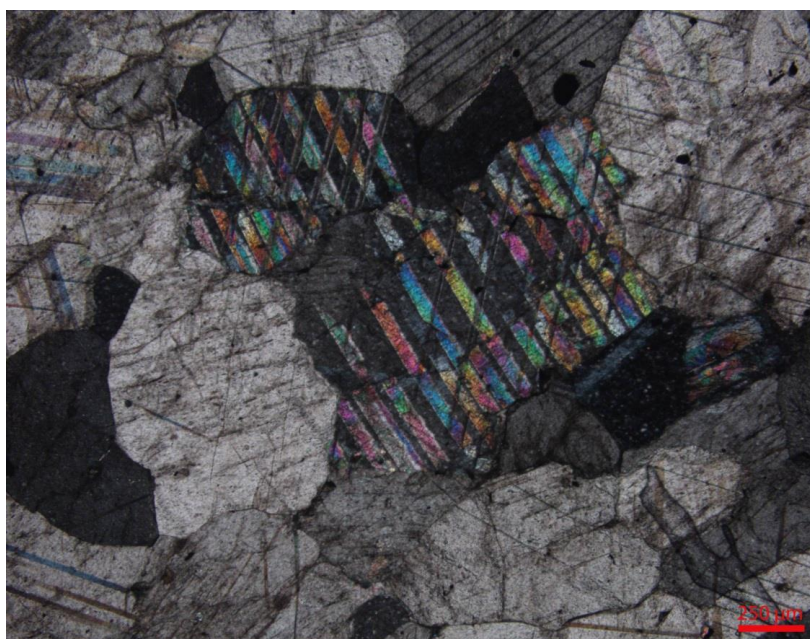
Dolomitic marble is a metamorphic rock consisting of crystalline grains of the mineral dolomite or calcite, formed under heat and pressure. Dominated by dolomite with variable amounts of calcite. Accessory minerals commonly include quartz, tremolite/actinolite or other Ca-Mg silicates (depending on metamorphic reactions and protolith impurities), phyllosilicates in interbeds, and minor iron oxides or graphite in impure bands. Petrographic variation reflects protolith chemistry.

The general strike of the dolomite marble is NW-SE and dip is south easterly. Medium- to coarse-grained, equigranular to slightly recrystallized mosaic of carbonate grains; may show granoblastic texture from metamorphism. Outcrops show foliation or banding where carbonate interleaves with silicate-rich layers.

A large exposure of Dolomitic Marble is located in the central part of the block which measures 100X10m. One bedrock sample was collected for petrographic studies and which revealed it is “Dolomitic Marble” .



Figure 1:
Photograph showing
Dolomitic Marble in central
portion of the block



Pmg - 1:
Photomicrograph depicts medium to fine subhedral to anhedral dolomitic aggregates showing sugary texture and diachroism in dolomitic marble as seen under crossed nicols.

Specimen No. : DP/PT/02

Magnification : 40X

7.6.3 GONDITE/MANGANESE MINERALISATION BAND

7.6.3.1 In Sausar group of rock, two distinct bands of manganese mineralization. In the explored block Manganese mineralization is mapped in Gondite as host rock. General trend of the mineralization is WNW-ESE with dipping due south. The Manganese body was mapped over 190m in strike length and has 7m average width, the continuation was confirmed in

the Trench (dimension 9X2X1.5m) dug by previous lease holder. Manganese floats can be found along the trench and area surrounding it.

- 7.6.3.2 Manganese typically appears as a dark grey to black silicate rock with fine to medium grain size. The mineralization is strata-bound and primarily occurs in the form of bedded ore interlayered with Gondite.
- 7.6.3.3 Within Gondite, manganese mineralization is observed as a single, discontinuous band exhibiting pinching within a 190 m strike length of the ore body. This band is separated by intervening units of quartz-muscovite-biotite schist.
- 7.6.3.4 A total 23 nos samples were collected from the mineralized zone, as channel samples cutting across the ore body and trench. A total 5 and 4 no of samples were studied for petrography and Minerography respectively.

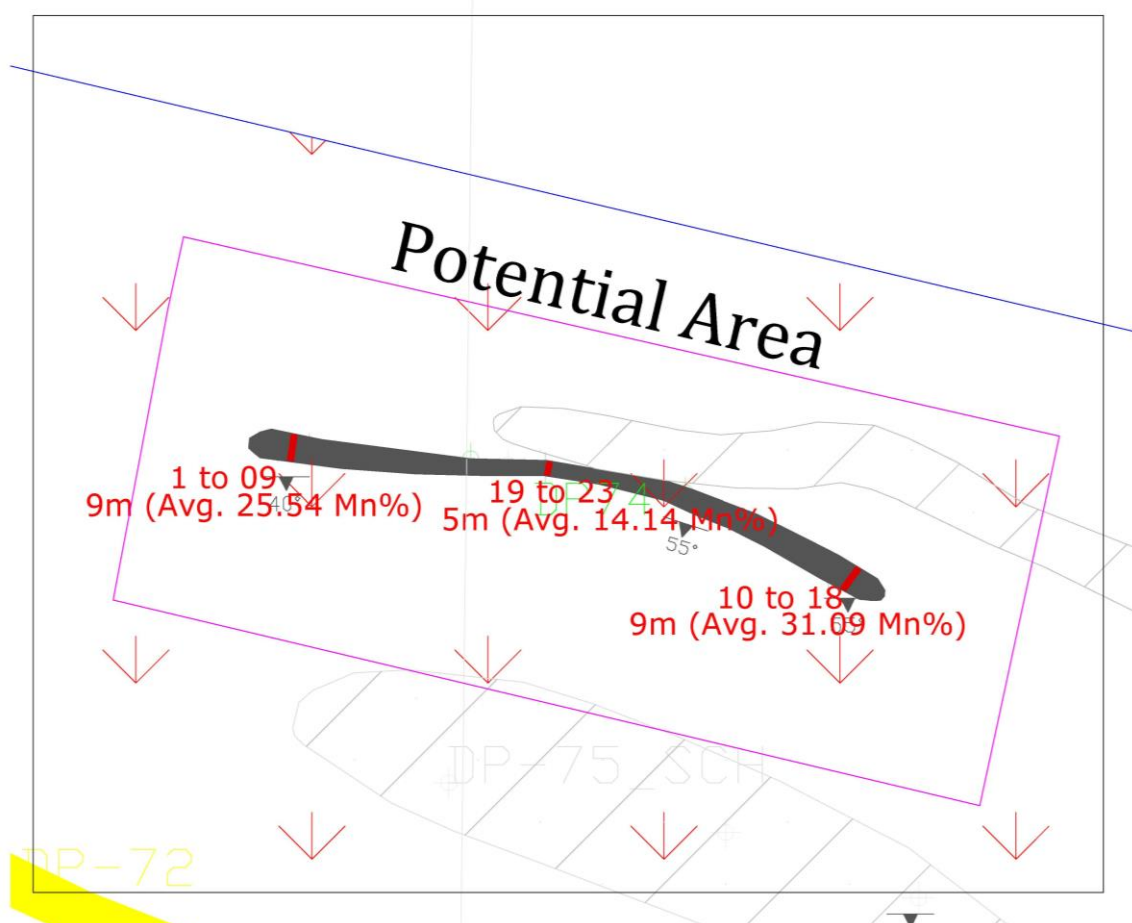


Figure 2: Photograph showing potential zone for Manganese ore mineralisation



Figure 3: Photograph showing channel sampling at existing trench

7.6.3.5 About 9 samples were studied in western margin of ore zone i.e., Old Trench area, these samples were analyzed for 6 radicals, this revealed Mn ranges from 17.63% to 33.73%.

