DRAFT ENVIRONMENTAL IMPACT ASSESSMENT

AND

ENVIRONMENTAL MANAGEMENT PLAN

OF

SAND MINING PROJECT ON BARNAR RIVER (JAMUI BARNAR BLOCK NO – 02 SAND GHAT)

SAND BLOCK	**BLOCK 02**
PROPOSAL NO	**SIA/BR/MIN/414721/2023**
TOR NO	**SIA/1(a)/2293/2023**
AREA	**6.76 HA**
PRODUCTION	**40560 cum/annum or 88770.4 TPA**
LOCATION	**Mauja – Mahgaon, Block - Sono , District- Jamui, (Bihar)**

Applicant

M/s Raj Construction

Prop.- Nisha Kumari

D/O- Late Chandrashekhar Prasad Singh

Vill – Shiv Bhavani Lane, Ranchi University

District- Ranchi

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

The Proposed Sand Mining Project is located on Barnar River at Block No – 02 Sand Ghat at Mauja – Mahgaon, Block - Sono , District- Jamui, (Bihar).

The Proposed Production is 40560 cum per annum or 88770.4 Tonnes per annum and Area of the project site is 6.76 ha.

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 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.

The details of the project are given below:

Name & Address of the Mine	Block 02	Sand Mining Project on Barnar River Block No – 02 Sand Ghat, Mauja – Mahgaon, Block - Sono , District- Jamui, (Bihar).
River	Barnar	
Mineral	Sand	
Area (ha)	Block 02	6.76 ha
Production	Block 02	40560 cum per annum or 88770.4 Tonnes per annum

Postal Address	Block 02	M/s Raj Construction Prop.- Nisha Kumari D/O- Late Chandrashekhar Prasad Singh Vill – Shiv Bhavani Lane, Ranchi University District- Ranchi
Status of Mine	Fresh application for Environmental Clearance.	
Project Cost	RS- 53,72,800/-	
CER Cost	CER cost will be 2% of the total project cost. This amount will be used for social welfare. CER COST is 53,72,800/-x 2% = Rs. 1,07,456/-	

1.2 BRIEF DESCRIPTION OF PROJECT

The proposed project is open cast semi-mechanized mining of sand with a proposed production of 88770.4 Tonnes for applied lease. Detail has been given below:

The proposed project is over an area 6.76 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
Block 02	6.76	Khasra No. - 273, 274, 275, 276, 277, 278, 279, 280, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292	88770.4 TPA	42,58,800/-
Total			88770.4 TPA	42,58,800/-

The proposed mining lease area falls in Survey of India Toposheet 72C/02 & 72C/06. The mine lease co-ordinates and connectivity details are listed below:

Table: 1.2 Mine lease Pillar Co-ordinates (Block 02)

Pillar	Geo Coordinate	
1	24°39'43.32"N	86°19'43.03"E
2	24°39'51.20"N	86°19'39.97"E
3	24°39'58.59"N	86°19'46.85"E
4	24°40'2.58"N	86°19'52.69"E
5	24°39'57.47"N	86°19'50.89"E
6	24°39'51.67"N	86°19'46.82"E

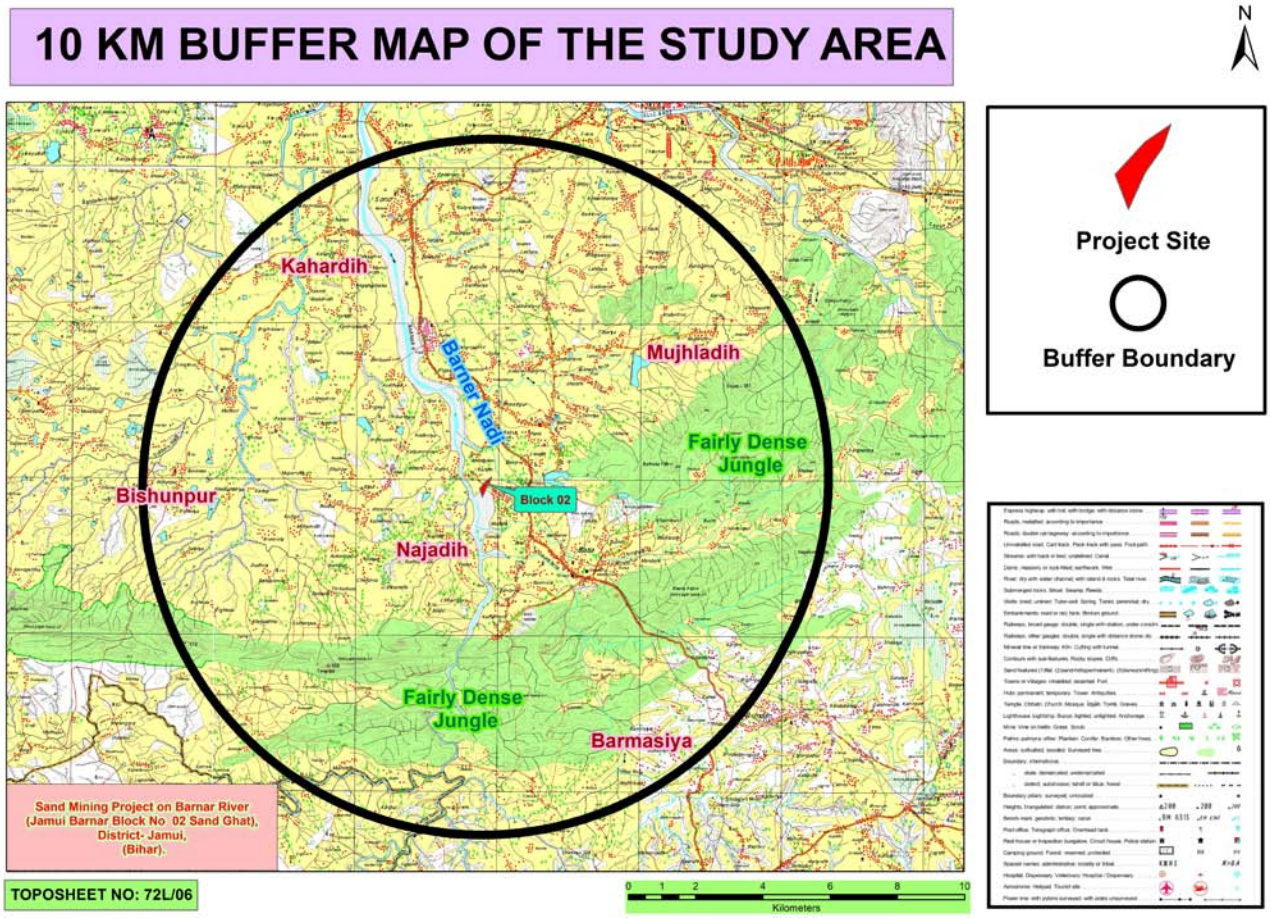

Figure 1.1, 10 km buffer map

Table: 1.3, Connectivity Details given below

<table>
<tr><td></td><td>
<table>
<tr><th>Blocks</th><th>Village</th><th>Distance (Km) Direction</th></tr>
<tr><td>Block 02</td><td>Tola Mahagaon,

Tola Nimatanr,

Tola Sono,</td><td>approx. 0.50 Km in ESE direction.

approx.1.10 Km in SE direction.
approx.8.60 Km in NNW direction.</td></tr>
</table>
</td></tr>
<tr><td>Nearest Railway Station</td><td>
<table>
<tr><th>Blocks</th><th>Railway Station</th><th>Distance (Km) Direction</th></tr>
<tr><td>Block 02</td><td>Jhajha Railway Station</td><td>Jhajha Railway station, approx. 13.10 km towards NE direction.</td></tr>
</table>
</td></tr>
<tr><td>Nearest Airport</td><td>
<table>
<tr><th>Blocks</th><th>Airport</th><th>Distance (Km) Direction</th></tr>
<tr><td>Block 02</td><td>Deoghar Airport</td><td>Deoghar Airport, approx. 45.0 km towards SE</td></tr>
</table>
</td></tr>
<tr><td>Nearest Highway</td><td>NH-333: Approx. 1.25 KM towards E direction.</td></tr>
</table>

Table 1.4 :Details of environmental settings

Sl. No.	Particulars	Details
1	Ecological Sensitive Areas (National Park,	There is no any Ecological Sensitive Areas Like National Park, Wildlife Sanctuaries, etc are found within 10 km of the study area.

	Wildlife Sanctuaries)	
2	Nearest water body	The mine site lies on the dry bed of Barnar 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.

1.3 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: 1.5 Point wise compliance for TOR of Block -02

(ToR File No- SIA/1(a)/2293/2023)

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. 2035/khanan dated. 01.12.2022 for Block 02	**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 02, 6.76 Hectare Lessee (Block 02): M/S Raj Construction Prop.- Nisha Kumari D/o- Late Chandrashekhar Prasad Singh Vill – Shiv Bhavani Lane, Ranchi University District- Ranchi Waste generation- No waste will be generated. Mining Method-Opencast semi-mechanized method	**Annexure- III** Mine plan All details has been complied in chapter-2
4	All corner coordinates of the mine lease area, superimposed on a High Resolution Imagery /toposheet, topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).	All Corner Coordinates of mining lease area superimposed on 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	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

	may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large, may also be detailed in the EIA Report.		
8	Issues relating to Mine safety ,including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided.	Issue related to mine safety has been given in of chapter 7.	
9	The study area will comprise of l0 km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc. should be for the life of the mine/lease period.	The 10 km zone from periphery of the lease has been considered as the study area. The Buffer map of the study area is attached with report. 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.	Chapter I Figure 1.1
10	Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park,	Land use pattern of 10 km from the periphery of the lease area has been prepared and	Land-use of the study area Figure 3.1 , Table 3.1

	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.	incorporated with the report. The study area lies in Barnar River. There is no any Wild Life sanctuary & National Park within the study area.	10 km buffer map enclosed in Chapter I of EIA Report.
11	Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use ,R&R Issues, if any, should be given.	There is no overburden outside the mine lease area.	
12	A Certificate from the Competent Authority in the State Forest Department should be provided, 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	There is no forest land within the lease area.	---

	Department to assist the Expert Appraisal Committees.		
13	Status of forestry clearance for the broken up area and virgin forestland involved in the Project including deposition of net present value (NPV) and Compensatory afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished.	No forest land is involved in the lease area, therefore, deposition of net present value (NPV) and compensated Afforestation is not indicated.	
14	Implementation status of recognition of forest rights under the schedule tribes and other traditional forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated"	There is no forest land involved in the leased out area. Hence, this act is not applicable for this project.	
15	The vegetation in the RF / PF areas in the study area, with necessary details, should be given	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,	The details Impacts & there mitigation measures are given in chapter IV of EIA/EMP Report.	Chapter IV

	detailed mitigative measures required, should be worked out with cost implications and submitted.		
17	Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger / Elephant Reserves / (existing as well as proposed), if any, within 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 obtained from the Standing Committee of National Board of Wildlife and copy furnished.	No National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger / Elephant Reserves / (existing as well as proposed) are found within 10 km of the study area. MAP showing eco sensitive zone is attached in Chapter III (Fig 3.4)	Chapter III Section 3.1.6 Biological Environment
18	A detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled-I fauna found in	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

	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.		
19	Proximity to Areas declared as 'Critically Polluted' or the Project areas attracting court restrictions for mining operations, should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Dept. Should be secured and furnished to the effect that the proposed mining activities could be considered.	Proposed project does not come under critically polluted area.	
20	Similarly, for coastal projects ,A CRZ map duly authenticated by one of the authorized agencies demarcating LTL.HTL, CRZ area ,location of the mine lease w.r.t CRZ, Coastal features such as mangroves ,if any should be furnished.(Note: The Mining Projects falling under CRZ would also need to obtain approval of the	There is no R & R involved in this project.	

	concerned Coastal Zone Management Authority)		
21	R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a need based sample survey, family-wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in the mine lease area will be shifted or not. The issues relating to shifting of village(s) including their R&R and socio-economic aspects should be discussed in the Report.	There is no R & R involved in this project.	
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	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	Chapter III Section 3.1.2 Air Environment

	Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report" Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given.	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.	
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	Air quality modelling details will be incorporated in Final EIA Report.	

	sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map.		
24	The water requirement for the Project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the Project should be indicated.	The water requirement for Sand Block 02 is 2.04 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 requisite quantity of water for the Project should be provided.	Water requirement will be fulfilled by private water tanker. So, no clearance is required.	Chapter II
26	Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the project, if any required should be provided.	The project do not consume any process water except for drinking, dust suppression & plantation. Plantation is proposed, which will increase the water holding capacity & 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 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.	The mining will be done only upto 1.0 m depth. The detailed impact and 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	The project site lies on Barnar River. No diversion is proposed.	

	brought out.		
30	Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and bgl. A schematic diagram may also be provided for the same.	The mining will be done as per the approved mining plan and 1 meter bgl whichever is comes first.	
31	A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and Quantities coverage, plant species and time frame) and Submitted keeping in mind the same will have to be executed up front on commencement of the Project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution.	Plantation/afforestation will be done as per program i.e along the road sides and near civic amenities, as per mine plan. Post plantation, the area will be regularly monitored in every season for evaluation of success rate. List of Plant species selected for green belt is detailed in the EIA report. The plant species selected for green belt have a greater ecological value and are of good utility value to the local population. The plant species are selected by giving emphasis on local and native species and the species which are tolerant to pollution	Chapter VIII Section 8.2
32	Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a	The projection has been done based on the mineral transportation.	Chapter IV Section 4.6 Traffic

	result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines.	The details of traffic analysis are discussed in the report.	Analysis Fig 4.2, Table 4.3(i), 4.3(ii)
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	Occupational health impact mainly is expected due air pollution due to fugitive dust emission because of movement	Chapter VII Section 7.2

	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.	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. About 4.0 lakh for each lease for cluster situation has been earmarked for occupational health.	Chapter VIII Section 8.3
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	Socio-economic significance provided to the local community i.e. to the nearby villagers is given in the	Chapter VI Section 6.4 Chapter VII

	indicated. As far as possible, quantitative dimensions may be given with time to time for implementation.	EIA/EMP Report.	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 specific to the proposed Project	The detailed environmental management plan to mitigate the environmental impacts has been mentioned in of the EIA/EMP Report.	Chapter VIII
39	Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project.	This is a draft EIA report. Public hearing is yet to be conducted.	--
40	Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.	No litigation is pending against the project.	
41	The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.	The capital cost & recurring cost for has been earmarked for EMP. Chapter IX **Block** / **Capital Cost** / **Recurring Cost** Block 02 / 1.305 Lakhs / 5.5 lakhs	Chapter IX

42	A Disaster management Plan shall be prepared and included in the EIA/EMP Report".	A Disaster management Plan has been given in EIA report.	Chapter VI
43	Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.	2% of the total cost of the project has been earmarked towards the Enterprise Social Commitment which will be used for the development of village.	
44	**Besides the above, the below mentioned general points are also to be followed:-**		
a	All 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	Agreed	

	documentation.		
h	As per the circular no. J-11011/618/2010-IA. II (I) dated 30.5.2012, certified report of the status of compliance of the conditions stipulated in the environment clearance for the existing operations of the project, should be obtained from the Regional Office of Ministry of Environment, Forest and Climate Change, as may be applicable.	This is new case for Mining. No certified compliance is required.	
i	The EIA report should also include (i) surface plan of the area indicating contours of main topographic features, drainage and mining area, (ii) geological maps and sections and (iii) sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area.	Compiled With EIA report.	

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2.0 TYPE OF PROJECT

The project is proposed is for sand Ghat block no-02 for the excavation of sand from the bed of river Barnar. The proposed project is opencast semi-mechanized/OTFM mining project.

2.1 NEED FOR THE PROJECT

The project site lies on Barnar 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 Barnar River at Block No – 02 Sand Ghat at Mauja – Mahgaon, Block - Sono , District- Jamui, (Bihar).

The Proposed Production is 40560 cum per annam or 88770.4 Tonne per annam and Area of the project site is 6.76 ha.

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 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.

Geo Coordinate of Lease Area:

Table 2.1, Mine lease Pillar Co-ordinates (Block 02)

Pillar	Geo Coordinate	
1	24°39'43.32"N	86°19'43.03"E
2	24°39'51.20"N	86°19'39.97"E
3	24°39'58.59"N	86°19'46.85"E
4	24°40'2.58"N	86°19'52.69"E
5	24°39'57.47"N	86°19'50.89"E
6	24°39'51.67"N	86°19'46.82"E

Block 02 Sand Ghat is well connected by NH-333: Approx. 1.25 KM towards E direction.

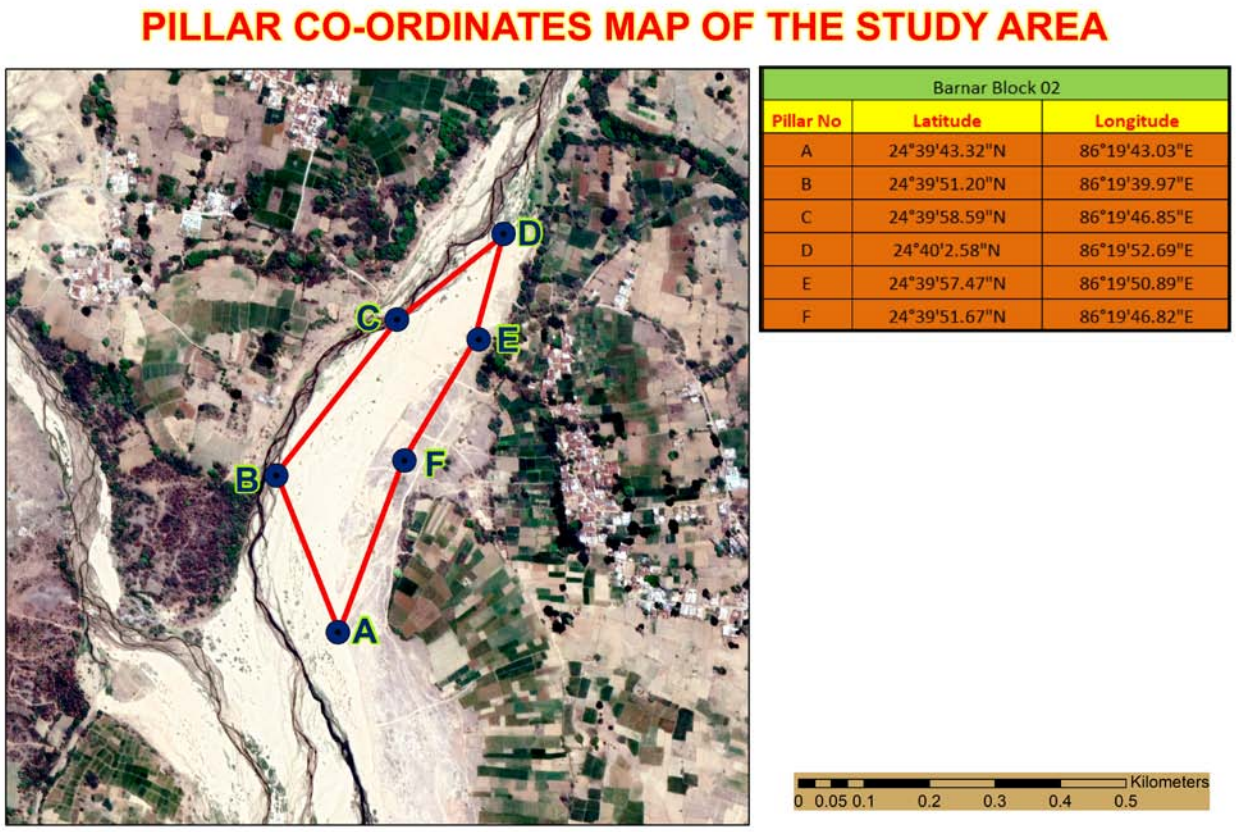

Figure 2.1:- Pillar Coordinate Map of Block 02

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	Khata No /Khasra No	Production	Auction Cost
Block 02	6.76	Khasra No. - 273, 274, 275, 276, 277, 278, 279, 280, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292	88770.4 TPA	42,58,800/-
Total			88770.4 TPA	42,58,800/-

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.

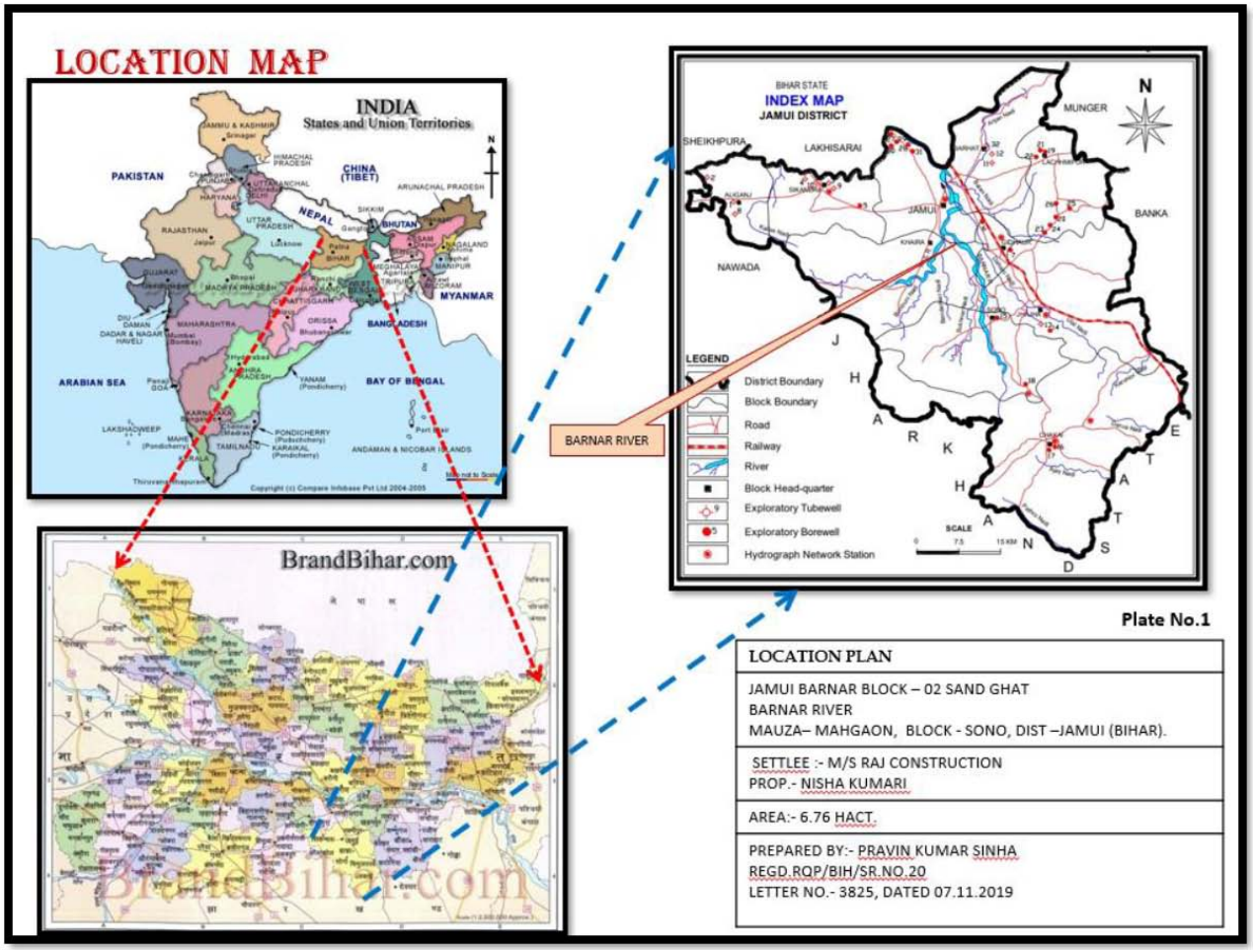

Figure 2.2:- Location map of the project site Block 02

2.3 TOPOGRAPHY & GEOLOGY

2.3.1 Topography

Most of the part of the district has hilly topography. Western portion of Jamui like Sikandra Jamul 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, qual1Zites, basicintrusives and pegmatites. They are exposed in Aurangabad, Gaya, Nawada, Jamui, Bhagalpur and Banka districts. Based on broad geomorphic parameters stich 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 Chotanagptlr 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 Bamar sub tributaries river of kiul in the district of JamuL 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 distrkts of the Indian state of Bihar and joins Harohar river in the Oiara 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 isjoined by the Anjan. It then flows north·east up to Lakhisarai, It passes below the railway bridge between Kill! junction and Lakhisari station and is joined a few miles north of that Rahuaghat, by the Harohar (Halahar or Harhobar), a continuation of the Sakri after this if tums due east and falls into the Ganges near Surajgarha. Until it meets the Harohar the 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 02

Classification	Code	Quantity of Sand
A)Mineral Reserves		Cum
1)Proved Mineral Reserve	111	67600
Total		67600

Replenished quantity of sand = 67600 cum or 141284 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 (2.09 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 mineable reserves of Block 02 Sand Ghat as below (the bulk density multiply by 2.09 kg/m3).

