

FINAL REPORT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) STUDY FOR CGD NATURAL GAS PIPELINE FOR GA 11.24 IN TIKAMGARH, TEHSIL- NIWARI, DISTRICT- NIWARI, MADHYA PRADESH

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-that the information supplied to us for the purpose of preparing this report was (when supplied) and continues to be true, accurate and not misleading in any respect.

-that there are no other materials or other facts of which we have not been informed in relation to such matters.




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ABBREVIATIONS

| | |
|-----------|---|
| ATGL | Adani Total Gas Limited |
| AoI | Area of Influence |
| ASME | American Society of Mechanical Engineers |
| BCM | Billion Cubic Meters |
| CBM | Coal Bed Methane |
| CGD | City Gas Distribution |
| CGS | City Gate Station |
| CGWA | Central Ground Water Authority |
| CNG | Compressed Natural Gas |
| COP-26 | 26th UN Climate Change Conference of the Parties |
| CPCB | Central Pollution Control Board |
| DRS | District Regulatory Station |
| EHS | Environment, Health, and Safety |
| EIA | Environmental Impact Assessment |
| ESIA | Environmental and Social Impact Assessment |
| ESIA | Environmental and Social Impact Assessment |
| G.S.R | Gazette of India, Statutory Rules and Orders |
| GA | Geographical Area |
| GA | Geographical Area |
| GI | Galvanized Iron |
| GIS | Geographic Information System |
| H.T. Line | High Tension Line |
| HDD | Horizontal Directional Drilling |
| IFC | International Finance Corporation |
| ISO | International Organization for Standardization |
| JV | Joint Venture |
| MoEF&CC | Ministry of Environment, Forests and Climate Change |
| MSS | Manufacturers Standardization Society |
| MUT | Mechanized Ultrasonic Testing |
| NG | Natural Gas |
| NH | National Highway |
| NOCs | National Oil Companies |
| OISD | Oil Industry Safety Directorate |
| PCV | Pressure Control Valve |
| PESO | Petroleum & Explosive Safety Organization |
| PNGRB | Petroleum & Natural Gas Regulatory Board |
| RoU | Right of Use |
| RoW | Right of Way |
| ROW | Right of Way |
| SCADA | Supervisory Control and Data Acquisition |
| SOP | Standard operating Procedure |
| SDG | Sustainable Development Goal |
| SH | State Highway |
| UN | United Nations |

NON-TECHNICAL SUMMARY

INTRODUCTION

Adani Total Gas Limited (hereinafter referred as **ATGL**) is in the process of developing City Gas Distribution (CGD) networks to deliver Piped Natural Gas (PNG) to industrial, commercial, and residential sectors, as well as Compressed Natural Gas (CNG) to the transportation sector. Natural gas is a reliable, convenient, and environmentally friendly fuel that provides consumers with enhanced safety, convenience, and economic efficiency.

The company has already set up city gas distribution networks in various locations in India. During the 11th round of CGD bidding, Adani Total Gas Limited has successfully bid for multiple Geographical Areas (GA) in Chhattisgarh, Madhya Pradesh, Maharashtra, Jharkhand and Odisha the list of all the 11 GAs. To cater industrial, commercial and transportation demand of natural gas **ATGL** has planned to develop a total of **“22.161 km Natural Gas Pipeline Infrastructure”** in Niwari District of Madhya Pradesh India. The CGD is proposed via one route approximately 22.161 km from Bijoli Village to proposed Orchha Helipad of natural gas in the Niwari District of Madhya Pradesh.

ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT (ESIA STUDY) & SCREENING

TÜV SÜD South Asia Private Limited (hereinafter referred as **“TÜV SÜD”**) has been entrusted by **ATGL** for providing consultancy services of Environmental and Social Impact Assessment Study (ESIA) for City Gas Distribution Project at Niwari District, Madhya Pradesh, India. The objective of the study is to assess potential Social and Ecological, Environmental Impacts from the project on the environment and social setting and address mitigation measures for the identified impacts. Environmental and Social management Plan (ESMP) has been designed in line with the impact identified and mitigation measures suggested in this report. In accordance with the screening criteria of IFC, and in accordance the observations of site reconnaissance survey, **TÜV SÜD** ESIA team has categorized Project as **Category B+**, since the proposed line route passes through the Katelakhandi Reserve Forest, Larpura Reserve Forest, Bangaon Reserve Forest range and require forest clearance.


AREA OF INFLUENCE (AOI) FOR ESIA STUDY

ESIA study to evaluate environment and social risks and impacts associated with the Project.

The overall area covered by the assessment includes the following constituent areas:

- The footprint of the project, hereafter referred to as the ‘Project Site’.
- The area extending 500 m (either side) outward from the project site boundary (estimated to contain the potential receptors of any project related environment, social and ecological impacts), hereafter referred to as the ‘Area of Influence’ or ‘AOI’; and
- Buffer zone is 5 km.

LEGAL FRAMEWORK

| | |
|---|---|
| Client: Adani Total Gas Limited | Assignment Name: Environmental and Social Impact Assessment (ESIA) Study for Natural Gas Pipeline for Tikamgarh GA, District- Niwari, Madhya Pradesh Report No.: 2025/ET-006496/AD/NA/NA/64187 Version No and Date of Version: Ver 01 dated 17.07.2025 |
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The Environmental and Social Impact Assessment study report has been prepared in accordance with major international and national regulatory frameworks. The major guidelines considered for the project are the IFC's EHS Guidelines dated 30th April 2007. The IFC performance standard, 2012 and Equators principle "EP4" guideline has also been considered during the study.

PROJECT DESCRIPTION

ATGL is responsible for laying (6 inches diameter), building, operating or expanding the CGD of natural gas pipeline network planned in approx. 22.161 km stretch across Bijoli Village to proposed Orchha Helipad in Niwari District.

BASELINE ENVIRONMENTAL AND SOCIAL CONDITION

The baseline environmental, ecological, and social conditions of the project area have been assessed within 05 km radius of study area. Assessment of physical environmental parameters is currently under progress and ecological, and environmental survey was conducted during the site visit from **20th to 21st February 2025**


ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT

As per impact assessment study conducted for the proposed CGD for the natural gas pipeline project, environmental and social parameters can be mitigated with prescribed measures. Permission will be required for NH from the NHAI, for SH and ODR from the relevant state departments the pipeline route, permission from Railways will be required for the pipeline route, permission from the forest department will also be required as it passes through the Katelakhandi Reserve Forest, Larpura Reserve Forest, Bangaon Reserve Forest range. Therefore, during the Planning Phase, the impact of land procurement is initially moderate, but with proper mitigation and permissions, it reduces to low.

During construction Phase, various factors such as topography, drainage, water resources, and ambient air and noise quality have moderate impacts, which can be reduced to low with appropriate management. Ecology shows a low impact, which becomes insignificant post-mitigation. Socio-economic impacts are initially low but can turn moderate-beneficial because of community engagement and local employment. Occupational health and safety risks, which are moderate at first, are minimized to low with proper safety measures. In the Operational Phase, the water environment and health & safety impacts are low, and with effective measures, they reduce to insignificant. Summary of impacts has been provided below.

Table: Summary of Impacts

| Category | Impact Significance (without mitigation measures) | Impact Significance (post-mitigation) |
|----------------------------------|---|---------------------------------------|
| Planning Phase | | |
| Impact due to Land Procurement | Moderate | Low |
| Construction Phase | | |
| Topography and Drainage | Moderate | Low |
| Water resources and availability | Low | Insignificant |
| Ambient air and noise quality | Moderate | Low |

| | |
|---|---|
| Client: Adani Total Gas Limited | Assignment Name: Environmental and Social Impact Assessment (ESIA) Study for Natural Gas Pipeline for Tikamgarh GA, District- Niwari, Madhya Pradesh Report No.: 2025/ET-006496/AD/NA/NA/64187 Version No and Date of Version: Ver 01 dated 17.07.2025 |
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| Category | Impact Significance (without mitigation measures) | Impact Significance (post-mitigation) |
|--------------------------------|---|---------------------------------------|
| Ecology | Low | Insignificant |
| Socio-economic Impacts | Low | Moderate-beneficial |
| Occupational Health and Safety | Moderate | Low |
| Operational Phase | | |
| Water Environment | Low | Insignificant |
| Environment Health & Safety | Low | Insignificant |

*Source: Analysis by TUV-SUD Team

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

Environmental and Social Management Plan for the project has been designed in accordance with the impact identified during the project lifecycle (Construction and Operation phase). Adequate mitigation measures have been suggested against each identified impact during each of the above-mentioned phases.

Based on the ESIA Study conducted, it may be concluded that the project is eco-friendly and environmentally sustainable in the long run. The project will not only help in reducing the CO₂ emission responsible for global warming but also other gases and particulate emissions, which otherwise would be generated using conventional fossil fuel-based transportation vehicles and to cater energy demand for residential and commercial use. This Baseline ESIA study together with mitigation measures and follow up of recommendations on management actions will help **ATGL** in complying with the environmental & social standards/safeguard policy of MFIs & National regulations as well.

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1 INTRODUCTION

1.1 BACKGROUND


Energy has been essential to human advancement since the "Industrial Revolution," and it will continue to be a key component of India's economic growth. India is home to about 18% of the world's population. Only about 6% of the world's basic energy resources are currently consumed by it. India uses around a third of the world's average amount of energy per person. However, as the nation continues to grow and prosper, so too will its energy needs in the years to come. The government's first objective is to guarantee that people have access to clean and sustainable energy sources. The Indian government is making strategic efforts to achieve Sustainable Development Goal (SDG) 7, which is to ***“Ensure access to affordable, reliable, sustainable, and modern energy for all.”*** The government has taken various steps to achieve the five nectar elements (Panchamrit) of India's climate action as outlined during COP-26 by achieving the target of net-zero emissions by 2070 and reduction of the carbon intensity of the economy by 45 percent by 2030.

Energy is fundamental to economic development and plays a vital role in driving a country's growth. In India's energy portfolio, the Oil and gas sector holds a significant share of around one-third and is posed to continue serving as a critical enabler of India's rapidly growing economy. Energy is the mainstay of socio-economic growth and development for a nation like India which is currently the third largest primary energy consumer while its per-capita energy consumption is only a third of the global average. As per various projections, India's Energy Demand is expected to grow at 2.7% till 2050 as compared to World's 0.6%. India constitutes ~6% of the global primary energy demand wherein it constitutes 9.4% of the global oil demand and 2.2% of the global gas demand.

The demand for energy is met mostly by fossil fuels as fossil fuels make up 88% of India's primary energy requirement. Coal accounts for 55% of the energy mix, oil, and gas account for 28% and 6%, respectively. During the financial year 2022-23, 67% of natural gas production was by National Oil Companies from nomination regime, 33% of natural gas production was by Private/JV companies/ NOCs from Contract regimes (inclusive of ~2% was from Coal Bed Methane). The import dependency on crude oil and natural gas based on consumption of petroleum products in 2022-23 was about 87.4 % and 43.9 %, respectively. This provides a scope and opportunity for increasing energy consumption by India in near future and it being the central driving force in the global energy narrative. The Oil & Gas sector holds a prominent position as one of India's eight core industries, exerting significant influence on decision-making across various sectors of the economy.¹

Adani Total Gas Limited (ATGL) is in the process of developing City Gas Distribution (CGD) networks to deliver Piped Natural Gas (PNG) to industrial, commercial, and residential sectors, as well as Compressed

¹ Indian Petroleum and Natural Gas Statistics (2022-23), Ministry of Petroleum & Natural Gas, GOI

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Natural Gas (CNG) to the transportation sector. Natural gas is a reliable, convenient, and environmentally friendly fuel that provides consumers with enhanced safety, convenience, and economic efficiency.

The company has already set up city gas distribution networks in various locations in India. During the 11th round of CGD bidding, Adani Total Gas Limited has successfully bid for multiple Geographical Areas (GA) in Chhattisgarh, Madhya Pradesh, Maharashtra, Jharkhand and Odisha the list of all the 11 GAs for which Adani Gas Limited has been granted authorization to lay city gas infrastructure and supply natural gas in the XI round of CGD bidding is attached in **Niwari District**, Madhya Pradesh. To cater industrial, commercial and transportation demand of natural gas in Niwari and the surroundings, ATGL has planned to develop a total of “22.161 kms Natural Gas Pipeline Infrastructure” in Niwari District via one route.

Table 1-1. Among these, Adani Total Gas Limited received authorization for development of CGD for the GA: Niwari District, Madhya Pradesh. To cater industrial, commercial and transportation demand of natural gas in Niwari and the surroundings, ATGL has planned to develop a total of “22.161 kms Natural Gas Pipeline Infrastructure” in Niwari District via one route.

Table 1-1: List of 11 GAs for CGD And Supply Natural Gas in XI Round


| S. No. | GA ID | GA Name |
|--------|--------------|---|
| 1. | 11.09 | Kabirdhan, Raj Nandgaon and Knker districts |
| 2. | 11.10 | Mungeli, Bemetara, Durg, Balod and Dhamtari districts |
| 3. | 11.11 | Jashpur, Raigarh, Janjgir-Champa and Mahasamund districts |
| 4. | 11.19 | Gumla, Latehar, Lohardaga, Simdega, Garhwa and Khunti districts |
| 5. | 11.23 | Burhanpur, Khandwa, Khargone and Harda districts |
| 6. | 11.24 | Niwari, Niwar, Chhattarpur and Panna districts |
| 7. | 11.30 | Akola, Hindoli and Washim districts |
| 8. | 11.31 | Amravati and Yavatmal districts |
| 9. | 11.34 | Bhandara, Gondiya and Garchiroli districts |
| 10. | 11.35 | Alirajpur, Nandurbar and Barwani districts |
| 11. | 11.36 | Koraput, Malkangiri and Nabarangpur district |

1.2 PROJECT BRIEF

Adani Total Gas Limited (ATGL) is a joint venture between Adani Group and Total Energies. ATGL is one of India’s largest city gas distribution companies. **ATGL** specializes in the development of city gas distribution (CGD) networks for the continuous supply of piped natural gas (PNG) and compressed natural gas (CNG).

With intent of catering demand of natural gas of several industrial and commercial service sectors in, ATGL has planned to develop a total of 22.161 Kms Natural Gas Pipeline Infrastructure in Niwari, Madhya Pradesh. The pipeline has been planned to be laid in single line route from Bijoli Village to Pratappura village in Niwari district.

ATGL is responsible for designing and installation of optimal size of the infrastructure in terms of pipeline of various types including steel belting of the authorized area, allied equipment and facilities in the NG

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pipeline network depending upon the potential demand for natural gas. The infrastructure in the network will be adequate to maintain uninterrupted flow of natural gas in the pipelines.

The service for Environment and Social Impact Assessment (hereinafter referred as “ESIA”) has been aligned in accordance with the **International Finance Corporation (IFC’s) Performance Standards (PS) on Environmental & Social Sustainability (2012)**. The pipeline being included within the regulatory framework of host country, attracts MoEF&CC EIA Notification 2006 & its subsequent amendments. The proposed natural gas pipeline has been categorised under “**Item 6(a) i.e., Oil & gas transportation pipeline (crude and refinery/ petrochemical products), passing through national parks /sanctuaries/coral reefs /ecologically sensitive areas including LNG Terminal**” of Schedule of EIA Notification,2006 & its subsequent amendments²².”

1.3 PROJECT DEVELOPER

Adani Total Gas Limited (ATGL) is a joint venture between Adani Group and Total Energies. ATGL is one of India’s largest city gas distribution companies. The company specializes in the development of city gas distribution (CGD) networks for the continuous supply of piped natural gas (PNG) and compressed natural gas (CNG). These networks provide natural gas as a convenient, economical, dependable, and environmentally friendly fuel option, offering consumers safety and convenience. ATGL has ventured into e-mobility and biomass business through two wholly owned subsidiaries – Adani Total Energies E-mobility Limited (ATEL) and Adani Total Energies Biomass Limited (ATBL) respectively.

The company is expanding its operations to include the production and distribution of clean energy derived from biomass, as well as the establishment of electric vehicle charging infrastructure. ATGL is adopting a comprehensive approach by providing a unified wallet offering that encompasses basket of services. Additionally, ATGL has entered the gas meter manufacturing sector (mechanical and smart meters), through its JV, SMTPL.


1.4 ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) CONSULTANT

TÜV SÜD South Asia Private Limited (hereinafter referred as “**TÜV SÜD**”) has been entrusted by **ATGL** for providing consultancy services of Environmental and Social Impact Assessment Study (ESIA) for City Gas Distribution Project at Niwari District, Madhya Pradesh, India.

TÜV SÜD is one of the leading testing, certification, and technical advisory firm. TUV SUD was established in 1995 in India and is a 100% owned subsidiary of **TUV SUD AG, Germany**. It is the trusted advisor to some of the world’s leading businesses and institutions. The organization provides products, services, and insights to private, public, and independent sector organizations throughout the capital value chain, drawn from nearly two decades of front-line experience.

Working for many years with evaluation and assessment of sustainability, environment, safety, and social management, supply chain management and performance of companies all over the world and working

²² [standardtorreference.pdf](#)

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with Bi-lateral and Multilateral Financial Institutions (MFIs), **TÜV SÜD** has developed an eclectic understanding in Environment, Social, Safety management system and presenting our studies in a balanced and trustworthy manner. Assessment of projects impact on environmental and social aspects and reporting by **TÜV SÜD** will therefore add trust and confidence to the report and your communication with stakeholders.

1.5 SCREENING OF THE PROJECT & RATIONAL

The purpose of this assignment is to evaluate the environmental and social impacts of the proposed project in line with the **International Finance Corporation (IFC's)** Performance Standards (PS) on Environmental & Social Sustainability (2012) and other national and international statutory regulations applicable to the project.


This project has been screened considering guidelines provided in **IFC's** Interpretation Note (IN) on Environmental and Social Categorization, 2012. Categories underlined in **IFC** Project screening methodology are as follows:

- **Category A:** Business activities with potential significant adverse environmental or social risks and/or impacts that are diverse, irreversible, or unprecedented.
- **Category B:** Business activities with potential limited adverse environmental or social risks and/or impacts that are few, generally site-specific, largely reversible, and readily addressed through mitigation measures.
- **Category B+:** The categorization of projects under B+ generally covers small to medium-scale projects which have localized impacts and can be managed through the implementation of specific mitigation measures. These projects might involve changes to land use, small-scale infrastructure development, or activities that don't significantly affect sensitive areas like forests, wetlands, or biodiversity hotspots.
- **Category C:** Business activities with minimal or no adverse environmental or social risks and/or impacts.
- **Category FI:** Business activities involving investments in financial institutions (FIs) or through delivery mechanisms involving financial intermediation.

In accordance with the screening criteria of IFC, and in accordance the observations of site reconnaissance survey, **TÜV SÜD** ESIA team has categorized Project as **Category B+**, which specifies that the project can have potential limited adverse social or environmental impacts since the proposed line route passes through the Katelakhundi Reserve Forest, Larpura Reserve Forest, Bangaon Reserve Forest range and require forest clearance.

1.6 LIMITATIONS OF THE STUDY

The EIA Report has been prepared based on professional judgement to ascertain facts with resultant subjective interpretations. Professional judgments expressed herein are based on the facts available

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within the limits of the scope of work, information provided by the client or its representatives, prevailing secondary data, budget, and schedule.


The walk-through survey along with a brief discussion with project stakeholders was undertaken during the site visit based on the present understanding of the project. This assessment may change in case of a change in the project location. The documents like SOPs, policy and procedures for EHS&S management were limited for review at the time of pre-project desktop review process. The Traffic Survey was not conducted by TUV team on site, however, the team has prepared a generic Traffic Management Plan enclosed in Section 9.13 of this report for highlighting the suggestions for the client to prepare a detailed Traffic Management Plan as per the site condition.

1.7 CONTENTS OF ESIA REPORT

The report has been divided into the following chapters as depicted in **Table 1-2**:

Table 1-2: Contents of ESIA Report

| Chapter | Title | Description and Details |
|-----------|---|---|
| Chapter 1 | Introduction | This chapter provides background information of the existing pipeline, brief description and objectives of the project, scope of the study. |
| Chapter 2 | Project Description | This chapter presents the details of the proposed project with description of the resources required and emissions, waste and wastewater anticipated to be generated. |
| Chapter 3 | Legal, Policy and Administrative Framework | Assessment of applicable laws & legislations, and institutional framework for its implementation. |
| Chapter 4 | Description of Environment | This chapter describes the existing baseline status of environment components collected in a pre-defined study area based on primary and secondary data collection. |
| Chapter 5 | Anticipated environment impacts and mitigation measures | This chapter describes the potential impacts of the proposed project and evaluates their significance based on parameters such as Intensity, Spatial extension, Temporal duration, and Environmental Vulnerability. Impact avoidance and mitigation measures are delineated. |
| Chapter 6 | Analysis of Alternatives | This chapter assesses the alternative routes, assesses their feasibility for pipeline construction, and examines the reasons why certain routes may not be viable. |
| Chapter 7 | Additional Studies | This chapter assesses the potential risks involved in the construction and operation of proposed facilities and presents a Disaster Management Plan (DMP). |
| Chapter 8 | Project Benefits | This chapter presents the details of direct and indirect benefits due to proposed project. |
| Chapter 9 | Environment Monitoring & Management Plan | This chapter describes the details of the monitoring schedule to be implemented for checking the effectiveness of mitigation measures. It covers the parameters, frequency, and location of monitoring. If existing monitoring schedule is sufficient to cover the proposed development, the same has been clearly mentioned. The chapter |

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| Chapter | Title | Description and Details |
|------------|-----------------------|---|
| | | also describes the organizational structure and resources planned for implementing the mitigation measures and monitoring schedule. |
| Chapter 10 | Summary & Conclusions | This chapter summarizes the potential positive and negative environmental impacts of the project. |

1.8 NEED AND SCOPE OF ESIA

The purpose of this ESIA is to assess the potential environmental and social impacts due to the proposed project in a study area of 05 km radius around and 500 m on both sides of the pipeline. The assessment covers both construction and operation phases of the project. The ESIA forecasts changes (positive and negative) that may occur because of key project activities to the baseline environmental conditions in the study area. Early identification of impacts and their mitigation reduces the risk of long-term adverse environmental effects.

The broad scope of work will be undertaken by the consultant for ESIA study includes the following aspects of proposed project but not limited to the following:

- Literature survey, data collection, examination of available environmental, social reports/data, understanding the proposed project through project report and discussions etc.


Baseline environmental studies shall be carried out as below, but not limited to:

■ Physical environment

- Temperature, Wind speed, Wind direction, Wind rose patterns, relative humidity, Rainfall, Visibility, Cloud cover, Solar Radiation.
- Ambient air quality (PM10, PM2.5, SO2, NOx, CO) to be monitored as per CPCB guidelines.
- Noise levels of the study area shall be monitored and measured as per CPCB guidelines and IFC PS requirements.
- Ground water quality (drinking purpose) shall be monitored against IS specifications.
- Surface water quality shall be monitored and measured as per CPCB norms.
- Soil quality of study area will be monitored and analyzed for parameters as per ICAR specification/guidelines.
- Geological & hydro geological data/information will be compiled from secondary sources or as per study requirement.
- Land use information/status will be based on the district census handbooks as well as with the help of satellite imagery.

■ Ecological environment

- This shall include assessments/information of terrestrial and aquatic communities (as

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applicable), presence of rare, threatened & endangered species etc. if any.

- The survey also includes identification & presence of national parks, sanctuaries, Biodiversity Park, endangered/threatened/ rare species & assessment of the species diversity, density, abundance etc. and formulation of ecological indexes.

■ Socioeconomic environment


- Demographical information/status will be based on census document and other state level / district level databases.
- Socio-economic information and profile outlining data from census and socio- economic surveys, with information on livelihood profile, infrastructure, vulnerability, gender, indigenous peoples (ethnic minorities, scheduled tribes), and labour.
- Identification of historical/ archaeological sites/ monuments in the study area (if any) based on Archaeological Survey of India (ASI)/revenue records.
- Identification of common property resources within project site and mitigation measures, if any.
- Traffic survey for the present daily traffic, peak hour traffic and traffic composition & any change in traffic composition and volumes due to project development.

■ Assessment of E&S Impacts


- The potential E&S impacts will be assessed based on baseline data generated from studies. It should be analyzed and compared with applicable standards for each environmental attribute. The short term and long-term impacts particularly on sensitive targets such as endangered species, plants and historically important monuments should also be identified.
- A qualitative and quantitative assessment of sources of pollution from proposed project (dust, wastewater, noise pollution, solid waste, etc.) should be done to identify the adequacy of the proposed control measures as well as the likely impact on existing critical areas.
- Discuss the land procurement / acquisition process, considering Indian laws, rules and regulations. Rates of compensation paid in accordance with market rates, consultation before land procurement shall be reflected with relevant evidence in the Study.
- Discuss impacts on indigenous peoples or scheduled tribes.
- Impacts will be assessed for both Construction & Operation phases.

■ Environmental, Social & Biodiversity management & monitoring plan

- Identify and summarize all anticipated significant adverse E&S impacts along with mitigation measures.
- Define a set of policies and objectives for environmental performance and continual enhancement of performance.

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- Monitoring programme for the proposed project (for construction & operation phase) will be worked out covering all E&S attributes as per the best practices in the World Bank/IFC General and sector specific EHS.
- For each potential negative impact identified, recommendations will be presented for avoidance, minimization or mitigation of impacts along with costs associated with potential mitigation. The ESMP will address the following:
 - i. Recommend monitoring and reporting procedures including the parameters to monitored, methods to be used, sampling locations, frequency of measurements, detection limits and definition of thresholds that will signal the need for corrective actions.
 - ii. Develop management plan for addressing specific issues such as waste management, disasters, emergencies, external grievances, construction safety, labour management, stakeholder engagement, indigenous peoples etc.


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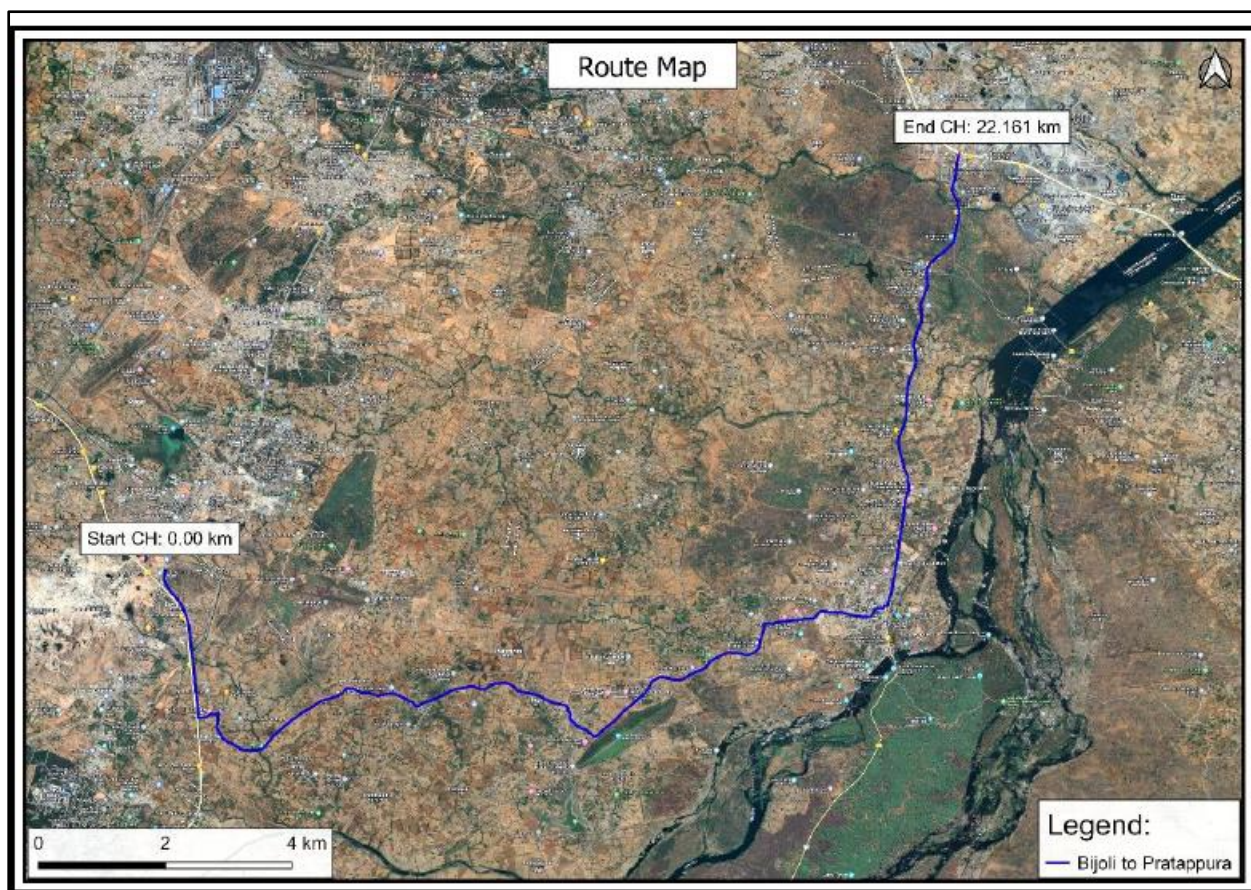
2 PROJECT DESCRIPTION

2.1 DESCRIPTION OF NATURAL GAS PIPELINE NETWORK

Adani Gas Limited has been granted authorization for laying, building, operating or expanding the City Gas Distribution CGD Network in GA 11.24 i.e., Tikamgarh, Niwari, Chattarpur and Panna districts and the proposed CGD covers four charge areas in the state of Madhya Pradesh. This report covers the Niwari District GA where ATGL has planned to lay 8 inches diameter natural gas pipeline network in approx. 22.161 km stretch covering villages including Bijoli, Bangay Har, Bangay Khas, Azadpura, Orcha, Pratappura.

Adani Gas Limited is responsible for laying, building, operating or expanding the (CGD) network of optimal size of the infrastructure in terms of pipeline of various types including steel belting of the authorized area, allied equipment and facilities in the NG pipeline network depending upon the potential demand for natural gas. The infrastructure in the NG pipeline network will be adequate to maintain uninterrupted flow of natural gas. **Figure 2-1** provides the details of layout of the pipeline gas network

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*Source: ATGL and Google Earth

Figure 2-1: Route Map of Proposed Natural Gas Pipeline Network of Pipeline Route

2.2 PROJECT IMPLEMENTATION SCHEDULE

A grant of authorization was signed on 15th March 2022 by Petroleum and Natural Gas Regulatory Board (PNGRB) vide a letter of authorization to AGL group. The letter schedule D of the letter stated the year wise work program within the 8-contract year period.

2.3 PIPELINE ROUTE & ACCESSIBILITY


The CGD pipeline running along the ROW of the Niwari GA is divided into a single pipeline route, beginning from Bijoli and extending to the proposed Orchha Helipad. The details of each route are provided below.

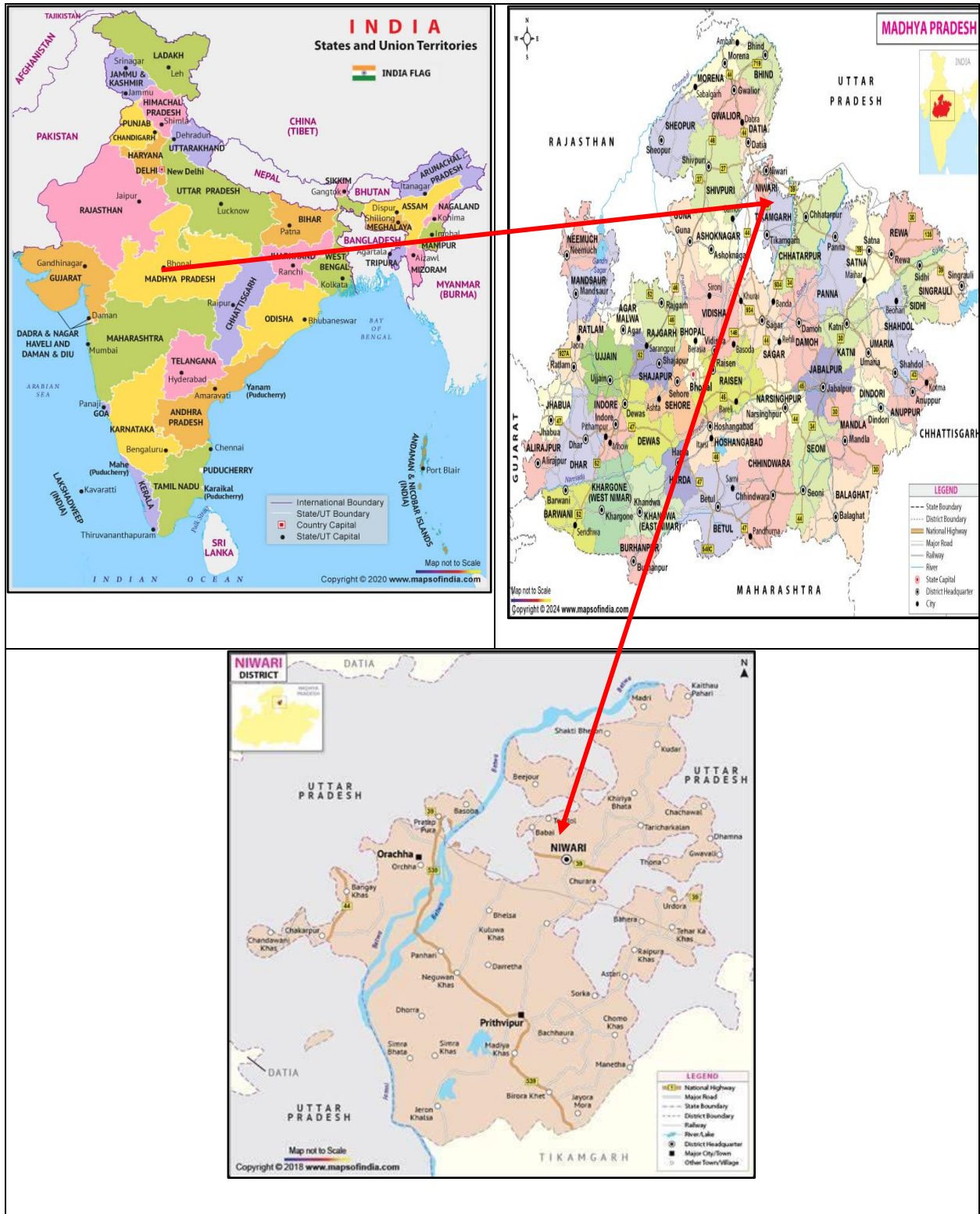
Table 2-1: Basic Details of the Pipeline

| Sl.No | Feature | | Pipeline Route |
|-------|----------------------|-------------------------|--------------------------------|
| 1 | Name of the pipeline | | Bijoli to Pratappura |
| 2 | Length | | 22.161 Km |
| 3 | Start Point | Name | Bijoli |
| 4 | | Location of coordinates | 78°32'18.73"E 25°21'28.04"N |
| 5 | | Tehsil | Orchha |

| | | | |
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| Sl.No | Feature | | Pipeline Route |
|-------|-----------|-------------------------|--------------------------------|
| 6 | | District | Niwari |
| 7 | End point | Name | Pratappura |
| 8 | | Location of coordinates | 78°39'04.62"E 25°24'59.80"N |
| 9 | | Tehsil | Orchha |
| 10 | | District | Niwari |
| 11 | | State | Madhya Pradesh |

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| Client: Adani Total Gas Limited | Assignment Name: Environmental and Social Impact Assessment (ESIA) Study for Natural Gas Pipeline for GA 11.24 in Tikamgarh and Surrounding Villages, District-Niwari, Madhya Pradesh Report No.: 2025/ET-006496/AD/NA/NA/64187 Version No and Date of Version: Ver 01 dated 17.06.2025 |
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*Source: Maps of India

Figure 2-2: Location Map of Project Site

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| <p>Photo 2.1: Proposed Pipeline Route Starting point</p> | <p>Photo 2.2: Canal Crossing the Proposed Pipeline Route in near Laltipur Road</p> |
| | |
| <p>Photo 2.3: CGS for the proposed pipeline route at Raksa</p> | <p>Photo 2.4: Proposed Pipeline Route after excavation work at Majra Bangaya Village</p> |

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*Source: TUV SUD Primary Survey

Figure 2-3: Photos of the Proposed Pipeline Routes

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List of the Crossings for the pipeline route is given in **Table 2-2** and Details of all the major crossing along with its chainage are given in **Table 2-3**.

Table 2-2: List of Crossings for all the Three Pipeline Routes

| Sl. No. | Detail of Crossing | Pipeline Route |
|--------------|--------------------|----------------|
| 1. | NH | 2 |
| 2. | Road | 9 |
| 3. | Cart track | - |
| 4. | Railway | 1 |
| 5. | River | 1 |
| 6. | Canal | 1 |
| 7. | Nala/ Drain | - |
| 8. | Pipeline | - |
| 9. | H.T/Powerline | - |
| Total | | 15 |

**Source: DPR, Adani Total Gas Limited*


Table 2-3: Details of Major Crossing within Proposed Pipeline Routes

| Sl. No. | Description | Chainage (m) | | | Location |
|--|-----------------------|--------------|-----------|----------|-------------|
| | | Start | Centre | End | |
| Pipeline Route: Bijoli to Orchha Helipad | | | | | |
| ROAD CROSSINGS | | | | | |
| 1 | Jhansi Babina Road | 0.00 | 17.915 | 35.83 | TP0-TP1 |
| 2 | Unnamed Road | 7723.43 | 7787.815 | 7852.2 | TP170-TP171 |
| 3 | Unnamed Road | 9488.67 | 9537.91 | 9587.15 | TP205-TP206 |
| 4 | Unnamed Road | 10828.45 | 10889.15 | 10849.85 | TP234-TP235 |
| 5 | Unnamed Road | 12819.4 | 12825.72 | 12832.04 | TP291-TP292 |
| 6 | Orchha Bypass Road | 14557.84 | 14571.705 | 14585.57 | TP346-TP347 |
| 7 | Tikamgarh Jhansi Road | 14731.71 | 14753.555 | 14775.4 | TP354-TP355 |
| 8 | Unnamed Road | 16610.27 | 16631.885 | 16653.5 | TP384-TP385 |
| 9 | Rajmahal Road | 17931.63 | 17982.57 | 18033.51 | TP402-TP403 |
| Railway Crossing | | | | | |
| 10 | Railway Line Crossing | 20177.76 | 20220.29 | 20262.82 | TP440-TP441 |
| Cannel Crossing | | | | | |
| 11 | Unnamed Cannel | 1229.43 | 1444.67 | 1659.91 | TP18-TP19 |

**Source: DPR, Adani Total Gas Limited and TUV-SUD Secondary Survey*

Table 2-4: Technical Specifications of Pipeline

| Sl. No. | Description | Piping Details |
|---------|--|---------------------------------------|
| 1. | Pipeline internal Diameter (Inches) | 8" |
| 2. | Pipeline Wall Thickness (mm) | 6.4 |
| 3. | Pipeline Grade/Material Specifications | CS, API5L-X42, ERW, BE |
| 4. | Type of Coating | External 3-Layer Polyethylene Coating |
| 5. | Normal Operating Pressure | 26 Bar |
| 6. | Maximum Allowable Operating Pressure (Design Pressure) | 49 Bar |
| 7. | Design Throughput (MMSCMD) | 1.9811 MMSCMD |
| 8. | Pipeline Design Life | 40 years |
| 9. | Design Temperature (°C) | 0/+65 Degree C |

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| Sl. No. | Description | Piping Details |
|---------|-------------------------|--|
| 10. | Mainline Valve Stations | distance between two subsequent SV shall not be more than 3 km as per PNGRB regulation |

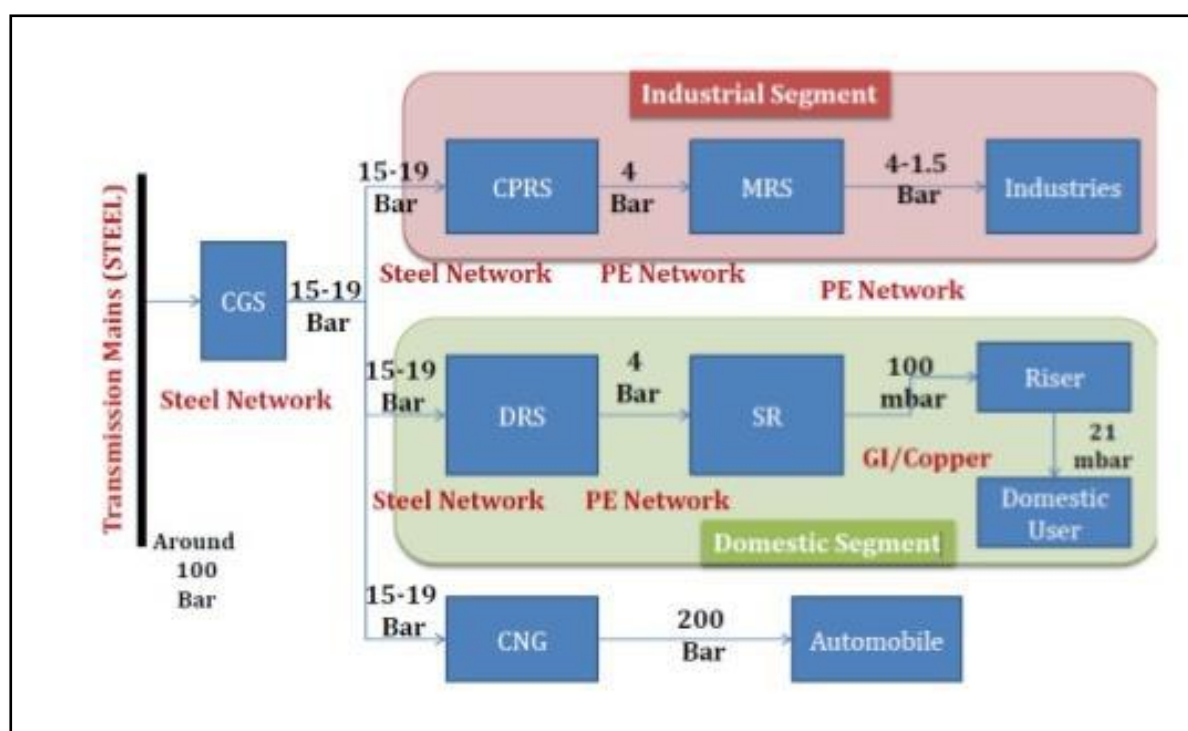
*Source: DPR, Adani Total Gas Limited

2.4 ASSOCIATED TECHNICAL FACILITIES

2.4.1 CGD Network

A typical CGD network shall comprise of one or more or all the following:

- City Gate Station (CGS)
- Pipeline Network-Steel pipeline, Polyethylene pipeline etc.
- Regulating stations- District Regulating Stations (DRS), Service Regulators, Domestic / Commercial / Industrial Regulators.
- Metering Stations / Metering & Regulating Stations (MRS)
- CNG Stations



*Source: DPR, Adani Total Gas Limited

Figure 2-4: Network Diagram- Typical Arrangement Network of CGD

Project Company will take tap-off from nearest natural gas transmission pipeline of Gas Suppliers and further lay steel pipeline network, build City Gate Stations (CGS), Compressed Natural Gas (CNG) stations & District Regulating Stations (DRS), lay MDPE pipeline network etc in the various GAS for supplying piped natural gas to Domestic Households, Commercial & Industrial consumers and CNG to

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Automotive sector. The steel pipeline route will be mainly along the National or State highways from CGS and will further spread inside city boundaries.

The Gas Distribution network will be designed and engineered primarily in accordance with the provisions of the PNGRB Regulations GSR 612(E), Aug' 2008 (T4S) and ASME Standards for Gas Transmissions and Piping Systems (ASME B31.8).

2.4.2 City Gate Station (CGS)

The gas from pipeline owner shall be available at a maximum pressure of 49 Bar(g) at the upstream of CGS. Pressure reduction skid is assumed to be installed by pipeline owner or CGD entity within its premise as per their normal business practice. Un-odourised gas is assumed to be made available from the downstream flange at the outlet of pressure reduction skid after metering at a maximum pressure of 45 Bar(g).

2.4.2.1 Steel Network

Steel pipeline sizes is generally restricted to 16" NB, 12" NB, 8" NB, 6" NB & 4" NB whereas, spur lines shall be of 4" NB. Steel pipeline is proposed to be installed at a minimum depth of 1.2 meters of soil cover, and in accordance with international standards for pipeline laying.

2.4.2.2 District Regulating Station (DRS)

DRS are provided at various demand centres based on the requirement. DRS are located either in customer's premise or at a safe location on the roadsides. DRS capacity may be 5000 SCMH, 2500 SCMH, 1500 SCMH and 1000 SCMH or below is based on its availability and requirement in a particular area.


2.4.2.3 CNG Stations (MOTHER /ONLINE/DAUGHTER/ DAUGHTER BOOSTER Stations)

CNG Station

CNG station is a site consisting of interconnected equipment, which is designed to compress natural gas to a high pressure, store and dispense it directly to a natural gas vehicle. CNG stations are located at various locations in the city based on the demand and availability of land. CNG station can be either – On-line station (including mother stations) or daughter booster station.

Mother / Online Station

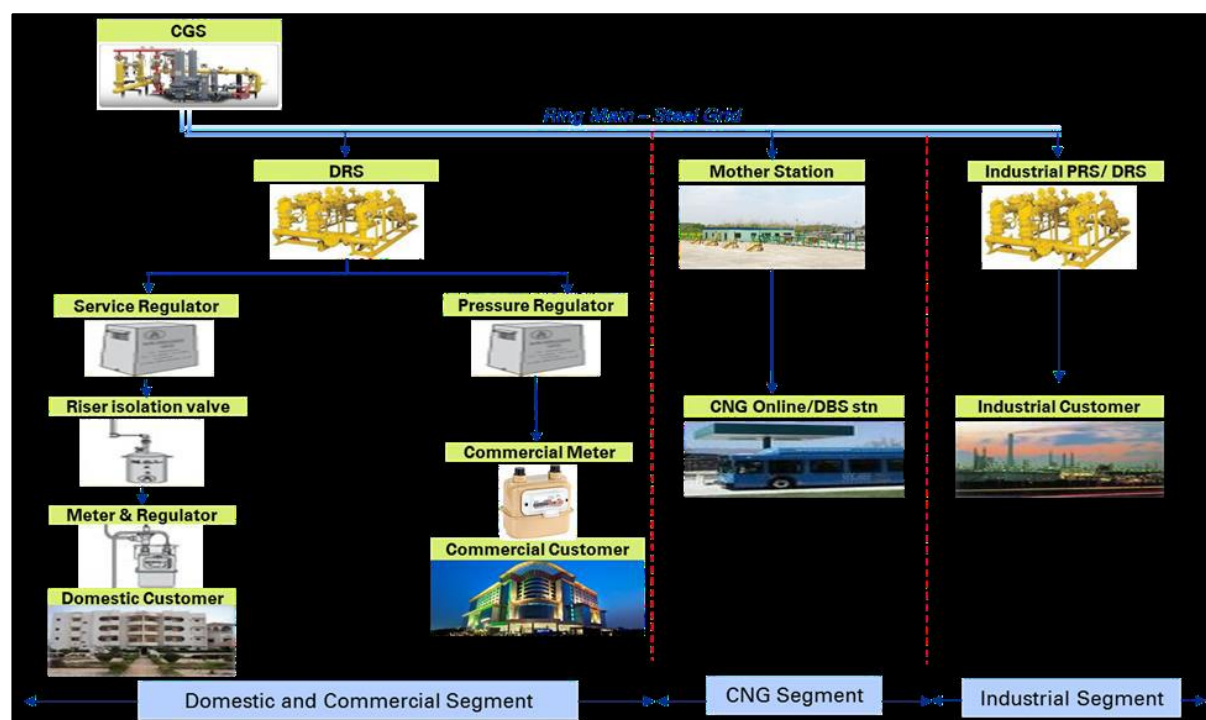
These are equipped with a compressor, which compresses low-pressure pipeline gas to the pressure of 255 bar for dispensing CNG to the vehicle cylinder at a pressure of 200 bar (g). Some of these stations also provide Cascade filling facility at 255 bar (g), used to fill gas in small cascades and transmitted to daughter booster stations. These kinds of stations are referred to as "Mother Stations". Online stations are the same as mother stations except that they do not have the cascade filling facility. The main components of an online CNG station are Compressors along with auxiliaries, Stationary cascades, Dispensers for cars and three-wheelers (autos), Dispenser for buses, Loading Facility for Mobile Cascades, Stainless steel tube connecting compressor, dispenser & cascades laid in

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U/G trenches, DG Set, UPS & Battery Bank, AVR, Electrical Control Panel, Instrument Air and Water Facilities and firefighting equipment.

Daughter Booster Station: Daughter station provided with the compressor (Known as booster) to compress the gas we are getting from the mother station are known as as daughter booster station.

Daughter station: Daughter stations are established in those areas where laying a pipeline is not possible. In that case gas is delivered from mother station to daughter station, via mobile cascade van. The gas from mother station is filled in mobile cascade by LCV filling point.



*Source: DPR, Adani Total Gas Limited

Figure 2-5: Typical Arrangement Network of CNG Station

2.4.3 Design Basis/Philosophy Considered for CGD Network Simulation

The detailed market assessment of natural gas demand for all four segments that are Domestic, Commercial, Industrial and CNG Demand is conducted for 25 years. Based on 25th year natural gas demand, the major demand centres are mapped & identified and depicted below in Error! Reference source not found. in the geographical area of Niwari, Niwar, Chattarpur, and Panna districts 11th round of CGD bidding. Network is planned in such a way that it caters all the major demand centres.

The details of the four segments in which natural gas use/ application is primarily segmented are as following:

- **Domestic segment (cooking/residential use)** – This segment includes Households and their usage for cooking and other house utilities such as geyser etc within the geographical area.

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- **Commercial segment**– This segment includes usage of gas in hotels, hospitals, bakeries, shops, hostels, food plazas, restaurants, sweet shops, malls and other commercial establishments for cooking/ heating purpose within the GA.
- **Industrial segment (heating/ power generation use)** – This segment includes small/ medium scale industries (customers having requirement of natural gas up to 50,000 SCMD shall be supplied through the CGD network) located within GA for power generation, heating and other industrial applications.
- **CNG Segment (NGV applications)** – This segment primarily caters to the transportation fuel demand of the various vehicles and potentially inter-city floating vehicles.

2.4.4 SCADA, Telecommunication and Leak Detection System

SCADA system shall be devised to monitor and operate the NG pipeline network. The Master Control Station shall be equipped with Supervisory Control and Data Acquisition (SCADA) software running under multi-programming, multitasking real time operating system environment. The SCADA software shall incorporate control & monitoring of all locations including Block valves. Leak Detection system shall be provided, and the Leak Detection Software shall run in a separate machine at Master Control Station. Regular check and control will be conducted to assure the safe continuity of the gas supply to consumers. For the network, patrolling will be conducted by the owner operators. This operation shall include but not limited to the activities like, checking of local device such as levels of liquid, filter DP in filtration skid, regulator/ monitor/ SSV reliability etc. The gas quantity consumed by each end user will be totalized once a year. This package will enable the operator to take optimal control actions and thus ensure the safety and security of the pipeline network.


2.4.5 Filtration Skid

Cartridge type filters will be installed to remove entrained particles (filtration efficiency 99%) made up of Borosilicate fibre glass cartridge type. Equipment like regulators and metering are quite sensitive to dirt. Metering requires no particles above 5 microns.

2.4.6 Pressure Reduction Skid

The pressure reduction system shall consist of the following:

- Slam-shut valve actuated to close in case of downstream pressure increase above safe level; it needs local manual reset.
- *Monitor*: A Pressure Control Valve (PCV) which takes over control in case the Active PCV fails to maintain downstream pressure below required maximum pressure; Fail-safe is to open.
- *Active Pressure Control Valve (PCV)* that regulates the downstream pressure as required.
- Such concept is called “Non-Venting Pressure Safety” and allows avoiding the "Safety Relief Valves" more common in industrial plants. Indeed, large relieves as may be needed by the “Venting Pressure Safety” is then avoided and relevant hazards suppressed.

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2.4.7 Metering Skid

Custody transfer metering will be provided before the gas is transferred to the end users. The custody transfer metering system will be Ultra Sonic Meter. The flow meters are connected to a flow computer which calculates the mass flow and corrects for temperature and pressure. Gas quality and gas compressibility data will be provided to the flow computer by a gas chromatograph located at a place before comingling of the gas from various sources.

2.4.8 Odorizer

Natural gas is, by nature, odourless what makes detection of leaks impossible without special gas detection tools. End-users connected to a Natural Gas Distribution System being not supposed to have adequate skill for gas handling, it is mandatory to add an odorant to the gas before it enters the CGD System. Odorization shall be based on the injection of suitable sulphur compound in adequate proportion (in function of actual flow) on the primary network system. The Odorization unit will consists of a Stainless-Steel storage vessel with reserve vessel internal piping & accessories, suitable cabinet & skid. This unit shall be designed to provide the desired odour intensity for the entire gas stream.

A salient feature of odorization skid at CGRS is mentioned in table below:

Table 2-5: Salient Feature of Odorization


| Sl. No. | Particulars | Specifications |
|---------|------------------------------|---|
| 1. | Operating Pressure | 26 Bar (max.) |
| 2. | Operating temperature | 5-55 Degree C |
| 3. | Design pressure | 49 Bar |
| 4. | Design temperature (min/max) | 0/+65 Degree C |
| 5. | Odorization agent | Tetra-Hydro-Thiophene (THT), Ethyl Mercaptan, Tetra-Butyl Mercaptan (TBM) |
| 6. | Dosing rate | Enough for identifying leakage at far-off place |

**Source: Standard industry Norms*

2.4.9 Fire Alarm and Fire Fighting System

As per the Petroleum and natural gas regulatory board notification 2008, Schedule 1 D, after construction activities relevant warning signs shall be displayed in the area. A proper Emergency Response Plan shall be in place and emergency contact numbers of relevant agencies should be visible. Firefighting equipment's should be available during commissioning.

As per the PNGRB notification, 2008, ATGL shall provide an Emergency Control Room, staffed round the clock, and equipped with effective communication system and emergency vehicles fitted with communication facilities, first aid equipment, fire extinguishers, gas detectors, repair kits and tools, maps, plans, material safety data sheets etc. at its disposal. The entity shall put in place an Emergency Response Plan, a Disaster Management Plan, and a Pandemic Plan. While preparing these plans the entity shall take into confidence the various local authorities (i.e., Fire authorities, Police authorities, Health authorities, local administration, Disaster Management authorities, Mutual aid, Factory inspectorate etc) and clearly elaborate on their role in case of an incident.

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2.4.10 Corrosion Protection

Underground carbon steel section beyond transition fitting is below ground, it shall be protected against corrosion by minimum 400 micron thick 2 pack high build epoxy coating. Above ground service piping shall be Galvanized Iron or copper, or carbon steel protected by anti-corrosive coating.

2.5 LAYING OF PIPELINE

The pipeline construction is proposed to be conducted through deployment of 4 to 5 spreads. The sequence and methodology of construction of new pipeline is given below:

- **Clearing and grading:** A 30 m wide Right of Use (RoU) area will be cleared off for vegetation and other obstacles such as boulders. Tree felling will not take place.
- **Stringing:** Pipes are transported to the site on trucks will be offloaded using side booms. Pipes are then strung adjacent to the trench. Trailers and cranes will be used for manoeuvring of pipes. This activity may be done before or after trenching.
- **Trenching:** Trenchers and backhoe type excavators will be used to dig the trench for laying the pipeline. The topsoil in agricultural areas will be removed and stockpiled for restoration. The excavated sub-soil will be stockpiled separately for backfill.
- **Bending:** Pipes will be bent using a bending machine to the appropriate angle to match the vertical and horizontal alignment of the trench.
- **Welding:** Welding will be done using conventional manual/ semi-automatic welding involving a crew of welders and fitters. Once the pipe is strung a line-up crew will position the pipe using side booms in preparation for welding. Pipe strings to be welded will be effectively earthed. During welding, at least one end of the pipe string will be closed to prevent a forced draught effect.
- **Non-Destructive Inspection:** Mechanized Ultrasonic Testing (MUT) is the specified method to be applied for the execution of NDT. Each field weld will be 100% radiographed to evaluate for soundness of the weld in compliance with specifications. NDT and its evaluation shall be performed in accordance with API Standard 1104.
- **Coating:** After welding at each weld joint, coating of field joints of bare pipes and the repair of coating shall be done by.
- **Burial:** General burial depth of the pipeline along the route will be with a minimum 1.0 m cover. Burial cover will be compacted to avoid future erosion by all weathers.
- **Backfilling:** The excavated sub-soil will be returned to the trench. The topsoil, which has been preserved on the side of the ROU, will be spread over the filled-up trench. A crown of soil will be kept on top of the trenched portion to allow for future settlement. Backfilling will be managed so that damage from sizable rocks is not used or any other materials that may damage the pipeline.
- **Crossings:** The method used for the crossing of waterways and other infrastructure facilities will vary from place to place depending on the environmental setting and the geo-technical features of the area. The detail method of various types of crossings is specified below.


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Table 2-6: Type of Crossings

| Sl. No. | Type of Crossing | Method of Crossing |
|---------|-------------------|---|
| 1 | National Highway | Conventional Trenching/ Horizontal Directional Drilling (HDD) |
| 2 | State Highway | Conventional Trenching/ HDD |
| 3 | Other Roads | Conventional Trenching/ HDD |
| 4 | Railway Crossing | HDD |
| 5 | Major Lined Canal | HDD |
| 6 | Unlined Canal | HDD |

**Source: PNRGB Notification, 2008*


- **Restoration** - Restoration of the ROU will be conducted progressively following the completion of construction work. This will involve removal of foreign materials such as construction debris and wastes. The ROU will be returned to its original condition by spreading the topsoil over the areas from where it was stripped, so that green belt activities will be restored along roadside of the SEZ area. Special focus will be given to restoration of side slopes and beds of natural water body crossings.
- **Pipeline warning markers**—In the final stages of construction, warning marker posts will be erected indicating the location of the pipeline and the crossing of other pipelines, cables, and features. A marker tape will be placed in the trench 500 mm above the pipeline to indicate to future excavators that a pipeline is below and that they are nearing.

The major construction activity involved during laying of pipeline are as follows:

- Transport of pipes from the place of availability to stock/lining yard.
- Transporting of pipes from the stock / lining yard to suitable places along the route of the pipeline.
- Application of lining and coating.
- Fabrication of fittings and special lining and coating of the same.
- Excavation and preparation of trenches for the pipes. Topsoil to be kept separately.
- Lowering the pipes into the trench.
- Jointing of pipes inside the trench.
- Welding of pipes.
- Rectification of defects and re-testing
- Finishing the coating and lining at weld joints.
- Back-filling of the trench with topsoil layer.
- Construction of valve chambers and erection of valve.
- Construction of necessary pipe supports anchor blocks.
- Providing line markers

2.5.1 Site Preparation and Laying Methodology

The project is for laying of natural gas pipeline with open trenching. However, for the Portion passing through, train tracks, Canals, Horizontal Directional Drilling Method (HDD) will do ponds bridges to reduce the environmental impacts to minimum.

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The usual approach to pipeline installation is to dig an open trench, place the pipeline and then bury it. Proposed pipeline is passing through commercial, industrial residential, agricultural areas, water bodies, public spaces etc. shall be laid by:

1. Horizontal Directional Drilling (HDD) method for pipeline.
2. Open cut method for remaining portion of pipeline.

Horizontal Directional Drilling (HDD) is a Trench-less methodology that provides an installation alternative that can offer several benefits over traditional open-cut method.

- In a sensitive wetland environment such as a river/creek crossing, wildlife habitats would be destroyed, and extensive mitigation efforts would be required while pipe laying by open cut method. As a result, trenchless or "no-dig" technology has been used extensively worldwide.
- HDD can be implemented with little disruption to surface activities, requires less working space, and may be performed more quickly than open-cut methods.
- 8" Nominal bore & 4" Nominal bore pipelines Steel Pipelines laid together by HDD methodology and remaining length of CRZ portion by Open Cut Method.

Open Cut Method is a usual approach to pipeline installation is to dig an open trench, place the pipeline and then bury it.

- Pressure shall be between 16-40 Bar, 3 layers of PE coated steel pipes for the transportation of gas to its delivery centres.

2.5.2 Pipeline Burial


As per the Petroleum and natural gas regulatory board notification 2008, all types of pipes (plastic and steel) and fittings shall be laid underground and shall not be exposed. The buried service lines are provided with a minimum cover of 1.0- 1.5 m. Where it is impractical to provide 1.0 m cover due to physical constraints, additional protective measures such as concrete slabs or high impact resistance plastic sheets shall be installed at least 300 mm above the service line. In no case the depth of cover shall be less than 600mm. For transition from plastic pipe to GI pipe, transition fittings shall be used. Plastic part of transition fitting protruding above ground shall be protected by encasing it with concrete guard.

In case carbon steel section beyond transition fitting is below ground, it shall be protected against corrosion by minimum 400 micron thick 2 packs high build epoxy coating. Above ground service piping shall be Galvanized Iron or copper, or carbon steel protected by anti-corrosive coating.

In cases where HDD is used for pipeline burial, plastic or carbon steel, adequate depth of 2-2.5m shall be maintained under if the pipeline is going below from any of the listed features, i.e., River/ canal beds, highways, roads, houses, and industries.

Table 2-7: Minimum Depth of Cover for Buried

| Sl. No. | Location | Minimum Cover (m) |
|---------|-----------------------|-------------------|
| 1 | Normal/ Rocky Terrain | 1.0 |

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| Sl. No. | Location | Minimum Cover (m) |
|---------|---|-------------------|
| 2 | Minor River/ unlined canal/ nala crossing/ tidal areas/ other water courses | 1.5 |
| 3 | Major River Crossings | 2.5 |
| 4 | Rivers with rocky bed | 1.5 |
| 5 | Lined canals/ drains/nalas | 1.5 |
| 6 | Drainage ditches at roadways and railways | 1.0 |
| 7 | Rocky Areas | 1.0 |
| 8 | Cased/ uncased road crossing | 1.2 |
| 9 | Cased railroad crossing | 1.7 |

*Source: PNGRB Notification, 2008

2.5.3 Testing, Cleaning and Drying

2.5.3.1 Filling of Nitrogen for Gas-in

The nitrogen shall be injected in the pipeline before filling the pipeline with gas (gas-in) to prevent direct mixing of gas with air. Nitrogen needed for Energization of the pipeline shall be provided by the contractor. The maximum allowable Oxygen content inside the pipeline shall be less than 1% by volume. The pipeline will be evaluated, cleaned, and dried, section after section.

2.5.3.2 Cleaning of Pipeline

Before starting the pigging activity, initial weight of the pig shall be measured at the Launching Station and after receiving the pig at the Receiving Station, the final weight of the pig shall also be measured. The difference between the initial and final weights of the Pig shall not exceed more than 20% of the initial weight of the pig. Air cleaning must be done by oil free compressors only.

2.5.3.3 Testing


Pre-Hydrostatic test Pressure and Final Hydrostatic Test Pressure shall be done at 1.4 times of design pressure. It should be confirmed that the hoop stress should not increase by 95% of SMYS.

2.5.3.4 Thermal Stabilization

If the difference of minimum and maximum atmospheric temperature should cause thermal instability on the pipe section directly exposed to atmospheric condition, the temporary scraper traps and above ground pipeline shall be properly protected. The test medium shall be evaluated to confirm soft non-aggressive water. The water to be used shall be filtered, shall not be contaminated, and free from sand or silt. Before filling operation, air driven pigs will clean the pipeline to remove all mill scale rust/sand from the internal of pipe sections. The final change shall be executed with pigs provided with air jet holes or nozzles to keep the internal dust in turbulence ahead of the pigs. Thermal stabilization shall be considered to have been achieved when a difference not higher than 1°C is attained between the average values of the last two readings.

2.5.3.5 Swabbing and Drying

Poly pigs followed by high and medium density foam pigs shall be propelled with compressed / Dry air for removal of residual water for swabbing operation. Drying shall be conducted round the clock, once started after the swabbing operation. If possible, the swabbing shall be preferably conducted using

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drying air to reduce the drying time. Mainline valves shall be kept fully open during operation and by passes shall be used only to check drying stage in between length and drying of valves.

After completion of swabbing and tie-in of valves, tap off etc. in each Hydrotest section, following operations shall be conducted for the drying. A sequence of three nos. of foam pigs, High, Medium & Low density (7 to 10-kg ranges) shall be launched with the super dry air at the interval of 30 minutes each. The discharge of drying unit shall be measured at every 06 hours using digital dew point meter and – 45°C at the outlet of dryer shall be maintained. The foam pigs when received at other end shall be removed and vents shall be kept open on receiving end to ensure min. backpressure. The dry air shall be allowed to flow continuously till – 8 to 10°C is achieved at the receiving end.

2.6 PROJECT REQUIREMENT

2.6.1 Land

The land required for the project is only for natural gas pipeline network measuring 22.161 km starting near Bijoli village (Jhansi Babina Road) to proposed Orchha Helipad at Tikamgarh town in Niwari district.

2.6.2 Manpower Resources


During the construction phase, local skilled and unskilled labour will get temporary employment based on required skill sets. However, as the development will be phase wise, the total number of locals employed at any one time may not be more than 40-50. **ATGL** has contracted out the construction works and management of labour to contractors, local skilled and unskilled workers and service providers are preferred to boost local employment generation. For operational phase is considered, guards will be employed to patrol the pipeline areas, which will be around 10-20 people for this stretch. Skilled workers will be employed for the operation and maintenance. All these will also be contracted out to the subcontractors.

2.6.3 Power Requirement

The power requirement will be met from DG sets during construction phase of the project. During operational phase, power will be only required for SCADA & associated facilities. The same shall be supplied via state grid.


2.6.4 Water Requirement

Water requirement will be minimal for the project associated only with domestic use by the workers during construction, for the sprinkling purpose to avoid air pollution and office staff will require during constructions and operations period at the distribution centres. The water requirement for construction phase will be contracted out to private tankers. There will be no water requirement during operation phase expect for domestic usage of staff and workers.

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2.6.5 Emission and Discharges

Fugitive dust shall be the main air pollutant, from the small diesel engines used for the construction works & movement of vehicles for which dust suppression system will be used as relevant points. No effluent will be generated during operation of the proposed project.

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3 LEGAL, POLICY AND REGULATORY FRAMEWORK

The emerging environmental scenario calls for attention on conservation and judicious use of natural resources. There is a need to integrate the environmental consequences of development activities and for planning suitable measures to ensure sustainable development of the region. The environmental and social considerations in any developmental process have become necessary for achieving sustainable development. To achieve such goals, the basic principles to be adopted are:

- To enhance the quality of environment in and around the project area by adopting proper measures for conservation of natural resources.
- Prevention of adverse environmental and social impact to maximum possible extent; and
- To mitigate the possible adverse environmental and socio-economic impact on the project-affected areas.

This section highlights the environmental and social regulations applicable to proposed City Gas Pipeline distribution network project. The section broadly focuses institutional framework, applicable environment, health and safety and social legislative, World Bank's guidelines and IFC's Performance Standards requirements relevant to the proposed project.

3.1 ENFORCEMENT AGENCIES

All the permissions and the approvals must be taken from concerned ministries, line departments and the local civic bodies for any upcoming project in India. The environmental and social governance approach in the country consists of:


1. Regulatory and implementing entities.
2. Legal framework including policies, acts, and laws; and
3. Permitting system.

With the aim to create a National Gas Grid (One Nation, One Gas Grid) and increase the availability of natural gas across the country, Petroleum and Natural Gas Regulatory Board (PNGRB) under Ministry of Petroleum and Natural Gas has authorized to lay Natural Gas Pipeline network across the country and the environmental aspects are governed by Ministry of Environment, Forests and Climate Change (MoEF&CC), Central Pollution Control Board (CPCB). The social governance aspects at the micro level are addressed by institutions like panchayats and municipal bodies.

A brief description of the relevant enforcement agencies with respect to the institutional framework is described in the following sub-sections:

3.1.1 Ministry of Environment, Forests and Climate Change (MoEF&CC)

The Ministry of Environment, Forests and Climate Change (MoEF&CC) is the nodal agency in the administrative structure of the Central Government for the planning, promotion, co-ordination and overseeing the implementation of India's environmental and forestry policies and programs. The

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primary concerns of the ministry are implementation of policies and programs related to conservation of the country's natural resources including its lakes and rivers, its biodiversity, forests, and wildlife, ensuring the welfare of animals, and the prevention and abatement of pollution. While implementing these policies and programs, the ministry is guided by the principle of sustainable development and enhancement of human well-being. The specific functions of MoEF&CC are as follows:

- Environmental policy planning.
- Effective implementation of legislation.
- Monitoring and control of pollution.
- Environmental Clearances for industrial and development projects covered under EIA notification.
- Promotion of environmental education, training, and awareness; and
- Forest conservation, development, and wildlife protection.

3.1.2 Central Pollution Control Board (CPCB)


The Central Pollution Control Board (CPCB) was established in September 1974, for the purpose of implementing provisions of the Water (Prevention and Control of Pollution) Act, 1974. The executive responsibilities for the industrial pollution prevention and control are primarily executed by the CPCB at the Central level, which is a statutory body, attached to the MoEF&CC. CPCB works towards control of water, air and noise pollution, land degradation and hazardous substances and waste management. The specific functions of CPCB are as follows:

- Prevent pollution of streams and wells.
- Advise the Central Government on matters concerning prevention, control and abatement of water and air pollution.
- Co-ordinate the activities of SPCB's and provide them with technical and research assistance.
- Establish and keep under review quality standards for surface and groundwater and for air quality.
- Planning and execution of national program for the prevention, control, and abatement of pollution through the Water and Air Acts; and
- The CPCB is responsible for the overall implementation and monitoring of air and water pollution control under the Water Act, 1974, and the Air Act, 1981.

