DRAFT ENVIRONMENTAL IMPACT ASSESSMENT

AND

ENVIRONMENTAL MANAGEMENT PLAN

OF

SAND MINING PROJECT ON ULAI RIVER (ULAI RIVER BLOCK NO.- 03 SAND GHAT) DISTRICT- JAMUI

SAND BLOCK	**BLOCK 03**
PROPOSAL NO	**SIA/BR/MIN/414292/2023**
TOR NO	**SIA/1(a)/2385/2023**
AREA	**9.42 HA**
PRODUCTION	**56520 cum/year or 117561.6 TPA**
LOCATION	**Village –Tola Mahapur, Block- Jhajha, District- Jamui, (Bihar)**

Applicant

Ratan Coal Suppliers Pvt. Ltd.

Prashant Kumar

S/o- Shivratan Prasad

Add.- N.H-02, Nirsa, Dhanbad Jharkhand

PMS
PRESERVING TOMORROW

CONSULTANT

P&M Solution

C-88, Sector 65, Noida -201301 – U.P

A QCI –NABET Accredited Organization

Regional Office: 201, Mangal Market, Raja Bazaar, Patna, 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 14th September, 2006 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 Ulai River at Block No – 03 Sand Ghat at Village – Tola Mahapur, Block- Jhajha , District- Jamui, (Bihar).

The proposed mining was a cluster of 04 mining lease area of Jamui Ulai Block 01, Jamui Ulai Block 02, Jamui Ulai Block 03 & Jamui Ulai Block 04 over an combined area of 44.32 Ha is for river bed sand mining on Ulai River at Mauza- Tola Auria, Mahapur, & Tola Satighat, Block- Jhajha District- Jamui, Bihar.

Cluster Situation: As per District Survey Report Jamui the Proposed Sand Ghats of Jamui Ulai Block 01, Jamui Ulai Block 02, Jamui Ulai Block 03 & Jamui Ulai Block 04 are comes in cluster situation whose combined cluster area is 44.32 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 (As per DSR) given below:

Sand Block name	Area (Ha)	Production(TPA)
Jamui Ulai Block 01	15.5	193440
Jamui Ulai Block 02	14.4	179712
Jamui Ulai Block 03	9.42	117561.6
Jamui Ulai Block 04	5.0	62400

Total	**44.32**	**553113.6 TPA**

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. Ulai Block 03 Sand Ghat fall in Village – Tola Mahapur Block-Jhajha, District- Jamui, (Bihar).

The details of the project are given below:

Name & Address of the Mine	Block 03	Sand Mining Project on Ulai River Block No – 03 Sand Ghat, Village – Tola Mahapur Block- Jhajha, District- Jamui, (Bihar).
River	Ulai	
Mineral	Sand	
Area (ha)	Block 03	9.42 ha
Production	Block 03	56520 cum/year or 117561.6 TPA
Postal Address	Block 03	Ratan Coal Suppliers Pvt. Ltd. Prashant Kumar S/o- Shivratan Prasad Add.- N.H-02, Nirsa, Dhanbad Jharkhand
Status of Mine	Fresh application for Environmental Clearance.	
Project Cost	RS- 61,75,900/-	
CER Cost	CER cost will be 2% of the total project cost. This amount will be used for social welfare. CER COST is Rs. 61,75,900/- x 2% = Rs. 1,23,518/-	

1.2 BRIEF DESCRIPTION OF PROJECT

The proposed project is open cast semi-mechanized/OTFM mining of sand with a proposed production of 117561.6 TPA for applied lease. Detail has been given below:

The proposed project is over an area 9.42 ha. Details are summarized in Table no 1.1

As per MoEF, New Delhi Gazette dated 14th 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

Sand Ghat Block	Area (Ha.)	Khata No.	Khasra No.	Production	Auction Cost(Rs.)
Block 03	9.42	103	1602	117561.6 TPA	46,62,900/-
Total				117561.6 TPA	46,62,900/-

The proposed mining lease area falls in Survey of India Toposheet 72 L/05 & 72 L/06. The mine lease co-ordinates and connectivity details are listed below:

Table: 1.2 Mine lease Pillar Co-ordinates (Block 03)

Pillar	Geo Coordinate	
A	24° 45'6.33"N	86°23'51.94"E
B	24° 44'59.71"N	86°24'4.39"E
C	24° 45'0.92"N	86°24'5.40"E
D	24° 45'11.83"N	86°23'55.77"E
E	24° 45'21.17"N	86°23'53.64"E
F	24° 45'13.24"N	86°23'49.49"E

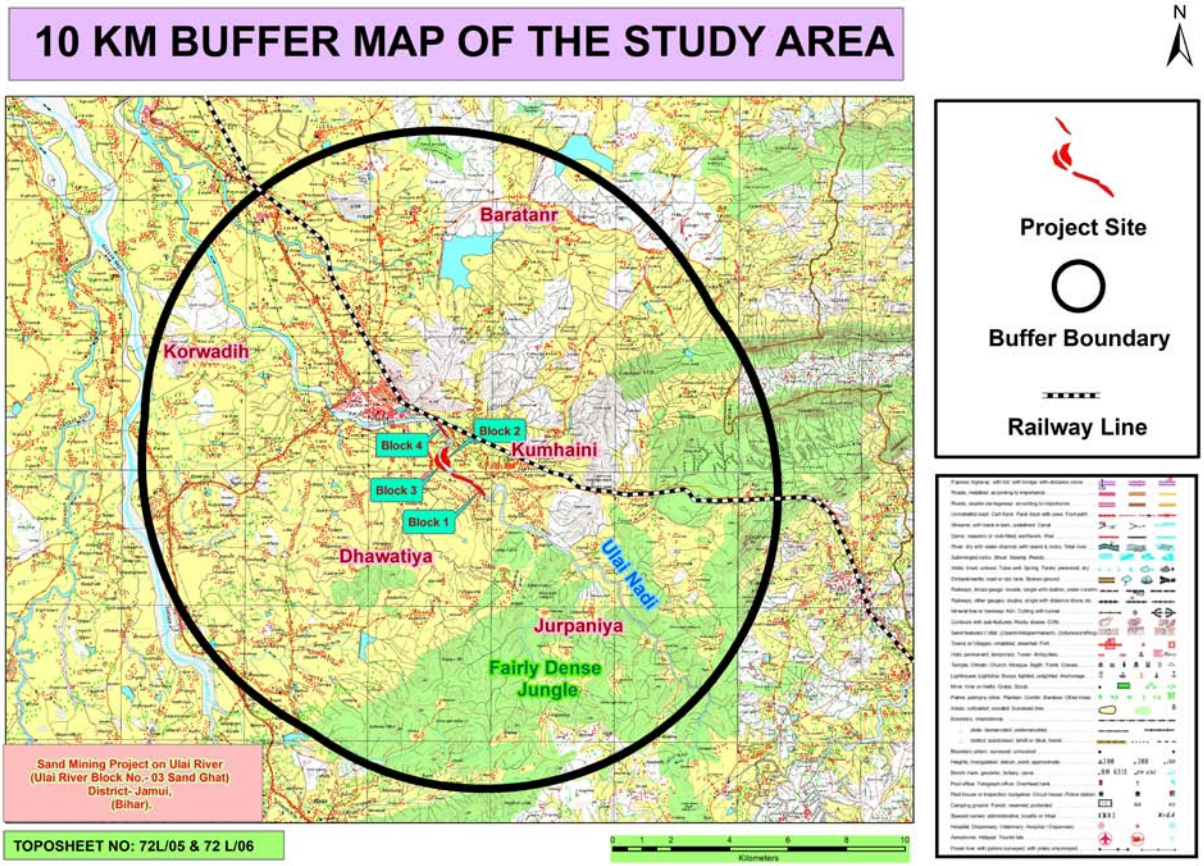

Figure 1.1, 10 km buffer map

Table: 1.3, Connectivity Details given below

Nearest Habitation/ town	**Blocks**	**Village**	**Distance (Km) Direction**
	Block 03	Tola Mahapur Jhajha	approx. 0.35 Km in WSW direction. approx. 2.00 Km in NW direction.
Nearest Railway Station	**Blocks**	**Railway Station**	**Distance (Km) Direction**
	Block 03	Jhajha Railway Station	Jhajha Railway station, approx. 2.20 km towards NW

			direction.
Nearest Airport	**Blocks**	**Airport**	**Distance (Km) Direction**
	Block 03	Deoghar Airport	Deoghar Airport, approx.46.0 km towards SE direction
Nearest Highway	NH-333A: Approx. 0.75 KM towards NE direction.		

1.3 Details of environmental settings

Sl. No.	Particulars	Details
1	Ecological Sensitive Areas (National Park, Wildlife Sanctuaries)	There is no any Ecological Sensitive Areas Like National Park, Wildlife Sanctuaries, etc are found within 10 km of the study area.
2	Nearest water body	The mine site lies on the dry bed of Ulai river.
3	Seismic Zone	Zone- IV *Source BMTC 2nd edition https://www.bmtpc.org/disaster%20resistnace%20technolgies/ZONE%20IV.htm*

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 attached as **Annexure-1.**

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

Table: 1.4 Point wise compliance for TOR of Block -03

(ToR File No- SIA/1(a)/2385/2023)

S. No	TOR	Compliance	Reference in the Report
1	Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to 1994.	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. 2089/khanan dated. 06.12.2022 for Block 03	**Annexure II, LOI**
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- Block 03, 9.42 Hectare Lessee (Block 03): Ratan Coal Suppliers Pvt. Ltd. Prashant Kumar S/o- Shivratan Prasad Add.- N.H-02, Nirsa, Dhanbad Jharkhand.	**Annexure- III** Mine plan All details has been complied in chapter-2

		Waste generation- No waste will be generated. Mining Method-Opencast semi-mechanized method.	
4	All corner coordinates of the mine lease area, superimposed on a High Resolution Imagery /toposheet, topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).	All Corner Coordinates of mining lease area superimposed on Toposheet Map has been incorporated in EIA/EMP Report.	Refer Chapter 2 Fig: 2.1, Corner Coordinates map
5	Information should be provided in Survey of India Toposheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics.	The land use map showing salient features of the area is given in the report. The geological map of the mine lease area is also given in the report showing geomorphology	Land-use of the study area Figure 3.1.
6	Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority.	The Lease area is dry part of River bed. This is a barren land. The mining process will be done by land use policy of the State & no land diversion has been proposed.	Chapter II & III

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 l0 km	The 10 km zone from	Chapter I

	zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc. should be for the life of the mine/lease period.	periphery of the lease has been considered 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 Ulai River. There is no any Wild Life sanctuary & National Park, within the 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	There is no forest land within	---

	Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees.	the lease area.	
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	There is no any Ecological Sensitive Areas Like National Park, Wildlife Sanctuaries, etc are found within 10 km of the study area. 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 l0 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	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

	obtained from the Standing Committee of National Board of Wildlife and copy furnished.		
18	A detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled-I fauna found in the study area, the necessary plan 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,	Proposed project does not come under critically polluted area.	

	clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Dept. Should be secured and furnished to the effect that the proposed mining activities could be considered.		
20	Similarly, for coastal projects ,A CRZ map duly authenticated by one of the authorized agencies demarcating LTL.HTL, CRZ area ,location of the mine lease w.r.t CRZ, Coastal features such as mangroves ,if any should be furnished.(Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority)	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,	There is no R & R involved in this project.	

	integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in the mine lease area will be shifted or not. The issues relating to shifting of village(s) including their R&R and socio-economic aspects should be discussed in the Report.		
22	One season (non-monsoon) [i.e. March-May (Summer Season); October-December (post monsoon 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	Base line study was carried out for winter season Dec 2022 - Feb 2023 Details are provided in EIA/EMP Report. The locations of the monitoring stations were decided on the basis of prevailing meteorological conditions (Wind direction & wind speed) of the study area. 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. The location of the monitoring sites has been shown in map.	Chapter III Section 3.1.2 Air Environment

	in the pre-dominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given.		
23	Air quality modeling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of vehicles for transportation of mineral. The details of the model used and input parameters used for modeling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map.	A detailed study on Air quality modeling will be incorporated at the time of FEIA.	
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 Sand Block 03 is 2.50 KLD for drinking, dust suppression and green belt development. A detailed water balance is being provided in the report.	Chapter –II Section 2.7.4 Water Requirement
25	Necessary clearance from the Competent Authority for drawl of	Water requirement will be fulfilled by private water	Chapter II

	requisite quantity of water for the Project should be provided.	tanker. So, no clearance is required.	
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 & help in recharging of ground water. 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.	
27	Impact of the Project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided".	Mining activity will be done on Dry Bed of River so there is no impact on surface water. Mining will be up to 1 m below ground level or above the ground water table whichever comes first. This will not intersect the ground water table.	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	The mining will be done only upto 1.0 m depth. The detailed impact and	

	may be provided. In case the working will intersect groundwater table, a detailed Hydro Geological Study should be undertaken and Report furnished. The Report inter – alia,shall include details of the aquifers present and impact of mining activities on these aquifers. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished.	control measure w.r.t the quality of water in the surrounding area is discussed under Chapter 4.	
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 Ulai 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	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	Chapter VIII Section 8.2

	executed up front on commencement of the Project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution.	every season for evaluation of success rate. List of Plant species selected for green belt is detailed in the EIA report. The plant species selected for green belt have a greater ecological value and are of good utility value to the local population. The plant species are selected by giving emphasis on local and native species and the species which are tolerant to pollution	
32	Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress	The projection has been done based on the mineral transportation. The details of traffic analysis are discussed in the report.	Chapter IV Section 4.6 Traffic Analysis Fig 4.2, Table 4.3(i), 4.3(ii)

	Guidelines.		
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 Section 2.12.2
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.	Occupational health impact mainly is expected due air pollution due to fugitive dust emission because of movement of vehicles. However appropriate mitigation measures for air pollution control have been given in the report, discussed in Chapter-4. Each labour will undergo pre-placement medical examination. Thereafter periodical heath check up will be arranged as stated in the report.	Chapter VII Section 7.2 Chapter VIII Section 8.3

		About 4.0 lakh for each lease for cluster situation has been earmarked for occupational health.	
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 Section 7.2 Chapter VIII Section 8.3
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 Section 6.4 Chapter VII Section 7.2
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	The detailed environmental management plan to mitigate the environmental impacts has been mentioned in of the EIA/EMP Report.	Chapter VIII

<table>
<tr><td></td><td>specific to the proposed Project</td><td></td><td></td></tr>
<tr><td>39</td><td>Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project.</td><td>This is a draft EIA report. Public hearing is yet to be conducted.</td><td>--</td></tr>
<tr><td>40</td><td>Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.</td><td>No litigation is pending against the project.</td><td></td></tr>
<tr><td>41</td><td>The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.</td><td>The capital cost & recurring cost for has been earmarked for EMP. Chapter IX
<table>
<tr><th>Block</th><th>Capital Cost</th><th>Recurring Cost</th></tr>
<tr><td>Block 03</td><td>1.69 Lakh</td><td>5.5 lakh</td></tr>
</table></td><td>Chapter IX</td></tr>
<tr><td>42</td><td>A Disaster management Plan shall be prepared and included in the EIA/EMP Report".</td><td>A Disaster management Plan has been given in EIA report.</td><td>Chapter VI</td></tr>
<tr><td>43</td><td>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.</td><td>2% of the total cost of the project has been earmarked towards the Enterprise Social Commitment which will be used for the development of</td><td></td></tr>
</table>

		village.	
44	**Besides the above, the below mentioned general points are also to be followed:-**		
a	All documents to be properly referenced with index and continuous page numberings.	All the documents to be properly referenced with index and continuous page numbering.	
b	Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated.	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	This is new case for Mining. No certified compliance is required.	

	Regional Office of Ministry of Environment, Forest and Climate Change, as may be applicable.		
i	The EIA report should also include (i) surface plan of the area indicating contours of main topographic features, drainage and mining area, (ii) geological maps and sections and (iii) sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area.	Compiled With EIA report.	

****

2.0 TYPE OF PROJECT

The project is proposed is for sand Ghat block no-03 for the excavation of sand from the bed of river Ulai. The proposed project is opencast semi-mechanized/OTFM mining project.

2.1 NEED FOR THE PROJECT

The project site lies on Ulai 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 Ulai River at Block No – 03 Sand Ghat at Village – Tola Mahapur, Block- Jhajha , District- Jamui, (Bihar).

The proposed mining was a cluster of 04 mining lease area of Jamui Ulai Block 01, Jamui Ulai Block 02, Jamui Ulai Block 03 & Jamui Ulai Block 04 over an combined area of 44.32 Ha is for river bed sand mining on Ulai River at Mauza- Tola Auria, Tola Mahapur, & Tola Satighat, Block- Jhajha District- Jamui, Bihar.

Cluster Situation: As per District Survey Report Jamui the Proposed Sand Ghats of Jamui Ulai Block 01, Jamui Ulai Block 02, Jamui Ulai Block 03 & Jamui Ulai Block 04 are comes in cluster situation whose combined cluster area is 44.32 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 Ulai Block 01	15.5	193440
Jamui Ulai Block 02	14.4	179712
Jamui Ulai Block 03	9.42	117561.6

Jamui Ulai Block 04	5.0	62400
Total	**44.32**	**553113.6 TPA**

Geo Coordinate of Lease Area:

Table 2.1, Mine lease Pillar Co-ordinates (Block 03)

Pillar	Geo Coordinate	
A	24° 45'6.33"N	86°23'51.94"E
B	24° 44'59.71"N	86°24'4.39"E
C	24° 45'0.92"N	86°24'5.40"E
D	24° 45'11.83"N	86°23'55.77"E
E	24° 45'21.17"N	86°23'53.64"E
F	24° 45'13.24"N	86°23'49.49"E

Block 03 Sand Ghat is well connected by NH-333A: Approx. 0.30 KM towards NE direction.

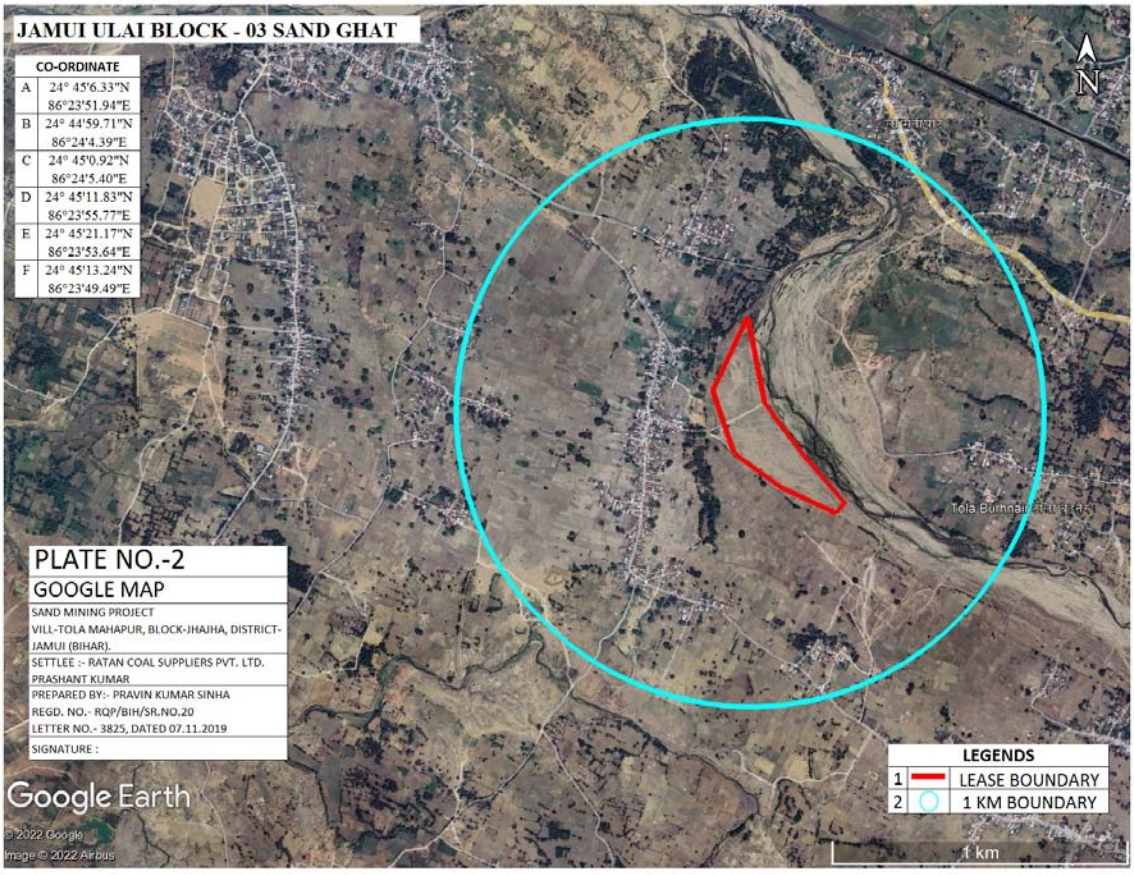

Figure 2.1:- Pillar Coordinate Map of Block 03

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.

Sand Ghat Block	Area (Ha.)	Khata No.	Khasra No.	Production	Auction Cost(Rs.)
Block 03	9.42	103	1602	117561.6 TPA	46,62,900/-
Total				117561.6 TPA	46,62,900/-

As per MoEF, New Delhi Gazette dated 14th 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.

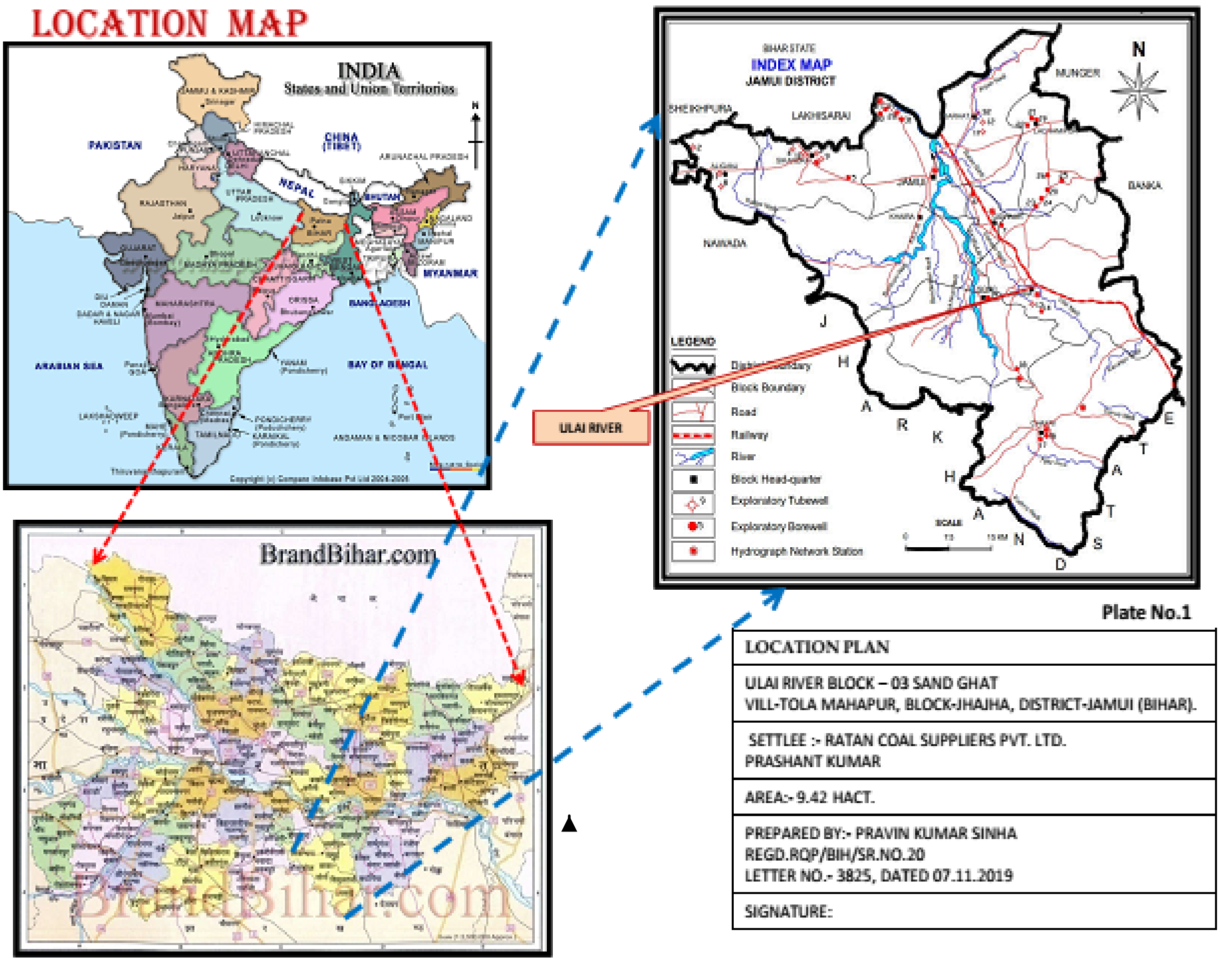

Figure 2.2:- Location map of the project site Block 03

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 Khaira has plain area. Sikandra block is situated in alluvial zone. A sizeable part of the district comprise plains which are paddy-growing lands. Sourthern 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: *http://cgwb.gov.in/district_profile/Bihar/jamui.pdf*

2.3.3 REGIONAL GEOLOGY

Regional Geology

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

Table 2.2. Showing the Geological Succession and their geographic 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
Vindhyans	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

2.3.4 LOCAL GEOLOGY OF THE AREA

The Archaean's are the oldest rock formation in the state. The most predominant rocktype is mainly of gneisses and granitic rocks with lesser amount of schists, quartzites, basicintrusives and pegmatites. They are exposed in Aurangabad, Gaya, Nawada, Jamui, Bhagalpur and Banka districts.

Based on broad geomorphic parameters such as relief, drainage pattern and geology ,Bihar may be divided into three geomorphic domains.

(i) Uplifted block of hilly southern highlands comprising the northern part of the Kodarma-Santhal Pargana planation surface, falling in parts of Bihar, northern fringe or escarpment of Chotanagpur plateau and Rohtas plateau

(ii) The transition zone between the southern highlands and the Great Ganga Plains,constituting the central Bihar Plains, and

(iii) The Ganga foredeep of the North Bihar Plains bounded by the rising Himalaya in the north and the Ganga R. in the South

Kiul River is a tributary of Ganges and Barnar sub tributaries river of kiul in the district of Jamui. Total length of the river is 52 km in the district and originates from Tola Jogia. 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 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 Lakhisari 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 course 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 42^0C, while in winter season it drops to as low as 2^0C.

Source *http://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.

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

Table-2.3:- Proved Mineral Reserves Block 03

Classification	Code	Quantity of Sand
A)Mineral Reserves		Cum
1)Proved Mineral Reserve	111	94200
Total		**94200**

Total Geological Reserve = 94200 cum. or 195936 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 (2.08 kg/m3) 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 paleo channels of the river will be leveled & restored back.