Table 2.4: Block 02

Bench Level (mRL)	Length (m)	Width (m)	Depth (m)	Volume (cum)	Tonnes
147-146	490	122	1	59780	124940.2
Total				**59780**	**124950.2**

Total Mineable Reserve = **59780** CUM or **124950.2** Tonnes

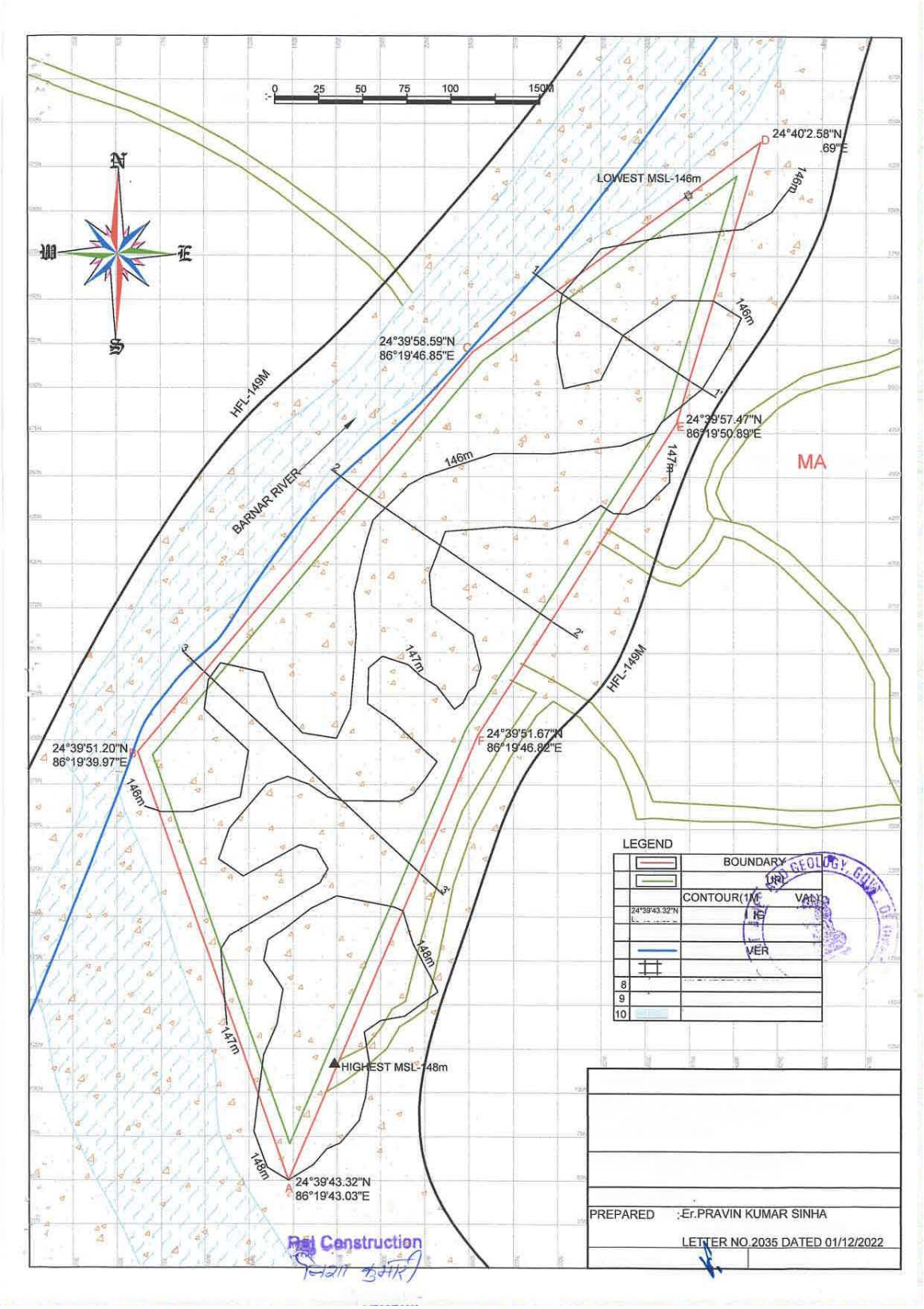

Figure 2.3:- Surface cum Geological Section of Block 02

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.
- Proper benching of 1.5 m height and 6m width will be maintained for mining blocks as per guideline M.M.R-2019, under rule 115(1).
- Mining will be done only during the day time and completely stopped during the monsoon season.

2.4.3 Year Wise Production Schedule:

The bench wise annual exploitation of sand from Jamui Barnar Block 02 Sand Ghat are given below :-

Table 2.5: Year wise Production Details of Sand Ghat 02

YEAR	ROM sand (cum)
1st Year	40560
2nd Year	40560
3rd Year	40560
4th Year	40560
5th Year	40560
Total	2,02,800

The annual extractable RBM comes to **40560 CUM or 88770 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 Barnar Block 02 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 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 Barnar River so there will be no impact on surface water.

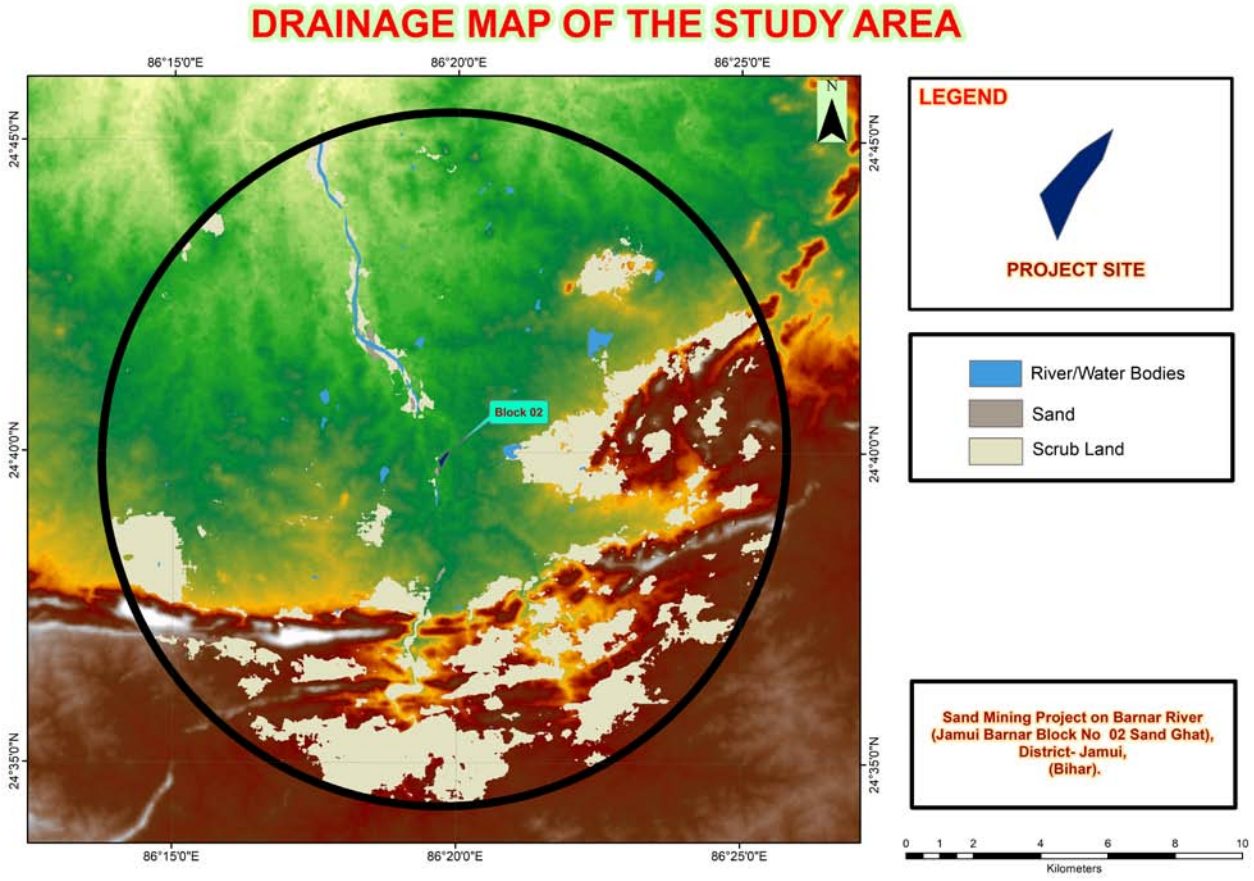

Fig-2.4, Drainage Map

2.7.3 Man power requirement

The manpower requirement for the proposed project will be around 20 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 02

S. No.	Category	Numbers
1.	Administration	1
2.	Supervisor	1
3.	Skilled	4
4.	Un-skilled	14
TOTAL		**20**

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*20/1000= 0.20 KLD	0.20
Dust Suppression	**Total approach road to be water sprinkled** = 250 m for block 02 250 m*6m*0.5 *2 times= 1500/1000= 1.50 KLD	1.50
Plantation	68 plant (during plan period) @ 5 L/per plant= 68*5lts= 340/1000= 0.34 KLD	0.34
Total		**2.04 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.

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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.

The baseline environment quality was carried out over a radial distance of 10 km around the cluster of 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	5345.42
Forest	7171.16
River/Water Bodies	195.56
Settlement	2001.30
Vegetation	30.51
Agriculture	18073.63
AREA	**32817.58**

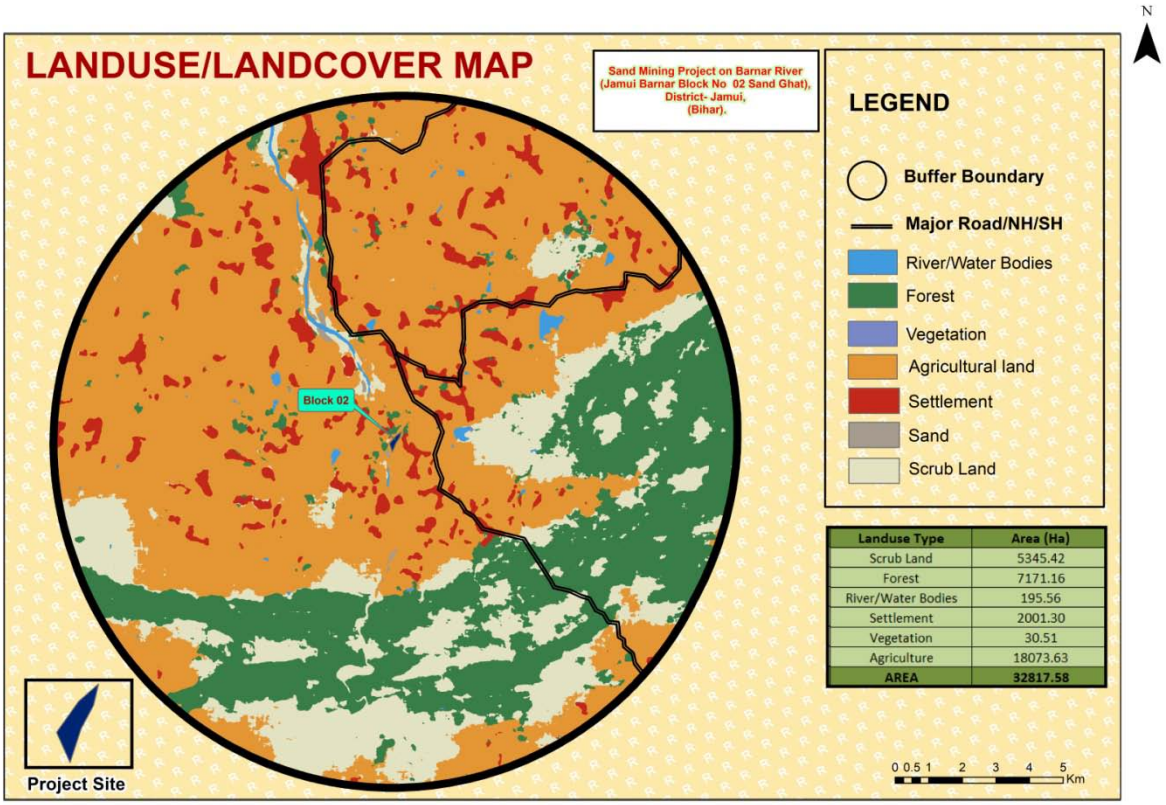

Figure 3.1: Land Use Cover of the Project Study Area

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: WaterSampling Locations

Water (Ground) Monitoring Locations		
GW 1	Near Mahgaon village	0.15 km E
GW 2	Pairamatihana	2.25km ENE
GW 3	Tola Bishunpur	7.7 Km W

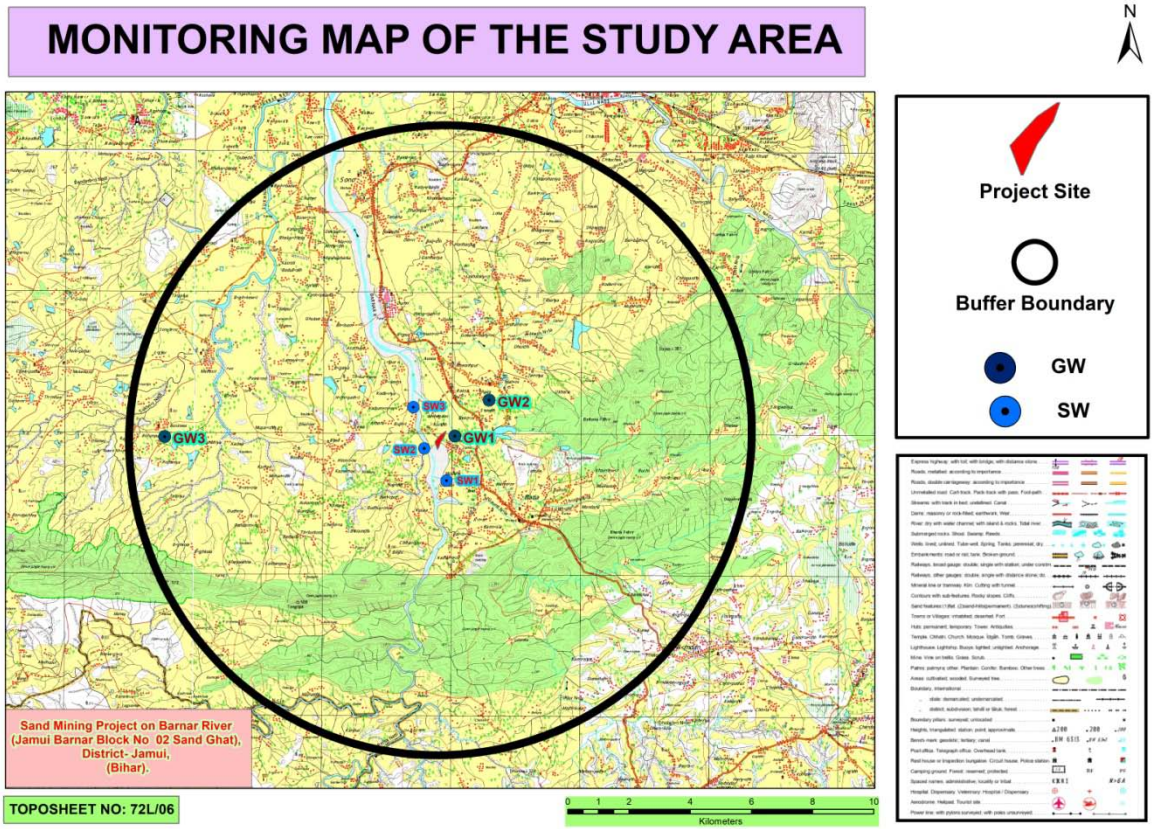

Figure 3.2 Water Sampling Location Map

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	25	<2	<2	<2
2	Odour	-	Un	-	Un	Un	Un
3	Taste	-	Agreeable	-	Agreeable	Agreeable	Agreeable
4	Turbidity	NTU	5	10	<1	<1	<1
5	pH	-	6.5-8.5	No Relaxation	7.98	7.86	7.74
6	Total Hardness (as CaCO3)	mg/l	300	600	187	175	160
7	Iron (as Fe)	mg/l	0.3	1	0.07	0.08	0.06
8	Chlorides (as	mg/l	250	1000	22	20	17

	Cl)						
9	Fluoride (as F)	mg/l	1	1.5	0.5	0.5	0.4
10	TDS	mg/l	500	2000	281	262	241
11	Calcium(as Ca2+)	mg/l	75	200	47	45	43
12	Magnesium (as Mg2+)	mg/l	30	100	17	15	13
13	Copper (as Cu)	mg/l	0.05	1.5	<0.01	<0.01	<0.01
14	Manganese(as Mn)	mg/l	0.1	0.3	0.01	0.02	0.01
15	Sulphate (as SO4)	mg/l	200	400	15	13	11
16	Nitrate(as NO3)	mg/l	45	No Relaxation	1.4	1.1	1.4
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	0.01	No Relaxation	<0.01	<0.01	<0.01
20	Selenium (as Se)	mg/l	0.01	No Relaxation	<0.01	<0.01	<0.01
21	Arsenic (as As)	mg/l	0.01	No Relaxation	<0.01	<0.01	<0.01
22	Cyanide (as CN)	mg/l	0.05	No Relaxation	<0.01	<0.01	<0.01
23	Lead (as Pb)	mg/l	0.05	No Relaxation	<0.01	<0.01	<0.01
24	Zinc (as Zn)	mg/l	5	15	0.04	0.05	0.04
25	Anionic Detergent (as MBAS)	mg/l	0.2	1	<0.01	<0.01	<0.01
26	Chromium (as Cr6+)	mg/l	0.05	No Relaxation	<0.01	<0.01	<0.01
27	Mineral oil	mg/l	0.01	0.03	<0.01	<0.01	<0.01
28	Alkalinity as CaCO3	mg/l	200	600	198	187	175
29	Aluminium (as Al)	mg/l	0.03	0.2	<0.02	<0.02	<0.02
30	Boron (as B)	mg/l	1	5	0.1	0.1	0.1
	Microbiological Parameter						
31	Total Coliform	MPN /100ml	10 , Max	-	4	<2	<2

32	*E. coli*	E.coli /100ml	Absent	-	Absent	Absent	Absent

Observation:

Analysis of results of ground water reveals the following: -

- pH varies from **7.74 to 7.98**.
- Total hardness varies from **160 mg/l to 187 mg/l** .
- Total dissolved solids vary from **241 mg/l to 281 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 Tola Jarwanari	1.0 Km S
SW 2	Project site	----
SW 3	Downstream near Tola Ghogha	2.0 NW

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	-	7.65	7.72	7.58
2	Dissolved oxygen	mg/l	7	6.8	6.6
3	BOD (3 Days at 27°C)	mg/l	3	3	4
4	Free Ammonia (as N)	mg/l	<0.1	<0.1	<0.1
5	Sodium Adsorption Ratio	-	0.61	0.65	0.54

6	Boron	mg/l	0.2	0.1	0.2
7	Conductivity	µmhos/cm	420	454	472
8	Turbidity	NTU	4	5	4
9	Magnesium Hardness (as $CaCO_3$)	mg/l	55	57	64
10	Total Alkalinity (as $CaCO_3$)	mg/l	154	162	172
11	Chloride (as Cl)	mg/l	31	35	32
12	Sulphate (as SO_4)	mg/l	11	13	15
13	Nitrate (as NO_3)	mg/l	1.4	1.6	1.2
14	Fluoride (as F)	mg/l	0.5	0.5	0.4
15	Sodium (as Na)	mg/l	18	20	16
16	Potassium (as K)	mg/l	3.2	3.6	2.8
17	TKN (as N)	mg/l	2.3	2.5	2.6
18	Total Phosphorous (as PO_4)	mg/l	0.18	0.21	0.19
19	COD	mg/l	11	10	15
20	Phenolic compounds (as C_6H_5OH)	mg/l	<0.001	<0.001	<0.001
21	Iron (as Fe)	mg/l	0.1	0.09	0.13
22	Zinc (as Zn)	mg/l	0.05	0.06	0.05
23	Arsenic (as As)	mg/l	<0.01	<0.01	<0.01
24	Mercury (as Hg)	mg/l	<0.001	<0.001	<0.001
25	TDS	mg/l	252	274	286
26	Total Coliform	MPN/100ml	3400	4000	5000
27	Faecal Coliform	MPN/100ml	1400	1700	2200

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 3.6** 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 **7.58 to 7.72.**
- Dissolved Oxygen (DO) was observed in the range of **6.6 to 7.0 mg/l** against the minimum requirement of 4 mg/l.
- BOD values were observed to be in the range of **3.0 to 4.0mg/l.**
- Total Coliform examination of surface water samples revealed the presence of total coliform in range of 3400 MPN/100 ml to 5000 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	Min	Max
DEC 2022	10	20	1	24
JANUARY 2023	05	19	1	26
FEBRUARY 2023	12	22	2	32

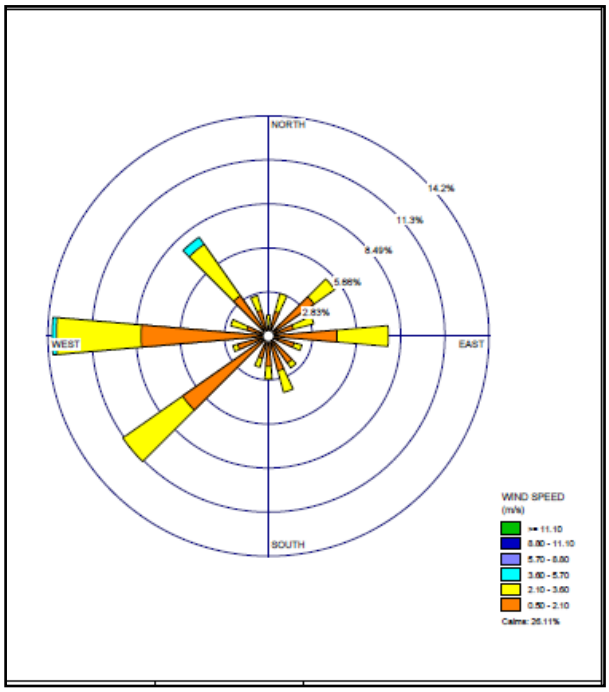

Figure 3.3: Wind Rose Diagram (at site)

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- Patnais about 40 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.

METHOD OF MONITORING

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

Methods adopted for PM2.5, PM10, SO2 and NOX (as NO2)

Parameters	Technique	Technical Protocol	Minimum Detectable Limit
PM2.5	Gravimetric method	US EPA Method	5 (µg/m3)
PM10	Gravimetric method	IS 5182 (Part-XXIII)	5 (µg/m3)
Sulphur Dioxide	West and Gaeke	IS-5182 (Part-II)	3 (µg/m3)
Nitrogen Oxide	Jacob & Hochheiser	IS-5182 (Part-VI)	7 (µg/m3)

i. Particulate Matter (PM):-

The CPCB method and IS 5182 (Part-XXIII) adopt a very similar approach to particulate sampling. There are some differences in the expressions used, but they are generally of no practical significance. It is recommended that CPCB method is adapted.

ii. Equipment calibration:

For accurate testing of emission sources, the components of the sampling train is calibrated by outsource and supplier (Master Calibrator) standards and solutions are used, calibrated under certified reference material.

