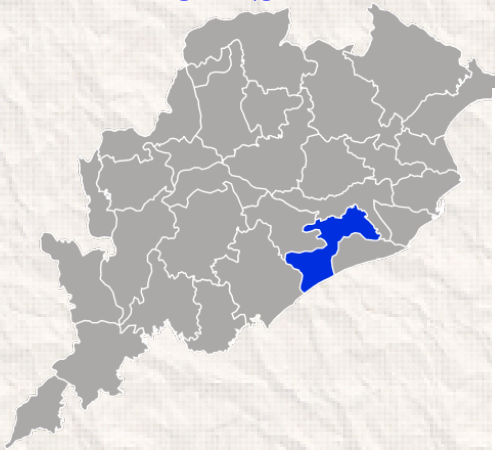




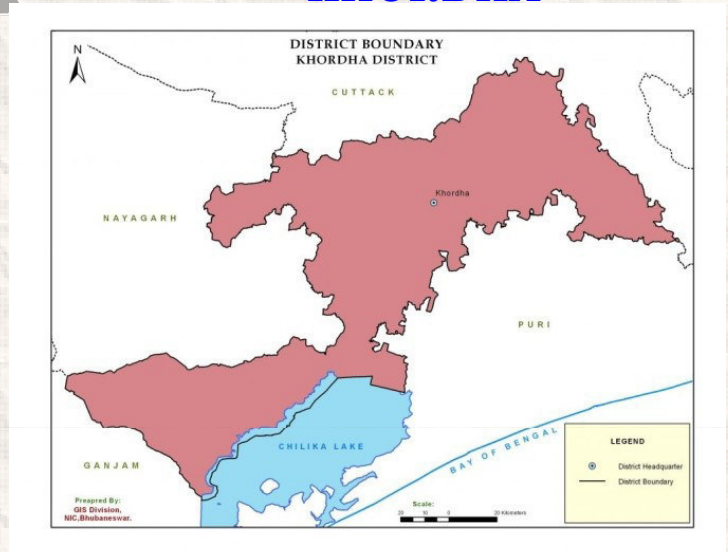
DISTRICT SURVEY REPORT (DSR) 2020 OF KHORDHA DISTRICT, ODISHA FOR LATERITE

(FOR PLANNING & EXPLOITING OF MINOR
MINERAL RESOURCES)

ODISHA



KHORDHA



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

COLLECTORATE, KHORDHA

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	7
6	LANDUSE PATTERN	7
7	SURFACE WATER & GROUND WATER SCENARIO	8
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	9
16	USE OF MINERAL	9
17	DEMAND & SUPPLY OF THE MINERAL	10
18	MINING LEASES MARKED ON THE MAP OF THE DISTRICT	11
19	DETAILS OF AREAS WHERE THERE IS A CLUSTER OF MINING LEASES	12
20	DETAILS OF ECO-SENSITIVE AREA	12
21	IMPACT ON THE ENVIRONMENT (AIR, WATER, NOISE, SOIL FLORA & FAUNAL, LAND USE, AGRICULTURE, FOREST ETC.) DUE TO MINING	12
22	REMEDIAL MEASURES TO MITIGATE THE IMPACT OF MINING ON THE ENVIRONMENT	13
23	RECLAMATION OF MINED OUT AREA (BEST PRACTICE ALREADY IMPLEMENTED IN THE DISTRICT, REQUIREMENT AS PER RULES AND REGULATION, PROPOSED RECLAMATION PLAN)	15
24	RISK ASSESSMENT & DISASTER MANAGEMENT PLAN	16
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)	17
26	PLANTATION OF GREEN BELT DEVELOPMENT IN RESPECT OF LEASES ALREADY GRANTED IN THE DISTRICT	18
27	ANY OTHER INFORMATION	18

