DRAFT ENVIRONMENTAL IMPACT ASSESSMENT

AND

ENVIRONMENTAL MANAGEMENT PLAN

OF

SAND MINING PROJECT OF PAHLEJA GHAT/UNIT-12 SAND GHAT, DISTRICT - SARAN

SAND BLOCK	**PAHLEJA GHAT/UNIT-12**
PROPOSAL NO	**SIA/BR/MIN/425535/2023**
TOR NO	**SIA/1(a)/2399/2023**
AREA	**13.8 HA**
PRODUCTION	**248400 cum/year OR 370116 TPA**
LOCATION	**VILLAGE- KASAMAR, RASULPUR, ANCHAL- SONEPUR, DISTRICT- SARAN, (BIHAR)**

APPLICANT

Maa Bhawani Traders;
Prop.- Vikash Kumar Singh
Add.- Rampur, Aami, Dighwara,
Dist.- Saran, Bihar

CONSULTANT

P&M Solution

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A QCI –NABET Accredited Organization

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1.0 PURPOSE OF THE REPORT

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

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

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

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

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

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

1.1 IDENTIFICATION OF PROJECT, PROJECT PROPONENT

The Proposed Sand Mining Project is located on Ganga River at Pahleja Ghat/Unit-12 Sand Ghat at Village- Kasamar, Rasulpur, Anchal- Sonepur, District- Saran (Bihar)

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

The proposed project is of River bed sand mining and falls under Category- "B1" as per EIA Notification 2006 and its subsequent amendments by Ministry of Environment Forests & Climate Change, GOI. Pahleja Ghat/Unit-12 Sand Ghat fall in Village- Kasamar, Rasulpur, Anchal- Sonepur, District- Saran (Bihar). The details of the project are given below:

Name & Address of the Mine	Pahleja Ghat/Unit-12	Sand Mining Project (Pahleja Ghat/Unit-12) Sand Ghat on Ganga River at Village – Kasamar, Rasulpur, Anchal – Sonepur Dist - Saran (Bihar).
River	Ganga	
Mineral	Sand	
Area (Ha.)	Pahleja Ghat/Unit-12	13.8 Ha.
Production	Pahleja Ghat/Unit-12	248400 cum/year or 370116 TPA
Postal Address	Pahleja Ghat/Unit-12	Maa Bhawani Traders; Prop.- Vikash Kumar Singh

		Add.- Rampur, Aami, Dighwara, Dist.- Saran, Bihar
Status of Mine	Fresh application for Environmental Clearance.	
Project Cost	RS- 6,73,05,000/-	
CER Cost	CSR cost will be 2% of the total project cost. This amount will be used for social welfare. CSR COST is Rs 6,73,05,000/-x 2% = Rs. 13,46,100/-	

1.2 BRIEF DESCRIPTION OF PROJECT

The proposed project is open cast semi-mechanized mining of sand with a proposed production of 370116 Tonnes per annum for all these three applied lease. Detail has been given below:

The proposed project is over an area 13.8 ha for Pahleja Ghat/Unit-12. Details are summarized in Table no 1.1

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

Table: 1.1 Project cost & Production

Block	Area	Production	Project Cost (Rs.)
Pahleja Ghat/Unit-12	13.8 Ha.	370116 TPA	6,73,05,000/-
Total		**370116 TPA**	6,73,05,000/-

.

Khata No.& Khasra No.
Khata No.–516, 434, 307, 511, 369, 522, 298, 521, 444, 331, 612, 615, 398, 402, 391, 618, 42, 10, 623, 622, 611, 574, 579, 577, 369, 311, 402, 373, 340, 578, 580, 600, 96, 606, 446, 448, 463, 422, 468, 462, 461, 455, 462, 461, 453, 466, 460, 470, 476, 450, 455, 458, 454, 449, 468, 478, 490, 486, 478, 484, 456, 451, 457, 473, 464, 485, 487, 488, 486, 475, 473, 487, 471, 490, 483, 482, 480, 358, 474, 471, 477, 488, 487, 400, 375, 357, 365, 436, 381, 309, 429, 299, 308, 529, 540, 562, 567, 627, 630, 629, 564, 567, 547, 546, 562, 538, 534, 537, 573, 533, 572, 575, 573, 537, 586.

Khasra No.- 1005, 810, 811, 1001, 813, 1000, 999, 814, 998, 819, 820, 824, 988, 987, 825, 828, 830, 986, 985, 984, 831, 832, 983, 979, 978, 976, 977, 975, 974, 973, 967, 966, 834, 835, 836, 837, 853, 854, 855, 856, 964, 963, 962, 961, 945, 944, 942, 946, 948, 949, 947, 1129, 1131, 1132, 1125, 1126, 1128, 1130, 1738, 1739, 1742, 1737, 1736, 1740, 1741, 1734, 1733, 1743, 1744, 1748, 1735, 1766, 1825, 1720, 1731, 1732, 1727, 1726, 1728, 1730, 1725, 1729, 1753, 1754, 1757, 1745, 1749, 1750, 1751, 1752, 1759, 1758, 1760, 1761, 1755, 1756, 1765, 1764, 1763, 1762, 1721, 1723, 1724, 1767, 1722, 1771, 1772, 1773, 1769, 1770, 1774, 1775, 1820, 1776, 1768, 1782, 1783, 1784, 1785, 1786, 1787, 1788, 1781, 1780, 1777, 1778, 1779, 1810, 1789, 1790, 1791, 1792, 1793, 1794, 1795, 1796, 1797, 1798, 1799, 1800, 1801, 1808, 1807, 1805, 1804, 1803, 1802, 1916, 1917, 1918, 1919, 1921, 1922, 1923, 1924, 1925, 1926, 1927, 1932, 1933, 1941, 1942, 1945, 1944, 1945, 1947, 1948, 1949, 1950, 1951, 1943, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1484, 1485, 1486, 1487, 1488, 1479, 1480, 1481, 1483, 1477; Thana No.- 80

The proposed mining lease area falls in Survey of India Toposheet 72G/01 & 72G/02. The mine lease co-ordinates and connectivity details are listed below:

Table: 1.2 Mine lease Pillar Co-ordinates (Pahleja Ghat/Unit-12)

Pillar No	Latitude (N)	Longitude (E)
A	25°42'46.31"N	85° 6'38.31"E
B	25°42'9.30"N	85° 6'32.39"E
C	25°42'8.28"N	85° 6'28.86"E
D	25°42'25.28"N	85° 6'30.04"E
E	25°42'46.99"N	85° 6'34.82"E

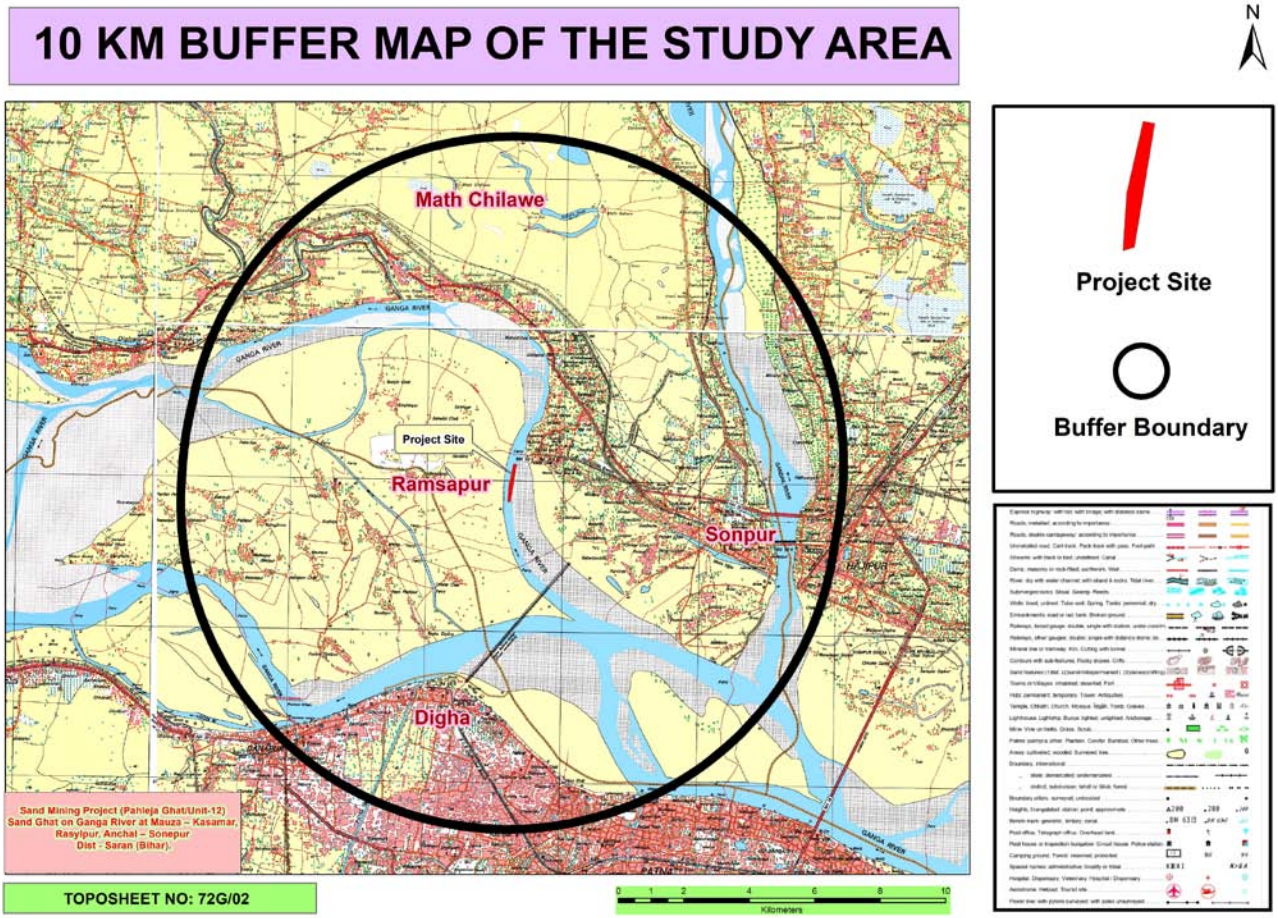

Figure 1.1, 10 km buffer map

Table: 1.3, Connectivity Details given below

Nearest Habitation/ town	**Blocks**	**Village**	**Distance (Km) Direction**
	Pahleja Ghat/Unit-12	Mirzapur	Mirzapur, approx. 1.0 Km in NE direction.
		Chausiya	Chausiya approx. 0.80 Km in NNE direction.
		Sonepur	Sonepur approx. 6.30 Km in East direction.
Nearest Railway Station	**Blocks**	**Railway Station**	**Distance (Km)**

			Direction
	Pahleja Ghat/Unit-12	Bharpura Pahleja Ghat Railway Station	approx. 2.80 km in SE.direction.
Nearest Airport	**Blocks**	**Airport**	**Distance (Km) Direction**
	Pahleja Ghat/Unit-12	Jayprakash Narayan Airport, Patna	approx. 13 km in SW direction.
Nearest Highway	NH-31 at a distance of approx. 2.75 Km in NE direction.		

1.3, Details of environmental settings

Sl. No.	Particulars	Details
2	Ecological Sensitive Areas (National Park, Wildlife Sanctuaries)	No Ecological Sensitive areas found within 10 km study area.
3	Nearest water body	The mine site lies on the dry bed of Ganga 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, extraction of these minor minerals through mining was expedient. The haphazard mining of sands being practiced now for long, through unregulated, uncontrolled and illegal way added almost an irreversible damage to the environment, which became a cause of serious concern to everyone. Though sands are very important mineral source for development, its mining through scientific methods has also become equally imperative.

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

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

1.4 SCOPE OF THE STUDY

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

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

Table: 1.5 Point wise compliance for TOR of Pahleja Ghat/Unit-12

(ToR File No - SIA/1(a)/2399/2023)

S. No	TOR	Compliance	Reference in the Report
1	Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to 1994.	This is fresh LOI, Mine is yet to be opened. It will open only after getting environmental clearance.	--
2	A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given.	State Govt. has given consent for mining vide letter no. 2983/M dated 26/10/2022 for Pahleja Ghat/Unit-12.	**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- 13.8 Hectare. Lessee: Maa Bhawani Traders; Prop.- Vikash Kumar Singh Add.- Rampur, Aami, Dighwara, Dist.- Saran, Bihar Waste generation- No waste will be generated. Mining Method-Opencast semi-mechanized method	**Annexure- III** Mine plan All details has been complied in chapter-2

4	All corner coordinates of the mine lease area, superimposed on a High Resolution Imagery /toposheet, topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).	All Corner Coordinates of mining lease area superimposed on Toposheet Map has been incorporated in EIA/EMP Report	Refer Chapter 2 Fig: 2.1, Corner Coordinates map
5	Information should be provided in Survey of India Toposheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics.	The land use map showing salient features of the area is given in the report. The geological map of the mine lease area is also given in the report showing geomorphology	Land-use of the study area Figure 3.1.
6	Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority.	The Lease area is dry part of River bed. This is a barren land. The mining process will be done by land use policy of the State & no land diversion has been proposed.	Chapter II & III
7	It should be clearly stated whether the proponent Company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating	Yes, the proponent Company has a well laid down Environment Policy. The hierarchical system or administrative order of the company has been given in the	Chapter VIII Section 8.1 Corporate Environment Policy

	processes /procedures to bring into focus any infringement / deviation / violation of the environmental or forest norms / conditions?. The hierarchical system or administrative order of the company to deal with the environmental issues and for insuring compliances with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large, may also be detailed in the EIA Report.	EIA report.	
8	Issues relating to Mine safety ,including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided.	Issue related to mine safety has been given in of chapter 7.	
9	The study area will comprise of l0 km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc. should be for the life of the mine/lease period.	The 10 km zone from periphery of the lease has been considered as the study area. The Buffer map of the study area is attached with report. All the details in the EIA report are for the life of the mine	Chapter I Figure 1.1

		period. The details of mining & production have been given in the report.	
10	Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.	Land use pattern of 10 km from the periphery of the lease area has been prepared and incorporated with the report. The study area lies in Ganga River. No Ecological Sensitive areas found within 10 km study area.	Land-use of the study area Figure 3.1 , Table 3.1 10 km buffer map enclosed in Chapter I of EIA Report.
11	Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use ,R&R Issues, if any, should be given.	There is no overburden outside the mine lease area.	
12	A Certificate from the Competent Authority in the State Forest Department should be provided, 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	There is no forest land within the lease area.	---

	the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees.		
13	Status of forestry clearance for the broken up area and virgin forestland involved in the Project including deposition of net present value (NPV) and Compensatory afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished.	No forest land is involved in the lease area, therefore, deposition of net present value (NPV) and compensated Afforestation is not indicated.	
14	Implementation status of recognition of forest rights under the schedule tribes and other traditional forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated"	There is no forest land involved in the leased out area. Hence, this act is not applicable for this project.	
15	The vegetation in the RF / PF areas in the study area, with necessary details, should be given	However, the vegetation details of the study area are incorporated with the report.	Chapter III Section 3.1.6 Biological Environment
16	A study shall be got done to ascertain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project on the	The details Impacts & there mitigation measures are given in chapter IV of EIA/EMP	Chapter IV

	wildlife in the surrounding and any other protected area and accordingly, detailed mitigative measures required, should be worked out with cost implications and submitted.	Report.	
17	Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger / Elephant Reserves / (existing as well as proposed), if any, within l0 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished.	No National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger / Elephant Reserves / (existing as well as proposed) are found within 10 km of the study area. MAP showing eco sensitive zone is attached in Chapter III (Fig 3.4)	Chapter III Section 3.1.6 Biological Environment
18	A detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In	Detailed biological study of core zone and buffer zone within 10 km radius of the periphery of the mine lease has been carried out for the project. The same has been incorporated in the report.	Chapter III Section 3.1.6 Biological Environment

	case of any scheduled-I fauna found in the study area, the necessary plan along with budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost.		
19	Proximity to Areas declared as 'Critically Polluted' or the Project areas attracting court restrictions for mining operations, should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Dept. Should be secured and furnished to the effect that the proposed mining activities could be considered.	Proposed project does not come under critically polluted area.	
20	Similarly, for coastal projects ,A CRZ map duly authenticated by one of the authorized agencies demarcating LTL.HTL, CRZ area ,location of the mine lease w.r.t CRZ, Coastal features such as mangroves ,if any should be furnished.(Note: The Mining Projects falling under CRZ would also need to obtain approval of the	There is no R & R involved in this project.	

	concerned Coastal Zone Management Authority)		
21	R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a need based sample survey, family-wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in the mine lease area will be shifted or not. The issues relating to shifting of village(s) including their R&R and socio-economic aspects should be discussed in the Report.	There is no R & R involved in this project.	
22	One season (non-monsoon) [i.e. March-May (Summer Season); October-December (post monsoon season); December-February (winter season)] primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality,	Base line study was carried out for March 2023 to May 2023 Details are provided in EIA/EMP Report. The locations of the monitoring stations were decided on the basis of prevailing	Chapter III

	noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report" Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given.	meteorological conditions (Wind direction & wind speed) of the study area. The wind rose has been given in chapter III of EIA/EMP Report. One location has been selected in downwind direction within 500 m from the lease boundary. The location of the monitoring sites has been shown in map.	
23	Air quality modeling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of vehicles for transportation of mineral. The details of the model used and input parameters used for modeling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing	A detailed study on Air quality modeling will be incorporated at the time of FEIA.	

	pre-dominant wind direction may also be indicated on the map.		
24	The water requirement for the Project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the Project should be indicated.	The water requirement 5.13 KLD for Pahleja Ghat/Unit-12 A detailed water balance is being provided in the report.	Chapter –II Section 2.7 Water Requirement
25	Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.	Water requirement will be fulfilled by private water tanker. So, no clearance is required.	Chapter II
26	Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the project, if any required should be provided.	The project do not consume any process water except for drinking, dust suppression & plantation. Plantation is proposed, which will increase the water holding capacity & 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	Mining activity will be done on Dry Bed of River so there is no impact on surface water.	Chapter II

	safeguard measures, if any required, should be provided".	Mining will be up to 3 m below 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 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 Ganga 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 mining will be done as per the approved mining plan and 3 meter bgl whichever is comes	

	schematic diagram may also be provided for the same.	first.	
31	A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and Quantities coverage, plant species and time frame) and Submitted keeping in mind the same will have to be executed up front on commencement of the Project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution.	Plantation/afforestation will be done as per program i.e along the road sides and near civic amenities, as per mine plan. Post plantation, the area will be regularly monitored in every season for evaluation of success rate. List of Plant species selected for green belt is detailed in the EIA report. The plant species selected for green belt have a greater ecological value and are of good utility value to the local population. The plant species are selected by giving emphasis on local and native species and the species which are tolerant to pollution	Chapter VIII Section 8.2
32	Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load.	The projection has been done based on the mineral transportation. The details of traffic analysis are discussed in the report.	Chapter IV

	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 project specific occupational health mitigation measures with required facilities proposed in the mining area	Occupational health impact mainly is expected due air pollution due to fugitive dust emission because of movement of vehicles. However appropriate mitigation measures for air pollution control have been given in the report, discussed in Chapter-4.	Chapter VII

	may be detailed.	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.	
36	Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.	The proposed project being a small scale semi-mechanized mining project, there will be hardly any process related health implication on the population of the nearby villages except fugitive dust emissions due to transportation. Budgetary allocation is given in Chapter-VIII.	Chapter VII
37	Measures of socio economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time to time for implementation.	Socio-economic significance provided to the local community i.e. to the nearby villagers is given in the EIA/EMP Report.	Chapter VI
38	Detailed environmental management plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational	The detailed environmental management plan to mitigate the environmental impacts has been mentioned in of the EIA/EMP Report.	Chapter VIII

	health impacts besides other impacts specific to the proposed Project		
39	Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project.	This is a draft EIA report. Public hearing is yet to be conducted.	--
40	Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.	No litigation is pending against the project.	
41	The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.	The capital cost & recurring cost has been earmarked for EMP in Chapter IX **Block** / **Capital Cost** / **Recurring Cost** **Pahleja Ghat/Unit-12** / **3.08** / **5.5**	Chapter IX
42	A Disaster management Plan shall be prepared and included in the EIA/EMP Report".	A Disaster management Plan has been given in EIA report.	Chapter VI
43	Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.	2% of the total cost of the project has been earmarked towards the Enterprise Social Commitment which will be used for the development of village.	

44	**Besides the above, the below mentioned general points are also to be followed:-**		
a	All documents to be properly referenced with index and continuous page numberings.	All the documents to be properly referenced with index and continuous page numbering.	
b	Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated.	Compiled With EIA report.	
c	Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF&CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the Project.	Compiled With EIA report.	
d	Where the documents provided are in a language other than English, an English translation should be provided.	Compiled With EIA report.	
e	The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.	Compiled With EIA report.	
f	While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF vide O.M. No. J-	Compiled With EIA report.	

	11013/41/2006-IA.II (I) dated 4th August, 2009, which are available on the website of this Ministry, should be followed.		
g	Changes, if any made in the basic scope and project parameters (as submitted in Form-I and the PFR for securing the TOR) should be brought to the attention of MoEF&CC with reasons for such changes and permission should be sought, as the TOR may also have to be altered. Post Public Hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation.	Agreed.	
h	As per the circular no. J-11011/618/2010-IA. II (I) dated 30.5.2012, certified report of the status of compliance of the conditions stipulated in the environment clearance for the existing operations of the project, should be obtained from the Regional Office of Ministry of Environment, Forest and Climate Change, as may be applicable.	This is new case for Mining. No certified compliance is required.	

i	The EIA report should also include (i) surface plan of the area indicating contours of main topographic features, drainage and mining area, (ii) geological maps and sections and (iii) sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area.	Compiled With EIA report.	

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2.0 TYPE OF PROJECT

The project is proposed is for sand block Pahleja Ghat/Unit-12 for the excavation of sand from the bed of river Ganga. The proposed project is opencast semi-mechanized/OTFM mining project.

2.1 NEED FOR THE PROJECT

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

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

2.2 LOCATION DETAILS

The Proposed Sand Mining Project was located on Ganga River at Pahleja Ghat/Unit-12, Sand Ghat at Mauza– Kasamar, Rasulpur, Anchal –Sonepur Dist - Saran (Bihar)

Table: 2.1 Mine lease Pillar Co-ordinates (Pahleja Ghat/Unit-12)

Pillar No	Latitude (N)	Longitude (E)
A	25°42'46.31"N	85° 6'38.31"E
B	25°42'9.30"N	85° 6'32.39"E
C	25°42'8.28"N	85° 6'28.86"E
D	25°42'25.28"N	85° 6'30.04"E
E	25°42'46.99"N	85° 6'34.82"E

Pahleja Ghat/Unit-12 Sand Ghat is well connected by NH-31 at a distance of approx. 2.75 Km in NE direction.

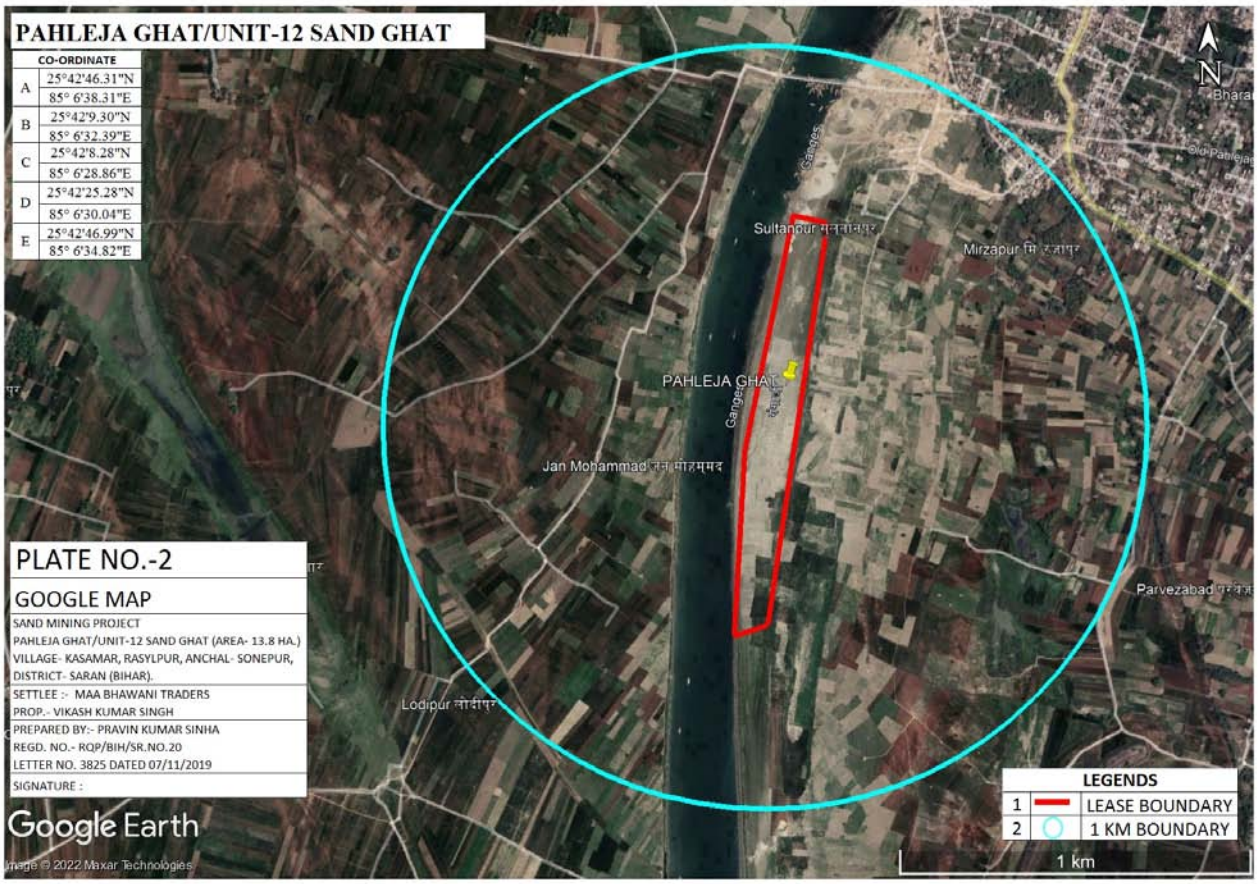

Figure 2.1:- Pillar Coordinate map of Pahleja Ghat/Unit-12

2.2.1 Lease / Block Area

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

Block	Area	Production	Project Cost (Rs.)
Pahleja Ghat/Unit-12	13.8 Ha.	370116 TPA	6,73,05,000/-
Total		**370116 TPA**	**6,73,05,000/-**

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Khata No.& Khasra No.
Khata No.–516, 434, 307, 511, 369, 522, 298, 521, 444, 331, 612, 615, 398, 402, 391, 618, 42, 10, 623, 622, 611, 574, 579, 577, 369, 311, 402, 373, 340, 578, 580, 600, 96, 606,

446, 448, 463, 422, 468, 462, 461, 455, 462, 461, 453, 466, 460, 470, 476, 450, 455, 458, 454, 449, 468, 478, 490, 486, 478, 484, 456, 451, 457, 473, 464, 485, 487, 488, 486, 475, 473, 487, 471, 490, 483, 482, 480, 358, 474, 471, 477, 488, 487, 400, 375, 357, 365, 436, 381, 309, 429, 299, 308, 529, 540, 562, 567, 627, 630, 629, 564, 567, 547, 546, 562, 538, 534, 537, 573, 533, 572, 575, 573, 537, 586.

Khasra No.- 1005, 810, 811, 1001, 813, 1000, 999, 814, 998, 819, 820, 824, 988, 987, 825, 828, 830, 986, 985, 984, 831, 832, 983, 979, 978, 976, 977, 975, 974, 973, 967, 966, 834, 835, 836, 837, 853, 854, 855, 856, 964, 963, 962, 961, 945, 944, 942, 946, 948, 949, 947, 1129, 1131, 1132, 1125, 1126, 1128, 1130, 1738, 1739, 1742, 1737, 1736, 1740, 1741, 1734, 1733, 1743, 1744, 1748, 1735, 1766, 1825, 1720, 1731, 1732, 1727, 1726, 1728, 1730, 1725, 1729, 1753, 1754, 1757, 1745, 1749, 1750, 1751, 1752, 1759, 1758, 1760, 1761, 1755, 1756, 1765, 1764, 1763, 1762, 1721, 1723, 1724, 1767, 1722, 1771, 1772, 1773, 1769, 1770, 1774, 1775, 1820, 1776, 1768, 1782, 1783, 1784, 1785, 1786, 1787, 1788, 1781, 1780, 1777, 1778, 1779, 1810, 1789, 1790, 1791, 1792, 1793, 1794, 1795, 1796, 1797, 1798, 1799, 1800, 1801, 1808, 1807, 1805, 1804, 1803, 1802, 1916, 1917, 1918, 1919, 1921, 1922, 1923, 1924, 1925, 1926, 1927, 1932, 1933, 1941, 1942, 1945, 1944, 1945, 1947, 1948, 1949, 1950, 1951, 1943, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1484, 1485, 1486, 1487, 1488, 1479, 1480, 1481, 1483, 1477; Thana No.- 80

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

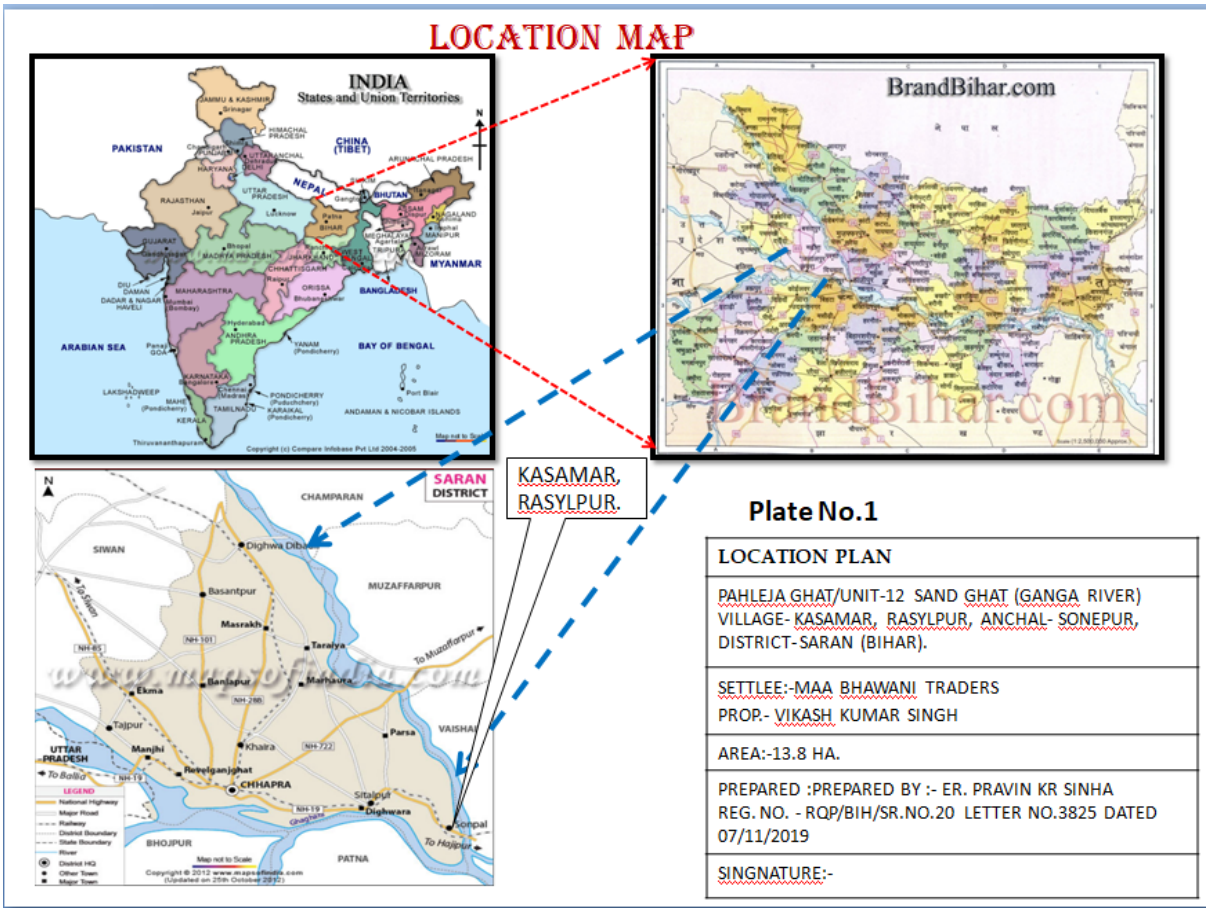

Figure 2.2:- Location map of the project site Pahleja Ghat/Unit-12

2.3 TOPOGRAPHY & GEOLOGY

2.3.1 Topography

Saran district is one of the thirty-eight districts of Indian state of Bihar. The district, part of Saran Division, is also known as Chhapra district after the headquarters of the district, Chhapra. Geography of Saran district is situated between 25°36' and 26°13' North latitude and 84°24' and 85°15' East longitude in the southern post of the newly created Saran Division of North Bihar. The Ganges constitute the Southern boundary of the district beyond which lie the districts of Bhojpur and Patna.

