DRAFT ENVIRONMENTAL IMPACT ASSESSMENT

AND

ENVIRONMENTAL MANAGEMENT PLAN

OF

SAND MINING PROJECT (BHOJ SON 38 SAND GHAT) AT RIVERBED OF SON RIVER.

PROPOSAL NO	SIA/BR/MIN/421625/2023
TOR NO	SIA/1(a)/2397/2023
AREA	96.0 Ha
PRODUCTION	1728000 cum/year or 2937600 TPA
LOCATION	Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

APPLICANT

M/s Tirupati HP
Prop.- Rajeev Ranjan Prasad Singh
S/o- Sukhdeo Prasad Singh
Add.- Shamsher Nagar, Daudnagar, Dist.- Aurangabad, Pin-824143.

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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Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

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.

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

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 project is being proposed by:

M/s Tirupati HP

Prop.- Rajeev Ranjan Prasad Singh

S/o- Sukhdeo Prasad Singh

Add.- Shamsher Nagar, Daudnagar, Dist.- Aurangabad, Pin- 824143.

Phone No.- 7970660015

E-mail ID: mminfraway@gmail.com

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. Bhoj Son - 38 Sand Ghat fall in Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar. The details of the project are given below:

Name of Mine	Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar
Mineral	Sand
Area (ha)	96.0 Ha
Postal Address	M/s Tirupati HP Prop.- Rajeev Ranjan Prasad Singh S/o- Sukhdeo Prasad Singh Add.- Shamsher Nagar, Daudnagar, Dist.- Aurangabad, Pin- 824143. Mob. 7970660015 Email. mminfraway@gmail.com
Status of Mine	Fresh application for Environmental Clearance.

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1.2   BRIEF DESCRIPTION OF PROJECT

The proposed project is Open Cast Semi-Mechanized Mining of Sand with a proposed production of 1728000 cum/year or 2937600 TPA.

The project has been proposed by M/s Tirupati HP, (Prop.- Rajeev Ranjan Prasad Singh). The proposed project is over an area of 96.0 Ha at Khata no. – 153, Khasra No.- 1408, on Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, 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 **Rs 29,96,20,000/-** (including auction cost).

Table: 1.1 Project cost break-up

S. No.	Description	Cost in Rs.
1	Auction Cost	28,51,20,000
2	Miscellaneous	1,00,000
3	Cost of Labour & Equipment	1,44,00,000
TOTAL		**29,96,20,000/-**

The proposed mining lease area falls in Survey of India Toposheet No. 72C/7, 72C/11, 72C/8 & 72C/12.

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

Table: 1.2 Mine lease Pillar Co-ordinates

	Co-ordinates	River
1	25° 12' 56.062" N 84° 31' 14.072" E	Son
2	25° 13' 1.988" N 84° 31' 11.060" E	
3	25° 13' 7.640" N 84° 31' 20.464" E	
4	25° 13' 10.740" N 84° 31' 30.745" E	
5	25° 13' 12.796" N 84° 31' 58.547" E	
6	25° 13' 12.264" N 84° 32' 10.220" E	
7	25° 13' 0.224" N 84° 32' 23.704" E	
8	25° 12' 56.884" N 84° 32' 21.827" E	
9	25° 12' 53.709" N 84° 32' 3.425" E	
10	25° 12' 51.675" N 84° 31' 30.947" E	
11	25° 12' 54.671" N 84° 31' 25.014" E	
12	25° 12' 56.661" N 84° 31' 17.490" E	

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FIGURE 1.1, 10 KM BUFFER MAP

Table: 1.3, Connectivity Details given below

Nearest Railway Station	Piro Railway Station, approx. 16.0 km towards NW direction.
Nearest Airport	Jay Prakash Narayan International Airport Patna, approx. 71.0 km towards NE direction.
Nearest Highway	SH 81: Approx. 0.27 KM towards North direction. NH 139 : Approx. 7.0 KM towards SE direction.

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Table: 1.4, Details of Environmental Settings

Sl. No.	Particulars	Details
1	Elevation	73 AMSL to 74 AMSL
2	Ecological Sensitive Areas (National Park, Wildlife Sanctuaries)	None
3	Nearest water body	The mine site lies on the dry bed of Son river.
4	Seismic Zone	Zone- IV *Source BMTC 2nd edition* *https://www.bmtpc.org/disaster%20resistnace%20technolgies/ZONE%20III.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,

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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 dated 20.05.2023 attached as **Annexure-1**

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

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Table: 1.5 Point wise compliance for TOR

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	This is fresh LOI, Mine is yet to be operate. It will operate only after getting environmental clearance.	--

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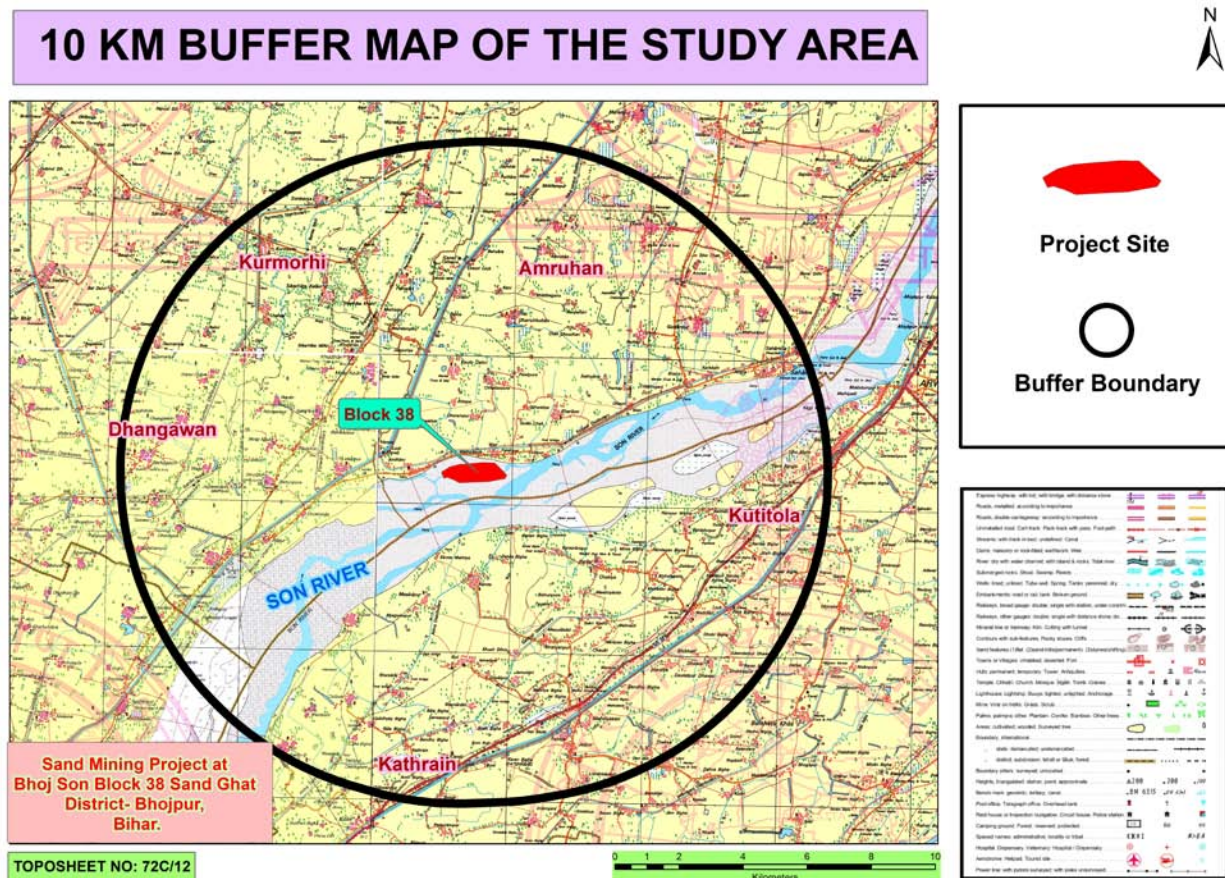| Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar. |
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	after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to 1994.		
2	A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given.	State Govt. has given consent for mining vide letter no. 395/khanan, dated 20-01-2023 in favor of M/s Tirupati HP, (Prop.- Rajeev Ranjan Prasad Singh).	**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- 96.0 Hectare. Lessee: M/s Tirupati HP, (Prop.- Rajeev Ranjan Prasad Singh). Proposed Production- 1728000 cum/year or 2937600 TPA. Waste generation- No waste will be generated. Mining Method-Open Cast semi-mechanized/OTFM 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	All Corner Coordinates of mining lease area superimposed on High Resolution Imagery has been incorporated in EIA/EMP	Refer Chapter 2 Fig: 2.1, Corner Coordinates map

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	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).	Report.	
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. 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	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

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	system or administrative order of the company to deal with the environmental issues and for insuring compliances with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large, may also be detailed in the EIA Report.		
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.	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 |

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10	Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.	Land use pattern of 10 km from the periphery of the lease area has been prepared and incorporated with the report. The study area lies on Son River. There is no wildlife sanctuary or national park within the study area.	Land-use of the study area Figure 3.1 , Table 3.1
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	There is no forest land within the lease area.	---

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	mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees.		
13	Status of forestry clearance for the broken up area and virgin forestland involved in the Project including deposition of net present value (NPV) and Compensatory afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished.	No forest land is involved in the lease area, therefore, deposition of net present value (NPV) and compensated Afforestation is not indicated.	
14	Implementation status of reorganization 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.	No RF/PF is present within the 10 km radius of the lease area. However, the vegetation details of the study area are incorporated with the report.	Chapter III
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

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	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.	
18	A detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled-I fauna found in the study area, the necessary plan along	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

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	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 concerned Coastal Zone Management Authority).	There is no LTL, HTL, CRZ area involved in this project.	

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21	R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a need based sample survey, family-wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in the mine lease area will be shifted or not. The issues relating to shifting of village(s) including their R&R and socio-economic aspects should be discussed in the Report.	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 Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and	Base line study was carried out for season March to May 2023. Details are provided in EIA/EMP Report. The locations of the monitoring stations were decided on the basis of prevailing meteorological conditions (Wind direction & wind speed)	Chapter III

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	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.	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 sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map.	A detailed study on Air quality modeling will be incorporated at the time of FEIA.	

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24	The water requirement for the Project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the Project should be indicated.	The water requirement for the project is 7.50 KLD for drinking, dust suppression and green belt development. A detailed water balance is being provided in the report.	Chapter –II
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.	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,	Mining activity will be done on Dry Bed of River so there is no impact on surface water. Mining will be up to 3 m below	Chapter II

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	should be provided"	ground level or above the ground water table whichever comes first. This will not intersect the ground water table.	
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 3.0 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 brought out.	The project site lies on Son river. No diversion is proposed.	
30	Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and bgl. A	The Elevation of the applied area for the block is 73 AMSL to 74 AMSL in the stretch.	

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	schematic diagram may also be provided for the same.	Mining will be up to 3 m below ground level or above the ground water table whichever 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. 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 IX
32	Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out,	The projection has been done based on the mineral transportation. The details of traffic analysis are discussed in the report.	Chapter IV

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	indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines.		
33	Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.	A temporary rest shelter will be provided for the workers near to the site with provisions of water, first aid facility, protective equipments, etc. Details are given in the EIA/EMP Report.	Chapter II
34	Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.	Conceptual plans and Sections are given in Chapter 2.	
35	Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The	Occupational health impact mainly is expected due air pollution due to fugitive dust emission because of movement of vehicles. However appropriate mitigation measures for air pollution control have	Chapter VII

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	project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.	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 has been earmarked for occupational health.	Chapter VIII
36	Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.	The proposed project being a small scale semi-mechanized/OTFM Method mining project, there will be hardly any process related health implication on the population of the nearby villages except fugitive dust emissions due to transportation. Budgetary allocation is given in Chapter-VIII.	
37	Measures of socio economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time to time for implementation.	Socio-economic significance provided to the local community i.e. to the nearby villagers is given in the EIA/EMP Report.	

	Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.	

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 IX
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 of **10.275** lakh & **5.5** lakh as recurring cost has been earmarked for EMP. Chapter IX table no. 9.2	Chapter IX
42	A Disaster management Plan shall be prepared and included in the EIA/EMP Report".	A Disaster management Plan has been given in EIA report.	Chapter VI
43	Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly	2% of the total cost of the project has been earmarked towards the Enterprise Social	

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

	indicate environmental, social, economic, employment potential, etc.	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 the documents to be properly referenced with index and continuous page numbering.	All the documents are 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	The project proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF&CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the project.	Compiled With EIA report.	
d	Where the documents provided are in language other than English, an English translation should be provided.	Compiled With EIA report.	
e	The Questionnaire for environment appraisal of mining projects as devised earlier by the ministry shall also be filled and submitted.	Compiled With EIA report.	

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

f	While preparing the EIA report, the instructions for the proponents and instructions for the consultants issued by MoEF&CC vide O.M. No-J-11013/41/2006-IA.II (I) dated 4rth 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 the project parameters (as submitted in Form-1 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 modification arising out of the P.H. process) Will entail conducting the PH again with the revised documentation.	Agreed	

CHAPTER-I   INTRODUCTION

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

h	As per the circular no J-11011/618/2010-IA,II(I) dated 30.5.2012 certified report of the status 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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Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–
Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

2.0   TYPE OF PROJECT

The project is proposed for the excavation of sand from the bed of river Son. The proposed
project is Open cast Semi-mechanized/OTFM mining project.

2.1   NEED FOR THE PROJECT

The project site lies on Son 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 project has been proposed by M/s Tirupati HP, (Prop.- Rajeev Ranjan Prasad Singh).
The proposed project is over an area of 96.0 Ha at Khata no. – 153, Khasra No.- 1408, on
Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar. The lease area falls
in Survey of India Toposheet No. 72C/7, 72C/11, 72C/8 & 72C/12. The lease co-ordinates
and connectivity details are listed below:

Table 2.1, Mine Lease Co-ordinates

	Co-ordinates	River
1	25° 12' 56.062" N 84° 31' 14.072" E	Son
2	25° 13' 1.988" N 84° 31' 11.060" E	
3	25° 13' 7.640" N 84° 31' 20.464" E	
4	25° 13' 10.740" N 84° 31' 30.745" E	
5	25° 13' 12.796" N 84° 31' 58.547" E	
6	25° 13' 12.264" N 84° 32' 10.220" E	
7	25° 13' 0.224" N 84° 32' 23.704" E	
8	25° 12' 56.884" N 84° 32' 21.827" E	
9	25° 12' 53.709" N 84° 32' 3.425" E	
10	25° 12' 51.675" N 84° 31' 30.947" E	
11	25° 12' 54.671" N 84° 31' 25.014" E	
12	25° 12' 56.661" N 84° 31' 17.490" E	

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

The mine site is well connected via an approach road of approx. 270 Metres to SH 81. SH 81is at Approx. 0.27 KM towards North direction. Piro Railway Station is approx. 16.0 km towards NW direction. Jay Prakash Narayan International Airport Patna,is approx. 71.0 km towards NE direction.
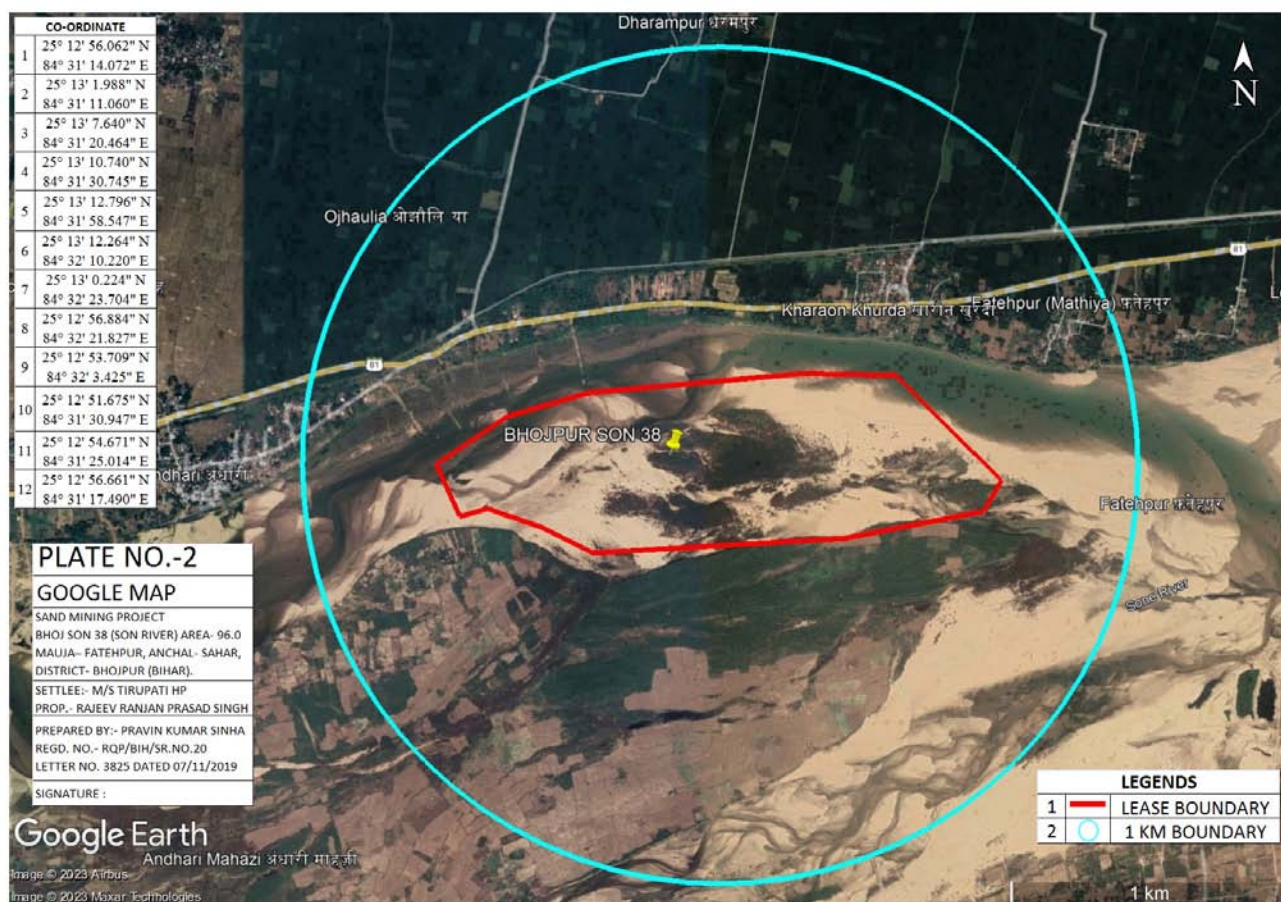
FIGURE 2.1:- PILLAR COORDINATE MAP

2.2.1   Lease / Block Area

The proposed project is Open Cast Semi-Mechanized Mining of Sand with a proposed production of 1728000 cum/year or 2937600 TPA.

The project has been proposed by M/s Tirupati HP, (Prop.- Rajeev Ranjan Prasad Singh). The proposed project is over an area of 96.0 Ha at Khata no. – 153, Khasra No.- 1408, on Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar. As per MoEF, New Delhi Gazette dated 14th September 2006 and amended thereof, the proposed mining project is

CHAPTER-II	PROJECT DESCRIPTION

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

categorized as Category 'B-1'. The estimated project cost for the proposed project is Rs 29,96,20,000/- (including auction cost).
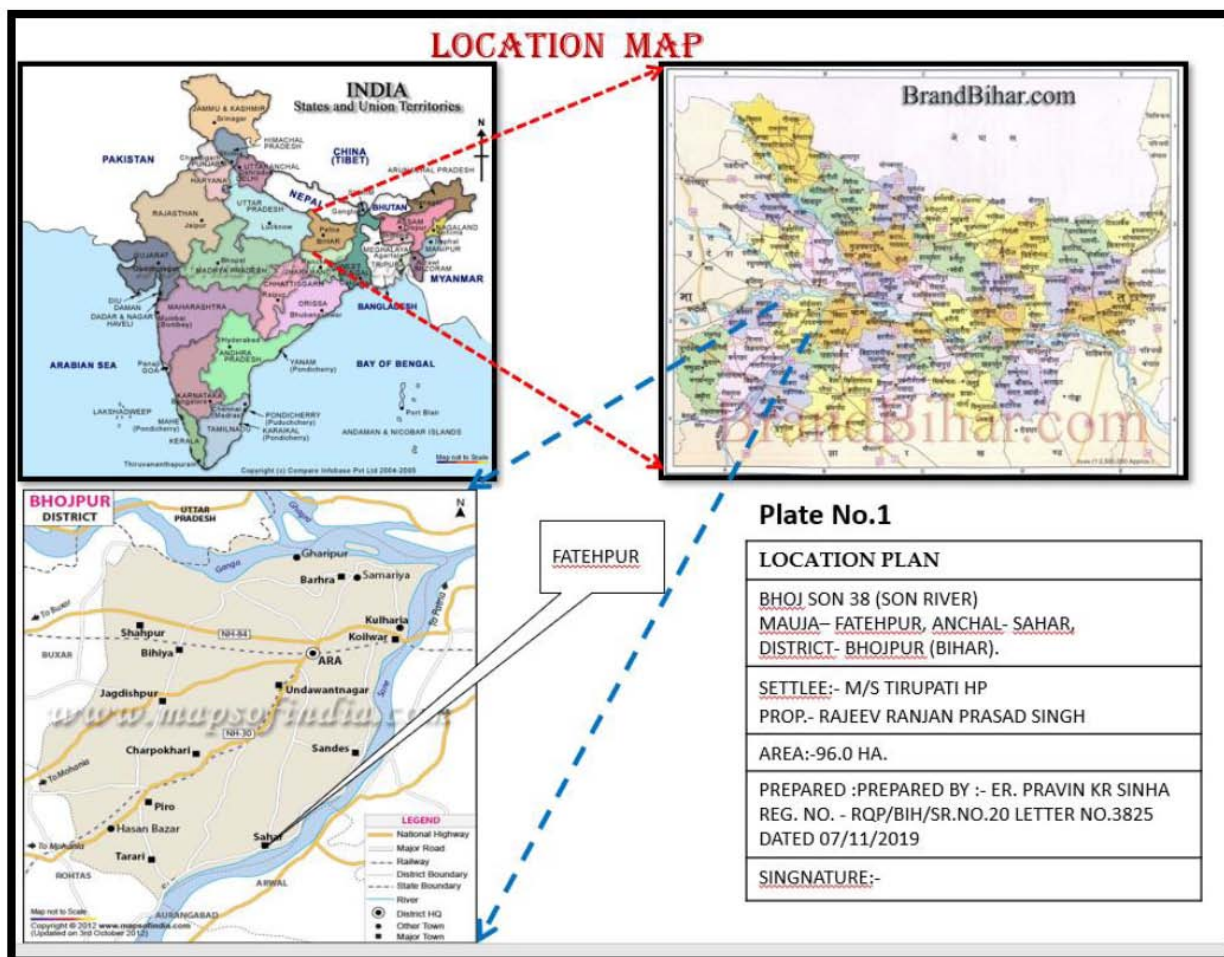
FIGURE 2.2:- LOCATION MAP OF THE PROJECT SITE

2.3   TOPOGRAPHY & GEOLOGY

2.3.1 Topography

Bhojpur district is situated in the South Bihar alluvial plains. Bhojpur is an administrative district in the state of Bihar in India. The district headquarters are located at Arrah also known as Ara. The district occupies an area of 2,474 km² and has a population of 1,792,771 (as of 2001). Bhojpur district occupies an area of 2,395 square kilometres (925 sq mi), It is located at a longitude of 83° 45' to 84° 45' East and the latitude is 25° 10' to 25° 40' North and is situated at a height of 193 meters above sea level. The sand deposits of Bhojpur

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–
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district of Bihar broadly form part and parcel of the flood plains of Ganga River as whole formed since geological ages.

The various sand mining lease areas (also referred to as sand Ghats) lie in the river bed of river Son which is a major tributary of river Ganga. They are formed in the Quaternary period of central Bihar Plains- the OAG (Older Alluvium Group) forming the highest terrace, in the Son-Ganga alluvial tract, and NAG (Newer Alluvium Group) forming younger terraces, as Older Flood Plains, are exposed all along the Alluvial Upland.

Ganga & Sone Valley Plains:

The river Son originates at an elevation of 600 m above msl near Amarkantak plateau in Madhya Pradesh (MP), and debouches in the river Ganga near Patna, Bihar. The total length of the river is 784 km, out of which about 500 km lies in MP, 82 km in Uttar Pradesh and the remaining 202 km in Bihar. The important tributaries of river Ganga are Son , Mahatwain, Dharda, Dhowa ,Mohani, Punpun, Morhar The total catchment area of the river is spread over 71,259 sq km. The river has a steep gradient with quick run-off and ephemeral regimes, becoming a roaring river with the rainwater in the catchment area, but turning quickly into a formidable stream. The river being wide and shallow leaves disconnected pools of water during summer (lean period).

2.3.2 Geomorphology

Bhojpur district is mainly covered with alluvium (Plate IV) and hard rocks of Vindhyan Supergroup are situated at the southwestern side beyond the district boundary. The north and northeast parts of the district are covered with Newer Alluvium and younger flood plains (diaraformations) while the central and southern parts are covered with Older Alluvium and older flood plains. The entire area of the district has a general slope towards the north and northeast. The general elevation with respect to mean sea level is 50-90 m. The gradient is 0.6 m/km approximately from south to north.

The north and northeast area of the district is pitted with oxbow lakes, meander scars with point bars left over by old Ganga channels. The local small rivers follow little yazoo pattern before entering the meander belt of river Ganga and flow few kilometers parallel to the southern levee of river Ganga.

Source: http://cgwb.gov.in/district_profile/bihar/bhojpur.pdf

CHAPTER-II   **PROJECT DESCRIPTION**

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–
Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

2.3.3 REGIONAL GEOLOGY

Regionally the area constitutes a part of the Ganga River Basin. The part of Bihar is predominantly characterized by sedimentary lithology in the Sub-Himalayan zone comprising Subathus, Dagshais, Kasaulis and Siwaliks. A general Regional stratigraphic sequence in the area is given below :

Showing the Geological Succession and their geographic distribution

Table 2.2 Showing the Geological Succession and their Occurrences distribution

Age	Geology	Occurrences
Quaternary	Alluvial Deposits (Sand, Clay, Silt, Fragments)	North Bihar Plain & Central Bihar Plain
Tertiary	Sand Stones & Clay Stones	North Champaran Hills
Gondwana	Coal Measures, Forming a series of Small outlier basins	Banka District
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

Source: Mining Plan

2.3.4 LOCAL GEOLOGY OF THE AREA

The sand exposed in the River bed of Son and surrounding areas is the product of the deposition of the sediments brought and deposited in the flood plains of River Ganga. These sediments are of recent geological formation. The litho-units exposed within the river and surrounding areas have formed as water borne sediments brought by flood water during rainy season every year and deposited in riverbed.

