

**DRAFT ENVIRONMENTAL IMPACT ASSESSMENT  
AND  
ENVIRONMENTAL MANAGEMENT PLAN  
OF  
SAND MINING PROJECT ON KIUL RIVER AT  
(JAMUI KIUL BLOCK - 14) SAND GHAT**

<b>SAND BLOCK</b>	<b>BLOCK 14</b>
<b>PROPOSAL NO</b>	<b>SIA/BR/MIN/415742/2023</b>
<b>TOR NO</b>	<b>SIA/1(a)/2318/2023</b>
<b>AREA</b>	<b>51.80 HA</b>
<b>PRODUCTION</b>	<b>310800 cum/year or 640248 TPA</b>
<b>LOCATION</b>	<b>Mauza – Katauna, Block- Jamui, District- Jamui, Bihar</b>

**Applicant**

**Vashishtha Narayan Singh Construction Pvt. Ltd.,  
Vashishtha Narayan Singh  
S/o- Ramprit Singh  
Add.- Nupur Fatra, Bazar Samiti,  
Patna City, Patna**



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**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)**

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## **1.0 PURPOSE OF THE REPORT**

Environment Impact Assessment (EIA) is a process used to identify the environmental, social & economic impacts of a project prior to decision making. It aims to predict environmental impacts at an early stage of project planning & design, find ways & means to reduce adverse impacts. By using EIA, we can decide the suitable mitigation measures for implementation to maintain healthy working environment and contain pollution within permissible limits.

River plays an important role in the lives of the people. The river systems provide irrigation, potable water, transportation, electricity, and the livelihoods for a large number of people all over the country and to rural areas. Apart from this, river is also a good source of construction grade material as sand & gravel.

As transportation and construction infrastructure expanded since last few decades, the demand for construction grade sand also increased exponentially. The market demand of river sand is high throughout the nation. Sand is extracted directly from the river channel and it doesn't require processing other than size grading. But it is now well understood that continued and indiscriminate sand mining can cause serious environmental impacts, particularly if the river being mined is eroded.

Environmental Impact Assessment is one of the proven management tools for integrating environmental concerns in development process and for improved decision making as there is a need to harmonize the developmental activities with the environmental concerns into the larger interest of the society. The growing awareness, over the years, on environmental protection and sustainable development, has given further emphasis to the implementation of sound environmental management practices for mitigating adverse impacts from developmental activities. EIA study plays a vital role in sustainable development of a country. Recognizing its importance, the Ministry of Environment and Forest, Government of India had formulated policies and procedures governing the industrial and other developmental activities to prevent indiscriminate exploitation of natural resources and to promote integration of environmental concern in project development.

Environmental Impact Assessment report is prepared to comply with the Terms of Reference (TOR) received from SEIAA, Bihar under EIA notification of the MoEF & CC dated 14<sup>th</sup> September, 2006

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and its subsequent amendment there-off and also the EIA Guidance Manual for Mining of Minerals of MoEF & CC, Govt. of India, for seeking environmental clearance for mining of Sand in the applied mining lease area.

## **1.1 IDENTIFICATION OF PROJECT, PROJECT PROPONENT & CLUSTER APPROCH**

The Proposed Sand Mining Project is located on Kiul River at **Jamui Kiul Block 14 Sand Ghat** At Mauza – Katauna, Block -Jamui, District- Jamui, (Bihar).

The proposed mining is a cluster of 03 mining lease area of Jamui Kiul Block 13, Jamui Kiul Block 14 & Jamui Kiul Block 15 over an combined area of 135.3 Ha is for river bed sand mining on Kiul River at Dist- Jamui, Bihar.

**Cluster Situation:** As per District Survey Report Jamui the Proposed Sand Ghats of Jamui Kiul Block 13, Jamui Kiul Block 14 & Jamui Kiul Block 15 are comes in cluster situation whose combined cluster area is 135.3 ha. All the lease area of homogeneous minerals is coming within 500 m radius from each other confirming a cluster situation.

As per the Director of Geology, Bihar, the modification of mining plan has been approved .As per EIA notification 2016 and subsequent amendments, the project is coming under category ‘**B**’ (**B1**) and the lease area is more than 5.0 Ha, approved Mining Plan, Pre-feasibility Report and EMP are required for Environment Clearance in respect of the said quarry lease. Copy of letter is enclosed as **Annexure No. II.**

The Details of Cluster of lease area given below:

<b>Sand Block Name</b>	<b>Area (Ha)</b>	<b>Production</b>
Jamui Kiul Block 13	69.9	388104 TPA
Jamui Kiul Block 14	51.8	376980 TPA
Jamui Kiul Block 15	17.6	379452 TPA
<b>Total</b>	<b>135.3</b>	<b>11,44,536 TPA</b>

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The proposed project is of River bed sand mining and falls under Category- “B1” as per EIA Notification 2006 and its subsequent amendments by Ministry of Environment Forests & Climate Change, GOI. Jamui Kiul Block 14 Sand Ghat fall in Mauza – Katauna, Block -Jamui Dist - Jamui (Bihar). The details of the project are given below:

<b>Name &amp; Address of the Mine</b>	Jamui Kiul Block 14	Sand Mining Project On Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)
<b>River</b>	Kiul	
<b>Mineral</b>	Sand	
<b>Area (Ha.)</b>	Jamui Kiul Block 14	51.80 Ha.
<b>Production</b>	Jamui Kiul Block 14	640248 TPA
<b>Postal Address</b>	Jamui Kiul Block 14	Vashishtha Narayan Singh Construction Pvt. Ltd., Vashishtha Narayan Singh S/o- Ramprit Singh Add.- Nupur Fatra, Bazar Samiti, Patna City, Patna
<b>Status of Mine</b>	Fresh application for Environmental Clearance.	
<b>Project Cost</b>	RS- 5,91,52,000/-	
<b>CER Cost</b>	CSR cost will be 2% of the total project cost. This amount will be used for social welfare. CSR COST is Rs. 5,91,52,000 x 2% = Rs. 11,83,040/-	

## 1.2 BRIEF DESCRIPTION OF PROJECT

The proposed project is open cast semi-mechanized mining of sand with a proposed production of 640248 Tonnes per annum for applied lease. Detail has been given below:

The proposed project is over an area 51.80 ha for Jamui Kiul Block 14. Details are summarized in Table no 1.1

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As per MoEF, New Delhi Gazette dated 14<sup>th</sup> September 2006 and amended thereof, the proposed mining project is categorized as **Category ‘B-1’**. The estimated project cost for the proposed project is **given below:** (including auction cost)

**Table: 1.1 Project cost break-up & Production**

Block	Area	Khata No	Khasra No	Production	Auction Cost(Rs.)
Jamui Kiul Block 14	51.80	222, 125/52	721/1150, 39/549	640248 TPA	5,12,82,000
<b>Total</b>				<b>640248 TPA</b>	5,12,82,000

The proposed mining lease area falls in Survey of India Toposheet 72 L/01, 72 L/04, 72 L/05, 72 L/08.

The mine lease co-ordinates and connectivity details are listed below:

**Table: 1.2 Mine lease Pillar Co-ordinates (Jamui Kiul Block 14)**

Pillar No	Latitude (N)	Longitude (E)
A	24°56'24.74"N	86°15'24.16"E
B	24°56'40.72"N	86°15'18.82"E
C	24°56'54.51"N	86°14'56.87"E
D	24°56'40.90"N	86°14'54.81"E
E	24°56'26.67"N	86°15'6.77"E
F	24°56'11.55"N	86°15'18.19"E



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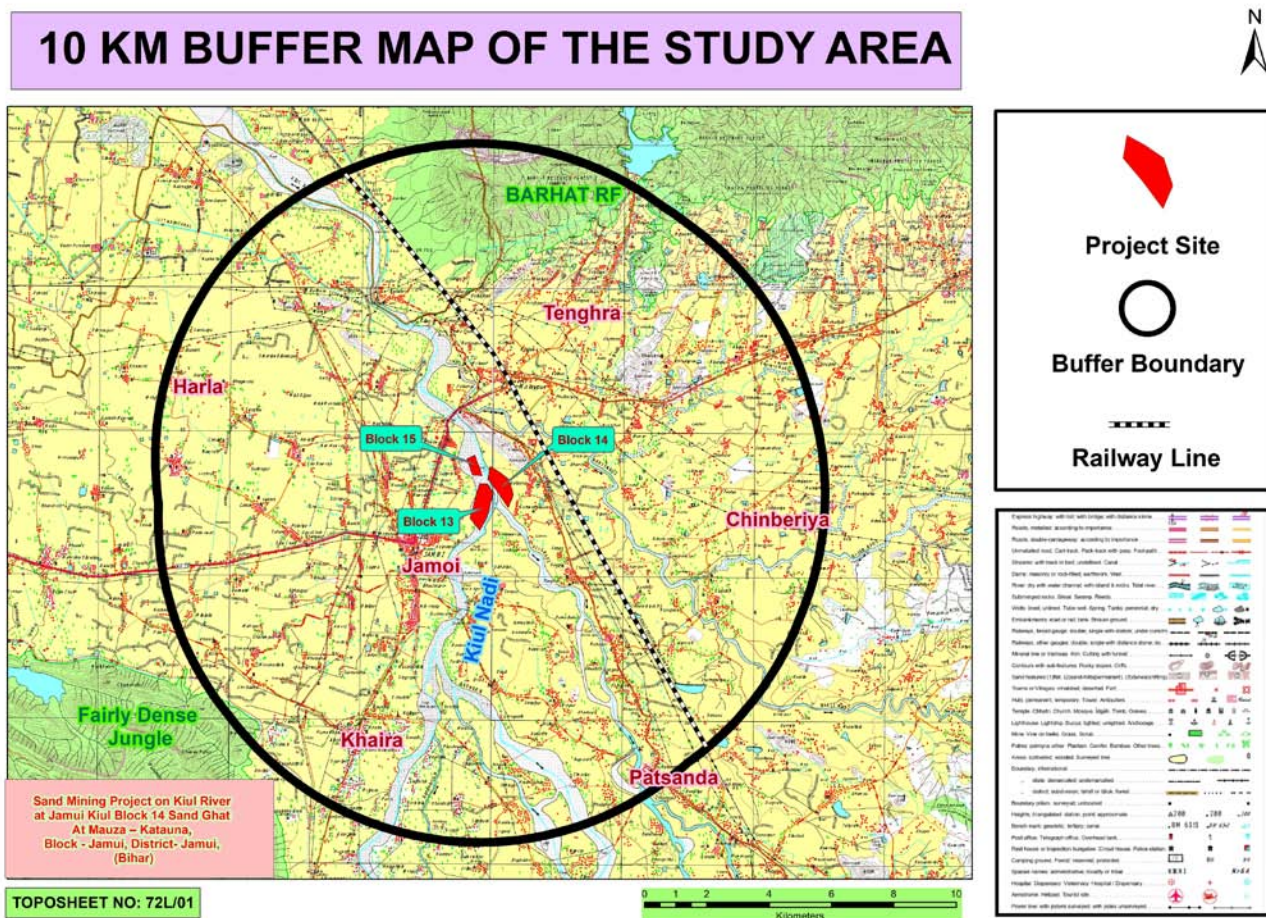


Figure 1.1, 10 km buffer map

Table: 1.3, Connectivity Details given below

Nearest Habitation/ town	Blocks	Village	Distance (Km) Direction
	Jamui Kiul Block 14	Katauna  Jamui	Katauna, approx. 0.80 Km in E direction.  Jamui approx. 3.70 Km in SW direction.
Nearest Railway Station	Blocks	Railway Station	Distance (Km) Direction
	Jamui Kiul Block 14	Jamui Railway Station	Jamui Railway Station, approx.

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			3.40 km towards North direction.
Nearest Airport	<b>Blocks</b>	<b>Airport</b>	<b>Distance (Km) Direction</b>
	Jamui Kiul Block 14	JPN International Airport Patna	JPN International Airport Patna, approx. 133.90 km towards NW direction.
Nearest Highway	SH-18: Approx. 3.90 KM towards West direction. NH-333A: Approx. 1.50 KM towards North direction.		

### 1.3, Details of environmental settings

Sl. No.	Particulars	Details
1	Ecological Sensitive Areas (National Park, Wildlife Sanctuaries)	No Ecological Sensitive areas found within 10 km study area.
2	Nearest water body	The mine site lies on the dry bed of Kiul river.
3	Seismic Zone	Zone- IV <i>Source</i> <i>BMTC</i> <i>2<sup>nd</sup></i> <i>edition</i> <a href="https://www.bmtpc.org/disaster%20resistnace%20technolgies/ZONE%20II.htm">https://www.bmtpc.org/disaster%20resistnace%20technolgies/ZONE%20II.htm</a>

The EIA-EMP report is prepared as per the TOR granted under the EIA Notification. In order to assess the impact on environment due to proposed mine, it is necessary to ascertain present status of environment prevailing at the project site and identification and assessment of impacts on the environment of the proposed operation.

### Project's importance to the country and the region

Sands are 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. Life without sand is unthinkable. 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 sands, etc. which travelled as sediments with the flow. This sand got deposited along the river course wherever conditions were favorable. In the deep past this settled sand was not extracted in a quantity in which it deposited; since due to less population the requirements was not enough. As a result of continuous deposit of sand, the rivers went on changing their course, widening by itself, eroding the fields and expanding, resulting in flooding, inundation and breaking their banks, causing devastation of property and loss of life. There has been a severe impact on every aspect of the environment. The rivers thus, needed channelization and therefore, extraction of these minor minerals through mining was expedient. The haphazard mining of sands 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 sands are 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.

#### **1.4 SCOPE OF THE STUDY**

The project proposal was submitted to State Level Environment Impact Assessment Authority-Bihar for its appraisal. Based on which, presentation was held for Terms of Reference (TOR). Based on the data provided and presentation made, the SEIAA-Bihar has issued the Terms of Reference is attached at **Annexure-1**.

Followings are the point wise compliance of the ToR provided by the SEIAA Bihar.

**Table: 1.5 Point wise compliance for TOR of of Jamui Kiul Block 14  
(ToR File No- SIA/1(a)/2318/2023)**

<b>S. No</b>	<b>TOR</b>	<b>Compliance</b>	<b>Reference in the Report</b>
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.	This is fresh LOI, Mine is yet to be opened. It will open only after getting environmental clearance.	--
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 vide letter no. 2072 dated 05-12-2022 in favor of Vashishtha Narayan Singh Construction Pvt. Ltd., (Vashishtha Narayan Singh)	<b>Annexure II, LOI</b>
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 and mining technology 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. to following information:  Mining Lease Area- 51.80 Hectare.  Lessee: Vashishtha Narayan Singh Construction Pvt. Ltd., (Vashishtha Narayan Singh)	<b>Annexure- III</b>  Mine plan  All details has been complied in chapter-2

		<p>Proposed Production- 310800 cum/year or 640248 TPA.</p> <p>Waste generation-</p> <p>No waste will be generated.</p> <p>Mining Method-Opencast semi-mechanized method</p>	
4	<p>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).</p>	<p>All Corner Coordinates of mining lease area superimposed on Toposheet Map has been incorporated in EIA/EMP Report</p>	<p>Refer Chapter 2</p> <p>Fig: 2.1, Corner Coordinates map</p>
5	<p>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.</p>	<p>The land use map showing salient features of the area is given in the report.</p> <p>The geological map of the mine lease area is also given in the report showing geomorphology</p>	<p>Land-use of the study area Figure 3.1.</p>
6	<p>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.</p>	<p>The Lease area is dry part of River bed. This is a barren land.</p> <p>The mining process will be done by land use policy of the State &amp; no land diversion has been proposed.</p>	<p>Chapter II &amp; III</p>



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 processes /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 insuring compliances 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.	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 EIA report.	Chapter VIII  Section 8.1  Corporate Environment Policy
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 7.	
9	The study area will comprise of 10 km zone around the mine lease from lease	The 10 km zone from periphery of the lease has been considered	Chapter I

	periphery and the data contained in the EIA such as waste generation etc. should be for the life of the mine/lease period.	as the study area. The Buffer map of the study area is attached with report.  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.	Figure 1.1
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.	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 in Kiul River. No Ecological Sensitive areas found within 10 km study area.	Land-use of the study area Figure 3.1 , Table 3.1  10 km buffer map enclosed in Chapter I of EIA Report.
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,	There is no forest land within the lease area.	---

	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.	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 schedule tribes and other traditional forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated"	There is no forest land involved in the leased out area. Hence, this act is not applicable for this project.	



15	The vegetation in the RF / PF areas in the study area, with necessary details, should be given	However, the vegetation details of the study area are incorporated with the report.	Chapter III  Section 3.1.6 Biological Environment
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.	The details Impacts & there mitigation measures are given in chapter IV of EIA/EMP Report.	Chapter IV
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) are found within 10 km of the study area.  MAP showing eco sensitive zone is attached in Chapter III (Fig 3.4)	Chapter III  Section 3.1.6 Biological Environment

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 Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost.	Detailed biological study of core zone and buffer zone within 10 km radius of the periphery of the mine lease has been carried out for the project. The same has been incorporated in the report.	Chapter III  Section 3.1.6  Biological Environment
19	Proximity to Areas declared as ‘Critically Polluted’ or the Project areas 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	Proposed project does not come under critically polluted area.	

	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)	There is no R & R involved in this project.	
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	There is no R & R involved in this project.	

	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 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.	<p>Base line study was carried out for Dec 22 January 23, February 23 Details are provided in EIA/EMP Report.</p> <p>The locations of the monitoring stations were decided on the basis of prevailing meteorological conditions (Wind direction &amp; wind speed) of the study area.</p> <p>The wind rose has been given in chapter III of EIA/EMP Report. One location has been selected in downwind direction within 500 m from the lease boundary.</p> <p>The location of the monitoring sites has been shown in map.</p>	Chapter III
23	Air quality modeling should be carried out for prediction of impact of the	Air quality modeling detail submitted at the time of FEIA.	

	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.	The water requirement for the project is 4.2 KLD for drinking, dust suppression and green belt development.  A detailed water balance is being provided in the report.	Chapter –II  Section 2.7 Water Requirement
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 is required.	Chapter II
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 required should be provided.	The project do not consume any process water except for drinking, dust suppression & plantation. Plantation is proposed, which will increase the water holding capacity &	

		<p>help in recharging of ground water.</p> <p>No artificial rainwater harvesting is proposed for the present project in lease area, however if any such project proposed by State Government PP will help out for the above.</p>	
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".	<p>Mining activity will be done on Dry Bed of River so there is no impact on surface water.</p> <p>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.</p>	Chapter II
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	The detailed impact and control measure w.r.t the quality of water in the surrounding area is discussed under Chapter 4.	

	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.	The project site lies on Kiul river. No diversion is proposed.	
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.	The mining will be done as per the approved mining plan and 1 meter bgl whichever is comes first.	
31	A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and Quantities 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	<p>Plantation/afforestation will be done as per program i.e along the road sides and near civic amenities, as per mine plan. Post plantation, the area will be regularly monitored in every season for evaluation of success rate.</p> <p>List of Plant species selected for green belt is detailed in the EIA report.</p> <p>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</p>	Chapter VIII Section 8.2

	the local population with emphasis on local and native species and the species which are tolerant to pollution.	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.	Chapter II



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.	Conceptual plans and Sections are given in Chapter 2.	
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.	<p>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.</p> <p>Each labour will undergo pre-placement medical examination. Thereafter periodical health check up will be arranged as stated in the report. About 4.0 lakh has been earmarked for occupational health.</p>	Chapter VII

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.	Chapter VII
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 to time for implementation.	Socio-economic significance provided to the local community i.e. to the nearby villagers is given in the EIA/EMP Report.	Chapter VI
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	The detailed environmental management plan to mitigate the environmental impacts has been mentioned in of the EIA/EMP Report.	Chapter VIII
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	This is a draft EIA report. Public hearing is yet to be conducted.	--

	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.	No litigation is pending against the project.	
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.	The capital cost of <b>5.73</b> lakh & <b>5.5</b> lakh as recurring cost has been earmarked for EMP. Chapter IX table no. 9.2	Chapter IX
42	A Disaster management Plan shall be prepared and included in the EIA/EMP Report".	A Disaster management Plan has been given in EIA report.	Chapter VII
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	<b>Besides the above, the below mentioned general points are also to be followed:-</b>		
a	All documents to be properly referenced with index and continuous page numberings.	All the documents to be properly referenced with index and continuous page numbering.	

**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)**

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.	Compiled With EIA report.	
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.	Compiled With EIA report.	
d	Where the documents provided are in a language other than English, an English translation should be provided.	Compiled With EIA report.	
e	The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.	Compiled With EIA report.	
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.	Compiled With EIA report.	

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.	Agreed	
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 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	Compiled With EIA report.	

**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna,  
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	dumps, if any, clearly showing the land features of the adjoining area.		
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**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)**

## 2.0 TYPE OF PROJECT

The project is proposed is for sand block Jamui Kiul Block 14 for the excavation of sand from the bed of river Kiul. The proposed project is opencast semi-mechanized/OTFM mining project.

## 2.1 NEED FOR THE PROJECT

The project site lies on Kiul River. The river get recharged by the rain water and carries sediment consisting of sand etc during monsoon season, generally.

Sand is used widely in the construction industry. It is usually mixed with cement and other ingredients to create mortar for building. It is also used in agriculture, as sandy soils are ideal for crops such as watermelons, peaches and peanuts. Sand is also used in Aquaria as it makes a low cost aquarium base material. This project will also provide employment to local people helping them earn livelihood.

## 2.2 LOCATION DETAILS

The Proposed Sand Mining Project is located on Kiul River at Jamui Kiul Block 14, Sand Ghat at Mauza – Katauna, Block -Jamui, District- Jamui, (Bihar).

The proposed mining is a cluster of 03 mining lease area of Jamui Kiul Block 13, Jamui Kiul Block 14 & Jamui Kiul Block 15 over an combined area of 135.3 Ha is for river bed sand mining on Kiul River at Dist- Jamui, Bihar.

**Cluster Situation:** As per District Survey Report Jamui the Proposed Sand Ghats of Jamui Kiul Block 13, Jamui Kiul Block 14 & Jamui Kiul Block 15 are comes in cluster situation whose combined cluster area is 135.3 ha. All the lease area of homogeneous minerals is coming within 500 m radius from each other confirming a cluster situation.

The address of the proponents is given below:

Sand Block name	Area (Ha)	Production
Jamui Kiul Block 13	69.9	388104 TPA
Jamui Kiul Block 14	51.8	376980 TPA
Jamui Kiul Block 15	17.6	379452 TPA
<b>Total</b>	<b>135.3</b>	<b>11,44,536 TPA</b>

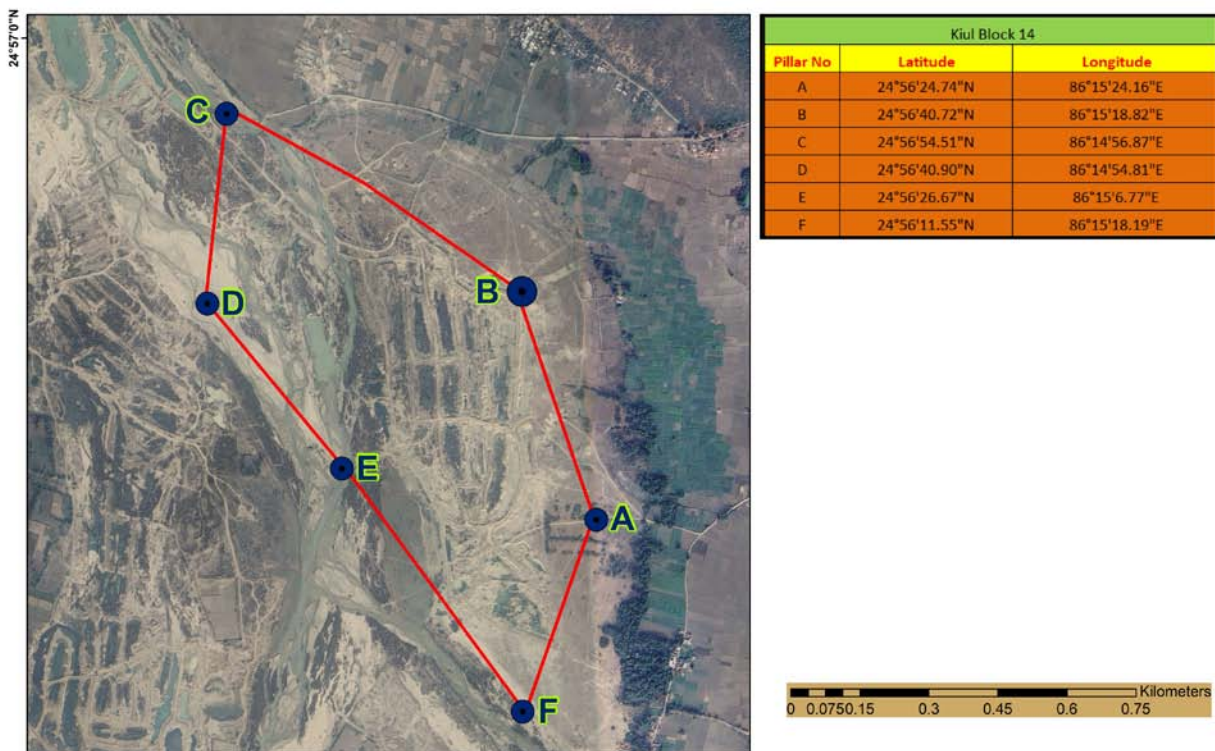
**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)**

**Table: 2.1 Mine lease Pillar Co-ordinates (Jamui Kiul Block 14)**

Pillar No	Latitude (N)	Longitude (E)
A	24°56'24.74"N	86°15'24.16"E
B	24°56'40.72"N	86°15'18.82"E
C	24°56'54.51"N	86°14'56.87"E
D	24°56'40.90"N	86°14'54.81"E
E	24°56'26.67"N	86°15'6.77"E
F	24°56'11.55"N	86°15'18.19"E

The mine site is well connected via an approach road of approx. 220 Metres to Metalled Road. NH-333A: Approx. 1.50 KM towards North direction. SH-18: Approx. 3.90 KM towards West direction.

### PILLAR CO-ORDINATES MAP OF THE STUDY AREA



**Figure 2.1:- Pillar Coordinate map of Jamui Kiul Block 14**



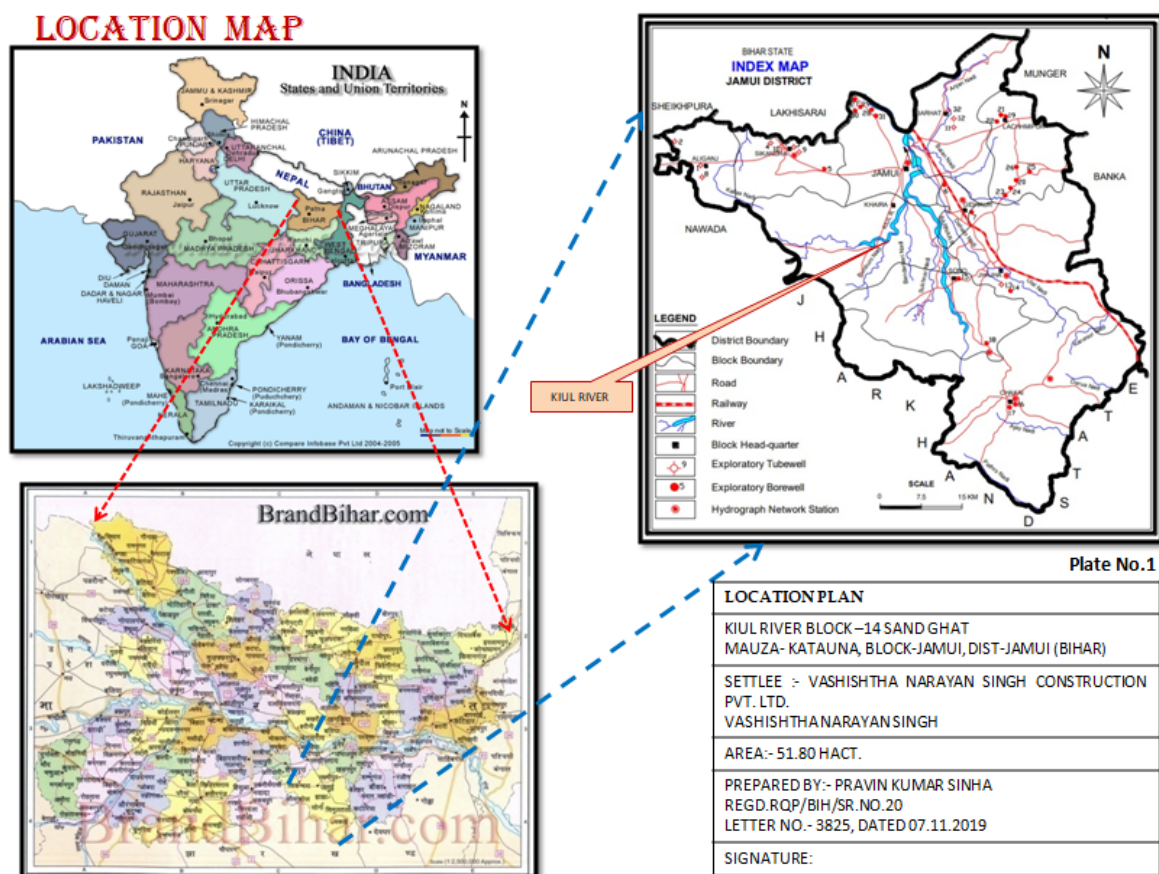
**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)**

### 2.2.1 Lease / Block Area

The proposed project is Open Cast Semi-Mechanized Mining of Sand with a proposed production is given below in tabular form.

Block	Area	Khata No	Khasra No	Production	Auction Cost
Jamui Kiul Block 14	51.80	222, 125/52	721/1150, 39/549	640248 TPA	5,12,82,000
<b>Total</b>				<b>640248 TPA</b>	<b>5,12,82,000</b>

As per MoEF, New Delhi Gazette dated 14<sup>th</sup> September 2006 and amended thereof, the proposed mining project is categorized as Category ‘B-1’. The estimated project cost for the proposed project is given in above table.



**Figure 2.2:- LOCATION MAP OF THE PROJECT SITE**

**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)**

## 2.3 TOPOGRAPHY & GEOLOGY

### 2.3.1 Topography

Most of the part of the district has hilly topography. Western portion of Jamui like Sikandra Jamui a little part of Jamui has plain area. Sikandra block is situated in alluvial zone. A sizeable part of the district comprise plains which are paddy-growing lands. Southern part of the district is covered with hills and forest characteristically reminiscent of the Chhotanagpur plateau in physical features. Hills of the district are considered to be the out – laying extension of Vindhya Range. Southwest part of the district has another block of hills known as Gidheswar Pahar.

*Source: Mining plan*

### 2.3.2 GEOMORPHOLOGY

The district has a diverse geomorphology ranging from hills to flood plains. The major geomorphic units are rocky upland, plateau / pediplain and alluvial plain.

There are three major hilly tracts, namely, a) the hills of Batia-Jhajha area having strike in east-west direction lying in the northern fringe of Chakai plateau, b) the Gidheshwar hills in the western part of the district and c) the Kharagpur hills lying in north-eastern part of the district. Attaining a height of 475 m amsl in Barhat block.

Plateau representing oldest table land in the area is Chakai plateau. The pediplains having rolling topography has relief up to 300 m amsl. It extends from Batia to the south of Kharagpur hills and comprises residual soil overlain by mixture of sheet wash deposits.

Alluvial plain is represented by Jamui terrace. It is made up of sediments derived from the denudation of Chakai plateau and Kharagpur hill. The thickness of alluvium in the northern part is about 80 m, while in southern part it reduces to 10 m. Other landforms such as escarpment, inselberg, valley fills are also present.

*Source: [https://cgwb.gov.in/District\\_Profile/Bihar/Jamui.pdf](https://cgwb.gov.in/District_Profile/Bihar/Jamui.pdf)*

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### 2.3.3 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 geographic distribution

**Table 2.2 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
Vindhya	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

*Source: Mining Plan*

### 2.3.4 LOCAL GEOLOGY OF THE AREA

Kiul River is a tributary of Ganges. Kiul River originates in Giridih of Jharkhand and flows through Lakhisarai, Sheikhpura and Jamui districts of the Indian state of Bihar and joins Harohar river in the Diara region. Kiul originates from the Tisri Hill Range

**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)**

in Kharagdiha police station area of Giridih district. After forming the boundary of the district for a short distance it enters Jamui district through a narrow gorge near the Satpahari hill. It first flows in an easterly direction close to the southern base of the Girdheswari Hills. It turns northward at their eastern extremity and passes near the town of Jamui. Two miles south of Jamui it is joined by Barnar, below this point it receives the Alai, a mountain stream and near Jamui railway station it is joined by the Anjan. It then flows north-east up to Lakhisarai, It passes below the railway bridge between Kiul junction and Lakhisarai station and is joined a few miles north of that place, near Rahuaghat, by the Harohar (Halahar or Harhobar), a continuation of the Sakri River. After this it turns due east and falls into the Ganges near Surajgarha. Until it meets the Harohar the Kiul has broad sandy bed and in some places is as much as half a mile wide, though it contains very little water in summer.

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.

*Source: Mining Plan*

### 2.3.5 CLIMATE

The average annual rainfall of district is 1107.3 mm. About 80% of the rainfall is received during June to September by south-west monsoon. The climate of Jamui district represents a transition between dry and extreme climates of the northern India and warm and humid of West Bengal. In the summer season the diurnal temperature rises up to 42<sup>0</sup>C, while in winter season it drops to as low as 2<sup>0</sup>C.

*Source: [https://cgwb.gov.in/District\\_Profile/Bihar/Jamui.pdf](https://cgwb.gov.in/District_Profile/Bihar/Jamui.pdf)*

### 2.4 GEOLOGICAL RESERVE

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.

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Proved Mineral Reserves (111): All quantities of sand occurring up to depth of 1m from surface has been considered as proved reserves.

**Table-2.2:- Proved Mineral Reserves**

Classification	Code	Quantity of Sand
A) Mineral Reserves		Cum
1) Proved Mineral Reserves	111	518000
Total		518000

Total Geological Reserve = **518000 cum. or 1067080 tonnes.**

*Source: Mining Plan*

#### **2.4.1 Mineable Reserves:**

Mineable reserves have been computed up to 1m depth from surface. The volume multiplied by bulk density (2.06 kg/m<sup>3</sup>) 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 leveled & restored back.

**Table-2.4:- Summary of minable reserves of Jamui Kiul Block 14 Sand Ghat as below (the bulk density multiply by 2.06)**

Bench Level (mRL)	Length (m)	Width (m)	Depth (m)	Volume (cum)	Tonnes
75 - 74	1146	431	1	493926	1017488
Total				493926	1017488

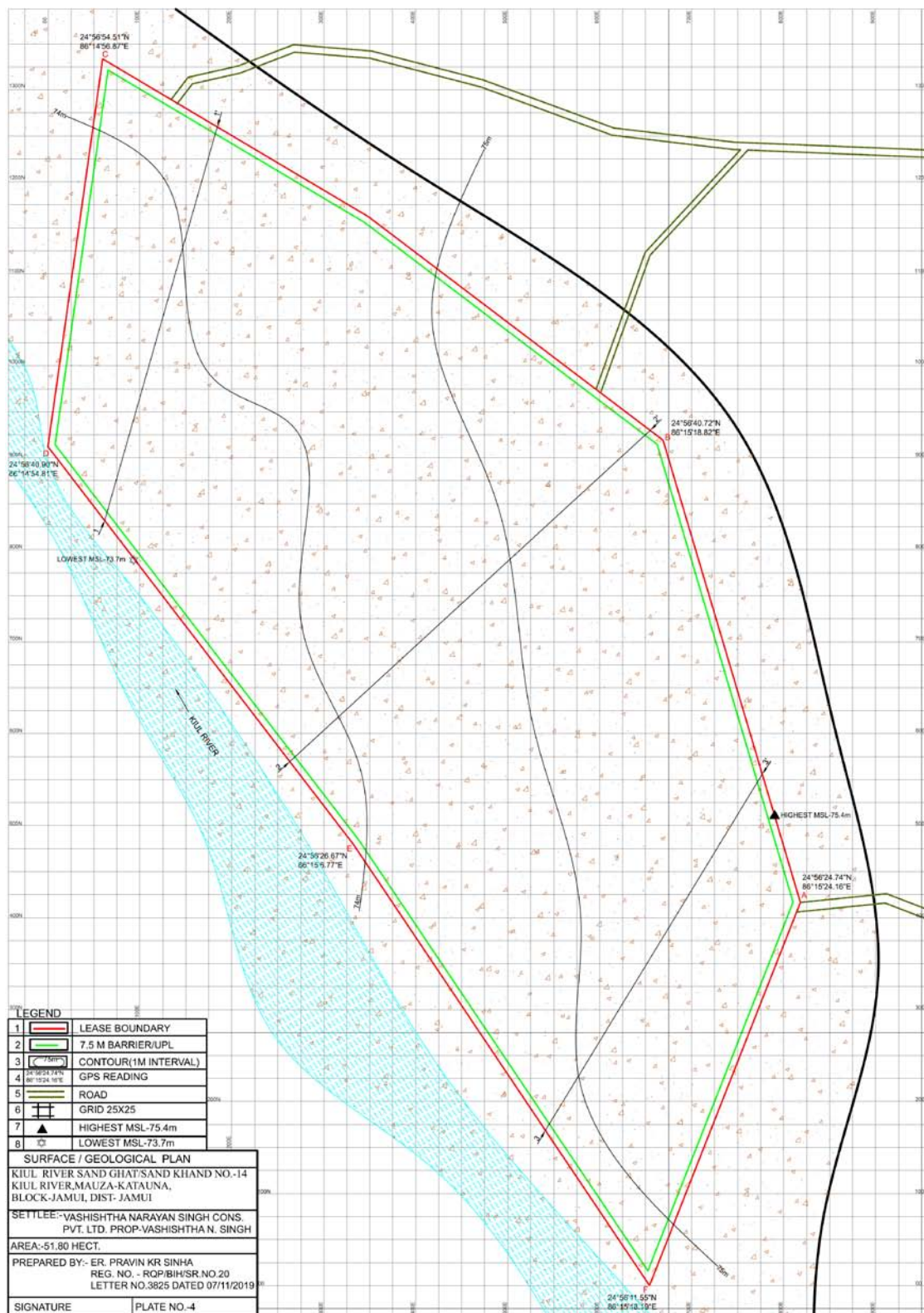
Total Mineable Reserve = 493926 CUM or 1017488 Tonnes

**Table No-.2.5 Classification Mineral Reserves:**

Sand Ghat	Area (Hect)	Geological Reserves (m <sup>3</sup> )	Mineable Reserves (m <sup>3</sup> )	Annual Mineable Permitted Reserve As per LoI (m <sup>3</sup> )
Jamui Kiul Block 14	51.8	518000	493926	310800



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**Figure 2.3:- Surface cum Geological Section of Jamui Kiul Block 14**

**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)**

### 2.4.2 Type of Mining

- Mining will be done as per the guidelines of Bihar Mineral (Concession Prevention of illegal Mining Transportation & Storage ) Rules, 2019, SSMG -2016, and EMGSM – 2020.
- 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 1 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 6 m width will be maintained for mining blocks as per guideline M.M.R-12019, under rule 115(1).
- Mining will be done only during the day time and completely stopped during the monsoon season.

### 2.4.3 Year Wise Production Schedule:

The bench wise annual exploitation of sand from Jamui Kiul Block 14 are given below :-

**Table 2.3 Year wise Production Details of Jamui Kiul Block 14**

<b>YEAR</b>	<b>ROM sand (cum)</b>	<b>ROM sand (Tones)</b>
<b>1<sup>st</sup> Year</b>	310800	640248
<b>2<sup>nd</sup> Year</b>	310800	640248
<b>3<sup>rd</sup> Year</b>	310800	640248
<b>4<sup>th</sup> Year</b>	310800	640248
<b>5<sup>th</sup> Year</b>	310800	640248
<b>Total</b>	<b>15,54,000</b>	<b>32,01,240</b>

*Source: Mining Plan*

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## 2.5 Conceptual Mining Plan

Mine Applied Area will be worked for Jamui Kiul Block 14 Sand Ghat. However, as the digging depth will be restricted to 1.0 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: 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.

## 2.6.0 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.

### 2.6.1 Waste –disposal arrangement

No top soil is present in the mining area as it is riverbed. 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. No waste will be thrown into the streams or left on the banks. Separate bins will be kept within the lease area for domestic wastes.