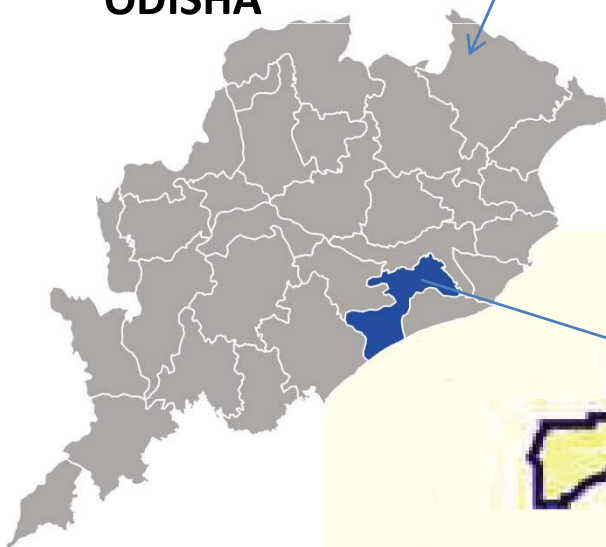
LIST OF PLATES

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

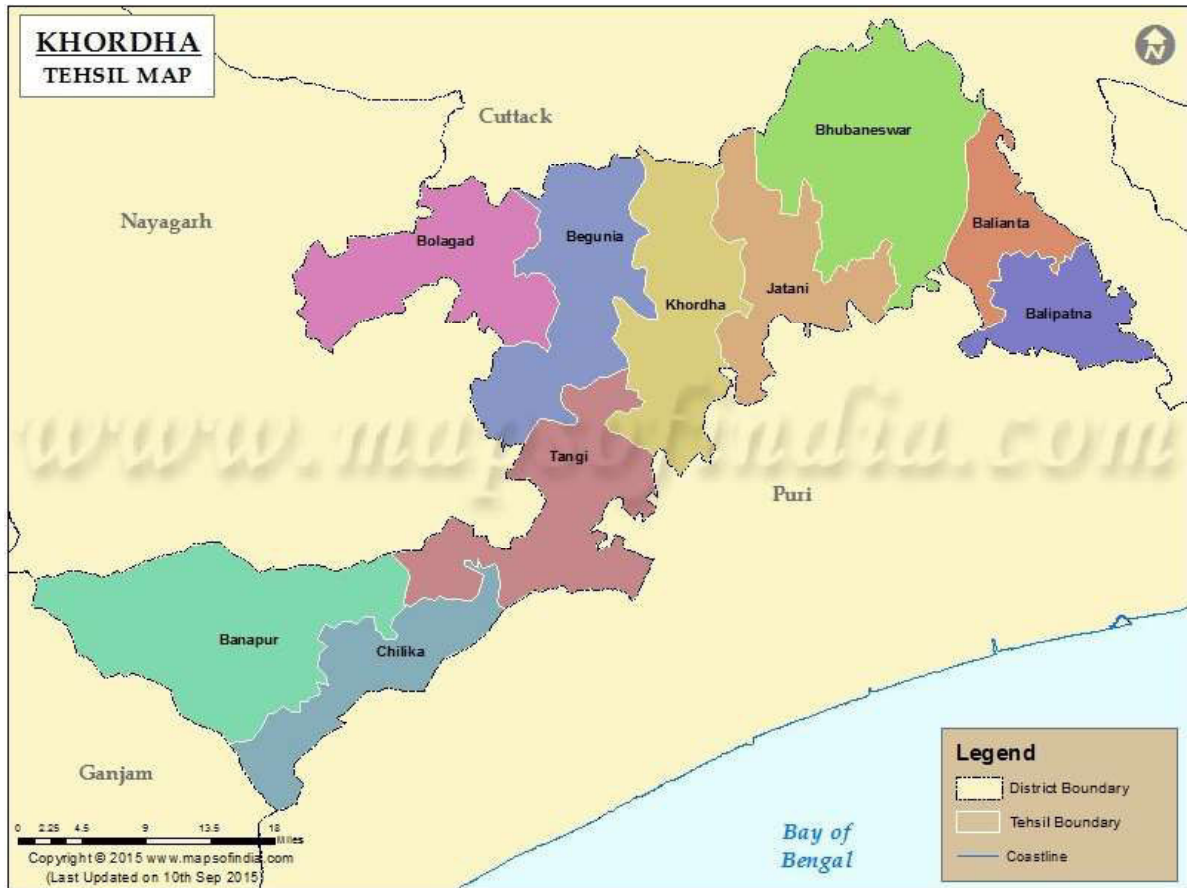
INDEX MAP



ODISHA



MAP SHOWING THE TAHASILS OF KHORDHA DISTRICT



MAP SHOWING THE MAJOR ROADS OF KHORDHA DISTRICT

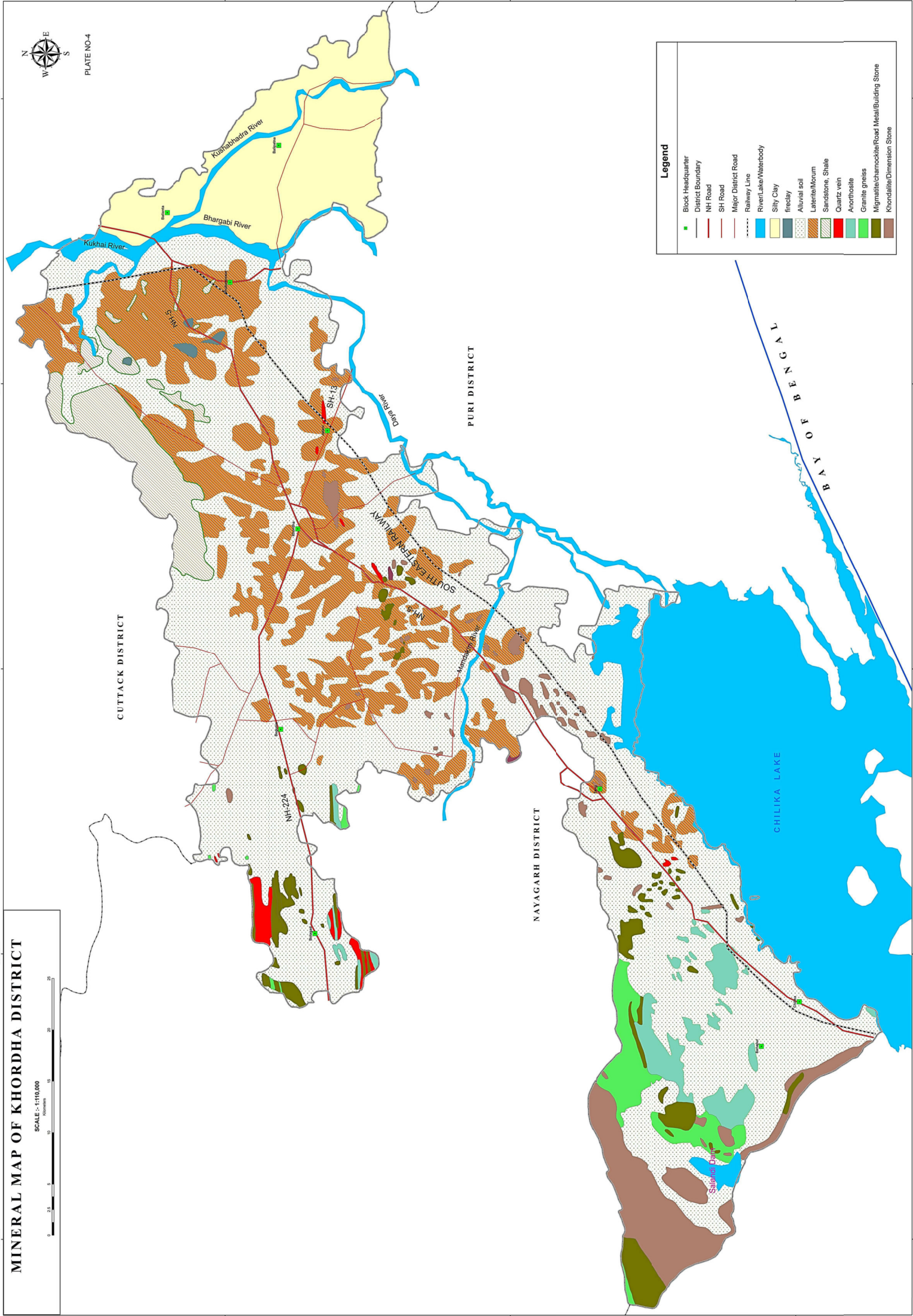


MINERAL MAP OF KHORDHA DISTRICT

SCALE = 1:110,000



PLATE NO-4



Legend

- Block Headquarter
- District Boundary
- NH Road
- SH Road
- Major District Road
- Railway Line
- River/Lake/Waterbody
- Silty Clay
- fireclay
- Alluvial soil
- Laterite/Morum
- Sandstone, Shale
- Quartz vein
- Auriferous
- Granite gneiss
- Migmatite/Charnockite/Road Metal/Building Stone
- Khondalite/Dimension Stone