CHAPTER-II   PROJECT DESCRIPTION

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

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.

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

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

Source: Mining Plan

2.3.5 CLIMATE

Warm and humid climate prevails in the district. The temperature touches 39^0C on an average during the months of April and May, and that of the minimum 6.3^0C during the month of January.. The monsoon starts mostly from the mid of June and continues up to the end of the September. From seventy years (1901- 1970) annual rainfall data it has been observed that the normal rainfall of the district is at 1080 mm/yr. The annual rainfall of the district varies within 1025.2 to 1106.2 mm. About 85.46 % of the total annual rainfall is received during monsoon period and the rest (only 14.54 % approximately) comes in the months of November to May of non monsoon period.
Source: https://cgwb.gov.in/District_Profile/Bihar/Bhojpur.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.

CHAPTER-II   **PROJECT DESCRIPTION**

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

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

Table-2.3:- Proved Mineral Reserves

Classification	Code	Quantity of Sand
A) Mineral Reserves		Cum
1) Proved Mineral Reserve	111	2880000
Total		**2880000**

Source: Mining Plan

2.4.1 Mineable Reserves:

Mineable reserves have been computed up to 3m depth from surface. Benches having height 1.5m & width 6.0m drawn from the ultimate pit limit. Area of each benches have been calculated multiplied by strike influence to get the volume. The volume multiplied by bulk density (1.7 g/cm3) to get the tonnage.

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

.**Table-2.4:- Minable Reserves**

Bench Level (mRL)	Length (m)	Width (m)	Depth (m)	Volume (cum)	Tonnes
73-71.5	1915	485	1.5	1393163	2368377
71.5-70	1905	475	1.5	1357313	2307432
Total				2750475	4675808

Total Mineable Reserve = 2750475 CUM or 4675808 Tonnes

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.
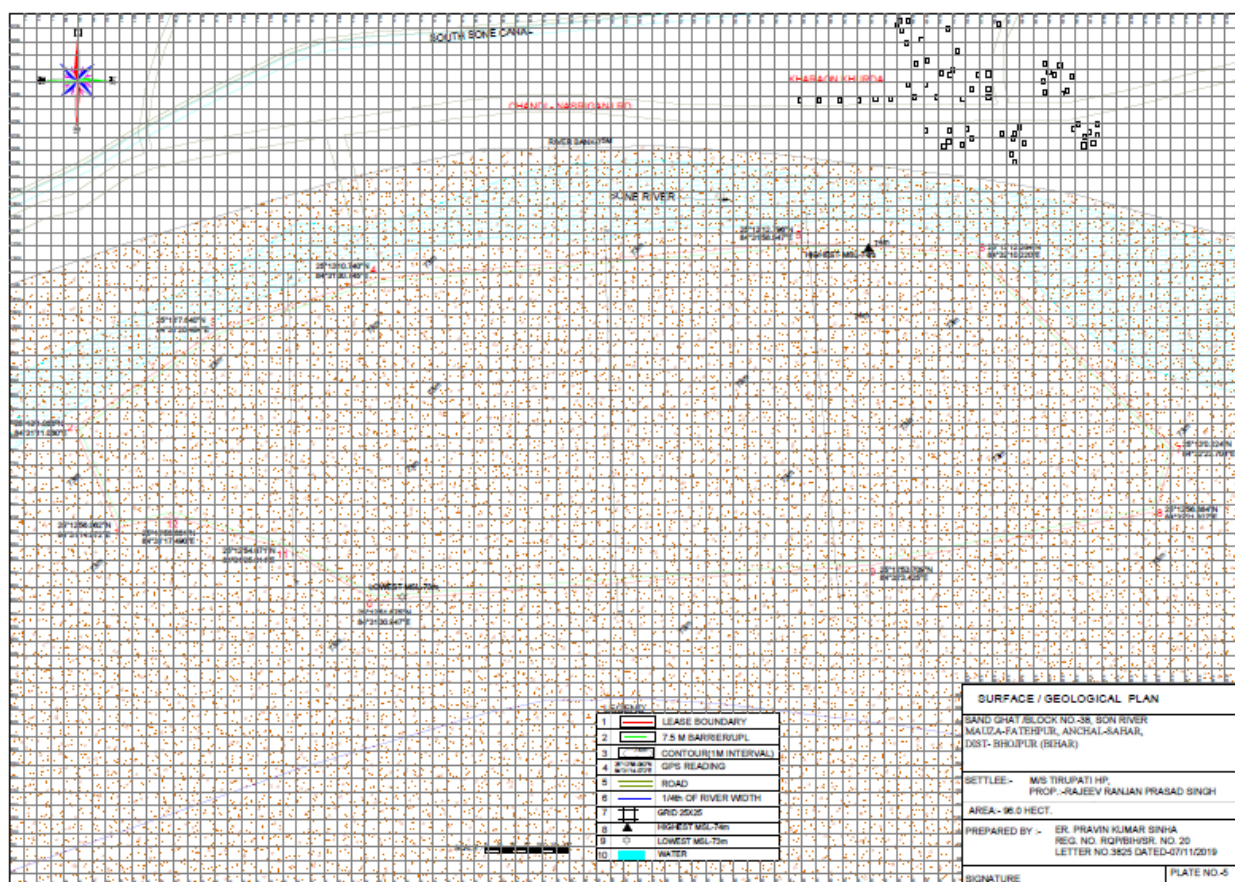
FIGURE 2.3:- SURFACE CUM GEOLOGICAL PLAN OF PROJECT

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 3 m bgl or above ground water level (whichever is less), for river bed block.

No drilling /blasting are required as the material is loose in nature.

Proper benching of 1.5 m height and 6m width will be maintained for mining blocks as per guideline M.M.R-2019, under rule 115(1).

Mining will be done only during the day time and completely stopped during the monsoon season.

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Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–
Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

2.4.3 Year Wise Production Schedule:

The bench wise annual exploitation of sand from Bhoj Son 38 is given below:-

Table 2.5 Year wise Production Detail

YEAR	ROM sand (cum)	Saleable Sand (cum)	ROM sand (tons)
1st Year	1728000	1728000	2937600
2nd Year	1728000	1728000	2937600
3rd Year	1728000	1728000	2937600
4th Year	1728000	1728000	2937600
5th Year	1728000	1728000	2937600

The annual extractable RBM comes to **1728000 CUM or 2937600 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 Bhoj Son 38 Sand Ghat. However, as the digging depth will be restricted to 3.0 m only. This will be further replenished during rainy season. Sand Ghat will be worked systematically as the width is limited while length is much more. As the lease period is only 5 (Five) years, some of the area will be left un-worked at the end of lease period.

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

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

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Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

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

2.6 Anticipated life of mine

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

2.6.1 Waste –disposal arrangement

No top soil is present in the mining area as it is riverbed. Small amount of domestic waste will be generated by the workers at the site, which will be disposed off through proper municipal way. No other waste generation is expected. No waste will be thrown into the streams or left on the banks. Separate bins will be kept within the lease area for domestic wastes.

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 lies on the dry bed of Son River so there will be no impact on surface water.

CHAPTER-II　　　　　　　　　　**PROJECT DESCRIPTION**

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–
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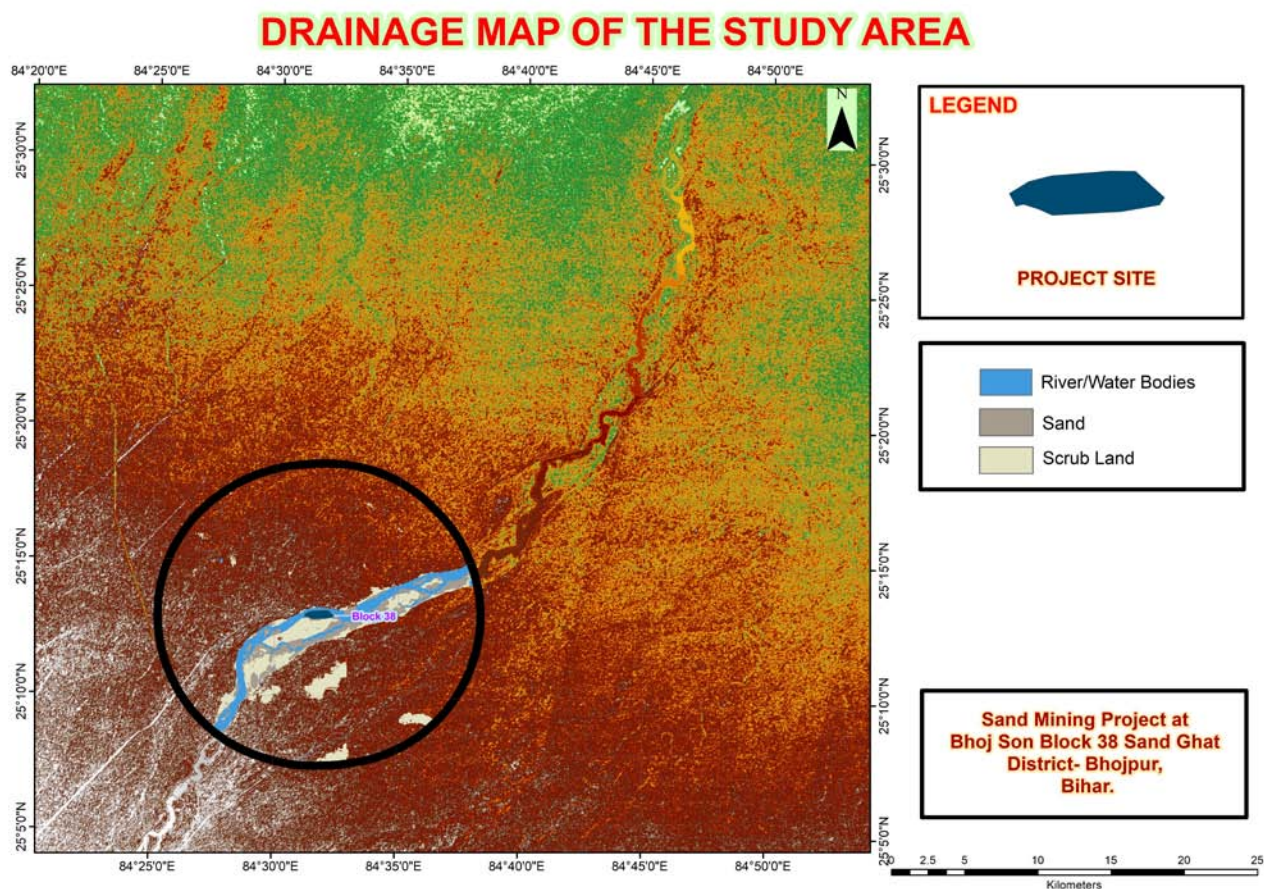
FIG-2.4, DRAINAGE MAP

2.7.3 Man power requirement

The manpower requirement for the proposed project will be around 104 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

S. No.	Category	Numbers
1.	Administration	2
2.	Supervisor	4
3.	Skilled	18
4.	Un-skilled	80
TOTAL		**104**

CHAPTER-II   **PROJECT DESCRIPTION**

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

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:

Activity	Calculation	Round off Figure in KLD
Drinking	@ 10 lpcd per labor 10*104/1000= 1.04 KLD	1.04
Dust Suppression	**Total approach road to be water sprinkled** = 270 m 270 m*6m*0.5 *2 times/1000= 1.62 KLD	1.62
Plantation	960 plant (during plan period) @ 5 L/per plant= 960*5lts= 4800/1000= 4.8 KLD	4.80
Total		**7.46 ~ 7.50**

```
                    ┌─────────────────────────┐
                    │   Daily Water Demand    │
                    │     7.46 ~ 7.50 KLD     │
                    └─────────────────────────┘
           ┌───────────────────┼───────────────────┐
           ▼                   ▼                   ▼
  ┌──────────────────┐ ┌──────────────────┐ ┌──────────────────┐
  │ Domestic Purpose │ │ Dust Suppression │ │   Green belt     │
  │    1.04 KLD      │ │    1.62 KLD      │ │  development     │
  │                  │ │                  │ │    4.80 KLD      │
  └──────────────────┘ └──────────────────┘ └──────────────────┘
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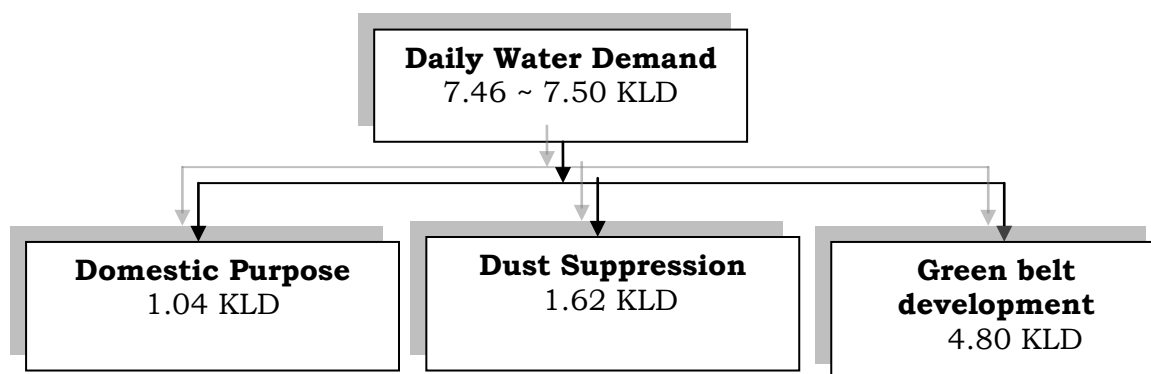
FIGURE 2.5: WATER REQUIREMENT

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:

CHAPTER-II   **PROJECT DESCRIPTION**

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

- 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.

Table 2.7, List of Equipment to be used

S. No.	Name of machinery	Capacity	Fuel Consumption	No. of Machinery
1	JCB	1.00 m^3	10 Ltr/hr	3
2	Excavator	2.0 m^3	16 Ltr/hr	11
3	Trucks	12 tonnes	4 Ltr/hr	750
4	Tractors	04 Tonnes	2 Ltr/hr	688
5	Water Tanker	4000 liter	4 Ltr/hr	2
6	Light vehicles	As per requirement	4 Ltr/hr	1

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.

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Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

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.

****

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

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 March to May 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.

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- ✓ 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 (March to May 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.**

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

Table 3.1: Land Use Cover of the Project Study Area

Landuse Type	Area (Ha.)
Scrub Land	2285.62
Forest	425.06
River/Water Bodies	1504.22
Settlement	3806.11
Vegetation	77.39
Sand	577.39
Agriculture	26769.01
Total	**35444.80**
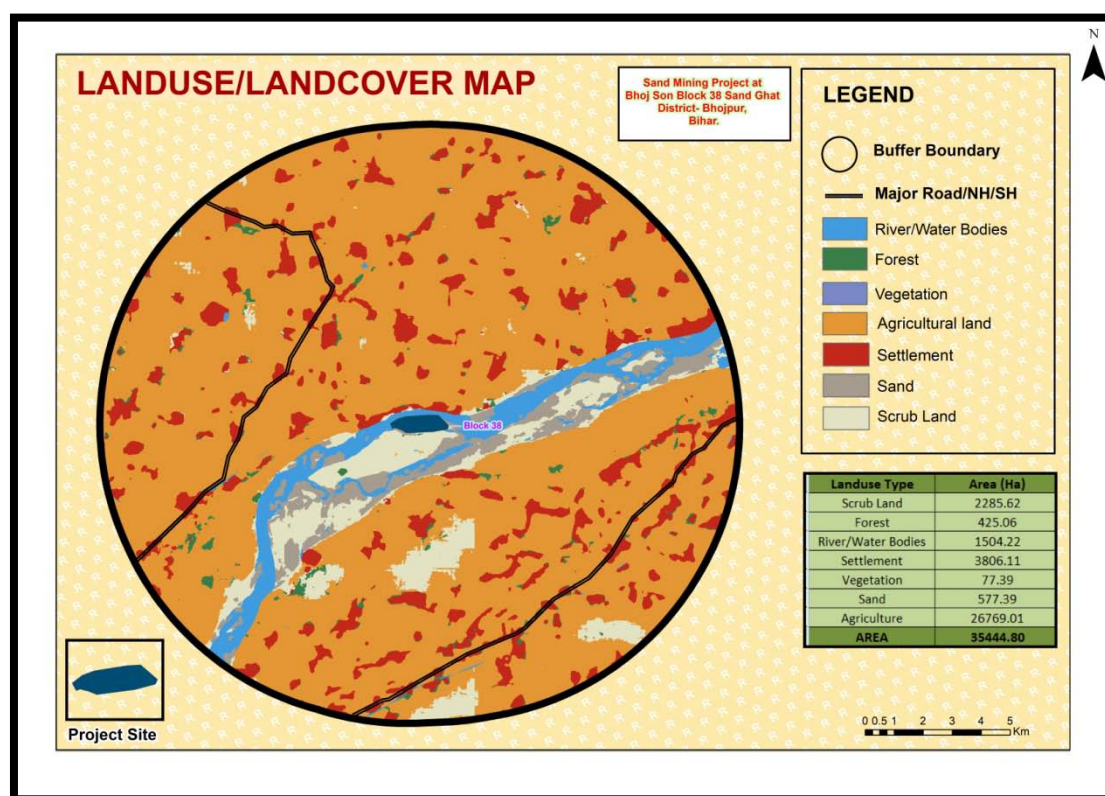
FIGURE 3.1: LAND USE COVER OF THE PROJECT STUDY AREA

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.

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

Table 3.2: Water Sampling Locations

Water (Ground) Monitoring Locations		
GW 1	Near Project Site Fatehpur Village	0.60 km, ENE
GW 2	Bahadurpur	5.70 km, ESE
GW 3	Andhary	1.53 km, WNW

Figure 3.2 Water Sampling Location Map

Chapter-III   **BASELINE DATA DESCRIPTION**

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–
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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	7.38	7.42	7.61
6	Total Hardness (as CaCO3)	mg/l	300	600	308	232	340
7	Iron (as Fe)	mg/l	0.3	1	0.11	0.09	0.07
8	Chlorides (as Cl)	mg/l	250	1000	106	92	114
9	Fluoride (as F)	mg/l	1	1.5	0.5	0.5	0.7
10	TDS	mg/l	500	2000	426	438	505
11	Calcium(as Ca2+)	mg/l	75	200	66	52	72
12	Magnesium (as Mg2+)	mg/l	30	100	34	24	38
13	Copper (as Cu	mg/l	0.05	1.5	<0.01	<0.01	<0.01
14	Manganese(as Mn)	mg/l	0.1	0.3	0.02	0.03	0.04
15	Sulphate (as SO4)	mg/l	200	400	20	32	26
16	Nitrate(as NO3)	mg/l	45	No Relaxation	6	5	6
17	Phenolic Compounds (as C6H5OH)	mg/l	0.001	0.002	<0.001	<0.001	<0.001
18	Mercury (as	mg/l	0.001	No	<0.001	<0.001	<0.001

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BASELINE DATA DESCRIPTION

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

	Hg)			Relaxation			
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	0.02	0.02
24	Zinc (as Zn)	mg/l	5	15	0.06	0.04	0.05
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	168	185	218
29	Aluminium (as Al)	mg/l	0.03	0.2	0.04	0.03	0.03
30	Boron (as B)	mg/l	1	5	0.2	0.2	0.4
	Microbiological Parameter						
31	Total Coliform	MPN /100ml	10 , Max	-	<2	<2	4
32	*E. coli*	E.coli /100ml	Absent	-	Absent	Absent	Absent

Observation:

Analysis of results of ground water reveals the following: -

- pH varies from **7.38 to 7.61**.

- Total hardness varies from **232 mg/l to 340 mg/l** .

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Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–
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- Total dissolved solids vary from **426 mg/l to 505 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		
SW 1	Upstream (River Son)	500 Meters
SW 2	Project site	----
SW 3	Downstream (River Son)	500 Meters

Table 3.5: Physio-chemical properties of surface water

S. No.	Parameter	Unit	S.W. 1	S.W.2	S.W. 3
			Upstream	Site	Downstream
1	pH	-	8.22	8.21	8.32
2	Dissolved oxygen	mg/l	7.8	7.7	7.8
3	BOD (3 Days at 27°C)	mg/l	2	2	1
4	Free Ammonia (as N)	mg/l	<0.1	<0.1	<0.1
5	Sodium Adsorption Ratio	-	1.14	0.76	0.68
6	Boron	mg/l	0.1	0.2	0.1
7	Conductivity	µmhos/cm	615	641	634
8	Turbidity	NTU	3	2	2
9	Magnesium Hardness (as $CaCO_3$)	mg/l	83	100	94
10	Total Alkalinity (as $CaCO_3$)	mg/l	164	192	172

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11	Chloride (as Cl)	mg/l	82	70	76
12	Sulphate (as SO_4)	mg/l	14	18	16
13	Nitrate (as NO_3)	mg/l	2.1	2.8	3.3
14	Fluoride (as F)	mg/l	0.5	0.6	0.5
15	Sodium (as Na)	mg/l	36	26	24
16	Potassium (as K)	mg/l	5.2	4.8	5.5
17	Total Nitrogen (as N)	mg/l	2.4	3.1	3.4
18	Total Phosphorous (as PO_4)	mg/l	0.34	0.29	0.22
19	COD	mg/l	6	8	5
20	Phenolic compounds (as C_6H_5OH)	mg/l	<0.001	<0.001	<0.001
21	Iron (as Fe)	mg/l	0.1	0.12	0.16
22	Zinc (as Zn)	mg/l	0.04	0.03	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	346	384	366
26	Total Coliform	MPN/100ml	1110	1170	1180
27	Faecal Coliform	MPN/100ml	150	170	180

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:

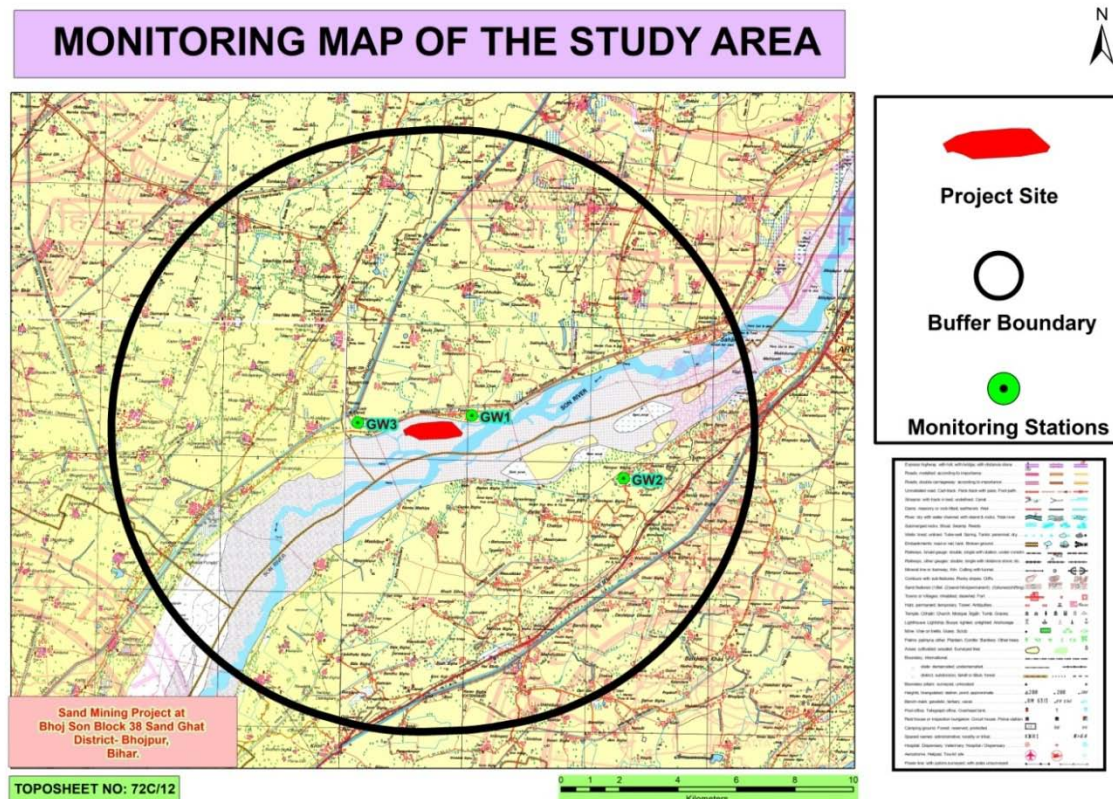**Chapter-III**   **BASELINE DATA DESCRIPTION**

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–
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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.

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

3.2.2 Result & Conclusion:

Surface water Observation:

- The analysis results indicate that the pH ranges between **8.21 and 8.32.**

- Dissolved Oxygen (DO) was observed in the range of **7.7 to 7.8 mg/l** against the minimum requirement of 4 mg/l.

- BOD values were observed to be in the range of **1.0 to 2.0 mg/l.**

- Total Coliform examination of surface water samples revealed the presence of total coliform in range of 1100 MPN/100 ml to 1900 MPN/100 ml .

  Based on the results it is evident that most of the parameters of the samples comply with 'Category 'B' standards of CPCB 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 pre-monsoon 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 pre-monsoon Season

Month	Temperature °C			Wind Speed (Km/Hr)	
	Min	Max	Avg.	Avg.	Max
March 2023	14	29	20	9.7	16.8
April 2023	17	33	24	10.7	17.1

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| May 2023 | 18 | 32 | 24 | 9.4 | 15.6 |
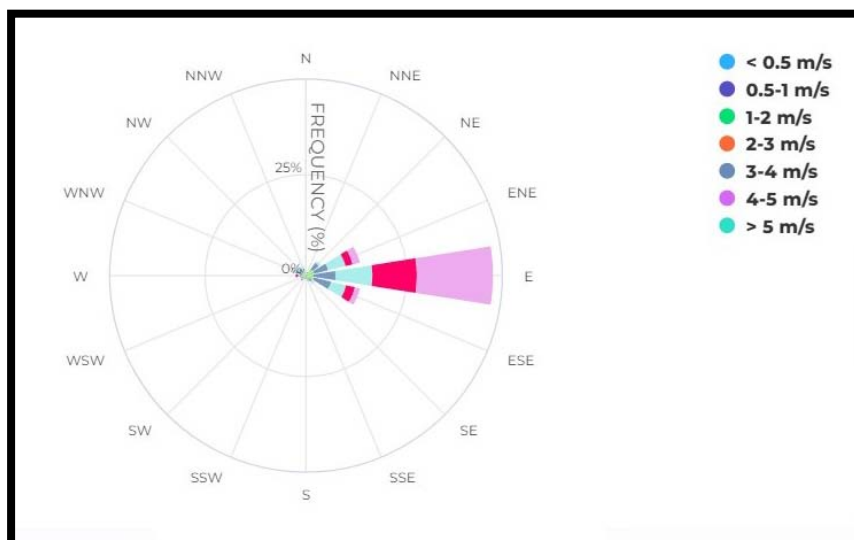
Figure 3.3: Wind Rose Diagram (at site)

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 70 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.

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:

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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 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.

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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 05 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	Near Project Site Fatehpur Village	0.60 km, ENE
AAQ 2	Bahadurpur	5.70 km, ESE
AAQ 3	Khushdehira	4.89 km, SE
AAQ 4	Andhary	1.53 km, WNW

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AAQ 5	Mahabirganj	4.80 km, NW
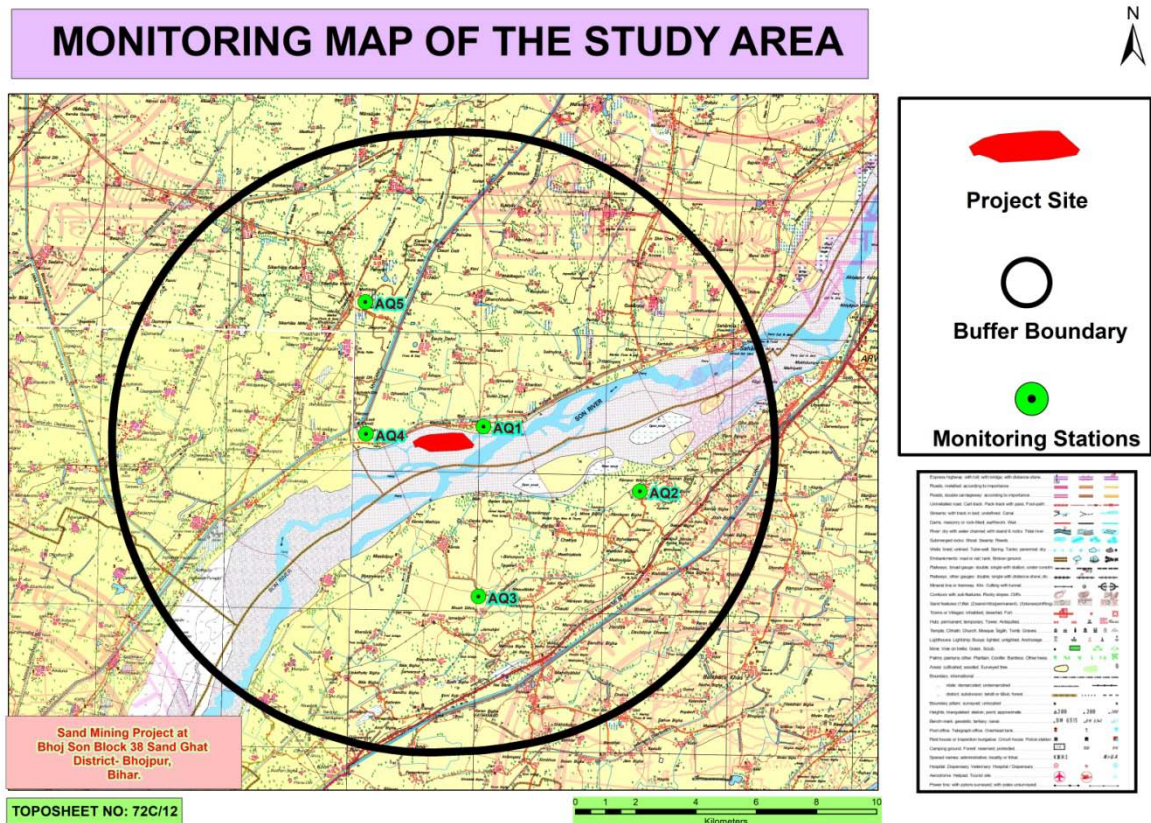
Figure 3.4 Ambient Air Quality Monitoring Stations

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

Location Code	PM2.5 ($\mu g/m^3$)				
	Name of the station	Min	Max	Average	98th Percentile
AAQ1	Near Project Site Fatehpur Village	37.1	49.6	42.5	48.4
AAQ2	Bahadurpur	38.3	50.8	43.7	49.6
AAQ3	Khushdehira	37.6	49.6	43.0	48.6
AAQ4	Andhary	38.8	51.3	44.2	50.1
AAQ5	Mahabirganj	38.1	50.6	43.5	49.4

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

Location Code	PM10 (µg/m³)				
	Name of the station	Min	Max	Average	98th Percentile
AAQ1	Near Project Site Fatehpur Village	68.4	89.3	79.1	88.4
AAQ2	Bahadurpur	70.4	91.7	81.3	90.7
AAQ3	Khushdehira	69.2	90.3	80.0	89.4
AAQ4	Andhary	71.2	92.6	82.3	91.7
AAQ5	Mahabirganj	70.0	92.0	81.0	90.7

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

Location Code	SO_2 (µg/m³)				
	Name of the station	Min	Max	Average	98th Percentile
AAQ1	Near Project Site Fatehpur Village	4.0	7.2	5.5	7.1
AAQ2	Bahadurpur	4.2	7.7	5.9	7.5
AAQ3	Khushdehira	4.1	7.5	5.6	7.3
AAQ4	Andhary	5.1	7.9	6.4	7.7
AAQ5	Mahabirganj	4.3	7.9	6.0	7.7

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

Location Code	NO_2 (µg/m³)				
	Name of the station	Min	Max	Average	98th Percentile
AAQ1	Near Project Site	7.5	14.8	9.5	13.8

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	Fatehpur Village				
AAQ2	Bahadurpur	6.7	16.3	10.8	15.7
AAQ3	Khushdehira	5.9	15.3	9.6	14.4
AAQ4	Andhary	7.6	17.0	11.8	16.0
AAQ5	Mahabirganj	6.3	15.0	10.6	14.7

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 37.1 µg/m^3 to 51.3 µg/m^3. The 24 hourly average values of PM2.5 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 68.4 µg/m^3 to 92.6 µg/m^3. The 24 hourly average values of PM10 were compared with the National Ambient Air Quality Standards (NAAQS) and found that all sampling stations

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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 4.0 µg/m^3 to 7.9 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 5.9 µg/m^3 to 17.0 µg/m^3.

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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	Near Project Site Fatehpur Village	1.14	1.49
AAQ2	Bahadurpur	1.46	1.72
AAQ3	Khushdehira	1.30	1.51
AAQ4	Andhary	1.41	1.69
AAQ5	Mahabirganj	1.33	1.52

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 03 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	Near Project Site Fatehpur Village	0.60 km, ENE
SQ 2	Bahadurpur	5.70 km, ESE
SQ 3	Andhary	1.53 km, WNW

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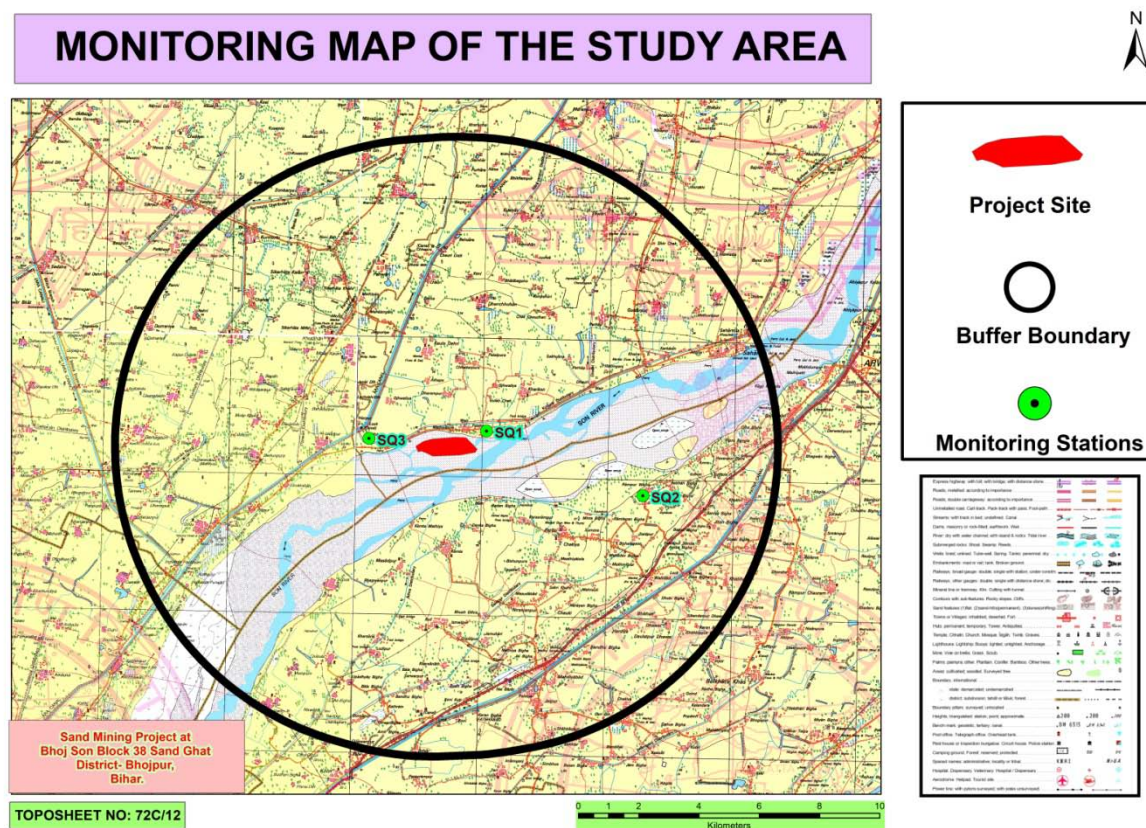
Figure 3.5, Soil Sampling Locations

Table 3.14 :Physico-chemical properties of soil

S.No	Parameter	Unit	SQ-1	SQ-2	SQ-3
1	Texture	-	Sand	Loamy Sand	Loamy Sand
	Silt	%	1.30	2.68	7.24
	clay	%	6.73	7.48	8.64
	Sand	%	90.54	88.64	85.32
2	pH	-	7.80	8.09	8.18
3	Electrical Conductivity	µmhos/cm	1214	1207	1348
4	Cation exchange capacity	meq/100 gm	10.78	11.78	12.55
5	Potassium	mg/kg	69.15	74.62	77.52
6	Sodium	mg/kg	90.17	113.42	110.59
7	Calcium	mg/kg	1952.46	2163.72	2278.15
8	Magnesium	mg/kg	104.48	114.53	125.28
9	Sodium Absorption	-	0.50	0.61	0.55

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	Ratio				
10	Water Holding Capacity	%	16.24	17.2	15.95
11	Porosity	%	47.31	44.57	43.82

Observations:

Samples collected from identified locations indicate the soil is sandy type and the pH value ranging from 7.80 to 8.18, 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.**
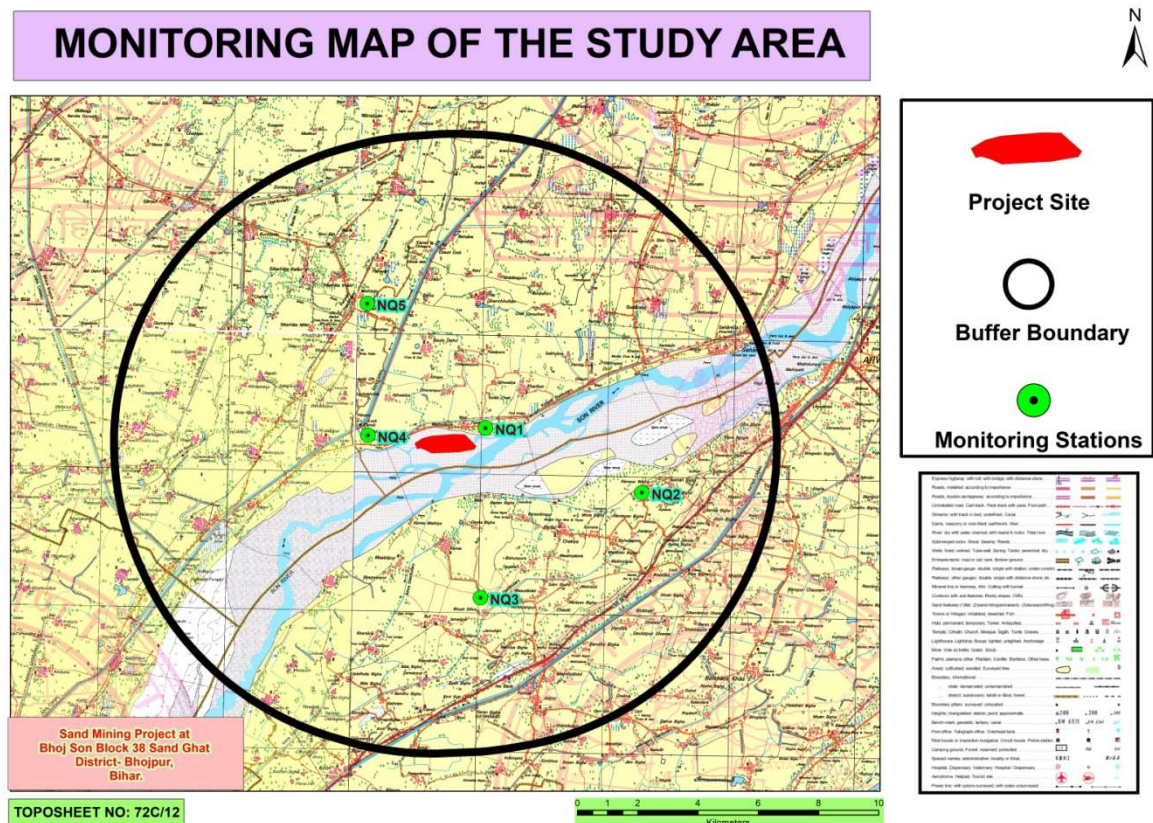
Figure 3.6 Noise Monitoring Stations

Table 3.15: Noise Quality Monitoring Stations

Noise Monitoring Locations		
NQ 1	Near Project Site Fatehpur Village	0.60 km, ENE
NQ 2	Bahadurpur	5.70 km, ESE
NQ 3	Khushdehira	4.89 km, SE
NQ 4	Andhary	1.53 km, WNW
NQ 5	Mahabirganj	4.80 km, NW

Table 3.16: Noise Monitoring Results

S.No.	PROJECT SITE	ZONE	Leq LIMIT (as per CPCB Guidelines), in dB(A)		Leq Value monitored, in dB(A)	
			DAY*	NIGHT*	DAY*	NIGHT*
1	NQ-1	Industrial Zone (Project Site)	75	70	54.7	44.1
2	NQ-2	Residential Zone	55	45	53.8	43.1
3	NQ-3	Residential Zone	55	45	51.8	42.7
4	NQ-4	Silence zone	50	40	48.3	38.5
5	NQ-5	Residential Zone	55	45	52.1	41.8

Results

Noise monitoring reveals that the minimum & maximum noise levels at day time were recorded as **48.3 dB(A) to 54.7 dB(A)** respectively. The minimum & maximum noise levels at night time were found to be **38.5dB (A) & 44.1dB (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.

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3.6   BIOLOGICAL ENVIRONMENT

3.6.1.1 Introduction

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

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

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

The main objective of the ecological survey is aimed to find out the baseline status of flora and fauna (terrestrial and aquatic ecosystem) of the study area before the start of Sand Mining Project, On Son River At Bhoj Son 38 Sand Ghat.

3.6.2 Description of the study area

The Proposed Sand Mining Project is located on Son River at Mauja– Fatehpur, Anchal-Sahar, District- Bhojpur, 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

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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 pre-monsoon period (March to May 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 Son , and available published literature.

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### 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 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.

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3.6.7 Sampling Sites

A total of 05 sampling site 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 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 Bhojpur District. The common species grown near the villages are mostly edible, fruits bearing or useful plants. Purposely planted tree patches (mostly fruit-bearing) are available nearby several villages in the study area. The most dominant tree species in the study area are *Aegle marmelos* (Bel), *Azadirachta indica* (Neem), *Emblica officinalis* (Amla), *Dalbergia sissoo* (Sisam), *Ficus bengalensis* (Bargad), *Musa paradisiacal* (Kela), *Syzygiumcumini* (Jamun), *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 09 selected sites of the core (Bhojpur district)and the details are given in table 4. 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

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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, Bhojpur		

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

Aquatic floral details of the core zone were collected from 08 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 thethe 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 08 selected sampling sites of the study area. A total of 69 phytoplankton species were recorded from the different water bodies of the study area, out of which 27 species were of class Chlorophyceae, 17 species of

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Cyanophyceae, 19 species of Bacillariophyceae, and 6 species of Euglenophyceae. 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	*Arthrodesmus* sp.	+		+	+		+		+	NA	NA
2	*Ankistrodesmus falcatus*		+	+			+	+	+	NA	NA
3	*Chlorococcum* sp.	+	+	+			+		+	NA	NA
4	*Closteriopsis* sp.	+	+		+	+		+		NA	NA
5	*Cosmarium formii*	+	+	+	+	+	+		+	NA	NA
6	*Cosmarium margaritatum*	+		+	+		+	+		NA	NA
7	*Crucigenia* sp.	+	+	+	+		+			NA	NA
8	*Chlorella vulgaris*	+		+	+	+			+	NA	NA
9	*Oocystis crassa*	+	+			+	+	+	+	NA	NA
10	*Pediastrum simplex*			+	+	+				NA	NA
11	*Scenedesmus armatus*	+	+	+		+	+	+	+	NA	NA
12	*Scenedesmus bijugatus*	+		+	+	+	+		+	NA	NA
13	*Spirogyra* sp.	+	+	+		+	+	+		NA	NA
14	*Tetraedron trigonum*				+		+		+	NA	NA
15	*Tetrastrum* sp.	+	+	+		+	+		+	NA	NA
16	*Ulothrix* sp.	+	+	+	+	+	+	+		NA	NA
17	*Ulothrix zonata*	+		+		+	+		+	NA	NA
18	*Volvox* sp.	+	+	+		+	+			NA	NA
	Total	19	15	23	16	17	24	12	17		
	Cyanophyceae									NA	NA
1	*Anabaena* sp.		+	+	+	+	+		+	NA	NA

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2	*Anabaena circinalis*	+	+	+	+	+	+	+		NA	NA
3	*Aphanocapsa* sp.	+		+	+	+	+	+	+	NA	NA
4	*Aphanothece* sp.	+	+		+	+			+	NA	NA
5	*Chroococcus* sp.	+		+	+	+	+	+		NA	NA
6	*Gloeocapsa* sp.	+	+	+			+		+	NA	NA
7	*Lyngbya* sp.	+	+		+	+	+	+	+	NA	NA
8	*Merismopedia* sp.	+	+	+		+	+	+	+	NA	NA
9	*Merismopedia tenuissima*	+		+	+	+	+			NA	NA
10	*Microcystis* sp.		+		+			+	+	NA	NA
11	*Microcystis aeruginosa*	+		+			+			NA	NA
12	*Nostoc* sp.		+		+	+	+	+	+	NA	NA
	Total	**12**	**11**	**11**	**12**	**13**	**15**	**9**	**12**		
	Bacillariophyceae									NA	NA
1	*Amphora ovalis*	+				+	+		+	NA	NA
2	*Amphora* sp.	+	+	+	+	+		+		NA	NA
3	*Cyclotella* sp.			+		+	+	+	+	NA	NA
4	*Cymbella affinis*	+		+	+		+		+	NA	NA
5	*Eunotia major*	+	+		+	+		+		NA	NA
6	*Fragillaria pinnata*		+	+		+	+		+	NA	NA
7	*Gomphonema* sp.	+			+		+	+	+	NA	NA
8	*Gomphonema lanceolatum*	+	+	+	+	+			+	NA	NA
9	*Melosira* sp.	+	+	+	+	+	+			NA	NA
10	*Navicula similis*	+	+	+	+		+	+	+	NA	NA
11	*Navicula subrhyncocephala*	+	+		+		+		+	NA	NA
12	*Nitzschia palea*	+	+		+	+	+			NA	NA
13	*Pinnularia sp.*	+	+	+				+	+	NA	NA
14	*Synedra acus*	+				+	+		+	NA	NA
15	*Synedra ulna*		+		+	+	+	+	+	NA	NA
	Total	**16**	**12**	**9**	**13**	**11**	**15**	**10**	**13**		
	Euglenophyceae									NA	NA
1	*Euglena acus*	+	+	+	+	+	+	+	+	NA	NA
2	*Euglena* sp.	+			+	+	+		+	NA	NA

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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
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		+	+	+	+	+		+

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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,a total of 77 species of plant species were observed from the study area. Out of 77 plant species,42 species of tree, 18 species of shrubs/herbs, 6 species of climbers, and 10 species of Grass species were recorded from the buffer zone of the present study area. The below-mentioned vegetation details have been collected from the Core as well as Buffer zone of the present study area. All the details have been furnished based on the field survey at different locations and data supported by the Department of Forest, Bhojpur 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	*Acacia leucophloea*	Safed babul	Mimosaceae
4	*Aegle marmelos*	Bel	Rutaceae
5	*Ailanthus excels*	Adusa	Simaroubaceae
6.	*Albizzia amara*	Siris	Mimosoideae

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7	*Albizzia lebbeck*	Sirish	Mimosaceae
8	*Alstonia scholaris*	Saptaparni	Apocynaceae
9	*Anogeissus latifolia*	Dhaura,	Combretaceae
10	*Anthocephalus cadamba*	Kadamb	Rubiaceae
11	*Artocorpus heterophyllus*	Jack fruit	Moraceae
12	*Azadirachta indica*	Neem	Meliaceae
13	*Bauhinia racemosa*	Apta	Leguminosae
14	*Bauhinia variegata L.*	Kachnar	Leguminosae
15	*Bombax ceiba*	Semal	Malvaceae
16	*Bombax malabaricum*	Semal tree	Malvaceae
17	*Borassus flabellifer*	Nariyal	Palmae
18	*Butea monosperma*	Palas	Leguminosae
19	*Dalbergia latifolia*	Shisam	Leguminosae
20	*Dalbergia sissoo*	Shisam	Leguminosae
21	*Delonix regia*	Gulmohar	Fabaceae
22	*Dendrocalamus strictus*	Bamboo	Poaceae
23	*Diospyros melanoxylon*	Tendu	Ebenaceae
24	*Ficus benghalensis*	Bargad	Moraceae
25	*Ficus religiosa*	Pipal	Moraceae
26	*Madhuca longifolia*	Mohua tree	Sapotaceae
27	*Magnifera indica*	Aam	Anacardiaceae
28	*Melia azedarach*	Bukkam Neem	Meliaceae
29	*Moringa olerifera*	Munga	Moringanaceae
30	*Nerium oleamder*	Kaner	Apocynaceae
31	*Phoenix sylvestris*	Date palm	Arecaceae
32	*Phyllanthus emblica*	Awla	Euphorbiaceae
33	*Pisidium guava*	Guava	Myrtaceae
34	*Pongamia pinnata*	Karanj	Leguminosae
35	*Prosopis juliflora*	Vilayati babool	Fabaceae
36	*Sarracca indica*	Ashok	Annonaceae
37	*Shorea robusta*	Sal	Depterocarpaceae
38	*Syzygium cumini*	Jamun	Myrtaceae

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39	*Tectona grandis*	Sagwan	Verbenaceae
40	*Terminalia arjuna*	Arjun	Combretaceae
41	*Terminalia chebula*	Harhar	Combretaceae
42	*Zizyphus jujube*	Ber	Rhamnaceae
Shrub & Herbs			
43	*Acanthospermum hispidum*	Kanti	Asteraceae
44	*Acheranthus aspera*	Aghada	Amaranthaceae
45	*Argemone mexicana*	Pila dhtura	Papaveraceae
46	*Baugainvellia glabra*	Paper flower	Nyctaginaceae
47	*Calotropis procera*	Aakra	Asclepiadaceae
48	*Cassia auriculata*	Tarwar	Fabaceae
49	*Cassia tora*	Tarota /Takla	Caesalpiniaceae
50	*Chenopodium album*	manure weed	Amaranthaceae
51	*Dalura metel*	Dhotra	Solanaceae
52	*Ipomoea carnea*	Besharam	Convolvulaceae
53	*Jatropha gossipifolia*	cotton-leaf	Euphorbiaceae
54	*Lantana camara*	Ghaneri	Verbenaceae
55	*Mimosa pudica*	Chui Mui	Mimosaceae
56	*Ocimum sanctum*	Tulsi	Labiatae
57	*Parthenium hysterophorus*	Gajar grass	Asteraceae
58	*Ricinus communis*	Arand	Euphorbiaceae
59	*Ricinus communis*	castor oil plant	Euphorbiaceae
60	*Tridax procumbens*	Kambarmodi	Asteraceae
Grasses			
61	*Apluda mutica*	Mauntian grass	Poaceae
62	*Commelina benghalensis*	Bokna	Commelinaceae
63	*Cynodon dactylon*	Doob	Poaceae
64	*Cyperus rotundus*	Motha	cyperaceae
65	*DactylSeptemberenum aegyptium*	Crow foot grass	Poaceae
66	*Pennisetum purpureum*	Elephant grass	Poaceae
Climbers			
67	*Antigonon leptopus*	Anantalata	Polygonaceae

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68	*Bougainvillea glabra*	Booganbel	Nyctaginaceae
69	*Celastrus paniculata*	Kujari	Celastraceae
70	*Cissampelos pareira*	Khariya lata	Menispermaceae
71	*Clitoria ternatea*	Blue pea	Fabaceae
72	*Coccinia grandis*	Jungli Kundru	Cucurbitaceae
73	*Combretum indicum*	Madhu Malati	Combretaceae
74	*Cuscuta reflexa*	Amarbel	Convolvulaceae
75	*Cuscuta reflexa*	Amar bel	Convolvulaceae
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, Bhojpur district of Bihar**.**

3.6.10.2 Agricultural vegetation/ Commercial vegetation of the Buffer zone.

The variety of Crops and cropping patternsin 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)and the details are given in Table 3.16.

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

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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; Buffalo (*BuSands bubalis*); Ass (*Equus hemionus*) , Cow (*Bos primigenius)*; Goat (*Capra aegagrus*) Horse (*Equus caballus*); 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.	Jungle cat	*Fellis chaus*	Felidae	II	LC
2.	Five striped palm squirrel	*Funambulus pennanti*	Sciuridae	IV	LC
3.	Indian Fulvous Fruit-Bat	*Rousettus leschenaultia*	Pteropodidae	V	LC
4.	Indian Field Mouse	*Mus booduga*	Muridae	V	LC
5.	Common House Rat	*Rattus rattus*	Muridae	V	LC
