



DISTRICT SURVEY REPORT (DSR)

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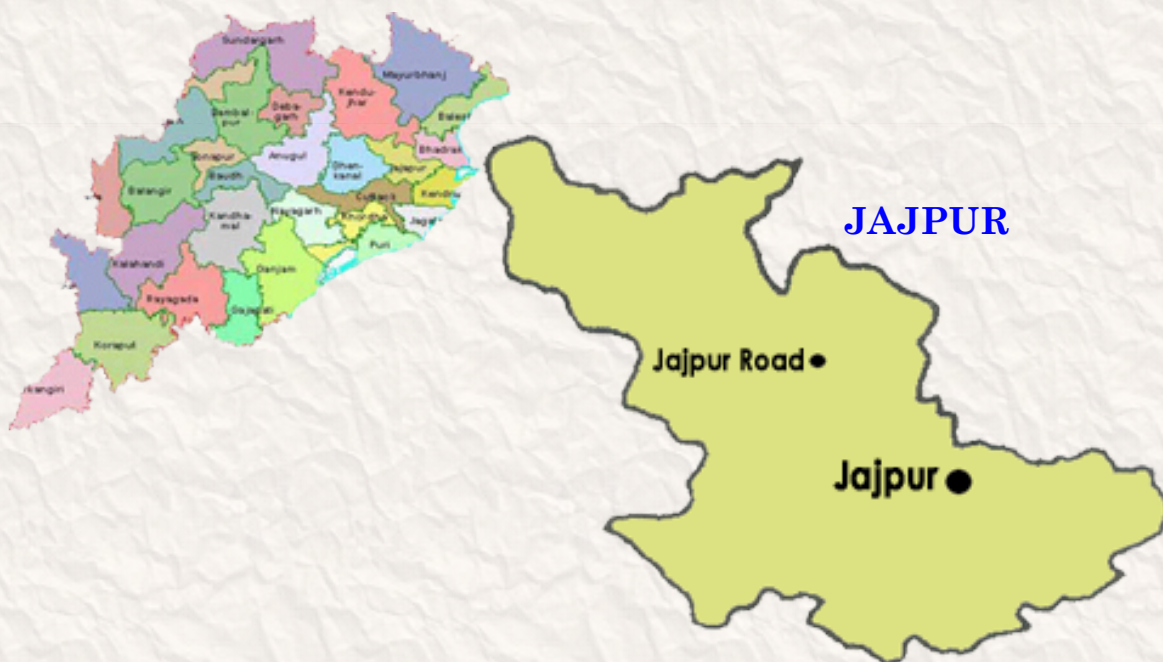
JAJPUR DISTRICT, ODISHA

FOR

LATERITE

**(FOR PLANNING & EXPLOITING OF MINOR
MINERAL RESOURCES)**

ODISHA



As per Notification No. S.O. 3611(E) New Delhi,
25th July, 2018
MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE
(MoEF & CC)

COLLECTORATE, JAJPUR

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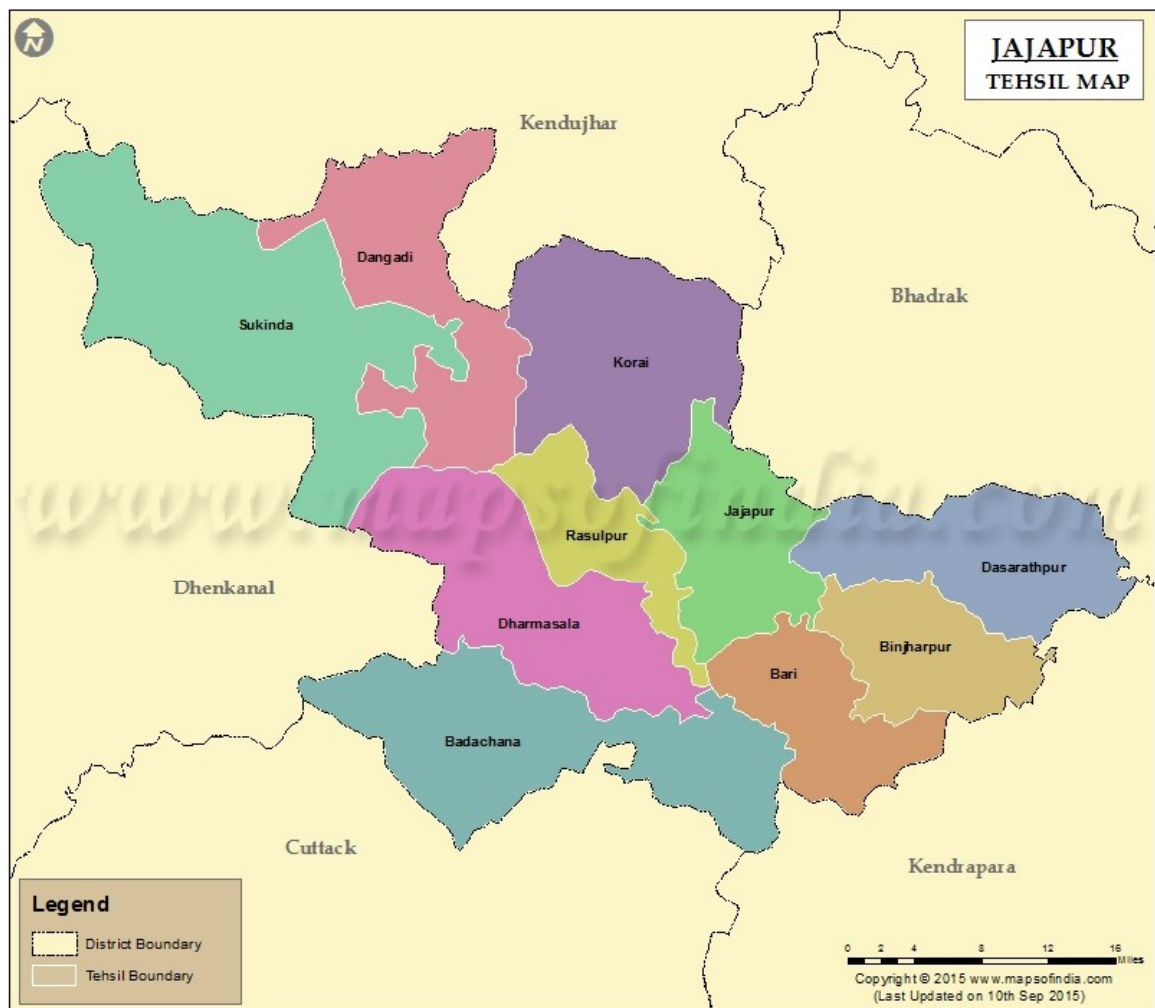
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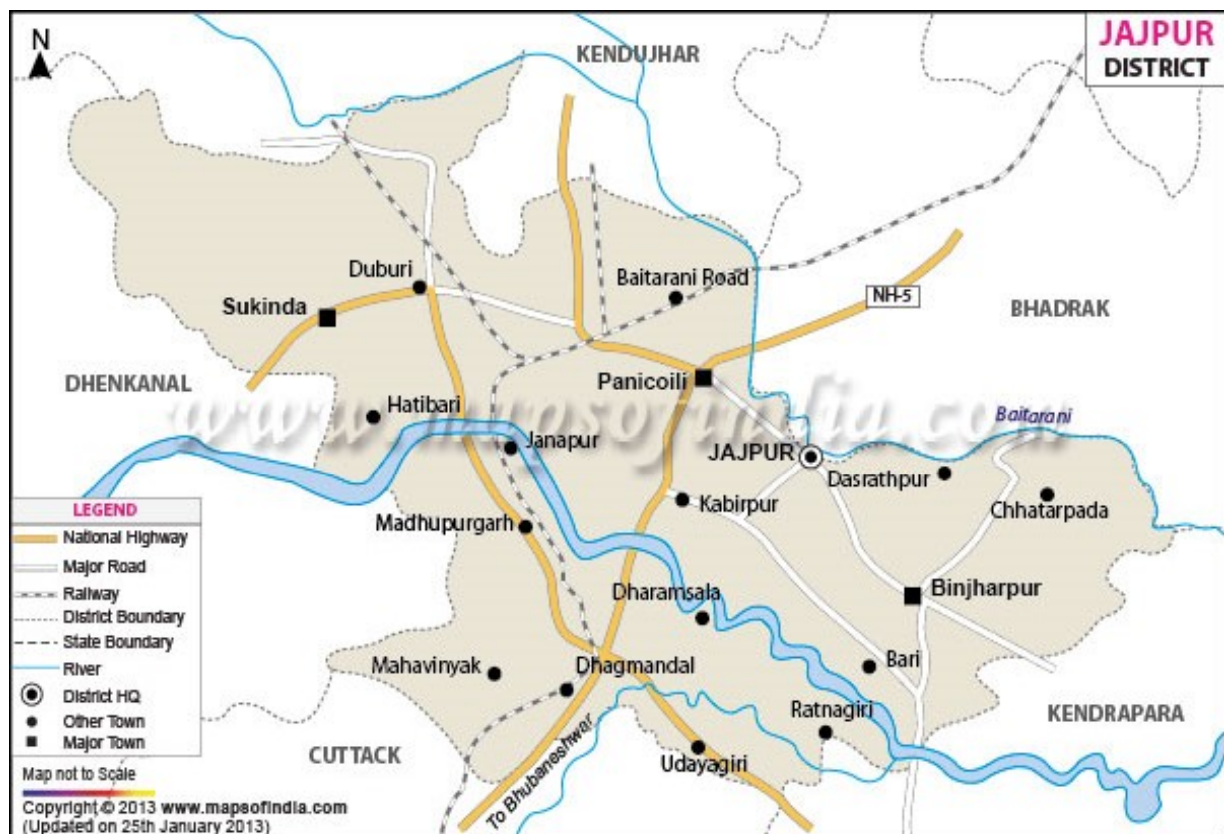
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MAP SHOWING THE TAHASILS OF JAJPUR DISTRICT