Table-2.4:- Summary of minable reserves of Jamui Ulai Block 03 Sand Ghat as below (the bulk density multiply by 2.08 kg/m3)

Jamui Ulai Block 03 Sand Ghat

Level (mRL)	Length (m)	Width (m)	Depth (m)	Volume (cum)	Tonnes
136 - 135	614	134	1	82276	171134
Total				82276	171134

Total Mineable Reserve = **82276 CUM or 171134 Tonnes.**

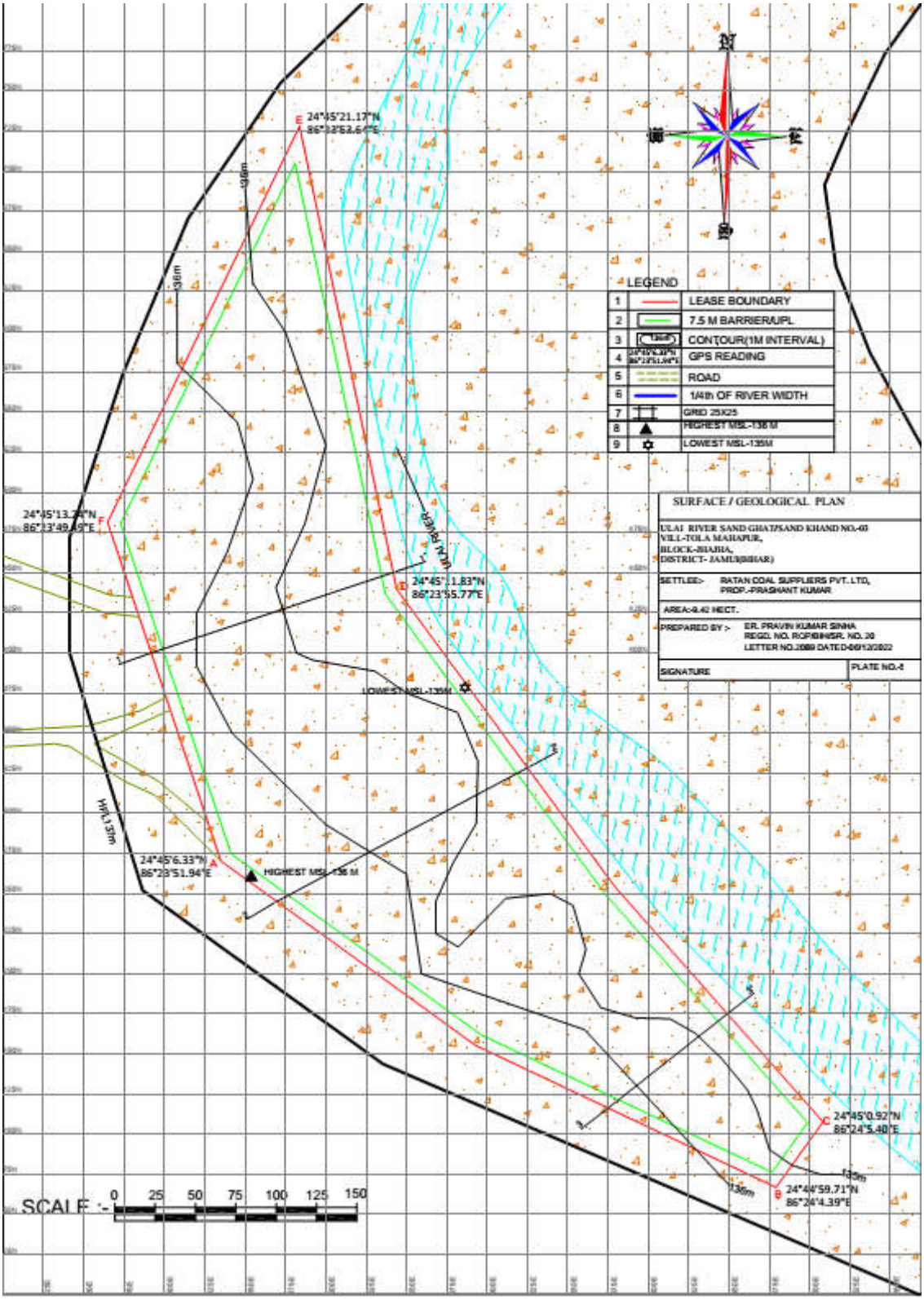

Figure 2.3:- Surface cum Geological Section of Block 03

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.
- 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.
- 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 Ulai Block 03 Sand Ghat are given below :-

Table 2.4: Year wise Production Details of Sand Ghat 03

YEAR	ROM sand (cum)
1st Year	56520
2nd Year	56520
3rd Year	56520
4th Year	56520
5th Year	56520
Total	**2,82,600**

The annual extractable RBM comes to **56520 CUM or 117561.6 Tonnes**. It will be replenished after rainy season every year.

Source: Mining Plan

2.5 Conceptual Mining Plan

Mine Applied Area will be worked for Jamui Ulai Block 03 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.

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

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 waste as such will be generated at the site as all materials are saleable. If, at all silt clay will be generated along with the minerals will be used to dispose off in the low lying areas as spread, where plantation will be done after spreading top soil on it.

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 Ulai River so there will be no impact on surface water.

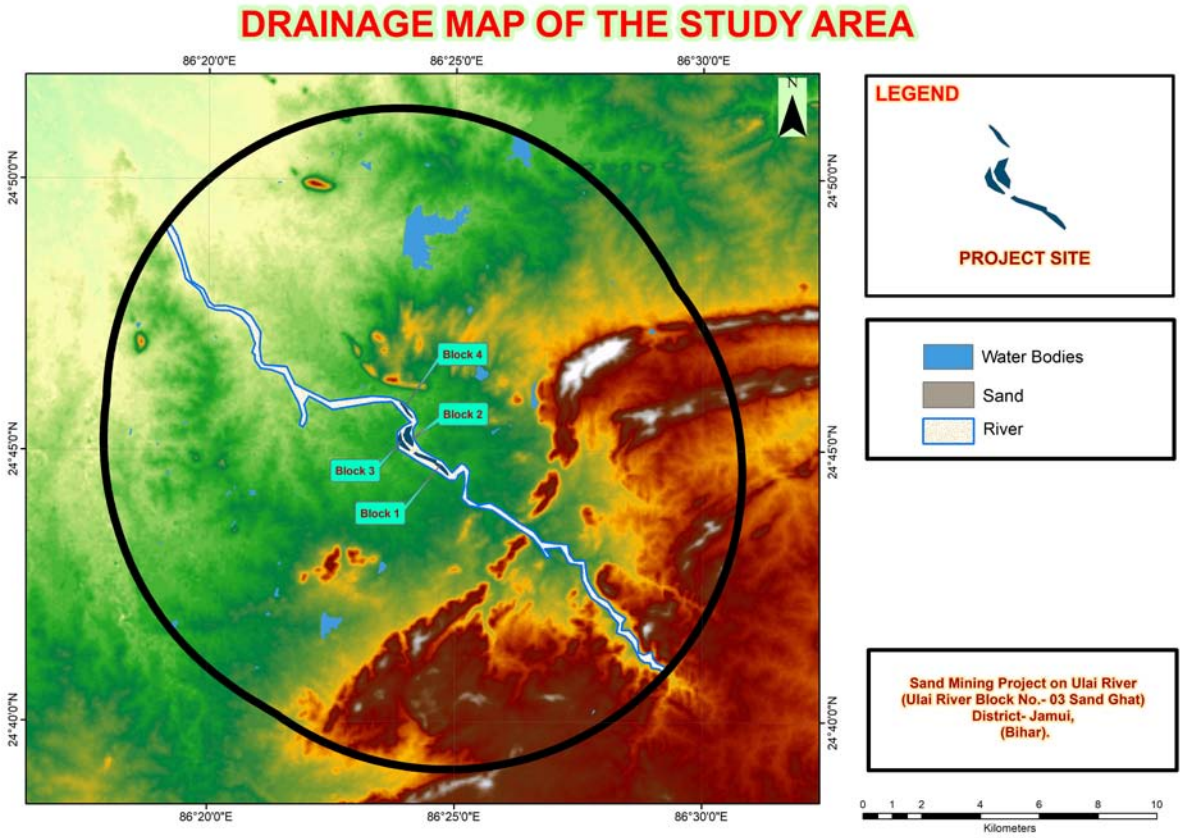

Fig-2.4, Drainage Map

2.7.3 Man power requirement

The manpower requirement for the proposed project will be around 23 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 2.6.**

Table 2.6 Manpower Requirement in Block 03

S. No.	Category	Numbers

1.	Administration	01
2.	Supervisor	02
3.	Skilled	06
4.	Un-skilled	10
TOTAL		**19**

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 2.7 - Water Requirement

Activity	Calculation	Round off Figure in KLD
Drinking	@ 10 lpcd per labor 10*19/1000= 0.19 KLD	0.19
Dust Suppression	**Total approach road to be water sprinkled** = 300 m for block 03 300 m*6m*0.5 *2 times 1800/1000= 1.8KLD	1.8
Plantation	94 plant (during plan period) @ 5 L/per plant= 94*5lts= 470/1000= 0.47 KLD	0.47
Total		**2.46 ~ 2.50 KLD**

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.

❖ 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_{10}, $PM_{2.5}$) 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 he 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.**

Table 3.1: Land Use Cover of the Project Study Area

Landuse Type	Area (Ha)
Scrub Land	5882.34
Forest	8008.32
River/Water Bodies	568.66
Settlement	3104.16
Vegetation	8.08
Agriculture	20598.23
AREA	**38169.79**

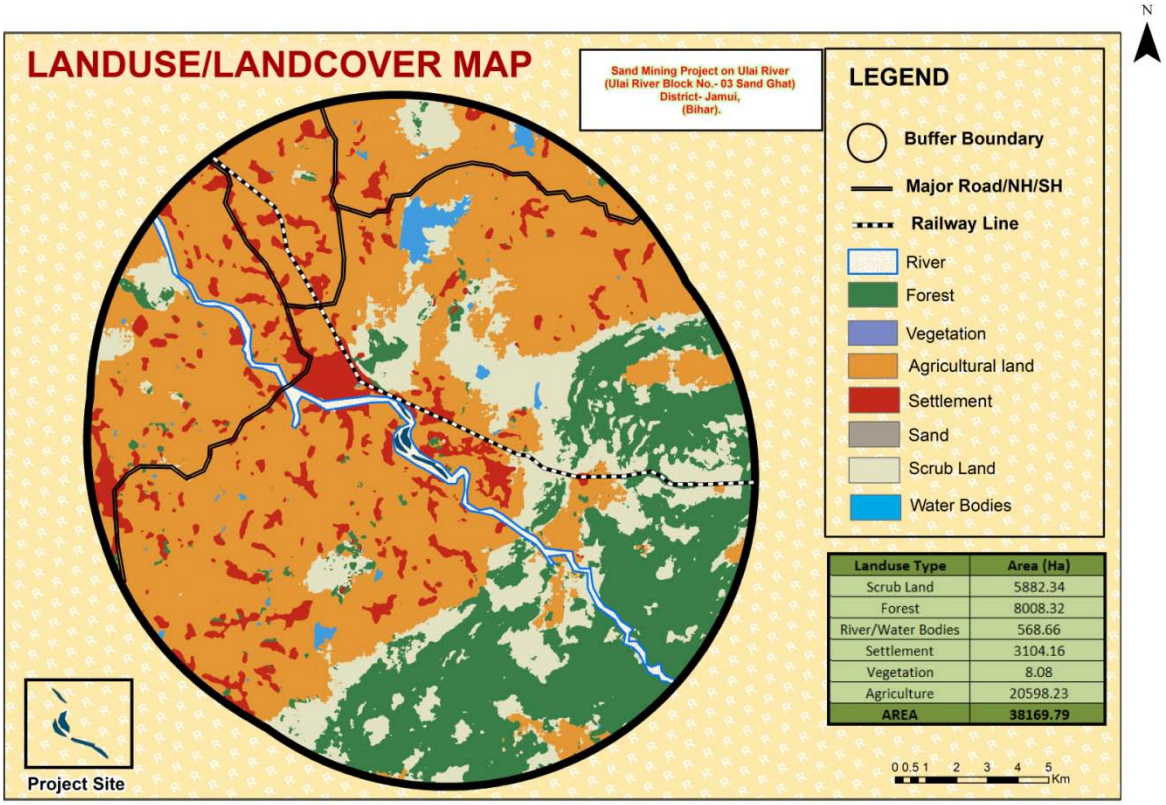

FIGURE 3.1: LAND USE COVER OF THE PROJECT STUDY AREA

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

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	Project Site (Near Village Bamar)	0.42 Km East
GW 2	Project Site (Near Village Garhi)	0.67 Km West
GW 3	Chituchak	1.70 Km West

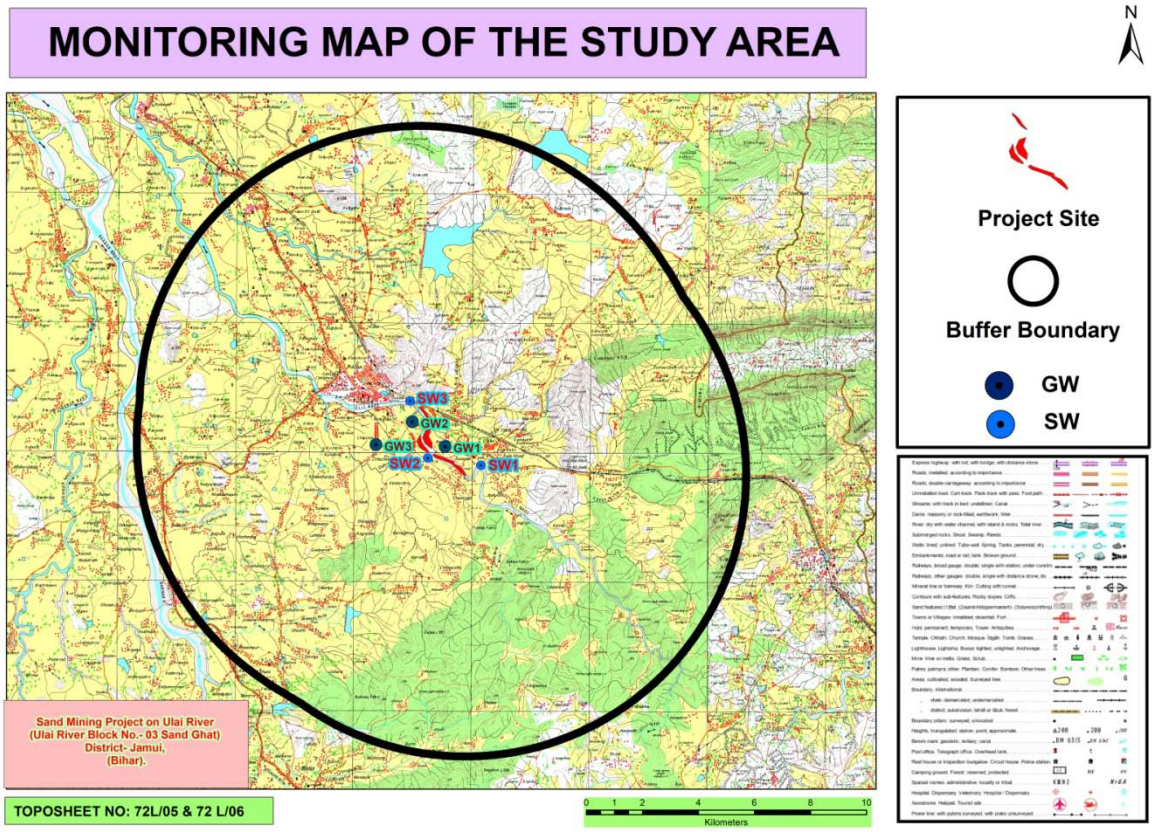

Figure 3.2 Water Sampling Location Map

Table 3.3 Ground Water Quality Monitoring Result

S. No.	Parameter	Unit	Limit (as per IS:10500)		GW1	GW2	GW3
			Desirable	Permissible			
1	Colour	Hazen	5	15	<5	<5	<5
2	Odour	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3	Taste	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4	Turbidity	NTU	1	5	<1	<1	<1
5	pH	-	6.5-8.5	No Relaxation	7.35	7.92	7.63
6	Total Hardness (as CaCO3)	mg/l	200	600	276	330	302
7	Iron (as Fe)	mg/l	0.3	No Relaxation	0.12	0.15	0.13
8	Chlorides (as Cl)	mg/l	250	1000	63	82	71
9	Fluoride (as F)	mg/l	1	1.5	0.5	0.6	0.5
10	TDS	mg/l	500	2000	485	587	534
11	Calcium(as Ca2+)	mg/l	75	200	66	79	72
12	Magnesium (as Mg2+)	mg/l	30	100	27	32	29
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	0.02	0.03	0.02
15	Sulphate (as SO4)	mg/l	200	400	23	30	25
16	Nitrate(as NO3)	mg/l	45	No Relaxation	6	10	8
17	Phenolic Compounds (as C6H5OH)	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	0.003	No Relaxation	<0.01	<0.01	<0.01
20	Selenium (as Se)	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	0.01	No Relaxation	<0.01	<0.01	<0.01
24	Zinc (as Zn)	mg/l	5	15	0.1	0.13	0.12
25	Anionic	mg/l	0.2	1	<0.01	<0.01	<0.01

	Detergent (as MBAS)						
26	Chromium (as Cr6+)	mg/l	0.05	No Relaxation	<0.01	<0.01	<0.01
27	Mineral oil	mg/l	0.5	No Relaxation	<0.01	<0.01	<0.01
28	Alkalinity as CaCO3	mg/l	200	600	253	293	276
29	Aluminium (as Al)	mg/l	0.03	0.2	<0.02	<0.02	<0.02
30	Boron (as B)	mg/l	0.5	1	0.1	0.2	0.1
	Microbiological Parameter						
31	Total Coliform	MPN /100ml	Shall not be detectable		Absent	Absent	Absent
32	E.coli	E.coli /100ml	Shall not be detectable		Absent	Absent	Absent

Observation:

Analysis of results of ground water reveals the following: -

- pH varies from 7.35 to 7.92.
- Total hardness varies from 276 mg/l to 330 mg/l .
- Total dissolved solids vary from 485 mg/l to 587 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 3.4. The physio-chemical analysis of the these samples are given in the Table 3.5

Table 3.4: Surface water sampling locations

Surface Water Monitoring Locations		
SW1	Upstream Near village Rajila	0.50 Km SE
SW 2	Project site	----
SW 3	Downstream near village Dhuatoli	0.24 Km North

Table 3.5: Physio-chemical properties of surface water

S. No.	Parameter	Unit	S.W. 1	S.W. 2	S.W. 3
			Upstream	Centre	Downstream
1	pH	-	7.73	7.64	7.89
2	Dissolved oxygen	mg/l	7.3	7.0	6.9
3	BOD (3 Days at 27°C)	mg/l	2	2	3
4	Free Ammonia (as N)	mg/l	<0.1	<0.1	<0.1
5	Sodium Adsorption Ratio	-	1.07	1.22	1.64
6	Boron	mg/l	0.1	0.1	0.2
7	Conductivity	µmhos/cm	498	556	660
8	Turbidity	NTU	3	2	4
9	Magnesium Hardness (as CaCO3)	mg/l	68	73	79
10	Total Alkalinity (as CaCO3)	mg/l	178	192	232
11	Chloride (as Cl)	mg/l	52	59	65
12	sulphate (as SO4)	mg/l	12	15	17
13	Nitrate (as NO3)	mg/l	4	3	5
14	Fluoride (as F)	mg/l	0.4	0.6	0.5
15	Sodium (as Na)	mg/l	34	40	56
16	Potassium (as K)	mg/l	3.9	4.5	5.8
17	Total Nitrogen (as N)	mg/l	2.7	2.9	3.4
18	Total Phosphorous (as PO4)	mg/l	0.09	0.13	0.11
19	COD	mg/l	12	16	18
20	Phenolic compounds (as C6H5OH)	mg/l	<0.001	<0.01	<0.001
21	Iron (as Fe)	mg/l	0.28	0.35	0.22
22	Zinc (as Zn)	mg/l	0.11	0.17	0.10
23	Mercury (as Hg)	mg/l	<0.001	<0.001	<0.001
24	TDS	mg/l	312	346	406
25	Total Coliform	MPN/100ml	1340	1400	1500
26	Faecal Coliform	MPN/100ml	1140	1170	1220

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:

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:

- The analysis results indicate that the pH ranges between 7.73 and 7.89.
- Dissolved Oxygen (DO) was observed in the range of 6.9 to 7.3 mg/l against the minimum requirement of 4 mg/l.
- BOD values were observed to be in the range of 2.0 to 3.0 mg/l.
- Total Coliform examination of surface water samples revealed the presence of total coliform in range of 1500 MPN/100 ml to 1340 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-3.7**

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

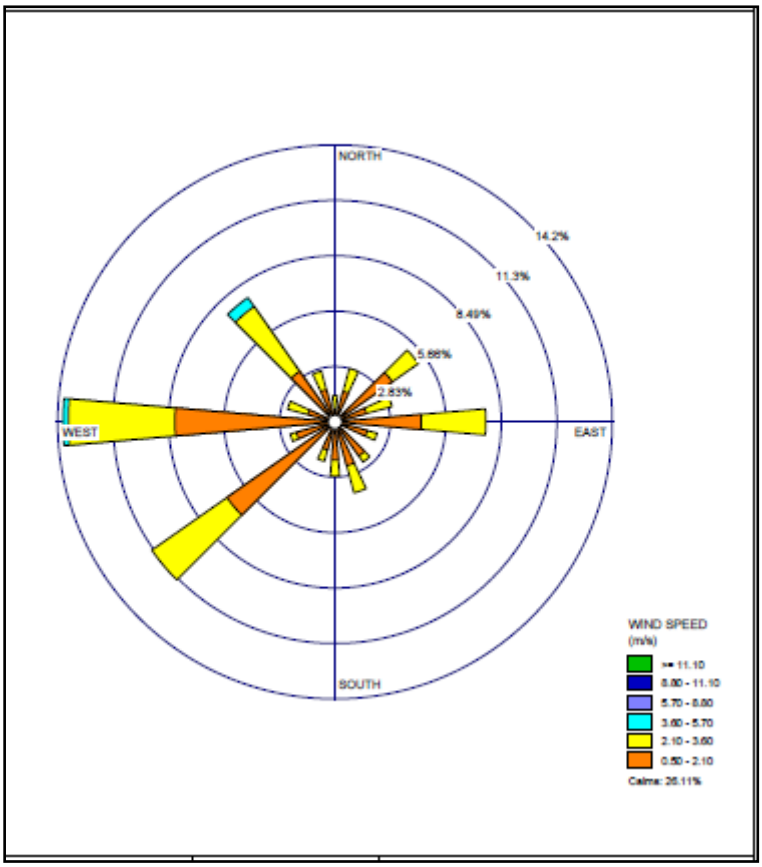

Figure 3.3: Wind Rose Diagram (at site)

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-3.7**

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

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 10 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-3.8**

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_{10}) & $PM_{2.5}$, Sulphur-dioxide (SO_2) and Oxides of Nitrogen (NO_2) has been measured through a planned field monitoring.

The baseline values of the air pollutants of concern are presented in Tables below statistical parameters like minimum, maximum, average and 98th percentiles have been computed from the observed field data for all sampling stations and are given **Table-3.9, Table-3.10, Table-3.11 & Table 3.12.** These are compared with the standards prescribed by Central PollutionControl Board (CPCB) for industrial, residential and rural zone.

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 Bamar)	0.42 Km East
AAQ 2	Project Site (Near Village Garhi)	0.67 Km West
AAQ 3	Kanhaydih	3.33 Km East
AAQ 4	Chituchak	1.70 Km West
AAQ 5	Narganjo	4.79 Km SE
AAQ 6	Chhapardih	3.90 Km South
AAQ 7	Surajanr	1.33 Km North
AAQ 8	Khurparas	6.72 Km NW
AAQ 9	Lakhankiyari	6.94 Km SW
AAQ 10	Karhara	7.75 Km NE

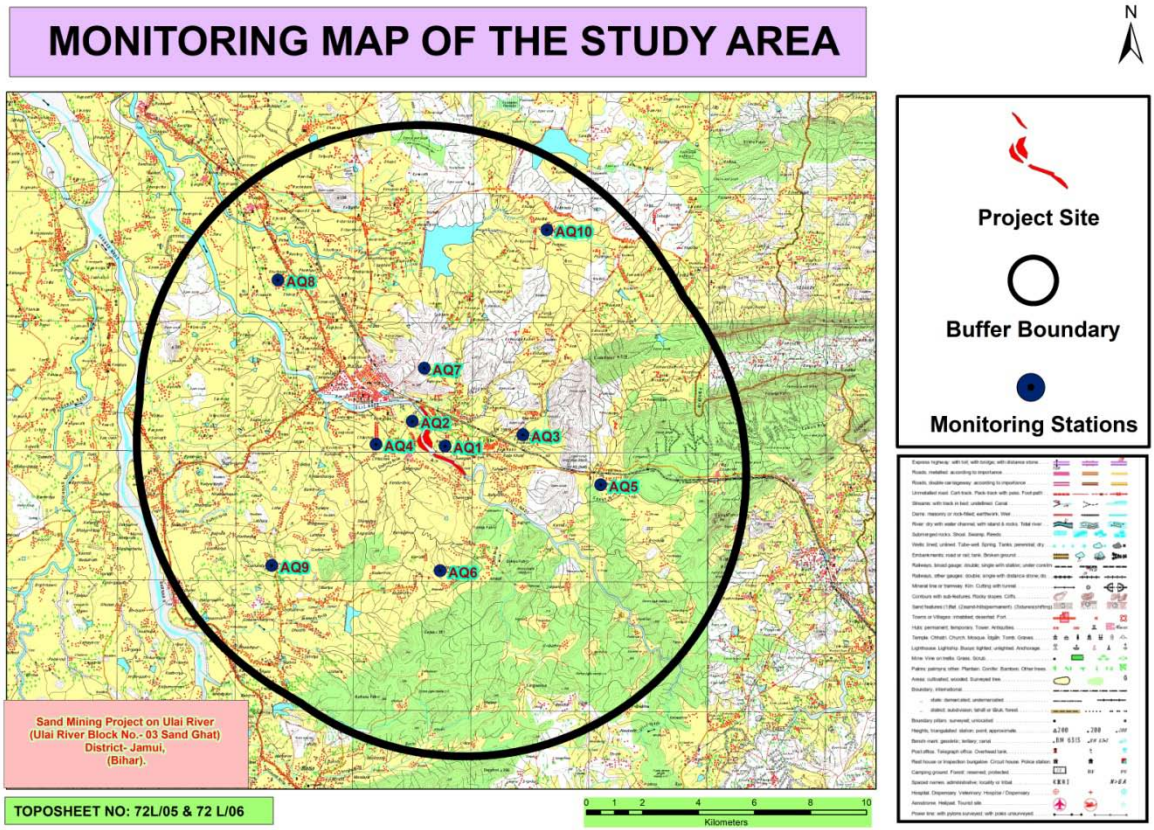

Figure 3.4 Ambient Air Quality Monitoring Stations

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

Location Code	PM2.5 (µg/m^3)				
	Name of the station	**Min**	**Max**	**Average**	**98th Percentile**
AAQ1	Project Site (Near Village Bamar)	37.4	49.2	40.4	48.3
AAQ2	Project Site (Near Village Garhi)	35.5	48.2	39.1	45.3
AAQ3	Kanhaydih	40.5	52.6	45.4	51.6
AAQ4	Chituchak	38.6	50.2	41.8	48.3
AAQ5	Narganjo	33.3	46.5	37.4	45.1
AAQ6	Chhapardih	37.2	44.6	40.1	43.7
AAQ7	Surajanr	40.6	50.2	44.5	45.6
AAQ8	Khurparas	39.7	47.5	43.4	47.3
AAQ9	Lakhankiyari	41.1	48.1	44.4	47.4

AAQ10	Karhara	38.9	47.6	42.2	46.6

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

Location Code	PM10 (µg/m^3)				
	Name of the station	**Min**	**Max**	**Average**	**98th Percentile**
AAQ1	Project Site (Near Village Bamar)	78.5	89.6	82.6	88.5
AAQ2	Project Site (Near Village Garhi)	76.9	88.4	81.3	86.6
AAQ3	Kanhaydih	86.7	98.6	93.1	98.5
AAQ4	Chituchak	79.6	91.5	86.0	90.5
AAQ5	Narganjo	76.2	85.6	80.2	84.5
AAQ6	Chhapardih	77.5	87.8	81.9	87.0
AAQ7	Surajanr	83.4	98.4	92.8	98.2
AAQ8	Khurparas	81.6	93.4	87.1	93.3
AAQ9	Lakhankiyari	82.3	94.8	88.1	94.2
AAQ10	Karhara	79.2	91.6	85.3	91.0

Table-3.11: Ambient Air Quality in the Study Area SO2

Location Code	SO2 (µg/m^3)				
	Name of the station	**Min**	**Max**	**Average**	**98th Percentile**
AAQ1	Project Site (Near Village Bamar)	6.2	8.5	7.2	8.2
AAQ2	Project Site (Near Village Garhi)	6.7	9.5	7.5	9.1
AAQ3	Kanhaydih	7.3	11.2	8.2	10.3
AAQ4	Chituchak	7.5	10.3	8.6	9.7
AAQ5	Narganjo	5.8	9.2	6.8	8.6

AAQ6	Chhapardih	6.8	8.9	7.5	8.6
AAQ7	Surajanr	8.0	11.3	9.1	10.9
AAQ8	Khurparas	7.6	10.4	8.6	10.0
AAQ9	Lakhankiyari	7.8	10.3	8.8	10.0
AAQ10	Karhara	7	9.9	8.0	9.7

Table-3.12: Ambient Air Quality in the Study Area NO2

Location Code	**NO2 (µg/m^3)**				
	Name of the station	**Min**	**Max**	**Average**	**98th Percentile**
AAQ1	Project Site (Near Village Bamar)	18.9	25.3	21.2	24.4
AAQ2	Project Site (Near Village Garhi)	16.3	23.4	18.7	22.6
AAQ3	Kanhaydih	20.3	28.5	23.4	28.2
AAQ4	Chituchak	19.8	25.6	22.1	24.8
AAQ5	Narganjo	16.4	24.9	19.1	23.1
AAQ6	Chhapardih	15.2	19.8	16.7	19.2
AAQ7	Surajanr	19.2	25.5	21.1	24.5
AAQ8	Khurparas	17.0	23.1	19.1	22.2
AAQ9	Lakhankiyari	18.5	25.5	20.5	24.1
AAQ10	Karhara	16.3	22.7	18.5	22.4

3.3.4.1 Baseline Scenario

Particulate Matter (PM2.5)

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

PM2.5 recorded within the study area was in the range of 33.3 µg/m^3 to 52.6 µg/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., 60µg/m^3 for $PM_{2.5}$ for industrial, residential, rural and other areas.

