

**DISTRICT SURVEY REPORT OF MINOR MINERAL SOURCE RUDABIDINGIA  
(GRANITE STONE DEPOSIT AREA) UNDER TIKABALI TAHASIL OF  
KANDHAMAL DISTRICT.**

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**1. Introduction:**

The district survey report is being prepared through a sub-divisional level committee headed by Sub-Collector as Chairman and after approval it by the committee it is being recommended by the Collector & District Magistrate to SEIAA committee. The main objective of the DSR is the identification of areas of aggradations or deposition where mining can be allowed; and identification of areas of erosion and proximity to infrastructural structures and installations where mining should be prohibited and calculation of annual rate of replenishment and allowing time for replenishment after mining in that area. Along with that by preparing DSR, the new sources can be included in the DSR report of the Kandhamal District and further it can be leased out through auction process and through temporary quarry permit generating more revenue to state as well as reducing mineral theft cases in the district. In compliance to the notification issued by the Ministry of Environment, Forest, Climate change dated 15.01.2016, the preparation of District survey report of sustainable sand mining is in accordance with appendix 10 of the notification. The District Survey Report will guide systematic and scientific utilization of natural resources, so that present and future generation shall be benefitted at large.

**2. Over view of Mining activity in the District:**

The Kandhamal District is having large mineral deposit of Graphite, Buxite & Coal (Major Mineral) as per geological exploration report made earlier. Except that in case of minor mineral the river sand, Granite gneiss in boulders forms and somewhere as massive deposit form are found with deposition of pebbles are found in most of the Tahasils under Kandhamal District. The above minor mineral resources were earlier under the execution of District Administration authority and at present it has been transferred to the Steel & Mines Departmental authority. Mining activity in Kandhamal district consists of river bed sand mining, mining of boulder, stones, morrums and ordinary earth. The demand for sand (river borne collection) in Kandhamal district, is mainly met by the supply from Salunki river bed flowing in the district. All mining activities are made for local consumptions only and are non-organized in nature. Manual excavation of sand from river bed is being done from notified sairat sources.

**3. General profile of the Kandhamal District:**

Kandhamal district is one of the costal district of Odisha. ever since Boudh –Phulbani district was created in 1948 by merging feudatory state of Boudh with Phulbani sub division with its Headquarters at Phulbani, it lies between 83° 30' to 84° 35' East longitude and between 19° 34' to 20° 34' North latitude. It is bounded by the Boudh district in north, Gajapati district in south, Nayagarh district in the east and Kalahandi district in the west. The district has an area of 8021 sq.kms and 7.33 lakhs of population as per 2011 census. The district accounts for 5.15 percent of the state territory and shares 1.75 percent of the state population. It has 2587 villages (including 170 un-inhabited villages) covering 12 blocks 12 Tahasils. and 2 Sub-divisions. As per 2011 census the schedule caste population is 115544 (15.8%) and schedule tribe population 392820 (53.6%) The literacy percentage of the district covers 64.1 against 72.9 of the state.

### **Geology:**

The geological formation of Kandhamal district is in archian crystalline form of eastern ghat phases, which are comprises of associate minerals such as Granite, Khondolite, Charcolite and Quarzite etc.

### **Geomorphology:**

Kandhamal District is one among 30 Districts of Odisha State. The administrative headquarters of Kandhamal District is Phulbani. It is Located 198 Km East towards State capital Bhubaneswar. The geographical area of the district is 8021 sq. kms. Area-wise the district rank is 6th among all the districts of Orissa.

Kandhamal literally "the land of Kondhs" is a district with a substantial tribal population. It was formed by bifurcating the former Boudh-Phulbani or Kandhamal District on 1st January, 1994. The agro-climatic condition of the district is otherwise very rich in organic contents.

#### **4. Geology of the District and mineral wealth :**

Geologically the area forms part of the Eastern Ghats Super Group and is divided into khondalite group, Charnockite group and migmatite group. The alluvium is of Pleistocene to recent age. Khondalite group of rocks are of metasedimentary origin and represented by quartzgarnet-silimanite schist and gneisses without graphite, sillimanite quartzite and quartzsilimanite sericite schist occurring as enclaves within granite. Occurrences of basic charnockite are very restricted as bands or lensoid patches within the granites. Intermediate or acid charnockite are common being distributed throughout the hilly area. Migmatite group comprising augen gnesis, garnetiferous leucogranites are the most abundant rock types of the area. This constitutes high hill ranges at several places towards north and south and smooth rolling topography in the plains. Rocks of lower Gondwana group especially the Talchir formation is exposed in the northern part of the area. The contact between Talchir and older rocks is faulted at places. Pockets of laterites commonly found in khondalite bearing ridges mainly over the hill tops. The laterite exposed in the area is of Cainozoic age. The river beds of the area are covered by recent alluvium. The general strike of the foliation is WNW-ESE to ENE-WSW through NE-SW and NS. The amount of dip ranges between 500 to sub-vertical. There is one major shear zone near Ranipathar area. Mylonite and silicification occur along this zone at several places. Both vertical as well as inclined joint planes are observed. Numbers of fault planes occur in the area with varieties of strike direction. A number of lineaments are deciphered in this area from LANDSAT imageries. Two major sets of these lineaments are deciphered running along NW-SE to NNWSSE and NS directions. A number of mineral occurrences are noticed in the area. Bauxite deposits have been located in the plateau of khondalite hills. Rucy, mica-bearing pegmatite vein is located East of Mundagaon. Several occurrences of dimension stones are found at the southern bank of kalipana river. Graphite occur in the garnet-quartz-silimanite schist of khondalite suite in the form of bands, enechelon veins and lenses or disseminated forms. They are usually disposed conformably along the foliation planes of the host rocks. A number of graphite deposits have 13 been found in the western part of the area at NW of Tumudibandha. Only occurrence of bed ocher, found in the district is situated south of Ghumusar Udayagiri.

### 5. Drainage of Irrigation pattern:

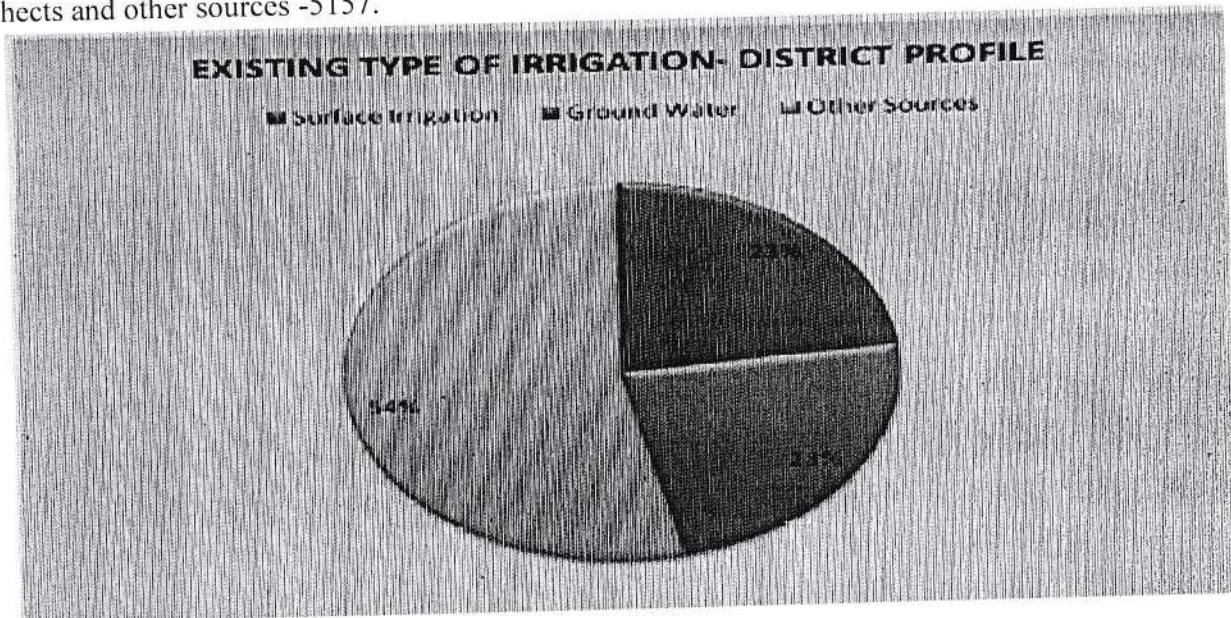
#### Hydrology:

