M/S KRISHNA DAS

at: Mahindpur, PS: Biridi, Jagatsinghpur (Mob-9593944576)

Ref No: KD/MSQ/EC-06.B Date: 26.04.2022

To

The Member Secretary
State Environment Impact Assessment Authority, Odisha.
Unit-IX, Bhubaneswar-751022

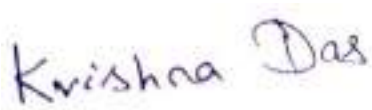
Sub: Environmental Clearance for production of 19426 Cum/annum of river sand by Quarrying over Sanawaubari Devi Nadi Sand Quarry (ML area 8.093 ha) in village Sanawaubari, Biridi Tahsil of Jagatsinghpur District, Odisha by Smt. Krishna Das, W/o- Rasabihari Das At- Maindipur, Ps- Biridi, Jagatsinghpur, Odisha: Regarding EDS Reply

Dear Sir,

With reference to above mentioned subject, we need to inform you that as per letter from Tahsildar Vide No186 date 11.02.2022 Environmental Clearance to be issued in favor of Tahsildar Biridi, Jagatsinghpur,odisha , w.r.t proposal of Environmental Clarence for sand mining over Sanawaubari Devi Nadi Sand Quarry (ML area 8.093 ha) in village Sanawaubari, Biridi Tahsil of Jagatsinghpur District, Odisha by Smt. Krishna Das, W/o- Rasabihari Das At- Maindipur, Ps- Biridi, Jagatsinghpur, Odisha.

Replenishment Survey was carried out by NABET accredited consultant and copy of DSR attached attached for your kind perusal.

For Sanawaubarai Devi Nadi Sand Quarry



KRISHNA DAS
Successful Bidder

OFFICE OF THE TAHASILDAR: BIRIDI,JAGATSINGHPUR

Email: tah.biridi-od@nic.in *Ph. No.06724-268678*

Letter No. 186 Dt. 11.02.2022

To

The Member Secretary,

State Environment Impact Assessment Authority, Odisha

Bhubaneswar

Sub: Issuance of Environment Clearance for Sanawaubari Devi Nadi Sand Quarry.

Sir,

In inviting a reference to the subject cited above, I am to intimate you that Mrs. Krishna Das W/o- Rasabihari Das At- Maindipur Ps- Biridi Dist- Jagatsinghpur has been selected as the highest bidder for Sanawaubari Devi Nadi Sand Quarry in the Auction process.

Hence I would request you to issue Environment Clearance in favour of the Project proponent i.e Tahasildar, Biridi and subsequently the EC will be transferred to the highest bidder.

Yours faithfully

11/2/22

Tahasildar, Biridi

Memo No: 187 **Date:** 11.02.2022

Copy submitted to the Additional District Magistrate, Jagatsinghpur for favour of kind information.

11/2/22

Tahasildar, Biridi

REPLENISHMENT STUDY REPORT FOR

Sanawaubarai Sand Quarry

DEVI RIVER BED SAND MINING PROJECT

(ML AREA 8.093 Ha)
At- Village Sanawaubarai, Tahasil-Biridi, Dist- Jagatsinghpur, Odisha

NAME OF RIVER –DEVI

Proposed Production – 19426Cum per annum

CATEGORY- 'B as Per EIA Notification 2006

APPLICANT

Tahsildar, Biridi,Dist Jagatsighpur,Odisha

PREPARED BY

VVN Technologies Pvt. Ltd.
No.305, Opp. Ramnathapur Lake, YES Bank Building,
ARINI Arcade, Ramnathapur, Uppal,
Hyderabad, Telangana-500013

Successful Bidder: Krishna Das
at: Mahindipur,Dist Jagatsinghpur,Odisha

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(b) Resources quantity assessment: 14

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Introduction

The project has been proposed for extraction of River Sand from the Sanawaubarai Sand Ghat. It is estimated that the amount of total production of River Sand is 19426 CuM/Annum Which is to be extracted by open cast Manual method. This is not linked or dependent on any other project so far, as the production of River Sand is concerned. The lease area is bounded by Latitude 20°21'57.39"N to 20°21'48.22"N & Longitude 86°01'12.30"E to 86°01'11.78"E. It is part of the area covered in the Survey of India Toposheet No. 73L/3.

The lease area is situated in village at Sanawaubarai village of Biridi Tahasil in district of Jagatsinghpur of State Odisha and lease has been granted to Mrs Krishna Das, At/Po – Mahindipur ,Dist-Jagatsinghpur,Odisha vides order no. 653 dated 25.05.2021.

The lease area of Sanawaubarai Sand quarry present in river Devi over an area of 19.99acres (8.093 ha) in village- Sanawaubarai, Tahasil-Biridi, District-Jagatsinghpur, Odisha. It is estimated that the amount of total proposed production of River Sand is 19426 Cu.m/Annum which is to be extracted by open cast manual method.

The mining plan was approved by Joint Director of Geology, Dhenkanal, Odisha.

Sanawaubarai Sand Ghat, lease area is a Govt. land of “Nadi” kisam. This is a mine having River Sand deposit and the lease area is non forest govt. waste land. Hence no such alternative sites have been considered, as the mining activity is site specific.

The Sanawaubarai Sand Ghat is an open cast sand quarry project from which the river sand will be excavated. The lessee has planned to work in opencast manual method of mining which will be on single shift basis. Around 19426 Cu.m per annum will be dispatches from the mine. Total working months are eight months in a year. The total area covers sand deposit with a partly of water covers. The excavated Sand will be sold in domestic market for construction purposes.

PROJECT DETAIL

Details	Lease Details	Area (in Ha)	Mining leases within 500 meters (if yes cluster area)	Minable Reserve (Mine depth max as 1 m)	Mineral to be Mined (mine depth 0.5 m)
Sanawaubarai Sand Ghat (ML area 8.093ha), village Sanawaubarai, Tahsil Biridi, Jagatsinghpur, Odisha	Mining of River Sand owned by Mr. Mrs Krishna Das Mahindipur, Dist Jagatsinghpur, Odisha	8.093	Nil	38852 cum	97130.00 Cum / Plan Period or 19426Cum/annum

Estimation of Reserves

The method of cross section has been adopted for computing the reserve. The mining lease boundary, proven & mining limits are marked on the plan which is there after transferred to cross section for determining the different categories of reserve.

Estimation of Reserves

Lease Area applied	8.093 Ha
Peripheral strip	1.0117 Ha (10% of total mining area)
Mining Area	3.88 Ha
Geological Reserve (up to 7.5 m)	80937 m3
Mineable Reserve/ Total Vol. of Mineral(up to 1.0 m)	38852 m3.
Maximum Mineable sand (in cum) (60% of total potential) as per DSR	241200.0 m^3
Method of Mining	Opencast Manual

Geological Reserves

All the quantity estimated is under proved (111) category under UNCEF classification. The area of mining lease and the average thickness of mineral are multiply to get volume.

Lease area is = 8.093 Ha

Estimated Depth of reserve = 13 mRL up to an average depth of 1m; 12 mRL

Reserve Geological reserves of the lease area = 80937 m3

Mineable

Based on the surface exposures, the updated geological resources as well as mineable reserves have been estimated in the entire lease area under proved, reserves for geological and mineable category based on the following parameters.

The category wise geological proved sources as well as Mineable proved Reserves have been calculated for the lease area referring different parameters.

As estimated, proved geological reserve of River Sand is 80937 m3 and proved mineable reserve is 38852 m3. During the plan period, a total of 97130 Cu.m (saleable) River Sand will be produced. Reserve of River Sand may increase after the extraction carried out by the lessee.

Land Use Plan: According to the given Land Use plan as per the Mine plan, 8.093 Ha area will be excavated for the sand mining.

LAND UTILIZATION PLAN

Land Use	Area in Ha.
Water channel area	3.55
Left over area adjacent to water channel	0.004
Quarry Safety Zone & Untouched area	0.659
Potential Mineable surface area within the plan period	3.88
Total	**8.093**

Working Depth

The mining is confined to extraction of sand from the bed of Devi. The mining will be manual in which the material will be collected in its existing form and transportation through dumpers and tractors. Mining of minor minerals in river-bed proves to be most viable and least disturbing to the environment. The mining process is manual method without drilling & blasting. There would be no risk to the employee working in the mines. Except in cases of emergency, when suppliers are to be effected to Government agencies and other requisite parameters of need, manual mining operations may be resorted to, without drilling & blasting. As the working is going to be methodical i.e. mining will be done in benches. There would be no risk to the employee working in the mines.

Mining will be starting from its center and advance toward the banks across the river uniformly. The mineral extraction will be done for a period of 240 days in a year.

In order to maintain safety and stability of river banks a safety distance of 7.5 m or 1/10th of the width of the river on both side of river bank will be left as per sustainable sand.

Sand Mining Guidelines issued by MOEF&CC in 2016 & 2020 shall be followed. The lease area gets the sediment deposit due to the river flow which remains undisturbed during the monsoons. The extraction process can slow or stop aggradations thereby maintaining the channel's capacity and its flow.

NO mining shall be carried out up to a distance of 1 kilometre (1 km) from major bridges and highways on both sides, or five times (5x) of the span (x) of a bridge/public civil structure (including water intake points) on up-stream side and ten times (10x) the span of such bridge on down-stream side, subjected to a minimum of 250 meters on the upstream side and 500 meters on the downstream side.

