



Government of Nepal
Ministry of Physical Infrastructure and Transport
Department of Roads
Development Cooperation Implementation Division

**Accelerating Transport and Trade Connectivity in Eastern South Asia
(ACCESS) Phase-1 Project**

**Upgrading of Gorusinghe - Chandrauta Road Section of East-West
Highway**



Environmental and Social Impact Assessment (ESIA)

November 2025

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List of Acronyms

ACCESS	Accelerating Transport and Trade Connectivity in Eastern South Asia
Amsl	Above mean sea level
AP	Affected peoples
BOD	Biological Oxygen Demand
CBOs	Community-Based Organizations
CC	Construction Contractor
CDC	Compensation Determination Committee
C-ESMP	Contractor's Environmental and Social Management Plan
CF	Community Forests
CIA	Cumulative Impact Assessment
CITES	Convention on International Trade of Endangered Species
CoI	Corridor of Impact
CSC	Construction Supervision Consultant
Cums	Cubic meters
DAO	District Administration Office
DBST	Double Bituminous Surface Treatment
DCC	District Coordination Committee
DCID	Development Cooperation Implementation Division
DFO	Divisional Forest Office
DIA	Direct Impact Area
DLR	District Land Revenue Office
DNPWC	Department of National Parks and Wildlife Conservation
DO	Dissolved Oxygen
DoLOS	Department of Labour and Occupational Safety
DoMG	Department of Mines and Geology
DoR	Department of Roads
DoTM	Department of Transport Management
DPHO	District Public Health Office
DRO	Divisional Road Offices
EA	Environmental Assessment
EAAA	Ecologically Appropriate Area of Analysis

EHS	Environment Health and Safety
EPA	Environmental Protection Act
EPR	Environmental Protection Rules
ESCP	Environmental and Social Commitment Plan
ESF	Environment and Social Framework
ESIA	Environment and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESS	Environmental and Social Standard
FB	Footbridges
FGD	Focus Group Discussions
FPIC	Free Prior Informed Consent
GBV	Gender Based Violence
GC	Gorusinge Chandrauta
GESU	Geo-Environment and Social Unit
GHG	Greenhouse Gas
GoN	Government of Nepal
GPN	Good Practice Note
GRC	Grievance Redress Committee
GRM	Grievance Redress Mechanism
Ha	Hectare
HHs	Households
IAS	Invasive Alien Species
IFC	International Finance Corporation
IIA	Indirect Impact Area
IP	Indigenous People
IPDP	Indigenous People's Development Plan
IPDP	Indigenous Peoples Development Plan
IPPF	Indigenous Peoples Planning Framework
KII	Key Informant Interviews
LHF	Leasehold Forest
LLR	Land and Land Resources
LMP	Labour Management Procedure
MBT	Main Boundary Thrust
MCT	Main Central Thrust
MFT	Main Frontal Thrust

MoFE	Ministry of Forest and Environment
MoPIT	Ministry of Physical Infrastructure and Transport
MT	Mahabharat Thrust
NDWQS	National Drinking Water Quality Standard
NEFIN	Nepal Federation of Indigenous Nationalities
NEIC	National Earthquake Information Centre
NGDC	National Geological Data Centre
NGO	Non-Government Organization
NNQSL	National Noise Quality Standard Limit
NOAA	National Oceanic and Atmospheric Administration
NTFP	Non-Timber Forest Products
OSH	Occupational Safety and Health
OSHA	Occupational Safety and Health Association
PA	Project Area
PAF	Project Affected Families
PAP	Project Affected Persons
PCU	Project Coordination Units
PGA	Peak Gravitational Acceleration
PMU	Project Management Units
RM	Rural Municipality
RoW	Right of Way
SC	Supervision Consultant
SPAF	Severely Project Affected Families
SRCTIP	Strategic Road Connectivity and Trade Improvement Project
SRN	Strategic Road Network
STI	Sexually Transmitted Infections
TAL	Terai Arc Landscape
WB	World Bank
ZOI	Zone of Influence
FOB	Foot over Bridge

EXECUTIVE SUMMARY

Introduction

The Government of Nepal has prepared and started the Accelerating Transport and Trade Connectivity in Eastern South Asia– Nepal Phase 1 Project (ACCESS) Program for World Bank financing, which is in the implementation phase. The ACCESS Phase 1 Project (the Project) is the first phase of the Program to support the development of efficient and resilient trade and transport along selected regional corridors. The Project has four components:

- **Component 1: *Digital Systems for trade.*** This component supports the adoption and Implementation of Digital and Automated Systems for the improvement of Nepal’s cross-border clearances. (a) Development of Integrated Automated System Border Management, including an electronic cargo tracking system, (b) Development of a businessintelligence and data analytics system and risk engine (c) Development of – Deployment of intelligence systems related to data networks, closed-circuit television (CCTV) systems, and other monitoring systems, through the upgrading of hardware and software systems, and (d) Development of a web-based supply MIS for automation of registration processes and permits.
- **Component 2: *Green and Resilient Transport and Trade Infrastructure.*** This component supports (a)Upgrading of Butwal-Gorusinghe Road section and Gorusinghe-Chanauta Road section of East-West Highway from 2 to 4 lanes, (b) Construction of a green resilient urban bridge (including detailed design/urban design and construction), and (c) Support for development and implementation of green resilient highway concept, integrating transportation functionality and ecological sustainability.
- **Component 3: *Institutional and Policy Strengthening for Transport and Trade.*** The component supports in streamlining the policy environment for regional trade and cross-border movement of goods through (a) Bangladesh-India-Nepal Motor Vehicle Agreement-related reforms, (b) Reforms to support private sector initiatives, (c) Training programs and capacity building activities, and (d) Project preparation studies.
- **Component 4: *Contingency Emergency Response supports unforeseen emergency needs.*** In case of a major natural or human-made disaster, GoN may request the Bank to re-allocate project funds to this component to support its quick response and reconstruction

Environmental and Social Risk and Impact Assessment Approaches of the Project

The Project is adopting an Environmental and Social Management Framework (ESMF) and project-specific Environmental and Social Impact Assessment (ESIA) for the screening, assessment, and management of environmental and social impacts and risks of the project and projects. The updated ESMF of DoR, which has been developed and disclosed dated 3rd February, 2025 which is separately, being used separately to guide the screening, impact assessment, and development of the environmental and social management measures of the Gorusinghe-Chandrauta Road section of the East-West Highway, the Green resilient urban bridge, and the upgradation of facilities of land ports at important border crossings. During project implementation, the design details of these activities/projects are defined and prepared.

This ESIA is prepared for the Gorusinghe-Chandrauta Road section of the East-West Highway based on the detailed design to assess the environmental and social risks and impacts before execution of the project, following the Government of Nepal's (GoN) requirements and World Bank's Environmental and Social Framework (ESF).

Description of the Gorusinghe-Chandrauta Road Section of the East-West Highway

The Gorusinghe-Chandrauta (GC) road is located in the Kapilbastu district of Lumbini Province. The GC Road section starts from near Belwagurdawa river bridge (CH 640+000), i.e., continuation of BG section, and ends at Umari/Shivpur Chowk (659+200) west of Chandrauta Chowk. The road passes through a section of Buddhabhumi and Shivraj Municipality, crossing through two major settlements, viz Gorusinghe and Chandrauta, via small built-up areas such as

Imiliya, Dumara, Champapur, Kharendrapur, and Shivpur etc. The road section passes entirely through plain terrain (generally varying from 100-150 masl). This road section passes through the community forests and the collaborative forest for the major part. The location of the road is shown in Figure E1.

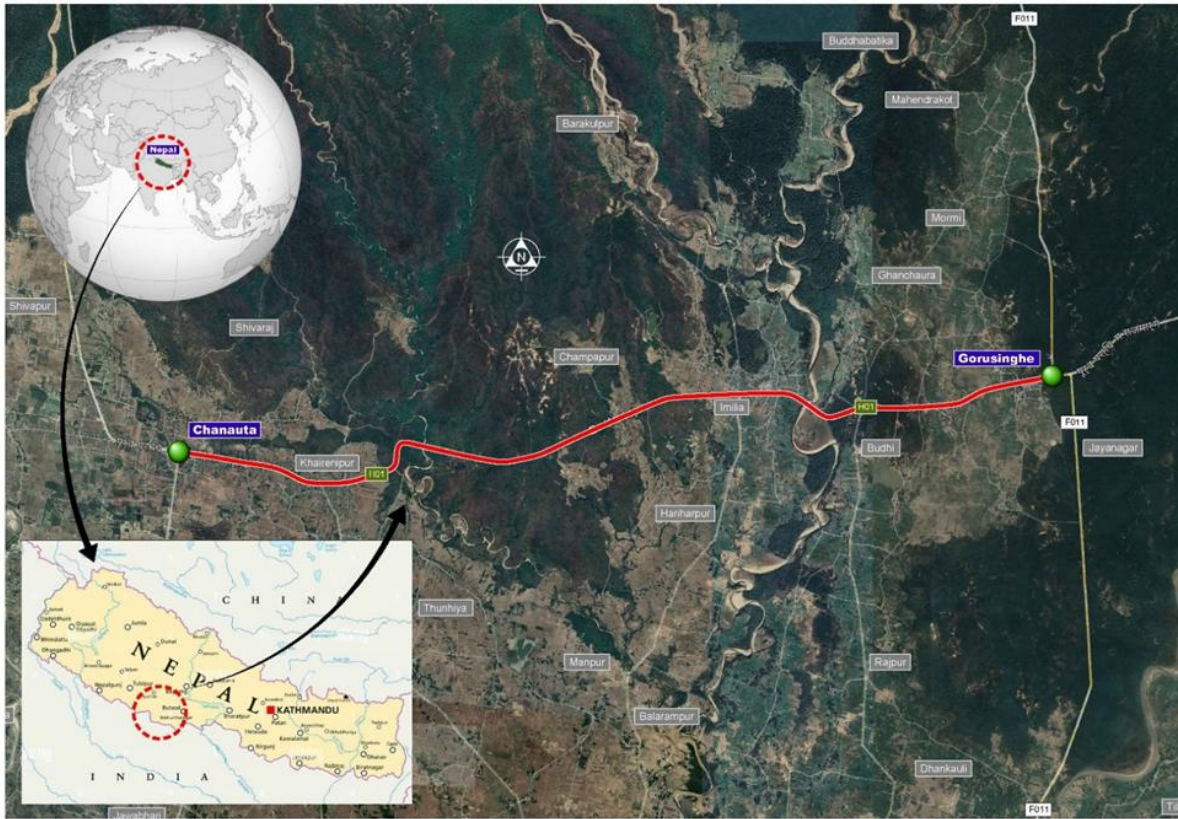


Figure E1: Location Map of Goringhe - Chandrauta (GC) Road

The existing 19.2 km long GC Road is a two-lane bituminous road with a 6 m carriage way and 1 m shoulder on both sides. The GC Road is a section of the East-West Highway, connecting cross-border trade facilities with India. The current condition of the road is poor due to damage and cracks in the pavement, with potholes at many locations. The retaining walls in the initial section are also in poor condition. There are no road safety facilities, such as footpaths, pedestrian crossings, paved shoulders, road signs, wildlife crossings, crash barriers, including cycle lanes. In Chandrauta and urban areas existing road is 15 m wide. All existing bridges in the section are double-lane configurations. On average, the finished road level rises 0.5-1 m above the natural ground level, except at embankments for bridge approaches, where it reaches above 6 meters. The existing RoW is 25 m each side (total of 50 m RoW) from the central line. As such, there will be no need to acquire additional land for the project except in the case of improving reverse curves.

The existing right-of-way (RoW) of the road is 50m, and the proposed works will be implemented within the available existing ROW. Under the Project, GC Road will be upgraded from 2 lanes to 4 lanes with additional service roads with intermittent service lanes on sides, additional roadside structures, geometry improvements, pavement construction with asphalt concrete drainage improvement, retaining structures, slope protection/stabilization, and bridge construction works on traffic management and road safety, pedestrian sheds, footpaths, and cycle lanes. Eight new bridges, including box culverts of different lengths, will also be constructed. The 19.2 km GC road will be an express highway, with a design speed of 100 Kmph in plain terrain and 80 Kmph

in rolling terrain, and with a green resilient road in Asian Highway standard traversing the Kapilbastu district. The road covers ward 9 of Buddhabhumi municipality and wards 1, 3, 4 & 5 of Shivraj municipality.

The salient features of the existing road and proposed road upgrading works are given in Table E1. A conceptual design of these upgrades is shown in Figure E2.

Table E1. Salient Features of the Existing GC Road

Description	Features
Name of the project	Upgrading of the Gorusinghe-Chandrauta road (19.2 km) section of EWH to four-lane standards.
Province	Lumbini
District	Kapilbastu
Affected municipality	Buddhabhumi Municipality and Shivraj Municipality
Geographical features	Terai
Geology	Plain/ Rolling
Climate	Tropical /Sub-tropical
Altitude	100 m-150 m msl
Total length	19.2 km
Starting point	Near Belwagurdawa Nadi (CH 640+000)
End point	Umari/Shivpur Chowk (CH 659+200)
Road standard	National highway
Right of Way	25 m each side from the central line (50 m ROW)
Existing Carriage way width, with Shoulder	Two-lane facility (7 m carriageway) with paved shoulders
Design speed	100 Kmph in plain terrain and 80 Kmph in rolling terrain
Design period for operation	20 years
Surface type	Bituminous
Type of work	Upgrading
Total bridge	2 Major bridges and 6 minor bridges, 1 VUP & 2 PUPs, 1 FOB
Culverts	64 box culverts and 7 pipe culverts
Carriageway width of the structure	Rural and forest area - 24.0 m, Urban area- 50 m, including space for utility
Width of Footpath	2.0 m (Both Sides)
Estimated Project Cost	NRs. 5.6 billion (without VAT)
Cost Per Km	NRs. 290.2 million

Scope of ESIA for the Gorusinghe-Chandrauta Road

This ESIA is for the GC Road to: i) establish the environment and social characteristics/baseline within the Direct Impact Area RoW 25 m. either side the center of road, Indirect Impact Zone as 300m. corridor, on both sides edge of the road and Zone of Influence (ZoI) could be the affected wards (ward- 9 of Buddhabhumi Municipality and wards-1, 3, 4 & 5 of Shivaraj Municipality); ii) assess potential adverse and positive environmental and social (E&S) risks and impacts due to the planned improvements under the project during its entire cycle, that is, from preconstruction to construction, operation and maintenance; iii) consider all Environment, Social, Health and Safety (ESHS) risks and impacts likely in the GC road improvement works; and to propose proportionate measures to

address all environmental and social impacts of the road improvement. iii) Project alternatives analysis study was selected, and two options were mainly considered environmental, technical, and economic reasons. In the first option, concentric widening of the road with eccentric widening of bridges, and in the second option, eccentric widening in the rural section, concentric in the urban section of the road with eccentric widening of bridges. iv) Stakeholder consultations throughout the entire project cycle for project information sharing and addressing people's concerns, views, and recommendations into the design and grievances redress mechanism (project level GRM, workers' GRM, and SEA/SH GRM) as part of the citizen engagement. The ESMP proposed in this ESIA study will be complemented by key social management plans such as the Resettlement Action Plan (RAP), Stakeholder Engagement Plan (SEP), Labour Management Procedure (LMP), and Sexual Exploitation, Abuse and Sexual Harassment (SEA/SH) Risk Mitigation Action Plan. Development Cooperation Implementation Division (DCID) under the Department of Roads (DoR) and the Ministry of Physical Infrastructure and Transport (MoPIT) is the key implementing agency for overall project implementation and monitoring of ESMP implementation, along with a reporting system as ESIA scope.

Legal and Institutional Framework

Nepal's national legislative framework, WB Environmental and Social Framework (ESF) and Environment Health and Safety Guidelines (EHSGs), form the legal and institutional framework for this ESIA. This section of the ESIA provides an overview of the applicable environmental and social policies, legislative and institutional frameworks, which the project must comply with during its implementation. The national legal and institutional framework is based on the Constitution of Nepal (2015), which provides the right of everybody to live in a clean and healthy environment and conserve, promote and make sustainable use of natural resources. A detailed analysis of the existing legislative framework in Nepal was undertaken, which included a review of all relevant documents such as development plans, strategies, policies, acts and rules. The national directives, guidelines, manuals, and standards help fulfill the regulatory framework requirements, providing useful, practical tools applicable to project implementation.

The existing regulatory framework was analyzed and tabulated, highlighting relevant key provisions to the GC Road ESIA. Some of the important laws and regulations reviewed included (but were not limited to) the following: The Road Safety Action Plan (2013-2020), Nepal National Biodiversity Action Plan (2014-2020), Nepal National Environment Policy (2019), Forest Policy (2015), Labour Policy (2005), Land Acquisition, Resettlement and Rehabilitation Policy (2015), Environment Protection Act (2019), Forest Act (2019), Control of International Trade of Endangered Wild Fauna and Flora Act (2017), Labour Act (2017), Child Labour (Prohibition and Regulation) Act (2000), National Gender Equality Policy (2020), Sexual Harassment at Workplace (Prevention) Act, 2014, and Land Acquisition Act (1977) with amendments, Labour Rules (2018), Water Resources Regulation (1993), National Climate Change Policy, 2019, Industrial Policy (2010), Environment Protection Rules (2020), Forest Regulation (2022), Occupational Health and Safety Policy, 2023. Being a signatory party for many international conventions and other treaties, Nepal is bound to address the vital environmental and social issues transboundary or global in nature, such as pollution, climate change, and biodiversity conservation.

The provisions of the national regulatory framework, guideline and manual have been taken into account during the ESIA process, in addition to the World Bank ESF and EHSGs to omit key policy and institutional gaps through assessment of impacts with risk categorizations (High Risk, Substantial Risk, Moderate Risk and Low Risk) and management by mitigation hierarchies (avoid, minimize, mitigate and compensation/offset) based on WB 10 ESSs. This ESIA study mainly covers and focuses on ESS-1, ESS-2, ESS-3, ESS-4, ESS-5, ESS-6, ESS-7, ESS-8, ESS-

10 and preparation of standalone documents RAP, LMP, SEP and site-specific plans/ESMPs as required to fill such gaps and safeguard compliance.

Baseline Environmental and Social Conditions

The baseline data was collected from April to December 2024 for key environmental attributes like physiography, drainage, geology, soil, hydrogeology, land use, flora, fauna, forest/vegetation cover, climate, ambient air quality, water quality, ambient noise levels, hazards and vulnerability. It also collected social attributes such as socio-economic characteristics of affected households, cultural heritage, public utilities, Indigenous Peoples (IPs), vulnerable groups, and gender.

GC road passes entirely through plain terrain (generally varies from 100-150 masl). It starts near Belwagurdawa Nadi Bridge (CH 640+000) i.e., continuation of Butwal-Gorusinghe Section and ends at Umari/Shivpur Chowk. The project road passes through Buddhabhumi and Shivraj municipality crossing through two major settlements, viz Gorusinghe and Chandrauta via small built sections such as Imiliya, Champapur, Kharendrapur and Shivpur etc.

Physical Environment:

The GC Road mainly lies within the Terai region (plain terrain), with an elevation of 100 to 150 m amsl (above mean sea level). The land use map of the GC Road is shown in Figure E2. The road lies in a tropical and sub-tropical climate with humid and hot characteristics. In general, the rainy season (monsoon) starts in June and ends in September. About 80% of the rainfall occurs in this season. The average minimum temperature of Kapilbastu is 18.79°C °C, and the average maximum temperature is 30.93°C. Throughout the year Kapilvastu district has a temperature range from around 10°C to 43°C, with the lowest temperatures occurring in December-January and peak temperatures in May-June. Most of the major rivers in the project area originate from the Siwalik and Mahabharat hills. Some of these rivers are prone to flash floods during the monsoon but dry during the remaining seasons. The road alignment falls on the sediments of the Gangetic Plain (Upper Terai) and rocks of the Siwalik Group of western Nepal.

Baseline Air Quality of the project area has been monitored in three representative locations, Imeliya, Jawai Khola, and Chandrauta. The Lab analysis report for air quality is given in Annex II. It is noticed that all the monitored parameters were within the National Air Quality Standard (NAQS), Ministry of Forests and Environment, 2012. The main sources of air pollution within the project area are vehicular emissions, construction activities, industrial pollution, and loading and unloading of sand from riverbeds. It is noticed that both the sound level and the equivalent noise level are higher at Chandrauta Chowk than in other places. The maximum noise level is in Chandrauta (75 dB) and the minimum is in the Jawai river (35 dB). It is found that all three different locations have not exceeded the National Standard for Noise Level 2069 for urban residential area and were within the range of commercial area. The measured noise level in other places was within an urban residential area. Peak noise is recorded when vehicles (mainly trucks and buses) blow a pressure horn and the impact is high at night when background noise is low. In terms of drinking water quality, all the parameters are within the Nepal Drinking Water Quality Standard (NDWQS).