MAP SHOWING THE MAJOR ROADS OF JAJPUR DISTRICT



PREFACE

In compliance to the notification issued by the Ministry of Environment and Forest and Climate Change Notification no. S.O.3611 (E) New Delhi dated 25-07-2018, the preparation of district survey report of road metal/building stone mining has been prepared in accordance with Clause II of Appendix X of the notification. Every effort has been made to cover laterite slab mining locations, future potential areas and overview of laterite slab mining activities in the district with all its relevant features pertaining to geology and mineral wealth. This report will act as a compendium of available mineral resources, geological set up, environmental and ecological set up of the district and is based on data of various departments like Revenue, Water Resources, Forest, Geology and Mining in the district as well as statistical data uploaded by various state Government departments. The main purpose of preparation of District Survey Report is to identify the mineral resources and developing the mining activities along with other relevant data of the District.

1. INTRODUCTION

Jajpur District was formed by 'Jajati Keshari', the Somavanshi King in early 10th Century. The District takes its name from its head quarter town, Jajpur.

The history of Jajpur dates back to the prehistoric times. The name Jajpur itself a testimony to this. Some scholars attribute it to the word Yajnapura , while others opine that the name originated from Jajatipura Sasanas in Jajpur area. Jajati is also said to have made Jajatipur as his capital and renamed the city as Jajapura. King Jajati, it is said, had organized a great yajna called Daswamedha at this place. For this, he brought 10,000 Brahmins from North India and got them settled in various localities later on. Preceding this event, Jajpur finds mention in ancient Indian mythology texts and the Puranic literatures alike where it is referred to as Viraja and Baitarini Tirtha, one of the most important tirthas of India. The place has also been described in the Kapilasamhita, Brahmanda Purana, Vayu Purana, Brahma Purana, Tantrachintamani, Astapithamahatmaya and Chaitanya Charitamrita. The place holds great significance among the Hindus as it is considered to be one of the Sakti Pithas where the amputated corpse of Sati, the consort of Shiva, fell having been chopped off by Lord Vishnu. Thus jajpur is referred to as Parvati Tirth sometimes. Jajpur has also been mentioned in the Mahabharat where it is stated that, at the

Viraja in the banks of Baitarani, the Pandava brothers had taken holy dip along with the saint Lomash. Historical anecdotes about the place can however be found only after 7th century A.D with the rise of the Bhaumkaras who ruled over Odisha with Guheswar Patak near Viraja as their Capital.

Earlier Jajpur was a breeding ground for both Buddhism and Jainism. Accounts from Hieun Tsang in 639 A.D. go on to prove the existence of Puspagiri Vihar in the precincts of Jajpur. Tantrayan sprang upon the decadence of Buddhism towards the 8th century. The Kubija Tantra describes Viraja as the Maheswari of Uddiyan.

A great revival of Brahmanism in India and Odisha happened with the emergence of the imperial Guptas. Royal houses encouraged Brahminism by getting Brahmins en masse from Banaras and other north Indian township and making them settled in their provinces. Accordingly Kings were known to perform yajnas to preserve their strength and reputation. In all probability jajati keshari also performed the Daswamedha yajna under Brahmanical on the banks of the Baitarani river. He is in fact known to have performed a series of different yajnas on the banks of the river.