Suspended Particulate Matter (PM10)

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 PM10 recorded within the study area was in the range of 76.2 µg/$m^3$to 98.6 µg/m^3 . The 24 hourly average values of PM10 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 µg/m^3 for PM10 in industrial, residential, rural and other areas.

Sulphur Dioxide (SO2)

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.

The minimum and maximum concentration of SO_2 recorded within the study area was 5.8 µg/$m^3$to 11.3 µg/m^3.

The 24 hourly average values of SO_2 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^3 for Residential, Rural and other areas.

Oxides of Nitrogen (NO2)

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. NO2 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 NO2 recorded within the study area was in the range of was 15.2 µg/$m^3$to 28.5 µg/m^3.

The 24 hourly average values of NO_2 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^3 for Residential, Rural and other areas.

Ambient Air Quality in the Study Area, Free Silica

SiO2(µg/m3)	AQ1	AQ2	AQ3	AQ4	AQ5	AQ6	AQ7	AQ8	AQ9	AQ10
Minimum	1.55	1.67	1.63	1.65	1.58	1.65	1.69	1.43	1.60	1.51
Maximum	1.76	2.23	1.87	1.90	1.83	1.71	1.94	1.75	1.92	1.75

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 3.13.** Thephysico-chemical characteristic of these soil samples is given in **Table 3.14.**

Table 3.13: Description of Soil Sampling Locations

Soil monitoring locations		
SQ 1	Project Site (Near Village Bamar)	0.42 Km East
SQ 2	Project Site (Near Village Garhi)	0.67 Km West
SQ 3	Kanhaydih	3.33 Km East
SQ 4	Chituchak	1.70 Km West
SQ 5	Narganjo	4.79 Km SE

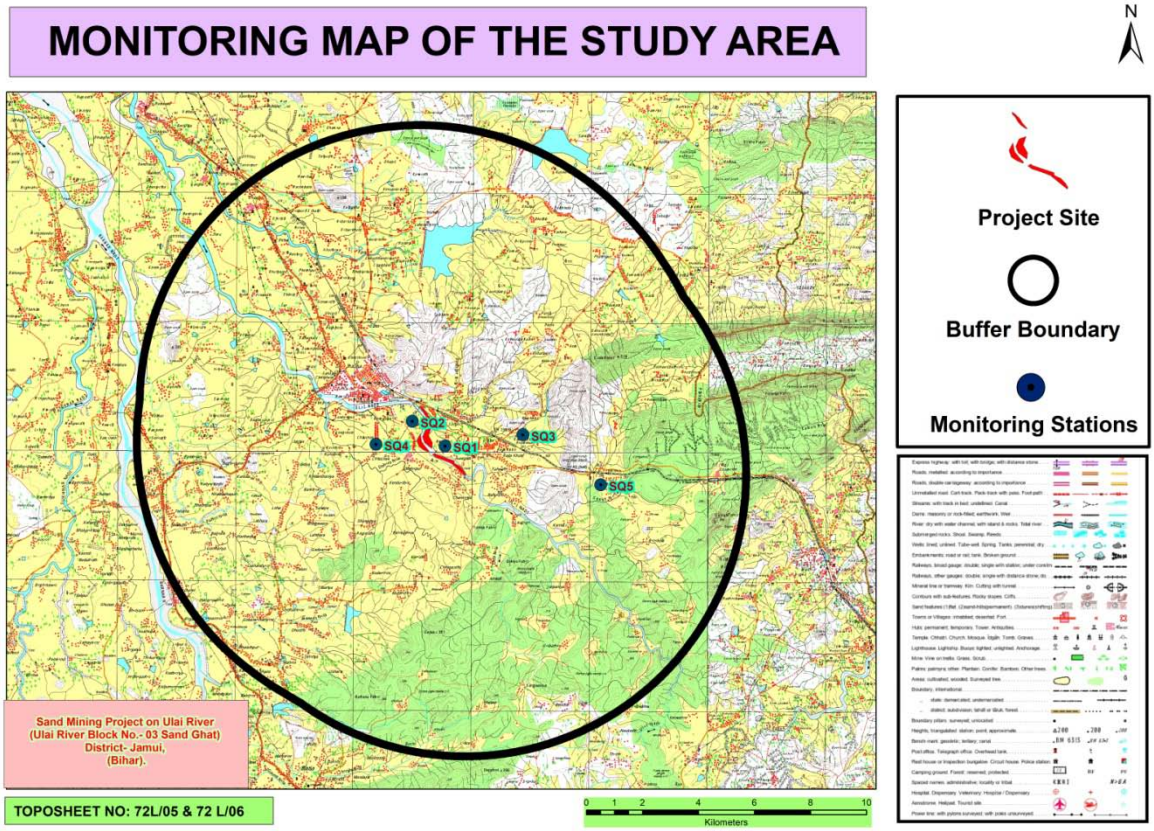

Figure 3.5, Soil Sampling Locations

Table 3.14:Physico-chemical properties of soil

S.No	Parameter	Unit	SQ-1	SQ-2	SQ-3	SQ-4	SQ-5
1	Texture	-	Sandy loam	Loamy Sand	Sandy Clay Loam	Loamy Sand	Sandy loam
	Sand	%	65.3	84.6	60.5	82.6	60.3
	Silt	%	19.4	7.5	15.9	9.6	20.5
	Clay	%	15.3	7.9	23.6	7.8	19.2
2	pH (1:2)	-	7.65	7.39	8.02	7.98	8.01
3	Electrical Conductivity (1:2)	µmhos/cm	321	109	389	215	378
4	Cation exchange capacity	meq/100 gm	13.48	11.44	15.7	13.77	15.18
5	Exchangeable Potassium	meq/100 gm	0.34	0.19	0.42	0.19	0.34
6	Exchangeable Sodium	meq/100 gm	0.46	0.28	0.76	0.48	0.51
7	Exchangeable Calcium	meq/100 gm	8.94	8.51	10.3	9.6	10.21
8	Exchangeable Magnesium	meq/100 gm	3.74	2.46	4.2	3.5	4.12
9	Sodium Absorption Ratio	-	0.58	0.38	0.89	0.59	0.60
10	Water Holding Capacity	%	25.8	21.4	28.6	21.1	28.9
11	Porosity	%	39.4	47.8	36.7	44.6	39.4
12	Permeability	cm/hr	2.1	2.4	1.8	2.3	1.9
13	Total kjehdahl Nitrogen	%	0.037	0.017	0.052	0.026	0.042
14	Phosphorus(Olsen's)	mg/kg	6.8	3.1	10.1	5.8	8.7
15	Bulk Density	gm/cc	1.36	1.48	0.39	0.25	1.32

16	Organic Matter	%	0.32	0.11	1.30	1.45	0.34

Observations:

Samples collected from identified locations indicate the soil is sandy type and the pH value ranging from 7.39 to 8.02, which shows that the soil is alkaline in nature. Exchangable Potassium is found to be from 0.19 mg/kg to 0.34 mg/kg.

3.5 NOISE ENVIRONNENT

The noise levels within the study area were recorded using Sound Level Meter and noise monitoring results were compared with the Ambient Noise Quality Standard notified under Environment Protection Act, 1986. The levels recorded are as stated in **Table 3.16.** The noise level monitoring locations are marked in**Figure 3.6**and shown in **Table 3.15.**

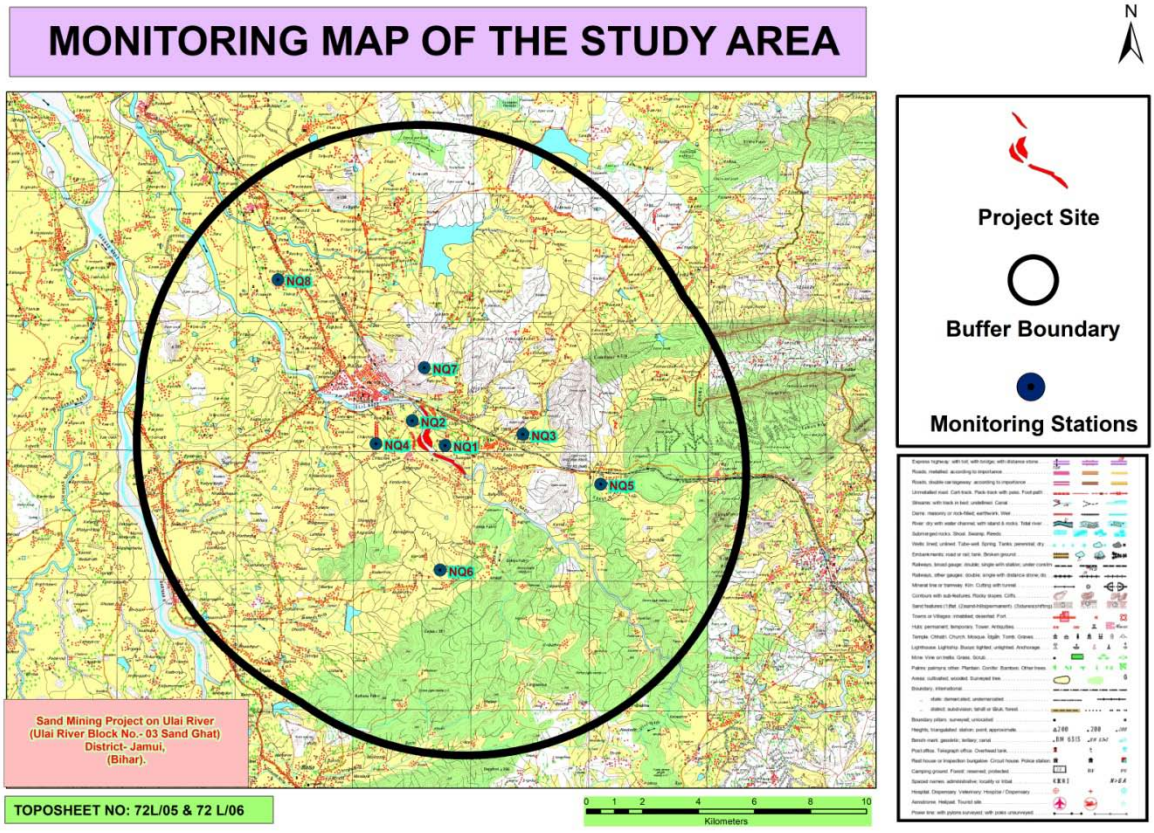

Figure 3.6 Noise Monitoring Stations

Table 3.15: Noise Quality Monitoring Stations

Noise Monitoring Locations		
NQ 1	Project Site (Near Village Bamar)	0.42 Km East
NQ 2	Project Site (Near Village Garhi)	0.67 Km West
NQ 3	Kanhaydih	3.33 Km East
NQ 4	Chituchak	1.70 Km West
NQ 5	Narganjo	4.79 Km SE
NQ 6	Chhapardih	3.90 Km South
NQ 7	Surajanr	1.33 Km North
NQ 8	Khurparas	6.72 Km NW

Table 3.16: Noise Monitoring Results

S.No.	PROJECT SITE	ZONE	Leq LIMIT (as per CPCB Guidelines), in dB(A)		Leq Value monitored, in dB(A)	
			DAY*	NIGHT*	DAY*	NIGHT*
1	NQ-1	Industrial Zone	75	70	57.1	46.8
2	NQ-2	Silence zone	50	40	41.5	37.6
3	NQ-3	Residential Zone	55	45	51.9	40.8
4	NQ-4	Residential Zone	55	45	54.2	42.7
5	NQ-5	Residential Zone	55	45	45.7	38.6
6	NQ-6	Residential Zone	55	45	52.9	42.8
7	NQ-7	Residential Zone	55	45	54.3	42.6
8	NQ-8	Residential Zone	55	45	45.9	39.6

* Day time Leq in **dB(A)** (6.00AM TO 10.00PM)
Night time Leq in **dB(A)** (10.00PM TO 6.00AM)

Results

Noise monitoring reveals that the minimum & maximum noise levels at day time were recorded as 57.1 dB(A) to 41.5 dB(A) respectively. The minimum & maximum noise levels at night time were found to be 46.8 dB (A) & 37.6 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 Ulai River at Jamui Block 03 Sand Ghat.

3.6.2 Description of the study area

The Proposed Sand Mining Project was located on Ulai River at Jamui Block No – 03Sand Ghat at Village – Tola Mahapur, Block- Jhajha , District- Jamui, (Bihar).

The proposed mining was a cluster of 04 mining lease area of Jamui Block 04, Jamui Ulai Block 01, Jamui Ulai Block 02, Jamui Ulai Block 03 & Jamui Ulai Block 04 over an combined area of 44.32 Ha is for river bed sand mining on Ulai 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 mitigatorymeasures to protect/conserve 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.
- The survey has been coveringa 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 [(≥30 cm 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.

3.6.8Flora 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.).

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 3.17: List of Crops seasonally planted by respective farmers in the Core and Buffer Zone

S.No.	**Botanical Name**	**Local/Trade Name**	**Family Name**
1	*Zey mays*	Makkha/Maize	Poaceae
2	*Triticum aestivum*	Wheat	
3	*Oryza sativa*	Paddy	
4	*Cicer arietinum*	Channa	Fabacea
5	*Coriander sativum*	Dhaniya	Apiaceae
6	*Abelmoschus esculentus*	Bhendi	Amaranthacea
7	*Mamordica charanta*	Karela	Cucurbiataceae
8	*Capsicum annum*	Mirchi	Solanaceae
9	*Lycopersicon lycopersicum*	Tomato	
10	*Solanum melongena*	Brinjal	
11	*Capsicum annuum*	Mirchi	
12	*Solanum tuberosum*	Potato	
13	*Allium cepa*	Onian	Amaryllidaceae
14	*Cajanus cajan*	Pigeon pea	Fabaceae
15	*Carica papaya*	Papaya	Caricaceae
16	*Okra*	Ladyfinger/ Bhindi	Malvaceae
17	*Lagenaria siceraria*	Bottle gourd/ Lauki	Cucurbitaceae
	Source: 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 located in the core & buffer zone. Details of phytoplankton and macrophytic vegetation of the core and the buffer zone are given in tables 3.18, 3.19 & 3.20

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 3.18

Table 3.18: 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
	Chlorophyceae									NA	NA
1	*Ankistrodesmus* sp.			+	+	+	+			NA	NA
2	*Ankistrodesmus falcatus*		+	+			+	+	+	NA	NA
3	*Arthrodesmus* sp.	+		+	+		+		+	NA	NA
4	*Chlorella* sp.		+	+	+	+	+	+	+	NA	NA
5	*Chlorella vulgaris*	+		+	+	+			+	NA	NA
6	*Chlorococcum* sp.	+	+	+			+		+	NA	NA
7	*Closteriopsis* sp.	+	+		+	+		+		NA	NA
8	*Closterium quadratulum*						+	+	+	NA	NA
9	*Coelastrum* sp.	+	+	+	+		+		+	NA	NA
10	*Cosmarium aequale*			+	+		+	+		NA	NA
11	*Cosmarium formii*	+	+	+	+	+	+		+	NA	NA
12	*Cosmarium margaritatum*	+		+	+		+	+		NA	NA
13	*Crucigenia* sp.	+	+	+	+		+			NA	NA
14	*Gonium* sp.	+		+		+	+		+	NA	NA
15	*Oocystis crassa*	+	+			+	+	+	+	NA	NA
16	*Pediastrum duplex*	+	+	+	+		+		+	NA	NA
17	*Treubaria triappendiculata*			+		+	+	+	+	NA	NA
18	*Ulothrix* sp.	+	+	+	+	+	+	+		NA	NA
19	*Ulothrix zonata*	+		+		+	+		+	NA	NA
20	*Volvox* sp.	+	+	+		+	+			NA	NA
21	*Zygnema* sp.	+	+	+	+	+	+	+		NA	NA
	Total	19	**15**	**23**	**16**	**17**	**24**	**12**	**17**		
	Cyanophyceae									NA	NA
1	*Anabaena* sp.		+	+	+	+	+		+	NA	NA
2	*Anabaena circinalis*	+	+	+	+	+	+	+		NA	NA
3	*Anabaena flosaque*	+	+		+	+	+	+	+	NA	NA
4	*Anacystis* sp.	+		+		+	+		+	NA	NA
5	*Aphanocapsa* sp.	+		+	+	+	+	+	+	NA	NA
6	*Aphanothece* sp.	+	+		+	+			+	NA	NA
7	*Chroococcus* sp.	+		+	+	+	+	+		NA	NA
8	*Gloeocapsa* sp.	+	+	+			+		+	NA	NA
9	*Lyngbya* sp.	+	+		+	+	+	+	+	NA	NA
10	*Merismopedia* sp.	+	+	+		+	+	+	+	NA	NA
11	*Merismopedia tenuissima*	+		+	+	+	+			NA	NA
12	*Microcystis* sp.		+		+			+	+	NA	NA
13	*Microcystis aeruginosa*	+		+			+			NA	NA
14	*Nostoc* sp.		+		+	+	+	+	+	NA	NA

15	*Oscillatoria subbrevis*	+			+		+		+	NA	NA
16	*Spirulina* sp.		+	+	+	+	+	+		NA	NA
17	*Spirulina laxissima*		+	+		+	+		+	NA	NA
	Total	**12**	**11**	**11**	**12**	**13**	**15**	**9**	**12**		
	Bacillariophyceae									NA	NA
1	*Achnanthes* sp.	+	+	+	+		+	+	+	NA	NA
2	*Amphora ovalis*	+				+	+		+	NA	NA
3	*Amphora* sp.	+	+	+	+	+		+		NA	NA
4	*Cocooneis* sp.	+	+		+		+	+	+	NA	NA
5	*Cyclotella* sp.			+		+	+	+	+	NA	NA
6	*Cymbella affinis*	+		+	+		+		+	NA	NA
7	*Melosira granulata*	+				+	+	+		NA	NA
8	*Navicula similis*	+	+	+	+		+	+	+	NA	NA
9	*Navicula subrhyncocephala*	+	+		+		+		+	NA	NA
10	*Nitzschia palea*	+	+		+	+	+			NA	NA
11	*Pinnularia sp.*	+	+	+				+	+	NA	NA
12	*Synedra acus*	+				+	+		+	NA	NA
13	*Synedra ulna*		+		+	+	+	+	+	NA	NA
14	*Tabellaria* sp.	+			+		+			NA	NA
	Total	**16**	**12**	**9**	**13**	**11**	**15**	**10**	**13**		
	Euglenophyceae									NA	NA
1	*Euglena acus*	+	+	+	+	+	+	+	+	NA	NA
2	*Euglena* sp.	+			+	+	+		+	NA	NA
3	*Euglepha* sp.	+	+	+	+	+	+	+	+	NA	NA
4	*Phacus* sp.		+				+			NA	NA
5	*Phacus caudatus*	+			+	+	+	+	+	NA	NA
6	*Trachelomonas* sp.	+	+	+	+	+	+	+		NA	NA
	Total	**5**	**4**	**3**	**5**	**5**	**6**	**4**	**4**		
	Source: Primary Survey Data of P&M Solution Pvt. Ltd., Noida										

Table 3.19: 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
Total No. of Species	**52**	**42**	**46**	**46**	**46**	**60**	**35**	**46**

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 3.20

Table 3.20: 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	*Azolla pinnata*	Salviniaceae	LC	+	+	+	+	+	+	+	+
2	*Cyperus alopecuroides*	Cyperaceae	LC	+	+			+	+	+	+
3	*Cyperus difformis*	Cyperaceae	LC	+		+	+		+	+	+
4	*Eichhornia crassipes*	Pontederiaceae	LC	+	+	+		+	+		+
5	*Hydrilla verticillata*	Hydrocharitaceae	LC				+			+	+
6	*Ipomea aquatica*	Convolvulaceae	LC		+	+	+	+	+		+
7	*Ipomea carnea*	Convolvulaceae	LC	+	+	+	+		+	+	+
8	*Lemna minor*	Araceae	LC	+	+			+	+	+	+
9	*Ludwigia parviflora*	Onagraceae	LC	+	+	+	+		+	+	+
10	*Nelumbo sp.*	Nelumbonaceae	LC		+			+			
11	*Nymphoides aquatica*	Menyanthaceae	LC	+		+		+	+	+	+
12	*Phragmites karka*	Poaceae	LC						+		
13	*Pistia stratiotes*	Araceae	LC		+		+			+	+
14	*Polygonum glabrum*	Polygonaceae	LC	+	+	+		+	+	+	+
15	*Typha latifolia*	Typhaceae	LC						+		+
16	*Typha orientalis*	Typhaceae	LC		+		+	+	+	+	
Total No. of Species				**9**	**8**	**8**	**8**	**9**	**13**	**11**	**13**

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 3.21.

Table 3.21: List of Trees, Shrubs, Herbs and Grasses observed in Buffer Zone

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

35	*Shorea robusta*	Sal	Depterocarpaceae
36	*Syzygium cumini*	Jamun	Myrtaceae
37	*Tectona grandis*	Sagwan	Verbenaceae
38	*Terminalia arjuna*	Arjun	Combretaceae
39	*Zizyphus jujube*	Ber	Rhamnaceae
40	*Zyziphus mauritiana*	Ber	Rhamnaceae
Shrub & Herbs			
41	*Acanthospermum hispidum*	Kanti	Asteraceae
42	*Acheranthus aspera*	Aghada	Amaranthaceae
43	*Antigonum leptopus*	coral vine	eaecanogyloP
44	*Argemone mexicana*	Pila dhtura	Papaveraceae
45	*Chenopodium album*	manure weed	Amaranthaceae
46	*cleome viscosa*	Pivali tilval	Cleomaceae
47	*Dalura metel*	Dhotra	Solanaceae
48	*Echinops echinatus*	Unthkantali	Asteraceae
49	*Ervatamia divaricata*	Chandani	Apocynaceae
50	*Euphorbia hirta*	Mothi dudhi	Evphorbiaceae
51	*Ipomoea carnea*	Besharam	Convolvulaceae
52	*Jatropha gossipifolia*	cotton-leaf	Euphorbiaceae
53	*Lantana camara*	Ghaneri	Verbenaceae
54	*Mimosa pudica*	Chui Mui	Mimosaceae
55	*Ocimum sanctum*	Tulsi	Labiatae
56	*Parthenium hysterophorus*	Gajar grass	Asteraceae
57	*Ricinus communis*	Arand	Euphorbiaceae
58	*Tridax procumbens*	Kambarmodi	Asteraceae
59	*Xanthium strumarium*	Chota Dhatura	Asteraceae
Grasses			
60	*Apluda mutica*	Mauntian grass	Poaceae
61	*Apluda mutica*	Banjura grass	Poaceae
62	*Commelina benghalensis*	Bokna	Commelinaceae
63	*Cynodon dactylon*	Doob	Poaceae
64	*DactylSeptemberenum aegyptium*	Crow foot grass	Poaceae
65	*Pennisetum purpureum*	Elephant grass	Poaceae
66	*Saccharum spontaneum*	kans	Poaceae
Climbers			
67	*Abrus precatorius*	Gunja	Fabaceae
68	*Antigonon leptopus*	Anantalata	Polygonaceae
69	*Bougainvillea glabra*	Booganbel	Nyctaginaceae
70	*Celastrus paniculata*	Kujari	Celastraceae
71	*Cissampelos pareira*	Khariya lata	Menispermaceae
72	*Clitoria ternatea*	Blue pea	Fabaceae
73	*Cuscuta reflexa*	Amarbel	Convolvulaceae
74	*Cuscuta reflexa*	Amar bel	Convolvulaceae
75	*Hemidesmus indicus*	Anantamul	Apocynaceae

76	*Ipomoea cairica*	Neeli Bel	Convolvulaceae
77	*Tilospora cordifolia*	Giloy	Menispermaceae
Source: 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

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

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*

familaris) 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 3.22.

Table 3.22: List of Mammals/Reptiles/Amphibians/Birds recorded from the Core Zone

S. No.	Common Name	Scientific Name	Family	Schedule status (as per WPA-1972)	IUCN status
Mammals					
1	Five striped palm squirrel	*Funambulus pennanti*	Sciuridae	IV	LC
2	Indian Field Mouse	*Mus booduga*	Muridae	V	LC
3	Common House Rat	*Rattus rattus*	Muridae	V	LC
4	Bandicoot Rat	*Bandicotabengalensis*	Muridae	V	LC
Reptiles & Amphibians					
5	Garden lizard	*Calotes versicolor*	Agamidae	IV	NE
6	Common skink	*Eutropis carinata*	Scincidae	IV	LC
7	King cobra	Ophiophagus hannah	Elapidae	II	LC
8	Cobra	Naja naja	Elapidae	II	LC
9	Garden lizard	Calotes versicolor	Agamidae	IV	NE
Bird Species					
1	*Acridotheres tristis*	Myna	Sturnidae	IV	LC
2	*Acridotheres tristis*	Common myna	Sturnidae	IV	LC
3	Ardeola grayii	Indian pond heron	Ardeidae	IV	LC
4	Bubulcus ibis	Cattle egret	Ardeidae	IV	LC
5	*Columba livia*	Pigeon	Columbidae	IV	LC
6	*Corvus splendens*	Crow	Corvidae	V	LC
7	*Milvus migrans*	Black Kite	Accipitridae	IV	LC
8	*Passer domesticus*	House sparrow	Passeridae	IV	LC
9	*Phalacrocorax niger*	Little cormorant	Phalacrocoracidae	IV	LC
10	*Pycnonotus cafer*	Red-vented bulbul	Pycnonotidae	IV	LC
11	Saxicoloides fulicatus	Indian robin	Psittaculidae	IV	LC
12	*Turdoides caudate*	Common babbler	Leiothrichidae	IV	LC
13	*Upupa epops*	Common hoopoe	Upupidae	IV	LC

14	*Vanellus indicus*	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 3.23: Butterflies observed in the Core zone

S. No.	Common Name	Scientific Name	Family	IUCN Status
1.	Plain Tiger	*Danaus chrysippus*	Nymphalidae	LC
2.	Common emigrant	Catopsilia pomona	Pieridae	LC
3.	Common crow	*Euploea core*	Nymphalidae	LC
4.	Small grass yellow	Eurema brigitta	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 thestudy area are given in Tables 3.25 to 3.27**.**

i. Mammals and Reptiles/ Amphibians

The domesticated animals like Goat (*Capra aegagrus*); Buffalo (*Bubalus bubalis*); Cow (*Bos primigenius)*; Horse (*Equus caballus*); Ass (*Equus hemionus*) and Dog (*Canis lupus familaris*) 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 3.24.

