

**DRAFT ENVIRONMENTAL IMPACT ASSESSMENT
AND
ENVIRONMENTAL MANAGEMENT PLAN
OF
SAND MINING PROJECT OF PATNA SON 02 SAND
GHAT, DISTRICT - PATNA**

SAND BLOCK	PATNA SON 02
PROPOSAL NO	SIA/BR/MIN/422026/2023
TOR NO	SIA/1(a)/2400/2023
AREA	49.93 HA
PRODUCTION	898740 CUM OR 1545833 TPA
LOCATION	MAUJA- MUHAMMADPUR , ANCHAL -PALIGANJ DIST - PATNA, (BIHAR) OVER AN AREA OF 49.93 HECTARES
KHASRA NO	325,326,328

APPLICANT
RANJAN ENGICON PRIVATE LIMITED
Prop.- Sanjay Kumar
S/o- Kishun Chandra Singh
Add.- Mahatma Gandhi Nagar, Kanti Factory Road Near
Buddha Dental College, Kankarbagh, Patna, Pin- 800020



CONSULTANT
P&M Solution
C-88, Sector 65, Noida -201301 – U.P
A QCI –NABET Accredited Organization
Regional Office: 201, Mangal Market,
Raja Bazaar, Patna, Bihar



Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

TABLE OF CONTENTS

CHAPTERS	TITLE	PAGE NO
CHAPTER 1		
INTRODUCTION		
1.0	Purpose of the Report	I-1
1.1	Identification of project & project proponent	I-2
1.2	Brief description of project	I-3
1.3	Environmental Setting	I-7
1.4	Scope of the Study	I-8
CHAPTER 2		
PROJECT DESCRIPTION		
2.0	General	II-28
2.1	Need for the project	II-28
2.2	Location Details	II-28
2.3	Topography & Geology	II-32
2.4	Geological Reserve	II-35
2.5	Conceptual Mining Plan	II-37
2.6	Anticipated Life of Mine	II-38
2.7	General Features	II-38
CHAPTER 3		
BASELINE ENVIRONMENTAL STATUS		
3.0	General	III-43
3.1	Land Environment of the Study Area	III-44
3.2	Water Environment	III-45
3.3	Air Environment	III-51
3.4	Soil Environment	III-59
3.5	Noise Characteristics	III-62
3.6	Biological Environment	III-64
3.7	Socio-Economic Environment	III-89
CHAPTER 4		
ANTICIPATED ENVIRONMENTAL IMPACTS & MITIGATION MEASURES		
4.0	General	IV-126
4.1	Land Environment	IV-127
4.2	Water Environment	IV-128
4.3	Impact on Air Quality	IV-129

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

4.4	Noise Environnent	IV-135
4.5	Biological Environment	IV-137
4.6	Traffic Analysis	IV-138
CHAPTER 5		
ANALYSIS OF ALTERNATIVE TECHNOLOGY & SITE		
5.0	Analysis of alternative Technology & Site	V-143
5.1	Site Alternatives under Consideration	V-143
5.2	Analysis of alternative Technology	V-143
CHAPTER 6		
ENVIRONMENT MONITORING PROGRAMME		
6.0	Introduction	VI-144
6.1	Environmental Monitoring and Reporting Procedure	VI-144
6.2	Monitoring Methodologies And Parameters	VI-145
6.3	Monitoring Schedule	VI-146
6.4	Monitoring Schedule-Implementation	VI-147
6.5	Budget allocation for Monitoring	VI-147
6.6	Reporting Schedule of the monitoring data	VI-148
CHAPTER 7		
ADDITIONAL STUDIES		
7.0	Public Consultation	VII-150
7.1	Hazard Identification and Risk assessment methodology	VII-150
7.2	Risk Assessment	VII-153
7.3	Disaster Management Plan	VII-156
7.4	Socio-Economic Impact of the project	VII-157
CHAPTER 8		
PROJECT BENEFITS		
8.0	General	VIII-162
8.1	Physical Benefits	VIII-162
8.2	Social Benefits	VIII-162
8.3	Environmental Benefits	VIII-163
8.4	Corporate Environmental Responsibility	VIII-164
CHAPTER 9		
9.0	Introduction	IX-165
9.1	Environment Management Cell	IX-165
9.2	Air Pollution Control	IX-166
9.3	Water Pollution Control	IX-167
9.4	Noise Pollution Control Measures	IX-167

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

9.5	Biological Environment	IX-168
9.6	Land use Planning	IX-170
9.7	Occupational Hazards & Safety	IX-170
9.8	Socio-economic Environment	IX-171
9.9	Environment Policy	IX-171
9.10	Budget Allocation for EMP Implementation	IX-172
CHAPTER 10 SUMMARY AND CONCLUSION		
10.1	Purpose of the Report	X-174
10.2	Identification of Project & Project Proponent	X-174
10.3	Brief Description of Project	X-175
10.4	Project Description	X-178
10.5	Afforestation Programme	X-179
10.6	Land Use Pattern	X-180
10.7	Baseline Environmental Status	X-180
10.8	Anticipated Environmental Impacts	X-181
10.9	Environmental Management Plan	X-183
10.10	Environmental Monitoring Program	X-183
10.11	Environmental Monitoring Cost	X-184
10.12	Additional Studies	X-184
10.13	Project Benefits	X-185
10.14	Conclusions	X-186
CHAPTER 11		
11.0	Disclosure of Consultants	XI-187

SL NO.	ANNEXURE
1.	TOR
2.	LOI
3.	Mine Plan

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

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

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

1.1 IDENTIFICATION OF PROJECT, PROJECT PROPONENT & CLUSTER APPROCH

The Proposed Sand Mining Project was located on Son River at Patna Son 02, Sand Ghat at Mauza– Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar)

The proposed mining was a cluster of 03 mining lease area of Patna Son 01, Patna Son 02 & Patna Son 03 over an combined area of 176.27 Ha is for river bed sand mining on Son River at Mauza- Muhammadpur, Mahabalipur, Dist- Patna, Bihar.

Cluster Situation: As per District Survey Report Patna the Proposed Sand Ghats of Patna Son 01, Patna Son 02 & Patna Son 03 are comes in cluster situation whose combined cluster area is 176.27 ha. All the lease area of homogeneous minerals is coming within 500 m radius from each other confirming a cluster situation.

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

The Details of Cluster of lease area given below:

Sand Block name	Area (Ha)	Production
Patna Son 01	69.9	3397140 TPA
Patna Son 02	49.93	2426598 TPA
Patna Son 03	56.44	2742984 TPA
Total	176.27	8566722 TPA

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

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. Patna Son 02 Sand Ghat fall in Mauza– Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar). The details of the project are given below:

Name & Address of the Mine	Patna Son 02	Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal – Paliganj Dist - Patna (Bihar).
River	Son	
Mineral	Sand	
Area (Ha.)	Patna Son 02	49.93 Ha.
Production	Patna Son 02	898740 cum/year or 1545833 TPA
Postal Address	Patna Son 02	Ranjan Engicon Private Limited Prop.- Sanjay Kumar S/o- Kishun Chandra Singh Add.- Mahatma Gandhi Nagar, Kanti Factory Road Near Buddha Dental College, Kankarbagh, Patna, Pin- 800020
Status of Mine	Fresh application for Environmental Clearance.	
Project Cost	RS- 23,67,67,500/-	
CER Cost	CSR cost will be 2% of the total project cost. This amount will be used for social welfare. CSR COST is 23,67,67,500/- x 2% = Rs. 47,35,350/-	

1.2 BRIEF DESCRIPTION OF PROJECT

The proposed project is open cast semi-mechanized mining of sand with a proposed production of 1545833Tonnes per annum for these entire three applied lease. Detail has been given below:

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

The proposed project is over an area 49.93 ha for Patna Son 02. Details are summarized in Table no 1.1

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

Table: 1.1 Project cost break-up & Production

Block	Area	Khata No	Khasra No	Production	Auction Cost
Patna Son 02	49.93	68	325,326,328	1545833 TPA	22,91,78,000/-
Total				1545833 TPA	22,91,78,000/-

The proposed mining lease area falls in Survey of India Toposheet 72 C/11, 72C/12, 72C/15.

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

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

Pillar No	Latitude (N)	Longitude (E)
1	25.31853153	84.70673864
2	25.31853173	84.70673845
3	25.3185365	84.70673377
4	25.31856552	84.70680112
5	25.3186042	84.70689089
6	25.31860432	84.70689117
7	25.31894962	84.70769257
8	25.31972666	84.70949595
9	25.3206228	84.71216619
10	25.31744039	84.71523043
11	25.31541326	84.71717125
12	25.31541893	84.71717681
13	25.31540911	84.71718627
14	25.31263107	84.71441268

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

15	25.31249029	84.71412618
16	25.3126346	84.71346106
17	25.31201656	84.7131621
18	25.31200483	84.7131416
19	25.31205751	84.71308992
20	25.31221458	84.71293583
21	25.31229306	84.71285884
22	25.31243964	84.71271505
23	25.31245725	84.71269778
24	25.31272731	84.71243284
25	25.31281559	84.71234624
26	25.31301973	84.71214598
27	25.31325396	84.7119162
28	25.31356004	84.71161596
29	25.31821498	84.70704942
30	25.3185066	84.70676313
31	25.31852505	84.70674501
32	25.31853016	84.70673999
33	25.31853089	84.70673927

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

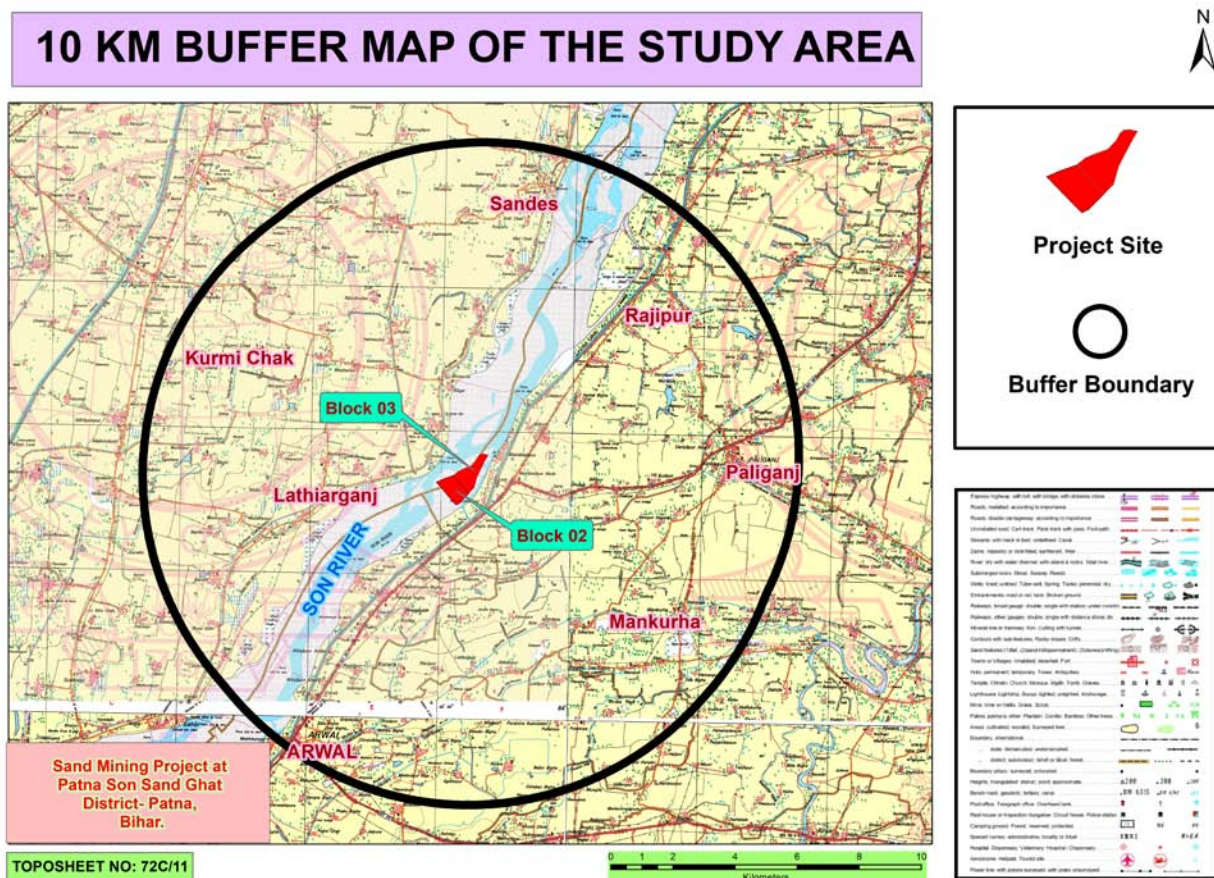


Figure 1.1, 10 km buffer map

Table: 1.3, Connectivity Details given below

Nearest Habitation/ town	Blocks	Village	Distance (Km)
	Patna Son 02	Mahabalipur	Mahabalipur, approx. 1.60 Km in ENE direction.
		Mahamadpur	Mahamadpur approx. 0.60 Km in ESE direction.

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

		Paliganj	Paliganj approx. 8.50 Km in East direction.
Nearest Railway Station	Blocks	Railway Station	Distance (Km) Direction
	Patna Son 02	Garhani Railway station	Garhani Railway station at distance of approx. 17.20 Km in NW in East direction.
Nearest Airport	Blocks	Airport	Distance (Km) Direction
	Patna Son 02	Jayprakash Narayan Airport, Patna	Approx. 49.20 Km in NE direction.
Nearest Highway	NH 139 Approx. 0.80 km towards SE direction. SH-81 is approx 70 m in NW 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 Son river.
4	Seismic Zone	Zone- IV <i>Source</i> <i>BMTC</i> <i>2nd</i> <i>edition</i> https://www.bmtpc.org/disaster%20resistnace%20technolgies/ZONE%20II.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

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

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: 1.4 Point wise compliance for TOR of Patna Son 02
(ToR File No - SIA/1(a)/2400/2023)**

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. 3272/M Patna dated 19/12/2022 for Patna Son 02.	Annexure II, LOI
3	All documents including approved mine plan, EIA and public hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management and mining technology and should be in the name of the lessee.	The documents including mine plan and EIA report submitted are compatible with one another w.r.t. to following information: Mining Lease Area- 49.93 Hectare. Lessee: Ranjan Engicon Private Limited	Annexure- III Mine plan All details has been complied in chapter-2

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

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

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

7	It should be clearly stated whether the proponent Company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating processes /procedures to bring into focus any infringement / deviation / violation of the environmental or forest norms / conditions?. The hierarchical system or administrative order of the company to deal with the environmental issues and for insuring compliances with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large, may also be detailed in the EIA Report.	Yes, the proponent Company has a well laid down Environment Policy. The hierarchical system or administrative order of the company has been given in the EIA report.	Chapter VIII Section 8.1 Corporate Environment Policy
8	Issues relating to Mine safety ,including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided.	Issue related to mine safety has been given in of chapter 7.	
9	The study area will comprise of 10 km zone around the mine lease from lease	The 10 km zone from periphery of the lease has been considered	Chapter I

	periphery and the data contained in the EIA such as waste generation etc. should be for the life of the mine/lease period.	as the study area. The Buffer map of the study area is attached with report. All the details in the EIA report are for the life of the mine period. The details of mining & production have been given in the report.	Figure 1.1
10	Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.	Land use pattern of 10 km from the periphery of the lease area has been prepared and incorporated with the report. The study area lies in Son River. No Ecological Sensitive areas found within 10 km study area.	Land-use of the study area Figure 3.1 , Table 3.1 10 km buffer map enclosed in Chapter I of EIA Report.
11	Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use ,R & R Issues, if any, should be given.	There is no overburden outside the mine lease area.	
12	A Certificate from the Competent Authority in the State Forest Department should be provided,	There is no forest land within the lease area.	---

	confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees.		
13	Status of forestry clearance for the broken up area and virgin forestland involved in the Project including deposition of net present value (NPV) and Compensatory afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished.	No forest land is involved in the lease area, therefore, deposition of net present value (NPV) and compensated Afforestation is not indicated.	
14	Implementation status of recognition of forest rights under the schedule tribes and other traditional forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated"	There is no forest land involved in the leased out area. Hence, this act is not applicable for this project.	

15	The vegetation in the RF / PF areas in the study area, with necessary details, should be given	However, the vegetation details of the study area are incorporated with the report.	Chapter III Section 3.1.6 Biological Environment
16	A study shall be got done to ascertain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and accordingly, detailed mitigative measures required, should be worked out with cost implications and submitted.	The details Impacts & there mitigation measures are given in chapter IV of EIA/EMP Report.	Chapter IV
17	Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger / Elephant Reserves / (existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished.	No National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger / Elephant Reserves / (existing as well as proposed) are found within 10 km of the study area. MAP showing eco sensitive zone is attached in Chapter III (Fig 3.4)	Chapter III Section 3.1.6 Biological Environment

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

18	A detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled-I fauna found in the study area, the necessary plan along with budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost.	Detailed biological study of core zone and buffer zone within 10 km radius of the periphery of the mine lease has been carried out for the project. The same has been incorporated in the report.	Chapter III Section 3.1.6 Biological Environment
19	Proximity to Areas declared as ‘Critically Polluted’ or the Project areas attracting court restrictions for mining operations, should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Dept. Should be secured and furnished to the effect that the proposed mining activities could be	Proposed project does not come under critically polluted area.	

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

	considered.		
20	Similarly, for coastal projects ,A CRZ map duly authenticated by one of the authorized agencies demarcating LTL.HTL, CRZ area ,location of the mine lease w.r.t CRZ, Coastal features such as mangroves ,if any should be furnished.(Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority)	There is no R & R involved in this project.	
21	R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a need based sample survey, family-wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in the mine lease area will be shifted or	There is no R & R involved in this project.	

	not. The issues relating to shifting of village(s) including their R&R and socio-economic aspects should be discussed in the Report.		
22	One season (non-monsoon) [i.e. March-May (Summer Season); October-December (post monsoon season); December-February (winter season)] primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report" Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given.	Base line study was carried out for Dec 22 January 23, February 23 Details are provided in EIA/EMP Report. The locations of the monitoring stations were decided on the basis of prevailing meteorological conditions (Wind direction & wind speed) of the study area. The wind rose has been given in chapter III of EIA/EMP Report. One location has been selected in downwind direction within 500 m from the lease boundary. The location of the monitoring sites has been shown in map.	Chapter III
23	Air quality modeling should be carried out for prediction of impact of the	Air quality modeling detail given in EIA/EMP report in	

	project on the air quality of the area. It should also take into account the impact of movement of vehicles for transportation of mineral. The details of the model used and input parameters used for modeling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map.	Chapter 04.	
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 7.96 ~ 8.00 KLD for Patna Son 02 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	

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

		<p>water.</p> <p>No artificial rainwater harvesting is proposed for the present project in lease area, however if any such project proposed by State Government PP will help out for the above.</p>	
27	Impact of the Project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided".	<p>Mining activity will be done on Dry Bed of River so there is no impact on surface water.</p> <p>Mining will be up to 3 m below ground level or above the ground water table whichever comes first. This will not intersect the ground water table.</p>	Chapter II
28	Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. In case the working will intersect groundwater table, a detailed Hydro Geological Study should be undertaken and Report furnished. The Report inter – alia, shall include details of the aquifers present and impact of mining activities on these aquifers. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of ground water should also be	The detailed impact and control measure w.r.t the quality of water in the surrounding area is discussed under Chapter 4.	

	obtained and copy furnished.		
29	Details of any stream, seasonal or otherwise, passing through the lease area and modification / diversion proposed, if any, and the impact of the same on the hydrology should be brought out.	The project site lies on Son river. No diversion is proposed.	
30	Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and bgl. A schematic diagram may also be provided for the same.	The mining will be done as per the approved mining plan and 3 meter bgl whichever is comes first.	
31	A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and Quantities coverage, plant species and time frame) and Submitted keeping in mind the same will have to be executed up front on commencement of the Project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to be covered under plantation and the species to be planted. The details of plantation already done should be given. The plant species selected for green belt should have greater ecological value and should be of good utility value to	<p>Plantation/afforestation will be done as per program i.e along the road sides and near civic amenities, as per mine plan. Post plantation, the area will be regularly monitored in every season for evaluation of success rate.</p> <p>List of Plant species selected for green belt is detailed in the EIA report.</p> <p>The plant species selected for green belt have a greater ecological value and are of good utility value to the local population. The plant species are selected by giving emphasis</p>	Chapter VIII Section 8.2

	the local population with emphasis on local and native species and the species which are tolerant to pollution.	on local and native species and the species which are tolerant to pollution	
32	Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines.	The projection has been done based on the mineral transportation. The details of traffic analysis are discussed in the report.	Chapter IV
33	Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report	A temporary rest shelter will be provided for the workers near to the site with provisions of water, first aid facility, protective equipments, etc. Details are given in the EIA/EMP Report.	Chapter II

34	Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.	Conceptual plans and Sections are given in Chapter 2.	
35	Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.	<p>Occupational health impact mainly is expected due air pollution due to fugitive dust emission because of movement of vehicles. However appropriate mitigation measures for air pollution control have been given in the report, discussed in Chapter-4.</p> <p>Each labour will undergo pre-placement medical examination. Thereafter periodical health check up will be arranged as stated in the report. About 4.0 lakh has been earmarked for occupational health.</p>	Chapter VII

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

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

	provided and also incorporated in the final EIA/EMP Report of the Project.								
40	Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.	No litigation is pending against the project.							
41	The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.	<div>The capital cost & recurring cost has been earmarked for EMP in Chapter IX<table><tr><td>Block</td><td>Capital Cost</td><td>Recurring Cost</td></tr><tr><td>Patna Son 02</td><td>7.0</td><td>5.5</td></tr></table></div>	Block	Capital Cost	Recurring Cost	Patna Son 02	7.0	5.5	Chapter IX
Block	Capital Cost	Recurring Cost							
Patna Son 02	7.0	5.5							
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.							

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

b	Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated.	Compiled With EIA report.	
c	Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF&CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the Project.	Compiled With EIA report.	
d	Where the documents provided are in a language other than English, an English translation should be provided.	Compiled With EIA report.	
e	The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.	Compiled With EIA report.	
f	While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF vide O.M. No. J-11013/41/2006-IA.II (I) dated 4th August, 2009, which are available on the website of this Ministry, should be followed.	Compiled With EIA report.	

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

g	Changes, if any made in the basic scope and project parameters (as submitted in Form-I and the PFR for securing the TOR) should be brought to the attention of MoEF&CC with reasons for such changes and permission should be sought, as the TOR may also have to be altered. Post Public Hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation.	Agreed	
h	As per the circular no. J-11011/618/2010-IA. II (I) dated 30.5.2012, certified report of the status of compliance of the conditions stipulated in the environment clearance for the existing operations of the project, should be obtained from the Regional Office of Ministry of Environment, Forest and Climate Change, as may be applicable.	This is new case for Mining. No certified compliance is required.	
i	The EIA report should also include (i) surface plan of the area indicating contours of main topographic features, drainage and mining area, (ii) geological maps and sections and (iii) sections of the mine pit and external	Compiled With EIA report.	

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

	dumps, if any, clearly showing the land features of the adjoining area.		
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Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

2.0 GENERAL

The project is proposed is for sand block Patna Son 02 for the excavation of sand from the bed of river Son. The proposed project is opencast semi-mechanized/OTFM mining project.

2.1 NEED FOR THE PROJECT

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

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

2.2 LOCATION DETAILS

The Proposed Sand Mining Project was located on Son River at Patna Son 02, Sand Ghat at Mauza– Muhammadpur, Anchal – Paliganj, Dist - Patna (Bihar).

The proposed mining was a cluster of 03 mining lease area of Patna Son 01, Patna Son 02 & Patna Son 03 over an combined area of 176.27 Ha is for river bed sand mining on Son River at Mauza- Muhammadpur, Mahabalipur, Dist- Patna, Bihar.

Cluster Situation: As per District Survey Report Patna the Proposed Sand Ghats of Patna Son 01, Patna Son 02 & Patna Son 03 are comes in cluster situation whose combined cluster area is 176.27 ha. All the lease area of homogeneous minerals is coming within 500 m radius from each other confirming a cluster situation.

The address of the proponents is given below:

Sand Block name	Area (Ha)	Production
Patna Son 01	69.9	3397140 TPA
Patna Son 02	49.93	2426598 TPA
Patna Son 03	56.44	2742984 TPA

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

Total	176.27	8566722 TPA
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Table: 2.1 Mine lease Pillar Co-ordinates (Patna Son 02)

Pillar No	Latitude (N)	Longitude (E)
1	25.31853153	84.70673864
2	25.31853173	84.70673845
3	25.3185365	84.70673377
4	25.31856552	84.70680112
5	25.3186042	84.70689089
6	25.31860432	84.70689117
7	25.31894962	84.70769257
8	25.31972666	84.70949595
9	25.3206228	84.71216619
10	25.31744039	84.71523043
11	25.31541326	84.71717125
12	25.31541893	84.71717681
13	25.31540911	84.71718627
14	25.31263107	84.71441268
15	25.31249029	84.71412618
16	25.3126346	84.71346106
17	25.31201656	84.7131621
18	25.31200483	84.7131416
19	25.31205751	84.71308992
20	25.31221458	84.71293583
21	25.31229306	84.71285884
22	25.31243964	84.71271505
23	25.31245725	84.71269778
24	25.31272731	84.71243284
25	25.31281559	84.71234624
26	25.31301973	84.71214598

CHAPTER-2**PROJECT DESCRIPTION**

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

27	25.31325396	84.7119162
28	25.31356004	84.71161596
29	25.31821498	84.70704942
30	25.3185066	84.70676313
31	25.31852505	84.70674501
32	25.31853016	84.70673999
33	25.31853089	84.70673927

Patna Son 02 Sand Ghat is well connected via an approach road of approx. 0.80 Km to NH - 139. Garhani Railway station at distance of approx. 17.20 Km in NW in East direction.

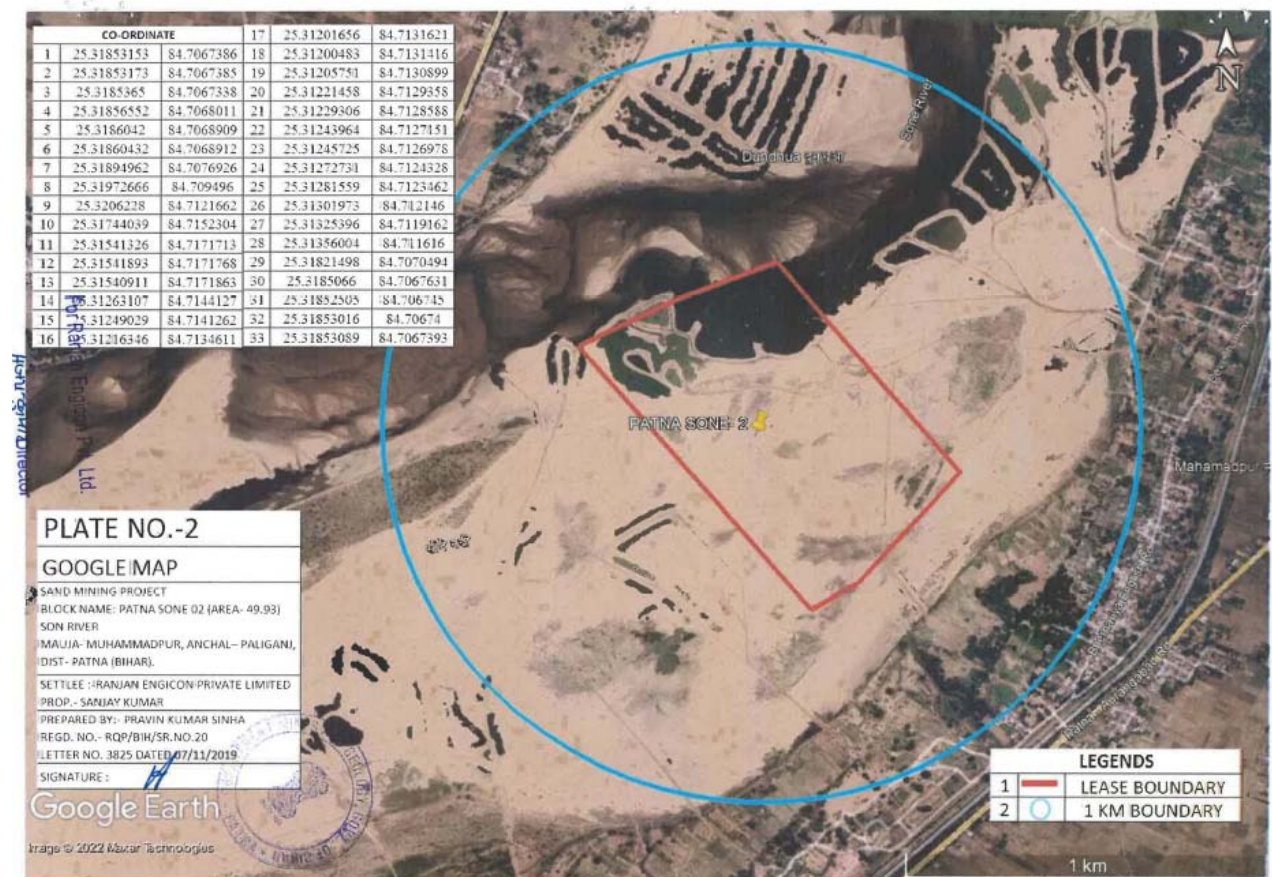


Figure 2.1:- Pillar Coordinate map of Patna Son 02

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

2.2.1 Lease / Block Area

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

Block	Area	Khata No	Khasra No	Production	Auction Cost
Patna Son 02	49.93	68	325,326,328	1545833 TPA	22,91,78,000/-
Total				1545833 TPA	22,91,78,000/-

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.

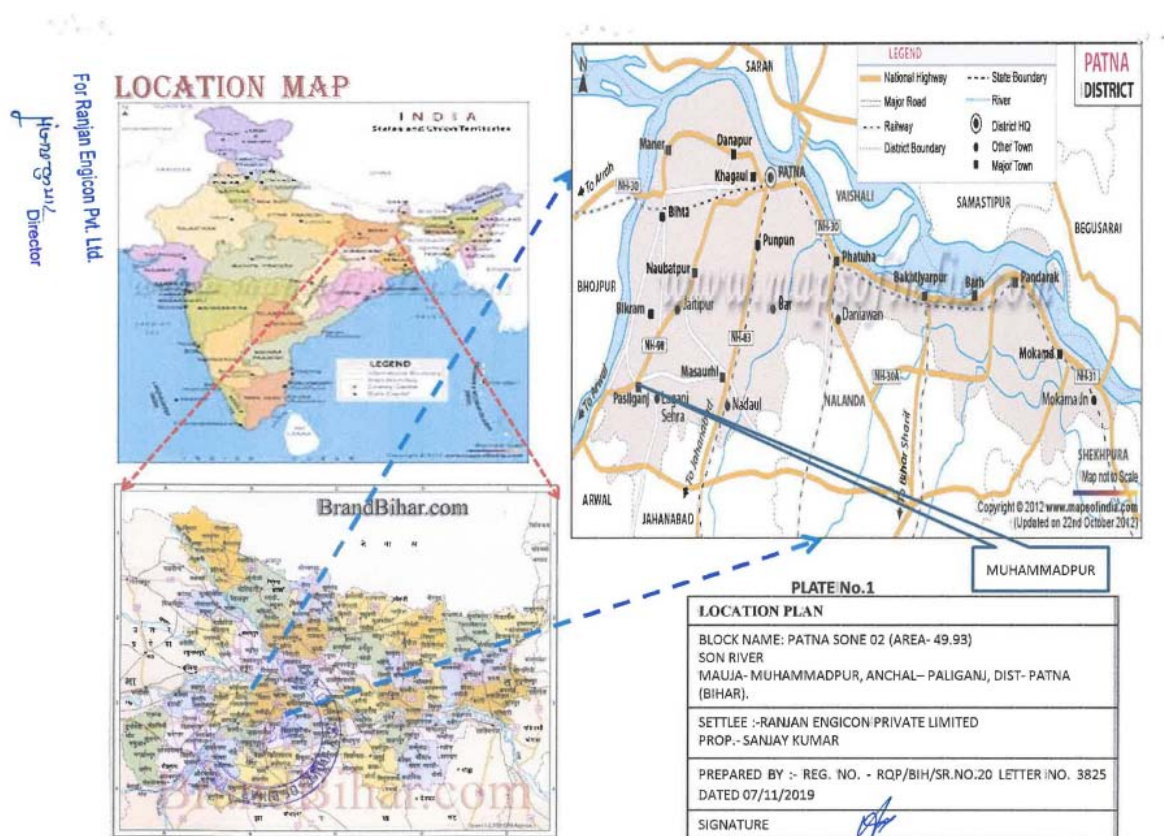


Figure 2.2:- Location map of the project site Patna Son 02.

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

2.3 TOPOGRAPHY & GEOLOGY

2.3.1 Topography

The Elevation of the applied area for the block is 68 ASML to 66 ASML in the stretch. The sand deposits of Patna district of Bihar broadly form part and parcel of the flood plains of Ganga River as whole formed since geological ages.

The State of Bihar is transecting by a no. of rivers. The individual river basins and their catchment areas.

