DRAFT DISTRICT SURVEY REPORT (DSR)

OF

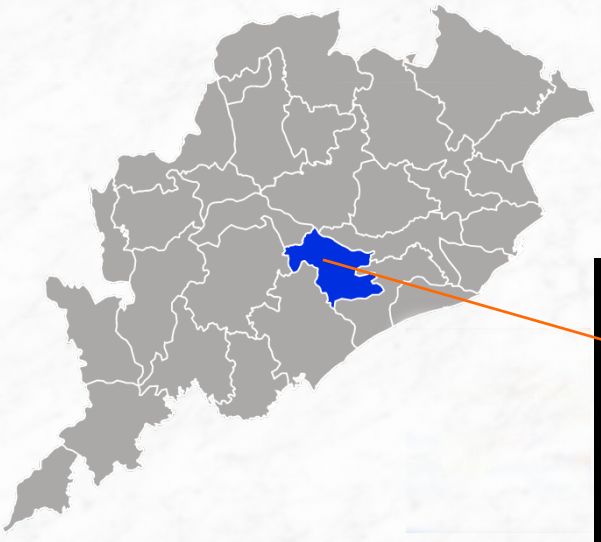
NAYAGARH DISTRICT, ODISHA

FOR

LATERITE SLAB

(FOR PLANNING & EXPLOITING OF MINOR MINERAL RESOURCES)

ODISHA



NAYAGARH

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

COLLECTORATE, NAYAGARH

CONTENT

SL NO	DESCRIPTION	PAGE NO
1	INTRODUCTION	1
2	OVERVIEW OF MINING ACTIVITIES IN THE DISTRICT	2
3	GENERAL PROFILE	2
4	GEOLOGY	4
5	DRAINAGE AND IRRIGATION PATTERN	6
6	LANDUSE PATTERN	7
7	SURFACE WATER & GROUND WATER SCENARIO	7
8	RAINFALL & CLIMATIC CONDITION	8
9	DETAILS OF MINING LEASES	8
10	DETAILS OF ROYALTY COLLECTED	8
11	DETAILS OF PRODUCTION	9
12	MINERAL MAP OF THE DISTRICT	9
13	LIST OF LOI HOLDERS ALONG WITH VALIDITY	9
14	TOTAL MINERAL RESERVE AVAILABLE IN THE DISTRICT	9
15	QUALITY/GRADE OF MINERAL	10
16	USE OF MINERAL	10
17	DEMAND & SUPPLY OF THE MINERAL	10
18	MINING LEASES MARKED ON THE MAP OF THE DISTRICT	12
19	DETAILS OF AREAS WHERE THERE IS A CLUSTER OF MINING LEASES	12
20	DETAILS OF ECO-SENSITIVE AREA	15
21	IMPACT ON THE ENVIRONMENT (AIR, WATER, NOISE, SOIL FLORA & FAUNAL, LAND USE, AGRICULTURE, FOREST ETC.) DUE TO MINING	15
22	REMEDIAL MEASURES TO MITIGATE THE IMPACT OF MINING ON THE ENVIRONMENT	16
23	RECLAMATION OF MINED OUT AREA (BEST PRACTICE ALREADY IMPLEMENTED IN THE DISTRICT, REQUIREMENT AS PER RULES AND REGULATION, PROPOSED RECLAMATION PLAN)	18
24	RISK ASSESSMENT & DISASTER MANAGEMENT PLAN	19

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)	20
26	PLANTATION OF GREEN BELT DEVELOPMENT IN RESPECT OF LEASES ALREADY GRANTED IN THE DISTRICT	21
27	ANY OTHER INFORMATION	21

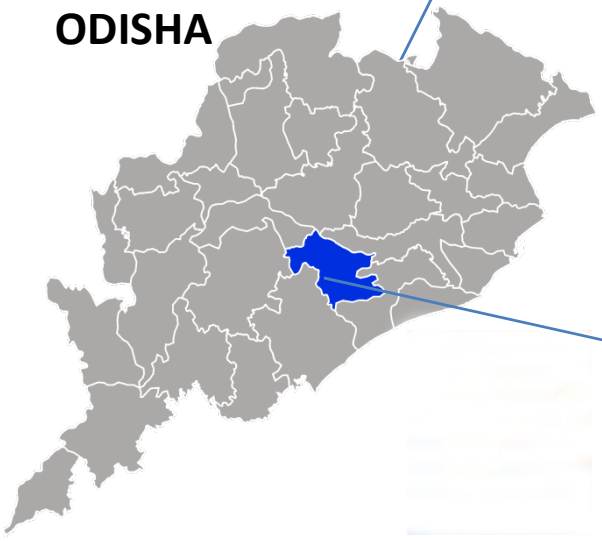
LIST OF PLATES

DESCRIPTION	PLATE NO
INDEX MAP OF THE DISTRICT	1
MAP SHOWING TAHASILS	2
ROAD MAP OF THE DISTRICT	3
MINERAL MAP OF THE DISTRICT	4
LEASE/POTENTIAL AREA MAP OF THE DISTRICT	5