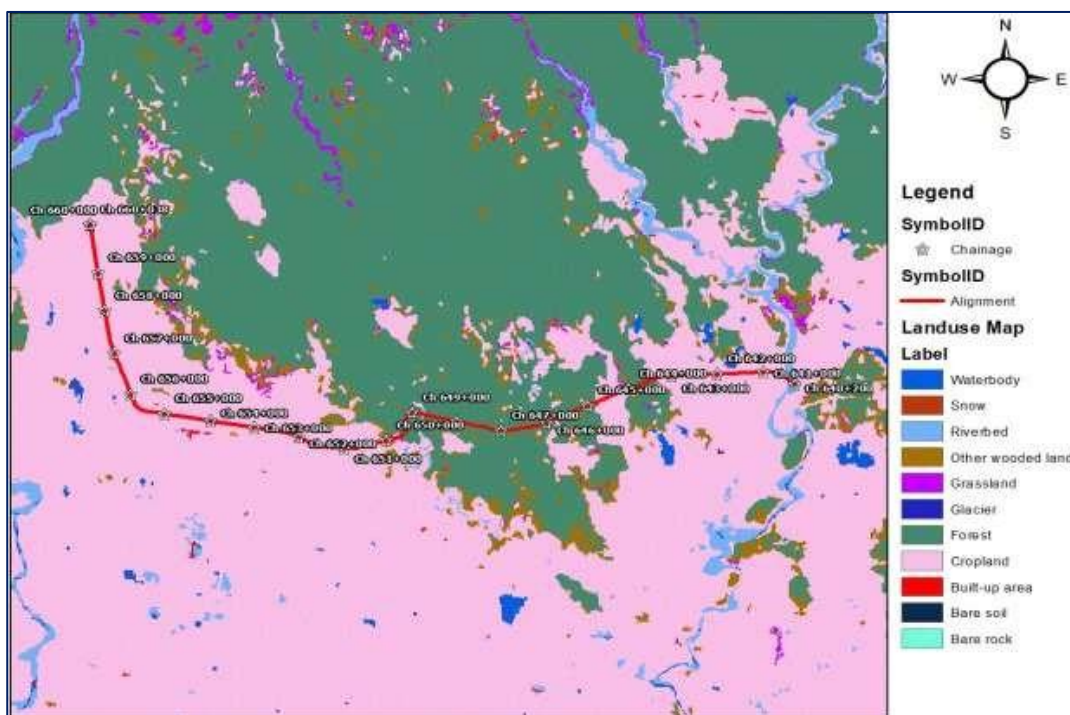


Figure E2: Landuse Map along GC Road

Biological environment:

The East-West Highway is largely located in the Terai Arc Landscape (TAL). The TAL extends for over 900 km from the Bagmati River, Nepal, in the east to the Yamuna River in Uttaranchal, India, in the west, with an area of 51,002 km². The TAL harbors globally important biodiversity and conserves several of Asia's large mammals, birds, reptiles, and freshwater fishes; sustains environmental flows in important rivers; and provides ecosystem services that support the socio-economic well-being of people and development in the Terai and Churia region of Nepal. The GC Road section covered under this ESIA is located centrally within the TAL, which is within a densely populated part of the TAL. The GC Road does not overlap with any protected areas or wildlife corridors and does not fragment any significant natural habitats identified within the TAL. About 5 km of the GC road alignment passes through the community forests dominated by *Shorea robusta* (*Sal*) forest and patches of *Dalbergia-Acacia* (Rosewood) forest near the riverine sections. There are two major forest areas crossing the GC Road (see Figure E2), and they are (i) from the chainage¹ Ch 611+870 to KM 617+730 (Barkalpur-Chamapapur Forest patch (ii) and Ch 626+970 to KM 635+200 (Chamapur-Kharendrapur forest patch). These forests are predominantly community forests followed by the collaborative forest used for multiple purposes, including community use and production of timber, firewood, and fodder. The forests located within 50m RoW (25m from the center of the existing road to both sides) are owned by DoR and are already disturbed and degraded. There are no nationally or internationally designated protected areas, such as national parks or conservation areas, including identified wildlife migration corridors within the corridor of impact and project zone of influence.

Socio-economic and Cultural environment:

¹ The starting chainage of the road is KM 640+220 (this chainage is referenced to the East West Highway) and ends at KM 660+038

The project area covers Lumbini Province and Kapilbastu district and lies in the Buddhabhumi and Shivaraj municipalities. The caste and ethnic compositions found in the project area are Brahmin, Chhetri, Dalit, Muslims, Madheshi, and Janajatis. In the project area, there are three IP groups, namely Tharu, New, Magar, and some vulnerable groups, like above mentioned Dalit, Muslims, and Madheshi community. The major religion is Hindu (68.9%), followed by Buddhist and Muslim, whereas Nepali, Newari, Tharu, Magar, and Muslim mother tongues are commonly used in the project area. The total population of the project influence area, covering (5) wards (Ward-9 of Buddhabhumi and Ward-1, 3, 4 & 5 of Shivaraj Municipality) is (53782). Out of this total population, females are 51.76% and males 48.23%, respectively. The overall literacy and female rates are 95%, which is more than the national average (76.3 and 69.4%). The status of women and girls looks good in terms of education and decision-making. The major occupation is agriculture (46.1%), followed by foreign jobs (24.4%) and business (17.5%). Roadside seasonal business is also observed as part of the mode of livelihoods. Besides this, some vector-borne diseases common cold/cough, diarrhea, typhoid, and pneumonia, including COVID-19 and dengue, are found in the project area.

The total surveyed households are 312 (@20% of the total universe's households within the indirect impact zone-300 either side of the center line of the road) with 1643 population and the household size is 3.5 persons.

Regarding project-affected households, there are a total of 50 households going to lose their structures because some sections of the right of way are encroached by people, especially in urban areas. The total population of the project-affected households is 316, and the average family size is 6.3.

Environmental and Social Benefits and Risks

Beneficial impacts from the GC Road improvement include facilitated economic development of the project area, covering employment generation & support for locals' livelihood, arising opportunities for businesses, access to services and markets, improved road infrastructure contributing to safety issues, and better transportation, including cross-border and support for international trade. Beneficial impacts are also related to the economic improvement of local women. The major potential risks and impacts are damage to private/public structures, flooding and river bank cutting, water logging and land fragmentation, community health and safety risk, human trafficking, and SEA/SH risk due to project activities. Due to the clearance of 9808 trees from the RoW, there will be a loss of habitat for wild animals like birds, mammals, and reptiles. For the mitigation activities, compensatory tree plantation will be carried out in a 1:10 ratio (i.e., 98,080 new trees for 9,808), and native species will be preferred for the plantation. Besides this road, roadside greenery will be maintained, as well as wildlife crossings/monkey canopy bridges will be constructed, and critical habitats lost during construction.

All impacts were categorized in terms of their magnitude and significance. The following sections summarize the environmental and social risks and impacts of the GC road improvement works by each relevant environmental and social standard.

Assessment and Management of Environmental and Social Risks and Impacts (ESS1): The Environmental and Social Risk Classification of the project is 'substantial.' The widening and improvements of GC Road from (2) lanes to (4) lanes have been planned within the existing RoW. However, some sections of the RoW have been encroached by residential and commercial structures, and they will be partially or fully affected by the widening works, so that a Resettlement Action Plan (RAP) is required. Further, the widening work will not require land acquisition but will require acquisition of some private and public structures within RoW (50m.), which are already owned by the Government of Nepal.

The project intervention may cause damage (53) private structures of (50) households, out of this only (5) project affected household are physically displace (who are going to lose their structures fully) and the remaining (45) project affected household are facing minor lose category or partial loss of their (48) structures including associated structures (i.e. mainly their front porches (*verandas*), small business huts, sheds, toilets, kitchen). All (5) physically displace households are belong to vulnerable groups as defined by women headed households (2), Below poverty line income household (2) & Dalit households (1) whereas among minor loss category (45) households, (43) households are belongs to caste group and only (2) households are belong to indigenous people (IPs) who are setting-up their businesses and building houses. However, the impacts are minor loss category, and project activities on these IP HHs do not meet the criteria as provided in ESS-7 for obtaining free, prior, and informed consent (FPIC), as these IPs are living at the household level but not as part of mainstream communities with collective attachment to the land and governed by local municipal administrative systems. The social issues related to resettlement and livelihood impacts are further discussed under ESS-5, whereas IPs and FPIC will be discussed briefly in ESS-7.

The environmental impacts during construction mainly relate to dust nuisance and noise pollution, increased risk to the health and safety of workers and communities. There will be minimal impact expected from the human activities on the nearby wildlife, as the forest area associated with the road has not been in the direct vicinity of settlements, and also activities inside the forest area have been taken care of by the community forest user groups. The project area is well-defined, and a coordinated response mechanism. SEA/SH risks associated with labor influx indicate a 'moderate' level of SEA/SH risk.

The labor influx-related risk and impacts, such as pressure on local resources and public service facilities, sexual exploitation and abuse, sexual harassment (SEA/SH), child/forced labor, human trafficking, and communicable diseases all anticipated during the construction stage. Increased traffic flow and mismanagement of traffic safety may cause traffic congestion and road accidents.

The improvements of GC road are also assessed to have no significant induced or cumulative impacts as works are mainly confined within the existing RoW and in an area that has already been altered, fragmented and highly disturbed for many decades as a result of human population growth, encroachment and establishment of new settlements along the highway, land transformation, agriculture development and other associated development. With or without improvement works on the GC road, land-use change and land transformation have already taken place and will continue to take place as a result of other factors such as urbanization and development of rural areas resulting from increased federalization and decentralization of development in the province. Increased density of the road networks and lack of protective measures have aggravated the adverse impacts on the environment that have already taken place, such as siltation and sedimentation of rivers, the threat of poor water drainage, and community health and safety. The impacts might be exacerbated by climate change and the uncoordinated development of local communities, which may cause significant economic losses.

To address cumulative impacts though it is insignificant and enhance the overall performance associated with East West Highway and improve the capacity of DoR for better planning, management and improved transport efficiency of the country's Strategic Road Network, a Strategic Environmental and Social Assessment (SESA) study and Cumulative Impact Assessment (CIA) study has already been conducted under Strategic Road Connectivity and Trade Improvement Project (SRCTIP). The results of the SESA study and CIA informed further project design for the BG section, also (under the ACCESS project), and helped to generate collaborative engagements with other actors towards implementing the recommendations of those studies, such as management of sedimentation, siltation problems, coordinating with respective forest offices, and respective stakeholders to minimize the poaching of small animals.

Labor and Working Conditions (ESS2): The GC Road project is expected to involve direct (i.e. specialized consultants and technical specialists engaged by the DoR to perform direct responsibilities on the project), contracted (i.e. workers engaged by civil works contractors and other third parties to perform core functions of the project) and primary supply workers (i.e. workers of construction material suppliers such as sand and gravel, bitumen, steel, cement and loading/construction material transport services). The project will employ about 350,000 man-days of unskilled labor and 100,500 man-days of skilled labor as direct and contracted workers presents a significant employment opportunity for the local community (about 40% of workers will be targeted from local communities or from the districts of Terai region and Sudurpaschim province and sometimes from India also), who may be exposed to risks such as poor conditions in labor camps, non-payment of wages or other benefits timely, discrimination in employment between male and female in similar nature of work, child labor or forced labor, occupational health and safety (OHS) issues including workplace accidents, exposure to communicable diseases, grievances related to workers and SEA/SH. The contracted workers are more susceptible to such risks. The contractor will prepare and implement a labor management plan as part of the contractor's ESMP. To ensure the health and safety of workers during construction, the contractors will be required to prepare, obtain approval of, and implement an Occupational Health and Safety Plan (OHSP), traffic management plan and emergency response plan as well as all required plans following the WB EHS Guidelines (for construction activities), and relevant OHS standards (e.g. US OSHA) and finalize before the commencement of civil works. Moreover, annual health checkups for workers will be practiced. A labor grievance mechanism will be established for the workers as part of the LMP, which will also include measures to be taken to address risks and impacts relevant to ESS2. Moreover, basic facilities for drinking water and defecation (toilets/urinals) at every worksite need to be provided to improve the workers' health, productivity, and comply with the national protocol to avoid free defecation. The possible migrant labour engaged in the project will be possibly from Sudurpachhim and Madesh provinces, and sometimes from India also. The labour influx will be managed through engaging a greater number of local workers and equipping them with the required skills applied in the project. To manage the foreseeable consequences of labour influx, the project will manage by providing adequate facilities of accommodation, food, and water within the project area. The site-specific emergency preparedness and response plan will be developed and communicated to all workers. Workplace risk assessment and corrective actions will be done.

Resource Efficiency and Pollution Prevention Management (ESS-3): ESS-3 refers to several risks and impacts, including air and noise pollution, potential hazards, solid waste management, and pollution of water sources. The project's impacts and risks would be of significance to sensitive receptors due to waste disposal; slope stability and erosion; blocking of seasonal streams during cross drainage construction; stressing water sources used by the community; emission from construction vehicles, equipment and plants; dust from earthworks, cutting, stack yard, transportation of materials, noise pollution and settlements along road; damage to structure vibration from movement of machine and equipment; handling of hazardous and non-hazardous wastes, quarry and borrow area. All these impacts are more prominent during the construction stage and can be managed through the implementation of the waste management plan (onsite composting for organic waste, reuse of spoils and excess construction waste, and use of existing local municipal waste disposal sites for garbage), pollution prevention plan (sedimentation ponds and septic tanks for treatment of wastewater), and emission control measures (for air and noise quality) according to national standards for air, noise and water quality as well as through best practices applicable to road construction projects. Annual Green House Gas (GHG) emission as a result of upgrading GC road was estimated, although the

net GHG emission reduction is expected due to increased travel speed and fuel reduction for the motorized vehicles, and the estimated annual GHG emission is 44,754 tons².

Community Health and Safety (ESS-4): During construction, transporting construction materials may cause nuisances and health and safety risks to the local communities. Construction activities such as road excavation and the use of vibration equipment might result in landslides and dust pollution. In addition, operations like batching and asphalt might also influence the local communities in terms of air and water pollution. The stockpiling of construction materials debris generated during construction may disturb the landscape and cultivated lands and contaminate the water bodies. Impacts on existing traffic are likely with the construction activities, plying of construction vehicles, and storage of construction materials in proximity to the existing highway; therefore, during the construction stage, there is a need to also create temporary access. Similarly, to improve safety, traffic speed reduction measures should be implemented in areas where significant improvements are not feasible, such as sharp curves, school zones, and densely populated locations. The Contractor must provide safe access and crossing points for community members and separation of public vehicles and mobile plant. Additionally, noise barriers should be considered for areas with sensitive receptors, including residential neighborhoods, schools, and healthcare facilities, whenever possible and necessary. The presence of an outside labor force in the project area may cause negative impacts on the environment and local communities, and should be managed to prevent conflict situations, including SEA/SH. The outside laborers and security personnel also sign the CoC and are obligated to follow the contract agreement. In addition to that, the security guards are under the observation of CSC/Contractor's safeguard team. The project area is well-defined, and a coordinated response mechanism. SEA/SH risks associated with labor influx indicate a 'moderate' level of SEA/SH risk. The risks associated with labor influx and the increased presence of outsiders may aggravate the spread of infectious diseases, like typhoid, pneumonia, and diarrhea, including COVID-19, HIV/AIDS, and STIs. The project will develop a plan to address such specific issues and be available with the required facilities, such as camps, including safety and security within the project location. However, a stand-alone SEA/SH Action Plan is being prepared to manage risks related to SEA/SH associated with the project, which includes community awareness raising programs, orientation to project staffs on SEA/SH risk and mitigation measures, orientation and signing of code of conduct by workers, mapping of locally available services, and GRM to address SEA/SH issues.

Land Acquisition, Restrictions of Land Use and Involuntary Resettlement (ESS-5): The widening and improvements of GC Road from (2) lanes to (4) lanes will be confined within the existing RoW (50m.) and land acquisition is not required except temporary land requirement for stockpiling, establishment of contractor's camp sites, labor camp sites, asphalt plant and crusher plant sites. However, some sections of the RoW have been encroached by private residential and commercial structures, which might cause partial or full damage by the project intervention. The Resettlement Action Plan (RAP) has been finalized. Altogether, (53) private structures belonging to (50) project-affected households (PAHs) will be affected due to encroachment within the existing RoW. Looking at the intensity of resettlement impacts only, (5) PAHs are physically displaced from their dwellings (who are going to lose their five residential structures fully), whereas (45) PAHs are in the minor loss category (Who are going to lose their forty-eight structures (residential, business, kitchen, sheds, toilets) partially).

² The GHG emission calculation has been done considering the material quantities required for the GC section. The major materials required for construction are Soil, Aggregate, Bitumen, Cement and Steel etc. was estimated based on detailed design report. The emission factors as per "Guidelines for estimating greenhouse gas emissions of Asian Development Bank projects: Additional guidance for transport projects" was used for calculating GHG emission (Source: U.S. Department of Agriculture (USDA))

The socio-economic categorization, among the total (50) project-affected households, IP households is (2), vulnerable household is (5) (2 female headed, 2 BPL and 1 Dalit), Muslim households is (4) and rest of the households belongs to caste group is (39).

Construction-induced impacts will be avoided, minimized, and mitigated. Residual irreversible impacts will be compensated in cash with replacement value before the commencement of construction works as per the measures outlined in the Resettlement Action Plan (RAP) based on ESS-5 principles. Cash compensation for the loss of assets will be determined at replacement value, which includes current market value plus necessary transaction costs like displacement allowance, transportation allowance, rental, stipends, and business disruption assistance as endorsed by the respective district Compensation Determination Committee (CDC). Cash compensation payments will be disbursed in two tranches: 50% upfront payment to eligible PAPs and groups prior to dismantling and removal of structures, followed by an additional 50% after dismantling the structures. The Entitlement Framework specifies compensation and/or rehabilitation measures for two units of entitlement as structures affected individuals, and vulnerable households, including roadside vendors. Rehabilitation and livelihood support training will be provided for vulnerable households, along with roadside vendors (sugar cane juice and popcorn sellers), based on their specific needs and requests.

In addition, the public structures belonging to public institutions, such as waiting sheds, public toilets, chautari, temple, police check-post/bit, school gate, boundary wall, and hand pump, will be affected by project intervention and require relocation and rehabilitation work total of 82 public structures. Before relocation and rehabilitation, an appropriate remedial relocation plan will be developed in close coordination and consultation with the respective communities and the temple management committee (public institution) along the road alignment, and in case of drinking water, temporary measures will be put in place. Furthermore, electric poles (1003), transformers (24), telephone cable poles (154), and solar street lights (21) will also require relocation. The MoU with NEA and NTC will be done for the relocation of these public utilities.

Biodiversity Conservation and Sustainable Management of Living Natural Resources (ESS6): The habitats in the existing ROW and surrounding areas of the GC Road are largely modified, and patches of natural habitats, which are already fragmented, and anthropogenic pressure in the area is very prevalent due to its long history of development and human settlements. Critical Habitat Assessment carried out as part of the ESIA for the GC road identified two endangered mammal species and one globally critically endangered reptile species, namely Fishing Cat (*Prionailurus viverrinus*), Striped Hyena (*Hyaena hyaena*), and Elongated Tortoise (*Indotestudo elongata*), that would qualify under ESS6 critical habitat Criterion (a) and are potentially impacted by the project. Data is not available to quantify impacts on these species; however, potential impacts are expected to be minimal as these species are uncommon in the project area, and impacts are expected to be low. The ESIA proposes comprehensive mitigation measures, such as the existing bridge will be modified for wildlife crossing for medium-sized animals at Belnadi (648+561) and Jwaikhola (649+257), and we follow the Wildlife Friendly Infrastructure Construction Directive-2022, for medium/small-sized animals, as well as a canopy bridge near Belnadi (648+561) for arboreal animals in the forest areas. Compensatory afforestation, regular recording of roadkill, and usage of wildlife crossing, speed limits, and installation of warning signboards, awareness raising for workers and communities. The ESIA further indicated that the improvement of the existing GC road would affect a total of 27 hectares of forest within RoW along 6 km of its length. The direct impact involves the cutting of 9808 trees located within RoW. Among them, None of these trees are threatened species, though the species of Sal (*Shorea robusta*), which is protected and of least concern in IUCN categories, has been recorded within the RoW. The physical work within the ROW will not adversely impact critical habitats. In addition, there are also no protected areas, wildlife reserves, or migratory wildlife corridors along the GC road. Nevertheless, for every tree that will be cut, the project will replant 10 trees

in an area designated by the Department of Forest and Soil Conservation (DoFSC) to meet the requirements of the GoN. A budget of 160 million rupees (NRs) is proposed in the ESMP for compensatory tree plantation.

Indigenous People (ESS-7): There are 3 indigenous peoples (IP) groups in the project area, namely Newar, Magar, and Tharu, living at the individual household level but not as part of the mainstream local communities and collective attachment to the land that concerns project activities. Among all project-affected IP households, only two households might have experienced minor impacts on their structures, which are partially affected due to encroachment within the RoW. They have not lost their private land because their structures are constructed within the RoW, and they obtained mixed cultural practices in a mixed group society and are governed by local municipal administrative systems. The minimum number of IP communities (3) are residing near the project area and negligible resettlement impacts on IP households with only (2) PAHs, so it doesn't require to development of a standalone Indigenous Peoples Development Plan (IPDP). These resettlement-related IP issues have been addressed in the Resettlement Action Plan (RAP). Besides this, the project has not caused any direct impact on their ancestral land and does not require for complete relocation of any IP communities, and also does not cause any impacts on the cultural heritage of the IP communities. Therefore, the impacts of project activities on these IP HHs do not meet the criteria as provided in ESS-7 for obtaining Free, Prior and Informed Consent (FPIC), as these IPs are living at the household level but not as part of mainstream communities and collective attachment to the land. The potential impacts and risks are related to labor influx, GBV/SEA/SH, traffic safety, air and water quality deterioration during construction, etc. Therefore, according to the requirements of free, prior, and informed consent (FPIC) under ESS-7, FPIC is not a trigger for this project.

Cultural Heritage (ESS-8): ESS-8 sets out general provisions on risks and impacts to tangible and intangible cultural heritage. During the ESIA, no archeologically and historically tangible heritages such as monasteries or ancient monuments were found along the road alignment, and there will be no impacts on other tangible or intangible cultural heritage. There are (6) small temples/shrines, i.e., Durga Mandir (temple), Supadeurali temple, Masjeed (mosque), Dewarbaba temple, and two other small shrines within the ROW, which are of less historical importance or significance, may have been impacted partially or fully. As advised during stakeholder consultations, these temples/shrines will be rehabilitated and relocated to the nearby public land in consultation with the respective priest and temple management committee. Temples and Masjid are the main religious places in the Chandrauta Bazar area. Chandrauta Bazar is the place where people come to take a religious bath on Eid al-Fitr, the main festival of Muslims. Dewarbaba temple at Dumara Chowk is represented as the clan god of the Tharu Community. They used to worship in October for good health, fertility, and the protection of foodstuffs. Similarly, Hindu and Buddhist followers used to go Supaderali and Lumbini areas, which can be taken as religious and tourism sites. Hari and Briz Tal (lakes) are famous lakes of the project area, which have more tourist value.

A Chance-finds procedure has been included in the Environmental and Social Management Plan (ESMP), which will be followed if, during construction, any chance finds are encountered. The chance find procedures will also be included in the bidding documents, in the contractor contract, and in the contractor's ESMP (C-ESMP). The stakeholder engagement activities under the project will be leveraged to further identify and manage other cultural heritage sites and artifacts, both tangible and intangible, throughout the project lifecycle.

Financial Intermediaries (ESS-9): Since no financial intermediary is involved in this project, ESS-9 is not applicable.

Stakeholder Engagement and Information Disclosure (ESS-10): Stakeholder engagement is an inclusive process to engage stakeholders throughout the project lifecycle. Stakeholder consultations carried out during detailed engineering design, ToR, IEE, and ESIA preparation focused on environmental and social issues and concerns of

project-affected parties, other interested parties, and vulnerable groups. The project affected parties who would be directly affected by the project activities and located within the impact area include households that have encroached into the RoW, local communities, public service providers, and local health facilities. The other interested parties are local governments i.e. Buddhabhumi and Shivaraj municipalities, local non-governmental organizations (NGOs), civil society, teachers, political leaders, women groups, indigenous people, local entrepreneurs, local user groups (forest, water, irrigation etc.), security personnel (traffic police and army), road users (including drivers & travelers); media and vulnerable & marginalized groups, including those who are differently-abled.