3.1.3 Madhya Pradesh Pollution Control Board (MPPCB)

Madhya Pradesh Pollution Control Board (MPPCB) holds significant power and responsibility through various environmental laws to prevent pollution. **MPPCB** presently looks after the implementation of following Acts/Rules:

- Water (Prevention Control of Pollution) Act, 1974
- Air (Prevention & Control of Pollution) Act, 1981

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- Environment Protection Act, 1986 (certain sections)
- Public Liability Insurance Act, 1991
- Madhya Pradesh Jaiv Anaashya Apashista (Niyantaran) Act & Rule

The primary goal of **MPPCB** is to preserve water, air, and soil in a healthy and usable state for various purposes. To achieve this, the Board operates 2 Zonal Offices (Jabalpur, Mandideep), 13 Regional Offices, and 4 District Offices, all staffed with trained personnel and advanced equipment, who continuously monitor environmental activities across the state.

3.1.4 Petroleum and Explosives Safety Organization (PESO)

The PESO is under the Department of Industrial Policy & Promotion, Ministry of Commerce and Industry, Government of India. The Chief Controller of Explosives is responsible to deal with provisions of:

- The Petroleum Act 1934 and the Rules 2002.
- The Static and Mobile pressure vessels {Unfired} Rules, 1981 and amendment 2000, 2004.
- Manufacture, Storage and Import of Hazardous Chemical Rules, 1989 and amendment 2000.


3.1.5 Ministry of Petroleum and Natural Gas

The MoPNG is the nodal ministry of Government of India for all matters related to petroleum and Natural Gas. The ministry formulates policies for the exploration, production, refining, distribution, and marketing of petroleum and natural gas. The ministry, through the Petroleum and Natural Gas Regulatory Board (PNGRB), authorizes entities to develop City Gas Distribution networks. These networks supply piped natural gas (PNG) to households, industries, and commercial establishments, and compressed natural gas (CNG) for vehicles. MoPNG promotes the development of infrastructure for natural gas, including pipelines and import terminals, to enhance the availability and accessibility of natural gas across the country. The ministry issues guidelines for the allocation and pricing of natural gas to ensure its efficient and equitable distribution.

3.1.6 Central Ground Water Authority (CGWA)

Central Ground Water Authority (CGWA) was constituted under sub-section (3) of Section 3 of the Environment (Protection) Act, 1986 for the purposes of regulation and control of ground water development and management. The authority is entrusted with powers of:

- To resort the penal provisions contained in section 15 to 21 of the said act.
- To regulate and control, management and development of ground water in the country and to issue necessary regulatory directions for the purpose.
- Exercise of powers under section 4 of Environment (Protection) Act, 1986 for the appointment of Officers.

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CGWA is regulating withdrawal of ground water by industries/ projects. CGWA has published guidelines/ criteria for evaluating proposals/ requests for ground water abstraction (with effect from 16/11/2015). As per the guidelines, for non-notified areas, NOC for ground water withdrawal will be considered for Industries as per the criteria given in the notification, presented in Niwari District, Madhya Pradesh. To cater industrial, commercial and transportation demand of natural gas in Niwari and the surroundings, ATGL has planned to develop a total of “22.161 kms Natural Gas Pipeline Infrastructure” in Niwari District via one route.

Table 1-1 **Table 3-1** below.

Table 3-1: Criteria for granting NOC to Industries/ Infrastructure/ Mining in Non-Notified Areas

| Category | Requirement of NOC | | | |
|---|--|--|--|---|
| | Safe | Semi-Critical | Critical | Overexploited |
| Domestic use (rural & urban)/Rural drinking water supply schemes/armed forces establishment/MSME abstracting less than 10 cum/day | Not Required | Not Required | Not Required | Not Required |
| Residential Apartments / Group Housing Societies / Govt. Water Supply Agency | Required (GW abstraction charges to be paid) | Required (GW abstraction charges to be paid) | Required (GW abstraction charges to be paid) | Required (GW abstraction charges to be paid) |
| Agriculture | Not Required | Not Required | Not Required | Not Required |
| Industrial Use | Required | Required | Required | Prohibited except MSME excluding new packaged water industries |
| Mining | Required (GW abstraction charges to be paid) | Required (GW abstraction charges to be paid) | Required (GW abstraction charges to be paid) | Required (GW restoration charges to be paid) |
| Infrastructure Projects | Required (GW abstraction charges to be paid) | Required (GW abstraction charges to be paid) | Required (GW abstraction charges to be paid) | Prohibited for Water Parks/Theme Parks/Amusement Parks. For construction allowed only if alternate option such as treated sewage water is not available within 05 km. |

*Authorized water tankers will supply the water needed to clean the modules in areas where automated cleaning systems are not available. However, **Orange Circle Energy** will adopt robotic cleaning technology and dry brush cleaning to conserve water.*

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3.2 IFC EHS GUIDELINES

The IFC's EHS Guidelines dated 30th April 2007 shall be applicable for the project. **ATGL** should ensure using the Guidelines as guiding framework for addressing impacts on Environment, Occupational Health and Safety, Community Health and Safety during construction, operation as well as decommissioning phase of the project.

The IFC's EHS Guidelines provides industry specific management measures for addressing impacts on biodiversity, occupational health, and safety as well as community health and safety as early as possible in the project cycle, including the incorporation of EHS considerations into the site selection, to maximize the range of options available to avoid and minimize potential adverse impacts.

The EHS Guidelines for Electrical Power Transmission and Distribution dated 30th April 2007 should further be followed by **ATGL** for addressing EHS issues associated with electric power transmission and distribution that occur during the construction and operation phases of the project along with recommendations for their management.

3.3 IFC PERFORMANCE STANDARDS

The Performance Standards (PS) established stipulates that the project shall meet the following throughout the life of an investment by IFC or other relevant financial institution:


- **Performance Standard 1:** Assessment and Management of Environmental and Social Risks and Impacts.
- **Performance Standard 2:** Labour and Working Conditions.
- **Performance Standard 3:** Resource Efficiency and Pollution Prevention.
- **Performance Standard 4:** Community Health, Safety and Security.
- **Performance Standard 5:** Land Acquisition and Involuntary Resettlement.
- **Performance Standard 6:** Biodiversity Conservation and Sustainable Management of Living Natural Resources
- **Performance Standard 7:** Indigenous Peoples; and
- **Performance Standard 8:** Cultural Heritage.

These performance standards and guidelines provide ways and means to identify impacts and affected stakeholders and lay down processes for management and mitigation of adverse impacts. A brief on the requirements as laid down in the performance standards is described below.

Table 3-2: Applicable performance Standards

| PS No. | Performance Standards | Applicability |
|--------|---|---------------|
| PS-1 | Assessment and Management of Environmental and Social Risks & Impacts | • Yes o No |
| PS-2 | Labour and Working Conditions | • Yes o No |
| PS-3 | Resource Efficiency and Pollution Prevention | • Yes o No |
| PS-4 | Community Health, Safety, and Security | • Yes o No |

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| PS No. | Performance Standards | Applicability |
|--------|--|--|
| PS-5 | Land Acquisition and Involuntary Resettlement | <input type="radio"/> Yes • <input type="radio"/> No |
| PS-6 | Biodiversity Conservation and Sustainable Management of Living Natural Resources | • <input type="radio"/> Yes <input type="radio"/> No |
| PS-7 | Indigenous Peoples | <input type="radio"/> Yes • <input type="radio"/> No |
| PS-8 | Cultural Heritage | • <input type="radio"/> Yes <input type="radio"/> No |

The details of applicability of IFC Performance Standards for proposed solar power project are given below **Table 3-3**:


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Table 3-3: Applicability of IFC Performance Standards for CGD Project

| Title of Performance Standard | Performance Standard (PS) requirements in brief | Applicability to project(Compliance) | Actions Taken/Requirements |
|---|--|---|---|
| Assessment and Management of Environmental and Social Risks & Impacts (PS-1) | <p>PS-1 establishes the importance of integrated assessment to identify the environmental and social impacts, risks, and opportunities of projects; effective community engagement through disclosure of project-related information and consultation with local communities on matters that directly affect them; the client's management of environmental and social performance throughout the life of the project.</p> | <p>The PS-1 is applicable to projects with environmental and/or social risks and/or impacts. The proposed project is a CGD of NGP Project and will have environmental and social impacts such as stress on existing water resources, generation of noise, air emission during construction activities and transportation, biodiversity impacts etc.</p> | <p>Applicable Policy and Environment and Social Assessment and Management System ATGL in coordination with other responsible government agencies and third parties as appropriate, will conduct a process of environmental and social assessment. The client will also establish an overarching policy defining the environmental & social objectives and principles that guide the project to achieve sound environmental and social performance. Further, ATGL needs to adhere with respect to measures suggested in ESMP of this report to manage the risks associated with its operations like stakeholder engagement, emergency response plan, contractor management plan, grievance redressal etc. and decommissioning phase of the project. Requirements: Identification of Risks and Impacts and Management Programs. ATGL will establish and maintain a process for identifying the environmental & social risks and impacts of the project. Management Programs will be developed depending upon nature and scale of the project. Impacts identified during construction and operation phase of the project have been detailed in Chapter 5 of this ESIA report. Chapter Error! Reference source not found. defines framework for environmental and social management plan for the proposed project. Requirements: Organizational Capacity and competency ATGL in collaboration with appropriate & relevant third parties, will establish, maintain, and strengthen as necessary an organizational structure that defines roles, responsibilities in association with the project. Organization structure for implementation of environmental and social management plan has been detailed in Section 10, EMP of the report. It reflects the role of corporate and site level EHS team in managing EHS aspects at site and outlines a clear responsibility of the EHS team in</p> |

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| Title of Performance Standard | Performance Standard (PS) requirements in brief | Applicability to project(Compliance) | Actions Taken/Requirements |
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| | | | <p>management of EHS with respect to ESMP. Some of the specific trainings that will be carried out on routine basis are as follows:</p> <ul style="list-style-type: none"> • Occupational Health & Safety • Fire Safety & Prevention • Emergency Response Preparedness • Operational Training • HR Induction Training • PPE Training • Driver Safety • Implementation of Environment and Social Management Plan. <p>The above-mentioned trainings are preliminary trainings which will be undertaken at inception stage once the employee/worker joins the company and/or project. Post that, monthly refresher training can be taken especially for the workers.</p> <p>ATGL will draw project specific HSE plan and other management plans like water management, waste management, labour management, site security etc</p> <p>Requirements: Emergency Preparedness and Response</p> <p>The ATGL will establish emergency preparedness and response system to respond to accidental and emergency situations associated with the project in a manner appropriate to prevent and mitigate any harm to people and/or the environment. The client is required to design emergency preparedness and response plans based on the risks to community health and safety identified during the risks and impacts identification process. The level of planning and communication should be commensurate with the potential impacts.</p> <p>ATGL will establish procedures to monitor & measure effectiveness of management program, as well as compliance with any related legal and/or contractual obligations and regulatory requirements.</p> <p>This ESMP will have to be monitored on aregular basis, quarterly or half-</p> |

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| Title of Performance Standard | Performance Standard (PS) requirements in brief | Applicability to project(Compliance) | Actions Taken/Requirements |
|-------------------------------|---|--------------------------------------|---|
| | | | <p>yearly and all outcomes would need to be audited in accordance with existing EHS commitments.</p> <p>Requirements: Monitoring and Review</p> <p>The monitoring process will cover all stakeholders including contractors, labourers, suppliers, and local community impacted by project activities and associated facilities. Inspection and monitoring of environmental & social impacts of construction and operation phase activities will increase the effectiveness of suggested mitigations. Through the process of inspection, audit, and monitoring, ATGL will ensure that all contractors comply with the requirements of conditions for all applicable permits including suggested action plans. The inspections and audits will be done by ATGL's trained team & external agencies/experts. The entire process of inspections & audits will be documented. The inspection and audit findings will be implemented by contractors in their respective areas.</p> <p>Requirements: Stakeholder Engagement, Disclosure of Information and Consultations</p> <p>ATGL should identify the range of stakeholders that may be interested in their actions and consider how external communications might facilitate a dialogue with all stakeholders. ATGL will develop and implement a Stakeholder Engagement Plan that is scaled to the project risks & impacts. It will be tailored to characteristics and interests of the affected communities. ATGL will provide affected communities with access to relevant information on:</p> <ul style="list-style-type: none"> (i) Purpose, nature, and scale of the project. (ii) Duration of project activities (iii) Any risks to and potential impacts on such communities and Relevant mitigation measures. (iv) Envisaged stakeholder engagement process. (v) Grievance mechanism. <p>When affected communities are subject to identified risks and adverse</p> |

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| Title of Performance Standard | Performance Standard (PS) requirements in brief | Applicability to project(Compliance) | Actions Taken/Requirements |
|---|---|--|--|
| | | | impacts from a project, the client will undertake a process of consultation in a manner that provides the affected communities with opportunities to express their views on project risks, impacts and mitigation measures. It will allow the client to consider & respond to them. Chapter 9 of the report details the stakeholder identification and engagement related to the project. A stakeholder's engagement plan is also formulated as a part of ESIA report to correct any gaps and ensure adequate stakeholder engagement going forward. |
| Labour and Working Conditions (PS-2) | <p>Performance Standard 2 recognizes that the pursuit of economic growth through employment creation and income generation should be accompanied by protection of fundamental rights of workers. The objectives of PS 2 are:</p> <ul style="list-style-type: none"> To promote fair treatment, non-discrimination, and equal opportunity of workers. To establish, maintain, and improve worker- management relationship. To promote compliance with national employment and labour laws. To protect workers, including vulnerable categories of workers such as children, migrant workers, workers engaged by third parties, and workers in the client's supply chain. | The proposed project will involve employment of direct and contracted workers during construction and operation phase. The client will engage direct workers, workers engaged through third parties (contracted workers), as well as workers engaged by the client's primary suppliers (supply chain workers). | <p>Applicable Requirements: Working Conditions and Management of Worker Relationship</p> <p>The client will provide workers with documented information that is clear and understandable, regarding their rights under national labour and employment law. The proponent shall ensure measures to:</p> <ul style="list-style-type: none"> Prevent child labour, forced labour, and discrimination. Freedom of association and collective bargaining shall be provided. Wages, work hours and other benefits shall be as per the national labour and employment laws. <p>ATGL will ensure that reasonable working conditions and terms of employment for both direct and contracted workers through contractor agreements are provided.</p> <p>Contractor engaged by ATGL for various activities should ensure that terms of employment include wages and benefits, wage deductions, hours of work, breaks, rest days, overtime arrangements, overtime compensation, medical insurance, pension, leave for illness, vacation, maternity, and holiday are communicated to workers clearly.</p> <p>Migrant workers, if employed shall also be provided same working conditions equivalent to those of non-migrant workers performing the same type of work. It will be the responsibility of all the construction contractors engaged by ATGL for the project, to provide accommodation,</p> |

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| Title of Performance Standard | Performance Standard (PS) requirements in brief | Applicability to project(Compliance) | Actions Taken/Requirements |
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| | <ul style="list-style-type: none"> To promote safe and healthy working conditions, and health of workers. To avoid use of forced labour. | | <p>transportation, and basic services including water, sanitation, & medical care to workers.</p> <p>Requirements: Non-Discrimination and Equal Opportunity ATGL will not discriminate with respect to any aspects of employment relationship, such as recruitment, hiring, compensation (including wages and benefits), working conditions, terms of employment, access to training, job assignment, promotion, termination of employment or retirement, and disciplinary practices.</p> <p>ATGL will take appropriate measures to prevent any discriminatory treatment of migrant workers. Measures to prevent any harassment, including sexual harassment or psychological mistreatment within the workplace will also be undertaken.</p> <p>Requirements: Retrenchment ATGL should ensure that all workers receive notice of dismissal and severance payments mandated by law and collective agreements in a timely manner.</p> <p>ATGL should ensure that proper consultations are undertaken with the workers before retrenchment, if any. Selection criteria for those to be laid off should be objective, fair, and transparent. The retrenchment should not be based on personal characteristics and unrelated to inherent job requirements.</p> <p>Requirements: Grievance Mechanism ATGL will provide a grievance mechanism for workers (and their organizations, where they exist) to raise workplace concerns. In providing a grievance mechanism through which workers may raise workplace concerns,</p> <p>ATGL should ensure that matters are brought to management's attention and addressed expeditiously. ATGL needs to document all grievances and follow up on any corrective actions.</p> <p>Requirements: Protecting the Work Force</p> |

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| Title of Performance Standard | Performance Standard (PS) requirements in brief | Applicability to project(Compliance) | Actions Taken/Requirements |
|--|---|---|--|
| | | | <p>ATGL will not employ children in any manner that is economically exploitative or is likely to be hazardous or to interfere with the child's education, or to be harmful to the child's health or physical, mental, spiritual, moral, or social development.</p> <p>ATGL is required to ensure that no child labour (as defined in IFC PS 2), forced labour is employed by the contractor during construction and operation phase of the project. ATGL should also exercise diligence regarding key contractors and subcontractors so that they do not knowingly benefit from practices that lead to bonded or indentured status of workers.</p> <p>Requirements: Occupational Health and Safety (OHS)</p> <p>ATGL will provide a safe and healthy work environment, considering inherent risks in its sector and specific classes of hazards in the client's work areas, including physical, chemical, biological, and radiological hazards, and specific threats to women. ATGL will extend a safe and healthy work environment to contracted workers and to any other workers who provide project-related work and services. ATGL should ensure that training is provided to all workers on relevant aspects of OHS associated with their daily work, including emergency arrangements and OHS briefing for visitors and other third parties accessing the premises. All occupational injuries, illnesses and fatalities are to be documented and should be clearly communicated to third parties, and if possible, to workers engaged by these third parties.</p> |
| Resource Efficiency and Pollution Prevention (PS-3) | Performance Standard 3 recognizes that increased economic activity and urbanization often generate increased levels of pollution to air, water, and land, and consume finite resources in a manner that may threaten people and the environment at the local, regional, | ATGL shall assess the impacts and risks associated with generation, use, storage, release, and/or disposal of pollutants during the ESIA, and implement them as per action plan. Also, pollution control measures shall be planned and implemented right from the project conception stage. Practices like minimal release of waste, handling of | <p>Applicable</p> <p>Requirements: Resource Efficiency</p> <p>ATGL will implement technically and financially feasible and cost-effective measures for improving efficiency in its consumption of energy, water, as well as other resources and material inputs, with a focus on areas that are considered core business activities.</p> <p>Requirements: Greenhouse Gases</p> <p>ATGL needs to work on the management, mitigation, and reduction of GHG</p> |

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| | <p>and global levels. The objectives of PS 3 are:</p> <ul style="list-style-type: none"> To avoid or minimize adverse impacts on human health and the environment by avoiding or minimizing pollution from project activities. To promote more sustainable use of resources, including energy and water. To reduce project related GHG emissions. | <p>hazardous waste, safe disposal of waste, wastewater management etc. shall be considered prior to each phase. PS -3 is therefore applicable for the proposed project.</p> <p>The proposed project is a clean energy project and will not have major pollution sources associated with it. The construction works for development of project will entail generation of wastes like wastewater, waste oil and construction debris. The operation phase will result in generation of minor quantities of waste such as transformer oil and wastewater from cleaning of solar panels.</p> | <p>emissions associated with the construction, operation, and decommissioning of the pipeline. These emissions primarily include methane (CH₄), which is a potent GHG associated with natural gas distribution, and other related carbon emissions.</p> <p>Requirements: Water Consumption</p> <p>During the construction phase, water will be primarily required for dust suppression on the site, hydrostatic testing, concrete mixing, and providing catering and sanitation for the workforce.</p> <p>Sustainable sourcing prevents over-extraction, proper wastewater management prevents contamination. Compliance with local regulations and monitoring are crucial for sustainable water use. Continuous adjustment is essential to meet IFC Performance Standard 3 requirements and avoid the significant adverse impacts on others.</p> <p>Requirements: Pollution Prevention</p> <p>ATGL will avoid the release of pollutants or, when avoidance is not feasible, minimize and/or control the intensity and mass flow of their release.</p> <p>ATGL should monitor emissions to ensure that requirements of PS-3 are being met. Monitoring frequency of pollutant emissions should be appropriate to the nature, scale, and variability of potential impacts.</p> <p>Requirements: Waste and Hazardous Materials Management</p> <p>ATGL will avoid generation of hazardous and non-hazardous waste materials. Where waste generation cannot be avoided, they will reduce generation of waste, recover and reuse waste in a manner that is safe for human health and the environment. ATGL should investigate options for waste avoidance, waste recovery and/or waste disposal during the design and operational stage of the project. MSDS for all the hazardous chemicals to be used during construction and operation phase should be readily available. Also, arrangements for storage yard and scrap yard needs to be made for storage of construction material and disposal of scrap. The arrangements need to be made for segregation of biodegradable and non-</p> |

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| | | | biodegradable waste and a CPCB authorized vendor is required to be hired for waste handling and management. |
| Community Health, Safety, and Security (PS-4) | PS 4 recognizes that project activities, equipment, and infrastructure can increase community exposure to risks and impacts. Its main stress is to ensure that safeguarding of personnel and property is carried out in accordance with relevant human rights principles and in a manner that avoids or minimizes risks to the affected communities. | The proposed project will involve transportation of construction material and movement of construction machinery using existing village road which may pose safety risks to the affected communities. | <p>Applicable Requirements: Community Health and Safety and Community Exposure to Disease Community health and safety considerations should be addressed through a process of environmental & social risks and impact identification resulting in action plan for disclosure to project affected communities. ATGL is required to address community health and safety associated with the construction and operation phase of the project. A transport and traffic management plan will be developed and required to be implemented during different phases of the project. Since the project will be using existing roads for transportation of equipment and machinery, impacts due to transportation on the community could be mitigated through implementation of Traffic Management Plan.</p> <p>Requirements: Infrastructure and Equipment Design and Safety For the ATGL it is essential to minimize risks and protect the health and safety of both workers and the surrounding community, they should also build its internal capacity to monitor engineering design and managing the potential hazards associated with the distribution of natural gas, including leaks, explosions, fire risks, and other operational safety concerns.</p> <p><u>During Construction Phase:</u> The safety-first approach in pipeline design involves integrating safety features like gas leak prevention measures, pressure relief systems, and venting systems. It also ensures easy emergency access and provides worker safety equipment to minimize risks associated with natural gas exposure. The project will pass through and will involve movement of vehicles through the NH, SH, MDR and other roads mainly for transportation of construction material. The traffic management plan needs to be properly implemented to avoid impacts on community safety and security. The speed limit should not exceed 20 km/hr in proximity</p> |

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| | | | <p>of settlements and habitation in villages. Also, the village road should be continually repaired if damaged due to project activity.</p> <p><u>During Operation Phase:</u> It is necessary for ATGL to ensure the Gas Distribution Safety systems such as automated shut-off valves, pressure regulation systems, and gas detection sensors to minimize the risk of leaks, fires, and explosions. Corrosion protection, Leak Detection Systems, Emergency Shut-Off Systems and worker's safety.</p> <p>Requirements: Hazardous Materials Management and Safety</p> <p>ATGL will avoid or minimize potential for community exposure to hazardous materials and substances that may be released by the project. The project will not use any hazardous chemicals. Limited number of hazardous substances such as diesel in DG sets, transformer oil etc., will be required.</p> <p>ATGL will either engage a contractor for handling used oil or will ensure proper handling and storage procedures will be followed to minimize any contamination due to accidental spills of such substances.</p> <p>Requirements: Ecosystem Services</p> <p>CGD of NGP project being linear project there will be no significant change to physical environment, such as natural vegetation cover, existing topography, and hydrologic regime due to the project.</p> <p>Requirements: Emergency Preparedness and Response</p> <p>ATGL will assist and collaborate with affected communities, local government agencies, and other relevant parties to respond effectively to emergency situations, especially when their participation and collaboration are necessary to respond to such emergency situations.</p> <p>ATGL is required to design emergency response plans based on risks to health and safety of the affected community and other stakeholders. Emergency plans should be developed in close collaboration and consultation with potentially affected communities and other stakeholders. The plans should include detailed preparation to safeguard health and safety of workers and communities during emergency.</p> |

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| | | | <p>Requirements: Security Personnel</p> <p>When the client retains direct or contracted workers to provide security to safeguard its personnel and property, it will assess risks posed by its security arrangements to those within and outside the project site.</p> <p>ATGL will make reasonable inquiries to ensure that those providing security are not implicated in past abuses; will train them adequately in use of force (and where applicable, firearms), and appropriate conduct toward workers and affected communities.</p> |
| Land Acquisition and Involuntary Resettlement (PS-5) | PS 5 recognizes that project-related land acquisition and restrictions on land use can have adverse impacts on communities and persons that use this land. The main aim is to anticipate and avoid, or where avoidance is not possible, minimize adverse social and economic impacts from land acquisition or restrictions on land use by providing compensation for loss of assets at replacement cost and ensuring that resettlement activities are implemented with appropriate disclosure of information, consultation, and the informed participation of those affected. | <p>In this case, the project will be located entirely within the existing Right-of-Way (ROW) of an operational road, which means the pipeline will be constructed along land that has already been designated for road use. This pre-existing ROW likely already includes agreements or easements that allow for infrastructure development.</p> <p>No new land acquisition will occur for the pipeline, as the land needed for construction is already allocated for road use. Hence, there will be no involuntary resettlement, displacement of people, or loss of access to land or resources. The project avoids the need for additional land purchases or changes to land use, which are the primary triggers for PS-5.</p> <p>Compliance to PS-5: Given that the ROW is already dedicated to infrastructure (the road), no new displacement or land acquisition is involved. Therefore, PS-5 does not apply, as there is no involuntary</p> | <p>Not Applicable</p> <p>Requirements: verification of ROW and Land Use</p> <p>ATGL shall ensure that the ROW is legally clear for pipeline construction and that no new land acquisition or involuntary displacement occurs.</p> <p>Monitoring for Potential Issues: Even though PS-5 is not applicable, it's prudent to monitor the social and environmental impacts during construction, particularly regarding temporary disruption or access issues that could affect communities near the pipeline route.</p> <p>Requirements: Community Engagement and Engagement with Relevant Authorities</p> <p>ATGL shall engage with affected communities, including host communities, through the process of stakeholder engagement. ATGL engaged community for disclosure of relevant information and participation of affected communities during planning & implementation stage of the project. A Stakeholder Engagement Plan was developed as a part of environment and social management plan. ATGL shall engage with local authorities and stakeholders to ensure that the project complies with any regulatory or land-use guidelines relevant to the ROW, as well as any applicable local laws that may govern infrastructure development within road corridors.</p> <p>Requirements: Grievance Mechanism</p> <p>ATGL shall establish a grievance mechanism consistent with Performance</p> |


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| | | resettlement or physical displacement anticipated. | <p>Standard 2 in the project development phase. ATGL shall ensure to resolve grievances at the community level. It is also to be ensured that a designated person will be trained and available to receive grievances and coordinate efforts to redress those grievances through the appropriate channels, taking into consideration of any customary and traditional methods of dispute resolution within the affected communities. Grievance Redressal Mechanism is already in place with ATGL and the same will be implemented at project level.</p> <p>During consultation with the land seller and Sarpanch under which all the project villages fall, it was confirmed that they have no objection or any other concern with projects plan or the acquisition of land. They expressed their satisfaction with rates from market rate compensation they got from land sale.</p> <p>Requirements: Economic Displacement</p> <p>Economically displaced persons who face loss of assets or loss of livelihood during the development of project or access to assets shall be compensated for such loss at full replacement cost.</p> |
| Biodiversity Conservation and Sustainable Management (PS-6) | PS 6 recognizes that protecting and conserving biodiversity, maintaining ecosystem services, and sustainably managing living natural resources are fundamental to sustainable development. This standard is aimed to promote the sustainable management of living natural resources through the adoption of practices that integrate conservation needs and development priorities. | Ground vegetation will be cleared for development of project. The project activities are not likely to have any significant impact on the ecology. | <p>Applicable</p> <p>Requirements: Protection and Conservation of Biodiversity</p> <p>For the protection and conservation of biodiversity, the mitigation hierarchy includes biodiversity offsets, that may be considered only after appropriate avoidance, minimization, and restoration measures. Baseline studies for ecological aspects have been described in “Chapter 4 ENVIRONMENTAL DESCRIPTION” of the report. The study has been collected through site survey, literature review and initial desktop analysis. The extent of the literature review will depend on sensitivity of biodiversity attributes associated with project’s area of influence and ecosystem services that may be impacted. There is no critical habitat with high biodiversity value, including:</p> |

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| | | | <ul style="list-style-type: none"> i. habitat of significant importance to critically endangered and/or endangered species. ii. habitat of significant importance to endemic and/or restricted-range species. iii. habitat supporting globally significant concentrations of migratory species and/or congregatory species. iv. highly threatened and/or unique ecosystems; and/or v. areas associated with key evolutionary processes in the project area of influence (AoI) and its associated facilities and in buffer zone. <p>The line route passes through the Orchha Forest range hence the forest clearance will be required from the Forest Department of Madhya Pradesh. ATGL should adopt mitigation measures to achieve no net loss of biodiversity wherever feasible. Appropriate actions include:</p> <ul style="list-style-type: none"> • Avoiding impacts on biodiversity through the identification and protection of set asides. • Restoring habitats during operations and/or after operations; and • Avoiding intentionally introduces any new alien species. <p>ATGL should take all precautionary measures during laying of the pipeline to avoid any impact during project construction activities. It is advised that the pipeline should adhere to the mitigation measures given in “Chapter 5 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES” of ESIA Report.</p> <p>Requirements: Management of Ecosystem Services</p> <p>With respect to impacts on priority ecosystem services of relevance to affected communities and where the client has direct management control or significant influence over such ecosystem services, adverse impacts should be avoided. Being a cleaner source of energy, no significant degradation and loss of ecosystem services are associated with the project</p> |

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| <div style="display: flex; justify-content: space-between; align-items: center;"> <div>  </div> <div> Page 59 </div> </div> | |

| Title of Performance Standard | Performance Standard (PS) requirements in brief | Applicability to project(Compliance) | Actions Taken/Requirements |
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| | | | that can pose operational, financial, and reputational risks to project sustainability. |
| Indigenous Peoples (PS-7) | Performance Standard-7 recognizes that indigenous peoples, such as social groups with identities that are distinct from mainstream groups in national societies, are often among the most marginalized and vulnerable segments of the population. In many cases, their economic, social, and legal status limits their capacity to defend their rights to, and interests in, lands and natural and cultural resources, and may restrict their ability to participate in and benefit from development. | In the Niwari district of Madhya Pradesh, where the CGD project is proposed, Schedule Caste (SC) constitute of 25% of the population, while Schedule Tribe (ST) people constitute nearly 4.7%. | Not Applicable Since, for the pipeline route project no land acquisition is required, hence it can be said that no land of ST population is getting affected. However, ATGL has policy of not buying any land from SC/ST or other vulnerable community members to the maximum extent possible. |
| Cultural Heritage (PS-8) | PS 8 recognizes the importance of cultural heritage for current and future generations. Consistent with the convention concerning the Protection of the World Cultural and Natural Heritage, this Performance Standard aims to ensure that clients protect cultural heritage during their project activities. In addition, the requirements of this Performance Standard on a project's use of cultural heritage are based in part on standards set by the | Few cultural heritage or place of importance is located within a 05 km radius from the project site. Like Orchha Chhatris, Rajamaharaj and Orchha Fort within 10 km radius of the pipeline route. | Applicable Requirements: Protection of Cultural Heritage in Project Design and Execution In addition to complying with applicable law on the protection of cultural heritage, World Cultural and including national law implementing the host country's obligations under the Convention Concerning the Protection of the Natural Heritage, the client will identify and protect cultural heritage by ensuring that internationally recognized practices for the protection, field-based study, and documentation of cultural heritage are implemented. No clearance is required to be obtained from ASI as proposed development not identified within 200 meters of the protected site. However, project should be monitored during construction phase so that environmental |

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| | Convention on Biological Diversity. For this Performance Standard, cultural heritage refers to tangible forms of cultural heritage, such as tangible moveable or immovable objects, property, sites, structures, or groups of structures, having archaeological (prehistoric), paleontological, historical, cultural, artistic, and religious values. | | <p>pollution from the project would not impact the natural and cultural heritage sites around the project site.</p> <p>Requirements: Project's Use of Cultural Heritage</p> <p>Where a project proposes to use the cultural heritage, including knowledge, innovations, or practices of local communities for commercial purposes, the client will inform these communities of (i) their rights under national law; (ii) the scope and nature of the proposed commercial development; and (iii) the potential consequences of such development. The client will not proceed with such commercialization unless it (i) enters a process of ICP as described in Performance Standard 1 and which uses a good faith negotiation process that results in a documented outcome and (ii) provides for fair and equitable sharing of benefits from commercialization of such knowledge, innovation, or practice, consistent with their customs and traditions.</p> |

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3.4 PROJECT SPECIFIC REGULATORY GUIDELINES

The Ministry of Environment, Forest, and Climate Change (MoEF&CC) has notified the Environmental Impact Assessment (EIA) Notification, 2006 under the provisions of the Environment (Protection) Act, 1986, which regulates development and their expansion/modernization of 39 sectors/activities listed in the Schedule to the EIA Notification, 2006. There are two categories of the projects in the notification namely Category 'A' and Category 'B' projects. Category 'A' projects are appraised at the level of MoEF&CC and Category 'B' projects are appraised by the respective State Environment Impact Assessment Authority (SEIAA) following the procedure prescribed under the EIA Notification, 2006.

As per project/ activity 6 (a) of Schedule of EIA Notification 2006, oil and gas transportation pipelines that pass through national parks, sanctuaries, coral reefs, or ecologically sensitive areas sites require Environmental Clearance (EC).

A recent notification by dated 7th November 2014 by MoEF&CC (Annexure-1) accorded general approval under the Forest (Conservation) Act, 1980 (FC Act) for underground laying of optical fibre cables, telephone lines, drinking water supply pipeline and CNG/ PNG pipelines along the petroleum pipelines within existing right of way not falling in National Parks and Wildlife Sanctuaries, without felling of trees, where the maximum size of the trench is not more than 2.00 meter depth and 1.00 meter width.

The present project does not fall under any notified area in the state of Madhya Pradesh hence no clearance is required. However, the client needs to intimate the project detail to the respective State Environment Impact Assessment Authority (SEIAA) Madhya Pradesh following the procedure prescribed under the EIA Notification, 2006.

The pipeline passes along main other district roads, state and national highway hence it is required to obtain clearance from the National Highway Authority of India (NHAI) and Madhya Pradesh Road Development Corporation Limited (MPRDC). It also crosses railway lines hence will be requiring clearance from Indian Railways. The project also requires permission from irrigation department as the pipeline passes through rivers and canals. The line route passes through the Katelakhandi Reserve Forest, Larpura Reserve Forest, Bangaon Reserve Forest range hence the forest clearance will be required from the Forest Department of Madhya Pradesh. Hence the proposed project can be categorized as “**Category B+**” project



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Table 3-4: Applicability of all acts, laws & rules to Pipeline Project


| Sl. No. | Legal Instrument | Objective | Reason for Applicability | Authority | Applicable (Yes/No) |
|---------|---|---|---|--|---|
| 1. | Environmental (Protection) Act & Rules, 1986 | To protect and improve overall environment | All environmental notifications, rules and schedules are issued under this act | MoEF&CC, Govt., Forest, Ecology & Environment Department, CPCB, & Chhattisgarh Environment Conservation Board (CECB) | Yes |
| 2. | The Irrigation Laws (Amendment) Act, 1964 | To maintain the uninterrupted flow of natural water ways and canals | For using land under the right of way basis for laying the NG pipeline across either side of the flowing water course of all canals, branches, distributaries, major-minor channels etc. | Water Resources Department Chhattisgarh (PWD) | Yes Application to be made to the Water Resources Department |
| 3. | The Railways Act, 1989 | To manage safety of railways | For using land under the right of way basis for laying the NG pipeline | Indian Railways (IR) | Yes. Permission/NOC is required from Railways Department as the NG pipeline crosses railway track at 1 location in Orchha. |
| 4. | The Control of National Highways (Land and Traffic) Act, 2002 | To manage safety National Highway, State Highway | For using land along the highway on right of way basis for laying the NG pipeline | National Highway Authority of India (NHAI) & Road and Building Department | Yes. Permission/NOC is required. |
| 5. | Environmental Impact Assessment (EIA) Notification, 2006 | To provide environmental clearance to new development activities following environmental impact assessment. | As per project/ activity 6 (a) of Schedule of EIA Notification 2006, oil and gas transportation pipelines which pass through national parks, sanctuaries, coral reefs or ecologically sensitive areas sites | MoEF&CC | No |

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| Sl. No. | Legal Instrument | Objective | Reason for Applicability | Authority | Applicable (Yes/No) |
|---------|--|---|--|--|---------------------|
| | | | require Environmental Clearance (EC). The project lies in Category A of the notification. | | |
| 6. | Forest (Conservation) Act, 1980 and amendments thereof | To check deforestation by restricting conversion of forested areas into non-forested areas. | The project lies along the Orchha Forest area | Forest Department (Madhya Pradesh) | Yes. |
| 7. | National Forest Policy (Revised), 1988 | To maintain ecological stability through preservation and restoration of biological diversity | Eco sensitive zone exists along the project corridor, from which the pipeline passes through. | Forest Department Madhya Pradesh | |
| 8. | Wildlife Protection Act, 1972 & 2022 (Amended) | To protect wildlife sanctuaries and National Parks | Not Applicable. | NBWL, SBWL & Chief Wildlife Warden, MoEF&CC | No |
| 9. | Water (Prevention and Control of Pollution) Act, 1974 and amendments thereof | To control water pollution by controlling emission & Water pollutants as per the prescribed standards | This act will be applicable during construction, for establishments of hot mix plant, construction camp, workers' camp, etc. | Madhya Pradesh Environment Conservation Board (CECB) | Yes |
| 10. | Air (Prevention and Control of Pollution) Act, 1981 and amendments thereof | To control air pollution by controlling emission and air pollutants according to prescribed standards | This act will be applicable during construction; for obtaining NOC for establishment of hot mix plant, workers' camp, stone crusher, construction camp, & other heavy machinery. | Madhya Pradesh Environment Conservation Board (CECB) | Yes |
| 11. | Noise Pollution (Regulation and Control) rules, 2000 | Noise pollution regulation and controls | This act will be applicable as vehicular noise on project routes required to assess for future years and necessary protection measure need to be considered in design. | Madhya Pradesh Environment Conservation Board (CECB) | Yes |

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| Sl. No. | Legal Instrument | Objective | Reason for Applicability | Authority | Applicable (Yes/No) |
|---------|--|--|---|--|---------------------|
| 12. | The Explosives Act (& Rules), 1884 | An Act to regulate the manufacture, possession, use, sale, transport, import and export of Explosives | For transporting and storing diesel, bitumen etc. | Madhya Pradesh Environment Conservation Board (CECB) | Yes |
| 13. | Public Liability Insurance Act, 1991 | Insurance for the purpose of providing immediate relief to the persons affected by accident occurring while handling any hazardous substance and for matters connected therewith or incidental thereto | Contractor needs to stock hazardous material like diesel, Bitumen, Emulsions etc. safely in designated locations within the construction camp | Madhya Pradesh Environment Conservation Board (CECB) | Yes |
| 14. | Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 (Amended, 2023) | Storage, handling, transportation, and disposal of hazardous waste | Storage and handling of hazardous waste during construction | Madhya Pradesh Environment Conservation Board (CECB) | Yes |
| 15. | Solid Waste Management Rules, 2016 | Management and handling of solid waste | For disposal of solid waste generated during construction | Madhya Pradesh Environment Conservation Board (CECB) | Yes |
| 16. | Construction and Demolition Waste Management Rules, 2016 | Management of construction and demolition waste | For disposal of solid waste generated due to construction and demolition | Madhya Pradesh Environment Conservation Board (CECB) | Yes |
| 17. | Batteries (Management & Handling) Amendment Rules, 2023 | Management and handling of used lead acid batteries | Safe disposal of used lead batteries through authorized e waste recyclers | Madhya Pradesh Environment Conservation Board (CECB) | Yes |
| 18. | E-Waste (Management) Amendment Rules, 2023 | Effective mechanism to regulate generation, collection, storage, transport, import, export, recycling, treatment and disposal of e-wastes | Handling of e-waste | Madhya Pradesh Environment Conservation Board (CECB) | Yes |


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| Sl. No. | Legal Instrument | Objective | Reason for Applicability | Authority | Applicable (Yes/No) |
|---------|--|--|--|-------------------------------------|---|
| 19. | Central Motor Vehicles Act, 1988 | To control vehicular air and noise pollution | This rule will be applicable to road users and construction machinery | Motor Vehicle Department | Yes |
| 20. | The Petroleum Act 1934, as amended in August 1976 The Petroleum Rules 1976, as amended in March 2002. | Operation, Storage and transportation of Petroleum products | The rule is applicable as the transportation and distribution of compressed natural gas will take place | Ministry of Petroleum & Natural Gas | Yes |
| 21. | Petroleum and Natural Gas Rules, 1959, amended 2009. | As states own the blocks found within their territory and are therefore, responsible for awarding the licenses | The rule is applicable as the distribution of natural gas will take place in Madhya Pradesh | Ministry of Petroleum & Natural Gas | Yes |
| 22. | The Petroleum and minerals pipeline (acquisition of right of user in land) act, 1962 | Acquisition of right of user in land [for laying pipelines for the transport of petroleum and minerals and Provision of compensation in case of any damage, loss or injury is sustained by any person interested in the land under which the pipeline is proposed to be, or is being, or has been laid | The pipeline passes through industrial, residential and commercial areas. | Ministry of Petroleum & Natural Gas | Yes |
| 23. | Petroleum and Natural Gas Regulatory Board Act, 2006 | Regulation of refining, processing, storage, transportation, distribution, marketing and sale of petroleum, petroleum products and natural gas excluding production of crude oil and natural gas to protect the interests of consumers and entities engaged in specified activities | The project is proposed under this act and is bid out by PNGRB for uninterrupted and adequate supply of petroleum, petroleum products and natural gas in all parts of the country. | PNGRB | Yes |
| | NOC from Gram Panchayat | As per Madhya Pradesh Panchayat Raj Avam Gram Swaraj Adhiniyam, 1993 | Madhya Pradesh Panchayat Raj Avam Gram Swaraj Adhiniyam, 1993 | Village Sarpanch | Application to village Panchayat falling in the stretch is to be made |

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Environmental issues during pipeline laying & construction stage generally involve equity, safety, and public health issues. The construction agencies require complying with laws mentioned below as well:

- **Workmen's Compensation Act 1923** (the Act provides for compensation in case of injury by accident arising out of and during 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.).
- **Contact Labor (Regulation and Abolition) Act, 1970** (the Act provides for certain welfare measures to be provided by the contractor to contract labour).
- **Minimum Wages Act, 1948** (the employer is supposed to pay not less than the Minimum Wages fixed by appropriate Government as per provisions).
- **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 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).
- **The Child Labour (Prohibition and Regulation) Amendment Act, 2016:** An Act further to amend the 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, traveling expenses from home to the establishment and back, etc.).

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- **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).

3.5 PIPELINE DESIGN AND CODE


According to the PNGRB Notification 2008, the design, materials and equipment, welding, fabrication, installation, testing, operation and maintenance, and corrosion control of the CGD network shall comply with the requirements of ASME B31.8, except where such requirements are specifically cancelled, replaced, or modified by the regulations specified in this notification.

It is intended to apply these regulations to all new and such aspects of already existing networks as design, fabrication, installation, testing at the time of construction and commissioning. However, if an Adani has laid, built, constructed, or expanded the CGD infrastructure based on some other standard or is not meeting the standards specified in these regulations, then it needs to carry out a detailed technical audit of its infrastructure through a Board authorized or approved third party agency by the Board. Adani thereafter shall submit the recommendations made by the third party along-with its time-based mitigation plan and implementation schedule to the Board for authorization within six months from the date of notification of these regulations.


Technical standards and specifications mentioned in PNGRB notification, 2008 including safety standards (hereinafter referred to as standards) for city or local natural gas distribution networks are as specified in Schedule-I which cover material and equipment (Schedule-1A), welding (Schedule-1B), piping system components and fabrication (Schedule-1C), design, installation and testing (Schedule-1D), operating and maintenance procedures (Schedule-1E), corrosion control (Schedule-1F) and miscellaneous (Schedule-1G).

Table 3-5: Applicable Standards and Codes

| Sl. No. | Code No. | Description |
|---------|-------------|---|
| 1. | ASME B31.8 | Gas Transmission and Distribution Piping Systems |
| 2. | ASME B16.5 | Specification for Pipe flanges and flanged fittings |
| 3. | ASME B16.9 | Specification for Factory made Wrought Steel Butt welding fittings |
| 4. | ASME B16.11 | Specification for Forged Fittings, Socket – Welding and Threaded |
| 5. | ASME B16.34 | Pressure and temperature ratings for forgings, castings, plate, bar, and tubular products |
| 6. | API 5L | Specification for Line Pipe |
| 7. | API 6D | Specification for Pipeline Valve |
| 8. | API RP 1102 | Steel Pipelines Crossing Railroads & Highways |
| 9. | API 1104 | Welding of Pipelines and Related Facilities |


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| Sl. No. | Code No. | Description |
|---------|----------------------|---|
| 10. | API RP 2201 | Procedures for Welding or Hot. Tapping on Equipment in Service |
| 11. | ASTM A106 | Specification for Seamless Carbon Steel Pipe for High- Temperature Service |
| 12. | ASTM A234 | Specification for Piping Fittings of Wrought Carbon steel and alloy steel for moderate and High Temp. service |
| 13. | ANSI 16.20 | Ring-joint Gaskets & Grooves for Steel Pipe Flanges |
| 14. | T4S | Technical Standards and Specifications Including Safety Standards for City or Local Natural Gas Distribution Networks |
| 15. | INFRA/IMP/CGD/1/2013 | Integrity Management System for City or Local Natural Gas Distribution Network |
| 16. | G.S.R. 478(E) | Determining capacity of Petroleum, Petroleum products and Natural Gas Pipeline |
| 17. | Codes | Details |
| 18. | G.S.R 720(E) | Code of Practice for Quality-of-Service City or Local Natural Gas Distribution Networks |
| 19. | G.S.R 196(E) | Authorizing Entities to Lay, Build, Operate or Expand City or Local Natural Gas Distribution Networks |
| 20. | OISD 141 | Design and Construction Requirements for Cross- Country Hydrocarbon Pipeline |
| 21. | DIN 30671 | Thermoset Plastic Coating for Buried Steel Pipes |
| 22. | DIN 30672 | Tape and Shrinkable Materials for the Corrosion Protection of buried or Underwater Pipelines without Cathodic Protection for Use at Operating Temperatures Up to 500 °C |
| 23. | DIN 30673 | Bitumen Coatings and Linings for Steel Pipes, Fittings and Vessel |
| 24. | DIN 30675-1 | External Corrosion Protection of Buried Pipes & Range of Applications for Steel Pipes |
| 25. | DIN 30677 | Protection of Buried Valves Against Corrosion Coating (External) with Duroplastics |
| 26. | DIN 30670 | Polyethylene Coating on Steel Pipes and Fittings |
| 27. | EN 12062 | Non-Destructive Examinations of Welds-General Rules of Metallic Materials |
| 28. | EN 10285 | Steel tubes and fittings for on shore and offshore pipelines- external three-layer extruded polyethylene-based coating |
| 29. | EN 12068 | Cathodic Protection – External Organic Coatings for the Corrosion Protection of Buried or Immersed Steel Pipelines Used in Conjunction with Cathodic Protection of Steel Structures |
| 30. | IS 8062 | Code of Practice for Cathodic Protection of Steel Structures |
| 31. | IS 12944-5 | Paints and Varnishes – Corrosion Protection of Steel Structures by Protective Paint System |
| 32. | ISO 8502-3 | Preparation of Steel Substrates before Application of Paints and Related Products – Tests for the Assessment of Surface Cleanliness |
| 33. | ISO 9305 | Seamless Steel Tubes for Pressure Purpose Full Peripheral Ultrasonic Testing for the Detection of Transverse Imperfections |
| 34. | ISO 10124 | Seamless 7 Welded (Except Submerged Arc Welded) Steel Tubes for Pressure Purposes. Ultrasonic Testing for the Detection of Laminar Imperfections |
| 35. | ISO 12094 | Welded Steel Tubes for Pressure Purpose. Ultrasonic Testing for the Detection of Laminar Imperfections in Strips / Plates used in Manufacture of Welded Tubes |

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| Sl. No. | Code No. | Description |
|---------|-------------|---|
| 36. | ISO 15741 | Paints and Varnishes – Friction-Reduction coatings for the interior of on- and offshore steel pipelines for non- corrosive gases |
| 37. | ISO 15590-1 | Petroleum and natural gas industries-induction bends, fittings and flanges for pipeline transportation system- part:1 induction bends |
| 38. | ISO 21809-3 | Petroleum and Natural gas industries-external coatings for buried or submerged pipelines used in pipeline transportation system |
| 39. | MSS-SP-44 | Steel Pipeline Flanges |
| 40. | MSS-SP-25 | Standard Marking System for Valves |
| 41. | MSS SP75 | Specification for High Test, Wrought, Butt Welding Fittings |
| 42. | G.S.R 198€ | Exclusivity for City or Local Natural Gas Distribution Network |
| 43. | OISD 105 | Work Permit for Testing & Commissioning |
| 44. | OISD 226 | Natural Gas Transmission Pipeline & City gas Distribution |
| 45. | OISD 179 | Safety Requirements on Compression, Storage, Handling & Refueling of Natural Gas (CNG). |

Source: ATGL Due Diligence Report


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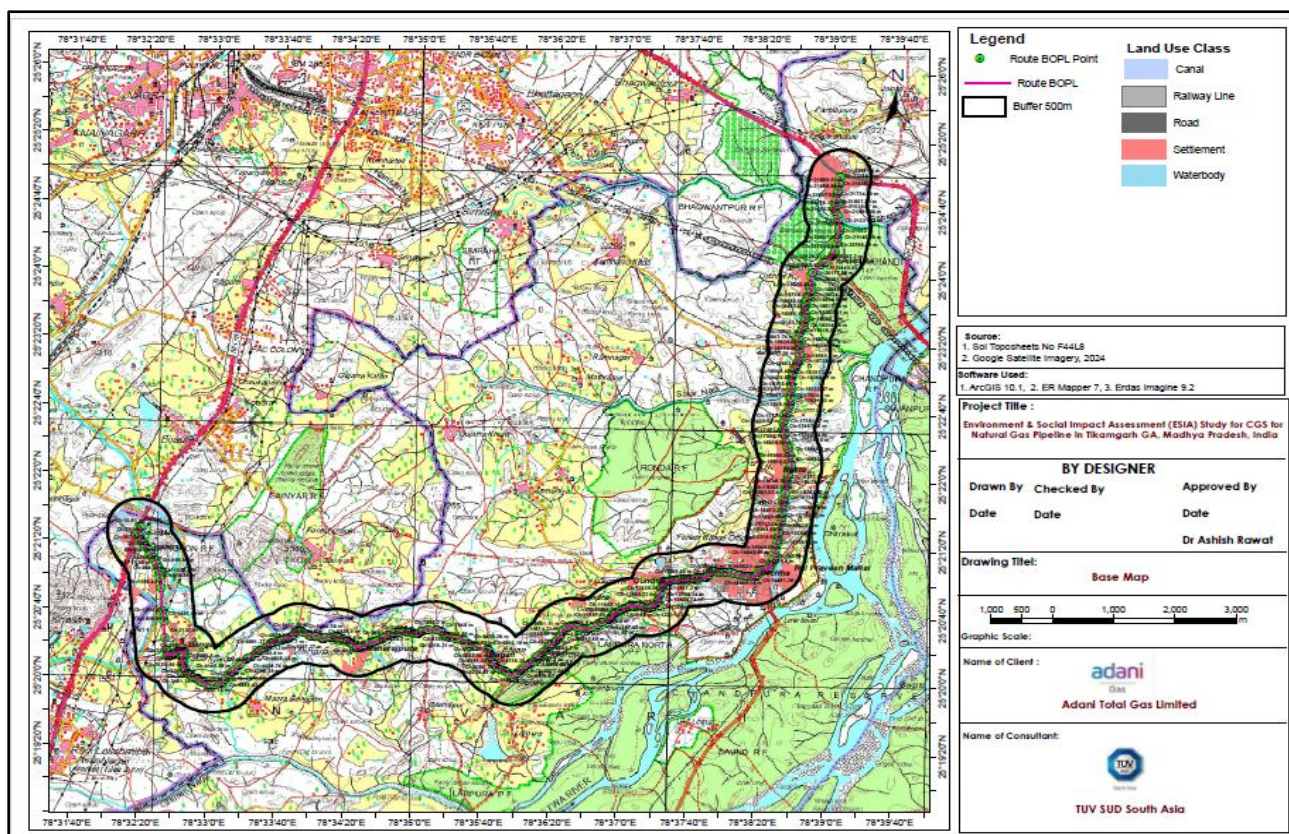
4 ENVIRONMENTAL DESCRIPTION

Baseline data generation forms an integral part of the EIA study and helps to evaluate the predicted impacts on the various environmental and social attributes in the study area by using scientifically developed and widely accepted environmental and social impact assessment methodologies.

4.1 STUDY AREA

The study area comprises “Project Footprint Area” (area to be physically impacted by the project activities across all phases) and “Area of Influence (up to 500 m)” and the “buffer zone” (5 km). While the primary field investigations for the physical and biological and socio-economic environment have been collected from Project Footprint area and Area of influence. The Environmental baseline survey and study for the project has been carried out on **20th- 21st January 2025**.

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*Source: TUVSUD GIS Mapping

Figure 4-1: Project Study Area superimposed on Toposheet

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4.2 PROJECT FOOTPRINT AREA


The Project Footprint is the area that may reasonably be expected to be physically touched by Project activities across all phases. The NG pipeline runs underground starting from the Bijoli and extends all the way to the villages, forest and agricultural lands inside Niwari District.

4.3 AREA OF INFLUENCE (AOI)

Baseline monitoring for Environmental Impact Assessment study has been designed with primary data collection followed by secondary data review for establishing and interrelating the baseline condition of the project area. To collect the data for baseline study, the 'Area of Influence' (AoI) has been defined as the area in which a direct or indirect impact on the physical, biological, social, or cultural environment might occur, and it has been considered as 500 m to the maximum buffer up to 5 km surrounding of the project footprint area. For the detailed analysis of the current baseline of the project, the following areas of influence have been defined in **Table 4-1**.

Table 4-1: Detailed Area of Influence (AOI) considered for Different Attributes

| Sl. No. | Environmental & Social issues | Area of Influence (AoI) | Justification |
|-----------------------------------|-------------------------------|--|--|
| Physical Environment | | | |
| 1. | Ambient Air Quality | Immediate vicinity of the project foot-print area | Dust Emissions, Fugitive dust etc. is typically observed within 100-200 meters from the Construction/operation areas. AoI minimum of 500 m to maximum 1.00 km has been taken to capture all sources of emissions including vehicular movement in surrounding and across access road. |
| 2. | Noise Pollution | 500 m | Primary Noise effect from a noisy source can often be detected up-to 400-500 m from any operation. However, keeping in view, an AoI of 500 m has been considered from noise pollution from all sources including vehicular movement. |
| 3. | Surface Water | Surface Water Bodies (within 05 km of the project foot-print area) | The entire project area of influence has been considered for Surface Water Sampling. Surface water samples were collected from multiple surface water sources, which are coming within AoI (500-05 km) aerial distance from project foot-print areas. |
| 4. | Ground Water condition | 5.00 Km | Ground water quality of the project study area has been assessed in project influence area, close to the proposed construction activity sites and habitation areas. |
| 5. | Land Environment | 500 m | An area of 500 m has been considered around the project footprint area and near to habitation areas to predict the indirect effects usually occur due to accidental release of hazardous waste, vehicular/heavy machinery movement and activities at allied sites. |
| Biology and Environment | | | |
| 1. | Terrestrial Ecology | 500 m- 05 km | Area of Influence has been considered as 500 m AOI & 05 km buffer around the project footprint area to identify the biodiversity of the area and its impacts due to the project. |
| Socio-economic Environment | | | |

| | | | |
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| Sl. No. | Environmental & Social issues | Area of Influence (AoI) | Justification |
|---------|-------------------------------|-------------------------|---|
| 2. | Socio-economic conditions | 05.00 km | An AoI of 05.00 Km radius is considered for the socio-economic consultations to determine perceived impacts due to the project including employment opportunity and increased anthropogenic/vehicular activities in remote areas. |

4.4 METHODOLOGY FOR ENVIRONMENTAL AND SOCIAL BASELINE SURVEY


Environmental & Social study includes the study of various baseline environmental aspects covering Physical, Biological and Socio-Economic parameters. Integration of these parameters gives an overall perception of positive and negative impacts due to construction of underground NG pipeline within the port area.

Initially after primary desktop assessment of the project, detailed project reports and site details were collected from Adani Total Gas Limited. A team comprising of Social, ecological, and environmental Experts from TÜV SÜD visited the site on **20th and 21st January 2025** to collect the primary baseline data of drainage, land-use, topographic, ecological condition of the site and collect data on socio-economic scenario of the project study area. Baseline monitoring plan has been finalized and subsequently, in accordance with the baseline monitoring plan, environmental monitoring is currently under progress and will be completed in the February 2025 in accordance with the Terms of Reference and Guidelines of MoEF&CC & CPCB.

Apart from the baseline environmental monitoring for Ambient Air, Noise, Soil, Water (Groundwater & Surface water) various other attributes such as aquatic and terrestrial avifaunal habitat & biodiversity, socio-economic status, geology, hydrology, and land-use pattern etc. of the study area was also studied and data has been collected from primary and authenticated secondary sources.

Table 4-2: Secondary Data Sources for Baseline Study

| Data | Source |
|--|---|
| Long term Climatological Data | India Meteorological Dept. (IMD), Govt. of India and data from other Remote climate monitoring stations |
| Toposheets | Survey of India (SOI), Dehradun |
| Soil Maps | NBCC Nagpur |
| Satellite Data | NRSA, Google Earth, etc. |
| Forest Characteristics, Forest Types & Resources | Forest Survey of India (FSI) |
| Details of Flora, Fauna & Wildlife Habitats | From various publicly available research papers, journals, and manuscripts |
| Land Record and Demography Status | State Revenue Dept., District Statistical Handbook & Census of India, etc. |
| Drainage Pattern | Water Resource Dept., NASA SRTM data |
| Hydro-geology Status | District Ground Water Report, Central Ground Water Board (CGWB) |
| Technical Data | Details provided by ATGL |

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Prior to the site visit, the following relevant and available documents related to the underground NG pipeline project at Niwari and adjacent villages in Niwari District, Madhya Pradesh have been collected from **ATGL**:

- Project Location Maps
- Project specifications and technical details of the project – DPR

Primary environment baseline monitoring and secondary data collection was undertaken as per process tabulated below in **Table 4-3**.

Table 4-3: Environmental and Social Attributes studied


| Sl. No. | Attributes | Parameters | Source & Frequency |
|---------|--------------------------------|--|---|
| 1. | Ambient Air Quality | SO ₂ , NO ₂ , PM ₁₀ , PM _{2.5} , CO | Twice a week for 1 month |
| 2. | Ambient Noise quality | Noise level in dB(A) | Daytime and night-time sampling for single day for all locations |
| 3. | Soil condition and its quality | Physical and chemical parameters | Composite sampling in all locations |
| 4. | Ground water quality | Physical, chemical, biological parameters as per IS 10500:2012 | Single sampling (mainly from Bore well/tube well) |
| 5. | Surface water quality | Physical, chemical, biological parameters of different surface water stream/body within the project study area. | Single Sampling from surface water bodies. |
| 6. | Socio-economic aspects | Socio-economic, demographic, livelihood characteristics | Secondary sources data like primary census abstracts of Census of India 2011. |
| 7. | Hydrology & Drainage | Drainage area and pattern, nature of streams, aquifer characteristics, | Based on primary site visit and data collected from secondary sources. |
| 8. | Ecology | Floral and faunal distribution, Terrestrial and water birds citing, identification of any migratory corridor within the project study area | From different places within study area |

4.5 SECONDARY DATA COLLECTION

The environmental monitoring stations were selected for ambient Air Quality, Ambient Noise Quality, Surface Water Quality, Ground Water Quality, and Soil Quality. A NABL accredited & MoEF&CC approved laboratory is selected for conducting secondary environment baseline monitoring at project study area, under supervision of TÜV SÜD representative. In accordance with the Scope of Work, the baseline environmental monitoring will be carried out in the project footprint and study area during the February 2024.

PHYSICAL ENVIRONMENT

The study related to physical environment was conducted through site visits and review of the data from secondary sources such as Census of India, District Statistical Handbook, State of the Forests Report, Central Groundwater Development Board Report, District Revenue Office, and other published peer

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information in respect of the topographical and physiographical features, regional and the local geology of the project area, climatology, and seismicity.

Soil characteristics were established through physio-chemical tests of the soil samples revalidated through the published literature while land use and land cover; slope of the study area were established through remote sensing by using GIS tools. Prior to initiating the baseline survey, monitoring design was prepared in coordination with TÜV SÜD Environmental Experts and the same was fine-tuned during site survey prior to the baseline monitoring.

The components of physio-chemical environment discussed in this section include:

1. Physiography & Topography
2. Geomorphology and Drainage
3. Land-Use & Land Cover
4. Soil Quality
5. Seismicity & Natural Hazards
6. Climate & Meteorology
7. Ambient Air Quality
8. Ambient Noise Levels
9. Ground Water Quality
10. Surface Water Quality

4.5.1 *Physiography and Topography*

The underground gas pipeline project extends between Bijoli and Pratappura, passing through Bangaon Village in Niwari District, Niwari, Madhya Pradesh.

Niwari, located in central Bundelkhand, slopes from the high Vindhyan plateau in the southwest to the Ganga-Yamuna plains in the northeast. The southwestern area has an elevation of around 350 meters, dropping to 150 meters in the northeast. The region features unique landforms like Inselbergs, Quartz Reefs (long ridges), and denudational hills. The ridges, running in a northeast-southwest direction, are steep, while Inselbergs and Padi plains are scattered throughout the district. These features contribute to the district's distinct geomorphology. The Contour Map (**Figure 4-3**) of the project AOI is shown below.


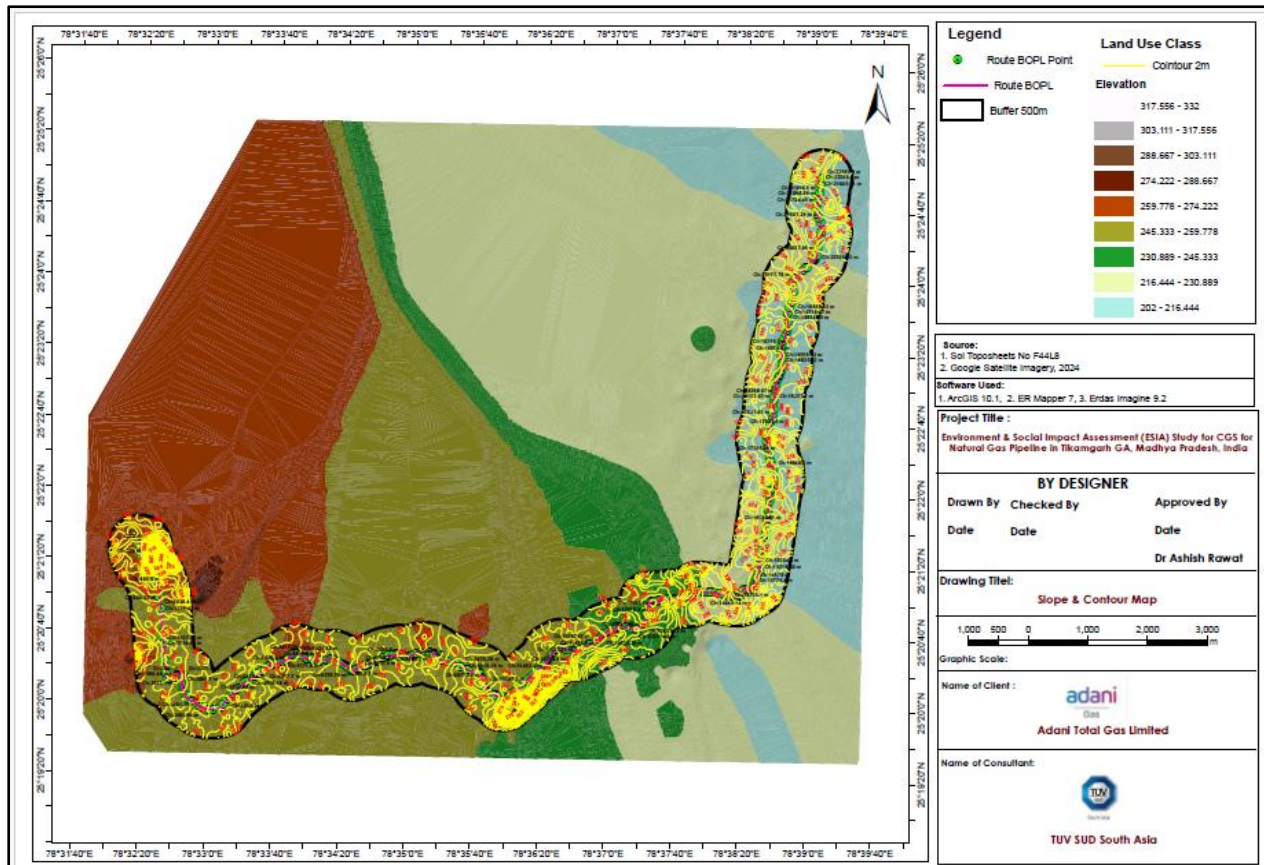
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Figure 4-2: District Administrative Map (Red Circle: Project AOI)

ADVISORY REPORT



*Source: TUV SUD GIS Mapping Study

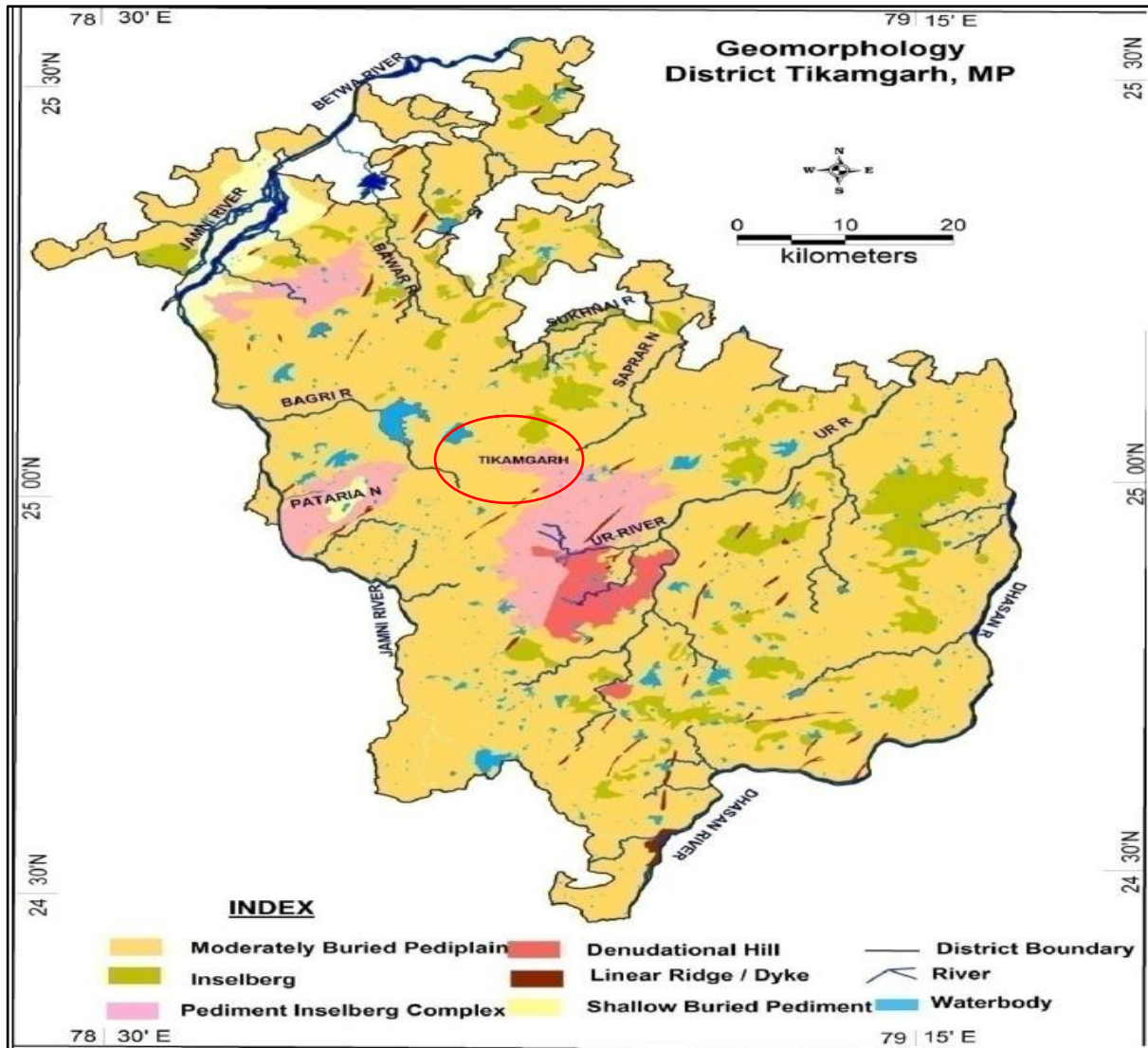
Figure 4-3: Terrain and Contour Map of Project AOI

4.5.2 Geomorphology and Drainage

4.5.2.1 Geomorphology

About three-fourth of Niwari is covered by pediplains, which are ideal for farming. Some harder rocks that resist erosion have formed Inselbergs. In the northern part of the district, there are areas with shallow buried materials. Around Jatara and Prithvipur, you'll find areas where shallow buried pediments and Inselbergs are combined, creating pediment Inselberg complexes. To the northeast of Niwari, there are small hills mixed with flat land, known as Denudational Hills. The region also features long ridges made of giant Quartz veins, which act as barriers to water flow, with several large water bodies located along these ridges. The landforms of this area can be divided into hill ranges and fertile valleys. Some important valleys in the districts are Joramora-Madia, Majrakachhar-Dighaura Khurd, Mudeni-Dhaura, and Bachchoda-Kistone, which mostly slope or trend towards the north-west.