PLATE NO- 1

INDEX MAP

ODISHA



NAYAGARH

PLATE NO- 2

MAP SHOWING THE TAHASILS OF NAYAGARH DISTRICT

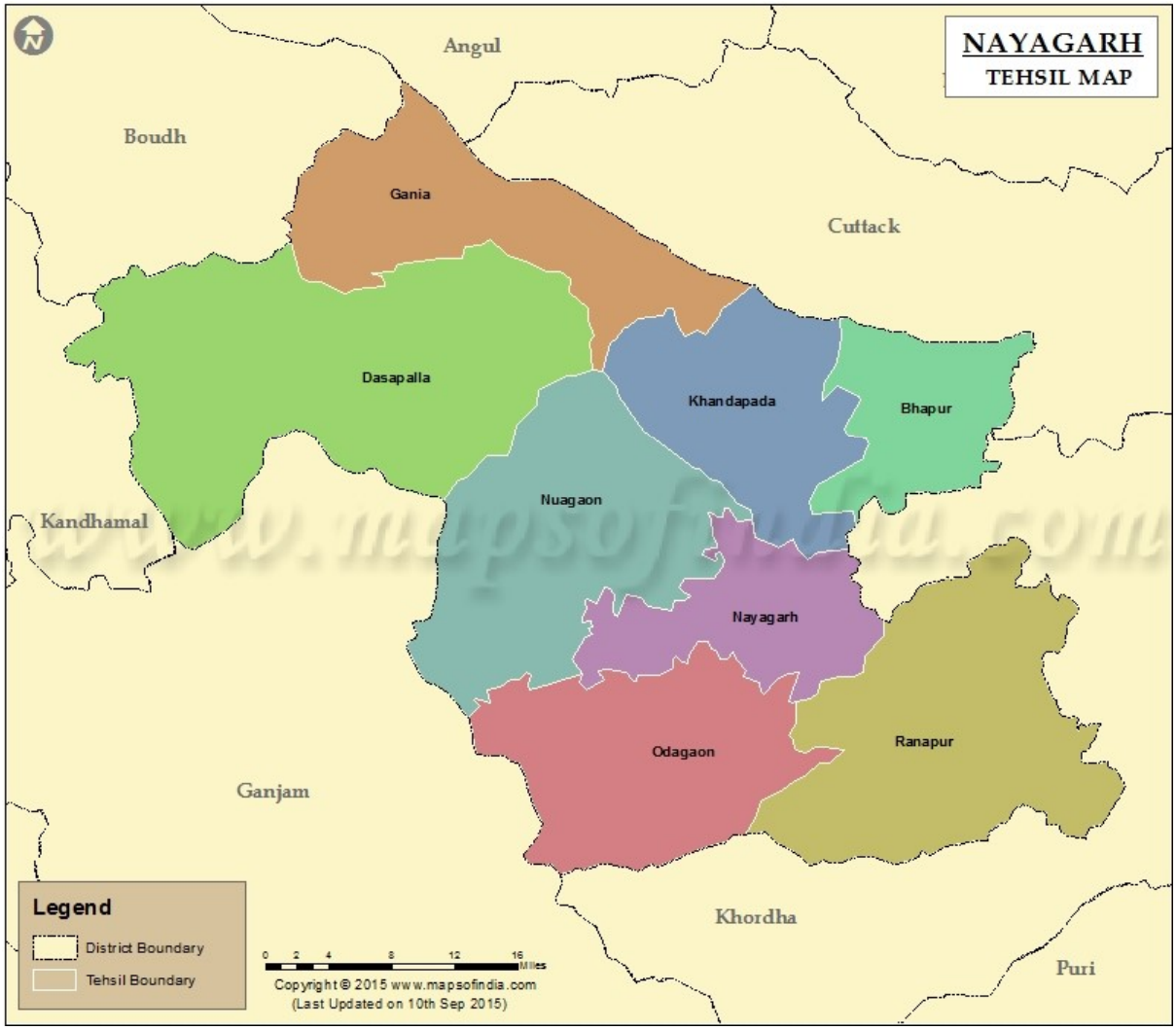
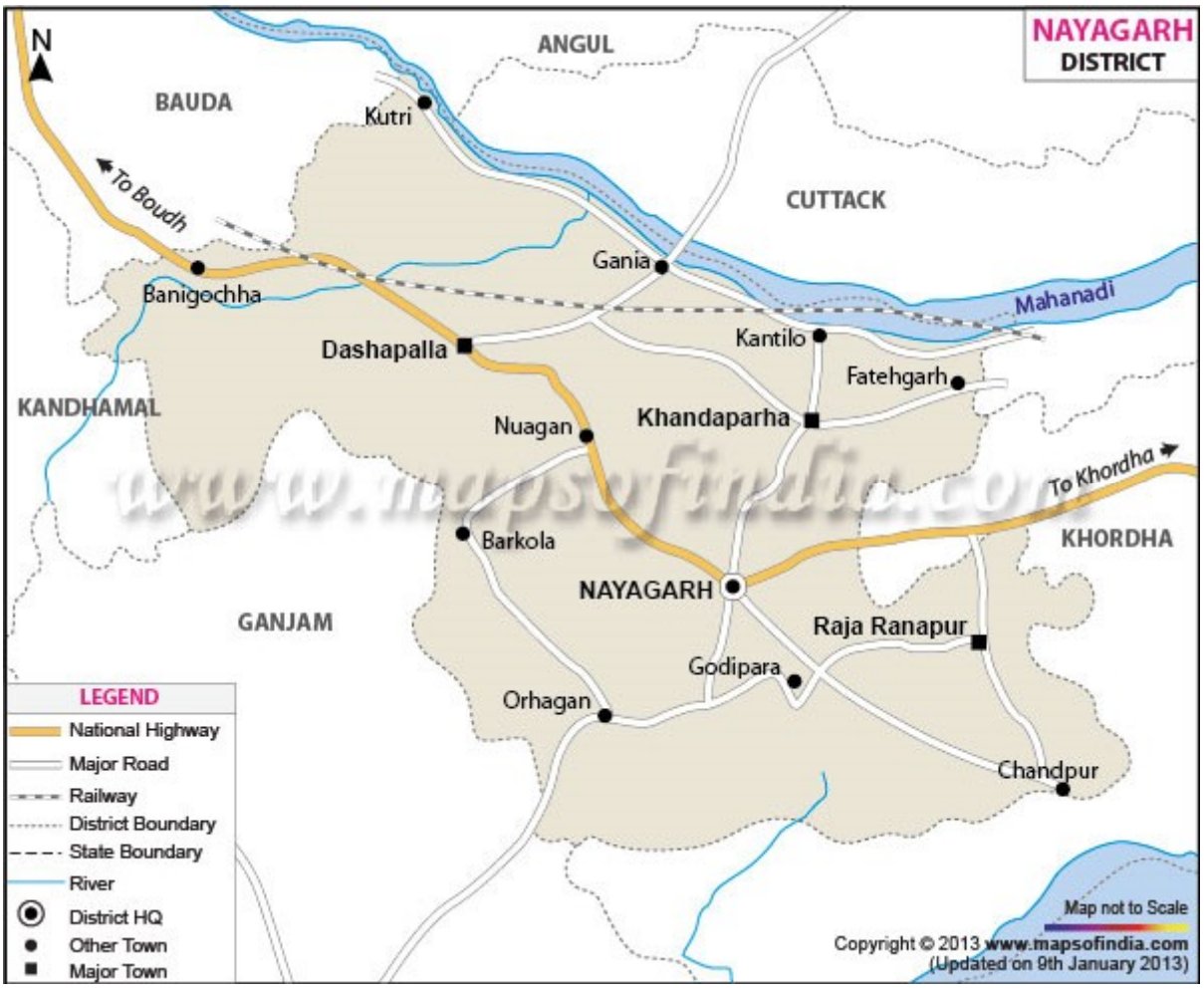