The stakeholder consultations have been carried out with a cross-section of the above stakeholders to share the project information and to document and incorporate their initial feedback on the project concept and the environmental and social concerns related to the project design. During the project's initial phase, a quick site visit and a few consultations with above mentioned stakeholders have been carried out as part of Rapid Rural Appraisal (RRA) dated March 2024. After that, household questionnaire surveys were carried out in (312) sampled households (@20% of the total universe 1562(HHs), followed by individual interviews with (13) local government officials. Altogether (12) Focus Group Discussions (FGD) and (11) Key Informant Interviews were also conducted, and discussions project potential impact, and its mitigation provision dated August 2024. Similarly, a public hearing has been conducted during IEE preparation at Buddhabhumi and Shivaraj Municipality dated 3 to 4 January 2025. During IEE and ESIA preparation, a separate consultation and discussion meeting with (2) Tharu women groups has also been conducted at Barkalpur, and the Gauriya Tharu community has been consulted. Beside this the separate consultation has also been carried out with Division forest office Buddhabhumi including sub-division at Kherdarpur and Champapur, Kapilbastu collaborative forest management committee and community forest users group (Hariyali and Kanchan CFUG), local Indigenous (Magar and Newar) community, NGOs working on differently able person, wild life environmental and social issues (Bird Conservation Nepal), Wildlife researcher and activists, NEA, Nepal telecom, Business groups, local Jaggery (traditional unrefined sweetener made from the juice of sugarcane or centrifugal cane sugar consumed in southeast Asia) coal cottage yards, labor union, media, political leader, Chair of Barkalpur Tharu Hastakala, Haatbazar management team, school teacher and traffic police.

The main agendas of this consultation meeting are to share project information, project benefits and adverse impacts, livelihood restoration program, improvement of Haat bazar, vehicular under pass (VUP), pedestrian under pass (PUP), overhead foot over pedestrian crossing bridge, public toilet with universal access, along with labor influx related issues, awareness on gender and GBV/SEA/SH related issues.

During the preparation of Detailed engineering design, ToR/IEE/ESIA, around 40) number of stakeholder consultation meetings with different stakeholders of the project area were conducted dated April-December 2024. In total, more than 600 participants (Including household survey respondents) have taken part in stakeholder consultation meetings. Among them, around (200) participants are female, and around (400) participants are male. Consultations with the specific groups, such as NGOs working with different persons, the department of forest, forest users' group, women's group, indigenous people, affected people, and other interested parties, were also carried out. Furthermore, (10) additional consultations have been carried out with affected people during the preparation of the RAP dated January 2025.

The key issues raised by the stakeholders during consultations are: timely commencement and completion of project, timely compensation payment for affected private structures, proper management of relocation and rehabilitation of public structures and public utilities; employment opportunities to locals during road construction, capacity building training to women and youth group, bicycle lane, proper drainage management to control water logging issue, air pollution, construction of pedestrian crossing foot over bridges near school, hospital area and settlement area, skill development training using local materials for indigenous Tharu people, demand additional

side drain and cross drainage facilities to control water logging issues during rainy seasons, management of existing culvert and additional culvert at Champapur, Chandranta bazar, near Belwagurdawa bridge and other require place, enhancement of Haat bazar at Imiliya, access and enhancement of shed near cremation site at Bel Nadi, public toilets with universal access, ownership of harvested trees should be granted to respective forest user groups, roadside plantation, fence in community forest area along roadside should be reconstructed; and stakeholder engagement during road upgrading works with proper construction schedules and planning. .

As part of citizen engagement, a project-level GRM will be established to address grievances, including those related to SEA/SH grievances, along with a separate workers GRM as provisioned in the Stakeholder Engagement Plan (SEP) prepared and adopted for the ACCESS project.

Environmental and Social Management Measures

The key management measures in line with ESSs have been given below: Cooperation and information dissemination amongst project-affected, other interested stakeholders, and vulnerable and marginalized groups will help to execute all mitigation measures. The project will coordinate with local bodies and concerned stakeholders for the implementation of E&S mitigation measures.

An Environmental and Social Management Plan (ESMP) applying the mitigation hierarchy (avoid, minimize, mitigate, and compensation or offset) has been prepared to manage the project's environmental and social risks and impacts developing ESMP. It includes generic and site-specific mitigation measures, a monitoring plan, capacity building, responsibilities, and reporting system, and environmental and social costs. In addition, the ESMP provides measures to address OHS and SEA/SH issues at the project level. The key issues regarding labor influx will be managed in compliance with the Labor Act, 2017, and Labor Rules, 2018, OHS Policy, 2023 (Department of Roads), and WB ESS-2 through a comprehensive Labor Management Procedure (LMP) prepared and adopted for the ACCESS project. A GRM will be provided both for local people and project workers to help lodge grievances and to manage the resolution of overall project-related and worker-related grievances. A worker camp operation plan and workers' Code of Conduct (CoC) will be prepared. Each worker will be oriented on CoC and required to sign before the start of work. Workers must receive a signed copy of the CoC, which will help to prevent or minimize incidents of Sexual Exploitation and Abuse/Sexual Harassment (SEA/SH) as it outlines the acceptable and unacceptable behavioral standards.

A separate RAP is required to address physical and economic displacement resulting from project activities. All project-affected private structures will be compensated with replacement costs, and public structures will be relocated and rehabilitated as per the entitlement matrix. Updates of design phase RAP by joint verification (Project, CDC & CSC) are required in the pre-construction phase, and any additional impacts occurring during the project implementation phase, additional RAP will be prepared as provisioned in the resettlement framework for the additional losses. Regarding construction-induced impact, the mentioned procedures will be applicable to this RAP.

The ESMP obliges the contractor, upon mobilization, to prepare the Contractor's ESMP (C-ESMP), which shall be prepared prior to the commencement of construction activities. The C-ESMP shall include Project information sharing and communication plan, Community health and safety management plan, appropriate remedial relocation and rehabilitation plan for public utilities and public structures, Temporary relocation plan for project affected people covering community awareness and sensitization with an emphasis on women and young girls which includes SEA/SH risk mitigation plan; site-specific Labor Camp Management Plan, Occupational Health and Safety Management Plans adopting safety measures such as barricades, information, housekeeping and storage of materials, stress free work schedule, work zone management, regular health checkup for the workers as engineering and process control whereas for workers such as reflecting jackets (aprons), boots, gloves, helmets, safety harnesses,

goggle etc.; compliance with the labor laws; establishment of Worker Camp Operations Guidelines; development of a Hazardous Materials Management Plan to manage hazardous material use, storage, transport, and disposal; chemical management plan prior to construction including handling and disposal of hazardous chemical and waste as provisioned in LMP. Development of a Water Quality Management Plan; Water and Waste Management Plan, Traffic management and road safety management plans, Emergency Preparedness Plan, Quarry/borrow area management plan, and Site Restoration Plan, among others, in accordance with the GoN DoR's ESMF-2024, OHS Policy-2023, GESI-2074, and IFC&WB workers' accommodation guidelines.

A Stakeholder Engagement Plan (SEP) has been developed for the project to identify stakeholders and to provide a plan for engaging with stakeholders throughout the project lifecycle. The SEP provides materials for community awareness and sensitization with emphasis on women and young girls, promoting health-seeking behavior. The SEP includes details of a project-level GRM, including those related to SEA/SH, and Workers GRM, to raise any questions and grievances. Establishing a grievance redress mechanism (GRM) for complaints, and providing a grievance record form at the project sites. However, in case of an accident or incident related to the Project, the DoR-DCID must notify the World Bank within 48 hours of becoming aware of the situation. Following this, an incident investigation report, including corrective measures, should be submitted to the World Bank within 30 days from the date the incident was initially reported.

Mitigation measures for general risks and impacts: Mitigation measures for general risks and impacts based on the mitigation hierarchy avoid, minimize, mitigate, and compensation or offset. Bioengineering and reinforcement structures; restoration of affected landscapes; development of a stockpiling yards and relocation and rehabilitation works, spoil disposal, information boards, barricading the work zone, adequate supply of water and defecation facilities, regular health checkup for the workers recommendations for fuel-efficient machinery and carbon offset by compensatory plantation; proper relocation and restoration of all affected utilities with meaningful consultation taking the community into confidence, enforcement and control of anti-poaching regulations; establishing speed limit signs in appropriate locations; providing awareness to drivers and local community.

Site-specific mitigation measures: Site-specific mitigation measures include developing different plans Resettlement Action Plan for timely compensation for private structures, a traffic management plan for traffic management provisions, a Bio-engineering plan for construction sites and slope protection work (Civil engineering and Bio-engineering works). Cross drainage structures (such as box culverts, new bridges, and side drains) will be provided to reduce waterlogging and flooding in the project area. Installation of traffic signs, road safety signs, crash barriers, and pedestrian crossings/overhead for road safety. For flood protection, river training will be implemented. Compensatory tree plantation, sign board, speed limit, and display boards in forest areas will be placed in the required locations for wildlife crossings. Installation of fencing and culvert/underpass at specific locations for wildlife protection and prevention of road kills in the forest areas is also proposed. Relocation of public utilities (Drinking water supply lines, electric poles, irrigation canals, etc.), restoration of damaged community infrastructures, Safety Equipment (PPEs), reinstatement of quarry borrow pit, batching plants, and camp are provided in the site-specific mitigation measures at cost.

Environmental and Social Monitoring:

Internal and external monitoring are an integral part of the project. Environmental and social monitoring during the whole project cycle is essential and will be carried out by DoR-DCID once a month. Regular monitoring of environmental and social safeguard activities during the implementation phase is the job of CSC and the Project. The resettlement compensation and rehabilitation works, labor camp and contractor's camp, asphalt plant and batching plant stock piling yards and quarry sites, and borrow area, dust nuisance, air and Noise Quality monitoring, and water sprinkling in dust-prone areas to reduce dust, water quality monitoring will be done by CSC and the

project on a regular basis.. In regard to OHS monitoring, the contractor will introduce regular monitoring of the site and self-audit system within their section, which will be further monitored and verified along with the needful support from CSC and DCID team. Moreover, for the verification of the compliance audit, at least one third-party audit across the section could be applicable. The details of monitoring indicators and frequency, including the reporting system, are discussed in ESMP Chapter 5.

Key Measures and Actions for the Environmental and Social Commitment Plan (ESCP)

The ESCP identifies measures and actions to meet ESS requirements. These include the development of a SEP, LMP, RPF, and RAP identified to be required for the GC Road project along with the timeframe. The ESCP also required the completion of a biodiversity assessment, including a critical habitat assessment, and preparation of a biodiversity management plan as appropriate, following the mitigation hierarchy as part of the comprehensive ESIA for GC Road. If an offset is required, this will be included in the biodiversity management plan. The Ministry of Physical Infrastructure and Transport (MoPIT) is responsible for compliance with all requirements of the ESCP during the implementation of specific measures and actions conducted and implemented by the DoR-Development Cooperation Implementation Division (DCID).

Implementation of the material measures and actions set out in the ESCP will be monitored and reported to the Bank by DoR as specified in the ESCP. The World Bank will monitor and assess the progress and completion of the material measures and actions throughout the implementation of the project. If required, the ESCP may be revised and updated during project implementation to reflect adaptive management of project changes and unforeseen circumstances or in response to the assessment of project performance conducted under the ESCP itself.

Institutional Arrangements

Development Cooperation Implementation Division (DCID)- DoR under MoPIT is the key implementing agency for the development and implementation of ACCESS road projects (donor-funded). DoR has five deputy directorates/branches that develop and implement projects. To facilitate field implementation, DoR maintains 33 Divisional Road Offices (DROs). The DCID is one of the key directorates undertaking all donor-funded projects. Project Coordination Unit (PCU) under DCID will procure contractors and supervision consultants, and the Project office, having Project-In-Charge (PIC), will be responsible for implementation of the project and E&S risk management. The DoR-DCID will have a dedicated Environmental Expert, a Social Development Expert, a Gender Specialist, and an OHS Specialist to support management of environmental, social, social health and safety risk and impact of the ACCESS project.

DoR's Geo-Environment and Social Unit (GESU) is the focal point for the E&S risk management and monitoring unit at DoR. GESU undertakes compliance monitoring and review of IEEs and ESIAs for government/donor-funded projects. MoPIT is the governing agency mandated by the Environmental Protection Act (EPA) to review and approve IEEs for projects in the transport sector. It also reviews and endorses EIA reports for review and approval by the Ministry of Forest and Environment (MoFE). The EIA Unit under MoFE undertakes the review and approves EIAs.

Department of Forestry and Soil Conservation (DoFSC) / Divisional Forest Office, District Administration Office, Department of Land Revenue Office (DLRO), Survey Department, Department of Urban Development and Building Construction (DUDBC), and project-affected M/RM will be the supportive institutions for the project implementation.

Contractors and sub-contractors are responsible for project implementation and also responsible for complying with the C-ESMP and related plans, which are provided in bidding documents, work contracts, and in the ESCP of DoR.

Training and capacity building of DoR and agencies involved in project implementation to manage environmental and social risks and impacts will be supported by the project under the institutional strengthening component. To omit the key policy and institutional gap some training is required i.e. E & S risk management training, training on how to integrate E & S risk measures into different phase of project design, training on CIA selecting valued environmental components, training on human and wildlife conflict management, training on sustainable management of bio-diversity and natural resources, training on MLARR to DoR officials, importance of RoW and management, training on indigenous knowledge FPIC, and training on meaningful consultation to enhance capacity of DoR and interlink line agencies.

OHS-related trainings like OHS and safe work practices, safe handling and storage of hazardous material/chemical, accident reporting and recording system, worksite first aid, personal hygiene and sanitation, hot surface work, stress management, emergency preparedness and response, PPE use and practices, etc. related training.

Estimated Budget

A total of NPR 148,334,192, excluding resettlement and compensation RAP, has been allocated for the environmental and social mitigation and enhancement measures while implementing the project. Similarly, NPR 67,00,000 have been proposed for environmental monitoring to ensure the EMP implementation. The resettlement and compensation costs have been estimated at NPR 2,89,82,587 and covered by GoN as part of the project, and included in RAP

कार्यकारी सारांस

परिचय

नेपाल सरकारले विश्व बैंकको वित्तीय सहयोगमा “पूर्व दक्षिण एसियाको यातायात तथा व्यापार आवद्धता अभिवृद्धि कार्यक्रम-नेपाल चरण १ आयोजना (ACCESS)” तयार गरी कार्यान्वयन सुरु गरेको छ। आयोजनाको चरण १ मा नेपालमा छनौट गरिएका करिडोरहरूमा व्यापार र यातायातको दक्षता र उत्थानशिलता बढाउने उद्देश्यले प्रारम्भ गरिएको हो। यस आयोजनाका चारवटा मुख्य घटक रहेका छन्:

- **घटक १: व्यापारका लागि डिजिटल प्रणालीहरू:** यस घटकले नेपालको सिमानामा मालसामानको पारवहन तथा ढुवानी प्रक्रियालाई छिटो र प्रभावकारी बनाउन डिजिटल र स्वचालित प्रणालीहरूको विकास तथा कार्यान्वयनलाई सहयोग पुऱ्याउँछ। यस अन्तर्गत: (क) एकीकृत स्वचालित सीमा व्यवस्थापन प्रणाली सहित इलेक्ट्रोनिक कार्गो ट्र्याकिंग प्रणाली विकास, (ख) हार्डवेयर र सफ्टवेयर प्रणाली अपग्रेड गरेर intelligence system स्थापना गर्ने (ग) Business intelligence, data analytics system र risk engine को विकास र (घ) दर्ता प्रक्रिया र अनुमति स्वचालित गर्नकै लागि वेबमा आधारित MIS प्रणालीको विकास।
- **घटक २: हरित र दिगो यातायात तथा व्यापार पूर्वाधार:** यस घटकले सहयोग गर्ने कार्यहरू: (क) पूर्व-पश्चिम राजमार्गको बुटवल-गोरूसिंगे र गोरूसिंगे-चन्द्रौटा खण्डलाई २ लेनबाट ४ लेनमा स्तरोन्नति गर्ने, (ख) हरित र दिगो पुलको विस्तृत डिजाइन तथा निर्माण र (ग) यातायात कार्यक्षमता र वातावरणीय दिगोपनालाई समेट्ने गरी हरित र दिगो राजमार्ग अवधारणाको विकास र कार्यान्वयन।
- **घटक ३: यातायात तथा व्यापारका लागि संस्थागत र नीतिगत सुदृढीकरण:** यस घटकले यातायात र व्यापार क्षेत्रको संस्थागत, प्राविधिक र नीतिगत सुधारमा सहयोग पुऱ्याउँछ। यस अन्तर्गत: (क) बंगलादेश-भारत-नेपाल मोटर भेहिकल सम्झौता सम्बन्धि सुधार, (ख) भन्सारका सुधार, (ग) निजी क्षेत्रका पहललाई सहयोग गर्ने सुधारहरू, (घ) तालिम कार्यक्रम र क्षमता विकास गतिविधिहरू र (घ) आयोजना तयारी सम्बन्धी अध्ययनहरू।
- **घटक ४: आकस्मिक आपत्कालीन अवस्थाको लागि तयारी:** यो घटकले आकस्मिक प्राकृतिक वा मानव निर्मित विपत्तिको अवस्थामा सहयोग पुऱ्याउँछ। यस्तो आपतमा नेपाल सरकारले विश्व बैंकसँग यस अवयवमा आयोजनाको रकम पुनः विनियोजन गर्न अनुरोध गर्न सक्नेछ, जसले छिटो प्रतिक्रिया र पुनर्निर्माणलाई सहयोग पुऱ्याउँछ।

आयोजनाका वातावरणीय तथा सामाजिक जोखिम र प्रभाव मूल्याङ्कनका उपायहरू

आयोजनाले सम्भावित वातावरणीय तथा सामाजिक जोखिम र प्रभावहरूको छनोट, मूल्याङ्कन तथा व्यवस्थापनका लागि वातावरणीय तथा सामाजिक व्यवस्थापन रूपरेखा (ESMF) र आयोजना-विशेष वातावरणीय तथा सामाजिक प्रभाव मूल्याङ्कन प्रतिवेदन (ESIA) तयार गरिएको छ। सडक विभागद्वारा तयार गरी २०८१ साल माघ २० गते (३ फेब्रुअरी २०२५) मा सार्वजनिक गरिएको परिमार्जित वातावरणीय तथा सामाजिक रूपरेखाले प्रभाव मूल्याङ्कन तथा वातावरणीय र सामाजिक व्यवस्थापनका उपायहरूको तयारीका लागि मार्गदर्शन गर्ने आधारपत्रको रूपमा कार्य गरेको छ जसले गोरूसिंगे-चन्द्रौटा खण्ड (पूर्व-पश्चिम राजमार्ग), हरित र जलवायु-अनुकूल पुलको निर्माण, तथा प्रमुख नाकाहरूमा अवस्थित भन्सार स्थलहरूका पूर्वाधार स्तरोन्नति सम्बन्धी गतिविधिहरूको छनोट, प्रभाव मूल्यांकन र वातावरणीय तथा सामाजिक व्यवस्थापन

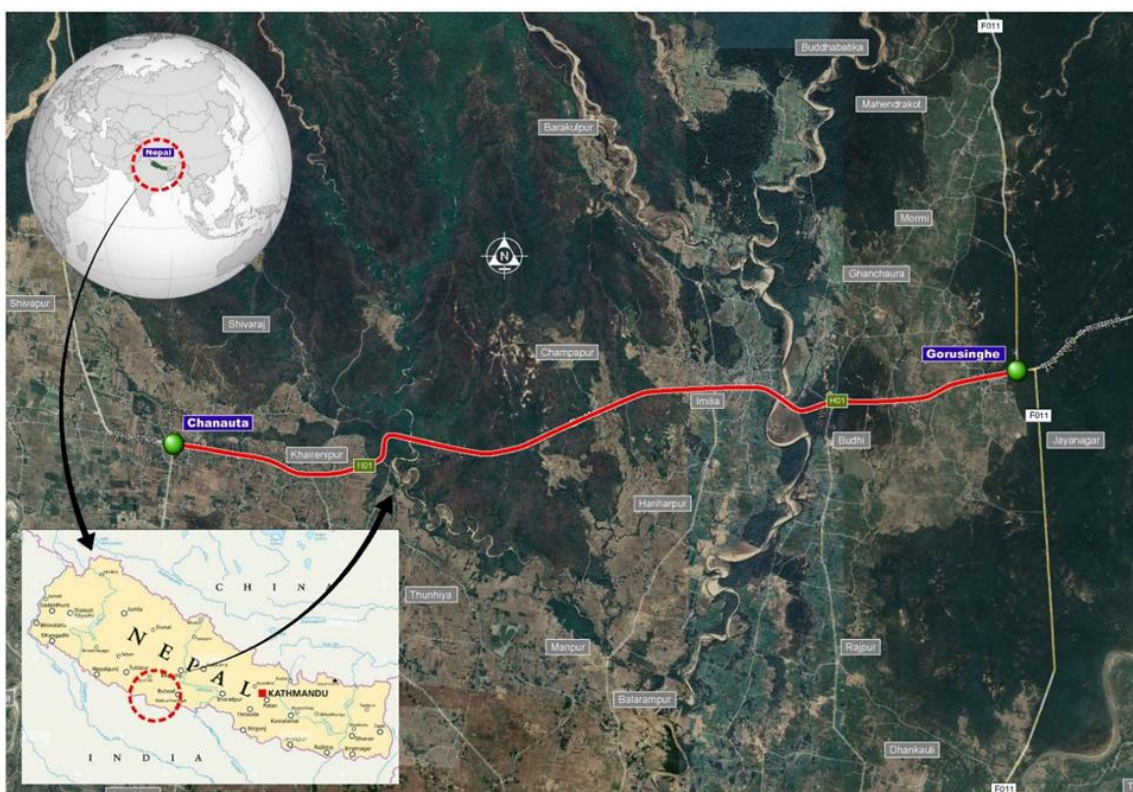
उपायहरूको विकासलाई मार्गदर्शन गर्दछ। आयोजना कार्यान्वयनको क्रममा यी गतिविधिहरू र विस्तृत डिजाइन मुताविक परिभाषित तथा लागु गरिने छ।

यस ईएसआए प्रतिवेदन पूर्व-पश्चिम राजमार्ग अन्तर्गत गोरुसिंगे-चन्द्रौटा सडक खण्डको विस्तृत डिजाइनसंगै तयार पारिएको हो, जसले आयोजना कार्यान्वयन हुनुअघि वातावरणीय तथा सामाजिक जोखिम र प्रभावहरूको मूल्यांकन गरेको छ। यस कार्यमा नेपाल सरकारका नीतिगत आवश्यकताहरू र विश्व बैंकको वातावरणीय तथा सामाजिक रूपरेखा (ESF) दुवैलाई पालना गरिएको छ।