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*Source: Aquifer Map and Management Plan- Niwari District

Figure 4-4: Geomorphological Map of Niwari District (Red Circle: Project AOI)

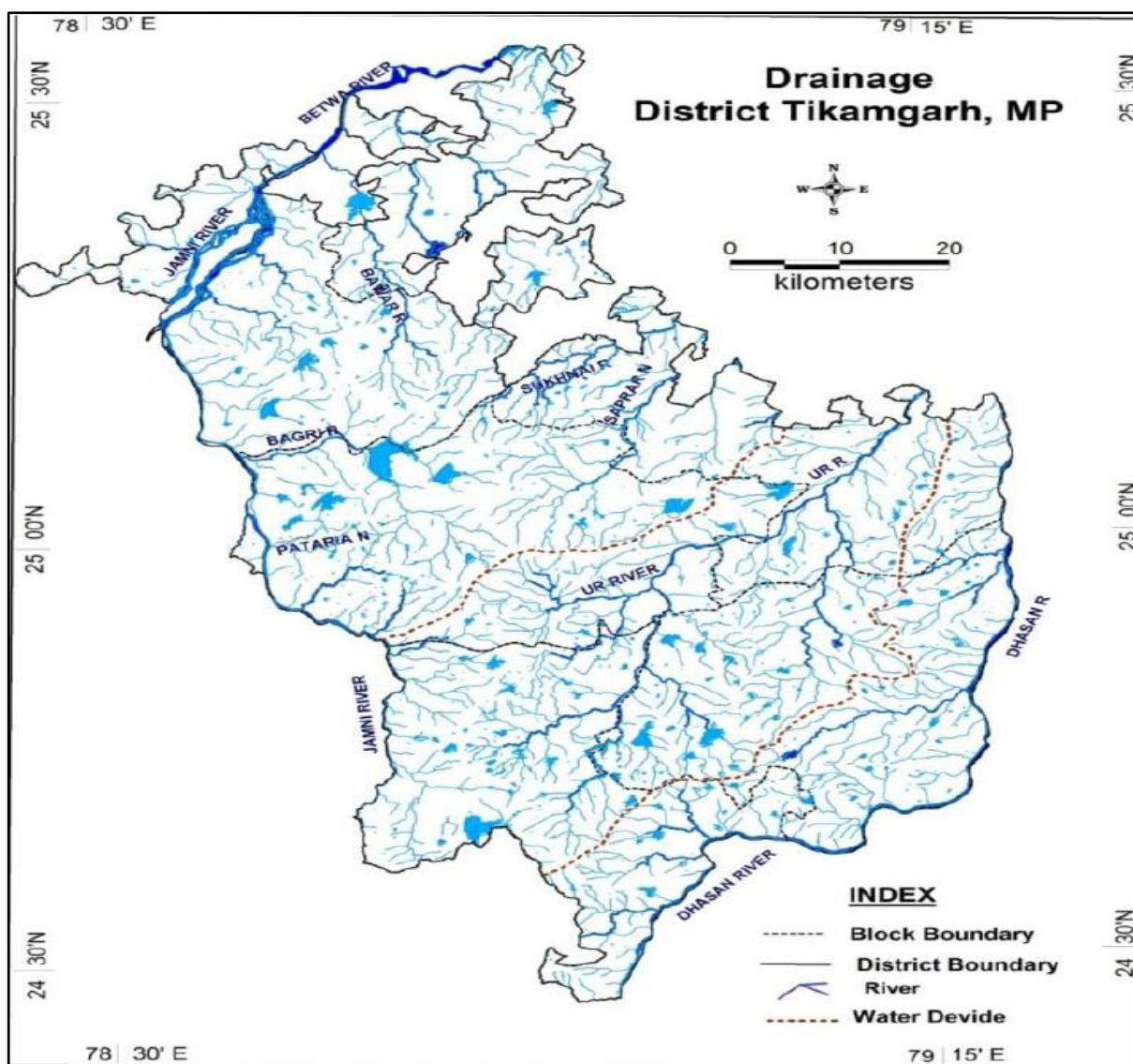
As indicated in **Figure 4-4** above, the project study area falls in Moderately Buried Pediplain.

4.5.2.2 Drainage

The Niwari district is traversed by three major rivers: Betwa, Jamni, and Dhasan. Both Jamni and Dhasan serve as tributaries of the Betwa River. The Jamni River flows through the western region of the district, while the Dhasan River runs along its southern and eastern boundaries. The pipeline cross one water body named Satar Nadi and several irrigation canals. Drainage Map of district indicating project study area has been depicted below in **Figure 4-5**.

The pipeline route passes through 1 canal crossings.

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| | |




*Source: Aquifer Map and Management Plan- Niwari District

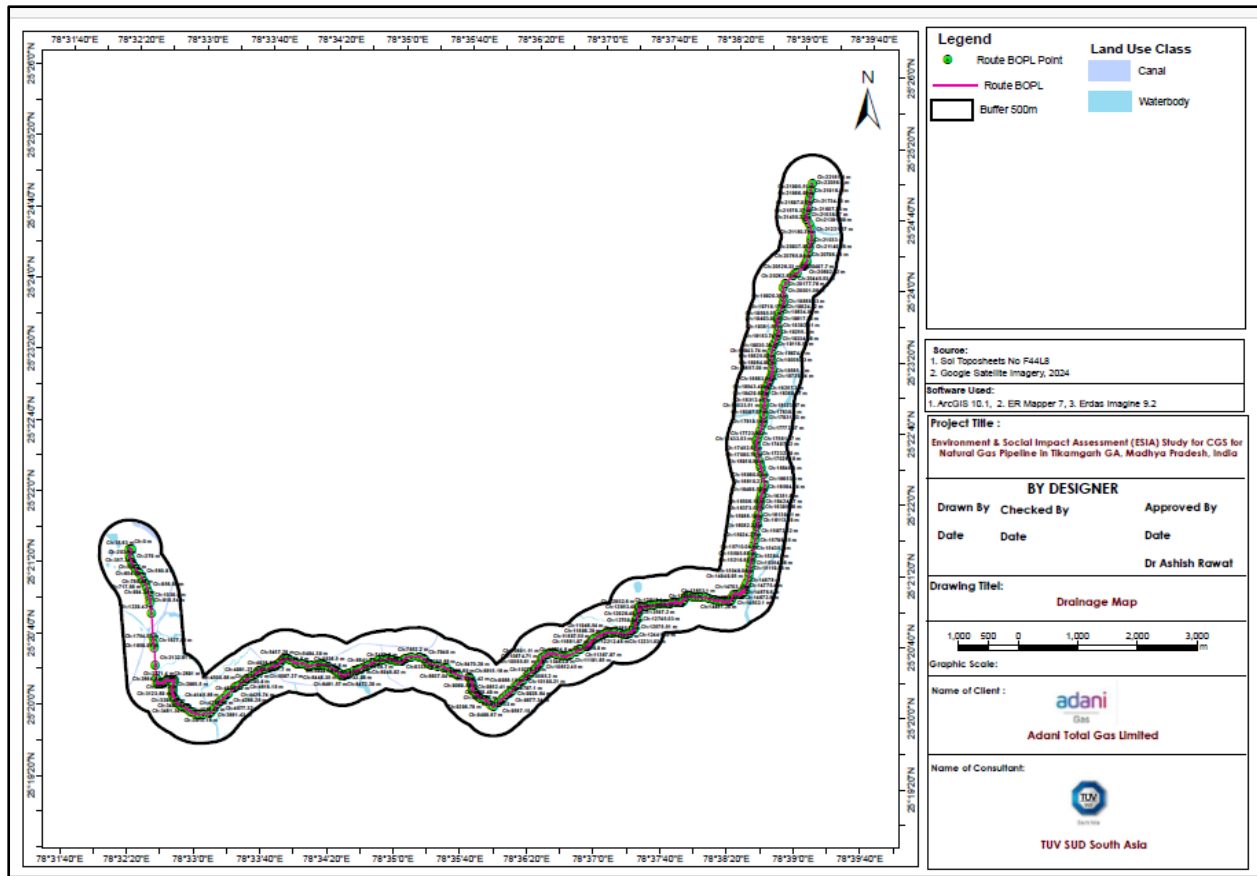
Figure 4-5: Drainage Map of Kachchh Niwari District

The project study area has the following drainage patterns/river systems as mentioned in **Table 4-4**:

Table 4-4: Details of Waterbodies in Project Study Area

| Sl. No. | Detail of Crossing | Pipeline Route 1 |
|---------|--------------------|------------------|
| 1. | River | 1 |
| 2. | Canal | 1 |
| 3. | Drain Nallah | - |

| | |
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*Source: TUV SUD GIS Mapping Study

Figure 4-6: Drainage Map of Project Study Area

4.5.3 Geology

Niwari is primarily composed of ancient Granite and Gneisses, with Quartzite and Quartz Reefs extending in a northeast-southwest direction. In the southeast, Basic Dykes of Dolerite, also aligned in the same direction, are found. In the northwest, river islands formed by the Jamni and Betwa rivers are made up of alluvial deposits, which help sustain some of the district's forested regions.

4.5.4 Land use and Land Cover

According to the Madhya Pradesh Revenue Department, Niwari district spans 504,002 hectares. Total 13.64% forest cover is present. The net sown area, based on the 2014-15 triennial average, is 276,480 hectares, accounting for 54.7% of the total area. 66,657 hectares (13.23%) of land is barren and unsuitable for cultivation. 29,060 hectares (5.77%) is occupied by non-agricultural activities. The detailed land-use breakup of the study area is given in **Table 4-5** and Land Use map of study area is depicted in **Figure 4-7**.

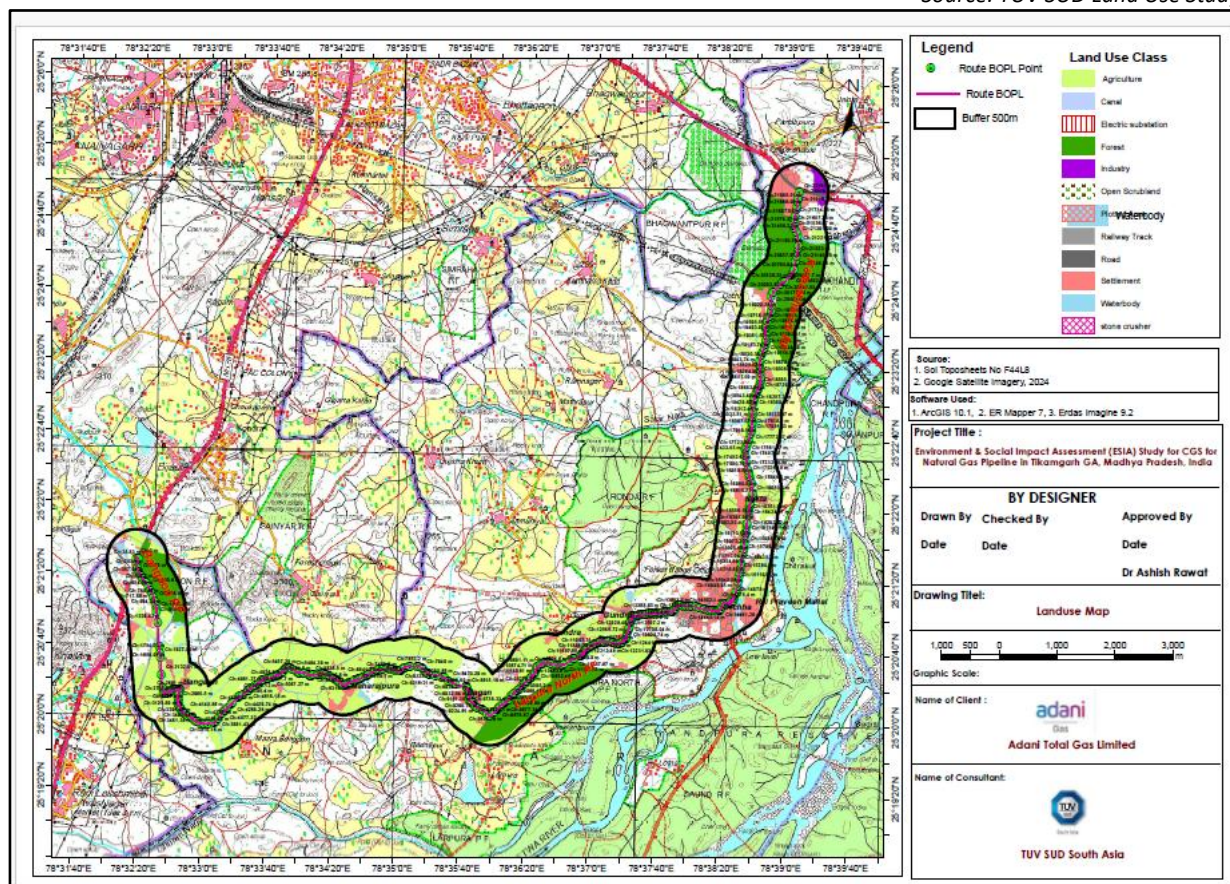
Table 4-5: Land use Details of Project Study Area

| S.No | Land Use | Area in Sq. Km | Area in % |
|------|---------------------|----------------|-----------|
| 1 | Agriculture | 9.442 | 42.038 |
| 2 | Canal | 0.154 | 0.685 |
| 3 | Electric substation | 0.018 | 0.080 |

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| | | | |

| S.No | Land Use | Area in Sq. Km | Area in % |
|------|----------------|----------------|-----------|
| 4 | Forest | 3.306 | 14.721 |
| 5 | Industry | 0.103 | 0.461 |
| 6 | Open Scrubland | 5.082 | 22.627 |
| 7 | Plotted Area | 0.258 | 1.149 |
| 8 | Railway Line | 0.017 | 0.076 |
| 9 | Road | 0.669 | 2.977 |
| 10 | Settlement | 2.844 | 12.660 |
| 11 | Waterbody | 0.507 | 2.257 |
| 12 | Stone Crusher | 0.061 | 0.270 |
| 13 | Study Area | 22.461 | 100.000 |

*Source: TUV SUD Land Use Study



*Source: TUV SUD GIS Mapping Study

Figure 4-7: Land Use Map of Project Study Area

| | |
|--|--|
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4.5.5 Soil Quality

The soils in Niwari predominantly belong to the Entisols and Inceptisols categories. Entisols exhibit minimal soil formation, whereas Inceptisols demonstrate slightly better horizon development. The soil in this region is characterized by low organic content but has a good moisture retention capacity. The primary soil types include black humus, granitic, and yellowish-grey soil with kankar, which have formed due to the disintegration of parent rocks. The soil classification of the district is provided in **Table 4-6**.


Table 4-6: Soil Classification in the District (Type wise)

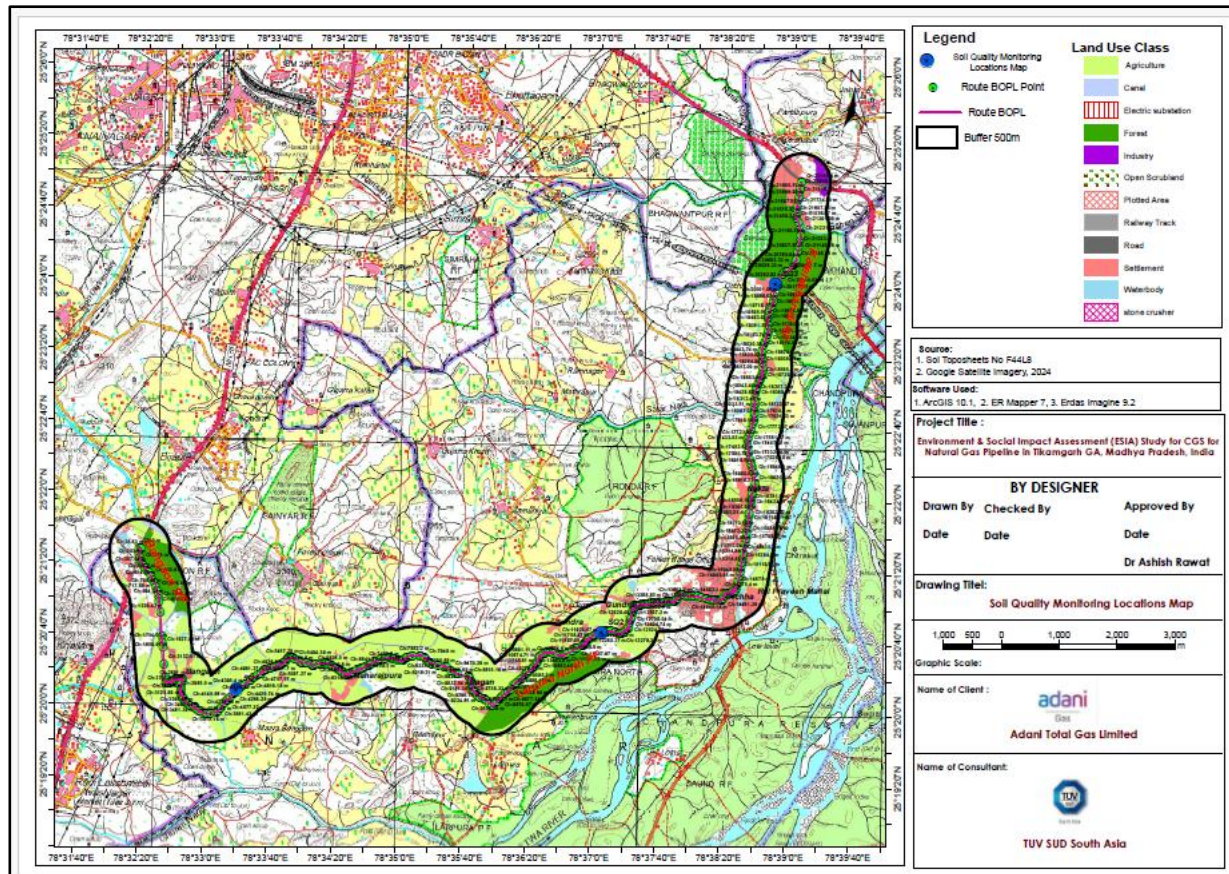
| Sl. No. | US Soil Taxonomy | Indian Equivalents |
|---------|------------------|---------------------------|
| 1 | Entisols | Alluvial and desert soils |
| 2 | Inceptisols | Shallow black soil |

The soil samples were analyzed for various physical and chemical parameters of soil. The soil quality monitoring locations are provided in **Table 4-7** and **Figure 4-8**.

Table 4-7: Soil Quality Monitoring Locations

| Sl. No. | Sample code | Locations | Coordinates |
|---------|-------------|--|-----------------------------|
| 1. | SQ1 | Between Ch: 4266.28 m and Ch: 4395.4 m | 25°20'9.31"N, 78°33'20.36"E |
| 2. | SQ2 | Near Ch: 11898.29 m | 25°20'45.02"N, 78°37'5.54"E |
| 3. | SQ3 | Near Ch: 20262.82 m | 25°24'2.54"N, 78°38'49.43"E |

| | |
|---|---|
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*Source: TUV SUD GIS Mapping Study

Figure 4-8: Soil Quality Monitoring Locations

The samples were collected by ramming a core-cutter into the soil from three different depths viz. 30 cm, 60 cm, and 90 cm below the surface and homogenized. The homogenized samples were analyzed for physical and chemical characteristics. The sealed samples then have been sent to the laboratory for analysis. The soil samples were analyzed for various physical and chemical parameters of soil and the results of the soil quality analysis are given in **Table 4-8, Figure 4-9** and **Figure 4-10**.

Table 4-8 Soil Quality Monitoring Results

| S. No. | Parameters | Unit | SQ1 25°20'9.31"N, 78°33'20.36"E | SQ2 25°20'45.02"N, 78°37'5.54"E | SQ3 25°24'2.54"N, 78°38'49.43"E | Test Method |
|--------|------------|------|---------------------------------------|---------------------------------------|---------------------------------------|--------------------------------------|
| 1. | Texture | | Sandy clay Loam | Sandy Loam | Sandy Loam | IS: 2720 (part-4), 1985 Reaff:2015) |
| 2. | Sand | | 47.3 | 48.2 | 46.14 | IS: 2720 (part-4), 1985,(Reaff:2015) |
| 3. | Silt | % | 27.4 | 26.3 | 24.10 | IS: 2720 (part-4), 1985,(Reaff:2015) |
| 4. | Clay | | 25.3 | 25.5 | 29.76 | IS: 2720 (part-4), 1985,(Reaff:2015) |
| 5. | Porosity | % | 48.2 | 41.1 | 42.0 | STRL /STP/SOIL/01, |

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| S. No. | Parameters | Unit | SQ1 25°20'9.31"N, 78°33'20.36"E | SQ2 25°20'45.02"N, 78°37'5.54"E | SQ3 25°24'2.54"N, 78°38'49.43"E | Test Method |
|--------|--------------------|-------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|
| 6. | Bulk Density | g/cc | 1.34 | 1.34 | 1.32 | STRL /STP/SOIL/01 |
| 7. | pH | | 7.23 | 7.48 | 7.40 | STRL /STP/SOIL/01 |
| 8. | E. Conductivity | µs/cm | 0.46 | 0.38 | 0.39 | STRL /STP/SOIL/01 |
| 9. | Magnesium | mg/kg | 32.9 | 36.9 | 37.6 | STRL /STP/SOIL/01 |
| 10. | Calcium | mg/kg | 167.5 | 157.6 | 145.6 | STRL /STP/SOIL/01 |
| 11. | Chlorides | mg/kg | 56.9 | 54.4 | 61.3 | STRL /STP/SOIL/01 |
| 12. | Sodium | mg/kg | 76.4 | 81.0 | 69.9 | STRL /STP/SOIL/01 |
| 13. | Potassium | mg/kg | 54.3 | 47.3 | 47.3 | STRL /STP/SOIL/01 |
| 14. | Organic Carbon | % | 0.23 | 0.27 | 0.27 | IS : 2720 (Part-24)- 1976(R- 2015) |
| 15. | Organic matter | % | 0.13 | 0.50 | 0.19 | IS : 2720 (Part-24)- 1976(R..2015) |
| 16. | Phosphorous | mg/kg | 71.63 | 72.76 | 68.8 | IS: 2720 (part-26),1987. (R:2011) |
| 17. | SAR | meq | 1.55 | 1.291 | 1.291 | STRL /STP/SOIL/01 |
| 18. | Nitrogen (as N) | mg/kg | 0.30 | 0.32 | 0.32 | STRL /STP/SOIL/01 |
| 19. | Salinity (as NaCl) | % | 0.33 | 0.29 | 0.31 | STRL /STP/SOIL/01 |

Porosity & Water Holding Capacity


Porosity of the soil in study area ranges between 41.1-48.2%. The soil textured as mainly Clayey Sandy Loam with sand percentage varies about 46.14-48.2% and clay percentage varies above 25.3-29.76%.

Organic Carbon & Organic Matter

Organic carbon content varies between 0.23-0.27% in the collected samples of the 3 Soil monitoring locations, whereas organic matter ranges between 0.13-0.50%.

N-P-K & and soil fertility

The Nitrogen content in the soil samples were found between 0.30 mg/kg. to 0.32 mg/kg., which is considered as low. Potassium content found with a range between 47.3 mg/kg to 54.3 mg/kg, which can be considered as low 'K' concentration. Phosphorus content ranged between 68.8 mg/kg. to 72.76 mg/kg, which would be considered as Low concentration of 'P'. Thus, 'NPK' concentration of the study area soil can be considered as 'NPK: low-low-low'. Considering, the overall soil quality of the project study area, the soils are found suitable/fertile for agricultural use. However, during public consultation, it was mentioned by the project affected families, that in recent past, rainfall intensity fluctuates year by year and cultivations are highly dependent on the rainfall frequency.

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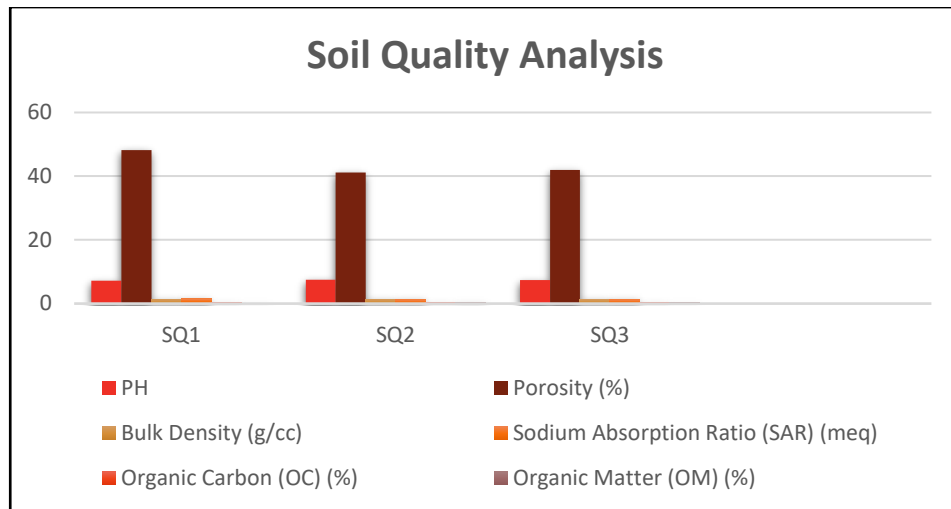


Figure 4-9 Soil Quality Analysis

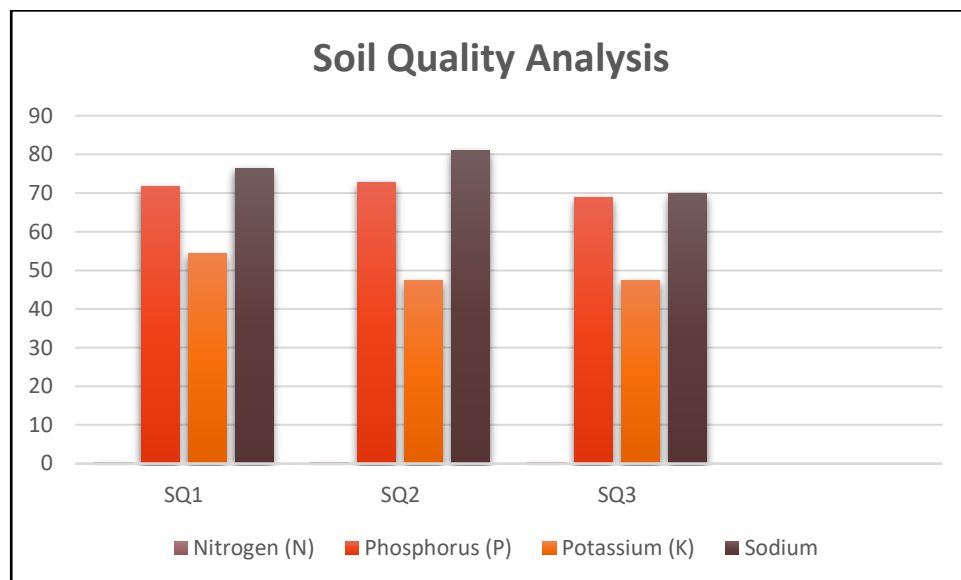



Figure 4-10 Soil Quality Analysis

4.5.6 Natural Hazards

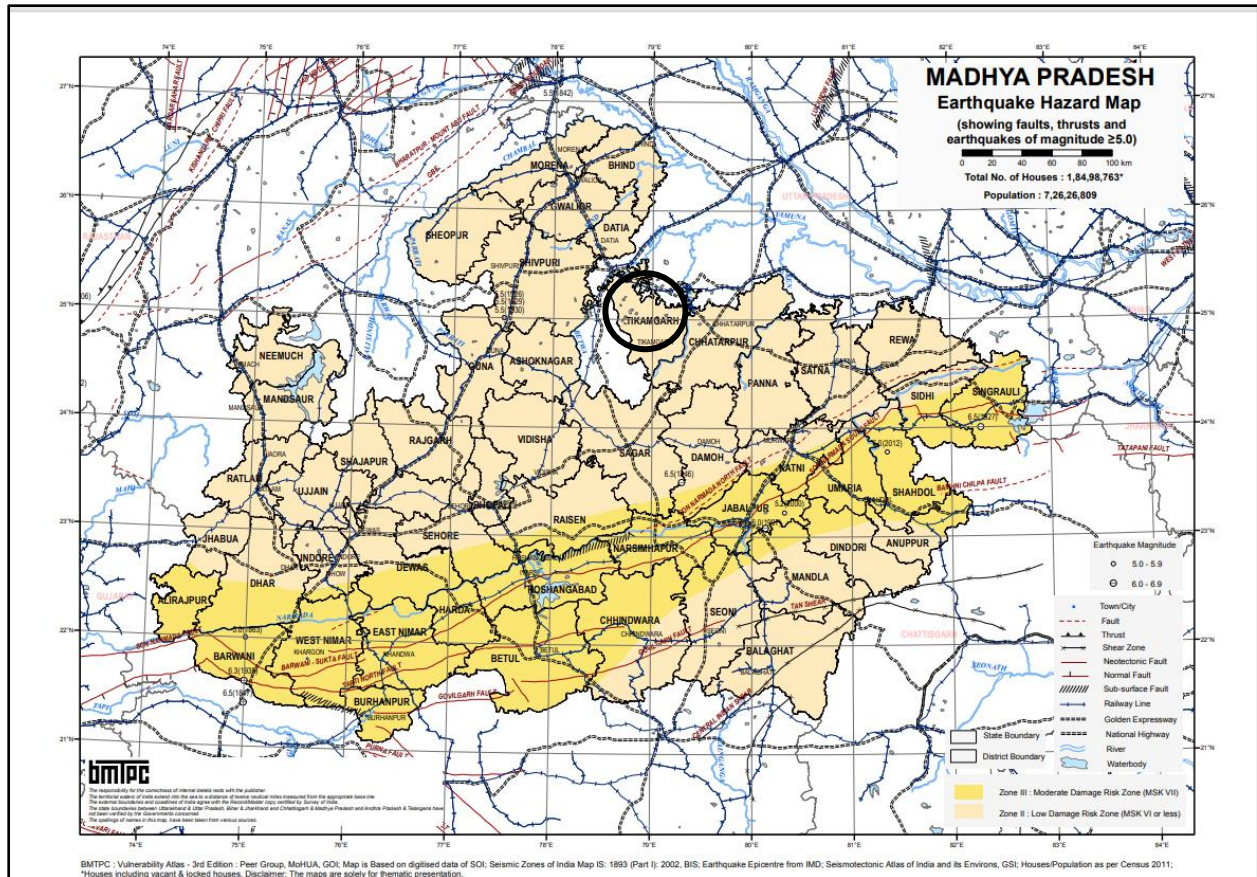
Natural hazards are naturally occurring physical phenomena caused either by rapid or slow onset events which can be geophysical (earthquakes, landslides, tsunamis, and volcanic activity), hydrological (floods), climatological (droughts, etc.), meteorological (cyclones and storms/wave surges) or biological (disease epidemics and insect/animal plagues). Natural hazards can have impacts on the developments; hence assessment of the natural hazards in the area is important for any proposed development.

4.5.6.1 Seismicity

The state of Madhya Pradesh has very low rates of seismic activity, as shown in seismic map of the state in **Figure 4-11**. The study area falls in **Zone II: Low Damage Risk Zone (MSK VI or Less)** in accordance with the Earthquake Hazard map of Madhya Pradesh, Vulnerability Atlas of 3rd edition, 2019 prepared by

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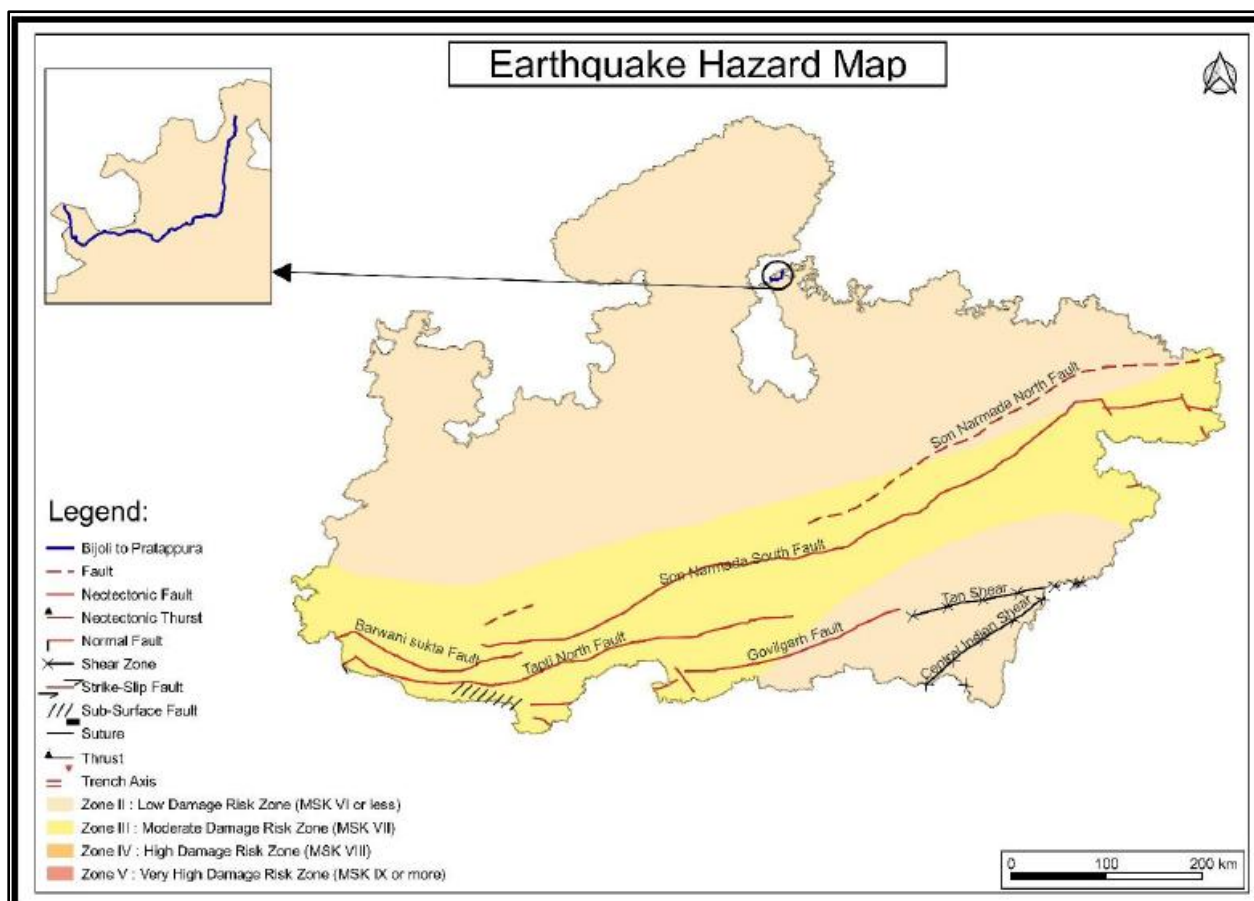
BMTPC. Hence, the threat of damage due to an earthquake is of very low intensity. The seismic map is shown in **Figure 4-12**.



* BMTPC Vulnerability Atlas

Figure 4-11: Earthquake Hazard Map of Madhya Pradesh (Black Circle-Project Study Area)

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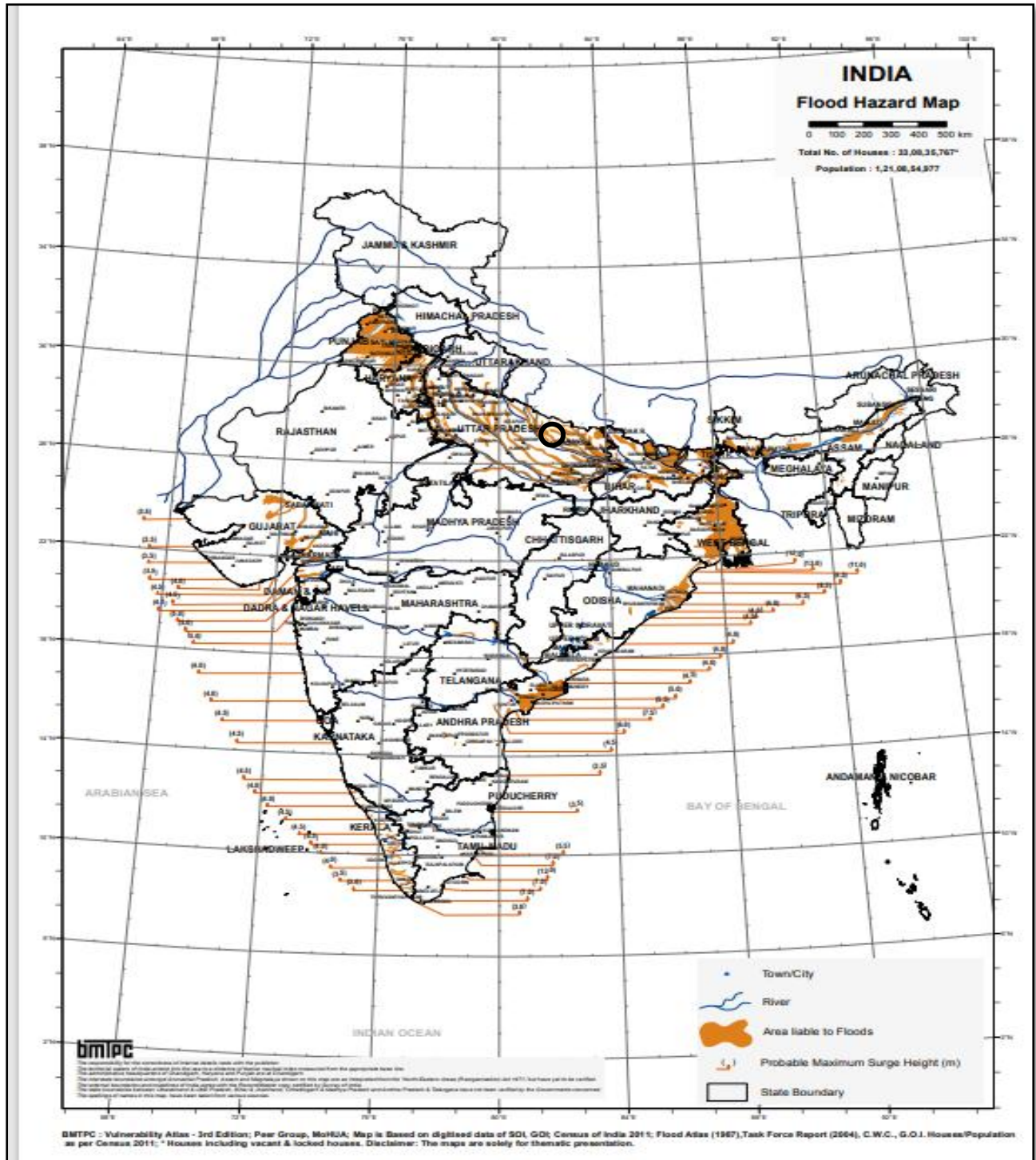
* Source: ATGL Detailed Engineering Survey Report

Figure 4-12: Seismic Hazard Map of Niwari for Pipeline Route

4.5.6.2 Flood

The flood hazard in Niwari District is classified as **low**. The project area encompasses three major rivers—Betwa, Jamni, and Dhasan. However, as per the Flood Hazard Map of India and the Vulnerability Atlas of 3rd Edition, 2019 prepared by BMTPC, there are no identified flood-prone areas within the project's impact zone. The Flood Hazard map of the India is provided in **Figure 4-13**. The Flood Hazard map of the Madhya Pradesh is provided in **Figure 4-14**.

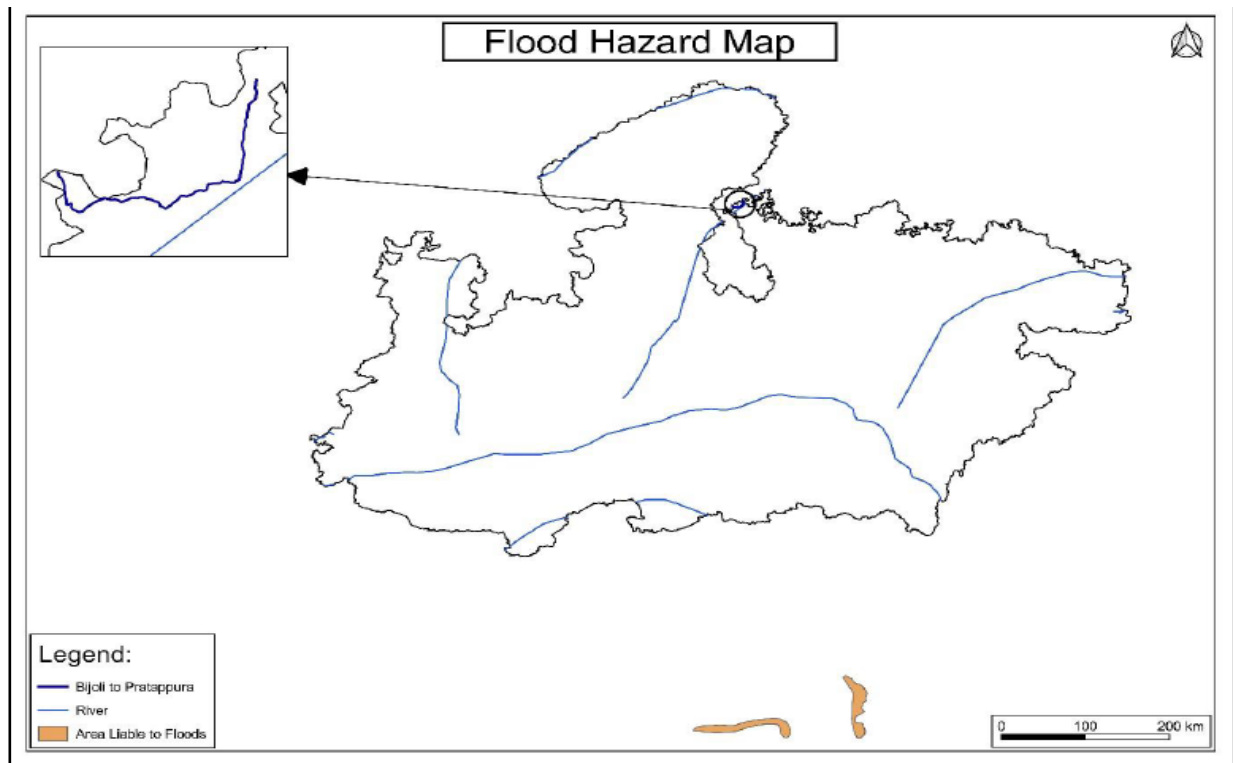
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| Client: Adani Total Gas Limited | Assignment Name: Environmental and Social Impact Assessment (ESIA) Study for Natural Gas Pipeline for Tikamgarh GA, District- Niwari, Madhya Pradesh Report No.: 2025/ET-006496/AD/NA/NA/64187 Version No and Date of Version: Ver 01 dated 17.07.2025 |
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*Source-BMTPC Vulnerability Atlas

Figure 4-13: Flood Hazard Map of India

| | |
|--|--|
| <p>Client: Adani Total Gas Limited</p> | <p>Assignment Name: Environmental and Social Impact Assessment (ESIA) Study for Natural Gas Pipeline for Tikamgarh GA, District- Niwari, Madhya Pradesh</p> <p>Report No.: 2025/ET-006496/AD/NA/NA/64187</p> <p>Version No and Date of Version: Ver 01 dated 17.07.2025</p> |
| | <p>Page 89</p> |




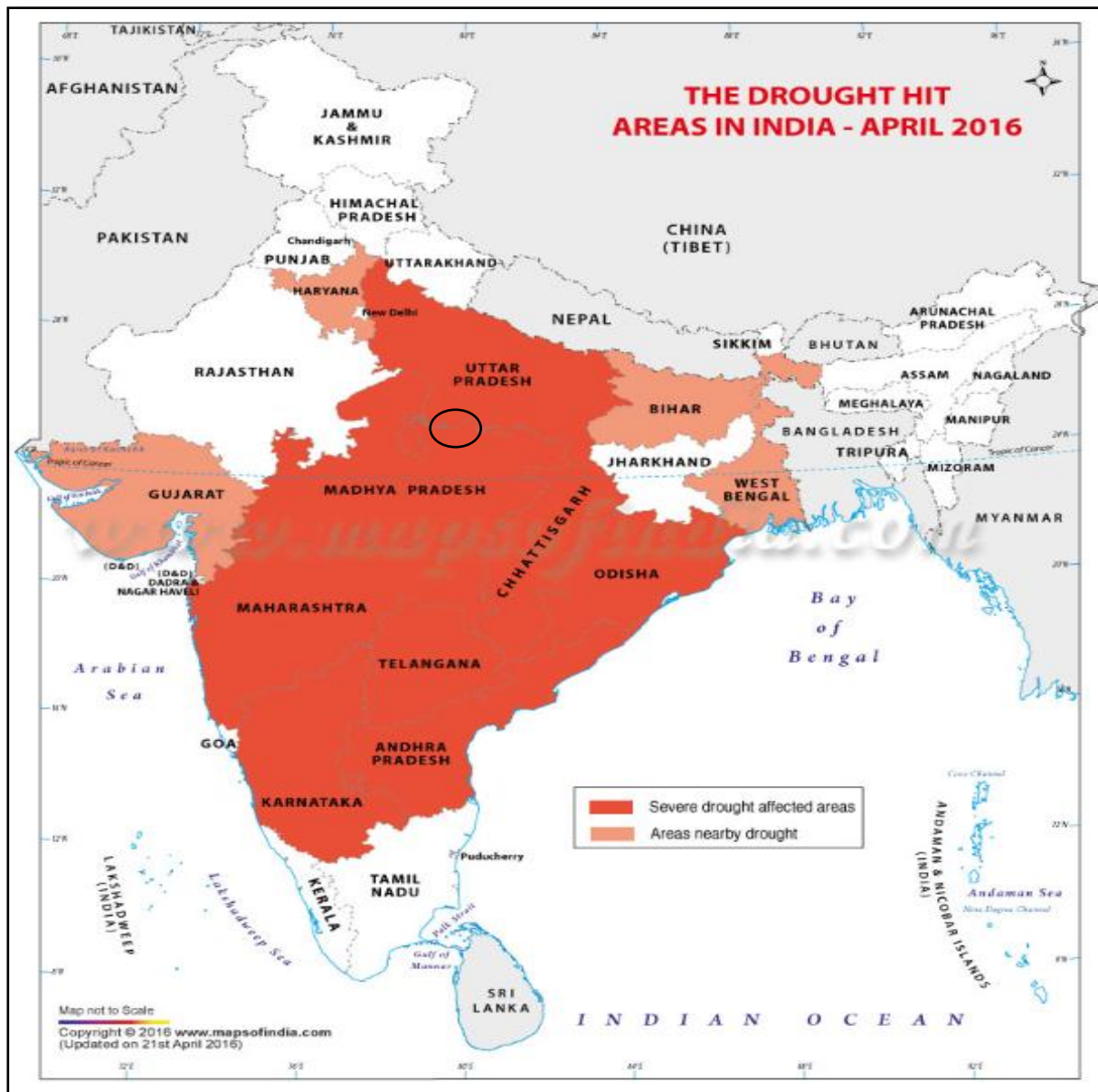
* Source: ATGL Detailed Engineering Survey Report

Figure 4-14: Flood Hazard Map of Madhya Pradesh

4.5.6.3 Drought

Frequent drought is one of the major problems of the district along with other problems of salinity and water logging. Niwari district contains 15.44 km² and 193.55 km² of the district are categorized under very high and high drought risk, respectively. Additionally, 568.01 km² fall under moderate risk, while 389.30 km² and 3.70 km² are classified as low and very low risk areas.

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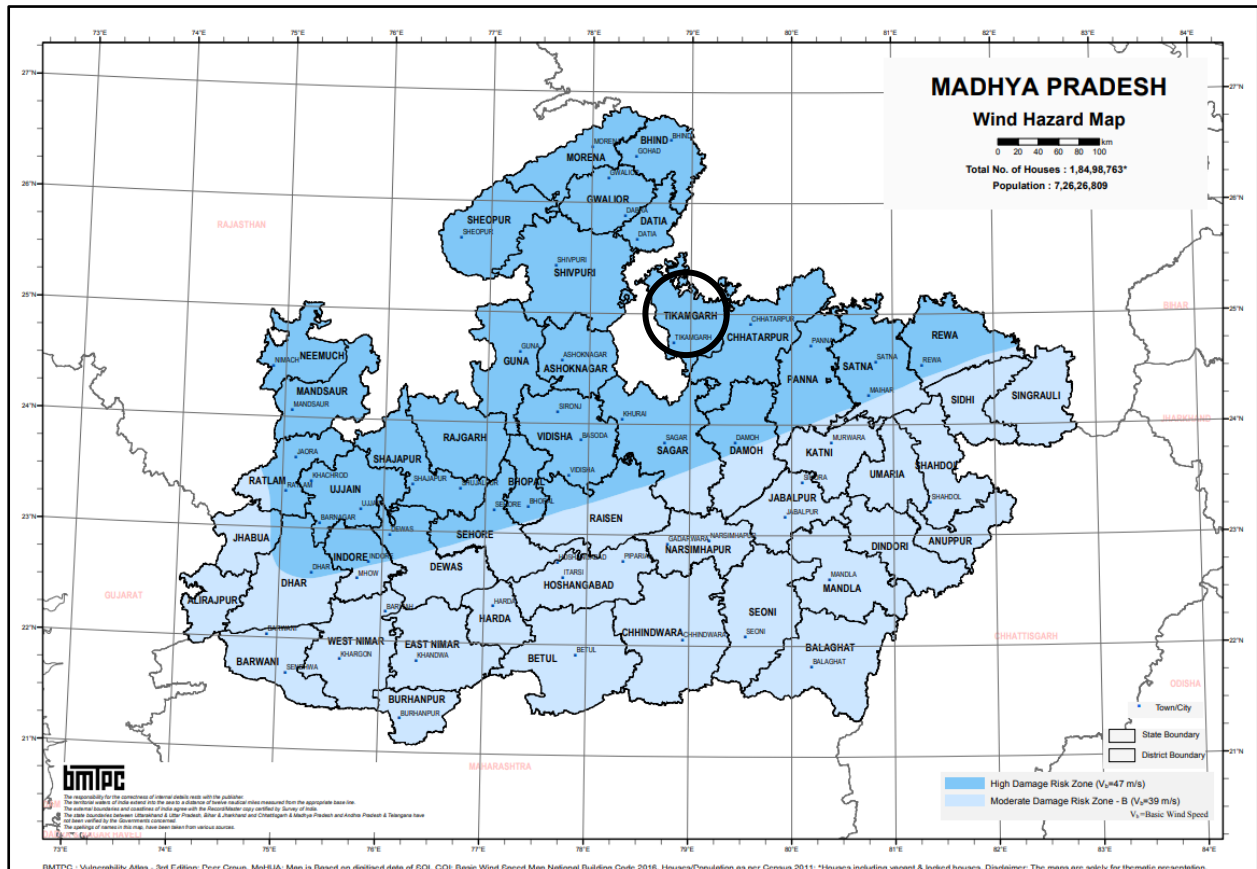
*Source: Maps of India

Figure 4-15: Drought Prone Map of India (Black Circle indicating Project Area)

4.5.6.4 Wind Hazard

The project study area has been identified in High Damage Risk Zone - B ($V_b=47$ m/s) according to the Wind Hazard map of Madhya Pradesh, Vulnerability Atlas of 3rd edition, 2019 prepared by BMTPC. Wind Hazard Map of Madhya Pradesh indicating project study area has been depicted in **Figure 4-16**.

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*BMTPC Vulnerability Atlas

Figure 4-16: Wind Hazard Map, Madhya Pradesh (Project Area identified with “Black Circle”)

4.5.7 Climate and Meteorology

In accordance with ³Köppen–Geiger Climate Classification system (**Figure 4-17**) the climate zone of project area Madhya Pradesh considered as to be BSh category, indicating a semi-arid climate characterized by hot temperatures and low rainfall.

³ Köppen-Geiger Climate Classification is one of the most widely used climate classification systems. The system is based on the concept that native vegetation is the best expression of climate. Thus, climate zone boundaries have been selected with vegetation distribution in mind. It combines average annual and monthly temperatures and precipitation, and the seasonality of precipitation.

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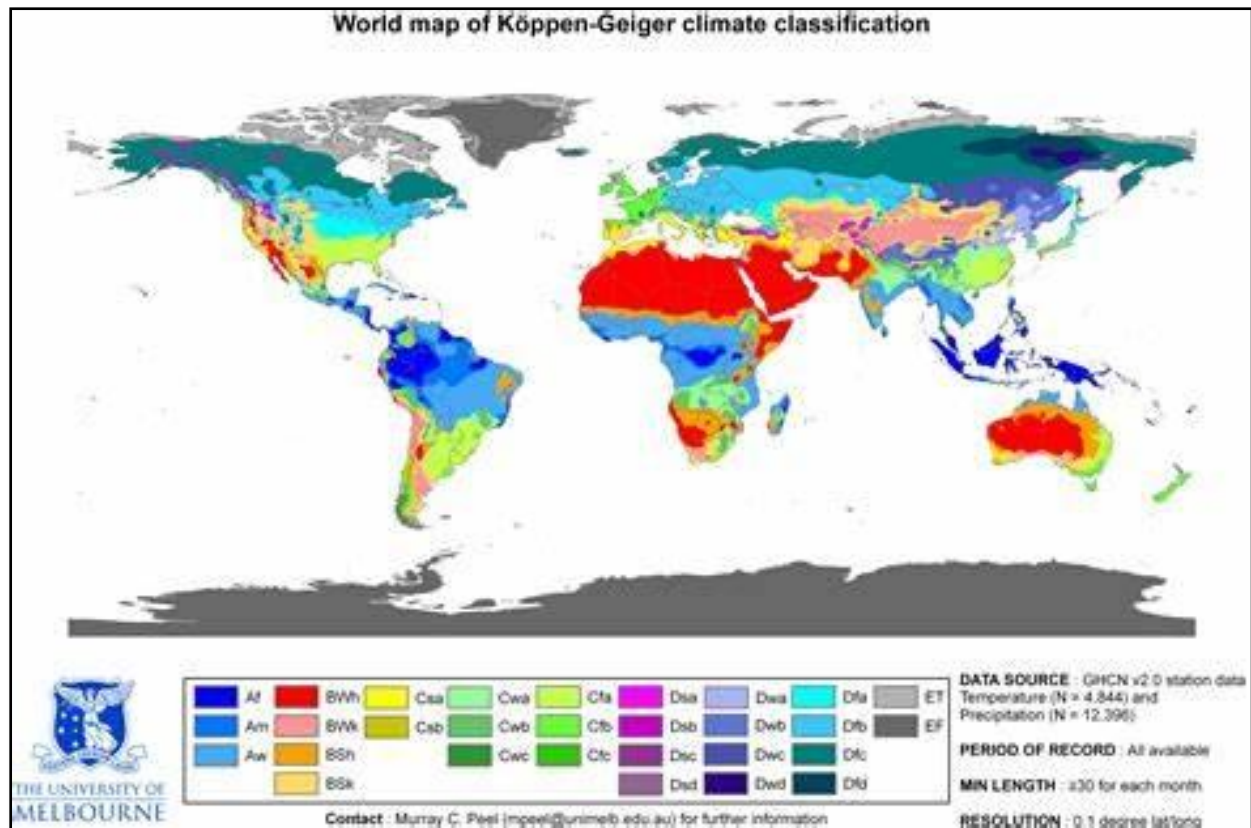


Figure 4-17: World Map of Köppen–Geiger Climate Classification

Niwari district in Madhya Pradesh experiences hot summers and generally dry conditions, except during the southwest monsoon season. The year is divided into four distinct seasons:

1. Winter (December to February)
2. Summer (March to mid-June)
3. Monsoon (mid-June to September)
4. Post-monsoon (October to November) – Transition period

May is the hottest month, with temperatures reaching 41.8°C, while January is the coldest, with temperatures dropping to 7.0°C. The district receives an annual rainfall of 1057.1 mm, with August being the most humid month and May the driest.

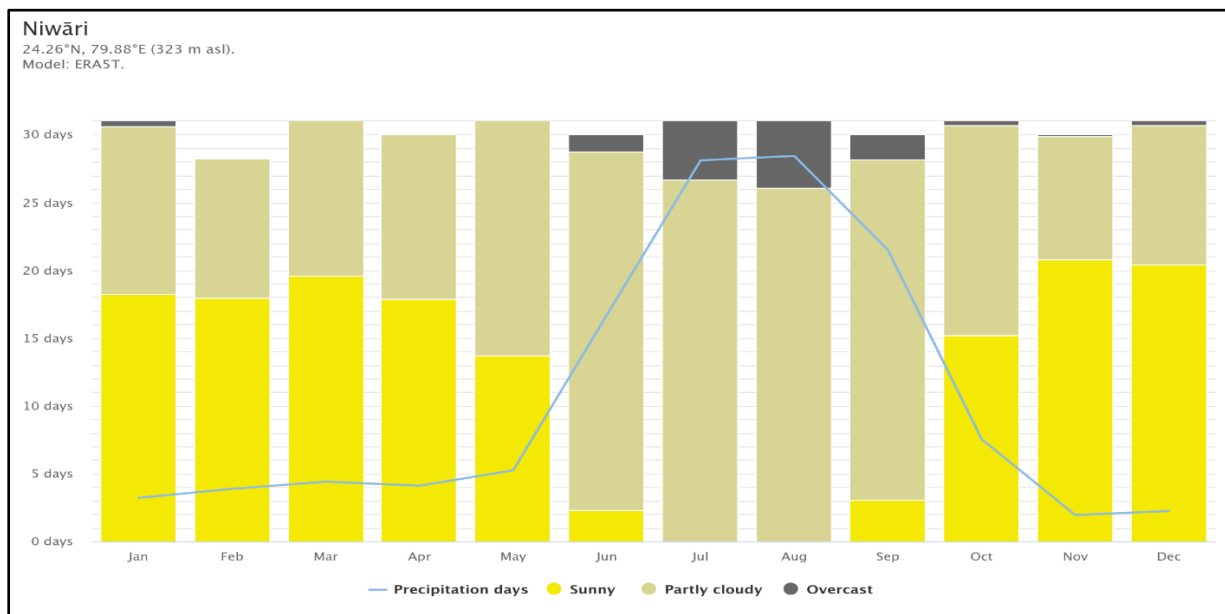
The atmospheric humidity is usually low during summer months around 25%. However, humidity slowly starts building up from third week of May and it reaches maximum around 85% during monsoon period. The humidity again decreases in winter season and it varies between 30 to 40% during winter season.

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*Source: Meteoblue.com

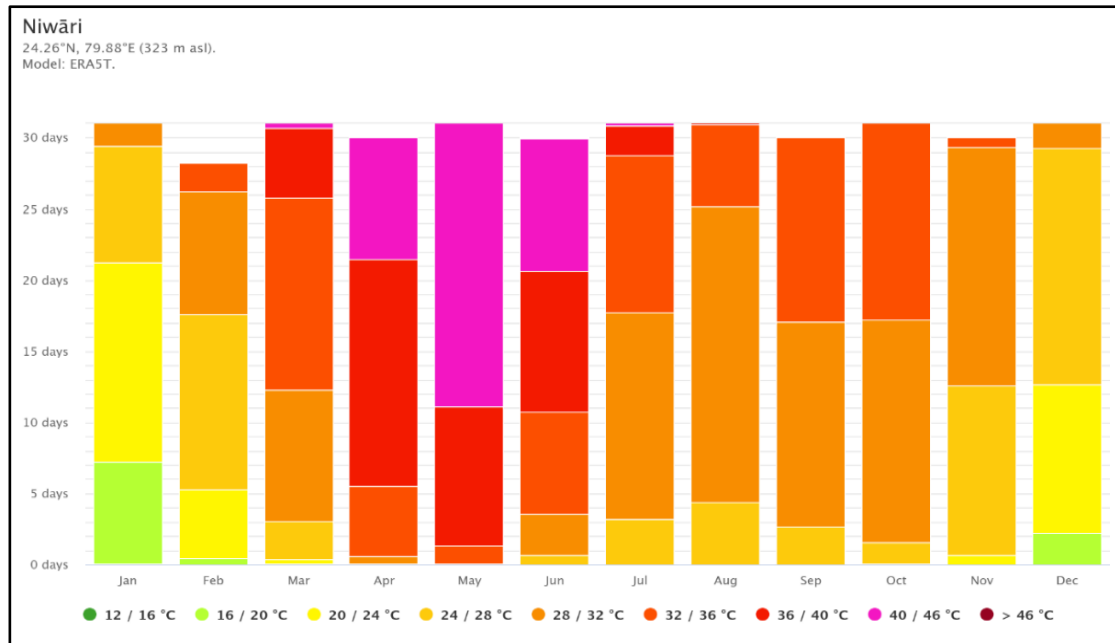
Figure 4-18: Average Temperature and Precipitation



*Source: Meteoblue.com

Figure 4-19: Precipitation Graph of Study Area

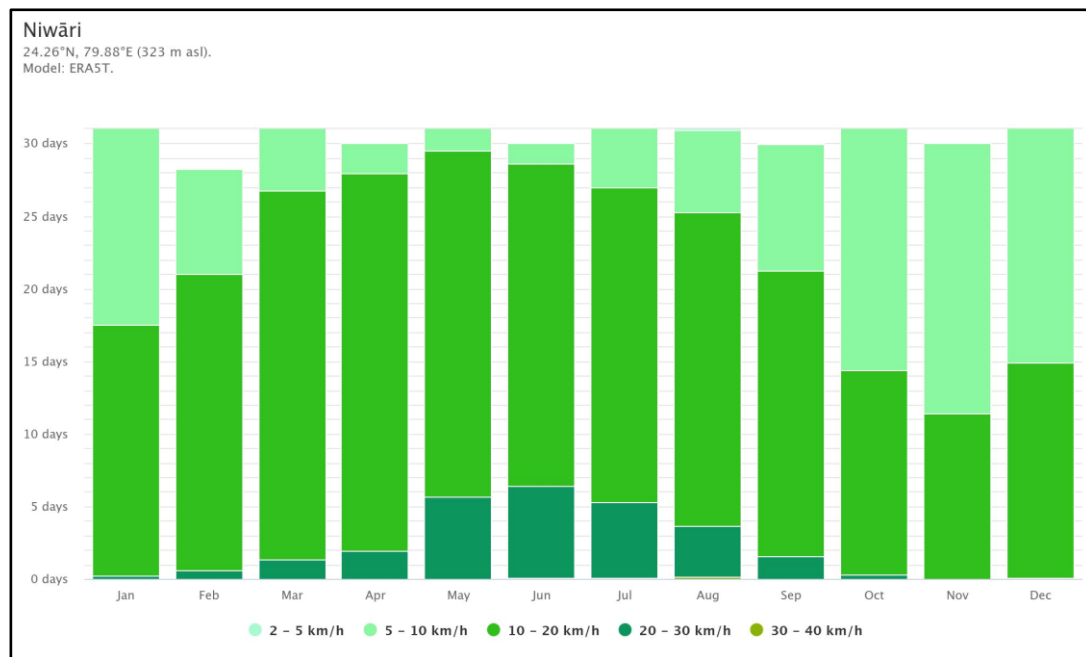
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| Client: Adani Total Gas Limited | Assignment Name: Environmental and Social Impact Assessment (ESIA) Study for Natural Gas Pipeline for Tikamgarh GA, District- Niwari, Madhya Pradesh Report No.: 2025/ET-006496/AD/NA/NA/64187 Version No and Date of Version: Ver 01 dated 17.07.2025 |
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*Source: Meteoblue.com

Figure 4-20: Temperature Trend in Study Area (for last 30 Years)

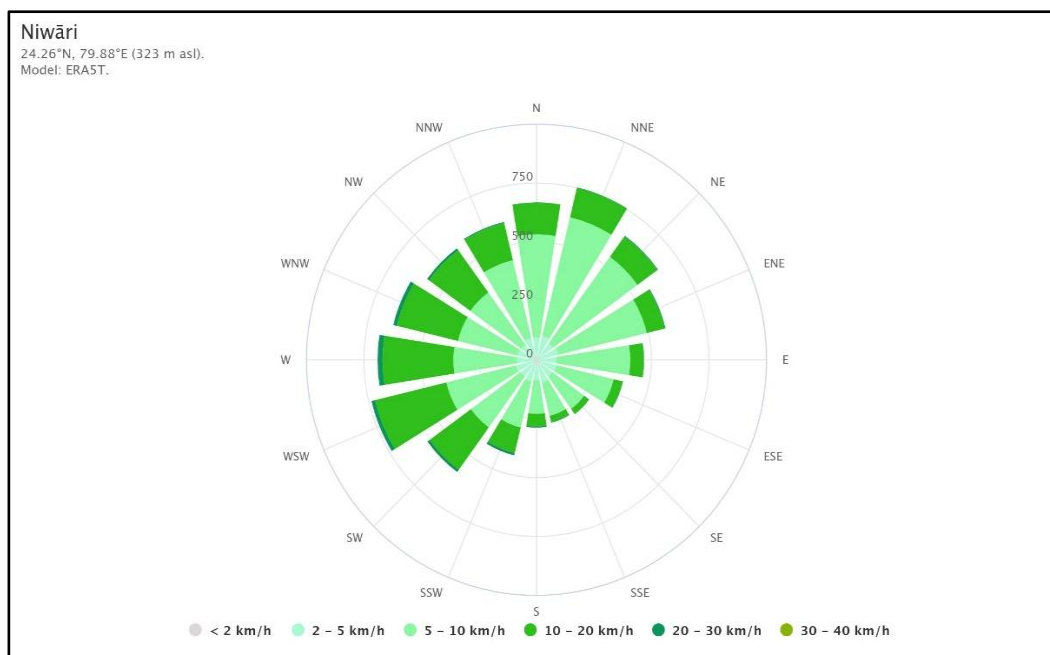
The wind intensity analysis and wind-rose diagram for study area is given in **Figure 4-21** and **Figure 4-22** respectively.



*Source: Meteoblue.com

Figure 4-21: Wind Intensity of Study Area

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*Source: Meteoblue.com

Figure 4-22: Windrose Diagram of Project Study Area

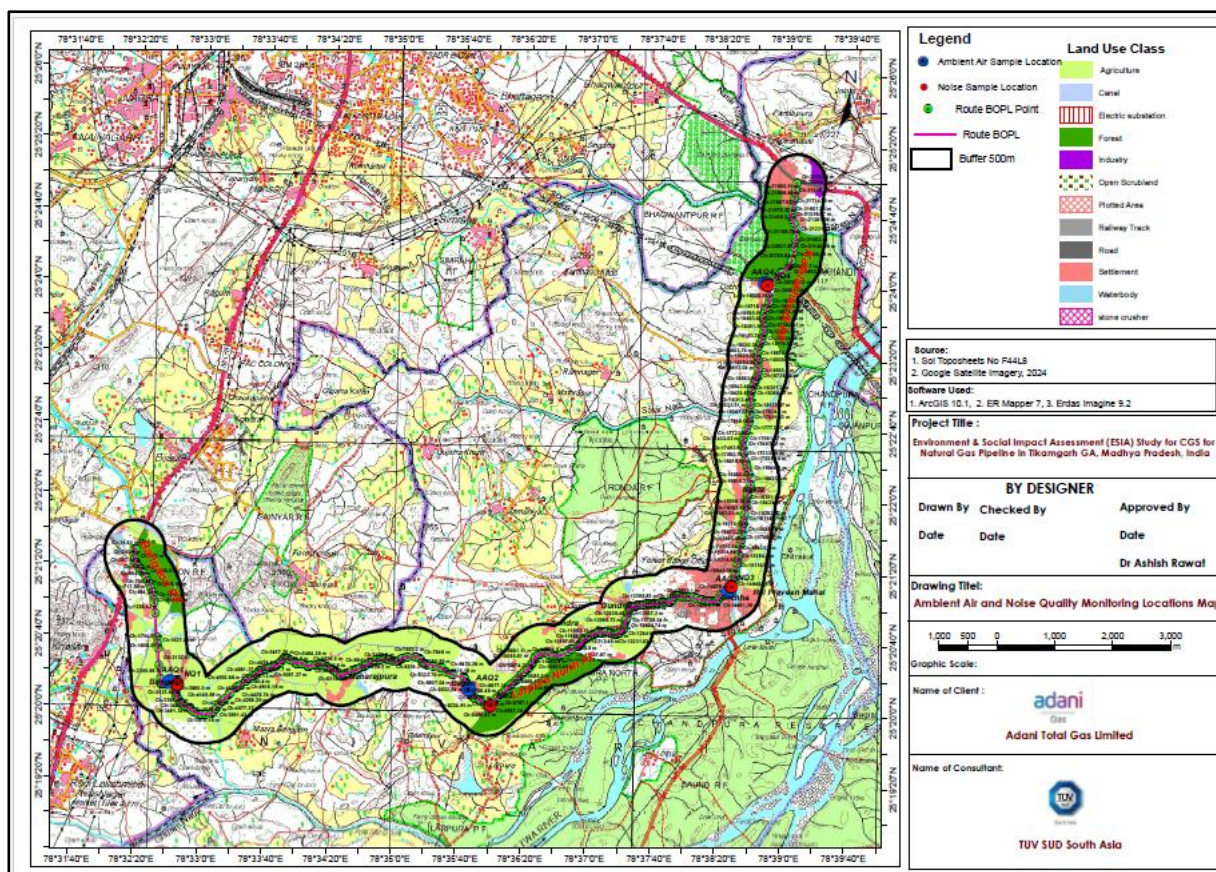
4.5.8 Ambient Air Quality

The ambient air quality monitoring was carried out at four (4) locations. The sampling locations for air and noise quality are based on certain meteorological conditions such as wind direction, wind speed, surrounding receptors and in accordance with that, the monitoring sites are identified close to the proposed project activity area. Ambient air quality monitoring locations are shown in **Table 4-9** and depicted in **Figure 4-23**. Ambient air quality monitoring results are shown in **Table 4-10**, and depicted in **Figure 4-24**.