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## 2.7 GENERAL FEATURES

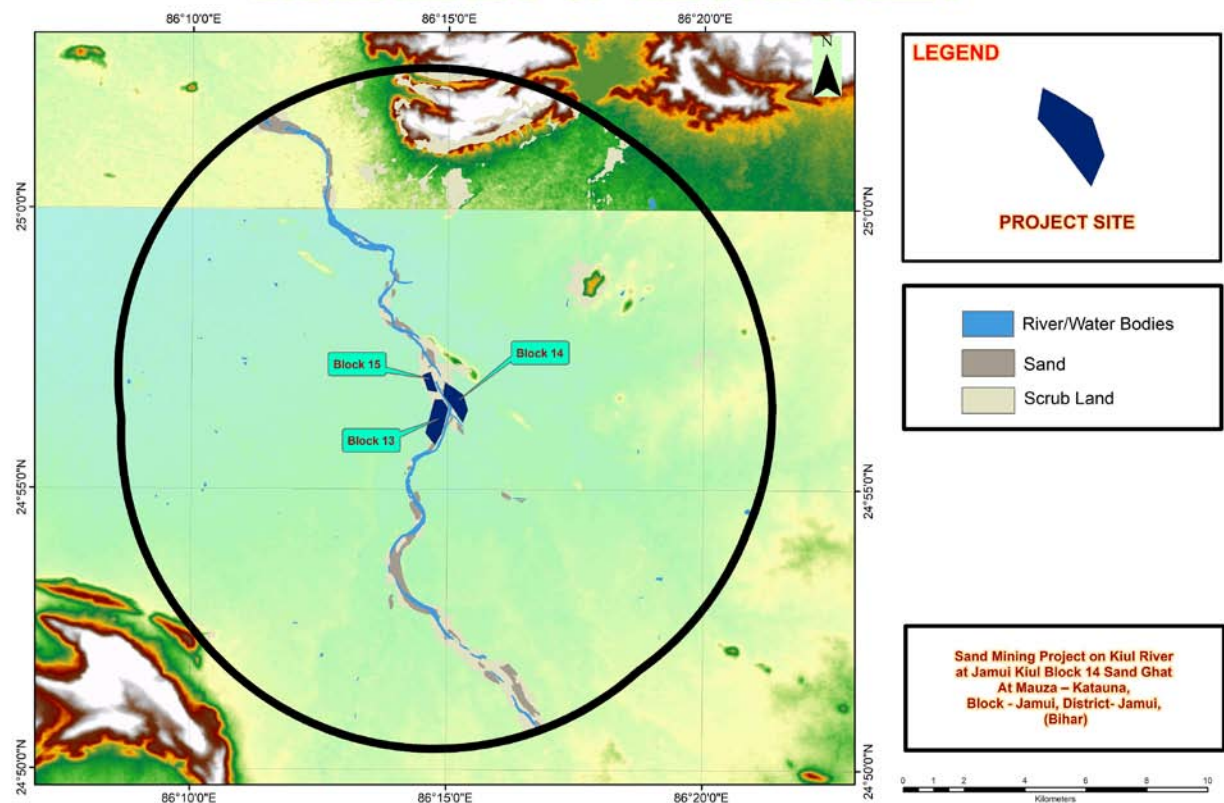
### 2.7.1 Land-use pattern

The mine lease area is flat river bed and river banks. There is no forest land or agriculture land in the mine lease area. The entire mining lease lies within River.

### 2.7.2 Surface drainage pattern

The mine site lie on the dry bed of Kiul River so there will be no impact on surface water.

### DRAINAGE MAP OF THE STUDY AREA



**Fig-2.4, Drainage map**

### 2.7.3 Man power requirement

The manpower requirement for the proposed project will be around 29 who will be utilized for excavation & loading of minerals into trucks or tractor-trolleys. Break-up of Man-power requirement is given in below **Table 2.8**.

**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)**

**Table 2.4 Manpower Requirement**

S. No.	Category	Numbers
1.	Administration	01
2.	Supervisor	02
3.	Skilled	06
4.	Un-skilled	20
TOTAL		29

#### 2.7.4 Water supply

Water requirement for the proposed project will be provided for the workers for drinking & domestic purpose. Water will also be provided for dust suppression. Fresh water will be only used for drinking purpose. The break up for water requirement is given below:

**Table 2.5 Water requirement**

Activity	Calculation	Round off Figure in KLD
Drinking	@ 10 lpcd per labor $10 \times 29 / 1000 = 0.29$ KLD	0.29
Dust Suppression	Total approach road to be water sprinkled = 220 m $220 \text{ m} \times 6 \text{ m} \times 0.5 \times 2 \text{ times} / 1000 = 1.32$ KLD	1.32
Plantation	518 plant (during plan period) @ 5 L/per plant = $518 \times 5 \text{ lts} = 2590 / 1000 = 0.50$ KLD	2.59
Total		4.2

The water will be supplied from available sources from nearby village.

#### 2.7.5 Site services

The following facilities/amenities will be extended by the mine management under 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 will be made available at the site. In emergency worker.

**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)**

- ❖ Sanitation facility i.e. septic tank or community toilet facility will be provided for the workers.
- ❖ Mask and gloves distribution to the workers.

### **2.7.6 Extent of mechanization**

The operation will be open cast semi- mechanized/OTFM with use of excavators/JCBs truck /tractors combination or Manually etc. The sand will be collected in its existing form.

### **2.7.7 Statutory requirements**

It is accepted that effective resource management cannot be done in isolation. The proponent therefore vigorously pursues approaches towards coordination and integration where possible, so as to lead to coordinated regulatory systems.

Various 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:

- Bihar Minor Mineral Concession Rule, 2014 amended till date.
- 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.
- 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.

\*\*\*\*\*

### **3.0 General**

The main objective of describing the environment which may be potentially affected, are i) to assess present environmental quality and the environmental impacts and ii) to identify environmentally significant factors that could preclude mine development. Mining activities affect the existing status of environment at site. In order to maintain the existing environmental status at mining site it is essential study existing environmental status and assess the impact of upcoming project on various environmental components. This chapter gives idea of description of environment status of the study area and this will be helpful for assessment of impact on the environment due to proposed mining activities. Baseline environmental status in and around proposed mining lease area describe the existing conditions of air, noise, water, soil, biological and socio-economic environment. The proposed project as a center, a radial distance of 10 km is considered as study area for baseline data collection and environmental monitoring. The data was collected for various environmental attributes so as to compute the impacts that are likely to arise due to proposed development activity.

#### **3.0.1 Study area & study period**

The proposed project as a center, a radial distance of 10 km is considered as study area for baseline data collection and environmental monitoring. The baseline environment quality was carried out over a radial distance of 10 km around the mining lease area during the months of Dec 2022, Jan-Feb 2023.

#### **3.0.2 Methodology**

Base line attributes like ambient air, water, meteorology, noise, Soil, Ecology and Biodiversity & Socio Economy condition were collected as per approved term of reference. Secondary data was also collected from various government department as well as local people. Methodology adopted in this study is as follows.

- ✓ By setting up meteorological station near project site
- ✓ Collection of site specific meteorological data at the mine site.
- ✓ Installation of respiratory dust samplers (for PM<sub>10</sub>, PM<sub>2.5</sub>) at different location in the study area for the collection of primary air pollutant and analyze the existing air conditions.
- ✓ Carrying out a detailed biological study for the Core and Buffer Zone

- ✓ Soil sample were collected from various location in the study area to analyze physical and chemical characteristics for assessment of impact on soil.
- ✓ Surface and Ground water samples were also collected from the various locations in the study area for analysing the existing water quality in the study area.
- ✓ Noise measurement has been done in core zone as well as buffer zone to analyze the existing situation in the study area.
- ✓ Literature review that includes identification of relevant data and articles from various publications, various government agencies and other sources for socio-economy, demography has been done with primary data collection in 10 km of the study area.
- ✓ Existing pollution load has been also identified in the buffer zone due to similar activities.
- ✓ Accordingly, field studies were carried out during the study period (Dec 2022, Jan-Feb 2023) to establish the existing baseline conditions.

### 3.1 Land Environment of the Study area

#### Land use

Land use involves the management and modification of natural environment or wilderness in to built environment such as settlements and semi-natural habitats such as arable fields, pastures, and managed woods. It also has been defined as "the total of arrangements, activities and inputs that people undertake in a certain land cover type.

#### Land cover

Land cover is the physical material at the surface of the earth. Land covers include grass, asphalt, trees, bare ground, water, etc. Earth cover is the expression used by ecologist Frederick Edward Clements that has its closest modern equivalent being vegetation. The expression continues to be used by the Bureau of Land Management.

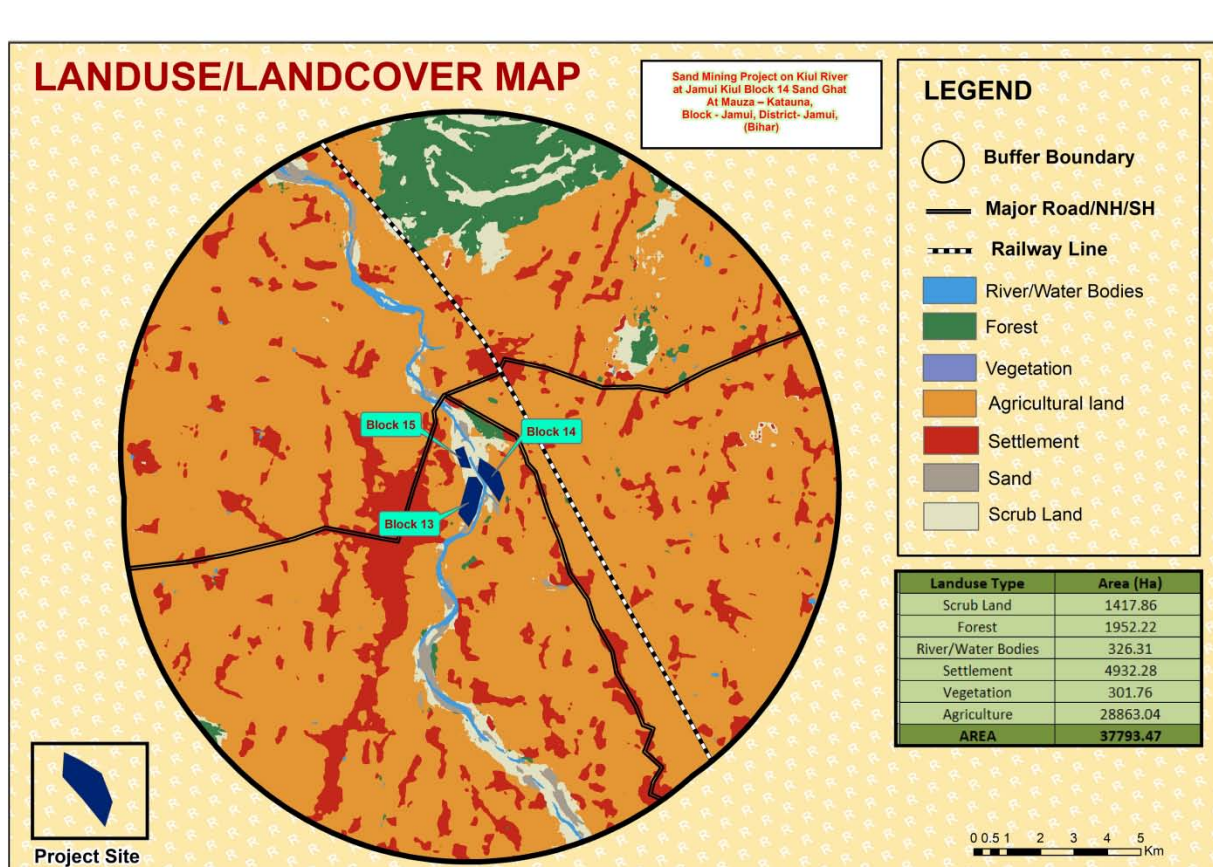
To assess the land use pattern surrounding the 10 km radius of the site, a detailed study was carried out. The land use pattern study reveals that the 10 km environs is predominantly agricultural land. The land use details are given in **Table- 3.1** and shown in **Figure-3.1**.



**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)**

**Table 3.1: Land Use Cover of the Project Study Area**

Landuse Type	Area (Ha)
Scrub Land	1417.86
Forest	1952.22
River/Water Bodies	326.31
Settlement	4932.28
Vegetation	301.76
Agriculture	28863.04
<b>AREA</b>	<b>37793.47</b>



**FIGURE 3.1: LAND USE COVER OF THE PROJECT STUDY AREA**

### 3.2 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

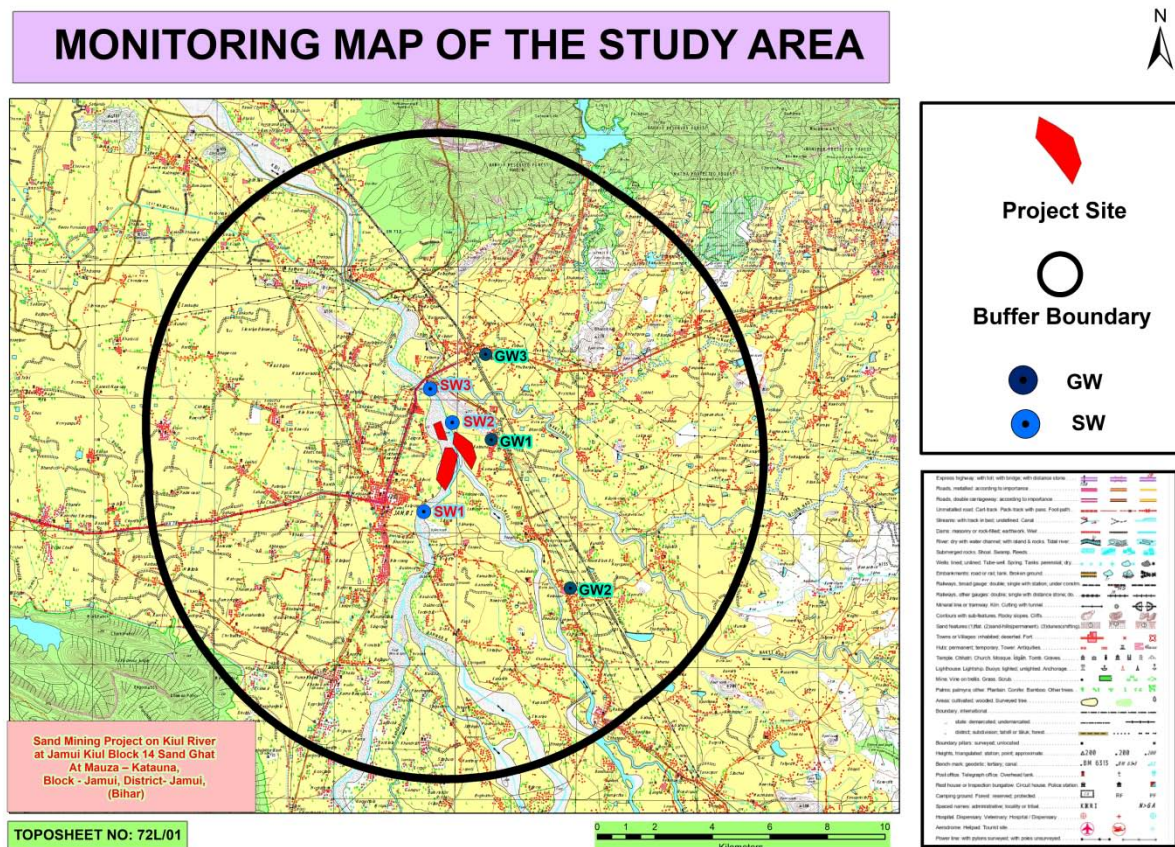
**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)**

ground water has been studied in order to assess proposed water-uses in construction, drinking, cooling and horticulture purpose.

The water quality at the site and other locations within the 10 km impact zone was monitored during Dec 2022 to February 2023. The water sampling locations marked within the study are presented in **Table 3.2** and **Figure 3.2** and the result of the monitoring and analysis are presented in the **Table 3.3** showing Water Quality Monitoring Locations marked within the Study Area.

**Table 3.2: Water Sampling Locations**

Water (Ground) Monitoring Locations		
GW 1	Katauna village	1.0 km E
GW 2	Ratanpur	6.87 Km SE
GW 3	Mallehpur	3.10 Km N



**Figure 3.2 Water Sampling Location Map**

**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)**

Table 3.3 Ground Water Quality Monitoring Result

S.No	Parameter	Unit	Limit as per IS:10500		GW1	GW2	GW3
			Desirable Limit	Permissible Limit			
1	Colour	Hazen	5	25, Max	<2	<2	<2
2	Odour	-	Unobjectionable	-	Unobjectionable	Unobjectionable	Un
3	Taste	-	Agreeable	-	Agreeable	Agreeable	Agreeable
4	Turbidity	NTU	5	10	<1	<1	<1
5	pH	-	6.5-8.5	No Relaxation	7.35	7.54	8.21
6	Total Hardness (as CaCO <sub>3</sub> )	mg/l	300	600	224	238	212
7	Iron (as Fe)	mg/l	0.3	1	0.08	0.09	0.13
8	Chlorides (as Cl)	mg/l	250	1000	28	35	52
9	Fluoride (as F)	mg/l	1	1.5	0.4	0.5	0.7
10	TDS	mg/l	500	2000	278	328	360
11	Calcium(as Ca <sup>2+</sup> )	mg/l	75	200	55	57	47
12	Magnesium (as Mg <sup>2+</sup> )	mg/l	30	100	21	23	23
13	Copper (as Cu)	mg/l	0.05	1.5	<0.01	<0.01	<0.01
14	Manganese(as Mn)	mg/l	0.1	0.3	0.01	0.02	0.08
15	Sulphate (as SO <sub>4</sub> )	mg/l	200	400	12	16	28
16	Nitrate(as NO <sub>3</sub> )	mg/l	45	No Relaxation	1.2	1.8	4
17	Phenolic Compounds (as C <sub>6</sub> H <sub>5</sub> OH)	mg/l	0.001	0.002	<0.001	<0.001	<0.001
18	Mercury (as Hg)	mg/l	0.001	No Relaxation	<0.001	<0.001	<0.001
19	Cadmium (as Cd)	mg/l	0.01	No Relaxation	<0.01	<0.01	<0.01
20	Selenium ( as Se )	mg/l	0.01	No Relaxation	<0.01	<0.01	<0.01
21	Arsenic (as As)	mg/l	0.01	No Relaxation	<0.01	<0.01	<0.01
22	Cyanide (as CN)	mg/l	0.05	No Relaxation	<0.01	<0.01	<0.01
23	Lead (as Pb)	mg/l	0.05	No Relaxation	<0.01	<0.01	<0.01
24	Zinc (as Zn)	mg/l	5	15	0.04	0.05	0.21
25	Anionic Detergent (as MBAS)	mg/l	0.2	1	<0.01	<0.01	<0.01
26	Chromium (as Cr <sup>6+</sup> )	mg/l	0.05	No Relaxation	<0.01	<0.01	<0.01
27	Mineral oil	mg/l	0.01	0.03	<0.01	<0.01	<0.01



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28	Alkalinity (as CaCO <sub>3</sub> )	mg/l	200	600	190	218	188
29	Aluminum (as Al)	mg/l	0.03	0.2	<0.02	<0.02	0.04
30	Boron (as B)	mg/l	1	5	0.1	0.1	0.3
<b>Microbiological Parameter</b>							
1	Total Coliform	MPN/100 ml	10 , Max	-	<2	<2	14
2	E.coli	E.coli /100ml	Absent	-	Absent	Absent	Absent

### Observation:

Analysis of results of ground water reveals the following: -

- pH varies from 7.35 at to 8.21
- Total hardness varies from 212 mg/l to 238 mg/l .
- Total dissolved solids vary from 278 mg/l to 360 mg/l.

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.

### 3.2 (b) SURFACE WATER

Three surface water samples were collected from the study area. The location of surface water samples is given in Table 3.3 (iii). The physio-chemical analysis of the these samples are given in the Table 3.3 (iv)

**Table 3.4: Surface water sampling locations**

Surface Water Monitoring Locations		
SW1	Upstream Near village Garo Nawada	2.0 Km SW
SW 2	Project site	----
SW 3	Downstream near village Patauna	2.33 NW

**Table 3.5: Physio-chemical properties of surface water**

S.No.	Parameter	Unit	S.W. 1	S.W. 2	S.W. 3
			Upstream	center	Downstream
1	pH	-	7.67	7.76	7.83
2	Dissolved Oxygen	mg/l	7	6.9	7.2
3	BOD (3 Days at 27 °C)	mg/l	3	4	3
4	Free Ammonia (as N)	mg/l	<0.1	<0.1	<0.1
5	Sodium Adsorption Ratio	-	0.40	0.48	0.49
6	Boron	mg/l	0.2	0.2	0.1

<b>Chapter-III</b>	<b>BASELINE DATA DESCRIPTION</b>
<b>Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)</b>	

7	Conductivity	μmhos/cm	480	532	524
8	Turbidity	NTU	4	5	5
9	Magnesium Hardness (as CaCO <sub>3</sub> )	mg/l	83	89	93
10	Total Alkalinity (as CaCO <sub>3</sub> )	mg/l	190	201	212
11	Chloride (as Cl)	mg/l	45	51	53
12	sulphate (as SO <sub>4</sub> )	mg/l	9	11	10
13	Nitrate (as NO <sub>3</sub> )	mg/l	1.2	1.5	1.8
14	Fluoride (as F)	mg/l	0.4	0.5	0.5
15	Sodium (as Na)	mg/l	14	17	18
16	Potassium (as K)	mg/l	3.1	3.4	3.7
17	TKN (as N)	mg/l	2.4	2.6	2.2
18	Total Phosphorous (as P)	mg/l	0.21	0.28	0.24
19	COD	mg/l	10	11	8
20	Phenolic compounds (as C <sub>6</sub> H <sub>5</sub> OH)	mg/l	<0.001	<0.001	<0.001
21	Iron (as Fe)	mg/l	0.09	0.1	0.08
22	Zinc (as Zn)	mg/l	0.04	0.05	0.06
23	Arsenic (as As)	mg/l	<0.01	<0.01	<0.01
24	Mercury (as Hg)	mg/l	<0.001	<0.001	<0.001
25	Total Dissolved Solids (TDS)	mg/l	298	321	328
<b>Microbiological Parameters</b>					
1	Total Coliform	MPN/100ml	1500	1800	1300
2	Faecal Coliform	MPN/100ml	600	750	650

### 3.2.1 Sampling frequency

Parameters for analysis of water quality were selected based on the utility of the particular source of water as per CPCB guidance. Surface water quality was monitored for parameters as per Methods of Monitoring & Analysis published by CPCB and it was rated according to the CPCB Water Quality Criteria against A, B, C, D & E class of water. Water samples were collected as Grab water sample from sampling location for complete physico-chemical and bacteriological tests respectively. The samples were analyzed as per standard procedure / method given in IS: 10500.

The surface water quality is compared with CPCB water quality criteria mentioned in **Table 3.4** below:

**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)**

**Table 3.6, Water quality criteria as per Central Pollution Control Board**

Designated-Best-Use	Class of water	Criteria
Drinking Water Source without conventional treatment but after disinfection	A	Total Coliforms Organism MPN/100ml shall be 50 or less pH between 6.5 and 8.5 Dissolved Oxygen 6mg/l or more Biochemical Oxygen Demand 5 days 20°C 2mg/l or less
Outdoor bathing (Organized)	B	Total Coliforms Organism MPN/100ml shall be 500 or less; pH between 6.5 and 8.5; Dissolved Oxygen 5mg/l or more Biochemical Oxygen Demand 5 days 20°C 3mg/l or less
Drinking water source after conventional treatment and disinfection	C	Total Coliforms Organism MPN/100ml shall be 5000 or less; pH between 6 to 9; Dissolved Oxygen 4mg/l or more Biochemical Oxygen Demand 5 days 20°C 3mg/l or less
Propagation of Wild life and Fisheries	D	pH between 6.5 to 8.5 Dissolved Oxygen 4mg/l or more Free Ammonia (as N) 1.2 mg/l or less
Irrigation, Industrial Cooling, Controlled Waste disposal	E	pH between 6.0 to 8.5 Electrical Conductivity at 25°C micro mhos/cm Max.2250 Sodium absorption Ratio Max. 26 Boron Max. 2mg/l
	Below-E	Not Meeting A, B, C, D & E Criteria

As per the standard practice, one sample from each station was taken in January. Sampling was done by standard sampling technique as per the Standard Methods. Necessary precautions were taken for preservation of samples.

### 3.2.2 Result & Conclusion:

#### Surface water Observation:

**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)**

- The analysis results indicate that the pH ranges between 7.67 and 7.83.
- Dissolved Oxygen (DO) was observed in the range of 6.9 to 7.2 mg/l against the minimum requirement of 4 mg/l.
- BOD values were observed to be in the range of 3 to 4 mg/l.
- Total Coliform examination of surface water samples revealed the presence of total coliform in range of 4000 MPN/100 ml to 1500 MPN/100 ml .

**Based on the results it is evident that most of the parameters of the samples comply with ‘Category ‘C’ standards of CPCB (Table 3.5) are indicating their suitability for only Drinking water source after conventional treatment and disinfections.**

### 3.3 Air Environment

Meteorology is the key to understand the air quality. The essential relationship between meteorology and atmospheric dispersion involves the wind in the broadest sense. Wind fluctuations over a very wide range of time, accomplish dispersion and strongly influence other processes associated with them.

A meteorological station was set up at the proposed mine premises. Meteorological data was generated during the winter season and shown in **Table-3.5**

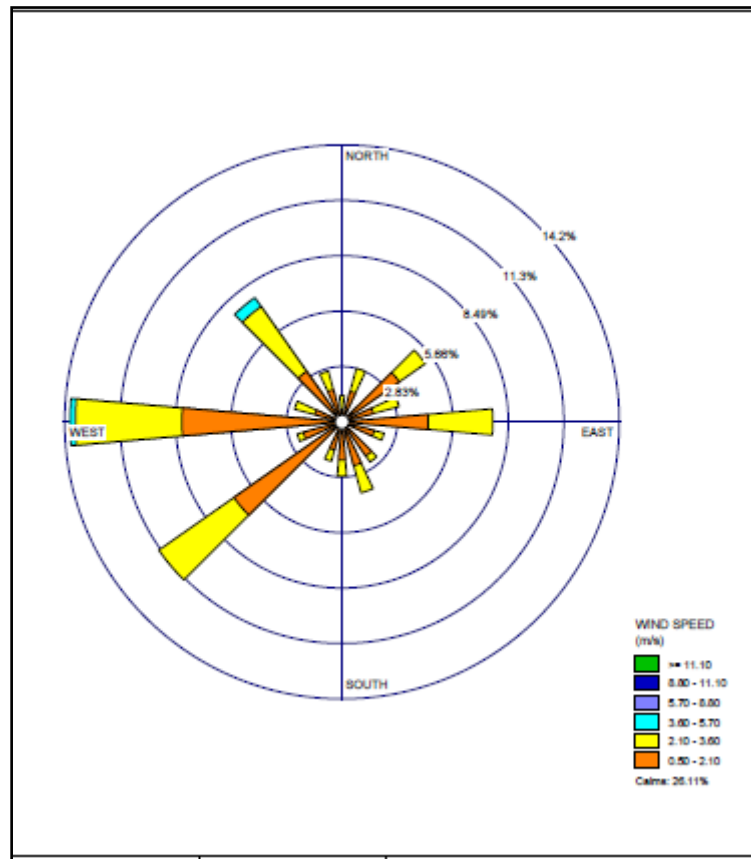
The following parameters were recorded at hourly intervals continuously during monitoring period, except rainfall which was recorded on daily basis.

- Wind speed
- Wind Direction
- Air Temperature

**Table-3.7, Summarized project site meteorological data for Winter Season**

Month	Temperature °C		Wind Speed (Km/Hr)	
	Min	Max	Avarage	Max
DEC 2022	12	26	7.6	12.7
JANUARY 2023	11	25	8.2	13.9
FEBRUARY 2023	14	31	8.8	15.9

**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)**



**Figure 3.3: Wind Rose Diagram (at site)**

### 3.3.1 Secondary Data Collected from IMD

Secondary data from IMD- Patna been collected for temperature, relative humidity, rainfall, wind speed and direction. The data at IMD is usually measured twice a day viz., at 0830 and 1730 hr.

The meteorological data is collected from the IMD- Patna is about 140 km from project site, which is the nearest operating IMD station to the project site. The data collected from IMD includes wind speed, wind direction, temperature, relative humidity and rainfall for the year 1981-2010. The monthly maximum, minimum and average values are collected for all the parameters except wind speed and direction. The collected data is tabulated in **Table-3.6**

When the data generated at project site is compared with the data recorded at IMD, it is observed that the data generated at the site is broadly in comparison with regional meteorology, except for minor variations as described above.

### 3.3.2 Comparison of primary and secondary data

**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)**

The India Meteorological Department (IMD) records the data twice a day viz. 0830 hr and 1730 hr while the site-specific data has been recorded at an hourly interval. On comparison of site specific data generated for study period vis-à-vis the IMD data, slight variations were observed. The following observations are brought out:

When the data generated at project site is compared with the data recorded at IMD, it is observed that the data generated at the site is broadly in comparison with regional meteorology, except for minor variations as described above such as predominant wind direction is NW at IMD while at project site predominant wind direction is West.

### 3.3.3 Ambient Air Quality

The ambient air quality was monitored in the impact area as per MoEF& CC guidelines. The study area represents entirely rural environment. The prime objective of the baseline air quality study was to assess the ambient air quality of the mining lease area.

### 3.3.4 Selection criteria for monitoring location

The baseline status of the ambient air quality has been assessed through a scientifically designed ambient air quality network. The design of monitoring network in the air quality surveillance programme has been based on the following consideration.

- Meteorological parameters including wind direction
- Topography of the study area
- Representative of regional background air quality for obtaining baseline status
- Representative of likely impact areas.

Ambient Air Quality Monitoring (AAQM) stations were set up at 08 locations with due consideration to the above mentioned points. AAQM locations were selected in downwind, upwind as well as crosswind direction of the proposed mining lease area covering core and buffer zones. The details of the monitoring stations are given in **Figure 3.4** and shown in **Table-3.7**

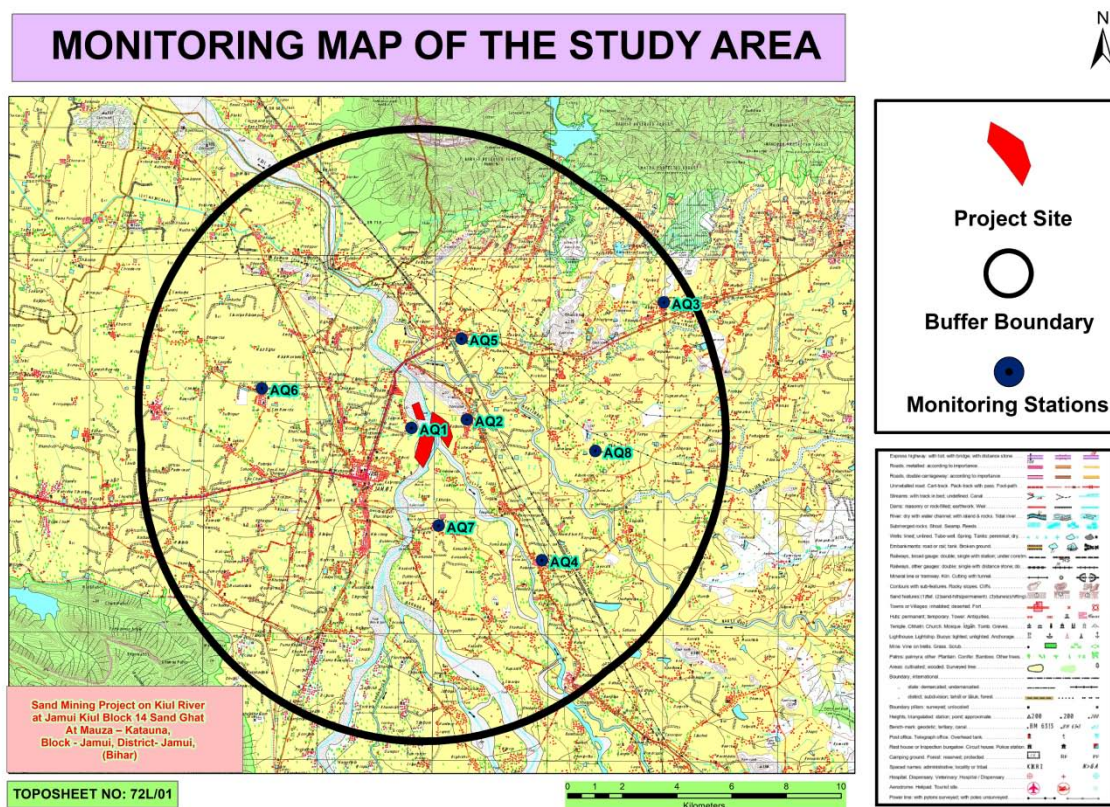
Ambient air quality monitoring was carried out twice a week with a frequency of 24 hours for three months during the study period. The common air pollutant namely Particulate Matter-10 (PM<sub>10</sub>) & PM<sub>2.5</sub>, Sulphur-dioxide (SO<sub>2</sub>) and Oxides of Nitrogen (NO<sub>2</sub>) has been measured through a planned field monitoring.

The baseline values of the air pollutants of concern are presented in Tables below statistical



### Table 3.8: Ambient Air Quality Monitoring Stations

Air Monitoring Locations		
Location ID	Location name	Distance (Km) and Direction
AAQ 1	Project Site(Near Village Jamui)	-
AAQ 2	Katauna village	1.0 km E
AAQ 3	Bahera village	9.30 Km NE
AAQ 4	Ratanpur	6.87 Km SE
AAQ 5	Mallehpur	3.10 Km N
AAQ 6	Amrath	6.60 Km W
AAQ 7	Sonpai	3.40 Km S
AAQ 8	Darah	6.75Km E



### Figure 3.4 Ambient Air Quality Monitoring Stations

**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)**

**Table-3.9: Ambient Air Quality in the Study Area PM2.5**

Location Code	PM2.5 ( $\mu\text{g}/\text{m}^3$ )				
	Name of the station	Min	Max	Average	98 <sup>th</sup> Percentile
AAQ1	Project Site(Near Village Jamui)	34.9	46.8	42.4	46.4
AAQ2	Katauna village	34.6	46.3	42.5	46.3
AAQ3	Bahera village	36.4	48.1	43.7	46.9
AAQ4	Ratanpur	37.6	50.8	46	50
AAQ5	Mallehpur	37.3	49.8	44.1	49
AAQ6	Amrath	37.5	50.7	46.1	49.9
AAQ7	Sonpai	37.5	47.5	42	46.5
AAQ8	Darah	34.1	46.5	40.5	45.6

**Table-3.10: Ambient Air Quality in the Study Area PM10**

Location Code	PM10 ( $\mu\text{g}/\text{m}^3$ )				
	Name of the station	Min	Max	Average	98 <sup>th</sup> Percentile
AAQ1	Project Site(Near Village Jamui)	63.5	80.6	74.9	80.4
AAQ2	Katauna village	63.1	80.5	74.6	80
AAQ3	Bahera village	65.7	84	75.7	83.4
AAQ4	Ratanpur	71.4	88.3	80.8	87.5
AAQ5	Mallehpur	67.8	88	77.3	85.3
AAQ6	Amrath	68.6	88.5	79.4	87.9
AAQ7	Sonpai	65	82.8	73.1	81.2
AAQ8	Darah	62	81.3	72.8	80.3



**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)**

**Table-3.11: Ambient Air Quality in the Study Area SO<sub>2</sub>**

Location Code	SO <sub>2</sub> (µg/m <sup>3</sup> )				
	Name of the station	Min	Max	Average	98 <sup>th</sup> Percentile
AAQ1	Project Site(Near Village Jamui)	4.9	8.1	6.2	7.8
AAQ2	Katauna village	5.8	9.2	7.3	9.1
AAQ3	Bahera village	6.1	9.8	7.7	9.5
AAQ4	Ratanpur	6.6	11.3	8.2	10.8
AAQ5	Mallehpur	5.4	9.4	7	9.3
AAQ6	Amrath	5.6	9.2	7.3	9.1
AAQ7	Sonpai	5.2	9.2	6.8	9.1
AAQ8	Darah	4.9	9	6.4	8.6

**Table-3.12: Ambient Air Quality in the Study Area NO<sub>2</sub>**

Location Code	NO <sub>2</sub> (µg/m <sup>3</sup> )				
	Name of the station	Min	Max	Average	98 <sup>th</sup> Percentile
AAQ1	Project Site(Near Village Jamui)	9.6	16.8	13.4	16.7
AAQ2	Katauna village	10.8	18.3	14.3	17.7
AAQ3	Bahera village	11.8	20.3	15.1	19.1
AAQ4	Ratanpur	12.7	20.9	16.3	19.9
AAQ5	Mallehpur	10.4	18.6	14.6	18.3
AAQ6	Amrath	11.7	20	14.8	18.9
AAQ7	Sonpai	7.5	15	10.2	14.4
AAQ8	Darah	8	13.5	9.8	12.7

#### 3.3.4.1 Baseline Scenario

##### Particulate Matter (PM<sub>2.5</sub>)

Fine particles include all types of combustion, including motor vehicles, power plants,

residential wood burning, forest fires, agricultural burning, and some industrial processes. In general some of the important sources of particulate matter are mines. The following sources of particulate matter in the study area are identified:

- Emission due to vehicular movement
- Dust generation from ground or other mining operations

PM<sub>2.5</sub> recorded within the study area was in the range of 34.1  $\mu\text{g}/\text{m}^3$  to 50.8  $\mu\text{g}/\text{m}^3$ . Table 3.3 were compared with the National Ambient Air Quality Standards (NAAQS) and found that all sampling stations recorded in the study area are within the applicable limits i.e., 60 $\mu\text{g}/\text{m}^3$  for PM<sub>2.5</sub> for industrial, residential, rural and other areas.

### **Suspended Particulate Matter (PM<sub>10</sub>)**

Suspended particulate matter in general terms is the particulate matter in suspension in ambient air. It includes dust, smoke etc. In general some of the important sources of suspended particulate matter are mines. The following sources of suspended particulate matter in the study area are identified:

- Emission due to vehicular movement
- Dust generation from ground or other mining operations

The minimum and maximum level of PM<sub>10</sub> recorded within the study area was in the range of 62.0  $\mu\text{g}/\text{m}^3$  to 88.5  $\mu\text{g}/\text{m}^3$ . The 24 hourly average values of PM<sub>10</sub> were compared with the National Ambient Air Quality Standards (NAAQS) and found that all sampling stations recorded in the study area are within the applicable limits i.e., 100  $\mu\text{g}/\text{m}^3$  for PM<sub>10</sub> in industrial, residential, rural and other areas.

### **Sulphur Dioxide (SO<sub>2</sub>)**

Sulphur dioxide gas is an inorganic gaseous pollutant. Sulphur dioxide emissions are expected to be emitted wherever combustion of any fuel containing Sulphur takes place. The Sulphur in the fuel will combine with oxygen to form Sulphur dioxide. The following sources of Sulphur dioxide in the study area are identified:

- Emissions from domestic/consumption of fuel (coal, diesel, etc)

Sulphur dioxide in atmosphere is significant because of its toxicity; Sulphur dioxide is capable of causing illness and lung injury. Further it can combine with water in the air to form toxic acid aerosols that can corrode metal surfaces, fabrics and the leaves of plants. Sulphur dioxide is an irritant to the eyes and respiratory system. Excessive exposure to Sulphur dioxide causes breathing related diseases as it affects the lungs.

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The minimum and maximum concentration of SO<sub>2</sub> recorded within the study area was 4.9 µg/m<sup>3</sup> to 11.3 µg/m<sup>3</sup>.

The 24 hourly average values of SO<sub>2</sub> were compared with the National Ambient Air Quality Standards (NAAQS) and it was found that all sampling stations recorded values are below the applicable limits 80 µg/m<sup>3</sup> for Residential, Rural and other areas.

### **Oxides of Nitrogen (NO<sub>2</sub>)**

The important sources of oxides of Nitrogen are from utilities and auto exhaust due to vehicular movement in mine lease area. The following sources of oxides of nitrogen in the study area are identified.

- Emissions from vehicular movements in the study area.

Oxides of Nitrogen in the presence of sunlight will undergo reactions with a number of organic compounds to produce all the effects associated with photochemical smog. NO<sub>2</sub> has inherent ability to produce deleterious effects by themselves like toxicity. It causes asphyxiation when its concentration is great enough to reduce the normal oxygen supply from the air. The minimum and maximum level of NO<sub>2</sub> recorded within the study area was in the range of was 7.5 µg/m<sup>3</sup> to 20.9 µg/m<sup>3</sup>.

The 24 hourly average values of NO<sub>2</sub> were compared with the National Ambient Air Quality Standards (NAAQS) and it was found that all sampling stations recorded values are below the applicable limits 80 µg/m<sup>3</sup> for Residential, Rural and other areas.

