

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT & ENVIRONMENTAL MANAGEMENT PLAN For

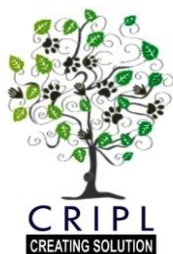
SAND MINING PROJECT ON MORHAR RIVER BLOCK-26 (GAYA MORHAR-13) SAND GHAT

PROPOSAL NO.	SIA/BR/MIN/415652/2023
AREA(Ha)	23.0
PRODUCTION	414000 CUM per annum or 745200 TPA
LOCATION	KhataNo.-108,162,48,15,37 Khasra No. –1,282,283,1,1193,1194,1195/1397,473,87,98,207 Thana No 645,687,689,685,688 Village/Mauja – Baiju Bigha, Bilauti, Dhibra G.P, Phulsathar, Tanrwa Tehsil/Anchal- Gurua District- Gaya, State-Bihar

APPLICANT

**M/s Rajendra and Sons Infra Private Limited
Prop.- Minti Kumari
Add-15 Mother Teresa Marg North S.K Puri Patna**

ENVIRONMENT CONSULTANT



COGNIZANCE RESEARCH INDIA PVT LTD

(Accredited by QCI/NABET)

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Sand Mining Project Block – 26 (Gaya Morhar-13) Sand Ghat on Morhar River,
 Khata No.-108,162,48,15,37 Khasra No. –1,282,283,1,1193,1194,1195/1397,473,87,98,207 Thana No 645,687,689,685,688
 Village/Mauja – Baiju Bigha, Bilauti, Dhibra G.P, Phulsathar, Tanrwa Tehsil/Anchal- Gurua District- Gaya, State-Bihar
 Proponent- M/s Rajendra and Sons Infra Private Limited, Prop. Minti Kumari
 Production- 414000 CUM per annum or 745200 TPA Area- 23.0 Ha

DEIA

Chapter I - INTRODUCTION

**CHAPTER-I
 INTRODUCTION
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1.0 PREAMBLE

Environment Impact Assessment (EIA) is a process used to identify the environmental, social & economic impacts of a project prior to decision making. It is a decision-making tool, which guides the decision makers in taking appropriate decisions for proposed projects. It aims predicting environmental impacts at an early stage of project planning and design, find ways and means to reduce adverse impacts, shape projects to suit the local environment and present the predictions and options to decision makers. By using EIA, both environmental & economic benefits can be achieved. By considering environmental effects prediction & mitigation, early benefits in project planning, protection of environment, optimum utilization of resources, thus saving overall time & cost of the project.

Sand have long been used as aggregate for construction of roads and building. Today, the demand for these materials continues to rise day by day. In recent years, rapid development has led to an increased demand for river sand as a source of construction material. It is recommended to remove the sand deposition on the regular basis otherwise the river will raise the height and may pose threats of inundation of unaffected areas. Besides this, the deposited mineral is a constant source of revenue generation to the state government and ensures the constant supply of this building material. Environmental Impact Assessment report is prepared to comply with the Terms of Reference (TOR) received from SEIAA, Bihar, under EIA Notification of the MoEF dated 14-09-2006, and its subsequent amendments and EIA Guidance Manual for Mining of Minerals of MoEF, Govt. of India, for seeking environmental clearance for mining of Sand in the applied mining lease area measuring 23.0 Ha, The project falls under Category- “B-1” as per EIA Notification 2006 and its subsequent amendments thereof of the Ministry of Environment Forests & Climate Change, GOI. As per NGT Order Dated 13-09-2018 and MOEF & CC OM No L-11011/175/2018-IA-II(M) Dated 12-12-2018 the project comes under B1 Category as the area is more than 5 Ha.

Sand Mining Project Block – 26 (Gaya Morhar-13) Sand Ghat on Morhar River,
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1.1 DESCRIPTION OF PROJECT PROPONENT

The project is being proposed by M/s Rajendra And Sons Infra Private Limited; Prop.- Minti Kumari Address 15 Mother Teresa Marg North S.K Puri Patna

Proposed project has been allotted to the proponent By District mining office. LOI has been granted in favor of M/S Rajendra And Sons Infra Private Limited; Prop.- Minti Kumari vide letter no. 5503/Khanan Gaya dated- 29/11/2022, for a period of 5 years attached as Annexure II. The EIA-EMP report has been prepared as per the TOR granted under the EIA Notification of September 14th 2006. In order to assess the impact on environment due to proposed mining, it is necessary to ascertain the present status of environment prevailing at the project site and identification and assessment of impacts on the environment of the proposed operations.

1.2 DESCRIPTION OF PROJECT

Name of the Project – Sand Mining Project Block – 26 (Gaya Morhar-13) Sand Ghat on Morhar River, District- Gaya, State-Bihar.

Village/Mauja	Block	Teshil /Anchal	District	State	Area in Ha.
Baiju Bigha, Bilauti, Dhibra G.P, Phulsathar, Tanrwa	Block -26 Gaya Morhar-13	Gurua	Gaya	Bihar	23.0

Table 1.1 Project Coordinate-

Coordinates		
	Latitude	Longitude
A	24°39'46.86"N	84°48'55.72"E
B	24°39'46.04"N	84°49'3.59"E
C	24°39'2.75"N	84°48'49.15"E
D	24°39'3.54"N	84°48'43.91"E

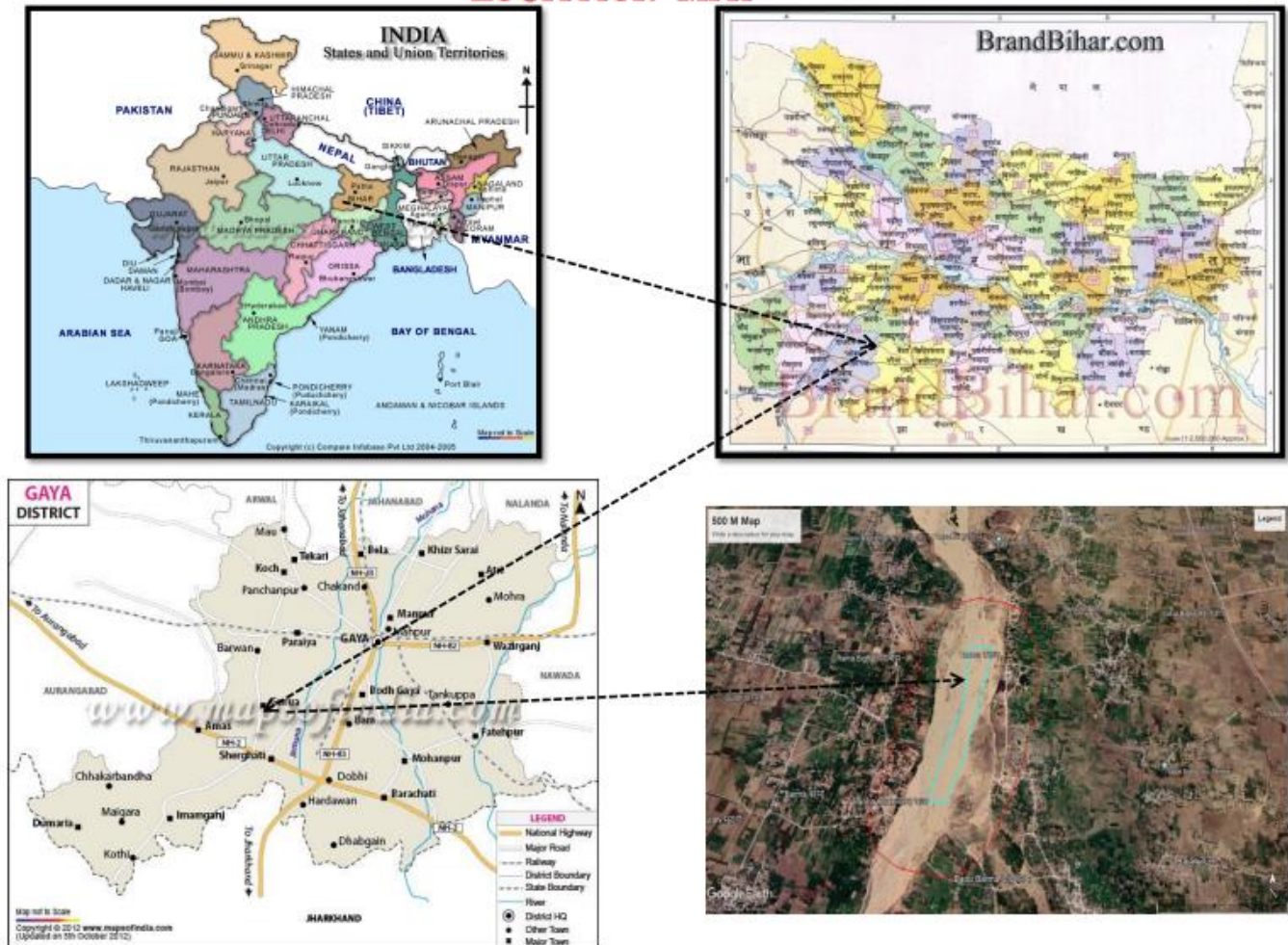
Sand Mining Project Block – 26 (Gaya Morhar-13) Sand Ghat on Morhar River,
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Figure-1.1 Location of the Project

LOCATION MAP



Sand Mining Project Block – 26 (Gaya Morhar-13) Sand Ghat on Morhar River,
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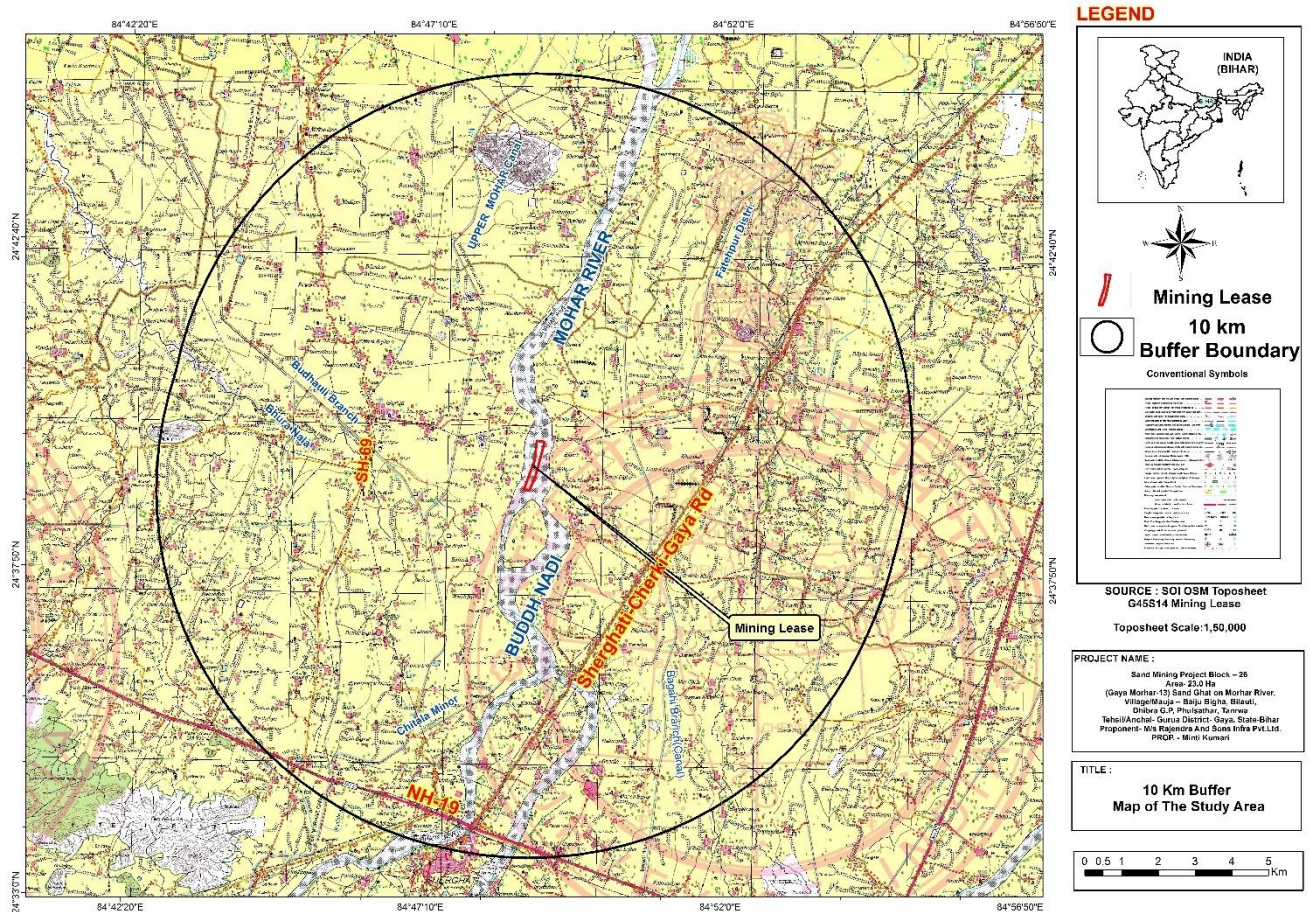


Figure1.2: 10 Km Buffer Map

Table 1.2- Site & Surrounding

Nearest Settlements	Barma Chak Village is about 0.38 Km in SW direction.
Nearest Road	Gurua Charki Road is about 0.39Km in N Direction. NH-19 is about 9.2 Km in S Direction. SH-69 is about 4.2 Km in W direction.
Nearest Airport	Gaya International Airport at distance of approx. 15.96 Km in NE direction.
Nearest Railway Station	Paraiya Railway Station at distance of approx. 16.3 km in NNE.
Water body	Project lies on Morhar River.
Nearest School/ college	DS Memorial Public school is about 0.73 Km in W Direction.

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Nearest Hospital	Primary Healthcare centre in Barma Chak Approx. 0.36 Km in SW direction.
Temple	Shiv Temple is about 0.4 Km in N Direction.

Table 1.3- Project Salient Features

On-line proposal No.	SIA/BR/MIN/415652/2023		
Name of Proponent	M/s Rajendra and Sons Infra Private Limited; Patna. Prop.- Minti Kumari		
Full correspondence address of proponent	15 Mother Teresa Marg North S.K Puri Patna		
Name of Project	Sand Mining Project, Block 26 (Gaya Morhar-13) Sand Ghat		
Name of River	Morhar		
Name of Village	Khata No.-108,162,48,15,37 Khasra No. – 1,282,283,1,1193,1194,1195/1397,473,87,98,207 Thana No 645,687,689,685,688 Village/Mauja – Baiju Bigha, Bilauti, Dhibra G.P, Phulsathar, Tanrwa		
Tehsil	Tehsil/Anchal- Gurua		
District	Gaya		
Name of Minor Mineral	Sand		
Sanctioned Lease Area (in Ha.)	23.0 Ha		
Pillar Coordinates	Pillar	Coordinate	
		Latitude	Longitude
	A	24°39'46.86"N	84°48'55.72"E
	B	24°39'46.04"N	84°49'3.59"E
	C	24°39'2.75"N	84°48'49.15"E
	D	24°39'3.54"N	84°48'43.91"E
Total Geological Reserves	690000 Cum		
Total Mineable Reserves	646611 Cum		
Proposed Production/year	414000 CUM per annum or 745200 TPA		
Sanctioned Period of Mine lease	5 years		
Method of Mining	Open Cast semi mechanized method / OTFM		
No. of working days	250 days		
Working hours/day	8hrs		
No. of workers	32		

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Ultimate Depth of Mining	3 m	
Nearest metalled road from site	880 m	
Water Requirement	PURPOSE	REQUIREMENT (KLD)
	Drinking & Domestic	0.64
	Plantation 230 Plants @ 5 L/Plant	1.15
	Dust Suppression	10.56
	Total	12.35
Any litigation pending against the project or land in any court	No	
Proposed Project cost	The total cost of project would be around Rs 12,77,50,000	
Proposed EMP budget	Recurring Cost- 6,30,000/-Capital Cost -2,80,000/-(INR)	
Proposed CER budget (2% of Project Cost)	Rs. 25,55,000	
Length and breadth of Haul Road	Length: 880 m, width: 6 m	
No. of Trees to be Planted	230 plants	

Project's Importance to the country and the region

This project operation will provide employment to the people residing in vicinity as about manpower will be required annually and approximately 32 people may be benefited directly and indirectly by the project. The project involves collection of river bed material, thus it is expected that the proposed mining project would improve the supply of construction materials like Sand making a positive impact on the infrastructural projects like construction of roads, buildings, bridges etc in the state.

The river carry sediments along with it and depositing of the sediments takes place constantly at a specific point, where they eventually result in formation of Sand. This Sand extremely influences on the river flow, obstruct navigation and cause flooding. The present project will thus ensure scraping of such Sand and prevent flooding.

1.3 REGULATORY COMPLIANCES & APPLICABLE LAWS/REGULATIONS

- There is no legal case against the project and project proponent.
- There is no national park / Sanctuary notified under the Wildlife Protection Act in the study area.

1.4 SCOPE OF THE STUDY

In line with the Terms of Reference (TOR) prescribed by SEIAA, Bihar attached as **Annexure-I**, the area comprising 10 km radius around the proposed mine lease boundary is considered as the study area. The detailed studies have been conducted as per prescribed TOR.

The scope of study broadly covered:

- Literature review and collection of data relevant to the study area;
- Establish the baseline environmental aspects in and around the proposed project;
- Identify various existing pollution loads due to various mining activities;
- Predict incremental levels of pollutants in the study area due to the proposed operations;
- Evaluate the predicted impacts on various environmental attributes in the study area by using scientifically developed and widely accepted environmental impact assessment methodologies;
- Prepare an Environment Management Plan (EMP) outlining the measures for improving the environmental quality.

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Chapter I - INTRODUCTION

Table 1.4(a) Standard TOR

TOR Ref.	TOR Points for the preparation of EIA	TOR Reply
1	Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to 1994.	Not Applicable as it's a fresh lease
2.	A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given.	State Govt has given consent for mining in favor of M/s Rajendra and Sons Infra Private Limited Prop.- Minti Kumari vide letter no. 5503/Khanan Gaya dated- 29/11/2022 (Annexure-II LOI Attached)
3.	All documents including approved mine plan, EIA and Public Hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc. and should be in the name of the lessee.	The documents including mine plan and EIA report submitted are compatible with one another w.r.t following information Mining lease area-23.0 Ha. Lessee- M/s Rajendra and Sons Infra Private Limited; Prop.- Minti Kumari Production-414000 CUM per annum No Waste generation Mining Method-Opencast Semi Mechanized (Annexure-III Mining Plan and All the details given in chapter-2)
4.	All corner coordinates of the mine lease area, superimposed on a High-Resolution Imagery/toposheet, topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).	All corner coordinates of mining lease area superimposed on high resolution imagery has been incorporated in EIA/EMP report. Refer Chapter 1 & Chapter 2
5.	Information should be provided in Survey of India Toposheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics.	The land use map showing salient features of the area is given in the report. Chapter-3

**Sand Mining Project Block – 26 (Gaya Morhar-13) Sand Ghat on Morhar River,
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Village/Mauja – Baiju Bigha, Bilauti, Dhibra G.P, Phulsathar, Tanrwa Tehsil/Anchal- Gurua District- Gaya, State-Bihar
Proponent- M/s Rajendra and Sons Infra Private Limited, Prop. Minti Kumari
Production- 414000 CUM per annum or 745200 TPA Area- 23.0 Ha**

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6.	Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority.	The Lease area is dry part of River bed. The mining process will be done by land use policy of the State & no land diversion has been proposed.
7.	It should be clearly stated whether the proponent Company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/procedures to bring into focus any infringement/deviation/violation of the environmental or forest norms/ conditions? The hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stake holders at large may also be detailed in the EIA Report.	Yes, the proponent Company has a well laid down Environment Policy. The hierarchical system or administrative order of the company has been given in the Chapter 6 of report.
8.	Issues relating to Mine Safety, including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided.	Issue related to mine safety has been given in of chapter 2 & Chapter 7.
9.	The study area will comprise of 10 km zone around the mine lease from lease periphery and the data contained in the EIA.	The 10 km zone from periphery of the lease has been considered as the study area. The Buffer map of the study area is attached with report in chapter-1 All the details in the EIA report are for the life of the mine period. The details of mining & production have been given in the report.
10.	Land use of the study area delineating forest area, agricultural lands, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any of change of land use should be given.	Land use pattern of 10 km from the periphery of the lease area has been prepared and incorporated with the report. The study area lies on Morhar River. There is no wildlife sanctuary or national park within the study area.

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11.	Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be given.	There is no overburden outside the mine lease area.
12.	A certificate from the competent authority in the State Forest Department should be provided. Confirming the involvement of forest land, if any in the project area. In the event of any contrary claim by the Project Proponent regarding the status of forests the site may be inspected by the State Forest Department along with Regional Office of the Ministry to ascertain the status of forests based on which the certificate in this regard as mentioned above be issued. In all such cases , it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees	No Forest Area involved within Project site.
13.	Status of forestry clearance for the broken up area and virgin forestland involved in the project including deposition of net present value (NPV) and compensatory afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished.	No forest land is involved in the lease area, therefore, deposition of net present value (NPV) and compensated Afforestation is not indicated
14.	Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated.	There is no forest land involved in the lease area. Hence, this act is not applicable.
15.	The vegetation in the RF/PF areas in the study area, with necessary details, should be indicated.	No RF/PF is present within the 10 km radius of the lease area. However, the vegetation details of the study area are incorporated with the report.
16.	A study shall be got done ascertain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and accordingly, detailed mitigative measure required, should be worked out with cost implications and submitted.	The details Impacts & there mitigation measures are given in chapter IV of EIA/EMP Report.

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17.	Location of National parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/Elephant Reserves/(existing as well as proposed), if any within 10 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden, Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished.	NO National parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/Elephant Reserves (existing as well as proposed) Within 10 km periphery of the mine lease.
18	A detailed biological study of the study area [core zone and buffer zone (10 Km radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey clearly indicating the Schedule of the fauna present. In case of any scheduled –I fauna found in the study area, the necessary plan along with budgetary provisions for their conservation should be prepared in consultation with State forest and Wildlife Departments and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost.	Biological study of core zone and buffer zone of the mine lease has been carried out and detailed in Chapter-3.
19.	Proximity of Areas declared as “Critically Polluted” or the project areas likely to come under the “Aravali Range”, (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Department should be secured and furnished to the effect that the proposed mining activities could be considered.	Proposed project does not come under critically polluted area.
20.	Similarly, for coastal Projects, A CRZ map duly authenticated by one of the authorized agencies demarcating LTL, HTL, CRZ area, location of the mine lease w.r.t CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority).	The proposed project is not a coastal project. Hence not applicable.

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21	R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a need based sample survey, family-wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in the mine lease area will be shifted or not. The issues relating to shifting of village(s) including their R&R and socio-economic aspects should be discussed in the Report.	
22.	One Season (non-monsoon)[i.e. March-May (Summer Season); October-December (Post monsoon seasons); December –February (winter season)] primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so complied presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given.	Baseline data for one season i.e. from March 2023 to May 2023, has been collected. Detail given in Chapter-3.
23.	Air quality modeling should be carried out for preparation of impact of the project on the air quality of the area. it should also take into account the impact of movement of vehicles for transportation of minerals. The details of the model used and input parameters used for modeling should be provided. The air quality contours may be shown on the location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre- dominant wind direction may also be indicated on the map.	AERMOD CLOUD will be used for air quality modelling. Air quality modelling will be submitted with Final EIA report.

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24.	The water requirement for the project, its availability and sources should be furnished. A detailed water balance should also be provided. Fresh water requirement for the project should be indicated.	The water requirement for the project is 12.35 KLD for drinking, Domestic, dust suppression and green belt development. This water supplied from nearby area by water tanker. Details given in Chapter-2
25.	Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the project should be provided.	Water requirement will be fulfilled by private water tanker. So, no clearance isrequired.
26.	Description of water conservation measures proposed to be adopted in the project should be given. Details of rainwater harvesting proposed in the project, if any should be provided	The project do not consume any process water except for drinking, dust suppression & plantation. Hence no artificial conservation measures have been proposed. Plantation is proposed, which will increase the water holding capacity & help in recharging of ground water.
27.	Impact of the project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided.	Mining activity will be done on Dry Bed of River so there is no impact on surface water. Mining will be up to 1 m below ground level or above the ground water table whichever comes first. This will not intersect the ground water table. (Details given in Chapter-IV)
28.	Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. In case the working will intersect groundwater table, a detailed Hydro Geological Study should be undertaken and Report furnished. The Report inter-alia, shall include details of the aquifers present and impact of mining activities on these aquifers. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished.	Mining will be Restricted up to 3.0 m below ground level or above the ground water table whichever comes first. This will not intersect the ground water table.
29.	Details of any stream, seasonal or otherwise, passing through the lease area and modification/diversion proposed, if any and the impact of the same on the hydrology should be brought out.	Project is on Morhar River Bed. However, no modification/diversion is proposed as mining will be carried on the dry part of the river bed leaving safety distance from stream.
30.	Information on site elevation, working depth, groundwater table etc, Should be provided both in AMSL and bgl. A schematics diagram may also be provided for the same.	Detail given in chapter-2 The details are also mentioned in Mine plan, attached as Annexure-III

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31.	A time bound progressive Greenbelt Development plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind; the same will have to be executed up front on commencement of the project. Phase wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution.	Plantation/afforestation will be done as per program i.e along the road sides and near civic amenities. Post plantation, the area will be regularly monitored in every season for evaluation of success rate. List of Plant species selected for green belt is detailed in the EIA report. The plant species selected for green belt have a greater ecological value and are of good utility value to the local population. The plant species are selected by giving emphasis on local and native species and the species which are tolerant to pollution
32.	Impact on local transport infrastructure due to the project should be indicated. Projected increase in truck traffic as a result of the project in the present road network (including those outside the project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as state government) should be covered. Project proponent shall conduct impact of Transportation study as per Indian Road Congress Guidelines.	The projection has been done based on the mineral transportation. The details of traffic analysis are discussed in the report. Chapter IV
33.	Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA report.	A temporary rest shelter will be provided for the workers near to the site with provisions of water, first aid facility, protective equipments, etc. Details are given in the EIA/EMP Report.
34.	Conceptual post mining land use and reclamation and restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA.	Detail given in chapter-2

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35.	Occupational Health impacts of the project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.	Occupational health impact mainly is expected due air pollution due to fugitive dust emission because of movement of vehicles. However appropriate mitigation measures for air pollution control have been given in the report, discussed in Chapter-4. Each labour will undergo pre-placement medical examination. Thereafter periodical health check up will be arranged as stated in the report. Budget for Occupational Health given in Chapter VIII
36.	Public health implications of the project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.	The proposed project being a small scale semi-mechanized mining project, there will be hardly any process related health implication on the population of the nearby villages except fugitive dust emissions due to transportation. Budgetary allocation is given in Chapter-VIII.
37.	Measures of socio-economic significance and influence to the local community proposed to be provided by the project proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.	Detail given in chapter-3
38.	Detailed Environment Management Plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed project.	The detailed environmental management plan to mitigate the environmental impacts has been mentioned in of the EIA/EMP Report. Detail given in chapter-9
39.	Public hearing points raised and commitment of the project proponent on the same along with the time bound action plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP report of the project.	Public Hearing details shall be incorporated in final EIA Report after conducting public hearing.
40.	Details of litigation pending against the project, if any, with direction/order passed by any court of law against the project should be given.	No Litigation Pending.

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41.	The cost of the project (capital cost & recurring cost) as well as the cost towards implementation of EMP should clearly be spelt out.	EMP Capital Cost is Rs. 2,80,000 & EMP Recurring Cost is 6,30,000/- Detail given in chapter-9
42.	A Disaster Management Plan shall be prepared and included in the EIA/EMP report.	Detail given in chapter-7
43.	Benefits of the project if the project is implemented should be spelt out. The benefits of the project shall clearly indicate environmental, social, economic, employment potential, etc.	2% of the total cost of the project has been earmarked towards the Enterprise Social Commitment which will be used for the development of village.
44.	Besides the above, the below mentioned general points are also to be followed: -	
a.	All document to be properly referenced with index and continuous page numbering	All the documents to be properly referenced with index and continuous page numbering
b.	Where data are presented in the report especially in table, the period in which the data were collected and the sources should be indicated.	Where data are presented in the report especially in tables, the period in which the data were collected and the sources should be indicated.
c.	Project Proponent shall enclose all the analysis /Testing reports of water, air, soil, noise, etc. using the MoEF&CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the project.	The project proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF&CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the project
d.	Where the documents provided are in a language other than English, an English translation should be available during appraisal of the project.	Complied
e.	The Questionnaire for environmental appraisal of mining projects as devised earlier by the ministry shall also be filled and submitted.	The Questionnaire for environment appraisal of mining projects as devised earlier by the ministry shall also be filled and submitted during FEIA Appraisal.
f.	While preparing the EIA report the instruction for the proponent & instruction for the consultants issued by MoEF&CC vide O.M. No. J-11013/41/2006-IA-II (I) dated 4 th August 2009, which are available on the website of the ministry, should be followed.	Complied With EIA report

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g.	Changes, if any made in the basic scope and project parameter (as submitted in Form-I and the PFR for securing the TOR) should be brought to the attention of MoEF&CC with reasons for such changes and permission should be sought, as the TOR may also have to be altered. Post Public hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation.	No changes done in report
h	As per the circular no. J-11011/618/2010-IA.II(I) dated 30.5.2012, certified report of the status of compliance of the conditions stipulated in the environment clearance for the existing operations of the project, should be obtained from the Regional Office of Ministry of Environment, Forest and Climate Change, as may be applicable.	This is new case for Mining. No certified compliance report is required.
i.	The EIA report should also include: (i) surface plan of the area indicating contours of main topographic features, drainage and mining area (ii) geological maps and sections and (iii) sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area.	Compiled With EIA report.

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Chapter II- DESCRIPTION OF THE PROJECT

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 DESCRIPTION OF THE PROJECT
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Chapter II- DESCRIPTION OF THE PROJECT

2.0 GENERAL

The Environmental Impact Assessment report has been prepared in terms of EIA notification of the MoEF dated 14-9-2006, amended till date, for seeking environmental clearance for mining in the area of ordinary Sand mining lease measuring 23.0 Ha. Falling under category “B1”.

Name of the lessee- Mr. Rajendra Singh Address 15 Mother Teresa Marg North S.K Puri Patna.

2.1 DESCRIPTION OF THE PROJECT

The proposed project is an opencast semi-mechanized mining project, where mining of Sand will be done from the bed of Morhar River.

2.2 NEED FOR THE PROJECT

The project lies on the bed of Morhar River. Due to rapid infrastructure development in India, the demand of construction material has increased. To supply this demand, mining of sand is done. This project operation will provide employment directly and indirectly to the people residing in vicinity, thus improving the Socio-economic status of the area.

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Chapter II- DESCRIPTION OF THE PROJECT

2.3 LOCATION DETAILS

LOCATION MAP

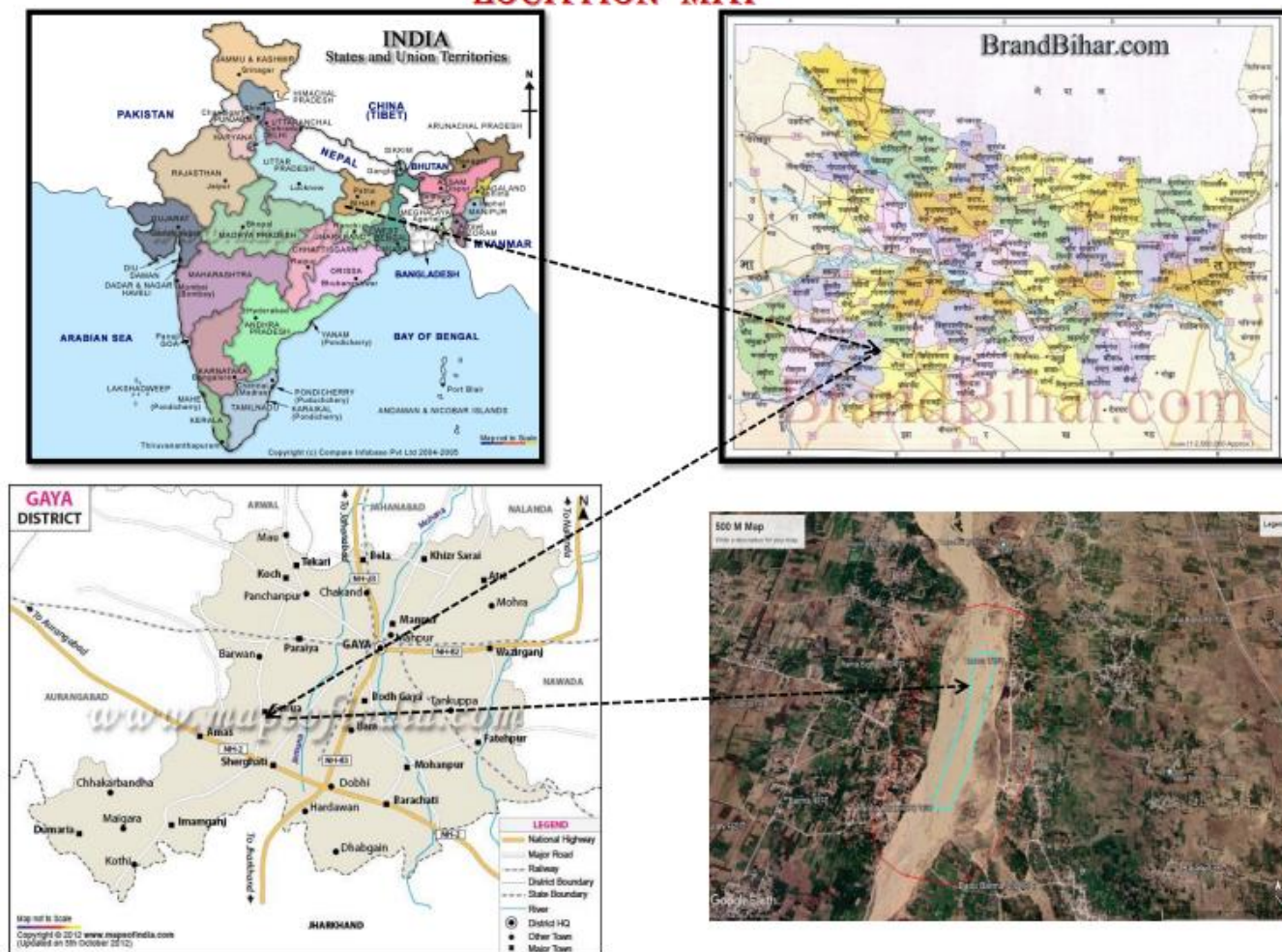


Figure-2.1 Location of the Project

Sand Mining Project Block – 26 (Gaya Morhar-13) Sand Ghat on Morhar River,
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Table No 2.1: Salient Features of Project

On-line proposal No.	SIA/BR/MIN/415652/2023		
Name of Proponent	M/s Rajendra and Sons Infra Private Limited; Patna. Prop.- Minti Kumari		
Full correspondence address of proponent	15 Mother Teresa Marg North S.K Puri Patna		
Name of Project	Sand Mining Project, Block 26 (Gaya Morhar-13) Sand Ghat		
Name of River	Morhar		
Name of Village	Khata No.-108,162,48,15,37 Khasra No. – 1,282,283,1,1193,1194,1195/1397,473,87,98,207 Thana No 645,687,689,685,688 Village/Mauja – Baiju Bigha, Bilauti, Dhibra G.P, Phulsathar, Tanrwa		
Tehsil	Tehsil/Anchal- Gurua		
District	Gaya		
Name of Minor Mineral	Sand		
Sanctioned Lease Area (in Ha.)	23.0 Ha		
Pillar Coordinates	Pillar	Coordinate	
		Latitude	Longitude
	A	24°39'46.86"N	84°48'55.72"E
	B	24°39'46.04"N	84°49'3.59"E
	C	24°39'2.75"N	84°48'49.15"E
	D	24°39'3.54"N	84°48'43.91"E
Total Geological Reserves	690000 Cum		
Total Mineable Reserves	646611 Cum		
Proposed Production/year	414000 CUM per annum or 745200 TPA		
Sanctioned Period of Mine lease	5 years		
Method of Mining	Open Cast semi mechanized method / OTFM		
No. of working days	250 days		
Working hours/day	8hrs		
No. of workers	32		
Ultimate Depth of Mining	3 m		
Nearest metalled road from site	880 m		
Water Requirement	PURPOSE	REQUIREMENT (KLD)	
	Drinking & Domestic	0.64	
	Plantation 270 Plants @ 5 L/Plant	1.15	
	Dust Suppression	10.56	
	Total	12.35	

Sand Mining Project Block – 26 (Gaya Morhar-13) Sand Ghat on Morhar River,
Khata No.-108,162,48,15,37 Khasra No. –1,282,283,1,1193,1194,1195/1397,473,87,98,207 Thana No 645,687,689,685,688
Village/Mauja – Baiju Bigha, Bilauti, Dhibra G.P, Phulsathar, Tanrwa Tehsil/Anchal- Gurua District- Gaya, State-Bihar
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Production- 414000 CUM per annum or 745200 TPA Area- 23.0 Ha

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Proposed Project cost	The total cost of project would be around Rs 127750000
Proposed EMP budget	Recurring Cost- 6,30,000/- Capital Cost -2,80,000
Proposed CER budget (2% of Project Cost)	Rs. 25,55,000
Length and breadth of Haul Road	Length: 880 m, width: 6 m
No. of Trees to be Planted	230 plants

2.4 LEASE HOLD AREA

Location of the Project- Sand Mining Project Block – 26 (Gaya Morhar-13) Sand Ghat on Morhar River, District- Gaya, State-Bihar.

Table 2.2 Project Coordinates

Pillar	Coordinate	
	Latitude	Longitude
A	24°39'46.86"N	84°48'55.72"E
B	24°39'46.04"N	84°49'3.59"E
C	24°39'2.75"N	84°48'49.15"E
D	24°39'3.54"N	84°48'43.91"E

Table 2.3- Detail of site & surrounding in study area

Nearest Settlements	Barma Chak Village is about 0.38 Km in SW direction.
Nearest Road	Gurua Charki Road is about 0.39Km in N Direction. NH-19 is about 9.2 Km in S Direction. SH-69 is about 4.2 Km in W direction.
Nearest Airport	Gaya International Airport at distance of approx. 15.96 Km in NE direction.
Nearest Railway Station	Paraiya Railway Station at distance of approx. 16.3 km in NNE.
Water body	Project lies on Morhar River.
Nearest School/ college	DS Memorial Public school is about 0.73 Km in W Direction.
Temple	Shiv Temple is about 0.4 Km in N Direction.

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Table no 2.4 –Area Details

S.No.	Land use	River bed (Ha)	Forest Land (Ha)	Barren land (Ha)	Grazing Land (Ha)
1	Mining pits Quarry	-	-	-	-
2	Approach Road	-	-	-	-
3	Dumps	-	-	-	-
4	Office, Resht Shelter etc.	-	-	-	-
5	Balance undisturbed land	23.0	-	-	-
Total		23.0	-	-	-

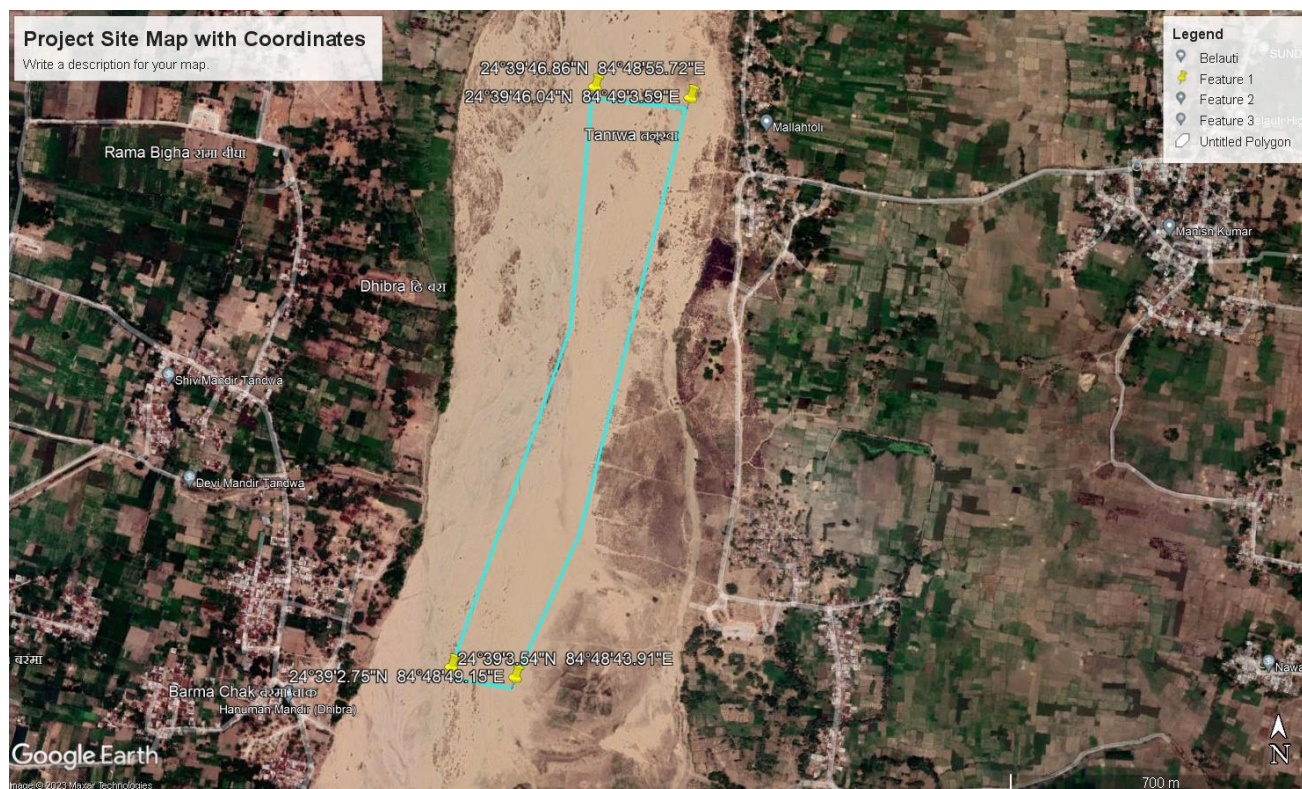


Fig 2.2 Mining Site

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2.5 TOPOGRAPHY

The district of Gaya is broadly divided into two distinct physical units. The south is a region of broken undulating country merging into long ranges of hills, with a wide belt of brushwood jungle at their base. Much of this tract is high and barren and incapable of much cultivation; the soil has poor crops and the population is sparse. These high lands project into the alluvial plains to the north as spurs from the Chhotanagpur Plateau. The greater part of the district, however, consists of the flat alluvial plain. This wide alluvial plain of the north forms part of the Gangetic depression with alluvial deposits of immense depth and is broken here and there by groups and low ranges of hills or isolated peaks arising abruptly from the level country at their feet. The alluvial plain is protected from drought by a wonderful system of indigenous irrigation consisting of ahars (reservoirs) and pains (channels). It is, therefore, a region of great fertility when compared with the southern part of the district and is comparatively densely populated. The northern portion, which is highly cultivated and extensively irrigated.

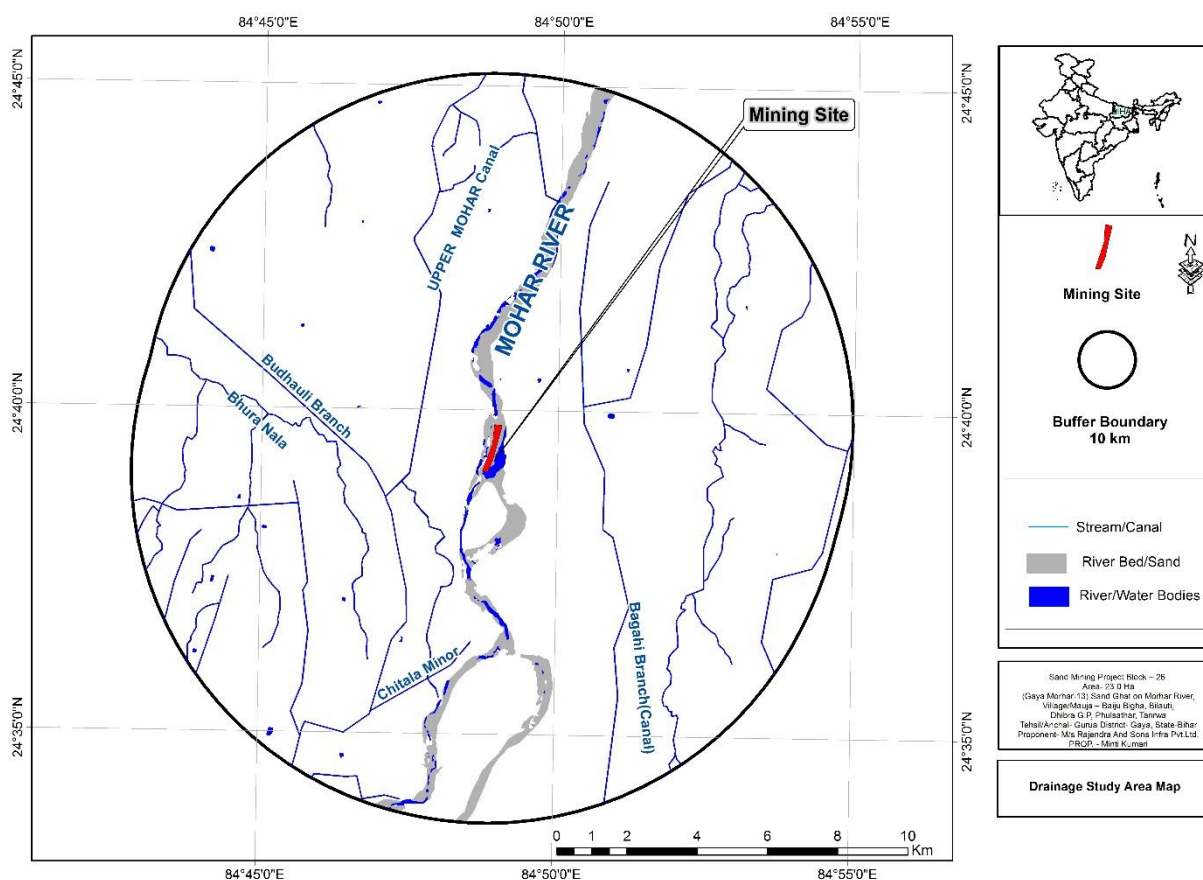


Fig 2.3 Drainage Map

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2.6 GEOLOGY

General Geology

The main geological formation of the region is of Quaternary age. The area is mostly covered by unconsolidated sediments which is known as alluvial deposits followed by consolidated deposits of Satpura range. Few areas are also characterized by units of Archaean ages. The Satpura range mainly exposed in Gaya hills and Rajgir hills comprises low grade supracrustals – Schists, ferruginous phyllite, quartzites and phyllitic slate. The Archeans are the oldest rock formation in the area. The most predominant rock type is gneisses and granites with basic intrusives and medium to fine sand geologically the area comprising of Terrace alluvium deposited in depositional terraces of old rivers & contain cyclic sequence of fine to coarse grained sand. It is angular to sub angular and the angularity of the grains of this category of sand decreases with depth.

Regional Geology

Geologically, it represents nearly two third of Bihar is under cover of Ganga basin composed of alluvium and masks the nature of basement rocks.

Table 2.5 Showing the Geological Succession and their Occurrences distribution

Age	Geology	Occurrences
Quaternary	Alluvial Deposits (Sand, Clay, Silt, Fragments)	North Bihar Plain & Central Bihar Plain
Tertiary	Sand Stones & Clay Stones	North Champaran Hills
Gondwana	Coal Measures, Forming a series of Small outlier basins	Banka District
Vindhyan	Sandstones, Shales, Limestones, etc.	Parts of Bahbhua and Rohtas dist
Satpura	Schist, Phyllite, Quartzite	Part of Aurangabad, Gaya, Nawada, Nalanda, Sheikhpura and Munger District
Proterozoic	Mica Schist, amphibolites, quartzite, granite, dolerite and pegmatite	Nawada, Jamui and Banka
Archaean	Gneisses, Granites, Schists, Phyllites, quartzite, amphibolites & intrusive all metamorphosed sedimentary and igneous rocks	Part of Aurangabad, Gaya, Nawada, Jamui, Banka and Bhagalpur

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GEOLOGY OF THE AREA

The area is dominated by medium to fine sand geologically the area comprising of Terrace alluvium deposited in depositional terraces of old rivers & contain cyclic sequence of fine to coarse grained sand. It is angular to subangular and the angularity of the grains of this category of sand decreases with depth. The Litho unit shown on the geological map of the leased out area have been plotted on the basis of physical characteristics observed in the field. Sand and silt are deposited in the middle of the river whereas fine sand and soil are deposited at the fringe of the river banks. Soil/ alluvium varying in thickness from 0.20m to 0.60m m constitute the top horizons in the area suitable for agriculture. River Falgu & Morhar meanders through the area exposing the alluvium and soil at the banks.

The litho units encountered in the riverbed and surrounding areas belongs to the Shivalik super groups. The size of the sediments towards the source i.e. host rock is coarse and at the tale end of the river the grain size is reduced to smaller sizes resulted in the formation of clay beds. The following sequences have been observed in the area, i.e. Top soil/ Alluvium followed by sand deposition (as shown in the figure below).

Sand and silt are deposited in the middle of the river whereas fine sand and soil are deposited at the fringe of the riverbanks.

Soil/ alluvium varying in thickness from 0.20m to 0.60m m constitute the top horizons in the area suitable for agriculture. River Ganga meanders through the area exposing the alluvium and soil at the banks. Sand is found in the river bed upto a depth of more than 3.0 m. The major part of bed remains dry as water flows in a single stream during the non-monsoon seasons. Only during rainy seasons the entire flood plain has water, when there will be no mining done.

2.7 RESERVE ESTIMATION

The geological reserves have been estimated as per UNFC guidelines in all the three axis.

Economic Axis (E-1): The Sand is exists within the entire stretch & having no problem selling in the market. The road is near the Ghat & sand shall loaded into tipper with the deployment of an excavator & transport to various parties. The land is State Govt. land & State Govt. has given its

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consent for the exploitation of Sand on their expensive land. On the feasibility study, economic viability of deposit has been established sand in economic viable, therefore economic axis has been considered as E-1.

Feasibility Status (F-1): Feasibility study has been carried out & is considered to be feasibility status. A feasibility study provides a preliminary assessment with a level of confidence as compared to that of feasibility study. It has been revealed that exploitation of sand is feasible & economic viable & feasibility axis under UNFC code has been considered as F-1.

Geological Axis: The exposure of sand is seen in the entire stretch & thickness of sand varies 2.5m to 3.0m. Therefore geological axis has been considered as G-1.

Geological Reserves:

The geological reserves have been each stretches & for individual blocks. Geological reserves have been completed through cross sectional area method. The area of each section line is multiplied by strike influence to get the volume.

- i) **Proved Mineral Reserves (111):** All quantities of sand occurring upto depth of 3 m from surface has been considered as proved reserves.

Classification	Code	Quantity of Sand
A) Mineral Reserves		Cum
1) Proved Mineral Reserves	111	690000
Total		690000

Total Geological Reserve =690000 cum. or 1242000 tonnes.

*Bulk density is 1.8 g/cm³

MINEABLE RESERVES:

Mineable reserves have been computed up to 3m depth from surface. Benches having height 1.5m & width 6.0m drawn from the ultimate pit limit. Area of each benches have been calculated multiplied by strike influence to get the volume. The volume multiplied by bulk density (1.8 g/cm³) to get the tonnage.