The major water bearing of Kandhamal district are measure through pre-monsoon depth to water level i.e. 6.40 mtr to 12.35mtr & the post- monsoon that water level is 0.14mtr to 10.70 mtr.

#### River:

The Kandhamal physiographic units are remark by valley pediment, hills & flood plain. The major drainage system is being regulated by the river Mahanadi, Tel & their tributaries.

The total irrigation potential of Kandhamal district for kharif 2023 is 3380 hecets. covers about 25.89 percentage of cultivated area. The drainage of irrigation pattern is designed for 33080 hecets as belows such as :- Medium irrigation project-2033 hecets, MIP +check dam -10314 hecets, Lift irrigation project-11524 hecets, W.H.S.- 982 hecets, DBW + Micro River lift – 3070 hecets and other sources -5157.



### 6.Land utilisation pattern in the District:

#### Forest:

District of Kandhamal has abundant of Forest area that contributed 71.19% of the total geographical area of the district. Total Geographical area of Kandhamal District is 8021 sq kms. Out of total geographical area the total forest area is 5859.85 sq.kms. The total reserve forest area is 2050.42 sq.kms.

Perennial Rivers and Streams in Balliguda Forest Division	
Name of Range	Name of stream/river
Balliguda	Khadaga, Budhanai merged with Rouljadi and Jhiripani nallah
Nuagam	Kalipen nallah
Daringbadi	Gumardihinala nallah
Daringbadi	Periaju nallah
Tumudibandha	Rouljadi
Belghar	Pippili, Penaju nallah
Brahmanigaon	Rushikulya-Originate at Rushimal forest block
Kotagarh	Chauldhua, Dimuru, Rouljadi

### Wet lends in forest areas.

The entire division is traversed by a number of rivers/nallahs. These rivers originate from almost the centre of the division and run parallel to the general direction of North and North-West. The perennial rivers and streams found in Balliguda Division are summarized in the Table below

Perennial Rivers and Streams in Balliguda Forest Division	
Name of Range	Name of stream/river
Balliguda	Khadaga, Budhanai merged with Rounadi and Jhiripani nallah
Nuagam	Kalipen nallah
Simanbadi	Gumardihinala nallah
Daringbadi	Periaju nallah
Tumudibandha	Rounadi
Belghar	Pippili, Penaju nallah
Brahmanigaon	Rushikulya-Originate at Rushimal forest block
Kotagarh	Chauldhua, Dimuru, Rounadi

### Agriculture:

The land utilisation of Kandhamal district is as follows:-

The total geographical area 802100 Hects.

Forest area- 570983 hecets , Misc. Tree crops/Groves- 33775 hecets , Pmt. Pasture / Grazing land - 10079 hecets , Cultivable waste land- 14245 hecets, Land put to Non Agril. use- 9103 hecets , Barren/ non cultivable land- 29943 hecets. , Cultivable land- 133972 hecets., Cultivable land- 127790 hecets. , Other fallow- 6182 hecets. , Current fallow- 935 hecets. , Net area sown- 126855 hecets.

### Horticulture:

In the year 2023-24 total 21678.8 hecets land area has been used for horticulture purpose in 12 Nos. of blocks in Kandhamal district where 2338 Nos. of beneficiaries have been benefited.

### Mining :

The total area under Mining activities in Kandhamal district is found to be 67.235 hecets. out of which 18.715 hecets area is for stone quarries and rest 48.520 hecets is for sand quarries areas. The total mineable reserve in existing stone quarries in Kandhamal district is 1331919cum.

### 7. Surface water & ground water scenario:

In the Kandhamal district the water exploration programme is executed through drilled wells having depth range of 20.30mtr to 266.00mtr where discharge lps is counted from 0.2lps to 3.73lps. In the ground water mostly presence of chemical consituance are found more than permissible limit and this type of water is fit for irrigation & drinking with a few abstention. The annual replenishable ground water resources are 70266.00 where the net ground water drafts are 8748.00. The projected demand for domestic & industrial uses of ground water provision resources upto 2025 is 2524.00 & the stage of ground water development are found 12.45 percentage board to assess the ground water potential of rock formation at dipper depths. The ground water regime condition is being mentioned by quite a large no. of permanent hydrograph stations 4 times a year.

### 8. Rainfall of the district and climatic condition:

Kandhamal district comes under North Eastern Ghat agro-climatic zone covering 15% of area with Hot & moist, Sub-humid climate, characterized by hot and dry summer and dry cold winter. The geographical situation of the district is characterized by undulated topography with hilly terrain where the rain water is carried through hill streams and nallahs. The average annual rainfall of Kandhamal district is 1428.15 mm. and temperature ranges between a maximum of 40 degree to minimum 1 degree centigrade. The Humidity of the air is generally high especially in the south-west monsoon and post monsoon months. April is the driest month. Afternoon period is comparatively drier and more so from March to May. The peak period of rainy season is from 15<sup>th</sup> June to September.

### 9.Details of Mining leases (Stone quarry) in the District:

Name of the Tahasil	Name of the Mineral	Name of the Lessee	Address & Contact No. of Lessee	Mining lease Grant Order No. & date	Area of Mining lease (ha)	Period of Mining lease (Initial)		Period of Mining lease (1 <sup>st</sup> / 2 <sup>nd</sup> ...renewal)	
						From	To	From	To
1	2	3	4	5	6	7	8	9	10
Raikia	Alamramu Stone Quarry	Smt. Sasmita Behera	At- Masterpada, Po- Phulbani, Contact no.6372811301	114721001 60, Dated 02.12.2021	1.00	2021-22	2025-26	-	-
	Dadingia Stone Quarry	Smt. Sasmita Behera	At- Masterpada, Po- Phulbani, Contact no.6372811301	114721001 61, Dated 02.12.2021	3.00	2021-22	2025-26	-	-
	Landabali Stone Quarry	Sri Krushna Chandra Jena	At/Po- Kantabania, Dist.-Puri, Contact no.9938395467	114721001 62, Dated 02.12.2021	2.613	2021-22	2025-26	-	-
Tikabali	Rudabidingia Stone Quarry	Sri Narayan Senapati	Shivam Condev Pvt. Ltd. Rasulgada,BBSR , Contact no.8917527261	114723000 58 ,Dated 18.03.2023	1.000	2023-24	2027-28	-	-
Tumudibandha	Dadanga Stone Quarry	Sri Ramakrishna Padhy	At/Po- Tumudibandha, Dist.- Kandhamal, Contact no.	114520001 00, Dated 18.11.2020	3.176	2020-21	2024-25	-	-
Balliguda	Madinata Stone Quarry	Sri Simanchal Acharya	At/Po- Balliguda, Dist.- Kandhamal, Contact no.- 9437122941	114522001 17, Dated 22.06.2022	2.100	2022-23	2026-27	-	-
Daringbadi	Dalibandha Stone Quarry	RKD construction Pvt. ltd	M/S RKD CONSTRUCTION(P)LTD,B/20,CHANDAKA INDUSTRIAL ESTATE,PATIA,BBSR	1146210006 1,Dated 10.12.2021	2.106	2021-22	2025-26	-	-