पूर्व-पश्चिम राजमार्गको गोरुसिंगे-चन्द्रौटा सडक खण्डको विवरण

गोरुसिंगे-चन्द्रौटा सडक खण्ड लुम्बिनी प्रदेशको कपिलबस्तु जिल्लामा अवस्थित छ। यो खण्ड पूर्व-पश्चिम राजमार्गको (चे.६४०+०००) बेलवागुर्दवा नदी पुल नजिकैबाट सुरु हुन्छ, जुन बुटवल-गोरुसिंगे खण्डको निरन्तरता हो र यो सडक खण्ड चन्द्रौटा चौकबाट पश्चिम तर्फ रहेको उमरी/शिवपुर चौक (चे. ६५९+ २००) मा गएर अन्त्य हुन्छ। सडकखण्ड बुद्धभूमि र शिवराज नगरपालिकाबाट जान्छ र दुई मुख्य बस्तीहरू गोरुसिंगे र चन्द्रौटा सहित साना बसोबास भएका क्षेत्रहरू जस्तै इमिलिया, डुमरा, चम्पापुर, खरेन्द्रपुर र शिवपुर रहेका छन्। सडकखण्ड तराईको समतल भू-भागमा अवस्थित छ, जसको उचाइ समुद्र सतहबाट १०० देखि १५० मिटरको बीचमा पर्छ। सडकखण्डको केही भाग सामुदायिक वन क्षेत्र हुँदै जाने भएकोले यस क्षेत्रमा वातावरणीय संवेदनशीलता रहेको समेत दर्शाउँछ।

गोरुसिंगे-चन्द्रौटा सडक खण्डको स्थिति चित्र E1 मा देखाइएको छ।



चित्र E1: गोरुसिंगे-चन्द्रौटा सडक खण्डको नक्सा

१९.२ किलोमिटर लामो गोरुसिंगे-चन्द्रौटा सडक दुई-लेनको बिटुमिनस सडक हो, जसको हालको क्यारिज वे ६ मिटर र दुवै छेउमा १ मिटरको सोल्डर रहेको छ। गोरुसिंगे-चन्द्रौटा सडक पूर्व-पश्चिम राजमार्गको एक खण्ड हो, जसले भारतसँगको सीमा-पार व्यापारमा सहजता प्रदान गर्दछ। सडकको वर्तमान अवस्था कमजोर छ, किनकि सडकको सतहमा क्षति र चिरा छन् र धेरै स्थानमा सतह समेत एकनासको छैन। सडक सुरक्षासम्बन्धी कुनै सुविधा छैन, जस्तै पैदल यात्रुका लागि फुटपाथ, क्रसिङ, पक्की शोल्डर, सडक संकेत, वन्यजन्तु क्रसिङ, त्रयास ब्यारियर, र साइकल लेन आदि। चन्द्रौटा बजार लगायतका शहरी क्षेत्रमा वर्तमान सडक १५ मिटर चौडा छ। सडक खण्डमा हाल अवस्थित सबै पुलहरू दुई-लेन संरचनाका छन्। औसत रूपमा, सडकको तयार सतह प्राकृतिक भू-स्तर भन्दा ०.५-१ मिटर माथि उठेको छ, पुलको एप्रोच भएको बाँधमा यो ६ मिटरभन्दा माथि पुग्छ। वर्तमान अधिकार क्षेत्र केन्द्र रेखाबाट दुवै तर्फ २५ मिटर (कुल ५० मिटर RoW) छ। यस कारणले, आयोजनाका लागि थप जग्गा अधिग्रहण गर्नु आवश्यक पर्दैन।

सडकको वर्तमान अधिकार क्षेत्र ५० मिटर रहेको छ र प्रस्तावित कामहरू सडकको अधिकार क्षेत्रभित्रै कार्यान्वयन गरिनेछ। आयोजना अन्तर्गत गोरुसिंगे-चन्द्रौटा सडकलाई २ लेनबाट ४ लेनमा स्तरोन्नति गरिनेछ, साथै बजार क्षेत्रमा दुवै छेउमा सर्भिस लेनसहितको सडक, अतिरिक्त सडक संरचना, ज्यामिति सुधार, अस्फाल्ट कंक्रीट सहितको सडक निर्माण, निकास सुधार, रोकथाम संरचना, स्लोप संरक्षण/स्थिरता, र पुल निर्माण कार्य गरिनेछ। यातायात व्यवस्थापन र सडक सुरक्षा, पैदल यात्रु प्रतिकालय, फुटपाथ र साइकल लेन पनि निर्माण गरिनेछ।

१९.२ किलोमिटर लामो गोरुसिंगे-चन्द्रौटा सडक स्तरोन्नति पश्चात एक्सप्रेस राजमार्ग हुनेछ, जसको डिजाइन गति समतल भू-भागमा १०० किमी प्रतिघण्टा र चुरे भू-भागमा ८० किमी प्रतिघण्टा हुनेछ, साथै यसले एशियाली राजमार्गको मापदण्ड अनुसार हरित र जलवायुमैत्री सडक बनाइनेछ र कपिलवस्तु जिल्ला हुँदै यो सडक जानेछ। गोरुसिंगे-चन्द्रौटा सडक बुद्धभूमि नगरपालिका वार्ड-९, र शिवराज नगरपालिका वार्ड-१, ३, ४ र ५ हुँदै गएको छ।

वर्तमान सडक र प्रस्तावित सडक स्तरोन्नति कार्यका मुख्य विशेषताहरू तालिका E1 मा दिइएका छन्। यी यिनीहरूको अवधारणात्मक डिजाइन चित्र E2 मा देखाइएको छ।

तालिका E1. हालको गोरुसिंगे-चन्द्रौटा सडकको प्रमुख विशेषता

विवरण	विशेषताहरू
आयोजनाको नाम	पूर्व-पश्चिम राजमार्गको गोरुसिंगे-चन्द्रौटा सडक (१९.२ किलोमिटर) खण्डलाई चार लेन स्तरमा स्तरोन्नति गर्ने
प्रदेश	लुम्बिनी
जिल्ला	कपिलवस्तु
प्रभावित नगरपालिका	बुद्धभूमि र शिवराज नगरपालिका
भौगोलिक विशेषताहरू	तराई
भौगर्भिक अवस्था	समथर

हावापानी	उष्ण तथा उपोष्ण
उचाई	समुद्र सतहबाट १०० देखि १५० मी. सम्म
कूल लम्बाई	१९.२ किमि
शुरुवाती बिन्दु	बेलवागुर्दवा नदी नजिकै (चे. ६४०+०००)
अन्तिम बिन्दु	उमरी/ शिवपुर चौक (चे. ६५९+ २००)
सडकको स्ट्याण्डर्ड	राष्ट्रिय राजमार्ग
सडकको अधिकार क्षेत्र	कूल ५० मिटर (दायाँ बायाँ सहित)
सोलजर सहित बिद्यमान क्यरिज वे को चौडाई	पेभ्ड सोलजर सहित दूई लेन स्तरको (७ मिटर क्यरिज वे)
डिजाइन स्पिड	समतल भूभागमा १०० किलोमिटर प्रतिघण्टा
सञ्चालनको लागि डिजाइन अवधि	२० वर्ष
सतहको प्रकार	बिटुमिनस
कामको प्रकार	स्तरोन्नति
कूल पुलको संख्या	२ वटा प्रमुख पुल र ६ वटा साना पुल, १ भीयुपी र २ वटा पियुपी १ फुटओभर ब्रिज
कल्भर्ट	६४ वटा बक्स कल्भर्ट र ७ वटा पाइप कल्भर्ट
संरचनाको क्यारिजवे चौडाइ	ग्रामीण तथा वन क्षेत्र -२४.० मिटर, शहरी क्षेत्र-उपयोगिताको लागि ठाउँ सहित ५० मिटर
फुटपाथको चौडाई	२.० मिटर (दुवै तर्फ)
आयोजनाको अनुमानित लागत	रु. ५.६ अर्ब (भ्याट बाहेक)
प्रति कि.मी. लागत	रु. २९.२ करोड

गोरुसिङ्गे-चन्द्रौटा सडकको ESIA को स्कोप

यो ESIA अध्ययन गोरुसिङ्गे-चन्द्रौटा सडकका लागि तयार गरिएको हो र मुख्यतया निम्न कार्यहरू गर्ने स्कोप रहेको छः

- वातावरणीय र सामाजिक बेसलाइन स्थापना गर्न प्रत्यक्ष प्रभाव क्षेत्र: सडकको बीच भागदेखि दायाँ-बायाँ २५ मिटर। अप्रत्यक्ष प्रभाव क्षेत्र: सडक किनारादेखि दुवैतर्फ ३०० मिटर चौडाइ। प्रभाव क्षेत्र: प्रभावित वडाहरू-बुद्धभूमि नगरपालिका वडा नं. ९ र शिवराज नगरपालिका वडा नं. १, ३, ४ र ५।

ii) आयोजनाबाट हुने सम्भावित नकारात्मक र सकारात्मक वातावरणीय तथा सामाजिक (E&S) जोखिम र प्रभावहरूको मूल्याङ्कन गर्न- आयोजनाको सम्पूर्ण चक्र (निर्माण पूर्व, निर्माण, सञ्चालन र मर्मत-सम्भार चरण) मा। iii) गोरुसिंगे-चन्द्रौटा सडक सुधार कार्यमा देखिन सक्ने सबै वातावरण, समाज, स्वास्थ्य र सुरक्षा (ESHS) जोखिम र प्रभावहरूलाई विचार गर्न, र तिनीहरूलाई सम्बोधन गर्नुपर्ने अनुपातिक उपायहरू प्रस्ताव गर्न।

iii) आयोजना विकल्पहरूको विश्लेषण अध्ययन-वातावरणीय, प्राविधिक र आर्थिक कारणहरूलाई ध्यानमा राखी दुई विकल्प छनोट गरिएका छन्: पहिलो विकल्प: सडकलाई केन्द्र (concentric) बाट चौडा गर्ने र पुललाई असमान (eccentric) ढङ्गले चौडा गर्ने। दोस्रो विकल्प: ग्रामीण क्षेत्रमा असमान (eccentric) चौडाइ, शहरी क्षेत्रमा केन्द्र (concentric) चौडाइ, र पुललाई असमान (eccentric) चौडाइ गर्ने।

iv) सरोकारवाला निकायहरूसँग परामर्श: आयोजनाको सम्पूर्ण चक्रमा जानकारी साझेदारी गर्ने, स्थानीय जनताको चासो, सुझाव र सिफारिसलाई सम्बोधन गर्ने, तिनलाई आयोजना डिजाइनमा समावेश गर्ने, प्रभावकारी गुनासो समाधान संयन्त्र (GRM) स्थापना गर्ने, आयोजना स्तरको गुनासो समाधान संयन्त्र, श्रमिकहरूको गुनासो समाधान संयन्त्र, यौन शोषण/दुरुपयोग तथा लैङ्गिक हिंसा (SEA/SH) सम्बन्धी गुनासो समाधान संयन्त्र।

ESMP यस ESIA अध्ययनमा प्रस्ताव गरिएको छ, जसलाई निम्न प्रमुख सामाजिक सुरक्षण सम्बन्धि प्रतिवेदनले परिपूरक बनाइनेछ: पुनर्स्थापना कार्ययोजना (RAP), सरोकारवालसँगको सहभागिता योजना (SEP), श्रम व्यवस्थापन प्रक्रिया (LMP), यौन शोषण, दुरुपयोग तथा लैङ्गिक हिंसा (SEA/SH) जोखिम न्यूनीकरण कार्ययोजना।

कार्यान्वयन गर्ने निकाय: सडक विभाग अन्तर्गतको विकास सहायता कार्यान्वयन महाशाखा र भौतिक पूर्वाधार तथा यातायात मन्त्रालय मुख्य कार्यान्वयन गर्ने निकाय रहेका छन्। यी संस्थाहरूले आयोजनाको कार्यान्वयन, ESMP कार्यान्वयनको अनुगमन र प्रतिवेदन प्रणाली सुनिश्चित गरेका छन्।

कानुनी र संस्थागत ढाँचा

नेपालको राष्ट्रिय कानुनी संरचना, विश्व बैंकको वातावरणीय तथा सामाजिक ढाँचा (ESF) र वातावरण, स्वास्थ्य तथा सुरक्षा दिशानिर्देशहरू (EHSs) यस ESIA को कानुनी र संस्थागत ढाँचाको आधार बनेका छन्। यस ESIA को यो खण्डले आयोजनाको कार्यान्वयनका क्रममा पालना गर्नुपर्ने सम्बन्धित पर्यावरणीय तथा सामाजिक नीतिहरू, कानुनी तथा संस्थागत ढाँचाहरूको एक अवलोकन प्रदान गर्दछ।

राष्ट्रिय कानुनी र संस्थागत ढाँचा नेपालको संविधान (२०७२) मा आधारित छ, जसले हरेक व्यक्तिलाई स्वच्छ र स्वस्थ वातावरणमा बाँच्ने अधिकार र प्राकृतिक स्रोतहरूको संरक्षण, प्रवर्द्धन र दिगो उपयोग गर्ने अधिकार प्रदान गर्दछ।

नेपालमा विद्यमान कानुनी संरचनाको विस्तृत अध्ययन गरिएको थियो, जसमा विकास योजना, रणनीतिहरू, नीतिहरू, ऐनहरू र नियमहरूको समीक्षा समावेश थियो। राष्ट्रिय निर्देशनहरू, दिशानिर्देशहरू, म्यानुअलहरू र मापदण्डहरूले नियामक ढाँचाका आवश्यकताहरू पूरा गर्न सहयोग पुऱ्याउँछन्, जसले आयोजना कार्यान्वयनमा प्रयोग गर्न मिल्ने व्यावहारिक उपकरणहरू प्रदान गर्छन्। विद्यमान कानुनी संरचनाको विश्लेषण गरी तालिकाबद्ध गरिएको थियो, जसमा गोरुसिंगे-चन्द्रौटा सडकको ESIA का लागि सम्बन्धित प्रमुख प्रावधानहरू हाइलाइट गरिएका छन्।

समीक्षा गरिएका केही महत्वपूर्ण कानून र नियमहरू निम्नानुसार रहेका छन्: सडक सुरक्षा कार्ययोजना (२०१३-२०२०), नेपाल राष्ट्रिय जैविक विविधता कार्ययोजना (२०१४-२०२०), नेपाल राष्ट्रिय वातावरण नीति (२०७६), वन नीति (२०७५), श्रम नीति (२०६२), भूमिअधिग्रहण, पुनर्स्थापना र पुनर्वास नीति (२०७१), वातावरण संरक्षण ऐन (२०७६), वन ऐन (२०७८), सङ्कटापन्न वन्यजन्तु तथा वनस्पतिको अन्तराष्ट्रिय व्यापार नियन्त्रण ऐन, (२०७३), श्रम ऐन (२०७४), बाल श्रम (प्रतिबन्ध र नियमन) ऐन (२०५६), राष्ट्रिय लैङ्गिक समानता नीति (२०७७), कार्यस्थलमा यौन दुर्व्यवहार (निवारण) ऐन (२०७१), भूमि सम्बन्धि ऐन (२०२१) र संशोधनहरू, श्रम नियमावली (२०७५), जलस्रोत नियमावली (२०५०), राष्ट्रिय जलवायु परिवर्तन नीति (२०७६), औद्योगिक नीति (२०६७), वातावरण संरक्षण नियमावली (२०७७), वन नियमावली (२०७९) र व्यवसायजन्य स्वास्थ्य तथा सुरक्षा नीति (२०८०)। धेरै अन्तर्राष्ट्रिय सम्मेलन र सन्धिहरूमा हस्ताक्षरकर्ता राष्ट्रका रूपमा, नेपालले प्रदूषण, जलवायु परिवर्तन र जैविक विविधता संरक्षण जस्ता अन्तरदेशीय वा विश्वव्यापी प्रकृतिका महत्वपूर्ण पर्यावरणीय तथा सामाजिक मुद्दाहरूलाई सम्बोधन गर्नुपर्ने दायित्व लिएको छ।

राष्ट्रिय कानुनी संरचना, दिशानिर्देश र म्यानुअलका प्रावधानहरूलाई ESIA प्रक्रियामा समावेश गरिएको छ। साथै, विश्व बैंकको ESF र EHSs का मार्गनिर्देशन पनि अवलम्बन गरिएको छ, जसले प्रमुख नीति र संस्थागत कमि कमजोरी हटाउन जोखिम वर्गीकरण (उच्च जोखिम, पर्याप्त जोखिम, मध्यम जोखिम र न्यून जोखिम) सहितको प्रभाव मूल्यांकन र न्यूनीकरण क्रम (टार्ने, घटाउने, न्यूनीकरण गर्ने र क्षतिपूर्ति/प्रतिपूर्तिको व्यवस्था) द्वारा व्यवस्थापन गर्न सहयोग गर्दछ, जुन विश्व बैंकका १० वटा ESSs स्ट्याण्डर्डमा आधारित छन्।

यो ESIA अध्ययन मुख्य रूपमा विश्व बैंकको ESS-1, ESS-2, ESS-3, ESS-4, ESS-5, ESS-6, ESS-7, ESS-8 र ESS-10 मा केन्द्रित छ र आवश्यकतानुसार तयार पारिएका दस्तावेजहरू RAP (पुनर्स्थापना कार्ययोजना), LMP (श्रम व्यवस्थापन योजना), SEP (सरोकारवाला निकायको संलग्नता योजना) र स्थल-विशिष्ट योजनाहरू ESMPs-मार्फत ती कमि कमजोरीहरू पूरा गर्ने उद्देश्य राख्दछ।

आधारभूत वातावरणीय तथा सामाजिक अवस्था

आधारभूत (बेसलाइन) वातावरणीय तथा सामाजिक तथ्यांकहरू सन् २०२४ को अप्रिलदेखि डिसेम्बरसम्म संकलन गरिएको हो । यस अध्ययनले प्रमुख वातावरणीय पक्षहरू जस्तै भौगोलिक बनावट (physiography), निकास प्रणाली (drainage), भू-विज्ञान (geology), माटो (soil), जलभूविज्ञान (hydrogeology), भूमि-उपयोग (land use), वनस्पति र जीवजन्तु (flora and fauna), वन/वनस्पति आवरण (forest/vegetation cover), जलवायु (climate), वायुको गुणस्तर (ambient air quality), पानीको गुणस्तर (water quality), ध्वनि स्तर (ambient noise levels), जोखिम तथा संवेदनशीलता (hazards and vulnerability) सम्बन्धी विवरणहरू संकलन गरिएको छ । यसले साथै सामाजिक पक्षहरू जस्तै प्रभावित घरपरिवारका सामाजिक-आर्थिक अवस्था (socio-economic characteristics), सांस्कृतिक सम्पदा (cultural heritage), सार्वजनिक पूर्वाधार (public utilities), आदिवासी जनजाति (Indigenous People - IPs), संवेदनशील समूह (vulnerable groups), तथा लैङ्गिक पक्ष (gender) सम्बन्धी तथ्यांक पनि संकलन गरेको छ ।

गोरुसिंगे-चन्द्रौटा सडक पूर्ण रूपमा समथर भू-भाग (साधारणतया समुद्र सतहबाट १०० देखि १५० मिटर उचाइ) हुँदै गएको छ । यो सडक बुटवल-गोरुसिंगे खण्डको निरन्तरता हो, जुन बेलवागुर्दवा नदी पुल (चैनज ६४०+०००) नजिकबाट सुरु भएर अन्ततः उमरी/शिवपुर चौकमा समाप्त हुन्छ।

आयोजना सडक बुद्धभूमि र शिवराज नगरपालिका हुँदै जाने क्रममा दुई प्रमुख बस्तीहरू गोरुसिंगे र चन्द्रौटाबाट गुज्रन्छ । साथै यो इमिलिया, चम्पापुर, खरेन्द्रपुर, शिवपुर आदि साना शहरी/बस्ती क्षेत्रहरू हुँदै पनि जाने गर्दछ ।

भौतिक वातावरण:

गोरुसिंगे-चन्द्रौटा सडक मुख्य रूपमा तराई क्षेत्र (समथर भू-भाग) भित्र अवस्थित छ, जसको उचाइ समुद्री सतहबाट करिब १०० देखि १५० मिटर सम्मको दायरामा पर्छ। गोरुसिंगे-चन्द्रौटा सडकको भूमिउपयोग नक्सा चित्र E2 मा देखाइएको छ। यो सडक उष्ण र उपोष्ण जलवायु क्षेत्रमा पर्दछ, जहाँ मौसम तातो र आर्द्र हुन्छ। सामान्यतया वर्षा याम (मनसुन) जुन महिनाबाट सुरु भई सेप्टेम्बरमा समाप्त हुन्छ, र वार्षिक कुल वर्षाको करिब ८०% यही समयमा पर्छ। कपिलवस्तु जिल्लाको औसत न्यूनतम तापक्रम १८.७९°से र औसत अधिकतम तापक्रम ३०.९३°से रहेको छ। वर्षभरि कपिलवस्तु जिल्लामा तापक्रम १०°से देखि ४३°से सम्म रहन्छ, जहाँ डिसेम्बर-जनवरीमा सबैभन्दा चिसो र मे, जुन महिनामा सबैभन्दा तातो-गर्मी मौसम हुने गर्दछ।

आयोजना क्षेत्रका अधिकांश प्रमुख नदीहरू शिवालिक र महाभारत पहाडबाट उद्गम भएका हुन्। यी नदीहरू मध्ये केही मनसुनको समयमा आकस्मिक बाढी (flash flood) का लागि संवेदनशील छन् तर बाँकी मौसममा प्रायः सुक्खा रहन्छन्। सडकको एलान्टमेन्ट गङ्गा मैदानी क्षेत्रका भागहरू र पश्चिम नेपालको शिवालिक समूहका ढुंगामाटोका क्षेत्रमा पर्दछ।

आयोजना क्षेत्रको आधारभूत वायुको गुणस्तर मापन गर्दा इमिलिया, जवई खोला र चन्द्रौटा गरी तीन स्थानहरूले अन्य स्थानको प्रतिनिधित्व हुने किसिमले मापन गरिएको थियो। वायु गुणस्तरको प्रयोगशाला विश्लेषण प्रतिवेदन एनेक्स-II मा दिइएको छ। सबै मापन गरिएका सूचकहरू वन तथा वातावरण मन्त्रालय (MoFE), २०१२ द्वारा तोकिएको राष्ट्रिय वायु तथा गुणस्तर मापदण्ड भित्र रहेका पाइएका छन्। आयोजना क्षेत्रमा वायु प्रदूषणका मुख्य स्रोतहरू सवारी साधनका धुवाँ उत्सर्जन, निर्माण कार्यहरू, औद्योगिक प्रदूषण, नदीबाट बालुवा लोड तथा अनलोड गर्ने क्रियाकलाप रहेका छन्।