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The minerals excavated from the river bed will be replenished gradually during the monsoon season every year. And the area pertaining to paleochannels of the river will be leveled & restored back.

Summary of mineable reserves of Sand Ghat as below:

Table 2.6 The mineable reserves are given in below for Block- 26 (Gaya Morhar – 13) Sand Ghat

Bench Level (mRL)	Length (m)	Width (m)	Depth (m)	Volume (cum)	Tones
123-121.5	1369	163	1.5	334721	602497
121.5-120	1359	153	1.5	311891	561403
Total				646611	1163900

Total Mineable Reserve = 646611 CUM or 1163900 Tonnes

- Mineable reserve has been consider 60% approx. of geological reserve after applying the guideline of Enforcement & Monitoring Guidelines for Sand Mining 2020.
- The proposed production grant in LOI is 414000 Cum. per year which is within the sustainable limit of mineable reserve.
- The BD for Sand has been adopted at 1.8 g/cm³ [Noida Testing Laboratories]

Classification Mineral Reserves Table 2.7

Sand Ghat	Area (Hect)	Geological Reserves (m ³)	Mineable Reserves (m ³)	Annual Permitted Reserve As per LoI (m ³)
Block-26 (Gaya Morhar – 13) Sand Ghat	23.0	690000	646611	414000

The annual extractable RBM comes to 414000 CUM or 745200 Tonnes. It will be replenished after rainy season every year.

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2.8 PROPOSED METHOD OF MINING

MINING

- Mining will be done as per the guidelines of Bihar Mineral (Concession Prevention of illegal Mining Transportation & Storage) Rules, 2019.
- This is an open-cast mining project. The operation will be semi-mechanized/OTFM with use of excavators/JCBs truck /tractors combination or Manually etc. The sand will be collected in its existing form.
- Sand Mining will be carried out only upto a depth of 3 m bgl or above ground water level (whichever is less), for river bed block.
- No drilling /blasting are required as the material is loose in nature.
- Proper benching of 1.5 m height and 6m width will be maintained for mining blocks as per guideline M.M.R-2019, under rule 115(1).
- Mining will be done only during the day time and completely stopped during the monsoon season.

Restriction on mining:

- i) Sand and gravel shall not be extracted up to a distance of 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 side, subjected to a minimum of 250 meters on the upstream side and 500 meters on the downstream side.
- ii) No quarrying shall be permitted within 50 (fifty) metres of any public place i.e. cremation Ghat or any religious place etc.
- iii) No quarrying shall be permitted within 5 (five) metres from both banks of the river.
- iv) The quarrying of sand shall be prohibited within 100 (one hundred) metres upstream and downstream from any dam/weir or any other structure erected for irrigation purpose.
- v) Sand Ghats should preferably be located on the river side embankment. For low embankment less than 6 metres height, quarrying should not be done within 25 metre from toe/heel of the embankment and depth of mining should not be more than 1.00 metre. In

case of higher embankments, the distance should not be less than 50 meter and depth of mining should be maximum 1.50 meter and at a distance of 75 meter of more mining depth should be maximum 2.00 meter. In order to obviate the development of flow parallel to embankment, crossbars of width eight times the depth of mining pits spaced at 50 to 60 meters center to center should be left in the mining pits.

- vi)** The irrigation outlet shall be maintained at the same level as that of the river bed and in no case the river bed level shall be permitted to be below the irrigation outlet level. No quarrying shall be permitted around the infiltration well/intake well up to a distance of 5 meters.
- vii)** The extraction of sand shall be permitted only after obtaining a No Objection Certificate from the Water Resources Department in the case of rivers where from irrigation channels are out flowing.
- viii)** No quarrying of sand shall be permitted in any private land owned by a person other than the settlee unless the settle obtains the consent of the concerned land owner/raiyat.
- ix)** No quarrying of sand shall be permitted in any area which the State Government notifies as a restricted area.
- x)** Sand and gravel shall not be allowed to be extracted where erosion may occur, such as at the concave bank.
- xi)** Mining depth should be restricted to 3 meters and distance from the bank should be $\frac{1}{4}$ th or river width and should not be less than 7.5 meters.

PROPOSED METHOD OF MINING

- Mining activity will be carried out by open cast semi mechanized method.
- No OB/ waste material will be produced in river bed. The sand shall be exploited upto depth of 3.0 m only through the formation of bench height 1.5m & width 6.0m. An approach road having width 6.0m & gradient 1:12 shall be provided for the movement of loading machineries & transportation of sand. The sand shall be exploited with the deployment of an excavator & filled into Tractors/Trucks & transported to various buyers.
- No drilling/ blasting are required as the material is loose in nature.

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- Proper benching of 1.5 m height will be maintained.
- Roads will be properly made and sprayed by water for suppression of dust.
- Roads in the applied area for the movement of loaded tractors/ trucks will not have slopes more than 1 in 16.
- The mined out area shall be replenished each year during monsoon period and maintained in maximum original topography.
- Approach roads from the various blocks as already described earlier will be merging with permanent tar roads on both sides of the river for transportation of the mineral to final destinations.
- The Sand transportation shall be insured after the covering the vehicle Tarpaulin.

The annual exploitation of sand from Block– 27 (Gaya Morhar – 14) Sand Ghat are given below:-

Table 2.8 Year Wise Production Schedule:

YEAR	Over burden (Cum.)	ROM Sand (Cum.)	Saleable Sand (Cum.)
1 ST	-	414000	414000
2 ND	-	414000	414000
3 RD	-	414000	414000
4 TH	-	414000	414000
5 TH	-	414000	414000

The annual extractable RBM comes to 414000 CUM or 745200 Tonnes. It will be replenished after rainy season every year.

2.9 DRILLING AND BLASTING

No drilling and blasting shall be required to for the exploitation of river sand.

2.10 CONCEPTUAL MINING PLAN

Mine Applied Area will be worked for Block-26 (Gaya Morhar – 13) Sand Ghat. However, as the digging depth will be restricted to 3.0 m only. This will be further replenished during rainy season. Sand Ghat will be worked systematically as the width is limited while length is much more. As the

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lease period is only 5 (Five) years, some of the area will be left un-worked at the end of lease period.

- (i) Final Slope Angle to Be Adopted: Height of the bench is limited to 1.5 m while width of individual bench shall be kept 6.0m. River bank side will be protected by working in dry part of the river and by leaving safety distance of the width of the river of 5 meter. Bank side natural slope will not be disturbed. This will prevent collapse of bank and erosion. However, the height of the bank with respect to river bed is varying from 3-4 meters.
- (ii) During plan period workings will be carried out in the Sand Ghat at a time of the Applied Area simultaneously. Scattered workings will ensure safety, remove congestion of vehicles and will have better control and management.
- (iii) Ultimate Capacity of Dumps: There will be no OB removal / during the plan period. Therefore no proposal has been envisaged for its separate dumping. No outside material will be filled up in the extracted zone.

The **conceptual plan & section** of each mining plots are attached with mine plan.

2.10.1 Anticipated life of mine

There is as such no specific life of the mine as the area under reference is inactive part of river bed of the river and its pale channels and whatever quantity of minor minerals are extracted from the Applied Area during five year; almost equal to extracted quantity of the same are replenished every year and the river bed area will be leveled & restored back. However, as lease has been granted for 5 years, mining will be done for the allotted time.

2.10.2 Waste Management

The area devoid of soil cover, therefore there would be no generation of top soil or any other waste generation. All quantities of Sand to be exploited shall be saleable. Therefore, waste management is envisaged.

2.10.3 Reclamation/Rehabilitation:

Every year in monsoon Season, the extracted sand area will be replenished naturally. No other Reclamation/Rehabilitation is proposed.

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2.11 UTILITIES

2.11.1 Power

There is no power requirement proposed for the project.

2.11.2 Water Supply

In the river bed mining projects there is as such no need of water to carry out operations, except for dust suppression & drinking. The number of working peoples are 38 & the total water requirement will be around 15.79 KLD. This water will be supplied from the nearby area.

Table 2.9- Water Demand

S. No.	Purpose	Manpower/Area	Water Demand KLD	Source
1.	Drinking & Domestic	Manpower (32) (32*20= 640 L/Day)	0.64	Nearby Village
2.	Plantation	230trees*5L= 1150 L/D	1.15	Private Tanker
3.	Dust Suppression	Haul Road = 880m length *6m width=5280m ² *2L= 10560L/D	10.56	Private Tanker
Total			12.35	

2.11.3 Infrastructure:

The site services like rest room shelter, first aid box, drinking water facility will be provided to workers at the mine site.

2.11.4 Manpower requirement

The manpower requirement for the proposed project is tabulated below. This manpower is the permanent resource which excludes personnel's coming along with trucks / Tractors.

Table No.2.10 Employment detail

S. No.	Category	Numbers
1.	Administration	1
2.	Supervisor	1
3.	Skilled	7
4.	Un-skilled	23
TOTAL		32

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The maximum annual production envisaged is 745200 TPA which will be achieved every year that implies about 2981 tonnes per day. 250-working days in a year. That implies 32 workers will meet the required production.

2.11.5 Machinery

The proposed project being semi mechanized in nature, other than vehicles, few machineries shall be engaged for mining activities like excavating, loading, etc. The equipments are enlisted in the table below:

Table 2.11 List of Equipment's to be used

S. No.	Name of machinery
1	JCB
2	Excavator
3	Trucks
4	Tractors
5	Water Tanker
6	Light vehicles

2.11.6 Use of Mineral

The Sand will be used for making buildings, bridges, infrastructure etc. Sand is an essential minor mineral used extensively across the country for construction.

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 Thana No 645, 687, 689, 685, 688
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CHAPTER III DESCRIPTION OF ENVIRONMENT

CHAPTER-III
DESCRIPTION OF THE ENVIRONMENT

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3.8	SOCIAL IMPACT ASSESSMENT, REHABILITATION & RESETTLEMENT (R&R) ACTION PLAN	III-78

**Sand Mining Project Block – 26 (Gaya Morhar-13) Sand Ghat on Morhar River,
Khata No. – 108, 162, 48, 15, 37 Khasra No. – 1,282,283,1,1193,1194,1195/1397,473,87,98,207
Thana No 645, 687, 689, 685, 688
Village/Mauja –Baiju Bigha, Bilauti, Dhibra G.P, Phulsathar, Tanrwa Tehsil/Anchal- Gurua
District- Gaya, State-Bihar
Proponent- M/s Rajendra and Sons Infra Private Limited PROP. - Minti Kumari
Production- 414000 CUM per annum or 745200 TPA Area- 23.0 Ha**

DEIA

CHAPTER III DESCRIPTION OF ENVIRONMENT

3.0 INTRODUCTION

Information on the existing environmental status is essential for assessing the likely environmental impacts of the project. In order to get an idea about the existing state of the environment, various environmental attributes such as meteorology, air quality, water quality, soil quality, noise level, ecology and socio-economic environment have been studied/ monitored. This section contains the description of baseline studies of the 10 km radius of the area Sand mining Project on Morhar River located at, Village/Mauja – Baiju Bigha, Bilauti, Dhibra G.P, Phulsathar, Tanrwa Tehsil/Anchal- Gurua District- Gaya, State-Bihar, and Area – 23.0 Ha. & Proposed Production 414000 Cum. per annum or 745200 TPA. The data collected has been used to understand the existing environment scenario around the proposed mining project against which the potential impacts of the project can be assessed.

3.1 BASELINE DATA

Baseline environmental data generation for air, water, noise and soil quality monitoring has been conducted at project site and other locations from March 2023 – May 2023.

3.2 LAND ENVIRONMENT

To assess the land use pattern of the study area i.e. 10 km radius of the site, a detailed study was carried out and using the Survey of India Toposheet a landuse map has been prepared as shown in the figure below. The land use pattern reveals that the 10 km environs is predominantly agricultural land.

Also the landuse cover of the study area is tabulated below wherein it shows that the project area is completely river bed which is completely an undisturbed land where presently no mining activity is being carried out.

Sand Mining Project Block – 26 (Gaya Morhar-13) Sand Ghat on Morhar River,
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CHAPTER III DESCRIPTION OF ENVIRONMENT

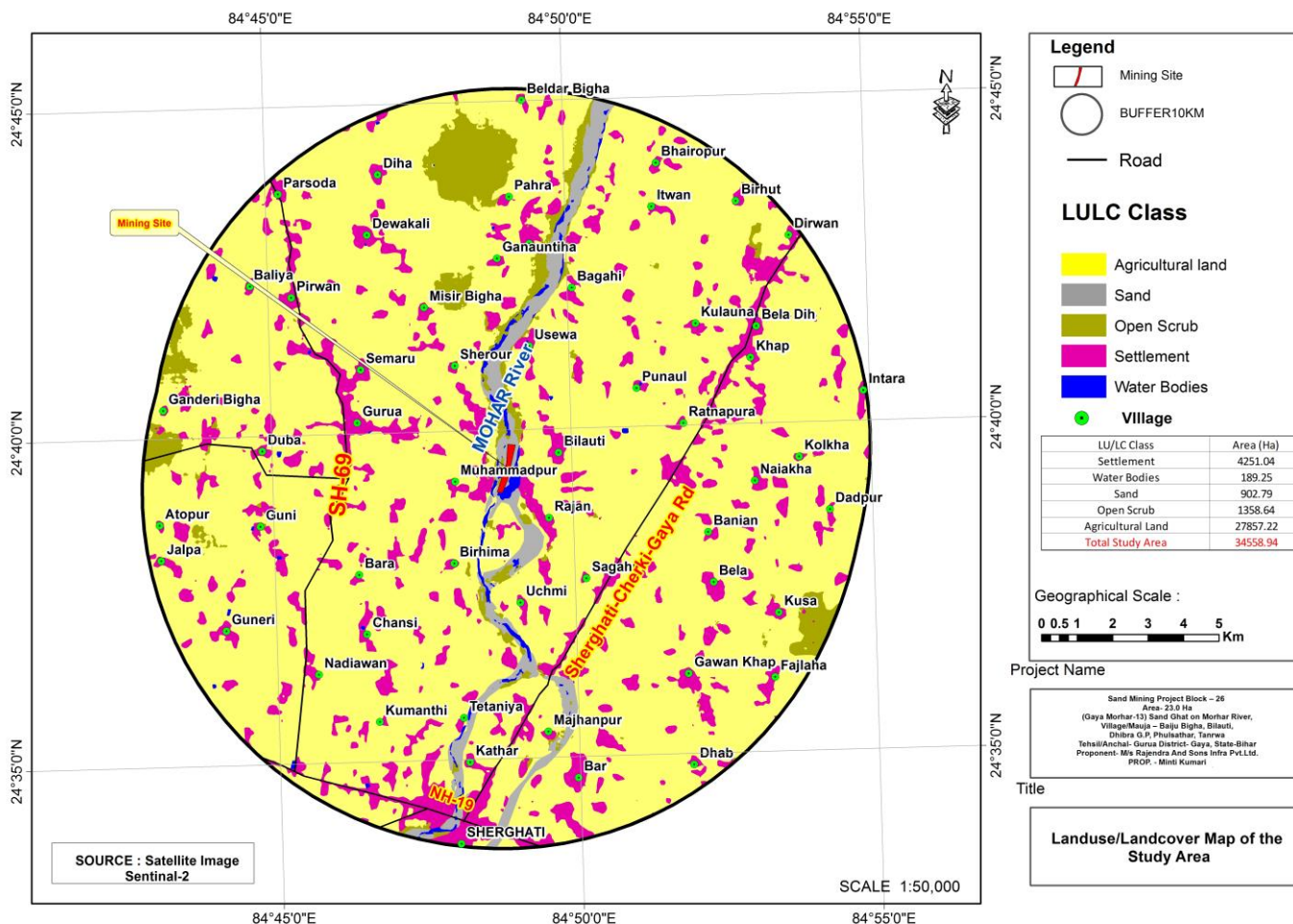


Fig 3.1 Land use Map

Table 3.1 Land use cover of the project area

S. No.	Land use	River bed (Ha)	Forest Land (Ha)	Barren land (Ha)	Grazing Land (Ha)
1	Mining pits Quarry	-	-	-	-
2	Approach Road	-	-	-	-
3	Dumps	-	-	-	-
4	Office, Resht Shelter etc.	-	-	-	-
5	Balance undisturbed land	23.0	-	-	-
Total		23.0	-	-	-

Sand Mining Project Block – 26 (Gaya Morhar-13) Sand Ghat on Morhar River,
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CHAPTER III DESCRIPTION OF ENVIRONMENT

3.3 AIR ENVIRONMENT

The prime objective of the baseline study with respect to ambient air quality is to establish the present air quality and its conformity to National Ambient Air Quality Standards. This data has been further used during impact assessment to predict the final air quality. Ambient air quality monitoring stations were selected primarily on the basis of surface influence, demographic influence and meteorological influence. 24 hourly monitoring was carried out for SO₂, NO₂, PM₁₀ & PM_{2.5} twice a week at each station. This study was done during post monsoon season for a period of 3 months (March to May 2023).

METHODS FOR MONITORING

The Central Pollution Control Board (CPCB) has published comprehensive document on emission testing regulations (“Emission Regulations Part-3, 1985”). Those procedures relevant to the particulate monitoring are summarized below:

Table 3.2 Methods adopted for PM_{2.5}, PM₁₀, SO₂ and NO_x (as NO₂)

Parameters	Technique	Technical Protocol	Minimum Detectable Limit
PM _{2.5}	Gravimetric method	US EPA Method	5 (µg/m ³)
PM 10	Gravimetric method	IS 5182 (Part-XXIII)	5 (µg/m ³)
Sulphur Dioxide	West and Gaeke	IS-5182 (Part-II)	3 (µg/m ³)
Nitrogen Oxide	Jacob & Hochheiser	IS-5182 (Part-VI)	7 (µg/m ³)

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DEIA
CHAPTER III DESCRIPTION OF ENVIRONMENT

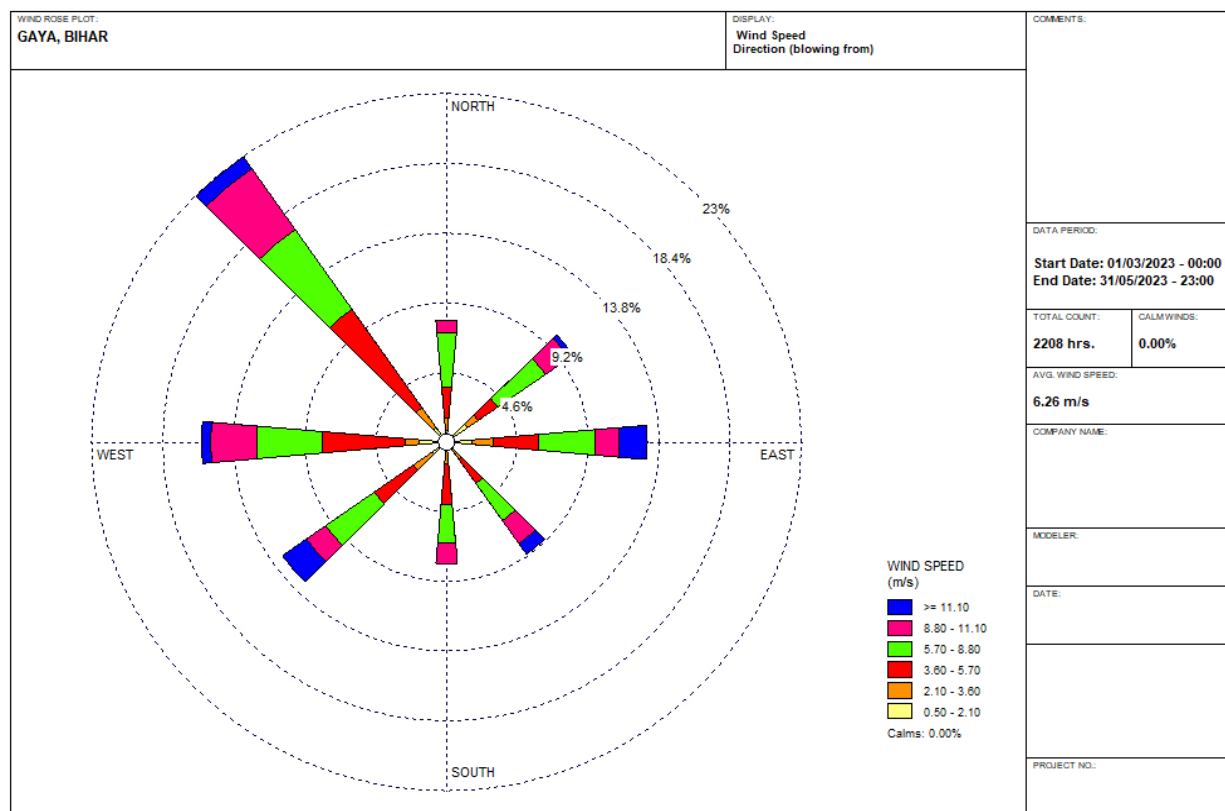


Fig 3.2 – Wind Rose Diagram

Equipment Calibration: For accurate testing of emission sources, the components of the sampling train is calibrated by outsource and supplier (Master Calibrator) standards and solutions are used, calibrated under certified reference material. The Ambient air quality monitoring locations are marked in Map. The ambient air quality data were collected to find the existing GLC. To quantify the impact of the project on the ambient air quality, it is necessary at first to evaluate the existing ambient air quality of the area. The existing ambient air quality, in terms of Particulate Matter – 10 (PM₁₀), Particulate Matter- 2.5 (PM_{2.5}), Sulphur-dioxide (SO₂) and Oxides of Nitrogen (NO₂), has been measured through a planned field monitoring. Table 3.2(ii) gives location of the ambient air quality monitoring stations.

Table 3.3 (i) Ambient Air quality monitoring stations

Location Code	Location	Distance & Direction (Study Area)
AAQ1	Near Project Site	0.35 km in E direction
AAQ2	Belauti	0.19 km in E direction

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CHAPTER III DESCRIPTION OF ENVIRONMENT

AAQ3	Barma Chak	0.27 km in W direction
AAQ4	Birahma	2.05 km in SW direction
AAQ5	Itahri	1.21 km in SE direction
AAQ6	Dadu Barma	0.93 km in S direction
AAQ7	Chetab Kalan	5.01 km in SE direction

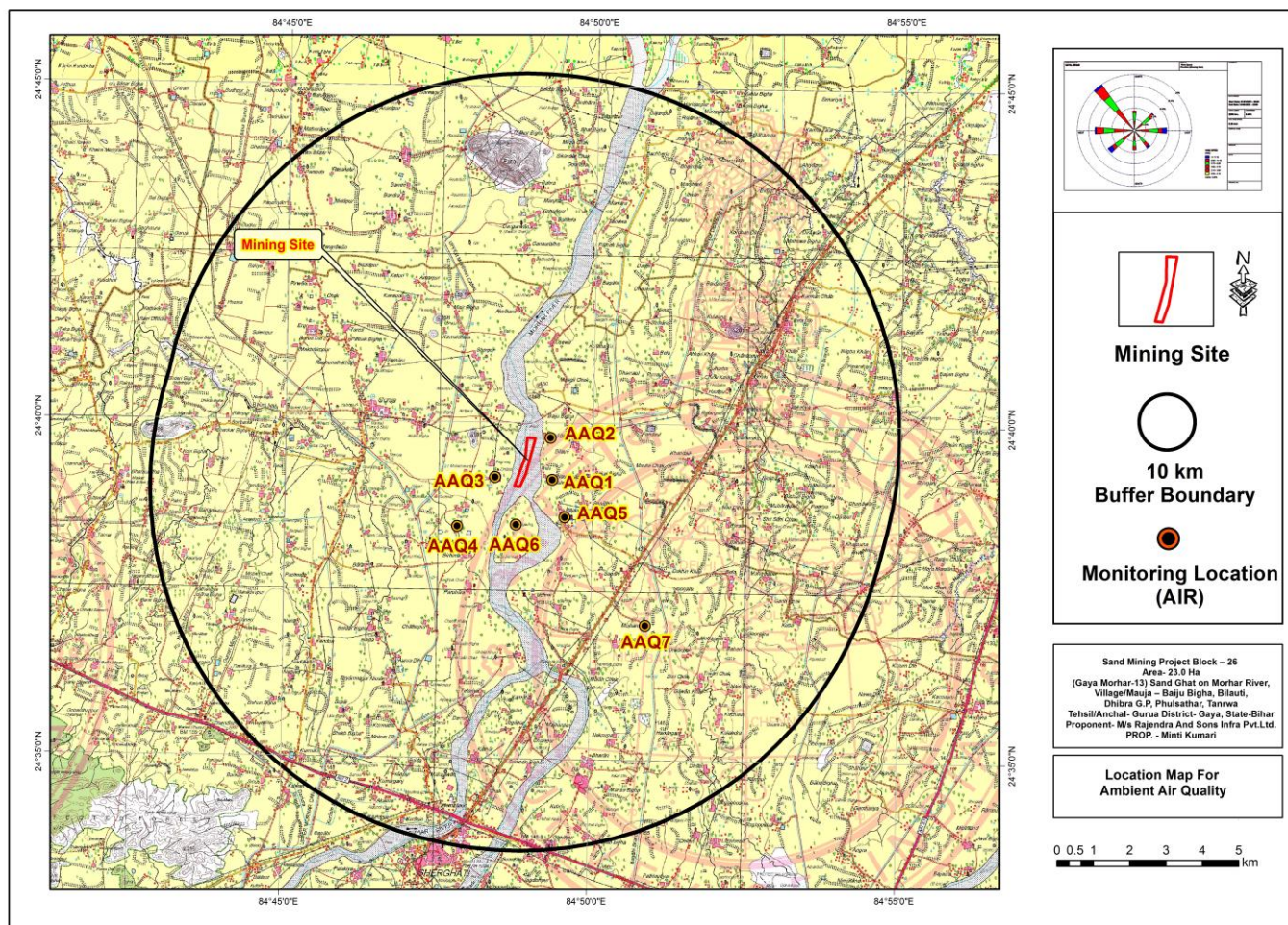


Fig 3.2 (a) Air Quality Monitoring Locations

Sand Mining Project Block – 26 (Gaya Morhar-13) Sand Ghat on Morhar River,
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 CHAPTER III DESCRIPTION OF ENVIRONMENT

Table 3.3 (ii): Ambient Air Quality Status

AAQ1 Near Project site within 500m (Core Zone)

S.No	Date	Particulate Matter PM10 ($\mu\text{g}/\text{m}^3$)	Particulate Matter PM2.5 ($\mu\text{g}/\text{m}^3$)	Sulphur Dioxide SO ₂ ($\mu\text{g}/\text{m}^3$)	Nitrogen Dioxide NO ₂ ($\mu\text{g}/\text{m}^3$)	Carbon monoxide CO (mg/ m^3)
		IS:5182(Part-23)	IS:5182(Part-24)	IS:5182(Part-2)	IS:5182(Part-6)	IS:5182(Part-X)
1	02-03-2023	87.45	42.25	11.43	15.51	0.54
2	06-03-2023	74.50	39.56	8.76	12.24	0.43
3	11-03-2023	89.70	45.53	10.39	16.55	0.76
4	15-03-2023	72.36	37.20	7.20	13.17	0.93
5	19-03-2023	91.13	43.48	13.25	15.28	0.89
6	23-03-2023	77.50	32.24	11.40	11.37	0.53
7	26-03-2023	84.29	46.92	9.93	9.34	0.64
8	29-03-2023	73.40	40.63	12.75	14.62	0.86
9	01-04-2023	88.72	34.52	10.90	12.20	0.48
10	05-04-2023	75.32	45.85	8.41	10.31	0.69
11	08-04-2023	90.60	32.93	6.43	12.65	0.52
12	12-04-2023	89.70	42.50	12.85	9.55	0.61
13	16-04-2023	78.50	43.65	8.85	13.52	0.72
14	20-04-2023	91.40	42.85	12.45	10.02	0.68
15	24-04-2023	79.84	40.78	6.34	14.60	0.75
16	27-04-2023	87.60	44.84	10.50	9.85	0.59
17	02-05-2023	79.96	36.45	7.98	16.54	0.92
18	05-05-2023	91.40	46.52	10.50	14.65	0.76
19	08-05-2023	82.50	41.50	13.16	9.95	0.69
20	12-05-2023	73.93	42.25	11.60	15.65	0.79
21	15-05-2023	85.50	34.96	9.90	10.56	0.61
22	18-05-2023	73.60	46.63	13.45	13.66	0.45
23	21-05-2023	90.50	38.56	12.50	9.45	0.91
24	25-05-2023	82.10	44.98	10.50	14.26	0.82
Minimum		72.36	32.24	6.34	9.34	0.43
Maximum		91.4	46.92	13.45	16.55	0.93
Average		82.98	41.15	10.48	12.73	0.69
98 th Percentile		91.40	46.79	13.36	16.55	0.93
NAAQS, For 24 Hourly Monitoring		100.0	60.0	80.0	80.0	4.0

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 CHAPTER III DESCRIPTION OF ENVIRONMENT

AAQ2 Belauti

S.No	Date	Particulate Matter PM10 ($\mu\text{g}/\text{m}^3$)	Particulate Matter PM2.5 ($\mu\text{g}/\text{m}^3$)	Sulphur Dioxide SO ₂ ($\mu\text{g}/\text{m}^3$)	Nitrogen Dioxide NO ₂ ($\mu\text{g}/\text{m}^3$)	Carbon monoxide CO (mg/ m^3)
		IS:5182(Part-23)	CPCB Volume – 1 Gravimetric	IS:5182(Part-2)	IS:5182(Part-6)	IS:5182(Part-X)
1	02-03-2023	73.76	42.35	8.10	12.22	0.65
2	06-03-2023	84.86	35.50	9.99	9.85	0.61
3	11-03-2023	67.65	43.85	6.78	16.21	0.50
4	15-03-2023	82.45	36.50	11.15	16.78	0.86
5	19-03-2023	61.25	43.90	8.96	13.18	0.60
6	23-03-2023	80.15	41.65	12.12	11.69	0.59
7	26-03-2023	66.18	34.80	6.51	8.58	0.54
8	29-03-2023	87.90	42.85	8.96	13.13	0.62
9	01-04-2023	76.19	35.50	6.85	15.50	0.46
10	05-04-2023	84.17	46.98	5.45	9.78	0.55
11	08-04-2023	64.46	40.04	5.45	12.35	0.46
12	12-04-2023	79.57	32.98	8.99	7.98	0.54
13	16-04-2023	85.72	41.98	7.98	14.12	0.56
14	20-04-2023	75.78	39.56	8.85	9.78	0.63
15	24-04-2023	70.13	36.45	9.51	12.76	0.54
16	27-04-2023	67.25	40.90	8.87	9.40	0.62
17	02-05-2023	84.49	38.45	10.78	14.12	0.55
18	05-05-2023	75.65	45.80	9.56	10.65	0.67
19	08-05-2023	85.65	31.90	8.52	10.95	0.48
20	12-05-2023	74.54	40.25	9.56	8.74	0.59
21	15-05-2023	81.98	42.54	5.54	9.25	0.68
22	18-05-2023	68.76	35.90	8.45	14.19	0.45
23	21-05-2023	76.50	45.12	6.75	11.45	0.6
24	25-05-2023	82.49	42.02	5.13	10.26	0.56
Minimum		61.25	31.9	5.13	7.98	0.45
Maximum		87.9	46.98	12.12	16.78	0.86
Average		76.56	39.91	8.28	11.79	0.58
98th Percentile		86.90	46.44	11.67	16.52	0.78
NAAQS, For 24 Hourly Monitoring		100.0	60.0	80.0	80.0	4.0

Sand Mining Project Block – 26 (Gaya Morhar-13) Sand Ghat on Morhar River,
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DEIA
 CHAPTER III DESCRIPTION OF ENVIRONMENT

AAQ3 Barma Chak

S.No	Date	Particulate Matter PM10 ($\mu\text{g}/\text{m}^3$)	Particulate Matter PM2.5 ($\mu\text{g}/\text{m}^3$)	Sulphur Dioxide SO ₂ ($\mu\text{g}/\text{m}^3$)	Nitrogen Dioxide NO ₂ ($\mu\text{g}/\text{m}^3$)	Carbon monoxide CO (mg /m ³)
		IS:5182(Part-23)	CPCB Volume – 1 Gravimetric	IS:5182(Part-2)	IS:5182(Part-6)	IS:5182(Part-X)
1	02-03-2023	67.80	25.10	4.89	12.43	0.34
2	06-03-2023	79.56	37.54	6.60	10.50	0.49
3	11-03-2023	63.25	42.28	3.12	12.67	0.56
4	15-03-2023	77.39	28.34	6.43	9.69	0.48
5	19-03-2023	59.50	41.70	9.60	7.45	0.54
6	23-03-2023	66.38	26.50	7.35	10.36	0.58
7	26-03-2023	69.40	33.54	10.59	8.70	0.60
8	29-03-2023	54.80	39.30	8.50	6.12	0.45
9	01-04-2023	78.85	48.98	6.65	8.56	0.96
10	05-04-2023	69.20	41.30	8.45	11.34	0.58
11	08-04-2023	78.30	32.50	9.45	11.12	0.45
12	12-04-2023	66.55	28.65	4.12	6.95	0.77
13	16-04-2023	78.60	48.70	6.98	10.56	0.51
14	20-04-2023	66.36	35.65	3.13	9.79	0.58
15	24-04-2023	75.50	25.12	8.51	11.80	0.85
16	27-04-2023	72.39	39.60	5.98	9.45	0.48
17	02-05-2023	79.10	30.25	6.45	11.56	0.98
18	05-05-2023	56.17	38.90	4.85	10.10	0.45
19	08-05-2023	78.25	32.52	7.65	12.54	0.59
20	12-05-2023	70.59	39.90	4.78	6.14	0.58
21	15-05-2023	70.15	35.65	6.45	9.25	0.46
22	18-05-2023	65.45	39.90	5.45	8.58	0.49
23	21-05-2023	76.50	37.80	4.41	11.54	0.54
24	25-05-2023	61.58	32.56	5.45	6.25	0.89
Minimum		54.8	25.1	3.12	6.12	0.34
Maximum		79.56	48.98	10.59	12.67	0.98
Average		70.07	35.93	6.49	9.73	0.59
98th Percentile		79.35	48.85	10.13	12.61	0.97
NAAQS, For 24 Hourly Monitoring		100.0	60.0	80.0	80.0	4.0

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DEIA
 CHAPTER III DESCRIPTION OF ENVIRONMENT

AAQ4 Birahma

S.No	Date	Particulate Matter PM10 ($\mu\text{g}/\text{m}^3$)	Particulate Matter PM2.5 ($\mu\text{g}/\text{m}^3$)	Sulphur Dioxide SO ₂ ($\mu\text{g}/\text{m}^3$)	Nitrogen Dioxide NO ₂ ($\mu\text{g}/\text{m}^3$)	Carbon monoxide CO (mg/ m^3)
		IS:5182(Part-23)	IS:5182(Part-24)	IS:5182(Part-2)	IS:5182(Part-6)	IS:5182(Part-X)
1	02-03-2023	73.46	41.354	9.45	12.56	0.58
2	06-03-2023	84.48	35.26	7.67	10.47	0.42
3	11-03-2023	69.21	44.84	9.31	8.31	0.67
4	15-03-2023	82.65	32.10	6.42	11.96	0.87
5	19-03-2023	69.37	40.64	4.58	14.65	0.98
6	23-03-2023	57.15	45.69	9.78	10.60	0.57
7	26-03-2023	68.76	38.82	7.57	7.32	0.74
8	29-03-2023	87.68	43.75	5.23	13.26	0.82
9	01-04-2023	77.45	36.24	4.59	11.76	0.69
10	05-04-2023	84.98	42.98	7.24	9.50	0.59
11	08-04-2023	64.79	41.04	6.45	12.52	0.48
12	12-04-2023	75.56	36.98	8.99	7.98	0.85
13	16-04-2023	85.9	44.98	6.85	11.54	0.55
14	20-04-2023	77.58	38.56	8.35	9.78	0.60
15	24-04-2023	72.18	32.54	6.51	12.95	0.55
16	27-04-2023	57.25	43.90	4.95	10.40	0.89
17	02-05-2023	84.60	37.45	7.78	13.45	0.58
18	05-05-2023	79.65	45.65	6.56	10.65	0.64
19	08-05-2023	85.65	36.90	9.52	11.85	0.44
20	12-05-2023	78.54	40.25	7.65	9.74	0.93
21	15-05-2023	81.49	42.54	6.54	9.25	0.61
22	18-05-2023	69.78	32.90	5.45	10.20	0.49
23	21-05-2023	76.50	44.12	6.45	11.45	0.68
24	25-05-2023	81.45	44.57	9.13	14.26	0.85
Minimum		57.15	32.1	4.58	7.32	0.42
Maximum		87.68	45.69	9.78	14.65	0.98
Average		76.09	40.17	7.21	11.10	0.67
98th Percentile		86.86	45.67	9.66	14.47	0.96
NAAQS, For 24 Hourly Monitoring		100.0	60.0	80.0	80.0	4.0

Sand Mining Project Block – 26 (Gaya Morhar-13) Sand Ghat on Morhar River,
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 Proponent- M/s Rajendra and Sons Infra Private Limited PROP. - Minti Kumari
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DEIA
 CHAPTER III DESCRIPTION OF ENVIRONMENT

AAQ5 Itahri

S.No	Date	Particulate Matter PM10 ($\mu\text{g}/\text{m}^3$)	Particulate Matter PM2.5 ($\mu\text{g}/\text{m}^3$)	Sulphur Dioxide SO ₂ ($\mu\text{g}/\text{m}^3$)	Nitrogen Dioxide NO ₂ ($\mu\text{g}/\text{m}^3$)	Carbon monoxide CO (mg /m ³)
		IS:5182(Part-23)	CPCB Volume – 1 Gravimetric	IS:5182(Part-2)	IS:5182(Part-6)	IS:5182(Part-X)
1	02-03-2023	67.89	42.35	7.10	12.13	0.42
2	06-03-2023	81.63	36.50	7.84	9.85	0.68
3	11-03-2023	76.56	41.38	6.78	13.21	0.59
4	15-03-2023	81.54	39.50	7.15	9.78	0.65
5	19-03-2023	66.28	47.11	8.96	7.69	0.69
6	23-03-2023	80.22	36.54	8.12	11.29	0.55
7	26-03-2023	69.28	33.35	7.51	7.10	0.61
8	29-03-2023	83.14	35.48	7.84	9.30	0.62
9	01-04-2023	74.65	46.36	6.85	11.62	0.45
10	05-04-2023	85.99	39.85	5.45	9.75	0.45
11	08-04-2023	65.45	42.94	6.45	12.25	0.89
12	12-04-2023	79.36	35.98	4.99	8.85	0.65
13	16-04-2023	83.25	42.56	6.98	10.56	0.56
14	20-04-2023	67.32	35.75	9.85	11.78	0.60
15	24-04-2023	80.09	26.56	6.51	12.56	0.58
16	27-04-2023	76.85	41.35	8.13	9.40	0.61
17	02-05-2023	89.17	33.65	6.78	10.56	0.57
18	05-05-2023	62.28	41.65	7.56	10.10	0.62
19	08-05-2023	82.12	32.52	8.65	12.54	0.46
20	12-05-2023	70.54	40.25	7.56	7.89	0.58
21	15-05-2023	81.59	43.54	6.54	9.25	0.69
22	18-05-2023	90.45	39.90	5.85	11.56	0.42
23	21-05-2023	76.50	42.89	5.19	13.45	0.65
24	25-05-2023	80.45	35.88	4.13	8.33	0.56
Minimum		62.28	26.56	4.13	7.1	0.42
Maximum		90.45	47.11	9.85	13.45	0.89
Average		77.19	38.91	7.03	10.45	0.59
98th Percentile		89.86	46.77	9.44	13.34	0.80
NAAQS, For 24 Hourly Monitoring		100.0	60.0	80.0	80.0	4.0

Sand Mining Project Block – 26 (Gaya Morhar-13) Sand Ghat on Morhar River,
 Khata No. – 108, 162, 48, 15, 37 Khasra No. – 1,282,283,1,1193,1194,1195/1397,473,87,98,207
 Thana No 645, 687, 689, 685, 688
 Village/Mauja – Baiju Bigha, Bilauti, Dhibra G.P, Phulsathar, Tanrwa Tehsil/Anchal- Gurua
 District- Gaya, State-Bihar
 Proponent- M/s Rajendra and Sons Infra Private Limited PROP. - Minti Kumari
 Production- 414000 CUM per annum or 745200 TPA Area- 23.0 Ha

DEIA
 CHAPTER III DESCRIPTION OF ENVIRONMENT

AAQ6 Dadu Barma

S.No	Date	Particulate Matter PM10 ($\mu\text{g}/\text{m}^3$)	Particulate Matter PM2.5 ($\mu\text{g}/\text{m}^3$)	Sulphur Dioxide SO ₂ ($\mu\text{g}/\text{m}^3$)	Nitrogen Dioxide NO ₂ ($\mu\text{g}/\text{m}^3$)	Carbon monoxide CO (mg /m ³)
		IS:5182(Part-23)	CPCB Volume – 1 Gravimetric	IS:5182(Part-2)	IS:5182(Part-6)	IS:5182(Part-X)
1	02-03-2023	62.41	43.14	7.56	10.67	0.49
2	06-03-2023	77.50	39.60	9.65	8.45	0.61
3	11-03-2023	65.71	33.21	6.20	6.31	0.68
4	15-03-2023	82.30	28.47	4.10	9.87	0.41
5	19-03-2023	72.76	42.76	7.65	11.87	0.57
6	23-03-2023	63.23	24.43	9.87	8.45	0.50
7	26-03-2023	54.56	39.76	10.60	10.20	0.58
8	29-03-2023	43.20	54.73	7.21	8.79	0.47
9	01-04-2023	60.23	47.48	11.82	10.31	0.52
10	05-04-2023	81.34	63.32	9.76	7.90	0.59
11	08-04-2023	78.30	62.02	6.55	11.15	0.45
12	12-04-2023	65.50	36.98	4.42	6.95	0.47
13	16-04-2023	75.60	25.50	6.68	10.56	0.52
14	20-04-2023	66.32	35.65	7.13	9.88	0.58
15	24-04-2023	74.50	56.64	6.61	12.58	0.55
16	27-04-2023	72.36	39.60	5.98	9.40	0.66
17	02-05-2023	79.10	50.25	6.55	11.66	0.58
18	05-05-2023	69.18	49.70	4.55	10.10	0.45
19	08-05-2023	80.14	32.82	6.65	11.44	0.48
20	12-05-2023	79.54	60.65	4.78	6.99	0.54
21	15-05-2023	78.15	34.65	6.54	9.25	0.46
22	18-05-2023	69.45	59.90	5.95	11.58	0.45
23	21-05-2023	76.50	35.80	4.65	10.54	0.57
24	25-05-2023	43.58	43.56	5.95	8.25	0.49
Minimum		43.2	24.43	4.1	6.31	0.41
Maximum		82.3	63.32	11.82	12.58	0.68
Average		69.64	43.36	6.98	9.71	0.53
98th Percentile		81.86	62.72	11.26	12.25	0.67
NAAQS, For 24 Hourly Monitoring		100.0	60.0	80.0	80.0	4.0

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DEIA
 CHAPTER III DESCRIPTION OF ENVIRONMENT

AAQ7 Chetab Kalan

S.No	Date	Particulate Matter PM10 ($\mu\text{g}/\text{m}^3$)	Particulate Matter PM2.5 ($\mu\text{g}/\text{m}^3$)	Sulphur Dioxide SO ₂ ($\mu\text{g}/\text{m}^3$)	Nitrogen Dioxide NO ₂ ($\mu\text{g}/\text{m}^3$)	Carbon monoxide CO (mg /m ³)
		IS:5182(Part-23)	CPCB Volume – 1 Gravimetric	IS:5182(Part-2)	IS:5182(Part-6)	IS:5182(Part-X)
1	02-03-2023	64.79	25.58	5.50	11.13	0.35
2	06-03-2023	79.16	35.50	6.54	9.80	0.45
3	11-03-2023	62.15	39.70	9.96	12.21	0.55
4	15-03-2023	75.89	26.65	7.15	9.78	0.49
5	19-03-2023	69.78	42.56	10.85	7.70	0.55
6	23-03-2023	64.14	28.65	9.05	11.29	0.55
7	26-03-2023	68.56	30.25	11.51	9.97	0.65
8	29-03-2023	55.58	45.21	5.64	8.50	0.44
9	01-04-2023	76.45	39.30	8.85	11.60	0.65
10	05-04-2023	69.14	46.45	10.15	7.50	0.45
11	08-04-2023	78.30	29.50	9.45	7.12	0.49
12	12-04-2023	66.55	28.65	4.12	6.95	0.70
13	16-04-2023	74.60	49.70	6.98	11.56	0.51
14	20-04-2023	66.36	35.65	4.13	9.79	0.54
15	24-04-2023	76.50	26.12	8.51	11.80	0.85
16	27-04-2023	72.39	39.60	5.98	9.45	0.48
17	02-05-2023	70.10	31.25	8.45	12.56	0.95
18	05-05-2023	56.17	34.90	4.85	10.10	0.45
19	08-05-2023	70.25	32.52	7.65	12.54	0.58
20	12-05-2023	71.59	39.90	9.78	7.14	0.58
21	15-05-2023	72.15	30.65	6.45	9.25	0.46
22	18-05-2023	65.45	39.90	5.45	8.58	0.46
23	21-05-2023	76.50	38.80	10.41	12.54	0.54
24	25-05-2023	60.58	35.56	11.45	5.25	0.94
Minimum		55.58	25.58	4.12	5.25	0.35
Maximum		79.16	49.7	11.51	12.56	0.95
Average		69.30	35.52	7.87	9.75	0.57
98th Percentile		78.76	48.21	11.48	12.55	0.95
NAAQS, For 24 Hourly Monitoring		100.0	60.0	80.0	80.0	4.0

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Observations:

Ambient Air Quality Monitoring (AAQM) has been carried out at seven locations during pre-monsoon season from March to May 2023. The minimum and maximum level of PM_{2.5} recorded within the study area was in the range of 24.43µg/m³ to 63.32µg/m³ with the 98th percentile 45.67 µg/m³ to 62.72µg/m³ at. The minimum and maximum level of PM₁₀ recorded within the study area was in the range of 43.2µg/m³ to 91.4µg/m³ with the 98th percentile 78.76µg/m³ to 91.40µg/m³. The minimum and maximum concentration of SO₂ recorded within the study area was in the range of was 3.12 µg/m³ to 13.45µg/m³ with the 98th percentile 9.44µg/m³ to 13.36 µg/m³. The minimum and maximum level of NO₂ recorded within the study area was in the range of was 6.12µg/m³ to 16.78µg/m³ with the 98th percentile 12.25µg/m³ to 16.55µg/m³. The minimum and maximum level of CO recorded within the study area was in the range of was 0.34µg/m³ to 0.98µg/m³ with the 98th percentile 0.67µg/m³ to 0.97µg/m³. The results thus obtained indicate that the concentrations of PM₁₀, PM_{2.5}, SO₂ and NO₂ in the Ambient Air are well within the National Ambient Air Quality (NAAQ) standards for Industrial, Residential, Rural and other areas.

Free SiO₂ (in µg/m³):

SiO ₂	AAQ-1	AAQ-2	AAQ-3	AAQ-4	AAQ-5	AAQ-6	AAQ-7
Maximum	0.95	0.96	0.94	0.91	0.85	0.87	0.82
Minimum	0.80	0.79	0.68	0.76	0.69	0.70	0.72

Observations:

The minimum & maximum concentrations of SiO₂ were found to be 0.68µg/m³ at AAQ-3 & 0.96µg/m³ at AAQ-2 respectively.

3.4 WATER ENVIRONMENT

Water quality assessment is one of the essential components of EIA study. Such assessment helps in evaluating the existing health of water body and suggesting appropriate mitigation measures to minimize the potential impact from development projects. Water quality of ground water has been studied in order to assess proposed water-uses in construction, drinking, cooling and horticulture

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DEIA
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purpose. The water quality at project site and other locations within the 10 km impact zone was monitored during March to May 2023.