### **Ambient Air Quality in the Study Area, Free Silica**

Location Code	Free silica (µg/m <sup>3</sup> )		
	Name of the station	Min	Max
AAQ1	Project Site(Near Village Jamui)	1.27	1.59
AAQ2	Katauna village	1.20	1.57
AAQ3	Bahera village	1.26	1.626
AAQ4	Ratanpur	1.41	1.81
AAQ5	Mallehpur	1.28	1.58
AAQ6	Amrath	1.21	1.63

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AAQ7	Sonpai	1.31	1.72
AAQ8	Darah	1.36	1.68

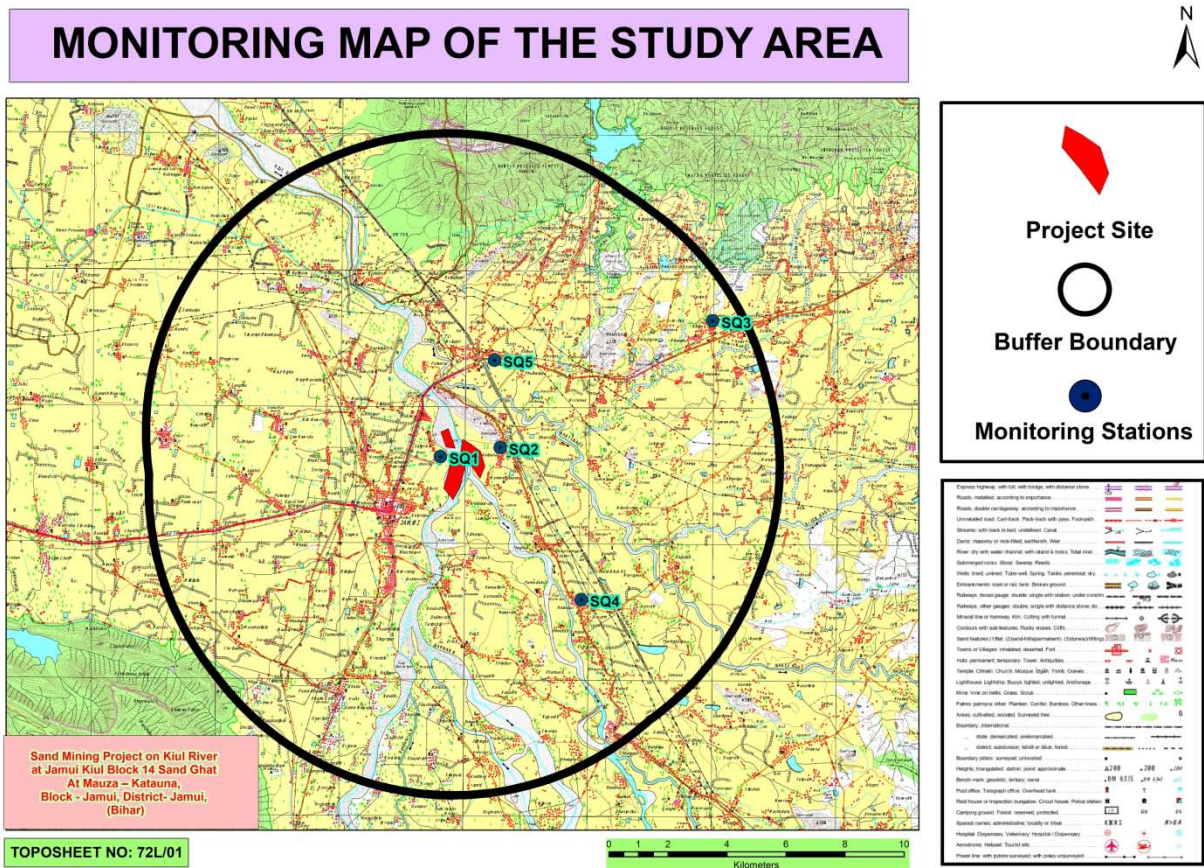
### 3.4 SOIL ENVIRONMENT

Soil may be defined as a thin layer of earth's crust, a 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 05 locations and analyzed as per CPCB norms. The soil sampling locations are marked in **Figure 3.5** and shown in **Table 3.12**. The physico-chemical characteristic of these soil samples is given in **Table 3.13**.

**Table 3.13: Description of soil sampling locations**

Soil monitoring locations		
SQ 1	Project Site (Near Village Jamui)	-
SQ 2	Katauna village	1.0 km E
SQ 3	Bahera village	9.30 Km NE
SQ 4	Ratanpur	6.87 Km SE
SQ 5	Mallehpur	3.10 Km N

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**Table 3.14 (a) :Physico-chemical properties of soil**

S.No	Parameter	Unit	SQ-1	SQ-2	SQ-3	SQ-4	SQ-5
1	Texture	-	Sand	Loamy Sand	Loamy Sand	Loamy Sand	Loamy Sand
	Silt	%	2.23	4.68	3.62	10.25	7
	clay	%	6.92	7.18	10.76	11.24	8.74
	Sand	%	90.85	88.14	85.62	78.51	84.26
2	pH	-	8.29	8.12	8.34	8.14	7.74
3	Electrical Conductivity	µmhos/cm	1218	1358	1467	1470	1321
4	Cation exchange capacity	meq/100 gm	11.43	12.01	13.34	14.25	11.83
5	Potassium	mg/kg	71.12	74.86	63.77	77.86	70.38
6	Sodium	mg/kg	55.31	62.67	86.24	58.67	109.54
7	Calcium	mg/kg	1962.85	2056.61	2292.56	2124.61	2038.71
8	Magnesium	mg/kg	144.01	152.13	160.76	157.13	118.37
9	Sodium Absorption Ratio	-	0.32	0.35	0.46	0.36	0.63
10	Water Holding Capacity	%	20.4	21.9	22.5	24.9	18.5



Samples collected from identified locations indicate the soil is sandy type and the pH value ranging from 7.74 to 8.34, which shows that the soil is alkaline in nature. Potassium is found to be from 63.77 mg/kg to 77.86 mg/kg.

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 3.15**. The noise level monitoring locations are marked in **Figure 3.6** and shown in **Table 3.14**.



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**Table 3.15: Noise Quality Monitoring Stations**

Noise Monitoring Locations		
NQ 1	Project Site (Near Village Jamui)	-
NQ 2	Katauna village	1.0 km E
NQ 3	Bahera village	9.30 Km NE
NQ 4	Ratanpur	6.87 Km SE
NQ 5	Mallehpur	3.10 Km N
NQ 6	Amrath	6.60 Km W
NQ 7	Sonpai	3.40 Km S
NQ 8	Darah	6.75Km E

**Table 3.16: Noise Monitoring Results**

S. No.	Locations		Equivalent Noise Level, dB (A)			
			Limit (as per CPCB Guidelines),Leq, dB(A)		Observed value Leq, dB(A)	
			DAY*	NIGHT*	DAY*	NIGHT*
1	Project Site (Near Village Jamui)	Industrial Zone	75	70	54.3	42.9
2	Katauna village	Residential Zone	55	45	53.4	42.1
3	Bahera village	Residential Zone	55	45	54.2	43.1
4	Ratanpur	Silence zone	50	40	49.5	39.4
5	Mallehpur	Residential Zone	55	45	52.6	40.7
6	Amrath	Residential Zone	55	45	48.6	38.6
7	Sonpai	Residential Zone	55	45	55.4	43.1
8	Darah	Residential Zone	55	45	56.2	40.1

## **Results**

Noise monitoring reveals that the minimum & maximum noise levels at day time were recorded as 48.6 dB(A) to 56.2 dB(A) respectively. The minimum & maximum noise levels at night time were found to be 38.6 dB (A) & 43.1 dB(A) respectively.

There are several sources in the 10 km radius of study area, which contributes to the local noise level of the area. On the commencement of the project, the sound from traffic activities will add to the ambient noise level of the area. This will be kept under check by taking proper suggestive measures.

## **3.6 BIOLOGICAL ENVIRONMENT**

### **3.6.1.1 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 Kiul River at Jamui Kiul Block 14 Sand Ghat.

### **3.6.2 Description of the study area**

The Proposed Sand Mining Project is located on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block -Jamui, District- Jamui, (Bihar).



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The proposed mining is a cluster of 03 mining lease area of Jamui Kiul Block 13, Jamui Kiul Block 14 & Jamui Kiul Block 15 over an combined area of 135.3 Ha is for river bed sand mining on Kiul River at Dist- Jamui, Bihar.

### **3.6.2.1 Description of Eco-sensitive zones in the Study Area (Wildlife 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 5 km from the present project.

Also, areas protected under international conventions, national or local legislation for their ecological, landscape, cultural or other related value are doesn't exist in the core and buffer zone of the present project. On the other hand, the proposed alignment will cross over some riverine channel in the core zone. Adequate structure for cross drainage shall be constructed in order to maintain the natural hydrology and protection of all forms of biota found there in all the water bodies of the area. Apart from the above, the proposed project the area will promote tourism activities due to the existing Beraila Wildlife Sanctuaries (Bird Sanctuary).

### **3.6.3 Drainage /Water Bodies of the Study Area**

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.
- 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.

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- 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 transboundary impacts, possible irreversible change.

### 3.6.4 Methodology/ Data Collection

A primary field survey was carried out within a 10 km radius of the proposed project in winter period (Dec-Feb 2023). 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 Jamui, and available published literature.

### 3.6.5 Flora (Aquatic and Terrestrial)

For the collection of data for aquatic flora, the methodology prescribed in the standard book of Adoni (1985), NEERI (1998), and APHA (2015) has been adopted. A total of 05 sampling sites were selected for the collection of samples to analyze the aquatic flora.

On the other hand, for the terrestrial data, community analysis was carried out during the summer season. For the collection of terrestrial data, a total of 05 sampling points were selected. At every sampling site, quadrates of 10m X 10m (100 sq.m.) size were randomly laid to study tree species. The circumference of all the adult individuals [(circumference at breast height (CBH)] was measured with Freeman's tape. The study of communities was carried out by using qualitative characteristics, and quantitative characteristics. Qualitative characteristic mainly involved presence/absence of the species, genera, and family. This showed the community structures, composition and other characteristic can be readily described by visual observation without actual measurements. The quantitative analysis involved the structure and composition of vegetation across vegetation types and compared in terms of frequency, density, abundance, and basal area of tree species.

### 3.6.6 Fauna (Aquatic and Terrestrial)

For the collection of data for aquatic fauna, the methodology prescribed in the standard book of Adoni (1985), NEERI (1998), and APHA (2015) has been adopted. A total of 05 sampling points were selected for the collection of samples to identify the aquatic fauna.

On the other hand, for the terrestrial data, the assessment of fauna was done by an extensive field survey in the area at 05 locations. During the survey, the Line Transect method was used for the study of mammals and Transact & Patch sampling were used for Amphibians, visual encountered methods was used for reptiles and butterflies. The presence of wildlife was also confirmed from the animal calls, footmarks, excreta, and from the local inhabitants depending on the animal sightings and the frequency of their visits in the project area which was later confirmed from the different government offices like the forest department or wildlife department, etc.

Observations of birds were made during a walk-through in the chosen transect for sighting birds. The number of birds observed in each sampling location was listed. Birds were noted and identified with the help of binocular and standard field identification guides.

### 3.6.7 Sampling Sites

A total of 05 sampling sites (TS-1 to TS-5) were selected for the terrestrial vegetation, avian fauna, and other terrestrial animals like reptiles, mammals, etc. For the collection of samples and data of aquatic flora and fauna, 05 separate sampling sites (AS-1 to AS-5) were also selected at different locations in the study area.

### 3.6.8 Flora of the Study Area

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 Jamui 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, *Ficus bengalensis* (Bargad) *Azadirachta indica* (Neem), *Aegle marmelos* (Bel), *Emblica officinalis* (Amla), *Syzygiumcumini* (Jamun), *Dalbergia sissoo* (Sisam), , *Musa paradisiacal* (Kela), *Cassia siamea* (Kasod/Siris), *Litchi chinensis* (Litchi), *Mangifera indica* (Aam) and in case of shrubs *Antigonum leptopus*, *Ricinus communis*, *Lantana camara*, *Jatropha gossipifolia* and *Cassia auriculata* etc. The most dominant species in the study area of both the district was *Mangifera indica* (Aam) and its different varieties.

### 3.6.9 Flora of Core zone

#### 3.6.9.1 Terrestrial Flora of Core zone (Natural vegetation etc.).

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There is no flora found in the core zone

### 3.6.9.2 Agricultural Crops/ Commercial Crops of the Core zone and Buffer Zone

Details of the agricultural vegetation and commercial crops were collected from the 05 selected sites of the core (Jamui district). These crops are similar to the crops of buffer zone also. So, the same information is applicable for the core and buffer zone.

**Table 3.18: 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 annuum</i>	Mirchi	
12	<i>Solanum tuberosum</i>	Potato	
13	<i>Allium cepa</i>	Onian	Amaryllidaceae
14	<i>Cajanus cajan</i>	Pigeon pea	Fabaceae
15	<i>Carica papaya</i>	Papaya	Caricaceae
16	<i>Okra</i>	Ladyfinger/ Bhindi	Malvaceae
17	<i>Lagenaria siceraria</i>	Bottle gourd/ Lauki	Cucurbitaceae
<b>Source:</b> Present Survey Data Supported by District Agriculture Department, Jamui			

### 3.6.9.3 Aquatic Flora of Core zone (Phytoplankton/ Macrophytes).

Aquatic floral details of the core zone were collected from 05 selected sites of the study area. Some sites were located buffer zone adjacent to the present alignment, however some were

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located in the core & buffer zone. Details of phytoplankton and macrophytic vegetation of the core and the buffer zone are given in tables 3.19, 3.20 & 3.21, and Figures 3.10 & 3.11.

**Phytoplankton:** Most of the phytoplankton species recorded from the core zone was similar to the buffer zone also. So, the same information is applicable for the core and buffer zone. Phytoplankton species were collected and identified from 05 selected sampling sites of the study area. Details of Phytoplankton species are given in table 3.19 and Figure 3.10.

**Table 3.19: List of Phytoplankton species present in different water bodies in study area (Core and Buffer Zone).**

S.N.	Taxonomic Details	S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8	Schedule Status in WPA (1972)	IUCN Status
	<b>Chlorophyceae</b>									NA	NA
1	<i>Ankistrodesmus</i> sp.			+	+	+	+			NA	NA
2	<i>Ankistrodesmus falcatus</i>		+	+			+	+	+	NA	NA
3	<i>Arthrodesmus</i> sp.	+		+	+		+		+	NA	NA
4	<i>Chlorella</i> sp.		+	+	+	+	+	+	+	NA	NA
5	<i>Chlorella vulgaris</i>	+		+	+	+			+	NA	NA
6	<i>Chlorococcum</i> sp.	+	+	+			+		+	NA	NA
7	<i>Closteriopsis</i> sp.	+	+		+	+		+		NA	NA
8	<i>Closterium quadratum</i>						+	+	+	NA	NA
9	<i>Coelastrum</i> sp.	+	+	+	+		+		+	NA	NA
10	<i>Cosmarium aequale</i>			+	+		+	+		NA	NA
11	<i>Cosmarium formii</i>	+	+	+	+	+	+		+	NA	NA
12	<i>Cosmarium margaritatum</i>	+		+	+		+	+		NA	NA
13	<i>Crucigenia</i> sp.	+	+	+	+		+			NA	NA
14	<i>Gonium</i> sp.	+		+		+	+		+	NA	NA
15	<i>Oocystis crassa</i>	+	+			+	+	+	+	NA	NA
16	<i>Pediastrum duplex</i>	+	+	+	+		+		+	NA	NA

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17	<i>Treubaria triappendiculata</i>			+		+	+	+	+	NA	NA
18	<i>Ulothrix</i> sp.	+	+	+	+	+	+	+		NA	NA
19	<i>Ulothrix zonata</i>	+		+		+	+		+	NA	NA
20	<i>Volvox</i> sp.	+	+	+		+	+			NA	NA
21	<i>Zygnema</i> sp.	+	+	+	+	+	+	+		NA	NA
	<b>Total</b>	<b>19</b>	<b>15</b>	<b>23</b>	<b>16</b>	<b>17</b>	<b>24</b>	<b>12</b>	<b>17</b>		
	<b>Cyanophyceae</b>									NA	NA
1	<i>Anabaena</i> sp.		+	+	+	+	+		+	NA	NA
2	<i>Anabaena circinalis</i>	+	+	+	+	+	+	+		NA	NA
3	<i>Anabaena flosaque</i>	+	+		+	+	+	+	+	NA	NA
4	<i>Anacystis</i> sp.	+		+		+	+		+	NA	NA
5	<i>Aphanocapsa</i> sp.	+		+	+	+	+	+	+	NA	NA
6	<i>Aphanothece</i> sp.	+	+		+	+			+	NA	NA
7	<i>Chroococcus</i> sp.	+		+	+	+	+	+		NA	NA
8	<i>Gloeocapsa</i> sp.	+	+	+			+		+	NA	NA
9	<i>Lyngbya</i> sp.	+	+		+	+	+	+	+	NA	NA
10	<i>Merismopedia</i> sp.	+	+	+		+	+	+	+	NA	NA
11	<i>Merismopedia tenuissima</i>	+		+	+	+	+			NA	NA
12	<i>Microcystis</i> sp.		+		+			+	+	NA	NA
13	<i>Microcystis aeruginosa</i>	+		+			+			NA	NA
14	<i>Nostoc</i> sp.		+		+	+	+	+	+	NA	NA
15	<i>Oscillatoria subbrevis</i>	+			+		+		+	NA	NA
16	<i>Spirulina</i> sp.		+	+	+	+	+	+		NA	NA
17	<i>Spirulina laxissima</i>		+	+		+	+		+	NA	NA
	<b>Total</b>	<b>12</b>	<b>11</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>15</b>	<b>9</b>	<b>12</b>		
	<b>Bacillariophyceae</b>									NA	NA
1	<i>Achnanthes</i> sp.	+	+	+	+		+	+	+	NA	NA
2	<i>Amphora ovalis</i>	+				+	+		+	NA	NA
3	<i>Amphora</i> sp.	+	+	+	+	+		+		NA	NA
4	<i>Cocconeis</i> sp.	+	+		+		+	+	+	NA	NA
5	<i>Cyclotella</i> sp.			+		+	+	+	+	NA	NA
6	<i>Cymbella affinis</i>	+		+	+		+		+	NA	NA
7	<i>Melosira granulata</i>	+				+	+	+		NA	NA

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8	<i>Navicula similis</i>	+	+	+	+		+	+	+	NA	NA
9	<i>Navicula subrhyncocephala</i>	+	+		+		+		+	NA	NA
10	<i>Nitzschia palea</i>	+	+		+	+	+			NA	NA
11	<i>Pinnularia sp.</i>	+	+	+				+	+	NA	NA
12	<i>Synedra acus</i>	+				+	+		+	NA	NA
13	<i>Synedra ulna</i>		+		+	+	+	+	+	NA	NA
14	<i>Tabellaria sp.</i>	+			+		+			NA	NA
	<b>Total</b>	<b>16</b>	<b>12</b>	<b>9</b>	<b>13</b>	<b>11</b>	<b>15</b>	<b>10</b>	<b>13</b>		
	<b>Euglenophyceae</b>									NA	NA
1	<i>Euglena acus</i>	+	+	+	+	+	+	+	+	NA	NA
2	<i>Euglena sp.</i>	+			+	+	+		+	NA	NA
3	<i>Euglepha sp.</i>	+	+	+	+	+	+	+	+	NA	NA
4	<i>Phacus sp.</i>		+				+			NA	NA
5	<i>Phacus caudatus</i>	+			+	+	+	+	+	NA	NA
6	<i>Trachelomonas sp.</i>	+	+	+	+	+	+	+		NA	NA
	<b>Total</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>5</b>	<b>5</b>	<b>6</b>	<b>4</b>	<b>4</b>		
	<b>Source:</b> Primary Survey Data of P&M Solution Pvt. Ltd., Noida										

**Table 3.20: Site wise Qualitative list of Phytoplankton species recorded from the Core and Buffer Zone**

Class	S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8
Chlorophyceae	19	15	23	16	17	24	12	17
Cyanophyceae	12	11	11	12	13	15	9	12
Bacillariophyceae	16	12	9	13	11	15	10	13
Euglenophyceae	5	4	3	5	5	6	4	4
<b>Total No. of Species</b>	<b>52</b>	<b>42</b>	<b>46</b>	<b>46</b>	<b>46</b>	<b>60</b>	<b>35</b>	<b>46</b>

**Macrophytes:** The aquatic vegetation recorded from the core zone was similar to the aquatic vegetation of the buffer zone also. So, the same information is applicable for the core and buffer zone. The maximum number of aquatic vegetation was recorded at sites 06 and 08 due to the perennial nature of the water bodies. On the other hand, other water bodies support less vegetation due to a lack of water (monsoon-fed streams), and moisture. The details of Macrophytes species are given in table 3.21 and Figure 3.11.

**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)**

**Table 3.21: List of Aquatic Macrophytic vegetation of Core and Buffer Zone**

S.No.	Name of the Taxa	Family Name	IUCN Status	S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8
1	<i>Azolla pinnata</i>	Salviniaceae	LC	+	+	+	+	+	+	+	+
2	<i>Cyperus alopecuroides</i>	Cyperaceae	LC	+	+			+	+	+	+
3	<i>Cyperus difformis</i>	Cyperaceae	LC	+		+	+		+	+	+
4	<i>Eichhornia crassipes</i>	Pontederiaceae	LC	+	+	+		+	+		+
5	<i>Hydrilla verticillata</i>	Hydrocharitaceae	LC				+			+	+
6	<i>Ipomea aquatica</i>	Convolvulaceae	LC		+	+	+	+	+		+
7	<i>Ipomea carnea</i>	Convolvulaceae	LC	+	+	+	+		+	+	+
8	<i>Lemna minor</i>	Araceae	LC	+	+			+	+	+	+
9	<i>Ludwigia parviflora</i>	Onagraceae	LC	+	+	+	+		+	+	+
10	<i>Nelumbo sp.</i>	Nelumbonaceae	LC		+			+			
11	<i>Nymphoides aquatica</i>	Menyanthaceae	LC	+		+		+	+	+	+
12	<i>Phragmites karka</i>	Poaceae	LC						+		
13	<i>Pistia stratiotes</i>	Araceae	LC		+		+			+	+
14	<i>Polygonum glabrum</i>	Polygonaceae	LC	+	+	+		+	+	+	+
15	<i>Typha latifolia</i>	Typhaceae	LC						+		+
16	<i>Typha orientalis</i>	Typhaceae	LC		+		+	+	+	+	
<b>Total No. of Species</b>				<b>9</b>	<b>8</b>	<b>8</b>	<b>8</b>	<b>9</b>	<b>13</b>	<b>11</b>	<b>13</b>

### 3.6.10 Flora of Buffer zone

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

During the present survey Tree herbs and shrubs 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, Jamui district of Bihar. The details of vegetation of the buffer zone is given in Table 3.22.

**Table 3.22: List of Trees, Shrubs, Herbs and Grasses observed in Buffer Zone**



**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)**

S.No.	Botanical Name	Common/ Hindi Name	Name of family
	<b>Trees</b>		
1	<i>Acacia nilotica</i>	Babool	Mimosaceae
2	<i>Acacia nilotica</i>	Desi babool	Fabaceae
3	<i>Aegle marmelos</i>	Bel	Rutaceae
4	<i>Ailanthus excels</i>	Adusa	Simaroubaceae
5	<i>Albizzia amara</i>	Siris	Mimosoideae
6	<i>Albizzia lebbeck</i>	Sirish	Mimosaceae
7	<i>Alstonia scholaris</i>	Saptaparni	Apocynaceae
8	<i>Anthocephalus cadamba</i>	Kadamb	Rubiaceae
9	<i>Artocarpus heterophyllus</i>	Jack fruit	Moraceae
10	<i>Azadirachta indica</i>	Neem	Meliaceae
11	<i>Bauhinia variegata L.</i>	Kachnar	Leguminosae
12	<i>Bombax ceiba</i>	Semal	Malvaceae
13	<i>Bombax malabaricum</i>	Semal tree	Malvaceae
14	<i>Butea monosperma</i>	Palas	Leguminosae
15	<i>Cassia fistula</i>	Bahawa	Caesalpinaceae
16	<i>Cassia siamea</i>	Chirkundi	Mimosaceae
17	<i>Dalbergia latifolia</i>	Shisam	Leguminosae
18	<i>Dalbergia sissoo</i>	Shisam	Leguminosae
19	<i>Delonix regia</i>	Gulmohar	Fabaceae
20	<i>Dendrocalamus strictus</i>	Bamboo	Poaceae
21	<i>Eucalyptus globules</i>	Nilgiri	Myrtaceae
22	<i>Ficus benghalensis</i>	Bargad	Moraceae
23	<i>Ficus religiosa</i>	Pipal	Moraceae
24	<i>Madhuca longifolia</i>	Mohua tree	Sapotaceae
25	<i>Magnifera indica</i>	Aam	Anacardiaceae
26	<i>Melia azedarach</i>	Bukkam Neem	Meliaceae
27	<i>Moringa olerifera</i>	Munga	Moringanaceae
28	<i>Musa paradisiacal</i>	Banana	Musaceae
29	<i>Nerium oleamder</i>	Kaner	Apocynaceae
30	<i>Phyllanthus emblica</i>	Awla	Euphorbiaceae

**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)**

31	<i>Pisidium guava</i>	Guava	Myrtaceae
32	<i>Pongamia pinnata</i>	Karanj	Leguminosae
33	<i>Prosopis juliflora</i>	Vilayati babool	Fabaceae
34	<i>Punica malus</i>	Anar	Lythraceae
35	<i>Shorea robusta</i>	Sal	Depterocarpaceae
36	<i>Syzygium cumini</i>	Jamun	Myrtaceae
37	<i>Tectona grandis</i>	Sagwan	Verbenaceae
38	<i>Terminalia arjuna</i>	Arjun	Combretaceae
39	<i>Zizyphus jujube</i>	Ber	Rhamnaceae
40	<i>Zyziphus mauritiana</i>	Ber	Rhamnaceae
<b>Shrub &amp; Herbs</b>			
41	<i>Acanthospermum hispidum</i>	Kanti	Asteraceae
42	<i>Acheranthus aspera</i>	Aghada	Amaranthaceae
43	<i>Antigonum leptopus</i>	coral vine	eaecanogyloP
44	<i>Argemone mexicana</i>	Pila dhtura	Papaveraceae
45	<i>Chenopodium album</i>	manure weed	Amaranthaceae
46	<i>cleome viscosa</i>	Pivali tilval	Cleomaceae
47	<i>Dalura metel</i>	Dhotra	Solanaceae
48	<i>Echinops echinatus</i>	Unthkantali	Asteraceae
49	<i>Ervatamia divaricata</i>	Chandani	Apocynaceae
50	<i>Euphorbia hirta</i>	Mothi dudhi	Evphorbiaceae
51	<i>Ipomoea carnea</i>	Besharam	Convolvulaceae
52	<i>Jatropha gossipifolia</i>	cotton-leaf	Euphorbiaceae
53	<i>Lantana camara</i>	Ghaneri	Verbenaceae
54	<i>Mimosa pudica</i>	Chui Mui	Mimosaceae
55	<i>Ocimum sanctum</i>	Tulsi	Labiatae
56	<i>Parthenium hysterophorus</i>	Gajar grass	Asteraceae
57	<i>Ricinus communis</i>	Arand	Euphorbiaceae
58	<i>Tridax procumbens</i>	Kambarmodi	Asteraceae
59	<i>Xanthium strumarium</i>	Chota Dhatura	Asteraceae
<b>Grasses</b>			
60	<i>Apluda mutica</i>	Mauntian grass	Poaceae
61	<i>Apluda mutica</i>	Banjura grass	Poaceae

Chapter-III	BASELINE DATA DESCRIPTION
<b>Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)</b>	

62	<i>Commelina benghalensis</i>	Bokna	Commelinaceae
63	<i>Cynodon dactylon</i>	Doob	Poaceae
64	<i>Dactylis aegyptium</i>	Crow foot grass	Poaceae
65	<i>Pennisetum purpureum</i>	Elephant grass	Poaceae
66	<i>Saccharum spontaneum</i>	kans	Poaceae
<b>Climbers</b>			
67	<i>Abrus precatorius</i>	Gunja	Fabaceae
68	<i>Antigonon leptopus</i>	Anantalata	Polygonaceae
69	<i>Bougainvillea glabra</i>	Booganbel	Nyctaginaceae
70	<i>Celastrus paniculata</i>	Kujari	Celastraceae
71	<i>Cissampelos pareira</i>	Khariya lata	Menispermaceae
72	<i>Clitoria ternatea</i>	Blue pea	Fabaceae
73	<i>Cuscuta reflexa</i>	Amarbel	Convolvulaceae
74	<i>Cuscuta reflexa</i>	Amar bel	Convolvulaceae
75	<i>Hemidesmus indicus</i>	Anantamul	Apocynaceae
76	<i>Ipomoea cairica</i>	Neeli Bel	Convolvulaceae
77	<i>Tilospora cordifolia</i>	Giloy	Menispermaceae
<b>Source:</b> Primary data of P&M Solution, Noida and data supported by the Department of Forest, Jamui district of Bihar.			

### 3.6.10.2 Agricultural vegetation/ Commercial vegetation of the Buffer zone.

The variety of Crops and cropping patterns in the core and the buffer zone was the same in the study area. Vegetation details of the buffer zone were collected from 05 selected sites (TS-1 to TS-05)

### 3.6.10.3 Aquatic Flora of Buffer zone (Phytoplankton/ Macrophytes/ Aquatic Weeds)

**Phytoplankton:** The diversity of Phytoplankton species was similar in the core and buffer zone. The details of macrophytic vegetation of the buffer zone are given in Table 3.19 & 3.20 and Figure 3.10.

**Macrophytes:** The diversity of aquatic macrophytes was similar in both core and buffer zone. The details of macrophytic vegetation of the buffer zone are given in Table 3.21 and Figure 3.11.

**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)**

### 3.6.11 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.

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.

### 3.6.12 Fauna of the Core Zone

#### 3.6.12.1 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. Other mammals and reptiles found in the study area are listed in Table 3.23.

**Table 3.23: 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
<b>Mammals</b>					
1	Five striped palm squirrel	<i>Funambulus pennanti</i>	Sciuridae	IV	LC
2	Indian Field Mouse	<i>Mus booduga</i>	Muridae	V	LC
3	Common House Rat	<i>Rattus rattus</i>	Muridae	V	LC
4	Bandicoot Rat	<i>Bandicotabengalensis</i>	Muridae	V	LC
<b>Reptiles &amp; Amphibians</b>					

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5	Garden lizard	<i>Calotes versicolor</i>	Agamidae	IV	NE
6	Common skink	<i>Eutropis carinata</i>	Scincidae	IV	LC
7	King cobra	<i>Ophiophagus hannah</i>	Elapidae	II	LC
8	Cobra	<i>Naja naja</i>	Elapidae	II	LC
9	Garden lizard	<i>Calotes versicolor</i>	Agamidae	IV	NE

#### Bird Species

1	<i>Acridotheres tristis</i>	Myna	Sturnidae	IV	LC
2	<i>Acridotheres tristis</i>	Common myna	Sturnidae	IV	LC
3	<i>Ardeola grayii</i>	Indian pond heron	Ardeidae	IV	LC
4	<i>Bubulcus ibis</i>	Cattle egret	Ardeidae	IV	LC
5	<i>Columba livia</i>	Pigeon	Columbidae	IV	LC
6	<i>Corvus splendens</i>	Crow	Corvidae	V	LC
7	<i>Milvus migrans</i>	Black Kite	Accipitridae	IV	LC
8	<i>Passer domesticus</i>	House sparrow	Passeridae	IV	LC
9	<i>Phalacrocorax niger</i>	Little cormorant	Phalacrocoracidae	IV	LC
10	<i>Pycnonotus cafer</i>	Red-vented bulbul	Pycnonotidae	IV	LC
11	<i>Saxicoloides fulicatus</i>	Indian robin	Psittaculidae	IV	LC
12	<i>Turdoides caudate</i>	Common babbler	Leiothrichidae	IV	LC
13	<i>Upupa epops</i>	Common hoopoe	Upupidae	IV	LC
14	<i>Vanellus indicus</i>	Red-wattled lapwing	Charadriidae	IV	LC

**IUCN Status** =LC: Least Concern, NE: Not Evaluated.

**Source:** Primary Survey data of P&M Solution, Noida and the data supported by Department of Forest, Jamui district of Bihar

**Table 3.24: 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

**Source:** Primary Survey data of P&M Solution, Noida and the data supported by Department of Forest, Jamui district of Bihar

### **3.6.12.3 Aquatic Fauna of Core zone (Zooplankton/ Macro-invertebrates/ Fishes/ Amphibians/ Turtles etc.)**

All the aquatic fauna recorded from the core zone were also recorded from the buffer zone and most of the sampling sites are the same for the core and buffer zone as given in table 3.17. So, the list of aquatic fauna of the core zone is merged with the details of the buffer zone and is given in Table 3.25 to 3.27.

### **3.6.12.4 Fauna of Buffer zone**

To prepare a detailed report on the status of faunal biodiversity of the present study area (1 km buffer) of Jamui 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, 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 (Core and Buffer zone) vary upon the local topography and different types of habitats. The fauna of the study area has been categorized into two categories based on their habitat, i.e.

- (i) Aquatic fauna and
- (ii) Terrestrial fauna.

During the present survey, there are some seasonal, perennial and private water body was observed along with the proposed alignment, which will be affected due to the present project activities. The alignment of the project will cross a few seasonal and perennial streams.

### **3.6.12.6 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 3.25 to 3.27.

#### **i. Mammals and Reptiles/ Amphibians**



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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 3.25.

**Table 3.25: List Mammals, Reptiles and Amphibians recorded from the Buffer Zone**

S. No.	Common Name	Scientific Name	Family	Status as per WPA- 1972	IUCN status
<b>Mammals</b>					
1	<i>Bandicota bengalensis</i>	Bandicoot Rat	Sciuridae	IV	LC
2	<i>Canis auris</i>	Jackal	Pteropodidae	V	LC
3	<i>Felis chaus</i>	Jungle cat	Soricidae	IV	LC
4	<i>Funambulus palmarum</i>	Three-striped Squirrel	Suidae	III	LC
5	<i>Funambulus pennanti</i>	Five striped palm squirrel	Hyaenidae	III	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
11	<i>Pteropus giganteus</i>	Indian Flying Fox	Pteropodidae	V	LC
12	<i>Suncus murinus</i>	Grey musk Shrew	Muridae	V	LC
13	<i>Sus scrofa</i>	Wild Boar	Canidae	III	LC
14	<i>Vulpes bengalensis</i>	Indian fox	Felidae	II	LC
<b>Reptiles and Amphibians</b>					
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</i> sp.	Pit viper	Viperidae	II	LC

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5	<i>Euphlyctis hexadactyla</i>	Common frog	Dicroglossidae	IV	LC
6	<i>Eutropis carinata</i>	Common skink	Scincidae	IV	LC
7	<i>Naja naja</i>	Cobra	Elapidae	II	LC
8	<i>Ophiophagus hannah</i>	King cobra	Elapidae	II	LC
9	<i>Ptyas mucosa</i>	Rat Snake	Colubridae	II	NE
10	<i>Rana temporaria</i>	Common frog	Ranidae	IV	LC
11	<i>Testudo graeca</i>	Common Tortoise	Testudinidae	IV	VU
12	<i>Varanus sp.</i>	Monitor lizard	Varanidae	II	LC

**IUCN Status** =LC: Least Concern, VU: Vulnerable. NT: Near Threatened, NE: Not Evaluated,

**Source:** Primary Survey data of P&M solution, Noida and the data supported by Department of Forest, Jamui District.

## ii. Avian Fauna

**Table 3.26: Avian Fauna observed from the study area (01 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
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

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13	<i>Centropus sinensis</i>	Crow pheasant	Cuculidae	IV	LC
14	<i>Ceryle rudis</i>	Pied kingfisher	Alcedinidae	IV	LC
15	<i>Cinnyris asiaticus</i>	Purple Sunbird	Psittaculidae	IV	LC
16	<i>Columba livia</i>	Pigeon	Columbidae	IV	LC
17	<i>Corvus macrorhynchos</i>	Jungle crow	Corvidae	IV	LC
18	<i>Corvus splendens</i>	Crow	Corvidae	V	LC
19	<i>Dicrurus adsimilis</i>	Black drongo	Dicruridae	IV	LC
20	<i>Egretta garzetta</i>	Little egret	Ardeidae	IV	LC
21	<i>Francolinus pondicerianus</i>	Titar	Phasianidae	IV	LC
22	<i>Gallinule chloropus</i>	Common moorhen	Rallidae	IV	LC
23	<i>Gallus gallus</i>	Jungle hen	Phasianidae	IV	LC
24	<i>Passer domesticus</i>	House sparrow	Passeridae	IV	LC
25	<i>Pluvialis fulva</i>	Pacific golden plover	Charadriidae	IV	LC
26	<i>Pseudibis papillosa</i>	Red-naped ibis	Threskiornithidae	IV	LC
27	<i>Psittacula krameri</i>	Rose ringed Parakeet	Psittacidae	IV	LC
28	<i>Pycnonotus cafer</i>	Red-vented bulbul	Pycnonotidae	IV	LC
29	<i>Sarkidiornis melanotos</i>	Knob-billed duck	Anatidae	IV	LC
30	<i>Saxicoloides fulicatus</i>	Indian robin	Psittaculidae	IV	LC
31	<i>Spilopelia senegalensis</i>	Little brown dove	Columbidae	IV	LC
32	<i>Sturnia pagodarum</i>	Brahminy Starling	Sturnidae	IV	LC
33	<i>Tringa tetanus</i>	Common redshank	Charadriidae	IV	LC
34	<i>Turdoides caudate</i>	Common babbler	Leiothrichidae	IV	LC
35	<i>Upupa epops</i>	Common hoopoe	Upupidae	IV	LC

**IUCN Status =LC:** Least Concern, **VU:** Vulnerable.

**Source:** Primary Survey data of P&M Solution and the data supported by Department of Forest, Jamui, Bihar.

### iii. Butter Flies

**Table 3.27: Butterflies observed from the Buffer zone of the study area**

**Project:** Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)

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
<b>Source:</b> Primary Survey data of P&M Solution and the data supported by Department of Forest, Jamui, Bihar.				

### 3.6.12.7 Aquatic Fauna of Buffer zone (Zooplankton/Macro-invertebrates/Fishes/Amphibians /Turtles etc.)

Aquatic fauna is referred to as any form of an animal that has adapted to living in the aquatic environments such as rivers, lakes, ponds, dams, streams, etc.). River and its adjoining streams are formed the drainage in the study area. Few other seasonal water bodies like village ponds, streams, and nallas are also present in the study area. In general, faunal account of any water bodies can be divided into following categories, *i.e.*, (i) zooplankton, (ii) Macro-invertebrates/Insects/Benthos (iii) Fishes (iv) Amphibians/ Reptiles/ etc. Details of Zooplankton; Macro-invertebrates/insects/benthos; Amphibians/Reptiles and Fishes recorded from the different water bodies of the study area (Jamui District) are given in Tables 3.28 to 3.31.

#### i. Zooplankton

Zooplankton is commonly found in all types of aquatic habitats. These are recognized as secondary producers and considered as one of the best tools for the environmental monitoring program. During the present study period, a total of 60 zooplankton species was recorded and identified comprising of class Protozoa, Rotifera, Cladocera, Copepoda, and Ostracoda. The details of the zooplankton diversity of different habitats are given in Table 3.28 and Fig 3.12.

**Table 3.28: Zooplankton species found in the different water bodies situated in the buffer zone**

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S.No.	Name of the Taxa	S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8	Schedule Status in WPA (1972)	IUCN Status
	<b>Protozoa</b>										
1	<i>Arcella</i> sp.	+	+	+		+	+		+	NA	NA
2	<i>Arcella discoides</i>	+	+	+	+	+	+	+	+	NA	NA
3	<i>Arcella vulgaris</i>	+	+	+	+	+	+	+	+	NA	NA
4	<i>Centropyxis</i> sp.	+	+	+	+	+	+	+		NA	NA
5	<i>Centropyxis ecornis</i>		+			+	+		+	NA	NA
6	<i>Diffflugia cuminata</i>	+	+		+	+	+		+	NA	NA
7	<i>Euglypha</i> sp.	+		+	+	+	+	+	+	NA	NA
8	<i>Metopus</i> sp.		+	+	+		+			NA	NA
	<b>Total</b>	<b>8</b>	<b>9</b>	<b>8</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>5</b>	<b>8</b>		
	<b>Rotifera</b>										
1	<i>Anuraeopsis</i> sp.	+		+	+	+	+	+	+	NA	NA
2	<i>Anuraeopsis fissa</i>				+	+	+	+	+	NA	NA
3	<i>Asplanchna</i> sp.	+	+	+		+	+	+	+	NA	NA
4	<i>Asplanchna brightwelli</i>		+		+	+	+	+	+	NA	NA
5	<i>Brachionus</i> sp.	+		+	+	+	+	+		NA	NA
6	<i>Brachionus angularis</i>		+						+	NA	NA
7	<i>Brachionus calyciflorus</i>	+	+	+	+		+	+	+	NA	NA
8	<i>Brachionus quadridentata</i>		+	+	+		+	+		NA	NA
9	<i>Brachionus falcatus</i>	+			+	+	+	+		NA	NA
10	<i>Brachionus forficula</i>	+		+		+	+		+	NA	NA
11	<i>Cephalodella gibba</i>	+	+		+	+	+	+		NA	NA
12	<i>Filinia</i> sp.	+					+	+	+	NA	NA
13	<i>Filinia longiseta</i>		+	+		+		+	+	NA	NA
14	<i>Keratella</i> sp.	+		+		+			+	NA	NA
15	<i>Keratella Cochlearis</i>	+	+	+	+	+	+	+	+	NA	NA
16	<i>Keratella Tropica</i>	+	+		+		+	+		NA	NA
17	<i>Lecane</i> sp.				+		+	+	+	NA	NA
18	<i>Lecane luna</i>	+		+		+	+		+	NA	NA

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19	<i>Monostyla quadridentatus</i>		+	+						NA	NA
20	<i>Mytilina</i> sp.	+			+	+	+	+	+	NA	NA
21	<i>Polyarthra vulgaris</i>	+		+		+			+	NA	NA
22	<i>Testudinella patina</i>		+		+		+	+		NA	NA
23	<i>Trichocerca</i> sp.	+		+		+	+		+	NA	NA
	<b>Total</b>	<b>15</b>	<b>11</b>	<b>13</b>	<b>13</b>	<b>15</b>	<b>18</b>	<b>16</b>	<b>16</b>		
	<b>Cladocera</b>										
1	<i>Alona</i> sp.	+	+	+	+	+	+	+	+	NA	NA
2	<i>Alona intermediate</i>		+		+		+	+		NA	NA
3	<i>Bosmina</i> sp.	+		+	+	+	+	+	+	NA	NA
4	<i>Bosmina longirostris</i>	+		+			+	+		NA	NA
5	<i>Ceriodaphnia</i> sp.		+	+		+	+		+	NA	NA
6	<i>Chydorus sphaericus</i>	+	+		+		+	+		NA	NA
7	<i>Daphnia</i> sp.	+		+	+		+	+		NA	NA
8	<i>Daphnia pulex</i>	+			+	+	+		+	NA	NA
9	<i>Diaphnosoma excisum</i>	+	+	+			+	+		NA	NA
10	<i>Leydgia</i> sp.		+	+		+	+		+	NA	NA
11	<i>Moina daphnia</i>	+			+		+	+	+	NA	NA
12	<i>Simocephalus</i> sp.	+	+	+		+			+	NA	NA
	<b>Total</b>	<b>9</b>	<b>7</b>	<b>8</b>	<b>7</b>	<b>6</b>	<b>11</b>	<b>8</b>	<b>7</b>		
	<b>Copepoda</b>										
1	<i>Cyclops</i> sp.	+	+	+	+	+	+	+	+	NA	NA
2	<i>Diaptomus</i> sp.	+	+	+	+	+	+		+	NA	NA
3	<i>Eucyclops</i> sp.	+	+	+			+	+	+	NA	NA
4	<i>Heleodiptomus viduus</i>	+	+			+	+			NA	NA
5	<i>Mesocyclops</i> sp.	+	+		+		+	+	+	NA	NA
6	<i>Nauplius larvae</i>	+	+	+	+	+	+	+	+	NA	NA
7	<i>Neodiptomus</i> sp.		+		+		+		+	NA	NA
8	<i>Nitzii amphibia</i>	+	+	+	+	+	+	+		NA	NA
9	<i>Paradiptomus</i> sp.	+		+	+		+		+	NA	NA
10	<i>Thermocyclops</i> sp.	+	+	+	+	+	+	+	+	NA	NA
11	<i>Thermocyclops crassus</i>	+	+	+	+	+	+	+	+	NA	NA
	<b>Total</b>	<b>10</b>	<b>10</b>	<b>8</b>	<b>9</b>	<b>7</b>	<b>11</b>	<b>7</b>	<b>9</b>		



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	Ostracoda										
1	<i>Cyprinotus</i> sp.	+		+	+	+	+	+	+	NA	NA
2	<i>Cypris</i> sp.	+	+	+	+		+	+	+	NA	NA
3	<i>Stenocypris</i> sp.	+	+	+	+	+	+	+	+	NA	NA
4	<i>Stenocypris malcolmsoni</i>	+	+	+	+	+	+		+	NA	NA
	<b>Total</b>	<b>4</b>	<b>3</b>	<b>4</b>	<b>4</b>	<b>3</b>	<b>4</b>	<b>3</b>	<b>4</b>		
<b>Source:</b> Primary Survey data of P&M Solution, Noida.											