Table 4-9: Ambient Air Quality Monitoring Locations

| Sl. No. | Sample code | Locations | Coordinates |
|---------|-------------|---|------------------------------|
| 1. | AAQ1 | Serolex Shilipar Factory (near Ch: 2619.03 m) | 25°20'13.75"N, 78°32'42.24"E |
| 2. | AAQ2 | Near Ch: 9020.91 m | 25°20'12.44"N, 78°35'46.71"E |
| 3. | AAQ3 | Near Ch: 14731.71 m | 25°21'10.14"N, 78°38'26.74"E |
| 4. | AAQ4 | Near Ch: 20262.82 m | 25°24'3.61"N, 78°38'46.17"E |

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*Source: TUV-SUD GIS Mapping Study

Figure 4-23: Ambient Air and Noise Monitoring Locations within Project AOI

Table 4-10 Ambient Air Quality Monitoring Results (AAQ1-AAQ2)

| S. No. | Test Parameters | Unit | AAQ-1 25°20'13.75"N, 78°32'42.24"E | AAQ-2 25°20'12.44"N, 78°35'46.71"E | AAQ-3 25°21'10.14"N, 78°38'26.74"E | AAQ-4 25°24'3.61"N, 78°38'46.17"E | Limits as per NAAQS |
|--------|--|-------------------|--|--|--|---|---------------------|
| 1 | Particulate Matter (PM10) | µg/m ³ | 58.8 | 57.4 | 60.2 | 59.3 | 100 |
| 2 | Particulate Matter (PM2.5) | µg/m ³ | 38.8 | 40.3 | 44.2 | 44.5 | 60 |
| 3 | Sulphur Dioxide (as SO ₂) | µg/m ³ | 6.92 | 7.12 | 7.64 | 6.53 | 80 |
| 4 | Nitrogen Dioxide (as NO ₂) | µg/m ³ | 8.12 | 7.04 | 7.04 | 8.12 | 80 |
| 5 | Ozone (O ₃) | µg/m ³ | 11.3 | 12.4 | 12.2 | 12.4 | 100 |

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| S. No. | Test Parameters | Unit | AAQ-1 25°20'13.75"N, 78°32'42.24"E | AAQ-2 25°20'12.44"N, 78°35'46.71"E | AAQ-3 25°21'10.14"N, 78°38'26.74"E | AAQ-4 25°24'3.61"N, 78°38'46.17"E | Limits as per NAAQS |
|----------------------|----------------------------|-------------------|--|--|--|---|---------------------|
| 6 | Lead (Pb) | µg/m ³ | <1.0 | <1.0 | <1.0 | <1.0 | 1.0 |
| 7 | Carbon MonoOxid | mg/m ³ | 0.22 | 0.22 | 0.25 | 0.24 | 4.0 |
| 8 | Ammonia (NH ₃) | µg/m ³ | < 10 | < 10 | < 10 | < 10 | 400 |
| 9 | Arsenic (As) | ng/m ³ | <1.0 | <1.0 | <1.0 | <1.0 | 6 |
| 10 | Nickel (Ni) | ng/m ³ | 0.21 | 0.22 | 0.24 | 0.20 | 20 |
| AQI of the Locations | | | 65 (SATISFACTOR) | 67 (SATISFACTORY) | 74 (SATISFACTOR) | 74 (SATISFACTOR) | |

The ambient air quality monitoring at the project study area indicates that air quality of the area 'Satisfactory' in terms of AQI index, which is less than 100 in all the sampled locations. The gaseous pollutant's concentration was observed as low; however, particulate matter concentration was observed in the higher side in comparison to low pollution zones like villages, where no industrial activities carried out and vehicular movements are also low in comparison to any busy major roads. Predominant/determining pollutant is identified as PM₁₀ and PM_{2.5}; However, all air pollutants' concentration were observed below the standard limit set by NAAQS.

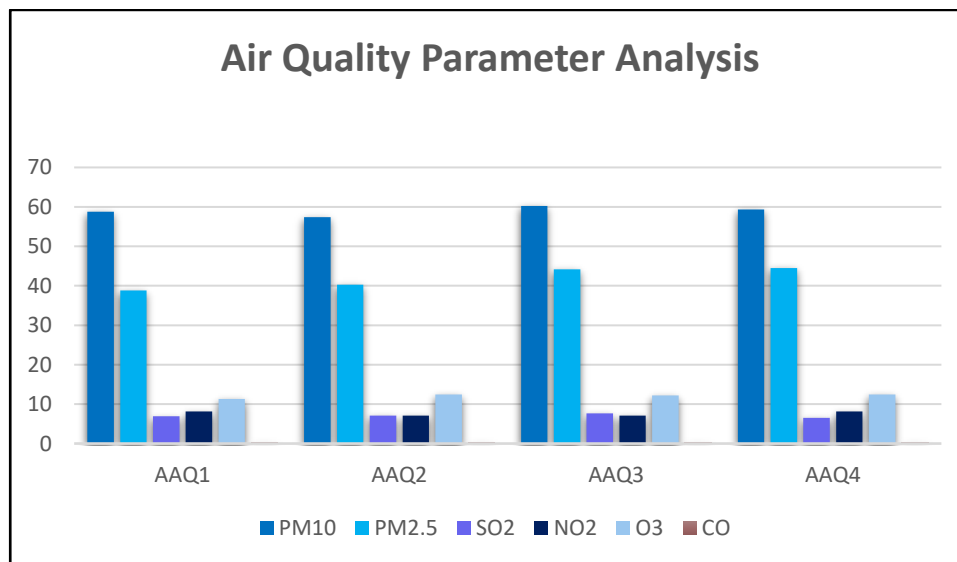



Figure 4-24 Air Quality Parameter Analysis

| | |
|---|---|
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4.5.9 Ambient Noise Quality

In the present study, sound pressure levels (SPL) were measured by a sound level meter. Since loudness of sound is important for its effects on people, the dependence of loudness upon frequency must be considered in noise impact assessment. This has been achieved using A-weighting filters in the noise measuring instrument which gives a direct reading of approximate loudness. A-weighted equivalent continuous sound pressure level (Leq) values have been computed from the values of A-weighted sound pressure level measured with the help of noise meter. Four (04) locations has been identified to carry out the secondary noise monitoring for the pipeline route at as mentioned in **Table 4-11** to identify the baseline noise level of the project surrounding areas, so that noise pollution during construction phase can be predicted and cumulative effect of ambient noise can be identified. The ambient noise quality monitoring results have been shown in **Table 4-12** and **Figure 4-25**.

Table 4-11: Ambient Noise Quality Monitoring Stations


| Sl. No. | Sample code | Locations | Coordinates |
|---------|-------------|---|------------------------------|
| 1. | NQ1 | Bangay Khas Village (between Ch: 2823.01 m and Ch: 2873.43 m) | 25°20'12.02"N, 78°32'46.99"E |
| 2. | NQ2 | Between Ch: 9488.67 m and Ch: 9587.15 m | 25°20'3.59"N, 78°36'0.26"E |
| 3. | NQ3 | Between Ch: 14824.61 m and Ch:14878 m) | 25°21'12.18"N, 78°38'28.22"E |
| 4. | NQ4 | Near Ch: 20177.76 m | 25°24'1.85"N, 78°38'47.24"E |

Noise quality monitoring has been conducted in each proposed project location for over a period of twenty-four hours (once) to obtain Leq values at uniform time intervals of 1 hour. In each hourly time interval Leq values it was computed from SPL readings taken at uniform time intervals of 15 minutes. For each location, day and night-time Leq values has then been computed from the hourly Leq values so that comparison could be made with the national ambient noise standards. Day time Leq has been computed from the hourly Leq values between 6.00 a.m. - 10.00 p.m. and night-time Leq from the hourly Leq values between 10.00 p.m. - 6.00 a.m.

Table 4-12 Ambient Noise Quality Monitoring Results

| S. No. | Locations | Location Code | Results in Db(A) Leq | | Limit for A Per CPCB Guidelines ;Leq, dB (A) | |
|--------|---|---------------|-------------------------|---------------------------|--|------------|
| | | | Average Day Noise Level | Average Night Noise Level | Day Time | Night-Time |
| 1 | Bangay Khas village | NQ1 | 52.4 | 39.8 | 55 | 45 |
| 2 | Between Ch: 9488.67 m and Ch: 9587.15 m | NQ2 | 50.5 | 38.5 | 65 | 55 |
| 3 | Between Ch: 14824.61 m and Ch:14878 m | NQ3 | 51.7 | 39.43 | 75 | 70 |
| 4 | Near Ch: 20177.76 m | NQ4 | 49.6 | 40.2 | 50 | 40 |

It has been observed that in all the locations, where ambient noise quality was monitored during baseline survey, are having ambient noise level around 49.6 to 52.4 Db(A) during daytime and 38.5 to 40.2 Db(A)

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during night-time. It is found that daytime and night-time noise levels are well within CPCB limits specified for Residential area as per Noise Pollution (Regulation and Control) Rules, 2000.

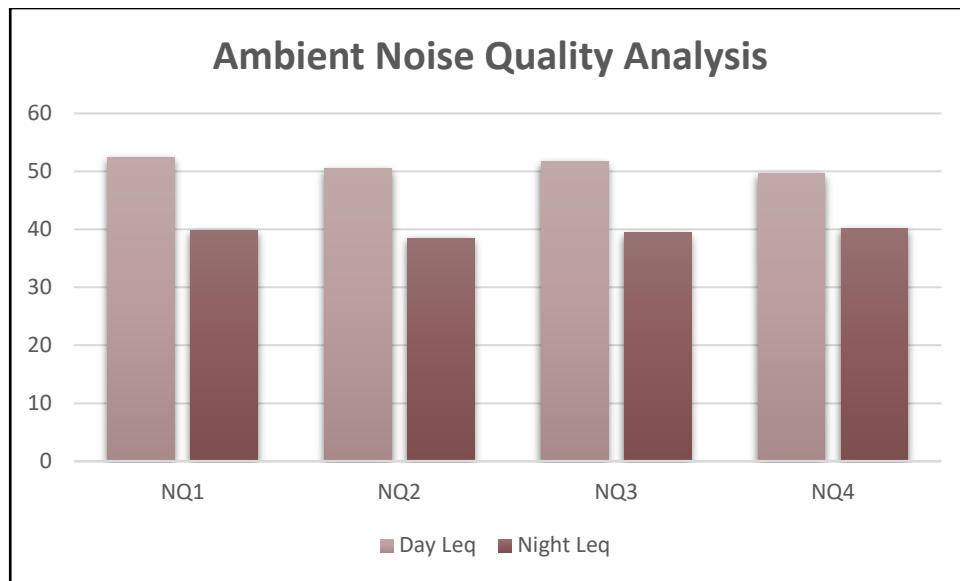


Figure 4-25 Ambient Noise Quality Analysis

4.5.10 Hydrogeology and Ground Water Quality

4.5.10.1 Hydrogeology


Niwari district is composed of Bundelkhand Granite and Gneisses, which are extensively intruded by quartz reefs and pegmatites. The granite is typically flesh-red in color and coarse-grained, displaying a porphyritic texture. In some areas, such as Jatara, Baldeogarh, and Palera, grey-colored granite is also present, which appears to have metamorphosed into a gneissic variety. Both the pink and grey granites have undergone significant weathering. Quartz reefs, forming long narrow ridges, are intrusive into the granite. These intrusions have caused the development of joints and fractures in the host granitic rock. These quartz reefs serve as water divides and barriers to groundwater flow. The primary factors influencing the groundwater environment in this area include:

- The composition and structure of the granitic rock.
- The depth and characteristics of the weathered mantle (overburden) over the hard, compact basement.
- The size, intensity, and connectivity of the joints and fractures in the granite.
- The extent and layout of valleys between the quartz reefs.
- The water storage and yield capacity of aquifers in both the overburden and fractured granite. Generally, thicker overburden, intense weathering, and closely spaced joint planes enhance groundwater storage and yield in granitic terrains.

Hydrogeological studies in Niwari reveal two distinct groundwater environments:

a. Upland and Hilly Granite Tract

This area consists of highly weathered granite, promoting rapid percolation of rainwater and supporting groundwater occurrence at depths of 5 to 8 meters below ground level (bgl). The average groundwater

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yield ranges from 0.16 to 0.2 cubic meters per hour, with annual water level fluctuations between 2 and 2.5 meters.

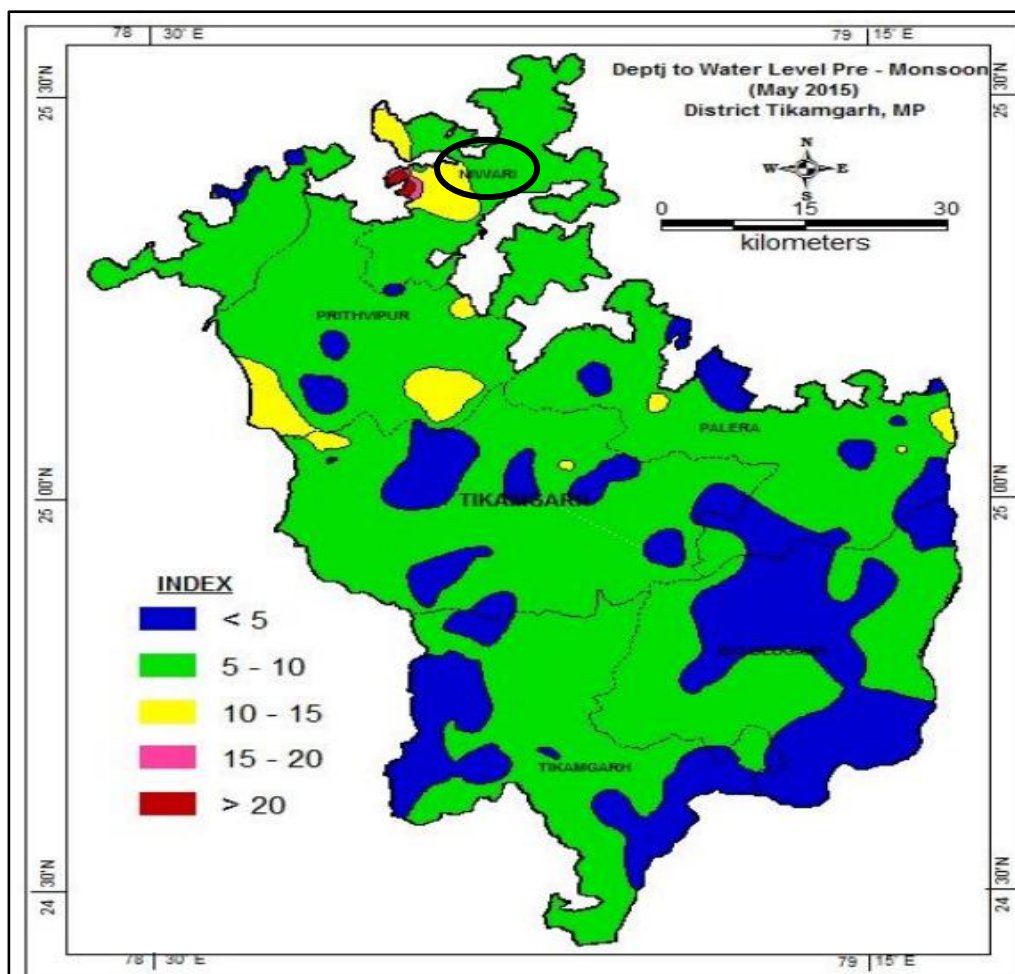
b. Granitic Tract Between Intrusive Bodies

This area is characterized by the presence of quartz reefs. The granite here has developed fractures and joints, acting as conduits for groundwater circulation within the boundaries set by the quartz reefs. Exploratory wells drilled up to 200 meters show a yield ranging from 0.75 to 6.0 liters per second, with transmissivity values between 12.87 and 145 square meters per day. The storage coefficient of the Joriya Exploratory well is 4.78×10^{-4} .

DEPTH TO WATER LEVEL

The depth to water level in the district ranges between 5-10 m bgl during pre-monsoon and 2-10 m bgl for post-monsoon. Maps indicating depth to water level during pre-monsoon & post-monsoon have been depicted in **Figure 4-26** Error! Reference source not found. and **Figure 4-27**.

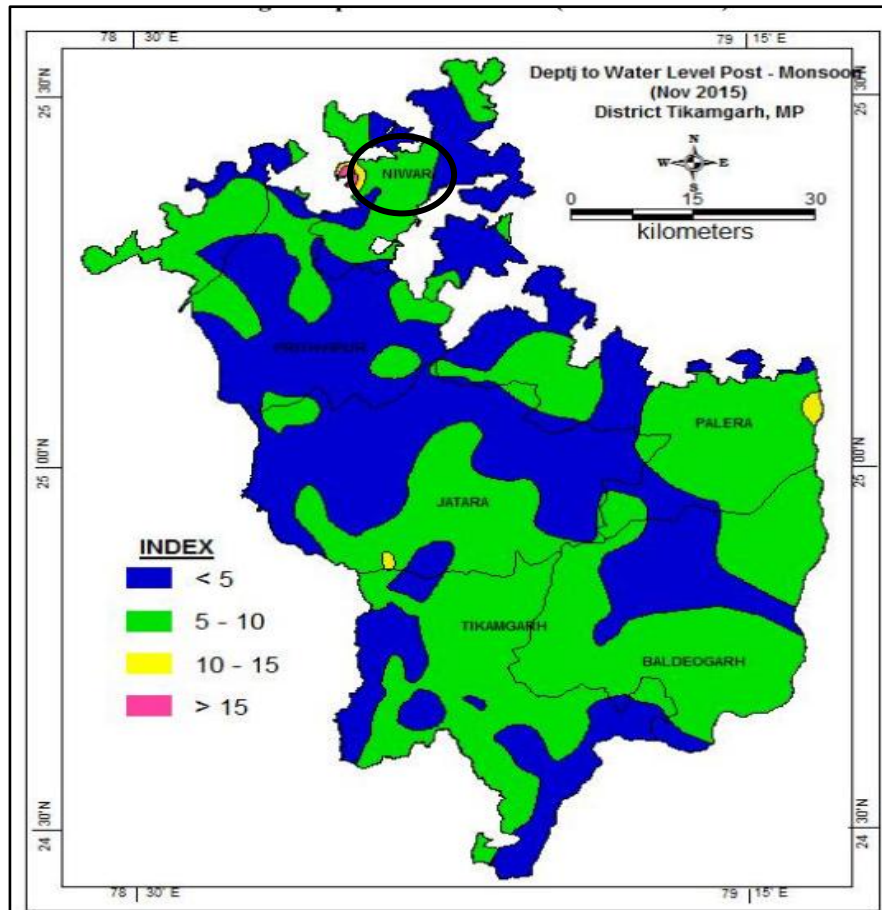
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**Source: Aquifer Map and Management Plan, Niwari District*

Figure 4-26: Pre-Monsoon Water Level, Niwari District (Project Study Area demarcated with “Black Circle”)

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*Source: Aquifer Map and Management Plan, Niwari District

Figure 4-27: Post-Monsoon Water Level, Niwari District (Project Study Area demarcated with “Black Circle”)

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GROUND WATER RESOURCES

With approx. 50% of ground water extraction, Niwari⁴ district falls in “Safe” category.


4.5.10.2 Ground Water Quality

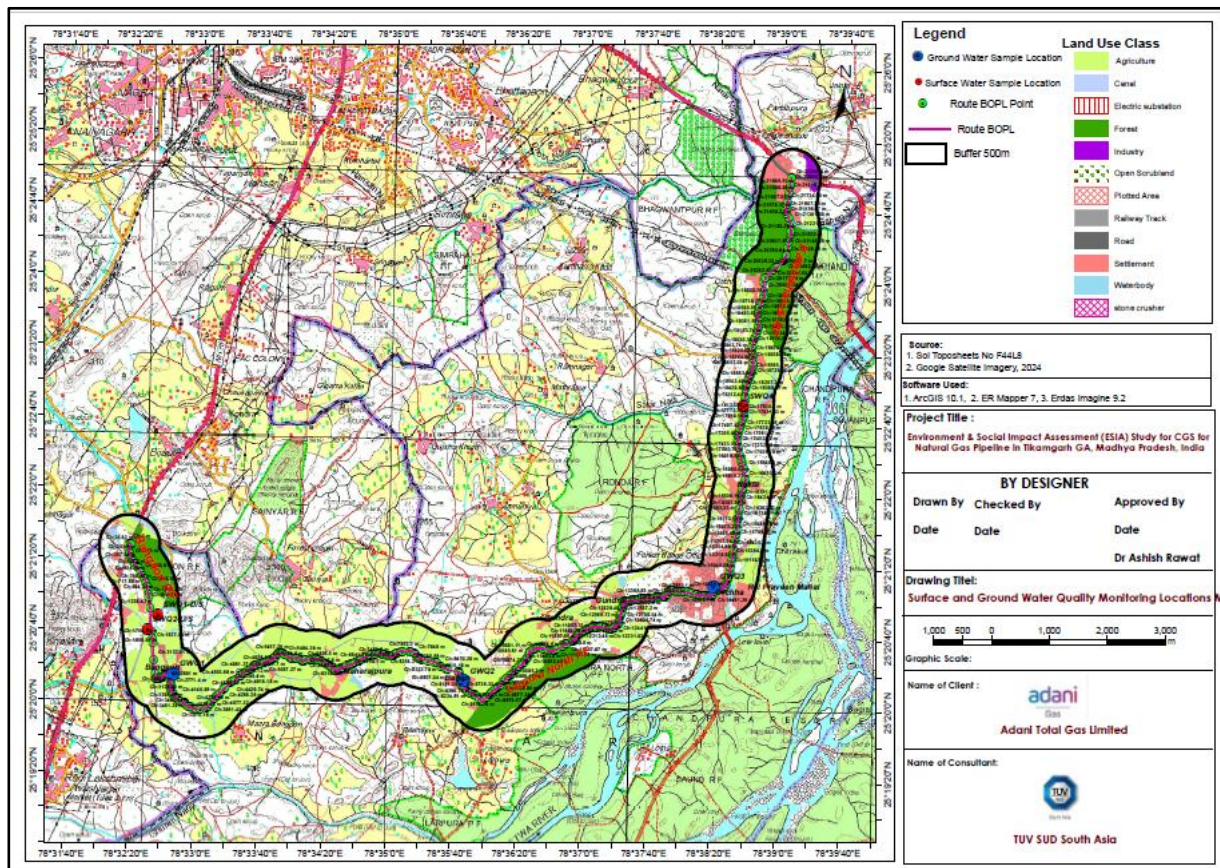
To conduct the ground water monitoring in project study area, three (03) locations have been identified as mentioned in the **Table 4-13** and depicted in **Figure 4-28** below. The ground water quality and ground water situation of the area has been studied during baseline monitoring. The Ground water quality monitoring results have been shown in **Table 4-14**, and **Figure 4-29**, **Figure 4-30**.

Table 4-13: Ground Water Quality Monitoring Locations

| Sl. No. | Sample code | Locations | Coordinates |
|---------|-------------|---|------------------------------|
| 1. | GWQ1 | Near Ch: 2771.4 m | 25°20'15.52"N, 78°32'47.72"E |
| 2. | GWQ2 | Between Ch: 8942.42 m and Ch: 8977.56 m | 25°20'14.09"N, 78°35'46.97"E |
| 3. | GWQ3 | Near Ch: 14557.84 m | 25°21'9.28"N, 78°38'20.61"E |

⁴ The project area falls in Niwari district, which used to be part of Tikamgarh district before 1st October, 2018. However, the district profile has been considered as Tikamgarh as per “AQUIFER MAPPING REPORT-September, 2017”

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*Source: TUV SUD GIS Mapping Study

Figure 4-28: Surface and Groundwater Quality Monitoring Locations

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Table 4-14 Ground Water Quality Monitoring Results

| S. No | Test Parameters | Unit | GWQ-1 25°20'15.52"N, 78°32'47.72"E | GWQ-2 25°20'14.09"N, 78°35'46.97"E | GWQ-3 25°21'9.28"N, 78°38'20.61"E | Requirements As per IS: 10500-2012 | |
|-------|--|-----------|--|--|---|------------------------------------|-------------------------|
| | | | | | | Acceptable Limit | Permissible Limit |
| 1 | Color | -- | 0.1 | 0.1 | 0.1 | -- | -- |
| 2 | Odour | - | Agreeable | Agreeable | Agreeable | Agreeable | Agreeable |
| 3 | Taste | | Agreeable | Agreeable | Agreeable | Agreeable | Agreeable |
| 4 | Temperature | °C | 20.9 | 21.2 | 24.3 | - | - |
| 5 | pH | - | 7.43 | 7.40 | 7.28 | 6.5-8.5 | No Relaxation |
| 6 | Electric Conductivity | μhos/cm | 810 | 871 | 769 | - | - |
| 7 | Total Hardness (as CaCO ₃) (as CaCO ₃) | mg/l | 248.0 | 312.0 | 189.3 | 200 | 600 |
| 8 | Iron (as Fe) | mg/l | 0.12 | 0.11 | 0.13 | 0.3 | No Relaxation |
| 9 | Chlorides (as Cl) | mg/l | 123.2 | 138.2 | 104.3 | 250 | 1000 |
| 10 | Fluoride (as F) | mg/l | < 1.0 | < 1.0 | <1.0 | 1 | 1.5 |
| 11 | TDS | mg/l | 490 | 544.3 | 467.4 | 500 | 2000 |
| 12 | Calcium (as Ca ²⁺) | mg/l | 48.9 | 52.4 | 37.3 | 75 | 200 |
| 13 | Magnesium (as Mg ²⁺) | mg/l | 31.3 | 44.8 | 12.2 | 30 | 100 |
| 14 | Sulphate (as SO ₄) | mg/l | 36.4 | 39.2 | 31.8 | 200 | 400 |
| 15 | Nitrate (as NO ₃) | mg/l | 24.8 | 26.0 | 18.0 | 45 | No Relaxation |
| 16 | Alkalinity (as CaCO ₃) | mg/l | 194.1 | 206.4 | 180.2 | 200 | 600 |
| 17 | Total Coli Form | Cfu/100gm | Not Detected (<2) | Not Detected (<2) | Not Detected (<2) | MPN/100ml E.coli/100ml | Shall Not Be Detectable |
| 18 | E. coli | Cfu/100g | Absent | Absent | Absent | E.coli/100ml | Shall Not Be Detectable |

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Ground water quality monitoring revealed that project study area having overall higher concentration of Total Hardness, which is ranging between 189 mg/l to 312 mg/l. Total Dissolved Solid concentration found between the range of 470 mg/l to 544 mg/l. Alkalinity concentration found around 180-206 mg/l. pH of the groundwater samples were found to be within the range of 7.28-7.43. Magnesium concentration is found around 12 mg/l-44mg/l. All the other major parameters were found within the desirable limits for drinking use.

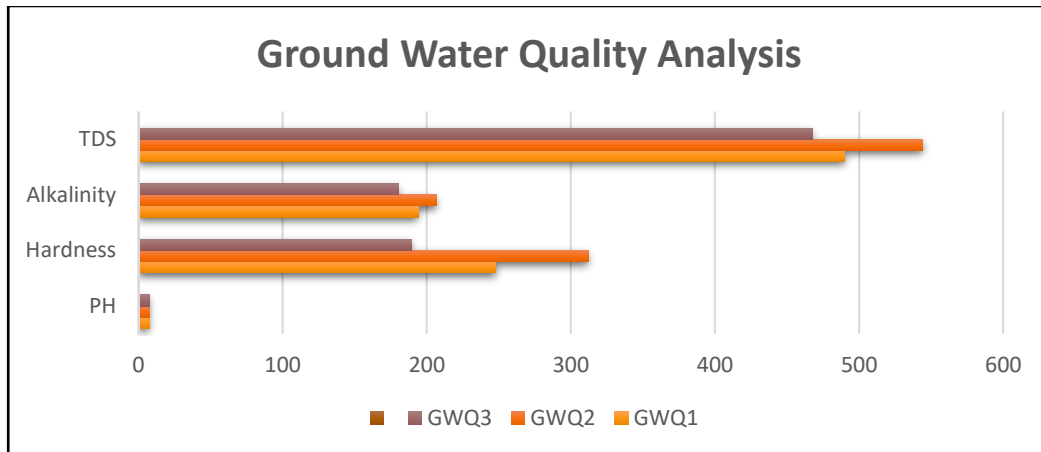


Figure 4-29 Ground Water Quality Analysis

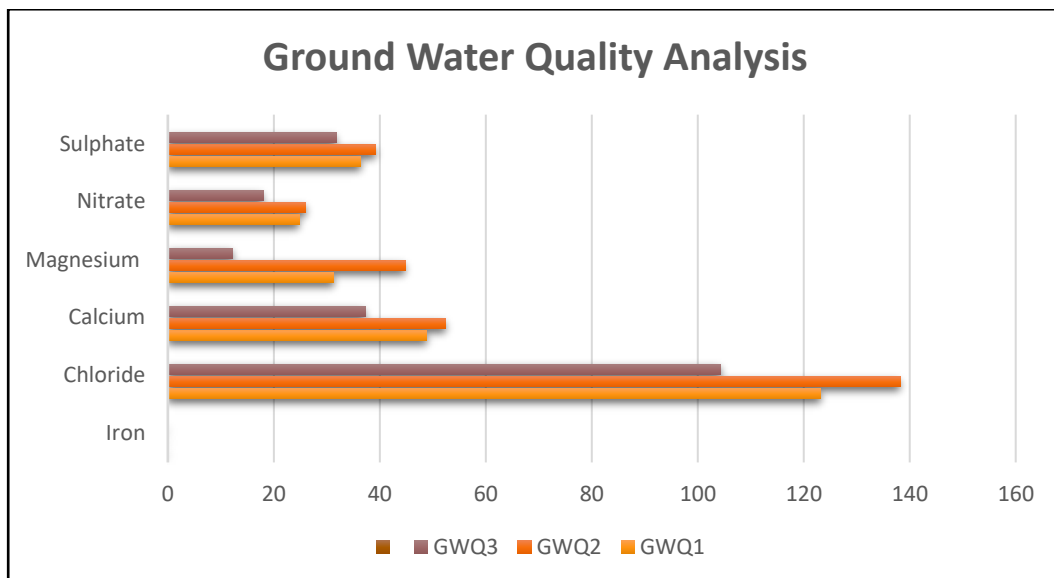


Figure 4-30 Ground Water Quality Analysis

4.5.11 Surface Water Quality

Total four (02) locations have been identified (as mentioned in the **Table 4-15** and map depicted in **Figure 4-28**. All the samples were collected from the river and canal that flows within the project study area.

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Table 4-15: Surface Water Quality Monitoring Locations

| Sl. No. | Sample code | Locations | Coordinates |
|---------|-------------|--|------------------------------|
| 1. | SWQ1 | Irrigation canal (between Ch:1229.43 m and Ch: 1659.91 m) Downstream | 25°20'44.92"N, 78°32'34.01"E |
| 2. | SWQ2 | Irrigation canal (near Ch: 1659.91 m) Upstream | 25°20'40.30"N, 78°32'30.99"E |

Analysis of the samples has been carried out as per established standard methods and procedures prescribed by CPCB, IS3025, IS 10500:2012 and APHA 22nd edition, 2012. The quality of water has been determined with respect to the standard values provided by the Central Pollution Control Board (CPCB). The surface water quality monitoring results have 'been shown in **Table 4-16**,

Figure 4-31 and **Figure 4-32**.

Table 4-16 Surface Water Quality Monitoring Results

| S. No. | Parameter | Unit | Result | Result |
|--------|---------------------------------------|-------|---|---|
| | | | SWQ1 25°20'44.92"N, 78°32'34.01"E | SWQ2 25°20'40.30"N, 78°32'30.99"E |
| 1 | Turbidity | NTU | 3.43 | 2.87 |
| 2 | pH (at 25°C) | - | 7.40 | 7.43 |
| 3 | Conductivity, | µS/cm | 839 | 910 |
| 4 | Total Dissolve Solids | mg/l | 329 | 476 |
| 5 | Total Hardness as CaCO ₃ | mg/l | 326.2 | 351.0 |
| 6 | Calcium as Ca | mg/l | 58.2 | 58.1 |
| 7 | Magnesium as Mg | mg/l | 42.3 | 48.3 |
| 8 | Sodium as Na | mg/l | 99.3 | 72.3 |
| 9 | Potassium as K | mg/l | 51.3 | 62.2 |
| 10 | Chloride as Cl | mg/l | 174.4 | 180.2 |
| 11 | Sulphate as SO ₄ | mg/l | 76.9 | 64.4 |
| 12 | Nitrate as NO ₃ | mg/l | 36.3 | 36.4 |
| 13 | Total Alkalinity as CaCO ₃ | mg/l | 201.2 | 244.2 |
| 14 | Fluoride | mg/l | 0.12 | 0.08 |
| 15 | Cyanide | mg/l | <0.05 | <0.05 |
| 16 | Arsenic | mg/l | <0.01 | <0.01 |
| 17 | Boron as B | mg/l | <0.01 | <0.01 |
| 18 | Cadmium as Cd | mg/l | <0.01 | <0.01 |
| 19 | Chromium, Total | mg/l | <0.01 | <0.01 |
| 20 | Copper as Cu | mg/l | <0.05 | <0.05 |
| 21 | Lead as Pb | mg/l | <0.05 | <0.05 |
| 22 | Manganese as Mn | mg/l | <0.05 | <0.05 |
| 23 | Mercury | mg/l | <0.01 | <0.01 |
| 24 | Nickel as Ni | mg/l | <0.01 | <0.01 |
| 25 | Selenium as Se | mg/l | <0.01 | <0.01 |

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| S. No. | Parameter | Unit | Result | Result |
|--------|--|----------------|---|---|
| | | | SWQ1 25°20'44.92"N, 78°32'34.01"E | SWQ2 25°20'40.30"N, 78°32'30.99"E |
| 26 | Zinc | mg/l | 0.013 | 0.021 |
| 27 | Dissolved Oxygen | mg/l | 5.71 | 5.70 |
| 28 | Total Suspended Solid | mg/l | 46.4 | 38.4 |
| 29 | Total Solid | mg/l | 365.2 | 480 |
| 30 | Chemical Oxygen Demand as O ₂ | mg/l | 28 | 16.7 |
| 31 | BOD, 3 days @27°C as O ₂ | mg/l | 4.8 | 3.2 |
| 32 | Oil & Grease | mg/l | <0.01 | <0.01 |
| 33 | Total Coliform | MPN /100 ml | 26 | 18 |

The surface water monitoring of the project study area reveals that COD concentration ranges between 16.7-28 mg/l, whereas BOD concentration found between 3.2-4.8 mg/l. Dissolved Oxygen level found between 5.71-5.70 mg/l. Thus, overall, the surface water quality of the area is well below the desired limit of surface water and wastewater parameters' standards.

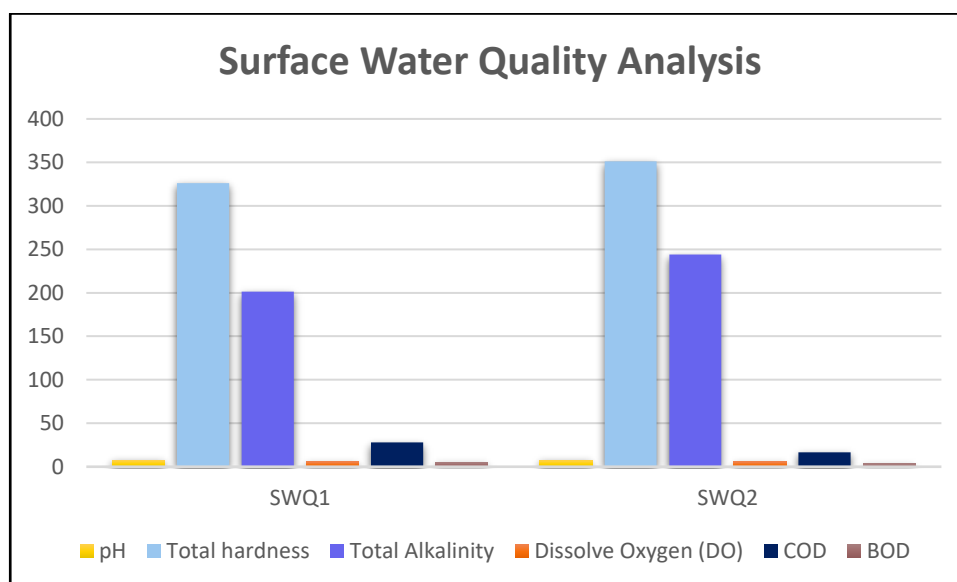


Figure 4-31 Surface Water Quality Analysis

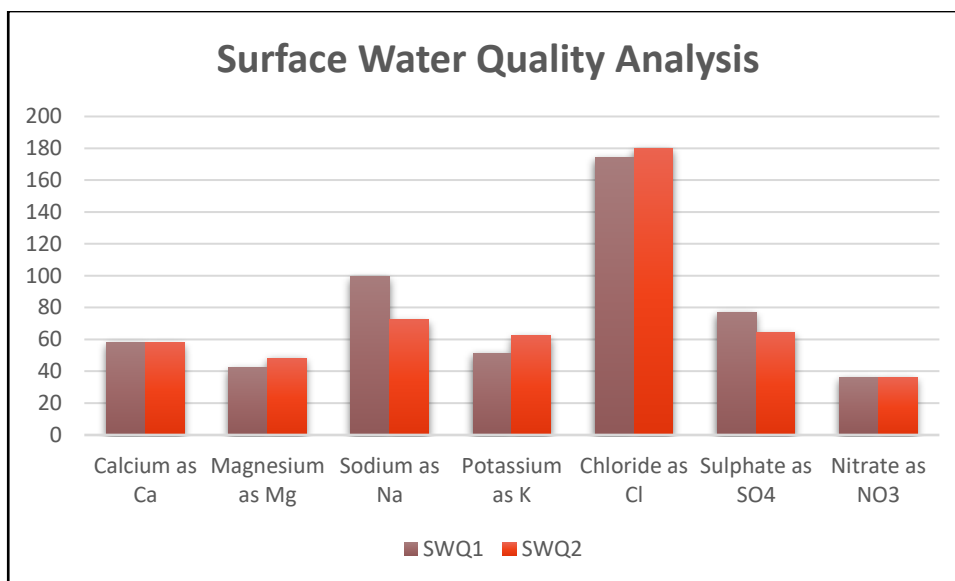


Figure 4-32 Surface Water Quality Analysis


4.6 ARCHAEOLOGICAL SITES

As per Archaeological Survey of India, no registered monuments or heritage sites were observed in the project area along the pipeline route. However, ruins of a large temple of the Chandel period, Bangama is located at an aerial distance of 3.64 km towards east of the pipeline route on the other side of the Betwa river (Nearest chainage: Ch 19718.17 m).

During site visit few cultural heritage sites (not registered in ASI) has been found along with the pipeline route, i.e. Royal Chattris, Rajmahal Palace, Chaturbhuj Temple Orchha.

Table 4-17: List of Cultural Heritage at Orchha

| Sl. no | Cultural Heritage | Location | Distance |
|--------|--------------------|----------|----------|
| 1 | The Royal Chhatris | Orccha | 0.85kms |
| 2 | Ramraja Mandir | Orchha | 0.06kms |
| 3 | Chaturbhuj Temple | Orchha | 0.16kms |
| 4 | Rajmahal Palace | Orccha | 0.35kms |

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| | |
| <p>Photo 4.1: Chaturbhuj Temple at proposed pipeline route</p> | <p>Photo 4.2: The Royal Chhatris at proposed pipeline route</p> |
| | |
| <p>Photo 4.3: Ram Raja Mandir near proposed pipeline route</p> | <p>Photo 4.4: Rajamahal Palace near proposed pipeline route</p> |

*Source: TUV-SUD Primary Survey

Figure 4-33: Cultural Heritage Sites Adjacent to the Proposed Pipeline Route

4.7 BIOLOGICAL ENVIRONMENT

Ecological studies are one of the important aspects of Environmental Impact Assessment (EIA) with a view to conserve biodiversity. Ecological systems show complex inter-relationships between biotic and abiotic

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components including dependence, competition, and mutualism. Biotic components comprise of both plant and animal communities, which interact not only within and between themselves but also with the biotic components viz. physical and chemical components of the environment. Generally, biological communities are good indicators of climatic and edaphic factors. Studies on biological aspects of ecosystems are important for safety of flora and fauna. The biological environment includes terrestrial and aquatic ecosystems.

The observations and assessment of overall ecological scenario presented in this chapter include details of flora, fauna, natural habitats, protected areas, wildlife species and their migration corridors etc. Such baseline information provides a better understanding of the situation and overall ecological importance of the area. This baseline information viewed against industrial activities help in predicting their impacts on wildlife and their habitats in the region.

This section describes the methodology adopted for secondary data collection, diversity of higher flora and fauna recorded through primary field studies and the secondary data sourced from published scientific literature, habitat profile and ecosystem services profile and nearest designated areas of the project site.


4.7.1 Scope and Objectives

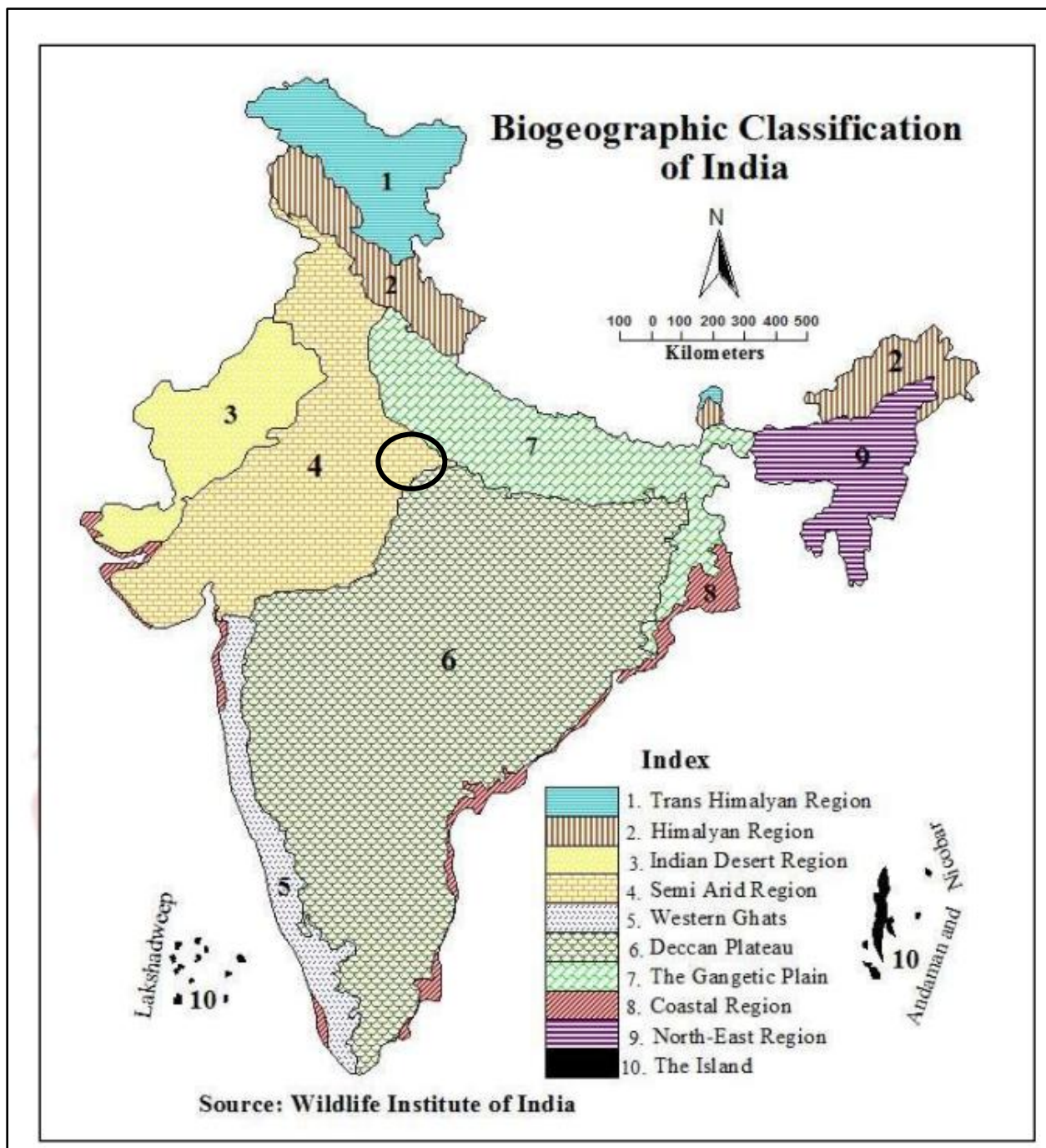
The ecology & biodiversity study carried out at the project study area i.e., includes Project Footprint Area (Pipeline) and surrounding 05 km radius area of buffer zone. Based upon the study and findings, impacts were assessed and subsequently mitigation measures were recommended. Thus, further primary objectives for ecological surveys are elaborated as follows:

- Review and analyze the available literature data related to habitats, flora, and fauna of the site around proposed project and surrounding areas of 05 km radius (Buffer Zone).
- Identification of critical habitats, wildlife corridors, national parks, wildlife sanctuary, any other areas of ecological significance.
- Identification of native, alien, exotic, rare, threatened, and endangered species (if any).
- Assessment of impacts of the project on ecology during construction and operation phase.
- Identification of any notified area under international conventions, national or local legislation for their ecological, landscape, cultural or other related values within the study site.
- Suggestion of mitigation measures to minimize/avoid adverse impacts on ecology during construction and operation phase.

4.7.2 Biogeographic Description of Study Area

According to the Biogeographic provinces of India published by Wildlife Institute of India (Rodgers, Panwar and Mathur, 2002), the project site falls under the Biogeographic Province: Semi-Arid region (Figure 4-34).

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*Source: https://indiaflora-ces.iisc.ac.in/bio_zones.php

Figure 4-34: Biogeographic Regions of India

4.7.3 Methodology for Ecological Survey

4.7.3.1 Desktop Review

A desktop review was conducted to determine the land use and land cover (Toposheet, Satellite imagery), Forest type (Champion and Seth, 1962), Bio-geographic provinces and zones (Rodgers, Panwar and Mathur 2000) and floral & faunal assemblage in the study area from published documents/papers etc. To

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provide representative ecological status for the project, existing critical habitats, scrubs/vegetative cover and water bodies around the project area and other factors were searched/collected and selected for ecological survey in and around of such habitats. To conduct the survey, a core and buffer zone was delineated, so that ecological receptors and impacts on them can be established during the EIA process. The core and buffer zone are as follows:

- Project Footprint Area
- Area of Influence and the buffer zone

4.7.3.2 Baseline Survey


Secondary data collection and primary on-site survey were two components of the baseline survey. The primary baseline survey was carried out to determine the existing ecological conditions and was designed to fill any data gaps, and to facilitate an adequate assessment of the project impacts upon local ecology and the development of appropriate mitigation measures. Prior to that, secondary data regarding sensitive ecological habitat (national park, sanctuary, ecological sensitive area, migratory corridor, habitat of endangered, vulnerable and range restricted species etc.) has been reviewed from desktop study and further flora & fauna in the project area was recorded through undertaking primary baseline phytosociological analysis, public consultation and through referring other authentic published documents to understand the major flora & fauna in the study area, assemblage of birds in the water bodies during peak winter in India, pressure on the local natural resources, presence of any Schedule-I species in the project area.

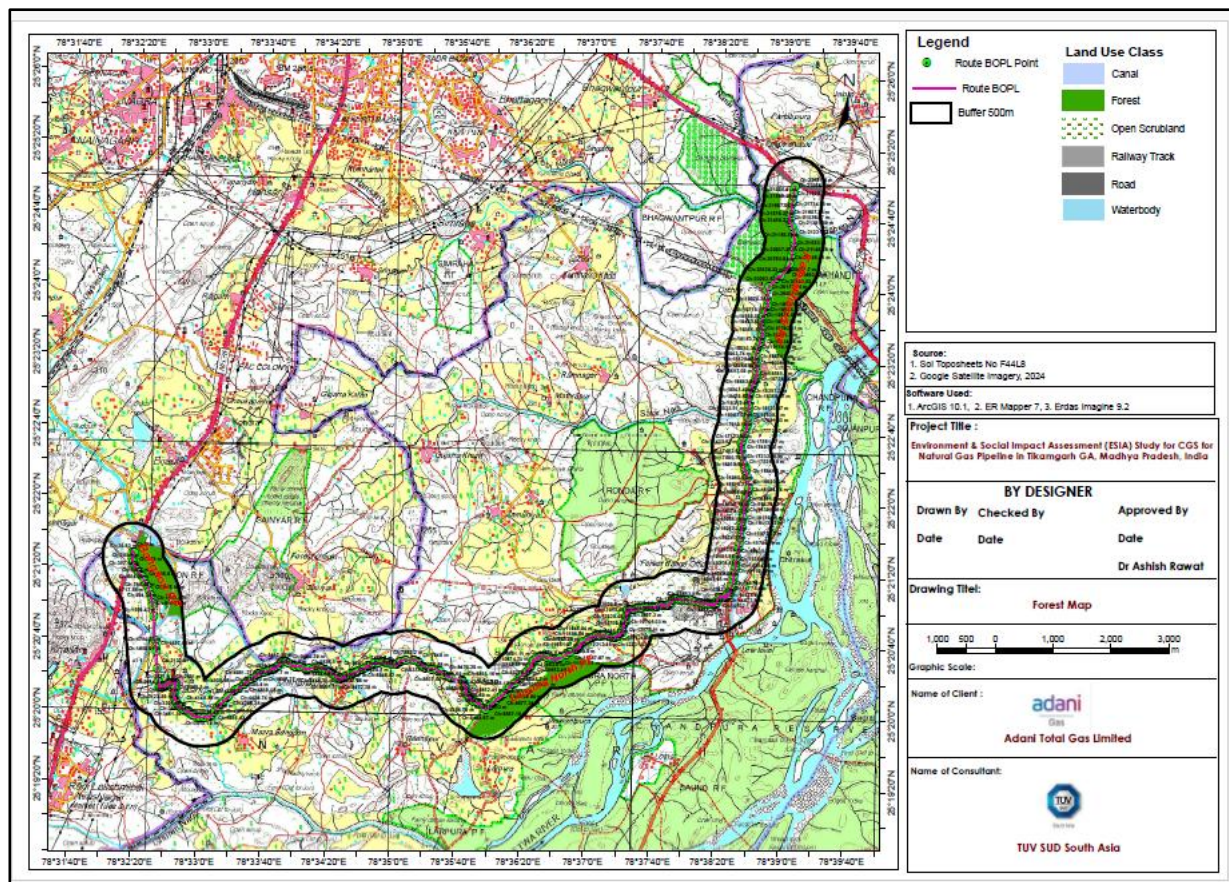
Primary survey was done at site & surrounding areas. Based on primary survey and secondary analysis of authenticated documents, inventory of floral and faunal species was made.

4.7.3.3 Study of Ecological Habitat

4.7.3.3.1 Forests

According to the Champion and Seth Classification of Indian Forests, the natural vegetation of the survey area represents the “Tropical Thorn Forest”. These types of forests occur in the region average 25 to 75 cm rainfall. These forests contain sparse and stunted growth of species *Acacia senegal*, *Prosopis spicigera*, *Prosopis cineraria*, *Acacia leucophloea*, *Acacia nilotica*, *Ziziphus spp*, and *Salvadora spp*.

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*Source: TUV SUD GIS Mapping Study

Figure 4-35: Forest Map of Project Study Area

4.7.3.3.2 Scrubland

This type of vegetation is extensively found in non-cultivated lands, particularly revenue lands/grazing land located within the study area. The following shrubs are integral to the traditional medicinal practices in Niwari district, reflecting the rich ethnobotanical heritage of the region *Cassia auriculata*, *Calotropis procera*, *Azadirachta indica*, *Acacia chundra*, *Acacia nilotica*, *Ziziphus nummularia*, *Prosopis juliflora*, *Prosopis cineraria* and *Ziziphus jujuba* etc.

4.7.3.3.3 Cropping Pattern of Study Area

The principal crops of the district are soyabean, wheat, gram, rice and jawar.

4.7.3.3.4 Water Bodies

Betwa, Dhansi, and Jamini the main river of Niwari district, there are several water bodies located within the vicinity of the project. The pipeline route crosses one unnamed canal.

4.7.3.3.5 Protected Area and Eco-sensitive Areas


The study area comprising of core and buffer zone was assessed for the presence of important wildlife habitats and protected areas, breeding and nesting habitats of fauna, important wetlands, and grassland area from project locations and pipeline' core and buffer zones. These important areas such as Protected areas (National Park, Wildlife Sanctuaries, Conservation Reserves etc.), Wetlands of national importance,

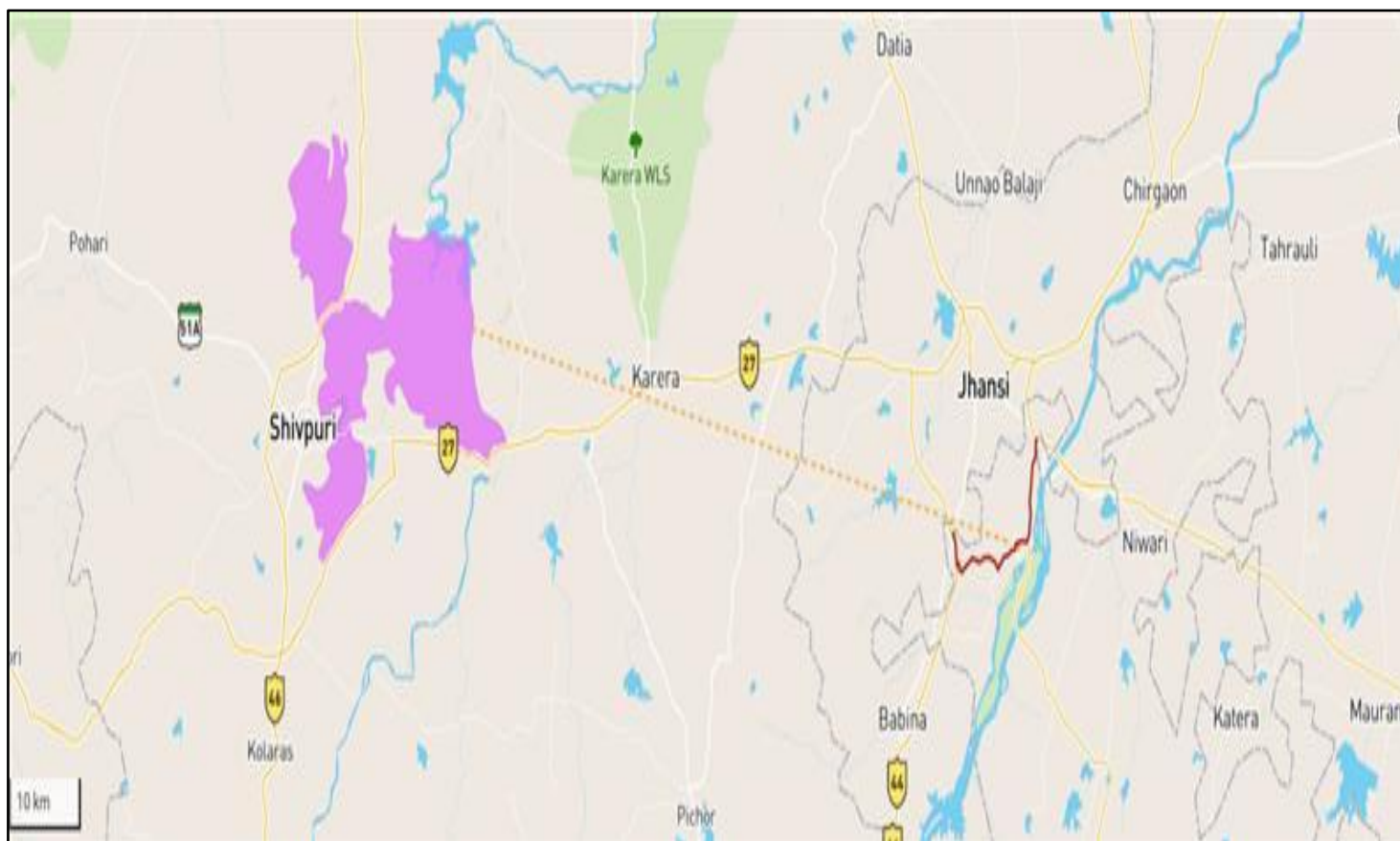
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Ramsar sites, Important Bird Areas (IBAs), classified by Birdlife International and Bombay Natural History Society etc. Data collected and gathered from primary and secondary sources on flora, fauna, protected area, natural habitats, wildlife species etc., were analyzed and results are presented below in **Table 4-18**.

Table 4-18: Details of Eco-sensitive Areas of Project Study Area

| Ecological Sensitive Habitat | Description |
|--|---|
| National Parks/ Wildlife Sanctuary/ Biosphere reserves/ Elephant Reserve/ Any Other Reserves | <ul style="list-style-type: none"> Orchha Wildlife Sanctuary (2km, SE) Bangaon RF (within 10m) Larpura North RF (within 10m) Katelakhandi RF (within 10m) |
| Important Bird Areas (IBAs) | Nil |
| Ramsar Wetland Site | None within 10 km radius study area |
| Wildlife Corridors & Routes | Nil |
| Breeding/nesting areas of endangered species | Nil |

| | |
|---|---|
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*Source: TUVSUD GIS Survey

Figure 4-36: Map Showing the Eco-Sensitive Habitats Identified in the Proposed Project Area

| | |
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4.7.3.3.6 Migratory Birds and Migratory Pathway

No Important Bird Area (IBA) is located within 10 km radius of the project site. India lies along the Central Asian Flyway, a global migratory pathway that connects the Palearctic (Europe and Northern Asia) to the Indian subcontinent. The birds that utilize this flyway, travel south to the Indian subcontinent between October-early December depending on the end of the monsoon season and remain in the country till February-March. Bird species travelling along the Central Asian Flyway, utilize several large water bodies across India as congregation sites or rest stops. The nearest Important Bird Area is Panna National Park which is 150 km from the project site in the SE direction.

4.7.4 Floral Diversity


The present study revealed that 28 tree species, 10 shrub species, 5 herbs species were present in both core zone and buffer zone area up to 10 km radius of study area. Secondary data was also considered while listing the species for validation. Since open bare lands and Agri ecosystem is predominant in study area, this region supports low plant diversity and therefore, not many large trees with sizable canopies were observed.

CORE ZONE HABITAT

The core zone of the pipeline project consists of *Aegle marmelos*, *Azadirachta indica*, and *Albizia lebbbeck* species. Tabulated details of flora recorded in study area have been provided below in **Table 4-19** below:

Table 4-19: List of Floral species

| Sl. No. | Scientific Name | Local Name | Family |
|--------------|--------------------------------|----------------|--------------|
| TREES | | | |
| 1. | <i>Anogeissus pendula</i> | Kardhai | Combretaceae |
| 2. | <i>Acacia leucophloea</i> | Reuanja | Fabaceae |
| 3. | <i>Acacia torta</i> | Ail | Combretaceae |
| 4. | <i>Aegle marmelos</i> | Bel | Rutaceae |
| 5. | <i>Azadirachta indica</i> | Neem | Meliaceae |
| 6. | <i>Albizia lebbbeck</i> | Siris | Fabaceae |
| 7. | <i>Cassia fistula</i> | Amaltas | Fabaceae |
| 8. | <i>Cordia myxa</i> | Labhera | Boraginaceae |
| 9. | <i>Pongamia glabra</i> | Karanj | Fabaceae |
| 10. | <i>Salmaia malabarica</i> | Semal | Malvaceae |
| 11. | <i>Tamarindus indica</i> | Imli | Fabaceae |
| 12. | <i>Tectona grandis or Teak</i> | Sagon | Lamiaceae |
| 13. | <i>Terminalia arjuna</i> | Kahua | Combretaceae |
| 14. | <i>Ficus benghalensis</i> | Indian banyan | Moraceae |
| 15. | <i>Cassia fistula</i> | Golden shower | Fabaceae |
| 16. | <i>Millettia pinnata</i> | Indian beech | Fabaceae |
| 17. | <i>Ficus religiosa</i> | Sacred fig | Moraceae |
| 18. | <i>Adansonia digitata</i> | African Baobab | Malvaceae |
| 19. | <i>Terminalia arjuna</i> | Arjun | Combretaceae |

| | |
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| Sl. No. | Scientific Name | Local Name | Family |
|---------------|---------------------------------|-------------------|----------------|
| 20 | <i>Emblica officinalis</i> | Amla | Euphorbiaceae |
| 21 | <i>Acacia nilotica</i> | Babul | Leguminosae |
| 22 | <i>Butea monosperma</i> | Palas | Leguminosae |
| 23 | <i>Ficus religiosa</i> | Papal | Moraceae |
| 24 | <i>Magnifera indica</i> | Mango | Anacardaceae |
| 25 | <i>Phyllostachys aurea</i> | Golden bamboo | Poaceae |
| 26 | <i>Zizyphus jujuba</i> | Ber | Rhamnaceae |
| 27 | <i>Psidium gujava</i> | Guava | Myrtaceae |
| 28 | <i>Chamaerops humilis</i> | European fan palm | Arecaceae |
| SHRUBS | | | |
| 1. | <i>Butea frondosa</i> | Chhewla | Fabaceae |
| 2. | <i>Flacourtia ramontchii</i> | katai | Apocynaceae |
| 3. | <i>Helicteres isora</i> | Aithani | Lamiaceae |
| 4. | <i>Lannea coromandelica</i> | Gunja | Fabaceae |
| 5. | <i>Zizyphus oenoplea</i> | Makora | Rubiaceae |
| 6. | <i>Ziyphus xylopyrus</i> | Ghont | Rhamnaceae |
| 7 | <i>Phoenix sylvestris</i> | Chhind | Arecaceae |
| 8 | <i>Embelia robusta</i> | Baibirang | Primulaceae |
| 9 | <i>Alangium salvifolium</i> | Akol | Cornaceae |
| 10 | <i>Nyctanthes arbor-tristis</i> | Harsingar | Oleaceae |
| HERBS | | | |
| 1 | <i>Wrightia tinctoria</i> | Dudhi | Apocynaceae |
| 2 | <i>Adhatodha vasica</i> | Adusa | Acanthaceae |
| 3 | <i>Catotropis gigantea</i> | Aak | Apocynaceae |
| 4 | <i>Tribulus terrestris</i> | Gokharu | Zygophyllaceae |
| 5 | <i>Solanum nigrum</i> | Jangli bhata | Solanaceae |

4.7.5 Faunal Diversity

Diversity of faunal distribution shows the health of ecosystem. In this study area a total of 16 types of faunal species were observed or reported in which 8 species of mammals, 3 amphibians, 5 reptiles were recorded.

4.7.5.1 Mammals

The mammals are occupying higher tropic levels in many ecosystems and respond quickly to the changes in their habitats, therefore, serves as best indicators of the ecosystem health. Hence, the baseline information on distribution and abundance of mammals is prepared. A qualitative check list of mammals based on their presences and absence using indirect evidence and signs such as footprints, dens, droppings, diggings, scrap marks, etc. in the study area was prepared. Following list of mammal species as presented in **Table 4-20** were predominantly recorded in the project study area.


| | |
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Table 4-20: List of Mammals Species in Project Study Area

| Sl. No. | Common Name | Scientific Name | Schedule as per WPA,2022 | IUCN Status |
|---------|------------------------|--------------------------------|--------------------------|-------------|
| 1. | Northern palm squirrel | <i>Funambulus pennantii</i> | I | LC |
| 2. | Black rat | <i>Rattus rattus</i> | I | LC |
| 3. | Nil gai | <i>Boselaphus tragocamelus</i> | - | LC |
| 4. | Indian grey mongoose | <i>Herpestes edwardsi</i> | I | LC |
| 5 | Indian hare | <i>Lepus nigricollis</i> | II | LC |
| 6 | Bengal fox | <i>Vulpes bengalensis</i> | III | LC |
| 7 | Golden jackal | <i>Canis aureus</i> | III | LC |
| 8 | Rhesus macaque | <i>Macaca mulatta</i> | I | LC |

*Sources: TUV SUD Primary Survey and secondary data Study
IUCN-The IUCN Red List of Threatened Species. Version 2023-1.

Schedules I to II: Indian Wildlife (Protection) Act, 2022. LC: Least Concern, IUCN Red List of Threatened Species

4.7.5.2 Herpetofauna

The diversity of amphibian and reptilian species in an ecosystem is cumulatively called Herpetofaunal diversity. Amphibians are fauna which can survive on land as well as in water. They inhabit a wide variety of habitats with most species living within terrestrial, fossorial, arboreal or freshwater aquatic ecosystems. Their presence witness's richness of ecosystem. They are omnivorous in feeding habit. The following (Table 4-21) species of herpetofauna were observed in the study area.

Table 4-21: Herpetofaunal Species recorded in Project Study Area

| Sl. No. | Common Name | Scientific Name | Schedule as per WPA,2022 | IUCN Status |
|---------|------------------------|-----------------------------------|--------------------------|-------------|
| 1. | Oriental garden lizard | <i>Calotes versicolor</i> | - | LC |
| 2. | Indian Cobra | <i>Naja naja</i> | I | LC |
| 3. | Oriental rat snake | <i>Ptyas mucosus</i> | I | LC |
| 4. | Bengal monitor | <i>Varanus bengalensis</i> | I | NT |
| 5 | Common krait | <i>Bungarus caeruleus</i> | - | LC |
| 6 | Indian tree frog | <i>Polypedates maculatus</i> | - | LC |
| 7 | Asian common toad | <i>Duttaphrynus melanostictus</i> | - | LC |
| 8 | Indian bullfrog | <i>Hoplobatrachus tigerinus</i> | II | LC |


*Sources: TUV SUD Primary Survey and secondary data Study
IUCN-The IUCN Red List of Threatened Species. Version 2023-1.

Schedules I to II: Indian Wildlife (Protection) Act, 2022. LC: Least Concern, IUCN Red List of Threatened Species

4.7.5.3 Avifauna

A total of 50 bird species were observed or reported in Niwari district. Also, there is no Important Bird Area (IBA), Bird migratory paths and congregatory birds' locations were observed in study area. The list of avifauna observed or reported in study area is presented in Error! Reference source not found..

Table 4-22: List of Avifaunal Species in Project Study Area

| | |
|---|---|
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| Sl. No. | Common Name | Scientific Name | Schedule as per WPA,2022 | IUCN Status |
|---------|---------------------------|-----------------------------------|--------------------------|-------------|
| 1 | Rose-ringed Parakeet | <i>Psittacula krameri</i> | II | LC |
| 2 | Red-vented Bulbul | <i>Pycnonotus cafer</i> | II | LC |
| 3 | Rock Pigeon | <i>Columba livia</i> | - | LC |
| 4 | Gray-breasted Prinia | <i>Prinia hodgsonii</i> | II | LC |
| 5 | Indian Robin | <i>Copsychus fulicatus</i> | II | LC |
| 6 | Brown Rock Chat | <i>Oenanthe fusca</i> | II | LC |
| 7 | Indian Peafowl | <i>Pavo cristatus</i> | I | LC |
| 8 | Great Cormorant | <i>Phalacrocorax carbo</i> | II | LC |
| 9 | Indian Roller | <i>Coracias benghalensis</i> | II | LC |
| 10 | Long-tailed Shrike | <i>Lanius schach</i> | II | LC |
| 11 | Ashy Prinia | <i>Prinia socialis</i> | II | LC |
| 12 | Green Sandpiper | <i>Tringa ochropus</i> | II | LC |
| 13 | Indian Vulture | <i>Gyps indicus</i> | I | CR |
| 14 | White-throated Kingfisher | <i>Halcyon smyrnensis</i> | II | LC |
| 15 | Pied Kingfisher | <i>Ceryle rudis</i> | II | LC |
| 16 | House Sparrow | <i>Passer domesticus</i> | II | LC |
| 17 | Gray Francolin | <i>Ortygornis pondicerianus</i> | II | LC |
| 18 | Red-wattled Lapwing | <i>Vanellus indicus</i> | II | LC |
| 19 | Indian Gray Hornbill | <i>Ocyrceros birostris</i> | II | LC |
| 20 | Plain Prinia | <i>Prinia inornate</i> | II | LC |
| 21 | Greater Coucal | <i>Centropus sinensis</i> | II | LC |
| 22 | Black-crowned Night Heron | <i>Nycticorax nycticorax</i> | II | LC |
| 23 | Indian Pond-Heron | <i>Ardeola grayii</i> | II | LC |
| 24 | Barn Swallow | <i>Hirundo rustica</i> | II | LC |
| 25 | Common Tailorbird | <i>Orthotomus sutorius</i> | II | LC |
| 26 | Spotted Dove | <i>Spilopelia chinensis</i> | II | LC |
| 27 | Rufous Treepie | <i>Dendrocitta vagabunda</i> | II | LC |
| 28 | Black Kite | <i>Milvus migrans</i> | II | LC |
| 29 | Gray Wagtail | <i>Motacilla cinerea</i> | II | LC |
| 30 | Laughing Dove | <i>Spilopelia senegalensis</i> | II | LC |
| 31 | Brahminy Starling | <i>Sturnia pagodarum</i> | II | LC |
| 32 | Black-winged Stilt | <i>Himantopus Himantopus</i> | II | LC |
| 33 | Oriental Honey-buzzard | <i>Pernis ptilorhynchus</i> | II | LC |
| 34 | Jungle Babbler | <i>Argya striata</i> | II | LC |
| 35 | Red Collared-Dove | <i>Streptopelia tranquebarica</i> | II | LC |
| 36 | Common Sandpiper | <i>Actitis hypoleucos</i> | II | LC |
| 37 | Booted Eagle | <i>Hieraaetus pennatus</i> | I | LC |
| 38 | Tree Pipit | <i>Anthus trivialis</i> | II | LC |
| 39 | Bluethroat | <i>Luscinia svecica</i> | II | LC |
| 40 | Common Chiffchaff | <i>Phylloscopus collybita</i> | II | LC |
| 41 | Indian Pied Starling | <i>Gracupica contra</i> | II | LC |
| 42 | Purple Sunbird | <i>Cinnyris asiaticus</i> | II | LC |

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| Sl. No. | Common Name | Scientific Name | Schedule as per WPA,2022 | IUCN Status |
|---------|-------------------------|-------------------------------------|--------------------------|-------------|
| 43 | Bank Myna | <i>Acridotheres ginginianus</i> | II | LC |
| 44 | Ashy Woodswallow | <i>Artamus fuscus</i> | II | LC |
| 45 | Egyptian Vulture | <i>Neophron percnopterus</i> | I | EN |
| 46 | Wire-tailed Swallow | <i>Hirundo smithii</i> | II | LC |
| 47 | Indian Cuckoo | <i>Cuculus Micropterus</i> | II | LC |
| 48 | Common Iora | <i>Aegithina tiphia</i> | II | LC |
| 49 | Common Hawk-Cuckoo | <i>Hierococcyx varius</i> | II | LC |
| 50 | Small Minivet | <i>Pericrocotus cinnamomeus</i> | I | LC |

*Sources: TUV SUD Primary Survey and secondary data

IUCN-The IUCN Red List of Threatened Species. Version 2023-1.