PLATE NO- 3

MAP SHOWING THE MAJOR ROADS OF NAYAGARH 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 road metal/building stone mining locations, future potential areas and overview of road metal 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

The Nayagarh district is located towards the west of Puri district surrounded by Cuttack district in the North, Phulbani district in the West, Ganjam district in the South and Khurda district in the East. It lies between 19°54' to 20°32' North latitude and between 84° 29' to 85° 27' East longitude. It has an average elevation of 178 meters (583 feet). This town has Rukhi mountain to the South and Balaram mountain in North. These mountains mitigated the effects of the 1999 Odisha Cyclone on Nayagarh. This district is situated in the hilly ranges in the West and its North Eastern part has formed a small well cultivated fertile valleys intersected by small streams. It's in the higher altitude than the sea level and above flood level. The River Mahanadi flows in the Eastern boundary.

From the history of Nayagarh district it reveals that the district was founded by Suryamani of Baghela dynasty who had came to Puri on a pilgrimage from "Rewa" of Madhya Pradesh. He had built his fort here and adopted Tiger Head as a state symbol. Ninth king of this dynasty "Bagel Singh" (1480–1510) shifted his capital to the district. As per his name this place was known as "Baghua Nayagarh". He was a Vaishnavite and is known to have made small

icons of Shree Vigraha Chaturdha Murty and installed the deities in a mudaltar on the foot hill of Balarama for the first time in the history of Nayagarh district.

During the rule of 12th King of Nayagarh District, Raghunath Singh (1565–1595) had already captured Odisha and the king Mukunda Dev (1565) was defeated in Gohritikira and died. Taking advantage of the flaccid political situation, Raghunath Singh attacked Ranapur and captured Odgaon, Sarankul and Baunsiapara area from Ranapur estate and took control of the Nayagarh–Daspalla border area from the King of Boudh and Sunamuhin area of Odgaon from the King of Ghumusar. He also captured a portion from Banpur.

Just before his death, the King Ragunath Singh divided his estate between his three sons. Harihar Singh got Nayagarh and Jadunath Singh got four Khandagrams (large area of land) which was known as Khandapara later. It was his heirs from here on that ruled Nayagarh until it was captured by the Britishers.

2. OVERVIEW OF MINING ACTIVITIES IN THE DISTRICT.

As per Schedule-IV of OMMC Rules'2016, the Mining Officer, Cuttack isthe competent authority of Specified Minor Minerals of the district. In Nayagarh district, presently there isexistence of one no. of Specified Minor Mineral i.e. Decorative Stone. There are2nos. of Decorative Stone Mining Lease (ML) and one no. of Prospecting License (PL) of Decorative Stone. Out of the said 2 nos. of Mining Leases, one Mining Lease is in village Dimiritadi under Dasapalla Tahasil of Nayagarh district which has been executed in favour of Maa Chandeswari Granites over an area of 5.504 hects.for a period of 30 years i.e.from 29.01.2018 to 28.01.2048 which has started its operation since January'2019 .

Another Mining Lease is in village Bhatagada under Dasapalla Tahasil of Nayagarh district which has been executed in favour of Maa Chandeswari Granites over an area of 15.766 hects.for a period of 30 years i.e.from

13.11.2018 to 12.11.2048 in which mining operation has not been commenced till date.

There is also aProspecting license in this district which is located at Kudabadi village over an area of 38.077 hects granted in favour of SGS Mines & Industries Pvt. Ltd. for a period of 2years i.e.from 14.02.2019 to 13.02.2021. The said Prospecting License is in operative condition.

(b) Other than the above mentioned minerals, minor minerals such as river sand, laterite slabs, building stone/black stone/road metals, morrum etc. are also available in the district.

