NATIONAL MISSION FOR CLEAN GANGA

Ministry of Jal Shakti,

Department of Water Resources, River Development & Ganga Rejuvenation, Government of India

Final Environmental and Social Assessment and Management Plan

Sewerage and Sewerage Treatment at Buxar, Bihar

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LIST OF ABBREVIATIONS

BSPCB	---	Bihar State Pollution Control Board
BUIDCO	__	Bihar Urban Infrastructure Development Corporation Ltd
CBO	---	Community-Based Organization
CPCB	---	Central Pollution Control Board
CP GRAM	---	Centralized Public Grievance Redress and Monitoring System
CTE	---	Consent of Establish
CTO	---	Consent of Operate
DM	---	District Magistrate
DoE	---	Department of Environment
DPR	---	Detailed Project Report
EA	---	Executing Agencies
EMP	---	Environmental Management Plan
EPA	---	Environment (Protection) Act
ESMF	---	Environmental and Social Management Framework
ESAMP	---	Environmental & Social Assessment and Management Plan
ESMAP	---	Environmental & Social Management Action Plan
GAAP	---	Governance and Accountability Action Plan
GoI	---	Government of India
GBV	---	Gender Based Violence
GRM	---	Grievance Redressal Mechanism
GRO	---	Grievance Redress Officer
ha.	---	Hectare
I&D	---	Interception & Diversion
ICC	---	Internal Complaints Committee
IEC	---	Information, Education and Communication
IMD	---	Indian Metrological Department
INTACH	---	Indian National Trust for Art and Culture Heritage
IPS	---	Intermediate Pumping Station
LASA	---	Lea Associates South Asia Private Limited
LPVA	---	Land Price and Valuation Approval Committee
MC	---	Municipal Corporation
MDA	---	Meerut Development Authority
MFP	---	Minor Forest Produce
MLD	---	Million Liter per day
MoEF&CC	---	Ministry of Environment, Forests and Climate Change
MoU	---	Memorandum of Understanding
MPS	---	Main Pumping Station
NCR	---	National Capital Region
NGO	---	Non-Government Organization
NGRBA	---	National Ganga River Basin Authority
NGRBP	---	National Ganga River Basin Projects
NH	---	National Highways
NMCG	---	National Mission for Clean Ganga
NOC	---	No Objection Certificate
O&M	---	Operation & Maintenance
OHS	---	Occupational Health & Safety
OP	---	Operational Policy
PAFs	---	Project Affected Families
SEIAA	---	State Level Environment Impact Assessment Authority

SPCB	---	State Pollution Control Board
SMCG	---	State Mission for Clean Ganga
SPS	---	Sewage Pumping Station
ST	---	Scheduled Tribe
STP	---	Sewage Treatment Plant
ToR	---	Terms Of Reference
ULBs	---	Urban Local Bodies
WB	---	World Bank
YAP	---	Yamuna Action Plan

EXECUTIVE SUMMARY

INTRODUCTION

1. The Government of India has given Ganga the status of a "National River" and in exercise of the powers conferred by sub-sections (1) and (3) of Section 3 of the Environment (Protection) Act, 1986, the Central Government constituted the National Ganga River Basin Authority (NGRBA) on 20th February 2009, as a planning, financing, monitoring and coordinating authority for strengthening the collective efforts of the Central and State Governments for effective abatement of pollution and conservation of the Ganga river by adopting a river basin approach with comprehensive planning and management. In regards to this initiative, under pollution abatement programme NGRBA proposes "**Sewerage and Sewerage Treatment at Buxar for Pollution Abatement of River Ganga in Bihar**".

2. The Government of India has launched "Namami Gange" as an Integrated Conservative Mission Programme in the year 2015. The Namami Gange programme is an umbrella programme that covers the previously sanctioned ongoing projects as well as the projects in new components with a multi sector mandate to address both water quality and water quantity issues. The programme aims at integrating previous and currently ongoing initiatives by enhancing efficiency, extracting synergies and supplementing them with more comprehensive and better coordinated interventions. Namami Gange Programme has been segregated into three different components:

- **Component 1: Institutional Development**: Pertains to ongoing projects of cleaning of river Ganga & its tributaries, including World Bank Assisted NGRBA programme having remaining central liabilities.
- **Component 2: Infrastructure Development**: Pertains to new initiatives to be undertaken in 5 major sectors i.e. Infrastructure Development (Sewage Treatment, River Front Development, and Industrial Wastewater Treatment & Solid Waste Management), Institutional Development, Ecological Sustainability, Research & Development and Communication & Public Outreach.
- **Component 3: Program communication and management:** NMCG conducts a range of vibrant communication activities ranging from ground-level community engagement exercises, social and traditional media outreach, public debates and lectures, to a flagship mass media campaign.

3. The Namami Gange Programme will be implemented in the Ganga Basin in India. The overall technical assistance and program development under the proposed project will focus on the entire Ganga Basin; however specific sub-project investments under this project will focus on critical stretches of six basin states of Uttarakhand, Bihar, Uttar Pradesh, Jharkhand, West Bengal and Madhya Pradesh in India.

4. As per the Environmental and Social Management Framework (NGRBA, 2017)[1], the implementation of such river pollution mitigation projects under the NGRBP is anticipated to encounter a variety of environmental and social issues/problems. Therefore, the study of the environment and social

[1] For the Environmental and Social Management Framework (ESMF) document please refer https://www.nmcg.nic.in/writereaddata/fileupload/25_Namami_Gange_ESMF__August_17_2017__1___1_.pdf

sector is required for analysing the impacts of the proposed project and suggesting the management plans to handle any negative impacts. In this regard, the Environmental and Social Assessment and Management Plan (ESAMP) has been prepared.

5. The ESAMP will provide a clear understanding of the prevailing and expected environmental and social impacts as well as their probable causes, which have to be considered while preparing and implementing the proposed interventions for strengthening the existing and proposed sewerage infrastructure at Buxar.

PROJECT AREA

6. The Buxar city is the headquarters of the Buxar district in the state of Bihar. The city situated where Ganga River enters into Bihar and the river literally border the Bihar with Uttar Pradesh and located about 117 km from Patna the State capital of Bihar, 393 km from Lucknow the capital of Uttar Pradesh. Buxar is an old town situated on the right bank of the Ganges River, while Balia and Gazipur of Uttar Pradesh situated on the left bank of the river. It is a place of historical, cultural and administrative importance since the time immemorial.

7. The city is governed by Nagar Parishad situated in the Buxar block of Buxar district, Bihar. The project block/tehsil exists with Buxar Nagar Parishad and Sarimpur Census town and adjoining 132 villages. The Nagar Parishad of Buxar (as of Census 2011) has a population of 102,861 and the No. of Households is 16710.

PROJECT DESCRIPTION

8. The Project area lies between latitude 25^0 18' to 25^0 45' north and longitude 84^0 20' to 84^0 40' east in the Southern Ganga plain in the Indo-Gangetic plains of India. The State of Bihar is classified into two unequal regions: (i) the northern Ganga River, (ii) the Southern Ganga River by the river Ganges which flows through the middle from west to east. Its geographical area is 1624 Km^2. Physiography of the district is alluvial plain having a gentle slope towards the north. The plain land is marked by the presence of several minor depressions. The topography of the Buxar Town is flat with average elevation level as 65.0 m above mean sea level (AMSL).

9. The sewerage project was started earlier in March 2010 with the approved estimation of Rs. 74. 95 Cr. (with 5 years O&M cost) for laying of 95.21 km of sewerage network along with 16 MLD STP. The project was to be completed within 36 months period. However, the project was not completed due to various reasons and slow progress from the Contractor's side. Accordingly, BUIDCo has terminated the contract of the existing contractor. Further re-tendering process for the remaining works has been initiated by the BUIDCo with the revised project approval for Rs. 164.23 Cr. including 15 years for O&M cost and Rs. 17.29 Crores of expenditure which has been incurred in the previous works, with cost-sharing of 70:30 between State and Central Government.

10. Presently, the status of the existing sewerage network and treatment plant is about 60% works in the STP and 41% of sewer network (39.438 km out of 95.22 km as per earlier approved network) is completed in Buxar city. The details of completed works in the STP and IPS locations are presented in the table below.

Details of completed works in the STP and IPS locations

Completed Works	Details
STP works	
Chlorine Contact Tank	Final life wall completed
Secondary clarifier	Final life completed
Return Sludge sump	Final life completed
Sludge Thickener tank	5th lift shuttering completed
Aeration Tank	RCC, 3rd Lift wall casting completed
Administration Completed	RCC up to plinth beam completed
Centrifuge shed	RCC up to plinth beam completed
Chlorination room and Chlorination tonner shed	Up to FFI brick work
Grid Separator	Neutralization pit 1st lift casting completed
SPS/IPS works	
SPS/IPS 1 near ITI	30% work completed
SPS/IPS 2 near Dhobi Ghat	No work done yet
Grit Separator	Neutralization pit 1st lift casting completed

Source: Revised Administration approval, NMCG 2019

11. According to the recent development and revised administrative approval, the earlier project is proposed to commission the remaining works in the STP and IPS locations to utilize its full design capacity of 16 MLD and laying of remaining sewer network of 55.782km. the Scope is included with the components of the remaining works in the Sewerage project at Buxar, Bihar under Namami Gange Program includes:

12. The proposed project components (according to the revised Administrative Approval and Expenditure Sanctioned for the project dated 31st December 2019) of sewerage infrastructure of the Buxar for Sewerage and Sewerage Treatment at Buxar for Pollution Abatement of River Ganga in Bihar.

13. The major components of the proposed "Sewerage and Sewerage Treatment at Buxar for Pollution Abatement of River Ganga in Bihar" under Namami Gange Program include:

- Laying of the sewer network of 66.62 km (Revised scope is 106.06km out of which 39.438km already laid). This also includes 2 km laying through trenchless technology)
- House connection chambers.
- Completion of the remaining works in the STP (16 MLD), mechanical and electrical works including additional works for meeting the new effluent standard prescribed by NGT.
- Completion of the works in the SPS.
- Operation & Maintenance (O&M) of the Structures for 15 years.
- Environmental Monitoring and Management Measures.

14. As per recent development and administrative approval, it is proposed to commission the remaining works in the STP and IPS locations to utilize its full design capacity of 16 MLD and laying of remaining sewer network (39.438 km laid out of 95.22 from earlier approved network length).

15. As per recent development and administrative approval, it is proposed to commission the remaining works in the STP and IPS locations to utilize its full design capacity of 16 MLD and laying of remaining sewer network (39.438 km laid out of 95.22 from earlier approved network length).

16. It was decided in the 25th Executive Committee (EC) meeting of NMCG that installation of trash and its regular O&M at the mouth of all drains and adequate provision for co-treatment of Septage in the STP facility may also be made part of project proposal for implementation.

17. It was also decided in the meeting that the State government will pari-pasu implement the project for utilization of treated wastewater from the project for irrigation, industrial purpose as per its policy. Besides, it was directed by EC that the latest effluent standards as per the NGT order shall be followed and for that necessary flushing the tank shall be placed in the STP to meet the requirements of meeting the norms.

EXISTING SCENARIO OF SEWERAGE FACILITIES

18. The Sewerage system in Buxar is undeveloped and the sewage and wastewater disposed of through different sanitation methods, of which one the most adopted on-site treatment and disposal method are Septic Tank. The supernatant from the septic tanks is discharged to the roadside drains/sewer lines and further this wastewater is drained to the nearest depression creating pond/slumps. This causes the bad smell, unhygienic condition, and breeding of mosquitoes.

19. In general, the sullage water fixtures and fittings are connected with an open storm water collection system. All the sullage from household activities is discharged in roadside drains which are finally collected in nearby local surface depressions/slumps. These ponds/depressions create unsightly conditions in the locality. These ponds of collected sullage are a potential threat to local public health as these are breeding grounds of mosquitoes etc.

20. Apart from the above septic tanks from the households, there are community toilets in the city located in three different areas such as near the old bus stand, near Ramrekha Ghat and near Railways Station.

21. The untreated sewerage disposal of town and from un-sewer areas are discharged directly into the drains creating an unhygienic environment. To reduce the pollution load of major drains of Buxar, the sewerage network necessities renovation and strengthening. So that the wastewater would be treated before it is discharged into the River Ganga.

22. Bihar Urban Infrastructure Development Corporation Ltd (BUIDCo) is a flagship company owned by the Government of Bihar is the agency responsible for the implementation of sewerage projects under the Namami Gange program. Further, Buxar Municipal Corporation operates and maintains the pumping stations and the treatment plant. State Mission for Clean Ganga is the overall responsibility of monitoring the activities of the sewerage project in Buxar.

23. In the Buxar Nagar Parishad area there are five (5) drains namely, Nath Baba Drain, Tadka Drain, Sati Ghat Drain, Sidhnath Drain, and Saripur Drain. Through these drains untreated sewage are being discharged into the Ganga River. The total sewage/wastewater discharges through aforesaid drains have assessed to 11 MLD. The details of the drains are hereunder.

Details of drains in Buxar Nagar Parisad area

Sl. No.	Name of the drain	Average Flow of Discharge (in MLD)	Recipient	Catchment Area
1	Nath Baba Drain	2	Ganga River	Teachers Colony, Shweta Nagar, Virat Nagar, Mitra Lok Colony, Civil Line, Gajadharganj, Misharaulia, Pandey Patti, Naya Bazar, Buxar Post office area.
2	Tadka Drain	4	Ganga River	Ramrekha Ghat Mandir Area, Jahaji Ghat Area, Pipal Pati, M.P. High School Area, Pustakalaya Road,
3	Sati Ghat Drain	1	Ganga River	Thatheri Bazar, Gola Bazar, Sati Ghat Road
4	Sidhnath Drain	1	Ganga River	Ram Janaki Mandir area, Tulsi Ghat area, Amla Toli, Jhana Road, Maharaj Hata Mohallah, Civil Line, Badi Bazar
5	Saripur Drain	3	Ganga River	Sarimpur , Godhanpurva, Sohnipatti, Main Road, Mathia Mahalla, New Bus Stand, Sydicate, Baba Nagar, Niranjanpur.
	TOTAL	**11**		

Source: *Action Plan for Conservation of River Ganga in Bihar, Bihar State Ganga River Conservation and Program Management Society & Bihar State Pollution Control Board. (Status of drains discharging based on the year 2016-17).*

NECESSITY OF THIS PROJECT

24. Buxar city does not have a sewer system for collection, transportation, treatment and disposal of domestic wastewater. The present system of disposal of sewage is through open drains and septic tanks. The drains dispose in lower areas and ponds and thereby creating crude pollution of the environment and water bodies. Households have septic tanks that discharge in open drains and are often overflowing. This causes the bad smell, unhygienic condition, and breeding of mosquitoes. Due to tremendous population growth and increased areas of habitation, different sections of the existing nala network are partially and/or fully chocked creates a pathetic situation in the city.

25. In the absence of a safe disposal system of sewage as mentioned above, the people of Buxar are facing an unhealthy and unhygienic environment; therefore, public representatives are also demanding facilities of a sewerage system on a priority basis. The town requires sound drainage and sewerage network. After execution of the sewerage system by providing an underground sewer pipeline network followed by the sewerage treatment plant, there will be a marked improvement in water quality of river Ganga and the public of Buxar would find great relief from the unhealthy and unhygienic environment.

APPROACH AND METHODOLOGY

26. The Environmental and Social Assessment and Management Plan (ESAMP) is prepared by LEA Associates South Asia Private Limited, New Delhi, based on a Detailed Project Report that has been prepared by Bihar Urban Infrastructure Development Corporation Ltd., (BUIDCO), Patna. The Environmental and Social Management Framework (ESMF of NGRBA, 2011 and subsequently revised in March 2017) is intended to identify and assess the several environments and social impacts (both positive and negative) that may results for the proposed pollution abatement of River Ganga at Buxar, under Namami Gange Programme (earlier National Ganga River Basin Project-NGRBP), as well as to provide a corresponding management plan to handle any adverse/negative impacts. The methodology adopted for conducting Environmental and Social Assessment and Management Plan (ESAMP)for the proposed interventions includes –

- Describe the sub-project and its components;

- Provide the applicable policies and legal guidelines to the proposed sub-project and include the specific clearances/approvals that has to be obtained by the executive agency/contractor.
- Describe the baseline environmental and social conditions of the sub-project areas and the proposed project facilities;
- Carryout public consultations and participation with different stakeholder groups at the local, regional and district level.
- Identification and analysis of key environmental and social issues viz. presence of any ecologically sensitive areas in the vicinity of the project site, as well as land availability issues(if any) associated with the project;
- Alternative analysis that were examined in the course of developing the proposed project towards in siting of project location, design, technology adopted, selection of construction techniques and phasing and operating and maintenance procedures.
- Develop Environmental and Social Management Plan (ESMP) outlining suitable mitigation and monitoring measures to be adopted by the relevant implementing actor;
- Suggesting suitable institutional arrangement for the implementation of ESAMP at varied levels, this includes man power requirement, skills and training requirements, organization mechanisms and information dissemination requirements

POLICY, LEGAL AND REGULATORY REQUIREMENTS

27. The key applicable legal requirements to the environmental and social aspects of the investments implemented in the project are as follows:

- Environmental Protection Act, 1986 (an umbrella Act) to protect and improve the overall environment
- Environmental and Social Management Framework for Namami Gange Programme

28. The Operational Policies and the guidelines of the World Bank applicable to the project are as follows:

- Environmental Assessment (OP 4.01) – OP. 4.01 is an Umbrella Policy applicable for all infrastructure projects under Namami Gange Programme. Environment and Social Due Diligence (ESDD) for projects under DBOT/PPP/Hybrid Annuity Mode followed by the preparation of a detailed ESAMP report during the detailed design stage (irrespective of the final design by the Concessionaire/Contractor).
- The World Bank's Environmental, Health, and Safety (EHS) Guidelines for Water and Sanitation is also applicable for the proposed project. This guideline will provide guidance on EHS issues; principally occur during the construction, operation and maintenance phases, of the sewage collection through a system of pipes, pumps, and other associated infrastructure (sewerage) to a centralized storage and/or treatment system.

29. The applicable compliance with the regulatory requirements to the project are as follows:

- The project does not require any environmental clearance or forest clearance. At the same time, the project requires to obtain required consents and permissions from competent authorities. The specific requirements are mentioned as under, for which the Concessionaire should comply with before initiating the construction:

- Consent to Establish (CTE) and Consent to Operate (CTO) for the establishment and operation of STP is mandatory to obtain under Water (Prevention and Control of Pollution) Act 1974 and the Air (Prevention and Control of Pollution) Act 1981 of Government of India.
- Permission for use of water for construction purposes from irrigation department/CGWA (for Surface or Ground Water) respectively.
- Labour license requires to be obtained by the Contractor before construction

PROJECT SCREENING

30. The project screening was carried out to understand the nature, scale, and magnitude of environmental and social issues associated with the project. The screening activity was conducted as per the guidelines provided in the Environmental and Social Management Framework (ESMF of NGRBA, 2017) and on the secondary data analysis, field assessments and stakeholder interactions/consultations. Thereafter, based on the aforementioned, the environmental and social impacts were identified and analyzed to develop an Environmental and Social Assessment and Management Action Plan (ESAMP) outlining suitable mitigation measures to be adopted by the relevant implementing actions associated with the present project.

31. Based on the Environmental and Social Screening carried out as part of this Assessment and Management exercise using the screening matrix of the Environmental and Social Management Framework of NGRBA, the present project of Sewerage and Sewerage Treatment at Buxar, falls under 'Low Impact' category. Project have temporary environmental impacts due to construction and laying of sewer network and does not require to purchase any private land for setting up the STP and IPS locations and not envisage any displacement of squatters and encroachers due to laying of the sewer network. This project has an overall positive impact by tapping the sewer network and preventing its flow into the river Ganga. Overall project rate and assessment based on the environmental and social features are discussed below:

32. The project shall be referred for the overall rating and assessment is **low Category** due to the not applicability of the following criteria:

- The project location is not located nearby by any eco-sensitive zone or in any adjoining eco-sensitive zone and there is no such area within 10 km.
- The project is an augmentation of already initiated the Sewerage system through the previous contract (60% of civil works completed at STP and 30 % works done at IPS at ITI ground) which is not located within the notified Forest area and no forest clearance is required. No tree cutting is envisaged. The sewer lines and manholes will be constructed at the center of the road.
- Buxar city is not under the list of Critically Polluted Areas (Based on CEPI index assessed in 2011 by CPCB).
- The project is not an environmental sensitive project and does not require clearance as per Environmental Impact Assessment Notification 14th September' 2006 and further amendments.
- Geographically, the city is lies in middle Gangetic plain and situated in the western most region of Bihar State, therefore it is not covered under Coastal Regulation Zone.
- The proposed STP site is not located within regulatory zone of ASI structure (300 m).
- The project STP site involves no private land acquisition and any resettlement/displacement and loss of livelihood.

BASELINE ENVIRONMENTAL AND SOCIAL FEATURES OF PROJECT AREA

33. The baseline information forms the basis to analyse the probable impacts of the proposed project vis-à-vis the present background environmental and social quality of the study area. The baseline information of existing environmental quality and social features related to the physio-chemical aspects, ecological aspects, socio-economic and cultural aspects of the project area has been collected and collated from various secondary sources and available literature. The information on the baseline environmental and social conditions were gathered through primary surveys at strategic locations considering various project components like laying of sewer line, construction of IPS, STP, etc.

34. In the baseline environmental scenario, it reflects the status of the climate, geological features, water quality, and air and noise levels and existing green cover in the study area. Buxar is a city in the state of Bihar towards the eastern part of India and geographically located at coordinates 25.35 North latitude and 83.59 East longitudes. The city is situated at the extreme west end of the district as well as the State. It is located at around 117 km from the state capital Patna. It is surrounded by Ballia and Ghazipur districts of Uttar Pradesh along its north western and western boundaries respectively. Also, River Ganges forms its western and north-western boundary, separating it from the state of Uttar Pradesh.

Meteorology The climate in Buxar is generally warm and temperate. As compared to winters, the summers have much more rainfall. The average temperature in Buxar is 26.2 °C (79.2 °F) and the annual rainfall is 923 mm (36.3 inches). The driest month is December, with 3 mm of rain. In August, the precipitation reaches its peak, with an average of 268 mm. Thus there is a difference of 265 mm of precipitation between the driest and the wettest months. The variation in annual temperature is around 16.9 °C (62.4 °F).

Topography: Buxar is a part of the southern Ganga Plains. Physiography of the area is characterized by alluvial plains gently sloping towards the north. The plain land is marked by the presence of several minor depressions. The average elevation of the land surface in the town is about 65.0 m above mean sea level (AMSL).

Geomorphology: Buxar forms a part of the axial belt of the Indo-Gangetic plain and consists of Newer and older alluvium of Quaternary age. The lithology of the region is characterized by Recent to Upper Pleistocene of newer alluvium comprising of sand, silt and clay with coarse textured facies.
Seismic Hazard: As per the seismic hazard map of India, Buxar falls in Seismically Active zone III (Moderate Intensity Zone).

Hydrology/Drainage Condition: The Bihar plain is divided into two unequal halves by Ganga which flows from west to east. In Bihar, Ganga traverses a distance of 425 Km. from Chausa (Buxar) to downstream of Kahalgaon (Bhagalpur).

Air quality: Ambient air quality monitoring at the proposed STP location at Sarimpur was carried out to assess the existing air quality of the project area. This will also be useful in assessing conformity to standards of the ambient air quality during the construction and operation phases. Ambient Air Quality Monitoring reveals at the STP site for the concentrations of PM2.5 and PM10 are lower than the National Ambient Air Quality standard of 60 µg/m3 and 100 µg/m3 respectively. The gaseous pollutants SO2, NO2, CO are concerned and the concentrations were found within the prescribed limit of CPCB.

Noise Levels: Ambient noise levels were measured around the proposed project site**.** The noise levels recorded during the day and night time respectively. The noise levels near the residential /Institutional/commercial area of the proposed project locations near IPS (near Dhobi Ghat, and ITI) and STP site were found within the prescribed limits of noise quality during the day time (except at IPS near Dhobi Ghat slight increases with the prescribed standards).

Soil quality: Randomly a soil sample was collected from the proposed STP site at Sarimpur, up to a depth of 15 cm and then sent to the laboratory for analyzing various physical and chemical characteristics of the soil of the project location. Soil texture is Clay Loam. The analysis result shows that soil is basic as pH value is 7.11 with organic matter 1.20 %. The concentration of Nitrogen 323.5 Kg/Ha, Phosphorus 94 Kg/Ha and Potassium 120 Kg/Ha is in good amount in the soil samples.

Surface and groundwater quality: A review of the chemical analysis from the water samples reveals that the surface and groundwater collected from the premises of proposed STP (16 MLD) located at Sarimpur remains suitable for drinking purposes after conventional treatment as all the constituents are within the limits prescribed for drinking water standards promulgated by Indian Standards.

Biological Environment: Buxar fall in Agro-Climatic Zone III B (Southern West) as per the Agro-Climatic Zone of Bihar and Zone 7-Gangatic Plain as per the Biogeographic classification of India and 7A-Gangatic Plain – Upper Gangetic Plain as per the Biogeographic Province map of India. The total geographical area of Buxar district is 1,703sq.km of which the distribution of forest types i.e. very dense forest 0 sq.km, moderate dense forest 3 sq.km and open forest 3sq.km which is 0.35 % of the total geographic area.

It was noticed during the site observations that about 15 to 18 trees are reported within the proposed STP (16 MLD) premises, mostly planted to maintain the green cover. Most of these trees are planted along the periphery, which would not involve tree felling for construction work.

Aquatic Habitat: Based on the Report submitted by the Wildlife Institute of India (WII) it can conclude that habitat of Gangetic Dolphins exists in Ganga River in Buxar District. These Gangetic Dolphins are Schedule – I Species as per the Schedule to The Wildlife (Protection), Act – 1972 and need conservation. As per the IUCN Red List - 2020, Gangetic Dolphin (*Platanista gangetica sp. Gangetica*) is declared endangered species with showing decrease in population trends.

Archaeological Sites: During the site assessment and secondary information, the proposed STP site is not located within regulatory zone of ASI structure (300 m). Therefore, as of now no prior permission is required under ASI.

Population: The demographic and cultural environmental situation was studied as per available Census 2011 data for the project city. The total population of Buxar Municipal Corporation as per the 2011 census is 102,861 out of which 54,277 (53%) are male and 48,584 (47%) are female. However, as per the 2011 Census, total children (0-6) in Buxar city are 14,165, which include 7,491 boys and 6,674 girls. The child forms 13.77 % of the total population of Buxar City.

Literacy, Sex Ratio and ST Population: Project city revealed the sex ratio of 895 females per thousand males. Similarly, looking into the Juvenile sex ratio it is analyzed that as against the juvenile sex ratio of the project city have a sex ratio of 891 girls per thousand boys. As per the 2011 census, the total literates in Buxar city are 74,344 persons (72%) of which 41,701 (76%) are males while 32,643 (44%) are females. The Average literacy rate of Buxar city is 83.82%, this constitutes 89.13% male literates and 77.89% female. As per Census 2011, the ST community for Buxar city accounts for the share is only 2 percent to the total population.

Cultural Heritage: The city is enriched with an ancient and glorious past. The city is popular as mini Kashi. The place is associated with two famous wars, one which was fought between Mughal dynastic descendant

Humayun and Sher Shah Suri at Chausa in 1539 A.D and the second which was fought in 1764 and is popularly known as Battle of Buxar which was fought between Mir Kasim along with Nawab Shuja against the British. River Ganga and relevant ghats (Ramrekha ghat etc.,) are the main tourist places, many visitors come for rituals, that leads to increase the visitor ratio and the traffic congestion for the future perspective, proper mitigations measures to be taken while laying the sewer network to avoid or minimize the disturbance to local and outside visitors in the City.

Land availability: The proposed project will involve 3.694 Acres for Government Land, which is already available with BUIDCo. This land has been allocated for the establishment of 16 MLD STP for treatment of waste water generated from Buxar City Household and other IPS services. The table below provides the details of land availability.

Sl. No.	Description	Land Availability (Acres)	Under the Possession of
1	STP	3.250	BUIDCo (Land acquired previously and available for STP under the possessions of BUIDCo)
2	IPS/SPS-1	0.222	BUIDCo (NOC obtained from the concerned department for two IPS locations)
3	IPS/SPS-2	0.222	
	TOTAL	**3.694**	

Source: BUIDCo, Bihar

PUBLIC CONSULTATIONS

35. Stakeholder consultations were carried out while preparing the ESAMP. Meeting with Managing Director, BUIDCo and Technical team comprising Executive Engineer, SDO (Mechanical Engineer), Environmental and Social Management Consultant were consulted on 26th Feb 2020. Community Consultation at Buxar in 3 wards has also been conducted on 27th Feb 2020. Meeting with elected representatives of ULB Buxar has been organised on 28th Feb 2020 at the Office of the Chairman Municipality Buxar. After collecting all the major issues and concerns, a meeting with District Magistrate, Buxar has been conducted on 28th Feb 2020.

36. During a consultation with the community it's observed that the people in the Buxar are well received the project development that will result in improved sanitation facilities of the city. Consultation with District Magistrate was very fruitful and issues related to land availability, dumping location, sludge disposal related issues were discussed in details. Chairman and Dy. Chairman, ULP has raised a strong point that the restorations of roads and excavated areas must be ensured by senior officials of BUIDCo. As in the previous contract, contractor has not done the restoration work on time and properly. They also requested to complete the project within the stipulated time. Delay in project will not be benefited for anyone.

37. Based on the site visits and consultations with the local people, the proposed project is expected to benefit the people in Buxar city, as the wastewater that currently flows untreated into the Ganga River will be captured, treated and the remainder of the treated effluent will be used for irrigation purpose.

ENVIRONMENTAL AND SOCIAL IMPACTS AND MITIGATION MEASURES

38. The project envisages few environmental and social impacts that can be mitigated with proper implementation of safeguard measures. For establishing various proposed project components (i.e. one STP – 16 MLD, 2 Pumping Stations, Office and Staff quarters, etc.) about 3.694 acres of land is required. However, government land is available for the required land for all proposed IPS locations and the STP.

39. The project is expected to benefit the Buxar city, as the wastewater that currently flows untreated into the unused ponds and low laying area and finally goes to the River Ganga will be captured, treated and the remainder of the treated effluent will be allowed to use for agriculture purpose.

40. The STP project will improve overall surface water quality of Ganga River by treating all the effluent before it is discharge into Ganga River. The improvement in Ganga Water Quality will improve the primary productivity (phytoplankton/ Zooplanktons) thereby improving the fish population in the river.

41. This improved aquatic ecological system will provide suitable/better feeding and breeding ground for Ganga River Dolphins. This would help in conservation of this endangered species and would leads to overall improve in Fresh water Dolphin population in Ganga Ecosystem. Thus the STP Project will have overall Positive impact on river Ecosystem and Dolphins population.

42. The present projects of sewerage and sewerage treatment schemes in Buxar have minimal temporary impacts and fall under the 'Low Impact' category. The major outcomes of the assessment are given under:

- The proposed project for establishing various project components (i.e. STP, Pumping Stations, Staff quarters, etc.) is neither located in an eco-sensitive area nor any adjoining eco-sensitive/forest area.
- There is no requirement of acquisition or purchase of any private land in the project.
- The impact assessment also reiterates that the project does not involve any loss of livelihood and displacement of squatter and encroachers.
- The project will not have any impact on the tribal population.

43. The project components have limited environment and social impacts, which can be mitigated with the adoption of suitable mitigation measures by way of project specific Environmental Management Plan (EMP).

44. Although there would not be any permanent negative or adverse environmental or social impacts but will have temporary impacts on water quality, air quality (impact on health), traffic blockages, safety hazards for pedestrians, possible damage to private property, possible interruption in commercial activity.

45. The social assessment clearly defines that no significant issues arise from the land acquired for pumping stations and STP in Buxar. This explicitly implies that there will be no loss of income, loss of livelihood or need for relocation of households or displacement of encroached settlements. However, if any loss of livelihood would be noticed during the implementation of this project, then the affected party will be compensated according to Environment and Social Management Framework (ESMF) guidelines set by the NGRBA.

46. Moreover, some inconvenience caused to the local public has been reported along with the local mitigation plan which is to be adopted to overcome any inconvenience during the project. A prominent suggestion that was received during the consultations was the execution of construction work within a scheduled time frame with the provision of prior notice to residents and shop-owners. A public grievance mechanism (as prescribed by ESMF of NGRBA) is to be followed.

47. Some social concerns are associated with environmental issues and for them, a social management plan has been developed comprising of mitigation measures. The mitigation measures are provided in the SMP are described briefly as follows:

48. Construction Stage: 1. Impact on Livelihood: There is no impact on the livelihood of any permanent residents, shop owners, and any kiosks. However, it is suggested to notice if any during construction, then it should be compensated according to the Entitlement Matrix suggested in ESMF. 2. Land Acquisition issues: No impact and no fresh and further lands are required for proposed construction activities. 3. Inconvenience to the public: There will be a minor inconvenience to the public due to construction activities like access to their premises will be disturbed. Advance public notices to be circulated and construction should be completed in the given time limit. Debris should be cleared in time. 4. Health issues due to dust and noise levels: During the construction stage, a minor inconvenience to the public and can cause a nuisance to people especially elderly and children, but time duration of impact is very limited and temporary. 5. Traffic Congestion: Re-route traffic wherever possible and employing traffic police to manage the traffic movement in heavy traffic areas and the busy intersection of the roads. 6. Health hazardous: Fences/temporary enclosures should be put around construction sites (even inactive ones, if hazards, like open pits, remain); enclosures should be properly marked with caution signs.

ENVIRONMENTAL MANAGEMENT PLAN

49. For all the identified issues a mitigation measure is suggested and of the measure is not included in the DPR, lump sum cost estimation has been done and given as EMP cost. The identified temporary impacts may be mitigated with appropriate mitigation plans, which have been suggested as well, along with monitoring and evaluation of future projects. A lump-sum cost of probable environmental management plans, which were not a part of the DPR was estimated to be approximately Rs.60, 91, 290.00 (approximately 61 Lakhs). The mitigation measures are provided in the EMP are described briefly as follows:

50. Construction Stage: 1. Environmental Sensitive areas: There are no environmentally sensitive areas in the project area, further any roadside trees will not be affected since the laying of sewers are planned to be in the middle of the road. 2. Air Pollution: Sprinkling of water at regular intervals to control dust especially places where the soil is stockpiled are suggested, Ensuring the use of low fume emitting and newer generators and vehicles with well-maintained engines and control devices. 3. Noise levels: Noise barriers/sheets all-around construction sites and proper maintenance of construction equipment are provided in the EMP. 4. Contamination of water resources: suggestion to ensure proper handling and disposing of construction waste at identified refusal sites. Proper stockpiling of excavated soil.

51. Operation Stage: Further Noise, Air and Water Quality, proper handling and regular maintenance of operating machines at pumping stations and STP including generators, air diffusers and regular clearing of waste, etc. Leakage and overflow in the sewer network system creates and carry the pollution load to the Ganga River through the major nalas in the city and it leads to deteriorate to dolphins populated in the river Ganga. Therefore, mitigation measures to be followed to prevent the leakage and overflow in the sewer network system and appropriate adequate design measures and slope in the gravity mains to prevent siltation and accumulation of solid waste.

IMPLEMENTATION OF EMP

52. The nodal Ministry for the Namami Gange program is the Ministry of Jal Shakti, Department of Water Resources, River Development and Ganga Rejuvenation (DoWR, RD&GR0). National Mission for Clean Ganga (NMCG) is the primary implementing agency for the project at the national level. The implementing agencies at the state level are the State Mission for Clean Ganga (SMCGs). At the local level, specific Executing Agencies (EAs) will be there for implementation of various activities, including infrastructure investments under the Namami Gange program.

53. Bihar Urban Infrastructure Development Corporation Limited (BUIDCo) is the Executive Agency (EA) as the parastatal organization for the development of Sewerage and Sewerage Treatment plant at Buxar, Bihar. The contractor shall be responsible to implement the EMP primarily in assistance with the Project Executing Agency (BUIDCo). The Environmental Engineer/Specialist from the Contractor and Independent Engineer/ Supervision Consultant shall implement and monitor the compliance of the EMP and all the design drawings of various civil structures shall be implemented after his approval. Also to assist to the respective Project managers to ensure social and environmentally sound and safe construction practices.

54. The main functions of the various agencies with regard to the Namami Gange program include the following:

► The NMCG will be responsible for overall project planning and management at the national level; direct implementation of the national level activities; ensuring satisfactory implementation of the state-level investments and activities; providing guidance, support and approvals to the SMCGs where needed; and monitoring implementation performance;

► The SMCGs will be responsible for project planning and management at state level, ensuring satisfactory implementation of the state-level investments and Activities; direct implementation of some of the state-level activities; providing guidance, support and approvals to the state EAs where needed; and monitoring implementation performance of the EAs;

► The EAs will plan and implement the activities/investments and put in place arrangements for satisfactory and sustainable operation and maintenance of the assets created. The EAs will be responsible for all contract management, including preparation of feasibility reports and DPRs, and seeking the necessary approvals.

55. The State, local Government will be responsible for Coordination, Monitoring and evaluation of the Environmental Management Plan. It should ensure all the safeguarding plans are in line and acted upon. The Contractor shall report the implementation of the Environment Management Plan to the Environmental Expert and as well as to BUIDCO through monthly reports. Further, a quarterly report is required to be prepared and required to be given to SPMG (State Program Management Group) and National Mission for Clean Ganga (NMCG) for the progress made in implementing the Environment Management Plan.

56. Feedback from the residents can also be taken from time to time to cross check the contractor's report. BUIDCO should make inspection visits at the construction site to check the implementation of Environment Management Plan as per the contract.

Cost of Environmental Management Plan

Sl. No.	EMP Component	Mitigation Measures suggested	Cost (INR)	Responsible Agency	Monitoring Responsibility
1	Dust generation	Water sprinkling on excavated material to suppress dust and provision of top cover when transported through vehicles	299,790.00	Contractor under Project Supervision Consultant/ Executing Agency (EA)-BUIDCo	NMCG/SMCG & BUIDCo
2	Noise and Vibrations	Use of sound barriers or sheets	172,500.00	-do-	-do-
3	Safety Hazards to workers and residents	PPE for workers included in the DPR, however, placing of fencing/barricades at the excavated locations to demarcate the area.	92,000.00	-do-	-do-
4	Health hazards and nuisance due to absence of facility for sanitation or solid waste management and water supply	Creation of Sanitation and water supply at construction camp	1,000,000.00	-do-	-do-
5	Fly nuisance at STP	Applications of Insecticides	100,000.00	-do-	-do-
6	Tree planation/land scape at STP and IPS	Reduction of noise and odour	500,000.00	-do-	-do-
7	Dust Control measures at STP Locations.	Installation of Shade Cloths downwind at the STP fence to prevent dust reaching the surrounding settlements	200,000.00	-do-	-do-
8	Training/ Awareness generation along with IEC material	Undertake to develop communication strategy, capacity building and training initiatives for all stakeholders such as the SPMGs, EAs, ULBs, NGOs and common citizens	2,000,000.00	-do-	-do-
			4,364,290.00		

Environmental Monitoring Cost

Item	Location	Season	Year	Total no. of samples	Unit cost (INR)	Total cost (INR)
Environmental Monitoring during Construction Stage						
Air Quality Monitoring	3	3	2	18	7000	126000
Noise/Vibration	3	3	2	18	2500	45000
Water Sample (Surface Water)	2	3	2	12	6000	72000
Water Sample (Ground Water)	2	3	2	12	7000	84000
Soil	2	3	2	12	5000	60000
Travel and Transportation of Monitoring team (Lump sum cost)						200000
Sub-Total:						**587000**
Environmental Monitoring during Operation Stage						
Air Quality Monitoring	3	2	5	30	7000	210000
Noise/Vibration	3	2	5	30	2500	75000
Water Sample (Surface Water)	2	2	5	20	6000	120000
Water Sample (Ground Water)	2	2	5	20	7000	140000
Soil	2	2	5	20	5000	100000
Sludge	1	2	15	30	6500	195000
Travel and Transportation of Monitoring team (Lump sum Amount)						300000
Sub-Total:						**1140000**
Total for Environmental Monitoring						**17,27,000**
Total cost for Environmental Management and Monitoring cost(Rs. 4364290+1727000)						**60,91,290.00**

GRIEVANCE REDRESS MECHANISM

57. National Mission for Clean Ganga (NMCG) under the Ministry of Water Resources, River Development & Ganga Rejuvenation has set an objective to ensure effective abatement of pollution and conservation of the river Ganga by adopting a river basin approach for comprehensive planning and management.

58. Under the flagship Program of Namami Gange, several sewerage projects have been taken up along the banks of river Ganga in Bihar. Under these projects, Grievance Redressal Mechanism (GRM) is proposed to establish. In 14th Implementation Mission meeting at NMCG Office Delhi, a detail discussion was held and a common approach to solve the grievances was finalized which is detailed below:-

i. On receipt of complaints and suggestions from different stakeholders & citizens, a plan of action is devised accordingly.
ii. Time-bound reply to the complainant after doing a root causes analysis (RCA) of the incoming complaint as per rules & regulations of the Government and project scope.
iii. Co-ordination with Executing Agencies (BUIDCo), SPMG and the Government Department -UD&HD for effective redressal of the complaints.
iv. In compliance to above, the following actions have been taken up by BUIDCo, an Executing Agency for the Namami Gange Projects:-

a) A Control room is set up in the BUIDCo office with a toll-free number (18003456130).
b) A Toll-free number is published in the newspaper, displayed on the BUIDCo website and each project site.
c) This control room works from 10.00 am to 06:00 pm.
d) Four numbers of staff are deputed here to receive the calls, register the complaints, segregate it project-wise and refer to concerned Executive Engineer by next day.
e) The same control room is working as Grievance Redressal Cell which is under IT cell.

v. In BUIDCO GRM is working in a three-tier system to resolve the issues effectively on time.

A. The First tier- At each project site,

- At each project site, project-specific Grievance Redressal Committee is working comprise of Executive Engineer of the project, Asst. Engineer of the project, ESMC BUIDCo, Project Manager (Contractor), Supervisor Contractor and Health & Safety Officer (Contractor).
- Along with toll-free number, detail of Grievance Redressal Committee is also displayed on the site.
- This committee is taking up the referred issues of GRC and directly received complain in scheduled Monday meetings at each site and try to resolve it in 15days. If fails to resolve, the issue is forwarded to the Second-tier.

B. Second-tier- BUIDCo HQ level

- In the second tier, the issue is taken up at Chief Engineer and MD BUIDCo level.
- Any unresolved issue of the First-tier is taken up in monthly scheduled review meetings in the chairmanship of MD BUIDCo.
- Unresolved issues of the second tier will be forwarded to SPMG for necessary action and direction.

C. Third-tier- SPMG level

59. At this level, issues will be taken up in the review meeting of Namami Gange projects at UD&HD in the chairmanship of Secretary, UD&HD (SPMG).

LABOUR MANAGEMENT PLAN

60. Contractor shall prepare and submit Labour Influx and Worker's Camp Management Plan to the concerned EA that addresses specific activities that will be undertaken to minimize the impact on the local community, including elements such as worker codes of conduct, workers accommodation facilities, training programs on workers safety, and also to address COVID-19 issues. A Workers' Labour Camp Management Plan addresses specific aspects of the establishment and operation of workers' camp.

GENDER ASSESSMENT AND DEVELOPMENT

61. According to ESMF, the objective of Gender Assessment and Development is to analyse gender issues during the preparation stage of sub projects, design interventions and primary data collection. The gender analysis shall be carried out based on findings from gender specific queries and requirements during data collection and community consultation process. The quantitative and qualitative analysis shall include sex-disaggregated data, issues related to gender disparity, needs, constraints, priorities and understanding of gender-based inequitable risks, benefits and opportunities as well as gender relevant indicators.

1 INTRODUCTION

62. River **Ganga**, along with her many tributaries, has been the source of physical and spiritual sustenance of Indian civilization for millennia, and consequently, her well-being is of prime national concern. It is the largest river basin in India in terms of catchment area and constitutes almost 26% of the country's landmass, near about 30% of the country's water resources and supports more than 43% of the country's population[2]. The delta of the Ganga basin is one of the largest in the world, which is known by Sundarbans. It is the 20th longest river in Asia. Drainage of the River traverses through 11 states of the country (Uttarakhand, Himachal Pradesh, Haryana, Delhi, Uttar Pradesh, Rajasthan, Madhya Pradesh, Chhattisgarh, Bihar, Jharkhand and West Bengal), where largely covered states are Uttar Pradesh (28.02%), Bihar (10.86%), West Bengal (8.3%), Uttarakhand (6.15 %) and Jharkhand (5.85%). In addition to the physical resource value, the economic, environmental and cultural value of river Ganga is enormous in India. The Ganga also serves as one of India's holiest rivers whose cultural and spiritual significance is widely known.

63. Despite this iconic status and religious heritage, the Ganga River today is facing formidable pollution pressures, along with the attendant threats to its biodiversity and environmental sustainability. An ever-growing population, together with inadequately planned urbanization and industrialization, has affected the quality of the river's waters. Today, the Ganga's waters are sullied by the incessant outpouring of sewage, as well as by the large volumes of solid and industrial waste that are churned out by human and economic activity along the river's banks. According to the reports, the main causes of extreme pollution pressures in river Ganga include (i) inadequacy of municipal wastewater infrastructure and services, (ii) inadequacy of industrial effluent management, (iii) solid waste and non-point pollution sources, and (iv) inadequate in-stream flows.

1.1 GANGA CLEAN UP INITIATIVES

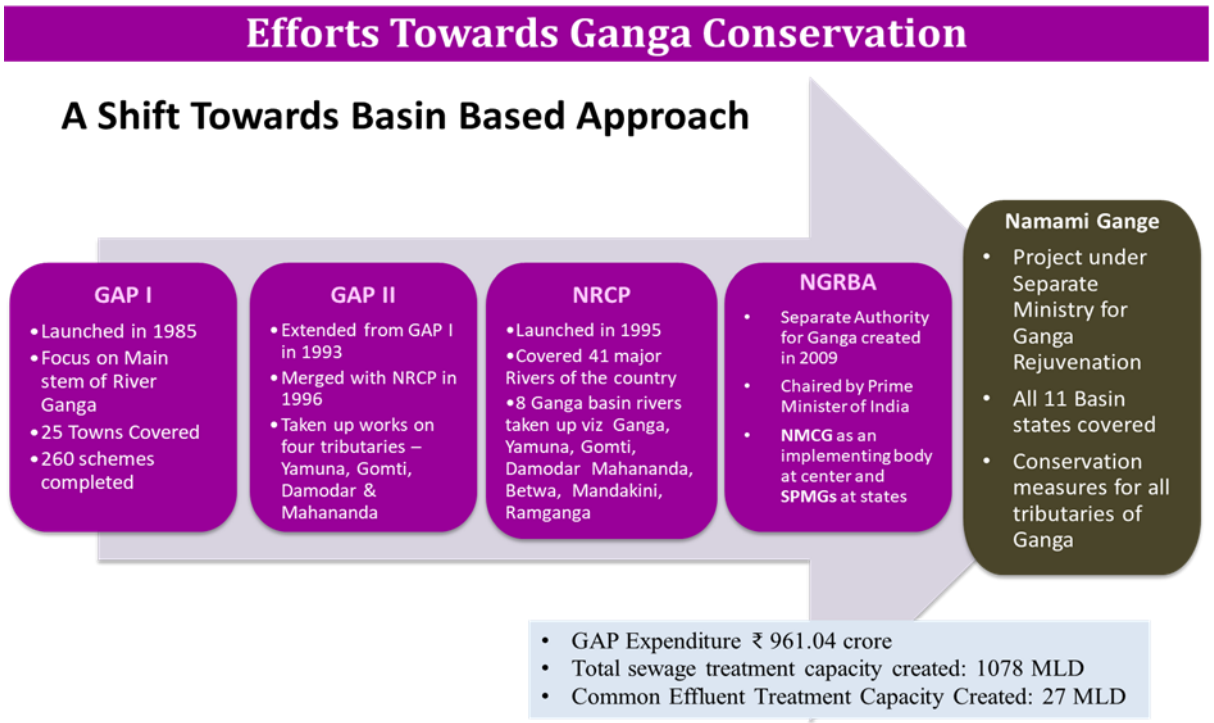
64. The Government of India (GoI) has undertaken clean-up initiatives in the past. The most prominent of such efforts was the Ganga Action Plan, launched in 1985, later complemented by a similar plan for the Yamuna, the biggest tributary of the Ganga. These programmes have faced significant public scrutiny, but made some gains in slowing the rate of water quality degradation. The major weaknesses of previous initiatives were 1. Weakness in design aspect & limited scope; 2. Lack of clear policy & Institutional framework; 3.Weakness in implementation (partial coverage, delay in creating assets, over designed STPs); 4. Weakness in O&M (irregular maintenance, unviable financial model); 5. Weakness in monitoring, evaluation & Regulation etc. The previous attempt to clean the river, such as Ganga Action Plan (GAP) have provided some gains in arresting rate of water quality degradation, but lot more needs to be done. The lessons drawn from these prior experiences indicate that improving water quality in the Ganga cannot be achieved by plugging the infrastructure gap alone. Rather, any effective initiative will have to adopt a three-pronged approach:

[2] Source: https://nmcg.nic.in/csr/csrebook/csrebook.html#p=10

- Establishing a basin-level, multi-sectoral framework for addressing pollution in the river (including national/state policies and river basin management institutions).
- Making relevant institutions operational and effective (e.g. with the capacity to plan, implement and manage investments and enforce regulations); and,
- Implementing a phased programme of prioritized infrastructure investments (with emphasis on sustainable operations and mobilization of community support)

1.2 GANGA RIVER BASIN MANAGEMENT INITIATIVES

65. As a major first step in this direction, the Government of India (GoI) has established the National Ganga River Basin Authority (NGRBA) in 2009 and National Council for River Ganga (Rejuvenation, Protection and Management) in 2016, as an Authority has been created for comprehensive management of the river. The NGRBA was established through Gazette notification of the Government of India S.O. No. 521 (Extraordinary) dated 20 February 2009 under section 3 of the Environment Protection Act, 1986, as an empowered planning, financing, monitoring and coordinating authority for the Ganga River.