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 8 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 98^{th} 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 Mahgaon village)	0.15 km E
AAQ 2	Pairamatihana	2.25km ENE
AAQ 3	Tola Bishunpur	7.7 Km W
AAQ 4	Tola Bijaia	3.20 Km W
AAQ 5	Bhuraha	3.40 Km SE
AAQ 6	Tola Lakhanpur	6.0 Km Km SW
AAQ 7	Tola Lohthara	6.85 Km NNE
AAQ 8	Saharpharka	6.90 Km NNW

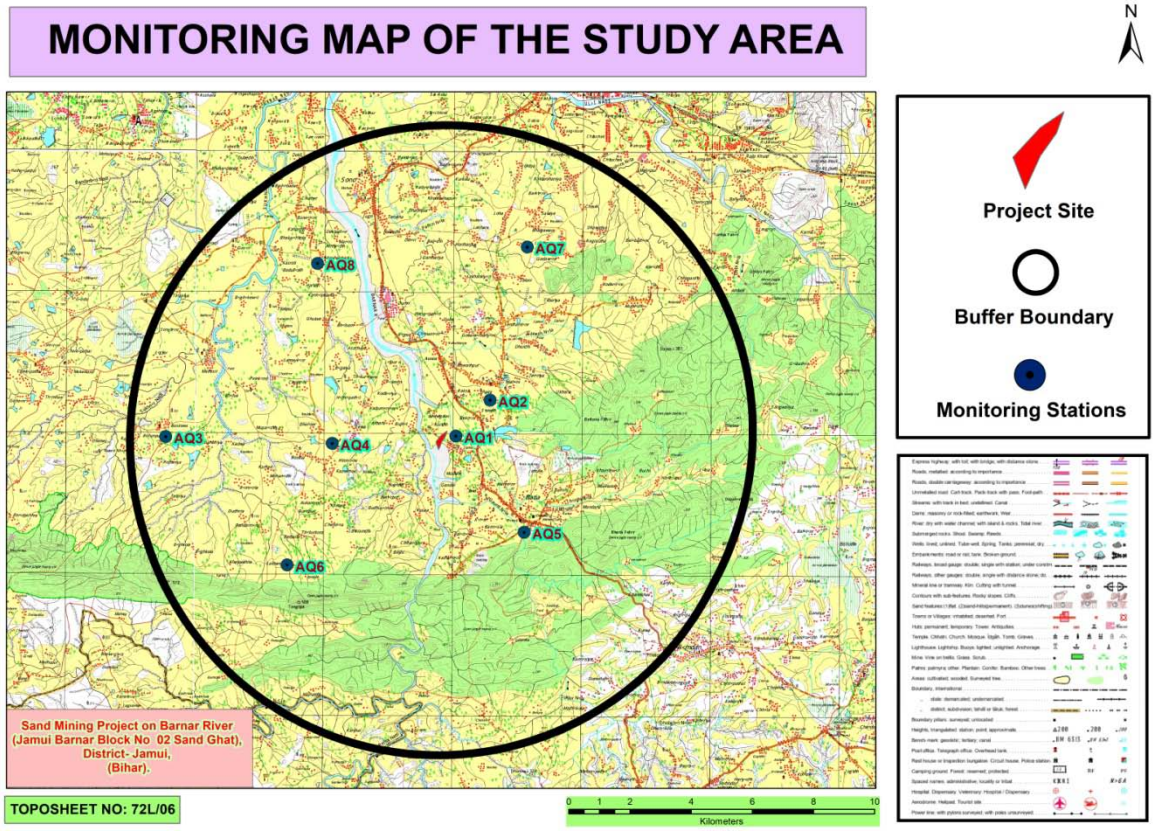

Figure 3.4 Ambient Air Quality Monitoring Stations

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 Mahgaon village)	31.2	44.1	39.6	43.3
AAQ2	Pairamatihana	42.4	49.5	44.9	48.6
AAQ3	Tola Bishunpur	44.7	55.1	51.6	54.5

AAQ4	Tola Bijaia	27.6	42.9	33.3	41.7
AAQ5	Bhuraha	45.2	52.7	48.3	51.8
AAQ6	Tola Lakhanpur	48.2	56.6	51.9	55.7
AAQ7	Tola Lohthara	38.5	46.3	41.6	45.3
AAQ8	Saharpharka	37.5	48.6	42.0	47.7

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 Mahgaon village)	63.2	87.4	72.3	86.0
AAQ2	Pairamatihana	75.6	87.5	81.7	86.5
AAQ3	Tola Bishunpur	81.2	93.8	86.7	92.9
AAQ4	Tola Bijaia	66.3	83.4	73.3	82.5
AAQ5	Bhuraha	79.5	90.8	85.5	89.9
AAQ6	Tola Lakhanpur	83.1	95.8	90.1	94.8
AAQ7	Tola Lohthara	72.5	84.6	80.0	83.8
AAQ8	Saharpharka	71.8	93.1	83.1	92.4

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 Mahgaon village)	6.5	9.8	7.8	9.7
AAQ2	Pairamatihana	7.3	11.4	8.7	10.9
AAQ3	Tola Bishunpur	8.1	13.2	10.1	12.6
AAQ4	Tola Bijaia	5.8	9.3	7.4	9.3
AAQ5	Bhuraha	8.1	12.3	9.9	11.8
AAQ6	Tola Lakhanpur	8.4	13.5	10.4	12.9
AAQ7	Tola Lohthara	6.5	10.3	8.1	9.8
AAQ8	Saharpharka	4.4	8.0	6.0	7.8

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 Mahgaon village)	14.4	21.9	17.6	21.3
AAQ2	Pairamatihana	14.2	19.3	15.8	18.9

AAQ3	Tola Bishunpur	17.5	23.8	19.8	22.8
AAQ4	Tola Bijaia	15.4	20.4	17.2	19.8
AAQ5	Bhuraha	14.8	20.1	17.0	19.5
AAQ6	Tola Lakhanpur	18.3	24.1	20.3	23.3
AAQ7	Tola Lohthara	12.5	17.2	13.9	16.6
AAQ8	Saharpharka	7.6	15.0	10.4	14.1

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 27.6 µg/$m^3$to 56.6 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 63.2 µg/$m^3$to 95.8 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 4.4 µg/$m^3$to 13.5 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 7.6 µg/$m^3$to 24.1 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

Location Code	Free silica (µg/m^3)		
	Name of the station	**Min**	**Max**
AAQ1	Project Site (Near Mahgaon village)	1.40	1.69
AAQ2	Pairamatihana	1.31	1.68
AAQ3	Tola Bishunpur	1.51	1.75
AAQ4	Tola Bijaia	1.33	1.55
AAQ5	Bhuraha	1.41	1.72
AAQ6	Tola Lakhanpur	1.42	1.74
AAQ7	Tola Lohthara	1.44	1.80
AAQ8	Saharpharka	1.40	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 5 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 Mahgaon village)	0.15 km E
SQ 2	Pairamatihana	2.25km ENE
SQ 3	Tola Bishunpur	7.7 Km W
SQ 4	Tola Bijaia	3.20 Km W
SQ 5	Bhuraha	3.40 Km SE

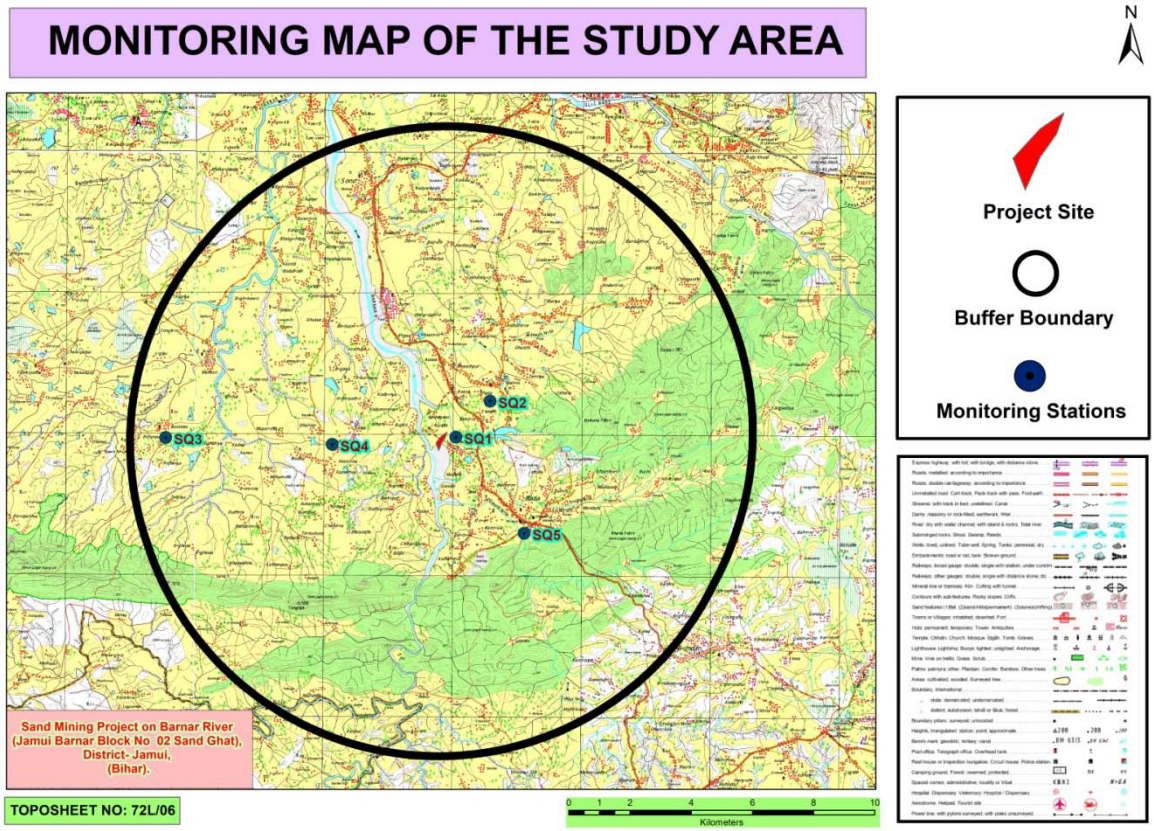

Figure 3.5, Soil Sampling Locations

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 clay loam	Sand	Sand	Sandy Loam	Sandy Loam
	Silt	%	16.3	12.5	14.3	10.5	13.6
	clay	%	21.4	7.67	8.25	20.6	19.7
	Sand	%	62.3	79.83	77.45	68.9	66.7
2	pH	-	8.21	8.15	7.15	7.58	7.25
3	Electrical Conductivity	µmhos/cm	108	112	114	120	125
4	Cation exchange capacity	meq/100 gm	9.43	8.32	8.40	11.76	13.76
5	Potassium	mg/kg	48.58	46.93	46.93	49.36	54.36
6	Sodium	mg/kg	60.41	55.04	54.04	67.74	61.74
7	Calcium	mg/kg	1659.42	1446.93	1247.93	1844.74	18116.74
8	Magnesium	mg/kg	90.15	87.72	87.72	93.34	101.34
9	Sodium Absorption Ratio	-	0.39	0.37	0.39	0.41	0.43
10	Water Holding Capacity	%	30.2	21.7	24.7	29.7	28.7
11	Porosity	%	37.2	51.2	54.2	41.9	41.8

Observations:

Samples collected from identified locations indicate the soil is sandy type and the pH value ranging from **7.15 to 8.21**, which shows that the soil is alkaline in nature.

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 3.15.** The noise level monitoring locations are marked in **Figure 3.6** and shown in **Table 3.16.**

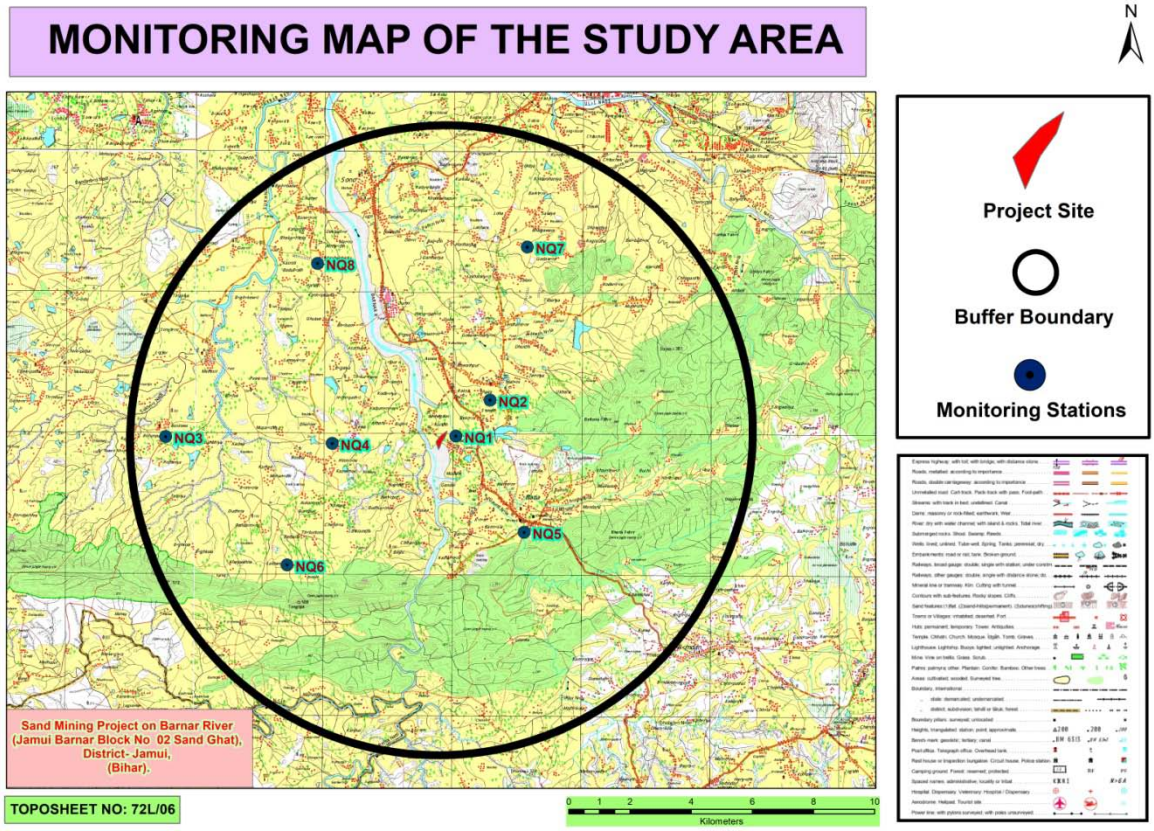

Figure 3.6 Noise Monitoring Stations

Table 3.15: Noise Quality Monitoring Stations

Noise Monitoring Locations		
NQ 1	Project Site(Near Mahgaon village)	0.15 km E
NQ 2	Pairamatihana	2.25km ENE
NQ 3	Tola Bishunpur	7.7 Km W
NQ 4	Tola Bijaia	3.20 Km W
NQ 5	Bhuraha	3.40 Km SE
NQ 6	Tola Lakhanpur	6.0 Km SW
NQ 7	Tola Lohthara	6.85 Km NNE
NQ 8	Saharpharka	6.90 Km NNW

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 (Project Site)	75	70	50.2	40.1
2	NQ-2	Residential Zone	55	45	52.1	43.1
3	NQ-3	Residential Zone	55	45	53.8	42.4
4	NQ-4	Silence zone	50	40	39.2	35.6
5	NQ-5	Residential Zone	55	45	45.2	39.1
6	NQ-6	Residential Zone	55	45	42.1	35.1
7	NQ-7	Residential Zone	55	45	49.8	41.4
8	NQ-8	Residential Zone	55	45	41.2	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 **39.2 dB(A) to 53.8 dB(A)** respectively. The minimum & maximum noise levels at night time were found to be **35.1 dB (A) & 43.1 dB(A)** respectively.

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

3.6 BIOLOGICAL ENVIRONMENT

3.6.1 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 Barnar River at Jamui Barnar Block 02 Sand Ghat.

3.6.2 Description of the study area

The Proposed Sand Mining Project was located on Barnar River at Jamui Barnar Block 02 Sand Ghat, At Mauza – Mahgaon, Block - Sono, District- 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.

3.6.8 Flora of the Study Area

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

A major part of the core and buffer zone of the project is agricultural land having some major vegetation in the form of agro forestry. Vegetation patterns in villages and surrounding areas are slightly different from the rest of the areas in the Jamui district.

The common species grown near the villages are mostly edible, fruits bearing or useful plants. Purposely planted tree patches (mostly fruit-bearing) are available nearby several villages in the study area. The most dominant tree species in the study area are, *Ficus bengalensis* (Bargad) *Azadirachta indica* (Neem), *Aegle marmelos* (Bel), *Emblica officinalis* (Amla), *Syzygiumcumini* (Jamun), *Dalbergia sissoo* (Sisam), , *Musa paradisiacal* (Kela), *Cassia siamea* (Kasod/Siris), *Litchi chinensis* (Litchi), *Mangifera indica* (Aam) and in case of shrubs *Antigonum leptopus*, *Ricinus communis*, *Lantana camara*, *Jatropha gossipifolia* and *Cassia auriculata* etc. The most dominant species in the study area of both the district was *Mangifera indica* (Aam) and its different varieties.

3.6.9 Flora of Core zone

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

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 3.18 & 3.19.

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 3.20.

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 is given below. So, the list of aquatic fauna of the core zone is merged with the details of the buffer zone and is given below.

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 3.24 to 3.25.

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	Dicroglossida	IV	LC

			e		
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 melanotos*	Knob-billed duck	Anatidae	IV	LC
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 3.27 to 3.30.

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 are mainly used for the culture of fishes. All these water bodies support fish species. Fishes found in the study area are listed in Table 3.30.

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 222 villages and one Town named Tola Pairamatihana (CT) lying under Jamui District in Bihar state. Overall study area villages are falling mainly under 2 tehsils namely Sono (175 villages & 01 Town),and Chakai (47 villages) of Jamui district in Bihar state.

There are 32 villages of Jamui district in Bihar state found as uninhabited villages in the study area. There is only one town named Tola Pairamatihana (CT) found in the 10km radial study zone.

Population Distribution (10 km)

As per the Census Records 2011, the total population of 10 km study zone was recorded as 164012persons of 223villages and one town named Tola Pairamatihana (CT) of Jamui district inBihar state. Male-female wise total population was recorded as 84542 males (51.5%) and 79470(48.5%) females respectively.

Total number of 'Households' was observed as 29156in the 10 km radius study zone. Scheduled Caste ('SC') population was observed as 21537persons consisting of 11021males (51.2%) and 10516 females (48.8%) in the 10km study zone. Scheduled Tribes ('ST') population was also observed as 14743 persons (9.0%) consisting of 7397 males (50.2%) and 7346females (49.8%) in the 10 km study zone.The child population (0-6 Age) of the study area is recorded as 31364(19.1%) and comprising of 15815 (50.4%)males&15549 (49.6%) females respectively.

Rural and Urban population distribution is shown in **Table 3.31, 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	**28049**	**158154**	**81562**	**76592**	**20693**	**10581**	**10112**	**14740**	**7396**	**7344**
%age	96.2	96.4	96.5	96.4	96.0	96.0	96.2	99.9	100	0.03
Urban	**1107**	**5858**	**2980**	**2878**	**844**	**440**	**404**	**3**	**1**	**2**
%age	3.8	3.6	3.5	3.6	4.0	4.0	3.8	0.1	-	99.97
Total (10km)	**29156**	**164012**	**84542**	**79470**	**21537**	**11021**	**10516**	**14743**	**7397**	**7346**
Source-Census of India, 2011										

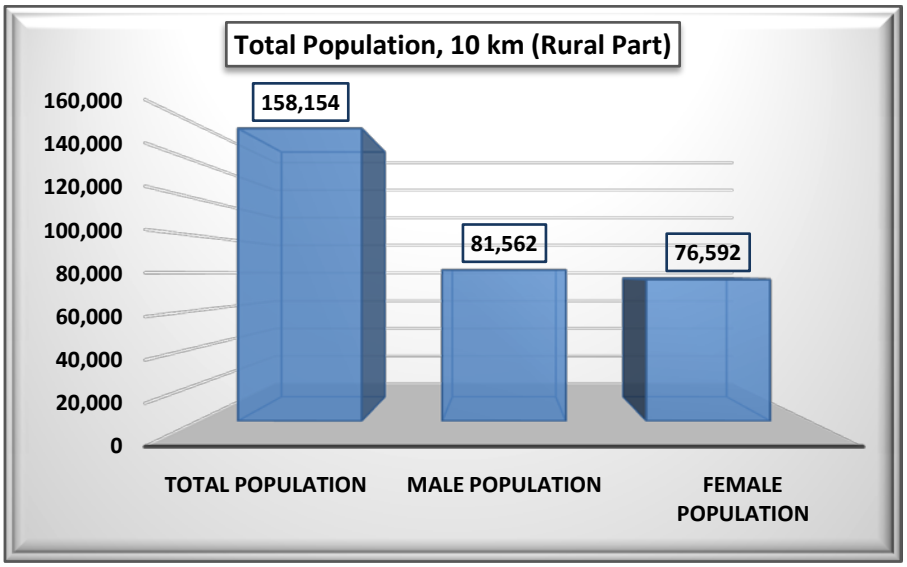

Figure 3.7: Male-Female Wise Rural Population Distribution

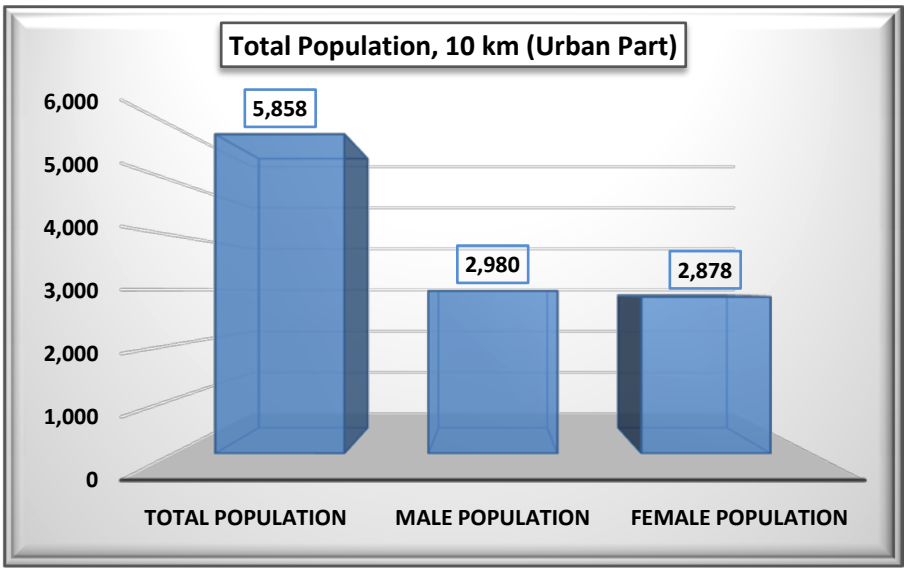

Figure 3.8: Male-Female Wise Urban Population Distribution

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	Male	Female	Persons	Male	Female
Tola Ghotari	27	181	92	89	41	20	21
Tola Pachpahri	29	135	68	67	31	16	15
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 Nawadih	60	455	236	219	85	52	33
Tola Dehari	68	384	211	173	77	44	33
Tola Baijadih	85	500	269	231	73	36	37
Tola Gamharia	40	252	128	124	36	18	18
Tola Mararo	64	294	144	150	57	25	32
Tola Nawada	Uninhabited Village						
Tola Oaira	19	107	58	49	21	10	11
Tola Bhalsom	56	333	182	151	43	26	17
Tola Silauna	7	33	21	12	7	5	2
Tola Rajpur	275	1460	773	687	202	102	100
Tola Dumri Khas	530	2760	1450	1310	421	233	188
Tola Koria	77	463	254	209	98	56	42
Tola Duba	83	746	396	350	116	57	59
Tola Rakat Rohinia	347	1884	997	887	422	219	203
Tola Karijhal	Uninhabited Village						
Tola Chauki	117	671	345	326	162	85	77
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 Jirhulia	30	204	107	97	22	14	8
Tola Khairalewar	104	567	304	263	107	60	47
Tola Buchchi	20	128	70	58	13	6	7
Tola Khanjar	19	105	56	49	21	12	9
Tola Bhelwa	37	194	98	96	28	12	16
Tola Pahar 1	49	239	118	121	38	15	23
Tola Asarhua	276	1632	838	794	331	177	154
Tola Thakur Ahra	124	740	395	345	149	82	67
Tola Ghogha	28	162	89	73	33	17	16
Tola Laugain	Uninhabited Village						
Tola Kairabank	23	136	73	63	18	6	12
Tola Lalpur	78	504	269	235	95	48	47
Tola Kodbaria	31	171	95	76	28	14	14
Tola Kishumantanr	43	360	174	186	62	28	34
Tola Nimatanr	14	80	40	40	12	5	7
Tola Chanantanr	298	1311	674	637	247	128	119
Tola Khopariadih	218	1475	740	735	321	158	163
Tola Auraia	256	1620	853	767	290	144	146
Tola Tewaritanr	71	351	178	173	68	36	32
Tola Gorwa Matihana	199	1130	575	555	214	106	108
Tola Gangtia	21	91	45	46	24	12	12
Tola Chharna	83	419	204	215	96	45	51
Tola Kukurbhento	31	187	108	79	36	22	14
Tola Bharathpur	277	1662	835	827	377	187	190