A) Ground water

Four water samples were collected from the study area. The locations of the monitoring are given below:-

Table 3.3 (iii) Ground water sampling locations

Location Code	Location	Distance & Direction (Study Area)
GW – 1	Near Project Site	0.35 km in E direction
GW – 2	Itahri	1.21 km in SE direction
GW – 3	Chetab Kalan	5.01 km in SE direction

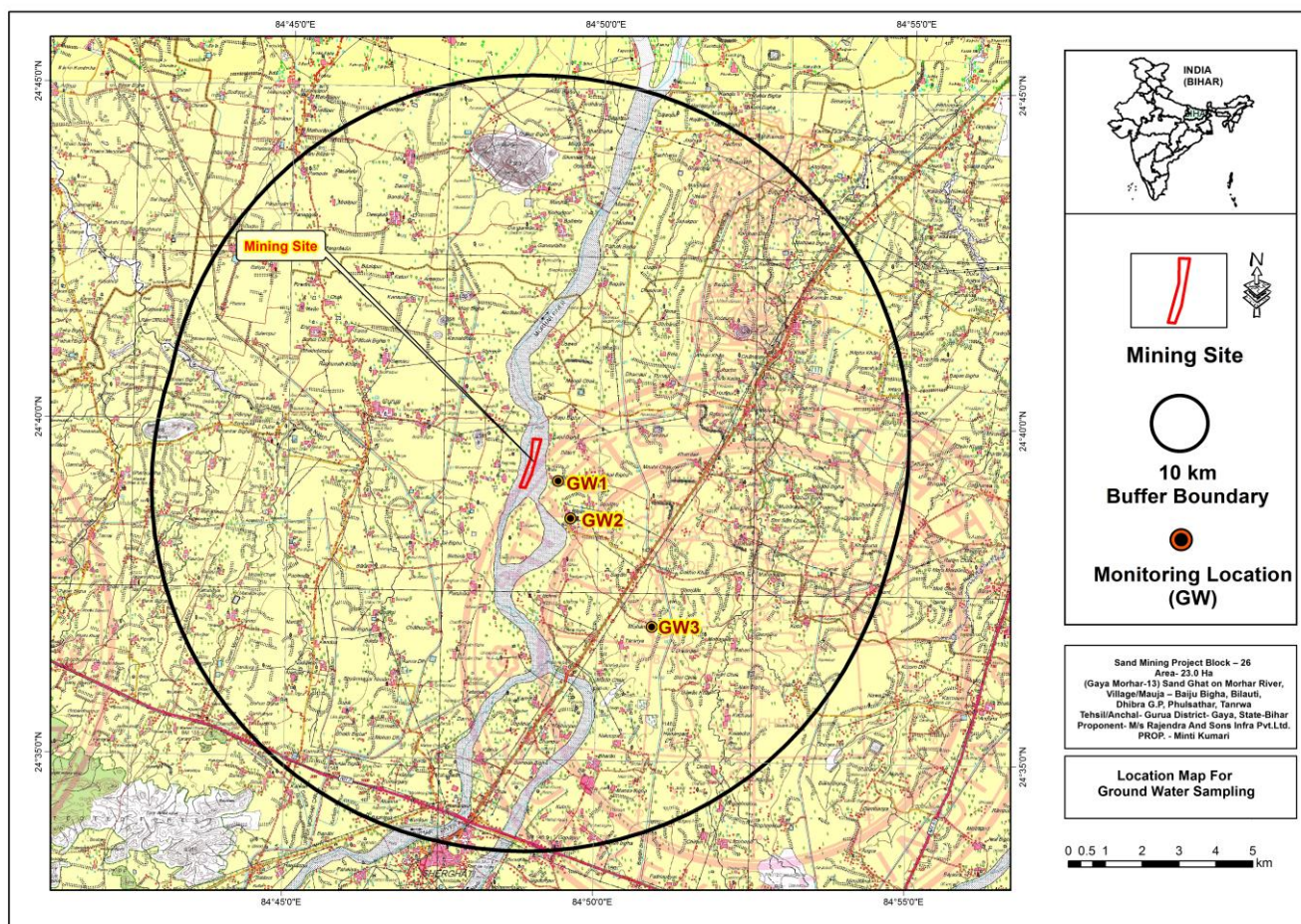


Fig 3.2 (b) Ground water Quality Monitoring Locations

Sand Mining Project Block – 26 (Gaya Morhar-13) Sand Ghat on Morhar River,
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Table 3.3 (IV) Physico-chemical properties of ground water Study

S.No	Parameter	Results			Units	Acceptable Limit	Permissible Limit in the Absence of Alternate Source
		Location					
		GW-1	GW-2	GW-3			
1	pH	7.24	7.43	6.25	-	6.5-8.5	-
2	Colour	<5.0	<5.0	<5.0	Hazen	5	15
3	Odour	Agreeable	Agreeable	Agreeable	-	Agreeable	Agreeable
4	Taste	Agreeable	Agreeable	Agreeable	-	Agreeable	Agreeable
5	Turbidity	<1.0	<1.0	<1.0	NTU	1	5
6	Total Hardness (as CaCO ₃)	245	274	346	mg/l	200	600
7	Calcium(as Ca)	45.65	74.48	82.25	mg/l	75	200
8	Magnesium(as Mg)	17.45	22.65	27.42	mg/l	30	100
9	Chloride(as Cl)	193.71	151.54	144.15	mg/l	250	1000
10	Iron(as Fe)	0.087	0.49	0.98	mg/l	0.3	No Relaxation
11	Fluoride(as F)	0.45	0.65	0.48	mg/l	1	1.5
12	Free Residual chlorine	<0.1	<0.1	<0.1	mg/l	0.2	1
13	Total Dissolved Solid	648	679	884	mg/l	500	2000
14	Phenolic Compound (as C ₆ H ₅ OH)	<0.001	<0.001	<0.001	mg/l	0.001max	0.002 Max
15	Anionic Detergents (as MBAS)	<0.1	<0.1	<0.1	mg/l	0.2	1.0
16	Sulphate (as SO ₄)	47.49	51.97	62.35	mg/l	200	400
17	Nitrate (as NO ₃)	4.35	5.88	6.75	mg/l	45	No Relaxation

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18	Alkalinity(as CaCO ₃)	252	497	348	mg/l	200	600
19	Chloramines (as Cl ₂)	< 1.0	< 1.0	< 1.0	mg/l	4	No Relaxation
20	Cadmium (as Cd)	<0.001	<0.001	<0.001	mg/l	0.003	No Relaxation
21	Lead (as Pb)	<0.01	<0.01	<0.01	mg/l	0.01	No Relaxation
22	Total Chromium (as Cr)	<0.01	<0.01	<0.01	mg/l	0.05	No Relaxation
23	Copper (as Cu)	<0.01	<0.01	<0.01	mg/l	0.05	1.5
24	Total Ammonia	<0.5	<0.5	<0.5	mg/l	0.5	No Relaxation
25	Nickel (as Ni)	<0.01	<0.01	<0.01	mg/l	0.02	0.2
26	Zinc (as Zn)	0.48	0.92	0.59	mg/l	5	15
27	Manganese (as Mn)	<0.1	<0.1	<0.1	mg/l	0.1	0.3
28	Boron (as B)	<0.1	<0.1	<0.1	mg/l	0.5	1
29	Selenium (Se)	<0.01	<0.01	<0.01	mg/l	0.01	No Relaxation
30	Arsenic (as As)	<0.01	<0.01	<0.01	mg/l	0.01	0.05

RESULTS
As per IS 10500:2012

S.No	Parameter	Test Method	Results			Units	Requirements
			GW-1	GW-2	GW3		
1	E.coli	IS-1622	Not Detected (<2)	Not Detected (<2)	Not Detected (<2)	E.Coli/100ml	Shall not be detectable in 100 ml sample
2	Total Coliform	IS-1622	Absent	Absent	Absent	MPN/100ml	Shall not be detectable in 100 ml sample

Note: Un- Unobjectionable



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Observation:

Analysis results of ground water reveal the following: -

- pH varies from 6.25 to 7.43.
- Total hardness varies from 245 mg/l to 346 mg/l.
- Total dissolved solids vary from 648 mg/l to 884 mg/l.

Results shows that the sample from GW1 had minimum amount of TDS & Total Hardness and in the contrary, samples taken from GW3 have the maximum values for most of the parameters.

The ground water from all sources remains suitable for drinking purposes as all the constituents are within the limits prescribed by drinking water standards promulgated by Indian Standards IS: 10500. Fluorides and nitrates are within the permissible limits. Most of the parameter in ground water sources are well within the permissible limits as per IS – 10500, drinking water standards.

b. Surface water

Two water samples were collected from the study area. The Physico-chemical analysis of the water samples is given in the Table 3.3 (vi). The Surface water sampling locations are marked in **Fig no. 3.2(c)**.

Table 3.3 (v) Surface water sampling locations

Location Code	Sample collected from	Direction & Distance
SW – 1	Morhar River (Upstream)	5km in S direction
SW – 2	Morhar River (Downstream)	5km in N direction

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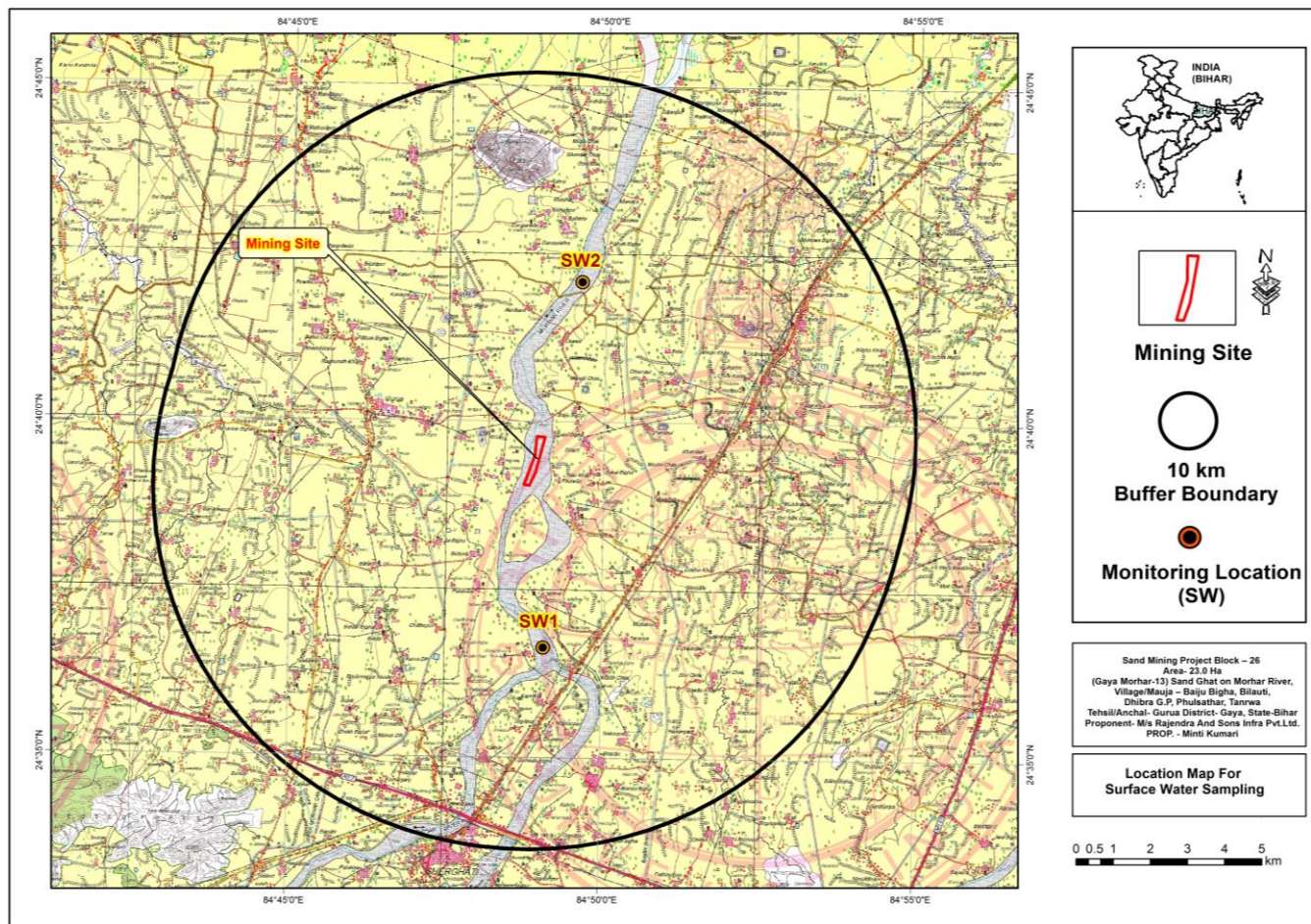


Fig. 3.2 (c) - Surface water sampling locations in the study area

Table 3.3 (vi) Physico-chemical properties of surface water

S.No	Parameter	SW-1 Morhar River (Upstream)	SW-2 Morhar River (Downstream)	Units
1	pH	7.45	7.21	-
2	Temperature	18.4	17.6	°C
3	Turbidity	13.2	19.8	NTU
4	Conductivity @25°C	445	615.10	µs/cm.
5	Total Suspended Solid	36.2	29.7	mg/l
6	Total Alkalinity (as CaCO ₃)	145	197	mg/l
7	Biological Oxygen Demand (Max.) (at 270C for 3 days)	5.48	2.84	mg/l

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8	Dissolved Oxygen (as O ₂) Min.	5.45	6.56	mg/l
9	Calcium(as Ca)	92.98	22.45	mg/l
10	Magnesium(as Mg)	48.48	13.32	mg/l
11	Chloride(as Cl),Max	64.40	55.48	mg/l
12	Iron(as Fe),Max	0.15	0.19	mg/l
13	Fluoride(as F),Max	0.65	1.18	mg/l
14	Total Dissolved Solid	645	343	mg/l
15	Total Hardness (as CaCO ₃)	195.00	145.65	mg/l
16	Sulphate (as SO ₄)Max	20.45	16.48	mg/l
17	Phosphate (as P)	0.09	<0.2	mg/l
18	Sodium (as Na)	49.45	28.54	mg/l
19	Manganese (as Mn)	0.08	<0.1	mg/l
20	Total Chromiun (as Cr)	<0.05	<0.05	mg/l
21	Zinc (as Zn)	1.46	0.89	mg/l
22	Potassium (as K)	2.98	4.16	mg/l
23	Nitrate (as NO ₃),Max	0.85	<0.5	mg/l
24	Cadmium (as Cd)	<0.01	<0.01	mg/l
25	Lead (as Pb)	<0.01	<0.01	mg/l
26	Copper (as Cu)	<0.01	<0.01	mg/l
27	Chemical Oxygen Demand (asO ₂)	25.0	16.65	mg/l
28	Arsenic (as As)	<0.01	<0.01	mg/l

RESULTS

S.No	Parameter	Test Method	Results	Units	Tolerance Limit as per IS:2296				
					Class A	Class B	Class C	Class D	Class E
SW-1	Total Coli Form	IS:1622	45	MPN/100ml	50	500	5000	-	-
SW-2	Total Coli Form	IS:1622	98	MPN/100ml	50	500	5000	-	-

Observation:

The analysis results indicate that the pH ranges between 7.21 and 7.45.

Dissolved Oxygen (DO) was observed in the range of 5.45 mg/l against the minimum requirement of 6.56 mg/l. BOD values were observed to be in the range of 2.84 mg/l. to 5.48 mg/l.

The chlorides and Sulphates were found to be in the range of 55.48-64.40 mg/l and 16.48-20.45 mg/l respectively.



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Bacteriological examination of surface water samples revealed the presence of total coliform in range of 45 MPN/100ml to 98MPN/100ml. Based on the results it is evident that most of the parameters of the samples comply with ‘Category ‘A’ standards of CPCB indicating their suitability for Drinking water source after conventional treatment and disinfection.

3.5 SOIL ENVIRONMENT

Soil may be defined as a thin layer of earth’s crust, medium for the growth of plants. The soil characteristics include both physical and chemical properties. The soil survey and soil sample were carried out / collected to assess the soil characteristics of the study area. Soil samples were collected from 3 locations and analyzed as per CPCB norms.

The soil sampling locations are marked in **fig. 3.2 (d)** the Physico-chemical characteristic of these soil samples is given in Table No. 3.3 (viii).

Table No. 3.3 (vii) Soil sampling locations

Location Code	Location	Distance & Direction
SQ1	Near Project Site	0.35 km in E direction
SQ2	Itahri	1.21 km in SE direction
SQ3	Chetab Kalan	5.01 km in SE direction

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Thana No 645, 687, 689, 685, 688
Village/Mauja –Baiju Bigha, Bilauti, Dhibra G.P, Phulsathar, Tanrwa Tehsil/Anchal- Gurua
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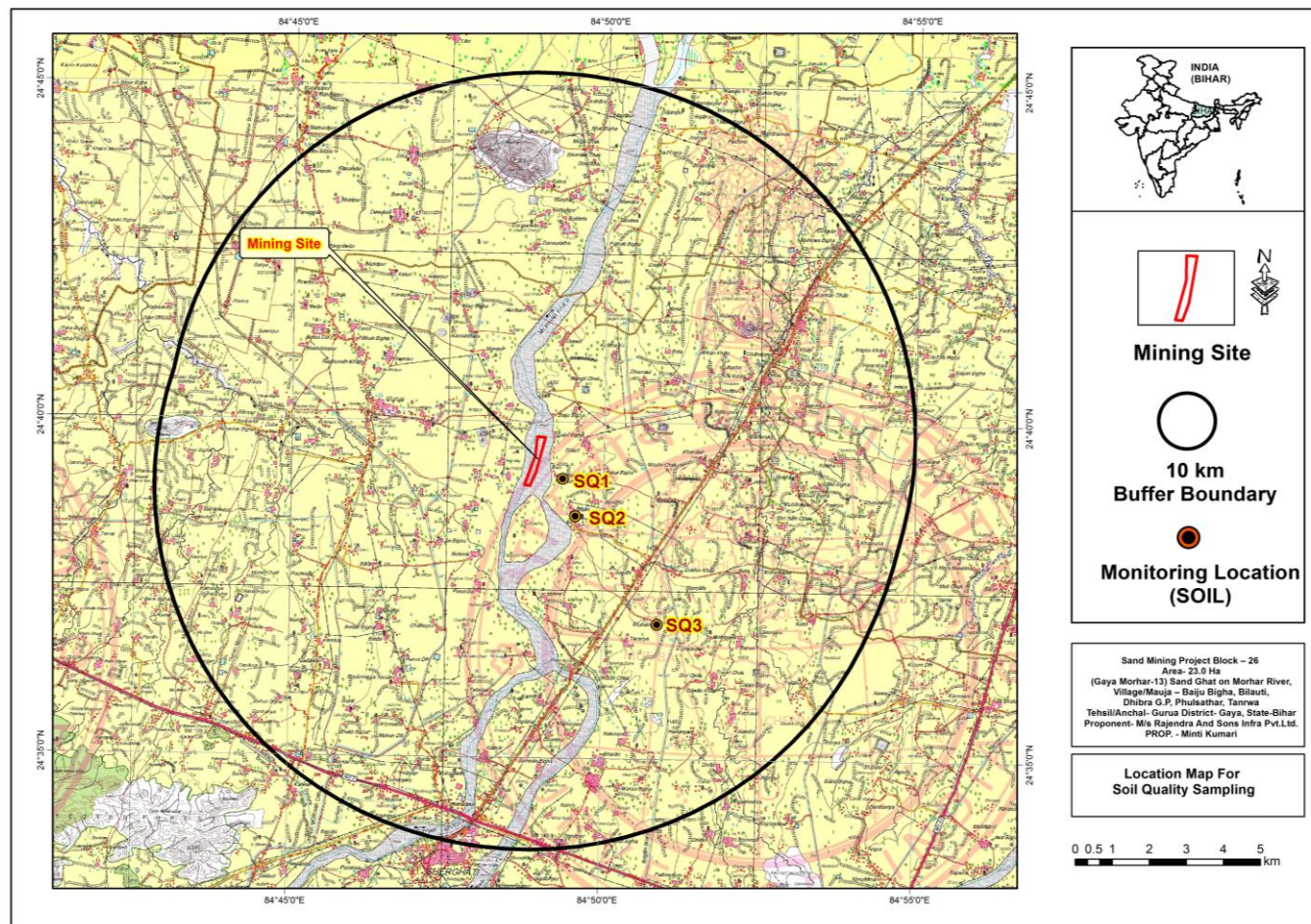


Fig.3.2 (d) Soil sampling Location

Table 3.3 (viii) Physico-chemical properties of soil

S.No	Parameter	Units	Result		
			Location		
			SQ-1	SQ-2	SQ-3
1	Texture	-	Clay Loam to Silty Loam	Clay Loam	Clay Loam
	Sand	%	47.85	36.59	42.46
	Clay	%	38.2	36.76	37.24
	Silt	%	13.6	31.55	21.49
2	pH(1:2.5 Suspension)	-	6.85	6.58	6.29
3	Electrical Conductivity	μmhos/cm	245.4	395.45	378.8
4	Potassium (as K)	mg/kg	153.56	167.46	184.35
5	Sodium (as Na)	mg/kg	242.49	198.59	148.15

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6	Calcium (as Ca)	mg/kg	3710.52	4204.56	3308.65
7	Magnesium (as Mg)	mg/kg	656.80	525.37	469.84
8	Sodium Absorption Ratio	-	0.95	0.48	0.75
9	Water Holding Capacity	%	32.02	32.92	34.75
10	Total Kjeldahl Nitrogen	%	0.058	0.097	0.099
11	Phosphorous	mg/kg	62.45	53.16	58.98
12	Bulk Density	gm/cc	1.45	1.49	1.54
13	Organic Matter	%	0.88	1.50	1.56
14	Porosity	%	36.29	37.22	31.95

Observations:

Samples collected from identified locations indicate the soil is sandy type and the pH value ranging from 6.29-6.85, which shows that the soil is alkaline in nature. Potassium is found to be from 153.56 mg/kg to 184.35 mg/kg. The water holding capacity is found in between 32.02% to 32.75%.

3.6 NOISE ENVIRONNENT

The noise levels within the study area were recorded using Sound Level Meter and noise monitoring results were compared with the Ambient Noise Quality Standard notified under Environment Protection Act, 1986. The levels recorded are as stated in Table 3.3 (x).

The noise level monitoring locations are marked in Fig. no.3.3 (e)

Table 3.3 (ix) Noise quality monitoring stations

Location Code	Location	Distance & Direction
NQ1	Near Project Site	0.35 km in E direction
NQ2	Belauti	0.19 km in E direction
NQ3	Barma Chak	0.27 km in W direction
NQ4	Itahri	1.21 km in SE direction
NQ5	Chetab Kalan	5.01 km in SE direction

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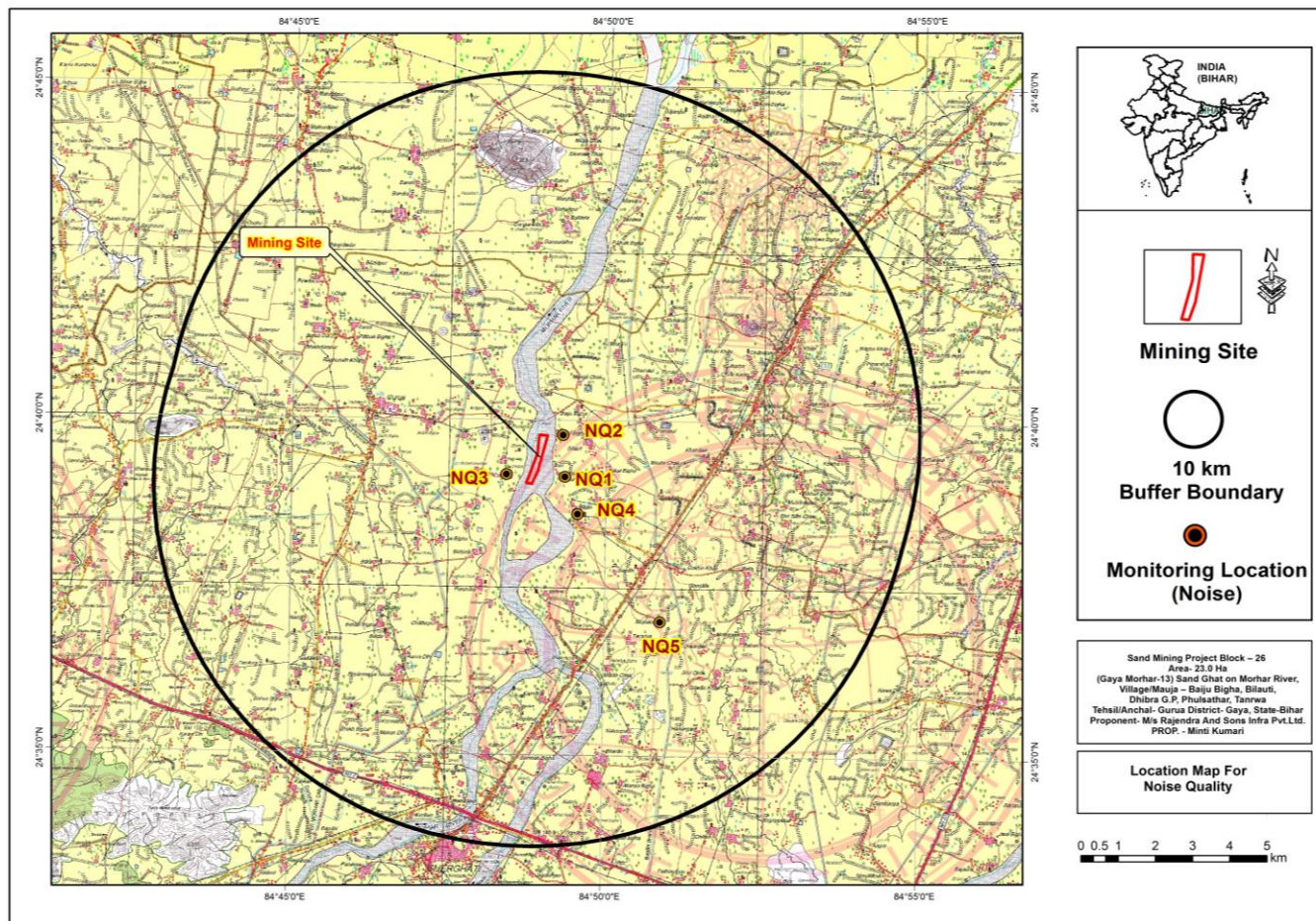


Fig.3.2 (e) - Noise quality monitoring stations

Table No. 3.3 (x) Noise level status

TEST RESULT							
S.No	Location	Observed Value Leq dB(A)			Limit as per CPCB Guidelines Leq. dB(A)		Zone
		Day*	Night*	Day/Night	Day*	Night*	
1	NQ1- Near Project site within 500m	54.5	43.5	49.0	75.0	70.0	Industrial
2	NQ2- Belauti	52.0	40.1	45.54	55.0	45.0	Residential
3	NQ3- Barma Chak	50.8	41.6	46.45	55.0	45.0	Residential
4	NQ4- Itahri	42.4	35.3	41.52	55.0	45.0	Residential
5	NQ5- Chetab Kalan	45.8	32.6	42.40	55.0	45.0	Residential
*Day Time		Leq(6.00AM TO 10.00 PM)					

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*Night Time	Leq (10.00PM TO 6.00 AM)
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Results

Noise monitoring reveals that the maximum & minimum noise levels at day time were recorded as 54.5 dB (A) & 42.4 dB (A), respectively. The maximum & minimum noise levels at night time were found to be 43.5 dB (A) & 32.6 dB (A). There are several other sources in the 10 km radius of study area, which contributes to the local noise level of the area. Traffic activities as well as activities in nearby villages and agricultural fields add to the ambient noise level of the area.

3.7 BIOLOGICAL ENVIRONMENT

3.7.1 Introduction

The ecological study reflects the potential of a regional ecosystem and its biological components. In India, the biological diversity of plants and animals varies from region to region on account of their diversity and density. Producers (plants), consumers (animals), and decomposers (microbes) govern the whole cycle of ecology. Plant and animals both are interdependent on each other.

The biological study is essential to understand the impact of any developmental project on the existing flora and fauna present in the study area. Hence, studies on various aspects of the ecosystem play an important role in identifying sensitive issues for undertaking appropriate action to mitigate the impact if required.

The Environment baseline data generation report in respect of flora-fauna has been prepared to assess the current ecology & biodiversity scenario of the area; and to carry out Environmental Management Plan based on the proposed project activities. The plan will identify and address the environmental and ecological conservation implications of the area. Conservation of biodiversity is essential for sustainable development.

The main objective of the ecological survey is aimed to find out the baseline status of flora and fauna (terrestrial and aquatic ecosystem) of the study area before the start of Sand Mining Project, On Morhar River At Gaya Block No.- 26 Sand Ghat.

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3.7.2 Ecosystem Overview of the Area

- The area falls under Tropical Dry-Deciduous forest. Tropical Dry Deciduous Forests are a transitional type of forest between moist deciduous and thorn forests on the wetter side and thorn forests on the drier side. They thrive in harsh and highly fluctuating climates marked by low annual rainfall, 5-6 dry months per year, and nutrient-depleted soil. The biotic components (producer, consumers, and decomposers) in this ecosystem type are characterized by plants and animals with specific adaptations to survive the extended dry season. The abiotic factors (climate, temperature, soil, precipitation) such as lack of precipitation for a lengthy period of time is more important than any other component in producing a true dry forest. Seasonally dry tropical forest (SDTF), tropical dry deciduous forest, monsoon forest, caatinga, cuabal and other terms have been used to describe this forest. The annual rainfall in the tropical dry deciduous forest is 100-150 cm.
- There is a low annual rainfall with **5 to 6 dry months** within the annual cycle.
- The climate in these forests is **hot and humid**, with average temperatures ranging from 25 to 30 degrees Celsius, but no lower than 18 degrees Celsius.
- The soil of tropical dry deciduous forests is generally nutrient-poor. Alfisols and Ultisols make up the majority of the soils in this area. The soils of tropical dry deciduous forests are old and less fertile. But because there is a dry season, more nutrients can be retained. The single **most essential adaptation** among plants to extended droughts is **deciduousness**.

After the rains stop, most trees drop their leaves and essentially stop photosynthesis, as they would otherwise be unable to survive the dry season due to water loss. These forests are made up of a variety of deciduous trees that can reach a height of 20 meters. Enough light reaches the ground to allow primary producers and climbers to thrive. Teak (*Tectona grandis*), coromandel ebony (*Diospyros melanoxylon*), dhaora (*Anogeissus latifolia*), *Lagerstroemia parviflora*, *Terminalia tomentosa*, *Lannea coromandelica*, *Hardwickia binata*, and *Boswellia serrata* are the main canopy trees found here. Axle wood, rosewood, common bamboo, red sanders, laurel, satinwood and other significant species are also common among them. There are 276 bird species in the area, none of which are endemic. Tropical dry deciduous forests are vital to rural

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livelihoods, especially for the poor who rely on them. Tropical dry deciduous forests and woodlands contribute to the direct provision of numerous products, including timber and non-timber forest products, in addition to their roles in maintaining resilient and multi-functional landscapes. These products are shown to help people supplement their incomes and alleviate poverty. They are especially important as a safety net during adverse situations when other economic activities are affected by the regular droughts. A wide range of these products are collected, either for personal consumption or to make a little amount of cash. Drought-prone animals rely on the forest for fodder. Tropical Dry deciduous forests are among the world's most endangered ecosystems due to extensive anthropogenic disruptions. Vast sections of these forests have been destroyed to make way for agriculture. Overgrazing, fire, and other factors have devastated these forests. They also face biotic disturbances, which can lead to ecosystem fragmentation and conversion, resulting in changes in biomass, productivity, and soil microbial biomass, among other things.

Agriculture

A large area of study area is covered with agricultural land. Major farming systems are: Paddy, Wheat, Moong, Lentil, fallow, Rai, Sugarcane, Potato, vegetables, maize, dairy, poultry, bee keeping, fishery.

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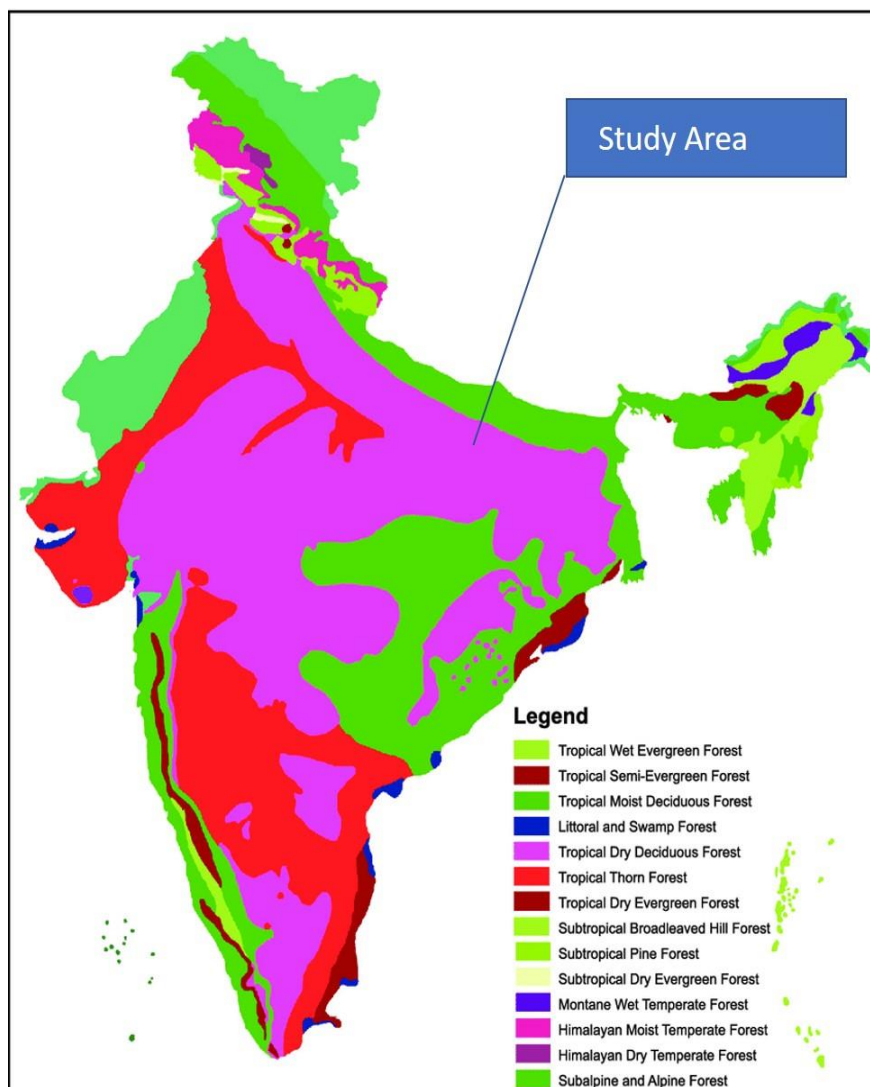


Fig 3.3 (a) Location of Study area on the map of Forest Classification of India

3.7.3. Description of Eco-sensitive zones in the Study Area (Wild life Sanctuary/ National Parks/Animal or Elephant Corridors/ Protected Wetlands etc.)

There are no National parks, Biosphere Reserves, Wildlife corridors, Tiger/Elephant reserves (existing as well as proposed), within 10 km from the present project. Also, areas protected under international conventions, national or local legislation for their ecological, landscape, cultural or other related value, doesn't exist in the core and buffer zone of the present project. On the other

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hand, the proposed is on Morhar River. Natural hydrology and protection of all forms of biota found there in all the water bodies of the area will be maintained by Project executors.

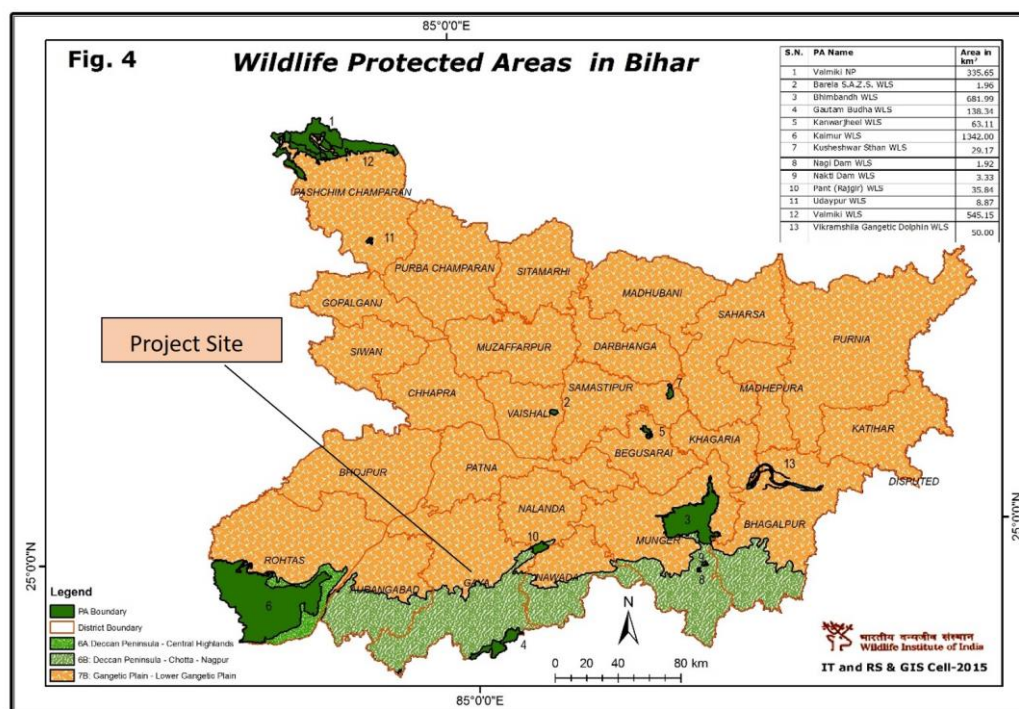


Figure 3.3 (b) Map showing Eco-Sensitive Zones of Bihar with Project Area

3.7.4 Drainage /Water Bodies of the Study Area

Project lies on the Riverbed of River Morhar. Apart from these, some seasonal (monsoon-fed) riverine streams and Nallas are also present in the study area. Few ponds are also recorded nearby the different villages mainly used for fish farming, Cattle feeding, Irrigation purpose by the villagers, etc.

Scope and Objectives of the Study

The above study aims in identifying potential impacts on flora and fauna and to suggest relevant compensatory and mitigatory measures to protect/conservate biodiversity in the likely impacted area due to the project activity. Following points to be covered under the scope of work:

- Survey of terrestrial & aquatic flora & fauna for core & buffer zone separately.

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- Details of endemic species found in the study area and their IUCN status, Schedule status (as per WPA, 1972).
- Survey of the study area in terms of features like breeding & spawning grounds, habitats, flight paths, and the migratory path of the animals.
- Survey of flora covering types e.g. agriculture crop, commercial crop, plantation, natural vegetation/forest type, grass land. The endangered & endemic species of flora & fauna beside any other flora, if present are also to be identified.
- The survey has been covering a total listing of the faunal population. The survey has also covered endangered, endemic, migratory & detail of aquatic fauna.
- The assessment of potential damage to terrestrial & aquatic flora and fauna. The impact should be categorized as primary & secondary, temporary and long term, unavoidable & risk trans boundary impacts, possible irreversible change.

3.7.5 Methodology/ Data Collection

A primary field survey was carried out within a 10 km radius of the proposed project. Both terrestrial and aquatic ecosystems have been studied to understand the biological environment. Secondary data were collected from authentic sources like the Forests Department, Fisheries Department, Agriculture Department of Gaya, and available published literature.

- Survey sites: project site, few identified locations in 10 km radius
- Core zone: Project site and 500m radius from project site
- Buffer zone: 10 km radius surrounding the project area
- Study period: March, 2023

Table 3.4 (i): Mode of data collection & parameters considered during the survey

Aspect	Data	Mode of data collection	Parameters monitored
	Primary data Collection	Field survey, Interview with client and local people	Floral, fauna

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Terrestrial Ecology	Secondary data collection	From authentic sources like, Published literature, Government Websites and Published Maps	Flora and Fauna diversity and study of vegetation, forest type, importance etc.
River Ecology	Secondary data collection	List of fish fauna obtained from Published literature on fish fauna of the Major River and their tributary Government Websites	Fish fauna

3.7.6 Flora of Core zone

A) Terrestrial Flora of Core zone (Natural vegetation etc.).

There is no flora found in the core zone

B) Agricultural Crops/ Commercial Crops of the Core zone and Buffer Zone

Details of the agricultural vegetation and commercial crops were collected from the site of the study area and the details are given below in the table 3.4 (ii).

Table 3.4 (ii) : List of Crops seasonally planted by respective farmers in the Core and Buffer Zone

S.No	Botanical Name	Local/Trade Name	Family Name
1	<i>Zey mays</i>	Makkha/Maize	Poaceae
2	<i>Triticum aestivum</i>	Wheat	
3	<i>Oryza sativa</i>	Paddy	
4	<i>Cicer arietinum</i>	Channa	Fabacea
5	<i>Coriander sativum</i>	Dhaniya	Apiaceae
6	<i>Abelmoschus esculentus</i>	Bhendi	Amaranthaceae
7	<i>Mamordica charanta</i>	Karela	Cucurbiataceae
8	<i>Capsicum annum</i>	Mirchi	Solanaceae
9	<i>Lycopersicon lycopersicum</i>	Tomato	
10	<i>Solanum melongena</i>	Brinjal	
11	<i>Capsicum annum</i>	Mirchi	
12	<i>Solanum tuberosum</i>	Potato	
13	<i>Allium cepa</i>	Onian	Amaryllidaceae
14	<i>Cajanus cajan</i>	Pigeon pea	Fabaceae

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15	<i>Carica papaya</i>	Papaya	Caricaceae
16	<i>Okra</i>	Ladyfinger/ Bhindi	Malvaceae
17	<i>Lagenaria siceraria</i>	Bottle gourd/ Lauki	Cucurbitaceae

3.7.7 Flora of Buffer zone

A) Terrestrial Flora of Buffer zone (Natural vegetation/Commercial vegetation).

During the present survey, total of 102 species of plant species were observed from the study area. Out of 103 plant species, 53 species of tree, 25 species of shrubs/herbs, 14 species of climbers, and 10 species of Grass species were recorded from the buffer zone of the present study area. The below-mentioned vegetation details have been collected from the Core as well as Buffer zone of the present study area. All the details have been furnished based on the field survey at 09 different locations and data supported by the Department of Forest, Gaya district of Bihar. The details of vegetation of the buffer zone is given in Table 3.4 (iii) below.

Table 3.4 (iii): List of Trees, Shrubs, Herbs and Grasses observed in Buffer Zone

Sr. No.	Botanical Name	Common name	Family
1	<i>Acacia auriculiformis</i>	Australian babul	Fabaceae
2	<i>Acacia leucophloea</i>	Safed babul	Mimosaceae
3	<i>Acacia nilotica</i>	Babool	Mimosaceae
4	<i>Acacia nilotica</i>	Desi babool	Fabaceae
5	<i>Aegle marmelos</i>	Bel	Rutaceae
6.	<i>Ailanthus excels</i>	Adusa	Simaroubaceae
7	<i>Albizzia amara</i>	Siris	Mimosoideae
8	<i>Albizzia lebbeck</i>	Sirish	Mimosaceae
9	<i>Alstonia scholaris</i>	Saptarni	Apocynaceae
10	<i>Anogeissus latifolia</i>	Dhaura,	Combretaceae
11	<i>Anthocephalus cadamba</i>	Kadamb	Rubiaceae
12	<i>Artocarpus heterophyllus</i>	Jack fruit	Moraceae
13	<i>Azadirachta indica</i>	Neem	Meliaceae
14	<i>Bambusa arundinacea</i>	Katang bamboo	Poaceae
15	<i>Bauhinia racemosa</i>	Apta	Leguminosae
16	<i>Bauhinia variegata L.</i>	Kachnar	Leguminosae

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17	<i>Bombax ceiba</i>	Semal	Malvaceae
18	<i>Bombax malabaricum</i>	Semal tree	Malvaceae
19	<i>Borassus flabellifer</i>	Nariyal	Palmae
20	<i>Butea monosperma</i>	Palas	Leguminosae
21	<i>Cassia fistula</i>	Bahawa	Caesalpinaceae
22	<i>Cassia siamea</i>	Chirkundi	Mimosaceae
23	<i>Dalbergia latifolia</i>	Shisam	Leguminosae
24	<i>Dalbergia sissoo</i>	Shisam	Leguminosae
25	<i>Delonix regia</i>	Gulmohar	Fabaceae
26	<i>Dendrocalamus strictus</i>	Bamboo	Poaceae
27	<i>Diospyros melanoxylon</i>	Tendu	Ebenaceae
28	<i>Diospyros melanoxylon</i>	Timru	Ebenaceae
29	<i>Eucalyptus globules</i>	Nilgiri	Myrtaceae
30	<i>Ficus benghalensis</i>	Vad	Moraceae
31	<i>Ficus benghalensis</i>	Bargad	Moraceae
32	<i>Ficus religiosa</i>	Pipal	Moraceae
33	<i>Madhuca longifolia</i>	Mohua tree	Sapotaceae
34	<i>Magnifera indica</i>	Aam	Anacardiaceae
35	<i>Melia azedarach</i>	Bukkam Neem	Meliaceae
36	<i>Moringa olerifera</i>	Munga	Moringanaceae
37	<i>Musa paradisiacal</i>	Banana	Musaceae
38	<i>Nerium oleamder</i>	Kaner	Apocynaceae
39	<i>Phoenix sylvestris</i>	Date palm	Arecaceae
40	<i>Phyllanthus emblica</i>	Awla	Euphorbiaceae
41	<i>Pisidium guava</i>	Guava	Myrtaceae
42	<i>Pongamia pinnata</i>	Karanj	Leguminosae
43	<i>Prosopis juliflora</i>	Vilayati babool	Fabaceae
44	<i>Pterocarpus marsupium</i>	Bija	Leguminosae
45	<i>Punica malus</i>	Anar	Lythraceae
46	<i>Sarracca indica</i>	Ashok	Annonaceae
47	<i>Shorea robusta</i>	Sal	Depterocarpaceae
48	<i>Syzygium cumini</i>	Jamun	Myrtaceae
49	<i>Tectona grandis</i>	Sagwan	Verbenaceae
50	<i>Terminalia arjuna</i>	Arjun	Combretaceae
51	<i>Terminalia chebula</i>	Harhar	Combretaceae

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52	<i>Zizyphus jujube</i>	Ber	Rhamnaceae
53	<i>Zyziphus mauritiana</i>	Ber	Rhamnaceae
Shrub & Herbs			
54	<i>Acanthospermum hispidum</i>	Kanti	Asteraceae
55	<i>Acheranthus aspera</i>	Aghada	Amaranthaceae
56	<i>Antigonum leptopus</i>	coral vine	Polygonaceae
57	<i>Argemone mexicana</i>	Pila dhtura	Papaveraceae
58	<i>Baugainvella glabra</i>	Paper flower	Nyctaginaceae
59	<i>Calotropis procera</i>	Aakra	Asclepiadaceae
60	<i>Cassia auriculata</i>	Tarwar	Fabaceae
61	<i>Cassia tora</i>	Tarota /Takla	Caesalpiniaceae
62	<i>Chenopodium album</i>	manure weed	Amaranthaceae
63	<i>cleome viscosa</i>	Pivali tilval	Cleomaceae
64	<i>Dalura metel</i>	Dhotra	Solanaceae
65	<i>Echinops echinatus</i>	Unthkantali	Asteraceae
66	<i>Ervatamia divaricata</i>	Chandani	Apocynaceae
67	<i>Euphorbia hirta</i>	Mothi dudhi	Evphorbiaceae
68	<i>Ipomoea carnea</i>	Besharam	Convolvulaceae
69	<i>Jatropha gossipifolia</i>	cotton-leaf	Euphorbiaceae
70	<i>Lantana camara</i>	Ghaneri	Verbenaceae
71	<i>Mimosa pudica</i>	Chui Mui	Mimosaceae
72	<i>Ocimum sanctum</i>	Tulsi	Labiatae
73	<i>Parthenium hysterophorus</i>	Gajar grass	Asteraceae
74	<i>Ricinus communis</i>	Arand	Euphorbiaceae
75	<i>Ricinus communis</i>	castor oil plant	Euphorbiaceae
76	<i>Solanum surattense</i>	Bhuiringani	Solanaceae
77	<i>Tridax procumbens</i>	Kambarmodi	Asteraceae
78	<i>Xanthium strumarium</i>	Chota Dhatura	Asteraceae
Grasses			
79	<i>Apluda mutica</i>	Mountain grass	Poaceae
80	<i>Apluda mutica</i>	Banjura grass	Poaceae
81	<i>Commelina benghalensis</i>	Bokna	Commelinaceae
82	<i>Cynodon dactylon</i>	Doob	Poaceae
83	<i>Cyperus rotundus</i>	Motha	cyperaceae

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84	<i>DactylSeptemnerenum aegyptium</i>	Crow foot grass	Poaceae
85	<i>Digitaria ternate</i>	--	Graminae
86	<i>Kyllinga tenuifolia</i>	--	Cyperaceae
87	<i>Pennisetum purpureum</i>	Elephant grass	Poaceae
88	<i>Saccharum spontaneum</i>	Kans	Poaceae
Climbers			
89	<i>Abrus precatorius</i>	Gunja	Fabaceae
90	<i>Antigonon leptopus</i>	Anantalata	Polygonaceae
90	<i>Bougainvillea glabra</i>	Booganbel	Nyctaginaceae
92	<i>Celastrus paniculata</i>	Kujari	Celastraceae
93	<i>Cissampelos pareira</i>	Khariya lata	Menispermaceae
94	<i>Clitoria ternatea</i>	Blue pea	Fabaceae
95	<i>Coccinia grandis</i>	Jungli Kundru	Cucurbitaceae
96	<i>Combretum indicum</i>	Madhu Malati	Combretaceae
97	<i>Cuscuta reflexa</i>	Amarbel	Convolvulaceae
98	<i>Cuscuta reflexa</i>	Amar bel	Convolvulaceae
99	<i>Hemidesmus indicus</i>	Anantamul	Apocynaceae
100	<i>Ipomoea cairica</i>	Neeli Bel	Convolvulaceae
101	<i>Tilospora cordifolia</i>	Giloy	Menispermaceae
102	<i>Zizyphus oenoplia</i>	Makor	Rhamnaceae

3.7.8 Fauna of the Study Area

Proposed alignment passing through the rural and purely in the agricultural field. At some places, it will cross from adjacent to some villages in the study area. The study area is devoid of any natural forest, so, major wildlife animals are rarely found in the area. Only some moving animals were observed. Domesticated animals mainly constitute the faunal population within the project area. The assessment of fauna was done on the bases of secondary data collected from different government offices like the forest department, wildlife department, etc. The presence of wildlife was also confirmed by the local inhabitants depending on the animal sightings and the frequency of their visits in the project area.

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During the present study period, a large number of local birds are noticed in the buffer zone of the study area. But, there are no bird habitats like nesting, breeding, and foraging patterns are noticed in the core zone.

3.7.9 Fauna of the Core Zone

A) Terrestrial fauna of core zone (Mammals/Reptiles/amphibians/birds/insects etc.).

The domesticated animals like Goat (*Capra aegagrus*); Buffalo (*Bubalus bubalis*); Cow (*Bos primigenius*); Horse (*Equus caballus*); Ass (*Equus hemionus*) and Dog (*Canis lupus familiaris*) were observed moving in different parts of the study area (including core and buffer zone), especially nearby town and villages. Mammals & other faunal species found in the study area are listed in Table 3.4 (iv).

Table 3.4 (iv): List of Mammals/Reptiles/Amphibians/Birds recorded from the Core Zone

S. No.	Common Name	Scientific Name	Family	Schedule status (as per WPA-1972)	IUCN status
Mammals					
1.	Five striped palm squirrel	<i>Funambulus pennanti</i>	Sciuridae	IV	LC
2.	Indian Fulvous Fruit-Bat	<i>Rousettus leschenaultia</i>	Pteropodidae	V	LC
3.	Indian Field Mouse	<i>Mus booduga</i>	Muridae	V	LC
4.	Common House Rat	<i>Rattus rattus</i>	Muridae	V	LC
5.	Bandicoot Rat	<i>Bandicota bengalensis</i>	Muridae	V	LC
Reptiles & Amphibians					
6.	Garden lizard	<i>Calotes versicolor</i>	Agamidae	IV	LC
7.	Common skink	<i>Eutropis carinata</i>	Scincidae	IV	LC
IUCN Status =LC: Least Concern					

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Bird Species					
1	<i>Acridotheres tristis</i>	Myna	Sturnidae	IV	LC
2	<i>Acridotheres tristis</i>	Common myna	Sturnidae	IV	LC
3	<i>Amandava amandava</i>	Red munia	Estrildidae	IV	LC
4	<i>Ardea cinerea</i>	Grey heron	Ardeidae	IV	LC
5	<i>Ardeola grayii</i>	Indian pond heron	Ardeidae	IV	LC
6	<i>Bubulcus ibis</i>	Cattle egret	Ardeidae	IV	LC
7	<i>Columba livia</i>	Pigeon	Columbidae	IV	LC
8	<i>Corvus macrorhynchos</i>	Jungle crow	Corvidae	IV	LC
9	<i>Corvus splendens</i>	Crow	Corvidae	V	LC
10	<i>Dicrurus adsimilis</i>	Black drongo	Dicruridae	IV	LC
11	<i>Gallinule chloropus</i>	Common moorhen	Rallidae	IV	LC
12	<i>Milvus migrans</i>	Black Kite	Accipitridae	IV	LC
13	<i>Passer domesticus</i>	House sparrow	Passeridae	IV	LC
14	<i>Phalacrocorax niger</i>	Little cormorant	Phalacrocoracidae	IV	LC
15	<i>Pycnonotus cafer</i>	Red-vented bulbul	Pycnonotidae	IV	LC
16	<i>Saxicoloides fulicatus</i>	Indian robin	Psittaculidae	IV	LC
17	<i>Turdoides caudate</i>	Common babbler	Leiothrichidae	IV	LC
18	<i>Upupa epops</i>	Common hoopoe	Upupidae	IV	LC
19	<i>Vanellus indicus</i>	Red-wattled lapwing	Charadriidae	IV	LC
IUCN Status =LC: Least Concern, NE: Not Evaluated.					

Table 3.4 (v): Butterflies observed in the Core zone

S. No.	Common Name	Scientific Name	Family	IUCN Status
1.	Plain Tiger	<i>Danaus chrysippus</i>	Nymphalidae	LC
2.	Common emigrant	<i>Catopsilia pomona</i>	Pieridae	LC
3.	Common crow	<i>Euploea core</i>	Nymphalidae	LC
4.	Small grass yellow	<i>Eurema brigitta</i>	Pieridae	LC

3.7.10 Fauna of Buffer zone

To prepare a detailed report on the status of faunal biodiversity of the present study area (10 km buffer) of Gaya district of Bihar and to assess the impacts due to digging/ leveling of alignment route/ construction of bridge/ operational activity which evolves suitable mitigation measures to protect & conserve biodiversity following components were studied: terrestrial biodiversity,

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wildlife survey (diversity), habitat study (feeding, breeding, roosting areas), distribution of birds, rare & endangered species of the study area.

The fauna of the study area vary upon the local topography and different types of habitats. Terrestrial Fauna of Buffer zone (Mammals/Reptiles/Amphibians/Birds/ Insects etc.)