66. Considering the requirement of large investment to meet above objective, The World Bank has been formally requested to provide long-term support to NGRBA, through several phases of substantive financing and knowledge support. While, the overall technical assistance and program development under the proposed initiatives will focus on the entire Ganga main stem, the initial emphasis of the specific investments under the first project will focus on main stem of Ganga flowing through five basin states of Bihar, Jharkhand, Uttar Pradesh, Uttarakhand and West Bengal in India. Specifically, pollution abatement programs in cities on the banks of these States which would include a range of municipal investments such as sewer networks, waste water treatment facilities, industrial pollution control measures, municipal solid

waste and river front management. This is expected to be achieved through several phases of substantive financing and knowledge support.

67. The first project of such several phases of support aims at;

(i) Establishing and operationalizing central and state level NGRBA institutions capable of planning and implementing a multi sectoral river water quality improvement program and;

(ii) Reducing pollution loads into the river through selected investments.

68. A comprehensive, basin-level, and multi-sectoral approach has been adopted, with support for investments in wastewater, solid waste and river front management, industrial effluent management, address non-point source of pollution and maintaining ecological flows and assessment of biodiversity and afforestation and public participation. The portfolio of investments under the NGRBA program includes the following:

- Sewerage and sanitation systems/sewage treatment plants (new/up gradation)
- Solid Waste Management
- Industrial Pollution Control Initiatives
- River front Management initiative

1.3 WORLD BANK ASSISTANCE

69. The Government of India (GoI) has received loan assistance from the World Bank for the Mission Clean Ganga related activities under NGRBA Program (later which is included as one of the components of the Namami Gange Programme) at the level of institutional development, operational and implementation support and in four sectors, namely, wastewater collection and treatment, industrial pollution control, solid waste management, and riverfront development.

70. At the Central level, the National Mission for Clean Ganga (NMCG) registered as a society on 12th August 2011 under the Societies Registration Act, 1860, was constituted as an authority to ensure implementation of Namami Gange Programme. At State level, State Mission for Clean Ganga (SMCGs) was set-up as registered societies in the respective states, namely Uttarakhand, Bihar, Uttar Pradesh and West Bengal while Jharkhand has a dedicated nodal cell within the Department of Urban Development was set up.

71. The current focus of World Bank-funded National Ganga River Basin Projects (NGRBP) under National Mission for Clean Ganga (NMCG) is on six participating states namely Uttarakhand, Bihar, Uttar Pradesh, Jharkhand, West Bengal and Madhya Pradesh. The National Mission for Clean Ganga (NMCG), the implementing wing of Namami Gange Programme has appointed LEA Associates South Asia Private Limited, New Delhi, as a Consulting agency for the preparation of Environmental and Social Assessment and Management Plan (ESAMP) for **"Sewerage and Sewerage Treatment at Buxar for Pollution Abatement of River Ganga in Bihar,** under Component 2 of Namami Gange Programme, following the principles of ESMF of NGRBA.

1.4 NAMAMI GANGE PROGRAMME

72. The Government of India has launched "Namami Gange" as an Integrated Conservative Mission Programme in the year 2015. The Namami Gange programme is an umbrella programme that has adopted a river-basin approach and has been given a multi- sectoral mandate to address both water quantity and quality aspects. Under Namami Gange Programme, diverse set of interventions for cleaning and rejuvenation of river Ganga have been taken up. These include pollution abatement activities including sewage, industrial effluent, Solid Waste etc., River Front Management, Aviral Dhara, Rural Sanitation, Afforestation, Biodiversity Conservation, Public Participation etc. The programme covers short term, medium term and long term activities. The programme aims at integrating previous and currently ongoing initiatives by enhancing efficiency, extracting synergies and supplementing them with more comprehensive and better coordinated interventions. Namami Gange Programme has been segregated into three different components:

- **Component 1:** Pertains to ongoing projects of cleaning of river Ganga & its tributaries, including the World Bank Assisted NGRBA programme having remaining central liabilities.
- **Component 2:** Pertains to new initiatives to be undertaken in 5 major sectors i.e. Infrastructure Development (Sewage Treatment, River Front Development, and Industrial Wastewater Treatment & Solid Waste Management), Institutional Development, Ecological Sustainability, Research & Development and Communication & Public Outreach.
- **Component 3: Program communication and management:** NMCG conducts a range of vibrant communication activities ranging from ground-level community engagement exercises, social and traditional media outreach, public debates and lectures, to a flagship mass media campaign.

73. The Namami Gange Program with a definite timeline of five year required a truly empowered implementing body. This realization led to reconstitution of NMCG as an Authority on 7th October 2016. With simultaneous dissolution of NGRBA, the present form of NMCG as an Authority is the designated body to take all necessary decisions and actions for pollution abatement and rejuvenation of River Ganga. Later in 2019, **Ministry of Jal Shakti** was formed by merging Ministry of Water Resources, River Development & Ganga Rejuvenation and Ministry of Drinking Water and Sanitation. Now, NMCG falls under the Department of Water Resources, River Development & Ganga Rejuvenation, Ministry of Jal Shakti.

74. The Namami Gange Programme will be implemented in the Ganga Basin in India. The overall technical assistance and program development under the proposed project will focus on the entire Ganga Basin; however specific sub-project investments under this project will focus on critical stretches of six basin

Salient Features of Namami Gange Program

states of Uttarakhand, Bihar, Uttar Pradesh, Jharkhand, West Bengal and Madhya Pradesh in India.

1.5 STRUCTURE OF THE REPORT

75. This report deals with the Environmental and Social Assessment and Management Plan for the proposed "**Sewerage and Sewerage Treatment at Buxar for Pollution Abatement of River Ganga in Bihar**" as per the requirement of Environment and Social Management Framework (ESMF) of NGRBA. In line with the requisite of ToR, the present ESAMP has been arranged in the following chapters:

Chapter 1	**Introduction** This chapter details the background of Ganga Clean-up Initiatives, Namami Gange programme, and various mechanisms to implement the project.
Chapter 2	**Project Description** This chapter provides a brief description of the project including the scenario of existing sewerage infrastructure of the project area, need of the proposed project, and outlines the various components and/or interventions proposed under the present sewerage project.
Chapter 3	**Approach and Methodology** This chapter of the report talks about the approach and methodology adopted for conducting environmental and social assessments for the present project in Buxar.
Chapter 4	**Policy and Legal Guideline** This chapter insight to various policy and legal framework of the government of India as well the policies of World Bank applicable to the project, as per the requirements of ESMF of NGRBA
Chapter 5	**Baseline Environmental and Social Profile of the Project Area** Description of the baseline environmental and social condition including the baseline physical environment, biological environment and socio-cultural conditions of the proposed project area are briefly described in this chapter.
Chapter 6	**Stakeholder Consultations** This chapter of the report details about the consultation processes carried out with the various sections of community and stakeholder groups in and around the project area, as well as the suggestions provided under the consultations is documented.
Chapter 7	**Environmental and Social Impacts and Mitigation Measures** This chapter provides an assessment of potential environmental and social impacts associated with the various stages of the project cycle including during the design and development phase, construction and during the operation phase. This section of the report deals with the set of mitigation and management measures to be adopted for each environmental and social impact including Grievance Redress Mechanism, Gender Assessment, Development and Gender-Based Violence (GBV), during project design, construction and operation.
Chapter 8	**Alternative Analysis** This section describes the alternatives considered in the project towards improving the project.

Chapter 9	**Environmental Management Plan** It includes the steps involved in the identification of anticipated impacts, the description of each mitigation measure with technical details, including the type of impact to which it relates and the conditions under which it is required. This chapter also envisages the implementation schedule, responsibilities and respective time frame for implementation of ESAMP.
Chapter 10	**Conclusions** Finally, this chapter concludes the inferences brought out from the environmental and social analysis of the project activities for the proposed sewerage and sewerage treatment at Buxar city, it also highlights the conclusion based on the analysis which shows that the proposed project can be categorized as 'Low Impact'.

2 PROJECT DESCRIPTION

2.1 CITY PROFILE

76. The Buxar city is the headquarters of the Buxar district in the state of Bihar. The city situated where Ganga River enters into Bihar and the river literally border the Bihar with Uttar Pradesh and located about 117 km from Patna the State capital of Bihar, 393 km from Lucknow the capital of Uttar Pradesh. Buxar is an old town situated on the right bank of the Ganges River, while Balia and Gazipur of Uttar Pradesh situated on the left bank of the river. It is a place of historical, cultural and administrative importance since the time immemorial. The regional setting of Buxar District and Buxar City are given in Figure 2-1

77. The city is governed by the Buxar Municipal Corporation (Nagar Parishad) situated in the Buxar block of Buxar district, Bihar. The project block/tehsil exists with Buxar Nagar Parishad and Sarimpur Census town and adjoining 132 villages. The Nagar Parishad of Buxar (as of Census 2011) has a population of 102,861 and the No. of Households is 16710.

78. Agriculture is the main occupation and main source of the livelihood of the people of the project district. The main food grains in the district are Wheat, Rice, Grams and Pulses, etc. Few small scale industries in the district are Soap Industry, Timber/Furniture work and Leather Industry, etc.

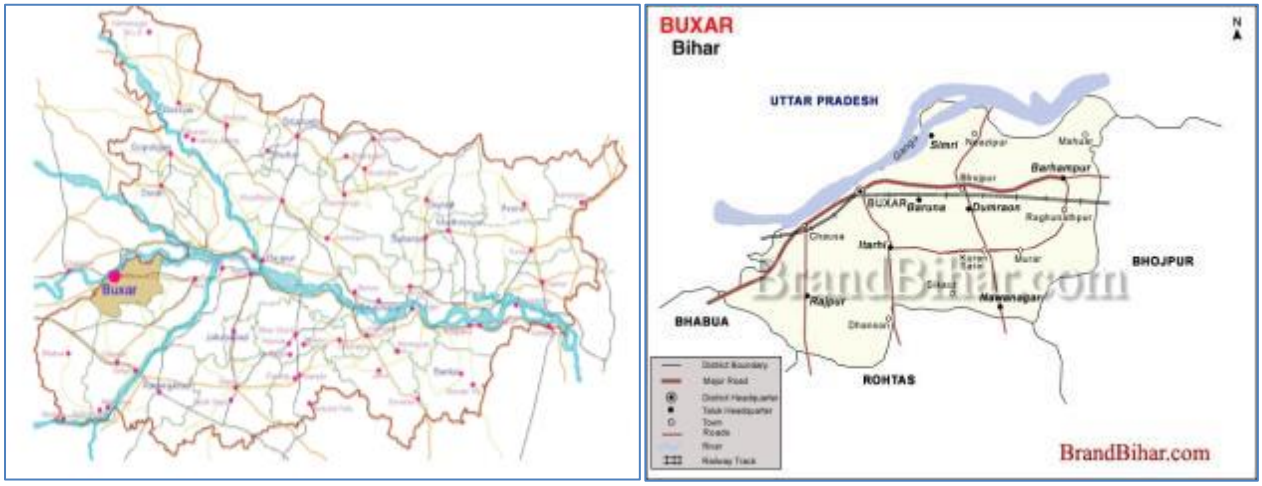


Figure 2-1: Regional setting of Buxar District and Buxar City (Source: BrandBihar.com)

79. The city plays a major role in contributing to the overall economic development of the region. By road, rail network, Buxar city is well-connected to major cities in the State and with other States. Buxar Railway Station lies on the Patna-Mughal Sarai section of the Howrah-Delhi mainline. Waterways in the district are well served by rivers; with the development of roads and railway in the district, the importance of river-borne traffic has diminished largely.

80. The city is enriched with an ancient and glorious past. The city is popular as mini Kashi. The place is associated with two famous wars, one which was fought between Mughal dynastic descendant Humayun and Sher Shah Suri at Chausa in 1539 A.D and the second which was fought in 1764 and is

popularly known as Battle of Buxar which was fought between Mir Kasim and Nawab Shuja (Nawab of Bengal) against the British.


Buxar Railway Station and Ganga Bridge, Buxar

2.2 EXISTING SCENARIO OF SEWERAGE FACILITIES IN BUXAR CITY

81. There is no comprehensive sewerage system existing in Buxar town. The city is majorly dependent on On-site Sanitation Systems (OSS). The most common on-site wastewater treatment and disposal practice adopted in town is Septic Tank. In general, the spent water from kitchen and bathrooms are discharged into surface drains that transport the wastewater to local depressions. In most of the households and in newly developed housing societies of the city, the wastewater disposal is done through septic tanks. The effluent from these septic tanks is directly discharged into the road side open drains and gets collected in nearby local surface depressions. The collected sewage is causing bad smell and generates unhygienic conditions in the locality and potential threat to public health.

82. Apart from the above septic tanks from the households, there are community toilets in the city located in three different areas such as near the old bus stand, near Ramrekha Ghat and Railways Station.

83. Bihar Urban Infrastructure Development Corporation Ltd (BUIDCO) is a flagship company owned by Government of Bihar and is responsible for the implementation of sewerage projects under the Namami Gange programme. Further, Buxar Municipal Council/Urban local governing body maintains the pumping stations and the treatment plant which are under construction. State Mission for Clean Ganga is the overall responsibility of monitoring the activities of the sewerage project in Buxar.

84. Presently about 60% works in the STP and 41% of sewer network (39.438 km out of 95.22 km as per earlier approved network) is completed in Buxar city. The earlier project was approved in March 2010 with an estimation of Rs. 74.95 Cr. (with 5 years O&M cost) for laying of 95.21 km of sewerage network along with 16 MLD STP. The project was to be completed within 36 months period. To date, the project has been stopped, due to various reasons and slow progress from the Contractor's side. Accordingly BUIDCo has terminated the contract of the existing contractor. Further re-tendering process for the remaining works has been initiated by the BUIDCo with the revised project approval for Rs. 164.23 Cr. Including 15 years for O&M cost and including Rs. 17.29 Crores of expenditure which has been incurred in the previous works, with cost-sharing of 70:30 between State and Central Government. The

brief details about the completed works in the previous contract under the sewerage project in Buxar city are described below table 2.1.

Table 2-1: STP works Status in Buxar city

Completed Works	Details
STP works	
Chlorine Contact Tank	Final life wall completed
Secondary clarifier	Final life completed
Return Sludge sump	Final life completed
Sludge Thickener tank	5th lift shuttering completed
Aeration Tank	RCC, 3rd Lift wall casting completed
Administration Completed	RCC up to plinth beam completed
Centrifuge shed	RCC up to plinth beam completed
Chlorination room and Chlorination tonner shed	Up to FFI brick work
Grid Separator	Neutralization pit 1st lift casting completed
SPS/IPS works	
SPS/IPS 1 near ITI	30% work completed
SPS/IPS 2 near Dhobi Ghat	No work done yet
Grit Separator	Neutralization pit 1st lift casting completed

Source: Revised Administration approval, NMCG 2019

85. The following Photographs present the works completed in the previous contract at Sewer network, IPS 1 and Sewerage Treatment Plant. The works were not initiated at IPS 2 location near Dhobi Ghat.

Completed Sewer Network at Ward No. 34 Sugar Mill area Road no.-1

IPS 1 At ITI Ground (30 % Work done with base structures)

STP at Sarimpur town, Buxar (60 % Works done with all the required structures)

86. Based on topographical and geographical features, the city has been divided into three sewerage zones. The sewer zone wise details are tabulated below:

Table 2-2: Summary of Sewered Areas - zone wise in Buxar City

Sl. No.	Sewerage Zone No.	Households/Wards	IPS Location	Geographical area
1	**Zone - 1**	All households from Zone 1	IPS-1 (ITI Ground)	Entire Southern Part of the City
2	**Zone - 2**	All Households from Zone 2	IPS-2 (Near Dhobi Ghat)	Entire Central part of the City
3	**Zone – 3**	Entire Sewerage from Zone 1 & 2	STP at Sarimpur town	Northern Western part of the city

87. There is total household connectivity (100%) were proposed in Buxar city which are connected with sewerage system to divert the flow to the STP of 16 MLD at Sarimpur town through 2 numbers of Intermediate Pumping Stations (IPS). Figures 2.2 to 2.4 provide the zone wise sewerage network plan (highlighted and marked with the completed network in the previous contract) in Buxar city.

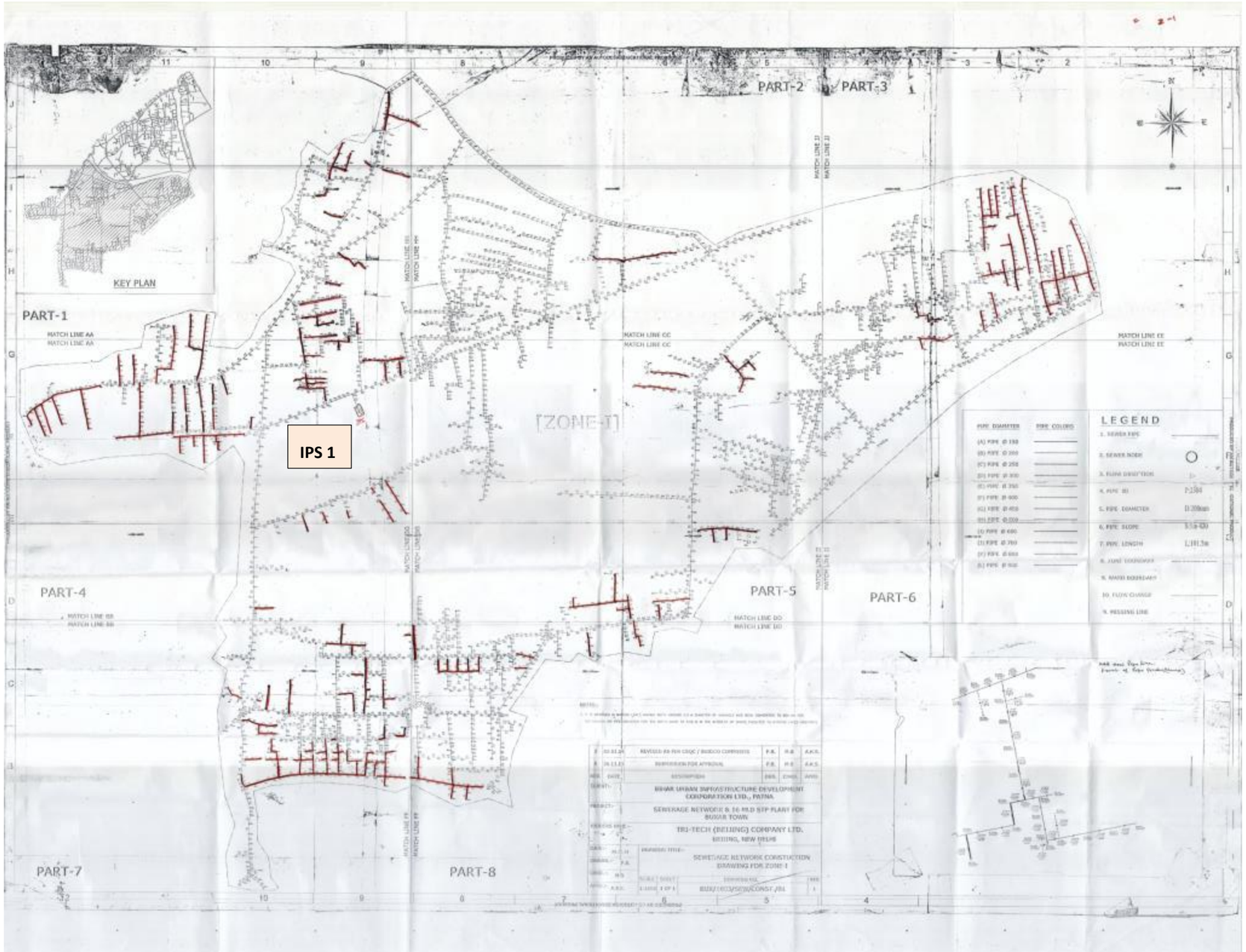


Figure 2-2: Zone 1 Map (The highlighted length shows on the map as completed network)

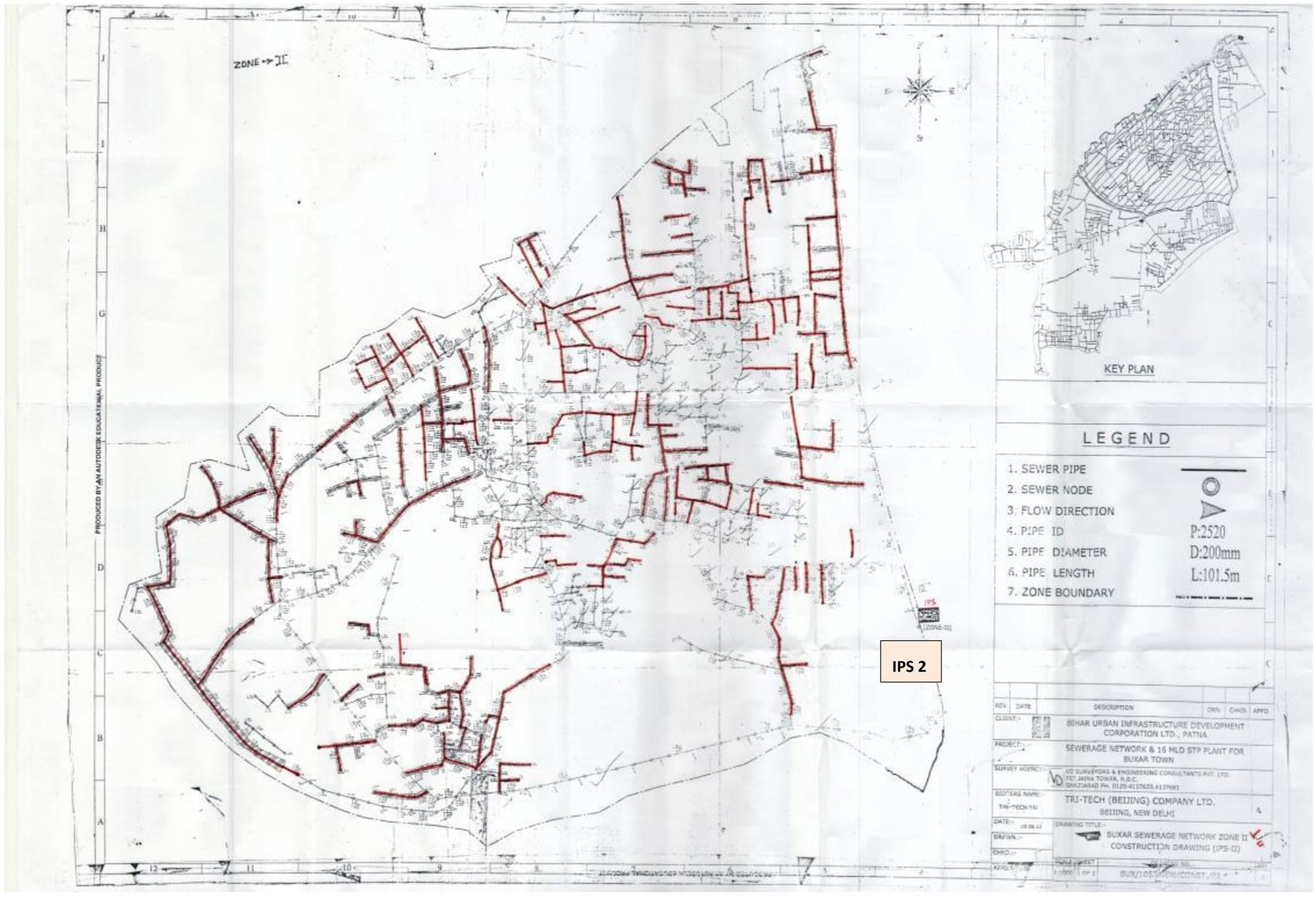
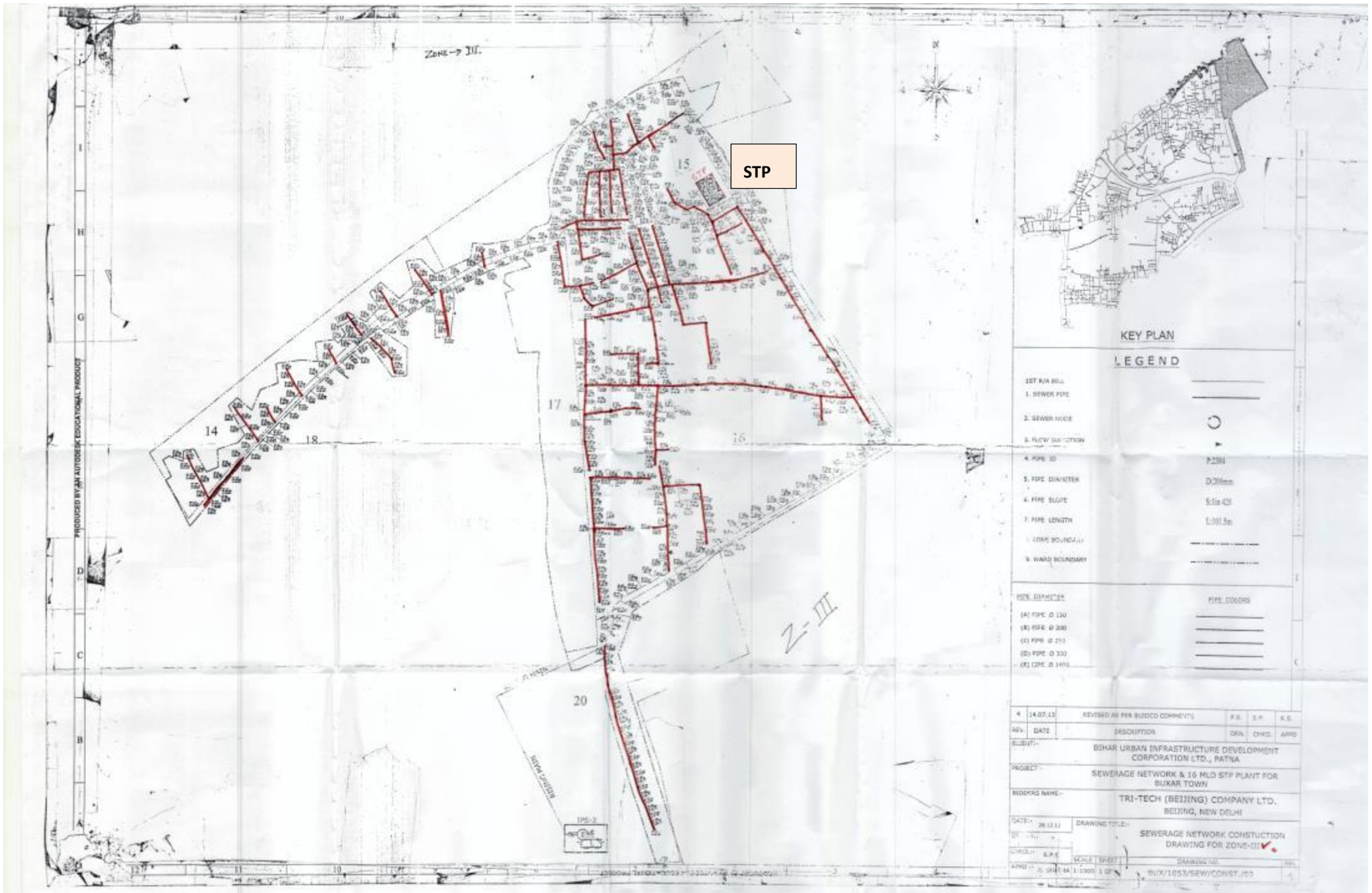


Figure 2-3: Zone 2 Map (The highlighted length shows on the map as a completed network)



(**Source:** *BUIDCO, Patna)*

Zone 3 Map (The highlighted length shows on the map as a completed network)

Figure 2-4: Zone Wise-Sewerage Network Plan of Buxar city

2.3 NECESSITY OF THIS PROJECT

88. Buxar city does not have a sewer system for collection, transportation, treatment and disposal of domestic and industrial wastewater. The present system of disposal of sewage is through open drains and septic tanks. The drains dispose in lower areas and ponds and thereby creating crude pollution of the environment and water bodies. Households have septic tanks which discharge in open drains and are often overflowing. This causes the bad smell, unhygienic condition, and breeding of mosquitoes. Due to tremendous population growth and increased areas of habitation, different sections of the existing nala network are partially and/or fully chocked creates a pathetic situation in the city.

89. Carrying sullage through an open drainage system is entirely unsatisfactory and unhygienic. Generally, disposal through septic tanks is recommended only for isolated dwellings away from the habitat. With the increasing population and rise in population density of the residential area, the problem may become serious for disposal of effluent from septic tanks, because of the poor soaking capacity of the soil. Besides due to increasing pressure on land for residential purposes, sufficient land may not be available for providing on-site disposal systems in the already developed residential areas (old areas).

90. The location of a large number of soak pit/septic tanks within the area of the municipal council must be causing pollution of groundwater. In the absence of a safe disposal system of sewage as mentioned above, the people of Buxar are facing an unhealthy and unhygienic environment; therefore, public representatives are also demanding facilities of a sewerage system on a priority basis. The town requires sound drainage and sewerage network. The soil owing to irrigated area/ canal /high level of the water table, does not have the soaking capacity. After execution of the sewerage system by providing an underground sewer pipeline network followed by the sewerage treatment plant, there will be a marked improvement in water quality of river Ganga and the public of Buxar would find great relief from the unhealthy and unhygienic environment.

91. The untreated sewerage disposal of town and from un-sewer areas are discharged directly into the drains creating an unhygienic environment. Likewise, the effluents of industries and houses are also discharged directly into the drains without any treatment. To reduce the pollution load of major drains of Buxar, the sewerage network necessities renovation and strengthening. So that the wastewater would be treated before it is discharge into the River Ganga.

92. In the Buxar Nagar Parishad area there are five (5) drains namely, Nath Baba Drain, Tadka Drain, Sati Ghat Drain, Sidhnath Drain, and Saripur Drain. Through these drains untreated sewage are being discharged into Ganga River. The total sewage/wastewater discharges through aforesaid drains have assessed to 11 MLD. The details of the drains are hereunder (Table 2.3). The census data on the decadal population of Buxar City since the year 1991 and up to 2041 is presented in **Figure 2-5.**

Table 2-3: Details of drains in Buxar Nagar Parisad area

Sl. No.	Name of the drain	Average Flow (in MLD)	Recipient	Catchment Area
1	Nath Baba Drain	2	Ganga River	Teachers Colony, Shweta Nagar, Virat Nagar, Mitra Lok Colony, Civil Line, Gajadharganj, Misharaulia, Pandey Patti, Naya Bazar, Buxar Post office area.
2	Tadka Drain	4	Ganga River	Ramrekha Ghat Mandir Area, Jahaji Ghat Area, Pipal Pati, M.P. High School Area, Pustakalaya Road,
3	Sati Ghat Drain	1	Ganga River	Thatheri Bazar, Gola Bazar, Sati Ghat Road
4	Sidhnath Drain	1	Ganga River	Ram Janaki Mandir area, Tulsi Ghat area, Amla Toli, Jhana Road, Maharaj Hata Mohallah, Civil Line, Badi Bazar
5	Saripur Drain	3	Ganga River	Sarimpur , Godhanpurva, Sohnipatti, Main Road, Mathia Mahalla, New Bus Stand, Sydicate, Baba Nagar, Niranjanpur.
	TOTAL	**11**		

Source: *Action Plan for Conservation of River Ganga in Bihar, Bihar State Ganga River Conservation and Program Management Society & Bihar State Pollution Control Board. (Status of drains discharging based on the year 2016-17).*

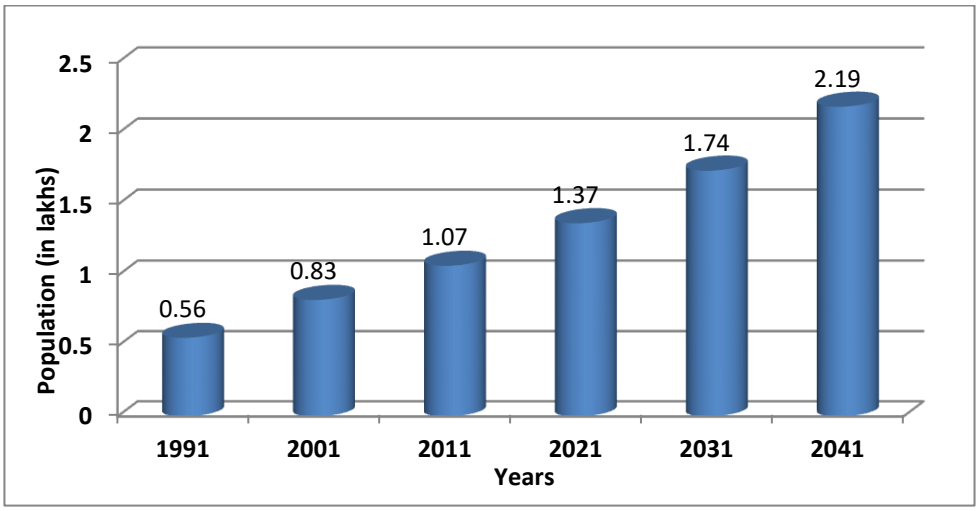


Figure 2-5: Population Growth Trend of Buxar City

93. As per DPR, the water requirement for the city in the year 2021 is 18.4 MLD, if considered for the year 2031 the estimated water requirement will be as 20.8 MLD. The sewage generation in 2031 is considered as 80% of total generated from water supplied (according to the DPR) which works out 108 lpcd, therefore the estimated sewage generation in the year 2031 will be 17.28 MLD (Table 2.4). The STP is proposed for 16 MLD capacities to treat wastewater. The treatment process proposed is an activated sludge process based on Sequential Batch Reactor Technology. Two Intermediate Pumping Stations proposed with the capacity of 24 MLD each for storage and pumping to STP for the required capacity of wastewater.

Table 2-4: Details of Population and Sewage Generation

Year	Population (Projected)	Water Supply requirement (lpcd)	Water Requirement (MLD)	Waste water/Sewerage Generation (lpcd)	Waste Water Volume (MLD)	Infiltration (MLD)	Total Sewage Generation (MLD)
2011	106759	135	14.4	108	11.53	0.65	12.18
2021	136567	135	18.4	108	14.75	0.65	15.40
2031	153995	135	20.8	108	16.63	0.65	17.28
2041	218514	135	29.5	108	23.60	0.65	24.25

Source: DPR, Buxar, BUIDCO

2.4 DESCRIPTION OF PROPOSED PROJECT ACTIVITIES

94. Detailed discussions with the State Government, TPA (IIT-Roorkee) on the 25th Executive Committee (EC) Meeting[3] was held at NMCG on 18th November 2019, the Executive Committee (EC) resolved to approve the revised cost estimate to a tune of Rs. 164. 23 Crores (including O&M cost for 15 years and Rs. 17.2 Cr. of expenditure incurred in the project). According to the revised Administrative Approval and Expenditure Sanctioned for the project dated 31st December 2019 the sewerage infrastructure for Sewerage and Sewerage Treatment at Buxar for Pollution Abatement of River Ganga in Bihar, the Scope is included with the components of the remaining works in the Sewerage project at Buxar, Bihar under Namami Gange Program includes:

- Laying of the sewer network of 66.62 km (Revised scope is 106.06km out of which 39.438km already laid). This is also including 2 km laying through trenchless technology).
- House connection chambers.
- Completion of the remaining works in the STP (16 MLD), mechanical and electrical works including additional works for meeting the new effluent standard prescribed by NGT.
- Completion of the works in the SPS.
- Operation & Maintenance (O&M) of the Structures for 15 years.
- Environmental Monitoring and Management Measures.

95. As per recent development and administrative approval, it is proposed to commission the remaining works in the STP and IPS locations to utilize its full design capacity of 16 MLD and laying of remaining sewer network (39.438 km laid out of 95.22 from earlier approved network length).

96. It was decided in the 25th Executive Committee (EC) meeting of NMCG that installation of trash and its regular O&M at the mouth of all drains and adequate provision for co-treatment of Septage in the STP facility may also be made part of project proposal for implementation.

97. It was also decided in the meeting that the State government will pari-pasu implement the project for utilization of treated wastewater from the project for irrigation, industrial purpose as per its policy. Besides, it was directed by EC that the latest effluent standards as per the NGT order shall be followed and for that necessary flushing tank shall be placed in the STP to meet the requirements of meeting the norms.

98. The proposed sewerage network in Buxar will not impact trees and any natural environment since the sewers are planned to be laid at the center of the road. Probable impact in terms of an increase in the dust level while excavating the land material, cutting and backfilling will be expected. There will be temporary impacts like a minor inconvenience to the people to access their premises and temporary blockage of drains/water logging by unmanaged excavated material while laying the sewer lines. The table below (Table 2.5) provides the land use details of the Sewer network and anticipated impacts. **Figure 2.6** presents the land use Map along with the locations of STP and IPS1 and IPS2. Location Map with 10 km buffer area marked on Topo sheet presented in **Figure 2.7.** Layout Plan of Sewerage Treatment Plant (STP) for 16 MLD is presented in **Figure 2.8**.

[3] Minutes of Meeting of the Executive Committee (EC) of NMCG for clean Ganga held on 8th November, 2019, published on 3rd December 2019

Table 2-5: Profile of Sewer Network in Buxar

No.	Name of IPS/MPS	Details of Sewer Network	Land Use	Anticipated Impacts
1	IPS-1 (ITI Ground)	Wastewater will be collected from Wards of entire Zone 1 area) (Ward nos. from 1 to 11 and 34)	Built up and Residential area	The proposed Sewerage network/ structures situated in the commercial and market area, probable increase in the dust level while excavating the land material and cutting and backfilling activities. There may be temporary blockage of drains/ waterlogging by unmanaged excavated material while laying the sewer lines. During construction, a minor inconvenience to the people to access their premises is envisaged.
2	IPS-2 (Near Dhobi Ghat)	This pumping station collects wastewater from entire zone 2 area (Ward nos. from 12 to 14 and 17 to 33)	Residential and Water body	Since the proposed IPS -2 location is situated near Dhobi Ghat and pond located on the other side of the proposed location, contamination of water body by unmanaged excavated and construction materials is envisaged and there may be temporary blockage of drains/ waterlogging and temporary flooding during monsoon.
3	MPS/STP	Entire Sewerage from Zone 1 and Zone 2 (Ward Nos 15, 16 of Sarimpur town)	Residential and Water body (Near Ganga basin)	Since the proposed Sewerage treatment plant is situated near Ganga River, during the construction of outlet for discharge of treated effluent, contamination of water body by unmanaged excavated and construction materials is envisaged and there may be temporary blockage of drains/ waterlogging and temporary flooding during monsoon.

99. During the assessment of project sites of Sewerage network, the vicinity of the sub-project component area is mostly built up with residential/commercial area and envisaged that the impacts associated with Sewerage network are temporary during the construction stage, no tree cutting is envisaged. The sewer line and manholes will be constructed at the centre of the road. Construction of 16 MLD STP at Serimpur town will be carried out on an available 3.14 Acres government land. Proposed IPS locations at ITI ground and near Dhobi Ghat will also be constructed in the available government land (NOC of the lands have been obtained by the BUIDCo and are attached as **Annexure.2).** Hence seeing the overall impact, the project is categorised as low category. However, necessary care shall be taken by the potential Concessionaire / Contractor to avoid disturbance to neighbourhood area under the supervision of the concerned authority of BUIDCo, Buxar Division. To address the E&S issues, site- specific EMP has to be prepared by the Concessionaire/Contractor and get it approved from the competent authority of BUIDCO/SMCG, Bihar.

2.5 COMPONENTS PROPOSED FOR SEWERAGE WORK

100. A comprehensive sewerage network is proposed in the city to cover the entire area with the sewerage system, so that sewage flows can be collected in an integrated manner and conveyed to STP for treatment. The proposed sewerage system is designed for 30 years period i.e 2041. The following components are proposed for the sewerage system is mainly:

Sewer System:

101. A sewerage network of 95.22 km (as per DPR prepared in 2010) has been designed using the design principles and the criteria used are provided below. Since most of the area included in this estimate is an inner and old portion of the city, having dense population branch sewers of diameter minimum 150 dia to 1100 dia. RCC S/S NP3 class pipes concrete pipes are proposed to be used. The design of sewer has to be

amended as per prevailing site conditions/parameters before the execution of work. The following design criteria were adopted for the sewerage network are:

- A per capita water supply figure of 135 LPCD with 80% contributing to wastewater is adopted to arrive at expected wastewater flows in sewers.
- An infiltration value of 250 lit/manhole/day in the pipe is adopted considering the high water table in the town.
- A minimum diameter of the sewer pipe is adopted as 150 mm as currently in practice.
- A minimum earth cover of 1.0 m is kept for all the pipes.
- For sewer pipes in initial reaches, it is difficult to achieve the minimum velocity of 0.8 m/s. It is proposed to lay 150 mm diameter sewers at a gradient of 1 in 160 and to have the provision of mobile flushing units for regular flushing all initial sewers at a regular time interval.
- All subsequent pipes are designed to achieve a minimum flow velocity of 0.8 m/sec.
- Crown of the outgoing sewer is matched to the crown of lowest of incoming sewers in that particular manhole.

Manholes:

102. Table 2.6 below gives the type and size of various types of manholes proposed to be provided for different diameters and depth of sewers. The Spacing of manholes will be as per I.S. Code 411 - 1957 i.e. 30m for sewers up to 500 mm dia., 60m for sewers ranging between 500 mm to 800 mm diameter and 90m for sewers above 800 mm diameter.

103. As the project town is situated on the banks of River Ganga, the water table in the town is very much near the ground. Looking at the possibility of infiltration of groundwater, it is proposed to adopt strict quality control measures for material & workmanship. However, a provision of infiltration in sewers is adopted as 250 liter/manhole/day.

Table 2-6: Type and size of various types of Manholes proposed to be used in the project

Type of Manhole	Minimum Manhole Diameter (mm)	Manhole Depth (m)
Slab Type	900 mm x 800mm	0.9m
Circular Manhole	900 mm dia.	0.90 - 1.65 m
	1200 mm dia.	1.65 – 2.30 m
	1500 mm dia.	2.30 – 9.0 m
	1500 mm dia.	9.0 – 14.0 m

House Connecting and Sewer Connecting Chambers:

104. It is proposed to utilize the UPVC pipe of diameter 100 mm for property connections in connecting the individual property to public sewers.

Intermediate Sewage Pumping Stations:

105. Sewage flow through these sewers would require intercepting with two numbers of sewage pumping stations and a lift station namely:

- Intermediate Pumping Station (IPS-1) at ITI Ground: Located at the corner of ITI ground. A clear site and is Govt land. (30% of construction is done in the previous contract).

- Intermediate Pumping Station (IPS-2) at Dhobi Ghat: Located next to Water Body (An abandoned canal). No construction started yet.

106. Overall, none of the proposed sites will have the issue of displacement or resettlement. A Consultant team has carried out a field reconnaissance survey at the proposed IPS sites and consulted BUIDCO officials and local people in this regard. STP and IPS locations at ITI and Dhobi Ghat belong to the government and obtained the NOCs for the respective locations.