This district is a part of the Lower Ganga Basin. It falls in the Gandak sub-basin. Perennial rivers viz., the Ganga, the Ghagra and the Gandak, govern the drainage system in the district. The river Ganga meets the district at Kotwapatti Rampur and flow from west to east along the southern boundary of the district. The Gandak flows from northwest to southeast

forming the northeastern boundary of the district. The river Gandak meets the river Ganga at Sonepur. The tributaries of the Gandak River viz., Mahi, Ghoghari and Gandaki flow roughly in the southeast direction. The Ghagra River also known as Suryu, in the adjacent state Uttar Pradesh, flows in the southeast direction. It forms the southwestern boundary of the district. The river Ghagra meets the river Ganga near Chapra. Saran district is located on global map between 25°36' and 26°13' North latitude and 84°24' and 85°15' East longitude. The district occupies an area of 2,641 square kilometers.

The district is shaped like a triangle with its apex at the confluence of the boundary of Gopalganj district and the Gandak river. The Gandak river along with Muzaffarpur and Vaishali districts forms the eastern side, the Ganges and the Ghaghra along with Bhojpur and Patna districts forms the southern side, whereas the boundaries of Balia district of U.P. and Siwan and Gopalganj districts of Bihar and north western form the western side of the triangular Saran district. The land slopes towards the south east which is also the direction followed by the rivers.

The State of Bihar is transecting by a no. of rivers. The individual river basins and their catchment areas is shown in Fig. no. 1 below. 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.

Source: *Mining plan.*

2.3.2 GEOMORPHOLOGY

The district is shaped like a triangle with its apex at the junction of the boundary of Gopalganj district and the Gandak River. The land slopes towards southeast. The area has rich and fertile alluvial plain with quite a few depressions and marshes. There are three broad geomorphic divisions.

a) The alluvial plains along the major rivers, which are subjected to periodic inundation

b) The region of uplands away from the river and not subjected to floods and

c) The "diara" areas in the beds of the river Ganges, Gandak and Ghagra.

Source: *https://cgwb.gov.in/District_Profile/Bihar/Saran.pdf***.**

2.3.3 REGIONAL GEOLOGY

Regionally the area constitutes a part of the Ganga River Basin.

The north-eastern part of Haryana 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.

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 Gandak ,Ghagra 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.

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 river banks.

Soil/ alluvium varying in thickness from 0.20m to 0.60m m constitute the top horizons in the area suitable for agriculture. River 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 2.0 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

The westerly wind accompanied by dust storms around middle March marks the beginning of the summer season. May is the hottest month of the year when ambient temperature shoots up to 46^0C. The summer continues upto June before onset of monsoon. The winter starts towards the middle of October and ambient temperature dips down to about 7^0C during the month of January, which is the coldest month of the year. The humidity is lowest in April and highest in August.

Source https://cgwb.gov.in/District_Profile/Bihar/Saran.pdf

2.4 GEOLOGICAL RESERVE

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

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

Table-2.2:- Proved Mineral Reserves of Pahleja Ghat/Unit-12

Classification	Code	Quantity of Sand
A) Mineral Reserves		Cum
1) Proved Mineral Reserves	111	414000
Total		414000

Total Geological Reserve = **414000 cum. or 616860 tonnes.**

Source Mining Plan

2.4.1 Mineable Reserves:

Mineable reserves have been computed up to 3.0 m 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 (1.49 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 palaeo channels of the river will be leveled & restored back.

Table-2.4:- Summary of minable reserves of Pahleja Ghat/Unit-12 Sand Ghat

Bench Level (mRL)	Length (m)	Width (m)	Depth (m)	Volume (cum)	Tonnes
43-41.5	1154	108	1.5	186948	278553
41.5-40	1144	98	1.5	168168	250571
Total				**355116**	**529124**

Total Mineable Reserve = 355116 CUM or 529124 Tonnes

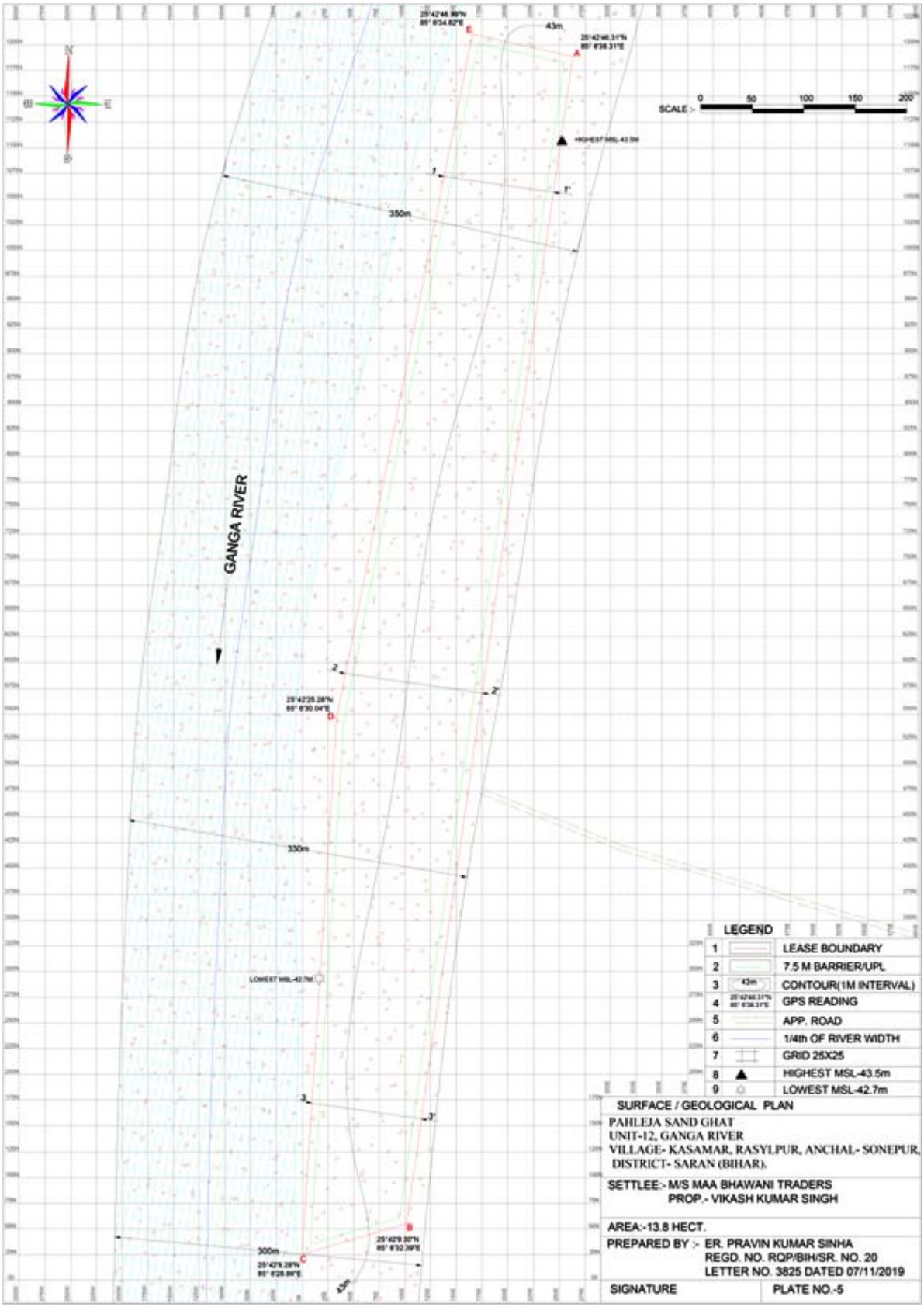

Figure 2.3:- Surface cum Geological Section of Pahleja Ghat/Unit-12

2.4.2 Type of Mining

•Mining will be done as per the guidelines of Bihar Mineral (Concession Prevention of illegal Mining Transportation & Storage) Rules, 2019, SSMG -2016, and EMGSM – 2020.

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

•Sand Mining will be carried out only upto a depth of 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 6 m width will be maintained for mining blocks as per guideline M.M.R-12019, under rule 115(1).

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

2.4.3 Year Wise Production Schedule:

The bench wise annual exploitation of sand from Pahleja Ghat/Unit-12 are given below :-

Table 2.3 Year wise Production Details of Pahleja Ghat/Unit-12

YEAR	ROM Sand (cum)	Saleable Sand (cum)
1st Year	248400	248400
2nd Year	248400	248400
3rd Year	248400	248400
4th Year	248400	248400
5th Year	248400	248400

Source: Mining Plan

2.5 Conceptual Mining Plan

Mine Applied Area will be worked for Pahleja Ghat/Unit-12 Sand Ghat. However, as the digging depth will be restricted to 3.0 m only. This will be further replenished during rainy season. Sand Ghat will be worked systematically as the width is limited while length is

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

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

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

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

2.6.0 Anticipated life of mine

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

2.6.1 Waste –disposal arrangement

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

2.7 GENERAL FEATURES

2.7.1 Land-use pattern

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

2.7.2 Surface drainage pattern

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

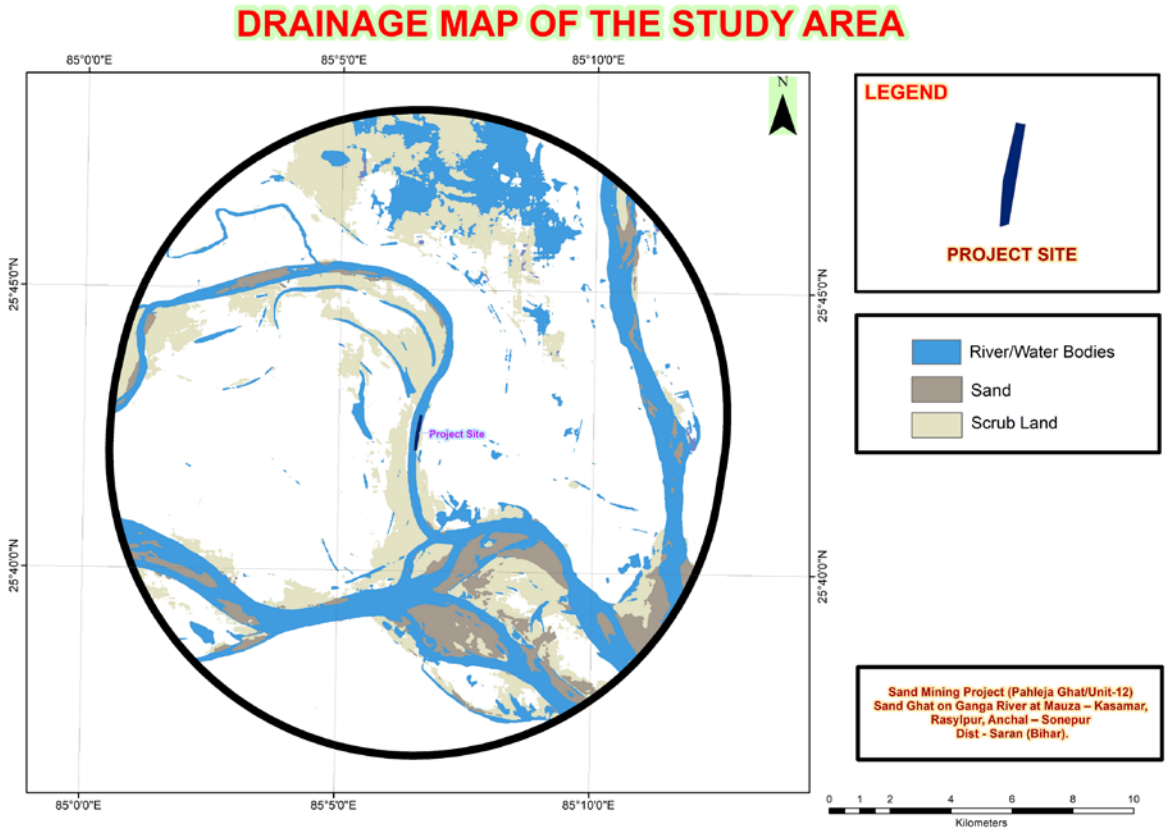

Fig-2.4, Drainage map

2.7.3 Man power requirement

The manpower requirement for the proposed project will be around 36 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 2.4.**

Table 2.4 Manpower Requirement in Pahleja Ghat/Unit-12

S. No.	Category	Numbers
1.	Administration	1
2.	Supervisor	1
3.	Skilled	4
4.	Un-skilled	30
TOTAL		**36**

2.7.4 Water supply

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

Table 2.5 Water requirement

Activity	Calculation	Round off Figure in KLD
Drinking	@ 10 lpcd per labor 10*36/1000= 0.36 KLD	0.36
Dust Suppression	**Total approach road to be water sprinkled** = 680 m 680 m*6m*0.5 *2 times/1000= 4.08 KLD	4.08
Plantation	138 plant (during plan period) @ 5 L/per plant= 138*5lts= 690/1000= 0.69 KLD	0.69
Total		**5.13**

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

2.7.5 Site services

The following facilities/amenities will be extended by the mine management under site services:

- A temporary rest shelter will be provided for the workers near to the site for rest.
- Provisions will also be made for following in the rest shelter:
  - ❖ First aid box will be made available at the site. In emergency worker.
  - ❖ Sanitation facility i.e. septic tank or community toilet facility will be provided for the workers.
  - ❖ Mask and gloves distribution to the workers.

2.7.6 Extent of mechanization

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

2.7.7 Statutory requirements

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

Various acts dealing with matters relating to the conservation and protection of the environment and which a holder of a mining authorization must also take cognizance of include inter alia, the following:

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

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3.0 General

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

3.0.1 Study area & study period

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

Table 3.1: Land Use Cover of the Project Study Area

Landuse Type	Area (Ha)
Scrub Land	4277.25
Forest	976.47
River/Water Bodies	5577.80
Settlement	15861.03
Vegetation	22.85
Sand	1978.68
Agriculture	13078.97
AREA	**41773.05**

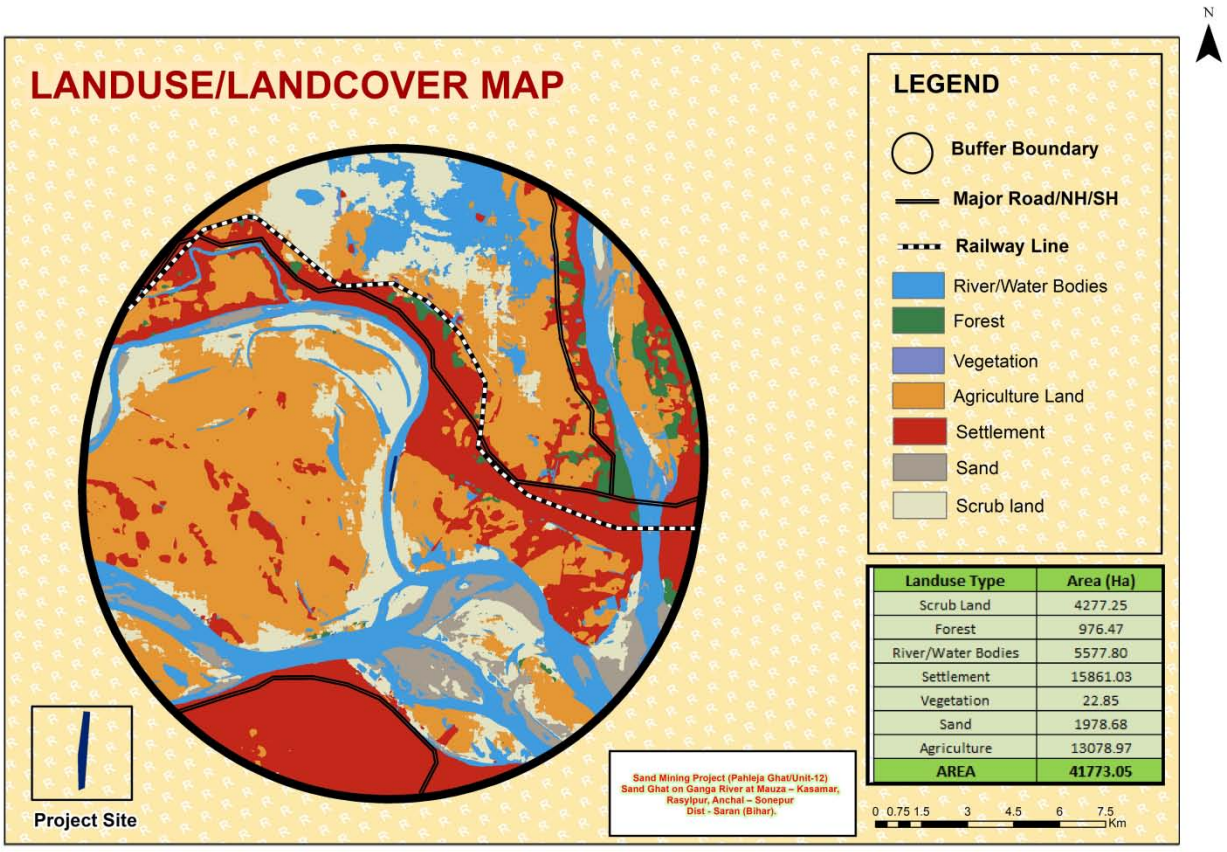

FIGURE 3.1: LAND USE COVER OF THE PROJECT STUDY AREA

3.2 Water Environment

Water quality assessment is one of the essential components of EIA study. Such assessment helps in evaluating the existing health of water body and suggesting appropriate mitigation measures to minimize the potential impact from development projects. Water quality of

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

The water quality at the site and other locations within the 10 km impact zone was monitored during March 2023 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	Mirjapur	2.33 Km, W
GW 2	Dudhia	5.0 Km, WSW
GW 3	Nayagaon	5.8 Km, N
GW 4	Govind chak	2.30 Km,NE
GW 5	Sonepur	7.0 Km,E

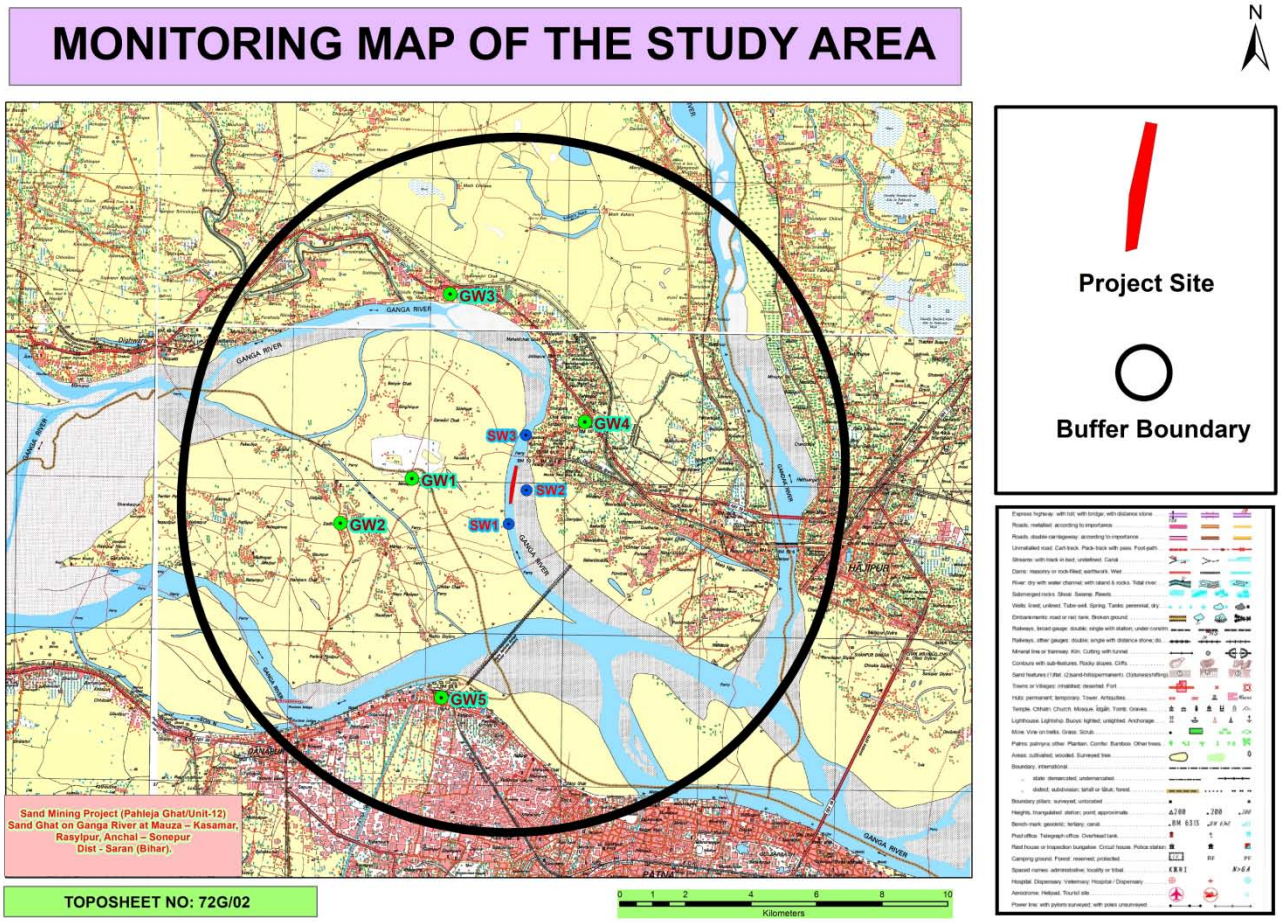

Figure 3.2 Water Sampling Location Map

Table 3.3 Ground Water Quality Monitoring Result

S. No.	Parameter	Unit	Limit (as per IS:10500:2012)		GW1	GW2	GW3	GW4	GW5
			Desirable	Permissible					
1	Colour	Hazen	5	15	<5	<5	<5	<5	<5
2	Odour	-	Un	-	Un	Un	Un	Un	Un
3	Taste	-	Agreeable	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4	Turbidity	NTU	5	10	<1	<1	<1	<1	<1
5	pH	-	6.5-8.5	No Relaxation	7.51	7.59	7.69	7.29	8.1
6	Total Hardness(as CaCO3)	mg/l	300	600	325	406	360	290	380
7	Iron (as Fe)	mg/l	0.3	No Relaxation	0.13	0.16	0.09	0.10	0.12
8	Chlorides (as Cl)	mg/l	250	1000	96	120	98	89	113
9	Fluoride (as F)	mg/l	1	1.5	0.5	0.7	0.6	0.8	0.6
10	TDS	mg/l	500	2000	571	711	620	536	674
11	Calcium(as Ca2+)	mg/l	75	200	78	94	85	74	93
12	Magnesium (as Mg2+)	mg/l	30	100	30	40	36	38	32
13	Copper (as Cu)	mg/l	0.05	1.5	<0.01	<0.01	<0.01	<0.01	<0.01
14	Manganese(as Mn)	mg/l	0.1	0.3	0.03	0.04	0.06	0.02	0.03
15	Sulphate (as SO4)	mg/l	200	400	45	60	52	41	53
16	Nitrate(as NO3)	mg/l	45	No Relaxation	8	11	9	7	10
17	Phenolic Compounds (as C6H5OH)	mg/l	0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001
18	Mercury (as Hg)	mg/l	0.001	No Relaxation	<0.001	<0.001	<0.001	<0.001	<0.001
19	Cadmium (as Cd)	mg/l	0.003	No Relaxation	<0.01	<0.01	<0.01	<0.01	<0.01
20	Selenium (as Se)	mg/l	0.01	No Relaxation	<0.01	<0.01	<0.01	<0.01	<0.01
21	Arsenic (as As)	mg/l	0.01	0.05	<0.01	<0.01	<0.01	<0.01	<0.01
22	Cyanide (as CN)	mg/l	0.05	No Relaxation	<0.01	<0.01	<0.01	<0.01	<0.01
23	Lead (as Pb)	mg/l	0.01	No	<0.01	<0.01	<0.01	<0.01	<0.01

				Relaxation					
24	Zinc (as Zn)	mg/l	5	15	0.15	0.09	0.11	0.12	0.07
25	Anionic Detergent (as MBAS)	mg/l	0.2	1	<0.01	<0.01	<0.01	<0.01	<0.01
26	Chromium (as Cr6+)	mg/l	0.05	No Relaxation	<0.01	<0.01	<0.01	<0.01	<0.01
27	Mineral oil	mg/l	0.5	No Relaxation	<0.01	<0.01	<0.01	<0.01	<0.01
28	Alkalinity as CaCO3	mg/l	200	600	299	367	354	281	343
29	Aluminium (as Al)	mg/l	0.03	0.2	<0.02	<0.02	<0.02	<0.02	<0.02
30	Boron (as B)	mg/l	0.5	1	0.1	0.2	0.2	<0.1	<0.1
31	Total Coliform	MPN/100ml	10 , Max	-	<2	<2	<2	<2	<2
32	*E. coli*	E.coli/ 100ml	Absent	-	Absent	Absent	Absent	Absent	Absent

Observation:

Analysis of results of ground water reveals the following: -

- pH varies from 7.29 to 8.10.
- Total hardness varies from 290 mg/l to 406 mg/l .
- Total dissolved solids vary from 290 mg/l to 406 mg/l.

The ground water from all sources remains suitable for drinking purposes as all the constituents are within the limits prescribed by drinking water standards promulgated by Indian Standards IS: 10500.

3.2 (b) SURFACE WATER

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

Table 3.4: Surface water sampling locations

Surface Water Monitoring Locations		
SW1	Ganga River (upstream)	0.40 Km, S
SW 2	Near Project Site (Ganga River)	-
SW 3	Ganga River (downstream)	0.45 Km, N

Table 3.5: Physio-chemical properties of surface water

S. No.	Parameter	Unit	S.W. 1	S.W. 2	S.W. 3
1	pH	-	7.11	7.6	7.4
2	Dissolved oxygen	mg/l	7.5	7.3	7.4
3	BOD (3 Days at 27°C)	mg/l	3	2	3
4	Free Ammonia (as N)	mg/l	<0.1	<0.1	<0.1
5	Sodium Adsorption Ratio	-	1.17	1.06	1.19
6	Boron	mg/l	0.3	0.4	0.2
7	Conductivity	µmhos/cm	498	520	541
8	Turbidity	NTU	5	3	4
9	Magnesium Hardness (as $CaCO_3$)	mg/l	85	95	94
10	Total Alkalinity (as $CaCO_3$)	mg/l	193	215	220
11	Chloride (as Cl)	mg/l	31	36	38
12	Sulphate (as SO_4)	mg/l	5	7	6
13	Nitrate (as NO_3)	mg/l	2.3	2.2	2.5
14	Fluoride (as F)	mg/l	0.5	0.6	0.7
15	Sodium (as Na)	mg/l	33	36	34
16	Potassium (as K)	mg/l	2.1	3.1	3.2
17	TKN (as N)	mg/l	1.8	2.1	2.3
18	Total Phosphorous (as PO_4)	mg/l	0.17	0.19	0.16
19	COD	mg/l	16	17	18
20	Phenolic compounds (as C_6H_5OH)	mg/l	<0.001	<0.001	<0.001
21	Iron (as Fe)	mg/l	0.23	0.40	0.42
22	Zinc (as Zn)	mg/l	0.08	0.06	0.05
23	Arsenic (as As)	mg/l	<0.01	<0.01	<0.01
24	Mercury (as Hg)	mg/l	<0.001	<0.001	<0.001
25	Total Coliform	MPN/100ml	1269	1400	1020
26	Faecal Coliform	MPN/100ml	613	710	500

3.2.1 Sampling frequency

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

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

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

Designated-Best-Use	Class of water	Criteria
Drinking Water Source without conventional treatment but after disinfection	A	Total Coliforms Organism MPN/100ml shall be 50 or less pH between 6.5 and 8.5 Dissolved Oxygen 6mg/l or more Biochemical Oxygen Demand 5 days 20°C 2mg/l or less
Outdoor bathing (Organized)	B	Total Coliforms Organism MPN/100ml shall be 500 or less; pH between 6.5 and 8.5; Dissolved Oxygen 5mg/l or more Biochemical Oxygen Demand 5 days 20°C 3mg/l or less
Drinking water source after conventional treatment and disinfection	C	Total Coliforms Organism MPN/100ml shall be 5000 or less; pH between 6 to 9; Dissolved Oxygen 4mg/l or more Biochemical Oxygen Demand 5 days 20°C 3mg/l or less
Propagation of Wild life and Fisheries	D	pH between 6.5 to 8.5 Dissolved Oxygen 4mg/l or more Free Ammonia

		(as N) 1.2 mg/l or less
Irrigation, Industrial Cooling, Controlled Waste disposal	E	pH between 6.0 to 8.5 Electrical Conductivity at 25°C micro mhos/cm Max.2250 Sodium absorption Ratio Max. 26 Boron Max. 2mg/l
	Below-E	Not Meeting A, B, C, D & E Criteria

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

3.2.2 Result & Conclusion:

Surface water Observation:

- The analysis results indicate that the pH ranges between 7.11 to 7.60.
- Dissolved Oxygen (DO) was observed in the range of 7.3 to 7.5 mg/l against the minimum requirement of 4 mg/l.
- BOD values were observed to be in the range of 2.0 to 3.0 mg/l.