The major part of the study area lies under agricultural fields and barren land which restricts the wildlife habitat significantly. There is neither any wildlife sensitive area nor any corridor for the movement of wildlife in the study area. A list of the animals of the study area has been prepared on the basis of the survey and also inquire from the local people. The animals, thus recorded were cross-checked with Wildlife (Protection) Act, 1972 for their schedule status. Faunal details of the study area are given in Tables below.

i. Mammals and Reptiles/ Amphibians

The domesticated animals like Goat (*Capra aegagrus*); Buffalo (*Bubalus bubalis*); Cow (*Bos primigenius*); Horse (*Equus caballus*); Ass (*Equus hemionus*) and Dog (*Canis lupus familiaris*) were observed moving in different parts of the study area, especially nearby town and villages. Other mammals and reptiles found in the study area are listed in table 3.4 (vi).

Table 3.4 (vi): List Mammals, Reptiles and Amphibians recorded from the Buffer Zone

S. No.	Common Name	Scientific Name	Family	Status as per WPA- 1972	IUCN status
Mammals					
1	<i>Bandicota bengalensis</i>	Bandicoot Rat	Sciuridae	IV	LC
2	<i>Canis auris</i>	Jackal	Pteropodidae	V	LC
3	<i>Fellis chaus</i>	Jungle cat	Soricidae	II	LC
4	<i>Funambulus palmarum</i>	Three-striped Squirrel	Suidae	III	LC
5	<i>Funambulus pennanti</i>	Five striped palm squirrel	Hyaenidae	IV	LC
6	<i>Herpestes edwardsi</i>	Indian Grey Mongoose	Canidae	II	LC
7	<i>Hyaena hyaena</i>	Stripped hyena	Leporidae	V	LC
8	<i>Lepus nigricollis</i>	Indian Hare	Canidae	II	LC
9	<i>Mus booduga</i>	Indian Field Mouse	Sciuridae	IV	LC
10	<i>Presbytis entellus</i>	Common langur	Cercopithecidae	II	LC

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11	<i>Pteropus giganteus</i>	Indian Flying Fox	Pteropodidae	V	LC
12	<i>Rattus rattus</i>	Common House Rat	Muridae	V	LC
13	<i>Rousettus leschenaultia</i>	Indian Fulvous Fruit- Bat	Muridae	V	LC
14	<i>Suncus murinus</i>	Grey musk Shrew	Muridae	V	LC
15	<i>Sus scrofa</i>	Wild Boar	Canidae	III	LC
16	<i>Vulpes bengalensis</i>	Indian fox	Felidae	II	LC
Reptiles and Amphibians					
1	<i>Bufo melanostictus</i>	Common toad	Bufonidae	IV	LC
2	<i>Bungarus caeruleus</i>	Krait	Elapidae	IV	NE
3	<i>Calotes versicolor</i>	Garden lizard	Agamidae	IV	NE
4	<i>Crotalus sp.</i>	Pit viper	Viperidae	II	LC
5	<i>Enhydryis enhydryis</i>	Smooth water Snake	Homalopsidae	IV	LC
6	<i>Euphlyctis hexadactyla</i>	Common frog	Dicroglossidae	IV	LC
7	<i>Eutropis carinata</i>	Common skink	Scincidae	IV	LC
8	Hemidactylus Flaviviridis	House Gecko	Gekkonidae	--	NE
9	<i>Naja naja</i>	Cobra	Elapidae	II	LC
10	<i>Ophiophagus hannah</i>	King cobra	Elapidae	II	LC
11	<i>Ptyas mucosa</i>	Rat Snake	Colubridae	II	NE
12	<i>Rana temporaria</i>	Common frog	Ranidae	IV	LC
13	<i>Testudo graeca</i>	Common Tortoise	Testudinidae	IV	VU
14	<i>Varanus sp.</i>	Monitor lizard	Varanidae	II	LC
IUCN Status =LC: Least Concern, VU: Vulnerable. NT: Near Threatened, NE: Not Evaluated,					

ii. Avian Fauna

Table 3.4 (vii) : Avian Fauna observed from the study area (10 KM Buffer area)

S.No	Scientific Name	Common Name	Family	Schedule Status (WPA-1972)	IUCN Status
1	<i>Acridotheres tristis</i>	Myna	Sturnidae	IV	LC
2	<i>Acridotheres tristis</i>	Common myna	Sturnidae	IV	LC
3	<i>Alcedo atthis</i>	Small blue kingfisher	Alcedinidae	IV	LC
4	<i>Amandava amandava</i>	Red munia	Estrildidae	IV	LC

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5	<i>Amaurornis phoenicurus</i>	White-breasted waterhen	Rallidae	IV	LC
6	<i>Ardea cinerea</i>	Grey heron	Ardeidae	IV	LC
7	<i>Ardea purpurea</i>	Purple heron	Ardeidae	IV	LC
8	<i>Ardeola grayii</i>	Indian pond heron	Ardeidae	IV	LC
9	<i>Athene brama</i>	Spotted Owlet	Strigidae	IV	LC
10	<i>Bubulcus ibis</i>	Cattle egret	Ardeidae	IV	LC
11	<i>Butorides striatus</i>	Striated heron	Ardeidae	IV	LC
12	<i>Casmerodius albus</i>	Great egret	Ardeidae	IV	LC
13	<i>Centropus sinensis</i>	Crow pheasant	Cuculidae	IV	LC
14	<i>Ceryle rudis</i>	Pied kingfisher	Alcedinidae	IV	LC
15	<i>Charadrius dubius</i>	Little ringed plover	Charadriidae	IV	LC
16	<i>Ciconia episcopus</i>	White-necked stork	Ciconidae	IV	NT
17	<i>Cinnyris asiaticus</i>	Purple Sunbird	Psittaculidae	IV	LC
18	<i>Columba livia</i>	Pigeon	Columbidae	IV	LC
19	<i>Corvus macrorhynchos</i>	Jungle crow	Corvidae	IV	LC
20	<i>Corvus splendens</i>	Crow	Corvidae	V	LC
21	<i>Dendrocygna icolour</i>	Fulvous whistling duck	Anatidae	IV	LC
22	<i>Dicrurus adsimilis</i>	Black drango	Dicruridae	IV	LC
23	<i>Egretta alba</i>	Larger egret	Ardeidae	IV	LC
24	<i>Egretta garzetta</i>	Little egret	Ardeidae	IV	LC
25	<i>Francolinus pondicerianus</i>	Titar	Phasianidae	IV	LC
26	<i>Gallinule chloropus</i>	Common moorhen	Rallidae	IV	LC
27	<i>Gallus gallus</i>	Jungle hen	Phasianidae	IV	LC
28	<i>Halcyon smymensis</i>	White-throated kingfisher	Alcedinidae	IV	LC
29	<i>Milvus migrans</i>	Black Kite	Accipitridae	IV	LC
30	<i>Nycticorax nycticorax</i>	Black-crowned night heron	Ardeidae	IV	LC
31	<i>Passer domesticus</i>	House sparrow	Passeridae	IV	LC
32	<i>Pelecanus onocrotalus</i>	Great white pelican	Pelecanidae	IV	LC
33	<i>Phalacrocorax carbo</i>	Great cormorant	Phalacrocoracidae	IV	LC
34	<i>Phalacrocorax niger</i>	Little cormorant	Phalacrocoracidae	IV	LC
35	<i>Pluvialis fulva</i>	Pacific golden plover	Charadriidae	IV	LC
36	<i>Pseudibis papillosa</i>	Red-naped ibis	Threskiornithidae	IV	LC
37	<i>Psittacula krameri</i>	Rose ringed Parakeet	Psittacidae	IV	LC

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38	<i>Pycnonotus cafer</i>	Red-vented bulbul	Pycnonotidae	IV	LC
39	<i>Sarkidiornis melanotos</i>	Knob-billed duck	Anatidae	IV	LC
40	<i>Saxicoloides fulicatus</i>	Indian robin	Psittaculidae	IV	LC
41	<i>Spilopelia senegalensis</i>	Little brown dove	Columbidae	IV	LC
42	<i>Sturnia pagodarum</i>	Brahminy Starling	Sturnidae	IV	LC
43	<i>Sturnus contra</i>	Asian pied starling	Sturnidae	IV	LC
44	<i>Tachybaptus ruficollis</i>	Little grebe	Podicipitidae	IV	LC
45	<i>Tadorna ferruginea</i>	Ruddy shelduck	Anatidae	IV	LC
5	<i>Tringa tetanus</i>	Common redshank	Charadriidae	IV	LC
46	<i>Turdoides caudate</i>	Common babbler	Leiothrichidae	IV	LC
47	<i>Upupa epops</i>	Common hoopoe	Upupidae	IV	LC
48	<i>Vanellus indicus</i>	Red-wattled lapwing	Charadriidae	IV	LC
IUCN Status =LC: Least Concern, VU: Vulnerable.					

iii. Butter Flies

Table 3.4 (viii) : Butterflies observed from the Buffer zone of the study area

S.No.	Scientific Name	Common Name	Family	IUCN Status
1	<i>Catopsilia pomona</i>	Common emigrant	Pieridae	LC
2	<i>Chlosyne lacinia</i>	Sunflower/Bordered Patch	Nymphalidae	LC
3	<i>Crocothemis erythraea</i>	Scarlet dragonfly	Libellulidae	LC
4	<i>Danaus chrysippus</i>	Plain Tiger	Nymphalidae	LC
5	<i>Danaus genutia</i>	Stripped Tiger	Nymphalidae	LC
6	<i>Euploea core</i>	Common crow	Nymphalidae	LC
7	<i>Eurema brigitta</i>	Small grass yellow	Pieridae	LC
8	<i>Tirumala limniace</i>	Blue tiger	Nymphalidae	LC

3.7.11 Aquatic Fauna of Buffer zone

The study area of the present Project development project has several lentic and lotic water bodies in which few are perennial and most of the water bodies are seasonal or monsoon fed. Morhar River is a major lotic system in the study area. Some private ponds are also present in the study area which are mainly used for the culture of fishes. All these water bodies support fish species. Fishes found in the study area are listed in Table

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Table 3.4 (ix): Fish Fauna found in different seasonal and perennial water bodies in the study area

S.No.	Scientific Name	Family Name	IUCN Status	Schedule Status in WPA (1972)
1	<i>Catla catla</i>	Cyprinidae	LC	NA
2	<i>Channa stiatu</i>	Chandadae	LC	NA
3	<i>Channa punctatus</i>	Chandadae	LC	NA
4	<i>Labeo bata</i>	Cyprinidae	LC	NA
5	<i>Labeo rohita</i>	Cyprinidae	LC	NA
6	<i>Macrobrachium Malcomsoni</i>	Palaemonidae	LC	NA
7	<i>Mystus bleekeri</i>	Bagridae	LC	NA
8	<i>Mystus tengara</i>	Bagridae	LC	NA
9	<i>Puntius sarana</i>	Cyprinidae	LC	NA
10	<i>Puntius sophore</i>	Cyprinidae	LC	NA
11	<i>Puntius stigma</i>	Cyprinidae	LC	NA
12	<i>Puntius ticto</i>	Cyprinidae	LC	NA
13	<i>Xenentodon cancila</i>	Belonidae	LC	NA
14	<i>Pangasius Buchanani</i>	Pangasiidae	LC	NA

3.7.12 Observations of Present Study (Flora & Fauna)

Flora

Most of the parts of the present study area (Gaya district) are agricultural fields, village land. The forest of the district comprises tropical deciduous vegetation due to high temperature and humidity. No any rare, endangered and threatened floral species have been observed from the core and buffer zone of the present study.

Fauna

There are no National parks, Sanctuaries, Biosphere Reserves, Wildlife corridors, Tiger/Elephant reserves (existing as well as proposed), within 10 km buffer area of the project area. No endangered and threatened faunal species were observed from the core zone. However, care will be taken during the developmental activities if found any. On the other hand, in the buffer zone there is no Schedule-I fauna was recorded as per the Wildlife (Protection) Act, 1972. 11 species are Scheduled

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in II in WPA, 1972. One species i.e. Common Tortoise listed under IUCN list of vulnerable species is also reported from buffer zone.

3.8 SOCIAL IMPACT ASSESSMENT, REHABILITATION & RESETTLEMENT (R&R) ACTION PLAN

There will be no resettlement or rehabilitation involved in the project being on meandering course of the river. However, a detailed Socio Economic Assessment has been performed, which is given below:

Introduction

In this section of the report an attempt has been made to measure Socio-economic impact of the proposed river bed mining project on river Morhar at located Village/Mauja – Baiju Bigha, Bilauti, Dhibra G.P, Phulsathar, Tanrwa Tehsil/Anchal- Gurua District- Gaya, State-Bihar. The various attributes that have been taken into account are population composition, employment generation, occupational shift, household income, consumption pattern, ethnic issue and law & order problem. The key objective of the study is to assess possible impact of the project on socio-economic life of the people in the neighborhood known as study area.

The objectives of the socio-economic impact assessment are as follows:

- a) To collect baseline data of the study area.
- b) To know the socio-economic status of the people living in the study area of the proposed mining project.
- c) To assess the possible impact of the project on socio-economic aspects in the study area.
- d) To measure the impact of the project on Quality of life of the people in the study area.

Approach & Methodology

- a) A mixture of both quantitative and qualitative approach has been adopted in the current socio-economic study.
- b) The study has been conducted based on primary and secondary data. While primary data has been collected through a sample survey of selected households in the study area, the secondary data has been collected from the administrative records of the Government of Bihar, Census 2011, district hand books and from the Bihar Government portal.

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- c) The details regarding population composition, number of literates, workers, etc have been collected from secondary sources and analyzed. Also village/city/town wise details regarding amenities available in the study area have been collected from secondary sources like Census 2011, and analyzed.
- d) Two stage sampling design has been adopted to select the sampling units. The first stage units are census villages in the rural areas and towns/cities in urban areas. The ultimate stage units are households in the selected villages and towns/cities. Probability sampling has been adopted to select the sampling units.
- e) Estimation of various parameters has been made based on sample data and bottom top approach has been adopted.
- f) On the basis of a preliminary reconnaissance survey, two questionnaires were developed to make it suitable to fulfill the objectives of the study. The questionnaires contained both open ended and close ended questions
- g) The data collected during the above survey was analyzed to evaluate the prevailing socio-economic profile of the area.
- h) Based on the above data, impacts due to mining operation on the community have been assessed and recommendations for improvement have been made.

Concept & Definition of Terms Used

- a) **Study Area:** The study area, also known as impact area has been defined as the sum total of core area and buffer area with a radius of 10 Kilometers from the periphery of the project site. The study area includes all the land marks both natural and manmade, falling therein.
- b) **QoL:** The Quality of Life (QoL) refers to degree to which a person enjoys the important possibilities of his/her life. The 'Possibilities' result from the opportunities and limitations, each person has in his/her life and reflect the interaction of personal and environmental factors. Enjoyment has two components: the experience of satisfaction and the possession or achievement of some characteristic.
- c) **Household:** A group of persons who normally live together and take their meals from a common kitchen are called a household. Persons living in a household may be related or unrelated or a mix of both. However, if a group of related or unrelated persons live in a house but do not take their meals from the common kitchen, then they are not part of a common household. Each such person

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is treated as a separate household. There may be one member households, two member households or multi-member households.

- d) **Sex Ratio:** Sex ratio is the ratio of females to males in a given population. It is expressed as 'number of females per 1000 males'.
- e) **Literates:** All persons aged 7 years and above who can both read and write with understanding in any language are taken as literate. It is not necessary for a person to have received any formal education or passed any minimum educational standard for being treated as literate. People who are blind but can read in Braille are also treated as literates.
- f) **Literacy Rate:** Literacy rate of population is defined as the percentage of literates to the total population aged 7 years and above.
- g) **Labour Force:** The labour force is the number of people employed and unemployed in a geographical entity. The size of the labour force is the sum total of persons employed and unemployed. An unemployed person is defined as a person not employed but actively seeking work. Normally, the labour force of a country consists of everyone of working age (commencing from 14 to 16 years) and below retirement (around 65 years) that are participating workers, that is people actively employed or seeking employment. People not counted under labour force are students, retired persons, and stay-at home people, people in prisons, permanently disabled persons and discouraged workers.
- h) **Work:** Work is defined as participation in any economically productive activity with or without compensation, wages or profit. Such participation may be physical and/or mental in nature. Work involves not only actual work but also includes effective supervision and direction of work. The work may be part time or full time or unpaid work in a farm, family enterprise or in any other economic activity.
- i) **Worker:** All persons engaged in 'work' are defined as workers. Persons who are engaged in cultivation of land or milk production even solely for domestic consumption are also treated as workers.
- j) **Main Workers:** Those workers who had worked for the major part of the reference period (i.e. 6 months or more in the case of a year) are termed as Main Workers.
- k) **Marginal Workers:** Those workers who did not work for the major part of the reference period (i.e. less than 6 months) are termed as Marginal Workers.

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- 1) **Work participation rate:** The work participation rate is the ratio between the labour force and the overall size of their cohort (national population of the same age range). In the present study the work participation rate is defined as the percentage of total workers (main and marginal) to total population.

Findings of the Study

Study Area

The field investigation has revealed that the entire study area of the proposed mining project is located Village/Mauja – Baiju Bigha, Bilauti, Dhibra G.P, Phulsathar, Tanrwa Tehsil/Anchal- Gurua District- Gaya, State-Bihar.

Table 3.5 (i) Demographic Particulars of the Buffer area (10km)

Description	Number	%
Total Population	62743	100
Males	32124	51.2
Females	30619	48.8
Sex ratio (No. of females per 1000 males)	953	
Total Literates	35136	100
Male	24068	68.5
Female	11068	31.5
Total Literacy Rate	56	
Male	74.92	
Female	36.14	
Gender gap in literacy rate	38.78	
Total Workers	25680	100
Male	17508	61.18
Female	8172	38.82
Total Main Workers	18356	100
Male	14258	77.68
Female	4098	22.32
Total Marginal Workers	7324	100
Male	2835	38.71
Female	4489	61.29
Total Agricultural Workers	16234	100
Cultivators	16317	63.54
Agricultural Labours	9362	36.46

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Male workers in total agricultural workers	5453	58.25
Female workers in total agricultural workers	3909	41.75
Total Household Industrial Workers	1256	100
Male	650	51.79
Female	606	48.21
Total Other Workers	2058	100
Male	1636	79.52
Female	422	20.48

DEMOGRAPHIC COMPOSITION

Population

According to Census 2011, the total population of the study area is 62743. As there is no urban area the entire population belongs to rural area. The overall sex ratio has been worked out to 953 females per 1000 males, which is higher than the national average of 943 females per 1000 males. Furthermore, around 10.81 percent of the total population belongs to Schedule Caste community and the Schedule Tribe population in the study area is very negligible as per Census 2011.

Number of households and household size

The entire population of the study area has been grouped into 8963 households and the average household size is 7. The household size varies between 5 and 8.

Literacy and Literacy rate

The total number of literates in the study area has been worked out around 56 percent of the total population. The literacy rate of male has been worked out to 74.92 percent as against 36.14 percent for female, creating a gender gap of 38.78 percent.

Workers and work participation rate

The total number of workers in the study area is 25680, which is 40.92 percent of the total population. Among the total workers 71.4 percent are main workers and the remaining percent are marginal workers. The percentage of male in the main workers is 61.18%, while it is only 38.71percent in the case of marginal workers. On the other hand, the percentage share of female in

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the main workers is only 38.82percent. This indicates that male dominates the both main workers and the marginal workers.

POSSIBLE IMPACT ASSESSMENT

Impact on population composition

The impact of the proposed mining project on population composition will be marginal as only few skilled and managerial staff will be recruited from outside and the rest will be recruited locally. The impact will be significant if a large number of people from outside get employed in the proposed project.

In that case not only the population of the study area will go up but also the skewed sex ratio may make permanent social effects like rise in exploitation of women, higher crime rate, increase in sexual diseases and depression among youth.

Impact on employment generation

The proposed sand mining project is expected to provide employment opportunities to 32 persons Skilled & Semi-Skilled/ Unskilled workers. It is understood that all the persons to be deployed for various mining activities will be recruited locally and there is very little scope for migration of people from outside the study area. The employment potentiality of the project is expected to ameliorate the economic condition of the families of those persons who will get employed in the proposed mining project. However, the mining project will provide seasonal employment. Further, the project will provide indirect employment to about 32 people who will be involved in segregation of extracted mining materials, crushing of boulders, petty business and service oriented industries.

Impact on Health

Extraction of sand, boulder and *bazri* from the river bed poses serious health risks due to dust, quarrying and stone crushing. The effects will vary depending upon the nature of the dust particles, silica content in it and the size of the particles. Pneumoconiosis is an occupational lung disease often caused to miners, due to the inhalation of dust. Silica content in the sand may also lead to Silicosis, which is again an occupational lung disease. Miners may also suffer with occupational respiratory ailments, skin allergies etc, but the same are preventable if exposure is minimized. Further, regular health check-up of the miners is required to prevent any negative impact on their

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health. In the present mining project, no adverse impact on health is expected if minimum precautions are taken by the miners.

Impact on income

In India poverty is widespread. According to an estimate made by World Bank during 2005, 26 percent of the total Indian population falls below the International poverty Line of US\$ 1.25 a day (PPP, in nominal terms ₹ 21.6 a day in urban areas and ₹ 14.3 in rural areas). Bihar is one of the worst poverty ridden states in India, with per capita income of Rs. 26,051. The proposed mining project at Village/Mauja- Baiju Bigha, Bilauti, Dhibra G.P, Phulsathar, Tanrwa, is expected to provide casual employment to 32 semi-skilled/ unskilled workers and skilled workers for a period of 260 days in a year. According to Department of labour, Government of Bihar each unskilled worker is eligible to get a minimum basic wage of Rs. 300 per day. In addition they will get V.D.A amounting to Rs. 65.50 per day. Thus the total amount an unskilled worker is expected to get is Rs 365.50 per day. Further, a semi-skilled worker will get a basic wage of Rs 345 and V.D.A amounting to Rs.112.69 making the total amount of Rs. 457.69 per day. Lastly, a skilled worker can expect to get a minimum wage of Rs. 475.24 and V.D.A amounting to Rs. 124.76 making the total amount of Rs. 600 per day. The impact of the proposed mining activity on household income in the study area is thus positive since it will provide employment to local people, which will result to an increase in household income of those workers who will be recruited for mining operation. However, this impact will be effective for a period of 260 days in a year.

Impact on consumption pattern

The field survey has revealed that people in the study are poverty ridden. Increased household income may slightly change the consumption pattern of few but majority of the people will continue to be burdened with poverty.

Impact on road development

Movement of trucks and other vehicles to and fro the quarry is expected to increase substantially, when mining will start. The existing roads connecting the quarry with the national and state highways are mostly narrow mud roads. There will be mud slide and traffic bottle neck if these roads are not widened and their conditions are not improved by making them paved roads. Hence, there is ample scope for road development in and around the mining areas.

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Impact on law & Order

As local people will be employed to run the quarry, no law & order problem is envisaged. It is expected that the workers will attend to their duties from their residence and return to their homes after the day's work is over. There would have been law & order problem if the workers were migrants and lived in shanties closed to the mining area. However, to meet any untoward incident one police post may be set up closed to the project area.

Public Perception about the Project

Visit to project village has revealed that no villager was opposed to the proposed river bed mining project. They whole heartedly welcomed it as they were disgusted with perennial poverty. They hoped that the upcoming mining project will definitely increase their income which in turn will increase their purchasing power. They however, demanded that the beneficiaries should be selected from those who belong to BPL category and registered under SGSY scheme.

The villagers living in the distant villages located within the study area were found either not aware or partially aware of the upcoming mining project and they did not make any comment about its utility. They however demanded that labour intensive projects should be implemented in their villages, to fight poverty.

Suggestions

Provision of First Aid at mining site

Extraction of sand from the river bed poses serious health risks due to dust, quarrying. The effects vary depending on the nature of the dust particles, silica content in it and the size of the particle. To meet any emergency during extraction of the minerals from the river bed and subsequent loading in the transport vehicles, provision for First Aid should be made by the project proponent. Before the affected person is removed to a doctor or health institution for necessary medical aid, the miner should be provided with First Aid.

Tie up with the nearest PHC for medical help

To meet the medical needs of the mine workers it is suggested that tie-ups with nearest hospital or Primary Health Center (PHC) may be made. Few beds may be exclusively reserved for the mine workers in the above health institutions. This will ensure timely medical aid to the affected persons.

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Supply of Mask, Gloves and Helmets

The mine workers are subject to respiratory diseases, muscular-skeletal and gastro-intestinal disorders and skin diseases. For protection from dust it may be made compulsory for all mine workers to wear masks and gloves while working in the mines. Further, wearing of helmets will be encouraged while loading and unloading minerals in the trucks in order to avoid impending danger.

Regular health checkups

The miners may be encouraged to undergo health checkups at regular intervals in order to protect themselves from various diseases. The health Department of Bihar Government must Organize Health Camps at regular intervals preferably in every quarter. Further, free medical facilities may be made available to the workers and their family members.

Special telephone number

A special telephone number may be made available to the mine workers. In case of emergency the miners can dial the above number for medical assistance. Vehicle may be provided to the patients in short duration for shifting to the health institution.

Special Group Insurance Scheme

All the mine workers may be covered under a Group Insurance Scheme of LIC or any other Insurance company, if not so far.

Distribution of Blankets and Quilts

During winter season the mine workers may be distributed blankets and quilts free of cost.

Conclusion

The implementation of the Sand Mining Project on river Morhar in district Gaya will throw opportunities to local people for both direct and indirect employment. Since the quarries will be leased out to successful allottees, sand mining operation in the state will get legalized and it will fetch income to the state exchequer. It will also reduce flooding of river banks, destruction of standing crops, land and property to a great extent. The project will also provide impetus to industrialization of the area. Where transfer of Sand is necessary crushing units will come up. It is likely the intending entrepreneurs will venture to set up micro and small scale units in the near future making the area a mixed society, dependent on industry, trade and business. At present

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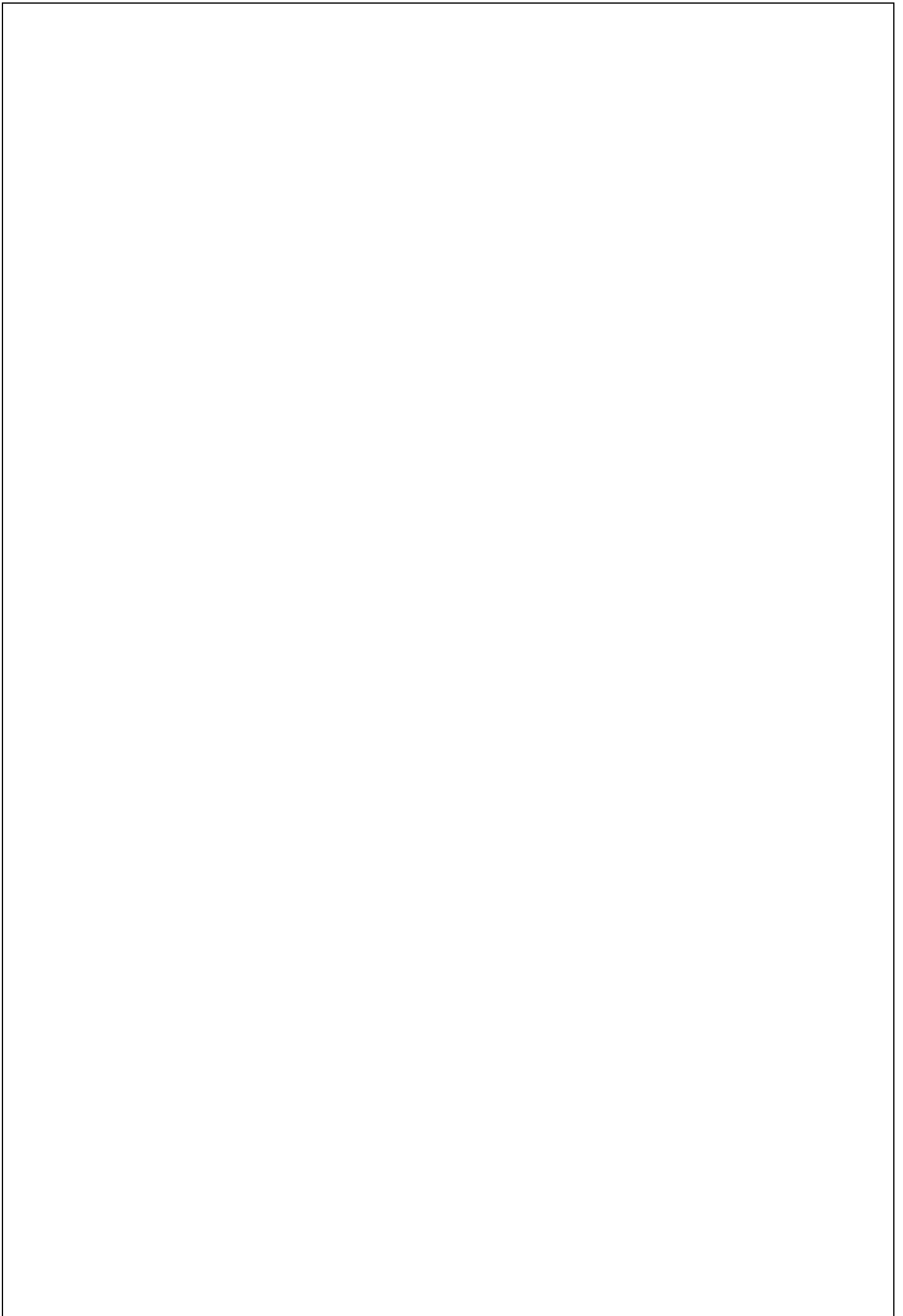
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agriculture is the main occupation of the people as 87 percent of the population depends on it. With the implementation of the proposed mining project the occupational pattern of the people in the area will change making more people engaged in industrial and business activities rather in agriculture. Thus there will be a gradual shifting of population from agriculture to mining and industry. Further, the mining and industrial activities in the area may lead to rapid increase in population and thereby urbanization. Due to urbanization of the area, employment opportunities will further increase.

The study area is still lacking in education, health, housing, water, electricity etc. It is expected that same will improve to a great extent due to proposed mining project and associated industrial and business activities. It is therefore suggested that extraction of minerals should be taken up on regular basis during the post monsoon period. This will dredge the river bed on regular basis, regulate the course of the river and check flooding of the catchment area.

Proposed activities and expenses on Corporate Environmental Responsibility will be as per CER Mandate of the Government.



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**DEIA CHAPTER IV –
 ANTICIPATED ENVIRONMENTAL IMPACT
 AND MITIGATION MEASURES**

**CHAPTER-IV
 ANTICIPATED ENVIRONMENTAL IMPACT AND MITIGATION MEASURES INDEX**

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4.0 GENERAL

Sand have long been used as aggregate for construction of roads and building. Today, the demand for these materials continues to rise day by day. In recent years, rapid development has led to an increased demand for river sand as a source of construction material. It is recommended to remove the sand deposition on the regular basis otherwise the river will raise the height and may pose threats of inundation of unaffected areas. Besides this, the deposited mineral is a constant source of revenue generation to the state government and ensures the constant supply of this building material.

All development projects have an impact on the natural set up of the environment. This impact may be beneficial or adverse, depending on the improvement or the deterioration it brings about in the status of air, water, land, ecology, natural systems, socio-cultural life styles and economics of the population. Depending on the nature of activities and baseline environment 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 countering or minimizing the impacts.

Keeping in mind, the environmental baseline scenario as detailed in Section III and the proposed mining activity described in Section II, it is attempted to assess the likely impact and its extent on various environmental parameters and likely mitigation measures to be adopted. This Chapter provides a brief overview of the potential impacts on various environmental components due to the proposed opencast mining activities. The opencast mining operations in general cause environmental degradation and if adequate control measures are not taken to prevent/mitigate the adverse environmental impacts, these operations may cause irreversible damage to the eco- system.

Any human activity in any environment produces impact, modifying it to status which is considered adverse or beneficial according to damage or improvement it brings about in physical, chemical & biological status, the impacts are assessed for their importance. On the basis of impact analysis, the mitigation action is focused in the environmental management plan for counting or minimizing adverse impacts. Effects of this mining project on each of the environmental parameters are detailed below in accordance with the parameters of environment likely to be affected- Climate, Air environment, Land environment, Ecology, Water requirement, Noise levels, Soil, Socio-economic environment, Cultural & Heritage environment. Centrally the environment impacts can be categorized as either primary or secondary. Primary impacts are those which can be attributed directly to the projects. On the indirectly

or induced typically include the associated investments & change patterns if social & economic by the proposed actions.

IMPACT OF SANDMINING

Impacts of sand mining can be broadly classified as given below:

Physical

The large-scale extraction of streambed materials, mining below the existing stream bed and the alteration of channel-bed form and shape lead to several impacts such as erosion of channel bed and banks, increase in channel slope, and change in channel morphology. These impacts may cause: (1) the undercutting and collapse of river banks, (2) the loss of adjacent land and/or structures, (3) upstream erosion as a result of an increase in channel slope and changes in flow velocity, and (4) downstream erosion due to increased carrying capacity of the stream, downstream changes in patterns of deposition, and changes in channel bed and habitat type.

Mitigation measures

- Sand mining will be restricted up to ~3.0 m below river bed / water table whichever less.
- The mining will be done in unsaturated zone. Thus minimum loss to habitat.
- Dredging will not be allowed.

Sand Budget

Determining the sand budget for a particular stream reach requires site-specific topographic, hydrologic, and hydraulic information. This information is used to determine the amount of sand that can be removed from the area without causing undue erosion or degradation, either at the site or at a nearby location, upstream or downstream.

In-channel or near-channel sand mining changes the sediment budget, and may result in substantial changes in the channel hydraulics. These interventions can have variable effects on aquatic habitat, depending on the magnitude and frequency of the disturbance, mining methods, particle-size characteristics of the sediment, the characteristics of riparian vegetation, and the magnitude and frequency of hydrologic events following the disturbance.

Temporal and spatial responses of alluvial river systems are a function of geomorphic thresholds, feedbacks, lags, upstream or downstream transmission of disturbances, and geologic/physiographic

controls. Minimization of the negative effects of sand mining requires a detailed understanding of the response of the channel to mining disturbances.

Decisions on where to mine, how much and how often require the definition of a reference state, i.e., a minimally acceptable or agreed-upon physical and biological condition of the channel. Present understanding of alluvial systems is generally not sufficient to enable the prediction of channel responses quantitatively and with confidence; therefore, reference states are difficult to determine. Still, a general knowledge of fluvial processes can provide guidelines to minimize the detrimental effects of mining. Well-documented cases and related field data are required to properly assess physical, biological, and economic tradeoffs.

Mitigation measures

Quantities will be strictly limited so that sand recruitment and accumulation rates are sufficient to avoid extended impacts on channel morphology and instream habitat. Although conceptually simple, annual sand recruitment to a particular site is highly variable and not well understood.

- Flow and sediment transport for most rivers and streams is highly variable from year-to-year, thus an annual average rate may be meaningless.
- An "annual average deposition rate" could bear little relation to the sediment transport regimes in a river in any given year.
- The site selection was done keeping the following points; minor mineral reserves, site specific problems like flooding, submergence crop lands / fields, need of excavation, rate of sediment deposition etc.
- Sand mining will be restricted up to ~3.0 m below bed / water table whichever less.

Construction Phase- There will be no impacts as no construction phase is involved in this project.

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Operation Phase-

Impact & mitigation measures on topography & Drainage:

- The mine working will remain confined to river bed only & in no case disturbing any surface area outside which may affect topography or drainage course.
- Due to mining Temporary pits will form & it is replenished in upcoming monsoon season.
- Mining will be done in a planned way i.e collection of mineral/working shall be started from the central dip to rise & then laterally 1.5-meter slice so that river course will not get affected.
- Unwanted material including mineral or spillage (in any) will not be stacked on the bank side as it will hinder the flow of water in monsoon season.
- The mining from river bed will not have any impact on natural drainage of surrounding area as the excavated Sand from river bed is filled with first heavy flow in river during monsoon season.

Impact on Climate:

a) Temperature

The temperature pattern is a regional behavior & is not likely to be affected by river bed mining activity over a small area. Some local and temporary effect may be perceived due to movement of vehicles and equipment used.

b) Rainfall

The trend of rainfall forms part of regional pattern, not dependent on the relatively small area of river bed mining activity. The mining operation, therefore is not likely to have any adverse impact on rainfall pattern.

c) Humidity

The pattern of relative humidity depends mainly on the rainfall, wind temperature & other weather phenomenon that regional in behavior. The mining operation is not likely to have any impact on the relative humidity in the surrounding.

4.1 LAND ENVIRONMENT

No adverse impact is anticipated on land use of buffer zone due to present mining operations. As all the related activities are confined to the core zone.

The area likely to be degraded due to quarrying, pitting & roads. The impact on the land form or physiography will be limited to the modification of the slope. The landscape and land use will undergo a radical change due to open cast mining. The impact during next five years is limited as benches will be formed. Besides these benches, roads will also modify the physiography. The impact on land use will also be limited.

Impact on Land use Pattern including change of River course:

- If mining is not carried out in systematic manner by leaving sufficient safety barriers from the bank than it may disturb the river flow/course.
- Stacking of uncoated material including mineral or spillage (if any) on the bank side of river will hinder the flow of water in monsoon season, raise water level upstream, which may lead to bank cutting or flouting.
- Deviation from planned mining procedures can lead to river channel shifting as well as degradation of surrounding land, causing loss of properties & degradation of land scape.

Mitigation measures:

- Mineral will be mined out only from Dry River Bed & sufficient safety barrier 10% of width will be left towards bank side, so that river flow/course will not get disturbed.
- Mining of mineral will be started towards rise at the centre & also laterally in 1m slice so that river course will not get affected. Unwanted material or spillage (if any) will not be stacked by the side of excavation voids created. This is to be done so. Because it will otherwise hinder flow of water in monsoon period.
- Mining is to be done by leaving safety barrier on both sides & maximum barrier should be do concave side of river preferably the flow channel (excavation void created) should be kept straight so as to help avoid erosion as side cuttings, Upto next depth of 3.0 m from river bed level.

No waste water will be generated from the mining activities of minor minerals as the project. Only involves lifting of Sand from the river bed.

4.2 WATER ENVIRONMENT

Damage in the water body, depends on its assimilative capacity. To find out assimilative capacity of receiving water body, water samples were collected from different groundwater and surface water sources. The study indicates that assimilative capacity of the River water bodies still exists, but effective measures shall be taken to check water pollution. To find out the effect on ground water an extensive hydro-geological study has been conducted and from the study it can be safely concluded that there is no noticeable effect on surrounding ground water resource due to mining. The mining activity does not require water. The collection of sand is done on the river bed where excessive sedimentation has been noticed.

Mining of sand from within or near a streambed has a direct impact on the stream's physical habitat characteristics. These characteristics include geometry, bed evaluation, substrate composition and stability, in stream roughness elements, depth, velocity, turbidity, sediment transport, stream discharge and temperature. Altering these habitat characteristics can have deleterious impacts on both in stream biota and associated riparian habitat.

The detrimental effects to biota resulting from bed material mining are caused by three main processes:

- i. alteration of flow patterns resulting from modification of the river bed
- ii. an excess of suspended sediment
- iii. damage to riparian vegetation and in stream habitat

As the project activity is carried out in the meandering part of the river bed, none of the project activities affect the water environment or riparian habitats. In the projects, it is not proposed to divert or truncate any stream. No proposal is envisaged for pumping of water either from the river or tapping the ground water. In the lean months, the proposed sand mining will not expose the base flow of the river and hence, there will not be any adverse impact on surface hydrology and ground water regime due to this project. The contractor will adhere all guidelines and rules for proper and scientific method of mining during the period of extracting the ordinary sand. Thus, the project activities shall not have any adverse effect on the physical components of the environment and therefore may not have any effect on the recharge of ground waters or affect the water quality.

Impacts on hydrological Conditions:

- The study area is itself part of river course carries surface as well as ground water (under current). The flow of surface/ground water (sub surface flow is following the trend of topography).
- The area is part of dry river bed for more than nine months in a year except for the rainy season. The Sand mining is Restricted up to the depth of 3.0 m will have in significant impact on water regime.
- The general ground water table which will be about 3.0m below surface of river bed in the mining area during dry seasons will not be disturbed as ultimate working depth 3.0.

Impact on Water Quality:

- Mining causes lowering of riverbed level as well as riverbed water level resulting in lowering in ground table due to excessive extraction & drainage out of ground water from the adjacent areas, if general ground water table is higher than the river bed level. In case the general ground water level is lower than riverbed water level, than it will have positive impact on ground water table will recharge vertically as well as laterally. In the former case may cause shortage of water for the vegetation & human settlement in the vicinity, but in later case it will help in improving situations
- River is recharging the ground water, excessive mining will reduce the thickness of the natural filter material (sediments), infiltration through which the ground water recharged, so restriction in depth becomes necessity.

Mitigation Measures:

Mining in the area will be done above the water table as well as river bed water level, therefore much impact on water regime is not anticipated.

4.3 AIR ENVIRONMENT

Anticipated impacts and evaluation

Information on air quality was studied and various modeling techniques predicted that the mining activity will not affect the air quality in a significant manner. In mining operations, loading,

transportation and unloading operations may cause deterioration in air quality due to handling dry materials. In the present case, only wet materials will be handled, thus eliminating problems of fugitive dust. Also, the collection and lifting of minerals will be done Semi- Mechanized without any blasting. Therefore the dust generated is insignificant as compared to mining process of other hard minerals like the process of drilling, blasting, mechanized loading etc.

Mitigation measures

- In control the emission regular preventive maintenance of equipment will be carried out on contractual basis.
- Proper mitigation measures like water sprinkling will be adopted to control dust emission.
- Plantation will be done at place which authorized by Local Authority.
- It is being certified that all transportation vehicles will carry a valid PUC certified. The only air pollution sources are the road transport network of the trucks. The dust suppression measures like water spraying will be done on the roads. This will decrease the dust emission by 75%.
- There is no toxic element present in the mineral which may contaminate the soil.

4.4 NOISE ENVIRONMENT

The sand mining projects are mainly not noisy as these are mainly manual in nature. But in this case the methodology adopted for mining is opencast semi mechanized mining method which may generate noise.

Impact on environment

At mines, noise is created by movement of machinery & transportation vehicles, etc. The noise level in the working environment are compared with the standards prescribed by Occupational Safety and Health Administration (OSHA-USA) which has been adopted and enforced by the Govt. of India through model rules framed under Factories Act, 1980 and CPCB 2000 norms. The summary of the permissible exposures in cases of continuous noise as per above rules is given below:

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Table 4.1 Noise impact

Total time of expos per day in hour	Sound pressure dB(A)	Remarks
1	2	3
8.0	90	No exposure in excess of 115 dB is permissible
6.0	92	--
4.0	95	For any period of exposure fallin between any figure and lower fi as indicated in column (1), permissible sound is to determined by extrapolation proportionate scale.
3.0	97	
2.0	100	
1 ½	102	
1	105	
¾	107	
½	110	
¼	115	

Noise at lower levels (sound pressure) is quite acceptable and does not have any bad effect on human beings, but when it is abnormally high- it incurs some maleficent effects.

a. Mitigation measures

The off-site receptors are not significantly affected as noise generated by mines is insignificant but for some disturbances due to vehicle movement. The following measures have been envisaged to reduce the impact from the transportation of minerals:

- Periodical monitoring of noise will be done.
- Transportation vehicles will be maintained in good running condition so that noise will be reduced to minimum possible level.
- Noise generated by these Equipment shall be intermittent & does not cause much adverse impact.
- Proper maintenance of all equipment/machines will be carried out which help in reducing noise level during operations.
- In addition, truck drivers will be instructed to make minimum use of horns in the village area and sensitive zones.

4.5 BIOLOGICAL ENVIRONMENT

Impact on Ecology of the Area

Excessive and unscientific Riverbed sand mining causes the degradation of rivers. Mining which leads to the removal of channel substrate, re-suspension of streambed sediment, clearance of vegetation, and stockpiling on the streambed, will have ecological impacts. These impacts may have an effect on the direct loss of stream reserve habitat, disturbances of species attached to streambed deposits, reduced light penetration, reduced primary production, and reduced feeding opportunities.

Riverbed sand mining results in the destruction of aquatic and riparian habitat through large changes in the channel morphology. Impacts include bed degradation, bed coarsening, lowered water tables near the streambed, and channel instability. These physical impacts cause degradation of riparian and aquatic biota and may lead to the undermining of bridges and other structures. Continued extraction may also cause the entire streambed to degrade to the depth of excavation.

Sand mining generates extra vehicle traffic, which negatively impairs the environment. Where access roads cross riparian areas, the local environment may be impacted.

Mitigation measures

As the present mining will be done in a scientific manner as mentioned before, not much significant impact is predicted, however, the following mitigation measure will be taken to further minimize it.

- Re-suspension, turbulence, stream flow, channel substrate and associated species will be disturbed and lost due to proposed mining will disturb existing pattern but in respect to river area is very minimum / less. The activity will mainly be carried out By semi-Mechanized to minimize associated loss, as stated earlier that the settling pit will be created to minimize the adverse impact downstream.
- No mining will be done near to important structure like bridges, dam and others.
- No mining will be carried out during the rainy season to minimize impact on aquatic life.
- As the mining site has no vegetation, thus clearance of vegetation not required.
- The mining activity will employ many heavy vehicles to transport the sand outside the mine to desired destination that cause the loss to riparian habitat. Safe site / site having less impact will be selected for transportation, all the vehicles will be employed for transportation purpose will

be PUC certified. On closure / during the rainy season the eroded bank will be restored / reclaimed to minimize negative impacts.

Flora and Fauna of Riparian Habitat

If sand mining is done in an unscientific way, i.e. beyond the replenishment capacity, riverbed mining can have adverse effects at the mine sites. The fertile streamside land will be lost gradually and the wildlife in the riparian areas may start vanishing. Degraded stream habitats will result in loss of fisheries productivity, biodiversity, and recreational potential. Thus the severely degraded channels may lower the aesthetic value too.

Anthropogenic activities that artificially lower stream bed elevation cause bed instabilities that result in a net release of sediment in the local vicinity. Unstable sediments simplify and, therefore, degrade stream habitats for many aquatic species.

The most important effects of excessive and unscientific Riverbed sand mining on aquatic habitats are bed degradation and sedimentation, which can have substantial negative effects on aquatic life. The stability of sand-bed streams depends on a delicate balance between stream flow, sediment supplied from the watershed, and channel form. Mining-induced changes in sediment supply and channel form disrupt channel and habitat development processes. Furthermore, movement of unstable substrates results in downstream sedimentation of habitats. The affected distance depends on the intensity of mining, particles sizes, stream flows, and channel morphology. Channel widening causes swallowing of the streambed, producing braided flow or subsurface intergrades flow in riffle areas, hindering movement of fishes between pools. Channel reaches become more uniformly shallow as deep pools fill with gravel and other sediments, reducing habitat complexity, riffle-pool structure, and numbers of large predatory fishes.

All such impacts can be reduced by following scientific mining practices and mitigation measures as restricted.

Mitigation measures

Sand extraction operations will be managed to avoid or minimize damage to stream/river banks and riparian habitats

- Sand extraction in vegetated riparian areas will be avoided.

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- Large woody debris in the riparian zone will be left undisturbed or replaced when moved and not be burnt.
- Sand stockpiles, overburden and/or vegetative debris will not be stored within the riparian zone.
- It is essential that overburden is evenly redistributed over exposed areas as soon as possible after the operation has been completed for faster revegetation.
- Operation and storage of heavy equipment within riparian habitat will be restricted.
- Access roads will not encroach into the riparian zones

No exotic species will be introduced by the RBM project activity & associated persons at all.

As the mining will not be done beyond the stipulated limit, so the chances of river mouth widening, bank widening will be negligible. Thus, mining in a scientific and systematic way will reduce such impending effects.

4.6 SOCIO-ECONOMIC ENVIRONMENT

Impact on Human Settlement

- The villages & their inhabitants in the buffer zone will not be disturbed from their settlement due to mining operations.
- There is no inhabitation with in the area. Therefore neither villagers nor any part of village or any hamlet will be disturbed during entire life of mining. As the mining operations will not disturb or relocate any village or settlement, no adverse impact is anticipated on any human.

Impact on Employment

- The area is considered as industrially backward. The preparation on general do not have opportunities of easing from employment. The only employment is depend on is agriculture, which is seasonal. In the absence of any high employment potential activities, the people are economically backward. The local people shall be employed for mining activities.
- The various indirect employment opportunities have also been generated. Several persons of neighboring villages would be benefited with contract work, employment through contractors, running on jeeps, trucks, tractors & buses on hire, different bird of shops & transport related businessavenues

Impact on Economic Status

- Some people shall be edged in trading of Sand. Therefore, due to mining of Sand, the per capita income of local people shall be improved. The local people shall be provided with either direct employments or indirect employment such as business, contract works & development work like roads etc. & other welfare amenities such as medical facilities conveyance, free education, and drinking water supply.
- The job/business opportunities shall improve the economic condition of the persons. They are in a position to utilize this money for propose of tractors, trucks, jeeps, etc., which may be put into use for business purpose. Part of the money shall also be utilized in starting of some business as per person's skill

4.7 TRAFFIC ANALYSIS

Traffic analysis is carried out by understanding the existing carrying capacity of the roads near to the project site and the connecting main roads in the area. Then depending on the capacity of the mine, the number of trucks that will be added to the present scenario will be compared to the carrying capacity.

Table 4.2 (i): Existing No. of Day count Vehicles (inventory)

S.No.	Traffic Vehicle	No. of vehicles per day count Gurua Charki Road	No. of vehicles per day count SH-69	Factor	Equivalent Passenger Car Unit MDR	Equivalent Passenger Car Unit NH-22
1.	H.M.V	20	450	3	60	1350
2.	L.M.V	80	530	1	80	530
3.	Two/ three wheelers	200	850	0.5	100	425
4.	Others	0	0	-	0	0
	Total	300	1830		240	2305

Table 4.2 (ii): Existing Traffic Scenario & LOS

Road	V	C	Existing V/C Ratio	LOS
Gurua Charki Road	240	6000	0.04	A
SH-69	2305	15000	0.153	A

V= Volume in PCU's/hrs. & C = Capacity in PCU's/ hrs.

The existing Level of Service is "A" i.e. Excellent for MDR & "A" i.e. Excellent for NH-22.

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V/C	LOS	Performance
0.0 - 0.2	A	Excellent
0.2 - 0.4	B	Very Good
0.4 - 0.6	C	Good / Average / Fair
0.6 - 0.8	D	Poor
0.8 - 1.0	E	Very Poor

Note: Capacity as per IRC: 64-1990 page no 11-12 for arterial road/ Highways

During mine operation

Total capacity of mine	:	745200 TPA
No. of working days	:	250 days
Per day capacity of mine	:	2980.8 Tonnes
Truck capacity	:	20 Tonnes
No. of trucks deployed per day	:	149 Trucks
No. of Trips/day to & fro	:	298
Considering both loaded & empty trucks		
Increase in PCU/day will be	:	894

Table 4.2 (iii): Additional per day load due to proposed mining operation (inventory)

S.No.	Traffic Vehicle	No. of vehicles per day count Gurua Charki Road	No. of vehicles per day count SH-69	Factor	Equivalent Passenger Car Unit MDR	Equivalent Passenger Car Unit NH-22
1.	H.M.V	20+298=318	450+298=748	3	954	2244
2.	L.M.V	80+10=90	530+10=540	1	90	540
3.	Two/ three wheelers	200	850	0.5	100	425
4.	Others	0	0	-	0	0
	Total	608	2138		1144	3209

Table 4.2 (iv): Modified Traffic Scenario & LOS

Road	V	C	Existing V/C Ratio	LOS
Gurua Charki Road	1144	6000	0.19	B
SH-69	3209	15000	0.213	B

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Results

From the above analysis it can be seen that the V/C ratio will changed from 0.04 to 0.19 for Gurua Charki Road LOS will remain unchanged “A” i.e., Excellent & for SH-69 V/C ratio will be change from 0.153 to 0.213 with LOS **changing from “A” to “B”** i.e., from Excellent to Very Good respectively, So the additional load on the carrying capacity will be affected to a minimum level.