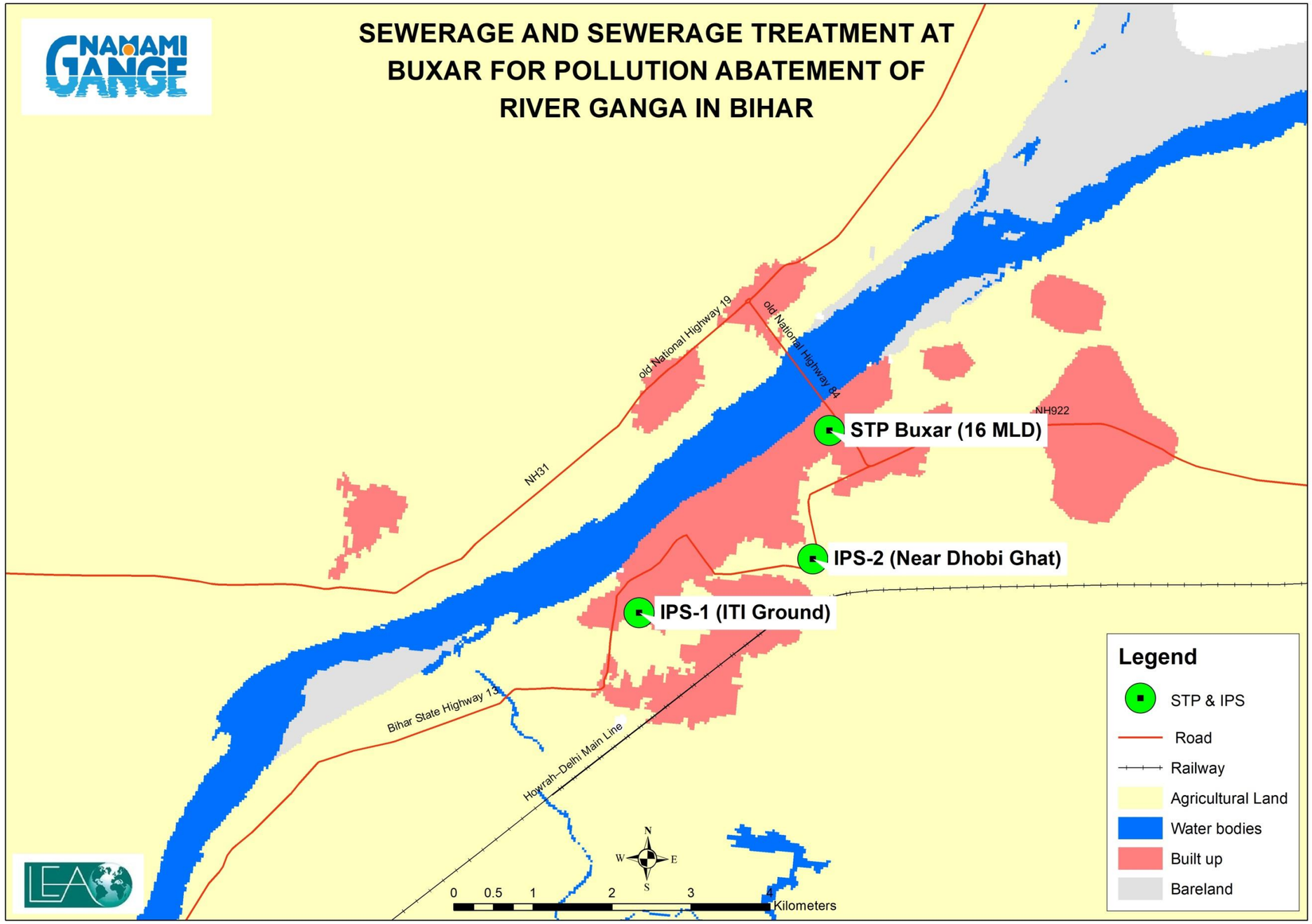


Figure 2-6: Land Use Map Showing IPS and STP Locations

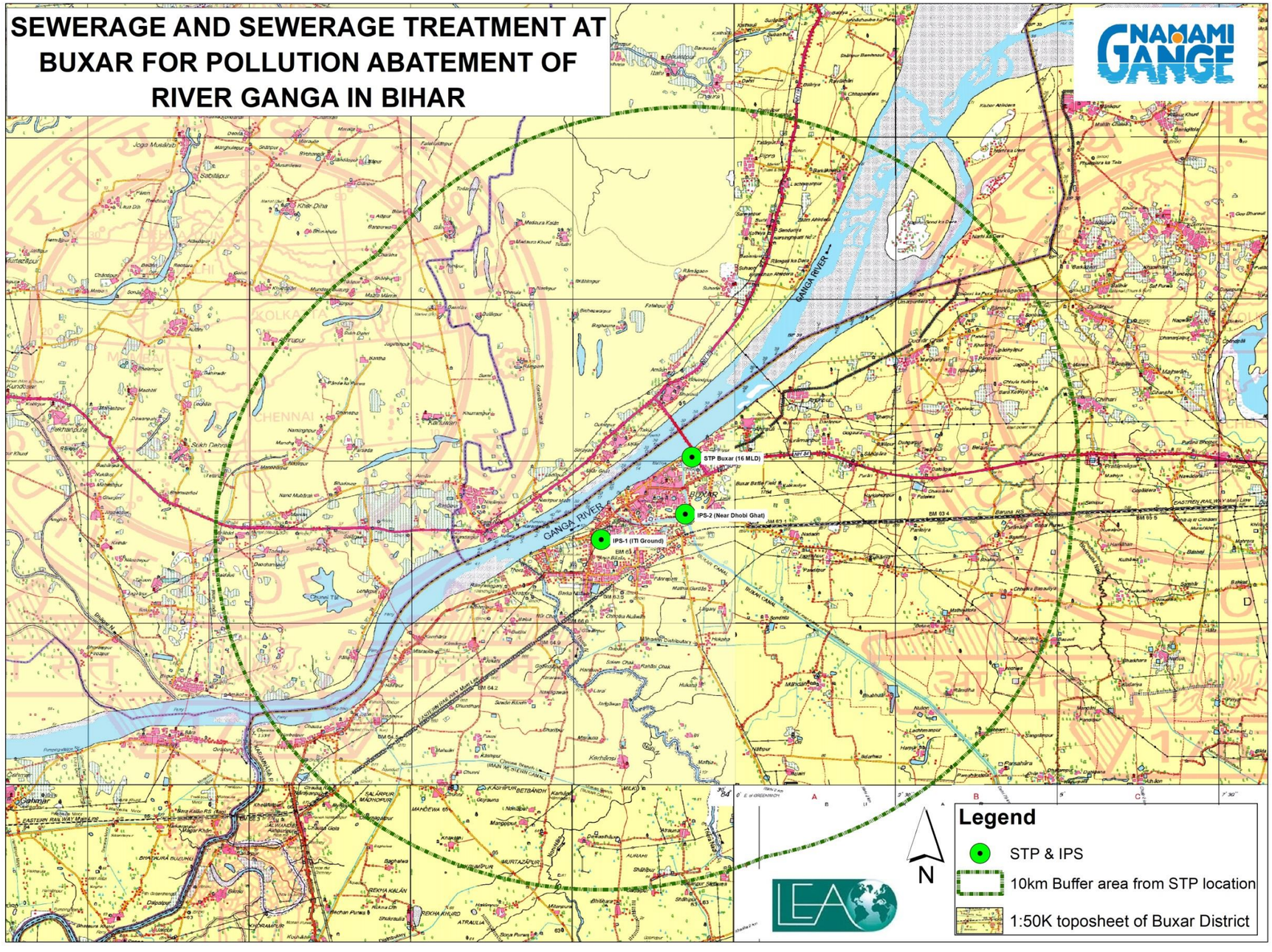
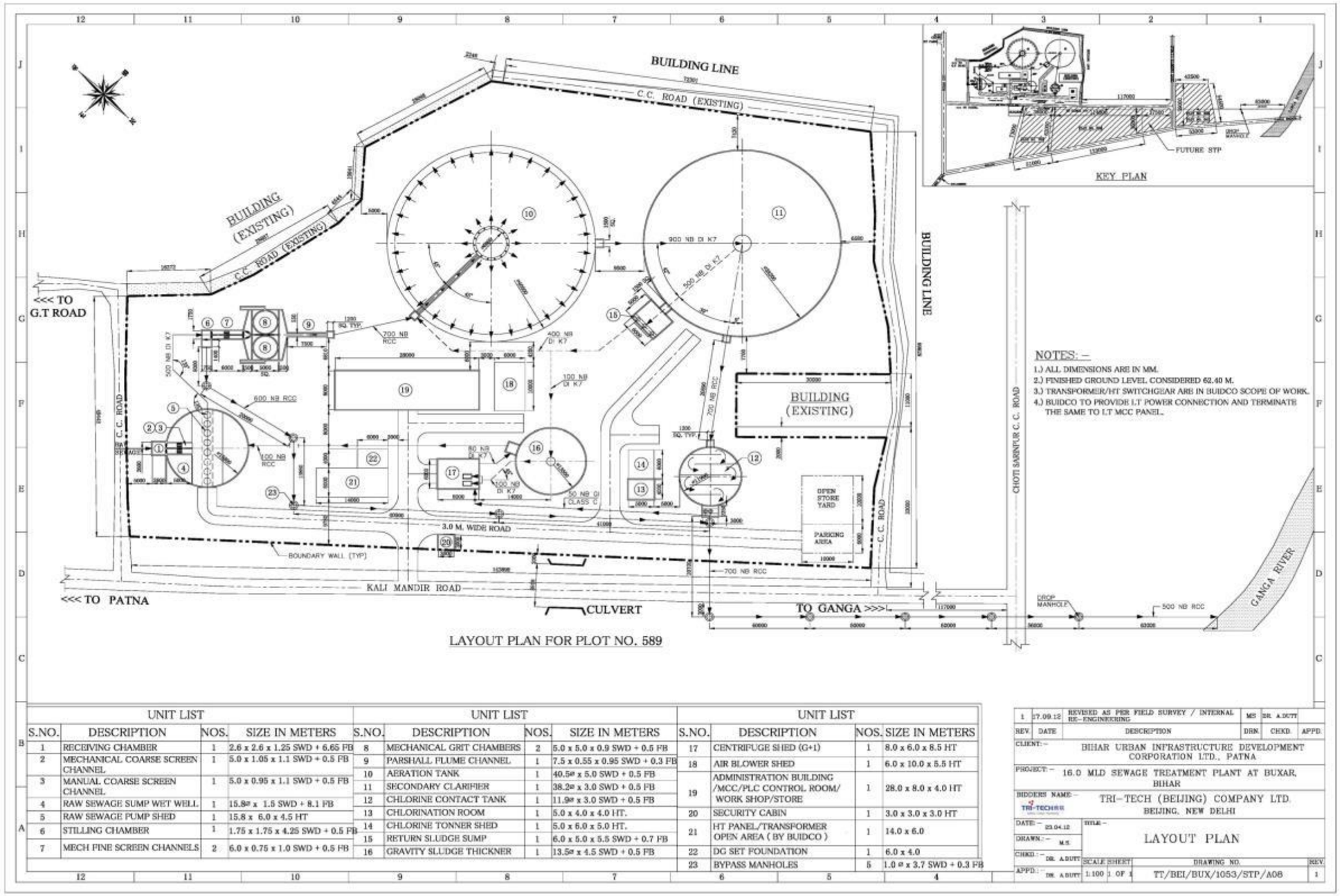


Figure 2.7: Buffer Area (10 km Radius) from the STP Location Marked on the Topo sheet



LAYOUT PLAN FOR PLOT NO. 589

UNIT LIST

S.NO.	DESCRIPTION	NOS.	SIZE IN METERS
1	RECEIVING CHAMBER	1	2.6 x 2.6 x 1.25 SWD + 6.65 FB
2	MECHANICAL COARSE SCREEN CHANNEL	1	5.0 x 1.05 x 1.1 SWD + 0.5 FB
3	MANUAL COARSE SCREEN CHANNEL	1	5.0 x 0.95 x 1.1 SWD + 0.5 FB
4	RAW SEWAGE SUMP WET WELL	1	15.8ø x 1.5 SWD + 8.1 FB
5	RAW SEWAGE PUMP SHED	1	15.8 x 6.0 x 4.5 HT
6	STILLING CHAMBER	1	1.75 x 1.75 x 4.25 SWD + 0.5 FB
7	MECH FINE SCREEN CHANNELS	2	6.0 x 0.75 x 1.0 SWD + 0.5 FB

UNIT LIST

S.NO.	DESCRIPTION	NOS.	SIZE IN METERS
8	MECHANICAL GRIT CHAMBERS	2	5.0 x 5.0 x 0.9 SWD + 0.5 FB
9	PARSHALL FLUME CHANNEL	1	7.5 x 0.55 x 0.95 SWD + 0.3 FB
10	AERATION TANK	1	40.5ø x 5.0 SWD + 0.5 FB
11	SECONDARY CLARIFIER	1	38.2ø x 3.0 SWD + 0.5 FB
12	CHLORINE CONTACT TANK	1	11.9ø x 3.0 SWD + 0.5 FB
13	CHLORINATION ROOM	1	5.0 x 4.0 x 4.0 HT.
14	CHLORINE TONNER SHED	1	5.0 x 6.0 x 5.0 HT.
15	RETURN SLUDGE SUMP	1	6.0 x 5.0 x 5.5 SWD + 0.7 FB
16	GRAVITY SLUDGE THICKNER	1	13.5ø x 4.5 SWD + 0.5 FB

UNIT LIST

S.NO.	DESCRIPTION	NOS.	SIZE IN METERS
17	CENTRIFUGE SHED (G+1)	1	8.0 x 6.0 x 8.5 HT
18	AIR BLOWER SHED	1	6.0 x 10.0 x 5.5 HT
19	ADMINISTRATION BUILDING /MCC/PLC CONTROL ROOM/ WORK SHOP/STORE	1	28.0 x 8.0 x 4.0 HT
20	SECURITY CABIN	1	3.0 x 3.0 x 3.0 HT
21	HT PANEL/TRANSFORMER OPEN AREA (BY BUIDCO)	1	14.0 x 6.0
22	DG SET FOUNDATION	1	6.0 x 4.0
23	BYPASS MANHOLES	5	1.0 ø x 3.7 SWD + 0.3 FB

REV.	DATE	DESCRIPTION	DRN.	CHKD.	APPD.
1	17.09.12	REVISED AS PER FIELD SURVEY / INTERNAL RE-ENGINEERING	MS	DR. A.DUTT	

CLIENT:- BIHAR URBAN INFRASTRUCTURE DEVELOPMENT CORPORATION LTD., PATNA
PROJECT:- 16.0 MLD SEWAGE TREATMENT PLANT AT BUXAR, BIHAR
BIDDERS NAME:- TRI-TECH (BEIJING) COMPANY LTD. BEIJING, NEW DELHI
DATE:- 23.04.12 | DRAWN:- M.S. | CHKD.:- DR. A.DUTT | APPD.:- DR. A.DUTT
TITLE:- LAYOUT PLAN
SCALE: 1:100 | SHEET: 1 OF 1 | DRAWING NO.: TT/BEI/BUX/1053/STP/A08 | REV.: 1

Figure 2.8: Layout Plant for STP (16 MLD) at Sarimpur Town

107. Proposed STP with a capacity of 16 MLD is based on population projection over some time internal sewers in the city the estimated sewage generation in the year 2031. The overall design includes reinforced cement concrete non-pressure circular pipes for sewers suitably supported with bedding, depending on structural requirement. Minimum size of 150 mm is adopted for the sewer lines. Manholes are proposed to be provided at every 30m or more spacing depending on the requirement and specifications.

108. The STP is based on Sequential Batch Reactor (SBR) technology. It is also proposed to be converted 33 percent of the area in the STP site shall be converted into a green belt/plantation of large trees/creepers to ensure that odor that can be diluted or diffused if it emitted. The project is being left overwork which will be executed following DBOT mode instead of Hybrid annuity based PPP mode, as the previous contract was taken up under DBOT mode. It is anticipated that the entire work will be completed within 24 months from the date of start.

109. The key objective of the proposed project is (i) to prevent untreated wastewater by providing sewerage network through STP of capacity 16 MLD and IPSs (for each 24 MLD) before its discharge into Ganga River in Buxar city and, (ii) to achieve the sewage effluent standards as prescribed by the CPCB, MoEF&CC, Government of India, and recommended by the CPHEEO in its latest manual and by the NGT vide its order dated 30th April 2019.

110. The characteristics of treated sewage effluent at discharge point are given below (Table 2-7): The Contractor/Operator shall comply with the latest NGT order dated 30th April 2019.

Table 2-7: Characteristics of treated sewage effluent (Standards recommended for all the Cities)

Parameters	Standards for treated sewage effluent for disposal (Applicable to all mode of disposal)
Biochemical Oxygen Demand BOD (mg/l)	10
Chemical Oxygen Demand (COD) (mg/l)	50
Total Suspended Solids TSS (mg/l)	20
Total Nitrogen (mg/l)	10
Total Phosphorus (mg/l)	1.0
Faecal Coliform MPN/100 ml : Desirable, Permissible	Desirable100, Permissible 230

Source: *Hon'ble NGT Order dated 30th April 2019.*

2.6 DISPOSAL OF TREATED EFFLUENT

111. The treated wastewater of STP will be preferably reused for agriculture (BUIDCO has already discussed with the irrigation department for utilization of treated wastewater, minutes of the meeting received from Nagar Vikas for the same is attached with an **Annexure.3)** and also for industrial purposes to avoid discharge into the River Ganga. The other alternative measure to reuse the water shall also be explored.

2.7 SLUDGE DISPOSAL MANAGEMENT

112. As per the design of the STP, the generated sludge shall be digested first and only after digestion, it will be handed over to local farmers for agriculture purpose. The sequence of such handling over of sludge to the farmers shall be developed through a sludge management plan by the contractor/Concessionaire.

This is being practiced in many Namami Gange projects, especially in Uttarakhand. Every state government is also promoting such usage.

113. However, only in the worst case if it is found that the digested sludge is not at all suitable (chances are less than 1%) then only it shall be disposed of in the landfill site identified by the Municipal corporation which will be located away from the habitation and nearby water bodies. The land fill site will be identified by following the latest MoEF&CC Notification and will be purchased for the dumping of solid waste. The District Magistrate of Buxar has clarified that the finalisation of landfill site is in progress, once it is decided or completed, the same will be intimated to the BUIDCo officials to utilize the land for disposal of solid waste and sludge disposal, in case if generated sludge not suitable for agriculture purposes. Project Manager, BUIDCo has also confirmed that discussions are going on regarding the landfill site with the local ULB/Municipal Corporation.

114. Appropriate Sludge Management Plan shall be prepared by the Contractor. A suitable site for disposal will be finalised soon by the local ULB/Municipal Corporation and intimated to the BUIDCo officials. The necessary safeguard measures associated with the storage and disposal of sludge are provided in the EMP in Table 9.1.

2.8 SEPTAGE MANAGEMENT

115. A comprehensive sewerage network is proposed in the city and designed for 30 years that is covering the entire city area along with 100 percent Household connection. Therefore, STP will have the adequate provision/capacity of the co-treatment facility for Septage, without hampering the functioning of the sewage treatment plant. (As per revised administrative approval, the septage management is one of the proposed components in the sewerage system).

116. In view of economic considerations related to distance and transport, the additional measures of Septage will be taken into consideration that nearby proposed IPS/STP will be selected based on distance and locality to maximize the catchment, and by adopting suitable management.

3 APPROACH AND METHODOLOGY

3.1 METHODOLOGY

117. The Environmental and Social Management Framework (ESMF of NGRBA, 2017)[4] is intended to identify and assess several environment and social impacts (both positive and negative) that may result for the proposed river pollution mitigation project "**Sewerage and Sewerage Treatment at Buxar for Pollution Abatement Works of River Ganga in Bihar**" under NGRBP, as well as to provide a corresponding management plan to handle any adverse/negative impacts. The methodology adopted for conducting Environmental and Social Assessment and Management Plan (ESAMP) for the proposed interventions is given in **Figure 3-1** below.

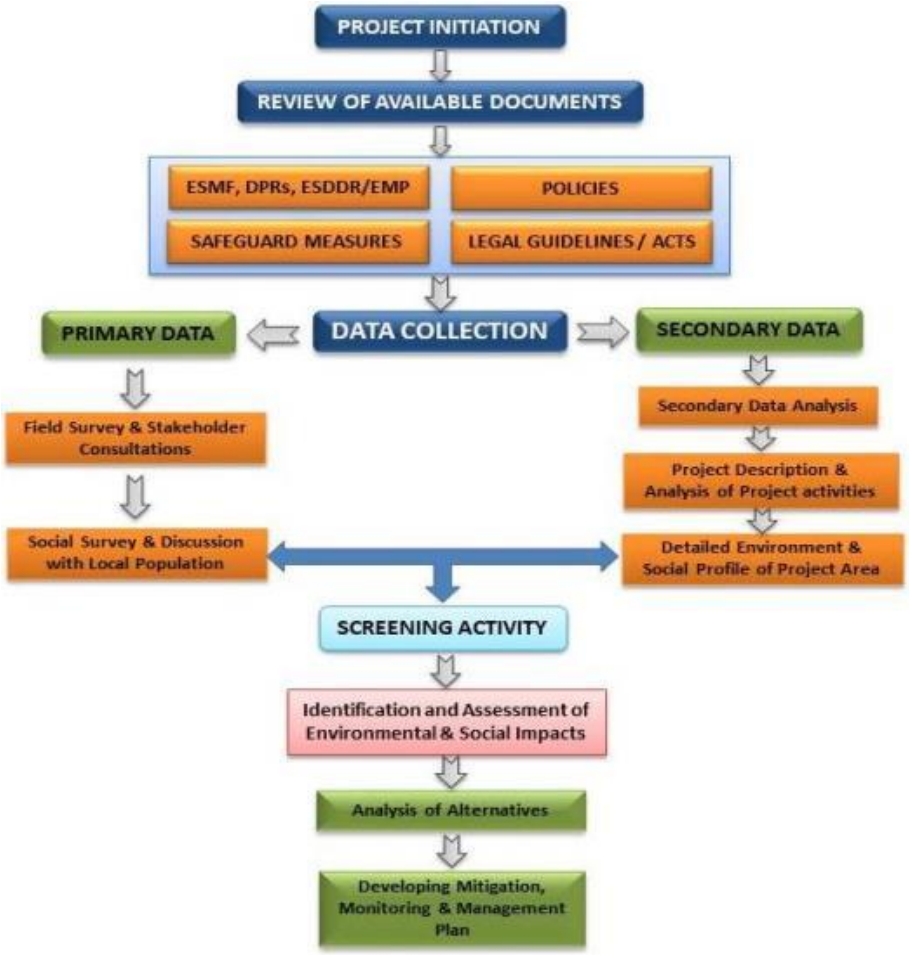


Figure 3-1: Flowchart describing steps adopted for ESAMP preparation

118. The Environmental and Social Assessment and Management Plan (ESAMP) has been prepared by LEA Associates South Asia Private Limited, New Delhi, on the basis of Detailed Project Report and Revised Administration Approval and Expenditure Sanction dated 31st December 2019 for the project on "Sewerage

[4] For the Environmental and Social Management Framework (ESMF) document please refer https://www.nmcg.nic.in/writereaddata/fileupload/25_Namami_Gange_ESMF__August_17_2017__1___1_.pdf

and Sewerage Treatment at Buxar for Pollution abatement of River Ganga in Bihar" that has been prepared by Bihar Urban Infrastructure Development Corporation Limited (BUIDCO).

3.2 REVIEW OF AVAILABLE DOCUMENTS AND DATA COLLATION

119. Review of available documents and collating information from various documents to assess the possible environmental and social impacts of the proposed project. All the available information and data (quantitative and qualitative) regarding the proposed project has been collected mainly from the Detailed Project Report (DPR), Environmental and Social Management Framework (ESMF), Environmental and Social Due Diligence Report (ESDDR), Environmental Management Plan (EMP) consultation with stake-holders and other secondary sources including the water/air/noise monitoring data of Bihar Pollution Control Board, BUIDCO and from the reports of tests conducted at site.

120. This task also involves review of all relevant documents on policy and legal framework to understand the requirements and level of environmental and social sensitivity with special reference to the preparation of Environmental & Social Impact Assessment and Management (ESAMP) as well as to assess the applicability of relevant regulations and guidelines on the proposed projects.

3.3 DESCRIBING THE SUB-PROJECT ACTIVITIES

121. With the help of information and data received mainly from the Detailed Project Report (DPR) and revised Administrative Approval (dated 31st December 2019) and consultations with stakeholders, a brief description and analysis of the project activities has been established. Based on initial understanding, the list of required information has been drafted before conducting the field survey.

3.4 STAKEHOLDER CONSULTATIONS

122. The key stakeholders including the BUIDCO, Buxar were interacted (both formally and informally) during the field visits while preparing the ESAMP. Associated government departments were visited to collect the relevant data and their feedback on the proposed project activities. Also they were asked about the mitigation plans they have adopted or are planning to adopt, suggestions for improvement and any public grievances.

123. Surveys were conducted along the path of proposed project sites. Different sections of the local community (both men and women) including residents of households, residents of temporary settlements, shop keepers, street vendors, etc. were also consulted during the preparation of ESAMP. The details some of these discussions are given in Table 6.1. Attendance sheets of consultations and minutes of the Meeting are provided as **Annexure-4**.

3.5 BASELINE ENVIRONMENTAL AND SOCIAL PROFILE OF PROJECT AREA

124. With the help of secondary information/data received from the available documents and from the discussions/interactions with key stakeholders and host population, a brief description of the baseline environmental and social profile of the project area has been established.

3.6 SCREENING ACTIVITIES

125. The project screening has also been carried out to understand the nature, scale and magnitude of potential environmental and social impacts associated with the proposed project. The screening activities have been conducted as per the guidelines provided in Environmental and Social Management Framework of NGRBA (NGRBA, 2011) and on the basis of secondary data analysis, field assessments and stakeholder interactions/consultations.

126. The screening checklist provided in **Annexure 1** detailed out the impact level of various activities during the construction and operation phases. The criteria included environmental factors such as the presence of eco-sensitive region in and around the project area, clearance of tree cover, improper storage of excavation spoils, flooding of adjacent areas, elevated noise and dust levels, damage to existing utilities, etc. Social criteria included factors such as requirement of land purchase, displacement of tribes, and loss of livelihood and gender issues.

3.7 IDENTIFICATION AND ASSESSMENT OF IMPACTS

127. Based on the analysis of the data collected from field surveys, stakeholder interactions/ consultations and secondary sources, issues related to the environmental and social sectors were identified. Through this assessment, it was envisaged that the project will have few environmental and social impacts, however they will be on temporary, can be mitigated with the proper implementation of safeguard measures suggested in the EMP and SMP designed for the project along with effective monitoring during implementation.

3.8 ANALYSIS OF ALTERNATIVES

128. In consultations with the officials of NMCG/SPMG, Implementing agencies, other related agencies as well as in light of the current environmental and social circumstances, appropriate alternatives to be assessed in the process of ESAMP preparation.

129. The project alternative was evaluated on the basis of site suitability, technology scale, waste management, and other local environmental and social features of the proposed project area.

3.9 DEVELOPING MANAGEMENT ACTION PLAN

130. Based on the identified and assessed potential environmental and social impacts, an appropriate mitigation / management action plan has been developed recommending suitable measures needed to prevent, minimize, mitigate, or compensate for adverse impacts (if any) and to improve the environmental and social performance. The mitigation plans is suggested for different stages of the project, as applicable: designing phase, construction phase and, operation and maintenance phase.

3.10 SCOPE OF WORK

131. Based on the Environmental and Social Screening carried out as part of this assessment using the screening matrix provided in the Environmental and Social Management Framework of NGRBA (refer **Annexure-1**), concludes that the present project of pollution abatement works at Buxar, is categorized as

'Low Impact' category. The project components have limited environment and social impacts, which can be mitigated with the adoption of suitable mitigation measures. The scope of the ESAMP that has been finalized on the basis of project screening and categorization are given below:

- Describe the sub-project and its components;
- Provided the applicable policies and legal guidelines to the proposed sub-project and include the specific clearances/approvals that have to be obtained by the executive agency/contractor.
- Describe the baseline environmental and social conditions of the sub-project areas and the proposed project facilities;
- Carryout public consultations and participation with different stakeholder groups at the local, regional and district level.
- Identification and analysis of key environmental and social issues viz. presence of any ecologically sensitive areas in the vicinity of the project site, as well as land availability issues(if any) associated with the project;
- Alternative analysis that were examined in the course of developing the proposed project towards in siting of project location, design, technology adopted, selection of construction techniques and phasing and operating and maintenance procedures.
- Develop Environmental and Social Management Plan (ESMP) outlining suitable mitigation and monitoring measures to be adopted by the relevant implementing actor;
- Suggesting suitable institutional arrangement for the implementation of ESAMP at varied levels, this includes man power requirement, skills and training requirements, organization mechanisms and information dissemination requirements.

4 POLICY AND LEGAL GUIDELINE

132. The key applicable legal requirements for environmental and social aspects attracted by the project under investments and implementation are as follows:

- Policy and Regulatory Framework of Government of India (GoI);
- Environmental Policy and Regulations of the respective State Governments;
- Legislations applicable to construction activities;
- Environment and Social Management Framework of Namami Gange Programme
- The World Bank Group Environmental and Social Operation and safeguard policy
- The World Bank Environment Health and Safety (EHS) Guidelines for Water and Sanitation

4.1 POLICY, LEGAL AND REGULATORY REQUIREMENTS

133. The Government of India has laid out various policy guidelines, acts and regulations pertaining to sustenance, protection of environment and its various components. The Environment (Protection) Act, 1986 is umbrella Act for the protection of environment. As per this Act, the responsibility to administer the legislation has been jointly entrusted to the Ministry of Environment & Forests and Climate Change (MoEF&CC) and the Central Pollution Control Board (CPCB) / State Pollution Control Boards (SPCBs).

4.2 KEY APPLICABLE LAWS AND REGULATIONS – ENVIRONMENTAL & SOCIAL

134. As per the EIA Notification, dated 14th September' 2006 and its amendments thereafter, stipulated by the Ministry of Environment, Forest and Climate Change (MoEF&CC); the proposed project does not attract any environmental clearance. However, the project shall require to obtain Consents from competent authorities such as the BSPCB, for 'Consent to Establish' by submitting a common application (as per Schedule-I), under the Water (Prevention and Control of Pollution) Act, 1974, the Air (Prevention and Control of Pollution) Act, 1981 and The Hazardous Wastes (Management and Handling) Rules, 1989, as amended in January 6, 2000 and May 21, 2003.

135. Meanwhile, the Consent to Establish (CtE) obtained under Air and Water Act from Bihar State Pollution Control Board (BSPCB), Patna for STP establishment; vide Memo No. 7-9890; dated 08.09.2014, has been expired (please refer **Annexure 5).** In accordance to the prevalent practice, BUIDCo is required to submit application and requisite fees to BSPCB, Patna, to obtain NoC for establishing STP on priority basis.

136. The key environmental and social laws and regulations relevant to the projects under the NGRBP are tabulated below (Table 4.1). The key environmental regulations can also be accessed at www.moef.nic.in/rules-and-regulations.

Table 4-1: Environmental Regulations and Legislations

S. No.	Act / Rules	Purpose	Applicable (Yes / No)	Reason for Applicability	Authority
1	Environment (Protection) Act, 1986	To protect and improve overall environment. This is an umbrella Act.	Yes	All environmental notifications, rules and schedules are issued under this act.	MoEF&CC, CPCB, SPCB
2	Environmental Impact Assessment Notification	To ensure and regulate all new development/ expansion	No	STP and Sewage Network Project are not listed in	MoEF&CC, SEIAA, GOI

S. No.	Act / Rules	Purpose	Applicable (Yes / No)	Reason for Applicability	Authority
	14th Sep' 2006 and its amendments	of existing project which are listed in EIA Schedule		Schedule to EIA notification 2006 and its amendment made thereafter.	
3	Solid Waste Management Rules, 2016	To manage collection, transportation, Segregation, Treatment, and disposal of solid wastes (other than Hazardous water, plastic Waste , BIO Medical waste)	Yes	Applicable for Waste generated from the camp, offices, STPs.	MoEF&CC, CPCB, SPCB
4	The Forest (Conservation) Act, 1980	To regulate non-forest activities in the notified forest area which are protected under the Indian Forest Act 1927	No	No forest land diversion is involved.	State Forest Department & GOI MOEF &CC
5	National Forest Policy, 1988	To maintain ecological stability through preservation and restoration of biological diversity.	No	This policy will be applicable if any eco sensitive feature exists in and around the investments.	Forest Dept., State Gov. and MoEF&CC, GoI
6	Wild Life Protection Act, 1972	To protect notified protected area and Eco Sensitive Zone (ESZ)	No	None of project location and activities is located near to any National Park / Sanctuary / Eco sensitive zones and nor fall within 10 Km. radius of such protected areas.	State Board for Wildlife (SBWL)/ National Board for Wildlife (NBWL) and MoEFC&C.
7	Air (Prevention and Control of Pollution) Act, 1981 (21 of 1981)	To control air pollution by controlling emission of air pollutants as per the prescribed standards.	Yes	Consent to establish and Consent to Operate is required to be obtained from SPCB under section 21 of Air (Prevention and control of Pollution) Act 1981.	State Pollution Control Board, Bihar
8	Water Prevention and Control of Pollution) Act, 1974(25 of 1974)	To control water pollution by controlling discharge of pollutants as per the prescribed standards	Yes	Consent to establish (CtE) and Consent to Operate (CtO) is required to be obtained from SPCB under section 25 of this Act.	State Pollution Control Board, Bihar
9	The Noise Pollution (Regulation and Control) Rules, 2000 & amendments	The standards for noise for day and night have been promulgated by the MoEF&CC for various activities.	Yes	This act will be applicable for all construction equipment deployed at worksite and in operation.	State Pollution Control Board, Bihar
10	Ancient Monuments and Archaeological Sites and Remains Act, 1958	Conservation of cultural and historical remains found in India notified under ASI Act - 1958	No	None of the new construction of STP, MPS, IPS are located within regulated zone of any ASI structure	Archaeological Department GoI, Indian Heritage Society and Indian National Trust for Art and Culture Heritage (INTACH).
11	Public Liability and Insurance Act, 1991	Protection form hazardous materials and accidents.	No	This act will be applicable for providing immediate relief to the persons affected by accident occurring while handling any hazardous substances / chemicals viz. chlorine (to be used for	State Pollution Control Board, Bihar

S. No.	Act / Rules	Purpose	Applicable (Yes / No)	Reason for Applicability	Authority
				Chlorination System) as detailed in the Schedule to this act	
12	Explosive Act 1984	Safe transportation, storage and use of explosive material.	Yes	This act will be applicable during construction by the Concessionaire for the storing diesel, lubricants, etc.	Chief Controller of Explosives
13	Minor Mineral Concession Rules	For opening new quarry.	Yes	This act will be applicable during construction by the Concessionaire for the use of minor minerals like stone, soil, river sand; etc.	Regional Mining Department/ State Mining Department
14	The Mines Act, 1952	The mining act has been notified for safe and sound mining activity.	No	The construction activities for investments will require aggregates. These will be procured through mining from approved quarries.	Dept. of mining, State Government
15	Central Motor Vehicle Act 1988	To check vehicular air and noise pollution.	Yes	This rule will be applicable to vehicles deployed for construction activities and construction Machinery.	Motor Vehicle Department
16	Demolition and Construction Waste Management Rules 2016	The rules shall apply to every waste resulting from construction, remodeling, repair and demolition of any civil structure of individual or organization or authority who generates construction and demolition waste such as materials, debris etc.,	Yes	This rule is applicable for demolition and construction waste generated while laying of sewer structure	State Pollution Control Board, Bihar and EA/ Concessionaire
17	Hazardous waste management, handling and transboundary rules, 2016	For making effective procedure for inventory, control, handling and disposal hazardous wastes.	Yes	This rule is applicable in the storage, use and disposal of hazardous substances viz. chlorine to be used for Chlorination System, waste oils, emulsions, colour, spent chemicals and metal finishing wastes emanating during construction	State Pollution Control Board, Bihar and EA/ Concessionaire
18	The Plastic Waste Management Rules, 2016	For the storage and disposal of plastic wastes through authorized vendors.	Yes	This act will be applicable for the storage and disposal of all the plastic wastes viz. plastic bags / cement bags generate during the construction.	State Pollution Control Board , Bihar

137. Although the proposed project does not attract any environmental clearance as such. However, the project necessitates procurement of necessary NOCs / Consents / Permissions from the competent authorities. At the same time, the construction agencies should also comply with the specific and general conditions of those consents and permissions before initiating the construction activities such as necessary permission to be obtained from Municipal Corporation/Municipality for sludge disposal to an identified land fil site etc, in case, if the sludge not suitable as manure can be disposed of.

4.3 OTHER LEGISLATIONS APPLICABLE TO CONSTRUCTION ACTIVITIES UNDER THE PROJECT

138. The Construction stage generally involves equity, safety and public health issues. The construction agencies therefore will be required to comply with various other laws and regulations of the land, which include:

- Workmen's Compensation Act 1923 (the Act provides for compensation in case of injury by accident arising out of and during the course of employment);
- Payment of Gratuity Act, 1972 (gratuity is payable to an employee under the Act on satisfaction of certain conditions on separation if an employee has completed 5 years);
- Employees PF and Miscellaneous Provision Act 1952 (the Act provides for monthly contributions by the employer plus workers);
- Maternity Benefit Act, 1951 (the Act provides for leave and some other benefits to women employees in case of confinement or miscarriage, etc.);
- Contract Labor (Regulation and Abolition) Act, 1970 (the Act provides for certain welfare measures to be provided by the Concessionaire to contract labour);
- Minimum Wages Act, 1948 (the employer is supposed to pay not less than the Minimum Wages fixed by the Government as per provisions of the Act);
- Payment of Wages Act, 1936 (it lays down as to by what date the wages are to be paid, when it will be paid and what deductions can be made from the wages of the workers);
- Equal Remuneration Act, 1979 (the Act provides for payment of equal wages for work of equal nature to Male and Female workers and not for making discrimination against Female employees);
- Payment of Bonus Act, 1965 (the Act provides for payments of annual bonus subject to a minimum of 83.3% of wages and maximum of 20% of wages);
- Industrial Disputes Act, 1947 (the Act lays down the machinery and procedure for resolution of industrial disputes, in what situations a strike or lock-out becomes illegal and what are the requirements for laying off or retrenching the employees or closing down the establishment);
- Industrial Employment (Standing Orders) Act; 1946 (the Act provides for laying down rules governing the conditions of employment);
- Trade Unions Act, 1926 (the Act lays down the procedure for registration of trade unions of workers and employers. The trade unions registered under the Act have been given certain immunities from civil and criminal liabilities);
- Child Labour (Prohibition and Regulation) Act, 1986 (the Act prohibits employment of children below 14 years of age in certain occupations and processes and provides for regulation of employment of children in all other occupations and processes. Employment of child labour is prohibited in Building and Construction Industry);
- Inter-State Migrant Workmen's (Regulation of Employment and Conditions of Service) Act, 1979 (the inter-state migrant workers, in an establishment to which this Act becomes applicable, are required to be provided certain facilities such as housing, medical aid, travelling expenses from home to the establishment and back, etc.);
- The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996 and the Cess Act of 1996 (all the establishments who carry on any building or other

construction work and employs 10 or more workers are covered under this Act; the employer of the establishment is required to provide safety measures at the building or construction work and other welfare measures, such as canteens, first-aid facilities, ambulance, housing accommodation for Workers near the workplace, etc.);

- The Factories Act, 1948 (the Act lays down the procedure for approval of plans before setting up a factory, health and safety provisions, welfare provisions, working hours and rendering information-regarding accidents or dangerous occurrences to designated authorities);
- Sexual Harassment of Women at the Workplace (Prevention, Prohibition and Redressal) Act, 2013 (The Act defines Sexual Harassment in the Workplace, provides for an enquiry procedure in case of complaints and mandates the setting up of an Internal Complaints Committee)- This is a legislative Act that seeks to protect women from sexual harassment in the construction camp/ any work place.
- Hazardous Wastes (Management, Handling and Trans-boundary Movement) Rules, 2008 (the Rules govern handling, movement and disposal of hazardous waste); the Hazardous and Other Wastes (Management and Transboundary Movement) Amendment, Rules, 2019
- Manufacture, Storage and Import of Hazardous Chemicals Rules 1989, amended 1994 and 2000 (the Rules provide indicative criteria for hazardous chemicals and require occupiers to identify major accident hazards and prepare on-site and off-site emergency plans).
- All the laws and regulations set by different authorities (MoEF&CC, NGRBA, CPCB, etc.) have been reviewed to understand the applicable laws in the context of this proposed sub-project in Buxar. All the applicable laws enlist the responsible authority and reasons for its applicability. It is therefore proposed that during the implementation of this project responsible authorities should be contacted acted by the implementing agency for monitoring the law and regulation.

4.4 APPLICABILITY OF THE WORLD BANK POLICIES

139. The project is seeking financing from the World Bank; henceforth The World Bank's environmental and social safeguard policies are applicable to this Project. The World Bank's Operational Policies applicable to the proposed project under Namami Gange programme, are as follows (Table 4.2):

Table 4-2: Applicable Safeguard Policies of World Bank

S. No.	World Bank Safeguard Policies	Subject Category	Applicable (Yes / No)	Reason for Applicability
1	OP 4.01	Environmental Assessment	Yes	OP. 4.01 is an Umbrella Policy applicable for all infrastructure projects under Namami Gange Programme. Environment and Social Due Diligence (ESDD) for projects under DBOT/PPP/Hybrid Annuity Mode followed by the preparation of a detailed ESAMP report during the detailed design stage (irrespective of the final design by the Concessionaire/Contractor).
2	OP 4.04	Natural Habitats	No	Applicable to protect natural habitats including forest and wild life impacted due to project. No forest land diversion and tree felling is envisaged under the proposed project activities. None of project location and activities is also located near to any National Park / Sanctuary / Eco sensitive zones and nor fall within 10 Km. radius of such protected areas.
3	OP 4.12	Involuntary Resettlement	No	Applicable in case of Private Land Acquisition to minimize / avoid resettlement wherever feasible. No land acquisition and/or resettlement are envisaged under the proposed project activities.

				STP construction and laying of sewer lane will not lead to loss of livelihoods, loss of land and buildings etc.
4	OP 4.36	Forestry	No	The project does not involve diversion of forest area
5	OP 4.11	Physical Cultural Resources	No	No protected Monuments/ Heritage site and their remains within 300 (regulated) zone.
6	OP 7.50	Projects on International Waterways	No	These projects will not add potential pollution of any waterways. It would improve the water quality of notified Ganga National waterways -1
7	OP 4.10	Indigenous people	No	No indigenous people livelihood are affected by the proposed project.

140. The World Bank's Environmental, Health, and Safety (EHS) Guidelines for Water and Sanitation is also applicable for the proposed project. This guideline will provide guidance on EHS issues; principally occur during the construction, operation and maintenance phases, of the sewage collection through a system of pipes, pumps, and other associated infrastructure (sewerage) to a centralized storage and/or treatment system.

4.5 COMPLIANCE TO REGULATORY REQUIREMENTS

- The project does not require any environmental clearance, or forest clearance. At the same time, the project requires to obtain required consents and permissions from competent authorities. The specific requirements are mentioned as under, for which the Concessionaire should comply with before initiating the construction:
- Consent to Establish (CtE) and Consent to Operate (CtO) for the establishment and operation of STP is mandatory to obtain under Water (Prevention and Control of Pollution) Act 1972 and Air (Prevention and Control of Pollution) Act 1981 of Government of India.
- Permission for use of water for construction purpose from irrigation department/CGWA (for Surface or Ground Water) respectively.
- Labour license requires to be obtained by the Contractor prior to construction.

4.6 ENVIRONMENTAL AND SOCIAL MANAGEMENT FRAMEWORK OF NGRBA

141. Project has prepared an Environmental and Social Management Framework to ensure socially and environmentally sustainable development in NGRBA's endeavour of Mission Clean Ganga by effective management of environmental and social issues in all the investments with a special focus on the following:

- ensure that all investments adhere to the national, state and local regulatory requirements during the design, implementation and operation stages
- ensure that best environmental and social practices are mainstreamed/ integrated during design, implementation and operation of the investments
- strive to enhance environmental conditions wherever feasible
- Undertake to develop communication strategy, capacity building and training initiatives for all stakeholders such as the SPMGs, EAs, ULBs, NGOs and common citizens.

142. The purpose of the ESMF is to facilitate the management of environmental and social issues of the river pollution mitigation investments. The Environment and Social Management Framework (ESMF), therefore, would be used as an umbrella by the NGRBA program (the PMG and SPMGs) and all

implementing agencies while preparing and/ or appraising, approving and executing the investments. The ESMF includes a Resettlement Policy and Land Acquisition Framework (RPLAF), which specifies the procedures, eligibility, grievance redressal and other measures to be followed in the event that resettlement or land acquisition is required for any sub-project. As part of the ESMF, a Gender Development Framework has been designed which will help to analyze gender issues during the preparation stages of the sub-project, and to design interventions to address women's needs. Gender analysis will be part of the social assessment at the sub-project level.

5 BASELINE STUDY OF THE PROJECT AREA

143. This section briefly describes the baseline environmental and social profile of the study area. Buxar town is an old town situated on the bank of river Ganges (Ganga) and is the headquarter of Buxar district. Buxar city is governed by the Buxar Municipal Council (BMC)/Buxar Nagar Parishad. The BMC's administrative boundary covers 8.71sq.km.

144. Based on the Environmental and Social Screening carried out as part of this Assessment and Management exercise using the screening matrix of the Environmental and Social Management Framework of NGRBA, the present project of Sewerage and Sewerage Treatment at Buxar, falls under 'Low Impact' category. Project have temporary environmental impacts due to construction and laying of sewer network and does not require to purchase any private land for setting up the STP and IPS locations and not envisage any displacement of squatters and encroachers due to laying of the sewer network. This project has an overall positive impact by tapping the sewer network and preventing its flow into the river Ganga. Overall project rate and assessment based on the environmental and social features are discussed below:

145. The project can be referred for the overall rating and assessment is **low Category** due to the not applicability of the following criteria:

- The project location is not located nearby by any eco-sensitive zone or in any adjoining eco-sensitive zone and there is no such area within 10 km.
- The project is an augmentation of already initiated the Sewerage system through the previous contract (60% of civil works completed at STP and 30 % works done at IPS at ITI ground) which is not located within the notified Forest area and no forest clearance is required. No tree cutting is envisaged. The sewer lines and manholes will be constructed at the center of the road.
- Buxar city is not under the list of Critically Polluted Areas (Based on CEPI index assessed in 2011 by CPCB).
- The project is not an environmental sensitive project and does not require clearance as per Environmental Impact Assessment Notification 14th September' 2006 and further amendments.
- Geographically, the city is lies in middle Gangetic plain and situated in the western most region of Bihar State, therefore it is not covered under Coastal Regulation Zone.
- The proposed STP site is not located within regulatory zone of ASI structure (300 m).
- The project STP site involves no private land acquisition and any resettlement/displacement and loss of livelihood

5.1 LOCATION AND GEOGRAPHY

146. Buxar is a city in the state of Bihar towards the eastern part of India and geographically located at coordinates 25.35 North latitude and 83.59 East longitude. The city is situated at the extreme west end of the district as well as the State. It is located at around 117.7 Km. from the state capital Patna. It is surrounded by Ballia and Ghazipur districts of Uttar Pradesh along its north-western and western boundaries respectively. Also, River Ganges forms its western and north-western boundary, separating it from the state of Uttar Pradesh. The location map of Buxar town w.r.t. the district is presented in below **Figure 5-1.**

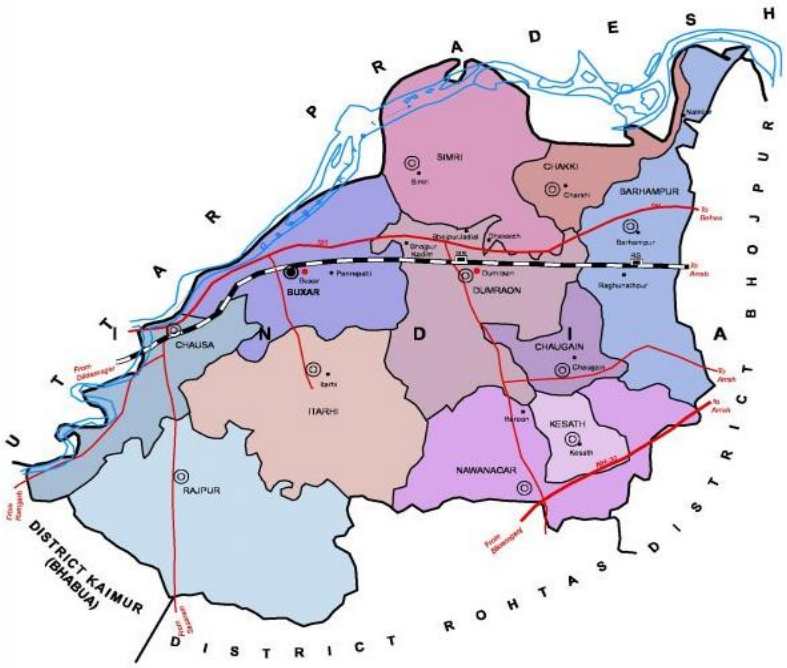


Figure 5-1: Location of Buxar in the District Map

Source: https://www. buxar.nic.in

5.2 GEOMORPHOLOGY

147. Buxar forms a part of the axial belt of the Indo-Gangetic plain and consists of Newer and Older alluvium of Quaternary age. The lithology of the region is characterized by Recent to Upper Pleistocene of newer alluvium comprising of sand, silt and clay with coarse textured facies[5]. The entire strip of land between the River Ganges on the north and the main line of the Eastern Railways on the south is a low lying alluvial plain.

5.3 TOPOGRAPHY

148. Buxar is a part of the southern Ganga Plains. Physiography of the area is characterized by alluvial plains gently sloping towards the north. The plain land is marked by the presence of several minor depressions. The average elevation of the land surface in the town is about 65.0 m above mean sea level (AMSL). Broadly, the region of Buxar can be divided into two micro physiographic units, namely the low-lying northern plains with deposits of silt and natural levee along the course of the River Ganga and the flat region of the south, extending southwards of the railway line in east-west direction, covered by a network of Sone-canal system.

[5] Source: Ground Water Information Booklet, Buxar District, Bihar State, September 2013.