Virajakshetra is triangular. In each corner we find a Siva temple at equal distance. These are Bileswar, Khiltateswar and Baruneswar. The first two temples have received land grants from king Anangabhimadeva, as is evident from Madalapanji. Beautiful ancient Budhist and jaina images are found in the architectural programme of the temples. The Brahma Purana says that there were one less to one crore Sivalingas in jajpur area, which indicates the religious importance of the place.

Much of the architectural pomp of the place was destroyed in later periods as jajpur was subject to constant attacks by the muslim invaders. It was witness to many politically significant battles. One of the battles that changed the course of Odisha history by transferring power to the Afghans was also fought near Jajpur at Gohira Tikiri between the reigning king Mukundadeva Harichandan and Ramachandra bhanja.

Few people of Jajpur in Odisha know that the writer of the national song, Bankim Chandra Chatterjee was working as the Deputy Magistrate from 1882 to 1884 in Jajpur. Bankim worked as a deputy magistrate in Jajpur for about two years during his three decade long stint as a deputy magistrate in Bengal and Odisha as during that period Odisha was under the Bengal province. Bankim Chandra joined as a

deputy magistrate in 1859 and retired in 1891. Jajpur became a sub-division in 1859. The noted writer savoured the tranquility of the riverside in his official residence at Jajpur and penned 'Devi Chaudharani' based on a real story. It was published in 1884.

Earlier Jajpur was part of undivided Cuttack district. On 1st April 1993 it got its separate administrative identity. The district consists of 10 Blocks, 09 tahasils, 280 GPs, 4286 wards. Now Jajpur is poised as country's largest steel hub with many major units starting production and yet others are trying to find their place in its rich industrial scenario. Ever a land of fertile soil and rich mineral resources, Jajpur is also known as a melting pot of many religions, faiths and beliefs steadily holding in its rich mosaic the essence of fraternity and peace.

The District is bounded by Keonjhar and Bhadrak Districts on its North, Cuttack on its South, Dhenkanal District on its East and Kendrapada District on its West.

The Jajpur District located in between 20 degree 30' to 21 degree 10' North Latitude and 85 degree 40' to 86 degree 44' East Longitude. The District covering an area of 2887.69 sq km is moderately populated having total population of 18,26,275 as per 2011 census.

2. OVERVIEW OF MINING ACTIVITIES IN THE DISTRICT.

Minerals found in the district include iron ore, chromite, quartzite, pyroxenite apart from minor minerals like buildingstone, sand, laterite, morrum and brick earth.

Minerals found within the district:

Chromite: Chromite deposits are located in the Sukinda Ultramafic complex around Bhimtangar, Kaliapani, Sukarangi, Saruabil and Surjang areas. The total reserve of chromite is estimated in the order of 164.24 million tonnes with 30% Cr₂O₃.

Nickel: Nickel ore is associated with chromite bodies within the Sukinda Ultramafic Complex and found around Kansa sector, Kamarda-Saruabil sector, Kaliapani sector and at Tisco sector. The total reserve of all grades (high + low) of Nickel ore is estimated in the order of 140 million tonnes.

Iron ore: Iron ore occurs at Daitari and Mahagiri hill ranges.

Platinum group of elements (PGE): The PGE occurs in dunite, peridotite and granite occurring in Sukinda valley area. The PGE values vary from 2ppb to 12ppb in these rocks and 50ppb in chromite and is relatively high, i.e. 60ppb to 500ppb in chromite horizons at places.

Red ochre: Small occurrences of red ochre are observed in Daitari hill ranges.

Plastic clay: The non swelling plastic clay occurs in north of Bhimtangar.

Soapstone: Small occurrences of soapstone are reported to the north of Brahmani River around 292m hill.

The concessions granted within the district for different minerals/ores other than minor minerals are as below:

Name of ore/mineral	No of concessions	Tent Area covered in Ha
Chromite	14	4112
Quartzite,	3	20
Pyroxenite	1	10
Iron ore	1	1813
Total		5955

Other than the above mentioned minerals, minor minerals such as river sand, laterite slabs, building stone/black stone/road metals, morrum, brick earth etc. are also available in the district. Most of the building stone/black stone/road metals potentials are located in Dharmasala, and Sukinda Tahasils of the district. Others like laterite, morrum, sand and earth are distributed in almost all tahasils.

3. GENERAL PROFILE

a. Administrative set up:

SI No	Item	Unit	Magnitude
1	Location		
	Longitude	Degree	85°40' to 86°44' East
	Latitude	Degree	20° 33' to 21°10' North
2	Geographical area	Sq.Km.	2899

3	Sub-division	Numbers	1
4	Tahasils	Numbers	10
5	C D Blocks	Numbers	10
6	Towns	Numbers	2
7	Municipalities	Numbers	2
8	NACs	Numbers	0
9	Police Stations	Numbers	21
10	Gram Panchayats	Numbers	311
11	Villages	Numbers	1783
	Inhabited	Numbers	1598
	Uninhabited	Numbers	185
12	Parliament constituencies	Numbers	21
13	Assembly constituencies	Numbers	147

b. Area and Population:

The district has an area of 2899 sq.kms and 18.27 lakhs of population as per 2011 census. The district accounts for 1.86 percent of the states territory and shares 4.35 percent of the state's population. The density of population of the district is 630 per sq. kms. as against 270 person per sq.km of the state. As per 2011 census the schedule caste population is 433387 (23.7%) and schedule tribe population 151432 (8.3%). The literacy percentage of the district covers 80.1 against 72.9 of the state.

c. Climate :

The climate condition of the district is generally hot with high humidity during April and May and cold during December and January The monsoon generally breaks during the month of July.

d. Economy:

The District of Jajpur being rich in mineral deposit and having skilled human resources there is huge potential for establishment of SMEs.This is the only

sector next to agriculture which can provide maximum employment to the unemployed mass. In the decreasing trend to employment in Govt. and public sector under taking the only option left for our young mass is for establishment of self ventures. The state Govt.'s present policy of employment mission will be successful through SMEs mostly.

e. Industry:

No. of MSME units set up	Investment (In Rs. crores)	Employment Generated				Employment of women
		SC	ST	General	Total	
2240	13038.95	1112	148	4813	6073	933

Apart from these the heavy industries within the district are:

Sl No	Name of the Industry	Location	Production Items	Capacity	Status
1	Nilachal Ispat Nigam Ltd	Kalinganagar	Pig iron	492000MT	Working
2	Tata Steel Ltd	Duburi	steel	No Information	Working
3	Jindal Industries	Kalinganagar	Stainless Steel	1600000MT	Working
4	VISA Steel	Jakhapura	Mid steel	320000MT	Working
5	Rohit ferro tech Ltd	Kalinga Nagar	Ferro Alloys	80,000MT	Working
6	K.J. Ispat Limited	Kalinganagar	Sponge iron	30000MT	Working
7	IDCOL ferrocrome	Jajpur Road	High carbon	18000MT	Working
8	Maithan Ispat Ltd	Kalinganagar	Sponge iron	740000MT	Working
9	MESCO	KHURUNTI	Pig Iron	600000MT	Working
10	Dinabandhu steel and Power	Kalinganagar	Steel	250000MT	Working

f. Agriculture:

During the year 2017-18, the net area sown was 124 thousand hectares against 5356 thousand hectares of the state. The production of paddy was

223.75 thousand MT, 0.20 thousand MT wheat, 5.06 thousand MT maize, 11.73 thousand MT mung, 7.31 thousand MT biri, 3.05 thousand MT kulthi, and 0.29 thousand MT til, 46.33 thousand MT groundnuts, 1.29 thousand MT mustard, 8.40 thousand MT potatoes, 7.57 thousand MT jute and 86.09 thousand MT sugarcane. During 2017-18, the total fertilizers used in Jajpur district is about 19420 MT with a breakage of 11011 MT nitrogenous, 4896 MT phosphatic and 3513 MT pottasic and the consumption of fertilizer per hectare is 90.36kg.

g. Power:

Consumption of electricity in Jajpur district during the year covers 82 million units per month and villages so far electrified as on 30.08.2019 is 1619 which constitutes almost 100% to the total villages of the district.

h. Transport & Communication:

Railway route length (14-15) km	131.66
No of Rly stations and PH(14-15)	17
Forest road (17-18) km	42
National Highway (16-17) km	202.02
State Highway (17-18) km	31.447
Major district road (17-18) km	56.334
Other dist road (17-18) km	901.021
Rural road(17-18) km	14352.264
Inter village road (16-17) km	886.349
Intra village road (16-17) km	1471.24

i. Health:

The medical facilities are provided by different agencies like Govt., Private individuals and voluntary organizations in the district.

Govt. Allopathic medical institutions	75 No
Beds facilities	14 No
Homoeopathic dispensaries	20 No
Ayurvedic dispensaries	23 No

j. Tourist places:

There are 13 nos. of tourist center such as Ashokjhan, Baruneswarpitha, Chandikhol, Chhatia, Gokarnika, Jajpur, Kuransa, Mahavinayak, Patharajpur, Ratnagiri & Udayagiri, Satyapira, Singhapur and Vyasa Sarovar identified by department of Tourism and Culture, Odisha.

k. Forest areas:

Category of forest	Area in sq km
Reserve Forest	6.35
Unclassified Forest	0.01
Demarcated Protected Forest (DRF)	299.32
Undemarcated Protected Forest	0
Other forest under Revenue Dept	419.59
Total	725.27

l. Education:

Primary School (2017-18)	No. of Schools	1413
	Enrolment (No)	165963
	Pupil Teacher Ratio	21.05
Upper Primary School 2017-18	No. of Schools	992
	Enrolment (No)	92696
	Pupil Teacher Ratio	17.75
General College 2017-18	Junior	72
	Degree	44
Secondary School	No. of Schools	486
	Enrolment (No)	57511
	Pupil Teacher Ratio	25.53
Literacy Rate, 2011	Male	86.8
	Female	73.3
	Total	80.1

m. Culture & Heritage:

Once Jajpur District was a great centre of art and culture in ancient Odisha. This district is declared as a heritage district 'Biraja Khetra' is one of the ancient cities of Odisha rich in archaeological remains .It is reputed to be one of the important Tantra Khetras in the state. The ancient monuments like Biraja Temple, Lord Baraha Temple, Daswasamedhaghat, Jagannath Temple,

Trilochaneswar Temple, Ratnagiri, and Udayagiri and so many other places of historical importance add tourist attraction. Jaipur is also known as Navigaya. People all over the state and neighboring state come here to offer SRADDHA on the Bank of River Baitarini.

A land of rich and diverse artistic achievement, Jajpur's art and culture are the product of a long historical process in which the spiritual, philosophical and the humane dimensions have merged to yield the finest effects of culture and civilized life. The cultural heritage of Jajpur is reflected in its vibrant Art forms.

The district has village tradition of painting, architectures, sculpture, and handicrafts. The Jajpur school of painting has three streams such as Jhoti, Chita and Muruja.

4. GEOLOGY

Geologically the district can be broadly divided into four sectors. The northwestern and southwestern hilly areas comprise the meta-sediments of Gorumahisani Group and Eastern Ghat Supergroup with basic and ultramafic intrusions. The laterite covers the central and northwestern part of the district. The horizontally disposed Quaternary sediments occupy the southeast, east and northern part of the district. The Eastern Ghat Supergroup consists of quartz-feldspar-garnet-sillimanite $\pm$ graphite schist/gneiss, garnetiferous quartzite, calcsilicate and charnockites. All these rocks have undergone intensive migmatization. The Gorumahisani Group comprises banded hematite/magnetite quartzite, banded hematite jasper, banded chert, quartzite, ferruginous shale, fuchsite quartzite, conglomerate, gritty quartzite, ortho quartzite. These are associated with metavolcanics, pyroxinite and chromiferous ultramafics. Granite and granophyres are intrusive into these rocks. The meta-sedimentaries and ultramafics have undergone intensive lateritization and the thickness varies from 5m to 15m. These rocks are overlain by Quaternary sediments of sub-recent to recent period. These sediments constitute transported laterite at the base, sandy clay with kankar, black clay and present flood plain deposits consisting of coarse to fine sand. The meta-sediments of Eastern Ghat Supergroup have undergone polyphase deformation. The axis of first generation of folds is represented by NE-SW

trend; the second generation is represented by NW-SE trend and the youngest one by the N-S trend. The axial planes of these folds are highly sheared and faulted. The Gorumahisani Group of meta-sediments has undergone three phases of deformation. The first and second generation of folds are co-axial and trend in N70°E-S70°W direction. The second generation of folds is of open type and plunges towards west. These folds are cross folded along N-S axis and are represented by broad warps.