Tola Raksa	159	726	376	350	138	82	56
Tola Belatanr	116	633	335	298	110	64	46
Tola Koradih	97	495	249	246	100	45	55
Tola Mahgaon	703	3656	1932	1724	607	324	283
Tola Bijaia	279	1608	824	784	353	164	189
Tola Lewa	99	508	256	252	93	49	44
Tola Tetaria 1	74	413	195	218	95	48	47
Tola Hirniatanr	6	54	29	25	12	6	6
Tola Karmatanr	60	457	219	238	94	38	56
Tola Morbaia	63	244	126	118	57	31	26
Tola Nonchhaha	14	70	37	33	12	5	7
Tola Hathiapathar	14	70	36	34	13	6	7
Tola Arbaria	115	649	325	324	121	55	66
Tola Bujhanet	391	1741	913	828	340	179	161
Tola Jarwanari	20	107	59	48	14	9	5
Tola Kenduatari	Uninhabited Village						
Tola Aklu	25	146	78	68	32	23	9
Tola Kasba	Uninhabited Village						
Tola Naiadih	225	1504	768	736	254	124	130
Tola Bariarpur	264	1634	850	784	324	163	161
Tola Khotwa	54	368	203	165	67	38	29
Tola Bikramdih	30	162	84	78	29	15	14
Tola Chhatakaram	Uninhabited Village						
Tola Panari	91	419	217	202	70	31	39
Tola Silauni	Uninhabited Village						
Tola Budhuatanr	54	218	110	108	48	25	23
Tola Binjhi	33	136	69	67	25	15	10
Tola Kusaia	167	935	484	451	203	90	113
Tola Burhialapur	197	1179	618	561	293	142	151
Tola Chendara	161	712	359	353	161	81	80

Tola Debidih	24	96	43	53	18	5	13
Tola Thakurkura	11	86	47	39	6	4	2
Tola Panaripahar	Uninhabited Village						
Tola Kamarakh	Uninhabited Village						
Tola Kewali	401	1764	909	855	273	138	135
Tola Sono	1833	9932	5321	4611	1607	845	762
Tola Debipahari	8	53	24	29	10	6	4
Tola Jugri	96	559	299	260	99	47	52
Churhit	498	2777	1394	1383	552	285	267
Shaharpharka	333	2074	1106	968	384	199	185
Keshopharka	655	3900	2025	1875	679	334	345
Dumari Arazi	Uninhabited Village						
Kanhaipharka	71	526	283	243	74	37	37
Tola Ghutwe	330	2051	1053	998	384	179	205
Tola Bautha	534	3150	1626	1524	719	352	367
Tola Karmatia	Uninhabited Village						
Tola Taraun	94	654	328	326	156	72	84
Tola Ghosari	24	156	81	75	37	17	20
Tola Charghara Kohila	252	1379	711	668	284	150	134
Tola Kairi	101	571	290	281	139	73	66
Tola Tilkatia	Uninhabited Village						
Tola Telia Baihayari	Uninhabited Village						
Tola Purainia	35	158	77	81	30	14	16
Tola Sonailtanr	95	621	317	304	146	84	62
Tola Mahesri Gadi	706	4384	2432	1952	724	396	328
Tola Tilakpur	145	896	466	430	170	84	86
Tola Boghakewal	183	931	466	465	178	96	82
Tola Alkusa	Uninhabited Village						
Tola Bela	Uninhabited Village						

Tola Dhamni	122	758	366	392	173	79	94
Tola Sonailtanr	56	404	204	200	97	46	51
Tola Mahui	4	37	16	21	4	2	2
Tola Tamorijot	6	59	31	28	6	1	5
Tola Patikewal	Uninhabited Village						
Tola Kharik	140	870	419	451	195	101	94
Tola Karmatanr	29	131	73	58	30	20	10
Tola Sugatanr	20	143	77	66	35	19	16
Tola Pachrukhi	Uninhabited Village						
Tola Painkandh	47	334	184	150	68	41	27
Tola Bhalua	100	586	319	267	154	83	71
Tola Bharara	Uninhabited Village						
Tola Khaguhari	Uninhabited Village						
Tola Jhilia	Uninhabited Village						
Tola Kadwa	32	202	106	96	43	21	22
Tola Bhelsumbhia	297	1970	1034	936	421	231	190
Tola Bishunpur	387	2215	1164	1051	389	200	189
Tola Rajaun	506	3158	1653	1505	598	325	273
Tola Murmala	Uninhabited Village						
Tola Basauwa	61	272	147	125	63	33	30
Tola Nawai Ahar	86	476	247	229	87	40	47
Tola Tetaria 2	51	314	168	146	49	24	25
Tola Nawadih	Uninhabited Village						
Tola Baghakolo	32	139	65	74	33	16	17
Tola Barkitanr	Uninhabited Village						
Tola Phuldaun	Uninhabited Village						
Tola Barmania	124	755	374	381	154	69	85
Tola Dudhania	104	667	340	327	121	53	68
Tola Karhari	177	1104	567	537	208	103	105
Tola Mohanadih	46	291	138	153	80	43	37

Tola Bandarmara	184	1072	544	528	219	102	117
Tola Thelpathar	7	31	17	14	3	2	1
Tola Akonwatanr	78	498	250	248	117	57	60
Tola Botbaria	55	284	134	150	64	26	38
Tola Lakhanpur	12	54	28	26	9	4	5
Gandar	716	4486	2300	2186	837	406	431
Tola Dahiari	481	2706	1398	1308	582	289	293
Tola Kurawa	33	192	104	88	50	26	24
Tola Gidhadih	136	721	373	348	137	65	72
Tola Teliadesh	103	541	280	261	106	55	51
Tola Karyasair	29	189	95	94	42	15	27
Tola Itwa	413	2254	1145	1109	486	238	248
Tola Batia	202	1212	639	573	199	103	96
Tola Bhuraha	150	774	409	365	101	57	44
Tola Barmasia 1	43	271	136	135	61	24	37
Tola Hethbatia	60	297	149	148	50	23	27
Tola Pairamatihana (CT)	1107	5858	2980	2878	1130	558	572
Tola Marwa	41	220	115	105	33	14	19
Tola Panana	57	328	172	156	52	31	21
Tola Goswarah	55	345	176	169	64	34	30
Tola Barmoria	87	477	225	252	90	42	48
Tola Gurarbaj	148	854	422	432	201	90	111
Tola Dubardih	19	85	48	37	25	16	9
Tola Rajadumar	63	325	165	160	72	34	38
Tola Hasikol	21	119	60	59	31	13	18
Tola Barakhutia	77	396	196	200	57	27	30
Tola Pahar 2	Uninhabited Village						
Tola Barkha	Uninhabited Village						
Tola Telanga	26	136	71	65	21	9	12

Tola Guhia	47	245	124	121	35	14	21
Tola Mangurakura	17	73	34	39	11	3	8
Tola Pipra	86	391	198	193	49	25	24
Tola Barmasia 2	78	328	168	160	53	26	27
Tola Kurwa	87	420	207	213	70	34	36
Tola Chandosal	Uninhabited Village						
Tola Bamdah	400	1742	893	849	278	136	142
Tola Phitkuria	49	244	133	111	52	35	17
Tola Tarakhar	93	454	231	223	60	29	31
Tola Domohan	102	552	279	273	84	37	47
Tola Majhlakola	39	196	114	82	32	17	15
Tola Bhutaha	4	14	10	4	0	0	0
Tola Ramchandih	326	1811	941	870	297	151	146
Tola Hariharpur	61	267	140	127	53	25	28
Tola Lakra	38	180	92	88	18	10	8
Tola Karijhal	71	356	193	163	44	21	23
Tola Chandosol	32	170	79	91	30	13	17
Tola Baghopatar	131	709	343	366	115	60	55
Tola Deopanar	Uninhabited Village						
Tola Kachuwa	173	949	471	478	181	82	99
Tola Behara	167	931	469	462	170	91	79
Tola Chehara	77	416	213	203	62	24	38
Tola Belkhari	86	401	206	195	68	38	30
Tola Harni	50	237	108	129	33	14	19
Tola Jogia	22	97	47	50	21	7	14
Tola Siktia	74	373	186	187	60	34	26
Tola Nimtari	Uninhabited Village						
Tola Nanhia	91	495	245	250	95	37	58
Tola Khairsala	13	67	32	35	18	10	8
Tola Dhamna	134	746	399	347	171	89	82

Tola Panana	43	273	145	128	49	25	24
Tola Chatra	31	200	113	87	30	16	14
Tola Sugi Gamhar	19	118	63	55	23	12	11
Tola Bathna	60	361	180	181	47	20	27
Tola Nawadih	170	1263	658	605	241	114	127
TOTAL (10km)	**29156**	**164012**	**84542**	**79470**	**31364**	**15815**	**15549**
Source-Census of India, 2011							

Table 3.33: Village-wise SC & ST Population Distribution (10km)

Name of Village/Town	Total Population	Scheduled Castes			Scheduled Tribes		
		Persons	Males	Females	Persons	Males	Females
Tola Ghotari	181	0	0	0	0	0	0
Tola Pachpahri	135	63	32	31	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 Nawadih	455	175	90	85	0	0	0
Tola Dehari	384	86	44	42	0	0	0
Tola Baijadih	500	46	22	24	0	0	0
Tola Gamharia	252	0	0	0	0	0	0
Tola Mararo	294	84	36	48	0	0	0

Tola Nawada	Uninhabited Village						
Tola Oaira	107	0	0	0	0	0	0
Tola Bhalsom	333	0	0	0	0	0	0
Tola Silauna	33	0	0	0	0	0	0
Tola Rajpur	1460	0	0	0	0	0	0
Tola Dumri Khas	2760	830	434	396	2	0	2
Tola Koria	463	50	26	24	0	0	0
Tola Duba	746	1	1	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 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 Jirhulia	204	0	0	0	68	35	33
Tola Khairalewar	567	66	35	31	177	96	81
Tola Buchchi	128	0	0	0	8	5	3
Tola Khanjar	105	0	0	0	105	56	49
Tola Bhelwa	194	0	0	0	180	90	90
Tola Pahar 1	239	0	0	0	237	118	119
Tola Asarhua	1632	258	139	119	0	0	0
Tola Thakur Ahra	740	0	0	0	0	0	0
Tola Ghogha	162	14	9	5	0	0	0
Tola Laugain	Uninhabited Village						
Tola Kairabank	136	0	0	0	0	0	0
Tola Lalpur	504	161	84	77	0	0	0
Tola Kodbaria	171	14	10	4	0	0	0
Tola Kishumantanr	360	0	0	0	0	0	0
Tola Nimatanr	80	0	0	0	0	0	0
Tola Chanantanr	1311	1311	674	637	0	0	0
Tola Khopariadih	1475	0	0	0	0	0	0
Tola Auraia	1620	378	188	190	0	0	0
Tola Tewaritanr	351	0	0	0	0	0	0
Tola Gorwa Matihana	1130	221	118	103	0	0	0
Tola Gangtia	91	86	43	43	4	2	2
Tola Chharna	419	0	0	0	0	0	0
Tola Kukurbhento	187	0	0	0	0	0	0
Tola Bharathpur	1662	447	216	231	0	0	0
Tola Raksa	726	0	0	0	0	0	0
Tola Belatanr	633	46	22	24	0	0	0
Tola Koradih	495	45	24	21	102	49	53
Tola Mahgaon	3656	311	170	141	0	0	0
Tola Bijaia	1608	312	151	161	0	0	0
Tola Lewa	508	0	0	0	0	0	0

Tola Tetaria 1	413	0	0	0	0	0	0
Tola Hirniatanr	54	0	0	0	0	0	0
Tola Karmatanr	457	0	0	0	0	0	0
Tola Morbaia	244	0	0	0	0	0	0
Tola Nonchhaha	70	0	0	0	0	0	0
Tola Hathiapathar	70	0	0	0	0	0	0
Tola Arbaria	649	0	0	0	0	0	0
Tola Bujhanet	1741	772	403	369	0	0	0
Tola Jarwanari	107	0	0	0	0	0	0
Tola Kenduatari	Uninhabited Village						
Tola Aklu	146	0	0	0	0	0	0
Tola Kasba	Uninhabited Village						
Tola Naiadih	1504	0	0	0	0	0	0
Tola Bariarpur	1634	148	68	80	0	0	0
Tola Khotwa	368	0	0	0	0	0	0
Tola Bikramdih	162	0	0	0	0	0	0
Tola Chhatakaram	Uninhabited Village						
Tola Panari	419	0	0	0	419	217	202
Tola Silauni	Uninhabited Village						
Tola Budhuatanr	218	0	0	0	0	0	0
Tola Binjhi	136	0	0	0	114	59	55
Tola Kusaia	935	123	59	64	95	45	50
Tola Burhialapur	1179	0	0	0	0	0	0
Tola Chendara	712	252	130	122	0	0	0
Tola Debidih	96	0	0	0	87	39	48
Tola Thakurkura	86	0	0	0	0	0	0
Tola Panaripahar	Uninhabited Village						
Tola Kamarakh	Uninhabited Village						
Tola Kewali	1764	320	156	164	0	0	0
Tola Sono	9932	1202	633	569	9	4	5

Tola Debipahari	53	0	0	0	0	0	0
Tola Jugri	559	80	43	37	0	0	0
Churhit	2777	1179	585	594	1	1	0
Shaharpharka	2074	69	42	27	0	0	0
Keshopharka	3900	1025	532	493	0	0	0
Dumari Arazi	Uninhabited Village						
Kanhaipharka	526	0	0	0	0	0	0
Tola Ghutwe	2051	298	148	150	0	0	0
Tola Bautha	3150	274	145	129	0	0	0
Tola Karmatia	Uninhabited Village						
Tola Taraun	654	0	0	0	0	0	0
Tola Ghosari	156	0	0	0	0	0	0
Tola Charghara Kohila	1379	435	230	205	0	0	0
Tola Kairi	571	112	51	61	1	1	0
Tola Tilkatia	Uninhabited Village						
Tola Telia Baihayari	Uninhabited Village						
Tola Purainia	158	143	68	75	0	0	0
Tola Sonailtanr	621	312	153	159	0	0	0
Tola Mahesri Gadi	4384	184	92	92	2	1	1
Tola Tilakpur	896	385	196	189	0	0	0
Tola Boghakewal	931	206	103	103	0	0	0
Tola Alkusa	Uninhabited Village						
Tola Bela	Uninhabited Village						
Tola Dhamni	758	77	43	34	0	0	0
Tola Sonailtanr	404	23	14	9	0	0	0
Tola Mahui	37	0	0	0	0	0	0
Tola Tamorijot	59	0	0	0	0	0	0
Tola Patikewal	Uninhabited Village						
Tola Kharik	870	8	4	4	0	0	0

Tola Karmatanr	131	0	0	0	0	0	0
Tola Sugatanr	143	43	22	21	0	0	0
Tola Pachrukhi	Uninhabited Village						
Tola Painkandh	334	0	0	0	0	0	0
Tola Bhalua	586	0	0	0	0	0	0
Tola Bharara	Uninhabited Village						
Tola Khaguhari	Uninhabited Village						
Tola Jhilia	Uninhabited Village						
Tola Kadwa	202	0	0	0	0	0	0
Tola Bhelsumbhia	1970	0	0	0	0	0	0
Tola Bishunpur	2215	187	96	91	151	78	73
Tola Rajaun	3158	1212	620	592	1	1	0
Tola Murmala	Uninhabited Village						
Tola Basauwa	272	0	0	0	0	0	0
Tola Nawai Ahar	476	0	0	0	0	0	0
Tola Tetaria 2	314	0	0	0	307	165	142
Tola Nawadih	Uninhabited Village						
Tola Baghakolo	139	109	51	58	30	14	16
Tola Barkitanr	Uninhabited Village						
Tola Phuldaun	Uninhabited Village						
Tola Barmania	755	40	22	18	0	0	0
Tola Dudhania	667	0	0	0	0	0	0
Tola Karhari	1104	0	0	0	0	0	0
Tola Mohanadih	291	0	0	0	0	0	0
Tola Bandarmara	1072	0	0	0	0	0	0
Tola Thelpathar	31	0	0	0	31	17	14
Tola Akonwatanr	498	0	0	0	0	0	0
Tola Botbaria	284	0	0	0	0	0	0
Tola Lakhanpur	54	0	0	0	54	28	26
Gandar	4486	1030	533	497	1	0	1

Tola Dahiari	2706	781	386	395	102	57	45
Tola Kurawa	192	101	51	50	0	0	0
Tola Gidhadih	721	352	180	172	0	0	0
Tola Teliadesh	541	177	93	84	0	0	0
Tola Karyasair	189	42	21	21	0	0	0
Tola Itwa	2254	627	322	305	0	0	0
Tola Batia	1212	166	84	82	0	0	0
Tola Bhuraha	774	0	0	0	0	0	0
Tola Barmasia 1	271	0	0	0	0	0	0
Tola Hethbatia	297	34	19	15	70	34	36
Tola Pairamatihana (CT)	5858	844	440	404	3	1	2
Tola Marwa	220	0	0	0	165	89	76
Tola Panana	328	0	0	0	323	169	154
Tola Goswarah	345	4	3	1	169	81	88
Tola Barmoria	477	15	4	11	437	207	230
Tola Gurarbaj	854	0	0	0	0	0	0
Tola Dubardih	85	0	0	0	85	48	37
Tola Rajadumar	325	0	0	0	317	160	157
Tola Hasikol	119	5	2	3	86	43	43
Tola Barakhutia	396	0	0	0	396	196	200
Tola Pahar 2	Uninhabited Village						
Tola Barkha	Uninhabited Village						
Tola Telanga	136	0	0	0	136	71	65
Tola Guhia	245	0	0	0	245	124	121
Tola Mangurakura	73	0	0	0	73	34	39
Tola Pipra	391	0	0	0	377	188	189
Tola Barmasia 2	328	0	0	0	327	167	160
Tola Kurwa	420	25	12	13	393	195	198
Tola Chandosal	Uninhabited Village						

Tola Bamdah	1742	47	27	20	743	363	380
Tola Phitkuria	244	0	0	0	242	131	111
Tola Tarakhar	454	4	1	3	334	167	167
Tola Domohan	552	0	0	0	327	168	159
Tola Majhlakola	196	0	0	0	144	83	61
Tola Bhutaha	14	0	0	0	0	0	0
Tola Ramchandih	1811	73	35	38	0	0	0
Tola Hariharpur	267	0	0	0	250	131	119
Tola Lakra	180	1	1	0	178	91	87
Tola Karijhal	356	0	0	0	300	164	136
Tola Chandosol	170	0	0	0	169	78	91
Tola Baghopatar	709	0	0	0	645	314	331
Tola Deopanar	Uninhabited Village						
Tola Kachuwa	949	3	2	1	891	445	446
Tola Behara	931	186	99	87	434	208	226
Tola Chehara	416	37	20	17	361	183	178
Tola Belkhari	401	3	2	1	326	168	158
Tola Harni	237	1	0	1	235	108	127
Tola Jogia	97	0	0	0	11	7	4
Tola Siktia	373	18	7	11	316	162	154
Tola Nimtari	Uninhabited Village						
Tola Nanhia	495	0	0	0	406	198	208
Tola Khairsala	67	0	0	0	67	32	35
Tola Dhamna	746	112	62	50	433	226	207
Tola Panana	273	0	0	0	76	41	35
Tola Chatra	200	0	0	0	53	30	23
Tola Sugi Gamhar	118	0	0	0	0	0	0
Tola Bathna	361	1	1	0	290	141	149
Tola Nawadih	1263	268	148	120	0	0	0
TOTAL (10km)	**164012**	**21537**	**1102**	**10516**	**14743**	**7397**	**7346**

			1				

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 940females for every 1000 males in the study area. The child (0-6 yr age) sex ratio of the stud area was observed as 983 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.**

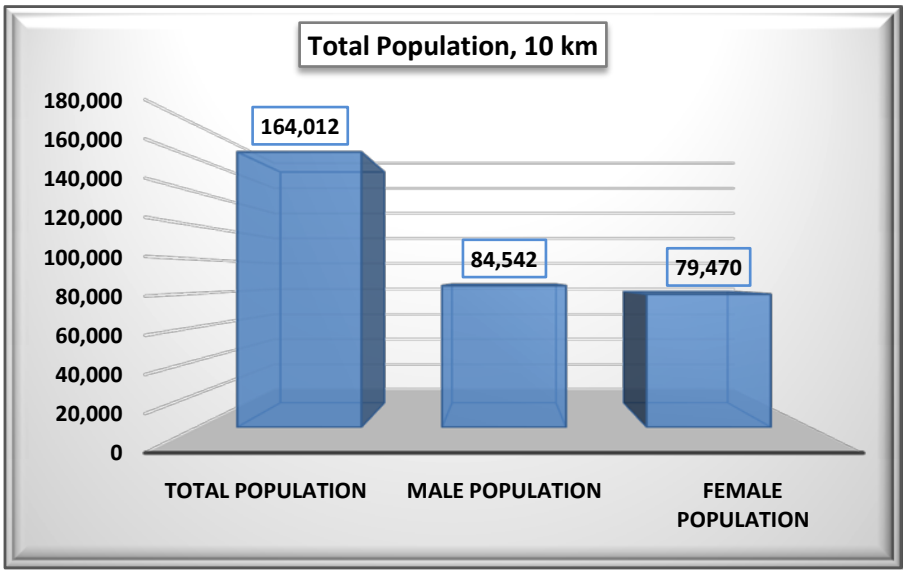

Figure 3.9: Male-Female Wise Population Distribution

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 21537persons consisting of 11021 males and 10516females respectively in the study area which accounts as 13.0% to the total population (164012persons) of the study area. Scheduled Tribes ('ST') population was observed as 14743 persons,accounts as 9.0% to the total population of the study zone consisting of 7397males (50.2%) and 7346females (49.8%) in the 10km radius study zone.It implies that the rest 79.0% 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.