6.	Bandicoot Rat	*Bandicotabengalensis*	Muridae	V	LC
7.	Indian Grey Mongoose	*Herpestesedwardsi edwardsi*	Herpestidae	II	LC
Reptiles & Amphibians					

8.	Garden lizard	*Calotes versicolor*	Agamidae	IV	NE
9	King cobra	Ophiophagus hannah	Elapidae	II	LC
10	Cobra	Naja naja	Elapidae	II	LC
11.	Pit viper	Crotolus sp	Viperadae	II	LC
12	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	Amandava amandava	Red munia	Estrildidae	IV	LC
4	*Ardea cinerea*	Grey heron	Ardeidae	IV	LC
6	Bubulcus ibis	Cattle egret	Ardeidae	IV	LC
7	*Columba livia*	Pigeon	Columbidae	IV	LC
5	*Corvus macrorhynchos*	Jungle crow	Corvidae	IV	LC
6	*Corvus splendens*	Crow	Corvidae	V	LC
7	*Gallinule chloropus*	Common moorhen	Rallidae	IV	LC
8	*Milvus migrans*	Black Kite	Accipitridae	IV	LC
9	*Passer domesticus*	House sparrow	Passeridae	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
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, Bhojpur 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

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

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

All the aquatic fauna recorded from the core zone were also recorded from the buffer zone and most of the sampling sites are the same for the core and buffer zone as given in table 3.16. So, the list of aquatic fauna of the core zone is merged with the details of the buffer zone and is given in Table 3.24 to 3.26.

3.6.12.4 Fauna of Buffer zon

To prepare a detailed report on the status of faunal biodiversity of the present study area (1 km buffer) of Bhojpur 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

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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 3.26**.**

i. Mammals and Reptiles/ Amphibians

The domesticated animals like Goat (*Capra aegagrus*); Buffalo (*BuSands 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	*Rattus rattus*	Common House Rat	Muridae	V	LC
13	*Rousettus leschenaultia*	Indian Fulvous	Muridae	V	LC

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		Fruit- Bat			
14	*Suncus murinus*	Grey musk Shrew	Muridae	V	LC
15	*Sus scrofa*	Wild Boar	Canidae	III	LC
16	*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	*Enhydris enhydris*	Smooth water snake	Homalopsidae	IV	LC
6	*Euphlyctis hexadactyla*	Common frog	Dicroglossidae	IV	LC
7	Hemidactylus flaviviridis	House Gecko	Gekkonidae	--	NE
8	*Naja naja*	Cobra	Elapidae	II	LC
9	Ophiophagus hannah	King cobra	Elapidae	II	LC
10	Ptyas mucosa	Rat Snake	Colubridae	II	NE
11	Rana temporaria	Common frog	Ranidae	IV	LC
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, Bhojpur District.

ii. Avian Fauna

Table 3.25: Avian Fauna observed from the study area (10 KM Buffer area)

S.No	Scientific Name	Common Name	Family	Schedule Status (WPA-1972	IUCN Status
1	*Acridotheres tristis*	Myna	Sturnidae	IV	LC
2	*Acridotheres tristis*	Common myna	Sturnidae	IV	LC
3	Alcedo atthis	Small blue kingfisher	Alcedinidae	IV	LC

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4	Amandava amandava	Red munia	Estrildidae	IV	LC
5	*Ardea cinerea*	Grey heron	Ardeidae	IV	LC
6	Ardeola grayii	Indian pond heron	Ardeidae	IV	LC
7	Athene brama	Spotted Owlet	Strigidae	IV	LC
8	Bubulcus ibis	Cattle egret	Ardeidae	IV	LC
9	*Centropus sinensis*	Crow pheasant	Cuculidae	IV	LC
10	*Ceryle rudis*	Pied kingfisher	Alcedinidae	IV	LC
11	*Charadrius dubius*	Little ringed plover	Charadriidae	IV	LC
12	*Ciconia episcopus*	White-necked stork	Ciconidae	IV	NT
13	Cinnyris asiaticus	Purple Sunbird	Psittaculidae	IV	LC
14	*Columba livia*	Pigeon	Columbidae	IV	LC
15	*Corvus macrorhynchos*	Jungle crow	Corvidae	IV	LC
16	*Corvus splendens*	Crow	Corvidae	V	LC
17	*Dicrurus adsimilis*	Black drango	Dicruridae	IV	LC
18	Egretta alba	Larger egret	Ardeidae	IV	LC
19	*Egretta garzetta*	Little egret	Ardeidae	IV	LC
20	*Francolinus pondicerianus*	Titar	Phasianidae	IV	LC
21	*Gallinule chloropus*	Common moorhen	Rallidae	IV	LC
22	*Gallus gallus*	Jungle hen	Phasianidae	IV	LC
23	*Halcyon smymensis*	White-throated kingfisher	Alcedinidae	IV	LC
24	*Milvus migrans*	Black Kite	Accipitridae	IV	LC
25	*Passer domesticus*	House sparrow	Passeridae	IV	LC
26	*Phalacrocorax carbo*	Great cormorant	Phalacrocoracidae	IV	LC
27	*Phalacrocorax niger*	Little cormorant	Phalacrocoracidae	IV	LC
28	*Pluvialis fulva*	Pacific golden plover	Charadriidae	IV	LC
29	*Pseudibis papillosa*	Red-naped ibis	Threskiornithidae	IV	LC
30	*Psittacula krameri*	Rose ringed Parakeet	Psittacidae	IV	LC
31	*Pycnonotus cafer*	Red-vented bulbul	Pycnonotidae	IV	LC
32	Saxicoloides fulicatus	Indian robin	Psittaculidae	IV	LC

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

Source: Primary Survey data of P&M Solution and the data supported by Department of Forest, Son, 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	*Danaus chrysippus*	Plain Tiger	Nymphalidae	LC
4	*Danaus genutia*	Stripped Tiger	Nymphalidae	LC
5	*Euploea core*	Common crow	Nymphalidae	LC

Source: Primary Survey data of P&M Solution and the data supported by Department of Forest, Son, 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.). Son 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 (Bhojpur district) are given in Tables 3.27 to 3.30.

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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 49 zooplankton species was recorded and identified comprising of class Protozoa (8 species), Rotifera (20 species), Cladocera (10 species), Copepoda (8 species), and Ostracoda (3 species). 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	*Euglypha* sp.	+		+	+	+	+	+	+	NA	NA
7	*Metopus* sp.		+	+	+		+			NA	NA
8	*Opercularia* 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

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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	*Monostyla quadridentatus*		+	+						NA	NA
17	*Mytilina* sp.	+			+	+	+	+	+	NA	NA
18	*Polyarthra vulgaris*	+		+		+			+	NA	NA
19	*Testudinella patina*		+		+		+	+		NA	NA
20	*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	*Leydgia* sp.		+	+		+	+		+	NA	NA
9	*Moina daphnia*	+			+		+	+	+	NA	NA
10	*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

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6	*Nauplius larvae*	+	+	+	+	+	+	+	+	NA	NA
7	*Neodiaptomus* sp.		+		+		+		+	NA	NA
8	*Nitzii amphibia*	+	+	+	+	+	+	+		NA	NA
	Total	**10**	**10**	**8**	**9**	**7**	**11**	**7**	**9**		
	Ostracoda										
1	*Cyprinotus* sp.	+		+	+	+	+	+	+	NA	NA
2	*Cypris sp.*	+	+	+	+		+	+	+	NA	NA
3	*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	*Hirudineria sp.*	+	+	+			+	+	+	NA	NE
7	*Limnodrillus hoffmeisteri*	+					+			NA	NE
8	*Mayflies nymphs*		+		+		+	+	+	NA	NE
9	*Mosquitos larvae*	+	+	+	+	+	+	+	+	NA	NE
10	*Ranatra elongata*	+	+			+	+	+	+	NA	NE

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		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	*Unio tigridis*				+	+		+	+	+	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	*Bufo melanostictus*	Common toad	+	+	+	+	+	+	+	+	IV	LC
2	*Bungarus caeruleus*	Common Krait	+	+	+	+	+	+	+	+	IV	LC
3	*Bungarus fasciatus*	Banded Krait	+	+	+	+	+	+	+	+	IV	LC
4	*Euphlyctis cyanophlyctis*	Indian skipper frog	+	+	+	+	+	+	+	+	IV	LC

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5	*Hoplobatrachus tigerinus*	(Indian bullfrog).	+	+	+	+	+	+	+	+	IV	LC
6	*Chamelion calcarata*	Chameleon	+	+	+	+	+	+	+	+	II	LC
7	*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, Bhojpur District, 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

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11	*Puntius stigma*	Cyprinidae			+	+		+			LC	NA
12	*Puntius ticto*	Cyprinidae		+	+	+			+	+	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, Bhojpur District, Bihar.

3.6.13 Observations of Present Study (Flora & Fauna)

3.6.13.1 Flora

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

3.6.13.2 Fauna

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

3.7 Socio-Economic Environment

Demography& Socio-Economic Features

Demography

Demography is one of the important indicators of environmental health of an area. It includes population, sex ratio, number of households, literacy, population density, etc. In order to assess the Demographic & Socio-economic features of the area, Census data 2011, for the 3 concerned districts i.e. Bhojpur, Rohtas and ArwalinBiharstate was compiled and placed in the form of tabulation and graphical representation.

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Demography of the Bhojpur District

As per the census records 2011, Bhojpur district has a population of 27,28,407 persons followed by 14,30,380 males and 12,98,027 females respectively.

The decadal variation of the district has been seen at 21.6% during the decade 2001-11. The Urban area of the district has attained a higher decadal variation of 24.8% as compared to that of rural area at 21.1%. The district has a population density of 1,136 inhabitants per square kilometre (2,940/sq. mi). Its population growth rate over the decade 2001-11 was 21.27%.

As per 2011 census sex ratio of the district is 907 females per 1,000 males. The same for rural and urban areas of the district stands at 910 and 892 respectively. The sex ratio of population in the age group 0-6, which works out to 918, is much higher than the sex ratio of the total population (910) in the district of Bhojpur. While the sex ratio of (0-6) population in the rural areas of the district is 920, the sex ratio of (0-6) population for the urban areas is only 904.

Mother Tongue

The population of the Bhojpur district during 2001 was 22,43,144. As per distribution of different mother tongues (languages mentioned under 8th Schedule of Constitution of India) as returned during the 2001 Census for Bhojpur district, Hindi, the main mother tongue of the district was returned by 96.1 percent (21,55,948 persons) of the population. The corresponding percentage for the Urdu, the second most prominent language spoken in Bhojpur district, was 3.7 percent (84,074 persons). Speakers of other Scheduled languages were very thin in number than the two described above.

Religion

The population of the Bhojpur district during 2011 was 2,728,407. Hindus constitute 92.30 percent (2,518,216 persons) of the population in the district followed by Muslims 7.25% (197,819 persons). All other four major religious communities have almost negligible percentages.

Methodology

In order to assess the Demographic & Socio-economic features along with the 10km distance based on field surveys and public consultations undertaken during the baseline field study period and Census records 2011, for the 3 concerned districts i.e. Bhojpur, Rohtas and Arwal in Bihar state respectively was compiled and placed in the form of tabulation and graphical

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representation. Entire study area is observed predominantly rural, no town 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 '*SandGhatMining Project'*, as operation phase of any project invariably leads to Socio-economic changes. The construction phase of any kind of project could lead to unplanned and haphazard development of slums of various size and description with little or rudimentary.

Description of Social Environment

As per the Census Records 2011, the study area has a total of 159 villages lying under 3 main districts namely Bhojpur, Rohtas and Arwal in Bihar state. Overall study area villages are falling mainly under 8 tehsils namely Shahpur (03 villages), Tarari (59 villages), Sahar (37 villages), Kochas (01 villages), Dinara (05 villages), Karakat (05 villages), Arwal (07 villages) and Kaler (42 villages) of above mentioned 3 districts in Bihar State. No town found in the study area. There are seventeen (17) villages of above mentioned 3 districts of Bihar state found as uninhabited villages in the study area.

Population Distribution within 10 km radial Study Zone

As per the Census Records 2011, the total population of 10 km study zone was recorded as 305088persons of 159villages/townsof 3 main districts named Bhojpur, Rohtas and ArwalinBihar state. Male-female wise total population was recorded as 157381 males (51.6%) and 147647(48.4%) females respectively.

Total number of 'Households' was observed as 49575in the 10 km radius study zone. Scheduled Caste ('SC') population was observed as 65576persons consisting of 33832males (51.6%) and 31744females (48.4%) in the 10km study zone. Scheduled Tribes ('ST') population was also observed as 537 persons (0.2%) consisting of 279males (52.0%) and 258 females (48.0%) in the 10 km study zone.The child population (0-6 Age) of the study area is recorded as 53345(17.5%) and comprising of 27400 (51.4%)males&25945 (48.6%) females respectively.

Village wise details of population distributionare given as follows in **Table 3.31 & 3.32.**

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Table 3.31: 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
1. District Bhojpur, Bihar							
Dumariya	487	3265	1766	1499	460	254	206
Dhauri	202	1724	921	803	246	129	117
Chanda	258	1803	979	824	246	129	117
Gopalpur 1	60	410	232	178	40	23	17
Amaharua	198	1148	617	531	207	116	91
Tarari	588	3586	1836	1750	611	316	295
Bhopatpur 1	51	405	200	205	76	35	41
Paranpura	164	924	452	472	162	84	78
Saidanpur	224	1621	846	775	292	141	151
Tanrwa	46	229	117	112	46	27	19
Bandhwa	431	2340	1209	1131	431	214	217
Barka Gaon	1077	6335	3223	3112	1013	517	496
Surmana	88	469	246	223	76	38	38
Bhadsera	250	1655	838	817	272	126	146
Dihri	178	1252	623	629	181	86	95
Gangti	101	711	366	345	132	69	63
Dumaria	409	2733	1413	1320	463	240	223
Itahri	150	1039	538	501	147	79	68
Ranni	202	1327	673	654	219	109	110
Patkhauli	209	1340	686	654	253	135	118
Manikpur	Uninhabited Village						
Labna	221	1288	680	608	195	104	91
Nirbhai Dehra	157	1057	560	497	207	99	108
Kiratpur	Uninhabited Village						
Kariman Chak	Uninhabited Village						
Gazo Dih	48	283	146	137	56	27	29

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Santokha Chak	Uninhabited Village						
Salhadia	Uninhabited Village						
Afzal Chak	Uninhabited Village						
Chanda	472	3016	1595	1421	482	265	217
Deo Arazi	Uninhabited Village						
Sikarhata Milik	110	705	370	335	131	61	70
Sikarhata	1331	8587	4413	4174	1812	919	893
Sikarhata Khurd	529	3297	1749	1548	480	245	235
Noni Dih	191	1068	550	518	205	105	100
Basra	138	963	507	456	171	93	78
Bagar	1102	6118	3174	2944	1028	543	485
Khairulla Chak	76	441	238	203	107	53	54
Harpur	95	484	261	223	99	53	46
Usri	Uninhabited Village						
Kurmorhi	832	5125	2590	2535	870	440	430
Dari Dih	275	1518	743	775	247	116	131
Panwari	736	4466	2321	2145	841	452	389
Imadpur	561	3788	1945	1843	627	309	318
Patelwa	Uninhabited Village						
Bahadurpur	142	889	464	425	162	75	87
Lachchhi Dih	43	336	171	165	50	20	30
Bishamharpur	146	952	480	472	166	83	83
Kanu Dih	25	133	75	58	11	6	5
Moap Buzurg	826	5386	2799	2587	871	440	431
Khutaha	385	2389	1245	1144	360	177	183
Berain	143	991	529	462	138	76	62
Narayanpur	119	901	464	437	183	81	102
Deo	735	4398	2268	2130	758	395	363
Kab Dehra	429	2374	1188	1186	438	215	223
Dhangawan	476	3300	1769	1531	513	292	221
Warsi	278	1789	931	858	280	145	135
Moap Khurd	463	3329	1692	1637	576	282	294

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Dewria	Uninhabited Village						
Bishunpura	548	3624	1845	1779	659	351	308
Rajpur	548	3306	1747	1559	601	303	298
Bihta	1553	9756	5112	4644	1651	884	767
Karbasin	301	1977	1031	946	344	168	176
Khaira	280	1827	966	861	401	196	205
Jagdish Chak	Uninhabited Village						
Perhap	919	5285	2674	2611	935	473	462
Hatimganj	104	717	375	342	134	76	58
Dhauri Chak	Uninhabited Village						
Dhauri	228	1401	751	650	289	155	134
Kharaon Chaturbhuj	355	2521	1282	1239	413	216	197
Sakhuana	145	888	442	446	136	70	66
Chak Chaudhari	344	2309	1162	1147	421	215	206
Kanpahari	81	572	280	292	96	52	44
Amruhan	584	3227	1655	1572	548	289	259
Kusiar	500	3007	1535	1472	469	244	225
Purhara	330	1801	895	906	321	152	169
Nima	147	569	318	251	33	15	18
Koriar	146	783	386	397	127	64	63
Bagaunti	153	916	453	463	171	89	82
Bahuara	250	1605	773	832	281	131	150
Koni	113	597	307	290	71	30	41
Chauri	394	2228	1093	1135	387	201	186
Mahabirganj	59	457	220	237	83	40	43
Janpuria	211	1287	700	587	208	118	90
Kaul Dehri	937	5740	2951	2789	1007	514	493
2. District Rohtas, Bihar							
Dhanchhuhan	678	3885	1962	1923	665	344	321
Patarpura	177	1000	482	518	182	93	89
Chhatarpura	260	1524	760	764	285	138	147
Kharaon Buzurg	481	2613	1271	1342	445	222	223

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Lodipur 1	134	784	389	395	119	49	70
Fatehpur	326	1859	958	901	380	218	162
Dharampur	209	1013	521	492	121	60	61
Athpa	183	1112	558	554	196	105	91
Ojhaulia	167	1030	516	514	199	116	83
Andhari	569	3140	1556	1584	573	289	284
Andhari Mahazi	Uninhabited Village						
Harpur	110	714	366	348	139	64	75
Bhopatpur 2	5	52	30	22	14	6	8
Janaidih	91	468	234	234	76	33	43
Dhanchhua	127	978	498	480	160	68	92
Sonbarsa	77	473	247	226	65	33	32
Durgapur	Uninhabited Village						
Mathiya	132	987	511	476	149	78	71
Gopalpur 2	323	2204	1157	1047	381	188	193
Milki	Uninhabited Village						
Dhanchhuha	Uninhabited Village						
Chak Niranjan	Uninhabited Village						
Danwar	688	5174	2693	2481	785	424	361
Belarhi	160	1100	596	504	193	113	80
Sonbarsa	287	1958	1016	942	306	169	137
3. District Arwal, Bihar							
Rampur waina	650	3655	1916	1739	607	325	282
Bichlagawan	281	1595	855	740	276	153	123
Saidpur	251	1281	663	618	307	154	153
Bahadurpur	216	1352	697	655	252	135	117
Sumera	588	3794	1976	1818	707	370	337
Chakia	197	1152	589	563	191	102	89
Parasi	725	4428	2355	2073	758	392	366
Ballopur	53	386	200	186	69	44	25
Makhmulpur	214	1237	644	593	223	130	93
Walidad	1190	6549	3353	3196	1219	578	641

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Parasrampur	214	1306	681	625	226	125	101
Bath	702	4311	2265	2046	845	453	392
Kamta	872	5284	2731	2553	998	531	467
Tawakala	243	1406	677	729	231	108	123
Gorkatta	116	667	344	323	151	70	81
Sakri	756	4390	2237	2153	822	414	408
Mahrauli	63	360	152	208	56	23	33
Hardia	409	2582	1335	1247	447	222	225
Maraila	83	520	270	250	120	73	47
Mehdiyabad	556	3175	1661	1514	503	239	264
Chauki 1	60	305	156	149	75	34	41
Masuda	342	2109	1058	1051	416	205	211
Niranjanpur	280	1589	788	801	333	156	177
Khushdihra	120	682	358	324	150	75	75
Jamuhari	260	1333	683	650	199	104	95
Ismailpur Koil	444	2586	1369	1217	480	237	243
Turkharsa	152	1010	541	469	163	92	71
Sarwarpur	390	2526	1298	1228	450	225	225
Koilbhupat	335	1917	980	937	333	165	168
Masadpur	270	1835	951	884	346	192	154
Bhagwanpur	153	1071	588	483	185	98	87
Sohsa	573	3923	2077	1846	829	436	393
Kharsa	259	1584	833	751	216	109	107
Lodipur 2	368	2299	1213	1086	371	186	185
Musepur	216	1372	696	676	274	144	130
Mainpura	533	3061	1591	1470	587	305	282
Upadhea Bigha	210	1381	704	677	233	118	115
Kathrain	150	1150	595	555	157	94	63
Durgapur	221	1255	664	591	225	128	97
Wojha Bigha	153	942	472	470	175	87	88
Nawada	146	751	380	371	150	70	80
Belawan	759	4620	2384	2236	748	375	373

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Belsar	951	5633	2895	2738	979	491	488
Chauki 2	59	373	188	185	81	39	42
Koni	333	2371	1233	1138	462	238	224
Pahleja	1025	6106	3124	2982	1147	583	564
Fatehabad	Uninhabited Village						
Jaipur	993	6067	3088	2979	1111	561	550
Teri	570	3592	1901	1691	606	318	288
TOTAL (10km)	**49575**	**305028**	**157381**	**147647**	**53345**	**27400**	**25945**
Source-Census of India, 2011							

Table 3.32: Village-wise SC & ST Population Distribution (10km)

Name of Village/Town	Total Population	Scheduled Castes			Scheduled Tribes		
		Persons	Males	Females	Persons	Males	Females
1. District Bhojpur, Bihar							
Dumariya	3265	834	461	373	193	101	92
Dhauri	1724	295	143	152	42	25	17
Chanda	1803	303	172	131	0	0	0
Gopalpur 1	410	39	18	21	0	0	0
Amaharua	1148	521	285	236	0	0	0
Tarari	3586	1054	531	523	1	1	0
Bhopatpur 1	405	185	92	93	11	6	5
Paranpura	924	265	133	132	0	0	0
Saidanpur	1621	0	0	0	0	0	0
Tanrwa	229	215	110	105	0	0	0
Bandhwa	2340	996	539	457	0	0	0
Barka Gaon	6335	1502	755	747	0	0	0
Surmana	469	0	0	0	0	0	0
Bhadsera	1655	541	276	265	2	1	1
Dihri	1252	447	223	224	0	0	0

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Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

Gangti	711	7	3	4	0	0	0
Dumaria	2733	549	293	256	9	7	2
Itahri	1039	203	102	101	0	0	0
Ranni	1327	322	167	155	0	0	0
Patkhauli	1340	345	181	164	1	1	0
Manikpur	Uninhabited Village						
Labna	1288	205	115	90	0	0	0
Nirbhai Dehra	1057	213	111	102	0	0	0
Kiratpur	Uninhabited Village						
Kariman Chak	Uninhabited Village						
Gazo Dih	283	137	72	65	0	0	0
Santokha Chak	Uninhabited Village						
Salhadia	Uninhabited Village						
Afzal Chak	Uninhabited Village						
Chanda	3016	449	246	203	0	0	0
Deo Arazi	Uninhabited Village						
Sikarhata Milik	705	0	0	0	0	0	0
Sikarhata	8587	2224	1116	1108	2	1	1
Sikarhata Khurd	3297	207	115	92	0	0	0
Noni Dih	1068	482	242	240	0	0	0
Basra	963	261	135	126	1	0	1
Bagar	6118	933	484	449	114	61	53
Khairulla Chak	441	68	37	31	0	0	0
Harpur	484	58	29	29	0	0	0
Usri	Uninhabited Village						
Kurmorhi	5125	802	402	400	0	0	0
Dari Dih	1518	266	132	134	0	0	0
Panwari	4466	1554	816	738	5	3	2
Imadpur	3788	443	226	217	1	1	0
Patelwa	Uninhabited Village						
Bahadurpur	889	127	66	61	0	0	0
Lachchhi Dih	336	0	0	0	0	0	0

Chapter-III   **BASELINE DATA DESCRIPTION**

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

Bishamharpur	952	168	87	81	0	0	0
Kanu Dih	133	0	0	0	0	0	0
Moap Buzurg	5386	1131	584	547	1	1	0
Khutaha	2389	351	190	161	0	0	0
Berain	991	0	0	0	0	0	0
Narayanpur	901	466	231	235	0	0	0
Deo	4398	854	432	422	0	0	0
Kab Dehra	2374	589	284	305	21	9	12
Dhangawan	3300	326	186	140	0	0	0
Warsi	1789	379	206	173	0	0	0
Moap Khurd	3329	374	191	183	0	0	0
Dewria	Uninhabited Village						
Bishunpura	3624	927	482	445	1	0	1
Rajpur	3306	880	460	420	5	5	0
Bihta	9756	2155	1150	1005	1	0	1
Karbasin	1977	107	53	54	32	13	19
Khaira	1827	855	440	415	0	0	0
Jagdish Chak	Uninhabited Village						
Perhap	5285	1297	649	648	3	1	2
Hatimganj	717	0	0	0	0	0	0
Dhauri Chak	Uninhabited Village						
Dhauri	1401	87	49	38	0	0	0
Kharaon Chaturbhuj	2521	299	144	155	0	0	0
Sakhuana	888	48	20	28	0	0	0
Chak Chaudhari	2309	274	144	130	0	0	0
Kanpahari	572	0	0	0	0	0	0
Amruhan	3227	661	337	324	0	0	0
Kusiar	3007	151	80	71	0	0	0
Purhara	1801	337	175	162	0	0	0
Nima	569	346	189	157	0	0	0
Koriar	783	108	56	52	0	0	0
Bagaunti	916	299	150	149	0	0	0

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

Bahuara	1605	178	77	101	0	0	0
Koni	597	0	0	0	0	0	0
Chauri	2228	643	306	337	0	0	0
Mahabirganj	457	117	55	62	0	0	0
Janpuria	1287	120	68	52	0	0	0
Kaul Dehri	5740	1034	541	493	0	0	0
2. District Rohtas, Bihar							
Dhanchhuhan	3885	1312	680	632	0	0	0
Patarpura	1000	264	132	132	0	0	0
Chhatarpura	1524	288	143	145	0	0	0