Sample No.	Mn %	SiO ₂ %	P ₂ O ₅ %	Fe ₂ O ₃ %	MnO ₂ %	Acid Insoluble%
DP/CHN/01	23.86	43.95	1.35	9.14	16.04	64.88
DP/CHN/02	33.73	27.50	0.58	12.87	20.01	47.56
DP/CHN/03	23.63	39.71	1.11	13.55	17.30	64.90
DP/CHN/04	17.63	44.78	0.61	11.53	13.40	68.32
DP/CHN/05	24.38	34.72	0.90	13.54	20.78	59.04
DP/CHN/06	30.17	28.33	0.84	15.10	21.58	54.38
DP/CHN/07	26.82	30.48	1.07	13.49	17.07	59.32
DP/CHN/08	17.85	50.47	1.04	11.24	10.39	74.66
DP/CHN/09	31.74	21.85	0.67	17.59	25.05	42.67
Min.	17.63	21.85	0.58	9.14	10.39	42.67
Max.	33.73	50.47	1.35	17.59	25.05	74.66

7.6.3.6 About 5 samples were studied in Central margin of ore zone i.e., outcrop of Mn orebody, these samples were analyzed for 6 radicals, this revealed Mn ranges from 6.09% to 36.78%.

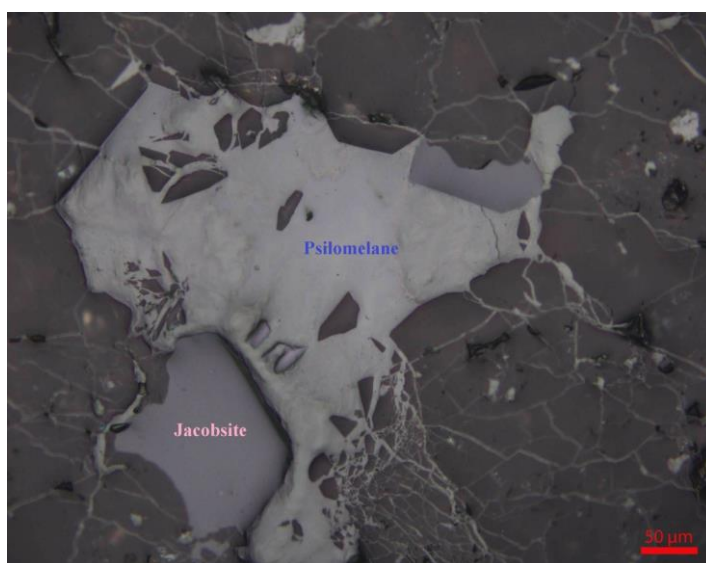
Sample No.	Mn%	SiO ₂ %	P ₂ O ₅ %	Fe ₂ O ₃ %	MnO ₂ %	Acid Insoluble%
DP/CHN/19	11.20	51.72	1.85	22.48	1.97	73.68
DP/CHN/20	14.24	62.26	1.09	10.09	5.60	82.44
DP/CHN/21	14.03	55.46	1.77	15.08	3.14	82.15
DP/CHN/22	17.09	50.47	1.67	15.31	3.95	81.83
DP/CHN/23	14.15	55.41	1.78	15.19	2.88	82.00
Min.	11.20	50.47	1.09	10.09	1.97	73.68
Max.	17.09	62.26	1.85	22.48	5.60	82.44

7.6.3.7 About 9 samples were studied in Eastern margin of ore zone i.e., outcrop Mn orebody area, these samples were analyzed for 6 radicals, this revealed Mn ranges from 11.20% to 17.09%.

Sample No.	Mn%	SiO ₂ %	P ₂ O ₅ %	Fe ₂ O ₃ %	MnO ₂ %	Acid Insoluble%
DP/CHN/10	27.73	38.47	1.02	11.36	22.64	57.29
DP/CHN/11	30.98	28.65	1.06	13.98	24.98	47.73
DP/CHN/12	36.78	15.21	0.68	15.40	29.50	34.85
DP/CHN/13	35.48	19.08	0.77	14.61	25.42	39.28
DP/CHN/14	36.26	15.45	1.12	16.05	27.35	35.63
DP/CHN/15	35.41	16.95	0.51	17.11	26.22	33.31
DP/CHN/16	34.91	20.38	1.41	15.04	33.33	39.89
DP/CHN/17	36.16	20.84	1.12	15.47	23.31	46.85
DP/CHN/18	6.09	17.44	0.33	2.64	3.75	63.57
Min.	6.09	15.21	0.33	2.64	3.75	33.31
Max.	36.78	38.47	1.41	17.11	33.33	63.57

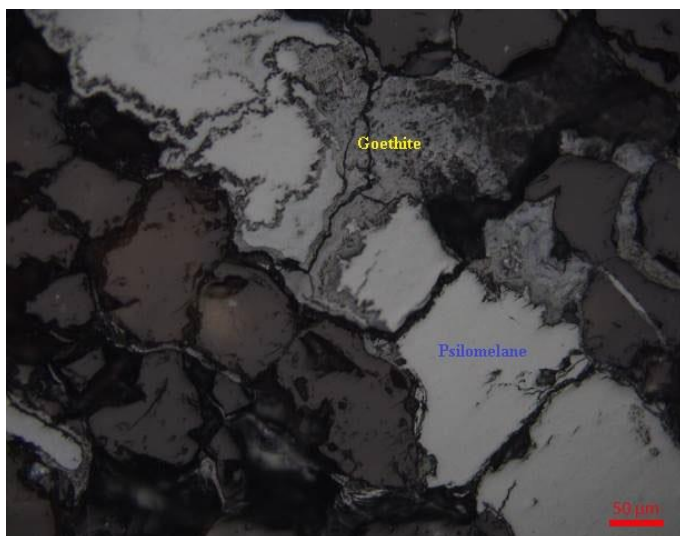
7.6.3.8 Reflected-light photomicrographs reveal **patches and very fine fillings of psilomelane containing subhedral to anhedral grains of jacobsite**, along with **psilomelane–goethite intermixed fillings**, indicating multiple stages of mineral deposition. The overall assemblage is **dominated by pyrolusite**, with psilomelane, jacobsite, and goethite representing primary metamorphic phases overprinted by supergene oxidation and late-stage hydrothermal activity.