85°00'E

85°15'E

85°30'E

85°45'E

86°00'E

N.051.02

N.050.02

N.057.61

85°00'E

85°15'E

85°30'E

85°45'E

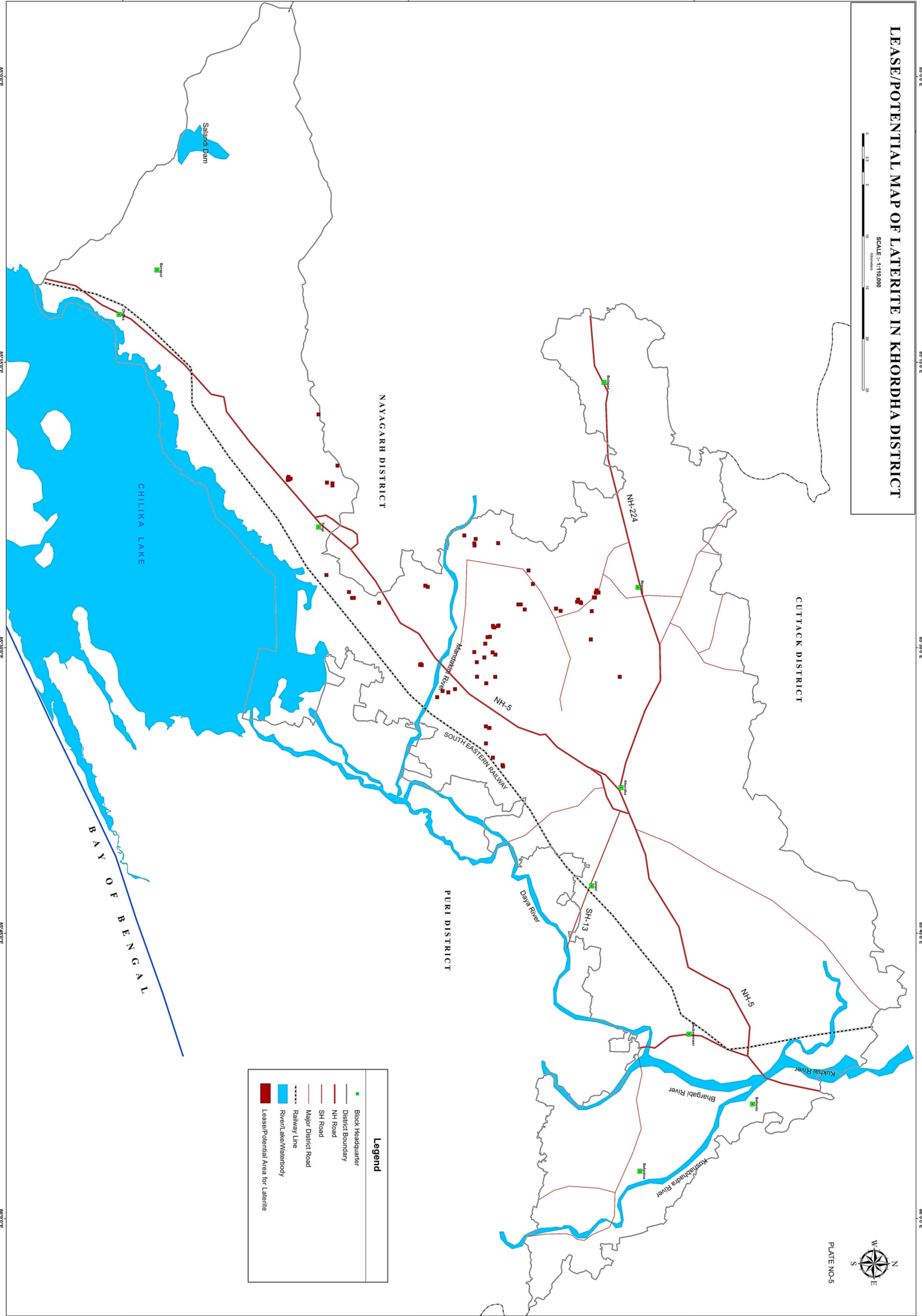
86°00'E

LEASE/POTENTIAL MAP OF LATERITE IN KHORDHA DISTRICT

SCALE - 1:110,000



PLATE NO-5



Legend

- Block Headquarter
- District Boundary
- NH Road
- SH Road
- Major District Road
- Railway Line
- River/also/Waterbody
- Lease/Potential Area for Laterite

87°00'E 87°00'E 87°00'E 87°00'E 87°00'E 87°00'E 87°00'E 87°00'E 87°00'E 87°00'E

N.0.51.02

N.0.51.02

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 laterite slab 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 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 for preparation for district survey report. The main purpose of preparation of the present District Survey Report is to update the possible mineral resources and developing the mining activities along with other relevant data of the district keeping equilibrium with the involved environmental issues.

1. INTRODUCTION

Khordha district has a unique place in history as the last kingdom to be conquered by the British in 1803. Khordha is famous for the Paik revolution of 1817 led by Jai Rajguru and Bakshi Jagabandhu Bidyadhar. The district came into being with effect from 2nd October 1992.

Khordha district is located in the south-eastern part of Odisha, adjoining the coastal area. It occupies an area of about 2887.5 sq km. The district is bounded by latitudes 19° 40' to 20° 25' and longitudes is 84° 56' to 86°05' and occupies parts of degree sheets 73 H, L, P & 74 I,A,E. It is surrounded by Cuttack district to the north, Ganjam and part of Puri district to the south, Puri district to the east and Nayagarh district to the west. Bhubaneswar – Vizayanagaram segment of the East-coast railway runs through the district along NE –SW direction. National Highway No. 16 running almost sub-parallel to the East coast railway line, passes through Khordha, the district headquarters and Bhubaneswar the state capital. Khordha is about 30 km from

Bhubaneswar and 12 km from Jatani, the nearest railway station of East coast railway. It has an average elevation of 75 m (246ft).