5.4 CLIMATE AND METEROLOGY

149. The climate in Buxar is generally warm and temperate. As compared to winters, the summers have much more rainfall. The average temperature in Buxar is 26.2 °C (79.2 °F) and the annual rainfall is 923 mm (36.3 inch). The driest month is December, with 3 mm of rain. In August, the precipitation reaches its peak, with an average of 268 mm. Thus there is a difference of 265 mm of precipitation between the driest and the wettest months. The variation in annual temperature is around 16.9 °C (62.4 °F). The trend of monthly average temperature and rainfall over the years are presented below in **Figure 5-2** and **Figure 5-2** respectively.

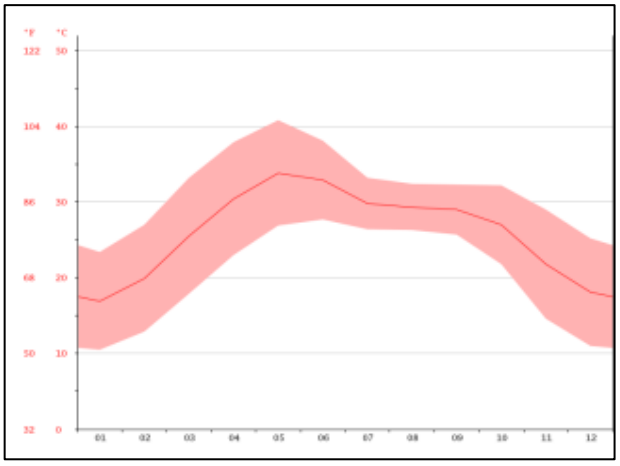


Figure 5-2: Monthly Average Temperature Curve, Buxar

Source : *https://en.climate-data.org/asia/india/bihar/buxar-174744/*

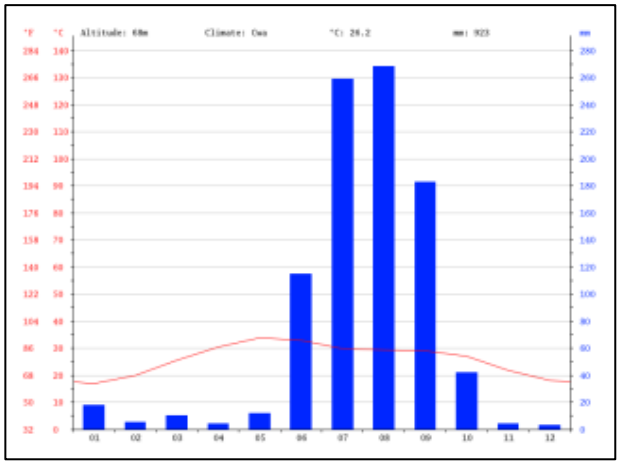
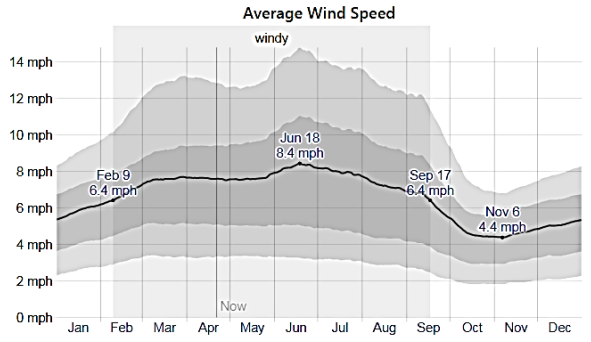


Figure 5-3: Monthly Average Rainfall Bar Graph, Buxar

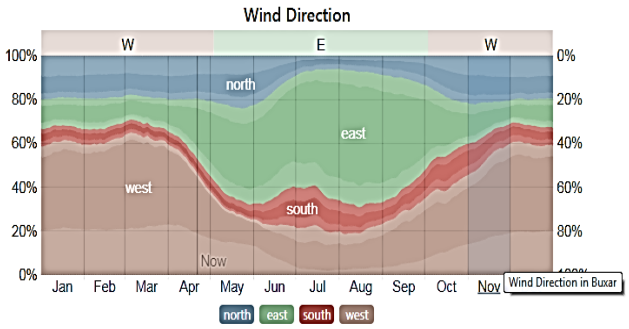
5.5 WIND SPEED AND DIRECTION

150. The average hourly wind speed in Buxar experiences significant seasonal variation over the course of the year. The windier part of the year lasts for 7.2 months from February to September with an average wind speed of more than 6.4 miles per hour. The windiest day and month of the year is June (on June 18), with an average hourly wind speed of 8.4 miles per hour. The calmer time of the year lasts for 4.8 months from September to February and calmest day of the year is November 6, with an average hourly speed of 4.4 miles per hour.

151. The predominant average hourly wind direction in Buxar varies throughout the year. The wind is most often from the east for 5 months from May to October, with a peak percentage of 62% on August 14. The wind is most often from the west for 7 months from October to May, with a peak percentage of 59% on 1st January of the year.



The average of mean hourly wind speeds (dark gray line), with 25th to 75th and 10th to 90th percentile bands.



The percentage of hours in which the mean wind direction is from each of the four cardinal wind directions, excluding hours in which the mean wind speed is less than 1.0 mph. The lightly tinted areas at the boundaries are the percentage of hours spent in the implied intermediate directions (northeast, southeast, southwest, and northwest).

Source: https://weatherspark.com/y/110730/Average-Weather-in-Buxar-India-Year-Round

5.6 AMBIENT AIR QUALITY

152. The ambient air quality with concerning the proposed project site forms the baseline information. The various sources of air pollution in the region are dust rising from unpaved roads, domestic fuel burning, vehicular traffic, agricultural activities, etc. The prime objective of baseline air quality monitoring is to assess existing air quality of the proposed STP (16 MLD) site located at Sarimpur village. This will also be useful in assessing the conformity to standards of the ambient air quality during the construction and operation phases.

153. Due to the non-availability of any monitoring station of BSPCB / CPCB at Buxar city, the secondary information connected to the status of city's ambient air quality is not available. However, to assess the Ambient Air Quality, the Consultant has carried out on-site ambient air quality monitoring at the STP site on 28.02.2020 and 02.03.2020, for 24 hours as per CPCB standards, through accredited Environmental Monitoring Agency.

154. The air pollutants viz. Particulate Matter (PM2.5 & PM10), Sulphur Dioxide (SO2), Nitrogen Dioxide (NO2), and Carbon Monoxide (CO) representing the basic air quality were identified for Ambient Air Quality Monitoring (AAQM). The results of ambient air quality monitoring carried out in the proposed STP (16 MLD) site located at Sarimpur , is given in **Table 5-1** below.

Table 5-1: Results of Ambient Air Quality Monitoring conducted at the proposed STP (16 MLD) site, Sarimpur

Location	Date of Monitoring	GPS Coordinates	$PM_{2.5}$ ($\mu g/m^3$)	PM_{10} ($\mu g/m^3$)	SO_2 ($\mu g/m^3$)	NOx ($\mu g/m^3$)	CO ($\mu g/m^3$)
Proposed STP (16 MLD) site, Sarimpur	28.02.2020 -29.02.2020	25°35'4.16"N 85°59'20.58"E	26.5	46.13	15.73	18.28	<1.0
	02.03.2020 – 03.03.2020	25°35'4.52"N 85°59'20.05"E	26.1	45.81	15.17	17.45	<1.0
Permissible Limit (as per CPCB Guidelines)			**60.0**	**100.0**	**80.0**	**80.0**	**4000**

155. The results of Ambient Air Quality monitoring reveal that the concentrations of all the parameters were found within the prescribed limit of CPCB. Detailed Air Monitoring Lab reports are attached as **Annexure-6**. The standards of Ambient Air Quality in India are available online at http://cpcbenvis.nic.in.

156. During the construction phase, operation of construction machineries at the site and usage of vehicles for transporting the construction material are the primary sources of air pollution. Necessary

precautionary measures shall be adopted during construction to avoid degradation of air quality, for the execution of activities which may induces dust problem in and around the project site. However, during the operation phase due to the decrease movement of vehicular traffic to the site the potential for negative impacts on air quality will minimize.

5.7 NOISE QUALITY

157. Noise in general is sound, which is composed of frequency components of loudness distributed over the audible frequency range. Noise levels are more annoying in the night time particularly in the residential areas. The environmental impact of noise can have several effects varying from annoyance to hearing loss depending on loudness of noise levels. The main objective of the noise level monitoring is to assess the background noise levels in different zones viz. industrial, commercial, residential, and silence zones in and around the proposed project site.

158. The Ambient Noise Levels were measured by the Consultant at three sampling locations, for 24 hours. Since the proposed STP (16 MLD) and IPS are located in the areas close to habitation, the Ambient Noise Level monitoring locations were taken at the proposed STP (16 MLD) site located in Sarimpur as well as proposed IPSs sites near ITI ground and Dhobi Ghat respectively. The results of ambient noise monitoring recorded at above mentioned sampling locations are given in **Table 5-2** below.

Table 5-2: Ambient Noise Monitoring Results recorded at proposed STP (16 MLD) and IPS sites (Residential and Commercial zones)

Location	GPS Coordinates	Date	Equivalent Noise Level, Leq (Day) dB (A)	Equivalent Noise Level, Leq (Night) dB (A)
Proposed STP (16 MLD) site, Sarimpur	25°35'1.97"N 83°59'19.17"E	29.02.2020	53.8	41.3
Proposed IPS site, near Dhobi Ghat	25°34'10.44"N 83°59'14.83"E	29.02.2020	58.94	42.13
Limit for Residential Zone as per the Noise Pollution (Regulation and Control) Rules, 2000			**55**	**45**
Proposed IPS site, near ITI ground	25°33'49.08"N 83°58'1.50"E	29.02.2020	61.7	46.5
Limit for Commercial zone as per the Noise Pollution (Regulation and Control) Rules, 2000			65	55

159. Thus noise levels recorded at all the sampling locations were found within the prescribed limits (except IPS site near Dhobi Ghat is slightly high with the prescribed limits, due to proximity of function halls located and highway traffic. Noise levels at commercial area near ITI are within the permissible limits. The Noise Quality data attached as **Annexure-6** and Ambient Air Quality Standards with respect of Noise is available online at http://cpcbenvis.nic.in.

5.8 SURFACE WATER HYDROLOGY

160. The Bihar plain is divided into two unequal halves by Ganga which flows from west to east. In Bihar, Ganga traverses a distance of 425 Km. from Chausa (Buxar) to downstream of Kahalgaon (Bhagalpur). An aerial view of the location of River Ganges along with its tributaries basins in the state of Bihar presented in below **Figure 5-4**.

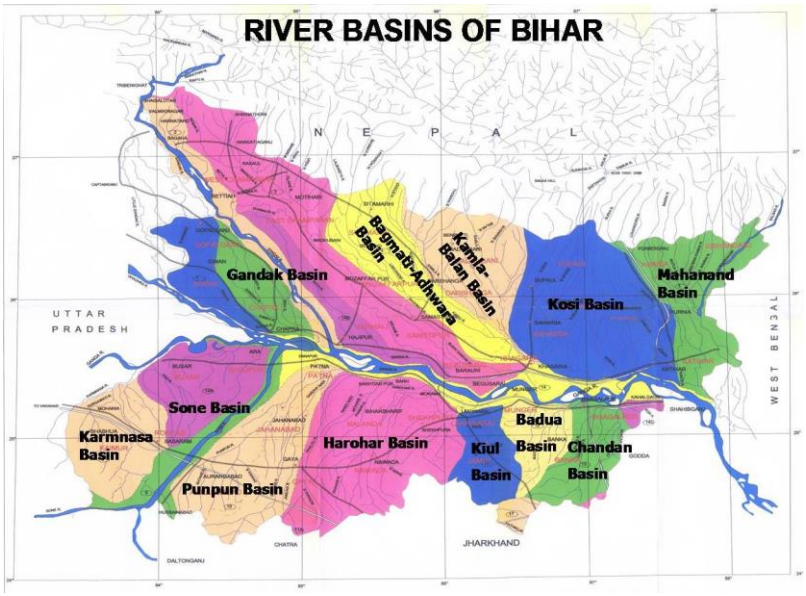


Figure 5-4: River Basin Map of Bihar

Source: Water Resource Department, Bihar

5.9 WATER QUALITY OF GANGA RIVER

161. The CPCB identified a total of 302 polluted river stretches in the country during the year 2015, which have since increased to 351. Out of 302 polluted river stretches those identified in the State of Bihar, the Ganga River is categorized as 'Priority-V' (i.e. BOD value between 03-06 mg/L).

162. The Water Quality monitoring is carried out under National Water Quality Monitoring Program (NWMP) sponsored by CPCB. There are total 161 water quality monitoring stations under NWMP. The Bihar State Pollution Control Board is regularly monitoring the water quality of river Ganga at varied locations. As per the study conducted by the CPCB; during 2010-11 to 2017-18, on the water quality of river Ganga in Bihar, indicates that the Ganga River from Buxar to Bhagalpur may not be treated as polluted river stretch[6] with respect to BOD value. However, the water quality does not conform with respect to bacteriological population (Total Coliform and Faecal coliform). This is mainly due to discharge of untreated sewage/domestic waste water from the cities located on its bank.

163. The Bihar State Pollution Control Board is monitoring some representative water quality parameters, such as pH, DO, BOD, TC, FC of Ganga River at four monitoring stations of Buxar, namely (i) Ganga at Chausa (Mahdaba Ghat), (ii) Ganga at Ramrekha Ghat and (iii) Ganga at Buxar D/S near Ganga Bridge and (iv) Ganga at Jail Ghat, on monthly basis[7]. To assess the organic and bacteriological parameters for various upstream and downstream stations of Ganga River at Buxar, consecutively eight years secondary data have been sourced from the website of Bihar State Pollution Control Board, Patna. Based on the available data from the BSPCB for the year 2011 – 2012 to 2018 – 2019, by taking the average of

[6] Action Plan for Restoration & Conservation of Polluted River Stretches in Bihar, Department of Environment, Forest & Climate Change, Govt. of Bihar.

[7] Source: Action Plan for Conservation of River Ganga in Bihar, BGCMS & BSPCB

data of four monitoring stations, an illustrative record of the water quality record has been shown in the below in **Figure 5-5.**

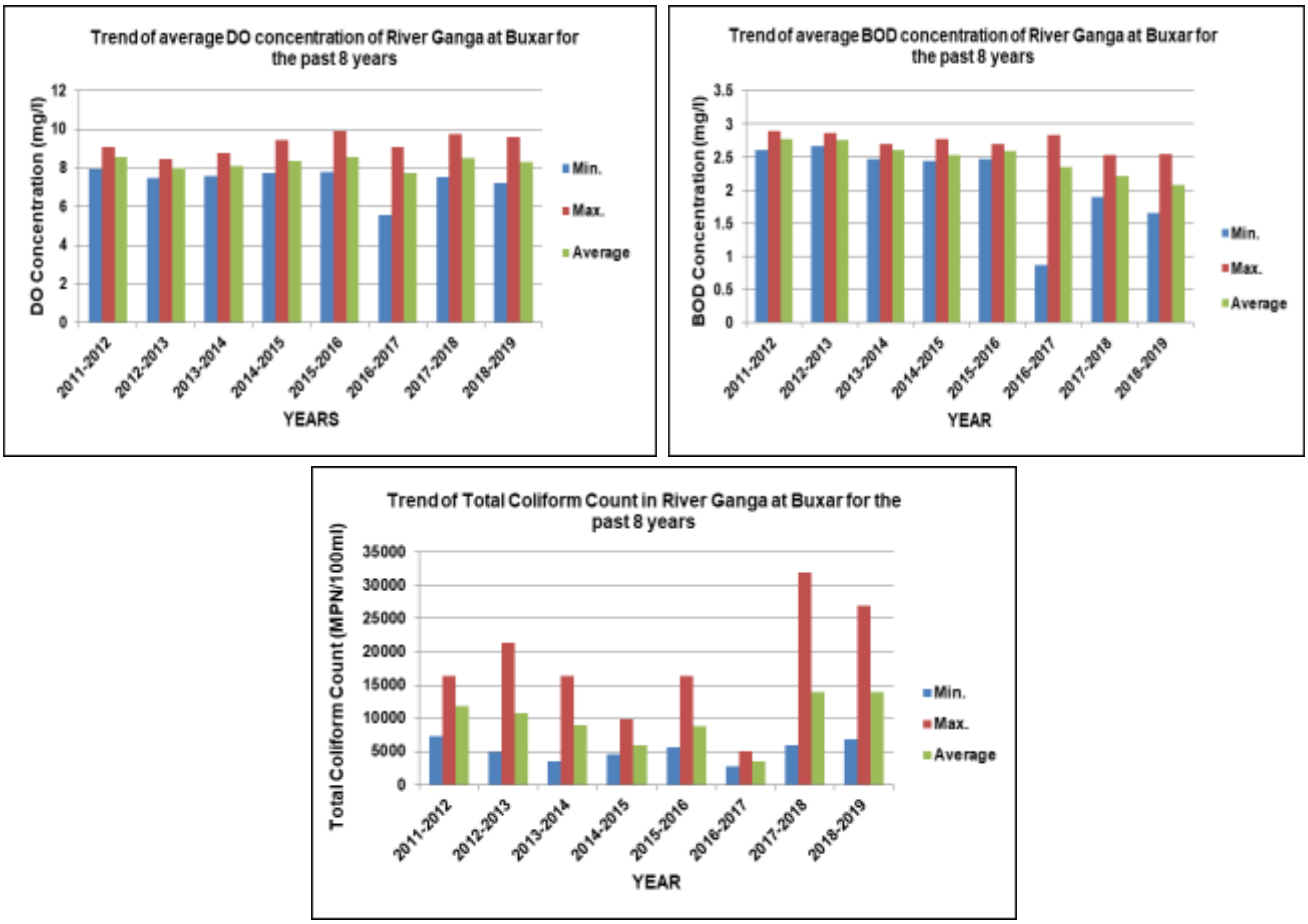


Figure 5-5: Comparative record of Water quality for the year 2011– 2019.

Source: *Bihar State Pollution Control Board (http://bspcb.bih.nic.in).*

164. The graphical representation of Dissolved Oxygen (DO) data for consecutive eight years shows that the maximum level of DO has been recorded to be in the range of 8 to 10 mg/l, whereas the lowest minimum level is more than 5 mg/l during the year 2016-2017, which qualifies the water as Class-B by CPCB rendering it fit for drinking purpose after conventional treatment and disinfection. Also it can support breeding of fishes and wild lives as well as outdoor bathing.

165. With regard to the concentration of Biochemical Oxygen Demand (BOD), it can be noted that during the tenure of eight years (i.e. from 2011 till 2019), the level remained less than 3 mg/l, thus conforming to B and C quality classes prescribed by CPCB.

166. The graphical representation of data on Total Coliform shows a maximum level more than 30,000 MPN/100ml during the year 2017-2018, however the minimum level had gone down to around 5000 MPN/100ml. The TC data in general demonstrates a fluctuating trend in the levels throughout the period of 8 years, with 2016-2017 presenting a much lower values of minimum and maximum counts. The reason possibly attributed to some sewage disposal facilities that might have been installed or implemented in the upstream regions of the town together with the open defecation free drive.

167. Further, with this development of sewerage system, the drain water which currently falls in the Ganga River without treatment is stopped and is diverted into STP for treatment. After treatment, if the treated effluent meets with the effluent discharge for STP as stipulated in the NGT Order in original application 1069/2018 dated 30th April 2019 for class –I city with population more than one lakh. This treated water discharge after treatment will improve overall river ecosystem. The decrease in the Coliform level, SS, Nitrogen, COD, BOD, pH, would improve the overall river water quality, improving the primary productivity of the river ecosystem. It will also improve the secondary productivity like fishes, amphibians, etc and top trophic species like Water Dolphins and other mammalian species reported in the Ganga River. Hence it will result in an overall improvement in physical, chemical and biological components of Ganga River.

168. The Consultant has also done sampling for surface water to assess the Water Quality of Ganga River. The surface water sample was taken near to proposed STP site at the downstream location of River Ganga. The details of surface water monitoring location is given in **Table 5-3** and the surface water quality analysis results are given in **Table 5-4 and Table 5-6** below.

Table 5-3: Details of Surface Water Monitoring Location

GPS Coordinate	Location of Surface Water Sampling	Distance and Direction from proposed STP (16 MLD) site
25°35'21.14"N 83°59'24.31"E	Upstream of River Ganga near to proposed STP at Sarimpur	445 m towards North East from STP site
25°35'7.51"N 83°59'7.18"E	Downstream of River Ganga near to proposed STP at Sarimpur	310 m towards North West from STP site

Table 5-4: Physico-chemical and Biological Characteristics of Surface Water collected (Upstream) from Ganga River near to proposed STP (16 MLD) at Sarimpur

S. No.	Parameters	Unit	IS: 2296 -1992(Class C) Tolerance Limit	Results	Test method
1	pH	-	6.5 - 8.5	7.12	IS: 3025(Pt-11)1983, RA. 2002
2	Temperature	°C	-	23	APHA 23rd Edn.2017-2550 B
3	D.O	mg/l	Minimum -4	7.2	IS 3025(Part-38): 2006.
4	BOD	mg/l	30	1.2	IS 3025(Part-44):1993, RA 2009
5	Color	Hazen	300	<5	IS: 3025 (Pt-4) 1983, RA 2017
6	Odour	-	-	Agreeable	IS: 3025(Pt-5)
7	TDS	mg/l	1500	294	IS 3025(Part-16): 1984, RA 2006
8	TSS	mg/l	-	3	IS 3025(Part-17)
9	TKN	mg/l		3.2	IS: 3025(Pt-34)1988, RA. 2003
10	Ammonical Nitrogen	mg/l		<0.1	IS: 3025(Pt-34)1988, RA. 2003
11	Nitrate(as NO_3)	mg/l	50	1.2	IS: 3025(Pt-34)1988, RA. 2003
12	Free Ammonia	mg/l		<0.1	IS: 3025(Pt-34)1988, RA. 2003
13	Chlorides (as Cl)	mg/l	600	100	IS 3025(Part-32): 1988
14	Sulphates (as SO_4)	mg/l	400	22.4	IS 3025(Part-24):1986, RA 2003
15	Fluoride (as F)	mg/l	1.5	42	APHA 21st Ed., 4500F(D)
16	Oil & Grease	mg/l	0.1	<0.1	IS 3025(Part-39):1991, RA 2009
17	Phenolic Compound (as C_6H_5OH)	mg/l	0.005	<0.001	5530-B,C&E,APHA 23rd 2017
18	Arsenic	mg/l	0.2	<0.1	3110- B, APHA 23rd Ed. 2017 (AAS)
19	Mercury(as Hg)	mg/l	-	<0.001	3110- B, APHA 23rd Ed.2017
20	Lead (as Pb)	mg/l	0.1	<0.1	3110- B, APHA 23rd Ed. 2017 (AAS)
21	Cadmium (as Cd)	mg/l	0.01	0.002	3110- B, APHA 23rd Ed. 2017 (AAS)
22	Chromium (as Cr^{+6})	mg/l	0.05	0.02	IS 3025(Part-52): 200
23	Copper (as Cu)	mg/l	1.5	<0.1	3110- B, APHA 23rd Ed. 2017 (AAS)

S. No.	Parameters	Unit	IS: 2296 -1992(Class C) Tolerance Limit	Results	Test method
24	Zinc (as Zn)	mg/l	15	0.11	3110- B, APHA 23rd Ed. 2017 (AAS)
25	Selenium (as Se)	mg/l	-	<0.1	IS: 3025 (P- 56)
26	Anionic detergents (as MBAS)	mg/l	1	<0.1	Annexure K Of IS 13428
27	Iron (as Fe)	mg/l	50	0.13	3500-Fe- B, APHA 23rd Ed. 2017
28	Sulphide(as H_2S)	mg/l	-	<0.1	IS-3025 (P-29)
29	Phosphate (as PO_4)	mg/l	-	0.1	APHA 22nd Edn.2012-4500-P C
30	Cyanide (as CN)	mg/l	0.05	<0.1	4500-CN-B,C & E, APHA 23rd Ed.2017
31	Manganese (as Mn)	mg/l		0.03	3110- B, APHA 23rd Ed.2017
32	COD	mg/l	-	4	IS 3025(Part-58): 2006
Microbiological Parameters					
33	Total Coli form	MPN/100ml	5000	1400	IS : 1622-1981

Table 5-5: Physico-chemical & Biological Characteristics of Surface Water sample of Ganga River (Downstream) near STP Site

S. No.	Parameters	Unit	IS: 2296 -1992(Class C) Tolerance Limit	Results	Test method
1	pH	-	6.5 - 8.5	6.98	IS: 3025(Pt-11)1983, RA. 2002
2	Temperature	°C	-	22	APHA 23rd Edn.2017-2550 B
3	D.O	mg/l	Minimum -4	6.9	IS 3025(Part-38): 2006.
4	BOD	mg/l	30	1.9	IS 3025(Part-44):1993, RA 2009
5	Color	Hazen	300	<5	IS: 3025 (Pt-4) 1983, RA 2017
6	Odour	-	-	Agreeable	IS: 3025(Pt-5)
7	TDS	mg/l	1500	300	IS 3025(Part-16): 1984, RA 2006
8	TSS	mg/l	-	4.0	IS 3025(Part-17)
9	TKN	mg/l		4.4	IS: 3025(Pt-34)1988, RA. 2003
10	Ammonical Nitrogen	mg/l		<0.1	IS: 3025(Pt-34)1988, RA. 2003
11	Nitrate(as NO_3)	mg/l	50	1.5	IS: 3025(Pt-34)1988, RA. 2003
12	Free Ammonia	mg/l		<0.1	IS: 3025(Pt-34)1988, RA. 2003
13	Chlorides (as Cl)	mg/l	600	100	IS 3025(Part-32): 1988
14	Sulphates (as SO_4)	mg/l	400	24.5	IS 3025(Part-24):1986, RA 2003
15	Fluoride (as F)	mg/l	1.5	0.45	APHA 21st Ed., 4500F(D)
16	Oil & Grease	mg/l	0.1	<0.1	IS 3025(Part-39):1991, RA 2009
17	Phenolic Compound (as C_6H_5OH)	mg/l	0.005	<0.001	5530-B,C&E,APHA 23rd 2017
18	Arsenic	mg/l	0.2	<0.1	3110- B, APHA 23rd Ed. 2017 (AAS)
19	Mercury(as Hg)	mg/l	-	<0.001	3110- B, APHA 23rd Ed.2017
20	Lead (as Pb)	mg/l	0.1	0.01	3110- B, APHA 23rd Ed. 2017 (AAS)
21	Cadmium (as Cd)	mg/l	0.01	0.002	3110- B, APHA 23rd Ed. 2017 (AAS)
22	Chromium (as Cr^{+6})	mg/l	0.05	0.1	IS 3025(Part-52): 200
23	Copper (as Cu)	mg/l	1.5	0.01	3110- B, APHA 23rd Ed. 2017 (AAS)
24	Zinc (as Zn)	mg/l	15	0.13	3110- B, APHA 23rd Ed. 2017 (AAS)
25	Selenium (as Se)	mg/l	-	<0.1	IS: 3025 (P- 56)
26	Anionic detergents (as MBAS)	mg/l	1.0	<0.1	Annexure K Of IS 13428
27	Iron (as Fe)	mg/l	50	0.16	3500-Fe- B, APHA 23rd Ed. 2017
28	Sulphide(as H_2S)	mg/l	-	<0.1	IS-3025 (P-29)
29	Phosphate (as PO_4)	mg/l	-	0.1	APHA 22nd Edn.2012-4500-P C
30	Cyanide (as CN)	mg/l	0.05	<0.1	4500-CN-B,C & E, APHA 23rd Ed.2017
31	Manganese (as Mn)	mg/l		0.04	3110- B, APHA 23rd Ed.2017
32	COD	mg/l	-	8.0	IS 3025(Part-58): 2006
Microbiological Parameters					
33	Total Coli form	MPN/100ml	5000	1800	IS : 1622-1981

169. A review of the above chemical analysis reveals that there is some variation in chemical composition of surface water samples collected from upstream and downstream of River Ganga. The analysis result shows that the surface water criterion as per CPCB classification for designated best use/

beneficial use falls within C,D & E classification of water. Hence the Ganga River Water at Buxar can be used for Drinking water source after conventional treatment and disinfection (C), Propagation of wild life and fisheries (D) and Irrigation, industrial cooling, controlled waste disposal (E)[8]. Water quality data is attached as Annexure 6 and Indian Standard Drinking water specifications IS 10500:2012 for water quality is available online at http://cgwb.gov.in/Documents/WQ standards.pdf.

5.10 GROUND WATER HYDROLOGY

170. As per the studies of Central Ground Water Board, Ground Water Information Booklet Buxar District, Bihar State (2013). The pre-monsoon (May 2011) depth to water level generally varies from 2.69 to 10.93 m bgl in major parts of the district (Figure 5-6). The post-monsoon water level generally varies from 0.42 to 7.2 m bgl in major part of the district (Figure 5-7). The seasonal water level shows rise of 1.39 to 5.69 m. The May 2011 (Pre-monsoon) water level fluctuation with respect to May 2010 data has shown a rise from 0.3 to 0.94m and November 2011 (Post monsoon) water level fluctuation with respect to November 2010 shown rise from 0.52 to 2.05 m, as compared by CGWB. The long-term decadal (2001-2011) water level fluctuation shows variation between 0.14 to 1.76 m. Whole of Buxar district is divided into eleven (11) blocks, out of which except Chakki Block all other fall under safe category. The project area falls within Buxar Block, where stage of Ground Water Development is 33.8% and categorized under safe zone and is not over exploited.

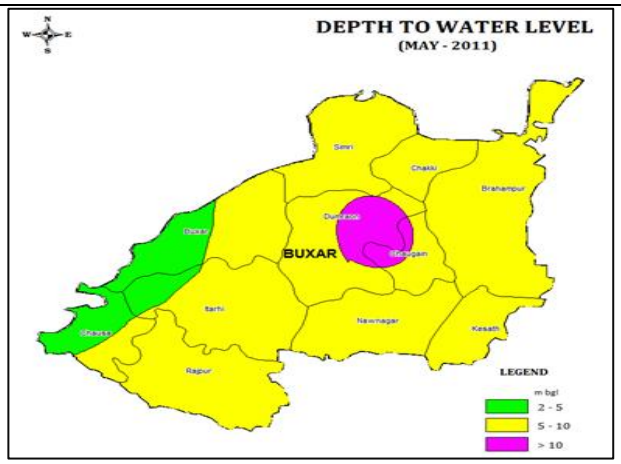


Figure 5-6: Pre-monsoon water level map of Buxar district.

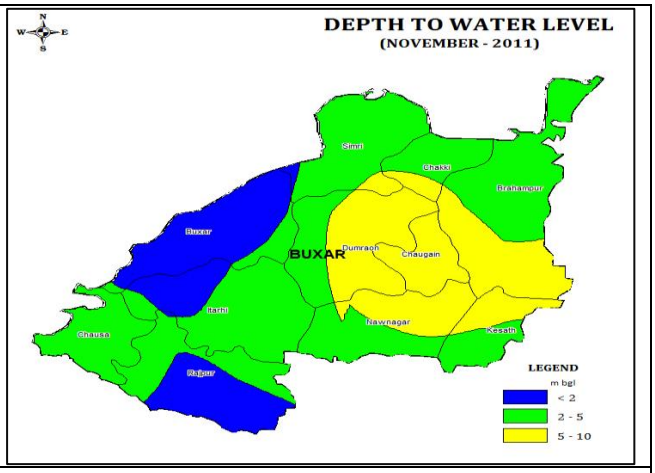


Figure 5-7: Post-monsoon water level map of Buxar district.

Source: *http://cgwb.gov.in/District_Profile/Bihar/Buxar.pdf*

171. Based on the study conducted by CGWB in Buxar District, the Chemical analysis of ground water reveals that the water is suitable for drinking and irrigation purposes. The ground water is mildly alkaline in nature with pH varying from 8.1 to 8.3. Electrical conductivity (EC) is almost 370 micro Siemens/cm at Buxar. All major parameters are within the permissible limit, except the concentration of arsenic were 1220 ppb at Ekdar and 1100 ppb at Chakni villages of the district, showed levels higher than the permissible limit of 50 ppb. However, the proposed project site in Buxar city is not falling within the arsenic contaminated area. The Ground Water Board has already recommended necessary arrangements of piped

[8] http://www.cpcbenvis.nic.in/water_pollution_main.html#

water for the villagers from the deep tube wells in the affected areas and the top 60 m of the aquifer has been sealed by using latest techniques.

172. The Consultant has also done sampling for ground water to assess the Water Quality of project location. The ground water sample was taken from the proposed STP site. The details of ground water monitoring location is given in Table 5-6 and the analysis results of ground water quality are given in **Table 5-7** below.

Table 5-6: Details of ground water monitoring location

GPS Coordinate	Location of Ground Water Sampling	Distance and Direction from proposed STP (16 MLD) site
25°35'4.16"N 85°59'20.58"E	Near proposed STP (16 MLD) site at Sarimpur	10m from proposed STP (16 MLD) site

Table 5-7: Analysis Result of Ground Water collected from the proposed STP (16 MLD), Sarimpur

S. No.	Parameters	Unit	Limit (IS-10500:2012)		Results	Test method
			Desirable Limit	Permissible Limit		
1	Color	Hazen	5	15	<5	IS: 3025(Pt-4)
2	Odour	-	Agreeable	Agreeable	Agreeable	IS: 3025(Pt-5)
3	Taste	-	Agreeable	Agreeable	Agreeable	IS: 3025(Pt-8)
4	Turbidity	NTU	1	5	<1	IS 3025(Part-10)
5	pH	-	6.5-8.5	No Relaxation	6.98	IS: 3025(Pt-11)
6	Total Hardness (as $CaCO_3$)	mg/l	200	600	300	IS 3025(Part-21)
7	Iron (as Fe)	mg/l	1	No Relaxation	0.18	3500-Fe- B, APHA 23rd Ed.2017
8	Chlorides (as Cl)	mg/l	250	1000	120	IS 3025(Part-32)
9	Fluoride (as F)	mg/l	1	1.5	0.64	4500-F-(D),APHA 23rd Ed. 2017
10	TDS	mg/l	500	2000	660	IS 3025(Part-16)
11	Calcium (as Ca2+)	mg/l	75	200	80	IS 3025(Part-40)
12	Magnesium (as Mg2+)	mg/l	30	100	24.3	3500-Mg B, APHA 23rd Ed 2017
13	Sulphate (as SO4)	mg/l	200	400	46.6	IS 3025(Part-24)
14	Nitrate (as NO3)	mg/l	45	No Relaxation	5.5	IS: 3025(Pt-34)
15	Total Chromium (as Cr)	mg/l	0.05	No Relaxation	<0.01	3110 - B, APHA 23rd Ed.2017
16	Alkalinity as CaCO3	mg/l	200	600	440	IS 3025(Part-23)
17	Aluminium (as Al)	mg/l	0.03	0.2	<0.01	IS 3025(Part-55)
18	Total Arsenic(as As)	mg/l	0.01	No Relaxation	<0.01	3110- B, APHA 23rd Ed2017
19	Copper (as Cu)	mg/l	0.05	1.5	<0.05	3110- B, APHA 23rd Ed2017
20	Manganese (as Mn)	mg/l	0.1	0.3	<0.01	3110- B, APHA 23rd Ed2017
21	Zinc (as Zn)	mg/l	5	15	0.18	3110- B, APHA 23rd Ed2017
22	Ammonia (as NH3-N)	mg/l	0.5	No Relaxation	<0.1	4500-NH3-B &C, APHA 23rd ED2017
23	Anionic Detergents (as MBAS)	mg/l	0.2	1	<0.1	Annexure K of IS-13428
24	Boron (as B)	mg/l	0.5	1	0.12	IS: 3025(Pt-57)
25	Mineral Oil	mg/l	0.5	No Relaxation	<0.1	IS 3025(Part-39)
26	Phenolic Compound (as C6H5OH)	mg/l	0.001	0.002	<0.001	IS 3025(Part-44)
27	Cadmium (as Cd)	mg/l	0.003	No Relaxation	<0.002	3110- B, APHA 23rd Ed2017
28	Cyanide (as CN)	mg/l	0.05	No Relaxation	<0.1	4500- CN-B,C &E, APHA 23rd Ed2017
29	Lead	mg/l	0.01	No Relaxation	<0.01	3110- B, APHA 23rd Ed2017
30	Mercury (as Hg)	mg/l	0.001	No Relaxation	<0.001	3110- B, APHA 23rd Ed2017
31	Nickel (as Ni)	mg/l	0.02	No Relaxation	<0.02	3110- B, APHA 23rd Ed2017
32	Residual Free Chlorine	mg/l	0.2	1	<0.2	4500-Cl-B, APHA 23nd Ed2017
33	Molybdenum (Mo)	mg/l	<0.05	0.07	No Relaxation	3110- B, APHA 23rd Ed.2017
34	Polynuclear Aromatic Hydro Carbons	mg/l	<0.0001	0.0001	No Relaxation	APHA 6440,23rd Ed.2017
35	Poly chlorinated biphenyl	mg/l	<0.0001	0.0005	No Relaxation	APHA 6430,23rd Ed.2017
36	Residual Free Chlorine	Mg/l	0.2	1	<0.2	4500-Cl-B, APHA 23rd Ed2017
Microbiological Parameters						

36	Total Coli form	MPN/100ml	Shall not be detectable in any 100 ml of sample	<1	IS : 1622-1981
37	E.coli	E.coli/100ml	Shall not be detectable in any 100 ml of sample	Absent	IS : 1622-1981

173. A review of the above chemical analysis reveals that the ground water collected from the premises of proposed STP (16 MLD) located at Sarimpur remains suitable for drinking purposes as all the constituents are within the limits prescribed for drinking water standards promulgated by Indian Standards (IS: 10500 (2012). Water Quality data is attached as **Annexure-6** and Indian standard Drinking water Specification, IS 10500:2012 for water quality is available online at http://cgwb.gov.in/Documents/WQ-standards.pdf.

5.11 SOIL QUALITY

174. Soil in the area mainly comprises of Recent Alluvium Levee Soil[9], found along the banks of the river Ganga. It is a new alluvium calcareous soil and white to light grey in colour. It is light in texture and has medium to high fertility. The pH varies between 6.6 and 7.5. Main crops are maize, sugarcane, wheat, gram and other rabi crops. The river Ganga has built a long natural levee along its course. Every year the area gets fresh deposit of silt, as a result of which the region is rich in fertile soil. The main cropping pattern in the area is revealed as rice – wheat, rice – gram, rice – lentil and rice – rai combinations[10].

175. Assessment of soil quality is an important aspect with reference to tree plantations, percolation of water, ground water impact etc. The information on soils has been collected from various secondary sources and also through primary soil sampling analysis of which is described in this section.

176. Randomly 1 soil sample of the proposed STP (16 MLD) site located at Sarimpur (25°35'4.16" North and 85°59'20.58" East) up to depth of 15 cm was collected and sent to laboratory for analyzing various physical and chemical characteristics. The analysis results of soil quality are given in **Table 5-7** below.

Table 5-8 : Soil Quality Sampling Results of the proposed STP (16 MLD) site, Sarimpur

S. No.	Parameters	Units	Results	Test Method
	Physical Characteristics			
1	Colour		Brown	STRL/STP/SOIL/01
2	Textural class		Clay Loam	IS27720 (P-4), 1985 (Reaff: 2015)
3	Bulk Density	gm/cm^3	1.2	IS 14765: 2000, RA 2010
4	Water Holding Capacity	%	38	STRL/STP/SOIL/01
	Particle Size Distribution			
5	Sand	%	35.5	IS27720 (P-4), 1985 (Reaff: 2015)
6	Slit	%	18.5	IS27720 (P-4), 1985 (Reaff: 2015)
7	Clay	%	46	IS27720 (P-4), 1985 (Reaff: 2015)
	Chemical Characteristics			
8	pH (1:2 Suspension)	-	7.11	IS: 2720 (part-26),1987 (Reaff:2011)
9	Electrical Conductivity (1:2)	µmhos/cm	120	IS: 14767(2000), RA 2016
10	Organic Matter	%W/W	1.2	STRL/STP/SOIL/01
11	Exchangeable Calcium	mg/kg	45450	IS 2720 (Part 24): 1976, RA 2010
12	Exchangeable Magnesium	mg/kg	19866	IS 2720 (Part 24): 1976, RA 2010
13	Copper	mg/kg	4.4	IS 2720(Part-27): 1977,

[9] Source: Ground Water Information Booklet, Buxar District, Bihar State, September 2013.

[10] Source: http://krishi.bih.nic.in/Introduction.htm.

S. No.	Parameters	Units	Results	Test Method
14	Nickel	mg/kg	2.6	IS 2720(Part-27): 1977,
15	Chromium	mg/kg	16.6	IS 2720(Part-27): 1977,
16	Iron	mg/kg	6565.7	IS 2720(Part-27): 1977,
17	Lead	mg/kg	2.4	IS 2720(Part-27): 1977,
18	Sulphate	mg/kg	224.5	IS 2720(Part-27): 1977,
	Available Nutrients (Kg/Ha)			
19	Nitrogen (as N)	Kg/Ha	323.5	IS:10158:1982, RA 2009
20	Phosphorous	Kg/Ha	94	IS:10158:1982, RA 2009
21	Potassium	Kg/Ha	120	STRL/STP/SOIL/01

177. The analysis result shows that soil is basic in nature as pH value is 7.11 with organic matter 1.20 %. The concentration of Nitrogen 323.5 Kg/Ha, Phosphorus 94 Kg/Ha and Potassium 120 Kg/Ha has been found to be in good amount in the soil samples. Soil texture is Clay Loam. Soil Quality data is attached as **Annexure-6.**

5.12 BIOLOGICAL ENVIRONMENT

178. Buxar fall in Agro-Climatic Zone III B (Southern West) as per the Agro-Climatic Zone of Bihar and Zone 7-Gangatic Plain as per the Biogeographic classification of India and 7A-Gangatic Plain – Upper Gangetic Plain as per the Biogeographic Province map of India.

179. The total geographical area of Buxar district is 1,703sq.km of which the distribution of forest types i.e. very dense forest 0 sq.km, moderate dense forest 3 sq.km and open forest 3sq.km which is 0.35 % of the total geographic area[11].

180. Based on the primary survey, the site does not falls within the Notified forest area which are declared protected under "The Indian Act, 1927" and within the Eco-Sensitive Zone of Wildlife Sanctuary/National Park declared protected under "The wildlife (Protection) Act, 1972".

181. During floristic survey of the site, it was noticed that about 15 to 18 trees are reported within the proposed STP (16 MLD) premises, mostly planted to maintain the green cover. Most of these trees are planted along the periphery, which would not involve tree felling for construction work (Figures 5.8 and 5.9). Scattered growth of dub (Cynodon dactylon) grasses was noticed in patches. Shrubs like Calotropis procera, Parthenium hysterophorus, Lantana camara, etc. which are mainly weeds were noticed. The photographs of grasses and weed reported at site are given in table below:

Photographs of Grasses and Weeds reported at site

[11] Source: State of Forest Report – 2017.

Dub grass (Cynodon dactylon)

Calotropis procera

Figure 5-8: Panoramic view of proposed STP site.

Figure 5-9: Trees reported within the project boundary.

182. The dominant species of trees reported within the site are Eucalyptus sp. followed by neem (Azadirachta indica), Tad palm tree (Borassus flabellifer), etc. During primary five species of trees are reported which comprises of 7- trees of Eucalyptus, 1- Peepal tree, 2- Palm Trees, 2- Neem Trees and 1- Semal trees. The photographs of trees reported within site are shown below:

Neem Tree (*Azadirachta indica)*

Tad palm tree *(Borassus flabellifer)*

Euclayptus sp.

Peepal (Ficus religiosa)

183. The faunal survey of the project site, witness presence of few species of birds like crow, sparrow, myna, etc which are Least Concern as per the IUCN Red Data Book and fall within the Schedule-IV as per the WLPA-1972[12]. The other species of fauna reported are reptiles like garden lizard and common house gecko.

184. Within close vicinity presence of mammals like goat, dog, cows, buffalo, etc which are domesticated by the locals are noticed. No schedule –I species as per the WLPA-1972 are noticed. Within 500 meters from project boundary, the habitat types reported are built-up area with Ganga river flowing from North west direction to North east Direction. Within the built-up area scattered growth of planted trees are noticed. Habitat types reported within 500 meters from project site are shown in **Figure 5-10.**

[12] WLPA- Wildlife (Protection) Act, 1972.

5.13 AQUATIC HABITAT

185. The Ganga River flows at about 0.23 km towards North West to North East from project boundary. During primary survey, no well-established riparian habitat was noticed due to anthropogenic activities and due to agricultural practices. Growths of vegetable are reported with patches of trees along the banks.

186. The aquatic fauna species reported based on the secondary source and interaction with the local's common carp, Mystus sp., Sperata sp., Wallago sp., Channa sp., Mastacembelus sp., Labeo sp., etc. Among aquatic mammals, smooth coated otter are reported by the fishermen during consultation.

187. Based on the study conducted by Wildlife Institute of India (WII) on the distribution of Dolphins in Ganga River and its tributaries. The WII has submitted report on "AQUATIC FAUNA OF THE GANGA RIVER - STATUS AND CONSERVATION". The report clearly mentions the locations where dolphin are reported during preliminary survey and findings are discussed in table below (Table 5-9):

Table 5-9: Encounter Rate of Dolphins in Ganga River & its Tributaries

S.No	River Stretch	Encounter rate (Individuals/km)	
		Previous Studies	Present Study (2017)
1.	Bijnor and Narora	0.36 Behera (1995)	0.21
2.	Narora and Kanpur	0 Sinha (1999)	0.03
3.	Kanpur and Allahabad	0.49 IIT (2012)	0.24
4.	Allahabad to Buxar	0.48 Sinha et.al. (1999)	0.77
5.	Buxar to Maniharighat	1.62 Sinha et.al. (2010)	0.36
6.	Vikramshila Gangetic Dolphin Survey	1.8 Choddhary et al. (2006)	0.65
7.	Maniharighat to Farraka	1.64 Sinha (1999)	0.22
8.	Farakka Feeder Canal	0.55 Sinha et al. (2000)	0.10

(Source: Aquatic Fauna of the Ganga River – Status and Conservation – WII)

188. Based on the above mentioned details it can conclude that habitat of Gangetic Dolphins exists in Ganga River in Buxar District. These Gangetic Dolphins are Schedule –I Species as per the Schedule to The Wildlife (Protection), Act – 1972 and need conservation. As per the IUCN Red List - 2020 , Gangetic Dolphin (*Platanista gangetica ssp. Gangetica*) is declared Endangered species with showing decrease in population trends[13]. It is also assessed based on survey done by the Wildlife Institute of India in the Year 2017, highest encounter rate was reported between Allahabad to Buxar (0.77), followed by Vikramshila Gangetic Dolphins (0.65), and lowest in the Farakka feeder Canal (0.10).

Habitats:

189. Ganges River Dolphins are generally concentrated in counter-current pools below channel convergences and sharp meanders (Kasuya and Haque 1972, Smith 1993, Smith et al. 1998) and above and below mid-channel islands, bridge pilings, and other engineering structures that cause scouring (Smith, unpublished data). Their fidelity to counter-current pools is probably greatest in fast-flowing channels (Smithet al. 1998). Annual monsoon-driven floods cause great variability in the dolphins' access to large parts of their range. Isolation in seasonal lakes sometimes occurs (especially in the Brahmaputra basin), as does "escapement" from the river channels into artificial water bodies such as canals and reservoirs.The project region located in Gangetic plains having highly fertile alluvial soil and became an important place in

[13] https://www.iucnredlist.org/species/41756/17627639#habitat-ecology

the field of agriculture in the State. Roughly 70% of the land is under agricultural use. The significance of commercial crops have increased manifold as an importance of sugar cane production. Buxar is well known for its agriculture produce such as sugar, mangoes and rice.

Figure 5-10: Habitat type within study Area in Buxar city.

5.14 SEISMIC HAZARD

190. As per the seismic hazard map of India, Buxar falls in Seismically Active zone III (Moderate Intensity Zone). In consideration of this, due measures are considered and incorporated in designing of sewer structures considering the earthquake challenging conditions (viz. Ductile Iron pipe will be used for deep trenches, seismic activity situation etc).