Table 3.24: List Mammals, Reptiles and Amphibians recorded from the Buffer Zone

S. No.	Common Name	Scientific Name	Family	Status as per WPA-1972	IUCN status
Mammals					
1	*Bandicota bengalensis*	Bandicoot Rat	Sciuridae	IV	LC
2	*Canis aurius*	Jackal	Pteropodidae	V	LC
3	*Fellis chaus*	Jungle cat	Soricidae	IV	LC
4	*Funambulus palmarum*	Three-striped Squirrel	Suidae	III	LC
5	*Funambulus pennanti*	Five striped palm squirrel	Hyaenidae	III	LC
6	*Herpestes edwardsi*	Indian Grey Mongoose	Canidae	II	LC

7	*Hyaena hyaena*	Stripped hyena	Leporidae	V	LC
8	*Lepus nigricollis*	Indian Hare	Canidae	II	LC
9	*Mus booduga*	Indian Field Mouse	Sciuridae	IV	LC
10	*Presbytis entellus*	Common langur	Cercopithecidae	II	LC
11	*Pteropus giganteus*	Indian Flying Fox	Pteropodidae	V	LC
12	*Suncus murinus*	Grey musk Shrew	Muridae	V	LC
13	*Sus scrofa*	Wild Boar	Canidae	III	LC
14	*Vulpes bengalensis*	Indian fox	Felidae	II	LC
Reptiles and Amphibians					
1	*Bufo melanostictus*	Common toad	Bufonidae	IV	LC
2	*Bungarus caeruelus*	Krait	Elapidae	IV	NE
3	*Calotes versicolor*	Garden lizard	Agamidae	IV	NE
4	*Crotolus* sp.	Pit viper	Viperadae	II	LC
5	*Euphlyctis hexadactyla*	Common frog	Dicroglossidae	IV	LC
6	*Eutropis carinata*	Common skink	Scincidae	IV	LC
7	*Naja naja*	Cobra	Elapidae	II	LC
8	Ophiophagus hannah	King cobra	Elapidae	II	LC
9	Ptyas mucosa	Rat Snake	Colubridae	II	NE
10	Rana temporaria	Common frog	Ranidae	IV	LC
11	Testudo graeca	Common Tortoise	Testudinidae	IV	VU
12	Varanus sp.	Monitor lizzard	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 3.25: 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	*Acridotheres tristis*	Myna	Sturnidae	IV	LC
2	*Acridotheres tristis*	Common myna	Sturnidae	IV	LC
3	Alcedo atthis	Small blue kingfisher	Alcedinidae	IV	LC
4	Amandava amandava	Red munia	Estrildidae	IV	LC
5	*Amaurornis phoenicurus*	White-breasted waterhen	Rallidae	IV	LC
6	*Ardea cinerea*	Grey heron	Ardeidae	IV	LC
7	*Ardea purpurea*	Purple heron	Ardeidae	IV	LC
8	Ardeola grayii	Indian pond heron	Ardeidae	IV	LC
9	Athene brama	Spotted Owlet	Strigidae	IV	LC
10	Bubulcus ibis	Cattle egret	Ardeidae	IV	LC
11	*Butorides striatus*	Striated heron	Ardeidae	IV	LC
12	*Casmerodius albus*	Great egret	Ardeidae	IV	LC
13	*Centropus sinensis*	Crow pheasant	Cuculidae	IV	LC
14	*Ceryle rudis*	Pied kingfisher	Alcedinidae	IV	LC
15	Cinnyris asiaticus	Purple Sunbird	Psittaculidae	IV	LC
16	*Columba livia*	Pigeon	Columbidae	IV	LC
17	*Corvus macrorhynchos*	Jungle crow	Corvidae	IV	LC
18	*Corvus splendens*	Crow	Corvidae	V	LC
19	*Dicrurus adsimilis*	Black drango	Dicruridae	IV	LC
20	*Egretta garzetta*	Little egret	Ardeidae	IV	LC
21	*Francolinus pondicerianus*	Titar	Phasianidae	IV	LC
22	*Gallinule chloropus*	Common moorhen	Rallidae	IV	LC
23	*Gallus gallus*	Jungle hen	Phasianidae	IV	LC
24	*Passer domesticus*	House sparrow	Passeridae	IV	LC
25	*Pluvialis fulva*	Pacific golden plover	Charadriidae	IV	LC
26	*Pseudibis papillosa*	Red-naped ibis	Threskiornithidae	IV	LC
27	*Psittacula krameri*	Rose ringed Parakeet	Psittacidae	IV	LC
28	*Pycnonotus cafer*	Red-vented bulbul	Pycnonotidae	IV	LC
29	*Sarkidiornis*	Knob-billed duck	Anatidae	IV	LC

	melanotos				
30	Saxicoloides fulicatus	Indian robin	Psittaculidae	IV	LC
31	Spilopelia senegalensis	Little brown dove	Columbidae	IV	LC
32	Sturnia pagodarum	Brahminy Starling	Sturnidae	IV	LC
33	*Tringa tetanus*	Common redshank	Charadriidae	IV	LC
34	*Turdoides caudate*	Common babbler	Leiothrichidae	IV	LC
35	*Upupa epops*	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 3.26: Butterflies observed from the Buffer zone of the study area

S.No.	Scientific Name	Common Name	Family	IUCN Status
1	*Catopsilia pomona*	Common emigrant	Pieridae	LC
2	*Chlosyne lacinia*	Sunflower/Bordered Patch	Nymphalidae	LC
3	*Crocothemis erythraea*	Scarlet dragonfly	Libellulidae	LC
4	*Danaus chrysippus*	Plain Tiger	Nymphalidae	LC
5	*Danaus genutia*	Stripped Tiger	Nymphalidae	LC
6	*Euploea core*	Common crow	Nymphalidae	LC
7	*Eurema brigitta*	Small grass yellow	Pieridae	LC
Source: 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 3.29 to 3.32.

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 3.27

Table 3.27: Zooplankton species found in the different water bodies situated in the buffer zone

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
	Protozoa										
1	*Arcella* sp.	+	+	+		+	+		+	NA	NA
2	*Arcella discoides*	+	+	+	+	+	+	+	+	NA	NA
3	*Arcella vulgaris*	+	+	+	+	+	+	+	+	NA	NA
4	*Centropyxis* sp.	+	+	+	+	+	+	+		NA	NA
5	*Centropyxis ecornis*		+			+	+		+	NA	NA
6	*Difflugia cuminata*	+	+		+	+	+		+	NA	NA
7	*Euglypha* sp.	+		+	+	+	+	+	+	NA	NA
8	*Metopus* sp.		+	+	+		+			NA	NA
	Total	**8**	**9**	**8**	**7**	**8**	**9**	**5**	**8**		
	Rotifera										
1	*Anuraeopsis*sp.	+		+	+	+	+	+	+	NA	NA
2	*Anuraeopsis fissa*				+	+	+	+	+	NA	NA
3	*Asplanchna* sp.	+	+	+		+	+	+	+	NA	NA
4	*Asplanchna brightwelli*		+		+	+	+	+	+	NA	NA
5	*Brachionus* sp.	+		+	+	+	+	+		NA	NA

6	*Brachionus angularis*		+						+	NA	NA
7	*Brachionus calyciflorus*	+	+	+	+		+	+	+	NA	NA
8	*Brachionus quadridentata*		+	+	+		+	+		NA	NA
9	*Brachionus falcatus*	+			+	+	+	+		NA	NA
10	*Brachionus forficula*	+		+		+	+		+	NA	NA
11	*Cephlodella gibba*	+	+		+	+	+	+		NA	NA
12	*Filinia* sp.	+					+	+	+	NA	NA
13	*Filinia longiseta*		+	+		+		+	+	NA	NA
14	*Keratella* sp.	+		+		+			+	NA	NA
15	*Keratella Cochlearis*	+	+	+	+	+	+	+	+	NA	NA
16	*Keratella Tropica*	+	+		+		+	+		NA	NA
17	*Lecane* sp.				+		+	+	+	NA	NA
18	*Lecane luna*	+		+		+	+		+	NA	NA
19	*Monostyla quadridentatus*		+	+						NA	NA
20	*Mytilina* sp.	+			+	+	+	+	+	NA	NA
21	*Polyarthra vulgaris*	+		+		+			+	NA	NA
22	*Testudinella patina*		+		+		+	+		NA	NA
23	*Trichocerca* sp.	+		+		+	+		+	NA	NA
	Total	**15**	**11**	**13**	**13**	**15**	**18**	**16**	**16**		
	Cladocera										
1	*Alona* sp.	+	+	+	+	+	+	+	+	NA	NA
2	*Alona intermediate*		+		+		+	+		NA	NA
3	*Bosmina* sp.	+		+	+	+	+	+	+	NA	NA
4	*Bosmina longirostris*	+		+			+	+		NA	NA
5	*Ceriodaphnia* sp.		+	+		+	+		+	NA	NA
6	*Chydorus sphaericus*	+	+		+		+	+		NA	NA
7	*Daphnia* sp.	+		+	+		+	+		NA	NA
8	*Daphnia pulex*	+			+	+	+		+	NA	NA
9	*Diaphnosoma excisum*	+	+	+			+	+		NA	NA
10	*Leydgia* sp.		+	+		+	+		+	NA	NA
11	*Moina daphnia*	+			+		+	+	+	NA	NA
12	*Simocephalus* sp.	+	+	+		+			+	NA	NA
	Total	**9**	**7**	**8**	**7**	**6**	**11**	**8**	**7**		

	Copepoda										
1	*Cyclops* sp.	+	+	+	+	+	+	+	+	NA	NA
2	*Diaptomus* sp.	+	+	+	+	+	+		+	NA	NA
3	*Eucyclops* sp.	+	+	+			+	+	+	NA	NA
4	*Heleodiaptomus viduus*	+	+			+	+			NA	NA
5	*Mesocyclops* sp.	+	+		+		+	+	+	NA	NA
6	*Nauplius larvae*	+	+	+	+	+	+	+	+	NA	NA
7	*Neodiaptomus* sp.		+		+		+		+	NA	NA
8	*Nitzii amphibia*	+	+	+	+	+	+	+		NA	NA
9	*Paradiaptomus* sp.	+		+	+		+		+	NA	NA
10	*Thermocyclops* sp.	+	+	+	+	+	+	+	+	NA	NA
11	*Thermocyclops crassus*	+	+	+	+	+	+	+	+	NA	NA
	Total	**10**	**10**	**8**	**9**	**7**	**11**	**7**	**9**		
	Ostracoda										
1	*Cyprinotus* sp.	+		+	+	+	+	+	+	NA	NA
2	*Cypris sp.*	+	+	+	+		+	+	+	NA	NA
3	*Stenocypris* sp.	+	+	+	+	+	+	+	+	NA	NA
4	*Stenocypris malcolmsoni*	+	+	+	+	+	+		+	NA	NA
	Total	**4**	**3**	**4**	**4**	**3**	**4**	3	**4**		

Source: 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 3.28.

Table 3.28: Macro-invertebrates recorded from the Core and Buffer zone

	Insecta										
1	*Baetis nymph*		+	+	+	+	+	+	+	NA	NE

2	*Caenid mayfly*	+			+		+			NA	NE
3	*Chironomus plumosus*	+	+	+	+	+	+	+	+	NA	NE
4	*Chironomus* sp.	+	+	+	+	+	+	+	+	NA	NE
5	*Damsel flies nymphs*	+			+		+			NA	NE
6	*Dragon flies nymphs*	+		+	+		+	+	+	NA	NE
7	*Ephydra larvae*	+	+	+	+	+	+			NA	NE
8	*Hirudineria glossophonia*		+			+	+	+	+	NA	NE
9	*Hirudineria sp.*	+	+	+			+	+	+	NA	NE
10	*Limnodrillus hoffmeisteri*	+					+			NA	NE
11	*Mayflies nymphs*		+		+		+	+	+	NA	NE
12	*Mosquitos larvae*	+	+	+	+	+	+	+	+	NA	NE
13	*Ranatra elongata*	+	+			+	+	+	+	NA	NE
14	*Ranatra filliformis*	+		+	+	+	+	+	+	NA	NE
15	*Stone flies nymphs*			+	+		+			NA	NE
16	*Tubifex tubifex*	+	+	+		+	+	+	+	NA	NE
	Total	**12**	**10**	**10**	**11**	**9**	**16**	**11**	**11**		
	Mollusca										
1	*Bellamya bengalensis*	+		+	+	+	+	+	+	NA	NE
2	*Corbicula fluminalis*		+	+	+	+	+	+	+	NA	NE
3	*Corbicula sp.*	+	+	+	+	+	+			NA	NE
4	*Gyraulus convexiculus*	+		+			+	+	+	NA	NE
5	*Gyraulus sp.*	+	+		+	+	+		+	NA	NE
6	*Lymnaea acuminata*	+		+		+		+	+	NA	NE
7	*Lymnaea sp.*	+	+	+	+	+	+	+		NA	NE
8	*Melanoides lineatus*		+	+			+		+	NA	NE
9	*Pila globosa(apple snail)*		+		+		+		+	NA	NE
10	*Pila sp.*	+		+	+	+	+	+	+	NA	NE
11	*Thira sp.*	+	+	+			+	+	+	NA	NE
12	*Thira tuberculata*	+	+	+	+		+		+	NA	NE
13	*Unio tigridis*			+	+		+	+	+	NA	NE
14	*Vivipara bengalensis*			+	+	+	+	+		NA	NE
	Total	**9**	**8**	**12**	**10**	**8**	**13**	**9**	**11**		
	Source: 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 3.29.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 3.29: Amphibians and Reptilesrecorded 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
1	*Agama buberculatus*	Rock Lizard	+	+	+	+	+	+	+	+	IV	LC
2	*Bufo melanostictus*	Common toad	+	+	+	+	+	+	+	+	IV	LC
3	*Bungarus caeruleus*	Common Krait	+	+	+	+	+	+	+	+	IV	LC
4	*Bungarus fasciatus*	Banded Krait	+	+	+	+	+	+	+	+	IV	LC
5	*Euphlyctis cyanophlyctis*	Indian skipper frog	+	+	+	+	+	+	+	+	IV	LC
6	*Hoplobatrachus tigerinus*	(Indian bullfrog).	+	+	+	+	+	+	+	+	IV	LC
7	*Chamelion calcarata*	Chameleon	+	+	+	+	+	+	+	+	II	LC
8	*Naja naja*	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 is mainly used for the culture of fishes. All these water bodies support fish species. Fishes found in the study area are listed in Table 3.30

Table 3.30 : 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	*Catla catla*	Cyprinidae	+	+	+	+		+		+	VU	NA
2	*Channa stiatus*	Chandadae					+	+	+		LC	NA
3	*Channa punctatus*	Chandadae			+	+	+		+	+	LC	NA
4	*Labeo bata*	Cyprinidae		+		+				+	LC	NA
5	*Labeo rohita*	Cyprinidae	+		+	+		+			LC	NA
6	*Macrobrachium malcomsoni*	Palaemonidae	+		+	+	+	+	+	+	LC	NA
7	*Mystus bleekri*	Bagridae		+			+	+			LC	NA
8	*Mystus tengara*	Bagridae	+	+	+	+	+	+	+	+	LC	NA
9	*Puntius sarana*	Cyprinidae			+			+	+	+	LC	NA
10	*Puntius sophore*	Cyprinidae	+	+	+		+			+	LC	NA
11	*Puntius stigma*	Cyprinidae			+	+		+			LC	NA
12	*Puntius ticto*	Cyprinidae		+	+	+			+	+	LC	NA
13	*Xenentodon cancila*	Belonidae	+					+			LC	NA
14	Pangasius buchanani	Pangasiidae	+	+	+	+	+	+		+	LC	NA
		Total	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, JamuiDistrict, 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.

3.6.13.2Fauna

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 onemajor district namedJamuiof Biharstate was compiled and placed in the form of tabulation and graphical representation.

Demography of the JamuiDistrict

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 922for 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&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&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& 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 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%.

Religions

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% (217,621 persons). All other four major religious communities have almost negligible percentages.

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.

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 districtof Bihar state respectively was compiled and placed in the form of tabulation and graphical representation. Entire study area is observed predominantly ruraland 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 'SandGhatProject', 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 166 villages and 4 Towns named Jhajha (NP), Tola Chain (CT), Tola Baliadih (CT) and Tola Pairamatihana (CT) lying under Jamui District in Bihar state.

Overall study area villages are falling mainly under 3 tehsils namely Jhajha (103 villages & 3 Towns), Khaira (02 villages), Sono (62 villages) of Jamui district in Bihar state. There are 12 villages were found as uninhabited villages in the study area.

Population Distribution (10 km)

As per the Census Records 2011, the total population of 10 km study zone was recorded as 243265persons of 115villages and one town named Jamui (NP) of Jamui district inBihar state. Male-female wise total population was recorded as 125851 males (51.74%) and 117414(48.3%) females respectively.

Total number of 'Households' was observed as 42890in the 10 km radius study zone. Scheduled Caste ('SC') population was observed as 30726persons consisting of 15798males (51.4%) and 14928 females (48.6%) in the 10km study zone. Scheduled Tribes ('ST') population was also observed as 10851 persons (4.5%) consisting of 5480 males (50.5%) and 5371females (49.5%) in the 10 km study zone.The child population (0-6 Age) of the study area is recorded as 45152(18.6%) and comprising of 22850 (50.6%)males&22302 (49.4%) females respectively.

Rural and Urban population distribution is shown in **Table 3.31** and **Figure 3.7 & 3.8** given as follows;

Table 3.31: Rural& Urban Population Distribution (10 km)

Zone	No. of Households	Total Population			Scheduled Castes			Scheduled Tribes		
		Persons	Males	Females	Persons	Males	Females	Persons	Males	Females
Rural	**32522**	**185289**	**95577**	**89712**	**20398**	**10490**	**9908**	**10369**	**5240**	**5129**
%age	75.8	76.2	76.0	76.4	66.4	66.4	66.4	95.6	95.6	95.5
Urban	**10368**	**57976**	**30274**	**27702**	**10328**	**5308**	**5020**	**482**	**240**	**242**
%age	24.2	23.8	24.0	23.6	33.6	33.6	33.6	4.4	4.4	4.5
Total (10km)	**42890**	**243265**	**125851**	**117414**	**30726**	**15798**	**14928**	**10851**	**5480**	**5371**
Source-Census of India, 2011										

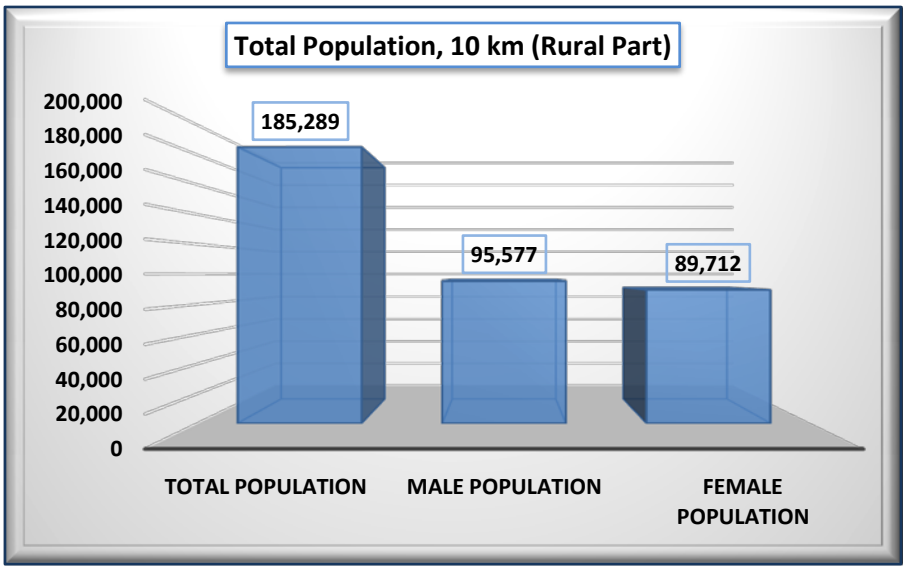

Figure 3.7: Male-Female Wise Rural Population Distribution

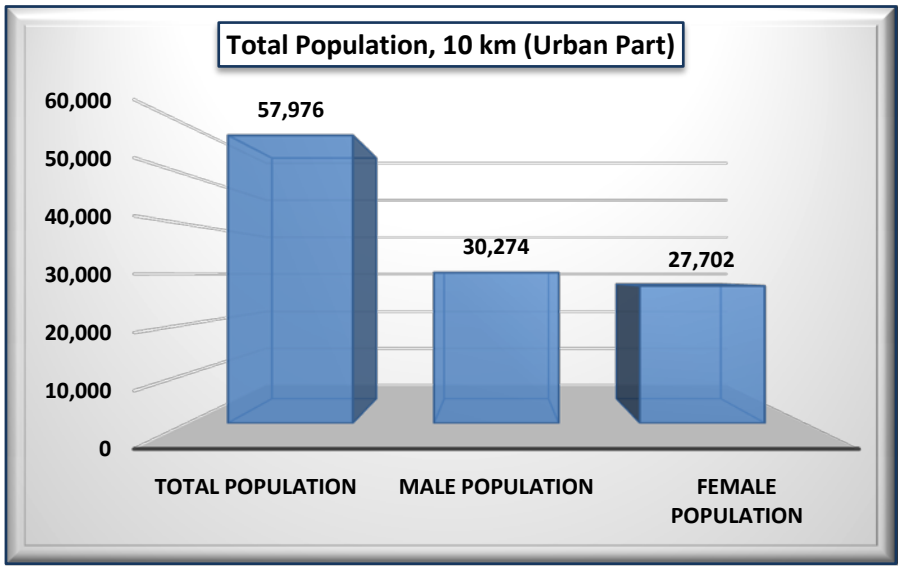

Figure 3.8: Male-Female Wise Urban Population Distribution

Village wise details of population distributionare 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	Males	Females	Persons	Males	Females
Tola Bhelbindha	195	1198	590	608	212	104	108
Tola Datkichwa	103	610	314	296	151	75	76
Tola Kaljugaha	114	595	310	285	100	50	50
Tola Kahbar khurd	59	317	157	160	64	32	32
Tola Kakania	61	317	165	152	62	26	36
Tola Kabar Kalan	104	559	281	278	113	56	57
Tola Pipra	79	393	197	196	73	34	39
Tola Dhawatanr	2	11	5	6	5	1	4
Tola Kanan	940	5545	2847	2698	1129	556	573
Tola Fatehpur	204	1189	605	584	234	104	130

Tola Benibank	111	685	359	326	102	51	51
Tola Ramdih	102	630	335	295	100	57	43
Tola Khoriparas	168	978	504	474	199	105	94
Tola Patao	218	1297	680	617	217	111	106
Tola EKdara	197	942	486	456	162	87	75
Tola Dhapri Kita	87	406	212	194	73	44	29
Tola Sundari	280	1371	703	668	223	114	109
Tola Algajara	190	1140	601	539	225	121	104
Tola Manikura	84	397	219	178	74	41	33
Tola Jiankura	Uninhabited village						
Tola Nathukura	Uninhabited village						
Tola Gongakura	99	604	300	304	134	64	70
Tola Nauakura	Uninhabited village						
Tola Dhobiakura	133	1067	557	510	252	128	124
Tola Chito Chak	472	2996	1584	1412	585	313	272
Tola Baramasia	435	2640	1359	1281	494	252	242
Tola Mahapur	510	2974	1547	1427	578	300	278
Tola Tumbapahar	489	2837	1436	1401	697	318	379
Tola Auria	377	2675	1399	1276	522	270	252
Tola Burhnair	82	690	352	338	128	62	66
Tola Harna	568	3097	1648	1449	569	291	278
Tola Satighat	286	2604	1354	1250	586	293	293
Tola Tetaria Kalan	103	559	298	261	123	68	55
Tola Tetaria Khurd	120	631	302	329	149	67	82
Tola Chilko	61	348	183	165	89	46	43
Tola Belatanr	171	992	518	474	185	100	85
Tola Tara Kura Nawadih	121	785	386	399	132	58	74
Tola Tara Kura Chhapa	415	2045	1010	1035	431	196	235
Tola Barajor	1976	12608	6505	6103	2394	1198	1196
Tola Harhanja	240	1306	691	615	271	133	138
Tola Chhapa	845	5139	2680	2459	968	502	466
Tola Baratanr	118	625	292	333	123	56	67
Tola Karhara	515	3001	1526	1475	600	288	312
Tola Karma	128	765	424	341	129	77	52
Tola Goradamgi	48	281	144	137	65	33	32
Tola Kathautia Kalan	43	188	99	89	32	16	16
Tola Kathautia Kurd	48	232	118	114	40	24	16
Tola Balapanrar	190	1093	573	520	213	109	104
Tola Fatehpur	224	1048	523	525	204	92	112
Tola Dumarmah	434	2421	1164	1257	440	212	228
Tola Sikardih	139	874	447	427	160	77	83
Tola Kauatol	125	685	345	340	112	61	51
Tola Porsil	10	72	39	33	6	3	3
Tola Parsatanr	110	608	329	279	69	35	34
Tola Ukharia	36	185	104	81	39	25	14
Tola Asta	302	1790	910	880	371	183	188
Tola Dario	236	1220	651	569	227	109	118
Tola Borwa	381	2067	1085	982	346	170	176
Tola Gandeghat	Uninhabited village						
Tola Bishunpur	92	446	214	232	79	37	42
Tola Bakhori Bathan	55	416	226	190	70	44	26
Tola Maniktham	120	762	390	372	143	68	75
Tola Narganjo	341	2009	1069	940	319	181	138

Tola Siritanr	5	26	12	14	5	1	4
Tola Tithichak	64	293	155	138	44	25	19
Tola Kumhaini	60	311	163	148	45	19	26
Tola Pidron	21	123	63	60	22	13	9
Tola Agaria Kalan	49	227	113	114	44	23	21
Tola Agaria Khurd	Uninhabited village						
Tola Rajla Kalan	677	3552	1819	1733	692	356	336
Tola Rajla Khurd	104	846	426	420	149	73	76
Tola Tabhwa	719	4188	2199	1989	891	447	444
Tola Naugain	250	1198	646	552	201	104	97
Tola Rupatari	Uninhabited village						
Tola Karma	66	334	171	163	77	45	32
Tola Nagarwatari	Uninhabited village						
Tola Parasi	362	2007	1045	962	463	212	251
Tola Dhakio	40	233	117	116	36	18	18
Tola Pipra	18	136	67	69	22	8	14
Tola Ghormara	45	401	221	180	108	55	53
Tola Ukharia	57	264	132	132	39	15	24
Tola Barakola	55	181	93	88	20	10	10
Tola Pichani	Uninhabited village						
Tola Pachkathia	43	192	100	92	23	10	13
Tola Paijharna	23	133	67	66	21	10	11
Tola Kansajharna	13	65	37	28	13	8	5
Tola Dhanukatari	18	89	55	34	4	2	2
Tola Jinatbhandar	16	82	38	44	7	2	5
Tola Jurpania	106	582	325	257	103	62	41
Tola Thelpathal	41	198	99	99	35	13	22
Machhendra	273	1619	834	785	338	192	146
Dadpur	331	1830	951	879	309	154	155
Dhiba	324	1776	935	841	335	168	167
Kharhaia Urf Jamu	641	3622	1873	1749	649	341	308
Sidhesri	748	3933	2080	1853	781	416	365
Hathia	1398	7411	3866	3545	1523	807	716
Tola Amakoli	62	330	163	167	54	29	25
Tola Dudharwa	50	181	90	91	36	15	21
Tola Hardia	31	132	63	69	27	10	17
Tola Dahua	30	159	82	77	27	12	15
Tola Ghorparan	52	239	104	135	39	18	21
Tola Patua	28	159	79	80	30	18	12
Tola Amjhari	7	24	11	13	2	1	1
Jhajha (NP)/22 Wards	7223	40646	21406	19240	5736	2936	2800
Tola Chain (CT)	1095	6072	3081	2991	1250	613	637
Tola Baliadih (CT) WARD NO.-0001	943	5400	2807	2593	1100	552	548
Nauniatanr	67	376	192	184	88	44	44
Dehuridih	364	2272	1154	1118	424	206	218
Tola Prembathan	15	94	48	46	12	6	6
Tola Teliachhourat	106	437	244	193	103	68	35
Tola Panbajan	169	925	471	454	185	96	89
Tola Binjhi	99	565	298	267	108	50	58
Tola Ghotari	27	181	92	89	41	20	21
Tola Pachpahri	29	135	68	67	31	16	15
Tola Angnapathal	42	247	129	118	44	18	26
Tola Dumri Kalan	Uninhabited village						