Kharaon Buzurg	2613	480	239	241	0	0	0
Lodipur 1	784	250	124	126	0	0	0
Fatehpur	1859	595	310	285	0	0	0
Dharampur	1013	387	194	193	1	1	0
Athpa	1112	304	142	162	0	0	0
Ojhaulia	1030	252	128	124	0	0	0
Andhari	3140	318	153	165	7	2	5
Andhari Mahazi	Uninhabited Village						
Harpur	714	289	154	135	0	0	0
Bhopatpur 2	52	0	0	0	0	0	0
Janaidih	468	145	75	70	0	0	0
Dhanchhua	978	31	17	14	0	0	0
Sonbarsa	473	166	82	84	0	0	0
Durgapur	Uninhabited Village						
Mathiya	987	0	0	0	0	0	0
Gopalpur 2	2204	446	229	217	0	0	0
Milki	Uninhabited Village						
Dhanchhuha	Uninhabited Village						
Chak Niranjan	Uninhabited Village						
Danwar	5174	299	156	143	0	0	0
Belarhi	1100	352	188	164	0	0	0
Sonbarsa	1958	276	137	139	0	0	0

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–
Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

3. District Arwal, Bihar

Rampur waina	3655	831	449	382	1	1	0
Bichlagawan	1595	310	174	136	19	9	10
Saidpur	1281	1230	638	592	22	11	11
Bahadurpur	1352	171	82	89	1	0	1
Sumera	3794	653	329	324	21	10	11
Chakia	1152	256	125	131	2	0	2
Parasi	4428	687	373	314	10	5	5
Ballopur	386	41	21	20	0	0	0
Makhmulpur	1237	101	45	56	0	0	0
Walidad	6549	2049	1033	1016	5	3	2
Parasrampur	1306	302	167	135	0	0	0
Bath	4311	777	411	366	0	0	0
Kamta	5284	810	426	384	0	0	0
Tawakala	1406	410	201	209	0	0	0
Gorkatta	667	166	82	84	1	0	1
Sakri	4390	458	231	227	0	0	0
Mahrauli	360	40	19	21	0	0	0
Hardia	2582	805	425	380	0	0	0
Maraila	520	26	14	12	0	0	0
Mehdiyabad	3175	497	277	220	0	0	0
Chauki 1	305	79	37	42	0	0	0
Masuda	2109	463	237	226	0	0	0
Niranjanpur	1589	334	175	159	0	0	0
Khushdihra	682	50	24	26	0	0	0
Jamuhari	1333	352	179	173	0	0	0
Ismailpur Koil	2586	762	397	365	0	0	0
Turkharsa	1010	23	12	11	0	0	0
Sarwarpur	2526	569	282	287	0	0	0
Koilbhupat	1917	688	340	348	0	0	0
Masadpur	1835	433	219	214	0	0	0
Bhagwanpur	1071	200	109	91	0	0	0

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

Sohsa	3923	628	320	308	0	0	0
Kharsa	1584	575	307	268	1	0	1
Lodipur 2	2299	479	257	222	0	0	0
Musepur	1372	401	195	206	0	0	0
Mainpura	3061	880	450	430	0	0	0
Upadhea Bigha	1381	213	114	99	0	0	0
Kathrain	1150	320	165	155	0	0	0
Durgapur	1255	450	229	221	0	0	0
Wojha Bigha	942	463	238	225	0	0	0
Nawada	751	247	143	104	0	0	0
Belawan	4620	732	365	367	0	0	0
Belsar	5633	1048	531	517	0	0	0
Chauki 2	373	332	165	167	0	0	0
Koni	2371	625	324	301	0	0	0
Pahleja	6106	2361	1212	1149	0	0	0
Fatehabad	Uninhabited Village						
Jaipur	6067	1213	628	585	0	0	0
Teri	3592	969	529	440	0	0	0
TOTAL (10km)	**305028**	**65576**	**33832**	**31744**	**537**	**279**	**258**
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 907females per 1000 males in the District. The same was recorded as 938females for every 1000 males in the study area. The child (0-6 yr age) sex ratio of the study area was observed as 947 female children per 1000 male children.

Chapter-III   **BASELINE DATA DESCRIPTION**

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–
Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

The village wise male-female population distribution for the study area is depicted and shown by graphical representation in **Figure 3.7.**
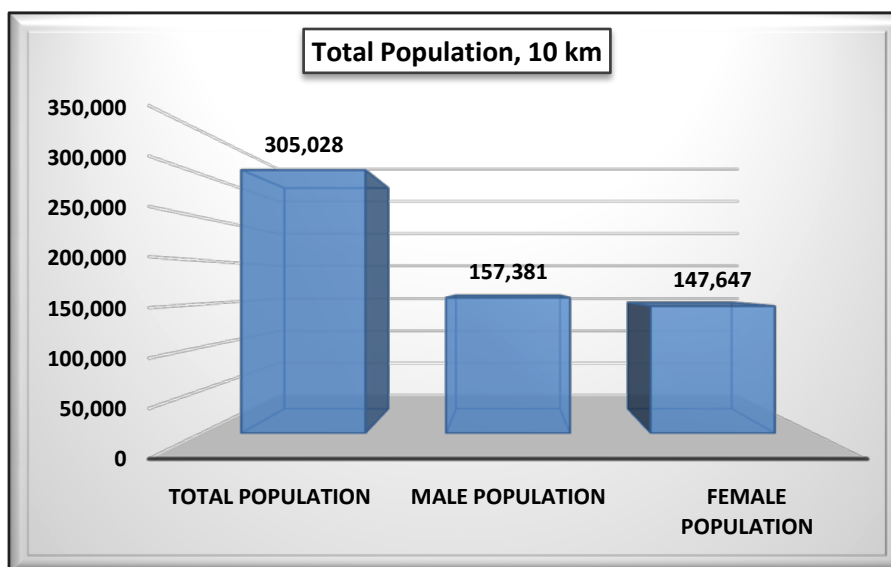
Figure 3.7: Male-Female Wise Population Distribution

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 65576persons consisting of 33832 males and 31744females respectively in the study area which accounts as 21.5% to the total population (305028persons) of the study area. Scheduled Tribes ('ST') population was observed as 537persons,accounts as 0.2% to the total population of the study zone consisting of 279males and 258females in the 10 km radius study zone.It implies that the rest 78.3% of the total population belongs to the general category.

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

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.
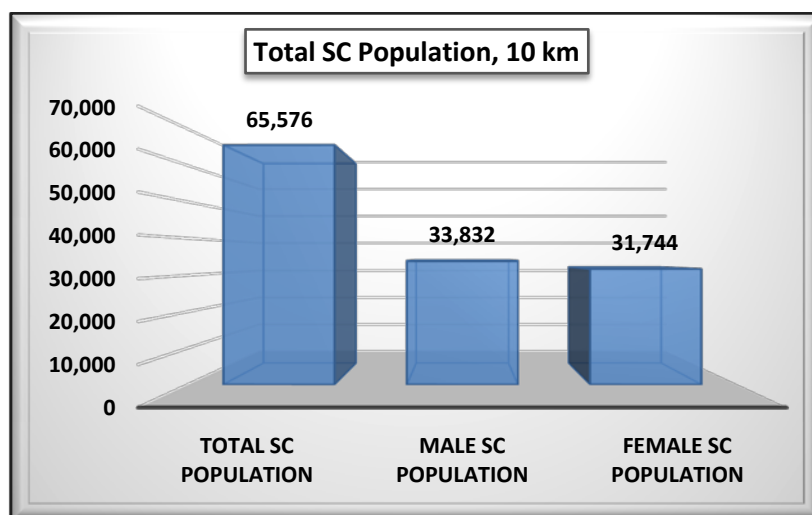
Figure 3.8: Scheduled Caste Population in the Study Area
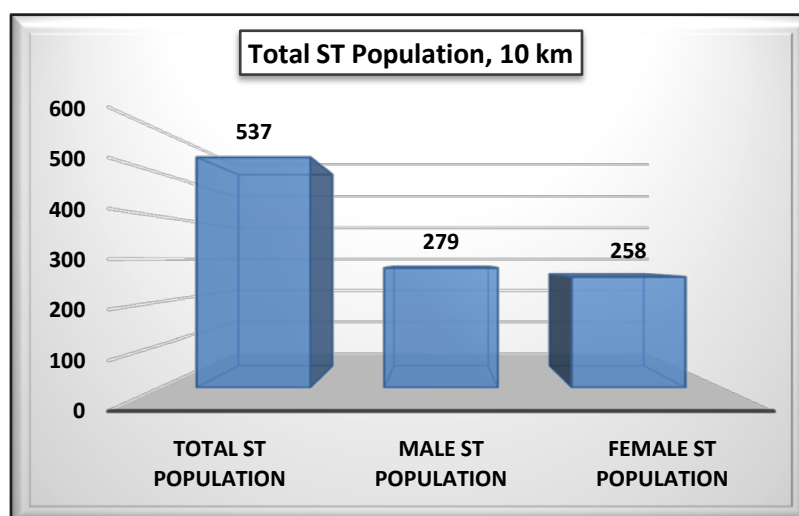
Figure 3.9: Scheduled Tribes Population in the Study Area

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 3.33.** Total literate's population was recorded as 176021 persons (57.7%) in the study area. **Table 3.33** reveals that Male-Female wise literates are observed as 106583 & 69438 persons respectively, implies that the 'Literacy Rate' is recorded as 57.7% with male-female wise percentages being 35.0% &22.8% respectively.

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

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.
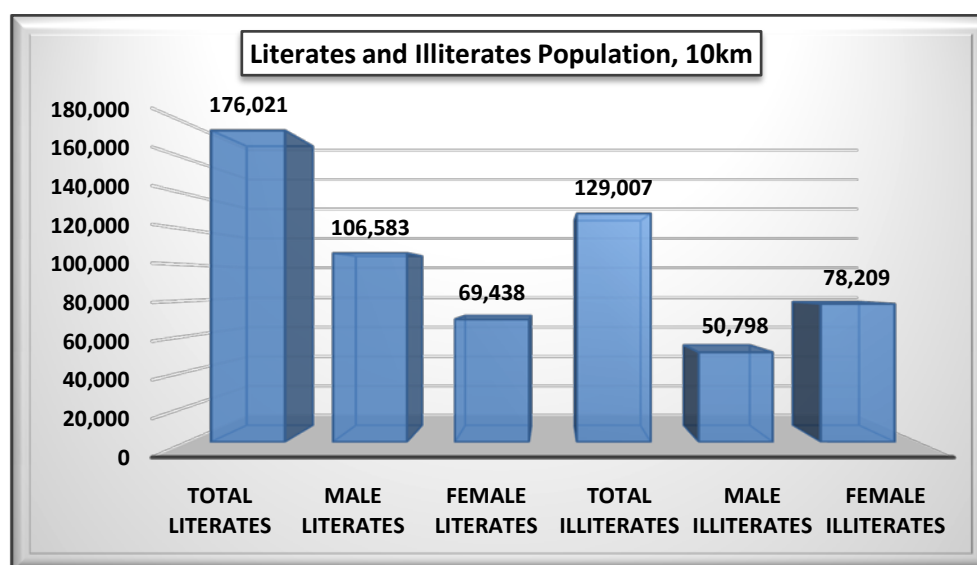
Figure 3.10: Male-Female Wise Distribution of Literates & Illiterates

Table 3.33: Male-Female Wise Literates and Illiterates(10km)

Name of Village/Town	Total Population	Literates			Illiterates		
		Persons	Males	Females	Persons	Males	Females
1. District Bhojpur, Bihar							
Dumariya	3265	2322	1395	927	943	371	572
Dhauri	1724	1238	723	515	486	198	288
Chanda	1803	1259	776	483	544	203	341
Gopalpur 1	410	286	198	88	124	34	90
Amaharua	1148	736	441	295	412	176	236
Tarari	3586	2188	1300	888	1398	536	862
Bhopatpur 1	405	242	155	87	163	45	118
Paranpura	924	586	327	259	338	125	213
Saidanpur	1621	889	591	298	732	255	477
Tanrwa	229	111	70	41	118	47	71
Bandhwa	2340	1270	785	485	1070	424	646
Barka Gaon	6335	3932	2324	1608	2403	899	1504
Surmana	469	293	182	111	176	64	112
Bhadsera	1655	1129	670	459	526	168	358

Chapter-III

BASELINE DATA DESCRIPTION

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

|							
Dihri	1252	843	485	358	409	138	271
Gangti	711	376	239	137	335	127	208
Dumaria	2733	1784	1048	736	949	365	584
Itahri	1039	638	383	255	401	155	246
Ranni	1327	828	482	346	499	191	308
Patkhauli	1340	691	433	258	649	253	396
Manikpur	Uninhabited Village						
Labna	1288	783	481	302	505	199	306
Nirbhai Dehra	1057	627	416	211	430	144	286
Kiratpur	Uninhabited Village						
Kariman Chak	Uninhabited Village						
Gazo Dih	283	114	79	35	169	67	102
Santokha Chak	Uninhabited Village						
Salhadia	Uninhabited Village						
Afzal Chak	Uninhabited Village						
Chanda	3016	1756	1052	704	1260	543	717
Deo Arazi	Uninhabited Village						
Sikarhata Milik	705	305	199	106	400	171	229
Sikarhata	8587	4246	2582	1664	4341	1831	2510
Sikarhata Khurd	3297	2405	1378	1027	892	371	521
Noni Dih	1068	630	374	256	438	176	262
Basra	963	605	365	240	358	142	216
Bagar	6118	3572	2156	1416	2546	1018	1528
Khairulla Chak	441	183	124	59	258	114	144
Harpur	484	225	153	72	259	108	151
Usri	Uninhabited Village						
Kurmorhi	5125	2951	1739	1212	2174	851	1323
Dari Dih	1518	904	553	351	614	190	424
Panwari	4466	2190	1330	860	2276	991	1285
Imadpur	3788	2239	1352	887	1549	593	956
Patelwa	Uninhabited Village						
Bahadurpur	889	539	348	191	350	116	234

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

Lachchhi Dih	336	242	140	102	94	31	63
Bishamharpur	952	570	332	238	382	148	234
Kanu Dih	133	116	69	47	17	6	11
Moap Buzurg	5386	3437	2053	1384	1949	746	1203
Khutaha	2389	1441	894	547	948	351	597
Berain	991	701	402	299	290	127	163
Narayanpur	901	437	286	151	464	178	286
Deo	4398	2585	1547	1038	1813	721	1092
Kab Dehra	2374	1171	726	445	1203	462	741
Dhangawan	3300	2143	1304	839	1157	465	692
Warsi	1789	1173	715	458	616	216	400
Moap Khurd	3329	1971	1219	752	1358	473	885
Dewria	Uninhabited Village						
Bishunpura	3624	2146	1270	876	1478	575	903
Rajpur	3306	1823	1191	632	1483	556	927
Bihta	9756	5133	3152	1981	4623	1960	2663
Karbasin	1977	1213	745	468	764	286	478
Khaira	1827	962	618	344	865	348	517
Jagdish Chak	Uninhabited Village						
Perhap	5285	3333	1924	1409	1952	750	1202
Hatimganj	717	410	264	146	307	111	196
Dhauri Chak	Uninhabited Village						
Dhauri	1401	772	509	263	629	242	387
Kharaon Chaturbhuj	2521	1410	840	570	1111	442	669
Sakhuana	888	579	338	241	309	104	205
Chak Chaudhari	2309	1282	762	520	1027	400	627
Kanpahari	572	383	216	167	189	64	125
Amruhan	3227	1719	1091	628	1508	564	944
Kusiar	3007	1969	1163	806	1038	372	666
Purhara	1801	1002	595	407	799	300	499
Nima	569	166	124	42	403	194	209

Chapter-III   **BASELINE DATA DESCRIPTION**

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–
Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

Koriar	783	442	254	188	341	132	209
Bagaunti	916	439	296	143	477	157	320
Bahuara	1605	935	570	365	670	203	467
Koni	597	322	213	109	275	94	181
Chauri	2228	1185	718	467	1043	375	668
Mahabirganj	457	264	147	117	193	73	120
Janpuria	1287	781	494	287	506	206	300
Kaul Dehri	5740	3106	1866	1240	2634	1085	1549
2. District Rohtas, Bihar							
Dhanchhuhan	3885	2190	1330	860	1695	632	1063
Patarpura	1000	598	343	255	402	139	263
Chhatarpura	1524	851	494	357	673	266	407
Kharaon Buzurg	2613	1295	795	500	1318	476	842
Lodipur 1	784	436	283	153	348	106	242
Fatehpur	1859	965	592	373	894	366	528
Dharampur	1013	493	350	143	520	171	349
Athpa	1112	455	288	167	657	270	387
Ojhaulia	1030	609	345	264	421	171	250
Andhari	3140	1469	895	574	1671	661	1010
Andhari Mahazi	Uninhabited Village						
Harpur	714	241	149	92	473	217	256
Bhopatpur 2	52	34	23	11	18	7	11
Janaidih	468	302	171	131	166	63	103
Dhanchhua	978	520	332	188	458	166	292
Sonbarsa	473	275	169	106	198	78	120
Durgapur	Uninhabited Village						
Mathiya	987	724	394	330	263	117	146
Gopalpur 2	2204	1387	815	572	817	342	475
Milki	Uninhabited Village						
Dhanchhuha	Uninhabited Village						
Chak Niranjan	Uninhabited Village						
Danwar	5174	3187	1889	1298	1987	804	1183

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

Belarhi	1100	645	405	240	455	191	264
Sonbarsa	1958	1273	744	529	685	272	413
3. District Arwal, Bihar							
Rampur waina	3655	2095	1242	853	1560	674	886
Bichlagawan	1595	998	619	379	597	236	361
Saidpur	1281	533	345	188	748	318	430
Bahadurpur	1352	800	450	350	552	247	305
Sumera	3794	2135	1316	819	1659	660	999
Chakia	1152	597	347	250	555	242	313
Parasi	4428	2592	1578	1014	1836	777	1059
Ballopur	386	192	117	75	194	83	111
Makhmulpur	1237	767	460	307	470	184	286
Walidad	6549	3764	2260	1504	2785	1093	1692
Parasrampur	1306	794	463	331	512	218	294
Bath	4311	2429	1500	929	1882	765	1117
Kamta	5284	3027	1837	1190	2257	894	1363
Tawakala	1406	832	482	350	574	195	379
Gorkatta	667	427	254	173	240	90	150
Sakri	4390	2392	1468	924	1998	769	1229
Mahrauli	360	213	94	119	147	58	89
Hardia	2582	1458	917	541	1124	418	706
Maraila	520	247	166	81	273	104	169
Mehdiyabad	3175	1967	1156	811	1208	505	703
Chauki 1	305	112	78	34	193	78	115
Masuda	2109	1060	665	395	1049	393	656
Niranjanpur	1589	890	553	337	699	235	464
Khushdihra	682	379	255	124	303	103	200
Jamuhari	1333	840	513	327	493	170	323
Ismailpur Koil	2586	1360	910	450	1226	459	767
Turkharsa	1010	661	383	278	349	158	191
Sarwarpur	2526	1302	847	455	1224	451	773
Koilbhupat	1917	1162	683	479	755	297	458

Masadpur	1835	933	588	345	902	363	539
Bhagwanpur	1071	711	435	276	360	153	207
Sohsa	3923	2146	1352	794	1777	725	1052
Kharsa	1584	967	557	410	617	276	341
Lodipur 2	2299	1275	805	470	1024	408	616
Musepur	1372	734	440	294	638	256	382
Mainpura	3061	1740	1034	706	1321	557	764
Upadhea Bigha	1381	795	490	305	586	214	372
Kathrain	1150	719	430	289	431	165	266
Durgapur	1255	716	431	285	539	233	306
Wojha Bigha	942	539	322	217	403	150	253
Nawada	751	410	253	157	341	127	214
Belawan	4620	2600	1581	1019	2020	803	1217
Belsar	5633	3429	1957	1472	2204	938	1266
Chauki 2	373	191	122	69	182	66	116
Koni	2371	1399	825	574	972	408	564
Pahleja	6106	3426	2068	1358	2680	1056	1624
Fatehabad	Uninhabited Village						
Jaipur	6067	3495	2048	1447	2572	1040	1532
Teri	3592	2144	1346	798	1448	555	893
TOTAL (10km)	**305028**	**176021**	**106583**	**69438**	**129007**	**50798**	**78209**
Source-Census of India, 2011							

Economic Profile of Bhojpur District:

Agriculture is the main source of income for majority of people of the district. Rice, Wheat &
Gram are the three main crops grown in the district. The other major economic activities of
the district are dairy, rice-milling, petty trade, transport, etc. The district is major producer of
rice and milk.

Sand is major mineral of Bhojpur district of Bihar. Yellow sand in Sone river and Ganga
river are major source of revenue collection in district as well as soil/clay is actively mined
for bricks and pottery industry. In the financial year, huge amount of clay was produced for

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Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

these purposes. It is also used as a decorative material in landscaping. Specific types of sand are used in the manufacture of glass and as a molding material for metal casting. Wide flood plains and high banks are the common features in the course of the Ganga and the Sone along with silt and clay deposits.

In 2006 the Indian government named Bhojpur one of the country's 250 most backward districts (out of a total of 640). It is one of the 38 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 64488(21.0%) and 36674(12.0%) to the total population (305028), while the remaining 203866(67.0%) 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 3.34.**

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

Table 3.34: Village-wise Occupational Pattern (10km)

Name of the Village	MAIN WORK_P	MAIN _CL_P	MAIN _AL_P	MAIN _HH_P	MAIN _OT_P	MARG WORK_P	MARG _CL_P	MARG _AL_P	MARG_ HH_P	MARG _OT_P
1. District Bhojpur, Bihar										
Dumariya	516	178	75	39	224	629	32	469	51	77
Dhauri	924	129	675	40	80	217	54	98	6	59
Chanda	98	10	10	4	74	358	93	225	7	33
Gopalpur 1	190	120	15	25	30	34	10	6	4	14
Amaharua	401	107	230	12	52	3	0	3	0	0
Tarari	523	171	269	9	74	1236	52	891	71	222
Bhopatpur 1	104	9	46	0	49	33	6	8	0	19
Paranpura	13	7	1	0	5	578	228	326	9	15
Saidanpur	381	172	75	4	130	368	38	62	12	256
Tanrwa	9	1	2	2	4	152	0	152	0	0
Bandhwa	293	161	87	14	31	1028	32	649	23	324
Barka Gaon	1096	302	621	5	168	431	67	336	9	19
Surmana	125	110	13	0	2	2	1	0	0	1
Bhadsera	246	81	125	2	38	170	108	52	2	8
Dihri	289	85	168	11	25	55	4	46	1	4
Gangti	219	54	94	0	71	4	1	3	0	0
Dumaria	407	152	208	16	31	229	10	211	1	7
Itahri	139	122	1	0	16	160	5	111	8	36
Ranni	194	162	3	2	27	212	10	200	0	2
Patkhauli	185	97	58	3	27	255	5	243	2	5
Manikpur	Uninhabited Village									
Labna	227	66	91	21	49	151	44	93	5	9
Nirbhai Dehra	205	138	4	2	61	80	0	79	0	1
Kiratpur	Uninhabited Village									
Kariman Chak	Uninhabited Village									

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Gazo Dih	72	0	66	0	6	69	0	69	0	0
Santokha Chak	Uninhabited Village									
Salhadia	Uninhabited Village									
Afzal Chak	Uninhabited Village									
Chanda	552	161	205	48	138	468	56	290	69	53
Deo Arazi	Uninhabited Village									
Sikarhata Milik	163	2	158	0	3	1	0	0	0	1
Sikarhata	1189	106	721	46	316	1496	263	1033	29	171
Sikarhata Khurd	669	138	335	1	195	282	49	79	6	148
Noni Dih	434	67	315	17	35	24	6	9	7	2
Basra	79	4	47	0	28	193	89	94	1	9
Bagar	1004	220	384	153	247	1257	141	528	469	119
Khairulla Chak	0	0	0	0	0	118	48	70	0	0
Harpur	249	21	221	1	6	7	2	2	0	3
Usri	Uninhabited Village									
Kurmorhi	406	216	61	7	122	1169	175	966	3	25
Dari Dih	219	69	98	5	47	262	9	218	11	24
Panwari	711	195	442	22	52	634	52	549	21	12
Imadpur	496	285	121	8	82	672	139	501	10	22
Patelwa	Uninhabited Village									
Bahadurpur	207	63	120	0	24	16	0	15	0	1
Lachchhi Dih	57	56	0	0	1	25	2	23	0	0
Bishamharpur	209	65	92	2	50	37	15	14	0	8
Kanu Dih	35	33	1	0	1	10	1	9	0	0
Moap Buzurg	1188	388	563	26	211	396	21	334	7	34
Khutaha	302	17	173	8	104	270	9	216	6	39
Berain	244	189	37	0	18	22	2	18	0	2
Narayanpur	214	12	194	0	8	17	7	9	1	0
Deo	603	65	388	30	120	881	66	398	141	276
Kab Dehra	417	128	204	3	82	504	46	440	7	11

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Dhangawan	659	189	430	12	28	255	113	97	2	43
Warsi	318	241	23	12	42	195	64	118	7	6
Moap Khurd	913	237	427	4	245	92	4	55	12	21
Dewria	Uninhabited Village									
Bishunpura	612	172	333	7	100	248	13	218	2	15
Rajpur	748	228	423	1	96	128	18	98	0	12
Bihta	2096	656	1160	89	191	808	39	666	60	43
Karbasin	314	116	79	2	117	145	84	43	4	14
Khaira	181	0	74	2	105	352	13	135	109	95
Jagdish Chak	Uninhabited Village									
Perhap	1577	409	739	54	375	369	73	233	8	55
Hatimganj	250	6	9	0	235	142	1	4	0	137
Dhauri Chak	Uninhabited Village									
Dhauri	473	100	358	3	12	25	8	16	0	1
Kharaon Chaturbhuj	467	255	102	26	84	851	230	408	14	199
Sakhuana	334	127	57	93	57	106	37	40	16	13
Chak Chaudhari	573	331	204	7	31	198	37	126	28	7
Kanpahari	134	91	37	1	5	99	9	68	13	9
Amruhan	927	394	504	1	28	48	2	37	6	3
Kusiar	636	382	186	15	53	156	61	60	5	30
Purhara	333	74	242	1	16	137	30	74	0	33
Nima	195	89	106	0	0	0	0	0	0	0
Koriar	244	89	148	0	7	6	3	1	0	2
Bagaunti	192	103	66	1	22	105	6	83	0	16
Bahuara	323	154	60	8	101	300	78	210	2	10
Koni	7	0	4	0	3	326	7	313	3	3
Chauri	653	226	368	1	58	184	38	121	1	24
Mahabirganj	110	57	52	0	1	0	0	0	0	0
Janpuria	299	110	144	0	45	46	10	23	0	13
Kaul Dehri	1123	210	568	58	287	866	17	627	108	114

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

2. District Rohtas, Bihar

Dhanchhuhan	719	195	419	3	102	699	63	613	11	12
Patarpura	382	33	306	14	29	16	2	4	4	6
Chhatarpura	263	46	79	10	128	219	17	126	35	41
Kharaon Buzurg	193	143	12	2	36	474	80	330	1	63
Lodipur 1	198	18	162	2	16	143	14	109	5	15
Fatehpur	198	61	89	1	47	352	64	213	31	44
Dharampur	238	149	76	1	12	46	15	30	0	1
Athpa	258	168	78	1	11	1	1	0	0	0
Ojhaulia	222	130	73	0	19	8	1	6	1	0
Andhari	479	138	249	8	84	424	39	367	1	17
Andhari Mahazi	Uninhabited Village									
Harpur	104	17	76	2	9	158	2	149	7	0
Bhopatpur 2	Uninhabited Village									
Janaidih	131	42	75	2	12	74	16	49	1	8
Dhanchhua	66	28	25	0	13	370	157	207	1	5
Sonbarsa	37	8	0	2	27	75	4	66	1	4
Durgapur	Uninhabited Village									
Mathiya	218	190	8	1	19	25	18	5	0	2
Gopalpur 2	301	179	50	2	70	479	15	440	9	15
Milki	Uninhabited Village									
Dhanchhuha	Uninhabited Village									
Chak Niranjan	Uninhabited Village									
Danwar	1017	490	378	13	136	368	14	321	6	27
Belarhi	295	178	99	3	15	18	2	16	0	0
Sonbarsa	417	184	188	2	43	78	16	52	7	3
3. District Arwal, Bihar										
Rampur waina	1162	203	916	6	37	162	16	135	6	5
Bichlagawan	357	87	239	1	30	122	2	103	13	4
Saidpur	313	2	287	17	7	2	0	0	0	2

|									
Bahadurpur	218	166	12	4	36	194	112	74	3	5
Sumera	881	290	512	0	79	150	46	87	3	14
Chakia	251	42	144	0	65	106	0	80	0	26
Parasi	1061	87	686	1	287	133	12	48	0	73
Ballopur	53	0	47	3	3	138	1	118	0	19
Makhmulpur	229	142	21	8	58	170	14	55	8	93
Walidad	720	116	235	35	334	1362	15	709	316	322
Parasrampur	340	24	304	2	10	157	25	98	1	33
Bath	981	99	611	123	148	584	9	351	189	35
Kamta	1369	324	808	18	219	595	30	476	7	82
Tawakala	418	85	279	12	42	49	2	31	7	9
Gorkatta	287	39	185	2	61	13	2	5	1	5
Sakri	477	206	166	10	95	592	29	478	30	55
Mahrauli	111	97	11	0	3	5	1	2	0	2
Hardia	527	153	333	1	40	530	75	438	6	11
Maraila	194	89	87	0	18	88	51	35	0	2
Mehdiyabad	816	414	278	21	103	175	28	107	4	36
Chauki 1	3	0	2	0	1	123	4	103	0	16
Masuda	196	83	73	26	14	416	69	291	19	37
Niranjanpur	307	78	122	50	57	139	0	134	2	3
Khushdihra	166	121	28	2	15	5	3	1	1	0
Jamuhari	267	82	127	1	57	64	11	44	1	8
Ismailpur Koil	423	35	288	25	75	408	16	324	22	46
Turkharsa	93	56	12	0	25	177	3	155	7	12
Sarwarpur	1089	380	678	0	31	65	12	41	4	8
Koilbhupat	622	152	385	2	83	49	3	38	3	5
Masadpur	851	141	680	0	30	16	3	7	2	4
Bhagwanpur	331	40	272	3	16	33	7	20	1	5
Sohsa	957	376	361	33	187	463	119	323	11	10
Kharsa	447	145	291	6	5	230	3	137	42	48

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Village										
Lodipur 2	1136	46	1048	5	37	46	5	29	0	12
Musepur	482	117	309	9	47	26	5	10	1	10
Mainpura	1180	462	606	26	86	83	27	40	2	14
Upadhea Bigha	339	45	252	2	40	116	10	95	0	11
Kathrain	538	203	295	0	40	12	6	5	0	1
Durgapur	248	81	115	22	30	304	64	230	3	7
Wojha Bigha	296	96	188	0	12	130	1	122	0	7
Nawada	366	7	339	0	20	22	0	21	0	1
Belawan	1052	326	479	103	144	758	11	685	25	37
Belsar	902	354	342	27	179	726	111	461	34	120
Chauki 2	154	3	150	0	1	22	0	22	0	0
Koni	708	139	520	11	38	285	4	246	7	28
Pahleja	1321	285	786	42	208	818	44	653	41	80
Fatehabad	Uninhabited Village									
Jaipur	1425	495	790	13	127	301	16	224	10	51
Teri	894	310	558	0	26	56	31	17	0	8
TOTAL (10km)	**64488**	**19700**	**33419**	**1727**	**9642**	**36674**	**4591**	**25057**	**2352**	**4674**

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

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Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

Distribution of work participation rate of the study area population is shown in **Table 3.35** as follows;

Table 3.35: Distribution of Work Participation Rate (10km)

Occupation Class	Year, 2011
Main Workers	**64488 (21.0%)**
Male	51596(80.0%)
Female	12892(20.0%)
Marginal Workers	**36674(12.0%)**
Male	21911(59.7%)
Female	14763(40.3%)
Non-Workers	**203866(67.0%)**
Male	83874 (41.0%)
Female	119992(59.0%)
Total Population (10km)	**305028**
Source: Census of India Records, 2011	

Graphical representation of Workers Scenario is given below as **Figure 3.11.**
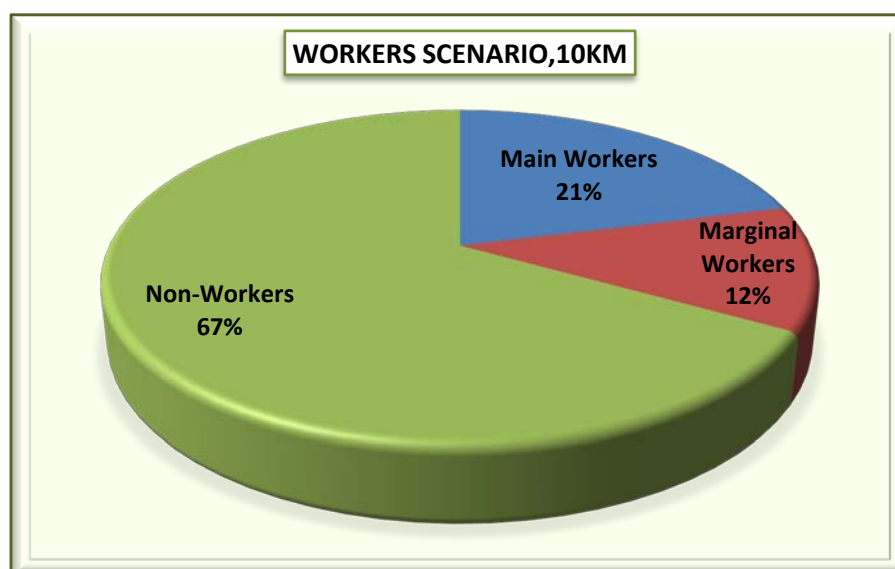
Figure 3.11: Workers Scenario of Study Area

Chapter-III   **BASELINE DATA DESCRIPTION**

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–
Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

Composition of Main Workers:

The 'Main Workers' were observed as 64488persons (21.0%) to the total population (305028) of the study area and its composition is made-up of Casual laborers as 19700 (30.0%), Agricultural laborers as 33419(52.0%), Household workers 1727(3.0%) and other workers as 9642(15.0%) respectively.

Composition of Main workers is shown below as **Figure 3.12.**
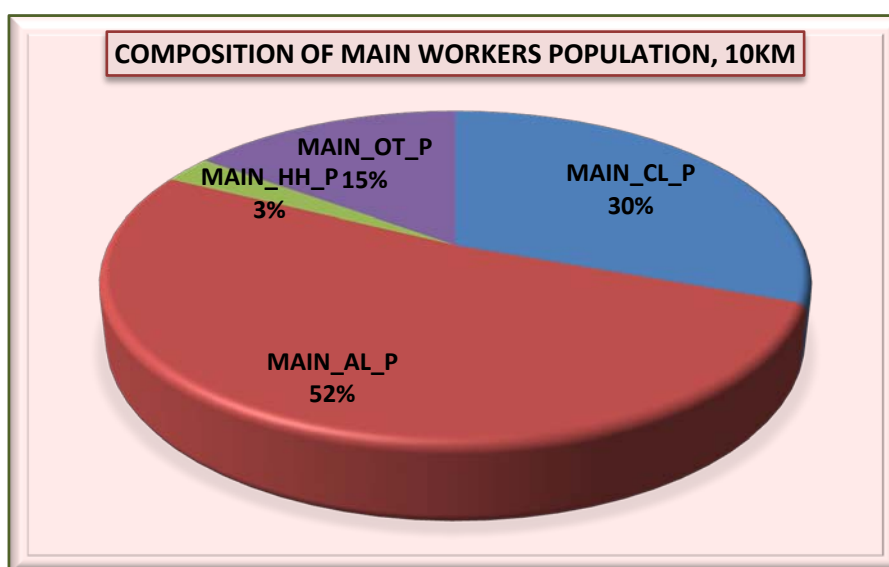
Figure 3.12: Composition of Main Workers Population

Composition of Marginal Workers:

The total marginal workers are observed as 36674 which constitute 12.0% to the total population (305028) comprising of Marginal Casual Laborers as 4591 (13.0%), Marginal Agricultural Laborers as 25057(68.0%), Marginal Household laborers as 2352 (6.0%) and marginal other workers were also observed as 4674 (13.0%) of the total marginal workers respectively.

Details about marginal workers in the study area are tabulated in **Table 3.35.** Composition of Marginal workers is shown in **Figure 3.13** as follows.

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Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.
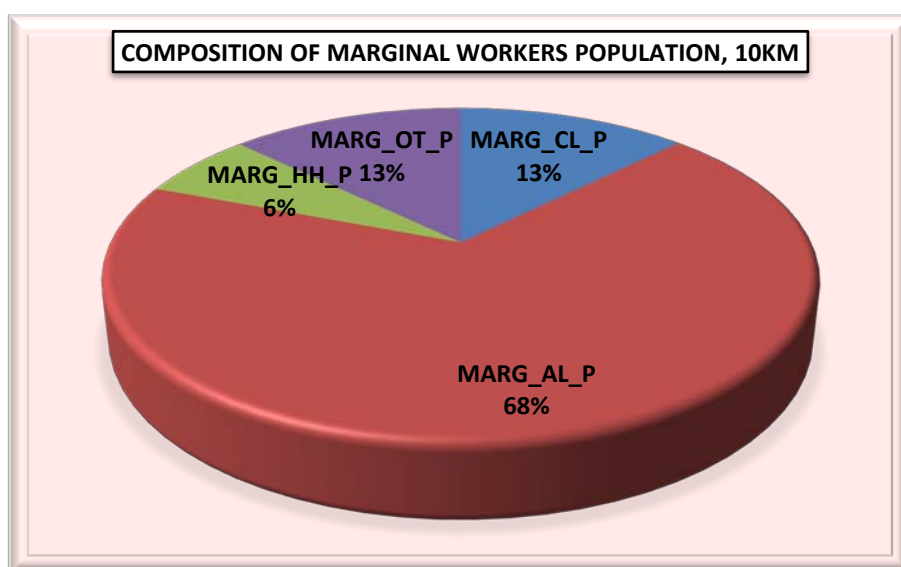
Figure 3.13: Composition of Marginal Workers

Composition of Non-Workers:

The total Non-worker's population was observed as 203866which accounts67.0% to the total population (305028) of the study area. Male-female wise Non-worker's population was recorded as 83874 Males (41.0%) and 119992Females (59.0%) respectively.

Details about Total Non-workers in the study area are compiled in **Table 3.36.** Graphical representation of Non-worker's population is shown as follows in **Figure 3.14.**

Table 3.36: Composition of Non-Workers

Non-Workers Population		
Persons	**Males**	**Females**
203866	83874 (41.0%)	119992(59.0%)