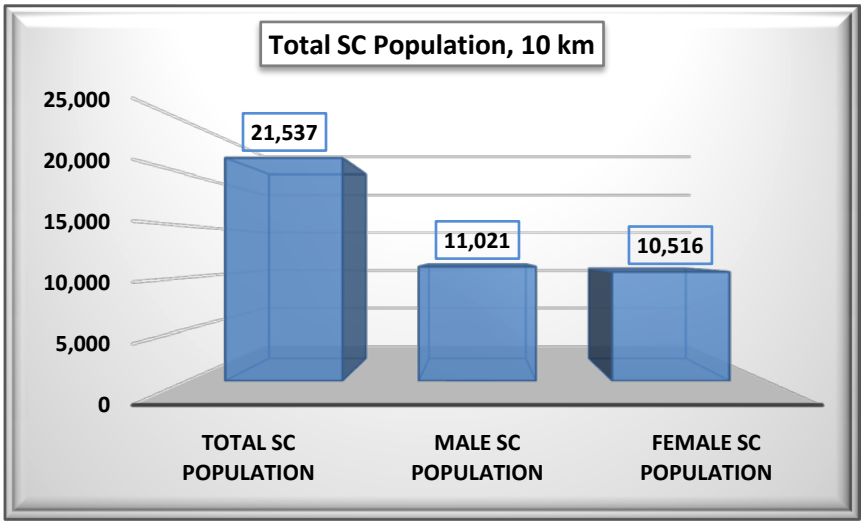

Figure 3.10: Scheduled Caste Population in the Study Area

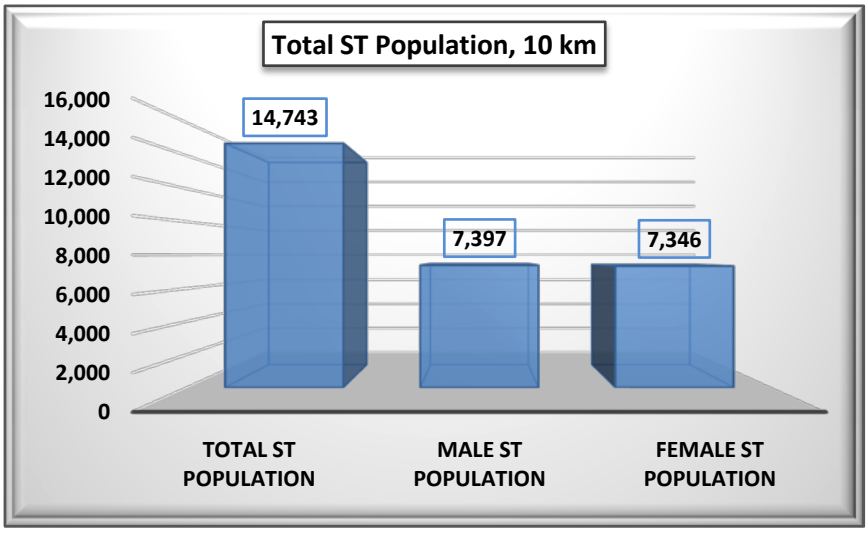

Figure 3.11: Scheduled Tribes Population in the Study Area

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.** Total literate's population was recorded as 73267 persons (44.7%) in the study area. **Table 3.34** reveals that Male-Female wise literates are observed as 46924 & 26343 persons respectively, implies that the 'Literacy Rate' is recorded as 44.7% with male-female wise percentages being 28.6% & 16.0% respectively.

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

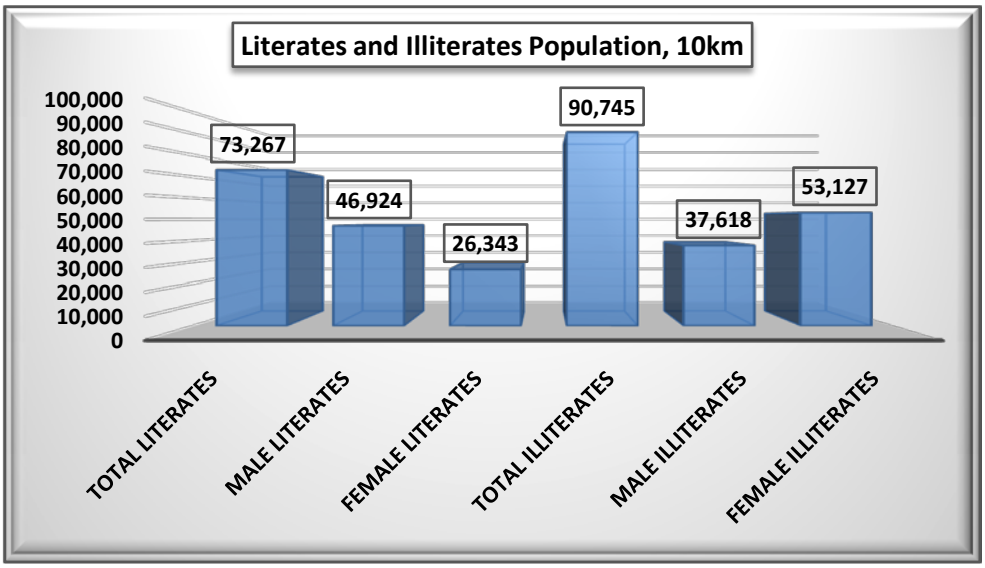

Figure 3.12: Male-Female Wise Distribution of Literates & Illiterates

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 Ghotari	181	90	51	39	91	41	50
Tola Pachpahri	135	48	30	18	87	38	49
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 Nawadih	455	237	131	106	218	105	113
Tola Dehari	384	185	133	52	199	78	121

Tola Baijadih	500	241	168	73	259	101	158
Tola Gamharia	252	64	36	28	188	92	96
Tola Mararo	294	206	107	99	88	37	51
Tola Nawada	Uninhabited Village						
Tola Oaira	107	56	36	20	51	22	29
Tola Bhalsom	333	221	133	88	112	49	63
Tola Silauna	33	16	13	3	17	8	9
Tola Rajpur	1460	919	591	328	541	182	359
Tola Dumri Khas	2760	1755	1001	754	1005	449	556
Tola Koria	463	201	147	54	262	107	155
Tola Duba	746	369	252	117	377	144	233
Tola Rakat Rohinia	1884	598	398	200	1286	599	687
Tola Karijhal	Uninhabited Village						
Tola Chauki	671	342	215	127	329	130	199
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 Jirhulia	204	45	31	14	159	76	83
Tola Khairalewar	567	228	160	68	339	144	195
Tola Buchchi	128	50	37	13	78	33	45
Tola Khanjar	105	20	15	5	85	41	44
Tola Bhelwa	194	31	25	6	163	73	90
Tola Pahar 1	239	85	54	31	154	64	90
Tola Asarhua	1632	770	467	303	862	371	491
Tola Thakur Ahra	740	375	239	136	365	156	209
Tola Ghogha	162	84	55	29	78	34	44
Tola Laugain	Uninhabited Village						
Tola Kairabank	136	73	49	24	63	24	39
Tola Lalpur	504	159	114	45	345	155	190
Tola Kodbaria	171	56	35	21	115	60	55
Tola Kishumantanr	360	184	108	76	176	66	110
Tola Nimatanr	80	48	28	20	32	12	20
Tola Chanantanr	1311	687	436	251	624	238	386
Tola Khopariadih	1475	793	455	338	682	285	397
Tola Auraia	1620	963	604	359	657	249	408
Tola Tewaritanr	351	171	109	62	180	69	111
Tola Gorwa Matihana	1130	418	274	144	712	301	411
Tola Gangtia	91	16	10	6	75	35	40
Tola Chharna	419	144	95	49	275	109	166
Tola Kukurbhento	187	106	72	34	81	36	45
Tola Bharathpur	1662	695	441	254	967	394	573
Tola Raksa	726	387	224	163	339	152	187
Tola Belatanr	633	242	164	78	391	171	220
Tola Koradih	495	153	101	52	342	148	194

Tola Mahgaon	3656	1997	1272	725	1659	660	999
Tola Bijaia	1608	548	381	167	1060	443	617
Tola Lewa	508	213	153	60	295	103	192
Tola Tetaria 1	413	169	102	67	244	93	151
Tola Hirniatanr	54	31	19	12	23	10	13
Tola Karmatanr	457	203	123	80	254	96	158
Tola Morbaia	244	45	29	16	199	97	102
Tola Nonchhaha	70	38	29	9	32	8	24
Tola Hathiapathar	70	29	22	7	41	14	27
Tola Arbaria	649	310	190	120	339	135	204
Tola Bujhanet	1741	899	530	369	842	383	459
Tola Jarwanari	107	89	50	39	18	9	9
Tola Kenduatari	Uninhabited Village						
Tola Aklu	146	43	32	11	103	46	57
Tola Kasba	Uninhabited Village						
Tola Naiadih	1504	452	332	120	1052	436	616
Tola Bariarpur	1634	552	378	174	1082	472	610
Tola Khotwa	368	159	107	52	209	96	113
Tola Bikramdih	162	70	44	26	92	40	52
Tola Chhatakaram	Uninhabited Village						
Tola Panari	419	166	106	60	253	111	142
Tola Silauni	Uninhabited Village						
Tola Budhuatanr	218	44	24	20	174	86	88
Tola Binjhi	136	54	33	21	82	36	46
Tola Kusaia	935	360	282	78	575	202	373
Tola Burhialapur	1179	417	307	110	762	311	451
Tola Chendara	712	166	116	50	546	243	303
Tola Debidih	96	15	14	1	81	29	52
Tola Thakurkura	86	54	36	18	32	11	21
Tola Panaripahar	Uninhabited Village						

Tola Kamarakh	Uninhabited Village						
Tola Kewali	1764	1002	562	440	762	347	415
Tola Sono	9932	6311	3790	2521	3621	1531	2090
Tola Debipahari	53	34	14	20	19	10	9
Tola Jugri	559	384	228	156	175	71	104
Churhit	2777	1449	846	603	1328	548	780
Shaharpharka	2074	1036	665	371	1038	441	597
Keshopharka	3900	1897	1183	714	2003	842	1161
Dumari Arazi	Uninhabited Village						
Kanhaipharka	526	343	218	125	183	65	118
Tola Ghutwe	2051	861	591	270	1190	462	728
Tola Bautha	3150	1174	824	350	1976	802	1174
Tola Karmatia	Uninhabited Village						
Tola Taraun	654	278	189	89	376	139	237
Tola Ghosari	156	50	36	14	106	45	61
Tola Charghara Kohila	1379	385	257	128	994	454	540
Tola Kairi	571	141	83	58	430	207	223
Tola Tilkatia	Uninhabited Village						
Tola Telia Baihayari	Uninhabited Village						
Tola Purainia	158	10	8	2	148	69	79
Tola Sonailtanr	621	209	130	79	412	187	225
Tola Mahesri Gadi	4384	2373	1548	825	2011	884	1127
Tola Tilakpur	896	326	203	123	570	263	307
Tola Boghakewal	931	350	224	126	581	242	339
Tola Alkusa	Uninhabited Village						
Tola Bela	Uninhabited Village						
Tola Dhamni	758	204	153	51	554	213	341
Tola Sonailtanr	404	192	126	66	212	78	134
Tola Mahui	37	26	14	12	11	2	9

Tola Tamorijot	59	35	22	13	24	9	15
Tola Patikewal	Uninhabited Village						
Tola Kharik	870	384	220	164	486	199	287
Tola Karmatanr	131	49	41	8	82	32	50
Tola Sugatanr	143	53	34	19	90	43	47
Tola Pachrukhi	Uninhabited Village						
Tola Painkandh	334	156	105	51	178	79	99
Tola Bhalua	586	249	170	79	337	149	188
Tola Bharara	Uninhabited Village						
Tola Khaguhari	Uninhabited Village						
Tola Jhilia	Uninhabited Village						
Tola Kadwa	202	50	35	15	152	71	81
Tola Bhelsumbhia	1970	827	558	269	1143	476	667
Tola Bishunpur	2215	962	674	288	1253	490	763
Tola Rajaun	3158	993	740	253	2165	913	1252
Tola Murmala	Uninhabited Village						
Tola Basauwa	272	51	44	7	221	103	118
Tola Nawai Ahar	476	91	77	14	385	170	215
Tola Tetaria 2	314	65	53	12	249	115	134
Tola Nawadih	Uninhabited Village						
Tola Baghakolo	139	22	13	9	117	52	65
Tola Barkitanr	Uninhabited Village						
Tola Phuldaun	Uninhabited Village						
Tola Barmania	755	334	187	147	421	187	234
Tola Dudhania	667	154	109	45	513	231	282
Tola Karhari	1104	278	201	77	826	366	460
Tola Mohanadih	291	95	56	39	196	82	114
Tola Bandarmara	1072	353	219	134	719	325	394
Tola Thelpathar	31	13	8	5	18	9	9
Tola Akonwatanr	498	64	57	7	434	193	241

Tola Botbaria	284	39	34	5	245	100	145
Tola Lakhanpur	54	7	5	2	47	23	24
Gandar	4486	2131	1390	741	2355	910	1445
Tola Dahiari	2706	1054	723	331	1652	675	977
Tola Kurawa	192	57	39	18	135	65	70
Tola Gidhadih	721	405	235	170	316	138	178
Tola Teliadesh	541	209	137	72	332	143	189
Tola Karyasair	189	81	61	20	108	34	74
Tola Itwa	2254	828	581	247	1426	564	862
Tola Batia	1212	676	419	257	536	220	316
Tola Bhuraha	774	378	264	114	396	145	251
Tola Barmasia 1	271	64	50	14	207	86	121
Tola Hethbatia	297	100	54	46	197	95	102
Tola Pairamatihana (CT)	5858	2570	1687	883	3288	1293	1995
Tola Marwa	220	61	39	22	159	76	83
Tola Panana	328	81	48	33	247	124	123
Tola Goswarah	345	49	39	10	296	137	159
Tola Barmoria	477	163	95	68	314	130	184
Tola Gurarbaj	854	225	153	72	629	269	360
Tola Dubardih	85	19	13	6	66	35	31
Tola Rajadumar	325	80	51	29	245	114	131
Tola Hasikol	119	25	17	8	94	43	51
Tola Barakhutia	396	125	77	48	271	119	152
Tola Pahar 2	Uninhabited Village						
Tola Barkha	Uninhabited Village						
Tola Telanga	136	67	43	24	69	28	41
Tola Guhia	245	96	60	36	149	64	85
Tola Mangurakura	73	26	16	10	47	18	29
Tola Pipra	391	197	130	67	194	68	126

Tola Barmasia 2	328	153	110	43	175	58	117
Tola Kurwa	420	185	128	57	235	79	156
Tola Chandosal	Uninhabited Village						
Tola Bamdah	1742	1110	653	457	632	240	392
Tola Phitkuria	244	101	73	28	143	60	83
Tola Tarakhar	454	242	150	92	212	81	131
Tola Domohan	552	233	163	70	319	116	203
Tola Majhlakola	196	81	67	14	115	47	68
Tola Bhutaha	14	8	8	0	6	2	4
Tola Ramchandih	1811	1090	646	444	721	295	426
Tola Hariharpur	267	159	94	65	108	46	62
Tola Lakra	180	112	65	47	68	27	41
Tola Karijhal	356	133	93	40	223	100	123
Tola Chandosol	170	44	31	13	126	48	78
Tola Baghopatar	709	327	205	122	382	138	244
Tola Deopanar	Uninhabited Village						
Tola Kachuwa	949	349	227	122	600	244	356
Tola Behara	931	365	250	115	566	219	347
Tola Chehara	416	204	140	64	212	73	139
Tola Belkhari	401	206	119	87	195	87	108
Tola Harni	237	119	72	47	118	36	82
Tola Jogia	97	15	13	2	82	34	48
Tola Siktia	373	181	115	66	192	71	121
Tola Nimtari	Uninhabited Village						
Tola Nanhia	495	266	152	114	229	93	136
Tola Khairsala	67	30	19	11	37	13	24
Tola Dhamna	746	354	247	107	392	152	240
Tola Panana	273	188	113	75	85	32	53
Tola Chatra	200	107	80	27	93	33	60
Tola Sugi Gamhar	118	53	38	15	65	25	40

Tola Bathna	361	202	120	82	159	60	99
Tola Nawadih	1263	753	452	301	510	206	304
TOTAL (10km)	**164012**	**73267**	**46924**	**26343**	**90745**	**37618**	**53127**
Source-Census of India, 2011							

Economic Profile ofJamuiDistrict:

*Jamui i*s 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 51135(31.0%) and 25364(16.0%) to the total population (164012), while the remaining 97513(53.0%) 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_H H_P	MAIN_O T_P	MARG WORK_P	MARG_ CL_P	MARG_ AL_P	MARG_ HH_P	MARG_ OT_P
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 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 Nawadih	152	31	94	24	3	6	4	1	0	1
Tola Dehari	141	18	113	4	6	138	61	24	1	52
Tola Baijadih	121	96	23	0	2	2	0	0	0	2
Tola Gamharia	70	1	0	68	1	70	0	70	0	0

Tola Mararo	76	26	11	1	38	3	0	0	1	2
Tola Nawada	Uninhabited Village									
Tola Oaira	28	27	0	0	1	0	0	0	0	0
Tola Bhalsom	148	0	146	0	2	19	0	18	0	1
Tola Silauna	8	0	8	0	0	8	0	8	0	0
Tola Rajpur	494	184	40	162	108	58	6	23	6	23
Tola Dumri Khas	890	234	309	162	185	21	5	7	2	7
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 Rakat Rohinia	404	114	36	121	133	542	35	254	19	234
Tola Karijhal	Uninhabited Village									
Tola Chauki	103	23	0	51	29	133	16	34	75	8
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 Jirhulia	95	47	34	14	0	43	0	0	43	0
Tola Khairalewar	92	57	23	9	3	185	4	83	98	0
Tola Buchchi	50	46	0	4	0	17	0	0	17	0
Tola Khanjar	29	0	29	0	0	29	0	0	29	0
Tola Bhelwa	14	4	1	5	4	66	15	3	42	6
Tola Pahar 1	122	1	118	2	1	2	0	0	1	1
Tola Asarhua	757	66	388	277	26	20	0	18	1	1

Tola Thakur Ahra	356	11	207	135	3	0	0	0	0	0
Tola Ghogha	46	14	31	0	1	0	0	0	0	0
Tola Laugain	Uninhabited Village									
Tola Kairabank	35	1	1	29	4	29	0	8	0	21
Tola Lalpur	134	85	42	4	3	56	7	6	37	6
Tola Kodbaria	27	4	14	0	9	60	2	24	33	1
Tola Kishumantanr	2	0	0	0	2	178	0	88	89	1
Tola Nimatanr	0	0	0	0	0	34	0	18	15	1
Tola Chanantanr	469	5	8	278	178	188	1	11	151	25
Tola Khopariadih	621	4	313	294	10	12	0	9	0	3
Tola Auraia	529	80	246	192	11	279	7	253	10	9
Tola Tewaritanr	213	85	123	0	5	1	0	0	0	1
Tola Gorwa Matihana	509	202	157	138	12	39	2	3	10	24
Tola Gangtia	41	2	9	30	0	0	0	0	0	0
Tola Chharna	177	6	2	132	37	16	0	6	1	9
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 Raksa	227	68	1	118	40	67	0	64	0	3
Tola Belatanr	243	70	18	153	2	239	5	21	137	76

Tola Koradih	245	1	42	197	5	17	2	2	12	1
Tola Mahgaon	1185	299	565	180	141	371	65	135	114	57
Tola Bijaia	333	161	101	60	11	324	12	102	187	23
Tola Lewa	295	9	133	152	1	3	0	1	2	0
Tola Tetaria 1	71	62	0	1	8	97	12	0	81	4
Tola Hirniatanr	22	0	9	7	6	0	0	0	0	0
Tola Karmatanr	150	1	50	70	29	6	0	3	3	0
Tola Morbaia	Uninhabited Village									
Tola Nonchhaha	1	0	0	0	1	35	0	4	16	15
Tola Hathiapathar	1	0	1	0	0	38	0	12	20	6
Tola Arbaria	7	2	0	0	5	264	136	3	124	1
Tola Bujhanet	383	43	107	194	39	470	4	228	184	54
Tola Jarwanari	29	21	0	2	6	1	1	0	0	0
Tola Kenduatari	Uninhabited Village									
Tola Aklu	67	6	22	32	7	0	0	0	0	0
Tola Kasba	Uninhabited Village									
Tola Naiadih	760	69	271	346	74	35	12	10	8	5
Tola Bariarpur	397	122	86	148	41	401	37	141	195	28
Tola Khotwa	2	1	1	0	0	163	18	61	73	11

Tola Bikramdih	3	0	0	0	3	68	6	20	34	8
Tola Chhatakaram	Uninhabited Village									
Tola Panari	62	0	3	5	54	159	0	59	96	4
Tola Silauni	Uninhabited Village									
Tola Budhuatanr	1	0	1	0	0	111	0	86	22	3
Tola Binjhi	0	0	0	0	0	66	2	47	10	7
Tola Kusaia	1	0	1	0	0	433	4	171	217	41
Tola Burhialapur	374	37	143	174	20	162	1	2	118	41
Tola Chendara	380	123	89	160	8	2	0	2	0	0
Tola Debidih	45	20	13	12	0	11	0	1	10	0
Tola Thakurkura	21	20	1	0	0	0	0	0	0	0
Tola Panaripahar	Uninhabited Village									
Tola Kamarakh	Uninhabited Village									
Tola Kewali	346	117	189	1	39	331	169	150	0	12
Tola Sono	3042	351	623	898	1170	68	14	9	30	15
Tola Debipahari	7	3	1	0	3	13	4	1	0	8
Tola Jugri	127	70	34	1	22	2	0	0	0	2
Churhit	811	80	566	115	50	69	4	11	39	15
Shaharpharka	583	204	243	66	70	277	152	38	18	69

Keshopharka	1199	246	885	12	56	937	22	322	539	54
Dumari Arazi	Uninhabited Village									
Kanhaipharka	187	60	49	64	14	1	0	0	0	1
Tola Ghutwe	440	78	205	1	156	641	4	364	219	54
Tola Bautha	942	215	391	177	159	698	123	434	8	133
Tola Karmatia	Uninhabited Village									
Tola Taraun	133	0	113	1	19	168	0	2	148	18
Tola Ghosari	31	26	4	0	1	6	0	6	0	0
Tola Charghara Kohila	616	255	128	205	28	7	3	2	1	1
Tola Kairi	116	0	116	0	0	6	0	6	0	0
Tola Tilkatia	Uninhabited Village									
Tola Telia Baihayari	Uninhabited Village									
Tola Purainia	77	0	42	35	0	4	0	1	3	0
Tola Sonailtanr	210	2	206	1	1	78	0	3	74	1
Tola Mahesri Gadi	1568	376	558	349	285	285	127	91	40	27
Tola Tilakpur	397	32	179	178	8	71	0	12	53	6
Tola Boghakewal	385	114	118	121	32	2	0	1	0	1
Tola Alkusa	Uninhabited Village									

Tola Bela	Uninhabited Village									
Tola Dhamni	418	48	156	203	11	24	0	1	22	1
Tola Sonailtanr	102	23	78	0	1	85	13	3	69	0
Tola Mahui	7	0	7	0	0	10	0	8	2	0
Tola Tamorijot	18	0	17	0	1	16	0	0	16	0
Tola Patikewal	Uninhabited Village									
Tola Kharik	389	0	195	175	19	79	5	4	51	19
Tola Karmatanr	32	0	32	0	0	31	0	4	27	0
Tola Sugatanr	30	0	25	0	5	12	0	10	0	2
Tola Pachrukhi	Uninhabited Village									
Tola Painkandh	84	61	23	0	0	0	0	0	0	0
Tola Bhalua	13	4	0	0	9	242	6	222	0	14
Tola Bharara	Uninhabited Village									
Tola Khaguhari	Uninhabited Village									
Tola Jhilia	Uninhabited Village									
Tola Kadwa	90	1	54	35	0	7	0	2	5	0
Tola Bhelsumbhia	853	147	426	274	6	36	11	21	2	2
Tola Bishunpur	1048	191	434	411	12	74	3	64	2	5
Tola Rajaun	364	2	208	98	56	1217	255	647	265	50