3. GENERAL PROFILE

a. Administrative set up:

Sl No	Item	Unit	Magnitude
1	Location		
	Longitude	Degree	$84^0$29' to $85^0$27'East
	Latitude	Degree	19^0 54' to $20^0$32' North
2	Geographical area	Sq.Km.	3890
3	Sub-division	Numbers	1
4	Tahasils	Numbers	8
5	C D Blocks	Numbers	8
6	Municipalities	Numbers	-
7	NACs	Numbers	5
8	Police Stations	Numbers	14
9	Gram Panchayats	Numbers	194
10	Villages	Numbers	1692
	Inhabited	Numbers	1541
	Uninhabited	Numbers	151
11	Assembly constituencies	Numbers	4

b. Area and Population:

The district has an area 3890 Sq. Kms and 9.63 lakh of population as per 2011 Census. The district accounts for 2.50 percent of the State's territory and

shares 2.29 percent of the State population. The density of population in this district is 248 person Per Sq. Km as against 270 person Per Sq. km of the State. As per 2011 Census the Schedule Caste population was 136399 (14.20 %) and Schedule Tribe population was 58691 (6.10 %). The literacy percentage of the district covers 80.42 against 72.90 of the State. The decennial growth rate as per 2001-2011 was 11.40% as against 14.00% of the State.

c. Climate :

The climate condition of the district is generally hot and high humidity during April to May and cold during November to December. The monsoon generally breaks during the month of July, Average annual rainfall of the district was 1219.7 mm during 2017, which is lower than the normal rainfall 1354.3 mm.

d. Agriculture:

During the year 2017-18 the net area sown was 119 thousand hectares against 5356 thousand hectares of the state. The production of was as below:

Name	Paddy	Wheat	Maize	Mung	Biri	Kulthi	TilL	Groundnut	Mustard	Potatoes	Jute	Sugarcane
Production in 000 MT	189.56	0.19	12.85	24.50	6.89	2.87	0.64	1.70	0.71	2.40	0.00	106.04

During 2017-18, the total fertilizers used in the district was about

Type of fertiliser	Nitrogenous	Phosphatic	Pottasic	Total	Consumption per Ha
Quantity in MT	5684	2307	1184	9175	44.48

e. Transport & Communication:

Railway route length (14-15) km	-
No of Rly stations and PH(14-15)	-
Forest road (17-18) km	370.11

National Highway (16-17) km	98.93
State Highway (17-18) km	92.62
Major district road (17-18) km	40.33
Other dist road (17-18) km	555.74
Rural road(17-18) km	648.71
Inter village road (16-17) km	2596.92
Intra village road (16-17) km	1784.83

f. Health:

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

Sub divisional hospitals including mobile	0 No
Beds facilities	650 No
Homoeopathic dispensaries	15 No
Ayurvedic dispensaries	20 No

g. Tourist places:

There are 8 nos. of tourist centres such as Nilamadhava (Kantilo), Baramul, Tarabalo, Raghunath Jew (Odagaon), Ladubaba (Sarankul), Nayagarh, Jamupatna, Maa Maninaga Devi (Ranapur), Deer Park (Near Kuanria Dam, Dasapalla), Kuturi, Udayapur, Gokulananda Ashram, Sidhamula Panchupalli pragana and Jogi-jogiani. During 2015 the numbers of Domestic tourists were 1371035 who visited the tourists spots of the district.

h. Forest areas:

Category of forest	Area in sq km
Reserve Forest	1301.99
Unclassified Forest	0.25
Demarcated Protected Forest (DRF)	188.03
Undemarcated Protected Forest	135.58
Other forest under	455.12

Revenue Dept	
Total	2080.97

i. Education:

Primary School (2017-18)	No. of Schools	762
	Enrolment (No)	71025
	Pupil Teacher Ratio	16.44
Upper Primary School 2017-18	No. of Schools	477
	Enrolment (No)	43867
	Pupil Teacher Ratio	16.87
Gerneral College 2017-18	Junior	41
	Degree	26
Secondary School	No. of Schools	245
	Enrolment (No)	30345
	Pupil Teacher Ratio	23.41
Literacy Rate, 2011	Male	88.2
	Female	72.0
	Total	80.4

j. Culture & Heritage:

The culture of Nayagarh is a composite culture of heterogeneous faiths, with the presence of a good number of Semitic and Islamic followers. The aboriginal 'Savaras' and Kandhas are the indigenous people of Nayagarh District.The Aryans came later. The Brahmins are mostly the outsiders, invited by the Khatriya rulers to be engaged as priests in the temples and for other holy rites. The archeological remains with their inscriptions, temples, churches, mosques, forts, folk dances, art, sculptures, handicrafts and festivals of this district displays its rich cultural heritage. In 2003, seven copper plates dating back to early 9th and 10th Century A.D were discovered while excavating an old well in the village Dhanchengada in Bhapur Block of Khandapara Assembly Constituency and they have inscriptions on them. The Somanth Temple complex at Govindpur near Nayagarh has also stone inscriptions.

The right side entrance door of Kaunri Thakurani and the front entrance door (inner side) of Beleswar Mahadev, have two inscriptions which are yet to be deciphered. Another inscription is found on the foot–post of Goddess Sita in

Raghunath Temple at Odagaon that reads "Shakabda Saramangalya Rutusya Odanayak".

Buddhist shrine at Anala Patta, Nilamadhaba Temple at Kantilo, Raghunath and Jagannath Temples throughout the District and other Vaishnavite, Shaiva and Shakta shrines are also the symbols of the art and culture of the District. Also are present many forts and buildings in this District that symbolizes its rich art and cultural heritage. The important folk dances of this District are Ghantakalasa (Similisahi, Nayagarh), Danda Nrutya (Itamati), Dhena Koila (Similisahi), Khanjani (Balugaon), Singi Baza (Daspalla), Dhumpa (Khandapara), Ghuduki (Ranapur), Dholamahuri (Lathipada), Paika Akhada (Lathipada, Olasa), Adivasi–Nritya (Banigochha) and Janu–Ghanta. Kantilo is famous for its brass works.
It is to mention here that, Millennium Talent Cup, the first of this kind in the world has the distinction of becoming the world's tallest cup and was made by the Kansaries of Kantilo for Odisha Institute of Educational Research, Bhubaneswar. Kantilo is also famous for brass works.