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 forms a part of the Ganga basin and is characterized by a monotonously flat relief with elevation. In general, the western part of the district is sloping due north and north-east, with elevation of the land surface varying from 68 m in the south to 48 m in the north, and from 67 m in the west to 45 m in the east. A notable geomorphic feature is the strong natural levee formation or upland all along the southern bank of the Ganga which acts as a natural barrier thereby causing many of the streams flowing from south to run parallel to the course of Ganga before finally joining it further east of the district boundary.

Source: http://cgwb.gov.in/district_profile/Bihar/Patna.pdf

2.3.3 REGIONAL GEOLOGY

Regionally the area constitutes a part of the Ganga River Basin. The Son originates near Amarkantak in Anuppur district of Madhya Pradesh, just east of the headwater of the Narmada River, and flows north-northwest through Shahdol district in Madhya Pradesh state before turning sharply eastward where it encounters the southwest-northeast-Kaimur Range. The Son parallels the Kaimur hills, flowing east-northeast through Uttar Pradesh, Jharkhand and Bihar states to join the Ganges just west of Patna. Geologically, the

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

lower valley of the Son is an extension of the Narmada Valley, and the Kaimur Range an extension of the Vindhya range .

Anuppur, Chopan, Deori, Rohtasgarh, Dehri, Sonbhadra and Bihta are the major cities situated on Son River.

Table 2.2 Showing the Geological Succession and their Occurrences distribution

Age	Geology	Occurrences
Quaternary	Alluvial Deposits (Sand, Clay, Silt, Fragments)	North Bihar Plain & Central Bihar Plain
Tertiary	Sand Stones & Clay Stones	North Champaran Hills
Gondwana	Coal Measures, Forming a series of Small outlier basins	Banka District
Vindhya	Sandstones, Shales, Limestones, etc.	Parts of Bahbhua and Rohtas dist
Satpura	Schist, Phyllite, Quartzite	Part of Aurangabad, Gaya, Nawada, Nalanda, Sheikhpura and Munger District
Proterozoic	Mica Schist, amphibolites, quartzite, granite, dolerite and pegmatite	Nawada, Jamui and Banka
Archaean	Gneisses, Granites, Schists, Phyllites, quartzite, amphibolites & intrusive all metamorphosed sedimentary and igneous rocks	Part of Aurangabad, Gaya, Nawada, Jamui, Banka and Bhagalpur

Source: Mining Plan

2.3.4 LOCAL GEOLOGY OF THE AREA

The Son parallels the Kaimur hills, flowing east-northeast through Uttar Pradesh, Jharkhand and Bihar states to join the Ganges just west of Patna. Geologically, the lower valley of

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

the Son is an extension of the Narmada Valley, and the Kaimur Range an extension of the Vindhya Range.

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

The litho units encountered in the riverbed and surrounding areas belongs to the Shivalik super groups. The size of the sediments towards the source i.e. host rock is coarse and at the tale end of the river the grain size is reduced to smaller sizes resulted in the formation of clay beds. The following sequences have been observed in the area, i.e. Top soil/ Alluvium followed by sand deposition.

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

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

Source: Mining Plan

2.3.5 CLIMATE

The climate of the district is somewhat extreme in nature, i.e., quite hot during the summer and fairly cold during the winter. January is the coldest month. The temperature starts rising from March and reaches its peak in May. Rain starts sometime in mid June and lasts till mid September. Maximum rains occur during the monsoon months of July and August. Sometimes winter rains occur in Jan-February. The normal annual rainfall in the district is around 1076 mm.

Source http://cgwb.gov.in/district_profile/Bihar/Patna.pdf

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

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 3m from surface has been considered as proved reserves.

Table-2.3:- Proved Mineral Reserves of Patna Son 02

Classification	Code	Quantity of Sand
A) Mineral Reserves		Cum
1) Proved Mineral Reserves	111	1497900
Total		1497900

Total Geological Reserve = **1497900 cum. or 2576388 tonnes.**

Source Mining Plan

2.4.1 Mineable Reserves:

Mineable reserves have been computed up to 3m depth from surface. Benches having height 1.5m & width 6.0m drawn from the ultimate pit limit. Area of each benches have been calculated multiplied by strike influence to get the volume. The volume multiplied by bulk density (1.72 g/cm^3) to get the tonnage.

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

Table-2.4:- Summary of minable reserves of Patna Son 02 Sand Ghat as below (the bulk density multiply by 1.72)

Bench Level (mRL)	Length (m)	Width (m)	Depth (m)	Volume (cum)	Tonnes
68 – 66.5	879	544	1.5	717264	1233695
66.5- 65	879	534	1.5	696069	1197239
Total				1413333	2430933

Total Mineable Reserve = 1413333 CUM or 2430933 Tonne

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

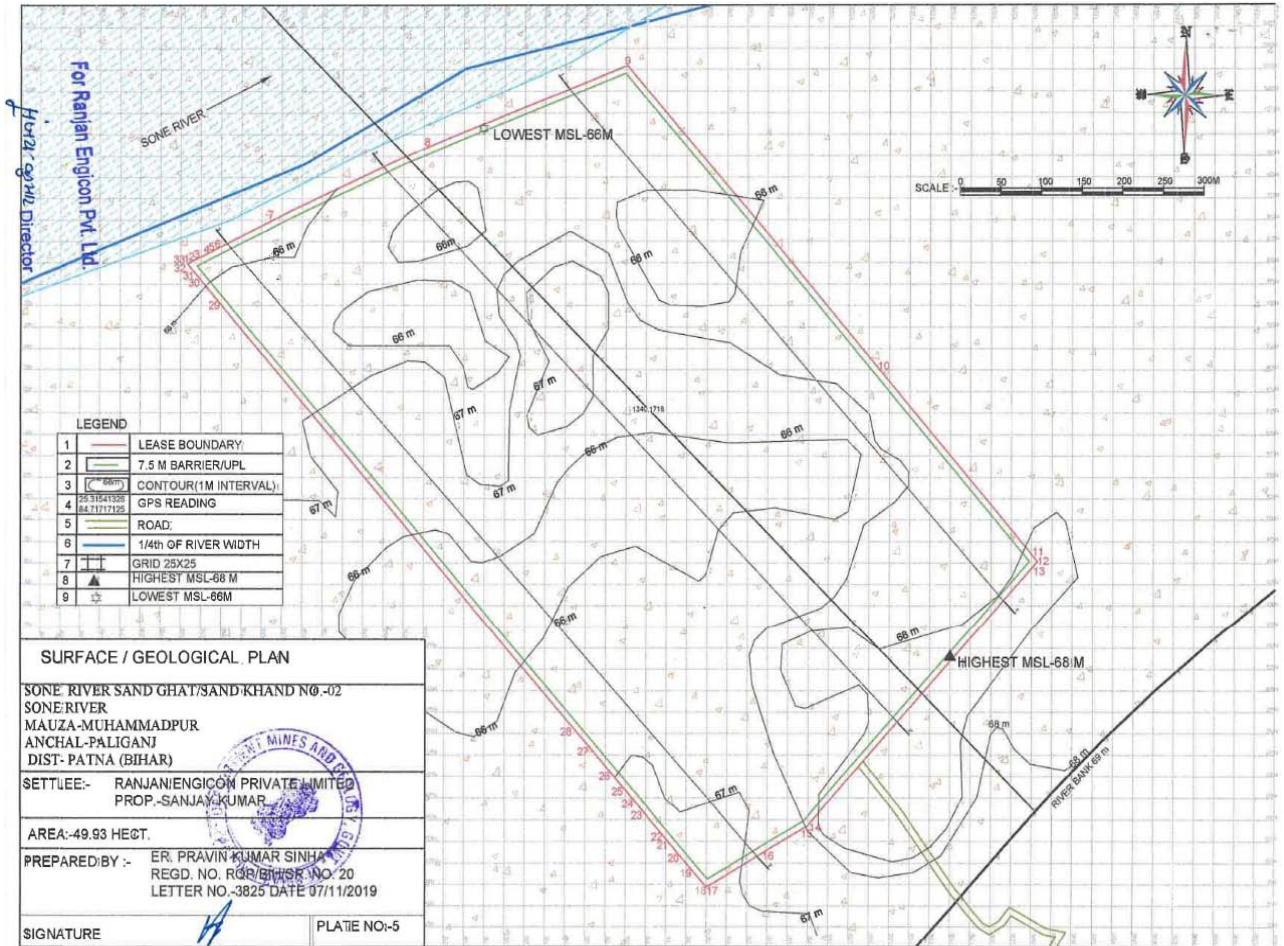


Figure 2.3:- Surface cum Geological Section of Patna Son 02

2.4.2 Type of Mining

- Mining will be done as per the guidelines of Bihar Mineral (Concession Prevention of illegal Mining Transportation & Storage) Rules, 2019, 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).

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

- 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 Patna Son 02 are given below:-

Table 2.4 Year wise Production Details of Patna Son 02

YEAR	ROM sand (cum)	ROM sand (Tones)
1 st Year	898740	1545833
2 nd Year	898740	1545833
3 rd Year	898740	1545833
4 th Year	898740	1545833
5 th Year	898740	1545833
Total	4493700	7729165

Source: Mining Plan

2.5 Conceptual Mining Plan

Mine Applied Area will be worked for Patna Son 02 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.

- 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.

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

(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 Son River so there will be no impact on surface water.

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

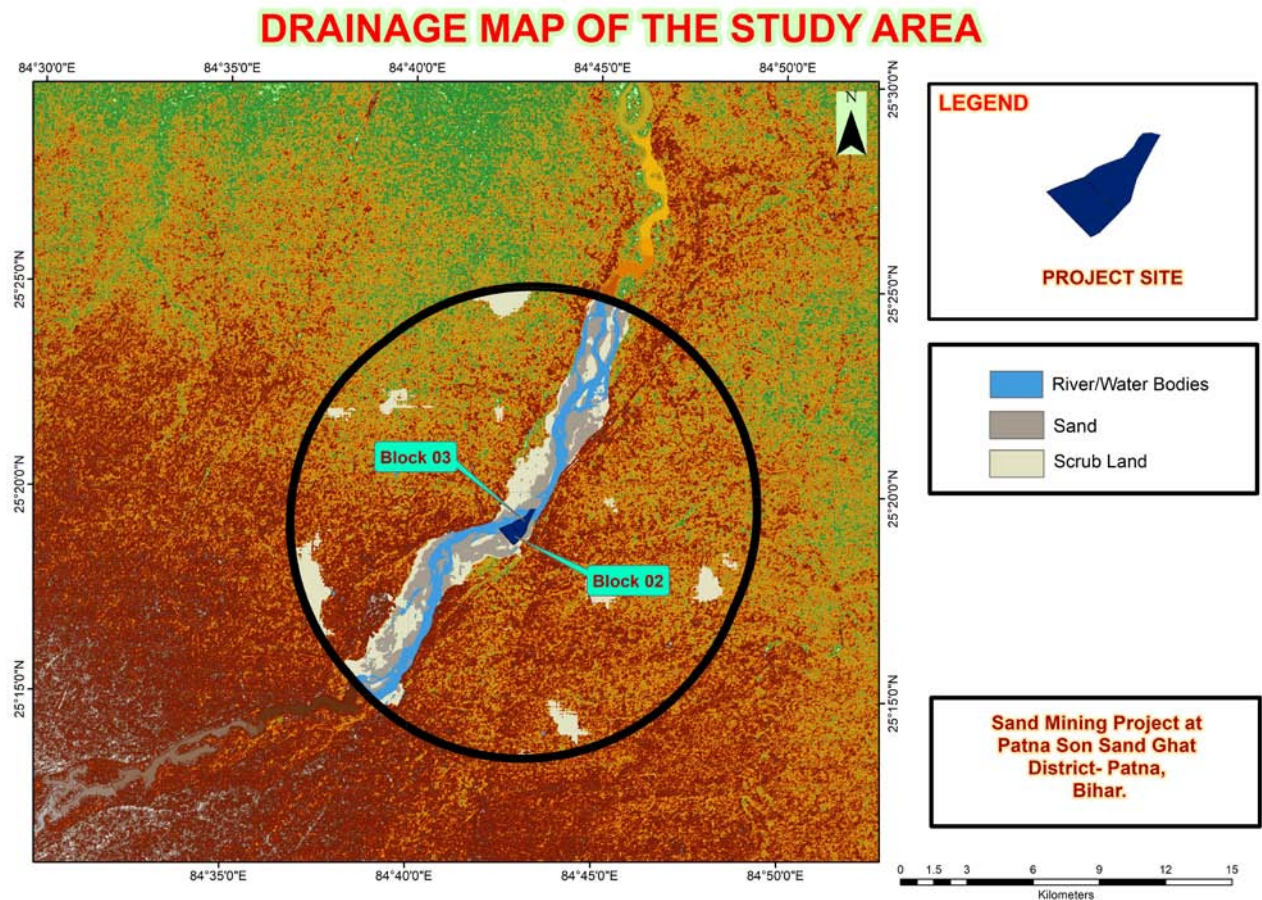


Fig-2.4, Drainage map

2.7.3 Man power requirement

The manpower requirement for the proposed project will be around 66 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 2.5 Manpower Requirement in Patna Son 02

S. No.	Category	Numbers
1.	Administration	01
2.	Supervisor	04
3.	Skilled	15
4.	Un-skilled	46
TOTAL		66

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

2.7.4 Water supply

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

Table 2.5 Water requirement

Activity	Calculation	Round off Figure in KLD
Drinking	@ 10 lpcd per labor $10 \times 66 / 1000 = 0.66$ KLD	0.66
Dust Suppression	Total approach road to be water sprinkled = 800 m $800 \text{ m} \times 6 \text{ m} \times 0.5 \times 2 \text{ times} / 1000 = 4.8$ KLD	4.8
Plantation	500 plant (during plan period) @ 5 L/per plant = $500 \times 5 \text{ lts} = 2500 / 1000 = 2.5$ KLD	2.5
Total		7.96 ~ 8.00

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.

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

2.7.7 Statutory requirements

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

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

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

3.0 General

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

3.0.1 Study area & study period

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

3.0.2 Methodology

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

- ✓ By setting up meteorological station near project site
- ✓ Collection of site specific meteorological data at the mine site.
- ✓ Installation of respiratory dust samplers (for PM₁₀, PM_{2.5}) at different location in the study area for the collection of primary air pollutant and analyze the existing air conditions.

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

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

3.1 Land Environment of the Study area

Land use

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

Land cover

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

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

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

Table 3.1: Land Use Cover of the Project Study Area

Landuse Type	Area (Ha)
Scrub Land	2565.79
Forest	444.17
River/Water Bodies	1306.42
Settlement	3825.28
Sand	1590.08
Agriculture	25299.59
AREA	35031.33

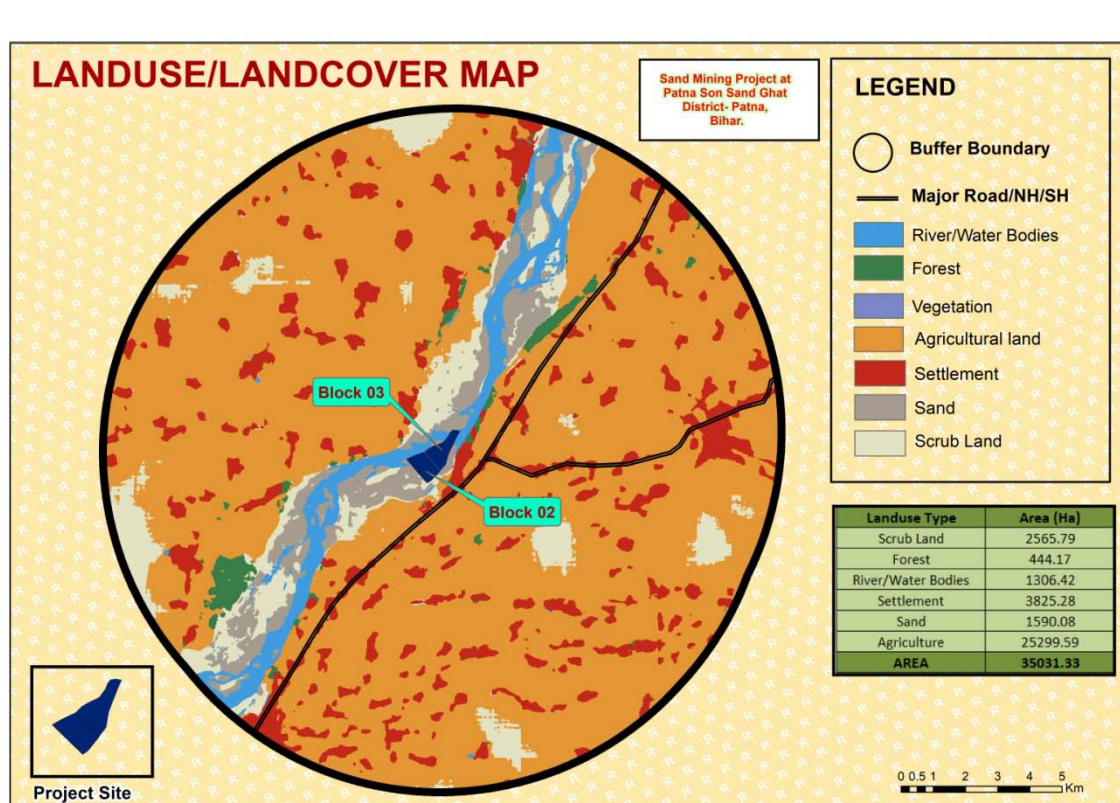


FIGURE 3.1: LAND USE COVER OF THE PROJECT STUDY AREA

3.2 Water Environment

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

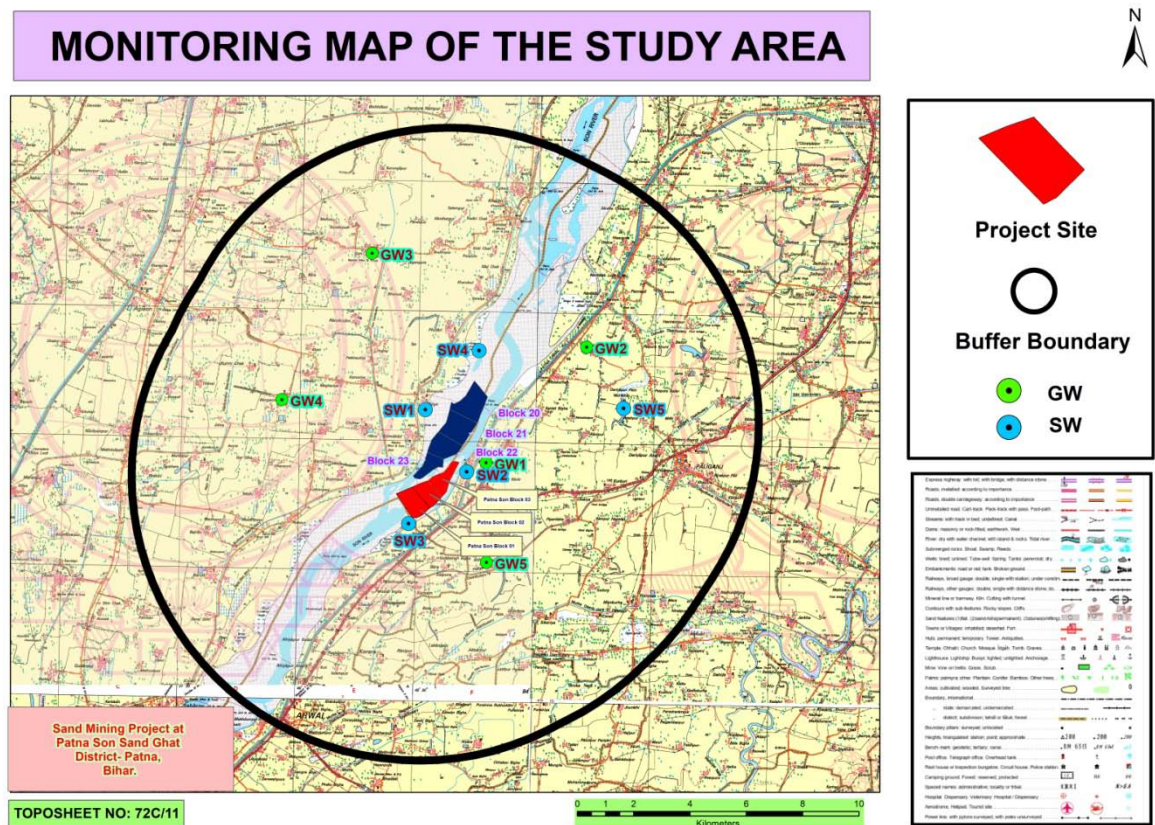
Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

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

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

Table 3.2: Water Sampling Locations

Water (Ground) Monitoring Locations		
GW 1	Mahabalipur	0.5 Km,ESE
GW 2	Jalpura	4.70 Km,NE
GW 3	Kori	6.11 Km,NW
GW 4	Bargaon	5.83 Km, WSW
GW 5	Shrirampur	4.23 Km, SE



Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

Table 3.3 Ground Water Quality Monitoring Result

S. No.	Parameter	GW1	GW2	GW3	GW4	GW5	Requirement (Acceptable Limit)	Permissible Limit in absence of alternate source
Physical Parameters								
1.	pH (at 25 °C)	7.46	7.61	7.70	7.65	7.66	6.5-8.5	-
2.	Colour (Hazen Unit)	<5	<5	<5	<5	<5	5	15
3.	Turbidity (NTU)	<1	<1	<1	<1	<1	1	5
4.	Odour	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
5.	Taste	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	-
Chemical Parameters								
6.	Total Hardness as CaCO ₃ (mg/L)	205	215	244	304	350	200	600
7.	Calcium as Ca (mg/L)	42.80	35.10	30.50	28.60	40.20	75	200
8.	Alkalinity as CaCO ₃ (mg/L)	145.02	151.38	162.12	157.34	163.70	200	600
9.	Chloride as Cl (mg/L)	33.94	38.58	37.52	34.66	41.65	250	103000
10.	Cyanide as CN (mg/L)	<0.02	<0.02	<0.02	<0.02	<0.02	0.05	No Relaxation
11.	Magnesium as Mg (mg/L)	12.56	9.67	8.94	10.12	11.36	30	100
12.	Total Dissolved Solids (mg/L)	364.0	385	436.0	351.35	421.0	500	2000
13.	Sulphate as SO ₄ (mg/L)	30.49	36.57	28.27	25.89	32.24	200	400
14.	Fluoride as F (mg/L)	0.59	0.83	0.56	0.076	0.11	1.0	1.5
15.	Nitrate as NO ₃ (mg/L)	7.54	8.87	6.94	8.62	6.65	45	No Relaxation
16.	Iron as Fe (mg/L)	0.116	0.154	0.172	0.132	0.124	0.3	No Relaxation
17.	Aluminium as Al (mg/L)	<0.03	<0.03	<0.03	<0.03	<0.03	0.03	0.2
18.	Boron (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	0.5	1.0
19.	Chromium as Cr (mg/L)	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.05	No Relaxation
20.	Conductivity (µS/cm)	568	601	680	548	656	1.500	-
21.	Phenolic Compounds (mg/L)	< 0.001	< 0.001	< 0.001	<0.001	< 0.001	0.001	0.002
22.	Mineral Oil (mg/L)	< 0.01	< 0.01	< 0.01	<0.01	< 0.01	0.5	No Relaxation

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

23.	Anionic Detergents as MBA (mg/L)	<0.02	< 0.02	< 0.02	<0.02	<0.02	0.2	1.0
24.	Zinc as Zn (mg/L)	0.134	0.141	0.122	0.157	0.154	-	15
25.	Copper as Cu (mg/L)	<0.1	<0.1	<0.1	<0.1	<0.1	0.05	1.5
26.	Manganese as Mn (mg/L)	< 0.10	< 0.10	< 0.10	<0.10	< 0.10	0.1	0.3
27.	Cadmium as Cd (mg/L)	< 0.001	< 0.001	< 0.001	<0.001	< 0.001	0.003	No Relaxation
28.	Lead as Pb (mg/L)	< 0.01	< 0.01	< 0.01	<0.001	< 0.01	0.01	No Relaxation
29.	Selenium as Se (mg/L)	< 0.01	< 0.01	< 0.01	<0.01	< 0.01	0.01	No Relaxation
30.	Arsenic as As (mg/L)	< 0.01	< 0.01	< 0.01	<0.01	< 0.01	0.01	No Relaxation
31.	Mercury as Hg (mg/L)	<0.001	< 0.001	<0.001	<0.001	<0.001	0.001	No Relaxation
32.	Total Coliform (MPN/100 mL)	<2/100ml	<2/100ml	<2/100ml	<2/100ml	<2/100ml	Absent/250ml	
Microbiological Parameters								
33.	<i>E. coli</i> (CFU/100mL)	Absent	Absent	Absent	Absent	Absent	Absent/250ml	

Observation:

Analysis of results of ground water reveals the following: -

- pH varies from 7.46 to 7.70.
- Total hardness varies from 205 mg/l to 350 mg/l.
- Total dissolved solids vary from 351.38 mg/l to 436 mg/l.

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

3.2 (b) SURFACE WATER

Three surface water samples were collected from the study area. The location of surface water samples is given in Table 3.4. The physio-chemical analyses of the samples are given in the Table 3.5.

Table 3.4: Surface water sampling locations

Surface Water Monitoring Locations		
SW1	River Son (Upstream) Near Village Baga	-----

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

SW 2	Project Site	-----
SW 3	River Son (Upstream) Near village Chaukitola	-----
SW 4	River Son (Downstream)	-----
SW 5	Pond near Fatehpur Village	5.0 Km,NE

Table 3.5: Physio-chemical properties of surface water

TEST RESULTS								
S. No	Parameter	Test Method	Units	SW1	SW2	SW3	SW4	SW5
1.	pH (at 25 ⁰ C)	IS:3025(Part-11)	---	7.37	7.61	7.29	7.11	7.62
2.	Temperature	IS:3025(Part-9)	⁰ C	24.0	23.0	24.0	22.0	24.0
3.	Turbidity	IS:3025(Part-10)	NTU	1.83	2.4	1.93	1.36	15.6
4.	Electric Conductivity @25 ⁰ C	IS:3025(Part-14)	μS/cm	318	410	350	217	312
5.	Sulphate (SO ₄)	IS:3025(Part-24)	mg/l	11.6	48.2	14.0	10.9	12.01
6.	Nitrate (NO ₃)	IS:3025(Part-34)	mg/l	5.7	3.8	6.21	4.65	6.60
7.	Total Hardness (as CaCO ₃)	IS:3025(Part-21)	mg/l	182	290	210.5	134.0	132
8.	Chloride (as Cl)	IS:3025(Part-32)	mg/l	8.92	9.41	9.87	8.98	12.4
9.	Fluoride (as F)	APHA 4500F	mg/l	0.4	0.6	0.12	0.14	0.21
10.	COD (as O ₂)	APHA-5220 B	mg/l	23.41	21.54	23.69	24.81	25.0
11.	Iron (as Fe)	IS:3025(Part-53)	mg/l	0.351	1.18	0.492	0.3	0.164
12.	Dissolve Oxygen	IS-3025(Part-38)	mg/l	7.12	8.62	8.7	8.2	6.2
13.	Total Dissolved Solid	IS:3025(Part-16)	mg/l	190.8	190.7	190.9	190.5	200
14.	BOD (3 days at 27 ⁰ C)	IS:3025 (P-44)	mg/l	2.9	2.19	2.12	2.17	5.20
15.	Calcium (as Ca)	IS:3025(Part-40)	mg/l	72.5	71.84	45.96	59.86	46.49
16.	Magnesium (as Mg)	IS:3025(Part-46)	mg/l	13.96	16.97	9.7	12.50	17.50
17.	Lead (as Pb)	IS:3025(Part-47)	mg/l	BDL (<0.01)	BDL (<0.01)	BDL (<0.01)	BDL (<0.01)	BDL (<0.01)
18.	Copper (as Cu)	IS:3025(Part-42)	mg/l	BDL (<0.05)	BDL (<0.05)	BDL (<0.05)	BDL (<0.05)	BDL (<0.05)
19.	Zinc (as Zn)	IS:3025(Part-49)	mg/l	BDL (<0.01)	BDL (<0.01)	BDL (<0.01)	BDL (<0.01)	BDL (<0.01)
20.	Manganese (as Mn)	IS:3025(Part-59)	mg/l	BDL (<0.10)	BDL (<0.10)	BDL (<0.10)	BDL (<0.10)	BDL (<0.10)
21.	Sodium (as Na)	IS:3025(Part-45)	mg/l	26.0	54.0	27.4	26.0	23.5
22.	Potassium (as K)	IS:3025(Part-45)	mg/l	1.2	4.0	1.8	1.6	1.8
23.	Total Alkalinity (as CaCO ₃)	IS:3025(Part-23)	mg/l	176	210	180	172	155
24.	Phosphate (as P)	IS:3025(Part-31)	mg/l	0.24	0.36	0.25	0.19	0.21
25.	Nitrite (as NO ₂)	IS:3025(Part-34)	mg/l	0.15	0.22	0.18	0.14	0.14
26.	Total Suspended Solid	IS:3025(Part-17)	mg/l	8.04	9.41	8.70	10.2	12.4
27.	Faecal Coliform	IS-1622	MPN/100 ml	1400	2100	1200	1500	1000
28.	Total Coliform	IS-1622	MPN/100 ml	1800	4000	1500	2200	1800

3.2.1 Sampling frequency

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

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

The surface water quality is compared with CPCB water quality criteria mentioned in **Table 3.6** below:

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

Designated-Best-Use	Class of water	Criteria
Drinking Water Source without conventional treatment but after disinfection	A	Total Coliforms Organism MPN/100ml shall be 50 or less pH between 6.5 and 8.5 Dissolved Oxygen 6mg/l or more Biochemical Oxygen Demand 5 days 20°C 2mg/l or less
Outdoor bathing (Organized)	B	Total Coliforms Organism MPN/100ml shall be 500 or less; pH between 6.5 and 8.5; Dissolved Oxygen 5mg/l or more Biochemical Oxygen Demand 5 days 20°C 3mg/l or less
Drinking water source after conventional treatment and disinfection	C	Total Coliforms Organism MPN/100ml shall be 5000 or less; pH between 6 to 9; Dissolved Oxygen 4mg/l or more Biochemical Oxygen Demand 5 days 20°C 3mg/l or less
Propagation of Wild life and Fisheries	D	pH between 6.5 to 8.5 Dissolved Oxygen 4mg/l or more Free Ammonia (as N) 1.2 mg/l or less
Irrigation, Industrial	E	pH between 6.0 to 8.5

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

Cooling, Controlled Waste disposal		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 and 7.62.
- Dissolved Oxygen (DO) was observed in the range of 6.2 to 8.7 mg/l against the minimum requirement of 4 mg/l.
- BOD values were observed to be in the range of 2.17 to 5.20 mg/l.
- Total Coliform examination of surface water samples revealed the presence of total coliform in range of 4000 MPN/100 ml to 1500 MPN/100 ml .

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

3.3 Air Environment

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

A meteorological station was set up at the proposed mine premises. Meteorological data was generated during the winter season and shown in **Table-3.7**

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

- Wind speed
- Wind Direction

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

- Air Temperature

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

Month	Temperature °C		Wind Speed (Km/Hr)	
	Min	Max	Min	Max
DEC 2022	10	20	1	24
JANUARY 2023	05	19	1	26
FEBRUARY 2023	12	22	2	32

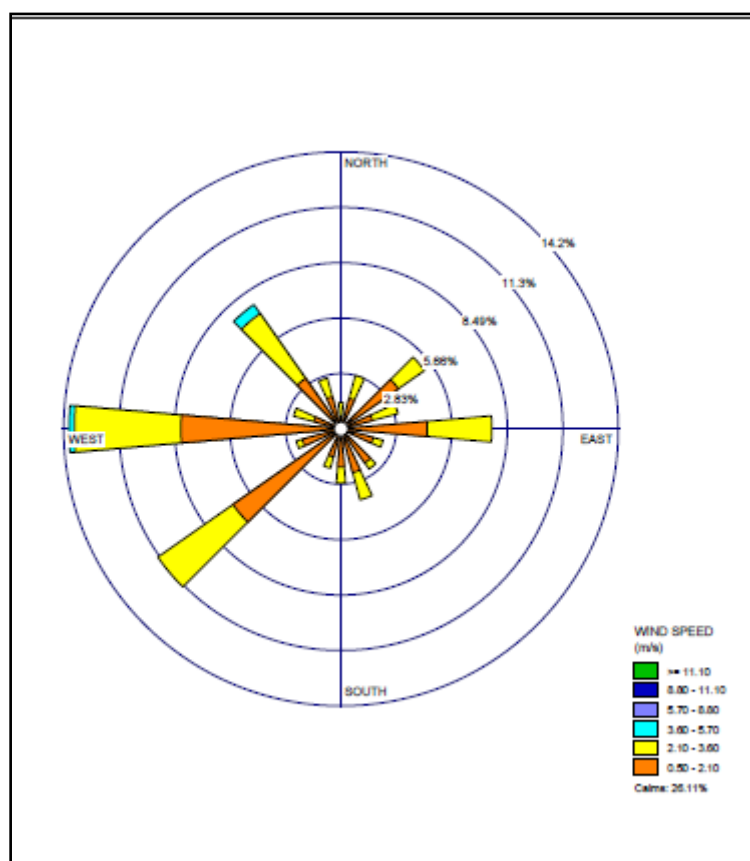


Figure 3.3: Wind Rose Diagram (at site)

3.3.1 Secondary Data Collected from IMD

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

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

The meteorological data is collected from the IMD- Patna is about 40 km from project site, which is the nearest operating IMD station to the project site. The data collected from IMD includes wind speed, wind direction, temperature, relative humidity and rainfall for the year 1981-2010. The monthly maximum, minimum and average values are collected for all the parameters except wind speed and direction. The collected data is tabulated in **Table-3.7**

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

3.3.2 Comparison of primary and secondary data

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

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

3.3.3 Ambient Air Quality

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

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

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

- Representative of likely impact areas.