Tola Murmala	Uninhabited Village									
Tola Basauwa	78	0	73	4	1	64	0	40	24	0
Tola Nawai Ahar	124	16	108	0	0	79	0	76	0	3
Tola Tetaria 2	14	0	14	0	0	150	0	61	89	0
Tola Nawadih	Uninhabited Village									
Tola Baghakolo	48	0	45	3	0	22	0	16	6	0
Tola Barkitanr	Uninhabited Village									
Tola Phuldaun	Uninhabited Village									
Tola Barmania	381	309	72	0	0	188	160	28	0	0
Tola Dudhania	304	158	27	107	12	7	4	0	1	2
Tola Karhari	557	279	50	129	99	160	160	0	0	0
Tola Mohanadih	97	60	26	6	5	94	66	27	1	0
Tola Bandarmara	227	41	170	13	3	342	1	86	254	1
Tola Thelpathar	14	0	0	14	0	14	0	0	14	0
Tola Akonwatanr	6	0	1	1	4	237	0	121	115	1
Tola Botbaria	1	0	0	0	1	127	1	62	63	1
Tola Lakhanpur	0	0	0	0	0	27	0	16	11	0
Gandar	1483	464	367	458	194	710	28	514	111	57
Tola Dahiari	1282	278	638	269	97	22	4	8	1	9

Tola Kurawa	52	0	48	1	3	31	0	31	0	0
Tola Gidhadih	210	3	129	2	76	76	0	50	15	11
Tola Teliadesh	188	111	29	40	8	67	0	2	65	0
Tola Karyasair	76	39	16	20	1	16	0	0	16	0
Tola Itwa	834	235	381	181	37	8	1	1	5	1
Tola Batia	346	14	80	10	242	168	5	30	19	114
Tola Bhuraha	111	50	7	11	43	325	6	66	236	17
Tola Barmasia 1	53	1	0	52	0	75	48	27	0	0
Tola Hethbatia	69	2	2	62	3	75	13	59	2	1
Tola Pairamatihana (CT)	1992	291	293	1116	292	791	10	195	440	146
Tola Marwa	72	18	54	0	0	42	6	34	2	0
Tola Panana	79	50	26	0	3	79	33	43	1	2
Tola Goswarah	82	53	25	0	4	75	69	5	0	1
Tola Barmoria	176	0	175	0	1	13	12	0	0	1
Tola Gurarbaj	312	162	146	0	4	29	12	17	0	0
Tola Dubardih	21	20	0	0	1	17	16	1	0	0
Tola Rajadumar	81	57	21	0	3	108	76	32	0	0
Tola Hasikol	27	21	4	2	0	32	27	5	0	0

Tola Barakhutia	69	39	30	0	0	141	139	1	0	1
Tola Pahar 2	Uninhabited Village									
Tola Barkha	Uninhabited Village									
Tola Telanga	3	1	0	0	2	56	42	12	2	0
Tola Guhia	43	21	22	0	0	27	4	13	7	3
Tola Mangurakura	9	3	5	1	0	33	5	12	13	3
Tola Pipra	87	75	7	2	3	190	104	56	28	2
Tola Barmasia 2	90	9	50	26	5	139	51	82	2	4
Tola Kurwa	140	51	47	31	11	132	121	1	4	6
Tola Chandosal	Uninhabited Village									
Tola Bamdah	542	20	258	32	232	369	25	102	76	166
Tola Phitkuria	86	59	25	1	1	114	68	45	1	0
Tola Tarakhar	260	43	207	7	3	35	3	31	0	1
Tola Domohan	18	11	3	0	4	409	224	174	10	1
Tola Majhlakola	5	3	1	0	1	138	106	32	0	0
Tola Bhutaha	8	6	2	0	0	0	0	0	0	0
Tola Ramchandih	137	54	21	1	61	224	76	120	2	26
Tola Hariharpur	68	31	15	9	13	127	12	19	46	50
Tola Lakra	38	8	18	3	9	101	4	30	31	36

Tola Karijhal	83	60	21	0	2	87	83	4	0	0
Tola Chandosol	37	2	34	0	1	47	31	16	0	0
Tola Baghopatar	27	0	22	0	5	527	136	381	3	7
Tola Deopanar	Uninhabited Village									
Tola Kachuwa	382	141	233	4	4	127	30	88	0	9
Tola Behara	388	184	116	63	25	83	32	36	13	2
Tola Chehara	85	36	30	13	6	186	53	68	58	7
Tola Belkhari	85	13	56	14	2	117	3	113	1	0
Tola Harni	0	0	0	0	0	136	0	136	0	0
Tola Jogia	0	0	0	0	0	55	0	55	0	0
Tola Siktia	5	0	0	0	5	239	0	237	0	2
Tola Nimtari	Uninhabited Village									
Tola Nanhia	113	30	76	0	7	120	33	87	0	0
Tola Khairsala	16	1	15	0	0	16	2	14	0	0
Tola Dhamna	162	14	141	0	7	254	7	247	0	0
Tola Panana	77	52	20	0	5	84	79	5	0	0
Tola Chatra	32	24	7	1	0	124	3	118	3	0
Tola Sugi Gamhar	20	19	1	0	0	37	36	1	0	0
Tola Bathna	60	28	0	0	32	107	86	0	0	21

Tola Nawadih	157	93	53	0	11	314	154	158	0	2
TOTAL (10km)	**51135**	**10763**	**18553**	**15366**	**6453**	**25364**	**4079**	**10406**	**7732**	**3147**

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	**51135 (31.0%)**
Male	32022(62.6%)
Female	19113(37.4%)
Marginal Workers	**25364(16.0%)**
Male	11183(44.0%)
Female	14181(56.0%)
Non-Workers	**87513(53.0%)**
Male	41337 (47.2%)
Female	46176(52.8%)
Total Population (10km)	**164012**
Source: Census of India Records, 2011	

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

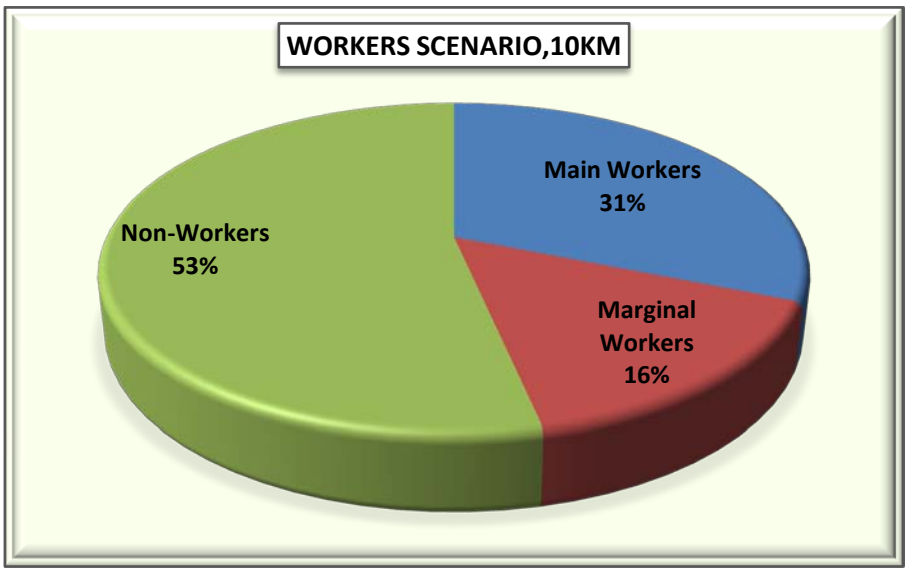

Figure 3.13: Workers Scenario of Study Area

Composition of Main Workers:

The 'Main Workers' were observed as 51135persons (31.0%) to the total population (164012) of the study area and its composition is made-up of Casual laborers as 10763 (21.0%), Agricultural laborers as 18553(36.0%), Household workers 15366(30.0%) and other workers as 6453(13.0%) respectively.

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

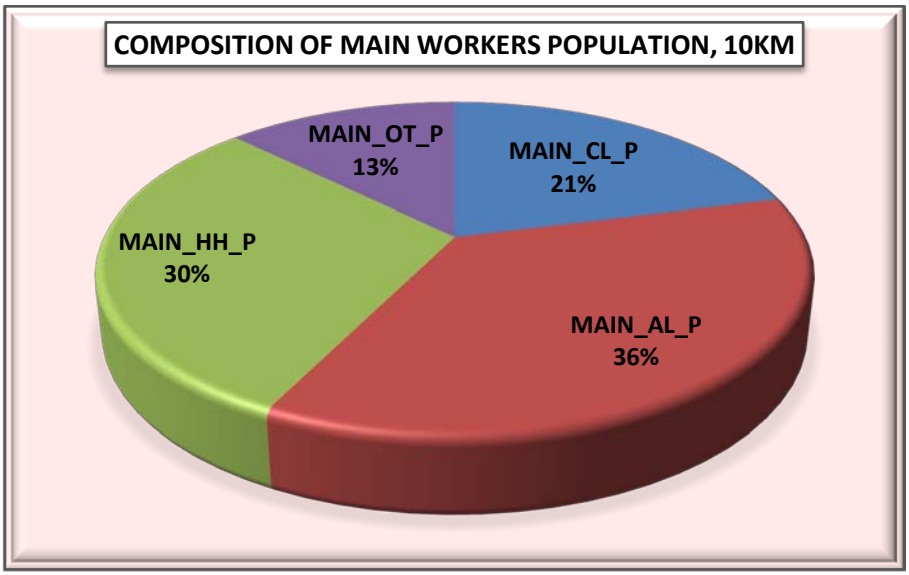

Figure 3.14: Composition of Main Workers Population

Composition of Marginal Workers:

The total marginal workers are observed as 25364 which constitute 16.0% to the total population (164012) comprising of Marginal Casual Laborers as 4079 (16.0%), Marginal Agricultural Laborers as 10406(41.0%), Marginal Household laborers as 7732 (31.0%) and marginal other workers were also observed as 3147 (12.0%) 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.

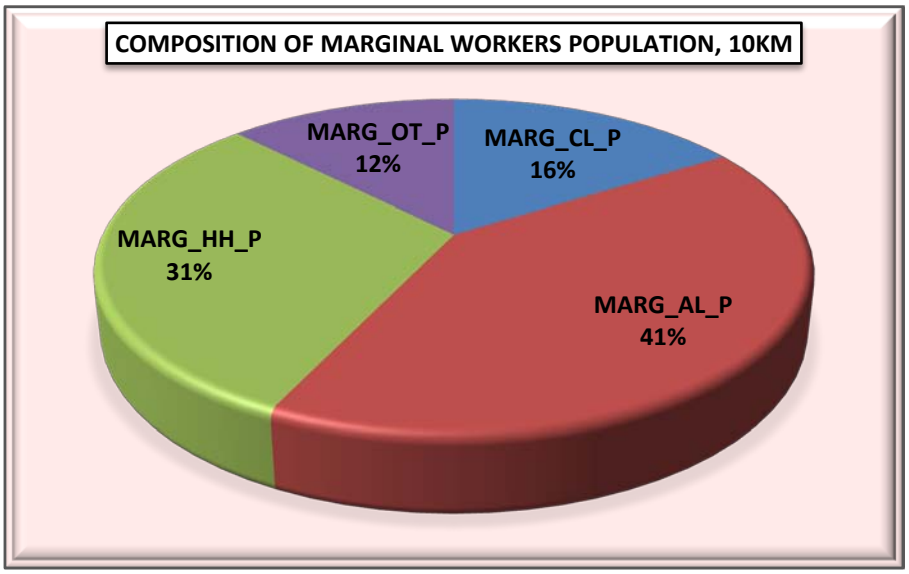

Figure 3.15: Composition of Marginal Workers

Composition of Non-Workers:

The total Non-worker's population was observed as 87513which accounts53.0% to the total population (164012) of the study area. Male-female wise Non-worker's population was recorded as 41337 Males (47.2%) and 46176Females (52.8%) 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**
87513	41337(47.2%)	46176(52.8%)

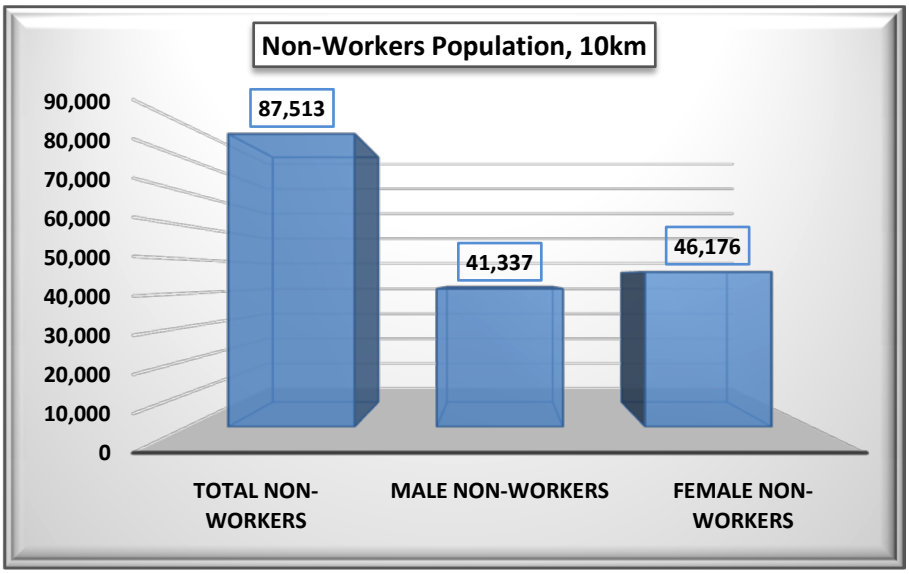

Figure 3.16: Composition of Non-Workers

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 222 villages and one Town named Tola Pairamatihana (CT) lying under Jamui District in Bihar state. Overall study area villages are falling mainly under 2 tehsils namely Sono (175 villages & 01 Town),and Chakai (47 villages) of Jamui district in Bihar state.

There are 32 villages of Jamui district in Bihar state found as uninhabited villages in the study area. There is only one town named Tola Pairamatihana (CT) found in the 10km radial study zone.

Educational Facilities

There isa total no. of109 Primary schools existing in the 10km radius study area.About 45 no of Middle schools are foundin the study area. About4Higher Secondary School (SS) and2Senior 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 one of primary health centerexistin 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 8no of Primary Health Sub-Centers exists in the villages of the study area. Only 2no of Mother & Child Welfare Centersarefound in the study area. Noallopathic hospitalexists in the study area. Only 01medical dispansaryand Family Welfare Centerwerefound in the study area. Overall study area villages are served by poor 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 223 villages/towns,only43 villages (19.3%)are served with River/Canal water in the study area. As per the census records 2011, only 4 villages(1.4%) was 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. About 03 villages(1.4%) 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. About 01 villages werefound with railway station facility in the study area.Site is well connected by National Highway & State Highwayroadalsopassing in the area. Nearest railway station Jhajha Railway Station is situated at about 14.0km in NE Direction. Nearest town is Sono located at about 9.0km in NNW direction. District Headquarters Jamui (District Court) is situated at approx. 31.0 km towards NNW direction. Nearest airport Deoghar is located at 72.0km in South direction. Jai Prakash Narayan Airport Patna is also located at about 160 km in NW 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. About 100villages (45.0%) of the study area are electrified for domestic purpose, 97villages (43.5%) for agricultural purpose,and for commercial & for all purposes in the study area.Out of 223 villages/towns in the study area, 123villages (55.2%) including 32uninhabited villages (14.4%)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	Eag.	EC	EA	
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	Jhajha,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	Jhajha,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	Jhajha,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	Jhajha,10km
Tola Behrabad	Uninhabited Village																														Jhajha,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	Jhajha,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	Jhajha,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	Jhajha,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	Jhajha,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	Jhajha,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	Jhajha,10km
Tola Nawadih	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	Jhajha,10km
Tola Dehari	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	Jhajha,10km
Tola Baijadih	1	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	Jhajha,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	Jhajha,10km
Tola Mararo	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	Jhajha,10km
Tola Nawada	Uninhabited Village																														Jhajha,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	Jhajha,12km
Tola Bhalsom	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	Jhajha,22km
Tola Silauna	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	Jhajha,12km
Tola Rajpur	2	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	Jhajha,42km
Tola Dumri Khas	1	1	1	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	1	2	2	2	1	2	2	1	1	1	1	1	Jhajha,15km
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	Jhajha,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	Jhajha,18km
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	Jhajha,8km
Tola Karijhal	Uninhabited Village																														Jhajha,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	1	1	1	1	1	Jhajha,11km
Tola Bhalguha	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	Jhajha,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	2	1	2	1	1	1	1	Jhajha,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	Jhajha,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	2	1	2	1	1	1	1	Jhajha,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	2	1	2	1	1	1	1	Jhajha,10km
Tola Belabathan	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	Jhajha,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	2	1	2	1	1	1	1	Jhajha,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	Jhajha,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	Jhajha,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	Jhajha,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	Jhajha,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	Jhajha,10km
Tola Amjhari	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	Jhajha,10km
Tola Jatkatwa	Uninhabited Village																													Jhajha,10km
Tola Ganglichip	Uninhabited Village																													Jhajha,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	Jhajha,10km

Tola Ukharia	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	Jhajha,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	Jhajha,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	Jhajha,10km
Tola Jirhulia	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	Jhajha,10km
Tola Khairalewar	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	Jhajha,10km
Tola Buchchi	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	Jhajha,10km
Tola Khanjar	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	Jhajha,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	Jhajha,10km
Tola Pahar 1	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	Jhajha,10km
Tola Asarhua	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	Jhajha,10km
Tola Thakur Ahra	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	Jhajha,10km
Tola Ghogha	1	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	Jhajha,10km
Tola Laugain	Uninhabited Village																													Jhajha,10km
Tola Kairabank	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	Jhajha,20km
Tola Lalpur	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	Jhajha,19km
Tola Kodbaria	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	2	2	1	2	2	1	1	1	1	1	Jhajha,19km
Tola Kishumantanr	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	Jhajha,19km

Tola Nimatanr	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	Jhajha,16km
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	Jhajha,17km
Tola Khopariadih	0	0	0	0	0	0	0	0	0	0	0	2	1	1	2	2	2	2	2	2	2	2	1	2	2	1	1	1	1	1	Jhajha,18km
Tola Auraia	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	Jhajha,19km
Tola Tewaritanr	0	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	1	1	1	1	Jhajha,13km
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	Jhajha,13km
Tola Gangtia	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	Jhajha,12km
Tola Chharna	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	Jhajha,18km
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	Jhajha,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	Jhajha,20km
Tola Raksa	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	Jhajha,20km
Tola Belatanr	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	Jhajha,21km
Tola Koradih	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	Jhajha,18km
Tola Mahgaon	2	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	Jhajha,22km
Tola Bijaia	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	1	1	1	1	Jhajha,21km
Tola Lewa	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	Jhajha,22km

Tola Tetaria 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	1	1	1	1	1	1	Jhajha,22km
Tola Hirniatanr	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	Jhajha,28km
Tola Karmatanr	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	Jhajha,28km
Tola Morbaia	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	Jhajha,27km
Tola Nonchhaha	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	Jhajha,20km
Tola Hathiapathar	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	Jhajha,23km
Tola Arbaria	0	0	0	0	0	0	0	0	0	0	0	2	1	1	2	2	2	2	2	2	2	2	2	1	2	1	2	2	2	2	Jhajha,23km
Tola Bujhanet	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	Jhajha,19km
Tola Jarwanari	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	Jhajha,23km
Tola Kenduatari	Uninhabited Village																														Jhajha,23km
Tola Aklu	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	Jhajha,23km
Tola Kasba	Uninhabited Village																														Jhajha,23km
Tola Naiadih	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	1	2	2	2	2	2	2	1	2	2	2	2	Jhajha,25km
Tola Bariarpur	1	0	0	0	0	0	0	0	0	0	0	2	1	1	2	1	2	2	2	2	2	2	2	2	2	1	2	2	2	2	Jhajha,23km
Tola Khotwa	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	Jhajha,24km
Tola Bikramdih	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	Jhajha,24km
Tola Chhatakaram	Uninhabited Village																														Jhajha,24km

Tola Panari	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	Jhajha,23km
Tola Silauni	Uninhabited Village																													Jhajha,23km
Tola Budhuatanr	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	Jhajha,27km
Tola Binjhi	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	Jhajha,28km
Tola Kusaia	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	Jhajha,27km
Tola Burhialapur	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	Jhajha,24km
Tola Chendara	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	Jhajha,28km
Tola Debidih	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	Jhajha,29km
Tola Thakurkura	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	Jhajha,25km
Tola Panaripahar	Uninhabited Village																													Jhajha,20km
Tola Kamarakh	Uninhabited Village																													Jhajha,20km
Tola Kewali	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	Jhajha,20km
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	Jhajha,12km
Tola Debipahari	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	Jhajha,11km
Tola Jugri	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	Jhajha,12km
Churhit	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	Jhajha,16km
Shaharpharka	1	1	0	0	0	0	0	0	0	0	0	2	1	1	1	2	2	2	2	2	2	2	1	1	2	1	1	1	1	1	Jhajha,16km

Keshopharka	2	1	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	Jhajha,18km
Dumari Arazi	Uninhabited Village																														Jhajha,18km
Kanhaipharka	1	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	Jhajha,20km
Tola Ghutwe	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	Jhajha,18km
Tola Bautha	1	0	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	1	1	2	1	1	1	1	1	Jhajha,12km
Tola Karmatia	Uninhabited Village																														Jhajha,12km
Tola Taraun	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	Jhajha,10km
Tola Ghosari	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	Jhajha,22km
Tola Charghara Kohila	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	2	2	2	2	Jhajha,23km
Tola Kairi	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	Jhajha,29km
Tola Tilkatia	Uninhabited Village																														Jhajha,29km
Tola Telia Baihayari	Uninhabited Village																														Jhajha,29km
Tola Purainia	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	Jhajha,31km
Tola Sonailtanr	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	Jhajha,26km
Tola Mahesri Gadi	1	0	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	Jhajha,21km
Tola Tilakpur	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	Jhajha,29km

Tola Boghakewal	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	Jhajha,26km
Tola Alkusa	Uninhabited Village																													Jhajha,26km
Tola Bela	Uninhabited Village																													Jhajha,26km
Tola Dhamni	0	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	2	2	2	2	Jhajha,28km
Tola Sonailtanr	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	Jhajha,25km
Tola Mahui	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	Jhajha,25km
Tola Tamorijot	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	Jhajha,29km
Tola Patikewal	Uninhabited Village																													Jhajha,29km
Tola Kharik	0	0	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	2	2	1	2	2	2	2	Jhajha,31km
Tola Karmatanr	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	Jhajha,23km
Tola Sugatanr	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	2	2	1	2	2	2	2	Jhajha,29km
Tola Pachrukhi	Uninhabited Village																													Jhajha,29km
Tola Painkandh	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	Jhajha,33km
Tola Bhalua	1	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	Jhajha,32km
Tola Bharara	Uninhabited Village																													Jhajha,32km
Tola Khaguhari	Uninhabited Village																													Jhajha,32km
Tola Jhilia	Uninhabited Village																													Jhajha,32km

Tola Kadwa	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	Jhajha,32km
Tola Bhelsumbhia	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	2	2	2	1	1	2	2	2	Jhajha,31km
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	2	2	1	1	2	2	2	Jhajha,30km
Tola Rajaun	1	0	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	2	2	2	2	2	2	1	1	2	2	2	Jhajha,26km
Tola Murmala	Uninhabited Village																													Jhajha,26km
Tola Basauwa	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	Jhajha,25km
Tola Nawai Ahar	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	Jhajha,22km
Tola Tetaria 2	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	2	2	2	1	2	2	2	2	Jhajha,10km
Tola Nawadih	Uninhabited Village																													Jhajha,10km
Tola Baghakolo	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	Jhajha,32km
Tola Barkitanr	Uninhabited Village																													Jhajha,32km
Tola Phuldaun	Uninhabited Village																													Jhajha,32km
Tola Barmania	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	Jhajha,28km
Tola Dudhania	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	2	2	2	1	2	2	2	2	Jhajha,28km
Tola Karhari	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	Jhajha,31km
Tola Mohanadih	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	2	2	2	1	2	2	2	2	Jhajha,32km
Tola Bandarmara	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	Jhajha,30km