Schedules I to II: Indian Wildlife (Protection) Act, 2022. LC: Least Concern, IUCN Red List of Threatened Species

4.7.5.4 Aquatic Ecology

PHYTOPLANKTONS: On secondary data analysis of the study area, the following phytoplankton species have been recorded:

Table 4-23: Details of Phytoplankton Species recorded in Study Area

| Sl. No. | Phytoplankton Species |
|---------|-----------------------|
| 1. | Cladophora sp. |
| 2. | Coelastrum sp. |
| 3. | Pandorina sp. |
| 4. | Spirogyra sp |
| 5. | Staurostrum sp. |
| 6. | Volvox sp |
| 7. | Zygnema sp. |
| 8. | Anacystis sp |
| 9. | Phormidium sp. |
| 10. | Oscillatoria sp. |
| 11. | Diatom sp |
| 12. | Pinnularia sp. |
| 13. | Synedra sp |
| 14. | Euglena sp |

ZOOPLANKTONS: Copepods, Rotifers, and Cladocerans (Water Fleas) are the most common group of zooplanktons observed in the study area.

Table 4-24: Details of Phytoplankton Species recorded in Study Area

| Sl. No. | Zooplankton Species |
|---------|---------------------|
| 1. | Arcella sp. |
| 2. | Actinophrys sp |
| 3. | Diffuzia sp. |
| 4. | Asplanchna sp |
| 5. | Branchionus sp. |
| 6. | Cephalodella sp |

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| Sl. No. | Zooplankton Species |
|---------|---------------------|
| 7. | Keretella sp. |
| 8. | Monostyla sp. |
| 9. | Bosmina sp |
| 10. | Daphnia sp. |
| 11. | Diaphanosom a sp. |
| 12. | Simocephalus sp |
| 13. | Cyclops sp. |
| 14. | Macrocylops sp |
| 15. | Mesocylops sp |

FISH SPECIES: The following fish species have been recorded within the study area.

Table 4-25: Details of Fish Species recorded in Study Area

| Sl. No. | Scientific Name | Common Name/English Name |
|---------|------------------------------|----------------------------|
| 1 | <i>Notopterus notopterus</i> | Bronze Featherback |
| 2 | <i>Gonialosa manmina</i> | Ganges River Shad |
| 3 | <i>Amblypharogodon mola</i> | Mola Carplet |
| 4 | <i>Labeo bata</i> | Bata |
| 5 | <i>Labeo angra</i> | Angra |
| 6 | <i>Labeo rohita</i> | Rohu |
| 7 | <i>Catla catla</i> | Catla |
| 8 | <i>Cyprinus carpio</i> | Common Carp |
| 9 | <i>Puntius saphore</i> | Pool barb |
| 10 | <i>Puntius ticto</i> | Two Spot Barb |
| 11 | <i>Puntius titiu</i> | Cherry Barb |
| 12 | <i>Oxygaster bacaila</i> | Indian River Shad |
| 13 | <i>Oxygaster clupoides</i> | Clupeoid Razorbelly Minnow |
| 14 | <i>Tor tor</i> | Mahseer |
| 15 | <i>Mystus bleekeri</i> | Bleeker's Mystus |
| 16 | <i>Mystus aor</i> | Long-Whiskered Catfish |
| 17 | <i>Clupisoma garua</i> | Garua Bachcha |
| 18 | <i>Clarias batrachus</i> | Walking Catfish |
| 19 | <i>Namachilus botia</i> | Loach |
| 20 | <i>Chanda nama</i> | Indian Glassy Fish |
| 21 | <i>Talapia mossombica</i> | Mozambique Tilapia |
| 22 | <i>Channa gachua</i> | Dwarf Snakehead |
| 23 | <i>Glossogobius giuris</i> | Tank Goby |
| 24 | <i>Rhinomugil corsula</i> | Corsula Mullet |
| 25 | <i>Xenentodon cancila</i> | Needlefish |
| 26 | <i>Channa punctatus</i> | Spotted Snakehead |
| 27 | <i>Channa marulius</i> | Giant Snakehead |
| 28 | <i>Nandus nandus</i> | Gangetic Nandus |
| 29 | <i>Wallago attu</i> | Wallago Catfish |
| 30 | <i>Eutropiichthys vacha</i> | Indian River Catfish |

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4.8 SOCIO-ECONOMIC ENVIRONMENT

The primary objective of socio-economic study is to assess the current socio-economic status of the village(s) and community within the project area and to assess the potential impact of the project on the community in terms of livelihood, health, education, and others. The study is also used to understand the existing issues and concerns of the community based on which mitigation measures and other community development activities are designed.


This section envisages to present the socio-economic baseline of the project footprint area along with the synopsis of the stakeholder consultations conducted on the site.

4.8.1 Methodology

A mixture of both quantitative and qualitative approach has been adopted in the current socio-economic study. The study has been conducted based on primary and secondary data. While primary data has been collected through reconnaissance survey within the villages/towns/district headquarters falling on the proposed project alignment, secondary data has been collected from the Census of India 2011 and district statistical handbook, state and district portal. The details regarding population composition, number of literates, working population and access to basic facilities and others have been collected from secondary sources and analyzed. Tikamgarh district and four (04) Tehsils Baldeogarh, Niwari, Jatara and Orchha are identified as the Project Impact Area to address the qualitative aspects of the study.

4.8.2 Concept and Definition of Terms Used

- a) **Household:** A group of persons who normally live together and take their meals from a common kitchen are called a household. Persons living in a household may be related or unrelated or a mix of both. However, if a group of related or unrelated persons live in a house but do not take their meals from the common kitchen, then they are not part of a common household. Each such person is treated as a separate household. There may be one member households, two member households or multi-member households.
- b) **Density:** is a statistic that tells you how many people live in a certain geographical area. This type of measurement is called arithmetic density and is reported as the total number of people per land area.
- c) **Sex Ratio:** Sex ratio is the ratio of females to males in each population. It is expressed as 'number of females per 1000 males'.
- d) **Literates:** All persons aged up to 7 years and above who can both read and write with understanding in any language are taken as literate. It is not necessary for a person to have received any formal education or passed any minimum educational standard for being treated as literate. People who are blind but can read in Braille are also treated as literates.
- e) **Literacy Rate:** Literacy rate of population is defined as the percentage of literates to the total population aged 7 years and above.
- f) **Work:** Work is defined as participation in any economically productive activity with or without compensation, wages, or profit. Such participation may be physical and/or mental in nature. Work

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involves not only actual work but also includes effective supervision and direction of work. The work may be part time or full time or unpaid work in a farm, family enterprise or in any other economic activity.


- g) **Worker:** All persons engaged in 'work' are defined as workers. Persons who are engaged in cultivation of land or milk production even solely for domestic consumption are also treated as workers.
- h) **Main Workers:** Those workers who had worked for a major part of the reference period (i.e., 6 months or more in the case of a year) are termed as Main Workers.
- i) **Marginal Workers:** Those workers who did not work for a major part of the reference period (i.e., less than 6 months) are termed as Marginal Workers.
- j) **Work Participation rate (WPR):** The work participation rate is the ratio between the labour force and the overall size of their cohort (national population of the same age range). In the present study the work participation rate is defined as the percentage of total workers (main and marginal) to total population.

4.9 State Profile-Madhya Pradesh

Madhya Pradesh is the second-largest state in India in terms of area and the fifth largest in terms of population. The state is administratively divided into 10 divisions and 52 districts. Geographically, it is bounded by the Ganga-Yamuna Plains in the north, the Aravalli Range in the west, Chhattisgarh in the east, and the Tapti Valley and Maharashtra Plateau in the south.

As per the Census of India 2011, Madhya Pradesh covers a total area of 308,252 square kilometers and has a population of 7.27 crores. The state comprises 51,929 inhabited villages and 476 towns. The recorded sex ratio is 931 females per 1,000 males, compared to the national average of 943.

In terms of demographic composition, the Scheduled Caste (SC) population stands at 11,342,320 individuals, while the Scheduled Tribe (ST) population accounts for 15,316,784 individuals, as per the 2011 Census.

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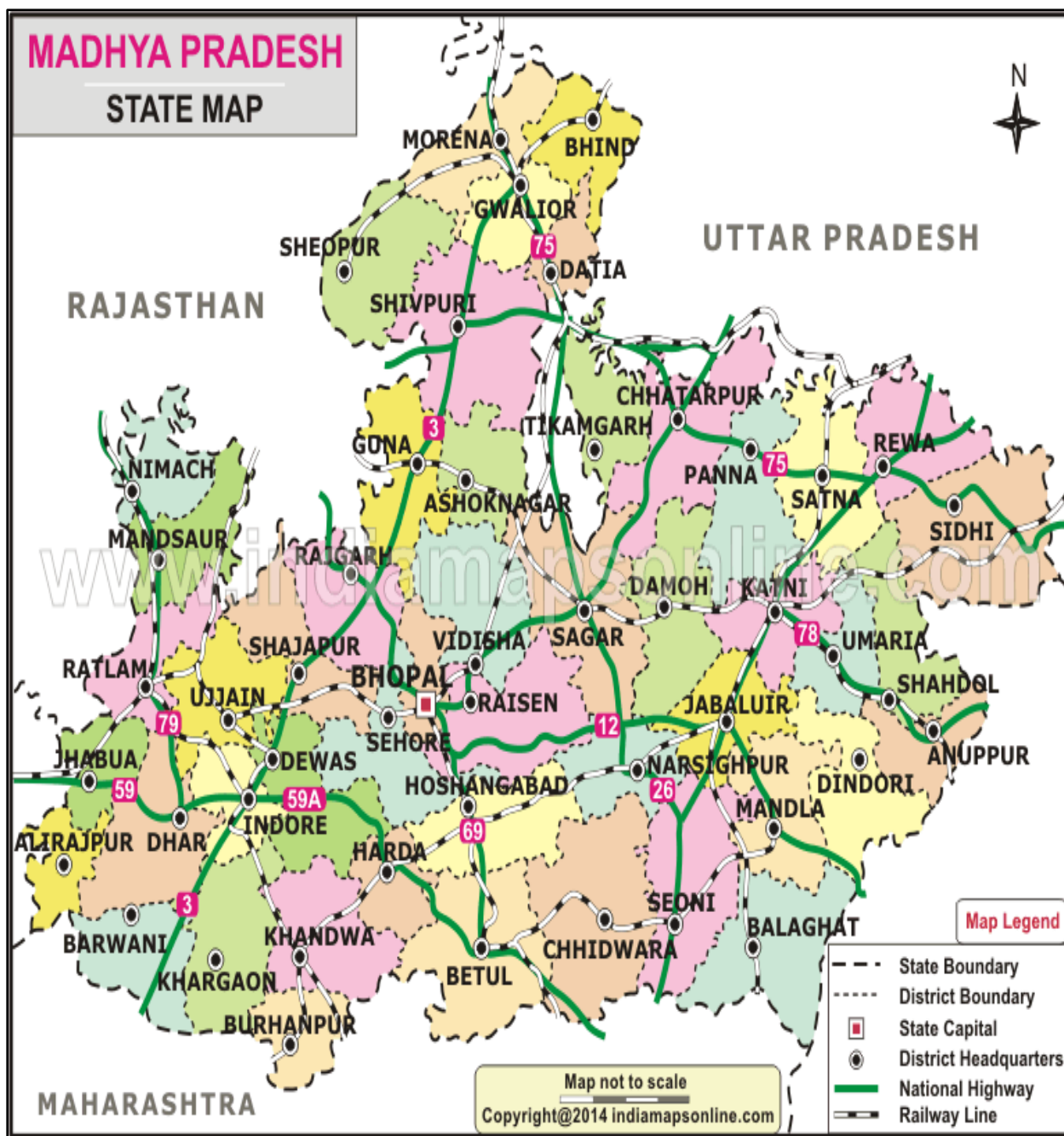


Figure 4-37 State Map of Madhya Pradesh

4.9.1 District Profile

Tikamgarh district is located between 24°26' and 25°33' N latitude and 78°27' and 79°21' E longitude, covering an area of 4,048 square kilometers. It is bounded by Chhatarpur district to the east, Lalitpur and Jhansi districts of Uttar Pradesh to the west and north, and Sagar and Damoh districts to the south, with the Betwa and Dhasan rivers forming its western and eastern boundaries, respectively. The district accounts for 1.64 percent of the state's total geographical area and ranks 23rd in terms of population. Administratively, it is divided into nine tehsils and six community development blocks comprising 459

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Gram Panchayats, 83 Patwari Halkas, and 865 revenue villages. The district has 13 towns, including one municipality (Tikamgarh) and 12 Nagar Panchayats. As per the 2011 Census, the district has a total population of 1,445,166, with 82.71% residing in rural areas and 17.29% in urban areas. The sex ratio is 899 females per 1,000 males in rural areas and 909 in urban areas. The average literacy rate stands at 61.43%, with male literacy at 71.77% and female literacy at 49.97%. The Scheduled Caste (SC) and Scheduled Tribe (ST) populations were also recorded as 25 percent and 4.7 percent respectively as recorded in the 2011 Census.



Figure 4-38 District Map of Tikamgarh

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4.9.2 Block Profile

The route proposed for the gas pipeline traverses through four blocks which are Niwari, Baldeogarh, Jatara and Orchha, encompassing both rural and urban areas as outlined in the Census of India 2011 data. The key characteristics of each block are detailed in the following sections.

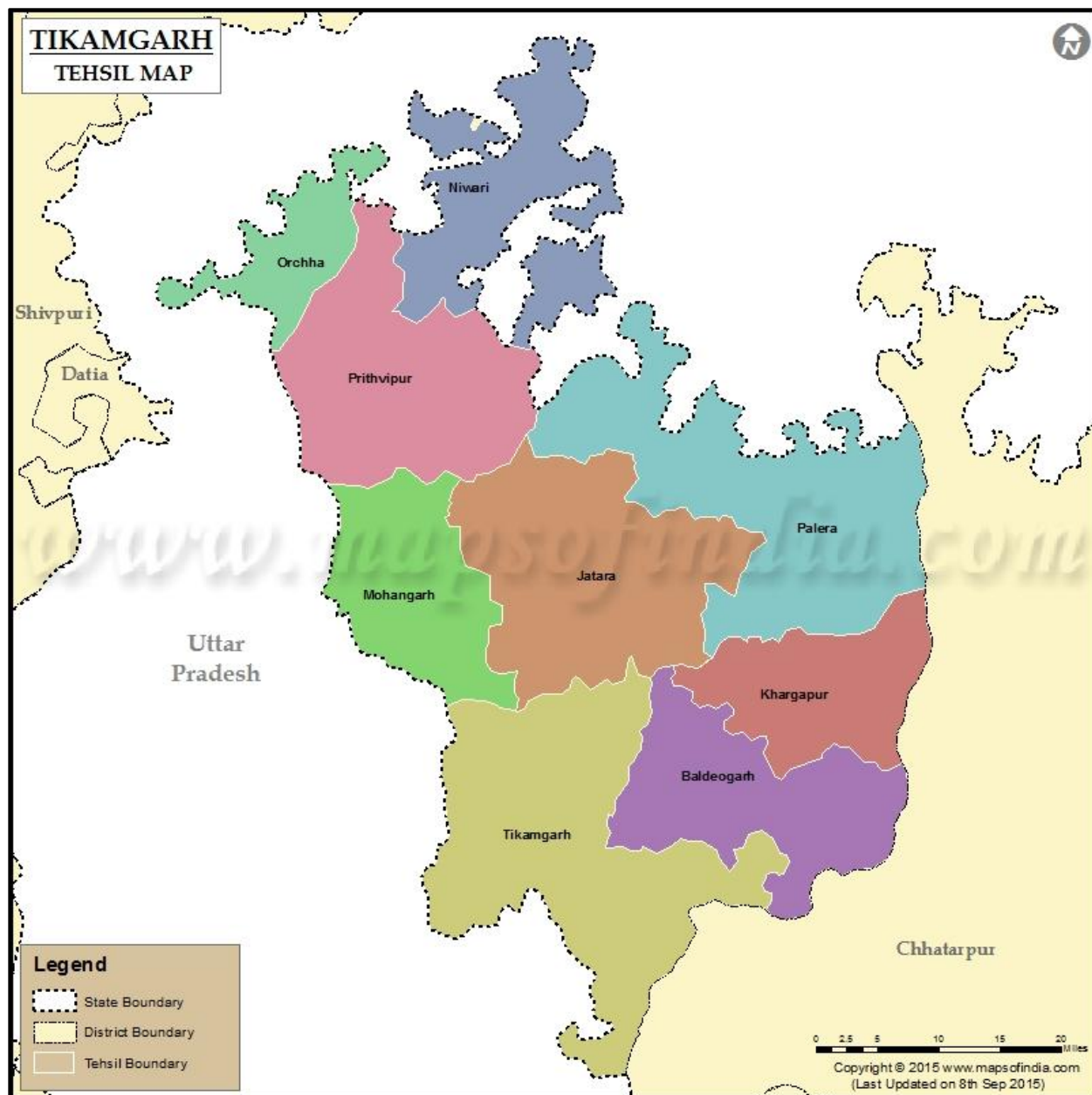


Figure 4-39 Tehsil map of Jatara, Niwari, Baldeogarh and Orchha

4.9.3 Demography

Table 4-26 provides an overview of the area and demographic characteristics of Jatara, Niwari, Baldeogarh, and Orchha based on Census 2011 data. Jatara with a population of 2,56,648 persons reported the largest population amongst the four blocks with male and female population accounting

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52.73 percent and 47.27 percent respectively of the total population with Scheduled Castes (SC) and Scheduled Tribes (ST) comprising 27.05 percent and 5.17 percent of the population, respectively. The sex ratio in Jatara is 901 females per 1,000 males, and the literacy rate is 47.67 percent. While almost all blocks recorded similar proportions of SC populations, Orchha recorded the highest proportion of ST population amongst all four blocks accounting for about 7.2 percent of the block's population.

Table 4-26: Demographic Details-Block Profile

| Sl. No. | Block Name | Area (in sq. kms) | No. of HH | Total Pop | Percent Male | Percent Female | Percent SC | Percent ST | Literacy Rate |
|---------|------------|-------------------|-----------|-----------|--------------|----------------|------------|------------|---------------|
| 1 | Jatara | 913.9 | 54,616 | 256,648 | 52.73 | 47.27 | 27.05 | 5.17 | 47.67 |
| 2 | Niwari | 570.9 | 35,359 | 172,342 | 52.63 | 47.37 | 26.87 | 3.93 | 54.92 |
| 3 | Baldeogarh | 821.3 | 46,736 | 214,092 | 52.69 | 47.31 | 22.65 | 5.46 | 44.59 |
| 4 | Orchha | 198.0 | 9,625 | 47,358 | 53.19 | 46.81 | 22.70 | 7.16 | 54.28 |

**Source: Census, 2011*

4.9.4 Working Population


Analysis of census data suggests the average working population of the blocks is about 45.40 percent. While Jatara recorded the highest proportion of the working population at 49.71 percent, Orchha recorded the lowest proportion of the working population at 39.45 percent as depicted **Figure 4-40**.

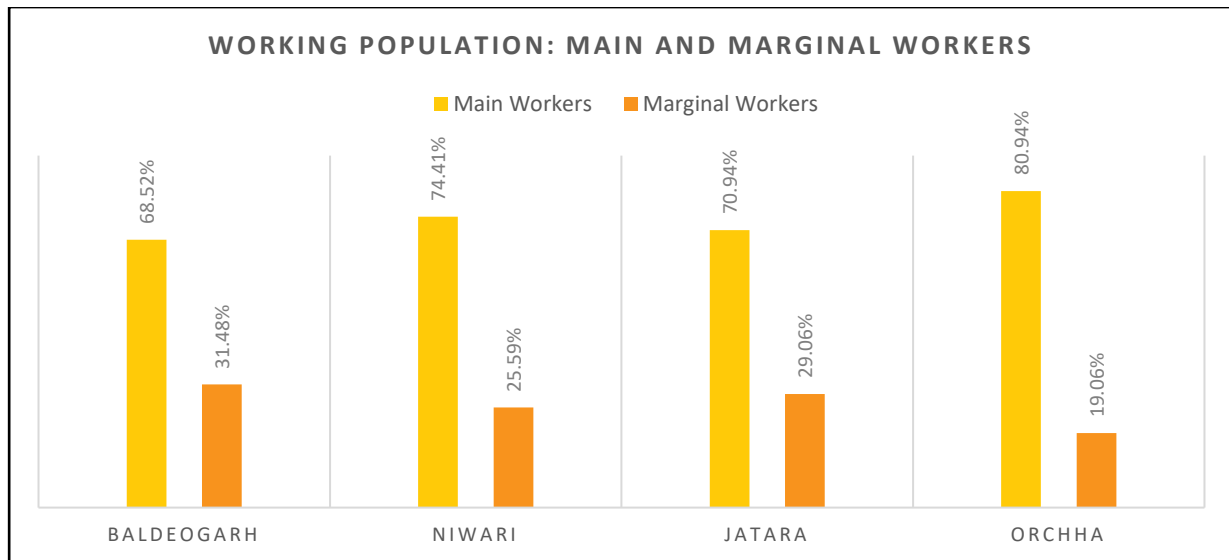


**Source: Census, 2011*

Figure 4-40: Segregation of Workers and Non-Workers

Figure 4-41 provides graphical representation of the main and marginal workers of the four blocks. While Orchha recorded the highest proportion of the main workers at 80.94 percent, Baldeogarh recorded the lowest proportion of the main workers at 68.52 percent. Jatara and Niwari recorded similar proportions of main and marginal workers.

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*Source: Census, 2011

Figure 4-41: Main and Marginal Workers

Figure 4-42 provides a graphical representation of the segregation of workers by nature of work, where the proportion of main and marginal workers engaged in different occupations has been analyzed as per the data provided in the Census 2011. The average proportion of main workers engaged in agricultural labor was calculated to be approximately 28.58%, whereas the average proportion of cultivators in the villages was calculated to be 56.59%. Workers engaged in other activities contributed to 13.01% of the total number of main workers.

Further disaggregation of marginal workers suggests that approximately 54.12% of the marginal workers are engaged as agriculture laborers, while only about 27.29% are engaged as cultivators. Workers engaged in other activities contributed 13.63% of the total marginal workers.

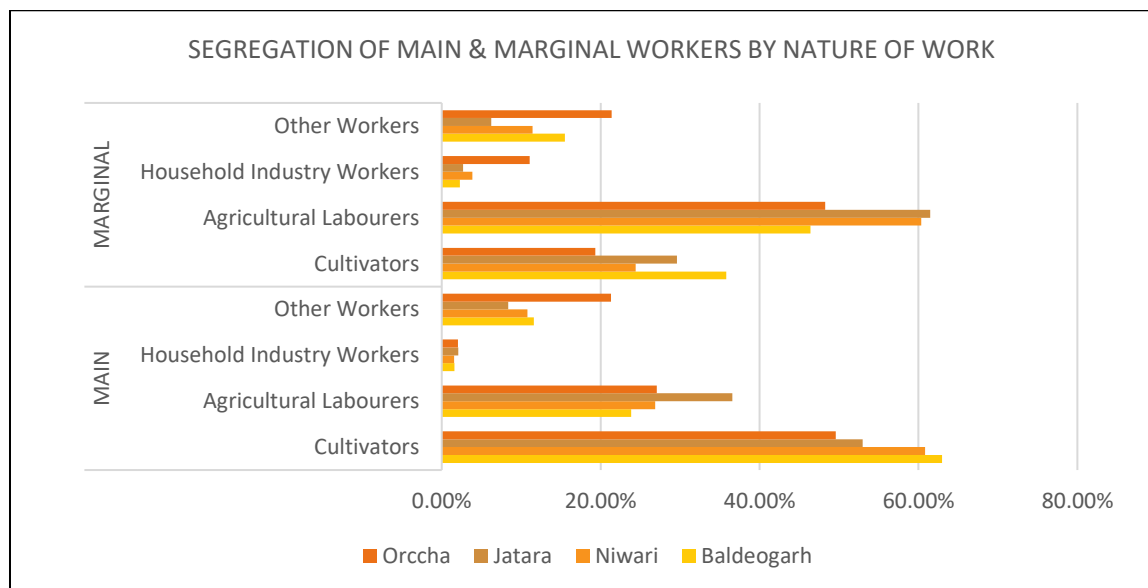


Figure 4-42: Segregation of Main Working Population by Nature of Work

4.10 Project Impact Area

As per the data shared by the project proponent, Mathupura, Majra Bangaya, Bangay Khas, Bangaya Har and Pratappura are the villages where the project area is located.

4.10.1 Demography

Table 4-27 The demographic and literacy profile of six villages highlights variations in population, social composition, and education levels. Maharajpura recorded the highest geographical area, however the highest population was recorded in Orchha town at 47358 persons. Bangay Har was recorded as the smallest village with only 14 households and 64 persons. While almost all villages and town recorded SC population, ST populations were recorded by only three of them i.e. Orchha Town, Bangay Khas and Pratap Pura. Highset literacy rate was also recorded by Bangay Har.


Table 4-27: Demography- Project Impact Area

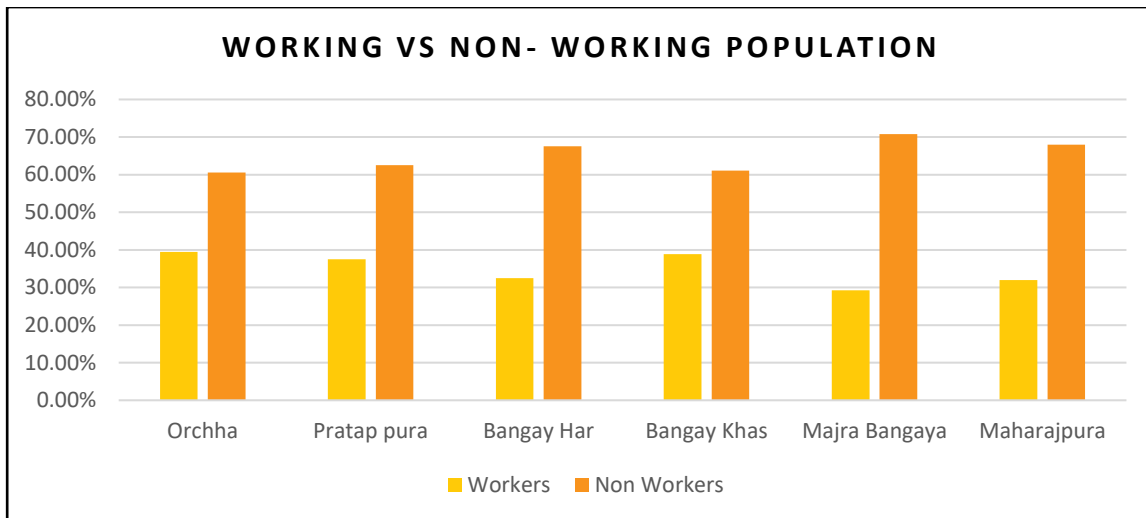
| Sl. No | Village Name | Total Geographical Area | No of HH | Total Pop | Percent Male | Percent Female | Percent SC | Percent ST | Literacy Rate |
|--------|---------------|-------------------------|----------|-----------|--------------|----------------|------------|------------|---------------|
| 1 | Orchha (Town) | - | 9625 | 47358 | 53.2 | 46.8 | 22.7 | 46.3 | 64.2 |
| 2 | Bangay Har | 289.89 | 14 | 64 | 51.6 | 48.4 | 1.6 | 0 | 90.6 |
| 3 | Majra Bangaya | 268.96 | 103 | 514 | 53.5 | 46.5 | 0.2 | 0 | 67.4 |
| 4 | Maharajpura | 547.43 | 282 | 1316 | 51.9 | 48.1 | 36.5 | 0 | 53.9 |
| 5 | Bangay Khas | 521.44 | 383 | 1851 | 53.2 | 46.8 | 37.8 | 45.4 | 67.0 |
| 6 | Pratap Pura | 390.48 | 194 | 956 | 53.1 | 46.9 | 32.3 | 43.7 | 50.2 |

*Source: Census, 2011

4.10.2 Working Population

Analysis of census data suggests the average working population of the villages/town in the project impact area is about 38.87 percent. While Orchha town recorded the highest proportion of the working population at 39.45 percent, Majra Bangaya recorded the lowest proportion of the working population at 29.23 percent. The average non-working population was recorded 61.13 percent. **Figure 4-43** provides details of the working and non-working populations.

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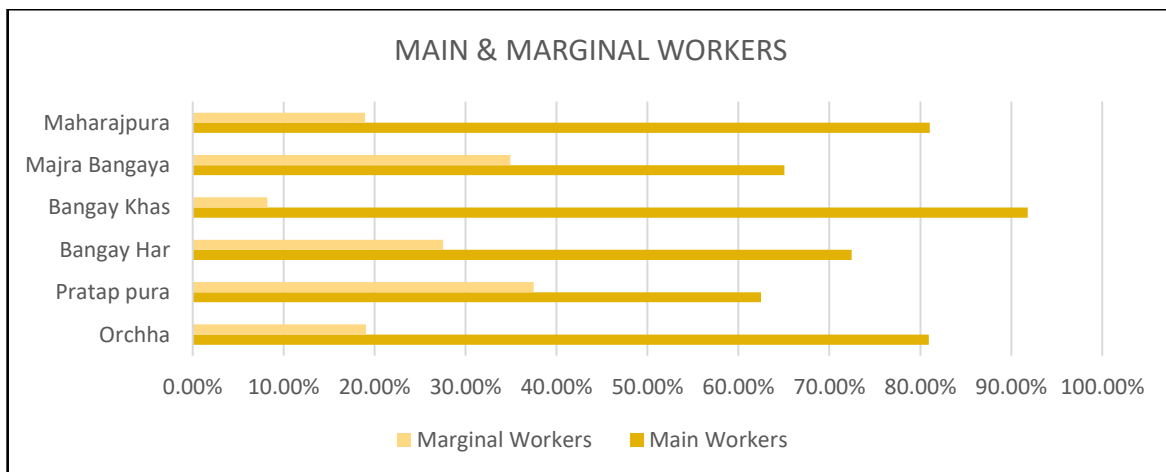


*Source: Census,2011

Figure 4-43: Segregation of Working and Non-working Population

*Source: Census,2011

Figure 4-44 provides a snapshot of the proportion of main and marginal workers of the villages within the area of influence. While Bangay Khas recorded the highest proportion of the main workers at 91.80 percent, Pratap pura recorded the lowest proportion of the main workers at 62.50 percent of the working population. While Pratap pura recorded the highest proportion of the marginal workers population at 37.50, Bangay Khas recorded the lowest proportion of the marginal workers population at 8.2 percent.



*Source: Census,2011

Figure 4-44 Segregation of Main and Marginal Workers

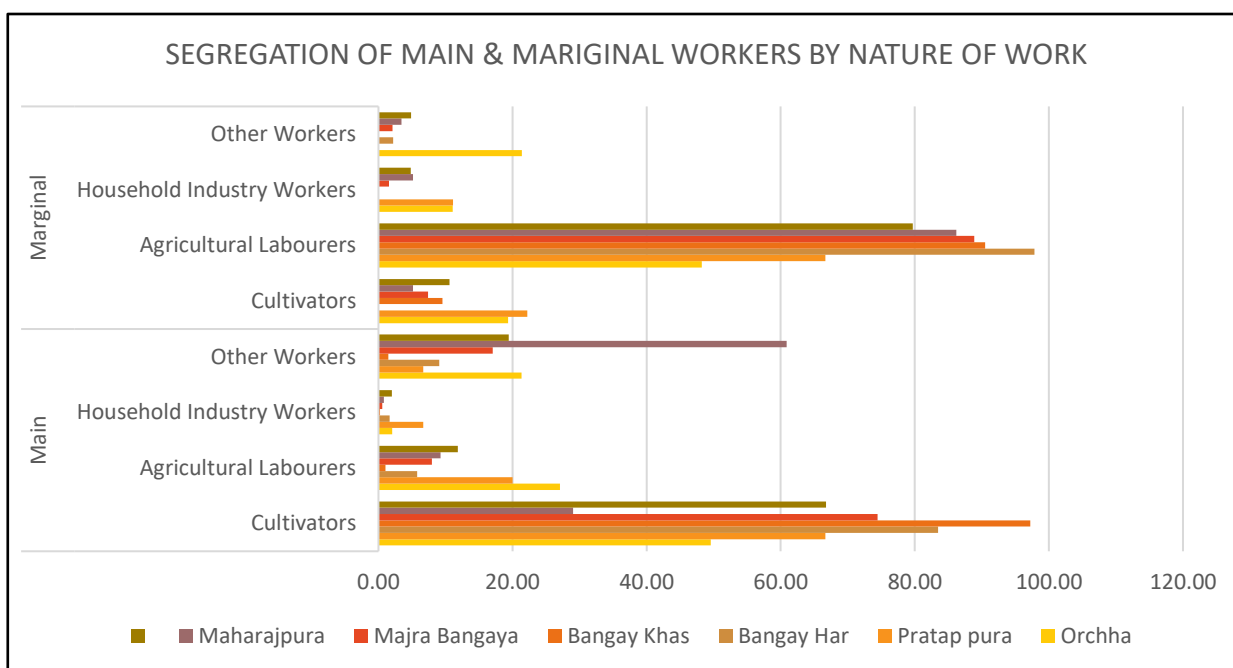
*Source: Census,2011

Figure 4-45 provides a graphical representation of the segregation of workers by nature of work, where the proportion of main and marginal workers engaged in different occupations has been analyzed as per the data provided in the Census 2011. Further segregation of main workers suggests that the majority of

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villages reported that a larger number of main workers are engaged in Cultivators. The average proportion of main workers engaged in agricultural labor was calculated to be approximately 11.86%, whereas the average proportion of cultivators in the villages was calculated to be 66.74%. Workers engaged in other activities contributed to 19.42% of the total number of main workers.

Further disaggregation of marginal workers suggests that approximately 79.72% of the marginal workers are engaged as agriculture laborers, while only about 10.61% are engaged as cultivators. Workers engaged in other activities contributed 4.85% of the total marginal workers.



*Source: Census, 2011

Figure 4-45: Segregation of Main & Marginal Workers by Nature of Work

4.10.3 Education Facilities

Table 4-28 provides details of the government educational facilities present in the village. While Pre-primary education facilities were not present in any of the villages, primary education facilities were present in almost all villages except Bangay Har. Secondary and Senior Secondary education facilities were not available in any of the villages. Orchha being a town has both government and private education facilities and thus have not been included in the table.

Table 4-28: Educational Facilities- Project Impact Area

| Village Name | Pre-primary | Primary | Middle | Secondary | Senior Secondary |
|---------------|---------------|------------|------------|-----------------|------------------|
| Bangay Har | within 5km | within 5km | within 5km | More than 10 km | More than 10 km |
| Majra Bangaya | within 5km | Available | within 5km | More than 10 km | More than 10 km |
| Maharajpura | Not Available | Available | Available | More than 10 km | Not Available |
| Bangay Khas | within 5km | Available | Available | More than 10 km | More than 10 km |
| Pratap Pura | Not Available | Available | Available | within 5-10 | within 5-10 |

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4.10.4 Health Facilities

Table 4-29 provides details of health infrastructure available in the villages based on the data from Census 2011. Healthcare facilities in the villages are largely inaccessible, with Community Health Centres, Primary Health Centres, and Maternity and Child Welfare Centres located more than 10 km away from all villages. Only Maharajpura and Pratap Pura have a Primary Health Sub-Centre, while Bangay Har, Majra Bangaya, and Bangay Khas lack even this basic facility.

Table 4-29: Health Facilities- Project Impact Area

| Village Name | Community Health Centre | Primary Health Centre | Primary Health Sub Centre | Maternity and Child Welfare Centre |
|---------------|-------------------------|-----------------------|---------------------------|------------------------------------|
| Bangay Har | More than 10 km | More than 10 km | More than 10 km | More than 10 km |
| Majra Bangaya | More than 10 km | More than 10 km | More than 10 km | More than 10 km |
| Maharajpura | More than 10 km | More than 10 km | Available | More than 10 km |
| Bangay Khas | More than 10 km | More than 10 km | More than 10 km | More than 10 km |
| Pratap Pura | More than 10 km | More than 10 km | Available | More than 10 km |

*Source: Census, 2011

4.10.5 Drinking Water Facilities

Table 4-30 provides details of the drinking water facilities available in the village based on the data from Census 2011. Tap water was reportedly available Bangay Har, while all other villages were dependent on handpumps on supply of drinking water. Orchha town, being administered by Municipality has piped water connection and hence has not been included in the table.

Table 4-30: Drinking Water Facilities- Project Impact Area

| Village Name | Tap Water | Well Water | Hand Pump | Spring | River |
|---------------|---------------|---------------|-----------|---------------|---------------|
| Bangay Har | Not Available | Not Available | Available | Not Available | Not Available |
| Majra Bangaya | Not Available | Not Available | Available | Not Available | Available |
| Maharajpura | Not Available | Not Available | Available | Not Available | Available |
| Bangay Khas | Available | Available | Available | Available | Available |
| Pratap Pura | Not Available | Not Available | Available | Not Available | Not Available |

*Source: Census, 2011

4.10.6 Communication Facilities

Transportation and connectivity across the villages show varying levels of accessibility. Bus services are available in Bangay Har and Bangay Khas, while Pratap Pura has access within 5-10 km. Most villages lack nearby railway stations, with distances exceeding 10 km, except for Pratap Pura, where a station is within 5 km. Bangay Har has direct access to a national highway, while Bangay Khas and Majra Bangaya are within 5-10 km. State highway connectivity is present in Bangay Har and Bangay Khas, whereas other villages have limited access.


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Table 4-31: Communication Facilities- Project Impact Area

| Village Name | Bus Service | Railway Station | Connected National to | Connected to State Highway (SH) |
|---------------|-----------------|-----------------|-----------------------|---------------------------------|
| Bangay Har | Available | More than 10kms | Available | Available |
| Majra Bangaya | More than 10kms | More than 10kms | within 5-10kms | More than 10kms |
| Maharajpura | More than 10kms | Not Available | More than 10kms | More than 10kms |
| Bangay Khas | Available | More than 10kms | within 5km | Available |
| Pratap Pura | within 5-10kms | Within 5km | More than 10kms | More than 10kms |

*Source: Census, 2011

4.10.7 Social Sensitivities

Adani Gas Limited has been granted authorization for laying, building, operating or expanding the City Gas Distribution CGD Network in GA 11.24 i.e., Niwari, Niwar, Chattarpur, and Panna districts and the proposed CGD covers four charge areas in the state of Chhattisgarh.

This section discusses the social sensitivities identified along the proposed route in the Niwari District GA, where ATGL plans to install an 8-inch diameter natural gas pipeline spanning approximately 22.161 km. The route is divided into a single segment from Bijoli to Orchha Helipad, covering the Raksa Charge Area.


Observation

The social sensitivity analysis for the natural gas pipeline project in Niwari, Madhya Pradesh, highlights the proximity of critical community facilities to the proposed project. Observations for the proposed natural gas pipeline in Niwari, Madhya Pradesh, along the pipeline route indicate several major crossings, including roads such as Jhansi bypass road, Orchha bypass road and the Jhansi-Babina Road, as well as one irrigation canal, and one railway track. Proximity to community facilities—including temples, health centers, and some hotels and small shops were also assessed during the exercise.


These primary observations during site visit are essential for risk assessment and ensuring that the necessary safety protocols and community engagement measures are implemented throughout the project lifecycle.

Table 4-32 Social Sensitive Areas Identified During Site Visit

| Sl. No. | Chainage (m) | | Observation | Recommendation |
|--|--------------|---------|--|--|
| | Start | End | | |
| Pipeline Route: Bijoli to Orchha Helipad | | | | |
| 1. | 00 | 22161.3 | <p>The proposed pipeline route runs throughout Jhansi byapss road.</p> <p>Key features of this stretch include:</p> <ul style="list-style-type: none">A lined canal located in between the Ch 1229.43 and Ch 1659.91.A railway track located in between the chainage 20177.76m and 20262.82m. | <ul style="list-style-type: none">Given the nine road crossings, implementation of effective traffic diversion plans will be required to minimize disruption to residents during construction.Usage of clear signage and direct traffic flow to |

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| Sl. No. | Chainage (m) | | Observation | Recommendation |
|---------|--------------|-----|--|---|
| | Start | End | | |
| | | | <ul style="list-style-type: none"> 9 major road crossings have been found in the total pipeline route. Two hospitals have been found in between chainage Ch 15435.2m and Ch 15595.68m Almost 8 hotels and restaurants have been found throughout the pipeline route. Few temples and monuments have been found throughout the pipeline route, (i.e Rajmahal Palace, Orchha Chhtaris, Ramraja Mandir). Few small shops (grocery shops, jewelry shops etc) have been found near the chainage Ch 13785.71m and Ch 15986.19m. <p>However, no school has been found throughout the pipeline route.</p> | <p>alternate routes where possible.</p> <ul style="list-style-type: none"> Installation of appropriate safety barriers and signage around the road crossings and near the hospital and temples to protect both workers and the public. Notify key stakeholders in advance, share excavation schedules, and establish a dedicated contact point for quick issue resolution. Engage with temple authorities and local communities, share excavation schedules, and provide a dedicated contact point for concerns and updates. |

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5 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

5.1 INTRODUCTION

The proposed project may have impact on the environment & social conditions during construction and operation phases. This chapter describes various environmental impacts identified and assessed for during construction and operation phases of the project. The identification of impacts has been done based on review of available project information, discussions with local community and representatives of project proponent and other sector-specific professionals.

During the construction phase, the impacts may be regarded as temporary or short-term, while long term impacts may be observed during the operation stage. The major potential impacts associated with the proposed project are impact on soil, impact on water resources and area drainage, air quality degradation, noise impacts, impact on ecological environment, impact on agriculture, land use changes, impact on health and safety, impact on socio-economic features, impact on community activities, impact on cultural heritage and impact on aesthetics. These impacts can occur at any stage i.e., the construction stage and the operation stage.


The identified impacts due to the proposed project can be mitigated through the incorporation of appropriate measures at different stages of the project. This will ensure the best design with minimal damage to or loss of significant or sensitive features such as roadside vegetation, local water resources, etc.

5.2 IMPACT APPRAISAL CRITERIA

The identification of impacts has been done based on baseline environmental and social survey, review of available project information, discussions with local community and representatives of **ATGL** and other sector specific professionals. The criteria employed to appraise the proposed impacts on various social and environmental components has been presented as **Table 5-1** below.

Table 5-1: Impact Appraisal Criteria

| Criteria | Sub-Classification | Defining Limit | Remarks |
|---|-------------------------------|---|--|
| Spread: refers to area of direct influence from the impact of a particular project activity. | Insignificant/ Local spread | Impact is restricted within the project site. | Except for ecology (which is defined as loss of vegetation and wildlife habitat. |
| | Medium Spread | Impact is spread from up to 2 km from the boundary of the project. | Except for ecology (which is defined as loss of vegetation and wildlife habitat. |
| | High Spread | Impact is spread up to 2 km to 5 km from footprint boundary of the project. | Except for ecology (which is defined as loss of vegetation and wildlife habitat. |
| Duration: based on duration of impact and the time taken by | Insignificant/ Short Duration | When impact is likely to be restricted for duration of less than 1 year. | The anticipated recovery of the affected environmental component within 2 years. |

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| Criteria | Sub-Classification | Defining Limit | Remarks |
|---|-------------------------|--|--|
| an environmental component to recover back to current state | Medium Duration | When impact extends up to 3 years. | With an anticipated recovery of the affected environmental component within 6 years. |
| | Long Duration | When impact extends beyond 3 years. | With anticipated recovery of prevailing condition to happen within 6 years or beyond or upon completion of the project life. |
| Intensity: defines the magnitude of Impact | Insignificant intensity | When resulting in changes in the environmental baseline conditions is up to 10%. | However, it shall be reconsidered where the baseline values are already high. |
| | Low intensity | When resulting in changes in the baseline conditions up to 20%. | For ecology it refers to minimal changes in the existing ecology in terms of their reproductive capacity, survival, or habitat change. |
| | Moderate intensity | When resulting in changes in the baseline conditions for up to 30%. | For ecology, it refers to changes that are expected to be recoverable. |
| | High intensity | When change resulting in the baseline conditions beyond 30%. | While for ecology, high intensity refers to changes that result in serious destruction to species, productivity, or their habitat. |
| Nature: refers to whether the effect is considered beneficial or adverse | Beneficial | | Useful to Environment and Community. |
| | Adverse | | Harmful to Environment and Community. |
| Likelihood: refers the possibility of a risk event occurring | Low | Will most likely not occur | Low likelihood refers that the impact will most likely not occur. |
| | Moderate | Possible to occur | Moderate likelihood refers that the chances of impacts are possible to occur. |
| | High | Likely to occur | High likelihood refers that a particular risk or impact will likely occur. |

Impact identification is a continual process and completes only when the effects of the identified impact are assigned a mitigation strategy. The impacts shall be assessed based on the following criteria:

- Significance of the impact
- Duration of the impact
- Mitigation measures
- Residual impacts

5.3 ASSESSMENT OF IMPACT SIGNIFICANCE

A project specific significance assessment matrix has been developed to assess the impacts based on the appraisal criteria developed above. A reference impact significance matrix is given in **Table 5-2** below.


| | |
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Table 5-2: Impact Significance Criteria

| Spread | Duration | Intensity | Likelihood | Overall Significance | |
|--------|----------|-----------|------------|----------------------|---------------|
| | | | | Adverse | Beneficial |
| Local | Short | Low | Low | Insignificant | Insignificant |
| Local | Short | Moderate | Moderate | Minor | Minor |
| Local | Medium | Low | Low | Minor | Minor |
| Local | Medium | Moderate | Moderate | Minor | Minor |
| Medium | Short | Low | Low | Minor | Minor |
| Local | Long | Low | Low | Minor | Minor |
| Local | Long | Low | Moderate | Minor | Minor |
| Local | Short | High | High | Moderate | Moderate |
| Local | Medium | High | High | Moderate | Moderate |
| Local | Long | Moderate | Moderate | Moderate | Moderate |
| Medium | Short | Moderate | Moderate | Moderate | Moderate |
| Medium | Medium | Low | Low | Moderate | Moderate |
| Medium | Medium | Moderate | Moderate | Moderate | Moderate |
| Medium | Long | Low | Low | Moderate | Moderate |
| Medium | Long | Moderate | Moderate | Moderate | Moderate |
| High | Short | Low | Low | Moderate | Moderate |
| High | Short | Moderate | Moderate | Moderate | Moderate |
| High | Medium | Low | Low | Moderate | Moderate |
| High | Medium | Moderate | Moderate | Moderate | Moderate |
| High | Long | Low | Low | Moderate | Moderate |
| Local | Long | High | High | Major | Major |
| Medium | Short | High | High | Major | Major |
| Medium | Long | High | High | Major | Major |
| High | Short | High | High | Major | Major |
| High | Medium | High | High | Major | Major |
| High | Long | Moderate | Moderate | Major | Major |
| High | Low | Low | Low | Major | Major |
| High | Low | High | High | Major | Major |

The impacts for the proposed project have been covered under following subsections:

- Construction Phase
- Operational phase

The social impacts associated with construction and operations stages have been assessed qualitatively and, in some cases, quantitatively (subject to availability of data), using professional judgement and based on experience from similar projects.

5.4 IDENTIFICATION OF ENVIRONMENTAL IMPACTS

The identification of impacts has been done based on baseline environmental and social survey, review of available project information, discussions with local community and representatives of **ATGL** and other sector specific professionals. The environmental impacts associated with the proposed project on various environmental components such as air, water, noise, soil, flora, fauna, land, socioeconomic, etc. has been identified using Impact Identification Matrix as depicted in **Table 5-3**:


| | |
|---|---|
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Table 5-3: Impact Identification Matrix for NG Pipeline Route

| Components | Physical | | | | Biological | | Socio-Economic | | |
|--|---------------------|------------------------------------|-----------------------|---|------------|-------|---------------------------|----------------|-----------------|
| | Ambient Air Quality | Ground/Surface Water (Qty/Quality) | Ambient Noise Quality | Land (Land use, Topography, drainage, soil) | Flora | Fauna | Livelihood and Occupation | Infrastructure | Health & Safety |
| AUGMENTATION OF FACILITIES | | | | | | | | | |
| CONSTRUCTION PHASE | | | | | | | | | |
| Civil and mechanical works | • | • | • | • | • | • | • | • | • |
| Movement of vehicles | • | | • | • | • | • | | • | • |
| Hydro testing | | | | | | | | | • |
| Waste generation, handling, and disposal | | | • | • | • | • | | | • |
| OPERATION PHASE | | | | | | | | | |
| Operation of pumps and compressors | • | • | • | | | | | | |
| Storage of Gas/ Crude | • | | | | | | | | • |
| Cleaning & maintenance | | | | | | | | | |
| Movement of vehicles | | • | | • | | | | | |
| Waste generation, handling, and disposal | | • | | • | • | • | | • | • |
| Leakage from Pipeline | • | • | | | • | • | | | • |
| LAYING OF NEW PIPELINE | | | | | | | | | |
| CONSTRUCTION PHASE | | | | | | | | | |
| Preparation of Right of way | • | • | • | • | • | • | • | • | • |
| Pipe laying | • | | • | • | • | • | • | • | • |
| Chemical use/handling | • | • | | • | | | | | • |
| Movement of vehicles | • | | • | | | | | | |
| Waste generation, handling, and disposal | • | • | | • | | | | | |
| OPERATION PHASE | | | | | | | | | |
| Operation of compressors | • | • | • | | | | | | |
| Cleaning & maintenance | • | | | • | | | | | |


5.5 PRE-CONSTRUCTION PHASE IMPACTS

5.5.1 Impact on Land Procurement

Impact- Context and Receptors

ATGL has identified the 22.161 km Natural Gas Pipeline spanning across Niwari and nearby villages, in one (01) pipeline route from Bijoli to Orchha proposed helipad.

The entire stretch of this route passes through NH-539 hence the permission/right of way (ROW) approvals will be required from the National Highway Authority of India (NHAI). This route crosses canal at one location hence permission will be required for crossing the canal from irrigation department, including possible diversion or construction of bridge structures for pipeline installation. This route also crosses the railway track near the chainage Ch 20177.76m hence the permission from the Railways will be also required. This route also crosses the Orchha Eco Sensitive zone hence the permission from the forest department also required.

| | | | |
|--|---|--|--|
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Impact significance

The significance of this impact has been evaluated to be **“Moderate”**.

Mitigation Measures

- Permission/right of way (ROW) approvals will be required from the National Highway Authority of India (NHAI), other roads, railways, forest and for canal.
- Develop and implement detailed restoration plans for land, roads, and infrastructure affected during construction to ensure full post-project restoration.
- Forest disturbance should be minimum to minimize and preserve biodiversity.
- Designing of the overpasses or other infrastructure to cross canals should be such that the effect on water flow or canal operations is minimum.

Residual Impacts

After the implementation of these mitigation measures, the residual impact significance is expected to be **“Low”**.

Table 5-4: Impact Significance on Private/Revenue Land Acquisition

| Impact | | Impact on land Procurement | | | | |
|---------------------------------------|--------------------|----------------------------|------------|-----------|------------|----------|
| Impact nature | | Negative | | | | |
| Impact Type | | Direct | | | | |
| Impact Duration | | Short-Term | | | | |
| Impact Extent | | Regional | | | | |
| Impact Scale | | Low | | | | |
| Impact Magnitude (Without Mitigation) | | Negative-Moderate | | | | |
| Aspect | Scenario | Spread | Duration | Intensity | Likelihood | Overall |
| Land Acquisition | Without Mitigation | Local | Long-term | Moderate | Moderate | Moderate |
| | With Mitigation | Local | Short-term | Low | Low | Low |


5.6 IMPACTS DURING CONSTRUCTION PHASE

The construction activities shall comprise of following activities that may impact the environmental and social aspects, as described in sections below:

- Site Preparation
- Labour Engagement
- Material Handling and Storage
- Construction Demobilization

5.6.1 Topography, Land use and Drainage

Impact- Context and Receptors

| | | | | | |
|--|---|--|--|--|--|
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The surrounding area features a plain land. Land use is primarily agricultural, with some industrial and urban development. The drainage system is influenced by the Betwa River and its tributaries, with natural streams helping manage runoff, the proposed pipeline covers some portion of the river and runs parallel to the river and does not cross it. Although, the pipeline crosses two canals in its right of way and may affect the surface drainage temporarily.

Laying of natural gas pipeline will be done within depth of 2 m in land while NG pipeline will be laid as per standard protocols and procedures. There will be limited change in topographic characteristics of project footprint area. The alteration in surface drainage pattern of the area due to construction activities will be limited to smaller areas located in project footprint. The natural flow of storm water will not be altered on contiguous larger area.

Embedded/In-Built Control

- Using trenchless construction methods like Horizontal Directional Drilling (HDD) for canal crossings, where possible, to avoid direct excavation in the canals and minimize disruption to water flow and the surrounding ecosystem.
- Implement soil erosion control measures like silt fences, sedimentation ponds, and planting grass cover in disturbed areas to minimize soil loss, especially in agricultural fields and forest areas.
- Design and layout the pipeline route to avoid impacting high-value agricultural areas as much as possible.

Impact Magnitude


- There will be very limited change in the topographic character of the project footprint area. The alteration in surface drainage pattern of the area due to construction activities, if not maintained with appropriate control measures is probable. The natural flow of storm water will not be altered on contiguous larger area. Intensity of the effect can be considered as moderate, and duration of the effect would be short (during monsoon and post-monsoon season) in nature. Hence, impact magnitude is assessed to be **Moderate**. However, with controlled and managed construction work in water side and forest and agricultural land side may reduce the impact magnitude to **Low**.

Impact Significance

- As per the impact significant assessment matrix, the impact has been assessed as **Moderate** considering the construction for transmission line during monsoon season along the drainage area, which can be mitigated, and magnitude of impact can be **Low** with use of mitigation measures.

Mitigation Measures

- Project shall ensure trenching follows natural contours to minimize disruption to the topography especially during the pre-construction and construction phase
- Anti-buoyancy measures will be adapted during laying out of pipeline within water bodies.
- Ensure topsoil removal and its preservation during construction, so it can be returned to the disturbed area to facilitate faster vegetation regrowth.

| | |
|---|---|
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- Use mulching and vegetative cover to stabilize disturbed soil and reduce erosion during and after construction.

Residual Impact Significance

- After implementation of mitigation measures, the significance of residual impacts for construction activities will be **Low**.

Table 5-5: Impact Significance for Topography and Drainage

| Impact | | Impact on Topography & Drainage | | | | |
|---------------------------------------|--------------------|---|----------|-----------|------------|----------|
| Impact nature | | Negative | | | | |
| Impact Type | | Indirect | | | | |
| Impact Duration | | Short-term | | | | |
| Impact Extent | | Regional | | | | |
| Impact Scale | | Uncontrolled construction work and waste generating from construction site may contaminate drainage of the area | | | | |
| Impact Magnitude (Without Mitigation) | | Negative-Moderate | | | | |
| Aspect | Scenario | Spread | Duration | Intensity | Likelihood | Overall |
| Topography and Drainage | Without Mitigation | Regional | Short | Moderate | Moderate | Moderate |
| | With Mitigation | Local | Short | Low | Low | Low |

5.6.2 Water Resources and Availability

Impacts- Context and Receptors

During construction phase, water will be primarily required for domestic activities by staff and to sprinkle for dust suppression. Additionally, the pipeline crosses two canals and few drains in its right of way. Freshwater will be sourced from private tankers. There will be generation of sewage by construction workers. There is a very less possibility that deterioration of water quality during construction phase can occur due to wastewater disposal from the workers camp and sludge generated from construction sites. Additionally, there might be a possibility of contamination of the canals during laying of NG pipeline in the creeks coming within ROW of the pipeline.


Embedded/In-Built Control

NIL

Impact Magnitude

Water requirement for construction works will be temporary just during construction phase and short-lived while domestic water requirement for construction workers will be needed during the entire construction phase. The construction phase will be of duration of 3 to 4 months with peak construction period of 1.5 to 2 months. Hence, the magnitude of impact is assessed as **moderate/low**.

Impact Significance


| | | | | | |
|--|---|--|--|--|--|
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As per the impact significant assessment matrix (**Table 5-3**), a combination of medium-term impact duration, moderate intensity, moderate likelihood, and local level spread the impact magnitude has been assessed as **Low**.

MITIGATION MEASURES

- Quality of construction wastewater emanating from the construction site will be controlled through suitable drainage system with sediment traps (silting basin as water intercepting ditch) for arresting the silt / sediment load before its disposal into the main natural drainage system around the site.
- The trench shall be excavated only so far in advance of pipe laying that it does not cause increased soil erosion and silting of water bodies.
- The discharge of the trench de-watering pumps shall be conveyed either to drainage channel or to natural drains after passing through a catch pit for settling the silt.
- The trench shall be excavated to the exact gradient specified so that no making of the sub-grade by back filling is required and the concrete bed, where required, may be prepared with greatest ease giving a uniform and continuous bearing and support for the pipe.
- All the construction and preparatory activities to be conducted during dry seasons only.
- Construction materials to be stacked together by fencing it with brick or earth to prevent spillage into the water bodies, also these materials to be stacked away from the water bodies.
- Concrete shall be evaluated in accordance with IS: specification and shall have a minimum compressive strength to avoid pressure on water body.
- Aggregates will be clean and free from injurious amounts of salt, alkali, deleterious substances, or organic impurities as per IS 383 & evaluated as per 2386 to avoid contamination of water bodies.
- Proper sanitation facilities to be provided at the construction site to prevent health related problems due to water contamination.
- Waste disposal and sanitation to workers in the construction camp will be properly maintained or taken care off to check their entry into the water bodies like ponds, streams etc.
- Vehicle maintenance and refuelling will be confined to areas near construction camps designed to trap discarded lubricants and fuel spills from entering the water bodies.
- Drinking water supply for the workers in the construction camps to meet the Indian National Standards. Assess the portability of the supplied water to the construction labour camps water quality to be periodically monitored.
- Garbage to be collected in tanks and disposed of daily to check the solid wastes entering the ponds, streams etc.
- Concrete will be placed within 30 minutes from the time of mixing and will be managed in such a way to prevent aggregate segregation and excessive moisture loss. Concrete container will be kept clean and free from hardened or partially hardened concrete.

Residual Impact Significance

| | |
|---|---|
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- After implementation of mitigation measures, the significance of residual impacts for construction activities will be **Low**.

Table 5-6: Impact Significance on Water Resource and Quality

| Impact | | Impact on water resource and quality | | | | |
|---------------------------------------|--------------------|---|----------|-----------|------------|---------------|
| Impact nature | | Negative | | | | |
| Impact Type | | Direct | | | | |
| Impact Duration | | Short-term | | | | |
| Impact Extent | | local | | | | |
| Impact Scale | | Uncontrolled construction works and waste generating from construction site may contaminate drainage of the area. | | | | |
| Impact Magnitude (Without Mitigation) | | Negative-Moderate | | | | |
| Aspect | Scenario | Spread | Duration | Intensity | Likelihood | Overall |
| Impact on Water Resource | Without Mitigation | Local | Short | Moderate | Moderate | Low |
| | With Mitigation | Local | Short | Low | Low | Insignificant |

5.6.3 Ambient Air and Noise Quality

Impacts- Context and Receptors


Air: The air quality along the project stretch may get affected during the construction period. Particulate matter will be the predominant pollutant affecting the air quality during the construction phase as the construction activities are likely to generate dust. Operation of equipment and machineries for pipeline laying and civil works in pipeline ROW & other sites will generate dust that could impact the air quality. Mostly the additional automobile traffic and construction machineries involved during construction activities will generate pollutants like PM, SO₂ & NO_x. Therefore, the receptor sensitivity is assessed as **“Moderate”**. However, this will not lead to any tangible effect, as the additional traffic volume related to construction activities will be low.

Noise: During construction phase, noise will be generated due to movement of vehicles, and operation of light and heavy construction machineries including pneumatic tools (hot mixer, dozer, tipper, loader, excavator, grader, scrapper, roller, concrete mixer, generator, pump, vibrator, crane, compressor, HDD etc.). Operation of construction machinery may lead to rise in noise level in the range between 80-100 dB(A). The magnitude of impact from noise will depend upon types of equipment used, construction methods and on work scheduling. The main sources of noise during construction period are:

- Movement of vehicles during the construction period for procurement of construction material.
- During site preparation, surface preparation, pipeline laying etc.

Noise generated from sources mentioned above will be mostly during daytime. Moreover, villages / settlements being near to the route, significant impact on local people is apprehended (as a few congested human habitations are along the site), as the noise generated will be a problem. However, the workers are likely to be exposed to high noise levels that may affect them.

Embedded/In-Built Control

| | | | | | |
|--|---|--|--|--|--|
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- Suppression of fugitive dust emissions by spraying water, wetting of the stockpile.
- Pre-identified proper locations of material stockpiles, especially sand.
- Screening or providing wind breaks for stockpiles, covering of trucks with tarpaulin sheets during transportation of material.
- Normal working hours of the contractor will be defined (preferable 8 am to 6pm). If work needs to be undertaken outside these hours, it would be limited to activities which do not generate noise.
- Avoid unnecessary honking in traffic movement.
- Barricading of project premises to avoid dispersion of dust and noise outside the project premises.

Impact Magnitude

The major source of emissions in the construction phase is fugitive dust emissions & emissions from excavation and other construction activities. In addition, operation of DG sets will also cause gaseous emissions. There will be some impacts due to plying of vehicles on the access roads which runs across settlement area.


The construction activities will occur for maximum 2-4 months whereas dust emitting activities such as site clearing, civil construction etc. will be of short/medium duration for 1-2 peak months. The impact magnitude has been categorized as small because the soil type is alluvial. Thus, dust emission would be restricted to construction phase only for shorter duration.

Impact Significance

As per the impact significant assessment matrix (**Table 5-3**) combination of low impact magnitude with medium receptor sensitivity results in impact significance as Moderate.

Mitigation Measures

- Proper and prior planning, appropriate sequencing and scheduling of all major construction activities will be done, and timely availability of infrastructure supports needed for construction will be ensured to shorten the construction period vis-à-vis reduce pollution.
- Construction materials will be stored in covered godowns or enclosed spaces to prevent the windblown fugitive emissions.
- Concrete will be mixed in a mechanical mixer to ensure thorough mixing of all materials to avoid dispersion of particulate matter into the ambient air. Reinforcements will be placed around the length of pipeline. Night Caps to be provided to both ends of line pipe before starting the work.
- Stringent construction material handling / overhauling procedures shall be followed.
- Adequate dust suppression measures such as regular water sprinkling on unpaved haul roads, at vulnerable areas of construction sites will be undertaken to control fugitive dust during material handling and hauling activities particularly near habitations especially in dry seasons.
- The construction material delivering vehicles will be covered to reduce spills.
- Low emission construction equipment, vehicles and generator sets to will be used.

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- It will be ensured that all construction equipment and vehicles are in good working conditions, finely tuned and maintained to keep emission within the permissible limits and engines tuned off when not in use to reduce pollution.
- Vehicles and machineries will be regularly maintained so that emissions confirm to standards of Central Pollution Control Board (CPCB).
- Construction workers to be provided with appropriate PPEs during construction phase.
- Temporary labour sheds will be located away from the immediate vicinity of construction sites and major road traffic.
- Protective gears such as earplugs, etc. will be provided to construction personnel exposed to high noise levels as preventive measures.
- It will be ensured that all the construction equipment and vehicles used are in good working condition, properly lubricated and maintained to keep noise within the permissible limits and engines tuned off when not in use to reduce noise.
- Construction activities carried out near residential locations will be scheduled to the daytime (i.e. from 10.00 a.m. to 6.00 p.m.) only to have minimum disturbance to the residents.
- Whenever possible static noisy machinery will be placed on vibration isolators or temporary sheeting will be provided to check noise propagation.
- Noise level will be monitored at regular intervals during construction phase, which will help in taking appropriate action to maintain it within the prescribed limit

Residual Impact Significance

- The significance of residual impact will be **Low** after implementing mitigation measures.


Table 5-7: Impact Significance for Ambient Air & Noise Quality

| Impact | | Impact on Ambient Air & Noise Quality | | | | |
|---------------------------------------|--------------------|--|----------|-----------|------------|----------|
| Impact nature | | Negative | | | | |
| Impact Type | | Direct | | | | |
| Impact Duration | | Short-term | | | | |
| Impact Extent | | Regional | | | | |
| Impact Scale | | Impact due to construction activity and operation of construction vehicles | | | | |
| Impact Magnitude (Without Mitigation) | | Negative-Moderate | | | | |
| Aspect | Scenario | Spread | Duration | Intensity | Likelihood | Overall |
| Ambient Air & Noise Quality | Without Mitigation | Regional | Short | Moderate | Moderate | Moderate |
| | With Mitigation | Regional | Short | Low | Low | Low |

5.6.4 Land and Soil Environment

Impacts- Context and Receptors

The construction activities such as earth moving may lead to reduction in vegetation cover on ground thus leading to soil erosion. During the construction period the movement of heavy vehicles will result in

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compaction of soil by making it hard and impermeable. The erosion at construction stretches will result in increased sediment load in recipient streams. Any leakage of lubricants in equipment yard may cause soil contamination. Solid waste disposal along roadside also adds to impact on the land environment during the construction. During construction activity for laying of pipeline cutting of existing land will be done and the dug material generated will be replaced back after laying of the pipes. Loosening of topsoil and loss of vegetative cover (land clearing) along the route and construction areas due to excavation and back filling which lead to enhance soil erosion.

Embedded/In-Built Control

- Erosion and sediment control measures should be adopted including using silt fences to manage runoff, applying erosion control mats on disturbed soil, hydroseeding for vegetation restoration, and setting up sediment basins to collect runoff.
- In order to do topsoil management, the topsoil should be striped and stockpiled separately before construction, and it should be replaced after construction to restore soil fertility.
- For vegetation and habitat protection land disturbance should be minimization by keeping the construction area narrow and by the usage of controlled clearing methods for vegetation removal.
- To achieve the soil compaction prevention usage of mats or gravel paths for heavy machinery should be adopted.
- Water management and protection involves using trenchless technology for stream, canal and wetland crossings, designing proper drainage systems to prevent erosion, and managing de-watering to avoid soil erosion.
- Contaminant management includes setting up spill prevention and containment measures for fuel or oil spills and conducting soil testing to monitor contamination levels.
- Trench management focuses on stabilizing trenches during construction to prevent collapse and refilling trenches promptly to avoid long-term soil settlement.

Impact Magnitude


The overall magnitude of the land and soil impacts is expected to be moderate because the excavation of the land to lay the pipeline will disturb the soil structure and soil compaction, removal of topsoil, and trenching can alter the natural state of the soil.

Impact Significance

The significance can range from **moderate**

MITIGATION MEASURES

- During excavation, care will be taken to see that the topsoil and the subsoil are stored separately. Topsoil (50cm) of route pits will be conserved and restored after excavation is over and will be replaced back for filling of the pit areas. Whereas the topsoil (25cm) stripped from the area stacked separately as topsoil dump of not more than 1m in height and the same will be redistributed to the pit after laying of pipeline. During refilling, care will be taken to see that the topsoil is replaced back at the top while refilling after laying of pipeline.

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- Back filling shall be carried out immediately after the pipeline has been laid in the trench. On no account the topsoil from ROW shall be used for this purpose. The backfill material shall not contain any extraneous material and/or hard lumps of the soil. After the initial backfill has been placed into the trench to a level slightly above the surrounding ground, the backfill material shall be compacted.
- When the trench has been dug through driveways or roads all backfills shall be executed with sand or a suitable material and shall be thoroughly compacted.
- Trench excavated in dykes which are the property of the railways, or which is part of main road shall be graded and backfilled in their original profile and condition.
- Also, necessary contour bunding, gully plugging, and staggered trenching shall be carried out wherever required in the pipeline corridor and in areas where excavated soil will be dumped to check soil erosion.
- Stone pitching will be provided at the slopes near the irrigation and natural drainage / rivers to prevent silting of soil into these water bodies.
- Concrete shall be tested in accordance with IS: specification and shall have a minimum compressive strength as per concrete grade design and the same will be utilized for construction purposes.
- Approved quality of cement conforming to IS code will be used only OPC 53 grades.
- Concrete coating will be reinforced by a Single layer of steel reinforcement.

Residual Impact Significance

- The significance of residual impact will be **Low** after implementing mitigation measures.


Table 5-8: Impact Significance for Land and Soil Environment

| Impact | | Impact on Land and Soil Environment | | | | |
|---------------------------------------|--------------------|--|----------|-----------|------------|----------|
| Impact nature | | Negative | | | | |
| Impact Type | | Direct | | | | |
| Impact Duration | | Short-term | | | | |
| Impact Extent | | Regional | | | | |
| Impact Scale | | Erosion, sediment runoff, compaction, habitat loss, disruption of topsoil, Localized, with concentrated effects near water crossings, steep areas, and during trenching. | | | | |
| Impact Magnitude (Without Mitigation) | | Medium | | | | |
| Aspect | Scenario | Spread | Duration | Intensity | Likelihood | Overall |
| Land & Soil environment | Without Mitigation | Local | Short | Moderate | Moderate | Moderate |
| | With Mitigation | Local | Short | Low | Low | Low |

5.6.5 Ecology and Biodiversity

Impacts- Context and Receptors

The construction works of the NG pipeline route involves clearance of land, but it does not include uprooting of trees since most of the stretch of the pipeline route will be conducted only on the RoW of

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the road. Although few shrubs and herbs will be cleared. Therefore, no significant impact on the ecological environment is envisaged due to the construction activity of the proposed pipeline project.

Embedded/In-Built Control

- The clearance of shrubs and herbs should be minimal. The design should ensure that no significant disruption to larger vegetation or habitats occurs during construction.
- Design provisions should allow for buffer zones around sensitive ecological areas, further reducing potential disturbances.
- To prevent erosion during and after construction, appropriate soil erosion control measures should be in place, such as silt fences and temporary revegetation.