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

3.3 Air Environment

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

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

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

- Wind speed
- Wind Direction
- Air Temperature

Table-3.7, Summarized project site meteorological data for pre monsoon Season

Month	Temperature °C		Wind Speed (Km/Hr)	
	Min	Max	Averages	Max
MAR 2023	21	37	10.3	18.5
APRIL 2023	27	44	14.8	24.9
MAY 2023	28	44	14	25

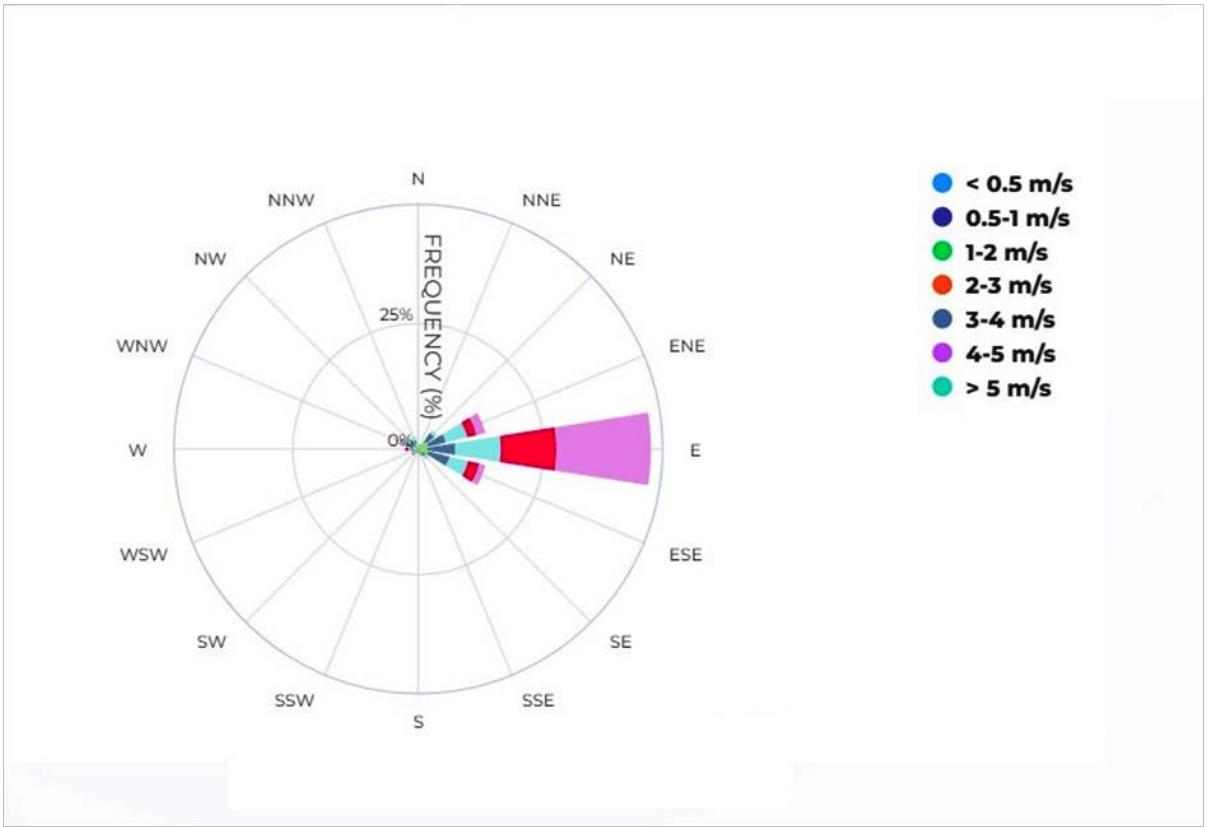

Figure 3.3: Wind Rose Diagram (at site)

3.3.1 Secondary Data Collected from IMD

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

The meteorological data is collected from the IMD- Patna is about 12 km from project site, which is the nearest operating IMD station to the project site. The data collected from IMD

includes wind speed, wind direction, temperature, relative humidity and rainfall for the year 1981-2010. The monthly maximum, minimum and average values are collected for all the parameters except wind speed and direction. The collected data is tabulated in **Table-3.6**

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

3.3.2 Comparison of primary and secondary data

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

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

3.3.3 Ambient Air Quality

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

3.3.4 Selection criteria for monitoring location

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

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

Ambient Air Quality Monitoring (AAQM) stations were set up at 08 locations with due consideration to the above mentioned points. AAQM locations were selected in downwind,

upwind as well as crosswind direction of the proposed mining lease area covering core and buffer zones. The details of the monitoring stations are given in **Figure 3.4** and shown in **Table-3.7**

Ambient air quality monitoring was carried out twice a week with a frequency of 24 hours for three months during the study period. The common air pollutant namely Particulate Matter-10 (PM_{10}) & $PM_{2.5}$, Sulphur-dioxide (SO_2) and Oxides of Nitrogen (NO_2) has been measured through a planned field monitoring.

The baseline values of the air pollutants of concern are presented in Tables below statistical parameters like minimum, maximum, average and 98th percentiles have been computed from the observed field data for all sampling stations and are given **Table-3.8, Table-3.9, Table-3.10& Table 3.11.** 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	-
AAQ 2	Mirjapur	2.33 Km, W
AAQ 3	Dudhia	5.0 Km, WSW
AAQ 4	Nayagaon	5.8 Km, N
AAQ 5	Govind chak	2.30 Km,NE
AAQ 6	Sonepur	7.0 Km,E
AAQ 7	Gangajal Tola	2.6 Km, SE
AAQ 8	Digha	6.50 Km, S

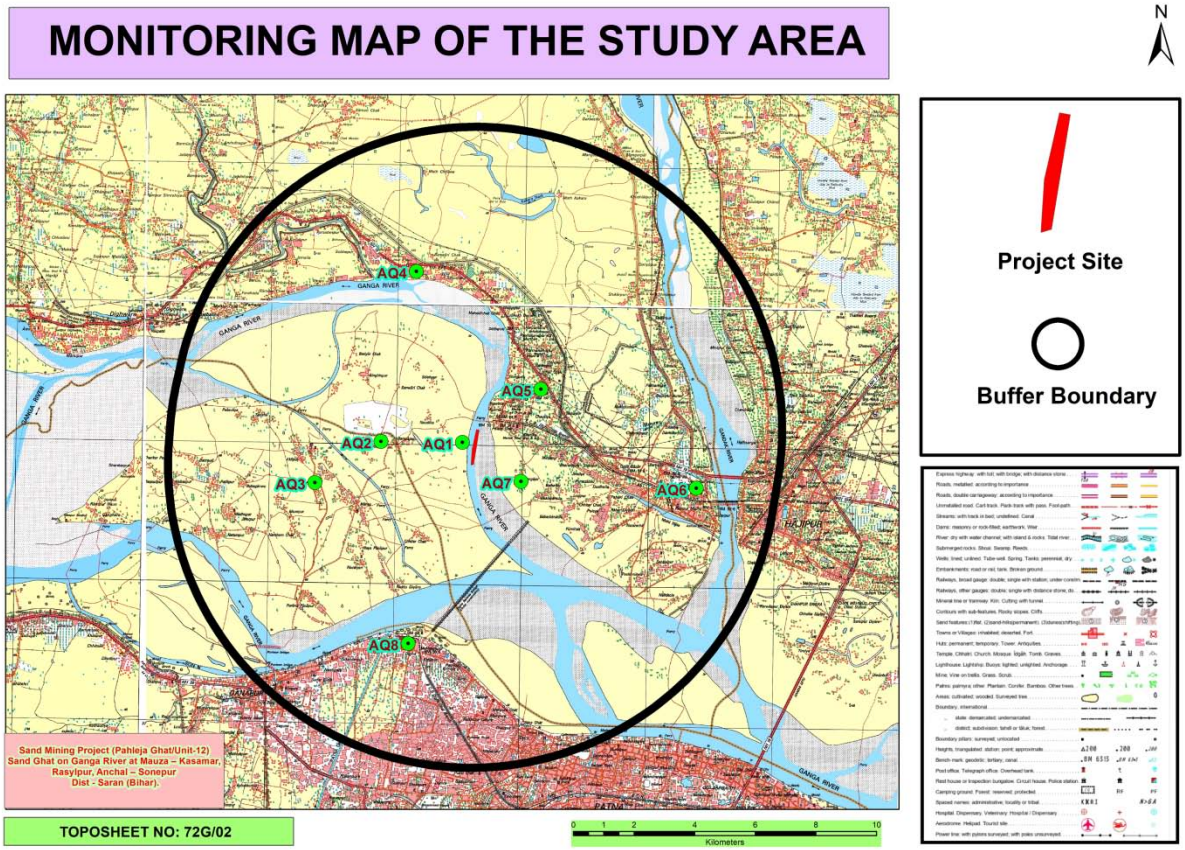

Figure 3.4 Ambient Air Quality Monitoring Stations

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

Location Code	PM2.5 (µg/m^3)				
	Name of the station	**Min**	**Max**	**Average**	**98th Percentile**
AAQ1	Near Project Site	34.73	42.83	38.26	42.33
AAQ2	Mirjapur	31.54	39.62	34.77	38.79
AAQ3	Dudhia	36.13	46.5	40.86	45.52
AAQ4	Nayagaon	38.38	46.5	41.39	45.18
AAQ5	Govind chak	35.31	46.35	40.5	45.61
AAQ6	Sonepur	39.82	51.59	44.77	49.87
AAQ7	Gangajal Tola	30.58	42.43	35.08	40.84
AAQ8	Digha	40.48	51.09	44.58	50.06

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

Location Code	PM10 (µg/m^3)				
	Name of the	**Min**	**Max**	**Average**	**98th**

	station				Percentile
AAQ1	Near Project Site	50.47	64.97	57.81	63.53
AAQ2	Mirjapur	57.2	68.45	62.24	67.38
AAQ3	Dudhia	51.07	65.66	58.65	64.91
AAQ4	Nayagaon	55.74	69.8	61.66	68.71
AAQ5	Govind chak	57.52	69.45	63.4	68.42
AAQ6	Sonepur	62.48	73.39	66.56	71.58
AAQ7	Gangajal Tola	52.64	64.46	59.38	64.4
AAQ8	Digha	76.15	87.95	81.57	86.74

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

Location Code	SO2 (µg/m^3)				
	Name of the station	**Min**	**Max**	**Average**	**98th Percentile**
AAQ1	Near Project Site	4.39	5.88	4.92	5.69
AAQ2	Mirjapur	5.33	7.25	5.94	6.95
AAQ3	Dudhia	4.48	6.24	5.07	6.09
AAQ4	Nayagaon	4.96	6.56	5.42	6.34
AAQ5	Govind chak	5.2	7.12	5.87	6.86
AAQ6	Sonepur	4.98	7.51	6.02	7.15
AAQ7	Gangajal Tola	5.37	7.74	6.64	7.67
AAQ8	Digha	4.35	6.91	5.33	6.49

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

Location Code	NO2 (µg/m^3)				
	Name of the station	**Min**	**Max**	**Average**	**98th Percentile**
AAQ1	Near Project Site	8.17	11.69	9.09	10.88
AAQ2	Mirjapur	9.87	14.21	11.71	13.73
AAQ3	Dudhia	8.14	12.02	9.68	11.43
AAQ4	Nayagaon	8.5	12.38	9.72	11.75
AAQ5	Govind chak	8.73	13.56	10.58	13.1
AAQ6	Sonepur	9.72	14.76	11.76	14.04
AAQ7	Gangajal Tola	11.7	13.53	12.63	13.53
AAQ8	Digha	7.74	11.62	9.43	11.17

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 30.58 µg/m^3 to 51.59 µg/m^3. Table 3.3 were compared with the National Ambient Air Quality Standards (NAAQS) and found that all sampling stations recorded in the study area are within the applicable limits i.e., 60µg/m^3 for $PM_{2.5}$ for industrial, residential, rural and other areas.

Suspended Particulate Matter (PM10)

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

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

The minimum and maximum level of PM10 recorded within the study area was in the range of 50.47 µg/$m^3$to 87.95 µg/m^3 . The 24 hourly average values of PM10 were compared with the National Ambient Air Quality Standards (NAAQS) and found that all sampling stations recorded in the study area are within the applicable limits i.e., 100 µg/m^3 for PM10 in industrial, residential, rural and other areas.

Sulphur Dioxide (SO2)

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

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

Sulphur dioxide in atmosphere is significant because of its toxicity; Sulphur dioxide is capable of causing illness and lung injury. Further it can combine with water in the air to

form toxic acid aerosols that can corrode metal surfaces, fabrics and the leaves of plants. Sulphur dioxide is an irritant to the eyes and respiratory system. Excessive exposure to Sulphur dioxide causes breathing related diseases as it affects the lungs.

The minimum and maximum concentration of SO_2 recorded within the study area was 4.35 µg/m^{3}to 7.74 µg/m^3.

The 24 hourly average values of SO_2 were compared with the National Ambient Air Quality Standards (NAAQS) and it was found that all sampling stations recorded values are below the applicable limits 80 µg/m^3 for Residential, Rural and other areas.

Oxides of Nitrogen (NO2)

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

- Emissions from vehicular movements in the study area.

Oxides of Nitrogen in the presence of sunlight will undergo reactions with a number of organic compounds to produce all the effects associated with photochemical smog. NO2 has inherent ability to produce deleterious effects by themselves like toxicity. It causes asphyxiation when its concentration is great enough to reduce the normal oxygen supply from the air. The minimum and maximum level of NO2 recorded within the study area was in the range of was 7.74 µg/m^{3}to 14.76 µg/m^3.

The 24 hourly average values of NO_2 were compared with the National Ambient Air Quality Standards (NAAQS) and it was found that all sampling stations recorded values are below the applicable limits 80 µg/m^3 for Residential, Rural and other areas.

Ambient Air Quality in the Study Area, Free Silica

Location Code	Free silica (µg/m^3)		
	Name of the station	Min	Max
AAQ1	Near Project Site	1.57	1.80
AAQ2	Mirjapur	1.75	1.98
AAQ3	Dudhia	1.56	1.79
AAQ4	Nayagaon	1.48	1.86

AAQ5	Govind chak	1.58	1.81
AAQ6	Sonepur	1.51	1.79
AAQ7	Gangajal Tola	1.69	1.80
AAQ8	Digha	1.59	1.73

3.4 SOIL ENVIRONMENT

Soil may be defined as a thin layer of earth's crust, a medium for the growth of plants. The soil characteristics include both physical and chemical properties. The soil survey and soil sample were carried out / collected to assess the soil characteristics of the study area. Soil samples were collected from 05 locations and analyzed as per CPCB norms. The soil sampling locations are marked in **Figure 3.5**and shown in **Table 3.12.** Thephysico-chemical characteristic of these soil samples is given in **Table 3.13.**

Table 3.13: Description of soil sampling locations

SITE	Location	Distance, direction
SQ1	Mirjapur	2.33 Km, W
SQ2	Dudhia	5.0 Km, WSW
SQ3	Nayagaon	5.8 Km, N
SQ4	Govind chak	2.30 Km,NE
SQ5	Sonepur	7.0 Km,E

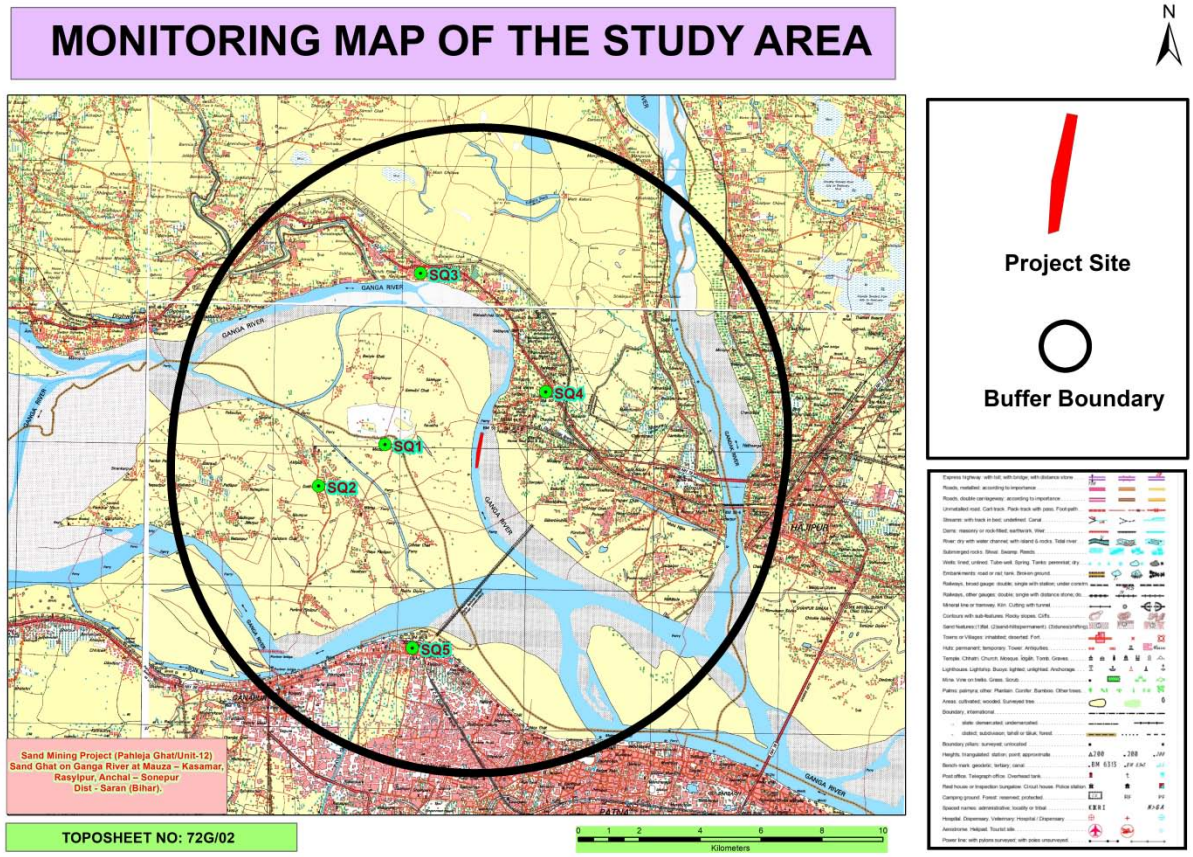

Figure 3.5, Soil Sampling Locations

Table 3.14 :Physico-chemical properties of soil

S.No	Parameter	Unit	SQ-1	SQ-2	SQ-3	SQ-4	SQ-5
1	Texture	-	Sandy loam	Sandy clay loam	sandy Clay loam	Sandy clay loam	sandy Clay loam
	Silt	%	76.3	56.7	60.4	60.2	65.1
	clay	%	8.3	19.7	18.3	20.2	20.3
	Sand	%	15.4	23.6	21.3	19.6	14.6
2	pH	-	7.66	8.06	8.03	7.10	7.10
3	Electrical Conductivity	µmhos/cm	186	438	341	425	325
4	Cation exchange capacity	meq/100 gm	14.1	16.1	15.4	17.1	15.4
5	Exchangeable Potassium	meq/100 gm	0.14	0.17	0.20	0.23	0.22
6	Exchangeable Sodium	meq/100 gm	0.22	0.35	0.31	0.39	0.35
7	Exchangeable Calcium	meq/100 gm	10.1	12.5	11.1	11.3	11.4
8	Exchangeable Magnesium	meq/100 gm	2.5	3.0	2.6	3.8	2.8

9	Sodium Absorption Ratio	-	0.33	0.45	0.38	0.41	0.40
10	Water Holding Capacity	%	24.5	28.1	27.3	30.7	29.1
11	Porosity	%	41.1	36.5	38.3	29.1	40.3
12	Permeability	cm/hrs	2.4	1.9	2.1	2.0	2.3
13	Total kjehdahl Nitrogen	%	0.036	0.052	0.048	0.090	0.047
14	Phosphorus(Olsen's)	mg/kg	12.4	17.4	14.8	16.8	15.7
15	Organic Matter	%	0.27	0.34	0.31	0.24	0.31
16	Bulk Density	gm/cc	1.39	1.20	1.33	1.34	1.25

Observations:

Samples collected from identified locations indicate the soil is sandy type and the pH value ranging from 7.66 to 8.06, 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 3.14.**

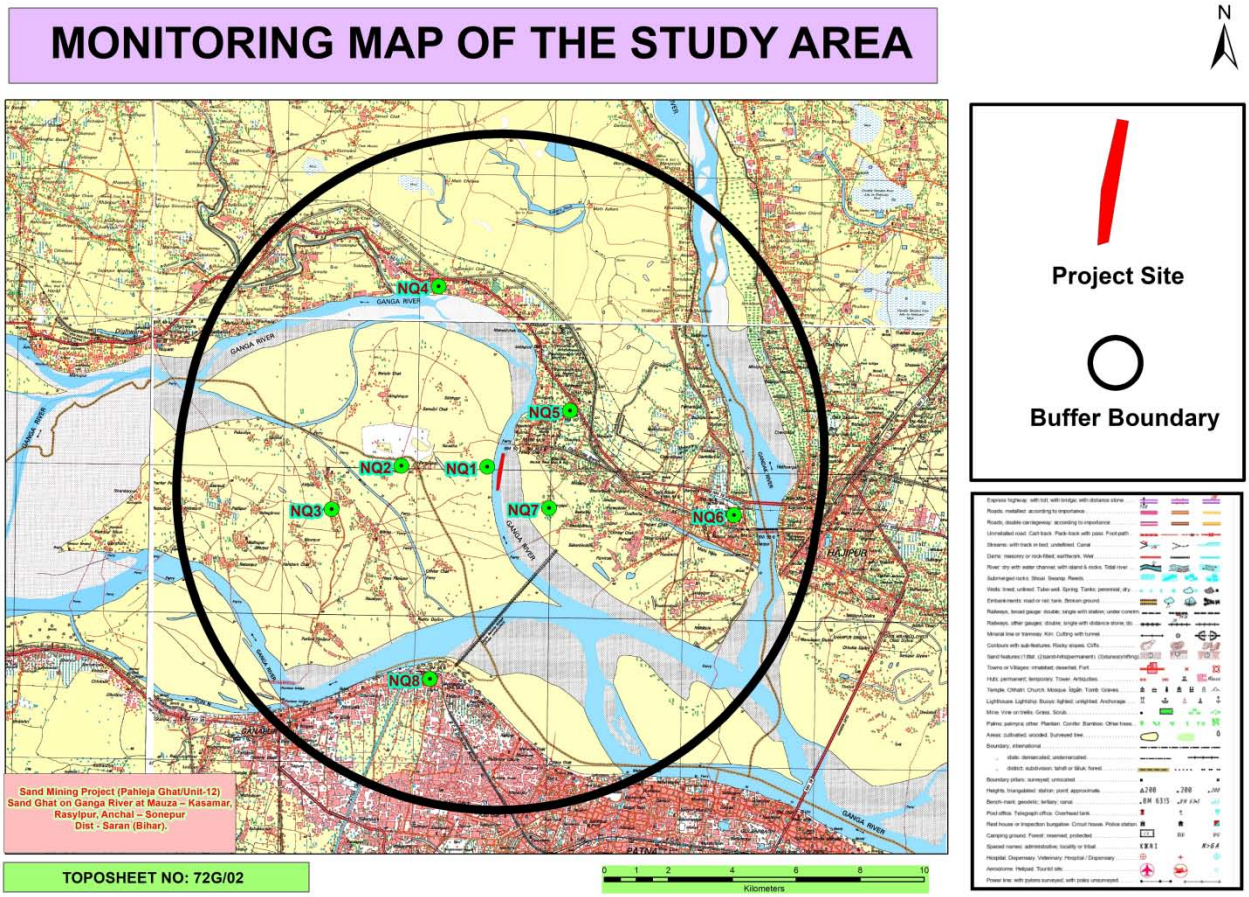

Figure 3.6 Noise Monitoring Stations

Table 3.15: Noise Quality Monitoring Stations

Noise Monitoring Locations		
NQ 1	Near Project Site	-
NQ 2	Mirjapur	2.33 Km, W
NQ 3	Dudhia	5.0 Km, WSW
NQ 4	Nayagaon	5.8 Km, N
NQ 5	Govind chak	2.30 Km,NE
NQ 6	Sonepur	7.0 Km,E
NQ 7	Gangajal Tola	2.6 Km, SE
NQ 8	Digha	6.50 Km, S

Table 3.16: Noise Monitoring Results

S. No.	Locations		Equivalent Noise Level, dB (A)			
			Limit (as per CPCB Guidelines),Leq, dB(A)		Observed value Leq, dB(A)	
			DAY*	NIGHT*	DAY*	NIGHT*
1	Near Project Site	Residential Zone	55	45	52.1	40.3
2	Mirjapur	Residential Zone	55	45	51.5	38.2
3	Dudhia	Residential Zone	55	45	50.9	39.6
4	Nayagaon	Silence zone	50	40	41.8	36.2
5	Govind chak	Residential Zone	55	45	48.3	41.5
6	Sonepur	Residential Zone	55	45	47.4	41.1
7	Gangajal Tola	Residential Zone	55	45	46.5	39.3
8	Digha	Residential Zone	55	45	48.4	40.6

Results

Noise monitoring reveals that the minimum & maximum noise levels at day time were recorded as 41.8 dB(A) to 52.1 dB(A) respectively. The minimum & maximum noise levels at night time were found to be 36.2dB (A) & 41.5 dB(A) respectively.

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

3.6 BIOLOGICAL ENVIRONMENT

3.6.1.1 Introduction

The ecological study reflects the potential of a regional ecosystem and its biological components. In India, the biological diversity of plants and animals varies from region to

region on account of their diversity and density. Producers (plants), consumers (animals), and decomposers (microbes) govern the whole cycle of ecology. Plant and animals both are interdependent on each other.

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

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

The main objective of the ecological survey is aimed to find out the baseline status of flora and fauna (terrestrial and aquatic ecosystem) of the study area before the start of Sand Mining Project, (Pahleja Ghat/Unit-12) Sand Ghat on Ganga River.

3.6.2 Description of the study area

The Proposed Sand Mining Project (Pahleja Ghat/Unit-12) Sand Ghat on Ganga River at Mauza – Kasamar, Rasulpur, Anchal – Sonepur Dist - Saran (Bihar).

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

There are no National parks, Biosphere Reserves, Wildlife corridors, Tiger/Elephant reserves (existing as well as proposed), within 5 km from the present project**.**

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

3.6.3 Drainage /Water Bodies of the Study Area

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

Scope and Objectives of the Study

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

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

3.6.4 Methodology/ Data Collection

A primary field survey was carried out within a 10 km radius of the proposed project in 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 and available published literature.

3.6.5 Flora (Aquatic and Terrestrial)

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

On the other hand, for the terrestrial data, community analysis was carried out during the summer season. For the collection of terrestrial data, a total of 05 sampling points were selected. At every sampling site, quadrates of 10m X 10m (100 sq.m.) size were randomly laid to study tree species. The circumference of all the adult individuals [≥30 cm circumference at breast height (CBH)] was measured with Freeman's tape. The study of communities was carried out by using qualitative characteristics, and quantitative characteristics. Qualitative characteristic mainly involved presence/absence of the species, genera, and family. This showed the community structures, composition and other characteristic can be readily described by visual observation without actual measurements. The quantitative analysis involved the structure and composition of vegetation across vegetation types and compared in terms of frequency, density, abundance, and basal area of tree species.

3.6.6 Fauna (Aquatic and Terrestrial)

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

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

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

3.6.7 Sampling Sites

A total of 05 sampling 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.

3.6.8Flora of the Study Area

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

A major part of the core and buffer zone of the project is agricultural land having some major vegetation in the form of agro forestry. Vegetation patterns in villages and surrounding areas are slightly different from the rest of the areas in the Saran 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 (Saran 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 3.18: List of Crops seasonally planted by respective farmers in the Core and Buffer Zone

S.No.	**Botanical Name**	**Local/Trade Name**	**Family Name**
1	*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		

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

Aquatic floral details of the core zone were collected from 05 selected sites of the study area.Some sites were located buffer zone adjacent to the present alignment, however some were located in the core & buffer zone. Details of phytoplankton and macrophytic vegetation of the core and the buffer zone

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 Cyanophyceae, 19 species of Bacillariophyceae, and 6 species of Euglenophyceae. Details of Phytoplankton species are given in table 3.19.

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

S.N.	Taxonomic Details	S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8	Schedule Status in WPA (1972)	IUCN Status
	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
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
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 3.20: Site wise Qualitative list of Phytoplankton species recorded from the Core and Buffer Zone

Class	S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8
Chlorophyceae	19	15	23	16	17	24	12	17
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 3.21.

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

S.No.	Name of the Taxa	Family Name	IUCN Status	S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8
1	*Azolla pinnata*	Salviniaceae	LC	+	+	+	+	+	+	+	+
2	*Cyperus alopecuroides*	Cyperaceae	LC	+	+			+	+	+	+
3	*Cyperus difformis*	Cyperaceae	LC	+		+	+		+	+	+
4	*Eichhornia crassipes*	Pontederiaceae	LC	+	+	+		+	+		+
5	*Hydrilla verticillata*	Hydrocharitaceae	LC				+			+	+
6	*Ipomea aquatica*	Convolvulaceae	LC		+	+	+	+	+		+
7	*Ipomea carnea*	Convolvulaceae	LC	+	+	+	+		+	+	+

8	*Lemna minor*	Araceae	LC	+	+			+	+	+	+
9	*Ludwigia parviflora*	Onagraceae	LC	+	+	+	+		+	+	+
10	*Nelumbo sp.*	Nelumbonaceae	LC		+			+			
11	*Nymphoides aquatica*	Menyanthaceae	LC	+		+		+	+	+	+
12	*Phragmites karka*	Poaceae	LC						+		
13	*Pistia stratiotes*	Araceae	LC		+		+			+	+
14	*Polygonum glabrum*	Polygonaceae	LC	+	+	+		+	+	+	+
15	*Typha latifolia*	Typhaceae	LC						+		+
16	*Typha orientalis*	Typhaceae	LC		+		+	+	+	+	
Total No. of Species				**9**	**8**	**8**	**8**	**9**	**13**	**11**	**13**

3.6.10 Flora of Buffer zone

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

During the present survey,a total of 77 species of plant species were observed from the study area. Out of 77 plant species,42species 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 of Bihar. The details of vegetation of the buffer zone is given in Table 3.22.

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

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
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
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
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			

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 3.17.

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

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

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

3.6.11 Fauna of the Study Area

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

The assessment of fauna was done on the bases of secondary data collected from different government offices like the forest department, wildlife department, etc. The presence of wildlife was also confirmed by the local inhabitants depending on the animal sightings and the frequency of their visits in the project area.

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

3.6.12 Fauna of the Core Zone

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

The domesticated animals like; 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 3.23.

Table 3.23: List of Mammals/Reptiles/Amphibians/Birds recorded from the Core Zone

S. No.	Common Name	Scientific Name	Family	Schedule status (as per WPA-1972)	IUCN status
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, Saran district of Bihar					

Table 3.24: Butterflies observed in the Core zone

S. No.	Common Name	Scientific Name	Family	IUCN Status
1.	Plain Tiger	*Danaus chrysippus*	Nymphalidae	LC
2.	Common emigrant	Catopsilia pomona	Pieridae	LC
3.	Common crow	*Euploea core*	Nymphalidae	LC
4.	Small grass yellow	Eurema brigitta	Pieridae	LC
Source: Primary Survey data of P&M Solution, Noida and the data supported by Department of Forest, Saran district of Bihar				

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

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

3.6.12.4 Fauna of Buffer zon

To prepare a detailed report on the status of faunal biodiversity of the present study area (1 km buffer) of Saran district of Bihar and to assess the impacts due to digging/ leveling of alignment route/ construction of bridge/ operational activity which evolves suitable mitigation measures to protect & conserve biodiversity following components were studied: terrestrial biodiversity, wildlife survey (diversity), habitat study (feeding, breeding, roosting areas), distribution of birds, rare & endangered species of the study area.