Kumbharm unda Stone Quarry	Trishakti Constructio n pvt.ltd.	At/Po/Ps- Daringbadi, Dist- Kandhamal, Contact no. 9437980355	1146220005 8, Dated 15.11.2022	3.720	2022-23	2026-27	-	-
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Date of commencement of Mining Operation	Status (Working/Non-Working/Temp. Working for dispatch etc.	Captive/ Non-Captive	Obtained Environmental Clearance (Yes/No), If Yes Letter No with date of grant of EC.	Location of the Mining lease (Latitude & Longitude)	Method of Mining (Opencast/Underground)
11	12	13	14	15	16
02.12.2021	working	Non-captive	Yes, L.No.4420/SEIAA dated.27.04.2022	Lat 20°02'55.6" N 20°02'55.75"N Long 84°11'53.21"e 84°11'48.52"E	Opencast
02.12.2021	working	Non-captive	Yes, L.No.694/SEIAA dated.26.02.2021	Lat 20°05'08.7" N 20°05'16.19"N Long 84°14'24.27"e 84°14'25.61"E	Opencast
02.12.2021	working	Non-captive	Yes, L.No.696/SEIAA dated.26.02.2021	Lat 19°57'43.9" N 19°57'38.4"N Long 84°22'59.8"e 84°22'58.6"E	Opencast
18.03.2023	working	Captive	Yes, L.No. EC22B001OR181371 dated.22.08.2022	Lat 20°12'45.85" N 20°12'50.60"N Long 84°22'05.39"e 84°22'09.80"E	Opencast
18.11.2020	working	Captive	Yes, L.No.8650/SEIAA dated.06.08.2020	Lat 20°00'42.81" N 20°00'50.15"N Long 83°42'9.1"e 83°42'16.78"E	Opencast
22.06.2022	working	Non-captive	Yes, L.No.2646/SEIAA dated.04.09.2021	Lat 20°15'24.02" N 20°15'27.05"N Long 83°54'13.05"e 83°54'21.00"E	Opencast
10.12.2021	working	Captive	Yes, L.No.3904/SEIAA dated.28.01.2022	Lat 19°56'53.62"N 19°57'00.31"N Long 84°06'39.13"E 84°06'45.86"E	Opencast
15.11.2022	working	Captive	Yes, L.No.EC22B001OR1758 89 Dtaed.17.08.2022	Lat 19°58'22.90"N 19°58'29.90"N Long 84°01'13.10"E 84°01'22.01"E	Opencast

**Patta Land /Khatadari Land:**

Owner	Sy.No.	Area (Ha)	District	Tehsil	Village	Agricultural Land (Yes/No)
Smt. Sasmita Behera	1	3.00	Kandhamal	Raikia	Dadingia	No
Smt. Sasmita Behera	2	1.00	Kandhamal	Raikia	Alamramu	No
Sri Krushna Chandra Jena	3	2.613	Kandhamal	Raikia	Landabali	No
Sri Simanchal Acharya	4	2.100	Kandhamal	Balliguda	Madinata	No
Sri Narayan Senapati	5	1.000	Kandhamal	Tikabali	Rudabidingia	No
Sri Ramakrishna Padhy	6	3.176	Kandhamal	Tumudibandha	Dadang	No
RKD construction pvt. ltd	7	2.106	Kandhamal	Daringibadi	Dalibandha	No
Trishakti Construction pvt.ltd.	8	3.720	Kandhamal	Daringibadi	Kumbharmunda	No

**Patta Lands/Khatadari Land: (existing & proposed)**

Owner	Sy.No.	Area	District	Tehsil	Village	Total Reserve (MT)	Total Mineral to be mined (MT)	Existing /Proposed
Smt. Sasmita Behera	1	3.00	Kandhamal	Raikia	Dadingia	182896cu m	10125cu m	Existing
Smt. Sasmita Behera	2	1.00	Kandhamal	Raikia	Alamramu	88340cu m	10125cu m	Existing
Sri Krushna Chandra Jena	3	2.613	Kandhamal	Raikia	Landabali	173535cu m	10125cu m	Existing
Sri Simanchal Acharya	4	2.100	Kandhamal	Balliguda	Madinata	197437cu m	7830cu m	Existing
Sri Narayan Senapati	5	1.000	Kandhamal	Tikabali	Rudabidingia	87211cu m	20250cu m	Existing
Sri Ramakrishna Padhy	6	3.176	Kandhamal	Tumudibandha	Dadang	193020cu m	19008cu m	Existing
RKD construction pvt. ltd	7	2.106	Kandhamal	Daringibadi	Dalibandha	269028cu m	163910cu m	Existing
Trishakti Construction pvt.ltd.	8	3.720	Kandhamal	Daringibadi	Kumbharmunda	140452cu m	100325cu m	Existing

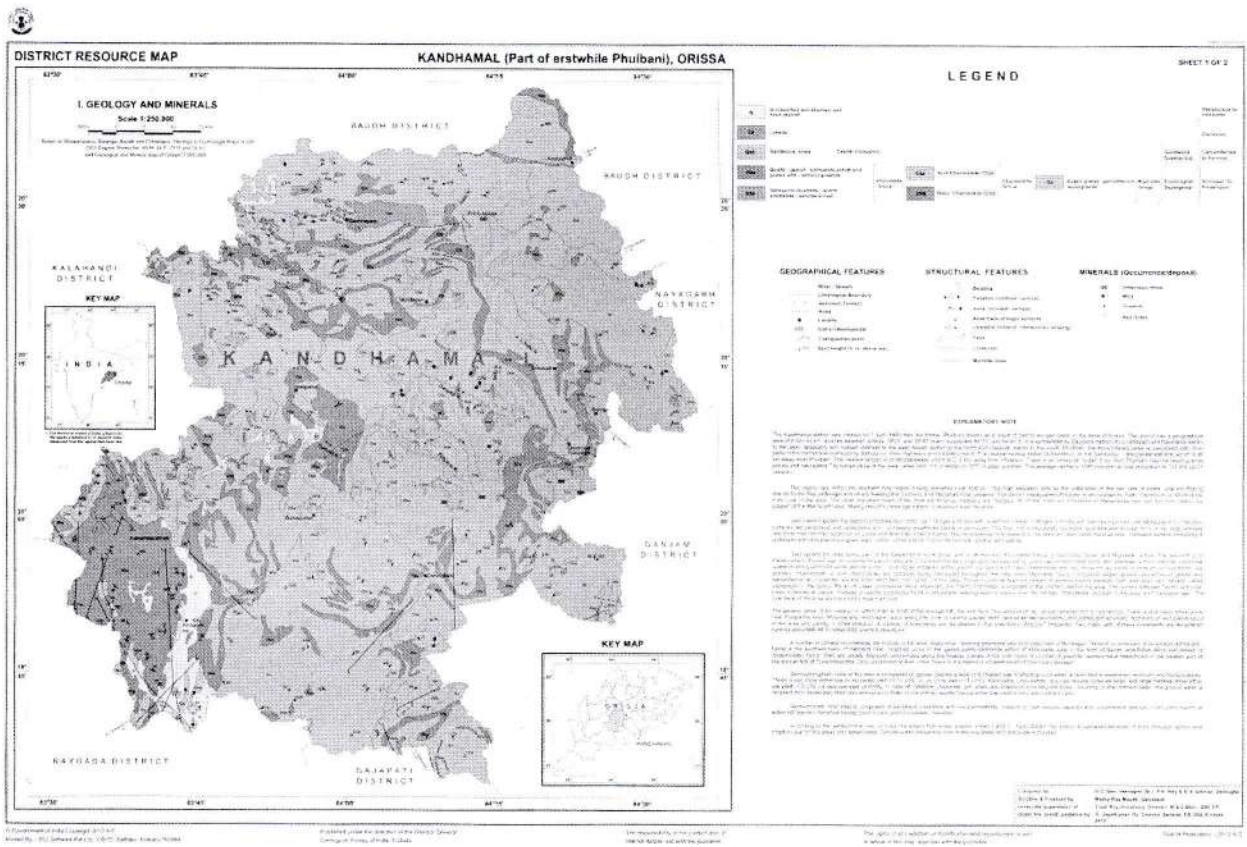
**10.Details of Royalty and revenue received in last three years:**