7.6.3.9 The detailed report of Mineragraphic study is presented in Annexure-IV.



Pmg – 3: Photomicrograph showing patches and very fine fillings of psilomelane and associated subhedral to anhedral grains of jacobsite as seen under reflected light.

Specimen No. : DP/MG/01 Magnification : 200X



Pmg – 4: Photomicrograph showing psilomelane-goethite intermixed fillings as seen under reflected light.

Specimen No. : DP/MG/03

Magnification : 200X

7.7.0 KHONDALITE

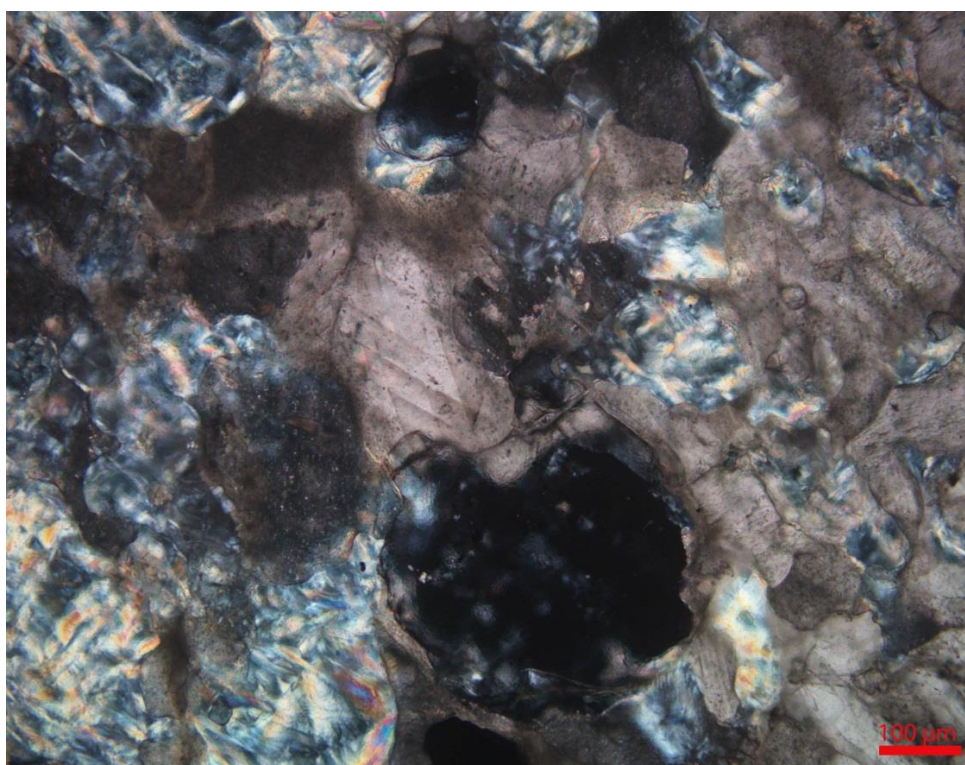
Khondalite is a high-grade, foliated metasedimentary rock type typically described as a garnet–sillimanite–quartz (\pm feldspar, \pm graphite, \pm Fe–Ti oxides) gneiss or schist. Model proportions vary: some bodies are quartz-rich with abundant sillimanite; others are garnetiferous biotite gneisses. Quartz, sillimanite (needle-like), garnet (almandine-type commonly), K-feldspar/plagioclase in places, biotite; accessory magnetite/ilmenite, rutile, zircon, monazite and occasional graphite. Grain sizes are commonly millimetric; foliation is usually subparallel to original sedimentary layering and may be folded or migmatitic locally. Khondalitic lithologies are mapped near quartzite–manganese occurrences.

Khondalite exposures occur in the central part of the block alongside of the Dolomitic Marble. The trend of the Khondalite is WNW-ESE and foliation towards southernly. A medium to coarse grained, banded, garnet-sillimanite-quartz-feldspar gneiss, often with a shiny surface due to mica/sillimanite. Banded or foliated; alignment of mica/sillimanite gives a schistose to gneissic look. Khondalite is reddish to brown in colour.

An outcrop sample DP/PT/03 was collected from the central portion of the block and subjected to petrographic study, which confirmed that the specimen is “Khondalite”.



Figure 4: Photograph showing of Khondalite exposure in agriculture field in central part of the block area



Pmg – 2: Photomicrograph showing association of calcite, antigorite and minor garnet in calcite-antigorite rich rock/ altered meta-calc silicate as seen under crossed nicols.
Specimen No.: DP/PT/04 **Magnification: 100X**

7.8.0 QUARTZITE

Quartzite belongs to the Precambrian Sausar Group, occurring as hard, compact, metamorphosed quartz-rich ridges interbedded with schists, calc-silicates, and Gondites. They are regionally metamorphosed sandstones, typically resistant and ridge-forming, playing both a stratigraphic and geomorphological role in the Sausar belt and forming an important part of the framework enclosing manganese ore deposits.

The Sausar belt extends through Ramtek, Saoner, Parseoni, and Mansar areas, where quartzites form prominent ridges and hill ranges. It is dominantly quartz grains (90–95%) recrystallised under regional metamorphism, making the rock very hard and compact. Fine to medium-grained, saccharoidal in some places, with a sugary appearance due to interlocking quartz crystals. Quartzites are highly jointed and foliated in places, reflecting deformation during the regional tectonic events that also folded the Sausar Group. They commonly show banding (alternate micaceous/quartz-rich layers).



Figure 5: Photograph showing big exposures of Quartzite in Southeastern part of the block

In south eastern part of the block, there is small ridge, whose dimensions are 1000m x 70m complete Quartzite exposures. The trend of the exposures is E-W and sub vertical dipping towards southernly.

An outcrop sample DP/PT/01 was collected from the south eastern portion of the block and petrographically studied, which confirmed that the specimen is “Quartzite”.

7.9.0 QUARTZ-BIOTITE-SCHIST

Mos the exploration bloc is covered by soil, which is underlain by Quartz-Biotite-Schist.

The quartz-biotite-schist is a metasedimentary rock characterized by its schistosity (parallel alignment of platy minerals) and a mineral assemblage dominated by quartz and biotite. The trend of the Quartz-Biotite-Schist rock in the block is WNW-ESE and foliation towards southernly. Fine- to medium-grained quartz matrix and tabular biotite and light grey to black in colour. It has occurred in near the Manganese bearing Gondite in the Potential area. It has mostly observed in the nala cutting with highly weathered.



Figure 6: Photograph showing of exposure of Quartz-Biotite-Schist in the block area

7.9.0 GRANITE GNEISS

The granite gneiss forms the Archaean–Proterozoic crystalline basement to the Sausar metasediments. It is a quartz–feldspar–biotite–hornblende gneiss, strongly foliated, regionally metamorphosed, and structurally deformed, with local migmatitic patches. It is widespread in the Ramtek–Saoner–Parseoni–Mansar belt, underlying manganese-bearing horizons, and plays a key role in the regional geology.