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Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.
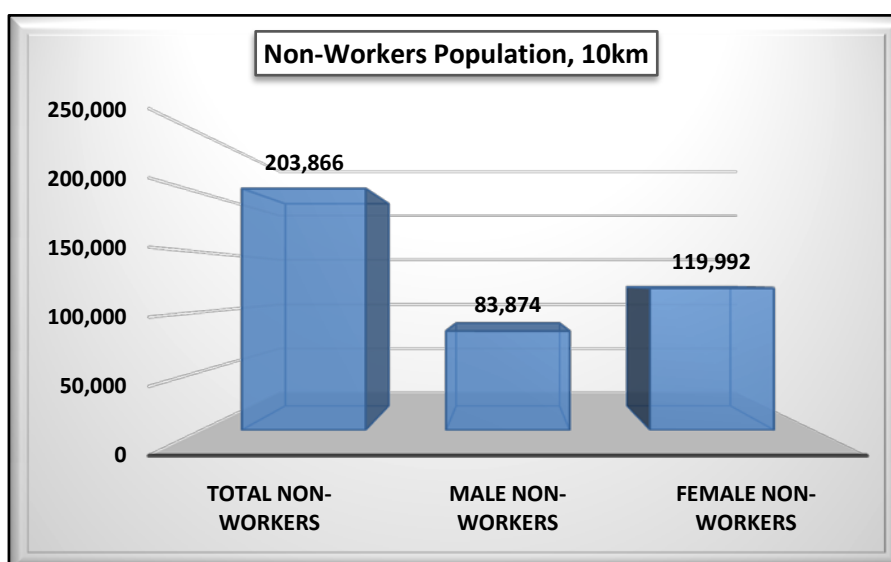
Figure 3.14: Composition of Non-Workers

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

A review of basic infrastructure facilities (*Amenities*) available in the study area has been done on the basis of the field survey and Census records, 2011 for the study area inhabited villages of Bhojpur, Rohtasand Arwaldistricts 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 159 villages lying under 3 main districts namely Bhojpur, Rohtas and Arwal in Bihar state. Overall study area villages are falling mainly under 8 tehsils namely Shahpur (03 villages), Tarari (59 villages), Sahar (37 villages), Kochas (01 villages), Dinara (05 villages), Karakat (05 villages), Arwal (07 villages) and Kaler (42 villages) of above mentioned 3 districts in Bihar State. No town found in the study area. There are seventeen (17) villages of above mentioned 3 districts of Bihar state found as uninhabited villages in the study area.

Educational Facilities

There isa total no. of170 Primary schools existing in the 10km radius study area.Ninety (90) no of Middle schools are foundin the study area. Only eighteen (18)Higher Secondary School (SS) andSix (06)Senior Secondary School (SSS) facility is available in the study area. The educational facilities have been further strengthening now and a number of private public

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Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–
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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.No town was found in the 10 km radial study area.

Availability of University Education in Bhojpur District

There are several affiliated and constituted colleges of the Veer Kunwar Singh University, Arrah which impart under graduate and post graduate education in the district. IGNOU (Indira Gandhi National Open University) has opened study center H D Jain College in Arrah 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 11 primary health centersexistin the study area; most of the study area villages depend upon the towns & district HQ of the study area having such facility. No community health centre exists in the study area. Only thirty-seven (37)Primary Health Sub-Centers exists in the villages of the study area. Only twenty-six (26) no of Mother & Child Welfare Centersarefound in the study area. Noallopathic hospitalexists in the study area. Only 2medical dispansaries were found in the study area. Only thirty-five (35) Family Welfare Centersare found in the study area. Overall study area villages are served by average 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 159 villages,109 villages (68.5%)are served with River/Canal water in the study area. As per the census records 2011, only3 villageswere foundbeing served with Tank/Pond/Lake as potable water facility in the study area.

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

Communication, Road & Transport Facilities

Apart from Post &Telegraph Office (PTO) services, transport is the main communication linkage in the study area. Compiled census 2011, data shows that the study area has good postal facilities in the 10km radius zone. About 51 villages(32.1%) were foundserving with Post Office facilities in the study area, remaining villages are depending upon towns of the study area. The study area has average rail and road network, passes from the area.

Only 2 villageswerefound with railway station facility in the study area.Nearest railway station isPiroRailway station in NW direction from the mine lease area site. Nearest town and District headquarter Arrah, is situated in Northeast.

Site is well connected by Nearest State Highway (SH-81) ispassing towards Northdirection from the site.Nearest airport is Jayprakash Narayan International Airport Patna, in Bihar state, situated at about 75.0km in Northeast direction from the mine lease area site.

Communication

Roads - The district of Bhojpur is well served by a network of roads. Road communication is the mainmode 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, theRural Engineering Organisation, the Zila Parishad and Municipalities. It is also connected with the interiorof the district by metalled road. Two National Highway NH-30 and NH-84 pass through the district.

The district has been fairly rich in road communication for a long time. Francis Buchanan has mentionedin 'Shahabad Journal' that there are some very good roads in the district. He traveled "by a very good roadwith brick bridges from Koilwar to Ara" he also mentions a few other good roads viz., "The great road ofBuxar, the Banaras road, road to Sasaram and the great road of Dumraon". Patna-Ara – Buxar road, Bihia-Piro road, Sasaram-Bikramganj-Ara road are also worth mentioning.

Railways - The district of Bhojpur has a railway communication system. It is served by East CentralRailway. Ara, the District Headquarters, is on the main line of Eastern Railway. It enters the district atKoilwar on the East and moves via Buxar to Moghalsarai on the West. Earlier, there was a narrow-gaugerail link from Ara to Sasaram. It is now closed since last 217 years. A new Broad-gauge rail line is beingconstructed between Ara and Sasaram.

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

Airways –The district of Bhojpur is not served by any regular air service.

Boats – The Ganga is navigable river in whole year round and goods are transported across the river tothe Uttar Pradesh in the North through boats also play in the Sone intermittently, through the district has anetwork of canals.

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.

Ara town is the hub of commercial activities of the district. In Bhojpur district, trade consists mainly of export of pulses, rices, castor seed, milk products and vegetables and import of cotton textiles, iron and steel products, cement, coal and consumer goods.

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 with poor electrification for Domestic, Agriculture, and Commercial& for allpurposes in the study area. Only10villages (6.3%) and towns of the study area are electrified for domestic purpose, only 07villages (4.4%) were found for agricultural purpose, commercial purpose & for all purposes in the study area.Out of 159 villages in the study area, 132 villages (83.0%) including 17 uninhabited villages (10.7%)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 Bhojpur 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. There are 3 rural power sub-station of 33/11 K.V. at Koilwar, Behia and Shahpur in the district Bhojpur. Four other rural Power sub-stations of the same capacity are under construction at Garahani, Piro, Jagdishpur and Saraia. Total numbers of villages electrified in the district are 420.

Village/town wise Basic Infrastructure and Amenities availabilities data for the entire study area is compiled and presented in **Table 3.37** as follows;

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

Table 3.37: Village wise Basic Amenities Availability

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	CT	PO	PTO	BS	RS	PR	KR	NW	FP	ED	E Ag.	EC	EA	
1. District Bhojpur, Bihar																															
Dumariya	1	1	0	1	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	Shahpur,15km
Dhauri	1	1	1	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	Shahpur,10km
Chanda	1	0	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	1	2	2	2	1	1	2	1	2	2	2	2	Shahpur,8km
Gopalpur 1	0	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	Piro,12km
Amaharua	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	Piro,12km
Tarari	1	1	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	1	1	2	2	1	2	2	1	2	2	2	2	Piro,12km
Bhopatpur 1	1	1	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	Piro,25km
Paranpura	1	1	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	Piro,25km
Saidanpur	1	1	0	0	0	0	1	0	0	0	1	2	2	1	1	1	2	2	1	2	2	2	1	1	2	1	2	2	2	2	Piro,25km
Tanrwa	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	Piro,16km
Bandhwa	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	Piro,17km

Chapter-III   **BASELINE DATA DESCRIPTION**

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

Village																															Location
Barka Gaon	3	3	1	1	0	0	1	0	0	0	0	2	2	1	1	1	2	2	1	2	2	2	2	1	2	1	2	2	2	2	Piro,17km
Surmana	0	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	Piro,17km
Bhadsera	1	1	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	1	2	2	2	1	1	2	1	2	2	2	2	Piro,17km
Dihri	1	0	0	0	0	0	0	0	0	0	1	2	2	1	1	1	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Piro,17km
Gangti	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	1	2	1	2	2	2	2	Piro,15km
Dumaria	2	1	0	0	0	0	1	0	0	0	0	2	2	1	1	1	2	2	1	2	2	2	1	1	2	1	2	2	2	2	Piro,15km
Itahri	1	1	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Piro,15km
Ranni	1	0	1	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	2	2	2	1	1	1	1	2	2	2	2	Piro,15km
Patkhauli	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	Piro,15km
Manikpur	Uninhabited Village																														Piro,15km
Labna	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	Piro,8km
Nirbhai Dehra	1	0	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	2	2	2	1	1	1	1	1	1	1	1	Piro,8km
Kiratpur	Uninhabited Village																														Piro,8km
Kariman Chak	Uninhabited Village																														Piro,8km
Gazo Dih	0	0	0	0	0	0	1	0	0	0	1	2	2	1	1	1	2	2	1	2	2	2	1	1	2	1	1	2	2	2	Piro,9km
Santokha Chak	Uninhabited Village																														Piro,9km
Salhadia	Uninhabited Village																														Piro,9km
Afzal Chak	Uninhabited Village																														Piro,9km
Chanda	1	1	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Piro,10km

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

Village	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Location
Deo Arazi	Uninhabited Village																														Piro,10km
Sikarhata Milik	0	0	0	0	0	0	0	0	0	0	0	2	1	1	1	2	2	2	1	2	2	2	2	2	1	1	2	2	2	2	Piro,10km
Sikarhata	4	4	1	1	0	0	1	0	0	0	0	2	2	1	1	1	2	2	1	2	2	2	1	1	2	1	2	2	2	2	Piro,10km
Sikarhata Khurd	2	1	0	0	0	0	1	0	0	0	0	2	1	1	1	1	2	2	2	2	1	2	1	2	2	1	2	2	2	2	Piro,10km
Noni Dih	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	1	2	2	1	2	2	2	2	Piro,10km
Basra	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Piro,10km
Bagar	2	3	1	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	1	2	2	2	1	1	2	1	2	2	2	2	Piro,10km
Khairulla Chak	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	1	2	2	2	1	2	2	1	2	2	2	2	Piro,10km
Harpur	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	Piro,12km
Usri	Uninhabited Village																														Piro,12km
Kurmorhi	3	2	1	0	0	0	1	0	0	0	1	2	2	1	1	1	2	2	1	2	2	2	1	1	2	1	2	2	2	2	Piro,10km
Dari Dih	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	Piro,10km
Panwari	4	2	0	0	0	1	1	1	0	0	1	2	2	1	1	1	2	2	1	2	2	2	1	1	2	1	2	2	2	2	Piro,10km
Imadpur	2	1	0	0	0	1	1	1	0	0	1	2	2	1	1	1	2	2	1	2	2	2	2	1	2	1	2	2	2	2	Piro,10km
Patelwa	Uninhabited Village																														Piro,10km
Bahadurpur	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Piro,10km
Lachchhi Dih	0	0	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	2	2	2	2	1	2	1	2	2	2	2	Piro,10km
Bishamharpur	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	Piro,10km
Kanu Dih	0	0	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	2	2	2	2	1	2	1	2	2	2	2	Piro,10km

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

Village																															Location
Moap Buzurg	4	1	1	0	0	0	1	0	0	0	1	2	2	1	2	1	2	2	1	2	2	2	1	1	2	1	2	2	2	2	Piro,10km
Khutaha	1	1	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	1	2	2	2	1	1	2	1	2	2	2	2	Piro,10km
Berain	1	1	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Piro,11km
Narayanpur	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	Piro,11km
Deo	1	1	1	0	0	0	0	0	0	0	1	2	2	1	1	1	2	2	1	2	2	2	1	1	2	1	2	2	2	2	Piro,11km
Kab Dehra	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	2	2	2	2	Piro,11km
Dhangawan	1	0	0	0	0	0	1	0	0	0	0	2	2	1	1	1	2	1	1	2	2	2	1	1	2	1	2	2	2	2	Piro,11km
Warsi	1	1	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Piro,11km
Moap Khurd	1	1	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Piro,11km
Dewria	Uninhabited Village																															Piro,11km
Bishunpura	1	1	0	0	0	1	1	1	0	0	1	2	2	1	1	1	2	2	1	2	2	2	2	1	2	1	2	2	2	2	Piro,12km
Rajpur	1	1	0	0	0	1	1	1	0	0	1	2	2	1	1	1	2	2	1	2	2	2	2	1	1	1	2	2	2	2	Piro,12km
Bihta	4	2	1	1	0	0	1	0	0	0	1	2	2	1	1	1	2	2	1	2	2	1	1	1	2	1	1	2	2	2	Piro,14km
Karbasin	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	2	Arwal,7km
Khaira	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	2	2	2	2	Arwal,7km
Jagdish Chak	Uninhabited Village																															Arwal,7km
Perhap	1	1	1	0	0	0	0	0	0	0	1	2	2	1	2	1	2	2	2	2	2	2	2	1	1	1	2	2	2	2	Arwal,7km
Hatimganj	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	Arwal,14km
Dhauri Chak	Uninhabited Village																															Arwal,14km

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

Village	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Location
Dhauri	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	1	2	2	2	2	Arwal,18km
Kharaon Chaturbhuj	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	1	2	2	2	1	2	1	1	2	2	2	2	Arwal,14km
Sakhuana	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	2	Arwal,12km
Chak Chaudhari	2	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	Arwal,10km
Kanpahari	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	Arwal,11km
Amruhan	1	1	0	0	0	1	1	1	0	0	1	2	2	1	2	1	2	2	1	2	2	1	2	1	2	1	2	2	2	2	Arwal,14km
Kusiar	1	1	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	1	1	2	2	2	1	2	1	2	2	2	2	Arwal,14km
Purhara	1	1	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	Arwal,14km
Nima	2	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	Arwal,16km
Koriar	1	1	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	Arwal,16km
Bagaunti	1	0	0	0	0	0	0	0	0	0	0	2	1	1	1	1	2	2	2	2	2	2	2	1	2	1	2	2	2	2	Arwal,16km
Bahuara	1	1	0	0	0	0	0	0	0	0	0	2	1	1	2	1	2	2	2	2	2	2	2	1	2	1	2	2	2	2	Arwal,16km
Koni	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	Arwal,18km
Chauri	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	2	Arwal,19km
Mahabirganj	1	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	2	2	2	2	Arwal,19km
Janpuria	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Arwal,24km
Kaul Dehri	1	1	1	0	0	0	0	0	0	0	1	2	2	1	1	1	2	2	2	2	2	2	1	2	2	1	2	2	2	2	Arwal,24km

2. District Rohtas, Bihar

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

Village																															Location
Dhanchhuhan	1	1	1	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	1	2	2	2	2	1	2	1	2	2	2	2	Arwal,22km
Patarpura	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	Arwal,21km
Chhatarpura	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Arwal,22km
Kharaon Buzurg	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	1	2	1	2	1	1	2	1	2	2	2	2	Arwal,14km
Lodipur 1	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	2	2	2	2	Arwal,14km
Fatehpur	1	1	1	0	0	1	1	1	0	0	1	2	2	1	1	1	2	2	1	2	2	2	1	2	1	1	1	2	2	2	Arwal,15km
Dharampur	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	Arwal,15km
Athpa	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	Arwal,16km
Ojhaulia	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	2	2	2	2	Arwal,19km
Andhari	1	0	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	1	2	2	2	1	1	2	1	2	2	2	2	Arwal,18km
Andhari Mahazi	Uninhabited Village																														Arwal,18km
Harpur	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	2	2	2	2	Arwal,20km
Bhopatpur 2	0	0	0	0	0	0	0	0	0	0	0	2	2	2	1	1	2	2	2	2	2	2	2	1	2	1	2	2	2	2	Arwal,20km
Janaidih	0	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	2	2	2	2	Arwal,20km
Dhanchhua	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	2	2	2	2	Sasaram,40km
Sonbarsa	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	Sasaram,45km
Durgapur	Uninhabited Village																														Sasaram,26km
Mathiya	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	Sasaram,35km
Gopalpur 2	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	Sasaram,50km

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

Milki	Uninhabited Village																														Sasaram,0km
Dhanchhuha	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	2	1	2	1	1	1	1	1	Bikramganj,10km
Chak Niranjan	Uninhabited Village																														Bikramganj,10km
Danwar	1	1	0	0	0	1	1	1	0	1	1	2	2	1	2	1	1	2	1	2	1	2	1	1	1	1	1	1	1	1	Bikramganj,18km
Belarhi	1	0	0	0	0	0	1	1	0	0	1	2	2	1	2	1	2	2	2	2	2	1	1	1	2	1	1	1	1	1	Bikramganj,16km
Sonbarsa	2	0	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	1	2	2	2	2	1	2	1	1	1	1	1	Bikramganj,25km
3. District Arwal, Bihar																															
Rampur waina	1	1	1	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	1	2	2	2	2	2	2	1	2	2	2	2	Arwal,12km
Bichlagawan	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	1	2	2	2	1	1	2	1	2	2	2	2	Arwal,13km
Saidpur	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Arwal,15km
Bahadurpur	1	1	0	0	0	1	1	1	0	0	1	2	2	1	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	Arwal,14km
Sumera	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	Arwal,13km
Chakia	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	1	2	2	2	1	1	2	1	2	2	2	2	Arwal,13km
Parasi	2	1	0	0	0	1	1	1	0	0	1	2	1	1	2	2	2	2	1	2	2	2	1	1	2	1	2	2	2	2	Arwal,13km
Ballopur	1	0	0	0	0	0	0	0	0	0	0	2	1	1	2	2	2	2	2	2	2	2	1	1	1	1	2	2	2	2	Arwal,10km
Makhmulpur	1	0	0	0	0	0	0	0	0	0	0	2	1	1	2	1	2	2	2	2	2	2	1	1	1	1	2	2	2	2	Arwal,10km
Walidad	1	1	0	0	0	0	1	1	0	1	1	2	1	1	2	1	1	2	1	2	1	2	1	1	2	1	2	2	2	2	Arwal,10km
Parasrampur	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	1	2	2	1	2	2	2	2	Arwal,17km
Bath	4	1	0	0	0	0	1	1	0	0	1	2	2	1	2	1	2	2	1	2	2	2	1	2	2	1	2	2	2	2	Arwal,18km

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

Kamta	1	1	1	0	0	0	1	1	0	0	1	2	2	1	2	1	2	2	1	2	1	2	1	2	1	1	2	2	2	2	Arwal,22km
Tawakala	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	1	2	2	2	1	1	2	1	2	2	2	2	Arwal,20km
Gorkatta	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Arwal,20km
Sakri	4	1	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	1	2	2	2	1	1	2	1	2	2	2	2	Arwal,20km
Mahrauli	1	1	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	Arwal,10km
Hardia	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	1	1	1	1	2	2	2	2	Arwal,15km
Maraila	1	1	0	0	0	0	1	1	0	0	1	2	2	1	2	1	2	2	1	2	1	2	1	1	2	1	2	2	2	2	Arwal,20km
Mehdiyabad	2	2	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	1	2	1	1	2	1	2	2	2	2	Arwal,15km
Chauki 1	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	1	2	2	1	2	1	2	2	2	2	Arwal,20km
Masuda	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	2	2	2	2	Arwal,20km
Niranjanpur	1	1	1	1	0	0	0	0	0	0	0	2	2	1	2	1	2	2	1	2	2	2	1	1	2	1	2	2	2	2	Arwal,25km
Khushdihra	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	Arwal,25km
Jamuhari	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	Arwal,26km
Ismailpur Koil	1	1	0	0	0	0	1	1	0	0	1	2	2	1	2	2	2	2	2	2	2	2	1	2	1	1	2	2	2	2	Arwal,22km
Turkharsa	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	Arwal,26km
Sarwarpur	1	1	0	0	0	0	1	1	0	0	1	2	2	1	2	1	2	2	1	2	2	2	1	2	2	1	2	2	2	2	Arwal,22km
Koilbhupat	1	1	0	0	0	0	1	1	0	0	1	2	2	1	2	2	2	2	2	2	2	2	1	2	1	1	2	2	2	2	Arwal,22km
Masadpur	1	1	0	0	0	1	1	1	0	0	1	2	2	1	2	2	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Arwal,30km
Bhagwanpur	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	1	2	2	1	2	1	2	2	2	2	Arwal,30km

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–
Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

Village																															Location
Sohsa	1	1	1	0	0	0	1	1	0	0	1	2	1	1	2	1	2	2	1	2	2	2	1	2	1	1	2	2	2	2	Arwal,30km
Kharsa	1	1	0	0	0	0	0	0	0	0	0	2	1	1	2	1	2	2	2	2	2	2	1	2	1	1	2	2	2	2	Arwal,31km
Lodipur 2	1	1	0	0	0	0	1	1	0	0	1	2	2	1	2	1	2	2	1	2	1	2	1	2	1	1	2	2	2	2	Arwal,32km
Musepur	2	1	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	1	2	1	1	2	2	2	2	Arwal,23km
Mainpura	1	1	0	0	0	0	1	1	0	0	1	2	2	1	2	1	2	2	1	2	1	2	1	2	1	1	2	2	2	2	Arwal,30km
Upadhea Bigha	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	2	2	1	2	2	2	2	Arwal,30km
Kathrain	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	1	2	2	2	1	2	2	1	2	2	2	2	Arwal,20km
Durgapur	1	0	0	0	0	0	1	1	0	0	1	2	2	1	2	1	2	2	2	2	2	2	2	2	2	1	2	2	2	2	Drwal,22km
Wojha Bigha	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	Arwal,30km
Nawada	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	1	2	1	1	2	2	2	2	Arwal,25km
Belawan	2	1	0	0	0	0	1	1	0	0	1	2	2	1	1	1	1	2	1	2	2	2	1	1	1	1	2	2	2	2	Arwal,36km
Belsar	1	1	1	0	0	0	1	1	0	0	1	2	1	1	2	1	2	2	1	2	2	2	1	1	2	1	2	2	2	2	Arwal,20km
Chauki 2	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Arwal,30km
Koni	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	Arwal,30km
Pahleja	3	1	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	2	2	1	2	2	2	2	Arwal,25km
Fatehabad	Uninhabited Village																														Arwal,16km
Jaipur	1	2	0	1	0	1	1	1	0	0	1	2	2	1	2	2	2	2	1	2	2	2	1	2	2	1	2	2	2	2	Arwal,20km
Teri	4	1	0	0	0	0	1	1	0	0	1	2	2	1	2	1	2	2	1	2	2	2	1	2	2	1	2	2	2	2	Arwal,20km
TOTAL (10km)	**1**	**9**	**1**	**6**	**0**	**1**	**3**	**2**	**0**	**2**	**3**	*Status for Availability and Non-Availability is shown as A (1) & NA (2)*																			

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–
Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

| 7 | 0 | 8 | | 1 | 7 | 6 | | 5 | | *respectively* | |
| 0 | | | | | | | | | | | |

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.

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

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;

Dalaur - The village is situated 2 kilometres east of Jadishpur and is noted as the site of the final battle between Babu Kuer Singh and the British forces in 1857. Situated 6 kilometres from Kulharia Railway Station in Koilwar block, the village is noted for the large contingent it provides to the Indian army.

Koilwar - The recently declared notified area committee, the town lies on the western bank of river Sone about 50 Kms. West of Patna and is the headquarters of the development block-cum-anchal of the same name. It is supposed to have a healthy climate and a sanatorium for T.B. patients has been built at a distance of two kilometers from the main town. There is a long road-cum-rail bridge over the river Sone. The upper part of the bridge serves the railways whereas pedestrians and vehicular traffic use the lower part.