## ii. Macro-invertebrates (Insects/Benthos)

Macro-invertebrates are commonly found in all types of aquatic habitats such as streams, rivers, wetlands, lakes, and ponds. The term macro-invertebrate is used for those animals that have no backbone and can be seen with the naked eye. These animals generally include insects, crustaceans, mollusks, and annelids. They are significant within the food chain as larger animals such as fish and birds rely on them as a food source. None of the macro-invertebrate species have been observed under the of Rare, Endangered, and threatened category. Various macro-invertebrate species were collected and identified from the present study area and listed in Table 3.29.

**Table 3.29: Macro-invertebrates recorded from the Core and Buffer zone**

	Insecta										
1	<i>Baetis</i> nymph		+	+	+	+	+	+	+	NA	NE
2	<i>Caenid</i> mayfly	+			+		+			NA	NE
3	<i>Chironomus plumosus</i>	+	+	+	+	+	+	+	+	NA	NE
4	<i>Chironomus</i> sp.	+	+	+	+	+	+	+	+	NA	NE
5	<i>Damsel flies</i> nymphs	+			+		+			NA	NE
6	<i>Dragon flies</i> nymphs	+		+	+		+	+	+	NA	NE
7	<i>Ephydra</i> larvae	+	+	+	+	+	+			NA	NE
8	<i>Hirudineria glossophonia</i>		+			+	+	+	+	NA	NE
9	<i>Hirudineria</i> sp.	+	+	+			+	+	+	NA	NE
10	<i>Limnodrillus hoffmeisteri</i>	+					+			NA	NE
11	<i>Mayflies</i> nymphs		+		+		+	+	+	NA	NE
12	<i>Mosquitos</i> larvae	+	+	+	+	+	+	+	+	NA	NE
13	<i>Ranatra elongata</i>	+	+			+	+	+	+	NA	NE
14	<i>Ranatra filliformis</i>	+		+	+	+	+	+	+	NA	NE

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15	<i>Stone flies nymphs</i>			+	+		+			NA	NE
16	<i>Tubifex tubifex</i>	+	+	+		+	+	+	+	NA	NE
	<b>Total</b>	<b>12</b>	<b>10</b>	<b>10</b>	<b>11</b>	<b>9</b>	<b>16</b>	<b>11</b>	<b>11</b>		
	<b>Mollusca</b>										
1	<i>Bellamya bengalensis</i>	+		+	+	+	+	+	+	NA	NE
2	<i>Corbicula fluminalis</i>		+	+	+	+	+	+	+	NA	NE
3	<i>Corbicula sp.</i>	+	+	+	+	+	+			NA	NE
4	<i>Gyraulus convexus</i>	+		+			+	+	+	NA	NE
5	<i>Gyraulus sp.</i>	+	+		+	+	+		+	NA	NE
6	<i>Lymnaea acuminata</i>	+		+		+		+	+	NA	NE
7	<i>Lymnaea sp.</i>	+	+	+	+	+	+	+		NA	NE
8	<i>Melanoides lineatus</i>		+	+			+		+	NA	NE
9	<i>Pila globosa</i> (apple snail)		+		+		+		+	NA	NE
10	<i>Pila sp.</i>	+		+	+	+	+	+	+	NA	NE
11	<i>Thira sp.</i>	+	+	+			+	+	+	NA	NE
12	<i>Thira tuberculata</i>	+	+	+	+		+		+	NA	NE
13	<i>Unio tigris</i>			+	+		+	+	+	NA	NE
14	<i>Vivipara bengalensis</i>			+	+	+	+	+		NA	NE
	<b>Total</b>	<b>9</b>	<b>8</b>	<b>12</b>	<b>10</b>	<b>8</b>	<b>13</b>	<b>9</b>	<b>11</b>		
	<b>Source:</b> Primary Survey data of P&M Solution, Noida.										

### iii. Amphibians

Amphibians and reptiles are commonly found at places along the margin of aquatic and terrestrial systems. The presence of water bodies like rivers, streams, etc. in the study area are providing shelter to many amphibian species. Some of the commonly reported amphibian species in the present study areas are given in Table 3.30. None of the Amphibians and Reptiles have been observed under the Rare, Endangered, and threatened category. Also, none of them are under the Schedule-I category as per Wildlife Protection Act, 1972.

**Table 3.30: Amphibians and Reptiles recorded from the Core and Buffer zone**

S. No	English Name	Scientific Name	S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8	Schedule Status (WPA,1972)	IUCN Status
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1	<i>Agama buberculatus</i>	Rock Lizard	+	+	+	+	+	+	+	+	+	IV	LC
2	<i>Bufo melanostictus</i>	Common toad	+	+	+	+	+	+	+	+	+	IV	LC
3	<i>Bungarus caeruleus</i>	Common Krait	+	+	+	+	+	+	+	+	+	IV	LC
4	<i>Bungarus fasciatus</i>	Banded Krait	+	+	+	+	+	+	+	+	+	IV	LC
5	<i>Euphlyctis cyanophlyctis</i>	Indian skipper frog	+	+	+	+	+	+	+	+	+	IV	LC
6	<i>Hoplobatrachus tigerinus</i>	(Indian bullfrog).	+	+	+	+	+	+	+	+	+	IV	LC
7	<i>Chamelion calcarata</i>	Chameleon	+	+	+	+	+	+	+	+	+	II	LC
8	<i>Naja naja</i>	Indian Cobra	+	+	+	+	+	+	+	+	+	II	LC

**Note:**DD=Data Deficient, LC=Least Concern, NE=Not Evaluated.

**Source:** Primary Survey data of P&M Solution, Noida and Data supported by data of Department of Forest, Jamuidistrict, Bihar.

### (iii) Fishes

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. Jammuaririver 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 3.31 and their site wise species variation is shown in Fig. 3.14.

**Table 3.31: Fish Fauna found in different seasonal and perennial water bodies in the study area**

S.No.	Name of the Taxa	Family Name	S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8	IUCN Status	Schedule Status in WPA (1972)
1	<i>Catla catla</i>	Cyprinidae	+	+	+	+		+		+	VU	NA
2	<i>Channa stiiatus</i>	Chandadae					+	+	+		LC	NA
3	<i>Channa punctatus</i>	Chandadae			+	+	+		+	+	LC	NA

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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 buechanani</i>	Pangasiidae	+	+	+	+	+	+		+	LC	NA
<b>Total</b>			7	7	10	9	7	10	6	9		

**Note:** VU= Vulnerable, LC= Least Concern and NA= Not Application.

**Source:** Primary Survey data of P&M Solution, Noida and data supported by Department of Fisheries, Jamui District, Bihar.

### 3.6.13 Observations of Present Study (Flora & Fauna)

#### 3.6.13.1 Flora

Most of the parts of the present study area (Jamui 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.

#### 3.6.13.2 Fauna

There are no National parks, Sanctuaries, Biosphere Reserves, Wildlife corridors, Tiger/Elephant reserves (existing as well as proposed), within 1 km buffer area as well as 5 km of the project area. No any endangered and threatened faunal species were observed from the core and buffer zone of the present study area. On the other hand, there is no any Schedule-I fauna was recorded as per the Wildlife (Protection) Act, 1972. However, care will be taken during the developmental activities if found any.

### **3.7 Socio-Economic Environment**

#### **Demography& Socio-Economic Features**

##### **Demography**

Demography is one of the important indicators of environmental health of an area. It includes population, sex ratio, number of households, literacy, population density, etc. In order to assess the Demographic & Socio-economic features of the area, Census data 2011, for one major district named Jamui of Bihar state was compiled and placed in the form of tabulation and graphical representation.

##### **Demography of the Jamui District**

As per the census records 2011, Jamui district has a population of 17,60,405 persons followed by 9,16,064 males and 8,44,341 females respectively. Out of the total population of the district, about 8.3% population lived in urban areas while 91.7% live in rural areas. The decadal Variation of the district has been seen at 25.9% during the decade 2001-11. The Urban area of the district has attained a higher decadal Variation of 40.8% as compared to that of rural area at 24.7%. The district has a population density of 567 inhabitants per square kilometre (1,470/sq. mi)

As per 2011 census sex ratio of the district is 922 females per 1,000 males. The same for rural and urban areas of the district stands at 923 and 905 respectively. As per the census records 2011, the sex ratio of population in the age group 0-6, which works out to 956, is much higher than the sex ratio of the total population as 922 for the district of Jamui. While the sex ratio of (0-6) population in the rural areas of the district is 957, the sex ratio of (0-6) population for the urban areas is only 936 females per 1000 males.

As per the census records 2011, it is observed that the proportion of scheduled castes and scheduled tribe's population to the total population of the district is found to be only 17.2 and 4.5% respectively. For rural areas, the respective proportion of scheduled castes and scheduled tribes to the total population of the district comes out to be 17.5 and 4.8% respectively. Similarly, in urban areas, the percentage of scheduled castes and scheduled tribe's population to the total population of the district comes out to 13.2 and 0.4% respectively.

It is also observed from the census records 2011, that the district has registered a literacy rate of 59.8%. As regards to rural and urban areas of the district the literacy rates have been registered 58.4&75.0% respectively. The gap in the male-female literacy rates has been

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24.0% point as it is 71.2% male and 47.2% female respectively. For the district as a whole, the literacy rate of males is much higher than that of females.

Census data 2011 shows that the work participation rate (WPR) in the district is 25.3% for main workers and 16.03% for marginal workers. Proportion of non workers in the district is 58.67%.

### **Mother Tongue**

At the time of the 2011 Census of India, 73.37% of the population in the district spoke Hindi, 6.81% Urdu, 5.94% Khortha, 3.66% Santali and 3.06% Magahi as their first language. 7.02% of the population spoke languages recorded as 'Others' under Hindi under Hindi on the census.

### **Religion**

The population of the Jamui district during 2011 was 1,760,405. Hindus constitute 86.67 percent (1,525,746 persons) of the population in the district followed by Muslims 12.36 percent (217,621 persons). All other four major religious communities have almost negligible percentages

### **Methodology**

In order to assess the Demographic & Socio-economic features along with the 10km distance based on field surveys and public consultations undertaken during the baseline field study period and Census records 2011, for Jamui district of Bihar state respectively was compiled and placed in the form of tabulation and graphical representation. Entire study area is observed predominantly rural and no town was found in the study area.

### **Purpose of the Study**

Socio-economic study was conducted to establish the baseline demographic features and impacts due to this '*Sand Ghat Mining Project*', as operation phase of any project invariably leads to Socio-economic changes. The construction phase of any kind of project could lead to unplanned and haphazard development of slums of various size and description with little or rudimentary.

### **Description of Social Environment**

As per the Census Records 2011, the study area has a total of 128 villages and one major Town named Jamui (NP/30 Wards) lying under Jamui District in Bihar state. Overall study area villages are falling mainly under Five (05) tehsils namely Jamui (62 villages & 01



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Town), Barhat (24 villages), Lakshmipur (01 villages) and Gidhaur (11 villages), Khaira (31 villages) of Jamui district in Bihar state.

There are ten (10) villages of Jamui district in Bihar state found as uninhabited villages in the study area. There is one major town named Jamui (NP/30 Wards) found in the 10km radial study zone.

### Population Distribution within 10 km radial Study Zone

As per the Census Records 2011, the total population of 10 km study zone was recorded as 4,00,773 persons of 129 villages and one major town named Jamui (NP) of Jamui district in Bihar state. Male-female wise total population was recorded as 2,09,433 males (52.3%) and 1,91,340 (47.7%) females respectively.

Total number of 'Households' was observed as 70,102 in the 10 km radius study zone. Scheduled Caste ('SC') population was observed as 74,182 persons consisting of 38,207 males (51.5%) and 35,975 females (48.5%) in the 10km study zone. Scheduled Tribes ('ST') population was also observed as 4552 persons (1.1%) consisting of 2,345 males (51.5%) and 2,207 females (48.5%) in the 10 km study zone. The child population (0-6 Age) of the study area is recorded as 71,547 (18.0%) and comprising of 36,970 (51.7%) males & 34,577 (48.3%) females respectively.

Village wise details of population distribution are given as follows in Table 3.32 & 3.33

**Table 3.32 : Village-wise Population Distribution (10km)**

Name of Village/Town	No of Households	Total Population			Child Population (0-6 Years)		
		Persons	Male	Female	Persons	Male	Female
Daulatpur	850	4661	2456	2205	810	420	390
Maniadda	417	2402	1220	1182	454	229	225
Bhajour	112	816	448	368	111	71	40
Garowada	299	1553	794	759	239	122	117
Lathane	334	1976	1039	937	369	202	167
Sugi	277	1506	792	714	304	154	150
Thegua	99	534	291	243	126	71	55
Sonpai	632	3442	1791	1651	611	297	314
Garsanda	836	4467	2306	2161	888	476	412
Barar	125	755	388	367	148	79	69
Khairi	27	143	75	68	29	14	15
Rampur	164	871	442	429	168	79	89
Khargpur	156	819	437	382	128	73	55
UgniChak	51	242	138	104	18	13	5
SihoChak	83	446	235	211	88	50	38
Puteria	132	770	417	353	145	82	63

**Chapter-III****BASELINE DATA DESCRIPTION**

**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)**

Lukhri	172	924	489	435	166	87	79
Sahur	57	280	154	126	42	21	21
SitlaChak	Uninhabited Village						
AgabaraBarwata	1399	7063	3650	3413	1251	626	625
Piri	61	289	143	146	68	35	33
Abhaipur	258	1564	818	746	289	143	146
Markata	110	596	277	319	125	61	64
Manjura	6	39	21	18	3	3	0
Indpe	512	2962	1548	1414	526	263	263
Dhenkdih	73	352	158	194	56	27	29
Bukar	586	3042	1573	1469	546	271	275
Lotan	183	932	493	439	212	118	94
Narainpur	544	2784	1397	1387	426	199	227
Bijuahi	151	757	394	363	106	53	53
Kakan	1309	7121	3648	3473	1342	663	679
Sonai	385	2288	1203	1085	429	244	185
Dhandh	379	2272	1207	1065	381	184	197
Lakhanpur	453	2371	1279	1092	361	185	176
Partapur	321	1786	955	831	328	189	139
Rajpura	128	815	430	385	175	91	84
Marwa	311	1817	929	888	414	219	195
Dighoi	85	681	364	317	138	84	54
SemariaBikrampur	171	1188	631	557	216	117	99
AmmaSarari	704	3631	1893	1738	759	406	353
Misir Manda	148	757	397	360	139	77	62
Nim Nawada	226	1305	659	646	238	115	123
Bhat Chak	279	1459	756	703	238	117	121
Damdama	35	152	80	72	28	17	11
Sira Nawada	132	735	382	353	91	48	43
Neuri	Uninhabited Village						
Lohra	866	5140	2636	2504	1029	534	495
Udaipur	Uninhabited Village						
Sultanpur	43	304	168	136	66	34	32
Amrath	1221	7175	3693	3482	1532	756	776
RamalBigha	Uninhabited Village						
MisirBigha	152	964	485	479	224	111	113
Sangthu	739	3806	1970	1836	759	382	377
Deochand Nawada	Uninhabited Village						
Bhagwana	204	1328	691	637	276	135	141
Kundri Son KurhaHarla	1142	5734	2918	2816	1116	567	549
Chhitma	28	208	109	99	55	23	32
Achari	129	872	455	417	163	77	86
Tetaria	Uninhabited Village						
Arsar	1293	7635	3955	3680	1417	708	709
Dundu	279	1851	939	912	333	179	154
Jamui (NP)/30 Wards	14509	87357	46014	41343	14173	7423	6750
Barhat	1444	7630	4029	3601	1392	711	681

**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)**

Bahera	684	3737	1968	1769	739	395	344
Bahera Kita Alaiya	Uninhabited Village						
Bishunpur	729	3963	1979	1984	846	414	432
Lakra	189	1303	674	629	191	95	96
Bangawan	177	929	483	446	174	99	75
Numar	826	4974	2617	2357	857	427	430
Kolhua	1052	5729	2946	2783	1102	567	535
Malepur	2188	12232	6477	5755	2100	1085	1015
Bhaluka	573	3178	1634	1544	718	370	348
Mohanpur	38	249	125	124	39	19	20
Patauna	505	2291	1204	1087	391	215	176
Narsota	66	412	220	192	92	55	37
Achhra	217	1100	586	514	119	62	57
Phulwaria	229	1378	696	682	291	155	136
Nasrichak	47	471	253	218	97	52	45
Katauna	1563	8358	4374	3984	1463	772	691
Sukhlewa	147	836	435	401	168	82	86
Guguldih ( Part in Gidhaur )*	1499	7423	3854	3569	1468	747	721
Darha	1203	6476	3374	3102	1124	569	555
Lathlathwa	40	271	136	135	38	21	17
Labhet	255	1518	827	691	218	127	91
Bhandara	385	2633	1393	1240	447	228	219
Lakhai	752	4215	2191	2024	743	401	342
Harla	776	4155	2139	2016	706	362	344
Simaria	131	617	329	288	91	46	45
Kolhua	466	2930	1543	1387	560	303	257
Kumardih	259	1471	755	716	258	128	130
Kharhua	163	911	470	441	177	94	83
Mahuli	569	2961	1547	1414	534	266	268
Sewa	1510	9151	4888	4263	1613	855	758
Ratanpur	2015	10968	5687	5281	1902	952	950
Kundhur	730	3519	1812	1707	692	362	330
Nayagaon	281	1268	689	579	228	118	110
Genadih	516	2813	1464	1349	482	249	233
Guguldih ( Part in Barhat )*	1324	7698	4008	3690	1464	738	726
Chandabank	Uninhabited Village						
Singarpur	407	2331	1243	1088	420	237	183
Ballopur	222	1490	761	729	296	151	145
Naudiha	403	2281	1205	1076	426	241	185
Suraundha	72	341	172	169	93	41	52
Nauniatanr	67	376	192	184	88	44	44
Amari	598	3370	1767	1603	670	338	332
Khutauna	278	1342	721	621	235	117	118
Dharampur	319	1792	935	857	365	183	182
Mahapur Khurd	64	331	162	169	77	37	40
Kharui	233	1441	740	701	264	134	130
Dumarkola	583	3775	2024	1751	710	382	328

**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)**

Khaira	1544	9581	5068	4513	1611	849	762
Gopalpur	612	3651	1908	1743	757	389	368
Karan Nawada	146	659	331	328	121	55	66
Kendih	568	3268	1744	1524	522	273	249
BaribagJaljoga	356	2240	1146	1094	399	211	188
Fatehpur	594	3605	1882	1723	738	375	363
Baheratari	Uninhabited Village						
JorbahaDharampur	338	2074	1088	986	413	214	199
Bhojpur	119	867	444	423	114	46	68
Sagdaha	291	1631	868	763	242	124	118
Bhandra	241	1317	661	656	212	102	110
Chanco	137	781	422	359	121	65	56
Dabil	822	5095	2668	2427	792	399	393
Durgodih	Uninhabited Village						
Changodih	362	2603	1365	1238	413	217	196
Nariana	332	1927	1017	910	394	210	184
Jogajhingoal	433	2704	1393	1311	503	242	261
Jitjhingoi	1157	6557	3402	3155	1093	564	529
Banpur	879	5836	3068	2768	1062	565	497
<b>TOTAL (10km)</b>	<b>70102</b>	<b>400773</b>	<b>209433</b>	<b>191340</b>	<b>71547</b>	<b>36970</b>	<b>34577</b>
<i>Source-Census of India, 2011</i>							

**Table 3.33: Village-wise SC & STPopulation Distribution (10km)**

Name of Village/Town	Total Population	Scheduled Castes			Scheduled Tribes		
		Persons	Males	Females	Persons	Males	Females
Daulatpur	4661	928	485	443	0	0	0
Maniadda	2402	431	220	211	0	0	0
Bhajour	816	89	48	41	0	0	0
Garo Nawada	1553	264	121	143	3	2	1
Lathane	1976	310	153	157	0	0	0
Sugi	1506	222	120	102	0	0	0
Thegua	534	210	117	93	4	2	2
Sonpai	3442	866	442	424	2	0	2
Garsanda	4467	1054	550	504	0	0	0
Barar	755	148	77	71	4	3	1
Khairi	143	47	23	24	0	0	0
Rampur	871	368	188	180	3	1	2
Khargpur	819	294	163	131	1	1	0
UgniChak	242	0	0	0	0	0	0
SihoChak	446	231	126	105	0	0	0
Puteria	770	238	124	114	1	1	0
Lukhri	924	61	33	28	0	0	0
Sahur	280	0	0	0	0	0	0
SitlaChak	Uninhabited Village						
AgabaraBarwata	7063	1744	881	863	3	2	1
Piri	289	269	134	135	0	0	0
Abhaipur	1564	223	108	115	0	0	0

Chapter-III	BASELINE DATA DESCRIPTION
<b>Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)</b>	

Markata	596	0	0	0	0	0	0
Manjura	39	0	0	0	0	0	0
Indpe	2962	610	312	298	0	0	0
Dhenkdih	352	0	0	0	0	0	0
Bukar	3042	721	362	359	0	0	0
Lotan	932	624	329	295	0	0	0
Narainpur	2784	339	166	173	0	0	0
Bijuahi	757	132	69	63	2	0	2
Kakan	7121	1933	971	962	0	0	0
Sonai	2288	725	387	338	2	1	1
Dhandh	2272	412	207	205	6	3	3
Lakhanpur	2371	408	205	203	2	1	1
Partapur	1786	292	154	138	5	5	0
Rajpura	815	147	72	75	0	0	0
Marwa	1817	612	308	304	9	5	4
Dighoi	681	0	0	0	0	0	0
SemariaBikrampur	1188	64	33	31	0	0	0
AmmaSarari	3631	657	353	304	0	0	0
Misir Manda	757	161	79	82	0	0	0
Nim Nawada	1305	399	196	203	1	0	1
Bhat Chak	1459	120	64	56	0	0	0
Damdama	152	146	76	70	0	0	0
Sira Nawada	735	230	114	116	0	0	0
Neuri	Uninhabited Village						
Lohra	5140	597	309	288	0	0	0
Udaipur	Uninhabited Village						
Sultanpur	304	0	0	0	0	0	0
Amrath	7175	1311	688	623	1	1	0
RamalBigha	Uninhabited Village						
MisirBigha	964	264	127	137	1	1	0
Sangthu	3806	645	337	308	10	3	7
Deochand Nawada	Uninhabited Village						
Bhagwana	1328	132	67	65	0	0	0
Kundri Son KurhaHarla	5734	1845	941	904	3	1	2
Chhitma	208	0	0	0	0	0	0
Achari	872	351	176	175	4	3	1
Tetaria	Uninhabited Village						
Arsar	7635	905	441	464	6	3	3
Dundu	1851	0	0	0	0	0	0
Jamui (NP)/30 Wards	87357	8895	4693	4202	110	42	68
Barhat	7630	2307	1160	1147	1524	828	696
Bahera	3737	654	336	318	347	186	161
Bahera Kita Alaiya	Uninhabited Village						
Bishunpur	3963	2045	1040	1005	586	286	300
Lakra	1303	566	281	285	1	1	0
Bangawan	929	109	50	59	0	0	0

**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)**

Numar	4974	640	320	320	10	7	3
Kolhua	5729	2022	1033	989	330	163	167
Malepur	12232	1943	991	952	5	2	3
Bhaluka	3178	565	286	279	739	385	354
Mohanpur	249	15	6	9	0	0	0
Patauna	2291	498	252	246	0	0	0
Narsota	412	0	0	0	4	2	2
Achhra	1100	175	90	85	0	0	0
Phulwaria	1378	125	55	70	0	0	0
Nasrichak	471	107	58	49	0	0	0
Katauna	8358	1814	920	894	12	7	5
Sukhlewa	836	259	124	135	1	0	1
Guguldih ( Part in Gidhaur )*	7423	1489	748	741	0	0	0
Darha	6476	1412	739	673	0	0	0
Lathlathwa	271	10	6	4	0	0	0
Labhet	1518	315	151	164	7	5	2
Bhandara	2633	837	447	390	1	0	1
Lakhai	4215	1891	973	918	1	0	1
Harla	4155	1321	698	623	1	0	1
Simaria	617	403	217	186	0	0	0
Kolhua	2930	294	162	132	2	2	0
Kumardih	1471	351	180	171	1	0	1
Kharhua	911	196	96	100	0	0	0
Mahuli	2961	512	281	231	1	1	0
Sewa	9151	2186	1143	1043	2	0	2
Ratanpur	10968	1614	828	786	16	9	7
Kundhur	3519	1100	566	534	3	2	1
Nayagaon	1268	367	188	179	1	0	1
Genadih	2813	358	177	181	0	0	0
Guguldih ( Part in Barhat )*	7698	1163	620	543	497	230	267
Chandabank	Uninhabited Village						
Singarpur	2331	533	289	244	1	1	0
Ballopur	1490	206	104	102	0	0	0
Naudiha	2281	236	115	121	0	0	0
Suraundha	341	276	143	133	0	0	0
Nauniatanr	376	247	129	118	0	0	0
Amari	3370	726	367	359	0	0	0
Khutauna	1342	257	138	119	0	0	0
Dharampur	1792	346	161	185	0	0	0
Mahapur Khurd	331	331	162	169	0	0	0
Kharui	1441	315	161	154	244	127	117
Dumarkola	3775	727	389	338	3	2	1
Khaira	9581	1331	692	639	12	7	5
Gopalpur	3651	1138	607	531	2	2	0
Karan Nawada	659	0	0	0	0	0	0
Kendih	3268	390	208	182	0	0	0
BaribagJaljoga	2240	309	152	157	0	0	0

**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)**

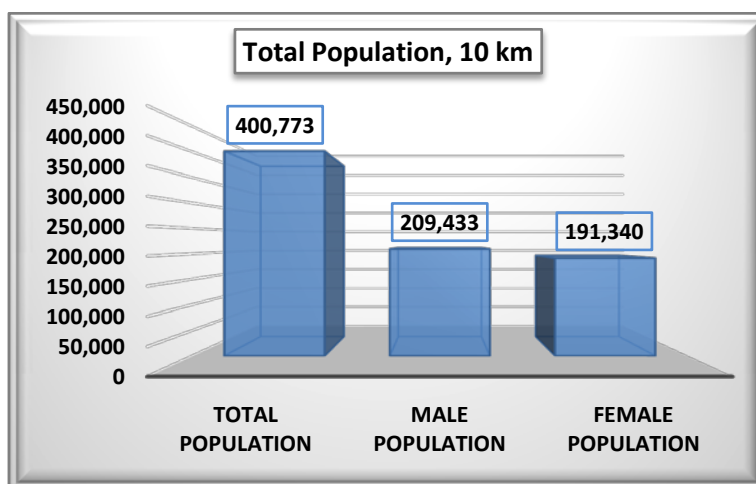
Fatehpur	3605	1167	591	576	4	3	1
Baheratari	Uninhabited Village						
JorbahaDharampur	2074	286	148	138	0	0	0
Bhojpur	867	28	13	15	0	0	0
Sagdaha	1631	201	111	90	0	0	0
Bhandra	1317	143	77	66	0	0	0
Chancho	781	212	115	97	0	0	0
Dabil	5095	699	368	331	3	2	1
Durgodih	Uninhabited Village						
Changodih	2603	328	176	152	1	0	1
Nariana	1927	476	243	233	1	1	0
Jogajhingoal	2704	363	180	183	0	0	0
Jitjhingoi	6557	1399	718	681	6	3	3
Banpur	5836	175	79	96	0	0	0
<b>TOTAL (10km)</b>	<b>400773</b>	<b>74182</b>	<b>38207</b>	<b>35975</b>	<b>4552</b>	<b>2345</b>	<b>2207</b>
<i>Source-Census of India, 2011</i>							

### Sex Ratio

The ‘Sex Ratio’ of the study area is a numeric relationship between females and males of an area and bears paramount importance in the present day scenario where the un-ethnic pre-determination of sex and killing of female foetus during pregnancy is practiced by unscrupulous medical practitioners against the rule of the law of the country. It is evident that by contrast the practice of female foeticide is not prevalent in the study area.

The ‘Sex Ratio’ was observed as 922 females per 1000 males in the District. The same was recorded as 914 females for every 1000 males in the study area. The child (0-6 yr age) sex ratio of the stud area was observed as 935 female children per 1000 male children

The village wise male-female population distribution for the study area is depicted and shown by graphical representation in **Table 3.34 & Figure 3.7**



**Figure3.7 :Male-Female Wise Population Distribution**

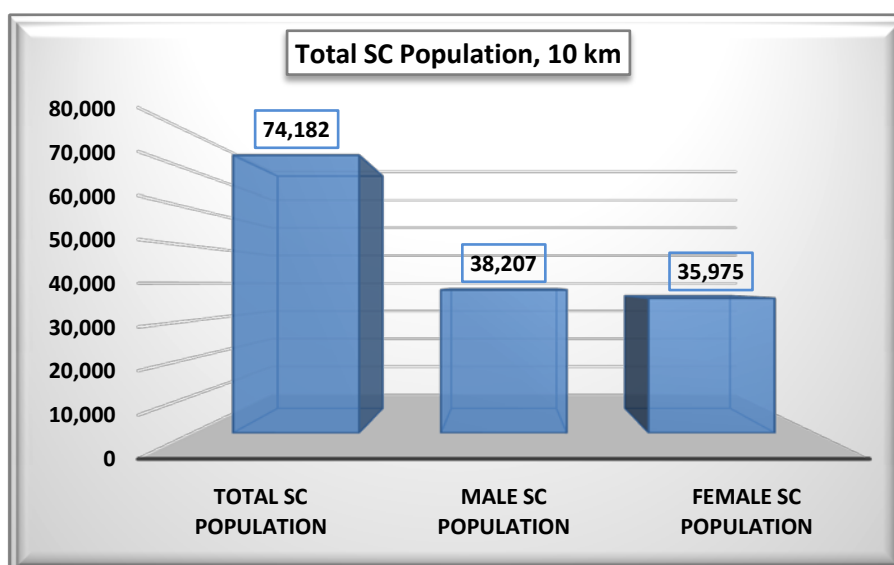


**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)**

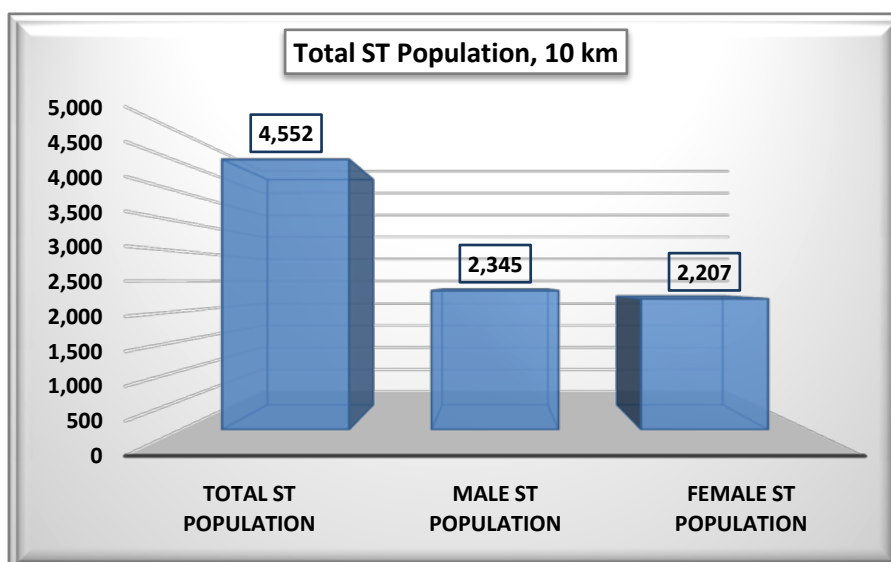
### Scheduled Caste & Scheduled Tribe Population

On the basis of the village wise SC & ST population distribution of the study area during 2011, the ‘Scheduled Castes’ population was observed as 74182 persons consisting of 38207 males and 35975 females respectively in the study area which accounts as 18.5% to the total population (4,00,773 persons) of the study area. Scheduled Tribes (‘ST’) population was observed as 4,552 persons, accounts as 1.1% to the total population of the study zone consisting of 2,345 males (51.5%) and 2,207 females (48.5%) in the 10km radius study zone. It implies that the rest 80.4% of the total population belongs to the general category.

Male-female wise distribution of ‘SC’ & ‘ST’ population in the study area is graphically shown in **Figure 3.8 .& 3.9** as follows.



**Figure 3.8 :Scheduled Caste Population in the Study Area**



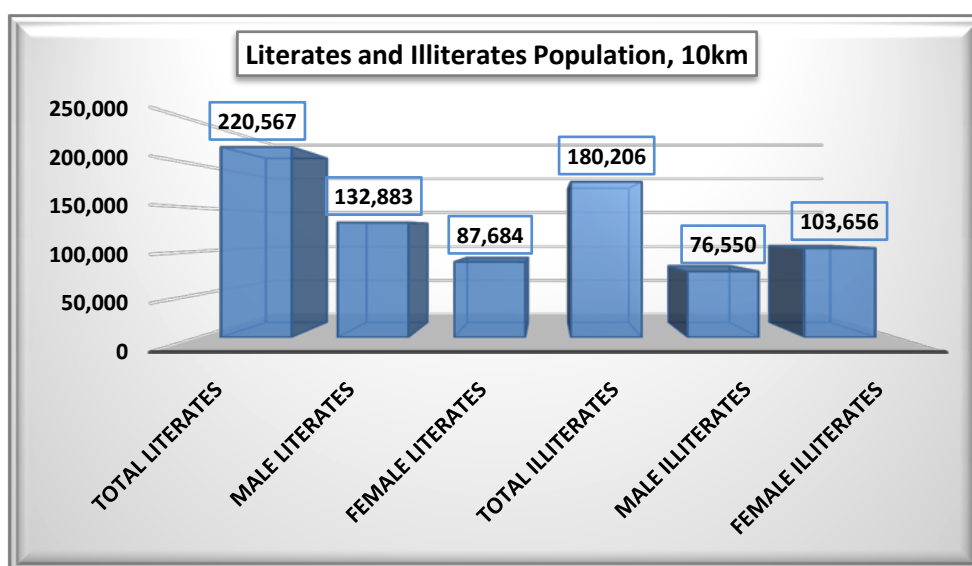
**Figure 3.9 :Scheduled Tribes Population in the Study Area**

**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)**

### Literacy Rate

Literacy level is quantifiable indicator to assess the development status of an area or region. Male-Female wise literates and illiterate's population is represented in **Table 3.34** Total literate's population was recorded as 220,567 persons (55.0%) in the study area. **Table 3.34** reveals that Male-Female wise literates are observed as 1,32,883 & 87,684 persons respectively, implies that the 'Literacy Rate' is recorded as 55.0% with male-female wise percentages being 33.2% & 22.0% respectively.

The Male-Female wise graphical representation of literates & illiterate's population in study area villages/town is shown in **Figure 3.10**



**Figure 3.10 : Male-Female Wise Distribution of Literates & Illiterates**

**Table 3.34 : Male-Female Wise Literates and Illiterates (10km)**

Name of Village/Town	Total Population	Literates			Illiterates		
		Persons	Males	Females	Persons	Males	Females
Daulatpur	4661	2443	1493	950	2218	963	1255
Maniadda	2402	1297	785	512	1105	435	670
Bhajour	816	595	339	256	221	109	112
Garo Nawada	1553	1117	610	507	436	184	252
Lathane	1976	1008	665	343	968	374	594
Sugi	1506	778	523	255	728	269	459
Thegua	534	151	117	34	383	174	209
Sonpai	3442	1851	1139	712	1591	652	939
Garsanda	4467	2300	1448	852	2167	858	1309
Barar	755	454	251	203	301	137	164
Khairi	143	76	44	32	67	31	36
Rampur	871	518	272	246	353	170	183
Khargpur	819	434	267	167	385	170	215
UgniChak	242	221	124	97	21	14	7
SihoChak	446	267	149	118	179	86	93

**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)**

Puteria	770	411	250	161	359	167	192
Lukhri	924	544	349	195	380	140	240
Sahur	280	161	118	43	119	36	83
SitlaChak	Uninhabited Village						
AgabaraBarwata	7063	3754	2284	1470	3309	1366	1943
Piri	289	129	82	47	160	61	99
Abhaipur	1564	932	579	353	632	239	393
Markata	596	298	182	116	298	95	203
Manjura	39	26	14	12	13	7	6
Indpe	2962	1668	1019	649	1294	529	765
Dhenkdih	352	213	115	98	139	43	96
Bukar	3042	1555	948	607	1487	625	862
Lotan	932	346	208	138	586	285	301
Narainpur	2784	1667	1006	661	1117	391	726
Bijuahi	757	564	324	240	193	70	123
Kakan	7121	3227	1919	1308	3894	1729	2165
Sonai	2288	1016	590	426	1272	613	659
Dhandh	2272	1237	767	470	1035	440	595
Lakhanpur	2371	1423	915	508	948	364	584
Partapur	1786	944	576	368	842	379	463
Rajpura	815	301	199	102	514	231	283
Marwa	1817	691	425	266	1126	504	622
Dighoi	681	325	211	114	356	153	203
SemariaBikrampur	1188	618	419	199	570	212	358
AmmaSarari	3631	1918	1139	779	1713	754	959
Misir Manda	757	402	235	167	355	162	193
Nim Nawada	1305	636	378	258	669	281	388
Bhat Chak	1459	839	518	321	620	238	382
Damdama	152	71	50	21	81	30	51
Sira Nawada	735	202	114	88	533	268	265
Neuri	Uninhabited Village						
Lohra	5140	2633	1602	1031	2507	1034	1473
Udaipur	Uninhabited Village						
Sultanpur	304	77	62	15	227	106	121
Amrath	7175	3321	2009	1312	3854	1684	2170
RamalBigha	Uninhabited Village						
MisirBigha	964	347	230	117	617	255	362
Sangthu	3806	2102	1196	906	1704	774	930
Deochand Nawada	Uninhabited Village						
Bhagwana	1328	619	434	185	709	257	452
Kundri Son KurhaHarla	5734	3226	1846	1380	2508	1072	1436
Chhitma	208	44	40	4	164	69	95
Achari	872	432	261	171	440	194	246
Tetaria	Uninhabited Village						
Arsar	7635	4329	2485	1844	3306	1470	1836
Dundu	1851	1101	635	466	750	304	446
Jamui (NP)/30 Wards	87357	56201	32257	23944	31156	13757	17399
Barhat	7630	3010	1961	1049	4620	2068	2552
Bahera	3737	1774	1162	612	1963	806	1157
Bahera Kita Alaiya	Uninhabited Village						
Bishunpur	3963	1663	1049	614	2300	930	1370
Lakra	1303	848	506	342	455	168	287
Bangawan	929	479	294	185	450	189	261

**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)**

Numar	4974	2567	1641	926	2407	976	1431
Kolhua	5729	2514	1550	964	3215	1396	1819
Malepur	12232	7118	4283	2835	5114	2194	2920
Bhaluka	3178	1069	748	321	2109	886	1223
Mohanpur	249	97	65	32	152	60	92
Patauna	2291	1258	770	488	1033	434	599
Narsota	412	244	136	108	168	84	84
Achhra	1100	741	423	318	359	163	196
Phulwaria	1378	681	409	272	697	287	410
Nasrichak	471	246	150	96	225	103	122
Katauna	8358	4919	2943	1976	3439	1431	2008
Sukhlewa	836	475	276	199	361	159	202
Guguldih ( Part in Gidhaur )*	7423	3893	2364	1529	3530	1490	2040
Darha	6476	2991	1886	1105	3485	1488	1997
Lathlathwa	271	124	82	42	147	54	93
Labhet	1518	988	598	390	530	229	301
Bhandara	2633	1246	827	419	1387	566	821
Lakhai	4215	2213	1354	859	2002	837	1165
Harla	4155	2564	1513	1051	1591	626	965
Simaria	617	302	178	124	315	151	164
Kolhua	2930	1633	1033	600	1297	510	787
Kumardih	1471	907	523	384	564	232	332
Kharhua	911	454	282	172	457	188	269
Mahuli	2961	1547	972	575	1414	575	839
Sewa	9151	4995	3186	1809	4156	1702	2454
Ratanpur	10968	6215	3782	2433	4753	1905	2848
Kundhur	3519	1763	1037	726	1756	775	981
Nayagaon	1268	691	457	234	577	232	345
Genadih	2813	1626	977	649	1187	487	700
Guguldih ( Part in Barhat )*	7698	3570	2332	1238	4128	1676	2452
Chandabank	Uninhabited Village						
Singarpur	2331	1143	693	450	1188	550	638
Ballopur	1490	630	407	223	860	354	506
Naudiha	2281	1457	816	641	824	389	435
Suraundha	341	121	61	60	220	111	109
Nauniatanr	376	143	78	65	233	114	119
Amari	3370	1703	1114	589	1667	653	1014
Khutauna	1342	871	545	326	471	176	295
Dharampur	1792	957	571	386	835	364	471
Mahapur Khurd	331	154	69	85	177	93	84
Kharui	1441	723	433	290	718	307	411
Dumarkola	3775	1931	1168	763	1844	856	988
Khaira	9581	5566	3383	2183	4015	1685	2330
Gopalpur	3651	2092	1209	883	1559	699	860
Karan Nawada	659	524	272	252	135	59	76
Kendih	3268	1873	1161	712	1395	583	812
BaribagJaljoga	2240	1009	627	382	1231	519	712
Fatehpur	3605	1729	1041	688	1876	841	1035
Baheratari	Uninhabited Village						
JorbahaDharampur	2074	725	491	234	1349	597	752
Bhojpur	867	388	250	138	479	194	285
Sagdaha	1631	1082	653	429	549	215	334

**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)**

Bhandra	1317	767	467	300	550	194	356
Chanco	781	488	304	184	293	118	175
Dabil	5095	2582	1698	884	2513	970	1543
Durgodih	Uninhabited Village						
Changodih	2603	1692	977	715	911	388	523
Nariana	1927	1004	616	388	923	401	522
Jogajhingoal	2704	1329	818	511	1375	575	800
Jitjhingoi	6557	3402	2172	1230	3155	1230	1925
Banpur	5836	2997	1824	1173	2839	1244	1595
<b>TOTAL (10km)</b>	<b>400773</b>	<b>220567</b>	<b>132883</b>	<b>87684</b>	<b>180206</b>	<b>76550</b>	<b>103656</b>
<i>Source-Census of India, 2011</i>							

### Economic Profile of Jamui District:

Jamui is a district among 38 districts of Bihar state, India. The district was formed on 21 February 1991, when it was separated from Munger district.