Odagaon is famous for stone sculptures. It may be noted here that all most all the temple architects of Odisha hail from Odagaon. Govind Chandra Sur Deo of Nayagarh was an eminent mural painter. All the mural and wall paintings in the temple of Lord Jagannath at Nayagarh is his works. Khandapara is famous for jute handicrafts and Situlia communities of Gania are eminent sculptors of Terracotta. Ravanapodi at Daspalla, festival of Dakhinakali at Nayagarh, Shivaratri of Ladukeswar at Saranakul, Sriram Navamai at Odagaon, Pana Sanakranti, , Kantilo Mela and Car Festival at Nayagarh, Khandapara, Daspalla and Ranpur are the important festivals celebrated in this District. It needs special mention here that the Chariots of Lord Jagannath, Balabhadra and Subhadra of Ranpur are 2nd in height only next to the Chariots of Puri Car Festival.

4. GEOLOGY

In the district, the oldest rocks are represented by Eastern Ghat Supergroup of Archaean age. The Eastern Ghat Supergroup comprises of khondalites and charnockites (acid, intermediate and basic). Khondalites and charnockites occur as isolated residual hills throughout the district. Khondalite group of rocks comprise garnet-quartz-feldspar-graphite schist, gneiss, granetiferous and sillimanite quartzite and leptynite. Granite gneiss and biotite granite of Archaean age represent major country rock of the district. In the eastern part of the district, residual soil is widespread, while laterite occurs as patches in the southern part. A shear zone trending WNW-ESE, identified by the presence of mylonite and crushed zone stretches for 24 Km. along the southern bank of Mahanadi.

STRATIGRAPHY:

The geological succession in the district is as follows:

Age	Supergroup	Group	Litho
Pleistocene to Recent			Residual Soil
Cainozoic			Laterite
Archaean	Eastern Ghat		Granite Gneiss/ Biotite Granite
			Quartz Vein
		Charnockite	Charnockite (Acid & Intermediate)
			Charnockite (Basic)
		Khondalite	Quartz-Garnet-Sillimanite Gneiss/ Schist
			Leptynite

Minerals:

Graphite: Graphite deposits are located around Sanaperi, Gochhabari(Dungiastaila), Gochhabari(Makastaila) and Sanasillinga, Takara and Narachipara area of the district. The Fixed Carbon in these graphite deposits ranges from 7.83% to 16.4%.

Semiprecious stone: Occurrences of semiprecious stone are reported around Dimiripat, Malaspadar and Sagarbhanga area of the district.

Dimension and Decorative stone: Occurrences of Decorative & Dimension stone around Chaupalli, Mardarajpur, Khunta bandh, Singhpada, Khandapada, Sunamundhi, Kantilo, Laxmiprasad, Bebartapur, Malisahi, Bhandarparbat, Damasahi, Kabti hill and Kailama etc. are note worthy. A total resource of 2.2836 million cubic meter has been estimated in the district. Apart from this, Berhampur blue (Granetiferous granite gneiss) at Bhalumundia with recoverable reserve of 0.9 million cubic meter and multi colour granite (Granetiferous granite gneiss) at Bedangi with recoverable reserve of 0.108 million cubic meter has been reported in the district.

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.

5. DRAINAGE AND IRRIGATION PATTERN.

The Mahanadi, Burtanga, Kaunria, Kamai, Budha nadi constitute the major drainage system of the district. The drainage is mainly dendritic, radial & centripetal in nature. Hot springs have been reported at Tarabalo near the village Nilakantha prasad. At Tarabalo, the patches of warm water (mud pool) in an elevated area cover about 1,500 Sq.m through which hot water oozes out. The temperature is about 57 degree centigrade and has a feebly sulphorous odour. The discharge is found to be 0.3 lps.

6. LANDUSE PATTERN

Sl No	Landuse	Area in '000Ha
1	Forest Area	208
2	Misc. trees & Grooves	6

3	Permanent Pasture	4
4	Culturable Waste	5
5	Land put to Non Agril Use	25
6	Barren & Unculturable Land	5
7	Current Fallow	15
8	Other Fallow	1
9	Net Area Sown	119
10	Mining	1
	Geographical Area	389

7. SURFACE WATER & GROUND WATER SCENARIO

This district comes under eastern ghats climate and type of terrain Is mostly undulating. As the terrain is undulated most of the rainfall flows as Surface run off to the river or nallas. Hence it is highly essential to promote extension activities relating to water harvesting and water management. Similarly, steps have to be taken for creation of major and medium Irrigation projects to make optimum utilisation of surface water.

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	1.08	0.5	0.7	1.0
Maximum	10.4	6.5	7.0	8.5

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 45^0C in the summer and up to 7^0-8^0 C during peak winter.

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

Year/ Month	April	May	June	July	August	September	October	November	December	January	February	March	Total
2015-16	627.2	343	1248.7	1594.9	2141	2029.1	298.66	43.5	261.76	82.4	129.6	133.2	**8932.97**
2016-17	76.7	869.5	1158.4	2193.9	1859.8	2004.3	686.56	22.2	0	2	0	476.4	**9349.68**
2017-18	67.2	246.9	1063.5	2539.5	2038	1465	1453.2	395.71	9.8	0	0	0	**9278.79**
2018-19	483.3	852.8	809.85	3182.4	1505.4	2102.4	1875.9	0	394.1	37.1	238.3	0	**11481.61**
Average	**156.80**	**578**	**535.05**	**1188.8**	**943.04**	**930.11**	**539.29**	**115.36**	**125.73**	**15.19**	**45.99**	**76.2**	**5249.64**

9. DETAILS OF MINING LEASES

No quarry lease has been granted and hence not applicable.

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

Attached as Annexure I.

14. TOTAL MINERAL RESERVE AVAILABLE IN THE DISTRICT

Total mineral reserve of laterite slab is 11,62,709 cum which may increase after detail investigation.

Details of the potential areas submitted as Annexure II.