STRATIGRAPHY:

The geological succession in the district is as follows:

Age	Supergroup	Group	Formation	Lithounit
Late Holocene			Brahmani	Fine Sand
Middle to Late Holocene			Bankigarh	Brownish Silty Clay (Upper Deltaic Facies) Black Clay (Lower Deltaic Facies)
Early Holocene to Late Pleistocene			Kaimundi	Clay with calcareous concretions
Early Pleistocene to Late Tertiary			Bolgarh	Laterite/ Latosol (Insitu)
Proterozoic			Intrusive	Granophyre Hornblende granite Basic lava Pyroxenite, Ultramafics Bonai granite Ortho quartzite Gritty quartzite Conglomerate Fuchsite quartzite/ andalusite quartz-schist / ferruginous shale Banded chert (q _{2c})/ BMQ, BHQ (q _{2h}), BHJ (q _{2j}) Quartzite
Archaean		Gorumahisani		
		Charnockite		Granetiferous granite and gneiss
	Eastern			Acid and intermediate charnockite

Ghat

Khondalite

Quartz-Feldspar-Garnet-Sillimanite ±
Graphite Schist/ Gneiss

Calc silicate

5. DRAINAGE AND IRRIGATION PATTERN.

The drainage of the district is mainly controlled by rivers like Brahmani, Kharasuhan, Birupa, Baitarani & Kelua. Detail of the river system is narrated below.

Sl. No.	Name of the river	Place of origin	Altitude at origin	Total length in the district (in km)	Area drained (Sq. Km)	% Area drained in the district	Process of deposition of sediments	Volume of sand deposited in last 4 yrs (Year-wise)				Any important note related to leasing of sand quarry within the river
								2015-16	2016-17	2017-18	2018-19	
A	B	C	D	E	F	G	H	I	J	K	L	M
1	Brahmani	Bedavyasa-Rourkela	22-14-45-N	68.5	28.4	30%	Flord water	45400 00 Cum	464 000 0	318 000 0	404 200 0	
2	Kharasuhan	Pankpal	20-82-12-N	26.5	12.34	30%	Flord wate	41100 0 Cum	412 000	330 000	357 000	
3	Kelua	Bedapur	20-76-41-N	20.1	8.04	12%	Flord Water	21100 0 Cum	212 000	182 000	210 000	
4	Birupa	Jobra	20-3-20-n	13.38	0.9	55	Flord Water	28000 Cum	300 00	286 00	385 00	
5	Tangighala	Hasinpur	20-72-57-N	28	1.94	40%	Flord Water	-	-	-	-	
6	Baitarani	Gonasika	900 mts (3000 Ft)	78	13482	23%	Due to settlement of sand particulars	The volume of sand is not maser able				The sand quarrying close to the river bank at meandering to reach and where the river embakment is very close to the bank is not safe both for the river bank and embakment
7	Kharsuhan	Jokadia	-	45 km from NH-5 to Singhpur	-	15%	Due to settlement of sand particulars	The volume of sand is not maser able				

Irrigation area (2017-18) in 000 Ha:

Major & Medium	Kharif	61.53
	Rabi	32.92
Mega Lift	Kharif	0.00

	Rabi	0.00
Minor Flow	Kharif	10.03
	Rabi	1.67
Minor Lift	Kharif	51.20
	Rabi	27.68

6. LANDUSE PATTERN

SI No	Landuse	Area in '000Ha
1	Forest Area	72
2	Misc. trees & Grooves	4
3	Permanent Pasture	4
4	Culturable Waste	4
5	Land put to Non Agril Use	41
6	Barren & Unculturable Land	5
7	Current Fallow	21
8	Other Fallow	5
9	Net Area Sown	124
10	Mining	10
	Geographical Area	281

7. SURFACE WATER & GROUND WATER SCENARIO

The drainage systems i.e. rivers of the district gets filled with water during the monsoon and the gradually it decreases from the month of January to June of each year. In the summer season all rivers become almost dry excepting narrow flow of water within the basin.

The variation of ground water table in the district is as follows:

Depth of water level (mbgl)/ Period	April	August	November	January
Minimum	2.63	0.41	1.1	1.9
Maximum	14.1	8.75	8.75	6.88

8. RAINFALL & CLIMATIC CONDITION

The district is generally hot with high humidity during April and May and cold during December and January. The monsoon generally breaks during the month of July and continues till end of October. The temperature goes as high as up to 45°C in the summer and up to 7⁰-8⁰ C during peak winter.

The rainfall statistics of the district for last four years is given below:

Year/ Month	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MARCH	TOTAL
15-16	96.40	74.60	186.60	495.50	142.40	146.60	30.10	0.20	10.90	-	31.90	11.40	1266.60
16-17	15.30	130.80	177.20	345.20	336.16	290.70	71.89	38.38	-	-	-	70.91	1504.58
17-18	2.55	86.73	189.45	227.46	249.26	135.67	250.12	74.29	15.79	-	-	-	1231.32
18-19	106.99	157.60	218.50	496.88	261.39	604.30	239.12	-	6.84	-	14.81	30.48	2136.19
AVG	53.31	112.43	192.93	391.37	264.05	294.29	147.80	28.36	8.38	-	12.43	28.91	1534.67

9. DETAILS OF MINING LEASES OF ROAD METAL

No quarry lease has been granted.

10. DETAILS OF ROYALTY COLLECTED

Not applicable

11. DETAILS OF PRODUCTION OF MINOR MINERAL

Not applicable

12. MINERAL MAP OF THE DISTRICT

Attached as Plate No 4.

13. LIST OF LOI HOLDERS ALONG WITH VALIDITY

No LOI has been issued. Hence not applicable.

14. TOTAL MINERAL RESERVE AVAILABLE IN THE DISTRICT

The tentative total mineral reserve of laterite block is 849479 cum which may increase after detail investigation and survey.

Details of the potential areas is submitted as Annexure I.

15. QUALITY/GRADE OF MINERAL

Due to less content of Alumina, the laterite of the district is suitable for construction of walls related boundary or houses after manual sizing of the slabs.

16. USE OF MINERAL

Laterite of the district is used mainly for construction of walls related boundary or houses after manual sizing of the slabs.

17. DEMAND & SUPPLY OF THE MINERAL

The demand for laterite slab is moderate in the district and is approximately to the tune of 1,00,000 cum per annum. The demand will be mainly fulfilled from the production of Darpan and Sukinda tahasils.

18. MINING LEASES MARKED ON THE MAP OF THE DISTRICT.

Attached as Plate No 5.

19. DETAILS OF AREAS WHERE THERE IS A CLUSTER OF MINING LEASES

Not applicable.