The economy of the district is mainly based on agriculture. Almost all people of the district is engaged in agriculture since it has no big industries and factories. Every year a huge chunk of revenue comes from the agricultural products grown in the district. Some of its chief agricultural products are paddy, wheat, lentils etc. The district is not very developed educationally due to lack of educational institutions in the district compels its students to go to other places in order to take education.

In 2006 the Ministry of Panchayati Raj named Jamui one of the country's 250 most backward districts (out of a total of 640). It is one of the 36 districts in Bihar currently receiving funds from the Backward Regions Grant Fund Programme (BRGF).

### Workers Scenario:

Occupational studied to assess the skills of people in the study area. Occupational pattern helps in identifying major economic activities of the area. In the study area the Main and Marginal Workers population was observed as 97,369(24.0%) and 48,488(12.0%) to the total population (4,00,773), while the remaining 254,916(64.0%) persons were recorded as non-workers. Thus it implies that the semi-skilled and non-skilled work-force required in study area for the project is available in plenty.

The village-wise main and marginal worker's population with further classification as casual, agricultural, households and other workers is shown as follows in **Table 3.35**

**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)**

**Table 3.35 :Village-wise Occupational Pattern (10km)**

Name of the Village/Town	MAIN WORK_P	MAIN_C L_P	MAIN_A L_P	MAIN_H H_P	MAIN_O T_P	MARG WORK_P	MARG_CL_P	MARG_AL_P	MARG_HH_P	MARG_OT_P
Daulatpur	917	88	199	80	550	519	56	368	25	70
Maniadda	575	136	258	38	143	203	83	108	4	8
Bhajour	149	48	8	0	93	105	1	65	1	38
Garo Nawada	321	124	102	2	93	212	3	203	2	4
Lathane	141	14	17	9	101	611	44	420	45	102
Sugi	208	9	133	22	44	40	0	33	4	3
Thegua	20	2	15	0	3	253	4	239	0	10
Sonpai	752	316	228	40	168	155	38	14	3	100
Garsanda	1018	242	324	77	375	980	78	669	112	121
Barar	122	2	0	6	114	173	16	5	32	120
Khairi	49	8	39	0	2	1	0	1	0	0
Rampur	156	35	47	0	74	180	1	7	1	171
Khargpur	161	27	128	0	6	77	0	72	0	5
UgniChak	68	53	0	1	14	0	0	0	0	0
SihoChak	33	10	14	0	9	76	5	69	0	2
Puteria	130	50	22	4	54	130	12	106	0	12
Lukhri	298	50	178	31	39	142	14	108	4	16
Sahur	10	1	0	0	9	90	10	67	0	13
SitlaChak	Uninhabited Village									
AgabaraBarwata	1157	338	474	18	327	1270	150	992	17	111
Piri	87	0	83	4	0	52	0	52	0	0
Abhaipur	283	187	41	0	55	246	141	86	4	15
Markata	141	27	3	13	98	91	15	36	24	16
Manjura	7	2	2	0	3	7	0	0	7	0
Indpe	683	204	381	21	77	273	64	151	9	49
Dhenkdih	154	95	8	2	49	31	7	13	2	9
Bukar	661	174	98	68	321	813	13	669	49	82

**Chapter-III****BASELINE DATA DESCRIPTION**

**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)**

Lotan	250	73	172	0	5	20	2	18	0	0
Narainpur	503	0	461	3	39	422	38	315	1	68
Bijuahi	169	6	120	5	38	27	0	19	0	8
Kakan	1324	218	979	13	114	1474	122	683	90	579
Sonai	579	55	383	23	118	286	14	207	4	61
Dhandh	444	64	319	2	59	252	47	164	6	35
Lakhanpur	546	209	237	1	99	215	39	161	3	12
Partapur	282	39	146	3	94	243	4	231	0	8
Rajpura	106	4	56	5	41	125	0	112	1	12
Marwa	540	67	431	9	33	48	5	21	3	19
Dighoi	46	0	35	0	11	122	3	117	0	2
SemariaBikrampur	263	131	93	3	36	271	15	142	85	29
AmmaSarari	79	34	6	3	36	1408	102	1237	35	34
Misir Manda	197	57	101	6	33	190	4	44	138	4
Nim Nawada	404	164	216	2	22	1	1	0	0	0
Bhat Chak	399	124	139	74	62	138	14	67	26	31
Damdama	42	1	41	0	0	33	0	33	0	0
Sira Nawada	143	83	49	0	11	89	5	12	0	72
Neuri	Uninhabited Village									
Lohra	1676	622	919	13	122	140	20	104	4	12
Udaipur	Uninhabited Village									
Sultanpur	251	248	0	3	0	9	9	0	0	0
Amrath	1518	257	650	34	577	838	49	474	21	294
RamalBigha	Uninhabited Village									
MisirBigha	291	1	283	1	6	38	3	35	0	0
Sangthu	807	412	274	4	117	913	238	621	4	50
Deochand Nawada	Uninhabited Village									
Bhagwana	55	50	3	0	2	521	32	480	0	9
Kundri Son KurhaHarla	809	330	370	35	74	1686	225	1426	8	27



**Chapter-III****BASELINE DATA DESCRIPTION**

**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)**

Chhitma	96	95	0	0	1	1	1	0	0	0
Achari	382	115	261	0	6	7	0	5	0	2
Tetaria	Uninhabited Village									
Arsar	1374	581	584	12	197	582	77	450	7	48
Dundu	245	183	31	3	28	213	135	53	0	25
Jamui (NP)/30 Wards	18728	1404	3533	965	12826	6555	479	2612	648	2816
Barhat	3600	256	2834	314	196	219	3	187	19	10
Bahera	932	200	350	156	226	360	8	230	4	118
Bahera Kita Alaiya	Uninhabited Village									
Bishunpur	844	117	592	18	117	784	17	691	14	62
Lakra	319	17	250	8	44	192	0	72	6	114
Bangawan	187	103	14	1	69	238	169	64	0	5
Numar	1324	613	488	20	203	587	125	393	52	17
Kolhua	1605	132	1287	51	135	959	15	792	12	140
Malepur	3313	852	1086	74	1301	802	403	236	34	129
Bhaluka	1239	230	954	5	50	201	9	116	6	70
Mohanpur	4	2	0	0	2	95	0	81	0	14
Patauna	557	122	375	5	55	671	95	317	5	254
Narsota	113	31	14	0	68	0	0	0	0	0
Achhra	378	101	109	2	166	186	97	87	0	2
Phulwaria	267	66	183	1	17	456	122	328	1	5
Nasrichak	42	24	17	0	1	98	14	19	4	61
Katauna	2380	1337	558	84	401	1390	355	641	177	217
Sukhlewa	300	92	201	7	0	76	3	65	6	2
Guguldih ( Part in Gidhaur )*	1966	144	1071	391	360	1131	32	710	237	152
Darha	1951	378	1422	43	108	782	286	329	122	45
Lathlathwa	140	13	114	1	12	2	0	2	0	0
Labhet	178	98	23	4	53	144	4	132	2	6

**Chapter-III****BASELINE DATA DESCRIPTION**

**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)**

Bhandara	957	628	309	5	15	41	4	23	0	14
Lakhai	675	351	248	0	76	623	6	602	2	13
Harla	944	185	656	8	95	794	18	569	7	200
Simaria	194	75	111	3	5	104	4	100	0	0
Kolhua	564	212	287	25	40	350	4	293	46	7
Kumardih	405	147	174	16	68	207	43	128	4	32
Kharhua	291	109	42	75	65	78	5	27	13	33
Mahuli	1142	133	640	34	335	310	4	265	18	23
Sewa	3046	674	1223	937	212	654	42	486	87	39
Ratanpur	2943	1044	1322	111	466	992	244	299	202	247
Kundhur	1264	428	788	3	45	287	65	192	16	14
Nayagaon	149	131	5	0	13	172	3	160	2	7
Genadih	769	516	203	5	45	306	45	126	40	95
Guguldih ( Part in Barhat )*	3231	966	1025	945	295	888	310	354	138	86
Chandabank	Uninhabited Village									
Singarpur	711	146	515	2	48	30	5	19	0	6
Ballopur	364	104	248	0	12	32	0	29	2	1
Naudiha	419	101	226	18	74	349	117	204	4	24
Suraundha	160	0	157	0	3	30	0	30	0	0
Nauniatanr	133	0	132	0	1	70	0	70	0	0
Amari	797	123	577	33	64	544	22	487	20	15
Khutauna	319	108	183	2	26	341	29	290	7	15
Dharampur	381	118	174	8	81	295	57	224	1	13
Mahapur Khurd	4	0	0	0	4	160	0	92	68	0
Kharui	304	73	168	35	28	6	1	0	4	1
Dumarkola	1354	583	523	194	54	167	19	111	28	9
Khaira	2996	432	948	893	723	534	189	144	68	133
Gopalpur	1182	328	646	38	170	289	116	144	7	22
Karan Nawada	77	22	54	0	1	194	0	194	0	0

**Chapter-III****BASELINE DATA DESCRIPTION**

**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)**

Kendih	703	279	131	16	277	516	6	355	45	110
BaribagJaljoga	484	15	429	12	28	254	40	188	3	23
Fatehpur	410	196	129	30	55	1335	70	615	288	362
Baheratari	Uninhabited Village									
JorbahaDharampur	306	49	163	33	61	339	15	243	59	22
Bhojpur	498	264	32	201	1	67	15	10	42	0
Sagdaha	439	217	111	5	106	59	8	25	1	25
Bhandra	179	34	130	0	15	193	4	188	0	1
Chanco	85	9	30	32	14	267	5	112	76	74
Dabil	1122	96	700	54	272	722	29	393	89	211
Durgodih	Uninhabited Village									
Changodih	411	152	211	0	48	432	15	403	2	12
Nariana	461	49	301	11	100	186	1	175	4	6
Jogajhingoal	470	114	153	73	130	360	105	118	85	52
Jitjhingoi	1875	437	1061	108	269	1331	217	759	253	102
Banpur	1663	303	847	33	480	610	36	454	52	68
<b>TOTAL (10km)</b>	<b>97369</b>	<b>22748</b>	<b>41648</b>	<b>6841</b>	<b>26132</b>	<b>48488</b>	<b>6113</b>	<b>29588</b>	<b>3913</b>	<b>8874</b>

*Source-Census of India, 2011*

**ABBREVIATIONS:**

**MAIN WORKERS POPULATION:** **MAIN WORK\_P:** Main worker's total population, **MAIN\_CL\_P:** Main cultivated labour population, **MAIN\_AL\_P:** Main agricultural labour population, **MAIN\_HH\_P:** Main workers population involved in household industries, **MAIN\_OT\_P:** Main other worker's population

**MARGINAL WORKERS POPULATION:**

**MARG WORK\_P:** Marginal worker's total population, **MARG\_CL\_P:** Marginal cultivated labors total population, **MARG\_AL\_P:** Marginal agricultural labors population, **MARG\_HH\_P:** Marginal workers involved in household industries, **MARG\_OT\_P :** Marginal other workers Population

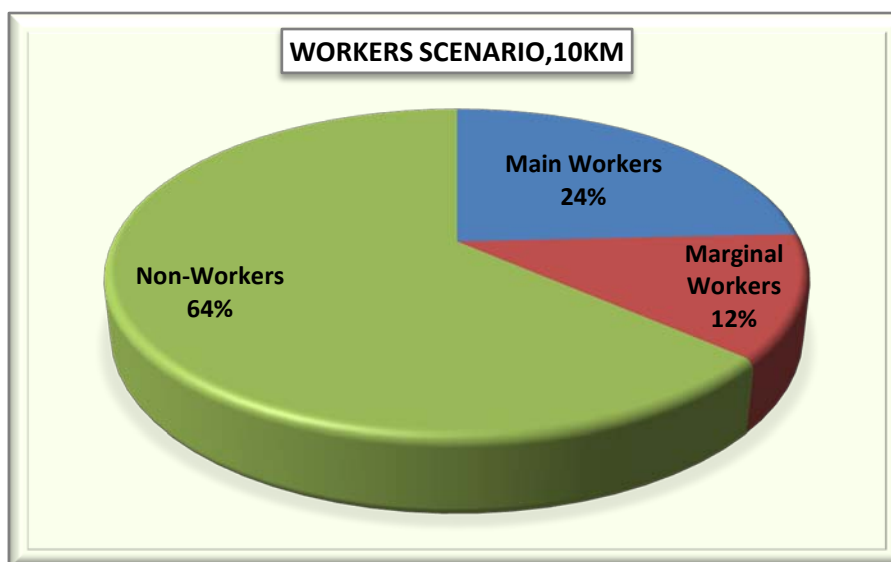
**Project:** Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)

Distribution of work participation rate of the study area population is shown in **Table 3.36** as follows;

**Table 3.36 :Distribution of Work Participation Rate(10km)**

Occupation Class	Year, 2011
<b>Main Workers</b>	<b>97,369 (24.0%)</b>
Male	74,062(76.0%)
Female	23,307(24.0%)
<b>Marginal Workers</b>	<b>48,488(12.0%)</b>
Male	25,528(52.6%)
Female	22,960(47.4%)
<b>Non-Workers</b>	<b>2,54,916(64.0%)</b>
Male	1,09,843 (43.0%)
Female	1,45,073(57.0%)
<b>Total Population (10km)</b>	<b>4,00,773</b>
<i>Source: Census of India Records, 2011</i>	

Graphical representation of Workers Scenario is given below as **Figure 3.11**



**Figure 3.11 :Workers Scenario of Study Area**

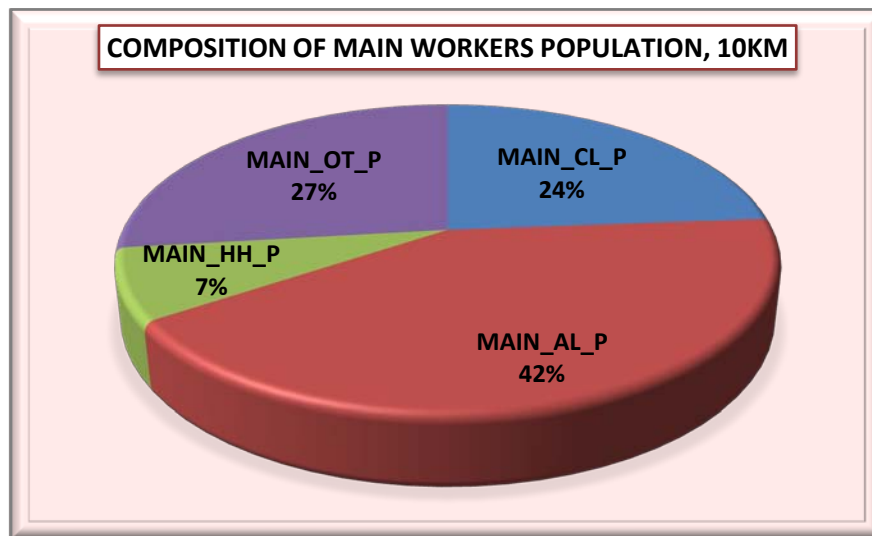
#### **Composition of Main Workers:**

The 'Main Workers' were observed as 97369 persons (24.0%) to the total population (4,00773) of the study area and its composition is made-up of Casual laborers as 22748

**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)**

(23.0%), Agricultural laborers as 41648(43.0%), Household workers 6841(7.0%) and other workers as 26132(27.0%) respectively.

Composition of Main workers is shown below as **Figure 3.12**

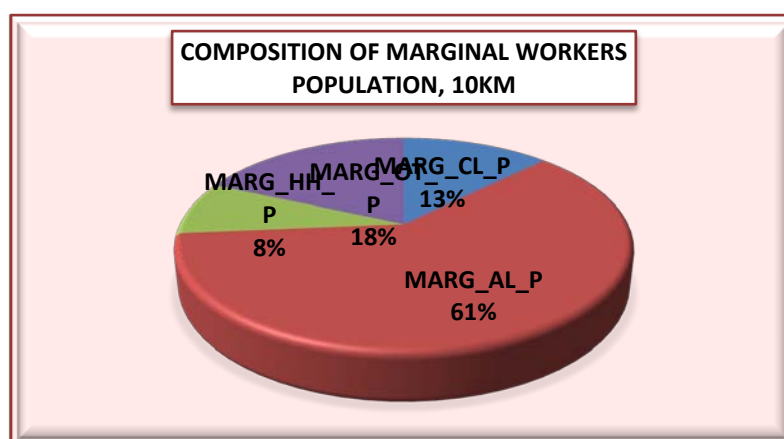


**Figure 3.12 :Composition of Main Workers Population**

#### **Composition of Marginal Workers:**

The total marginal workers are observed as 48488 which constitute 12.0% to the total population (4,00,773) comprising of Marginal Casual Laborers as 6,113 (13.0%), Marginal Agricultural Laborers as 29,588(61.0%), Marginal Household laborers as 3,913 (8.0%) and marginal other workers were also observed as 8,874 (18.0%) of the total marginal workers respectively.

Details about marginal workers in the study area are tabulated in **Table 3.37** .Composition of Marginal workers is shown in **Figure 3.13** as follows.



**Figure 3.13 :Composition of Marginal Workers**

**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)**

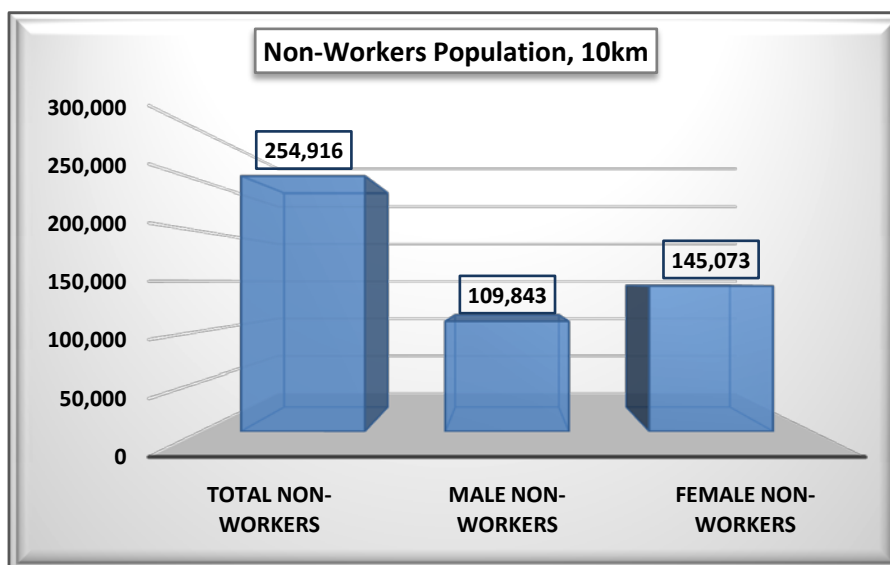
### Composition of Non-Workers:

The total Non-worker's population was observed as 2,54,916 which accounts 64.0% to the total population (4,00,773) of the study area. Male-female wise Non-worker's population was recorded as 1,09,843 Males (43.0%) and 1,45,073 Females (57.0%) respectively.

Details about Total Non-workers in the study area are compiled in **Table 3.37** Graphical representation of Non-worker's population is shown as follows in **Figure 3.14**

**Table 3.37 : Composition of Non-Workers**

Non-Workers Population		
Persons	Males	Females
2,54,916	1,09,843 (43.0%)	1,45,073 (57.0%)



**Figure 3.14 : Composition of Non-Workers**

### Basic Infrastructure Facilities Availability (as per the census records of 2011)

A review of basic infrastructure facilities (*Amenities*) available in the study area has been done on the basis of the field survey and Census records, 2011 for the study area inhabited villages of Jamui District in Bihar state. The study area has average level of basic infrastructure facilities like educational, medical, potable water and power supply and transport & communication network.

As per the Census Records 2011, the study area has a total of 128 villages and one major Town named Jamui (NP/30 Wards) lying under Jamui District in Bihar state. Overall study area villages are falling mainly under Five (05) tehsils namely Jamui (62 villages & 01 Town), Barhat (24

**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)**

villages), Lakshampur (01 villages) and Gidhaur (11 villages), Khaira (31 villages) of Jamui district in Bihar state.

There are ten (10) villages of Jamui district in Bihar state found as uninhabited villages in the study area. There is one major town named Jamui (NP/30 Wards) found in the 10km radial study zone.

### **Educational Facilities**

There is a total no. of 176 Primary schools existing in the 10km radius study area. About 86 no of Middle schools are found in the study area. About 12 Higher Secondary School (SS) and 3 Senior Secondary School (SSS) facility is available in the study area. The educational facilities have been further strengthening now and a number of private public schools and colleges are also functioning in the surroundings of the study area. Besides, there are Engineering and Medical colleges available in Towns and District headquarters only. Higher education facilities are available in Towns of the district. There is a considerable improvement in educational facility. The villages of the study area have no such facilities can reach within 5 to 10km range.

### **Availability of University Education in Jamui District**

There are several affiliated and constituted colleges of the Tilka Manjhi University, Bhagalpur which imparts under graduate and post graduate education in the district. IGNOU (Indira Gandhi National Open University) has opened study center K.K.M College in Jamui where one can study many distance courses of under graduate, post graduate and vocational etc.

### **Medical Facilities**

The medical facilities are provided by different agencies like Govt. & Private individuals and voluntary organizations in the study area. As per the census 2011, only 14 no of primary health center exist in the study area; most of the study area villages depend upon the towns & district HQ of the study area having such facility. No community health centre exists in the study area. Only 27 no of Primary Health Sub-Centers exists in the villages of the study area. Only 14 no of Mother & Child Welfare Centers are found in the study area. No allopathic hospital exists in the study area. Only 14 medical dispensaries and Family Welfare Centers were found in the study area. Overall study area villages are served by moderate level of medical facilities. Specialized medical facilities are available only in towns and District Headquarter (HQ) only.

### **Potable Water Facilities**

Potable water facility is available in most of the villages of the study area. The entire study area has average level of potable water facilities. Hand Pump (HP) water facility is commonly observed in the study area as potable water facility. Out of the total 129 villages/towns, only 41 villages (31.8%) are



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served with River/Canal water in the study area. As per the census records 2011, no village was found served with Tank/Pond/Lake as potable water facility in the study area.

### **Communication, Road & Transport Facilities**

Apart from Post & Telegraph Office (PTO) services, transport is the main communication linkage in the study area. Compiled census 2011, data shows that the study area has good postal facilities in the 10km radius zone. About 38 villages (29.5%) were found serving with Post Office facilities in the study area, remaining villages are depending upon towns of the study area. The study area has average rail and road network, passes from the area.

About 9 villages were found with railway station facility in the study area. Site is well connected by National Highway & State Highway road also passing in the area. Nearest railway station Jamui Railway Station is situated at about 3.0km in North Direction. Nearest town is Jamui (NP) located at about 3.7km in NW direction. District Headquarters Jamui (District Court) is situated at approx. 2.6 km towards SW direction. Nearest airport Deoghar is located at 72.0km in South direction. Jai Prakash Narayan Airport Patna is also located at about 137km in Northwest direction.

#### *Communications (Jamui District)*

**Roads** - The district of Jamui is well served by a network of roads. Road communication is the main mode of transportation in this district. The roads are classified as the National Highways, State Highways, Major district roads and other district roads. They are maintained by the Public Works Department, the Rural Engineering Organisation, the Zila Parishad and Municipalities. It is also connected with the interior of the district by metalled road. Two State Highways (SH-6 & SH-18) also passes through the district.

**Railways** - The district of Jamui has a railway communication system. It is served by East Central Railway. Jamui railway station is in Howarah-Patna-Mugalsarai main line.

**Airways** - Airways facilities are not available in the district.

**Boats** – Waterways facilities are not available in the district.

### **Banking Facility**

The study area has almost all the schedule commercial banks with ATM facility at urban areas and the district HQ.

### **Trade and Commerce**

The development of the means of communication has had a great impact on the trade and commerce of the district. The district may now be said to be fairly well- connected by Road and Rail. Jamui is

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predominantly an agricultural district. Its export-trade comprises mostly of Rice, Wheat and other cereals. But the main agricultural trade comprises of dairy and horticultural products like milk and vegetables. The important items imported in the district are coal, iron and steel products, salt, sugar, cement, cotton and woollen textile, kerosene oil, spices and tobacco.ade and Commerce

#### *Mines and Minerals*

In Jhajha, Khairi, Sono and Chakai the chief formation is Gneiss Basement complex. China Clay is found near Panari 24 km. south-west of Jhajha, the mines being known as BhukhliKaoten. Mines are worked by the Jhajha China Clay works.

#### **Power Supply**

It is revealed from the compiled information on amenities availability as per the census record of 2011; most of the villages and towns are electrified for Domestic, Agriculture, and Commercial& for all purposes. About 86villages (66.7%) of the study area are electrified for domestic purpose, 80villages (62.0%) for agricultural purpose,and for commercial & for all purposes in the study area.Out of 129 villages/towns in the study area, 42villages (32.6%) including 10uninhabited villages (7.8%)are not electrified for any purpose in the study area.

The district receives its entire power supply from Bihar State Electricity Board. All the towns of Jamui district have electricity. In the rural areas, the Government is trying to extended electric line to the maximum number of villages by implementing various schemes for rural electrification.

Village/town wise Basic Infrastructure and Amenities availabilities data for the entire study area is compiled and presented in**Table 3.38** as follows;

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# BASELINE DATA DESCRIPTION

**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)**

**Table 3.38 Village wise Basic Amenities Availability**

Name of the Village/Town	Educational				Medical							Drinking Water							C T	Communication & Transport				Approach to the Village				Power Supply				Nearest Town Distance, km
	P	M	S	S	C	P	P	M	H	D	F	T	W	H	T	R	T	P		P	PT	B	RS	P	K	N	F	E	E	E	E	
Daulatpur	1	1	1	0	0	1	1	1	0	1	1	2	2	1	2	1	2	2	1	2	2	2	2	1	1	2	1	1	1	1	1	Jamui,6km
Maniadda	0	0	0	0	0	1	1	1	0	1	1	2	2	1	2	2	2	2	1	2	2	2	2	1	1	2	1	1	1	1	1	Jamui,5km
Bhajour	1	1	0	0	0	1	1	1	0	1	1	2	2	1	2	1	2	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Jamui,5km
Garo Nawada	2	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	2	1	1	2	1	1	1	1	1	Jamui,5km
Lathane	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	2	1	1	2	1	1	1	1	1	Jamui,5km
Sugi	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	1	2	2	2	2	2	1	2	1	1	1	1	1	Jamui,10km
Thegua	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	2	1	1	2	1	1	1	1	1	Jamui,10km
Sonpai	3	1	0	0	0	1	1	1	0	1	1	2	2	1	1	1	2	2	1	2	2	2	2	1	1	2	1	1	1	1	1	Jamui,6km
Garsanda	3	1	0	0	0	1	1	1	0	1	1	2	2	1	1	1	2	2	1	2	2	2	2	1	1	2	1	1	1	1	1	Jamui,5km
Barar	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	2	1	2	1	1	1	1	1	Jamui,3km
Khairi	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	2	2	1	2	1	2	2	2	2	Jamui,6km
Rampur	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	2	2	1	2	1	2	2	2	2	Jamui,6km
Khargpur	0	0	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	1	2	1	2	2	2	1	2	1	2	2	2	2	Jamui,6km
UgniChak	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Jamui,8km
SihoChak	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	1	2	2	1	2	1	2	2	2	2	Jamui,9km
Puteria	1	0	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Jamui,9km
Lukhri	1	0	0	0	0	0	0	0	0	0	0	2	1	1	2	1	2	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Jamui,6km
Sahur	1	0	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	2	2	1	2	1	2	2	2	2	Jamui,6km
SitlaChak	Uninhabited Village																															Jamui, km
AgabaraBarwata	1	1	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	2	1	1	2	1	1	1	1	1	Jamui,6km
Piri	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Jamui,6km
Abhaipur	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	1	1	2	1	1	1	1	1	Jamui,9km
Markata	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	1	1	2	1	1	1	1	1	Jamui,6km
Manjura	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	Jamui,6km
Indpe	1	0	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	2	1	1	2	1	1	1	1	1	Jamui,6km
Dhenkdih	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	1	1	2	1	1	1	1	1	Jamui,12km
Bukar	3	1	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	1	2	2	2	2	1	1	2	1	1	1	1	1	Jamui,8km
Lotan	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	1	1	2	1	1	1	1	1	Jamui,9km
Narainpur	1	1	0	0	0	0	1	0	0	0	0	2	2	1	2	2	2	2	1	2	2	2	2	1	1	2	1	1	1	1	1	Jamui,9km
Bijuahi	1	0	0	0	0	1	1	1	0	1	1	2	2	1	2	2	2	2	2	2	2	2	2	1	1	2	1	1	1	1	1	Jamui,12km
Kakan	3	1	0	0	0	1	1	1	0	1	1	2	2	1	1	2	2	2	1	2	2	2	2	1	1	2	1	1	1	1	1	Jamui,15km

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# BASELINE DATA DESCRIPTION

**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna,  
Block - Jamui, District- Jamui, (Bihar)**

Sonai	1	0	0	0	0	1	1	1	0	1	1	2	2	1	2	2	2	2	1	2	2	2	1	1	2	1	1	1	1	1	Jamui,12km	
Dhandh	1	0	0	0	0	0	1	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	1	2	1	1	1	1	1	Jamui,12km	
Lakhanpur	1	0	0	0	0	0	0	0	0	0	0	2	1	1	2	2	2	2	2	2	2	2	1	1	2	1	1	1	1	1	Jamui,12km	
Partapur	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	1	2	1	1	1	1	1	Jamui,11km	
Rajpura	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Jamui,6km	
Marwa	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	1	2	1	1	1	1	1	Jamui,9km	
Dighoi	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Jamui,6km	
SemariaBikrampur	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	1	2	1	1	1	1	1	Jamui,7km	
AmmaSarari	1	0	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	1	1	2	1	1	1	1	1	Jamui,6km	
Misir Manda	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Jamui,6km	
Nim Nawada	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	1	2	1	1	1	1	1	Jamui,7km	
Bhat Chak	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	1	2	1	1	1	1	1	Jamui,6km	
Damdama	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	1	2	1	2	2	2	2	Jamui,6km	
Sira Nawada	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	1	2	1	1	1	1	1	Jamui,15km	
Neuri	Uninhabited Village																													Jamui, km		
Lohra	8	0	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	1	2	2	2	1	1	2	1	1	1	1	1	Jamui,10km	
Udaipur	Uninhabited Village																													Jamui, km		
Sultanpur	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Jamui,14km	
Amrath	1	1	0	0	0	1	1	1	0	1	1	2	2	1	2	2	2	2	1	2	2	2	2	1	1	2	1	1	1	1	1	Jamui,14km
RamalBigha	Uninhabited Village																													Jamui, km		
MisirBigha	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Jamui,14km	
Sangthu	1	0	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	1	1	2	1	1	1	1	1	Jamui,10km	
Deochand Nawada	Uninhabited Village																													Jamui, km		
Bhagwana	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	1	2	1	1	1	1	1	Jamui,13km	
Kundri Son KurhaHarla	4	0	0	0	0	1	1	1	0	1	1	2	2	1	2	2	2	2	2	2	2	2	1	1	2	1	1	1	1	1	Jamui,15km	
Chhitma	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Jamui,10km	
Achari	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	1	2	1	1	2	1	2	2	2	2	Jamui,8km	
Tetaria	Uninhabited Village																													Jamui, km		
Arsar	1	1	1	0	0	1	1	1	0	1	1	2	2	1	2	2	2	2	1	2	1	2	1	1	2	1	1	1	1	1	Jamui,9km	
Dundu	1	1	1	0	0	1	1	1	0	1	1	2	2	1	2	1	2	2	1	2	2	2	1	1	2	1	1	1	1	1	Jamui,12km	
Jamui (NP)	Town Area																													Jamui (NP),0km		
Barhat	8	3	0	0	0	0	1	0	0	0	0	2	2	1	1	2	2	2	1	2	1	1	1	1	2	1	1	1	1	1	Jamui,10km	
Bahera	2	2	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	2	2	2	1	2	2	1	1	1	1	1	Jamui,20km	
Bahera Kita Alaiya	Uninhabited Village																													Jamui,km		
Bishunpur	3	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	1	1	2	1	1	1	1	1	Jamui,18km	
Lakra	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	1	2	1	1	2	1	1	1	1	Jamui,12km	
Bangawan	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	2	1	2	2	2	2	2	Jamui,12km	
Numar	4	2	0	0	0	0	1	0	0	0	0	2	2	1	1	1	2	2	1	2	2	2	1	1	2	1	1	1	1	1	Jamui,13km	
Kolhua	8	3	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	1	2	2	2	1	1	1	1	1	1	1	1	Jamui,12km	

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# BASELINE DATA DESCRIPTION

**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna,  
Block - Jamui, District- Jamui, (Bihar)**

Malepur	8	6	2	0	0	1	1	1	0	1	1	2	2	1	1	1	2	2	1	2	1	1	1	1	2	1	1	1	1	1	Jamui,8km
Bhaluka	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	1	1	1	2	2	1	1	1	1	1	Jamui,10km
Mohanpur	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	1	2	1	2	2	2	2	2	Jamui,8km
Patauna	2	2	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	2	2	2	1	1	2	1	1	1	1	1	Jamui,8km
Narsota	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	1	1	1	1	2	1	1	1	1	1	Jamui,8km
Achhra	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	1	1	1	1	2	1	1	1	1	1	Jamui,9km
Phulwaria	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	1	1	2	1	2	1	1	1	1	1	Jamui,9km
Nasrichak	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	1	1	1	1	2	1	2	2	2	2	Jamui,12km
Katauna	3	1	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	1	2	1	1	1	1	2	1	1	1	1	1	Jamui,9km
Sukhlewa	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	1	1	1	1	1	2	2	2	2	Jamui,13km
Guguldih ( Part in Gidhaur )*	6	2	0	0	0	0	1	0	0	0	0	2	1	1	1	1	2	2	1	2	2	2	1	1	2	1	1	1	1	1	Jamui,20km
Darha	8	4	1	0	0	0	1	0	0	0	0	2	2	1	1	1	2	2	1	2	2	2	1	1	2	1	1	1	1	1	Jamui,15km
Lathlathwa	1	1	1	1	0	0	1	0	0	0	0	2	2	1	2	2	2	2	1	2	2	2	1	1	2	1	2	2	2	2	Jamui,14km
Labhet	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	Jamui,15km
Bhandara	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	1	2	2	1	1	1	1	1	1	Jamui,10km
Lakhai	2	2	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	2	1	2	1	1	1	1	1	Jamui,10km
Harla	1	1	0	0	0	0	1	0	0	0	0	2	2	1	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	Jamui,25km
Simaria	2	1	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	1	1	2	1	1	1	1	1	Jamui,24km
Kolhua	1	0	0	0	0	0	1	0	0	0	0	2	2	1	1	2	2	2	1	2	2	2	1	1	2	1	1	1	1	1	Jamui,26km
Kumardih	1	0	0	0	0	0	1	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	1	1	2	1	1	1	1	1	Jamui,27km
Kharhua	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	1	2	2	2	1	1	2	1	1	1	1	1	Jamui,29km
Mahuli	1	3	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	1	1	2	1	1	1	1	1	Jamui,18km
Sewa	3	3	1	0	0	0	1	0	0	0	0	2	2	1	1	1	2	2	1	2	2	2	1	1	2	1	1	1	1	1	Jamui,25km
Ratanpur	2	5	1	0	0	0	1	0	0	0	0	2	2	1	1	1	2	2	1	1	1	2	1	1	2	1	1	1	1	1	Jamui,15km
Kundhur	3	1	0	0	0	0	1	0	0	0	0	2	2	1	1	1	2	2	2	2	2	2	1	1	2	1	1	1	1	1	Jamui,17km
Nayagaon	1	1	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	1	2	1	1	1	1	2	1	1	1	1	1	Jamui,18km
Genadih	1	1	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	1	1	2	1	1	1	1	1	Jamui,20km
Guguldih ( Part in Barhat )*	4	4	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	1	1	2	1	1	1	1	1	Jamui,22km
Chandabank	Uninhabited Village																														Jamui, km
Singarpur	1	0	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	1	2	1	1	1	1	1	1	Jamui,5km
Ballopur	1	1	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	Jamui,5km
Naudiha	1	1	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	1	1	1	2	2	1	1	1	1	1	1	Jamui,6km
Suraundha	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	Jamui,6km
Nauniatanr	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	Jamui,6km
Amari	1	1	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	1	2	2	2	1	2	2	1	1	2	2	2	Jamui,18km
Khutauna	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	2	2	1	2	2	2	2	Jamui,16km
Dharampur	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	2	1	1	2	2	2	2	Jamui,15km
Mahapur Khurd	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	Jamui,16km
Kharui	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	1	2	1	2	2	2	2	Jamui,18km

### Chapter-III

### BASELINE DATA DESCRIPTION

**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna,  
Block - Jamui, District- Jamui, (Bihar)**

Dumarkola	1	1	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	1	2	2	2	1	2	2	1	1	2	2	2	Jamui,20km
Khaira	3	2	2	2	0	1	1	1	0	1	0	1	2	2	1	1	2	2	2	1	1	1	2	2	1	1	1	1	2	1	Jamui,6km
Gopalpur	1	1	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	1	2	2	2	1	2	2	1	1	1	1	1	Jamui,7km
Karan Nawada	1	1	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	Jamui,5km
Kendih	2	1	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	1	2	2	1	1	1	1	1	Jamui,5km
BaribagJaljoga	1	1	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	1	2	2	2	1	1	2	1	1	1	1	1	Jamui,8km
Fatehpur	2	1	0	0	0	0	0	0	0	0	0	2	1	1	1	1	2	2	2	2	2	2	1	1	2	1	1	2	2	2	Jamui,12km
Baheratari	Uninhabited Village																														Jamui, km
JorbahaDharampur	1	0	0	0	0	0	0	0	0	0	0	2	1	1	2	1	2	2	2	2	2	2	1	1	2	1	1	2	2	2	Jamui,13km
Bhojpur	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	1	2	1	1	2	1	2	2	2	2	Jamui,18km
Sagdaha	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	1	2	1	1	1	1	1	1	Jamui,10km
Bhandra	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	1	2	1	1	1	1	1	1	Jamui,12km
Chancho	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	1	2	2	2	2	2	1	1	1	1	1	1	Jamui,8km
Dabil	2	0	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	1	2	2	2	1	2	2	1	1	2	2	2	Jamui,15km
Durgodih	Uninhabited Village																														Jamui, km
Changodih	1	2	1	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	1	2	2	2	1	2	1	1	1	2	2	2	Jamui,7km
Nariana	1	1	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	1	2	2	2	1	1	1	1	1	1	1	1	Jamui,8km
Jogajhingoal	1	0	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	2	2	2	1	1	2	1	1	1	1	1	Jamui,10km
Jitjhingoi	2	1	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	1	2	2	2	1	1	1	1	1	1	1	1	Jamui,12km
Banpur	1	1	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	1	2	2	2	1	2	1	1	1	1	1	1	Jamui,8km
TOTAL (10km)	1																														
	7	8	1			1	2	1		1	1	Status for Availability and Non-Availability is shown as A (1) & NA (2) respectively																			
	6	6	2	3	0	4	7	4	0	4	4																				

Source-<http://www.censusindia.gov.in/2011census/dchb/DCHB.html>

#### Abbreviations:

**Educational Facilities:** P-Primary School, M-Middle School, SS-Higher Secondary Schools, SSS-Senior Secondary School

**Medical Facilities:** CHC-Community Health Centre, PHC-Primary Health Centre, PHSC-Primary Health Sub-Centre, MCWC-Maternity and Child Welfare Centre, H-Hospital, D-Dispensary, FWC-Family Welfare Centre

**Drinking Water Facilities:** T-Tap Water, W-Well Water, HP-Hand Pump, TW-Tube Well Water, R-River Water, Tk-Tank Water, O-Other Drinking Water Facility, CT-Community Toilet

**Communication & Transport Facilities:** PO-Post Office, SPO-Sub-Post Office, PTO-Post & Telegraph Office, Tel. -Telephone Connection, Mob. -Mobile Phone Coverage, BS-Bus Services, RS-Railways Services

**Approach to Village:** PR-Paved Roads, KR-Kuchha Road, FP-Foot Path

**Power Supply:** ED-Power Supply for Domestic use, E Ag. -Power Supply for Agricultural use, EC- Power supply for Commercial use, EA-Electricity for All Purposes

**Nearest Town & Distance, km :** a for < 5 Km, b for 5-10 Km and c for 10+ km of nearest place where facility is available is given.