Tola Thelpathar	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	Jhajha,30km
Tola Akonwatanr	0	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	Jhajha,24km
Tola Botbaria	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	Jhajha,24km
Tola Lakhanpur	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	Jhajha,24km
Gandar	3	1	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	2	2	2	1	2	2	1	1	1	1	1	Jhajha,22km
Tola Dahiari	2	1	0	0	0	0	1	0	0	0	0	2	2	1	1	1	2	2	2	2	2	2	1	1	1	1	1	1	1	1	Jhajha,22km
Tola Kurawa	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	Jhajha,30km
Tola Gidhadih	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	Jhajha,23km
Tola Teliadesh	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	Jhajha,24km
Tola Karyasair	0	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	Jhajha,25km
Tola Itwa	1	1	0	0	0	0	1	0	0	0	0	2	2	1	1	1	2	2	2	2	1	2	1	1	2	1	1	1	1	1	Jhajha,24km
Tola Batia	1	1	0	0	0	0	0	0	0	0	0	2	1	1	2	1	2	2	1	2	1	2	1	1	1	1	1	1	1	1	Jhajha,25km
Tola Bhuraha	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	Jhajha,26km
Tola Barmasia 1	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	Jhajha,27km
Tola Hethbatia	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	2	2	2	1	1	1	1	1	Jhajha,25km
Tola Pairamatihana (CT)	Urban Part																														Tola Pairamatihana (CT), 0km

Tola Marwa	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	Deoghar, JH,70km
Tola Panana	0	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	2	2	2	Deoghar, JH,75km
Tola Goswarah	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	Deoghar, JH,58km
Tola Barmoria	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	Deoghar, JH,60km
Tola Gurarbaj	2	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	2	2	2	Deoghar, JH,75km
Tola Dubardih	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	Deoghar, JH,53km
Tola Rajadumar	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	1	2	2	2	2	2	2	2	2	1	2	2	2	Jamui,65km
Tola Hasikol	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	Jamui,75km
Tola Barakhutia	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	2	2	2	1	2	2	2	Jamui,75km
Tola Pahar 2	Uninhabited Village																													Jamui,75km
Tola Barkha	Uninhabited Village																													Jamui,75km
Tola Telanga	0	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	2	2	2	Deoghar, JH,62km
Tola Guhia	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	2	2	2	Deoghar, JH,52km
Tola Mangurakura	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	2	2	2	1	2	2	2	Deoghar, JH,59km
Tola Pipra	1	0	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	2	2	2	1	1	2	1	2	2	2	Jhajha,22km
Tola Barmasia 2	1	0	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	2	2	2	1	1	2	1	2	2	2	Jhajha,22km
Tola Kurwa	1	0	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	1	1	2	1	2	2	2	Jhajha,26km

Tola Chandosal	Uninhabited Village																													Jhajha,26km
Tola Bamdah	1	1	1	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	1	2	2	2	1	1	2	1	2	2	2	2	Jhajha,20km
Tola Phitkuria	0	0	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Jhajha,19km
Tola Tarakhar	1	0	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	1	2	2	1	1	2	1	2	2	2	2	Jhajha,23km
Tola Domohan	1	0	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Jhajha,21km
Tola Majhlakola	0	0	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	1	2	2	1	1	2	1	2	2	2	2	Jhajha,22km
Tola Bhutaha	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	Deoghar, JH,32km
Tola Ramchandih	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	Deoghar, JH,40km
Tola Hariharpur	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	2	2	2	1	2	2	2	2	Deoghar, JH,25km
Tola Lakra	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	2	2	2	1	2	2	2	2	Deoghar, JH,25km
Tola Karijhal	1	0	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Deoghar, JH,25km
Tola Chandosol	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	Deoghar, JH,25km
Tola Baghopatar	1	0	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Jhajha,24km
Tola Deopanar	Uninhabited Village																													Jhajha,24km
Tola Kachuwa	1	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	2	2	2	2	Deoghar, JH,25km
Tola Behara	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	Deoghar, JH,50km
Tola Chehara	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	2	2	2	2	Deoghar, JH,50km

Tola Belkhari	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	2	1	1	1	2	2	2	2	Deoghar, JH,47km
Tola Harni	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	2	2	2	2	Deoghar, JH,48km
Tola Jogia	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	Deoghar, JH,45km
Tola Siktia	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	Deoghar, JH,44km
Tola Nimtari	Uninhabited Village																														Deoghar, JH,42km
Tola Nanhia	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Deoghar, JH,43km
Tola Khairsala	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	2	2	2	2	Deoghar, JH,47km
Tola Dhamna	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	Deoghar, JH,47km
Tola Panana	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	1	2	2	2	2	2	2	1	2	1	2	2	2	2	Deoghar, JH,48km
Tola Chatra	1	0	0	0	0	0	1	1	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	1	2	1	2	2	2	2	Deoghar, JH,45km
Tola Sugi Gamhar	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Deoghar, JH,45km
Tola Bathna	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Deoghar, JH,45km
Tola Nawadih	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Deoghar, JH,45km
TOTAL (10km)	**109**	**45**	**4**	**2**	**0**	**1**	**8**	**2**	**0**	**1**	**1**	*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 land use pattern. In this project, silt and clay are also produced as a constituent along with minerals, which are considered to be waste.

Anticipated Impacts:

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

Mitigation measures:

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

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

4.2 WATER ENVIRONMENT

Anticipated Impacts:

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

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

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

Mitigation measures

Project activity will be carried out only in the dry part of the Barnar 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.

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 Barnar 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.

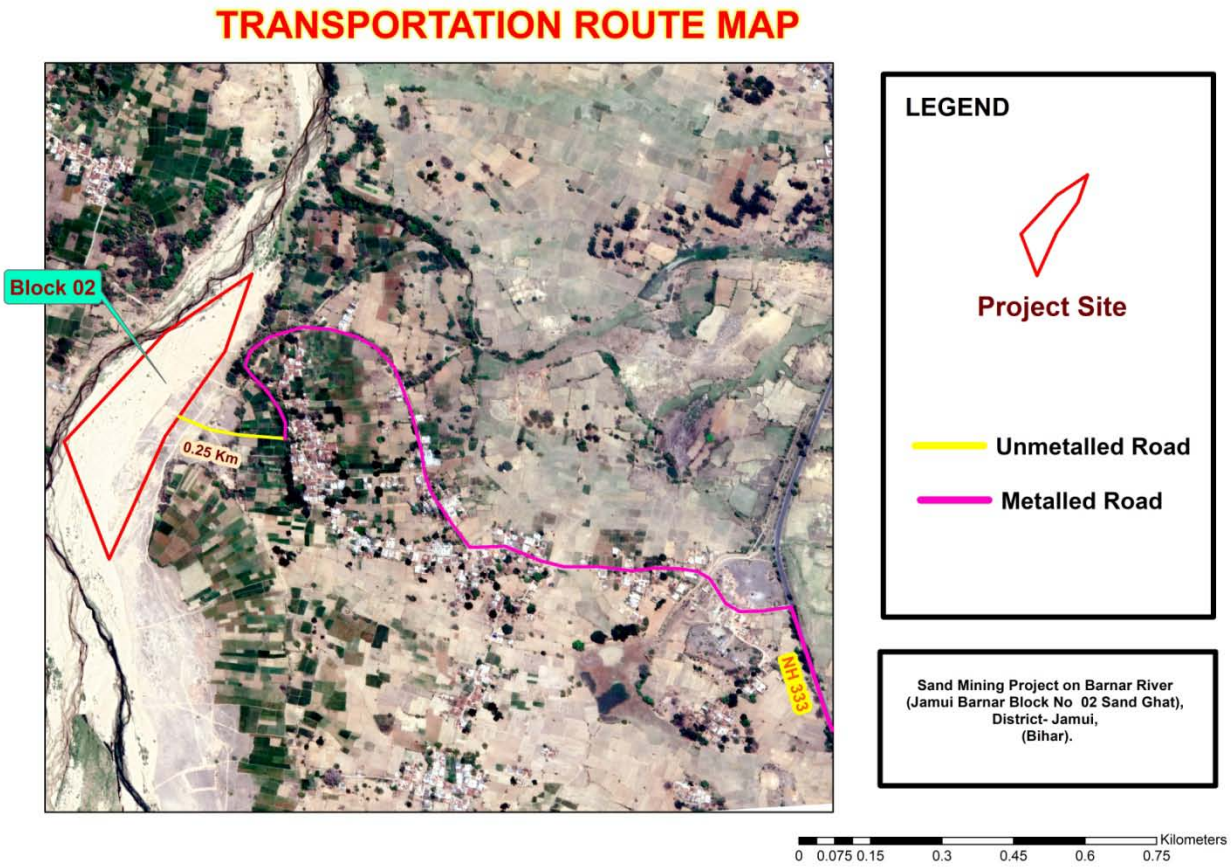

FIGURE 4.1 MAP SHOWING EVACUATION ROUTE

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 02

Road	V	C	Existing V/C Ratio	LOS
National Highway	2500	15000	0.16	A

(NH-333)				

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 02**

Proposed Capacity of Mine/annum : 88770.4 TPA
No. of working days : 250 days
Proposed Capacity of mine/day : 355.08 or say 355
Truck Capacity : 16 tonnes
No. of trucks deployed/day : 22.18 or 22
Increase in PCU/day (22*3) : 66

Table 4.2 (ii): Modified Traffic Scenario & LOS

Road	V	C	Modified V/C Ratio	LOS
National Highway (NH-333)	2500+66 = 2566	15000	0.17	A

Results

From the above analysis it can be seen that the LOS has changed from 0.16 to 0.17 at Highway intersection that is LOS remain 'A' i.e '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:

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.

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6.0 INTRODUCTION

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

Environmental Monitoring Program will be implemented once the project activity commences. Environmental monitoring program includes (i) Environmental surveillance, (ii) analysis & interpretation of data, (iii) Preparation of reports to support environmental management system and (iv) Organizational set up responsible for the implementation of the programme.

6.1 ENVIRONMENTAL MONITORING AND REPORTING PROCEDURE

Monitoring shall confirm that commitments are being met. This may take the form of direct measurement and recording of quantitative information, such as amounts and concentrations of discharges and wastes, for measurement against corporate or statutory standards, consent limits or targets. It may also require measurement of ambient environmental quality in the vicinity of a site using ecological/biological, physical and chemical indicators. Monitoring may include socio-economic interaction, through local liaison activities or even assessment of complaints.

The preventive approach to environment management may also require monitoring of process inputs, for example, type and method used, resource consumption, equipment and pollution control performance etc.

The key aims of environment monitoring are:

1. To ensure that results/ conditions are as forecast during the planning stage, and where they are not, to pinpoint the cause and implement action to remedy the situation.

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

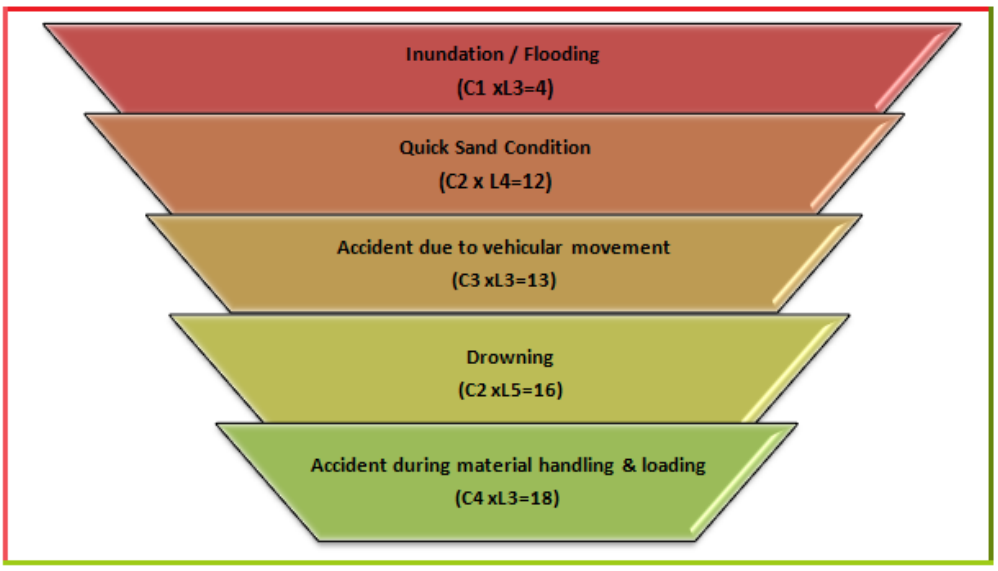
Risk Rank **Likelihood Consequence**	**L1** **Almost certain**	**L2** **Likely**	**L3** **Possible**	**L4** **Unlikely**	**L5** **Rare**
C1 **Catastrophic**	**1**	**2**	**4**	**7**	**11**

C2 Major	**3**	**5**	**8**	**12**	**16**
C3 Moderate	**6**	**9**	**13**	**17**	**20**
C4 Minor	**10**	**14**	**18**	**21**	**23**
C5 Insignificant	**15**	**19**	**22**	**24**	**25**

RISK RATING:

HIGH RISK 1-6	**MEDIUM RISK 7-15**	**LOW RISK 16-25**

7.2 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 around 71 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 Barnar 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 Barnar River (Jamui Barnar Block No –02 Sand Ghat) at Mauja – Mahgaon, Block - Sono, 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 Barnar 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 Barnar 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 53,72,800/-x 2% = Rs. 1,07,456/-

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

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9.0 INTRODUCTION

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

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

9.1 ENVIRONMENTAL MANAGEMENT CELL (EMC)

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

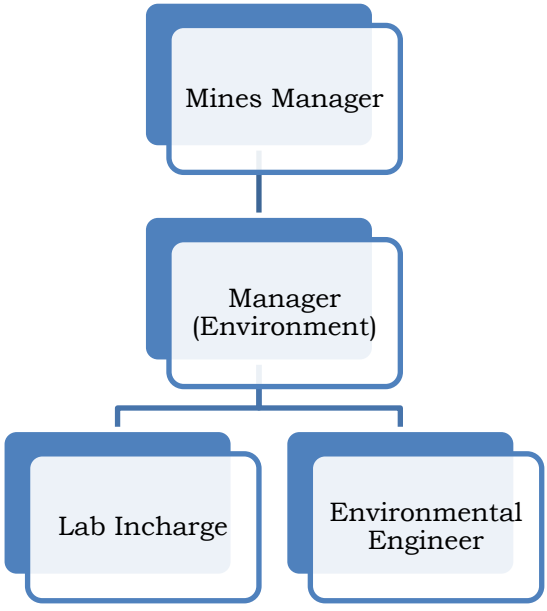

Figure 9.1 Environment Management Cell

The EMC will perform the following activities:

- 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 1.0m maximum from the surface level well above the ground water table, therefore impact on water regime is not anticipated.
- Monitoring of water quality of nearby surface water, ground water and domestic water will be conducted once in every season except monsoon to evaluate the performance of the mitigation measures.

9.4 NOISE POLLUTION CONTROL MEASURES

As there will be no heavy earth moving machinery there will not be any major impact on noise level due to sand mining and other association activities a detailed noise survey has been carried out and results were cross referenced with standards and were found to be well within limits. Blasting technique is not used for sand mining hence no possibility of land

vibration. It was found that the proposed mining activity will not have any significant impact on the noise environment of the region. The only impact will be due to transportation of sand and by excavator involve trucks and tractor trolleys.

- 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. 68 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 plants 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 Blocks are given below.

Sand Ghat	Area (Ha)	Plants
Block 02	6.76	6.76*10 Plants= 68 plants
Total Plants		68 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	*Ficusreligiosa*	Peepal	Dust particles absorbance
2	*Acacia nilotica*	Babul	Tolerant to SO_2
3	*Mangiferaindica*	Aam	Tolerant to Dust control
4	*Tectonagrandis*	Sagon	Tolerant to Dust control

5	*Azadirachtaindica*	Neem	Tolerant to SO_2
6	*Pithecolibiumducle*	Jungle jalebi	Tolerant to SO_2 and Dust control
7	*Ficusbenghalensis*	Bargad	Tolerant to Dust control
8	*Scigiumcumuni*	Jamun	To stop river bank erosion
9	*Terminaliaarjuna*	Arjun	To stop river bank erosion
10	*Populus ciliate*	Popular	Fast growing, broad leaf

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 M/s Raj Construction, Prop.- Nisha Kumari, D/O- Late Chandrashekhar Prasad Singh, Vill. – Shiv

Bhavani Lane, Ranchi University, District- Ranchi (Sand Block 02) 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

M/s Raj Construction, Prop.- Nisha Kumari, D/O- Late Chandrashekhar Prasad Singh, Vill. – Shiv Bhavani Lane, Ranchi University, District- Ranchi, (Sand Block 02) 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-02)

Sl. No	Description	Capital Cost (lakh)	Recurring Cost (lakh)
1	Pollution Control & Dust Suppression	--	1.5
2	Pollution Monitoring i) Air pollution ii) Water pollution iii) Soil pollution iv) Noise Pollution	--	2.0
3	Plantation and salary for one gardener (part time basis).	0.68	0.5
4	Haul road Maintenance Cost	0.625	1.5
TOTAL		**1.305**	**5.5**

Note: *68 plants * 1000 Rs (for each plants including hedges and fences) =Rs 68000/-

- 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 *0.25 km haul road) = 62500/-

****

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 Barnar River at Block No – 02 Sand Ghat at Mauja – Mahgaon, Block - Sono , District- Jamui, (Bihar). The Proposed Production is 40560 cum per annam or 88770.4 Tonnes per annam and Area of the project site is 6.76 ha.

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.**

10.3 BRIEF DESCRIPTION OF PROJECT

The proposed project is Open Cast Semi-Mechanized Mining of Sand with a proposed production of 40560 cum per annam or 88770.4 Tonnes per annum. The project has been proposed by M/s Raj Construction, Prop.- Nisha Kumari, D/O- Late Chandrashekhar Prasad Singh, Vill. – Shiv Bhavani Lane, Ranchi University, District- Ranchi.

The proposed project is over an area 6.76 ha. on Barnar River at Mauja – Mahgaon, Block - Sono , 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 **Sand Block 02 - Rs - 53,72,800/-** (including auction cost).

The proposed mining lease area falls in Survey of India Toposheet 72C/02 & 72C/06.

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

Table: 10.1 Mine lease Co-ordinates (Block 02)

Pillar	Geo Coordinate	
1	24°39'43.32"N	86°19'43.03"E
2	24°39'51.20"N	86°19'39.97"E
3	24°39'58.59"N	86°19'46.85"E
4	24°40'2.58"N	86°19'52.69"E
5	24°39'57.47"N	86°19'50.89"E
6	24°39'51.67"N	86°19'46.82"E

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

Table-10.2: Details of Environmental Setting

Sr. No.	Particulars	Details
1	**Location**	
a	Village	Mauja – Mahgaon
b	Block	Sono
c	District	Jamui
d	State	Bihar
2	Elevation above	Block No.- 02 (148 mRL - 146 mRL)
3	Nearest National Highway/State Highway	NH-333: Approx. 1.25 KM towards E direction.
4	Nearest Railway station	**Block** / **Railway Station** / **Distance (Km) Direction** **Block 02** / Jhajha Railway Station / Jhajha Railway station, approx. 13.10 km towards NE direction.
5	Nearest Airport	**Block** / **Airport** / **Distance (Km) Direction** **Block 02** / Deoghar Airport / Deoghar Airport, approx. 45.0 km towards SE

Sr. No.	Particulars	Details
6	Ecological Sensitive Areas (Wildlife Sanctuaries)	There is no any Ecological Sensitive Areas Like National Park, Wildlife Sanctuaries, etc are found within 10 km of the study area.
7	Seismic Zone	Zone- IV *Source BMTC 2nd edition https://www.bmtpc.org/disaster%20resistnace%20technolgies/ZONE%20IV.htm*

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 Barnar River Block No – 02 Sand Ghat, Mauja – Mahgaon, Block - Sono , District- Jamui, (Bihar).
2	Mining Capacity	40560 cum per annum or 88770.4 Tonnes per annum
3	Method of mining	Open cast semi-mechanized mining/OTFM
4	Total ML area	6.76 ha
5	Depth of mining	1.0 m depth
6	Manpower	20 persons
9	Water Requirement	BLOCK 02 – 2.04 KLD
10	Source of Water	Tanker/ Nearby village.

10.4.2 Mineral Reserves and production

Slices of height 1.5m & width 6.0 m has been drawn in geological sections to calculate the mineable reserves. The area of each bench level has been calculated & multiplied by strike influence to get the volume. Volume is multiplied by bulk density (2.09 kg/m3) to get Tonnes.

Table 10.4 Classification Mineral Reserves

Bench Level (mRL)	Length (m)	Width (m)	Depth (m)	Volume (cum)	Tonnes
147-146	490	122	1	59780	124940.2
Total				**59780**	**124950.2**

Total Mineable Reserve = 59780 CUM or 124950.2 Tonnes

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 Barnar River (Jamui Barnar Block 02 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. 68 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 06 ^{0}C to 25.0 ^{0}C.

10.7.3 Ambient Air Quality

Ambient Air Quality Monitoring (AAQM) has been carried out at 8 locations. The Particulate Matter (PM_{10}) conc. ranged of 63.2 µg/$m^3$to 95.8 µg/m^3. The Particulate Matter ($PM_{2.5}$) ranged from 27.6 µg/$m^3$to 56.6 µg/$m^{3.}$ Sulphur dioxide (SO_2) between 4.4 µg/$m^3$to 13.5 µg/m^3.Oxides of Nitrogen (NO_2) between 7.6 µg/$m^3$to 24.1 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 Ground water sampling was taken from 3 locations The analysis results indicate that the pH ranges between 7.74 and 7.98. Total hardness varies from 160 mg/l to 187 mg/l .Total dissolved solids vary from 241 mg/l to 281 mg/l

The Surface water sampling was taken from 3 locations The analysis results indicate that the pH ranges between 7.58 and 7.72, Dissolved Oxygen (DO) was observed in the range of 6.6 to 7.0 mg/l against the minimum requirement of 4 mg/l. BOD values were observed to be in the range of 3.0 to 4.0 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 **39.2 dB(A) to 53.8 dB(A)** respectively. The minimum & maximum noise levels at night time were found to be **35.1 dB (A) & 43.1 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 Barnar 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 (Block- 02)

Sl. No	Description	Capital Cost (lakh)	Recurring Cost (lakh)
1	Pollution Control & Dust Suppression	--	1.5
2	Pollution Monitoring i) Air pollution ii) Water pollution iii) Soil pollution iv) Noise Pollution	--	2.0
3	Plantation and salary for one gardener (part time basis).	0.68	0.5
4	Haul road Maintenance Cost	0.625	1.5
TOTAL		**1.305**	**5.5**

Note: *68 plants * 1000 Rs (for each plants including hedges and fences) =Rs 68000/-

- 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 *0.25 km haul road) = 62500/-

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 53,72,800/-x 2% = Rs. 1,07,456/-

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.