चित्र E2: गोरुसिंगे-चन्द्रौटा सडकसँगैको भूमि उपयोग नक्सा

जैविक वातावरण:

पूर्व-पश्चिम राजमार्गको अधिकांश भाग तराई आर्क परिदृश्य (Terai Arc Landscape-TAL) भित्र पर्दछ। TAL करिब ९०० किलोमिटर लम्बाइमा नेपालको बागमती नदीदेखि पूर्वतर्फ र भारतको उत्तराञ्चलस्थित यमुना नदीसम्म पश्चिमतर्फ फैलिएको छ, जसको कुल क्षेत्रफल ५१,००२ वर्ग किलोमिटर छ। TAL ले विश्वस्तरमा महत्त्वपूर्ण जैविक विविधता समेटेको छ र यसले एशियाका ठूला जनावरहरू, चराहरू, सरिसृपहरू तथा ताजा पानीका माछाहरूको संरक्षण गर्दछ; साथै यस क्षेत्रका महत्त्वपूर्ण नदीहरूमा वातावरणीय प्रवाह (environmental flow) कायम राख्न मद्दत गर्दछ। यसले तराई र चुरे क्षेत्रका जनताको सामाजिक-आर्थिक समृद्धि र विकासमा सहयोग पुऱ्याउने पारिस्थितिक प्रणालीमा आधारित सेवा पनि प्रदान गर्दछ।

यो ईएसआईए अन्तर्गत समावेश गरिएको गोरुसिंगे-चन्द्रौटा सडक खण्ड TAL को मध्य भागमा पर्दछ, जुन TAL को बाक्लो जनसंख्या भएको क्षेत्र हो। गोरुसिंगे-चन्द्रौटा सडक कुनै पनि संरक्षित क्षेत्र वा वन्यजन्तु आवत जावत मार्गसँग अवलम्बित (overlap) छैन, र TAL भित्र पहिचान गरिएका कुनै पनि महत्त्वपूर्ण प्राकृतिक बासस्थानहरूलाई टुक्र्याउने कार्य गर्दैन।

करिब ५ किलोमिटर लम्बाइको गोरुसिंगे-चन्द्रौटा सडक सामुदायिक वनहरू हुँदै गएको छ, जहाँ प्रमुख रूपमा सालका वनहरू रहेका छन्, र नदी आसपासका क्षेत्रमा दलवर्जिया-अकेसिया (Dalbergia–Acacia) अर्थात् रोजवुड वनका साना टुक्राहरू पनि पाइन्छन्। गोरुसिंगे-चन्द्रौटा सडकखण्डमा दुईवटा प्रमुख वन क्षेत्रहरू रहेका छन्। (चित्र E2): (i) चेनज ६११+ ८७० देखि ६१७+७३० सम्मको बरकलपुर-चम्पापुर वनक्षेत्र, र (ii) चेनज ६२६+९७० देखि ६३५+२०० सम्मको चम्पापुर-खरेंद्रपुर वनक्षेत्र।

यी वनहरू मुख्य रूपमा सामुदायिक वनहरू हुन्, जसपछि साझेदारी वनहरू पर्दछन्, जुन काठ, दाउरा, घाँस तथा अन्य सामुदायिक प्रयोजनका लागि बहुउद्देश्यीय रूपमा प्रयोग गरिदै आएको छ। हालको सडकको केन्द्रदेखि दुबैपट्टि २५ मिटरको दूरीभित्र पर्ने ५० मिटरको अधिकार क्षेत्र भित्रका वन क्षेत्रहरू सडक विभागको स्वामित्वमा छन्, र ती क्षेत्रहरू पहिले नै अव्यवस्थित (disturbed) र अवनत (degraded) अवस्थामा रहेका छन्।

आयोजनाको प्रभाव क्षेत्र (corridor of impact) तथा प्रभाव क्षेत्राधिकार (zone of influence) भित्र कुनै पनि राष्ट्रिय वा अन्तर्राष्ट्रिय रूपमा घोषणा गरिएको संरक्षित क्षेत्रहरू-जस्तै राष्ट्रिय निकुञ्ज, संरक्षण क्षेत्र, वा वन्यजन्तु आवागमन मार्ग अवस्थित छैनन्।

सामाजिक-आर्थिक तथा सांस्कृतिक वातावरण

आयोजना क्षेत्र लुम्बिनी प्रदेश र कपिलवस्तु जिल्लाभित्र पर्दछ, जसमा बुद्धभूमि र शिवराज नगरपालिका समावेश छन्। आयोजना क्षेत्रमा रहेका जातीय तथा समुदायगत संरचना ब्राह्मण, क्षेत्री, दलित, मुसलमान, मधेसी र जनजाति हुन्। यस क्षेत्रमा तीनवटा आदिवासी जनजाति समूह रहेका छन् 'थारू, नेवार र मगर। साथै, माथि उल्लेख गरिएका दलित, मुसलमान र मधेसी समुदायहरू पनि संवेदनशील समूह अन्तर्गत पर्छन्। मुख्य धर्म हिन्दु (६८.९%) हो, त्यसपछि बौद्ध र इस्लाम धर्म पालना गर्नेहरू रहेका छन्। आयोजना क्षेत्रमा नेपाली, नेवारी, थारू, मगर र मुस्लिम मातृभाषा सामान्यतया प्रचलित छन्।

आयोजनाको प्रभाव क्षेत्र पाँच वडा (बुद्धभूमि नगरपालिका वडा नं. ९ र शिवराज नगरपालिका वडा नं. १, ३, ४ र ५) समेटेदछ, जसको कुल जनसंख्या ५३,७८२ छ। यसमध्ये महिला जनसंख्या ५१.७६% र पुरुष जनसंख्या ४८.२३% छ। समग्र साक्षरता दर र महिला साक्षरता दर ९५% रहेको छ, जुन राष्ट्रिय औसत (क्रमशः ७६.३% र ६९.४%) भन्दा बढी हो। शिक्षा र निर्णय-निर्माणको दृष्टिले महिला र बालिकाहरूको अवस्था सन्तोषजनक देखिन्छ।

मुख्य पेसा कृषि (४६.१%) हो, त्यसपछि वैदेशिक रोजगार (२४.४%) र व्यापार/व्यवसाय (१७.५%) रहेका छन्। सडक छेउका मौसमी व्यवसायहरू पनि जीविकोपार्जनका माध्यम (mode of livelihood) का रूपमा देखिएका छन्। यस बाहेक, आयोजना क्षेत्रमा केही संक्रामक तथा भेक्टर-जन्य रोगहरू जस्तै रुघा-खोकी, झाडापखाला, टाइफाइड, निमोनिया, साथै कोभिड-१९ र डेङ्गु पनि फैला परेका छन्।

कुल ३१२ घरधुरीहरूको सर्वेक्षण गरिएको छ (जुन अप्रत्यक्ष प्रभाव क्षेत्र अर्थात् सडकको केन्द्र रेखादेखि दुबैपट्टि ३०० मिटरभित्रका कुल घरधुरीहरूको करिब २०% हो), जसमा कुल जनसंख्या १,६४३ छ र औसत परिवार आकार ३.५ जना रहेको छ।

आयोजनाबाट प्रत्यक्ष प्रभावित घरधुरीहरू कुल ५० घरधुरी रहेका छन्, जसले आफ्ना संरचना गुमाउनेछन्, किनभने केही भागमा सडकको अधिकार क्षेत्र (RoW) स्थानीय बासिन्दाहरू, विशेषगरी शहरी क्षेत्रमा, द्वारा अतिक्रमित गरिएको छ। यी प्रभावित घरधुरीहरूको कुल जनसंख्या ३१६ छ र औसत परिवार आकार ६.३ जना रहेको छ।

वातावरणीय र सामाजिक लाभ तथा जोखिमहरू:

गोरुसिंगे-चन्द्रौटा सडक सुधारबाट प्राप्त हुने मुख्य लाभकारी प्रभावहरूमा आयोजना क्षेत्रको आर्थिक विकासमा सहजता, रोजगारी सिर्जना र स्थानीय जनताको जीविकोपार्जनमा सहयोग, व्यापारका अवसरहरूको वृद्धि, सेवासुविधा र बजारसम्मको पहुँच सुधार, सडक पूर्वाधारको सुधारमार्फत सडक सुरक्षामा वृद्धि, राम्रो यातायात सुविधा, सीमा पार व्यापार तथा अन्तर्राष्ट्रिय व्यापारमा सहयोग जस्ता पक्षहरू समावेश छन्। यी लाभहरू स्थानीय महिलाहरूको आर्थिक सशक्तीकरणसँग पनि प्रत्यक्ष रूपमा सम्बन्धित छन्।

मुख्य सम्भावित जोखिम र नकारात्मक प्रभावहरूमा निजी तथा सार्वजनिक संरचनाको क्षति, बाढी र नदी किनार कटान, पानी जम्ने समस्या र जग्गा टुक्रिने समस्या, सामुदायिक स्वास्थ्य तथा सुरक्षा जोखिम, मानव बेचबिखन र आयोजना गतिविधिका कारण उत्पन्न लैङ्गिक हिंसा (SEA/SH) को जोखिमहरू पर्दछन्।

सडकको अधिकार क्षेत्र भित्रका ९,८०८ वटा रूख कटान गर्दा चराचुरुङ्गी, साना स्तनधारी जनावर र सरिसृपजस्ता वन्यजन्तुका बासस्थानहरू गुम्नेछन्। यस नोक्सानीलाई न्यूनीकरण गर्न १:१० अनुपातमा प्रतिपूरक वृक्षारोपण गरिनेछ, अर्थात् ९,८०८ रूखको सट्टा ९८,०८० नयाँ रूखहरू रोपिनेछन्। वृक्षारोपण गर्दा लागि स्थानीय प्रजातिहरूलाई प्राथमिकता दिइनेछ।

यसका अतिरिक्त सडकछेउमा हरियाली कायम गरिनेछ, वन्यजन्तु आवागमनका लागि क्रसिङ्ग मार्गहरू र बाँदरका लागि क्यानोपी पुलहरू निर्माण गरिनेछ, जसले निर्माण कार्यका क्रममा महत्वपूर्ण बासस्थानहरूको क्षतिलाई न्यून पार्नेछ।

सबै प्रभावहरूलाई तिनको परिमाण (magnitude) र महत्व (significance) अनुसार वर्गीकरण गरिएको छ। तलका खण्डहरूमा प्रत्येक सम्बन्धित वातावरणीय तथा सामाजिक मापदण्ड अनुसार जी.सी. सडक सुधार कार्यका वातावरणीय र सामाजिक जोखिम तथा प्रभावहरूको संक्षेप विवरण प्रस्तुत गरिएको छ।

वातावरणीय तथा सामाजिक जोखिम र प्रभावको मूल्याङ्कन र व्यवस्थापन (ESS1):

आयोजनाको वातावरणीय तथा सामाजिक जोखिम वर्गीकरण मध्यम खालको रहेको छ। गोरुसिंगे-चन्द्रौटा सडकको विस्तार र सुधार कार्य २ लेनबाट ४ लेनसम्म पुर्याउने कार्य विद्यमान अधिकार क्षेत्र (RoW) भित्र गरिनेछ। तर, RoW का केही भागहरूमा आवासीय तथा व्यवसायिक संरचनाहरूले अतिक्रमण गरेका छन्, र सडक विस्तारका क्रममा ती भागहरू आंशिक वा पूर्ण रूपमा प्रभावित हुने भएकाले पुनःस्थापना योजना (RAP) आवश्यक छ।

सडक विस्तारको लागि जग्गा अधिग्रहण आवश्यक नपर्ने भए पनि RoW (५० मिटर) भित्रका केही निजी र सार्वजनिक संरचनाहरू अधिग्रहण गर्नुपर्नेछ, जुन हाल नेपाल सरकारको स्वामित्वमा छन्।

आयोजनाले ५० घरधुरीका ५३ निजी संरचनाहरूलाई असर गर्नेछ। यसमध्ये ५ घरधुरीहरूले आफ्ना संरचनाहरू पूर्ण रूपमा गुमाउनेछन् भने बाँकी ४८ घरधुरीहरूले आंशिक रूपमा आफ्नो संरचना गुमाउनेछन्, मुख्य रूपमा अगाडिको बरान्डाहरू प्रभावित हुनेछन्। यी आयोजनाबाट प्रभावित घरधुरीहरू मध्ये ५ घरधुरी संवेदनशील समूहसँग सम्बन्धित छन्, महिला नेतृत्वमा रहेका घरधुरी (२), गरिबी रेखाभन्दा तल आय भएका घरधुरी (२), दलित घरधुरी (१)। साथै, आदिवासी जनजाति (IPs) का २ घरधुरी व्यवसाय स्थापना र घर निर्माणका लागि प्रभावित छन्। तर यी IP घरधुरीहरूमा आयोजना गतिविधिको प्रभाव ESS-7 मा निर्दिष्ट गरिएको स्वतन्त्र र अग्रिम जानकारी सहितको पूर्व सहमति (FPIC) को मापदण्ड पूरा गर्दैनन्, किनभने यी IPs व्यक्तिगत घरधुरी स्तरमा बस्छन् र भूमिसँग सामूहिक सम्बन्ध राख्दैनन् र स्थानीय नगरपालिका प्रशासन प्रणाली अन्तर्गत व्यवस्थित छैनन्।

पुनःस्थापना र जीविकोपार्जन सम्बन्धी सामाजिक मुद्दाहरू ESS-5 अन्तर्गत विस्तृत रूपमा छलफल गरिएको छ भने IP र FPIC सम्बन्धी विषयहरू ESS-7 मा संक्षेपमा प्रस्तुत गरिएको छ।

निर्माण अवधिमा वातावरणीय प्रभाव मुख्य रूपमा धुलो उत्पन्न हुने, ध्वनि प्रदूषण, श्रमिक र समुदायको स्वास्थ्य तथा सुरक्षामा जोखिम बढ्ने जस्ता पक्षसँग सम्बन्धित छन्। सडक छेउको वन क्षेत्र आवासीय क्षेत्रको सिधा नजिक नभएको हुनाले नजिकका वन्यजन्तुमा मानव गतिविधिको प्रभाव न्यून हुने अपेक्षा गरिएको छ। वन क्षेत्र भित्रका गतिविधिहरू समुदाय वन प्रयोगकर्ता समूहद्वारा नियन्त्रित छन्।

श्रमिकको आगमनसँग सम्बन्धित SEA/SH जोखिम मध्यम स्तरको छ। निर्माण चरणमा स्थानीय स्रोत र सार्वजनिक सेवामा दबाव, यौन शोषण तथा दुरुपयोग, यौन उत्पीडन (SEA/SH), बाल/जबर्जस्ती श्रम, मानव बेचबिखन, र संक्रामक रोगहरूजस्ता जोखिमहरू अनुमानित छन्। साथै, यातायात प्रवाहमा वृद्धि र ट्राफिक व्यवस्थापनको कमीले ट्राफिक जाम र सडक दुर्घटनाको जोखिम बढाउन सक्छ।

गोरुसिंगे-चन्द्रौटा सडक सुधार कार्यले थप महत्वपूर्ण प्रेरित (induced) वा संचयी (cumulative) प्रभाव उत्पन्न नगर्ने अनुमान गरिएको छ। किनभने कार्य मुख्य रूपमा विद्यमान RoW भित्र सीमित छ र क्षेत्र मानव जनसंख्या वृद्धि, अतिक्रमण, नयाँ बस्ती स्थापना, भूमिको रूपान्तरण, कृषि विकास र अन्य विकास गतिविधिका कारण दशकौंदेखि परिवर्तन, टुक्रिएको र धेरै प्रभावित भइसकेको छ। सडक सुधार भए/नभए पनि भूमि उपयोग परिवर्तन र भूमिको रूपान्तरण पहिले नै भइसकेको छ र शहरीकरण तथा ग्रामीण क्षेत्रको विकास, संघीयकरण र विकेन्द्रीकरणका कारण आगामी दिनमा पनि जारी रहनेछ।

सडक जालको घनत्व वृद्धि र सुरक्षात्मक उपायको कमीले पहिल्यै भएका वातावरणीय नकारात्मक प्रभावहरू (जस्तै नदीमा माटोको जमावट, पानी निकासमा समस्या, सामुदायिक स्वास्थ्य र सुरक्षा जोखिम) बढाएको छ। जलवायु परिवर्तन र स्थानीय समुदायको असंयोजित विकासले यी प्रभावहरू अझ गहिरो आर्थिक नोक्सानीमा परिणत गर्न सक्छ।

संचयी प्रभावहरूलाई सम्बोधन गर्न र पूर्व-पश्चिम राजमार्गसँग सम्बन्धित समग्र कार्यक्षमता सुधार गर्न, साथै सडक विभागको योजना, व्यवस्थापन र देशको रणनीतिक सडक सन्जालको यातायात दक्षता वृद्धि गर्न, रणनीतिक वातावरणीय तथा सामाजिक मूल्याङ्कन (SESA) अध्ययन र संचयी प्रभाव मूल्याङ्कन (CIA) अध्ययन पहिले नै क्षेत्रीय व्यापारिक मार्ग बिस्तार आयोजना (SRCTIP) अन्तर्गत सम्पन्न गरिएको छ। SESA र CIA अध्ययनका परिणामहरूले आयोजना डिजाइनमा सुधार गर्न, र अन्य सरोकारवालासँग सहकार्यपूर्ण संलग्नता कायम गर्न मद्दत गर्न सक्छन्।

श्रमिक र कार्य परिस्थितिहरू (ESS2):

गोरुसिंगे-चन्द्रौटा सडक आयोजनाले प्रत्यक्ष (Direct) श्रमिकहरू (जसमा सडक विभागद्वारा आयोजनामा प्रत्यक्ष जिम्मेवारी पूरा गर्न नियुक्त विशेषज्ञ सल्लाहकार र प्राविधिक विज्ञहरू समावेश छन्), त्यस्तै कन्ट्र्याक्ट गरिएका श्रमिकहरू (जसमा निर्माण व्यवसायी र अन्य तेस्रो पक्षद्वारा आयोजनाका मुख्य कार्यहरू सञ्चालन गर्न नियुक्त श्रमिकहरू समावेश छन्) र प्राथमिक आपूर्ति श्रमिकहरू (जसमा बालुवा, गिट्टी, बिटुमेन, फलाम, सिमेन्ट लगायतका निर्माण सामग्री आपूर्तिकर्ता र तिनका लोड/ढुवानी सेवामा संलग्न श्रमिकहरू समावेश छन्) समावेश हुने अपेक्षा गरिएको छ।

आयोजनाले करिब ३,५०,००० मानव दिन अदक्ष श्रमिक र १,००,५०० मानव दिन दक्ष श्रमिकलाई प्रत्यक्ष र कन्ट्र्याक्ट गरिएका श्रमिकका रूपमा रोजगारी दिनेछ। यसले स्थानीय समुदायका लागि महत्वपूर्ण रोजगार अवसर सिर्जना गर्दछ। करिब ४०% श्रमिकहरू स्थानीय समुदाय, तराई क्षेत्र र सुदूरपश्चिम प्रदेशका जिल्लाबाट र कहिलेकाहीँ भारतबाट पनि आएर निर्माण कार्यमा संलग्न रहने अपेक्षा गरिएको छ।

तर, यी श्रमिकहरू निम्न जोखिमहरूमा पर्दा सक्ने सम्भावना रहेको छ: श्रमिक क्याम्पमा असुरक्षित वा असुविधाजनक अवस्था, मजदुरी वा अन्य लाभहरू समयमा नपाउने, समान प्रकृतिका काममा पुरुष र महिलाबीच रोजगारीमा भेदभाव, बालश्रम वा जबर्जस्ती श्रम, व्यवसायिक स्वास्थ्य र सुरक्षा (OHS) सम्बन्धी समस्या जस्तै कार्यस्थल दुर्घटना, संक्रामक रोगको जोखिम, श्रमिकसम्बन्धी उजुरी र SEA/SH सम्बन्धि जोखिम। यी जोखिमहरू श्रमिकका लागि बढी संवेदनशील हुन्छन्।

निर्माण व्यवसायीले श्रमिक व्यवस्थापन योजना (LMP) तयार पारेर कार्यान्वयन गर्नेछन्, जुन निर्माण व्यवसायीको ESMP को हिस्सा हुनेछ। निर्माण अवधिमा श्रमिकहरूको स्वास्थ्य र सुरक्षाको सुनिश्चित गर्न, निर्माण व्यवसायीले व्यावसायिक स्वास्थ्य र सुरक्षा योजना, ट्रफिक व्यवस्थापन योजना, आपतकालीन प्रतिक्रिया योजना (Emergency Response Plan) तयार पारेर अनुमोदन लिनु र कार्यान्वयन गर्नु पर्नेछ। यी योजनाहरू निर्माण गतिविधिका लागि विश्व बैंक EHS Guidelines र सम्बन्धित OHS मापदण्ड (जस्तै US OSHA) अनुसार तयार पारिनेछन् र निर्माण कार्य सुरु हुनु अघि अन्तिम रूप दिनेछन्।

साथै, श्रमिकहरूको लागि वार्षिक स्वास्थ्य परीक्षण अभ्यास गरिनेछ। LMP को हिस्सा रूपमा श्रमिकहरूको लागि श्रमिक उजुरी प्रणाली स्थापना गरिनेछ, जसमा ESS2 सम्बन्धी जोखिम र प्रभावलाई सम्बोधन गर्ने उपायहरू पनि समावेश हुनेछ।

श्रमिकहरूको स्वास्थ्य, उत्पादकता सुधार र खुला शौचबाट बचाउन प्रत्येक कार्यस्थलमा पेयजल सुविधा र शौचालय/मूत्रालय उपलब्ध गराउनु पर्नेछ। आयोजनामा संलग्न सम्भावित श्रमिकहरू सुदूरपश्चिम तथा मधेश प्रदेशबाट र कहिलेकाहीँ भारतबाट पनि आइ काम गर्न सक्ने अनुमान गरिएको छ ।

श्रमिक आगमन व्यवस्थापनको लागि स्थानीय श्रमिकको संलग्नता बढाइनेछ र आयोजनामा आवश्यक दक्षता विकास गरिनेछ। श्रमिक आगमनका सम्भावित परिणाम व्यवस्थापन गर्न आयोजनाले आवास, भोजन र अन्य आवश्यक सुविधाहरू प्रदान गर्नेछ। स्थान विशेष आपतकालीन तयारी र तत् सम्बन्धि योजना तयार पारिनेछ र सबै श्रमिकहरूसँग सञ्चार गरिनेछ। कार्यस्थल जोखिम मूल्याङ्कन र सुधारात्मक कदमहरू पनि कार्यान्वयन गरिनेछ।