The fauna of the study area (Core and Buffer zone) vary upon the local topography and different types of habitats. The fauna of the study area has been categorized into two categories based on their habitat, i.e.

(i) Aquatic fauna and

(ii) Terrestrial fauna.

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

3.6.12.6 Terrestrial Fauna of Buffer zone (Mammals/Reptiles/Amphibians/Birds/ Insects etc.)

The major part of the study area lies under agricultural fields and barren land which restricts the wildlife habitat significantly. There is neither any wildlife sensitive area nor any corridor for the movement of wildlife in the study area. A list of the animals of the study area has been prepared on the basis of the survey and also inquire from the local people. The animals, thus recorded were cross-checked with Wildlife (Protection) Act, 1972 for their schedule status. Faunal details of thestudy area are given in Tables 3.25 to 3.27**.**

i. Mammals and Reptiles/ Amphibians

The domesticated animals like Goat (*Capra aegagrus*); Buffalo (*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 3.25.

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

S. No.	Common Name	Scientific Name	Family	Status as per WPA-1972	IUCN status
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 Fruit- Bat	Muridae	V	LC
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

ii. Avian Fauna

Table 3.26: Avian Fauna observed from the study area (01 KM Buffer area)

S.No	Scientific Name	Common Name	Family	Schedule Status (WPA-1972	IUCN Status
1	*Acridotheres tristis*	Myna	Sturnidae	IV	LC
2	*Acridotheres tristis*	Common myna	Sturnidae	IV	LC
3	Alcedo atthis	Small blue kingfisher	Alcedinidae	IV	LC
4	Amandava amandava	Red munia	Estrildidae	IV	LC
5	*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
IUCN Status =LC: Least Concern**, VU:** Vulnerable.					
Source: Primary Survey data of P&M Solution and the data supported by Department of Forest,					

iii. Butter Flies

Table 3.27: 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				

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.). Ganga 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 (Saran district) are given in Tables 3.28 to 3.31.

i. Zooplankton

Zooplankton is commonly found in all types of aquatic habitats. These are recognized as secondary producers and considered as one of the best tools for the environmental monitoring program. During the present study period, a total of 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 3.28 and Fig 3.12.

Table 3.28: 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
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
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 3.29.

Table 3.29: 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
	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 3.30.None of the Amphibians and Reptiles have been observed under the Rare, Endangered, and threatened category. Also, none of them are under the Schedule-I category as per Wildlife Protection Act, 1972.

Table 3.30: Amphibians and 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
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

(iii) Fishes

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

support fish species. Fishes found in the study area are listed in Table 3.31 and their site wise species variation is shown in Fig. 3.14.

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

S.No.	Name of the Taxa	Family Name	**S-1**	**S-2**	**S-3**	**S-4**	**S-5**	**S-6**	**S-7**	**S-8**	IUCN Status	**Schedule Status in WPA (1972)**
1	*Catla catla*	Cyprinidae	+	+	+	+		+		+	VU	NA
2	*Channa stiatus*	Chandadae					+	+	+		LC	NA
3	*Channa punctatus*	Chandadae			+	+	+		+	+	LC	NA
4	*Labeo bata*	Cyprinidae		+		+				+	LC	NA
5	*Labeo rohita*	Cyprinidae	+		+	+		+			LC	NA
6	*Macrobrachium malcomsoni*	Palaemonidae	+		+	+	+	+	+	+	LC	NA
7	*Mystus bleekri*	Bagridae		+			+	+			LC	NA
8	*Mystus tengara*	Bagridae	+	+	+	+	+	+	+	+	LC	NA
9	*Puntius sarana*	Cyprinidae			+			+	+	+	LC	NA
10	*Puntius sophore*	Cyprinidae	+	+	+		+			+	LC	NA
11	*Puntius stigma*	Cyprinidae			+	+		+			LC	NA
12	*Puntius ticto*	Cyprinidae		+	+	+			+	+	LC	NA
		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

3.6.13 Observations of Present Study (Flora & Fauna)

3.6.13.1 Flora

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

3.6.13.2Fauna

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

3.7 Socio-Economic Environment

Demography& Socio-Economic Features

Introduction

Sand Mining Project, Pahleja Ghat/Unit-12 Sand Ghat fall in Village-Kasamar, Rasulpur, Anchal-Sonepur, District-Saran, Bihar. The proposed project activity will be carried out on the dry river bed of Ganga River.

The proposed project of 13.8 Ha is of river bed sand mining and falls under Category-"B1" as per by EIA Notification, 2006 and its subsequent amendments, Ministry of Environment Forests & Climate Change, GOI, New Delhi.

Need for the Project and its Importance to the Country & Region

The project lies on the bed of Ganga River. The sediment in the form of river bed material (RBM) deposited in the last many years had changed the shape of the river bed from a valley to a raised land. Hence, it is necessary to remove the materials so that the stream gets channelized. Due to rapid infrastructure development in India, the demand of construction material has increased. To supply this demand, mining of sand is done. This project operation will provide employment directly and indirectly to the people residing in vicinity, thus improving the Socio- economic status of the area.

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 three concerned districtsnamedSaran, Vaishali and Patnaof Biharstate was compiled and placed in the form of tabulation and graphical representation.

Demography of the Saran District

The district of Saran with a population of 39, 51,862 according to 2011 Census, is divided into 20 Community Development Blocks, Comprising 1764 villages,5 towns and 1 Census towns. With 3.7 percent of the total population of the state comprised within the district, Saran is a large sized district and ranks 7th in the state in order of population. The population of males and females are 20, 22,821 and 19, 29,041 spread over 2.8% area of the State.

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 lower decadal variation of 18.3 percent as compared to that of rural area at 22.0%. As per 2011 census sex ratio of the district is 954 females per 1,000 males. The same for rural and urban areas of the district stands at 958 and 912 respectively. It is observed from the table that sex ratio of population in the age group 0-6, which works out to 926 is much lower than the district sex ratio of the (954) in Saran. While the sex ratio of (0-6) population in the rural areas of the district is 927 and the sex ratio of (0-6) population for the urban areas is only 910 females per 1000 males.

It is observed that the proportion of scheduled castes and scheduled tribe's population to the total population of the district is found to be only 12 and 0.93% respectively. For rural areas, the respective proportion of scheduled castes and scheduled tribes to the total population of the district comes out to be 12.18 and 1% respectively.

As per the census records 2011, it is observed that the district has registered a literacy rate of 65.96%. As regards to rural and urban areas of the district the literacy rates have been registered 65.04% and 75.13% respectively. The gap in the male-female literacy rates has been 22.61% point as it is 77.03% male and 54.42% female respectively. For the district as a whole, the literacy rate of males is much higher than that of females.

Religions

The population of the *Saran district* during 2011 was 3,951,862. Hindus constitute 89.45% (3,534,772 persons) of the population in the district followed by Muslims 10.28% (406,449 persons).

Mother Tongue

As per the census records, for *Saran district*, Hindi, the main mother tongue of the district was returned by 96.0% of the population. The corresponding percentage for the Urdu, the second eminent language spoken in Saran district, was 3.8%. Speakers of other Scheduled languages were very thin in number than the two described above.

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 Saran, Vaishali and Patna districtsof Bihar state was compiled and placed in the form of tabulation and graphical representation. Entire study area is observed predominantly ruraland no town was found in the study area.

Purpose of the Study

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

Description of Social Environment

As per the Census Records 2011, the study area has a total of 176 villages and 4 towns named Sonepur (NP)/21 Wards, Hajipur (NP), Dinapur Nizamat (NP)/Part (4%) and Patna (M Corp. + OG) Part (5%) lying under Saran, Vaishali and Patna Districtsrespectively in Bihar state. Overall study area villages are falling mainly under Seven(07) tehsils namely Dariapur (17 villages), Dighwara (30 villages), Sonepur (76 villages& 01 town), Hajipur (28 villages&01 town), Maner (01 village), Dinapur-Cum-Khagaul (18 villages& 01 town) and Patna Rural (06 villages& 01 town) of Saran, Vaishali and Patna districts in Bihar state. About 46 villages (25.5%) were found as uninhabited villages in the 10kmradial study zone.

Population Distribution within 10 km radial Study Zone

As per the Census Records 2011, the total population of 10 km study zone was recorded as 2460357persons of 180villages/townsof 03 Districts named Saran, Vaishali and Patna inBihar state.Male-female wise total population was recorded as 1304589 males (53.0%) and 1155768(47.0%) females respectively. Total number of 'Households' was observed as 419208in the 10 km radius study zone. Scheduled Caste ('SC') population was observed as 240418persons consisting of 127042males (52.8%) and 113376 females (47.2%) in the 10km radial study zone. Scheduled Tribes ('ST') population was also observed as 5897 persons (0.24%) consisting of 2951 males (50.0%) and 2946females (50.0%) in the 10 km study zone.The child population (0-6 Age) of the study area is recorded as 329970(13.4%) and comprising of 175128(53.0%)males&154842 (47.0%) females respectively

. Rural & Urban Population Distribution

Zone	No. of Households	Total Population			Scheduled Castes			Scheduled Tribes		
		Persons	Males	Females	Persons	Males	Females	Persons	Males	Females
Rural	**65229**	**408167**	**216227**	**191940**	**43901**	**23029**	**20872**	**218**	**120**	**98**
%age	15.6%	16.6%	16.6%	16.6%	18.3%	18.0%	18.4%	3.7%	4.0%	3.3%
Urban	**353979**	**2052190**	**1088362**	**963828**	**196517**	**104013**	**92504**	**5679**	**2831**	**2848**
%age	84.4%	83.4%	83.4%	83.4%	81.7%	82.0%	81.6%	96.3%	96.0%	96.7%
Total (10km)	**419208**	**2460357**	**1304589**	**1155768**	**240418**	**127042**	**113376**	**5897**	**2951**	**2946**
Source-Census of India, 2011										

Village wise details of population distributionare given as follows in**Table3.32 & 3.33**

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

Name of Village/Town	No of Households	Total Population			Child Population (0-6 Years)		
		Persons	Male	Female	Persons	Male	Female
1. District Saran, Bihar							
Bhaw Chak	Uninhabited Village						
Mathchelwa	255	1400	741	659	325	166	159
Mansa Chak	Uninhabited Village						
Bhopan Chak	Uninhabited Village						
Lachhmanpur	Uninhabited Village						
Chandwa Chak	Uninhabited Village						
Litiahi	Uninhabited Village						
Karanpura	Uninhabited Village						

Murar chak	Uninhabited Village						
Bhagwan Chak	Uninhabited Village						
Gay Ghat	Uninhabited Village						
Chak Ruddi	Uninhabited Village						
Kusiari	Uninhabited Village						
Math Kakara	374	2228	1202	1026	403	217	186
Mangarpal Murtuza	674	3820	1974	1846	661	342	319
Khushihal pur	208	1117	599	518	185	95	90
Barua	260	1497	816	681	265	152	113
Sitalpur	1374	8678	4414	4264	1403	740	663
Una Chak	222	1598	832	766	297	158	139
Nizama Chak	394	2360	1214	1146	441	220	221
Bishunpur	53	308	152	156	43	20	23
Parsotimpur	148	923	475	448	148	73	75
Ahiman Patti	191	1293	672	621	271	157	114
Kanakpur	535	3537	1864	1673	559	307	252
Kesarpur	247	1574	808	766	310	159	151
Tilok Chak	465	2727	1362	1365	446	209	237
Barua	1056	5938	3132	2806	848	448	400
Pipra Salehpur	Uninhabited Village						
Ismaila	Uninhabited Village						
Kakaria	Uninhabited Village						
Baguraha	Uninhabited Village						
Milki	Uninhabited Village						
Chatra	Uninhabited Village						
Kuraia	667	4085	2180	1905	662	365	297
Dudhia	373	2733	1419	1314	619	317	302
Akilpur	547	3347	1785	1562	724	355	369
Baqarpur	155	1083	567	516	184	98	86
Salhadi	129	861	459	402	169	89	80
Anu CHak	Uninhabited Village						
Malkha Chak	574	3330	1763	1567	458	233	225
Haraji	906	5809	2999	2810	1172	585	587
Fakuli	321	1821	908	913	260	133	127
Parsotimpur	200	1287	653	634	231	110	121
Pakaulia	137	847	451	396	145	84	61
Batrauli	274	1742	896	846	355	183	172
Pakauliya	218	1532	806	726	304	147	157
Babhangawan	252	1921	991	930	358	190	168
Sobhepur	542	3205	1672	1533	622	299	323
Chhittu Pakar	225	1529	801	728	287	151	136
Murgia Chak	Uninhabited Village						
Hasilpur	394	2591	1386	1205	522	262	260
Kasturi Chak	310	1927	1019	908	296	153	143
Naya Ganw	1286	8575	4457	4118	1634	846	788
Makra	363	2185	1112	1073	380	208	172

Khuntaha	Uninhabited Village						
Lawang Patti	Uninhabited Village						
Rasulpur	822	4999	2637	2362	900	467	433
Chandpura	Uninhabited Village						
Hasanpur	655	3979	2091	1888	696	364	332
Gopalpur	1009	6070	3240	2830	855	444	411
Chaturpur	735	5054	2710	2344	752	427	325
Akilpur	224	1403	738	665	216	102	114
Dariyapur	426	2188	1175	1013	363	186	177
Chhapra	373	2074	1115	959	294	164	130
Shikarpur	1081	6973	3670	3303	1345	679	666
Murthan	535	3442	1821	1621	637	348	289
Parmanandpur	930	6029	3243	2786	1117	587	530
Gheghta	340	2182	1150	1032	398	205	193
Ismail Chak	346	2110	1108	1002	321	176	145
Apsaid	205	1449	771	678	254	125	129
Makhdumpur	111	743	363	380	135	65	70
Khemi Chak	16	81	41	40	12	4	8
Kaleanpur	597	3608	1875	1733	669	333	336
Semara	194	1227	649	578	265	139	126
Baijalpur Kesho	549	3468	1834	1634	569	314	255
Baijalpur	54	355	171	184	52	26	26
Damodarpur	223	1413	759	654	232	136	96
Baijalpur Fakir	Uninhabited Village						
Siktia	48	329	163	166	62	34	28
Baijalpur Tamuni	Uninhabited Village						
Faqrabad	348	2105	1075	1030	483	235	248
Chitarsenpur	460	2939	1569	1370	589	317	272
Baqarpur	319	1944	1029	915	356	194	162
Gobind Chak	658	3927	2077	1850	768	424	344
Saidpur	1278	7757	4072	3685	1454	744	710
ChakDaria	229	1485	775	710	309	157	152
Abdul Hai	Uninhabited Village						
Salehpur	Uninhabited Village						
Naudiha	Uninhabited Village						
Nawada	189	1059	574	485	186	93	93
Kasmar	1019	6620	3479	3141	1203	632	571
Rasulpur	Uninhabited Village						
Kharika	1409	8716	4601	4115	1442	784	658
Chausia	616	3313	1763	1550	568	310	258
Chak Daria Sultanpur	93	669	357	312	95	57	38
Sultanpur	177	958	502	456	177	89	88
Chausia	Uninhabited Village						
Mirzapur 1	507	2931	1530	1401	603	308	295
Bharanpura	1128	5543	2960	2583	806	427	379
Badurahi	708	4436	2344	2092	804	427	377

Parvezabad	247	1583	807	776	280	136	144
Jahangirpur	597	3498	1869	1629	576	310	266
Dudhaila	809	4548	2416	2132	721	382	339
Jaitiya	319	2098	1117	981	291	163	128
Sabalpur	4345	27262	14503	12759	5403	2808	2595
Rahar Diyara	Uninhabited Village						
Barbatta	61	501	236	265	101	47	54
Nazarmira	1158	7720	4089	3631	1386	745	641
Shahpur	2213	13547	7272	6275	2398	1254	1144
Gangajal	530	2867	1487	1380	495	259	236
Chhitar Chak	387	2414	1298	1116	514	238	276
Lodipur	Uninhabited Village						
Chak Chhitar	Uninhabited Village						
Ramsapur	182	1288	685	603	299	137	162
Mirzapur	29	218	109	109	44	20	24
Garibpatti	185	1484	796	688	299	143	156
Banwari Chak	5	20	10	10	3	2	1
Bariar Chak	208	1250	673	577	311	168	143
Chak Jujhari	Uninhabited Village						
Sighinpur	66	504	270	234	104	53	51
Pahleza	32	117	67	50	11	7	4
Raipur Hasanpur	323	2126	1145	981	425	229	196
Sabalpur	419	2537	1401	1136	477	270	207
Sonepur (NP)/21 Wards	6383	37776	19995	17781	5273	2764	2509
2. District Vaishali, Bihar							
Fatehpur Gaura	Uninhabited Village						
Harauli Fatehpur Ehtamali	Uninhabited Village						
Harauli Fatehpur	304	1876	984	892	333	166	167
Shahzadpur Jitwar Chak	Uninhabited Village						
Manua Khalak Dad	59	360	191	169	77	39	38
Shahzadpur Jitwar	102	627	333	294	109	57	52
Manua	Uninhabited Village						
Murgia Chak	34	181	92	89	25	13	12
Shahbazpur Patwa	167	1115	583	532	195	108	87
Ismailpur	1455	8569	4559	4010	1448	803	645
Jazira Ismailpur	Uninhabited Village						
Rampur Dumri	Uninhabited Village						
Bakarpur	10	66	34	32	5	3	2
Bakarpur	15	100	56	44	12	6	6
Chak Said Kari	50	314	168	146	29	19	10
Ghauspur Ijra	1037	5704	3068	2636	954	523	431
Dighi Kalan	3521	20520	11331	9189	3008	1659	1349
Purwa	179	1028	538	490	190	94	96
Bishunpur Bala Dhari urf Balwa	825	4445	2247	2198	805	411	394
Sair Chak	48	298	156	142	65	37	28
Chak Sakra	145	889	486	403	109	61	48

Chak Baladhari	144	711	370	341	143	73	70
Chak Bhoj urf Sahabuddin	132	644	351	293	124	68	56
Chak Nayamat	48	322	157	165	72	35	37
Chak Aima	108	607	310	297	140	74	66
Akilabad	404	2651	1470	1181	383	236	147
Akilabad Diara	Uninhabited Village						
Shampur Gandaki	Uninhabited Village						
Hajipur (NP)/39 Wards	24033	147688	78047	69641	20899	11090	9809
3. District Patna, Bihar							
Mangarpal	598	4544	2460	2084	801	431	370
Shankarpatti	56	432	218	214	92	45	47
Shankarpur khas	289	2026	1083	943	437	221	216
Maksudpur	272	1936	1034	902	429	213	216
Habaspur	580	4733	2472	2261	973	523	450
Ganghara	1197	8205	4411	3794	1572	846	726
Patlapur	559	3288	1719	1569	575	294	281
Madhopur	431	3765	1997	1768	714	382	332
Hetanpur	702	5312	2854	2458	1066	575	491
Jafarpur	130	826	433	393	188	94	94
Kafarpur	181	1069	559	510	228	117	111
Kedalpura	245	1639	848	791	360	177	183
Birbhan chak	Uninhabited Village						
Bishunpur	322	2144	1143	1001	457	230	227
Harsham chak	436	2800	1475	1325	653	334	319
Kasim chak	253	1722	943	779	389	209	180
Dalip chak	Uninhabited Village						
Taufir Mangar Pal	Uninhabited Village						
Panapur	3871	26310	13923	12387	5530	2779	2751
Dinapur Nizamat (NP)/Part (4%)	28932	182429	96875	85554	26424	14136	12288
Panapur Taufir	1180	7324	4029	3295	1441	777	664
Khas Mahal Digha Diara	19	118	64	54	26	12	14
Mohammadpur urf Chainpur	19	111	68	43	13	7	6
Dujra Diara	Uninhabited Village						
Mainpur Diara	42	242	135	107	41	28	13
Digha Diara	5	26	13	13	4	2	2
Patna (M Corp. + OG) Part (5%)	294631	1684297	893445	790852	203047	108192	94855
TOTAL (10km)	**419208**	**2460357**	**1304589**	**1155768**	**329970**	**175128**	**154842**
Source-Census of India, 2011							

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

Name of Village/Town	Total Population	Scheduled Castes			Scheduled Tribes		
		Persons	Males	Females	Persons	Males	Females
1. District Saran, Bihar							
Bhaw Chak	Uninhabited Village						
Mathchelwa	1400	0	0	0	0	0	0

Mansa Chak	Uninhabited Village						
Bhopan Chak	Uninhabited Village						
Lachhmanpur	Uninhabited Village						
Chandwa Chak	Uninhabited Village						
Litiahi	Uninhabited Village						
Karanpura	Uninhabited Village						
Murar chak	Uninhabited Village						
Bhagwan Chak	Uninhabited Village						
Gay Ghat	Uninhabited Village						
Chak Ruddi	Uninhabited Village						
Kusiari	Uninhabited Village						
Math Kakara	2228	0	0	0	0	0	0
Mangarpal Murtuza	3820	207	106	101	0	0	0
Khushihal pur	1117	214	116	98	0	0	0
Barua	1497	381	206	175	0	0	0
Sitalpur	8678	790	403	387	0	0	0
Una Chak	1598	270	144	126	0	0	0
Nizama Chak	2360	573	285	288	69	37	32
Bishunpur	308	0	0	0	0	0	0
Parsotimpur	923	298	155	143	0	0	0
Ahiman Patti	1293	14	8	6	0	0	0
Kanakpur	3537	312	169	143	0	0	0
Kesarpur	1574	416	207	209	0	0	0
Tilok Chak	2727	263	141	122	0	0	0
Barua	5938	460	228	232	17	10	7
Pipra Salehpur	Uninhabited Village						
Ismaila	Uninhabited Village						
Kakaria	Uninhabited Village						
Baguraha	Uninhabited Village						
Milki	Uninhabited Village						
Chatra	Uninhabited Village						
Kuraia	4085	825	457	368	0	0	0
Dudhia	2733	582	321	261	0	0	0
Akilpur	3347	103	49	54	2	2	0
Baqarpur	1083	369	195	174	0	0	0
Salhadi	861	163	85	78	0	0	0
Anu CHak	Uninhabited Village						
Malkha Chak	3330	584	318	266	0	0	0
Haraji	5809	978	492	486	4	1	3
Fakuli	1821	244	126	118	0	0	0
Parsotimpur	1287	104	50	54	0	0	0
Pakaulia	847	0	0	0	0	0	0
Batrauli	1742	0	0	0	0	0	0
Pakauliya	1532	232	129	103	0	0	0
Babhangawan	1921	135	71	64	0	0	0
Sobhepur	3205	442	226	216	0	0	0
Chhittu Pakar	1529	35	17	18	0	0	0
Murgia Chak	Uninhabited Village						
Hasilpur	2591	18	10	8	0	0	0
Kasturi Chak	1927	116	61	55	0	0	0
Naya Ganw	8575	1167	593	574	1	0	1
Makra	2185	97	49	48	0	0	0
Khuntaha	Uninhabited Village						

Lawang Patti	Uninhabited Village						
Rasulpur	4999	196	110	86	0	0	0
Chandpura	Uninhabited Village						
Hasanpur	3979	548	294	254	1	0	1
Gopalpur	6070	603	318	285	12	7	5
Chaturpur	5054	294	147	147	0	0	0
Akilpur	1403	149	82	67	0	0	0
Dariyapur	2188	634	341	293	0	0	0
Chhapra	2074	325	162	163	0	0	0
Shikarpur	6973	713	385	328	1	1	0
Murthan	3442	467	257	210	0	0	0
Parmanandpur	6029	806	436	370	0	0	0
Gheghta	2182	112	61	51	0	0	0
Ismail Chak	2110	183	90	93	0	0	0
Apsaid	1449	0	0	0	0	0	0
Makhdumpur	743	0	0	0	0	0	0
Khemi Chak	81	41	22	19	0	0	0
Kaleanpur	3608	116	57	59	0	0	0
Semara	1227	94	51	43	0	0	0
Baijalpur Kesho	3468	478	248	230	0	0	0
Baijalpur	355	138	63	75	0	0	0
Damodarpur	1413	12	6	6	0	0	0
Baijalpur Fakir	Uninhabited Village						
Siktia	329	0	0	0	0	0	0
Baijalpur Tamuni	Uninhabited Village						
Faqrabad	2105	851	448	403	0	0	0
Chitarsenpur	2939	17	10	7	0	0	0
Baqarpur	1944	103	46	57	0	0	0
Gobind Chak	3927	895	455	440	0	0	0
Saidpur	7757	702	367	335	0	0	0
ChakDaria	1485	75	39	36	0	0	0
Abdul Hai	Uninhabited Village						
Salehpur	Uninhabited Village						
Naudiha	Uninhabited Village						
Nawada	1059	41	22	19	0	0	0
Kasmar	6620	458	251	207	4	3	1
Rasulpur	Uninhabited Village						
Kharika	8716	856	453	403	0	0	0
Chausia	3313	250	133	117	3	2	1
Chak Daria Sultanpur	669	0	0	0	0	0	0
Sultanpur	958	274	148	126	0	0	0
Chausia	Uninhabited Village						
Mirzapur 1	2931	665	349	316	0	0	0
Bharanpura	5543	688	359	329	0	0	0
Badurahi	4436	388	196	192	0	0	0
Parvezabad	1583	41	21	20	0	0	0
Jahangirpur	3498	452	237	215	1	1	0
Dudhaila	4548	186	99	87	0	0	0
Jaitiya	2098	264	138	126	0	0	0
Sabalpur	27262	2222	1188	1034	48	25	23
Rahar Diyara	Uninhabited Village						
Barbatta	501	0	0	0	0	0	0
Nazarmira	7720	25	12	13	0	0	0

Shahpur	13547	1676	849	827	7	5	2
Gangajal	2867	138	74	64	0	0	0
Chhitar Chak	2414	47	25	22	0	0	0
Lodipur	Uninhabited Village						
Chak Chhitar	Uninhabited Village						
Ramsapur	1288	12	7	5	0	0	0
Mirzapur	218	0	0	0	0	0	0
Garibpatti	1484	0	0	0	0	0	0
Banwari Chak	20	0	0	0	0	0	0
Bariar Chak	1250	117	63	54	0	0	0
Chak Jujhari	Uninhabited Village						
Sighinpur	504	370	199	171	0	0	0
Pahleza	117	0	0	0	0	0	0
Raipur Hasanpur	2126	183	98	85	0	0	0
Sabalpur	2537	127	71	56	0	0	0
Sonepur (NP)/21 Wards	37776	5158	2721	2437	138	81	57
2. District Vaishali, Bihar							
Fatehpur Gaura	Uninhabited Village						
Harauli Fatehpur Ehtamali	Uninhabited Village						
Harauli Fatehpur	1876	437	233	204	0	0	0
Shahzadpur Jitwar Chak	Uninhabited Village						
Manua Khalak Dad	360	322	171	151	1	0	1
Shahzadpur Jitwar	627	36	18	18	0	0	0
Manua	Uninhabited Village						
Murgia Chak	181	5	2	3	0	0	0
Shahbazpur Patwa	1115	220	115	105	0	0	0
Ismailpur	8569	1456	763	693	2	1	1
Jazira Ismailpur	Uninhabited Village						
Rampur Dumri	Uninhabited Village						
Bakarpur	66	0	0	0	0	0	0
Bakarpur	100	0	0	0	0	0	0
Chak Said Kari	314	0	0	0	0	0	0
Ghauspur Ijra	5704	1392	729	663	0	0	0
Dighi Kalan	20520	3931	2127	1804	25	14	11
Purwa	1028	319	175	144	0	0	0
Bishunpur Bala Dhari urf Balwa	4445	1199	607	592	3	3	0
Sair Chak	298	18	11	7	0	0	0
Chak Sakra	889	81	49	32	0	0	0
Chak Baladhari	711	395	195	200	0	0	0
Chak Bhoj urf Sahabuddin	644	41	25	16	0	0	0
Chak Nayamat	322	322	157	165	0	0	0
Chak Aima	607	134	70	64	0	0	0
Akilabad	2651	274	151	123	2	2	0
Akilabad Diara	Uninhabited Village						
Shampur Gandaki	Uninhabited Village						
Hajipur (NP)/39 Wards	147688	24908	13132	11776	97	57	40
3. District Patna, Bihar							
Mangarpal	4544	63	40	23	0	0	0
Shankarpatti	432	0	0	0	0	0	0
Shankarpur khas	2026	0	0	0	0	0	0
Maksudpur	1936	426	221	205	1	1	0
Habaspur	4733	149	55	94	0	0	0
Ganghara	8205	483	259	224	0	0	0

Patlapur	3288	405	222	183	0	0	0
Madhopur	3765	480	252	228	2	1	1
Hetanpur	5312	331	175	156	0	0	0
Jafarpur	826	0	0	0	0	0	0
Kafarpur	1069	8	5	3	0	0	0
Kedalpura	1639	8	4	4	0	0	0
Birbhan chak	Uninhabited Village						
Bishunpur	2144	0	0	0	0	0	0
Harsham chak	2800	0	0	0	0	0	0
Kasim chak	1722	12	5	7	0	0	0
Dalip chak	Uninhabited Village						
Taufir Mangar Pal	Uninhabited Village						
Panapur	26310	2336	1188	1148	6	3	3
Dinapur Nizamat (NP)/Part (4%)	182429	14527	7639	6888	305	166	139
Panapur Taufir	7324	175	91	84	5	1	4
Khas Mahal Digha Diara	118	19	10	9	0	0	0
Mohammadpur urf Chainpur	111	0	0	0	0	0	0
Dujra Diara	Uninhabited Village						
Mainpur Diara	242	0	0	0	0	0	0
Digha Diara	26	0	0	0	1	0	1
Patna (M Corp. + OG) Part (5%)	1684297	151924	80521	71403	5139	2527	2612
TOTAL (10km)	**2460357**	**240418**	**127042**	**113376**	**5897**	**2951**	**2946**
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 954females per 1000 males in the District. The same was recorded as 886females for every 1000 males in the study area. The child (0-6 yr age) sex ratio of the stud area was observed as 884 female children per 1000 male children.

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

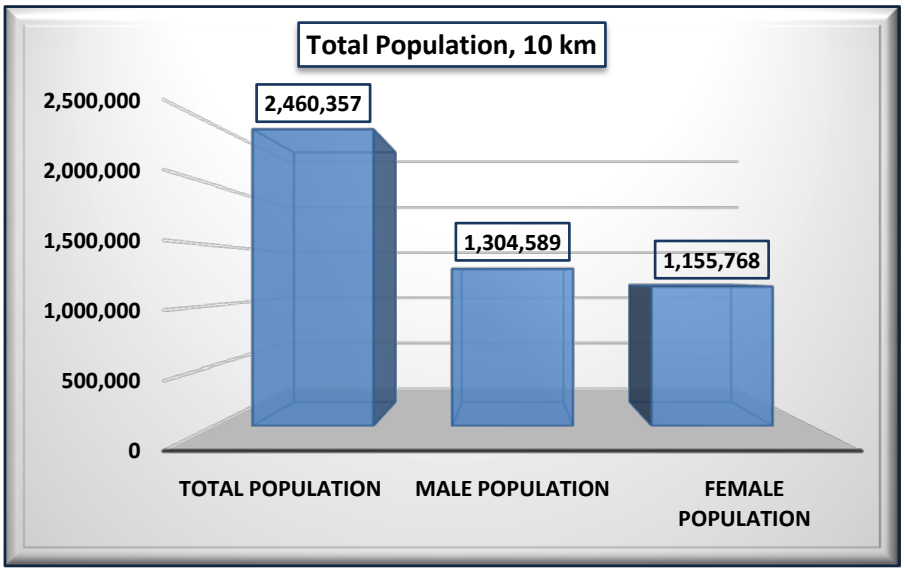

Figure3.7 :Male-Female Wise Population Distribution

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 240418persons consisting of 127042 males and 113376females respectively in the study area which accounts as 9.8% to the total population (2460357persons) of the study area. Scheduled Tribes ('ST') population was observed as 5897 persons,accounts as 0.24% to the total population of the study zone consisting of 2951males and 2946females in the 10km radius study zone.It implies that the rest 90.0% of the total population belongs to the general category.