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 tentative annual demand is to the tune of 1,00,000 cum of laterite slabs and is mainly supplied from different tahasils of the district and adjoining districts of Ganjam and Khordha.

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

Not applicable.

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 NOx , SO2 and CO emissions, usually at low levels. Dust can be of significant nuance surrounding land user and potential health risk in some circumstances.

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.

Noise Impact

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

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.

Impact on Flora & Fauna

The impact on biodiversity is difficult to quantify because of it's 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.
- 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 diction 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 to 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.
- 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 sewage from site office & urinals/latrines provided within ML/QL areas is to be discharged in septic tank followed by soak pits.

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 excavtion 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.

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.
- 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 retaning 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.

Details of occupational health issues in the district since last 5 years.

There is no case of Silicosis found in the district within the last five years.

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

ANNEXURE I

LATERITE SOURCES ALREADY AUCTIONED BUT NOT EXECUTED (LOI ISSUED) IN THE DISTRICT

Sl. No.	Name of Tahasil	Name of village/Date of Registration of lease deed	Name of Minor Mineral	Name of the Successful auction holder	Address & Contact No of Letter of Intent Holder	Letter of Intent Grant Order No. & date	Validity of LoI	Use (Captive/ Non-Captive)	Location of the Source recommended for mineral concession (GPS co-ordinates or Khata & Plot No) (Sketch map to be attached)	Longitude			Lattitude			Area of the mineral potential patch (in sq m)	Mineable mineral potential (in cum)
										Degree	Minute	Second	Degree	Minute	Second		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	Odagaon	Rohibank	Latrite stone, Area -0.506 Ha	Madhab Chandra Sahoo	At-Bhagabati Prasad, Po-Rohibank,P.S Odagaon Dist. Nayagarh Mob. 9479200255	399/ dt. 6.2.2018	2017-18 to 2022-23	Non-Captive	Mouza- Rohibank, Khata No. 417, Plot No. 1716,1717,1718,1719,1732							18125	25000.2
2	Odagaon	Komanda	Latrite stone, Area -0.275 Ha	Tukuna Patra	At-/Po Komanda, P.S Odagaon Dist. Nayagarh	400/6.2.2018	2017-18 to 2022-23	Non-Captive	Mouza- Komanda , Khata No.817, Plot No. 3334							9860	8258.4

ANNEXURE II

POTENTIAL OF LATERITE SLAB IN THE DISTRICT

Sl. No.	Name of Tahasil	Name of village /Date of registration of lease deed	Status	Name of Minor Mineral	Location of the Source (Total Hillock) recommended for mineral concession (GPS co-ordinates or Khata & Plot No) (Sketch map to be attached)	Longitude			Latitude			Area of the mineral potential patch (in sq m)	Mineable mineral potential (in cum)
						Degree	Minute	Second	Degree	Minute	Second		
1	2	3	4	5	6	7	9	10	11	12	13	14	15
1	Ranpur	**Ostapada**	**New**	**Laterite stone 1.214 Hac.**	**kh.no-216 Pl. No-1093 85 25' 50" to 19 59' 02"**	**85**	**25**	**50**	**19**	**59**	**02**	**12,140 m2**	**50,000**
2	Ranpur	**Ostapada**	**New**	**Laterite stone 1.011 Hac.**	**kh.no-216 Pl. No-1107 85 25' 48" to 19 59' 01"**	**85**	**25**	**48**	**19**	**59**	**01**	**10,110 m2**	**40,000**
3	Ranpur	**Ostapada**	**New**	**Laterite stone 1.214 Hac.**	**kh.no-216 Pl. No-1109 85 25' 53" to 19 59' 01"**	**85**	**25**	**53**	**19**	**59**	**01**	**12,140 m2**	**50,000**
4	Ranpur	**Ostapada**	**New**	**Laterite stone 0.607 Hac.**	**kh.no-216 Pl. No-1194 85 25' 51" to 19 59' 03"**	**85**	**25**	**51**	**19**	**59**	**03**	**6,070 m2**	**25,000**

5	Ranpur	**Borobor a jhara**	**New**	**Laterite stone 1.618 Hac.**	**kh.no-716 Pl. No-1648 85 25' 24" to 20 00' 27"**	**85**	**25**	**24**	**20**	**00**	**27**	**16,180 m2**	**65,000**
6	Ranpur	**Borobor a jhara**	**New**	**Laterite stone 0.242 Hac.**	**kh.no-716 Pl. No-1761 85 25' 24" to 20 00' 26"**	**85**	**25**	**24**	**20**	**00**	**26**	**2,420 m2**	**10,000**
7	Ranpur	**Borobor a jhara**	**New**	**Laterite stone 1.821 Hac.**	**kh.no-716 Pl. No-384 85 25' 46" to 20 01' 15"**	**85**	**25**	**46**	**20**	**01**	**15**	**18,210 m2**	**75,000**
8	Ranpur	**Barabar Jhara**	**New**	**L.S 0.404 Ha**	**kh.no-713 Pl. No-233 85 26' 05" to 20 01' 36"**	**85**	**26**	**05**	**20**	**01**	**36**	**4,040**	**16,000**
9	Ranpur	**Barabar Jhara**	**New**	**L.S 1.011 Ha**	**kh.no-713 Pl. No-248 85 26' 01" to 20 01' 39"**	**85**	**26**	**01**	**20**	**01**	**39**	**10,110**	**40,000**
10	Ranpur	**Jankia**	**New**	**L.S 0.679 Ha**	**kh.no-757 Pl. No-513 85 24' 19" to 19 59' 54"**	**85**	**24**	**19**	**19**	**59**	**54**	**6,790**	**28,000**
11	Ranpur	**Jankia**	**New**	**L.S 1.618 Ha**	**kh.no-760 Pl. No-92 85 23' 23" to 19 59' 16"**	**85**	**23**	**23**	**19**	**59**	**16**	**16,180**	**65,000**
12	Ranpur	**Mayurj halia**	**New**	**L.S 1.618 Ha**	**kh.no-495 Pl. No-1689 85 24' 51" to 19 59' 46"**	**85**	**24**	**51**	**19**	**59**	**46**	**16,180**	**65,000**
13	Ranpur	**Krushna Chandr a pur**	**New**	**L.S 0.242 Ha**	**kh.no-175 Pl. No-824 85 25' 21" to 19 58' 47"**	**85**	**25**	**21**	**19**	**58**	**47**	**2,420**	**10,000**
14	Ranpur	**Krushna Chandr a pur**	**New**	**L.S 0.242 Ha**	**kh.no-172 Pl. No-886 0.242 Ha 85 25' 22" to 19 58' 48"**	**85**	**25**	**22**	**19**	**58**	**48**	**2,420**	**10,000**