Tola Bagmadamgi	54	296	147	149	66	29	37
Tola Bhithra	298	1576	828	748	312	169	143
Tola Kurkuta	82	475	248	227	72	32	40
Tola Joktia	125	611	308	303	89	53	36
Tola Gobraha	35	164	92	72	41	22	19
Tola Mahapur Khurd	102	519	261	258	96	45	51
Tola Hariharpur	91	554	284	270	116	57	59
Tola Behrabad	Uninhabited village						
Tola Lakaraha	115	714	370	344	101	50	51
Tola Loha	205	1113	577	536	193	97	96
Tola Salaia	125	621	293	328	122	49	73
Tola Lohthara	143	757	372	385	134	77	57
Tola Chandra	36	206	109	97	45	26	19
Tola Terukha	183	1166	592	574	235	113	122
Tola Gamharia	40	252	128	124	36	18	18
Tola Oaira	19	107	58	49	21	10	11
Tola Koria	77	463	254	209	98	56	42
Tola Duba	83	746	396	350	116	57	59
Tola Kuanbank	139	851	465	386	168	89	79
Tola Rakat Rohinia	347	1884	997	887	422	219	203
Tola Karijhal	Uninhabited village						
Tola Chauki	117	671	345	326	162	85	77
Tola Asnalbari	42	258	132	126	49	27	22
Tola Kandualbar	199	1071	550	521	196	101	95
Tola Bhalguha	110	614	297	317	84	41	43
Tola Raghunatha	44	254	130	124	37	25	12
Tola Tilbaria	407	2228	1064	1164	616	296	320
Tola Dhawatia	93	577	295	282	120	60	60
Tola Mahathania	48	268	134	134	53	21	32
Tola Belabathan	153	918	462	456	200	90	110
Tola Kodwatanr	51	245	125	120	45	23	22
Tola Tharhi	278	1712	866	846	397	201	196
Tola Belamba	489	2866	1488	1378	674	341	333
Tola Chhapardih	204	1309	686	623	272	142	130
Tola Lakhankiari	855	4320	2165	2155	858	436	422
Tola Dhodhri	804	4570	2339	2231	868	440	428
Tola Amjhari	314	1712	851	861	362	191	171
Tola Jatkatwa	Uninhabited village						
Tola Ganglichip	Uninhabited village						
Tola Asuta	22	142	73	69	29	14	15
Tola Ukharia	25	130	53	77	27	13	14
Tola Piprabank	46	247	118	129	54	24	30
Tola Tetaria	358	1873	890	983	373	177	196
Tola Bhelwa	37	194	98	96	28	12	16
Tola Sengwaria	40	183	87	96	36	18	18
Tola Pahar	49	239	118	121	38	15	23
Tola Chanantanr	298	1311	674	637	247	128	119
Tola Gorwa Matihana	199	1130	575	555	214	106	108
Tola Kukurbhento	31	187	108	79	36	22	14
Tola Bharathpur	277	1662	835	827	377	187	190
Tola Balthar	335	1876	965	911	287	150	137
Tola Mandhata Majro	224	1242	613	629	265	128	137
Tola Sono	1833	9932	5321	4611	1607	845	762

Tola Pairamatihana (CT)	1107	5858	2980	2878	1130	558	572
TOTAL (10km)	**42890**	**243265**	**125851**	**117414**	**45152**	**22850**	**22302**
Source-Census of India, 2011							

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
Tola Bhelbindha	1198	104	56	48	45	25	20
Tola Datkichwa	610	0	0	0	0	0	0
Tola Kaljugaha	595	0	0	0	0	0	0
Tola Kahbar khurd	317	0	0	0	0	0	0
Tola Kakania	317	0	0	0	0	0	0
Tola Kabar Kalan	559	117	60	57	0	0	0
Tola Pipra	393	51	27	24	0	0	0
Tola Dhawatanr	11	0	0	0	0	0	0
Tola Kanan	5545	401	206	195	0	0	0
Tola Fatehpur	1189	114	66	48	0	0	0
Tola Benibank	685	0	0	0	0	0	0
Tola Ramdih	630	0	0	0	0	0	0
Tola Khoriparas	978	224	111	113	2	1	1
Tola Patao	1297	273	148	125	20	9	11
Tola EKdara	942	12	7	5	0	0	0
Tola Dhapri Kita	406	0	0	0	0	0	0
Tola Sundari	1371	1277	654	623	0	0	0
Tola Algajara	1140	0	0	0	0	0	0
Tola Manikura	397	0	0	0	0	0	0
Tola Jiankura	Uninhabited village						
Tola Nathukura	Uninhabited village						
Tola Gongakura	604	286	149	137	2	1	1
Tola Nauakura	Uninhabited village						
Tola Dhobiakura	1067	0	0	0	0	0	0
Tola Chito Chak	2996	430	223	207	0	0	0
Tola Baramasia	2640	0	0	0	0	0	0
Tola Mahapur	2974	0	0	0	0	0	0
Tola Tumbapahar	2837	0	0	0	352	172	180
Tola Auria	2675	103	53	50	0	0	0
Tola Burhnair	690	87	45	42	0	0	0
Tola Harna	3097	0	0	0	1	1	0
Tola Satighat	2604	0	0	0	0	0	0
Tola Tetaria Kalan	559	0	0	0	0	0	0
Tola Tetaria Khurd	631	0	0	0	0	0	0
Tola Chilko	348	8	4	4	0	0	0
Tola Belatanr	992	0	0	0	0	0	0
Tola Tara Kura Nawadih	785	152	77	75	419	208	211
Tola Tara Kura Chhapa	2045	128	61	67	59	27	32
Tola Barajor	12608	1413	722	691	100	54	46
Tola Harhanja	1306	177	90	87	0	0	0
Tola Chhapa	5139	839	428	411	2	1	1
Tola Baratanr	625	27	13	14	0	0	0
Tola Karhara	3001	609	320	289	0	0	0
Tola Karma	765	210	108	102	0	0	0

Tola Goradamgi	281	0	0	0	270	140	130
Tola Kathautia Kalan	188	0	0	0	148	76	72
Tola Kathautia Kurd	232	0	0	0	232	118	114
Tola Balapanrar	1093	41	23	18	0	0	0
Tola Fatehpur	1048	291	142	149	104	52	52
Tola Dumarmah	2421	0	0	0	181	87	94
Tola Sikardih	874	0	0	0	0	0	0
Tola Kauatol	685	47	22	25	84	39	45
Tola Porsil	72	0	0	0	0	0	0
Tola Parsatanr	608	0	0	0	0	0	0
Tola Ukharia	185	0	0	0	169	97	72
Tola Asta	1790	425	224	201	1084	543	541
Tola Dario	1220	144	82	62	91	47	44
Tola Borwa	2067	127	71	56	118	60	58
Tola Gandeghat	Uninhabited village						
Tola Bishunpur	446	140	70	70	0	0	0
Tola Bakhori Bathan	416	34	18	16	7	3	4
Tola Maniktham	762	15	6	9	376	202	174
Tola Narganjo	2009	1	1	0	820	428	392
Tola Siritanr	26	0	0	0	26	12	14
Tola Tithichak	293	0	0	0	196	103	93
Tola Kumhaini	311	0	0	0	178	87	91
Tola Pidron	123	0	0	0	0	0	0
Tola Agaria Kalan	227	0	0	0	0	0	0
Tola Agaria Khurd	Uninhabited village						
Tola Rajla Kalan	3552	222	116	106	0	0	0
Tola Rajla Khurd	846	0	0	0	198	99	99
Tola Tabhwa	4188	155	71	84	6	5	1
Tola Naugain	1198	182	100	82	12	6	6
Tola Rupatari	Uninhabited village						
Tola Karma	334	0	0	0	331	169	162
Tola Nagarwatari	Uninhabited village						
Tola Parasi	2007	787	409	378	0	0	0
Tola Dhakio	233	0	0	0	213	106	107
Tola Pipra	136	0	0	0	0	0	0
Tola Ghormara	401	0	0	0	0	0	0
Tola Ukharia	264	12	6	6	224	111	113
Tola Barakola	181	24	12	12	0	0	0
Tola Pichani	Uninhabited village						
Tola Pachkathia	192	0	0	0	35	18	17
Tola Paijharna	133	0	0	0	132	66	66
Tola Kansajharna	65	0	0	0	65	37	28
Tola Dhanukatari	89	0	0	0	89	55	34
Tola Jinatbhandar	82	0	0	0	82	38	44
Tola Jurpania	582	0	0	0	517	285	232
Tola Thelpathal	198	0	0	0	198	99	99
Machhendra	1619	191	93	98	0	0	0
Dadpur	1830	310	156	154	1	0	1
Dhiba	1776	332	168	164	2	1	1
Kharhaia Urf Jamu	3622	866	459	407	11	5	6
Sidhesri	3933	602	317	285	0	0	0
Hathia	7411	1213	623	590	0	0	0
Tola Amakoli	330	0	0	0	0	0	0

Tola Dudharwa	181	0	0	0	181	90	91
Tola Hardia	132	0	0	0	132	63	69
Tola Dahua	159	0	0	0	40	18	22
Tola Ghorparan	239	3	1	2	0	0	0
Tola Patua	159	0	0	0	158	78	80
Tola Amjhari	24	0	0	0	24	11	13
Jhajha (NP)/22 Wards	40646	5549	2874	2675	398	191	207
Tola Chain (CT)	6072	2728	1360	1368	0	0	0
Tola Baliadih (CT) WARD NO.-0001	5400	1207	634	573	81	48	33
Nauniatanr	376	247	129	118	0	0	0
Dehuridih	2272	107	50	57	0	0	0
Tola Prembathan	94	0	0	0	61	30	31
Tola Teliachhourat	437	87	51	36	232	129	103
Tola Panbajan	925	78	38	40	0	0	0
Tola Binjhi	565	0	0	0	0	0	0
Tola Ghotari	181	0	0	0	0	0	0
Tola Pachpahri	135	63	32	31	0	0	0
Tola Angnapathal	247	0	0	0	0	0	0
Tola Dumri Kalan	Uninhabited village						
Tola Bagmadamgi	296	0	0	0	0	0	0
Tola Bhithra	1576	181	95	86	0	0	0
Tola Kurkuta	475	8	6	2	0	0	0
Tola Joktia	611	212	103	109	0	0	0
Tola Gobraha	164	0	0	0	0	0	0
Tola Mahapur Khurd	519	119	62	57	0	0	0
Tola Hariharpur	554	0	0	0	0	0	0
Tola Behrabad	Uninhabited village						
Tola Lakaraha	714	223	112	111	0	0	0
Tola Loha	1113	103	59	44	6	2	4
Tola Salaia	621	0	0	0	255	115	140
Tola Lohthara	757	0	0	0	0	0	0
Tola Chandra	206	124	64	60	0	0	0
Tola Terukha	1166	194	100	94	0	0	0
Tola Gamharia	252	0	0	0	0	0	0
Tola Oaira	107	0	0	0	0	0	0
Tola Koria	463	50	26	24	0	0	0
Tola Duba	746	1	1	0	0	0	0
Tola Kuanbank	851	0	0	0	0	0	0
Tola Rakat Rohinia	1884	2	1	1	4	3	1
Tola Karijhal	Uninhabited village						
Tola Chauki	671	60	30	30	0	0	0
Tola Asnalbari	258	6	1	5	105	54	51
Tola Kandualbar	1071	19	8	11	0	0	0
Tola Bhalguha	614	20	8	12	499	244	255
Tola Raghunatha	254	1	1	0	252	129	123
Tola Tilbaria	2228	213	106	107	128	57	71
Tola Dhawatia	577	0	0	0	0	0	0
Tola Mahathania	268	0	0	0	0	0	0
Tola Belabathan	918	0	0	0	0	0	0
Tola Kodwatanr	245	0	0	0	244	124	120
Tola Tharhi	1712	21	12	9	0	0	0
Tola Belamba	2866	0	0	0	103	46	57
Tola Chhapardih	1309	0	0	0	0	0	0

Tola Lakhankiari	4320	608	311	297	0	0	0
Tola Dhodhri	4570	667	323	344	4	2	2
Tola Amjhari	1712	0	0	0	0	0	0
Tola Jatkatwa	Uninhabited village						
Tola Ganglichip	Uninhabited village						
Tola Asuta	142	2	0	2	0	0	0
Tola Ukharia	130	0	0	0	127	51	76
Tola Piprabank	247	0	0	0	0	0	0
Tola Tetaria	1873	0	0	0	0	0	0
Tola Bhelwa	194	0	0	0	180	90	90
Tola Sengwaria	183	0	0	0	183	87	96
Tola Pahar	239	0	0	0	237	118	119
Tola Chanantanr	1311	1311	674	637	0	0	0
Tola Gorwa Matihana	1130	221	118	103	0	0	0
Tola Kukurbhento	187	0	0	0	0	0	0
Tola Bharathpur	1662	447	216	231	0	0	0
Tola Balthar	1876	539	275	264	0	0	0
Tola Mandhata Majro	1242	56	27	29	3	2	1
Tola Sono	9932	1202	633	569	9	4	5
Tola Pairamatihana (CT)	5858	844	440	404	3	1	2
TOTAL (10km)	**243265**	**30726**	**15798**	**14928**	**10851**	**5480**	**5371**
Source-Census of India, 2011							

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 922females per 1000 males in the District. The same was recorded as 933females for every 1000 males in the study area. The child (0-6 yr age) sex ratio of the stud area was observed as 976 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 3.33& Figure 3.9.**

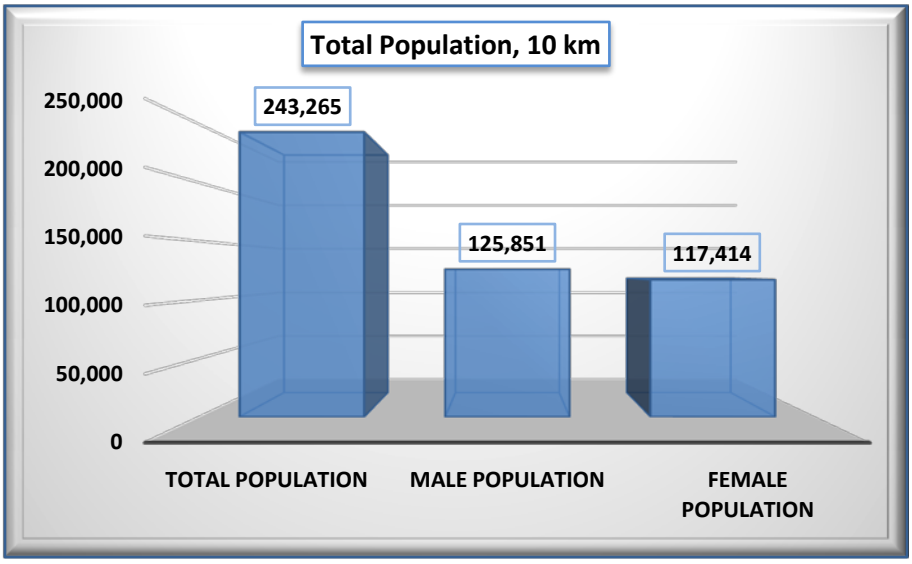

Figure 3.9:Male-Female Wise Population Distribution

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 30726persons consisting of 15798males and 14928females respectively in the study area which accounts as 12.6% to the total population (243265persons) of the study area. Scheduled Tribes ('ST') population was observed as 10851 persons,accounts as 4.5% to the total population of the study zone consisting of 5480males (50.5%) and 5371females (45.5%) in the 10km radius study zone.It implies that the rest 82.9% 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 3.10 & 3.11**as follows.

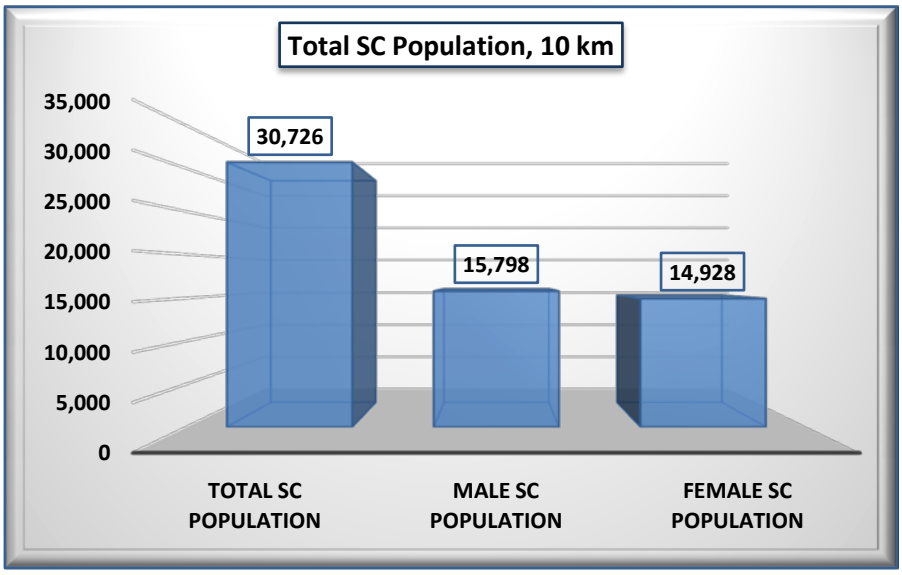

Figure 3.10:Scheduled Caste Population in the Study Area

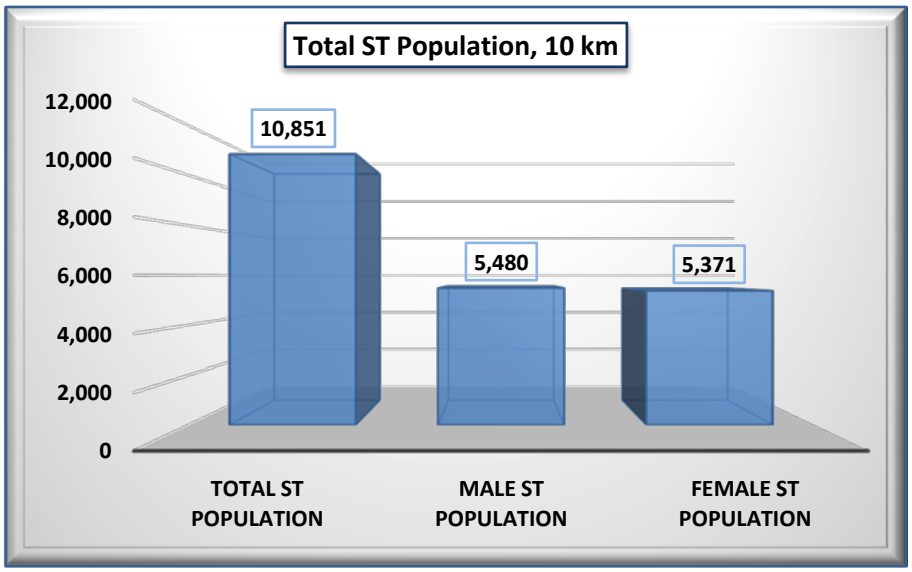

Figure 3.11:Scheduled Tribes Population in the Study Area

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.** Totalliterate's population was recorded as116787 persons (48.0%) in the study area.**Table 3.34**reveals that Male-Female wise literates are observed as 73655&43132persons respectively, implies that the 'Literacy Rate' is recorded as 48.0% with male-female wise percentages being 30.3% &17.7% respectively.

The Male-Female wise graphical representation of literates &illiterate's population in study area villages/town is shown in**Figure 3.12.**

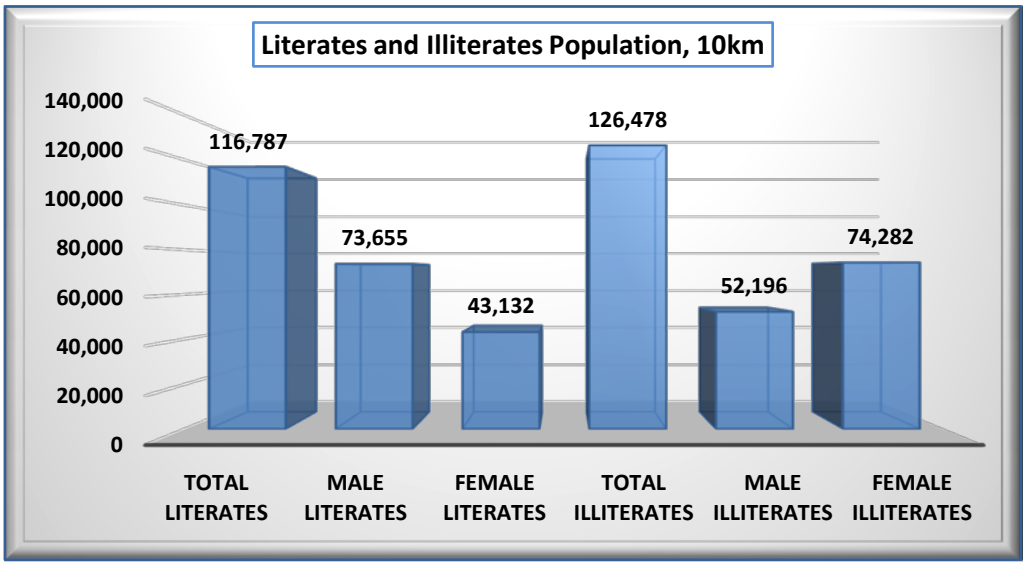

Figure 3.12: Male-Female Wise Distribution of Literates & Illiterates

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

Name of Village/Town	Total Population	Literates			Illiterates		
		Persons	Males	Females	Persons	Males	Females

Tola Bhelbindha	1198	538	356	182	660	234	426
Tola Datkichwa	610	226	156	70	384	158	226
Tola Kaljugaha	595	318	223	95	277	87	190
Tola Kahbar khurd	317	146	92	54	171	65	106
Tola Kakania	317	134	101	33	183	64	119
Tola Kabar Kalan	559	293	167	126	266	114	152
Tola Pipra	393	259	145	114	134	52	82
Tola Dhawatanr	11	4	3	1	7	2	5
Tola Kanan	5545	2559	1664	895	2986	1183	1803
Tola Fatehpur	1189	652	406	246	537	199	338
Tola Benibank	685	408	259	149	277	100	177
Tola Ramdih	630	286	188	98	344	147	197
Tola Khoriparas	978	515	330	185	463	174	289
Tola Patao	1297	648	438	210	649	242	407
Tola EKdara	942	498	321	177	444	165	279
Tola Dhapri Kita	406	222	140	82	184	72	112
Tola Sundari	1371	541	331	210	830	372	458
Tola Algajara	1140	621	417	204	519	184	335
Tola Manikura	397	257	160	97	140	59	81
Tola Jiankura	Uninhabited village						
Tola Nathukura	Uninhabited village						
Tola Gongakura	604	276	169	107	328	131	197
Tola Nauakura	Uninhabited village						
Tola Dhobiakura	1067	257	168	89	810	389	421
Tola Chito Chak	2996	1351	912	439	1645	672	973
Tola Baramasia	2640	897	494	403	1743	865	878
Tola Mahapur	2974	1297	877	420	1677	670	1007
Tola Tumbapahar	2837	1023	666	357	1814	770	1044
Tola Auria	2675	1305	870	435	1370	529	841
Tola Burhnair	690	238	132	106	452	220	232
Tola Harna	3097	1151	775	376	1946	873	1073
Tola Satighat	2604	850	604	246	1754	750	1004
Tola Tetaria Kalan	559	286	194	92	273	104	169
Tola Tetaria Khurd	631	189	96	93	442	206	236
Tola Chilko	348	109	77	32	239	106	133
Tola Belatanr	992	328	233	95	664	285	379
Tola Tara Kura Nawadih	785	347	226	121	438	160	278
Tola Tara Kura Chhapa	2045	633	447	186	1412	563	849
Tola Barajor	12608	6548	4175	2373	6060	2330	3730
Tola Harhanja	1306	474	360	114	832	331	501
Tola Chhapa	5139	1838	1319	519	3301	1361	1940
Tola Baratanr	625	95	67	28	530	225	305
Tola Karhara	3001	1186	789	397	1815	737	1078
Tola Karma	765	293	190	103	472	234	238
Tola Goradamgi	281	49	40	9	232	104	128
Tola Kathautia Kalan	188	68	49	19	120	50	70
Tola Kathautia Kurd	232	93	50	43	139	68	71
Tola Balapanrar	1093	477	339	138	616	234	382
Tola Fatehpur	1048	293	186	107	755	337	418
Tola Dumarmah	2421	1232	737	495	1189	427	762
Tola Sikardih	874	446	308	138	428	139	289
Tola Kauatol	685	101	78	23	584	267	317
Tola Porsil	72	1	0	1	71	39	32

Tola Parsatanr	608	338	231	107	270	98	172
Tola Ukharia	185	66	50	16	119	54	65
Tola Asta	1790	632	412	220	1158	498	660
Tola Dario	1220	499	350	149	721	301	420
Tola Borwa	2067	1289	822	467	778	263	515
Tola Gandeghat	Uninhabited village						
Tola Bishunpur	446	175	101	74	271	113	158
Tola Bakhori Bathan	416	191	126	65	225	100	125
Tola Manikthan	762	111	80	31	651	310	341
Tola Narganjo	2009	885	553	332	1124	516	608
Tola Siritanr	26	13	10	3	13	2	11
Tola Tithichak	293	89	53	36	204	102	102
Tola Kumhaini	311	148	107	41	163	56	107
Tola Pidron	123	52	32	20	71	31	40
Tola Agaria Kalan	227	38	24	14	189	89	100
Tola Agaria Khurd	Uninhabited village						
Tola Rajla Kalan	3552	1612	1047	565	1940	772	1168
Tola Rajla Khurd	846	84	66	18	762	360	402
Tola Tabhwa	4188	1633	1112	521	2555	1087	1468
Tola Naugain	1198	587	399	188	611	247	364
Tola Rupatari	Uninhabited village						
Tola Karma	334	127	83	44	207	88	119
Tola Nagarwatari	Uninhabited village						
Tola Parasi	2007	1017	656	361	990	389	601
Tola Dhakio	233	86	53	33	147	64	83
Tola Pipra	136	48	36	12	88	31	57
Tola Ghormara	401	251	147	104	150	74	76
Tola Ukharia	264	67	41	26	197	91	106
Tola Barakola	181	60	35	25	121	58	63
Tola Pichani	Uninhabited village						
Tola Pachkathia	192	73	50	23	119	50	69
Tola Paijharna	133	16	12	4	117	55	62
Tola Kansajharna	65	0	0	0	65	37	28
Tola Dhanukatari	89	34	26	8	55	29	26
Tola Jinatbhandar	82	29	14	15	53	24	29
Tola Jurpania	582	267	193	74	315	132	183
Tola Thelpathal	198	66	42	24	132	57	75
Machhendra	1619	891	505	386	728	329	399
Dadpur	1830	974	608	366	856	343	513
Dhiba	1776	788	543	245	988	392	596
Kharhaia Urf Jamu	3622	1566	995	571	2056	878	1178
Sidhesri	3933	2220	1418	802	1713	662	1051
Hathia	7411	2996	1980	1016	4415	1886	2529
Tola Amakoli	330	71	38	33	259	125	134
Tola Dudharwa	181	52	37	15	129	53	76
Tola Hardia	132	23	11	12	109	52	57
Tola Dahua	159	29	12	17	130	70	60
Tola Ghorparan	239	95	56	39	144	48	96
Tola Patua	159	22	9	13	137	70	67
Tola Amjhari	24	3	3	0	21	8	13
Jhajha (NP)/22 Wards	40646	27624	16137	11487	13022	5269	7753
Tola Chain (CT)	6072	2606	1648	958	3466	1433	2033
Tola Baliadih (CT) WARD NO.-0001	5400	2276	1472	804	3124	1335	1789