5.15 ARCHAEOLOGICAL SITES

191. During the site assessment, the proposed STP site is not located within regulatory zone of ASI structure (300 m). Therefore, as of now no prior permission is required under ASI. The Ancient Mound of Chausa garh is situated in Chausa of Buxar district in Bihar which is 11 kms away from the Buxar city. Buxar fort is located in the city, which is 2.5km away from the STP location.

5.16 AGRO-CLIMATIC ZONES AND SOIL CONDITION

192. State of Bihar has categorized into 3 zones based on their agro-climatic conditions. The city of Buxar is comes under Agro climatic zone 3 in south western alluvial plains of river Ganga and having alluvial soil (pH value range from normal to alkaline) and Organic matter minimum to medium quantity. The soil is highly fertile and rich. Major crops in this area are Paddy, wheat, Gram Lentil and Rai.

Source: krishi.bihar.nic.in

Figure 5-11: Agro-climatic Areas in Bihar

5.17 SOCIO-CULTURAL ENVIRONMENT

193. Buxar is said to have been the home for many of the authors of Vedic hymns and called as Vedagarbha, i.e. the womb or origin of the Vedas. Local tradition derives the name of the town from a tank near the temple of Gauri Shankar, which was originally called aghsar or effacer of sin, but in course of time came to be called baghsar. The story runs that a rishi or sage, called Bedsira, having transformed himself into a tiger to frighten the rishi Durvasa of whom he was jealous, was doomed by the latter to retain that form forever. He was restored to his original shape by bathing in the holy tank of aghsar and then worshipping Gauri Shankar and in commemoration of this event the spot was called Vyaghrasar of Baghsar i.e. the tiger tank. The most notable temple in the town is that of Rameshwar Nath Mahadeo to which pilgrims resort from distant places". Buxar is famous as the scene of the defeat (on the 23rd October, 1764) of Mir Qasim and the Nawab -Wazir of Oudh, Shuja-uddaula. The fort of Buxar standing on a high bluff, above the Ganges and effectually commanding the reaches of that River was long a position of considerable strategic importance.

5.18 POPULATION

194. The total population of Buxar Municipal Corporation as per 2011 census is 102,861 out of which 54,277 (53%) are male and 48,584 (47%) are female. However, as per 2011 Census total children (0-6) in Buxar city are 14,165, which include 7,491 boys and 6,674 girls. The child forms 13.77 % of total population of Buxar City.

195. As per 2011 census, Hinduism is majority religion in Buxar city with 86.99% followers. Islam is second most popular religion in city of Buxar with approximately 12.34% following it. In Buxar city, Christinity is followed by 0.32 %, Jainism by 0.01 %, Sikhism by 0.12 % and Buddhism by 0.12 %. Around 0.00% stated 'Other Religion' and approximately 0.16% stated 'No Particular Religion'.

5.19 SEX RATIO AND LITERACY RATE

196. Project city revealed the sex ratio of 895 females per thousand males. Similarly, looking into the Juvenile sex ratio it is analyzed that as against the juvenile sex ratio of the project city have sex ratio of 891 girls per thousand boys.

197. As per 2011 census, the total literates in Buxar city are 74,344 persons (72%) of which 41,701 (76%) are males while 32,643 (44%) are females. Average literacy rate of Buxar city is 83.82%, this constitutes 89.13% male literates and 77.89% female.

5.20 SCHEDULE CASTE AND SCHEDULE TRIBE POPULATION

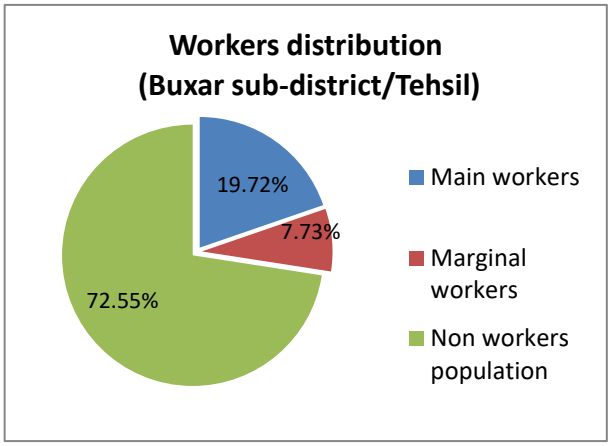
198. Analysis of social groups for the project area has also been done on the basis of concentration of Schedule Caste (SC) and Schedule Tribe (ST) population in project city. As per census 2011, the scheduled caste (SC) population is 8619 (8%) and the scheduled tribe (ST) population is only 1800 (2%) within the municipality area.

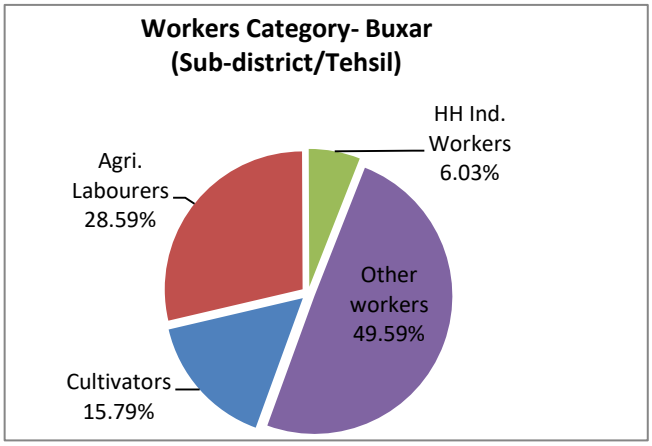
5.21 INCOME AND OCCUPATIONAL STRUCTURE

199. About 26,652 (26%) of the population in the project city constitute the working force and the work force participation among male is 86%, as against only 14% among women.

200. The total workers in the Buxar sub-district are 79917, in which main workers consist of 19.72%, marginal workers exists 7.73% and non-workers contribution is 72.55% as per census 2011. Workers composition for the sub-district/Tehsil shows highest share of workers in other sectors[14] (49.59 percent) followed by Agriculture labourers (28.59 percent) and Cultivators (15.79 percent) respectively.

201. Agriculture is the main occupation of the people in Buxar. The main source of income in the region is from the agriculture sector.





5.22 SLUM AREAS IN PROJECT CITY

202. Total no. of Slums in Buxar city is 1,700 in which population of 10,161 resides. This is around 9.88% of total population of Buxar city.

[14] Other Workers: all those workers other than cultivators or agricultural labourers or household industry workers are 'Other Workers'. The type of workers that come under this category of 'OW' include all government servants, municipal employees, teachers, factory workers, plantation workers, those engaged in trade, commerce, business, transport banking, mining, construction, political or social work, priests, entertainment artists, etc. In effect, all those workers other than cultivators or agricultural labourers or household industry workers are 'Other Workers'.

6 PUBLIC CONSULTATIONS

203. Stakeholder consultations were carried out with the locals residing adjacent to the proposed STP site and in sewer networking area where people will be affected during construction and digging work. Officials of various departments including the BUIDCo, Patna, DM, Buxar and Mayor of Nagar Panchayat were consulted. Different sections of the local community including landowners, residents of households, shop keepers, etc. were also consulted. The details of the consultation and issues discussed have been summarized in the table below (Table 6.1) and feedback notes along with attendance sheets included as an **Annexure 4.**

Table 6-1: Public Consultation held during ESAMP preparation

Sl. No.	Date of Consultation	Location	Name of the Officials/Person met	No. of Participants	Discussion Outcomes	Photos
1	26th February 2020	Office of the Managing Director BUIDCO, Patna	Shri Raman Kumar, IAS, Er KN Sahu, EE BUIDCO, Rana C. Kamal, SDO, Dr Lata Chaudhary, ESMS, Shri Ajit, Social Expert and others	7	▪ Brief presentation of the tasks to be carried out under the Namami Gange Program. ▪ Introduction and roles of the team and required assistance was discussed with MD, BUIDCO ▪ World Bank safeguard policy and documents for compliance ▪ Land and NOC related discussions ▪ Discussion regarding the disposal of solid waste and sludge disposal location.	
2	26th February 2020	Office of the Managing Director BUIDCO, Patna	Er KN Sahu, EE BUIDCO, Rana C. Kamal, SDO, Dr Lata Chaudhary, ESMS, Shri Ajit, Social Expert and others	5	▪ Discussions with BUIDCO officials regarding the status of the project, land requirements and availability of land at the proposed component at Buxar. ▪ NOC's have already been obtained from ITI and from the Irrigation department for 2 IPS locations and for STP land has been already in the name of ULB that has been allotted to STP construction. ▪ Introduction and roles of the team and required information to assess the proposed project. ▪ The Public response over the completed network and problem faced during the laying of the network in general. ▪ Discussion over the scheduled meetings with Chief Counselor and other word members along with Executive Officer and Buxar ULB in the project city.	

Sl. No.	Date of Consultation	Location	Name of the Officials/Person met	No. of Participants	Discussion Outcomes	Photos
					▪ The meeting was planned with District Magistrate regarding the project and to brief status and other necessary issues for World Bank compliance.	
3	27th February 2020	Ward No. 34 Sugar Mill area Road no.-1	Local community, shopkeepers and women Attendance sheet attached	8	▪ Briefing to the residents about the ongoing and completed projects ▪ Discussions regarding the problem faced and suggestions from the previous contract. ▪ Women were consulted and informed about the project components and further follow-up consultation with the benefits. ▪ During the consultation it was revealed that intimation of the work was not provided prior to the excavation of the road in the previous work, they had to face a lot of inconveniences. ▪ Restoration of path/road work was also not good and still, some locations are vulnerable conditions. ▪ Residents of the wards were suggested that where the excavation works to be carried out should be informed in advance and proper restoration should be done after completion of laying line. ▪ Noise and dust pollution was also noticed in a few locations and excess material on the road side was also not clear.	 

Sl. No.	Date of Consultation	Location	Name of the Officials/Person met	No. of Participants	Discussion Outcomes	Photos
4	27th February 2020	Office of the District Magistrate, Buxar	Shri Aman Samir, IAS, DM Buxar, Er KN Sahu, EE BUIDCO, Rana C. Kamal, SDO, Social Safeguard Specialist, Environmental Safeguard Specialist	5	▪ A detailed discussion about the project and present status of the project was briefed to the District Magistrate by the SDO Mr. RC Kamal and EE, BUIDCO. ▪ Availability of land and necessary NOCs from the concerned departments were briefed. ▪ DM informed that in other schemes "Bihar Jal-Jeevan Hariyali Abhiyan"[15], disposal of solid waste and sludge disposal location is well-intentioned. As soon as the land identification is completed the same will be informed to ULB for the disposal location. ▪ Discussion on the use of treated water for irrigation purposes and in consultation with the irrigation department which has already been initiated at a higher level.	 
5	28th February 2020	Near STP	Ward Member, Local community, shopkeepers And other local residents	11	▪ Project information about the ongoing and completed projects under Namami Gange Program. ▪ Discussions regarding problems faced and suggestions from the previous experience. ▪ Employment opportunity during the project execution. ▪ Ward Members informed that the work was not done properly in the previous work contract. A few locations leveling of manholes was not done properly, due to rising manholes many accidents have happened and after intimating to the Nagar Panchayat, it was done properly.	

[15] *Marking all public water storage structures such as ponds /canal / pines and their renovation. To make all public water harvesting structures encroachment free. Marking and renovating all public wells. To build blotting / recharging structure alongside all public wells / hand pumps / tube wells. Construction of check dams and other water harvesting structures in small rivers / drains and water storage areas of hilly areas. Creating new water sources. Building the structure of rainwater harvesting in all government buildings. Motivate to build the structure of rain water harvesting in private buildings. To organize a plantation campaign. To encourage the farmers for the use of alternative crops, drip irrigation, organic farming and other new technologies with less dependence on irrigation.*

Sl. No.	Date of Consultation	Location	Name of the Officials/Person met	No. of Participants	Discussion Outcomes	Photos
					▪ Briefed and explained to the local residents about the provisions to reduce or avoid the bad odor from STP.	
6	28th February 2020	Office of the Executive Officer Nagar Parishad, Buxar	Chairman, Nagar Parishad, Dy. Chairman, EO and the Ward Members	17	▪ A brief discussion about the completed and proposed sewerage project at Buxar. ▪ Women ward members were consulted and detailed discussion on the issues coming from local residents due to the laying of the network. ▪ The only suggestion from all the ward members that the work should be completed in a proper way, as they are unsatisfied with the works done in the previous contract. ▪ Dy Chairman suggested that due to incomplete and delay in restoration of excavated road works, locals have faced a major problem, particularly in the rainy season. ▪ The grievance mechanism should be available and timely redressal should be ensured. ▪ Dumping location for solid waste and sludge disposal to be finalized ▪ Work completion and accountability to the ULB.	 

204. The project specific EMP to be prepared by the Contractor shall address respective suggestions provided by the local community during the preparatory stage. :

- Access must be provided to shop owners/residential houses/schools and other users of community
- Excavation works on roads should be done with proper planning in order to avoid or minimize the disturbance to local residents.
- Restoration of excavated roads/sites should be carried out on priority basis.
- Excessive amount of noise during excavation works should be avoided. No night time work should be anticipated.
- Appropriate measures should be adopted for dust suppression during construction works.
- Construction works should be regulated according to school timings, especially in adjacent areas of educational institutions.
- The Contractor has to make sure that consultation/intimation to the respective gram panchayat/Ward Member before initiating the construction activities at the STP/IPS sites.

7 ENVIRONMENTAL AND SOCIAL IMPACTS AND MITIGATION MEASURES

205. Based on the major findings obtained from the field visits and secondary data analysis, the possible environmental and social issues with reference to the proposed sewer works in sewerage Treatment at Buxar city and respective mitigation measures have been discussed in the following sections. An Impact Evaluation Matrix with before and after the implementation of EMP and respective impact status has described below in Table 7.3.

7.1 POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATIONS MEASURES

206. The proposed project of sewer works in Buxar city would influence the environment in three distinct phases:

- During Designing Stage
- During the construction phase which would be temporary and short term;
- During the operation phase which would have long term effects

7.1.1 Design Stage Impacts

207. All sewer lines including trunk, lateral and branch sewer lines must be designed considering the future population and waste generation rate. Otherwise, the constructed sewer may not carry the waste load, leading to failure and financial loss. The alignment of sewer lines and sewerage pumping stations must be properly planned; else it may lead to both technical and social problems along with environmental issues of backflow creating foul smell and unhygienic conditions.

208. De-watering is to be carried out at IPS-1 (located at ITI ground) which is already constructed (30% work) and waterlogged at the under construction site. Sludge disposal location identified by the BUIDCO near the STP site, however, it requires the de-watering process at the site. During the site assessment, it was observed that waterlogging areas at both the locations of IPS 1 and Sludge disposal location identified by the BUIDCO, Patna.

7.1.2 Construction Stage Impacts

209. The sewerage network includes laying of remaining sewer lines (58.78km), and construction of 2 nos. of sewage pumping stations and STP at Sarimpur.

210. The construction activities would generally include earthworks, (excavation, filling, shuttering, compacting), civil construction (sewer lines, IPS, etc) and E & M installation and commissioning. The impacts of these construction stage activities on the various environmental and social parameters are examined below:

7.1.3 Physical Environment

Air Quality:

211. Based on the field observation and interaction/consultation with stakeholders, it is expected that the levels of dust (PM10 and PM2.5), carbon mono-oxide (CO), hydrocarbons and NOx (NO &NO2) is likely to increase during the construction phase mainly because of:

- Excavation, backfilling, compaction activity and movement of vehicles on un-paved roads (increases dust level)
- Vehicle exhausts from construction machinery and from light and heavy vehicles for transportation of pipes and construction material like cement, etc (increases NO2).
- Use of portable diesel generators and other fuel fired machinery (increases CO).

212. Further these construction activities cause temporary deterioration of the air quality which would be localized. A high concentration of PM10 and PM2.5 could also be a leading cause for eye, ear, nose and throat infections and related discomfort. Laying of sewer lines is mainly within the residential area; hence temporary impact on air quality where excavating and D.G sets operate to run digging machinery and to break the paved path would result in increase in fugitive dust.

213. At the proposed STP site, digging of wells below the ground level for erection of Bio Reactor Tanks, Screening chamber, Pumping point etc would lead to dust generation. These would be mechanical dug using JCB Machine and manually using local labors.

214. The ground leveling would be carried to lay the connecting pipes and other operational instruments. The unloading area like area earmarked for stocking of Bricks, Cements bags, Concrete, sand, etc would generate find dust.

215. Fugitive dust generated by vehicles carrying construction material like sand, cements and bricks and excess excavated materials.

Mitigations Measures:

216. Seasonal ambient Air Quality monitoring at the active construction site should be carried out with the help of NABL/MoEF&CC approve laboratory, downwind of the project site.

217. All the vehicles used for transport of construction material and used for construction activities should have Valid PUC certificate, should have proper maintenance and service as per the requirement.

218. While digging for sewer lane and sewer piping, dust prevention measures like water sprinkling, shade cloth should installed to attenuate dust.

219. All the D.G Sets should have appropriate stack height for proper dispersion of gaseous complying with the CPCB norms. The oil used should be lead free and use of low sulphur diesel.

220. The vehicles carrying construction materials should be properly covered to prevent dust falling from vehicles during plying.

221. At the stocking yard, loading and unload area temporary fence should be provided. All the workers should be provided with Personal Protection Equipment (PPE).

222. Shade Cloth with help of Scaffolds 3 meters high should be installed all along the STP site to prevent the surrounding residential colony from dust generation.

Noise Levels:

223. Noise levels in the vicinity of any construction activity rise due to plying of transport vehicles and use of portable generators, mechanical machinery such as cranes, riveting machines, hammering etc. These activities may occur round the clock and the noise pollution thus created may affect human habitations, particularly during the night time. The increase in noise levels may thus be a major concern at the project site, since it is located in the built up area of the city and close to habitation.

224. The primary impact of noise level would be mainly on workers operating high noise generating machines if appropriate control measures are not adopted. Schools and educational institutes may suffer temporarily due to the elevated noise levels. Increase of noise level at night may produce disturbances, causing sleeplessness in people in the vicinity of the site in case construction activity is extended into the night hours. However, these impacts are of temporary nature, lasting only during the construction period.

Mitigation Measures:

- The D.G set should be provided with acoustic enclosures and thickly padded to prevent vibration.
- Only day time work should be allowed (10 A.M to 6.00 P.M)
- All the instrument used should have lower sound power level
- Installation of mufflers on engine exhausts and compressor components.
- Limiting the hours of operation for hammer, Jackhammer to break the RCC road within the colony by using mobile source operating through settlements.
- Care should be taken that no employee be exposed to a noise level greater than 85 dB(A) for duration of more than 8 hours per day without hearing protection. No worker should be exposed to a peak sound pressure level of more than 140 dB(A) without using ear protective measures.
- Periodic medical hearing check should be performed on workers exposed to high noise level.
- The contractor should comply with the World Bank Group Environmental, Health and Safety General EHS Guidelines for Occupational Health and Safety.

Land Environment:

225. The proposed project will involve 3.694 Ha for Government Land, which is already available with BUIDCo. This land has been allocated for the establishment of 16 MLD STP for treatment of waste water generated from Buxar City Household and other services. This will be permanent impact throughout the life of STP (Operation Phase).

Mitigation Measures:

- Out of 3.694 hectare land about 30% of the land will be earmarked for green belt development.
- The top 15 cm soil will be removed and will be stored within the site at earmarked location and will be properly preserve.

- This top soil will be spread in the landscape area and tree plantation area
- To prevent soil, land pollution, all loading and unloading area, storage of hazardous chemicals, identified area used for storage of sludge will be paved.
- To prevent land pollution due to road tar (hazardous substance) which would be generated when road cutting operation would take place for laying of sewer lane. These bitumen should be back filled for are disposed of the designated landfill site.

7.1.4 Water Environment

226. The natural water bodies/drainage channels of the project area are likely to be affected in the following ways:

- By wastewater from construction activities – This would mostly contain suspended impurities. Other pollutants, which may find their way to it, are likely to be in insignificant concentrations and may be safely disregarded.
- Flooding is likely during monsoon as drainage paths could be obstructed by the excessive debris.

227. If adequate arrangements are not made to ensure proper drainage of wastewater from the construction sites, such waters may form stagnant pools, which might promote breeding of mosquitoes and create generally unsanitary conditions.

228. Soil erosion may be caused by the exposure of loosen soil to rain and wind during site clearance, earth moving, and excavation activity. This may result in sedimentation of surface drainage networks.

- Due to the diversion of sewer lines during the desilting/rehabilitation/replacement works to be carried out for the existing sewers.
- The above wastes are likely to be discharged to the nearby surface drains and would hence temporarily increase the pollution load of the drains/nallas.

Water body (Pond) located near IPS 2 (Dhobi ghat)

Low laying area near STP

Mitigation Measures:

- All the digging and lying of sewer lane should be planned as per the schedule of monsoon. No sewer work or diversion of sewer land should be done during monsoon season. This would prevent local flooding.
- To prevent sedimentation of soil, contouring and minimizing length and steepness of slope.

- Mulching to stabilize exposed area and lining steep channel and slopes.

7.1.5 Ecological Environment

229. The project site does not involve any forestland or tree cutting and ecologically sensitive areas. Thus, there will be no significant impact on the ecology of the area. The forest area/trees will not be impacted since sewer lines will be laid through habitation in residential/built up area on centre of the road.

230. The STP project will improve overall surface water quality of Ganga River by treating all the effluent before it is discharge into Ganga River. The improvement in Ganga Water Quality will improve the primary productivity (phytoplankton/ Zooplanktons) thereby improving the fish population in the river,

231. This improved aquatic ecological system will provide suitable/better feeding and breeding ground for Ganga River Dolphins. This would help in conservation of this endangered species and would leads to overall improve in Fresh water Dolphin population in Ganga Ecosystem. Thus the STP Project will have overall Positive impact on river Ecosystem and Dolphins population.

7.1.6 Management and Disposal of Excavated Material during construction

232. The proposed project will have lot of construction involved and as such if the management and disposal of excavated material is not properly done, it will impose a problem to local people and residents. This would be a temporary impact but a mitigation measure for this has been suggested. Digging and backfilling of trench for laying sewer lines may render topsoil loose. Soils of the construction area may be contaminated by wastewaters. This contamination may be due to:

- Alteration of chemical make-up of the soils, increased acidity/alkalinity
- Pressure of pathogens and other organic material in the excavated material

233. These impacts will be minor and limited to the construction phase only. No major impact on soil quality is anticipated.

7.1.7 Operation Stage Impacts

Water Environment:

234. Water resources in the project area would be the most positively benefited by the sanitation project since sewage will now be routed to the STP. Therefore proper operation and maintenance mechanism must be followed for efficient working of the system. During maintenance work periodically flushing to remove accumulated sediments at other impurities accumulated in pipe need to be removed. The environmental implication of pipe flushing is discharge of flushing water which may have high suspended solids, residual chlorine, and other contaminants etc. these can harm surface water. The uncontrolled discharge of domestic water into aquatic system can result in increase in microbial load, chemical contamination, oxygen depletion, turbidity, and eutrophication, etc. if problem in STP occurs. The probably environmental impacts related to water during operation stage may include unpredictable events such as:

- Temporary flooding of adjacent areas due to accidental leakages/bursts and also due to blockages and backlogging of lines.

- Water pollution and possibility of mixing with water supply line due to leakages/ overflows from the sewer lines
- Impairment of receiving water quality in surface/sub-surface source due to inadequate /inefficient sewage treatment process

Mitigation Measures:

- Discharge of flushed water into municipal sewerage system with adequate capacity
- Discharge of flushed water into detention pond, where solid can settle and residual chlorine consumed before water is discharge.
- Minimize erosion during flushing
- There should be effective collection and management of sewage and storm water

Noise and Air Quality:

235. Improper handling and irregular maintenance of operating machines including pumps, generators, air diffusers, etc may lead to increased noise pollution during operation activity. The odor generated from the waste water treatment plant can be nuisance to the community and settlements if located adjacent. Bio aerosol from the STP can cause diseases is not treated properly, the release of chlorine could affect the locals if not properly regulated.

Mitigation measures:

- A buffer zone can be created by planting three tier green belt along the periphery of the STP premises. This would act as caution wall between the STP and nearby community.
- The appropriate wall should be erected along the STP Boundary, this would act as noise and smell attenuation.
- The D.G set should have acoustic enclosure and should be thickly padded to attenuate vibration.
- The stack height of the D.G sets should comply with the CtO condition or should be three meter higher from nearby building.
- If possible the STP location should be away from populated neighborhoods or from potential sensitive receptors like hospitals, schools, etc.
- Before finalizing the STP location, if possible the facilities should be located downwind of settlement or sensitive receptors.

Leakages and Overflow:

236. The leakages and flow in the sewer networking system can result in soil, ground water and surface water pollution. If the ground water depth is less in the sewer. This would result in mixing of sewer water with ground water due to water seepages. Overflow condition in the sewer network occurs, when there is excess volume of waste water generated or there is blockade in sewer lane. It also happens when there is a heavy rain. The overflow in sewer line will happen when there is excess amount of wastewater generated, heavy rains, power loss, STP components malfunctioning, or blockages. A mitigation measures needs to be adopted to overcome the leakages and overflows. They are as follows:

Mitigation measures:

- There should be separate network for sewer and storm water network. This would prevent overflow of sewer line during monsoon season.
- Wherever possible avoid sewer line on heavy traffic road this would help in easy managing during malfunctioning.
- When ground water depth is less, there should be limit to the depth of sewer lane. Based on the CGWB report for Buxar district, the water table during pre- monsoon season varies between 2.69 mbgl to 10.93mbgl and post monsoon depth varies between 1.39mbgl to 5.69mbgl. Hence during laying of sewer line, water depth should be accounted.
- There should be adequate slope in the gravity mains to prevent siltation and accumulation of soild and hydrogen sulfide generation.
- The entire manhole should have appropriate cover which can withstand load and incase the cover breaks, it is easily replaceable.
- The pumping station should have Power back to have continuous operation during power failure. They should be regularly maintained, to prevent IPS failure.
- There should be routine maintenance program which should comply with "The World Bank Group Environmental, Health and Safety Guideline for Water and Sanitation".
- The agency should keep log book and record all the grey area were frequent overflow/ sewer leakage happens. This would save time and smooth functioning of the STP and Sewage system.

Aquatic Environment

237. Due to the leakage and overflow in the sewer network system creates the pollution load to the Ganga river water and leads to deteriorate to dolphin populations in the river Ganga.

Mitigation measures:

- Measures to be followed to prevent the leakage and overflow in the sewer network system.
- Appropriate adequate design measures and slope in the gravity mains to prevent siltation and accumulation of solid waste

Sludge and other solid waste

238. The solid waste i.e sludge and solids generated at pumping station, screening chamber, cleaning of drainage and sewer collection system, etc would be menace to the locals. If not collected it would choke the storm water network, and also can be potent disease vector. The sludge generated from the STP units during operation phase if not processed, handled properly, and would result in contamination of land, ground and surface water. Once dried, the fine dust components may be carried by wind to adjacent area. It would also generate foul smell and would cause inconvenience to the locals:

Mitigation Measures:

- At the IPS locations all the plastic and other waste which are removed should be collected daily and dumped at earmarked location or at the existing landfill sites.
- The solid waste generated during sewer line cleaning should be collected and removed from potential site simultaneously. In most of the cases it has been seen, that they are left for two to three day to get

dry, but are dangerous and would pose health issues to the locals. Due to vehicles movement they get stuck to the tyres and are spread on roads. They can even reach the storm water drains.

- The plastic, racks, wood, cloth which are screened at screening chamber of the STP should be collected and disposed of to the identified land filled site or active dumping site identified by the municipal corporation.
- The sludge generated from the STP should be collected, stored and should be processed within the site for dewatering adopting suitable technique. This dried sludge should be stocked within the site on paved/ concrete ground to prevent land contamination and washed off during rains. The operator needs to prepare sludge management plan in consultation with the locals, Municipal Corporation, etc. If the sludge is used by the farmers, it should be conform that it complies with the macro-nutrient, micro-nutrient, pH level needed for plant growth.
- The works engage in sludge handling and treatment, if generated from STP or sewer line should have safety training program for safe handling, personal hygiene practices so as to minimize exposure to pathogens and vectors.
- Use of vacuum trucks or tugs for removal of fecal sludge instead of manuals methods.
- There should be provision of PPE, showers and cloth changing area for workers and technicians

Hazardous chemical handling and exposure

239. During STP operation, chemicals like Chlorine, Aluminium hydroxide, Ferric hydroxide, etc. are used to disinfect treated water from microbial load, settle suspended solid etc. these chemical are hazardous to the individual who are handling them regularly. If they are not treated and proper concentration are maintained they may affect the individual, pollute surface water, soil and can suspended in air as fumes. The other hazardous chemical generated are for the STP operation like waste oil generated from the D.G set maintenance, D.G sets oil storage, etc. During handling these Hazardous chemical and to prevent them from exposure following mitigation measures need to be followed:

Mitigation Measures

- The waste oil generated from the D.G sets should be stored in close container and should be handed over to government approved recyclers.
- The D.G sets oil should be storage away from electric circuit, on paved floor and under close premises. It should be stored at one corner.
- The chlorination dose to disinfect the sewage and sludge should be well regulated as per the norms.
- The storage of chlorine, Aluminum hydroxide, Ferric hydroxide should be safely stored away from public place. The entry and exit into the storage room should be restricted.
- The storage of chlorine and other chemical should be packaged in plastic bags that are stored in sturdy cartons or drums in dry places.
- The tool and equipment used for handling one chemical should not be used to handle other chemicals. If not possible, the tool and equipment should be thoroughly washed, cleaned and dried before used for other chemicals.
- The storage area should be in close containers properly, cover opened or damaged packaging, store chemicals away from doors and windows, ensure that there are no roof leaks, open or broken windows, or leaks from water pipes, hoses, or the sprinkler system;

- Ensure that floors are sloped to keep water drained away, store chemicals on shelves or pallets to keep containers off the floor, always use waterproof covers on packaging, exercise particular caution to prevent water contact with stored chemicals any time water is used for cleanup of floor areas near stored packages and it should be ensure that water will not back up from faulty or clogged floor drains.
- All precaution should be taken to avoid mixing of chemicals by adopting following means
- Separate incompatible substances; avoid storing containers of liquids above containers of other incompatible substances.
- Do not mix old chemicals with fresh chemical, even if they are the same type
- Consider separate, designated tools for each chemical. Handle only one chemical at a time and make sure that tools used with one substance are not used with another unless all residues are removed.
- Use separate, designated containers for cleanup of spilled materials to avoid inadvertent mixing of spilled substances. Consult your local hazardous waste disposal facility for more detailed information on proper waste disposal; and
- Make chemical storage area housekeeping a priority. Don't allow rags, trash, debris, or other materials to clutter hazardous material storage area. Keep combustible and flammable substances away.

240. All Employees who handle chemicals should consult the chemical manufacturer's safety instructions as well as the Material Safety Data Sheets (MSDSs) for guidance on the appropriate personal protective equipment (PPE) necessary to protect your employees. Use basic PPE including, as a minimum, chemical goggles and liquid impervious gloves, and boots for any chemical handling activities.

Chance of accidents & injuries

241. The employee working in the STP operation and maintenance work would be subjected to injuries and health hazard if precaution at work place is not taken. In the STP system and at IPS locations there are work areas which are under ground or at elevation, there are open trenches, slippery walkways, electrical circuits, heavy equipment, storage tanks, wet wells, digesters, and pumping stations, etc. Even methane are generated from anaerobic bio digestion of sewage, which may result to fire and explosions.

242. The workers, staff and operators of sludge collection vehicles, can be exposed to the many pathogens contained in sewage. Workers may also be exposed to endotoxins, which are produced within a microorganism from sewage pipeline and from STP malfunctioning. This could affect the health of workers, if PPE and precaution are not properly taken. The workers while working at such location, the operator should adopt following mitigation measures.

Mitigation Measures:

- As protective measures there should be railing around all process tanks, bio-reactors and at location where work is at height or underground wells.
- The entry and exits to outsider should be restricted.
- The workers should use fall protection equipment's when working at height
- All the maintenance work should minimize slipping and tripping hazard
- Use proper techniques for trenching and shoring
- There should be well established traffic circular plan, demarcated parking area, rest area, etc
- When installing or repairing mains adjacent to roadways, implement procedures and traffic controls measure on road. Prior to start to start of work the work zone should be earmarked through sign board, traffic diversion signals, etc.
- Safety training program for works, safe handling and personal hygiene practices to minimize exposure to pathogens and vectors.
- Use of vacuum trucks or tugs for removals of fecal sludge instead of manual removals
- Encourage workers at wastewater facilities to wash hands frequently.

7.2 POTENTIAL SOCIAL IMPACTS AND MITIGATION MEASURES

243. Based on the surveys, interviews with the key stakeholders, interaction with the coordinating agencies, a screening checklist was prepared to identify the social issues associated with the project during construction phase. The proposed project will only influence social sector during construction phase. During the construction phase, the impacts identified below would be temporary and short term.

7.2.1 Impacts on Human Health

244. One of the potential impacts of the proposed sub-projects will be on the air quality due to the dust generated during excavation. The amount of dust generated will depend upon the level of digging and the prevailing weather conditions and can have an adverse impact on the health of the persons residing or working near the project sites. Increased dust was witnessed during the field visit during construction of Amruth Yojna-related water supply projects. Since the area has more of residential land use, the number of people who will be affected is more. Residential population includes more vulnerable groups such as elderly and children.

Mitigation Measure: Acoustic enclosures or hoardings can be constructed at the proposed sites

245. Our mitigation plan involves the erection of temporary enclosures around construction sites. These barriers will help entrap some of the dust that is brought up in digging. They will also provide safety benefits, to be detailed below. Water sprinkling will be undertaken as well, according to the contractors

7.2.2 Traffic Congestion

246. Due to the excavation work which will take place on the main roads of the city, there will be a disturbance in the traffic movement. People may suffer some inconvenience during the morning and evening peak hours. This issue is discussed in the DPR and suggests de-routing of the traffic as the mitigation measure. The main traffic congestion related problem was witnessed near IPS 1 location. Many

of the roads in the city areas narrow. Any excavation in these areas would disrupt traffic and already most of them witness traffic congestion during peak hours.

Figure 7-1: Narrow Congested Roads in Buxar city

Mitigation Measure: Re-route traffic whenever possible and employing traffic police to manage the traffic movement.

247. Traffic must be re-routed to facilitate ease of movement. Proper signage should provide detailed information on the dates and duration of road closures and which detours will be available, ideally well in advance of actual construction so residents can plan accordingly. Strategic placement of traffic cops at critical intersections will also facilitate better flow of traffic. Plans and budget for these measures are already included in the DPR.

7.2.3 Impact on Livelihood:

248. The excavation will lead to road blockage and as a result the commercial establishments and vendors will have some trouble in operating their business on daily basis. But there will be no loss of livelihood. Ambulatory vendors can very well shift their place as and when required. So, overall no loss of livelihood has been reported during the survey and Consultation with local commercial establishments. On a better note, most of the interviewed shop-owners and vendors are satisfied with proposed project and suggest that it should be completed well in time to minimize their inconvenience.

Mitigation Measure:

249. Sewer constructions will invariably lead to road closures, which will adversely affect shops on those streets. The first priority is for the contractor to take the necessary measures to ensure that pedestrians always have access to shops, vendors, etc. For mobile vendors, this may include adjusting the location of

the cart, etc. to a similar location in the immediate vicinity of the original location for the duration of the project. Projects should also proceed on schedule so as to minimize disruption. Additionally, clean-up of debris and clearance of blockages should commence immediately after project completion so as to remove any potential obstacles that might prevent customers from accessing businesses or other disruptions.

250. In the event that the contractor, despite best efforts, is unable to avoid blockages of the roads and/or disruption of local businesses, some assistance is necessary. The ESMF currently mandates assistances only in the case of permanent livelihood loss or displacement and provides no provisions for temporary livelihood loss. Additionally, no regulation, policy, guideline, etc. exists which can provide precedent or guidance in this instance ESMF clearly states that mobile/ambulatory hawkers: fruit cart vendors, etc. who can easily relocate fall into this category. These vendors are most eligible for a temporary relocation just outside the construction area, and will thus not be eligible for compensation as is the case for this proposed project.

251. However if during the construction of the project any party faces livelihood loss due to the proposed project, then that party should be compensated according to the entitlement matrix given in the ESMF report.

7.2.4 Impact on Existing Utilities

252. The road opening activities may damage the underground water pipelines or electricity poles in the vicinity of the site for the proposed sub-projects. This will lead to water supply interruptions, disruption in electricity supply and will involve expensive repair costs. Flooding of areas could also occur.

Mitigation Measure:

- Circulating the layout plans of the existing underground alignment near the work site.
- Contacting the relevant department in case there is any damage to any of the utility services and ensuring prompt fixing/replacing of damaged infrastructure.

253. All construction personnel must receive detailed layout plans of existing underground structures to prevent accidental water/electricity supply disruptions. The relevant departments should also be made aware of the timing and location of digging near supply lines so they can make the necessary preparations to respond swiftly to disruptions.

7.2.5 Safety Hazards

254. Interviews with city officials (Ward Members/Councillors) brought to notice the potential issue at few rising manholes (existing manholes) and due to that more accidents have been occurred in the past. This issue to be considered as a precautionary measure to carry out necessary care and level maintenance while laying of Manholes. There are potential hazards for the bikers, workers as well as for the pedestrians. Safety equipment for workers is provided as part of the DPR. Safety equipment for O&M requirement such as half & full face masks, gumboots, safety lamps, harnesses, hard hats and communication systems are to be provided.

Mitigation Measure: Fencing of the excavation site and providing proper caution sign boards.

255. As mentioned above, fencing should be erected around construction sites and appropriately marked with caution signage. These fences/signs should remain in place even if construction is not active, so long as a hazard (e.g. open pit) remains.

7.2.6 Elevated Noise Levels

256. Increase noise pollution (continuous Siren from bikers) was observed during the site assessment due to congested traffic at narrow roads. This will further disturb to the residences during construction and especially sensitive areas like schools and hospitals.

Mitigation Measure:

257. According to BUIDCO officials, construction will take place after school hours or at other times of school closing to avoid interfering with school function. Beyond that, construction must simply proceed in a deliberate and judicious manner to avoid unnecessary noise pollution.

7.2.7 Failure to Restore Temporary Construction Site

258. Excessive debris, trash or construction remnants (e.g. dirt piles) would create problems related to drainage, unhygienic conditions and poor aesthetics; however, clean-up and debris clearance is budgeted in the DPR so this should not be a concern.

259. ***Mitigation Measure:*** As mentioned above, provisions to rehabilitate roads and clear debris are already included in the DPR.

7.2.8 Effect to daily life

260. Residents of Ward Number 6 complained that during construction in previous approved works, they were not able to take out their vehicles and also access to their house also is problematic.

261. ***Mitigation Measure***: **Public Notice** -According to the suggestion given by the locals during the interview. Government and contractor should give a prior notice to each and every locality with the details of the project, street wise start date of construction and street wise end date of construction. Contact person during emergency. This information would help them better adjust to the situation and make necessary adjustments and provisions.

Damage to buildings

262. In summary, the task of correctly identifying the vulnerable parties is virtually impossible. Thus, the best mitigation plan is to reroute sewage lines to avoid disturbing the old sewage network in instances where the contractors determine that a house may be built upon it. The mitigation plan for this social concern proceeds in the following steps:

- Redirecting sewer lines around those houses that rely on the sewage lines for foundation.
- Should that not prove possible, identification of affected houses and categorization into different level of houses (permanent, semi-permanent, etc.) to determine possible compensation.
- Payment of compensation to affected houses on a "cost of repairs" basis. Should total destruction of the property ensue, then the full valuation of the property must be paid, and resettlement/ rehabilitation policies come into effect according to the ESMF.

Health Programmes for Workers

263. If un-sanitary conditions prevail at workers camp, health programs for their well-being should be implemented.

7.2.9 Social mitigation plans during operation phase

264. Noise pollution due to improper handling of machines: proper O&M should be carried out during the operation phase to ensure least disturbance is caused to the neighbouring residents.

7.2.10 Mitigation measures adopted by locals during similar nature of project activities

265. From the field surveys and interviewing the locals including shop-owners, residents, mobile vendors, following local adaptive measures have been recorded;

- Using transparent plastic sheets to block entry of dust into shops
- Avoiding opening of windows, especially when the construction is going on
- Taking different routes if possible to avoid areas where construction is happening
- Laying wooden/plywood plank over the excavated pits for making access route to house or shops
- Environmental and Social Assessment with Management Plan

266. The above measures indicate that the general public has already created adaptation measures to sewage construction projects.

7.2.11 Land Availability

267. As per the discussions held with the Executive Engineer and SDO, BUIDCo, Bihar, for establishing various proposed project components (i.e. One STP – 16 MLD, 2 IPS, office and Staff quarters, etc.) total about 3.69 acres of government land is available. The land for construction of STP at Sarimpur is available and is in possession of BUIDCo. There is no land related legacy (The land is acquired and all the compensation is paid). BUIDCo has initiated the construction activities under the previous contract in the year 2010-11). No objection certificates (NOCs) have obtained from the Urban Development and Housing Department, Government of Bihar for two IPS locations. The office order and related clearance from Manager (Legal), BUIDCo for STP and for IPS-1 the NOC from Special Executive Officer, Urban Development and Housing Department, Government of Bihar and for IPS-2 the Additional Secretary, Government of Bihar has been obtained and copies of the NOCs are provided at **Annexure-4**. The Table 7.1 below provides the details of land requirement and availability.

Table 7-1: Land Requirement Details for the Proposed IPS and STP locations

Sl. No.	Name of Location	Total Land required (Acre)	Available Govt. Land (Acre)	Details of proposed land
1	IPS-1 (ITI Ground)	0.222	0.222	Department of Labour Resources NOC has issued vide letter no-S.S.-T 3/Bhawan-38/2012 /1279 dated 22.08.14 at the Govt. ITI Ground. It's the north corner measuring 30x30=900 sqm.
2	IPS-2 (near Dhobi Ghat)	0.222	0.222	Water Resources Department, Government of Bihar NOC has issued vide letter no-21/Bhumi-04-1-/2012/561 dated 19.12.14. It's near the Dhobi Ghat measuring 30x30=900 sqm. (the land details are: Ward No-6, Thana No.-332, Khata No.-262, Khasra No.-943)
		0.444	**0.444**	**Government land is available for both IPS**
3	STP at Sarimpur, Buxar	3.250	3.250	The land is available and is in possession of BUIDCo, There is no land Legacy. BUIDCo has initiated the construction activities under the previous contract in the year 2010-11. Land details are: Thana No.-332, Khata No.-337, Khasra No.-589, 687, 688, 699 & 700, Hamlet- Sarimpur , Mauza Buxar.
	Total	**3.694**	**3.694**	

Source: BUIDCO, Patna, Bihar

7.2.12 Public Grievances

268. Locals also reported few instances where they lodged complaints about un-cleared debris, or damage of public utility generally to ULB officials. They usually do not lodge complaints due to the prior experience of the lack of response from government officials. Additionally, the interviewees said that they understood the inconveniences were of a temporary measure and are providing a social good. Thus, they have created local adaptation measures as quick and efficient ways to mitigate the temporary inconveniences. However the proposed project has grievance redress mechanism which will be adopted as mentioned below:

7.2.13 Grievance Redress Mechanism

269. National Mission for Clean Ganga (NMCG) under the Ministry of Water Resources, River Development & Ganga Rejuvenation has set an objective to ensure effective abatement of pollution and conservation of the river Ganga by adopting a river basin approach for comprehensive planning and management.

270. Under the flagship Program of Namami Gange, several sewerage projects have been taken up along the banks of river Ganga in Bihar. Under these projects, Grievance Redressal Mechanism (GRM) is proposed to establish. In 14th Implementation Mission meeting at NMCG Office Delhi, a detail discussion was held and a common approach to solve the grievances was finalized which is detailed below:-

271. On receipt of complaints and suggestions from different stakeholders & citizens, a plan of action is devised accordingly.

272. Time-bound reply to the complainant after doing a root causes analysis (RCA) of the incoming complaint as per rules & regulations of the Government and project scope.

273. Co-ordination with Executing Agencies (BUIDCo), SPMG and the Government Department -UD&HD for effective redressal of the complaints.

274. In compliance to above, the following actions have been taken up by BUIDCo, an Executing Agency for the Namami Gange Projects:-

- A Control room is set up in the BUIDCo office with toll free-umber (18003456130).
- Toll- free number is published in the newspaper, displayed on BUIDCo website and on each project site.
- This control room works from 10.00 am to 06:00 pm.
- Four numbers of staff are deputed here to receive the calls, register the complaints, segregate it project-wise and refer to concerned Executive Engineer by next day.
- The same control room is working as Grievance Redressal Cell which is under IT cell.

275. In BUIDCo GRM is working in three-tier system to resolve the issues effectively on time.

D. First-tier- At each project site,

- At each project site, project-specific Grievance Redressal Committee is working comprise of Executive Engineer of the project, Asst. Engineer of the project, ESMC BUIDCo, Project Manager (contractor), Supervisor Contractor and Health & Safety Officer (contractor).
- Along with toll-free number, detail of Grievance Redressal Committee is also displayed on the site.
- This committee is taking up the referred issues of GRC and directly received complain in scheduled Monday meetings at each site and try to resolve it in 15days.If fails to resolve, the issue is forwarded to the second tier.

E. Second-tier- BUIDCo HQ level

- In the second tier, the issue is taken up at Chief Engineer and MD BUIDCo level.
- Any unresolved issue of First tier is taken up in monthly scheduled review meetings in the chairmanship of MD BUIDCo.
- Unresolved issues of the second tier will be forwarded to SPMG for necessary action and direction.

F. Third tier- SPMG level

- At this level, issues will be taken up in review meeting of Namami Gange projects at UD&HD in the chairmanship of Secretary, UD&HD (SPMG).

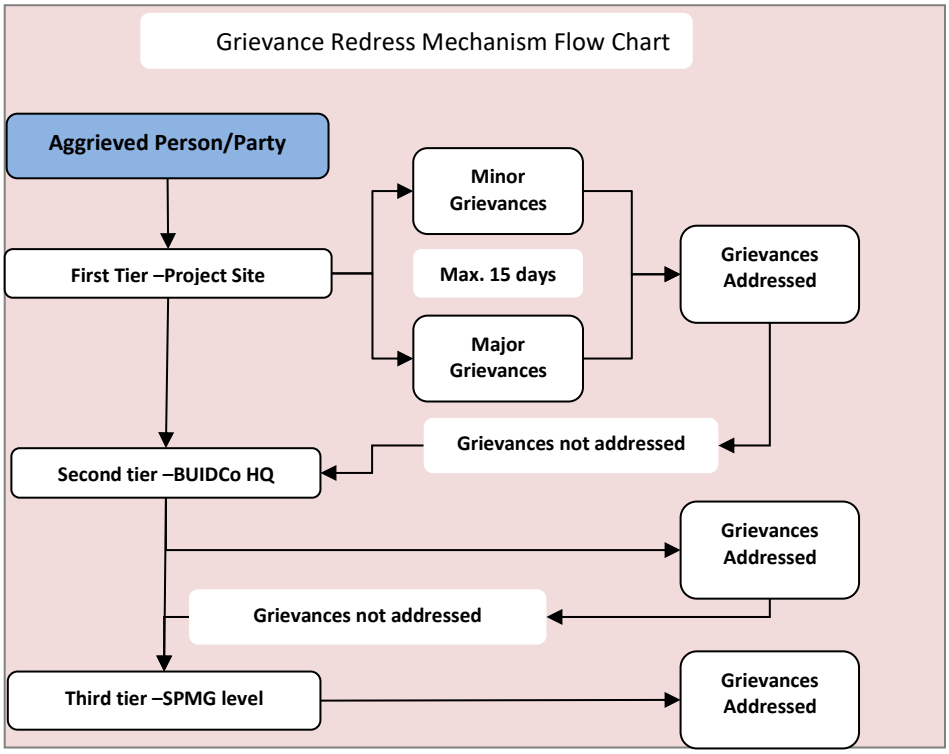


Figure 7-2: Grievance Redress Mechanism in BUIDCo

Approach to GRC:

276. Affected person/aggrieved party can approach to GRC for a redress of his/their grievances through any of the following modes:

- Through Grievance Redress: Aggrieved person/party can give their grievance in writing to Project office, ULB and BUIDCo office or SPMG level.
- BUIDCO is in process of developing an app for register/resolving the complaint/grievance related to projects.