Ambient Air Quality Monitoring (AAQM) stations were set up at 10 locations with due consideration to the above mentioned points. AAQM locations were selected in downwind, upwind as well as crosswind direction of the proposed mining lease area covering core and buffer zones. The details of the monitoring stations are given in **Figure 3.4** and shown in **Table-3.8**

Ambient air quality monitoring was carried out twice a week with a frequency of 24 hours for three months during the study period. The common air pollutant namely Particulate Matter-10 (PM₁₀) & PM_{2.5}, Sulphur-dioxide (SO₂) and Oxides of Nitrogen (NO₂) 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-3.09, Table-3.10, Table-3.11 & Table 3.12**. These are compared with the standards prescribed by Central PollutionControl Board (CPCB) for industrial, residential and rural zone.

Table 3.8: Ambient Air Quality Monitoring Stations

Air Monitoring Locations		
Location ID	Location name	Distance (Km) and Direction
AAQ 1	Project Site (Near Mahabalipur Village)	0.40 Km, West
AAQ 2	Near Azimabad Village	0.69 Km, NE
AAQ 3	Mahabalipur	0.5 Km, ESE
AAQ 4	Paliganj	7.47 Km, NE
AAQ 5	Jalpura	4.70 Km, NE
AAQ 6	Kori	6.11 Km, NW
AAQ 7	Bargaon	5.83 Km, WSW
AAQ 8	Shrirampur	4.23 Km, SE
AAQ 9	Turkaul	8.27 Km, NW
AAQ 10	Muzaffarpur	6.39 Km, SW

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

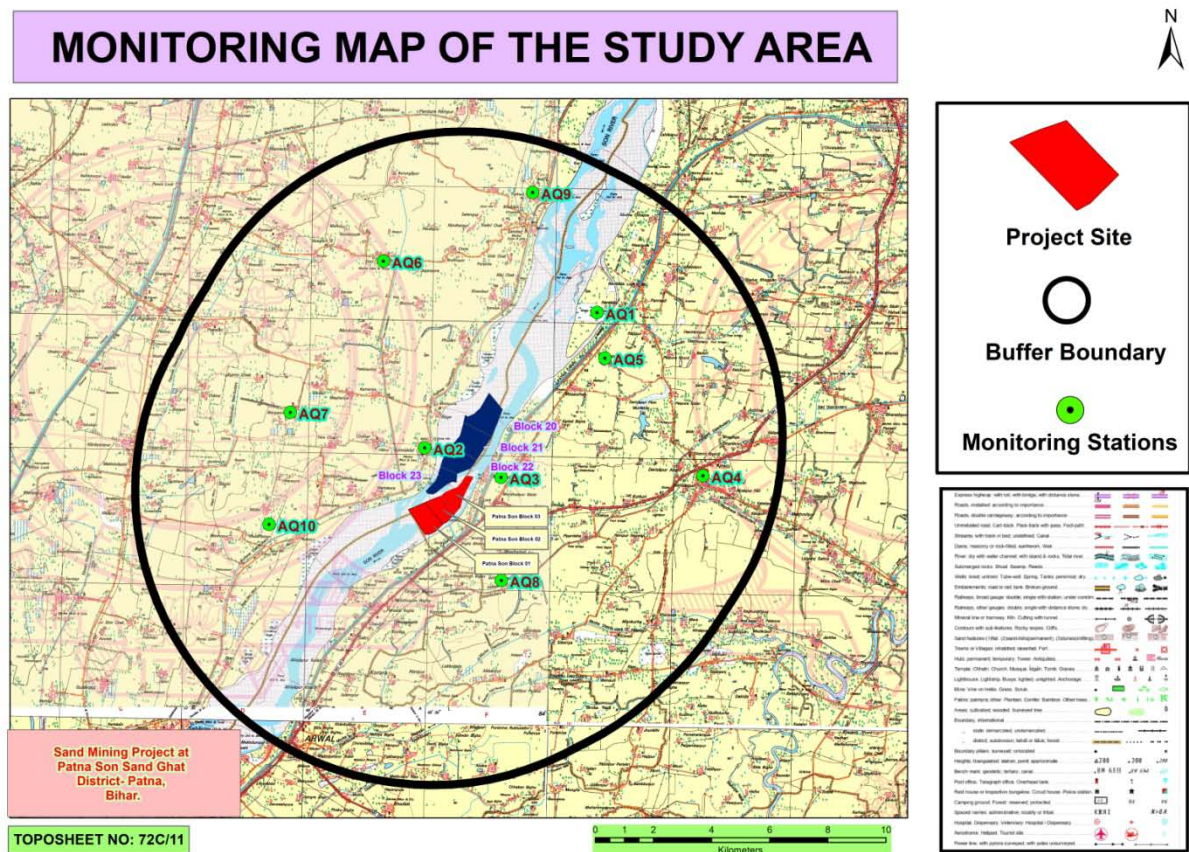


Figure 3.4 Ambient Air Quality Monitoring Stations

Table-3.9: Ambient Air Quality in the Study Area PM_{2.5}

Location Code	PM _{2.5} (µg/m ³)				
	Name of the station	Min	Max	Average	98 th Percentile
AAQ1	Project Site (Near Mahabalipur Village)	26.29	41.28	32.49	40.42
AAQ2	Near Azimabad Village	25.23	40.54	30.94	39.99
AAQ3	Mahabalipur	34.21	43.69	39.08	42.85
AAQ4	Paliganj	27.06	41.21	34.12	41.19
AAQ5	Jalpura	25.72	38.63	30.38	38.44
AAQ6	Kori	26.37	38.91	32.07	38.91
AAQ7	Bargaon	28.42	40.27	34.40	39.74
AAQ8	Shrirampur	30.23	43.51	37.41	43.35
AAQ9	Turkaul	28.94	39.75	34.80	39.35
AAQ10	Muzaffarpur	25.41	34.68	30.12	33.88

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

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

Location Code	PM10 ($\mu\text{g}/\text{m}^3$)				
	Name of the station	Min	Max	Average	98 th Percentile
AAQ1	Project Site (Near Mahabalipur Village)	66.85	86.64	75.43	86.03
AAQ2	Near Azimabad Village	64.26	77.38	70.77	77.36
AAQ3	Mahabalipur	64.86	78.64	72.15	78.29
AAQ4	Paliganj	54.34	76.28	66.64	75.72
AAQ5	Jalpura	51.28	73.41	63.40	72.38
AAQ6	Kori	53.45	74.92	65.62	74.41
AAQ7	Bargaon	53.92	75.29	62.29	73.10
AAQ8	Shrirampur	56.71	77.38	66.10	76.73
AAQ9	Turkaul	65.82	76.52	70.16	76.47
AAQ10	Muzaffarpur	50.92	72.68	60.98	72.61

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

Location Code	SO2 ($\mu\text{g}/\text{m}^3$)				
	Name of the station	Min	Max	Average	98 th Percentile
AAQ1	Project Site (Near Mahabalipur Village)	6.28	7.35	6.90	7.35
AAQ2	Near Azimabad Village	7.1	8.68	7.96	8.65
AAQ3	Mahabalipur	6.28	12.97	8.24	12.00
AAQ4	Paliganj	7.06	9.78	8.47	9.77
AAQ5	Jalpura	6.23	7.87	7.02	7.74
AAQ6	Kori	6.63	7.96	7.40	7.94
AAQ7	Bargaon	6.27	9.24	7.90	9.23
AAQ8	Shrirampur	7.29	9.38	8.35	9.35
AAQ9	Turkaul	7.25	10.15	8.84	10.13
AAQ10	Muzaffarpur	7.84	10.12	9.04	10.08

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

Location Code	NO2 ($\mu\text{g}/\text{m}^3$)
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Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

	Name of the station	Min	Max	Average	98 th Percentile
AAQ1	Project Site (Near Mahabalipur Village)	8.72	11.53	10.20	11.48
AAQ2	Near Azimabad Village	12.45	15.21	13.72	15.21
AAQ3	Mahabalipur	14.65	19.87	17.40	19.84
AAQ4	Paliganj	10.25	13.53	12.14	13.53
AAQ5	Jalpura	8.15	10.49	9.19	10.49
AAQ6	Kori	8.03	10.95	9.80	10.94
AAQ7	Bargaon	8.63	14.18	11.89	14.10
AAQ8	Shrirampur	10.27	13.06	11.81	13.05
AAQ9	Turkaul	12.26	15.58	13.96	15.48
AAQ10	Muzaffarpur	12.14	16.87	14.40	16.67

3.3.4.1 Baseline Scenario

Particulate Matter (PM_{2.5})

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

PM_{2.5} recorded within the study area was in the range of 25.23 µg/m³ to 43.69 µg/m³. 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/m³ 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 50.92 µg/m³ to 86.64 µg/m³. The 24 hourly average values of PM₁₀ were compared with

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

the National Ambient Air Quality Standards (NAAQS) and found that all sampling stations recorded in the study area are within the applicable limits i.e., $100 \mu\text{g}/\text{m}^3$ for 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 SO₂ recorded within the study area was $6.23 \mu\text{g}/\text{m}^3$ to $12.97 \mu\text{g}/\text{m}^3$.

The 24 hourly average values of SO₂ 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 $80 \mu\text{g}/\text{m}^3$ 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

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

range of was $8.03 \mu\text{g}/\text{m}^3$ to $19.87 \mu\text{g}/\text{m}^3$.

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 $80 \mu\text{g}/\text{m}^3$ for Residential, Rural and other areas.

Ambient Air Quality in the Study Area, Free Silica

Location Code	Free silica ($\mu\text{g}/\text{m}^3$)		
	Name of the station	Min	Max
AAQ1	Project Site (Near Mahabalipur Village)	1.25	1.45
AAQ2	Near Azimabad Village	1.50	1.85
AAQ3	Mahabalipur	1.30	1.55
AAQ4	Paliganj	1.40	1.61
AAQ5	Jalpura	1.31	1.42
AAQ6	Kori	1.36	1.45
AAQ7	Bargaon	1.40	1.80
AAQ8	Shrirampur	1.35	1.63
AAQ9	Turkaul	1.38	1.66
AAQ10	Muzaffarpur	1.20	1.50

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 10 locations and analyzed as per CPCB norms. The soil sampling locations are marked in **Figure 3.5** and shown in **Table 3.13**. The physico-chemical characteristic of these soil samples is given in **Table 3.14(a) & Table 3.14(b)**.

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

Table 3.13: Description of soil sampling locations

Soil monitoring locations		
SQ 1	Project Site (Near Mahabalipur Village)	0.40 Km, West
SQ 2	Near Azimabad Village	0.69 Km, NE
SQ 3	Mahabalipur	0.5 Km, ESE
SQ 4	Paliganj	7.47 Km, NE
SQ 5	Jalpura	4.70 Km, NE
SQ 6	Kori	6.11 Km, NW
SQ 7	Bargaon	5.83 Km, WSW
SQ 8	Shrirampur	4.23 Km, SE

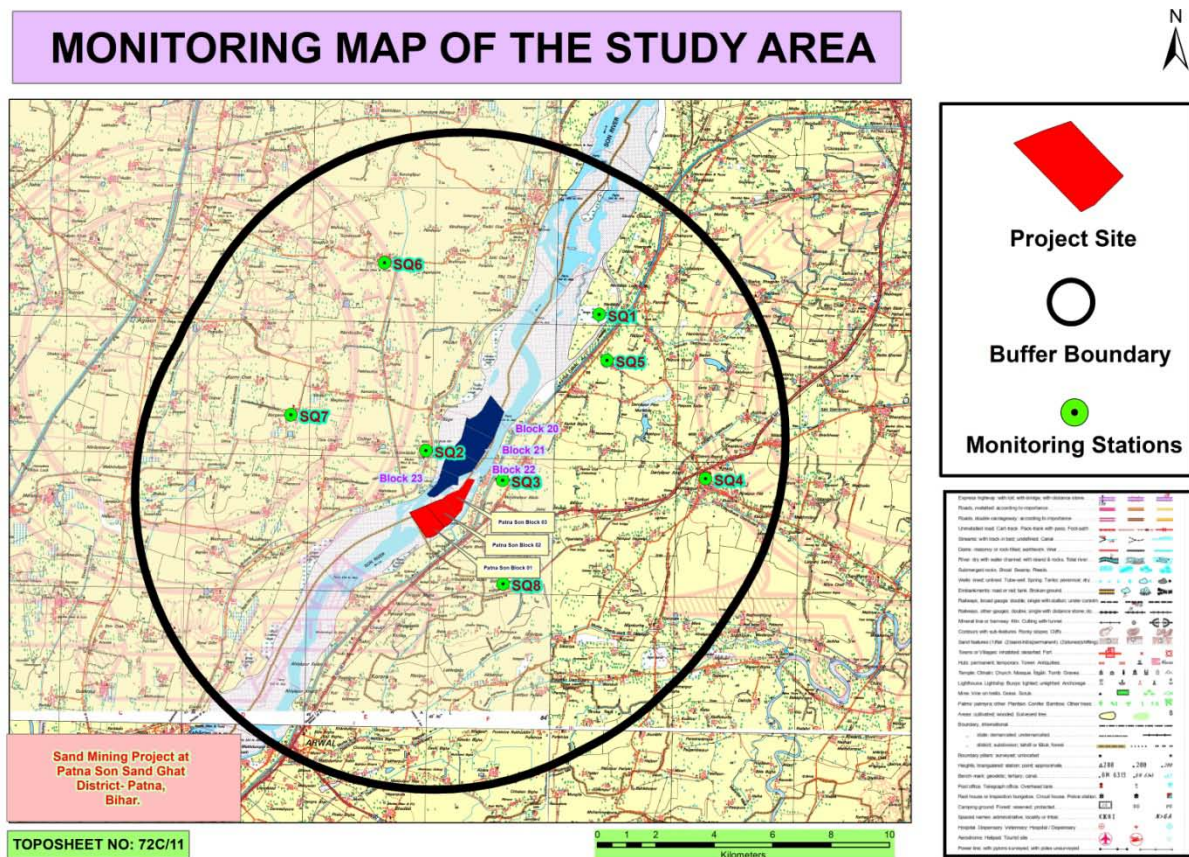


Figure 3.5, Soil Sampling Locations

Table 3.14 (a): Physico-chemical properties of soil (SQ1-SQ4)

		Location	SQ1	SQ2	SQ3	SQ4
Sr. No.	Parameters	Units	Results	Results	Results	Results
1	pH	-	7.89	7.54	8.23	7.80

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

2	Conductivity	μmhos/cm	518.0	460.0	440.0	521.0
3	Sodium (as Na)	mg/kg	64.70	75.40	78.21	64.80
4	Water holding capacity	%	32.0	28.6	28.8	30.1
5	Potassium (as K)	mg/kg	298.0	260.5	254.0	278.2
6	Sand	%	85.00	86.50	89.00	85.40
7	Clay	%	8.00	4.80	3.60	4.60
8	Silt	%	7.00	8.70	7.40	10.0
9	Calcium (as Ca)	mg/kg	454.00	441.00	445.00	542.00
10	Magnesium (as Mg)	mg/kg	168.10	173.09	153.56	203.34
11	SAR	-	0.95	1.49	1.55	1.40
12	CEC	meq/100gm	2.12	2.12	2.34	2.20
13	Phosphorus (as P)	mg/kg	10.80	12.50	12.76	12.44
14	Organic carbon	%	0.43	0.41	0.35	0.42
15	Porosity	%	38.00	36.89	45.6	35.6
16	Permeability	cm/hr	1.82	1.60	1.88	1.76
17	Bulk Density	kg/cm ³	1.41	1.44	1.38	1.45
18	Total Kjeldahl Nitrogen (TKN)	%	0.026	0.034	0.039	0.028

Table 3.14 (b): Physico-chemical properties of soil (SQ5-SQ8)

		Location	SQ5	SQ6	SQ7	SQ8
Sr. No.	Parameters	Units	Results	Results	Results	Results
1	pH	-	7.64	7.51	7.49	7.35
2	Conductivity	μmhos/cm	398.0	410.0	421.0	374.0
3	Sodium (as Na)	mg/kg	58.21	78.63	71.91	56.20
4	Water holding capacity	%	34.45	32.87	35.18	32.10
5	Potassium (as K)	mg/kg	241.03	197.46	238.20	249.50
6	Sand	%	61.00	64.00	68.00	64.00
7	Clay	%	18.00	22.00	19.00	22.00
8	Silt	%	21.00	16.00	13.00	16.00
9	Calcium (as Ca)	mg/kg	298.06	240.35	276.12	280.00
10	Magnesium (as Mg)	mg/kg	67.29	65.91	63.75	74.10
11	SAR	-	0.97	0.94	0.98	1.08
12	CEC	meq/100gm	2.15	2.27	2.17	2.27
13	Phosphorus (as P)	mg/kg	10.84	10.93	11.23	12.80
14	Organic carbon	%	0.46	0.46	0.48	0.48
15	Porosity	%	40.98	42.81	38.63	46.20
16	Permeability	cm/hr	1.95	1.83	1.92	1.97
17	Bulk Density	kg/cm ³	1.38	1.42	1.35	1.28
18	Total Kjeldahl Nitrogen (TKN)	%	0.041	0.036	0.025	0.045

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

Observations:

Samples collected from identified locations indicate the soil is sandy type and the pH value ranging from 7.35 to 8.23, which shows that the soil is alkaline in nature. Potassium is found to be from 197 mg/kg to 298 mg/kg.

3.5 NOISE ENVIRONNENT

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

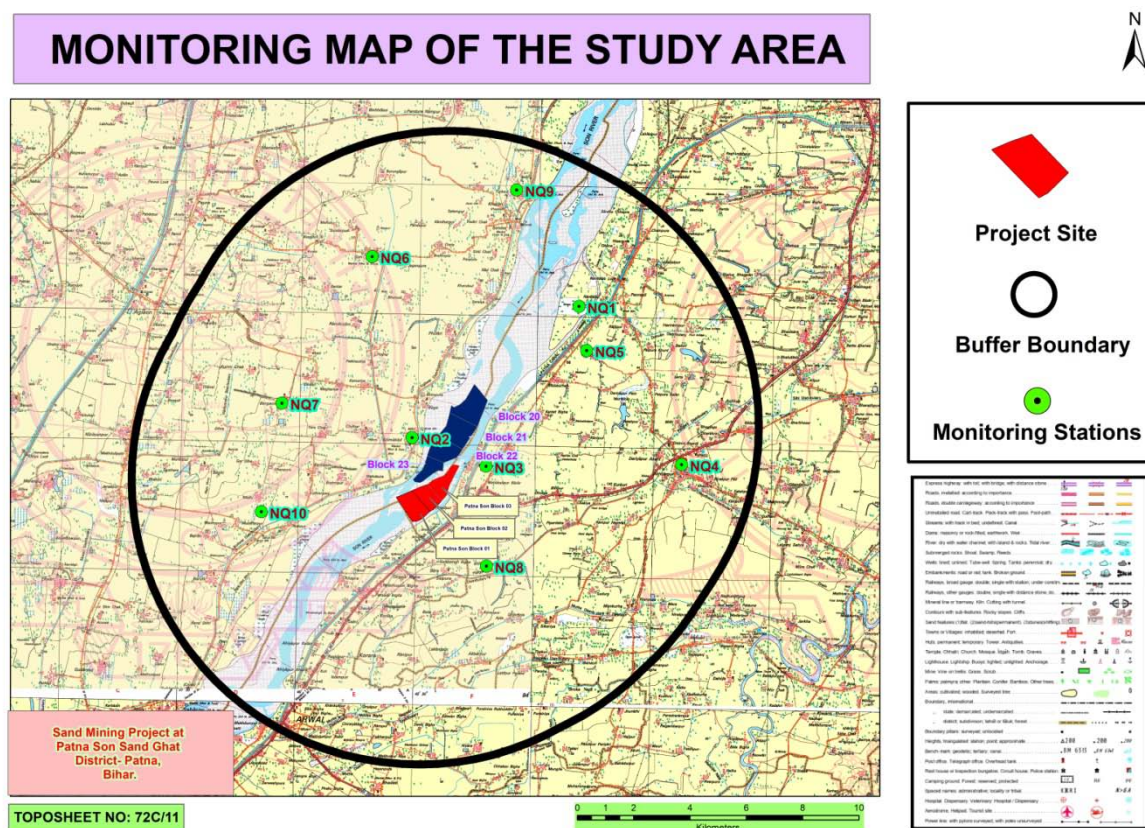


Figure 3.6 Noise Monitoring Stations

Table 3.15: Noise Quality Monitoring Stations

Noise Monitoring Locations		
NQ 1	Project Site (Near Mahabalipur Village)	0.40 Km, West

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

NQ 2	Near Azimabad Village	0.69 Km, NE
NQ 3	Mahabalipur	0.5 Km,ESE
NQ 4	Paliganj	7.47 Km, NE
NQ 5	Jalpura	4.70 Km,NE
NQ 6	Kori	6.11 Km,NW
NQ 7	Bargaon	5.83 Km, WSW
NQ 8	Shrirampur	4.23 Km, SE
NQ 9	Turkaul	8.27 Km, NW
NQ 10	Muzaffarpur	6.39 Km, SW

Table 3.16: Noise Monitoring Results

S. No.	Locations		Equivalent Noise Level, dB (A)			
			Limit (as per CPCB Guidelines),Leq, dB(A)		Observed value Leq, dB(A)	
			DAY*	NIGHT*	DAY*	NIGHT*
1	Project Site (Near Mahabalipur Village)	Industrial Zone	75	70	58.9	46.4
2	Near Azimabad Village	Residential Zone	55	45	50.2	43.0
3	Mahabalipur	Residential Zone	55	45	50.4	40.2
4	Paliganj	Residential Zone	55	45	51.1	40.1
5	Jalpura	Residential Zone	55	45	52.0	41.5
6	Kori	Residential Zone	55	45	51.5	38.8
7	Bargaon	Residential Zone	55	45	50.6	36.4
8	Shrirampur	Residential Zone	55	45	52.3	40.6
9	Turkaul	Residential Zone	55	45	53.4	42.5
10	Muzaffarpur	Residential Zone	55	45	50.1	41.8

Results

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

Noise monitoring reveals that the minimum & maximum noise levels at day time were recorded as 58.9 dB(A) to 50.1 dB(A) respectively. The minimum & maximum noise levels at night time were found to be 46.4 dB (A) & 36.4 dB(A) respectively.

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

3.6 BIOLOGICAL ENVIRONMENT

3.6.1.1 Introduction

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

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

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

The main objective of the ecological survey is aimed to find out the baseline status of flora and fauna (terrestrial and aquatic ecosystem) of the study area before the start of Sand Mining Project, On Son River At Son Block No.-02 Sand Ghat.

3.6.2 Description of the study area

The Proposed Sand Mining Project was located on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

The proposed mining was a cluster of 03 mining lease area of Patna Son 01, Patna Son 02 & Patna Son 03 over an combined area of 176.27 Ha is for river bed sand mining on Son River at Mauza- Muhammadpur, Mahabalipur, Dist- Patna, Bihar.

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

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

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

3.6.3 Drainage /Water Bodies of the Study Area

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

Scope and Objectives of the Study

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

- Survey of terrestrial & aquatic flora & fauna for core & buffer zone separately.
- Details of endemic species found in the study area and their IUCN status, Schedule status (as per WPA, 1972).
- Survey of the study area in terms of features like breeding & spawning grounds, habitats, flight paths, and the migratory path of the animals.

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

- 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 covering a total listing of the faunal population. The survey has also covered endangered, endemic, migratory & detail of aquatic fauna.
- The assessment of potential damage to terrestrial & aquatic flora and fauna. The impact should be categorized as primary & secondary, temporary and long term, unavoidable & risk transboundary impacts, possible irreversible change.

3.6.4 Methodology/ Data Collection

A primary field survey was carried out within a 10 km radius of the proposed project in winter period (Dec-Feb 2023). Both terrestrial and aquatic ecosystems have been studied to understand the biological environment. Secondary data were collected from authentic sources like the Forests Department, Fisheries Department, Agriculture Department of Son , 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.

3.6.8 Flora of the Study Area

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

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

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

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 (Patna district) and the details are given in table 3.17. These crops are similar to the crops of buffer zone also. So, the same information is applicable for the core and buffer zone.

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

S.No.	Botanical Name	Local/Trade Name	Family Name
1	<i>Zey mays</i>	Makkha/Maize	Poaceae
2	<i>Triticum aestivum</i>	Wheat	
3	<i>Oryza sativa</i>	Paddy	
4	<i>Cicer arietinum</i>	Channa	Fabacea
5	<i>Coriander sativum</i>	Dhaniya	Apiaceae
6	<i>Abelmoschus esculentus</i>	Bhendi	Amaranthaceae
7	<i>Mamordica charanta</i>	Karela	Cucurbiataceae
8	<i>Capsicum annum</i>	Mirchi	Solanaceae
9	<i>Lycopersicon lycopersicum</i>	Tomato	
10	<i>Solanum melongena</i>	Brinjal	
11	<i>Capsicum annuum</i>	Mirchi	
12	<i>Solanum tuberosum</i>	Potato	
13	<i>Allium cepa</i>	Onian	Amaryllidaceae
14	<i>Cajanus cajan</i>	Pigeon pea	Fabaceae
15	<i>Carica papaya</i>	Papaya	Caricaceae

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

16	<i>Okra</i>	Ladyfinger/ Bhindi	Malvaceae
17	<i>Lagenaria siceraria</i>	Bottle gourd/ Lauki	Cucurbitaceae
Source: Present Survey Data Supported by District Agriculture Department, Patna			

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

Aquatic floral details of the core zone were collected from 08 selected sites of the study area. Some sites were located buffer zone adjacent to the present alignment, however some were located in the core & buffer zone. Details of phytoplankton and macrophytic vegetation of the core and the buffer zone are given in tables 3.18, 3.19 & 3.20.

Phytoplankton: Most of the phytoplankton species recorded from the core zone was similar to the buffer zone also. So, the same information is applicable for the core and buffer zone. Phytoplankton species were collected and identified from 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 3.18.

Table 3.18: List of Phytoplankton species present in different water bodies in study area (Core and Buffer Zone).

S.N.	Taxonomic Details	S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8	Schedule Status in WPA (1972)	IUCN Status
	Chlorophyceae									NA	NA
1	<i>Arthrodesmus</i> sp.	+		+	+		+		+	NA	NA
2	<i>Ankistrodesmus falcatus</i>		+	+			+	+	+	NA	NA
3	<i>Chlorococcum</i> sp.	+	+	+			+		+	NA	NA
4	<i>Closteriopsis</i> sp.	+	+		+	+		+		NA	NA
5	<i>Cosmarium formii</i>	+	+	+	+	+	+		+	NA	NA

Chapter-III	BASELINE DATA DESCRIPTION
Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).	

6	<i>Cosmarium margaritatum</i>	+		+	+		+	+		NA	NA
7	<i>Crucigenia</i> sp.	+	+	+	+		+			NA	NA
8	<i>Chlorella vulgaris</i>	+		+	+	+			+	NA	NA
9	<i>Oocystis crassa</i>	+	+			+	+	+	+	NA	NA
10	<i>Pediastrum simplex</i>			+	+	+				NA	NA
11	<i>Scenedesmus armatus</i>	+	+	+		+	+	+	+	NA	NA
12	<i>Scenedesmus bijugatus</i>	+		+	+	+	+		+	NA	NA
13	<i>Spirogyra</i> sp.	+	+	+		+	+	+		NA	NA
14	<i>Tetraedron trigonum</i>				+		+		+	NA	NA
15	<i>Tetrastrum</i> sp.	+	+	+		+	+		+	NA	NA
16	<i>Ulothrix</i> sp.	+	+	+	+	+	+	+		NA	NA
17	<i>Ulothrix zonata</i>	+		+		+	+		+	NA	NA
18	<i>Volvox</i> sp.	+	+	+		+	+			NA	NA
	Total	19	15	23	16	17	24	12	17		
	Cyanophyceae									NA	NA
1	<i>Anabaena</i> sp.		+	+	+	+	+		+	NA	NA
2	<i>Anabaena circinalis</i>	+	+	+	+	+	+	+		NA	NA
3	<i>Aphanocapsa</i> sp.	+		+	+	+	+	+	+	NA	NA
4	<i>Aphanothece</i> sp.	+	+		+	+			+	NA	NA
5	<i>Chroococcus</i> sp.	+		+	+	+	+	+		NA	NA
6	<i>Gloeocapsa</i> sp.	+	+	+			+		+	NA	NA
7	<i>Lyngbya</i> sp.	+	+		+	+	+	+	+	NA	NA
8	<i>Merismopedia</i> sp.	+	+	+		+	+	+	+	NA	NA
9	<i>Merismopedia tenuissima</i>	+		+	+	+	+			NA	NA
10	<i>Microcystis</i> sp.		+		+			+	+	NA	NA
11	<i>Microcystis aeruginosa</i>	+		+			+			NA	NA
12	<i>Nostoc</i> sp.		+		+	+	+	+	+	NA	NA
	Total	12	11	11	12	13	15	9	12		
	Bacillariophyceae									NA	NA
1	<i>Amphora ovalis</i>	+				+	+		+	NA	NA
2	<i>Amphora</i> sp.	+	+	+	+	+		+		NA	NA
3	<i>Cyclotella</i> sp.			+		+	+	+	+	NA	NA

Chapter-III	BASELINE DATA DESCRIPTION
Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).	

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

Table 3.19: Site wise Qualitative list of Phytoplankton species recorded from the Core and Buffer Zone

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

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

Macrophytes: The aquatic vegetation recorded from the core zone was similar to the aquatic vegetation of the buffer zone also. So, the same information is applicable for the core and buffer zone. The maximum number of aquatic vegetation was recorded at sites 06 and 08 due to the perennial nature of the water bodies. On the other hand, other water bodies support less vegetation due to a lack of water (monsoon-fed streams), and moisture. The details of Macrophytes species are given in table 3.20.

Table 3.20: List of Aquatic Macrophytic vegetation of Core and Buffer Zone

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

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

During the present survey, a total of 77 species of plant species were observed from the study area. Out of 77 plant species, 42 species of tree, 18 species of shrubs/herbs, 6 species of climbers, and 10 species of Grass species were recorded from the buffer zone of the present study area. The below-mentioned vegetation details have been collected from the Core as well as Buffer zone of the present study area. All the details have been furnished based on the field survey at different locations and data supported by the Department of Forest, Patna of Bihar. The details of vegetation of the buffer zone is given in Table 3.21.