स्रोत उपयोग दक्षता र प्रदूषण रोकथाम व्यवस्थापन (ESS-3):

ESS-3 ले वायु र ध्वनि प्रदूषण, सम्भावित जोखिमहरू, ठोस फोहर व्यवस्थापन र जल स्रोत प्रदूषणसम्बन्धी विभिन्न जोखिम र प्रभावहरूलाई समेटेछ। आयोजनाका प्रभाव र जोखिमहरू संवेदनशील रिसेप्टरहरू का लागि महत्वपूर्ण हुन सक्छन्, जसमा फोहर निपटान, स्लोपको स्थिरता र कटान, क्रस ड्रेनेज निर्माणको क्रममा मौसमी खोलाहरूको अवरोध, समुदायले प्रयोग गर्ने जल स्रोतमा दबाव, निर्माण सवारी साधन, उपकरण र प्लान्टबाट उत्सर्जन, माटो उत्खनन, कटाइ, स्टक यार्ड, सामग्री ढुवानीबाट धुलो, ध्वनि प्रदूषण र सडक छेउका बस्तीहरू, मेशिन र उपकरणको चलनले संरचनामा हुने कम्पन, जोखिमयुक्त र जोखिमरहित फोहरको व्यवस्थापन, उत्खनन स्थल र बरो क्षेत्र समावेश छन्।

यी सबै प्रभावहरू मुख्य रूपमा निर्माण चरणमा देखिन्छन् र व्यवस्थापन गर्न सकिन्छ:

- फोहर व्यवस्थापन योजनाद्वारा (जैविक फोहरको लागि कार्यस्थलमै कम्पोस्टिंग, निर्माणबाट उत्पन्न फोहरको पुनः प्रयोग, र स्थानीय नगरपालिका फोहर व्यवस्थापन स्थलहरूको उपयोग),
- प्रदूषण रोकथाम योजनाद्वारा (फोहोरपानीको उपचारका लागि सेडिमेन्टेशन पोखरी र सेप्टिक ट्याङ्क),
- र उत्सर्जन नियन्त्रण उपायहरूद्वारा (वायु र ध्वनि गुणस्तरका लागि) राष्ट्रिय वायु, ध्वनि र जल गुणस्तर मापदण्डअनुसार र सडक निर्माण आयोजनामा लागू हुने सर्वोत्तम अभ्यासमार्फत।

गोरुसिंगे-चन्द्रौटा सडक सुधारको परिणामस्वरूप वार्षिक हरितगृह ग्यास उत्सर्जनको अनुमान गरिएको छ। तर, मोटरयुक्त सवारी साधनको गति वृद्धि र इन्धन खपतमा कमी हुने भएकाले कुल उत्सर्जनमा कमी हुने अपेक्षा गरिएको छ। वार्षिक अनुमानित GHG उत्सर्जन ४४,७५४ टन रहेको छ।

सामुदायिक स्वास्थ्य र सुरक्षा (ESS-4)

निर्माण अवधिमा निर्माण सामग्री ढुवानी गर्दा स्थानीय समुदायमा असुविधा र स्वास्थ्य तथा सुरक्षा जोखिम उत्पन्न हुन सक्छ। सडक उत्खनन, कम्पन उत्पन्न गर्ने उपकरणहरूको प्रयोग जस्ता निर्माण गतिविधिहरूले पहिरो र धुलो प्रदूषणको जोखिम बढाउन सक्छ। त्यसैगरी, ब्याचिङ्ग र असफाल्ट प्लान्ट संचालन जस्ता गतिविधिहरूले वायु र जल प्रदूषणको माध्यमबाट स्थानीय समुदायमा असर पार्न सक्छ।

निर्माण अवधिमा उत्पन्न हुने निर्माण सामग्रीको फोहोर वा डेब्रीस एकै स्थानमा धुपारेर राख्दा भू-दृश्य र खेतीयोग्य जमिनमा असर गर्न सक्छ र जल स्रोत प्रदूषण गर्न सक्छ। निर्माण गतिविधि, निर्माण सवारी साधनको आवागमन, र

निर्माण सामग्रीको सडक नजिक भण्डारणले विद्यमान यातायातमा पनि प्रभाव पार्न सक्छ। त्यसैले निर्माण चरणमा अस्थायी पहुँच मार्ग तयार गर्नु आवश्यक हुन्छ।

सुरक्षा सुधारका लागि तीव्र मोड, स्कूल क्षेत्र र बढी जनसंख्या भएको स्थानहरू जस्ता क्षेत्रमा, जहाँ महत्वपूर्ण सुधार सम्भव छैन, त्यहाँ यातायातको गति नियन्त्रण उपायहरू लागू गर्नुपर्छ। निर्माण व्यवसायीले समुदायका सदस्यहरूको सुरक्षित पहुँच र क्रसिङ्ग पोइन्ट सुनिश्चित गर्नुपर्छ र सार्वजनिक सवारी साधन र चलायमान उपकरण बीच अलगाव कायम गर्नुपर्छ।

संवेदनशील रिसेप्टरहरू भएका स्थानहरूमा (जस्तै आवासीय क्षेत्र, स्कूल, स्वास्थ्य सेवा सुविधा) ध्वनि अवरोध आवश्यक र सम्भव भएमा निर्माण कार्यको क्रममा विचार गर्नुपर्छ।

आयोजना क्षेत्रमा बाह्य श्रमिकको उपस्थिति वातावरण र स्थानीय समुदायमा नकारात्मक प्रभाव पार्न सक्छ र SEA/SH सहित द्वन्द्व स्थिति रोक्न व्यवस्थित गर्नुपर्छ। बाह्य श्रमिक र सुरक्षा कर्मचारीहरूले पनि आचार संहिता (CoC) मा हस्ताक्षर गर्ने र सम्झौता पालना गर्न बाध्य छन्। साथै, सुरक्षा गार्डहरू CSC र निर्माण व्यवसायी सुरक्षा टोलीको निरीक्षणमा रहन्छन्।

आयोजना क्षेत्र राम्रोसँग परिभाषित र समन्वित प्रतिक्रिया प्रणाली भएको छ। श्रमिक आगमनसँग सम्बन्धित SEA/SH जोखिम मध्यम स्तरको छ। श्रमिक आगमन र बाह्य व्यक्तिको उपस्थितिको वृद्धि सङ्क्रमण रोगहरू (जस्तै टाइफाइड, निमोनिया, झाडापखाला, कोभिड-१९, एचआईभी/एड्स र यौनजन्य सङ्क्रमक रोग) फैलिन सक्छ।

आयोजनाले यस्ता विशेष मुद्दाहरूलाई सम्बोधन गर्न योजना तयार पारेको छ र आयोजना स्थलमा आवश्यक सुविधा जस्तै क्याम्पहरू, सुरक्षा र सुरक्षासहित उपलब्ध गराउनेछ। तथापि, आयोजनासँग सम्बन्धित SEA/SH जोखिम व्यवस्थापन गर्न एक पृथक SEA/SH कार्ययोजना तयार पारिएको छ, जसमा समुदायमा सचेतना कार्यक्रम, आयोजना कर्मचारीहरूलाई SEA/SH जोखिम र न्यूनीकरण उपाय सम्बन्धी तालिम, श्रमिकहरूको लागि आचार संहिता हस्ताक्षर र तालिम, स्थानीय सेवाहरूको नक्शाङ्कन र SEA/SH मुद्दाहरू सम्बोधन गर्न GRM समावेश गरिएको छ।

भूमि अधिग्रहण, भूमि उपयोगमा प्रतिबन्ध र पुनःस्थापना (ESS-5):

गोरुसिंगे-चन्द्रौटा सडकको विस्तार र सुधार (२ लेनबाट ४ लेनसम्म) विद्यमान अधिकार क्षेत्र (RoW-५० मिटर) भित्र सीमित रहनेछ र जग्गा अधिग्रहण आवश्यक पर्ने छैन, केवल अस्थायी उद्देश्यका लागि जस्तै निर्माण सामग्रीको स्टकपाइलिङ, निर्माण व्यवसायीको क्याम्प साइट, श्रमिक क्याम्प साइट, अस्फाल्ट प्लान्ट र क्रसर प्लान्ट साइटको लागि अस्थायी जग्गा आवश्यक पर्न सक्छ।

तर, RoW का केही भागहरू निजी आवासीय र व्यवसायिक संरचनाद्वारा अतिक्रमित भएका छन्, जसले आयोजना हस्तक्षेपका कारण आंशिक वा पूर्ण क्षति हुन सक्नेछ। त्यसैले, यस चरणमा पुनःस्थापना कार्ययोजना (RAP) तयार गरिएको छ जुन विस्तृत इन्जिनियरिङ डिजाइन अनुरूप रहेको छ।

कुल मिलाएर, विद्यमान RoW भित्र अतिक्रमणका कारण ५० आयोजनाबाट प्रभावित घरधुरीका ५३ निजी संरचनाहरू प्रभावित हुनेछन्। यी प्रभावित घरधुरीहरूमा: आवासीय तथा व्यावसायिक संरचना: ३३ घरधुरी, आवासीय संरचना: ९ घरधुरी, साना व्यवसाय संरचना: ४ घरधुरी, सम्बन्धित संरचना (भान्सा, गाईगोठ, शौचालय): ४ घरधुरी पुनःस्थापना।

प्रभावको अवस्था हेर्दा, ५ घरधुरीले आफ्ना ५ संरचना पूर्ण रूपमा गुमाउनेछन् भने ४५ घरधुरीले ४८ संरचना आंशिक रूपमा गुमाउनेछन्।

सामाजिक-आर्थिक वर्गीकरण अनुसार, कुल प्रभावित घरधुरीहरूमा: आदिवासी जनजाति: २ घरधुरी, संवेदनशील घरधुरी: ५ घरधुरी (महिला नेतृत्वमा २, गरिबी रेखाभन्दा तल आय भएका २, दलित १), मुस्लिम घरधुरी: ४ घरधुरी, बाँकी घरधुरी जातीय समूहसँग सम्बन्धित: ३९ घरधुरी। निर्माण-स्रोत प्रभावहरूलाई रोक्न, न्यून गर्न र न्यूनीकरण गर्न पहल गरिनेछ। बाँकी अपरिवर्तनीय (residual irreversible) प्रभावको लागि, पुनःस्थापना कार्ययोजनामा (RAP) निर्दिष्ट ESS-5 सिद्धान्तअनुसार निर्माण कार्य सुरु हुनु अघि प्रतिस्थापन मूल्यमा नगद क्षतिपूर्ति प्रदान गरिनेछ।

संपत्ति क्षतिमा नगद क्षतिपूर्तिको निर्धारण प्रतिस्थापन मूल्यमा गरिनेछ, जसमा वर्तमान बजार मूल्यसहित आवश्यक खर्चहरू जस्तै "विस्थापन भत्ता, ढुवानी भत्ता, भाडा, भत्ता, व्यापार व्यवधान सहायता" समावेश हुनेछ र सम्बन्धित जिल्ला क्षतिपूर्ति निर्धारण समिति (CDC) को स्वीकृति अनुसार हुनेछ। नगद क्षतिपूर्ति दुई किस्तामा वितरण गरिनेछ: पहिलो ५०% योग्य आयोजनाबाट प्रभावित व्यक्ति PAPs र समूहलाई संरचना विघटन र हटाउनु अघि अग्रिम भुक्तानी। दोस्रो ५०% संरचना विघटनपछि भुक्तानी।

Entitlement Framework ले प्रभावित व्यक्तिहरू र संवेदनशील घरधुरी (roadside vendors सहित) का लागि क्षतिपूर्ति र/वा पुनर्स्थापना उपाय निर्दिष्ट गर्दछ। संवेदनशील घरधुरी र सडक छेउका विक्रेता (जस्तै: ऊखुको रस र मकै विक्रेता) का लागि विशेष आवश्यकताअनुसार पुनर्स्थापना र जीविकोपार्जन समर्थन तालिम प्रदान गरिनेछ।

त्यसैगरी, सार्वजनिक संस्था अन्तर्गतका सार्वजनिक संरचनाहरू जस्तै पर्खाइशेड (waiting shed), सार्वजनिक शौचालय, चौतारी, मन्दिर, प्रहरी चौकी/बिट, विद्यालयको गेट, पर्खाल (boundary wall) र ह्यान्डपम्प आयोजना हस्तक्षेपबाट प्रभावित हुनेछन् र कुल ८२ सार्वजनिक संरचनाहरूको पुनःस्थापना र पुनर्वास कार्य आवश्यक पर्नेछ।

पुनर्स्थापना र पुनर्वास अघि, सडक मार्गअनुसार सम्बन्धित समुदाय र मन्दिर व्यवस्थापन समितिसँग (सार्वजनिक संस्था) नजिकको समन्वय र परामर्श गरी उपयुक्त सुधारात्मक पुनःस्थापना योजना (remedial relocation plan) तयार गरिनेछ। साथै, खानेपानीको लागि अस्थायी उपायहरू लागू गरिनेछन्। थप रूपमा, विद्युत खम्बा (१,००३), ट्रान्सफर्मर (२४), टेलिफोन केबल खम्बा (१५४) र सोलार स्ट्रिट लाइट (२१) पनि पुनःस्थापनाको आवश्यकता पर्नेछ। यी सार्वजनिक सुविधाहरूको पुनःस्थापनाका लागि नेपाल विद्युत प्राधिकरण (NEA) र एनटीसी (NTC) सँग सम्झौता गरिनेछ।

जैविक विविधता संरक्षण र जीवित प्राकृतिक स्रोतको दिगो व्यवस्थापन (ESS6):

गोरुसिंगे-चन्द्रौटा सडकको विद्यमान RoW र वरिपरिका क्षेत्रका बासस्थानहरू प्रायः परिवर्तन भइसकेका छन् र प्राकृतिक बासस्थानका टुक्राहरू पहिले नै टुक्रिएका छन्। लामो समयदेखि भएको विकास र मानव बस्तीका कारण उक्त क्षेत्रमा मानवजनित दबाव निकै व्यापक छ।

गोरुसिंगे-चन्द्रौटा सडकको ESIA को भागको रूपमा गरिएको क्रिटिकल ह्याबिट्याट मूल्याङ्कनले दुई संकटापन्न स्तनधारी प्रजाति र एक विश्वव्यापी संकटग्रस्त सर्प/कछुवा प्रजाति पहिचान गरेको छ, जसमा: फिशिङ क्याट, स्ट्राइप्ड हाइना, एलॉङ्गेटेड टर्टोइस रहेका छन्।

यी प्रजातिहरू ESS6 क्रिटिकल ह्याबिट्याट मापदण्ड अन्तर्गत पर्छन् र आयोजनाबाट संभावित प्रभावमा पर्न सक्छन्। यी प्रजातिहरू आयोजना क्षेत्रमा असामान्य भएका कारण, प्रभाव न्यून हुने अपेक्षा गरिएको छ।

ESIA ले निम्न न्यूनीकरणका उपायहरू प्रस्ताव गरेको छः

- विद्यमान पुलहरूलाई बेलनदी (६४८+५६१) र ज्वाइखोला (६४९+२५७) मा मध्यम आकारका वन्यजन्तुका लागि, र साना पुलहरू (६४५+७८९ र ६४७+१५७) मा पनि वन्यजन्तुमैत्री पूर्वाधार निर्माण निर्देशिका-२०७८ अनुसार परिवर्तन गरिने।
- बेलनदी (६४८+५६१) वरिपरिका वन क्षेत्रका वृक्षमा बस्ने जनावरका लागि क्यानोपी पुल निर्माण गरिने।
- क्षतिपूर्ति वृक्षारोपण, सडकमा मारिएका वन्यजन्तुको नियमित अभिलेख राख्ने, वन्यजन्तु क्रसिङ्गको प्रयोग, गति सीमा र चेतावनी बोर्डको स्थापना, श्रमिक र समुदायका लागि सचेतना कार्यक्रम।

ESIA अनुसार, विद्यमान गोरुसिंगे-चन्द्रौटा सडकको सुधारले RoW भित्र करिब ६ किलोमिटर लामो सडकमा कुल २७ हेक्टर वनक्षेत्रमा प्रभाव पर्नेछ। प्रत्यक्ष प्रभावमा RoW भित्रका ९,८०८ रुख काटिने छन्। ती रुखहरूमा संकटग्रस्त प्रजाति छैनन्, यद्यपि RoW भित्र सुरक्षित र खतराको सुचिमा नपरेको वर्गको सालका प्रजाति पाइन्छ। RoW भित्रको सडक स्तरोन्नति कार्यले क्रिटिकल ह्याबिट्याटमा प्रतिकूल असर पार्ने छैन।

त्यसैगरी, गोरुसिंगे-चन्द्रौटा सडक वरिपरि कुनै संरक्षित क्षेत्र, वन्यजन्तु आरक्ष वा आवागमन मार्ग छैन। यद्यपि, काटिने प्रत्येक रुखको लागि सट्टाभर्ना स्वरूप, नेपाल सरकारको प्रचलित नियम कानून अनुसार वन तथा भू-संरक्षण विभागद्वारा तोकिएको क्षेत्रमा १० वटा रुख रोपिने तथा ५ वर्षसम्म ति रोपिएका बिरुवा हुर्काउने जिम्मा लिईनेछ। क्षतिपूर्ति वृक्षारोपण तथा ति रुख बिरुवा ५ वर्षसम्म हुर्काउने बापतको रकम, वन तथा भू-संरक्षण विभाग अन्तर्गतको वन विकास कोषमा जम्मा गरिनेछ। क्षतिपूर्ति वृक्षारोपणका लागि ESMP मा १६ करोड रुपैयाँ बजेट प्रस्ताव गरिएको छ।

आदिवासी/जनजाति (ESS-7):

आयोजना क्षेत्रमा तीन आदिवासी/जनजाति (IP) समूहहरू बसोबास गर्छन्, जसमा नेवार, मगर र थारू छन्। यी समूहहरू व्यक्तिगत घरधुरी स्तरमा बसोबास गर्छन् तर मुख्यधाराका स्थानीय समुदायको भाग वा जमिनसँग सामूहिक संलग्नतामा छैनन्, जसले आयोजनाका गतिविधिहरूलाई प्रभावित गर्न सक्छ।

कुल आयोजनाबाट प्रभावित घरधुरीमध्ये, मात्र २ IP घरधुरीले RoW अतिक्रमणका कारण आंशिक रूपमा आफ्नो संरचना गुमाउनेछन्। यी IP घरधुरीहरूले आफ्नो निजी जमिन गुमाउने छैनन् किनकि तिनीहरूको संरचना RoW भित्र बनाइएको छ र उनीहरूले मिश्रित समूह समाजमा मिश्रित सांस्कृतिक अभ्यास प्राप्त गरेका छन् र स्थानीय नगरपालिका प्रशासन प्रणालीअनुसार शासित छन्।

आयोजना क्षेत्र नजिक न्यूनतम ३ IP समुदाय बसोबास गर्छन् र मात्र २ PAHs मा सानो पुनःस्थापना प्रभाव पर्ने भएकाले पृथक आदिवासी जनजाति विकास योजना (IPDP) तयार गर्नु आवश्यक छैन। पुनःस्थापना सम्बन्धी IP मुद्दाहरू RAP प्रतिवेदनमा सम्बोधन गरिएको छ।

त्यसैगरी, आयोजनाले कुनै पनि IP समुदायको पुर्ख्यौली जमिनमा प्रत्यक्ष प्रभाव पार्ने छैन, कुनै IP समुदायको पूर्ण पुनःस्थापना आवश्यक पर्ने छैन, र IP समुदायको सांस्कृतिक सम्पदामा असर पर्ने छैन। यसकारण, यी IP घरधुरीमा आयोजना गतिविधिको प्रभाव ESS-7 अन्तर्गत FPIC प्राप्त गर्ने मापदण्डमा पर्दैन, किनभने यी IP घरधुरी व्यक्तिगत स्तरमा बसोबास गर्छन् र मुख्यधाराका समुदाय तथा जमिनसँग सामूहिक संलग्नता छैन।

संभावित प्रभाव र जोखिमहरू निर्माण अवधिमा श्रमिक आगमन, GBV/SEA/SH, यातायात सुरक्षा, वायु र जल गुणस्तर विग्रिनु आदि सँग सम्बन्धित छन्। त्यसैले, ESS-7 अन्तर्गत FPIC यस आयोजनाका लागि आवश्यक छैन।

सांस्कृतिक सम्पदा (ESS-8):

ESS-8 ले मूर्त (tangible) र अमूर्त (intangible) सांस्कृतिक सम्पदामा जोखिम र प्रभाव सम्बन्धी सामान्य प्रावधानहरू तोकेको छ। ESIA गर्दा सडक मार्गअनुसार कुनै पुरातात्विक वा ऐतिहासिक महत्वका मूर्त सम्पदा जस्तै मठ वा प्राचीन स्मारक फेला परेनन् र अन्य मूर्त वा अमूर्त सांस्कृतिक सम्पदामा कुनै प्रभाव पर्ने छैन।

सडक सीमा सरोकारवालाको भित्र (६) साना मन्दिर/पुजास्थलहरू रहेका छन्: दुर्गा मन्दिर, सुपा देउराली मन्दिर, मस्जिद, देवारबाबा मन्दिर र अन्य दुई साना पुजास्थल। यी सबै कम ऐतिहासिक महत्व वा महत्वपूर्ण छन् र आयोजनाको कारण आंशिक वा पूर्ण असर पर्न सक्नेछ। सरोकारवालासँगको परामर्श अनुसार, यी मन्दिर/पुजास्थलहरू सम्बन्धित पुजारी र मन्दिर व्यवस्थापन समितिसँग परामर्श गरी नजिकको सार्वजनिक जमिनमा पुनर्वास र पुनःस्थापना गरिनेछ।

मन्दिर र मस्जिद चन्द्रौटा बजार क्षेत्रका मुख्य धार्मिक स्थल हुन्। चन्द्रौटा बजार मुस्लिम धर्मावलम्बीहरूको मुख्य पर्व ईद-उल-फित्रको समयमा धार्मिक स्नानका लागि आउने स्थल हो। सरोकारवालाले उठाएका मुद्दाहरूमा: सार्वभौमिक पहुँचको सुनिश्चितता, प्रभावित व्यक्तिहरूलाई तालिम उपलब्ध गराउने, इमिलिया हाटबजारको सुधार, ढल व्यवस्थापन सुधार, बेल नदी नजिकको पर्खाल/सहज पहुँच सुधार, धार्मिक प्रक्रिया पूरा गरी मन्दिरहरूको पुनःस्थापना। यी विषयहरू आयोजनाका तयारीका छलफलमा आएका हुन्।