2. OVERVIEW OF MINING ACTIVITIES IN THE DISTRICT.

(a) In khordha district, presently there is one specified minor mineral lease i.e. for decorative stone in Village Tutumberpalli in favour of Sri Maa Granites. The lease area is 3.399 hecets. The lease has been commenced from 22.06.2015 and the lease period is for 20 years. The mining operation of the said lease is currently stopped due to want of Consent to Operate from OSPCB.

There are two other potential sources; one is located at Naranagarh village and the other at Kurumpada village of Khordha Tahasil and both are within the area of ownership of Shree Jagannath Temple Administration, Puri. Both these areas have been reserved by Govt of Odisha for ML to M/s OMC Ltd which would be supplied to Shree Jagannath Temple Administration, Puri for beautification of Puri town.

Another one located at Santasinghpur village over an area of 3.996 hecets has been under PL in favour of Sri Maa Granites which has commenced from dt. 14.02.2017 for 2 years. The final prospecting report along with ML application over the said PL area has been sent to Director of Mines, Odisha, Bhubaneswar for further examination at their end.

(b) Other than specified minor minerals such as river sand, laterite slabs, building stone/black stone/road metals etc. are also available in the district. Most of the building stone/black stone/road metals potentials are located in Khordha, Begunia and Tangi tahasils of the district. Others like laterite, morrum and earth are distributed in almost all tahasils.

3. GENERAL PROFILE

Geographical position	Longitude -84° 55' to 86° 5' Latitude- 19° 40' to 20° 25'
Area & Population	The district has an area of 2813 sq. km and 22.52 lakhs of population as per 2011 census. The district accounts for 1.81 percent of the states territory and shares 5.36 percent of the state's population. The density of population of the district is 800 per sq. Km as against 270 person per sq.km of the state. It has 1534 villages (including 178 un-inhabited

	villages) covering 10 blocks. 10 Tahasils and 2 sub-divisions. As per 2011 census the schedule caste population is 297472 (13.2%) and schedule tribe population 115051 (5.1 %). The literacy percentage of the district covers 86.9 against 72.9 of the state.
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
Industry & Mining	Khordha is an important centre of handloom industry. The lungi, napkin and saree produced here have an all Odisha market. Besides during the year 2014-15, 2187 nos. of small scale industries have been established with total capital investment of about Rs.10870.89 lakhs with 2176 nos. of Employment generated in the district. The district is also important for mining of minerals like decorative stone (Khondalite), building stone, laterite blocks, morrum & earth.
Power	Consumption of electricity in Khordha district during the year covers 1437.75 million units and revenue villages so far electrified as on 2013-14 is 1343 which constitutes 98.9 % to the total villages of the district.
Tourist Places	There are 19 nos. of tourist center such as Bhubaneswar, Dhauli, Khandgiri & Udayagiri, Nadankanan, Atri, Banapur, Barunei, Bhusandapur, Chilika (Barakul), Hirapur, Jayadev Kenduli, Gadamanitri, Rameswar, Madangiri (Mundiapada), Salia Dam-Barbara Hills, Kosalasuni, Thakuranipitha, Balipatna (Sisu Ananta Pitha), Shree Ananta Purusottam Dev (Jagulaipatna) and Sankat Mochan Mahavir Temple identified by department of Tourism and Culture, Odisha.
Transport & Communication	NH- 162.98 km SH- 25.97km Major district Road- 2555.08 km

	Other district road- 775.74 km Rural road- 1188.89 km Inter village road- 2424.00 km Intra village road- 1471.24 km Besides, 117.39 Kms. of Railway lines with 23 nos. of railway stations and passenger halts are there in the district.
Health	The medical facilities are provided by different agencies like Govt., Private individuals and voluntary organizations in the district. There were 282 nos. of the govt. Allopathic medical institutions with 965 beds facilities, 23 nos. of Homoeopathic dispensaries and 27 nos. of Ayurvedic dispensaries in the district during the year 2013-14.

4. GEOLOGY

Western & south-western part of the district is occupied by the hilly terrain of Eastern Ghats. The hilly area in the west gradually passes on to the low undulating rugged terrain towards the central part of the district. In the northern, eastern and south-eastern sides, the district is surrounded by the flood plain and deltaic deposits of Mahanadi river basin. Parts of Chilika lake and its set of tributaries are the most conspicuous geomorphic features in the south. Daya, Bhargabi, Kuakhai and Kushabhadra rivers, emerging as distributaries from Mahanadi river system, drain southerly through the eastern flank of the district and merge either with the Chilika lake or with the Bay of Bengal. Kaipadar, about 10 km south west of Khurda, marks a water divide with Ran River flowing northerly to Mahanadi and Mandakini river flowing southerly to Chilika. The highest elevation attained in the district is at 568 mts. in its southwestern corner, while Chilika represents the lowest at mean sea level.

The Major geology in the district can be broadly classified into Eastern Ghat Super Group of Archean to Proterozoic age, Proterozoic intrusive, Gondwana Super Group of Mesozoic and Pleistocene to Holocene age of Quaternary period of Cenozoic Era.

The rocks belonging to EGSG are mostly quartzite, khondalite and their variants, charnockite and pyroxene granulite. They are found mostly on the western

and south western parts of the district. The Eastern Ghat Super Group of rocks have been intruded by plugs/apophyses of anorthosite, popularly known as Banpur anorthosite/ Chilika lake complex, and are found as cluster of anorthosite bodies around Banpur, Rambha and Balugaon region in the southern & western side of Chilika lake and partly within the lake also. This pluton is emplaced in the core of an antiform (Perraju, 1960). Sarkar et al. (1981) deciphered 3 phases of folding (F_1 - F_3) in the khondalite host rocks and considered emplacement of anorthositic complex syntectonically with F_3 . Xenoliths of metasediments (khondalite and calc-silicate gneisses) and charnockite in anorthosite and locally developed pyroxene hornfels grade skarn zones indicate the intrusive nature of the complex.