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

S.No.	Botanical Name	Common/ Hindi Name	Name of family
	Trees		
1	<i>Acacia nilotica</i>	Babool	Mimosaceae
2	<i>Acacia nilotica</i>	Desi babool	Fabaceae
3	<i>Acacia leucophloea</i>	Safed babul	Mimosaceae
4	<i>Aegle marmelos</i>	Bel	Rutaceae
5	<i>Ailanthus excels</i>	Adusa	Simaroubaceae
6.	<i>Albizia amara</i>	Siris	Mimosoideae
7	<i>Albizia lebbek</i>	Sirish	Mimosaceae
8	<i>Alstonia scholaris</i>	Saptaparni	Apocynaceae
9	<i>Anogeissus latifolia</i>	Dhaura,	Combretaceae
10	<i>Anthocephalus cadamba</i>	Kadamb	Rubiaceae
11	<i>Artocarpus heterophyllus</i>	Jack fruit	Moraceae
12	<i>Azadirachta indica</i>	Neem	Meliaceae
13	<i>Bauhinia racemosa</i>	Apta	Leguminosae
14	<i>Bauhinia variegata L.</i>	Kachnar	Leguminosae
15	<i>Bombax ceiba</i>	Semal	Malvaceae
16	<i>Bombax malabaricum</i>	Semal tree	Malvaceae
17	<i>Borassus flabellifer</i>	Nariyal	Palmae
18	<i>Butea monosperma</i>	Palas	Leguminosae
19	<i>Dalbergia latifolia</i>	Shisam	Leguminosae
20	<i>Dalbergia sissoo</i>	Shisam	Leguminosae

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

21	<i>Delonix regia</i>	Gulmohar	Fabaceae
22	<i>Dendrocalamus strictus</i>	Bamboo	Poaceae
23	<i>Diospyros melanoxylon</i>	Tendu	Ebenaceae
24	<i>Ficus benghalensis</i>	Bargad	Moraceae
25	<i>Ficus religiosa</i>	Pipal	Moraceae
26	<i>Madhuca longifolia</i>	Mohua tree	Sapotaceae
27	<i>Magnifera indica</i>	Aam	Anacardiaceae
28	<i>Melia azedarach</i>	Bukkam Neem	Meliaceae
29	<i>Moringa olerifera</i>	Munga	Moringanaceae
30	<i>Nerium oleamder</i>	Kaner	Apocynaceae
31	<i>Phoenix sylvestris</i>	Date palm	Arecaceae
32	<i>Phyllanthus emblica</i>	Awla	Euphorbiaceae
33	<i>Pisidium guava</i>	Guava	Myrtaceae
34	<i>Pongamia pinnata</i>	Karanj	Leguminosae
35	<i>Prosopis juliflora</i>	Vilayati babool	Fabaceae
36	<i>Sarracca indica</i>	Ashok	Annonaceae
37	<i>Shorea robusta</i>	Sal	Depterocarpaceae
38	<i>Syzygium cumini</i>	Jamun	Myrtaceae
39	<i>Tectona grandis</i>	Sagwan	Verbenaceae
40	<i>Terminalia arjuna</i>	Arjun	Combretaceae
41	<i>Terminalia chebula</i>	Harhar	Combretaceae
42	<i>Zizyphus jujube</i>	Ber	Rhamnaceae
Shrub & Herbs			
43	<i>Acanthospermum hispidum</i>	Kanti	Asteraceae
44	<i>Acheranthus aspera</i>	Aghada	Amaranthaceae
45	<i>Argemone mexicana</i>	Pila dhtura	Papaveraceae
46	<i>Baugainvella glabra</i>	Paper flower	Nyctaginaceae
47	<i>Calotropis procera</i>	Aakra	Asclepiadaceae
48	<i>Cassia auriculata</i>	Tarwar	Fabaceae
49	<i>Cassia tora</i>	Tarota /Takla	Caesalpiniaceae
50	<i>Chenopodium album</i>	manure weed	Amaranthaceae
51	<i>Dalura metel</i>	Dhotra	Solanaceae

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

52	<i>Ipomoea carnea</i>	Besharam	Convolvulaceae
53	<i>Jatropha gossipifolia</i>	cotton-leaf	Euphorbiaceae
54	<i>Lantana camara</i>	Ghaneri	Verbenaceae
55	<i>Mimosa pudica</i>	Chui Mui	Mimosaceae
56	<i>Ocimum sanctum</i>	Tulsi	Labiatae
57	<i>Parthenium hysterophorus</i>	Gajar grass	Asteraceae
58	<i>Ricinus communis</i>	Arand	Euphorbiaceae
59	<i>Ricinus communis</i>	castor oil plant	Euphorbiaceae
60	<i>Tridax procumbens</i>	Kambarmodi	Asteraceae
Grasses			
61	<i>Apluda mutica</i>	Mauntian grass	Poaceae
62	<i>Commelina benghalensis</i>	Bokna	Commelinaceae
63	<i>Cynodon dactylon</i>	Doob	Poaceae
64	<i>Cyperus rotundus</i>	Motha	cyperaceae
65	<i>Dactylis aegyptium</i>	Crow foot grass	Poaceae
66	<i>Pennisetum purpureum</i>	Elephant grass	Poaceae
Climbers			
67	<i>Antigonon leptopus</i>	Anantalata	Polygonaceae
68	<i>Bougainvillea glabra</i>	Booganbel	Nyctaginaceae
69	<i>Celastrus paniculata</i>	Kujari	Celastraceae
70	<i>Cissampelos pareira</i>	Khariya lata	Menispermaceae
71	<i>Clitoria ternatea</i>	Blue pea	Fabaceae
72	<i>Coccinia grandis</i>	Jungli Kundru	Cucurbitaceae
73	<i>Combretum indicum</i>	Madhu Malati	Combretaceae
74	<i>Cuscuta reflexa</i>	Amarbel	Convolvulaceae
75	<i>Cuscuta reflexa</i>	Amar bel	Convolvulaceae
76	<i>Ipomoea cairica</i>	Neeli Bel	Convolvulaceae
77	<i>Tilospora cordifolia</i>	Giloy	Menispermaceae
Source: Primary data of P&M Solution, Noida and data supported by the Department of Forest, Patna district of Bihar.			

3.6.10.2 Agricultural vegetation/ Commercial vegetation of the Buffer zone.

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

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

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

Phytoplankton: The diversity of Phytoplankton species was similar in the core and buffer zone. The details of macrophytic vegetation of the buffer zone are given in Table 3.18 & 3.19.

Macrophytes: The diversity of aquatic macrophytes was similar in both core and buffer zone. The details of macrophytic vegetation of the buffer zone are given in Table 3.20.

3.6.11 Fauna of the Study Area

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

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

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

3.6.12 Fauna of the Core Zone

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

The domesticated animals like; Buffalo (*Bubalus bubalis*); Ass (*Equus hemionus*), Cow (*Bos primigenius*); Goat (*Capra aegagrus*) Horse (*Equus caballus*); and Dog (*Canis lupus familiaris*) were observed moving in different parts of the study area (including core and buffer zone), especially nearby town and villages. Other mammals and reptiles found in the study area are listed in Table 3.22.

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

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

S. No.	Common Name	Scientific Name	Family	Schedule status (as per WPA-1972)	IUCN status
Mammals					
1.	Jungle cat	<i>Felis chaus</i>	Felidae	II	LC
2.	Five striped palm squirrel	<i>Funambulus pennanti</i>	Sciuridae	IV	LC
3.	Indian Fulvous Fruit-Bat	<i>Rousettus leschenaultia</i>	Pteropodidae	V	LC
4.	Indian Field Mouse	<i>Mus booduga</i>	Muridae	V	LC
5.	Common House Rat	<i>Rattus rattus</i>	Muridae	V	LC
6.	Bandicoot Rat	<i>Bandicotabengalensis</i>	Muridae	V	LC
7.	Indian Grey Mongoose	<i>Herpestes edwardsi</i>	Herpestidae	II	LC
Reptiles & Amphibians					
8.	Garden lizard	<i>Calotes versicolor</i>	Agamidae	IV	NE
9	King cobra	<i>Ophiophagus hannah</i>	Elapidae	II	LC
10	Cobra	<i>Naja naja</i>	Elapidae	II	LC
11.	Pit viper	<i>Crotalus</i> sp	Viperidae	II	LC
12	Garden lizard	<i>Calotes versicolor</i>	Agamidae	IV	NE
Bird Species					
1	<i>Acridotheres tristis</i>	Myna	Sturnidae	IV	LC
2	<i>Acridotheres tristis</i>	Common myna	Sturnidae	IV	LC
3	<i>Amandava amandava</i>	Red munia	Estrildidae	IV	LC
4	<i>Ardea cinerea</i>	Grey heron	Ardeidae	IV	LC
6	<i>Bubulcus ibis</i>	Cattle egret	Ardeidae	IV	LC
7	<i>Columba livia</i>	Pigeon	Columbidae	IV	LC
5	<i>Corvus macrorhynchos</i>	Jungle crow	Corvidae	IV	LC

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

6	<i>Corvus splendens</i>	Crow	Corvidae	V	LC
7	<i>Gallinule chloropus</i>	Common moorhen	Rallidae	IV	LC
8	<i>Milvus migrans</i>	Black Kite	Accipitridae	IV	LC
9	<i>Passer domesticus</i>	House sparrow	Passeridae	IV	LC
10	<i>Pycnonotus cafer</i>	Red-vented bulbul	Pycnonotidae	IV	LC
11	<i>Saxicoloides fulicatus</i>	Indian robin	Psittaculidae	IV	LC
12	<i>Turdoides caudate</i>	Common babbler	Leiotherichidae	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, Patna district of Bihar

Table 3.23: Butterflies observed in the Core zone

S. No.	Common Name	Scientific Name	Family	IUCN Status
1.	Plain Tiger	<i>Danaus chrysippus</i>	Nymphalidae	LC
2.	Common emigrant	<i>Catopsilia pomona</i>	Pieridae	LC
3.	Common crow	<i>Euploea core</i>	Nymphalidae	LC
4.	Small grass yellow	<i>Eurema brigitta</i>	Pieridae	LC

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

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

terrestrial biodiversity, wildlife survey (diversity), habitat study (feeding, breeding, roosting areas), distribution of birds, rare & endangered species of the study area.

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

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

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

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

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

i. Mammals and Reptiles/ Amphibians

The domesticated animals like Goat (*Capra aegagrus*); Buffalo (*Bubalus bubalis*); Cow (*Bos primigenius*); Horse (*Equus caballus*); Ass (*Equus hemionus*) and Dog (*Canis lupus familiaris*) were observed moving in different parts of the study area, especially nearby town and villages. Other mammals and reptiles found in the study area are listed in Table 3.24.

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

S. No.	Common Name	Scientific Name	Family	Status as per WPA-	IUCN status

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

				1972	
Mammals					
1	<i>Bandicota bengalensis</i>	Bandicoot Rat	Sciuridae	IV	LC
2	<i>Canis aurius</i>	Jackal	Pteropodidae	V	LC
3	<i>Fellis chaus</i>	Jungle cat	Soricidae	IV	LC
4	<i>Funambulus palmarum</i>	Three-striped Squirrel	Suidae	III	LC
5	<i>Funambulus pennanti</i>	Five striped palm squirrel	Hyaenidae	III	LC
6	<i>Herpestes edwardsi</i>	Indian Grey Mongoose	Canidae	II	LC
7	<i>Hyaena hyaena</i>	Stripped hyena	Leporidae	V	LC
8	<i>Lepus nigricollis</i>	Indian Hare	Canidae	II	LC
9	<i>Mus booduga</i>	Indian Field Mouse	Sciuridae	IV	LC
10	<i>Presbytis entellus</i>	Common langur	Cercopithecidae	II	LC
11	<i>Pteropus giganteus</i>	Indian Flying Fox	Pteropodidae	V	LC
12	<i>Rattus rattus</i>	Common House Rat	Muridae	V	LC
13	<i>Rousettus leschenaultia</i>	Indian Fulvous Fruit- Bat	Muridae	V	LC
14	<i>Suncus murinus</i>	Grey musk Shrew	Muridae	V	LC
15	<i>Sus scrofa</i>	Wild Boar	Canidae	III	LC
16	<i>Vulpes bengalensis</i>	Indian fox	Felidae	II	LC
Reptiles and Amphibians					
1	<i>Bufo melanostictus</i>	Common toad	Bufonidae	IV	LC
2	<i>Bungarus caeruleus</i>	Krait	Elapidae	IV	NE
3	<i>Calotes versicolor</i>	Garden lizard	Agamidae	IV	NE
4	<i>Crotalus sp.</i>	Pit viper	Viperidae	II	LC
5	<i>Enhydrys enhydrys</i>	Smooth water snake	Homalopsidae	IV	LC
6	<i>Euphlyctis hexadactyla</i>	Common frog	Dicroglossidae	IV	LC

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

7	Hemidactylus flaviviridis	House Gecko	Gekkonidae	--	NE
8	<i>Naja naja</i>	Cobra	Elapidae	II	LC
9	<i>Ophiophagus hannah</i>	King cobra	Elapidae	II	LC
10	<i>Ptyas mucosa</i>	Rat Snake	Colubridae	II	NE
11	<i>Rana temporaria</i>	Common frog	Ranidae	IV	LC
12	<i>Varanus sp.</i>	Monitor lizard	Varanidae	II	LC

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

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

ii. Avian Fauna

Table 3.25: Avian Fauna observed from the study area (01 KM Buffer area)

S.No	Scientific Name	Common Name	Family	Schedule Status (WPA-1972)	IUCN Status
1	<i>Acridotheres tristis</i>	Myna	Sturnidae	IV	LC
2	<i>Acridotheres tristis</i>	Common myna	Sturnidae	IV	LC
3	<i>Alcedo atthis</i>	Small blue kingfisher	Alcedinidae	IV	LC
4	<i>Amandava amandava</i>	Red munia	Estrildidae	IV	LC
5	<i>Ardea cinerea</i>	Grey heron	Ardeidae	IV	LC
6	<i>Ardeola grayii</i>	Indian pond heron	Ardeidae	IV	LC
7	<i>Athene brama</i>	Spotted Owlet	Strigidae	IV	LC
8	<i>Bubulcus ibis</i>	Cattle egret	Ardeidae	IV	LC
9	<i>Centropus sinensis</i>	Crow pheasant	Cuculidae	IV	LC
10	<i>Ceryle rudis</i>	Pied kingfisher	Alcedinidae	IV	LC
11	<i>Charadrius dubius</i>	Little ringed plover	Charadriidae	IV	LC
12	<i>Ciconia episcopus</i>	White-necked stork	Ciconidae	IV	NT
13	<i>Cinnyris asiaticus</i>	Purple Sunbird	Psittaculidae	IV	LC
14	<i>Columba livia</i>	Pigeon	Columbidae	IV	LC

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

15	<i>Corvus macrorhynchos</i>	Jungle crow	Corvidae	IV	LC
16	<i>Corvus splendens</i>	Crow	Corvidae	V	LC
17	<i>Dicrurus adsimilis</i>	Black drongo	Dicruridae	IV	LC
18	<i>Egretta alba</i>	Larger egret	Ardeidae	IV	LC
19	<i>Egretta garzetta</i>	Little egret	Ardeidae	IV	LC
20	<i>Fringilla monticola</i>	Titar	Phasianidae	IV	LC
21	<i>Gallinule chloropus</i>	Common moorhen	Rallidae	IV	LC
22	<i>Gallus gallus</i>	Jungle hen	Phasianidae	IV	LC
23	<i>Halcyon smymensis</i>	White-throated kingfisher	Alcedinidae	IV	LC
24	<i>Milvus migrans</i>	Black Kite	Accipitridae	IV	LC
25	<i>Passer domesticus</i>	House sparrow	Passeridae	IV	LC
26	<i>Phalacrocorax carbo</i>	Great cormorant	Phalacrocoracidae	IV	LC
27	<i>Phalacrocorax niger</i>	Little cormorant	Phalacrocoracidae	IV	LC
28	<i>Pluvialis fulva</i>	Pacific golden plover	Charadriidae	IV	LC
29	<i>Pseudibis papillosa</i>	Red-naped ibis	Threskiornithidae	IV	LC
30	<i>Psittacula krameri</i>	Rose ringed Parakeet	Psittacidae	IV	LC
31	<i>Pycnonotus cafer</i>	Red-vented bulbul	Pycnonotidae	IV	LC
32	<i>Saxicoloides fulicatus</i>	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, Son, Bihar.

iii. Butter Flies

Table 3.26: Butterflies observed from the Buffer zone of the study area

S.No.	Scientific Name	Common Name	Family	IUCN Status
1	<i>Catopsilia pomona</i>	Common emigrant	Pieridae	LC
2	<i>Chlosyne lacinia</i>	Sunflower/Bordered Patch	Nymphalidae	LC
3	<i>Danaus chrysippus</i>	Plain Tiger	Nymphalidae	LC

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

4	<i>Danaus genutia</i>	Stripped Tiger	Nymphalidae	LC
5	<i>Euploea core</i>	Common crow	Nymphalidae	LC

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

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

Aquatic fauna is referred to as any form of an animal that has adapted to living in the aquatic environments such as rivers, lakes, ponds, dams, streams, etc.). Son River and its adjoining streams are formed the drainage in the study area. Few other seasonal water bodies like village ponds, streams, and nallas are also present in the study area. In general, faunal account of any water bodies can be divided into following categories, *i.e.*,

- (i) Zooplankton,
- (ii) Macro-invertebrates/Insects/Benthos
- (iii) Fishes
- (iv) Amphibians/ Reptiles/ etc.

Details of Zooplankton; Macro-invertebrates/insects/benthos; Amphibians/Reptiles and Fishes recorded from the different water bodies of the study area (Patna 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 3.27 and Fig 3.12.

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

S.No.	Name of the Taxa	S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-8	Schedule Status in WPA (1972)	IUCN Status
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Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

	Protozoa										
1	<i>Arcella</i> sp.	+	+	+		+	+		+	NA	NA
2	<i>Arcella discoides</i>	+	+	+	+	+	+	+	+	NA	NA
3	<i>Arcella vulgaris</i>	+	+	+	+	+	+	+	+	NA	NA
4	<i>Centropyxis</i> sp.	+	+	+	+	+	+	+		NA	NA
5	<i>Centropyxis ecornis</i>		+			+	+		+	NA	NA
6	<i>Euglypha</i> sp.	+		+	+	+	+	+	+	NA	NA
7	<i>Metopus</i> sp.		+	+	+		+			NA	NA
8	<i>Opercularia</i> sp.	+	+	+		+			+	NA	NA
	Total	8	9	8	7	8	9	5	8		
	Rotifera										
1	<i>Anuraeopsis</i> sp.	+		+	+	+	+	+	+	NA	NA
2	<i>Anuraeopsis fissa</i>				+	+	+	+	+	NA	NA
3	<i>Asplanchna</i> sp.	+	+	+		+	+	+	+	NA	NA
4	<i>Asplanchna brightwelli</i>		+		+	+	+	+	+	NA	NA
5	<i>Brachionus</i> sp.	+		+	+	+	+	+		NA	NA
6	<i>Brachionus angularis</i>		+						+	NA	NA
7	<i>Brachionus calyciflorus</i>	+	+	+	+		+	+	+	NA	NA
8	<i>Brachionus quadridentata</i>		+	+	+		+	+		NA	NA
9	<i>Brachionus falcatus</i>	+			+	+	+	+		NA	NA
10	<i>Brachionus forficula</i>	+		+		+	+		+	NA	NA
11	<i>Cephalodella gibba</i>	+	+		+	+	+	+		NA	NA
12	<i>Filinia</i> sp.	+					+	+	+	NA	NA
13	<i>Filinia longiseta</i>		+	+		+		+	+	NA	NA
14	<i>Keratella</i> sp.	+		+		+			+	NA	NA
15	<i>Keratella Cochlearis</i>	+	+	+	+	+	+	+	+	NA	NA
16	<i>Monostyla quadridentatus</i>		+	+						NA	NA
17	<i>Mytilina</i> sp.	+			+	+	+	+	+	NA	NA
18	<i>Polyarthra vulgaris</i>	+		+		+			+	NA	NA
19	<i>Testudinella patina</i>		+		+		+	+		NA	NA
20	<i>Trichocerca</i> sp.	+		+		+	+		+	NA	NA
	Total	15	11	13	13	15	18	16	16		

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

	Cladocera										
1	<i>Alona</i> sp.	+	+	+	+	+	+	+	+	NA	NA
2	<i>Alona intermediate</i>		+		+		+	+		NA	NA
3	<i>Bosmina</i> sp.	+		+	+	+	+	+	+	NA	NA
4	<i>Bosmina longirostris</i>	+		+			+	+		NA	NA
5	<i>Ceriodaphnia</i> sp.		+	+		+	+		+	NA	NA
6	<i>Chydorus sphaericus</i>	+	+		+		+	+		NA	NA
7	<i>Daphnia</i> sp.	+		+	+		+	+		NA	NA
8	<i>Leydgia</i> sp.		+	+		+	+		+	NA	NA
9	<i>Moina daphnia</i>	+			+		+	+	+	NA	NA
10	<i>Simocephalus</i> sp.	+	+	+		+			+	NA	NA
	Total	9	7	8	7	6	11	8	7		
	Copepoda										
1	<i>Cyclops</i> sp.	+	+	+	+	+	+	+	+	NA	NA
2	<i>Diaptomus</i> sp.	+	+	+	+	+	+		+	NA	NA
3	<i>Eucyclops</i> sp.	+	+	+			+	+	+	NA	NA
4	<i>Heleodiptomus viduus</i>	+	+			+	+			NA	NA
5	<i>Mesocyclops</i> sp.	+	+		+		+	+	+	NA	NA
6	<i>Nauplius larvae</i>	+	+	+	+	+	+	+	+	NA	NA
7	<i>Neodiptomus</i> sp.		+		+		+		+	NA	NA
8	<i>Nitzii amphibia</i>	+	+	+	+	+	+	+		NA	NA
	Total	10	10	8	9	7	11	7	9		
	Ostracoda										
1	<i>Cyprinotus</i> sp.	+		+	+	+	+	+	+	NA	NA
2	<i>Cypris</i> sp.	+	+	+	+		+	+	+	NA	NA
3	<i>Stenocypris malcolmsoni</i>	+	+	+	+	+	+		+	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

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

have no backbone and can be seen with the naked eye. These animals generally include insects, crustaceans, mollusks, and annelids. They are significant within the food chain as larger animals such as fish and birds rely on them as a food source. None of the macro-invertebrate species have been observed under the of Rare, Endangered, and threatened category. Various macro-invertebrate species were collected and identified from the present study area and listed in Table 3.28.

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

Insecta											
1	<i>Baetis nymph</i>		+	+	+	+	+	+	+	NA	NE
2	<i>Caenid mayfly</i>	+			+		+			NA	NE
3	<i>Chironomus plumosus</i>	+	+	+	+	+	+	+	+	NA	NE
4	<i>Chironomus sp.</i>	+	+	+	+	+	+	+	+	NA	NE
5	<i>Damsel flies nymphs</i>	+			+		+			NA	NE
6	<i>Hirudineria sp.</i>	+	+	+			+	+	+	NA	NE
7	<i>Limnodrillus hoffmeisteri</i>	+					+			NA	NE
8	<i>Mayflies nymphs</i>		+		+		+	+	+	NA	NE
9	<i>Mosquitos larvae</i>	+	+	+	+	+	+	+	+	NA	NE
10	<i>Ranatra elongata</i>	+	+			+	+	+	+	NA	NE
	Total	12	10	10	11	9	16	11	11		
Mollusca											
1	<i>Bellamya bengalensis</i>	+		+	+	+	+	+	+	NA	NE
2	<i>Corbicula fluminalis</i>		+	+	+	+	+	+	+	NA	NE
3	<i>Corbicula sp.</i>	+	+	+	+	+	+			NA	NE
4	<i>Gyraulus convexus</i>	+		+			+	+	+	NA	NE
5	<i>Gyraulus sp.</i>	+	+		+	+	+		+	NA	NE
6	<i>Lymnaea acuminata</i>	+		+		+		+	+	NA	NE
7	<i>Lymnaea sp.</i>	+	+	+	+	+	+	+		NA	NE
8	<i>Melanoides lineatus</i>		+	+			+		+	NA	NE
9	<i>Pila globosa (apple snail)</i>		+		+		+		+	NA	NE
10	<i>Unio tigris</i>			+	+		+	+	+	NA	NE
	Total	9	8	12	10	8	13	9	11		
Source: Primary Survey data of P&M Solution, Noida.											

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

iii. Amphibians

Amphibians and reptiles are commonly found at places along the margin of aquatic and terrestrial systems. The presence of water bodies like rivers, streams, etc. in the study area are providing shelter to many amphibian species. Some of the commonly reported amphibian species in the present study areas are given in Table 3.29. None of the Amphibians and Reptiles have been observed under the Rare, Endangered, and threatened category. Also, none of them are under the Schedule-I category as per Wildlife Protection Act, 1972.

Table 3.29: Amphibians and Reptiles recorded from the Core and Buffer zone

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

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

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

(iii) Fishes

The study area of the present Project development project has several lentic and lotic water bodies in which few are perennial and most of the water bodies are seasonal or monsoon fed. Jammuaririver is a major lotic system in the study area. Some private ponds are also present in the study area which are mainly used for the culture of fishes. All these water bodies support fish species. Fishes found in the study area are listed in Table 3.30.

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

Table 3.30: Fish Fauna found in different seasonal and perennial water bodies in the study area

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

3.6.13 Observations of Present Study (Flora & Fauna)

3.6.13.1 Flora

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

3.6.13.2 Fauna

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

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

3.7 Socio-Economic Environment

Demography & Socio-Economic Features

Demography

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

Demography of the Patna District

As per the census records 2011, Patna district has a population of 5,838,465 persons followed by 3,078,512 males and 2,759,953 females respectively. Out of the total population of the district, about 43.0% population lived in urban areas while 57.0% live in rural areas. The decadal Variation of the district has been seen at 23.7% during the decade 2001-11. The Urban area of the district has attained a higher decadal Variation of 28.2% as compared to that of rural area at 20.6%.

As per 2011 census sex ratio of the district is 897 females per 1,000 males. The same for rural and urban areas of the district stands at 904 and 887 respectively. As per the census records 2011, the sex ratio of population in the age group 0-6, which works out to 909, is much higher than the sex ratio of the total population (897) in the district of Patna. While the sex ratio of (0-6) population in the rural areas of the district is 923, the sex ratio of (0-6) population for the urban areas is only 883.

The district occupies an area of 3,202 square kilometres. As per the census records 2011, it is observed that the proportion of scheduled castes and scheduled tribe's population to the total population of the district is found to be only 15.77 and 0.16% respectively. For rural areas,

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

the respective proportion of scheduled castes and scheduled tribes to the total population of the district comes out to be 19.98 and 0.06% respectively. Similarly, in urban areas, the percentage of scheduled castes and scheduled tribe's population to the total population of the district comes out to be 10.21 and 0.27% respectively.

It is also observed from the census records 2011, that the district has registered a literacy rate of 70.68%. As regards to rural and urban areas of the district the literacy rates have been registered 62.38 & 80.98% respectively. The gap in the male-female literacy rates has been 16.52% point as it is 78.48% male and 61.96% female respectively. For the district as a whole, the literacy rate of males is much higher than that of females.

Census data 2011 shows that the work participation rate (WPR) in the district is 23.49% for main workers and 8.75% for marginal workers. Proportion of non workers in the district is 67.77%.

Mother Tongue

Spoken language, which is medium of conversation, is an important attribute of population. The Census of India has been the richest source of language data collected and published during the successive decennial censuses over a century. During 2001 census, as in the previous censuses, the mother tongue as returned by each individual was collected.

The population of the Patna district during 2001 was 4,718,592. As per distribution of different mother tongues (languages mentioned under 8th Schedule of Constitution of India) as returned during the 2001 Census for Patna district, Hindi, the main mother tongue of the district was returned by 91.7% (43,26,641 persons) of the population. The corresponding percentage for the Urdu, the second most prominent language spoken in Patna district, was 6.5% (307,130 persons). Speakers of other Scheduled languages were very thin in number than the two described above.

Religion

The population of the Patna district during 2011 was 5,838,465. Hindus constitute 91.74% (5,356,075 persons) of the population in the district followed by Muslims 7.54% (439,952 persons). All other four major religious communities have almost negligible percentages

Methodology

In order to assess the Demographic & Socio-economic features along with the 10km distance based on field surveys and public consultations undertaken during the baseline field study

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

period and Census records 2011, for 3 major districts named Patna, Bhojpur and Arwal of Bihar state respectively was compiled and placed in the form of tabulation and graphical representation. Entire study area is observed predominantly rural except one town named Arwal (NP).

Purpose of the Study

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

Description of Social Environment

As per the Census Records 2011, the study area has a total of 156 villages and one town named Arwal (NP) / (25 wards) lying under Patna, Bhojpur and Arwal in Bihar state. Overall study area villages are falling mainly under Ten (10) tehsils namely Dulhin Bazar (05 villages) and Paliganj (40 villages) of Patna district, Koilwar (01 village), Sandesh (23 villages), Udwan Nagar (03 villages), Charpokhari (02 villages), Agiaon (34 villages) and Sahar (11 villages) of Bhojpur district, Arwal (16 villages & 01 town) and Karpi (10 villages) of Arwal district respectively in Bihar state. There are eleven (11) villages of 3 major districts named Patna, Bhojpur and Arwal in Bihar state found as uninhabited villages in the study area.

Population Distribution within 10 km radial Study Zone

As per the Census Records 2011, the total population of 10 km study zone was recorded as 3,88,354 persons of 156 villages/towns of 3 main districts named Patna, Bhojpur and Arwal in Bihar state. Male-female wise total population was recorded as 2,01,138 males (51.8%) and 1,87,216 (48.2%) females respectively.

Total number of 'Households' was observed as 63,428 in the 10 km radius study zone. Scheduled Caste ('SC') population was observed as 73,738 persons consisting of 37,875 males (51.4%) and 35,863 females (48.6%) in the 10 km study zone. Scheduled Tribes ('ST') population was also observed as 179 persons (0.05%) consisting of 82 males (45.8%) and 97 females (54.2%) in the 10 km study zone. The child population (0-6 Age) of the study area is recorded as 67,904 (17.5%) and comprising of 34,978 (51.5%) males & 32,926 (48.5%) females respectively.

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

Village wise details of population distribution are given as follows in **Table 3.31 & 3.32**

Table 3.31 : Village-wise Population Distribution (10km)

Name of Village/Town	No of Households	Total Population			Child Population (0-6 Years)		
		Persons	Male	Female	Persons	Male	Female
1. District Patna, Bihar							
Mahabalipur	485	3009	1574	1435	504	266	238
Baduri	158	895	447	448	146	76	70
Paipura Khurd	183	1088	553	535	205	115	90
Rajipur	765	4509	2315	2194	859	418	441
Saraiya	452	2670	1392	1278	581	310	271
Kalyanpur	517	3450	1866	1584	583	321	262
Jalpura	216	1570	828	742	245	140	105
Masaurha	442	2413	1203	1210	397	207	190
Udaipur	367	2130	1073	1057	391	191	200
Mohbalipur	1251	6863	3466	3397	1273	640	633
Mohabbatpur	110	634	336	298	117	54	63
Ranipur	258	1584	828	756	263	140	123
Fatehpur	276	1630	856	774	265	143	122
Hasanpur	62	269	128	141	40	20	20
Dariapur Pem	302	1697	880	817	290	142	148
Paipura Kalan	304	1783	877	906	295	137	158
Ijarta	186	1117	536	581	182	78	104
Dharahra	792	4538	2421	2117	673	354	319
Dariapur Anant	309	1791	919	872	281	148	133
Nirakpur Pali	1977	11798	6170	5628	2066	1091	975
Akhtiarpur Pali	614	3776	1970	1806	661	386	275
Kurkuri	701	4444	2248	2196	763	386	377
Bibipur	198	1157	576	581	192	103	89
Harpur Ankuri	581	2810	1342	1468	576	287	289
Sarsi	385	2471	1293	1178	401	225	176
Muhammadpur	264	1452	751	701	262	128	134
Mohibalipur Chak	Uninhabited Village						
Habsapur	103	712	370	342	120	66	54
Pipardaha	652	4007	2055	1952	792	395	397
Belaunra	550	3078	1617	1461	500	274	226
Kansopur	197	1393	726	667	262	144	118
Bela	240	1729	887	842	283	149	134
Korra	691	4249	2159	2090	699	345	354
Lakhnipur	195	1196	623	573	209	107	102
Akbarpur	682	4399	2330	2069	665	342	323
Ajda	209	1010	505	505	158	82	76
Thakuri	205	1271	671	600	197	110	87
Sikaria	916	4768	2444	2324	910	471	439
Sedura	261	1787	900	887	334	163	171
Taranpur	290	1777	905	872	355	161	194
Chauri	153	917	472	445	157	81	76
Banauli Buzurg	114	687	384	303	99	48	51
Banauli Khurd	369	2288	1143	1145	460	237	223

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

Khiri	173	1107	588	519	173	96	77
Hemanpur	145	867	431	436	145	59	86
Khanpura	312	1597	841	756	315	169	146
Mankurha	278	1799	912	887	298	164	134
Torni	250	1363	674	689	298	133	165
Rampur Nagwan	710	4535	2348	2187	827	428	399
Mera	418	2449	1254	1195	441	232	209
Nirakhpur	283	1621	860	761	280	170	110
Patauna	341	2184	1115	1069	376	182	194
Katka	352	2273	1189	1084	471	242	229
Kudihra	148	1042	551	491	194	103	91
Mangila	583	3037	1515	1522	642	325	317
2. District Bhojpur, Bihar							
Makhdumpur	Uninhabited Village						
Sandesh	1037	6874	3573	3301	1219	616	603
Panpura	54	483	255	228	82	35	47
Kanharpur	209	1319	729	590	182	110	72
Chela	377	2139	1115	1024	365	188	177
Panrepur	97	594	335	259	66	36	30
Basauri	69	484	254	230	74	38	36
Bara 2	171	997	514	483	166	92	74
Bartiar	305	1788	942	846	330	184	146
Kosdihra	116	766	394	372	149	74	75
Kori	1067	6821	3434	3387	1208	589	619
Baranhpur	18	84	45	39	12	7	5
Khandaul	846	5179	2686	2493	791	429	362
Phulari	762	5036	2682	2354	762	387	375
Bhatauli	431	2482	1324	1158	345	169	176
Chanchar	Uninhabited Village						
Raman Sanrh	837	5613	3003	2610	890	478	412
Patkhaulia	85	552	273	279	103	54	49
Pinjroi	110	689	334	355	112	58	54
Mahadeopur	Uninhabited Village						
Ahiman Chak	230	1457	736	721	282	131	151
Khemkaranpur	Uninhabited Village						
Baga	472	2697	1316	1381	473	243	230
Bhikham Chak	8	39	16	23	7	2	5
Dariapur	267	1751	931	820	283	132	151
Kalyanpur	174	1118	572	546	218	107	111
Ekauna	540	3558	1886	1672	587	305	282
Thakuri	325	2096	1065	1031	361	181	180
Chakiya	Uninhabited Village						
Bhaluni	262	1872	1012	860	361	210	151
Seothara	161	978	496	482	145	76	69
Muradpur	159	1195	601	594	170	82	88
Chhaprapur	334	2158	1092	1066	380	188	192
Dihra	106	981	505	476	175	88	87
Mahpur	Uninhabited Village						
Chansi	624	3810	2005	1805	662	362	300
Banauli	448	2441	1301	1140	365	197	168
Keshwarpur	111	833	435	398	116	52	64
Ekauna	163	1077	555	522	211	111	100