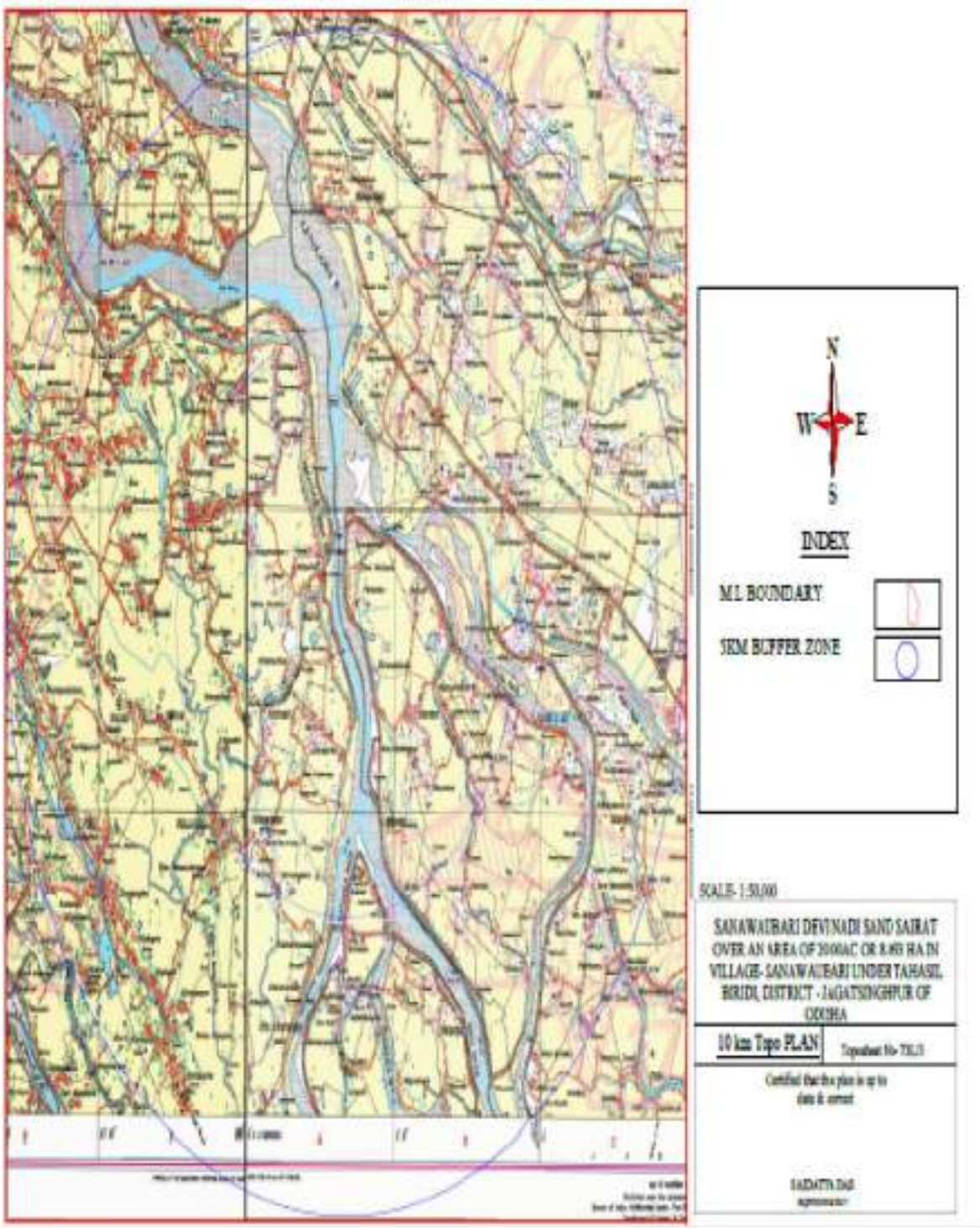
For the optimum utilization of the mineral available in the lease area, mine working has been planned in a scientific and systematic way as shown in the working plan and section. The excavation planning, slope, height, width and length of the bench are planned on the basis of deposit. Since the deposit is very simple, shallow and beds are horizontal, the simple adopted mining is most suitable.

The Mining for sand is been planned as per the mine plan as given below:

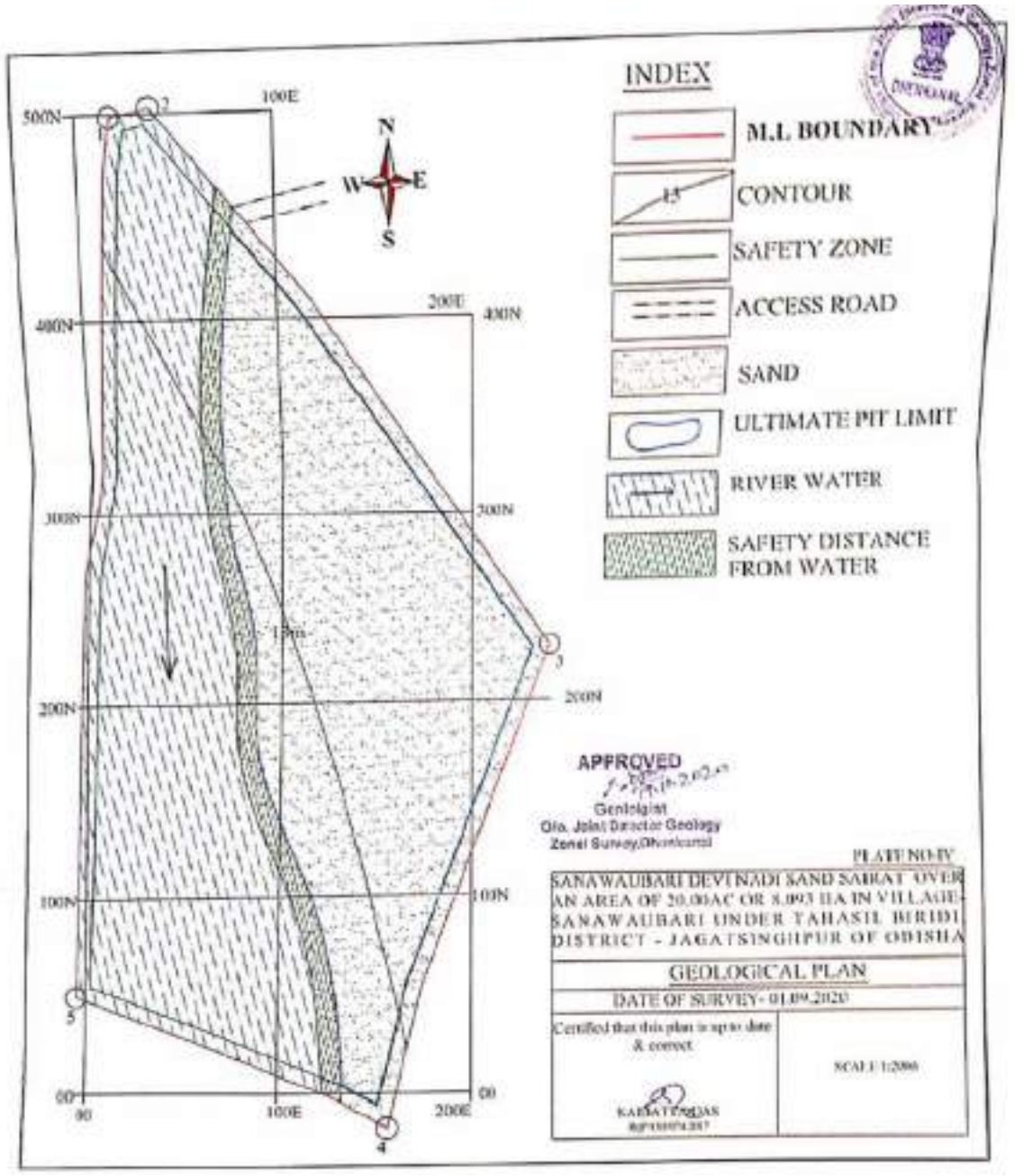
PROPOSED PRODUCTION SCHEDULE

Year of Plan	Surface Area	Depth	Volume of Sand (m^3)
1st Year	38852	0.5	19426
2nd Year	38852	0.5	19426
3rd Year	38852	0.5	19426
4th Year	38852	0.5	19426
5th Year	38852	0.5	19426
Total			97130