The big outcrops of Granite Greiss located are in western part of the block and some exposures are found in the eastern part of the block. The general strike of the Granite Greiss is E-W and dip is southernly.

An outcrop sample DP/PT/05 was collected from the western portion of the block and subjected to petrographic study, which confirmed that the specimen is “Granite Gneiss”.



Figure 7: Photograph showing of multiple folds in Migmatite in the block area

7.10.0 BLOCK STRUCTURE AND MINERALIZATION

The manganese deposit occurs as a strata-bound lens within Gondite, structurally aligned along a WNW–ESE to E–W strike and dipping 40°–55° southward.

7.11.0 BEDDING AND DIP CHARACTERISTICS

The strike aligns WNW–ESE to E–W with regional structural trends observed in the surrounding sedimentary basins.

7.11.1 Fracturing and Jointing

Surface exposures of Granite Gneiss show well-developed joint sets, often orthogonal to the bedding planes.

7.12.0 MINERALISATION IN THE BLOCK

- 7.12.1 The manganese ore in Dhavalapur block occurs largely in the Pre-Cambrian rocks (notably the Gondite series / Sausar group), which are metamorphosed manganeseiferous sediment. These ore bodies are often lenticular or in bands / lenses, intercalated in quartzites, schists, gneisses. Often aligned more or less parallel to the strike of the enclosing formations.
- 7.12.2 Sausar Group is well known for the manganese ore deposits, mainly within the Mansar Formation, hosting the syngenetic strata bound mineralisation. The manganese ore horizon is composed of inter banded manganese ore minerals or layer of gondite. Gondite occurs as massive as well as banded and composed of mainly quartz, spessartite and rhodonite with some manganese amphibole (cummingtonite).
- 7.12.3 The manganese mineralization is strongly structurally controlled, occurring as a strata-bound, bedded lens within the Gondite that trends WNW–ESE to E–W and dips 40°–55° to the south. This geometry—combined with the observed pinching and swelling of the ore band—points to deposition along a competent stratigraphic horizon later modified by folding and layer-parallel shearing; along fold hinges where fold axis is parallel to general strike of Mn mineralization is concentrated as thin bands., while south-dipping foliation favours down-dip continuation of mineralization. Minor fractures and cleavage, oblique to the main foliation, provided pathways for late-stage fluids and supergene oxidation, producing the psilomelane–goethite fillings and secondary enrichment seen in minerography.

CHAPTER 8

8.0.0 PREVIOUS WORK

8.1.0 DETAILS OF PREVIOUS EXPLORATION CARRIED OUT BY OTHER AGENCIES/PARTIES

- 8.1.1 The Dhavalapur block is lapsed lease area by State Government of Maharashtra, which was granted as per section 10(A) 2(B) of the MMDR Act-15. The block was granted to Shri Amol B. Nagpure during 24/09/2004 to 23/09/2006 for 2 years.
- 8.1.2 The earliest mention of manganese ore is by Jenkin (1833) and Voysey (1833) dealing with the geology and mineralogy of the Nagpur area, Central provinces.
- 8.1.3 Dutta (Fermor 1909) discovered several manganese ore deposit in Bhandara district. Fremor (1909) was the first to describe in detail the deposits in the entire manganese belt in his memoir, "The manganese ore deposits of India".
- 8.1.4 The area witnessed mining activity from the beginning of the 18 th century. The activity was at the peak during world war-II period. Further, the mining has been at its lowest ebb or came to an almost standstill during peace time and the prospects were abandoned possibly due to impoverishment in grade, sharp decline in prices and shallow depth persistence.
- 8.1.5 Fermor (1909) Dunn (1936) Basu 1964) Deshpande (1960) Roy (1961) 66, 68) D. J. Dasgupta et al (1984) Pal and Bhowmik (1995) and others have discussed the mineralogical and para genetic aspect of Manganese ore and Gondite (Gondite is a rock aggregate of manganese bearing minerals along with quartz and garnets).
- 8.1.6 Among the Private entrepreneurs who have worked in the manganese belt includes M/s Shanti Narang, M/s. Khemka Brothers and Shri C.K. Ram Choudhary who quarried the ore in Ramtek Mahuli-June Parseoni area which is nearby to the block.
- 8.1.7 Meshram et al. (2001) have studied and assessed manganese ore in Gugaldoh block in Ramtek tehsil.
- 8.1.8 MOIL has done exploration in this manganese belt in its lease area. MOIL has many underground and open cast mines of manganese are present in the nearby area.
- 8.1.9 Shri Amol B. Nagpure has carried out the prospecting in the area involving 5 pits and 2 trenches. They have analysed 7 no. of samples for manganese mineralisation in which MnO_2 ranges from 23.99 to 35.87% and Mn from 15.16 to 22.66. They have estimated 0.9 million tonnes manganese ore resources and mined out 200 tonnes of manganese ore with 25 to 30% MnO_2 during exploratory mining.
- 8.1.10 MECL studied the data provided by the DGM, Maharashtra and carried out the field visit

in and around the Dhavalapur area. The geologist team studied the area and observed the surface indication of the manganese mineralisation in block area. collected 5 no. of samples of gondite with manganese ore, which ranges from 23.55 to 32.25% Mn.

Sample No.	Grade (Mn %)
DH-1	23.96
DH-2	23.55
DH-3	27.13
DH-4	29.56
DH-5	32.25

CHAPTER - 9

9.0.0 AERIAL GROUND GEOPHYSICAL, GEOCHEMICAL EXPLORATION

9.1.0 During present investigation no Aerial, ground geophysical, geochemical exploration has been carried out.

CHAPTER - 10

10.0.0 EXPLORATION UNDERTAKEN DURING CURRENT INVESTIGATION

10.1.0 INTRODUCTION

- 10.1.1 The Dhavalapur Block falls in Survey of India Toposheet No. 55 O/2. Dhavalapur, Sawangi, Narhar, Ambazari and Banera are villages in and around the block which belongs to Tahsil – Parseoni District - Nagpur, State - Maharashtra.
- 10.1.2 The Dhavalapur Block has been proposed on the basis of lapsed lease areas identified by the State Government of Maharashtra, which were originally granted under Section 10A(2)(b) of the MMDR Act, 2015. However, following the 2021 amendment to the Act, all such Prospecting License (PL) reports were declared ineligible, mandating allocation through auction. Further, these PL reports are required to be evaluated to confirm the level of mineral evidence (G4, G3, etc.) as per the provisions of the Minerals (Evidence of Mineral Contents) Rules, 2015.
- 10.1.3 The Directorate of Geology and Mining (DGM), Government of Maharashtra, requested MECL to take up the exploration in lapsed 10A(2)(b) lease mining lease areas vide letter no. Tech/1848/2023/3938, Dated 22/12/2023.
- 10.1.4 MECL formulated exploration proposal involving 1000m drilling in 14 boreholes at G3 level of exploration in and around Dhavalapur villages of Tahsil Parseoni, District Nagpur, Maharashtra.
- 10.1.5 Exploration Proposal (G3) for Dhavalapur Block (2.00 sq.km.) was submitted and deliberated in 64th TCC-1 meeting held on 25th, 29th & 30th April 2024. Committee, noted 10A(2)(b) cases and request of Govt. of Maharashtra for exploration of these PL areas through MECL. Accordingly, 64th TCC-1 committee recommended the project proposal titled as “Preliminary Exploration (G3 Level) for Manganese Ore in Dhavalapur Block (2.00 sq.km), Nagpur District, Maharashtra”.
- 10.1.6 On recommendation of 64th TCC-1, 35th Executive committee (EC), NMEDT meeting held on 16th May 2024 and approved the block, vide letter no F.No. 23/458/2024-NMEDT/121, Dated 10th June, 2024 approved the project with cost of ₹ 231.60 lakhs.