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

Isarpura	108	714	376	338	117	53	64
Paswan	590	3490	1863	1627	603	311	292
Ahila	407	2477	1280	1197	488	245	243
Kheri	248	1706	858	848	330	160	170
Bargaon	1711	10748	5650	5098	1873	942	931
Megharia	227	1278	599	679	260	133	127
Kamaria	271	2004	1029	975	330	170	160
Kirkiri	686	4247	2194	2053	785	398	387
Dundhua	Uninhabited Village						
Barhampur Mehdanra	511	3044	1568	1476	473	252	221
Chilhar	685	4188	2221	1967	711	379	332
Tara Chak	256	1748	927	821	283	153	130
Karbasin	450	2846	1450	1396	566	291	275
Gordiha	166	1218	641	577	189	92	97
Amarpur	Uninhabited Village						
Nadhi	511	3469	1845	1624	579	316	263
Nonaaur	744	4691	2469	2222	820	433	387
Muzaffarpur	149	1450	779	671	241	134	107
Madhopur	87	591	308	283	119	65	54
Sewantha	307	1992	1012	980	328	178	150
Kharaich	155	1212	616	596	205	92	113
Dhobha	271	1713	877	836	310	150	160
Rudarpur	64	434	221	213	77	33	44
Ekauni	44	269	126	143	55	24	31
Bajrean	283	2160	1125	1035	373	203	170
Baruhi	1210	7021	3673	3348	1217	615	602
Inurkhi	384	2492	1271	1221	473	238	235
Kunrwa	71	463	252	211	45	23	22
Newada	306	2005	1044	961	319	156	163
Bansi Dehri	304	1472	699	773	238	114	124
Dehri	397	2452	1242	1210	443	230	213
Peur	401	2080	1016	1064	399	201	198
Peur Chak	Uninhabited Village						
Patrihan	249	1570	771	799	312	152	160
Kaul Dehri	937	5740	2951	2789	1007	514	493
3. District Arwal, Bihar							
Koriam	703	3935	1994	1941	728	349	379
Bara	199	998	522	476	109	64	45
Satpura	233	1307	665	642	161	77	84
Konika	370	1964	1034	930	405	212	193
Sonbarsa	849	4994	2605	2389	844	442	402
Sakri	436	2561	1351	1210	351	182	169
Sonbarsa Makbulpur Alauddin	221	1199	620	579	216	104	112
Aslampur Dullah	Uninhabited Village						
Bhusura	282	1665	869	796	304	160	144
Bhadasi	743	4675	2449	2226	834	432	402
Gaddopur	390	2474	1275	1199	518	254	264
Madanpur Dhawa	94	598	302	296	107	47	60
Makbulpur Raja	309	1891	941	950	344	179	165
Bhermpur Khapura	41	198	102	96	31	17	14
Rampur	150	1061	547	514	165	88	77
Fakharpur	542	3120	1540	1580	541	277	264

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

Arwal (NP)/25 Wards	8453	51849	27077	24772	9194	4754	4440
Patak Chak	86	603	339	264	113	62	51
Aiyara	1173	7815	4034	3781	1334	657	677
Larua	62	379	195	184	80	39	41
Purainia Ruknuddin	222	1261	631	630	244	110	134
Purainia Shekha	334	2133	1134	999	361	199	162
Latifpur Paraha	274	1487	778	709	307	158	149
Lodipur	162	1066	543	523	235	126	109
Nagawan	430	2383	1277	1106	417	232	185
Tekari	209	1477	798	679	287	167	120
Jhunathi	321	1626	830	796	283	145	138
TOTAL (10km)	63428	388354	201138	187216	67904	34978	32926
<i>Source-Census of India, 2011</i>							

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

Name of Village/Town	Total Population	Scheduled Castes			Scheduled Tribes		
		Persons	Males	Females	Persons	Males	Females
1. District Patna, Bihar							
Mahabalipur	3009	479	235	244	0	0	0
Baduri	895	96	48	48	0	0	0
Paipura Khurd	1088	253	129	124	0	0	0
Rajipur	4509	1281	654	627	0	0	0
Saraiya	2670	984	525	459	0	0	0
Kalyanpur	3450	329	177	152	0	0	0
Jalpura	1570	91	45	46	0	0	0
Masaurha	2413	600	310	290	0	0	0
Udaipur	2130	75	44	31	0	0	0
Mohbalipur	6863	1729	878	851	2	2	0
Mohabbatpur	634	0	0	0	0	0	0
Ranipur	1584	198	110	88	1	1	0
Fatehpur	1630	803	413	390	1	0	1
Hasanpur	269	54	23	31	0	0	0
Dariapur Pem	1697	853	438	415	1	0	1
Paipura Kalan	1783	307	151	156	0	0	0
Ijarta	1117	374	160	214	0	0	0
Dharahra	4538	436	229	207	1	0	1
Dariapur Anant	1791	438	229	209	0	0	0
Nirakpur Pali	11798	1814	936	878	1	0	1
Akhtiarpur Pali	3776	341	172	169	0	0	0
Kurkuri	4444	563	284	279	0	0	0
Bibipur	1157	320	158	162	0	0	0
Harpur Ankuri	2810	834	402	432	1	1	0
Sarsi	2471	597	318	279	0	0	0
Muhammadpur	1452	148	76	72	0	0	0
Mohibalipur Chak	Uninhabited Village						
Habsapur	712	49	26	23	0	0	0
Pipardaha	4007	1484	756	728	1	1	0
Belaunra	3078	757	406	351	0	0	0
Kansopur	1393	96	46	50	0	0	0

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

Bela	1729	36	17	19	0	0	0
Korra	4249	953	485	468	0	0	0
Lakhnipur	1196	446	229	217	1	0	1
Akbarpur	4399	858	428	430	0	0	0
Ajda	1010	237	117	120	0	0	0
Thakuri	1271	534	281	253	0	0	0
Sikaria	4768	1542	766	776	1	0	1
Sedura	1787	197	93	104	0	0	0
Taranpur	1777	836	425	411	1	1	0
Chauri	917	184	98	86	1	0	1
Banauli Buzurg	687	74	37	37	0	0	0
Banauli Khurd	2288	798	400	398	4	1	3
Khiri	1107	221	119	102	0	0	0
Hemanpur	867	0	0	0	0	0	0
Khanpura	1597	630	320	310	0	0	0
Mankurha	1799	283	156	127	4	2	2
Torni	1363	180	87	93	0	0	0
Rampur Nagwan	4535	534	277	257	6	2	4
Mera	2449	588	305	283	0	0	0
Nirakhpur	1621	332	177	155	1	1	0
Patauna	2184	909	466	443	1	1	0
Katka	2273	153	75	78	0	0	0
Kudihra	1042	75	43	32	0	0	0
Mangila	3037	818	408	410	0	0	0
2. District Bhojpur, Bihar							
Makhdumpur	Uninhabited Village						
Sandesh	6874	1826	929	897	1	0	1
Panpura	483	0	0	0	0	0	0
Kanharpur	1319	96	51	45	0	0	0
Chela	2139	723	399	324	0	0	0
Panrepur	594	0	0	0	0	0	0
Basauri	484	0	0	0	0	0	0
Bara 2	997	0	0	0	0	0	0
Bartiar	1788	402	214	188	0	0	0
Kosdihra	766	0	0	0	0	0	0
Kori	6821	1098	554	544	0	0	0
Baranhpur	84	0	0	0	0	0	0
Khandaul	5179	231	115	116	0	0	0
Phulari	5036	586	297	289	0	0	0
Bhatauli	2482	540	275	265	0	0	0
Chanchar	Uninhabited Village						
Raman Sanrh	5613	887	476	411	0	0	0
Patkhaulia	552	257	126	131	0	0	0
Pinjroi	689	0	0	0	0	0	0
Mahadeopur	Uninhabited Village						
Ahiman Chak	1457	77	44	33	0	0	0
Khemkaranpur	Uninhabited Village						
Baga	2697	295	140	155	0	0	0
Bhikham Chak	39	0	0	0	0	0	0
Dariapur	1751	310	160	150	0	0	0
Kalyanpur	1118	394	190	204	0	0	0
Ekauna	3558	765	405	360	0	0	0

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

Thakuri	2096	174	82	92	0	0	0
Chakiya	Uninhabited Village						
Bhaluni	1872	88	50	38	0	0	0
Seothara	978	359	170	189	0	0	0
Muradpur	1195	428	222	206	3	2	1
Chhaprapur	2158	134	72	62	0	0	0
Dihra	981	0	0	0	0	0	0
Mahpur	Uninhabited Village						
Chansi	3810	254	126	128	0	0	0
Banauli	2441	450	239	211	0	0	0
Keshwarpur	833	0	0	0	0	0	0
Ekauna	1077	352	179	173	0	0	0
Isarpura	714	0	0	0	0	0	0
Paswan	3490	871	453	418	0	0	0
Ahila	2477	360	190	170	0	0	0
Kheri	1706	138	75	63	0	0	0
Bargaon	10748	987	531	456	1	0	1
Megharia	1278	122	61	61	0	0	0
Kamaria	2004	98	49	49	0	0	0
Kirkiri	4247	201	102	99	0	0	0
Dundhua	Uninhabited Village						
Barhampur Mehdanra	3044	416	210	206	0	0	0
Chilhar	4188	1095	577	518	0	0	0
Tara Chak	1748	296	148	148	0	0	0
Karbasin	2846	693	348	345	1	0	1
Gordiha	1218	235	115	120	0	0	0
Amarpur	Uninhabited Village						
Nadhi	3469	884	481	403	0	0	0
Nonaur	4691	917	481	436	11	7	4
Muzaffarpur	1450	292	159	133	0	0	0
Madhopur	591	107	58	49	1	0	1
Sewantha	1992	494	250	244	0	0	0
Kharaich	1212	284	132	152	1	1	0
Dhobha	1713	231	116	115	0	0	0
Rudarpur	434	0	0	0	0	0	0
Ekauni	269	0	0	0	0	0	0
Bajrean	2160	112	59	53	0	0	0
Baruhi	7021	1973	1037	936	0	0	0
Inurkhi	2492	851	439	412	0	0	0
Kunrwa	463	0	0	0	0	0	0
Newada	2005	478	250	228	0	0	0
Bansi Dehri	1472	631	299	332	13	6	7
Dehri	2452	850	431	419	0	0	0
Peur	2080	402	206	196	0	0	0
Peur Chak	Uninhabited Village						
Patrihan	1570	199	105	94	0	0	0
Kaul Dehri	5740	1034	541	493	0	0	0
3. District Arwal, Bihar							
Koriam	3935	1109	560	549	0	0	0
Bara	998	105	48	57	0	0	0
Satpura	1307	196	89	107	0	0	0
Konika	1964	848	436	412	0	0	0

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

Sonbarsa	4994	910	485	425	1	1	0
Sakri	2561	958	499	459	0	0	0
Sonbarsa Makbulpur Alauddin	1199	119	65	54	21	12	9
Aslampur Dullah	Uninhabited Village						
Bhusura	1665	129	65	64	0	0	0
Bhadasi	4675	1008	518	490	2	0	2
Gaddopur	2474	766	383	383	0	0	0
Madanpur Dhawa	598	16	8	8	0	0	0
Makbulpur Raja	1891	99	47	52	0	0	0
Bhermpur Khapura	198	0	0	0	0	0	0
Rampur	1061	0	0	0	0	0	0
Fakharpur	3120	775	391	384	8	3	5
Arwal (NP)/25 Wards	51849	9599	4949	4650	78	34	44
Patak Chak	603	0	0	0	0	0	0
Aiyara	7815	510	243	267	4	0	4
Laraua	379	74	37	37	0	0	0
Purainia Ruknuddin	1261	442	231	211	3	2	1
Purainia Shekha	2133	173	88	85	0	0	0
Latifpur Paraha	1487	483	255	228	0	0	0
Lodipur	1066	58	33	25	0	0	0
Nagawan	2383	719	386	333	0	0	0
Tekari	1477	250	140	110	1	1	0
Jhunathi	1626	614	314	300	0	0	0
TOTAL (10km)	388354	73738	37875	35863	179	82	97
<i>Source-Census of India, 2011</i>							

Sex Ratio

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

The '*Sex Ratio*' was observed as 897 females per 1000 males in the District. The same was recorded as 931 females for every 1000 males in the study area. The child (0-6 yr age) sex ratio of the study area was observed as 941 female children per 1000 male children.

The village wise male-female population distribution for the study area is depicted and shown by graphical representation in **Table 3.33 & Figure 3.7**

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

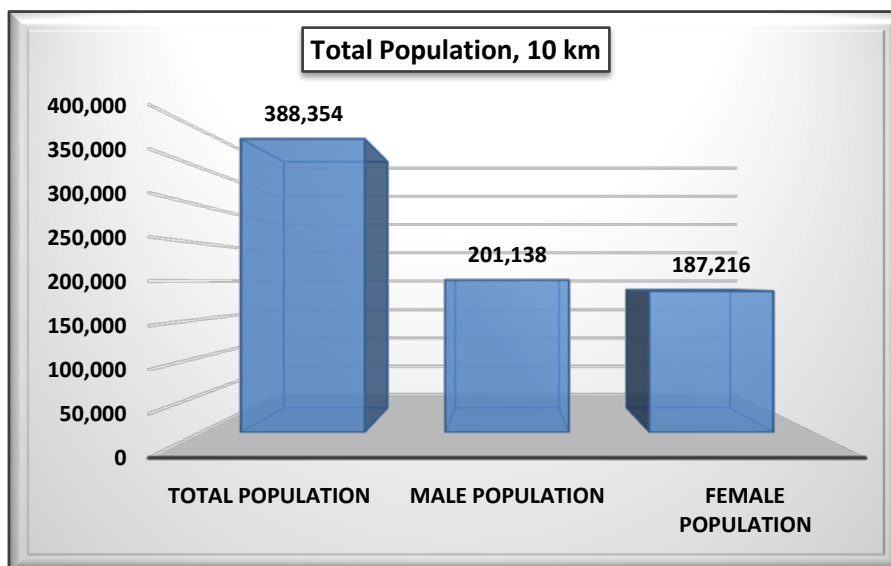
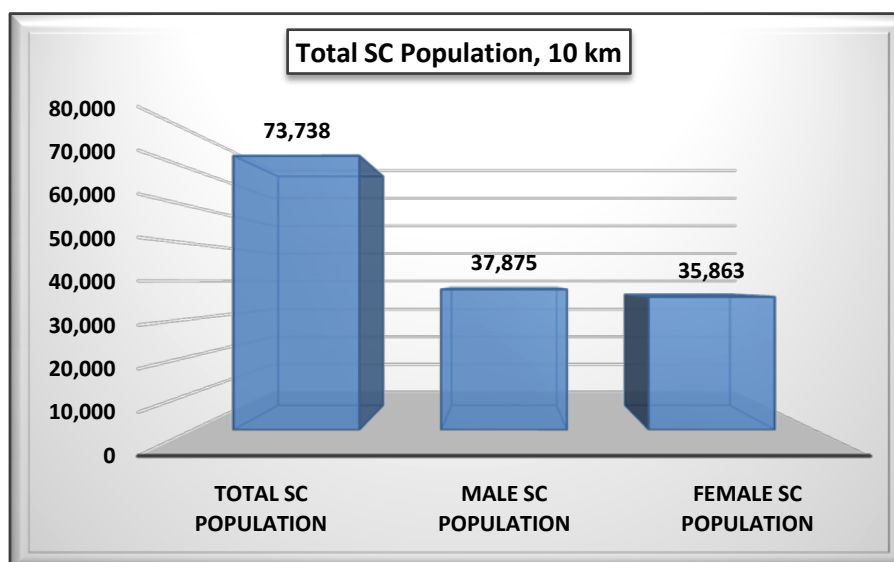


Figure3.7: Male-Female Wise Population Distribution

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 73,738 persons consisting of 37,875 males and 35,863 females respectively in the study area which accounts as 19.0% to the total population (3,88,354 persons) of the study area. Scheduled Tribes (‘ST’) population was observed as 179 persons, accounts as 0.05% to the total population of the study zone consisting of 82 males and 97 females in the 10 km radius study zone. It implies that the rest 81.0% 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.



Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

Figure 3.8: Scheduled Caste Population in the Study Area

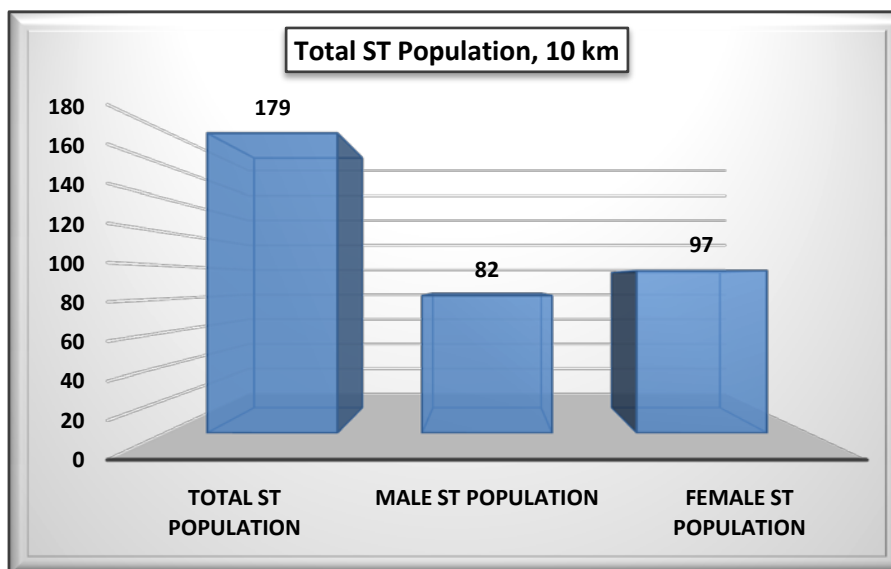


Figure 3.9: Scheduled Tribes Population in the Study Area

Literacy Rate

Literacy level is quantifiable indicator to assess the development status of an area or region. Male-Female wise literates and illiterate's population is represented in **Table 3.33** Total literate's population was recorded as 2,20,099 persons (56.7%) in the study area. **Table 3.33** reveals that Male-Female wise literates are observed as 1,34,263 & 85,836 persons respectively, implies that the 'Literacy Rate' is recorded as 56.6% with male-female wise percentages being 34.6% & 22.0% respectively.

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

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

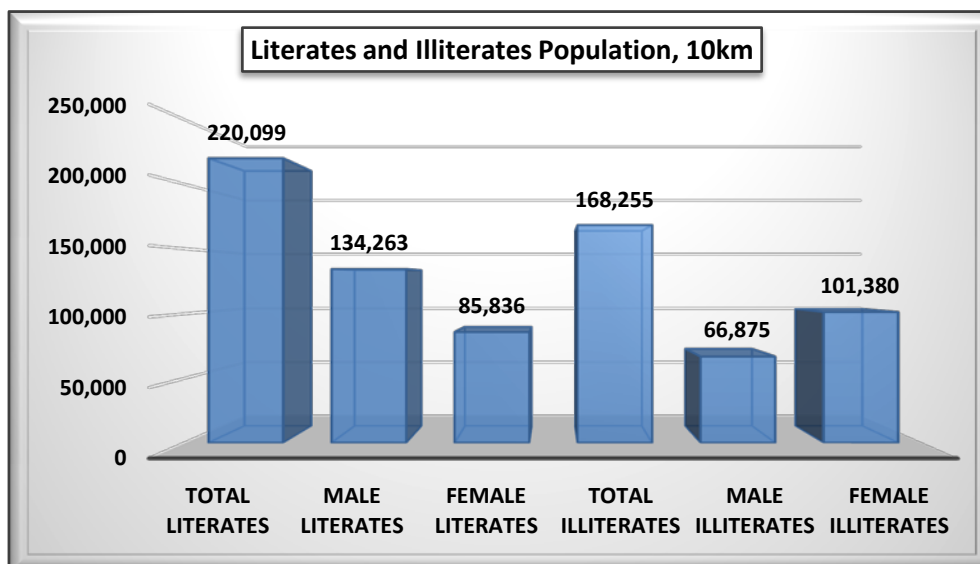


Figure3.10: Male-Female Wise Distribution of Literates & Illiterates

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

Name of Village/Town	Total Population	Literates			Illiterates		
		Persons	Males	Females	Persons	Males	Females
1. District Patna, Bihar							
Mahabalipur	3009	1813	1095	718	1196	479	717
Baduri	895	500	303	197	395	144	251
Paipura Khurd	1088	637	366	271	451	187	264
Rajipur	4509	2403	1489	914	2106	826	1280
Saraiya	2670	1099	697	402	1571	695	876
Kalyanpur	3450	1731	1136	595	1719	730	989
Jalpura	1570	1085	622	463	485	206	279
Masaurha	2413	1425	831	594	988	372	616
Udaipur	2130	1066	693	373	1064	380	684
Mohbalipur	6863	3804	2316	1488	3059	1150	1909
Mohabbatpur	634	342	243	99	292	93	199
Ranipur	1584	917	555	362	667	273	394
Fatehpur	1630	842	513	329	788	343	445
Hasanpur	269	133	83	50	136	45	91
Dariapur Pem	1697	720	481	239	977	399	578
Paipura Kalan	1783	1031	620	411	752	257	495
Ijarta	1117	557	320	237	560	216	344
Dharahra	4538	3024	1771	1253	1514	650	864
Dariapur Anant	1791	1095	642	453	696	277	419
Nirakpur Pali	11798	6962	4033	2929	4836	2137	2699
Akhtiarpur Pali	3776	2360	1382	978	1416	588	828
Kurkuri	4444	2692	1596	1096	1752	652	1100
Bibipur	1157	704	420	284	453	156	297
Harpur Ankuri	2810	1381	813	568	1429	529	900
Sarsi	2471	1549	939	610	922	354	568
Muhammadpur	1452	656	411	245	796	340	456
Mohibalipur Chak	Uninhabited Village						
Habsapur	712	460	263	197	252	107	145

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

Pipardaha	4007	1851	1205	646	2156	850	1306
Belaunra	3078	1656	1008	648	1422	609	813
Kansopur	1393	708	445	263	685	281	404
Bela	1729	988	601	387	741	286	455
Korra	4249	2521	1487	1034	1728	672	1056
Lakhnipur	1196	561	340	221	635	283	352
Akbarpur	4399	2781	1673	1108	1618	657	961
Ajda	1010	579	349	230	431	156	275
Thakuri	1271	736	444	292	535	227	308
Sikaria	4768	2561	1523	1038	2207	921	1286
Sedura	1787	1123	636	487	664	264	400
Taranpur	1777	828	535	293	949	370	579
Chauri	917	472	309	163	445	163	282
Banauli Buzurg	687	534	310	224	153	74	79
Banauli Khurd	2288	1151	638	513	1137	505	632
Khiri	1107	644	401	243	463	187	276
Hemanpur	867	379	258	121	488	173	315
Khanpura	1597	664	403	261	933	438	495
Mankurha	1799	934	567	367	865	345	520
Torni	1363	575	385	190	788	289	499
Rampur Nagwan	4535	2230	1410	820	2305	938	1367
Mera	2449	1195	704	491	1254	550	704
Nirakhpur	1621	823	524	299	798	336	462
Patauna	2184	1257	727	530	927	388	539
Katka	2273	1377	791	586	896	398	498
Kudihra	1042	630	398	232	412	153	259
Mangila	3037	1206	764	442	1831	751	1080
2. District Bhojpur, Bihar							
Makhdumpur	Uninhabited Village						
Sandesh	6874	4021	2453	1568	2853	1120	1733
Panpura	483	304	196	108	179	59	120
Kanharpur	1319	866	520	346	453	209	244
Chela	2139	1037	672	365	1102	443	659
Panrepur	594	176	132	44	418	203	215
Basauri	484	316	201	115	168	53	115
Bara 2	997	678	393	285	319	121	198
Bartiar	1788	1009	640	369	779	302	477
Kosdihra	766	353	246	107	413	148	265
Kori	6821	3549	2261	1288	3272	1173	2099
Baranhpur	84	59	38	21	25	7	18
Khandaul	5179	2624	1657	967	2555	1029	1526
Phulari	5036	3194	1990	1204	1842	692	1150
Bhatauli	2482	1427	928	499	1055	396	659
Chanchar	Uninhabited Village						
Raman Sanrh	5613	3301	2080	1221	2312	923	1389
Patkhaulia	552	318	189	129	234	84	150
Pinjroi	689	436	240	196	253	94	159
Mahadeopur	Uninhabited Village						
Ahiman Chak	1457	727	475	252	730	261	469
Khemkaranpur	Uninhabited Village						
Baga	2697	1668	948	720	1029	368	661

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

Bhikham Chak	39	20	9	11	19	7	12
Dariapur	1751	1153	713	440	598	218	380
Kalyanpur	1118	678	410	268	440	162	278
Ekauna	3558	2251	1395	856	1307	491	816
Thakuri	2096	1195	757	438	901	308	593
Chakiya	Uninhabited Village						
Bhaluni	1872	1028	681	347	844	331	513
Seothara	978	490	284	206	488	212	276
Muradpur	1195	812	483	329	383	118	265
Chhaprapur	2158	1238	773	465	920	319	601
Dihra	981	524	351	173	457	154	303
Mahpur	Uninhabited Village						
Chansi	3810	1949	1267	682	1861	738	1123
Banauli	2441	1334	859	475	1107	442	665
Keshwarpur	833	461	325	136	372	110	262
Ekauna	1077	634	396	238	443	159	284
Isarpura	714	438	293	145	276	83	193
Paswan	3490	1935	1212	723	1555	651	904
Ahila	2477	1261	810	451	1216	470	746
Kheri	1706	1041	629	412	665	229	436
Bargaon	10748	5758	3670	2088	4990	1980	3010
Megharia	1278	711	401	310	567	198	369
Kamaria	2004	1085	696	389	919	333	586
Kirkiri	4247	2532	1498	1034	1715	696	1019
Dundhua	Uninhabited Village						
Barhampur Mehdanra	3044	1553	958	595	1491	610	881
Chilhar	4188	2377	1437	940	1811	784	1027
Tara Chak	1748	998	637	361	750	290	460
Karbasin	2846	1563	953	610	1283	497	786
Gordiha	1218	589	402	187	629	239	390
Amarpur	Uninhabited Village						
Nadhi	3469	1911	1253	658	1558	592	966
Nonaur	4691	2639	1645	994	2052	824	1228
Muzaffarpur	1450	864	545	319	586	234	352
Madhopur	591	321	210	111	270	98	172
Sewantha	1992	1335	745	590	657	267	390
Kharaich	1212	787	473	314	425	143	282
Dhobha	1713	818	513	305	895	364	531
Rudarpur	434	275	160	115	159	61	98
Ekauni	269	112	71	41	157	55	102
Bajrean	2160	1192	793	399	968	332	636
Baruhi	7021	3579	2184	1395	3442	1489	1953
Inurkhi	2492	1326	847	479	1166	424	742
Kunrwa	463	266	173	93	197	79	118
Newada	2005	1215	769	446	790	275	515
Bansi Dehri	1472	812	455	357	660	244	416
Dehri	2452	1434	838	596	1018	404	614
Peur	2080	975	573	402	1105	443	662
Peur Chak	Uninhabited Village						
Patrihan	1570	856	519	337	714	252	462
Kaul Dehri	5740	3106	1866	1240	2634	1085	1549

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

3. District Arwal, Bihar

Koriam	3935	2196	1368	828	1739	626	1113
Bara	998	778	442	336	220	80	140
Satpura	1307	848	507	341	459	158	301
Konika	1964	1008	634	374	956	400	556
Sonbarsa	4994	3144	1855	1289	1850	750	1100
Sakri	2561	1762	1069	693	799	282	517
Sonbarsa Makbulpur Alauddin	1199	609	393	216	590	227	363
Aslampur Dullah	Uninhabited Village						
Bhusura	1665	1002	641	361	663	228	435
Bhadasi	4675	2693	1631	1062	1982	818	1164
Gaddopur	2474	1284	817	467	1190	458	732
Madanpur Dhawa	598	312	210	102	286	92	194
Makbulpur Raja	1891	975	560	415	916	381	535
Bhermpur Khapura	198	95	64	31	103	38	65
Rampur	1061	667	407	260	394	140	254
Fakharpur	3120	1682	966	716	1438	574	864
Arwal (NP)/25 Wards	51849	32116	19012	13104	19733	8065	11668
Patak Chak	603	314	211	103	289	128	161
Aiyara	7815	4909	2896	2013	2906	1138	1768
Laraua	379	113	74	39	266	121	145
Purainia Ruknuddin	1261	615	417	198	646	214	432
Purainia Shekha	2133	1243	782	461	890	352	538
Latifpur Paraha	1487	698	437	261	789	341	448
Lodipur	1066	565	330	235	501	213	288
Nagawan	2383	1405	880	525	978	397	581
Tekari	1477	734	487	247	743	311	432
Jhunathi	1626	886	515	371	740	315	425
TOTAL (10km)	388354	220099	134263	85836	168255	66875	101380

Source-Census of India, 2011

Economic Profile of Patna District:

Patna has long been a major agricultural hub and centre of trade. Its most active exports are grain, sugarcane, sesame, and medium-grained Patna rice. There are several sugar mills in and around Patna. It is an important business and luxury brand centre of eastern India.

The economy of Patna has seen sustained economic growth since 2005. The economy has been spurred by growth in the Fast-Moving Consumer Goods industry, the service sector, along with Green revolution businesses. In 2009, the World Bank stated Patna as the second best city in India to start up a business. As of 2015, GDP per capita of Patna is ₹1,06,000 and its GDP growth rate is 7.29 per cent.

Patna is the 21st fastest growing city in the world, and the fifth fastest growing city in India, and is expected to grow at an average annual rate of 3.72%.

Workers Scenario:



Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

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 86,452(22.0%) and 42,070(11.0%) to the total population (3,88,354), while the remaining 2,59,832(67.0%) persons were recorded as non-workers. Thus it implies that the semi-skilled and non-skilled work-force required in study area for the project is available in aplenty.