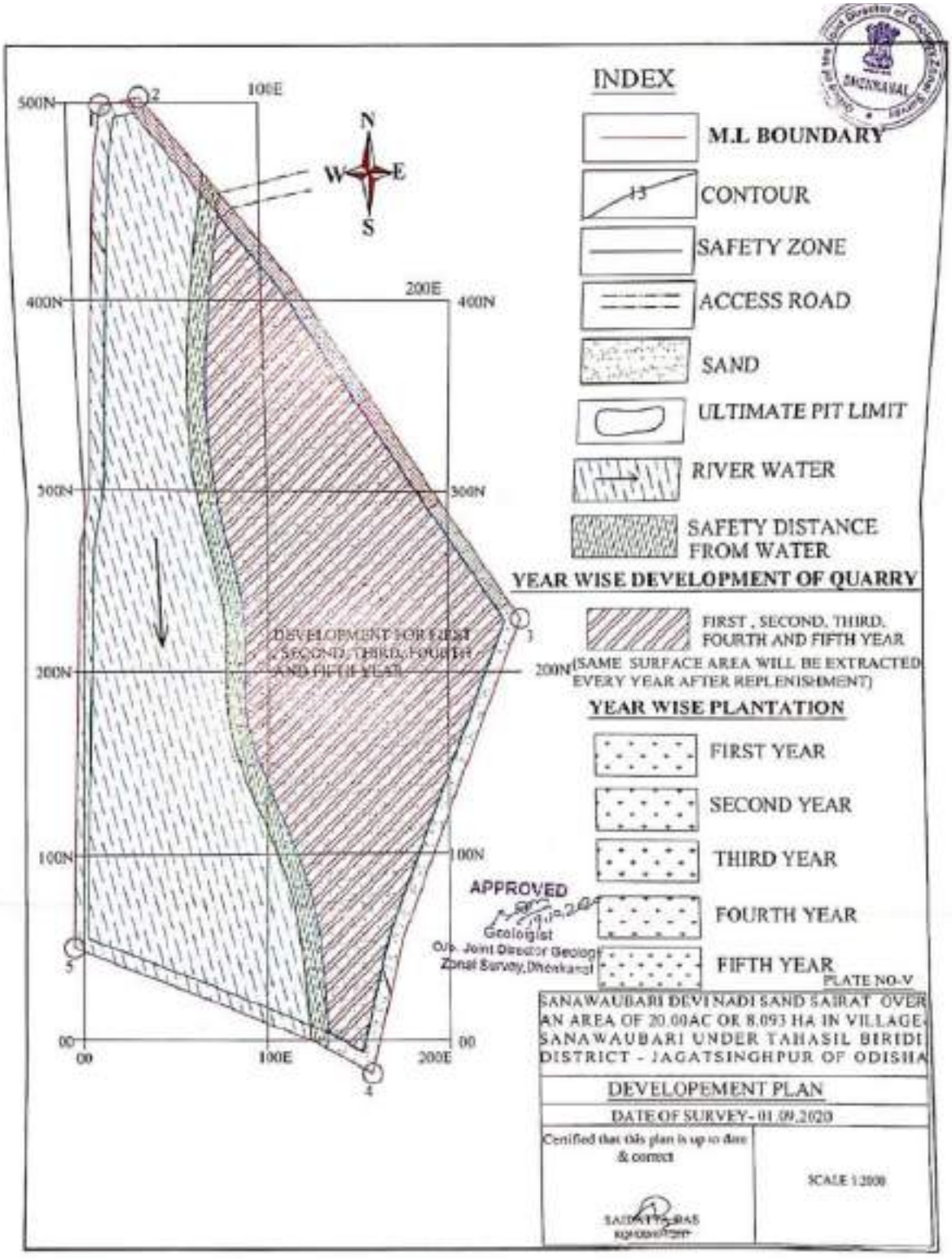
LOCATION MAP



GEOLOGICAL PLAN



DEVELOPMENT PLAN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CONTOUR
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ACCESS ROAD
SAND
ULTIMATE PIT LIMIT
RIVER WATER
SAFETY DISTANCE FROM WATER
YEAR WISE DEVELOPMENT OF QUARRY
FIRST , SECOND, THIRD, FOURTH AND FIFTH YEAR
(SAME SURFACE AREA WILL BE EXTRACTED EVERY YEAR AFTER REPLENISHMENT)
YEAR WISE PLANTATION
FIRST YEAR
SECOND YEAR
THIRD YEAR
FOURTH YEAR
FIFTH YEAR
APPROVED
Geologist
Dy. Joint Director Geology
Zonal Survey, Dhenkanal
PLATE NO-V
SANAWAUBARI DEVI NADI SAND SAIRAT OVER AN AREA OF 20.00AC OR 8.093 HA IN VILLAGE SANAWAUBARI UNDER TAHASIL BIRIDI DISTRICT - JAGATSINGHPUR OF ODISHA
DEVELOPEMENT PLAN
DATE OF SURVEY- 01.09.2020
Certified that this plan is up to date & correct
SCALE 1:2000
500N
400N
300N
200N
100N
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100E
200E
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W
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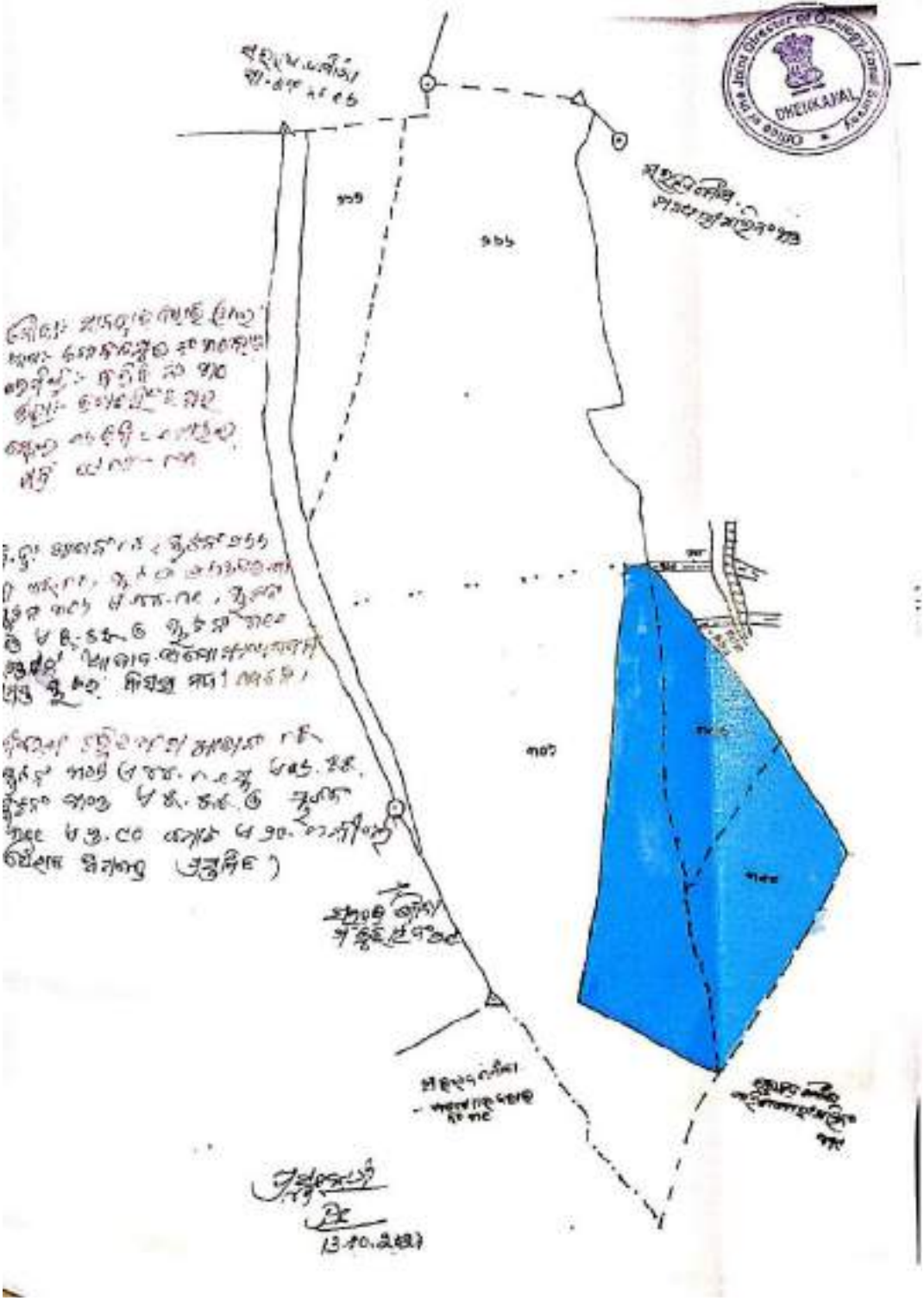
S

Lease Map



PHOTOGRAPHS OF APPLIED LEASE AREA

Photograph of South Side of the Mine Lease Area

Stages of Environmental Clearance

Application for prior Environmental clearance for the above project was submitted to the State Environmental Impact Assessment Authority (SEIAA) for determination of Terms of Reference (ToR) for the preparation of EIA Report. Proposal for ToR was issued in 09-04-2021 vides letter no. 1253/SEIAA for preparation of EIA/EMP report. In accordance with ToR letter Baseline Study was carried out during Dec. 2020 to Feb. 2021 and draft EIA/EMP report submitted to State pollution control Board for conducting Public Hearing.

The Public Hearing meeting was held in respect of environmental Impact assessment of Madhyasasan Sand Ghat of M/s Mrs Krishna Das for production of river sand of Capacity 19426Cum/annum over mining lease area of 8.093ha Madhasasan, Tahasil- Biridi of Jagatsinghpur District was held at the scheduled venue &time.

As per the mandate of the ToR Special Condition, a study of the annual replenishment rate of the sand by collecting pre monsoon & post monsoon data is been the objective of this study.

Replenishment Study: Topography, Drainage pattern, General Geology & Local geology

The topography of the applied area is mainly plain land marked with shallow nallah and undulations. The drainage pattern of this area in general flowing from North-West towards South- East direction.

Drainage:

Kandal river is the main southern distributaries of Devi river branching off at Jagatsinghpur, Odisha. Devi river later acquires the name Kandal as it flows further east.

General Geology

The Geological reserve has been estimated by considering the following parameters.

Outcome of geological mapping: the particular area is a new source. Fresh patches of unexploited river sand occurrences are also observed within the area. The maximum RL of the surface sand zone is around 13m.

It is observed that, the difference in elevation between the highest and lowest points is much less. Gradient of the river is also very low. Therefore, surface area method has been adapted for estimation of reserve for this river bed sand.

Thickness of sand zone: The mRL of the surface sand zone is around 13m. Considering the observations of thickness of sand bed of the area the maximum possible thickness of sand bed

that can be mined out i.e. 2.5m is assumed as the thickness of sand over the area for estimation of reserve.

The quarry lease area is a new source. Quarry lease for minor mineral (River sand) has been proposed to be granted by the Tahasildar, Biridi to the successful bidder for minor mineral (River sand) for five years after auction and the present document is being prepared in favour of Tahsildar, Biridi and the process would require at least 2 to 3 months from now. At that point of time the position and quantity of the present resource of river sand within the area cannot be calculated now. Also, the pattern of sand deposition in the ensuing years of the lease period is impossible to ascertain right now. To overcome this, the total lease area has been considered as potential zone for sand deposition excluding the water channel areas, if any located within the area (Plate No IV) and Geological resource has been calculated based on this area and the present thickness of sand deposit.

In the absence of any monitored database, it is assumed that 100% of the above calculated resource would be replenished cumulatively within the total QL period of 5 years. The resource of river sand over the area has been categorized as proved reserve.

The foreign particles in the sand such as wood and floating waste have been considered as waste. However, the volume of waste is negligible in quantity and in practice the waste will not be separated during mining. So recovery factor has been taken as 100% for sand.

Total volume of excavation of sand is saleable.

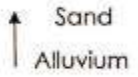
b. Litho-stratigraphy of Quaternary sequence in Odisha

Morpho Units	Litho Units	Tentative age
Present day Surface Holocene	Present day channel fill (Fine to medium sand with little clay and silt).	Late
Bankigarh Surface Holocene	Bankigarh Formation (Brownish sandy clay)	Late to Middle
Kaimundi Surface Pleistocene to early Holocene	Kaimundi Formation (Caliche bearing sandy clay).	Late
Bolagarh surface/ Pleistocene Naira Surface	Bolgarh Formation (Secondary laterite formation). (Semi-consolidated Pebbly sandstone with ash bed).	Middle to Early
~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ Un-conformity ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~		
Basement	Precambrian to Tertiary rocks.	

APPROVED
20.10.2020
Geologist
O/o. Joint Director of Geology

Local Geology

The sand deposit in Devi River near Madhyasasan belongs to recent to sub recent deposits of Holocene age. Beach Sand, younger and older alluvium also belongs to the same age. The proposed area is occupied by a gently sloping to almost flat deposits of sand. The basement consists of Tertiary deposits and the sequence of litho-units encountered in the auction hold area is as follow:



Summary of Reserves as per Approved Mining Plan:

Resource Quality and Quantity Assessment:

(a) Resources quality assessment:

River Sand will be mined from the river bed to be used as building material. Availability of sand resources- sand- 97130 cum. This is the maximum volume of sand which can be quarried out from the sources of the district and has been calculated as 70% of the quantity derived by multiplying the area of the source with 2m thickness as the exact resource of sand is not possible to calculate due to the monsoon period.