15	Ranpur	Krushnachandrapur	**New**	L.S , 0.145 Ha	khata no. 172 Plot no. 885 85 21 29 to 19 58 55	85	21	29	**19**	**58**	**55**	1450	6090
16	Ranpur	Brundabanbihari	**New**	L.S 2.54,Ha	Khata No.130 Plot No.571 85 24 39 to 19 57 42	85	24	39	**19**	**57**	**42**	25400	100000
17	Ranpur	Brundabanbihari	**New**	L.S, 2.4	Khata No.127 Plot no. 553 85 24 39 to 19 57 43	85	24	39	**19**	**57**	**43**	24000	100000
18	Ranpur	Upendrapur	**New**	L.S 0.58	Khata no. 228 plot No. 59 85 24 40 to 19 57 43	85	24	40	**19**	**57**	**43**	5800	24360
19	Ranpur	Muktapur	**New**	L.S 0.58	Khata No. 274 plot no 359 85 24 46 to 19 58 15	85	24	46	**19**	**58**	**15**	24800	100000
20	Ranpur	Muktapur	**New**	LS 1.80	Khata NO. 274 Plot nno.557 85 24 45 to 19 58 15	85	24	45	**19**	**58**	**15**	1800	75000
21	Ranpur	Muktapur	**New**	L.s 2.8 Hac	Khata no.274 plt no 1044 85 24 45 to 19 58 44	85	24	45	19	58	44	28000	115000
22	Ranpur	Muktapur	**New**	L.S 1.44	Khata No. 274 Plot No.564 85 25 02 to 19 58 26	85	25	02	19	58	26	14400	60000
23	Odagaon	Rohibank	LOI Issued	Latrite stone, Area -0.506 Ha	Mouza- Rohibank, Khata No. 417, Plot No. 1716,1717,1718,1719,1732							18125	25000.2
24	Odagaon	Komanda	LOI Issued	Latrite stone, Area -0.275 Ha	Mouza- Komanda , Khata No.817, Plot No. 3334							9860	8258.4