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

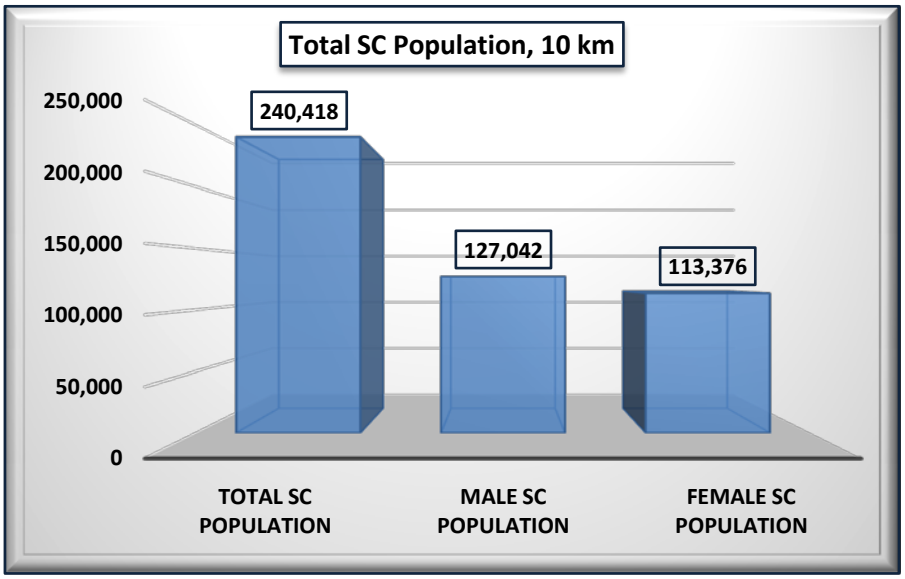

Figure 3.8 :Scheduled Caste Population in the Study Area

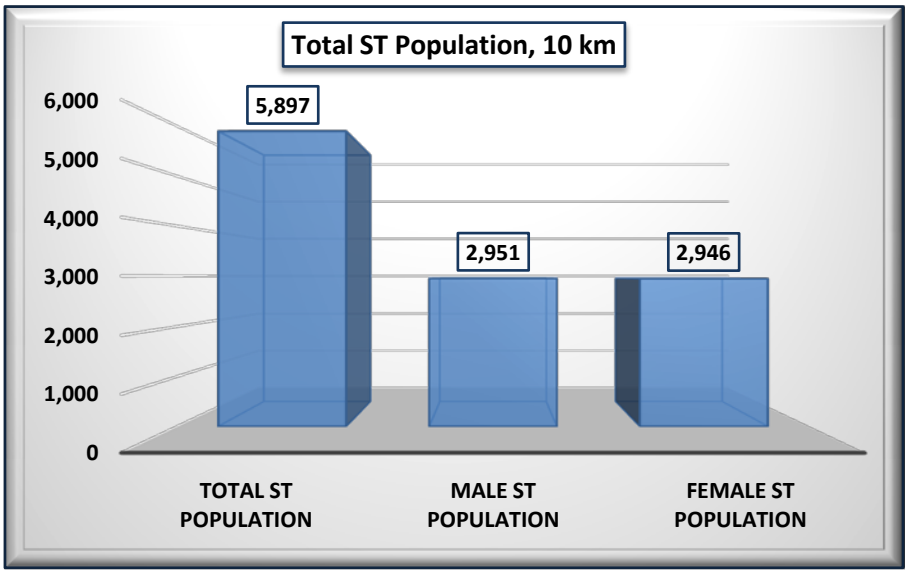

Figure 3.9 :Scheduled Tribes Population in the Study Area

Literacy Rate

Literacy level is quantifiable indicator to assess the development status of an area or region. Male-Female wise literates and illiterate's population is represented in**Table 3.34** Total literate's population was recorded as1685190 persons (68.5%)in the study area..**Table 3.34** reveals that Male-Female wise literates are observed as 851972&733218 persons respectively, implies that the 'Literacy Rate' is recorded as 68.5% with male-female wise percentages being 34.6% &29.8% respectively.

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

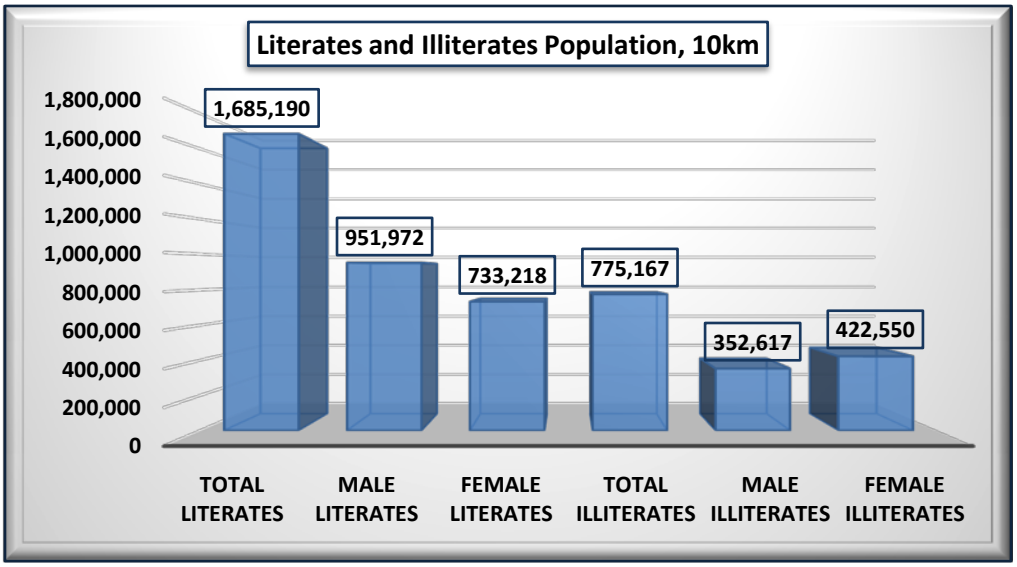

Figure3.10 :Male-Female Wise Distribution of Literates & Illiterates

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

Name of Village/Town	Total Population	Literates			Illiterates		
		Persons	Males	Females	Persons	Males	Females
1. District Saran, Bihar							
Bhaw Chak	Uninhabited Village						
Mathchelwa	1400	572	414	158	828	327	501
Mansa Chak	Uninhabited Village						
Bhopan Chak	Uninhabited Village						
Lachhmanpur	Uninhabited Village						
Chandwa Chak	Uninhabited Village						
Litiahi	Uninhabited Village						
Karanpura	Uninhabited Village						
Murar chak	Uninhabited Village						
Bhagwan Chak	Uninhabited Village						
Gay Ghat	Uninhabited Village						
Chak Ruddi	Uninhabited Village						
Kusiari	Uninhabited Village						
Math Kakara	2228	1250	788	462	978	414	564
Mangarpal Murtuza	3820	1839	1072	767	1981	902	1079
Khushihal pur	1117	311	192	119	806	407	399
Barua	1497	704	443	261	793	373	420
Sitalpur	8678	5254	3058	2196	3424	1356	2068
Una Chak	1598	941	568	373	657	264	393
Nizama Chak	2360	1245	749	496	1115	465	650
Bishunpur	308	194	118	76	114	34	80
Parsotimpur	923	513	314	199	410	161	249
Ahiman Patti	1293	685	417	268	608	255	353
Kanakpur	3537	2304	1363	941	1233	501	732
Kesarpur	1574	854	541	313	720	267	453
Tilok Chak	2727	1626	924	702	1101	438	663
Barua	5938	3840	2308	1532	2098	824	1274
Pipra Salehpur	Uninhabited Village						
Ismaila	Uninhabited Village						
Kakaria	Uninhabited Village						
Baguraha	Uninhabited Village						
Milki	Uninhabited Village						
Chatra	Uninhabited Village						
Kuraia	4085	2214	1370	844	1871	810	1061
Dudhia	2733	976	635	341	1757	784	973
Akilpur	3347	1214	788	426	2133	997	1136
Baqarpur	1083	418	245	173	665	322	343
Salhadi	861	325	219	106	536	240	296
Anu CHak	Uninhabited Village						
Malkha Chak	3330	2288	1338	950	1042	425	617
Haraji	5809	2996	1817	1179	2813	1182	1631
Fakuli	1821	1236	694	542	585	214	371
Parsotimpur	1287	809	474	335	478	179	299
Pakaulia	847	486	308	178	361	143	218
Batrauli	1742	522	301	221	1220	595	625
Pakauliya	1532	600	416	184	932	390	542
Babhangawan	1921	779	497	282	1142	494	648
Sobhepur	3205	1491	945	546	1714	727	987
Chhittu Pakar	1529	932	571	361	597	230	367

Murgia Chak	Uninhabited Village						
Hasilpur	2591	1230	795	435	1361	591	770
Kasturi Chak	1927	1277	745	532	650	274	376
Naya Ganw	8575	4532	2757	1775	4043	1700	2343
Makra	2185	1229	704	525	956	408	548
Khuntaha	Uninhabited Village						
Lawang Patti	Uninhabited Village						
Rasulpur	4999	2564	1540	1024	2435	1097	1338
Chandpura	Uninhabited Village						
Hasanpur	3979	2288	1399	889	1691	692	999
Gopalpur	6070	4094	2463	1631	1976	777	1199
Chaturpur	5054	3263	1953	1310	1791	757	1034
Akilpur	1403	801	466	335	602	272	330
Dariyapur	2188	1106	671	435	1082	504	578
Chhapra	2074	1185	710	475	889	405	484
Shikarpur	6973	2595	1668	927	4378	2002	2376
Murthan	3442	1923	1167	756	1519	654	865
Parmanandpur	6029	3020	1957	1063	3009	1286	1723
Gheghta	2182	1289	788	501	893	362	531
Ismail Chak	2110	1338	778	560	772	330	442
Apsaid	1449	896	559	337	553	212	341
Makhdumpur	743	467	263	204	276	100	176
Khemi Chak	81	36	23	13	45	18	27
Kaleanpur	3608	1498	938	560	2110	937	1173
Semara	1227	507	311	196	720	338	382
Baijalpur Kesho	3468	1942	1162	780	1526	672	854
Baijalpur	355	224	132	92	131	39	92
Damodarpur	1413	1049	593	456	364	166	198
Baijalpur Fakir	Uninhabited Village						
Siktia	329	177	104	73	152	59	93
Baijalpur Tamuni	Uninhabited Village						
Faqrabad	2105	921	590	331	1184	485	699
Chitarsenpur	2939	1217	814	403	1722	755	967
Baqarpur	1944	1235	727	508	709	302	407
Gobind Chak	3927	1967	1175	792	1960	902	1058
Saidpur	7757	3158	1937	1221	4599	2135	2464
ChakDaria	1485	564	355	209	921	420	501
Abdul Hai	Uninhabited Village						
Salehpur	Uninhabited Village						
Naudiha	Uninhabited Village						
Nawada	1059	485	300	185	574	274	300
Kasmar	6620	3397	2023	1374	3223	1456	1767
Rasulpur	Uninhabited Village						
Kharika	8716	5057	3052	2005	3659	1549	2110
Chausia	3313	2044	1247	797	1269	516	753
Chak Daria Sultanpur	669	408	254	154	261	103	158
Sultanpur	958	512	296	216	446	206	240
Chausia	Uninhabited Village						
Mirzapur 1	2931	1501	897	604	1430	633	797
Bharanpura	5543	3436	2093	1343	2107	867	1240
Badurahi	4436	2516	1538	978	1920	806	1114
Parvezabad	1583	918	547	371	665	260	405
Jahangirpur	3498	1971	1213	758	1527	656	871

Dudhaila	4548	2935	1751	1184	1613	665	948
Jaitiya	2098	1404	848	556	694	269	425
Sabalpur	27262	13420	8168	5252	13842	6335	7507
Rahar Diyara	Uninhabited Village						
Barbatta	501	270	150	120	231	86	145
Nazarmira	7720	4603	2932	1671	3117	1157	1960
Shahpur	13547	7130	4486	2644	6417	2786	3631
Gangajal	2867	1763	1013	750	1104	474	630
Chhitar Chak	2414	973	676	297	1441	622	819
Lodipur	Uninhabited Village						
Chak Chhitar	Uninhabited Village						
Ramsapur	1288	411	278	133	877	407	470
Mirzapur	218	79	51	28	139	58	81
Garibpatti	1484	193	150	43	1291	646	645
Banwari Chak	20	1	1	0	19	9	10
Bariar Chak	1250	264	204	60	986	469	517
Chak Jujhari	Uninhabited Village						
Sighinpur	504	179	118	61	325	152	173
Pahleza	117	88	55	33	29	12	17
Raipur Hasanpur	2126	484	305	179	1642	840	802
Sabalpur	2537	982	619	363	1555	782	773
Sonepur (NP)/21 Wards	37776	25893	14909	10984	11883	5086	6797
2. District Vaishali, Bihar							
Fatehpur Gaura	Uninhabited Village						
Harauli Fatehpur Ehtamali	Uninhabited Village						
Harauli Fatehpur	1876	1129	667	462	747	317	430
Shahzadpur Jitwar Chak	Uninhabited Village						
Manua Khalak Dad	360	103	63	40	257	128	129
Shahzadpur Jitwar	627	459	260	199	168	73	95
Manua	Uninhabited Village						
Murgia Chak	181	124	73	51	57	19	38
Shahbazpur Patwa	1115	472	299	173	643	284	359
Ismailpur	8569	5080	2962	2118	3489	1597	1892
Jazira Ismailpur	Uninhabited Village						
Rampur Dumri	Uninhabited Village						
Bakarpur	66	51	29	22	15	5	10
Bakarpur	100	72	47	25	28	9	19
Chak Said Kari	314	230	127	103	84	41	43
Ghauspur Ijra	5704	3229	2005	1224	2475	1063	1412
Dighi Kalan	20520	13004	7771	5233	7516	3560	3956
Purwa	1028	558	353	205	470	185	285
Bishunpur Bala Dhari urf Balwa	4445	2276	1291	985	2169	956	1213
Sair Chak	298	174	98	76	124	58	66
Chak Sakra	889	676	390	286	213	96	117
Chak Baladhari	711	372	231	141	339	139	200
Chak Bhoj urf Sahabuddin	644	356	218	138	288	133	155
Chak Nayamat	322	177	102	75	145	55	90
Chak Aima	607	248	146	102	359	164	195
Akilabad	2651	1539	933	606	1112	537	575
Akilabad Diara	Uninhabited Village						
Shampur Gandaki	Uninhabited Village						

Hajipur (NP)/39 Wards	147688	97372	55206	42166	50316	22841	27475
3. District Patna, Bihar							
Mangarpal	4544	2732	1691	1041	1812	769	1043
Shankarpatti	432	161	97	64	271	121	150
Shankarpur khas	2026	546	348	198	1480	735	745
Maksudpur	1936	531	341	190	1405	693	712
Habaspur	4733	1143	823	320	3590	1649	1941
Ganghara	8205	2788	1759	1029	5417	2652	2765
Patlapur	3288	1479	959	520	1809	760	1049
Madhopur	3765	1848	1135	713	1917	862	1055
Hetanpur	5312	1730	1154	576	3582	1700	1882
Jafarpur	826	270	187	83	556	246	310
Kafarpur	1069	488	306	182	581	253	328
Kedalpura	1639	488	309	179	1151	539	612
Birbhan chak	Uninhabited Village						
Bishunpur	2144	934	598	336	1210	545	665
Harsham chak	2800	784	510	274	2016	965	1051
Kasim chak	1722	620	433	187	1102	510	592
Dalip chak	Uninhabited Village						
Taufir Mangar Pal	Uninhabited Village						
Panapur	26310	10314	6933	3381	15996	6990	9006
Dinapur Nizamat (NP)/Part (4%)	182429	120135	68807	51328	62294	28068	34226
Panapur Taufir	7324	3070	2038	1032	4254	1991	2263
Khas Mahal Digha Diara	118	19	12	7	99	52	47
Mohammadpur urf Chainpur	111	26	23	3	85	45	40
Dujra Diara	Uninhabited Village						
Mainpur Diara	242	46	37	9	196	98	98
Digha Diara	26	19	11	8	7	2	5
Patna (M Corp. + OG) Part (5%)	1684297	1234991	685885	549106	449306	207560	241746
TOTAL (10km)	**2460357**	**1685190**	**951972**	**733218**	**775167**	**352617**	**422550**
Source-Census of India, 2011							

Economic Profile of Saran District:

Saran was earlier called 'money order economy' district, as people used to send remittances in money order to their families there. It is one of the 38 districts in Bihar currently receiving funds from the Backward Regions Grant Fund Programme (BRGF).

It is a primarily agriculture based rural and suburban region with little industrial output. This can partly be attributed to the non business friendly socialism inspired governments led by RJD in the region from 2001 to 2014. That period was marked by unethical election practices.

Agriculture is the main activity of Saran district. Agricultural products include paddy, wheat, sugar cane, potato and maize.The soil of the district is alluvial. The diara areas in the beds of the three rivers are subjected to periodic inundation, hence are highly fertile.No mineral of economic value is found in the district.Economy of Saran has seen sustained growth.The sugar factories in the region contribute the most to the industrial scenario of Saran.

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 577897(23.0%) and 143253(6.0%) to the total population (2460375), while the remaining 1739201(71.0%) persons were recorded as non-workers. Thus it implies that the semi-skilled and non-skilled work-force required in study area for the project is available in aplenty.

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

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

Name of the Village/Town	MAIN WORK_P	MAIN_CL_P	MAIN_AL_P	MAIN_HH_P	MAIN_OT_P	MARG WORK_P	MARG_CL_P	MARG_AL_P	MARG_HH_P	MARG_OT_P
1. District Saran, Bihar										
Bhaw Chak	Uninhabited Village									
Mathchelwa	34	2	31	0	1	138	2	136	0	0
Mansa Chak	Uninhabited Village									
Bhopan Chak	Uninhabited Village									
Lachhmanpur	Uninhabited Village									
Chandwa Chak	Uninhabited Village									
Litiahi	Uninhabited Village									
Karanpura	Uninhabited Village									
Murar chak	Uninhabited Village									
Bhagwan Chak	Uninhabited Village									
Gay Ghat	Uninhabited Village									
Chak Ruddi	Uninhabited Village									
Kusiari	Uninhabited Village									
Math Kakara	430	174	238	1	17	85	35	50	0	0
Mangarpal Murtuza	259	135	59	3	62	743	111	604	4	24

Khushihal pur	169	30	125	0	14	77	2	74	0	1
Barua	364	58	291	0	15	24	1	22	0	1
Sitalpur	1246	211	186	27	822	1050	186	413	60	391
Una Chak	240	52	18	39	131	214	96	27	16	75
Nizama Chak	184	12	62	8	102	389	2	337	5	45
Bishunpur	44	37	0	0	7	22	6	16	0	0
Parsotimpur	153	27	44	0	82	115	11	86	6	12
Ahiman Patti	34	5	7	2	20	233	13	139	4	77
Kanakpur	457	127	185	23	122	357	87	73	19	178
Kesarpur	121	14	4	8	95	264	1	256	3	4
Tilok Chak	414	100	65	25	224	197	8	130	3	56
Barua	923	378	344	40	161	548	33	409	26	80
Pipra Salehpur	Uninhabited Village									
Ismaila	Uninhabited Village									
Kakaria	Uninhabited Village									
Baguraha	Uninhabited Village									
Milki	Uninhabited Village									
Chatra	Uninhabited Village									

Kuraia	230	44	13	2	171	787	55	528	12	192
Dudhia	265	15	208	10	32	689	157	504	19	9
Akilpur	353	35	306	1	11	645	266	370	2	7
Baqarpur	72	28	17	8	19	175	123	49	1	2
Salhadi	245	22	205	3	15	57	0	56	0	1
Anu CHak	Uninhabited Village									
Malkha Chak	469	54	205	16	194	393	65	289	6	33
Haraji	361	100	86	66	109	1044	164	720	36	124
Fakuli	164	80	17	8	59	222	71	141	0	10
Parsotimpur	113	18	22	2	71	174	6	151	0	17
Pakaulia	92	49	0	0	43	114	17	72	0	25
Batrauli	282	78	167	6	31	212	7	203	0	2
Pakauliya	267	63	61	62	81	108	7	32	3	66
Babhangawan	349	121	175	2	51	61	21	26	0	14
Sobhepur	433	70	239	0	124	345	86	102	7	150
Chhittu Pakar	314	26	160	2	126	36	4	25	0	7
Murgia Chak	Uninhabited Village									
Hasilpur	264	46	150	1	67	335	32	233	29	41
Kasturi Chak	357	1	128	3	225	99	0	90	2	7
Naya Ganw	1439	167	531	50	691	679	56	328	47	248
Makra	197	3	89	3	102	342	12	50	6	274
Khuntaha	Uninhabited Village									

Lawang Patti	Uninhabited Village									
Rasulpur	347	77	44	13	213	1007	108	629	34	236
Chandpura	Uninhabited Village									
Hasanpur	912	246	328	44	294	127	6	98	8	15
Gopalpur	1140	435	335	26	344	382	66	277	10	29
Chaturpur	764	124	376	65	199	525	42	434	10	39
Akilpur	140	56	23	2	59	298	22	109	14	153
Dariyapur	336	75	228	5	28	298	9	253	3	33
Chhapra	258	9	197	2	50	319	18	272	2	27
Shikarpur	1156	297	620	3	236	864	121	673	39	31
Murthan	865	211	384	57	213	341	34	186	42	79
Parmanandpur	994	230	408	48	308	486	23	318	16	129
Gheghta	519	81	107	7	324	67	11	11	3	42
Ismail Chak	440	16	295	0	129	57	8	21	2	26
Apsaid	397	23	300	6	68	61	8	11	0	42
Makhdumpur	89	54	25	1	9	43	3	40	0	0
Khemi Chak	23	3	17	0	3	0	0	0	0	0
Kaleanpur	324	36	130	0	158	599	141	407	5	46
Semara	274	49	145	1	79	33	3	21	0	9
Baijalpur Kesho	682	172	253	4	253	212	12	115	9	76
Baijalpur	19	0	0	0	19	56	7	46	0	3
Damodarpur	103	13	19	1	70	275	18	248	0	9
Baijalpur Fakir	Uninhabited Village									
Siktia	8	2	0	0	6	61	27	34	0	0
Baijalpur Tamuni	Uninhabited Village									
Faqrabad	330	32	171	1	126	125	9	114	0	2
Chitarsenpur	303	39	190	4	70	403	18	352	1	32
Baqarpur	265	161	52	6	46	173	13	82	19	59
Gobind Chak	1073	173	530	35	335	107	2	77	3	25
Saidpur	1562	242	597	70	653	615	38	290	9	278
ChakDaria	143	79	10	0	54	278	2	261	0	15
Abdul Hai	Uninhabited Village									
Salehpur	Uninhabited Village									
Naudiha	Uninhabited Village									
Nawada	74	15	33	1	25	590	4	120	9	457
Kasmar	1442	272	577	140	453	478	57	330	18	73

Rasulpur	Uninhabited Village									
Kharika	1102	153	450	42	457	890	113	605	18	154
Chausia	125	13	39	5	68	769	212	524	18	15
Chak Daria Sultanpur	63	11	14	13	25	106	0	93	10	3
Sultanpur	242	37	188	0	17	6	3	3	0	0
Chausia	Uninhabited Village									
Mirzapur 1	486	106	247	0	133	248	24	217	2	5
Bharanpura	1131	177	406	62	486	312	13	250	1	48
Badurahi	601	280	166	2	153	522	44	370	4	104
Parvezabad	262	176	14	4	68	139	6	131	0	2
Jahangirpur	713	192	149	6	366	84	2	44	5	33
Dudhaila	568	130	120	8	310	575	68	392	7	108
Jaitiya	386	59	133	44	150	168	21	114	2	31
Sabalpur	5534	2440	1381	130	1583	2191	233	1268	109	581
Rahar Diyara	Uninhabited Village									
Barbatta	83	10	35	5	33	38	0	38	0	0
Nazarmira	758	187	80	9	482	762	160	447	12	143
Shahpur	1946	534	567	43	802	1420	147	1102	12	159
Gangajal	416	120	128	18	150	341	21	235	12	73
Chhitar Chak	514	178	329	0	7	135	24	72	1	38
Lodipur	Uninhabited Village									
Chak Chhitar	Uninhabited Village									
Ramsapur	136	95	22	0	19	221	32	152	3	34
Mirzapur	17	17	0	0	0	29	4	25	0	0
Garibpatti	238	208	6	1	23	189	4	175	0	10
Banwari Chak	6	6	0	0	0	2	0	2	0	0
Bariar Chak	140	22	116	0	2	177	28	149	0	0
Chak Jujhari	Uninhabited Village									
Sighinpur	10	4	5	0	1	122	3	113	2	4
Pahleza	56	55	1	0	0	2	1	1	0	0
Raipur Hasanpur	743	318	367	18	40	179	50	109	8	12
Sabalpur	273	62	176	2	33	454	32	295	18	109
Sonepur (NP)/21 Wards	7329	316	1059	266	5688	1868	67	955	74	772

2. District Vaishali, Bihar										
Fatehpur Gaura	Uninhabited Village									
Harauli Fatehpur Ehtamali	Uninhabited Village									
Harauli Fatehpur	471	91	232	30	118	4	0	0	0	4
Shahzadpur Jitwar Chak	Uninhabited Village									
Manua Khalak Dad	40	1	27	0	12	50	18	32	0	0
Shahzadpur Jitwar	179	110	1	11	57	28	8	0	0	20
Manua	Uninhabited Village									
Murgia Chak	24	13	0	0	11	25	10	9	1	5
Shahbazpur Patwa	213	71	42	2	98	76	1	21	1	53
Ismailpur	1534	534	534	57	409	808	201	451	43	113
Jazira Ismailpur	Uninhabited Village									
Rampur Dumri	Uninhabited Village									
Bakarpur	20	6	4	0	10	4	1	2	1	0
Bakarpur	3	0	0	0	3	16	6	0	0	10
Chak Said Kari	14	2	0	1	11	31	0	23	1	7
Ghauspur Ijra	1039	277	316	12	434	725	108	244	21	352
Dighi Kalan	4785	499	1477	112	2697	883	100	378	30	375
Purwa	223	66	105	0	52	122	4	99	1	18
Bishunpur Bala Dhari urf Balwa	778	161	266	31	320	429	33	253	21	122
Sair Chak	74	3	30	3	38	0	0	0	0	0
Chak Sakra	144	20	11	0	113	66	18	27	1	20
Chak Baladhari	162	3	16	13	130	9	0	1	1	7
Chak Bhoj urf Sahabuddin	166	34	26	2	104	5	1	2	0	2
Chak Nayamat	76	2	9	3	62	8	0	5	0	3
Chak Aima	131	29	8	3	91	20	4	2	1	13
Akilabad	545	34	403	44	64	251	11	118	27	95
Akilabad Diara	Uninhabited Village									
Shampur Gandaki	Uninhabited Village									
Hajipur (NP)/39 Wards	33596	2070	4298	1342	25886	6240	395	1443	343	4059
3. District Patna, Bihar										

Mangarpal	1226	312	454	290	170	56	8	3	3	42
Shankarpatti	160	147	12	1	0	22	22	0	0	0
Shankarpur khas	589	463	114	0	12	168	25	137	0	6
Maksudpur	626	73	490	14	49	208	28	102	38	40
Habaspur	1602	181	859	66	496	262	12	158	4	88
Ganghara	1948	388	1037	228	295	1502	67	929	133	373
Patlapur	528	159	173	14	182	406	25	241	38	102
Madhopur	522	263	78	22	159	834	159	426	77	172
Hetanpur	1171	367	411	21	372	965	397	233	42	293
Jafarpur	31	1	8	7	15	580	227	186	62	105
Kafarpur	258	163	83	0	12	8	2	5	0	1
Kedalpura	319	73	207	3	36	114	3	84	1	26
Birbhan chak	Uninhabited Village									
Bishunpur	528	274	220	1	33	224	8	192	0	24
Harsham chak	694	241	233	100	120	39	12	24	0	3
Kasim chak	323	147	52	1	123	150	22	97	2	29
Dalip chak	Uninhabited Village									
Taufir Mangar Pal	Uninhabited Village									
Panapur	5834	2727	1707	117	1283	1454	135	773	30	516
Dinapur Nizamat (NP)/Part (4%)	39137	1788	4606	1731	31012	10687	284	2227	632	7544
Panapur Taufir	1684	1058	474	17	135	210	34	152	5	19
Khas Mahal Digha Diara	30	1	20	0	9	0	0	0	0	0
Mohammadpur urf Chainpur	60	5	55	0	0	1	0	0	0	1
Dujra Diara										
Mainpur Diara	118	14	104	0	0	0	0	0	0	0
Digha Diara	8	0	7	1	0	8	0	3	2	3
Patna (M Corp. + OG) Part (5%)	426086	9606	16707	19015	380758	83753	3132	6641	5615	68365
TOTAL (10km)	**577897**	**33987**	**52946**	**24956**	**466008**	**143253**	**9406**	**36174**	**8067**	**89606**

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 worker's population involved in household industries, **MAIN_OT_P:** Main other worker's population

MARGINAL WORKERS POPULATION:

MARG WORK_P: Marginal worker's total population, **MARG_CL_P:** Marginal cultivated labors total population, **MARG_AL_P:** Marginal agricultural labors population, **MARG_HH_P:** Marginal workers involved in household industries, **MARG_OT_P :** Marginal other workers Population

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

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

Occupation Class	Year, 2011
Main Workers	**577897 (23.0%)**
Male	498841(86.3%)
Female	79056(13.7%)
Marginal Workers	**143253(6.0%)**
Male	101311(70.7%)
Female	41942(29.3%)
Non-Workers	**1739207(71.0%)**
Male	704437 (40.5%)
Female	1034770(59.5%)
Total Population (10km)	**2460357**
Source: Census of India Records, 2011	

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

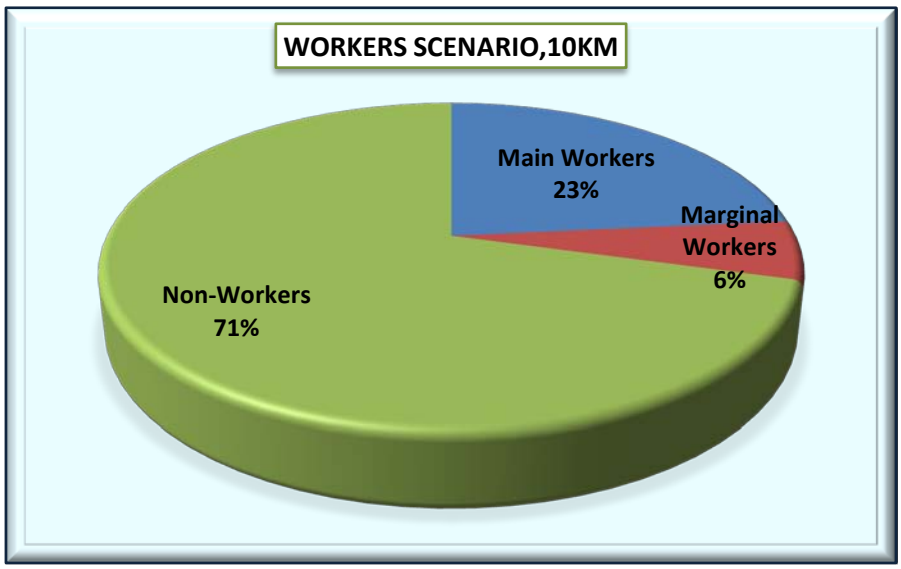

Figure 3.11 :Workers Scenario of Study Area

Composition of Main Workers:

The 'Main Workers' were observed as 577897 persons (23.0%) to the total population (2460357) of the study area and its composition is made-up of Casual laborers as 33987

(6.0%), Agricultural laborers as 52946(9.0%), Household workers 24956(4.0%) and other workers as 466008(81.0%) respectively.