10.2.0 OBJECTIVES OF INVESTIGATION

- 10.2.1 The preliminary exploration was proposed with following objectives in Dhavalapur Block are as follows:

(a) To carry out detailed Topographical Survey and Geological mapping on 1:2000

scale over an extent of 2.00 sq.km.

(b) To delineate the strike and depth continuity of the Manganese Ore by drilling of vertical boreholes of 14 numbers on 200m strike interval.

(c) To carry out exploration as per Minerals (Evidence of Mineral Contents) Rule-2015 (Amended 2021) & Mineral (Auction) Rules-2015 (Amendments).

(d) The proposed exploration programme will demarcate Manganese Ore zones of various grades, as per UNFC norms and estimation of Manganese Ore resources which in turn will facilitate the State Govt. for auctioning of the block.

10.3.0 DETAILS OF WORK

10.3.1 After receipt of approval from NMEDT, MECL has carried out exploration activities like geological mapping and geochemical sampling in Dhavalapur Block. The details, nature and quantum of work proposed Vs achievement is given below

Table No. 10.1
Quantum of Work for Proposed Vs Achieved in Dhavalapur Block

Sl. No.	Item of Work	Unit	Target	Achieved
1	Geological Mapping on 1:2000 scale (200 Ha)	sq.km	2	2
2	Topographic Survey on 1:2000 scale (200 Ha)	sq.km	2	Nil
3	Boundary and borehole demarcation with DGPS	Nos	24	Nil
4	Exploratory Drilling	m.	1000 (14 Bhs)	Nil
5	Laboratory Studies			
	i) Chemical Analysis; Primary samples for 6 radicals, Mn, SiO ₂ , P ₂ O ₅ , Fe ₂ O ₃ , MnO ₂ and Insolubles. (BRS and Borehole core samples) by XRF	Nos.	270	23
	ii) External Check (NABL) samples (10% of Primary samples) for 6 radicals, Mn, SiO ₂ , P ₂ O ₅ , Fe ₂ O ₃ , MnO ₂ and Insolubles by XRF	Nos.	27	Nil
6	Physical Studies			
	b) Petrological Studies	Nos.	10	5
	b) Mineragraphic Studies	Nos.	10	4
	c) Bulk Density	Nos.	10	Nil
	d) Digital Photographs	Nos.	10	3
7	Report Preparation (5 Hard copies with one soft copy)	Nos.	1	1

10.4.0 EXPLORATION ACTIVITIES TAKEN UP

- 10.4.1 Exploration activities viz., Geological Mapping with 1:2000 scale and geochemical sampling were carried out along with associated analytical works.
- 10.4.2 MECL commenced geological mapping and geochemical sampling on 15.06.2024 and completed on 30.09.2024.
- 10.4.3 Geological mapping was carried out at 1:2,000 scale for the entire area of 2.00 sq. km. depicting the lithology, structure, and surface mineralization signatures. Broad lithological units and litho-contacts have been mapped with the help of handheld GPS. Attitude and structural features of rocks like bedding, folds and joints has been recorded by Brunton Compass. General Strike of the litho-units WNW-ESE to E-W with dip angle 40°–55° due southernly. The readings recorded in the field were plotted in the geological map and submitted as (Plate III).
- 10.4.4 The analytical / laboratory studies were carried out in laboratories of MECL, Nagpur (NABL accredited laboratory).

10.5.0 DETAILS OF SURFACE SAMPLING, DRILLING ETC.

- 10.5.1 Geologists from MECL has undertaken pre field visit in the proposed area for preparing exploration proposal, during the visit about 5 nos. of samples were collected and analyzed for 6 elements.
- 10.5.2 MECL has collected 5 no. of bedrock samples in the block for petrographic studies and 4 samples for Mineragraphic studies.
- 10.5.3 Total 23 numbers of bed rock / channel samples are collected from Manganese bearing Gondite, which were analysed for 6 radicals i.e., Mn, SiO₂, P₂O₅, Fe₂O₃, MnO₂ and Insolubles by XRF method and compiled as Annexure-II.
- 10.5.4 A total of 5 no. of samples were studied for petrological and 4 no. of samples for Mineragraphic study, which is enclosed as Annexure-III and IV respectively.

CHAPTER - 11

11.0.0 LOCATION DATA POINTS

11.1.0 ACCURACY AND QUALITY OF SURVEY USED TO LOCATE BLOCK BOUNDARY AND DRILL HOLES

11.1.1 During present investigation no topographical survey has been carried out.

During the exploration program all the sample points were noted on hand held GPS (Model: BAP Precession, Make: Trimble).

CHAPTER – 12

12.0.0 SAMPLING TECHNIQUES

12.1.0 NATURE AND QUALITY OF SAMPLING AND MEASURES TAKEN TO ENSURE SAMPLE REPRESENTATIVITY

- 12.1.1 The present work has been formulated to undertake Preliminary Exploration (G3 stage) for Manganese Ore in the Dhavalapur Block. Given that nearly 60% of the block is soil covered with scanty outcrops, exploration was largely dependent on subsurface core drilling, but exploratory drilling work has not been carried out due to not getting of forest clearance of the block.
- 12.1.2 A total of 23 bed rock /channel samples were collected and analysed for 6 radicals, Mn, SiO₂, P₂O₅, Fe₂O₃, MnO₂ and Insolubles by XRF method. Further 5 no. of surface samples were studied for petrological and 4 no. of samples for Mineragraphic study.
- 12.1.3 Geochemical sampling work has been carried out in the presence of qualified geologist and sampling technician. Geologist marked the Manganese Ore for sample preparation and under supervision of sampling technician sample was generated.

CHAPTER – 13

13.0.0 DRILLING TECHNIQUES AND DRILL SAMPLING EMPLOYED

13.1.0 During present investigation no exploratory drilling has been carried out.

CHAPTER – 14

14.0.0 SUB SAMPLING TECHNIQUES AND SAMPLE PREPARATIONS

14.1.0 WHETHER CUT OR DRAWN AND WHETHER QUARTER, HALF OR ALL CORE TAKEN

14.1.1 Laboratory Procedure for samples: The chemical analyses of bed rock samples (BRS) have been carried out in MECL's Chemical laboratory for determining Mn, SiO₂, P₂O₅, Fe₂O₃, MnO₂ and Insolubles by XRF.