Figure-4.1 Transportation Route Map of the Study Area

4.8 PUBLIC HEALTH IMPLICATIONS

With the mitigation measures in relation to air pollution, water pollution, soil contamination and noise pollution proposed to be adopted at the mine along with plantation activities, with green belt plantation along the place which authorized by local authority, it is expected that there will be no impact of mining on the population in the impact zone. However, the following measures shall be adopted:

- Health check of all villagers in the immediate vicinity of the mine shall be carried out periodically.
- Surface water management shall be adopted to ensure that run-off from the mining are does not adversely affect natural water streams or other water bodies.
- All water bodies e.g. wells and surface water sources in the vicinity of the mine, shall be periodically tested for any pollution related to mining operations.
- Operators of all transport vehicles shall be instructed not to honk unnecessarily and not over speed while passing through villages or near schools

4.9 STATUTORY REQUIREMENTS

It is accepted that effective resource management cannot be done in isolation. The Department therefore pursues approaches towards coordination and integration where possible, which has led to coordinated regulatory systems.

A regulatory system consists of both statutory and non-statutory components. In the Sectoral-specific strategy for prospecting and mining, the Department participates within an integrated environmental management system which is administered in terms of the Acts and Rules. Other Acts dealing with matters relating to the conservation and protection of the environment and which a holder of a mining authorization must also take cognizance of include *inter alia*, the following:

- The Mines Act, 1952
- The Mines and Mineral (Development and Regulation) Act, 1957
- Mines Rules, 1955
- Mineral Concession Rules, 1960
- Mineral Conservation and Development Rules, 1988
- Bihar Minor Mineral Concession Rule, 2014
- The Water (Prevention and Control of Pollution) Act, 1974
- The Air (Prevention and Control of Pollution) Act, 1981
- The Environment (Protection) Act, 1986
- The Forest (Conservation) Act, 1980
- The Wildlife (Protection) Act, 1972

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 CHAPTER V – ANALYSIS OF ALTERNATIVES
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5.0 GENERAL

Examination of alternatives of technology and Site are an utmost important part for assuring that the project has long term sustainability, especially large projects, which involves a lot of money, manpower & their safety and nature, value of minerals & environmental hazards. River bank mining is a very simple operation needing extraction of sand from river bank which does not need much mechanization or drilling and blasting.

Sand bed mining is a site-specific project depending upon the geological set up and mineable portion of the river. Being inside the river meandering course, no objects of economic or ecological importance are disturbed. The area allotted is with abundant mineral reserve and hence auctioned by the state. Hence, there is not much scope for site alternative.

For the mining operation, which is semi mechanized in nature, no alternative technology has been adopted. As this leads to high employment potential of local habitants. Thus it will have more acceptability and help in socio economic upliftment of the area.

Therefore, the opencast semi-mechanized extraction of sand at the selected site is adopted.

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**CHAPTER VI – ENVIRONMENTAL MONITORING
 PROGRAMME**

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6.0 INTRODUCTION

The industrial development of any area needs to be intertwined with judicious utilization of non-renewable resources of the study area and within the limits of permissible assimilative capacity. The assimilative capacity of the study area is the maximum amount of pollution load that can be discharged into the environment without affecting the designated use and is governed by dilution, dispersion and removal due to physico-chemical and biological processes.

Regular monitoring of the various environmental parameters is necessary to evaluate the effectiveness of the management programme so that the necessary corrective measures can be taken in case there are some drawbacks in the proposed programme. Since environmental quality parameters at work zone and surrounding areas are important for maintaining sound operating practices of the project in conformity with environmental regulations, the post project monitoring work forms part of Environmental Monitoring Program.

Environmental Monitoring Program will be implemented once the project activity commences. Environmental monitoring program includes

- (i) Environmental surveillance,
- (ii) Analysis & interpretation of data,
- (iii) Preparation of reports to support environmental management system and
- (iv) Organizational set up responsible for the implementation of the programme.

The Environment Monitoring Programme is required to ensure sustainable development in the study area (10 km) of the project site, hence it needs to be an all-encompassing plan for which the plant authorities, Government, Regulating agencies like Pollution Control Board etc. working in the region and more importantly the affected population of the study area need to extend their co-operation and contribution.

6.1 ENVIRONMENTAL MONITORING AND REPORTING PROCEDURE

Monitoring shall confirm that commitments are being met. This may take the form of direct measurement and recording of quantitative information, such as amounts and concentrations of discharges and wastes, for measurement against corporate or statutory standards, consent limits or targets. It may also require measurement of ambient environmental quality in the vicinity of a site using ecological/biological, physical and chemical indicators. Monitoring may include socio-economic interaction, through local liaison activities or even assessment of complaints. The preventive approach to environment management may also require monitoring of process inputs, for example, type and method used, resource consumption, equipment and pollution control performance etc.

The key aims of environment monitoring are:

1. To ensure that results /conditions are as forecast during the planning stage, and where they are not, to pinpoint the cause and implement action to remedy the situation.
2. To verify the evaluations made during the planning process, in particular with risk and impact assessments and standard & target setting and to measure operational and process efficiency.
3. Monitoring will also be required to meet compliance with statutory and corporate requirements.
4. Finally, monitoring results provide the basis for auditing i.e. to identify unexpected changes.

The said team will be responsible for:

- i. Collecting water and air samples from surrounding area and work zone monitoring for pollutants.
- ii. Analyzing the water and air samples.
- iii. Implementing the control and protective measures.

- iv. Co-coordinating the environment related activities within the project as well as with outside agencies.
- v. Collecting statistics of health of workers and population of surrounding villages.
- vi. Monitoring the progress of implementation of environmental management program.

The laboratory will be suitably equipped for sampling/testing for various environmental pollutants.

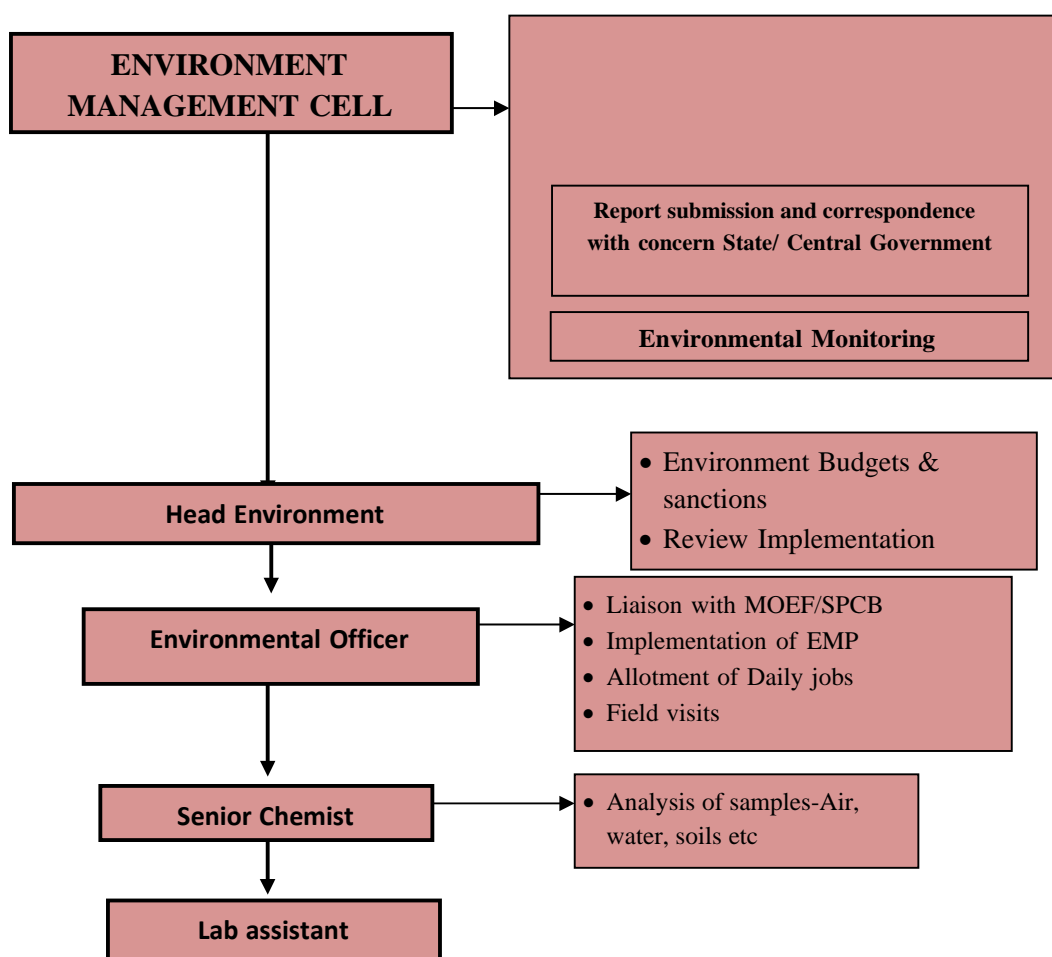


Fig. 6.1 Function of Environmental Management Cell

6.2 MONITORING METHODOLOGIES AND PARAMETERS

Air Quality Monitoring

Air Quality monitoring is essential for evaluation of the effectiveness of abatement programme and to develop appropriate control measures. Suspended Particulate Matter (PM₁₀&PM_{2.5}), Sulphur Dioxide (SO₂) and Nitrogen Dioxide (NO₂) will be monitored at the workplace i.e. core zone. The methodology proposed for is shown below:

Parameters	Technique	Technical Protocol
PM _{2.5}	Gravimetric method	CPCB Guideline Vol. I May' 2011
PM ₁₀	Gravimetric method	IS 5182 (Part-XXIII)
Sulphur Dioxide	Improved West and Gaeke	IS-5182 (Part-II)
Nitrogen Dioxide	Modified Jacob &Hoch heiser	IS-5182 (Part-VI)

Water Quality monitoring

Water quality monitoring involves periodical assessment of quality of surface water and the ground water near the mining project. Surface water samples will be analyzed for all the parameters as per EPA, 1986 ground water samples will be analyzed for all the parameters as per IS-10500.

Phreatic surface levels will be monitored through out the life of the project to study the impact of mining operations on ground water regime. A network of observation wells will be located in the villages around the projects area for monitoring of phreatic surface levels. The water levels will be monitored during pre-monsoon and post-monsoon seasons four times in a year.

Noise Level Monitoring

Noise level monitoring will be done for achieving the following objectives:

- To compare sound levels with the values specified in noise regulations
- To determine the need and extent of noises control of various noise generating sources
- Correlation of noise levels with community response to noise levels

Noise level monitoring will be done at the work zone to assess the occupational noise exposure levels. Noise levels will also be monitored at the noise generating sources like mineral handling arrangements, vehicle movements and also nearby villages for studying the impact due to higher noise levels for taking necessary control measures at the source.

Soil Quality Monitoring

The soil quality monitoring is carried out to assess the soil characteristic. The soil quality will be analysed as per CPCB norms.

Socio-economic Survey

Socio economic condition will be monitored to assess the demographic particulars of the area including the impacts on the social & economical condition on the residents nearby.

Plantation monitoring programme

Plantation monitoring will be done to ensure survival & growth rate of plantations.

6.3 MONITORING SCHEDULE

The schedule has been shown below for the parameters proposed for monitoring.

Table 6.1: Monitoring Schedule and Parameters

S.No.	Description of Parameters	Schedule of Monitoring
1	Air Quality	24 hourly samples twice a week in each season except monsoon
2	Water Quality (Surface & Groundwater)	Twice a year
3	Soil Quality	Once in a year in project area
4	Noise Level	Twice a year for first two years & then once a year
5	Socio-economic Condition	Once in 3 years
6	Plantation monitoring	Once in a season

6.4 MONITORING SCHEDULE IMPLEMENTATION

An implementation programme has been prepared as it serves no purpose if it is not implemented in letter and spirit. The major attributes of environment are not confined to the mining site alone. Implementation of proposed control measures and monitoring programme has an implication on the surrounding area as well as for the region. Therefore, mine management should strengthen the existing control measures as elaborated earlier in this report and monitor the efficacy of the control measures implemented within the mining area relating to the following specific areas:

- a) Collection of air and water samples at strategic locations with frequency suggested and by analyzing thereof. If the parameters exceed the permissible tolerance limits, corrective regulation measure will be taken.
- b) Collection of soil samples at strategic locations once every two years and analysis thereof with regard to deleterious constituents, if any.
- c) Measurement of water level fluctuations in the nearby ponds dug wells and bore wells and to assess if mining has got any impact on it or not.
- d) Measurement of noise levels at mine site, stationary and mobile sources, and adjacent villages will be done twice a year for first two years and thereafter once a year.
- e) Post plantation, the area will be regularly monitored in every season for evaluation of success rate. For selection of plant species local people should also be involved.

An Environmental Management Cell (EMC) is envisaged which will be responsible for monitoring EMP and its implementation. EMC members should meet periodically to assess the progress and analyze the data collected during the month.

6.5 BUDGET ALLOCATION FOR MONITORING

The EMC will be responsible to carry on the monitoring. Budget allocated has also been proposed for the same:

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CHAPTER VI – ENVIRONMENTAL MONITORING
 PROGRAMME

Table 6.2 Budget allotted for the Environmental Management Plan

S. No	Description	Annually Recurring Cost (INR)
1	Pollution Monitoring i) Air pollution ii) Water pollution iii) Soil iv) Noise Pollution	60,000*2 (Twice in a year) = 1,20,000 (Air- 20,000/-, Water – 15,000 Soil – 15,000, Noise – 10,000)
TOTAL		1,20,000/-

6.6 REPORTING SCHEDULES OF THE MONITORING DATA

It is proposed that voluntary reporting of environmental performance with reference to the EMP to be undertaken. The environmental monitoring cell will co-ordinate all monitoring programmes at site to furnish the data to the State regulatory agencies regularly in respect of the stipulated prior environmental clearance terms and conditions.

The proponent shall prominently advertise in the newspapers indicating that the project has been accorded environmental clearance and also the details of website where it is displayed.

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**DEIA CHAPTER VII-
 ADDITIONAL STUDIES**

**CHAPTER-VII
 ADDITIONAL STUDIES**

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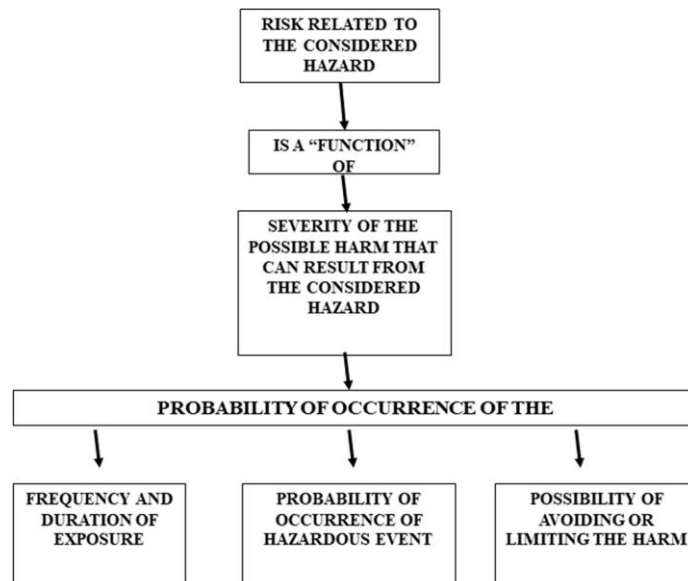
7.0 PUBLIC CONSULTATION

Public Hearing details will be incorporated in Final EIA report after conducting of Public Hearing.

7.1 HAZARD IDENTIFICATION AND RISK ASSESSMENT METHODOLOGY

A) RISK

Risk analysis is the systematic study of uncertainties and risks encountered in various areas. Risk analysis is to identify the risks involved in mining operations at various phases. Potential locations and activities around the proposed site are identified and probable risks are estimated on a person, business and Govt. establishment.



Tolerable risk: Risk which is accepted in a given context based on the current values of society

Protective measure: The combination of risk reduction strategies taken to achieve at least the tolerable risk. Protective measures include risk reduction by inherent safety, protective devices, and personal protective equipment, information for use and installation and training.

Severity: Severity is used for the degree of something undesirable.

Risk Analysis: A systematic use of available information to determine how often specified events may occur and the magnitude of their likely consequences.

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The different steps of risk assessment procedure are as given below:

Step I: Hazard Identification

The purpose of hazard identification is to identify and develop a list of hazards for each job in the organization that are reasonably likely to expose people to injury, illness or disease if not effectively controlled. Workers can then be informed of these hazards and controls put in place to protect workers prior to them being exposed to the actual hazard.

Step II: Risk Assessment

Risk assessment is the process used to determine the likelihood that people exposed to injury, illness or disease in the workplace arising from any situation identified during the hazard identification process prior to consideration or implementation of control measures. Risk occurs when a person is exposed to a hazard. Risk is the likelihood that exposure to a hazard will lead to injury or health issues. It is a measure of probability and potential severity of harm or loss.

Step III: Risk Control

Risk control is the process used to identify, develop, implement and continually review all practicable measures for eliminating or reducing the likelihood of an injury, illness or diseases in the workplace.

Step IV: Implementation of risk controls

All hazards that have been assessed should be dealt in order of priority in one or more of the following hierarchy of controls

The most effective methods of control are:

- i. Elimination of hazards
- ii. Substitute something safer
- iii. Use engineering/design controls
- iv. Use administrative controls such as safe work procedures
- v. Protect the workers i.e. By ensuring competence through supervision and training, etc.

Each measure must have a designated person and date assigned for the implementation of controls. This ensures that all required safety measures will be completed.

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Step V: Monitor and Review

Hazard identification, risk assessment and control are an on-going process. Therefore regular review of effectiveness of the hazard assessment and control measures is to be done. Make sure that you undertake a hazard and risk assessment when there is change to the workplace including when work systems, tools, machinery or equipment changes. Provide additional supervision when the new employees with reduced skill levels or knowledge are introduced to the workplace.

B) RISK ANALYSIS

The risk assessment portion of the process involves three levels of site evaluation:

- a) Initial Site Evaluation,
- b) Detailed Site Evaluation,
- c) Priority Site Investigations and Recommendations.

The risk assessment criteria used for all levels of site evaluation take into account two basic factors:

- The existing site conditions
- The level of the travelling public's exposure to those conditions.

The Initial Site Evaluation and Detailed Site Evaluation both apply weighted criteria to the existing information and information obtained from one site visit. The Initial Site Evaluation subdivides the initial inventory listing of sites into 5 risk assessment site groups. The Detailed Site Evaluation risk assessment is then performed on each of the three highest risk site groups in order of the group priority level of risk. The result of the Detailed Site Evaluation process is a prioritized listing of the sites within each of the three highest risk site groups.

Risk analysis is done for:

- Forecasting any unwanted situation
- Estimating damage potential of such situation
- Decision making to control such situation
- Evaluating effectiveness of control measures

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C) ACCEPTABLE RISK

Risk that is acceptable to regulatory agency and also to the public is called acceptable risk. There are no formally recognized regulatory criteria for risk to personnel in the mining industry. Individual organizations have developed criteria for employee risk and the concepts originally arising from industries. Because of the uncertainties linked with probabilistic risk analysis used for quantification of the risk levels the general guiding principle is that the risk be reduced to a level considered

As Low as Reasonably Practicable (ALARP). The risk acceptability criteria are given in following Table. It can be seen that there are three tiers:

- A tolerable region where risk has been shown to be negligible and comparable with everyday risks such as travel to work.
- A middle level where it is shown the risk has been reduced to As Low As Reasonably Practicable level and that further risk reduction is either impracticable or the cost is grossly disproportionate to the improvement gained. This is referred as the ALARP region.
- An intolerable region where risk cannot be justified on any grounds. The ALARP region is kept sufficiently extensive to allow for flexibility in decision making and allow for the positive management initiatives which may not be quantifiable in terms of risk reduction.

Table-7.1 the risk acceptability criteria

1	Risk un acceptance and must be reduced. The actions may include equipments and people or procedural measures. If risk cannot be reduced to ALARP level, operating philosophy must be fundamentally reviewed by the management.	Intolerable Region
2	Efforts must be made to reduce risk further and to as low as reasonably practicable, without expenditure that is grossly disproportionate to the benefit gained	ALARP Region (As Low as Reasonably Practicable)
3	Risk level is so low as to not require actions to reduce its magnitude further.	Tolerable Region

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A logical systematic process is usually followed during a qualitative risk assessment to identify the key risk events and to assess the consequences of the events occurring and the likelihood of their occurrence.

Table 7.2: Qualitative Risk Assessment

Risk Rank X Likelihood Consequence	L1 Almost certain	L2 Likely	L3 Possible	L4 Unlikely	L5 Rare
C1 Catastrophic	1	2	4	7	11
C2 Major	3	5	8	12	16
C3 Moderate	6	9	13	17	20
C4 Minor	10	14	18	21	23
C5 Insignificant	15	19	22	24	25

RISK RATING:

High Risk: 1-6
 Medium Risk: 7-15
 Low Risk: 16-25

7.2 POTENTIAL HAZARDS & ‘ALARP’ CONDITION

Mining and allied activities are associated with several potential hazards and risk to both the employees and the public at large. A worker in a mine should be able to work under “**ALARP**” conditions (as stated above), which are adequately safe and healthy. At the same time the environmental conditions should be such as not to be impair his working efficiency. This is possible only when there is adequate safety in mines.

7.3 RISK PRIORITISATION BASED ON HAZARDS

There are various factors, which can create unsafe working conditions/hazards in mining of minor minerals from river bed.

The key risk (hazard x probability) event rating associated with sand bed mining and to assess its consequences of such events occurring and the likelihood based on above Table are as:-

The Risk rating of such hazards is as follows:

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- a) Inundation / Flooding (C1 xL3=4)
- b) Drowning. (C5 xL5=25)
- c) Accident due to vehicular movement.(C3 xL3=13)
- d) Accident during sand loading, transporting and dumping=14. (i.e., C4 xL2=14)

7.3.1 Accident during sand/mineral loading, transportation

The risk rating assigned to this activity is assigned as “14 i.e. it is likely event with minor consequences”, as frequency of this operation is more but the predicted/assumed intensity (Based on experience) is less like minor cuts, abrasion, fall due to river bank collapse & falling of cattle’s, if not under proper supervision to bring under ALARP ZONE.

- a) There is possibility of injury in to the workers during excavation & loading of minerals.
- b) There is possibility that the workers standing on the other side of loading may get injury due to over thrown sand with pebbles.
- c) There is possibility of workers getting injured during opening of side covers to facilitate loading.
- d) There is possibility of riverbank collapse.
- e) There are chances of falling of cattle/children into pits in river bed by overlooking of fenced area near worksite or improper supervision.

7.3.2 Accident due to vehicular movement

The risk rating assigned to this activity is assigned as 13 i.e., it is possible event with moderate consequences as frequency of this operation is more but the predicted/assumed intensity (Based on experience) is less like minor cuts, bodily injury due to reckless or untrained driver. However, a strict control to be exercised to deploy trained drivers with valid driving license with a helper. A strict supervision/control to be exercised to avoid drunken driving or driving by unauthorized person to bring under ALARP ZONE.

The minerals loaded in trucks are being sent to through public roads.

- a) All possibilities of road accidents are possible due to rash driving.

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- b) Accident may also occur during movement in the haul road, in case pathway is not compacted suitably or movement is at the embankment.
- c) There are possibilities that due to overloading. Some pebbles or big boulder may injure the passerby public. In case Traffic & vehicle load bearing licensed capacity is neglected.

7.3.3 Inundation/Flooding

The risk rating assigned to this activity is assigned as 4 (C1 x L3=4) i.e., it is only possible, if warnings are neglected and work started without assessment of the river bed condition specially during monsoon season, the event will be catastrophic with major consequences as frequency of this operation is possible. However the event has to be brought under 'ALARP' Zone by strict supervision based on river water and other metrological data.

- a) The possibility of inundation/flooding of the mines are very high during monsoon or during heavy rains as the mine area lies in the riverbed.
- b) There is danger to the workers working in the mines.
- c) There is also danger to the trucks and other machineries due to flooding.
- d) Inundation or flooding is expected and beneficial for these mines as during this time only the mineral reserve gets replenished.

7.3.4 Drowning

The risk rating assigned to this activity is assigned as 25 i.e., it is insignificant due to dry season mining. There are no possibilities of drowning in the river, since mining operations are carried out only in the dry portion of the river and all mining activities will be stopped during the monsoon season.

7.4 OCCUPATIONAL HEALTH HAZARDS

Dry- pit mining by open cast method involves dust generation by excavation, loading and transportation of mineral. At site, during excavation and loading activity, dust is main pollutant which affects the health of workers whereas environmental and climatic conditions also generate the health problems. Addressing the occupational health hazard means gaining an understanding

of the source (its location and magnitude or concentration), identifying an exposure pathway (e.g. a means to get it in contact with someone), and determination of likely a receptor (someone receiving the stuff that is migrating).

Occupational hazard due to mining mainly comes under the physical hazards. Possible physical hazards are as below mention:-

Physical hazards due to mining operations

Following health related hazards were identified mining operations to the workers:-

1. **Light:** - The workers may be exposed to the risk of poor illumination or excessive brightness. The effects are eye strain, headache, eye pain and lachrymation, congestion around the cornea and eye fatigue.
2. **Heat and Humidity:** - The most common physical hazard is heat. The direct effects of heat exposure are burns, heat exhaustion, heat stroke and heat cramps; the indirect effects are decreased efficiency, increased fatigue and enhanced accident rates. Heat and humidity are encountered in hot and humid condition when temperatures and air temperatures increase in summer time up to 48⁰C or above mining area.
3. **Eye Irritation:** - During the high windy days in summer the dust could be the problems for eyes like itching and watering of eyes.
4. **Respiratory Problems:** - Large amounts of dust in air can be a health hazard, exacerbating respiratory disorders such as asthma and irritating the lungs and bronchial passages.
5. **Noise Induced Hearing Loss:** - Machinery is the main source of noise pollution at the mine site. Too much noise from the machines can induce loss of hearing.

Table-7.3: Management of Health Hazards

Particulars	Control Measures
Heat & Light	The mine site will have adequate drinking water supply so that workers do not get dehydration. Awareness will be created to wear lightweight and loose-fitting clothes having light colors.
Noise	Vehicles will be maintained properly. Greasing oiling will be done regularly. The personal protective equipment will be provided for each mine workers. Supervisor will be instructed for reporting any problems with hearing protectors or noise control equipment. Haul road will be leveled and maintained daily.

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Respiratory	Pack cabin will be given to the excavator operator with the sun glass and mask. PPE like face mask etc. will be provided during mining activity. Periodic medical examinations will be provided for all workers. Awareness program will be organized for workers. Control of dust through water spraying.
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Occupational health and Safety programme of the workers shall be undertaken periodically to observe any contractions due to exposure to dust and take corrective measures if required.

7.5 ADDITIONAL MITIGATION MAJORS TO BRING HAZARDS UNDER “ALARP” ZONE

7.5.1 Measures to Prevent Accidents during Loading

- The truck should be brought to a lower level so that the loading operation suits to the ergonomic condition of the workers.
- The loading should be done from one side of the truck only.
- The workers should be provided with gloves and safety shoes during loading.
- Opening of the side covers (pattas) should be done carefully and with warning to prevent injury to the loaders.
- Operations during daylight only.
- No foreign material should be allowed to remain/spill in river bed and catchment area, or no pits/pockets are allowed to be filled with such material.
- Stockpiling of minerals on the river bank should be avoided.

7.5.2 Measures to prevent accidents during transportation

- All transportation within the main working will be carried out directly under the supervision and control of the management.
- The vehicles will be maintained in good repairs and checked thoroughly at regular intervals by the competent person authorized for the purpose by the Management.
- To avoid danger while reversing the vehicles especially at the embankment and tipping points, the areas for reversing of lorries will be made man free as far as possible.

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- The truck will be covered and maintained to prevent any spillage and no overloading will be permitted.
- The maximum permissible speed limit will be ensured.
- The truck drivers will have proper driving license.
- A statutory provision of the fences, constant education, training etc. will go a long way in reducing the incidents of such accidents.

7.5.3 Measures to prevent Dangerous Incidents during Inundation/Flooding

Inundation of flooding is expected and beneficial for these mines as during this time only the mineral reserve gets replenished.

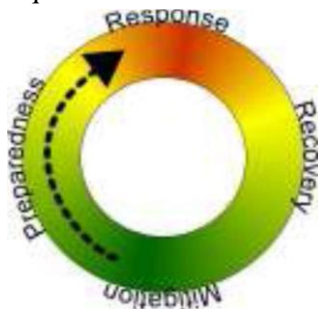
- During monsoon months and heavy rains the mining operations will be ceased.
- There would be mechanism/warning system of heavy rains and discharges from the upstream dams to make the workers alert.

7.5.4 Measure to Prevent Drowning

- The mining should be done under strict supervision and only during the dry season.
- Deep water areas must be identified.
- No go zones should be clearly marked and made aware to the mine workers.
- Signages will be erected if there is any steep slopes or existing pits, so that there is no movement in that area.

7.6 DISASTER MANAGEMENT PLAN

This should deal with action plan for high risk accidents like landslides, subsidence, flood, in underground mines, fire, seismic activities, tailing dam failures etc. and emergency plan proposed for quick evacuation, ameliorative measures to be taken etc. The capability of lessee to meet such eventualities and the assistance to be required from the local authorities should be described.



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- Communication plans with easily understandable terminology and methods.
- Proper maintenance and training of emergency services, including mass human resources such as community emergency response teams.
- Development and exercise of emergency population warning methods combined with emergency shelters and evacuation plans
- Develop organizations of trained volunteers among civilian populations.

7.6.1 Natural Hazards Floods:

Flood events are a part of nature. They mostly occur in the monsoon season at times of heavy rainfall. No Mining Shall be done in Rainy Season.

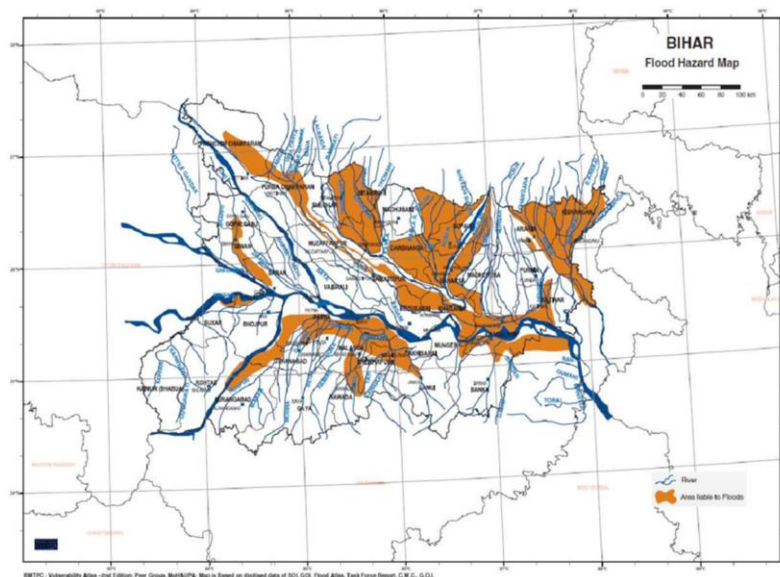


Figure 7.1 - Flood Map of Bihar

The region experiences heavy rainfall and due to water collection of the catchment area of various rivers, the proposed site may be prone to flood hazards during monsoon. As floods during rainy season are common and the district has minor flood risk, there are some chances of flood. A DMP will be in place to deal with any such occurrences.

Following Precautionary Measures will be undertaken:

- Storm water system will be checked and cleaned periodically
- Storm water network will be meticulously cleaned before the onset of monsoon

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Earthquakes: An Earthquake is a sudden, rapid shaking of the earth caused by the breaking and shifting of rocks beneath the earth surface.

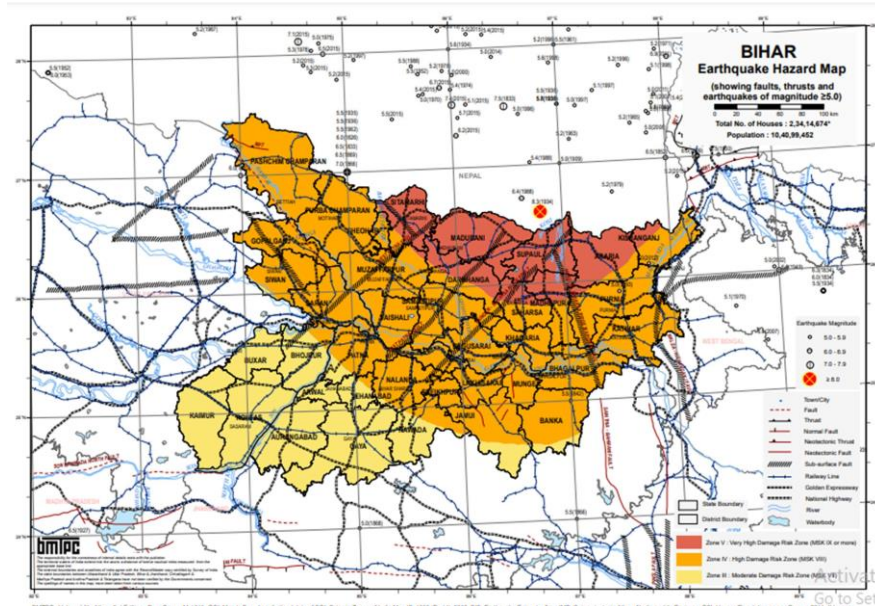


Figure 7.2- Earthquakes Map of Bihar

Based on the above figure, it is observed that proposed project lies in moderate damage risk zone. Gaya district has experienced earthquakes rarely and with less intensity. Since the district lies in Seismic Zone III – Moderate Damage Risk Zone, hence earthquakes are not major risks for the proposed project.

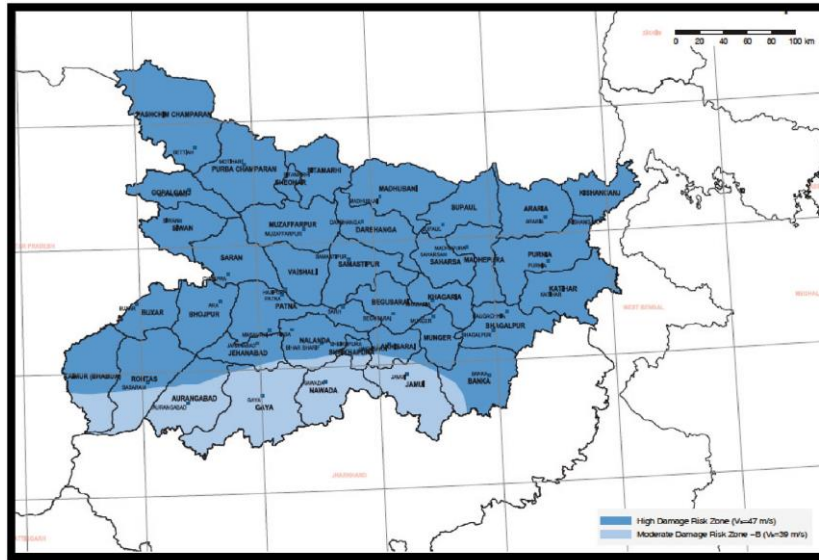
Cyclone: Cyclones are huge revolving storms caused by winds blowing around a central area of low atmospheric pressure. Cyclone is a storm accompanied by the high-speed wind. It brings torrential rains and creates several dangers for people living around tropical areas. These winds are strong enough to easily topple fences, sheds, trees, power poles and caravans, while hurling helpless people through the air.

It is observed that Gaya district lies under very high-speed winds zone. As detailed in the Vulnerability Atlas of India, 27 districts in Bihar are fully affected by high-speed winds of 47m/s intensity. Districts of South Bihar except Gaya are partly affected by high-speed winds of 44m/s. Gaya In all 86 percent of the total area of Bihar is prone to high-speed winds of 47m/s intensity

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and only 14 percent of the area prone to high-speed winds of lesser intensity. The probability of the cyclonic depression is very high in the study area. Hence, the structures will be designed keeping in mind the cyclonic risks.



Precautionary Measures to be undertaken:

- The complete mining operation will be carried out under the Management and control of experienced and qualified Mines Manager having Certificate of Competency to manage the mines granted by DGMS.
- All the provisions of Mines Act 1952, MMR 1961 and Mines Rules 1955 and other laws applicable to mine will strictly be complied with.
- During heavy rainfall the mining activities will be ceased.
- All persons in supervisory capacity will be provided with proper communication facilities.
- Periodic drills and training will be provided to the workers and supervisors to react at the time of disaster.
- Detailed warning system, implementation procedure, emergency control centre would be maintained at the mine with names of trained persons.
- Details and availability of heavy machinery, fire-fighting equipment would be available at the site.

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- Proper arrangements would be made for treatment of injured person with first aid, if any.
- All the safety equipment will be made available at the mine.

7.7 NATURAL RESOURCE CONSERVATION

Mining at the concave side of the river channel should be avoided to prevent bank erosion. Similarly meandering segment of a river should be selected for mining in such a way as to avoid natural eroding banks and to promote mining on naturally building (aggrading) meander components.

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**DEIA CHAPTER VIII-
PROJECT BENEFITS**

**CHAPTER-VIII
PROJECT BENEFITS**

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8.0 GENERAL

The operation of the project will protect against widening of river channel and flooding of adjoining areas due to non-removal of sediments which have been accumulating over years, naturally. It will bring overall improvement in the locality, neighborhood and the state by bringing industry, roads, water supply, electricity, employment, living standard and economic growth.

8.1 PHYSICAL BENEFITS

The opening of the proposed project will enhance the following physical infrastructure facilities in the adjoining areas.

- a. **Road Transport:** There will be improved road communication due to the proposed project and maintenance will also be done time to time.
- b. **Market:** Generating useful economic resource for construction. Excavated mineral will provide a good market opportunity.
- c. **Enhancement of green cover:** As a part of reclamation plan, plantation will be carried along the place in consultation with local authority.
- d. **Creation of community assets:** (infrastructure) like provision for drinking water, construction of school buildings, village roads/ linked roads, dispensary & health center, community center, market place etc, as a part of corporate social responsibility.

The impact on the civic amenities will be substantial after the commencement of mining activities. The basic requirement of the community needs will be strengthened by extending health care, educational facilities developed in the township to the community, providing drinking water to the villages, building/strengthening of existing roads in the area. The proponent will initiate the above amenities either by providing or by improving the facilities in the area, which will help in uplifting the living standards of local communities. Medical facilities will be provided in the form of first-aid facility at the mine. These medical facilities will also be available to local people in the surrounding in case of emergencies.

8.2 SOCIAL BENEFITS

- Generation of employment and improved standard of living;
- Increased revenue to the State by way of royalty, taxes and duties; and

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- Superior communication and transport facilities etc.
- There will be significant change in the socio-economic scenario of the area.
- The proposed project will enhance the prospects of employment. Recruitment for the unskilled and semiskilled workers for the proposed project will be from the nearby villages.
- The development of the basic amenities viz. roads, transportation, electricity, drinking water, proper sanitation, educational institutions, medical facilities, entertainment, etc. will be developed as far as possible.
- Overall the proposed project will change living standards of the people and improve the socio-economic conditions of the area.

A) Employment Potential- The employment of local people in primary and secondary sectors of project will upgrade the prosperity of the region. These will in-turn improves the socio-economic conditions of the area. The total manpower required for the proposed mining project under various categories is 38 persons, who will be mainly sourced from local community in and around mining project and few technical persons will be employed during operational phase from nearby area. In addition to the above, contractual labour and indirect employment opportunities will also be getting benefited after installation of mining project.

Table 8.1 Employment detail

S. No.	Category	Numbers
1.	Administration	1
2.	Supervisor	1
3.	Skilled	7
4.	Un-skilled	23
TOTAL		32

- B) Contribution to the Exchequer** as the saleable minerals will be given royalty. Since the quarries have been auctioned and leased out to successful allottees, mining operation in the state will get legalized and it will fetch income to the state exchequer.
- C) Increased Health related activities:** Healthcare promotional activities will be undertaken. Pre-placement & and Periodic medical checkups will be done, which will lift

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the general health status of the residents of the area. Health camps, medical aids, family welfare programs, immunization camp sports will be arranged.

D) Educational attainments: Educational activities will be promoted by the lessee. Awareness program will be arranged covering basic issues related to primary level education, environment, health and hygiene etc.

E) Strengthening of existing community facilities through the Community Development Programme.

Table 8.1 Budget for Public Health

S. No.	Activity	Tentative Cost
1.	Awareness campaigns regarding health issues in the nearby villages.	1,00,000
2.	Provide free health checkups & medicines to the nearby villagers of the project site	1,00,000
3.	Assistance to set up a temporary health center during the lease tenure	1,00,000
	Total	3,00,000

Table 8.2 Budget for Occupational Health

S. No.	Activity	Tentative Cost
1.	For Routine Checkup	80,000
2.	Medical aid as per ESI Scheme	1,50,000
3.	Training	1,00,000
	Total	3,30,000

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8.3 ENVIRONMENTAL BENEFITS

- a. Protection of banks
- b. Reducing submergence of adjoining agricultural lands due to flooding
- c. Reducing aggradations of river levels
- d. Protection of crops being cultivated along the bank
- e. A check on illegal mining activity

8.4 CORPORATE ENVIRONMENTAL RESPONSIBILITY

2 % of capital cost of the project cost will be allotted for the Corporate Environmental Responsibility as per OM dated 1st May 2018.

CER cost will be 2% of the total project cost. This amount will be used for social welfare. CER cost is Rs. 25,55,000

For each activity the funds to be earmarked by the proponent will be decided after discussion with the local authority/people and the beneficiaries during public hearing. It has been planned to undertake a concurrent evaluation of the activities to be taken up under the CER programme.

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CHAPTER-IX ENVIRONMENTAL MANAGEMENT PLAN

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9.0 INTRODUCTION

The environmental management plan consists of the set of mitigation, management, monitoring and institutional measures to be taken during the implementation and operation of the project, to eliminate adverse environmental impacts or reduce them to acceptable levels. The present environmental management plan addresses the components of environment, which are likely to be affected by the different operations in a mine area. To mitigate the adverse impact which may be caused due to the mining operations and overall scientific development of local habitat, environmental management plan (EMP) has been formulated and integrated with the mine planning. The details of the anticipated impacts and mitigate measures have been discussed in Section IV of this report, based on the results of present environmental conditions and environmental impact assessment. The EMP has therefore been made considering implementation and monitoring of environmental protection measures during and after mining operations.

The mitigation measures which reduce the impact have already been identified earlier in this report. To minimize the adverse impact, certain additional EMP is enumerated below for implementation.

The aims of EMP are:

- Overall conservation of environment.
- Minimization of waste generation and pollution.
- Judicious use of natural resources and water.
- Safety, welfare and good health of the work force and population.
- Ensure effective operation of all control measures.
- Vigilance against probable disasters and accidents.
- Monitoring of cumulative and long time impacts.
- Ensure effective operation of all control measures.

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9.1 ENVIRONMENTAL MANAGEMENT PLAN (EMP)

Proper environmental management plan is proposed for (Sand) Mine project to mitigate the impact during the mining operation.

- No overburden or loose sediments will be kept in the vicinity of the working benches.
- The possibility of the project activity contributing to the pollution of watercourses of the region or to the ground water regime is so less that this does not significantly constitute an area of concern.
- Construction of well-compacted roads.
- Regular water spraying on haul roads by tankers.
- Personal Protective Equipment (PPE) like earmuffs/earplugs, dust masks, helmets, safety boots will be provided to all operators and employees working near mining machineries or at higher noise zone.
- Plantation will be done at place which authorized by Local Authority.
- Proper and regular maintenance of vehicles.
- Care will be taken that noise produced during vehicles movement for carrying Sand is within the permissible noise level.
- Provision of Green Belt (thick foliage) along the approach road.
- Strict observance of the provisions of Acts, Rules and Regulations in respect of safety both by management and the workers.
- Proper planning and designing of work in order to reduce the risk of hazards.
- Specific instructions and supervisions of working where danger due to fall of side (overhanging, undercutting of bench, fall of objects from higher benches/places is apprehended).
- Training of work persons and the officials.

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- Since the haul road will be of considerable length, due importance will be given in the construction of road. The width of road will be maintained more than thrice the width of the vehicle. A code of traffic rules will be implemented.
- A code of practices for tipping in stock piles/dumping of overburden at dump yard and loading point will be implemented.
- In respect of contract work, safety code for contractors and workers will be implemented.
- They will be allowed to work under strict supervision of statutory person/officials only after they will impart training at vocational training centers. All personal protective equipment will be supplied to them.
- A code of practice for fighting fire will be implemented.
- Competent persons like fitters, mechanics will be imparted with special attention to project impact.
- Celebration of annual mines safety week and environmental week in order to develop safety awareness amongst employees.
- Pre joining medical checkup shall be done and regular health check-up in 6 monthly intervals is planned for the employees.
- Care will be taken that no cooking, or burning of woods will be allowed in the adjoining area.
- If some causality or injury to animal occurs, it should be informed to forest department and proper treatment should be given.
- Provision of rest shelters for mine workers with amenities like drinking water etc.
- Periodical Medical Examination (PME) of all workers by a medical Officer
- First Aid facility is provided at the mine site.

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- Close surveillance of the factors in working environment and work practices which may affect environment and worker's health.
- Working of mine as per approved mining plan and environmental plans.

9.2 ENVIRONMENTAL MANAGEMENT PLAN IMPLEMENTATION

Environmental Management Plan serves no purpose if it is not implemented with true spirit. Some loopholes in the EMP can also be detected afterwards when it is implanted and monitored. Thus, an implementation and monitoring programme has to be prepared. The major attributes of environment are not confined to the mining site alone. Implementation of proposed control measures and monitoring programme has an implication on the surrounding area as well as for the region. Therefore, mine management would strengthen the existing control measures as elaborated earlier in this report and monitor the efficacy of the control measures implemented within the mining area relating to the following specific areas:

- a) Collection of air and water samples at strategic locations with frequency suggested and by analyzing thereof. If the parameters exceed the permissible tolerance limits, corrective regulation measure will be taken.
- b) Collection of soil samples at strategic locations once in every year and analysis thereof with regard to deleterious constituents, if any.
- c) The effectiveness of drainage system depends upon proper cleaning of all drains provided in the surrounding of mine area. Any blockage due to siltation or loose material will be checked at least once in a month.
- d) Measurement of water level fluctuations in the nearby ponds, dug wells and bore wells.
- e) Regular visual examination will be carried out to look for erosion of river banks. Any abnormal condition, if observed will be taken care of.
- f) Measurement of noise levels at mine site, stationary and mobile sources, and adjacent villages will be done in every quarter of the year.

g) Plantation/afforestation as should be done at place which authorized by Local Authority. Post plantation, the area will be regularly monitored in every season for evaluation of success rate.

For selection of plant species local people should also be involved.

Mine management will be in regular touch with local surrounding villages to update the various developmental schemes made by them. They will also consider any immediate requirement, which could be taken care of in near future. Mine management will be in regular touch with State Pollution Control Board and Indian Bureau of Mines and send them annual progress report. Any new regulations considered by State/Central Pollution Control Board for the industry will be taken care of.

Green Belt Development Plan

Green belt is plantation of trees for reducing the pollution as they absorb both gaseous and particulate pollutant, thus removing them from atmosphere. Green plants form a surface capable of absorbing air pollutants and forming sinks for pollutants. It improves the aesthetic value of local environment. Under present project, green belt has been planned with emphasis on creating biodiversity; enhance natural surroundings and mitigating pollution.

These plantations will be done at place which given by Local Authority. About 230 Plants will be planted of various types of species. List of species is recommended for plantation. Native plants like Mango, Neem, Kadamb, Kathal, Peepal, Gulmohar, and other local species will selected in suitable combination, so that can grow fast and also have good leaf cover.

The basic objectives of plantations are as follows:

- Soil quality should be improved
- Vegetative cover can check soil erosion
- River bank stability should be improved
- Conservation of biological diversity
- Habitation for wild life.

9.3 ENVIRONMENTAL MANAGEMENT CELL (EMC)

To implement the EMP, a structured Environment Management Cell (EMC) which includes plant manager and representative of consultants interwoven with the existing management system is there. Occupational safety and health is very closely related to productivity and good employer-employee relationship. The factors of occupational health in the proposed Sand mine are mainly dust and land degradation. Safety of employees during operation and maintenance etc. shall be as per Mines rules and regulations. To avoid any adverse effect on the health of workers due to various pollutants, sufficient measures relating to safety and health will also be practiced.

A comprehensive environmental monitoring program as laid down by State Pollution Control Board is followed. All the above observations will be complied and documented by the EMC to serve the following purposes:

- Identification of any environmental problems that are occurring in the area.
- Initiating or providing solution to those problems through designed channels and verification of the implementation status.
- Controlling activities inside the project, until the environmental problem has been corrected.
- Suitably responding to emergency situations.

9.4 BUDEGT ALLOCATION FOR EMP IMPLEMENTATION

Annual budget for EMP is very essential for successful implementation of EMP. The fund allocated will not be diverted for any other purposes and the top management will be responsible for this. The budget will take into consideration the following capital and operating expenses:

- a) Capital cost for installing pollution control systems.
- b) Field cost for monitoring of parameters.
- c) Cost of any defined outsourcing
- d) Cost of chemicals, consumables and transport for data generation
- e) Any other cost as per EC condition.

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It is necessary to include the environmental cost as a part of the budgetary cost component. The project authorities propose to undertake the following environmental works to achieve the environmental quality as desired. The budget for environmental protection has been formulated and given in Table.

The total cost of project would be around Rs 12,77,50,000/- EMP Capital Cost is Rs. 2,80,000/- & EMP Recurring Cost is Rs 6,30,000/-

Table 9.1 Budget allotted for Environmental Management Plan

S.No	Description	Capital Cost (INR)	Recurring Cost (INR)
1	Pollution Control & Dust Suppression	Nil	2.0
2	Pollution Monitoring i) Air pollution ii) Water pollution iii) Noise Pollution iv) Soil	--	2.0
3	Plantation and salary for one gardener (parttime basis).	2.3	0.5
4	Haul road Maintenance Cost	0.5	1.8
TOTAL		2.8	6.3

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Chapter X- Executive Summary

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EXECUTIVE SUMMARY

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Sand Mining Project Block – 26 (Gaya Morhar-13) Sand Ghat on Morhar River,
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,685,688 Village/Mauja – Baiju Bigha, Bilauti, Dhibra G.P, Phulsathar, Tanrwa Tehsil/Anchal- Gurua District-
Gaya, State-Bihar Proponent- M/s Rajendra and Sons Infra Private Limited, Prop. Minti Kumari
Production- 414000 CUM per annum or 745200 TPA Area- 23.0 Ha

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10.0 INTRODUCTION OF PROJECT&PROPONENT

Environment Impact Assessment (EIA) is a process used to identify the environmental, social & economic impacts of a project prior to decision making. It is a decision-making tool, which guides the decision makers in taking appropriate decisions for proposed projects. It aims predicting environmental impacts at an early stage of project planning and design, find ways and means to reduce adverse impacts, shape projects to suit the local environment and present the predictions and options to decision makers. By using EIA, both environmental & economic benefits can be achieved. By considering environmental effects prediction & mitigation, early benefits in project planning, protection of environment, optimum utilization of resources, thus saving overall time & cost of the project.