Impact Magnitude

The magnitude of the impact on ecology and biodiversity is expected to be low. Since the land clearance is minimal, restricted to shrubs and herbs, the overall disturbance to plant species and ecosystems is limited. The temporary nature of the construction activity (lasting only for the duration of the pipeline installation) ensures that any impacts will be short-term and reversible.

Impact Significance

Given the minimal scope of vegetation clearance and the lack of uprooting of trees, the significance of ecological and biodiversity impacts is considered negligible to low.

Mitigation Measures


- No vegetation clearance will be undertaken in the pipeline route. Only few shrubs and herbs located within ROW of pipeline will be cleared.
- While planning / selection of route care to be taken to route the pipeline alignment in such a way to avoid areas with trees and shrubs and thus no major impact of loss of vegetation is anticipated.

Residual Impact Significance

- The significance of residual impact will be **insignificant** after implementing mitigation measures.

Table 5-9: Impact Significance for Ecology and Biodiversity

| Impact | | Impact on Ecology and Biodiversity | | | | |
|---------------------------------------|--------------------|------------------------------------|----------|---------------|------------|---------------|
| Impact nature | | Negative | | | | |
| Impact Type | | Direct | | | | |
| Impact Duration | | Short-term | | | | |
| Impact Extent | | Regional | | | | |
| Impact Scale | | | | | | |
| Impact Magnitude (Without Mitigation) | | Medium | | | | |
| Aspect | Scenario | Spread | Duration | Intensity | Likelihood | Overall |
| Ecology and Biodiversity | Without Mitigation | Local | Short | Low | Low | Low |
| | With Mitigation | Local | Short | Insignificant | Low | Insignificant |

| | | | | | | |
|---|--|--|---|--|--|--|
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5.6.6 Socio-economic Environment

Impacts- Context and Receptors

The project will provide either direct or indirect job opportunities to the local population as far as possible. There will be some migration of skilled labour force from outside the project area during construction phase, which may put some pressure on the local settlements and resources. Local skilled employees will be preferred.


There will be a temporary rise in traffic on nearby roads during the construction phase, both inside and outside the project site, because the pipeline route crosses several major roadways. The transportation of building equipment and raw materials will be the primary cause of this rise. Due to the project's size and nature, there can be inconveniences for the public as well as possible safety hazards. Residents may be at risk for health and safety issues since the pipeline route travels through villages with dense human settlements along the right of way (ROW). This will have minimal affect considering the size and nature of the project.

Impact Significance

The significance of this impact is evaluated to **low**, which can be translated to positive beneficial impacts of the area.

Mitigation Measures

- Implement a traffic management plan to regulate the movement of construction vehicles and machinery.
- Schedule transportation of raw materials and heavy equipment during off-peak hours to minimize traffic congestion.
- Designate specific routes for construction vehicles to reduce disturbances in residential and high-traffic areas.
- Install appropriate road signage, speed limits, and warning signals to alert commuters and pedestrians.
- Deploy trained personnel for traffic control at critical junctions to ensure smooth vehicle movement and public safety.
- Conduct awareness programs for nearby residents on safety precautions related to pipeline construction.
- Implement strict safety protocols, including barricading construction areas and placing warning signs along the Right of Way (ROW).
- Establish emergency response plans and provide first aid facilities at construction sites.
- Regular monitoring of air and noise pollution levels in residential areas near the construction zone.
- Ensure compliance with occupational health and safety standards to protect both workers and the public.
- Adopt strict measures to prevent spills or leakages of hazardous substances into rivers and water bodies.

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- Install silt traps and sedimentation barriers near river crossings to control soil erosion and prevent contamination.
- Conduct water quality monitoring before, during, and after construction to ensure no significant impact on aquatic life.
- Avoid construction activities near riverbanks during peak fishing seasons to minimize disruptions.
- Implement eco-friendly construction techniques to reduce the risk of river pollution and maintain biodiversity.
- Compensate affected individuals for any temporary disruptions to their livelihood due to construction activities.
- Promote local employment opportunities by prioritizing the hiring of skilled and unskilled workers from nearby villages.

Residual Impact Significance


- After the implementation of these mitigation measures, the residual impact significance is expected to be **Positive low to moderately beneficial**.

Table 5-10: Impact Significance for Ecology and Biodiversity

| Impact | | Impact on Socio-economic condition of the study area | | | | |
|---------------------------------------|--------------------|--|----------|-----------|------------|---------------------|
| Impact nature | | Negative (with mitigation impact would be positive and beneficial) | | | | |
| Impact Type | | Direct | | | | |
| Impact Duration | | Short-term | | | | |
| Impact Extent | | Local | | | | |
| Impact Scale | | Construction activity may impact on public health in close proximity of the project foot-print area. However, construction work may create jobs for local population/PAFs, which may convert the impact to beneficial. | | | | |
| Impact Magnitude (Without Mitigation) | | Negative-Low | | | | |
| Aspect | Scenario | Spread | Duration | Intensity | Likelihood | Overall |
| Socio-economic Impacts | Without Mitigation | Local | Short | Moderate | Moderate | Low |
| | With Mitigation | Local | Short | High | High | Moderate-beneficial |

5.7 IMPACT DURING OPERATION STAGE

The impact during the operation phase will be continuous in nature. For a gas-based pipeline, the potential for imparting adverse impacts is not high. However, whatever impact on environment is present will be minimized through incorporation of efficient technologies for pollution control measures.

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5.7.1 Air Environment

The pipeline will be 1.5 to 2 m below the ground and would be monitored via SCADA System. Some vehicular emissions during maintenance that will be short-term and temporary in nature. Therefore, there will be no impact on air environment due to operation of NG pipeline.

5.7.2 Noise Environment

The NG pipeline being underground in nature will not lead to noise pollution during its operation. However, noise could be generated during maintenance and repair works that will be temporary in nature.

5.7.3 Water Environment

IMPACTS

There will be no consumption of water during operation phase of the NG Pipeline. However, there are chances of water contamination due to unprecedented leakage of pipeline within the water bodies located in ROW of the pipeline.

Embedded/In-Built Controls

Nil

Impact Magnitude

The **magnitude** of potential impacts is also expected to be **low** during the operational phase. The pipeline's construction did not disturb any major water bodies.

Impact Significance


During the operation phase of the natural gas pipeline project, the impact on the water environment is expected to be minimal.

MITIGATION MEASURES

- Leak Detection and Control System shall be in place.
- Mock Drills shall be conducted at regular intervals in line with Emergency Response and Disaster Management Plan.
- Edges of the spilled area will be undercut so as to provide a key lock for the repair material. A stiff mixture of cement, water and aggregate will be throttled into & through the reinforcement and built-up until the surface is level with coating around the repair. The pipe will then be carefully laid with the repaired area at the top and will be moist cured for twenty-four (24) hours before further handling.

Table 5-11: Impact Significance for Water Environment

| Impact | Impact for Water Environment |
|---------------|---|
| Impact nature | Operation of the pipeline involves minimal disturbance to water bodies. |

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| Impact Type | | Temporary impacts, such as minor risks of water contamination due to accidental leakage or malfunction. | | | | |
|---------------------------------------|--------------------|---|----------|-----------|------------|---------------|
| Impact Duration | | Long-term operational phase with minimal oMedium ngoing impact. | | | | |
| Impact Extent | | Local | | | | |
| Impact Scale | | Localized to the pipeline's specific route | | | | |
| Impact Magnitude (Without Mitigation) | | Low | | | | |
| Aspect | Scenario | Spread | Duration | Intensity | Likelihood | Overall |
| Water Environment | Without Mitigation | Local | Long | Low | Moderate | Low |
| | With Mitigation | Local | Long | Low | Low | Insignificant |

5.7.4 Environment, Health, and Safety

There could be impacts on environment, health, and safety due to leakage from pipelines from likely external physical forces (Floods & Cyclones). Natural Gas being inflammable in nature could lead to fire hazards. Since the pipeline route passes through the several areas with the heavy settlements, canals, drains, railway crossing and heavy traffic areas. Ensuring the safety of workers during the construction phase, especially in highways and high-traffic areas along the pipeline route, requires the implementation of strict safety protocols and a comprehensive monitoring system. These precautions are essential to minimize risks related to natural gas leakage and to protect both workers and the surrounding community from potential hazards and accidents.

Embedded/In-Built Controls

- Project specific Health and Safety Management Plan will be put in place.
- Personal Protective Equipment (PPEs) including safety shoes, helmet, goggles, earmuffs, face shield, insulating (rubber) gloves with leather protectors, insulating sleeves, and flame-resistant (FR) clothing and face masks.
- Use of permit to work system
- Cranes and other lifting equipment are operated by trained and authorised persons.
- An up to date first aid box should be provided at all construction sites and a trained person should be appointed to manage it.


Impact Magnitude

As mentioned above, the O&M activities will be carried out by qualified team. With above embedded controls, the magnitude of impacts will be **Low**.

Impact Significance

As per the impact significant assessment matrix a combination of small impactmagnitude with medium receptor sensitivity results in impact significance as **Low**

MITIGATION MEASURES

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- Leak Detection and Control System shall be in place.
- SCADA monitoring shall be carried out.
- Mock Drills shall be conducted at regular intervals in line with Emergency Response and Disaster Management Plan.
- Continuous metering will be done to provide a comparison between input and output for leak detection.
- Periodic audits of pipeline and its control measures will be conducted regularly.
- Demarcation of Hazard Zones and pipeline chainage will be done.

Residual Impact Significance

- Residual significance of impacts during operation phase will be **Low to Insignificant**.

Table 5-12: Impact Significance for Environment, Health, and Safety


| Impact | | Impact for Environmental Health and Safety | | | | |
|---------------------------------------|--------------------|---|----------|-----------|------------|---------------|
| Impact nature | | Negative | | | | |
| Impact Type | | Direct | | | | |
| Impact Duration | | Long-term | | | | |
| Impact Extent | | Local | | | | |
| Impact Scale | | Operational activity may impact occasionally on health & Safety of operational work force | | | | |
| Impact Magnitude (Without Mitigation) | | Negative-Low | | | | |
| Aspect | Scenario | Spread | Duration | Intensity | Likelihood | Overall |
| Environmental Health and Safety | Without Mitigation | Local | Long | Low | Moderate | Low |
| | With Mitigation | Local | Long | Low | Low | Insignificant |

5.8 SUMMARY OF PRE AND POST MITIGATION IMPACT SIGNIFICANCE


Table 5-13 below presents the summary outcome of the comprehensive assessment of identified impacts pre and post mitigation during various phases of the project. During impact assessment study, significant impacts have been considered, and mitigation plans have been developed in accordance to mitigate the impacts.

Table 5-13: Summary of Impacts

| Category | Impact Significance (without mitigation measures) | Impact Significance (post-mitigation) |
|----------------------------------|---|---------------------------------------|
| Planning Phase | | |
| Impact due to Land Procurement | Moderate | Low |
| Construction Phase | | |
| Topography and Drainage | Moderate | Low |
| Water resources and availability | Low | Insignificant |
| Ambient air and noise quality | Moderate | Low |
| Ecology | Low | Insignificant |
| Socio-economic Impacts | Low | Moderate-beneficial |
| Occupational Health and Safety | Moderate | Low |
| Operational Phase | | |

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| Category | Impact Significance (without mitigation measures) | Impact Significance (post-mitigation) |
|-----------------------------|---|---------------------------------------|
| Water Environment | Low | Insignificant |
| Environment Health & Safety | Low | Insignificant |


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6 ANALYSIS OF ALTERNATIVES


Route selection is a process of identifying constraints, avoiding undesirable areas and maintaining the economic feasibility of the pipeline. Diversion of pipeline around obstacles can be very costly. The ideal route, of course, would be a straight line from the origin to the terminal point. However, physiographic, environmental, design and construction constraints usually alter the route

The pipeline route should be optimized based on the following considerations:

- Safety of public lives and property and safety of the pipeline from engineering and other considerations.
 - Shortest pipeline length.
 - Easy and favorable terrain condition free of large water bodies, low lying marshy lands, obstacles like ravines, depressions and unstable grounds, meandering rivers, etc.
 - Ground profile for pipeline hydraulics and avoidance of steep rising and falling ground, hills and valleys having sloping right of way.
 - Availability of infrastructure and access to the pipeline route during construction and maintenance.
 - Environmental impact and avoidance of environmentally sensitive lands, such as reserved forests, marine parks, built-up areas, places of worship, burial and public events.
 - Minimum crossing of existing pipelines, transmission lines, parallel alignment, etc.
 - Minimum road, rail, river and canal crossings.
 - Avoidance of rugged and intricate grounds with hard strata, exposed rocks, boulders and quarries.
 - Existing and future developments in the region, such as roads, rail lines, canal network, reservoirs, townships, industrial units, etc.
 - Scope for future expansion of the pipeline.
- a) The Petroleum and Natural Gas Regulatory Board (PNGRB) was constituted under The Petroleum and Natural Gas Regulatory Board Act, 2006 (NO. 19 OF 2006) notified via Gazette Notification dated 31st March 2006. The Act provide for the establishment of Petroleum and Natural Gas Regulatory Board to protect the interests of consumers and entities engaged in specified activities relating to petroleum, petroleum products and natural gas and to promote competitive markets and for matters connected therewith or incidental thereto.
 - b) Further as enshrined in the act, the board has also been mandated to regulate the refining, processing, storage, transportation, distribution, marketing and sale of petroleum, petroleum products and natural gas excluding production of crude oil so as and to ensure uninterrupted and adequate supply of petroleum, petroleum products and natural gas in all parts of the country. Hence the project was acquired through the bidding process and the area, number of customers, total CNG stations were already mentioned in it. So, the route selection was done within the allotted area.

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Since all the requirements in the projects were predefined, scope for alternate analysis was quite slim, as to which the route passes through mix and heavily populated area, forest areas, RoW of the road where the movement of heavy traffic is being observed and hence depending upon the technical and economic feasibility the proposed pipeline routes were selected.

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7 ADDITIONAL STUDIES

7.1 QUANTITATIVE RISK ASSESSMENT

Quantitative Risk Assessment (QRA) study should be undertaken for the proposed 8" diameter underground pipeline for the transfer of natural gas. The aim of QRA study will be to identify potential hazards, assess the consequences and frequency of hazards and evaluate the risk to personnel, property and public. To assess the relative level of risk posed by the proposed project, a comparison will be made with risk criteria that is considered tolerable (ALARP) for similar operations.

The overall approach and methodology employed for the study will be based on the guidelines given in IS 15656: 2006, Indian Standard – Hazard Identification and Risk Analysis – Code of Practice, May 2006, using PHAST Software/Correlations.

The pipeline system will be provided with state-of-the-art safety systems like protection system, SCADA, leak detection system / pipeline application software, Fire and gas detection systems, etc. The proposed transfer of gas will be examined for inherent hazards or the potential to result in an unplanned event or sequence of events at different sections along the pipeline route. Several hazards that can cause failure of pipelines will be identified. This included loss of integrity/ damage due to interference from third parties, corrosion, accidents, human error, sabotage, etc., during normal operation. Analysis of past accidents are to be used to establish the credibility of accident scenarios.

7.2 GUIDELINES FOR EMERGENCY RESPONSE PLAN


Emergency response plan will be developed with the resources available within the company. The important stages of the response plan are declaration of an emergency, identification of resources & manpower, ending of an emergency and rehearsal of the plan. Declaration of an emergency would involve recognizing a leak and reporting to Station in charge of nearest compressor station.

Other features are summarized below:

Emergency Response Structure: An emergency response structure will be developed for effective response to the emergency. The structure defines the main functions of the decision makers and the individual roles as well.

Roles & Responsibilities of Team: Emergency response team (ERT) to respond to fire, accidents and technical emergencies will be constituted from operations personnel, who can be called upon 24 hours a day, supported by senior management field personnel as and when required. The ERT will receive specific training for their roles and exercised on a regular basis. The proposed functions of employees that are planned to be deployed will be finalized prior to commissioning.

Operations Control: The pipeline operation will be monitored and controlled through Local control system and POC in command which will have the provision for emergency shut down or isolation of Pipeline. Security: Surveillance of the entire pipeline will be held periodically through ground patrolling. Using operators with knowledge of local area will be deployed for ground patrolling of the pipeline route.

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Medical and First Aid: All arrangements will be made available at site offices and camps for medical and first aid. First-Aid facility will be provided at compressor stations, master pipeline operation center/ local control center, MLVs and M&Rs. Adequate first-aid training will be provided to employees at these locations.


Communication: Responsibility for external and internal communication will be assigned at each station. Dedicated fiber optic cable-based communication system will be provided for quick communication between the control stations, dispatch and delivery station(s) of the pipeline. The backup system will consist of appropriate combination of fixed telephone lines/data-bandwidth of the local service provider, mobile phones, VHF sets etc.

Emergency control room: A safe location will be designated as emergency control room (ECR) within the compressor stations.

Emergency Procedures: PP will evolve easy-to-follow procedures for responding to the identified situation. The plan will be rehearsed once in three months.

Ending of an emergency: After controlling an emergency, the site ERT Leader will declare as “All Clear”. The siren will be sounded for 2 minutes to indicate that the Emergency is over.

The basic elements for an effective plan have been included in the development. Prior to the commissioning of the project, copies of the plan are to be given to the authorities.

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8 PROJECT BENEFITS

8.1 CONTRIBUTION TO NATIONAL ENERGY SECURITY


Energy is the key input for economic growth and Indian Energy sector play a vital role in country's Economy. Energy is a key input to the production processes that transform inputs to goods and services. India became the third largest energy consumer in the world after United States and China. Key drivers for increasing energy demand in India are population growth, industrialization, and urbanization. Energy security and sustainability are interdependent because emissions from energy consumption contributes to climate change in greater extend globally. Indian government is also committed to increase the share of natural gas in country's energy mix up to 15% by 2030 and Ministry of Petroleum and Natural Gas intervening with policy reforms in natural gas sector. India requires a sustained supply of energy to support its ambitious growth and welfare targets for the coming years. In a survey by NITI Aayog, it was noted that India's energy consumption will reach 2,300 million tons of oil equivalent by 2047 out of which natural gas will contribute 173 million tons of oil equivalent under the determined effect scenario.

According to the International Energy Agency (IEA), Indian gas market is considered one of the most growing energy markets in the world, the Agency expected that Indian gas demand will increase in the coming decades at 5.4% per annum over 2007-30 (IEA, 2009) reaching 132 BCM by 2030. With the growing need for oil and gas in India since the nineties of the last century, the Indian government has worked to develop the oil and gas sector through the development of mechanisms of action and the issuance of new regulatory laws, 1993, private investors have been allowed to import and market liquefied petroleum gas (LPG) and kerosene freely, private investment is also allowed in lubricants, which are not subject to price controls. In the 11th Five Year Plan, the Indian government has focused in particular on the energy sector in order to self-reliance for energy resources, particularly oil and gas by encouraging of exploration and extraction operations and reduce dependence on overseas.

8.2 REDUCED RISKS AND COSTS


Natural gas pipeline has been regarded as the most cost effective and safest channel of gas transportation and has extraordinary strategic significance for the country. Pipeline is regarded as the most cost effective and safest channel to transport the oil and gas from upstream oil field or port to the downstream users or refineries. The gas is significantly replaced by oil in all sectors i.e. power generation, domestic and transportation due to price hike in oil prices globally and cheaper availability of natural gas. During the last five years the oil import has reduced by 8 %. The other reason for that may be the availability of cheaper, safe, and durable mode of gas transportation system (main and distribution network of pipeline), which is continuously expending.

The gas pipeline projects help in reducing the travel cost in comparison to other resources and it is also very safe and cheaper for domestic, commercial, and industrial uses. The proposed pipeline project would be very feasible and cost effective as it is totally underground and there will be continuous access to the gas for the use.

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8.3 SOCIO-ECONOMIC DEVELOPMENT

The proposed project will create socio-economic development across the pipeline route and in the near vicinity as well. The project will provide employment during construction and operation phase to the local labours. Natural gas pipelines provide a reliable mode for transportation, reducing dependence on less stable energy supplies. Access to natural gas will decrease heating and electricity costs for local residents and businesses. Usage of gas in domestic households and other commercial activities will reduce consumption of fossil fuels that would be lead reduction in pollution.

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9 ENVIRONMENTAL, SOCIAL AND BIODIVERSITY MANAGEMENT & MONITORING PLAN

9.1 BACKGROUND

The Environmental Social and Biodiversity Management Plan (ESBMP) provides an essential link between predicted impacts and mitigation measures during implementation and operational activities. ESBMP outlines the mitigation, monitoring and institutional measures to be taken during project implementation and operation to avoid or mitigate adverse environmental impacts, and the actions needed to implement these measures. The likely impacts on various components of environment due to the project during developmental activities have been identified and measures for their mitigation are suggested. The ESBMP lists all the requirements to ensure effective mitigation of every potential biophysical and socio-economic impact identified in the EIA. For each attribute, or operation, which could otherwise give rise to impact, the following information is presented:

- A comprehensive listing of the mitigation measures
- Parameters that will be monitored to ensure effective implementation of the action.
- Timing for implementation of the action to ensure that the objectives of mitigation are fully met.

The ESBMP comprises a series of components covering direct mitigation and environmental monitoring, an outline waste management plan, and a project site restoration plan. Therefore, environmental management plan has been prepared for each of the above developmental activities.

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9.2 ENVIRONMENT, HEALTH & SAFETY POLICY


ATGL believes that Environment, Health, Safety and Quality (EHS&Q) is integral part of their business. By embracing the best principles EHS&Q, the company sincerely attempts to have all overall positive impact on the environment and communities where they operate. **ATGL** is committed to continually improve their EHS&Q performance by including the points below: The EHS&Q Policy of **ATGL** emphasizes on the following objectives:

- Implement highest standards of Environment, Health, Safety & Quality in planning, construction, operations, and maintenance of projects throughout their lifecycle to provide a safe and conducive working environment to its employees.
- Identify, eliminate, or mitigate potential EHS&Q risks associated with our business by implementing a robust due diligence and monitoring mechanism.
- Evaluate and comply with applicable regulations related to EHS&Q.
- Provide adequate training & resources to its employees to achieve its EHS&Q targets.
- Voluntarily adopt to an integrated Management Systems, compliant with international standards ISO 14001, ISO 45001, and ISO 9001 for EHS&Q respectively.


This EHS&Q policy is applicable for **ATGL**'s all business and project related activities and its subsidiaries. All employees and contractors of **ATGL** are required to adhere with this policy.

The HSE policy further ensures adherence of health and safety norms by hired contractor. The specific provisions to be followed includes the following:

- The contractor shall in its performance of the contract and carrying out of the work to ascertain and comply with all the relevant statutory laws and directives act as applicable.
- The contractor shall provide detail of EPF, ESIC, Labour License, medical fitness of workmen, valid photo id of workmen, undertaking letter mentioning workmen criminal record and other documents as applicable.
- All required safety item shall be supplied by contractor and any accident occurs during the contract period shall be to the contractor's account and **ATGL** will not be responsible for the minor/major accident/incident legally or financially.
- Workmen compensation policy must be obtained and kept in force.
- If contractor assigning the whole or partial work to third party should be intimated to **ATGL** in written with all required documents.
- Daily manpower and man-hour shall be reported by contractor.
- The contractor shall provide Attendance Register, Wages Register, EPF Remittance Challans, ESIC remittance challans every month or as on when required. This is also required for release of payment.

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- The contractor shall make provisions for potable and domestic water for manpower, proper sanitary requirements with sufficient toilets and wastewater management for workmen which will be deployed for all ongoing work.
- Dedicated safety supervisor/officer should be available at site all the time during work execution.
- Mandatory PPE. (All PPE's Should be of IS standards)
 - ✓ Safety Helmet / Hard Hat.
 - ✓ Safety Shoes.
 - ✓ Safety Goggle.
 - ✓ Safety Jacket.
 - ✓ Safety Hand gloves.
- Job Specific PPE's
 - a. Welding Work (Basic)
 - ✓ Safety Goggle / Welding Shield.
 - ✓ Leather Hand Gloves.
 - ✓ Leather apron.
 - ✓ Full sleeves shirt
 - ✓ Pant that covers the top of shoe.
 - b. Drilling Work (basic)
 - ✓ Safety Goggle
 - ✓ Nose mask.
 - ✓ Hand Gloves.
 - ✓ Ear Plug (as per requirement)
 - c. Electrical
 - ✓ Insulating (rubber) gloves.
 - ✓ Insulated tools.
 - ✓ All electrical extension boards should have industrial plug to wherever required.
 - ✓ All electrical extension boards should have 30mA ELCB MCB.
 - d. Civil Work
 - ✓ Gum Boot with steel toe.
 - ✓ Rubber Gloves.

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- ✓ Nose mask.
 - ✓ Safety Goggles.
 - ✓ Ear plug if working in high noise area.
- Any other specific PPE required that will be intimated time to time.
 - All required safety training will be provided by **ATGL** time to time.

Contractor should adhere all the **ATGL** & end customer safety norm. Failing to adhere may result in suspension of work or penalty will be applicable.

9.3 ORGANIZATION STRUCTURE

The overall management and coordination of the project will be managed through Chief Executive Officer (**ATGL**) who will be supported by the Plant Manager and Head (EHS&S). The Head- EHS&S /ESG will overview, monitor and control the activities of Site Manger and Safety officer. The contractors will be controlled by the site manager during construction phase. The construction contractor shall have a Health, Safety and Environment supervisor in their team who shall work in coordination with the EHS officer.


The primary responsibility of management of EHS&S functions within **ATGL** lies with the head quality control and EHS&S Officer. For management of land related issues, the responsibility rests directly with the land procurement personnel and HR related issues is managed by dedicated HR team. CSR is managed by a separate team altogether and is responsible for overlooking all assets operated by **ATGL**.

9.3.1 Roles and Responsibilities

Head EHS

The Head EHS should be the designated EHS&S head at **ATGL**. The key Roles and Responsibilities are as follows:

- The overall responsibility for implementation and communication of the EHS&S and associated policies and meeting ESMS performance objectives for the organization with respect to project.
- Ensuring adherence of EHS&S Policy and procedures and Safety compliance by Contractors.
- Ensuring compliance of existing and future operations with respect to the applicable national laws, rules and regulations, permits pertaining to Environmental, Safety, Health and Social as well as international best practices including reference frameworks such as IFC Performance Standards.
- Communication of EHS&S related issues and concerns with the CEOs office and project heads as well as guiding them on Go and No-Go decisions for projects with serious EHS&S risks and issues.
- Decision on internal risk categorization and rating lies with the ESHS head.
- Approvals for commissioning of ESIA studies, Resettlement Action Plans etc.
- Responsible for recommendation and appointment of EHS&S personals.

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- Responsible for taking up monitoring reports and audit reports with the CEO's office.
- Changes in this ESMS manual has to be sanctioned by the EHS&S head and formalized by the ESMS head.
- Responsible for decisions on higher level EHS&S non-compliance by external stakeholders such as contractors and vendors with respect to fines and associated penalties.

Corporate EHS&S Officer


EHS&S Manager at the corporate level will be responsible for the following:

- Overseeing successful EHS&S screening, audit and impact assessment of assets either internally or through external agencies as the case maybe.
- Overseeing the implementation of the systems, protocols and checklists of the ESMS at the corporate level and where necessary, transferring information and expertise at the site level.
- Interaction with other teams such as project team, land, procurement, HR etc. for handling and resolution of EHS&S issues and risks.
- Ensuring implementation of training and capacity building exercises at the corporate levels and project levels.
- Documentation and control of ESMS related documents.
- Development of processes with respect to EHS&S. Also includes internal updates of existing systems pertaining to EHS&S wherever feasibly and technically possible.

Functions of HR Department

The HR department is responsible only for the management of HR relations for internal employees within **ATGL**. Some of the primary roles and responsibilities undertaken by HR department are as follows:

- Responsible for implementation of the corporate HR Policy, manual and practices.
- Planning and recruitment of new employees as aligned with the business plan.
- Management of performance appraisal & review process.
- Implementation of desired employee engagement programs & practices.
- Management of any internal Human Resources Information System.
- Assessing and evaluation of competencies of existing employees.
- Carrying out of training programs and orientation of new employees.
- Liaise with law enforcement agencies whenever necessary.
- Manage harmonious industrial relations.
- Handling and management of employee grievances.

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CSR Team


The CSR department established at the corporate level primarily has the following roles and responsibilities:

- Conducting need-based assessment studies (internal or external) for project relevant CSR programs and activities.
- Undertaking stakeholder identification, profiling, analysis, and influence impact matrix.
- Defining and developing strategies which underpin the company's CSR objectives in the aspects defined under the central CSR policy.
- Developing site specific CSR engagement plan.
- Liaison and maintaining good rapport with government, educational institutions & community-based organization & engaging them for CSR activities.
- Developing evaluation and monitoring indicators for implementation across locations & conducting review meetings at regular intervals.
- Establishing effective ways of measuring and articulating **ATGL** impact in social development through the various CSR programs.
- Disclosure of the impacts and other aspects of the project including emergency response plan for the community.
- Ensuring sharing of project benefits to the local community.
- Visit project sites on a regular basis, monitor program progress and resolve implementation obstacles to ensure the programs are being implemented in accordance with plans and agreements.

Legal Team

Broadly key functions of legal team at Corporate Office of **ATGL** are as follows:

- Managing compliance and statutory requirements and records applicable to **ATGL** businesses including necessary licenses and permits.
- Providing legal support to land, asset, contractual transactions.
- Ensuring legal compliance of contractors and vendors to established terms and conditions.
- Government sanction/approvals.
- Checking, proofing and validation of legal documentations.
- Addressing legal disputes and litigation.
- Maintenance of legal records.

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- Review contractor/ supply chain engagement with compliance of all legal requirement related to EHS&S and HR provisions.

SITE LEVEL

Site Manager/ EHS&S Officer

The Project Manager/ EHS&S Officer are responsible for overall management of the project and ESMP implementation. The following tasks will fall within his/her responsibilities:

- Monitor site activities on a daily basis for compliance.
- Conduct internal audits of the construction site against the ESMP.
- Confine the construction site to the demarcated area.
- Reporting EHS&S related issues & incidents in respective area to Head-Solar Vertical.


Project Manager

- Responsible for the overall implementation of the EHS&S plan.
- Shall establish EHS&S organization for the effective implementation of this plan.
- Shall provide all resources to effectively implement the EHS&S plan.
- Shall initiate disciplinary actions for any violations of the EHS&S plan.
- Shall ensure project EHS&S plan is integrated with customer requirements and ensure its compliance.
- Communicate all kinds of events to customer and regulatory agencies as appropriate.
- Shall act as the highest authority in taking any decisions related to EHS&S violations.

EHS&S Officer

The EHS&S Officer will have the following responsibilities:

- Ensuring availability of resources and appropriate institutional arrangements for implementation of ESMP.
- Role may be combined with Project Security Manager's role.
- Ensuring this plan requirement are communicated to all sub-contractors and their contractors, employees, customers and visitors.
- Sub-Contractor shall take conduct periodic inspections to ensure compliance with the requirements of this plan.
- Provide support to implement the procedures of this plan for the respective project site.
- Ensuring that Identification Badges and Helmet Badges is not issued to his Employees, Visitors, Sub-Contractors and their contractors without undergoing the orientation training.

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- Ensuring compliance with legislative, IFC's and other lender's requirements.
- Carrying out audits, and inspection of all the project activities at regular intervals and rectify non-compliances if any.
- Preparation of necessary documents and record keeping system.
- Reviewing and updating of ESMP for its effective implementation.
- Acting as a point of contact for residents and community members.
- The contractor should develop a code of conduct to guide the employees on how to behave with the community to avoid conflicts.
- Develop a Grievance Redressal Mechanism in lines with informing the local community about the Grievance Redressal Mechanism and ensuring effective implementation; and
- Conducting periodic meetings with local community for understanding their grievances and outcomes of the CSR activities; and
- Address training needs of contractors and other employees for social and community issues.


Sub-Contractors/ Labour Contractors

- The sub-contractor's / labour contractors working for **ATGL** is hereby responsible to comply with the guidelines of this plan.
- Sub-Contractor shall provide all resources to implement the requirements of this plan in their respective work area.
- Sub-Contractor is responsible to communicate the requirements of the plan to all their sub-contractors and their contractors, their employees and visitors.
- Sub-Contractor shall take disciplinary actions for any violations of this plan as required.
- Sub-Contractor shall not issue Identification Badges and Helmet Badges to his employees, his Sub-Contractors and their contractors without undergoing the orientation training on the plan.
- Sub-contractor shall ensure commitment and compliance for no child/forced labour involvement in the project.

Training and capacity building

Training is one common method of supplying individuals with additional skills and knowledge. In order to be successful in EHS&S management, training programs need to be thought out carefully and systematically. A robust social and environmental, health and safety training plan is important for effective implementation of ESMS.

The Corporate EHS&S head at **ATGL** along with recommendations from EHS&S officers will ensure that the job specific training and EHS&S induction training needs are identified based on the specific requirements of the ESMS and existing capacity of site and project personnel (including the Contractors

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and Sub-contractors) to undertake the required actions and monitoring activities. Some of the specific trainings that will be carried out on routine basis are as follows:

- ESMS Checklists and procedural guidance
- Occupational Health & Safety
- Fire Safety and Prevention
- Emergency Response Preparedness
- Operational Training
- HR Induction Training
- PPE Training
- Driver Safety
- Implementation of Environmental and Social Management/Action plans


The above listed trainings are the preliminary trainings which will be undertaken at the inception stage once the employee/worker joins the company and/or Project. Post that, monthly refresher trainings will be undertaken, especially for the workers. Other training will be identified and implemented during the project lifecycle as per the need assessment, as part of mitigation measure and also capacity building of the staffs.

An environmental and social management training program will be conducted to ensure effective implementation of the management and control measures during construction and operation of the project. The training program will ensure that all concerned members of the team understand the following aspects:

- Purpose of action plan for the project activities.
- Requirements of the specific Action Plans.
- Understanding of the sensitive environmental and social features within and surrounding the project areas.
- Aware of the potential risks from the project activities.

In case of contractors or turnkey contractors having sufficiently well-developed standards on EHS&S management, the training can be sub-let to the same for their respective employees and **ATGL** will monitor the completion and sufficiency status of these programs. In case of subcontractors, the training and capacity building will be done by the site level EHS&S's officers along with the contractor's EHS&S manager to ensure such trainings of the contracted staffs either directly or through trainers of **ATGL**. Subsequently the responsibility can be passed on to the sub-contractors for all future training programs.

It is further advised that **ATGL** shall consider engaging a third party EHS&S audit to monitor and evaluate the EHS compliance during the construction phase. The EHS&S officer shall be responsible for checking compliance of the contractor(s) with the requirements of this ESMP and any other relevant environmental

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legislation for all activities associated with the contract. The general duties of the EHS&S officer will be as follows:

- Third Party EHS&S Officer will be responsible for conducting of an EHS&S audit during the construction phase of the project according to the provisions of the Environmental Management Plan.
- Conduct independent environmental audits.
- Submit audit reports to the EHS&S Specialist/ Head EHS&S and if required, relevant authority.


9.4 CONTRACTORS MANAGEMENT PLAN

The overall responsibility of the project will be of **ATGL**. It shall thus ensure that the ESMP is implemented by its contracts through contractual arrangements. **ATGL** has developed a Vendor's Code of Conduct which requires that all service providers and their directors, employees, agents, suppliers, and subcontractors (collectively Service Providers' representatives) always conduct themselves with integrity and in full compliance with this Code of Conduct and applicable laws, rules and regulations that govern their business activities. All **ATGL** service providers will be required to educate and, when appropriate, train their representatives to ensure they understand and comply with this Code of Conduct. The code of conduct principles of **ATGL** are as follows:

- Corruption & Prohibited Business Practices
- Health and Safety
- Environment
- Labor Standards
- Acting in Concert
- Mirroring of Contractual Requirements towards sub-suppliers
- Human Rights

The EHS norms in the code of conduct covers the following elements:

- The service provider shall secure that its workers are provided with a healthy and safe working environment in accordance with recognized standards. The Service Provider shall do its utmost to control hazards and take necessary precautionary measures against accidents and occupational diseases. The Service Provider shall ensure compliance with the provisions of Building and other Construction Workers (Regulation of Employment & Conditions of Service) Act, 1976. Whenever necessary the workers are to be provided with, and instructed to use, appropriate personal protective equipment, and are adequately & regularly trained to ensure that they are adequately educated on health and safety issues.
- Compliance with labour laws and legislations i.e. the Contract Labour (Regulation and Abolition) Act, 1970, Employees State Insurance Company Act, 1948, Employees' Provident Funds and (Misc. Provisions) Act 1952, Payment of Bonus Act 1965, Payment of Gratuity Act, 1972, Equal

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Remuneration Act, 1976, Maternity Benefit Act, 1961, Labour Welfare Fund Laws, Minimum Wages Act, 1948, Payment of Wages Act, 1936, Shops and Establishment Act and Inter-State migrant workmen (Regulation of Employment) and (Conditions of service) Act, 1979.

- Non-engagement of child labour and bonded labour.
- Non-discrimination based on caste, creed, religion, or sex.
- Ensuring that women employees of Service Provider are given full protection from sexual harassment as per guidelines laid down by the Supreme Court of India.
- Ensuring adherence of EHS policies and procedures by Contract Agreement in order to secure that its own suppliers', sub-supplier's, business partners and other third parties directly or indirectly used by the Service Provider in the provisioning of services to accept and adhere to the EHS requirements.

General environmental awareness will be increased among the project's team to encourage the implementation of environmentally sound practices and compliance requirements of the project activities. The same level of awareness and commitment will be imparted to the contractors and sub-contractors prior to the commencement of the project through a EHS Management Plan prepared for Project and Contractors engaged for the project. It shall ensure compliance with meeting **ATGL's** Environmental Performance Guidelines for New Projects and Developments, minimizing the safety hazards through good engineering design through the implementation of the Group Integrity Management Standard, and achieving a record of 'zero' Lost Workday Case (LWDC) injuries and incidents on the Project. It comprises of the following aspects:

- Project Management Plan Deliverables Register
- Project Contractor Requirements
- Project Risk Management Plan
- Project Training Matrices
- Project Reward & Recognition Program
- Project Safe Work Practices
- Project Document Management Procedure
- Project Records Management Procedure
- Project Communications Table
- Project Audit Program
- Project Emergency Response Plan

ATGL shall ensure that the job specific training and EHS Induction Training needs are identified based on the specific requirements of ESMP and existing capacity of site and project personnel (including the

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Contractors and Sub-contractors) to undertake the required actions and monitoring activities. Special emphasis will be placed on traffic management and operation of Cranes.

An environmental and social management training program will be conducted to ensure effective implementation of the management and control measures during construction and operation of the project. The training program will ensure that all concerned members of the team understand the following aspects:

- Purpose of action plan for the project activities.
- Requirements of the specific action plans.
- Understanding of the sensitive environmental and social features within and surrounding the project areas; and
- Aware of the potential risks from the project activities.

A basic occupational training program and specialty courses should be provided, as needed, to ensure that workers are oriented to the specific hazards of individual work assignments. Training shall be provided to management, supervisors, workers, and occasional visitors to areas of risks and hazards. Workers with rescue and first-aid duties shall receive dedicated training so as not to inadvertently aggravate exposures and health hazards to themselves or their co-workers.

Through appropriate contract specifications and monitoring, the employer should ensure that service providers, as well as contracted and subcontracted labour, are trained adequately before assignments begin.

9.5 COMMUNITY/ STAKEHOLDERS ENGAGEMENT PLAN (SEP)

ATGL shall adhere to Stakeholder Engagement Plan (SEP) for engagement with community, government bodies during the lifecycle of the project and to assess the efficiency of the communication process in meeting the objectives of the SEP and ensuring the projects' 'social license to operate'.


Table 9-1: Stakeholder Group Categorization

| Stakeholder Groups | Primary Stakeholders | Secondary Stakeholders |
|----------------------------|--|--|
| Community | Sub-contractors, local labours | Local community, agricultural labour, vulnerable communities |
| Institutional Stakeholders | Gram Panchayat, Project Investors | Village Institutions, (schools, health centers etc.) |
| Government Bodies | Regulatory Authorities, District Administrations | - |
| Other Groups | - | Media, other industries, projects |

9.5.1 Aims and Objectives of SEP

The engagement plan is to guide all the stakeholders' engagement during construction phase and operations phase. The objectives of the SEP are:

- Enable management to develop effective stakeholder management strategies for various projects in order to build long term relationship so as to ensure smooth functioning of the projects.

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- To define and standardize the process that the project will use to communicate with respective stakeholders.
- To ensure regular and timely sharing of information with project team to spruce up their understanding and skills of engaging with the stakeholders.
- Ensuring coordination in approach and message to be shared with the community regarding the company and the projects.
- To assess the efficiency of the communication process in meeting the objectives of the SEP and ensuring the projects' 'social license to operate.'


The community engagement process is informally managed by the QHSE Head and is limited to liaison with local authorities and the panchayat. To ensure the implementation of the ESMP and engage all the stakeholders identified, this process will need to be formalized through the social officer defined as above.

The two important elements of community engagement will be disclosure and consultation. This implies that as a first step, the findings of the ESIA, especially the ESMP will have to be disclosed to the community. The ESMP should be finalized through consultation with the community and an action plan shall be developed. Further, the community should be regularly updated about the implementation of the ESMP and all other relevant information pertaining to the construction phase, activities, health, and safety risks etc. The community shall also be made aware of the available job opportunities from time to time.

The project will engage with the affected people to understand the stakeholders on the common property resources (roads, grazing areas etc.) which would be impacted. It shall work closely with the Panchayat and local administration to identify and develop alternate areas for common resources (fodder,) if required.

To understand community expectations and manage any local concerns, **ATGL** will constitute a Grievance Redressal Mechanism to be managed by the Social Officer. This grievance mechanism will respond to the concerns and grievances of local communities, NGOs, Panchayats and any other aggrieved party or stakeholder. The project will share information about these mechanisms to the stakeholders through locally appropriate communication tools.

The Grievance Redressal Procedure will also outline the process and steps to be taken and the time limit within which the issue would need to be resolved to the satisfaction of the complainant. The project will endeavor to get all complaints recorded and addressed in a uniform and consistent manner. For disputes that cannot be internally resolved, the project will set up an independent mechanism with representation from community, Panchayats, and locally respected citizens of the area to sort these conflicts. If it has a legal implication the district administration will be approached.

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9.6 ESMP REVIEW & AMENDMENT

ESMP is a social and environment management tool which shall be reviewed periodically (at least once in 2 years or earlier) to address changes in the project design, life cycle processes and activities, organization, and regulatory requirements.

9.6.1 Inspection, Monitoring & Audit

To implement the ESMP, the on-site team will develop a time-bound and action- oriented Environmental and Social Action Plan to implement the mitigation measures provided for each of the identified environmental and social impacts. This ESMP will have to be monitored on a regular basis, quarterly or half-yearly and all outcomes would need to be audited in accordance with existing EHS commitments.

The monitoring process will cover all stakeholders including contractors, labourers, suppliers, and the local community impacted by the project activities and associated facilities. Inspection and monitoring of the environmental and social impacts of construction and operation phase activities will increase the effectiveness of suggested mitigations. Through the process of inspection, audit, and monitoring, the company will ensure that all the contractors comply with the requirements of conditions for all applicable permits including suggested action plans. The inspections and audits will be done by **ATGL**'s trained team and external agencies/experts. The entire process of inspections and audits will be documented. The inspection and audit findings will be implemented by the contractors in their respective areas.

9.6.2 Reporting and Review

ATGL will develop and implement a program of reporting through all stages of the project viz., construction and commissioning, operation, and decommissioning. Contractors will be required to fully comply with the reporting requirements in terms of timely report submission with acceptable level of details. Reporting will be done in form of environmental, health, safety and social check list, incident record register, environmental, health, safety, and social performance reports (weekly, monthly, quarterly, half yearly, yearly etc.).


9.6.3 External Reporting and Communication

All complaints and enquiries are to be appropriately dealt with, and records be maintained in a Complaint/Enquiry Register by QHSE Head or other delegated staff.

9.6.4 Internal Reporting and Communication

Inspection and audit observations along with their improvement program are to be regularly reported to the senior management for their consideration. The same are also to be communicated within the staff working on the project. To maintain open communication between the staff and management on EHS&S issues the following shall be used:

- Team Briefings,
- On-site work group meetings.
- Key Incidents/accidents and lessons learnt.

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- Work Specific Instructions; and
- Meeting with stakeholders.

9.7 DOCUMENT & RECORD KEEPING

Documentation and record keeping system must be established to ensure updating and recording of requirements specified in ESMP. Responsibilities must be assigned to relevant personnel for ensuring that the ESMP documentation system is maintained, and that document control is ensured through access by and distribution to identified personnel in form of the following:

- Documented Environment management system.
- Legal Register.
- Operation control procedures.
- Work instructions.
- Incident reports.
- Emergency preparedness and response procedures.
- Training records.
- Monitoring reports.
- Auditing reports; and
- Complaints register and issues attended/closed.

The following table provides a sample summary of engagements which are required in a typical project lifecycle. It indicates the methodology on how these stakeholder consultations are accomplished.




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Table 9-2: Methods of Consultations and Engagement

| Stakeholder | Stakeholder Category | Objective of Engagement | Stakeholder Influence | Methods of Consultation and Engagement | Frequency of Consultations and Engagement |
|---|----------------------|---|-----------------------|--|---|
| Sub-contractors/ Labours/Employees | Primary Stakeholder | To appraise about labour working condition and EHS compliance | Medium | Periodic Meetings (for the purpose of information dissemination, including information regarding labour laws, safety measures and discussions of grievances) as per the working duration, Information dissemination regarding welfare provisions for Labourers Information dissemination regarding welfare provisions for Labourers, employment opportunities, grievances, EHS and CSR activities through notice board and display of key messages on billboard. | Meetings and periodic reporting in the operation phase |
| Gram Panchayats And Village institutions | Primary Stakeholder | For necessary information disclosure of SEP. As Part of GRM Ensured involvement in CSR activities and local procurement if required | High | Consultations, meetings (FGD and individual interview) and Discussions; Sharing of documents, if required, as part of the disclosure mechanism; Meetings as a part of the Grievance Redressal mechanism, if required; Attendance at Panchayat meetings and participation in CSR activities and agreements with communities documented in minutes of meetings | <ul style="list-style-type: none"> As and when required; and As per the regulatory requirements |
| Regulatory Authorities | Primary Stakeholder | | High | Meetings and Discussions | <ul style="list-style-type: none"> As per the regulatory requirements As and when required |
| District Administration (Tehsildar, SDO, Patwari) | Primary Stakeholder | Regular engagement Participation in CSR Activities | High | Regular meetings and participation in CSR events | <ul style="list-style-type: none"> Regular Meetings; or Monthly or as & when required |

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| Stakeholder | Stakeholder Category | Objective of Engagement | Stakeholder Influence | Methods of Consultation and Engagement | Frequency of Consultations and Engagement |
|-------------|----------------------|--|-----------------------|--|---|
| Landowner | Primary Stakeholder | Discussion on land purchase modalities. | Very Low | Discussion during various festivals and other relevant occasions. | • As and when required. |
| Community | Primary Stakeholder | Managing and ensuring participation in CSR activities. As part of GRM. | Low | <ul style="list-style-type: none"> • Open Meetings, • Interactions with community at Gram Panchayat, • Discussion on CSR programs | • As and when required |

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9.8 GRIVANCE REDRESSAL MECHANISM (GRM)

ATGL has a well-defined Grievance Redressal Mechanism (GRM) procedure. This GRM serves as one of the components of **ATGL**'s Environmental and Social Management for managing overall performance of its projects as well as providing more accountability to its stakeholders. The GRM which caters to both internal and external grievances is based on four (4) guiding principles of the company which include:

- Transparency
- Fairness
- Respect
- Accountability

9.8.1 Internal Grievances

Employee Grievance: These include the employees hired specifically for the site.

9.8.2 External Grievances

Contractor and labour related grievances (directly /indirectly controlled by **ATGL**). Community grievances including those on land and resettlement issues, project activities, CSR intervention, employee/worker-community conflicts, and other project related issues (Directly/Indirectly controlled by **ATGL**).


This grievance mechanism shall respond to the concerns and grievances of local communities, NGOs, Panchayats and any other aggrieved party or stakeholder. The project shall share information about these mechanisms to the stakeholders through locally appropriate communication tools.

In case, the contractors have their own GRM, **ATGL** should ensure that it is functioning effectively and even review the grievance records. However, if the contractors lack GRM in the first place, **ATGL** should ensure that the workers are linked to their GRM process.

The project shall endeavor to get all complaints recorded and addressed in a uniform and consistent manner. For disputes that cannot be internally resolved, the project shall set up an independent mechanism with representation from community, panchayats, and locally respected citizens of the area to sort these conflicts. If it has a legal implication the district administration shall be approached.

ATGL has developed procedures for handling grievances, reviewing, and investigating grievances, grievance closure, monitoring, and review procedures.

A grievance body, leaded by designated Grievance officer is proposed for effective implementation of GRM and coordinating day to day functions. The grievance body would be reporting back to the appropriate authority including functional areas such as HR, Project, O&M, BD/Land, CSR, EHS etc. as per requirement. The mandate of this cell would be managed as part of the ESG forum. **ATGL** should ensure appropriate budget allocation in coordination with **ATGL** to deal with grievance tracking and handling with consent of appropriate authority. Awareness shall be provided in the company's policy and practices for both employee and appropriate stakeholder grievance mechanisms, relevant to their exposure and responsibilities

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9.9 CORPORATE SOCIAL RESPONSIBILITY (CSR) POLICY

ATGL will focus on the following areas for CSR projects from amongst the activities specified under Schedule VII of the Companies Act, 2013 and the Rules made thereunder including but not limited to Education, Empowerment, Environment and Health:

- Promoting gender equality & empowering women
- Employment enhancing vocational skills and livelihood enhancement programs
- Rural Infrastructure Development Projects

CSR committee may recommend to the Board of Directors additional CSR initiatives, based on specific merit, provided that these projects fall under the scope of schedule VII of the Companies Act, 2013, as may be amended from time to time.

As part of its devising and planning for CSR activities and programs, prior to the commencement of projects, **ATGL** carry out impact assessment studies or need based assessment studies within the proposed project footprint area in order to understand the basic needs, problems and requirements where interventions/intervention activities can be implemented in.

The study encompasses various parameters such as-health indicators, access to infrastructure, vulnerability, literacy levels, workforce participation, employment opportunities, sustainable livelihood options, and demographic profile including population data –below the poverty line and above the poverty line, state of infrastructure. From the data generated, project specific CSR plans are developed for implementation. CSR programs and activities can also be reactive in nature where the need and requirement for the same may arise even outside the purview of the impact assessment or the need-based assessment or may be entirely disassociated from any project implementation. Proper budgeting and scheduling are carried out for the programs.

ATGL will seek to identify suitable projects/programs for implementation in line with the CSR policy of the Company.


By and large, it may be endeavored to execute most of the CSR programs/ activities forming part of defined scope in and around the areas adjoining projects.

The medium of implementation of CSR programs would be directly by the CSR department or company's own foundation or collaboration/ tie-ups with Trust/ Society/ Section 8 Company/ NGOs as per the decision taken by the CSR committee.

Monitoring And Reporting

The CSR department will be responsible for regular monitoring & reporting of the CSR programs and provide regular progress report to the CSR Committee of the Board. This report would indicate:

- Achievement of the year-to-date in terms of coverage compared to the target, reason for variance, plans to overcome shortfalls if any and support required from the CSR Committee/Board to overcome the shortfalls.

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- Actual year-to-date spends compared to the budget and reasons for variance.
- In respect of activities undertaken through outside Trust/Society/NGO's/Government recognized funds, etc. there will be mechanism of reporting of progress on each such activities and the amount incurred thereon at the subsequent CSR Committee Meeting.
- The Board shall seek a progress report from the CSR Committee at least twice in a year.

9.10 LABOUR MANAGEMENT PLAN


The construction of the project has not yet started, and locals have been proposed to be hired for the project during construction phase. However, in case of hiring migrant labour, **ATGL** needs to adhere to implementation of *Labour Camp Management Plan Guidelines* as provided under “*Worker’s Accommodation Processes and Standards: A Guidance Note by IFC and EBRD⁵*” and ensure that the worker’s accommodation should be at clean, safe place and, at the minimum, should meet the basic requirements of workers. In particular, the provision of accommodation should meet national legislations and international good practices in relation, but not restricted, to the following:

- Practice for charging for accommodation.
- Provision of minimum amounts of space for each worker.
- Provision of sanitary, laundry and cooking facilities and potable water.
- Location of accommodation in relation to the workplace.
- Any health, fire safety or other hazards or disturbances and local facilities.
- Provision of first aid and medical facilities; and heating and ventilation.
- Workers’ freedom of movement to and from the employer-provided accommodation should not be unduly restricted.

9.10.1 Drinking Water Resources and Monitoring Water Quality

- Access to adequate & convenient supply of free potable water should be always available to workers.
- Depending on climate, weather conditions and accommodation standards, 80 to 180 liters per person per day are available.
- Drinking water should meet national/local or WHO drinking water standards.
- All tanks used for the storage of drinking water should be constructed and covered as to prevent water stored therein from becoming polluted or contaminated.
- Drinking water quality should be regularly monitored.

⁵ https://www.ifc.org/wps/wcm/connect/60593977-91c6-4140-84d3-737d0e203475/workers_accommodation.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-60593977-91c6-4140-84d3-737d0e203475-jqetNih


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9.10.2 Wastewater and Solid Waste

- Arrangements for discharge of wastewater, sewage, and disposal of food, kitchen waste and any other waste materials should be made without causing any impact on biophysical environment or surrounding communities.
- Specific containers for rubbish collection should be provided and emptied on a regular basis.
- Adequate number of rubbish containers to providing leak proof, non-absorbent, rust and corrosion-resistant containers protected from insects and rodents needs to be provided.
- The garbage/rubbish containers should be 30 meters from each shelter on a wooden, metal, or concrete stand. Such containers must be emptied at regular intervals (to be determined based on temperatures and volumes generated) to avoid unpleasant odors associated with decaying organic materials.
- Pest extermination, vector control and disinfection should be carried out throughout the living facilities in compliance with local requirements and/or good practice. Where warranted, pest and vector monitoring should be performed on a regular basis.

9.10.3 Labour Camp Room/ Dormitory Facilities

- Rooms/dormitories should be kept in good condition.
- Rooms/dormitories should be aired and cleaned at regular intervals.
- Rooms/dormitories are built with easily cleanable flooring material.
- Sanitary facilities should be located within the same buildings and provided separately for men and women. Usual standards range from 10 to 12.5 cubic meters (volume) or 4 to 5.5 square meters (surface).
- A minimum ceiling height of 2.10 meters is provided.
- In collective rooms, which are minimized, in order to provide workers with some privacy, only a reasonable number of workers are allowed to share the same room. Standards range from 2 to 8 workers.
- All doors and windows should be lockable and provided with mosquito screens where conditions warrant.
- There should be mobile partitions or curtains to ensure privacy.
- Every resident should be provided with adequate furniture such as a table, a chair, a mirror, and a bedside light.
- Separate sleeping areas should be provided for men and women, except in family accommodation.

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9.10.4 Bed Arrangements and Storage Facilities


- A separate bed for each worker should be provided. The practice of “hot bedding” should be avoided.
- There should be a minimum space between beds of 1 meter.
- Double deck bunks are not advisable for fire safety and hygiene reasons, and their use is minimized. Where they are used, there must be enough clear space between the lower and upper bunk of the bed. Standards range from 0.7 to 1.10 meters.
- Each worker should be provided with a comfortable mattress, pillow, cover, and clean bedding.
- Bed linen should be washed frequently and applied with repellents and disinfectants where conditions warrant (malaria).
- Facilities for the storage of personal belongings for workers should be provided.
- Separate storage for work boots and other personal protection equipment needs to be provided.

9.10.5 Sanitary and Toilet Facilities

- Sanitary and toilet facilities should be constructed of materials that are easily cleanable.
- Sanitary and toilet facilities should be cleaned frequently and kept in working condition.
- Sanitary and toilet facilities should be designed to provide workers with adequate privacy, including ceiling to floor partitions and lockable doors.
- Sanitary and toilet facilities should not be shared between men and women, except in family accommodation.
- An adequate number of toilets should be provided to workers. Standards range from 1 unit to 15 persons to 1 unit per 6 persons. For urinals, usual standards are 1 unit to 15 persons.
- Toilet facilities should be conveniently located and easily accessible. Standards range from 30 to 60 meters from rooms/dormitories. Toilet rooms shall be located so as to be accessible without any individual passing through any sleeping room. In addition, all toilet rooms should be well-lit, have good ventilation or external windows, have sufficient hand wash basins, and be conveniently located.

9.10.6 Showers/Bathrooms and Other Sanitary Facilities

- Shower/bathroom flooring should be made of anti-slip hard washable materials.
- An adequate number of handwash facilities should be provided to workers. Standards range from 1 unit to each 15 persons to 1 unit per 6 workers. Handwash facilities should consist of a tap and a basin, soap, and hygienic means of drying hands.

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- An adequate number of shower/bathroom facilities need to be provided to workers. Standards range from 1 unit to 15 persons to 1 unit per 6 persons.
- Showers/bathrooms should be conveniently located.
- Shower/bathroom facilities should be provided with an adequate supply of cold and hot running water.

9.10.7 Cooking Facilities

- Places for food preparation should permit good food hygiene practices, including protection against contamination between and during food preparation.
- Kitchens should be provided with facilities to maintain adequate personal hygiene including sufficient washbasins designated for cleaning hands with clean, running water and materials for hygienic drying.
- Wall surfaces adjacent to cooking areas should be made of fire-resistant materials. Food preparation tables are also equipped with a smooth durable washable surface. Further, to enable easy cleaning, it is good practice that stoves are not sealed against a wall, benches and fixtures are not built into the floor, and all cupboards and other fixtures and all walls and ceilings have a smooth durable washable surface.
- All kitchen floors, ceiling and wall surfaces adjacent to, or above food preparation and cooking areas are built using durable, non-absorbent, easily cleanable, non-toxic materials.
- Wall surfaces adjacent to cooking areas should be made of fire-resistant materials. Food preparation tables are equipped with a smooth, durable, easily cleanable, non-corrosive surface made of non-toxic materials. Further, to enable easy cleaning, it is good practice that stoves are not sealed against a wall, benches and fixtures are not built into the floor, and all cupboards and other fixtures have a smooth, durable, and washable surface.
- Adequate facilities for cleaning, disinfecting and storage of cooking utensils and equipment should be provided.
- Food waste and other refuse are to be adequately deposited in sealable containers and removed from the kitchen frequently to avoid accumulation.

9.10.8 Medical Facilities

- A number of first aid kits adequate to the number of residents should be available.
- First aid kits should be adequately stocked.
- An adequate number of staff/workers (1 first aider for every 50 persons) should be trained to provide first aid.
- Where possible and depending on the medical infrastructures existing in the community, other medical facilities should be provided (nurse rooms, dental care, minor surgery).


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9.10.9 Leisure, And Social Facilities

- Basic collective social/rest spaces should be provided to workers. Standards range from providing workers multipurpose halls to providing designated areas for radio, TV, cinema.
- Recreational facilities should be provided for the workers.

9.10.10 Security of Workers' Accommodation

- A security plan including clear measures to protect workers against theft and attack should be implemented.
- Security staff should be checked to ensure that they have not been implicated in any previous crimes or abuses. Where appropriate, security staff from both genders should be recruited.
- Security staff should have a clear mandate and have received clear instruction about their duties and responsibilities, in particular their duties not to harass, intimidate, discipline, or discriminate against workers.
- Security staff should have received adequate training in dealing with domestic violence and the use of force.
- Security staff should have a good understanding about the importance of respecting workers' rights and the rights of the communities.
- Workers and the locals residing in nearby areas in villages should have specific means to raise concerns about security arrangement and staff.
- **ATGL** should also adhere to Standard Operating Procedure for Work Resumption after Lockdown prepared by **ATGL** and ensure compliance with respect to following measures:
- Maintaining Social Distancing in Labour Accommodation (2 meter)
- Soap solutions / hand sanitizers to be placed in all quarters / washroom's places wherever required and replenished periodically.
- Ensuring that all doors / windows/fittings are sanitized frequently.
- Special attention to be given for the washrooms / toilets by periodical cleaning, Swabbing, disinfecting, and maintaining dry.
- Emergency Facilities to be available for 24 X 7 and displayed emergency key contacts.
- Soap solutions / hand sanitizers to be placed in all quarters / washroom's places wherever required and replenished periodically.
- To ensure that all the workers who are coming for work are healthy and not having any symptoms of COVID-19 (Fever, Dry cough, breathing problem).
- Arrangements to be made to supply all essential items like rice, wheat, groceries, water, etc. to colony itself so as to restrict movements of Labourers.


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- Appropriate masks to be distributed to all Labourers.
- All labour engaged at site shall be advised to wear mask always while at colony, movement outside and during duty timings.
- Always ensuring availability of the following
 1. Sanitizer
 2. Face mask
 3. Hand gloves
 4. Hand Wash
 5. Dettol
 6. Soap
 7. Thermometer
 8. BP checking machine
 9. First Aid Box
- Tie up with nearest Hospital/COVID-19 Rescue Team shall be made for getting medically examination of all people for any Covid-19 symptoms.
- Quarantine hall or room shall be established in labour colony for the said purpose.
- Contractor shall display precautions measures - dos and don'ts at colony premises in all languages spoken by the workers.
- Vehicle shall be kept ready or tip up for vehicle shall be made for emergency purpose.
- Minimum social distancing shall be ensured in keeping occupants in a single room.
- Disinfecting spray done at all the areas of colony after workers are left for work daily.
- A team comprising **ATGL** Admin, **ATGL** HSE and Contractor site in charge shall visit labour colony daily to ensure availability of essential things and regarding no off occupants, cleanliness, sanitization status, etc. and submit a report to Construction Manager and Project Manager.
- Feedback in written form or through personal interaction regarding labour colony requirements shall be obtained from contract labours on weekly basis.

9.11 WASTE MANAGEMENT PLAN

The proposed project should handle all incoming waste materials, all waste generated on site and both the disposal, and potential recycling of such materials. The exact quantities need to be detailed once agreed packaging and quantities of incoming material is identified. The project waste is primarily related to civil works, and packaging of incoming materials. The following principles are put in place to reduce the amount of waste generated:

- Packaging will be optimized to reduce non-recyclable content.
- Orders of cables and other consumables will be kept to a minimum.

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- The amount of earth works is kept to a minimum, including optimized road works to reduce required import of material to site.

Registered vendors are appointed by **ATGL** for collection of waste generated from their natural gas pipeline projects.

9.12 DISASTER MANAGEMENT PLAN

The district of Niwari is prone to natural and man-made disasters. The study area falls in Low Damage Risk Zone II (MSK VI or less) in accordance with the Earthquake Hazard map of India, Vulnerability Atlas of, 3rd edition, 2019 prepared by BMTPC. Niwari Taluka has no recorded history of flooding, and the entire district falls within a low-damage risk zone.

During the construction of the site the site will at times consist of loose and/or un-compacted soil and removed or destroyed vegetative cover. During this phase temporary drainage system will have to be installed. This will consist of landforms, both trenches, and deep pits to collect and dissipate water. The temporary drainage will either be converted into permanent drainage with masonry (where co-located) or closed off after completion of the planned system.

9.13 TRAFFIC MANAGEMENT PLAN

9.13.1 Introduction

The Traffic Management Plan (TMP) is designed to ensure the safe and efficient movement of vehicle and pedestrian traffic through and around construction zones. It also aims to safeguard workers and minimize disruptions to the public. This plan outlines the procedures, safety measures, and control devices to be implemented during road construction activities.

This TMP has been developed based on the preliminary site survey conducted during the Environmental and Social Impact Assessment (ESIA) phase. As such, it reflects the anticipated traffic conditions and construction impacts identified at that stage. However, recognizing that actual site conditions may vary during implementation, the TMP will be reviewed and updated by the contractor during the construction phase to ensure it remains responsive to real-time requirements and evolving site-specific challenges.


9.13.2 Objectives

The primary objectives of the TMP are:

- To ensure the safety of road users and construction workers.
- To maintain efficient traffic flow during construction.
- To provide clear and timely information to road users.
- To minimize environmental and social impacts due to traffic disruptions.

9.13.3 Key Principles

- **Warning Sign:** Inform road users well in advance of any changes or hazards.

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- **Safe Guidance:** Provide clearly marked and safe lanes for traffic.
- **Work Zone Protection:** Establish buffer zones and barriers to protect workers.
- **Driver Behavior Control:** Use signage and devices to influence safe driving behavior.

9.13.4 Planning Considerations

Traffic control plans will be tailored to specific site conditions, considering:

- **Traffic Volume:** Peak and non-peak hour densities.
- **Lane Requirements:** Width and number of lanes needed for construction.
- **Junction Complexity:** Number and type of intersections.
- **Pedestrian Infrastructure:** Availability and condition of footpaths.
- **Speed Limits:** Regulatory and advisory limits in the area.
- **Lane Geometry:** Changes in lane width or alignment.


9.13.5 Construction Zone Layout

Construction Zone is an integral part of any road construction system. The safety practices in construction will, therefore, be oriented towards reducing conditions, which lead to such hazards and consequent stress whereby the risk of accident increases.

Safety measures will be aimed at avoiding hazardous conditions, especially in work sub-zones where major construction activities are going on.

The construction zone is divided into four sub-zones:

- i. **Advance Warning Sub-zone**
 - **Purpose:** Alert drivers to upcoming construction. The warning system should educate the driver well in advance by providing information regarding distance, extent and type of hazard ahead so that he can gradually reduce the speed of his vehicle.
 - **Features:** Warning signs placed ~60m before the work zone.
 - **Devices:** Retro-reflective signage, flashing beacons.
- ii. **Transition Sub-zone**
 - **Purpose:** Guide traffic into the diversion path. This is the most crucial sub-zone from safety point of view since most of the movements are turning movements.
 - **Features:** Begins ~30m before the work zone.
 - **Devices:** Barricades, channelizers, directional signs.
- iii. **Work Sub-zone**
 - **Purpose:** Area of active construction, and therefore the safety of the Project workers / pedestrians / members of the road are the major concern at site from the plying traffic.

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- **Features:** The path of the traffic must be clearly delineated to prevent vehicle intrusion.
- **Devices:** Cones, barriers, safety signage, flagmen.

iv. Terminal Sub-zone

- **Purpose:** Indicate the end of the construction zone.
- **Features:** “End of Work Zone” signage.
- **Devices:** Informational signs, speed normalization signs.

Other Aspects: Following sections are from guidelines for Safety Construction, Indian Road Congress, IRC: SP: 55: 2001.

The pictorial representation of the sub-zones is depicted in **Figure 9-1** and the recommended length of traffic control zones are shown in the **Table 9-3**.

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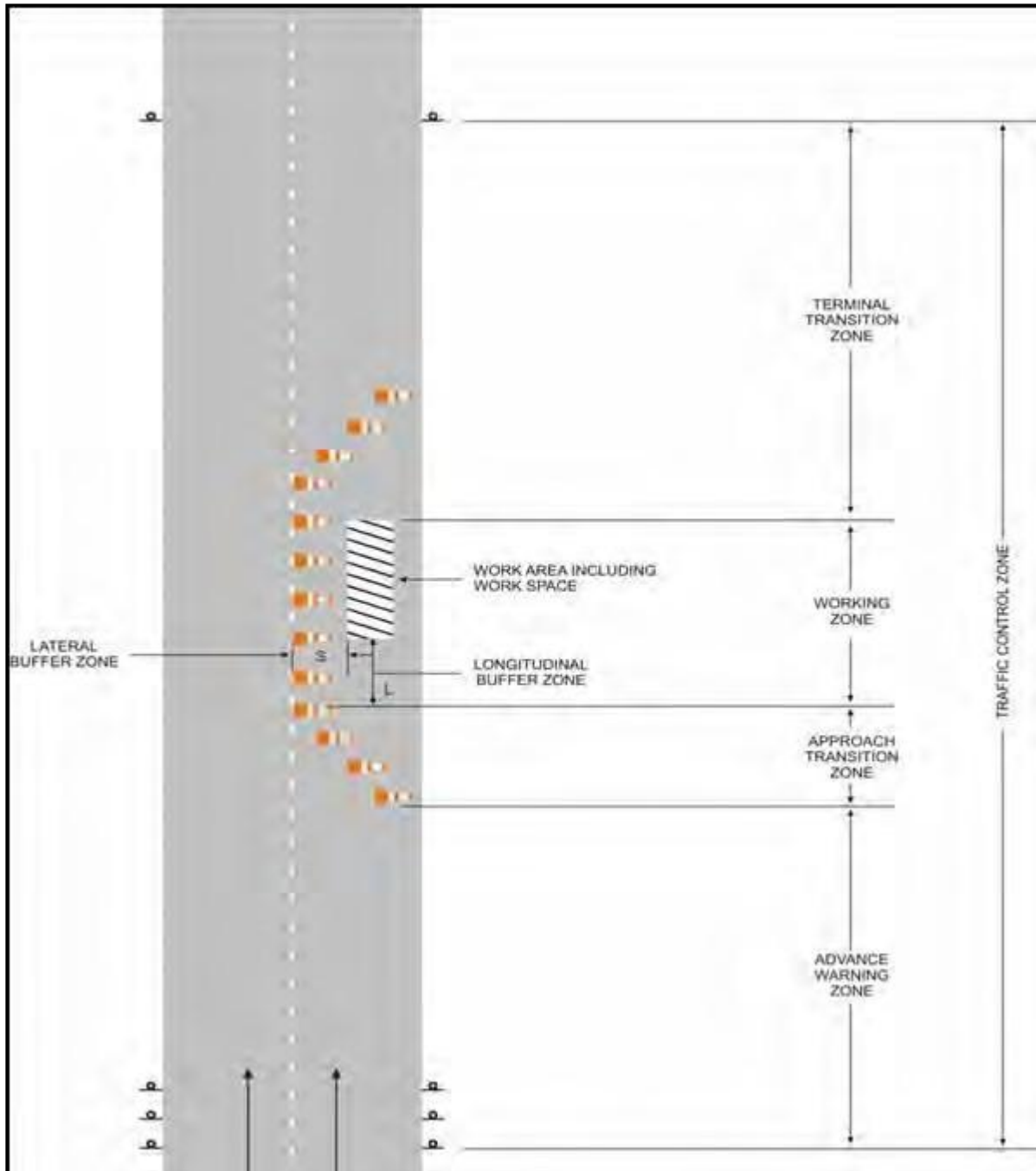


Figure 9-1: Recommended length for Construction Zones as per IRC: SP:55-2001


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Table 9-3: Recommended Lengths of Traffic Control Zones

| Average Approach Speed (Km/h) | Length of advance warning Zone (M) | Length Approach Transition Zone(M) | Length of working Zone(M) |
|-------------------------------|------------------------------------|------------------------------------|---------------------------|
| 50 or less | 100 | 50 | Varies |
| 51-80 | 100-300 | 50-100 | |
| 81-100 | 300-500 | 100-200 | |
| Over 100 | 1000 | 200-300 | |

9.13.6 Traffic Control Devices

Traffic control devices are essential components of a safe and effective traffic management system within construction zones. These devices serve the critical functions of warning, informing, guiding, and protecting both road users and construction personnel. Their proper deployment ensures smooth vehicular movement, minimizes confusion, and significantly reduces the risk of accidents.