(b) Resources quantity assessment:

Geological Resources have been estimated as per UNFC guideline.

Summary of resources available in the applied area is as below:

The total area of river channel attributing to the sand deposition in the meandered river basin of Devi nadi surrounding the lease area is mapped with sectional changes in the basin structure during pre and post monsoon periods as given below.

REPLENISHMENT STUDY

The rate of gross or absolute silt production (erosion) in the catchment area and the ability of the stream system to transport the eroded material in a river and then to a reservoir has the direct relation with the quantity of sediment delivered into a reservoir. The rate of gross erosion is dependent upon many physical factors live climatic

conditions, nature of soil, slope of the area, topography and the land use. Hydro-physical conditions of the watershed govern the capability of transporting the eroded material. It has been observed that the average rate of sediment production decreases as the size of drainage area increase and the larger watershed the lesser is the variation between the rates. The larger watershed presents more opportunity for deposition of silt during its traverse from the point of production. The watershed with maximum land use class of forest generate very low rate of production unless the forest are degraded or open forest. The cultivated watersheds with unscientific farming produce very high rate of silt production. The total amount of eroded material, which reaches a particular hydraulic control point, is termed as sediment yield. The sediment control of inflow is governed by Character of run-off; Susceptibility of soils; the extent and density of vegetative cover in the area; and the hydraulic efficiency of the drainage system.

The rotational mining is being adopted to facilitate the replenishment of the excavated pits during rainy season. Thus the mineable area has been divided in two blocks i.e. the upstream block and the downstream block. The Mining of these blocks is suggested on rotation basis in such a way that pit of previous year mining will act as depository for the monsoon season. Sand is extracted from the said lot during one year; more than the extracted quantity of the same are automatically replenished by rainfall in the monsoon by the river itself on account of its flow and velocity.

Study Methodology

Sediment load estimation for any river system is a time consuming and should be done over a period. Usually replenishment or sediment deposition quantities can be estimated in the following ways as given below:

A. Direct measurement of the sand bar upliftment, monitoring of the new sand bars created in the monsoon within the channel, elimination of sand bars during the monsoon etc. With systematic data acquisition, over a period, regression equations can be developed for modeling of the sediment yield and annual replenishment with variable components

In this report, for volume estimation of sand, “Depth x Area” has been followed. The planned sand production was monitored continuously on monthly basis

B. The replenishment estimation based on a theoretical empirical formula with the estimation of bed-load transport comprising of analytical models to calculate the replenishment estimation.

Sedimentation in any river is dependent on sediment yield and sediment yield depends on soil erosion in river’s catchment area. Depositional character of a river largely follows mathematical regressions if their natural flows are not disrupted by manmade structures or tectonic events. The flow dynamics of

a river largely affected due to construction of dams and barrages. The natural sediment flows get disrupted and premature sedimentation occurs in the point of obstructions.

Process of Replenishment study of the project explained below

Field data collation:

Field data collations were done during May for pre monsoon period and during November for post monsoon period. The relative elevation levels were captured through Total Station. Thickness of the sand bars was measured through sectional profiles.

The volumetric Survey was done in the proposed mining blocks in pre monsoon season from where mining was done earlier. By this method spot RL/level was marked & mapped and sections were drawn. After that for post-monsoon season again spot RL/level was marked & mapped on the same location.

Selection of Study profiles:

Study profiles are selected based on the occurrence of the sand bars in the project area. Aerial extents of each of the profiles are mapped through Google earth imageries

Data Compilation:

Following data were compiled for generation of this annual replenishment report:

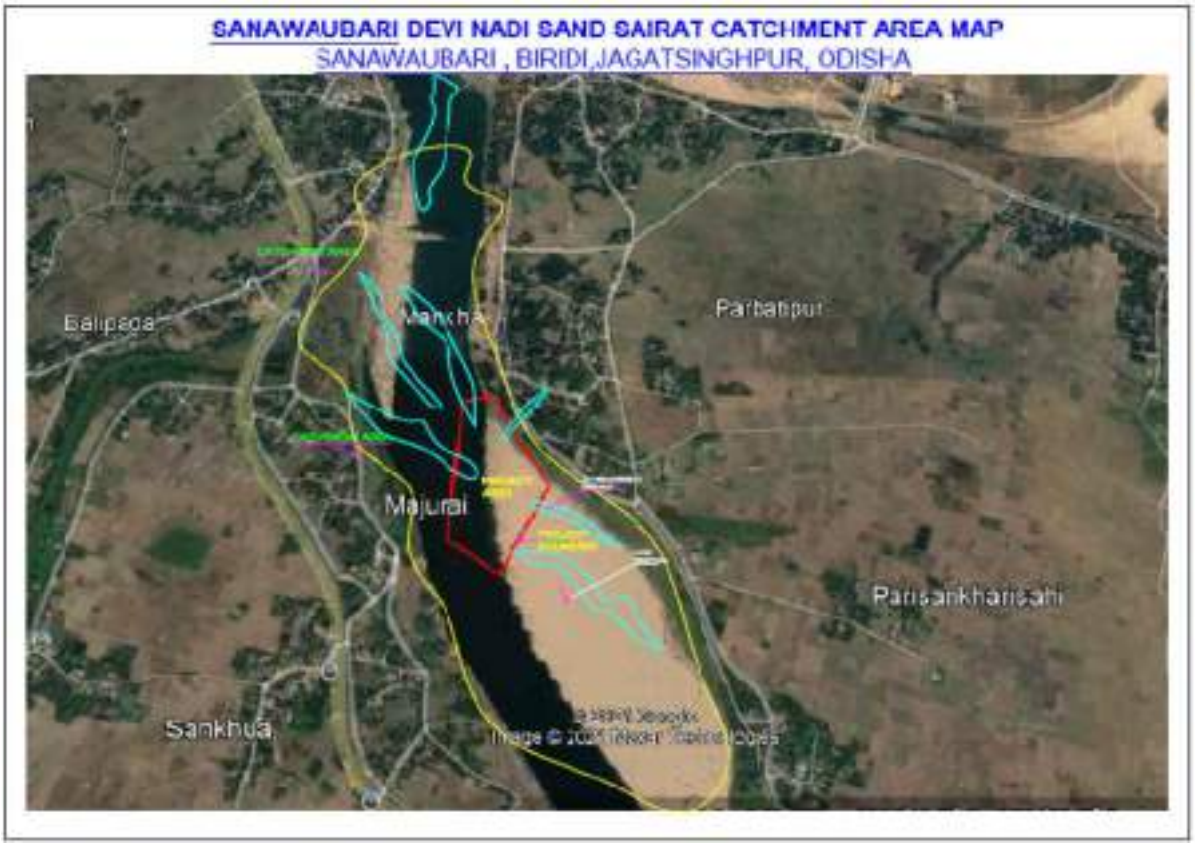
Elevation levels of the sand bar at the project area as measured at site.

Area of the sand quarry

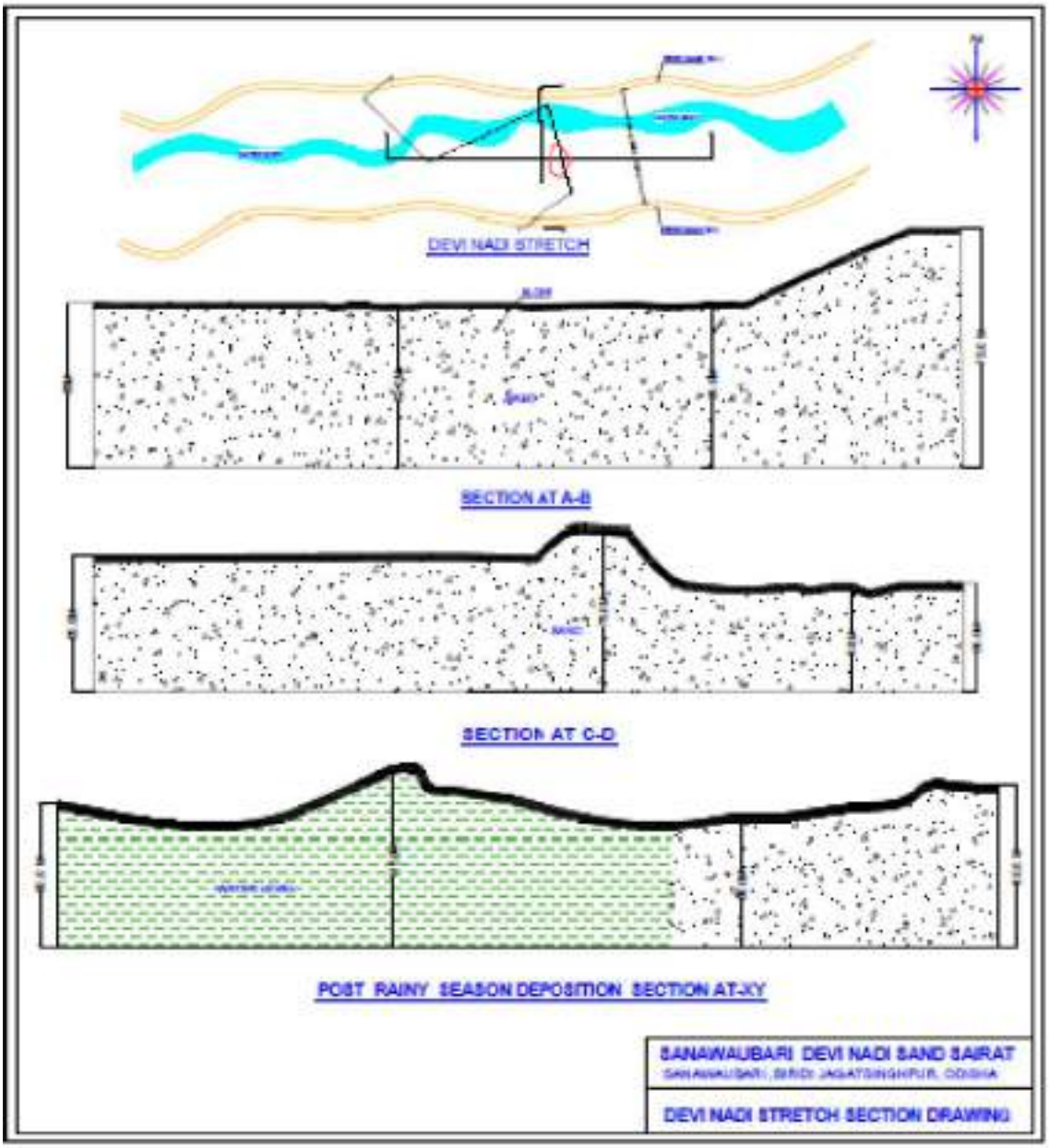
Year-wise projected sand production data collected from mine plan

Development of Cross profiles:

Cross section lines are chosen based on the variation of the river widths and the position of the sand bar in the project area. Relative disposition of sand within the project area is shown by the section lines as below



Cross section of Rivers along project area



Source of sand in proposed River bed area:-

Kathajodi river is the main southern distributary of Mahanadi river branching off at Jagatsinghpur, Odisha. Kathajodi river later acquires the name Devi as it flows further east.