The project is being proposed by M/s Rajendra And Sons Infra Private Limited; Prop.- Minti Kumari Address 15 Mother Teresa Marg North S.K Puri Patna

Proposed project has been allotted to the proponent By District mining office. LOI has been granted in favour of M/S Rajendra And Sons Infra Private Limited; Prop.- Minti Kumari vide letter no. 5503/ Khanan Gaya dated- 29/11/2022, for a period of 5 years attached as Annexure II. The EIA-EMP report has been prepared as per the TOR granted under the EIA Notification of September 14th 2006. In order to assess the impact on environment due to proposed mining, it is necessary to ascertain the present status of environment prevailing at the project site and identification and assessment of impacts on the environment of the proposed operations.

As per NGT Order Dated 13-09-2018 and MOEF & CC OM No L-11011/175/2018-IA-II(M) Dated 12-12-2018 the project comes under B1 Category as the area is more than 5 Ha. Environmental Impact Assessment report is prepared to comply with the Terms of Reference (TOR) received from SEIAA, Bihar.

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10.1 LOCATION

Name of the Project – Sand Mining Project Block – 26 (Gaya Morhar-13) Sand Ghat on
Morhar River, District- Gaya, State-Bihar.

Village/Mauja	Block	Tehsil /Anchal	District	State	Area in Ha.
– Baiju Bigha, Bilauti, Dhibra G.P, Phulsathar, Tanrwa	Block -26 Gaya Morhar- 13	Gurua	Gaya	Bihar	23.0

Table10.1- Detail of site & surrounding around Lease Area

Nearest Settlements	Barma Chak Village is about 0.38 Km in SW direction.
Nearest Road	Gurua Charki Road is about 0.39Km in N Direction. NH-19 is about 9.2 Km in S Direction. SH-69 is about 4.2 Km in W direction.
Nearest Airport	Gaya International Airport at distance of approx. 15.96 Km in NE direction.
Nearest Railway Station	Paraiya Railway Station at distance of approx. 16.3 km in NNE.
Water body	Project lies on Morhar River.
Nearest School/ college	DS Memorial Public school is about 0.73 Km in W Direction.
Temple	Shiv Temple is about 0.4 Km in N Direction

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Table 10.2-Details of Project

Name of Proponent	M/s Rajendra and Sons Infra Private Limited; Patna. Prop.- Minti Kumari		
Full correspondence address of proponent	15 Mother Teresa Marg North S.K Puri Patna		
Name of Project	Sand Mining Project, Block 26 (Gaya Morhar-13) Sand Ghat		
Name of River	Morhar		
Name of Village	Khata No.-108,162,48,15,37 Khasra No. – 1,282,283,1,1193,1194,1195/1397,473,87,98,207 Thana No 645,687,689,685,688 Village/Mauja – Baiju Bigha, Bilauti, Dhibra G.P, Phulsathar, Tanrwa		
Tehsil	Tehsil/Anchal- Gurua		
District	Gaya		
Name of Minor Mineral	Sand		
Sanctioned Lease Area (in Ha.)	23.0 Ha		
Pillar Coordinates	Coordinate		
		Latitude	Longitude
	A	24°39'46.86"N	84°48'55.72"E
	B	24°39'46.04"N	84°49'3.59"E
	C	24°39'2.75"N	84°48'49.15"E
	D	24°39'3.54"N	84°48'43.91"E
Total Geological Reserves	690000 Cum		
Total Mineable Reserves	646611 Cum		
Proposed Production/year	414000 CUM per annum or 745200 TPA		
Sanctioned Period of Mine lease	5 years		
Method of Mining	Open Cast semi mechanized method / OTFM		
No. of working days	250 days		
Working hours/day	8hrs		
No. of workers	32		
Ultimate Depth of Mining	3 m		
Nearest metalled road from site	880 m		
Water Requirement	PURPOSE	REQUIREMENT (KLD)	
	Drinking & Domestic	0.64	
	Plantation 270 Plants @ 5 L/Plant	1.15	
	Dust Suppression	10.56	
	Total	12.35	

Sand Mining Project Block – 26 (Gaya Morhar-13) Sand Ghat on Morhar River, Khata No.-108,162,48,15,37 Khasra No. –1,282,283,1,1193,1194,1195/1397,473,87,98,207 Thana No 645,687 ,689 ,685,688 Village/Mauja – Baiju Bigha, Bilauti, Dhibra G.P, Phulsathar, Tanrwa Tehsil/Anchal- Gurua District- Gaya, State-Bihar Proponent- M/s Rajendra and Sons Infra Private Limited, Prop. Minti Kumari Production- 414000 CUM per annum or 745200 TPA Area- 23.0 Ha

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Any litigation pending against the project orland in any court	No
Proposed Project cost	The total cost of project would be around Rs 127750000
Proposed EMP budget	Recurring Cost- 6,30,000/-Capital Cost - 2,80,000/- (INR)
Proposed CER budget (2% of Project Cost)	Rs. 25,55,000
Length and breadth of Haul Road	Length: 880 m, width: 6 m
No. of Trees to be Planted	230 plants

10.2 RESERVES

The geological reserves have been estimated as per UNFC guidelines in all the three axis.

Economic Axis (E-1): The Sand is exists with in the entire stretch & having no problem selling in the market. The road is near the Ghat & sand shall loaded into tipper with the deployment of an excavator & transport to various parties. The land is State Govt. land & State Govt. has given its consent for the exploitation of Sand on their expensive land. On the feasibility study, economic viability of deposit has been established sand in economic viable, therefore economic axis has been considered as E-1.

Feasibility Status (F-1): Feasibility study has been carried out & is considered to be feasibility status. A feasibility study provides a preliminary assessment with a level of confidence as compared to that of feasibility study. It has been revealed that exploitation of sand is feasible & economic viable & feasibility axis under UNFC code has been considered as F-1:

Geological Axis: The exposure of sand is seen in the entire stretch & thickness of sand varies 2.5m to 3.0m. Therefore geological axis has been considered as G-1.

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Geological Reserves

The geological reserves have been each stretches & for individual blocks. Geological reserves have been completed through cross sectional area method. The area of each section line is multiplied by strike influence to get the volume.

- i) **Proved Mineral Reserves (111):** All quantities of sand occurring upto depth of 3 m from surface has been considered as proved reserves.

Classification	Code	Quantity of Sand
A) Mineral Reserves		Cum
B) Proved Mineral Reserves	111	690000
Total		690000

Total Geological Reserve = 690000 cum. or 1242000 tonnes.

*Bulk density is 1.8 g/cm³

MINEABLE RESERVES:

Mineable reserves have been computed up to 3m depth from surface. Benches having height 1.5m & width 6.0m drawn from the ultimate pit limit. Area of each benches have been calculated multiplied by strike influence to get the volume. The volume multiplied by bulk density (1.8 g/cm³) to get the tonnage.

The minerals excavated from the river bed will be replenished gradually during the monsoon season every year. And the area pertaining to paleochannels of the river will be levelled & restored back.

BLOCK-26 (GAYA MORHAR – 13) SAND GHAT OF MORHAR RIVER

The mineable reserves are given in **Table No.10.3**

Bench Level (mRL)	Length (m)	Width (m)	Depth (m)	Volume (cum)	Tonnes
123-121.5	1369	163	1.5	334721	602497
121.5-120	1359	153	1.5	311891	561403
Total				646611	1163900

Total Mineable Reserve = 646611 CUM or 1163900 Tonnes

**Sand Mining Project Block – 26 (Gaya Morhar-13) Sand Ghat on Morhar River,
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- Mineable reserve has been consider 60% approx. of geological reserve after applying the guideline of Enforcement & Monitoring Guidelines for Sand Mining 2020.
- The proposed production grant in LOI is 414000 cum per year which is within the sustainable limit of mineable reserve.
- The BD for Sand has been adopted at 1.8 g/cm³ [Noida Testing Laboratories]

CLASSIFICATION MINERAL RESERVES:

Sand Ghat	Area (Hect)	Geological Reserves (m ³)	Mineable Reserves (m ³)	Annual Permitted Reserve As per LoI (m ³)
Block-26 (Gaya Morhar – 13) Sand Ghat	23.0	690000	646611	414000

The annual extractable RBM comes to 414000 CUM or 745200 Tonnes. It will be replenished after rainy season every year.

10.3 MINING PROCESS

- Mining activity will be carried out by open cast manual/Mechanically method.
- No OB/ waste material will be produced in river bed. The sand shall be exploited upto depth of 3.0 m only through the formation of bench height 1.5m & width 6.0m. An approach road having width 6.0m & gradient 1:12 shall be provided for the movement of loading machineries & transportation of sand. The sand shall be exploited with the deployment of an excavator & filled into Tractors/Trucks & transported to various buyers.
- No drilling/ blasting are required as the material is loose in nature.
- Proper benching of 1.5 m height will be maintained.
- Roads will be properly made and sprayed by water for suppression of dust.

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- Roads in the applied area for the movement of loaded tractors/ trucks will not have slopes more than 1 in 16.
- The mined out area shall be replenished each year during monsoon period and maintained in maximum original topography.
- Approach roads from the various blocks as already described earlier will be merging with permanent tar roads on both sides of the river for transportation of the mineral to final destinations.
- The Sand transportation shall be insured after the covering the vehicle Tarpaulin.

Year Wise Production Schedule:

The annual exploitation of sand from Block-26 (Gaya Morhar – 13) Sand Ghat are given below :-

Table No 10.4

YEAR	Over burden (cum)	ROM Sand (cum)	Saleable Sand (cum)
1 ST	-	414000	414000
2 ND	-	414000	414000
3 RD	-	414000	414000
4 TH	-	414000	414000
5 TH	-	414000	414000

The annual extractable RBM comes to 414000 CUM or 745200 Tonnes. It will be replenished after rainy season every year.

10.4 WATER DEMAND

In the river bed mining projects there is as such no need of water to carry out operations, except for dust suppression& drinking. The number of working people is 32 so the water requirement for workers for drinking purpose will be around 0.64 KLD & the total water requirement will be around 12.35 KLD. This water will be supplied from the nearby area through water tanker.

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Table 10.5- Water Demand

S. No.	Purpose	Water Demand KLD
1.	Drinking & Domestic	0.64
2.	Plantation	1.15
3.	Dust Suppression	10.56
		12.35

10.5 BASE LINE DATA

This section contains the description of baseline studies of the 10km radius of the area surrounding Sand mining Block-26 (Morhar 13) located at Khata No.-108,162,48,15,37 Khasra No. –1,282,283,1,1193,1194,1195/1397,473,87,98,207 Thana No 645,687,689,685,688 Village/Mauja – Baiju Bigha, Bilauti, Dhibra G.P, Phulsathar, Tanrwa Tehsil/Anchal- Gurua District- Gaya, State-Bihar. The data collected has been used to understand the existing environment scenario around the proposed mining project against which the potential impacts of the project can be assessed.

Environmental data has been collected in relation to proposed mining for:-

- (a) Air
- (b) Noise
- (c) Water
- (d) Soil
- (e) Ecology and Biodiversity
- (f) Socio-economy

Table 10.6 BASELINE ENVIRONMENTAL STATUS

Attribute	Baseline status
Ambient Air Quality	Ambient Air Quality Monitoring (AAQM) has been carried out at seven locations during pre-monsoon season from March to May 2023. The minimum and maximum level of PM _{2.5} recorded within the study area was in the range of 24.43µg/m ³ to 63.32µg/m ³ with the 98th percentile 45.67 µg/m ³ to 62.72µg/m ³ at. The minimum and maximum level of PM ₁₀ recorded within the study area was in the range of 43.2µg/m ³ to 91.4µg/m ³ with the 98th percentile 78.76µg/m ³ to 91.40µg/m ³ . The minimum and maximum concentration of SO ₂ recorded within the study area was in the range of was 3.12 µg/m ³ to 13.45µg/m ³ with the 98th percentile 9.44µg/m ³ to 13.36 µg/m ³ . The minimum and maximum level of NO ₂ recorded within the study area was in the range of was 6.12µg/m ³ to 16.78µg/m ³ with the 98th percentile 12.25µg/m ³ to 16.55µg/m ³ . The minimum and maximum level of CO recorded within the study area was in the range of was 0.34µg/m ³ to 0.98µg/m ³ with the 98th percentile 0.67µg/m ³ to 0.97µg/m ³ . The results thus obtained indicate that the concentrations of PM ₁₀ , PM _{2.5} , SO ₂ and NO ₂ in the Ambient Air are well within the National Ambient Air Quality (NAAQ) standards for Industrial, Residential, Rural and other areas.
Noise Levels	Noise monitoring was carried out at 5 locations. The results of the monitoring program indicated that both the daytime and night time levels of noise were well within the prescribed limits of NAAQS, at all the four locations monitored.
Water Quality	3Groundwater samples and 2 surface water samples were analyzed and concluded that: The ground water from all sources remains suitable for drinking purposes as all the constituents are within the limits prescribed by drinking water standards promulgated by Indian Standards IS: 10500. From the Surface water analysis it is evident that most of the parameters of the samples comply with ‘Category ‘C’ standards of CPCB indicating their suitability for Drinking water source after conventional treatment and disinfection.
Soil Quality	Samples collected from identified locations indicate the soil is sandy type and the pH value ranging from 6.29-6.85, which shows that the soil is alkaline in nature. Potassium is found to be from 153.56 mg/kg to 184.35 mg/kg. The water holding capacity is found in between 32.02% to 32.75%.

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Ecology and Biodiversity	There are no Ecologically Sensitive Areas present in the study area, but many reserved forests regions surround the project area
Socio-economy	The implementation of the Sand mining project on river Morhar will throw opportunities to local people for both direct and indirect employment. The study area is still lacking in education, health, housing, water, electricity etc. It is expected that same will improve to a great extent due to proposed mining project and associated industrial and business activities.

ANTICIPATED ENVIRONMENT IMPACT AND MITIGATION MEASURES

10.6 BIOLOGICAL ENVIRONMENT

Flora of the Core Zone

The core zone comprises of river sand bed by the side of water channel of Morhar river basin, where mining operation is proposed. The riparian vegetation has aquatic and marshland plants as the main component. Most among them are weeds. No ecologically sensitive plant species has been reported from this area.

Flora of the Buffer Zone

The core zone of the proposed project area doesn't have any major natural forest land.

A major part of the core and buffer zone of the project is agricultural land having some major vegetation in the form of agro forestry. Vegetation patterns in villages and surrounding areas are slightly different from the rest of the areas in the Gaya district. The common species grown near the villages are mostly edible, fruits bearing or useful plants. Purposely planted tree patches (mostly fruit-bearing) are available nearby several villages in the study area. The most dominant tree species in the study area are *Aegle marmelos* (Bel), *Azadirachta indica* (Neem), *Emblica officinalis* (Amla), *Dalbergia sissoo* (Sisam), *Ficus bengalensis* (Bargad), *Musa paradisiacal* (Kela), *Syzygium cumini* (Jamun), *Cassia siamea* (Kasod/Siris), *Litchi chinensis* (Litchi), *Mangifera indica* (Aam) and in case of shrubs *Antigonum leptopus*, *Ricinus communis*, *Lantana camara*, *Jatropha gossypifolia* and *Cassia auriculata* etc. The most dominant species in the study area of both the district was *Mangifera indica* (Aam) and its different varieties.

Fauna of the Buffer Zone

Proposed alignment passing through the rural and purely in the agricultural field. At some places, it will cross from adjacent to some villages in the study area. The study area is devoid of any natural forest, so, major wildlife animals are rarely found in the area. Only some moving animals were observed. Domesticated animals mainly constitute the faunal population within the project area.

Fauna reported in Core zone:

The domesticated animals like Goat (*Capra aegagrus*); Buffalo (*Bubalus bubalis*); Cow (*Bos primigenius*); Horse (*Equus caballus*); Ass (*Equus hemionus*) and Dog (*Canis lupus familiaris*) were observed moving in different parts of the study area (including core and buffer zone)

Table 10.7 Anticipated impact and mitigation measures for biological environment

Impact Predicted	Suggestive measure
Disturbance to free movement / living of wild fauna viz. Birds, Reptiles etc.	<p>If birds are noticed crossing the core zone, they will not be disturbed at all;</p> <p>Labours will not be allowed to discards food, plastic etc., which can attract animals/birds near the core site;</p> <p>Only low polluting vehicles having PUC will be allowed for carrying mining materials.</p> <p>Noise level will be maintained within permissible limit (silent zone- 50dB (A) during day time or residential zone 55dB (A)) as per noise pollution (regulation and control), rules, 2000, CPCB norms</p>
Disturbance of riparian ecosystem/ wetlands	The riparian ecosystem or the wetlands will not be destroyed by the mine owners

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Monitoring of upstream and downstream water quality	Water quality will be monitored from upstream and downstream area to assess the impact on water quality and plankton and mining activity will be controlled to maintain the clean water conditions.
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10.7 LAND ENVIRONMENT

No adverse impact is anticipated on land use of buffer zone due to present mining operations. As all the related activities are confined to the core zone.

Table 10.8

S.No.	Land use	River bed (Ha)	Forest Land (Ha)	Barren land (Ha)	Grazing Land (Ha)
1	Mining pits Quarry	-	-	-	-
2	Approach Road	-	-	-	-
3	Dumps	-	-	-	-
4	Office, Resht Shelter etc.	-	-	-	-
5	Balance undisturbed land	23.0	-	-	-
Total		23.0	-	-	-

Impact on Land use Pattern including change of River course:

- If mining is not carried out in systematic manner by leaving sufficient safety barriers from the bank than it may disturb the river flow/course.
- Stacking of uncoated material including mineral or spillage (if any) on the bank side of river will hinder the flow of water in monsoon season, raise water level upstream, which may lead to bank cutting or flouting.
- Deviation from planned mining procedures can lead to river channel shifting as well as degradation of surrounding land, causing loss of properties & degradation of land scape.

Mitigation measures:

- Mineral will be mined out in central portion of stream & sufficient safety barrier 10% of width will be left towards bank side, so that river flow/course will not get disturbed.
- Mining of mineral will be started towards rise at the centre & also laterally in 1m slice so

that river course will not get affected. Unwanted material or spillage (if any) will not be stacked by the side of excavation voids created. This is to be done so. Because it will otherwise hinder flow of water in monsoon period.

- No waste water will be generated from the mining activities of minor minerals as the project. Only involves lifting of Sand/Morrum from the river bed.

10.8 AIR ENVIRONMENT

Anticipated impacts and evaluation

Information on air quality was studied and various modelling techniques predicted that the mining activity will not affect the air quality in a significant manner. In mining operations, loading, transportation and unloading operations may cause deterioration in air quality due to handling dry materials. In the present case, only wet materials will be handled, thus eliminating problems of fugitive dust. Also, the collection and lifting of minerals will be done manually without any blasting. Therefore, the dust generated is insignificant as compared to mining process of other hard minerals like the process of drilling, blasting, mechanized loading etc.

Mitigation measures

- In control the emission regular preventive maintenance of equipment will be carried out on contractual basis.
- Proper mitigation measures like water sprinkling will be adopted to control dust emission.
- Plantation will be carried out on approach roads & nearby vicinity of river bank.
- It is being certified that all transportation vehicles will carry a valid PUC certified. The only air pollution sources are the road transport network of the trucks. The dust suppression measures like water spraying will be done on the roads. This will decrease the dust emission by 75%.
- There is no toxic element present in the mineral which may contaminate the soil.

10.9 WATER ENVIRONMENT

Impacts on hydrological Conditions:

- The study area is itself part of river course carries surface as well as ground water (under current). The flow of surface/ground water (sub surface flow is following the trend of topography).
- The area is part of dry river bed for more than nine months in a year except for the rainy season.
- The general ground water table which will be about 3.0m below surface of river bed in the mining area during dry seasons will not be disturbed as ultimate working depth will be 3m. At the end of mining operations every yearly season, the flood water would replenish the mined material, thus it will be positive impact on ground water scenario in the subsequent mining period.

Impact on Water Quality:

- Mining causes lowering of riverbed level as well as riverbed water level resulting in lowering in ground table due to excessive extraction & drainage out of ground water from the adjacent areas, if general ground water table is higher than the river bed level. In case the general ground water level is lower than riverbed water level, than it will have positive impact on ground water table will recharge vertically as well as laterally. In the former case may cause shortage of water for the vegetation & human settlement in the vicinity, but in later case it will help improve situations
- River is recharging the ground water, excessive mining will reduce the thickness of the natural filter material (sediments), infiltration through which the ground water recharged, so restriction in depth becomes necessity

Mitigation Measures: Mining in the area will be done above the water table as well as river bed water level, therefore much impact on water regime is not anticipated.

10.10 NOISE ENVIRONMENT

The sand mining projects are mainly not noisy as these are mainly manual in nature. But in this case the methodology adopted for mining is opencast semi mechanized mining method which may generate noise

Anticipated impacts and evaluation

At mines, noise is created by movement of machinery & transportation vehicles, etc. The noise level in the working environment are compared with the standards prescribed by Occupational Safety and Health Administration (OSHA-USA) which has been adopted and enforced by the Govt. of India through model rules framed under Factories Act, 1980 and CPCB 2000 norms.

Mitigation measures

The off-site receptors are not significantly affected as noise generated by mines is insignificant but for some disturbances due to vehicle movement. The following measures have been envisaged to reduce the impact from the transportation of minerals.

- Periodical monitoring of noise will be done.
- Transportation vehicles will be maintained in good running condition so that noise will be reduced to minimum possible level.
- Noise generated by these Equipment shall be intermittent & does not cause much adverse impact..
- In addition, truck drivers will be instructed to make minimum use of horns in the village area and sensitive zones.

10.11 TRAFFIC ANALYSIS

From the analysis it can be seen that the V/C ratio will change from 0.04 to 0.19 for Gurua Charki Road but LOS will remain unchanged “A” i.e., Excellent & for SH-69 V/C ratio will change from 0.153 to 0.213 with LOS changing from “A” to “B” i.e., from Excellent to Very Good respectively, So the additional load on the carrying capacity will be affected to a minimum level.

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,685,688 Village/Mauja – Baiju Bigha, Bilauti, Dhibra G.P, Phulsathar, Tanrwa Tehsil/Anchal- Gurua District-
Gaya, State-Bihar Proponent- M/s Rajendra and Sons Infra Private Limited, Prop. Minti Kumari
Production- 414000 CUM per annum or 745200 TPA Area- 23.0 Ha**

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10.12 SOCIO- ECONOMIC ENVIRONMENT

The implementation of the Sand/Morrum mining project will throw opportunities to local people for both direct and indirect employment. Since the quarries will be leased out to successful allottees, sand/Morrum mining operation in the state will get legalized and it will fetch income to the state exchequer. The project will also provide impetus to industrialization of the area. With the implementation of the proposed mining project the occupational pattern of the people in the area will change making more people engaged in industrial and business activities rather in agriculture. Thus, there will be a gradual shifting of population from agriculture to mining and industry. Further, the mining and industrial activities in the area may lead to rapid increase in population and thereby urbanization. Due to urbanization of the area, employment opportunities will further increase.

10.13 ENVIRONMENTAL MANAGEMENT PLAN (EMP)

Proper environmental management plan are proposed for “Sand/Morrum” mining project to mitigate the impact during the mining operation.

- Care will be taken that no labour camps will be allowed on river bed.
- Care will be taken that no cooking, or burning of woods will be allowed in the adjoining area.
- Prior to mining, short awareness program will be conducted for labors to make them aware to way of working.
- If some causality or injury to animal occurs, it will be informed to forest department and proper treatment will be given.
- No tree cutting, chopping, lumbering, uprooting of shrubs and herbs will be allowed.
- Corridor movement of wild mammals (If exists) will be avoided
- Care will be taken that noise produced during vehicles movement for carrying sand/Morrum are within the permissible noise level.
- No pilling of material will be in adjoining area.
- If wild animals are noticed crossing the river bed, it will not be disturbed or chased away, instead the labors will move away from their path.

10.14 ENVIRONMENTAL MANAGEMENT PLAN IMPLEMENTATION

Environmental Management Plan serves no purpose if it is not implemented with true spirit. Some loopholes in the EMP can also be detected afterwards when it is implanted and monitored. Thus, an implementation and monitoring programme has to be prepared.

The major attributes of environment are not confined to the mining site alone. Implementation of proposed control measures and monitoring programme has an implication on the surrounding area as well as for the region. Therefore, mine management will strengthen the existing control measures as elaborated earlier in this report and monitor the efficacy of the control measures implemented within the mining area relating to the following specific areas for eco-friendly mining:

- a. Collection of air and water samples at strategic locations with frequency suggested and by analyzing thereof. If the parameters exceed the permissible tolerance limits, corrective regulation measure will be taken.
- b. Collection of soil samples at strategic locations once in every year and analysis thereof with regard to deleterious constituents, if any.
- c. The effectiveness of drainage system depends upon proper cleaning of all drains provided in the surrounding of mine area. Any blockage due to siltation or loose material will be checked at least once in a month.
- d. Measurement of water level fluctuations in the nearby ponds, dug wells and bore wells.
- e. Regular visual examination will be carried out to look for erosion of river banks. Any abnormal condition, if observed will be taken care of.
- f. Measurement of noise levels at mine site, stationary and mobile sources, and adjacent villages will be done in every quarter of the year.
- g. Plantation/afforestation as will be done at area allotted by Government bodies as it is not

feasible to plant trees near the mine lease area. Post plantation, the area will be regularly monitored in every season for evaluation of success rate. For selection of plant species local people will also be involved.

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Table 10.9 Budget allotted for Environmental Management Plan

S. No	Description	Capital Cost (INR)	Recurring Cost (INR)
1	Pollution Control & Dust Suppression	Nil	2.0
2	Pollution Monitoring i) Air Pollution ii) Water Pollutioniii)Soil Pollution iv)Noise Pollution	--	2.0
3	Green Belt Development	2.3	0.5
4	Haul road Maintenance Cost	0.5	1.8
TOTAL		2.8	6.3

10.15 MONITORING SCHEDULE AND PARAMETERS

Table 10.10 Monitoring Schedule and Parameters

S.No.	Description of Parameters	Schedule of Monitoring
1	Air Quality	24 hourly samples twice a week in each season except monsoon
2	Water Quality (Surface &Groundwater)	Twice a year
3	Soil Quality	Once in a year in project area
4	Noise Level	Twice a year for first two years & then once a year
5	Socio-economic Condition	Once in 3 years
6	Plantation monitoring	Once in a season

10.16 BENEFIT OF MINING

➤ PHYSICAL BENEFITS

Improvement in the Physical Infrastructure

The opening of the proposed project will enhance the following physical infrastructure facilities in the adjoining areas.

- a. **Road Transport:** There will be improved road communication due to the proposed project and maintenance will also be done time to time.
- b. **Market:** Generating useful economic resource for construction. Excavated mineral will provide a good market opportunity.
- c. **Enhancement of green cover:** As a part of reclamation plan, plantation will be carried along the Lease boundary or along the road sides or near the civic amenities.
- a. **Creation of community assets** (infrastructure) like provision for drinking water, construction of school buildings, village roads/ linked roads, dispensary & health center, community center, market place etc, as a part of corporate social responsibility.

The impact on the civic amenities will be substantial after the commencement of mining activities. The basic requirement of the community needs will be strengthened by extending health care, educational facilities developed in the township to the community, providing drinking water to the villages, building/strengthening of existing roads in the area. The proponent will initiate the above amenities either by providing or by improving the facilities in the area, which will help in uplifting the living standards of local communities. Medical facilities will be provided in the form of first-aid facility at the mine. These medical facilities will also be available to local people in the surrounding in case of emergencies.

➤ SOCIAL BENEFITS

- Generation of employment and improved standard of living;
- Increased revenue to the State by way of royalty, taxes and duties; and

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- Superior communication and transport facilities etc.
 - There will be significant change in the socio-economic scenario of the area.
 - The proposed project will enhance the prospects of employment. Recruitment for the unskilled and semiskilled workers for the proposed project will be from the nearby villages.
 - The development of the basic amenities viz. roads, transportation, electricity, drinking water, proper sanitation, educational institutions, medical facilities, entertainment, etc. will be developed as far as possible.
 - Overall, the proposed project will change living standards of the people and improve the socio-economic conditions of the area.
- a) **Increase in Employment** Potential due to the project activity. Employment opportunities will increase both directly as well indirectly.
- b) **Contribution to the Exchequer** as the saleable minerals will be given royalty. Since the quarries will be leased out to successful allottees, mining operation in the state will get legalized and it will fetch income to the state exchequer.
- c) **Increased Health related activities:** Healthcare promotional activities will be undertaken. Pre-placement & Periodic medical check-up will be done, which will lift the general health status of the residents of the area. Health camps, medical aids, family welfare programs, immunization camp sports will be arranged.
- d) **Educational attainments:** educational activities will be promoted by the lessee. Awareness program will be arranged covering basic issues related to primary level education, environment, health and hygiene etc.
- e) **Strengthening of existing community** facilities through the Community Development Programme.

ENVIRONMENTAL BENEFITS

➤ Enhancement Of Green Cover

Plantation/afforestation will be done as per program 230 plants will be planted along the area demarcated by Gram Panchayat/Local Administrative body with consultation & permission of

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concerned authority within 5km from lease boundary along with provision for maintenance for 5 years. Post plantation, the area will be regularly monitored in every season for evaluation of success rate. For selection of plant species local people will also be involved. The management will provide free saplings of fruit and other trees, etc. to local during rain for plantation. This will increase the consciousness in workers and near-by villagers for greenery. Fruit trees can contribute towards their financial gains.

10.17 CORPORATE SOCIAL RESPONSIBILITY

2 % of capital cost of the project cost will be allotted for the Corporate Environmental Responsibility as per OM dated 1st May 2018.

CER cost will be 2% of the total project cost. This amount will be used for social welfare. CER cost is Rs. 25,55,000

For each activity the funds to be earmarked by the proponent will be decided after discussion with the local authority/people and the beneficiaries during public hearing. It has been planned to undertake a concurrent evaluation of the activities to be taken up under the CER programme

10.18 CONCLUSIONS

- The mining operations will meet the compliance requirements of MoEF & CC;
- Community impacts will be beneficial, as the project will generate significant economic benefits for the region;
- Adoption of Best Available Technology and Best Management Practices with more environmentally friendly process
- With the effective implementation of the Environment Management Plan (EMP) during the mining activities, the proposed project can proceed without any significant negative impact on environment

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11. DISCLOSURE OF CONSULTANTS
ENGAGED

The consultant engaged for the preparation of the EIA/EMP of the project is M/s Cognizance Research India Private Ltd. The information about the company with address is as follows:

Basic Information about the Consultant Engaged is as follows stated below:

Name of the Consultant	Cognizance Research India Private Ltd.
Address	Suite- B 02 H-61Sector –63, Noida - 201301, U.P
Credentials	Accredited by QCI/NABET

Personnel involved in the preparation of EIA/EMP report are stated below:

Sr. No.	Name	EC/FAE	Details
01	Mr. Pravin Kumar Sinha	EC	EIA Coordinator (Mining of minerals opencast).
02	Mr. Nimish Singhvi	FAE	AP, SHW & GEOLOGY
03	Mr. Bhavesh Jha	FAE	SE
04	Ms. Rahul Kumar	FAE	AQ
05	Mr. Ankur Sharma	FAE	WP
05	Ms. Pooja	FAE	EB
06	Mr. PM Jain	FAE	RH, NV
07	Abhishek Kumar Singh	FAE	LU
08	Vidhya Bhushan Trivedi	FAE	HG
09	Anjali Haribhau Chachane	FAE	SC

Accreditation Certificate of the Consultant Engaged:

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**QUALITY COUNCIL
OF INDIA**
Creating an Ecosystem for Quality



**National Accreditation Board
for Education and Training**



Certificate of Accreditation

Cognizance Research India Private Limited
 B-02, H-61, Sec 63, Noida, Uttar Pradesh

The organization is accredited as Category-A under the QCI-NABET Scheme for Accreditation of EIA Consultant Organization, Version 3: for preparing EIA-EMP reports in the following Sectors –

S. No	Sector Description	Sector (as per)		Cat.
		NABET	MoEFCC	
1	Mining of minerals including opencast/ underground mining	1	1 (a) (i)	A
2	River Valley projects	3	1 (c)	B
3	Mineral beneficiation	7	2 (b)	A
4	Synthetic organic chemicals industry (dyes & dye intermediates; bulk drugs and intermediates excluding drug formulations; synthetic rubbers; basic organic chemicals, other synthetic organic chemicals and chemical intermediates)	21	5 (f)	B
5	Building and construction projects	38	8 (a)	B
6	Townships and Area development projects	39	8 (b)	B

Note: Names of approved EIA Coordinators and Functional Area Experts are mentioned in SAAC minutes dated December 2, 2022 and Supplementary Assessment dated Dec 23, 2022 posted on QCI-NABET website.

The Accreditation shall remain in force subject to continued compliance to the terms and conditions mentioned in QCI-NABET's letter of accreditation bearing no. QCI/NABET/ENV/ACO/23/2644 dated Jan 18, 2023. The accreditation needs to be renewed before the expiry date by Cognizance Research India Private Limited following due process of assessment.


Sr. Director, NABET
 Dated: January 18, 2023

Certificate No.
 NABET/EIA/1922/SA 0186

Valid up to
 September 10, 2023

For the updated List of Accredited EIA Consultant Organizations with approved Sectors please refer to QCI-NABET website.

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Consultant Contact Details:

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Mobile no. - +919910047760, +919953843815

Email id – criplindia@gmail.com

ANNEXURE I

TOR

File No.SIA/1(a)/2360/2023
Government of India
State Level Environment Impact Assessment Authority
Bihar

To,

M/s RAJENDRA AND SONS INFRA PRIVATE LIMITED
15, Mother Teresa Marg, North SK Puri, Patliputra, Patna,
Patna-800013
Bihar

Tel.No.-; Email:rsinfrapatna15@gmail.com

Sub. Terms of Reference to the Sand Mining Project, Block-26 (Gaya Morhar – 13) Sand Ghat of District- Gaya, State-Bihar., 15, Mother Teresa Marg, North SK Puri, Patliputra, Patna

Dear Sir/Madam,

This has reference to the proposal submitted in the Ministry of Environment, Forest and Climate Change to prescribe the Terms of Reference (TOR) for undertaking detailed EIA study for the purpose of obtaining Environmental Clearance in accordance with the provisions of the EIA Notification, 2006. For this purpose, the proponent had submitted online information in the prescribed format (Form-1) along with a Pre-feasibility Report. The details of the proposal are given below:

- | | |
|---|--|
| 1. Proposal No.: | SIA/BR/MIN/415652/2023 |
| 2. Name of the Proposal: | Sand Mining Project, Block-26 (Gaya Morhar – 13) Sand Ghat of District- Gaya, State-Bihar. |
| 3. Category of the Proposal: | Non-Coal Mining |
| 4. Project/Activity applied for: | 1(a) Mining of minerals |
| 5. Date of submission for TOR: | 11 Mar 2023 |

Date : 21-04-2023

Mr. Sudhir Kumar
(Member Secretary)

Office : **2nd Floor, Beltron B**
Phone No : Mobile : **6205120678**
Email id : **seiaa.ms.br@gmail.com**

Note : This is auto tor granted letter.

In this regard, under the provisions of the EIA Notification 2006 as amended, the Standard TOR for the purpose of preparing environment impact assessment report and environment management plan for obtaining prior environment clearance is prescribed with public consultation as follows:

STANDARD TERMS OF REFERENCE (TOR) FOR EIA/EMP REPORT FOR PROJECTS/ACTIVITIES REQUIRING ENVIRONMENT CLEARANCE

Terms of Reference (TOR) for preparation of Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) for "Mining of Minerals" as per the EIA Notification, 2006 has been devised to improve the quality of the reports and facilitate decision-making transparent and easy. TOR will help the project proponents to prepare report with relevant project specific data and easily interpretable information. TOR for mining of minerals is expected to cover all environmental related features.

Mining of minerals plays a positive role in the process of country's economic development. In addition to the contribution towards economic growth, mining can also be a major source of degradation of physical as well as social environment, unless it is properly managed. Environmental impacts can arise during all activities of the mining process. Minimizing the damage due to mining operations depends on sound environmental practices in a framework of balanced environmental legislation. The potential adverse effects of mining activities include air pollution, surface and groundwater pollution, noise and vibration, damage to local ecology, natural topography and drainage, depletion of water resources etc. All these environmental components are required to be considered while selecting a proper methodology of mining, mitigation measures to reduce pollution load, conservation of natural resources etc.

The projects of mining of minerals as stated in the schedule require prior environment clearance under the EIA notification, 2006. Category 'A' Projects are handled in the MoEF&CC and Category 'B' projects are being handled by the respective State Environment Impact Assessment Authorities (SEIAAs) notified by MoEF&CC and following the procedure prescribed under the EIA Notification, 2006. As per this Notification, as amended, the projects of mining of minor minerals with mining lease area equal to or greater than 50 hectare are to be handled at the level of the MoEF&CC for grant of EC. Such projects with mining lease area less than 50 hectare are to be handled by the respective State Environment Impact Assessment Authority (SEIAA).

1(a):STANDARD TERMS OF REFERENCE FOR CONDUCTING ENVIRONMENT IMPACT ASSESSMENT STUDY FOR NON-COAL MINING PROJECTS AND INFORMATION TO BE INCLUDED IN EIA/EMP REPORT

- 1) Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to 1994.
- 2) A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given.
- 3) All documents including approved mine plan, EIA and Public Hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc. and should be in the name of the lessee.
- 4) All corner coordinates of the mine lease area, superimposed on a High Resolution Imagery/ toposheet, topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of

STANDARD TERMS OF REFERENCE (TOR) FOR EIA/EMP REPORT FOR PROJECTS/ ACTIVITIES REQUIRING ENVIRONMENT CLEARANCE

the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).

- 5) Information should be provided in Survey of India Toposheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics.
- 6) Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority.
- 7) It should be clearly stated whether the proponent Company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/procedures to bring into focus any infringement/deviation/violation of the environmental or forest norms/ conditions? The hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large, may also be detailed in the EIA Report.
- 8) Issues relating to Mine Safety, including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided.
- 9) The study area will comprise of 10 km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc. should be for the life of the mine / lease period.
- 10) Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.
- 11) Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be given.
- 12) A Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees.
- 13) Status of forestry clearance for the broken up area and virgin forestland involved in the Project including deposition of net present value (NPV) and compensatory afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished.

STANDARD TERMS OF REFERENCE (TOR) FOR EIA/EMP REPORT FOR PROJECTS/ACTIVITIES REQUIRING ENVIRONMENT CLEARANCE

- 14) Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated.
- 15) The vegetation in the RF / PF areas in the study area, with necessary details, should be given.
- 16) A study shall be got done to ascertain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and accordingly, detailed mitigative measures required, should be worked out with cost implications and submitted.
- 17) Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/ Elephant Reserves/(existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished.
- 18) A detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled-I fauna found in the study area, the necessary plan alongwith budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost.
- 19) Proximity to Areas declared as 'Critically Polluted' or the Project areas likely to come under the 'Aravali Range', (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Dept. Should be secured and furnished to the effect that the proposed mining activities could be considered.
- 20) Similarly, for coastal Projects, A CRZ map duly authenticated by one of the authorized agencies demarcating LTL, HTL, CRZ area, location of the mine lease w.r.t CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority).
- 21) R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a need based sample survey, family-wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in the mine lease area will be shifted or not. The issues relating to shifting of village(s) including their R&R and socio-economic aspects should be discussed in the Report.

STANDARD TERMS OF REFERENCE (TOR) FOR EIA/EMP REPORT FOR PROJECTS/ ACTIVITIES REQUIRING ENVIRONMENT CLEARANCE

- 22) One season (non-monsoon) [i.e. March-May (Summer Season); October-December (post monsoon season) ; December-February (winter season)]primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given.
- 23) Air quality modeling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of vehicles for transportation of mineral. The details of the model used and input parameters used for modeling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map.
- 24) The water requirement for the Project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the Project should be indicated.
- 25) Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.
- 26) Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.
- 27) Impact of the Project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided.
- 28) Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. In case the working will intersect groundwater table, a detailed Hydro Geological Study should be undertaken and Report furnished. The Report inter-alia, shall include details of the aquifers present and impact of mining activities on these aquifers. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished.
- 29) Details of any stream, seasonal or otherwise, passing through the lease area and modification / diversion proposed, if any, and the impact of the same on the hydrology should be brought out.
- 30) Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and bgl. A schematic diagram may also be provided for the same.
- 31) A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the Project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered

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under plantation and the species to be planted. The details of plantation already done should be given. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution.

- 32) Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines.
- 33) Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.
- 34) Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.
- 35) Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.
- 36) Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.
- 37) Measures of socio economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.
- 38) Detailed environmental management plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project.
- 39) Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project.
- 40) Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.
- 41) The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.
- 42) A Disaster management Plan shall be prepared and included in the EIA/EMP Report.

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- 43) Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.
- 44) Besides the above, the below mentioned general points are also to be followed:-
- a) All documents to be properly referenced with index and continuous page numbering.
 - b) Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated.
 - c) Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF&CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the Project.
 - d) Where the documents provided are in a language other than English, an English translation should be provided.
 - e) The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.
 - f) While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF vide O.M. No. J-11013/41/2006-IA.II(I) dated 4th August, 2009, which are available on the website of this Ministry, should be followed.
 - g) Changes, if any made in the basic scope and project parameters (as submitted in Form-I and the PFR for securing the TOR) should be brought to the attention of MoEF&CC with reasons for such changes and permission should be sought, as the TOR may also have to be altered. Post Public Hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation.
 - h) As per the circular no. J-11011/618/2010-IA.II(I) dated 30.5.2012, certified report of the status of compliance of the conditions stipulated in the environment clearance for the existing operations of the project, should be obtained from the Regional Office of Ministry of Environment, Forest and Climate Change, as may be applicable.
 - i) The EIA report should also include (i) surface plan of the area indicating contours of main topographic features, drainage and mining area, (ii) geological maps and sections and (iii) sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area.

ANNEXURE II

LOI

जिला खनन कार्यालय, गया।

पत्रांक...5503/खनन, गया, दिनांक...29.11.22

प्रेषक,

अमरेश कुमार (वि.प्र.से.)
वरीय उप समाहर्ता-सह-
प्रभारी खनिज विकास पदाधिकारी, गया।

सेवा में,

M/s RAJENDRA AND SONS INFRA PRIVATE LIMITED

Prop-Minti Kumari, D/o- Sri surendra Pd. Yadav
15, MOTHER TERESA MARG, NORTH S.K. PURI
Email- RSINFRAPATNA15@GMAIL.COM,
Mobile- 9431456331

विषय :- गया जिलान्तर्गत बालूखण्ड संख्या-26 (गया मोरहर-13) की आगामी पाँच वर्षों के लिए बन्दोबस्ती हेतु दिनांक-23.11.2022 को सम्पन्न ई-नीलामी में उच्चतम डाकवक्ता घोषित होने के फलस्वरूप सैद्धांतिक स्वीकृत्यादेश के संबंध में।

महाशय,

उपर्युक्त विषयक गया जिलान्तर्गत बालूखण्ड संख्या-26 (गया मोरहर-13), रकवा-23 हेक्टेयर की आगामी पाँच वर्षों के लिए बन्दोबस्ती हेतु दिनांक-23.11.2022 को सम्पन्न ई-नीलामी में आपके द्वारा निर्धारित सुरक्षित जमा राशि मो0- 6,21,00,000/- (छः करोड़ इक्कीस लाख) रू0 के विरुद्ध मो0- 12,42,00,000/- (बारह करोड़ बेयालीस लाख) रू0 की उच्चतम डाक बोली गई, फलस्वरूप आप उच्चतम/सफल डाकवक्ता घोषित हुए हैं। निविदा दस्तावेज की कंडिका-20 (i) के आलोक में आपके द्वारा नीलामी राशि की 25 प्रतिशत राशि (जमा अग्रधन राशि समायोजनोपरान्त) प्रतिभूति राशि मो0-1,55,25,000/- (एक करोड़ पचपन लाख पच्चीस हजार) रू0 के भुगतान का साक्ष्य दिनांक-25.11.2022 को कार्यालय में प्रस्तुत किया गया है।

निविदा दस्तावेज की कंडिका 20(i)(ii)(iii)(iv)(v) के आलोक में जिलान्तर्गत बालूखण्ड संख्या-26 (गया मोरहर-13) के सैद्धांतिक स्वीकृति की शर्त एवं बंधेज निम्नवत् हैं :-

1. बालूखण्ड संख्या-26 (गया मोरहर-13) से संबंधित विवरणी निम्नवत् है :-

क्र.	नदी का नाम	रकवा (हेक्टेयर में)	Geo Coordinates		
			Latitude		Longitude
1	मोरहर (Non-Perennial)	23	A	24°39'46.86"N	84°48'55.72"E
			B	24°39'46.04"N	84°49'3.59"E
			C	24°39'2.75"N	84°48'49.15"E
			D	24°39'3.54"N	84°48'43.91"E
2	वन क्षेत्र से दूरी		लगभग 9.06 कि.मी.		
3	सुरक्षित क्षेत्र/वन अभ्यारण्य क्षेत्र/पक्षी अभ्यारण्य/वन्य जीव आश्रयण क्षेत्र से दूरी		लगभग 26.91 कि.मी.		
4	बालूघाट/बालूखण्ड से 500 मीटर के अन्दर खनन पट्टा क्षेत्र की स्थिति		लागू नहीं		
5	पुरातात्विक स्थल से दूरी		लागू नहीं		
6	खनन योग्य मात्रा		414000 घनमीटर		

2. भुगतान की शर्त :-

- (i) नीलामी-राशि केवल प्रथम वर्ष के लिए बंदोबस्ती की राशि मानी जाएगी। दूसरे वर्ष और उसके अनुक्रमी वर्षों में बंदोबस्ती की राशि गत वर्ष की बंदोबस्ती राशि के 120 प्रतिशत अथवा समय-समय पर सरकार द्वारा निर्धारित निदेशों के अनुरूप होगा।

- (ii) प्रतिभूति जमा के अतिरिक्त आपको निम्नलिखित समय सारणी/भुगतान अनुसूची के अनुसार बंदोबस्ती की राशि का भुगतान करना होगा :-

किस्त	भुगतान की नियत तारीख
प्रथम किस्त (50%)	(क) पट्टा संविदा निष्पादन से पहले (पहले वर्ष के लिए) (ख) प्रथम वर्ष में पट्टा संविदा निष्पादन की तिथि से एक वर्ष पूरा होने के 60 दिन पूर्व और अनुक्रमिक वर्षों में इसी प्रक्रिया का पालन करते हुए जमा किया जायेगा।
द्वितीय किस्त (25%)	पट्टा संविदा निष्पादन की तिथि से 03 महीना पूरा होने से पहले।
तृतीय किस्त (25%)	पट्टा संविदा निष्पादन की तिथि से 06 महीना पूरा होने से पहले।

- GST का भुगतान :-** जी0एस0टी0 के रूप में प्रचलित दर के अनुसार राशि वाणिज्य कर विभाग को भुगतान करना होगा। जिला खनन कार्यालय, गया में जी0एस0टी0 भुगतान का प्रमाण प्रत्येक किस्त के साथ देना होगा।
- आयकर/अन्य करों का भुगतान :-** आयकर अधिनियम के तहत आयकर एवं उस पर नियमानुसार देय अधिभार का भुगतान आयकर विभाग के प्रचलित दर के अनुसार एक मुश्त करना होगा। यह राशि बंदोबस्ती राशि के प्रत्येक किस्त के साथ देय होगी। जिला खनन कार्यालय, गया द्वारा यह राशि आयकर मद में जमा करा दी जायेगी।
- जिला खनिज फाउण्डेशन :-** Bihar Mineral District Foundation Rules, 2018 के अनुसार बंदोबस्ती राशि की 2 प्रतिशत राशि जिला खनिज फाउण्डेशन, गया के नाम भुगतये बैंक ड्राफ्ट के माध्यम से करना होगा।
- वैधानिक अनापत्ति :-** बालूघाट संचालन हेतु आवश्यक समस्त वैधानिक अनापत्ति/अनुमति यथा:- खनन योजना, पर्यावरणीय स्वीकृति, जल एवं वायु सहमति आदि आपके द्वारा सैद्धांतिक स्वीकृत्यादेश (LOI) निर्गत तिथि से तीन माह की अवधि के अन्दर प्राप्त करना सुनिश्चित करेंगे। वैधानिक अनापत्ति/अनुमति प्राप्त करने के पश्चात् ही बालू खनन प्रारंभ किये जाने हेतु कार्यदेश निर्गत किया जा सकेगा। वैधानिक अनापत्ति/अनुमति निम्नानुसार है:-
 - खनन योजना:-** खनन योजना प्रभावी नियमों में उल्लिखित प्रावधानों के अनुसार सफल डाकवक्ता/बंदोबस्तधारी द्वारा QCI/NABET से मान्यता प्राप्त Professional RQP से तैयार कर निदेशक, खान या विभाग द्वारा प्राधिकृत पदाधिकारी के समक्ष लेटर ऑफ इंटेन्ट निर्गत होने से 30 दिनों के अन्दर अनुमोदन के लिए प्रस्तुत करेगा। खनन योजना बनाने पर होने वाले व्यय का वहन संबंधित खनिज डाकवक्ता/बंदोबस्तधारी द्वारा किया जायेगा। साथ ही खनन योजना की जाँच हेतु समाहर्ता/विभाग अन्य ऐजेंसी चयनित कर सकेगा, जिसका निर्धारित फीस/खर्च भी बंदोबस्तधारी को ही वहन करना होगा। सफल डाकवक्ता/बंदोबस्तधारी खनन योजना के अनुसार खनन करना सुनिश्चित करेंगे।
 - पर्यावरणीय स्वीकृति:-** सफल डाकवक्ता/बंदोबस्तधारी खनन योजना अनुमोदन के 15 दिनों के अन्दर पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय, भारत सरकार के सक्षम प्राधिकार के समक्ष पर्यावरणीय स्वीकृति (EC) के लिए प्रस्ताव समर्पित करेगा। समयबद्ध रीति से पर्यावरणीय एवं अन्य वैधानिक स्वीकृति प्राप्त करना सफल डाकवक्ता की जिम्मेवारी होगी। अपेक्षित पर्यावरणीय स्वीकृति एवं अन्य आवश्यक स्वीकृति प्राप्त करने में किसी भी प्रकार की देरी के लिए सफल डाकवक्ता स्वयं जिम्मेवार होंगे एवं इस संबंध में किसी भी प्रकार की क्षतिपूर्ति के लिए कोई भी दावा मान्य नहीं होगा।
 - जल एवं वायु सहमति:-** पर्यावरणीय स्वीकृति प्राप्त करने के पश्चात् सफल डाकवक्ता अधिकतम 07 (सात) दिवस के अंदर जल (प्रदूषण निवारण एवं नियंत्रण) अधिनियम, 1974 तथा वायु (प्रदूषण निवारण एवं नियंत्रण) अधिनियम, 1981 के अधीन सक्षम पदाधिकारी के समक्ष सहमति/ Consent to Establish/ Consent to Operate प्राप्त करने हेतु आवेदन प्रस्तुत करेगा।

- iv. **खनन के लिए अनुमत मात्रा:-** खनन योजना, पर्यावरणीय स्वीकृति तथा जल (प्रदूषण निवारण एवं नियंत्रण) अधिनियम, 1974 तथा वायु (प्रदूषण निवारण एवं नियंत्रण) अधिनियम, 1981 के तहत प्राप्त सहमति में वर्णित बालू की मात्रा (इनमें से जो भी कम हो) तक ही खनन अनुमान्य होगा। यदि अनुमोदित खनन योजना, पर्यावरणीय स्वीकृति तथा जल एवं वायु सहमति में खनन योग्य मात्रा कम किये जाने पर भी वार्षिक देय बंदोबस्ती राशि किसी स्थिति में कम नहीं की जाएगी।
- v. बिना किसी वैध कारण के पर्यावरणीय स्वीकृति, Consent to Establish/ Consent to Operate /जल एवं वायु सहमति प्राप्त नहीं कर पाते हैं या प्राप्त करने में रुचि नहीं लेते हैं तो, समाहर्ता द्वारा अग्रधन