This section is prepared in accordance with the Indian Roads Congress (IRC) Guidelines for Safety in Construction Zones (IRC: SP: 55-2001) and other relevant standards.

9.13.6.1 Purpose and Function

Traffic control devices are strategically installed across all sub-zones of the construction area to:

- Alert drivers to upcoming changes in road conditions.
- Provide clear guidance on lane usage and diversions.
- Protect workers and pedestrians from vehicular intrusion.
- Ensure safe passage for vehicles through or around the work zone.

These devices must be:

- Easily understandable and unambiguous.
- Clearly visible during both day and night.
- Stable under adverse weather conditions.
- Easy to install, maintain, and remove.


As per Specification 112.4, the use of barricades, signs, markings, flags, lights, and flagmen is mandatory for the safety and information of traffic approaching or passing through construction or maintenance zones.

9.13.6.2 Types of Traffic Control Devices

1. Regulatory Signs

These signs impose legal restrictions and must be installed in consultation with local traffic authorities. Common regulatory signs used in construction zones include:

- Do Not Enter

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- Road Closed
- Give Way to Pedestrians
- Speed Limit

2. Warning Signs

Warning signs alert drivers to potential hazards ahead. Typical examples include:

- Lane Closed
- Diversion to Other Carriageway
- Divided Carriageway Starts/Ends
- Two-Way Traffic

These signs may be supplemented with rectangular definition plates placed 0.15 m below the warning triangle for added clarity.

3. Directional (Guide) Signs

Guide signs provide navigational information and differ in appearance from standard informatory signs. As per IRC: 67-1977, construction zone guide signs should have: Black text and arrows on a Traffic Yellow (IS: 5-1978) background.

Common examples include:

- Diversion
- Road Ahead Closed
- Sharp Deviation of Route

4. Delineators and Channelizing Devices

Delineators help guide traffic safely through the construction zone. As per IRC: 79-1981, these include:


Traffic Cones: Typically, 0.5–0.75 m high and 0.3–0.4 m in diameter, made of plastic or rubber with red and white retro-reflective bands. Cones should be anchored securely and spaced 3–9 m apart, depending on speed and visibility requirements.

Traffic Cylinders and Tapes: Used for lane separation and guidance.

Drums: Metal or plastic drums (0.8–1 m high, 0.3 m diameter) painted with alternating black and white circumferential stripes. Metal drums offer high visibility and psychological deterrence, while plastic drums are lightweight and easier to handle.

5. Barricades

In urban construction zones, barricades are used to restrict unauthorized access and protect traffic from hazards such as excavated areas. These are typically constructed using MS frames and reinforced with horizontal bamboo or wooden posts to maintain continuity. Openings are provided only at designated

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access points such as shop entrances or residential driveways.

6. Flagmen

Flagmen play a vital role in ensuring on-site safety. Their responsibilities include:

- Controlling vehicle speed and movement near active work areas.
- Providing visual signals to drivers.
- Assisting in the safe movement of construction equipment such as cranes and excavators.

Flagmen must be properly trained, clearly visible to drivers, and equipped with appropriate signalling tools.

7. Vehicle Parking

A designated parking area will be developed to accommodate all work-related vehicles. This area will be:

- Firm and leveled to prevent vehicle instability.
- Free from obstructions to allow safe maneuvering.
- Clearly marked and labeled for easy identification.
- Located away from pedestrian pathways to avoid conflicts.
- Equipped with safety protocols requiring all raised parts of equipment (e.g., booms, backhoe buckets) to be fully lowered to the ground when parked.

Safe Parking Protocols

To ensure safety during vehicle parking, the following measures will be strictly enforced:


- The vehicle engine must be turned off.
- Keys must be removed from the ignition.
- Hand brakes must be applied.
- Wheel chocks must be used when parking on slopes.

8. Material Transportation

All construction materials will be transported to the site using suitable trucks or other appropriate vehicles. The following precautions will be taken:

- Materials will be securely fastened to prevent shifting or falling during transit.
- Wooden blocks or padding will be used between the load and vehicle body to ensure stability and minimize damage.
- Unloading and storage of materials will be done in a manner that does not obstruct traffic or cause congestion.

9. Speed Control

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To maintain safety within the construction site:

- The maximum vehicle speed limit will be restricted to 20 km/h, except for emergency vehicles during critical situations.
- Speed limit signs will be prominently displayed at strategic locations across the site.
- In areas with high pedestrian activity, reduced speed limits will be enforced and clearly indicated.

Speed Limit Violations

Violations of the prescribed speed limits will be treated with strict disciplinary action, including:

- Temporary suspension of the vehicle operator.
- Permanent removal from the site in cases of repeated or severe violations.

10. Personnel Safety

To ensure the safety of all personnel working near or on the roadway:

- All workers will always wear high-visibility reflective jackets.
- Additional personal protective equipment (PPE) such as helmets, safety shoes, and protective goggles will be mandatory based on the nature of the task.
- Site engineers and supervisors will be responsible for monitoring compliance and enforcing the use of PPE.

11. Signage and Visual Aids


The following standard traffic signs will be used throughout the construction site to guide and inform both workers and road users:

- Regulatory Signs: Stop, Entry Prohibited, Parking Prohibited, Speed Limit, Heavy Vehicle Prohibition.
- Warning Signs: Go Slow, Men at Work, Pedestrian Prohibited.
- Informational Signs: Parking Area, Pedestrian Only, Diversion.

All signs will be:

- Retro-reflective for night visibility.
- Mounted at appropriate heights and locations.
- Maintained regularly to ensure legibility and effectiveness.

For Sensitive Receptors no honking board should be provided with the minimal construction activity during the day time.

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| | | |
|---|---|--|
|  |  |  |
| Stop Sign | Entry Prohibited | Parking Prohibited |
|  |  |  |
| Pedestrian Prohibited | Speed Limit | Heavy Vehicle Prohibition |
|  |  |  |
| Go Slow | Parking Area | Pedestrian Only |
|  |  |  |
| Diversion | Diversion | Men at Work |

Figure 9-2: Traffic Regulatory Signs

9.13.7 Traffic Diversion Planning

During the construction phase, traffic diversions will be implemented based on actual site conditions to ensure minimal disruption and maximum safety for road users and workers. The diversion routes will be designed in accordance with the Indian Roads Congress (IRC) guidelines and will be finalized in coordination with local traffic authorities.

A detailed Traffic Diversion Plan will be prepared for each affected road segment, considering factors such as pipe diameter, road width, junction complexity, and availability of alternative routes. The plan will be updated dynamically as construction progresses as depicted in the **Table 9-4**.

In addition, visual diagrams (the



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Figure 9-3, Figure 9-4 and Figure 9-5) will be provided to illustrate :

- Traffic management during survey activities.
- Traffic control during active work zone operations.
- Diversion plans during full or partial road closures.

Table 9-4: Proposed Details of Traffic Diversion Plan

| S. No. | Road/Location | Dia of Pipe | Chainage | Total Length | Road Blockage | Alternative Route | Available Road Width | Type of Road |
|--------|---------------|-------------|----------|--------------|---------------|-------------------|----------------------|--------------|
| 1. | | | | | | | | |
| 2. | | | | | | | | |
| 3. | | | | | | | | |
| 4. | | | | | | | | |
| 5. | | | | | | | | |
| 6. | | | | | | | | |

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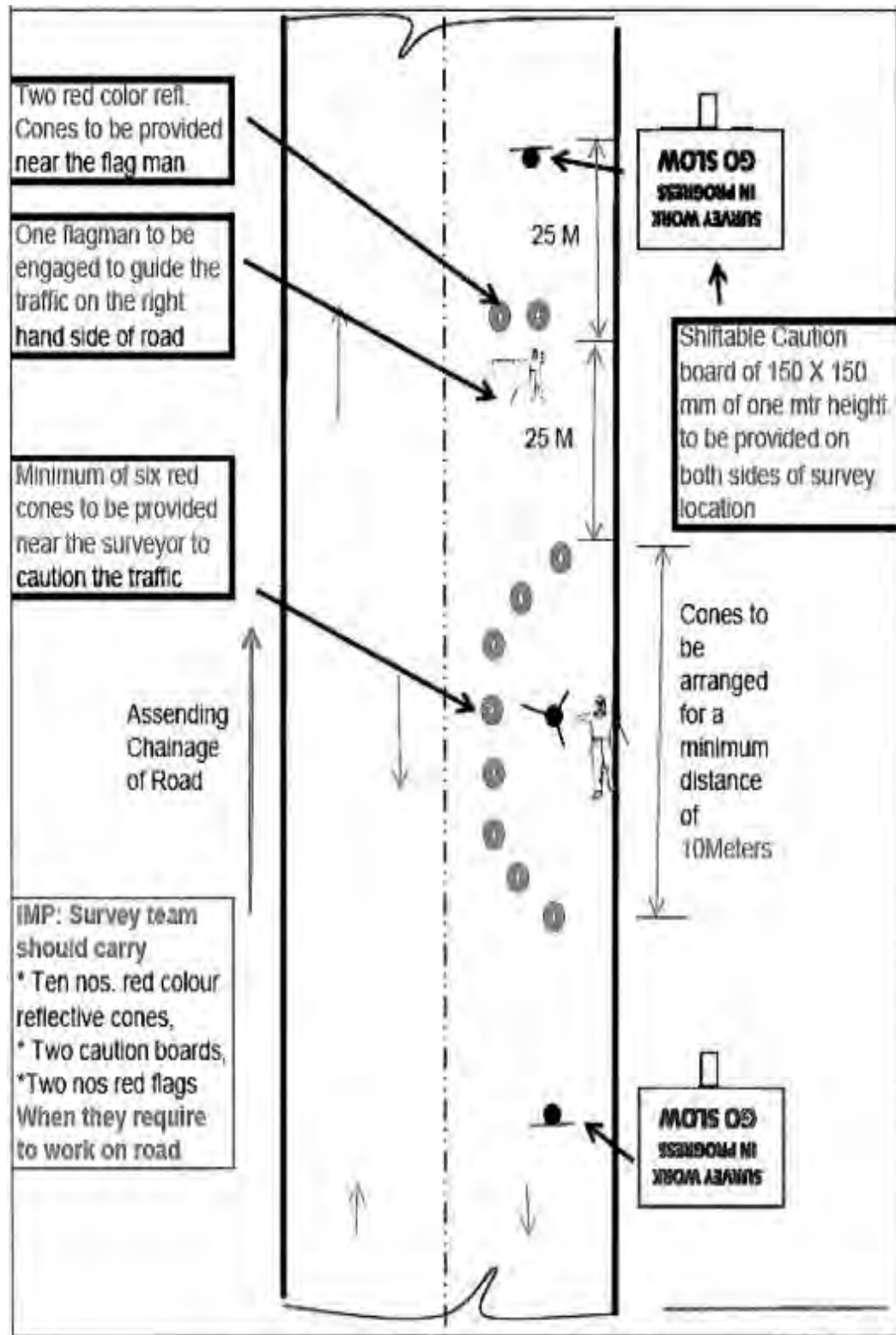


Figure 9-3: Traffic Management Plan for doing Survey

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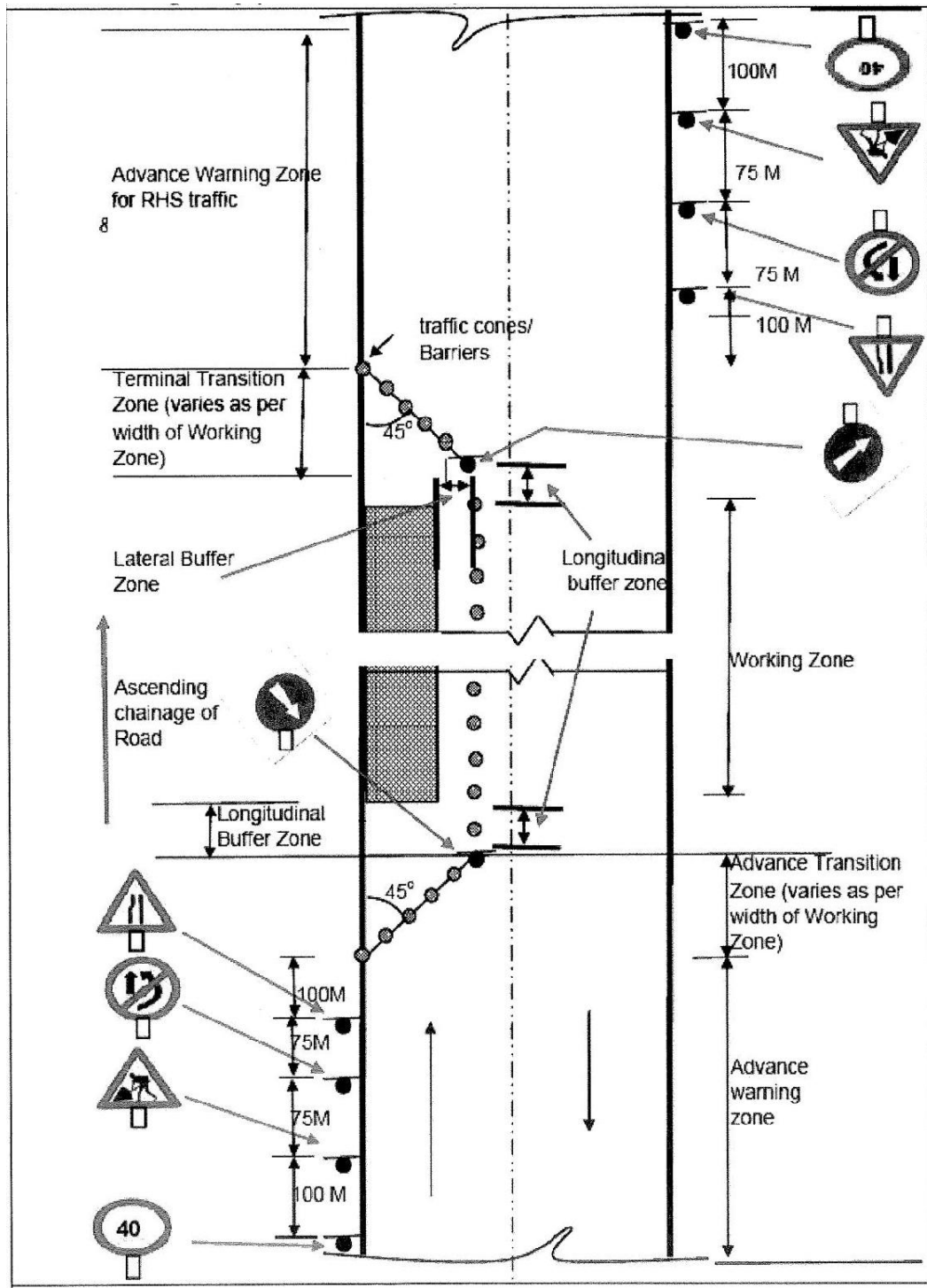


Figure 9-4: Traffic Management Plan for Working Zone

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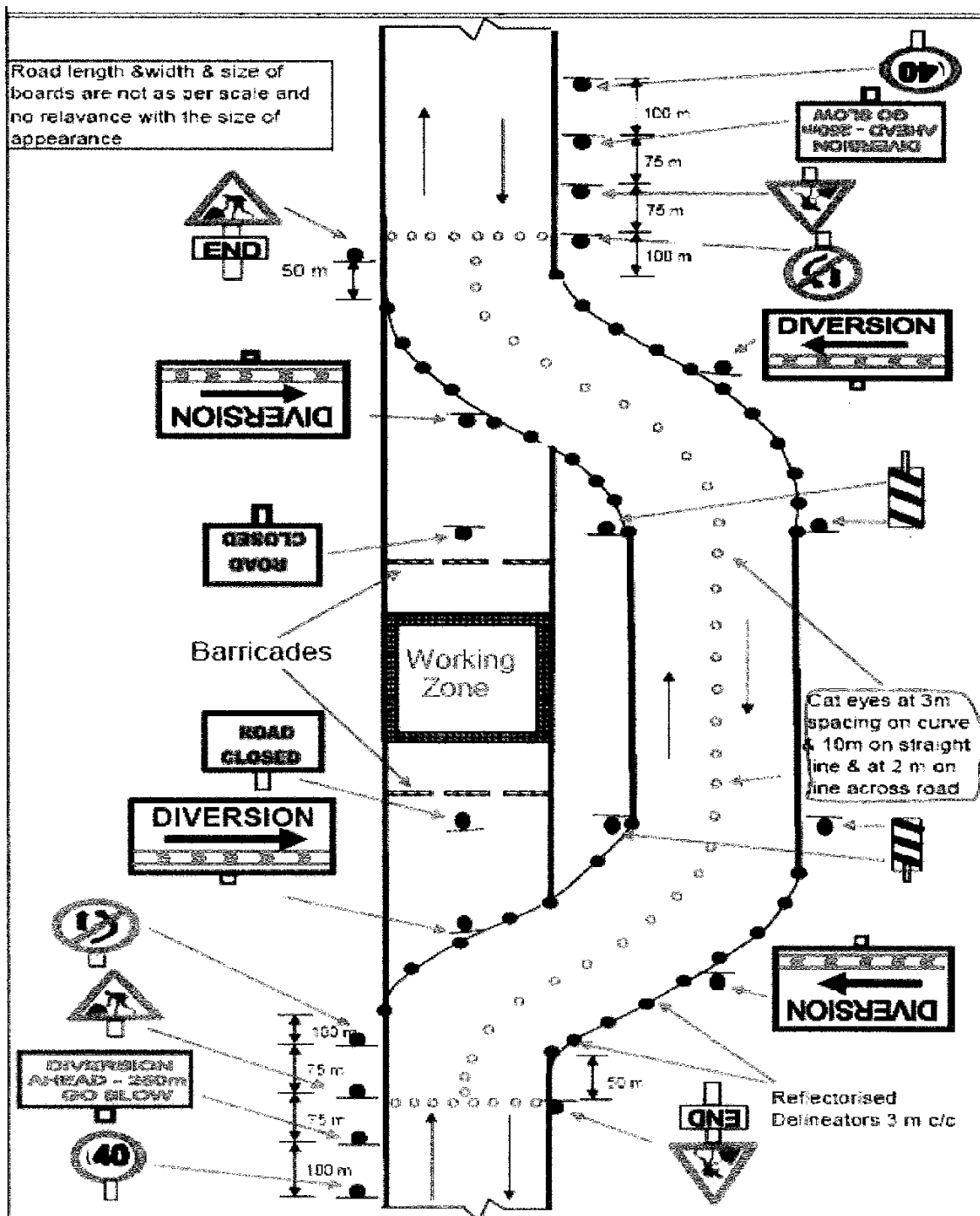


Figure 9-5: Traffic Management Plan for Diverting the Traffic

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9.13.8 Traffic Management Practices

The implementation of traffic management during construction will be guided by the following operational principles:


- **Optimal Use of Existing Lanes:** Existing carriageways will be utilized to the maximum extent possible to minimize the need for diversions.
- **Intersection Management:** At major intersections, turning movements will be maintained wherever feasible to reduce congestion.
- **Lane Bifurcation:** In constrained areas, two-way traffic may be temporarily accommodated on a single carriageway with appropriate signage and barriers.
- **Speed Control:** Vehicle speeds through construction zones will be reduced using speed breakers, warning signs, and visual cues.
- **Standardized Signage:** All advance warning and information signs will comply with IRC standards for visibility, placement, and content.
- **Equipment Placement:** Construction materials, machinery, and equipment will be stored away from berms and pedestrian paths, within the available road land.
- **Safe Machinery Parking:** All parked machinery will be clearly marked with red flags and red lights. Only the minimum quantity of material required for immediate operations will be stored at the work site.
- **Wildlife Safety:** In areas with dense vegetation, precautions will be taken to prevent snake encounters. This includes clearing bushes, applying carbolic acid, and mandating the use of gumboots.
- **Heat Stress Prevention:** During summer months, workers will be provided with adequate rest intervals to prevent heat-related illnesses such as sunstroke.

9.14 PROPOSED ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

An Environment and Social Management Plan has been developed following the delineation of impacts and mitigation measures. These measures will be adopted by the project proponent and imposed as conditions of contract of the sub-contractor employed for respective phases of the power project. The mitigation measures suggested during operation will be made part of the regular maintenance and monitoring schedule.

The ESMP includes the following:

- Investigations suggested for adverse environmental and social impacts and associated risks.
- Institutional arrangement - management tools and techniques for the implementation of environmental impacts and risk mitigations.
- Monitoring and reporting of requirements and mechanisms for the effective implementation of the suggested mitigations.

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- Monitoring arrangements for effective implementation of suggested mitigations for the proposed project; and
- Reporting requirement to the regulatory agencies and funding institutes.




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Table 9-5: Environment and Social Management Plan


| Impact Identified | Suggested Mitigation | Monitoring/ Training | Management Responsibility | Timeline |
|--|--|--|---|--|
| Planning Phase | | | | |
| <ul style="list-style-type: none"> Land Acquisition | <ul style="list-style-type: none"> Land procured for the project is prominently in RoW of government land. Permission must be obtained from the respective government or private authorities wherever the pipeline route crosses their jurisdiction. | <ul style="list-style-type: none"> As per land acquisition policy | <ul style="list-style-type: none"> ATGL | <ul style="list-style-type: none"> Pre-Construction |
| Construction Phase | | | | |
| Soil Characteristics | | | | |
| <ul style="list-style-type: none"> Erosion and compaction | <ul style="list-style-type: none"> Loose soil to be protected from wind and runoff by covering / watering / other means of covering. Existing roads to be used for transport of material to extent possible. All construction materials should be kept within the project footprint area. Re-fueling of machinery at site should be undertaken over paved surface. In case of any accidental spill, soil should be cut and stored securely for disposal with waste. | <ul style="list-style-type: none"> Project representative to make observations on storage and handling of construction material. Drivers should be instructed about use of dedicated tracks within the site workers to be trained on handling and storage of waste by contractor. Workers handling activity to be briefed about the need to prevent contamination. Inspection/Monitoring to conduct construction activities within the site boundary only. Soil monitoring for physical properties to be at least once during construction phase. | <ul style="list-style-type: none"> EPC contractor/Site supervisor/ Project Director to make observations and convey it to the contractors. EHS Personnel/ Project Director should monitor implementation of ESMP. | Throughout project cycle |
| Waste Disposal | | | | |

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| Impact Identified | Suggested Mitigation | Monitoring/ Training | Management Responsibility | Timeline |
|---|---|--|--|---|
| <ul style="list-style-type: none"> Accumulation of construction waste Unhygienic conditions for labours. Hazardous waste from machinery, generators etc. Soil and land contamination due to accidental leakage. Run off into rainwater channels. | <ul style="list-style-type: none"> Construction debris should be utilised for levelling of land and unused debris shall be disposed-off to C&D Disposal Site. Proper sanitation and sewage facility in terms of septic tank with soak pit should be provided. Nearby municipality should also be contacted for regular disposal of the labour camp waste. Other wastes like packaging material, metal, jute, etc. to be sold to scrap dealers/ buyers. Random stocking of raw material, storage of debris, piling of loose soil etc. should be strictly controlled. Portable toilets/ suitable arrangements with septic tank-soak pit arrangement should be provided for workers. | <ul style="list-style-type: none"> ATGL representative should brief specific needs as per country's requirement for further execution, as and when required. Workers should be instructed to maintain neat, clean & hygiene at facilities. Contractors should be briefed about need for proper storage and disposal of construction waste. | <ul style="list-style-type: none"> Contractors will be abided with Hazardous Waste (Management, Handling and Transboundary Movement) Rules, 2023. Site Engineer to make observations and convey it to the contractors. Monthly report of EHS Officer to include the compliance and observations if any. | <ul style="list-style-type: none"> Should be incorporated as part of project budget, no additional cost is envisaged. During Construction Phase |
| Water Resource and Quality | | | | |
| <ul style="list-style-type: none"> Run off into rainwater channels and drains passing through the site and ultimately into nearby surface water body. Wastage of water and sewage discharge from labour camp | <ul style="list-style-type: none"> Water for construction and consumption to be arranged by suitable local contractors through authorized tanker water suppliers. Arrangement for storm water management in construction area should be made to avoid sediment run off. Storm water flow during monsoon should be directed to existing drains. Natural flow and topography of the drains as flowing inside the project boundary should be maintained. | <ul style="list-style-type: none"> Daily consumption of water should be recorded. Storm water arrangements should be monitored. Performance parameters are EC, TSS, TDS, Oil & Grease, Total Coliforms, BOD, etc. Workers should be instructed about optimal use of water | <ul style="list-style-type: none"> Conditions should be the part of contract with the EPC contractor. Project Director or EHS personnel should make observations and convey it to the contractors. Report of Project Director/ Site EHS Officer should be sent to EHS head. | Construction Phase |

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| Impact Identified | Suggested Mitigation | Monitoring/ Training | Management Responsibility | Timeline |
|--|---|--|---|---|
| | <ul style="list-style-type: none"> Septic tank with soak pits should be provided at site to facilitate the sewage generated from labour area. | | | |
| Ecology | | | | |
| <ul style="list-style-type: none"> Clearance of vegetation | <ul style="list-style-type: none"> Tree cutting or shrub clearance should be limited to those patches directly affecting solar panel exposure. Workforce should be instructed to avoid any other activity likely to affect the local flora & fauna. Movement of construction & transport vehicles should follow dedicated paths to avoid any injury/mortality to the wildlife. | <ul style="list-style-type: none"> Visual damage loss inspection should be undertaken by Site Engineer Construction contractor should instruct and inform workers to refrain from activities that may adversely affect the ecology in near vicinity of the project. | Project Director/EPC Contractor | Construction Phase |
| Traffic and Transport | | | | |
| <ul style="list-style-type: none"> Break-down and Improper halt of vehicles. Discomfort due to air and noise pollution due to raw materials transportation. Damage to road and related structure from heavy vehicles. | <ul style="list-style-type: none"> Vehicle movement and parking within the project premises should be managed properly to avoid accidents. Routes for use by construction traffic should be planned to minimize impact on adjoining activities. Dedicated path within the site for exclusive entry and exit of construction vehicles should be provided. Only PUC certified vehicle should be deployed. Construction material should be transported in covered trucks. Transportation should be undertaken along pre-identified paths only. | <ul style="list-style-type: none"> Necessary training to the driver of construction vehicles for speed restrictions. Drivers should be assessed for their knowledge on traffic rules before engagement. During the construction phase, number of vehicles as well as any incidents and accidents need to be reported, and their outcomes should be monitored. | <ul style="list-style-type: none"> Project Director/ site EHS person should provide the training. Should be mentioned in the contract with the construction contractor. | <ul style="list-style-type: none"> Regular maintenance of vehicle and upkeep of roads should be included in O&M budget. For all construction related activities during construction and operation phases. |

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| Impact Identified | Suggested Mitigation | Monitoring/ Training | Management Responsibility | Timeline |
|--|---|---|--|--|
| | <ul style="list-style-type: none"> High noise generating activities should be restricted to daytime with proper mitigation measures. | | | |
| Air Quality | | | | |
| <ul style="list-style-type: none"> Fugitive dust Emissions from diesel engines/ vehicles | <ul style="list-style-type: none"> Regular water sprinkling while undertaking dust generation activities. Construction activities should be avoided during high wind speed time. Construction material should be covered to prevent any fugitive dust from these areas. Regular maintenance of construction machineries. Deployment of only PUC certified vehicles. Flyable Construction material should be transported in covered trucks only. Vehicle speed should be restricted to 30km/hour at site to minimize potential for dust emission in the surroundings. | <ul style="list-style-type: none"> Awareness should be developed among the site workers for fugitive dust management. Air Quality monitoring specifically for particulate matter in nearby settlement areas once during construction for compliance to NAAQ Standards. | <ul style="list-style-type: none"> Project Director should regularly coordinate and supervise work. Monitoring agency should take out the monitoring work. Should be incorporated in the contract with contractor | Water sprinkling will be done throughout construction phase. |
| Noise and Vibration | | | | |
| <ul style="list-style-type: none"> Disturbance to habitations Occupational Hazard | <ul style="list-style-type: none"> Only well-maintained equipment should be operated on site. DG sets should only be used for emergency power/ backup. Scheduling of the construction activities should be done. Loud, sudden noise emissions to be avoided wherever possible. | <ul style="list-style-type: none"> Arrangements/facilities for noise reduction should be monitored as and when required. Personal protective devices for site workers working near high noise equipment. Schedule of activities should be discussed and finalized between site manager and the contractor. | <ul style="list-style-type: none"> Project Director should take care of the compliance of ESMP. External training on use of PPE should be the responsibility of EPC Contractor | Throughout construction phase |

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| Impact Identified | Suggested Mitigation | Monitoring/ Training | Management Responsibility | Timeline |
|--|--|--|---|---|
| | | <ul style="list-style-type: none"> Noise monitoring in nearby settlement areas once during construction period to ensure compliance with Noise Rules | | |
| Cultural | | | | |
| Cultural differences amongst workers | To the extent possible sourcing of construction labour should be done from local region by contractor for unskilled activities. | Workers should be briefed about need for cooperation and harmony with the community. | EPC Contractor | Normal Practice |
| Health and Safety | | | | |
| <ul style="list-style-type: none"> Operation of heavy machinery Accidents leading to injuries fatalities. Occupational health hazards | <ul style="list-style-type: none"> Operation of loading–unloading equipment should be undertaken under the guidance / supervision of trained professional. Sufficiently competent person should be engaged in driving or operating construction machineries. Should ensure personal protective equipment for all personnel present at site are made available during Construction period. Arrangement for fire control measures Display of Emergency phone numbers at site. | <ul style="list-style-type: none"> Proper training of the workers regarding health and safety procedures. Workers should be trained through sub-contractors regarding use of Personal protection equipment and its importance. Operation of Cranes shall normally be limited for transmission line as per requirement. Crane (If required) should be operated as per contractor's Crane Safety Plan only. | <ul style="list-style-type: none"> Project Director should ensure compliance of safety guidelines. Safety Officer of contractor should be responsible for implementation of safety guidelines. To form part of the contractor's contract | Training of workers shall mostly be given by internal resources during Construction phase |
| Social | | | | |
| Expectations for infrastructure development benefits | <ul style="list-style-type: none"> Project officials should communicate and discuss with the community in a transparent manner on a regular basis and demonstrate their concerns. Consultation with women 's groups should also be held during construction and operation phases to listen to their issues and concerns | <ul style="list-style-type: none"> Project officials should hold regular consultations with appropriate stakeholders. All concerns must be addressed through systematic process. | Project Director | Normal Practice |

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| Impact Identified | Suggested Mitigation | Monitoring/ Training | Management Responsibility | Timeline |
|---|---|--|---|---------------------------|
| | regarding labour, health, and safety etc. as well as to solicit their ideas on various community initiatives. | | | |
| Local Employment | <ul style="list-style-type: none"> Assess the exact number of workers should be required at each stage through contractor/ own resource in the construction period. Should ensure priority is given to local people for short term/long term employment opportunities, based on required skill and education level. | <ul style="list-style-type: none"> Explore possibilities of training and capacity building to enable the community to be able to secure the available jobs and contracts, as per the applicability and requirement of the business. | EPC contractor in discussion with project director should assess potential for engagement of local community and for women. | Normal Practice |
| Demands for materials | Should ensure local contracting and vendor opportunities aligned with the scope and demand as far as possible. | - | Project proponent/Contractor | Normal Practice |
| Livelihood of roadside vendor might be impacted during to construction period at daytime. | <ul style="list-style-type: none"> Construction time should be selected in such a manner that minimum livelihood loss occurs due to construction and other project related activities. Compensation paid to roadside vendor if inconvenience caused due to construction of pipeline project. | Fair Compensation Policy | Land Team | Normal Practice |
| <ul style="list-style-type: none"> Excess load on existing resources | <ul style="list-style-type: none"> Local labour should be preferred for unskilled work. Awareness camp for communicable disease understanding. Medical camp as part of CSR activities | Awareness training for applicable regulatory regulations. | Project Director through EPC Contractor | During Construction Phase |
| Operation Phase | | | | |
| Waste Generation | | | | |

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| Impact Identified | Suggested Mitigation | Monitoring/ Training | Management Responsibility | Timeline |
|---|---|--|-----------------------------|------------------|
| Construction waste | <ul style="list-style-type: none"> Should earmark designated areas for storage of waste separately. Waste should be given to approved recyclers. | Training and briefing of the staff involved in waste management. | Project Director | Normal Process |
| Ecological Impact | | | | |
| Impacts on existing flora and fauna | <ul style="list-style-type: none"> A monitoring of bird and bat species within the project study area should be undertaken that may help understand the presence of threatened species inside the project area and their movement. This will further help in assessing the site-specific impacts and updating the mitigation measures. Any dead animals/carcass shall be removed in time from the site so that it does not attract movement of raptors. General awareness regarding wildlife shall be enhanced through trainings, posters, etc. among the staff and labourers. | Training and briefing of the staff involved for record keeping for any electrocution or carcass incident. | Plant EHS or Safety Officer | On regular basis |
| Water Resources | | | | |
| surface water body located across pipeline route. | <ul style="list-style-type: none"> Natural slope of the site shall be maintained laying of pipeline structures require very less topographical correction. Used oil and Waste should be stored in separate designated areas to avoid any contamination due to run-off. Avoidance of water wastage to the maximum extent Proper storm water facility | <ul style="list-style-type: none"> Regular check on water use quantity Awareness campaign for effective use of water | Plant EHS or Safety Officer | - |

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| Impact Identified | Suggested Mitigation | Monitoring/ Training | Management Responsibility | Timeline |
|--|--|--|-----------------------------|------------------------|
| Soil Quality Degradation | | | | |
| Soil quality might be impacted due to construction work | <ul style="list-style-type: none"> Topsoil Preservation: Strip and store topsoil separately before excavation to facilitate land restoration after construction. Soil Stabilization: Use geotextiles, mulch, or temporary vegetation cover to prevent soil erosion. Controlled Excavation: Minimize the area of disturbance by restricting excavation to designated work zones. | Regular record management of waste materials. | Plant EHS or Safety Officer | - |
| Health and Safety | | | | |
| <ul style="list-style-type: none"> Accidents leading to Injury / fatality. Fire Risk | <ul style="list-style-type: none"> Schedule high-risk work (such as excavation and pipe laying) during non-peak traffic hours to minimize risks. install warning signs, barricades, and reflective cones well in advance of the worksite. Fire extinguisher in accident prone areas. High-visibility safety jackets, hard hats, safety boots, gloves, Protective Eye Wear. | <ul style="list-style-type: none"> Health and safety awareness training on regular interval Safety incidents should be recorded and monitored with an aim that numbers are never significant and gradually reduce. | Plant EHS or Safety Officer | - |
| Social Aspects | | | | |
| <ul style="list-style-type: none"> Local Economy Upgradation of infrastructure | <ul style="list-style-type: none"> Should boost the local economy through local contracting to the extent possible. Infrastructure upgradation as part of CSR | - | CSR Team | Continuous improvement |
| Decommissioning Phase | | | | |
| Impacts due to disposal of material after construction work, | <ul style="list-style-type: none"> Segregate waste into recyclable (metal scraps, plastic, wood) and non-recyclable (hazardous, non-biodegradable) materials. Reuse excavated soil for backfilling and land restoration. | - | Plant EHS or Safety Officer | - |

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| Impact Identified | Suggested Mitigation | Monitoring/ Training | Management Responsibility | Timeline |
|---|--|----------------------|---------------------------|----------|
| <ul style="list-style-type: none"> Contamination of soil | <ul style="list-style-type: none"> Recycle metal pipes, concrete debris, and plastic materials wherever possible. | | | |

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9.14.1 On-Site Emergency Management Plan

The probability of inevitable residual risk, arising out of operations, capable of causing emergencies cannot be ruled out no matter how well a process is being controlled or safeguarded by instruments and process safety procedures. Such emergencies could be the result of malfunction, ignorance, non-observance of operating instructions or be the consequence of acts outside the control of people.

Hence the needs to prepare an **ON-SITE EMERGENCY PLAN (OSEP)** for dealing with accidents and natural calamities which may still occur and are likely to affect health, safety, life, property, and environment both at site and in the immediate neighborhood. An OSEP mitigates the effects of a major accident/emergency when these effects are contained within the boundary of the site.

This plan is guideline for employees, workers, contractors, sub-contractors, visitors etc., informing about prompt rescue operations, medical treatment, coordination, and communication among various internal & external members. The plan should be pro-active to avoid any confusion/panic and should direct to handle the emergency with clear instructions.


Purpose

ATGL has prepared an Emergency Management Plan for implementation at the project site in the event of an emergency so that the loss of life and damage to the properties and natural resources are minimized.

Objective

The overall objective of a good emergency preparedness plan is for what to do and what not during an emergency. The following aspects shall be included in emergency preparedness plan: -

- To assess what dangers could arise to people on and offsite as a result of these foreseeable emergencies and what the effects it could pose on the environment.
- To contain and control incidents.
- To assess the risk involved, and to mitigate the same by pre-planned remedial and rescue measures using, when necessary, the combined resources of the organization concerned and the public emergency services.
- To safeguard residents, employees and any one nearby who might be affected and to minimize the damage to property or the environment.
- The training of the individual personnel with duties under the plans will be familiarizing on site personnel with their roles, their equipment, and the details of the plans.
- The onsite emergency plan should be based on the specific needs of each particular site for dealing with those emergencies which it is for seen may arise.
- For an emergency plan to be successful, it should be tested, when first devised and thereafter to be rehearsed at suitable intervals.

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9.14.2 Environmental Monitoring Plan


Environmental monitoring is an effective tool in making necessary recommendations and adopt suitable control strategies so that menace of rising environmental pollution could be minimized, and a relief be extended to the people including labours in case of any damage caused under occupational health hazards. The monitoring is necessary for the following reasons:

- To verify the results of the impact assessment study.
- To assess what impacts have occurred.
- To evaluate the performance of mitigation measures proposed in the ESMP.
- To ensure that the conditions of necessary consent and approvals are adhered.
- To suggest improvements in management plan, if required.
- To ensure that any additional parameters, other than those identified in the impact, do not become critical after the commissioning of proposed project.
- Considering the short duration of construction phase (around 3-5 months), environmental monitoring can be considered on yearly basis during operation phase only. However, other mitigation measures suggested for construction phase shall be maintained for env. protection.


The proposed environmental monitoring program during both construction and operation phases of the project are given in **Table 9-6** below:

Table 9-6: Environment Monitoring Program- Construction & Operation Phase

| Sl. No. | Component | Location | Parameters | Frequency |
|---------------------------|---|--|--|--------------------|
| Construction Phase | | | | |
| 1 | Stack emission characteristics | Stacks attached to emission sources (e.g. DG set) | Stack monitoring for PM, SOx, NOx and HC | Once in a month |
| 2 | Ambient air quality | Nearest Residential Areas, and busy commercial locations | Ambient air quality parameters as per NAAQS viz. PM10, PM2.5, SOx, NOx, CO | Once in a month |
| 3 | Ground water quality (used as source of domestic water) | Point used for drinking water | Parameters listed in ISO:10500 | Once in a month |
| 4 | Effluent quality | Discharge header of hydrotested pipeline/tank | According to general discharge standards | As per requirement |
| 5 | Waste (including hazardous) | Construction sites and camps | Quantity/ volume generated and disposed | Once in a day |
| 6 | Equipment noise levels | 1 m from DG set | dB(A) | Once in a month |
| 7 | Ambient noise levels | Nearest residential areas/ Silent zones etc. | Ambient noise levels (Leq Day & Leq Night) | Once in a month |
| Operation Phase | | | | |
| 8 | Greenbelt development | Along the ROW of pipeline | Plant density, health, growth, and survival rate | Once in 6 months |

| | |
|---|---|
| Client: Adani Total Gas Limited | Assignment Name: Environmental and Social Impact Assessment (ESIA) Study for Natural Gas Pipeline for Tikamgarh GA, District- Niwari, Madhya Pradesh Report No.: 2025/ET-006496/AD/NA/NA/64187 Version No and Date of Version: Ver 01 dated 17.07.2025 |
|  | Page 213 |

| Sl. No. | Component | Location | Parameters | Frequency |
|---------|-----------------------------|---------------------------|---|------------------|
| 9 | Waste (including hazardous) | Along the ROW of pipeline | Quantity/ volume generated and disposed of. | Once in a month |
| 10 | Effluent quality | Along the ROW of pipeline | According to general discharge standards | Once in 6 months |

| | |
|---|---|
| Client: Adani Total Gas Limited | Assignment Name: Environmental and Social Impact Assessment (ESIA) Study for Natural Gas Pipeline for Tikamgarh GA, District- Niwari, Madhya Pradesh Report No.: 2025/ET-006496/AD/NA/NA/64187 Version No and Date of Version: Ver 01 dated 17.07.2025 |
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10 SUMMARY AND CONCLUSION

10.1 SUMMARY OF IMPACTS

Among the pipeline lifecycle stages of construction and operations, due to temporary nature of the pipeline laying/construction, most impacts are likely to be short term and reversible in nature. The impacts that shall be most significant and of primary concern are summarized in the subsequent sections.


10.2 IMPACT DUE TO PIPELINE ROUTE SELECTION

The proposed pipeline route has been so selected such that there are:

- Shortest length of the pipeline between source and destination points
- Avoidance of sensitive areas such as national parks, sanctuaries, and wildlife corridors
- Minimum impact to reserve forests and other sensitive areas.
- Minimum number of water crossings.
- Minimum impact to the environment.
- Easy access to the route during construction, operation, and maintenance of the pipeline.

10.3 IMPACTS DUE TO CONSTRUCTION OF PIPELINE

- The land identified for the proposed pipeline project is located within the Niwari district. The proposed project is of 22.161 km Natural Gas Pipeline Infrastructure in Niwari District. The pipeline has been planned to be laid one pipeline route starting from Bijoli to Orccha helipad. Permission will be required for NH from the NHAI, for SH and ODR from the relevant state departments for the pipeline route, permission from Railways will be required for the pipeline route and permission from the forest department will also be required since the pipeline route it passes through the Katelakhandi Reserve forest, Larpura Reserve Forest, Bangaon Reserve Forest range. Therefore, in terms of land procurement there will be no major impact that is observed due to proposed pipeline project except for the permissions.
- Earth work excavation, transport of construction materials, handling, laying and jointing of pipelines - These activities would cause a general increase in levels of dust and suspended particulate matter in the ambient air. However, this increase in concentration would be of temporary nature and localized.
- Movement of vehicles for transportation of construction material could lead to PM and other air emissions. However, the impact shall be short-term & temporary in nature.
- There will be no abstraction of ground water from project as freshwater for domestic purposes will be supplied by SEZ department/private tankers. Domestic sewage will be disposed of to the septic tanks with soak pits.
- Water consumption during hydro-testing of pipeline - Efficient use of water will be made to reuse test water in different test sections. Water will be tapped from different sources along the pipeline route, without unduly disturbing its normal users.

| | |
|---|---|
| Client: Adani Total Gas Limited | Assignment Name: Environmental and Social Impact Assessment (ESIA) Study for Natural Gas Pipeline for Tikamgarh GA, District- Niwari, Madhya Pradesh Report No.: 2025/ET-006496/AD/NA/NA/64187 Version No and Date of Version: Ver 01 dated 17.07.2025 |
|  | Page 215 |

- At major crossings, Horizontal Directional Drilling (HDD) method will be deployed so there will be no disturbance to the natural water flow or cause any pollution to the water body. Hence there will not be any obstruction/damage to fishing, recreational and navigation activities.
- The pipeline will be buried all along its length hence impact on land use pattern will be marginal and reversible. Appropriate reinforcements will be done to avoid contamination.
- Some quantity of earth excavated for pipeline laying will become surplus after installation of the pipeline and may be required for disposal. However, as this excess of earth will be taken to low lying area for filling purpose, the aesthetics of the pipeline and soil quality will not be affected.
- Noise Generation - The major human settlements are along the pipeline route where the noise levels due to construction activities are estimated to be around 70-90 dB(A). Such onetime exposure is not expected to last for more than few weeks and shall not exceed the stipulated standards. The pipeline laying work would be done in night only as there is lots of traffic in daytime and creates disturbance to the locals.
- Selection of the pipeline route has been done in such a way that eco-sensitive areas which may be affected during the construction of the pipeline are minimized.

10.4 IMPACTS DURING OPERATION OF PIPELINE


- No impact on any ecological sensitive area is envisaged during operation.
- No air emissions will be generated during the operation phase except during maintenance that could be temporary in nature.
- There will be no significant impact on ecological environment during the operational phase of the project.
- The probability of leakage will be significantly reduced by adoption of appropriate safety measures and SCADA system.
- The probability of leak from a pipeline is remote. Pipeline will be buried minimum 1.5 m at major crossings.

10.5 MITIGATION AND ENVIRONMENTAL MANAGEMENT PLAN

10.5.1 General

The mitigation measures to reduce environmental impacts, described in this EIA, can be divided into the following categories:

- Project decisions taken by **ATGL** with environmental protection in mind.
- Such measures are designed to avoid, eliminate, or reduce potential impacts that may occur to the environment during the proposed activities.
- Mock Drills shall be conducted at regular intervals in line with Emergency Response and Disaster Management Plan.

| | |
|---|---|
| Client: Adani Total Gas Limited | Assignment Name: Environmental and Social Impact Assessment (ESIA) Study for Natural Gas Pipeline for Tikamgarh GA, District- Niwari, Madhya Pradesh Report No.: 2025/ET-006496/AD/NA/NA/64187 Version No and Date of Version: Ver 01 dated 17.07.2025 |
|  | Page 216 |


10.5.2 Post-Monitoring Program

The implementation of mitigation measures during construction and operation phases will be monitored. The monitoring plan would provide for periodic revision, if necessary, considering the baseline status to indicate progress in project implementation and changing environmental conditions to provide a basis for evaluation of project impacts. The post monitoring program would include the following:


- Approved means of leak detection would be employed as per the provisions of Schedule I -E of PNGRB Regulations, 2008 and as per ASME B 31.8, Appendix - M.
- Regular and adequate patrolling of pipeline particularly at crossing locations and settlements.
- Monitoring of pressure, coating conditions and cathodic protection

10.6 CONCLUSION


There will be a beneficial effect from pipeline project that will directly and indirectly boost the living standards of the people, save foreign exchange and with increase in industrial activities, create more employment opportunities in the local economy. Thus, it can be concluded on a positive note that after the implementation of the mitigation measures and ESMP, the proposed activities of **ATGL** will have negligible impact on environment and will improve economy of the state and the nation.

| | |
|---|---|
| Client: Adani Total Gas Limited | Assignment Name: Environmental and Social Impact Assessment (ESIA) Study for Natural Gas Pipeline for Tikamgarh GA, District- Niwari, Madhya Pradesh Report No.: 2025/ET-006496/AD/NA/NA/64187 Version No and Date of Version: Ver 01 dated 17.07.2025 |
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ANNEXURE A: LABORATORY REPORTS

| | |
|---|---|
| Client: Adani Total Gas Limited | Assignment Name: Environmental and Social Impact Assessment (ESIA) Study for Natural Gas Pipeline for Tikamgarh GA, District- Niwari, Madhya Pradesh Report No.: 2025/ET-006496/AD/NA/NA/64187 Version No and Date of Version: Ver 01 dated 17.07.2025 |
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Annexure I: Laboratory Reports for Ambient Air Quality Analysis



SHRI OM TESTING & RESEARCH LABORATORY

Plot No. 296, 1st FNG Road, Sector-121, Ghari Chaukhandi, Noida - 201301
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 E-mail. : shriomlab@gmail.com, Web. : www.shriomlab.com, www.shriomlab.in
 GSTIN : 09ADHFS2444J1ZS

N.A.B.L. Accredited, ISO 9001, ISO 14001 & ISO 45001 Certified Laboratory.

TEST REPORT

Report No: STRLA- 3103202503-01

Issued To : M/s. Environment & Social Impact Assessment (ESIA) Study for CGD for Natural Gas Pipeline in Tikamgarh GA in Niwari and surrounding villages in Madhya Pradesh, India

Issue Date: 31.03.2025

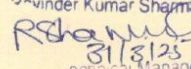
RESULTS
(Ambient Air Quality Analysis)

| SAMPLING DETAILS | | | |
|-------------------|------------------------------|-------------------|--------------------------|
| Sampling Protocol | STRL/LAB/AIR/STP/01 | Sampling Duration | 24 Hours |
| Flow Rate of Air | 1.0 M ³ /Min | Flow Rate of Gas | 1.0 LPM |
| Sample Packing | Plastic Bottle / Zip Polybag | Analysis Duration | 10.03.2025 to 30.03.2025 |

| S. No. | Parameters | Unit | AAQ1 Serolex Shilipar Factory (near Ch: 2619.03 m) 25°20'13.75"N, 78°32'42.24"E | AAQ2 Near Ch: 9020.91 m 25°20'12.44"N, 78°35'46.71"E | AAQ3 Near Ch: 14731.71 m 25°21'10.14"N, 78°38'26.74"E | AAQ4 Near Ch: 20262.82 m 25°24'3.61"N, 78°38'46.17"E | NAAQ Standards |
|--------|-------------------------------------|-------------------|--|--|---|--|-------------------|
| 1. | Particulate Matter-10 (PM-10) | µg/m ³ | 58.8 | 57.4 | 60.2 | 59.3 | 100 |
| 2. | Particulate Matter-2.5 (PM-2.5) | µg/m ³ | 38.8 | 40.3 | 44.2 | 44.5 | 60 |
| 3. | Sulphur Dioxide (SO ₂) | µg/m ³ | 6.92 | 7.12 | 7.64 | 6.53 | 80 |
| 4. | Nitrogen Dioxide (NO ₂) | µg/m ³ | 8.12 | 7.04 | 7.04 | 8.12 | 80 |
| 5. | Ozone (O ₃) -8Hr. | µg/m ³ | 11.3 | 12.4 | 12.2 | 12.4 | 100 |
| 6. | Lead (Pb) | µg/m ³ | <1.0 | <1.0 | <1.0 | <1.0 | 1.0 |
| 7. | Carbon Mono Oxide (CO)-1.0 Hr. | mg/m ³ | 0.22 | 0.22 | 0.25 | 0.24 | 4.0 |
| 8. | Ammonia (NH ₃) | µg/m ³ | < 10 | < 10 | < 10 | < 10 | 400 |
| 9. | Arsenic (As) | ng/m ³ | <1.0 | <1.0 | <1.0 | <1.0 | 6 |
| 10. | Nickel (Ni) | ng/m ³ | 0.21 | 0.22 | 0.24 | 0.20 | 20 |

End of Report

(Page No 01 of 01)


Shri Om Testing & Research Laboratory
 Praveen Kumar Sharma

 31/3/25
 Technical Manager

Authorised Signatory
 (Name, Designation & Signature with Seal)

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 2. This certificate shall not be reproduced wholly or in part without prior written consent of the laboratory.
 3. This certificate shall not be used in any advertising media or as evidence in the court of Law without prior written consent of the laboratory.
 4. The samples received shall be destroyed after 30 days from the date of issue of the certificate unless specified otherwise and sample for biological testing will be destroyed after 7 days of testing.

| | |
|---|--|
| <p>Client: Adani Total Gas Limited</p> | <p>Assignment Name: Environmental and Social Impact Assessment (ESIA) Study for Natural Gas Pipeline for Tikamgarh GA, District- Niwari, Madhya Pradesh</p> <p>Report No.: 2025/ET-006496/AD/NA/NA/64187</p> <p>Version No and Date of Version: Ver 01 dated 17.07.2025</p> |
|---|--|



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Annexure II: Laboratory Reports for Ambient Noise Quality Analysis



SHRI OM TESTING & RESEARCH LABORATORY

Plot No. 296, 1st FNG Road, Sector-121, Ghari Chaukhandi, Noida - 201301
 Mob. : 9821154906, 8076937396
 E-mail. : shriomlab@gmail.com, Web. : www.shriomlab.com, www.shriomlab.in
 GSTIN : 09ADHFS2444J1ZS

N.A.B.L. Accredited, ISO 9001, ISO 14001 & ISO 45001 Certified Laboratory.

TEST REPORT

Report No: STRLA- 3103202503-02

Issued To : M/s. Environment & Social Impact Assessment (ESIA) Study for CGD for Natural Gas Pipeline in Tikamgarh GA in Niwari and surrounding villages in Madhya Pradesh, India

Issue Date. 31.03.2025

RESULTS
(Ambient Noise Quality Analysis)

SAMPLING DETAILS

Sample Description : Ambient Noise
 Sample Collected by : STRL STAFF
 Monitoring Protocol : IS- 9989: 1981
 Monitoring Duration : 24 Hours

| S. No. | Location | Observed Value Leq, dB (A) | | Limit for A Per CPCB Guidelines ;Leq, dB (A) | | |
|--------|--|----------------------------|--------------|--|-----------|--------------|
| | | Day Time* | Night Time** | ZONE | Day Time* | Night Time** |
| 1. | NQ1 Bangay Khas Village (between Ch: 2823.01 m and Ch: 2873.43 m) 25°20'12.02"N, 78°32'46.99"E | 52.4 | 39.8 | Residential area | 55 | 45 |
| 2. | NQ2 Between Ch: 9488.67 m and Ch: 9587.15 m 25°20'3.59"N, 78°36'0.26"E | 50.5 | 38.5 | Commercial area | 65 | 55 |
| 3. | NQ3 Between Ch: 14824.61 m and Ch:14878 m) 25°21'12.18"N, 78°38'28.22"E | 51.7 | 39.43 | Industrial area | 75 | 70 |
| 4. | NQ4 Near Ch: 20177.76 m 25°24'1.85"N, 78°38'47.24"E | 49.6 | 40.2 | Silence area | 50 | 40 |

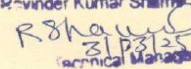
* Day Time

6.00 a.m. to 10.00 p.m

**Night Time

10.00 p.m. to 6.00 a.m

** End of Report ** Page No (01 of 01)

Shri Om Testing & Research Laboratory
 R-vinder Kumar Sharma

 Technical Manager


Authorised Signatory
(Name, Designation & Signature with Seal)

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 4. The samples received shall be destroyed after 30 days from the date of issue of the certificate unless specified otherwise and sample for biological testing will be destroyed after 7 days of testing.

Annexure III: Laboratory Reports for Ground Water Quality Analysis (GWQ1-GWQ2)

| | |
|---|--|
| <p>Client: Adani Total Gas Limited</p> | <p>Assignment Name: Environmental and Social Impact Assessment (ESIA) Study for Natural Gas Pipeline for Tikamgarh GA, District- Niwari, Madhya Pradesh</p> <p>Report No.: 2025/ET-006496/AD/NA/NA/64187</p> <p>Version No and Date of Version: Ver 01 dated 17.07.2025</p> |
|---|--|



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SHRI OM TESTING & RESEARCH LABORATORY

Plot No. 296, 1st FNG Road, Sector-121, Ghari Chaukhandi, Noida - 201301
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 GSTIN : 09ADHFS2444J1ZS

N.A.B.L. Accredited, ISO 9001, ISO 14001 & ISO 45001 Certified Laboratory.

TEST REPORT

Report No: STRLA-3103202503-03

Issue Date: 31.03.2025

Issued To : M/s. Environment & Social Impact Assessment (ESIA) Study for CGD for Natural Gas Pipeline in Tikamgarh GA in Niwari and surrounding villages in Madhya Pradesh, India

Sample Description: Ground Water

RESULTS

(Water Quality Analysis)

SAMPLING DETAILS

Sample Collected by : STRL STAFF
 Sampling Protocol : IS-3025(P-1)1987
 Weather Condition : Clear Sky
 Sampling Quantity : 5L+500ml
 Sample Packing : Plastic/Glass Bottle

| S. No. | Parameters | Units | Limits (as per IS:10500-2012) | | Results GWQ1 | Results GWQ2 | Test Methods |
|-----------------------------------|--|---------|-------------------------------|-------------------------|--|--|---|
| | | | Desirable Limit | Permissible Limit | Near Ch: 2771.4 m 25°20'15.52"N, 78°32'47.72"E | Between Ch: 8942.42 m and Ch: 8977.56 m 25°20'14.09"N, 78°35'46.97"E | |
| 1 | Color | | -- | -- | 0.1 | 0.1 | IS : 3025(Pt-4) 1983, Reaff. 2017 |
| 2 | Odour | -- | Agreeable | Agreeable | Agreeable | Agreeable | IS : 3025(Pt-5) 1983, Reaff. 2017 |
| 3 | Taste | - | Agreeable | Agreeable | Agreeable | Agreeable | IS : 3025(Pt-8)-1984, Reaff. 2017 |
| 4 | Temperature | - | - | - | 20.9 | 21.2 | IS: 3025(Pt-9)1984 Reaff. 2002 |
| 5 | pH | °C | 6.5-8.5 | No Relaxation | 7.43 | 7.40 | IS : 3025(Pt-11)1983, Reaff. 2017 |
| 6 | Electric Conductivity | - | - | - | 810 | 871 | IS : 3025 (Pt-14)-2013 |
| 7 | Total Hardness (as CaCO ₃) | µhos/cm | 200 | 600 | 248.0 | 312.0 | IS : 3025(Pt-21)1983, Reaff. 2014 |
| 8 | Iron (as Fe) | mg/l | 0.3 | No Relaxation | 0.12 | 0.11 | APHA 22 nd Ed., 3120B (3111B (AAS)) |
| 9 | Chlorides (as Cl) | mg/l | 250 | 1000 | 123.2 | 138.2 | IS : 3025(Pt-32)1988, Reaff. 2014 |
| 10 | Fluoride (as F) | mg/l | 1 | 1.5 | < 1.0 | < 1.0 | APHA 22 nd Ed., 4500F(D) |
| 11 | TDS | mg/l | 500 | 2000 | 490 | 544.3 | IS: 3025(Pt-16)1984, Reaff. 2017 |
| 12 | Calcium (as Ca ²⁺) | mg/l | 75 | 200 | 48.9 | 52.4 | IS :3025(Pt-40)1991, Reaff. 2014 |
| 13 | Magnesium (as Mg ²⁺) | mg/l | 30 | 100 | 31.3 | 44.8 | APHA 22 nd Ed., 3500-Mg (B) |
| 14 | Sulphate (as SO ₄) | mg/l | 200 | 400 | 36.4 | 39.2 | IS : 3025(Pt-24)1986, Reaff. 2014 |
| 15 | Nitrate(as NO ₃) | mg/l | 45 | No Relaxation | 24.8 | 26.0 | IS : 3025(Pt-34)1988, Reaff. 2014 |
| 16 | Alkalinity (as CaCO ₃) | mg/l | 200 | 600 | 194.1 | 206.4 | IS: 3025(Pt-23)1986, Reaff. 2014 |
| Bacteriological Parameters | | | | | | | |
| 1 | Total Coli form | | MPN/100ml | Shall Not Be Detectable | Not Detected (<2) | Not Detected (<2) | IS : 1622-1981 (Reaff.2003) |
| 2 | E.coli | | E.coli/100ml | Shall Not Be Detectable | Absent | Absent | IS : 1622-1981 (Reaff-2003) |

*END OF REPORT *** Page (01 of 01)

Shri Om Testing & Research Laboratory
 Raviinder Kumar Sharma
 31/03/25
 Technical Manager
 (Name, Designation & Signature with Seal)

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Client: Adani Total Gas Limited
Assignment Name: Environmental and Social Impact Assessment (ESIA) Study for Natural Gas Pipeline for Tikamgarh GA, District- Niwari, Madhya Pradesh
Report No.: 2025/ET-006496/AD/NA/NA/64187
Version No and Date of Version: Ver 01 dated 17.07.2025

Annexure IV: Laboratory Reports for Ground Water Quality Analysis (GWQ3)



SHRI OM TESTING & RESEARCH LABORATORY

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GSTIN : 09ADHFS2444J1ZS

N.A.B.L. Accredited, ISO 9001, ISO 14001 & ISO 45001 Certified Laboratory.

TEST REPORT

Report No: STRLA- 3103202503-04 Issue Date: 31.03.2025
Issued To : M/s. Environment & Social Impact Assessment (ESIA) Study for CGD for Natural Gas Pipeline in Tikamgarh GA in Niwari and surrounding villages in Madhya Pradesh, India

Sample Description: Ground Water

RESULTS (Water Quality Analysis)

SAMPLING DETAILS

Sample Collected by : STRL STAFF
Sampling Protocol : IS-3025(P-1)1987
Weather Condition : Clear Sky
Sampling Quantity : 5L+500ml
Sample Packing : Plastic/Glass Bottle

| S. No. | Parameters | Units | Limits (as per IS:10500-2012) | | Results | Test Methods |
|-----------------------------------|--|--------------|-------------------------------|-------------------|--|--|
| | | | Desirable Limit | Permissible Limit | | |
| | | | | | GWQ3 Near Ch: 14557.84 m 25°21'9.28"N, 78°38'20.61"E | |
| 1 | Color | -- | -- | -- | 0.1 | IS : 3025(Pt-4) 1983, Reaff. 2017 |
| 2 | Odour | - | Agreeable | Agreeable | Agreeable | IS : 3025(Pt-5) 1983, Reaff. 2017 |
| 3 | Taste | - | Agreeable | Agreeable | Agreeable | IS : 3025(Pt-8)-1984, Reaff. 2017 |
| 4 | Temperature | °C | - | - | 24.3 | IS : 3025(Pt-9)1984 Reaff 2002 |
| 5 | pH | - | 6.5-8.5 | No Relaxation | 7.28 | IS : 3025(Pt-11)1983, Reaff. 2017 |
| 6 | Electric Conductivity | µhos/cm | - | - | 769 | IS : 3025 (Pt-14)-2013 |
| 7 | Total Hardness (as CaCO ₃) | mg/l | 200 | 600 | 189.3 | IS : 3025(Pt-21)1983, Reaff. 2014 |
| 8 | Iron (as Fe) | mg/l | 0.3 | No Relaxation | 0.13 | APHA 22 nd Ed., 3120B (3111B (AAS). |
| 9 | Chlorides (as Cl) | mg/l | 250 | 1000 | 104.3 | IS : 3025(Pt-32)1988, Reaff. 2014 |
| 10 | Fluoride (as F) | mg/l | 1 | 1.5 | <1.0 | APHA 22 nd Ed., 4500F(D) |
| 11 | TDS | mg/l | 500 | 2000 | 467.4 | IS : 3025(Pt-16)1984, Reaff. 2017 |
| 12 | Calcium (as Ca ²⁺) | mg/l | 75 | 200 | 37.3 | IS : 3025(Pt-40)1991, Reaff. 2014 |
| 13 | Magnesium (as Mg ²⁺) | mg/l | 30 | 100 | 12.2 | APHA 22 nd Ed., 3500-Mg (B) |
| 14 | Sulphate (as SO ₄) | mg/l | 200 | 400 | 31.8 | IS : 3025(Pt-24)1986, Reaff. 2014 |
| 15 | Nitrate(as NO ₃) | mg/l | 45 | No Relaxation | 18.0 | IS : 3025(Pt-34)1988, Reaff. 2014 |
| 16 | Alkalinity (as CaCO ₃) | mg/l | 200 | 600 | 180.2 | IS : 3025(Pt-23)1986, Reaff. 2014 |
| Bacteriological Parameters | | | | | | |
| 1 | Total Coli form | MPN/100ml | Shall Not Be Detectable | | Not Detected (<2) | Not Detected (<2) IS : 1622-1981 (Reaff.2003) |
| 2 | E.coli | E.coli/100ml | Shall Not Be Detectable | | Absent | Absent IS : 1622-1981 (Reaff. 2003) |

***END OF REPORT *** Page (01 of 01)

Shri Om Testing & Research Laboratory
Ravinder Kumar Sharma
31/03/25
Technical Manager

Authorised Signatory
(Name, Designation & Signature with Seal)

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Note: 1. The results indicated only refer to the tested samples and listed parameters and do not endorse any product. The customer asked for the above tests only.

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4. The samples received shall be destroyed after 30 days from the date of issue of the certificate unless specified otherwise and sample for biological testing will be destroyed after 7 days of testing.

Client:
Adani Total Gas
Limited

Assignment Name: Environmental and Social Impact Assessment (ESIA) Study for Natural Gas Pipeline for Tikamgarh GA, District- Niwari, Madhya Pradesh
Report No.: 2025/ET-006496/AD/NA/NA/64187
Version No and Date of Version: Ver 01 dated 17.07.2025

adani
Gas

Annexure V: Laboratory Reports for Soil Quality Analysis



SHRI OM TESTING & RESEARCH LABORATORY

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GSTIN : 09ADHFS2444J1ZS

N.A.B.L. Accredited. ISO 9001, ISO 14001 & ISO 45001 Certified Laboratory.

TEST REPORT

Report No: STRLA- 3103202503-06

Issue Date. 31.03.2025

Issued To : M/s. Environment & Social Impact Assessment (ESIA) Study for CGD for Natural Gas Pipeline in Tikamgarh GA in Niwari and surrounding villages in Madhya Pradesh, India

Sample Description: Soil

RESULTS

SAMPLING DETAILS

(Soil Quality Analysis)

Date of Sampling

: 14.08.2023 Sample

Collected by

: STRL Staff Sampling

Protocol

: STRL/STP/SOIL/01

Sampling Quantity

: 5 kg

| S.No | PARAMETERS | UNIT | RESULTS | RESULTS | RESULTS | TEST PROTOCOL |
|------|--------------------|-------|---|---|---|--------------------------------------|
| | | | SQ1 Between Ch: 4266.28 m and Ch: 4395.4 m 25°20'9.31"N, 78°33'20.36"E | SQ2 Near Ch: 11898.29 m 25°20'45.02"N, 78°37'5.54"E | SQ3 Near Ch: 20262.82 m 25°24'2.54"N, 78°38'49.43"E | |
| 1. | Texture | | Sandy clay Loam | Sandy Loam | Sandy Loam | IS: 2720 (part-4), 1985 Reaff:2015) |
| 2. | Sand | | 47.3 | 48.2 | 46.14 | IS: 2720 (part-4), 1985,(Reaff:2015) |
| 3. | Silt | % | 27.4 | 26.3 | 24.10 | IS: 2720 (part-4), 1985,(Reaff:2015) |
| 4. | Clay | | 25.3 | 25.5 | 29.76 | IS: 2720 (part-4), 1985,(Reaff:2015) |
| 5. | Porosity | % | 48.2 | 41.1 | 42.0 | STRL/STP/SOIL/01, |
| 6. | Bulk Density | g/cc | 1.34 | 1.34 | 1.32 | STRL/STP/SOIL/01 |
| 7. | pH | | 7.23 | 7.48 | 7.40 | STRL/STP/SOIL/01 |
| 8. | E. Conductivity | µs/cm | 0.46 | 0.38 | 0.39 | STRL/STP/SOIL/01 |
| 9. | Magnesium | mg/kg | 32.9 | 36.9 | 37.6 | STRL/STP/SOIL/01 |
| 10. | Calcium | mg/kg | 167.5 | 167.6 | 145.6 | STRL/STP/SOIL/01 |
| 11. | Chlorides | mg/kg | 56.9 | 54.4 | 61.3 | STRL/STP/SOIL/01 |
| 12. | Sodium | mg/kg | 76.4 | 81.0 | 69.9 | STRL/STP/SOIL/01 |
| 13. | Potassium | mg/kg | 54.3 | 47.3 | 47.3 | STRL/STP/SOIL/01 |
| 14. | Organic Carbon | % | 0.23 | 0.27 | 0.27 | IS : 2720 (Part-24)-1976(R-2015) |
| 15. | Organic matter | % | 0.13 | 0.50 | 0.19 | IS : 2720 (Part-24)-1976(R..2015) |
| 16. | Phosphorous | mg/kg | 71.63 | 72.76 | 68.8 | IS: 2720 (part-26),1987. (R:2011) |
| 17. | SAR | meq | 1.55 | 1.291 | 1.291 | STRL/STP/SOIL/01 |
| 18. | Nitrogen (as N) | mg/kg | 0.30 | 0.32 | 0.32 | STRL/STP/SOIL/01 |
| 19. | Salinity (as NaCl) | % | 0.33 | 0.29 | 0.31 | STRL/STP/SOIL/01 |

**** End of Report****

Shri Om Testing & Research Laboratory
 Ravi Kumar Sharma

Ravi Kumar Sharma
 31/03/25
 Technical Manager

Authorised Signatory

(Name, Designation & Signature with Seal)

STRL/LAB/QF/058

Rev:00

Note: 1. The results indicated only refer to the tested samples and listed parameters and do not endorse any product. The customer asked for the above tests only.

2. This certificate shall not be reproduced wholly or in part without prior written consent of the laboratory.

3. This certificate shall not be used in any advertising media or as evidence in the court of Law without prior written consent of the laboratory.

4. The samples received shall be destroyed after 30 days from the date of issue of the certificate unless specified otherwise and sample for biological testing will be destroyed after 7 days of testing.


Client:
Adani Total Gas Limited

Assignment Name: Environmental and Social Impact Assessment (ESIA) Study for Natural Gas Pipeline for Tikamgarh GA, District- Niwari, Madhya Pradesh

Report No.: 2025/ET-006496/AD/NA/NA/64187

Version No and Date of Version: Ver 01 dated 17.07.2025

Annexure VI: Laboratory Reports for Surface Water Quality Analysis



SHRI OM TESTING & RESEARCH LABORATORY

Plot No. 296, 1st FNG Road, Sector-121, Ghari Chaukhandi, Noida - 201301
Mob. : 9821154906, 8076937396
E-mail. : shriomlab@gmail.com, Web. : www.shriomlab.com, www.shriomlab.in
GSTIN : 09ADHFS2444J1ZS

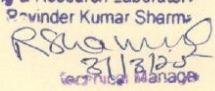
N.A.B.L. Accredited, ISO 9001, ISO 14001 & ISO 45001 Certified Laboratory.