14.1.2 Sampling has been carried out for Manganese bearing formation from the surface. Samples were marked and drawn from across the Manganese ore mapped. The bedrock samples, whole sample crushed to (-) 200 mesh size and about 500g representative sample of (-) 200 mesh was drawn by coning and quartering method of gradual size reduction with the help of crusher and pulveriser. Out of 500gm, 100gm each were drawn for Primary Chemical analysis of 6 radicals (Mn, SiO₂, P₂O₅, Fe₂O₃, MnO₂ and Insolubles) at Chemical Laboratory, MECL Nagpur. The remaining 400g fraction was kept for future reference purpose.

14.2.0 NATURE, QUALITY AND APPROPRIATENESS OF THE SAMPLE PREPARATION TECHNIQUE

14.2.1 The details of sampling procedure for primary samples are described in para

14.2.2 Quality of the sample preparation is maintained by proper cleaning, maintenance of the equipment and proper crushing, sieving and coning and quartering of samples. For sample preparation, proper technique and expertise has been used.

14.2.3 The adopted methodology is consistent with standard exploration practices prescribed by NMEDT and international sampling protocols (e.g., UNFC). The inclusion of external check samples further strengthens the QA/QC framework, ensuring analytical accuracy and comparability.

14.3.0 QUALITY CONTROL PROCEDURES ADOPTED

14.3.1 Systematic quality control measures were implemented throughout the exploration program to ensure the reliability and accuracy of results. The bed rock samples of Manganese ore were collected on surface and prepared at a centralized mechanized sampling unit under the strict supervision of qualified sampling technicians, following standard sampling protocols. Similarly, BRS samples were collected at controlled intervals of approximately 1 m or along lithological boundaries. Each sample was

properly sealed, labeled, and documented with length with coordinates to establish a clear chain of custody.

14.4.0 MEASURES TAKEN TO ENSURE THE SAMPLING IS REPRESENTATIVE OF THE IN-SITU MATERIAL COLLECTED

14.4.1 All the BRS samples of Manganese ore have been collected and prepared. These Manganese ore zones are subjected for preparation of samples as per the sampling procedure for bedrock samples are described in Para 14.1.2. The representative samples have been collected from the in-situ materials.

14.5.0 WHETHER SAMPLE SIZES ARE APPROPRIATE TO THE GRAIN SIZE OF THE MATERIAL BEING SAMPLED

14.5.1 The BRS samples have been prepared (-) 200 mesh size. As per the previous studies in the area, (-) 200 mesh size is appropriate for the analysis of Manganese Ore etc. mineralization in the block area.

CHAPTER - 15

15.0.0 QUALITY OF ASSAY DATA AND LABORATORY TESTS

15.1.0 THE NATURE, QUALITY AND APPROPRIATENESS OF THE ASSAYING AND LABORATORY PROCEDURES

15.1.1 The bed rock /channel samples from Manganese Ore mineralized zones have been analyzed for 6 radicals i.e. Mn, SiO₂, P₂O₅, Fe₂O₃, MnO₂ and Insolubles by XRF method in Chemical Laboratory of MECL, Nagpur.

15.2.0 STANDARD OPERATING PROCEDURE (SOP) FOR THE ANALYSIS BY MECL LAB, NAGPUR

15.2.1 The assaying and laboratory procedures adopted in the present exploration program were designed to ensure accuracy, reliability and scientific appropriateness of results in line with standard mineral exploration practices.

SOP for Chemical analysis carried out by XRF pellet method.

- (a) Sample Particle Size: The Sample is ground to a particle size <75μm, but <50μm is ideal.
- (b) Sample preparation: Pellets preparation - The process of making pressed pellets for XRF analysis includes grinding the sample to fine particle size and pressing the sample at pressure of between 15 to 35 ton.
- (c) Instrumentation procedure
 - (i) X-ray irradiates the sample, (ii) Sample emits secondary X-ray characteristic of a particular element. (iii) Analyzing sample rotates to accurately diffract each wavelength and satisfy Bragg's Law. (iv) Detector measures position and intensity of XRF peaks.



Figure 8: Photograph of WD- XRF instrument (Rigaku, Japan)
at Chemical Lab, MECL, Nagpur.

15.2.0 STANDARD OPERATING PROCEDURE (SOP) FOR THE DETERMINATION OF LOSS ON IGNITION (L.O.I.) AT MECL LAB.

Procedure:

1. Weigh 1 gm of dry sample in silica or platinum crucible.
2. Place this crucible in muffle furnace at a temperature below 300°C. Raise the temperature of the furnace to 1000°C. Keep this at this temperature for about 30 minutes.
3. Cool the crucible in desiccators and weigh the crucible.
4. Find the loss in weight.
5. % Loss on Ignition (LOI) = (Loss in weight / Weight of the sample) x 100.

15.3.0 STANDARD OPERATING PROCEDURE (SOP) FOR THE ANALYSIS BY JNARDDC, NAGPUR

15.3.1 Following Procedure followed for XRF pellet method with preparation sample pellet from homogenized 100gm sample with hydraulic compressor, following are steps followed

1. XRF (Model- Axiosm Ax, Make-Panalytical).
2. CRM used- NCSDC-16006.
3. Procedure for Preparation of Pellets by Hydraulic Press:

4. For XRF measurement a sample must be homogenized, pulverized to -200 mesh and pressed into pellet.
5. Weigh accurately 5 gm of sample and used 10 gm of boric acid as a binder.
6. Press the sample at a pressure of around 20-22 tons on a hydraulic press (Pallet Making Machine) with a diameter of 40 mm.
7. Calibrate the XRF equipment using known standards for elements present in Manganese Ore (Calcium, Magnesium etc.).
8. Ensure the instrument is set up correctly according to standard guidelines
9. Place the prepared pellet into the sample holder.
10. Ensure the sample cup is positioned correctly in the instrument for carrying out analysis.
11. Start the XRF analysis using software and initiate the analysis process automatically.
12. Allow the XRF instrument to scan the sample. It will emit X-rays onto the sample, causing the atoms to emit fluorescence.
13. Record the results in a report, including elemental concentrations and any relevant information about the analysis conditions.
14. Intermediate check also performed using bead with inbuilt software.

15.3.2 Procedure for determination of LOSS ON IGNITION (LOI).

Weighed quantity of sample (duly dried at 110°C) is placed in platinum crucible and heated to 1000°C for about an hour. Sample is again weighed after it is cooled. Difference in weight expressed in percentage as LOI.

15.4.0 NATURE OF QUALITY CONTROL PROCEDURES ADOPTED

15.4.1 In order to ensure the accuracy of the analysed samples, BCS-CRM No. 393 has been used as certified reference material (CRM) for Manganese Ore and NCS DC 28201 has been used as CRM for dolomite at Chemical lab, MECL. The Certified Reference Material (CRM) was processed under similar conditions as samples and run after every 20 samples.