The width of river is 1700 meter

Total mineable area is 38852 Sqm .

Method of Replenishment Study:

For the said project replenishment study has been done during the pre-monsoon (May-2021) and post-monsoon season (Oct. - 2021) by field survey (volumetric survey) method.

Firstly Volumetric Survey was done in the proposed mining blocks in pre monsoon season from where mining was done. By this method spot RL/level was marked & mapped and sections were drawn.

After that for post-monsoon season again spot RL/level was marked & mapped on the same location and sections were drawn.

Result:

Both the sections (pre-monsoon and post-monsoon) are superimposed and volume has been calculated & given in below table. The estimations are done with digging two pits of 30mt x30 m x 1m at the two proposed zones of mining during pre-monsoon season (as if the mining has happened for the last season) to see what depth is filled up with sand after monsoon season, which was measured during last week of October.

River Block Replenishment Volume Calculation

Sr. No.	Area of Mining Block (in Sq. mtr)	Thickness of area Pre monsoon season	Volume Before Pre Monsson	Thickness of area Post monsoon season	Volume in cu.m
1	12951 sq.m, Block-First-Third Year	0.5 m.	6475	0.4 m.	5180
2	12951 sq.m, Block–2nd & 4Th Year	0.5 m.	6475	0.3 m.	3885
2	12951 sq.m, Block– 5Th Year	0.5m	6475	0.4m	5180
Total			19426		14245

For volumetric measurement of sand deposition, RL during pre-monsoon period taken as base or zero thickness and the RL difference during post-monsoon period is consider as sand aggradations during monsoon period in the concern area.

To compare the planned production in the project area with respect to replenished sand, below table has been established.

ANNUAL PRODUCTION				REPLINISHMENT	
Year	**Surface Area of Sand (m^2)**	**Thickness of Sand (m)**	**Volume of Sand (m^3)**	**Thickness of Sand (m)**	**Volume of Sand (m^3)**
1st	38852	0.5	19426	0.4	15541
2nd	38852	0.5	19426	0.3	11656
3rd	38852	0.5	19426	0.4	15541
4th	38852	0.5	19426	0.3	11656
5th	38852	0.5	19426	0.4	15541
	Total		**97130**		**69934**

Conclusion:

The replenishment of Sand has been calculated by volumetric survey method and amount of sand deposited in the post monsoon season was calculated.

Sr. No.	Lease Area	Annual Production capacity (as per approved mining plan) Cum(average)	Estimated Annual replenishment in Cum(average)	Replenishment Status vis-à-vis planned production
1.	8.093ha.	19426	14245	Replenishment is less than the planned annual production

*Amount of sand Replenishment within the quarry area is 14245 Cum/annum & proposed production is 19426 tonnes i.e. appox. 73 % replenishment can been done. Therefore the areas for sand exploitation within the lease area is been divided into two zones, one for First-Third-Fifth years' mining and the other for Second-Fourth years' mining. Overall, after the planned period,

In the applied lease area replenishment depends upon the rainfall, if adequate amount of sand will not replenish during monsoon then excavation of sand will be limited to the quantity which will be equivalent to the replenished material up to a depth of 0.3-0.4 mtrs. Only. Further detail study can be done after start of operation

=====********=====

DRAFT DISTRICT SURVEY REPORT (DSR)

OF

JAGATSINGHPUR DISTRICT, ODISHA

FOR

RIVER SAND

(FOR PLANNING & EXPLOITING OF MINOR MINERAL RESOURCES)

ODISHA

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

COLLECTORATE, JAGATSINGHPUR

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PLATE NO- 1

INDEX MAP

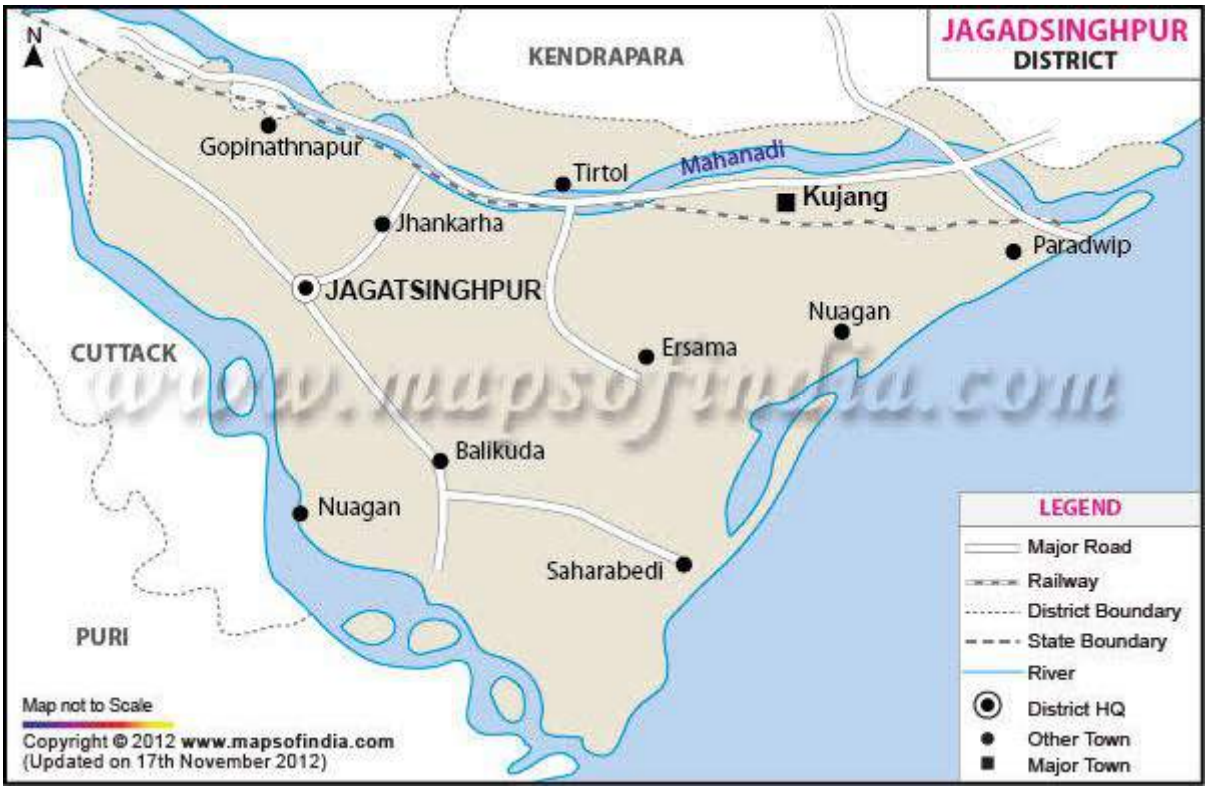
ODISHA

PLATE NO- 2

MAP SHOWING THE TAHASILS OF JAGATSINGHPUR DISTRICT

PLATE NO- 3

MAP SHOWING THE MAJOR ROADS OF JAGATSINGHPUR DISTRICT



PREFACE

In compliance to the notification issued by the Ministry of Environment and Forest and Climate Change Notification no. S.O.3611 (E) NEW DELHI dated 25-07-2018 the preparation of district survey report of river sand mining has been prepared in accordance with Clause II of Appendix X of the notification. Every effort has been made to cover river sand mining locations, future potential areas and overview of sand 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 District Survey Report is to identify the mineral resources and developing the mining activities along with other relevant data of the District.

1. INTRODUCTION

Jagatsinghpur District is one of the thirty districts of Odisha in the eastern coast of India. It became a new district on 1 April 1993 (Vide Government Notification No.14218/R dated 27.03.1993 and EOG No.459 dated 01.04.1993) being separated from Cuttack district. It lies between 86^0 3' E to 86^0 45' East longitude and between $19^058'$ to $20^023'$ North latitude .Its ancient name was Hariharapur. The city of Jagatsinghpur is the district headquarters. With 88.5% rate of male literacy and 68.5% of female literacy, the district ranks better than the national average in literacy and is one of the developed districts in Odisha. The district tops the list in male literacy and second in female literacy rate in Odisha.

Deltaic and partly littoral; the district of Jagatsinghpur is triangular in shape and small in geographical proportions .It is the smallest district in the state and covers a landmass of 1759 km^2. It has a history of its own dating back to the 6th century AD, being contemporaneous with the Prachi valley civilization.

2. OVERVIEW OF MINING ACTIVITIES IN THE DISTRICT.

The district constitutes a coastal track of Odisha and hence lacks any major mineral deposit excluding the incidence of beach sand. Mining of beach sand in the district is yet to be commenced.

Only quarrying takes place to win out the river sand from various rivers of the district.

3. LIST OF LEASES WITH LOCATION, AREA AND PERIOD OF VALIDITY

Enclosed as Annexure I

4. DETAILS OF ROYALTY COLLECTED (Rs)

Sl.No	Name of Tahasil	2015-16	2016-17	2017-18	2018-19
1	Biridi	200000	2416400	7216400	1216400
2	Jagatsinghpur	2076000	2076000	2076000	2076000
3	Nuagaon	2399350	2395750	2399850	2400250
4	Raghunathpur	2353587	2484397	2488817	2024717
5	Tirtol	3133050	3660285	3026895	3018345
6	Kujang	0	0	0	0
TOTAL		10161987	13032832	17207962	10735712

5. DETAILS OF PRODUCTION OF SAND (cum)

Sl.No	Name Of Tahasil	2015-16	2016-17	2017-18	2018-19
1	Biridi	1200	21700	21700	21700
2	Jagatsinghpur	10000	10000	10000	10000
3	Nuagaon	17350	17310	17355	17360
4	Tirtol	22950	34610	35880	35750
5	Raghunathpur	40450	40530	40550	40570
6	Kujang	0	0	0	0
TOTAL		91950	124150	125485	125380

6. PROCESS OF DEPOSIT OF SEDIMENTS IN THE RIVERS

The drainage of the district is mainly controlled by rivers like Mahanadi, Devi, Biluakhai & Paika. During rainy season the river water carries sand which is formed due to disintegration of rock bodies along with other suspensions. After recession of the water flow the sand gets deposited in the locations where there is less energy.