The District has earned revenue from minor mineral resources around Rs.22,69,38,171/- and in 2022-23 Rs.20,44,87,763/- and in 2023-24 Rs.50,01,822/- (Provisional collection upto May-2023) etc.

**11. Details of production of Minor Mineral (Stone) in last three years:**

The District has achieved the total production of last three years from the Stone Sources as mentioned for the year 2020-21 – 123857.00 cum, 2021-22 – 115072.00 cum & 2022-23 – 103476 cum.

**12. Mineral Map of the District (separately attached):**





13. List of letter of intent (LOI):

Name of the Tahasil	Name of the Mineral	Name of the Lessee	Address & Contact No. of Letter of Intent Holder	Letter of Intent Grant Order No. & date	Area of Mining lease to be allotted	Validity of LoI	Use (Captive /Non-Captive)	Location of the Mining lease (Latitude & Longitude)
1	2	3	4	5	6	7	8	9
Raikia	Alamramu Stone Quarry	Smt. Sasmita Behera	At-Masterpada, Po-Phulbani	11472100160, Dated 02.12.2021	1.00(ha)	01.12.2026	Non-captive	Lat 20°02'55.6" N 20°02'55.75"N Long 84°11'53.21"e 84°11'48.52"E
	Dadingia Stone Quarry	Smt. Sasmita Behera	At-Masterpada, Po-Phulbani	11472100161, Dated 02.12.2021	3.00(ha)	01.12.2026	Non-captive	Lat 20°05'08.7" N 20°05'16.19"N Long 84°14'24.27"e 84°14'25.61"E
	Landabali Stone Quarry	Sri Krushna Chandra Jena	At/Po-Kantabani, Dist.-Puri	11472100162, Dated 02.12.2021	2.613(ha)	01.12.2026	Non-captive	Lat 19°57'43.9" N 19°57'38.4"N Long 84°22'59.8"e 84°22'58.6"E
Tikabali	Rudabidingia Stone Quarry	Sri Narayan Senapati	Shivam Condev Pvt. Ltd. Rasulgada, BBSR	11472300058, Dated 18.03.2023	1.000	17.03.2028	Captive	Lat 20°12'45.85" N 20°12'50.60"N Long 84°22'05.39"e 84°22'09.80"E
Tumudibandha	Dadanga Stone Quarry	Sri Ramakrishna Padhy	At/Po-Tumudibandha, Dist.-Kandhamal	11452000100, Dated 18.11.2020	3.176	17.11.2025	Captive	Lat 20°00'42.81" N 20°00'50.15"N Long 83°42'9.1"e 83°42'16.78"E
Balliguda	Madinata Stone Quarry	Sri Simanchal Acharya	At/Po-Balliguda, Dist.-Kandhamal	11452200117, Dated 22.06.2022	2.100	21.06.2027	Non-captive	Lat 20°15'24.02" N 20°15'27.05"N Long 83°54'13.05"e 83°54'21.00"E
Daringbadi	Dalibandha Stone Quarry	RKD construction Pvt. ltd	M/S RKD CONSTRUCTION(P)LTD,B/20,CHANDAKA INDUSTRIAL ESTATE,PATIA,BBSR	11462100061, Date 10.12.2021	2.106	09.12.2026	Captive	Lat 19°56'53.62"N 19°57'00.31"N Long 84°06'39.13"E 84°06'45.86"E
	Kumbharmunda Stone Quarry	Trishakti Construction pvt.ltd.	At/Po/Ps-Daringbadi, Dist-Kandhamal, Contact no. 9437980355	11462200058, Dated 15.11.2022	3.720	14.11.2027	Captive	Lat 19°58'22.90"N 19°58'29.90"N Long 84°01'13.10"E 84°01'22.01"E

#### 14. Total Mineral reserve available in the district:

The estimated deposit of graphite in the district is around 1.68 lakhs MT. Though occurrence of some minerals like Bauxite and Lime stone have been reported, the commercial production/exploitation is not viable. About 531 numbers of areas were applied for prospecting License, Reconnaissance Permit or Mining leases for minerals like Bauxite, Iron Ore & Manganese, Quartz, Feldspar, Mica, Precious and Semi-Precious Stones, Graphite, Limestone, Dolomite, Coal, Lime Kankar, China Clay, Red Ochre, Granite, Decorative Stone, Sand and Road Metals. The mining activity in the Kandhamal District is currently dependent on the decision of the government because of the restriction imposed by the Ministry of Environment and Forest of the Government of India, and the leases for major minerals expired in the due course of time were listed for auction through International Bidding.

The Geological prospecting report indicates as such that in the Kandhamal District the Buxite deposit is found to be 33.7 million tonnes, Graphite(Industrial grade) is 1.477 million tonnes and Dimension stone is about 3.396 million cum.

#### 15. Quality/ grade of mineral available in the district:

##### Graphite (Mineral grade), Buxite( All grades)

Minor Mineral- massive and boulder deposit of Granite gneiss along with float zone of river based sand mixed with clay and pebbles.