7. बंदोबस्ती विलेख/पट्टा संविदा (डीड) निष्पादन करना :-


- सफल डाकवक्ता द्वारा सभी वैधानिक अनापत्ति प्राप्त करने के उपरान्त 5 वर्षों की अवधि के लिए बालू खनन करने हेतु समानुदान/बंदोबस्ती स्वीकृत किया जाएगा। सफल डाकवक्ता विहित प्रपत्र में संबंधित नियमानुसार बंदोबस्ती विलेख अथवा उसके समरूप एक प्रपत्र, कार्य आरंभ करने के पहले, निष्पादित करेगा तथा यथा विहित अपेक्षित प्रतिभूति राशि जमा देगा। बंदोबस्तधारी के पट्टे की अवधि विलेख/संविदा निष्पादन की तिथि से पाँच वर्षों के लिए विधिमान्य होगा।
- बंदोबस्तधारी को निष्पादित संविदा का निबंधन संबंधित विभाग के प्रचलित नियमों के अधीन 01 माह के अन्दर कराना अनिवार्य होगा।

8. सामान्य शर्तें :-

- बंदोबस्तधारी नदी तट से बालू प्रेषण के बिन्दु पर एक साईनबोर्ड एवं सीमा स्तंभ का अधिष्ठापन करायेगा जिसपर बंदोबस्तधारी का नाम एवं पता, बंदोबस्ती की अवधि, स्थानीय मैनेजर का नाम एवं पता तथा बालू का विक्रय मूल्य प्रदर्शित किया जाएगा। यदि साईन बोर्ड निरीक्षण में नहीं पाया गया तो शास्ति अधिरोपित की जाएगी।
- बंदोबस्तधारी श्रम विधियों के प्रावधानों के अनुसार आश्रय गृह, पीने का पानी, शिशु गृह (क्रेचेज) तथा फर्स्ट एड किट की व्यवस्था संबंधित बालूघाटों में लगे श्रमिकों के लिए करेगा।
- बंदोबस्तधारी संबंधित क्षेत्रों का निरीक्षण करेगा तथा स्वयं/ अथवा अपने द्वारा अधिकृत प्रतिनिधियों के माध्यम से बालूघाटों का प्रचालन करेगा। किसी रूप में किये गये उपपट्टा (सबलेटिंग) के लिए बंदोबस्ती रद्द कर दी जाएगी। बालूघाटों/नदी तल तक बालू के परिवहन के प्रयोजनार्थ पहुँच-पथ (अप्रोच रोड) का निर्माण सफल डाकवक्ता/बंदोबस्तधारी द्वारा स्वयं अपने खर्च से किया जाएगा।
- बालूघाट की सुरक्षा की जिम्मेदारी सफल डाकवक्ता/बंदोबस्तधारी की होगी।
- सफल डाकवक्ता/बंदोबस्तधारी बंदोबस्त क्षेत्र के भीतर किसी अवैध खनन के लिए जिम्मेवार होंगे और पाई गई किसी शिकायत पर गंभीरता से विचार किया जाएगा तथा बंदोबस्तधारी के विरुद्ध अपराधिक मामला दायर किया जाएगा।
- सफल डाकवक्ता/बंदोबस्तधारी समाहर्ता द्वारा बालूघाटों के संचालन के संबंध में लोकहित में जारी निर्बंधनों और शर्तों तथा निदेशों का पालन करेगा।
- यथोक्त शर्तों, बंधेजों एवं निर्बंधनों का पालन नहीं करने पर कारण पृच्छा निर्गत कर बंदोबस्ती रद्द करने की कार्यवाई की जा सकेगी।
- सफल डाकवक्ता/बंदोबस्तधारी को खनन राजस्व/जी0एस0टी0/आयकर/स्टाम्प शुल्क/रजिस्ट्रेशन फीस का भुगतान नहीं करने की दशा में 30 दिनों के अंदर कारण स्पष्ट करने हेतु नोटिस दी जायेगी। निर्धारित अवधि के अंदर सफल डाकवक्ता/बंदोबस्तधारी द्वारा बकाया का भुगतान करने में असफल रहने की दशा में राशि वसूली की कार्यवाई के साथ-साथ बंदोबस्ती रद्द करने की भी कार्यवाई की जाएगी।
- नीलामी हेतु प्रस्तावित बालूघाटों से संबंधित तकनीकी तथा अन्य बिन्दुओं यथा भूमि के अंचल, थाना, मौजा, खाता, खेसरा, रकबा तथा GPS Co-ordinate के संबंध में विवाद/त्रुटि पाए जाने पर संशोधन का अधिकार संबंधित जिला खनन कार्यालय का होगा। बालूघाटों का सीमांकन एवं नियमानुसार निर्धारित आयाम/विशिष्टियों का सीमा स्तंभ का अधिष्ठापन GPS Co-ordinate के अनुसार बालू बंदोबस्तधारी को कराना होगा तथा खनन के क्रम में संधारित कराना सफल

- डाकवक्ता/बंदोबस्तधारी की जवाबदेही होगी, जिसे RQP/ अंचलाधिकारी की उपस्थिति में प्रमाणित कराकर खनन कार्य कराना होगा। बालूघाटों के निर्धारित क्षेत्र का Reduced Level (RL)/Pre-Level (PL) एवं Satellite images मानसून के पूर्व एवं बाद का समर्पित करना होगा।
- (x) बालूघाट से लिंक रोड और बालूघाट के बीच कोई प्राकृतिक जल मार्ग सिंचाई नहर पड़ती हो सफल डाकवक्ता/बंदोबस्तधारी जल ससांधन विभाग की पूर्व अनुमति से अस्थायी संरचनाएँ खड़ा कर सकेगा। पूर्व अनुमति के लिए ऐसे आवेदन जल ससांधन विभाग के संबंधित मुख्य अभियंता के समक्ष दिए जाएंगे।
- (xi) बालूघाट में रैयती/बंदोबस्त जमीन होने पर संबंधित रैयत से सहमति प्राप्त कर बालू का खनन करना होगा। यह जिम्मेदारी पूर्णतः बंदोबस्तधारी की होगी एवं विभाग से कोई क्षतिपूर्ति का दावा मान्य नहीं होगा।
- (xii) बंदोबस्तधारी द्वारा बंदोबस्ती अवधि के दौरान किसी भी कारण से खनन कार्य नहीं करने की स्थिति में किसी भी प्रकार का मुआवजा/नुकसान एवं क्षतिपूर्ति का दावा मान्य नहीं होगा।
- (xiii) ई-नीलामी एवं बालूघाट की बंदोबस्ती अवधि के दौरान उत्पन्न किसी भी प्रकार का विवाद बिहार खनिज (समानुदान, अवैध खनन, परिवहन एवं भंडारण निवारण) नियमावली 2019, (यथा संशोधित) के अधीन होगा।
- (xiv) सफल डाकवक्ता/बंदोबस्तधारी को इलेक्ट्रॉनिक माध्यम से भेजी गई कोई भी सूचना/निदेश /आदेश इत्यादि IT Act के तहत स्वीकार्य साक्ष्य के रूप में माना जायेगा।

विश्वासभाजन



वरीय उप समाहर्ता-सह-
प्रभारी खनिज विकास पदाधिकारी, गया।

ANNEXURE III

MINING PLAN

बिहार सरकार,
खान एवं भूतत्व विभाग।

पत्रांक— 198 / एम0, पटना,

दिनांक— 12/01/2023

प्रेषक,

मो0 मोईज उद्दीन,
संयुक्त सचिव।

सेवा में,

Email

M/s RAJENDRA AND SONS INFRA PRIVATE LIMITED

Prop-Minti Kumari, D/o- Sri surendra Pd. Yadav

15, MOTHER TERESA MARG, NORTH S.K. PURI

Email- rsinfrapatna15@gmail.com

विषय,

गया जिलान्तर्गत बालूखण्ड संख्या-26 (गया मोरहर 13) के खनन योजना के अनुमोदन के संबंध में।

महाशय,

उपर्युक्त विषय के संबंध में कहना है कि बिहार बालू खनन नीति-2019 यथा संशोधित एवं बिहार खनिज (समानुदान अवैध खनन, परिवहन एवं भंडारण निवारण) नियमावली, 2019 (यथा संशोधित 2021) के नियम-17 में वर्णित प्रावधानों के तहत गया जिलान्तर्गत बालूखण्ड संख्या-26 (गया मोरहर-13) से संबंधित समर्पित खनन योजना के अनुमोदन पर प्राधिकृत समिति द्वारा समीक्षा की गई। समीक्षापश्चात् निम्न शर्तों एवं बंधनों के तहत खनन योजना अनुमोदित की जाती है -

1. उक्त खनन योजना केन्द्र सरकार/राज्य सरकार द्वारा विनियमित अन्य सभी अधिनियम/नियमावली में वर्णित प्रावधानों को तथा किसी न्यायालय/अन्य न्यायिक संस्था द्वारा पारित किये गये न्यायादेश को बिना प्रभावित किये अनुमोदित किया जा सकता है।
2. उक्त खनन योजना का अनुमोदन खान एवं खनिज (विकास एवं विनियमन) अधिनियम, 1957 (यथा संशोधित), बिहार खनिज (समानुदान अवैध खनन, परिवहन एवं भंडारण निवारण) नियमावली, 2019 के नियम-17, वन संरक्षण अधिनियम, 1980, पर्यावरण सुरक्षा अधिनियम, 1986, श्रम संबंधी नियम, EMGSM 2020 तथा अन्य सभी सुसंगत अधिनियम/नियमावली तथा उनमें वर्णित प्रावधानों के प्रतिकूल नहीं होगा। खीज के रकबा के अनुसार प्रति हेक्टेयर कम से कम 10 पौधा लगाना होगा तथा 50 प्रतिशत Survival सुनिश्चित करना होगा।
3. खनन योजना में निहित शर्तों का पालन करते हुए ही बालू खनिज का खनन तथा प्रेषण किया जायेगा।
4. संबंधित सक्षम प्राधिकार से यथा वांछित प्रमाण-पत्र प्राप्त कर विभाग को अवगत कराना अनिवार्य होगा।
5. यदि किसी भी समय खनन योजना में वर्णित शर्तों के अनुपालन में अनियमितता पायी जाती है, तो खनन पदाधिकारी को नियमानुसार आवश्यक कार्रवाई करने का अधिकार होगा।
6. संबंधित बालूघाट में खनिज की उपलब्धता, पहुँच पथ का निर्माण तथा अन्य खनन कार्यों से संबंधित सम्पूर्ण जबाबदेही बालूघाट संचालनकर्ता की होगी तथा इसमें किसी भी तरह का कोई दाना अथवा क्षतिपूर्ति मान्य नहीं होगा।
7. खनन योजना में वर्णित सभी तकनीकें तथा अन्य बिन्दुओं से संबंधित आँकड़ों की सत्यता / वैधता की जिम्मेवारी RQP/बंदोबस्तधारी की होगी तथा भविष्य में उपर्युक्त के संबंध में किसी प्रकार की मिन्नता/अनियमितता की पूरी जबाबदेही RQP/बंदोबस्तधारी की होगी।
8. खनन कार्य के दौरान घाट संचालनकर्ता द्वारा पर्यावरण संबंधी मानकों का नियमित रूप से अनुश्रवण करने की व्यवस्था करनी होगी। खनन कार्य के दौरान नदियों के प्राकृतिक बहाव आदि में किसी भी तरह का व्यवधान/रुकावट/बदलाव करना पूर्ण रूप से प्रतिबंधित होगा।

MINING PLAN

WITH PROGRESSIVE MINE CLOSURE PLAN

Submitted under Rule (17) of Bihar Minerals (Accession, Production of Record,
Transportation & Storage) Rules 2015

OF

BLOCK-26 (GAYA MORHAR - 13) SAND GHAT RIVER - MORHAR

in Manja- Baiju Higha, Bilauti, Dhubra G.P. Padsathar, Patna.

Anchal- Gauda, Dist- Gaya, (Bihar).

APPLIED AREA: 250 HECTARES

PLAN PERIOD: FOR FIVE YEARS



APPROVED

Vide Dept. of Mines & Geology

Govt. of Bihar, Patna

Letter No. 198.....Dt. 12/01/2022



Settler

M/s Rajendra And Sons Infra Private Limited

Prop- Mintu Kumari

D/o- Sri Surendra Pd. Yadav

Address- 15, Mother Teresa Marg.

North S. K. Puri, Patna.

Mob.- 9431456331

Email ID: sri.yadav.15@gmail.com

Prepared By:

Er. Pravin Kr Sinha (Regd. No.: RQP/BIH/SR.NO 20)

Consultant :

P&M Solution

C-88, SECTOR-65 NOIDA

(Accredited by QCI- NABET)

Regional Off -

9889024004 & 7542949027, Mangal Market, Raja

Bazar, Patna (Bihar) Pin - 800014

pravin.sinha@pmsoln.com

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LIST OF ANNEXURES

ANNEXURE NO.	NAME OF ANNEXURE
1	COPY OF LETTER OF INTENT
2	COPY OF RQP CERTIFICATE

LIST OF PLATES

PLATE NO.	LIST OF PLATES
1	LOCATION MAP
2	GOOGLE & ROUTE MAP
3	KEY PLAN
4	LEASE MAP
5	SURFACE GEOLOGICAL PLAN
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8	CONCEPTUAL PLAN
9	PROGRESSIVE MINE CLOSURE PLAN



MINING PLAN



PART A
CHAPTER-1

1. INTRODUCTION

1.1	Settlee Name & Full address Phone. No. E-mail ID	M/s Rajendra And Sons Infra Private Limited Prop- Minti Kumari D/o- Sri Surendra Pd. Yadav Address- 15, Mother Teresa Marg, North S. K. Puri, Patna. 9431456331. rsinfrapatna15@gmail.com
1.2	Letter no. / date of lease execution & lease period	District Magistrate issue L.OI on letter no. 5503/khanan dated. 29.11.2022 for a period of 05 years (Annexure No. -1)
1.3	Settlee post/social status	Private
1.4	Mineral or Minerals which the Settlee intends to mine	Sand
1.5	Applied area for mining lease	Block-26 (Gaya Morhar - 13) Sand Ghat Lease has an applied area of 23.0 Hectare.
1.6	Name & address of RQP & Regd. No. Mobile No. E-mail ID	Fr. Pravin Kr Sinha Reg. No. - RQP/BIH/SR.NO.20 Letter No. 3825 Dated 07/11/2019 Consultant : P & M Solution 201, Mangal Market Raja Bazar, Patna (Bihar) 9889024004 & 7542949027 indusminingbihar@gmail.com
1.7	RQP Certificate	RQP certificate copy attached as Annexure 2
1.8	Name of the Prospecting agency	The base data is collected from various geological reports of the Department of Mines & Geology and local authorities as well as detailed prospecting of the area is carried out by the RQP.
1.9	Status of Environmental clearance	After Mining Plan approval then Settlee shall submit application to state Environment Impact Assessment Authority (SEIAA) of Bihar for environment clearance.
2.0	Date of Survey	02.12.2022

Rajendra & Sons Infra Pvt. Ltd.

Minti
Director

CHAPTER-2

2. PROJECT DESCRIPTION

2.1 JUSTIFICATION OF PROJECT

Sand is a ubiquitous material, available everywhere and is being used from the time immemorial for wide applications in our daily life; infrastructures, building construction, highways, roads, townships, multiplexes, foundations of buildings and industrial units etc. and is an integral part of development. Over the millennia, the weathering effect, the flow of water at high velocities in rivers and the pressure of water from the high mountainous reservoirs converted and pushed the hard ground underneath into sand, etc. which travelled as sediments with the flow. Huge amount of sand get deposited along the river course wherever conditions were favorable. As a result of continuous deposit of sand, the rivers may change their course, by widening itself and expanding, can result in flooding, inundation and breaking their banks, may cause devastation of property and loss of life. The rivers thus, needed channelization and therefore, extraction of sand through mining was expedient. The haphazard mining of sand being practiced now for long, through unregulated, uncontrolled and illegal way added almost an irreversible damage to the environment, which became a cause of serious concern to everyone. Though sand is a very important mineral source for development, its mining through scientific methods has also become equally imperative.

It is for this purpose that 'mining plan' is being drawn so that all its aspects are taken care of justifiably, according to law, protecting the environment, removing all adverse impacts and creating a direct and indirect employment opportunities, improving socio-economic conditions of the local inhabitants and all-around status of life, achieving thereby a sustainable development.

Besides the above, the process of mining of minor minerals (Sand) is a constant source of revenue generation to the State Government through Royalty.



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2.2 BACKGROUND OF THE PROJECT

The Department of Mines & Geology, Bihar required under Bihar Minerals (Concession, Prevention of Illegal Mining, Transportation & Storage) Rules, 2019 & Bihar Sand Mining Policy, 2019. The general conditions of mining lease for minor minerals are mentioned here below:

- First the State Government shall identify the areas which are suitable for river bed mining based on quantity of the minor minerals available and suitable from ecological and environmental aspects as well.
- Under rule 17 (4) Approval and submission of Mining Plan - All Mineral Concession Holders or the Government/Corporation as the case may be shall submit a mining Plan duly prepared by an RQP and approved by the Director or any officer / person/academic institution/Govt. agency authorized by the Department in this regard within a period of three months from the date on which communication regarding grant of mineral concession is received or such other period as may be decided/ allowed by the department for the submission of the approved Mining Plan.
- While preparing the mining plan, proper attention has been paid to ensure that the relevant provisions under MMOR Act-1957, MMR-1961, Mines Act-1952 & Mines Rules-1955, Sustainable Sand Mining Guidelines - 2016 and Enforcement & Monitoring Guidelines for sand Mining - 2020 have been followed. All safety measures, provided in the statute, will be taken into consideration. On 17.09.2019 Bihar Government took its policy decision vide notification no. - 4/V.Mu-20-93 / 18-3174 /M . That all Mining Lessee / Settlee under rule 17 of the said Rules, the lessee shall submit the mining plan with Progressive Mine closure plan for approval to the competent officer, Department of Mines & Geology, Bihar
- Mining operation to be in accordance with Environmental clearance.
- For baseline, data assistance has been taken from the data, available from local authorities.

2.3 RESTRICTED AREAS FOR SAND QUARRYING

- i. The quarrying of sand shall be prohibited within 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.
- ii. No quarrying shall be permitted within 50 (fifty) meters of any public place i.e. cremation Ghat or any religious place etc.
- iii. No quarrying shall be allowed to be extracted where erosion may occur, such as at the concave bank.

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Prepared by: Prasen K. Sinha Reg. No. - RQP/BSU/PLMO 20 Letter No. 3825 Dated 07/11/2019

- iv. The quarrying of sand shall be prohibited within 100 (one hundred) meters upstream and downstream from any dam/weir or any other structure erected for irrigation purpose.
- v. Sand Ghats should preferably be located on the river side embankment. For low embankment less than 6 meters height, quarrying should not be done within 25 meter from toe/heel of the embankment and depth of mining should not be more than 1.0 meter. In case of higher embankments, the distance should not be less than 50 meter and depth of mining should be maximum 1.50 meter and at a distance of 75 meter or more mining depth should be maximum 2.0 meter. In order to obviate the development of flow parallel to embankment, crossbars of width eight times the depth of mining pits spaced at 50 to 60 meters center to center should be left in the mining pits.
- vi. The irrigation outlet shall be maintained at the same level as that of the river bed and in no case, the river bed level shall be permitted to be below the irrigation outlet level. No quarrying shall be permitted around the infiltration well/intake well up to a distance of 5 meters.
- vii. No quarrying of sand shall be permitted in any private land owned by a person other than a settlee unless the settlee obtains the consent of the concerned land owner/raiyat.
- viii. No quarrying of sand shall be permitted in any area which the State Government notifies as restricted area.
- ix. Mining depth should be restricted to 3 meters and distance from the bank should be $\frac{1}{4}$ th or river width and should not be less than 7.5 meters.
- x. Demarcation of mining area with pillars and geo-referencing should be done prior to the start of mining.
- xi. A buffer distance /un-mined block of 50 meters after every block of 1000 meters over which mining is undertaken or at such distance as may be directed/prescribed by the regulatory authority shall be maintained.
- xii. River bed sand mining shall be restricted within the central $\frac{3}{4}$ th width of the river/outlet or 7.5 meters (inward) from river banks but up to 10% of the width of the river, as the case may be and decided by regulatory authority while granting environmental clearance in consultation with irrigation department. Regulating authority while regulating the zone of river bed mining shall ensure that the objective to minimize the effects of riverbank erosion and consequential channel migration are achieved to the extent possible. In general, the area for removal of minerals shall not exceed 60% of the mine lease area, and any deviation or relaxation in this regard shall be adequately supported by the scientific report.



CHAPTER-3

3. LOCATION, GENERAL AND ACCESSIBILITY

3.1 LOCATION

(a) Details of the area

(i)	Lease-hold area	23.01 Hect.		
	Location	The Block-26 (Gaya Morhar - 13) Sand Ghat fall in Mauja- Rajju Bigha, Bilauti, Dhibra G.P, Phulsathar, Tanrwa, Anchal- Gurua, Dist- Gaya, (Bihar). The location plan is enclosed (Plate No. 1)		
(ii)	Mining Lease Map	Khata No.- 108, 162, 48, 15, 37. Khesra No. - 1, 282, 283, 1, 1193, 1194, 1195/1397, 473, 87, 98, 207. Thana No.- 645, 687, 689, 685, 688. Google Map of Block-26 (Gaya Morhar - 13) Sand Ghat is attached as Annexure no. 3.		
(iii)	District & State	Gaya, Bihar		
(iv)	Mining Plot	Sand Ghat	River	Area (ha)
		Block-26 (Gaya Morhar - 13) Sand Ghat	Morhar	23.0
		Total		23.0
(v)	Name of Ghat	Block-26 (Gaya Morhar - 13) Sand Ghat of 23.0 hectares.		
(vi)	Ghat details	23.0 ha (Morhar River bed)		
(vii)	Coordinates	The area & geographical coordinates of Block-26 (Gaya Morhar - 13) Sand Ghat is given in Table No.1 Toposheet No. -72D/10, 72D/13 & 72D/14		

BLOCK-26 (GAYA MORHAR - 13) SAND GHAT CO-ORDINATES

S. No	Sand Ghat	Area (in Ha)	Co-ordinates		Ghat/Village	River
1	Block-26 (Gaya Morhar - 13) Sand Ghat	23.0	A	24°39'46.86"N 84°48'55.72"E	Mauja- Rajju Bigha, Bilauti, Dhibra G.P, Phulsathar, Tanrwa, Anchal- Gurua, Dist- Gaya, (Bihar).	Morhar
			B	24°39'46.04"N 84°49'3.59"E		
			C	24°39'2.75"N 84°48'49.15"E		
			D	24°39'3.54"N 84°48'43.91"E		

(b) Key plan of area:-

Key plan of Block-26 (Gaya Morhar - 13) Sand Ghat (Morhar river) is attached as Plate-2.

Total mining area is completely outside of any restricted or protected area by any state or central government.

3.2 GENERAL

(a) Mineral being worked	Sand
(b) Period of Mining Lease	The lease period has been granted for Five years.
(c) Category of Land used	The mining area is inactive channel of riverbed
(d) Relief of Plot	Block-26 (Gaya Morhar - 13) Sand Ghat (121.8 ASML to 123.5 ASML)
(e) Existing pits	As the mining area is of river bed and it will be replenished every year no pits will be formed.
(f) Type of lease area:	Total area is almost hundred percent river bed flood plain land & it is free from forest land.
(g) Present land use pattern:	The existing land use is given below:

Sr. No.	Land use	River bed (Ha)	Forest Land (Ha)	Barren land (Ha)	Grazing Land (Ha)
1	Mining pits Quarry	-	-	-	-
2	Approach Road	-	-	-	-
3	Dumps	-	-	-	-
4	Office, Resht Shelter etc.	-	-	-	-
5	Balance undisturbed land	23.0	-	-	-
	Total	23.0	-	-	-



3.3 ACCESSIBILITY

Gaya is about 100 kilometers south of Patna, and is situated on the banks of Morhar River. It is a place sanctified by both the Hindu and the Buddhist religions. It is surrounded by small rocky hills (Mangala-Gauri, Shringa-Sthan, Ram-Shila and Brahmayoni) by three sides and the river flowing on the fourth (western) side. It is located at a Longitude of 84.40 to 85.50 towards East and the latitude is 24.50 - 25.100 towards North.

Project site is falls in Mauja Baiju Bighe, Bilauti, Dhibra G.P. Phulsathar, Tanwa. Site is well connected by Gurnu Cherki-road which is at distance of approx. 0.85 km in NE direction. Nearest NH/SH is SH-69 at approx. 4.45 Km in West. Nearest railway station is Neyamatpur Railway Station at distance of approx. 16.60 km in NW. Nearest airport is International Airport Patna at distance of approx. 106.88 km in NE.



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CHAPTER-4

4.1 GEOLOGY & EXPLORATION

Topography and general geology and local / mine geology of the mineral deposit including drainage pattern

The district of Gaya is broadly divided into two distinct physical units. The south is a region of broken undulating country merging into long ranges of hills, with a wide belt of brushwood jungle at their base. Much of this tract is high and barren and incapable of much cultivation: the soil has poor crops and the population is sparse. These high lands project into the alluvial plains to the north as spurs from the Chholanagpur Plateau. The greater part of the district, however, consists of the flat alluvial plain. This wide alluvial plain of the north forms part of the Gangetic depression with alluvial deposits of immense depth and is broken here and there by groups and low ranges of hills or isolated peaks arising abruptly from the level country at their feet. The alluvial plain is protected from drought by a wonderful system of indigenous irrigation consisting of akars (reservoirs) and pains (channels). It is, therefore, a region of great fertility when compared with the southern part of the district and is comparatively densely populated. The northern portion, which is highly cultivated and extensively irrigated

General Geology

The main geological formation of the region is of Quaternary age. The area is mostly covered by unconsolidated sediments which is known as Alluvial deposits followed by consolidated deposits of Satpura range. Few areas are also characterized by units of Archaean ages. The Satpura range mainly exposed in Gaya hills and Rajgir hills comprises low grade supracrustals - Schists, ferruginous phyllite, quartzites and phyllitic slate. The Archeans are the oldest rock formation in the area. The most predominant rock type is gneisses and granites with basic intrusives and medium to fine sand geologically the area comprising of Terrace alluvium deposited in depositional terraces of old rivers & contain cyclic sequence of fine to coarse grained sand. It is angular to sub angular and the angularity of the grains of this category of sand decreases with depth.



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Prepared by: Pravin K. Reg. No. - RGP/BIHAR/NO.20 Letter
No. 3825 Dated 07/11/2019

Regional Geology

Geologically, it represents nearly two third of Bihar is under cover of Ganga basin composed of alluvium and masks the nature of basement rocks.

Showing the Geological Succession and their Occurrences distribution

Age	Geology	Occurrences
Quaternary	Alluvial Deposits (Sand, Clay, Silt, Fragments)	North Bihar Plain & Central Bihar Plain
Tertiary	Sand Stones & Clay Stones	North Champaran Hills
Gondwana	Coal Measures, Forming a series of Small outlier basins	Banka District
Vindhyan	Sandstones, Shales, Limestones, etc.	Parts of Bahbhua and Rohtas dist
Satpura	Schist, Phyllite, Quartzite	Part of Aurangabad, Gaya, Nawada, Nalanda, Sheikhpura and Munger District
Proterozoic	Mica Schist, amphibolites, quartzite, granite, dolerite and pegmatite	Nawada, Jamui and Banka
Archaean	Gneisses, Granites, Schists, Phyllites, quartzite, amphibolites & intrusive all metamorphosed sedimentary and igneous rocks	Part of Aurangabad, Gaya, Nawada, Jamui, Banka and Bhagalpur

4.1.3 GEOLOGY OF THE AREA

The area is dominated by medium to fine sand geologically the area comprising of Terrace alluvium deposited in depositional terraces of old rivers & contain cyclic sequence of fine to coarse grained sand. It is angular to subangular and the angularity of the grains of this category of sand decreases with depth. The Litho unit shown on the geological map of the leased out area have been plotted on the basis of physical characteristics observed in the field. Sand and silt are deposited in the middle of the river whereas fine sand and soil are deposited at the fringe of the river banks. Soil/ alluvium varying in thickness from 0.20m to 0.60m m constitute the top

horizons in the area suitable for agriculture. River Falgu & Morhar meanders through the area exposing the alluvium and soil at the banks.

The litho units encountered in the riverbed and surrounding areas belongs to the Shivalik super groups. The size of the sediments towards the source i.e. host rock is coarse and at the tail end of the river the grain size is reduced to smaller sizes resulted in the formation of clay beds. The following sequences have been observed in the area, i.e. Top soil/ Alluvium followed by sand deposition (as shown in the figure below).



Sand and silt are deposited in the middle of the river whereas fine sand and soil are deposited at the fringe of the riverbanks.

Soil/ alluvium varying in thickness from 0.20m to 0.60m m constitute the top horizons in the area suitable for agriculture. River Ganga meanders through the area exposing the alluvium and soil at the banks. Sand is found in the river bed upto a depth of more than 3.0 m. The major part of bed remains dry as water flows in a single stream during the non-monsoon seasons. Only during rainy seasons the entire flood plain has water, when there will be no mining done.

4.2 ORIGIN & CONTROL OF MINERALIZATION (ANNUAL REPLENISHMENT OF MINERAL IN RIVER BED AREA/SEDIMENTATION)

Sedimentation, in the geological sciences, is a process of deposition of a solid material from a state of suspension or solution in a fluid (usually air or water). Broadly defined river sand is a product of natural weathering of rocks over a period of millions of years and these materials get collected under the impetus of gravity alone, as in talus deposits, or accumulations of rock debris at the base of cliffs. The term is commonly used as a synonym for sedimentary petrology and sedimentology.



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Sedimentation is generally considered by geologists in terms of the textures, structures, and fossil content of the deposits lay down in different geographic and geomorphic environments.

The factors which affects the "Computation of Sediment":

Geomorphology & Drainage Pattern: The following geomorphic units plays important role:

- Structural Plain
- Structural Hill
- Structural Ridge
- Denudation Ridge & Valley
- Plain & Plateau of Eogenetic plain
- Highly Dissected pediment
- Un-dissected pediment
- b) Distribution of Basin Area River wise
- c) Drainage System/Pattern of the area, Rainfall & Climate: Year wise Rainfall data for previous 10 years .
- e) As per Dandy & Bolton study "Sediment Yield" can be related to
 - i) Catchment Area and
 - ii) Mean Annual Run-off

Sand is an essential minor mineral used extensively across the country as a useful construction constituent and variety of other uses in sports, agriculture, glass making (a form of sand with high silica content) etc. It is common knowledge that minerals are non-renewable but this form of mineral naturally gets replenished from time to time in a given river system and is very much interrelated to the hydrological cycle in a river basin.

Sand mining has become a widely spread activity and does not require a huge set up or technology, the number of ventures has increased extensively and it has become a footloose industry in itself but the backward-forward linkages are becoming stronger as many are getting employed as well as the construction activity / industry requires this mineral at consistent rates. Riverine environmental systems are unique in themselves and provide environmental services, natural resources to meet variety of needs of urban and rural communities.

4.2.1 REPLENISHMENT STUDY OF MINED AREA OF MORHAR RIVER:-

Replenishment Rate is the rate at which Bajri is transported into the river channel, which is under examination or subjected to sand extraction. This volume is often considered as sustainable yield of that river. Estimation of Bajri discharge through stream bed and its residence period (temporary deposition) is one of the most difficult task in sediment budgeting.



The rate of gross or absolute silt production (erosion) in the watershed 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. 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 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.

This report quantifies the annual replenishment of bed material in the Morhar River during periods of sediment transport at high flows within the mined area. It provides estimates of the amounts of sand & bajri which will be used in construction and for other uses.

4.2.2. METHODOLOGY FOR REPLENISHMENT STUDY:-

The methodology used for Replenishment study is based on the measurement of volumetric survey at selected points as monitoring stations within the lease area in Pre-monsoon season & Post Monsoon season respectively. For the said project replenishment study has been done during the post-monsoon season has done by field survey (volumetric survey) method. Firstly Volumetric Survey was done in the proposed mining block. By this method spot RL/level are marked & mapped and sections are drawn for several monitoring locations within the mine area. After that, for post-monsoon season again spot RL/level are marked & mapped on the same location and sections are drawn. The RL(m) observed during Pre-monsoon season of all locations.

Table 7. volumetric survey measurement

Classification	Code	Quantity of Sand
A) Mineral Reserves		Cum
I) Proved Mineral Reserves	III	690000
Total		690000

Replenished quantity of sand = 690000 cum. or 1242000 tonnes.



4.3 EXPLORATION

Mining of sand is being done since long time therefore no specific method of exploration is required as the sand, deposited all along the bed and its pale channels, which is very well exposed on the surface. The minerals excavated from the river bed will be replenished gradually during the monsoon season every year. And the area pertaining to paleochannels of the river will be leveled & restored back. Adequate quantity of Sand in reserves is available for meeting consumer demand.

4.4 MINERAL RESERVES

The Mineral reserves have been estimated as per the Indian Standard Procedures. The area of the mining lease is 23.0 Hectares and the average thickness of the river bed minerals estimated as 3.0 mt.

4.4.1 PARAMETERS OF RESERVE ESTIMATION:

The geological reserves have been estimated as per UNFC guidelines in all the three axis.

Economic Axis (E-1): The Sand is exists with in the entire stretch & having no problem selling in the market. The road is near the Ghat & sand shall loaded into tipper with the deployment of an excavator & transport to various parties. The land is State Govt. land & State Govt. has given its consent for the exploitation of Sand on their expensive land. On the feasibility study, economic viability of deposit has been established sand is economic viable, therefore economic axis has been considered as E-1.

Feasibility Status (F-1): Feasibility study has been carried out & is considered to be feasibility status. A feasibility study provides a preliminary assessment with a level of confidence as compared to that of feasibility study. It has been revealed that exploitation of sand is feasible & economic viable & feasibility axis under UNFC code has been considered as F-1.

Geological Axis: The exposure of sand is seen in the entire stretch & thickness of sand varies 2.5m to 3.0m. Therefore geological axis has been considered as G-1.

Geological Reserves

The geological reserves have been each stretches & for individual blocks. Geological reserves have been completed through cross sectional area method. The area of each section line is multiplied by strike influence to get the volume.

- i) **Proved Mineral Reserves (111):** All quantities of sand occurring upto depth of 3 m from surface has been considered as proved reserves.



Classification	Code	Quantity of Sand
B) Mineral Reserves		Cum
2) Proved Mineral Reserves	111	690000
Total		690000

Total Geological Reserve – 690000 cum. or 1242000 tonnes.

*Bulk density is 1.8 g/cm³

4.4.2 MINEABLE RESERVES:

Mineable reserves have been computed up to 3m depth from surface. Benches having height 1.5m & width 6.0m drawn from the ultimate pit limit. Area of each benches have been calculated multiplied by strike influence to get the volume. The volume multiplied by bulk density (1.8 g/cm³) to get the tonnage.

The minerals excavated from the river bed will be replenished gradually during the monsoon season every year. And the area pertaining to palenchannels of the river will be leveled & restored back.

Table-4.4:- Summary of mineable reserves of Sand Ghat as below:

BLOCK-26 (GAYA MORHAR – 13) SAND GHAT OF MORHAR RIVER

The mineable reserves are given in Table Nus.4

Reach Level (m RL)	Length (m)	Width (m)	Depth (m)	Volume (cum)	Tonnes
123-121.5	1369	163	1.5	334721	602497
121.5-120	1359	153	1.5	311891	561403
Total				646611	1163900

Total Mineable Reserve = 646611 CUM or 1163900 Tonnes

- Mineable reserve has been consider 60% apprx. of geological reserve after applying the guideline of Enforcement & Munituring Guidelines for Sand Mining 2020.
- The proposed production grant in LOI is 414000 cum per year which is within the sustainable limit of mineable reserve.
- The B10 for Sand has been adopted at 1.8 g/cm³ [Noida Testing Laboratories]



[Signature]

• **CLASSIFICATION MINERAL RESERVES:**

Sand Ghat	Area (Hect)	Geological Reserves (m3)	Mineable Reserves (m3)	Annual Permitted Reserve As per L.O.I (m3)
Block-26 (Gaya Morhar - 13) Sand Ghat	23.0	690000	646611	414000

The annual extractable RBM comes to 414000 CUM or 745200 Tonnes. It will be replenished after rainy season every year.

4.5 LIFE OF MINE

There is as such no specific life of the mine as the area under reference is inactive part of river bed of the river and its pale channels and whatever quantity of minor minerals are extracted from the Applied Area during five year; almost equal to extracted quantity of the same are replenished every year and the river bed area will be leveled & restored back. However, as lease has been granted for 5 years, mining will be done for the allotted time.

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[Signature]

Director

CHAPTER - 5

5.0 MINING

- Mining will be done as per the guidelines of Bihar Mineral (Concession Prevention of illegal Mining Transportation & Storage) Rules, 2019.
- This is an open-cast mining project. The operation will be semi-mechanized/OTFM with use of excavators/JCBs truck /tractors combination or Manually etc. The sand will be collected in its existing form.
- Sand Mining will be carried out only upto a depth of 3 m bgl or above ground water level (whichever is less), for river bed block.
- No drilling /blasting are required as the material is loose in nature.
- Proper benching of 1.5 m height and 6m width will be maintained for mining blocks as per guideline M.M.R-2019, under rule 115(1).
- Mining will be done only during the day time and completely stopped during the monsoon season.

Restriction on mining:

- i) Sand and gravel shall not be extracted up to a distance of 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 side, subjected to a minimum of 250 meters on the upstream side and 500 meters on the downstream side.
- ii) No quarrying shall be permitted within 50 (fifty) metres of any public place i.e. cremation Ghat or any religious place etc.
- iii) No quarrying shall be permitted within 5 (five) metres from both banks of the river.
- iv) The quarrying of sand shall be prohibited within 100 (one hundred) metres upstream and downstream from any dam/weir or any other structure erected for irrigation purpose.
- v) Sand Ghats should preferably be located on the river side embankment. For low embankment less than 6 metres height, quarrying should not be done within 25 metre from toe/heel of the embankment and depth of mining should not be more than 1.00 metre. In case of higher embankments, the distance should not be less than 50 metre and depth of mining should be maximum 1.50 metre and at a distance of 75 metre if more mining depth should be maximum 2.00 metre. In order to obviate the development of flow parallel to embankment,

crossbars of width eight times the depth of mining pits spaced at 50 to 60 metres center to center should be left in the mining pits.

- vi) The irrigation outlet shall be maintained at the same level as that of the river bed and in no case the river bed level shall be permitted to be below the irrigation outlet level. No quarrying shall be permitted around the infiltration well/intake well up to a distance of 5 meters.
- vii) The extraction of sand shall be permitted only after obtaining a No Objection Certificate from the Water Resources Department in the case of rivers where from irrigation channels are out flowing.
- viii) No quarrying of sand shall be permitted in any private land owned by a person other than the settler unless the settler obtains the consent of the concerned land owner/raiyat.
- ix) No quarrying of sand shall be permitted in any area which the State Government notifies as a restricted area.
- x) Sand and gravel shall not be allowed to be extracted where erosion may occur, such as at the concave bank.
- xi) Mining depth should be restricted to 3 meters and distance from the bank should be $\frac{1}{4}$ th or river width and should not be less than 7.5 meters.

5.2.1 PROPOSED METHOD OF MINING:

- Mining activity will be carried out by open cast manual/Mechanically method.
- No OB/ waste material will be produced in river bed. The sand shall be exploited upto depth of 1.0 m only through the formation of bench height 1.5m & width 6.0m. An approach road having width 6.0m & gradient 1:12 shall be provided for the movement of loading machineries & transportation of sand. The sand shall be exploited with the deployment of an excavator & filled into Tractors/Trucks & transported to various buyers.
- No drilling/ blasting are required as the material is loose in nature.
- Proper benching of 1.5 m height will be maintained.
- Roads will be properly made and sprayed by water for suppression of dust.
- Roads in the applied area for the movement of loaded tractors/ trucks will not have slopes more than 1 in 16.
- The mined out area shall be replenished each year during monsoon period and maintained in maximum original topography.



Director

- Approach roads from the various blocks as already described earlier will be merging with permanent tar roads on both sides of the river for transportation of the mineral to final destinations.
- The Sand transportation shall be insured after the covering the vehicle Tarpaulin.

5.3 YEAR WISE PRODUCTION SCHEDULE:

The annual exploitation of sand from Block-26 (Gaya Morhar – 13) Sand Ghat are given below :-

YEAR	Overburden (cum)	ROM Sand (cum)	Saleable Sand (cum)
1 ST	-	414000	414000
2 ND	-	414000	414000
3 RD	-	414000	414000
4 TH	-	414000	414000
5 TH	-	414000	414000

The annual extractable RBM comes to **414000 CUM** or **745200 Tonnes**. It will be replenished after rainy season every year.

5.4 CONCEPTUAL MINING PLAN

Mine Applied Area will be worked for Block-26 (Gaya Morhar – 13) Sand Ghat. However, as the digging depth will be restricted to 3.0 m only. This will be further replenished during rainy season. Sand Ghat will be worked systematically as the width is limited while length is much more. As the lease period is only 5 (Five) years, some of the area will be left un-worked at the end of lease period.

(i) Final Slope Angle to Be Adopted: Height of the bench is limited to 1.5 m while width of individual bench shall be kept 6.0m. River bank side will be protected by working in dry part of the river and by leaving safety distance of the width of the river of 5 meter. Bank side natural slope will not be disturbed. This will prevent collapse of bank and erosion. However, the height of the bank with respect to river bed is varying from 3-4 meters.

(ii) During plan period workings will be carried out in the Sand Ghat at a time of the Applied Area simultaneously. Scattered workings will ensure safety, remove congestion of vehicles and will have better control and management.

(iii) Ultimate Capacity of Dumps: There will be no OB removal / during the plan period. Therefore no proposal has been envisaged for its separate dumping. No outside material will be filled up in the extracted zone.

The conceptual plan & section of each mining plots are attached with mine plan.

5.5 EXTENT OF MECHANIZATION:

The operation will be done by semi mechanized method / OTFM.

Following table gives the list of equipment to be used:

Table-5.2:- List of Equipment's to be used

S. No.	Name of machinery	Capacity	Fuel Consumption	No. of Machinery
1	JCB	1.00 m ³	10 Ltr/hr	2
2	Excavator	2.0 m ³	16 Ltr/hr	4
3	Trucks	12 tonnes	4 Ltr/hr	186
4	Tractors	04 Tonnes	2 Ltr/hr	186
5	Water Tanker	4000 liter	4 Ltr/hr	1
6	Light vehicles	As per requirement	4 Ltr/hr	1

5.6 QUANTITY OF HSD/ FUEL CONSUMPTION PER DAY

Table-5.3:- Quantity of HSD/Fuel to be used

S. No	Machine	Details of fuel (Diesel) requirements	Consumption of Diesel (in lits/ day.)
1.	Excavator & JCB	Number of Excavator & JCB - 4&2 Diesel consumption by 2 jcb & 4 Excavators m/c in one shift	672 liters

		working.(i.e-10/15 litre/hr) $=2*8*10=160$ liters & $4*8*16=512$ liters	
2	Tippers/Tractors	Number of Tractors & Trucks = 186 & 186 Diesel consumption by 186 trucks & 186 Tractors in one shift working (i.e-4ltr/hr.) & (i.e-2 ltr/hr.) $=186*2*8=2976$ $=186*4*8=5952$	8928 liters
3	Water Sprinkler	Number of Sprinkler=01 Diesel consumption by Sprinkler in one shift working.(i.e-4ltr/hr). $=1*10*4=40$ liters.	40 liters
3	Extra	Transport vehicle, supervision vehicle, maintenance vehicle	50 liters
			Total=9690 liters

5.7 MINERAL PRODUCTION

The mining will be confined to excavation of sand to an extent depending upon availability and market demand. Production is taken tentatively upto a maximum of 745200 TPA as per marked demand.



Rajendra & Sons, Infra Pvt. Ltd.

[Signature]

Director

Prepared by: Pradyumn K. Sinha Reg. No. - RQB/BIH/SP.NO.20 Letter No. 3825 Dated 07/11/2019

CHAPTER -6

6.0 DRILLING AND BLASTING

No drilling and blasting shall be required to for the exploitation of river sand.



CHAPTER-7

7.0 MINE DRAINAGE:

a) **LIKELY DEPTH OF WATER TABLE BASED ON OBSERVATIONS FROM NEARBY WELLS AND WATER BODIES:**

As per the proposed mining, the working shall be confined up to 3.0 m or above the ground water table whichever comes first. Hence no water is likely to be encountered. So there is no need of any such arrangements.



CHAPTER-8

8.0 DISPOSAL OF WASTE MATERIAL

No waste as such will be generated at the site as all materials are saleable. If, at all silt clay will be generated along with the minerals will be used to dispose off in the low lying areas as spread, where plantation will be done after spreading top soil on it.



CHAPTER-9

9.0 USE OF MINERALS

Sand has become a very important mineral for expansion of our society due to its many uses. It can be used for making concrete, filling roads, building sites, brick-making, making glass, sandpapers, reclamations, and etc.



CHAPTER – 10

10.0 OTHERS

10.1 HAULAGE AND SURFACE TRANSPORT

Mode of transportation of material is by trucks/ Tractors of size of 12 tonnes / 4 tons capacity have been planned.

Mining area is connected with an unmetalled (approach) road upto the nearest village and thereafter it is metalled road connected to State/National highway. The mine road is adequate to permit easy maneuverability of trucks allowing cross overs and changing points. Water is sprayed two times in a day by tractor mounted water sprinklers until dust remains airborne.

10.2 SITE SERVICES:

A temporary rest shelter will be provided for the workers near to the site for rest.

Provisions will also be made for following in the rest shelter:

- First aid box along with anti-venoms to counteract poison produced by certain Snakes / Reptiles, if any.
- Sanitation facility i.e. septic tank or community toilet facility will be provided for the workers.
- Canteen will be made available near the sites.

10.3 WATER REQUIREMENT

Total water requirement for the project is 5.5 KLD, its breakup is as under:-

Table: 10.1- Water Requirement of the proposed project

S.No.	Purpose	Water Requirement (KLD)
1.	Dust Suppression	2.5
2.	Domestic	01
3.	Green Belt	02
Total		5.5



Director

10.4 EMPLOYMENT:

The manpower requirement for the proposed project is tabulated below. This manpower is the permanent resource which excludes personnel's coming along with trucks / Tractors.

Table 10.2:- Man power distribution of the proposed project

S. No.	Category	Numbers
1.	Administration	1
2.	Supervisor	1
3.	Skilled	7
4.	Un-skilled	23
TOTAL		32

The maximum annual production envisaged is **745200 TPA** which will be achieved every year that implies about 2981 tonnes per day. 250-working days in a year. That implies 32 workers will meet the required production.

SAFETY PROVISION:

All provisions in safety rules & regulation will be maintained by providing required materials to the employees. The lessee will provide safety shoes, safety helmets to all the employees. There will be no violation of safety provisions.



[Signature]

Director

CHAPTER-11

11.0 MINERAL BENEFICIATION

Mineral Sand doesn't require processing or beneficiation. The excavated mineral will be directly loaded into the trucks.



Rajendra & Sons Infra Pvt. Ltd.²⁷

Director

Prepared by: Prabin K. Singh Reg. No. : NQPM/MSR/O.20 Letter No. 3828 Dated 07/11/2019

CHAPTER -12

12.0 ENVIRONMENT MANAGEMENT PLAN

12.1 SOLID WASTE MANAGEMENT

In this if top soil will be generated, will be used for purposed of applied for green belt development. Small amount of domestic waste will be generated by the workers at the site, which will be disposed off through proper municipal way. No other waste generation is expected.

12.2 PLANTATION

The area of the proposed project lies in the river bed and devoid of any forest land.

Mining activities in River Bed blocks will not cause any harm to riparian or aquatic vegetation as mining will be only in the dry river bed portions of the river leaving safety distance from the bank. Hence it proposed to plant trees along the banks (wherever possible), along the haul road sides or near the civic amenities in consultation with village authority/local bodies.

In river bed mining cases plantation will be done at the river banks. It is proposed to have plantation along the haul road sides on both sides to provide cover against dust emission and also to act as noise absorber. Plantation will also be carried out as social forestry programme in villages, school and the areas allocated by the village authority/local bodies. Every year 46 trees of will be planted with various types of species. List of species is recommended for plantation.

Native plants like Mango, Neem, Kadamb, Kathal, Peepal, Gulmohar, and other local species will selected in suitable combination, so that can grow fast and also have good leaf cover. It is proposed to plant.

12.3 ENVIRONMENT MANAGEMENT PLAN

1.	Top soil storage, preservation and utilization	Present mining area is river bed, therefore no generally no top soil is present, if found then quantities of top soil to be generated will be stacked separately, preserved and used for purposed of plantation therefore no proposal has been envisage for storage, preservation & utilization.
2.	Waste dump management	No waste will be generated during mining whatever material is collected is transported in its original shape. Hence no waste management is required. Small amount of domestic waste is expected, which will be disposed off in a proper way. No

EXECUTIVE SUMMARY

For

SAND MINING PROJECT ON MORHAR RIVER BLOCK-26 (GAYA MORHAR-13) SAND GHAT

PROPOSAL NO.	SIA/BR/MIN/415652/2023
AREA(Ha)	23.0
PRODUCTION	414000 CUM per annum or 745200 TPA
LOCATION	KhataNo.-108,162,48,15,37 Khasra No. –1,282,283,1,1193,1194,1195/1397,473,87,98,207 Thana No 645,687,689,685,688 Village/Mauja – Baiju Bigha, Bilauti, Dhibra G.P, Phulsathar, Tanrwa Tehsil/Anchal- Gurua District- Gaya, State-Bihar

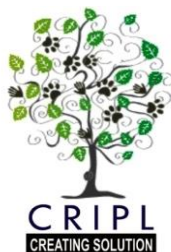
APPLICANT

M/s Rajendra and Sons Infra Private Limited

Prop.- Minti Kumari

Add-15 Mother Teresa Marg North S.K Puri Patna

ENVIRONMENT CONSULTANT



COGNIZANCE RESEARCH INDIA PVT LTD

(Accredited by QCI/NABET)

Suite -B02, Block-H-61, Sector-63, Noida, U.P-201301

Email: criplindia@gmail.com

EXECUTIVE SUMMARY

1.0 INTRODUCTION OF PROJECT & PROPONENT

Environment Impact Assessment (EIA) is a process used to identify the environmental, social & economic impacts of a project prior to decision making. It is a decision-making tool, which guides the decision makers in taking appropriate decisions for proposed projects. It aims predicting environmental impacts at an early stage of project planning and design, find ways and means to reduce adverse impacts, shape projects to suit the local environment and present the predictions and options to decision makers. By using EIA, both environmental & economic benefits can be achieved. By considering environmental effects prediction & mitigation, early benefits in project planning, protection of environment, optimum utilization of resources, thus saving overall time & cost of the project.

The project is being proposed by M/s Rajendra And Sons Infra Private Limited; Prop.- Minti Kumari Address 15 Mother Teresa Marg North S.K Puri Patna

Proposed project has been allotted to the proponent By District mining office. LOI has been granted in favour of M/S Rajendra And Sons Infra Private Limited; Prop.- Minti Kumari vide letter no. 5503/ Khanan Gaya dated- 29/11/2022, for a period of 5 years attached as Annexure II. The EIA-EMP report has been prepared as per the TOR granted under the EIA Notification of September 14th 2006. In order to assess the impact on environment due to proposed mining, it is necessary to ascertain the present status of environment prevailing at the project site and identification and assessment of impacts on the environment of the proposed operations.