7. GENERAL PROFILE

a. Administrative set up:

Sl No	Item	Unit	Magnitude
1	Location		
	Longitude	Degree	$86^0$03' to $86^0$58'East
	Latitude	Degree	19^0 58' to $20^0$23' North
2	Geographical area	Sq.Km.	1668
3	Sub-division	Numbers	1
4	Tahasils	Numbers	8
5	C D Blocks	Numbers	8
6	Municipalities	Numbers	2
7	NACs	Numbers	-
8	Police Stations	Numbers	15
9	Gram Panchayats	Numbers	198
10	Villages	Numbers	1292
	Inhabited	Numbers	1223
	Uninhabited	Numbers	69
11	Assembly constituencies	Numbers	4

b. Area and Population:

The district has an area of 1668 sq.kms and 11.37 lakhs of population as per 2011 census. The district accounts for 1.07. percent of the states territory and shares 2.71 percent of the state's population. The density of population of the district is 682 per sq. kms. As against 270 person per sq.km of the state. It has 1288 villages (including 61. un-inhabited villages) covering 8 blocks, 8 Tahasils and 1 Subdivisions. As per 2011 census the schedule caste population is 248152 (21.80%) and schedule tribe population 7862 (0.70%)of the district . The literacy percentage of the district covers 86.60 against 72.90 of the state.

c. Climate :

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

d. Industry:

No. of MSME units set up	Investment (In Rs. crores)	Employment Generated				Employment of women
		SC	ST	General	Total	
1100	6048.09	1196	38	1979	3213	502

e. Agriculture:

During the year 2017-18, the net area sown was 83 thousand hectares against 5356 thousand hectares of the state. The production of paddy was 231.96 thousand MT, 0.17 thousand MT wheat, 0.52 thousand MT maize, 22.50 thousand MT mung, 8.15 thousand MT biri, 0.89 thousand MT kulthi, 0.07 thousand MT til, 14.73 thousand MT groundnuts, 0.41 thousand MT mustard, 0.70 thousand MT of Jute, 6.0 thousand MT potatoes, and 59.41 thousand MT sugarcane. During 2017-18, the total fertilizers used in the district is about 12044 MT with a breakage of 6110 MT nitrogenous, 3909 MT phosphatic and 2025 MT pottasic and the consumption of fertilizer per hectare is 68.08kg.

f. Power:

Villages so far electrified as on 31.03.2018 is 1223 which constitutes almost 100% to the total inhabited villages of the district.

g. Transport & Communication:

Railway route length (14-15) km	68.12
No of Rly stations and PH(14-15)	10
Forest road (17-18) km	0
National Highway (16-17) km	103.40
State Highway (17-18) km	6.59
Major district road (17-18) km	34.91
Other dist road (17-18) km	199.41
Rural road(17-18) km	1225.0
Inter village road (16-17) km	1584.48
Intra village road (16-17) km	1522.56

h. Health:

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

Govt. Allopathic medical institutions	47
Beds facilities	284
Homoeopathic dispensaries	11
Ayurvedic dispensaries	17

i. Tourist places:

There are 8 nos. of tourist centres such as Paradip Port (Paradip), Sarala Temple (Kanakapur), Jagatnnath Temple (Garei), Jagannath Temple (Dhyankud), Iskon Temple (Balikuda), Astasambhu temple (Hajipur), Jagannath Temple (Sidhal,) Gorekhnath Temple (Chhapada) and identified by department of Tourism and Culture, Orissa. During 2011, the numbers of Domestic tourists were 8, 31,687 and foreign tourists were 8,869 who visited the tourists spots of the district.

j. Forest areas:

Category of forest	**Area in sq km**
Reserve Forest	1.23
Unclassified Forest	0.02
Demarcated Protected Forest (DRF)	4.77
Undemarcated Protected Forest	83.06
Other forest under Revenue Dept	13.84
Total	**132.92**

k. Education:

Primary School (2017-18)	No. of Schools	981
	Enrolment (No)	82486
	Pupil Teacher Ratio	14.65

Upper Primary School 2017-18	No. of Schools	601
	Enrolment (No)	48904
	Pupil Teacher Ratio	12.87
Gerneral College 2017-18	Junior	34
	Degree	18
Secondary School	No. of Schools	316
	Enrolment (No)	33387
	Pupil Teacher Ratio	22.50
Literacy Rate, 2011	Male	92.4
	Female	80.6
	Total	86.6

I. Histroy & Heritage:

The history of Jagatsinghpur comprises the conglomeration of Hindu, Muslim, Maratha and British realms. The East India Company established their arsenals at Hariharpur in 1600 A.D. and Capt. Bruton was in charge of administration of this place till 1633 A.D. Understanding of the origin of the name of Jagatsinghpur and its nomenclature mostly depends upon the legends. Legend says the name of Jagatsinghpur (Earlier Hariharpur) has come into existence as a revenue village, either in Mughal or Maratha rule after the name of Jagatsingh, the son of Bhagat Singh, an Amildar in Cuttack-Puri Sarkar or Cuttack Chakada since 1786. Bhagat Singh worked as an Amildar either in Mughal or Maratha rule. The Maratha administration kept the place under their jurisdiction and appointed Jagat Singh in 1748 to collect revenue. He collected the Peshkush and Nazrana and remained an unchallenged and uninterrupted administrator for a pretty long period.

The district had a large contribution to the freedom struggle of the country. It was Gopabandhu, the chief animating force, making Congress activities popular in Odisha. From the beginning of his career, he had associated himself with different sessions of the Congress. After attending the Lucknow session, he joined the Congress. In 1920, after the special session of the Congress at Kolkata, Gopabandhu decided to carry on Congress programme in Odisha launched by Mahatma Gandhi. The Utkal Provincial Congress Committee was constituted early in 1921 and Gopabandhu became its first president. The arrival of Mahatma Gandhi in Cuttack on 23 March 1921 galvanized the Non-cooperation movement. It was Gopabandhu who translated the speeches of Gandhi which prompted the people to join the Non-cooperation movement. Under his leadership, by 30

June 1921, the Utkal Pradesh Congress Committee collected Rs.21000/- for Tilak Swaraj fund and enrolled 39000 Congress members. Nabakrushna Chaudhury of the Jagatsinghpur district along with H.K.Mahtab and Nityananda Kanungo of Jagatsinghpur had to leave their studies to join the Congress movement. To carry out Congress programmes and to train workers and volunteers, Alaka Ashram was established in the district in the year 1922. To establish this Ashram, Gopabandhu Chaudhury, Bhagirathi Mahapatra and Pranakrushna Padhiary acted as the chief mobilizing force. It also became the meeting place of young volunteers (Banarsena) and published a weekly „Utkalika" edited by Sarala Devi, spreading Congress ideas like boycott of foreign cloth, law court and government institutions etc. The district had its contribution to the Civil Disobedience movement. Gandhiji had started this movement by breaking the salt law on 6 April 1930.

The Salt Satyagraha was a powerful movement in the coastal Odisha. The first batch of Satyagraha, led by Gopabandhu Chaudhury and Acharya Harihar, started for Inchudi from Swaraj Ashram at Cuttack. Kujanga was another important centre of salt Satyagraha. Rama Devi, Malati Devi, Sarala Devi, Rani Bhagyabati Patamahadei and hundreds of women volunteers joined the movement and violated the salt law. The centres of salt Satyagraha in the district were Chatua, Kaliapata, Paradeep, Erasama and Daradia. Apart from the organisation of salt Satyagraha, marches, boycott of foreign cloth, propagation of Khadi, picketing before excise shops and other constructive programmes formed part of the civil disobedience movement. This movement was withdrawn in May 1934. Sarala Devi was the first woman freedom fighter and satyagrahi from Jagatsinghpur in the freedom struggle. On 8 August 1942, the All India Congress Committee in its meeting at Bombay passed the famous Quit India resolution and gave a call for mass struggle to achieve freedom. Centres of Congress movement like Swaraj Ashram at Cuttack, Bari Ashram at Binjharpur, Alaka Ashram at Jagatsinghpur, Kendupatana Spinning Centre, etc. were declared unlawful. Prominent Congress leaders were taken into custody by 10 August 1942. The Quit India programmes included attack on post offices, police stations, tahasil offices and such other public offices to paralyze the administration and force the British to quit India. Such incidents occurred in the wake of the movements at

various places such as Tirtol, Erasama and Jagatsinghpur. It became a forceful movement to make India free. Notable freedom fighter of the district Surendra Nath Dwibedi came to lime light by taking part in the Quit India movement. After years of struggle, finally the country became independent and the district moved forward in the path of modernization and development.

The religious belief and rituals of the people find expression in the archaeological monuments of the district which includes temples and images of various pantheons. The temples generally follow the Odishan temple style in having a curvilinear superstructure for the sanctuary and pidha deula, for the frontal porch. The Lingaraj Mahadeva temple near Balia, on the bank of Biluakhai river, is an important specimen of the early series of the temples and can be assigned to 8th to 9th centuries. The small rekha temple is triratha in plan and has Mahisamardini as one of the Parsvadevatas. The Singhnath Siva temple in an islet of the Mahanadi at Singhnath is the most important Siva temple of 9th century A.D. The main temple is a beautiful rekha Deula but jagamohan, rectangular in plan, has terraced roof. The Amangai temple in another island of the Mahanadi near Kandarpur is now in ruins. Its pyramidal Jagmohan seems to be a later addition, but the Deula, pancharatha in plan, is a developed specimen of the Odishan style. Sathalpur in Jagatsighpur sub-division had a temple for Saptamatruka and the images still exist there. Buddhist images of the district hail from Tarapur and Paradeep garh. The beautiful image of Lokeswar at Paradeepgarh, worshipped as Bisnu-Lokanath, is a unique temple of Gajaprustha style.

8. LAND UTILISATION PATTERN

Sl No	Landuse	Area in '000Ha
1	Forest Area	13
2	Misc.Tree & Groves	4
3	Permanent Pasture	7
4	Culturable Waste	6
5	Land Put to Non Agril Use	12
6	Barren & Unculturable Land	13

7	Current Fallow	14
8	Other Fallow	7
9	Net Area Sown	90
10	Mining	0.8
	Geographical Area	166.8

9. RAINFALL

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 46^0C in the summer and up to 7^0-8^0 C during peak winter.