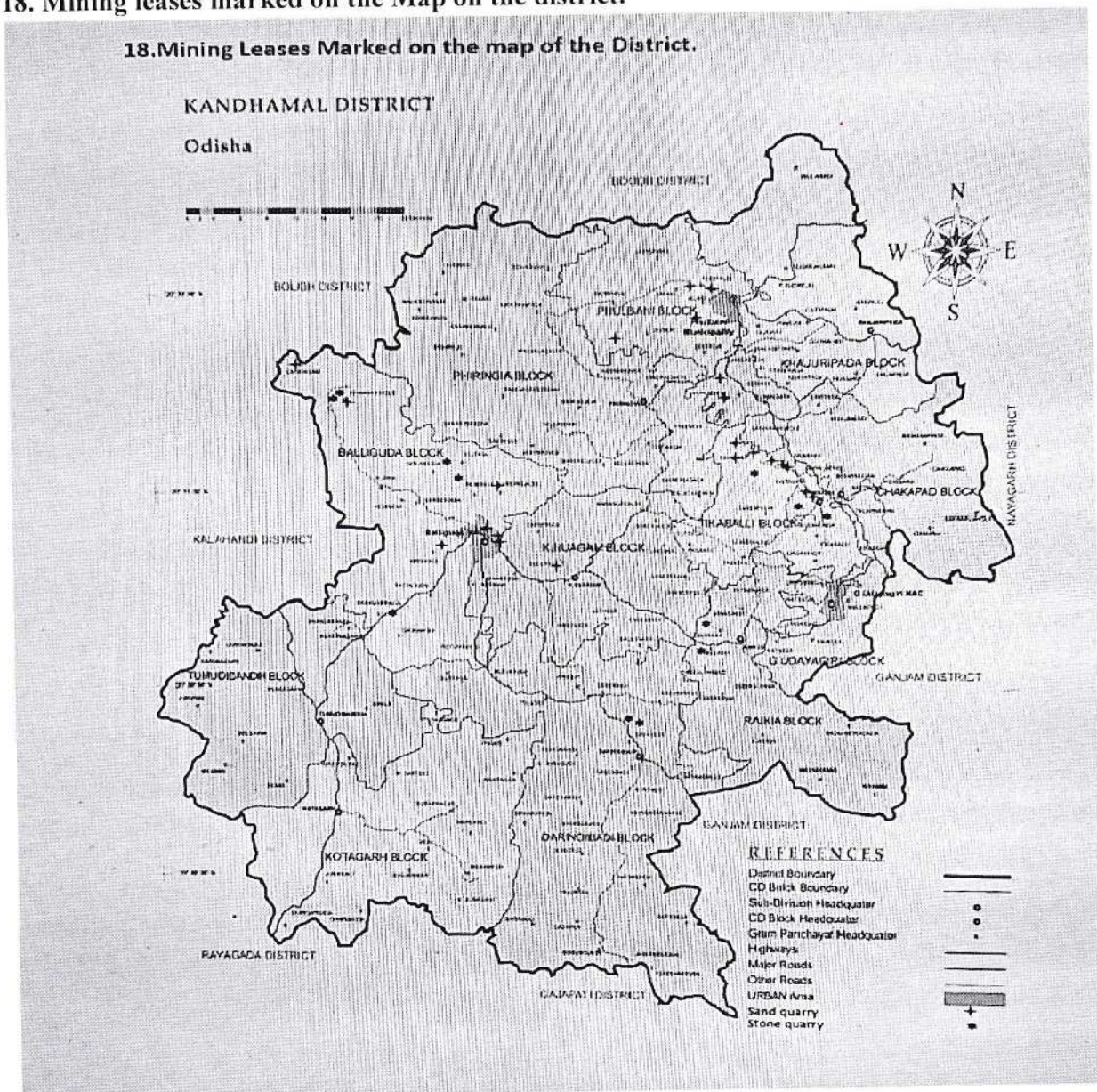
#### 16. Use of Mineral:

The river sand & Granite boulders are crushed and used as building and road material. People of this district depend mostly on agriculture and mineral resources for their livelihood. The developments of mining provide direct and indirect employment opportunities, infrastructure development, communication and socio-economic infrastructure. Mainly two types of minor minerals constituents such as sand and stone are required for any type of construction apart from other material like cement and steel.

#### 17. Demand and supply of the mineral in the last three years:

Name of the Mineral	2021-22		2022-23		2023-24	
	Demand (in cubic meter)	Supply (in cubic meter)	Demand (in cubic meter)	Supply (in cubic meter)	Demand (in cubic meter)	Supply (in cubic meter)
Stone	123857.00	123857.00	115072.00	115072.00	103476.00	103476.00

**18. Mining leases marked on the Map on the district:**



**19. Details of the area of where is a cluster of mining leases viz number of mining leases, location (latitude and longitude): NA**

**20. Details of Eco-sensitive area, if any, in the District:**

The Kotagarh Wildlife Sanctuary has been notified by Govt. of Orissa u/s 18 of wildlife (Protection) Act 1972. Erstwhile Forest and Environment Deptt. Notification No. 8F 162/87 -30253 Dt. 03.12.1981 for the purpose of protection, propagation, development and research on wildlife. The extent of area of the sanctuary is 399.5 sq. km. spread over the part jurisdiction of Kotagarh, Tumudibandha and Daringbadi CD Block of Balliguda civil Sub-Division. Out of the above the Forest area comes to 269.5096 sqkm, over 10 Forest Blocks and revenue area of 129.9904 sqkm. over 65 nos. of revenue villages. The Sanctuary area is rich in floral diversity having 165 no. of tree species, 38 Shrub species, 48 Climber

species and Herbs 132 species having high economic and ethno botanical importance which provide food security to the animals. The Kotagarh sanctuary is a paradise for a no. of wildlife and have an encouraging faunal diversity. There are 43 species of Mammals, 144 species of Birds, 41 species of Reptiles, 19 species of Amphibians, 76 species of Butterflies and 23 species of Odonates. The Northern and South western portion of Sanctuary constitute a part of Chandrapur Elephant corridor and it is migratory route for Elephants from Kalahandi Forest Division and from Lakhari Valley Sanctuary through Muniguda Range of Rayagada Forest Division. The other area are Forest land and habitation area, paddy fields, roads, river, nalah etc.

#### **Extent of Eco sensitive Zone:**

The Management of Sanctuary depends on the situation and condition of the area adjacent to the sanctuary as it acts as a shock absorber for the protected area. These areas though outside the protected area act as of vital ecological corridor links and require to be protected to prevent isolation of fragmentation of bio-diversity.

In South of Kotagarh Wildlife Sanctuary there are forest land of Bondru RF, Srirampur 'A'DPF, Lassery Extension RF, Durgapanga RF, Srirampur 'C'RF of Balliguda Division and Dhepaguda RF, Tamagudi RF of Rayagada Division with revenue villages of both the Districts. In North there are Bilamal RF, Belghar RF, Mundigarh RF, Jhiripani RF, Tumudibandha UDPF and some revenue villages of Kandhamal District. In East there are Adagan RF, Pakari RF and part of Srirampur 'B'PRF and revenue villages. In West there are Bilamal RF, Jhiripani RF of Kandhamal District and part of Raghubari RF of Rayagada District. There are no mining or industrial activities in the area except habitation. However, the land is having good tree covers with a no. of perennial streams which forms an ideal condition for wildlife for their movement. Considering the above situation a strip of land having 2 Km. to 10 Km. width from Sanctuary boundary is proposed as Eco-sensitive Zone.

The Eco-sensitive Zone boundary starts from the meeting point of KotagarhMuniguda PWD road and common district boundary of Kandhamal District and Rayagada District 3 Km. from Durgapanga and moves north west in clock wise direction along common district boundary of Rayagada and Kandhamal about 1.5 Km. Then to west inside Rayagada through Tamagudi RF to Sana Mindra. Then to north through village boundary of Banaganagan, Maligan and touches RF boundary of Dhepaguda RF at Dingarpanga and moves in same direction along Dhepaguda RF boundary and touches common district boundary Rayagada and Kandhamal at Tangikiari. Then it proceed along common district boundary in same direction upto village Srabuli then re-enter in Rayagada District through Raghubari RF via Sanamandura, Kumurupi and touches common district boundary at Pudempadar. Then it moves north in District boundary of Kalahandi and Kandhamal upto Sarachangudi village. From Sarachangudi it moves East along Jhiripani 'A' RF boundary via Saradhapur and touches Belghar RF at Surangbaru. From Surangbaru it moves East inside Belghar RF and crosses Uteinala near Gusupa village and proceed inside Mundigarh 'A'DPF and crosses NH – 59 at Matrugan and same NH at Jalespata. From Jalespata it moves East inside Tumudibandha UDPF touching village Badabandha, Dalabali, Jagadi. From Jagadi it moves South upto Sirla then towards East touching village Sinaguda. From Sinaguda it moves South inside then East amidst Adagan RF, then Pakari RF touching village Hadagan, Bathedi, Kukapanga, Adigamba, Parhatyabadi. From Parhatyabadi it moves South Srirampur 'B'PRF touching village Siripakal then village DaberhiSonepur and touches Srirampur 'C'RF near Budamaha and proceed upto village Sulumaha. Then it moves West crossing river Dimuru and moves inside Srirampur 'A'DPF touching village boundary Srirampur, Kuchimila, Tiamaha, Duriguda and enters to Bondru RF at Siranga. From Siranga it moves in South west direction in Bondru RF, Lassery Ext. RF then inside Durgapanga RF touching boundary of village Bondru, Dharakot, Sajeli and meet common district boundary near Kalishiguda and moves along common district boundary of Rayagada and Kandhamal in South west direction and meet the starting point.