नागरिक संलग्नताको एक अंगको रूपमा, आयोजनाले गुनासो सुनुवाई संयन्त्र (GRM) स्थापना गर्नेछ, जसले SEA/SH सम्बन्धी उजुरीसमेत सम्बोधन गर्नेछ। साथै, एक्सेस आयोजनाको लागि तयार गरिएको र अपनाइएको सरोकारवालाको सहभागिता योजना अनुसार, अलग श्रमिक GRM पनि उपलब्ध हुनेछ।

वातावरणीय तथा सामाजिक व्यवस्थापनका उपायहरू

ESS अनुसार प्रमुख व्यवस्थापन उपायहरू तल उल्लेख गरिएको छ: आयोजनाबाट प्रभावित पक्ष, अन्य सरोकारवालाहरू र संवेदनशील तथा अल्पसंख्यक समूहहरूबीच सहकार्य र सूचना प्रवाहले सबै न्यूनीकरण उपायहरू कार्यान्वयन गर्न मद्दत गर्नेछ। आयोजना स्थानीय निकाय र सम्बन्धित सरोकारवालासँग समन्वय गरी वातावरणीय तथा सामाजिक न्यूनीकरण उपायहरू कार्यान्वयन गर्नेछ।

आयोजनाका वातावरणीय र सामाजिक जोखिम तथा प्रभाव व्यवस्थापन गर्न, न्यूनीकरण पद्धति-(रोकथाम गर्ने, घटाउने, न्यूनीकरण गर्ने र क्षतिपूर्ति प्रदान गर्ने) लागू गर्दै ESMP तयार गरिएको छ। यसमा सामान्य र स्थल-विशेष न्यूनीकरण उपायहरू, अनुगमन योजना, क्षमता निर्माण, जिम्मेवारी र प्रतिवेदन प्रणाली, साथै वातावरणीय र सामाजिक लागत समावेश छन्। साथै, ESMP ले आयोजना स्तरमा OHS र SEA/SH मुद्दाहरू समाधान गर्ने उपायहरू प्रदान गर्दछ।

श्रमिक आगमनसँग सम्बन्धित मुख्य मुद्दाहरू श्रम ऐन २०७४, श्रम नियमावली २०७५, व्यवसायजन्य स्वास्थ्य तथा सुरक्षा नीति (२०८०) र विश्व बैंकको ESS-2 अनुसार एक्सेस आयोजनाका लागि तयार र अपनाइएको समग्र LMP मार्फत

व्यवस्थापन गरिनेछ। स्थानीय समुदाय र आयोजना श्रमिक दुवैका लागि GRM को सुविधा प्रदान गरिनेछ, जसले उजुरी दर्ता गर्न र आयोजनासम्बन्धी तथा श्रमिक सम्बन्धी उजुरीहरूको समाधान व्यवस्थापन गर्न मद्दत गर्नेछ।

श्रमिक क्याम्प सञ्चालन योजना र श्रमिकहरूको आचारसंहिता (CoC) तयार गरिनेछ। प्रत्येक श्रमिकलाई CoC सम्बन्धी प्रशिक्षण दिइनेछ र काम सुरु गर्नुअघि CoC मा हस्ताक्षर गर्न अनिवार्य हुनेछ। श्रमिकहरूले CoC को हस्ताक्षरित प्रतिलिपि प्राप्त गर्नेछन्, जसले SEA/SH घटनाहरू रोक्न वा न्यून गर्न मद्दत गर्नेछ, किनभने यसले स्वीकार्य र अस्वीकार्य व्यवहारका मापदण्ड स्पष्ट गर्दछ।

सडक स्तरोन्नतिको दौरान भौतिक र आर्थिक विस्थापन सम्बोधन गर्न पृथक पुनर्वास कार्ययोजना आवश्यक छ। Entitlement Matrix मा उल्लेख गरिए अनुरूप सबै प्रभावित निजी संरचनाहरू प्रतिस्थापन मूल्यमा क्षतिपूर्ति गरिनेछ र सार्वजनिक संरचनाहरू पुनःस्थापना र पुनर्वास गरिनेछ। निर्माणपूर्व चरणमा आयोजना, CDC र CSC को संयुक्त प्रमाणिकरणद्वारा RAP प्रतिवेदन अपडेट गरिनेछ। आयोजना कार्यान्वयन चरणमा थप प्रभावहरू आएमा RAP प्रतिवेदन अपडेट गरिनेछ। निर्माणकार्यको दौरान हुनसक्ने प्रभावको सन्दर्भमा, उक्त RAP प्रक्रियाहरू लागू हुनेछन्।

ESMP ले निर्माण व्यवसायीलाई, निर्माण कार्य सुरु हुनु अघि Contractor's ESMP (C-ESMP) तयार गर्न बाध्यकारी बनाउँदछ। C-ESMP मा समावेश हुने प्रमुख विषयहरू: आयोजना सूचना साझेदारी र सञ्चार योजना, समुदाय स्वास्थ्य र सुरक्षा व्यवस्थापन योजना, सार्वजनिक संरचना र सुविधाका लागि उपयुक्त सुधारात्मक पुनःस्थापना योजना, आयोजनाबाट प्रभावित व्यक्तिहरूको अस्थायी पुनःस्थापना योजना, SEA/SH जोखिम न्यूनीकरण योजना, स्थल-विशेष श्रमिक क्याम्प व्यवस्थापन योजना, व्यावसायिक स्वास्थ्य तथा सुरक्षा व्यवस्थापन योजना (OHS) जस्तै बारिकेड, सूचना, सामग्री भण्डारण, तनावमुक्त कार्यतालिका, कार्यक्षेत्र व्यवस्थापन, श्रमिकहरूको नियमित स्वास्थ्य परीक्षण, श्रमिकका लागि सुरक्षा उपकरणहरू (reflective jacket/apron, बुट, पञ्जा, हेलमेट, सुरक्षा हार्नेस, चस्मा आदि), श्रम कानून पालन, कामदार शिविर सञ्चालन निर्देशिका, रासायनिक व्यवस्थापन र नष्ट गर्ने योजना, जल गुणस्तर व्यवस्थापन योजना, पानी र फोहोर व्यवस्थापन योजना, यातायात व्यवस्थापन र सडक सुरक्षा योजना, आपतकालीन तयारी योजना, क्वारी/बोरो क्षेत्र व्यवस्थापन योजना, स्थल पुनर्स्थापना योजना। यी सबै उपायहरू सडक विभागको वातावरणीय तथा सामाजिक रूपरेखा-२०८१, व्यवसायजन्य स्वास्थ्य सुरक्षा नीति-२०८०, लैङ्गिक समानता तथा सामाजिक समावेशीकरण कार्यसञ्चालन निर्देशिका-२०७४ र IFC तथा विश्व बैंकको श्रमिक आवास मार्गनिर्देशन अनुसार तयार गरिनेछ।

आयोजनाको लागि सरोकारवाला निकायको छलफल योजना (SEP) तयार गरिएको छ, जसले सरोकारवालाहरू पहिचान गर्ने र आयोजना चक्रभर उनीहरूसँग संलग्न हुने योजना प्रदान गरेको छ। SEP मा महिला र युवा केटीमाथि जोडसहित समुदाय सचेतना र संवेदनशीलता कार्यक्रम समावेश छन्। SEP मा आयोजना स्तर GRM (SEA/SH सम्बन्धी) र श्रमिक GRM को विवरण पनि समावेश गरिएको छ।

GRM स्थापना गरी उजुरीको दर्ता गर्ने, उजुरी रेकर्ड फर्म प्रदान गर्ने व्यवस्था गरिनेछ। तर, आयोजनासम्बन्धी कुनै दुर्घटना वा घटना भएमा, सडक विभाग-विकास सहायता कार्यान्वयन महाशाखा अन्तर्गतको आयोजनाले विश्व बैंकलाई ४८ घण्टाभित्र जानकारी गराउनु पर्नेछ। त्यसपछि, घटनाको प्रारम्भिक रिपोर्ट गरिएको मितिदेखि ३० दिनभित्र सुधारात्मक उपाय सहितको दुर्घटना अनुसन्धान प्रतिवेदन विश्व बैंकमा बुझाउनुपर्नेछ।

जोखिम र प्रभावका लागि न्यूनीकरण उपायहरू:

सामान्य जोखिम र प्रभावका लागि न्यूनीकरण उपायहरू न्यूनीकरण पद्धति (टार्ने, न्यूनीकरण गर्ने, असर कम गर्ने र क्षतिपूर्ति) अनुसार निर्धारण गरिएका छन्।

मुख्य उपायहरूमा समावेश छन्: बायो-इन्जिनियरिङ र मजबुतीकरण संरचना निर्माण, प्रभावित भूदृश्यको पुनःस्थापना, सामग्री भण्डारण यार्डको विकास, पुनःस्थापना र पुनर्वास कार्यहरू, स्पोइल व्यवस्थापन, सूचना बोर्डको स्थापना, कार्यक्षेत्रमा ब्यारिकेड निर्माण, पर्याप्त पानी आपूर्ति र शौचालय/सफा सुविधाको व्यवस्थापन, श्रमिकहरूको नियमित स्वास्थ्य जाँच, इन्धन-कुशल मेशिनरी प्रयोग सम्बन्धी सिफारिस र क्षतिपूर्ति वृक्षारोपणद्वारा कार्बन क्षतिपूर्ति, प्रभावित सबै सार्वजनिक सुविधाहरूको उचित पुनःस्थापना र पुनर्वास, समुदायको विश्वास र परामर्शको साथ, शिकारी नियन्त्रण सम्बन्धी नियमहरूको कार्यान्वयन र नियन्त्रण, उपयुक्त स्थानहरूमा गति सीमा संकेतको स्थापना, चालक र स्थानीय समुदायमा सचेतना कार्यक्रम सञ्चालन

स्थल-विशेष न्यूनीकरण उपायहरू:

स्थल-विशेष न्यूनीकरण उपायहरूमा विभिन्न योजनाहरू विकास गर्ने समावेश छन्: निजी संरचनाहरूको समयमा क्षतिपूर्तिका लागि पुनर्वास कार्ययोजना (RAP), यातायात व्यवस्थापनका लागि ट्राफिक व्यवस्थापन योजना, निर्माण स्थल र स्लोपको सुरक्षा कार्यका लागि बायो इन्जिनियरिंग योजना र कार्यहरू रहेका छन्।

क्रस-ड्रेनेज संरचना (जस्तै: बक्स कल्भर्ट, नयाँ पुल, साइड ड्रेन) आयोजना क्षेत्रमा जल प्रवाह र बाढी कम गर्न प्रदान गरिनेछ। यातायात संकेत, सडक सुरक्षा संकेत, त्रयास बारियर्स र पैदल यात्री क्रसिङ/ओभरहेड सडक सुरक्षा सुनिश्चित गर्न स्थापना गरिनेछ। बाढीबाट सुरक्षा गर्न नदी सुरक्षा कार्यहरू (River Training Works) लागू गरिनेछ। वन्यजन्तु क्रसिङका लागि आवश्यक स्थानमा क्षतिपूर्ति वृक्षारोपण, साइन बोर्ड, गति सीमा र डिस्प्ले बोर्डहरू राखिनेछ। वन क्षेत्रमा वन्यजन्तु संरक्षण र सडकमा मारिनबाट रोक्न निश्चित स्थानमा बाँधनी (Fencing) र कल्भर्ट/अन्डरपासको स्थापना प्रस्ताव गरिएको छ।

सार्वजनिक संरचना पुनःस्थापना: सार्वजनिक सुविधा पुनर्स्थापना (पिउने पानी आपूर्ति लाइन, बिजुली पोल, सिँचाई नहर आदि), क्षतिग्रस्त सामुदायिक पूर्वाधारको पुनर्स्थापना, सुरक्षा उपकरण (PPEs), क्वारी/भुमिगत उत्खनन स्थल, ब्याचिड प्लान्ट, क्याम्प पुनःस्थापना। यी सबै स्थल-विशेष न्यूनीकरण उपायहरू लागत सहित प्रदान गरिएका छन्।

वातावरणीय र सामाजिक अनुगमन:

आन्तरिक र बाह्य अनुगमन आयोजनाको अभिन्न हिस्सा हो। आयोजना अवधिभर वातावरणीय र सामाजिक अनुगमन अनिवार्य छ र यसलाई मासिक रूपमा सडक विभाग-विकास सहायता कार्यान्वयनद्वारा सञ्चालन गरिनेछ। कार्यान्वयन चरणमा पर्यावरणीय र सामाजिक सुरक्षासम्बन्धी गतिविधिहरूको नियमित अनुगमन CSC र आयोजनाको जिम्मेवारी हो।

पुनर्स्थापन क्षतिपूर्ति र पुनर्वास कार्यहरू, श्रमिक क्याम्प र निर्माण व्यवसायीको क्याम्प, डामर प्लान्ट र ब्याचिड प्लान्ट, स्टक पाइलिङ यार्ड र क्वारी साइट तथा बोरो एरिया, धुलोको निगरानी, हावा र आवाजको गुणस्तर अनुगमन, धुलो-प्रवण क्षेत्रमा पानी छर्केर धुलो कम गर्ने, र पानीको गुणस्तर अनुगमन सुपरभिजन कन्सल्टेन्ट र आयोजनाद्वारा नियमित रूपमा व्यवसायजन्य स्वास्थ्य तथा सुरक्षा अनुगमनको सन्दर्भमा, निर्माण व्यवसायीले आफ्नो क्षेत्र भित्र साइटको नियमित अनुगमन र स्व-लेखा परीक्षण प्रणाली प्रस्तुत गर्नेछ, जसलाई सुपरभिजन कन्सल्टेन्ट र सडक विभागका टोलीबाट आवश्यक

सहयोगसहित अनुगमन र प्रमाणीकरण गरिनेछ। साथै, अनुपालन अडिटको प्रमाणीकरणको लागि कम्तिमा एक तेस्रो-पक्षीय अडिट लागू गर्न सकिनेछ। अनुगमनका विस्तृत संकेतकहरू, आवृत्ति र रिपोर्टिङ प्रणाली ESMP अध्याय-५ मा छलफल गरिएको छ।

वातावरणीय तथा सामाजिक प्रतिबद्धता योजनाका प्रमुख उपायहरू र कार्यहरू:

ESCP ले ESS आवश्यकताहरू पूरा गर्नका लागि उपायहरू र कार्यहरू पहिचान गर्दछ। यसमा GC रोड आयोजनाको लागि आवश्यक पर्ने SEP, LMP, RPF, र RAP को विकास तथा समयसीमासहितको कार्यान्वयन समावेश छ। ESCP अन्तर्गत जैविक विविधता मूल्याङ्कन पूरा गर्नु आवश्यक छ, जसमा महत्वपूर्ण आवास मूल्याङ्कन पनि समावेश छ र यदि आवश्यक परेमा जैविक विविधता व्यवस्थापन योजना तयार गरिनुपर्नेछ। यो जैविक विविधता व्यवस्थापन योजना, न्यूनिकरण प्रणाली अनुसरण गर्दै, व्यापक ESIA को भागको रूपमा तयार गरिनेछ। यदि कुनै क्षतिपूर्ति आवश्यक परेमा, यसलाई जैविक विविधता व्यवस्थापन योजनामा समावेश गरिनेछ।

भौतिक पूर्वाधार तथा यातायात मन्त्रालयले विशिष्ट उपायहरू र कार्यहरूको कार्यान्वयनका क्रममा ESCP का सबै आवश्यकताहरूको पालना गर्न जिम्मेवार हुनेछ, जुन कार्यहरू सडक विभाग-विकास सहायता कार्यान्वयन महाशाखाद्वारा सञ्चालन र कार्यान्वयन गरिनेछन्।

ESCP मा उल्लेखित महत्वपूर्ण उपायहरू र कार्यहरूको कार्यान्वयन सडक विभागद्वारा अनुगमन गरिनेछ र विश्व बैंकलाई रिपोर्ट गरिनेछ। विश्व बैंकले आयोजनाको कार्यान्वयनको क्रममा यी महत्वपूर्ण उपायहरू र कार्यहरूको प्रगति र पूर्णता मूल्याङ्कन गर्नेछ। आवश्यक परेमा, आयोजनामा आएको परिवर्तन, अप्रत्याशित परिस्थितिहरू वा ESCP अन्तर्गत गरिएको आयोजना मूल्याङ्कनको आधारमा, ESCP परिमार्जन र अपडेट गर्न सकिन्छ।

संस्थागत संरचना

भौतिक पूर्वाधार तथा यातायात मन्त्रालय अन्तर्गतको विकास सहायता कार्यान्वयन महाशाखा, सडक विभाग-एक्सेक जस्ता आयोजनाहरूको (दाताहरूको सहयोगप्राप्त) तयार र कार्यान्वयन गर्ने प्रमुख निकाय हो। सडक विभागसँग पाँच महाशाखाहरू छन् जसले आयोजनाहरू तयारी र कार्यान्वयन गर्दछन्। कार्यान्वयन सजिलो बनाउनका लागि, सडक विभागसँग ३० वटा डिभिजनल सडक कार्यालय छन्। विकास सहायता कार्यान्वयन महाशाखा, सडक संजाल अन्तर्गत दाताहरूको सहयोगप्राप्त आयोजनाहरू सञ्चालन गर्ने प्रमुख महाशाखा हो।

भू-वातावरण तथा सामाजिक शाखा, सडक विभागको भित्रको वातावरणीय र सामाजिक जोखिम व्यवस्थापन र अनुगमन गर्ने मुख्य निकाय हो। भू-वातावरण तथा सामाजिक शाखाले सरकारी तथा दात्री निकाय सम्बद्ध आयोजनाहरूको IEE र ESIA को अनुगमन र समीक्षा गर्छ। भौतिक पूर्वाधार तथा यातायात मन्त्रालय, वातावरण संरक्षण ऐन (EPA) अन्तर्गत यातायात क्षेत्रका आयोजनाहरूको IEE समीक्षा र अनुमोदन गर्ने संस्था हो। यसले EIA रिपोर्टहरूको समीक्षा पनि गर्छ र वन तथा वातावरण मन्त्रालय मार्फत अनुमोदनको लागि सिफारिस गर्छ। वन तथा वातावरण मन्त्रालय अन्तर्गतको EIA इकाई ले EIA को समीक्षा र अनुमोदन गर्छ।

वन तथा भू-संरक्षण विभाग/ डिभिजनल वन कार्यालय, जिल्ला प्रशासन कार्यालय, जिल्ला मालपोत कार्यालय, नापी विभाग, शहरी विकास तथा भवन निर्माण विभाग) र आयोजनाबाट प्रभावित नगरपालिका/गाउँपालिकाहरू आयोजनाको कार्यान्वयनमा सहयोगी हुनेछन्।

निर्माण व्यवसायीले आयोजना कार्यान्वयनको जिम्मेवारी लिनेछन् र सडक विभाग-विकास सहायता कार्यान्वयन महाशाखा अन्तर्गत आयोजनाको C-ESMP र सम्बन्धित योजनाहरूको पालना गर्न बाध्यकारी हुनेछन्, जुन प्रावधान बोलपत्र, कार्यसम्झौता र ESCP मा समेत राखिएको छ।

आयोजनाले संस्थागत सुदृढीकरण घटक अन्तर्गत आयोजना कार्यान्वयनमा संलग्न सडक विभाग र अन्य संस्थाहरूको वातावरणीय र सामाजिक जोखिम तथा प्रभाव व्यवस्थापन क्षमता विकासका लागि तालिम र क्षमता विकासका लागि सहयोग गर्नेछ। प्रमुख नीतिगत र संस्थागत कमि हटाउनका लागि केही तालिमहरू आवश्यक छन्, जस्तै: वातावरणीय र सामाजिक जोखिम व्यवस्थापन तालिम, आयोजना डिजाइनका विभिन्न चरणमा E&S जोखिम उपाय समावेश गर्ने तालिम, CIA अनुसार मूल्यवान वातावरणीय घटक चयन तालिम, मानव-बन्यजन्तु द्वन्द्व व्यवस्थापन तालिम, जैविक विविधता र प्राकृतिक स्रोतको दिगो व्यवस्थापन तालिम, MLARR तालिम DoR कर्मचारीहरूलाई, RoW को महत्व र व्यवस्थापन तालिम, आदिवासी ज्ञान FPIC तालिम, प्रभावकारी परामर्श तालिम, व्यवसायजन्य स्वास्थ्य तथा सुरक्षा सम्बन्धी तालिमहरू जस्तै: सुरक्षित कार्य अभ्यास, खतरनाक सामग्री/रासायनिक पदार्थको सुरक्षित ह्यान्डलिङ र भण्डारण, दुर्घटना रिपोर्टिङ र अभिलेख प्रणाली, कार्यस्थल प्राथमिक उपचार, व्यक्तिगत सरसफाइ र स्वास्थ्य, तातो सतहमा कार्य, तनाव व्यवस्थापन, आपतकालीन तयारी र प्रतिक्रिया, व्यक्तिगत सुरक्षा साधनको प्रयोग र अभ्यास।

अनुमानित लागत

आयोजना कार्यान्वयनको क्रममा वातावरणीय तथा सामाजिक जोखिम न्यूनीकरण र सुधार उपायहरूको लागि पुनर्वास र क्षतिपूर्ति सहित कुल १४८,३३४,१९२ रुपैया विनियोजित गरिएको छ। त्यसैगरी, वातावरणीय तथा सामाजिक व्यवस्थापन योजना कार्यान्वयन सुनिश्चित गर्न वातावरणीय तथा सामाजिक अनुगमनका लागि रु. ६७,००,००० प्रस्ताव गरिएको छ।

Chapter 1- Introduction

The Government of Nepal is working towards accelerating economic development, reducing regional imbalances, and addressing inequalities in the country. Recognizing that access to efficient transport and trade systems is a key determinant of economic opportunity and service delivery. The government has already started the implementation of upgrading green resilient roads with the IDA Credit from the World Bank, i.e., improvement and expansion of the East-West Highway, starting with the Butwal-Gorusinghe section and extending up to the Chandrauta section under Accelerating Transport and Trade Connectivity in Eastern South Asia (ACCESS)-Nepal Phase 1 Project. The loan has already been approved, and the project is already in the implementation phase. Under the part of this project, GoN intends to upgrade the Gorusinghe-Chandrauta (GC) road section (19 km) of East-West Highway from 2 lanes to a 4-lane road. DOR is the Project's implementing agency and has prepared a comprehensive Environmental and Social Impact Assessment (ESIA) and a draft Resettlement Action Plan (RAP).

The ACCESS Project Phase-1 has supported the GoN for (a) Upgrading of Butwal-Gorusinghe-Chandrauta section of East-West Highway from 2 to 4 lanes, (b) Construction of a green resilient urban bridge (including detailed design/urban design and construction), (c) Support for development and implementation of green resilient highway concept, integrating transportation functionality and ecological sustainability, and (d) Upgradation of trade facilities at critical locations. DOR has already prepared an Environmental and Social Management Framework (ESMF) and Resettlement Policy Framework (RPF) for the overall ACCESS Project.