The village-wise main and marginal worker's population with further classification as casual, agricultural, households and other workers is shown as follows in **Table 3.34**

Chapter-III**BASELINE DATA DESCRIPTION**

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

Table 3.34 :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 Patna, Bihar										
Mahabalipur	904	452	239	126	87	209	16	155	18	20
Baduri	227	10	46	0	171	49	14	10	3	22
Paipura Khurd	552	302	204	32	14	77	1	34	26	16
Rajipur	1230	39	287	4	900	387	32	281	9	65
Saraiya	845	385	399	19	42	138	10	87	23	18
Kalyanpur	877	155	665	1	56	318	11	236	1	70
Jalpura	166	89	20	1	56	240	160	42	1	37
Masaurha	404	183	137	22	62	597	98	360	70	69
Udaipur	240	48	64	33	95	542	38	436	39	29
Mohbalipur	993	386	249	52	306	967	94	725	51	97
Mohabbatpur	93	80	6	0	7	27	17	9	0	1
Ranipur	402	126	201	4	71	130	26	82	1	21
Fatehpur	304	28	230	5	41	331	1	316	5	9
Hasanpur	38	17	13	0	8	52	8	41	0	3
Dariapur Pem	354	84	221	12	37	481	35	245	13	188
Paipura Kalan	540	211	298	1	30	10	8	2	0	0
Ijarta	178	35	87	8	48	216	2	207	2	5
Dharahra	1175	227	323	37	588	302	40	135	67	60
Dariapur Anant	506	321	160	3	22	98	56	41	1	0
Nirakpur Pali	2627	237	478	171	1741	1047	93	412	25	517
Akhtiarpur Pali	772	250	291	94	137	419	62	194	40	123
Kurkuri	1198	529	543	1	125	107	11	77	0	19
Bibipur	252	57	88	1	106	105	5	96	0	4
Harpur Ankuri	587	257	193	1	136	370	17	279	0	74
Sarsi	672	232	326	7	107	33	13	7	0	13
Muhammadpur	226	31	186	2	7	86	48	18	9	11
Mohibalipur Chak	Uninhabited Village									
Habsapur	381	72	273	1	35	10	5	1	0	4
Pipardaha	870	204	604	1	61	517	67	409	13	28
Belaunra	634	325	253	7	49	695	7	621	36	31
Kansopur	313	156	133	3	21	18	0	11	0	7
Bela	117	26	60	8	23	837	39	319	418	61
Korra	1098	291	640	25	142	414	13	336	28	37
Lakhnipur	362	83	247	22	10	31	4	25	1	1
Akbarpur	1520	360	866	40	254	271	13	198	14	46
Ajda	237	80	149	4	4	9	1	7	1	0
Thakuri	307	73	200	3	31	10	1	4	2	3
Sikaria	1109	369	644	6	90	337	42	287	6	2
Sedura	186	53	110	4	19	505	19	442	21	23

Chapter-III**BASELINE DATA DESCRIPTION**

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

Taranpur	297	69	192	4	32	298	8	284	0	6
Chauri	173	31	124	0	18	103	2	99	1	1
Banauli Buzurg	230	4	204	0	22	36	1	33	0	2
Banauli Khurd	653	24	515	3	111	139	14	112	7	6
Khiri	259	16	211	2	30	7	1	2	0	4
Hemanpur	386	11	369	2	4	108	3	101	0	4
Khanpura	445	139	251	0	55	4	1	1	1	1
Mankurha	476	100	315	17	44	184	50	132	1	1
Torni	360	80	249	7	24	54	2	51	1	0
Rampur Nagwan	731	184	474	2	71	944	145	730	26	43
Mera	826	175	601	0	50	50	3	24	1	22
Nirakhpur	519	7	444	14	54	345	154	186	0	5
Patauna	831	235	476	7	113	38	6	24	4	4
Katka	438	92	43	9	294	51	3	11	5	32
Kudihra	378	4	295	3	76	3	0	2	1	0
Mangila	735	167	267	10	291	262	74	158	5	25
2. District Bhojpur, Bihar										
Makhdumpur	Uninhabited Village									
Sandesh	1591	106	507	344	634	684	42	290	66	286
Panpura	123	1	111	0	11	5	0	4	0	1
Kanharpur	240	68	105	0	67	109	10	72	0	27
Chela	368	186	113	3	66	365	135	212	4	14
Panrepur	138	24	80	17	17	16	6	2	2	6
Basauri	128	95	32	0	1	0	0	0	0	0
Bara 2	329	144	93	54	38	53	0	6	38	9
Bartiar	539	132	163	158	86	211	14	119	23	55
Kosdihra	154	125	8	0	21	38	4	30	1	3
Kori	2100	166	1545	52	337	154	4	131	4	15
Baranhpur	15	8	5	0	2	11	2	9	0	0
Khandaul	783	329	331	7	116	767	26	632	11	98
Phulari	912	150	515	5	242	658	200	294	11	153
Bhatauli	239	39	147	20	33	335	27	276	11	21
Chanchar	Uninhabited Village									
Raman Sanrh	1313	452	596	77	188	549	124	171	36	218
Patkhaulia	113	30	70	0	13	5	0	2	1	2
Pinjroi	126	79	18	0	29	0	0	0	0	0
Mahadeopur	Uninhabited Village									
Ahiman Chak	223	37	91	46	49	269	14	208	17	30
Khemkaranpur	Uninhabited Village									
Baga	233	12	123	3	95	328	66	232	9	21
Bhikham Chak	4	0	2	0	2	5	1	2	0	2
Dariapur	392	101	128	10	153	51	4	35	0	12
Kalyanpur	197	43	114	0	40	44	2	38	0	4
Ekauna	715	257	274	16	168	48	21	17	2	8
Thakuri	283	255	6	13	9	467	8	362	43	54

Chapter-III**BASELINE DATA DESCRIPTION**

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

Chakiya	Uninhabited Village									
Bhaluni	413	26	244	27	116	494	10	264	100	120
Seothara	42	22	7	1	12	354	64	256	1	33
Muradpur	27	15	3	0	9	419	3	381	2	33
Chhaprapur	622	153	353	14	102	35	5	7	5	18
Dihra	28	20	2	1	5	282	79	195	3	5
Mahpur	Uninhabited Village									
Chansi	1472	582	843	15	32	184	112	62	6	4
Banauli	759	204	522	5	28	28	7	8	1	12
Keshwarpur	211	191	5	0	15	190	190	0	0	0
Ekauna	320	206	60	2	52	110	10	90	0	10
Isarpura	16	4	3	0	9	369	3	346	8	12
Paswan	747	340	219	39	149	281	35	167	19	60
Ahila	713	213	186	189	125	375	83	229	22	41
Kheri	482	164	156	101	61	177	43	48	33	53
Bargaon	2075	541	1148	70	316	2079	188	1515	46	330
Megharia	192	55	41	45	51	90	13	67	7	3
Kamaria	378	230	112	10	26	327	36	126	10	155
Kirkiri	780	57	175	23	525	196	8	35	20	133
Dundhua	Uninhabited Village									
Barhampur Mehdanra	861	177	453	21	210	509	80	238	115	76
Chilhar	767	190	242	44	291	318	14	248	39	17
Tara Chak	435	272	121	1	41	385	19	343	2	21
Karbasin	898	115	481	191	111	249	12	135	13	89
Gordiha	36	16	6	3	11	625	74	515	10	26
Amarpur	Uninhabited Village									
Nadhi	815	271	495	6	43	339	170	130	15	24
Nonaaur	1009	336	470	12	191	421	107	293	7	14
Muzaffarpur	445	188	203	10	44	201	198	3	0	0
Madhopur	246	159	69	2	16	104	76	26	0	2
Sewantha	352	122	145	1	84	277	18	112	2	145
Kharaich	295	163	88	22	22	43	5	5	3	30
Dhobha	397	119	258	2	18	181	3	135	2	41
Rudarpur	182	93	76	8	5	68	5	10	0	53
Ekauni	57	37	18	1	1	7	5	2	0	0
Bajrean	549	408	86	2	53	91	32	55	1	3
Baruhi	1809	992	687	34	96	791	104	620	7	60
Inurkhi	465	227	130	8	100	456	94	246	56	60
Kunrwa	3	0	1	0	2	305	0	224	74	7
Newada	498	294	177	0	27	254	16	152	5	81
Bansi Dehri	461	372	77	0	12	275	252	1	1	21
Dehri	266	46	84	10	126	668	171	343	53	101
Peur	331	51	194	29	57	363	52	298	2	11
Peur Chak	Uninhabited Village									
Patrihan	305	107	156	11	31	180	6	124	1	49

BASELINE DATA DESCRIPTION

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

Kaul Dehri	1123	210	568	58	287	866	17	627	108	114
3. District Arwal, Bihar										
Koriam	705	153	425	12	115	287	9	260	5	13
Bara	242	123	62	14	43	8	1	3	2	2
Satpura	363	59	231	8	65	55	14	33	6	2
Konika	474	37	403	0	34	334	2	330	0	2
Sonbarsa	975	73	452	85	365	607	27	523	22	35
Sakri	523	215	213	2	93	199	0	184	0	15
Sonbarsa Makbulpur Alauddin	227	96	47	1	83	146	30	72	3	41
Aslampur Dullah	Uninhabited Village									
Bhusura	581	170	317	16	78	105	2	88	5	10
Bhadasi	1124	244	688	27	165	637	74	494	7	62
Gaddopur	685	87	491	12	95	31	0	27	1	3
Madanpur Dhawa	118	73	29	6	10	4	0	0	4	0
Makbulpur Raja	464	150	297	0	17	41	18	21	0	2
Bhermpur Khapura	47	45	0	0	2	9	0	9	0	0
Rampur	168	121	4	0	43	110	19	86	0	5
Fakharpur	500	121	201	23	155	317	40	240	5	32
Arwal (NP)/25 Wards	10565	1370	3724	204	5267	3763	324	2250	244	945
Patak Chak	49	14	10	0	25	124	1	118	0	5
Aiyara	1381	767	372	14	228	1244	272	880	9	83
Laraua	11	6	5	0	0	111	0	111	0	0
Purainia Ruknuddin	381	75	286	11	9	218	5	205	2	6
Purainia Shekha	591	264	256	19	52	350	8	320	3	19
Latifpur Paraha	374	138	186	1	49	19	0	19	0	0
Lodipur	375	65	250	17	43	3	0	1	0	2
Nagawan	504	244	226	3	31	252	4	237	2	9
Tekari	339	206	101	9	23	71	8	56	1	6
Jhunathi	313	62	193	12	46	269	9	248	1	11
TOTAL (10km)	86452	24006	39173	3180	20093	42070	5590	27777	2397	6306

Source-Census of India, 2011

ABBREVIATIONS:

MAIN WORKERS POPULATION: **MAIN WORK_P:** Main worker's total population, **MAIN_CL_P:** Main cultivated labour population, **MAIN_AL_P:** Main agricultural labour population, **MAIN_HH_P:** Main workers population involved in household industries, **MAIN_OT_P:** Main other worker's population

MARGINAL WORKERS POPULATION:

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

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

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

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

Occupation Class	Year, 2011
Main Workers	86,452 (22.0%)
Male	69,773(80.7%)
Female	16,679(19.3%)
Marginal Workers	42,070(11.0%)
Male	24,074(57.2%)
Female	17,996(42.8%)
Non-Workers	2,59,832(67.0%)
Male	1,07,291 (41.3%)
Female	1,52,541(58.7%)
Total Population (10km)	3,88,354
<i>Source: Census of India Records, 2011</i>	

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

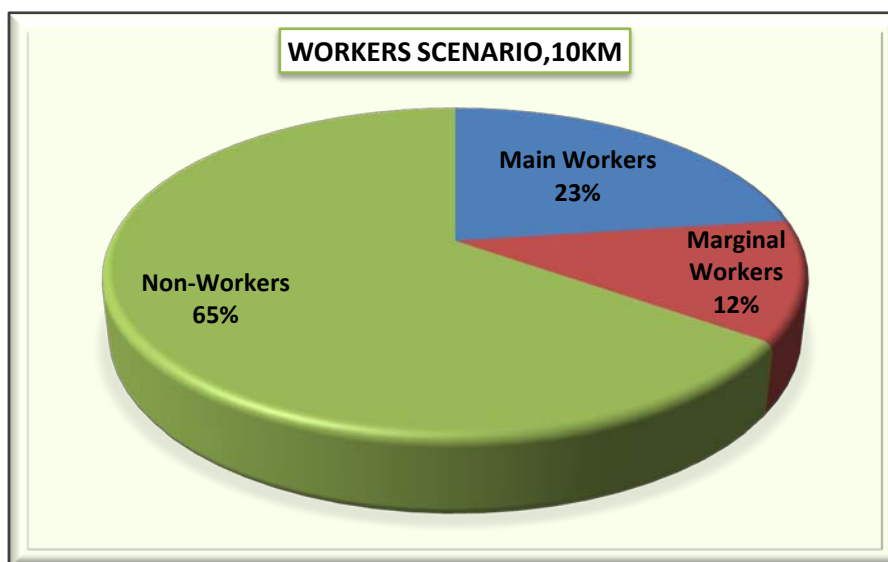


Figure 3.11: Workers Scenario of Study Area

Composition of Main Workers:

The 'Main Workers' were observed as 86,452 persons (22.0%) to the total population (3,88,354) of the study area and its composition is made-up of Casual laborers as 24,006

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

(28.0%), Agricultural laborers as 39,173(45.0%), Household workers 3,180(4.0%) and other workers as 20,093(23.0%) respectively.

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

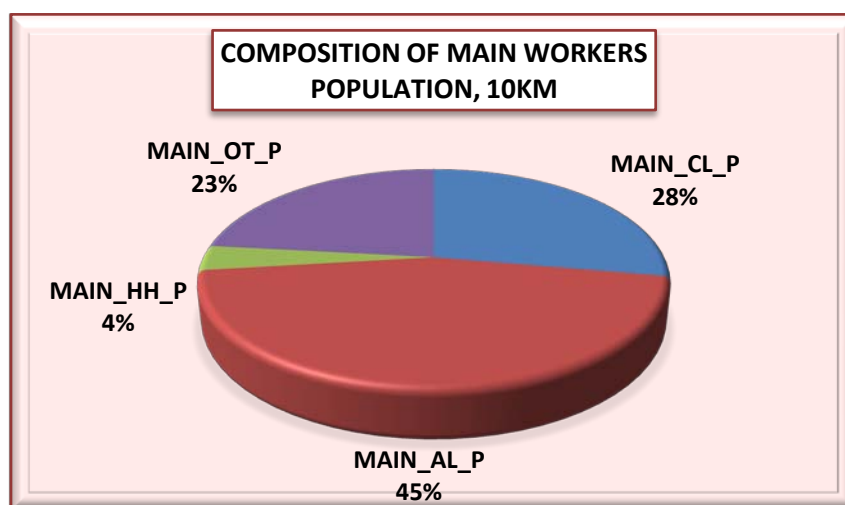
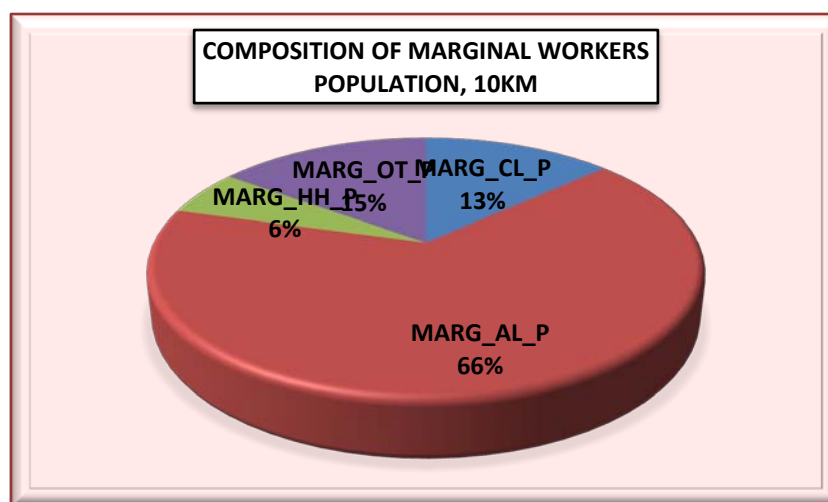


Figure 3.12: Composition of Main Workers Population

Composition of Marginal Workers:

The total marginal workers are observed as 42,070 which constitute 11.0% to the total population (3,88,354) comprising of Marginal Casual Laborers as 5,590 (13.0%), Marginal Agricultural Laborers as 27,777(66.0%), Marginal Household laborers as 2,397 (6.0%) and marginal other workers were also observed as 6,306 (15.0%) of the total marginal workers respectively.

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



Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

Figure 3.13: Composition of Marginal Workers

Composition of Non-Workers:

The total Non-worker's population was observed as 2, 59,832 which accounts 67.0% to the total population (3, 88,354) of the study area. Male-female wise Non-worker's population was recorded as 1,07,291 Males (41.3%) and 1,52,541 Females (58.7%) respectively.

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

Table 3.36 : Composition of Non-Workers

Non-Workers Population		
Persons	Males	Females
2,59,832	1,07,291 (41.3%)	1,52,541 (58.7%)

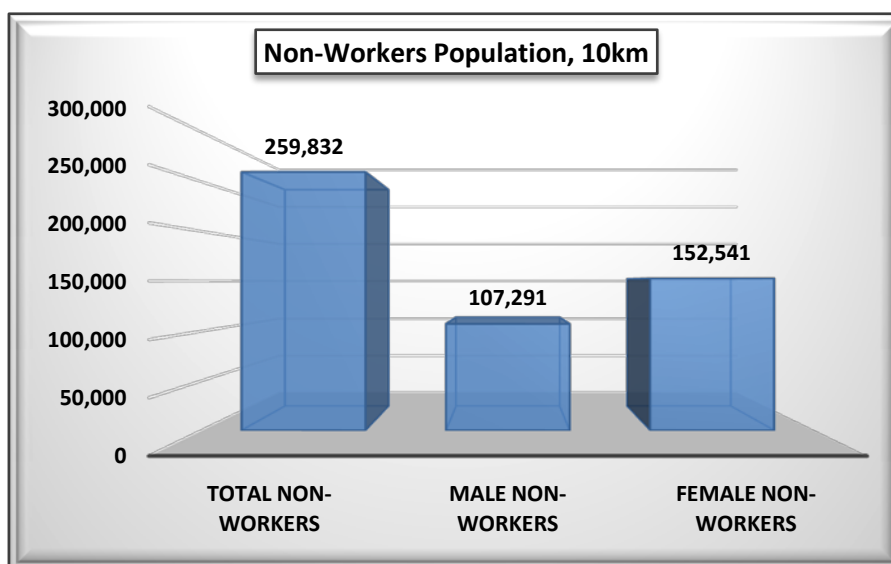


Figure 3.14: Composition of Non-Workers

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 Patna, Bhojpur and Arwal 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.

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

As per the Census Records 2011, the study area has a total of 156 villages and one town named Arwal (NP) / 25 wards lying under Patna, Bhojpur and Arwal in Bihar state. Overall study area villages are falling mainly under Ten (10) tehsils namely Dulhin Bazar (05 villages) and Paliganj (40 villages) of Patna district, Koilwar (01 village), Sandesh (23 villages), Udwant Nagar (03 villages), Charpokhari (02 villages), Agiaon (34 villages) and Sahar (11 villages) of Bhojpur district, Arwal (16 villages & 01 town) and Karpi (10 villages) of Arwal district respectively in Bihar state. There are eleven (11) villages of 3 major districts named Patna, Bhojpur and Arwal in Bihar state found as uninhabited villages in the study area.

Educational Facilities

There is a total no. of 179 Primary schools existing in the 10km radius study area. About 121 no. of Middle schools are found in the study area. Only eighty-six (86) Higher Secondary School (SS) and thirteen (13) Senior Secondary School (SSS) facility is available in the study area. The educational facilities have been further strengthening now and a number of private public schools and colleges are also functioning in the surroundings of the study area. Besides, there are Engineering and Medical colleges available in Towns and District headquarters only. Higher education facilities are available in Towns of the district. There is a considerable improvement in educational facility. The villages of the study area have no such facilities can reach within 5 to 10km range. No town was found in the 10 km radial study area.

Availability of University Education in Patna District

University education facility is available in the district. Many courses are studied in these universities. These universities are Patna University, Chankaya Law University, Extension center of Magadh University, Regional Study Center of Indira Gandhi Open University, Regional Center of Maulana Azad Urdu University, Nalanda Open University 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 12 primary health centers exist in the study area; most of the study area villages depend upon the towns & district HQ of the study area having such facility. No community health centre exists in the study area. Only twenty-three (23) Primary Health Sub-Centers exist in the villages of the study area.

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

area. Only sixteen(16) no of Mother & Child Welfare Centers are found in the study area. No allopathic hospital exists in the study area. Only 5 Dispensaries are found in the study area. Only seventeen (17) Family Welfare Centers are found in the study area. Overall study area villages are served by average medical facilities. Specialized medical facilities are available only in towns and District Headquarter (HQ) only.

Potable Water Facilities

Potable water facility is available in most of the villages of the study area. The entire study area has average level of potable water facilities. Hand Pump(HP) water facility is commonly observed in the study area as potable water facility. Out of the total 155 villages, only 76 villages (49.0%) are served with River/Canal water in the study area. As per the census records 2011, about 5 (3.2%) villages are being served with Tank/Pond/Lake as potable water facility in the study area.

Communication, Road & Transport Facilities

Apart from Post & Telegraph Office (PTO) services, transport is the main communication linkage in the study area. Compiled census 2011, data shows that the study area has good postal facilities in the 10km radius zone. About 50 villages (32.3%) were found serving with Post Office facilities in the study area, remaining villages are depending upon towns of the study area. The study area has average rail and road network, passes from the area.

Only two villages named Paipura Khurd and Sikaria under Dulhin Bazar and Paliganj tehsil of Patna district were found with railway station facility in the study area. Nearest railway station is Bihta Railway station in NE direction from the mine lease area site. Nearest town is Bihta, in NE direction. District Headquarters Patna, is situated towards NE direction.

Site is well connected by Nearest National Highway (NH-139) is passing towards East Direction from the site. Nearest airport is Jayprakash Narayan International Airport Patna, in Bihar state, situated at about 48.0km in NE direction from the mine lease area site.

Communication

Roads - The district of Patna is well served by a network of roads. Road communication is the main mode of transportation in this district. The roads are classified as the National Highways, State Highways, Major district roads and other district roads. They are maintained by the Public Works Department, the Rural Engineering Organisation, the Zila Parishad and

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

Municipalities. It is also connected with the interior of the district by metalled road. Five National Highway (NH) and Three State Highway (SH) cross the district. NH-2, NH-19, NH-30, NH-31 and NH-83 pass through the district. SH-1, SH-2 and SH-4 also pass through the district.

Railways - The district of Patna has a railway communication system. It is served by East Central Railway.

The main line of the East Central Railway passes through the entire length of the district running parallel to the Ganges. There are two railway lines running across the district from north to south, viz., the Patna – Gaya Branch and Bakhtiyarpur- Rajgir line. The third Fatuha - Islampur line is under construction. All three are branches of the East Central Railway. With the opening of the famous Patna-Hajipur Bridge (Mahatma Gandhi Setu), the ferry service connecting the capital with the North-Eastern Railway System has ceased to function.

Airways - Patna is connected by air to Calcutta, Delhi and Mumbai and a few other places by daily flights. There is an aerodrome near Phulwarisharif and another at Bihta.

Boats – The Ganges is navigable throughout the year and there is considerable boat traffic for transporting cargo. The smaller rivers, e.g., Punpun and Dardha become navigable only during the rains when they are used for transporting agricultural produce to the grain market at Fatuah. A ferry service has been started from Haldiya to Allahabad for transportation. The National Waterway-1 also passes through the district.

Banking Facility

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

Trade and Commerce

The development of the means of communication has had a great impact on the trade and commerce of the district. The district may now be said to be fairly well- connected by Road and Rail. Patna town is the hub of commercial activities of the district. Its central position at the junction of the three great rivers, viz., the Son, the Gandak and the Ganges gives it an additional advantage for the purpose of transport by river. The city proper comprises the large business quarters such as Marufganj, Mansurganj, the *Chawk* with Mirchaiganj, Maharajganj and other petty *bazars*. Marufganj is by far the most important of any of the marts in the city.

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

Besides the city of Patna, other important trade centres in the district are Dinapur, Barh, Mokameh, Fatwah and Masaurhi. In Patna district, trade consists mainly of export of pulses, dry chilies, castor seed, milk products and vegetables and import of cotton textiles, iron and steel products, cement, coal and consumer goods.

Mines and Minerals

The geological formation of the entire district of Patna is alluvial built-up with the alluvium brought down by the Ganges and deposited by it and its tributaries. No mineral of any kind is found in the district except sand.

Power Supply

It is revealed from the compiled information on amenities availability as per the census record of 2011; most of the villages and towns are electrified for Domestic, Agriculture, and Commercial & for all purposes. About 44 villages (28.4%) and towns of the study area are electrified for domestic purpose, only 2 villages (1.3%) for agricultural purpose, 10 villages for commercial purpose and for all purposes in the study area. Out of 155 villages in the study area, 112 villages (72.3%) including 12 uninhabited villages (7.7%) are not electrified for any purpose in the study area.

The district Patna receives its entire power supply from the Barauni Thermal Power Station, the Patratu Thermal Power Station and NTPC. All the 12 towns of Patna district have electricity. In rural areas also, the pace of electrification has been comparatively fast. In terms of proportion Patna is, better provided with electricity than many other districts of the State. The Government is paying full attention to provide electricity to villages under the Rural Electrification Scheme. The main consumption of electricity in the rural areas is for agricultural purposes. Total numbers of villages electrified in the district are 1012.

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

Chapter-III

BASELINE DATA DESCRIPTION

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

Table 3.37 Village wise Basic Amenities Availability

Name of the Village/Town	Educational				Medical							Drinking Water						C T	Communication & Transport				Approach to the Village				Power Supply				Nearest Town & Distance, km															
	P	M	S	S	C	H	P	C	H	C	F	W	C	T	W	H	P		T	W	R	T	k	P	O	P	T	O	B	S		R	S	P	R	K	R	N	W	F	P	E	D	E	A	g.
1.District Patna, Bihar																																														
Mahabalipur	2	1	1	0	0	0	0	0	0	0	0	2	2	1	2	2	2	1	2	2	2	2	1	2	2	2	2	2	2	2	2	1	1	2	1	1	5	1	1	Masaurhi,14km						
Baduri	1	1	1	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	1	2	2	2	2	1	2	2	2	2	2	2	1	1	2	1	1	3	1	1	Masaurhi,23km							
Paipura Khurd	2	2	2	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	2	1	1	1	1	1	2	1	1	3	1	1	Masaurhi,24km														
Rajipur	1	1	1	1	0	0	0	0	0	0	0	2	2	1	1	2	2	2	1	2	2	2	2	1	2	2	2	2	2	1	1	1	1	3	1	1	Masaurhi,25km									
Saraiya	1	1	1	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	3	1	1	Masaurhi,27km														
Kalyanpur	1	1	1	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	2	2	2	1	2	0	2	2	Jehanabad,25km														
Jalpura	1	1	1	0	0	1	1	1	0	1	1	2	2	1	2	1	2	2	2	2	2	2	1	1	2	1	2	0	2	2	Jehanabad,28km															
Masaurha	1	1	1	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	1	2	2	2	1	1	2	1	2	0	2	2	Jehanabad,28km															
Udaipur	1	1	1	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	2	2	2	1	1	2	1	2	0	2	2	Jehanabad,30km															
Mohbalipur	4	4	4	1	0	0	1	0	0	0	0	2	1	1	2	1	2	2	1	2	1	2	1	1	1	1	1	0	2	2	Jehanabad,28km															
Mohabbatpur	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	0	2	2	Jehanabad,27km															
Ranipur	1	1	1	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	1	2	2	1	1	2	1	1	0	2	2	Jehanabad,27km														
Fatehpur	1	1	1	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	1	2	2	2	2	1	2	1	2	0	2	2	Jehanabad,25km															
Hasanpur	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	1	2	2	1	1	0	2	2	Jehanabad,25km															
Dariapur Pem	2	2	2	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	1	2	1	1	0	2	2	Jehanabad,26km															
Paipura Kalan	1	1	1	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	1	2	2	2	1	1	1	1	2	0	2	2	Jehanabad,25km															
Ijarta	1	1	1	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	2	2	1	2	0	2	2	Jehanabad,25km															
Dharahra	5	5	5	1	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	1	2	2	1	1	1	1	2	0	2	2	Jehanabad,24km															
Dariapur Anant	1	1	1	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	2	2	2	1	1	2	1	1	0	2	2	Jehanabad,25km															
Nirakpur Pali	5	5	5	4	0	0	1	1	0	0	1	2	1	1	1	2	2	2	1	1	1	2	1	1	2	1	1	0	2	2	Jehanabad,24km															
Akhtiarpur Pali	1	1	1	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	2	1	1	1	2	0	2	2	Jehanabad,23km															
Kurkuri	2	1	1	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	1	2	1	2	1	2	2	1	2	0	2	2	Jehanabad,26km															
Bibipur	1	1	1	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	2	2	1	1	4	1	1	Jehanabad,28km															
Harpur Ankuri	1	1	1	0	0	0	0	0	0	0	0	2	1	1	2	2	2	2	1	2	2	2	1	2	2	1	1	0	2	2	Jehanabad,29km															
Sarsi	1	1	1	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	1	2	2	2	1	2	2	1	1	4	1	1	Jehanabad,29km															

Chapter-III

BASELINE DATA DESCRIPTION

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

Muhammadpur	1	1	1	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	1	2	1	1	1	1	1	1	1	Jehanabad,30km	
Mohibalipur Chak	Uninhabited Village																													Jehanabad,30km		
Habsapur	1	1	1	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	2	1	1	1	2	0	2	2	Jehanabad,27km	
Pipardaha	1	1	1	0	0	0	0	0	0	0	0	2	1	1	2	1	2	2	2	2	2	2	1	1	2	1	2	0	2	2	Jehanabad,25km	
Belaunra	1	2	2	0	0	0	1	0	0	0	0	2	2	1	2	1	2	2	1	2	2	2	1	1	2	1	2	0	2	2	Jehanabad,29km	
Kansopur	1	1	1	0	0	0	0	0	0	0	0	2	1	1	2	1	2	2	2	2	2	2	1	1	2	1	1	0	2	2	Jehanabad,29km	
Bela	1	1	1	0	0	0	0	0	0	0	0	2	1	1	2	1	2	2	2	2	2	2	1	1	2	1	1	0	2	2	Jehanabad,30km	
Korra	1	1	1	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	1	2	2	2	1	1	1	1	2	0	2	2	Jehanabad,32km	
Lakhnipur	1	1	1	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	2	1	2	1	2	0	2	2	Jehanabad,30km	
Akbarpur	1	1	1	0	0	1	1	1	0	1	1	2	2	1	2	1	2	2	1	2	2	2	1	2	2	1	2	0	2	2	Jehanabad,29km	
Ajda	1	1	1	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	2	1	2	1	1	0	2	2	Jehanabad,28km	
Thakuri	1	1	1	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	2	1	2	1	1	0	2	2	Jehanabad,26km	
Sikaria	2	1	1	0	0	0	0	0	0	0	0	2	1	1	1	1	2	2	1	2	1	1	1	2	1	1	2	0	2	2	Jehanabad,26km	
Sedura	1	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	2	0	2	2	Jehanabad,26km	
Taranpur	1	1	1	0	0	0	0	0	0	0	0	2	1	1	2	1	2	2	2	2	2	2	2	1	1	1	1	0	2	2	Jehanabad,25km	
Chauri	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	2	2	1	1	0	2	2	Jehanabad,25km	
Banauli Buzurg	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	0	2	2	Jehanabad,25km	
Banauli Khurd	1	1	1	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	1	2	2	2	2	1	2	1	1	0	2	2	Jehanabad,24km	
Khiri	1	1	1	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	1	2	2	2	2	2	2	1	1	6	2	2	Jehanabad,22km	
Hemanpur	1	1	1	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	2	2	1	1	0	2	2	Jehanabad,22km	
Khanpura	1	1	1	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	1	2	2	2	2	2	2	1	1	6	2	2	Jehanabad,22km	
Mankurha	1	1	1	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	2	2	2	1	1	6	2	2	Jehanabad,24km	
Torni	1	1	1	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	2	2	1	2	2	2	2	1	2	0	2	2	Jehanabad,24km
Rampur Nagwan	1	2	2	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	2	2	2	1	2	2	1	2	0	2	2	Jehanabad,24km	
Mera	1	1	1	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	2	2	1	1	0	2	2	Jehanabad,22km	
Nirakhpur	1	1	1	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	2	2	2	1	2	0	2	2	Jehanabad,22km	
Patauna	1	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	2	0	2	2	Jehanabad,19km	
Katka	1	1	1	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	2	2	1	1	0	2	2	Jehanabad,22km	
Kudihra	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	0	2	2	Jehanabad,22km	
Mangila	3	3	3	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	1	2	2	1	1	0	2	2	Jehanabad,24km	
2. District Bhojpur, Bihar																																
Makhdumpur	Uninhabited Village																													Jehanabad,24km		
Sandesh	1	0	1	1	0	1	1	1	0	1	1	2	2	1	2	1	1	2	1	1	1	2	1	1	2	1	1	0	2	2	Arrah,30km	
Panpura	0	0	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	2	2	2	1	1	2	1	2	0	2	2	Arrah,30km	



Chapter-III

BASELINE DATA DESCRIPTION

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

Kanharpur	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	2	0	2	2	Arrah,32km
Chela	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	2	0	2	2	Arrah,30km
Panrepur	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	0	2	2	Arrah,30km
Basauri	0	0	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	1	1	2	1	2	0	2	2	Arrah,30km
Bara 2	1	1	0	0	0	0	0	0	0	0	0	2	2	1	1	2	1	2	2	2	2	2	1	1	1	1	2	0	2	2	Arrah,24km
Bartiar	1	1	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	1	1	1	1	2	0	2	2	Arrah,24km
Kosdihra	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	1	1	1	2	0	2	2	Arrah,30km
Kori	1	1	1	0	0	0	1	0	0	0	0	2	2	1	1	2	2	2	1	1	1	2	1	1	2	1	1	0	2	2	Arrah,30km
Baranhpur	0	0	0	0	0	0	0	0	0	0	0	2	1	1	1	2	2	2	2	2	2	2	1	1	2	1	2	0	2	2	Arrah,28km
Khandaul	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	1	1	2	1	1	2	1	1	5	2	2	Arrah,30km
Phulari	3	1	1	0	0	0	1	0	0	0	0	2	2	1	2	2	2	2	1	2	1	2	1	1	2	1	1	0	2	2	Arrah,30km
Bhatauli	1	1	1	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	1	2	2	2	1	1	2	1	2	0	2	2	Arrah,20km
Chanchar	Uninhabited Village																														Arrah,20km
Raman Sanrh	1	1	1	0	0	0	1	0	0	1	0	2	2	1	1	1	2	2	1	2	2	2	1	1	2	1	2	0	2	2	Arrah,20km
Patkhaulia	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	0	2	2	Arrah,30km
Pinjroi	1	0	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	2	2	2	1	1	2	1	2	0	2	2	Arrah,30km
Mahadeopur	Uninhabited Village																														Arrah,30km
Ahiman Chak	1	0	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	2	1	2	1	1	2	1	2	0	2	2	Arrah,30km
Khemkaranpur	Uninhabited Village																														Arrah,30km
Baga	2	1	0	0	0	0	1	0	0	0	0	2	2	1	1	2	2	2	1	2	2	2	1	1	2	1	2	0	2	2	Arrah,30km
Bhikham Chak	0	0	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	1	2	1	1	2	1	2	0	2	2	Arrah,30km
Dariapur	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	4	1	1	Arrah,4km
Kalyanpur	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	0	2	2	Arrah,6km
Ekauna	2	1	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	1	2	1	2	1	1	2	1	1	1	1	1	Arrah,4km
Thakuri	1	1	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	1	2	2	2	2	2	2	1	2	0	2	2	Piro,8km
Chakiya	Uninhabited Village																														Piro,8km
Bhaluni	1	0	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	2	2	2	1	1	2	1	2	0	2	2	Arrah,30km
Seothara	1	0	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	1	1	2	2	1	1	2	1	2	0	2	2	Arrah,34km
Muradpur	1	0	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	2	2	2	1	1	2	1	2	0	2	2	Arrah,36km
Chhaprapur	3	1	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	1	2	2	1	2	0	2	2	Arrah,36km
Dihra	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	0	2	2	Arrah,30km
Mahpur	Uninhabited Village																														Arrah,30km
Chansi	2	1	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	1	2	1	2	1	2	2	1	2	0	2	2	Arrah,30km
Banauli	2	1	1	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	1	2	2	1	2	0	2	2	Arrah,30km