## **21. Impact on the Environment (Air, Water, Noise, Soil, Flora & Fauna, land use, agriculture, forest etc.) due to mining activity:**

Environmental Impact arising out of mining operations may be defined as an alteration of environmental conditions or creation of a new set of environmental conditions caused or induced by the mining operations. The purpose of identifying and assessing the existing environmental parameters is to know the basic conditions prevailing before getting the targeted production. Depending on the nature of activities and existing status, the impacts are assessed for their importance. On the basis of the impact analysis, the mitigating action and future monitoring requirement are focused in the Environmental Management Plan for counting or minimizing adverse impacts.

The environmental impact on land, air, water, noise, climate, flora & fauna and socioeconomic conditions arising out of mining operations need be assessed and thereafter mitigation measures are to be adopted. Impact due to mining on each of the environmental component are detailed below in accordance with the parameter of environment likely to be affected.

### **21.1 Air Environment:**

The mining and allied operations may cause deterioration of air quality due to pollution if prompt care is not taken. The principal sources of air pollution in general due to mining and allied activities will be the dust generation in the mine due to:

- Excavation of mineral, overburden.
- Movement of HEMM such as excavators, tippers etc.,
- Loading and unloading operation
- Overburden & mineral transportation

### **21.2 Water Environment:**

The major sources of water pollution normally associated due to mining and allied operations are:

- Generation of Industrial effluent water from workshop, service building.
- Disturbance to drainage course or water bodies in the project area, if any.
- Washouts from waste dumps/embankment, if any.
- Domestic effluent
- Mine discharge water pumped out from opencast mines, if any and effect on ground water table.

Direct impact on human beings due to poor water quality consequent to mining operation can lead to various water borne diseases like diarrhoea, jaundice, dysentery, typhoid etc. Besides, the polluted water may not be useful for animal or human consumption, vegetation and may affect aquatic life, if effluents are not properly treated to remove the harmful pollutants.

### **21.3 Noise & Vibration:**

The impact prediction and control measure for noise environment due to mining and allied activities are described below:

Noise is one of the inevitable causes of pollution in mining operations largely due to the extensive mechanization adopted. Hence, the major source of noise will be from the equipment's such as Excavation, loading & unloading & movement of vehicles etc., will produce noise of considerable magnitude in mining operations. Cumulative impacts of shoveling, ripping, drilling, blasting, transport,

crushing, grinding, and stock-piling can significantly affect wildlife and nearby residents. Prolonged exposure to a high noise level is harmful to the human auditory system and can create mental fatigue, rebellious attitude, annoyance and carelessness, which may lead to neglect of work and also results in accidents. Vibration has affected the stability of infrastructures, buildings, and homes of people living near large-scale open-pit mining operations. According to a study commissioned by the European Union in 2000: "Shocks and vibrations as a result of blasting in connection with mining can lead to noise, dust and collapse of structures in surrounding inhabited areas. The animal life, on which the local population may depend, might also be disturbed."

#### **21.4 Impact on Land Environment:**

Due to mining and its allied activities there will be some changes to the pre mining land status due to the following activities:

- Excavation of Overburden
- Temporary side casting / Backfilling of waste / overburden.
- Construction of Infrastructure facilities such as office, road, site services etc.,

#### **21.5 Impact on Biological Environment:**

The major possible impact on biological environment due to mining is given below:

- Clearance of vegetation due to mining and allied activities
- Retardation of tree growth, tip burning etc., due to deposition of dust and the particulate matter generated from the mining operation.
- Presence of Schedule-I fauna in the mining area.
- Proposed impact on surface water quality that also provides water to wildlife
- Risk of fall/slip or cause death to wild animals due to project activities
- The project releases effluents into water bodies that also supplies water to wildlife
- Diversion of Agricultural and forest lands for mining

### **22. Remedial Measures to mitigate the impact of mining on the Environment:**

The following remedial measures to be taken during mining.

#### **22.1 Remedial Measures to mitigate Air Pollution**

- Water sprinkling on mineral transport road from the mines to the main road
- Black topping of the main transportation roads to the possible extent.
- Avoiding crowding of trucks by properly spacing them to avoid the concentration of dust emission at any time
- Covering the trucks by tarpaulin sheets during ore transportation
- Proper maintenance of HEMM to minimize gaseous emission
- Imparting sufficient training to operators on safety and environmental parameters
- Development of green belt / plantation around mine, along the roads, backfilled area in various undisturbed areas within the mine lease areas etc.,

### **22.2 Remedial Measures to mitigate water Pollution:**

- Industrial effluent treatment systems wherever necessary to be introduced and maintained properly.
- Safety barriers to be provided for all water bodies and no mining activities should be carried out in the safety barrier area.
- Mitigative measures like construction of garland drains formation of earth bunds to be followed in the waste dumping areas to avoid wash off.
- Domestic effluents to be treated in scientific manner
- Required statutory clearances to be obtained and all precautionary measures to be adopted wherever pumping of ground water is involved.

### **22.3 Remedial Measures to reduce Noise & Vibration:**

- Planting rows of native trees around mine, along the roads, other noise generating centres to act as acoustic barriers.
- Sound proof operator's cabin for equipment may lead to less noise generation.
- Proper and regular maintenance of equipment may lead to less noise generation
- Air silencers of suitable type that can modulate the noise of the engines of machinery to be utilized and will be maintained effectively.
- Providing in-built mechanism for reducing sound emissions.
- Providing ear muff's to workers exposed to higher noise level and to those persons operating or working close to any machine.
- Conducting regular health check-up of workers including Audiometric test for the workers engaged in noise prone area.

### **22.4. Remedial Measures to mitigate Land Pollution:**

The mining in the area is being done from long time, therefore, land has already been degraded. The land affected due to mining will not be backfilled, mined out area will be converted into water reservoir. The water of this reservoir will very useful for fauna and domestic Animals of the area. This also recharges the groundwater table. Entire dumps in the area will be reclaimed by plantation. Wire fencing around the excavated area is proposed to restrict the inadvertent entry of human beings as well as animals.

- (i) Measures for proper utilization of top soil will be ensured.
- (ii) The waste dump will be properly stacked and reclaimed by plantation.
- (iii) Minimum land shall be used for waste dumping and other infrastructures.

### **22.5. Mitigation Measures for Socio Economic Development:**

- (i) All the workers have been employed from nearby villages.
- (ii) The Association will take interest for the welfare amenities Scheme in the area with the help of local people. Provision of Scholarship for meritorious students will be given those who getting highest mark in district level/State level exams.
- (iii) All other facilities like Medical help for the children & women/ widow etc., arrange medical camps in nearby area.