The rocks of Eastern Ghat Supergroup show foliation in NE-SW direction. Joint planes, wherever present, follow the same structural alignment. A prominent fault running ENE-WSW is recorded in north-western part of the district. Major lineaments trend in NE-SW direction. The NE-SW trending lineament passing through Baghamari houses a sulphurous hot spring at Atri and is of immense tectonic significance.

Granite gneiss of Archean to Proterozoic age, exposed in the western part of the district, are well foliated and are often garnetiferous. Quartz veins cut across the granulitic country at random.

The exposures belonging to Athgarh formation of Upper Gondwanas (Lower Cretaceous) mostly occur as a cluster forming upland in the north, NE parts of the district, i.e. west of Bhubaneswar. They are comprising dominantly of sandstones classified as quartz arenite, sub-lithic arenite and lithic wacke (Mishra, 1988; Pal, 1990), characteristically lacking in feldspars in clastic components. This also includes conglomerates, grits, carbonaceous shale, variegated shale and fire clay; most of them as small lenticular bodies breaking the monotonous vastness of sandstones. Deep drilling in the coastal Odisha has indicated the extension of the formation below the alluvial cover of the Mahanadi delta and the coastal Tertiary succession (Pandya et al. 2000).

The earliest Quaternary deposit, the Bolgarh formation (Pleistocene age) occupies central and northern part of the district, overlying the khondalite group of rocks. It comprises hard crust laterite, latosol and also residual soil.

Brahmani formation (Pleistocene to Holocene) consists of residual soil and alluvium and occupies an appreciable part of the district and are particularly conspicuous in the eastern and southern part of the district adjoining Chilika lake.

Bankigarh formation (Middle to Late Holocene) is occupied by north and NE part of the district i.e. east of Bhubaneswar. It mostly comprises brownish silty clay and occur in the flood plain / deltaic plains of Mahanadi River basin.

The district lacks any major mineral deposit of economic significance. Few fire clay deposits located in the north-eastern part of the district are the only deposits of minor minerals that are being mined presently by Tata Refractories Ltd. The other deposits that are being profusely exploited as Dimension and decorative stone for construction material/polished slabs and artisan grade of khondalite around Tapanga and Kurumpada area.

Ground water occurs in the porous sedimentary formations and in the fractured igneous and metamorphic rocks in unconfined to confined conditions. The nala and gully erosion in the tributaries and distributaries of Mahanadi river basin and in Chilika lake are quite common.

Stratigraphy:

Phanerozoic	Quarternary	Mid to Late Holocene	Bankigarh Fm	Brownish silty clay
		Pleistocene to Holocene	Brahmani/ Mahanadi Fm	Residual soil and alluvium
		Pleistocene	Bolagarh Fm	Laterite/Latosol
	Gondwana Sup Gp	Lr Cretaceous	Athagarh Fm	Sandstone, Shale
Precambrian	Archean to Proterozoic	Eastern Ghat Sup Gp		Quart vein Granite gneiss Anorthosite Chanockite gp of rocks Khondalite gp of rocks Quartzite

5. DRAINAGE AND IRRIGATION PATTERN.

The drainage of the district is mainly controlled by rivers like Kuakhai, Kusabhadra, Bhargavi & Daya. Detail of the river system is narrated below.

S L NO	NAME OF RIVER	PLECE OF ORIGIN	ALTITUDE OF ORIGIN	TOTAL LENGTH IN THE DISTRICT (IN Km)	Area drained (sq.km)	%GE AREAS DRAINED IN THE DISTRICT	PROCESS OF DEPOSITION OF SEDIMENTS
1	Kushabhadra	Bhubanapur (khorda dist)	11.8m	30.0km	212.32sq.km	48.86%	Slow (7000 cum from 15-16 to 18-19)
2	Bhargavi	Balakati (khordha dist)	7.80 m	14.0 km	Nil	Nil	Slow(25000 cum from 15-16 to 18-19)
3	Kuakhi	Mukameswra	25.92 m	26.500	21.85	45.60	Moderate
4	Daya	Nathapur	18.180 m.	10.100	10.10	51.80%	slow
5	Malaguni	Baunshagarh (nayagarh dist)	21.20m	35	8.40	62.50%	slow
6	Hada	Hatibari (Nayagarh dist)	19.80m	14	0.92	60.87%	No deposition
7	Kusumidhar	Randa (khordha dist)	60m	33	1.32	100.00%	No deposition

During the year 2013-14, it is reported by District Agriculture Officer that the irrigation potential created during Kharif and Rabi are 52655 hectares and 20346 hectares respectively from all sources.

6. LANDUSE PATTERN

SI No	Landuse	Area in '000Ha
1	Forest Area	62
2	Misc.Tree & Groves	10
3	Permanent Pasture	5
4	Culturable Waste	8
5	Land Put to Non Agril Use	45
6	Barren & Unculturable Land	15
7	Current Fallow	21
8	Other Fallow	6
9	Net Area Sown	108
10	Mining	1
	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	0.4	0.10	0.10	0.06
Maximum	14.2	6.20	9.15	12.60

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 7^o-8^o C during peak winter.

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

MONTH – WISE RAINFALL (mm) DATA OF KHORDHA DISTRICT (LAST 5 YEARS)													
Year/ Month	April	May	June	July	August	Sept	Oct	Nov	Dec	Jan	Feb	March	Total
15-16	72.2	14.7	135.2	225.1	252.9	198.9	43.3	4.8	3.6	0.6	3.5	9.2	964
16-17	0.7	87.9	138.64	262.83	291.25	299.37	75.9	15.4	0	0.7	0	52.7	1225.39
17-18	10.26	17.58	164.93	402.23	313.31	239.07	249.3	59.96	20.02	0	0	0	1476.66
18-19	51.89	136.37	162.23	577.66	296.79	333.66	234	2	17.02	11	8.6	11.8	1841.02
19-20	23.48	185.59	14048	370.29	317.46	426.77	328.23	2.12	0	12.2	50.32	28.47	1886.31
Avg.	31.706	88.428	2929.8	367.622	294.342	299.554	186.146	16.856	8.128	4.9	12.484	20.434	4260.4

9. DETAILS OF MINING LEASES

Attached as Annexure

10. DETAILS OF ROYALTY COLLECTED

Year-wise Calculation of Royalty (Rs) from Laterite QLs

Sl.No	Name Of Tahasil	2015-16	2016-17	2017-18	2018-19	2019-20
1	Khordha	0	0	0	0	0
2	Bolagarh	0	0	0	0	0