Nauniatanr	376	143	78	65	233	114	119
Dehuridih	2272	1058	654	404	1214	500	714
Tola Prembathan	94	61	34	27	33	14	19
Tola Teliachhourat	437	180	105	75	257	139	118
Tola Panbajan	925	335	233	102	590	238	352
Tola Binjhi	565	238	162	76	327	136	191
Tola Ghotari	181	90	51	39	91	41	50
Tola Pachpahri	135	48	30	18	87	38	49
Tola Angnapathal	247	113	76	37	134	53	81
Tola Dumri Kalan	Uninhabited village						
Tola Bagmadamgi	296	102	73	29	194	74	120
Tola Bhithra	1576	757	492	265	819	336	483
Tola Kurkuta	475	230	156	74	245	92	153
Tola Joktia	611	277	142	135	334	166	168
Tola Gobraha	164	34	24	10	130	68	62
Tola Mahapur Khurd	519	187	125	62	332	136	196
Tola Hariharpur	554	250	154	96	304	130	174
Tola Behrabad	Uninhabited village						
Tola Lakaraha	714	352	199	153	362	171	191
Tola Loha	1113	497	311	186	616	266	350
Tola Salaia	621	198	141	57	423	152	271
Tola Lohthara	757	291	193	98	466	179	287
Tola Chandra	206	80	47	33	126	62	64
Tola Terukha	1166	499	346	153	667	246	421
Tola Gamharia	252	64	36	28	188	92	96
Tola Oaira	107	56	36	20	51	22	29
Tola Koria	463	201	147	54	262	107	155
Tola Duba	746	369	252	117	377	144	233
Tola Kuanbank	851	350	257	93	501	208	293
Tola Rakat Rohinia	1884	598	398	200	1286	599	687
Tola Karijhal	Uninhabited village						
Tola Chauki	671	342	215	127	329	130	199
Tola Asnalbari	258	92	61	31	166	71	95
Tola Kandualbar	1071	551	377	174	520	173	347
Tola Bhalguha	614	346	201	145	268	96	172
Tola Raghunatha	254	90	55	35	164	75	89
Tola Tilbaria	2228	660	421	239	1568	643	925
Tola Dhawatia	577	295	188	107	282	107	175
Tola Mahathania	268	92	70	22	176	64	112
Tola Belabathan	918	357	227	130	561	235	326
Tola Kodwatanr	245	98	65	33	147	60	87
Tola Tharhi	1712	477	306	171	1235	560	675
Tola Belamba	2866	915	627	288	1951	861	1090
Tola Chhapardih	1309	493	319	174	816	367	449
Tola Lakhankiari	4320	2031	1308	723	2289	857	1432
Tola Dhodhri	4570	2101	1330	771	2469	1009	1460
Tola Amjhari	1712	722	452	270	990	399	591
Tola Jatkatwa	Uninhabited village						
Tola Ganglichip	Uninhabited village						
Tola Asuta	142	51	39	12	91	34	57
Tola Ukharia	130	53	24	29	77	29	48
Tola Piprabank	247	106	67	39	141	51	90
Tola Tetaria	1873	876	536	340	997	354	643

Tola Bhelwa	194	31	25	6	163	73	90
Tola Sengwaria	183	55	36	19	128	51	77
Tola Pahar	239	85	54	31	154	64	90
Tola Chanantanr	1311	687	436	251	624	238	386
Tola Gorwa Matihana	1130	418	274	144	712	301	411
Tola Kukurbhento	187	106	72	34	81	36	45
Tola Bharathpur	1662	695	441	254	967	394	573
Tola Balthar	1876	1176	696	480	700	269	431
Tola Mandhata Majro	1242	572	345	227	670	268	402
Tola Sono	9932	6311	3790	2521	3621	1531	2090
Tola Pairamatihana (CT)	5858	2570	1687	883	3288	1293	1995
TOTAL (10km)	**243265**	**116787**	**73655**	**43132**	**126478**	**52196**	**74282**
Source-Census of India, 2011							

Economic Profile ofJamuiDistrict:

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 inorder 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 71995(30.0%) and 35394(14.0%) to the total population (243265), while the remaining 135876(56.0%) 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 aplenty.

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.**

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

Name of the Village/Town	MAIN WORK_P	MAIN_CL_P	MAIN_AL_P	MAIN_HH_P	MAIN_OT_P	MARG WORK_P	MARG_CL_P	MARG_AL_P	MARG_HH_P	MARG_OT_P
Tola Bhelbindha	365	16	117	209	23	258	9	48	190	11
Tola Datkichwa	335	0	4	330	1	6	0	0	6	0
Tola Kaljugaha	41	2	34	0	5	176	1	170	0	5
Tola Kahbar khurd	26	0	26	0	0	133	0	131	0	2
Tola Kakania	1	0	0	0	1	163	0	163	0	0
Tola Kabar Kalan	140	26	100	3	11	128	2	118	0	8
Tola Pipra	10	4	3	1	2	211	16	163	14	18
Tola Dhawatanr	0	0	0	0	0	4	0	4	0	0
Tola Kanan	1682	160	213	1063	246	995	58	323	465	149
Tola Fatehpur	349	232	65	4	48	94	0	20	4	70
Tola Benibank	34	1	0	0	33	136	56	27	1	52
Tola Ramdih	191	64	32	50	45	30	6	3	7	14
Tola Khoriparas	396	155	134	68	39	16	0	14	0	2
Tola Patao	351	91	18	147	95	98	20	47	1	30
Tola EKdara	275	102	153	3	17	73	0	73	0	0
Tola Dhapri Kita	118	0	0	92	26	77	18	27	0	32
Tola Sundari	569	7	6	236	320	119	1	10	90	18
Tola Algajara	518	102	91	235	90	2	0	0	1	1
Tola Manikura	21	0	1	1	19	162	3	155	3	1
Tola Jiankura	Uninhabited village									
Tola Nathukura	Uninhabited village									
Tola Gongakura	173	10	8	46	109	75	1	3	44	27
Tola Nauakura	Uninhabited village									
Tola Dhobiakura	311	1	0	0	310	8	0	4	1	3
Tola Chito Chak	1556	26	16	210	1304	25	1	0	2	22
Tola Baramasia	1168	214	33	118	803	104	3	24	46	31
Tola Mahapur	827	76	145	307	299	564	45	56	269	194
Tola Tumbapahar	399	96	115	136	52	915	40	205	222	448
Tola Auria	910	95	179	199	437	407	90	25	240	52

Tola Burhnair	297	0	33	3	261	31	0	10	1	20
Tola Harna	958	355	110	285	208	471	68	40	247	116
Tola Satighat	1155	10	3	116	1026	95	0	25	2	68
Tola Tetaria Kalan	288	4	2	253	29	4	0	0	1	3
Tola Tetaria Khurd	297	1	144	150	2	4	0	2	2	0
Tola Chilko	112	2	43	62	5	47	0	35	11	1
Tola Belatanr	94	2	39	8	45	398	0	213	158	27
Tola Tara Kura Nawadih	321	38	260	6	17	125	3	115	2	5
Tola Tara Kura Chhapa	348	2	334	5	7	626	1	253	342	30
Tola Barajor	2548	576	450	776	746	2907	93	1092	893	829
Tola Harhanja	613	202	18	303	90	8	3	4	0	1
Tola Chhapa	751	467	157	56	71	1311	164	478	533	136
Tola Baratanr	95	49	45	0	1	219	1	148	20	50
Tola Karhara	1291	123	372	468	328	263	6	96	38	123
Tola Karma	159	143	3	5	8	4	2	0	1	1
Tola Goradamgi	131	29	99	0	3	4	0	4	0	0
Tola Kathautia Kalan	1	1	0	0	0	98	4	91	3	0
Tola Kathautia Kurd	1	0	0	0	1	124	0	122	2	0
Tola Balapanrar	104	102	1	0	1	439	32	120	276	11
Tola Fatehpur	328	64	70	188	6	189	2	92	91	4
Tola Dumarmah	437	10	110	301	16	466	7	321	112	26
Tola Sikardih	8	7	1	0	0	464	16	209	19	220
Tola Kauatol	350	45	115	169	21	7	0	2	5	0
Tola Porsil	43	0	0	43	0	0	0	0	0	0
Tola Parsatanr	282	1	115	164	2	13	0	3	8	2
Tola Ukharia	26	23	3	0	0	54	19	35	0	0
Tola Asta	708	4	356	46	302	391	0	21	304	66
Tola Dario	344	102	174	36	32	200	9	46	66	79
Tola Borwa	790	97	187	163	343	169	1	61	52	55
Tola Gandeghat	Uninhabited village									
Tola Bishunpur	132	1	1	122	8	136	44	44	19	29
Tola Bakhori Bathan	186	75	29	1	81	46	0	1	13	32
Tola Manikthan	192	4	176	3	9	196	0	14	17	165

Tola Narganjo	295	67	41	122	65	950	55	583	256	56
Tola Siritanr	10	5	0	0	5	2	1	0	0	1
Tola Tithichak	24	1	20	0	3	139	4	132	0	3
Tola Kumhaini	163	73	0	6	84	0	0	0	0	0
Tola Pidron	52	21	0	0	31	0	0	0	0	0
Tola Agaria Kalan	127	0	0	8	119	0	0	0	0	0
Tola Agaria Khurd	Uninhabited village									
Tola Rajla Kalan	1548	105	428	488	527	161	19	72	5	65
Tola Rajla Khurd	358	0	57	245	56	16	0	2	4	10
Tola Tabhwa	1204	244	474	382	104	647	42	147	318	140
Tola Naugain	437	49	354	2	32	92	10	51	7	24
Tola Rupatari	Uninhabited village									
Tola Karma	88	78	0	0	10	64	1	0	0	63
Tola Nagarwatari	Uninhabited village									
Tola Parasi	258	52	14	167	25	628	24	280	12	312
Tola Dhakio	9	2	3	0	4	67	2	63	0	2
Tola Pipra	45	24	11	9	1	16	1	3	11	1
Tola Ghormara	181	43	48	79	11	15	3	2	8	2
Tola Ukharia	5	0	1	0	4	111	0	111	0	0
Tola Barakola	62	29	17	14	2	29	1	12	15	1
Tola Pichani	Uninhabited village									
Tola Pachkathia	55	54	0	1	0	55	0	0	55	0
Tola Paijharna	32	1	30	0	1	52	41	11	0	0
Tola Kansajharna	22	0	22	0	0	8	0	8	0	0
Tola Dhanukatari	24	0	24	0	0	23	0	22	1	0
Tola Jinatbhandar	17	0	16	1	0	22	0	22	0	0
Tola Jurpania	12	0	3	1	8	256	0	71	179	6
Tola Thelpathal	101	97	3	0	1	0	0	0	0	0
Machhendra	206	40	115	15	36	460	6	106	292	56
Dadpur	564	100	178	192	94	334	19	135	128	52
Dhiba	687	59	121	90	417	95	2	38	15	40
Kharhaia Urf Jamu	1496	149	214	401	732	71	5	23	11	32
Sidhesri	1219	131	561	362	165	737	155	109	405	68

Hathia	1959	220	403	988	348	1638	176	459	793	210
Tola Amakoli	193	93	2	98	0	0	0	0	0	0
Tola Dudharwa	43	0	40	0	3	59	0	2	53	4
Tola Hardia	36	0	26	10	0	33	0	25	8	0
Tola Dahua	1	0	0	0	1	48	0	0	0	48
Tola Ghorparan	40	0	36	0	4	1	0	1	0	0
Tola Patua	0	0	0	0	0	48	0	1	0	47
Tola Amjhari	0	0	0	0	0	9	0	2	0	7
Jhajha (NP)/22 Wards	10575	348	1070	1328	7829	3210	50	760	344	2056
Tola Chain (CT)	1402	176	217	892	117	1401	934	199	181	87
Tola Baliadih (CT) WARD NO.-0001	1666	84	686	596	300	822	72	517	172	61
Nauniatanr	133	0	132	0	1	70	0	70	0	0
Dehuridih	483	74	284	97	28	518	60	318	97	43
Tola Prembathan	29	20	0	5	4	2	1	0	1	0
Tola Teliachhourat	129	47	5	1	76	9	1	4	0	4
Tola Panbajan	448	13	118	222	95	94	8	8	37	41
Tola Binjhi	257	40	93	122	2	4	1	1	1	1
Tola Ghotari	69	18	26	25	0	1	0	1	0	0
Tola Pachpahri	33	0	30	0	3	39	0	0	34	5
Tola Angnapathal	45	6	36	0	3	63	0	1	49	13
Tola Dumri Kalan	Uninhabited village									
Tola Bagmadamgi	139	8	27	69	35	4	0	2	0	2
Tola Bhithra	577	44	239	228	66	258	21	149	67	21
Tola Kurkuta	1	0	1	0	0	285	0	276	3	6
Tola Joktia	124	0	1	66	57	202	4	112	63	23
Tola Gobraha	85	3	0	0	82	0	0	0	0	0
Tola Mahapur Khurd	282	19	133	120	10	10	0	2	8	0
Tola Hariharpur	201	43	37	79	42	9	3	0	4	2
Tola Behrabad	Uninhabited village									
Tola Lakaraha	202	54	4	2	142	144	0	84	7	53
Tola Loha	430	65	228	3	134	76	2	48	0	26
Tola Salaia	129	0	0	123	6	150	0	149	0	1

Tola Lohthara	348	2	114	211	21	49	0	12	31	6
Tola Chandra	106	5	60	40	1	4	0	1	3	0
Tola Terukha	502	2	262	199	39	4	0	0	2	2
Tola Gamharia	70	1	0	68	1	70	0	70	0	0
Tola Oaira	28	27	0	0	1	0	0	0	0	0
Tola Koria	232	153	9	30	40	11	5	0	3	3
Tola Duba	322	65	257	0	0	2	1	1	0	0
Tola Kuanbank	387	13	65	211	98	21	2	0	8	11
Tola Rakat Rohinia	404	114	36	121	133	542	35	254	19	234
Tola Karijhal	0	0	0	0	0	0	0	0	0	0
Tola Chauki	103	23	0	51	29	133	16	34	75	8
Tola Asnalbari	128	5	90	32	1	3	1	0	0	2
Tola Kandualbar	557	218	197	110	32	6	2	1	0	3
Tola Bhalguha	255	1	151	89	14	39	0	3	19	17
Tola Raghunatha	76	18	0	0	58	6	0	0	0	6
Tola Tilbaria	681	58	195	400	28	335	0	2	307	26
Tola Dhawatia	240	36	80	86	38	4	1	0	0	3
Tola Mahathania	81	0	41	38	2	51	0	45	6	0
Tola Belabathan	400	4	130	208	58	10	1	2	7	0
Tola Kodwatanr	5	0	0	0	5	137	0	122	10	5
Tola Tharhi	325	2	119	179	25	417	47	66	298	6
Tola Belamba	1158	81	144	843	90	246	1	33	44	168
Tola Chhapardih	671	104	166	385	16	8	0	1	2	5
Tola Lakhankiari	639	113	388	55	83	1840	36	738	784	282
Tola Dhodhri	2145	299	406	1239	201	169	5	46	52	66
Tola Amjhari	585	101	177	274	33	345	52	90	143	60
Tola Jatkatwa	Uninhabited village									
Tola Ganglichip	Uninhabited village									
Tola Asuta	25	0	0	25	0	42	0	36	6	0
Tola Ukharia	22	0	3	19	0	36	1	29	2	4
Tola Piprabank	107	56	31	11	9	8	2	1	2	3
Tola Tetaria	714	254	186	204	70	297	6	84	185	22
Tola Bhelwa	14	4	1	5	4	66	15	3	42	6

Tola Sengwaria	32	0	2	15	15	77	11	0	63	3
Tola Pahar	122	1	118	2	1	2	0	0	1	1
Tola Chanantanr	469	5	8	278	178	188	1	11	151	25
Tola Gorwa Matihana	509	202	157	138	12	39	2	3	10	24
Tola Kukurbhento	83	10	2	30	41	1	0	0	0	1
Tola Bharathpur	415	22	122	172	99	284	8	31	5	240
Tola Balthar	490	246	73	71	100	178	45	20	98	15
Tola Mandhata Majro	343	41	130	80	92	120	19	17	78	6
Tola Sono	3042	351	623	898	1170	68	14	9	30	15
Tola Pairamatihana (CT)	1992	291	293	1116	292	791	10	195	440	146
TOTAL (10km)	**71995**	**9746**	**16408**	**22782**	**23059**	**35394**	**2908**	**12664**	**11414**	**8408**

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

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
Main Workers	**71995 (29.0%)**
Male	44110(61.3%)
Female	27885(38.7%)
Marginal Workers	**35394(14.0%)**
Male	17716(50.0%)
Female	17678(50.0%)
Non-Workers	**135876(56.0%)**
Male	64025 (47.0%)
Female	71851(53.0%)
Total Population (10km)	**243265**
Source: Census of India Records, 2011	

Graphical representation of Workers Scenario is given below as**Figure 3.13.**

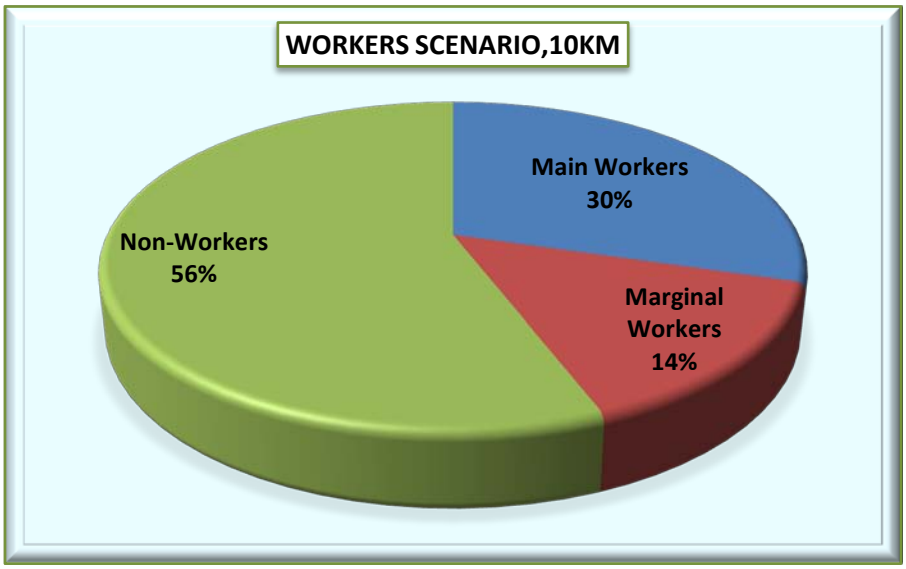

Figure 3.13: Workers Scenario of Study Area

Composition of Main Workers:

The 'Main Workers' were observed as 71995persons (30.0%) to the total population (243265) of the study area and its composition is made-up of Casual laborers as 9746 (13.0%), Agricultural laborers as 16408(23.0%), Household workers 22782(32.0%) and other workers as 23059(32.0%) respectively.

Composition of Main workers is shown below as**Figure 3.14.**

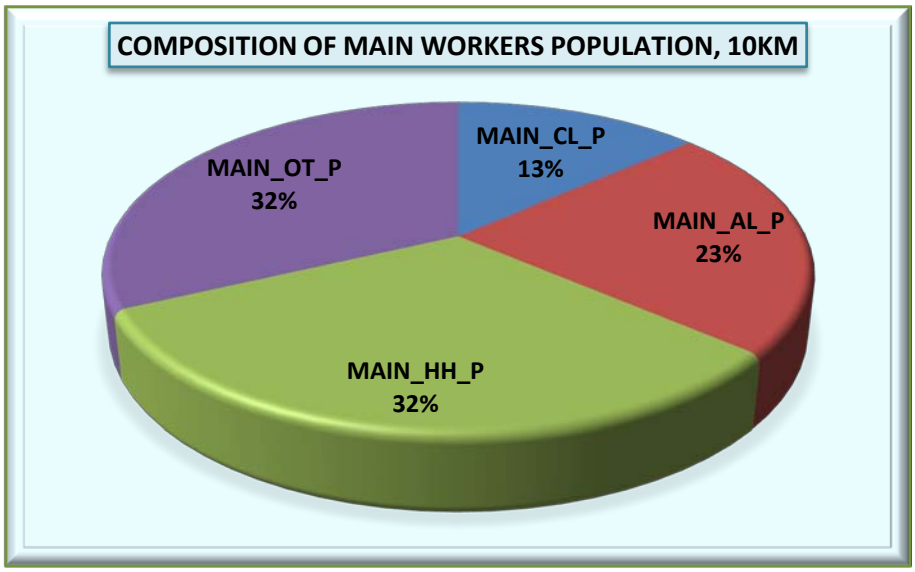

Figure 3.14:Composition of Main Workers Population

Composition of Marginal Workers:

The total marginal workers are observed as 35394 which constitute 14.0% to the total population (243265) comprising of Marginal Casual Laborers as 9746 (13.0%), Marginal Agricultural Laborers as 16408(23.0%), Marginal Household laborers as 22782 (32.0%) and marginal other workers were also observed as 23059 (32.0%) of the total marginal workers respectively.

Details about marginal workers in the study area are tabulated in**Table 3.36.** Composition of Marginal workers is shown in**Figure 3.15** as follows.

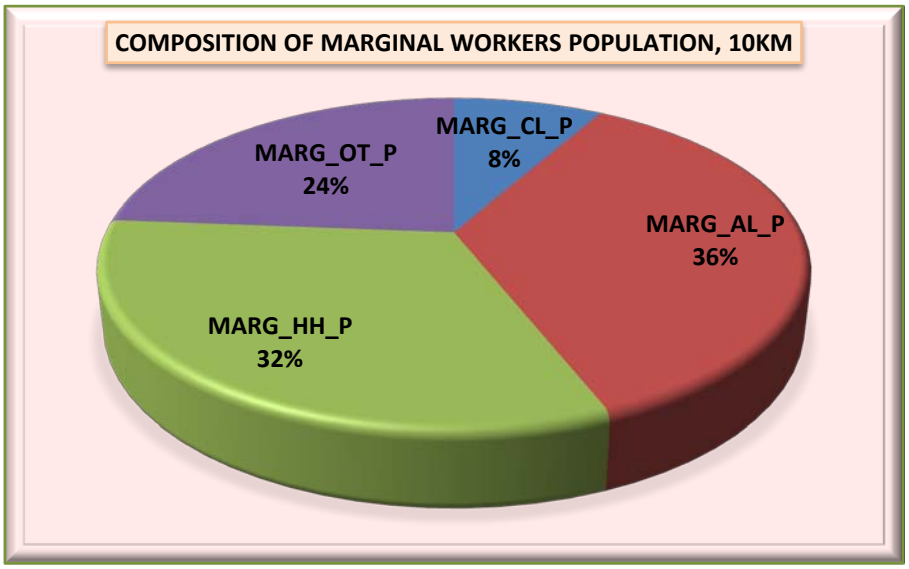

Figure 3.15: Composition of Marginal Workers

Composition of Non-Workers:

The total Non-worker's population was observed as 135876which accounts56.0% to the total population (243265) of the study area. Male-female wise Non-worker's population was recorded as 64025 Males (47.0%) and 71851Females (53.0%) 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 3.16.**

Table 3.37:Composition of Non-Workers

Non-Workers Population		
Persons	**Males**	**Females**
135876	64025(47.0%)	71851(53.%)

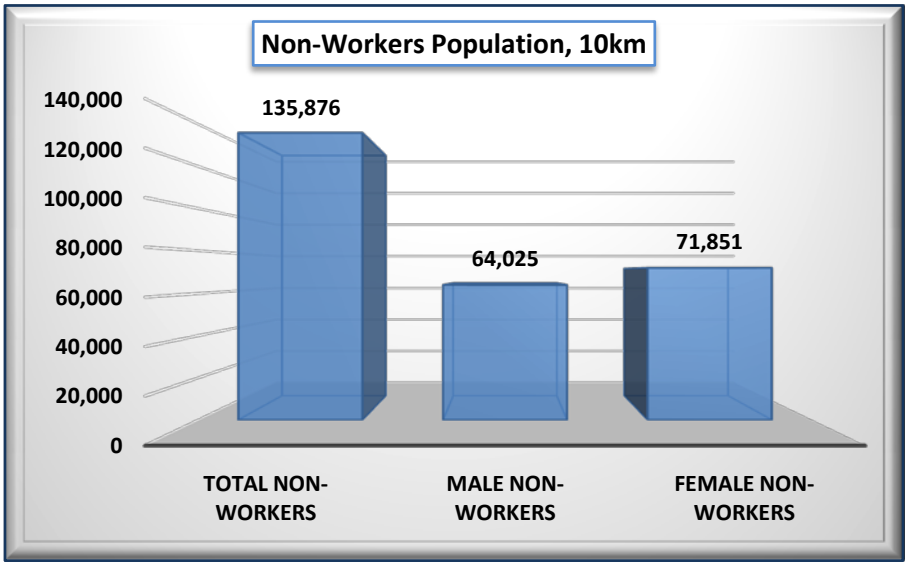

Figure 3.16: Composition of Non-Workers

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 JamuiDistrict 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 166 villages and 4 Towns named Jhajha (NP), Tola Chain (CT), Tola Baliadih (CT) and Tola Pairamatihana (CT) lying under Jamui District in Bihar state.

Overall study area villages are falling mainly under 3 tehsils namely Jhajha (103 villages & 3 Towns), Khaira (02 villages), Sono (62 villages) of Jamui district in Bihar state. There are 12 villages were found as uninhabited villages in the study area.