Chapter-III

BASELINE DATA DESCRIPTION

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

Keshwarpur	2	1	1	1	0	0	0	0	0	0	0	2	2	2	1	1	2	2	2	2	2	2	2	1	2	2	1	2	0	2	2	Arrah,25km		
Ekauna	1	1	0	0	0	0	0	0	0	0	0	2	2	2	1	1	1	2	2	2	2	2	2	2	2	1	2	1	2	0	2	2	Arrah,24km	
Isarpura	1	1	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	2	2	2	2	2	2	2	1	2	0	2	2	Arrah,24km		
Paswan	1	1	0	0	0	0	0	0	0	0	0	2	1	1	2	1	2	2	1	2	2	2	2	2	2	2	2	1	1	0	2	2	Arrah,25km	
Ahila	1	1	0	0	0	0	1	0	0	0	0	2	1	1	1	1	2	2	1	1	2	2	1	1	2	1	2	1	2	0	2	2	Arrah,30km	
Kheri	1	1	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	2	2	2	2	2	1	2	0	2	2	Arrah,32km	
Bargaon	5	1	1	2	0	1	1	1	0	0	1	2	2	1	2	2	2	2	1	2	2	2	2	2	2	2	2	1	2	0	2	2	Arrah,30km	
Megharia	0	0	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	1	1	2	2	1	2	2	2	1	2	0	2	2	Arrah,35km		
Kamaria	1	1	0	0	0	0	0	0	0	0	0	2	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	0	2	2	Arrah,35km	
Kirkiri	3	1	0	0	0	1	1	1	0	0	1	2	1	1	2	1	2	2	1	2	2	2	2	1	2	2	2	1	2	0	2	2	Arrah,35km	
Dundhua	Uninhabited Village																														Arrah,35km			
Barhampur Mehdanra	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	2	1	1	2	1	2	0	2	2	Arrah,25km		
Chilhar	2	1	1	0	0	1	1	1	0	0	1	2	2	1	2	1	2	2	1	1	2	2	2	2	2	2	1	2	0	2	2	Arrah,25km		
Tara Chak	1	1	0	0	0	1	1	1	0	1	1	2	2	1	2	2	2	2	2	2	2	2	2	2	1	2	1	2	0	2	2	Arrah,30km		
Karbasin	1	1	0	0	0	1	1	1	0	0	1	2	2	1	2	2	2	2	1	2	1	2	1	1	2	1	2	1	2	0	2	2	Arrah,30km	
Gordiha	1	1	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	2	2	2	2	1	1	2	1	2	0	2	2	Arrah,30km		
Amarpur	Uninhabited Village																														Arrah,30km			
Nadhi	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	2	1	2	0	2	2	Arrah,32km	
Nonaaur	3	1	1	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	2	1	2	2	2	2	1	1	2	0	2	2	Arrah,32km		
Muzaffarpur	1	0	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	2	2	2	2	1	1	1	1	2	0	2	2	Arrah,32km		
Madhopur	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	2	1	1	2	1	2	0	2	2	Arrah,32km		
Sewantha	1	0	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	1	1	2	2	1	1	2	1	2	1	2	0	2	2	Arrah,38km	
Kharaich	2	1	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	2	2	2	2	2	1	2	0	2	2	Arrah,32km	
Dhobha	1	1	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	2	1	1	2	1	2	0	2	2	Arrah,25km		
Rudarpur	0	0	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	2	2	2	2	2	2	2	2	1	2	0	2	2	Arrah,18km	
Ekauni	0	0	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	2	2	2	2	2	1	2	0	2	2	Arrah,19km	
Bajrean	2	1	0	0	0	0	0	0	0	0	0	2	1	1	1	2	2	2	2	2	2	2	2	1	2	2	2	1	2	0	2	2	Arwal,12km	
Baruhi	1	2	1	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	1	2	2	2	2	2	2	2	2	1	2	0	2	2	Arwal,12km	
Inurkhi	2	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	2	2	2	2	1	2	1	1	1	1	2	0	2	2	Arwal,12km	
Kunrwa	0	0	0	0	0	0	0	0	0	0	0	2	1	1	2	2	2	2	2	2	2	2	2	1	2	2	2	1	2	0	2	2	Arwal,9km	
Newada	2	1	0	0	0	1	1	1	0	0	1	2	2	1	2	2	2	2	1	2	2	2	2	2	1	2	1	2	1	2	0	2	2	Arwal,8km
Bansi Dehri	1	1	0	0	0	0	0	0	0	0	0	2	1	1	2	2	2	2	1	2	2	2	2	2	2	2	2	1	2	0	2	2	Arwal,8km	
Dehri	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	1	2	2	2	2	2	2	2	1	1	2	0	2	2	Arwal,7km	
Peur	3	1	1	1	0	1	1	1	0	0	1	2	2	1	1	1	2	2	1	2	1	2	1	1	1	1	1	1	2	0	2	2	Arwal,8km	

Chapter-III

BASELINE DATA DESCRIPTION

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

Peur Chak	Uninhabited Village																													Arwal,8km	
Patrihan	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	0	2	2	Arwal,9km
Kaul Dehri	1	1	1	0	0	0	0	0	0	0	1	2	2	1	1	1	2	2	2	2	2	2	1	2	2	1	2	0	2	2	Arwal,24km
3. District Arwal, Bihar																															
Koriam	1	1	1	0	0	1	1	1	0	0	1	2	2	1	2	1	2	2	2	2	2	2	1	2	2	1	2	0	2	2	Arwal,6km
Bara	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	1	2	2	2	1	1	1	1	2	0	2	2	Arwal,8km
Satpura	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	0	2	2	Arwal,8km
Konika	0	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	1	2	2	1	2	0	2	2	Arwal,7km
Sonbarsa	1	1	0	0	0	1	1	1	0	0	1	2	2	1	2	1	2	2	1	2	2	2	1	1	1	1	1	0	2	2	Arwal,8km
Sakri	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	2	0	2	2	Arwal,4km
Sonbarsa Makbulpur Alauddin	1	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	1	1	1	1	2	0	2	2	Arwal,6km
Aslampur Dullah	Uninhabited Village																													Arwal,5km	
Bhusura	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	0	2	2	Arwal,5km
Bhadasi	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	1	2	2	2	1	1	2	1	2	0	2	2	Arwal,2km
Gaddopur	1	0	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	2	2	2	2	1	2	1	1	0	2	2	Arwal,8km
Madanpur Dhawa	0	0	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	2	2	2	2	1	2	1	1	0	2	2	Arwal,9km
Makbulpur Raja	1	0	0	0	0	0	0	0	0	0	0	2	2	1	1	1	1	2	1	2	2	2	2	1	2	1	1	0	2	2	Arwal,8km
Bhermpur Khapura	0	0	0	0	0	0	0	0	0	0	0	2	2	1	1	1	2	2	2	2	2	2	2	1	2	1	1	0	2	2	Arwal,8km
Rampur	1	0	0	0	0	0	0	0	0	0	0	2	2	1	1	1	1	2	2	2	2	2	2	1	2	1	1	0	2	2	Arwal,5km
Fakharpur	1	2	1	1	0	0	1	1	0	0	1	2	2	1	1	1	1	2	1	2	1	2	1	1	2	1	1	0	2	2	Arwal,8km
Patak Chak	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	0	2	2	Arwal,4km
Aiyara	6	3	1	0	0	0	0	0	0	0	0	2	2	1	2	2	2	2	1	2	2	2	2	1	2	1	2	0	2	2	Arwal,15km
Laraua	1	0	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	2	1	2	1	2	0	2	2	Arwal,15km
Purainia Ruknuddin	0	0	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	0	2	2	Arwal,15km
Purainia Shekha	2	1	0	0	0	0	1	1	0	0	1	2	2	1	2	2	2	2	1	2	2	2	1	1	2	1	2	0	2	2	Arwal,15km
Latifpur Paraha	1	1	0	0	0	0	0	0	0	0	0	2	2	1	1	2	2	2	2	2	2	2	2	1	2	1	2	0	2	2	Arwal,12km
Lodipur	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	0	2	2	Arwal,13km
Nagawan	2	0	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	2	1	2	1	2	0	2	2	Arwal,14km
Tekari	1	1	0	0	0	0	0	0	0	0	0	2	2	1	2	1	2	2	2	2	2	2	2	1	2	1	2	0	2	2	Arwal,12km
Jhunathi	1	0	1	0	0	0	1	1	0	0	1	2	2	1	1	1	2	2	1	2	2	2	1	2	2	1	2	0	2	2	Arwal,20km
TOTAL(10km)	#	#	8			1	2	1			1	Status for Availability and Non-Availability is shown as A (1) & NA (2) respectively																			
	#	#	6	#	0	2	3	6	0	5	7																				

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



Chapter-III

BASELINE DATA DESCRIPTION

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

Abbreviations:

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

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

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

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

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

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

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

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

Brief description of place of religious, historical or archaeological and tourist interest are as follows;

Baikatpur -It is a village in Fatwah block, situated on the southern bank of the Ganges. It is noted for its Shiva temple said to have been built by Raja Man Singh, the famous General of Akbar's army. Weekly fairs are held on every Monday in the month of Shravana (July-August) and an annual fair on the occasion of Shivaratri.

Banarsi -The village lies on the southern bank of the Ganges about 3 kms. north of Barh railway station. It is noted for its old temple of Umanath. A large annual fair is held on the occasion of Shivaratri.

Bharatpura - The village is situated 14 kms. south of Bikram on the Bihta- Pali road. It is noted for its old library which has about 2,500 rare and old books, manuscripts and Tamraptras (copper plates).

Bihta -The village lies on the main line of the Eastern Railway about 25 kms. west of Patna. It is the headquarters of the block bearing the same name and has a large rice market. A large annual fair is held on the occasion of Shivaratri at Bihta.

Bijpura - It is a village situated about 14 kms. east of Taregna railway station. It is famous for its Kanhaiya-asthan built in the beginning of the 19th century.

Bir Oiara - The village is situated about 10 kms. east of Nadwan railway station. It is noted for its Shiva temple containing a four feet high image. Large fairs are held here on the occasion of Shivaratri and Basant Panchmi

Goraila - The village is situated 5 kms. south of the block headquarters at Naubatpur. It is famous for the tomb of the father of Makhdum Saheb of Biharsharif. It is a place of pilgrimage for the Mohammadans

Naubatpur - The village is the headquarters of the block bearing the same name. It has an Arya Samaj temple, built in the beginning of this century.

Nawada - A village situated about 6 kms. north-east of Barh railway station. It contains an old tomb of a Muslim saint which is held in high reverence not only by the Muslims but also by the Hindus.

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

Nisarpura - It is a village situated on the bank of river Punpun about 1.5 kms. south of the block headquarters at Naubatpur. It is noted for its large fairs held on the occasion of Makar Sankranti and Bisua.

Pakri - The village, situated on the river Punpun, is the headquarters of Punpun block. A large number of Hindu pilgrims congregate here during Pitripaksh, the second fortnight of Bhadrapad (September- October) to offer oblation to their deceased ancestors.

Seonar - The village is situated about 1.5 kms. west of Mokameh. It is famous for its temple of Nilkanth Mahadeo. An annual fair is held in the village on the occasion of Shivaratri.

Ular - The village lies about 13 kms. south of Bikram on the Bihta-Pali road. It is famous for its temple of Sun-God. An annual fair is held here on the occasion of Chhat in the month of Kartik every year.

Patna - Patna is the largest town and headquarters of Patna district, Patna division and Bihar State. It lies on the main line of the Eastern Railway and is well connected by road. It is mainly an administrative and educational centre. It has, however, a few ancient and sacred places as also places of tourist interest, the details of which are indicated below:

Phulwari - Phulwari town is situated on Patna-Khagaul road and is the headquarters of the block bearing the same name. It is an important place for the Muslims as it contains an old Khankah where the hairs of Prophet Mohammad are preserved. Every year on the occasion of Fateh-Duaz-Dahum (the birthday of the prophet) a large fair is held. It attracts an all India gathering. Phulwarisharif also has an old mosque built of red stone and known as Sangi-Masjid, believed to have been built by Emperor Humayun in 1533 AD.

Maner - The town is situated at about 27 km west of Patna on Patna-Arrah road and is the headquarters of the block bearing the same name. The village derives its name from King Maniar, the remains of whose fortress still exist. It is traditionally believed that the marriage party of Lord Rama halted at Maner both on the outward and inward journeys from Ayodhya to Janakpur. The village has a magnificent tomb of the Muslim saint Makhdum Saheb, said to have been constructed by Emperor Jehangir in 1660 AD.

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

Social and Cultural Even

Fairs and festivals are held regularly in the district. Sombari Mela is held in the immediate vicinity of the Patna Civil Court building on each Monday in the month of Shravana. (July-August). The main articles put up for sale during this fair are furnitures, utensils and plants of fruits and flowers. The Chhat festival is one of the most important and auspicious religious event for Patna district in general and Patna town in Particular. On the occasion the Sun God is worshipped. All ghats of Patna and all roads leading to these ghats are illuminated with sea of human heads moving around during this festival.

Rehabilitation & Resettlement (R & R)

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

4.0 GENERAL

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

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

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

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

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

4.1 LAND ENVIRONMENT

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

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

Anticipated Impacts:

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

Mitigation measures:

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

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

4.2 WATER ENVIRONMENT

Anticipated Impacts:

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

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

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

Mitigation measures

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

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

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

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

4.3 AIR ENVIRONMENT**Impact On Air Quality**

The proposed project includes various activities like development of benches, approach roads, haul roads, excavation and transportation of mineral and waste materials. These operations 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 $1.92 \times 10^{-3} \text{ g/s/m}^2$ based on moisture content 10-20% mine. It is assumed that moisture content was 10% and further moisture content will be increased to 10-20% to reduce emission of PM10 during unloading and average

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar)

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

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

4.3.2 Meteorological Data

The meteorological data recorded at hourly interval during the month of Dec 2022 to Feb 2023 on wind speed 0.92 m/s, wind direction, dry & wet bulb temperature, humidity, cloud cover and rainfall was processed to extract hourly mean meteorological data as per the guidelines of CPCB/MoEF for prediction of impacts from the area source. Stability was computed by Turner's method and mixing height was obtained from publication of IMD "Atlas of Hourly Mixing Height in India, 2008.

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

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar)

0.92m/s. Impact of the pollutants was anticipated in southeast sector under influence of northeasterly & westerly winds. Ambient air quality locations were selected based on the long term wind rose pattern of the area. Air quality sampling locations were finalized to study the baseline status around the proposed site and to study impact at various locations. 24-h maximum impact of PM₁₀ was envisaged in southeast sector at very short distance from the site due to moderate to low wind speed.

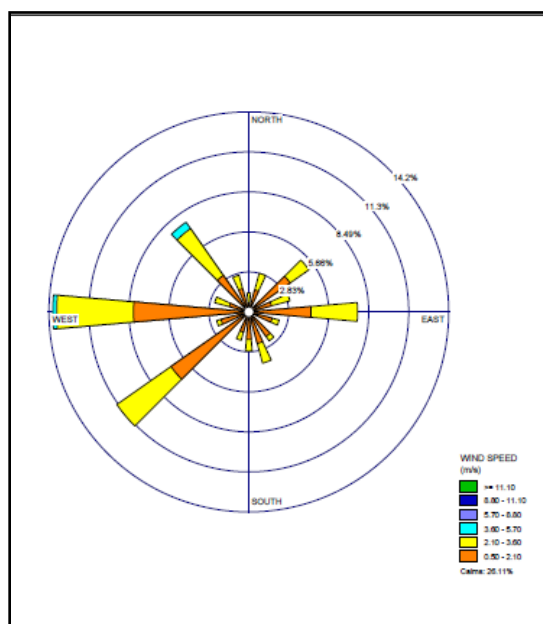


Figure 4.1: Wind Rose Diagram

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

4.3.3 Frame work of Computation & Model details

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

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

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

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

4.3.4 Model Results

The Air Quality Impact Prediction has been done by using “Industrial Source Complex Short Term version 3 (ISCST3), of USEPA”. The main sources of air pollution with regard to the proposed project for the purpose of estimation of increase in PM10 are identified due to –

- (i) Loading/unloading of ore
- (ii) Transportation of ore by trucks on the Haul roads from mining benches.

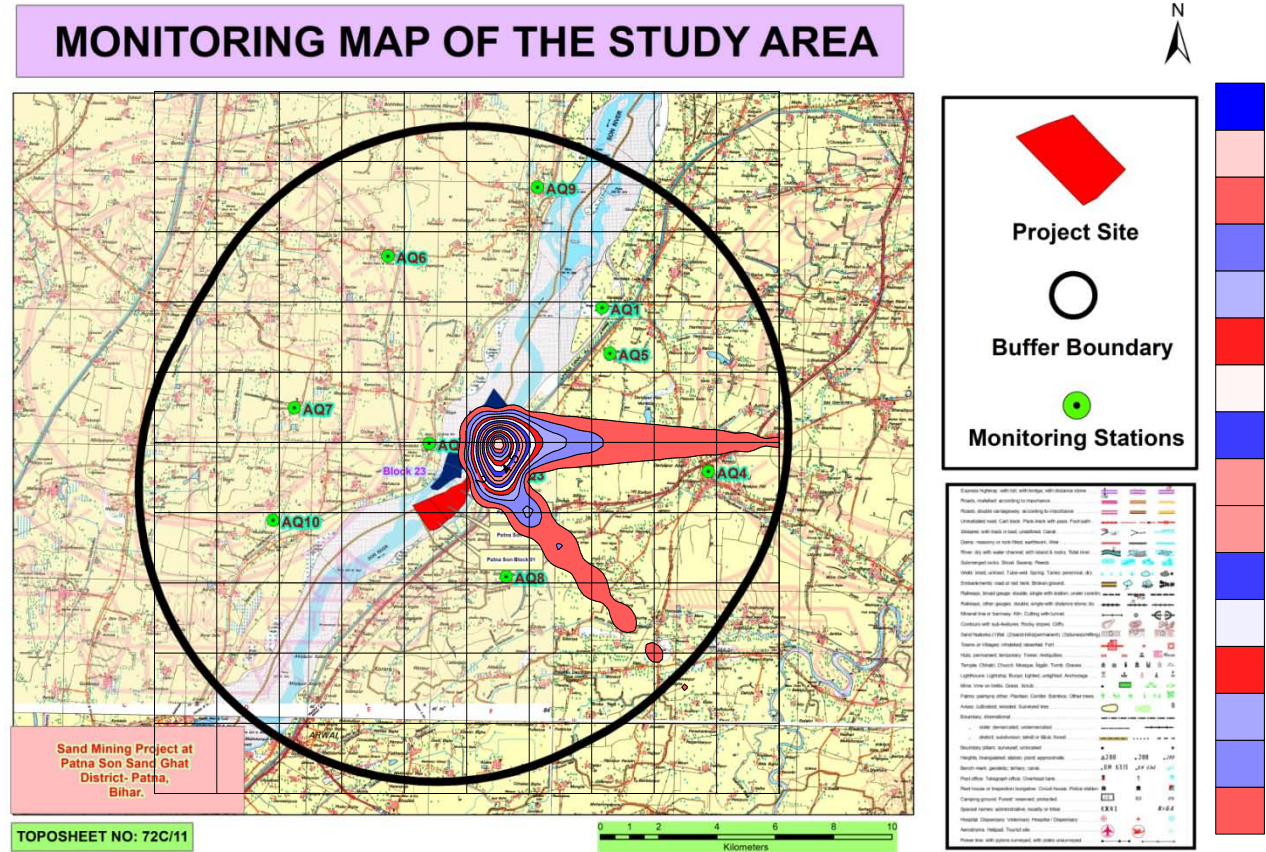
Combined impact of PM10 was considered due to mining activities occurred simultaneously on various sampling locations is given in below table:

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar)

Table 4.1 Incremental Concentration of PM10 in the Study Area

Location ID	Location name	Distance (Km) and Direction	98th Percentile	Incremental Value	Total Value
AAQ 1	Project Site (Near Mahabalipur Village)	0.40 Km, West	86.03	8.0	94.03
AAQ 2	Near Azimabad Village)	0.69 Km, NE (From Block 23)	77.36	<0.001	77.36
AAQ 3	Mahabalipur	0.5 Km, ESE	78.29	1.6	79.89
AAQ 4	Paliganj	7.47 Km, NE	75.72	<0.001	75.72
AAQ 5	Jalpura	4.70 Km, NE	72.38	<0.001	72.38
AAQ 6	Kori	6.11 Km, NW	74.41	<0.001	74.41
AAQ 7	Bargaon	5.83 Km, WSW	73.10	<0.001	73.10
AAQ 8	Shrirampur	4.23 Km, SE	76.73	2.4	79.13
AAQ 9	Turkaul	8.27 Km, NW	76.47	<0.001	76.47
AAQ 10	Muzaffarpur	6.39 Km, SW (From Block 23)	72.61	<0.001	72.61

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar)



(Iso-pleth of PM10 is $8.0 \mu\text{g}/\text{m}^3$ occurred near the project site at 2000 m x 2000 m grid network during

- i) ii) loading and unloading and
- ii) iii) Transportation of ore over the haul road.

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

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar)

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 4.2, Damage risk criteria for hearing loss OSHA regulations

Maximum allowable duration per day in hour	Sound pressure dB(A)	Remarks
(1)	(2)	(3)
8.0	90	1. For any period of exposure falling in between any figure and lower figure as indicated in column (1), the permissible sound is to be determined by extrapolation or proportionate scale.
6.0	92	
4.0	95	
3.0	97	
2.0	100	
1 ½	102	
1	105	
¾	107	
½	110	
¼	115	2. No exposure in excess of 115 dB (A) is permissible.

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

a. Mitigation measures

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

- The vehicles will be maintained in good running condition so that noise will be reduced to minimum possible level.
- In addition, truck drivers will be instructed to make minimum use of horns in the village area and sensitive zones.

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar)

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

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

Fauna

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

Mitigation measures

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

Flora

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

Fauna

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

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.

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar)



FIGURE 4.3 MAP SHOWING EVACUATION ROUTE FOR PATNA SON 02

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 4.3 (i): Existing Traffic Scenario & LOS for Block 02

Road	V	C	Existing V/C Ratio	LOS
National Highway (NH-139)	2500	15,000	0.166	A

Source: Capacity as per IRC: 64-1990

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar)

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

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

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

Reference: ENVIS Technical Report, IISc, Bangalore.

During Mine operation for Sand **Block 02**

Proposed Capacity of Mine/annum : 1545833 TPA

No. of working days : 250 days

Proposed Capacity of mine/day : 6183.33 or 6184

Truck Capacity : 16 tonnes

No. of trucks deployed/day : 386.5 or 387

Increase in PCU/day (387*3) : 1161

Table 4.3 (ii): Modified Traffic Scenario & LOS

Road	V	C	Modified V/C Ratio	LOS
National Highway (NH-139)	2500+1161=3661	15000	0.244	B

Results

From the above analysis it can be seen that the LOS has changed from 0.166 to 0.244 at Highway intersection that is from 'A' to 'B' i.e from 'Excellent' to 'Very Good' respectively. Hence, there will not so much adverse affect on the proposed evacuation roads due to additional traffic. Traffic management has been proposed as given in below

Traffic Management:

1. Roads will be repaired regularly and maintained in good conditions.
2. Haul roads will be sprinkled with water to keep the dust suppressed.
3. A supervisor will be appointed to regulate the traffic movement near the site.

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar)

4. Speed breakers will be constructed near accident prone areas to calm the traffic and its speed.

TRAFFIC MANAGEMENT FOR PROJECTS IN CLUSTER

Production Details of Cluster of project:

S no	Block No	Production Details
1	Patna Son 01	3397140 TPA
2	Patna Son 02	2426598 TPA
3	Patna Son 03	2742984 TPA
Total Production in cluster		8566722 TPA

**Table 4.4 (i): Existing Traffic Scenario & LOS for
Proposed Cluster of Block 01, Block-02, Block-03**

Road	V	C	Existing V/C Ratio	LOS
National Highway (NH-139)	2500	15,000	0.166	A

Source: Capacity as per IRC: 64-1990

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

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

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

Reference: ENVIS Technical Report, IISc, Bangalore.

During Mine operation for Proposed **Cluster of Patna Son 01, Patna Son 02, Patna Son 03**

Proposed Capacity of Mine/annum : **8566722 TPA**

No. of working days : 250 days

Proposed Capacity of mine/day : 34,266.8 or say 34267 TPD

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar)

Truck Capacity : 16 tones
 No. of trucks deployed/day : 2141.68 or 2142
 Increase in PCU/day (2142*3) : 6,426

Table 4.4 (ii): Modified Traffic Scenario & LOS

Road	V	C	Modified V/C Ratio	LOS
National Highway (NH-139)	2500+6426=8926	15000	0.595	C

Results

From the above analysis it can be seen that the LOS has changed from 0.16 to 0.595 at Highway intersection that is from 'A' to 'C' i.e from 'Excellent' to 'Very Poor' respectively, as per classification. Hence, there will not so much adverse affect on the proposed evacuation roads due to additional traffic. Traffic management has been proposed as given below.

Traffic Management:

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

5.0 ANALYSIS OF ALTERNATIVE TECHNOLOGY AND SITE

5.1 Site Alternatives under Consideration

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

5.2 Analysis of Alternative Technology

5.2.1 Choice of Method of Mining

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

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

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

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

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

Project: Sand Mining Project Patna son 02 Sand Ghat onson River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

6.0 INTRODUCTION

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

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

6.1 ENVIRONMENTAL MONITORING AND REPORTING PROCEDURE

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

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

The key aims of environment monitoring are:

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

Project: Sand Mining Project Patna son 02 Sand Ghat onson River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

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

6.2 MONITORING METHODOLOGIES AND PARAMETERS

Air quality monitoring

Air Quality monitoring is essential for evaluation of the effectiveness of abatement programmes and to develop appropriate control measures. Suspended Particulate Matter (SPM), Sulphur Dioxide (SO₂) and Nitrogen Dioxide (NO₂) 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.

Project: Sand Mining Project Patna son 02 Sand Ghat onson River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

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

Project: Sand Mining Project Patna son 02 Sand Ghat onson River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

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:

Project: Sand Mining Project Patna son 02 Sand Ghat onson River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

Table 6.3, Budget for monitoring

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

6.6 REPORTING SCHEDULES OF THE MONITORING DATA

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

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

7.0 PUBLIC CONSULTATION

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

7.1 HAZARD IDENTIFICATION AND RISK ASSESSMENT METHODOLOGY

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

Step I: Hazard Identification

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

Step II: Risk Assessment

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

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

Step III: Risk Control

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

Step IV: Implementation of risk controls

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

The most effective methods of control are:

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

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

- ✓ 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

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

- 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

Table 7.2, Qualitative Risk Assessment

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

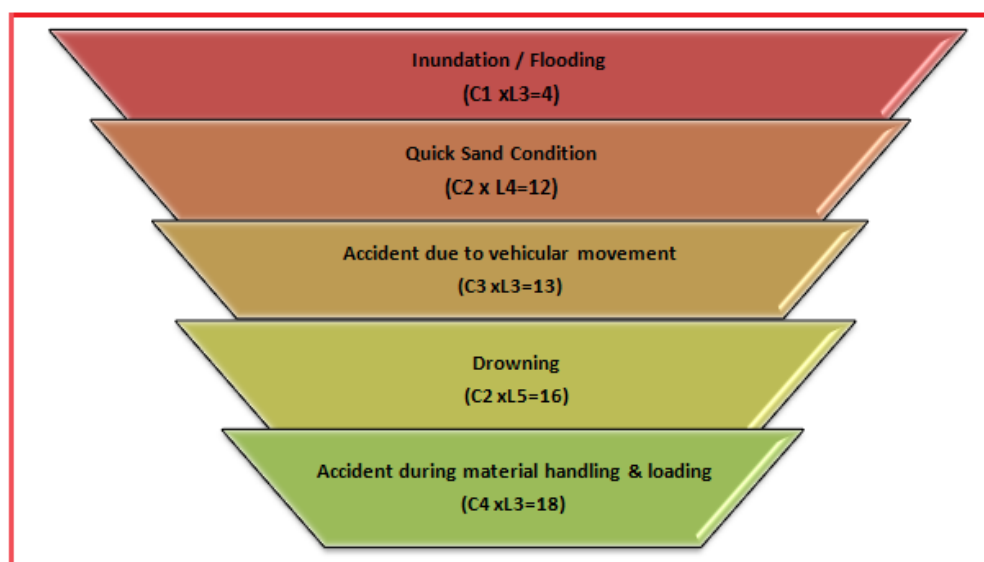
Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

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

RISK RATING:

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



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

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

The Risk rating of such hazards is as follows:

7.2.1 INUNDATION/FLOODING

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

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

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

Measures to prevent consequences of inundation/flooding

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

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

7.2.2 Quick Sand Condition

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

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

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

Measures to Prevent Quick Sand Condition

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

7.2.3 ACCIDENT DUE TO VEHICULAR MOVEMENT

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

Measures to Prevent Accidents during Transportation

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

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

7.2.4 DROWNING

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

Measure to Prevent Drowning

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

7.2.5 ACCIDENT DURING MATERIAL HANDLING & LOADING

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

Measures to Prevent Accidents during material handling & loading

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

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

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

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

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

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

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

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

The proposed Project will provide employment to the local people. The number of workers to be deployed in the mining project will depend upon the quantity of minerals to be extracted from the mine by the lease holder. Both the miners and the unskilled workers will be recruited locally. It has estimated that around 71 people will get employment in this mining project for a period of ten months in a year. It is a positive impact of the project since it is providing employment opportunities to the local people. The project will not affect the vulnerable groups of people.

Increased supply of sand in the market

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

Impact on agriculture

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

Impact on road development

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

Income to Government

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

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

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

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

This will ensure timely medical aid to the affected persons.

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

CONCLUSION

The commissioning of the Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur , Anchal –Paliganj Dist - Patna (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.

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

8.0 GENERAL

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

8.1 PHYSICAL BENEFITS

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

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

8.2 SOCIAL BENEFITS

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

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

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

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

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

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 23,67,67,500/-x 2% = Rs. 47,35,350/-

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.

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

9.0 INTRODUCTION

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

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

9.1 ENVIRONMENTAL MANAGEMENT CELL (EMC)

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

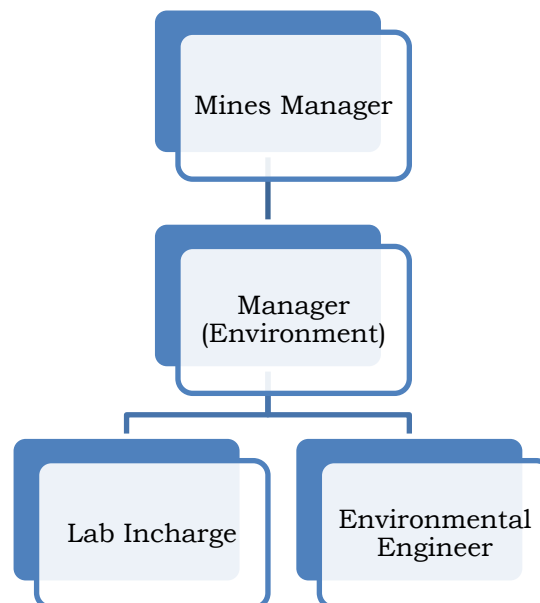


Figure 9.1 Environment Management Cell

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

The EMC will perform the following activities:

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

9.2 AIR POLLUTION CONTROL MEASURES

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

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

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

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

9.3 WATER POLLUTION CONTROL MEASURES

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

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

9.4 NOISE POLLUTION CONTROL MEASURES

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



Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

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

9.5 BIOLOGICAL ENVIRONMENT

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

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

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

- **Greenery development:** The project will not lead to any tree cutting. However, a social responsibility, greenery will be developed along the both sides of road and the bank of river. Community services will be deployed in raising these plantations. Trees of economic importance and native origin such as fruit trees shall be planted.
- Approx. 500 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 Blocks are given below.

Sand Ghat	Area (Ha)	Plants
Block 02	49.93	49.93*10 Plants= 499.3 plants
Total Plants		500 plants

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

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

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

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, and 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 Ranjan Engicon Private Limited, Prop.- Sanjay Kumar S/o- Kishun Chandra Singh Add.- Mahatma Gandhi Nagar, Kanti Factory Road Near Buddha Dental College, Kankarbagh, Patna, Pin- 800020 (Sand Block 02) is mainly dust. Safety of employees during operation and maintenance etc. shall be as per Mines rules and regulations.

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

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

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

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

9.8 SOCIO-ECONOMIC ENVIRONMENT

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

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

9.9 ENVIRONMENT POLICY

Ranjan Engicon Private Limited, Prop.- Sanjay Kumar S/o- Kishun Chandra Singh Add.- Mahatma Gandhi Nagar, Kanti Factory Road Near Buddha Dental College, Kankarbagh, Patna, Pin- 800020 (Sand Block 02) of Sand Ghat believes that responsible environmental stewardship comprises diligent application of well-established natural resource management, controls and practices for the protection of the mined out land, preservation of biodiversity and proper disposal of waste if any following the best environmental practices during the process of mining.

Environmental policy prescribed for standard operating process to bring into focus any violation/deviation of the environment and forest norms/conditions that the company



Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

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.

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

Table 9.2, Budget of EMP (Block-02)

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) Soil pollution iv) Noise Pollution	--	2.0
3	Plantation and salary for one gardener (part time basis).	5.0	0.5
4	Haul road Maintenance Cost	2.0	1.5
TOTAL		7.0	5.5

Note: *500 plants * 1000 Rs (for each plants including hedges and fences) =Rs 500000/-

- 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 *0.80 km haul road) = 200000/-

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

10.0 INTRODUCTION

10.1 Purpose of the Report

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

10.2 IDENTIFICATION OF PROJECT & PROJECT PROPONENT

10.2.1 Identification of Project

The Proposed Sand Mining Project was located on Son River at Patna Son 02, Sand Ghat at Mauza– Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar)

The proposed mining was a cluster of 03 mining lease area of Patna Son 01, Patna Son 02 & Patna Son 03 over an combined area of 176.27 Ha is for river bed sand mining on Son River at Mauza- Muhammadpur, Mahabalipur, Dist- Patna, Bihar.