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

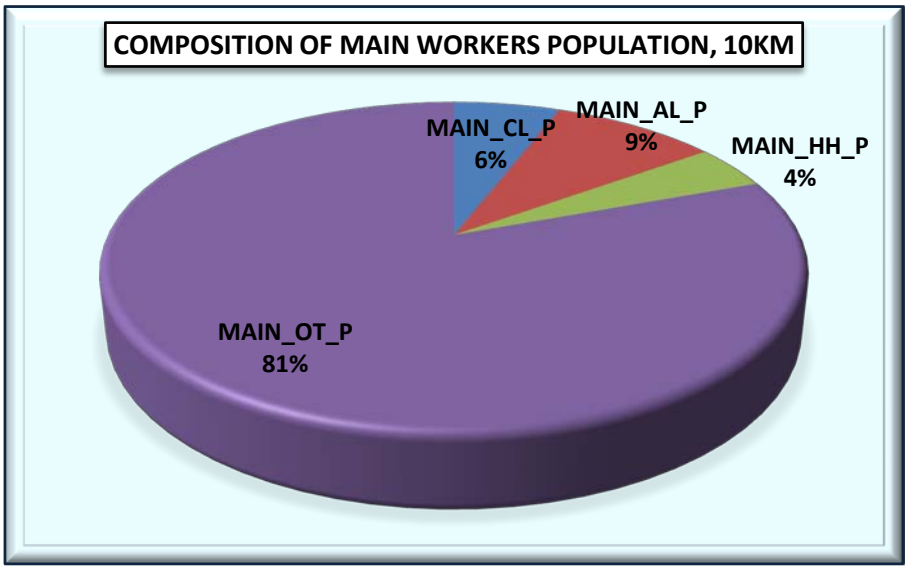

Figure 3.12 :Composition of Main Workers Population

Composition of Marginal Workers:

The total marginal workers are observed as 143253 which constitute 6.0% to the total population (2460357) comprising of Marginal Casual Laborers as 9406 (7.0%), Marginal Agricultural Laborers as 36174(25.0%), Marginal Household laborers as 8067 (6.0%) and marginal other workers were also observed as 89606 (62.0%) of the total marginal workers respectively.

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

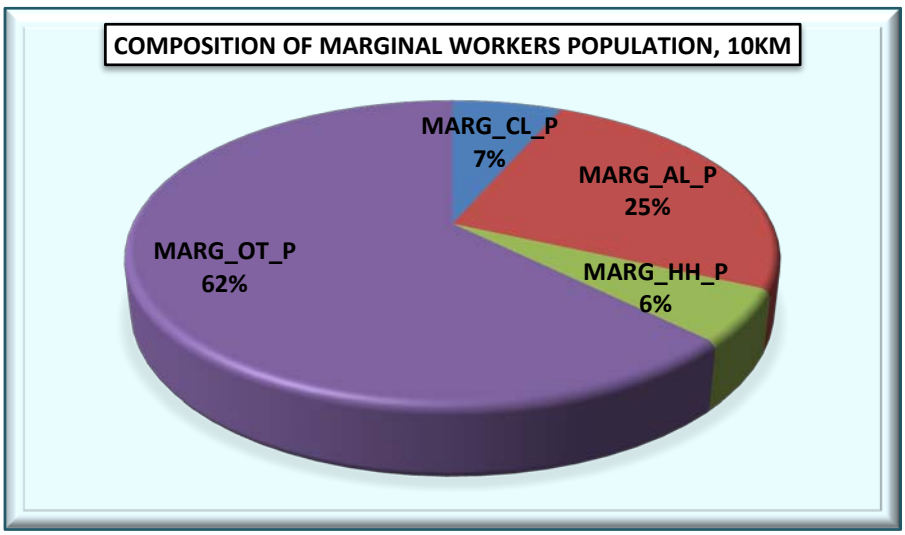

Figure 3.13 :Composition of Marginal Workers

Composition of Non-Workers:

The total Non-worker's population was observed as 1739207which accounts71.0% to the total population (2460357) of the study area. Male-female wise Non-worker's population was recorded as 704437 Males (40.5%) and 1034770 Females (59.5%) respectively.

Details about Total Non-workers in the study area are compiled in**Table 3.37** Graphical representation of Non-worker's population is shown as follows in**Figure3.14**

Table 3.37 :Composition of Non-Workers

Non-Workers Population		
Persons	**Males**	**Females**
1739207	704437 (40.5%)	1034770(59.5%)

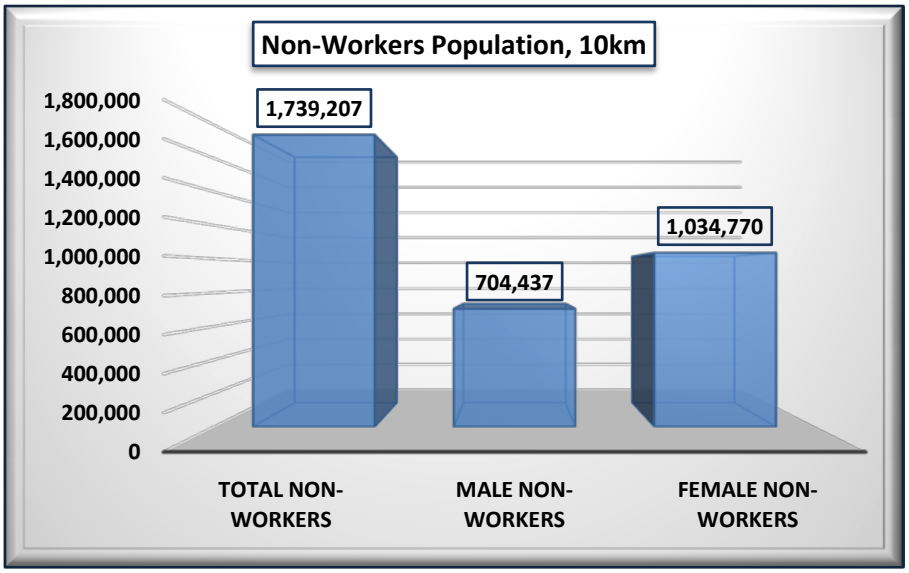

Figure 3.14 : Composition of Non-Workers

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 Saran, Vaishali and Patna districts 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 176 villages and 4 towns named Sonepur (NP)/21 Wards, Hajipur (NP), Dinapur Nizamat (NP)/Part (4%) and Patna (M Corp. + OG) Part (5%) lying under Saran, Vaishali and Patna Districts respectively in Bihar state. Overall study area villages are falling mainly under Seven (07) tehsils namely Dariapur (17 villages), Dighwara (30 villages), Sonepur (76 villages & 01 town), Hajipur (28 villages & 01 town), Maner (01 village), Dinapur-Cum-Khagaul (18 villages & 01 town) and Patna Rural

(06 villages & 01 town) of Saran, Vaishali and Patna districts in Bihar state. About 46 villages (25.5%) were found as uninhabited villages in the 10kmradial study zone.

Educational Facilities

There isa total no. of160Primary schools existing in the 10km radius study area.About 86 no of Middle schools are foundin the study area. About39 no ofHigher Secondary School (SS) andonly 13 no ofSenior Secondary School (SSS) facility is available in the study area. The educational facilities have been further strengthening now and a number of private public schools and colleges are also functioning in the surroundings of the study area. Besides, there are Engineering and Medical colleges available in Towns and District headquarters only. Higher education facilities are available in Towns of the district. There is a considerable improvement in educational facility. The villages of the study area have no such facilities can reach within 5to 10km range.

Availability of University Education in Patna District

There are several affiliated and constituted colleges of the Jay Prakash University, Chapra which imparts under graduate and post graduate education in the district. IGNOU (Indira Gandhi National Open University) has opened Spl. study center in Rajendra College, Chapra of the district where one can study many distance courses of under graduate, post graduate and vocational courses 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 4 no of primary health centersexistin the study area; most of the study area villages depend upon the towns & district HQ of the study area having such facility. No Community Health Centre (CHC) was found in the study area. Only 28no of Primary Health Sub-Centers exists in the villages of the study area. Only 10no of Mother & Child Welfare Centersarefound in the study area. Noallopathic hospitalexists in the study area. Only 6 no of Medical Dispensaries and 5 Family welfare centres were found in the study area. Overall study area villages are served by moderate level of medical facilities. Specialized medical facilities are available only in towns and District Headquarter (HQ) only.

Potable Water Facilities

Potable water facility is available in most of the villages of the study area. The entire study area has average level of potable water facilities. Hand Pump(HP) water facility is commonly observed in the study area as potable water facility9. Out of the total 180 villages/town,only42 villages (23.3%)are served with River/Canal water in the study area. As per the census records 2011, only 11 villageswere foundbeing served with Tank/Pond/Lake as potable water facility in the study area.

Communication, Road & Transport Facilities

Apart from Post &Telegraph Office (PTO) services, transport is the main communication linkage in the study area. Compiled census 2011, data shows that the study area has good postal facilities in the 10km radius zone. Only 30 villages(16.7%) 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. Nearest railway station is Bharpura Pahleja Ghat Junction Railway Station located at a distance of approx. 2.80km, in Southeast direction.Nearest National Highway, NH-31 passing at 2.75km away in Northeast direction. Nearest Town is Bharanpura,situated at 0.5km in East direction. District Headquarters ofSaran, is situated at approx. 35.0km away towardsWest direction. Nearest airport is JPN International Airport Patna is located at 13.0km away towards Southwest direction.

Communication

Roads **-** The district of Saran is well served by a network of roads. The roads are classified as the National Highways, State Highways, Major district roads and other district roads. They are maintained by the Public works Department, the Rural Engineering Organisation, the Zila parishad, Municipalities. It is also connected with the interior of the district by metalled road. Two National Highway (NH) and Two State Highway (SH) Cross the district. NH-19 which connects the district to Ballia, Uttar Pradesh and Other parts of Bihar and NH-85 passes through the district and connects the district to Gopalganj and Siwan, Bihar. SH-45 & SH-46 also pass through the district. The main roads in existence are as National Highway Road – 192 km, PWD Road – 298 km, Kachhi Road – 1052 km, Pakki Road-119 km and Brick Soling Road- 225 km.

Railways - The district of Saran has a well-knit communication system. It is served by the North-Eastern Railway. The North-Eastern Railway has three branches in the district. One runs through Chhapra to Varanasi – It runs for only 16 km. and other through Chhapra to Masrakh (44 km) and Chhapra to Gorakhpur–viz-Siwan – it runs for 35.2 km. In the district upto Chainwa. New Railway Route from Mashrakh to Maharjganj is under construction. The branch line from Sonepur to Pahleza Ghat has been closed due to the closure of ferry service between Pahleza Ghat and Mahendru Ghat. The total length of rail road is 91.04 km in the district.

Airway - There is only one landing ground in the district which is at Chhapra. This is however suitable for small aircrafts. Expansion and construction of an all weather runway is being taken up shortly.

Boats – The Saran district has a network of navigable rivers. Both Chhapra and Revelganj are important trading centers on account of their situation on river banks. With the development of roads and railway in the district, the importance of river borne traffic has diminished largely.

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 rail, road and waterways. In the district the trade consists mainly of export of linseed, mustard seeds, gram, pulses, spirit, etc. and importing of rice, paddy, other food grains, cotton piece goods, salt, kerosene oil and coal. The main business places in the district are Chhapra.

Chhapra is a very important trade centre. Wholesale trading in grains is carried on at Bazaar samiti, Chhapra. Chhapra is the chief centre of the wholesale business in the district. This trading centre has also developed a grain mandi. The retail shops of almost all the commodities consumed locally are found at Chhapra.

Mines and Minerals

The Geological formation of the district is Indo Gangetic alluvium. The silt brought downby the river Ganges and its tributaries since time immemorial has created the plains of the district.In the older alluvium, nodular segregations of the carbonate of line, known as knakar, are found.In many places the soil is Saliferous from which saltpeter is extracted. No mineral of anyeconomic importance is found in the district.

Power Supply

It is revealed from the compiled information on amenities availability as per the census record of 2011; most of the villages and towns are electrified for Domestic, Agriculture, and Commercial& for allpurposes. About 73villages (40.6%) of the study area are electrified for domestic purpose, 46villages (25.5%) for agricultural purpose,and 26 villages (14.4%) for commercial & for all purposes in the study area.Out of 180 villages/towns in the study area, 99villages (55.0%)including 46(25.5%) uninhabited villages were found not electrified for any purpose in the study area.

The district receives most of its power supply from the State Electricity Board, which has only one power house located at Chhapra, which was established in 1932, when it was run by private company. The State Electricity Board took over the control of this power house in 1955. There are 947 electrified villages in rural area of the district.

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

Table 3.38 Village wise Basic Amenities Availability

Name of the Village/Town	Educational				Medical							Drinking Water						CT	Communication & Transport				Approach to the Village				Power Supply				Nearest Town Distance, km
	P	M	SS	SSS	CHC	PHC	PHSC	MCWC	H	D	FWC	T	W	HP	TW	R	Tk		PO	PTO	BS	RS	PR	KR	NW	FP	ED	EAg.	EC	EA	
1. District Saran, Bihar																															
Bhaw Chak	Uninhabited Village																														Dighwara,10km
Mathchelwa	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	1	2	2	2	2	2	1	1	2	1	2	2	2	2	Dighwara,12km
Mansa Chak	Uninhabited Village																														Dighwara,12km
Bhopan Chak	Uninhabited Village																														Dighwara,12km
Lachhmanpur	Uninhabited Village																														Dighwara,12km
Chandwa Chak	Uninhabited Village																														Dighwara,12km
Litiahi	Uninhabited Village																														Dighwara,12km
Karanpura	Uninhabited Village																														Dighwara,12km
Murar chak	Uninhabited Village																														Dighwara,12km
Bhagwan Chak	Uninhabited Village																														Dighwara,12km
Gay Ghat	Uninhabited Village																														Dighwara,12km
Chak Ruddi	Uninhabited Village																														Dighwara,12km
Kusiari	Uninhabited Village																														Dighwara,12km
Math Kakara	1	0	0	0	0	0	1	0	0	0	0	2	2	1	2	1	2	2	1	2	2	2	2	1	2	1	2	2	2	2	Sonepur,18km
Mangarpal Murtuza	1	1	0	0	0	0	1	0	0	0	0	2	1	1	2	1	1	2	2	2	2	2	1	1	2	1	1	2	2	2	Sonepur,14km
Khushihal pur	1	1	0	0	0	0	0	0	0	0	0	2	1	1	2	1	1	2	2	2	2	2	1	1	2	1	2	2	2	2	Sonepur,12km
Barua	1	1	1	0	0	0	0	0	0	0	0	2	2	1	2	1	1	2	1	2	2	2	1	1	2	1	1	2	2	2	Sonepur,11km
Sitalpur	5	3	1	0	0	0	1	0	0	0	0	2	2	1	2	1	2	2	1	2	1	1	1	1	2	1	1	1	1	1	Chapra,22km
Una Chak	2	0	0	0	0	0	1	0	0	0	0	2	2	1	2	1	1	2	1	2	2	2	1	1	2	1	1	2	2	2	Hajipur,23km
Nizama Chak	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	1	2	2	1	1	2	2	2	Hajipur,20km
Bishunpur	1	0	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	2	2	2	1	1	2	1	1	1	2	2	Hajipur,19km
Parsotimpur	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	Dighwara,10km
Ahiman Patti	1	0	0	0	0	0	0	0	0	0	0	2	1	1	2	1	2	2	2	2	2	2	2	1	2	1	1	1	2	2	Dighwara,6km
Kanakpur	1	3	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	1	2	2	2	2	1	2	1	1	1	1	1	Chapra,22km
Kesarpur	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	1	1	1	1	Hajipur,20km
Tilok Chak	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	Chapra,38km

Barua	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	1	1	2	1	1	2	2	2	Chapra,18km
Pipra Salehpur	Uninhabited Village																													Chapra,18km
Ismaila	Uninhabited Village																													Chapra,18km
Kakaria	Uninhabited Village																													Chapra,18km
Baguraha	Uninhabited Village																													Chapra,18km
Milki	Uninhabited Village																													Chapra,18km
Chatra	Uninhabited Village																													Chapra,18km
Kuraia	2	1	1	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	1	1	2	1	1	1	2	2	Chapra,40km
Dudhia	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	Chapra,38km
Akilpur	2	1	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	1	2	2	2	2	1	2	1	2	2	2	2	Chapra,10km
Baqarpur	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	Dinapur,12km
Salhadi	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	1	2	1	2	2	2	2	Dinapur,12km
Anu CHak	Uninhabited Village																													Dinapur,12km
Malkha Chak	1	1	1	0	0	0	1	0	0	0	0	2	2	1	2	1	1	2	1	2	2	2	1	1	2	1	1	2	2	2	Dinapur,4km
Haraji	1	2	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	1	2	2	1	1	1	2	1	1	2	2	2	Chapra,7km
Fakuli	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	Chapra,22km
Parsotimpur	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	Chapra,20km
Pakaulia	1	0	0	0	0	0	0	0	0	0	0	2	1	1	2	2	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Chapra,16km
Batrauli	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	Chapra,19km
Pakauliya	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	1	2	1	1	2	2	2	Dighwara,4km
Babhangawan	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	Dighwara,7km
Sobhepur	4	0	0	0	0	0	1	0	0	0	0	2	2	1	2	1	1	2	1	2	1	2	1	1	2	1	1	2	2	2	Sonepur,20km
Chhittu Pakar	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	Sonepur,20km
Murgia Chak	Uninhabited Village																													Sonepur,20km
Hasilpur	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	Sonepur,16km
Kasturi Chak	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	1	2	1	1	2	1	1	1	2	2	Sonepur,12km
Naya Ganw	4	1	1	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	1	2	1	1	1	1	2	1	2	2	2	2	Sonepur,12km
Makra	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	1	2	2	2	2	2	2	1	2	1	1	1	2	2	Sonepur,10km
Khuntaha	Uninhabited Village																													Sonepur,10km
Lawang Patti	Uninhabited Village																													Sonepur,10km
Rasulpur	3	1	0	0	0	0	1	0	0	1	1	2	2	1	2	1	2	1	2	2	2	1	1	1	2	1	2	1	2	2	Sonepur,10km
Chandpura	Uninhabited Village																													Sonepur,10km
Hasanpur	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	1	2	1	1	1	2	2	Sonepur,16km
Gopalpur	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	1	2	2	2	1	1	2	1	1	1	1	1	Sonepur,14km
Chaturpur	4	2	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	1	2	1	1	1	2	2	Sonepur,10km

Akilpur	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	1	2	1	1	2	2	2	Sonepur,10km
Dariyapur	1	1	0	0	0	0	1	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	1	2	1	1	2	2	2	Sonepur,13km
Chhapra	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	1	1	2	1	1	2	2	2	Sonepur,12km
Shikarpur	2	1	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	1	2	2	2	1	1	2	1	2	2	2	2	Sonepur,10km
Murthan	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	1	2	1	1	1	2	2	Sonepur,10km
Parmanandpur	2	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	1	2	2	1	1	1	2	1	1	1	2	2	Sonepur,8km
Gheghta	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	1	2	2	2	1	1	2	1	1	1	1	1	Sonepur,7km
Ismail Chak	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	1	2	2	2	1	1	2	1	1	1	1	1	Sonepur,8km
Apsaid	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	2	2	1	1	1	1	1	Sonepur,8km
Makhdumpur	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	1	2	1	1	1	2	2	Sonepur,8km
Khemi Chak	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	Sonepur,8km
Kaleanpur	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	1	1	2	1	1	2	2	2	Sonepur,8km
Semara	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	1	2	1	1	2	2	2	Sonepur,7km
Baijalpur Kesho	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	1	2	2	2	1	1	2	1	1	2	2	2	Sonepur,4km
Baijalpur	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	1	1	2	1	1	2	2	2	Sonepur,4km
Damodarpur	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	1	2	1	1	2	2	2	Sonepur,3km
Baijalpur Fakir	Uninhabited Village																													Sonepur,3km
Siktia	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	1	2	2	2	Sonepur,6km
Baijalpur Tamuni	Uninhabited Village																													Sonepur,6km
Faqrabad	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	1	2	2	Sonepur,5km
Chitarsenpur	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	1	2	2	Sonepur,3km
Baqarpur	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	1	2	1	1	1	1	1	Sonepur,2km
Gobind Chak	2	2	1	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	1	2	2	2	1	1	2	1	1	1	1	1	Sonepur,6km
Saidpur	1	0	0	0	0	0	1	0	0	0	0	2	1	1	2	2	1	2	1	2	2	2	2	1	2	1	1	1	2	2	Sonepur,8km
ChakDaria	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	2	2	2	Sonepur,8km
Abdul Hai	Uninhabited Village																													Sonepur,8km
Salehpur	Uninhabited Village																													Sonepur,8km
Naudiha	Uninhabited Village																													Sonepur,8km
Nawada	3	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	Sonepur,8km
Kasmar	3	1	0	0	0	0	1	0	0	1	0	2	2	1	2	1	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Sonepur,8km
Rasulpur	Uninhabited Village																													Sonepur,8km
Kharika	2	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	1	1	1	1	Sonepur,8km
Chausia	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	1	2	2	2	2	1	1	2	1	1	1	1	1	Sonepur,8km
Chak Daria Sultanpur	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	1	2	2	2	2	1	1	2	1	1	1	1	1	Sonepur,7km
Sultanpur	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	1	2	1	1	1	1	1	Sonepur,8km

Chausia	Uninhabited Village																													Sonepur,8km
Mirzapur 1	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	1	2	1	1	1	1	1	Sonepur,8km
Bharanpura	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	1	1	2	2	2	1	1	2	1	1	1	1	1	Sonepur,4km
Badurahi	2	0	0	0	0	0	1	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	1	2	1	1	1	2	2	Sonepur,4km
Parvezabad	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	1	2	1	1	2	2	2	Sonepur,6km
Jahangirpur	2	3	0	0	0	0	1	0	0	0	0	2	1	1	2	1	1	2	2	2	2	2	1	1	2	1	1	1	1	1	Sonepur,5km
Dudhaila	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	1	2	1	1	1	1	1	Sonepur,5km
Jaitiya	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	1	2	2	Sonepur,3km
Sabalpur	4	2	1	0	0	1	1	1	0	0	1	2	2	1	2	1	2	2	1	1	2	2	1	1	2	1	1	1	2	2	Sonepur,3km
Sonepur (NP)/21 Wards	Urban Part																													Sonepur (NP),0km
Rahar Diyara	Uninhabited Village																													Sonepur,3km
Barbatta	3	1	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	1	1	2	1	1	1	1	1	Sonepur,3km
Nazarmira	3	1	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	1	1	2	1	1	1	1	1	Sonepur,2km
Shahpur	4	2	0	0	0	0	1	0	0	0	0	2	2	1	2	2	2	2	1	2	2	2	1	1	2	1	1	1	2	2	Sonepur,2km
Gangajal	2	2	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	1	1	2	1	1	1	2	2	Sonepur,2km
Chhitar Chak	1	1	0	0	0	0	1	0	0	1	0	2	2	1	2	1	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Sonepur,2km
Lodipur	Uninhabited Village																													Sonepur,2km
Chak Chhitar	Uninhabited Village																													Sonepur,2km
Ramsapur	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	Sonepur,7km
Mirzapur 2	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	1	2	1	2	2	2	2	Sonepur,9km
Garibpatti	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	1	2	1	2	2	2	2	Sonepur,9km
Banwari Chak	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	Sonepur,8km
Bariar Chak	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	1	2	2	2	2	2	2	2	1	2	2	2	2	Sonepur,10km
Chak Jujhari	Uninhabited Village																													Sonepur,10km
Sighinpur	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	Sonepur,10km
Pahleza	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	Sonepur,6km
Raipur Hasanpur	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	Sonepur,8km
Sabalpur	1	0	1	0	0	0	0	0	0	0	0	2	1	1	2	2	2	2	1	2	2	2	1	1	2	1	1	1	1	1	Sonepur,2km
2. District Vaishali, Bihar																														
Fatehpur Gaura	Uninhabited Village																													Sonepur,2km
Harauli Fatehpur Ehtamali	Uninhabited Village																													Sonepur,2km
Harauli Fatehpur	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	1	2	1	2	2	2	2	Hajipur,10km
Shahzadpur Jitwar Chak	Uninhabited Village																													Hajipur,10km
Manua Khalak Dad	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	1	2	1	1	2	2	2	Hajipur,8km
Shahzadpur Jitwar	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	1	2	1	2	2	2	2	Hajipur,9km

Manua	Uninhabited Village																													Hajipur,9km
Murgia Chak	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	Hajipur,10km
Shahbazpur Patwa	1	1	0	0	0	0	1	1	0	0	0	2	2	1	1	2	2	2	2	2	2	2	2	1	1	2	1	1	1	1	Hajipur,10km
Ismailpur	1	0	0	0	0	0	1	1	0	0	0	2	2	1	1	1	2	2	2	2	1	2	1	1	2	1	1	1	1	1	Hajipur,6km
Jazira Ismailpur	Uninhabited Village																													Hajipur,6km
Rampur Dumri	Uninhabited Village																													Hajipur,6km
Bakarpur	1	0	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	1	1	2	1	2	2	2	2	Hajipur,7km
Bakarpur	0	0	0	0	0	0	0	0	0	0	0	2	1	1	2	2	2	2	2	2	2	2	1	1	2	1	1	2	2	2	Hajipur,7km
Chak Said Kari	0	0	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	2	1	2	1	1	1	1	1	Hajipur,6km
Ghauspur Ijra	1	0	0	0	0	0	1	1	0	0	0	2	2	1	2	1	2	2	1	2	2	2	2	1	2	1	1	2	2	2	Hajipur,7km
Dighi Kalan	3	1	1	1	0	0	1	1	0	0	0	2	2	1	1	2	1	2	1	2	1	2	1	1	2	1	1	1	1	1	Hajipur,2km
Purwa	2	0	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	2	1	1	2	1	1	2	2	2	Hajipur,7km
Bishunpur Bala Dhari urf Balwa	1	1	0	0	0	0	1	1	0	0	0	2	2	1	2	2	2	2	2	2	1	1	1	1	2	1	1	2	1	2	Hajipur,5km
Sair Chak	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	1	1	2	1	1	2	2	2	Hajipur,3km
Chak Sakra	0	0	0	0	0	0	1	1	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	1	2	1	2	2	2	2	Hajipur,5km
Chak Baladhari	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	1	2	1	2	2	2	2	Hajipur,6km
Chak Bhoj urf Sahabuddin	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	1	2	1	2	2	2	2	Hajipur,7km
Chak Nayamat	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	1	2	1	1	2	2	2	Hajipur,7km
Chak Aima	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	1	2	1	1	2	2	2	Hajipur,5km
Akilabad	2	2	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	Hajipur,7km
Akilabad Diara	Uninhabited Village																													Hajipur,7km
Shampur Gandaki	Uninhabited Village																													Hajipur,7km
Hajipur (NP)	Urban Part																													Hajipur (NP),0km
3. District Patna, Bihar																														
Mangarpal	4	4	4	0	0	0	0	0	0	0	0	2	1	1	1	1	2	2	2	2	2	2	1	1	1	1	1	1	2	2	Maner,8km
Shankarpatti	1	1	1	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	Dinapur-Cum-Khagaul,11km
Shankarpur khas	1	1	1	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	Dinapur-Cum-Khagaul,14km
Maksudpur	1	1	1	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	Dinapur-Cum-Khagaul,14km
Habaspur	1	1	1	2	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	Dinapur-Cum-Khagaul,12km
Ganghara	2	1	1	3	0	0	0	0	0	0	0	2	1	1	2	1	2	2	1	2	2	2	2	1	1	1	2	2	2	2	Dinapur-Cum-Khagaul,20km
Patlapur	1	1	1	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	1	2	2	2	2	1	2	2	2	2	Dinapur-Cum-Khagaul,12km
Madhopur	0	0	0	0	0	1	1	1	0	1	1	2	2	1	2	2	2	2	2	2	1	2	2	2	2	1	2	2	2	2	Dinapur-Cum-Khagaul,16km
Hetanpur	1	1	1	2	0	1	1	1	0	1	1	2	1	1	2	1	2	2	2	2	2	2	2	1	2	1	2	2	2	2	Dinapur-Cum-Khagaul,16km
Jafarpur	1	1	1	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	1	2	2	2	2	1	2	2	2	2	Dinapur-Cum-Khagaul,14km
Kafarpur	1	1	1	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	Dinapur-Cum-Khagaul,14km
Kedalpura	2	2	2	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	Dinapur-Cum-Khagaul,15km
Birbhan chak	Uninhabited Village																													Dinapur-Cum-Khagaul,15km

Bishunpur	2	2	2	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	Dinapur-Cum-Khagaul,6km
Harsham chak	2	2	2	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	Dinapur-Cum-Khagaul,4km
Kasim chak	2	2	2	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	Dinapur-Cum-Khagaul,5km
Dalip chak	Uninhabited Village																													Dinapur-Cum-Khagaul,5km
Taufir Mangar Pal	Uninhabited Village																													Dinapur-Cum-Khagaul,5km
Panapur	1	1	1	5	0	0	0	0	0	0	0	2	1	1	2	2	2	2	1	2	2	2	2	1	2	1	2	2	2	2	Dinapur-Cum-Khagaul,3km
Dinapur Nizamat (NP)/Part (4%)	Urban Part																													Dinapur Nizamat (NP)/,0km
Panapur Taufir	1	1	1	0	0	1	1	1	0	1	1	2	2	1	2	2	2	2	2	2	2	2	1	1	2	1	1	2	2	2	Dinapur-Cum-Khagaul,6km
Khas Mahal Digha Diara	1	2	2	0	0	0	1	0	0	0	0	2	2	1	2	2	2	2	1	2	2	2	1	1	2	1	1	2	2	2	Dinapur-Cum-Khagaul,5km
Mohammadpur urf Chainpur	1	1	1	0	0	0	1	0	0	0	0	2	2	1	2	2	2	2	1	2	2	2	1	1	2	1	1	2	2	2	Dinapur-Cum-Khagaul,5km
Dujra Diara	Uninhabited Village																													Dinapur-Cum-Khagaul,5km
Mainpur Diara	1	2	2	0	0	0	1	0	0	0	0	2	2	2	2	2	2	2	1	2	2	2	1	1	2	1	1	1	2	2	Dinapur-Cum-Khagaul,4km
Digha Diara	1	1	1	0	0	0	1	0	0	0	0	2	2	1	2	2	2	2	1	2	2	2	1	1	2	1	1	1	1	1	Dinapur-Cum-Khagaul,5km
Patna (M Corp. + OG) Part (5%)	Urban Part																													Patna (M Corp. + OG),0km
TOTAL (10km)	**160**	**86**	**39**	**13**	**0**	**4**	**28**	**10**	**0**	**6**	**5**	***Status for Availability and Non-Availability is shown as A (1) & NA (2) respectively***																			

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

Abbreviations:
Educational Facilities: P-Primary School, M-Middle School, SS-Higher Secondary Schools, SSS- Senior Secondary School
Medical Facilities: CHC- Community Health Centre, PHC-Primary Health Centre, PHSC-Primary Health Sub-Centre, MCWC-Maternity and Child Welfare Centre, H-Hospital, D- Dispensary, FWC-Family Welfare Centre
Drinking Water Facilities: T-Tap Water, W-Well Water, HP-Hand Pump, TW-Tube Well Water, R-River Water, Tk-Tank Water, O-Other Drinking Water Facility
Communication and 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

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;

Baniapur – It is a large village and is the headquarters of Baniapur Anchal. The village is situated on Chapra -Salempur Road, at on distance of 27 km. from Chapra.