Kulharia - The village lying in the Koilwar block is famous because of the Kulharia family whose members have great contributions towards the welfare of the State. One of the biggest college in the State, B.N. College of Patna was founded by Babu Bisheshwar Narain Singh, an ex-Zamindar of Kullharia family. His descendants have the credit of starting various other education institutions.

Bibiganj - The 1961 Census Report mentions the village as follows: "The village, situated 6 kilometers west of Arrah on the Arrah-Shahpur Road, has a bridge which is famous as the site of a battle between the Britisher and Babu Kuer Singh in 1857. There is also a forest known as 'Sarayan' used as the headquarters of guerilla warfare by Babu Kuer Singh ".

Sasurhi (Katho) - The village, which is situated 5 kilometres east of Jagdishpur, has a 300-year-old grave of theMuslim saint, Masar Dewan. It is held as sacred by the Muslims. Tar Situated about 10 kms. north-west of Piro the village derives its name from Tadika, a giantess killed by Lord Rama. There is an old tank in the village which is said to be the wrestling ground ofTadika.

Behea - A notified town during 80's lies Jagdishpur subdivision. It is on the main line of the East Central Railway. It is well connected by road. Behea was formerly the home of a branch of Harihobans Rajputs. It is believed that the Raja, Bhopat Deo, violated Mahini,

Chapter-III   BASELINE DATA DESCRIPTION

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

a Brahmin woman, who thereupon hurt herself to death and in dying imprecated the most fearful curses on the Harihobans Rajputs. After this tragedy the clan left Behea and moved across the Ganges to Ballia. The tomb of Mahini lies under a Pipal tree close to the Railway at Behea and is visit3d by hundreds of worshippers especially the women.

Deo - The village has the remains of a temple of Sun God, believed to have been built by the Sea God in ancient times. The temple was ravaged by Mahmud Ghazni. Indra, Baroon and Kuber are enshrined in it.

Arrah - The District Gazetteer of Shahabad (1966) describes the town as follows:

General Gunningham has identified Arrah with the place mentioned by Hiuen-Tsiang as that at which Asoka set up a Stupa to commemorate the conversion by Buddha of the demons of the desert who feasted on the blood and flesh of men. Even to this day, a legend lingers that this part of the country was the home of a powerful demon named Bakra, whose daily food was a human being supplied either by the village of Bakri or by Ghakrapur, as Arrah was then called. During their wanderings, the five Pandavas came to Ghakrapur and were entertained by a Brahman whose turn it was to supply a victim for the demon. Bhim Pandava, on hearing this declared that as he had eaten the Brahman's salt, he would go himself to the demon; and setting forth, he fought and killed him at Bakri, and then brought his body to Ghakrapur. This myth is found in a more complete form in the Mahabharatas and General Guninghan considers that it must have been one of the five honoured legends of antiquity which the Buddhists adopted for the glorification of their great teacher. The village Bakri still exists in the near neighbourhood of Arrah, and though there are no ancient remains at either place, the Brahmanical legend of Bakrasur is, in the opinion of General Guninghan, so clearly identical with that of the man eating demons described by the Chinese pilgrim that he accepts Arrah as the site of the stupa and lion pillar erected by Ashoka ".

Social, Cultural Events

In the district of Bhojpur, 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 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.

Chapter-III   **BASELINE DATA DESCRIPTION**

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

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.

Chapter-III   **BASELINE DATA DESCRIPTION**

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

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Chapter-4	Anticipated Environmental Impact And Mitigation Measures

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

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

Chapter-4	Anticipated Environmental Impact And Mitigation Measures

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

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.

Chapter-4	Anticipated Environmental Impact And Mitigation Measures

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

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 Son 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

Chapter-4	Anticipated Environmental Impact And Mitigation Measures

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

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 semi-mechanized method. The air borne particulate matter (PM10) generated by ore and waste handling operations, transportation and screening of ore is the main respirable air pollutant. The emissions of Sulphur dioxide (SO2), Nitrogen Oxides (NO2) contributed by vehicles plying on haul roads will be marginal. Prediction of impacts on air environment has been carried out taking into consideration proposed production and net increase in emissions.

4.3.1 Emissions Details

Loading - unloading and transportation of sand material, wind erosion of the exposed area and movement of light vehicles will be the main polluting source in the proposed mining activities releasing Particulate Matter (PM10) affecting Ambient Air of the area. Emission during, Loading and unloading was calculated by the area sources. Details of emission during loading/unloading and transportation on the haul road, wind erosion of the exposed area and road maintenance were discussed and combined impact was predicted in the worst case scenario under worst meteorological condition given as follows:

Loading and Unloading - US EPA, 2008, revision of emission factor for AP-42 was used to calculate emission of particulate matter released into the atmosphere during loading and unloading separately. Emission during loading was found more than during unloading. Emission of PM10 during loading was calculated and found to be 1.92 x 10-3 $g/s/m^2$ based on moisture content 10-20% mine. It is assumed that moisture content was 10% and further moisture content will be increased to 10-20% to reduce emission of PM10 during unloading and average wind speed was 0.92 m/s as observed with site data as shown in wind rose and discussion of local meteorology of the area.

Chapter-4	Anticipated Environmental Impact And Mitigation Measures

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

Haul Road - US EPA, 2006, revision of emission factor for AP-42 was used to calculate emission of particulate matter released into the atmosphere during transportation of ore and over burden by trucks operated per hour on haul road. Emission of PM10 due to transportation of sand on haul road was 1.65×10^{-4} g/s/m2 based on assumption that silt content spread on road surface was 5%, and efficiency of PM10 emission control 90%. Truck will be fully covered with tarpaulin material and emission of PM10 during on the haul road will be insignificant.

Based on the above consideration that there was low emission of PM10 during transportation of ore and overburden, however during loading & unloading, transportation of ore over the haul road, emission of PM10 of the exposed area due to wind erosion and movement of light vehicles on the road were not considered and combined with mining activities. US EPA based Dispersion ISCST-3 model was used for prediction of impact with 24-h meteorological data of the study period for the assessment of GLC.

4.3.2 Meteorological Data

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

Data recorded from authorized source/Govt. agency were used as meteorological input for Dispersion Model which was stored in the computer for further analysis and interpretation to study the local meteorology of the study area. It was observed that westerly & north westerly was pre-dominant wind during summer as shown in wind rose (Figure 4.1) with low wind speed and 13.6 % calm condition was observed during study period at the site which was very much close and cumbersome with long term meteorological data of IMD. Average wind speed was 0.92m/s. Impact of the pollutants was anticipated in southeast sector under influence of northeasterly & westerly winds. Ambient air quality locations were selected based on the long term wind rose pattern of the area. Air quality sampling locations were finalized to study the

Chapter-4   **Anticipated Environmental Impact And**
Mitigation Measures

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

baseline status around the proposed site and to study impact at various locations. 24-h maximum impact of PM10 was envisaged in southeast sector at very short distance from the site due to moderate to low wind speed.
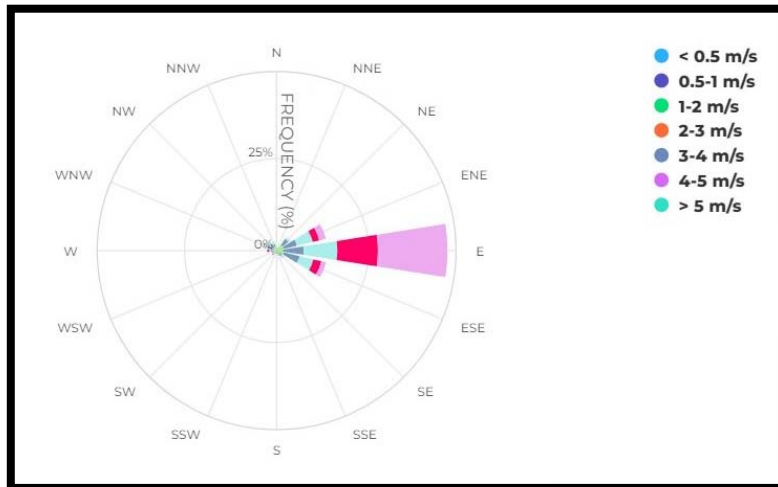
Figure 4.1: Wind Rose Diagram

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

4.3.3   Frame work of Computation & Model details

By using the above-mentioned inputs, ground level concentrations due to the mining activities have been estimated to know the incremental rise in ambient air quality and impact in the study area. The effect of air pollutants upon receptors are influenced by concentration of pollutants and their dispersion in the atmosphere. Air quality modeling is an important tool for prediction, planning and evaluation of air pollution control activities besides identifying the requirements for emission control to meet the regulatory standards and to apply mitigation measures to reduce

Chapter-4	Anticipated Environmental Impact And Mitigation Measures

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

impact caused by mining activities.

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

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

Mitigation measures

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

- ✓ Water sprinkling will be done on the haul roads twice in a day.
- ✓ Deploying PUC certified vehicles to reduce their emissions
- ✓ Proper tuning of vehicles to keep the gas emissions under check
- ✓ Monitoring to ensure compliance with emission limits would be carried out during operation
- ✓ There is no major source of emissions except emission from combustion of fuels from the Transportation Vehicles and Material Handling.
- ✓ Besides this, to control the emissions further regular preventive maintenance of Equipment / Transportation Vehicles will be carried out on contractual basis.
- ✓ It will be ensured that all transportation vehicles carry a valid PUC certificate.

Chapter-4
Anticipated Environmental Impact And Mitigation Measures

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

- ✓ 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
6.0	92	exposure falling in

Chapter-4   **Anticipated Environmental Impact And Mitigation Measures**

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4.0	95	between any figure and lower figure as indicated in column (1), the permissible sound is to be determined by extrapolation or proportionate scale.
3.0	97	
2.0	100	
1 ½	102	
1	105	
¾	107	
½	110	
¼	115	2. No exposure in excess of 115 dB (A) is permissible.

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.

Chapter-4   **Anticipated Environmental Impact And Mitigation Measures**

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

Anticipated Impacts:

Flora

The proposed project of river bed sand mining shall be carried out on the riverbed of Son 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.

Chapter-4   **Anticipated Environmental Impact And Mitigation Measures**

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

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 4.2: MAP SHOWING EVACUATION ROUTE FOR BHOJ SON BLOCK 38

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.

Chapter-4   **Anticipated Environmental Impact And Mitigation Measures**

| Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar. |

Table 4.2 (i): Existing Traffic Scenario & LOS for Block 38

Road	V	C	Existing V/C Ratio	LOS
State Highway (SH 81)	2500	15000	0.16	A

Source: Capacity as per IRC: 64-1990

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

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

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

Reference: ENVIS Technical Report, IISc, Bangalore.

During Mine operation for Sand **Block 38**

Proposed Capacity of Mine/annum   : 2937600 TPA

No. of working days   : 250 days

Proposed Capacity of mine/day   : 11750

Truck Capacity   : 16 tonnes

No. of trucks deployed/day   : 734.37 or 734

Increase in PCU/day (734*3)   : 2202

Table 4.2 (ii): Modified Traffic Scenario & LOS

Road	V	C	Modified V/C Ratio	LOS
State Highway (SH 81)	2500+2202= 4702	15000	0.31	B

Chapter-4	Anticipated Environmental Impact And Mitigation Measures

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

Results

From the above analysis it can be seen that the LOS has changed from 0.16 to 0.31 at Highway intersection that it changes from 'A' i.e 'Excellent' to 'B' i.e. 'Very Good'. 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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CHAPTER-5   **ANALYSIS OF ALTERNATIVE**
                                       TECHNOLOGY AND SITE

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

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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CHAPTER-6	ENVIRONMENTAL MONITORING PROGRAMME

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

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.

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

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.

CHAPTER-6	ENVIRONMENTAL MONITORING PROGRAMME

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

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

CHAPTER-6   ENVIRONMENTAL MONITORING PROGRAMME

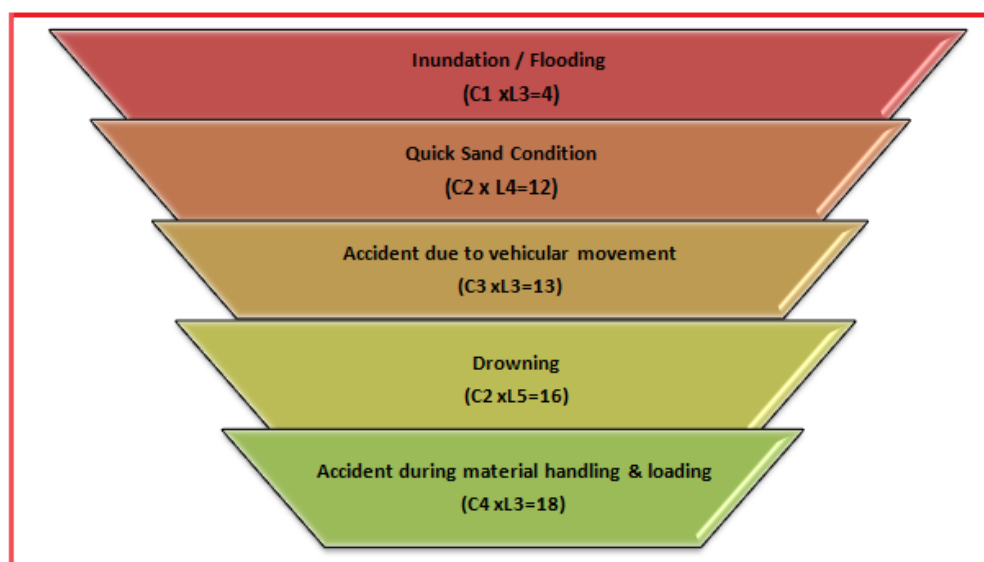**Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.**

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:

CHAPTER-6	ENVIRONMENTAL MONITORING PROGRAMME

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

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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CHAPTER-7	ADDITIONAL STUDIES

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

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.

CHAPTER-7   **ADDITIONAL STUDIES**

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–
Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

✓ 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.

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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	1	2	4	7	11

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Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

Catastrophic					
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:-

TheRisk rating of such hazards is as follows:

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

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

CHAPTER-7   **ADDITIONAL STUDIES**

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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.

CHAPTER-7

ADDITIONAL STUDIES

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

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**: Bhojpur 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.

| CHAPTER-7 | ADDITIONAL STUDIES |

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

(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 Bhojpur 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: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

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.

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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 104 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 Son 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.

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

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

CHAPTER-7   **ADDITIONAL STUDIES**

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

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 (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, 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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CHAPTER-8	PROJECT BENEFIT

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–
Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

8.0   GENERAL

Various benefits are envisaged while planning for the mining of sand from Son 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 Son 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

CHAPTER-8   **PROJECT BENEFIT**

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja–
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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.

CSR cost will be 2% of the total project cost. This amount will be used for social welfare. CSR COST is Rs 29,96,20,000/- x 2% = Rs. 59,92,400/-.

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

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CHAPTER-9   **ENVIRONMENTAL MANAGEMENT PLAN**

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

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:
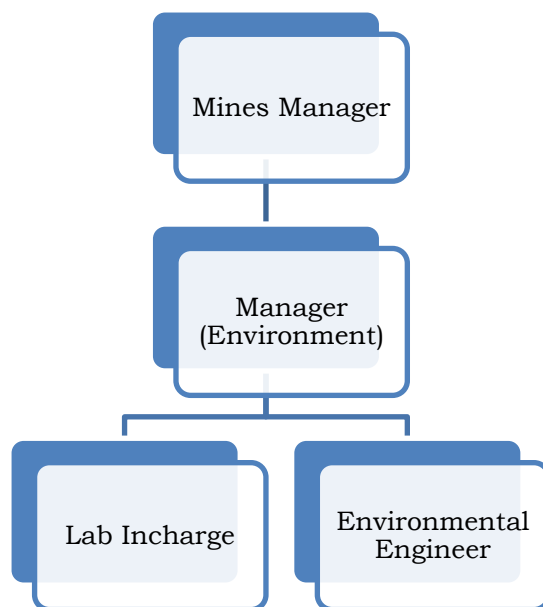
Figure 9.1 Environment Management Cell

CHAPTER-9	ENVIRONMENTAL MANAGEMENT PLAN

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

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.

CHAPTER-9   **ENVIRONMENTAL MANAGEMENT PLAN**

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

- Utmost care will be taken to prevent spillage of sand and stone from the trucks.

- Water sprinkling will be done to reduce the emission of dust due to transportation of minerals.

- Overloading will be prevented. The trucks/ tractor trolley will be covered by tarpaulin covers.

- Plantation activities in consultation with village Panchayat along the roads will also reduce the impact of dust in the nearby villages.

9.3   WATER POLLUTION CONTROL MEASURES

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

- Water requirements for drinking, plantation and dust suppression will be met by tanker supply on the daily basis.

- Local people will be employed and no permanent housing will be done so no permanent drainage pattern for sewerage system is required as domestic sewage shall be disposed off into septic tank followed by soak pits.

- Mining in the area will be done up to depth of 3.0mmaximum from the surface level well above the ground water table, therefore impact on water regime is not anticipated.

- Monitoring of water quality of nearby surface water, ground water and domestic water will be conducted once in every season except monsoon to evaluate the performance of the mitigation measures.

9.4   NOISE POLLUTION CONTROL MEASURES

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

CHAPTER-9	ENVIRONMENTAL MANAGEMENT PLAN

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

- 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.

CHAPTER-9	ENVIRONMENTAL MANAGEMENT PLAN

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

- 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. 960 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.

- Total Number of plants for cluster of Sand Blocks are given below.

Sand Ghat	Area (Ha)	Plants
Block 38	96.0	96.0*10 Plants= 960 plants
Total Plants		960 plants

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

S/n	Agro-climatic zone & Sub zone	Middle Genetic Plains, North west alluvial sub zone	
	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

CHAPTER-9   **ENVIRONMENTAL MANAGEMENT PLAN**

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

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 Tirupati HP, Prop.- Rajeev Ranjan Prasad Singh, S/o- Sukhdeo Prasad Singh, Add.- Shamsher Nagar, Daudnagar, Dist.- Aurangabad, Pin- 824143 (Sand Block 38) 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.

CHAPTER-9	ENVIRONMENTAL MANAGEMENT PLAN

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

- 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 inordinate delay in its execution.

9.9   ENVIRONMENT POLICY

M/s Tirupati HP, Prop.- Rajeev Ranjan Prasad Singh, S/o- Sukhdeo Prasad Singh, Add.- Shamsher Nagar, Daudnagar, Dist.- Aurangabad, Pin- 824143 (Sand Block 38) 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.

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

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.

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

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-38)

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).	9.60	0.5
4	Haul road Maintenance Cost	0.675	1.5
	TOTAL	**10.275**	**5.5**

Note: *960 plants * 1000 Rs (for each plants including hedges and fences) =Rs 9,60,000/-
- 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 *0.270 km haul road) = 67,500 /-

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Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

10.0   INTRODUCTION

10.1   Purpose of the Report

Environmental Impact Assessment report is prepared to comply with the Terms of Reference (TOR) received from SEIAA, Bihar under EIA notification of the MoEF&CC dated 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 Son River at Block No – 38 Sand Ghat at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar over an area of 96.0 hectares.

The Proposed Production is 1728000 cum/year or 2937600 TPA and Area of the project site is 96.0 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 1728000 cum/year or 2937600 TPA.

The project has been proposed by M/s Tirupati HP, (Prop.- Rajeev Ranjan Prasad Singh). The proposed project is over an area of 96.0 Ha at Khata no. – 153, Khasra No.- 1408, on Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, 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 **Rs 29,96,20,000/-** (including auction cost).

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

The proposed mining lease area falls in Survey of India Toposheet No. 72C/7, 72C/11, 72C/8 & 72C/12.

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

Table: 10.1 Mine lease Co-ordinates (Block 38)

	Co-ordinates	River
1	25° 12' 56.062" N 84° 31' 14.072" E	Son
2	25° 13' 1.988" N 84° 31' 11.060" E	
3	25° 13' 7.640" N 84° 31' 20.464" E	
4	25° 13' 10.740" N 84° 31' 30.745" E	
5	25° 13' 12.796" N 84° 31' 58.547" E	
6	25° 13' 12.264" N 84° 32' 10.220" E	