TEST REPORT

Report No: STRLA- 3103202501-05

| S.NO | Parameter | Unit | Result SWQ1 Irrigation canal (between Ch:1229.43 m and Ch: 1659.91 m) Downstream 25°20'44.92"N, 78°32'34.01"E | Result SWQ2 Irrigation canal (near Ch: 1659.91 m) Upstream 25°20'40.30"N, 78°32'30.99"E |
|------|--|-------------|--|---|
| 15 | Cyanide | mg/l | <0.05 | <0.05 |
| 16 | Arsenic | mg/l | <0.01 | <0.01 |
| 17 | Boron as B | mg/l | <0.01 | <0.01 |
| 18 | Cadmium as Cd | mg/l | <0.01 | <0.01 |
| 19 | Chromium, Total | mg/l | <0.01 | <0.01 |
| 20 | Copper as Cu | mg/l | <0.05 | <0.05 |
| 21 | Lead as Pb | mg/l | <0.05 | <0.05 |
| 22 | Manganese as Mn | mg/l | <0.05 | <0.05 |
| 23 | Mercury | mg/l | <0.01 | <0.01 |
| 24 | Nickel as Ni | mg/l | <0.01 | <0.01 |
| 25 | Selenium as Se | mg/l | <0.01 | <0.01 |
| 26 | Zinc | mg/l | 0.013 | 0.021 |
| 27 | Dissolved Oxygen | mg/l | 5.71 | 5.70 |
| 28 | Total Suspended Solid | mg/l | 46.4 | 38.4 |
| 29 | Total Solid | mg/l | 395.2 | 480 |
| 30 | Chemical Oxygen Demand as O ₂ | mg/l | 28 | 16.7 |
| 31 | BOD, 3 days @27°C as O ₂ | mg/l | 4.8 | 3.2 |
| 32 | Oil & Grease | mg/l | <0.01 | <0.01 |
| 33 | Total Coliform | MPN /100 ml | 26 | 18 |


** End of Report ** Page (02 of 02)

Shri Om Testing & Research Laboratory
Pavinder Kumar Sharma

Technical Manager
 Authorised Signatory
 (Name, Designation & Signature with Seal)


STRLA/LAB/QF/058 Rev:00

Note: 1. The results indicated only refer to the tested samples and listed parameters and do not endorse any product. The customer asked for the above tests only.
 2. This certificate shall not be reproduced wholly or in part without prior written consent of the laboratory.
 3. This certificate shall not be used in any advertising media or as evidence in the court of Law without prior written consent of the laboratory.
 4. The samples received shall be destroyed after 30 days from the date of issue of the certificate unless specified otherwise and sample for biological testing will be destroyed after 7 days of testing.

| | |
|--|---|
| Client: Adani Total Gas Limited | Assignment Name: Environmental and Social Impact Assessment (ESIA) Study for Natural Gas Pipeline for Tikamgarh GA, District- Niwari, Madhya Pradesh Report No.: 2025/ET-006496/AD/NA/NA/64187 Version No and Date of Version: Ver 01 dated 17.07.2025 |
|--|---|


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ANNEXURE B: Permission & NOC's

| | |
|---|---|
| Client: Adani Total Gas Limited | Assignment Name: Environmental and Social Impact Assessment (ESIA) Study for Natural Gas Pipeline for Tikamgarh GA, District- Niwari, Madhya Pradesh Report No.: 2025/ET-006496/AD/NA/NA/64187 Version No and Date of Version: Ver 01 dated 17.07.2025 |
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Annexure I: Certified Copy of Nadi Nala Crossing Orchha

समस्त प्रस्ताव 180/25 दिनांक 20/3/25

श्रीवत्सल गंगा नदी - नदी-नाला 21155 गंगा नदी नदी

न्यायालय अपर कलेक्टर, जिला निवाड़ी (म०प्र०)

Email: shunilwar@gmail.com

आर.सी.एम.एस. प्रकरण क्रमांक ००५७ / व-121 / 2024-25

आदेश

(पारित दिनांक 11/03/2025)

आवेदक गंगा प्रसाद वरुआ जी.ए. हेड अडानी टोटल गेस लिमिटेड द्वारा टिकमगढ़-निवाड़ी जी.ए.सी.जी.डी. परियोजना अन्तर्गत ग्राम मजरा बनगांव, डिमरपुरा, सावन्तनगर एवं बबेड़ी जंगल ग्रामों में नदी-नाला से गैस पाईप लाईन बिछाने की अनुमति चाही गई है।

प्रकरण में तहसीलदार ओरछा एवं अनुविभागीय अधिकारी राजस्व निवाड़ी से जांच प्रतिवेदन प्राप्त किया गया। तहसीलदार ओरछा के प्रतिवेदन दिनांक 13.02.2025 द्वारा उपरोक्त ग्रामों में नदी-नाला से पाईप लाईन बिछाने में प्रभावित रकबा एवं प्रीमियम एवं भू-भाटक की गणना कर निम्नानुसार प्रतिवेदन प्रस्तुत किया गया।

| क्र० | ग्राम का नाम | रेट प्रति वर्ग मी० (भू-भाटक) | क्षेत्रफल | राशि रुपये |
|--------|--------------|------------------------------|---------------|------------|
| 1. | मजराबनगांव | 900/- रुपये | 13.2 वर्गमीटर | 11880/- |
| 2. | डिमरपुरा | 11520/- रुपये | 13.2 वर्गमीटर | 152064/- |
| 3. | सावन्तनगर | 11520/- रुपये | 13.8 वर्गमीटर | 158976/- |
| 4. | बबेड़ीजंगल | 10560/- रुपये | 13.2 वर्गमीटर | 139392 |
| योग :- | | | | 462312/- |

रुपये 462312/- का 15 प्रतिशत 69347/- रुपये प्रीमियम एवं रुपये 69347/- का 2 प्रतिशत 1387/- रुपये भू-भाटक प्रस्तावित की गई है।

अनुविभागीय अधिकारी राजस्व निवाड़ी द्वारा प्रस्तुत प्रतिवेदन दिनांक 17.02.2025 में तहसीलदार द्वारा प्रस्तावित कार्यवाही को ही प्रतिवेदित कर अडानी टोटल गैस लिमिटेड के द्वारा गैस पाईप लाईन बिछाने में सार्वजनिक उपयोग में कोई बाधा न उत्पन्न होने पर प्रतिवेदन अनुशंसा सहित इस न्यायालय में प्रेषित किया गया।

अतः तहसीलदार निवाड़ी एवं अनुविभागीय अधिकारी राजस्व निवाड़ी के प्रतिवेदन से राहगत होते हुए आवेदक अडानी टोटल गेस लिमिटेड को आवेदित स्थलों पर गैस पाईप लाईन बिछाने की अनुमति निर्धारित प्रीमियम 69347/- रुपये एवं निर्धारित वार्षिक भू-भाटक 1387/- रुपये पर निम्न शर्तों के अधीन प्रदान की जाती है :-

- आवेदक को निर्धारित प्रीमियम एवं वार्षिक भू-भाटक की राशि आवश्यक रूप से जमा करनी होगी।

सत्य प्रतिलिपि

प्रतिलिपितार

कार्यालय कलेक्टर जिला निवाड़ी (म०प्र०)

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| | |
|--|---|
| Client: Adani Total Gas Limited | Assignment Name: Environmental and Social Impact Assessment (ESIA) Study for Natural Gas Pipeline for Tikamgarh GA, District- Niwari, Madhya Pradesh Report No.: 2025/ET-006496/AD/NA/NA/64187 Version No and Date of Version: Ver 01 dated 17.07.2025 |
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**मंडल रेल प्रबंधक कार्यालय
इंजीनियरिंग शाखा, झाँसी
DRM Office
Engineering Branch, Jhansi**

NO-JHS/W/LAND/NOC/E/Gas pipe xing/2024-WL-66

Dated- 04.10.2024

GA Head

Adani Total Gas Limited

Ahmedabad

Mb No 9958896200

Sub- Permission for laying of U/G Gas pipe (350 mm casing with 200 mm carrier)
Xing at 1139/10-11 between **ORC- BWR** stations on **JHS-MKP** Section by **M/s- Adani Total Gas Limited.**

Ref- IR-RBCS application ID no- **NCR-JHS-2024-WL-66** dated-**13.08.2024**

With reference to the above, your proposal of way leave facilities for above mentioned work have been approved by the competent authority. You are provisionally authorized to execute the work by Trenchless/HDD method within Railway land as per approved drawing subject to the following conditions:-

- Work to be executed after execution of way leave agreement & deposition of all way leave charges through online payment portal of MERS on RBCS website and submission of 5 lakh Bank Guarantee (BG)
- The work should be carried out under the close supervision of Railway Officials as per Railway board circular's/RDSO guidelines, amended time to time.
- If any damages occurred to the Railways property, necessary charges shall be paid by the party as per Railway board Lno-2001/LML/24/20 dated-14.09.2016 & 2003/Tele/RCIL/pt. IX dated-24.06.2012(Telecom circular no-17/2013).
- The work should be executed strictly as per approved final drawing only in presence of Railway authorized personnel concerned ADEN, SSE(P-way), SSE(Works) etc.
- Work should be executed with five day notice in advance to S&T/Engg./Electrical & Optg. staff. The depth of pipe line crossing below the GL should be strictly decided in consultation and presence of S&T department of Railway. The minimum depth from GL must be as per approved drawing.
- Date of commencement and completion of work information should be advised this office immediately.
- All safety measures must be taken at the time of execution of the work, by the party. It must be insured while execution of work existing cables must not be affected at any cost.
- The work should be completed within 06 months from date of final work permission/agreement.
- The Railway will not be responsible at any stage to refund way leave charges.

Sr.DEN/E/JHS

C/-Sr.DFM/JHS- For kind information and necessary action.

C/-Sr.DSTE/Co/JHS-for kind information and necessary action.

C/-Sr.DEE/G/JHSfor kind information and necessary action.

C/-Sr.DEE/TRD/JHS-for kind information and necessary action.

C/-ADEN/MBA- for kind information and necessary action.


Signature Not Verified

Digitally signed by
GOPALKRISHNAN
VISHWANATHAN
Date: 2024.10.04 17:43:12 IST

Signature Not Verified

Digitally signed by Ayush
Srivastava
Date: 2025.01.27 12:04:31
IST

Sr.DEN/E/JHS

| | |
|---|---|
| Client: Adani Total Gas Limited | Assignment Name: Environmental and Social Impact Assessment (ESIA) Study for Natural Gas Pipeline for Tikamgarh GA, District- Niwari, Madhya Pradesh Report No.: 2025/ET-006496/AD/NA/NA/64187 Version No and Date of Version: Ver 01 dated 17.07.2025 |
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Annexure III: Permission from Gram Panchayat (Maharajpura)

अनापली ज्ञापन पत्र

यह उत्तरित किया जाता है कि अडावी गैस लिमिटेड सी. जी. डी. प्रोजेक्ट निवाड़ी गैस की 8 इंची पाइप लाइन बिछाई जाने की अनुमति जो कि (मोपू) अफी गत पाइप लाइन केवल एवं डबल अफी की उपयोगिता के अधिकारी का अर्जन अधिनियम 2017 के तहत संदर्भ के माध्यम से आपकी द्वारा अछराजपुरा ग्राम द्वारा निर्मित मार्ग से होकर पाइप लाइन अनुमति पायी गई है।


गैस पाइप लाइन बिछाई जाने की अनुमति इस शर्त पर दी जाती है कि पाइप लाइन डालने के पश्चात समतली करण संधारण कर मार्ग प्रबलित तैयार कर ग्राम पंचायत को अलग कर देंगे।

- ① रोड का नाम - हनुमान भी मंदिर से अथाई मोहल्ला अछराजपुरा
 - ② गीष्ठी चवतरा से कारदेव बाबा मोहल्ला अछराजपुरा
- मार्ग को प्रबलित तैयार कर ग्राम पंचायत को दक्षित करेंगे किसी प्रकार की जनहानी या दुर्घटना से स्वयं आप जिम्मेदार रहेंगे। ग्राम पंचायत के आदेशों का पालन करेंगे। अनुमति प्रदान की जाती है।

दिनांक
22/10/2024

अनापली
सरपंच
ग्राम पंचायत महाराजपुरा
जनपद पंचायत-निवाड़ी
जिला-निवाड़ी (मोपू)

Annexure IV: Permission from Gram Panchayat (Bangaon)

| | |
|---|---|
| Client: Adani Total Gas Limited | Assignment Name: Environmental and Social Impact Assessment (ESIA) Study for Natural Gas Pipeline for Tikamgarh GA, District- Niwari, Madhya Pradesh Report No.: 2025/ET-006496/AD/NA/NA/64187 Version No and Date of Version: Ver 01 dated 17.07.2025 |
|  | |

कार्यालय ग्राम सभा वनगांयखास जिला-निवाड़ी (म.प्र.)

अनापत्ति प्रमाण पत्र

यह प्रमाणित किया जाता है कि अडानी टोटल गैस लिमिटेड सी.एन.जी. प्रोजेक्ट निवाड़ी गैस की 8 इंची पाईप लाईन बिछाई जाने की अनुमति जो कि मध्यप्रदेश भूमिगत पाईप लाईन केवल एवं डक्ट भूमि की उपयोगिता के अधिकारों का अर्जन अधिनियम 2017 के तहत संदर्भ के माध्यम से आपके द्वारा वनगांयखास ग्राम द्वारा निर्मित मार्ग से होकर गुजर रही पाईप लाईन की अनुमति चाही गई है।

गैस पाईप लाईन बिछाई जाने की अनुमति इस शर्त पर प्रदान की जाती है कि पाईप लाईन डालने के पश्चात समतली करण संधारण कर मार्ग पूर्ववत तैयार कर ग्राम पंचायत को अवगत करेंगे :-

रोड का नाम

वनगांय वायपास कच्चा रोड के समांतर लगभग 600 मीटर एवं अन्य तीन क्रासिंग मार्ग को पूर्ववत तैयार कर ग्राम पंचायत को सूचित करेंगे। किसी प्रकार की जनहानी या दूधटना का आप स्वयं जिम्मेदार रहेंगे। ग्राम पंचायत के आदेशों का पालन करेंगे। अनुमति प्रदान की जाती है।


दिनांक :-


सचिव
ग्राम पंचायत वनगांयखास
जनपद पंचायत निवाड़ी
मध्य प्रदेश


सरपंच
ग्राम पंचायत वनगांयखास
जनपद पंचायत निवाड़ी
मध्य प्रदेश

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Annexure V: Permission from Jal Nigam

| | |
|---|---|
| Client: Adani Total Gas Limited | Assignment Name: Environmental and Social Impact Assessment (ESIA) Study for Natural Gas Pipeline for Tikamgarh GA, District- Niwari, Madhya Pradesh Report No.: 2025/ET-006496/AD/NA/NA/64187 Version No and Date of Version: Ver 01 dated 17.07.2025 |
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मध्यप्रदेश जल निगम मर्यादित
(म0प्र0 शासन का उपक्रम)
कार्यालय महाप्रबंधक
परियोजना क्रियान्वयन इकाई छतरपुर (म.प्र.)
वार्ड क्र.- 35 गांधी आश्रम के पीछे गली नं. 02 शांति नगर कालोनी छतरपुर
(E-mail: gmchhatarp.jalnigam@mp.gov.in, Mob- 9425404797)

क्रमांक: 583/2025/MPJNM /महा.प्रबं./म.प्र.ज.नि.मर्या./परि.क्रि.ई. छतरपुर दिनांक 10-01-2025

प्रति,
GA Haed
Adani Total Gas Limited


विषय:- निवाडी जिले में बिछाई गई पाईप लाईन के Parallel/Crossing गैस पाईप लाईन बिछाने की अनुमति जारी करने के संबंध में।

संदर्भ:-

1. GA Haed , Adani Total Gas Limited का पत्र क्र. ATGL/Tikamgarh GA/WSPL/Per/2024/007 date 14.06.2024
2. इस कार्यालय का पत्र क्र. 7654 दिनांक 27.09.2024.
3. GA Haed , Adani Total Gas Limited का पत्र क्र. ATGL/TikamgarhGA/WSPL/Per/2024/007-003 date 11.10.2024.
4. This office letter No. 8119 Dated 16.10.2024.
5. इस कार्यालय का पत्र क्र. 8170 दिनांक 18.10.2024.
6. GA Haed , Adani Total Gas Limited का पत्र क्र. ATGL/Tikamgarh W_PL/Jal Nigam/Pay Sub/2024/8 date 06.01.2025.

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उपरोक्त विषयांतर्गत लेख है कि आपके द्वारा टीकमगढ़-निवाडी जीए सीजीडी प्रोजेक्ट अंतर्गत संदर्भित पत्र क्र. 01 के माध्यम से समूह जल प्रदाय योजनाओं अंतर्गत बिछाई गई पाईप लाईन के Parallel/Crossing गैस पाईप लाईन बिछाने की अनुमति हेतु प्रकरण इस कार्यालय में प्रस्तुत किया गया है। 14.50 कि.मी. पाईप लाईन के Parallel एवं 06 स्थानों पर क्रासिंग की स्वीकृति चाही गई है। जिसके उपरांत इस कार्यालय द्वारा संदर्भित पत्र क्र. 05 के माध्यम से 61.00 लाख (रु. इकसठ लाख) की बैंक गारंटी Managing Director , Madhya Pradesh Jal Nigam Maryadit, Bhopal के नाम तैयार कर एवं राशि रु. 10,32,500.00 (रु. दस लाख बत्तीस हजार पाँच सौ पचास मात्र) 18 प्रतिशत

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| Client: Adani Total Gas Limited | Assignment Name: Environmental and Social Impact Assessment (ESIA) Study for Natural Gas Pipeline for Tikamgarh GA, District- Niwari, Madhya Pradesh Report No.: 2025/ET-006496/AD/NA/NA/64187 Version No and Date of Version: Ver 01 dated 17.07.2025 |
|  | Page 231 |

जो.एस.साहेत NOC/Processing Fees को राशि जो Non Refundable रहेगी, उक्त राशि को DD/NEFT के माध्यम से Managing Director , Madhya Pradesh Jal Nigam Maryadit, Bhopal के नाम जमा करने हेतु निर्देशित किया गया था। जिसके उपरान्त आपके द्वारा संदर्भित पत्र क्र. 06 के माध्यम से राशि रु. 61,00,000.00 की Bank Guarantee No. 0024NDLG00267425 date 21.11.2024 वैधता दिनांक 17.11.2025 जमा की गई एवं NOC/Processing Fees की राशि राशि रु. 10,32,500.00 को दिनांक 24.12.2024 को खाता क्र. 32886895201 में जमा कर दी गई है।

अतः मध्यप्रदेश जल निगम द्वारा जिला निवाडी में बिछाई गई पाईप लाईन में से 14.50 कि.मी. पाईप लाईन के Parallel एवं 06 स्थानों पर क्रासिंग कर गैस पाईप लाईन बिछाने की स्वीकृति प्रदाय की जाती है।

Signed by Lakhan Lal

Tiwari

Date: 10-01-2025 14:35:30

महाप्रबंधक


म0प्र0 जल निगम मर्यादित
परियोजना क्रियान्वयन इकाई
छतरपुर (म0प्र0)

क्रमांक: 583/2025/MPJNM /महा.प्रबं./म.प्र.ज.नि.मर्या./परि.क्रि.ई.
प्रतिलिपि:-

छतरपुर दिनांक 10-01-2025

- मुख्य महाप्रबंधक, म.प्र. जल निगम, भोपाल की ओर सूचनार्थ एवं आवश्यक कार्यवाही हेतु प्रेषित।
- श्री संदीप भारद्वाज, उप-प्रबंधक, निवाडी की ओर सूचनार्थ एवं आवश्यक कार्यवाही हेतु प्रेषित।

महाप्रबंधक
म0प्र0 जल निगम मर्यादित
परियोजना क्रियान्वयन इकाई
छतरपुर (म0प्र0)

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| Client: Adani Total Gas Limited | Assignment Name: Environmental and Social Impact Assessment (ESIA) Study for Natural Gas Pipeline for Tikamgarh GA, District- Niwari, Madhya Pradesh Report No.: 2025/ET-006496/AD/NA/NA/64187 Version No and Date of Version: Ver 01 dated 17.07.2025 |
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Annexure VI: Permission from MPRRDA

कार्यालय महाप्रबंधक

म.प्र. ग्रामीण सड़क विकास प्राधिकरण परियोजना क्रियान्वयन इकाई, टीकमगढ़
अनामय हॉस्पिटल के बगल में नूतन बिहार कालौनी, ढौगा ग्राउण्ड, टीकमगढ़ (म.प्र.) 472001

क्रमांक 1075 / तक. / प.क्र.इ. / 2024
 प्रति, टीकमगढ़, दिनांक 12 / 09 / 2024

श्री गंगा प्रसाद बरुआ,
 जी-ए हेड निवाड़ी, छतरपुर, टीकमगढ़,
 अडानी टोटल गैस लिमिटेड,
 जिला छतरपुर (म.प्र.)
 मोबाइल नं. 9958896200

विषय:- प्रधानमंत्री ग्राम सड़क योजनांतर्गत निर्मित मार्गों में गैस पाइप लाइन डालने की अनुमति प्रदान करने बावत्।

संदर्भ:- आपका पत्र क्रमांक 04 दिनांक 18.06.2024 (बैंक गारंटी नं. 0024/एन.डी.एल.जी 00154225 दिनांक- 12.09.2024)

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उपरोक्त विषयांतर्गत संदर्भित पत्र के द्वारा निम्नलिखित मार्गों में म.प्र. ग्रामीण सड़क विकास प्राधिकरण की सड़कों को सामांतर एवं क्रॉस करते हुए गैस पाइप लाइन डालने की अनुमति चाही गई है :-

| स. क्र. | पैकेज क्रमांक | मार्ग का नाम | पाइप लाइन क्रॉस करने की आर डी क्र. (मीटर में) |
|---------|---------------|----------------------------|---|
| 1 | 2 | 3 | 4 |
| 1. | MP42MTN-053 | ओरछा से रामनगर | 00 |
| 2. | MP42FTN-003 | ओरछा चकरपुर रोड से बनगाँय | 0 से 6400 (सामांतर) |
| 3. | MP42704 | ओरछा चकरपुर रोड से जमुनिया | 3500 |
| 4. | MP42WB02 | बनगाँय से मजरा | 00 |
| 5. | MP42PT010 | ओरछा चकरपुर रोड से जमुनिया | 00 |

उपरोक्त मार्गों में अनुमति निम्नलिखित शर्तों के अधीन दी जाती है:-

- यह कि मार्ग रेस्टोरेशन निर्धारित Specification के अनुसार किया जाना होगा।
- यह कि कार्य में आसपास के घरों तथा आमजनों की सुरक्षा का पूर्णतया ध्यान रखा जाये।
- यह कि कार्य करने के दौरान मार्ग के किसी भी बोर्ड या अन्य संपत्ति की सुरक्षा की जाये।
- कार्य द्वारा यातायात बाधित न हो।
- यह कि सी.सी. रोड कटिंग का कार्य रोड कटिंग मशीन से किया जावेगा, जिससे सी.सी. रोड क्षतिग्रस्त न हो।
- यह कि रोड कटिंग के उपरांत गैस पाइप लाइन डालकर त्वरित Restoration करेगा ताकि आवागमन बाधित न हो।

यदि उपरोक्त शर्तों का उल्लंघन किया जाता है तो यह वी.जी. Incash कराते हुए अनुमति निरस्त मानो जावेगी।

महाप्रबंधक
 म.प्र.ग्रामीण सड़क विकास प्राधिकरण
 परियोजना क्रियान्वयन इकाई, टीकमगढ़ (म.प्र.)
 टीकमगढ़, दिनांक 12 / 09 / 2024

पृ. क्रमांक 1076 / तक. / प.क्र.इ. / 2024

प्रतिलिपि:- सहायक प्रबंधक/उपयंत्री, म.प्र.ग्रामीण सड़क विकास प्राधिकरण परियोजना क्रियान्वयन इकाई टीकमगढ़ की ओर आवश्यक कार्यवाही हेतु प्रेषित।

महाप्रबंधक
 म.प्र.ग्रामीण सड़क विकास प्राधिकरण
 परियोजना क्रियान्वयन इकाई, टीकमगढ़ (म.प्र.)

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| Client: Adani Total Gas Limited | Assignment Name: Environmental and Social Impact Assessment (ESIA) Study for Natural Gas Pipeline for Tikamgarh GA, District- Niwari, Madhya Pradesh Report No.: 2025/ET-006496/AD/NA/NA/64187 Version No and Date of Version: Ver 01 dated 17.07.2025 |
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Annexure VII: Nadi Nala Permission from Collector



न्यायालय अपर कलेक्टर, जिला निवाड़ी (म०प्र०)

Email: dmniwari@gmail.com

आर.सी.एम.एस. प्रकरण क्रमांक ८८५९ / ब-121 / 2024-25

आदेश

(पारित दिनांक 11/03/2025)

आवेदक गंगा प्रसाद बरुआ जी.ए. हेड अडानी टोटल गैस लिमिटेड द्वारा टीकमगढ़-निवाड़ी जी.ए.सी.जी.डी. परियोजना अन्तर्गत ग्राम मजरा बनगांव, डिमरपुरा, सावंतनगर एवं बबेड़ी जंगल ग्रामों में नदी-नाला से गैस पाईप लाईन बिछाने की अनुमति चाही गई है।

प्रकरण में तहसीलदार ओरछा एवं अनुविभागीय अधिकारी राजस्व निवाड़ी से जांच प्रतिवेदन प्राप्त किया गया। तहसीलदार ओरछा के प्रतिवेदन दिनांक 13.02.2025 द्वारा उपरोक्त ग्रामों में नदी-नाला से पाईप लाईन बिछाने में प्रभावित रकबा एवं प्रीमियम एवं भू-भाटक की गणना कर निम्नानुसार प्रतिवेदन प्रस्तुत किया गया।

| क्र० | ग्राम का नाम | रेट प्रति वर्ग मी० (भू-भाटक) | क्षेत्रफल | राशि रुपये |
|--------|--------------|------------------------------|---------------|------------|
| 1. | मजराबनगांव | 900/- रुपये | 13.2 वर्गमीटर | 11880/- |
| 2. | डिमरपुरा | 11520/- रुपये | 13.2 वर्गमीटर | 152064/- |
| 3. | सावंतनगर | 11520/- रुपये | 13.8 वर्गमीटर | 158976/- |
| 4. | बबेड़ीजंगल | 10560/- रुपये | 13.2 वर्गमीटर | 139392 |
| योग :- | | | | 462312/- |

रुपये 462312/- का 15 प्रतिशत 69347/- रुपये प्रीमियम एवं रुपये 69347/- का 2 प्रतिशत 1387/- रुपये भू-भाटक प्रस्तावित की गई है।

अनुविभागीय अधिकारी राजस्व निवाड़ी द्वारा प्रस्तुत प्रतिवेदन दिनांक 17.02.2025 में तहसीलदार द्वारा प्रस्तावित कार्यवाही को ही प्रतिवेदित कर अडानी टोटल गैस लिमिटेड के द्वारा गैस पाईप लाईन बिछाने में सार्वजनिक उपयोग में कोई बाधा न उत्पन्न होने पर प्रतिवेदन अनुशंसा सहित इस न्यायालय में प्रेषित किया गया।

अतः तहसीलदार निवाड़ी एवं अनुविभागीय अधिकारी राजस्व निवाड़ी के प्रतिवेदन से सहमत होते हुए आवेदक अडानी टोटल गैस लिमिटेड को आवेदित स्थलों पर गैस पाईप लाईन बिछाने की अनुमति निर्धारित प्रीमियम 69347/- रुपये एवं निर्धारित वार्षिक भू-भाटक 1387/- रुपये पर निम्न शर्तों के अधीन प्रदान की जाती है :-

1. आवेदक को निर्धारित प्रीमियम एवं वार्षिक भू-भाटक की राशि आवश्यक रूप से जमा करनी होगी।



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| Client: Adani Total Gas Limited | Assignment Name: Environmental and Social Impact Assessment (ESIA) Study for Natural Gas Pipeline for Tikamgarh GA, District- Niwari, Madhya Pradesh Report No.: 2025/ET-006496/AD/NA/NA/64187 Version No and Date of Version: Ver 01 dated 17.07.2025 |
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2. पाईप लाईन बिछाने में आवागमन एवं सार्वजनिक निस्तार में किसी प्रकार की बाधा उत्पन्न नहीं होना चाहिए।
3. शासन द्वारा समय-समय पर संशोधित नियमों एवं अधिनियमों का पालन करना अनिवार्य होगा।
4. पाईप लाईन से जनमानस को किसी भी प्रकार की क्षति नहीं होना चाहिए इसका सम्पूर्ण उत्तरदायित्व अडानी टोटल गैस लिमिटेड का होगा।
5. भूमि का उपयोग उसी प्रयोजन के लिए किया जायेगा जिसके लिए अनुमति दी गई है।
6. भूमि के उपयोग के लिए विकास कार्य की योजना के क्रियान्वयन एवं पर्यावरण प्रतिकूल प्रभावित नहीं होना चाहिए।
7. वन भूमि के मामले में आवेदक को वन संरक्षण अधिनियम 1980 एवं वन्य प्राणी संरक्षण अधिनियम 1972 के प्रावधानों के अन्तर्गत आवश्यक अनुमतियां वन विभाग के सक्षम अधिकारी से प्राप्त करना अनिवार्य होगा।
8. भू-अभिलेखों में भूमि के अभिलिखित नोईयत में कोई परिवर्तन नहीं किया जायेगा।
9. आवेदक भूमि पर कोई भवन या संरचना का निर्माण नहीं करेगा।
10. आवेदक को भूमिगत पाईप लाईन, केवल या डक्ट बिछाने का अनन्य अधिकार प्राप्त नहीं होगा। भूमिगत पाईप लाईन, केवल या डक्ट बिछाने के पश्चात् भूमि को मूल स्वरूप में लायेगा गड्ढों के रूप में नहीं छोड़ेगा।
11. तकनीकी अपेक्षाएं पूरी की गई है या नहीं यह तय करने का सक्षम प्राधिकारी को पूर्ण विवेकाधिकार प्राप्त रहेगा।
12. किसी भी शर्त का उल्लंघन होने पर यह अनुमति स्वतः निरस्त मानी जावेगी।

(कलेक्टर महोदय द्वारा अनुमोदित)



आर.सी.एम. सं. प्रकरण क्रमांक 0059 / ब-121 / 2024-25
प्रतिनिधि

(एच0बी0 शर्मा)
अपर कलेक्टर
जिला निवाड़ी, मध्य प्रदेश
निवाड़ी, दिनांक 11/03/2025

1. कलेक्टर जिला निवाड़ी ।
2. पुलिस अधीक्षक जिला निवाड़ी ।
3. जिला आपूर्ति अधिकारी जिला निवाड़ी की ओर सूचनार्थ एवं आवश्यक कार्यवाही हेतु।
4. अनुविभागीय अधिकारी निवाड़ी की ओर सूचनार्थ एवं आवश्यक कार्यवाही हेतु।
5. तहसीलदार ओरछा जिला निवाड़ी की ओर सूचनार्थ एवं आवश्यक कार्यवाही हेतु।



(एच0बी0 शर्मा)
अपर कलेक्टर
जिला निवाड़ी, मध्य प्रदेश
निवाड़ी, दिनांक 11/03/2025

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|---------------|-----------|---|
| Adani Limited | Total Gas | Natural Gas Pipeline for Tikamgarh GA, District- Niwari, Madhya Pradesh Report No.: 2025/ET-006496/AD/NA/NA/64187 Version No and Date of Version: Ver 01 dated 17.07.2025 |
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Annexure VIII: NH44 Permission

43. For PPP Projects, in case of any financial loss incurred by the respective project concessionaires due to such laying/shifting of utility services by the Licensee, compensation for the same shall be required to be borne by the Licensee in mutual agreement with the respective project concessionaires. MoRT&H/NHAI/ implementing authorities for the project shall not be liable to the concessionaire in any way in this regard.

This agreement has been made in duplicate, each on a Stamp Paper, Each party to this Agreement has retained one stamped copy each.

IN WITNESS WHEREOF THE PARTIES HERETO HAVE CAUSED THIS AGREEMENT TO BE EXECUTED THROUGH THEIR RESPECTIVE AUTHORISED REPRESENTATIVES THE DAY AND THE YEAR FIRST ABOVE WRITTEN.

SINGED SEALED AND DELIVERED FOR AND ON BEHALF OF AUTHORITY.

PROJECT DIRECTOR
NATIONAL HIGHWAY AUTHORITY OF INDIA
PIN JHANSI
DIST. JHANSI

SIGNED ON BEHALF OF M/S ADANI TOTAL GAS LIMITED (LICENSEE)

BY SHRI GANGA PRASAD BARUA
GA - HEAD
ADANI TOTAL GAS, LIMITED
CHATTARPUR

IN THE PRESENCE OF (WITNESSES)

1. Ghanu Singh Yadav S/o Omprakash Yadav . Shyam
2. Nitaj Mishra S/o Satyanarayan Mishra Nitaj Nitaj

On Behalf "NHAI"

1. Avinash Mendhiwal, Dr. Manager (tech)
2. (Kamaluddin), S/o

IDENTIFIED BY ME

Sign *Shyam*

Name *Ghanu Singh Yadav*

Add *3-92-Paragurki Nagar*

Kolab Road Bhopal (M.P.)

462042

ATTESTED

VIJAY SIRVIYAN
ADVOCATE & NOTARY
BHOVAL (M.P.)

15 JAN 2025

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| Client: Adani Total Gas Limited | Assignment Name: Environmental and Social Impact Assessment (ESIA) Study for Natural Gas Pipeline for Tikamgarh GA, District- Niwari, Madhya Pradesh Report No.: 2025/ET-006496/AD/NA/NA/64187 Version No and Date of Version: Ver 01 dated 17.07.2025 |
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भारतीय राष्ट्रीय राजमार्ग प्राधिकरण

(सड़क परिवहन और राजमार्ग मंत्रालय, भारत सरकार)

National Highways Authority of India

(Ministry of Road Transport & Highways, Govt. of India)

परियोजना कार्यान्वयन इकाई (राजमार्ग प्रबंधन इकाई), झाँसी
Project Implementation Unit (Corridor Management Unit), Jhansi,

पता : मकान संख्या-एन 43/1 ए, राजकीय महिला पॉलीटेक्निक के सामने, ग्वालियर रोड, झाँसी 284003 (उ०प्र०)

Address : House No. N 43/1 A, Infront of Govt. Mahila Polytechnic, Gwalior Road, Jhansi-284003 (U.P.)

दूरभाष/Phone : 0510-2980967, मो./Mob : 8130006259, ईमेल/Email : jha@nhai.org, piujhansi@gmail.com वेबसाइट/Website : http://www.nhai.gov.in



NHAI/PIU-Jhansi/NOC (Gas Pipeline)/2025/1953

Dated 18 January, 2025

To,

M/s. Adani Total Gas Limited
Adani Corporate House, Shantigram,
Nr. Vaishnodevi Circle S.G. Highway, Khodiyar
Ahmedabad - 382421, Gujarat,

Sub: Proposal for laying of 8" dia pipeline along and within ROW of Roads from Village-Bangaon, (Near Bijauli Industrial Area, Jhansi) to Village - Pratappura in Tehsil Orchha, District-Niwari (M.P.) - Pipeline laying from km. 13.787 to 16.090 along to National Highway-44 along the pipeline route in Niwari District.

Ref: (1) Letter ref. no.ATGL/Tikamgarh-Niwari GA/NH-44/Per/2024/001 dated 18.06.2024 (received on 28.06.2024) of Adani Gas.
(2) NHAI, PIU, Jhansi letter no. 1217 dated 24.09.2024
(3) NHAI, RO (West)-UP, Lucknow letter no. 24943 dated 13.11.2024
(4) NHAI, PIU, Jhansi letter no. 1757 dated 12.12.2024
(5) NHAI, RO (West)-UP, Lucknow letter no. 24928 dated 12.11.2024
(6) NHAI/Policy Guidelines/standard Operating Procedure (SOP) for access permission /2020 issued vide Policy Circular No. 14.19/2020 dated 06.01.2020
(7) NHAI,RO (West)-UP, Lucknow approval letter no. 19001/1/RO-W-UP/NH-509/UG/NOC/25428 dated 06.01.2025.

Sir,

This has reference to your letter dated 18.06.2024 (ref-1) regarding the Proposal for laying of 8" dia pipeline along and within ROW of Road from Village-Bangaon, (Near Bijauli Industrial Area, Jhansi) to Village - Pratappura in Tehsil Orchha, District- Niwari (M.P.) along National Highway-44 from km. 13.787 to 16.090. The Competent Authority has accorded the approval with the directions to follow the MoRT&H Circular No. RW/NH-33044/29/2015/S&R(R) dated 22.11.2016. Further, the approval is subject to ensure the compliance of following conditions :-

- That the initial permission would be valid for 5 years, which will be automatically renewed after payment of additional fees at the rate prevailing at the time of renewal.
- That the crossing/laying will be done as per the proposed/agreed location route within ROW, as per proposed layout plan.
- That the Licensee shall have to provide the safety measures like barricading danger lighting and other necessary caution boards while executing the work.
- Appropriate fees be levied for use of NH land for laying of Utilities as per Ministry Circular No. RW/NH-33044/29/2015/S&R(R) dated 22.11.2016.
- Undertaking to the following effect shall be submitted by the applicant which will be part of the agreement:-
 - Three copies of "As Laid Drawings" of utilities (Hard and Soft copies) shall be submitted to Highway Authorities for verifications and record within a month of completion of works.

Contd....2/-

क्षेत्रीय कार्यालय : पश्चिम (उ.प्र.), 3/248, विशाल खण्ड, गोमती नगर, लखनऊ-226010 (उ.प्र.)
Regional Office : West (U.P.), 3/248, Vishal Khand, Gomti Nagar, Lucknow-226010 (U.P.)
मुख्यालय : जी 5-6, सेक्टर-10, द्वारका, नई दिल्ली - 110075
Head Office : Plot No. : G-5 & 6, Sector-10, Dwarka New Delhi - 110075

दूरभाष/Phone : 0522-4960291
फैक्स/Fax : 0522-4950680
दूरभाष/Phone : 91-11-25074100/200
फैक्स/Fax : 91-11-25093507/514

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| Client: Adani Total Gas Limited | Assignment Name: Environmental and Social Impact Assessment (ESIA) Study for Natural Gas Pipeline for Tikamgarh GA, District- Niwari, Madhya Pradesh Report No.: 2025/ET-006496/AD/NA/NA/64187 Version No and Date of Version: Ver 01 dated 17.07.2025 |
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(2)

- b. The permission may be terminated immediately on violation of the agreed terms & conditions.
- c. The execution of the proposal by the Applicant would not hinder the future widening, if any, at the particular location and if required then the applicant would ensure shifting of their utility at their own cost without any liability to NHAI in a time bound manner prescribed by NHAI.
- d. The applicant shall have to submit a work programme and ensure timely completion.
- e. The compliance of various undertakings given by the applicant may be ensured before and after signing of License Agreement, as the case may be in the interest of safety of road users and NHAI.
- (vi) Laying work should be carried out as per Ministry Circular No.RW/NH-33044/29/2015/S&R(R) dated 22.11.2016.
- (vii) Crossing work should be carried out through HDD method.
- (viii) It shall be the responsibility of the applicant to ensure the Safety and maneuverability of Highway Traffic during laying of pipe line.
- (ix) The approval is based on the submissions made by the Applicant. The Applicant is responsible for the details provided in the application. The NHAI is at liberty to verify the authenticity of the documents at any time. Any misrepresentations, omission or suppression of facts or disclosure of incomplete facts detected at any stage shall lead to withdrawal of this approval with cost to the applicant.
- (x) In view of any future development requiring necessary alteration, including complete removal or shifting of the Pipe Line, the same shall be carried out by the Applicant at its own cost of the satisfaction the Highway Administrator.
- (xi) In case of violation of the norms of Ministry's Guidelines, the NOC automatically stand withdrawn.
- (xii) IRC: 98-2011 be complied wherever applicable.

Signed photo copy of Agreement dated 18.01.2025 executed between Project Director, NHAI, Project Implementation Unit, Jhansi and GA Head, M/s. Adani Total Gas Limited is enclosed for strict compliance.


Encl:- Copy of Agreement dated 18.01.2025

Yours faithfully,


(Tarveen Sehrawat)
Project Director

Copy to :-

- (1) NHAI, Regional Office (West)-UP, Lucknow.
- (2) RE, M/s. Artefact Projects Limited, Murari Nagar, Jhansi for necessary action.
- (3) Authorized Signatory M/s. Gayatri Jhansi Roadway Limited, Village- Khailar, Jhansi for information & necessary action.

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मध्य प्रदेश MADHYA PRADESH

CS 393842

For Stamp Certificate No: IN-CS 393842 Dated-15 January-2025



**AGREEMENT REGARDING GRANTING OF RIGHT OF WAY PERMISSIONS
FOR LAYING UTILITY SERVICES ON NATIONAL HIGHWAYS**

Agreement to lay 8" dia Steelpipeline from Ch. 13/787 Km. to 16/090 Km.
of along National Highway- 44 (Jhansi- Babina) land.

This agreement made this 18th day of Jan (Month) 2025
between the President of India acting in his executive capacity through The Project
Director, National Highway Authority of India, PIU, Jhansi (hereinafter referred to as
the "Authority" which expression shall unless excluded by or repugnant to the
context, include his successors in office and assigns) on the one part, and M/s Adani
Total Gas Limited, a company registered under the Companies Act, 1956 and having
its registered office at "Adani Corporate House", Shantigram, Nr. Vaishnodevi Circle,
S. G. Highway, Ahmedabad-382421, Gujarat (hereinafter called the "Licensee")
which expression shall unless excluded by repugnant to the context, include his
successors/ administrator assignee's on the second part. (hereinafter called the
"Licensee") which expression shall unless excluded by repugnant to the context,
include his successors/ administrator assignee's on the second part.

Whereas the authority is responsible, inter-alia, for development and
maintenance of lands from Ch. Km 13/787 to Km. 16/090 of NH no 44RoW.

Whereas the Licensee proposes to lay gas pipeline referred to as utility
services in subsequent paras.

Whereas the Licensee has applied to the Authority for permission to lay utility
services along National Highway- 44 in increasing order of chainage from Ch: 13/787
Km to 16/090 Km for development of CGD in Tikamgarh & Niwari city in Niwari District.

PROJECT DIRECTOR
परियोजना निदेशक
भारतीय राष्ट्रीय राजमार्ग प्राधिकरण

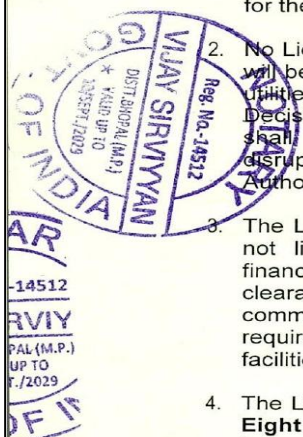
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And whereas the Authority has agreed to grant such permission for way leave on the NH ROW vide RO.-Lakh now letter no..... as per terms and conditions hereinafter mentioned.

Now this agreement witnesseth that in consideration of the conditions hereinafter contained and on the part of the Licensee to be observed and performed, the Authority hereby grants to the Licensee permission to lay utility services as per the approved drawing attached hereto subject to the following conditions, namely.

Now this agreement witnesseth that in consideration of the conditions hereinafter contained and on the part of the Licensee to be observed and performed, the Authority hereby grants to the Licensee permission to lay utility services as per the approved drawing attached hereto subject to the following conditions, namely.

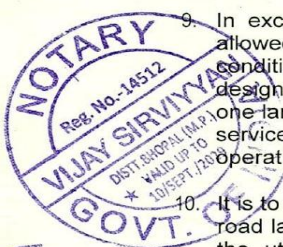
1. RoW permissions are only enabling in nature. The purpose of extending the way leave facility on the National Highway RoW is not for enhancing the scope of activity of a utility service provider, either by content or by intent. Further, enforceability of the permission so granted shall be restricted only to the extent of provision/scope of activities defined in the license agreement & for the purpose for which it is granted.
2. No Licensee shall claim exclusive right on the RoW and any subsequent user will be permitted to use the RoW, either above or below, or by the side of the utilities laid by the first user, subject to technical requirements being fulfilled. Decision of the Authority in relation to fulfillment of technical requirements shall be final and binding on all concerned parties. In case any disruption/damage is caused to any existing user by the subsequent user, the Authority shall not be held accountable or liable in any manner.
3. The Licensee shall be responsible for undertaking all activities including, but not limited to site identification, survey, design, engineering, arranging finance, project management, obtaining regulatory approvals & necessary clearances, supply of equipment, material, construction, erection, testing and commissioning, maintenance and operation and all other activities essential or required for efficient functioning of their own utility/industrial infrastructure facilities.
4. The Licensee shall pay license fees of RsRs. **64,845/-(Sixty four Thousand Eight Hundred Forty FiveOnly)** to the Authority. The License fee shall become payable from for five (5) years the date of handing over of RoW land to the Licensee, for laying of utilities/cables/conduits/pipelines for infrastructure/service provider. As regards Tariff and Terms and conditions for providing common utility ducts along National Highways, there shall be a separate agreement regime.
5. Fee shall have to be paid in advance for the period for which permission is granted for entering into a license agreement. In case of renewal, rate prevailing at the time of renewal shall be charged. Delay in deposition of fee shall attract interest @ 15% per annum compounded annually.




परियोजना निदेशक
PROJECT DIRECTOR
भारतगैस, पकाड़, झारखंड
NHAI, PIU, JHANSI

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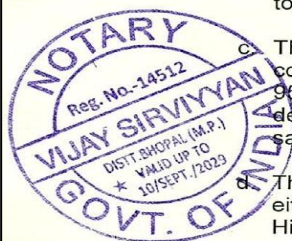
6. Present policy of the MoRT&H is to provide a 2.00 m wide utility corridor on either side of the extreme edge of RoW. In cases where utility ducts with sufficient space are already available along NH, the utility services shall be laid in such ducts subject to technical requirements being fulfilled.
7. The utility services shall be laid at the edge of the RoW. In case of restricted width of RoW, which may be adequate only to accommodate the carriageway, central verge, shoulders, slopes of embankment, drains, other road side furniture etc, the utility services shall be laid beyond the toe line of the embankments and clear of the drain.
8. The Licensee shall make his own arrangement for crossing of cross drainage structure, rivers, etc. below the bed. In case, this is not feasible, the utility services may be carried outside the railings/parapets and the bridge superstructure. The fixing and supporting arrangement with all details shall be required to be approved in advance from the concerned Highway Administration. Additional cost on account of fixing and supporting arrangement as assessed by the Authority shall be payable by the Licensee.
9. In exceptional cases, where RoW is restricted the utility services can be allowed beneath the carriageway of service road, if available, subject to the condition that the utility services be laid in concrete ducts, which will be designed to carry traffic on top. The width of the duct shall not be less than one lane. In such cases, it also needs to ensure that maintenance of the utility services shall not interfere with the safe and smooth flow of traffic. The cost of operation and maintenance will have to be borne by the Licensee.
10. It is to be ensured that at no time there is interference with the drainage of the road land and maintenance of the National Highways. Towards this, the top of the utility services shall be at least 0.6 meter below the ground level. However, any structure above ground shall be aesthetically provided for / landscaped with required safety measures as directed by the concerned Authority.
11. The utility services shall be permitted to cross the National Highway either through structure or conduits specially built for that purpose. The casing/conduit pipe should, as minimum, extend from drain to drain in cuts and toe of slope to toe of slope in the fills and shall be designed in accordance with the provision of IRC and executed following the Specifications of the Ministry.
12. Existing drainage structures shall not be allowed to carry the lines across.
13. The top of the casing/conduit pipe containing the utility services to cross the road shall be at least 1.2 m below the top of the sub grade or the existing ground level whichever is lower, subject to being at least 0.3m below the drain inverts. A typical sketch showing the clearances is given in Attachment-I.
14. The utility services shall cross the National Highway preferable on a line normal to it or as nearly so as practicable.
15. The casing/conduit pipe for crossing the road may be installed under the road embankment either by boring or digging a trench. Installation by boring method shall be preferred.



परियोजना निदेशक
PROJECT DIRECTOR
भारतगैस, पकाई, झरसी।
NHAI, PIU, JHANSI

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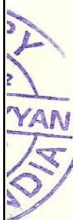
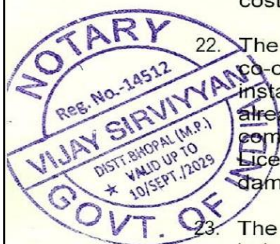
16. In case of trenching, the sides of the trench should be done as nearly vertical as possible. The trench width should be at least 30 cm. but not more than 60 cms wider than the outer diameter of the pipe. Filling of the trench shall conform to the specifications contained here-in-below or as supplied by the Highway Authority.
 - a. Bedding shall be to a depth not less than 30 cm. It shall consist of granular material, free of lumps, clods and cobbles, and graded to yield a firm surface without sudden change in the bearing value. Unsuitable soil and rock edges should be excavated and replaced by selected material.
 - b. The back fill shall be completed in two stages (i) Side-fill to the level of the top of the pipe (ii) Overfill to the bottom of the road crust.
 - c. The side fill shall consist of granular material laid in 15 cm. Layers each consolidated by mechanical tamping and controlled addition of moisture to 96% of the Proctor's Density. Overfill shall be compacted to the same density as the material that had been removed. Consolidation by saturation or ponding will not be permitted.
 - d. The road crust shall be built to the same strength as the existing crust on either side of the trench or to thickness and specifications stipulated by the Highway Authority.
17. The Licensee shall ensure making good the excavated trench for laying utility services by proper filling and compaction, so as to restore the land in to the same condition as it was before digging the trench, clearing debris/loose earth produced due to execution of trenching at least 50 m away from the edge of the right of way.
18. All required restoration work subsequent to laying of the cable shall be required to be undertaken by the Licensee at its cost either by itself or through its authorized representative in consultation with the Authority as per predetermined time schedule and quality standards.
19. Prior to commencement of any work on the ground, a performance Bank Guarantee @ Rs. 100/-Per route meter/Rs. One Lakh per crossing with a validity of one year initially (extendable if required till satisfactory completion of work) shall have to be furnished by the Licensee to the Authority/its designated agency as a security against improper restoration of ground in terms of filling/unsatisfactory compaction damages caused to other underground installations/utility services & interference, interruption, disruption or failure caused thereof to any services etc. In case of the Licensee failing to discharge the obligation of making good of the excavated trench/other restoration work, the Authority shall have a right to make good the damages caused by excavation, at the cost of the Licensee and recover the amount by forfeiture of the Bank Guarantee.



भारतीय गैस प्राधिकरण
PROJECT DIRECTOR
भारतीय गैस प्राधिकरण, जहानपुर
NHAI, PIU, JHANSI

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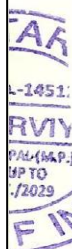
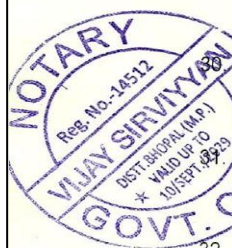
20. In case, the Performance Bank Guarantee is invoked as mentioned above, the Licensee shall be required to replenish and reinstate the required Performance Bank Guarantee within one month of such invoking. In case the work contemplated herein is not completed to the satisfaction of the Authority, which has granted the permission, within a period of 11 months from the date of issue of the Bank Guarantee, the Licensee shall either furnish a fresh guarantee or extend the guarantee for a further period of one year. Notwithstanding this, the Licensee shall be liable to pay full compensation to the aggrieved Authority/its designated agency for any damage sustained by them by reason of the exercise of the RoW facility.
21. The Licensee shall shift the utility services within 90 days (or as specified by the respective Authority) from the date of issue of the notice by the concerned Authority to shift/relocate the utility services, in case it is so required for the purpose of improvement/widening of the road/route/ highway or construction of flyover/bridge and restore the road/land to its original condition at his own cost and risk.
22. The Licensee shall be responsible to ascertain from the respective agency in co-ordination with Authority, regarding the location of the utilities/ underground installations/ facilities etc. The Licensee shall ensure the safety and security of already existing underground installations/ utilities/facilities etc. before commencement of the excavation/using the existing cable ducts. The Licensee shall procure insurance from a reputed insurance company against damages to already existing underground installations/utilities/facilities etc.
23. The Licensee shall be solely responsible/ liable for full compensation/ indemnification of concerned agency/aggrieved Authority for any direct, indirect or consequential damage caused to them/claims or replacements sought for, at the cost and risk of the Licensee. The concerned agency in co-ordination with Authority shall also have a right make good such damages/recover the claims by forfeiture of Bank Guarantee.
24. If the Licensee fails to comply with any condition to the satisfaction of the Authority, the same shall be executed by the Authority at the cost and risk of the Licensee.
25. Grant of License is subject to the Licensee satisfying (a) minimum disruption of traffic and (b) no damage to the highways. As far as possible, the Licensee should avoid cutting of the road for crossing highway, and other roads and try to carry out the work by trench less technology. In case any damage is caused to the road pavement in this process, the Licensee will be required to restore the road to the original condition at its cost. If due to unavoidable reasons the road needs to be cut for crossing or laying utility services, the Licensee has to execute the restoration work in a time bound manner at its cost either by itself or through its authorized representative in consultation with the Authority as per predetermined time schedule and quality standards. In case of the Licensee failing to discharge the obligation of making good of the excavated trench/other restoration work, the Authority shall have a right to make good the damages caused by excavation, at the cost of the Licensee and recover the amount by forfeiture of the Bank Guarantee.






परियोजना निदेशक
PROJECT DIRECTOR
भारराणा, पकड़, जमिनी।
NHAI, PIU, JHANSI

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26. The Licensee shall inform/give a notice to the concerned agency designated by the Authority at least 15 day in advance with route details prior to digging trenches, for fresh or maintenance/repair works. A separate performance Bank Guarantee for maintenance/repair works shall have to be furnished by the Licensee.
 27. Each day, the extent of digging the trenches should be strictly regulated so that utility services is laid and trenches filled up before the close of the work that day. Filling should be completed to the satisfaction of the concerned agency designated by the Authority.
 28. The Licensee shall indemnify the concerned agency in co-ordination with Authority, against all damages and claims, if any due to the digging of trenches for laying cables/ducts.
 29. The permission for laying utility services is granted maximum for 5 years at a time, which can thereafter be considered for renewal. On payment of additional fee at the time of renewal, the permission shall automatically be renewed, unless defaults exist. In case of renewal, rate prevailing at the time of renewal shall be charged. Delay in deposition of fee shall attract interest @ 15% per annum compounded annually.
- The permission shall be valid only for the period it is issued and fee deposited. However, the Authority also has a right to terminate the permission or to extend the period of Agreement.
- That the Licensee shall not undertake any work of shifting, repairs or alterations to the utility services without prior written permission of the concerned agency in co-ordination with the Authority.
32. The permission granted shall not in any way be deemed to convey to the Licensee any ownership right or any interest in route road/highway land property other than what is herein expressly granted. No use of NH RoW will be permitted for any purpose other than that specified in the Agreement.
 33. During the subsistence of this Agreement, the utility services located in highway land/ property shall be deemed to have been constructed and continued only by the consent and permission of the Authority so that the right of the Licensee to the use thereof shall not become absolute and indefeasible by lapse of time.
 34. The Licensee shall bear the Stamp Duty charged on this Agreement.
 35. Three copies of 'as laid drawings' of utilities (hard and soft copies) with Geo-tagged photographs and Geo-tagged video recordings of laying of cables in the trench (with respect to the NH) and after complete restoration shall be submitted to the Authority for verification and record within a month of completion of works.






 परियोजना निदेशक
 PROJECT DIRECTOR
 भारराणा, पकडे, झंसी।
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36. The Licensee shall allow free access to the Site at all times to the authorized representatives of Authority to inspect the Project Facilities and to investigate any matter within their Authority, and upon reasonable notice, shall provide reasonable assistance necessary to carry out their respective duties and functions.
37. The utility services shall not be made operational by the Licensee unless a completion certificate to the effect that the utility services has been laid in accordance with the approved specifications and drawings and the trenches have been filled up to the satisfaction of the concerned agency in co-ordination with the Authority has been obtained. Notwithstanding anything contained herein, this Agreement may be canceled at any time by Authority for breach of any condition of the same and the Licensee shall neither be entitled to any compensation for any loss caused to it by such cancellation nor shall it be absolved from any liability already incurred.
38. The Licensee shall ensure adherence to relevant Indian standards and follow best industry practices, methods and standards for the purpose of ensuring the safe, efficient and economic design, construction, commissioning, operation, repair and maintenance of any part of the utility lines/industrial infrastructure facilities and which practices, methods and standards shall be adjusted as necessary, to take account of;
 - a. Operation, repair and maintenance guidelines given by the manufactures,
 - b. the requirements of Law,
 - c. the physical conditions at the Site, and
 - d. The safety of operating personnel and human beings.
39. The Licensee shall have to provide safety measures like barricading, danger lighting and other necessary caution boards while executing the work.
40. While laying utility services, at least one lane of road shall be kept open to traffic at all times. In case of single lane roads, a diversion shall be constructed. If any traffic diversion works are found necessary during the working period such diversion shall be provided at the cost of Licensee.
41. After the termination/expiry of the agreement, the Licensee shall remove the utility services within 90 days and the site shall be brought back to the original condition failing which the Licensee will lose the right to remove the utility services. However before taking up the work of removal of utility services the Licensee shall furnish a Bank Guarantee to the Authority for a period of one year for an amount assessed by the Authority as a security for making good the excavated trench by proper filling and compaction, clearing debris, loose earth produced due to excavation of trenching at least 50m away from the edge of the RoW.
42. Any disputes in interpretation of the terms and conditions of this Agreement or their implementation shall be referred to the redress mechanism prevailing in the Ministry and the decision of the redress mechanism shall be final and binding on all.



परियोजना निदेशक
PROJECT DIRECTOR
भारतगैस, पटना-8, झारखंड
NHAI, PIU, JHANSI

Annexure IX: Permission from PWD Jhansi

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| Client: Adani Total Gas Limited | Assignment Name: Environmental and Social Impact Assessment (ESIA) Study for Natural Gas Pipeline for Tikamgarh GA, District- Niwari, Madhya Pradesh Report No.: 2025/ET-006496/AD/NA/NA/64187 Version No and Date of Version: Ver 01 dated 17.07.2025 |
|  | <div> <div>Page 245</div> <div>Format. No. TSSA-IS_GES_ET_ESIA_Rev.01 Dt.01.08.2024</div> <div>ADVISORY REPORT</div> </div> |

कार्यालय अधिशासी अभियन्ता
नि०ख०-३, लो०नि०वि०, झाँसी

पत्रांक :- 61/अधि/२५-२५
सेवा में

दिनांक :- 13/01/2025

Adani Total Gas Limited
(Formerly known as Adani Gas Ltd), Crest 4-5, Inspire Business Park,
Shantigram, Nr. Vaishnodevi Circle, S.G. Highway, Ahmedabad-282421

विषय :- Tikamgarh-Niwari GA CGD Project Proposal for laying of 8" dia pipeline along and within ROW of roads from village Bargaon, (Near Bijauli Industrial area, Jhansi) to village Pratappura in Tehsil Orchha, District Niwari-Pipeline laying along & across to various Road along the pipeline route in Niwari District

संदर्भ :- Your Ref No - ATGL/Tikamgarh GA/Jhansi/PWd Road/Pay Sub/2024 Dated-16.10.2024, & ATGL/Tikamgarh GA/Jhansi/PWd Road/Pay Sub/2024 Dated-23.12.2024

महोदय,

उपरोक्त विषयक संदर्भित पत्र के क्रम में अवगत कराना है, कि जनपद झाँसी में झाँसी बबीना मार्ग के चैनैज-10.300 से 10.454 लम्बाई-154 मीटर तक कच्चा सतह कटिंग (मार्ग के सामान्तर तक) एवं मार्ग के चैनैज-10.300 लम्बाई-20.50 मीटर (मार्ग को काटने हेतु) में गैस लाईन विछाने हेतु इस कार्यालय के पत्र संख्या-1121/कटिंग/2024-25 दिनांक-01.08.2024 के द्वारा रु० 247170.00 एवं 27457.00 की धनराशि कार्यालय में जमा कराने हेतु लिखा गया था। जिसके क्रम में गैस लाईन कैबिल डालने हेतु रोड कटिंग हेतु आप द्वारा Bank Guarantee No. 0024NDLG00176425 Dated-10.09.2024 & D.D. No. 500906 Dated-17.12.2024 को इस कार्यालय में जमा कर दी गयी है। जिसके क्रम में उपरोक्त मार्ग पर निम्न प्रतिबन्धों के साथ अनापत्ति प्रदान की जाती है :-

1. झाँसी बबीना मार्ग पर (ललितपुर से रक्सा) फोर लेन पर कच्चा सतह कटिंग का कार्य चैनैज-10.300 से 10.454 तक तटबन्ध के एज से उचित दूरी पर किया जायेगा। कटिंग का कार्य होने के 72 घण्टे के अन्दर स्थल को मूल स्थिति में ला दिया जाये।
2. मार्ग के चैनैज-10.300 पर ट्रान्सवर्स गैस पाईप लाईन डालने का कार्य HDD मैथर्ड द्वारा किया जायेगा। HDD मैथर्ड द्वारा मार्ग की सतह से कम से कम 2.0 मीटर गहराई पर ही गैस पाईप लाईन डालने का कार्य कराया जायेगा।
3. HDD मैथर्ड द्वारा गैस पाईप लाईन डालने हेतु पिट बनाने का कार्य मार्ग की पट्टी से उचित दूरी (कम से कम 3.0 मीटर) पर कराया जायेगा।
4. उक्त मार्ग अन्य जिला मार्ग श्रेणी का मार्ग है, जो कि एक महत्वपूर्ण मार्ग है, तथा यातायात घनत्व ज्यादा है। Edge कटिंग करते समय आवश्यक चेतावनी बोर्ड व बैरिकेट्स व रात्रि में Halogen Light लगायी जाये।
5. कार्य करते समय यदि दुर्घटना होती है, तो विभाग की कोई जिम्मेदारी नहीं होगी, इसकी पूर्ण जिम्मेदारी आपकी होगी।
6. गैस पाईप लाईन डालने हेतु पिट बनाने का कार्य मार्ग की पक्की सतह से कम से कम 6.00 मीटर ROW के बाहर पर किया जायेगा।
7. रोड कटिंग से यदि लो०नि०वि०, या अन्य किसी विभाग की सम्पत्ति/यूटिलिटी को किसी प्रकार की क्षति होती है, तो इसका समस्त उत्तरदायित्व आपका होगा।
8. यह अनुमति केवल दो माह के लिए अनुमन्य होगी।
9. उपरोक्त शर्तों का अनुपालन न करने पर यह एन०ओ०सी० स्वतः निरस्त तथा आपके विरुद्ध विभागीय निर्देशों के अनुसार कार्यवाही की जायेगी।

अधिशासी अभियन्ता
नि०ख०-३, लो०नि०वि०, झाँसी
दिनांक :- / / 2025

पत्रांक :- /

प्रतिलिपि :- सहायक अभियन्ता, () नि०ख०-३, लो०नि०वि०, झाँसी को उपरोक्तानुसार सूचनार्थ एवं आवश्यक कार्यवाही हेतु प्रेषित।

प्रतिलिपि :- खण्डीय कैशियर, नि०ख०-३, लो०नि०वि०, झाँसी को इस निर्देश के साथ प्रेषित है, कि रोड कटिंग की Bank Guarantee No. 0024NDLG00176425 Dated- 10.09.2024 Rs. 247170.00 & D.D. No. 500906 Dated- 17.12.2024 Rs. 27457.00 को उक्त मद में जमा कराना सुनिश्चित करें।

अधिशासी अभियन्ता
नि०ख०-३, लो०नि०वि०, झाँसी

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|------------------------------------|--|
| Client: Adani Total Gas Limited | Assignment Name: Environmental and Social Impact Assessment (ESIA) Study for Natural Gas Pipeline for Tikamgarh GA, District- Niwari, Madhya Pradesh Report No.: 2025/ET-006496/AD/NA/NA/64187 Version No and Date of Version: Ver 01 dated 17.07.2025 |
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Annexure X: Permission from PWD Niwari

कार्यालय कार्यपालन यंत्री लोक निर्माण विभाग संभाग निवाड़ी जिला निवाड़ी (म0प्र0)
Email- ceepwd.niwari@mp.gov.in

क्रमांक 790 / टी0एस0 / दिनांक 12.11.2024

प्रति,
 अडानी टोटल गैस लिमिटेड
 एस0जी0हाइवे अहमदाबाद
 गुजरात

विषय:- ओरछा मड़ोर चकरपुर मार्ग पर सड़क किनारे गैस पाईप लाईन विछाने हेतु अनापत्ति प्रमाण पत्र दिये जाने वावत्।

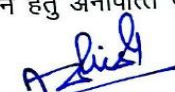
संदर्भ:- आपका पत्र क्रमांक/05/2024 दिनांक 06.05.2024 एवं इस कार्यालय का पत्र क्रमांक 515/टी0एस0/दिनांक 30.07.2024

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उपरोक्त विषय एवं संदर्भ में ओरछा मड़ोर चकरपुर मार्ग पर कुल 3800 मी0 लंबाई में सड़क किनारे गैस पाईप लाईन विछाने हेतु संदर्भित पत्र क्रमांक 02 द्वारा आपको सशर्त अनुमति प्रदान की गई थी।

आपके द्वारा क्षति प्राक्कलन अनुसार राशि 399000.00 राशि की आई0सी0आई0सी0आई0 बैंक गारण्टी क्र0 0024NDLG00176525, कार्यपालन यंत्री लोक निर्माण विभाग (म0/स0) संभाग टीकमगढ़ के पक्ष में एक वर्ष के लिये प्रदान की गई है। जिसकी वैधता दिनांक 09.09.2025 है।

अतः इस कार्यालय के पूर्व पत्र क्रमांक 515/टी0एस0/दिनांक 30.07.2024 द्वारा जारी अनापत्ति प्रमाण पत्र में प्रदत्त शर्त क्रमांक 1 से 4 का पालन करते हुये मार्ग के दोनों ओर 6.00 मी0 छोड़कर, 200 मी0 डाय गैस पाईप लाईन डाले जाने हेतु अनापत्ति जारी की जाती है।


 कार्यपालन यंत्री
 लोक निर्माण विभाग निवाड़ी

Annexure XI: Permission from DRM Jhansi

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| Client: Adani Total Gas Limited | Assignment Name: Environmental and Social Impact Assessment (ESIA) Study for Natural Gas Pipeline for Tikamgarh GA, District- Niwari, Madhya Pradesh Report No.: 2025/ET-006496/AD/NA/NA/64187 Version No and Date of Version: Ver 01 dated 17.07.2025 |
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**मंडल रेल प्रबंधक कार्यालय
इंजीनियरिंग शाखा, झाँसी
DRM Office
Engineering Branch, Jhansi**

NO-JHS/W/LAND/NOC/E/Gas pipe xing/2024-WL-66

Dated- 04.10.2024

GA Head

Adani Total Gas Limited

Ahmedabad

Mb No 9958896200

Sub- Permission for laying of U/G Gas pipe (350 mm casing with 200 mm carrier) Xing at 1139/10-11 between **ORC- BWR** stations on **JHS-MKP** Section by **M/s- Adani Total Gas Limited**.

Ref- IR-RBCS application ID no- **NCR-JHS-2024-WL-66** dated-**13.08.2024**

With reference to the above, your proposal of way leave facilities for above mentioned work have been approved by the competent authority. You are provisionally authorized to execute the work by Trenchless/HDD method within Railway land as per approved drawing subject to the following conditions:-

- Work to be executed after execution of way leave agreement & deposition of all way leave charges through online payment portal of MERS on RBCS website and submission of 5 lakh Bank Guarantee (BG)
- The work should be carried out under the close supervision of Railway Officials as per Railway board circular's/RDSO guidelines, amended time to time.
- If any damages occurred to the Railways property, necessary charges shall be paid by the party as per Railway board Lno-2001/LML/24/20 dated-14.09.2016 & 2003/Tele/RCIL/pt. IX dated-24.06.2012(Telecom circular no-17/2013).
- The work should be executed strictly as per approved final drawing only in presence of Railway authorized personnel concerned ADEN, SSE(P-way), SSE(Works) etc.
- Work should be executed with five day notice in advance to S&T/Engg./Electrical & Optg. staff. The depth of pipe line crossing below the GL should be strictly decided in consultation and presence of S&T department of Railway. The minimum depth from GL must be as per approved drawing.
- Date of commencement and completion of work information should be advised this office immediately.
- All safety measures must be taken at the time of execution of the work, by the party. It must be insured while execution of work existing cables must not be affected at any cost.
- The work should be completed within 06 months from date of final work permission/agreement.
- The Railway will not be responsible at any stage to refund way leave charges.

Sr.DEN/E/JHS

C/-Sr.DFM/JHS- For kind information and necessary action.

C/-Sr.DSTE/Co/JHS-for kind information and necessary action.

C/-Sr.DEE/G/JHSfor kind information and necessary action.

C/-Sr.DEE/TRD/JHS-for kind information and necessary action.

C/-ADEN/MBA- for kind information and necessary action.


Signature Not Verified

Digitally signed by
GOPALKRISHNAN
VISHWANATHAN
Date: 2024.10.04 17:43:12 IST

Signature Not Verified

Digitally signed by Ayush
Srivastava
Date: 2025.01.27 12:04:31
IST

Sr.DEN/E/JHS

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|---|---|
| Client: Adani Total Gas Limited | Assignment Name: Environmental and Social Impact Assessment (ESIA) Study for Natural Gas Pipeline for Tikamgarh GA, District- Niwari, Madhya Pradesh Report No.: 2025/ET-006496/AD/NA/NA/64187 Version No and Date of Version: Ver 01 dated 17.07.2025 |
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