Educational Facilities

There isa total no. of123 Primary schools existing in the 10km radius study area.About 89 no of Middle schools are foundin the study area. About7Higher Secondary School (SS) and7Senior 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 5to 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 2no of primary health centersexistin 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 12no of Primary Health Sub-Centers exists in the villages of the study area. Only2Mother & Child Welfare Centersarefound in the study area. Noallopathic hospitalexists in the study area. Only 2medical dispansaryand Family Welfare Centereach werefound in the study area. Overall study area villages are served by average 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 170 villages/towns,only38 villages (22.4%)are served with River/Canal water in the study area. As per the census records 2011, only 7 villagesnamed were foundserved 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 poor postal facilities in the 10km radius zone. Only about 30 villages(17.6%) were foundserving 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. Only 13villages werefound with railway station facility in the study area.Site is well connected by National Highway & State Highwayroadalsopassing in the area. Nearest railway station Rajla Halt Station is situated at approx. 1.62 km towards East direction.Nearest habitation isTola Aurai situated within 1.0km towards SE direction.District Headquarters Jamui (District Court) is

situated within <5.0km towards NW direction. Gaya International Airport, Bihar, is located at approx. 150 km towards West 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 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, Khaira, 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 Bhukhli Kaoten. 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 allpurposes. Out of 170 villages/towns of the study area, about 100villages (58.8%) of the study area are electrified for domestic purpose, 91villages (53.5%) for agricultural purpose, commercial & for all purposes in the study area.Out of 170 villages/towns in the study area, 64villages (37.6%) including 12uninhabited villages (7.1%)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;

Table 3.38: Village wise Basic Amenities Availability(10km)

Name of the Village/Town	Educational				Medical							Drinking Water						CT	Communication & Transport				Approach to the Village				Power Supply				Nearest Town Distance, km
	P	M	SS	SSS	CHC	PHC	PHSC	MCWC	H	D	FWC	T	W	HP	TW	R	Tk		PO	PTO	BS	RS	PR	KR	NW	FP	ED	E Ag.	EC	EA	
Tola Bhelbindha	1	0	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	1	2	2	2	1	1	1	1	1	1	1	1	Jhaha,12km
Tola Datkichwa	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	1	1	1	1	2	2	2	2	Jhaha,10km
Tola Kaljugaha	1	1	0	0	0	0	0	0	0	0	0	2	1	1	1	1	2	2	1	2	2	2	1	1	1	1	1	1	1	1	Jhaha,12km
Tola Kahbar khurd	1	1	0	0	0	0	0	0	0	0	0	2	1	1	1	1	2	2	2	2	2	2	1	1	1	1	1	1	1	1	Jhaha,10km
Tola Kakania	1	1	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	2	2	2	1	1	1	1	1	1	1	1	Jhaha,10km
Tola Kabar Kalan	1	1	0	0	0	0	0	0	0	0	0	2	1	1	1	1	2	2	2	2	2	2	1	1	1	1	1	1	1	1	Jhaha,10km
Tola Pipra 1	1	1	0	0	0	0	0	0	0	0	0	2	1	1	1	1	2	2	2	2	2	2	1	1	1	1	1	1	1	1	Jhaha,10km
Tola Dhawatanr	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	1	1	1	1	2	2	2	2	Jhaha,10km
Tola Kanan	1	1	0	0	0	0	0	0	0	0	0	2	1	1	1	1	2	2	2	2	2	2	1	1	1	1	1	1	1	1	Jhaha,8km
Tola Fatehpur	1	1	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	Jhaha,5km
Tola Benibank	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	1	2	2	1	1	1	1	1	Jhaha,5km
Tola Ramdih	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	Jhaha,5km
Tola Khoriparas	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	2	2	1	1	1	1	1	Jhaha,6km
Tola Patao	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	1	2	1	1	1	1	1	Jhaha,9km
Tola EKdara	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	2	2	1	1	1	1	1	Jhaha,5km
Tola Dhapri Kita	1	1	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	Jhaha,2km
Tola Sundari	1	1	0	0	0	0	0	0	0	0	0	2	1	1	2	1	2	2	2	2	2	2	1	1	1	1	1	1	1	1	Jhaha,2km
Tola Algajara	4	4	0	0	0	0	0	0	0	0	0	2	1	1	1	1	2	2	2	2	2	2	1	1	1	1	1	1	1	1	Jhaha,1km
Tola Manikura	1	0	0	0	0	0	0	0	0	0	0	2	1	1	1	1	2	2	2	2	2	2	1	1	1	1	1	1	1	1	Jhaha,2km
Tola Jiankura	Uninhabited Village																														Jhaha,2km
Tola Nathukura	Uninhabited Village																														Jhaha,2km
Tola Gongakura	0	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	2	2	2	2	Jhaha,1km
Tola Nauakura	Uninhabited Village																														Jhaha,1km
Tola Dhobiakura	1	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	Jhaha,2km
Tola Chito Chak	1	1	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	Jhaha,2km
Tola Baramasia	1	1	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	1	2	2	2	1	1	2	1	1	1	1	1	Jhaha,2km
Tola Mahapur	1	1	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	Jhaha,2km

Tola Tumbapahar	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	1	2	2	2	2	2	1	1	2	1	1	2	2	2	Jhaha,3km
Tola Auria	1	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	Jhaha,3km
Tola Burhnair	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	2	1	2	1	1	1	1	1	Jhaha,3km
Tola Harna	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	2	2	1	1	1	1	1	Jhaha,4km
Tola Satighat	1	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	Jhaha,4km
Tola Tetaria Kalan	1	1	0	0	0	0	0	0	0	0	0	2	2	1	1	1	1	2	2	2	2	2	1	1	1	1	2	2	2	2	Jhaha,4km
Tola Tetaria Khurd	1	1	0	0	0	0	0	0	0	0	0	2	2	1	1	2	1	2	2	2	2	2	1	1	1	1	2	2	2	2	Jhaha,4km
Tola Chilko	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	1	1	1	2	2	2	2	Jhaha,5km
Tola Belatanr	1	1	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	Jhaha,5km
Tola Tara Kura Nawadih	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	1	2	2	2	2	2	1	1	1	1	2	2	2	2	Jhaha,7km
Tola Tara Kura Chhapa	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	1	1	1	1	1	2	2	2	Jhaha,8km
Tola Barajor	5	4	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	Jhaha,9km
Tola Harhanja	1	1	0	0	0	0	0	0	0	0	0	2	1	1	1	1	1	2	1	2	2	2	1	1	1	1	1	1	1	1	Jhaha,9km
Tola Chhapa	1	1	0	0	0	0	0	0	0	0	0	2	1	1	1	1	2	2	1	2	2	2	1	1	1	1	1	1	1	1	Jhaha,11km
Tola Baratanr	1	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	Jhaha,12km
Tola Karhara	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	1	2	2	2	1	2	2	1	1	2	2	2	Jhaha,12km
Tola Karma	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	2	1	2	1	2	2	2	2	Jhaha,12km
Tola Goradamgi	1	0	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	1	2	2	2	1	1	1	1	2	2	2	2	Jhaha,12km
Tola Kathautia Kalan	1	1	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	Jhaha,12km
Tola Kathautia Kurd	1	1	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	2	2	2	1	2	1	2	2	2	2	Jhaha,10km
Tola Balapanrar	1	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	Jhaha,11km
Tola Fatehpur	1	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	1	1	1	1	Jhaha,12km
Tola Dumarmah	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	2	2	2	Jhaha,12km
Tola Sikardih	1	1	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	Jhaha,12km
Tola Kauatol	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	Jhaha,18km
Tola Porsil	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	Jhaha,16km
Tola Parsatanr	1	1	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	Jhaha,15km
Tola Ukharia 1	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	Jhaha,15km
Tola Asta	1	0	0	0	0	0	1	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	2	2	1	2	2	2	2	Jhaha,15km
Tola Dario	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	1	2	2	2	1	1	2	1	2	2	2	2	Jhaha,15km
Tola Borwa	1	1	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	1	2	2	2	1	1	2	1	1	2	2	2	Jhaha,16km
Tola Gandeghat	Uninhabited Village																														Jhaha,16km
Tola Bishunpur	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	Jhaha,18km
Tola Bakhori Bathan	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	1	2	2	2	1	1	2	1	2	2	2	2	Jhaha,16km
Tola Manikthan	1	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	Jhaha,12km

Tola Narganjo	2	1	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	1	2	2	1	1	1	2	1	1	2	2	2	Jhaha,12km
Tola Siritanr	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	1	2	2	2	1	2	2	1	2	2	2	2	Jhaha,12km
Tola Tithichak	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	1	1	1	1	1	1	2	1	1	1	1	1	Jhaha,7km
Tola Kumhaini	1	1	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	Jhaha,7km
Tola Pidron	1	2	2	2	0	0	0	0	0	0	0	2	2	1	2	2	2	2	1	1	1	1	1	1	1	1	2	2	2	2	Jhaha,7km
Tola Agaria Kalan	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	1	2	2	2	2	2	2	1	2	1	2	2	2	2	Jhaha,6km
Tola Agaria Khurd	Uninhabited Village																														Jhaha,6km
Tola Rajla Kalan	1	1	0	0	0	1	1	1	0	1	1	2	2	1	2	2	2	2	1	2	1	1	1	1	2	1	1	1	1	1	Jhaha,6km
Tola Rajla Khurd	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	1	2	2	2	1	1	2	1	1	1	1	1	Jhaha,6km
Tola Tabhwa	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	Jhaha,6km
Tola Naugain	1	1	1	1	0	0	0	0	0	0	0	2	2	1	2	2	2	2	1	1	1	1	1	1	1	1	2	2	2	2	Jhaha,7km
Tola Rupatari	Uninhabited Village																														Jhaha,7km
Tola Karma	1	1	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	Jhaha,7km
Tola Nagarwatari	Uninhabited Village																														Jhaha,7km
Tola Parasi	0	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	Jhaha,16km
Tola Dhakio	1	1	1	1	0	0	0	0	0	0	0	2	2	1	2	2	2	2	1	1	2	2	2	1	2	1	2	2	2	2	Jhaha,15km
Tola Pipra 2	1	0	0	0	0	0	0	0	0	0	0	2	1	1	1	2	2	2	1	1	2	1	2	1	2	1	1	1	1	1	Jhaha,14km
Tola Ghormara	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	1	2	2	1	2	2	1	1	1	1	1	Jhaha,16km
Tola Ukharia 2	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	1	2	2	2	1	2	1	2	2	2	2	Jhaha,16km
Tola Barakola	1	1	1	1	0	0	0	0	0	0	0	2	2	1	1	2	2	2	1	1	2	2	1	1	1	1	2	2	2	2	Jhaha,12km
Tola Pichani	Uninhabited Village																														Jhaha,12km
Tola Pachkathia	1	1	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	1	2	1	2	1	2	1	2	2	2	2	Jhaha,12km
Tola Paijharna	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	1	1	2	2	1	1	2	1	2	2	2	2	Jhaha,21km
Tola Kansajharna	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	1	1	2	1	2	1	2	1	2	2	2	2	Jhaha,14km
Tola Dhanukatari	1	0	0	0	0	0	0	0	0	0	0	2	2	2	2	1	2	2	2	1	2	2	1	1	2	1	2	2	2	2	Jhaha,20km
Tola Jinatbhandar	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	1	2	2	2	1	2	1	2	2	2	2	Jhaha,19km
Tola Jurpania	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	1	2	2	2	1	1	2	1	2	2	2	2	Jhaha,16km
Tola Thelpathal	1	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	Jhaha,17km
Machhendra	1	1	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	Jhaha,7km
Dadpur	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	1	1	1	1	1	1	1	1	1	1	Jhaha,9km
Dhiba	1	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	1	1	1	1	Jhaha,7km
Kharhaia Urf Jamu	1	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	2	2	2	Jhaha,9km
Sidhesri	2	2	0	0	0	0	1	0	0	0	0	2	1	1	1	1	2	2	2	2	2	2	1	1	1	1	1	1	1	1	Jhaha,4km
Hathia	1	1	0	0	0	0	0	0	0	0	0	2	1	1	1	1	2	2	2	2	2	2	1	1	1	1	1	1	1	1	Jhaha,3km
Tola Amakoli	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	Jhaha,15km

Tola Dudharwa	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	1	1	2	1	1	1	2	1	2	2	2	2	Jhaha,10km
Tola Hardia	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	1	1	2	2	1	1	2	1	2	2	2	2	Jhaha,17km
Tola Dahua	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	Jhaha,24km
Tola Ghorparan	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	1	2	1	2	1	1	1	1	1	Jhaha,18km
Tola Patua	1	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	Jhaha,18km
Tola Amjhari 1	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	1	2	1	2	1	1	1	1	1	Jhaha,18km
Jhajha (NP)	Urban Part																														Jhajha (NP)
Tola Chain (CT)	Urban Part																														Tola Chain (CT)
Tola Baliadih (CT)	Urban Part																														Tola Baliadih (CT)
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
Dehuridih	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	1	2	2	2	2	1	2	1	1	2	2	2	Jamui,20km
Tola Prembathan	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	Jhaha,10km
Tola Teliachhourat	0	0	0	0	0	0	1	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	1	2	1	1	1	1	1	Jhaha,10km
Tola Panbajan	1	0	0	0	0	0	1	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	1	2	1	1	1	1	1	Jhaha,10km
Tola Binjhi	0	0	0	0	0	0	1	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	1	2	1	2	2	2	2	Jhaha,10km
Tola Ghotari	0	0	0	0	0	0	1	0	0	0	0	2	2	1	2	2	2	2	2	2	1	2	1	2	2	1	1	1	1	1	Jhaha,10km
Tola Pachpahri	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	1	1	1	1	Jhaha,10km
Tola Angnapathal	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	1	1	1	1	Jhaha,10km
Tola Dumri Kalan	Uninhabited Village																														Jhaha,10km
Tola Bagmadamgi	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	Jhaha,10km
Tola Bhithra	2	0	0	0	0	0	1	0	0	0	0	2	2	1	2	2	2	2	2	2	1	2	1	2	2	1	1	1	1	1	Jhaha,10km
Tola Kurkuta	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	1	1	1	1	Jhaha,10km
Tola Joktia	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	1	2	1	1	2	1	1	1	1	1	Jhaha,10km
Tola Gobraha	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	Jhaha,10km
Tola 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	1	2	1	1	1	1	1	Jhaha,10km
Tola Hariharpur	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	1	1	1	1	Jhaha,10km
Tola Behrabad	Uninhabited Village																														Jhaha,10km
Tola Lakaraha	1	1	0	0	0	1	1	1	0	1	1	2	2	1	2	2	2	2	2	2	2	2	2	1	2	1	1	1	1	1	Jhaha,10km
Tola Loha	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	2	2	1	1	1	1	1	Jhaha,10km
Tola Salaia	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	1	1	1	1	Jhaha,10km
Tola Lohthara	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	1	2	1	1	1	1	1	Jhaha,10km
Tola Chandra	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	1	1	1	1	Jhaha,10km
Tola Terukha	2	2	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	2	2	1	1	1	1	1	Jhaha,10km
Tola Gamharia	0	0	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	Jhaha,10km
Tola Oaira	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	Jhaha,12km

Tola Koria	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	1	1	1	1	Jhaha,16km
Tola Duba	1	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	1	1	1	1	Jhaha,18km
Tola Kuanbank	1	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	1	1	1	1	Jhaha,10km
Tola Rakat Rohinia	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	Jhaha,8km
Tola Karijhal	Uninhabited Village																														Jhaha,8km
Tola Chauki	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	1	1	1	1	Jhaha,11km
Tola Asnalbari	0	0	0	0	0	0	1	0	0	0	0	2	2	1	2	2	1	2	2	2	2	2	2	1	2	1	1	1	1	1	Jhaha,10km
Tola Kandualbar	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	1	1	1	1	Jhaha,10km
Tola Bhalguha	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	1	1	1	1	Jhaha,5km
Tola Raghunatha	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	2	1	1	1	1	1	1	Jhaha,10km
Tola Tilbaria	2	2	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	2	2	1	1	1	1	1	Jhaha,10km
Tola Dhawatia	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	1	1	1	1	Jhaha,10km
Tola Mahathania	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	2	1	1	1	1	1	1	Jhaha,10km
Tola Belabathan	0	0	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	Jhaha,10km
Tola Kodwatanr	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	2	1	1	1	1	1	1	Jhaha,10km
Tola Tharhi	2	2	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	2	2	1	1	1	1	1	Jhaha,10km
Tola Belamba	2	2	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	Jhaha,10km
Tola Chhapardih	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	Jhaha,10km
Tola Lakhankiari	1	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	Jhaha,10km
Tola Dhodhri	1	0	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	Jhaha,10km
Tola Amjhari 2	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	2	2	1	1	1	1	1	Jhaha,10km
Tola Jatkatwa	Uninhabited Village																														Jhaha,10km
Tola Ganglichip	Uninhabited Village																														Jhaha,10km
Tola Asuta	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	1	1	1	1	Jhaha,10km
Tola Ukharia 3	1	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	1	1	1	1	Jhaha,10km
Tola Piprabank	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	2	2	1	1	1	1	1	Jhaha,10km
Tola Tetaria	1	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	1	1	1	1	Jhaha,10km
Tola Bhelwa	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	1	1	1	1	Jhaha,10km
Tola Sengwaria	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	1	1	1	1	Jhaha,10km
Tola Pahar	1	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	1	1	1	1	Jhaha,10km
Tola Chanantanr	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	1	1	1	1	Jhaha,17km
Tola Gorwa Matihana	1	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	1	1	1	1	Jhaha,13km
Tola Kukurbhento	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	1	2	2	1	1	1	1	1	Jhaha,17km
Tola Bharathpur	1	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	1	1	1	1	Jhaha,20km
Tola Balthar	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	2	2	1	1	1	1	1	Jhaha,15km

Tola Mandhata Majro	1	0	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	Jhaha,12km
Tola Sono	1	3	2	2	0	0	0	0	0	0	0	2	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	Jhaha,12km
Tola Pairamatihana (CT)	Urban Part																														T. Pairamatihana (CT)
TOTAL (10km)	**123**	**89**	**7**	**7**	**0**	**2**	**12**	**2**	**0**	**2**	**2**	*Status for Availability and Non-Availability is shown as A (1) & NA (2) respectively*																				

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.

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 follows;

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 Simultalla Awasiya Vidyalaya which has been developed in pattern of Netarhat residential school (now in Jharkhand).

Famous Temples:

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

Jhumraj sthan, 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.

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 landuse 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 Ulai 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 (PM10) generated by ore and waste handling operations, transportation and screening of ore is the main respirable air pollutant. The emissions of Sulphur dioxide (SO2), Nitrogen Oxides (NO2) 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 (PM10) 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 PM10 during loading was calculated and found to be 1.92 x 10-3 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 PM10 during unloading and average wind

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 over burden by trucks operated per hour on haul road. Emission of PM10 due to transportation of sand on haul road was 1.65 x 10-4 g/s/m2 based on assumption that silt content spread on road surface was 5%, and efficiency of PM10 emission control 90%. Truck will be fully covered with tarpaulin material and emission of PM10 during on the haul road will be insignificant.

Based on the above consideration that there was low emission of PM10 during transportation of ore and overburden, however during loading & unloading, transportation of ore over the haul road, emission of PM10 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

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 PM10 was envisaged in southeast sector at very short distance from the site due to moderate to low wind speed.

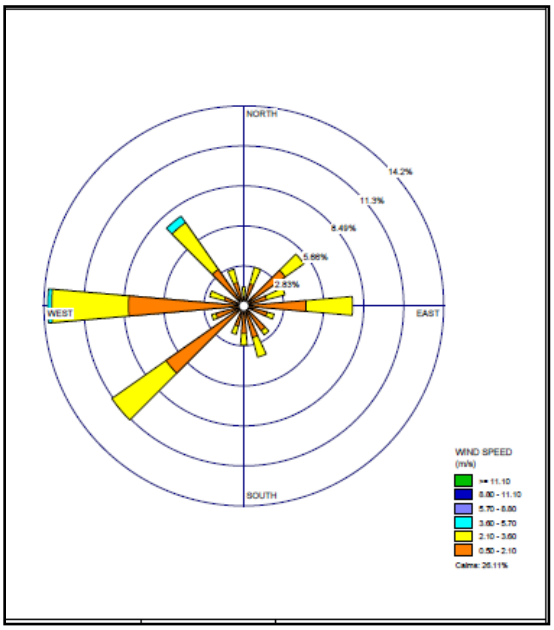

Figure 4.1: Wind Rose Diagram

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

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

- ✓ 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:

Table 4.1, Damage risk criteria for hearing loss OSHA regulations

Maximumallowable 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

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 Ulai 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

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.

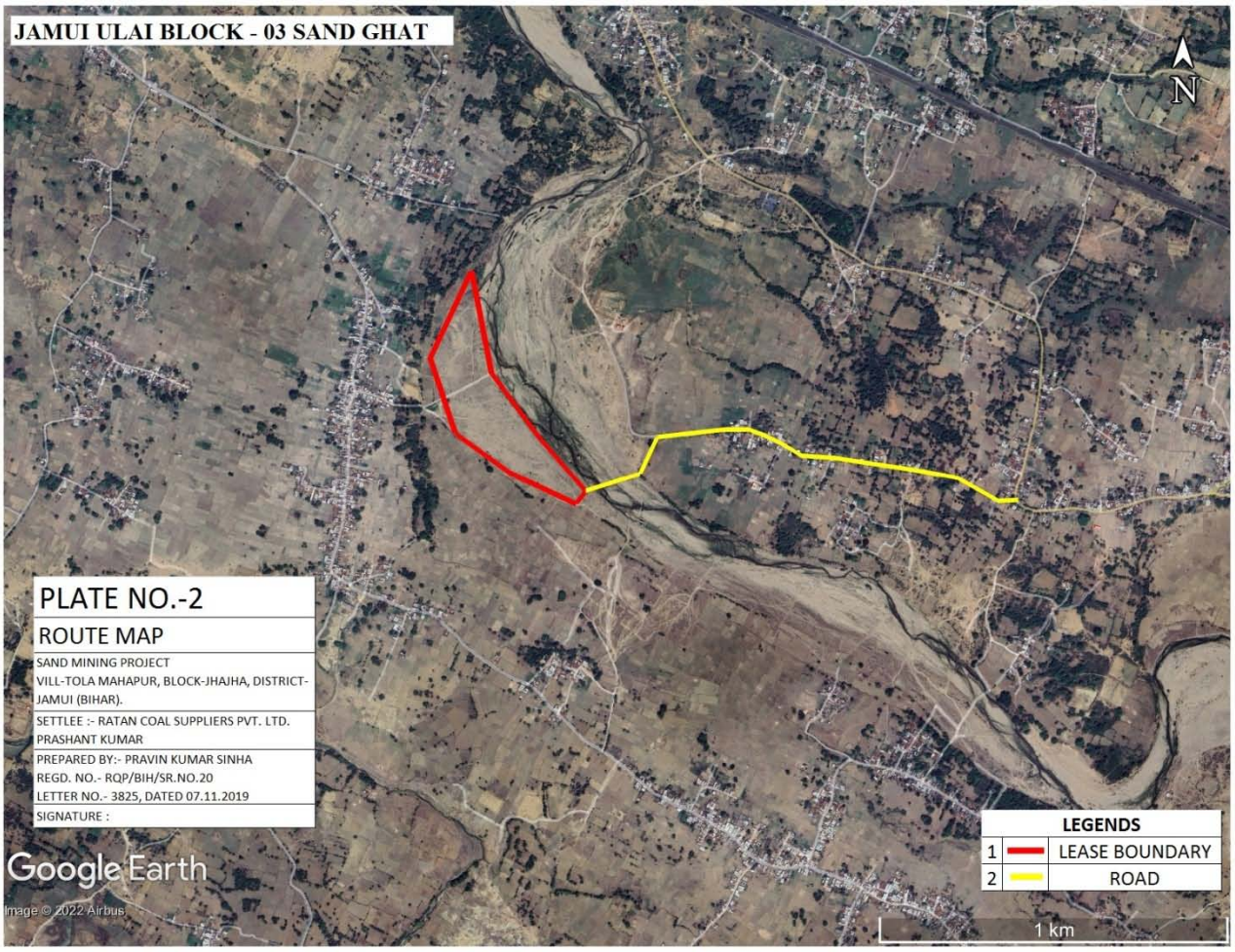

FIGURE 4.1 MAP SHOWING EVACUATION ROUTE FOR JAMUI ULAI BLOCK 03

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 03

Road	V	C	Existing V/C Ratio	LOS
National Highway 333 A	2500	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.

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 03**

Proposed Capacity of Mine/annum : 117561.6 TPA

No. of working days : 250 days

Proposed Capacity of mine/day : 470.24 or 471

Truck Capacity : 16 tonnes

No. of trucks deployed/day : 29.43 or 30

Increase in PCU/day (30*3) : 90

Table 4.2 (ii): Modified Traffic Scenario & LOS

Road	V	C	Modified V/C Ratio	LOS
National Highway 333 A	2500+90=2590	15000	0.172	A

Results

From the above analysis it can be seen that the LOS has changed from 0.16 to 0.172 at Highway intersection that is from 'A' to 'A' i.e remain Excellent'. 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 FOR PROJECTS IN CLUSTER

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

Sand Block name	Area (Ha)	Production(TPA)
Jamui Ulai Block 01	15.5	193440
Jamui Ulai Block 02	14.4	179712
Jamui Ulai Block 03	9.42	117561.6
Jamui Ulai Block 04	5.0	62400
Total	**44.32**	**553113.6 TPA**

Table 4.3 (i): Existing Traffic Scenario & LOS for Proposed Cluster of Block 01, Block-02, Block-03 & Block 04

Road	V	C	Existing V/C Ratio	LOS
National Highway 333 A	2500	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.

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 Proposed **Cluster of Jamui Ulai Block 01, Block-02, Block-03 & Block 04**

Proposed Capacity of Mine/annum : **553113.6 TPA**

No. of working days : 250 days

Proposed Capacity of mine/day : 2212.452 or say 2213 TPD

Truck Capacity : 16 tonnes

No. of trucks deployed/day : 138.2 or 139

Increase in PCU/day (139*3) : 417

Table 4.3 (ii): Modified Traffic Scenario & LOS

Road	V	C	Modified V/C Ratio	LOS
National Highway 333 A	2500+417=2917	15000	0.19	B

Results

From the above analysis it can be seen that the LOS has changed from 0.16 to 0.19 at Highway intersection that is from ‘A’ to 'A' i.e remain Excellent '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:

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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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.

****

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.

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_2) and Nitrogen Dioxide (NO_2) will be monitored at the workplace i.e. core zone. The methodology proposed for is shown below:

Table 6.1, Monitoring methodologies and parameters

Parameters	Technique	Technical Protocol
PM_{10}	Gravimetric method	**IS 5182 (Part-XXIII)**
Sulphur Dioxide	Improved West and Gaeke	**IS-5182 (Part-II)**
Nitrogen Dioxide	Modified Jacob & Hochheiser	**IS-5182 (Part-VI)**

Water quality monitoring

Water quality monitoring involves periodical assessment of quality of surface water and the ground water near the mining project.

- Surface water samples will be analyzed for all the parameters as per EPA, 1986
- Ground water samples will be analyzed for all the parameters as per IS-10500:2012.

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

S.No.	Description of Parameters	Schedule of Monitoring
1	Air Quality	24 hourly samples twice/Thrice 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

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:

Table 6.3, Budget for monitoring

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

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.

- ✓ 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

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

Table7.2, Qualitative Risk Assessment

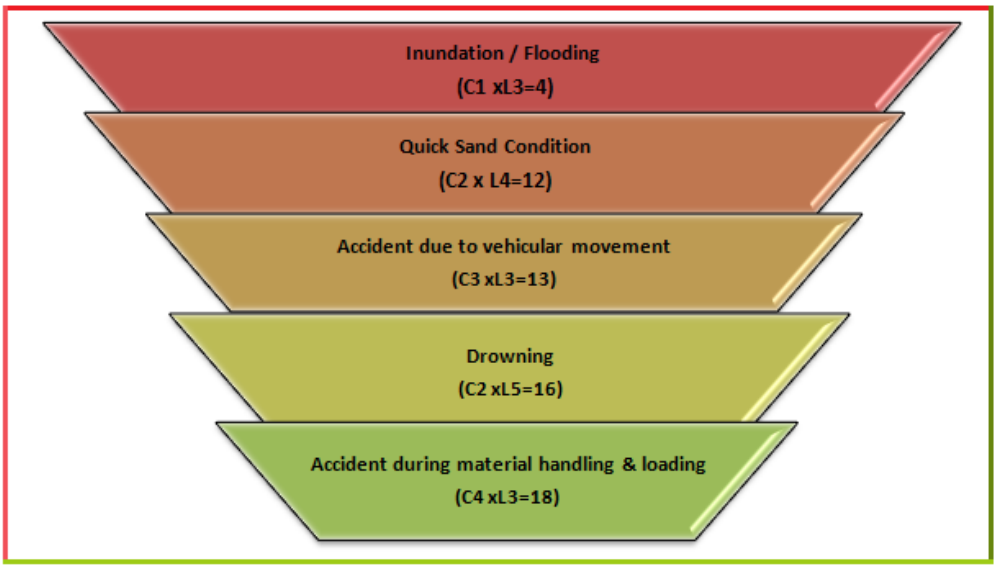
Risk Rank **Likelihood Consequence**	**L1** **Almost certain**	**L2** **Likely**	**L3** **Possible**	**L4** **Unlikely**	**L5** **Rare**
C1 **Catastrophic**	**1**	**2**	**4**	**7**	**11**
C2 **Major**	**3**	**5**	**8**	**12**	**16**
C3	**6**	**9**	**13**	**17**	**20**

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**

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.