7	25° 13' 0.224" N 84° 32' 23.704" E	
8	25° 12' 56.884" N 84° 32' 21.827" E	
9	25° 12' 53.709" N 84° 32' 3.425" E	
10	25° 12' 51.675" N 84° 31' 30.947" E	
11	25° 12' 54.671" N 84° 31' 25.014" E	
12	25° 12' 56.661" N 84° 31' 17.490" 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– Fatehpur
b	Anchal	Sahar
c	District	Bhojpur
d	State	Bihar
2	Elevation above	73 AMSL to 74 AMSL
3	Nearest National Highway/State Highway	SH 81: Approx. 0.27 KM towards North direction. NH 139 : Approx. 7.0 KM towards SE direction.
4	Nearest Railway station	Piro Railway Station, approx. 16.0 km towards NW direction.

CHAPTER-10   SUMMARY & CONCLUSION

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

Sr. No.	Particulars	Details
5	Nearest Airport	Jay Prakash Narayan International Airport Patna, approx. 71.0 km towards NE direction.
6	Ecological Sensitive Areas (Wildlife Sanctuaries)	There is no any Ecological Sensitive Areas Like National Park, Wildlife Sanctuaries, etc are found within 10 km of the study area.
7	Seismic Zone	Zone- IV *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 (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja– Fatehpur, Anchal-Sahar, District- Bhojpur, Bihar
2	Mining Capacity	The Proposed Production is 1728000 cum/year or 2937600 TPA and Area of the project site is 96.0 ha.
3	Method of mining	Open cast semi-mechanized mining/OTFM
4	Total ML area	96.0 ha
5	Depth of mining	3.0 m depth
6	Manpower	104 persons
9	Water Requirement	7.50
10	Source of Water	Tanker/ Nearby village.

CHAPTER-10	SUMMARY & CONCLUSION

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

10.4.2 Mineral Reserves and production

Mineable reserves have been computed up to 3m depth from surface. Benches having height 1.5m & width 6.0m drawn from the ultimate pit limit. Area of each benches have been calculated multiplied by strike influence to get the volume. The volume multiplied by bulk density (1.7 g/cm3) to get the tonnage.

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

Table 10.4 Classification Mineral Reserves

Bench Level (mRL)	Length (m)	Width (m)	Depth (m)	Volume (cum)	Tonnes
73-71.5	1915	485	1.5	1393163	2368377
71.5-70	1905	475	1.5	1357313	2307432
Total				2750475	4675808

Total Mineable Reserve = 2750475 CUM or 4675808 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 Bhoj Son 38 Sand Ghat. However, as the digging depth will be restricted to 3.0 m only. This will be further replenished during rainy season. Sand Ghat will be worked systematically as the width is limited while length is much more. As the lease period is only 5 (Five) years, some of the area will be left un-worked at the end of lease period.

(i)Final Slope Angle to Be Adopted: Height of the bench is limited to 1.5 m while width of individual bench shall be kept 6.0m. River bank side will be protected by working in dry part

CHAPTER-10	SUMMARY & CONCLUSION

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

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.

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. 960 plants 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 March to May 2023 representing pre-monsoon season. It was observed that the during study period, temperature ranged from $14\,^0$C to $33\,^0$C.

CHAPTER-10　　　　　　　　　　**SUMMARY & CONCLUSION**

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

10.7.3 Ambient Air Quality

Ambient Air Quality Monitoring (AAQM) has been carried out at 05 locations. The Particulate Matter (PM_{10}) conc. ranged of 68.4 µg/m^3 to 92.6 µg/m^3. The Particulate Matter ($PM_{2.5}$) ranged from 37.1 µg/m^3 to 51.3 µg/m^3. Sulphur dioxide (SO_2) between 4.0 µg/m^3 to 7.9 µg/m^3..Oxides of Nitrogen (NO_2) between 5.9 µg/m^3 to 17.0 µg/m^3. The results thus obtained indicate that the concentrations of PM10, SO_2 and NO_2 in the ambient air are well within the National Ambient Air Quality (NAAQ) standards for Residential and Rural areas.

10.7.4 Water quality

To assess the physical and chemical properties of water in the region, water samples from 03 locations were collected from various water sources around the mine lease area. The pH was varying for ground waters from 7.38 to 7.61. The total dissolved solids are varying from 426 mg/l to 505 mg/l .

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

10.7.5 Noise Quality

Noise monitoring reveals that the minimum & maximum noise levels at day time were recorded as **48.3 dB(A) to 54.7 dB(A)** respectively. The minimum & maximum noise levels at night time were found to be **38.5dB (A) & 44.1dB (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.

CHAPTER-10	SUMMARY & CONCLUSION

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

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 Son 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.

CHAPTER-10 **SUMMARY & CONCLUSION**

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

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

CHAPTER-10   **SUMMARY & CONCLUSION**

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

- 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

CHAPTER-10   **SUMMARY & CONCLUSION**

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

10.11 ENVIRONMENTAL PROTECTION COST

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

Table 10.6: Cost of Environmental Protection Measures
Budget of EMP (Block-38)

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).	9.60	0.5
4	Haul road Maintenance Cost	0.675	1.5
TOTAL		**10.275**	**5.5**

Note: *960 plants * 1000 Rs (for each plants including hedges and fences) =Rs 9,60,000/-
- 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 *0.270 km haul road) = 67,500 /-

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.

CSR cost will be 2% of the total project cost. This amount will be used for social welfare. CSR COST is Rs 29,96,20,000/- x 2% = Rs. 59,92,400/-.

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

CHAPTER-10   **SUMMARY & CONCLUSION**

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

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 (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, 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 (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar.

National Accreditation Board for Education and Training

NABET

QCI

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

To

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

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

Dear Sir/Madam

This has reference to the accreditation of your organization under the QCI-NABET EIA Scheme, the validity of **P and M Solution** is hereby extended till Sept 01, 2023 or completion of the assessment process, whichever is earlier.

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

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

With best regards.

(A K Jha)
Sr. Director, NABET

Project: Sand Mining Project (Bhoj Son 38 Sand Ghat) At Riverbed of Son River at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, 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	Abhay Nath Mishra	FAE	SE
9	Hussain Ziauddin	FAE	WP
10	Poonam Kumari Mangalam	FAE	LU
11	Jatin Kumar Srivastava	FAE	NV

****

कार्यकारी सारांश

बालू खनन परियोजना भोज सोन 38 बालू घाट के लिए

मौजा – फतेहपुर, अंचल - सहार
जिला- भोजपुर, राज्य - बिहार

रेत ब्लॉक	ब्लॉक सं 38
क्षेत्र	96.0 हेक्टेयर
उत्पादन	2937600 टन प्रति वर्ष

आवेदन कर्ता

मैसर्स तिरूपति एच.पी

प्रो.-राजीव रंजन प्रसाद सिंह

पुत्र - सुखदेव प्रसाद सिंह

पता- शमशेर नगर, दाउदनगर, जिला- औरंगाबाद, पिन- 824143

एनवायरनमेंट कन्सल्टेंट :

पी & एम सल्यूशन

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।

❖ भोज सोन 38

परियोजना के प्रस्ताव मैसर्स तिरूपति एच.पी. (प्रो.-राजीव रंजन प्रसाद सिंह) ने दिया है। प्रस्तावित बालू खनन परियोजना मौजा- फतेहपुर, अंचल-सहार, जिला-भोजपुर (बिहार) में ब्लॉक संख्या - 38 बालू घाट पर सोन नदी पर स्थित है। पत्र संख्या 395/खनन, दिनांक 20-01-2023 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 20-05-2023 द्वारा जारी किया गया है।

आवेदित पट्टे के लिए प्रति वर्ष लगभग 2937600 टन प्रति वर्ष खनन प्रस्तावित किया गया है, प्रस्तावित परियोजना के लिए अनुमानित परियोजना लागत 29,96,20,000/- रुपये (नीलामी लागत सहित) है।

❖ परियोजना विवरण

स्थान:

भोज सोन 38

प्रस्तावित खनन पट्टा क्षेत्र सर्वे ऑफ इंडिया टोपोशीट संख्या- 72C/7, 72C/11, 72C/8 & 72C/12 के अंतर्गत आता है। पट्टा क्षेत्र मौजा– फतेहपुर, अंचल-सहार, जिला-भोजपुर, राज्य- बिहार में स्थित है। खान पट्टा समन्वय नीचे सूचीबद्ध हैं:

स्तंभ	अक्षांश / देशांतर
1	25° 12' 56.062" N 84° 31' 14.072" E
2	25° 13' 1.988" N 84° 31' 11.060" E
3	25° 13' 7.640" N 84° 31' 20.464" E
4	25° 13' 10.740" N 84° 31' 30.745" E
5	25° 13' 12.796" N 84° 31' 58.547" E
6	25° 13' 12.264" N 84° 32' 10.220" E
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11	25° 12' 54.671" N 84° 31' 25.014" E
12	25° 12' 56.661" N 84° 31' 17.490" E

❖ **क्षेत्र और उत्पादन**: कुल क्षेत्रफल 96.0 हेक्टेयर है। उत्पादन की प्रस्तावित दर 2937600 टीपीए होगी।

❖ संयोजकता

भोज सोन 38

भोज सोन 38 बालू घाट पट्टे से 270 मी. की दूरी पर SH 81 से पहुँच सड़क के द्वारा अच्छी तरह से जुड़ा हुआ है। SH 81, लगभग 0.27 किमी उत्तर दिशा की ओर है। पिरो रेलवे स्टेशन, लगभग 16.0 किमी उत्तर पश्चिम दिशा की ओर है। जय प्रकाश नारायण अंतर्राष्ट्रीय हवाई अड्डा, पटना, लगभग 71.0 कि.मी उत्तर पूर्व दिशा की ओर है।

परियोजना की मुख्य विशेषताएं

भोज सोन 38

आवेदक का नाम	मैसर्स तिरूपति एच.पी प्रो.-राजीव रंजन प्रसाद सिंह

पट्टेदार का पता	मैसर्स तिरूपति एच.पी
	प्रो.-राजीव रंजन प्रसाद सिंह
	पुत्र - सुखदेव प्रसाद सिंह
	पता- शमशेर नगर, दाउदनगर, जिला- औरंगाबाद, पिन- 824143
नाम	बालू खनन परियोजना भोज सोन 38 बालू घाट (सोन नदी)
गाँव	मौजा- फतेहपुर
जिला और राज्य	भोजपुर, बिहार
खनिज	बालू
क्षेत्र (हेक्टेयर)	96.0 हेक्टेयर

❖ ड्रिलिंग

ड्रिलिंग और ब्लास्टिंग की आवश्यकता नहीं है।

❖ खनिज का उपयोग

बालू 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। बालू को अपने मौजूदा रूप में एकत्र किया जाएगा।

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

निक्षेप को संस्तर की सतह से 3 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 3 मीटर की गहराई तक की गई है। टनभार प्राप्त करने के लिए वॉल्यूम को बल्क डेंसिटी (1.70 g/cm3) से गुणा किया जाता है।

हर साल मानसून के मौसम के दौरान नदी तल से उत्खनन किए गए खनिजों की फिर से भरपाई (रिप्लेनिशमेंट) हो जाएग। नदी के पैलियो चैनल से संबंधित क्षेत्र को समतल करके वापस बहाल किया जाएगा।

बेंचवार बालू का वार्षिक दोहन नीचे दिया गया है:

<p align="center">ब्लॉक नं: 38</p>

बेंच स्तर (mRL)	लंबाई (M)	चौड़ाई (M)	गहराई (M)	मात्रा (घन मीटर)	टन
73-71.5	1915	485	1.5	1393163	2368377
71.5-70	1905	475	1.5	1357313	2307432
कुल				2750475	4675808

कुल खनन योग्य रिजर्व = 2750475 घन मीटर या 4675808 टन

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

❖ **साइट सुविधाएं और उपयोगिताएँ**
• **जलापूर्ति**

श्रमिकों को पीने व घरेलू उपयोग के लिए पानी उपलब्ध कराया जाएगा। धूल के दमन के लिए भी पानी की आवश्यकता होगी। प्रस्तावित परियोजना के लिए 7.50 केएलडी के जल की आवश्यकता होगी। ताजे पानी का उपयोग केवल पीने के उद्देश्य के लिए किया जाएगा। आसपास के गांव के उपलब्ध स्रोतों से पानी की आपूर्ति की जाएगी।

- **अस्थायी विश्राम गृह**

विश्राम के लिए स्थल के पास श्रमिकों के लिए एक अस्थायी विश्राम आश्रय प्रदान किया जाएगा। इसके अलावा, छोटे कीड़ों की कुछ प्रजातियों द्वारा उत्पादित जहर का मुकाबला करने के लिए एंटी-वेनम के साथ प्राथमिक उपचार बॉक्स, यदि कोई हो और श्रमिकों के लिए स्वच्छता सुविधा जैसे सेप्टिक टैंक या सामुदायिक शौचालय की सुविधा प्रदान की जाएगी।

- **आधारभूत पर्यावरणीय स्थिति**

वायु, ध्वनि, जल, मिट्टी, वनस्पति एवं जीव-जन्तुओं के लिए प्रस्तावित खनन के संबंध में पर्यावरणीय डाटा एकत्र किया गया है। बेसलाइन पर्यावरण अध्ययन मार्च 2023 से मई 2023 तक प्री मानसून के मौसम के दौरान खनन पट्टा क्षेत्र के आसपास 10 किमी की रेडियल दूरी वाले क्षेत्र में किया गया था।

- **मौसम-विज्ञान**

निगरानी अवधि मार्च 2023 से मई 2023 के लिए संक्षिप्त मौसम संबंधी डेटा नीचे दिया गया है:

महीना	तापमान °C			हवा की गति (किमी/घंटा)	
	न्यूनतम	अधिकतम	औसत	औसत	अधिकतम
मार्च 2023	14	29	20	9.7	16.8
अप्रैल 2023	17	33	24	10.7	17.1
मई 2023	18	32	24	9.4	15.6

आधारभूत पर्यावरणीय स्थिति

गुण	आधारभूत स्थिति
एम्बिएंट(परिवेशी) वायु गुणवत्ता	एम्बिएंट (परिवेशी) वायु गुणवत्ता निगरानी से पता चलता है कि सभी 05 AQ निगरानी स्टेशनों में PM2.5 की न्यूनतम और अधिकतम सांद्रता क्रमशः 37.1 μg/m3 से 51.3

	μg/m3 पाई गई; PM10 68.4 μg/m3to 92.6 μg/m3 की सीमा में था जहां तक गैसीय प्रदूषकों SO2 और NO2 का संबंध है, आवासीय और ग्रामीण क्षेत्रों के लिए 80 μg/m3 की निर्धारित CPCB सीमा किसी भी स्टेशन पर पार नहीं की गई है।
शोर का स्तर	निगरानी कार्यक्रम के परिणामों ने संकेत दिया कि निगरानी किए गए सभी 05 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। सोन 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 7.80 से 8.18 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 बालू खनन परियोजना के कार्यान्वयन से स्थानीय लोगों को प्रत्यक्ष और अप्रत्यक्ष दोनों तरह के रोजगार के अवसर मिलेंगे। अध्ययन क्षेत्र में शिक्षा, स्वास्थ्य, आवास, पानी, बिजली आदि को और बेहतर किया जा सकता है। उम्मीद है कि प्रस्तावित खनन परियोजना और संबद्ध औद्योगिक और व्यावसायिक गतिविधियों के कारण इसमें काफी हद तक और सुधार होगा।

❖ अनुमानित पर्यावरणीय प्रभाव

• वायु पर्यावरण पर प्रभाव

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

• जल पर्यावरण पर प्रभाव

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

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

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

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

❖ भूमि पर्यावरण पर प्रभाव

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

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

पोस्ट प्रोजेक्ट पर्यावरण निगरानी

क्रम संख्या	पैरामीटर्स का विवरण	निगरानी की अनुसूची
1	हवा की गुणवत्ता	मानसून को छोड़कर प्रत्येक मौसम में सप्ताह में दो बार/तीन बार 24 घंटे के नमूने

2	जल गुणवत्ता (सतह और भूजल)	साल में 4 सीजन के लिए एक बार
3	मिट्टी की गुणवत्ता	परियोजना क्षेत्र में वर्ष में एक बार
4	शोर स्तर	साल में दो बार पहले दो साल और फिर साल में एक बार
5	सामाजिक-आर्थिक स्थिति	3 साल में एक बार
6	वृक्षारोपण निगरानी	एक बार एक मौसम में

❖ अतिरिक्त अध्ययन

- **सार्वजनिक सुनवाई**

जन सुनवाई अभी बाकी है।

❖ जोखिम आकलन

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

❖ आपदा प्रबंधन योजना

आपदा प्रबंधन की योजना में आपातकालीन तैयारी एक महत्वपूर्ण पहलू है। कार्मिकों को उचित रूप से प्रशिक्षित किया जाएगा और सावधानीपूर्वक नियोजित, सिम्युलेटेड प्रक्रियाओं के माध्यम से आपातकालीन प्रतिक्रिया में मानसिक और शारीरिक रूप से तैयार किया जाएगा। इसी तरह, प्रमुख कर्मियों और आवश्यक कर्मियों को संचालन में प्रशिक्षित किया जाएगा।

❖ परियोजना लाभ

- **भौतिक लाभ**: सड़क परिवहन, बाजार, हरित आवरण में वृद्धि और सामुदायिक संपत्तियों का निर्माण।

- **सामाजिक लाभ**: रोजगार क्षमता में वृद्धि, राजकोष में योगदान, स्वास्थ्य संबंधी गतिविधियों में वृद्धि, शैक्षिक उपलब्धियां और मौजूदा सामुदायिक सुविधाओं का सुदृढ़ीकरण।

❖ पर्यावरणीय लाभ:

❖ नदी चैनल को नियंत्रित करना और बैंकों की सुरक्षा करना।

❖ बाढ़ के कारण आसपास की कृषि भूमि के डूबने को कम करना।

❖ नदी के स्तर के उन्नयन को कम करना।

❖ अवैध खनन गतिविधि पर एक जांच।

❖ कॉर्पोरेट की सामाजिक जिम्मेदारी

दिनांक 1 मई 2018 के कार्यालय ज्ञापन के अनुसार परियोजना लागत की पूंजीगत लागत का 2% कॉर्पोरेट पर्यावरणीय उत्तरदायित्व के लिए आवंटित किया जाएगा। लोगों की जरूरतों और मांग को ध्यान में रखते हुए निम्नलिखित प्रस्तावित किया गया है।

सैंड ब्लॉक 38 के लिए सीईआर (CER) लागत कुल परियोजना लागत का 2% होगी। इस राशि का उपयोग समाज कल्याण के लिए किया जाएगा। सीएसआर (CSR) लागत रु. 29,96,20,000/- x 2% = रु. 59,92,400/-.

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।
- योजना अवधि में हॉल रोड के आसपास लगभग 960 पौधे लगाए 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 जाएं

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

ईएमपी का बजट (ब्लॉक - 38)

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	एक माली के लिए वृक्षारोपण और वेतन (अंशकालिक आधार पर)	9.60	0.5
4	परिवहन सड़क रखरखाव लागत	0.675	1.5
	TOTAL	10.275	5.5

नोट: *960 पौधे * 1000 रुपये (हेज और बाड़ सहित प्रत्येक पौधे के लिए) = 9,60,000/- रुपये

• ढोना सड़क रखरखाव के लिए श्रम का वेतन 2 श्रमिक*300=600 प्रति दिन

• 600* 250= 1,50,000/-

• *2.5 लाख प्रति किलोमीटर (2,50,000*0.270 किमी लंबी सड़क) = 67,500 /-

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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EXECUTIVE SUMMARY

FOR

SAND MINING PROJECT BHOJ SON 38 SAND GHAT , DISTRICT - BHOJPUR

At
Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar

SAND BLOCK	BLOCK 38
AREA	96.0 HA
PRODUCTION	2937600 TPA

PROJECT PROPONENT

M/s Tirupati HP
Prop.- Rajeev Ranjan Prasad Singh
S/o- Sukhdeo Prasad Singh
Add.- Shamsher Nagar, Daudnagar, Dist.- Aurangabad, Pin- 824143.

Environment Consultant

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

PMS
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NABET

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.

Bhoj Son 38

The project has been proposed by M/s Tirupati HP, (Prop.- Rajeev Ranjan Prasad Singh). The Proposed Sand Mining Project is located on Son River at Block No – 38 Sand Ghat at Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar. LOI issued to lessee via letter no 395/khanan, dated 20-01-2023.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 20-05-2023.

It has been proposed to mine around **1728000 cum/year or 2937600 TPA** for applied lease. The estimated project cost for the proposed project is Rs 29,96,20,000/- (including auction cost).

PROJECT DESCRIPTION

LOCATION

Bhoj Son 38

The proposed mining lease area falls in Survey of India Toposheet No- 72C/7, 72C/11, 72C/8 & 72C/12. The lease area is located in Mauja– Fatehpur, Anchal- Sahar, District- Bhojpur, Bihar. The mine lease co-ordinates are listed below:

	Co-ordinates	River
1	25° 12' 56.062" N 84° 31' 14.072" E	Son
2	25° 13' 1.988" N 84° 31' 11.060" E	
3	25° 13' 7.640" N 84° 31' 20.464" E	
4	25° 13' 10.740" N 84° 31' 30.745" E	
5	25° 13' 12.796" N 84° 31' 58.547" E	
6	25° 13' 12.264" N 84° 32' 10.220" E	
7	25° 13' 0.224" N 84° 32' 23.704" E	
8	25° 12' 56.884" N 84° 32' 21.827" E	
9	25° 12' 53.709" N 84° 32' 3.425" E	
10	25° 12' 51.675" N 84° 31' 30.947" E	
11	25° 12' 54.671" N 84° 31' 25.014" E	
12	25° 12' 56.661" N 84° 31' 17.490" E	

Area & production: The total ML area is 96.0 Ha. Proposed rate of production will be 1728000 cum/year or 2937600 TPA.

Connectivity:

Bhoj Son 38

Bhoj Son 38 is well connected via an approach road of approx. 270 Metres to SH 81. SH 81 is at Approx. 0.27 KM towards North direction. Piro Railway Station is approx. 16.0 km towards NW direction. Jay Prakash Narayan International Airport Patna,is approx. 71.0 km towards NE direction.

Salient Features of Project

Bhoj Son 38

Name of the applicant	M/s Tirupati HP Prop.- Rajeev Ranjan Prasad Singh
Address of Lessee	M/s Tirupati HP Prop.- Rajeev Ranjan Prasad Singh S/o- Sukhdeo Prasad Singh Add.- Shamsher Nagar, Daudnagar, Dist.- Aurangabad, Pin- 824143. Mob. 7970660015 Email. mminfraway@gmail.com
Name of Mine	Sand Mining Project On Son River at Bhojpur Block No.-38 Sand Ghat,
Village	Mauza– Fatehpur
District & State	Bhojpur, Bihar
Mineral	Sand
Area (ha)	96.0 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 3 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 3m depth from surface. Benches having height 1.5m & width 6.0m drawn from the ultimate pit limit. Area of each benches have been calculated multiplied by strike influence to get the volume. The volume multiplied by bulk density (1.7 g/cm3) to get the tonnage.

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

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

Block No.- 38

Bench Level (mRL)	Length (m)	Width (m)	Depth (m)	Volume (cum)	Tonnes
73-71.5	1915	485	1.5	1393163	2368377
71.5-70	1905	475	1.5	1357313	2307432
Total				2750475	4675808

Total Mineable Reserve = 2750475 CUM or 4675808 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 cluster water of 7.50 KLD will be required for the proposed project. Fresh water will be only used for drinking purpose. The water will be supplied from available sources from nearby village.

Temporary Rest Shelter

A temporary rest shelter will be provided for the workers near to the site for rest. In addition, First aid box along with anti-venoms to counteract poison produced by certain species of small insects, if any and sanitation facility i.e. septic tank or community toilet facility will be provided for the workers.

BASELINE ENVIRONMENTAL STATUS

Environmental data has been collected in relation to proposed mining for Air, Noise, Water, Soil, Flora & Fauna. The baseline environment study was carried out over an area with radial distance of 10 km around the mining lease area during pre-monsoon season from March to May 2023

Meteorology

The Summarized Meteorological Data for the Monitoring Period March to May 2023 is given below:

Month	Temperature °C			Wind Speed (Km/Hr)	
	Min	Max	Avg.	Avg.	Max
March 2023	14	29	20	9.7	16.8
April 2023	17	33	24	10.7	17.1
May 2023	18	32	24	9.4	15.6

Baseline Environmental Status

Attribute	Baseline status
Ambient Air Quality	Ambient Air Quality Monitoring reveals that the minimum & maximum concentrations of PM2.5 amongst all the 05 AQ monitoring stations were found to be 37.1 µg/m^3 to 51.3 µg/m^3

	respectively; PM10 was in the range of 68.4 µg/m^{3}to 92.6 µg/m^{3}As far as the gaseous pollutants SO_2 and NO_2 are concerned, the prescribed CPCB limit of 80 µg/m^3 for residential and rural areas has never been surpassed at any station.
Noise Levels	The results of the monitoring program indicated that both the daytime and night time levels of noise were well within the prescribed limits of NAAQS, at all the 05 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 Son 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 7.80 to 8.18, 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 Son 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.

CSR cost will be 2% of the total project cost. This amount will be used for social welfare. CSR COST is Rs 29,96,20,000/- x 2% = Rs. 59,92,400/-.

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

❖ **PLANTATION:**

- The project will not lead to any tree cutting. However, asocial responsibility, greenery will be developed along the both sides of road and the bank of river. Community services will be deployed in raising these plantations. Trees of economic importance and native origin such as fruit trees shall be planted.
- Approx. 960 plants 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

Budget of EMP (Block-38)

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).	9.60	0.5
4	Haul road Maintenance Cost	0.675	1.5
TOTAL		**10.275**	**5.5**

Note: *960 plants * 1000 Rs (for each plants including hedges and fences) =Rs 9,60,000/-
- 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 *0.270 km haul road) = 67,500 /-

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.

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