15.4.2 Quality control (QC) ensures accuracy, precision, and reliability of analytical results in XRF Analysis. It involves systematic procedures to monitor and maintain data integrity. Running blanks, duplicates, and CRMs after every 20 samples ensures data quality, detects contamination, checks precision, and validates accuracy, which are critical for reliable XRF results.

15.5.0 SECURITY AND CHAIN OF CONTROL OF SAMPLES SHOULD BE CLEARLY MENTIONED.

15.5.1 The samples have been prepared at centralized mechanized sampling unit with proper labelling and tag and sent to chemical laboratory in supervision of qualified sampling technician. At the sampling unit, standard procedure has been followed and all the precautionary measures have been taken to avoid the contamination. The MECL sampling unit in Nagpur is part of the chemical laboratory.

15.5.2 Sample collection – under supervision of qualified geologist

Type of sample collection	Supervision
Bedrock/Soil/Stream	Qualified Geologist
Pitting Sample	N/A
Drill Core Sample Marking	N/A
Sample processing. Packing, labelling	Sample Technician
Analysis	Assistant Manager Chemical Lab
Sampling unit/Chemical Lab	Manager Chemical Lab

CHAPTER – 16

16.0.0 MOISTURE

16.1.0 All the analysis of bed rock samples has been carried out with in-situ moisture.

CHAPTER – 17

17.0.0 BULK DENSITY

17.1.0 BULK DENSITY ANALYSIS DETAILS

17.1.1 During present investigation no bulk density determination has been carried out.

CHAPTER – 18

18.0.0 BENEFICIATION STUDIES

18.1.0 Beneficiation studies have not been carried out in the present level of exploration.

CHAPTER – 19

19.0.0 RESOURCE ESTIMATION TECHNIQUE

19.1.0 The resources have been estimated with considering only outcrop mapping and geochemical data and no exploratory drilling was carried out, hence drilling data is not available.

CHAPTER – 20

20.0.0 RESOURCE ESTIMATION TECHNIQUE

20.1.0 GENERAL

20.1.1 Estimation of geological resources is the scientific and technical process of determining the quantity, quality, and economic value. Following data was considered for resource estimation (1) Geological mapping (2) Geochemical sampling (3) Chemical analysis and collecting of geological data of adjacent areas.

20.1.2 Grades and resources were categorized based on end-use grade classification given by IBM threshold in following categories for Manganese Ore.

Resources have been estimated by polygonal method as per MEMC Rules 2015 (Amended 2021) and placed under Inferred Resources category (334).

20.2.0 EVALUATION OF MINERALISATION ZONES

20.2.1 The evaluation of mineralization zones in the Dhavalapur Block has been carried out on the basis geochemical sampling and subsequent laboratory analysis. Manganese Ore is confined to the north eastern part of the explored area.

20.2.2 A total 23 samples were collected from 3 mineralized zones from Manganese ore outcrop, the strike length of Manganese ore body is 190m. average width is 7m.

20.2.3 It is noted that threshold grade Manganese Ore is interbedded within Gondite as lensoid whose widths are 9.00m, 5m and 9m. Manganese Ore is confined to the north eastern part of the explored area.

20.2.4 9 no. of channel samples were collected from western end of the Manganese ore body, 5 no. of channel samples collected from middle of the ore body and 9 no. of channel samples collected from eastern end of the Manganese Ore body. All three channels are shown in the geological map of the Dhavalapur block (Plate-III) and Figure-and the chemical analysis are presented in Annexure-II.

20.3.0 RESOURCES ESTIMATION METHODS

20.3.1 Manganese Ore outcrops occur as steep dipping body in the block area, strike in direction of WNW- ESE to E-W with varying dips of 40° to 55° southernly, the depth of the Manganese ore body assumed 20m depth were to estimate Manganese Ore resources up to a vertical depth of 20mRL. Manganese Ore resources were estimated by classical method.

20.4.0 ASSUMPTIONS FOR RESOURCE ESTIMATION

20.4.1 Resource was computed by simple classical method as per MEMC Rule, 2015 (Amended 2021). Certain axiomatic assumptions are inherently involved in estimating resource of a deposit, are given below:

20.4.2 For Manganese Ore resources, Threshold grade Manganese Ore is taken into consideration.

20.4.3 Minimum outcrop thickness of 2m for the demarcated grade was considered for resource estimation.

20.4.4 The specific gravity test was not carried in the present stage of exploration in the block. The specific gravity of Manganese Ore has been considered as 3.10 gm/cc for resources estimation. The specific gravity 3.10 gm/cc has been taken from the nearest block i.e. Nagardhan block, which is 50 km far from the block.

20.5.0 PARAMETERS OF RESOURCE ESTIMATION

20.5.1 CUT-OFF GRADE

Resources estimated for Manganese Ore with surface data as per IBM threshold grade classification i.e. 10% Mn.

20.5.2 SPECIFIC GRAVITY

The specific gravity 3.10 gr/cc has been considered for estimation of resources.

20.6.0 METHODOLOGY

The resources of Manganese Ore have been estimated by classical method as per MEMC rules, 2015 (Amended 2021). The methodology adopted, keeping the above assumptions in view, for resource estimation are described further.

The formula of resource estimation is as follows:

$$R = L \times W \times D \times \text{Specific Gravity}$$

Where, L = Strike Length of Mn Orebody

W = Average Width of Mn Orebody

D = Depth Continuity of Deposit

R = Resource/ Tonnage.

CHAPTER - 21

21.0.0 REPORTING OF RESOURCES

21.1.0 RESOURCE ESTIMATION

21.1.1 Resources are estimated by simple classical method.

21.1.2 Strike length of the Mn ore body is 190m, average width of the Mn ore body is 7m and probable depth continuity of ore body is 20m and specific gravity is 3.10 gr/cc are considered for estimation of resources of Dhavalapur block.

Length (m)	Width (m)	Depth (m)	Specific Gravity (gr/cc)	Resources (Tonnes)	Average Grade
190	7	20	3.10	82460	25.23% Mn.

21.1.3 A total 82460 tonnes of resources of Threshold Grade Manganese Ore resources estimated with an average grade of 25.23% Mn, 17.20% MnO₂, & 34.33% SiO₂.

CHAPTER – 22

22.0.0 SUMMARY AND RECOMMENDATIONS

22.1.0 SUMMARY

22.1.1 The Dhavalapur Block over an area of 2.00 sq.km, is bounded by Latitude 21°33'02.99" N to 21°33'33.48" N and Longitude 79°06'08.39" E to 79°07'47.02" E located in Toposheet No.55 O/2 in Dhavalapur, Sawangi, Narhar, Ambazari, Banera villages of Tehsil - Parseoni, District - Nagpur, State – Maharashtra.

22.1.2 Dhavalapur Block is proposed on the basis of lapsed lease areas by State Government of Maharashtra which was granted as per section 10A(2)(b) of the MMDR Act-15. In Year 2021 amendment to MMDR Act with a stipulation stated that all such PL reports stand ineligible and to conduct auction and PL Reports required to be evaluated to confirm mineral contents (G4, G3 etc stages of exploration) as per the stipulations under Minerals (Evidence of Mineral Contents) Rules, 2015.