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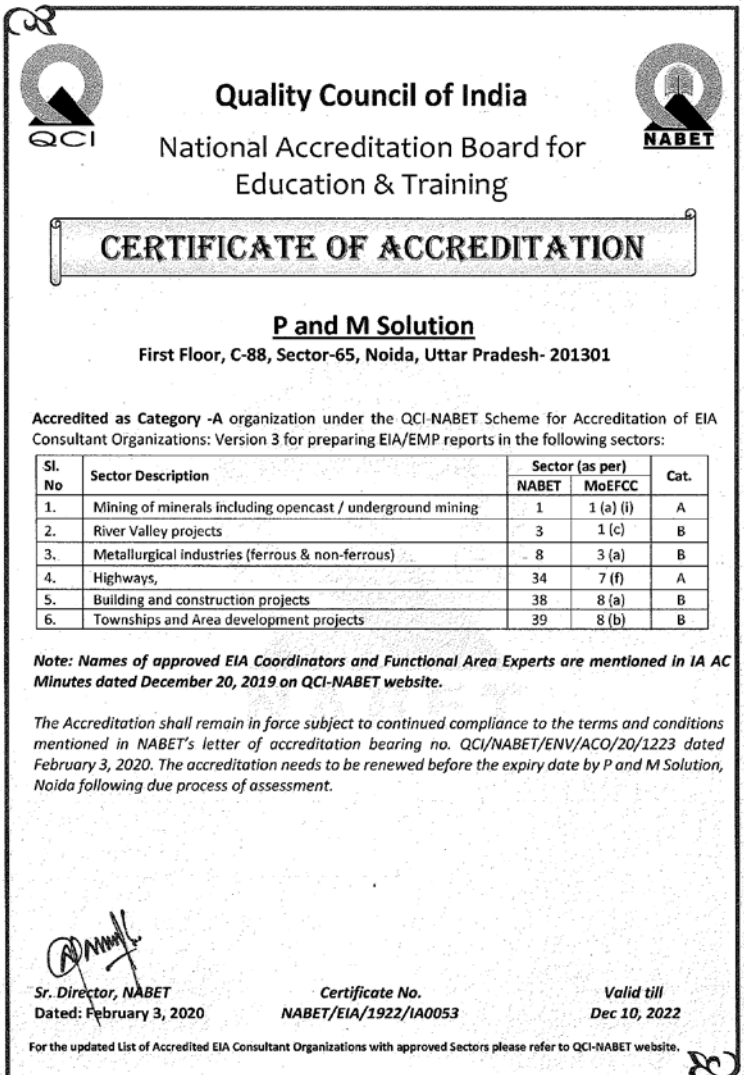
Project: Sand Mining Project on Barnar River (Jamui Barnar Block No – 02 Sand Ghat) At Mauja – Mahgaon, Block - Sono , District- Jamui, (Bihar).

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 Barnar River (Jamui Barnar Block No – 02 Sand Ghat) At Mauja – Mahgaon, Block - Sono , District- Jamui, (Bihar).

National Accreditation Board for Education and Training

QCI/NABET/ENV/ACO/23/2698 March 07, 2023

To

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

Sub.: Extension of Validity of Accreditation till June 06, 2023 – regarding
Ref.. Certificate no. NABET/EIA/1922/IA0053

Dear Sir/Madam

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

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

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

With best regards.

(A K Jha)
Sr. Director, NABET

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

Project: Sand Mining Project on Barnar River (Jamui Barnar Block No – 02 Sand Ghat) At Mauja – Mahgaon, Block - Sono , 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	PoonamKumariMangalam	FAE	LU
11	Jatinkumarsrivastava	FAE	NV

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EXECUTIVE SUMMARY

FOR

SAND MINING PROJECT ON BARNAR RIVER (JAMUI BARNAR BLOCK NO. – 02 SAND GHAT) DISTRICT - JAMUI

At

Mauja – Mahgaon, Block - Sono , District- Jamui, State – Bihar

SAND BLOCK	**BLOCK 02**
AREA	**6.76 HA**
PRODUCTION	**88770.4 TPA**

PROJECT PROPONENT

M/s Raj Construction

Prop.- Nisha Kumari

D/O- Late Chandrashekhar Prasad Singh

Vill – Shiv Bhavani Lane, Ranchi University

District- Ranchi

Environment Consultant

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

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 Barnar Block 02

The project has been proposed by M/s Raj Construction, Prop.- Nisha Kumari. The Proposed Sand Mining Project was located on Barnar River at Block No –02 Sand Ghat at Mauza- Mahgaon, Block - Sono , District- Jamui, (Bihar). LOI issued to lessee via letter no. 2035/khanan, dated 01-12-2022.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 14-02-2023.

It has been proposed to mine around **88770.4 Tonnes per annum** for applied lease. The estimated project cost for the proposed project is **Rs 53,72,800/-** (including auction cost)

PROJECT DESCRIPTION

LOCATION

Jamui Barnar Block 02

The proposed mining lease area falls in Survey of India Toposheet Topo sheet No- 72C/02 & 72C/06. The lease area is located in Mauza- Mahgaon, Block - Sono , District- Jamui, State- Bihar. The mine lease co-ordinates are listed below:

Pillar	Geo Coordinate	
1	24°39'43.32"N	86°19'43.03"E
2	24°39'51.20"N	86°19'39.97"E
3	24°39'58.59"N	86°19'46.85"E
4	24°40'2.58"N	86°19'52.69"E
5	24°39'57.47"N	86°19'50.89"E
6	24°39'51.67"N	86°19'46.82"E

Area & production: The total ML area is 6.76 Ha. Proposed rate of production will be 88770.4 TPA.

Connectivity:

Jamui Barnar Block 02

Jamui Barnar Block 02 Sand Ghat is well connected to the nearest metalled road 250 m distance from the lease. NH-333: Approx. 1.25 KM towards E direction. Jhajha Railway station, approx. 13.10 km towards NE direction.

Salient Features of Project

Jamui Barnar Block 02

Name of the applicant	M/s Raj Construction Prop.- Nisha Kumari
Address of Lessee	Vill – Shiv Bhavani Lane, Ranchi University District- Ranchi
Name of Mine	Sand Mining Project on Barnar River at Jamui Barnar Block No.- 02 Sand Ghat,
Village	Mauza– Mahgaon
District & State	Jamui, Bihar
Mineral	Sand
Area (ha)	6.76 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. Benches having height 1.5m & width 6.0m drawn from the ultimate pit limit. Area of each benches have been calculated multiplied by strike influence to get the volume. The volume multiplied by bulk density (2.09 g/cm^3) 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.

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

Block No.- 02

Bench Level (mRL)	Length (m)	Width (m)	Depth (m)	Volume (cum)	Tonnes
147-146	490	122	1	59780	124940.2
Total				**59780**	**124950.2**

Total Mineable Reserve = 59780 CUM or 124950.2 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 2.04 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	Min	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 (AAQM) has been carried out at 8 locations. The Particulate Matter (PM10) conc. ranged of 63.2 µg/m3to 95.8 µg/m3. The Particulate Matter (PM2.5) ranged from 27.6 µg/m3to 56.6 µg/m3. Sulphur dioxide (SO2) between 4.4 µg/m3to 13.5 µg/m3.Oxides of Nitrogen (NO2) between 7.6 µg/m3to 24.1 µg/m3.The results thus obtained indicate that the concentrations of PM10, SO2 and NO2 in the ambient air are well within the National Ambient Air Quality (NAAQ) standards for Residential and Rural areas.
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 8 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 Barnar 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 7.15 to 8.21, which shows that the soil is slightly alkaline in nature.
Ecology and Biodiversity	There is no Ecological Sensitive Areas are found within 10 km of 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 Barnar 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 will be 2% of the total project cost. This amount will be used for social welfare.

CER COST is 53,72,800/-x 2% = Rs. 1,07,456/-

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. 68 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,minimum5 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, Banyan, 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 (Block-02)

Sl. No	Description	Capital Cost (lakh)	Recurring Cost (lakh)
1	Pollution Control & Dust Suppression	--	1.5
2	Pollution Monitoring i) Air pollution ii) Water pollution iii) Soil pollution iv) Noise Pollution	--	2.0
3	Plantation and salary for one gardener (part time basis).	0.68	0.5
4	Haul road Maintenance Cost	0.625	1.5
TOTAL		**1.305**	**5.5**

Note: *68 plants * 1000 Rs (for each plants including hedges and fences) =Rs 68000/-

- 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 *0.25 km haul road) = 62500/-

CONCLUSION

Based on the EIA study it is observed that there will be an increase in the dust pollution, which will be controlled by sprinkling of water and plantation. There will be an insignificant impact on ambient environment and ecology due to the mining activities moreover the mining operation will lead to direct and indirect employment generation in the area. Green belt development around the area will also be taken up as an effective pollution mitigative technique, as well as to control the pollutants released from the premises of the Mine. Monitoring program will be followed till the mining operations continue. Hence, it can be summarized that the development of the mine will have a positive impact on the socio-economic environment of the area and lead to sustainable development of the region.

****

कार्यकारी सारांश

रेत खनन परियोजना

बरनार नदी (जमुई बरनार ब्लॉक संख्या - 02 रेत घाट)

के लिए

मौजा – महगाओं, ब्लॉक - सोनो, जिला- जमुई, (बिहार)

रेत ब्लॉक	ब्लॉक नं 02
क्षेत्र	6.76 हेक्टेयर
उत्पादन	88770.4 टन प्रति वर्ष

आवदेन कर्ता

मेसर्स राज कंस्ट्रक्शन

प्रोप.- निशा कुमारी

डी/ओ-स्वर्गीय चंद्रशेखर प्रसाद सिंह

ग्राम - शिव भवानी लेन, रांची विश्वविद्यालय जिला- रांची

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 बरनार ब्लॉक 02

परियोजना के प्रस्ताव मेसर्स राज कंस्ट्रक्शन, (प्रोप.- निशा कुमारी) ने दिया है। प्रस्तावित रेत खनन परियोजना मौजा- महगाओं, ब्लॉक - सोनो, जिला- जमुई (बिहार) में ब्लॉक संख्या - 02 रेत घाट पर बरनार नदी पर स्थित है। पत्र संख्या 2035/ खनन, दिनांक 01.12.2022 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 14-02-2023 द्वारा जारी किया गया है।

आवेदित पट्टे के लिए प्रति वर्ष लगभग 88770.4 टन खनन प्रस्तावित किया गया है, प्रस्तावित परियोजना के लिए अनुमानित परियोजना लागत 53,72,800/- रुपये (नीलामी लागत सहित) है।

❖ परियोजना विवरण

स्थान:

जमुई बरनार ब्लॉक 02

प्रस्तावित खनन पट्टा क्षेत्र सर्वे ऑफ इंडिया टोपोशीट टोपो शीट संख्या- 72C/02 & 72C/06 के अंतर्गत आता है। पट्टा क्षेत्र मौजा – महगाओं, ब्लॉक - सोनो, जिला-जमुई, राज्य- बिहार में स्थित है। खान पट्टा समन्वय नीचे सूचीबद्ध हैं:

स्तंभ	अक्षांश / देशांतर	
1	24°39'43.32"	86°19'43.03"
2	24°39'51.20"	86°19'39.97"
3	24°39'58.59"	86°19'46.85"
4	24°40'2.58"	86°19'52.69"
5	24°39'57.47"	86°19'50.89"
6	24°39'51.67"	86°19'46.82"

- **क्षेत्र और उत्पादन**: कुल क्षेत्रफल 6.76 हेक्टेयर है। उत्पादन की प्रस्तावित दर 88770.4 टीपीए होगी।

- **संयोजकता**

<u>जमुई बरनार ब्लॉक 02</u>

जमुई बरनार ब्लॉक 02 रेत घाट पट्टे से 250 मी. की दूरी पर निकटतम पक्की सड़क से अच्छी तरह से जुड़ा हुआ है। NH 333 लगभग 1.25 किमी पूर्व दिशा की ओर है। झाझा रेलवे स्टेशन, लगभग 13.10 किमी उत्तर पूर्व दिशा की ओर है।

परियोजना की मुख्य विशेषताएं

<u>जमुई बरनार ब्लॉक 02</u>

आवेदक का नाम	मेसर्स राज कंस्ट्रक्शन प्रोप.- निशा कुमारी
पट्टेदार का पता	ग्राम - शिव भवानी लेन, रांची विश्वविद्यालय जिला- रांची
नाम	रेत खनन परियोजना जमुई बरनार ब्लॉक 02 रेत घाट (बरनार नदी)
गाँव	मौजा - महगाओं
जिला और राज्य	जमुई, बिहार
खनिज	रेत
क्षेत्र (हेक्टेयर)	6.76 हेक्टेयर

❖ **ड्रिलिंग**

ड्रिलिंग और ब्लास्टिंग की आवश्यकता नहीं है।

❖ **खनिज का उपयोग**

रेत का उपयोग निर्माण कार्यवो में किया जाता है सड़क निर्माण में भी इसका उपयोग किया जाता है

❖ **खनन**

खनन प्रक्रिया ड्रिलिंग और ब्लास्टिंग के बिना खुली अर्ध-मशीनीकृत विधि है। यह एक ओपन कास्ट माइनिंग प्रोजेक्ट है। उत्खनन/जेसीबी ट्रक/ट्रैक्टर संयोजन या मैन्युअल आदि के उपयोग के साथ संचालन अर्ध-मशीनीकृत/ओटीएफएम होगा। रेत को अपने मौजूदा रूप में एकत्र किया जाएगा।

खनन रोटेशनल तरीके से किया जाएगा। चूंकि काम व्यवस्थित होने जा रहा है यानी बेंचों में खनन किया जाएगा। खदान में काम करने वाले कर्मचारी को कोई खतरा नहीं होगा। खनन परतों में किया जाएगा।

निक्षेप को संस्तर की सतह से 1 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 (2.09 g/cm^3) 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 रेत का वार्षिक दोहन नीचे दिया गया है:

ब्लॉक नं: 02

बेंच स्तर (mRL)	लंबाई (M)	चौड़ाई (M)	गहराई (M)	मात्रा (घन मीटर)	टन
147-146	490	122	1	59780	124940.2
कुल				59780	124940.2

कुल खनन योग्य रिजर्व = 59780 घन मीटर या 124950.2 टन

यह नदी तल जमा है और खनन क्षेत्र हर साल मानसून अवधि के दौरान फिर से भर जाएगा और खदान की गहराई हर साल नदी की रेत से भर जाएगा (रिप्लेनिशमेंट) और क्षेत्र अपनी मूल स्थलाकृति बहाल को कर देगा।

❖ **साइट सुविधाएं और उपयोगिताएँ**

- **जलापूर्ति**

श्रमिकों को पीने व घरेलू उपयोग के लिए पानी उपलब्ध कराया जाएगा। धूल के दमन के लिए भी पानी की आवश्यकता होगी। प्रस्तावित परियोजना के लिए 2.04 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	न्यूनतम	अधिकतम
दिसम्बर 2022	12	26	7.6	12.7
जनवरी 2023	11	25	8.2	13.9
फरवरी 2023	14	31	8.8	15.9

आधारभूत पर्यावरणीय स्थिति

गुण	आधारभूत स्थिति
एम्बिएंट(परिवेशी) वायु गुणवत्ता	एम्बिएंट (परिवेशी) वायु गुणवत्ता निगरानी से पता चलता है कि सभी 8 AQ निगरानी स्टेशनों में PM2.5 की न्यूनतम और अधिकतम सांद्रता क्रमशः 27.6 µg/m3 से 56.6 µg/m3 पाई गई; PM10, 63.2 µg/m3to 95.8 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	निगरानी कार्यक्रम के परिणामों ने संकेत दिया कि निगरानी किए गए सभी 8 स्थानों पर शोर के दिन और रात दोनों समय एनएएक्यूएस की निर्धारित सीमा के भीतर थे।
पानी की गुणवत्ता	सभी स्रोतों से भूजल पीने के उद्देश्यों के लिए उपयुक्त रहता है क्योंकि सभी घटक IS: 10500 द्वारा प्रख्यापित पेयजल मानकों द्वारा निर्धारित सीमा के भीतर हैं। बरनार 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 7.15 से 8.21 के बीच है, जो दर्शाता है कि मिट्टी प्रकृति में थोड़ी क्षारीय है।
पारिस्थितिकी और जैव विविधता	अध्ययन क्षेत्र के 10 कि.मी. के भीतर कोई भी पारिस्थितिक संवेदनशील क्षेत्र नहीं है
सामाजिक आर्थिक	नदी तल पर रेत खनन परियोजना के कार्यान्वयन से स्थानीय लोगों को प्रत्यक्ष और अप्रत्यक्ष दोनों तरह के रोजगार के अवसर मिलेंगे। अध्ययन क्षेत्र में शिक्षा, स्वास्थ्य, आवास, पानी, बिजली आदि को और बेहतर किया जा सकता है। उम्मीद है कि प्रस्तावित खनन परियोजना और संबद्ध औद्योगिक और व्यावसायिक गतिविधियों के कारण इसमें काफी हद तक और सुधार होगा।

❖ अनुमानित पर्यावरणीय प्रभाव

- **वायु पर्यावरण पर प्रभाव**

प्रस्तावित खनन गतिविधियां खनन में प्रयुक्त अन्य परिवहन वाहनों की लोडिंग और आवाजाही से धूल (SPM/RSPM) उत्पन्न होगी। खदान स्थल पर उचित जल छिड़काव किया जाएगा। हवा से होने वाले क्षणिक उत्सर्जन को कम करने के लिए खनिज को ढके हुए तिरपाल ट्रकों/टिप्परों के माध्यम से सड़क मार्ग से ले जाया जाएगा।

- **जल पर्यावरण पर प्रभाव**

नदी के भीतर या उसके पास से रेत के खनन का मानसून के मौसम के दौरान भौतिक-रासायनिक आवास विशेषताओं पर अप्रत्यक्ष प्रभाव पड़ता है। इन विशेषताओं में धारा खुरदरापन, तत्व, गहराई, वेग, मैलापन, तलछट परिवहन और धारा निर्वहन शामिल हैं।

संस्तर सामग्री खनन से उत्पन्न बायोटा पर हानिकारक प्रभाव, यदि कोई हो, निम्नलिखित के कारण होते हैं:

- नदी के परिवर्तन के परिणामस्वरूप प्रवाह पैटर्न में बदलाव
- मानसून के मौसम में निलम्बित तलछट की अधिकता।

परियोजना गतिविधि केवल बरनार नदी के शुष्क भाग में की जाएगी। इसलिए, परियोजना की कोई भी गतिविधि सीधे तौर पर जल पर्यावरण को प्रभावित नहीं करती है। परियोजना में केवल मानसून के मौसम में किसी धारा को मोड़ने या काट देने का प्रस्ताव नहीं है। नदी (मानसून में) या भूजल दोहन से पानी की पंपिंग के लिए किसी प्रस्ताव की परिकल्पना नहीं की गई है।

❖ भूमि पर्यावरण पर प्रभाव

स्ट्रीम बेड सामग्री का प्रस्तावित निष्कर्षण, मौजूदा स्ट्रीमबेड के नीचे खनन, और चैनल-बेड फॉर्म और आकार में परिवर्तन से चैनल बेड और बैंकों के क्षरण, चैनल ढलान में वृद्धि, और चैनल आकारिकी में परिवर्तन जैसे कई प्रभाव हो सकते हैं, यदि, संचालन व्यवस्थित रूप से नहीं किया जाता है।

रेत के व्यवस्थित और वैज्ञानिक तरीके से हटाने से क्यारियों का क्षरण नहीं होगा। कचरे के रूप में उत्पन्न गाद और मिट्टी का उपयोग वृक्षारोपण के लिए या निचले इलाकों को कहीं और भरने के लिए किया जाएगा। खनन की योजना गैर-मानसून मौसम में ही बनाई जाती है, ताकि उत्खनित क्षेत्र प्रत्येक वर्ष मानसून के दौरान धीरे-धीरे भर जाए (रिप्लेनिशमेंट)।

❖ शोर पर्यावरण पर प्रभाव

प्रस्तावित खनन गतिविधि प्रकृति में अर्ध-मशीनीकृत है। खनन गतिविधि के लिए कोई ड्रिलिंग और ब्लास्टिंग परिकल्पित नहीं है। इसलिए, केवल खनिजों के परिवहन के लिए तैनात वाहनों की आवाजाही के कारण प्रभाव का अनुमान लगाया गया है। वाहनों को अच्छी चालू स्थिति में रखा जाएगा ताकि शोर को न्यूनतम संभव स्तर तक कम किया जा सके।

❖ जैविक पर्यावरण पर प्रभाव

चूंकि प्रस्तावित खनन वैज्ञानिक तरीके से किया जाएगा, इसलिए ज्यादा महत्वपूर्ण प्रभाव का अनुमान नहीं है। जलीय जीवन पर प्रभाव को कम करने के लिए मानसून के मौसम के दौरान कोई खनन नहीं किया जाएगा जो कि कई प्रजातियों के लिए मुख्य रूप से प्रजनन का मौसम है। खनन स्थल पर कोई वनस्पति नहीं है; वनस्पति की सफाई नहीं की जाएगी। ढोने वाली सड़कों पर पानी का छिड़काव किया जाएगा जिससे धूल का उत्सर्जन कम होगा और इस प्रकार फसलों को होने वाले नुकसान से बचा जा सकेगा।

❖ सामाजिक आर्थिक पर्यावरण पर प्रभाव

क्षेत्र में खनन गतिविधि का प्रभाव क्षेत्र के सामाजिक-आर्थिक वातावरण पर सकारात्मक है। रेत खनन से स्थानीय लोगों को जब भी श्रमबल की आवश्यकता होगी रोजगार उपलब्ध होगा।

पोस्ट प्रोजेक्ट पर्यावरण निगरानी

क्रम संख्या	पैरामीटर्स का विवरण	निगरानी की अनुसूची
1	हवा की गुणवत्ता	मानसून को छोड़कर प्रत्येक मौसम में सप्ताह में दो बार/तीन बार 24 घंटे के नमूने
2	जल गुणवत्ता (सतह और भूजल)	साल में 4 सीजन के लिए एक बार
3	मिट्टी की गुणवत्ता	परियोजना क्षेत्र में वर्ष में एक बार
4	शोर स्तर	साल में दो बार पहले दो साल और फिर साल में एक

		बार
5	सामाजिक-आर्थिक स्थिति	3 साल में एक बार
6	वृक्षारोपण निगरानी	एक बार एक मौसम में

❖ अतिरिक्त अध्ययन

- **सार्वजनिक सुनवाई**

जन सुनवाई अभी बाकी है।

❖ जोखिम आकलन

पूर्ण खनन कार्य एक योग्य खदान प्रबंधक होल्डिंग के प्रबंधन नियंत्रण और निर्देशन में किया जाएगा। डीजीएमएस नियमित रूप से स्थायी आदेश, मॉडल स्थायी आदेश और आपदा, यदि कोई हो, के मामले में खान प्रबंधन द्वारा पालन किए जाने वाले परिपत्र जारी करता रहा है। साथ ही खनन कर्मचारियों को सतर्क रखने के लिए समय-समय पर रिफ्रेशर कोर्स में भेजा जाएगा।

❖ आपदा प्रबंधन योजना

आपदा प्रबंधन की योजना में आपातकालीन तैयारी एक महत्वपूर्ण पहलू है। 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।

सैंड ब्लॉक 10 के लिए सीईआर (CER) लागत कुल परियोजना लागत का 2% होगी। इस राशि का उपयोग समाज कल्याण के लिए किया जाएगा। सीएसआर (CSR) लागत 53,72,800/-x 2% = Rs. 1,07,456/-.

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 68 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, बरगद, 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 (ब्लॉक -02)

क्रम संख्या	विवरण	पूंजी लागत (लाख)	आवर्ती लागत (लाख)
1	प्रदूषण नियंत्रण और धूल दमन	--	1.5
2	प्रदूषण निगरानी i) वायु प्रदूषण ii) मृदा प्रदूषण iii) जल प्रदूषण iv) ध्वनि प्रदूषण	--	2.0
3	वृक्षारोपण और एक माली के लिए वेतन (अंशकालिक आधार पर)	0.68	0.5
4	परिवहन सड़क रखरखाव लागत	0.625	1.5
TOTAL		**1.305**	**5.5**

नोट: *68 पौधे * 1000 रुपये (हेज और बाड़ सहित प्रत्येक पौधे के लिए) = 68000/- 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*0.25 किमी लंबी सड़क) = 62,500/-

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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