As per NGT Order Dated 13-09-2018 and MOEF & CC OM No L-11011/175/2018-IA-II(M) Dated 12-12-2018 the project comes under B1 Category as the area is more than 5 Ha. Environmental Impact Assessment report is prepared to comply with the Terms of Reference (TOR) received from SEIAA, Bihar.

Sand Mining Project Block – 26 (Gaya Morhar-13) Sand Ghat on Morhar River,
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 ,685,688 Village/Mauja – Baiju Bigha, Bilauti, Dhibra G.P, Phulsathar, Tanrwa Tehsil/Anchal- Gurua District- Gaya,
 State-Bihar Proponent- M/s Rajendra and Sons Infra Private Limited, Prop. Minti Kumari
 Production- 414000 CUM per annum or 745200 TPA Area- 23.0 Ha

DEIA
EXECUTIVE SUMMARY

1.1 LOCATION

Name of the Project – Sand Mining Project Block – 26 (Gaya Morhar-13) Sand Ghat on Morhar River, District- Gaya, State-Bihar. .

Village/Mauja	Block	Tehsil /Anchal	District	State	Area in Ha.
– Baiju Bigha, Bilauti, Dhibra G.P, Phulsathar, Tanrwa	Block -26 Gaya Morhar-13	Gurua	Gaya	Bihar	23.0

Table 1.1 Detail of site & surrounding around Lease Area

Nearest Settlements	Barma Chak Village is about 0.38 Km in SW direction.
Nearest Road	Gurua Charki Road is about 0.39Km in N Direction. NH-19 is about 9.2 Km in S Direction. SH-69 is about 4.2 Km in W direction.
Nearest Airport	Gaya International Airport at distance of approx. 15.96 Km in NE direction.
Nearest Railway Station	Paraiya Railway Station at distance of approx. 16.3 km in NNE.
Water body	Project lies on Morhar River.
Nearest School/ college	DS Memorial Public school is about 0.73 Km in W Direction.
Temple	Shiv Temple is about 0.4 Km in N Direction

**Sand Mining Project Block – 26 (Gaya Morhar-13) Sand Ghat on Morhar River,
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State-Bihar Proponent- M/s Rajendra and Sons Infra Private Limited, Prop. Minti Kumari
Production- 414000 CUM per annum or 745200 TPA Area- 23.0 Ha**

**DEIA
EXECUTIVE SUMMARY**

Table 1.2 -Details of Project

Name of Proponent	M/s Rajendra and Sons Infra Private Limited; Patna. Prop.- Minti Kumari	
Full correspondence address of proponent	15 Mother Teresa Marg North S.K Puri Patna	
Name of Project	Sand Mining Project, Block 26 (Gaya Morhar-13) Sand Ghat	
Name of River	Morhar	
Name of Village	Khata No.-108,162,48,15,37 Khasra No. – 1,282,283,1,1193,1194,1195/1397,473,87,98,207 Thana No 645,687,689,685,688 Village/Mauja – Baiju Bigha, Bilauti, Dhibra G.P, Phulsathar, Tanrwa	
Tehsil	Tehsil/Anchal- Gurua	
District	Gaya	
Name of Minor Mineral	Sand	
Sanctioned Lease Area (in Ha.)	23.0 Ha	
Pillar Coordinates	Pillar	Coordinate
		Latitude
		Longitude
	A	24°39'46.86"N
	B	84°48'55.72"E
	C	24°39'46.04"N
	D	84°49'3.59"E
		24°39'2.75"N
		84°48'49.15"E
		24°39'3.54"N
		84°48'43.91"E
Total Geological Reserves	690000 Cum	
Total Mineable Reserves	646611 Cum	
Proposed Production/year	414000 CUM per annum or 745200 TPA	
Sanctioned Period of Mine lease	5 years	
Method of Mining	Open Cast semi mechanized method / OTFM	
No. of working days	250 days	
Working hours/day	8hrs	
No. of workers	32	
Ultimate Depth of Mining	3 m	
Nearest metalled road from site	880 m	
Water Requirement	PURPOSE	REQUIREMENT (KLD)
	Drinking & Domestic	0.64
	Plantation	1.15
	Dust Suppression	10.56
	Total	12.35

**Sand Mining Project Block – 26 (Gaya Morhar-13) Sand Ghat on Morhar River,
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Any litigation pending against the project or land in any court	No
Proposed Project cost	The total cost of project would be around Rs 127750000
Proposed EMP budget	Recurring Cost- 6,30,000/-Capital Cost -2,80,000/- (INR)
Proposed CER budget (2% of Project Cost)	Rs. 25,55,000
Length and breadth of Haul Road	Length: 880 m, width: 6 m
No. of Trees to be Planted	230 plants

1.2 WATER DEMAND

In the river bed mining projects there is as such no need of water to carry out operations, except for dust suppression& drinking. The number of working people is 32 so the water requirement for workers for drinking purpose will be around 0.64 KLD & the total water requirement will be around 12.35 KLD. This water will be supplied from the nearby area through water tanker.

Table 1.3- Water Demand

S. No.	Purpose	Water Demand KLD
1.	Drinking & Domestic	0.64
2.	Plantation	1.15
3.	Dust Suppression	10.56
Total		12.35

1.3 BASE LINE DATA

This section contains the description of baseline studies of the 10km radius of the area surrounding Sand mining Block-26 (Morhar 13) located at Khata No.-108,162,48,15,37 Khasra No. – 1,282,283,1,1193,1194,1195/1397,473,87,98,207 Thana No 645,687,689,685,688 Village/Mauja – Baiju Bigha, Bilauti, Dhibra G.P, Phulsathar, Tanrwa Tehsil/Anchal- Gurua District- Gaya, State-Bihar. The data collected has been used to understand the existing environment scenario around the proposed mining project against which the potential impacts of the project can be assessed.

Environmental data has been collected in relation to proposed mining for:-

- (a) Air
- (b) Noise
- (c) Water
- (d) Soil
- (e) Ecology and Biodiversity
- (f) Socio-economy

Table 1.4 Baseline Environmental Status

Attribute	Baseline status
Ambient Air Quality	Ambient Air Quality Monitoring (AAQM) has been carried out at seven locations during pre-monsoon season from March to May 2023. The minimum and maximum level of PM _{2.5} recorded within the study area was in the range of 24.43µg/m ³ to 63.32µg/m ³ with the 98th percentile 45.67 µg/m ³ to 62.72µg/m ³ at. The minimum and maximum level of PM ₁₀ recorded within the study area was in the range of 43.2µg/m ³ to 91.4µg/m ³ with the 98th percentile 78.76µg/m ³ to 91.40µg/m ³ . The minimum and maximum concentration of SO ₂ recorded within the study area was in the range of was 3.12 µg/m ³ to 13.45µg/m ³ with the 98th percentile 9.44µg/m ³ to 13.36 µg/m ³ . The minimum and maximum level of NO ₂ recorded within

Sand Mining Project Block – 26 (Gaya Morhar-13) Sand Ghat on Morhar River,
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	the study area was in the range of was 6.12µg/m ³ to 16.78µg/m ³ with the 98th percentile 12.25µg/m ³ to 16.55µg/m ³ . The minimum and maximum level of CO recorded within the study area was in the range of was 0.34µg/m ³ to 0.98µg/m ³ with the 98th percentile 0.67µg/m ³ to 0.97µg/m ³ . The results thus obtained indicate that the concentrations of PM ₁₀ , PM _{2.5} , SO ₂ and NO ₂ in the Ambient Air are well within the National Ambient Air Quality (NAAQ) standards for Industrial, Residential, Rural and other areas.
Noise Levels	Noise monitoring was carried out at 5 locations. The results of the monitoring program indicated that both the daytime and night time levels of noise were well within the prescribed limits of NAAQS, at all the four locations monitored.
Water Quality	3Groundwater samples and 2 surface water samples were analyzed and concluded that: The ground water from all sources remains suitable for drinking purposes as all the constituents are within the limits prescribed by drinking water standards promulgated by Indian Standards IS: 10500. From the Surface water analysis it is evident that most of the parameters of the samples comply with ‘Category ‘C’ standards of CPCB indicating their suitability for Drinking water source after conventional treatment and disinfection.
Soil Quality	Samples collected from identified locations indicate the soil is sandy type and the pH value ranging from 6.29-6.85, which shows that the soil is alkaline in nature. Potassium is found to be from 153.56 mg/kg to 184.35 mg/kg. The water holding capacity is found in between 32.02% to 32.75%.
Ecology and Biodiversity	There are no Ecologically Sensitive Areas present in the study area, but many reserved forests regions surround the project area
Socio-economy	The implementation of the Sand mining project on river Morhar will throw opportunities to local people for both direct and indirect employment. The study area is still lacking in education, health, housing, water, electricity etc. It is expected that same will improve to a great extent due to proposed mining project and associated industrial and business activities.

1.4 LAND ENVIRONMENT

No adverse impact is anticipated on land use of buffer zone due to present mining operations. As all the related activities are confined to the core zone.

The area likely to be degraded due to quarrying, pitting & roads. The impact on the land form or physiography will be limited to the modification of the slope. The landscape and land use will undergo a radical change due to open cast mining. The impact during next five years is limited as benches will be formed. Besides these benches, roads will also modify the physiography. The impact on land use will also be limited.

Impact on Land use Pattern including change of River course:

- If mining is not carried out in systematic manner by leaving sufficient safety barriers from the bank than it may disturb the river flow/course.
- Stacking of uncoated material including mineral or spillage (if any) on the bank side of river will hinder the flow of water in monsoon season, raise water level upstream, which may lead to bank cutting or flouting.
- Deviation from planned mining procedures can lead to river channel shifting as well as degradation of surrounding land, causing loss of properties & degradation of land scape.

Mitigation measures:

- Mineral will be mined out in central portion of stream & sufficient safety barrier 10% of width will be left towards bank side, so that river flow/course will not get disturbed.
- Mining of mineral will be started towards rise at the centre & also laterally in 1m slice so that river course will not get affected. Unwanted material or spillage (if any) will not be stacked by the side of excavation voids created. This is to be done so because it will otherwise hinder flow of water in monsoon period.

- Mining is to be done by leaving safety barrier on both sides & maximum barrier should be do concave side of river preferably the flow channel (excavation void created) should be kept straight so as to help avoid erosion as side cuttings, Upto next depth of 2.0m from river bed level.

No waste water will be generated from the mining activities of minor minerals as the project. Only involves lifting of Sand from the river bed.

1.5 AIR ENVIRONMENT

Anticipated impacts and evaluation

Information on air quality was studied and various modelling techniques predicted that the mining activity will not affect the air quality in a significant manner. In mining operations, loading, transportation and unloading operations may cause deterioration in air quality due to handling dry materials. In the present case, only wet materials will be handled, thus eliminating problems of fugitive dust.

Mitigation measures

- In control the emission regular preventive maintenance of equipment will be carried out on contractual basis.
- Proper mitigation measures like water sprinkling will be adopted to control dust emission.
- Plantation will be done at place which authorized by Local Authority.
- It is being certified that all transportation vehicles will carry a valid PUC certified. The only air pollution sources are the road transport network of the trucks. The dust suppression measures like water spraying will be done on the roads. This will decrease the dust emission by 75%.
- There is no toxic element present in the mineral which may contaminate the soil.

1.6 WATER ENVIRONMENT

Damage in the water body, depends on its assimilative capacity. To find out assimilative capacity of receiving water body, water samples were collected from different groundwater and surface water sources. The study indicates that assimilative capacity of the River water bodies still exists, but effective measures shall be taken to check water pollution. To find out the effect on ground water an extensive hydro-geological study has been conducted and from the study it can be safely concluded that there is no noticeable effect on surrounding ground water resource due to mining. The mining activity does not require water. The collection of sand is done on the river bed where excessive sedimentation has been noticed.

Mining of sand from within or near a streambed has a direct impact on the stream's physical habitat characteristics. These characteristics include geometry, bed evaluation, substrate composition and stability, in stream roughness elements, depth, velocity, turbidity, sediment transport, stream discharge and temperature. Altering these habitat characteristics can have deleterious impacts on both in stream biota and associated riparian habitat.

The detrimental effects to biota resulting from bed material mining are caused by three main processes

- i. alteration of flow patterns resulting from modification of the river bed
- ii. an excess of suspended sediment
- iii. damage to riparian vegetation and in stream habitat

As the project activity is carried out in the meandering part of the river bed, none of the project

activities affect the water environment or riparian habitats. In the projects, it is not proposed to divert or truncate any stream. No proposal is envisaged for pumping of water either from the river or tapping the ground water. In the lean months, the proposed sand mining will not expose the base flow of the river and hence, there will not be any adverse impact on surface hydrology and ground water regime due to this project. The contractor will adhere all guidelines and rules for proper and scientific method of mining during the period of extracting the ordinary sand. Thus, the project activities shall not have any adverse effect on the physical components of the environment and therefore may not have any effect on the recharge of ground waters or affect the water quality.

Impacts on hydrological Conditions:

- The study area is itself part of river course carries surface as well as ground water (under current). The flow of surface/ground water (sub surface flow is following the trend of topography).
- The area is part of dry river bed for more than nine months in a year except for the rainy season. The Sand mining is up to the depth of 3.0m will have in significant impact on water regime.
- The general ground water table which will be about 3.0 m below surface of river bed in the mining area during dry seasons will not be disturbed as ultimate working depth will be 3m.

Impact on Water Quality:

- Mining causes lowering of riverbed level as well as riverbed water level resulting in lowering in ground table due to excessive extraction & drainage out of ground water from the adjacent areas, if general ground water table is higher than the river bed level. In case the general ground water level is lower than riverbed water level, than it will have positive impact on ground water table will recharge vertically as well as laterally. In the former case may cause shortage of water for the vegetation & human settlement in the vicinity, but in later case it will help improve situations

- River is recharging the ground water, excessive mining will reduce the thickness of the natural filter material (sediments), infiltration through which the ground water recharged, so restriction in depth becomes necessity.

Mitigation Measures:

Mining in the area will be done above the water table as well as river bed water level, therefore much impact on water regime is not anticipated.

1.7 NOISE ENVIRONMENT

The sand mining projects are mainly not noisy as these are mainly manual in nature. But in this case the methodology adopted for mining is opencast semi mechanized mining method which may generate noise

Anticipated impacts and evaluation

At mines, noise is created by movement of machinery & transportation vehicles, etc. The noise level in the working environment are compared with the standards prescribed by Occupational Safety and Health Administration (OSHA-USA) which has been adopted and enforced by the Govt. of India through model rules framed under Factories Act, 1980 and CPCB 2000 norms.

Mitigation measures

The off-site receptors are not significantly affected as noise generated by mines is insignificant but for some disturbances due to vehicle movement. The following measures have been envisaged to reduce the impact from the transportation of minerals:

- Periodical monitoring of noise will be done.
- Transportation vehicles will be maintained in good running condition so that noise will be reduced to minimum possible level.
- Noise generated by these Equipment shall be intermittent & does not cause much adverse impact.
- Proper maintenance of all equipment/machines will be carried out which help in reducing noise level during operations.

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- In addition, truck drivers will be instructed to make minimum use of horns in the village area and sensitive zones.

1.8 TRAFFIC ANALYSIS

From the analysis it can be seen that the V/C ratio will changed from 0.04 to 0.19 for Gurua Charki Road but LOS will remain unchanged “A” i.e., Excellent & for SH-69 V/C ratio will be change from 0.153 to 0.213 with LOS changing from “A” to “B” i.e., from Excellent to Very Good respectively, So the additional load on the carrying capacity will be affected to a minimum level.

1.9 ENVIRONMENTAL MANAGEMENT PLAN BUDGET

Table 1.5-Budget allotted for the Project operation cost & Environmental Management Plan

S.No	Description	Capital Cost (INR)	Recurring Cost (INR)
1	Pollution Control & Dust Suppression	Nil	2.0
2	Pollution Monitoring i) Air pollution ii) Water pollution iii) Noise Pollution iv) Soil	--	2.0
3	Plantation and salary for one gardener (part time basis).	2.3=	0.5
4	Haul road Maintenance Cost	0.5	1.8
TOTAL		2.8	6.3

1.10 BENEFIT OF MINING

➤ PHYSICAL BENIFITS

The impact on the civic amenities will be substantial after the commencement of mining activities. The basic requirement of the community needs will be strengthened by extending health care, educational facilities developed in the township to the community, providing drinking water to the villages, building/strengthening of existing roads in the area. The proponent will initiate the above amenities either by providing or by improving the facilities in the area, which will help in uplifting the living standards of local communities. Medical facilities will be provided in the form of first-aid facility at the mine. These medical facilities will also be available to local people in the surrounding in case of emergencies.

➤ SOCIAL BENEFITS

- Generation of employment and improved standard of living;
- Increased revenue to the State by way of royalty, taxes and duties; and
- Superior communication and transport facilities etc.
- There will be significant change in the socio-economic scenario of the area.
- The proposed project will enhance the prospects of employment. Recruitment for the unskilled and semiskilled workers for the proposed project will be from the nearby villages.
- The development of the basic amenities viz. roads, transportation, electricity, drinking water, proper sanitation, educational institutions, medical facilities, entertainment, etc. will be developed as far as possible.
- Overall, the proposed project will change living standards of the people and improve the socio-economic conditions of the area.

ENVIRONMENTAL BENEFITS

➤ Enhancement Of Green Cover

Plantation/afforestation will be done as per program 230 plants will be done at place which authorized by Local Authority within 5km from lease boundary along with provision for maintenance for 5 years. Post plantation, the area will be regularly monitored in every season for evaluation of success rate. For selection of plant species local people will also be involved. The management will provide free saplings of fruit and other trees, etc. to local during rain for plantation. This will increase the consciousness in workers and near-by villagers for greenery. Fruit trees can contribute towards their financial gains.

1.11 CORPORATE SOCIAL RESPONSIBILITY

2 % of capital cost of the project cost will be allotted for the Corporate Environmental Responsibility as per OM dated 1st May 2018.

CER cost will be 2% of the total project cost. This amount will be used for social welfare. CER cost is Rs. 25,55,000. For each activity the funds to be earmarked by the proponent will be decided after discussion with the local authority/people and the beneficiaries during public hearing. It has been planned to undertake a concurrent evaluation of the activities to be taken up under the CER programme.

1.12 CONCLUSIONS

- The mining operations will meet the compliance requirements of MoEF & CC;
- Community impacts will be beneficial, as the project will generate significant economic benefits for the region;
- Adoption of Best Available Technology and Best Management Practices with more environmentally friendly process
- With the effective implementation of the Environment Management Plan (EMP) during the mining activities, the proposed project can proceed without any significant negative impact on environment.

कार्यकारी सारांश

बालू खनन परियोजना ब्लॉक – 26 (गया मोरहर -13)

स्थित – खसरा नंबर -1,282,283,1,1193,1194,1195/1397,473,87,98,207

खाता नंबर – 108,162,48,15,37

थाना नंबर –645,687,689,685,688

ग्राम- बैजू बीघा, बिलौती, ढिबरा जी.पी. फुल्सथर तन्त्रवा

अंचल- गुरुआ, जिला-गया, राज्य-बिहार

क्षेत्रफल – 23.0 हेक्टेयर

उत्पादन – 414000 घन मीटर प्रति वर्ष

परियोजना प्रस्तावक

मैसर्स राजेन्द्र एण्ड संस इंफ्रा प्राइवेट लिमिटेड,

प्रस्तावक- मिटी कुमारी

पता- 15 मदर टेरेसा मार्ग उत्तर एस. के पुरी पटना

पर्यावरण सलाहकार



कॉग्निजेंस रिसर्च इंडिया प्राइवेट लिमिटेड

(QCI/NABET द्वारा मान्यता प्राप्त)

सूट -B02, ब्लॉक - H-61, सेक्टर -63, नोएडा, यू.पी.- 201301

ई-मेल: criplindia@gmail.com

बालू खनन परियोजना ब्लॉक – 26 (गया मोरहर -13) मोरहर नदी पर बालू घाट,
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 क्षेत्रफल – 23.0 हेक्टेयर उत्पादन – 414000 घन मीटर प्रति वर्ष

कार्यकारी सारांश

कार्यकारी सारांश

1.0 परियोजना और प्रस्तावक का परिचय

पर्यावरण प्रभाव आकलन (ईआईए) एक प्रक्रिया है जिसका उपयोग निर्णय लेने से पहले किसी परियोजना के पर्यावरणीय, सामाजिक और आर्थिक प्रभावों की पहचान करने के लिए किया जाता है। यह एक निर्णय लेने वाला उपकरण है, जो निर्णय लेने वालों को प्रस्तावित परियोजनाओं के लिए उचित निर्णय लेने में मार्गदर्शन करता है। इसका उद्देश्य परियोजना योजना और डिजाइन के प्रारंभिक चरण में पर्यावरणीय प्रभावों की भविष्यवाणी करना, प्रतिकूल प्रभावों को कम करने के तरीके और साधन खोजना, स्थानीय पर्यावरण के अनुरूप परियोजनाओं को आकार देना और निर्णय निर्माताओं को भविष्यवाणियां और विकल्प प्रस्तुत करना है। ईआईए का उपयोग करके पर्यावरण और आर्थिक दोनों लाभ प्राप्त किए जा सकते हैं। पर्यावरणीय प्रभावों की भविष्यवाणी और शमन पर विचार करके, परियोजना नियोजन में शीघ्र लाभ, पर्यावरण की सुरक्षा, संसाधनों का इष्टतम उपयोग, इस प्रकार परियोजना के समग्र समय और लागत की बचत होती है।

परियोजना मैसर्स राजेन्द्र एण्ड संस इंफ्रा प्राइवेट लिमिटेड, प्रस्तावक- मिंटी कुमारी, पता- 15 मदर टेरेसा मार्ग उत्तर एस. के पुरी पटना द्वारा प्रस्तावित किया जा रहा है।

प्रस्तावक को जिला खनन कार्यालय द्वारा प्रस्तावित परियोजना आवंटित की गयी है। मैसर्स माँ राजेन्द्र एण्ड संस इंफ्रा प्राइवेट लिमिटेड, प्रस्तावक- मिंटी कुमारी के पक्ष में एलओआई प्रदान किया गया है, पत्र संख्या 5503 /खनन, दिनांक- 29/11/2022, पाँच वर्ष की अवधि के लिए अनुलग्नक I के रूप में संलग्न है। ईआईए-ईएमपी रिपोर्ट 14 सितंबर 2006 की ईआईए अधिसूचना के तहत दिए गए टीओआर के अनुसार तैयार की गई है। प्रस्तावित खनन के कारण पर्यावरण पर प्रभाव का आंकलन करने के लिए, परियोजना स्थल पर प्रचलित पर्यावरण की वर्तमान स्थिति का पता लगाना आवश्यक है। और प्रस्तावित संचालन के पर्यावरण पर प्रभावों की पहचान और मूल्यांकन। एनजीटी आदेश दिनांक 13-09-2018 और एमओईएफ और सीसी ओएम संख्या एल-11011/175/2018-आईए-द्वितीय (एम) दिनांक 12-12-2018 के अनुसार परियोजना “बी 1” श्रेणी के अंतर्गत आती है क्योंकि क्षेत्र 5 हेक्टेयर से अधिक है। पर्यावरणीय प्रभाव आंकलन रिपोर्ट एसईआईए, बिहार से प्राप्त संदर्भ की शर्तों (टीओआर) के अनुपालन के लिए तैयार की जाती है।

परियोजना की पहचान

रेत खनन परियोजना ब्लॉक – 26 (गया मोरहर -13) - मोरहर नदी पर बालू घाट, परियोजना का स्थान, खसरा नंबर - 1,282,283,1,1193,1194,1195/1397,473,87,98,207 खाता नंबर – 108,162,48,15,37 थाना नंबर –645,687,689,685,688 ग्राम- बैजू बीधा, बिलौती, ढिबरा जी.पी. फुल्सथर तत्रवा अंचल- गुरुआ, जिला-गया, राज्य-बिहार

1.1 स्थान

परियोजना का नाम- रेत खनन परियोजना ब्लॉक – 26 (गया मोरहर -13) मोरहर नदी पर बालू घाट

गाँव/ तहसील	ब्लॉक	जिला	राज्य	क्षेत्रफल हेक्टेयर में.
बैजू बीधा, बिलौती, ढिबरा जी.पी. फुल्सथर तत्रवा, अंचल- गुरुआ	ब्लॉक –26 (गया मोरहर -13) रेत घाट	गया	बिहार	23.0



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 क्षेत्रफल – 23.0 हेक्टेयर उत्पादन – 414000 घन मीटर प्रति वर्ष

कार्यकारी सारांश

तालिका 1.1 परियोजना निर्देशांक

क्रमांक	बालू घाट	क्षेत्र – (हेक्टेर)	निर्देशांक	
1	ब्लॉक –26 गया मोरहर -13	23.0	ए	24°39'46.86" न 84°48'55.72" ई
			बी	24°39'46.04" न 84°49'3.59" ई
			सी	24°39'2.75" न 84°48'49.15" ई
			डी	24°39'3.54" न 84°48'43.91" ई

तालिका 1.2- लीज क्षेत्र के आसपास साइट और आसपास का विवरण

निकटतम बस्तियाँ	बरमा चक गांव दक्षिण पश्चिम दिशा में लगभग 0.38 किलोमीटर है
निकटतम सड़क	गुरु चरकी रोड उत्तर दिशा में लगभग 0.39 किमी है NH-19 दक्षिण दिशा में लगभग 9.2 किमी है SH-69 दक्षिण पश्चिम दिशा में लगभग 4.2 किलोमीटर है
निकटतम हवाई अड्डा	गया अंतर्राष्ट्रीय हवाई अड्डा ,गया ,बिहार उत्तर पूर्व दिशा में लगभग 15.96 कि.मी. है।
निकटतम रेलवे स्टेशन	पैरैया रेलवे स्टेशन उत्तर पूर्व दिशा में 16.3 किमी. लगभग की दूरी पर है
जल निकाय	परियोजना मोरहर नदी पर स्थित है।
निकटतम स्कूल / कॉलेज	डीएस मेमोरियल पब्लिक स्कूल है पश्चिम दिशा में लगभग 0.73 किमी
निकटतम अस्पताल	प्राथमिक स्वास्थ्य केंद्र बरमा चक गांव दक्षिण पश्चिम दिशा में लगभग 0.38 किलोमीटर है
मंदिर	शिव मंदिर उत्तर दिशा में लगभग 0.4 कि.मी

तालिका- 1.3 परियोजना का विवरण

ऑनलाइन प्रस्ताव सं.	SIA/BR/MIN/415652/2023
प्रस्तावक का नाम	मैसर्स राजेन्द्र एण्ड संस इंफ्रा प्राइवेट लिमिटेड, प्रस्तावक- मिंटी कुमारी
प्रस्तावक का पूरा पत्राचार का पता	पता- 15 मदर टैरेसा मार्ग उत्तर एस. के पुरी पटना
परियोजना का नाम	प्रस्तावित बालू खनन परियोजना ब्लॉक –26 (गया मोरहर -13)
नदी का नाम	मोरहर



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 क्षेत्रफल – 23.0 हेक्टेयर उत्पादन – 414000 घन मीटर प्रति वर्ष

कार्यकारी सारांश

ग्राम का नाम/ तहसील	खसरा नंबर 1,282,283,1,1193,1194,1195/1397,473,87,98,207 खाता नंबर – 108,162,48,15,37 थाना नंबर-645,687,689,685,688 ग्राम- बैजू बीघा, बिलौती, ढिबरा जी.पी. फुल्सथर तत्रवा अंचल- गुरुआ, जिला-गया, राज्य-बिहार	
ज़िला	गया	
गौण खनिज का नाम	रेत	
स्वीकृत पट्टा क्षेत्र (हेक्टेयर में)	23.0 हेक्टेयर	
परियोजना की श्रेणी	"बी"1	
कुल भूवैज्ञानिक भंडार	690000 घन मीटर	
कुल खनन योग्य भंडार	646611 घन मीटर	
प्रस्तावित उत्पादन/वर्ष	414000 घन मीटर या 745200 टन	
खान पट्टे की स्वीकृत अवधि	5 साल	
खनन की विधि	ओपन कास्ट सेमी मैकेनाइज्ड मेथड / OTFM	
कार्य दिवसों की संख्या	250 दिन	
काम के घंटे/दिन	8 घंटे	
श्रमिकों की संख्या	32	
भूमि का प्रकार	सरकारी भूमि	
खनन की अंतिम गहराई	3 मीटर	
निकटतम पक्की सड़क	880 मीटर	
पानी की आवश्यकता	उद्देश्य	आवश्यकता (केएलडी)
	पीने और घरेलू	0.64
	पेड़ लगाना	1.15
	धूल दमन	10.56
	कुल	12.35
किसी भी अदालत में परियोजना या भूमि के खिलाफ कोई मुकदमा लंबित है	नहीं	
प्रस्तावित परियोजना लागत	परियोजना की कुल लागत लगभग ₹ 12,77,50,000	
प्रस्तावित ईएमपी बजट	आवर्ती लागत- 6,30,000 /- निश्चित लागत – 2,80,000 /-(रुपये में)	
कॉर्पोरेट सामाजिक उत्तरदायित्व लागत	₹ 25,55,000/-	
हॉल रोड की लंबाई और चौड़ाई	लंबाई- 8800 मीटर ,चौड़ाई- 6 मीटर	
लगाए जाने वाले पेड़ों की संख्या	230 पौधे	

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कार्यकारी सारांश

1.2 पानी की मांग

नदी तल खनन परियोजनाओं में धूल दमन और पीने के अलावा संचालन करने के लिए पानी की कोई आवश्यकता नहीं है। काम करने वाले लोगों की संख्या 32 है और कुल पानी की आवश्यकता लगभग 12.35 केएलडी होगी। यह पानी आसपास के इलाके से सप्लाई किया जाएगा।

तालिका 1.4- पानी की मांग

क्र.सं.	उद्देश्य	पानी की मांग के.एल.डी
1.	पीने और घरेलू	0.64
2.	पेड़ लगाना	1.15
3.	धूल दमन	10.56
कुल		12.35

1.3 बेस लाइन डेटा

ग्राम- बैजू बीघा, बिलौती, ढिबरा जी.पी. फुल्सथर तत्रवा, अंचल- गुरुआ, ब्लॉक –26 (गया मोरहर -13) बालू घाट जिला-गया, राज्य-बिहार, के आसपास के क्षेत्र के 10 किमी के दायरे के आधारभूत अध्ययन का विवरण है। एकत्र किए गए डेटा का उपयोग प्रस्तावित खनन परियोजना के आसपास के मौजूदा पर्यावरण परिदृश्य को समझने के लिए किया गया है जिसके विरुद्ध परियोजना के संभावित प्रभावों का आकलन किया जा सकता है।

निम्नलिखित के लिए प्रस्तावित खनन के संबंध में पर्यावरणीय डेटा एकत्र किया गया है:-

(ए) वायु

(बी) ध्वनि

(सी) पानी

(डी) मिट्टी

(ई) पारिस्थितिकी और जैव विविधता

(च) सामाजिक-अर्थव्यवस्था

तालिका 1.5 आधारभूत पर्यावरणीय स्थिति

गुण	आधारभूत स्थिति
परिवेशी वायु गुणवत्ता 5 किमी के दायरे में 7 स्थानों पर परिवेशी वायु गुणवत्ता की निगरानी की गई	मार्च से मई 2023 तक प्री-मानसून सीजन के दौरान सात स्थानों पर परिवेशी वायु गुणवत्ता निगरानी (AAQM) की गई है। अध्ययन क्षेत्र के भीतर दर्ज किए गए PM _{2.5} का न्यूनतम और अधिकतम स्तर 24.43 µg/m ³ से 63.32 के बीच था। µg/m ³ 98वें प्रतिशतक के साथ 45.67 µg/m ³ से 62.72 µg/m ³ पर। अध्ययन क्षेत्र के भीतर पीएम ₁₀ का न्यूनतम और अधिकतम स्तर 43.2 µg/m ³ से 91.4 µg/m ³ के बीच दर्ज किया गया, जिसमें 98वां प्रतिशतक 78.76 µg/m ³ से 91.40 µg/m ³ था। अध्ययन क्षेत्र के भीतर दर्ज की गई SO ₂ की न्यूनतम

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	और अधिकतम सांद्रता 3.12 $\mu\text{g}/\text{m}^3$ से 13.45 $\mu\text{g}/\text{m}^3$ की सीमा में थी, जिसमें 98वां प्रतिशतक 9.44 $\mu\text{g}/\text{m}^3$ से 13.36 $\mu\text{g}/\text{m}^3$ था। अध्ययन क्षेत्र के भीतर दर्ज किए गए NO_2 का न्यूनतम और अधिकतम स्तर 6.12 $\mu\text{g}/\text{m}^3$ से 16.78 $\mu\text{g}/\text{m}^3$ की सीमा में था, जिसमें 98वां प्रतिशतक 12.25 $\mu\text{g}/\text{m}^3$ से 16.55 $\mu\text{g}/\text{m}^3$ था। अध्ययन क्षेत्र के भीतर दर्ज सीओ का न्यूनतम और अधिकतम स्तर 0.34 $\mu\text{g}/\text{m}^3$ से 0.98 $\mu\text{g}/\text{m}^3$ की सीमा में था, जिसमें 98वां प्रतिशतक 0.67 $\mu\text{g}/\text{m}^3$ से 0.97 $\mu\text{g}/\text{m}^3$ था। इस प्रकार प्राप्त परिणामों से संकेत मिलता है कि परिवेशी वायु में PM_{10} , $\text{PM}_{2.5}$, SO_2 और NO_2 की सांद्रता औद्योगिक, आवासीय, ग्रामीण और अन्य क्षेत्रों के लिए राष्ट्रीय परिवेशी वायु गुणवत्ता (NAAQ) मानकों के भीतर है।
ध्वनि का स्तर	ध्वनि की निगरानी पाँच स्थानों पर की गई। निगरानी कार्यक्रम के परिणामों ने संकेत दिया कि निगरानी किए गए सभी चार स्थानों पर ध्वनि के दिन और रात दोनों समय NAAQS की निर्धारित सीमा के भीतर थे।
पानी की गुणवत्ता	भूजल के विश्लेषण के परिणामों से निम्नलिखित का पता चलता है: - <ul style="list-style-type: none"> • पीएच 6.88 से 7.29 तक भिन्न होता है • कुल कठोरता 245 mg/l से 385 mg/l तक भिन्न होती है। • कुल TDS पदार्थ 456 mg/l से 850 mg/l तक भिन्न होते हैं। परिणाम बताते हैं कि GW1 के नमूने में न्यूनतम TDS और कुल कठोरता थी और इसके विपरीत, GW3 से लिए गए नमूनों में अधिकांश मापदंडों के लिए अधिकतम मान हैं। सभी स्रोतों से भूजल पीने के उद्देश्यों के लिए उपयुक्त रहता है क्योंकि सभी घटक भारतीय मानक IS:10500 द्वारा प्रख्यापित पेयजल मानकों द्वारा निर्धारित सीमा के भीतर हैं। सतही जल विश्लेषण से यह स्पष्ट है कि नमूनों के अधिकांश पैरामीटर पारंपरिक उपचार और कीटाणुशोधन के बाद पेयजल स्रोत के लिए उनकी उपयुक्तता का संकेत देते हुए CPCB के वर्ग 'सी' मानकों का अनुपालन करते हैं।
मिट्टी की गुणवत्ता	पहचान किए गए स्थानों से एकत्र किए गए नमूने इंगित करते हैं कि मिट्टी रेतीली प्रकार की है और पीएच मान 6.29 – 6.85 के बीच है, जो दर्शाता है कि मिट्टी प्रकृति में क्षारीय है। पोटेशियम 152.56 kg/gm से 165.56 kg/gm तक पाया जाता है। जल धारण क्षमता 32.12 % से 34.45 % के बीच पाई जाती है।
पारिस्थितिकी और जैव विविधता	अध्ययन क्षेत्र में कोई पारिस्थितिक रूप से संवेदनशील क्षेत्र मौजूद नहीं है, लेकिन कई आरक्षित वन क्षेत्र परियोजना क्षेत्र के चारों ओर हैं।
सामाजिक-अर्थव्यवस्था	मोरहर नदी पर रेत खनन परियोजना के कार्यान्वयन से स्थानीय लोगों को प्रत्यक्ष और अप्रत्यक्ष दोनों तरह के रोजगार के अवसर मिलेंगे। अध्ययन क्षेत्र में अभी भी शिक्षा, स्वास्थ्य, आवास, पानी, बिजली आदि की कमी है। उम्मीद है कि प्रस्तावित खनन परियोजना और संबद्ध औद्योगिक और व्यावसायिक गतिविधियों के कारण इसमें काफी हद तक सुधार होगा।

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1.4 भूमि पर्यावरण

बफर जोन के भूमि उपयोग पर वर्तमान खनन कार्यों के कारण कोई प्रतिकूल प्रभाव प्रत्याशित नहीं है। चूंकि सभी संबंधित गतिविधियां कोर जोन तक ही सीमित हैं।

उत्खनन, गड्ढे और सड़कों के कारण क्षेत्र के खराब होने की संभावना है। भू-आकृति या प्राकृतिक भूगोल पर प्रभाव ढाल के संशोधन तक सीमित रहेगा। ओपन कास्ट माइनिंग के कारण लैंडस्केप और लैंड यूज में आमूल-चूल परिवर्तन होगा। अगले पांच वर्षों के दौरान प्रभाव सीमित होगा क्योंकि पीठें गठित की जाएंगी। इन बेंचों के अलावा सड़कों की फिजोग्राफी भी बदलेगी। भूमि उपयोग पर प्रभाव भी सीमित होगा।

नदी के मार्ग में परिवर्तन सहित भूमि उपयोग पैटर्न पर प्रभाव:

- यदि बैंक से पर्याप्त सुरक्षा अवरोधों को छोड़कर व्यवस्थित तरीके से खनन नहीं किया जाता है तो यह नदी के प्रवाह/मार्ग को बाधित कर सकता है।
- नदी के किनारे खनिज या छलकाव (यदि कोई हो) सहित अलेपित सामग्री का ढेर मानसून के मौसम में पानी के प्रवाह को बाधित करेगा, जल स्तर को ऊपर की ओर बढ़ाएगा, जिससे बैंक कटाव या बहाव हो सकता है।
- नियोजित खनन प्रक्रियाओं से विचलन नदी चैनल के स्थानांतरण के साथ-साथ आसपास की भूमि के क्षरण का कारण बन सकता है, जिससे संपत्तियों की हानि और भू-दृश्य का क्षरण हो सकता है।

शमन उपाय :

- धारा के मध्य भाग में खनिज का खनन किया जाएगा और पर्याप्त सुरक्षा बैरियर की 10% चौड़ाई किनारे की ओर छोड़ी जाएगी, ताकि नदी का प्रवाह/मार्ग बाधित न हो।
- खनिज का उत्खनन केंद्र में और बाद में 1 मी स्लाइस में भी शुरू किया जाएगा ताकि नदी का मार्ग प्रभावित न हो। अवांछित सामग्री या छलकाव (यदि कोई हो) को बनाए गए उत्खनन के किनारे नहीं रखा जाएगा। ऐसा इसलिए किया जाना है क्योंकि यह मानसून की अवधि में पानी के प्रवाह को बाधित करेगा।
- खनन दोनों तरफ सुरक्षा अवरोध छोड़कर किया जाना चाहिए और अधिकतम अवरोध नदी के अवतल किनारे पर किया जाना चाहिए, अधिमानतः प्रवाह चैनल (उत्खनन शून्य बनाया गया) को सीधा रखा जाना चाहिए ताकि साइड कटिंग के रूप में कटाव से बचने में मदद मिल सके, 2.0 मीटर की अगली गहराई तक नदी तल स्तर से।

परियोजना के रूप में गौण खनिजों के खनन गतिविधियों से कोई अपशिष्ट जल उत्पन्न नहीं होगा। केवल नदी तल से बालू उठाना शामिल है।

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1.5 वायु पर्यावरण

प्रत्याशित प्रभाव और मूल्यांकन

हवा की गुणवत्ता पर जानकारी का अध्ययन किया गया और विभिन्न मॉडलिंग तकनीकों ने भविष्यवाणी की कि खनन गतिविधि हवा की गुणवत्ता को महत्वपूर्ण तरीके से प्रभावित नहीं करेगी। खनन प्रचालनों में ,लदान ,परिवहन और उतराई प्रचालनों में शुष्क सामग्री को संभालने के कारण वायु की गुणवत्ता में गिरावट आ सकती है। वर्तमान मामले में ,केवल गीली सामग्री को संभाला जाएगा ,इस प्रकार उड़ने वाली धूल की समस्या समाप्त हो जाएगी।

शमन के उपाय

- उत्सर्जन को नियंत्रित करने के लिए उपकरणों का नियमित निवारक अनुसंधान अनुबंध के आधार पर किया जाएगा।
- धूल उत्सर्जन को नियंत्रित करने के लिए पानी के छिड़काव जैसे उचित शमन उपायों को अपनाया जाएगा।
- स्थानीय प्राधिकरण द्वारा अधिकृत स्थान पर पौधारोपण किया जायेगा।
- यह प्रमाणित किया जा रहा है कि सभी परिवहन वाहनों के पास वैध पीयूसी प्रमाणित होगा। वायु प्रदूषण का एकमात्र स्रोत ट्रकों का सड़क परिवहन नेटवर्क है। सड़कों पर धूल को कम करने के उपाय जैसे पानी का छिड़काव किया जाएगा। इससे धूल उत्सर्जन में 75 % की कमी आएगी।
- खनिज में कोई विषैला तत्व मौजूद नहीं है जो मिट्टी को दूषित कर सकता है।

1.6 जल पर्यावरण

हाइड्रोलॉजिकल स्थितियों पर प्रभाव:

- अध्ययन क्षेत्र स्वयं नदी के पाठ्यक्रम का हिस्सा है जो सतह के साथ-साथ भूजल (वर्तमान के तहत) का वहन करता है। सतह/भूजल का प्रवाह) उप सतही प्रवाह स्थलाकृति की प्रवृत्ति का अनुसरण कर रहा है।
- यह क्षेत्र बरसात के मौसम को छोड़कर साल में नौ महीने से अधिक समय तक सूखी नदी के तल का हिस्सा है। 3.0 मीटर की गहराई तक रेत खनन का जल व्यवस्था पर महत्वपूर्ण प्रभाव पड़ेगा।
- सामान्य भूजल तालिका जो शुष्क मौसम के दौरान खनन क्षेत्र में नदी के तल की सतह से लगभग 3.0 मीटर नीचे होगी ,उसमें कोई गड़बड़ी नहीं होगी क्योंकि अंतिम कार्य गहराई 3 मीटर होगी।

जल गुणवत्ता पर प्रभाव:

- खनन नदी के स्तर के साथ-साथ नदी के जल स्तर को कम करने का कारण बनता है ,जिसके परिणाम स्वरूप आस-पास के क्षेत्रों से भूजल के अत्यधिक निष्कर्षण और जल निकासी के कारण भूजल तालिका में कमी आती है ,यदि सामान्य भूजल स्तर नदी के स्तर से अधिक है। यदि सामान्य भूजल स्तर नदी के पानी के स्तर से कम है ,तो इससे भूजल स्तर पर सकारात्मक प्रभाव पड़ेगा और साथ

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ही साथ लंबवत रूप से रिचार्ज होगा। पूर्व मामले में आसपास के क्षेत्र में वनस्पति और मानव बस्ती के लिए पानी की कमी हो सकती है ,लेकिन बाद के मामले में यह स्थितियों को सुधारने में मदद करेगी।

शमन के उपाय:

क्षेत्र में खनन जल तालिका के साथ-साथ नदी तल के जल स्तर से ऊपर किया जाएगा ,इसलिए जल व्यवस्था पर अधिक प्रभाव का अनुमान नहीं है।

1.7 ध्वनि पर्यावरण

रेत खनन परियोजनाएं मुख्य रूप से शोरगुल वाली नहीं हैं क्योंकि ये मुख्य रूप से प्रकृति में मैनुअल हैं। लेकिन इस मामले में खनन के लिए अपनाई गई कार्यप्रणाली अर्ध यंत्रीकृत खनन विधि है जो शोर उत्पन्न कर सकती है।

प्रत्याशित प्रभाव और मूल्यांकन

खदानों में ,मशीनरी और परिवहन वाहनों आदि की आवाजाही से शोर पैदा होता है। काम के माहौल में शोर के स्तर की तुलना व्यावसायिक सुरक्षा और स्वास्थ्य प्रशासन (OSHA-USA) द्वारा निर्धारित मानकों से की जाती है ,जिसे सरकार द्वारा अपनाया और लागू किया गया है। भारत के कारखानों अधिनियम 1980 ,और CPCB 2000 मानदंडों के तहत बनाए गए मॉडल नियमों के माध्यम से।

शमन के उपाय

- शोर की समय-समय पर मॉनिटरिंग की जाएगी।
- परिवहन वाहनों को अच्छी चालू स्थिति में बनाए रखा जाएगा ताकि शोर को न्यूनतम संभव स्तर तक कम किया जा सके ।
- इन उपकरणों द्वारा उत्पन्न शोर रुक-रुक कर होगा और इससे ज्यादा प्रतिकूल प्रभाव नहीं पड़ेगा।
- सभी उपकरणों/मशीनों का उचित रखरखाव किया जाएगा जो संचालन के दौरान शोर के स्तर को कम करने में मदद करते हैं।
- साथ ही ट्रक चालकों को हिदायत दी जाएगी कि ग्रामीण क्षेत्र व संवेदनशील जोन में हार्न का कम से कम प्रयोग करें ।

1.8 यातायात विश्लेषण

विशिष्ट गया मोरहर ब्लॉक -24 के लिए यह देखा जा सकता है कि गुरु चरकी रोड के लिए वी/सी अनुपात 0.04 से 0.177 में बदल जाएगा जिसके कारण एलओएस में कोई बदलाव नहीं होगा यानी "ए" ही रहेगा। वही एसएच-69 के लिए वी/सी अनुपात 0.1506 से 0.208 में बदल जाएगा जिससे एलओएस "ए" से "बी" में बदल जाएगा। अर्थात क्रमशः उत्कृष्ट से बहुत अच्छा, इसलिए वहन क्षमता पर अतिरिक्त भार न्यूनतम स्तर तक प्रभावित होगा

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1.9 पर्यावरण प्रबंधन योजना बजट

तालिका 1.6 पर्यावरण प्रबंधन योजना के लिए आवंटित बजट

क्र.सं	विवरण	पूँजी लागत (रुपये में)	आवर्ती लागत (रुपये में)
1	प्रदूषण नियंत्रण और धूल दमन	शून्य	2.0
2	प्रदूषण मॉनिटरिंग i) वायु प्रदूषण ii) जल प्रदूषण iii) मिट्टी का प्रदूषण iv) ध्वनि प्रदूषण	--	2.0
3	हरित पट्टी विकास	2.3	0.5
4	हॉल रोड के रखरखाव की लागत	0.5	1.8
कुल		2.8	6.3

1.10 खनन के लाभ

➤ भौतिक लाभ

खनन गतिविधियों के शुरू होने के बाद नागरिक सुविधाओं पर प्रभाव काफी अधिक होगा। सामुदायिक आवश्यकताओं की बुनियादी आवश्यकता को स्वास्थ्य देखभाल, टाउनशिप में विकसित शैक्षिक सुविधाओं को समुदाय तक विस्तारित करके, गांवों को पेयजल उपलब्ध कराने, क्षेत्र में मौजूदा सड़कों के निर्माण/मजबूतीकरण द्वारा मजबूत किया जाएगा। प्रस्तावक या तो क्षेत्र में सुविधाएं प्रदान करके या सुधार कर उपरोक्त सुविधाओं की शुरुआत करेगा, जिससे स्थानीय समुदायों के जीवन स्तर को ऊपर उठाने में मदद मिलेगी। खदान में प्राथमिक चिकित्सा सुविधा के रूप में चिकित्सा सुविधा उपलब्ध कराई जाएगी। ये चिकित्सा सुविधाएं आपात स्थिति में आसपास के स्थानीय लोगों को भी उपलब्ध होंगी।

➤ सामाजिक लाभ

- रोजगार सृजन और जीवन स्तर में सुधार;
- रॉयल्टी, करों और शुल्कों के माध्यम से राज्य के राजस्व में वृद्धि; और
- सुपीरियर संचार और परिवहन सुविधाएं आदि।
- क्षेत्र के सामाजिक-आर्थिक परिदृश्य में महत्वपूर्ण परिवर्तन होगा।
- प्रस्तावित परियोजना से रोजगार की संभावनाएं बढ़ेंगी। प्रस्तावित परियोजना हेतु अकुशल एवं अर्द्धकुशल श्रमिकों की भर्ती निकटवर्ती ग्रामों से की जायेगी।



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- बुनियादी सुविधाओं का विकास जैसे। सड़कों ,परिवहन ,बिजली ,पेयजल ,उचित स्वच्छता ,शैक्षणिक संस्थानों ,चिकित्सा सुविधाओं ,मनोरंजन आदि का यथासंभव विकास किया जाएगा।
- कुल मिलाकर ,प्रस्तावित परियोजना से लोगों के जीवन स्तर में बदलाव आएगा और क्षेत्र की सामाजिक-आर्थिक स्थिति में सुधार होगा।

पर्यावरणीय लाभ

➤ हरित आवरण का संवर्धन

कार्यक्रम के अनुसार वृक्षारोपण/वृक्षारोपण 5 वर्ष तक रख-रखाव की व्यवस्था के साथ लीज सीमा से 5 किलोमीटर के भीतर स्थानीय प्राधिकारी द्वारा अधिकृत 230 पौधे किये जायेंगे। रोपण के बाद ,सफलता दर के मूल्यांकन के लिए हर मौसम में क्षेत्र की नियमित निगरानी की जाएगी। पौधों की प्रजातियों के चयन में स्थानीय लोगों को भी शामिल किया जाएगा। प्रबंधन बारिश के दौरान स्थानीय लोगों को वृक्षारोपण के लिए फल व अन्य पेड़ आदि के पौधे निःशुल्क उपलब्ध कराएगा। इससे श्रमिकों व आसपास के ग्रामीणों में हरियाली के प्रति जागरूकता बढ़ेगी। फलों के पेड़ अपने वित्तीय लाभ में योगदान कर सकते हैं।

1.11 कॉर्पोरेट पर्यावरण उत्तरदायित्व

दिनांक 1 मई 2018 के कार्यालय ज्ञापन के अनुसार परियोजना लागत की पूंजीगत लागत का 2% कॉर्पोरेट पर्यावरणीय उत्तरदायित्व के लिए आवंटित किया जाएगा।

सीईआर लागत कुल परियोजना लागत का 2% होगी। इस राशि का उपयोग समाज कल्याण के लिए किया जाएगा। सीईआर लागत रुपये 13 , 11 , 400/- है।

1.12 निष्कर्ष

- खनन परिचालन MoEF & CC की अनुपालन आवश्यकताओं को पूरा करेगा
- सामुदायिक प्रभाव लाभकारी होंगे ,क्योंकि परियोजना से क्षेत्र के लिए महत्वपूर्ण आर्थिक लाभ उत्पन्न होंगे।
- अधिक पर्यावरण के अनुकूल प्रक्रिया के साथ सर्वोत्तम उपलब्ध प्रौद्योगिकी और सर्वोत्तम प्रबंधन पद्धतियों को अपनाना।
- खनन गतिविधियों के दौरान पर्यावरण प्रबंधन योजना (ईएमप) के प्रभावी कार्यान्वयन के साथ प्रस्तावित परियोजना पर्यावरण पर किसी भी महत्वपूर्ण नकारात्मक प्रभाव के बिना आगे बढ़ सकती है।