20. DETAILS OF ECO-SENSITIVE AREA

There is no village coming under Eco-sensitive Zone in Jajpur District as per Notification No. 1659 (E) dt 17.06.2015 of the Govt. of India. Ministry of Environment, forest and Climate, New delhi. However, Kolha PRF of Jajpur district comes under Eco-Sensitive Zone of Kapilash Sanctuary, Dhenkanal.

21.IMPACT ON THE ENVIRONMENT (AIR, WATER, NOISE, SOIL FLORA & FAUNAL , LAND USE , AGRICULTURE, FOREST ETC.) DUE TO MINING

Activities attributed to Mining:-

Generally, the environment impact can be categorized as either primary or secondary. Primary Impacts are those, which are attributed directly by the project. Secondary impacts are those which are indirectly induced and typically include the associated investment and changed pattern of social and economic activities by the proposed action.

The impact has been ascertained for the project assuming that the pollution due to mining activity has been completely spelled out under the base line environmental status for the entire ROM which is proposed to be exploited from the mines.

Impact on Ambient Air

Mining operation are carried out by opencast manual, semi mechanized/ mechanized methods generating dust particles due to various activities likes, excavation, loading, handling of mineral and transportation. The air quality in the mining areas depends upon the nature and concentration of emissions and meteorological conditions.

The major air pollutants due to mining activities include:-

- Particulate matter (dust) of various sizes.
- Gases, such as sulphur dioxide, oxides of nitrogen, carbon monoxide etc from machine & vehicular exhaust.

Dust is the single air pollutant observed in the open cast mines. Diesel operating drilling machines, blasting and movement of machineries/ vehicles produce NO_x , SO₂ and CO emissions, usually at low levels. Dust can be of significant nuance surrounding land user and potential health risk in some circumstances.

Fugitive particulate matter emissions during various stages of mining are

- Ore excavation
- Loading and unloading
- Processing
- Ore/ mineral transportation in haul and transportation road

Water Impact

Sometimes the mining operation leads to intersect the water table causing ground water depletion. Due to the interference with surface water sources like river, nallah etc drainage pattern of the area is altered. In summary

- Strata water gets disturbed and contaminated in case of intersection of ground water table
- Natural drainage pattern of the area gets disturbed

- Contamination of surface water bodies due to discharges of Mine drainage water (point source) and surface runoffs (non-point source), workshop effluent, effluent from ore/mineral processing plant

Noise Impact

Noise pollution mainly due to operation of machineries and occasional plying of machineries. These activities will create noise pollution in the surrounding area.

All mining activities produce enormous noise and vibrations in the mining area

- Operation of drilling machines, blasting, excavation, ore/mineral processing, loading and unloading of mineral/ore, operation of Heavy Earth Moving Machineries like pay Loaders, excavators and Hyvas etc.
- Transportation of minerals inside the mine and to outside through trucks and tippers cause generation of noise
- Such high level of noise can cause health effects, poor work performance and disturbance to human and wildlife, and constant source of disturbance

Impact on Land environment

The topography of the area will change certain changes due to mining activity which may cause some alteration to the entire eco system.

Mining causes various land disturbance/degradation due to change in land use pattern

- Removal of forest cover which causes loss to flora and fauna and takes many years to get back similar forest cover if the mining area is properly reclaimed.
- Removal of top soil and overburden causes loss on agriculture.
- Large scale excavation
- Dumping of solid wastes
- Cutting of roads
- Abandoned mine pits
- Land subsidence in underground mines
- Generation of windblown dust from stock piles, roads and over burden dumps

Impact on Flora & Fauna

The impact on biodiversity is difficult to quantify because of its diverse and dynamic characteristics.

Mining activities generally result in the deforestation, land degradation, water, air and noise pollution which directly or indirectly affect the faunal and flora status of the project area.

However, occurrence and magnitude of these impacts are entirely dependent upon the project location, mode of operation and technology involved.

22. REMEDIAL MEASURES TO MITIGATE THE IMPACT OF MINING ON THE ENVIRONMENT:-

Air

Mitigation measures suggested for air pollution controls are to be based on the baseline ambient air quality of the project/cluster area and would include measures such as:

- Dust generation shall be reduced by using sharp teeth of shovels.
- Wet drilling shall be carried out to contain the dust particles.
- Controlled blasting techniques shall be adopted.
- Water spraying on haul roads, service roads and overburden dumps will help in reducing considerable dust pollution.
- Proper and regular maintenance of mining equipment's have to be undertaken.
- Transport of materials in trucks are to be covered with tarpaulin.
- The mine pit water can be utilized for dust suppression in and around mine area.
- Information on wind direction and meteorology are to be considered during planning, so that pollutants, which cannot be fully suppressed by engineering techniques, will be prevented from reaching the nearby agricultural land, if any.
- Comprehensive greenbelt around overburden dumps and periphery of the mining projects/clusters has to be carried out to reduce fugitive dust transmission from the project area in order to create clean & healthy environment.

Water

- Construction of garland drains and settling tanks to divert surface run –off of the mining area to the natural drainage.
- Construction of checks dams/ gully plugs at strategic places to arrest silt wash off from broken up area.
- Retaining walls with weep hole are to be constructed around the mine boundaries to arrest silt wash off.
- Retaining wall and garland drain and adequate treatment system like settling ponds shall be provided around the OB dump for proper surface runoff management
- The mined out pits shall be converted in to the water reservoir at the end of mine life. This will help in recharging ground water table by acting as a water harvesting structure.
- Periodic analysis of mine pit water and ground water quality in nearby villages are to be undertaken.
- Domestic effluent if any from mine shall be discharged to soak pit via septic tank constructed as per BIS specification or shall be treated in a suitably designed Sewage Treatment Plant.
- Water conservation measures shall be taken by rain water harvesting and recycling and reuse of treated mine water

NOISE

- Periodic maintenance of machineries, equipments shall be ensured to keep the noise generated within acceptable limit.
- Development of thick green belt around mining/cluster area, haul roads to reduce the noise.
- Provision of earplugs to workers exposed to high noise generating activities like blasting, excavation site etc. Worker and operators at work sites will be provided with earmuffs.
- Conducting periodical medical checkup of all workers for any noise related health problems.
- Proper training to personnel to create awareness about adverse noise related effects.

- Periodic noise monitoring at locations within the mining area and nearby habitations to assess efficacy of adopted control measures.
- During blasting optimum spacing, burden and charging of holes will be made under the supervision of competent qualified mines foreman, mate etc.
- No mining preferably blasting shall be carried out in night time so as to minimize impact of noise in the surrounding area. Adequate measures shall be taken for control of noise levels below the following limits.