Bankerwa – A village in Parsa Anchal, it lies on the western bank of the Gandak about 48 km. east of Chapra. It was an important centre for collection and dispatch of sugarcane to the sugar factories.

Chapra – The town is District headquarter of Saran and Saran Division. It is situated on the northern bank of the river Ghaghra at a distance of 107 km. west of Muzaffarpur and 51 km. west of Sonepur. It is also an important railway junction. The town owed its earlier importance chiefly as commercial centre on account of its strategic location for river-borne trade.

Dhoa-Sthan – Situated 16 km. of Baniapur, it is known for the ancient temple of Lord Shiva. The village is connected with Chapra by regular Bus service.

Dighwara – A Nagar Panchayat and rail head situated 28 km. south east of Chapra. Dighwara town is also headquarters of Dighwara Anchal. The name is derived from a celebrated sage, Dighwara. Situated on the bank of Ganges, it is also an important commercial centre for river-borne traffic.

Doriganj – The village is situated 11 km. east of Chapra. It was flourishing trade centre in the past when it stood a confluence of the Ganges and Ghaghra. Three kilometers upstream from Doriganj is Sherpur-Ghat where passengers from Arrah disembark after crossing the river Ganges. This place is famous for business of sand and grains.

Ekma – A village situated 28 km. North West of Chapra, it is also a rail head and headquarters of Ekma C.D. Block. Ekma is an important commercial centre connected with Chapra, Siwan, Manjhi, Darauli and Masrakh by all weather roads.

Eksar – The village situated close to Ekma and the village is noted for three stone images, one of dancing Ganesh and two of lord Vishnu, recovered from here. These have been kept in the State Museum at Patna.

Garkha – A village is situated on the Chapra-Rewa Ghat Road, it is also the headquarters of Garkha C.D. Block. It is noted that people of this place took active part in the freedom movement**.**

Hasanpura – It is a village in Parsa C.D. Block situated on the bank of Dhani River. It is noted for a large fair held under a big banyan tree on the occasion of Vijaya Dashmi.

Jalalpur – A village situated on the Chapra-Salempur Ghat Road, it lies 18 km. north of Chapra. It is also the headquarters of Jalalpur C.D. Block.

Jankinagar Hat – A village situated 2 km. south of Garkha.It is noted for the weekly cattle fair held during the half of the year from the 13th of Baisakh to the 15th Kartik. A large fairis also held here on the occasion of Basant Panchami.

Karinga – A village situated 5 km North West of Chapra town. The village is of historical importance as being the first centre of trade established by the Dutch.

Manjhi - A village and the headquarters of Manjhi C.D. Block. It is situated 19 km west of Chapra on the bank of Ghaghra. A large fair is held here on the occasion of Kartik Purnima, when people congregate to take bath in the river.

Marhaura - A village and headquarters of Marhaura C.D. Block. At present a Sub-Division situated 27 km north east of Chapra. It is also a rail head and noted for the sugar factory, engineering works, distillery and Morton factory.

Parsa - A large village situated 5 km north east of Ekma. Railway Station on the Ekma-Sohagpur Road, it is locally known as Babu Parsa in order to distinguish it from another village Parsas which is the headquarters of a C.D. Block of the same name. It is noted for the brassware available here.

Parsa - The village is the headquarters of Parsa C.D. Block and situated at a distance of 38 km from Chapra. It was important centre of indigo cultivation during the British regime.

Qasbamaker - A large village of Parsa C.D. Block, situated on the bank of Gandak 54 km north of Chapra. The village is noted for the fair held on the occasion of Gyarahwin Sharif which draws large number of visitors of all communities.

Revelganj - A small town having a municipality and lying adjacent to Chapra. It is also the headquarters of Revelganj C.D. Block. The town is named after Henruy Revel, Collector of Customs in 1778, under the East India Railway Company.

Sonepur - Internationally famous for the large fair held on the occasion of Kartik Purnima; it is also the headquarters of Sonepur C.D. Block & Sub-Division. Sonepur has a Nagar Panchayat Committee and it is noted for its Railway Platform.

Social and Cultural Events

No major social and cultural event has taken place in the Saran during the decade in the district. Fairs and festivals are however held regularly in the district.

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.There is no structure or habitation in the core zone mining lease area, hence, any planning with respect to Rehabilitation & Resettlement is not applicable.

4.0 GENERAL

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

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

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

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

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

4.1 LAND ENVIRONMENT

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

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

Anticipated Impacts:

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

Mitigation measures:

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

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

4.2 WATER ENVIRONMENT

Anticipated Impacts:

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

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

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

Mitigation measures

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

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

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

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

4.3 AIR ENVIRONMENT

Impact On Air Quality

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

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

4.3.1 Emissions Details

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

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

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

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

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

Mitigation measures

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

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

- ✓ It will be ensured that all transportation vehicles carry a valid PUC certificate.
- ✓ Plantation will be carried out along the approach road, river banks & at all strategic places in the vicinity area.
- ✓ Periodic air quality monitoring will be done to assess the quality and for timely corrective actions.
- ✓ Water sprinkling will be done on the haul roads twice in a day. This will reduce dust emission further.
- ✓ Speed limits will be enforced to reduce airborne fugitive dust from vehicular traffic.
- ✓ Spillage from the trucks will be prevented by covering tarpaulin over the trucks.

4.4 NOISE ENVIRONMENT

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

Anticipated Impacts:

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

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

Table 4.1, Damage risk criteria for hearing loss OSHA regulations

Maximumallowable duration per day in hour	Sound pressure dB(A)	Remarks
(1)	(2)	(3)

8.0	90	1. For any period of exposure falling in between any figure and lower figure as indicated in column (1), the permissible sound is to be determined by extrapolation or proportionate scale. 2. No exposure in excess of 115 dB (A) is permissible.
6.0	92	
4.0	95	
3.0	97	
2.0	100	
1 ½	102	
1	105	
¾	107	
½	110	
¼	115	

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

a. Mitigation measures

The following measures have been envisaged to reduce the impact from the transportation of minerals:

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

4.5 BIOLOGICAL ENVIRONMENT

Mining which leads to the removal of channel substrate, re-suspension of streambed sediment and stockpiling on the streambed, will have ecological impacts. These impacts may have an effect on the direct loss of stream reserve habitat, disturbances of species attached to streambed deposits, reduced light penetration, reduced primary production, and reduced feeding opportunities. Sand mining generates additional traffic, which negatively impairs the environment.

Anticipated Impacts:

Flora

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

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

Fauna

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

Mitigation measures

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

Flora

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

Fauna

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

4.6 TRAFFIC ANALYSIS

Transportation Route:

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

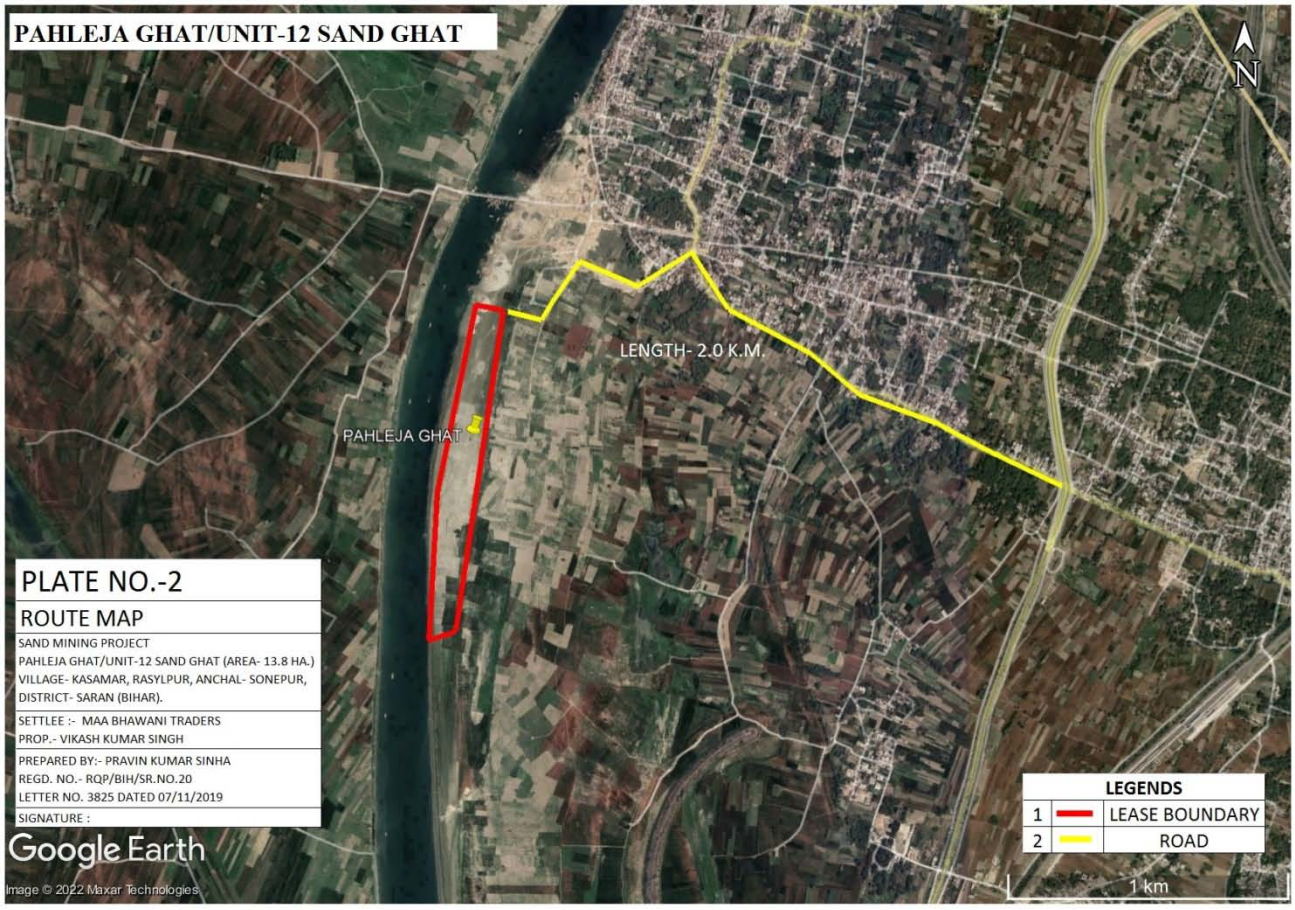

FIGURE 4.1 MAP SHOWING EVACUATION ROUTE FOR PAHLEJA GHAT/UNIT-12

Traffic analysis is carried out by understanding the existing carrying capacity of the roads near to the project site and the connecting main roads in the area. Then depending on the capacity of the

mine, the number of trucks that will be added to the present scenario will be compared to the carrying capacity.

Table 4.2 (i): Existing Traffic Scenario & LOS for PAHLEJA GHAT/UNIT-12

Road	V	C	Existing V/C Ratio	LOS
National Highway (NH-31)	2500	15,000	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 **Pahleja Ghat/Unit-12**

Proposed Capacity of Mine/annum : 370116 TPA

No. of working days : 250 days

Proposed Capacity of mine/day : 1480.46 or 1481

Truck Capacity : 16 tonnes

No. of trucks deployed/day : 92.56 or 93

Increase in PCU/day (93*3) : 279

Table 4.2 (ii): Modified Traffic Scenario & LOS

Road	V	C	Modified V/C Ratio	LOS
National Highway (NH-31)	2500+279=2779	15000	0.18	A

Results

From the above analysis it can be seen that the LOS has changed from 0.16 to 0.18 at Highway intersection that is from 'A' to 'A' i.e from Excellent' to ' Excellent' ' respectively. Hence, there will not so much adverse affect on the proposed evacuation roads due to additional traffic. Traffic management has been proposed as given in below

Traffic Management:

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

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5.0 ANALYSIS OF ALTERNATIVE TECHNOLOGY AND SITE

5.1 Site Alternatives under Consideration

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

5.2 Analysis of Alternative Technology

5.2.1 Choice of Method of Mining

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

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

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

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

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

****

6.0 INTRODUCTION

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

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

6.1 ENVIRONMENTAL MONITORING AND REPORTING PROCEDURE

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

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

The key aims of environment monitoring are:

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

2. To verify the evaluations made during the planning process, in particular with risk and impact assessments and standard & target setting and to measure operational and process efficiency.
3. Monitoring will also be required to meet compliance with statutory and corporate requirements.
4. Finally, monitoring results provide the basis for auditing i.e. to identify unexpected changes.

6.2 MONITORING METHODOLOGIES AND PARAMETERS

Air quality monitoring

Air Quality monitoring is essential for evaluation of the effectiveness of abatement programmes and to develop appropriate control measures. Suspended Particulate Matter (SPM), Sulphur Dioxide (SO_2) and Nitrogen Dioxide (NO_2) will be monitored at the workplace i.e. core zone. The methodology proposed for is shown below:

Table 6.1, Monitoring methodologies and parameters

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

Water quality monitoring

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

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

Soil quality monitoring

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

Noise level monitoring

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

a) To compare sound levels with the values specified in noise regulations

b) To determine the need and extent of noise control of various noise generating sources

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

Socio-economic Survey

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

Plantation Monitoring Programme

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

6.3 MONITORING SCHEDULE

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

Table 6.2, Details of monitoring schedule

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

4	Noise Level	Twice a year for first two years & then once a year
5	Socio-economic Condition	Once in 3 years
6	Plantation Monitoring	Once in a season

6.4 MONITORING SCHEDULE - IMPLEMENTATION

An implementation programme has been prepared as it serves no purpose if it is not implemented in letter and spirit.

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

a) Collection of air and water samples at strategic locations with frequency suggested and by analyzing thereof. If the parameters exceed the permissible tolerance limits, corrective regulation measure will be taken.

b) Collection of soil samples at strategic locations once every two years and analysis thereof with regard to deleterious constituents, if any.

c) Measurement of water level fluctuations in the nearby ponds dug wells and bore wells and to assess if mining has got any impact on it or not.

d) Measurement of noise levels at mine site and adjacent villages will be done twice a year for first two years and thereafter once a year.

e) Post plantation, the area will be regularly monitored in every season for evaluation of success rate. For selection of plant species local people should also be involved.

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

6.5 BUDGET ALLOCATION FOR MONITORING

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

Table 6.3, Budget for monitoring

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

6.6 REPORTING SCHEDULES OF THE MONITORING DATA

It is proposed that voluntary reporting of environmental performance with reference to the EMP should be undertaken. The environmental monitoring cell shall co-ordinate all monitoring programmes at site to furnish the data to the State regulatory agencies regularly in respect of the stipulated prior environmental clearance terms and conditions. The proponent shall prominently advertise in the newspapers indicating that the project has been accorded environmental clearance and also the details of website where it is displayed.

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7.0 PUBLIC CONSULTATION

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

7.1 HAZARD IDENTIFICATION AND RISK ASSESSMENT METHODOLOGY

Risk is to expose someone or something to danger, harm or loss. The different steps of risk assessment procedure are as given below:

Step I: Hazard Identification

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

Step II: Risk Assessment

Risk assessment is the process used to determine the likelihood that people exposed to injury, illness or disease in the workplace arising from any situation identified during the hazard identification process prior to consideration or implementation of control measures.

Risk occurs when a person is exposed to a hazard. Risk is the likelihood that exposure to a hazard will lead to injury or health issues. It is a measure of probability and potential severity of harm or loss.

Step III: Risk Control

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

Step IV: Implementation of risk controls

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

The most effective methods of control are:

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

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

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

Step V: Monitor and Review

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

A) RISK ANALYSIS

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

a) Initial Site Evaluation,

b) Detailed Site Evaluation,

c) Priority Site Investigations and Recommendations.

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

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

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

Risk analysis is done for:

- Forecasting any unwanted situation

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

Table 7.1, Risk Likelihood Table for Guidance

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

A logical systematic process is usually followed during a qualitative risk assessment to identify the key risk events and to assess the consequences of the events occurring and the likelihood of their occurrence Table 7.2

Table7.2, Qualitative Risk Assessment

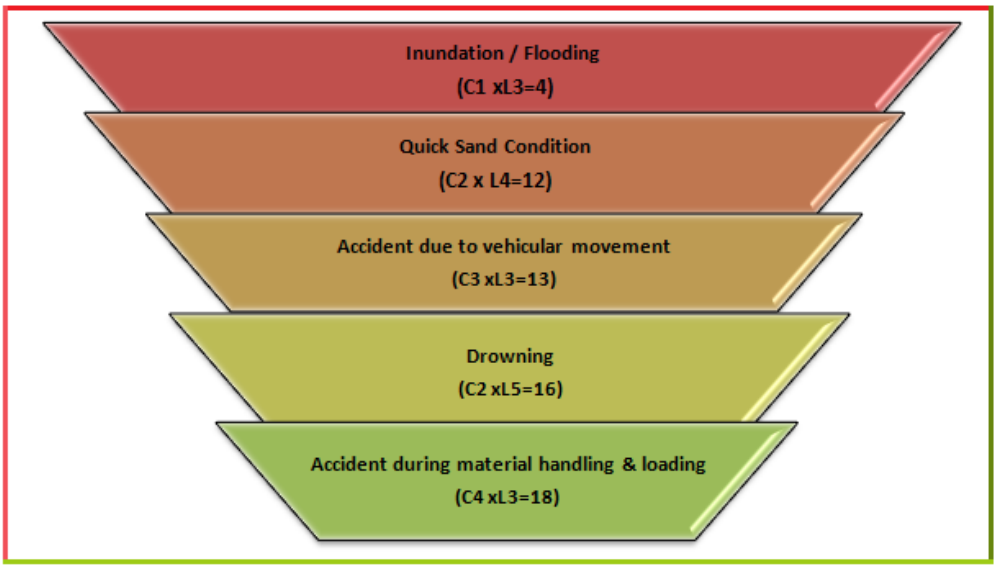
Risk Rank **Likelihood Consequence**	**L1** **Almost certain**	**L2** **Likely**	**L3** **Possible**	**L4** **Unlikely**	**L5** **Rare**
C1 **Catastrophic**	**1**	**2**	**4**	**7**	**11**
C2 **Major**	**3**	**5**	**8**	**12**	**16**
C3	**6**	**9**	**13**	**17**	**20**

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

RISK RATING:

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

7.2 RISK ASSESSMENT



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

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

The Risk rating of such hazards is as follows:

7.2.1 INUNDATION/FLOODING

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

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

Measures to prevent consequences of inundation/flooding

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

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

7.2.2 Quick Sand Condition

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

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

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

Measures to Prevent Quick Sand Condition

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

7.2.3 ACCIDENT DUE TO VEHICULAR MOVEMENT

The risk rating assigned to this activity is assigned as '13' i.e., it is possible event with moderate consequences as frequency of this operation is more but the predicted/assumed intensity is less like minor cuts, bodily injury. The possibilities of road accidents are due to reckless or untrained driver or overloading of trucks or in case pathway is not compacted suitably, etc.

Measures to Prevent Accidents during Transportation

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

7.2.4 DROWNING

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

Measure to Prevent Drowning

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

7.2.5 ACCIDENT DURING MATERIAL HANDLING & LOADING

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

Measures to Prevent Accidents during material handling & loading

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

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

7.3 DISASTERS & ITS MANAGEMENT

7.3.1 Anticipated Disaster

1. **Floods**: Most of the areas of this district are flood prone owing to the presence of seasonal rivers. Rivers and its tributaries cause heavy losses to the human lives, livestock, land and property mainly due to flash floods. Hence no mining has been proposed during monsoon and flood alerts will be given, if any.
2. **Earth Quake**: 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.

(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 Lakhisarai District has been prepared through incorporation of the features of Community Based Disaster Management and involvement of local governments, Municipalities etc.

7.4 SOCIO-ECONOMIC IMPACT OF THE PROJECT & SAFETY MEASURES

INTRODUCTION

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

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

OBJECTIVES OF SEIA

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

SCOPE

The Scope of the study is as follows:

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

SOCIO-ECONOMIC IMPACT OF THE PROJECT

Impact on Demographic Composition

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

Employment Opportunities

The proposed Project will provide employment to the local people. The number of workers to be deployed in the mining project will depend upon the quantity of minerals to be extracted from the mine by the lease holder. Both the miners and the unskilled workers will be recruited locally. It has estimated that around 36 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 Ganga River. There will be no negative impact on agriculture as no cultivation is taking place on the proposed mining area. Since, scientific mining will be adopted in the proposed mining project the area will be free from annual floods, which destroy standing crops and land & property. This is a positive impact of the proposed mining project.

Impact on road development

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

Income to Government

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

Impact on Law & Order

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

Impact on Health

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

Few safety measures are outlined below:

a) **Safe Working Environment**: The project proponent shall ensure health and safety of all the employees at work. Efforts will be made to provide and maintain a safe work environment and ensure that the machinery and equipment in use is safe for employees. Further, it will be ensured that working arrangements are not hazardous to employees.

b) **Provision of First Aid**: The first aid treatment reflects the hazards associated with the mining of minerals. The first-aiders will be well trained in handling patients working in the Project.

c) **Regular Health Examination:** For all mine workers regular health examination will be made compulsory. Treatment of serious back injury; existing asthma or respiratory diseases, existing skin diseases, lung function test (pre and post ventolin), Audiograms, Chest X- ray etc. will also be taken care of.

d) **Health Education:** Adequate health education and information related to the job will be provided to the workers. Baseline health information will be recorded for future references.

e) **Tie-up with the Nearest Hospital for Medical Assistance:** To meet the medical needs of the mine workers tie-up with nearest hospitals will be made. Efforts will be

made to reserve few beds in the above hospitals for the workers of the mining project. This will ensure timely medical aid to the affected persons.

f) **Supply of Mask and Gloves:** The workers in the Sand mining project are subject to respiratory diseases. For protection from dust it will be made compulsory for all workers to wear masks and gloves, while working in the mine.

g) **Administration of Anti-venom Injections:** Provision of Anti-venom therapy will be made available for administration to the workers in case of snake, spider and insect bites, while working in the mine.

h) **Special Telephone Number:** A special telephone number will be made available to the workers in case of emergency so that they can dial the same for–medical assistances. Further, efforts will be made to provide vehicles to the patients in short duration for shifting to a hospital.

i) **Special Group Insurance Scheme:** All the mine workers will be covered under a Group Insurance Scheme of LIC or any other Insurance company.

CONCLUSION

The commissioning of the (Pahleja Ghat/Unit-12) Sand Ghat on Ganga River at Mauza – Kasamar, Rasulpur, Anchal – Sonepur Dist - Saran (Bihar). provides employment to local people who are in search of the same. The granting of environment clearance to make mining of sand legally valid and it will generate revenue for the state. It is expected that prospective entrepreneurs will venture to set up industrial units in the vicinity in the near future making the area a mixed society, dependent on industry, trade and business. With the implementation of the project the occupational pattern of the people in the area will change making more people engaged in mining, industrial and business activities rather in agriculture only. The study area is still lacking in health and educational facilities. It is expected that same will improve to a great extent with opening of the project and associated industrial & business activities.

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8.0 GENERAL

Various benefits are envisaged while planning for the mining of sand from Ganga 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 Ganga River bed quarry site have been found suitable from techno-economic consideration.

8.1 PHYSICAL BENEFITS

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

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

8.2 SOCIAL BENEFITS

a) **Increase in Employment Potential due to the project activity:** Employment opportunities will increase both directly as well indirectly.
b) **Contribution to the Exchequer** as the saleable minerals will be given royalty. Since the quarries will be leased out to successful allottees, mining operation in the state will get legalized and it will fetch income to the state exchequer.
c) **Increased Health related activities**: Healthcare promotional activities will be undertaken. Pre-placement & and Periodic medical checkups will be done, which will lift the general health status of the residents of the area. Health camps, medical aids, family welfare programs, immunization camp, sports will be arranged.

Table-8.1, Budget for Public Health

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

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

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

Table 8.2, Budget for Occupational Health

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

8.3 ENVIRONMENTAL BENEFITS

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

8.4 CORPORATE ENVIRONMENTAL RESPONSIBILITY

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

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

CSR COST is Rs 6,73,05,000/-x 2% = Rs. 13,46,100/-

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

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9.0 INTRODUCTION

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

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

9.1 ENVIRONMENTAL MANAGEMENT CELL (EMC)

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

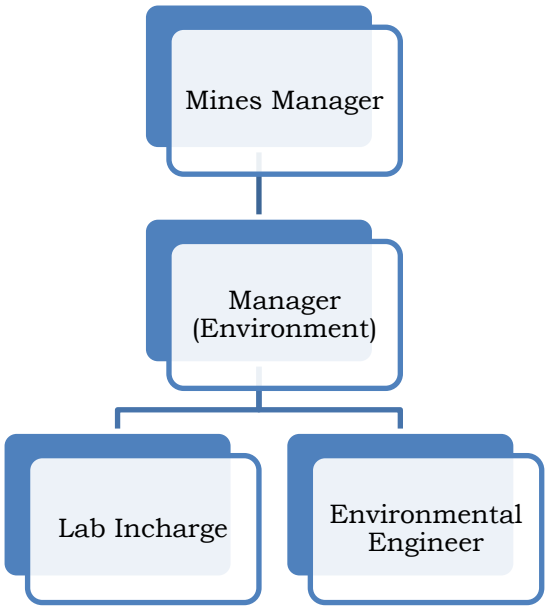


Figure 9.1 Environment Management Cell

The EMC will perform the following activities:

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

9.2 AIR POLLUTION CONTROL MEASURES

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

- Plantation will be done along the road-sides and also the vacant land present under Gram Panchayat after consultation with local villagers/authority.
- Dust mask provided to the workers engaged at dust generation points like excavations, loading and unloading points.
- The only air pollution sources are the road transport network of the trucks. The dust suppression measures like water spraying will be done on the roads.
- Utmost care will be taken to prevent spillage of sand and stone from the trucks.

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

9.3 WATER POLLUTION CONTROL MEASURES

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

- Water requirements for drinking, plantation and dust suppression will be met by tanker supply on the daily basis.
- Local people will be employed and no permanent housing will be done so no permanent drainage pattern for sewerage system is required as domestic sewage shall be disposed off into septic tank followed by soak pits.
- Mining in the area will be done up to depth of 3.0mmaximum from the surface level well above the ground water table, therefore impact on water regime is not anticipated.
- Monitoring of water quality of nearby surface water, ground water and domestic water will be conducted once in every season except monsoon to evaluate the performance of the mitigation measures.

9.4 NOISE POLLUTION CONTROL MEASURES

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

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

9.5 BIOLOGICAL ENVIRONMENT

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

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

- **Greenery development:** The project will not lead to any tree cutting. However, 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. 138 trees will be planted around haul road during the plan period.
- The trees proposed for plantation are:
- As per Sustainable Sand Management & Mining Guidelines 2016,minimum 5 plant per hectare will be proposed for development of greenbelt but in this cluster of projects 10 plants per hectare will be proposed for better condition of environment.
- Total Number of plants for cluster of Sand Bloks are given below.

Sand Ghat	Area (Ha)	Plants
Pahleja Ghat/Unit-12	13.8	13.8*10 Plants= 138 plants
Total Plants		138 plants

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

	Agro-climatic zone & Sub zone	**Middle Genetic Plains, North west alluvial sub zone**	
S/n	**Scientific name**	**Common Name**	**Pollution control features**
1	*Mangiferaindica*	Aam	Tolerant to Dust control
2	*Tectonagrandis*	Sagon	Tolerant to Dust control
3	*Ficusbenghalensis*	Bargad	Tolerant to Dust control
4	*Scigiumcumuni*	Jamun	To stop river bank erosion
5	*Terminaliaarjuna*	Arjun	To stop river bank erosion
6	*Populus ciliate*	Popular	Fast growing, broad leaf
7	*Ficusreligiosa*	Peepal	Dust particles absorbance
8	*Acacia nilotica*	Babul	Tolerant to SO_2
9	*Azadirachtaindica*	Neem	Tolerant to SO_2
10	*Pithecolibiumducle*	Jungle jalebi	Tolerant to SO_2 and Dust control

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 Maa Bhawani Traders; Prop.- Vikash Kumar Singh Add.- Rampur, Aami, Dighwara, Dist.- Saran, Bihar (Pahleja Ghat/Unit-12) is mainly dust. Safety of employees during operation and maintenance etc. shall be as per Mines rules and regulations.

To avoid any adverse effect on the health of workers due to various pollutants, sufficient measures relating to safety and health will also be practiced:

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

- Training of employees for use of safety appliances and first aid in vocational training center.
- Regular maintenance and testing of all equipment as per manufacturers' guidelines.
- Periodical Medical Examination (PME) of all workers by a Medical Officer.
- First Aid facility will be provided at the mine site.
- Close surveillance of the factors in working environment and work practices which may affect environment and worker's health.
- Working of mine as per approved mining plan and environmental plans.

9.8 SOCIO-ECONOMIC ENVIRONMENT

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

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

9.9 ENVIRONMENT POLICY

Maa Bhawani Traders; Prop.- Vikash Kumar Singh Add.- Rampur, Aami, Dighwara, Dist.- Saran, Bihar (Pahleja Ghat/Unit-12) of Sand Ghat believes that responsible environmental stewardship comprises diligent application of well-established natural resource management, controls and practices for the protection of the mined out land, preservation of biodiversity and proper disposal of waste if any following the best environmental practices during the process of mining.