**23. Reclamation of Mined out area (best practice already implemented in the district, requirement as per rule and regulation, proposed reclamation plan:**

The Reclamation of the mined-out areas by simultaneous backfilling and development of compensatory affore station taken in the neighborhood/ backfilled areas of the mining areas by the mining companies and the proprietors of the mines and quarries in the forest areas are dealt by the Departments of Forests and Revenue.

**24. Risk Assessment & Disaster Management Plan:**

Any type of mining activities requires stringent safety measures to avoid unwanted incidences which may damage life & machineries. It may cause widespread harm to assets and serious disruption at site as well as outside. Such situation requires quick action and emergency response plans which can be executed without the loss of time. Time factor is the essence in dealing emergencies to minimize the loss of human life and disruption of work. Any accident may develop into a major emergency even with the best safety measures and programmes in mining. Disaster management plan is formulated with an aim of taking precautionary steps to avert disaster and also to take such action after the disaster which limits the damage to the minimum. Hence, an emergency preparedness plan will be planned properly and documented for ease of implementation at the time of need without losing time and avoiding and delays.

**Objectives of disaster management plan:**

The objectives of DMP is to deal with various types of situation efficiently and to restore the normalcy for early resumption of mining operation due to an unexpected, sudden occurrence resulting to abnormality in the course of mining activity leading to a serious danger to workers or any machinery or the environment. Thus, the overall objectives of the emergency plan are summarized as: -

- To identify and assess emergencies, including risk impact assessment.
- Rapid control of hazardous situation
- Minimizing the risk and impact of event/ accident.
- Effective prevention of damage to property.
- Protect employees and people in vicinity by information about the risk and the role to be played in them in the event of emergency.
- Records, equipment, etc. should be preserved and organize investigation in cause of emergency and preventive measures to stop its recurrence.

In order to achieve objectives of emergency planning, the critical elements that form the spine of Disaster Management Plan (DMP) are: -

- Reliable and early detection of an emergency and immediate careful plan for action.
- The command, co-ordination and response organization structure along with availability of efficient trained personnel.
- The accessibility of resources for managing emergency situation.
- Appropriate emergency response action.
- Effective announcement and communication facility to inform at site.
- Regular evaluation and revise DMP.
- Training of the concerned personnel.
- Steps taken for minimizing the effects may include rescue operations, first aid, evacuation, habilitation and communicating promptly to people living nearby.



- An internal communication system should be provided. Telephone nos. and addresses of adjoining mines, rescue station, police station, Fire service station, local hospital, electricity supply agency and standing consultative committee members should be properly updated and displayed.

### **Identification of Hazards and Mitigation Measures:**

The following types of hazards are identified and precautions to be taken against them are enumerated below. the following natural/industrial problems may be encountered during the mining operation:

- Slope failures at the mine faces.
- Inundation-Filling of the mine pit due to excessive rains/flooding.
- Accident due to fire.

### **Mitigation Measures for fall of Sides & Roof:**

- Flatter slope angles are adopted where occurrences of loose earth are encountered.
- Insurmountable heights are not created.
- Loose rocks are properly dressed.
- Nature and structure of the rocks are properly studied for their slips.
- Bench height will be kept with respect to the digging depth of excavating equipment.
- No overhang/ under cutting will be allowed to be created in benches by the excavating equipment's.

### **Inundation-Filling of the mine pit due to excessive rains/flooding:**

- Drainage will be maintained to reduce inundation of working pits during rain from surface run-off.
- Garland drains will be constructed to prevent the water entering inside the mine.
- Adequate capacity Sumps with will be developed inside the mine.
- Adequate pumping capacity will be built up to deal of accumulated water.
- Dumping area will be benched and sloped at the top towards the low altitude side.

### **Fire:**

Fire generally occurs due to electrical short circuits, storage/handling of fuel oil, human carelessness, etc. Potential Impacts of fires are the burns, injuries and even loss of human life, property and loss of livelihood. Fire may interrupt services like power and communication. Environmental impacts include air pollution due to emission of harmful gases which may affect nearby settlements. Casualties during fire, some preventive measures will be taken to prevent the big damage to human life and property

- Proper care should be taken during the storage/handling of fuel oil without any negligence is the key to protect the fire hazard. First aid will be provided for burning case and immediate treatment will be provided.
- Adequate fire safety equipment's e.g. extinguishers, dry chemicals, carbon dioxide, foam spray, water spray should be kept.
- Good cables should be used for preventing short circuits.
- Move person to fresh air. Seek medical attention for discomfort or if coughing or other symptoms.

- Rinse eyes thoroughly with water to remove all particles. Seek medical attention for abrasions and burns.

### **Accidents**

- Accidents High vehicular speed results in greater stopping distances and turning radii which lead to possibilities of accidents.
- Transporting devices also contributes to serious accidents having potential to become fatal for the persons associated with such operations as well as those present in the vicinity at the time of accident.

### **Occupational Health and Safety**

The steps will be taken to minimize the impacts of mining activities and to ensure occupational health and safety during commissioning, operations and maintenance of mining equipment/machinery. It can be minimized by adopting below mentioned measures: -

- Periodic examination and testing of equipment, machineries and equipment handling substances.
- Firefighting training to workers and Staff for first aid, safe handling of materials and integrating safety.
- Suitable notices / boards displayed at several locations indicating appropriate hazards warning as well as DOs and DON'T for ensuring operational and personal Safety for information of workers / staff and visitors.
- Personnel protective equipment is provided to prevent the noise hazards.

### **Health and Safety Monitoring Plan**

- Each employee will undergo a proper medical examination.
- All other employees will be medically examined as per rules that are 20% strength every year.

### **25. Details of the Occupational Health issues in the District. (Last five year data of number of patients of Silicosis & tuberculosis is also needs to be submitted:**

Occupational health hazards refer to the potential risks to health and safety for those who work outside the home. Of course, the specific occupational health hazards faced by this large and growing number of people depend on the region and its economic standing. However, the following are some of the most common occupational health hazards faced by workers. Topping the list of occupational health hazards are structural failures and mechanical accidents. This includes structures vulnerable to adverse weather conditions, moving and/or unprotected parts of machinery, or general equipment failure. These occupational health hazards exist fairly equally in developed and undeveloped countries, regardless of industry. One of the most common work-related injuries to occur globally is the development of musculoskeletal disorders caused by heavy lifting and performing tasks that require repetitive motions. These occupational health hazards are also responsible for the most incidents of disability claims,

whether temporary, long-term, or permanent. Muscle injuries due to physical stress most often occur in occupations such as construction and farming, while repetitive motion injuries are most often sustained in environments related to services that typically involve heavy typing and data entry. Also grouped into this category of occupational health hazards are ergonomically poor working conditions and equipment. Hearing loss is another hazard encountered by those who work in industries such as construction and manufacturing. In fact, hearing loss ranks with mechanical hazards in terms of being one of the most common occupational health hazards in both developed and developing countries. Typically, hearing loss occurs over time from chronic exposure to noisy machinery without the use of earmuffs designed to protect hearing. Even long-term exposure to vibrations can contribute to hearing loss. Exposure to chemicals and other biological agents account for one of the most common and most harmful of occupational health hazards that affect several industries. The health risks from these hazards include liver damage, cancer, and reproductive disorders from chronic exposure to pesticides, heavy metals, and corrosive substances. Health care workers are at particular risk for contacting diseases such as HIV/AIDS, tuberculosis, and hepatitis B and hepatitis C. Others, such as those who work in agriculture, are at

increased risk of infections caused by fungi and parasites. Other groups are impacted by a high incidence of skin and respiratory disorders due to exposure to allergens, such as mold, bacteria, and organic dusts.