(6.00 AM - 9.00 PM) - Leq 75 dB(A)

(9.00PM - 6.00 AM) - Leq 70 dB(A)

Biological Environment

- Development of green belt/gap filling saplings in the safety barrier left around the quarry area/ cluster area.
- Carrying out thick greenbelt with local flora species predominantly with long canopy laves on the inactive mined out upper benches.
- Top soil and overburden (OB) generated during mining shall be stacked separately at earmarked areas maintaining slope as prescribed in the mining plan. The same shall be used in road construction as per the guidelines specified in the mining plan
- Proper planning and optimization for minimum land use, separate removal and handling of top and sub-soils, proper decommissioning, closure, reclamation and rehabilitation, getting back original landscape after mine closure, reduction of land subsidence movements and taking safety measures.
- Development of dense poly culture plantation using local floral species in the mining areas at conceptual stage if the mine is not continued much below the general ground level.
- Adoption of suitable air pollution control measures as suggested above.
- Transport of materials in trucks covered with tarpaulin.

23. RECLAMATION OF MINED OUT AREA (BEST PRACTICE ALREADY IMPLEMENTED IN THE DISTRICT, REQUIREMENT AS PER RULES AND REGULATION, PROPOSED RECLAMATION PLAN) :-

As per statute all mines/quarries are to be properly reclaimed before final closure of the mine. Reclamation of exhausted mines are planned to be undertaken in below three possible means:

1. If, substantial amount of waste is there, the exhausted quarry can be fully or partly backfilled using the stored waste. The backfilled areas are to be brought under plantation of local species.
2. If the generation of waste is much less as in the case of minor mineral mining, the exhausted quarries can be reclaimed by
 - a. Plantation on the broken up surface if the depth of quarry is not much below the surrounding surface level.
 - b. Converted to water reservoir after stabilization of the slopes if the exhausted quarry continues much below the surrounding surface level. It is preferred to cordon the water reservoir either through wire fencing or retaining wall with plantation from the safety point of view.

Most of the quarry/mining lease areas are yet to be exhausted from ore point of view. Hence, reclamation would be taken up only after exhaustion of the ore/mineral content from these areas. The exhausted minor mineral quarries of the district have been converted to water reservoirs.

24. RISK ASSESSMENT & DISASTER MANAGEMENT PLAN

The only risk involved related to mining of minor mineral excepting natural calamities is slope failure and probable accidents due to high and ill maintained bench walls. This can only be addressed through making of regular benches and undertaking mining in benching pattern.

The disaster management plan (DMP) is supposed be a dynamic, changing, document focusing on continual improvement of emergency response planning and arrangements.

The disaster management plan is to be aimed to ensure safety of life, protection of environment, protection of installation, restoration of production and savage operations in this same order of priorities. For effective implementation of the disaster management plan, it should be widely circulated

through rehearsal/induction conducted by the respective department from time to time .

General responsibilities of employees' during an emergency:

During an emergency, it becomes more enhanced and pronounced when an emergency warning is raised, the worker in charge, should adopt safe and emergency shut down and attend to any prescribed duty. If no such responsibility is assigned, the workers should adopt a safe course to assembly point and wait instructions. He should not resort to spread panic. On the other hand, he must assist emergency personnel towards objectives of DMP.

Co-ordination with local authorities:

The Mine Manger who is responsible for emergency will always keep a jeep ready at site. In case of any eventuality, the victim will be taken to the nearby hospitals after carrying out the first aid at the site. The Manger should collect and have adequate information of the nearby hospitals, fire station, police station, village panchayat heads, taxi stands, medical shops, district revenue authorities etc. and use them efficiently during the case of emergency.

25. DETAILS OF THE OCCUPATION HEALTH ISSUES IN THE DISTRICT. (LAST FIVE- YEAR DATA OF NUMBER OF PATIENTS OF SILICOSIS & TUBERCULOSIS IS ALSO NEEDS TO BE SUBMITTED):-

As per the guidelines of the Mine Rules 1995, occupational health safety has been stipulated by the ILO/WHO. The proponent's will take necessary precautions to fulfill the stipulations. Normal sanitary facilities have to be provided within the lease area. The management will carry out periodic health checkup of workers.

Occupational hazards involved in mines are related to dust pollution, noise pollution, blasting and injuries from moving machineries & equipment and fall from high places. DGMS has given necessary guidelines for safety against these occupational hazards. The management has to strictly follow these guidelines.

All necessary first aid and medical facilities are to be provided to the workers. The mine shall be well equipped with personal protective equipment (PPE). Further, all the necessary ported equipments such as helmet, safety goggles, earplugs, earmuffs

ets are to be provided to mine workers as per Mines Rules. All operators and mechanics are to be trained to handle fire fighting equipments.

TUBERCULOSIS DATA RNTCP KHORDHA

YEAR	TOTAL
15-16	841
16-17	679
17-18	1440
18-19	1475

There is no case of Silicosis found in Jajpur within the time frame mentioned above.

26. PLANTATION OF GREEN BELT DEVELOPMENT IN RESPECT OF LEASES ALREADY GRANTED IN THE DISTRICT

As most of the minor mineral mines/quarries of the district are yet to be exhausted of their mineral content no sort of reclamation measures including plantation has been undertaken excluding gap plantation of local species in the peripheral safety zones of the quarries/ clusters and in some of the haul roads.

27. ANY OTHER INFORMATION

Nil

DETAIL OF LATERITE POTENTIAL OF THE DISTRICT

Sl. No.	Name Of Tahasil	Name of village	Name of Minor Mineral and Area of Sairat (Ha)	Location of the Source (Total Hillock) recommended for mineral concession (GPS co-ordinates or Khata & Plot No)	Area of the mineral potential patch (in sq m)	Average height of potential patch (in m)	Mineable mineral potential (in cum)
A		B	C	D	E	F	G
1	Darpan	Ban dha pali	Laterite Stone		10521	4 M.	42086
2	Darpan	Ban dha pali	Laterite Stone		85387	4 M.	341549
3	Darpan	Ban dha pali	Laterite Stone		6556	4 M.	22662
4	Darpan	Raij har	Laterite Stone		68795	4	275182
5	Darpan	Bag hua	Laterite Stone		1	0.02	40000
6	Darpan	Ami yajh ari	Laterite Stone		0.1K.M.	1.8	60000
7	Darpan	Ami yajh ari	Laterite Stone		0.02	0.01	10000
8	Sukinda	Nizig arh	Nizigarh Laterite Stone	KH 884 Plt. No.2171	Ac.4.00	10	12000
9	Sukinda	Am bas ar	Ambasar Laterite Stone	Kh 453, 456 Plt. No.1850, 1851	Ac.4.00	10	12000
10	Sukinda	Pim pudi	Pimpudia Laterite Stone	Kh 147 Plt- 938	Ac.1.20	10	6000

		a					
11	Sukinda	Pimpudia	Pimpudia Laterite Stone quarry	Kh 147 Plt- 892	Ac.3.42	10	8000
12	Sukinda	Nuadiha	Nuadiha Laterite Stone quarry	Kh-150 Plt 1	Ac. 35.38	15	20000