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**Brief Description of Places of Religious, Historical or Archaeological Importance and Tourist interest in Villages and Towns of the District:***(District level information only)*

Brief description of place of religious, historical or archaeological and tourist interest are as *Chhatriyakund, Lachhuar* - Well known Jain temple exists here. The place is about 26 km away from Jamui town and Known as birth place of Lord Mahavir.

*Gidheshwar* - It is an important historical place having a Mahadeo temple. It is 12 km away from Jamui town.

*Simultalla*- It is a railhead on the main line of Hawrah-Delhi. It is an important tourist place in the district. This place is also famous for its SimultallaAwasiyaVidyalaya which has been developed in pattern of Netarhat residential school (now in Jharkhand).

**Famous Temples:**

*Jain Mandir Lachhuar* - This is a large Dharmsalawith 65 rooms constructedfor the Jain pilgrims. There is a Mandir of Lord Mahavira inside the dharm sala. The idol in this temple is more than 2,600 years old.

*Jhumrajsthan, Batiya* - There is a temple of Baba jhumraj located in Batiya which is about 50 km from Jamui and 55 km from Deoghar.

*Maa Netula Temple* - This is a temple of Maa Netula Situated at village kumar, block sikandra. It is about 26 km west form the district headquarter jamui Bihar. Millions of devotees come here and pray.

*Bhim Bandh* - It is located between Lakshmipur and Haveli Kharagpur Jungle. Here the visitors find many source of hot water. This is a picnic spot in winter season from October to February.

*Shiv Mandir* - It is situated in Harla jury of Lakshmipur block. It is a temple of lord Shiva in Lakshmipur block. It is about 500m southward from Lakshmipur market.

*Kali Mandir Lakshmipur* -Temple of goddess Kali is situated in Harla jury of Lakshmipur block. A temple of goddess Kali in this block. It is about 600m southward from Lakshmipur main market.



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*Khaira Fort* -This fort was built by Khaira-Jamui Chandel rulers. Another fort of Chandel rulers of Gidhor-Jamui was built at Gidhaur.Both Chandel dynasty was related to each other and split during period of Emperor Jahagir, Mughal Rulers of Delhi.

#### **Social and Cultural Events**

In the district of Jamui, no major social or cultural event has taken place during the decade. However, the district has been famous for fairs and melas held at different places throughout the year. Fairs and festivals are held regularly in the district. There is a brief lull during the two months of rainy season. There are some shopkeepers who keep on moving from fair to fair throughout the year. Some of the fairs held in the district are quite old.

#### **Rehabilitation & Resettlement (R & R)**

Policy to be adopted (Central/State) in respect of the project affected persons including home or land oustees and landless labour.Hence, any planning with respect to Rehabilitation & Resettlement is not applicable.

**4.0 GENERAL**

Identification of all potential environmental impacts due to project is an essential step of Environmental Impact Assessment. In case of mining projects, impacts on biodiversity, air pollution, water pollution, waste management and social issues are significant. Both direct and indirect environmental impacts will be created on various environmental attributes due to proposed mining activity in the surrounding environment, during the operational phase.

The occurrence of sand (minor mineral) deposits, being site specific, their exploitation often does not allow for any choice except adoption of eco-friendly operation. Positive impacts on socio-economic environment are expected due to creation of employment opportunities. Mining activities are normally carried out over a long period which also encourages development in the area such as roads, schools, hospitals etc.

Keeping in mind, the environmental baseline scenario as detailed in Chapter III and the proposed mining activity described in Chapter II, it is attempted to assess the likely impact and its extent on various environmental parameters and likely mitigation measures to be adopted.

The following parameters are of significance in the Environmental Impact Assessment and are being discussed in detail:

1. Land Environment
2. Water Environment
3. Air Environment
4. Noise Environment
5. Biological Environment
6. Socio-Economic Environment
7. Solid Waste
8. Traffic Environment

#### **4.1 LAND ENVIRONMENT**

The proposed extraction of stream bed materials, mining below the existing streambed, and alteration of channel-bed form and shape may lead to several impacts such as erosion of channel bed and banks, increase in channel slope, and change in channel morphology if, the operations are not carried out scientific & systematically.

The mining and allied activities involved due to mining result in creation of temporary haul roads and formation of mined pits, etc. affecting the land use pattern. In this project, silt and clay are also produced as a constituent along with minerals, which are considered to be waste.

##### **Anticipated Impacts:**

- Mining activity will impact river bed topography by formation of excavation voids.
- River bed mining may bring in some change in topography at the nearby area of the mine lease.
- Stacks of solid waste generated from mining activity may hinder the flow of water in monsoon season.

##### **Mitigation measures:**

Adopting suitable, site-specific mitigation measures can reduce the degree of impact of mining on land. Some of the land-related mitigation measures are as follows:

- Excavated pits will get replenished annually in monsoon itself & will be restored to original.
- The mine working will remain confined to allotted river bed only, so it will not disturb any surface area outside the mine lease area which may affect topography or drainage.
- Solid waste will not be stacked on the bank side as it will hinder the flow of water in monsoon season.

## **4.2 WATER ENVIRONMENT**

### **Anticipated Impacts:**

Mining of sand from within or near *river* has an indirect impact on the physico-chemical habitat characteristics during monsoon season. These characteristics include in stream roughness elements, depth, velocity, turbidity, sediment transport and stream discharge.

The detrimental effects, if any, to biota resulting from bed material mining are caused by following:

- Alteration of flow patterns resulting from modification of the *river*
- An excess of suspended sediment during monsoon season.

### **Mitigation measures**

Project activity will be carried out only in the dry part of the Kiul River. Hence, none of the project activities affect the water environment directly. In the project, it is not proposed to divert or truncate any stream in monsoon season only. No proposal is envisaged for pumping of water either from the *River* (in monsoon) or tapping the ground water.

In the lean months, the proposed mining will not expose the base flow of the *River* and hence, there will not be any adverse impact on surface hydrology.

The deposit will be worked from the top surface up to a maximum depth of 3m below ground level or above the ground water table whichever comes first. Hence mining will not affect the ground water regime as well.

Further mining will be completely stopped during the monsoon seasons to allow the excavated area to regain its natural profile.

**4.3 AIR ENVIRONMENT****Impact On Air Quality**

The proposed project includes various activities like development of benches, approach roads, haul roads, excavation and transportation of mineral and waste materials. These operations generally result in generation of dust and thereby pose health hazards. However, it is proposed that adequate control measures will be provided at every stage of operation such as, water sprinkling at loading, unloading points and on haul roads before transportation to reduce the fugitive dust emissions.

The mining is proposed to be carried out by opencast manual method. The air borne particulate matter (PM<sub>10</sub>) generated by ore and waste handling operations, transportation and screening of ore is the main respirable air pollutant. The emissions of Sulphur dioxide (SO<sub>2</sub>), Nitrogen Oxides (NO<sub>2</sub>) contributed by vehicles plying on haul roads will be marginal. Prediction of impacts on air environment has been carried out taking into consideration proposed production and net increase in emissions.

**4.3.1 Emissions Details**

Loading - unloading and transportation of sand material, wind erosion of the exposed area and movement of light vehicles will be the main polluting source in the proposed mining activities releasing Particulate Matter (PM<sub>10</sub>) affecting Ambient Air of the area. Emission during, Loading and unloading was calculated by the area sources. Details of emission during loading/unloading and transportation on the haul road, wind erosion of the exposed area and road maintenance were discussed and combined impact was predicted in the worst case scenario under worst meteorological condition given as follows:

Loading and Unloading - US EPA, 2008, revision of emission factor for AP-42 was used to calculate emission of particulate matter released into the atmosphere during loading and unloading separately. Emission during loading was found more than during unloading. Emission of PM<sub>10</sub> during loading was calculated and found to be  $1.92 \times 10^{-3} \text{ g/s/m}^2$  based on moisture content 10-20% mine. It is assumed that moisture content was 10% and further moisture content will be increased to 10-20% to reduce emission of PM<sub>10</sub> during unloading and average wind

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speed was 0.92 m/s as observed with site data as shown in wind rose and discussion of local meteorology of the area.

Haul Road - US EPA, 2006, revision of emission factor for AP-42 was used to calculate emission of particulate matter released into the atmosphere during transportation of ore and overburden by trucks operated per hour on haul road. Emission of PM<sub>10</sub> due to transportation of sand on haul road was  $1.65 \times 10^{-4}$  g/s/m<sup>2</sup> based on assumption that silt content spread on road surface was 5%, and efficiency of PM<sub>10</sub> emission control 90%. Truck will be fully covered with tarpaulin material and emission of PM<sub>10</sub> during on the haul road will be insignificant.

Based on the above consideration that there was low emission of PM<sub>10</sub> during transportation of ore and overburden, however during loading & unloading, transportation of ore over the haul road, emission of PM<sub>10</sub> of the exposed area due to wind erosion and movement of light vehicles on the road were not considered and combined with mining activities. US EPA based Dispersion ISCST-3 model was used for prediction of impact with 24-h meteorological data of the study period for the assessment of GLC.

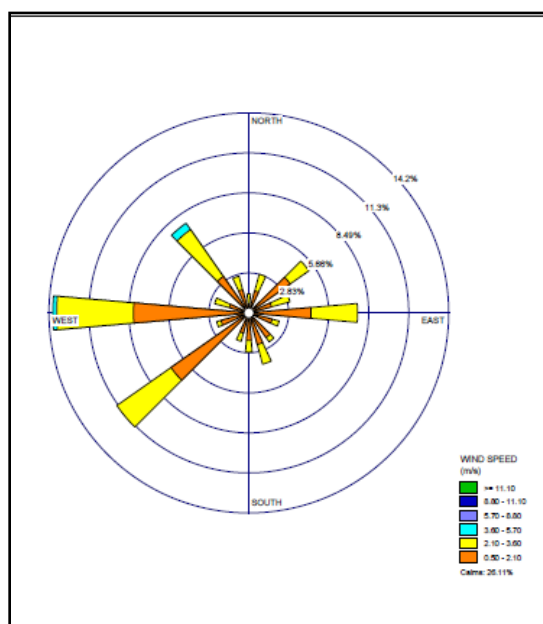
#### **4.3.2 Meteorological Data**

The meteorological data recorded at hourly interval during the month of Dec to feb 2023 on wind speed 0.92 m/s, wind direction, dry & wet bulb temperature, humidity, cloud cover and rainfall was processed to extract hourly mean meteorological data as per the guidelines of CPCB/MoEF for prediction of impacts from the area source. Stability was computed by Turner's method and mixing height was obtained from publication of IMD "Atlas of Hourly Mixing Height in India, 2008.

Data recorded from authorized source/Govt. agency were used as meteorological input for Dispersion Model which was stored in the computer for further analysis and interpretation to study the local meteorology of the study area. It was observed that westerly & north westerly was pre-dominant wind during summer as shown in wind rose (Figure 4.1) with low wind speed and 13.6 % calm condition was observed during study period at the site which was very much close and cumbersome with long term meteorological data of IMD. Average wind speed was

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0.92m/s. Impact of the pollutants was anticipated in southeast sector under influence of northeasterly & westerly winds. Ambient air quality locations were selected based on the long term wind rose pattern of the area. Air quality sampling locations were finalized to study the baseline status around the proposed site and to study impact at various locations. 24-h maximum impact of PM<sub>10</sub> was envisaged in southeast sector at very short distance from the site due to moderate to low wind speed.



**Figure 4.1: Wind Rose Diagram**

Stable atmospheric condition E & F dominates in early morning and night hours and B, C & D in day hours were observed. Pollutants were dispersed from the proposed source under influence of local meteorology and dispersed on the ground in downwind direction close (~100 m) to the source under influence of moderate to low wind speed. High temperature and low humidity were observed at site with high temperature in day hours and low during night. There was no significant rain fall received and sky was clear of clouds in most of the days.

### 4.3.3 Frame work of Computation & Model details

By using the above-mentioned inputs, ground level concentrations due to the mining activities have been estimated to know the incremental rise in ambient air quality and impact in the study



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area. The effect of air pollutants upon receptors are influenced by concentration of pollutants and their dispersion in the atmosphere. Air quality modeling is an important tool for prediction, planning and evaluation of air pollution control activities besides identifying the requirements for emission control to meet the regulatory standards and to apply mitigation measures to reduce impact caused by mining activities.

PM10 was the major pollutant occurred during mining activities. Impact of area source emission was considered and prediction of impact was made on various monitoring locations in the study area due to i) loading and unloading and iii) transportation of vehicles on the haul road in the mining area. Impact was predicted in the worst case scenario due to combined impact of loading and unloading and emission due to transportation of vehicles on mine on haul road of mining area and other mining activities will occur simultaneously.

Impact was predicted over the distance of 10,000 m and 2,000 m around the source in grids of 200m & 20 m respectively in Cartesian coordinates(X,Y) to assess the impact at each receptor separately at the various locations and maximum incremental GLC value at the project site. Maximum impact of PM10 was observed close to the source due to low to moderate wind speeds. Incremental value of PM10 was superimposed on the base line data monitored at the proposed site to predict total GLC of PM10 due to combined impacts.

### **Mitigation measures**

The collection and lifting of minerals will be done by loaders. Therefore, the dust generated is likely to be insignificant as there will be no drilling & blasting. The only air pollution sources are the road transport network of the trucks. The mitigation measures like the following will be resorted:

- ✓ Water sprinkling will be done on the haul roads twice in a day.
- ✓ Deploying PUC certified vehicles to reduce their emissions
- ✓ Proper tuning of vehicles to keep the gas emissions under check
- ✓ Monitoring to ensure compliance with emission limits would be carried out during operation

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- ✓ There is no major source of emissions except emission from combustion of fuels from the Transportation Vehicles and Material Handling.
- ✓ Besides this, to control the emissions further regular preventive maintenance of Equipment / Transportation Vehicles will be carried out on contractual basis.
- ✓ It will be ensured that all transportation vehicles carry a valid PUC certificate.
- ✓ Plantation will be carried out along the approach road, river banks & at all strategic places in the vicinity area.
- ✓ Periodic air quality monitoring will be done to assess the quality and for timely corrective actions.
- ✓ Water sprinkling will be done on the haul roads twice in a day. This will reduce dust emission further.
- ✓ Speed limits will be enforced to reduce airborne fugitive dust from vehicular traffic.
- ✓ Spillage from the trucks will be prevented by covering tarpaulin over the trucks.

#### **4.4 NOISE ENVIRONMENT**

The proposed mining activity is semi-mechanized in nature. No drilling & blasting is envisaged for the mining activity. Hence, the only impact is anticipated is due to movement of vehicles deployed for transportation of minerals.

##### **Anticipated Impacts:**

- Mental disturbance, stress& impaired hearing.
- Decrease in speech reception& communication.
- Distraction and diminished concentration affecting job performance efficiency.

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, Damage risk criteria for hearing loss OSHA regulations**

Maximum allowable duration per day in hour	Sound pressure dB(A)	Remarks
(1)	(2)	(3)
8.0	90	1. For any period of exposure falling in between any figure and lower figure as indicated in column (1), the permissible sound is to be determined by extrapolation or proportionate scale. 2. No exposure in excess of 115 dB (A) is permissible.
6.0	92	
4.0	95	
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 following measures have been envisaged to reduce the impact from the transportation of minerals:

- The vehicles will be maintained in good running condition so that noise will be reduced to minimum possible level.
- In addition, truck drivers will be instructed to make minimum use of horns in the village area and sensitive zones.
- No such machinery is used for mining which will create noise to have ill effects.
- Awareness will be imparted to the workers about the permissible noise levels & maximum exposure to those levels.

### **4.5 BIOLOGICAL ENVIRONMENT**

Mining which leads to the removal of channel substrate, re-suspension of streambed sediment and stockpiling on the streambed, will have ecological impacts. These impacts may have an

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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. Sand mining generates additional traffic, which negatively impairs the environment.

### **Anticipated Impacts:**

#### **Flora**

The proposed project of river bed sand mining shall be carried out on the riverbed of Kiul River. There are no trees in the project area. The project shall also not lead to any change in land use and will be replenished every year after successive rains. The proposed mining activity, which although is an economically gainful activity, also constitutes river training work. It allows for necessary dredging activity which may otherwise lead to flooding of the valley.

There shall be negligible air emissions or effluents from the project site during loading of the truck. This shall be a temporary effect and not anticipated to affect the surrounding vegetation significantly.

#### **Fauna**

Animals are sensitive to noise and avoid human territory. The project stretch of the river is not an identified drinking water point for the animals. However, any animal desirous of accessing the river can continue to do so upstream or downstream of the stretch during the mining activities, as there will not be any damming or diverting of water. Hence, no significant impact is anticipated from the proposed project.

### **Mitigation measures**

As the proposed mining will be carried out in a scientific manner, not much significant impact is anticipated, however, the following mitigation measures will be taken to further minimize it:

#### **Flora**

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Although, the project will not lead to any tree cutting, plantation activities shall be undertaken to improve the vegetation cover of the area. To avoid dust emissions, the mined materials will be covered with tarpaulin during transportation.

### **Fauna**

The workers shall be directed to not venture out of the leased area for collecting fuel wood, or hunting. They shall also be trained not to harm any wildlife. No work shall be carried out after sunset.

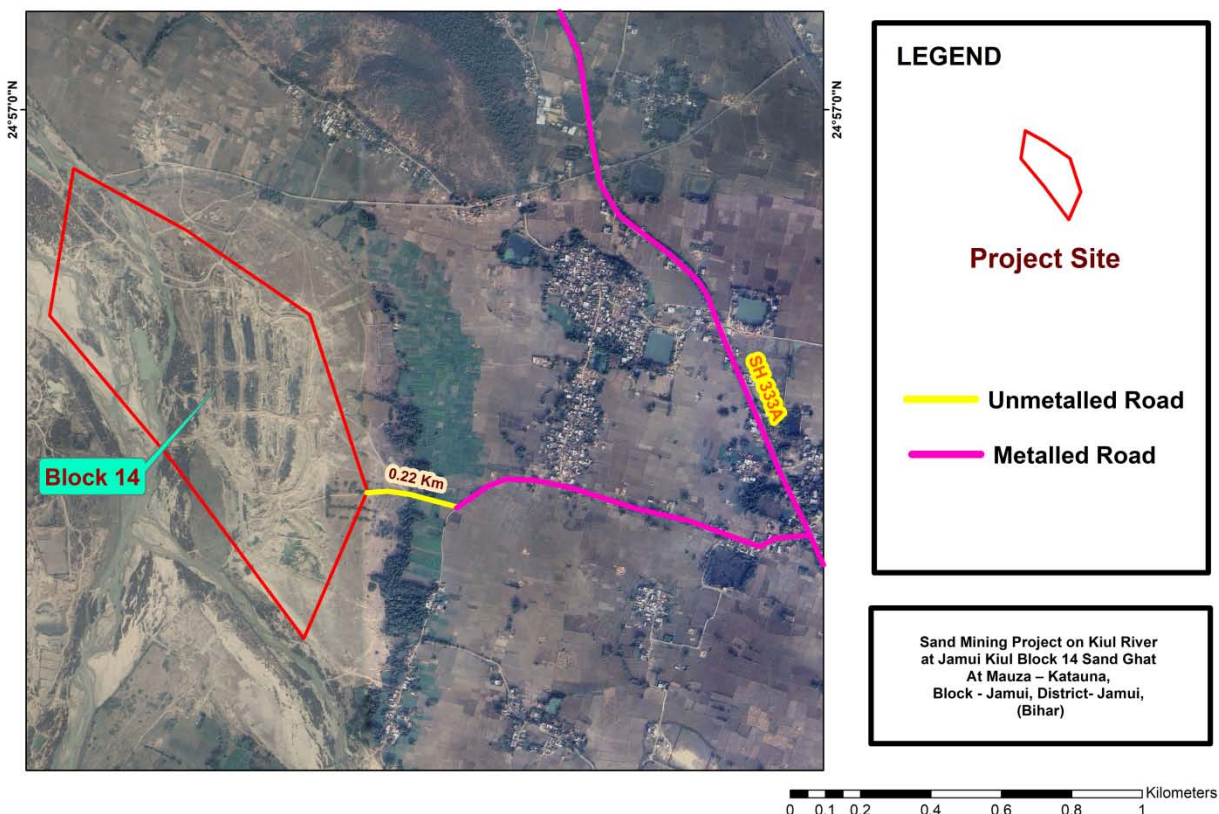
## **4.6 TRAFFIC ANALYSIS**

### **Transportation Route:**

The sand extracted will store the nearby storage point. From there sand will be transported to the market. Sand will be stored in to storage point and from there it will be transported in the night time when traffic load is low on nearest SH or NH.

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### TRANSPORTATION ROUTE MAP



**FIGURE 4.1 MAP SHOWING EVACUATION ROUTE FOR JAMUI KIUL BLOCK 14**

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 Traffic Scenario & LOS for Block 14**

Road	V	C	Existing V/C Ratio	LOS
National Highway (NH 333A)	2400	15000	0.16	A

*Source: Capacity as per IRC: 64-1990*

V= Volume of Vehicles in PCU's/day & C= Capacity of Road in PCU's/day

The existing Level of Service (LOS) is "A" & "B" i.e. excellent & very good.

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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

*Reference: ENVIS Technical Report, IISc, Bangalore.*

During Mine operation for Sand **Block 14**

Proposed Capacity of Mine/annum : 640248 TPA

No. of working days : 250 days

Proposed Capacity of mine/day : 2561

Truck Capacity : 16 tonnes

No. of trucks deployed/day : 160

Increase in PCU/day (160\*3) : 480

**Table 4.2 (ii): Modified Traffic Scenario & LOS**

Road	V	C	Modified V/C Ratio	LOS
National Highway (NH 333A)	2400+480=2880	15000	0.192	A

## Results

From the above analysis it can be seen that the LOS has changed from 0.16 to 0.192 at Highway intersection that is from 'A' to 'A' i.e from 'Excellent' to 'Very Good' respectively. Hence, there will not so much adverse affect on the proposed evacuation roads due to additional traffic. Traffic management has been proposed as given in below

### Traffic Management:

1. Roads will be repaired regularly and maintained in good conditions.
2. Haul roads will be sprinkled with water to keep the dust suppressed.
3. A supervisor will be appointed to regulate the traffic movement near the site.
4. Speed breakers will be constructed near accident prone areas to calm the traffic and its speed.



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### **TRAFFIC MANAGEMENT FOR PROJECTS IN CLUSTER**

**Production Details of Cluster of project(As per DSR):**

<b>S no</b>	<b>Block No</b>	<b>Production Details</b>
1	Jamui Kiul Block 13	388104 TPA
2	Jamui Kiul Block 14	376980 TPA
3	Jamui Kiul Block 15	379452 TPA
Total Production in cluster		<b>11,44,536 TPA</b>

**Table 4.2 (i): Existing Traffic Scenario & LOS for  
Proposed Cluster of Block 13, Block-14 & Block-15**

<b>Road</b>	<b>V</b>	<b>C</b>	<b>Existing V/C Ratio</b>	<b>LOS</b>
National Highway (NH 333A)	2400	15000	0.16	A

*Source: Capacity as per IRC: 64-1990*

V= Volume of Vehicles in PCU's/day & C= Capacity of Road in PCU's/day

The existing Level of Service (LOS) is "A" & "B" i.e. excellent & very good.

<b>V/C</b>	<b>LOS</b>	<b>Performance</b>
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

*Reference: ENVIS Technical Report, IISc, Bangalore.*

During Mine operation for Proposed **Cluster of Jamui Kiul Block 13, Block 14, & Block 15**

Proposed Capacity of Mine/annum : **11,44,536 TPA**

No. of working days : 250 days

Proposed Capacity of mine/day : 4578.14 or say 4579 TPD

Truck Capacity : 16 tonnes

No. of trucks deployed/day : 286.18 or 287

Increase in PCU/day (287\*3) : 861

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**Table 4.2 (ii): Modified Traffic Scenario & LOS**

<b>Road</b>	<b>V</b>	<b>C</b>	<b>Modified V/C Ratio</b>	<b>LOS</b>
National Highway (NH 333A)	2400+861=3261	15000	0.217	B

### **Results**

From the above analysis it can be seen that the LOS has changed from 0.16 to 0.217 at Highway intersection that is from 'A' to 'B' i.e from Excellent' to ' Very Good' respectively, as per classification. Hence, there will not so much adverse affect on the proposed evacuation roads due to additional traffic. Traffic management has been proposed as given below.

### **Traffic Management:**

5. Roads will be repaired regularly and maintained in good conditions.
6. Haul roads will be sprinkled with water to keep the dust suppressed.
7. A supervisor will be appointed to regulate the traffic movement near the site.
8. Speed breakers will be constructed near accident prone areas to calm the traffic and its speed.

\*\*\*\*\*

## **5.0 ANALYSIS OF ALTERNATIVE TECHNOLOGY AND SITE**

### **5.1 Site Alternatives under Consideration**

Presence of sand for commercial exploitation has been identified based on the result of geological investigations and exploration. The mining projects are site specific as such alternate sites were not considered.

### **5.2 Analysis of Alternative Technology**

#### **5.2.1 Choice of Method of Mining**

Factors in the choice of an actual mining method for a given deposit are deposit characteristics, requirement of health and safety and environmental concerns, production, scheduling scope of mechanization, workforce requirements wage rates, replenishment, operating and capital cost estimates. The selection of the mining method (development and extraction) is a key decision to be made in the opening up of a mine.

Surface or open cast mining is used for large, near-surface mineral deposits. Mineral is exploited, loaded into trucks, and hauled to a market.

The opencast mining method will be adopted because of the following reasons:

- The opencast mining operations ensure higher mineral conservation.
- Replenishment

The method used for mining is efficient for sand mining, so no alternative mining method is proposed.

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## **6.0 INTRODUCTION**

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.

## **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.

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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.

## **6.2 MONITORING METHODOLOGIES AND PARAMETERS**

### **Air quality monitoring**

Air Quality monitoring is essential for evaluation of the effectiveness of abatement programmes and to develop appropriate control measures. Suspended Particulate Matter (SPM), Sulphur Dioxide (SO<sub>2</sub>) and Nitrogen Dioxide (NO<sub>2</sub>) will be monitored at the workplace i.e. core zone. The methodology proposed for is shown below:

**Table 6.1, Monitoring methodologies and parameters**

<b>Parameters</b>	<b>Technique</b>	<b>Technical Protocol</b>
PM <sub>10</sub>	Gravimetric method	<b>IS 5182 (Part-XXIII)</b>
Sulphur Dioxide	Improved West and Gaeke	<b>IS-5182 (Part-II)</b>
Nitrogen Dioxide	Modified Jacob & Hochheiser	<b>IS-5182 (Part-VI)</b>

### **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-10500:2012.

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### **Soil quality monitoring**

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

### **Noise level monitoring**

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

- a) To compare sound levels with the values specified in noise regulations
- b) To determine the need and extent of noise control of various noise generating sources

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 at the nearest village for studying the impact due to higher noise levels for taking necessary control measures at the source.

### **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 6.2, Details of monitoring schedule**

<b>S.No.</b>	<b>Description of Parameters</b>	<b>Schedule of Monitoring</b>
<b>1</b>	Air Quality	24 hourly samples twice/Thrice a week in each season except monsoon
<b>2</b>	Water Quality (Surface & Groundwater)	Once a season for 4 seasons in a year
<b>3</b>	Soil Quality	Once in a year in project area

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<b>4</b>	Noise Level	Twice a year for first two years & then once a year
<b>5</b>	Socio-economic Condition	Once in 3 years
<b>6</b>	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.

Implementation of proposed control measures and monitoring programme has an implication on mining site as well as on the surrounding area. Therefore, mine management should strengthen the existing control measures as elaborated earlier in this report and monitor the efficacy of the control measures implemented in the entire study area:

- 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 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 allotment has also been proposed for the same:



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**Table 6.3, Budget for monitoring**

<b>S. No.</b>	<b>Description</b>	<b>Cost to be incurred (in lakhs/annum)</b>
<b>1</b>	Water Quality (Surface & Groundwater)	1.0
<b>2</b>	Soil Quality	0.50
<b>3</b>	Air Quality	1.0
<b>4</b>	Noise Level	0.5
<b>5</b>	Plantation Monitoring	0.5
<b>6</b>	Socio-economic Condition	0.5
<b>TOTAL</b>		<b>4.0</b>

## **6.6 REPORTING SCHEDULES OF THE MONITORING DATA**

It is proposed that voluntary reporting of environmental performance with reference to the EMP should be undertaken. The environmental monitoring cell shall 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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## **7.0 PUBLIC CONSULTATION**

This is Draft EIA report public hearing is yet to be conducted.

## **7.1 HAZARD IDENTIFICATION AND RISK ASSESSMENT METHODOLOGY**

Risk is to expose someone or something to danger, harm or loss. 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:

- ✓ Elimination of hazards.
- ✓ Substitute something safer.
- ✓ Use engineering/design controls.

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- ✓ Use administrative controls such as safe work procedures.
- ✓ Protect the workers i.e. by ensuring competence through supervision and training, etc.

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

### **Step V: Monitor and Review**

Hazard identification, risk assessment and control are an on-going process. Therefore regularly review the effectiveness of your hazard assessment and control measures. 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.

### **A) 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

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

**Table 7.1, Risk Likelihood Table for Guidance**

Step 1: Assess the Likelihood				Step 2: Assess the Consequences		
<b>L1</b>	Happens every time we operate	Almost Certain	Common or repeating occurrence	<b>C1</b>	Fatality	Catastrophic
<b>L2</b>	Happens regularly (often)	Likely	Known to have occurred "has happened"	<b>C2</b>	Permanent disability	Major
<b>L3</b>	Has happened (occasionally)	Possible	Could occur or "heard of it happening"	<b>C3</b>	Medical/hospital or lost time	Moderate
<b>L4</b>	Happens irregularly (almost never)	Unlikely	Not likely to occur	<b>C4</b>	First aid or no lost time	Minor
<b>L5</b>	Improbable (never)	Rare	Practically impossible	<b>C5</b>	No injury	Insignificant

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

**Table 7.2, Qualitative Risk Assessment**

Risk Rank	L1	L2	L3	L4	L5
Likelihood Consequence	Almost certain	Likely	Possible	Unlikely	Rare
<b>C1</b> Catastrophic	1	2	4	7	11
<b>C2</b> Major	3	5	8	12	16
<b>C3</b>	6	9	13	17	20

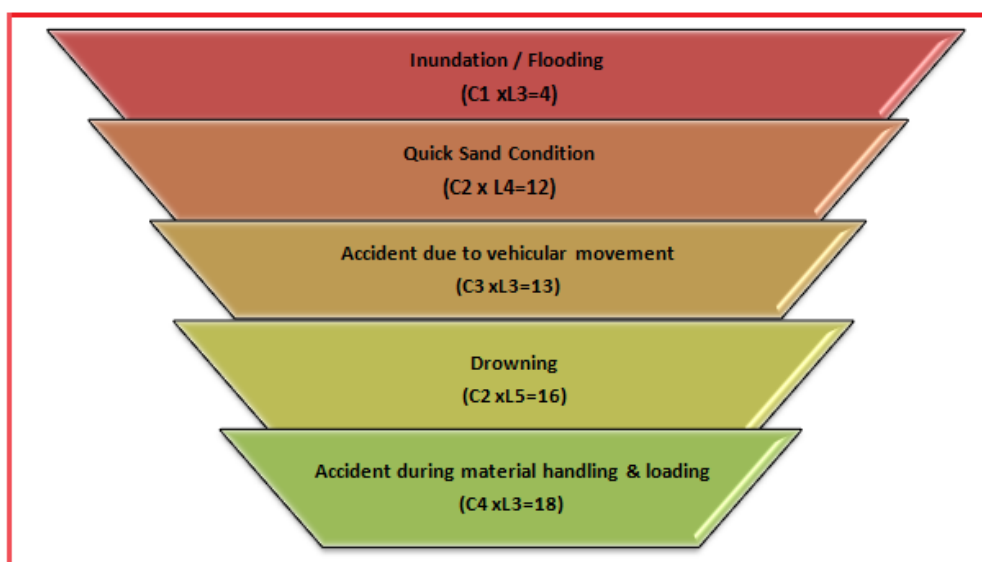
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Moderate					
C4 Minor	10	14	18	21	23
C5 Insignificant	15	19	22	24	25

### RISK RATING:

HIGH RISK 1-6	MEDIUM RISK 7-15	LOW RISK 16-25
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## 7.2 RISK ASSESSMENT



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

The key risk(hazard x probability) event rating associated with sand mining and to assess its consequences of such events occurring and the likelihood based on above Table 7.1 (ii) are as:-

The Risk rating of such hazards is as follows:

### 7.2.1 INUNDATION/FLOODING

The risk rating assigned to this activity is assigned as '4' i.e., it is possible and will have catastrophic with major consequences, if work started without assessment of the *river* condition especially during monsoon season.

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

#### **Measures to prevent consequences of inundation/flooding**

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

1. During monsoon months and heavy rains the mining operations are ceased.
2. There should be mechanism/warning system of heavy rains and discharges from the upstream dams.

#### **7.2.2 Quick Sand Condition**

The risk rating assigned to this activity is assigned as '12' i.e., it is an unlikely event with major consequences as frequency of this risk is less likely to occur.

Two things may create the conditions to form quicksand. Underground water may seep-up and saturate the sand, thereby reducing the friction between the sand grains and giving the sand a liquid nature. Or, sand or another soil may be sifted by the force of an earthquake so that friction is lessened and the earth becomes unsteady.

This creates danger condition to the trucks plying near the *river* and banks for transportation of minerals.

#### **Measures to Prevent Quick Sand Condition**

1. The only way to avoid quick sand condition is by avoiding mineral lifting below water table.
2. Mining will be done in layers rather than going for maximum depth at one time.

#### **7.2.3 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 is less like minor cuts, bodily injury. The possibilities of road accidents are due to reckless or untrained driver or overloading of trucks or in case pathway is not compacted suitably, etc.

#### **Measures to Prevent Accidents during Transportation**

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1. All transportation within the main working should be carried out directly under the supervision and control of the management.
2. The Vehicles will be maintained/repared and checked thoroughly by the competent person.
3. A statutory provision of constant education, training etc. will go a long way in reducing the incidents of such accidents.
4. Overloading will not be permitted and will be covered with tarpaulin.
5. The maximum permissible speed limit will be ensured.
6. The truck drivers will have valid driving license.

#### **7.2.4 DROWNING**

The risk rating assigned to this activity is assigned as ‘16’ i.e., it is a rare accident but will have major consequences, if occurred. This may occur due to flash floods etc due to which the workers at the site may get seriously injured or drowned.

##### **Measure to Prevent Drowning**

1. The mining will be done under strict supervision and only in the dry part of the *river*.
2. Mining will be completely stopped in monsoon season to avoid such accidents.
3. Deep water areas will be identified and ‘No Go Zones’ will be clearly marked and made aware to the mine workers.

#### **7.2.5 ACCIDENT DURING MATERIAL HANDLING & LOADING**

The risk rating assigned to this activity is assigned as ‘18’ i.e. it is possible event with minor consequences”, as frequency of this operation is more but the predicted/assumed intensity is less like minor cuts, abrasion, etc. may be due to bank of *river* collapse, over thrown boulders/pebbles, injuries due to carelessness use of hand tools, etc.

##### **Measures to Prevent Accidents during material handling & loading**

1. The truck should be brought to a lower level so that the loading operation suits to the ergonomic condition of the workers.
2. The loading should be done from one side of the truck only to avoid over throw of materials.
3. The workers should be provided with gloves and safety shoes during loading.



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All the activities will be done under strict supervision/control to avoid anticipated accidents so that the risk is reduced to a level considered **As Low As Reasonably Practicable (ALARP)** conditions which are adequately safe and healthy.

### 7.3 DISASTERS & ITS MANAGEMENT

#### 7.3.1 Anticipated Disaster

- 1. Floods:** Most of the areas of this district are flood prone owing to the presence of seasonal rivers. Rivers and its tributaries cause heavy losses to the human lives, livestock, land and property mainly due to flash floods. Hence no mining has been proposed during monsoon and flood alerts will be given, if any.
- 2. Earth Quake:** Jamui District like other areas of Bihar is moderately vulnerable to earthquake as it exists in Zone IV. However the vulnerability to damage near the site is quite low as there are no built in structures at the site.
- 3. Drought:** due to deficiency in rainfall prime reasons of recurring drought in Bihar is the nature of soil with low mineral and humus-contents besides extremely poor water holding capacity. Recurrent rainfall variability and sustained departure from the normal rainfall vis-a-vis low reliability, fluctuating both surface and underground water resources and extremely poor water holding capacity of the major soil group appear to have clubbed together to cause frequent droughts in Bihar. Besides, there is a positive relationship between reducing forest land and the increasing rainfall variability and the phenomenon is well manifested in Bihar scenario of recurrent droughts.

#### 7.3.2 Disaster Management Plan & Strategy

The Disaster Management Plan has three components:

##### (A) Risk Analysis and Vulnerability Assessment:

The Risk Analysis and Vulnerability Assessment depict the present picture for each disaster-exposure, loss of life, property damage, etc. It also shows geographic distribution of each hazard. The various monitoring facilities, regulatory regimes, countermeasures available for each disaster are identified and listed.

##### (B) Response Plan:

The response plan presents an organizational structure of the District to effectively handle the disaster in a coordinated and quickest possible manner to mitigate the impact of

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disaster. It identifies functional areas such as relief, restoration, communication, information, transport, emergency health services etc and proposes assignments to various departments; including identifying lead and supporting departments. The response plan also lays down preparedness checklists and standing operating procedure (SOP) guidelines.

**(C) Mitigation Strategy:**

The mitigation strategy and plan focus on the long-term planning for impact reduction. It deals with the issues of continued commitment to hazard identification and risk assessment, applied research and technology transfer, investment- incentives for mitigation, and leadership and co-ordination for mitigation.

The mine management will be in regular contact with the District administration to gather information on natural disasters and will pass on the message at the site to avoid any loss of health or wealth due to impending disasters.

Though the responsibility of disaster management is vested with the center and state Governments, it is extremely difficult for them to deal effectively all the aspects of disaster management according to the needs of the affected people.

Thus disaster management plan of the Jamui District has been prepared through incorporation of the features of Community Based Disaster Management and involvement of local governments, Municipalities etc.

## **7.4 SOCIO-ECONOMIC IMPACT OF THE PROJECT & SAFETY MEASURES**

### **INTRODUCTION**

Socio-Economic Impact Assessment (SEIA) refers to systematic analysis of various social and economic characteristics of human being living in a given geographical area during a given period. The geographical area is often called Study Area or Impact Area. SEIA is carried out separately but concurrently with Environment Impact Assessment (EIA). The study area consists of core area where the project is located and a buffer area encircling the project area with a radius of 10 km from the periphery of the core area. For every new project or existing project under expansion or tied for modernization or change in product mix, Socio-economic Impact Assessment is mandatory. The Socio-economic impact assessment focuses the effect of the project on social and economic well-being of the

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community. The impact may be direct or indirect. Further, the impact may be positive or negative.