3	Tangi	0	0	0	0	0
4	Chilika	0	0	0	0	2160
5	Begunia	0	59075	59075	59075	114575
6	Jatni	0	0	0	0	0
7	Balianta	0	0	0	0	0
8	Balipatana	0	0	0	0	0
9	Bhubaneswar	0	0	0	0	0
10	Balugaon	0	0	0	0	0
TOTAL		0	59075	59075	59075	116735

Penalty collected in Rs

Sl.No	Name of Tahasil	2019-20
1	Tangi	2627700
2	Chilika	104600
3	Begunia	3126500
TOTAL		58,58,800

11. DETAILS OF PRODUCTION OF MINOR MINERAL

Yearwise Production of Laterite in cum

Sl.No	Name Of Tahasil	2015-16	2016-17	2017-18	2018-19	2019-20
1	Khordha	0	0	0	0	0
2	Bolagarh	0	0	0	0	0
3	Tangi	0	0	0	0	0
4	Chilika	0	0	0	0	15.5
5	Begunia	0	425	425	425	425
6	Jatni	0	0	0	0	0
7	Balianta	0	0	0	0	0
8	Balipatana	0	0	0	0	0
9	Bhubaneswar	0	0	0	0	0
10	Balugaon	0	0	0	0	0
TOTAL		0	425	425	425	830.5

12. MINERAL MAP OF THE DISTRICT

Attached as Plate No 4.

13. LIST OF LOI HOLDERS ALONG WITH VALIDITY

Please refer Annexure.

14. TOTAL MINERAL RESERVE AVAILABLE IN THE DISTRICT

Total mineral reserve of laterite slab is 5393242.5 cum which may increase after detail investigation.

Details of the potential areas submitted as Annexure.

List of co-ordinates of the sources is attached as Annexur.

15. QUALITY/GRADE OF MINERAL

Due to less content of Alumina, the laterite slabs 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 to boundary or houses after manual sizing of the slabs.

17. DEMAND & SUPPLY OF THE MINERAL

The tentative annual demand is to the tune of 1.5 lakh cum of road metal and is mainly supplied from Khordha, Begunia, Chilika, Banapur, Jatani and Tangi tahasils of the district.

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

Nil

20. DETAILS OF ECO-SENSITIVE AREA

Eco-Sensitive Zone of Chandaka-Damapada Wildlife Sanctuary, Nandankanan zoo and Chilika are located within the district.

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 operations are carried out by opencast manual, semi mechanized/ mechanized methods generating dust particles due to various activities like, 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 machines and movement of machineries/ vehicles produce NO_x, SO₂ and CO emissions, usually at low levels. Dust can be of significant nuisance 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 activities 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 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.
- 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 movement of vehicles, 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.

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 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 salvage 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 etc 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	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	TOTAL
15-16	95	85	83	93	87	75	86	79	78	92	88	84	1025
16-17	96	84	86	88	78	69	104	103	98	118	115	128	1167
17-18	127	113	130	142	102	105	97	83	84	121	102	140	1346
18-19	160	156	124	121	119	116	98	124	123	117	142	130	1530
19-20	162	142	119	152	140	156	138	130	120	150	150	142	1701
TOTAL	640	580	542	596	526	521	523	519	503	598	597	624	6769
AVG.	128	116	108	119	105	104	105	104	101	120	119	125	1354

There is no case of Silicosis found in khordha 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

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15			16			17
SL NO	NAME OF TAHA SIL	NAME OF SOURCE	STATUS	KHATA NO	PLOT NO	AREA IN AC/Ha	NAME OF MINOR MINERAL	NAME OF LESSEE	ADDRESS & CONTACT NO OF LESSEE	DATE OF REGISTRATION OF LEASE DEED	NO & DATE OF GRANT OF ENV CLEARANCE	NAME OF SUCCESSFUL BIDDER	ADDRESS & CONTACT NO OF SUCCESSFUL BIDDER	LONGITUDE			LATITUDE			RESERVE IN CUM AS PER MINING PLAN
														DEGREE	MINUTE	SECOND	DEGREE	MINUTE	SECOND	
1	Begunia	Balibareni	New	619	497	3.43 Ha.	LATERITE							85	27	56.75	20	7	45.09	61023
2	Begunia	Balibareni	New	619	498	9.358 Ha.	LATERITE							85	27	56.69	20	7	44.65	350111
3	Begunia	Balibareni	New	619	510	10.572 Ha.	LATERITE							85	28	4.01	20	7	59.49	384431
4	Begunia	Uttareshwar	New	306	337	0.693 Ha	LATERITE							85	27	36.9	20	9	1.73	12047
5	Begunia	Uttareshwar	New	306	337	5.827 Ha.	LATERITE							85	27	28.47	20	8	55.06	219659
6	Begunia	Uttareshwar	New	306	213	9.810 Ha.	LATERITE							85	27	39.81	20	9	4.12	406800
7	Begunia	Uttareshwar	New	306	327	13.540 Ha.	LATERITE							85	27	35.47	20	8	51.42	504761

8	Begunia	Rautapada	New	1008	1486	4.990 Ha.	LATERITE								85	28	4.87	20	9	37.72	201663	
9	Begunia	Dingar	New	479	95/1831	14.270 Ha.	LATERITE								85	27	6.02	20	9	59.13	561218	
10	Begunia	Dingar	New	479	95/1832	13.279 Ha.	LATERITE								85	27	6.39	20	9	50.07	453339	
11	Begunia	Dingar	New	479	95	11.179 Ha.	LATERITE								85	26	59.06	20	9	52.85	442445	
12	Begunia	Dingar	New	479	1329	4.944 Ha.	LATERITE								85	27	21.09	20	9	44.14	88000	
13	Begunia	Dingar	New	479	1331	0.1410 Ha.	LATERITE								85	27	22	20	9	47.5	1500	
14	Begunia	Jalavar	New	441	1625	0.158 Ha.	LATERITE								85	24	30.57	20	4	42.7	2500	
15	Begunia	Pholachhanchuni	LOI	199	219	2.167 Ha.	LATERITE							Dibakara Behera	At-Chhatabara, Po-Chandaka, Dist-Khordha	85	31	31.92	20	11	5.98	66816