7.3 LABOUR MANAGEMENT PLAN

277. Contractor shall prepare and submit Labour Influx and Worker's Camp Management Plan to the concerned EA that addresses specific activities that will be undertaken to minimize the impact on the local community, including elements such as worker codes of conduct, accommodation facilities, training programs on workers safety, and also to address COVID-19 pandemic measures. A Workers' Labour Camp Management Plan addresses specific aspects of the establishment and operation of workers' camp.

This Labour Influx and Worker's Camp Management Plan will include:

(i) Provision of safe and healthy working condition, and a comfortable environment and accommodation with adequate facilities for migrant labour and to ensure compliance with the national labour laws.

(ii) Potential impacts associated with influx on the host population and receiving environment are minimized

(iii) mandatory and repeated training and awareness raising for the workforce about refraining from unacceptable conduct toward local community members, specifically women;

(iv) informing workers about national laws that make sexual harassment and gender-based violence a punishable offense which is prosecuted;

(v) introducing a Worker Code of Conduct as part of the employment contract and including sanctions for non-compliance (e.g., termination), manual scavenging, engagement with local residents, child labour, non-discrimination, harassment of co-workers including women and those belonging to SC and STs and other minority social groups;

(vi) Contractors adopting a policy to cooperate with law enforcement agencies in investigating complaints about gender-based violence;

(vii) training programs on HIV/AIDS and other communicable diseases;

(viii) workers' Camp Management Plan addressing specific aspects of the establishment and operation of workers' camps provided the Local Body/ Executing Agency is unable to cater to the demand for affordable housing for this additional workforce in terms of rentals, hostels, apartments, etc.; and complaint handling mechanism at the project level.

7.3.1 Management of COVID-19 Pandemic at the Project Site

278. Additional measures to address the COVID-19 situation that a systematic approach to planning, recognizing the challenges associated with rapidly changing circumstances shall be prepared by the Contractor. Addressing COVID-19 at a project site is beyond occupational health and safety and is a broader project issue which will require a designated team for documentation and discussed at regular meetings to facilitate adaptive management measures. The following good workplace management pertinent in preparing a response to COVID-19 are:

a. The Contractor should prepare a detailed profile of the workforce, key work activities, schedule period of such activities etc. Worker's accommodation should be kept with minimum contact with people near the site and regular contact should be avoided with the local communities.

b. Entry/exit to the work site should be controlled and documented for all the local workers (who return home daily), staff and suppliers. Confirming that workers are fit for work before they enter the site to start work.

c. The requirement of general hygiene should be communicated and monitored such that training to workers and staff on site on the symptoms of COVID-19, how it spread and how to protect themselves (including handwashing, social distancing). Ensuring handwashing facilities supplied with soap, disposal paper napkins/towels and closed dust bins etc.

d. Placing posters and signs around the site, with images and text in the local language.

e. Regular cleaning of all site facilities including offices, accommodation, canteen and common spaces.

f. Providing them appropriate PPE (masks, gloves, eye protection, boots etc,).

g. Expanding medical infrastructure facilities, if a worker is ill and unable to breathe properly on his/her own, they should be referred immediately to the local hospital. Agreeing with local medical services/ facilities the scope of services to be provided.

h. Workers if any symptoms of COVID-19 (fever, dry cough, fatigue) should be required to stop work, and immediately be required to be quarantined/isolated and transported to local health facilities for further tests. Family and close contacts of the works should be required to quarantine themselves to 14 days, even if they have no symptoms.

i. Training and monitoring should be conducted regularly and document procedures. If project representatives, contractors or workers are interacting with the community, they should practice social distancing and follow COVID-19 guidance (latest updated guidance issued) issued by relevant authorities, both national and international (e.g. WB or WHO).

j. In practice, workers may be employees of the contractors, or they may be informal, casual hires on a short-term basis. Many are also migrant workmen. Contractors can be advised to continue the employment of all workers during the period of COVID-19.

k. It would also be important to ensure that all eligible workers are given Building and Other Construction Workers (BOCW) registration, to be able to avail of benefits which are either under existing welfare schemes or provided as a part of the Covid-19 relief package.

7.3.2 Monitoring of COVID-19 pandemic by the Executive Agency (EA)

279. The Executing Agency (BUIDCo) shall monitor the COVID-19 issues at the project site and will make sure that the Contractor taking adequate precautions to prevent or minimize the outbreak of COVID-19. The following suggestions to deal are set out as below:

a. The EA, either directly or through the Supervising Consultant, should request details in writing from the main Contractor of the measures being taken to address the risks.

b. Monitor health and safety requirements are taken by the contractor which can be used as the basis for identification of, and requirements to implement, COVID-19 specific measures.

c. The EA should require the Contractor to convene regular meetings with the project health and safety specialists and medical staff (and where appropriate the local health authorities), and to take their advice in designing and implementing the agreed measures.

d. Where possible, a senior person should be identified as a focal point to deal with COVID-19 issues. This can be a work supervisor or a health and safety specialist. This person can be responsible for coordinating the preparation of the site and making sure that the measures taken are communicated to the workers, those entering the site and the local community. It is also advisable to designate at least one back-up person, in case the focal point becomes ill; that person should be aware of the arrangements that are in place.

e. In many cases, the EA can play a valuable role in connecting project representatives with local Government agencies and helping coordinate a strategic response, which takes into

account the availability of resources. To be most effective, projects authorities should consult and coordinate with relevant Government agencies and other projects in the vicinity.

f. The EA should make sure that workers should be encouraged to use the existing project grievance mechanism to report concerns relating to COVID-19, preparations being made by the project to address COVID-19 related issues, how procedures are being implemented, and concerns about the health of their co-workers and other staff.

7.4 GENDER ASSESSMENT, DEVELOPMENT

280. According to ESMF, the objective of Gender Assessment and Development is to analyse gender issues during the preparation stage of sub projects, design interventions and primary data collection. The gender analysis shall be carried out based on findings from gender specific queries and requirements during data collection and community consultation process. The quantitative and qualitative analysis shall include sex-disaggregated data, issues related to gender disparity, needs, constraints, priorities and understanding of gender-based inequitable risks, benefits and opportunities as well as gender relevant indicators.

7.5 GENDER BASED VIOLENCE (GBV)

281. GBV is an umbrella term for any harmful act that is perpetrated against a person's will and that is based on socially ascribed gender differences. GBV includes acts that inflict physical, mental, sexual harm or suffering; threats of such acts; and coercion and other deprivations of liberty, whether occurring in public or in private life. The project site includes both the actual locations where civil works are conducted and also the associated areas such as the locations of workers' camps, quarries, etc. These GBV risks need to be assessed throughout the project's life by monitoring the situation, assessing the effectiveness of risk mitigation measures, and adapting them.

282. Since a sub project involves construction work that will demand a constant supply of labourers, the influx of migrant workforce can be a potential risk for the host population. The influx of labour force can lead to the risk of Gender-Based Violence.

283. The interventions will be at three levels, that of SPMG, EA and the Contractor. According to guidelines of ESMF on GBV prevention has been prepared to define the roles and responsibilities at all levels. Robust measures shall be prepared and implemented to address the risk of gender based violence in the project and adjoining communities.

284. The table below (7.2) provides the Social Management Plan with possible mitigation measures.

Table 7-2: Social Management Plan

Activity	Potential Negative Impact/Concern	Mitigation Measures	Cost/Remarks
1. Sewerage Network			
A. Design and Development Stage			
Land Acquisition for	No Impact	As per first hand observation in the field and through interviews of key stakeholders,	Land acquired for the STP in the

Activity	Potential Negative Impact/Concern	Mitigation Measures	Cost/Remarks
IPS and STP		residents, local people, and other sources like DPR, it has been established that 3.25 acre of land already been acquired for STP in the previous contract at Sarimpur town (60% civil works construction is completed in the STP). Proposed IPS locations: IPS 1 (ITI Ground): Govt. land available for construction of IPS and NOC is obtained- 30% work completed IPS 2 (Near Dhobi Ghat)-Govt. Land is available- No work done yet.	previous contract. (Rs. 30 crore).
B. Construction Stage			
Impact on Livelihood	No Impact, as there will be no impact envisaged on livelihood of any permanent shop owners, residents and kiosk	The first priority is for the contractor to take the necessary measures to ensure that pedestrians always have access to shops, vendors, etc. Additionally, clean-up of debris and clearance of blockages should commence immediately after project completion so as to remove any potential obstacles that might prevent customers from accessing businesses or other disruptions	However if during the construction of the project any party faces livelihood loss due to the proposed project, then that party should be compensated according to the entitlement matrix given in the ESMF report[16].
Safety hazards to workers and residents		Provide workers with adequate safety equipment such as helmets, safety shoes, gloves, etc. Fences/temporary enclosures should be put around construction sites (even inactive ones, if hazards, like open pits, remain); enclosures should be properly marked with caution signs.	Safety kit will be provided by contractor Putting fences or other barricades to demarcate the area is to be done. (Cost included in the EMP budget)
Dust generation, with resulting implications for human health	Construction of temporary enclosures to entrap dust.	Water sprinkling, removal of excess materials, cleaning of sites upon completion of activities.	Water sprinkling cost is part of EMP budget.
Reduced pedestrian and vehicle access to residences and businesses Temporary water , electricity, supply interruptions		Work should proceed on schedule so as to minimize road closures Circulation of layout plan for all underground infrastructure to ensure that contractor is aware of water/electricity lines in construction zone Local utilities should be made aware of timing/location of all construction, enabling them to respond swiftly to supply disruption, especially in the event of flooding, etc. Upon project completion, quick clearance of debris, etc. will facilitate access by customers to local business and residents to their households	Debris clearance budgeted in DPR
Increased traffic inconvenience (emissions, congestions, longer		Use of alternate traffic routes; signage should clearly indicate dates of road closures and new routes so residents can plan accordingly Placement of traffic officers at busy	Part of Construction activities

[16] For the Environmental and Social Management Framework (ESMF) document please refer https://www.nmcg.nic.in/writereaddata/fileupload/25_Namami_Gange_ESMF__August_17_2017__1___1_.pdf

Activity	Potential Negative Impact/Concern	Mitigation Measures	Cost/Remarks
travel times)		intersections to facilitate easy of movement	
Impact to daily life		Prior public notice indicating the date of start of construction and end date of completion should be provided road-wise to the locals allowing them to make adjustments accordingly.	Notice boards are part of construction management practice by the Contractor
C. **Operation** Stage:			
Regular Monitoring of Sewerage Network and STP/SPS		Regular visits by the environmental and social specialists of the NMCG	

7.6 CONCLUSION

285. Based on the overall secondary data analysis, field investigation and stakeholder consultations, the proposed project is expected to benefit the Buxar City, as the wastewater that currently flows untreated into the Ganga River will be captured, treated and the remainder of the treated effluent will be allowed to utilize for agriculture purpose. The likely beneficial impacts of the projects include:

- Improvement in sewerage collection and treatment within the cities/towns
- Prevention of storm drains carrying sanitary sullage or dry weather flow
- Prevention of groundwater and soil pollution due to infiltration of untreated liquid waste
- Environmental and Social Assessment with Management Plan
- Prevention of discharge of untreated sewage into River Ganga
- Improvement in water quality of River Ganga, a national resource
- Improvement in environmental sanitation health and reduction in associated health hazards within the cities/towns
- Improvement in quality of life, human dignity and increased productivity
- The reduction of the nuisance of open defecation due to low cost sanitation and reduced malarial risks and other health hazards
- Although there would not be any permanent negative or adverse environmental impacts but will have temporary impacts, that can be mitigated with appropriate mitigation plans. However, the large environmental benefit of the project greatly outweighs the temporary inconveniences.

Table: 7.3 Impact Evaluation Matrix (Before and after EMP Implementation)

Environmental Components		Before EMP			After EMP		
		Pre-Construction Stage	Construction Stage	Operation Stage	Pre-Construction Stage	Construction Stage	Operation Stage
Physical Envionment	Air quality						
	Noise levels						
	Temperature						
	Odour						
Land Envionment	Soil quality						
	Soil Erosion						
	Debris disposal						

	Solid waste disposal						
	Agriculture/Open land						
	Sludge disposal						
Water Envionment	Surface Water						
	Ground Water						
	Water bodies						
Ecological Envionment	Flora						
	Fauna						
	Aquatic Habitat						

Not Significant	
Significant	
Severe	

8 ANALYSIS OF ALTERNATIVES

286. Analysis of alternatives involves a thorough study of the possible future conditions in the project study area in response to a set of alternatives without the project or status and condition.

287. **Sewerage Treatment Plant**: The project is an augmentation of already initiated the Sewerage system through the previous contract. (60% of civil works completed at STP and 30 % works done at IPS at ITI ground). Limited environmental impacts are expected during construction. Little air, water and noise pollution are expected from the proposed construction activities; however, these are localized impacts and can be minimized with the proper construction schedule and precautionary approach. Since the project is in an existing piece of government land no alternate sites were considered. However, the STP location is close to the habitation; hence 33% of the STP area is considered for green cover/planation to avoid bad odour and noise to the residents. Moreover, the proposed plant site is as per MoEF guidelines and guidelines according to the Bihar Urban and Housing Department, Govt. of Bihar for Siting of Sewerage Treatment Plant as follows:

- There are no National Parks/Sanctuaries within a 10 km radius.
- Not envisaged any Historical places/places of tourist importance within 10 km radius
- Choice of appropriate technology
- Land availability, with a preference for government-owned land
- Engineering and Environmentally suitability of land
- Availability of infrastructure facility

288. **Sewage Pumping Stations**: Two intermediate pumping stations proposed in the Sewerage network are for Zone –I to II. The proposed pumping stations are both at govt. land in ITI ground and near Dhobi Ghat, are proposed to cater to a load of entire sewage from zone I and II. These intermediate pumping stations are so placed that the depth of sewers through the zone restricted to adopted a minimum depth of sewer as 1.0 m in general and 0.6m in for shallow sewers. No alternative pumping site has been considered, as the proposed at ITI ground is already initiated the work (30% work done) and project facilities will be installed within the existing infrastructure facility. The government land is also available for both IPS locations. The majority of pipeline will be laid at the center of the road passages.

Technology Adopted for Sewerage Treatment: Sewage treatment plant based on sequential batch reactor (SBR) which is a proven technology for the population and area in Buxar City. It has some specific advantages compared to other conventional technology. Specific advantages of SBR process have been highlighted below:

- Land requirement of SBR based plant is very less and suits site condition
- Effluent characteristics are par best and meet every stipulated guidelines
- Have a proven track record throughout the nation.
- Treated effluent can be utilized for any purpose of reuse
- Module based plant, ease in O&M & future augmentation

289. Therefore, Sewage treatment plant based on sequential batch reactor (SBR) was selected for the project.

9 ENVIRONMENTAL MANAGEMENT PLAN

9.1 ENVIRONMENTAL MANAGEMENT PLAN

290. The generic environmental management plan for low category investment that identifies the potential issues of various activities that are anticipated in the design and development, construction, and operation phases of the proposed sewer work in sewerage project in Buxar is summarized in **Table 9.1.** The environmental management plan ensures to suggest appropriate mitigation measure against the issues/ concerns identified during the environmental and social assessment study.

291. In general, BUIDCO, Bihar (with assistance from Contractor and Independent Engineer/Supervision Consultant) is the responsible entity for ensuring that the mitigation measures as suggested in the ESAMP. The roles and responsibilities of the involved institutes are described below.

9.1.1 Implementation of EMP- Specific activities by BUIDCO

292. The role of BUIDCO in the implementation of EMP involves the following activities:

- EMP clearance from NMCG and World Bank and disclosure as required;
- Integrating the ESAMP in the bid document of contractor;
- Ensure the Tree Plantation in the STP site (according to the DPR, 33% of the STP area is to be developed into green belt.)

9.1.2 Implementation of EMP- Specific activities by Contractor

- De-watering process at proposed sites (which are filled with storm water at IPS 1 and Sludge disposal location identified by the BUIDCO)
- Obtain Consent to Establish from State Pollution Control Board for the STP
- Implementation of other mitigation measures as suggested in the EMP

9.1.3 Implementation of EMP

293. As nodal Ministry for the Namami Gange program, the Ministry of Jal Shakti, Department of Water Resources, River Development and Ganga Rejuvenation (DoWR, RD&GR) through NMCG is the primary implementing agency for the project at the national level. The implementing agencies at the state level are the State Mission for Clean Ganga (SMCGs). At the local level, specific Executing Agencies (EAs) will be selected for implementation of various activities, including infrastructure investments under the Namami Gange program. Bihar Urban Infrastructure Development Corporation Limited (BUIDCo) is the EA as the parastatal organization for the development of Sewerage and Sewerage Treatment plant at Buxar, Bihar.

294. The main functions of the various agencies with regard to the Namami Gange program include the following:

► The NMCG will be responsible for overall project planning and management at the national level; direct implementation of the national level activities; ensuring satisfactory implementation of the state-level investments and activities; providing guidance, support and approvals to the SMCGs where needed; and monitoring implementation performance;

► The SMCGs will be responsible for project planning and management at state level, ensuring satisfactory implementation of the state-level investments and Activities; direct implementation of some of the state-level activities; providing guidance, support and approvals to the state EAs where needed; and monitoring implementation performance of the EAs;

► The EAs will plan and implement the activities/investments and put in place arrangements for satisfactory and sustainable operation and maintenance of the assets created. The EAs will be responsible for all contract management, including preparation of feasibility reports and DPRs, and seeking the necessary approvals.

295. The contractor shall be responsible to implement the EMP primarily in assistance with the Project Executing Agency (BUIDCo). The Environmental Engineer/Specialist from the Contractor and Independent Engineer/ Supervision Consultant shall implement and monitor the compliance of the EMP and all the design drawings of various civil structures shall be implemented after his approval. Also to assist to the respective Project managers to ensure social and environmentally sound and safe construction practices.

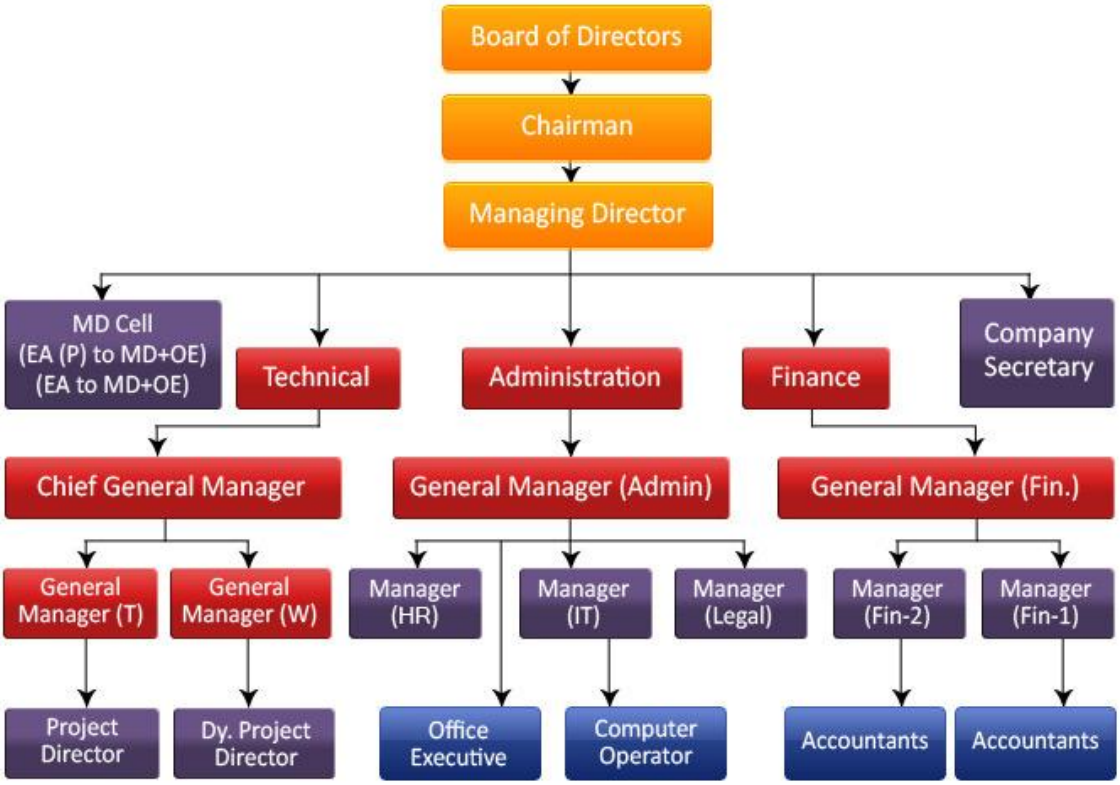
296. The State, local Government will be responsible for Coordination, Monitoring and evaluation of the Environmental Management Plan. It should ensure all the safeguarding plans are in line and acted upon. The Contractor shall report the implementation of the Environment Management Plan to the Environmental Expert and as well as to BUIDCO through monthly reports. Further, a quarterly report is required to be prepared and required to be given to SPMG (State Program Management Group) and National Mission for Clean Ganga (NMCG) for the progress made in implementing the Environment Management Plan.

297. Feedback from the residents can also be taken from time to time to cross check the contractor's report. BUIDCO should make inspection visits at the construction site to check the implementation of Environment Management Plan as per the contract.

9.1.4 Function and Organisation Structure of Executive Agency

298. During ESAMP preparation it was discussed that the Government of Bihar has recently reshuffled the departments and few other agencies have been merged with BUIDCO. According to the discussions with the officials presently BUIDCO is headed by Managing Director under the Secretary, Urban Development & Housing Development Department (UD&HD) supported by Chief Engineer, Superintending Engineer, Executive Engineer, Assistant Engineer. Environmental and Social Management Consultant will support to MD. Environmental and Social Management Consultant is further supported by Social Expert. SMCG is headed by Secretary, UD&HD and supported by Environmental and Social Safeguard specialist. Environmental Safeguard Specialist has been positioned whereas the social safeguard specialist post is vacant.

299. The functioning of the present organisation has been disclosed on the official website of BUIDCO and presented below:



Organisation Chart, BUIDCo, Patna

300. The executing agency is Bihar Urban Infrastructure Development Corporation Ltd. (BUIDCO) represents a Government company constituted by the Government of Bihar under the Companies Act, 1956 on 16th June 2009 and is mandated with the development of various urban infrastructure development schemes in the state. The objective of the company is to provide an efficient infrastructure system in the State. It is headquartered at Patna. The Government of Bihar established **BUIDCO** on the **16th of June, 2009** with a view to accelerating infrastructure development activities across all cities. GOB is a 100% shareholder in **BUIDCO**, which makes it a flagship company to execute infrastructure projects in the State. BUIDCO is mandated to work on assignments pertaining to all departments of the Government of Bihar or any other department, agency, organization or body through the Urban Development Department or directly.

301. The vision of BUIDCO is to become an organization of excellence resembling the revolutionary development of Bihar in such a manner the urban landscape of Bihar can become a role model for the civilization to come. BUIDCO will be the company of preference when any plan of urban infrastructure wants to become a reality. BUIDCO will stimulate the quality of life in urban centres to make them places of joy, comfort and prosperity.

Table 9-1: Generic Environmental Guidelines / Management Plan for Low impact category Investments (Sewerage and Sewerage Treatment at Buxar, Bihar)

Activity		Mitigation Measures	Responsible Agency	Monitoring Agency	Reference
Sewerage and Sanitation Investments **A. Design and Development Stage:**					
Sewerage Network	Accidental leakages/ bursts	Designing sewers with adequate capacity and gravity flow velocity, Regular inspection and maintenance of the sewer lines	Design Consultant/Contractor Executing Agency (EA)	SMCG /NMCG/ BUIDCo	Detailed Project Report (DPR) and The World Bank Group – Environmental, Health and Safety (EHS) Guideline for Water and Sanitation
	Flushing of sewers at necessary locations	Existing Sewer lines constructed in the previous contract must be de-silted between night and morning hours (approx. 11 pm to 5 am) since flow in sewers and on-road traffic will be minimum during that period. Sewer lines must first be dewatered by submersible pumps and then plugged by means of sand bags so as to divert flow of sewer before pumping manhole to manhole. The sewer lines must also be flushed with pressurized air to eject all harmful gases (such as H2S, CO2, CO). If human entry is required in the sewer lines, it is imperative to equip the worker with safety harness, a helmet with torch, gloves, water proof waders, oxygen cylinder with breathing apparatus	Contractor Project Supervision Consultant Executing Agency (EA)	SMCG/NMCG/ BUIDCo	DPR The World Bank Group EHS for Water and Sanitation
Pumping Stations and STP Location	Dewatering process	Pumping station (IPS 1 in ITI ground) is must first be dewatered by submersible pumps and then plugged by means of sand bags so as to divert flow of waste water before initiating the construction activities.	Contractor Project Supervision Consultant Executing Agency (EA)	SMCG/NMCG/ BUIDCo	
	Noise/Odour	Pump station in STP to ensure minimum noise generation; Tree plantation and landscaping along the periphery of the STP site to prevent spread of bad odour; Accumulated sludge and solid waste to be cleared within 24 hours; Spraying of herbicides like Maple and Gtechon accumulated sludge/solid waste to reduce odour D.G sets for Power backup should have appropriate stack height. Fence wall of STP should be of appropriate height to attenuate the noise and odour problem	Contractor Project Supervision Consultant Executing Agency (EA)	SMCG/NMCG/ BUIDCo	DPR Report D.G set Stack Height – CPCB Norms; The World Bank Group General Environmental, Health and Safety Guideline
	STP Breakdown/Failure	A provision of holding of untreated sewage is required to be made so that during the STP breakdown the untreated sewage does not flow to river Ganga	Contractor Project Supervision Consultant Executing Agency (EA)	SMCG/NMCG/ BUIDCo	

Activity		Mitigation Measures	Responsible Agency	Monitoring Agency	Reference
	Sludge disposal	Providing adequate and safe sludge disposal facilities Sludge disposal should be in a scientific manner or sale of sludge as manure	Contractor Project Supervision Consultant Executing Agency (EA)	SMCG/NMCG/ BUIDCo	DPR CPEEHO Manual The world Bank Group EHS guideline for Water and Sanitation.
	Provision for accidental leakages/ bursts	Provide proper drainage arrangements so that the water does not stagnate on the site especially for new STP and IPS building site	Contractor Project Supervision Consultant Executing Agency (EA)	SMCG/NMCG/ BUIDCo	Detailed Project Report (DPR) and The World Bank Group – Environmental, Health and Safety (EHS) Guideline for Water and Sanitation
	Adequate provision for handling co-treatment of Septage in the STP	Care should be taken that the fecal sludge are diluted as per the CPHEEO norms before discharging the fecal sludge into pumping stations or at the screening point of the STP. EA should identify a pumping station which would accept the fecal sludge for final discharge into the STP network for treatment. Each such location should be locality based up on the distance and economic considerations.	Contractor Project Supervision Consultant Executing Agency (EA)	SMCG/NMCG/ BUIDCo	DPR Report The world Bank Group EHS guideline for Water and Sanitation. CPHEEO Manual
	Discharge of Treated Effluent	Ensure efficient working condition. – Choice of treatment process, construction technique, equipment and skilled operation and supervision critical to maintain effluent quality compliance. The treated water quality shall comply with the standards laid down by the state pollution control board for disposal onto the land, water body or for irrigation use.	Contractor Executing Agency (EA)	SMCG/NMCG/ BUIDCo	CPCB Treated effluent, standard.
Labour Camp Arrangements	Occupational Health and Safety provisions	• Appropriate training to be imparted to construction laborers regarding health and safety aspects. Concessionaire/Contractor shall provide the workers with PPEs and they shall be encouraged to consistently use the PPEs. • Properly insulated electrical works shall be provided at respective STP and in construction sites elsewhere • Health facilities like medical checkup camp , first aid facility, hospital and ambulance shall be arranged	Contractor Executing Agency (EA)-BUIDCo	SMCG/NMCG/ BUIDCo	The World Bank Group General EHS Guideline
	Safety Precautions COVID-19	Workers deployment: • A basic Health screening of all new workers shall be carried out before deployment (Risk of serious illness rises with age wise). • Avoid over aged (more than 60 years old) workers deployment in Project area during COVID-19.	Contractor Executing Agency (EA)-BUIDCo	SMCG/NMCG/ BUIDCo	COVID-19 Guidelines (OSHA/GOI/WHO)

Activity		Mitigation Measures	Responsible Agency	Monitoring Agency	Reference
B. Construction Stage:					
Sewerage (laying of sewers), Construction of Pumping Stations and STP	Excavation, cutting, back filling and compaction operations	Review all available drawings, notes, and information on the existing underground lines and structures in determining the location of the existing facilities. Concerned authorities should be informed and their assistance sought to remove, relocate and restore services of these utilities prior to commencement of construction. All these underground utilities encountered in excavating trenches carefully shall be supported, maintained and protected from injury or interruption of service until backfill is complete and settlement has taken place. Minimize time for replacement operations; and appropriate scheduling as necessary especially for water supply line.	Contractor Project Supervision Consultant Executing Agency (EA)	SMCG/NMCG/ BUIDCo	
		Maintaining the excavation by Shoring trench sides by placing sheeting, timber shores, trench jacks, bracing, piles, or other materials to counter the surrounding earth load pressure. Exposed surface will be resurfaced and stabilized by making the sloping sides of trench to the angle of repose at which the soil will remain safely at rest.	Contractor Project Supervision Consultant Executing Agency (EA)	SMCG/NMCG/ BUIDCo	DPR The World Bank Group General EHS Guideline
		Construction activity may increase the dust levels in the air, posing as a respiratory hazard and sensory irritant for local residents and vendors. Dust is generated due to the disturbance of dry top-soil and excavation of roads. It is recommended to minimize dust generated by wetting all unprotected cleared areas and stockpiles with water, especially during dry and windy periods. Additionally, it is recommended to wet and cover excavated material transported by trucks.	Contractor Project Supervision Consultant Executing Agency (EA)	SMCG/NMCG/ BUIDCO	The World Bank Group General EHS Guideline
		Noise is a temporary nuisance caused due to construction activity. It is recommended that construction activities be carried out only during normal working hours after providing prior intimation to local residents and shop keepers. Construction works near schools and colleges should be carried out during vacations and preferably during night and works near hospitals should be completed on priority basis (in shorter time period with alternate provision of traffic, accessibility of exit/entry gates etc.). Wherever possible, the use of less noise generating equipment (such as enclosed generators with mufflers, instruments with built in vibration dampening and improved exhaust) for all activities is recommended to meet standards as per the Noise Pollution Control Committee, CPCB. Construction noise is not only a nuisance for the local community, but can also be a health hazard to construction workers due to prolonged exposure.	Contractor Project Supervision Consultant Executing Agency (EA)-BUIDCo	SMCG/NMCG/ BUIDCo	The World Bank Group General EHS Guideline CPCB Ambient Air Quality Standard with Respect to noise.

Activity		Mitigation Measures	Responsible Agency	Monitoring Agency	Reference
		Provision of protective equipment like ear muffs and plugs for operating personnel is recommended. It is recommended that where feasible, a sound barrier be provided in inhabited areas, particularly at sensitive zones like hospitals, schools etc.			
		Ensure that excavated soil material is stored on the higher lying areas of the site and not in any storm water run-off channels or any other areas where it is likely to cause erosion or where water would naturally accumulate causing flooding. The areas where excavated soil will be stockpiled must be bordered by berms to prevent soil loss caused by rain.	Contractor Project Supervision Consultant Executing Agency (EA)-BUIDCo	SMCG/NMCG/ BUIDCo	
		Due to construction and laying of sewer lines, there will be disruption of traffic, leading to congestion. Hence, alternate traffic routing must be adopted in consultation with concerned traffic police authorities. Traffic disruptions may also have adverse impacts on trade and commerce, hence works at business and market areas must be completed earlier. Care should be taken to minimize congestion (by effective traffic re-routing) especially around entry points of schools and hospitals. Provide temporary crossings/ bridges to maintain normalcy for pedestrians and businesses.	Contractor Project Supervision Consultant Executing Agency (EA)-BUIDCo Traffic Police	SMCG/NMCG/ BUIDCo	DPR Report
		The backfilling material shall be free from petroleum products, slag, cinders, ashes and rubbish, or other material. Backfilling activity should follow the construction schedule, as recommended by the DPR, which estimates that a 1 km stretch of construction work is to be completed in approximately 2.6 days. Proper compaction to be executed as per the soil specific conditions to retain the original level/ alignment and grade as it was prior to excavation.	Contractor Project Supervision Consultant Executing Agency (EA)-BUIDCo	SMCG/NMCG/ BUIDCo	
	Storage of Oil and Hazardous Substance	Store tanks and drums for excess capacity; forbid pouring into soils or drains; enforce adequate equipment maintenance procedures.	Contractor Project Supervision Consultant Executing Agency (EA)-BUIDCo	SMCG/NMCG/ BUIDCo	Consent to Establish general & Specific Condition. CPCB Guideline for Handling Hazardous Chemical and Waste
Air environment	Air Environment due to all construction activities	Sprinkling of water at regular intervals to control dust especially places where soil is stockpiled. Preventive maintenance of construction equipment and vehicles to meet emission standards. Ensuring use of low fume emitting, newer generators and vehicles with well-maintained engines and control devices.	Contractor Project Supervision Consultant Executing Agency (EA)-BUIDCo	SMCG/NMCG/ BUIDCo	Consent to Establish general & Specific Condition. The World Bank Group General EHS Guideline
Noise levels	Noise hazards	Noise attenuation with sound proof insulation for noise generation sources like pumps, generators or using less noise making equipment. Proper maintenance of construction equipment and vehicles to keep them with low noise. Construction activities need to be suspended during the night hours in the	Contractor Project Supervision Consultant Executing Agency (EA)-BUIDCo	SMCG/NMCG/ BUIDCo	The World Bank Group General EHS Guideline Consent to Establish general & Specific Condition.

Activity		Mitigation Measures	Responsible Agency	Monitoring Agency	Reference
		neighborhood of hospitals and in day time in the neighborhood of educational institutions			
Waste Management	Debris during construction	Ensure that no litter, refuse, wastes, rubbish, rubble, debris and builders wastes generated on the premises must be collected in rubbish bins and disposed of weekly at registered refuse facility sites. Toilet facility must be provided at construction site and should be maintained properly. Toilets must be emptied regularly at treatment plants and every effort must be made to prevent the contamination of surface or sub-surface water	Contractor Project Supervision Consultant Executing Agency (EA)-BUIDCo	SMCG/NMCG/ BUIDCo	Comply with Construction & Demolition Waste Management Rules, 2016.
Safety Arrangements	Safety issues during construction	Comply with the Occupational health and Safety act of India and EHS guidelines for water and Sanitation prepared by the World Bank. Ensure that the contact details of the police or security company and ambulance services nearby to the site.	Contractor Project Supervision Consultant Executing Agency (EA)-BUIDCo	SMCG/NMCG/ BUIDCo	The World Bank Group General EHS Guideline
Construction camps (if adopted)	Labour Camp Facilities	Labour camps are not required, if the labours are from the native place. If labourers are not from native place, than following measures must be undertaken: • Labour Management Plan shall be prepared by the Contractor in conformity with the Indian labour laws and shall also include the measures to address COVID-19 issues which shall be implemented by the Contractor after necessary approval of EA/SMCG. • The camp must not be in an environmentally sensitive area such as in close proximity to a watercourse, on a steep slope or on erosive soils. • Camp site will have adequate provision of shelter, water supply, sanitation and solid waste management as far as practicable.	Contractor Project Supervision Consultant Executing Agency (EA)-BUIDCo	SMCG/NMCG/ BUIDCo	The World Bank Group General EHS Guideline
	Safety Precautions-COVID-19	**Construction Activities, meetings and events:** • Always ensure all workplaces are clean and hygienic. • Thermal screening and record is mandatory for all workers/staffs prior to enter to work site & office before entry screening records shall be maintained in daily basis If the temperature recorded more than 37 C, report to SHE / Medical department immediately for further follow up) • Promote regular and thorough hand-washing by all workers • Regular Sanitization shall be carried out in all workplace. • Promote good respiratory hygiene in the Workplace. • Wearing of a face mask is compulsory to all workers during this period of COVID 19. • Always maintain sufficient gap between workers / staff as per	Contractor Project Supervision Consultant Executing Agency (EA)-BUIDCo	SMCG/NMCG/ BUIDCo	COVID-19 Guidelines (OSHA/GOI/WHO)

Activity		Mitigation Measures	Responsible Agency	Monitoring Agency	Reference
		mentioned in the guidelines (Min 1m interval) • All kinds of Social Gathering must be avoided. • There will be strict ban on the use of Gutka', 'Tambaku', 'Paan' etc. at work sites and spitting shall be strictly prohibited as well. • Entire construction site including site office, labour camp, canteens, pathways, toilets, and entry / exit gates must be disinfected on a basis. Housekeeping team should be provided with all necessary equipment/tools. • Avoid large gatherings or meetings • Appropriate signage shall be installed at construction sites, spelling out safety practices in the language which is understood by all • Provide information or a briefing, preferably both rally • and in writing, on COVID-19 and the measures that organizer • s are taking to make this event safe for workers • Display dispensers of alcohol-based hand rub prominently • in the workplace area • If there is space, arrange seats so that workers are at least 1 meter apart • If anyone who starts to feel unwell, follow your preparedness plan **Workers Accommodation:** • Adequate supply of food and water must be ensured • Regular inspection of worker accommodation areas to be carried out • Regular health check-up to all workforce • Rest area should be maintained in good hygienic with regular cleaning and sanitization. • Food should be consumed at designated areas only ensuring social distancing. Common sitting arrangements should be removed. Post lunch, waste should be disposed by individual in designated bins and area should remain clean. **Movement for Construction Activities:** • Consider issuing employees who are about to travel with small bottles of alcohol-based hand rub. This can facilitate regular hand-washing. • Sufficient hand sanitizer must be provided where it is required (work			

Activity		Mitigation Measures	Responsible Agency	Monitoring Agency	Reference
		base / Office base). • All workers details must be collected (Location Wise) for record purpose. • All vehicle need to be sanitized regularly and advise workers/ Staff need to maintain the gaps (1m interval minimum) . • Encourage employees to wash their hands regularly and stay at least 1 m away from people who are coughing or sneezing. • Maintain Social distance inside and outside the vehicle. **Handling with Materials, Machinery, Tools** • At all point of time, easy access to parking should be ensured since public transit is limited. • All vehicles and machinery entering the premise should be disinfected by spray mandatorily. • Non-touch garbage bins with biodegradable garbage bag should be installed for waste collection at all common access areas. Proper disposal of garbage bags along with daily cleaning and sanitization of bins should be ensured. • Wipe down interiors and door handle of machines or construction vehicles, the handles of equipment and tools that are shared, with disinfectant prior to using. • Maintaining the social distance during material shifting			

Activity		Mitigation Measures	Responsible Agency	Monitoring Agency	Reference
C. Operation Stage:					
Sewer lines	Leakage/ overflows	There may be temporary concern of leakages and overflows leading to flooding of adjacent areas in the sewerage network. However this can be mitigated and managed by: Regular monitoring of sewer line and manholes for visible leakages/ overflows. Immediate repair operation for the damaged portion of sewer line. De-siltation of blocked sewers/ manholes with sewage pumping machines-storing and disposal at appropriate refusal area after treatment. Ensure proper covering of manhole and avoid dumping of solid waste to prevent chocking of sewer line	Operator Buxar Nagar Parishad/Municipal Corporation	SMCG/NMCG/ BUIDCo	
	Waste Disposal	The de-silted waste should be collected immediately and disposed into pits excavated at landfill site	Operator Buxar Nagar Parishad/Municipal Corporation	SMCG/NMCG/BUIDCo	DPR and The World Bank Group – Environmental, Health and Safety (EHS) Guideline for Water and Sanitation
Waste Management	Sanitary conditions at construction camps and site	Ensure regular monitoring of provision of water supply, excreta and solid waste management. Waste should be emptied regularly at disposal area until the work is completed. Maintaining proper hygienic environment in and around camps and site by regular surveillance and monitoring of waste	Operator Buxar Nagar Parishad/Municipal Corporation	SMCG/NMCG/ BUIDCo	DPR & The World Bank Group – Environmental, Health and Safety (EHS) Guideline for Water and Sanitation
Safety	Workers exposed to toxic gases in sewers and hazardous materials in sewage during maintenance work	During cleaning/ maintenance operation, the sewer line will be adequately vented to ensure that no toxic or hazardous gases are present in the line Gases present in the sewer line should be analysed for hazardous/toxic gases before commencing cleaning operation. Proper gas masks should be provided to workers deployed in such areas. Provision of adequate safety precautions such as helmets, safety shoes, gloves, dust masks, gumboots, etc. during maintenance operation	Operator Buxar Nagar Parishad/Municipal Corporation	SMCG/NMCG/ BUIDCo	DPR & The World Bank Group – Environmental, Health and Safety (EHS) Guideline for Water and Sanitation
Treatment and Disposal		Monitor the treated sewage/effluent quality and ensure compliance with PCB standards for effluent disposal into surface water bodies, on land or for the agricultural use.	Operator Buxar Nagar Parishad/Municipal Corporation	SMCG/NMCG/ BUIDCo	DPR & CPCB guideline, Consent to Operate General and Specific Condition, The World Bank Group – Environmental, Health and Safety (EHS) Guideline for Water and Sanitation
		Provide buffer zones in the form of green belt around the STP; to be ensured during the design and development phase itself and to be maintained throughout the operation period	Operator Buxar Nagar Parishad/Municipal Corporation	SMCG/NMCG/ BUIDCo	DRP Report
		Prepares a sludge disposal plan and adheres to the same.	Operator	SMCG/NMCG/ BUIDCo	

Activity		Mitigation Measures	Responsible Agency	Monitoring Agency	Reference
			Buxar Nagar Parishad/Municipal Corporation		
		Ensure safe operation and maintenance practices are followed and plans for emergencies are in place	Operator Buxar Nagar Parishad/Municipal Corporation	SMCG/NMCG/BUIDCo	The World Bank Group General EHS Guideline
	Safety Precautions-COVID-19	**Operation Activities, meetings and events:** • Always ensure all workplaces are clean and hygienic. • Thermal screening and record is mandatory for all workers/staffs prior to enter to work site & office before entry (Screening records shall be maintained in daily basis If the temperature recorded more than 37 C, report to SHE / Medical department immediately for further follow up) • Promote regular and thorough hand-washing by all workers • Regular Sanitization shall be carried out in all workplace. • Promote good respiratory hygiene in the Workplace. • Wearing of a face mask is compulsory to all workers during this period of COVID 19. • Always maintain sufficient gap between workers / staff as per mentioned in the guidelines (Min 1m interval) All kinds of Social Gathering must be avoided. • There will be strict ban on the use of Gutka', 'Tambaku, 'Paan' etc. at work sites and spitting shall be strictly prohibited as well. • Entire construction site including site office, labour camp, canteens, pathways, toilets, and entry / exit gates must be disinfected on a basis. Housekeeping team should be provided with all necessary equipment/tools. • Avoid large gatherings or meetings • Appropriate signage shall be installed at construction sites, spelling out safety practices in the language which is understood by all • Provide information or a briefing, preferably both rally • and in writing, on COVID-19 and the measures that organizers are taking to make this event safe for workers • Display dispensers of alcohol-based hand rub prominently in the workplace area	Contractor Project Supervision Consultant Executing Agency (EA)-BUIDCo	SMCG/NMCG/ BUIDCo	COVID-19 Guidelines (OSHA/GOI/WHO)

Activity		Mitigation Measures	Responsible Agency	Monitoring Agency	Reference
		• If there is space, arrange seats so that workers are at least 1 meter apart • If anyone who starts to feel unwell, follow your preparedness plan **Handling with Materials, Machinery, Tools** • At all point of time, easy access to parking should be ensured since public transit is limited. • All vehicles and machinery entering the premise should be disinfected by spray mandatorily. • Non-touch garbage bins with biodegradable garbage bag should be installed for waste collection at all common access areas. Proper disposal of garbage bags along with daily cleaning and sanitization of bins should be ensured. • Wipe down interiors and door handle of machines or construction vehicles, the handles of equipment and tools that are shared, with disinfectant prior to using. • Maintaining the social distance during material shifting			

9.1.5 Environmental Monitoring Plan

302. The Environmental Monitoring Programme has been detailed out in Table 9-2. Monitoring locations for environmental components such as air, noise, water, Soil and sludge are presented in Figure 9.1. Successful implementation of the Environmental Monitoring Program is contingent on the following:

- The Project Supervision Consultant along with EA to request the Contractor to commence all the initial tests for monitoring (i.e. for Air, Water Quality and Noise Levels) early in the Contract to establish 'base' readings (i.e. to assess the existing conditions prior to effects from the Construction activities being felt);
- Contractor to submit for approval a proposed schedule of subsequent periodic tests to be carried out;
- Monitoring by the Environmental Officers of Supervision Consultant of all the environmental monitoring tests, and subsequent analysis of results;
- Where indicated by testing results, and any other relevant on-site conditions, PSC to instruct the Concessionaire / Contractor to:
- Modify the testing schedule (dates, frequency);
- Modify (add to or delete) testing locations;
- Verify testing results with additional testing as/if required;
- Require recalibration of equipment, etc., as necessary; and,
- Request the Contractor to stop, modify or defer specific construction equipment, processes, etc., as necessary, that are deemed to have contributed significantly to monitoring readings in excess of permissible environmental "safe" levels.

Monitoring of Contractor's Facilities, Plant and Equipment

- All issues related to negative environmental impacts of the Contractor's Facilities, Plant and equipment are to be controlled through;
- The Contractor's self-imposed quality assurance plan;
- Regular / periodic inspection of the Concessionaire / Contractor’s plant and equipment;
- Monthly appraisal of the Contractor.

303. Other environmental impacts are to be regularly identified and noted on the monthly appraisal inspection made to review all aspects of the Contractor's operation. The officer is to review all monthly appraisal reports, and through the team leader is to instruct the Contractor to rectify all significant negative environmental impacts.