22.1.3 The Directorate of Geology and Mining (DGM), Government of Maharashtra, requested MECL to take up the exploration in lapsed 10A(2)(b) lease mining lease areas vide letter no. Tech/1848/2023/3938, Dated 22/12/2023.

22.1.4 Exploration Proposal (G3) for Dhavalapur Block (2.00 sq.km) was submitted and deliberated in 64th TCC-1 meeting held on 25th, 29th & 30th April 2024. Committee, noted 10A(2)(b) cases and request of Govt. of Maharashtra for exploration of these PL areas through MECL. Accordingly, 64th TCC-1 committee recommended the project proposal titled as “Preliminary Exploration (G3 Level) for Manganese Ore in Dhavalapur Block (2.00 sq.km), Nagpur District, Maharashtra”.

22.1.5 On recommendation of 64th TCC-1, 35th Executive committee (EC), NMEDT meeting held on 16th May 2024 and approved the block, vide letter no F.No. 23/458/2024-NMEDT/121, Dated 10th June, 2024 approved the project with cost of INR 231.60 lakhs.

22.1.6 After receipt of approval from NMEDT, MECL has carried out G3 level exploration in Dhavalapur Block. MECL carried out geological mapping and geochemical sampling on 1:2000 scale with analysing 23 bed rock samples to delineate surface continuity. Trenching and drilling works were not carried out because forest permission was not accorded due to block area is falls in Pench Tiger Reserve Forest.

- 22.1.7 The area belongs to Mansar Formation of Sausar Group, which is a part of Sausar Supracrustal Belt. The Sausar Fold Belt (SFB), an important mesoproterozoic fold belt with southern convexity on the southern margin of the Central Indian Tectonic Zone (CITZ) trends E-W to ENE-WSW with about 20 to 40 km wide and 300 to 350km long. The Sausar Fold Belt (SFB) comprises of two major lithotectonic assemblages, viz. Tirodi Biotite Gneiss (TBG) and metasedimentary Sausar Group.
- 22.1.8 The lithology exposed in the block area Viz, Dolomitic Marble, Biotite gneiss, Khondalite, quartzite-biotite-schist, Gondites, these rocks are belongs to Mansar formation of Sausar Group. The manganese ore is associated with Gondites which are exposed in existing trench, which were excavated in the area. General trend of formations in the block area is WNW-ESE and Manganese mineralization is along WNW-ESE, dip 50° due South. Gondite is the host for manganese mineralisation in the area. It is a rock aggregate of manganese bearing minerals along with quartz and garnets.
- 22.1.9 Total of 23 nos. of samples were collected from bed rock/ channel in Dhavalapur Block which were analysed 6 radicals. 5 nos. of samples collected from bedrock for petrographic study and 4 no. of samples collected from Manganese Ore on surface for Mineralogical study.
- 22.1.10 A total 82460 Tonnes of resources were estimated under 334 category with an average grade 25.23% Mn.
- 22.1.11 The block lies near an eco-sensitive zone in a key manganese belt of Maharashtra.

22.2.0 RECOMMENDATIONS

- 22.2.1 MECL has carried out geological mapping and geochemical sampling works over an extent of 2.00 sq.km in Dhavalapur Block. The geological resources were estimated under 334 category with available data.
- 22.2.2 Based on the exploration work carried out, Gondite formations mapped and sampled, manganese ore mineralization is potential in these formation trend in WNW-ESE over 190m with an average width of 7m, this mineralization may be continued along the dip of the ore body, which needs to be established with Ground Geophysical survey followed by drilling. Hence, it is recommended for detailed exploration.

CHAPTER - 23

23.0.0 LIST OF PLATES

- 23.1.0 Location Map of Dhavalapur Block, District: Nagpur, Maharashtra, Not to scale (Plate-I).
- 23.2.0 Regional Geological Map of Dhavalapur Block, District: Nagpur, Maharashtra in 1:50000 scale (Plate-II).
- 23.3.0 Geological Map of Dhavalapur Block, District: Nagpur, Maharashtra in 1:2000 scale (Plate-III).
- 23.4.0 Geological Cross Section along Section line S1-S1' of Dhavalapur Block, District: Nagpur, Maharashtra in 1:2000 scale (Plate-IV).

CHAPTER - 24

24.0.0 ANNEXURES / ENCLOSURES TO THE REPORT

24.1.0 The report includes all the relevant annexures, maps, plans, photographs & photomicrograph etc. List of annexures, tables, maps/plans/ photographs, Text figures & photomicrograph etc. are provided before the start of the text part of the Geological Report.

CHAPTER - 25

25.0.0 ANY OTHER INFORMATION

25.1.1 No such information is required to be mentioned additionally.

CERTIFICATE FROM THE QUALIFIED PERSON
WITH NAME, DATE AND SIGNATURE

This is to certify that Geological Report on “Preliminary exploration (G3 level) for Manganese Ore in Dhavalapur Block, District: Nagpur, Maharashtra” has been prepared by Mineral Exploration and Consultancy Limited (MECL) on behalf of National Mineral Exploration & Development Trust (NMEDT). The report has been prepared in accordance with the Minerals (Evidence of Mineral Contents) Rule 2015 specified under Mineral Auction Rule, 2015 and amended up to 2021.

NAME: SHRIKANT SHARMA

DESIGNATION: HOD (EXPLORATION)

DATE: 30-09-2025

ABBREVIATIONS USED

SL. No.	Abbreviation	Full form
1	MECL	Mineral Exploration and Consultancy Limited
2	GSI	Geological Survey of India
3	CGWB	Central Ground Water Board
4	CPSE	Central Public Sector Enterprise
5	NMEDT	National Mineral Exploration Trust
6	TCC-1	Technical cum Cost Committee - One
7	EC	Executive Committee
8	DGM, MP	Directorate of Geology and Mining, Maharashtra
9	UNFC	United Nation Framework Classification
10	NMI	National Mineral Inventory
11	DGCO	Directorate General Camp Office
12	NABL	National Accreditation Board for Testing and Calibration Laboratories
13	F.S.P.	Field Season Programme
14	MEMC	Minerals (Evidence of Mineral Contents)
15	MMDR	Mines & Minerals (Development and Regulation)
16	NH	National Highway
17	WGS-84	World Geodetic System-84
18	UTM	Universal Transverse Mercator
19	RL	Reduced Level
20	cu m	Cubic Meter
21	DGPS	Differential Global Positioning System
22	DMS	Degree Minute Second
23	M / m	Meter
24	mt / MT	Million Tonne
25	Sq. km/sq.km	Square Kilometer
26	M. Sc.	Master of Science
27	M. Sc. Tech	Master of Science Technology
28	NDDP	Net District Domestic Product
29	mRL	Reduced Level in metre
30	XRF	X-ray Fluorescence
31	ML	Mining Lease
32	CRM	Certified Reference Material
33	CL	Composite License
34	R.F.	Representative Fraction
35	Mn	Manganese

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