16	Begunia	Chhiam	LOI	318	1120	0.898 Ha.	LATERITE						Rabi Narayana Jena	At-Sanapalla, Popallahat Ps/ Dist Khor dha	85	24	30.99	20	3	28.06	24300
17	Begunia	Chhiam	New	318	1151	0.346 Ha.	LATERITE								85	24	37.58	20	3	28.12	6435
18	Begunia	Chhiam	New	240	553	0.810 Ha.	LATERITE								85	27	59.42	20	6	6.46	12000
19	Begunia	Chhiam	New	240	1091	0.810 Ha.	LATERITE								85	27	43.57	20	5	53.74	12000
20	Begunia	Chhiam	New	240	1094	1.669 Ha.	LATERITE								85	27	43.6	20	5	46.59	30000
21	Begunia	Chhiam	New	318	1113	0.080 Ha.	LATERITE								85	24	17.34	20	3	31.92	1200
22	Begunia	Chhatrapda	Running	410	1322	0.121 Ha.	LATERITE	Dinesh Ranjan Pradhan	S/o Kartika Chandrapadhan, Vill-Nabi	16.11.2016	519/25.04.2020				85	26	39	20	5	92	2100

									naba g, Khor dha, Mob- 8908 1812 85											
23	Begunia	Ogalpur	New	219	804	0.810 0 Ha.	LATERITE							85	28	56 .3 1	20	4	30 .3 8	13000
24	Begunia	Ogalpur	New	219	797	0.850 0 Ha.	LATERITE							85	28	51 .2 9	20	4	26 .6 5	14000
25	Begunia	Ogalpur	New	219	798	1.044 0 Ha	LATERITE							85	28	54 .8 5	20	4	27 .6 6	17000
26	Begunia	Ogalpur	New	219	806	0.810 0 Ha.	LATERITE							85	28	51 .9 1	20	4	41 .5 5	12000
27	Begunia	Ogalpur	New	219	804	0.898 0 Ha.	LATERITE							85	28	49 .7 5	20	4	44 .0 3	16600
28	Begunia	Khadipadar	New	317	1023	14.98 7 Ac	LATERITE							85	24	6. 2	20	2	56 .0 8	36390
29	Begunia	Manikapurpana	New	143	154	0.42 Ac.	LATERITE							85	25	56 .4 5	20	6	18 .1 9	1020
30	Begunia	Kuruma	New	504	581	13.37 5 Ac.	LATERITE							85	28	12 .6 4	20	05	49 .4 1	32460

31	Tangi	Jagapur-1	LOI	392	250	4 Ac.	Laterite					Satya Multiplex	At-N-6/321 IRC Village, Nayapalli, Bhubaneswar Khor dha	85	30	51.8	20	0	38.9	25283
32	Tangi	Jagapur-2	LOI	392	250	3.970 Ac.	Laterite					Satya Multiplex	At-N-6/321 IRC Village, Nayapalli, Bhubaneswar Khor dha	85	30	54	20	0	36.5	28265
33	Tangi	Singarama	New	211	42	2.081 Ac.	Laterite							85	20	25.9	19	56	16.7	7000
34	Tangi	Singarama	New	211	217	0.793 Ac.	Laterite							85	20	23.59	19	1	22	6800
35	Tangi	Patrapada	New	107	207	0.279 Ac.	Laterite							85	27	38.29	19	58	27.49	2200

36	Tangi	Rasulpur	New	286	68	1.310 Ac.	Laterite							85	27	23.07	19	57	8.03	8800
37	Tangi	Rasulpur	New	286	77	0.504 Ac.	Laterite							85	27	23.07	19	57	2.57	2700
38	Tangi	Sundarpur	New	986	2511	0.345 Ac.	Laterite							85	26	10.94	19	55	41.34	1600
39	Tangi	Talagarh Kuhudi	New	226	163	5.170 Ac.	Laterite							85	21	7.006	19	53	48.76	65000
40	Tangi	Talagarh Kuhudi	New	226	283	4.963 Ac.	Laterite							85	21	9.586	19	53	43.866	68000
41	Tangi	Talagarh Kuhudi	New	226	283	5 Ac.	Laterite							85	21	1.202	19	53	41.65	60000
42	Tangi	Talagarh Kuhudi	New	226	283	5 Ac.	Laterite							85	21	6.6	19	53	40.3	48000
43	Tangi	Talagarh Kuhudi	New	226	283	5 Ac.	Laterite							85	21	6.6	19	53	40.3	58000
44	Tangi	Talagarh Kuhudi	New	226	283	5 Ac.	Laterite							85	21	11.043	19	53	39.99	76000

45	Tangi	Ramachandrapur	New	463	651	0.868 Ac.	Laterite							85	21	21.91	19	56	0.15	5600
46	Tangi	Ramachandrapur	New	465	651	4.825 Ac.	Laterite							85	21	28.45	19	56	0.71	36000
47	Tangi	Jagatpur	New LOI	392	262	2.605 Ac.	Laterite					Ananda Pradhan	At-Nanpada, Ponnirakara Pur, Dist-Khordha	85	30	55.1	20	0	41.8	10248
48	Tangi	Aranga B	New	518	1049	12.350 Ac.	Laterite							85	29	25.7	20	4	16.9	21310
49	Tangi	Aranga A	LOI	518	1049	12.350 Ac.	Laterite					Minkshi Pradhan	At-Jarasingh Dist-Khordha	85	29	26.8	20	4	9.2	22210
50	Tangi	Nayakote A	LOI	293	440	12.350 Ac.	Laterite					Pratap Keshori Mohanty	At-Laxmisagar, Bhubaneswar	85	30	14.8	20	4	25.1	20242