Table 9-2: Environmental Monitoring Plan

Environmental Component	Stage	Parameters	Locations	Total No. of Samples	Frequency	Standards /Methods	Implementation Agency
Air quality	Construction	PM10 µg /m3, PM2.5 µg/m3, SO2, NOX, CO	Pumping Sites IPS/SPS/STP	Eighteen Samples	Once in every season (except monsoon)	National Ambient Air Quality Standards, CPCB	Contractor though approved monitoring agency/Lab (NABL/ MoEF&CC accredit Laboratory) under the approval of the supervision consultant
	Operation			Thirty Samples	Twice in every year (except monsoon) for first 5 years		
Noise levels	Construction	Leq dB (A) (Day and Night) Average and Peak values	Pumping Sites IPS/SPS and at STP Location	Eighteen Samples	Once in every season (except monsoon)	National Ambient Air Quality Standards with respect to Noise Standards, CPCB	Contractor though approved monitoring agency/Lab (NABL/ MOEF&CC accredit Laboratory) under the approval of the supervision consultant
	Operation			Thirty Samples	Twice in every year (except monsoon) for first 5 years		
Water Quality (Surface and Ground water)	Construction	Ground Water Parameter as per IS:10500 (2012) and surface water parameters as per CPCB guideline for discharge of treated effluents in Inland water bodies	Ground Water at STP location and from one sample from nearby settlements	Twenty Four Samples	Once in every season (except monsoon)	As per CPCB Standards for treated effluent discharge and IS:10500 (2012) for ground water	Contractor though approved monitoring agency/Lab (NABL/ MoEF&CC accredit Laboratory) under the approval of the supervision consultant
	Operation			Forty Samples	Twice in every year (Pre and post monsoon) for first 5 years		
Soil	Construction	Physical Parameter: Texture, Grain Size, Gravel, Sand, Silt, Clay; Chemical Parameter: pH, Conductivity, Calcium, Magnesium, Sodium, Nitrogen, Absorption Ratio	STP Site and at Sludge dumping site	Twelve Samples	Once in every season (except monsoon)	Soil test method by Ministry of Agriculture	Contractor though approved monitoring agency/Lab (NABL and MoEF&CC accredit Laboratory) under the approval of the supervision consultant
	Operation			Twenty Samples	Twice in a year (except monsoon) for first 5 years		

Environmental Component	Stage	Parameters	Locations	Total No. of Samples	Frequency	Standards /Methods	Implementation Agency
Sludge	Operation Phase	Heavy metals, Toxic Metals and Biological Parameters as per the parameters for Testing of STP Soil	Sludge Disposal Site	Thirty Samples	Six monthly for 15 Years (Operation Phase)	STP Soil testing procedure	Contractor though approved monitoring agency/Lab (NABL and MoEF&CC accredit Laboratory) under the approval of the supervision consultant

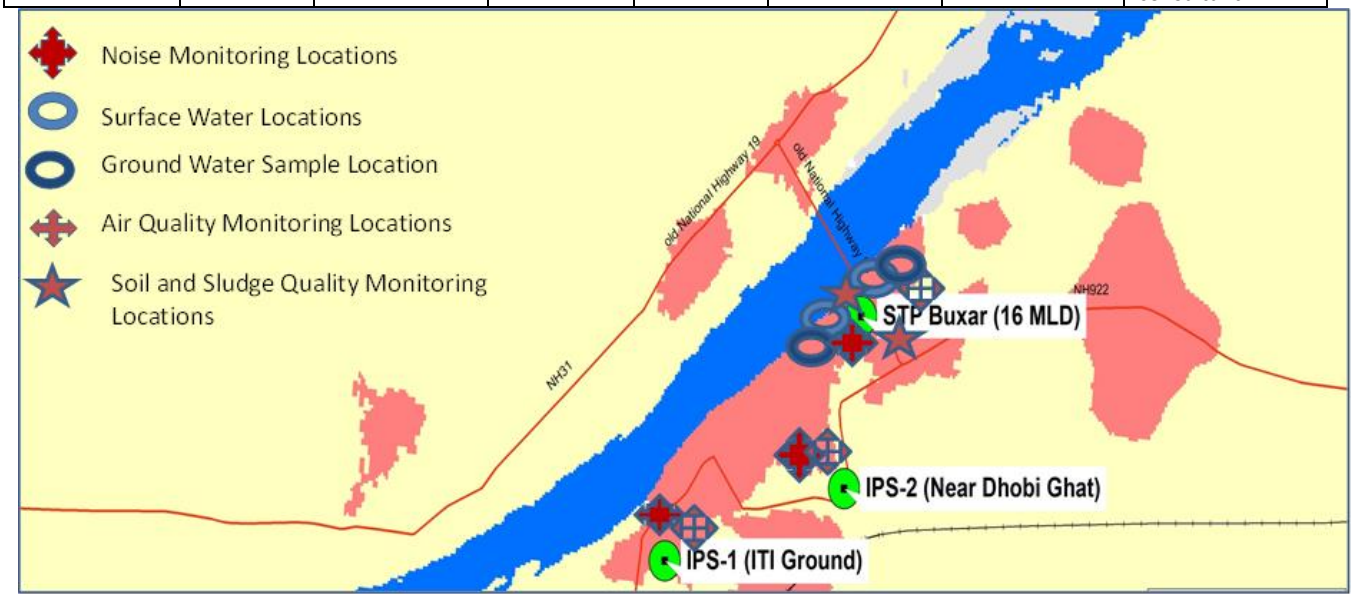


Figure 9.1: Environmental Monitoring Locations at the project area, Buxar

Environmental and Social budget

304. The cost of environmental budget for the various environmental management measures proposed in the EMP and the cost of the Environmental Monitoring is given in Table 9-3 and 9-4. There are several other environmental issues that have been addressed as part of good engineering practices, the costs for which have been accounted in the Engineering Cost. Various environmental aspects covered/will be covered under engineering costs are listed below:

- Proper drainage arrangements to prevent water stagnation/ flooding in IPS/SPS sites
- Appropriate siting, and enclosing within building to reduce noise and odour nuisance to surrounding area
- Alternate traffic re-routing,
- Ensuring storage of excavated soil material on the higher lying areas
- Flushing and desilting of sewers at necessary locations
- Excavation, cutting and filling operations
- Safety hazards to workers and residents

Table 9-3: Cost of Environmental Management

Stage	Environmental Components	Mitigation Measures	Cost included in the DPR (Yes/No/Not clear)	Cost (INR)	Remarks
Design and Development Stage	De-watering process	Water logged areas at pumping stations. Pumping stations are must first be dewatered by submersible pumps and then plugged by means of sand bags so as to divert flow of waste water before initiating the construction activities.	Yes (not specified but included as a part of associated construction activities)	Nil	Included in DPR for Sewerage System in Buxar
	Provision for leakages /bursts in STP/IPS	Proper drainage arrangements to prevent water stagnation/flooding in IPS sites and STP area	Yes (not specified but included as a part of associated construction activities)	Nil	
	Location of IPS/STP	Appropriate siting and enclosing with in building to reduce noise and odour nuisance to surrounding area	Yes	Nil	The proposed STP and IPS locations will be enclosed with proper boundary wall to reduce noise and odour.
Construction	Excavation, cutting and filling activities	Review of existing infrastructure, shoring trenches, reinstatement/resurfacing	Yes	Nil	The DPR includes these activities
	Damage to Public Utilities	Proper reviewing of existing drawing s of utilities, informing concern authorities and reinstatement of public utilities	Yes	Nil	The DPR includes these activities

Stage	Environmental Components	Mitigation Measures	Cost included in the DPR (Yes/No/Not clear)	Cost (INR)	Remarks
	Dust generation	Water sprinkling on excavated material to suppress dust and provision of top cover when transported through vehicles	No	2,99,790.00	Dust Suppression Measures (water sprinkling for remaining 66 km for 2 years and each kilometer cost of Rs. 2.25/km (including tanker cost of 600 and labour charge of 300) Per day, as estimated 400 m will be covered in a day with 4000 L water will be consumed every 400m using sprinkler, average 2 times a day. Labour cost = Rs. 300/day & Rs 600/tanker + Rs. 300 /labourer = Rs. 900 Per meter cost = Rs.900/400m = Rs. 2.25; Remaining sewer network is 66.620km; Total cost for 66620m *Rs.2.25 = 149895 Rs. 149895 Keeping a 2 times a day margin for construction and re-instatement per site: =2*149895=Rs. 2,99,790.00
	Noise and Vibrations	Use of sound barriers or sheets	No	1,72, 500.00	One side barricading: No. of sheet required (400 mtr/3 mtr) * 2 = 29.3, say 30 nos. So total number required 30. Cost of sheeting 30*1075=Rs 32,250/- (plain GI sheet cost Rs 1075 per sheet). Two sets barricading require 2*32,250/- =Rs 64500/-. Labour required for this work 6 nos @ 300/- = Rs 1800/- per day. Cost of labour = 1800*60= Rs 1,08,000/-. Total Cost = Rs 1,08,000/- + Rs 64,500= 1,72,500
	Safety Hazards to workers and residents	PPE for workers included in the DPR, however, placing of fencing/barricades at the excavated locations to demarcate the area.	No	92, 000.00	Cost of Fence /wire 100 kgs @Rs 800 per Kg = Rs 80,000/- . Labour required for this work 4 nos @ 300/- = Rs 1200/- per day=12000 (for 10 days) Total cost = Rs 92000
	Health hazards and nuisance due to absence of facility for sanitation or solid waste management and water supply	Creation of Sanitation and water supply at construction camp	No	10, 00, 000.00	Lump sum cost.

Stage	Environmental Components	Mitigation Measures	Cost included in the DPR (Yes/No/Not clear)	Cost (INR)	Remarks
	Fly nuisance at STP	Applications of Insecticides	No	1,00,000.00	Lump sum cost
	Tree planation/land scape at STP and IPS	Reduction of noise and odoour	No	5, 00,000.00	Lump sum cost
	Dust Control measures at STP Locations.	Installation of Shade Cloths downwind at the STP fence to prevent dust reaching the surrounding settlements	No	2,00,000.00	Lump sum Cost of shade cloth 130 Rs/m^2 for 3 meters height and 120 meters length. With 4 time replacement in two years.
	Training/ Awareness generation along with IEC material	Undertake to develop communication strategy, capacity building and training initiatives for all stakeholders such as the SPMGs, EAs, ULBs, NGOs and common citizens	No	20, 00,000.00	Public consultation at each wards (two in all 34 wards)=34*2*12,000=8,16,0,00/- Technical Staff (5) for 34 ward, two times at 2,000=6,80,000/- and Printing of IEC material, banners and posters, dissemination and disclosure at all 34 wards (lump sum=5,04,000/-)

Total Cost for Environmental Management: 43, 64,290.00

Table 9-4: Environmental Monitoring Costs

Item	Location	Season	Year	Total no. of samples	Unit cost (INR)	Total cost (INR)
Environmental Monitoring during Construction Stage						
Air Quality Monitoring	3	3	2	18	7000	126000
Noise/Vibration	3	3	2	18	2500	45000
Water Sample (Surface Water)	2	3	2	12	6000	72000
Water Sample (Ground Water)	2	3	2	12	7000	84000
Soil	2	3	2	12	5000	60000
Travel and Transportation of Monitoring team (Lump sum cost)						200000
Sub-Total:						**587000**
Environmental Monitoring during Operation Stage						
Air Quality Monitoring	3	2	5	30	7000	210000
Noise/Vibration	3	2	5	30	2500	75000
Water Sample (Surface Water)	2	2	5	20	6000	120000
Water Sample (Ground Water)	2	2	5	20	7000	140000
Soil	2	2	5	20	5000	100000
Sludge	1	2	15	30	6500	195000
Travel and Transportation of Monitoring team (Lump sum Amount)						300000
Sub-Total:						**1140000**
Total for Environmental Monitoring						**17,27,000**
Total cost for Environmental Management and Monitoring cost						**60,91,290.00**

9.1.6 IMPLEMENTATION ARRANGEMENTS

305. The implementation schedule, responsibilities and respective time frame is tabulated below:

Table 9-5: Implementation Schedule and Associated Responsibilities

Sl. No.	Action	Responsibility	Timeframe
ENVIRONMENT SAFEGUARD			
1	Prepare EMP & incorporate suitable conditions in Contract to prepare and implement ESMP by the Contractor.	EA / SMCG	Site specific EMP shall be prepared by Contractor before execution of the project.
2	Obtain 'Consent' from State Pollution control Board for establishment and operation of STPs.	Contractor/SPCB	Immediate and ensure that the works shall be initiated after receiving the Consents.
DETAILED ENVIRONMENTAL MANAGEMENT PLAN			
3	Preparation of detailed EMP (as per the Contract) and obtain the approval of the NMCG / Word Bank.	Contractor	Within 3 months of the commencement of Contract.
SOCIAL SAFEGUARDS			
4	Hiring of NGO/CBO for information dissemination	EA / SMCG	Immediate/ Prior to disbursement of retroactive claim under the project, if required.
5	Prepare IEC material	EA / SMCG/NGO	One Month after Action No. 4.
6	Establish GRC	EA / SMCG	Immediate
7	Designate Grievance Officer	EA / SMCG/ Contractor	Immediate
8	Information dissemination	EA/ SMCG/ NGO/Contractor	Continuous after Action No. 5.
9	In- Country disclosure of this ESAMP	EA / SMCG / NMCG	Immediate (Prior to initiation of Bidding process)

306. The Bihar Urban Infrastructure Development Corporation Ltd (BUIDCo) and State Program Management Group (SPMG-Bihar) in an extended arm of National Mission for Clean Ganga (NMCG) for the state of Bihar and implementing and monitoring the Namami Gange under NGRBA projects through various executing agencies. At the State level, it is implementing arm of State Ganga Committee

constituted vide S.O. 3187 E dated 07th October 2016 under Environment protection act 1986. The Bihar Urban Infrastructure Development Corporation Ltd, Patna which is headed by the Chief Engineer and assisted by the Superintending Engineer/Project Manager, Patna and Executive Engineer with assistance from Assistant Executive Engineer/Junior Engineer and Contractor / Supervision Consultant is the responsible entity for ensuring the implementation of mitigation measures as suggested in the EMP/SMP in the ESAMP Report.

10 CONCLUSION

307. The study of the environmental and social impact assessment for the proposed sub-project for sewerage network systems in Buxar city concludes that the overall project impact falls in the 'low impact category' and will have positive benefits to the people of the Buxar city on their life and the environment. The proposed sewerage project mainly involves laying of sewers along the road and construction of new Pumping Stations and a treatment plant, which requires no land acquisition not resulting in loss of income or livelihood, relocation of households. As per environmental and social management framework guidelines of NGRBA, Environmental and Social Assessment, with a Generic Safeguard Management Plan was conducted for addressing possible issues/ concerns arising from the proposed project.

308. Impacts of activities identified during the assessment fell under two separate categories of Construction and Operation. Although no such permanently negative or adverse environmental or social impacts were identified, there were certain temporary impacts, for which appropriate mitigation plans have been suggested. The environmental management plan brings forth appropriate mitigation measures against the issues/ concerns identified during environmental and social analysis. All the social and environmental issues were appropriately studied and have been substantiated using appropriate pieces of evidence, to ascertain the magnitude of their impacts. Even the issues of public grievances and public notice have been taken care in the report to confirm transparency during the project implementation. The report also ensures that well defined institutional mechanism is in place to monitor and evaluate the progress of the project during construction, implementation and operation phases.

309. Stakeholder consultations and interviews helped in understanding the general perception of the public towards the project and it can be determined that the people of the project site are happy and welcome such an initiative for their betterment. It was pointed out during the consultation that the large overall environmental benefits of the project such as prevention of a discharge of untreated sewage into River Ganga and improvement in sewerage collection. It was also mentioned by the public that the improvement in the quality of life, human dignity and increased productivity greatly outweigh the temporary inconveniences faced during the implementation stages.

Annexures

ANNEXURE 1: ENVIRONMENTAL AND SOCIAL SCREENING CHECKLIST

Project Title : **Sewerage and Sewerage Treatment at Buxar for Pollution Abatement of River Ganga in Bihar**

Implementing Agency : **Bihar BUIDCO, Patna**

Project Cost : **164.2368 Crore**

Project Components : **Intermediate Pumping Stations (IPS) 2 Nos.**

: **Construction of new Sewage Treatment Plant (STP) of capacity 16 MLD.**

- **Operation & maintenance (O&M) for 15 years.**
- **Installation of trash arresting rack and its regular O&M at the mouth of all drains.**
- **Adequate provision for handling septage in the STP.**

Project Location (Area / District) : Buxar

Sl. No.	Screening Criteria	Applicability (Yes/No)	Assessment of Category (High/ low)	Remarks / Explanatory note for categorisation
1	Is the project in an eco-sensitive area or adjoining an eco-sensitive area? (Yes/No) If Yes, which is the area? Elaborate impact accordingly.	No	No impact	The various components of the proposed project at Buxar is not located nearby any eco-sensitive area and there is no such area within 10 Km. radius.
2	Will the project create significant/ limited/ no social impacts?	No	No Social Impact	STP and 2 IPS locations are planned in the available Government land. The land is acquired in the previous contract at Sarimpur town for STP. For 2 IPS locations for the government land in Buxar NOC has obtained. Hence, no social impacts are envisaged.
	Involuntary land taking resulting in loss of income from agricultural land, plantation or other existing land-use.	No	No Impact	
	Involuntary land taking resulting in relocation of title holder or non-titleholder households.	No	No Impact	
	Any reduction of access to traditional and river dependent communities (to river and areas where they earn for their primary or substantial livelihood).	No	No Impact	No displacement of river dependent communities is envisaged.
	Any displacement or adverse impact on tribal settlement(s).	No	No Impact	Not envisaged any displacement or adverse impact on tribal settlement(s).
	Any specific gender issues.	No	No Impact	No gender specific issue directly related to the project is envisaged. However, better sanitation facility will improve health status of women in the area. Women labourer will also get an employment during construction.
3	Will the project create significant / limited / no environmental impacts during the construction stage? (significant / limited / no impacts)	Yes	Low and short term Impact during construction stage	The STP is proposed to be constructed in open and surrounded by habitation land at the STP site. Therefore, there will be only short term / limited environmental impact.
				The proposed lifting stations will be constructed in govt. land, which are open areas. Therefore, it will minimise the impact.
				The proposed sewer line will be under the road with minimum 3m or more road width.
	Clearance of vegetation / tree-cover	No	No impact	No tree cutting is required.
	Direct discharge of construction run-off, improper storage and disposal of excavation spoils, wastes and other		Low and short term impact	The STP is proposed to be developed on existing works which are initiated in the previous contract and will have construction specific impact during civil

Sl. No.	Screening Criteria	Applicability (Yes/No)	Assessment of Category (High/ low)	Remarks / Explanatory note for categorisation
	construction materials adversely affecting water quality and flow regimes.	Yes	during construction activities	construction activity. With due care and management direct discharge, improper storage of wastes shall be taken care of.
				The laying of sewer lines will cause some traffic disruption of temporary nature. Sensitive locations like schools, hospitals will have special problems which will be taken care of during construction.
	Flooding of adjacent areas	Yes	Low Impact	Construction of project will not obstruct any of natural drain /channel near the site. One IPS located near nala (Dhobi ghat), however, the level of STPs and SPS will be made with due care of high flood level record. Dewatering for construction will not generate any significant amount of water to flood adjacent areas.
				Proposed STP and IPS will have garland drain to avoid further flooding in premises and neighbourhood area in case of storm water during monsoon.
	Improper storage and handling of substances leading to contamination of soil and water	Yes	Low and short term impact during construction activities	Civil Construction material like cement, sand, earth etc. will be prevalent in use, while contaminated material such fuel, used oil shall be taken care of properly for storage and handling properly at site. Further the EMP shall be framed with inclusion of site specific environmental issues to address the safety health related issues·
	Elevated noise and dust emission	Yes	Low and short term impact during construction activities	Proper measure will be taken during sewer laying to minimise the noise and dust emissions. Contractor should ensure the proper acoustic measure for noise generating unit like DG set as per CPCB norm, etc.
				The Contractor/Concessionaire has to submit the method statement to comply with Air Act, 1981 and Noise Rules as per EP Act, 1986 before construction.
	Disruption to traffic movements	Yes	Low and short term Impact during construction activities	Proper diversion of traffic will ensure less disruption during construction. Concessionaire shall ensure the proper traffic management in place prior to construction activities.
	Damage to existing infrastructure, public utilities, amenities, etc.	Yes	Low and short term Impact during construction activities	Utility mapping of the existing infrastructure and relocation of the same if required will minimise the damage on existing infrastructure. Sewer lines shall be laid on the centre of the road. Shifting of other utilities like telephone lines, electric poles or street lights are not envisaged, however, if required shall be shifted temporarily or relocated (only if needed) after taking due permission from the concerned department.
	Failure to restore temporary construction sites	Yes	Low and short term Impact during construction activities	The roads will be reinstated to its original conditions after laying of sewer line. Mitigation measures towards restoration of temporary construction sites will be part of EMP of Concessionaire's bid document.
	Possible conflicts with and/or disruption to local community	No	No impact	The local community will be made aware of the temporary nature of disruption. All possible disputes during construction work shall be

Sl. No.	Screening Criteria	Applicability (Yes/No)	Assessment of Category (High/ low)	Remarks / Explanatory note for categorisation
				avoided by hiring of local labour as much as possible. In case of migrant labour hiring, the fundamental facility in labour camp shall be ensured by Concessionaire/Contractor to avoid further disputes.
	Health risks due to unhygienic conditions at workers camps	Yes	Low Impact	Adequate sanitation facilities and safety arrangement will be provided to the workers to tackle on-site hazards in construction camp. A site specific EMP shall be having Health and hygiene maintenance plan for project construction site, which will be part of BID document for its completed implementation at sites.
	Safety hazards during construction	Yes	Low and short term Impact during construction activities	Proper health and safety statement will be submitted by the Concessionaire and approved by The Engineer prior to the construction. This will be included in EMP and be part of Bid document.
4	Will the project create significant / limited / no environmental impacts during the operational stage? (Significant / limited / no impacts)	Yes	Low Impact during operation stage	STP will have minimal odour and noise pollution. Moreover, provision of green belt, landscaping within the STP premised will reduce the negative impact of odour. The proposed projects of establishment of STP are based on advance technologies of sewerage wastewater treatment plan.
	Flooding of adjacent areas	Yes	Low Impact	Proposed STP and MPS will have garland drain to avoid further flooding in premises and neighbourhood area in case of storm water during monsoon.
	Impacts to water quality due to effluent discharge	Yes	Low Impact	The characteristics of the treated wastewater from SBR reactor will be within limit set by latest NGT /CPCB guideline 2019.
	Gas emissions	Yes	Low Impact	The best available technologies (BAT) of sewerage waste water treatment plan viz. SBR or other Aerobic reactor is a compact system and the possibility of the gas emission is very less.
	Safety hazards	Yes	Low Impact during construction and operation stage	Mechanised system and trained people will be deployed to run the Pumping Stations and STP will reduce the risk of safety hazards. Proper PPEs shall be ensured by the Concessionaire for Concessionaire and Staff of STP/ MPS. First Aid Measures shall be adhered as part of safety management. Emergency Site management plan shall be adhered to the deputed STP area to avoid unsafe hazard like fire, electricity etc.
5	Do projects of this nature / type require prior environmental clearance either from the MOEF&CC or from a relevant state Government department? (MOEF&CC/relevant State Government department/ No clearance at all)	No	No clearance required	The project is not an environmental sensitive project and does not require clearance as per Environmental Impact Assessment Notification 14th September' 2006. However, the proposed project needs Consent to Establish (CTE) prior to start of construction of STP and Consent to Operate (CTO) prior to start operation of STP. These permissions are required from State Pollution Control Board (SPCB), Bihar under Air and Water Act.
6	Does the project involve any prior clearance from the MOEF&CC or State Forest department for either the	No	No clearance required	

Sl. No.	Screening Criteria	Applicability (Yes/No)	Assessment of Category (High/ low)	Remarks / Explanatory note for categorisation
	conversion of forest land or for tree-cutting? (Yes/ No). If yes, which?			
Overall Assessment			Low	• The proposed project activities are located neither in any eco-sensitive area nor in any adjoining eco-sensitive zone. • The project does not involve any private land acquisition and loss of income/livelihood. • It does not envisage any resettlement. The anticipated environmental and social impacts associated with the proposed project activities are temporary and limited during the construction stage, can be mitigated with the adoption of suitable mitigation/safeguard measures.

Further, the project can be referred for the overall rating and assessment is **low Category** due to the not applicability of the following criteria:

- The project location is not located nearby by any eco-sensitive zone or in any adjoining eco-sensitive zone and there is no such area within 10 km.
- The project is an augmentation of already initiated the Sewerage system through the previous contract (60% of civil works completed at STP and 30 % works done at IPS at ITI ground) which is not located within the notified Forest area and no forest clearance is required. No tree cutting is envisaged. The sewer lines and manholes will be constructed at the center of the road.
- Buxar city is not under the list of Critically Polluted Areas (Based on CEPI index assessed in 2011 by CPCB).
- The project is not an environmental sensitive project and does not require clearance as per Environmental Impact Assessment Notification 14th September' 2006 and further amendments.
- Geographically, the city is lies in middle Gangetic plain and situated in the western most region of Bihar State, therefore it is not covered under Coastal Regulation Zone.
- The proposed STP site is not located within regulatory zone of ASI structure (300 m).
- The project STP site involves no private land acquisition and any resettlement/displacement and loss of livelihood.

ANNEXURE 2: NOCS FOR THE LANDS IDENTIFIED FOR STP AND TWO IPS LOCATIONS

Copy of STP Received by the BUIDCo on Land Clearance

बिहार शहरी आधारभूत संरचना विकास निगम लि०
Bihar Urban Infrastructure Development Corporation Ltd.
303, मौर्या टावर / Maurya Tower, बुद्ध मार्ग / Buddh Marg, पटना / Patna- 800 001
दूरभाष / Phone : +91-612-2210101, फैक्स नं० / Fax No. : +91-612-2210103
E-mail : contact@buidco.in, web : http://buidco.in

BUIDCo
Building Better Tomorrow
ISO 9001:2008, 14001:2004

पत्र सं०/No.:

दिनांक/Date : 19/5/2014

Letter No:-BUIDCo/Yo-18/10(Part-3)/SIU-2/134

To,

Sri Raj Kumar Saini
General Manager (Project)
Tri –Tech (Beijing Company Ltd.)
Plot No.-293, Keshar Singh Estate.
Westend Marg,Saidula Jab,
New Delhi-110030,India.

Reg:- No:-BUIDCo/Legal /HC/SA/101/2013/1495

Sub :- Buxar STP and Sewerage Project "Regarding Buxar STP Land"

Sir,

This is to inform you that the land perposed for STP has got clearance from the Honorable High Court Patna. A copy of the verdict from the Court has been enclosed for your kind persual .

2. You are instructed to take necessary actions please.

Thanks and Regards.

sd/-
Project Director
(SIU-2) BUIDCo.Patna

Memo no.- 134 Date- 19/5/2014

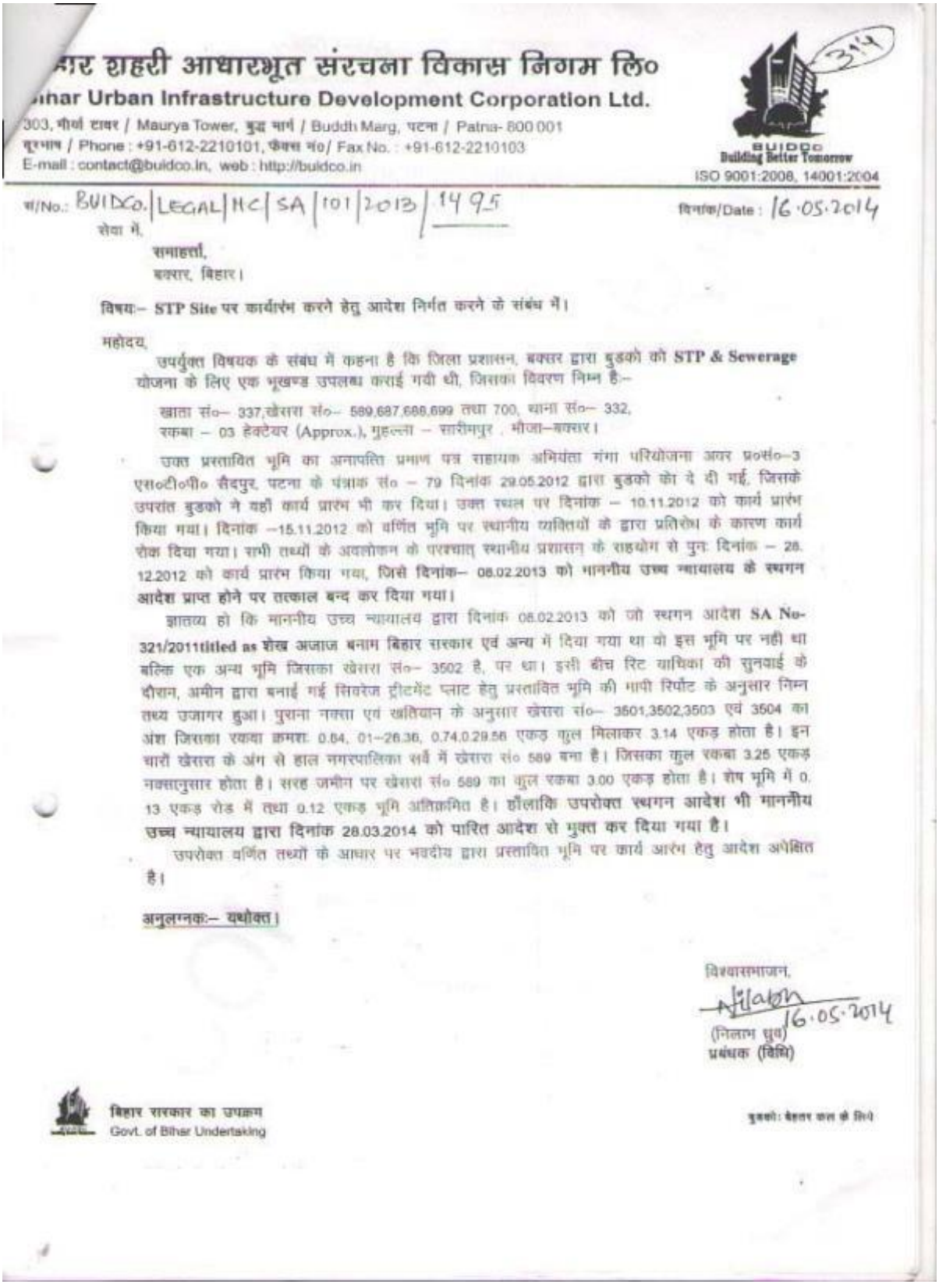
Copy to-

1. General Manager (Work),BUIDCo,Patna for your kind information please.
2. The Projec Manager ,M/s SHAH Technical Consultants Pvt.Ltd.,C/o Ramanuj Pandey,Shanti Communication,Nai Bazar (Near BDO, Block Office), Buxar -802101 for information and necessary action.

19/5/14
Project Director

Recieved by- (1) Copy
Rajesh Kushawaha
20/5/2014

बिहार सरकार का उपक्रम
Govt. of Bihar Undertaking



बक्सर शहरी आधारभूत संरचना विकास निगम लि०
Bihar Urban Infrastructure Development Corporation Ltd.
303, मौर्य टावर / Maurya Tower, बुद्ध मार्ग / Buddh Marg, पटना / Patna- 800 001
दूरभाष / Phone : +91-612-2210101, फैक्स नं० / Fax No. : +91-612-2210103
E-mail : contact@buidco.in, web : http://buidco.in

BUIDCo
Building Better Tomorrow
ISO 9001:2008, 14001:2004

पत्र/No.: BUIDCo./LEGAL/NC/SA/101/2013/1495 दिनांक/Date : 16.05.2014

सेवा में,

समाहर्ता,
बक्सर, बिहार।

विषयः– STP Site पर कार्यारंभ करने हेतु आदेश निर्गत करने के संबंध में।

महोदय,

उपर्युक्त विषयक के संबंध में कहना है कि जिला प्रशासन, बक्सर द्वारा बुडको को STP & Sewerage योजना के लिए एक भूखण्ड उपलब्ध कराई गयी थी, जिसका विवरण निम्न है:–

खाता सं०– 337,खेसरा सं०– 589,687,688,699 तथा 700, थाना सं०– 332,
रकबा – 03 हेक्टेयर (Approx.), मुहल्ला – सारीमपुर , मौजा–बक्सर।

उक्त प्रस्तावित भूमि का अनापत्ति प्रमाण पत्र सहायक अभियंता गंगा परियोजना अवर प्र०सं०–3 एस०टी०पी० सैदपुर, पटना के पंत्राक सं० – 79 दिनांक 29.05.2012 द्वारा बुडको को दे दी गई, जिसके उपरांत बुडको ने वहाँ कार्य प्रारंभ भी कर दिया। उक्त स्थल पर दिनांक – 10.11.2012 को कार्य प्रारंभ किया गया। दिनांक –15.11.2012 को वर्णित भूमि पर स्थानीय व्यक्तियों के द्वारा प्रतिरोध के कारण कार्य रोक दिया गया। सभी तथ्यों के अवलोकन के पश्चात् स्थानीय प्रशासन के सहयोग से पुनः दिनांक – 28.12.2012 को कार्य प्रारंभ किया गया, जिसे दिनांक– 08.02.2013 को माननीय उच्च न्यायालय के स्थगन आदेश प्राप्त होने पर तत्काल बन्द कर दिया गया।

ज्ञातव्य हो कि माननीय उच्च न्यायालय द्वारा दिनांक 08.02.2013 को जो स्थगन आदेश SA No-321/2011titled as शेख अजाज बनाम बिहार सरकार एवं अन्य में दिया गया था वो इस भूमि पर नहीं था बल्कि एक अन्य भूमि जिसका खेसरा सं०– 3502 है, पर था। इसी बीच रिट याचिका की सुनवाई के दौरान, अमीन द्वारा बनाई गई सिवरेज ट्रीटमेंट प्लांट हेतु प्रस्तावित भूमि की मापी रिपोर्ट के अनुसार निम्न तथ्य उजागर हुआ। पुराना नक्सा एवं खतियान के अनुसार खेसरा सं०– 3501,3502,3503 एवं 3504 का अंश जिसका रकबा क्रमशः 0.84, 01–26.36, 0.74.0.29.56 एकड़ कुल मिलाकर 3.14 एकड़ होता है। इन चारों खेसरा के अंग से हाल नगरपालिका सर्वे में खेसरा सं० 589 बना है। जिसका कुल रकबा 3.25 एकड़ नक्सानुसार होता है। सरह जमीन पर खेसरा सं० 589 का कुल रकबा 3.00 एकड़ होता है। शेष भूमि में 0.13 एकड़ रोड में तथा 0.12 एकड़ भूमि अतिक्रमित है। हाँलाकि उपरोक्त स्थगन आदेश भी माननीय उच्च न्यायालय द्वारा दिनांक 28.03.2014 को पारित आदेश से मुक्त कर दिया गया है।

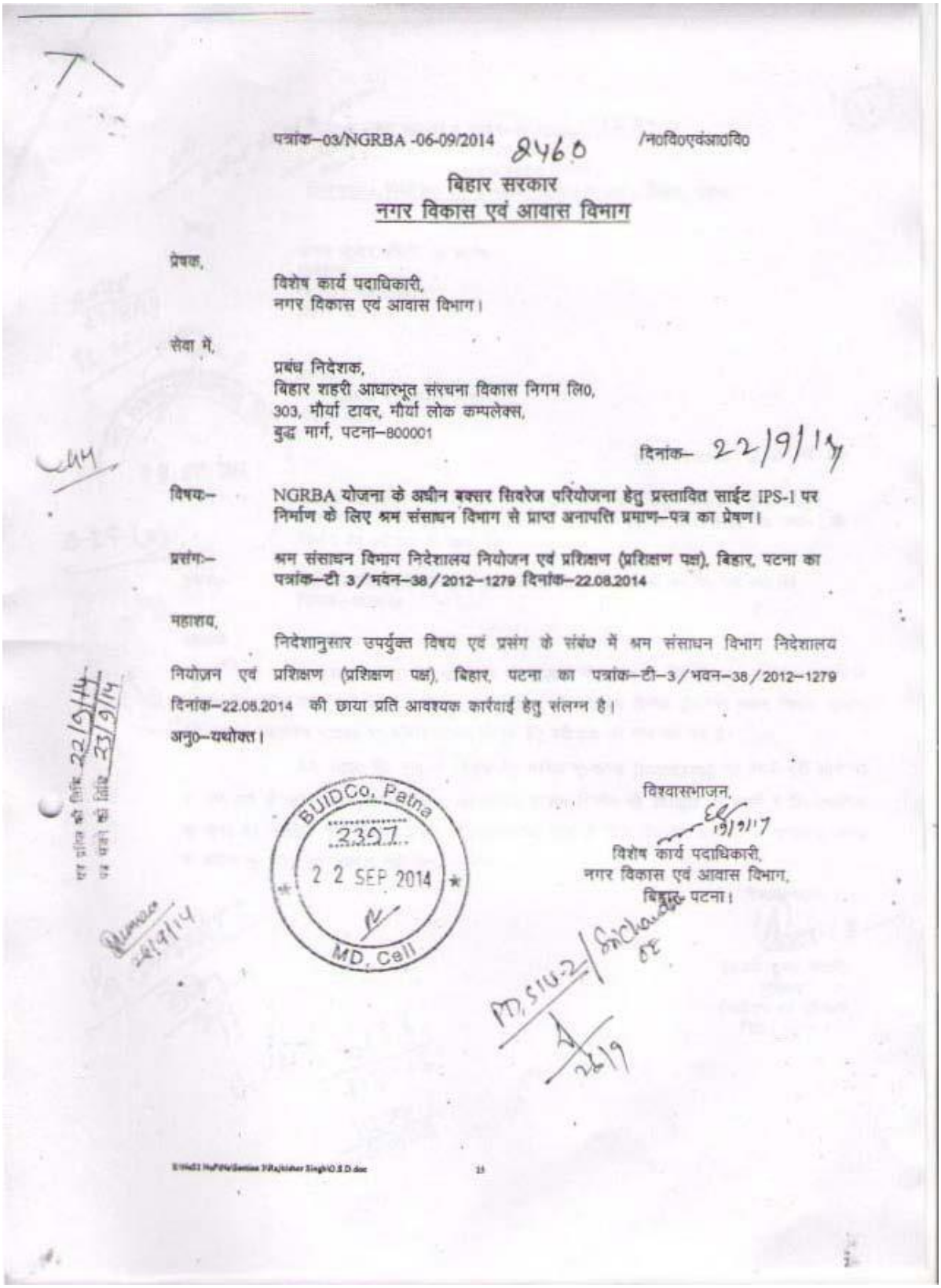
उपरोक्त वर्णित तथ्यों के आधार पर भवदीय द्वारा प्रस्तावित भूमि पर कार्य आरंभ हेतु आदेश अपेक्षित है।

अनुलग्नकः– यथोक्त।

विश्वासभाजन,
Nilam 16.05.2014
(निलाभ ध्रुव)
प्रबंधक (विधि)

बिहार सरकार का उपक्रम
Govt. of Bihar Undertaking

NOC obtained for IPS 1 from Urban Development and Housing Department, Bihar



पत्रांक–03/NGRBA -06-09/2014 8460 /नविए एवं आविए

बिहार सरकार
नगर विकास एवं आवास विभाग

प्रेषक,

विशेष कार्य पदाधिकारी,
नगर विकास एवं आवास विभाग।

सेवा में,

प्रबंध निदेशक,
बिहार शहरी आधारभूत संरचना विकास निगम लि0,
303, मौर्या टावर, मौर्या लोक कम्पलेक्स,
बुद्ध मार्ग, पटना–800001

दिनांक– 22/9/14

विषयः– NGRBA योजना के अधीन बक्सर सिवरेज परियोजना हेतु प्रस्तावित साईट IPS-1 पर निर्माण के लिए श्रम संसाधन विभाग से प्राप्त अनापत्ति प्रमाण–पत्र का प्रेषण।

प्रसंगः– श्रम संसाधन विभाग निदेशालय नियोजन एवं प्रशिक्षण (प्रशिक्षण पक्ष), बिहार, पटना का पत्रांक–टी 3/भवन–38/2012–1279 दिनांक–22.08.2014

महाशय,

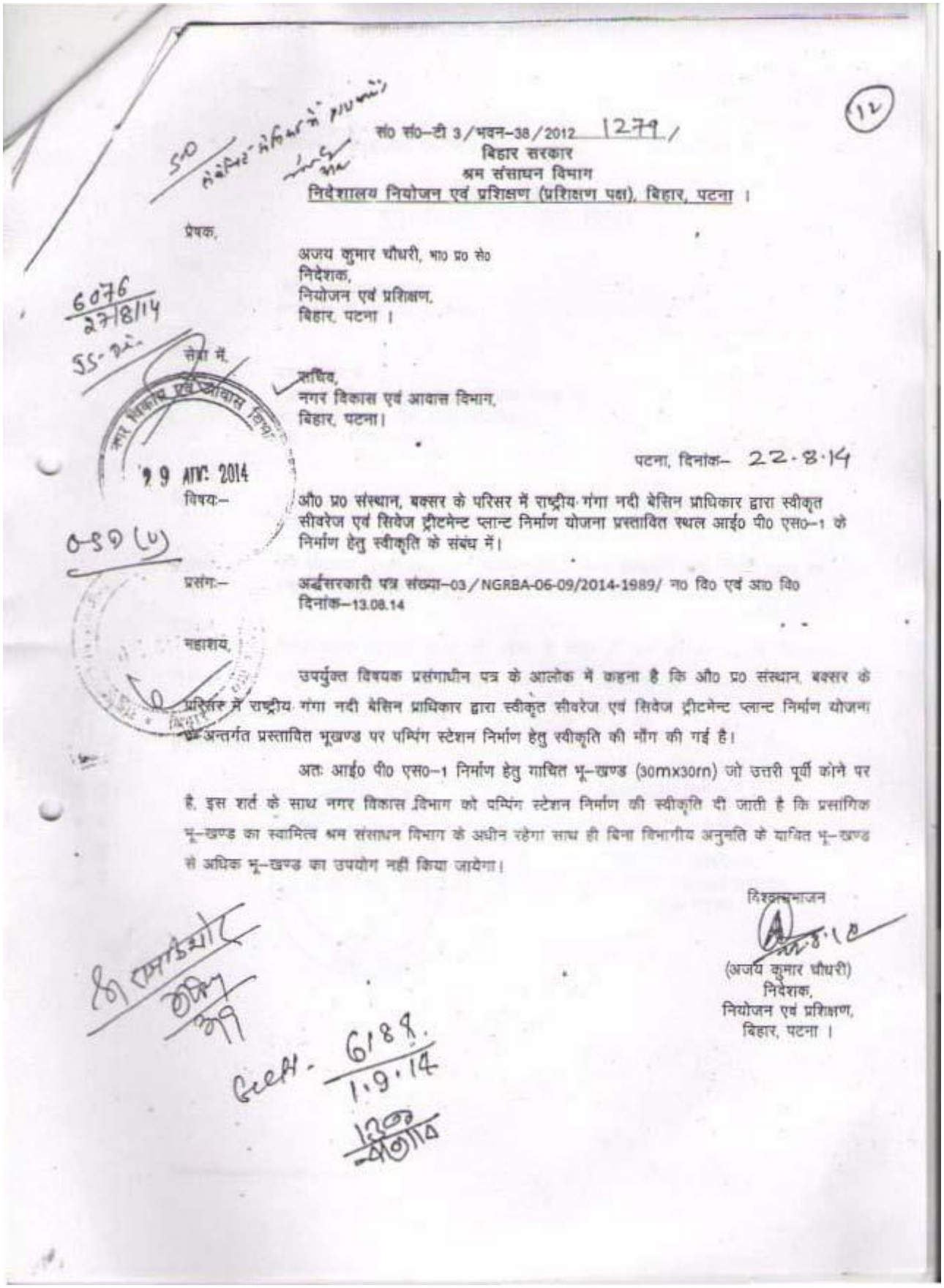
निदेशानुसार उपर्युक्त विषय एवं प्रसंग के संबंध में श्रम संसाधन विभाग निदेशालय नियोजन एवं प्रशिक्षण (प्रशिक्षण पक्ष), बिहार, पटना का पत्रांक–टी–3/भवन–38/2012–1279 दिनांक–22.08.2014 की छाया प्रति आवश्यक कार्रवाई हेतु संलग्न है।

अनु0–यथोक्त।

BUIDCo, Patna 2397 22 SEP 2014 MD, Cell

विश्वासभाजन,
19/9/14
विशेष कार्य पदाधिकारी,
नगर विकास एवं आवास विभाग,
बिहार, पटना।

MD, SIU-2 / 2619



सं0 सं0–टी 3/भवन–38/2012 1279/
बिहार सरकार
श्रम संसाधन विभाग
निदेशालय नियोजन एवं प्रशिक्षण (प्रशिक्षण पक्ष), बिहार, पटना ।

प्रेषक,

अजय कुमार चौधरी, भा0 प्र0 से0
निदेशक,
नियोजन एवं प्रशिक्षण,
बिहार, पटना ।

सेवा में,

सचिव,
नगर विकास एवं आवास विभाग,
बिहार, पटना।

पटना, दिनांक– 22.8.14

विषयः– औ0 प्र0 संस्थान, बक्सर के परिसर में राष्ट्रीय गंगा नदी बेसिन प्राधिकार द्वारा स्वीकृत सीवरेज एवं सिवेज ट्रीटमेन्ट प्लान्ट निर्माण योजना प्रस्तावित स्थल आई0 पी0 एस0–1 के निर्माण हेतु स्वीकृति के संबंध में।

प्रसंगः– अर्द्धसरकारी पत्र संख्या–03/NGRBA-06-09/2014-1989/ न0 वि0 एवं आ0 वि0 दिनांक–13.08.14

महाशय,

उपर्युक्त विषयक प्रसंगाधीन पत्र के आलोक में कहना है कि औ0 प्र0 संस्थान, बक्सर के परिसर में राष्ट्रीय गंगा नदी बेसिन प्राधिकार द्वारा स्वीकृत सीवरेज एवं सिवेज ट्रीटमेन्ट प्लान्ट निर्माण योजना के अन्तर्गत प्रस्तावित भूखण्ड पर पम्पिंग स्टेशन निर्माण हेतु स्वीकृति की माँग की गई है।

अतः आई0 पी0 एस0–1 निर्माण हेतु वांछित भू–खण्ड (30mx30m) जो उत्तरी पूर्वी कोने पर है, इस शर्त के साथ नगर विकास विभाग को पम्पिंग स्टेशन निर्माण की स्वीकृति दी जाती है कि प्रसांगिक भू–खण्ड का स्वामित्व श्रम संसाधन विभाग के अधीन रहेगा साथ ही बिना विभागीय अनुमति के वांछित भू–खण्ड से अधिक भू–खण्ड का उपयोग नहीं किया जायेगा।

विश्वस्त भवदीय

(अजय कुमार चौधरी)
निदेशक,
नियोजन एवं प्रशिक्षण,
बिहार, पटना ।

NOC for IPS 2 location from Water Resource Department, Bihar

पत्रांक–21 / भूमि–04–10 / 2012 561

बिहार सरकार
जल संसाधन विभाग

प्रेषक,

सतीश चन्द्र झा
सरकार के अपर सचिव

सेवा में,

महाप्रबंधक, (तकनीकी)
बुडको, पटना

पटना,दिनांक 19.12.2014

विषय – बक्सर सिवरेज प्लांट परियोजना हेतु पम्पिंग स्टेशन द्वितीय हेतु भूमि अनापत्ति प्रमाण पत्र के संबंध में ।

प्रसंग – आपका पत्रांक 4069 दिनांक 09.12.2014

महाशय,

उपर्युक्त विषयक प्रासंगिक पत्र के संबंध में कहना है कि विषयांकित मामले में विभागीय मंत्री महोदय की सहमति प्रदान कर दी गई है । संबंधित विषय की संचिका सं0 – 6 / खा0म0 बक्सर–20 / 12 राजस्व एवं भूमि सुधार विभाग, बिहार सरकार को आवश्यक कार्रवाई हेतु वापस की जा रही है ।

प्रस्तावित भूमि का विवरण :–

नगर परिषद वार्ड नं0 6, थाना नं0 332, खाता नं0 262, खेसरा नं0 942, रकबा 30मी0× 30मी0 यानि 900 (नौ सौ) वर्ग मीटर मात्र ।

विश्वासभाजन

17.12.14

सरकार के अपर सचिव

17.12.14

ANNEXURE.3: BUIDCO MINUTES OF THE MEETING WITH IRRIGATION DEPARTMENT AND URBAN DEVELOPMENT ON UTILIZATION OF TREATED SEWAGE FOR IRRIGATION PURPOSE

468

पत्रांक : पर्या०/वन०/ (मु०)–08/2019 111 /प०व०ज०प०
बिहार सरकार
पर्यावरण, वन एवं जलवायु परिवर्तन विभाग
कार्यालय– प्रधान मुख्य वन संरक्षक, बिहार, पटना
(जलवायु परिवर्तन संभाग)
तृतीय तल, अरण्य भवन, शहीद पीर अली खाँ मार्ग (राईडिंग रोड), शेखपुरा,पटना–800014

प्रेषक,

संतोष तिवारी, भा.व.से.
अपर प्रधान मुख्य वन संरक्षक,
पर्यावरण, जलवायु परिवर्तन एवं आर्द्रभूमि,
बिहार सरकार।

09 DEC 2019
प्राप्ति तिथि
बिहार, पटना

सेवा में,

प्रधान सचिव/सचिव,
नगर विकास एवं आवास विभाग/
जल संसाधन विभाग/लघु जल संसाधन विभाग/
बिहार, पटना।

पटना–14, दिनांक– 09/12/19

विषय :– माननीय NGT नई, दिल्ली में दायर O.A. No. 148/2016 M.A. No. 686/2017, महेश चन्द्र सक्सेना बनाम नगर निगम, दक्षिणी मामले में पारित आदेश के अनुपालन के संबंध में।

प्रसंग :– विभागीय पत्रांक–1364 (ई.), दिनांक–26.09.2019, पत्रांक–1546 (ई.), दिनांक–28.10.2019, इस कार्यालय का पत्रांक–34, दिनांक–13.11.2019 एवं पत्रांक–78, दिनांक–27.11.2019

महाशय,

उपर्युक्त विषयक प्रासंगिक पत्रों द्वारा माननीय NGT नई, दिल्ली में दायर O.A. No. 148/2016 M.A. No. 686/2017, महेश चन्द्र सक्सेना बनाम नगर निगम, दक्षिणी मामले में दिनांक–27.08.2019 में पारित आदेश के आलोक में STP के उपचारित जल के उपयोग हेतु कार्य योजना तैयार कर केन्द्रीय प्रदूषण नियंत्रण बोर्ड, नई दिल्ली तथा बिहार राज्य प्रदूषण नियंत्रण बोड, पटना को दिनांक–30.11.2019 तक उपलब्ध कराते हुए एक प्रति इस विभाग को भी देने का अनुरोध किया गया था। विदित है कि संबंधित मामले में अगली सुनवाई की तिथि के पूर्व दिनांक–30.12.2019 तक अनुपालन प्रतिवेदन माननीय NGT नई, दिल्ली में दायर किया जाना है।

अतः अनुरोध है कि इस संदर्भ में अनुपालन प्रतिवेदन यथाशीघ्र केन्द्रीय प्रदूषण नियंत्रण बोर्ड, नई दिल्ली तथा बिहार राज्य प्रदूषण नियंत्रण बोड, पटना को उपलब्ध कराते हुए विभाग को भी अवगत कराने की कृपा की जाय।

11 DEC 2019
No. 13204

विश्वासभाजन,

अपर प्रधान मुख्य वन संरक्षक,
पर्यावरण, जलवायु परिवर्तन एवं आर्द्रभूमि,
बिहार, पटना।

1532
13/12/19

468'

ज्ञापांक–...111....., दिनांक–09/12/19

प्रतिलिपि :– सदस्य सचिव, बिहार राज्य प्रदूषण नियंत्रण पर्षद, पटना को अनुलग्नक सहित सूचनार्थ एवं आवश्यक कार्रवाई हेतु प्रेषित।

अपर प्रधान मुख्य वन संरक्षक,
पर्यावरण, जलवायु परिवर्तन एवं आर्द्रभूमि,
बिहार, पटना।

Action plan on utilization of treated sewage in irrigation purpose and other issues related to river Ganga.