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

Year/ Month	APRIL	MAY	JUNE	JULY	AUGUST	SEPT	OCT	NOV	DEC	JAN	FEB	MARCH	TOTAL
15-16	534.1	29	2281.4	3935.1	3578.3	1366.8	93.6	0	180.4	44.3	59.8	96.6	12199.4
16-17	62.6	281.5	782.8	2109.1	4471.2	2323.2	452.9	2	0	156.2	0	110.2	10751.7
17-18	7.1	300.6	2488	3524.2	2311.2	1814	559.4	73.2	0	0	0	8.8	11086.5
18-19	428.2	948.8	1580.2	4763.4	4615.2	1634.3	124.5	9.8	830.4	6.3	235.8	257	15433.9
AVG	258	389.975	1783.1	3582.95	3743.98	1784.58	307.6	21.25	252.7	51.7	73.9	118.15	12367.9

10. GEOLOGY AND MINERAL WALTH

Geologically the district can be broadly divided into four sectors. The northwestern and southwestern hilly areas comprise the meta-sediments of Gorumahisani Group and Eastern Ghat Supergroup with basic and ultramafic intrusions. The laterite covers the central and northwestern part of the district.

The horizontally disposed Quaternary sediments occupy the southeast, east and northern part of the district. The Eastern Ghat Supergroup consists of quartz-feldspar-garnet-sillimanite ± graphite schist/gneiss, garnetiferous quartzite, calcsilicate and charnockites. All these rocks have undergone intensive migmatisation. The Gorumahisani Group comprises banded hematite/magnetite quartzite, banded hematite jasper, banded chert, quartzite, ferruginous shale, fuchsite quartzite, conglomerate, gritty quartzite, ortho quartzite. These are associated with metavolcanics, pyroxinite and chromiferous ultramafics. Granite and granophyres are intrusive into these rocks. The meta-sedimentaries and ultramafics have undergone intensive lateritisation and the thickness varies from 5m to 15m. These rocks are overlain by Quaternary sediments of sub-recent to recent period. These sediments constitute transported laterite at the base, sandy clay with kankar, black clay and present flood plain deposits consisting of coarse to fine sand. The meta-sediments of Eastern Ghat Supergroup have undergone polyphase deformation. The axis of first generation of folds is represented by NE-SW trend; the second generation is represented by NW-SE trend and the youngest one by the N-S trend. The axial planes of these folds are highly sheared and faulted. The Gorumahisani Group of meta-sediments has undergone three phases of deformation. The first and second generation of folds are co-axial and trend in N70^{0}E-S70^{0}W direction. The second generation of folds is of open type and plunges towards west. These folds are cross folded along N-S axis and are represented by broad warps.

STRATIGRAPHY:

The geological succession in the district is as follows:

Age	Supergroup	Group	Formation	Lithounit
Late Holocene			Brahmani	Fine Sand
Middle to Late Holocene			Bankigarh	Brownish Silty Clay (Upper Deltaic Facies)
				Black Clay (Lower Deltaic Facies)
Early Holocene to Late Pleistocene			Kaimundi	Clay with calcareous concretions
Early Pleistocene			Bolgarh	Laterite/ Latosol (Insitu)

to Late Tertiary				
Proterozoic			Intrusive	Granophyre
				Hornblende granite
				Basic lava
				Pyroxenite, Ultramafics
				Bonai granite
Archaean		Gorumahisani		Ortho quartzite
				Gritty quartzite
				Conglomerate
				Fuchsite quartzite/ andalusite quartz-schist / ferruginous shale
				Banded chert (q_2c)/ BMQ, BHQ (q_2h), BHJ (q_2j)
				Quartzite
		Charnockite		Granetiferous granite and gneiss
	Eastern Ghat			Acid and intermediate charnockite
		Khondalite		Quartz-Feldspar-Garnet-Sillimanite ± Graphite Schist/ Gneiss
				Calc silicate

a. Detail of river/stream/other sand source- Sand mining in the district is confined to main rivers like Mahanadi, Devi, Biluakhai & Paika etc.
b. Availability of maximum sand or gravel or aggregate resources- sand- 18,99,099 cum (Annexure II), Gravel- Nil, Aggregate- Nil
c. Detail of existing mining leases of sand and aggregates- For sand pl refer Annexure I. Aggregate- Nil

DRAINAGE SYSTEM AND DESCRIPTION OF SALIENT FEATURES OF MAIN RIVERS AND STREAMS

Detail of the potential of river sand of the district is submitted as Annexure II.

ANNEXURE I

SAND SAIRATS ALREADY LEASED OUT AND EXECUTED

Sl. No.	Name of Tahasil	River or stream and Name of Village/Date of Registration of lease deed	Status	Portion of the River or Stream leased for mineral concession (Khata & Plot No) (Sketch map to be attached)	Longitude			Lattitude			Length of area leased for mineral concession (in km)	Average width of area leased for mineral concession (in km)	Area leased for mineral concession (in sq m)	Mineable mineral potential as per approved mining plan (in cum)
					Degree	Minute	Second	Degree	Minute	Second				
1	2	3	4	5	8	9	10	11	12	13	14	15	16	17
1	Biridi	Madhya sasan devi nadi sand sairat Dt.19.06.15	Running	Khata No.994, Plot - 53(P)							0.7	0.31	0.060	1200
2	Biridi	Hazipur,Kulakaijanga, Nuapari Biluakhai Sand Sairat Dt.17.02.16	Running	Hazipur Khata No.869, Pl. No.2881 Kulakaijanga Khata No.735 Pl. No.1653 Nuapari Khata No.587, Pl. No.1086							0.11	0.33	5500	5500
3	Biridi	Manguli, Sankhari Sahi Biluakhai Sand Sairat Dt.06.04.16	Running	Manguli Khata No.543, Pl. No.7 & 1179 Sankharisahi Khata No.591, Pl. No.1407							0.92	0.26	15000	15000
4	Jagatsinghpur	Devinadi Alipingal & Adhanga 17.10.2015	Running	Mouza- Alipingal Khata No-780 Plot No-1879 Adhanga- Khata No-303 Plot No-1804	86	20	00	20	17	3	514	174	89436	8000
5	Jagatsingh	Devinadi	Running	Mouza-Mundilo	8	2	0	2	1	3	250	257	64250	2000

	pur	Mundilo & Patenigaon 13.06.2016		Khata No-496 Plot No-2499	6	0		0	7					
6	Naugaon	Sikhar Devi River sand sairat Dt.11.09.2019	Running	Khata No-760 Plot No-1482(P)	86	11	0	20	3	2.5	1.4 km	1.4 KM	1,25,426	67475
7	Naugaon	Bachhalo Devi River sand Sairat Dt.3.10.2015	Running	Khata No-275 Plot No-1(P)&2(P)	86	9	35.2	20	5	28.3	2.1 km	2.1KM	27,189	4250
8	Naugaon	Erada Devi River sand sairat	Running	Khata No-895, Plot No-	86	9	18.1	20	10	1.9	1.24km	1.24KM	60,690	15000
9	Raghunathpur	Nuapada & Regist.-date-15.10.15	Running	Khata No-324 , Plot-266	86	16	45.4	20	19	36.2	0.06	0.03	66975.47	10420 Cum
10	Raghunathpur	Jaipur & Regist.-date-14.09.15	Running	Khata No-703, Plot-2717 & 282	86	19	6	20	19	51	0.05	0.02	50990.39	94275 Cum
11	Raghunathpur	Tarpur-Achhutpur-Gokulpur& Regist.-date-15.09.15	Running	Khata No-418,1191,326, Plot-1,2,3,4,1,1,2,3	86	13	56	20	21	27	0.10	0.05	101211.88	97975 Cum
12	Tirtol	River-Mahanadi Village-Olagada and Tartol Date- 17.11.2015	Running	Khata No.377 Plot No.1270 and Khata No.336 Plot No.1123	86	20	0	20	17	3	0.89	0.099	0.0809 sq.km	50150
13	Tirtol	River-Mahanadi Village- Kanimula Date- 31.05.2016	Running	Khata No.338 Plot No.1041	86	20	0	20	19	20.3	0.413	0.14	0.0526 sq.km	24200
14	Tirtol	River-Paika Village-Anupala Date- 13.04.2017	Running	Khata No.288 Plot No.455/P	86	25	29.2	20	20	8.1	0.34	0.13	0.05 sq.km	5040

15	Tirtol	River-Paika Village-Bilashpur Date- 31.03.2017	Running	Khata No.286 Plot No.1004/P	86	22	58	20	20	34	0.11	0.10	0.0526 sq.km	5040
16	Tirtol	River-Paika Village-Arilo and Jaipur Date-09.01.2017	Running	Khata No.223 Plot No.765 and Khata No.614 Plot No.7	86	22	1.6	20	20	3.9	0.11	0.09	0.0526 sq.km	5100
17	Tirtol	River-Mahanadi Village- Posal Date- 15.02.2016	Running	Khata No.311 Plot No.1444	86	20	0	20	17	30	0.58	0.18	0.0526 sq.km	30530
18	Tirtol	River-Mahanadi Village- Kilipal Date- 30.05.2016	Running	Khata No.298 Plot No. 54	86	18	28	20	14	14	0.21	0.8	0.526 Sq.km	19180

ANNEXURE II

POTENTIAL OF SAND IN THE DISTRICT

Sl. No.	Name of Tahasil	Status	River or stream and Name of Village / date of Registration of lease deed	Portion of the River or Stream recommended for mineral concession (GPS co-ordinates or Khata & Plot No) (Sketch map to be attached)	Longitude			Lattitude			Length of area recommended for mineral concession (in km)	Average width of area recommended for mineral concession (in km)	Area recommended for mineral concession (in sq m)	Maximum Mineable sand (in cum) (60% of total potential)
					Degree	Minute	Second	Degree	Minute	Second				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Biridi	Running	Madhya sasan devi nadi sand sairat Dt.19.06.15	Khata No.994, Plot - 53(P)	-	-	-	-	-	-	0.7	0.31	0.060	1200
2	Biridi	Running	Hazipur,Kulakaijanga, Nuapari Biluakhai Sand Sairat Dt.17.02.16	Hazipur Khata No.869, Pl. No.2881 Kulakaijanga Khata No.735 Pl. No.1653 Nuapari Khata No.587, Pl. No.1086	-	-	-	-	-	-	0.11	0.33	5500	5500
3	Biridi	Running	Manguli,	Manguli	-	-	-	-	-	-	0.92	0.26	15000	15000