51	Tangi	Sahada ghai -A	LOI	27 8	71 9	6.425 Ac.	Laterit e					Patit apab ana Barik	At- Tank ola, Ps- Janki a, Dist- Khor dha	85	26	44 .6	20	0	53 .2	20520
52	Tangi	Bari ko	LOI	27 0	67 3	2.173 Ac.	Laterit e					Girid hari Das	At- Bada pari, Po- Tangi Dist- Khor dha	85	21	19 .3 4	19	55	43 .3 3	9354
53	Tangi	Olasi ngh- A	LOI	37 2	54 1	12.35 Ac.	Laterit e					Abhi many u Behe ra	Flat- 402, Jagan nath Saku ntala Apart ment , Ps- Naya palli Dist- Khor dha	85	29	47 .1 96	20	4	1. 90 8	40124
54	Tangi	Olasi ngh- B	LOI	37 2	59 3	12.35 Ac.	Laterit e					Bisw anna th	Maitr i Bihar	85	30	45 .6 19	20	3	35 .2 14	60254

												Behe ra	, Chan drase khar pur, Bhub anes war							
55	Tangi	Olas ingh- C	LOI	37 2	54 1	12.35 Ac.	Laterit e					Abhi many u Behe ra	Flat- 402, Jagan nath Saku ntala Apart ment , Ps- Naya palli Dist- Khor dha	85	30	30 .6 81	20	3	59 .1 32	49389
56	Tangi	Olas ingh- D	Ne w	37 2	10 06	12.35 Ac.	Laterit e							85	30	13 .6 11	20	3	27 .2 23	30950
57	Tangi	Da man abh uin- A	Ne w	70 8	21 61	10.23 Ac.	Laterit e							85	31	46 .0 52	20	31	18 .4 7	25230
58	Tangi	Da man abh uin-	Ne w	70 8	94 2	12.35 Ac.	Laterit e							85	31	31 .5 37	20	3	36 .0 98	30585

		B																		
59	Tangi	Damanabhin-C	New	705	731	12.35 Ac.	Laterite							85	31	52.156	20	4	5.112	25325
60	Tangi	Gayabandha	New	338	763	12.35 Ac.	Laterite							85	31	31.8	20	4	33.4	60032
61	Tangi	Sahadaghai-B	New	278	720	7.312 Ac	Laterite							85	26	48.2	20	1	0.8	37254
62	Tangi	Sahadaghai-C	New	278	754	3.950 Ac	Laterite							85	26	44.6	20	0	53.2	18720
63	Tangi	Sahadaghai-D	New	278	755	6.425 Ac.	Laterite							85	26	44.6	20	0	53.2	18720
64	Tangi	Nayakota-B	New	293	424	5.630 Ac	Laterite							85	30	21.59	20	4	33.938	26774
65	Tangi	Sundarpur-1	New	988,178	105/5055,179	0.75 Ac 1.355 Ac	Laterite							85	27	4.656	19	56	52.478	16867
66	Tangi	Narmanabi	New	107	33	2.00 Ac	Laterite							85	17	44.426	19	55	16.496	8212.5

67	Khordha (SJTA)	Dakshin eswar (GHA)	LOI	536/3	240	4.98 Ha.	Laterite					Sri Raiballav Mohanty	Radhaballav Sahi, Khordha	85	29	34.12	20	9	34.83	41425
68	Khordha (SJTA)	Nijagarh tapang (KA)	LOI	832/1	2054	2.48 Ha.	Laterite					Sri Jagadish Sankar Sahoo	Satyam Multiple Pvt. Ltd., At-N6/321, IRC Village, Nayapalli,	85	36	14.13	20	4	58.53	80000
69	Khordha (SJTA)	Nijagarh tapang (KHA)	LOI	832/1	2056	2.47 Ha.	Laterite					Raja Kishore Dash	Plot No-663, Bijipur, Tomando, Khordha	85	36	10.11	20	4	56.39	87200

70	Khordha (SJTA)	Narsinghprasad (KA)	LOI	37 7/ 6	76	4.68 Ha.	Laterite					Sri Jagdish Sankar Sahoo	Satyam Multiplex Pvt. Ltd., At-N6/321, IRC Village, Nayapalli,	85	35	46 .7 8	20	4	26 .0 9	50129
71	Khordha	Narsinghprasad Late rite Stone quarry	LOI	38 3	25	Ac.2. 000	Laterite					Rajendra Prasad Singh	S/o Late Harihar Singh At-New Rausapatna, P O-Baxibazar, PS-Purighat,D	85	35	1. 8	20	4	4. 1	7650

													ist.- Cutta ck. M- 7008 9379 91								
72	Khord ha	Cha mpa jhar Late rite Ston Qua rry- 1	LOI	44 8	48 0	Ac.2. 000	Laterit e					Rajen dra Prasa d Singh	S/o Late Harih ar Singh At- New Raus apat na,P O- Baxib azar, PS- Purig hat,D ist.- Cutta ck. M- 7008 9379 91	85	34	8. 4	20	4	3. 8	6850	

73	Khordha	Champajhar Late rite Stone Quarry-2	LOI	448	327	Ac.2.000	Laterite					Rajendra Prasad Singh	S/o Late Harihar Singh At-New Rausapatna, PO-Baxibazar, PS-Purighat, District.-Cuttack. M-7008937991	85	34	13.4	20	4	15.3	7930
74	Khordha	Lahanga Late rite Stone Quarry	LOI	571	59	Ac.2.000	Laterite					Rajendra Prasad Singh	S/o Late Harihar Singh At-New Rausapatna, PO-	85	34	13.4	20	4	14	8052

													Baxib azar, PS- Purig hat,D ist.- Cutta ck. M- 7008 9379 91								
75	Khord ha	Mu nda Am ba Late rite Ston e Qua rry-I	LOI	45 6	97 2	Ac.2. 000	Laterit e						Rajen dra Prasa d Singh	S/o Late Harih ar Singh At- New Raus apat na,P O- Baxib azar, PS- Purig hat,D ist.- Cutta ck. M- 7008 9379	85	32	20 .7 96	20	2	5. 6	7520

													91							
76	Khordha	Munda Amba Late rite Stone Quarry-II	New	458	262	Ac.4.500	Laterite							85	32	10.57	20	2	26.73	22000
77	Khordha	Haladipa da Late rite Stone Quarry	New	224	94,104,102	Ac.5.420	Laterite							85	32	16.4	20	1	47.75	24500
78	Khordha	Gopinathpur Late rite Stone	New	469	659	Ac.2.300	Laterite							85	32	36.12	20	1	30.79	11600

		e Qua rry																		
TOTAL																			53,93,242. 5	

x