### **OBJECTIVES OF SEIA**

The prime objective of the current study is to assess the impact of the proposed mining project on socio-economic characteristics of people living in the neighborhoods. Further, it is to be established whether the impending impact would be direct or indirect. Furthermore, it is to be examined whether the said impact would be positive or negative. Lastly, it is to be comprehended if the impact is positive how long it would sustain or if it is negative how soon the same could be eased.

### **SCOPE**

The Scope of the study is as follows:

- a) To collect baseline data of the study area
- b) To comprehend socio-economic status of the people living in the study area.
- c) To assess probable impact of the project on social and economic aspects in the study area.
- d) To measure the impact of the project on Quality of life of the people living in the study area.
- e) To ensure sustainability of positive impact.
- f) To suggest mitigation measures and agency responsible for taking action in case of adverse impact.

### **SOCIO-ECONOMIC IMPACT OF THE PROJECT**

#### ***Impact on Demographic Composition***

The proposed Project will hardly make any difference in the demographic composition of the study area as the additional employment it envisages to create will be met locally to the maximum extent. Hence, the chances of in-migration of people from outside the study area are remote. Accordingly, there will be no variation in the total population of the study area including that of sex ratio, when the mine starts operating.

#### ***Employment Opportunities***

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The proposed Project will provide employment to the local people. The number of workers to be deployed in the mining project will depend upon the quantity of minerals to be extracted from the mine by the lease holder. Both the miners and the unskilled workers will be recruited locally. It has estimated that around 16 people will get employment in this mining project for a period of ten months in a year. It is a positive impact of the project since it is providing employment opportunities to the local people. The project will not affect the vulnerable groups of people.

***Increased supply of sand in the market***

The demand for minerals is ever increasing with the growth of the infrastructure development in our country. Both Government departments and private developers have taken up construction of roads, bridges and buildings in a big way. The requirement for the building materials is always high and there is already an acute shortage of sand in the market and the construction industry is the main sufferer. With the commencement of the proposed mining project the supply of minerals will increase and the gap between demand & supply will decrease to some extent, if not fully.

***Impact on agriculture***

It is non-forest land and the proposed activity is to take place in the bed of the Kiul River. There will be no negative impact on agriculture as no cultivation is taking place on the proposed mining area. Since, scientific mining will be adopted in the proposed mining project the area will be free from annual floods, which destroy standing crops and land & property. This is a positive impact of the proposed mining project.

***Impact on road development***

Movement of trucks and other vehicles to and fro the mining site is expected to increase, when mining will start. The existing roads are connecting the quarry with the national highway connected by metalled followed by un-metalled roads. Hence, there is need for road maintenance and repairing regularly in the mining area. Further, there are risks of accidents during loading of extracted minerals into trucks and transportation to markets for sells. However, accidents can be avoided by taking due care and precautions.

**Income to Government**

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The proposed mining activity will benefit the State in the form of royalty, dead rent, fees and earnings from taxes.

#### ***Impact on Law & Order***

As most of the workers to be employed in the proposed mining project are local residents 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. 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 mining site.

#### ***Impact on Health***

There are no chances of occurring diseases, due to mining. The minerals excavated are non-toxic. To avoid respiratory problem from dust necessary protection should be taken.

#### ***Few safety measures are outlined below:***

- a) **Safe Working Environment:** The project proponent shall ensure health and safety of all the employees at work. Efforts will be made to provide and maintain a safe work environment and ensure that the machinery and equipment in use is safe for employees. Further, it will be ensured that working arrangements are not hazardous to employees.
- b) **Provision of First Aid:** The first aid treatment reflects the hazards associated with the mining of minerals. The first-aiders will be well trained in handling patients working in the Project.
- c) **Regular Health Examination:** For all mine workers regular health examination will be made compulsory. Treatment of serious back injury; existing asthma or respiratory diseases, existing skin diseases, lung function test (pre and post ventolin), Audiograms, Chest X- ray etc. will also be taken care of.
- d) **Health Education:** Adequate health education and information related to the job will be provided to the workers. Baseline health information will be recorded for future references.
- e) **Tie-up with the Nearest Hospital for Medical Assistance:** To meet the medical needs of the mine workers tie-up with nearest hospitals will be made. Efforts will be

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made to reserve few beds in the above hospitals for the workers of the mining project.

This will ensure timely medical aid to the affected persons.

- f) **Supply of Mask and Gloves:** The workers in the Sand mining project are subject to respiratory diseases. For protection from dust it will be made compulsory for all workers to wear masks and gloves, while working in the mine.
- g) **Administration of Anti-venom Injections:** Provision of Anti-venom therapy will be made available for administration to the workers in case of snake, spider and insect bites, while working in the mine.
- h) **Special Telephone Number:** A special telephone number will be made available to the workers in case of emergency so that they can dial the same for–medical assistances. Further, efforts will be made to provide vehicles to the patients in short duration for shifting to a hospital.
- i) **Special Group Insurance Scheme:** All the mine workers will be covered under a Group Insurance Scheme of LIC or any other Insurance company.

## CONCLUSION

The commissioning of the Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar). provides employment to local people who are in search of the same. The granting of environment clearance to make mining of sand legally valid and it will generate revenue for the state. It is expected that prospective entrepreneurs will venture to set up industrial units in the vicinity in the near future making the area a mixed society, dependent on industry, trade and business. With the implementation of the project the occupational pattern of the people in the area will change making more people engaged in mining, industrial and business activities rather in agriculture only. The study area is still lacking in health and educational facilities. It is expected that same will improve to a great extent with opening of the project and associated industrial & business activities.

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## 8.0 GENERAL

Various benefits are envisaged while planning for the mining of sand from Kiul River Bed. Sand is very important minor mineral and is the principal raw material for meeting the huge demand of construction material required in building construction and infrastructure works, road material for construction and maintenance of roads / highway; elastic ballast material for rail tracks in the State of Bihar & and nearby cities and towns of Bihar. The natural available materials in shoal deposits of Kiul River bed quarry site have been found suitable from techno-economic consideration.

## 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 minor mineral sand will provide a good market opportunity.
- c. **Enhancement of green cover:** As a part of reclamation plan, plantation will be carried along the river banks 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 centre, community centre, market place etc, as a part of corporate social responsibility.

## 8.2 SOCIAL BENEFITS

- 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 & and Periodic medical checkups 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.



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**Table-8.1, Budget for Public Health**

S. No.	Activities recommended for communities level services	Tentative cost (Lakh Rs) For Each Mine
1	Awareness campaigns regarding health issues in the nearby villages.	1.0
2	Provide free health checkups & medicines to the nearby villagers of the project site.	1.0
3	Assistance to set up a temporary health center during the lease tenure.	0.50
	<b>Total</b>	<b>2.5</b>

- 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 8.2, Budget for Occupational Health**

Particulars	Recurring Cost per year (Rs.) For Each Mine
For routine checkup	1,00,000
Medical aid as per ESI Scheme	2,00,000
Training	1,00,000
<b>Total</b>	<b>4,00,000</b>

### 8.3 ENVIRONMENTAL BENEFITS

- Protection of banks
- Reducing submergence of adjoining agricultural lands due to flooding.
- Reducing aggradations of river level.
- Protection of crops being cultivated along the bank.
- A check on illegal mining activity.

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#### **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. The following has been proposed considering the needs & demand of the people.

CSR cost will be 2% of the total project cost. This amount will be used for social welfare.

CSR COST is Rs. 5,91,52,000 x 2% = Rs. 11,83,040/-

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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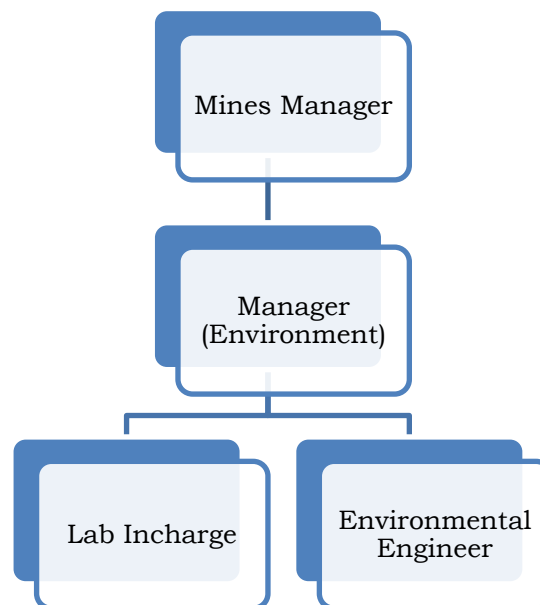
## 9.0 INTRODUCTION

The environmental management must be integrated into the process of mine planning so that ecological balance of the area is maintained and adverse effects are minimized. The Environmental Management Plan (EMP) consists of a set of monitoring programme, mitigation measures, and management control strategies to minimize adverse environmental impacts.

The EMP has therefore been made considering implementation and monitoring of environmental protection measures during and after mining operations. Measures to be taken for each of the impact areas are detailed in the following paras:

## 9.1 ENVIRONMENTAL MANAGEMENT CELL (EMC)

It is imperative to establish an effective organization to implement, maintain, monitor and control the environmental management system. A separate Environmental Management Cell (EMC) will be formed to look after the environment related matter of the mine. The structure of EMC is as follows:



**Figure 9.1 Environment Management Cell**

The EMC will perform the following activities:

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- EMC will oversee that environmental control measures are implemented as per the plan.
- EMC will ensure ambient Field monitoring like air monitoring, meteorological monitoring and noise monitoring in coordination with outside agencies.
- Coordinating the environment related activities within the organization as well as with outside agencies.
- Reporting the status report to the statutory authorities.
- Systematically document and record keeping w.r.t. environmental issues.
- Plantation and their maintenance
- Collection statistics of health of workers and population of surrounding villages.
- Environmental compliance to the regulatory authorities.
- Communication with the concerned department on the environmental issue.
- Monitoring the progress of implementation of environmental management programme.

## **9.2 AIR POLLUTION CONTROL MEASURES**

During the course of sand mining, no toxic substances are released into the atmosphere, so there seems to be no potential threat to health of human beings. In river bed mining activities, dust will be generated during mining, loading and transportation. The only source of fugitive gaseous emission during mining is vehicles which will be used for transportation. The environmental management for air pollution control includes:

- Plantation will be done along the road-sides and also the vacant land present under Gram Panchayat after consultation with local villagers/authority.
- Dust mask provided to the workers engaged at dust generation points like excavations, loading and unloading points.
- 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.
- Utmost care will be taken to prevent spillage of sand and stone from the trucks.

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- Water sprinkling will be done to reduce the emission of dust due to transportation of minerals.
- Overloading will be prevented. The trucks/ tractor trolley will be covered by tarpaulin covers.
- Plantation activities in consultation with village Panchayat along the roads will also reduce the impact of dust in the nearby villages.

### **9.3 WATER POLLUTION CONTROL MEASURES**

During the operational phase of mine no waste water or industrial effluent will be generated. The environmental management for water pollution control includes:

- Water requirements for drinking, plantation and dust suppression will be met by tanker supply on the daily basis.
- Local people will be employed and no permanent housing will be done so no permanent drainage pattern for sewerage system is required as domestic sewage shall be disposed off into septic tank followed by soak pits.
- Mining in the area will be done up to depth of 1.0m maximum from the surface level well above the ground water table, therefore impact on water regime is not anticipated.
- Monitoring of water quality of nearby surface water, ground water and domestic water will be conducted once in every season except monsoon to evaluate the performance of the mitigation measures.

### **9.4 NOISE POLLUTION CONTROL MEASURES**

As there will be no heavy earth moving machinery there will not be any major impact on noise level due to sand mining and other association activities a detailed noise survey has been carried out and results were cross referenced with standards and were found to be well within limits. Blasting technique is not used for sand mining hence no possibility of land vibration. It was found that the proposed mining activity will not have any significant impact on the noise environment of the region. The only impact will be due to transportation of sand and by excavator involve trucks and tractor trolleys.

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- Proper maintenance of all machines is being carried out, which help in reducing generation of noise during operations.
- No other equipments accept the Transportation vehicles and Excavator and Loaders (as and when required) for loading is allowed.
- Noise generated by these equipments is intermittent and does not cause much adverse impact.
- Periodical monitoring of noise will be done to adopt corrective actions wherever needed.
- Plantation will be taken up along the approach roads. The plantation minimizes propagation of noise and also arrests dust.

### **9.5 BIOLOGICAL ENVIRONMENT**

Although, there are no significant adverse impacts from the project, the following measures are proposed to minimize anticipated impacts:

- It will be ensured that no mining activity will be carried out during the monsoon season to minimize impact on aquatic life which is mainly breeding season for many of the species.
- As the mining site has no vegetation, no clearance of vegetation will be done.
- Prior to closure of mining operations / during the rainy season the eroded bank will be restored / reclaimed to minimize negative impacts on aquatic habitats.
- Sprinkling will be done on the haul roads with water to avoid the dust emission, thus avoiding damage to the crops.
- Mining will be carried out on the dry part of the lease area to avoid disturbance to the aquatic habitat and movement of fish species.
- No discard of food, polythene waste etc. will be allowed in the lease area which would distract/attract the wildlife.
- No night time mining will be allowed which may catch the attention of wild life.
- Workers will be made aware of the importance of the wildlife and signage will be displayed at the sensitive areas to caution the workers & other passerby.

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- **Greenery development:** The project will not lead to any tree cutting. However, asocial responsibility, greenery will be developed along the both sides of road and the bank of river. Community services will be deployed in raising these plantations. Trees of economic importance and native origin such as fruit trees shall be planted.
- Approx. 518 trees will be planted around haul road during the plan period.
- The trees proposed for plantation are:
- As per Sustainable Sand Management & Mining Guidelines 2016, minimum 5 plant per hectare will be proposed for development of greenbelt but in this cluster of projects 10 plants per hectare will be proposed for better condition of environment.
- Total Number of plants for cluster of Sand Bloks are given below.

Sand Ghat	Area (Ha)	Plants
Block 14	51.8	51.8*10 Plants= 518 plants
Total Plants		518 plants

**Table 9.1:- List of Plant selected for Green Belt Development**

	Agro-climatic zone & Sub zone	Middle Genetic Plains, North west alluvial sub zone	
S/n	Scientific name	Common Name	Pollution control features
1	<i>Mangifera indica</i>	Aam	Tolerant to Dust control
2	<i>Tectona grandis</i>	Sagon	Tolerant to Dust control
3	<i>Ficus benghalensis</i>	Bargad	Tolerant to Dust control
4	<i>Scigium cumuni</i>	Jamun	To stop river bank erosion
5	<i>Terminalia arjuna</i>	Arjun	To stop river bank erosion
6	<i>Populus ciliate</i>	Popular	Fast growing, broad leaf
7	<i>Ficus religiosa</i>	Peepal	Dust particles absorbance
8	<i>Acacia nilotica</i>	Babul	Tolerant to SO <sub>2</sub>
9	<i>Azadirachta indica</i>	Neem	Tolerant to SO <sub>2</sub>
10	<i>Pithecolibium ducle</i>	Jungle jalebi	Tolerant to SO <sub>2</sub> and Dust control



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## **9.6 LAND USE PLANNING**

Degradation of land is not a very significant adverse impact of riverbed mining due to creation of access roads, mining operations, transportation of mined material. In order to prevent the environmental degradation of leased mine area and its surroundings, the following measures shall be taken;

- Mineral will be mined out after leaving sufficient safety zone from the bank as per sustainable sand mining guidelines-2016 for bank stability.
- The pits from where the material will be picked should not get deeper than 3.0 meter & shall follow the normal channel direction of the river.
- No foreign material shall be allowed to remain/spill in river bed and catchment area, or no pits/pockets will be allowed to be filled with such material.
- The mining is planned in non-monsoon seasons only, so that the excavated area gets replenished during the monsoon each year.
- Pits will get replenished naturally every year after monsoon.

## **9.7 OCCUPATIONAL HEALTH & SAFETY**

Occupational safety and health is very closely related to productivity and good employer-employee relationship. The factor of occupational health in Sand Ghat of Vashishtha Narayan Singh Construction Pvt. Ltd., Vashishtha Narayan Singh S/o- Ramprit Singh Add.- Nupur Fatra, Bazar Samiti, Patna City, Patna (Sand Block 14) is mainly dust. 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:

- Provision of rest shelters for mine workers with amenities like drinking water, portable toilets etc.
- All safety measures like use of safety appliances, such as dust masks, shoes, non breakable goggles as the case may be, shall be ensured. Safety awareness programs, awards, posters, slogans related to safety etc. will be encouraged.

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- Training of employees for use of safety appliances and first aid in vocational training center.
- Regular maintenance and testing of all equipment as per manufacturers' guidelines.
- Periodical Medical Examination (PME) of all workers by a Medical Officer.
- First Aid facility will be provided at the mine site.
- 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.

## **9.8 SOCIO-ECONOMIC ENVIRONMENT**

This project operation will provide livelihood to the poorest section of the society. The overall impact of riverbed mining of sand on the social economics of the area shall be a very positive one, as not only it will generate employment opportunities for local population at mine site for transportation of mined material, etc. It will also give a good boost to the general economy of the area.

The proposed mining activity is expected to provide stimulus to socio-economic activities in the region and thereby accelerate further development processes. However, there is an apprehension that local people may get engaged in illegal activities if the proposed mining operation or the project is shelved or there is inordinate delay in its execution.

## **9.9 ENVIRONMENT POLICY**

Vashishtha Narayan Singh Construction Pvt. Ltd., Vashishtha Narayan Singh S/o- Ramprit Singh Add.- Nupur Fatra, Bazar Samiti, Patna City, Patna (Sand Block 14) of Sand Ghat believes that responsible environmental stewardship comprises diligent application of well-established natural resource management, controls and practices for the protection of the mined out land, preservation of biodiversity and proper disposal of waste if any following the best environmental practices during the process of mining.

Environmental policy prescribed for standard operating process to bring into focus any violation/deviation of the environment and forest norms/conditions that the company operations will implement operational and risk management practices that provide for

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maximum protection of people and the environment. To this end, the owner resolves that company will follow the below mentioned practices:

Operate in accordance with prescribed industry standards while complying with all applicable environmental, health and safety laws and regulations.

- Establish and maintain a well-defined environmental, health and safety management system to guide its operations.
- Ensure that all employees, officers and directors understand and adhere to its environmental, health and safety management program.
- Provide operations with the necessary resources, expertise and training to effectively carry out its EHS management programs.
- Engage employees at all levels in programs directed towards minimizing adverse effects on the environment resulting from mining activity.
- Work proactively with governments and the public in the development of cost effective and realistic regulations that promote enhanced environmental, health and safety protection.
- Promote environmental awareness among its employees, their families and the communities in which it operates.
- Require those who provide services and products to practice good environmental stewardship.
- Mitigate its environmental impacts through efficient use of resources, and the reduction of input materials and waste.
- Maintain a high degree of emergency preparedness.

#### **9.10 BUDGET ALLOCATION FOR EMP IMPLEMENTATION**

Annual budget for EMC is very essential for successful implementation of EMP. Costs will be both Capital and Recurring cost as given below. The fund allocated will not be diverted for any other purposes and the top management will be responsible for this.

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**Table 9.2, Budget of EMP (Block-14)**

<b>Sl. No</b>	<b>Description</b>	<b>Capital Cost (lakh)</b>	<b>Recurring Cost (lakh)</b>
1	Pollution Control & Dust Suppression	Nil	1.5
2	Pollution Monitoring i) Air pollution ii) Water pollution iv) Noise Pollution	--	2.0
3	Plantation and salary for one gardener (part time basis).	5.18	0.5
4	Haul road Maintenance Cost	0.55	1.5
<b>TOTAL</b>		<b>5.73</b>	<b>5.5</b>

Note: \*518 plants \* 1000 Rs (for each plants including hedges and fences) =Rs 518000/-

- Salary of Labour for haul road maintenance 2 labor\*300=600 per day
- 600\* 250= 1,50,000/-
- \* 2.5 lakh per kilometer ( 2,50,000 \*0.22 km haul road) = 55,000/-

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**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)**

## 10.0 INTRODUCTION

### 10.1 Purpose of the Report

Environmental Impact Assessment report is prepared to comply with the Terms of Reference (TOR) received from SEIAA, Bihar under EIA notification of the MoEF&CC dated 14<sup>th</sup> September, 2006 and its subsequent amendment there-off and also the EIA Guidance Manual for Mining of Minerals (Feb, 2010) of MoEF&CC, Govt. of India, for seeking environmental clearance for mining of Sand in the applied mining lease area.

## 10.2 IDENTIFICATION OF PROJECT & PROJECT PROPONENT

### 10.2.1 Identification of Project

The Proposed Sand Mining Project is located on Kiul River at **Jamui Kiul Block 14 Sand Ghat** At Mauza – Katauna, Block -Jamui, District- Jamui, (Bihar).

The proposed mining is a cluster of 03 mining lease area of Jamui Kiul Block 13, Jamui Kiul Block 14 & Jamui Kiul Block 15 over an combined area of 135.3 Ha is for river bed sand mining on Kiul River at Dist- Jamui, Bihar.

**Cluster Situation:** As per District Survey Report Jamui the Proposed Sand Ghats of Jamui Kiul Block 13, Jamui Kiul Block 14 & Jamui Kiul Block 15 are comes in cluster situation whose combined cluster area is 135.3 ha. All the lease area of homogeneous minerals is coming within 500 m radius from each other confirming a cluster situation.

As per the Director of Geology, Bihar, the modification of mining plan has been approved .As per EIA notification 2016 and subsequent amendments, the project is coming under category ‘B’ (B1) and the lease area is more than 5.0 Ha, approved Mining Plan, Pre-feasibility Report and EMP are required for Environment Clearance in respect of the said quarry lease. Copy of letter is enclosed as **Annexure No. II**.

The Details of cluster is given below:

Sand Block Name	Area (Ha)	Production
Jamui Kiul Block 13	69.9	388104 TPA
Jamui Kiul Block 14	51.8	376980 TPA
Jamui Kiul Block 15	17.6	379452 TPA
<b>Total</b>	<b>135.3</b>	<b>11,44,536 TPA</b>

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The proposed project is of River bed sand mining and falls under Category- “B1” as per EIA Notification 2006 and its subsequent amendments by Ministry of Environment Forests & Climate Change, GOI. Jamui Kiul Block 14 Sand Ghat fall in Mauza – Katauna, Block - Jamui Dist - Jamui (Bihar). over an area of 51.80 hectares.

### 10.3 BRIEF DESCRIPTION OF PROJECT

The proposed project is Open Cast Semi-Mechanized Mining of Sand with a proposed cluster production of 640248 Tonnes per annum. The project has been proposed by (Jamui Kiul Block 14 - Vashishtha Narayan Singh Construction Pvt. Ltd., Vashishtha Narayan Singh S/o- Ramprit Singh Add.- Nupur Fatra, Bazar Samiti, Patna City, Patna).

The proposed project is over an area 51.80 ha on Kiul River at Mauza – Katauna, Block - Jamui, District- Jamui (Bihar). As per MoEF, New Delhi Gazette dated 14<sup>th</sup> September 2006 and amended thereof, the proposed mining project is categorized as **Category ‘B-1’**. The estimated project cost for the proposed project is Jamui Kiul Block 14- **Rs- 5,91,52,000/-** (including auction cost).

The proposed mining lease area falls in Survey of India Toposheet 72 L/01, 72 L/04, 72 L/05, 72 L/08.

The mine lease co-ordinates and connectivity details are listed below:

**Table: 10.1 Mine lease Co-ordinates (Jamui Kiul Block 14)**

Pillar No	Latitude (N)	Longitude (E)
A	24°56'24.74"N	86°15'24.16"E
B	24°56'40.72"N	86°15'18.82"E
C	24°56'54.51"N	86°14'56.87"E
D	24°56'40.90"N	86°14'54.81"E
E	24°56'26.67"N	86°15'6.77"E
F	24°56'11.55"N	86°15'18.19"E

The details of environmental setting are given in **Table-10.2**.

**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)**

**Table-10.2: Details of Environmental Setting**

Sr. No.	Particulars	Details		
1	<b>Location</b>			
a	Village	Mauza – Katauna		
b	Tehsil	Block -Jamui		
c	District	Jamui		
d	State	Bihar		
2	Elevation above	Jamui Kiul Block 14 (73.70 mRL -75.40 mRL)		
3	Nearest National Highway/State Highway	SH-18: Approx. 3.90 KM towards West direction. NH-333A: Approx. 1.50 KM towards North direction.		
4	Nearest Railway station	<b>Blocks</b>	<b>Railway Station</b>	<b>Distance (Km) Direction</b>
		Jamui Kiul Block 14	Jamui Railway Station	Jamui Railway Station, approx. 3.40 km towards North direction.
5	Nearest Airport	<b>Blocks</b>	<b>Airport</b>	<b>Distance (Km) Direction</b>
		Jamui Kiul Block 14	JPN International Airport Patna	JPN International Airport Patna, approx. 133.90 km towards NW direction.
6	Ecological Sensitive Areas (Wildlife Sanctuaries)	There is no any Ecological Sensitive Areas Like National Park, Wildlife Sanctuaries, etc are found within 10 km of the study area.		
7	Seismic Zone	Zone- IV <i>Source BMTC 2<sup>nd</sup> edition</i> <a href="https://www.bmtpc.org/disaster%20resistnace%20technolgies /ZONE%20IV.htm">https://www.bmtpc.org/disaster%20resistnace%20technolgies /ZONE%20IV.htm</a>		

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## 10.4 PROJECT DESCRIPTION

### 10.4.1 Salient features of mine lease

The salient features of mine lease are given below:

**Table-10.3: Salient features of mine lease**

Sr. No.	Parameter	Description
1	Name of the Mine	Sand Mining Project On Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block -Jamui, District- Jamui, (Bihar)
2	Mining Capacity	640248 TPA
3	Method of mining	Open cast semi-mechanized mining/OTFM
4	Total ML area	51.80 ha
5	Depth of mining	1 m depth
6	Manpower	29 persons
9	Water Requirement	Jamui Kiul Block 14 – 4.20 KLD
10	Source of Water	Tanker/ Nearby village.

### 10.4.2 Mineral Reserves and production

Mineable reserves have been computed up to 1m depth from surface. The volume multiplied by bulk density (2.09 kg/m<sup>3</sup>) 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 leveled & restored back.

**Table 10.4 Classification Mineral Reserves**

Sand Ghat	Area (Hect)	Geological Reserves (m <sup>3</sup> )	Mineable Reserves (m <sup>3</sup> )	Annual Mineable Permitted Reserve As per LoI (m <sup>3</sup> )
Jamui Kiul Block 14	51.8	518000	493926	310800

In the lease area the river flow being reduced and sediment load get deposited. During flood season, the area gets replenished with sediments and source of erosion at this location. It is a river bed deposit and mined out area shall be replenished each year during monsoon period and depth of quarry shall be filled back by river sand each year and area will restore its original topography.



**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)**

### **10.4.3 Conceptual Plan**

Mine Applied Area will be worked for Jamui Kiul Block 14 Sand Ghat. However, as the digging depth will be restricted to 1.0 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.

### **10.4.4 Method of Mining**

Mining activity will be carried out by open cast semi- mechanized method/OTFM. 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.

## **10.5 AFFORESTATION PROGRAMME**

Topsoil if any would be utilized for intensive plantation and greenbelt development, all along the bank of the river. The details of plantation and number of saplings to be planted are given below. Approx. 564 trees will be planted around haul road during the plan period.

## **10.6 LAND USE PATTERN**

The mine lease area is flat river bed and river banks. There is no forest land or agriculture land in the mine lease area. The entire mining lease lies within River.

**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)**

## **10.7 BASELINE ENVIRONMENTAL STATUS**

### **10.7.1 Soil Quality**

Three soil samples were collected in and around the mine lease area to assess the present soil quality of the region. The pH of the soil indicates that the soil is slightly alkaline in nature. Based on the results, it is evident that the soils are not contaminated by any polluting sources.

### **10.7.2 Meteorology**

Meteorological data at the site was monitored during Dec 2022 to Jan-Feb 2023 representing winter season. It was observed that the during study period, temperature ranged from 11 °C to 31.0 °C.

### **10.7.3 Ambient Air Quality**

Ambient Air Quality Monitoring (AAQM) has been carried out at 08 locations. The Particulate Matter (PM<sub>10</sub>) conc. ranged of 63.5 µg/m<sup>3</sup> to 93.3 µg/m<sup>3</sup>. The Particulate Matter (PM<sub>2.5</sub>) ranged from 34.9 µg/m<sup>3</sup> to 50.7 µg/m<sup>3</sup>. Sulphur dioxide (SO<sub>2</sub>) between 4.3 µg/m<sup>3</sup> to 9.4 µg/m<sup>3</sup>. Oxides of Nitrogen (NO<sub>2</sub>) between 7.8 µg/m<sup>3</sup> to 20.0 µg/m<sup>3</sup>. The results thus obtained indicate that the concentrations of PM<sub>10</sub>, SO<sub>2</sub> and NO<sub>2</sub> in the ambient air are well within the National Ambient Air Quality (NAAQ) standards for Residential and Rural areas.

### **10.7.4 Water quality**

To assess the physical and chemical properties of water in the region, water samples from 03 locations were collected from various water sources around the mine lease area. The pH was varying for ground waters from 7.93 to 8.21. The total dissolved solids are varying from 198 mg/l to 360 mg/l.

The Surface water sampling was taken from 03 locations. The analysis results indicate that the pH ranges between 8.11 to 8.22. Dissolved Oxygen (DO) was observed in the range of 6.8 to 7.0 mg/l against the minimum requirement of 4 mg/l. BOD values were observed to be in the range of 3 to 4 mg/l.

The results indicate groundwater is generally in conformity with the drinking water standards (IS: 10500).

### **10.7.5 Noise Quality**

Noise monitoring reveals that the minimum & maximum noise levels at day time were recorded as 48.6 dB(A) to 54.3 dB(A) respectively. The minimum & maximum noise levels at night time were found to be 38.6 dB (A) & 43.9 dB(A) respectively.

**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)**

### 10.7.6 Ecological Environment

Based on the field studies and review of published literature, There is no any Ecological Sensitive Areas Like National Park, Wildlife Sanctuaries, etc are found within 10 km of the study area.

## 10.8 ANTICIPATED ENVIRONMENTAL IMPACTS

### 10.8.1 Impact on Air Environment

The proposed mining activities loading and movement of other transport vehicles used in mining will generate dust (SPM/RSPM). Proper water sprinkling shall be carried out at the mine site. The mineral will be transported by road through covered tarpaulin trucks/tippers to reduce the fugitive emission caused by the wind.

### 10.8.2 Impact on Water Environment

Mining of sand from within or near river has an indirect impact on the physico-chemical habitat characteristics during monsoon season. These characteristics include in stream roughness elements, depth, velocity, turbidity, sediment transport and stream discharge.

The detrimental effects, if any, to biota resulting from bed material mining are caused by following:

- Alteration of flow patterns resulting from modification of the river
- An excess of suspended sediment during monsoon season.

Project activity will be carried out only in the dry part of the Kiul River. Hence, none of the project activities affect the water environment directly. In the project, it is not proposed to divert or truncate any stream in monsoon season only. No proposal is envisaged for pumping of water either from the *River* (in monsoon) or tapping the ground water.

### 10.8.3 Impact on Water Quality

Analysis results of water samples collected from the buffer zone indicate that the pH, total dissolved solids (TDS) are well below the prescribed limits.

No wastewater generation is envisaged due to the mining operations. The sanitary wastewater will be sent to septic tanks.

**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)**

#### **10.8.4 Impact on Noise Environment**

The proposed mining activity is semi-mechanized/OTFM in nature. No drilling & blasting is envisaged for the mining activity. Hence, the only impact is anticipated is due to movement of vehicles deployed for transportation of minerals. The vehicles will be maintained in good running condition so that noise will be reduced to minimum possible level.

#### **10.8.5 Impact on Land Environment**

The proposed extraction of stream bed materials, mining below the existing streambed, and alteration of channel-bed form and shape may lead to several impacts such as erosion of channel bed and banks, increase in channel slope, and change in channel morphology if, the operations are not carried out systematically.

The systematic and scientific removal of sand will not cause bed degradation. The silt and clay generated as waste will be used for plantation or filling up low lying area elsewhere. The mining is planned in non monsoon seasons only, so that the excavated area gets replenished gradually during the monsoons each year.

#### **10.8.6 Impact on flora and fauna**

As the proposed mining will be carried out in a scientific manner, not much significant impact is anticipated. No mining will be carried out during the monsoon season to minimize impact on aquatic life which is mainly breeding season for many of the species. The mining site has no vegetation; no clearance of vegetation will be done. Haul roads will be sprinkled with water which would reduce the dust emission, thus avoiding damage to the crops.

#### **10.8.7 Impact on Socio - Economic Aspects**

The mine area does not cover any habitation. Hence the mining activity does not involve any displacement of human settlement. No public buildings, places, monuments etc exist within the lease area or in the vicinity. The mining operation will not disturb/ relocate any village or need resettlement. Thus no adverse impact is anticipated. The impact of mining activity in the area is positive on the socio-economic environment of the region. Sand mining will be providing employment to local people whenever there is requirement of manpower.

**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)**

### 10.9 ENVIRONMENTAL MANAGEMENT PLAN

- Extraction will be done from the bed leaving safety zone from bank.
- The maximum working depth will remain above ground water table of the area.
- Provide health facilities to the workers & surrounding people in the impact area to reduce the health impacts.
- Ensuring wildlife protection & arranging awareness campaigns for the same.
- Minimize activities that release fine sediment to the river.
- Effective mitigation measures will be adopted to minimize disturbance during transportation & handling of minerals:
- Establishment of reclamation program with plantation of local/native & fast growing species
- Establishment of restoration plan during the closure of mine at the onset of monsoon season.
- Establishment of effective Disaster Management Plan to take timely precautionary measures to avoid effects of impending disasters.
- Establishment of effective Monitoring Program monitored by Environment Management Cell.

### 10.10 ENVIRONMENTAL MONITORING PROGRAM

**Table 10.5: Post project environmental monitoring**

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)	Once a season for 4 seasons in 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

**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)**

### 10.11 ENVIRONMENTAL PROTECTION COST

The details of the cost to be incurred for successful monitoring of environmental parameters and implementation of control measures are given in **Table-10.6**.

**Table 10.6: Cost of Environmental Protection Measures**

**Table 10.6 (a), Budget of EMP (Jamui Kiul Block 14)**

Sl. No	Description	Capital Cost (lakh)	Recurring Cost (lakh)
1	Pollution Control & Dust Suppression	Nil	1.5
2	Pollution Monitoring i) Air pollution ii) Water pollution iv) Noise Pollution	--	2.0
3	Plantation and salary for one gardener (part time basis).	5.18	0.5
4	Haul road Maintenance Cost	0.55	1.5
<b>TOTAL</b>		<b>5.73</b>	<b>5.5</b>

Note: \*518 plants \* 1000 Rs (for each plants including hedges and fences) =Rs 518000/-

- Salary of Labour for haul road maintenance 2 labor\*300=600 per day
- 600\* 250= 1,50,000/-
- \* 2.5 lakh per kilometer ( 2,50,000 \*0.22 km haul road) = 55,000/-

### 10.12 ADDITIONAL STUDIES

#### 10.12.1 Risk Assessment

The complete mining operation will be carried out under the management control and direction of a qualified mine manager holding. The DGMS have been regularly issuing standing orders, model, standing orders and circulars to be followed by the mine management in case of disaster, if any.

#### 10.12.2 Disaster Management Plan

Emergency preparedness is an important aspect in the planning of Disaster Management. Personnel would be trained suitably and prepared mentally and physically in emergency response through carefully planned, simulated procedures. Similarly, the key personnel and essential personnel shall be trained in the operations.

**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)**

### 10.12.3 Public Consultation

This is a draft EIA report. Public Hearing will be incorporated in FEIA report.

### 10.13 PROJECT BENEFITS

**Physical Benefits:** Road Transport, Market, Enhancement of green cover & Creation of community assets.

**Social Benefits:** Increase in Employment Potential, Contribution to the Exchequer, Increased Health related activities, Educational attainments & Strengthening of existing community facilities.

#### **Environmental Benefits:**

- Controlling river channel and protection of banks.
- Reducing submergence of adjoining agricultural lands due to flooding.
- Reducing aggradation of river level.
- A check on illegal mining activity.

### Corporate Social Responsibility

2% of capital cost of the project cost will be allotted for the Corporate Environmental Responsibility as per OM dated 1<sup>st</sup> May 2018. The following has been proposed considering the needs & demand of the people.

CSR cost will be 2% of the total project cost. This amount will be used for social welfare.

CSR COST is Rs. 5,91,52,000 x 2% = Rs. 11,83,040/-

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.

### 10.14 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;
- Monitoring program will be followed till the mining operations continue.

**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)**

- 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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**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)**

### CONSULTANT

<b>Name of the Consultant</b>	P and M Solution
<b>Address</b>	C-88, Sector 65, Noida -201301 – U.P
<b>Credentials</b>	Accredited by QCI/NABET

Consultant accreditation details are given below:

**Quality Council of India**  
National Accreditation Board for  
Education & Training

**CERTIFICATE OF ACCREDITATION**


**P and M Solution**  
First Floor, C-88, Sector-65, Noida, Uttar Pradesh- 201301

Accredited as Category -A organization under the QCI-NABET Scheme for Accreditation of EIA Consultant Organizations: Version 3 for preparing EIA/EMP reports in the following sectors:

Sl. 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.	Metallurgical industries (ferrous & non-ferrous)	8	3 (a)	B
4.	Highways,	34	7 (f)	A
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 IA AC Minutes dated December 20, 2019 on QCI-NABET website.*

*The Accreditation shall remain in force subject to continued compliance to the terms and conditions mentioned in NABET's letter of accreditation bearing no. QCI/NABET/ENV/ACO/20/1223 dated February 3, 2020. The accreditation needs to be renewed before the expiry date by P and M Solution, Noida following due process of assessment.*

  
 Sr. Director, NABET  
 Dated: February 3, 2020

Certificate No.  
 NABET/EIA/1922/IA0053

Valid till  
 Dec 10, 2022

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

**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)**



**National Accreditation Board for Education and Training**



QCI/NABET/ENV/ACO/23/2698

March 07, 2023

To

**P and M Solution**

C-88, Sector-65 Noida

Noida, UP

Sub.: Extension of Validity of Accreditation till June 06, 2023 – regarding

Ref.. Certificate no. NABET/EIA/1922/IA0053

Dear Sir/Madam

This has reference to the accreditation of your organization under the QCI-NABET EIA Scheme, the validity of **P and M Solution** is hereby extended till June 06, 2023 or completion of the assessment process, whichever is earlier.

The above extension is subject to the submitted documents/required information with respect to your application and timely submission and closure of NC/Obs during the process of assessment.

You are requested not to use this letter after expiry of the above stated date.

With best regards.

(A K Jha)

Sr. Director, NABET

**NABET**

Institute of Town Planners India, 6<sup>th</sup> Floor, 4-A, Ring Road, I.P Estate, New Delhi-110 002, India  
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**Project: Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block - Jamui, District- Jamui, (Bihar)**

**Consultant Contact Details:**

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<b>S No</b>	<b>Name</b>	<b>EC/FAE</b>	<b>DETAILS</b>
1	Pravin Kumar Sinha	EC	EC
2	Pravin Kumar Sinha	FAE	GEO
3	TapanMajumdar	FAE	HG
4	Subhash Kumar	FAE	SC
5	Manoj Kumar Pandey	FAE	EB
6	R K Tiwary	FAE	RH,AP
7	Rahul kumar	FAE	AQ
8	AbhayNath Mishra	FAE	SE
9	HussainZiauddin	FAE	WP
10	PoonamKumariMangalam	FAE	LU
11	Jatinkumarsrivastava	FAE	NV

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# **EXECUTIVE SUMMARY**

## **FOR**

### **SAND MINING PROJECT ON KIUL RIVER AT (JAMUI KIUL BLOCK - 14) SAND GHAT**

**At**

**Mauza – Katauna, Block- Jamui,  
District- Jamui, State – Bihar**

**Area : 51.80 ha.  
Production: 640248 TPA**

### **PROJECT PROPONENT**

**Vashishtha Narayan Singh Construction Pvt. Ltd.,  
Vashishtha Narayan Singh  
S/o- Rampriti Singh  
Add.- Nupur Fatra, Bazar Samiti,  
Patna City, Patna**

### **Environment Consultant**



**P and M Solution  
(Accredited by QCI/NABET)  
Accreditation No. : NABET/EIA/1992/IA0053  
C-88, Sector 65 Noida  
[www.pmsolution.in](http://www.pmsolution.in)**



## EXECUTIVE SUMMARY

### **INTRODUCTION**

As per MoEF & CC, New Delhi Gazette dated 14<sup>th</sup> September 2006 and amended thereof, the proposed mining project is categorized as **Category ‘B1’** project.

### **Jamui Kiul Block 14**

The project has been proposed by Vashishtha Narayan Singh Construction Pvt. Ltd.,(Vashishtha Narayan Singh). The Proposed Sand Mining Project is located on Kiul River at Jamui Kiul Block 14 Sand Ghat At Mauza – Katauna, Block -Jamui, District- Jamui, (Bihar). LOI issued to lessee via letter no 2072 dated 05-12-2022. The Draft EIA report has been prepared according to EIA notification 2006 and its subsequent amendment thereof. TOR of the proposed project has been issued by SEIAA Bihar dated 22-02-2023.