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

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

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

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

9.10 BUDGET ALLOCATION FOR EMP IMPLEMENTATION

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

Table 9.2, Budget of EMP (Pahleja Ghat/Unit-12)

Sl. No	Description	Capital Cost (lakh)	Recurring Cost (lakh)
1	Pollution Control & Dust Suppression	**Nil**	**1.5**
2	Pollution Monitoring i) Air pollution ii) Water pollution iii) Water pollution iv) Noise Pollution	--	2.0
3	Plantation and salary for one gardener (part time basis).	1.38	0.5
4	Haul road Maintenance Cost	1.70	1.5
TOTAL		**3.08**	**5.5**

Note: *138 plants * 1000 Rs (for each plants including hedges and fences) =Rs 138000/-

- 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 *0.68 km haul road) = 1,70,000/-

****

10.0 INTRODUCTION

10.1 Purpose of the Report

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

10.2 IDENTIFICATION OF PROJECT & PROJECT PROPONENT

10.2.1 Identification of Project

The Proposed Sand Mining Project is located on Ganga River at Pahleja Ghat/Unit-12 Sand Ghat at Village- Kasamar, Rasulpur, Anchal- Sonepur, District- Saran (Bihar)

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

The proposed project is of River bed sand mining and falls under Category- "B1" as per EIA Notification 2006 and its subsequent amendments by Ministry of Environment Forests & Climate Change, GOI. Pahleja Ghat/Unit-12 Sand Ghat fall in Sand Ghat, Mauja– Kasamar, Rasulpur, Anchal –Sonepur Dist - Saran (Bihar) over an area of 13.8 hectares.

10.3 BRIEF DESCRIPTION OF PROJECT

The proposed project is Open Cast Semi-Mechanized Mining of Sand with a proposed cluster production of 370116 Tonnes per annum. The project has been proposed by (Pahleja Ghat/Unit-12) Maa Bhawani Traders; Prop.- Vikash Kumar Singh Add.- Rampur, Aami, Dighwara, Dist.- Saran, Bihar.

The proposed project is over an area 13.8 ha on Ganga River at Mauza – Kasamar, Rasulpur , Anchal –Sonepur Dist - Saran (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 **Pahleja Ghat/Unit-12- Rs**- 6,73,05,000/- (including auction cost).

The proposed mining lease area falls in Survey of India Toposheet 72G/01 & 72G/02.

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

Table: 10.1 Mine lease Co-ordinates (Pahleja Ghat/Unit-12)

Pillar No	Latitude (N)	Longitude (E)
A	25°42'46.31"N	85° 6'38.31"E
B	25°42'9.30"N	85° 6'32.39"E
C	25°42'8.28"N	85° 6'28.86"E
D	25°42'25.28"N	85° 6'30.04"E
E	25°42'46.99"N	85° 6'34.82"E

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

Table-10.2: Details of Environmental Setting

Sr. No.	Particulars	Details
1	**Location**	
a	Village	Kasamar , Rasulpur
b	Tehsil	Sonepur
c	District	Saran
d	State	Bihar
2	Elevation above	Pahleja Ghat/Unit-12 (42.7 ASML to 43.5 ASML)
3	Nearest National Highway/State Highway	NH-31 at a distance of approx. 2.75 Km in NE direction.
4	Nearest Railway station	**Blocks** / **Railway Station** / **Distance (Km) Direction**: Pahleja Ghat/Unit-12 / Bharpura Pahleja Ghat Railway Station / approx. 2.80 km in SE.direction.
5	Nearest Airport	**Blocks** / **Airport** / **Distance (Km) Direction**: Pahleja / Jayprakash / approx. 13 km in SW

Sr. No.	Particulars	Details
		Ghat/Unit-12 | Narayan Airport, Patna | 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 (Pahleja Ghat/Unit-12) Sand Ghat on Ganga River at Mauza – Kasamar, Rasulpur, Anchal – Sonepur Dist - Saran (Bihar).
2	Mining Capacity	248400 cum/year or 370116 TPA
3	Method of mining	Open cast semi-mechanized mining/OTFM
4	Total ML area	13.8 ha
5	Depth of mining	3 m depth
6	Manpower	36 persons
9	Water Requirement	5.13 KLD
10	Source of Water	Tanker/ Nearby village.

10.4.2 Mineral Reserves and production

Mineable reserves have been computed up to 3.0 m 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 (1.49 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 palaeo channels of the river will be leveled & restored back.

Table 10.4 Classification Mineral Reserves

Sand Ghat	Area (Hect)	Geological Reserves (m3)	Mineable Reserves (m3)	Annual Mineable Permitted Reserve As per LoI (m3)
Pahleja Ghat/Unit-12 Sand Ghat	13.8	414000	355116	248400

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 Pahleja Ghat/Unit-12 Sand Ghat. However, as the digging depth will be restricted to 3.0 m only. This will be further replenished during rainy season. Sand Ghat will be worked systematically as the width is limited while length is much more. As the lease period is only 5 (Five) years, some of the area will be left un-worked at the end of lease period.

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

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

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

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

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. 138 trees will be planted around haul road during the plan period.

10.6 LAND USE PATTERN

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

10.7 BASELINE ENVIRONMENTAL STATUS

10.7.1 Soil Quality

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

10.7.2 Meteorology

Meteorological data at the site was monitored during March 2023 to May 2023 representing winter season. It was observed that the during study period, temperature ranged from 21 ^{0}C to 44 ^{0}C.

10.7.3 Ambient Air Quality

Ambient Air Quality Monitoring (AAQM) has been carried out at 08 locations. The Particulate

Matter (PM_{10}) conc. ranged of 50.47 µg/$m^3$to 87.95µg/m^3. The Particulate Matter ($PM_{2.5}$) ranged from 30.58 µg/m^3 to 51.59 µg/m^3. Sulphur dioxide (SO_2) between 4.35 µg/$m^3$to 7.74 µg/m^3.Oxides of Nitrogen (NO_2) between 7.74 µg/$m^3$to 14.76 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 05 locations were collected from various water sources around the mine lease area. The pH was varying for ground waters from 7.29 to 8.10.The total dissolved solids are varying from 290 mg/l to 406 mg/l.

The Surface water sampling was taken from 03 locations The analysis results indicate that the pH ranges between 7.11 to 7.60. Dissolved Oxygen (DO) was observed in the range of 7.3 to 7.5 mg/l against the minimum requirement of 4 mg/l. BOD values were observed to be in the range of 2.0 to 3.0 mg/l.

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

10.7.5 Noise Quality

Noise monitoring reveals that the minimum & maximum noise levels at day time were recorded as 41.8 dB(A) to 52.1 dB(A) respectively. The minimum & maximum noise levels at night time were found to be 36.2dB (A) & 41.5 dB(A) respectively.

10.7.6 Ecological Environment

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

10.8 ANTICIPATED ENVIRONMENTAL IMPACTS

10.8.1 Impact on Air Environment

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

10.8.2 Impact on Water Environment

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

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

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

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

10.8.3 Impact on Water Quality

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

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

10.8.4 Impact on Noise Environment

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

10.8.5 Impact on Land Environment

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

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

10.8.6 Impact on flora and fauna

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

10.8.7 Impact on Socio - Economic Aspects

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

10.9 ENVIRONMENTAL MANAGEMENT PLAN

- Extraction will be done from the bed leaving safety zone from bank.
- The maximum working depth will remain above ground water table of the area.
- Provide health facilities to the workers & surrounding people in the impact area to reduce the health impacts.
- Ensuring wildlife protection & arranging awareness campaigns for the same.
- Minimize activities that release fine sediment to the river.
- Effective mitigation measures will be adopted to minimize disturbance during transportation & handling of minerals:
- Establishment of reclamation program with plantation of local/native & fast growing species

- Establishment of restoration plan during the closure of mine at the onset of monsoon season.
- Establishment of effective Disaster Management Plan to take timely precautionary measures to avoid effects of impending disasters.
- Establishment of effective Monitoring Program monitored by Environment Management Cell.

10.10 ENVIRONMENTAL MONITORING PROGRAM

Table 10.5: Post project environmental monitoring

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

10.11 ENVIRONMENTAL PROTECTION COST

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

Table 10.6: Cost of Environmental Protection Measures

Table 10.6 (a), Budget of EMP (Pahleja Ghat/Unit-12)

Sl. No	Description	Capital Cost (lakh)	Recurring Cost (lakh)
1	Pollution Control & Dust Suppression	**Nil**	**1.5**

2	Pollution Monitoring i) Air pollution ii) Water pollution iv) Noise Pollution	--	2.0
3	Plantation and salary for one gardener (part time basis).	1.38	0.5
4	Haul road Maintenance Cost	1.70	1.5
TOTAL		**3.08**	**5.5**

Note: *138 plants * 1000 Rs (for each plants including hedges and fences) =Rs 138000/-

- 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 *0.68 km haul road) = 1,70,000/-

10.12 ADDITIONAL STUDIES

10.12.1 Risk Assessment

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

10.12.2 Disaster Management Plan

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

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 6,73,05,000/-x 2% = Rs. 13,46,100/-

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

10.14 CONCLUSIONS

- The mining operations will meet the compliance requirements of MoEF&CC;
- Community impacts will be beneficial, as the project will generate significant economic benefits for the region;
- Monitoring program will be followed till the mining operations continue.
- With the effective implementation of the Environment Management Plan (EMP) during the mining activities, the proposed project can proceed without any significant negative impact on environment.

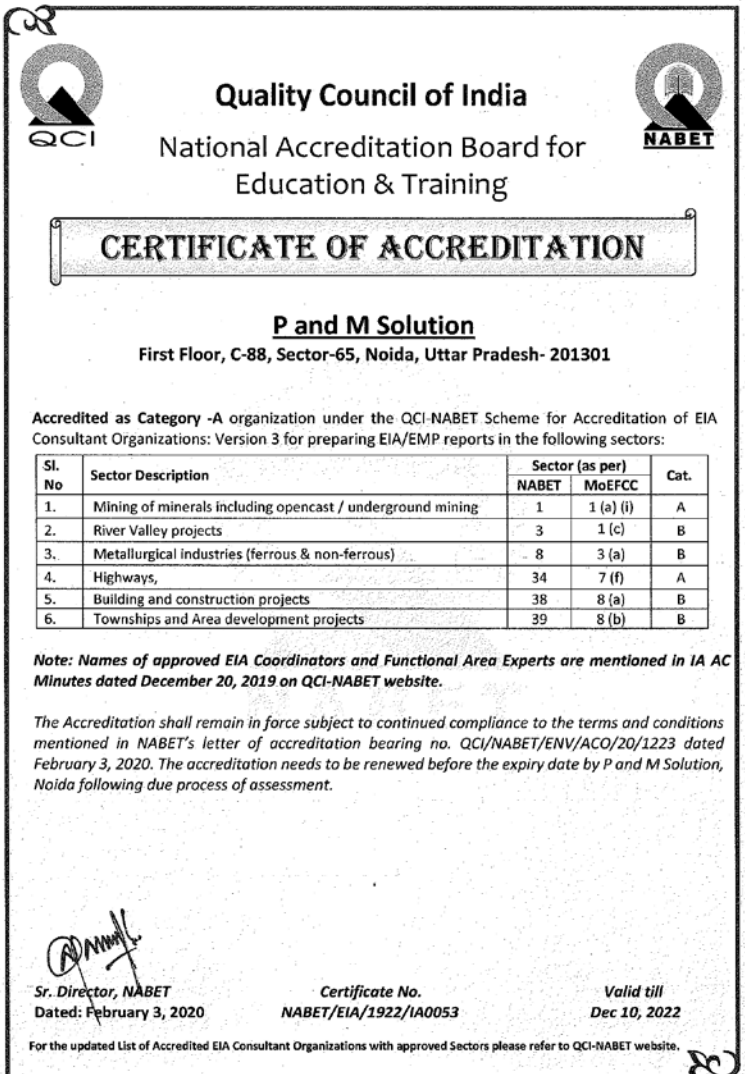
****

Project: Sand Mining Project (Pahleja Ghat/Unit-12) Sand Ghat on Ganga River at Mauza – Kasamar, Rasulpur, Anchal – Sonepur Dist - Saran (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 (Pahleja Ghat/Unit-12) Sand Ghat on Ganga River at Mauza – Kasamar, Rasulpur, Anchal – Sonepur Dist - Saran (Bihar).

National Accreditation Board for Education and Training

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

To

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

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

Dear Sir/Madam

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

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

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

With best regards.

(A K Jha)
Sr. Director, NABET

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

Consultant Contact Details:

P and M Solution

Address –C-88, Sector 65 Noida

Mobile no. - +8377871554, 8826287364

Project: Sand Mining Project (Pahleja Ghat/Unit-12) Sand Ghat on Ganga River at Mauza – Kasamar, Rasulpur, Anchal – Sonepur Dist - Saran (Bihar).

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

****

EXECUTIVE SUMMARY

FOR

SAND MINING PROJECT OF PAHLEJA GHAT/UNIT-12 SAND GHAT, DISTRICT- SARAN

At

Village- Kasamar, Rasulpur,
Anchal- Sonepur, District- Saran, State – Bihar

Area : 13.8 ha
Production: 370116 TPA

PROJECT PROPONENT

Maa Bhawani Traders;
Prop.- Vikash Kumar Singh
Add.- Rampur, Aami, Dighwara,
Dist.- Saran, Bihar

Environment Consultant

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

EXECUTIVE SUMMARY

INTRODUCTION

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

PAHLEJA GHAT/UNIT-12

The project has been proposed by Maa Bhawani Traders; Prop.- Vikash Kumar Singh. The Proposed Sand Mining Project is located on Ganga River at Pahleja Ghat/Unit-12 Sand Ghat at Village – Kasamar, Rasulpur, Anchal – Sonepur Dist - Saran (Bihar).

LOI issued to lessee via letter no 2983/M, dated 26.10.2022. The Draft EIA report has been prepared according to EIA notification 2006 and its subsequent amendment thereof. TOR of the proposed project has been issued by SEIAA Bihar dated 09-06-2023.

It has been proposed to mine around 248400 TPA for applied lease. The estimated project cost for the proposed project is **Rs 6,73,05,000/-** (including auction cost)

PROJECT DESCRIPTION

LOCATION

PAHLEJA GHAT/UNIT-12

The proposed mining lease area falls in Survey of India Toposheet Topo sheet No- 72G/01 & 72G/02. The lease area is located in Village – Kasamar, Rasulpur, Anchal – Sonepur Dist - Saran, State- Bihar. The mine lease co-ordinates are listed below:

Pillar No	Latitude (N)	Longitude (E)
A	25°42'46.31"N	85° 6'38.31"E
B	25°42'9.30"N	85° 6'32.39"E
C	25°42'8.28"N	85° 6'28.86"E
D	25°42'25.28"N	85° 6'30.04"E
E	25°42'46.99"N	85° 6'34.82"E

Area & production: The total ML area is 13.8 Ha. Proposed rate of production will be 248400 TPA.

Connectivity:

Pahleja Ghat/Unit-12 Sand Ghat is well connected to the nearest metalled road 0.68 km distance from the lease. NH-31 at a distance of approx. 2.75 Km in NE direction. Bharpura Pahleja Ghat Railway Station, approx. 2.80 km in SE.direction.

Salient Features of Project

Name of the applicant	Maa Bhawani Traders; Prop.- Vikash Kumar Singh
Address of Lessee	Maa Bhawani Traders; Prop.- Vikash Kumar Singh Add.- Rampur, Aami, Dighwara, Dist.- Saran, Bihar
Name of Mine	Sand Mining Project (Pahleja Ghat/Unit-12) Sand Ghat on Ganga River
Village	Kasamar, Rasulpur
District & State	Saran, Bihar
Mineral	Sand
Man Power	36
Area (ha)	13.8 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

The area of each bench level has been calculated & multiplied by strike influence to get the volume. Volume is multiplied by bulk density(1.49 g/cm3) to get tonnes.

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

Table Summary of minable reserves of Pahleja Ghat/Unit-12 Sand Ghat

Bench Level (mRL)	Length (m)	Width (m)	Depth (m)	Volume (cum)	Tonnes
43-41.5	1154	108	1.5	186948	278553
41.5-40	1144	98	1.5	168168	250571
Total				**355116**	**529124**

Total Mineable Reserve = **355116 CUM or 529124 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 5.13 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 2023 to May 2023

Meteorology

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

Month	Temperature °C		Wind Speed (Km/Hr)	
	Min	Max	Min	Max
MARCH 2023	21	37	10.3	18.5
APRIL 2023	27	44	14.8	24.9
MAY 2023	28	44	14	25

Table Baseline Environmental Status

Attribute	Baseline status
Ambient Air Quality	Ambient Air Quality Monitoring reveals that the minimum & maximum concentrations of PM2.5 amongst all the 08 AQ monitoring stations were found to be 30.58 µg/m^3 to 51.59 µg/m^3 respectively; PM10 was in the range of 50.47 µg/$m^3$to 87.95 µg/m^3 As far as the gaseous pollutants SO_2 and NO_2 are concerned, the prescribed CPCB limit of 80 µg/m^3 for residential and rural areas has never been surpassed at any station.
Noise Levels	The results of the monitoring program indicated that both the daytime and night time levels of noise were well within the prescribed limits of NAAQS, at all the locations monitored. Surface water analysis from River Ganga 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.
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.
Soil Quality	Samples collected from identified locations indicate the soil is sandy type and the pH value ranging from 7.66 to 8.06, which shows that the soil is slightly alkaline in nature.

Ecology and Biodiversity	There is no Eco-Sensitive Areas in the study area.

ANTICIPATED ENVIRONMENTALIMPACTS

Impact on Air Environment

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

Impact on Water Environment

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

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

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

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

Impact on Land Environment

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

The systematic and scientific removal of sand will not cause bed degradation. The silt and clay generated as waste will be used for plantation or filling up low lying area elsewhere. The mining

is planned in non monsoon seasons only, so that the excavated area gets replenished gradually during the monsoons each year.

Impact on Noise Environment

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

Impact on Biological Environment

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

Impact on Socio Economic Environment

The impact of mining activity in the area is positive on the socio-economic environment of the region. Sand mining will be providing employment to local people whenever there is requirement of manpower.

POST PROJECT ENVIRONMENTAL MONITORING

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

ADDITIONAL STUDIES

Public Hearing

Public hearing is yet to be conducted.

Risk Assessment

The complete mining operation will be carried out under the management control and direction of a qualified mine manager holding. The DGMS have been regularly issuing standing orders, model standing orders and circulars to be followed by the mine management in case of disaster, if any. Moreover, mining staff will be sent to refresher courses from time to time to keep them alert.

Disaster Management Plan

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

PROJECT BENEFITS

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

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

Environmental Benefits:

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

CORPORATE SOCIAL RESPONSIBILITY

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

CER cost for **Pahleja Ghat/Unit-12** will be 2% of the total project cost. This amount will be used for social welfare. CSR COST is Rs 6,73,05,000/-x 2% = Rs. 13,46,100/-

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. 138 trees will be planted around haul road during the plan period.
- The trees proposed for plantation are:
- As per Sustainable Sand Management & Mining Guidelines 2016,minimum 5 plant per hectare will be proposed for development of greenbelt but in this cluster of projects 10 plants per hectare will be proposed for better condition of environment.
- Peepal, Arjun, Jamun, Banyan, Neem, Mango etc trees will be planted.

ENVIRONMENTAL MANAGEMENT PLAN (EMP)

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

- Establishment of effective Disaster Management Plan to take timely precautionary measures to avoid effects of impending disasters.
- Establishment of effective Monitoring Program monitored by Environment Management Cell.

BUDGET ALLOCATION FOR EMP IMPLEMENTATION

Table, Budget of EMP (Pahleja Ghat/Unit-12)

Sl. No	Description	Capital Cost (lakh)	Recurring Cost (lakh)
1	Pollution Control & Dust Suppression	**Nil**	**1.5**
2	Pollution Monitoring i) Air pollution ii) Water pollution iii) Water pollution iv) Noise Pollution	--	2.0
3	Plantation and salary for one gardener (part time basis).	1.38	0.5
4	Haul road Maintenance Cost	1.70	1.5
TOTAL		**3.08**	**5.5**

Note: *138 plants * 1000 Rs (for each plants including hedges and fences) =Rs 138000/-

- 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 *0.68 km haul road) = 1,70,000/-

CONCLUSION

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

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कार्यकारी सारांश

बालू खनन परियोजना
पहलेजा घाट/यूनिट-12 बालू घाट जिला सारण के लिए

ग्राम- कसमार, रसूलपुर,
अंचल- सोनपुर, जिला- सारण, बिहार

क्षेत्रफल- 13.8 हेक्टेयर
उत्पादन: 370116 टीपीए

आवेदन कर्ता

माँ भवानी ट्रेडर्स

प्रो. विकाश कुमार सिंह
पता-रामपुर, आमी, दिघवारा,
जिला- सारण, बिहार

एनवायरनमेंट कन्सल्टेंट

पी & एम सल्यूशन

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

www.pmsolution.in

Accreditation No. : NABET/EIA/1992/IA0053

कार्यकारी सारांश

❖ परिचय

MoEF & CC (एमओईएफ एंड सीसी), नई दिल्ली राजपत्र दिनांक 14 सितंबर 2006 और उसमें समय समय पर किये गए संशोधन के अनुसार, प्रस्तावित खनन परियोजना को श्रेणी 'बी1' परियोजना के रूप में वर्गीकृत किया गया है।

पहलेजा घाट/यूनिट-12

परियोजना के प्रस्ताव माँ भवानी ट्रेडर्स प्रो. विकाश कुमार सिंह ने दिया है। प्रस्तावित बालू खनन परियोजना ग्राम- कसमार, रसूलपुर, अंचल- सोनपुर, जिला- सारण (बिहार) में पहलेजा घाट/यूनिट-12 बालू घाट पर गंगा नदी पर स्थित है। पत्र संख्या 2983/एम दिनांक 26.10.2022 के माध्यम से पट्टेदार को एलओआई जारी किया गया।

ईआईए अधिसूचना 2006 और इसके बाद के संशोधन के अनुसार ड्राफ्ट ईआईए रिपोर्ट तैयार की गई है। प्रस्तावित परियोजना का टीओआर SEIAA बिहार दिनांक 29-06-2023 द्वारा जारी किया गया है।

आवेदित पट्टे के लिए प्रति वर्ष लगभग 248400 टन खनन प्रस्तावित किया गया है, प्रस्तावित परियोजना के लिए अनुमानित परियोजना लागत 6,73,05,000/- रुपये (नीलामी लागत सहित) है।

❖ परियोजना विवरण

स्थिति:

प्रस्तावित खनन पट्टा क्षेत्र सर्वे ऑफ इंडिया टोपोशीट टोपो शीट संख्या- 72G/01 & 72G/02 के अंतर्गत आता है। पट्टा क्षेत्र ग्राम- कसमार, रसूलपुर, अंचल- सोनपुर, जिला- सारण, राज्य- बिहार में स्थित है। खान पट्टा समन्वय नीचे सूचीबद्ध हैं:

स्तंभ	अक्षांश (एन)	देशांतर (ई)
A	25°42'46.31"N	85° 6'38.31"E

B	25°42'9.30"N	85° 6'32.39"E
C	25°42'8.28"N	85° 6'28.86"E
D	25°42'25.28"N	85° 6'30.04"E
E	25°42'46.99"N	85° 6'34.82"E

❖ **क्षेत्र और उत्पादन**: कुल क्षेत्रफल 13.8 हेक्टेयर है। उत्पादन की प्रस्तावित दर 248400 टीपीए होगी।

❖ संयोजकता

पहलेजा घाट/यूनिट-12 बालू घाट पट्टे से 0.68 कि.मी. की दूरी पर निकटतम पक्की सड़क से अच्छी तरह से जुड़ा हुआ है। NH 31 लगभग 2.75 किमी उत्तर पूर्व दिशा में है भरपुरा पहलेजा घाट जंक्शन रेलवे स्टेशन, लगभग 2.80 किमी दक्षिण पश्चिम दिशा की ओर है।

परियोजना की मुख्य विशेषताएं

पहलेजा घाट/यूनिट-12

आवेदक का नाम	माँ भवानी ट्रेडर्स प्रो. विकाश कुमार सिंह
पट्टेदार का पता	माँ भवानी ट्रेडर्स प्रो. विकाश कुमार सिंह पता-रामपुर, आमी, दिघवारा, जिला- सारण, बिहार
नाम	बालू खनन परियोजना (पहलेजा घाट/यूनिट-12 बालू घाट) जिला सारण
गाँव	ग्राम- कसमार, रसूलपुर
जिला और राज्य	पटना, बिहार
खनिज	बालू
क्षेत्र (हेक्टेयर)	13.8 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 (1.49g/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:

खनन योग्य रिजर्व **(**पहलेजा घाट/यूनिट-12**)**

बेंच स्तर (mRL)	**लंबाई (M)**	**चौड़ाई**	**गहराई (M)**	**मात्रा (घन**	**टन**

		(M)		मीटर)	
43-41.5	1154	108	1.5	186948	278553
41.5-40	1144	98	1.5	168168	250571
कुल				**355116**	**529124**

कुल खनन योग्य रिजर्व = **355116** घन मीटर या **529124** 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 5.13 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 सीज़न 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	न्यूनतम	अधिकतम
मार्च 2023	21	37	10.3	18.5
अप्रैल 2023	27	44	14.8	24.9
मई 2023	28	44	14	25

आधारभूत पर्यावरणीय स्थिति

गुण	आधारभूत स्थिति
एम्बिएंट(परिवेशी) वायु गुणवत्ता	एम्बिएंट (परिवेशी) वायु गुणवत्ता निगरानी से पता चलता है कि सभी 08 AQ निगरानी स्टेशनों में PM2.5 की न्यूनतम और अधिकतम सांद्रता क्रमशः 30.58 µg/m3 से 51.59 µg/m3 पाई गई; PM10 50.47 µg/m3to 87.95 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 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। गंगा 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 7.66 से 8.06 के बीच है, जो दर्शाता है कि मिट्टी प्रकृति में थोड़ी क्षारीय है।
पारिस्थितिकी और जैव विविधता	अध्ययन क्षेत्र में कोई पर्यावरण-संवेदनशील क्षेत्र नहीं है।
सामाजिक आर्थिक	नदी तल पर बालू खनन परियोजना के कार्यान्वयन से स्थानीय लोगों को प्रत्यक्ष और अप्रत्यक्ष दोनों तरह के रोजगार के अवसर मिलेंगे। अध्ययन क्षेत्र में शिक्षा, स्वास्थ्य, आवास, पानी, बिजली आदि को और बेहतर किया जा सकता है। उम्मीद है कि प्रस्तावित खनन परियोजना और संबद्ध औद्योगिक और व्यावसायिक गतिविधियों के कारण इसमें काफी हद तक और सुधार होगा।

❖ अनुमानित पर्यावरणीय प्रभाव

• वायु पर्यावरण पर प्रभाव

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

• जल पर्यावरण पर प्रभाव

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

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

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

परियोजना गतिविधि केवल 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।

पहलेजा घाट/यूनिट-12 के लिए सीईआर (CER) लागत कुल परियोजना लागत का 2% होगी। इस राशि का उपयोग समाज कल्याण के लिए किया जाएगा। सीएसआर (CSR) लागत 6,73,05,000/- x 2%= रु. 13,46,100/-

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 138 पौधे रोपे जाएंगे।
- वृक्षारोपण के लिए प्रस्तावित पेड़ हैं:
- सस्टेनेबल सैंड मैनेजमेंट एंड माइनिंग गाइडलाइंस 2016 के अनुसार ग्रीनबेल्ट के विकास के लिए प्रति हेक्टेयर न्यूनतम 5 पौधे प्रस्तावित किए जाएंगे लेकिन पर्यावरण की बेहतर स्थिति के लिए परियोजनाओं के इस समूह में 10 पौधे प्रति हेक्टेयर प्रस्तावित किए जाएंगे।
- पीपल, अर्जुन, जामुन, बरगद, नीम, आम आदि के पेड़ लगाए जाएंगे।

पर्यावरण प्रबंधन योजना (ईएमपी)

- रिवर बैंक से सुरक्षा क्षेत्र छोड़कर नदी तल से निकासी की जाएगी।
- अधिकतम काम करने की गहराई क्षेत्र के भूजल तालिका के ऊपर रहेगी।

- स्वास्थ्य प्रभावों को कम करने के लिए प्रभाव क्षेत्र में श्रमिकों और आसपास के लोगों को स्वास्थ्य सुविधाएं प्रदान किया जायेगा ।
- वन्यजीव संरक्षण सुनिश्चित करना और उसी के लिए जागरूकता अभियान की व्यवस्था किया जायेगा।
- नदी में महीन तलछट छोड़ने वाली गतिविधियों को किया जायेगा।
- खनिजों के परिवहन और प्रबंधन के दौरान गड़बड़ी को कम करने के लिए प्रभावी शमन उपाय अपनाए जाएंगे
- स्थानीय/देशी और तेजी से बढ़ने वाली प्रजातियों के वृक्षारोपण के साथ सुधार कार्यक्रम की स्थापना किया जायेगा
- मानसून के मौसम की शुरुआत में खान के बंद होने के दौरान बहाली योजना की स्थापना किया जायेगा
- आसन्न आपदाओं के प्रभाव से बचने के लिए समय पर एहतियाती उपाय करने के लिए प्रभावी आपदा प्रबंधन योजना की स्थापना।
- पर्यावरण प्रबंधन प्रकोष्ठ द्वारा प्रभावी निगरानी कार्यक्रम की स्थापना किया जायेगा।

❖ ईएमपी कार्यान्वयन के लिए बजट आवंटन

टेबल, ईएमपी का बजट (ब्लॉक - पहलेजा घाट12-यूनिट/)

क्रम संख्या	विवरण	पूंजी लागत (लाख)	आवर्ती लागत (लाख)
1	प्रदूषण नियंत्रण और धूल दमन	**Nil**	**1.5**
2	प्रदूषण निगरानी i) वायु प्रदूषण ii) मृदा प्रदूषण iii) जल प्रदूषण iv) ध्वनि प्रदूषण	--	2.0
3	वृक्षारोपण और वेतन एक माली के लिए (अंशकालिक आधार पर)	1.38	0.5
4	परिवहन सड़क रखरखाव लागत	1.70	1.50
कुल		**3.08**	**5.5**

नोट: *138 पौधे * 1000 रुपये (हेज और बाड़ सहित प्रत्येक पौधे के लिए) = 1,38,000/- 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*0.68 किमी लंबी सड़क) = 1,70,000/-

निष्कर्ष

ईआईए अध्ययन के आधार पर यह देखा गया है कि धूल प्रदूषण में वृद्धि होगी, जिसे पानी के छिड़काव और वृक्षारोपण द्वारा नियंत्रित किया जाएगा। खनन गतिविधियों के कारण (एम्बिएंट) परिवेशी पर्यावरण और पारिस्थितिकी पर नगण्य प्रभाव पड़ेगा, इसके अलावा खनन संचालन से क्षेत्र में प्रत्यक्ष और अप्रत्यक्ष रोजगार सृजन होगा। क्षेत्र के चारों ओर हरित पट्टी का विकास एक प्रभावी प्रदूषण न्यूनीकरण तकनीक के साथ-साथ खान परिसर से निकलने वाले प्रदूषकों को नियंत्रित करने के लिए भी किया जाएगा। खनन कार्य जारी रहने तक निगरानी कार्यक्रम का पालन किया जाएगा। इसलिए, यह संक्षेप में कहा जा सकता है कि खान के विकास से क्षेत्र के सामाजिक-आर्थिक वातावरण पर सकारात्मक प्रभाव पड़ेगा और क्षेत्र के सतत विकास को बढ़ावा मिलेगा।

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