MINERAL MAP OF JAJPUR DISTRICT

SCALE :- 1:110,000
Kilometers

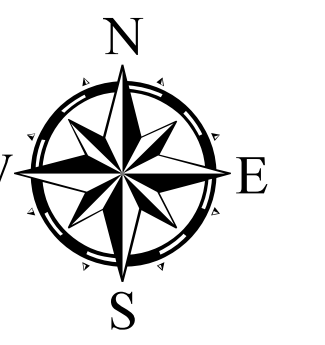
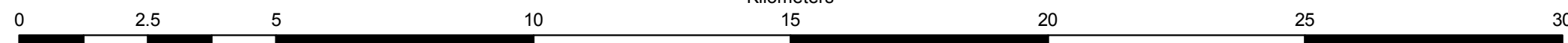
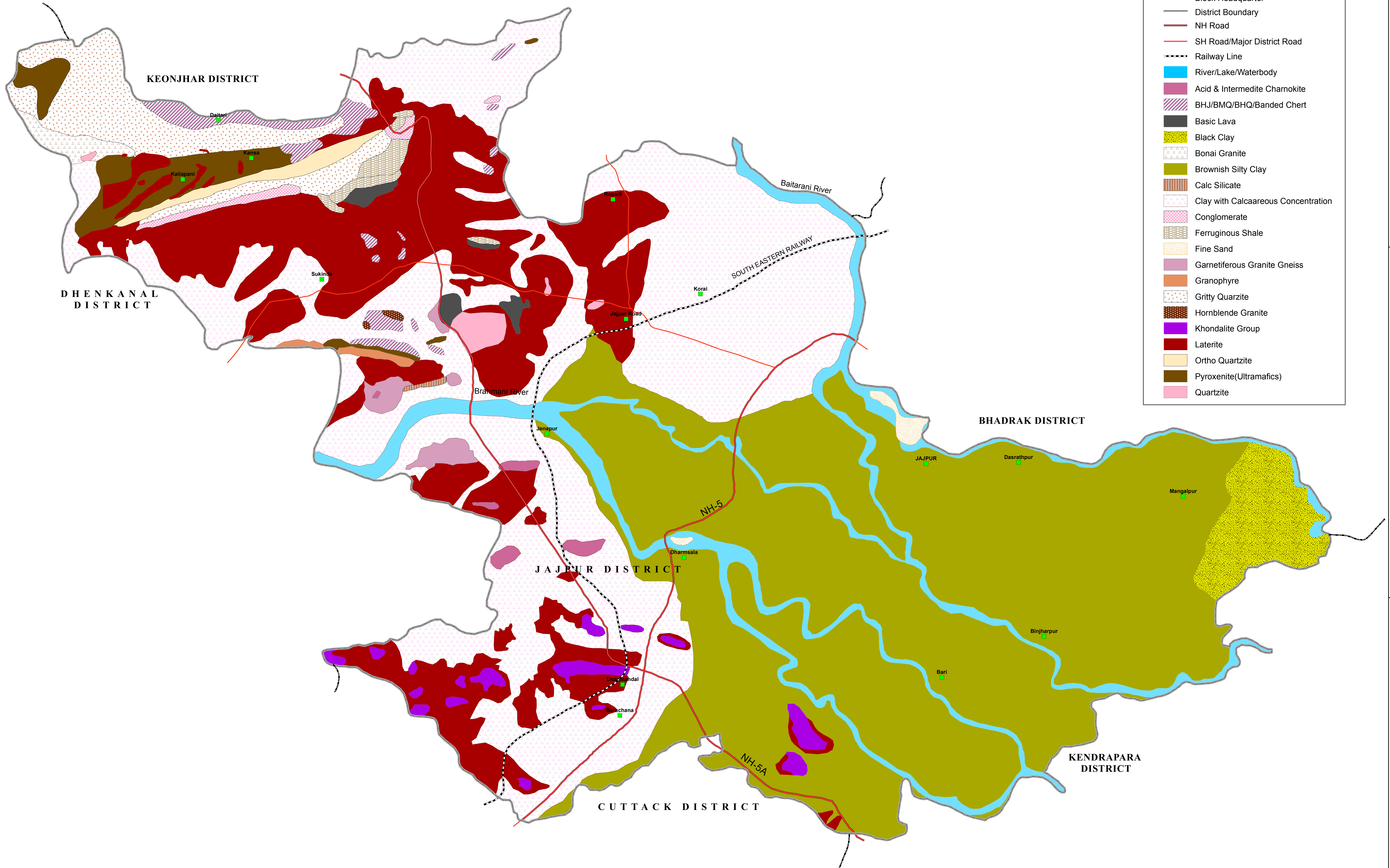


PLATE NO-4

Legend

- Block Headquarter
- District Boundary
- NH Road
- SH Road/Major District Road
- Railway Line
- River/Lake/Waterbody
- Acid & Intermedite Charnokite
- BHJ/BMQ/BHQ/Banded Chert
- Basic Lava
- Black Clay
- Bonai Granite
- Brownish Silty Clay
- Calc Silicate
- Clay with Calcaereous Concentration
- Conglomerate
- Ferruginous Shale
- Fine Sand
- Garnetiferous Granite Gneiss
- Granophyre
- Gritty Quarzite
- Hornblende Granite
- Khondalite Group
- Laterite
- Ortho Quartzite
- Pyroxenite(Ultramafics)
- Quartzite



LEASE/POTENTIAL MAP OF LATERITE IN JAJPUR DISTRICT

SCALE :- 1:110,000
Kilometers

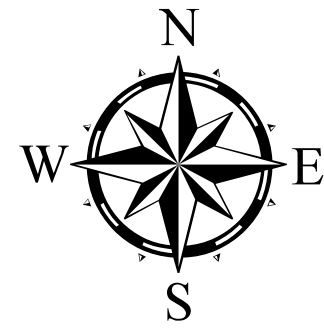


PLATE NO-5

Legend

Block Headquarter

District Boundary

NH Road

SH Road/Major District Road

Railway Line

River/Lake/Waterbody

Lease/Potential Area for Laterite