**Cluster Situation:** As per District Survey Report Jamui the Proposed Sand Ghats of Jamui Kiul Block 13, Jamui Kiul Block 14 & Jamui Kiul Block 15 are comes in cluster situation whose combined cluster area is 135.3 ha. All the lease area of homogeneous minerals is coming within 500 m radius from each other confirming a cluster situation.

The Details of cluster is given below:

<b>Sand Block Name</b>	<b>Area (Ha)</b>	<b>Production</b>
Jamui Kiul Block 13	69.9	388104 TPA
Jamui Kiul Block 14	51.8	376980 TPA
Jamui Kiul Block 15	17.6	379452 TPA
<b>Total</b>	<b>135.3</b>	<b>11,44,536 TPA</b>

It has been proposed to mine around 640248 TPA for applied lease. The estimated project cost for the proposed project is **Rs 5,91,52,000/-** (including auction cost)

## **PROJECT DESCRIPTION**

### **LOCATION**

The proposed mining lease area falls in Survey of India Toposheet Topo sheet No- 72 L/01, 72 L/04, 72 L/05, 72 L/08.. The lease area is located in Mauza – Katauna, Block -Jamui, District- Jamui, (Bihar). The mine lease co-ordinates are listed below:

<b>Pillar No</b>	<b>Latitude (N)</b>	<b>Longitude (E)</b>
A	24°56'24.74"N	86°15'24.16"E
B	24°56'40.72"N	86°15'18.82"E
C	24°56'54.51"N	86°14'56.87"E
D	24°56'40.90"N	86°14'54.81"E
E	24°56'26.67"N	86°15'6.77"E
F	24°56'11.55"N	86°15'18.19"E

**Area & production:** The total ML area is 51.80 Ha. Proposed rate of production will be 640248 TPA.

### **Connectivity:**

Sand Ghat is well connected to the nearest metalled road 0.22 km distance from the lease. SH-18: Approx. 3.90 KM towards West direction. NH-333A: Approx. 1.50 KM towards North direction. Jamui Railway Station, approx. 3.40 km towards North direction. Jayprakash Narayan Airport, Patna, approx. 133.90 km towards NW direction.

### **Salient Features of Project**

Name of the applicant	Vashishtha Narayan Singh Construction Pvt. Ltd., Vashishtha Narayan Singh
Address of Lessee	Vashishtha Narayan Singh Construction Pvt. Ltd., Vashishtha Narayan Singh S/o- Ramprit Singh Add.- Nupur Fatra, Bazar Samiti, Patna City, Patna
Name of Mine	Sand Mining Project on Kiul River at Jamui Kiul Block 14 Sand Ghat
Village	Mauza – Katauna
District & State	Jamui, Bihar
Mineral	Sand
Area (ha)	51.80 hectare

## **MINING**

The mining process is opencast semi-mechanized method without drilling & blasting. 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.

The mining will be done in a rotational way. As the working is going to be methodical i.e. mining will be done in benches. There would be no risk to the employee working in the mines.

Mining will be done in layers.

The deposit will be worked from the surface of the bed up to 1 m bgl or above ground water level, whichever comes first. Hence, at no point of time mining will intersect with ground water table. Mining will be done only during the day time and completely stopped during the monsoon season.

## **RESERVE AND PRODUCTION**

Mineable reserves have been computed up to 1m depth from surface. The volume multiplied by bulk density (2.06 kg/m<sup>3</sup>) to get the tonnage.

The bench-wise annual exploitation of sand of is given below:

**Table Summary of minable reserves of Jamui Kiul Block 14 Sand Ghat**

<b>Bench Level (mRL)</b>	<b>Length (m)</b>	<b>Width (m)</b>	<b>Depth (m)</b>	<b>Volume (cum)</b>	<b>Tonnes</b>
75 - 74	1146	431	1	493926	1017488
Total				<b>493926</b>	<b>1017488</b>

Total Mineable Reserve = 493926 CUM or 1017488 Tonnes

It is a river bed deposit and mined out area shall be replenished each year during monsoon period and depth of quarry shall be filled back by river sand each year and area will restore its original topography.

## **SITE FACILITIES AND UTILITIES**

### **Water Supply**

Water will be provided to workers for drinking & domestic purpose. Water will also be required for dust suppression. A total water of 4.20 KLD will be required for the proposed project. Fresh water will be only used for drinking purpose. The water will be supplied from available sources from nearby village.

### **Temporary Rest Shelter**

A temporary rest shelter will be provided for the workers near to the site for rest. In addition, First aid box along with anti-venoms to counteract poison produced by certain species of small insects, if any and sanitation facility i.e. septic tank or community toilet facility will be provided for the workers.

## **BASELINE ENVIRONMENTAL STATUS**

Environmental data has been collected in relation to proposed mining for Air, Noise, Water, Soil, Flora & Fauna. The baseline environment study was carried out over an area with radial distance of 10 km around the mining lease area during winter season from Dec 2022 to Jan-Feb 2023

### **Meteorology**

The Summarized Meteorological Data for the Monitoring Period (Dec 2022 to Jan-Feb 2023) is given below:

<b>Month</b>	<b>Temperature °C</b>		<b>Wind Speed (Km/Hr)</b>	
	<b>Min</b>	<b>Max</b>	<b>Average</b>	<b>Max</b>
DEC 2022	12	26	7.6	12.7
JANUARY 2023	11	25	8.2	13.9
FEBRUARY 2023	14	31	8.8	15.9

**Table Baseline Environmental Status**

<b>Attribute</b>	<b>Baseline status</b>
Ambient Air Quality	Ambient Air Quality Monitoring reveals that the minimum & maximum concentrations of PM <sub>2.5</sub> amongst all the 08 AQ monitoring stations were found to be 34.1 µg/m <sup>3</sup> to 50.8 µg/m <sup>3</sup> respectively; PM <sub>10</sub> was in the range of 62.0 µg/m <sup>3</sup> to 88.5 µg/m <sup>3</sup> As



	far as the gaseous pollutants SO <sub>2</sub> and NO <sub>2</sub> are concerned, the prescribed CPCB limit of 80 µg/m <sup>3</sup> for residential and rural areas has never been surpassed at any station.
Noise Levels	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 locations monitored.
Water Quality	<p>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 IS: 10500.</p> <p>Surface water analysis from River Kiul results it is evident that most of the parameters of the samples comply with 'Category B' standards of CPCB, indicating their suitability for outdoor bathing.</p>
Soil Quality	Samples collected from identified locations indicate the soil is sandy type and the pH value ranging from 7.74 to 8.34, which shows that the soil is slightly alkaline in nature.
Ecology and Biodiversity	There is no Eco-Sensitive Areas in the study area.

## **ANTICIPATED ENVIRONMENTAL IMPACTS**

### **Impact on Air Environment**

The proposed mining activities loading and movement of other transport vehicles used in mining will generate dust (SPM/RSPM). Proper water sprinkling shall be carried out at the mine site. The mineral will be transported by road through covered tarpaulin trucks/tippers to reduce the fugitive emission caused by the wind.

### **Impact on Water Environment**

Mining of sand from within or near *river* has an indirect impact on the physico-chemical habitat characteristics during monsoon season. These characteristics include in stream roughness, elements, depth, velocity, turbidity, sediment transport and stream discharge.

The detrimental effects, if any, to biota resulting from bed material mining are caused by following:

- Alteration of flow patterns resulting from modification of the *river*
- An excess of suspended sediment during monsoon season.

Project activity will be carried out only in the dry part of the Kiul River. Hence, none of the project activities affect the water environment directly. In the project, it is not proposed to divert or truncate any stream in monsoon season only. No proposal is envisaged for pumping of water either from the *River* (in monsoon) or tapping the ground water.

### **Impact on Land Environment**

The proposed extraction of stream bed materials, mining below the existing streambed, and alteration of channel-bed form and shape may lead to several impacts such as erosion of channel bed and banks, increase in channel slope, and change in channel morphology if, the operations are not carried out systematically.

The systematic and scientific removal of sand will not cause bed degradation. The silt and clay generated as waste will be used for plantation or filling up low lying area elsewhere. The mining is planned in non monsoon seasons only, so that the excavated area gets replenished gradually during the monsoons each year.

### **Impact on Noise Environment**

The proposed mining activity is semi-mechanized in nature. No drilling & blasting is envisaged for the mining activity. Hence, the only impact is anticipated is due to movement of vehicles deployed for transportation of minerals. The vehicles will be maintained in good running condition so that noise will be reduced to minimum possible level.

### **Impact on Biological Environment**

As the proposed mining will be carried out in a scientific manner, not much significant impact is anticipated. No mining will be carried out during the monsoon season to minimize impact on aquatic life which is mainly breeding season for many of the species. The mining site has no vegetation; no clearance of vegetation will be done. Haul roads will be sprinkled with water which would reduce the dust emission, thus avoiding damage to the crops.

### **Impact on Socio Economic Environment**

The impact of mining activity in the area is positive on the socio-economic environment of the region. Sand mining will be providing employment to local people whenever there is requirement of manpower.

### **POST PROJECT ENVIRONMENTAL MONITORING**

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

### **ADDITIONAL STUDIES**

#### **Public Hearing**

Public hearing is yet to be conducted.

#### **Risk Assessment**

The complete mining operation will be carried out under the management control and direction of a qualified mine manager holding. The DGMS have been regularly issuing standing orders, model standing orders and circulars to be followed by the mine management in case of disaster, if any. Moreover, mining staff will be sent to refresher courses from time to time to keep them alert.

#### **Disaster Management Plan**

Emergency preparedness is an important aspect in the planning of Disaster Management. Personnel would be trained suitably and prepared mentally and physically in emergency response through

carefully planned, simulated procedures. Similarly, the key personnel and essential personnel shall be trained in the operations.

### **PROJECT BENEFITS**

**Physical Benefits:** Road Transport, Market, Enhancement of green cover & Creation of community assets.

**Social Benefits:** Increase in Employment Potential, Contribution to the Exchequer, Increased Health related activities, Educational attainments & Strengthening of existing community facilities.

#### **Environmental Benefits:**

- Controlling *river* channel and protection of banks.
- Reducing submergence of adjoining agricultural lands due to flooding.
- Reducing aggradation of *river* level.
- A check on illegal mining activity.

### **CORPORATE SOCIAL RESPONSIBILITY**

2% of capital cost of the project cost will be allotted for the Corporate Environmental Responsibility as per OM dated 1<sup>st</sup> May 2018. The following has been proposed considering the needs & demand of the people.

CER cost for **Jamui Kiul Block 14** will be 2% of the total project cost. This amount will be used for social welfare. CSR COST is Rs. 5,91,52,000 x 2% = Rs. 11,83,040/-

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.

#### **❖ PLANTATION:**

- The project will not lead to any tree cutting. However, asocial responsibility, greenery will be developed along the both sides of road and the bank of river. Community services will be deployed in raising these plantations. Trees of economic importance and native origin such as fruit trees shall be planted.
- Approx. 518 trees will be planted around haul road during the plan period.
- The trees proposed for plantation are:

- As per Sustainable Sand Management & Mining Guidelines 2016, minimum 5 plant per hectare will be proposed for development of greenbelt but in this cluster of projects 10 plants per hectare will be proposed for better condition of environment.
- Peepal, Arjun, Jamun, Neem, Mango etc trees will be planted.

### **ENVIRONMENTAL MANAGEMENT PLAN (EMP)**

- Extraction will be done from the bed leaving safety zone from bank.
- The maximum working depth will remain above ground water table of the area.
- Provide health facilities to the workers & surrounding people in the impact area to reduce the health impacts.
- Ensuring wildlife protection & arranging awareness campaigns for the same.
- Minimize activities that release fine sediment to the *river*.
- Effective mitigation measures will be adopted to minimize disturbance during transportation & handling of minerals
- Establishment of reclamation program with plantation of local/native & fast growing species
- Establishment of restoration plan during the closure of mine at the onset of monsoon season.
- Establishment of effective Disaster Management Plan to take timely precautionary measures to avoid effects of impending disasters.
- Establishment of effective Monitoring Program monitored by Environment Management Cell.

### **BUDGET ALLOCATION FOR EMP IMPLEMENTATION**

**Table, Budget of EMP (Jamui Kiul Block 14)**

<b>Sl. No</b>	<b>Description</b>	<b>Capital Cost (lakh)</b>	<b>Recurring Cost (lakh)</b>
1	Pollution Control & Dust Suppression	Nil	1.5
2	Pollution Monitoring i) Air pollution ii) Water pollution iv) Noise Pollution	--	2.0
3	Plantation and salary for one gardener (part time basis).	5.18	0.5

4	Haul road Maintenance Cost	0.55	1.5
<b>TOTAL</b>		<b>5.73</b>	<b>5.5</b>

Note: \*518 plants \* 1000 Rs (for each plants including hedges and fences) =Rs 518000/-

- Salary of Labour for haul road maintenance 2 labor\*300=600 per day
- 600\* 250= 1,50,000/-
- \* 2.5 lakh per kilometer ( 2,50,000 \*0.22 km haul road) = 55,000/-

## **CONCLUSION**

Based on the EIA study it is observed that there will be an increase in the dust pollution, which will be controlled by sprinkling of water and plantation. There will be an insignificant impact on ambient environment and ecology due to the mining activities moreover the mining operation will lead to direct and indirect employment generation in the area. Green belt development around the area will also be taken up as an effective pollution mitigative technique, as well as to control the pollutants released from the premises of the Mine. Monitoring program will be followed till the mining operations continue. Hence, it can be summarized that the development of the mine will have a positive impact on the socio-economic environment of the area and lead to sustainable development of the region.

\*\*\*\*\*

# कार्यकारी सारांश

रेत खनन परियोजना  
(जमुई किउल नदी ब्लॉक 14 रेत घाट)  
के लिए

मौजा- कटौना, ब्लॉक- जमुई,  
जिला- जमुई, बिहार

क्षेत्रफल- 51.80 हेक्टेयर  
उत्पादन: 640248 टन प्रति वर्ष

## आवदेन कर्ता

वशिष्ठ नारायण सिंह कंस्ट्रक्शन प्रा. लिमिटेड  
वशिष्ठ नारायण सिंह पुत्र रामप्रीत सिंह  
पता.- नूपुर फतरा, बाजार समिति,  
पटना सिटी, पटना



एनवायरनमेंट कन्सल्टेंट

पी & एम सल्यूशन



(क्वालिटी कौंसिल ऑफ़ इंडिया द्वारा मान्यता प्राप्त)  
सी-88 सेक्टर 65 नॉएडा उत्तर-प्रदेश

[www.pmsolution.in](http://www.pmsolution.in)

Accreditation No. : NABET/EIA/1992/IA0053

## कार्यकारी सारांश

### ❖ परिचय

MoEF & CC (एमओईएफ एंड सीसी), नई दिल्ली राजपत्र दिनांक 14 सितंबर 2006 और उसमें समय समय पर किये गए संशोधन के अनुसार, प्रस्तावित खनन परियोजना को श्रेणी 'बी1' परियोजना के रूप में वर्गीकृत किया गया है।

### जमुई किउल ब्लॉक 14

परियोजना के प्रस्ताव वशिष्ठ नारायण सिंह कंस्ट्रक्शन प्रा. लिमिटेड (वशिष्ठ नारायण सिंह) ने दिया है। प्रस्तावित रेत खनन परियोजना मौजा- कटौना, ब्लॉक- जमुई, जिला- जमुई (बिहार) में ब्लॉक संख्या - 14 रेत घाट पर किउल नदी पर स्थित है। पत्र संख्या 2072/एम दिनांक 05.12.2022 के माध्यम से पट्टेदार को एलओआई जारी किया गया।

ईआईए अधिसूचना 2006 और इसके बाद के संशोधन के अनुसार ड्राफ्ट ईआईए रिपोर्ट तैयार की गई है। प्रस्तावित परियोजना का टीओआर SEIAA बिहार दिनांक 22.02.2023 द्वारा जारी किया गया है।

❖ **क्लस्टर स्थिति:** जिला सर्वेक्षण रिपोर्ट जमुई के अनुसार जमुई किउल ब्लॉक 13, ब्लॉक 14, और ब्लॉक 15 के प्रस्तावित रेत घाट क्लस्टर स्थिति में आते हैं जिनका संयुक्त क्लस्टर क्षेत्र 135.3 हेक्टेयर है। खनिजों का समस्त पट्टा क्षेत्र एक दूसरे से 500 मीटर के दायरे में आ रहा है जो एक समूह स्थिति की पुष्टि करता है।

**क्लस्टर का विवरण नीचे दिया गया है:**

ब्लॉक का नाम	क्षेत्र (हे),	उत्पादन (टीपीए)
जमुई किउल ब्लॉक 13	69.9	388104
जमुई किउल ब्लॉक 14	51.8	376980
जमुई किउल ब्लॉक 15	17.6	379452
कुल	135.3	11,44,536



आवेदित पट्टे के लिए प्रति वर्ष लगभग 6,40,248 टन खनन प्रस्तावित किया गया है, प्रस्तावित परियोजना के लिए अनुमानित परियोजना लागत 5,91,52,000/- रुपये (नीलामी लागत सहित) है।

## परियोजना विवरण

### स्थिति:

#### जमुई किउल ब्लॉक 14

प्रस्तावित खनन पट्टा क्षेत्र सर्वे ऑफ इंडिया टोपोशीट टोपो शीट संख्या- 72 L/01, 72 L/04, 72 L/05, 72 L/08 के अंतर्गत आता है। पट्टा क्षेत्र मौजा- कटौना, ब्लॉक- जमुई, जिला- जमुई, राज्य- बिहार में स्थित है। खान पट्टा समन्वय नीचे सूचीबद्ध हैं:

स्तंभ	अक्षांश (एन)	देशांतर (ई)
A	24°56'24.74"N	86°15'24.16"E
B	24°56'40.72"N	86°15'18.82"E
C	24°56'54.51"N	86°14'56.87"E
D	24°56'40.90"N	86°14'54.81"E
E	24°56'26.67"N	86°15'6.77"E
F	24°56'11.55"N	86°15'18.19"E

❖ **क्षेत्र और उत्पादन:** कुल क्षेत्रफल 51.80 हेक्टेयर है। उत्पादन की प्रस्तावित दर 640248 टीपीए है।

#### ❖ संयोजकता

रेत घाट पट्टे से 0.22 कि.मी. की दूरी पर निकटतम पक्की सड़क से अच्छी तरह से जुड़ा हुआ है। SH 18 लगभग 3.90 किमी पश्चिम दिशा में है जमुई रेलवे स्टेशन, लगभग 3.40 किमी उत्तर दिशा की ओर है। जयप्रकाश नारायण एयरपोर्ट, पटना लगभग 133.90 किमी उत्तर पश्चिम दिशा की ओर है।

## परियोजना की मुख्य विशेषताएं

आवेदक का नाम	वशिष्ठ नारायण सिंह कंस्ट्रक्शन प्रा. लिमिटेड वशिष्ठ नारायण सिंह
पट्टेदार का पता	वशिष्ठ नारायण सिंह कंस्ट्रक्शन प्रा. लिमिटेड वशिष्ठ नारायण सिंह पुत्र रामप्रीत सिंह पता.- नूपुर फतरा, बाजार समिति, पटना सिटी, पटना
नाम	रेत खनन परियोजना (जमुई किउल नदी ब्लॉक 14 रेत घाट)
गाँव	मौजा - कटौना
जिला और राज्य	जमुई, बिहार
खनिज	रेत
क्षेत्र (हेक्टेयर)	51.80 हेक्टेयर

### ❖ ड्रिलिंग

ड्रिलिंग और ब्लास्टिंग की आवश्यकता नहीं है।

### ❖ खनिज का उपयोग

रेत का उपयोग निर्माण कार्यों में किया जाता है सड़क निर्माण में भी इसका उपयोग किया जाता है

### ❖ खनन

खनन प्रक्रिया ड्रिलिंग और ब्लास्टिंग के बिना खुली अर्ध-मशीनीकृत विधि है। यह एक ओपन कास्ट माइनिंग प्रोजेक्ट है। उत्खनन/जेसीबी ट्रक/ट्रैक्टर संयोजन या मैन्युअल आदि के उपयोग के साथ संचालन अर्ध-मशीनीकृत/ओटीएफएम होगा। रेत को अपने मौजूदा रूप में एकत्र किया जाएगा।

खनन रोटेशनल तरीके से किया जाएगा। चूंकि काम व्यवस्थित होने जा रहा है यानी बेंचों में खनन किया जाएगा। खदान में काम करने वाले कर्मचारी को कोई खतरा नहीं होगा। खनन परतों में किया जाएगा।

निक्षेप को संस्तर की सतह से 01 एमबीजीएल या भूजल स्तर से ऊपर, जो भी पहले आए, तक कार्य किया जाएगा। इसलिए, किसी भी समय खनन भूजल स्तर को नहीं काटेगा। खनन केवल दिन के समय किया जाएगा और मानसून के मौसम में पूरी तरह बंद कर दिया जाएगा।

#### ❖ रिजर्व और उत्पादन

खनन योग्य भंडार की गणना सतह से 1 मीटर की गहराई तक की गई है। टनभार प्राप्त करने के लिए वॉल्यूम को बल्क डेंसिटी (2.06 g/cm<sup>3</sup>) से गुणा किया जाता है।

हर साल मानसून के मौसम के दौरान नदी तल से उत्खनन किए गए खनिजों की फिर से भरपाई (रिप्लेनिशमेंट) हो जाएगा। नदी के पैलियो चैनल से संबंधित क्षेत्र को समतल करके वापस बहाल किया जाएगा।

बैंचवार रेत का वार्षिक दोहन नीचे दिया गया है:

#### ब्लॉक नं: जमुई किउल ब्लॉक 14

बैंच स्तर (mRL)	लंबाई (M)	चौड़ाई (M)	गहराई (M)	मात्रा (घन मीटर)	टन
75 - 74	1146	431	1	493926	1017488
कुल				<b>493926</b>	<b>1017488</b>

कुल खनन योग्य रिजर्व = 493926 घन मीटर या 1017488 टन

यह नदी तल जमा है और खनन क्षेत्र हर साल मानसून अवधि के दौरान फिर से भर जाएगा और खदान की गहराई हर साल नदी की रेत से भर जाएगा (रिप्लेनिशमेंट) और क्षेत्र अपनी मूल स्थलाकृति बहाल को कर देगा।

#### ❖ साइट सुविधाएं और उपयोगिताएँ

##### • जलापूर्ति

श्रमिकों को पीने व घरेलू उपयोग के लिए पानी उपलब्ध कराया जाएगा। धूल के दमन के लिए भी पानी की आवश्यकता होगी। प्रस्तावित परियोजना के लिए 4.20 केएलडी के जल की आवश्यकता होगी। ताजे पानी

का उपयोग केवल पीने के उद्देश्य के लिए किया जाएगा। आसपास के गांव के उपलब्ध स्रोतों से पानी की आपूर्ति की जाएगी।

- **अस्थायी विश्राम गृह**

विश्राम के लिए स्थल के पास श्रमिकों के लिए एक अस्थायी विश्राम आश्रय प्रदान किया जाएगा। इसके अलावा, छोटे कीड़ों की कुछ प्रजातियों द्वारा उत्पादित जहर का मुकाबला करने के लिए एंटी-वेनम के साथ प्राथमिक उपचार बॉक्स, यदि कोई हो और श्रमिकों के लिए स्वच्छता सुविधा जैसे सेप्टिक टैंक या सामुदायिक शौचालय की सुविधा प्रदान की जाएगी।

- **आधारभूत पर्यावरणीय स्थिति**

वायु, ध्वनि, जल, मिट्टी, वनस्पति एवं जीव-जन्तुओं के लिए प्रस्तावित खनन के संबंध में पर्यावरणीय डाटा एकत्र किया गया है। बेसलाइन पर्यावरण अध्ययन दिसंबर 2022 से जनवरी-फरवरी 2023 तक सर्दियों के मौसम के दौरान खनन पट्टा क्षेत्र के आसपास 10 किमी की रेडियल दूरी वाले क्षेत्र में किया गया था।

- **मौसम विज्ञान**

निगरानी अवधि दिसंबर 2022 से जनवरी-फरवरी 2023 के लिए संक्षिप्त मौसम संबंधी डेटा नीचे दिया गया है:

महीना	तापमान °C		हवा की गति (किमी/घंटा)	
	न्यूनतम	अधिकतम	औसतन	अधिकतम
दिसम्बर 2022	12	26	7.6	12.7
जनवरी 2023	11	25	8.2	13.9
फरवरी 2023	14	31	8.8	15.9

### आधारभूत पर्यावरणीय स्थिति

गुण	आधारभूत स्थिति
एम्बिएंट(परिवेशी) वायु गुणवत्ता	एम्बिएंट (परिवेशी) वायु गुणवत्ता निगरानी से पता चलता है कि सभी 08 AQ निगरानी स्टेशनों में PM2.5 की न्यूनतम और अधिकतम सांद्रता क्रमशः 34.1 $\mu\text{g}/\text{m}^3$ से 50.8 $\mu\text{g}/\text{m}^3$ पाई गई; PM10 62.0 $\mu\text{g}/\text{m}^3$ to 88.5 $\mu\text{g}/\text{m}^3$ की सीमा में था जहां तक गैसीय प्रदूषकों SO2 और NO2 का संबंध है, आवासीय और ग्रामीण क्षेत्रों के लिए 80 $\mu\text{g}/\text{m}^3$ की निर्धारित CPCB सीमा किसी भी स्टेशन पर पार नहीं की गई है।
शोर का स्तर	निगरानी कार्यक्रम के परिणामों ने संकेत दिया कि निगरानी किए गए सभी स्थानों पर शोर के दिन और रात दोनों समय एनएएक्यूएस की निर्धारित सीमा के भीतर थे।
पानी की गुणवत्ता	सभी स्रोतों से भूजल पीने के उद्देश्यों के लिए उपयुक्त रहता है क्योंकि सभी घटक IS: 10500 द्वारा प्रख्यापित पेयजल मानकों द्वारा निर्धारित सीमा के भीतर हैं। किउल नदी के सतही जल विश्लेषण के परिणामों से यह स्पष्ट होता है कि नमूनों के अधिकांश पैरामीटर सीपीसीबी के 'श्रेणी बी' मानकों का अनुपालन करते हैं, जो इंगित करता है यह जल स्नान के लिए उपयुक्त हैं।
मिट्टी की गुणवत्ता	चिन्निहित किए गए स्थानों से एकत्र किए गए नमूने इंगित करते हैं कि मिट्टी रेतीली प्रकार की है और पीएच मान 7.74 से 8.34 के बीच है, जो दर्शाता है कि मिट्टी प्रकृति में थोड़ी क्षारीय है।
पारिस्थितिकी और जैव विविधता	अध्ययन क्षेत्र में कोई पर्यावरण-संवेदनशील क्षेत्र नहीं है।
सामाजिक आर्थिक	नदी तल पर रेत खनन परियोजना के कार्यान्वयन से स्थानीय लोगों को प्रत्यक्ष और अप्रत्यक्ष दोनों तरह के रोजगार के अवसर मिलेंगे। अध्ययन क्षेत्र में शिक्षा, स्वास्थ्य, आवास, पानी, बिजली आदि को और बेहतर किया जा सकता है। उम्मीद है कि प्रस्तावित खनन परियोजना और संबद्ध औद्योगिक और व्यावसायिक गतिविधियों के कारण इसमें काफी हद तक और सुधार होगा।

## ❖ अनुमानित पर्यावरणीय प्रभाव

### • वायु पर्यावरण पर प्रभाव

प्रस्तावित खनन गतिविधियां खनन में प्रयुक्त अन्य परिवहन वाहनों की लोडिंग और आवाजाही से धूल (SPM/RSPM) उत्पन्न होगी। खदान स्थल पर उचित जल छिड़काव किया जाएगा। हवा से होने वाले क्षणिक उत्सर्जन को कम करने के लिए खनिज को ढके हुए तिरपाल ट्रकों/टिप्परो के माध्यम से सड़क मार्ग से ले जाया जाएगा।

### • जल पर्यावरण पर प्रभाव

नदी के भीतर या उसके पास से रेत के खनन का मानसून के मौसम के दौरान भौतिक-रासायनिक आवास विशेषताओं पर अप्रत्यक्ष प्रभाव पड़ता है। इन विशेषताओं में धारा खुरदरापन, तत्व, गहराई, वेग, मैलापन, तलछट परिवहन और धारा निर्वहन शामिल हैं।

संस्तर सामग्री खनन से उत्पन्न बायोटा पर हानिकारक प्रभाव, यदि कोई हो, निम्नलिखित के कारण होते हैं:

- नदी के परिवर्तन के परिणामस्वरूप प्रवाह पैटर्न में बदलाव
- मानसून के मौसम में निलम्बित तलछट की अधिकता।

परियोजना गतिविधि केवल किउल नदी के शुष्क भाग में की जाएगी। इसलिए, परियोजना की कोई भी गतिविधि सीधे तौर पर जल पर्यावरण को प्रभावित नहीं करती है। परियोजना में केवल मानसून के मौसम में किसी धारा को मोड़ने या काट देने का प्रस्ताव नहीं है। नदी (मानसून में) या भूजल दोहन से पानी की पंपिंग के लिए किसी प्रस्ताव की परिकल्पना नहीं की गई है।

### ❖ भूमि पर्यावरण पर प्रभाव

स्ट्रीम बेड सामग्री का प्रस्तावित निष्कर्षण, मौजूदा स्ट्रीमबेड के नीचे खनन, और चैनल-बेड फॉर्म और आकार में परिवर्तन से चैनल बेड और बैंकों के क्षरण, चैनल ढलान में वृद्धि, और चैनल आकारिकी में परिवर्तन जैसे कई प्रभाव हो सकते हैं, यदि, संचालन व्यवस्थित रूप से नहीं किया जाता है।

रेत के व्यवस्थित और वैज्ञानिक तरीके से हटाने से क्यारियों का क्षरण नहीं होगा। कचरे के रूप में उत्पन्न गाद और मिट्टी का उपयोग वृक्षारोपण के लिए या निचले इलाकों को कहीं और भरने के लिए किया जाएगा। खनन की योजना गैर-मानसून मौसम में ही बनाई जाती है, ताकि उत्खनित क्षेत्र प्रत्येक वर्ष मानसून के दौरान धीरे-धीरे भर जाए (रिप्लेनिशमेंट)।

### ❖ शोर पर्यावरण पर प्रभाव

प्रस्तावित खनन गतिविधि प्रकृति में अर्ध-मशीनीकृत है। खनन गतिविधि के लिए कोई ड्रिलिंग और ब्लास्टिंग परिकल्पित नहीं है। इसलिए, केवल खनिजों के परिवहन के लिए तैनात वाहनों की आवाजाही के कारण प्रभाव का अनुमान लगाया गया है। वाहनों को अच्छी चालू स्थिति में रखा जाएगा ताकि शोर को न्यूनतम संभव स्तर तक कम किया जा सके।

### ❖ जैविक पर्यावरण पर प्रभाव

चूंकि प्रस्तावित खनन वैज्ञानिक तरीके से किया जाएगा, इसलिए ज्यादा महत्वपूर्ण प्रभाव का अनुमान नहीं है। जलीय जीवन पर प्रभाव को कम करने के लिए मानसून के मौसम के दौरान कोई खनन नहीं किया जाएगा जो कि कई प्रजातियों के लिए मुख्य रूप से प्रजनन का मौसम है। खनन स्थल पर कोई वनस्पति नहीं है; वनस्पति की सफाई नहीं की जाएगी। ढोने वाली सड़कों पर पानी का छिड़काव किया जाएगा जिससे धूल का उत्सर्जन कम होगा और इस प्रकार फसलों को होने वाले नुकसान से बचा जा सकेगा।

### ❖ सामाजिक आर्थिक पर्यावरण पर प्रभाव

क्षेत्र में खनन गतिविधि का प्रभाव क्षेत्र के सामाजिक-आर्थिक वातावरण पर सकारात्मक है। रेत खनन से स्थानीय लोगों को जब भी श्रमबल की आवश्यकता होगी रोजगार उपलब्ध होगा।

### पोस्ट प्रोजेक्ट पर्यावरण निगरानी

क्रम संख्या	पैरामीटर्स का विवरण	निगरानी की अनुसूची
1	हवा की गुणवत्ता	मानसून को छोड़कर प्रत्येक मौसम में सप्ताह में दो

		बार/तीन बार 24 घंटे के नमूने
2	जल गुणवत्ता (सतह और भूजल)	साल में 4 सीजन के लिए एक बार
3	मिट्टी की गुणवत्ता	परियोजना क्षेत्र में वर्ष में एक बार
4	शोर स्तर	साल में दो बार पहले दो साल और फिर साल में एक बार
5	सामाजिक-आर्थिक स्थिति	3 साल में एक बार
6	वृक्षारोपण निगरानी	एक बार एक मौसम में

### ❖ अतिरिक्त अध्ययन

#### • सार्वजनिक सुनवाई

जन सुनवाई अभी बाकी है।

#### ❖ जोखिम आकलन

पूर्ण खनन कार्य एक योग्य खदान प्रबंधक होल्डिंग के प्रबंधन नियंत्रण और निर्देशन में किया जाएगा। डीजीएमएस नियमित रूप से स्थायी आदेश, मॉडल स्थायी आदेश और आपदा, यदि कोई हो, के मामले में खान प्रबंधन द्वारा पालन किए जाने वाले परिपत्र जारी करता रहा है। साथ ही खनन कर्मचारियों को सतर्क रखने के लिए समय-समय पर रिफ्रेशर कोर्स में भेजा जाएगा।

#### ❖ आपदा प्रबंधन योजना

आपदा प्रबंधन की योजना में आपातकालीन तैयारी एक महत्वपूर्ण पहलू है। कर्मिकों को उचित रूप से प्रशिक्षित किया जाएगा और सावधानीपूर्वक नियोजित, सिम्युलेटेड प्रक्रियाओं के माध्यम से आपातकालीन प्रतिक्रिया में मानसिक और शारीरिक रूप से तैयार किया जाएगा। इसी तरह, प्रमुख कर्मियों और आवश्यक कर्मियों को संचालन में प्रशिक्षित किया जाएगा।

#### ❖ परियोजना लाभ



- **भौतिक लाभ:** सड़क परिवहन, बाजार, हरित आवरण में वृद्धि और सामुदायिक संपत्तियों का निर्माण।
- **सामाजिक लाभ:** रोजगार क्षमता में वृद्धि, राजकोष में योगदान, स्वास्थ्य संबंधी गतिविधियों में वृद्धि, शैक्षिक उपलब्धियां और मौजूदा सामुदायिक सुविधाओं का सुदृढीकरण।

#### ❖ पर्यावरणीय लाभ:

- ❖ नदी चैनल को नियंत्रित करना और बैंकों की सुरक्षा करना।
- ❖ बाढ़ के कारण आसपास की कृषि भूमि के डूबने को कम करना।
- ❖ नदी के स्तर के उन्नयन को कम करना।
- ❖ अवैध खनन गतिविधि पर एक जांच।

#### ❖ कॉर्पोरेट की सामाजिक जिम्मेदारी

दिनांक 1 मई 2018 के कार्यालय ज्ञापन के अनुसार परियोजना लागत की पूंजीगत लागत का 2% कॉर्पोरेट पर्यावरणीय उत्तरदायित्व के लिए आवंटित किया जाएगा। लोगों की जरूरतों और मांग को ध्यान में रखते हुए निम्नलिखित प्रस्तावित किया गया है।

जमुई किउल ब्लॉक 14 के लिए सीईआर (CER) लागत कुल परियोजना लागत का 2% होगी। इस राशि का उपयोग समाज कल्याण के लिए किया जाएगा। सीएसआर (CSR) लागत 5,91,52,000/- x 2%= रु. 11,83,040/-

प्रत्येक गतिविधि के लिए प्रस्तावक द्वारा निर्धारित की जाने वाली धनराशि का निर्धारण जन सुनवाई के दौरान स्थानीय प्राधिकारी/लोगों एवं हितग्राहियों से चर्चा के बाद किया जायेगा। सीईआर कार्यक्रम के तहत की जाने वाली गतिविधियों का समवर्ती मूल्यांकन करने की योजना बनाई गई है।

#### ❖ वृक्षारोपण:

- परियोजना से कोई पेड़ नहीं कटेगा। तथापि, असामाजिक उत्तरदायित्व, सड़क के दोनों ओर और नदी के किनारे हरियाली विकसित की जाएगी। इन वृक्षारोपण को बढ़ाने के लिए सामुदायिक सेवाओं को तैनात किया जाएगा। आर्थिक महत्व के पेड़ और देशी मूल के पेड़ जैसे फलों के पेड़ लगाए जाएंगे।
- लगभग योजना अवधि में हॉल रोड के आसपास 518 पौधे रोपे जाएंगे।

- वृक्षारोपण के लिए प्रस्तावित पेड़ हैं:
- सस्टेनेबल सैंड मैनेजमेंट एंड माइनिंग गाइडलाइंस 2016 के अनुसार ग्रीनबेल्ट के विकास के लिए प्रति हेक्टेयर न्यूनतम 5 पौधे प्रस्तावित किए जाएंगे लेकिन पर्यावरण की बेहतर स्थिति के लिए परियोजनाओं के इस समूह में 10 पौधे प्रति हेक्टेयर प्रस्तावित किए जाएंगे।
- पीपल, अर्जुन, जामुन, नीम, आम आदि के पेड़ लगाए जाएंगे।

### **पर्यावरण प्रबंधन योजना (ईएमपी)**

- रिवर बैंक से सुरक्षा क्षेत्र छोड़कर नदी तल से निकासी की जाएगी।
- अधिकतम काम करने की गहराई क्षेत्र के भूजल तालिका के ऊपर रहेगी।
- स्वास्थ्य प्रभावों को कम करने के लिए प्रभाव क्षेत्र में श्रमिकों और आसपास के लोगों को स्वास्थ्य सुविधाएं प्रदान किया जायेगा ।
- वन्यजीव संरक्षण सुनिश्चित करना और उसी के लिए जागरूकता अभियान की व्यवस्था किया जायेगा।
- नदी में महीन तलछट छोड़ने वाली गतिविधियों को किया जायेगा।
- खनिजों के परिवहन और प्रबंधन के दौरान गड़बड़ी को कम करने के लिए प्रभावी शमन उपाय अपनाए जाएंगे
- स्थानीय/देशी और तेजी से बढ़ने वाली प्रजातियों के वृक्षारोपण के साथ सुधार कार्यक्रम की स्थापना किया जायेगा
- मानसून के मौसम की शुरुआत में खान के बंद होने के दौरान बहाली योजना की स्थापना किया जायेगा
- आसन्न आपदाओं के प्रभाव से बचने के लिए समय पर एहतियाती उपाय करने के लिए प्रभावी आपदा प्रबंधन योजना की स्थापना।
- पर्यावरण प्रबंधन प्रकोष्ठ द्वारा प्रभावी निगरानी कार्यक्रम की स्थापना किया जायेगा।

## ❖ ईएमपी कार्यान्वयन के लिए बजट आवंटन

टेबल, ईएमपी का बजट (जमुई किउल ब्लॉक 14)

क्रम संख्या	विवरण	पूंजी लागत (लाख)	आवर्ती लागत (लाख)
1	प्रदूषण नियंत्रण और धूल दमन	Nil	1.5
2	प्रदूषण निगरानी i) वायु प्रदूषण ii) मृदा प्रदूषण iii) जल प्रदूषण iv) ध्वनि प्रदूषण	--	2.0
3	वृक्षारोपण और वेतन एक माली के लिए (अंशकालिक आधार पर)	5.18	0.5
4	परिवहन सड़क रखरखाव लागत	0.55	1.5
<b>कुल</b>		<b>5.73</b>	<b>5.5</b>

नोट: \*518 पौधे \* 1000 रुपये (हेज और बाड़ सहित प्रत्येक पौधे के लिए) = 5,18,000/- रुपये

· दोना सड़क रखरखाव के लिए श्रम का वेतन 2 श्रमिक\*300=600 प्रति दिन

· 600\* 250= 1,50,000/-

· \*2.5 लाख प्रति किलोमीटर (2,50,000\*0.22 किमी लंबी सड़क) = 55,000/-

### निष्कर्ष

ईआईए अध्ययन के आधार पर यह देखा गया है कि धूल प्रदूषण में वृद्धि होगी, जिसे पानी के छिड़काव और वृक्षारोपण द्वारा नियंत्रित किया जाएगा। खनन गतिविधियों के कारण (एम्बिएंट) परिवेशी पर्यावरण और पारिस्थितिकी पर नगण्य प्रभाव पड़ेगा, इसके अलावा खनन संचालन से क्षेत्र में प्रत्यक्ष और अप्रत्यक्ष रोजगार सृजन होगा। क्षेत्र के चारों ओर हरित पट्टी का विकास एक प्रभावी प्रदूषण न्यूनीकरण तकनीक के साथ-साथ खान परिसर से निकलने वाले प्रदूषकों को नियंत्रित करने के लिए भी किया जाएगा। खनन कार्य जारी रहने तक निगरानी कार्यक्रम का पालन किया जाएगा। इसलिए, यह संक्षेप में कहा जा सकता है कि खान के विकास से क्षेत्र के सामाजिक-आर्थिक वातावरण पर सकारात्मक प्रभाव पड़ेगा और क्षेत्र के सतत विकास को बढ़ावा मिलेगा।

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