Cluster Situation: As per District Survey Report Patna the Proposed Sand Ghats of Patna Son 01, Patna Son 02 & Patna Son 03 are comes in cluster situation whose combined cluster area is 176.27 ha. All the lease area of homogeneous minerals is coming within 500 m radius from each other confirming a cluster situation.

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

The Details of cluster is given below:

Sand Block name	Area (Ha)	Production
Patna Son 01	69.9	3397140 TPA
Patna Son 02	49.93	2426598 TPA

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

Patna Son 03	56.44	2742984 TPA
Total	176.27	8566722 TPA

The proposed project is of River bed sand mining and falls under Category- “B1” as per EIA Notification 2006 and its subsequent amendments by Ministry of Environment Forests & Climate Change, GOI. Block No.- 02 Sand Ghat fall in Sand Ghat, Mauja– Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar) over an area of 49.93 hectares.

10.3 BRIEF DESCRIPTION OF PROJECT

The proposed project is open cast semi-mechanized mining of sand with a proposed production of 1545833 Tonnes per annum. The project has been proposed by (Patna Son 02 - Ranjan Engicon Private Limited, Prop.- Sanjay Kumar S/o- Kishun Chandra Singh Add.- Mahatma Gandhi Nagar, Kanti Factory Road Near Buddha Dental College, Kankarbagh, Patna, Pin- 800020. The proposed project is over an area 49.93 ha on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (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 Patna Son 02 - Rs- 23,67,67,500/- (including auction cost).

The proposed mining lease area falls in Survey of India Toposheet 72 C/11, 72C/12, 72C/15, 72C/16.

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

Table: 10.1 Mine lease Co-ordinates (Patna Son 02)

Pillar No	Latitude (N)	Longitude (E)
1	25.31853153	84.70673864
2	25.31853173	84.70673845
3	25.3185365	84.70673377
4	25.31856552	84.70680112
5	25.3186042	84.70689089
6	25.31860432	84.70689117
7	25.31894962	84.70769257

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

8	25.31972666	84.70949595
9	25.3206228	84.71216619
10	25.31744039	84.71523043
11	25.31541326	84.71717125
12	25.31541893	84.71717681
13	25.31540911	84.71718627
14	25.31263107	84.71441268
15	25.31249029	84.71412618
16	25.3126346	84.71346106
17	25.31201656	84.7131621
18	25.31200483	84.7131416
19	25.31205751	84.71308992
20	25.31221458	84.71293583
21	25.31229306	84.71285884
22	25.31243964	84.71271505
23	25.31245725	84.71269778
24	25.31272731	84.71243284
25	25.31281559	84.71234624
26	25.31301973	84.71214598
27	25.31325396	84.7119162
28	25.31356004	84.71161596
29	25.31821498	84.70704942
30	25.3185066	84.70676313
31	25.31852505	84.70674501
32	25.31853016	84.70673999
33	25.31853089	84.70673927

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

Table-10.2: Details of Environmental Setting

Sr. No.	Particulars	Details			
1	Location				
a	Village	Mauza – Muhammadpur			
b	Tehsil	Paliganj			
c	District	Patna			
d	State	Bihar			
2	Elevation above	Patna Son 02 (68 mRL -66 mRL)			
3	Nearest National Highway/State Highway	NH 139 Approx. 0.80 km towards SE direction. SH-81 is approx 70 m in NW direction.			
4	Nearest Railway station	Blocks	Railway Station	Distance (Km)	Direction
		Patna Son 02	Garhani Railway station	Garhani Railway station at distance of approx. 17.20 Km in NW in East direction.	
5	Nearest Airport	Blocks	Airport	Distance (Km)	Direction
		Patna Son 02	Jayprakash Narayan Airport, Patna	Approx. 49.20 Km in NE direction.	
6	Ecological Sensitive Areas (Wildlife Sanctuaries)	There is no any Ecological Sensitive Areas Like National Park, Wildlife Sanctuaries, etc are found within 10 km of the study area.			
7	Seismic Zone	Zone- IV <i>Source</i> <i>BMTC</i> <i>2nd</i> <i>edition</i> https://www.bmtpc.org/disaster%20resistnace%20technolgies/ZONE%20IV.htm			

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

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 Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).
2	Mining Capacity	898740 cum/year or 1545833 TPA
3	Method of mining	Open cast semi-mechanized mining/OTFM
4	Total ML area	49.93 ha
5	Depth of mining	3 m depth
6	Manpower	66 persons
9	Water Requirement	Patna Son 02 – 7.96 ~ 8.00 KLD
10	Source of Water	Tanker/ Nearby village.

10.4.2 Mineral Reserves and production

Mineable reserves have been computed up to 3m depth from surface. Benches having height 1.5m & width 6.0m drawn from the ultimate pit limit. Area of each benches have been calculated multiplied by strike influence to get the volume. The volume multiplied by bulk density (1.72 g/cm^3) to get the tonnage.

The minerals excavated from the river bed will be replenished gradually during the monsoon season every year. And the area pertaining to 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)
Patna Son 02	49.93	1497900	1413333	898740

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

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

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 Patna Son 02 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. 500 trees will be planted around haul road during the plan period.

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

10.6 LAND USE PATTERN

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

10.7 BASELINE ENVIRONMENTAL STATUS

10.7.1 Soil Quality

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

10.7.2 Meteorology

Meteorological data at the site was monitored during Dec 2022 to Jan-Feb 2023 representing winter season. It was observed that the during study period, temperature ranged from 06 °C to 25.0 °C.

10.7.3 Ambient Air Quality

Ambient Air Quality Monitoring (AAQM) has been carried out at 10 locations. The Particulate Matter (PM₁₀) conc. ranged of 50.92 µg/m³ to 86.64 µg/m³. The Particulate Matter (PM_{2.5}) ranged from 25.23 µg/m³ to 43.69 µg/m³. Sulphur dioxide (SO₂) between 6.23 µg/m³ to 12.97 µg/m³. Oxides of Nitrogen (NO₂) between 8.03 µg/m³ to 19.87 µg/m³. The results thus obtained indicate that the concentrations of PM₁₀, SO₂ and NO₂ in the ambient air are well within the National Ambient Air Quality (NAAQ) standards for Residential and Rural areas.

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 7.46 to 7.70. The total dissolved solids are varying from 351.38 mg/l to 436 mg/l.

The Surface water sampling was taken from 5 locations. The analysis results indicate that the pH ranges between 7.11 and 7.62. Dissolved Oxygen (DO) was observed in the range of 6.2 to 8.7 mg/l against the minimum requirement of 4 mg/l. BOD values were observed to be in the range of 2.17 to 5.20 mg/l.

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

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

10.7.5 Noise Quality

Noise monitoring reveals that the minimum & maximum noise levels at day time were recorded as 58.9 dB(A) to 50.1 dB(A) respectively. The minimum & maximum noise levels at night time were found to be 46.4 dB (A) & 36.4 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 Son River. Hence, none of the project activities affect the water environment directly. In the project, it is not proposed to divert or truncate any stream in monsoon season only. No proposal is envisaged for pumping of water either from the *River* (in monsoon) or tapping the ground water.

10.8.3 Impact on Water Quality

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

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

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

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

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

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

10.11 ENVIRONMENTAL PROTECTION COST

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

Table 10.6: Cost of Environmental Protection Measures

Budget of EMP (Patna Son 02)

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) Soil pollution iv) Noise Pollution	--	2.0
3	Plantation and salary for one gardener (part time basis).	5.0	0.5
4	Haul road Maintenance Cost	2.0	1.5
TOTAL		7.0	5.5

Note: *500 plants * 1000 Rs (for each plants including hedges and fences) =Rs 500000/-

- 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 *0.80 km haul road) = 200000/-

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.

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

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 $23,67,67,500/- \times 2\% = \text{Rs. } 47,35,350/-$ 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.

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).



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 Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (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

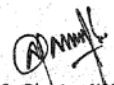
P and M Solution
 First Floor, C-88, Sector-65, Noida, Uttar Pradesh- 201301

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)		Cat.
		NABET	MoEFCC	
1.	Mining of minerals including opencast / underground mining	1	1 (a) (i)	A
2.	River Valley projects	3	1 (c)	B
3.	Metallurgical industries (ferrous & non-ferrous)	8	3 (a)	B
4.	Highways,	34	7 (f)	A
5.	Building and construction projects	38	8 (a)	B
6.	Townships and Area development projects	39	8 (b)	B

Note: Names of approved EIA Coordinators and Functional Area Experts are mentioned in IA AC Minutes dated December 20, 2019 on QCI-NABET website.

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


 Sr. Director, NABET
 Dated: February 3, 2020

Certificate No.
 NABET/EIA/1922/IA0053

Valid till
 Dec 10, 2022

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

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (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

NABET

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

Project: Sand Mining Project Patna Son 02 Sand Ghat on Son River at Mauza – Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar).

Consultant Contact Details:

P and M Solution

Address –C-88, Sector 65 Noida

Mobile no. - +8377871554, 8826287364

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

EXECUTIVE SUMMARY

FOR

SAND MINING PROJECT OF PATNA SON 02

SAND GHAT, DISTRICT - PATNA

At

Mauja– Muhammadpur, Anchal –Paliganj ,

Dist - Patna ,State - Bihar

Area : 49.93 ha

Production: 1545833 TPA

PROJECT PROPONENT :

RANJAN ENGICON PRIVATE LIMITED

Prop.- Sanjay Kumar

S/o- Kishun Chandra Singh

**Add.- Mahatma Gandhi Nagar, Kanti Factory
Road Near Buddha Dental College, Kankarbagh,
Patna, Pin- 800020**

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.

Patna Son – 02

The project has been proposed by Ranjan Engicon Private Limited, Prop.- Sanjay Kumar. The Proposed Sand Mining Project was located on Son River at Block No – 02, Sand Ghat at Mauza- Muhammadpur, Anchal –Paliganj Dist - Patna (Bihar). LOI issued to lessee via letter no 3272/M, Patna dated 19.12.2022. The Draft EIA report has been prepared according to EIA notification 2006 and its subsequent amendment thereof. TOR of the proposed project has been issued by SEIAA Bihar dated 20-05-2023.

Cluster Situation: As per District Survey Report Patna the Proposed Sand Ghats of Patna Son 01, Patna Son 02 & Patna Son 03 are comes in cluster situation whose combined cluster area is 176.27 ha. All the lease area of homogeneous minerals is coming within 500 m radius from each other confirming a cluster situation.

The Details of cluster is given below:

Sand Block name	Area (Ha)	Production
Patna Son 01	69.9	3397140 TPA
Patna Son 02	49.93	2426598 TPA
Patna Son 03	56.44	2742984 TPA
Total	176.27	8566722 TPA

It has been proposed to mine around 1545833 TPA for applied lease. The estimated project cost for the proposed project is **Rs 23,67,67,500/-** (including auction cost)

PROJECT DESCRIPTION

LOCATION

Patna Son 02

The proposed mining lease area falls in Survey of India Toposheet Topo sheet No- 72 C/11, 72C/12, 72C/15. The lease area is located in Mauza – Muhammadpur, Anchal – Paliganj, Dist- Patna, State- Bihar. The mine lease co-ordinates are listed below:

Pillar No	Latitude (N)	Longitude (E)
1	25.31853153	84.70673864
2	25.31853173	84.70673845
3	25.3185365	84.70673377
4	25.31856552	84.70680112
5	25.3186042	84.70689089
6	25.31860432	84.70689117
7	25.31894962	84.70769257
8	25.31972666	84.70949595
9	25.3206228	84.71216619
10	25.31744039	84.71523043
11	25.31541326	84.71717125
12	25.31541893	84.71717681
13	25.31540911	84.71718627
14	25.31263107	84.71441268
15	25.31249029	84.71412618
16	25.3126346	84.71346106
17	25.31201656	84.7131621
18	25.31200483	84.7131416
19	25.31205751	84.71308992
20	25.31221458	84.71293583
21	25.31229306	84.71285884
22	25.31243964	84.71271505
23	25.31245725	84.71269778
24	25.31272731	84.71243284

25	25.31281559	84.71234624
26	25.31301973	84.71214598
27	25.31325396	84.7119162
28	25.31356004	84.71161596
29	25.31821498	84.70704942
30	25.3185066	84.70676313
31	25.31852505	84.70674501
32	25.31853016	84.70673999
33	25.31853089	84.70673927

Area & production: The total ML area is 49.93 Ha. Proposed rate of production will be 1545833 TPA.

Connectivity:

Patna Son 02

Patna Son 02 Sand Ghat is well connected via an approach road of approx. 0.80 Km to NH -139. NH 139 Approx. 0.80 km towards SE direction. SH-81 is approx 70 m in NW direction. Garhani Railway station at distance of approx. 17.20 Km in NW in East direction. JPN International Airport Patna, Approx. 49.20 Km in NE direction.

Salient Features of Project

Patna Son 02

Name of the applicant	Ranjan Engicon Private Limited Prop.- Sanjay Kumar
Address of Lessee	Ranjan Engicon Private Limited Prop.- Sanjay Kumar S/o- Kishun Chandra Singh Add.- Mahatma Gandhi Nagar, Kanti Factory Road Near Buddha Dental College, Kankarbagh, Patna, Pin- 800020
Name of Mine	Sand Mining Project On Son River at Patna Block No.- 02 Sand Ghat
Village	Mauza – Muhammadpur
District & State	Patna, Bihar
Mineral	Sand
Area (ha)	49.93 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 (1.72) to get tonnes.

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

Table Patna Son 02

Bench Level (mRL)	Length (m)	Width (m)	Depth (m)	Volume (cum)	Tonnes
68 – 66.5	879	544	1.5	717264	1233695
66.5- 65	879	534	1.5	696069	1197239
Total				1413333	2430933

Total Mineable Reserve = **1413333** CUM or **2430933** Tonnes

It is a river bed deposit and mined out area shall be replenished each year during monsoon period and depth of quarry shall be filled back by river sand each year and area will restore its original topography.

SITE FACILITIES AND UTILITIES

Water Supply

Water will be provided to workers for drinking & domestic purpose. Water will also be required for dust suppression. A total cluster water of 7.96 ~ 8.0 KLD will be required for the proposed

project. Fresh water will be only used for drinking purpose. The water will be supplied from available sources from nearby village.

Temporary Rest Shelter

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

BASELINE ENVIRONMENTAL STATUS

Environmental data has been collected in relation to proposed mining for Air, Noise, Water, Soil, Flora & Fauna. The baseline environment study was carried out over an area with radial distance of 10 km around the mining lease area during winter season from Dec 2022 to Jan-Feb 2023

Meteorology

The Summarized Meteorological Data for the Monitoring Period Dec 2022 to Jan-Feb 2023) is given below:

Month	Temperature °C		Wind Speed (Km/Hr)	
	Min	Max	Min	Max
DEC 2022	10	20	1	24
JANUARY 2023	05	19	1	26
FEBRUARY 2023	12	22	2	32

Table Baseline Environmental Status

Attribute	Baseline status
Ambient Air Quality	Ambient Air Quality Monitoring reveals that the minimum & maximum concentrations of PM _{2.5} amongst all the 10 AQ monitoring stations were found to be 25.23 µg/m ³ to 43.69 µg/m ³ respectively; PM ₁₀ was in the range of 50.92 µg/m ³ to 86.64 µg/m ³ . As far as the gaseous pollutants SO ₂ and NO ₂ are concerned, the prescribed CPCB limit of 80 µg/m ³ for residential and rural areas has never been surpassed at any station.
Noise Levels	The results of the monitoring program indicated that both the

	daytime and night time levels of noise were well within the prescribed limits of NAAQS, at all the locations monitored.
Water Quality	<p>The ground water from all sources remains suitable for drinking purposes as all the constituents are within the limits prescribed by drinking water standards promulgated by IS: 10500.</p> <p>Surface water analysis from River Son results it is evident that most of the parameters of the samples comply with 'Category B' standards of CPCB, indicating their suitability for outdoor bathing.</p>
Soil Quality	Samples collected from identified locations indicate the soil is sandy type and the pH value ranging from 7.35 to 8.23, which shows that the soil is slightly alkaline in nature.
Ecology and Biodiversity	There is no Eco-Sensitive Areas in the study area.

ANTICIPATED ENVIRONMENTAL IMPACTS

Impact on Air Environment

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

Impact on Water Environment

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

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

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

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

Impact on Land Environment

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

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

Impact on Noise Environment

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

Impact on Biological Environment

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

Impact on Socio Economic Environment

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

POST PROJECT ENVIRONMENTAL MONITORING

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

ADDITIONAL STUDIES

Public Hearing

Public hearing is yet to be conducted.

Risk Assessment

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

Disaster Management Plan

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

PROJECT BENEFITS

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

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

Environmental Benefits:

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

CORPORATE SOCIAL RESPONSIBILITY

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

CER cost for **Patna Son 02** will be 2% of the total project cost. This amount will be used for social welfare. CSR COST is 23,67,67,500/- x 2% = Rs. 47,35,350/-

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

❖ PLANTATION:

- The project will not lead to any tree cutting. However, a social responsibility, greenery will be developed along the both sides of road and the bank of river. Community services will be deployed in raising these plantations. Trees of economic importance and native origin such as fruit trees shall be planted.
- Approx.500 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 (Patna Son 02)

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) Soil pollution iv) Noise Pollution	--	2.0
3	Plantation and salary for one gardener (part time basis).	5.0	0.5
4	Haul road Maintenance Cost	2.0	1.50
TOTAL		7.0	5.5

Note: *500 plants * 1000 Rs (for each plants including hedges and fences) =Rs 500000/-

- Salary of Labour for haul road maintenance 2 labor*300=600 per day

- $600 \times 250 = 1,50,000/-$
- $* 2.5 \text{ lakh per kilometer } (2,50,000 \times 0.80 \text{ km haul road}) = 200000/-$

CONCLUSION

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

कार्यकारी सारांश

रेत खनन परियोजना पटना सोन 02
रेत घाट जिला- पटना
के लिए

मौजा-मुहम्मदपुर, अंचल-पालीगंज,
जिला-पटना, बिहार
क्षेत्रफल- 49.93 हेक्टेयर
उत्पादन: 1545833 टीपीए

आवेदन कर्ता

रंजन एंजीकॉन प्राइवेट लिमिटेड

प्रो०- संजय कुमार, पिता - किशुन चन्द्र सिंह

पता: - महात्मा गांधी नगर, कांटी फैक्ट्री रोड नियर बुद्ध डेन्टल कॉलेज,
कंकड़बाग, पटना, पिन - 800020



एनवायरनमेंट कन्सल्टेंट :

पी & एम सल्यूशन



(कालिटी 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।

❖ ब्लॉक संख्या - 02

परियोजना के प्रस्ताव रंजन एंजीकॉन प्राइवेट लिमिटेड प्रो0 - संजय कुमार ने दिया है। प्रस्तावित रेत खनन परियोजना मौजा- मुहम्मदपुर, अंचल-पालीगंज, जिला-पटना (बिहार) में ब्लॉक संख्या - 02 रेत घाट पर सोन नदी पर स्थित है। पत्र संख्या 3272/एम दिनांक 19.12.2022 के माध्यम से पट्टेदार को एलओआई जारी किया गया।

ईआईए अधिसूचना 2006 और इसके बाद के संशोधन के अनुसार ड्राफ्ट ईआईए रिपोर्ट तैयार की गई है। प्रस्तावित परियोजना का टीओआर SEIAA बिहार दिनांक 25-05-2023 द्वारा जारी किया गया है।

❖ **क्लस्टर स्थिति:** जिला सर्वेक्षण रिपोर्ट पटना के अनुसार पटना सोन 01, पटना सोन 02 एवं पटना सोन 03 के प्रस्तावित बालू घाट क्लस्टर स्थिति में आते हैं जिनका संयुक्त क्लस्टर क्षेत्र 176.27 हेक्टेयर है। सजातीय खनिजों का समस्त पट्टा क्षेत्र एक दूसरे से 500 मीटर के दायरे में आ रहा है जो एक समूह स्थिति की पुष्टि करता है।

क्लस्टर का विवरण नीचे दिया गया है:

ब्लॉक का नाम	क्षेत्र (हे),	उत्पादन (टीपीए)
पटना सोन 01	69.9	3397140
पटना सोन 02	49.93	2426598
पटना सोन 03	56.44	2742984
कुल	176.27	8566722

आवेदित पट्टे के लिए प्रति वर्ष लगभग 1545833 टन खनन प्रस्तावित किया गया है, प्रस्तावित परियोजना के लिए अनुमानित परियोजना लागत 23,67,67,500/- रुपये (नीलामी लागत सहित) है।

❖ परियोजना विवरण

स्थिति:

पटना सोन 02

प्रस्तावित खनन पट्टा क्षेत्र सर्वे ऑफ इंडिया टोपोशीट टोपो शीट संख्या- 72 C/11, 72C/12, 72C/15, के अंतर्गत आता है। पट्टा क्षेत्र मौजा- मौजा-मुहम्मदपुर, अंचल-पालीगंज, जिला-पटना, राज्य- बिहार में स्थित है। खान पट्टा समन्वय नीचे सूचीबद्ध हैं:

स्तंभ	अक्षांश (एन)	देशांतर (ई)
1	25.31853153	84.70673864
2	25.31853173	84.70673845
3	25.3185365	84.70673377
4	25.31856552	84.70680112
5	25.3186042	84.70689089
6	25.31860432	84.70689117
7	25.31894962	84.70769257
8	25.31972666	84.70949595
9	25.3206228	84.71216619
10	25.31744039	84.71523043
11	25.31541326	84.71717125
12	25.31541893	84.71717681
13	25.31540911	84.71718627
14	25.31263107	84.71441268
15	25.31249029	84.71412618

16	25.3126346	84.71346106
17	25.31201656	84.7131621
18	25.31200483	84.7131416
19	25.31205751	84.71308992
20	25.31221458	84.71293583
21	25.31229306	84.71285884
22	25.31243964	84.71271505
23	25.31245725	84.71269778
24	25.31272731	84.71243284
25	25.31281559	84.71234624
26	25.31301973	84.71214598
27	25.31325396	84.7119162
28	25.31356004	84.71161596
29	25.31821498	84.70704942
30	25.3185066	84.70676313
31	25.31852505	84.70674501
32	25.31853016	84.70673999
33	25.31853089	84.70673927

❖ **क्षेत्र और उत्पादन:** कुल क्षेत्रफल 49.93 हेक्टेयर है। उत्पादन की प्रस्तावित दर 1545833 टीपीए होगी।

❖ **संयोजकता**

पटना सोन 02

पटना सोन 02 रेत घाट 0.80 कि.मी. की दूरी पर NH 139 से एक एप्रोच रोड के माध्यम से अच्छी तरह से जुड़ा हुआ है। NH 139 लगभग 0.80 किमी दक्षिण पूर्व दिशा में है SH 81 लगभग 0.70 किमी उत्तर पश्चिम दिशा में है गड़हनी रेलवे स्टेशन, लगभग 17.20 किमी उत्तर पश्चिम दिशा की ओर है।

परियोजना की मुख्य विशेषताएं

पटना सोन 02

आवेदक का नाम	रंजन एंजीकॉन प्राइवेट लिमिटेड प्रो०- संजय कुमार
पट्टेदार का पता	रंजन एंजीकॉन प्राइवेट लिमिटेड प्रो०- संजय कुमार, पिता - किशुन चन्द्र सिंह पता: - महात्मा गांधी नगर, कांटी फैक्ट्री रोड नियर बुद्ध डेन्टल कॉलेज, कंकड़बाग, पटना, पिन - 800020
नाम	पटना सोन 02 रेत घाट, मौजा- मुहम्मदपुर, जिला-पटना (बिहार) में सोन नदी पर रेत खनन परियोजना
गाँव	मौजा - मुहम्मदपुर
जिला और राज्य	पटना, बिहार
खनिज	रेत
क्षेत्र (हेक्टेयर)	49.93 हेक्टेयर

❖ ड्रिलिंग

ड्रिलिंग और ब्लास्टिंग की आवश्यकता नहीं है।

❖ खनिज का उपयोग

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

❖ खनन

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

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

निक्षेप को संस्तर की सतह से 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 (1.72 g/cm^3) से गुणा किया जाता है।

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

बेंचवार रेत का वार्षिक दोहन नीचे दिया गया है:

ब्लॉक नं: पटना सोन 02

बेंच स्तर (mRL)	लंबाई (M)	चौड़ाई (M)	गहराई (M)	मात्रा (घन मीटर)	टन
68 – 66.5	879	544	1.5	717264	1233695
66.5- 65	879	534	1.5	696069	1197239
कुल				1413333	2430933

कुल खनन योग्य रिजर्व = 1413333 घन मीटर या 2430933 टन

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

❖ साइट सुविधाएं और उपयोगिताएँ

- जलापूर्ति

श्रमिकों को पीने व घरेलू उपयोग के लिए पानी उपलब्ध कराया जाएगा। धूल के दमन के लिए भी पानी की आवश्यकता होगी। प्रस्तावित परियोजना के लिए 7.96 ~ 8.0 केएलडी के जल की आवश्यकता होगी। ताजे पानी का उपयोग केवल पीने के उद्देश्य के लिए किया जाएगा। आसपास के गांव के उपलब्ध स्रोतों से पानी की आपूर्ति की जाएगी।

- **अस्थायी विश्राम गृह**

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

- **आधारभूत पर्यावरणीय स्थिति**

वायु, ध्वनि, जल, मिट्टी, वनस्पति एवं जीव-जन्तुओं के लिए प्रस्तावित खनन के संबंध में पर्यावरणीय डाटा एकत्र किया गया है। बेसलाइन पर्यावरण अध्ययन दिसंबर 2022 से जनवरी-फरवरी 2023 तक सर्दियों के मौसम के दौरान खनन पट्टा क्षेत्र के आसपास 10 किमी की रेडियल दूरी वाले क्षेत्र में किया गया था।

- **मौसम विज्ञान**

निगरानी अवधि दिसंबर 2022 से जनवरी-फरवरी 2023 के लिए संक्षिप्त मौसम संबंधी डेटा नीचे दिया गया है:

महीना	तापमान °C		हवा की गति (किमी/घंटा)	
	न्यूनतम	अधिकतम	न्यूनतम	अधिकतम
दिसम्बर 2022	10	20	1	24
जनवरी 2023	05	19	1	26
फरवरी 2023	12	22	2	32

आधारभूत पर्यावरणीय स्थिति

गुण	आधारभूत स्थिति
एम्बिएंट(परिवेशी) वायु गुणवत्ता	एम्बिएंट (परिवेशी) वायु गुणवत्ता निगरानी से पता चलता है कि सभी 10 AQ निगरानी स्टेशनों में PM2.5 की न्यूनतम और अधिकतम सांद्रता क्रमशः 25.23 $\mu\text{g}/\text{m}^3$ से 43.69 $\mu\text{g}/\text{m}^3$ पाई गई; PM10 50.92 $\mu\text{g}/\text{m}^3$ to 86.64 $\mu\text{g}/\text{m}^3$ की सीमा में था जहां तक गैसीय प्रदूषकों SO ₂ और NO ₂ का संबंध है, आवासीय और ग्रामीण क्षेत्रों के लिए 80 $\mu\text{g}/\text{m}^3$ की निर्धारित CPCB सीमा किसी भी स्टेशन पर पार नहीं की गई है।
शोर का स्तर	निगरानी कार्यक्रम के परिणामों ने संकेत दिया कि निगरानी किए गए सभी स्थानों पर शोर के दिन और रात दोनों समय एनएएक्यूएस की निर्धारित सीमा के भीतर थे।
पानी की गुणवत्ता	सभी स्रोतों से भूजल पीने के उद्देश्यों के लिए उपयुक्त रहता है क्योंकि सभी घटक IS: 10500 द्वारा प्रख्यापित पेयजल मानकों द्वारा निर्धारित सीमा के भीतर हैं। सोन नदी के सतही जल विश्लेषण के परिणामों से यह स्पष्ट होता है कि नमूनों के अधिकांश पैरामीटर सीपीसीबी के 'श्रेणी बी' मानकों का अनुपालन करते हैं, जो इंगित करता है यह जल स्नान के लिए उपयुक्त हैं।
मिट्टी की गुणवत्ता	चिन्निहित किए गए स्थानों से एकत्र किए गए नमूने इंगित करते हैं कि मिट्टी रेतीली प्रकार की है और पीएच मान 7.35 से 8.23 के बीच है, जो दर्शाता है कि मिट्टी प्रकृति में थोड़ी क्षारीय है।
पारिस्थितिकी और जैव विविधता	अध्ययन क्षेत्र में कोई पर्यावरण-संवेदनशील क्षेत्र नहीं है।
सामाजिक आर्थिक	नदी तल पर रेत खनन परियोजना के

	<p>कार्यान्वयन से स्थानीय लोगों को प्रत्यक्ष और अप्रत्यक्ष दोनों तरह के रोजगार के अवसर मिलेंगे।</p> <p>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।</p>
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❖ अनुमानित पर्यावरणीय प्रभाव

• वायु पर्यावरण पर प्रभाव

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

• जल पर्यावरण पर प्रभाव

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

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

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

परियोजना गतिविधि केवल 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।

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

❖ शोर पर्यावरण पर प्रभाव

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

❖ जैविक पर्यावरण पर प्रभाव

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

❖ सामाजिक आर्थिक पर्यावरण पर प्रभाव

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

पोस्ट प्रोजेक्ट पर्यावरण निगरानी

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

❖ अतिरिक्त अध्ययन

• सार्वजनिक सुनवाई

जन सुनवाई अभी बाकी है।

❖ जोखिम आकलन

पूर्ण खनन कार्य एक योग्य खदान प्रबंधक होल्डिंग के प्रबंधन नियंत्रण और निर्देशन में किया जाएगा। डीजीएमएस नियमित रूप से स्थायी आदेश, मॉडल स्थायी आदेश और आपदा, यदि कोई हो, के मामले में

खान प्रबंधन द्वारा पालन किए जाने वाले परिपत्र जारी करता रहा है। साथ ही खनन कर्मचारियों को सतर्क रखने के लिए समय-समय पर रिफ्रेशर कोर्स में भेजा जाएगा।

❖ आपदा प्रबंधन योजना

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

❖ परियोजना लाभ

- **भौतिक लाभ:** सड़क परिवहन, बाजार, हरित आवरण में वृद्धि और सामुदायिक संपत्तियों का निर्माण।
- **सामाजिक लाभ:** रोजगार क्षमता में वृद्धि, राजकोष में योगदान, स्वास्थ्य संबंधी गतिविधियों में वृद्धि, शैक्षिक उपलब्धियां और मौजूदा सामुदायिक सुविधाओं का सुदृढीकरण।

❖ पर्यावरणीय लाभ:

- ❖ नदी चैनल को नियंत्रित करना और बैंकों की सुरक्षा करना।
- ❖ बाढ़ के कारण आसपास की कृषि भूमि के डूबने को कम करना।
- ❖ नदी के स्तर के उन्नयन को कम करना।
- ❖ अवैध खनन गतिविधि पर एक जांच।

❖ कॉर्पोरेट की सामाजिक जिम्मेदारी

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

पटना सोन 02 के लिए सीईआर (CER) लागत कुल परियोजना लागत का 2% होगी। इस राशि का उपयोग समाज कल्याण के लिए किया जाएगा। सीएसआर (CSR) लागत 23,67,67,500/- x 2%= रु. 47,35,350/-

प्रत्येक गतिविधि के लिए प्रस्तावक द्वारा निर्धारित की जाने वाली धनराशि का निर्धारण जन सुनवाई के दौरान स्थानीय प्राधिकारी/लोगों एवं हितग्राहियों से चर्चा के बाद किया जायेगा। सीईआर कार्यक्रम के तहत की जाने वाली गतिविधियों का समवर्ती मूल्यांकन करने की योजना बनाई गई है।

❖ वृक्षारोपण:

- परियोजना से कोई पेड़ नहीं कटेगा। तथापि, असामाजिक उत्तरदायित्व, सड़क के दोनों ओर और नदी के किनारे हरियाली विकसित की जाएगी। इन वृक्षारोपण को बढ़ाने के लिए सामुदायिक सेवाओं को तैनात किया जाएगा। आर्थिक महत्व के पेड़ और देशी मूल के पेड़ जैसे फलों के पेड़ लगाए जाएंगे।
- लगभग। योजना अवधि में हॉल रोड के आसपास 500 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 - पटना सोन 02)

क्रम संख्या	विवरण	पूंजी लागत (लाख)	आवर्ती लागत (लाख)
1	प्रदूषण नियंत्रण और धूल दमन	Nil	1.5
2	प्रदूषण निगरानी i) वायु प्रदूषण ii) मृदा प्रदूषण iii) जल प्रदूषण iv) ध्वनि प्रदूषण	--	2.0
3	वृक्षारोपण और वेतन एक माली के लिए (अंशकालिक आधार पर)	5.0	0.5
4	परिवहन सड़क रखरखाव लागत	2.0	1.50
कुल		7.0	5.5

नोट: *500 पौधे * 1000 रुपये (हेज और बाड़ सहित प्रत्येक पौधे के लिए) = 5,00,000/- 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*0.80 किमी लंबी सड़क) = 2,00,000/-

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 (एम्ब्रेंट) 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।