			Sankhari Sahi Biluakhai Sand Sairat Dt.06.04.16	Khata No.543, Pl. No.7 & 1179 Sankharisahi Khata No.591, Pl. No.1407										
4	Biridi	New	Chasikhanda Biluakhai Nadi Sand Sairat	Khata No.712, Pl. No.157 & Pl. No.1752	-	-	-	-	-	-	-	-	101173	18211
5	Biridi	New	Sanawaubarai Sand Sairat	Khata No.85, Pl. No.266, 306 & 307	-	-	-	-	-	-	-	-	10000	18000
6	Jagatsinghpur	Running	Devinadi Alipingal & Adhanga 17.10.2015	Mouza-Alipingal Khata No-780 Plot No-1879 Adhanga-Khata No-303 Plot No-1804	86	20	0	20	17	3	514	174	89436	8000
7	Jagatsinghpur	Running	Devinadi Mundilo & Patenigaon 13.06.2016	Mouza-Mundilo Khata No-496 Plot No-2499	86	20	0	20	17	3	250	257	64250	2000
8	Jagatsinghpur	New	Devinadi Bodaro	Bodaro Khata No-88 Plot No-1	-	-	-	--	-	-	300	170	51000	91800
9	Naugaon	Running	Sikhar Devi River sand sairat Dt.11.09.2019	Khata No-760 Plot No-1482(P)	86	11	0	20	3	2.5	1.4 km	1.4 KM	1,25,426	67475
10	Naugaon	Running	Bachhalo Devi River sand Sairat Dt.3.10.2015	Khata No-275 Plot No-1(P)&2(P)	86	9	35.2	20	5	28.3	2.1 km	2.1KM	27,189	4250

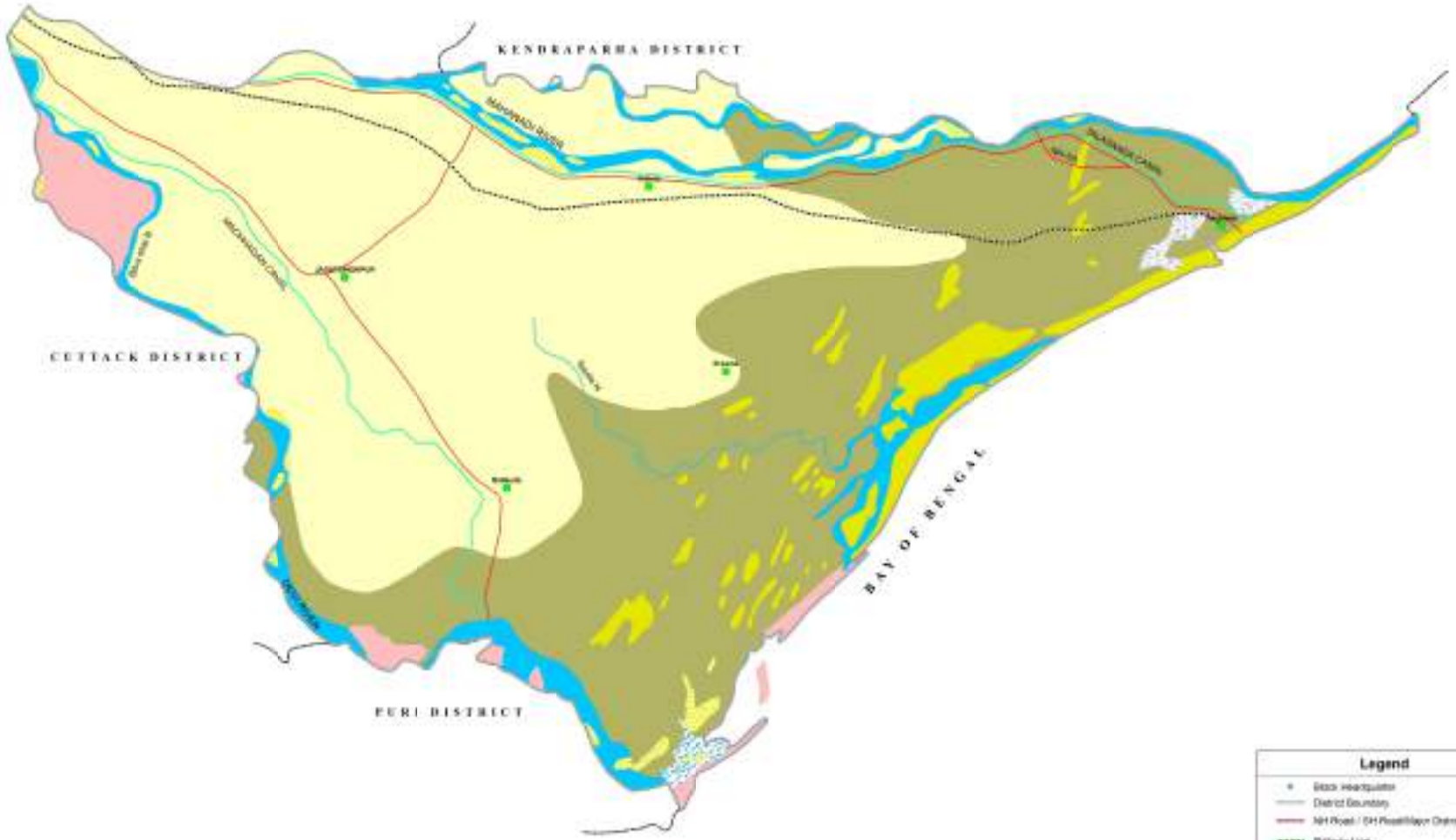
11	Nauga on	Running	Erada Devi River sand sairat	Khata No-895, Plot No-	86	9	18 .1	20	10	1. 9	1.24k m	1.24KM	60,69 0	15000
12	Nauga on	Pokamul a Devi River Sand Sairat	New	Khata-214 Plot-662	-	-	-	-	-	-	-	-	46742	84136
13	Nauga on	Arakhak uda Devi River sand Sairat	New	Khata-1223 Plot-3987	-	-	-	-	-	-	-	-	15087 0	27156 6
14	Nauga on	Galadari Devi River Sand sairat	New	Khata-1057 Plot-5853/5864 2464/5870 2488/2489	-	-	-	-	-	-	-	-	59126	10642 7
15	Nauga on	Alana-2 Devi River Sand Sairat	New	Khata No-441 Plot-2 117	-	-	-	-	-	-	-	-	20558 5	37005 3
16	Raghun athpur	Running	Nuapada & Regist.-date-15.10.15	Khata No-324 , Plot-266	86	16	45 .4	20	19	36 .2	0.06	0.03	66975 .47	10420 Cum
17	Raghun athpur	Running	Jaipur & Regist.-date-14.09.15	Khata No-703, Plot-2717 & 282	86	19	6	20	19	51	0.05	0.02	50990 .39	94275 Cum
18	Raghun athpur	Running	Tarpur-Achhutpur-Gokulpur& Regist.-date-15.09.15	Khata No-418,1191,326, Plot-1,2,3,4,1,1,2,3	86	13	56	20	21	27	0.10	0.05	10121 1.88	97975 Cum
19	Tirtol	Running	River-	Khata No.377	86	20	0	20	17	3	0.89	0.099	0.080	50150

			Mahanadi Village- Olagada and Tartol Date- 17.11.2015	Plot No.1270 and Khata No.336 Plot No.1123									9 sq.km	
20	Tirtol	Running	River- Mahanadi Village- Kanimula Date- 31.05.2016	Khata No.338 Plot No.1041	86	20	0	20	19	20.3	0.413	0.14	0.0526 sq.km	24200
21	Tirtol	Running	River-Paika Village- Anupala Date- 13.04.2017	Khata No.288 Plot No.455/P	86	25	29.2	20	20	8.1	0.34	0.13	0.05 sq.km	5040
22	Tirtol	Running	River-Paika Village- Bilashpur Date- 31.03.2017	Khata No.286 Plot No.1004/P	86	22	58	20	20	34	0.11	0.10	0.0526 sq.km	5040
23	Tirtol	Running	River-Paika Village- Arilo and Jaipur Date- 09.01.2017	Khata No.223 Plot No.765 and Khata No.614 Plot No.7	86	22	1.6	20	20	3.9	0.11	0.09	0.0526 sq.km	5100
24	Tirtol	Running	River- Mahanadi Village- Posal Date- 15.02.2016	Khata No.311 Plot No.1444	86	20	0	20	17	30	0.58	0.18	0.0526 sq.km	30530
25	Tirtol	Running	River- Mahanadi Village- Kilipal	Khata No.298 Plot No. 54	86	18	28	20	14	14	0.21	0.8	0.526 Sq.km	19180

			Date-30.05.2016											
26	Tirtol	River-Paikanadi	New	Khata No.1743 Plot No.72/4147	-	-	-	-	-	-	0.29	0.181	50990	**91782**
27	Tirtol	River-Mahanadi	New	Khata No.1743 Plot No.4101	-	-	-	-	-	-	0.241	0.21	50990	**91782**
28	Tirtol	River-Paika Nadi	New	Khata No. 278 Plot No.1	-	-	-	-	-	-	0.25	0.2	50585	**91053**
29	Tirtol	River Mohanadi	New	Khata No.204. Plot No.5	-	-	-	-	-	-	-	-	26103	46985
30	Tirtol	River Paika	New	Khata No.492. Plot No.1	-	-	-	-	-	-	-	-	30554	54997
31	Kujanga	River Mohanadi	New	Khata No.204. Plot No.5	-	-	-	-	-	-	-	-	26100	46980
32	Kujanga	River Paika	New	Khata No.492. Plot No.1	-	-	-	-	-	-	-	-	30551	54992

MINERAL MAP OF JAGATSINGHPUR DISTRICT

PLATE NO:4



Legend

- Block Headquarter
- District Boundary
- NH Road / SH Road/Major District Road
- Railway Line
- Canal
- River/Lake/Waterbody
- Sand & silts (flat surface with occasional dunes/ Point & beach/ bars & meander Scrolls)
- Very fine sand, silt and clay (Older dunes)
- Sandy silt and silty clay
- Clay with fine sand and silt
- Compact sand and silt
- Swamp
- Mud

LEASE/POTENTIAL MAP OF SAND IN JAGATSINGHPUR DISTRICT

PLATE NO.9