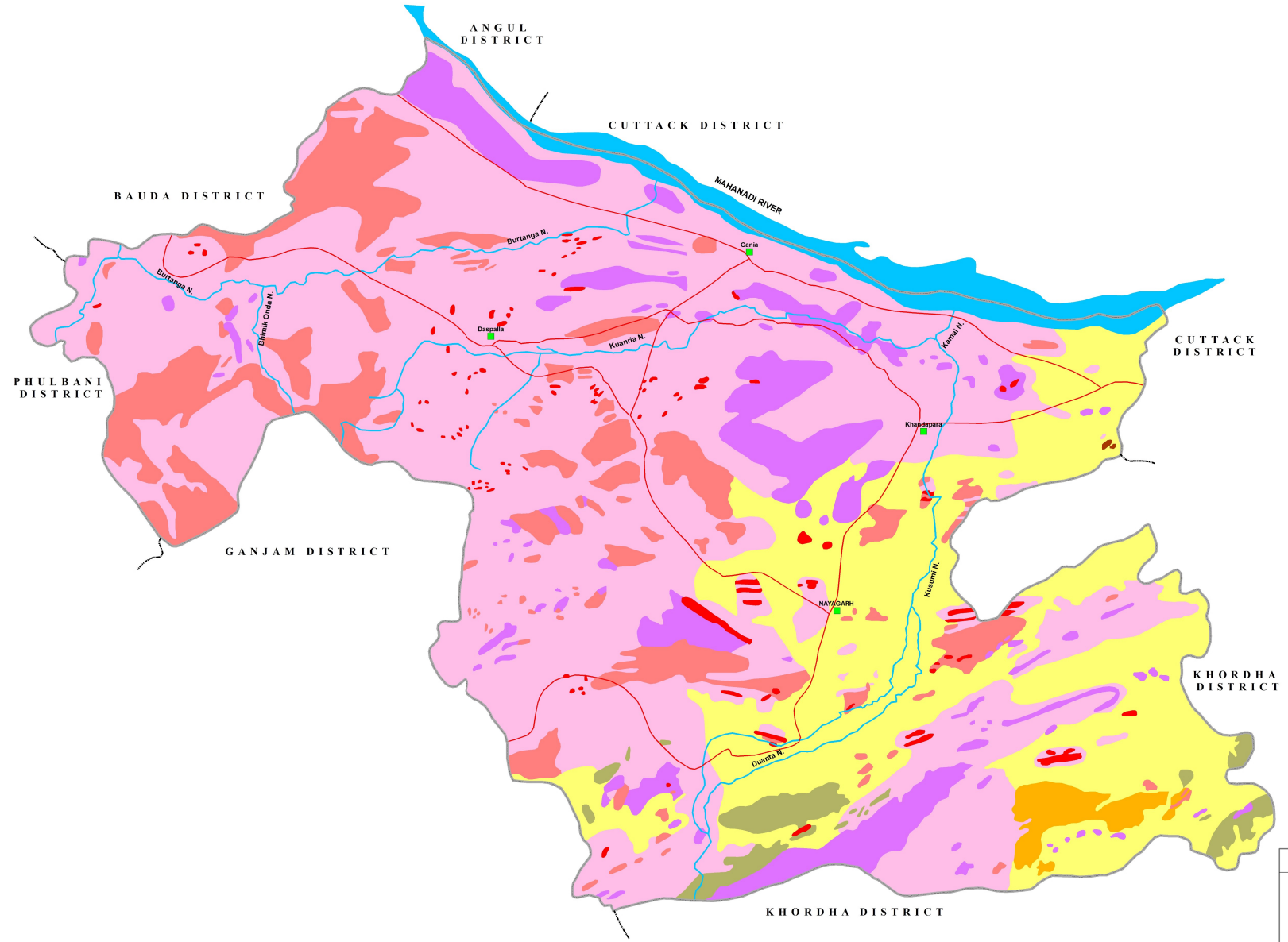
MINERAL MAP OF NAYAGARH DISTRICT

SCALE :- 1:130,000

Kilometers

0 2.5 5 10 15 20

PLATE NO-4



Legend

- Block Headquarter
- District Boundary
- NH Road / SH Road/Major District Road
- River/Lake/Waterbody
- Residual soil
- Laterite
- Granite gneiss/ biotite granite
- Quartz vein
- Charnockite (acid & intermediate)
- Charnockite (basic)
- Quartz garnet sillimanite gneiss/ schist
- Leptynite

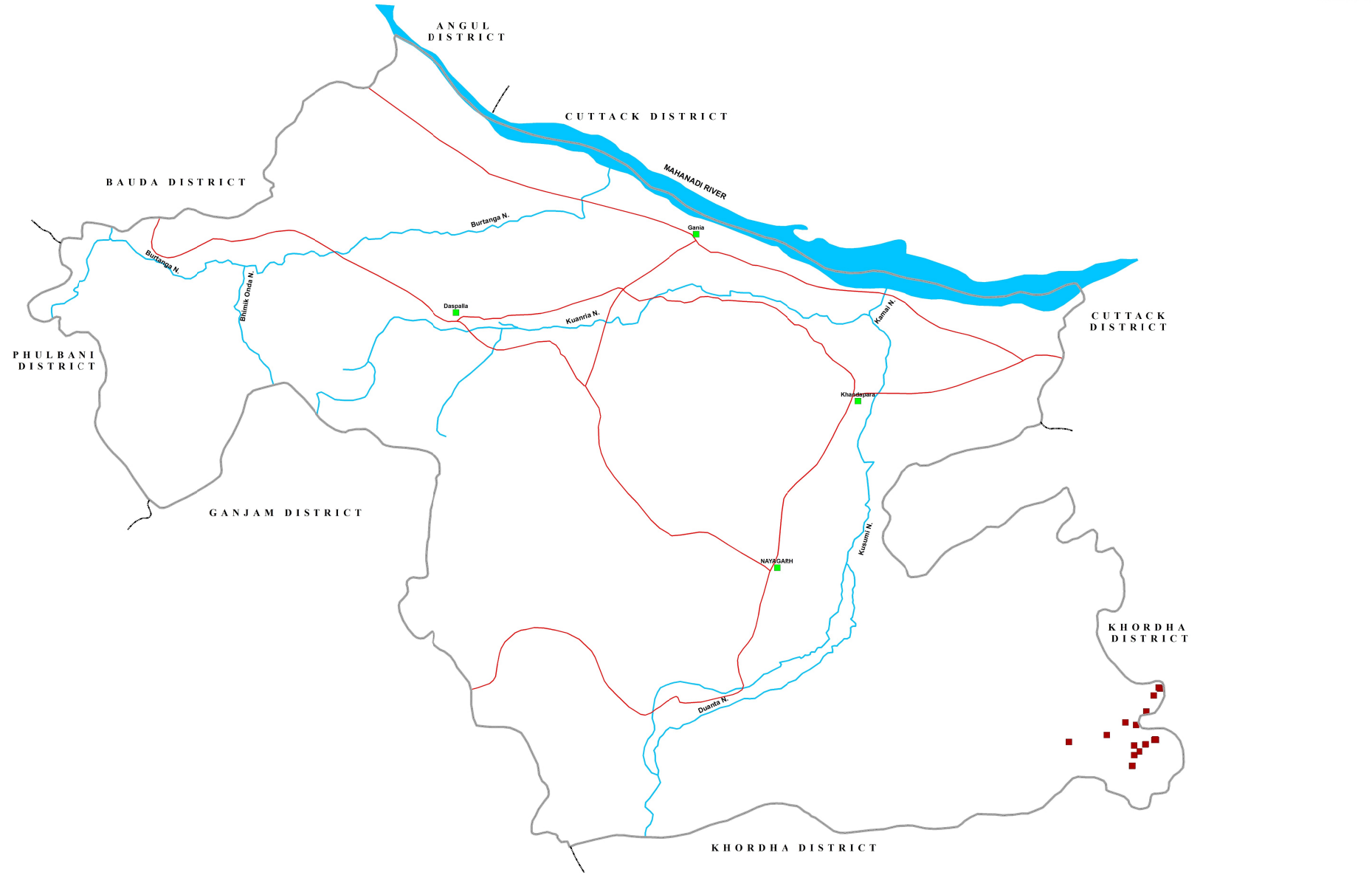
LEASE/POTENTIAL MAP OF LATERITE IN NAYAGARH DISTRICT

SCALE :- 1:130,000

Kilometers

0 2.5 5 10 15 20

PLATE NO-5



Legend

- Block Headquarter
- District Boundary
- NH Road / SH Road/Major District Road
- River/Lake/Waterbody
- Lease/Po:ential Area for Laterite