The details of number of patients treated for silicosis and Tuberculosis for the last five years in the district is given below:

Sl.No	Year	Number of patients treated for silicosis	Number of patients treated for Tuberculosis
1	2019	Nil	1016
2	2020	Nil	1030
3	2021	Nil	1250
4	2022	Nil	1402
5	2023	Nil	1364

## 26. Plantation and Green Belt development in respect of leases already granted in the District:

The greenbelt development plan aims to overall improvement in the environmental conditions of the region. The plan with a five-fold objective addresses issues such as prevention of land degradation due to activities during Mining operation, enhancing the forest cover for increasing the biodiversity of the region, providing aesthetic value to the project area for enhancing the ecological equilibrium of the area and to a large proportion in combating soil erosion.

### Need for greenbelt development plan with scheme for greenbelt development

The implementation for development of green belt will be paramount importance as it will not only add up as an aesthetic feature, but also act as a pollution sink.

The scheme of plantation in-side the cluster area is given as follows:

- The species to be grown in the area should be dust tolerant and fast-growing species so that permanent green belt is created.
- The Green belt development will be done along the haul roads.
- The Green Belt Development will be done nearby the mining leases to minimize the pollution level.
- The green belt will be put under a protective regulatory framework to ensure that it is not degraded or disturbed. No ecologically disruptive activity will be allowed in this zone.
- The Green Belt Development should be Approx. 33% of the area of the mining lease.

Sl. No.	Name of the Site	Plantation/ nearby Forest Block
1	Mediadami Stone quarry under Raikia Tahasil	-5 KM from Dibari RF. -5 KM from 10 ha. of ANR with gap plantation under schemeCAMP 2020-21 in Dibari RF.
2	Alamramu Stone quarry under Raikia Tahasil	-1 KM from Dibari RF. -7 KM from Kilondi RF.
3	Rudabidingia Stone quarry under Tikabali Tahasil	-1 KM from Tikabali KF (proposed new site for plantation of 10 ha. under IGC Bald hill 2024-25). -500 Mtr. from Talarimaha PRF. -2 KM from Burtang South RF.
4	Dadanga Stone quarry under Tumudibandha Tahasil	-Avenue plantation Tumudibandha to Dadanga 10 Rkm. under MGNREGS inside Budhanai South PRF.

		<p>Distance from Quarry to plantation 1 Km.</p> <p>-ANR with gap plantation at Kapibira over 50 ha. inside Budhanai South PRF. Distance from Quarry to plantation is 12 Km.</p> <p>- ANR with gap plantation at Kapibira over 50 ha. inside Budhanai South PRF. Distance from Quarry to plantation is 3 Km.</p> <p>-The proposed stone quarry is coming under Budhanai 'S' PRF.</p>
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**Transportation Route for individual Lease and leases in Cluster**

Lease No.	Transportation Route No.	Number of tippers/day of lease	Number of tippers/day of all the lease on route	Length of route in KM	Type of Road (Black Topped/unpaved)	Recommendation for road (Black Topped/unpaved)	The road will be constructed by Govt./Lease owner	Route Map & Location
2				7.9 KM	VILLEGE ROAD(unpaved road)		The unpaved road will be constructed by the Lease owner	84°14'47.02"E 20°3'30.85" N

Cluster No.	Transportation Route No.	Number of tippers/Day of cluster	Number of tippers/Day of all the cluster on route	Length of route in KM	Type of road (Black Topped/unpaved)	Recommendation for road (Black Topped/unpaved)	The road will be constructed by Govt./Lease owner	Route Map & Location
NA	NA	NA	NA	NA	NA	NA	NA	NA

**Patta Lands/Khatedari Land: (existing & proposed)**

Owner	Sy.No.	Area	District	Tehsil	Village	Total Reserve (MT)	Total Mineral to be mined (MT)	Existing /Proposed
	2	12.52	kandhamala	Tikabali	Rudabidingia	3708767	3433782	Proposed

**Final List of Cluster & Contiguous Cluster**

Clusters:							
River Name	Cluster No.	Lease No	Location (Riverbed / Patta Land)	Village	Area (in Ha)	Total Excavation (Ton)	Total Mineral Excavation (Ton)
		2		Rudabidingia	12.52	3708767	3433782

**. Final Transportation Route for individual Lease and leases in Cluster**

Lease No.	Transportation Route No.	Number of tippers/day of lease	Number of tippers/day of all the lease on route	Length of route in KM	Type of Road (Black Topped/unpaved)	Recommendation for road (Black Topped/unpaved)	The road will be constructed by Govt./Lease owner	Route Map & Location
Rudabidingia	SH7			7.9 KM	Both Black Topped & Unpaved Road		The unpaved road will be constructed by the Lease owner	84°14'47.02"E 20°3'30.85" N

Cluster No.	Transportation Route No.	Number of tippers/Day of cluster	Number of tippers/Day of all the cluster on route	Length of route in KM	Type of road (Black Topped/unpaved)	Recommendation for road (Black Topped/unpaved)	The road will be constructed by Govt./Lease owner	Route Map & Location
NA	NA	NA	NA	NA	NA	NA	NA	NA

1. The land schedule & status of the source is prescribed as below:

Name of the Tahasil	Name of the sairat source	Land Schedule						Present Status
		village	Khat a No.	Plot No.	Kisam	Total area (in HC)	Proposed Area in Hc	
Tikabali	Rudabidingia (Granite Stone)	Rudabidingia	150	39	Pathar abani	13.520	12.520	Not operation

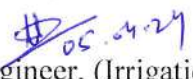
**Details of royalty or Revenue received in last three years from stone source:**

Name of the Tahasil	Name of the Sairat Source	Collection of Royalty/ Revenue made in the last three years (in Rs.)		
		2020-21	2021-22	2022-23
Tikabali	Rudabidingia (Granite Stone)	Nil	Nil	Nil

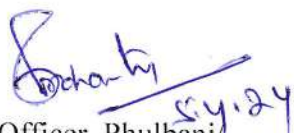
**Details of Production of Stone in last three year's:**

Name of the Tahasil	Name of the Sairat Source	Production of Stone in last three years (in cubic meters.)		
		2020-21	2021-22	2022-23
Tikabali	Rudabidingia (Granite Stone)	Nil	Nil	Nil

  
Sub Collector & SDM, Balliguda,  
Chairman

  
Executive Engineer, (Irrigation/WR)  
Member

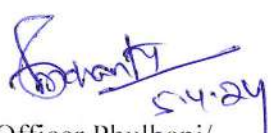
  
Divisional Forest Officer/ACF, Phulbani  
Member

  
Mining Officer, Phulbani/  
Deputy Director Mines (Minor Mineral)(I/C)  
Concerned Circle,  
Member

  
Geologist from O/o Joint Director Geology of  
Concerned Zone / Directorate of Mines & Geology  
Member

  
RO of State Pollution Control Board  
Member

  
Divisional Forest Officer/ACF, Baliguda  
Member

  
Mining Officer, Phulbani/  
Deputy Director Mines (Specified Minor Mineral)(I/C)  
Concerned Circle/Dist/Area  
Member

  
Mining Officer, Minor Mineral  
Kandhamal,  
Member- Convener

( APPROVED )  
  
Collector,  
Kandhamal, Phulbani