Sl. no.	Related Point	Status
1	Utilization of Treated sewage water using STP (sewage > 100 MLD)	350 MLD (142.90 cusec) treated sewage water from the STP's situated at Beur, Karmalichak,Saidpur, Kankarbaagh, Pahaadi and Digha in Patna district is proposed to be used in following options :- (i) Treated water from Beur STP will be pumped through Ductile Iron (DI) Pipe to provide irrigation in the command area of Fatehpur and Dariapur distributaries of Sone Canal System. Treated water from Saidpur, Pahadi, Kankarbagh and Karmlichak STPs will be pumped through Ductile Iron (DI) pipe to provide irrigation in the green belt in Patna Master Plan through existing structure of MWRD and ponds and in the command area of Fatehpur and Dariapur distributaries of Sone Canal System. (data obtained from Department of Revenue and Land Reforms and shown on the MAP) Excess water during heavy rains and surplus water during rabbi season will be escaped in local pynes beyond the Dardha right embankment. But it may be taken up in phase-2 because design discharge has been calculated for projected period. The present available discharge (77 MLD) will be utilized in the green belt itself. (Escape for five STPs, estimated cost Rs. 55.00 Cr. is to be constructed in phase-2) Treated water from Digha STP will be pumped through DI pipes Up to Naubatpur Lock to compensate for the water deficiency in Fatehpur and Manjhauli Distributary of Sone Canal System. (Total Estimated Cost-220 Cr.) (ii) Treated water from Beur, Saidpur, Pahadi, Kankarbagh and Karmlichak STPs will be discharged through the Badshahi Nala/Barmutta Nala/Saidpur/Khanua Nala under gravity and collected in the Sump near anti-flood sluice at Madhopur village on the Punpun left embankment. The collected water in the Sump will be pumped through DI pipes to provide irrigation in the command area of Fatehpur and Dariapur distributaries of Sone Canal System and the green belt in Patna Master Plan through existing structure of MWRD and ponds. (Escape for five STPs, estimated cost Rs. 55.00 Cr. is to be constructed in phase-2) Treated water from Digha STP will be pumped through DI pipes Up to Naubatpur Lock to compensate for the water deficiency in Fatehpur and Manjhauli Distributary of Sone Canal System. (Total Estimated Cost-183 Cr.)

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		(iii) Treated water from Beur, Saidpur, Pahadi, Kankarbagh and Karmlichak STPs will be discharged through the Badshahi Nala/Barmutta Nala/Saidpur/Khanua Nala under gravity and collected in the Sump near anti-flood sluice at Madhopur village on the Punpun left embankment. The collected water in the Sump will be pumped through Mild Steel (MS) Pipe in the Dhowa River by crossing the Punpun river in downstream of Dardha right embankment. Treated water from Digha STP will be pumped through DI pipes Up to Naubatpur Lock to compensate for the water deficiency in Fatehpur and Manjhauli Distributary of Sone Canal System. (Total Estimated Cost-170 Cr.) Keeping in view of the recent water stagnation in Patna on 28-29 Sept 2019, the other options for the usage of treated sewage water is being studied by Urban Development and Housing Dept. At present construction work of STP's located at Beur, Karmalichak, Saidpur and Pahaadi is under progress, whereas for STP's located at Kankarbagh and Digha, work allotment is in progress by Urban Development and housing Dept.

पत्रांक– BGCMS/2017/AP of SWM & SM for NGT/46(Part-III)1021.....न.वि. एवं आ.वि.

बिहार सरकार
नगर विकास एवं आवास विभाग
बिहार राज्य गंगा नदी संरक्षण कार्यक्रम प्रबंधन सोसाइटी (BGCMS)

प्रेषक,

संजय कुमार,
विशेष सचिव,
नगर विकास एवं आवास विभाग,

सेवा में,

सदस्य सचिव,
केन्द्रीय प्रदूषण नियंत्रण पर्षद, नई दिल्ली।

पटना, दिनांक– 19/12/19

विषयः– माननीय NGT में दायर O.A. No. 148/2016 (M.A. No. 686/2017) महेश चन्द्र सक्सेना बनाम नगर निगम, दक्षिणी दिल्ली मामले में दिनांक– 27.08.2019 को पारित आदेश के अनुपालन के संबंध में।

प्रसंगः– (1) पर्यावरण, जलवायु परिवर्तन एवं आर्द्रभूमि विभाग का पत्रांक– पर्या0 /वन0/(मु0)– 08/2019– 111/प0व0ज0प0 दिनांक– 09/12/2019
(2) जल संसाधन विभाग का पत्रांक– यो0अ0(के0ज0आ0)08–04/08 पार्ट– III/ 545 दिनांक 19.11.2019
(3) लघु जल संसाधन विभाग का पत्रांक– ल0ज0स0(पी0एम0जी0)/201/1762 दिनांक 26.11.2019

महाशय,

उपर्युक्त विषयक प्रासंगिक पत्रों का कृपया संदर्भ ग्रहण किया जाय। निदेशानुसार, इस संबंध में कहना है कि माननीय NGT में दायर O.A. No. 148/2016 (M.A. No. 686/2017) महेश चन्द्र सक्सेना बनाम नगर निगम, दक्षिणी दिल्ली मामले में दिनांक– 27.08.2019 को पारित आदेश के अनुपालन हेतु जल संसाधन विभाग/लघु जल संसाधन विभाग द्वारा क्रमशः पटना एवं अन्य शहरों के STPs परियोजनायें से उपचारित जल के उपयोग संबंधित कार्य योजना प्रासंगिक पत्रों द्वारा विभाग को भेजा गया है। उक्त कार्य–योजना (Action Plan) की Soft Copy बिहार राज्य प्रदूषण नियंत्रण पर्षद एवं पर्यावरण, जलवायु परिवर्तन एवं आर्द्रभूमि विभाग, पटना को E-Mail के माध्यम से दिनांक 30.11.2019 को प्रेषित करते हुए उसकी एक प्रतिलिपि (छायाप्रति संलग्न) केन्द्रीय प्रदूषण नियंत्रण पर्षद, नई दिल्ली को भी भेज दी गई है।

सूचित करना है कि उपर्युक्त कार्य योजनाओं का अद्यतनीकरण कर संबंधित विभागों द्वारा पुनः भेजा गया है। सुलभ प्रसंग हेतु अद्यतन कार्य–योजना की Hard Copy सूचनार्थ एवं आवश्यक कार्रवाई हेतु संलग्न कर भेजी जा रही है।

अनुलग्नक–यथोक्त।

विश्वासभाजन

19.12.19

विशेष सचिव,
नगर विकास एवं आवास विभाग।

ANNEXURE.4: ATTENDANCE SHEETS AND FEEDBACK NOTES ON STAKEHOLDER CONSULTATION

ATTENDANCE SHEETS COMMUNITY CONSULTATION, WARD NO.-34 CHINI MILL AREA

National Mission for Clean Ganga
(Reg. Society)
Ministry of Jal Shakti, Department of Water Resources, River Development & Ganga Rejuvenation, Government of India

ATTENDANCE SHEET

FOR ENVIRONMENT AND SOCIAL SCREENING REPORT AND ESDDR / ESAMP
(WORLD BANK FUNDED)

Venue/Location: Ward No. 34 Chini Mill

Date & Time:

Sl. No.	Name	Age	Sex	Occupation	Contact no.	Signature
1.	Dhananjay Kr.	38	M	Bussiness	9431025791	[illegible]
2.	Parmeshwar gupta	40	M	-do-	9523902966	[illegible]
3.	Santosh Singh	40	M	-do-	9801484230	Santosh Singh
4.	Omprakash Gupta	45	M.	-do-	9334622597	[illegible]
5.	Durgawati Devi	65	F	House wife	9523902966	दुर्गावती देवी
6.	Usha Devi	60	F	Housewife		
7.	Sudhir kr. Singh	34	M	Agri	9931280565	Sudhir
8	Papu Singh	38	M	Agri	9939561171	[illegible]

CANADA | INDIA | AFRICA | MIDDLE EAST

- Feedback Notes from Community Consultation, Ward No.-34 Chini Mill Area

National Mission for Clean Ganga
(Reg. Society)
Ministry of Jal Shakti, Department of Water Resources, River Development & Ganga Rejuvenation, Government of India

MINUTES OF CONSULTATION

FOR ENVIRONMENT AND SOCIAL SCREENING REPORT AND ESDDR/ESAMP

(WORLD BANK FUNDED)

Venue/Location: Ward No-34. Chini Mill BXR. **Date & Time:** 27.2.2020.

Suggestions:

① काम शुरू करने से पहले सुचित किया जाए। ताकि आम जनता को कोई परेशानी न हो। घर से कार्यक्रम करने के लिए पहले से जानकारी दिया जाए।

② रात में काम न करें।

③ रोड को पुरा खराब न करें।

④ रोड पुनः से निर्माण करते दिया जाए।

⑤ ~~[illegible]~~.

Attendance Sheets Community Consultation, Ward No.-15 Sarimpur area

National Mission for Clean Ganga
(Reg. Society)
Ministry of Jal Shakti, Department of Water Resources, River Development & Ganga Rejuvenation, Government of India

ATTENDANCE SHEET

FOR ENVIRONMENT AND SOCIAL SCREENING REPORT AND ESDDR / ESAMP
(WORLD BANK FUNDED)

Venue/Location: Ward No. 15 Date & Time: 28.02.2020

Sl. No.	Name	Age	Sex	Occupation	Contact no.	Signature
1.	Binod Kr Rai	42	M	Business	8873775393	
2.	Rishikesh Pandey	39	M	Agri	9931890650	
3	Rajesh kumar	21	m	Student	9304641514	
(4)	[illegible]	40	m	कृषि	7970807036	
(5)	[illegible]	40	m	कृषि	7739218689	
(6)	[illegible]	45	M	कृषि	7050654913	
(7)	[illegible]	43	M	कृषि	880517547[illegible]8X	
(8)	[illegible]	34	M	व्यवसाय	8603723331	
(9)	[illegible]	54	M	Ward Member No-15	91226 00396	

Feedback Notes from Community Consultation, Ward No.-15, Sarimpur

National Mission for Clean Ganga
(Reg. Society)
Ministry of Jal Shakti, Department of Water Resources, River Development & Ganga Rejuvenation, Government of India

MINUTES OF CONSULTATION

FOR ENVIRONMENT AND SOCIAL SCREENING REPORT AND ESDDR/ESAMP

(WORLD BANK FUNDED)

Venue/Location: Ward no. 15 Choti SariMPur **Date & Time:**

Suggestions:

1. सरकार प्रायोजित नमामि गंगे के अंतर्गत चलाए अभियान के तहत बहुत ही अच्छी बात है इससे जनसमुदाय को फायदा मिलेगा हम सभी लोग इससे लाभान्वित होंगे।

2. कार्य करते समय किसी भी प्रकार की असुविधा नहीं है.
3. इस परियोजना से हमारे मुहल्ले छोटी सरीमपुर वार्ड-15 में बहुत ही अच्छा कार्य हो रहा है।
4. इस परियोजना से आगे चलकर हमलोगों को बहुत फायदा होगा।

5. भविष्य के लिए बहुत ही अच्छी परियोजना है.

CANADA | INDIA | AFRICA | MIDDLE EAST

Attendance Sheets Community Consultation, Chairman and Ward Members

National Mission for Clean Ganga
(Reg. Society)
Ministry of Jal Shakti, Department of Water Resources, River Development & Ganga Rejuvenation, Government of India

ATTENDANCE SHEET

FOR ENVIRONMENT AND SOCIAL SCREENING REPORT AND ESDDR/ESAMP
(WORLD BANK FUNDED)

Venue/Location: नगर परिषद कार्यालय जिला बक्सर, बिहार **Date & Time:** 28.2.2020 अप० 3 बजे

Sl. No.	Name	Designation/ Agency	Department	Contact no. & Email ID	Signature
1	माया देवी	वार्ड नं -3		मो० 9110912647	माया देवी मुख्य पार्षद
2	सुजीत कुमार	कार्यपालक	न०प०कि०आ०वि	9386863960	[illegible] 28/2/20
3	इन्द्र प्रताप सिंह	उ.मु. पार्षद (वार्ड 23)		7004373100	इ.प्र.सिंह
4	अनूप कुमार वर्मा	पार्षद (वार्ड 30)		9122494927	29/02/2020 Anup Verma
5	आशुतोष कुमार	अधीर पार्षद (14)		8709995374	[illegible]
6	राम स्वरूप [illegible] सिंह	वार्ड 32		8986189270	[illegible]
7	महेन्द्र राम	वार्ड पार्षद 15 वार्ड नं		9122600396	महेन्द्र राम
8	सतोष कुमार राम	पार्षद 34		9122049750	[illegible]
9	रंजीत कुमार श्रीवास्तव	9-20		7480863111	
10	Guptesh war Prajapati	04	–	9122816255	
11	[illegible]	वार्ड 8	→	~~6205388295~~ 6205388295	
12	प्रमिला देवी	वार्ड नं 5	–	9771883825	
13	राजा चन्द्र [illegible]		–	8544413143	[illegible]
14	केदार प्रसाद साहु			9431482224	[illegible]

CANADA | INDIA | AFRICA | MIDDLE EAST

नमामि गंगे

National Mission for Clean Ganga
(Reg. Society)
Ministry of Jal Shakti, Department of Water Resources, River Development & Ganga Rejuvenation, Government of India

ATTENDANCE SHEET

FOR ENVIRONMENT AND SOCIAL SCREENING REPORT AND ESDDR/ESAMP
(WORLD BANK FUNDED)

Venue/Location: BUXAR NAGAR PARISHAD DIST- BUXAR (BIHAR) **Date & Time:** 03:00 PM / 28.02.2020

Sl. No.	Name	Designation/ Agency	Department	Contact no. & Email ID	Signature
15	राकेश कुमार सिंह	वार्ड न० 27		9693702077	राकेश कुमार सिंह
16	[illegible]	कृषि		9931290565	Sachin
17	पप्पु सिंह	कृषि		99335(1)141	[illegible]

LEA CANADA | INDIA | AFRICA | MIDDLE EAST

Attendance Sheets with BUIDCo Technical Officer

National Mission for Clean Ganga
(Reg. Society)
Ministry of Jal Shakti, Department of Water Resources, River Development & Ganga Rejuvenation, Government of India

ATTENDANCE SHEET

FOR ENVIRONMENT AND SOCIAL SCREENING REPORT AND ESDDR/ESAMP
(WORLD BANK FUNDED)

Venue/Location: BUIDCO, Office Patna Date & Time: 26.02.2020

Sl. No.	Name	Designation/ Agency	Department	Contact no. & Email ID	Signature
1	K.P. Sahu	EE, BUIDCO	BUIDCO BUXAR	94314 82224	26.2.20
2.	R.C. Rana	AEE, BUIDCO	BUIDCO	85444 13143	
3	DR. Lata Choudhary	ESMC	BIDCL	85444 13136	
4.	Ajit kumar	Social Expert	BUIDCO	834045 1009	

ANNEXURE 5: CTE OBTAINED FROM BSPCB IN THE PREVIOUS CONTRACT

Pol

BIHAR STATE POLLUTION CONTROL BOARD
BELTRON Bhawan, Shastri Nagar, Patna – 800 023
EPABX - 0612-2281250/2282265, Fax - 0612-2281050
E-mail-bspcb@vsnl.net, Website - http://bspcb.bih.nic.in

Ref. No.P/T(NOC)- 1623/14- Patna,dated:-

'CONSENT-TO-ESTABLISH' (NOC)
UNDER SECTIONS 25/26 OF THE WATER (PREVENTION AND CONTROL OF POLLUTION) ACT, 1974 AND 21 OF THE AIR (PREVENTION AND CONTROL OF POLLUTION) ACT, 1981

Reference application no.: 50526, dated: 09.06.2014 of Buxar Sewarage & Sewage Treatment Plant (STP), Proponent: Project Director, Bihar Urban Infrastructure Development Corporation Ltd., 303, Mourya Tower, Mouryalok Complex, Budh Marg, Patna-800 001 for the establishment of a STP (16MLD) at Khata no.-337, Khesra no.-589, at Mouza- Buxar, P.s- Buxar, District- Buxar. Total land available is 3acre. The STP shall be based on Activated Sludge Process with Extended Aeration technology. The treatment process comprises of coarse & fine mechanical screens, Grit Chamber, Aeration Tank, Secondary Clarifier, Chlorine Contact Tank, Sludge thickener, Centrifuge, etc. The final discharge shall conform to the standard as prescribed. The capacity of the STP shall be 16million litre per day (MLD) for the design period of 30years. Treated effluent shall be utilized for irrigation purpose with the excess effluent to be discharged to River Ganga through pipe. Total cost of the STP as per the project report shall be Rs.17.20 Crores approximately. Augmented power requirement shall be met by D.G. Set of 500kVA.

AFTER CONSIDERING:

(i) The facts stated in their application;
(ii) Bihar State Pollution Control Board's Notification No. 26 dated 08.11.2003;
(iii) Provisions of the Water (Prevention and Control of Pollution) Act, 1974 and the Air (Prevention and Control of Pollution) Act, 1981
(iv) Proposal Order of SDO, Buxar for land transfer dated: 21.4.2011 and Attested Copy of measurement certificate by the C.O., Buxar dated: 20.1.2014.

NOC IN FAVOUR OF THE PROPONENT AT THE SAID SITE IS HEREBY ACCORDED SUBJECT TO THE FOLLOWING CONDITIONS:

(i) That, the project authority must obtain all other statutory prior clearance/ permission from competent authority.
(ii) The proponent shall obtain 'Consent-to-Operate' under sections 25 & 26 of the Water Act, 1974 and Section 21 of the Air Act, 1981 prior to commissioning of the plant from this Board;
(iii) The effluent (domestic or trade) and emission, if any, shall conform to the standard prescribed by the Board;

Page 1 of 3

(iv) That, Diesel Generator set(s) shall have integral acoustic enclosure as per norms of the Board. The noise from the diesel engine, if any, shall be controlled by treating the room acoustically in which it is installed. The Ambient Noise Level outside his premises shall be within ambient noise level standard.

(v) That, construction of the STP shall be done leach proof with proper lining with HDPE to prevent ground water pollution.

(vi) That, study on human health, assimilative capacity of pollutants (solid, liquid as well as gaseous), social risk in the peripheral environment shall be assessed to know the effect of STP so as to do remedial measures during its construction/operation.

(vii) That, pucca approach road shall be constructed prior to commencing construction activity so as to avoid fugitive emissions.

(viii) Adequate no. of ground water monitoring stations by providing piezometers around the project area shall be set up. Sampling and trend analysis must be made on monthly basis and report shall be submitted to this Board. The ground water quality monitoring for pH, BOD, COD, ammonical nitrogen, Chloride, and total Dissolved solids shall be monitored. Sampling and analysis monitoring must be made on monthly basis and report shall be submitted to the Board.

(ix) No storage of wet solid sludge shall be done at the site. They shall be dried properly at the sludge drying bed itself before its adequate and safe disposal to secured land fill site. In case of any storage, they shall have proper arrangements for the storage to avoid bad odour in and outside the campus.

(x) Proper arrangements shall be done for quality operation of STP such a way that it does not get foul, air borne or fly around the plant.

(xi) An Environment Management Plan (EMP) and risk assessment study report shall be prepared for the project and report shall be submitted to this Board within six month.

(xii) No further expansion or modernization in the plant shall be carried out without prior approval of the Board. In case of any deviation or alteration in the project proposal submitted in this Board, a fresh reference shall be made to this Board for the adequacy of conditions imposed and to add additional environmental protection measures required, if any.

(xiii) The company shall comply with all the environmental protection measures and safeguards during construction and operation of the plant. Record shall be maintained.

(xiv) A full fledged laboratory facility shall be setup to carry out operational monitoring functions.

(xv) That, continuous operation of STP shall be ensured.

(xvi) The project proponent shall also submit six monthly compliance reports on the status of compliance of the NOC conditions including results of monitored data (both in hard copies as well as by email) to this Board.

(xvii) Tree plantation and landscape shall be developed and maintained.

NOTE:

1. Bihar State Pollution Control Board reserves the option to revise or add other conditions, if necessary, for protection of Environment in general and for Pollution Control in particular;
2. The present NOC should not be construed as an assurance for the grant of 'Consent-to-Operate' the proposed plant but shall be subject to compliance of all the conditions indicated above;
3. The NOC, granted, shall be valid for a period of twelve months from the date of issue; and
4. Issued under the instructions of the Competent Authority.

sd/-
(Rakesh Kumar)
Member-Secretary.

Memo No.:- 7E 9890 Patna,dated:- 08/9/14

Copy forwarded to: Project Director, Bihar Urban Infrastructure Development Corporation Ltd., 303, Mourya Tower, Mouryalok Complex, Budh Marg, Patna-800 001/ Concern AEE, Patna for information and necessary action.

(Rakesh Kumar)
Member-Secretary.

ANNEXURE 6: TEST REPORTS OF ENVIRONMENTAL COMPONENTS (AIR, NOISE, WATER AND SOIL)

Test Reports of Air Quality Monitoring carried out at Project Location

SHRI OM TESTING & RESEARCH LABORATORY

Plot No. 296, 1st FNG Road, Sector-121, Ghari Chaukhandi, Noida - 201301
Mob. : 9971980045, 9868546270, 9821154906
E-mail. : shriomlab@gmail.com, **Web. :** www.shriomlab.com, www.shriomlab.in

N.A.B.L. Accredited, ISO 9001, ISO 14001 & ISO 18001 Certified Laboratory.

Issued To :	M/s LEA Associate South Asia Pacific Pvt. Ltd,	Report /Sample No :	ENVA2020022901
		Date Of Monitoring :	28.02.2020
Project:	Consulting Services for Environmental & Social Audit and Preparation of Environmental and Social Due Diligence Report (ESDDR) and Environmental& Social Assessment and Management Plan (ESAMP	Date of Issue :	05.03.2020
Nature of the Sample	: Ambient Air Quality	Test Started On :	28.02.2020
Customer Ref. No	: NS	Test Completed on :	06.03.2020

Monitoring Details:

Monitoring Location : Sewerage and STP Scheme at Buxar
Monitoring Done by : Mr. Varun
Weather Condition : Clear Sky
Monitoring Period : 28/02/2020 to 29/02/2020

Ambient Air Quality Reports

6S. No	Parameters	Unit	Project site	Requirement permissible limits as per NAAQS/CPCB	Test Method
1	Particulate Matter, PM 10	µg/m3	46.13	100	IS:5182 (P-23) : 2006
2	Particulate Matter, PM 2.5	µg/m3	26.5	60	SOP1/STRL/Ambient Air/Gravimetric Method
3	Sulphur Dioxide (as SO2)	µg/m3	15.73	80	IS:5182 (P-2) : 2006
4	Carbon Monoxide (as CO)	µg/m3	<1.0	04(1hourly)	IS:5182 (P-10) : 199,RA-2003
5	Oxide of Nitrogen (as NO2)	µg/m3	18.28	80	IS:5182 (P-6) : 2006

*$PM_{2.5}$ & PM_{10} values are reported to be generally on high side in line. It is attributable to severe weather conditions during winter season.

End of Report

Authorized Signature

Test Reports of Noise Quality Monitoring carried out at Project Locations

SHRI OM TESTING & RESEARCH LABORATORY

Plot No. 296, 1st FNG Road, Sector-121, Ghari Chaukhandi, Noida - 201301
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N.A.B.L. Accredited, ISO 9001, ISO 14001 & ISO 18001 Certified Laboratory.

TEST REPORT

Issued To: LEA Associate South Asia Pacific Pvt. Ltd.

Report /Sample No: ENVN2020022901
Measurement Started : 29.02.2020
Test Started: 29.02.2020
Test Completed : 1.03.2020

Project: Consulting Services for Environmental & Social Audit and Preparation of Environmental and Social Due Diligence Report (ESDDR) and Environmental& Social Assessment and Management Plan (ESAMP)

Sample identification: Ambient Noise Quality

Sampling Details:
Type of Monitoring : Ambient Noise Quality
Location of Sampling Point : IPS near (Dhobi Ghat) scheme at Buxar
Measurement Started on : (29.02.2020)
Measurement Completed on : (01.03.2020)
Environmental Conditions : Clear Sunny

Ambient Noise Measurement Result at Project Site

S.No	Date	Equivalent Noise Level, Leq (Day*) dB (A)	Equivalent Noise Level, Leq (Night**) dB (A)	Test Method
1	29.02.2020	58.94	42.13	IS 9989 : 1981 (RA 2008)
Limit for Residential Zone As Per the NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000		55	45	

Note: -*Day time means from 6.00 a.m. to 10.00 p.m.
** Night time means from 10.00 p.m. to 6.00 a.m.

End of Report

Authorized Signature
(Chemist)

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TEST REPORT

Issued To:	LEA Associate South Asia Pacific Pvt. Ltd.	Report /Sample No:	ENVN2020022902
		Measurement Started :	29.02.2020
		Test Started:	29.02.2020
		Test Completed :	1.03.2020

Project: Consulting Services for Environmental & Social Audit and Preparation of Environmental and Social Due Diligence Report (ESDDR) and Environmental& Social Assessment and Management Plan (ESAMP)

Sample identification: Ambient Noise Quality

Sampling Details:

Type of Monitoring	: Ambient Noise Quality
Location of Sampling Point	: IPS near (ITI) scheme at Buxar
Measurement Started on	: (29.02.2020)
Measurement Completed on	: (01.03.2020)
Environmental Conditions	: Clear Sunny

Ambient Noise Measurement Result at Project Site

S.No	Date	Equivalent Noise Level, Leq (Day*) dB (A)	Equivalent Noise Level, Leq (Night**) dB (A)	Test Method
1	29.02.2020	61.7	46.5	IS 9989 : 1981 (RA 2008)
Limit for Residential Zone As Per the NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000		65	55	

Note: -*Day time means from 6.00 a.m. to 10.00 p.m.
** Night time means from 10.00 p.m. to 6.00 a.m.

End of Report

Authorized Signature
(Chemist)

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TEST REPORT

Issued To:	LEA Associate South Asia Pacific Pvt. Ltd.	Report /Sample No:	ENVN2020022903
		Measurement Started :	29.02.2020
		Test Started:	29.02.2020
		Test Completed :	1.03.2020

Project: Consulting Services for Environmental & Social Audit and Preparation of Environmental and Social Due Diligence Report (ESDDR) and Environmental& Social Assessment and Management Plan (ESAMP)

Sample identification: Ambient Noise Quality

Sampling Details:

Type of Monitoring	: Ambient Noise Quality
Location of Sampling Point	: Sewerage and STP scheme at Buxar
Measurement Started on	: (29.02.2020)
Measurement Completed on	: (01.03.2020)
Environmental Conditions	: Clear Sunny

Ambient Noise Measurement Result at Project Site

S.No	Date	Equivalent Noise Level, Leq (Day*) dB (A)	Equivalent Noise Level, Leq (Night**) dB (A)	Test Method
1	29.02.2020	53.8	41.3	IS 9989 : 1981 (RA 2008)
Limit for Residential Zone As Per the NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000		55	45	

Note: -*Day time means from 6.00 a.m. to 10.00 p.m.
** Night time means from 10.00 p.m. to 6.00 a.m.

End of Report

Authorized Signature
(Chemist)

Test Reports of Soil Quality Monitoring carried out at Project Location

SHRI OM TESTING & RESEARCH LABORATORY

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Issued To	**LEA Associate South Asia Pacific Pvt. Ltd.**	**Report No**	**ENVS2020022901**
Project Name	**Consulting Services for Environmental & Social Audit and Preparation of Environmental and Social Due Diligence Report (ESDDR) and Environmental& Social Assessment and Management Plan (ESAMP)**	**Date Of Sampling**	**29.02.2020**
		Date of Issue in lab	**01.03.2020**
		Test Started On	**01.03.2020**
Nature of the Sample	**Soil**	**Testing Completed on**	**06.03.2020**

Sampling Details:
Sampling Method : SOP/SOIL/001
Type of Sample : Soil
Location of Sampling Point : Buxar
Environmental Conditions : Normal
Average Temperature Degree Celsius : 21.6
Sampling Done by :Mr Varun Kumar

TEST REPORT

S. No.	Parameters	Units	Results	Test Method
	Physical Characteristics			
1.	Colour		Brown	STRL/STP/SOIL/01
2.	Textural class		Clay Loam	IS27720 (P-4), 1985 (Reaff: 2015)
3.	Bulk Density	gm/cm3	1.2	IS 14765: 2000, RA 2010
4.	Water Holding Capacity	%	38	STRL/STP/SOIL/01
7.	Sand	%	35.5	IS27720 (P-4), 1985 (Reaff: 2015)
8.	Slit	%	18.5	IS27720 (P-4), 1985 (Reaff: 2015)
9.	Clay	%	46.0	IS27720 (P-4), 1985 (Reaff: 2015)
10.	pH (1:2 Suspension)	-	7.11	IS: 2720 (part-26),1987 (Reaff:2011)
11.	Electrical Conductivity (1:2)	µmhos/cm	120	IS: 14767(2000), RA 2016
12.	Organic Matter	%W/W	1.2	STRL/STP/SOIL/01
13.	Exchangeable Calcium	mg/kg	45450	IS 2720 (Part 24): 1976, RA 2010
14.	Exchangeable Magnesium	mg/kg	19866	IS 2720 (Part 24): 1976, RA 2010
15	Copper	mg/kg	4.4	IS 2720(Part-27): 1977,
16	Nickel	mg/kg	2.6	IS 2720(Part-27): 1977,
17	Chromium	mg/kg	16.6	IS 2720(Part-27): 1977,
18	Iron	mg/kg	6565.7	IS 2720(Part-27): 1977,
19	Lead	mg/kg	2.4	IS 2720(Part-27): 1977,
20.	Sulphate	mg/kg	224.5	IS 2720(Part-27): 1977,
	Available Nutrients (Kg/Ha)			
21.	Nitrogen (as N)	Kg/Ha	323.5	IS:10158:1982, RA 2009
22.	Phosphorous	Kg/Ha	94	IS:10158:1982, RA 2009
23.	Exchangeable Potassium	Kg/Ha	120	STRL/STP/SOIL/01

**End of Report*

Authorized Signature

Test Reports of Surface and Ground water Quality Monitoring carried out at Project Locations

SHRI OM TESTING & RESEARCH LABORATORY
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Issued To	LEA Associate South Asia Pacific Pvt. Ltd.	Report No	ENVSW2020030301
		Date Of Sampling	29.02.2020
		Date of Issue in lab	03.03.2020
Project Name	Consulting Services for Environmental & Social Audit and Preparation of Environmental and Social Due Diligence Report (ESDDR) and Environmental& Social Assessment and Management Plan (ESAMP) Development of Urban extension	Test Started On	03.03.2020
Nature of the Sample	Surface Water	Testing Completed on	07.03.2020

SAMPLING DETAILS:

Sampling Location	: SW- Near STP, Ganga River, Buxar
Sampling Done by	: Mr. Varun
Weather Condition	: Clear Sky
Sample Packing & Marking	: Plastic Bottle & Glass Bottle, PD/GW-1
Sampling Protocol	: IS: 3025(P-1)-1987, Reef: 2003& IS: 1622-1981 (Reaff.2003)
Sample Quantity	: 5 L+500 ml

S. No.	Parameters	Unit	IS: 2296 - 1992(Class C) Tolerance Limit	Near STP	Test method
1	pH	-	6.5 -8.5	7.12	IS: 3025(Pt-11)1983, RA. 2002
2	Temperature	°c	-	23	APHA 23rd Edn.2017-2550 B
3	D.O	mg/l	Minimum -4	7.2	IS 3025(Part-38): 2006.
4	BOD	mg/l	30	1.2	IS 3025(Part-44):1993, RA 2009
5	Color	Hazen	300	<5	IS: 3025 (Pt-4) 1983, RA 2017
6	Odour	-	-	Agreeable	IS: 3025(Pt-5)
7	TDS	mg/l	1500	294	IS 3025(Part-16): 1984, RA 2006
8	TSS	mg/l	-	3.0	IS 3025(Part-17)
9	TKN	mg/l		3.2	IS: 3025(Pt-34)1988, RA. 2003
10	Ammonical Nitrogen	mg/l		<0.1	IS: 3025(Pt-34)1988, RA. 2003
11	Nitrate(as NO3)	mg/l	50	1.2	IS: 3025(Pt-34)1988, RA. 2003
12	Free Ammonia	mg/l		<0.1	IS: 3025(Pt-34)1988, RA. 2003
13	Chlorides (as Cl)	mg/l	600	100	IS 3025(Part-32): 1988
14	Sulphates(as SO4)	mg/l	400	22.4	IS 3025(Part-24):1986, RA 2003
15	Fluoride (as F)	mg/l	1.5	042	APHA 21st Ed., 4500F(D)
16	Oil & Grease	mg/l	0.1	<0.1	IS 3025(Part-39):1991, RA 2009
17	Phenolic Compound (as C6H5OH)	mg/l	0.005	<0.001	5530-B,C&E,APHA 23nd 2017

Authorized Signature

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Report No- ENVSW2020030301					
18.	Arsenic	mg/l	0.2	<0.1	3110- B, APHA 23nd Ed. 2017
19	Mercury(as Hg)	mg/l	-	<0.001	3110- B, APHA 23nd Ed.2017
20	Lead (as Pb)	mg/l	0.1	<0.1	3110- B, APHA 23nd Ed. 201 (AAS)
21	Cadmium (as Cd)	mg/l	0.01	<0.002	3110- B, APHA 23nd Ed. 2017
22.	Chromium (as Cr+6)	mg/l	0.05	<0.1	IS 3025(Part-52): 200
23.	Copper (as Cu)	mg/l	1.5	<0.01	3110- B, APHA 23nd Ed. 2017 (AAS)
24.	Zinc (as Zn)	mg/l	15	0.11	3110- B, APHA 23nd Ed. 2017 (AAS)
25	Selenium (as Se)	mg/l	-	<0.1	IS: 3025 (P- 56)
26.	Anionic detergents (as MBAS)	mg/l	1.0	<0.1	Annexure K Of IS 13428
27.	Iron (as Fe)	mg/l	50	0.13	3500-Fe- B, APHA 23nd Ed. 2017
28.	Sulphide(as H_2S)	mg/l	-	<0.1	IS-3025 (P-29)
29.	Phosphate (as PO4)	mg/l	-	0.1	APHA 22nd Edn.2012-4500-P C
30.	Cyanide (as CN)	mg/l	0.05	<0.1	4500-CN-B,C & E, APHA 23nd Ed.2017
31.	Manganese (as Mn)	mg/l		0.03	3110- B, APHA 23nd Ed.2017
32.	COD	mg/l	-	4.0	IS 3025(Part-58): 2006
			Microbiological Parameters		
33.	Total Coli form	MPN/100ml	5000	1400	IS : 1622-1981

End of Report

Microbiologist Signature

Authorized Signature

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Issued To	LEA Associate South Asia Pacific Pvt. Ltd.	Report No	ENVSW2020030302
		Date Of Sampling	29.02.2020
		Date of Issue in lab	03.03.2020
Project Name	Consulting Services for Environmental & Social Audit and Preparation of Environmental and Social Due Diligence Report (ESDDR) and Environmental& Social Assessment and Management Plan (ESAMP) Development of Urban extension	Test Started On	03.03.2020
Nature of the Sample	Surface Water	Testing Completed on	07.03.2020

SAMPLING DETAILS:

Sampling Location	: SW- Down Stream Ganga River, Buxar
Sampling Done by	: Mr. Varun
Weather Condition	: Clear Sky
Sample Packing & Marking	: Plastic Bottle & Glass Bottle, PD/SW-2
Sampling Protocol	: IS: 3025(P-1)-1987, Reef: 2003& IS: 1622-1981 (Reaff.2003)
Sample Quantity	: 5 L+500 ml

S. No.	Parameters	Unit	IS: 2296 - 1992(Class C) Tolerance Limit	Results Down Stream	Test method
1	pH	-	6.5 -8.5	6.98	IS: 3025(Pt-11)1983, RA. 2002
2	Temperature	°c	-	22	APHA 23rd Edn.2017-2550 B
3	D.O	mg/l	Minimum -4	6.9	IS 3025(Part-38): 2006.
4	BOD	mg/l	30	1.9	IS 3025(Part-44):1993, RA 2009
5	Color	Hazen	300	<5	IS: 3025 (Pt-4) 1983, RA 2017
6	Odour	-	-	Agreeable	IS: 3025(Pt-5)
7	TDS	mg/l	1500	300	IS 3025(Part-16): 1984, RA 2006
8	TSS	mg/l	-	4.0	IS 3025(Part-17)
9	TKN	mg/l		4.4	IS: 3025(Pt-34)1988, RA. 2003
10	Ammonical Nitrogen	mg/l		<0.1	IS: 3025(Pt-34)1988, RA. 2003
11	Nitrate(as NO3)	mg/l	50	1.5	IS: 3025(Pt-34)1988, RA. 2003
12	Free Ammonia	mg/l		<0.1	IS: 3025(Pt-34)1988, RA. 2003
13	Chlorides (as Cl)	mg/l	600	100	IS 3025(Part-32): 1988
14	Sulphates(as SO4)	mg/l	400	24.5	IS 3025(Part-24):1986, RA 2003
15	Fluoride (as F)	mg/l	1.5	0.45	APHA 21st Ed., 4500F(D)
16	Oil & Grease	mg/l	0.1	<0.1	IS 3025(Part-39):1991, RA 2009

Authorized Signature

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N.A.B.L. Accredited, ISO 9001, ISO 14001 & ISO 18001 Certified Laboratory.

Report No :ENVSW2020030302

17	Phenolic Compound (as C6H5OH)	mg/l	0.005	<0.001	5530-B,C&E,APHA 23nd 2017
18.	Arsenic	mg/l	0.2	<0.1	3110- B, APHA 23nd Ed. 2017 (AAS)
19	Mercury(as Hg)	mg/l	-	<0.001	3110- B, APHA 23nd Ed.2017
20	Lead (as Pb)	mg/l	0.1	<0.1	3110- B, APHA 23nd Ed. 201 (AAS)
21	Cadmium (as Cd)	mg/l	0.01	<0.002	3110- B, APHA 23nd Ed. 2017 (AAS)
22.	Chromium (as Cr+6)	mg/l	0.05	<0.1	IS 3025(Part-52): 200
23.	Copper (as Cu)	mg/l	1.5	<0.01	3110- B, APHA 23nd Ed. 2017 (AAS)
24.	Zinc (as Zn)	mg/l	15	0.13	3110- B, APHA 23nd Ed. 2017 (AAS)
25	Selenium (as Se)	mg/l	-	<0.1	IS: 3025 (P- 56)
26.	Anionic detergents (as MBAS)	mg/l	1.0	<0.1	Annexure K Of IS 13428
27.	Iron (as Fe)	mg/l	50	0..16	3500-Fe- B, APHA 23nd Ed. 2017
28.	Sulphide(as H_2S)	mg/l	-	<0.1	IS-3025 (P-29)
29.	Phosphate (as PO4)	mg/l	-	0.1	APHA 22nd Edn.2012-4500-P C
30.	Cyanide (as CN)	mg/l	0.05	<0.1	4500-CN-B,C & E, APHA 23nd Ed.2017
31.	Manganese (as Mn)	mg/l		0.04	3110- B, APHA 23nd Ed.2017
32.	COD	mg/l	-	8.0	IS 3025(Part-58): 2006

Microbiological Parameters

33.	Total Coli form	MPN/100 ml	5000	1800	IS : 1622-1981

End of Report

Microbiologist Signature

Authorized Signature

SHRI OM TESTING & RESEARCH LABORATORY

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Issued To	LEA Associate South Asia Pacific Pvt. Ltd.	Report No	ENVGW2020030301
		Date Of Sampling	29.02.2020
		Date of Issue in lab	03.03.2020
Project Name	Consulting Services for Environmental & Social Audit and Preparation of Environmental and Social Due Diligence Repo (ESDDR) and Environmental& Social Assessment and Management Plan (ESAMP)	Test Started On	03.03.2020
Nature of the Sample	Ground Water	Testing Completed	07.03.2020

SAMPLING & ANALYSIS DATA

Sample Collected By : Lab Representative
Sample Drawn On : 29.02.2019
Sample Quantity : 2L+ 500 ML
Sample packing Details : In Sealed Plastic Bottle & Glass Bottle
Analysis Duration : 03.03.2019 to 07.03.2019
Sample Description : Ground Water
Required Test Standard : IS 10500 : 2012

S. No.	Parameters	Unit	Limit (IS-10500:2012)		Results-GW1	Test method
			Desirable Limit	Permissible Limit		
1	Color	Hazen	5	15	<5	IS: 3025(Pt-4)
2	Odour	-	Agreeable	Agreeable	Agreeable	IS: 3025(Pt-5)
3	Taste	-	Agreeable	Agreeable	Agreeable	IS: 3025(Pt-8)
4	Turbidity	NTU	1	5	<1	IS 3025(Part-10)
5	pH	-	6.5-8.5	No Relaxation	6.98	IS: 3025(Pt-11)
6	Total Hardness (as CaCO3)	mg/l	200	600	300.0	IS 3025(Part-21)
7	Iron (as Fe)	mg/l	1.0	No Relaxation	0.18	3500-Fe- B, APHA 23nd Ed.2017
8	Chlorides (as Cl)	mg/l	250	1000	120.0	IS 3025(Part-32)
9	Fluoride (as F)	mg/l	1	1.5	0.64	4500-F-(D),APHA 23st Ed2017
10	TDS	mg/l	500	2000	660.0	IS 3025(Part-16)
11	Calcium(as Ca^{2+})	mg/l	75	200	80.0	IS 3025(Part-40)
12	Magnesium (as Mg^{2+})	mg/l	30	100	24.3	3500- Mg B, APHA 23nd Ed2017
13	Sulphate (as SO4)	mg/l	200	400	46.6	IS 3025(Part-24)
14	Nitrate(as NO3)	mg/l	45	No Relaxation	5.5	IS: 3025(Pt-34)

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Report No : ENVGW2020030301

15	Total Chromium (as Cr)	mg/l	0.05	No Relaxation	<0.01	
16	Alkalinity as CaCO3	mg/l	200	600	440.0	IS 3025(Part-23)
17	Aluminum (as Al)	mg/l	0.03	0.2	<0.01	IS 3025(Part-55)
18	Total Arsenic(as As)	mg/l	0.01	No Relaxation	<0.01	3110- B, APHA 23nd Ed2017
19	Copper (as Cu)	mg/l	0.05	1.5	<0.05	3110- B, APHA 23nd Ed2017
20	Manganese (as Mn)	mg/l	0.1	0.3	<0.01	3110- B, APHA 23nd Ed2017
21	Zinc (as Zn)	mg/l	5	15	0.18	3110- B, APHA 23nd Ed2017
22	Ammonia (as NH3-N)	mg/l	0.5	No Relaxation	<0.1	4500-NH_3-B &C, APHA 23rd ED2017
23	Anionic Detergents(as MBAS)	mg/l	0.2	1	<0.1	Annexure K of IS-13428.
24	Boron(as B)	mg/l	0.5	1	0.12	IS: 3025(Pt-57)
25	Mineral Oil	mg/l	0.5	No Relaxation	<0.1	IS 3025(Part-39)
26	Phenolic Compound (as C6H5OH)	mg/l	0.001	0.002	<0.001	IS 3025(Part-44)
27	Cadmium (as Cd)	mg/l	0.003	No Relaxation	<0.002	3110- B, APHA 23nd Ed2017
28	Cyanide(as CN)	mg/l	0.05	No Relaxation	<0.1	4500- CN-B,C &E, APHA 23nd Ed2017
29	Lead	mg/l	0.01	No Relaxation	<0.01	3110- B, APHA 23nd Ed2017
30	Mercury(as Hg)	mg/l	0.001	No Relaxation	<0.001	3110- B, APHA 23nd Ed2017
31.	Nickel (as Ni)	mg/l	0.02	No Relaxation	<0.02	3110- B, APHA 23nd Ed.2017
32.	Residual Free Chlorine	mg/l	0.2	1.0	<0.2	4500-Cl-B, APHA 23nd Ed2017
33.	Molybdenum (Mo)	mg/l	<0.05	0.07	No Relaxation	3110- B, APHA 23nd Ed.2017
34.	Polynuclear Aromatic Hydro Carbons	mg/l	<0.0001	0.0001	No Relaxation	APHA 6440,23nd Ed.2017
35.	Poly chlorinated biphenyl	mg/l	<0.0001	0.0005	No Relaxation	APHA 6430,23nd Ed.2017
32.	Residual Free Chlorine	mg/l	0.2	1.0	<0.2	4500-Cl-B, APHA 23nd Ed2017
	Microbiological Parameters					
36.	Total Coli form	MPN/100ml	Shall not be detectable in any 100 ml of sample		<1	IS : 1622-1981
37.	E.Coli	E.coli/100ml	Shall not be detectable in any 100 ml of sample		Absent	IS : 1622-1981

End of Report

Authorized