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 of 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

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/repaired 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.

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

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

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

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 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 Ulai 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

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

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 Ulai River (Ulai River Block No.- 03 Sand Ghat) At Village – Tola Mahapur, Block- Jhajha, 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 Ulai 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 Ulai 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.

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**
	Total	**2.5**

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
Total	**4,00,000**

8.3 ENVIRONMENTAL BENEFITS

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

8.4 CORPORATE ENVIRONMENTAL RESPONSIBILITY

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

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

CER COST is Rs. 61,75,900/- x 2% = Rs. 1,23,518/-

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.

****

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:

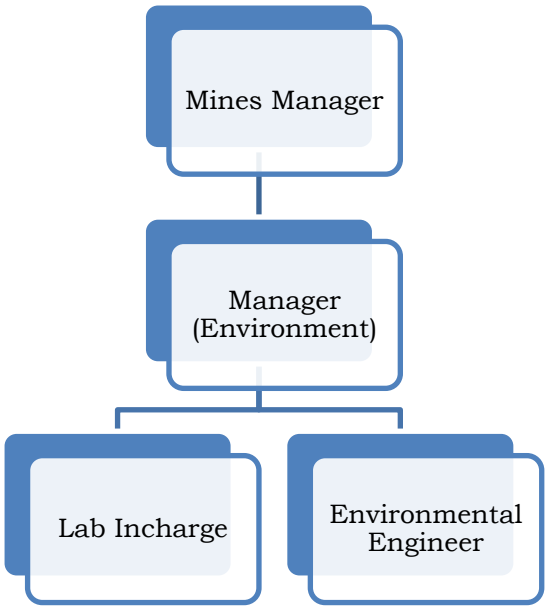


Figure 9.1 Environment Management Cell

The EMC will perform the following activities:

- 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.
- 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 3.0mmaximum 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.

- 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.
- **Greenery development:** The project will not lead to any tree cutting. However, a social 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. 94 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 03	9.42	9.42 *10 Plants= 94.2 or 94 plants
Total Plants		94 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	*Scigiumcumuni*	Jamun	To stop river bank erosion
2	*Terminaliaarjuna*	Arjun	To stop river bank erosion
3	*Populus ciliate*	Popular	Fast growing, broad leaf
4	*Mangiferaindica*	Aam	Tolerant to Dust control
5	*Tectonagrandis*	Sagon	Tolerant to Dust control
6	*Ficusbenghalensis*	Bargad	Tolerant to Dust control
7	*Azadirachtaindica*	Neem	Tolerant to SO_2
8	*Pithecolibiumducle*	Jungle jalebi	Tolerant to SO_2 and Dust control

9	*Ficusreligiosa*	Peepal	Dust particles absorbance
10	*Acacia nilotica*	Babul	Tolerant to SO_2

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 Ratan Coal Suppliers Pvt. Ltd., Prashant Kumar S/o- Shivratan Prasad Add.- N.H-02, Nirsa, Dhanbad Jharkhand (Ulai Sand Block 03) 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.
- 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 in ordinate delay in its execution.

9.9 ENVIRONMENT POLICY

Sand Ghat Ratan Coal Suppliers Pvt. Ltd., Prashant Kumar S/o- Shivratan Prasad Add.- N.H-02, Nirsa, Dhanbad Jharkhand (Ulai Sand Block 03) 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 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.

Table 9.2, Budget of EMP (Block-03)

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).	0.94	0.5
4	Haul road Maintenance Cost	0.75	1.5
TOTAL		**1.69**	**5.5**

Note: *94 plants * 1000 Rs (for each plants including hedges and fences) =Rs 94000/-

- 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 *0.30 km haul road) = 75,000/-

****

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 14th 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 Ulai River at Block No – 03 Sand Ghat at Village – Tola Mahapur, Block- Jhajha , District- Jamui, (Bihar).

The proposed mining was a cluster of 04 mining lease area of Jamui Ulai Block 01, Jamui Ulai Block 02, Jamui Ulai Block 03 & Jamui Ulai Block 04 over an combined area of 44.32 Ha is for river bed sand mining on Ulai River at Mauza- Tola Auria, Tola Mahapur, & Tola Satighat, Block- Jhajha District- Jamui, Bihar.

Cluster Situation: As per District Survey Report Jamui the Proposed Sand Ghats of Jamui Ulai Block 01, Jamui Ulai Block 02, Jamui Ulai Block 03 & Jamui Ulai Block 04 are comes in cluster situation whose combined cluster area is 44.32 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(TPA)
Jamui Ulai Block 01	15.5	193440
Jamui Ulai Block 02	14.4	179712

Jamui Ulai Block 03	9.42	117561.6
Jamui Ulai Block 04	5.0	62400
Total	**44.32**	**553113.6 TPA**

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. Ulai Block 03 Sand Ghat fall in Village – Tola Mahapur Block-Jhajha, District- Jamui, (Bihar).

10.3 BRIEF DESCRIPTION OF PROJECT

The proposed project is Open Cast Semi-Mechanized/OTFM Mining of Sand with a proposed production of 117561.6 Tonnes per annum. The project has been proposed by (Sand Mining Project on Ulai River Block No – 03 Sand Ghat, Village – Tola Mahapur Block- Jhajha, District- Jamui, (Bihar).

The proposed project is over an area 9.42 ha on Ulai River Block No – 03 Sand Ghat, Village – Tola Mahapur Block- Jhajha, District- Jamui, (Bihar). As per MoEF, New Delhi Gazette dated 14th 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 Ulai Block 03- **Rs**- 61,75,900/- (including auction cost).

The proposed mining lease area falls in Survey of India Toposheet 72 L/05 & 72 L/06

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

Table: 10.1 Mine lease Co-ordinates (Jamui Ulai Block 03)

Pillar	Geo Coordinate	
A	24° 45'6.33"N	86°23'51.94"E
B	24° 44'59.71"N	86°24'4.39"E
C	24° 45'0.92"N	86°24'5.40"E
D	24° 45'11.83"N	86°23'55.77"E
E	24° 45'21.17"N	86°23'53.64"E
F	24° 45'13.24"N	86°23'49.49"E

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

Table-10.2: Details of Environmental Setting

<table>
<tr><th>Sr. No.</th><th>Particulars</th><th>Details</th></tr>
<tr><td>1</td><td colspan="2">Location</td></tr>
<tr><td>a</td><td>Village</td><td>Village – Tola Mahapur</td></tr>
<tr><td>b</td><td>Tehsil</td><td>Block- Jhajha,</td></tr>
<tr><td>c</td><td>District</td><td>Jamui</td></tr>
<tr><td>d</td><td>State</td><td>Bihar</td></tr>
<tr><td>2</td><td>Elevation above</td><td>Jamui Ulai Block 03 (136 mRL -135 mRL)</td></tr>
<tr><td>3</td><td>Nearest National Highway/State Highway</td><td>NH-333A: Approx. 0.75 KM towards NE direction..</td></tr>
<tr><td>4</td><td>Nearest Railway station</td><td><table><tr><th>Blocks</th><th>Railway Station</th><th>Distance (Km) Direction</th></tr><tr><td>Jamui Ulai Block 03</td><td>Jhajha Railway Station</td><td>Jhajha Railway station, approx. 2.20 km towards NW direction.</td></tr></table></td></tr>
<tr><td>5</td><td>Nearest Airport</td><td><table><tr><th>Blocks</th><th>Airport</th><th>Distance (Km) Direction</th></tr><tr><td>Jamui Ulai Block 03</td><td>Deoghar Airport</td><td>Deoghar Airport, approx.46.0 km towards SE direction</td></tr></table></td></tr>
<tr><td>6</td><td>Ecological Sensitive Areas (Wildlife Sanctuaries)</td><td>There is no any Ecological Sensitive Areas Like National Park, Wildlife Sanctuaries, etc are found within 10 km of the study area.</td></tr>
<tr><td>7</td><td>Seismic Zone</td><td>Zone- IV
Source BMTC 2nd edition https://www.bmtpc.org/disaster%20resistnace%20technolgies/ZONE%20IV.htm</td></tr>
</table>

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 Ulai River Block No – 03 Sand Ghat, Village – Tola Mahapur Block- Jhajha, District- Jamui, (Bihar).
2	Mining Capacity	56520 cum/year or 117561.6 TPA
3	Method of mining	Open cast semi-mechanized mining/OTFM
4	Total ML area	9.42 ha
5	Depth of mining	1 m depth
6	Manpower	19 persons
9	Water Requirement	2.50 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 (2.08 kg/m3) 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 (m3)	Mineable Reserves (m3)	Annual Mineable Permitted Reserve As per LoI (m3)
Jamui Ulai Block 03	9.42	94200	82276	**56520**

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.

10.4.3 Conceptual Plan

Mine Applied Area will be worked for Jamui Ulai Block 03 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. 40 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.

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 ^{0}C to 31.0 ^{0}C.

10.7.3 Ambient Air Quality

Ambient Air Quality Monitoring (AAQM) has been carried out at 10 locations. The Particulate Matter (PM_{10}) conc. ranged of76.2 µg/m^{3}to 98.6 µg/m^3 . The Particulate Matter ($PM_{2.5}$) ranged from 33.3 µg/m^3 to 52.6 µg/m^3. Sulphur dioxide (SO_2) between 5.8 µg/m^{3}to 11.3 µg/m^3. Oxides of Nitrogen (NO_2) between 15.2 µg/m^{3}to 28.5 µg/m^3.The results thus obtained indicate that the concentrations of PM10, SO_2 and NO_2 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 7.35 to 7.92. The total dissolved solids are varying from 276 mg/l to 330 mg/l .

The Surface water sampling was taken from 03 locations The analysis results indicate that the pH ranges between 7.73 and 7.89. Dissolved Oxygen (DO) was observed in the range of 6.9 to 7.3 mg/l against the minimum requirement of 4 mg/l. BOD values were observed to be in the range of 2.0 to 3.0 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 57.1 dB(A) to 41.5 dB(A) respectively. The minimum & maximum noise levels at night time were found to be 46.8 dB (A) & 37.6 dB(A) respectively.

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 Ulai 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.

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.

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

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

Budget of EMP (Jamui Ulai Block 03)

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).	0.94	0.5
4	Haul road Maintenance Cost	0.75	1.5
TOTAL		**1.69**	**5.5**

Note: *94 plants * 1000 Rs (for each plants including hedges and fences) =Rs 94000/-

- 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 *0.30 km haul road) = 75000/-

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.

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 1st May 2018. The following has been proposed considering the needs & demand of the people.

CER cost will be 2% of the total project cost. This amount will be used for social welfare.
CER COST is Rs. 61,75,900/- x 2% = Rs. 1,23,518/- 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.
- 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.

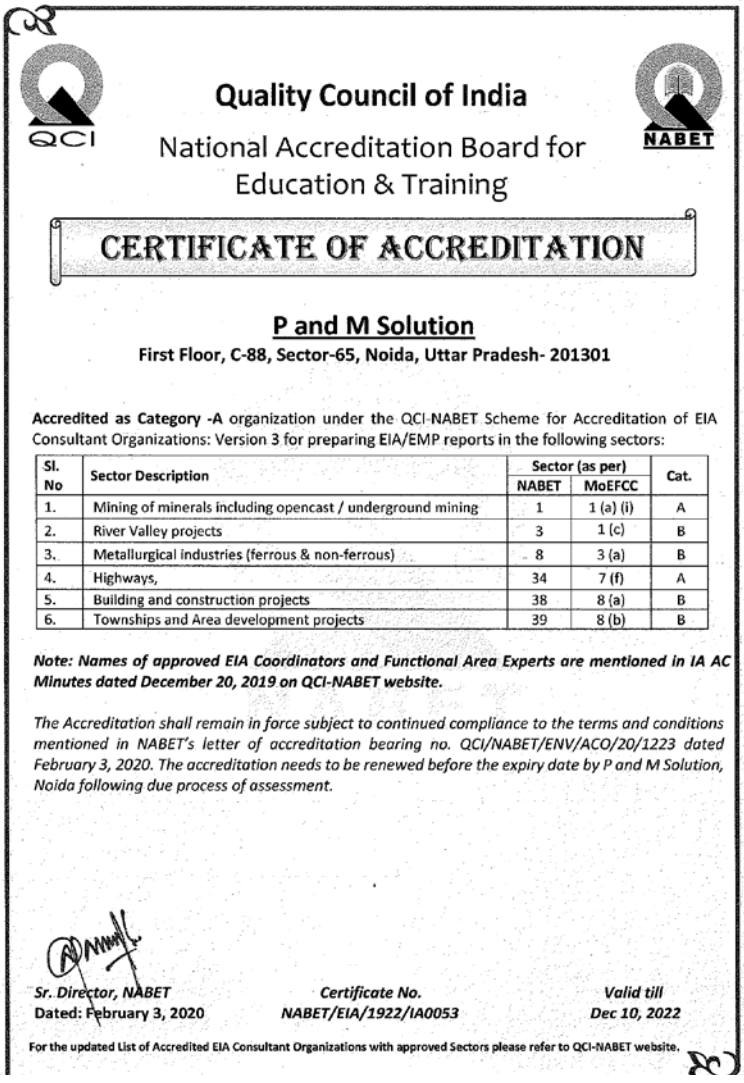
****

Project: Sand Mining Project on Ulai River (Ulai River Block No.- 03 Sand Ghat) At Village –Mahapur, Block- Jhajha, District- Jamui, (Bihar).

CONSULTANT

Name of the Consultant	P and M Solution
Address	C-88, Sector 65, Noida -201301 – U.P
Credentials	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) NABET	Sector (as per) MoEFCC	Cat.
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 Ulai River (Ulai River Block No.- 03 Sand Ghat) At Village –Mahapur, Block- Jhajha, District- Jamui, (Bihar).

National Accreditation Board for Education and Training

QCI/NABET/ENV/ACO/23/2770 June 02, 2023

To

P and M Solution
C-88, Sector-65 Noida
Noida, UP

Sub.: Extension of Validity of Accreditation till Sept 01, 2023 – regarding
Ref.. 1. Certificate no. NABET/EIA/1922/IA0053
2. Request e-mail dated May 30, 2023

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 Sept 01, 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

Institute of Town Planners India, 6th Floor, 4-A, Ring Road, I.P Estate, New Delhi-110 002, India
Tel. : +91-11-233 23 416, 417, 418, 419, 420, 421, 423 E-mail : ceo.nabet@qcin.org Website : www.qcin.org

CHAPTER-11 DISCLOSURE OF CONSULTANT

Project: Sand Mining Project on Ulai River (Ulai River Block No.- 03 Sand Ghat) At Village –Mahapur, Block- Jhajha, District- Jamui, (Bihar).

Consultant Contact Details:

P and M Solution

Address –C-88, Sector 65 Noida

Mobile no. - +8377871554, 8826287364

S No	Name	EC/FAE	DETAILS
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	Poonam Kumari Mangalam	FAE	LU
11	Jatin kumar srivastava	FAE	NV

****

EXECUTIVE SUMMARY

FOR

SAND MINING PROJECT ON ULAI RIVER (ULAI RIVER BLOCK NO.- 03 SAND GHAT)

At

Mauza – Tola Mahapur, Block – Jhajha,
District- Jamui, State - Bihar

Area : 9.42 ha
Production: 117561.6 TPA

PROJECT PROPONENT

Ratan Coal Suppliers Pvt. Ltd.
Prashant Kumar
S/o- Shivratan Prasad
Add.- N.H-02, Nirsa, Dhanbad Jharkhand

Environment Consultant

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

EXECUTIVE SUMMARY

INTRODUCTION

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

Jamui Ulai Block 03

The project has been proposed by Ratan Coal Suppliers Pvt. Ltd., Prashant Kumar. The Proposed Sand Mining Project is located on Ulai River at Jamui Ulai Block 03 Sand Ghat At Mauza – Tola Mahapur, Block -Jhajha, District- Jamui, (Bihar). LOI issued to lessee via letter no 2089 dated 06-12-2022. 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 11-05-2023.

Cluster Situation: As per District Survey Report Jamui the Proposed Sand Ghats of Jamui Ulai Block 01, Jamui Ulai Block 02, Jamui Ulai Block 03 & Jamui Ulai Block 04 are comes in cluster situation whose combined cluster area is 44.32 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:

Sand Block Name	Area (Ha)	Production
Jamui Ulai Block 01	15.5	193440
Jamui Ulai Block 02	14.4	179712
Jamui Ulai Block 03	9.42	117561.6
Jamui Ulai Block 04	5.0	62400
Total	**44.32**	**553113.6 TPA**

It has been proposed to mine around 117561.6 TPA for applied lease. The estimated project cost for the proposed project is **Rs 61,75,900/-** (including auction cost)

PROJECT DESCRIPTION

LOCATION

The proposed mining lease area falls in Survey of India Toposheet Topo sheet No- 72 L/05 & 72 L/06. The lease area is located in Mauza – Tola Mahapur, Block -Jhajha, District- Jamui, (Bihar). The mine lease co-ordinates are listed below:

Pillar	Geo Coordinate	
A	24° 45'6.33"N	86°23'51.94"E
B	24° 44'59.71"N	86°24'4.39"E
C	24° 45'0.92"N	86°24'5.40"E
D	24° 45'11.83"N	86°23'55.77"E
E	24° 45'21.17"N	86°23'53.64"E
F	24° 45'13.24"N	86°23'49.49"E

Area & production: The total ML area is 9.42 Ha. Proposed rate of production will be 117561.6 TPA.

Connectivity:

Sand Ghat is well connected to the nearest metalled road 0.30 km distance from the lease. NH-333A: Approx. 0.75 KM towards East direction. Jhajha Railway station, approx. 2.20 km towards NW direction. Deoghar Airport, approx.46.0 km towards SE direction.

Salient Features of Project

Name of the applicant	Ratan Coal Suppliers Pvt. Ltd. Prashant Kumar
Address of Lessee	Ratan Coal Suppliers Pvt. Ltd. Prashant Kumar S/o- Shivratan Prasad Add.- N.H-02, Nirsa, Dhanbad Jharkhand
Name of Mine	Sand Mining Project on Ulai River at Jamui Ulai Block 03 Sand Ghat
Village	Tola Mahapur
District & State	Jamui, Bihar

Mineral	Sand
Area (ha)	9.42 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 (2.08 kg/m3) to get the tonnage.

The bench-wise annual exploitation of sand of is given below:

Table Summary of minable reserves of Jamui Ulai Block 03 Sand Ghat

Level (mRL)	Length (m)	Width (m)	Depth (m)	Volume (cum)	Tonnes
136 - 135	614	134	1	82276	171134
Total				82276	171134

Total Mineable Reserve = **82276 CUM or 171134 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 2.50 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:

Month	Temperature °C		Wind Speed (Km/Hr)	
	Min	Max	Average	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

Table Baseline Environmental Status

Attribute	Baseline status
Ambient Air Quality	Ambient Air Quality Monitoring reveals that the minimum & maximum concentrations of PM2.5 amongst all the 10 AQ monitoring stations were found to be 33.3 µg/m^3 to 52.6 µg/m^3 respectively; PM10 was in the range of 76.2 µg/$m^3$to 98.6 µg/m^3 As

	far as the gaseous pollutants SO_2 and NO_2 are concerned, the prescribed CPCB limit of 80 µg/m^3 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	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. Surface water analysis from River Ulai 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.
Soil Quality	Samples collected from identified locations indicate the soil is sandy type and the pH value ranging from 7.39 to 8.02, which shows that the soil is slightly alkaline in nature.
Ecology and Biodiversity	There is no Eco-Sensitive Areas in the study area.

ANTICIPATED ENVIRONMENTALIMPACTS

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 Ulai 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

S.No.	Description of Parameters	Schedule of Monitoring
1	Air Quality	24 hourly samples twice/thrice 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

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 1st May 2018. The following has been proposed considering the needs & demand of the people.

CER cost for **Jamui Ulai Block 03** will be 2% of the total project cost. This amount will be used for social welfare. CSR COST is Rs. 61,75,900/- x 2% = Rs. 1,23,518/-

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, a social 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. 94 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 Ulai Block 03)

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).	0.94	0.5
4	Haul road Maintenance Cost	0.75	1.5

TOTAL	**1.69**	**5.5**

Note: *94 plants * 1000 Rs (for each plants including hedges and fences) =Rs 94000/-

- 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 *0.30 km haul road) = 75,000/-

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

बालू खनन परियोजना
(जमुई उलई नदी ब्लॉक 03 बालू घाट)
के लिए

मौजा- टोला महापुर, ब्लॉक- झाझा,
जिला- जमुई, बिहार

क्षेत्रफल- 9.42 हेक्टेयर
उत्पादन: 117561.6 टन प्रति वर्ष

आवेदन कर्ता

रतन कोल सप्लायर्स प्रा. लिमिटेड
प्रशांत कुमार
पुत्र शिवरतन प्रसाद
पता.-N.H-02, निरसा, धनबाद, झारखंड

एनवायरनमेंट कन्सल्टेंट
पी & एम सल्यूशन

(क्वालिटी कौंसिल ऑफ़ इंडिया द्वारा मान्यता प्राप्त)
सी-88 सेक्टर 65 नॉएडा उत्तर-प्रदेश
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 उलाई ब्लॉक 03

परियोजना के प्रस्ताव रतन कोल सप्लायर्स प्रा. लिमिटेड (प्रशांत कुमार) ने दिया है। प्रस्तावित बालू खनन परियोजना मौजा- टोला महापुर, ब्लॉक- झाझा, जिला- जमुई (बिहार) में ब्लॉक संख्या - 03 बालू घाट पर उलाई नदी पर स्थित है। पत्र संख्या 2089/एम दिनांक 06.12.2022 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 11.05.2023 द्वारा जारी किया गया है।

- **क्लस्टर स्थिति**: जिला सर्वेक्षण रिपोर्ट जमुई के अनुसार जमुई उलाई ब्लॉक 01, जमुई उलाई ब्लॉक 02, जमुई उलाई ब्लॉक 03 और जमुई उलाई ब्लॉक 04 के प्रस्तावित बालू घाट क्लस्टर स्थिति में आते हैं जिनका संयुक्त क्लस्टर क्षेत्र 44.32 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 उलाई ब्लॉक 01	15.5	193440
जमुई उलाई ब्लॉक 02	14.4	179712
जमुई उलाई ब्लॉक 03	9.42	179712
जमुई उलाई ब्लॉक 04	5.0	62400
कुल	44.32	553113.6

आवेदित पट्टे के लिए प्रति वर्ष लगभग 117561.6 टन खनन प्रस्तावित किया गया है, प्रस्तावित परियोजना के लिए अनुमानित परियोजना लागत **61,75,900/-** रुपये (नीलामी लागत सहित) है।

परियोजना विवरण

स्थिति:

<u>जमुई उलाई ब्लॉक 03</u>

प्रस्तावित खनन पट्टा क्षेत्र सर्वे ऑफ इंडिया टोपोशीट टोपो शीट संख्या- 72 L/05 & 72 L/06के अंतर्गत आता है। पट्टा क्षेत्र मौजा- टोला महापुर, ब्लॉक- झाझा, जिला- जमुई, राज्य- बिहार में स्थित है। खान पट्टा समन्वय नीचे सूचीबद्ध हैं:

स्तंभ	**अक्षांश (एन)**	**देशांतर (ई)**
A	24° 45'6.33"N	86°23'51.94"E
B	24° 44'59.71"N	86°24'4.39"E
C	24° 45'0.92"N	86°24'5.40"E
D	24° 45'11.83"N	86°23'55.77"E
E	24° 45'21.17"N	86°23'53.64"E
F	24° 45'13.24"N	86°23'49.49"E

- **क्षेत्र और उत्पादन**: कुल क्षेत्रफल 9.42 हेक्टेयर है। उत्पादन की प्रस्तावित दर 117561.6 टीपीए है।

- **संयोजकता**

बालू घाट पट्टे से 0.30 कि.मी. की दूरी पर निकटतम पक्की सड़क से अच्छी तरह से जुड़ा हुआ है। NH-333A: लगभग 0.75 किमी की दूरी पर है झाझा रेलवे स्टेशन, लगभग 2.20 किमी की दूरी पर है। देवघर हवाई अड्डा लगभग 46 किमी. दक्षिण पूर्व दिशा की ओर है।

परियोजना की मुख्य विशेषताएं

आवेदक का नाम	रतन कोल सप्लायर्स प्रा. लिमिटेड प्रशांत कुमार
पट्टेदार का पता	रतन कोल सप्लायर्स प्रा. लिमिटेड प्रशांत कुमार पुत्र शिवरतन प्रसाद पता.-N.H-02, निरसा, धनबाद, झारखंड
नाम	बालू खनन परियोजना (जमुई उलाई नदी ब्लॉक 03)
गाँव	मौजा - टोला महापुर
जिला और राज्य	जमुई, बिहार
खनिज	बालू
क्षेत्र (हेक्टेयर)	9.42 हेक्टेयर

❖ ड्रिलिंग

ड्रिलिंग और ब्लास्टिंग की आवश्यकता नहीं है

❖ खनिज का उपयोग

बालू 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। बालू 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 (2.08 g/cm3) 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 जाएग। नदी के पैलियो चैनल से संबंधित क्षेत्र को समतल करके वापस बहाल किया जाएगा।

बेंचवार बालू का वार्षिक दोहन नीचे दिया गया है:

ब्लॉक नं: जमुई उलाई ब्लॉक 03

बेंच स्तर (mRL)	**लंबाई** (M)	**चौड़ाई** (M)	**गहराई** (M)	**मात्रा** (**घन मीटर**)	**टन**
136 - 135	614	134	1	82276	171134
कुल				82276	171134

कुल खनन योग्य रिजर्व = 82276 घन मीटर या 171134 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 बालू 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 2.50 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
□□□□□□□ 2022	12	26	7.6	12.7
□□□□□ 2023	11	25	8.2	13.9
□□□□□ 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 33.3 µg/m3 से 52.6 µg/m3 पाई गई; PM10 76.2 µg/m3to 98.6 µg/m3 की सीमा में था जहां तक गैसीय प्रदूषकों SO2 और NO2 का संबंध है, आवासीय और ग्रामीण क्षेत्रों के लिए 80 µg/m3 की निर्धारित CPCB सीमा किसी भी स्टेशन पर पार नहीं की गई है।
शोर का स्तर	शोर के निगरानी कार्यक्रम के परिणामों ने संकेत दिया कि निगरानी किए गए सभी स्थानों पर 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। उलाई 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 7.39 से 8.02 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 बालू 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/टिप्परों के माध्यम से सड़क मार्ग से ले जाया जाएगा।

- **जल पर्यावरण पर प्रभाव**

नदी के भीतर या उसके पास से बालू 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 उलाई 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।

बालू 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।

❖ 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। बालू 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। कार्मिकों 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 सुदृढ़ीकरण।

❖ **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 उलाई ब्लॉक 03 के लिए सीईआर (CER) लागत कुल परियोजना लागत का 2% होगी। इस राशि का उपयोग समाज कल्याण के लिए किया जाएगा। सीएसआर (CSR) लागत रु 61,75,900/- x 2%= रु. . 1,23,518/-

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 94 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 उलाई ब्लॉक 03)

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)	0.94	0.5
4	परिवहन सड़क रखरखाव लागत	0.75	1.5
कुल		1.69	5.5

नोट: *94 पौधे * 1000 रुपये (हेज और बाड़ सहित प्रत्येक पौधे के लिए) = 94,000/- रुपये

- ढोना 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*0.30 किमी लंबी सड़क) = 75,000/-

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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