1.1 Background

Efficient movement of goods and people within and across the borders of Nepal is key to economic growth, and this goal is currently being hampered by challenges in cost-efficiency and resilience of trade and transport. The Gorusinghe-Chandrauta section of the East-West (E-W) Highway is proposed to address these challenges. This project is the first phase of a larger investment program along the western part of the E-W highway corridor that would allow the Government to achieve its development goals in terms of regional trade and sustainable economic growth.

The East-West Highway is the main domestic as well as international trade corridor of Nepal. East-West Highway (EWH) was constructed about 50 years ago with a single-lane bituminous carriageway width and has been rehabilitated/upgraded to a double lane during different periods between 1998-2005. The East-West Highway is the main domestic as well as international trade corridor of Nepal. The East-West highway is part of the Asian Highway 2 (AH2). The Asian Highway Network (AHN), also known as the Great Asian Highway, is a cooperative project among countries in Asia, Europe, and the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP), and focuses on improving the highway systems in Asia.

The present condition of the Gorusinghe-Chandrauta (GC) Road section does not respond to the need for increased traffic flow and requires improvement. The existing highway is a two-lane carriageway road sealed with Bituminous Surface Treatment (DBST) in almost all areas.

The proposed project will support capacity, quality, and safety improvements of the East-West Highway. The Gorusinghe-Chandrauta road section is of great importance in providing connectivity to the people of Lumbini Province and the rest of the country.

Accelerating Transport and Trade Connectivity in Eastern South Asia (ACCESS)

The proposed ACCESS project aims to develop cost-efficient and resilient trade and transport in Nepal along the main selected corridors. The ACCESS has the following components:

- **Component 1: Digital Systems for trade.** This component may support the adoption and Implementation of Digital and Automated Systems for the improvement of Nepal's cross-border clearances: (a) Development of an Integrated Automated Boarder Management including electronic cargo tracking system, (b) Development of web-based supply MIS for automation of registration processes and permits and (c) Development of a web-based supply MIS for automation of registration processes and permits
- **Component 2: Green and Resilient Transport and Trade Infrastructure.** This component will support (a) Upgrading of Butwal-Gorusinghe-Chandrauta Road Section of the East-West Highway from 2 to 4 lanes, (b) Construction of a signature green resilient urban bridge (including detailed design/urban design and construction), and (c) Support for development and implementation of a green resilient highway concept, integrating transportation functionality and ecological sustainability.
- **Component 3: Institutional and Policy Strengthening for Transport and Trade.** This component will provide support in streamlining the policy environment for regional trade and cross-border movement of goods through (a) Bangladesh-India-Nepal Motor Vehicle Agreement-related reforms, (b) Reforms to support private sector initiatives, (c) Training programs and capacity building activities, and (d) Project preparation studies.
- **Component 4: Contingency Emergency Response** will support unforeseen emergency needs. In case of a major natural or human-made disaster, GoN may request the Bank to re-allocate project funds to this component to support its quick response and reconstruction

1.2 The Project

Location and Current Road Conditions.

Gorusinghe- Chandrauta Road Section of the East-West Highway starts from the Belwagurdawa Bridge at Gorusinghe and ends at Umari Chowk/Shivapur. This road section is 19.2 km in length. For most of the section, the width of the existing road is 8.00 m, including a 6 m wide carriageway and 1m shoulder on both sides. The project area lies between 27°39'27.50" N, Latitude and 82°59'47.15" E Longitude at Gorusinghe to 27°41'24.59" N, Latitude and 82°50'22.45" E longitude at Umari Chowk, Chandrauta. The Gorusinghe Bazar connects the Arghakhachi and Gulmi via the northern section and Lumbini, the birthplace of Buddha, at the southern section. The proposed Gorusinghe-Chandrauta Road is located in the Kapilbastu district of Lumbini Province. The location map of Gorusinghe Chandrauta Road in the context of the Asian highway is shown in **Figure 1**

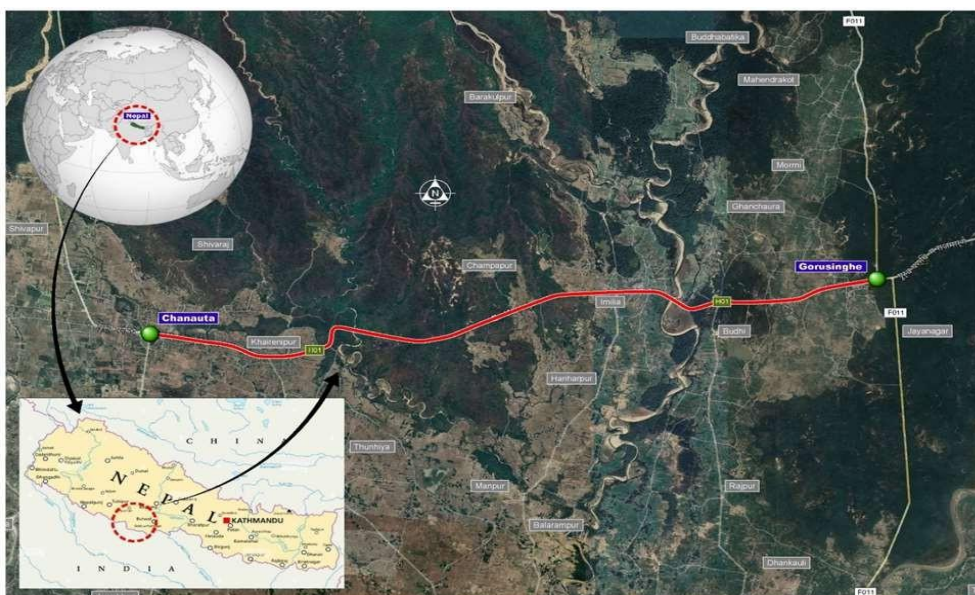


Figure 1: Location of the Project (GC Road)

Proposed Construction Works. A detailed description of the proposed facilities to be built is given in Chapter 3. A summary of the main physical works is given below:

- Widening of 19.2 km Goringha-Chandrauta Road from 2 lanes to 4 lanes
- Construction of service roads on both sides of the carriage way in urban areas
- Construction of footpaths, pedestrian sheds, cycle lanes, and service roads on both sides of the carriage way in urban areas
- Wildlife-friendly structures are proposed at Ch 648+561 (Bel Nadi) and Ch. 649+257 (Jwai khola) for big wildlife species, minor bridge (Dry Nala) at Ch. 648+157 for medium wildlife, and Box Culverts at Ch. 645+789, Ch 646+233, and Ch 647+791 for small wildlife, including herpetofauna.

1.3 The Environmental and Social Assessment of the Goringha-Chandrauta Road

Studies and basic data: This ESIA is based on field studies and data collected from May 2024 to February 2025 by the consultant team.. A team of environmental and social specialists, including an ecologist from the design consultant, has participated in the studies and collected data on the existing physical, biological, and socio-economic environment of the project area. The team included experts from LEA Associates South Asia Pvt. Ltd., India, in association with GEOCOM International Pvt. Ltd. & Material Test (p) Ltd., Nepal. The Environmental and Social expert from DoR-DCID has taken the lead role in writing ESIA report in coordination with the design consultants for necessary data collection as per the guidelines of the World Bank. The team has conducted 40 consultation meetings (involving 410 individuals) with the affected communities, local governments, relevant environmental and forest departments, community-based organizations, and NGOs. Field sampling and analysis were carried out at 3 locations for river water quality and air and noise quality.

Chapter 1 has introduced the overall Project and the current project. **Chapter 2** reviews the prevailing government regulatory requirements relevant to the environmental assessment and World Bank ESF applicable to this project, and actions taken by DOR to comply with these requirements, along with the required methodology and study

approach. **Chapter 3** presents a detailed description of the baseline environmental, biological, and social conditions in the project area. Potential environmental and social issues from the Project implementation, as well as the appropriate mitigation measures to address these negative impacts, have been discussed in **Chapter 4**. An Environmental and Social Management Plan (ESMP) is presented in **Chapter 5**. The proposed institutional arrangement has been presented in **Chapter 6**. Finally, **Chapter 7** describes the consultations carried out with the stakeholders.

1.4 Project Description

This chapter presents a detailed description of the proposed activities in the Upgradation of the Goringhe-Chandrauta Road Project.

Salient Features of Existing Project Road and Proposed Upgrades

The 19.2-km-long Goringhe-Chandrauta Road is located in the Kapilbastu district of Lumbini Province (see Figure 1.1 for the location map). It is a Section of the East-West Highway that starts from near the Belwagurdawa Bridge at Goringhe and ends at Umari Chowk/Shivapur. The starting chainage of the road is KM 640+000 (this chainage is referenced to the East-West Highway) and ends at KM 659+200

This road section is 19.2 km in length. The road alignment passes through 2 municipalities, as Budhabhumi and Shivaraj municipalities of Kapilbastu district

The salient features of the existing road and proposed road upgrading works are given in Table 1.

Table 1: Salient Features of Existing Road and Proposed Upgrades

Description	Features
Name of the project	Upgrading of the Goringhe Road (19.2 Km) section of EWH to a four-lane standards.
Province	Lumbini
District	Kapilvastu
Affected municipality	Budhabhumi Municipality and Shivaraj Municipality
Geographical Location	
Geographical features	Terai
Geology	Plain/ Rolling
Climate	Tropical /Sub-tropical

Description	Features	
Altitude	100 m-150 m msl	
Total length	19.2 km	
Start and End of the road	Chainage and GPS	Political boundary

Starting point	Near Belwagurdawa Nadi (CH 640+000) GPS: 27°39’27.50” N, 82°59’47.15” E	Buddhabhumi Municipality, ward no. 9
End point	Umari/Shivapur Chowk (CH 659+200) GPS: 27°41’24.59” N, 82°50’22.45” E	Shivraj Municipality ward no.6
Road standard	National highway	
Right of Way	25 m each side from the central line (50 m RoW)	
Construction width	Up to 50 m in urban settlements, 24 m in forest and rural areas	
Existing Carriageway width, shoulder	Two-lane facility (7 m carriageway) with paved shoulders and earthen shoulders	
Design speed	100 Kmph in plain terrain and 80 Kmph in rolling terrain	
Design period for operation	20 years	
Surface type	Bituminous	
Type of work	Upgrading of the Road	
Cross section		
Carriageway width of Structure	Rural and forest area - 24.0 m, Urban area-50 m including space for utilities	
Width of Footpath	2.0 m (Both Sides)	
Cross Drainages (Culverts and bridges)		
Total bridge	2 major bridges and 6 minor bridges, 1 VUP & 2 PUPs, 1 FoB	
Culverts	64 box culverts and 7 pipe culverts	
Earth Works (Cutting and Filling)		
Cutting quantity (m³)	1,06,242	
Filling quantity (m³)	1,45,652	
Structures (Masonry, RCC, and RE walls)		
RCC Retaining wall (m³)	1,569.0	
RE Retaining wall (m²)	10,567	

Source: Design Report of GC Road Section 2024

Description of the Existing Project Road

For most of the section, the width of the existing road is 7.00 m, including a 6 m wide carriageway and 1m shoulder on both sides. In the Initial section, the alignment passes through settlement areas, followed by the barren land and forest land lying in the plain of the terrain region. There is one major junction at Chandrauta bazar; the rest of the areas cover semi-urban and forest areas. Roadside tree cutting is required in this section while upgrading the road. There are relatively minimal obstacles, such as buildings, houses within the ROW. However, there are a number of bus waiting sheds, resting places (Chautari), electrical poles and cables, and telecommunication facilities within the ROW that have to be relocated during the widening of the road.

The pavement condition is good to fair. Traffic signs, delineator posts, road painting, and crash barriers are in poor condition. In many places, damage to pavement was found due to poor surface drainage management. Most of the sections don't have longitudinal drainage facilities. There is a drainage system in the city area only.

Drainage management, water logging, road safety, and traffic congestion are major issues due to the increase in population growth on both sides of the highway; however, there are no road crossing structures established at the populated settlement areas along the alignment

Current Traffic and Future Traffic Estimates

The current traffic levels are measured at 2 locations (Imiliya and Chandrauta). Traffic data was collected for a regular seven days at two locations (via Imiliya and Chandrauta) along the road sections. The representative Average Daily Traffic (ADT), expressed as numbers of vehicles, is given below in Table 2:

Table 2: Existing Traffic on Gorusinghe-Chandrauta Road and Traffic Estimation for Base Year

Vehicle Type	UP Direction		DN Direction	
	At Imiliya	At Chandrauta	At Imiliya	At Chandrauta
Car	1,628	629	1,646	630
Utility vehicle (Pickups, 4WD)	895	242	894	197
Minibus, Matatu	450	309	466	315
Medium bus or coaster	483	237	437	205
Large Bus, coach	606	230	546	304
Light Truck (Dynos, etc)	69	72	606	230
Heavy truck (Fuso 10- tyre, etc)	305	334	268	348
Multi Axle	259	585	271	617
Motor Cycles	7,983	2,541	8,140	2,782
Tractor-Trailer	145	122	128	154
Total	12822	5301	13403	5782

Source: Detailed Design Report-2024

The future traffic volume growth rate was calculated by applying the future real GDP growth rate to traffic demand elasticity. The projected future traffic at the GC section is given in Table 3. On the basis of this data, past trend, and seasonal variation factor, the design has estimated Annual Average Daily Traffic (AADT) at two locations of road sections. Estimated AADT for base year (i.e., 2024).

Traffic Estimation for Base Year

Vehicle Type	UP Direction		DN Direction	
	Imiliya	Chandrauta	Imiliya	Chandrauta
Car	1,514	585	1,531	586
Utility vehicle (Pickups, 4WD)	832	225	831	183
Minibus, Matatu	419	287	433	293
Medium bus or coaster	449	220	406	191

Vehicle Type	UP Direction		DN Direction	
	Imiliya	Chandrauta	Imiliya	Chandrauta
Large Bus, coach	564	214	508	283
Light Truck (Dynas, etc)	64	67	564	214
Heavy truck (Fuso 10-tyre, etc)	284	311	249	324
Multi Axle	241	544	252	574
Motor Cycles	7,424	2,363	7,570	2,587
Tractor-Trailer	135	113	119	143
Total	11925	4930	12464	5377

Source: Detailed Design Report 2024

Traffic forecast for different sections of the GC road was made focusing on potential traffic congestion junctions, especially in Imilia and Chandrauta Chowk. The projection of categorical traffic volume for the next twenty years, including consecutive five-year periods starting with 2024, is made and presented in Table 3.

Table 3: Traffic flow projection at major junctions

At Imilia					
Vehicle Type	2024	2029	2034	2039	2044
Car	1,514	5,308	8,070	11,791	16,443
Utility vehicle (Pickups, 4WD)	832	2,194	2,701	3,261	3,846
Minibus, matatu	419	1,185	1,538	1,944	2,386
Medium bus or coaster	449	1,271	1,650	2,085	2,559
Large Bus, coach	563	1,594	2,070	2,617	3,211
Light Truck (Dynas, etc)	64	168	207	250	295
Medium Truck (Lorries, etc)	284	748	920	1,111	1,310
Heavy truck (Fuso 10-tyre, etc)	241	636	783	945	1,115
Truck, Trailer, and Semi Trailer	7,424	19,575	24,092	29,087	34,312
Motor Cycles	135	238	317	409	512
Bicycles	0	0	0	0	0
Total Vehicles	11925	32,917	42,347	44,437	46,641
Total PCUs	30,070	81,246	1,02,233	1,06,797	1,11,577
At Chandrauta					
Vehicle Type	2024	2029	2034	2039	2044
Car	585	2,075	3,154	4,609	6,428
Utility vehicle (Pickups, 4WD)	225	597	734	887	1,046
Minibus, matatu	287	819	1,063	1,344	1,649
Medium bus or coaster	220	628	815	1,031	1,265
Large Bus, coach	214	610	791	1,000	1,228
Light Truck (Dynas, etc)	67	178	219	264	311
Medium Truck (Lorries, etc)	311	824	1,014	1,224	1,444
Heavy truck (Fuso 10-tyre, etc)	544	1,443	1,775	2,143	2,528
Truck, Trailer, and Semi-Trailer	2,363	6,266	7,711	9,310	10,983
Motor Cycles	113	201	267	345	431

Bicycles	0	0	0	0	0
Total Vehicles	4,930	6,668	8,587	12,304	12,952
Total PCUs	12,555	16,933	21,735	31,040	32,545

Source: Detailed Design Report 2024

Need for the Project (No Project Alternative)

The “No Action” alternative assumes that there will be no alteration of the existing road. This would imply that the road section would be left in its present state with the following geometric defects:

- Presence of road hazards such as “S” curves with poor visibility;
- Localized flooding and overtopping due to narrow cross-sections without proper drainage channels;
- Waterlogging on the carriageway due to a lack of and shallow side drains;
- Lack of crash barriers, particularly along the embankment in built-up areas;
- No provision for wildlife crossing increases the risk of collision with vehicles, particularly at night;
- Inadequate road signs to warn motorists of impending hazards; and
- Lack of pedestrian crossings in the settlements;

The impacts of these defects against the backdrop of an increase in traffic in the future are: i) increased risk of injuries and mortalities from road crashes due to inadequate road safety measures; ii) accelerated deterioration of the road condition due to inadequate drainage works will increase road maintenance cost; iii) increase in road congestion due to lack of road capacity will lead to increase in operating cost, and travel time resulting to economic loss; iv) congestion and accelerated deterioration of road leads due to non-optimal travel speed will increase fuel consumption leading to higher emissions, deterioration of air quality, and increase impacts on human health. An increase in traffic, particularly at night, will increase the risk of vehicle-wildlife crashes endangering the population of wildlife. However, one positive note of not improving the road is the preservation of trees along the road right-of-way and avoiding further disturbance to wildlife habitat in the project area, and the avoidance of economic and physical displacement. Finally, without the project, all construction-related impacts like camp site management, occupational and community health and safety, shifting of utilities, dust, noise, and vibration from construction equipment are avoided.

1.5 Proposed Interventions

The proposed project involves key upgrading activities, including geometry improvement, pavement upgrading, drainage improvement, retaining structures, slope protection/stabilization, other off-road works, and traffic management and road safety.

Geometric Design

Regarding geometric design criteria, the Nepal Road Standards 2070 (2013) and other relevant standards were considered while upgrading the road. Based on the standard to be followed, the following basic standards have been proposed for the project road:

There will be a median of 3 m at the center, which will be followed by 0.5 m kerb shy each side. There will be 7 m dedicated formation on either side for the movement of vehicles on either side, representing two lanes each. Similarly, there will be 2.5 m of paved shoulders on either side and 0.5 m.

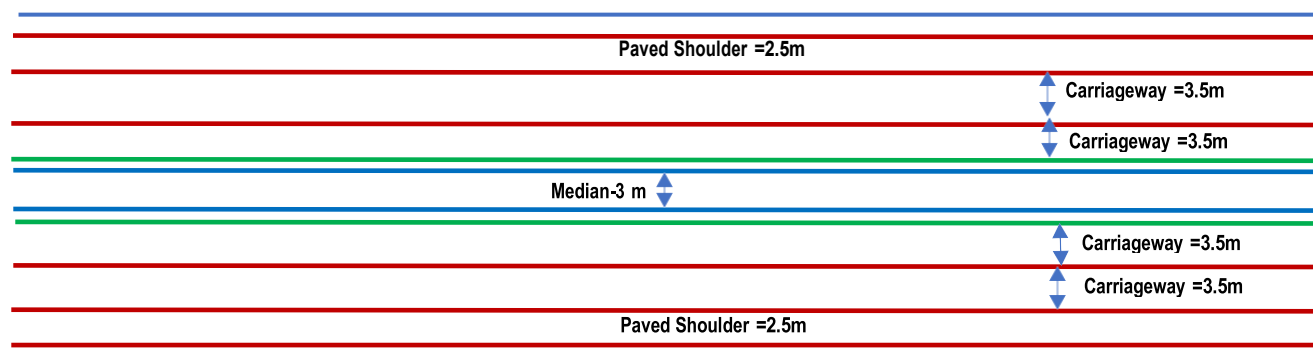


Figure 2: Cross-section of the Road

Pavement Design

Pavement has been designed to withstand the traffic volume and axle load for 20 20-year period. Adequate drainage will be provided below the pavement layers and sub-grade level. Pavement layers in general will consist of granular sub-base, crushed stone base, and asphalt concrete. Capping layer of suitable material will also be provided in those areas, where deemed necessary. Pavement will be designed as per Pavement Design Guidelines (Flexible Pavement)-2014 (Second Edition 2021), published by the Department of Roads, Overseas Road Note 31 published by Transport Research Laboratory of the UK, and IRC-37-2018, as well as suggestions from DoR. The bituminous surface pavement (Asphalt) will be designed to meet the expected traffic level and sub-grade strength. The design of the intersections for access to approach for other connecting roads will be provided to ensure the safety of vehicles diverging from or merging into high-speed roads. Intersection will be considered for major feeder roads, minor feeder roads, and district roads. Road furniture will be provided in the form of road signs, crash barriers, road markings, delineators, foot paths, and covered side drains. The pavement design for the project road will be carried out by adopting various parameters. The parameters that can be adopted considering provisions/stipulations made in NRS 2070 and IRC-37-2018, as well as suggestions from the DoR. The following parameters have been proposed for the pavement design.

This project is WB WB-funded project, which aims to effectively address safeguard issues, ensuring compliance with environmental and social standards. Hence, the project will perform environmental and social impact\ assessment for the WB as well, based on the ESF of the bank. Similarly, ESMF as well as the Baseline Report of this project have also been considered so that the IEE is aligned with the WB report, and both reports have consistency. Furthermore, other prepared documents like RAP, as well as the Poverty and Social Analysis report, will be accessed for IEE, especially in the social aspect.

Table 4: Pavement design for the project

Proposed Pavement Type	Flexible Pavement
Design Period	20 years
Design Sub-grade	Based on the outcome of the field survey
Axle Load Distribution	50%/50%
Vehicle for axle load consideration	All commercial vehicles
Design Codes	NRS 2070 IRC 37-2018 (verification by IIT Pave Software)

Bridges

The project includes two major bridges and six minor bridges. Four minor bridges will be dismantled, and the entire four-lane minor box bridges will be constructed. Furthermore, in the remaining two minor bridges and two major bridges, two two-lane bridges will be constructed downstream of the existing bridge. All the design of bridges is based on the guidelines provided by Nepal Bridge Standards - 2067 of DOR. All bridges have been designed for a discharge of 100 years return period of the river. Similarly, all bridges have been designed as per IRC loadings or AASHTO loadings. Details of the bridges and construction status/modality are presented in the following Table 5.

Table 5: Details of the bridges and construction status

S. N	Chainage	Name of the Bridge	Length	Type of construction	Remarks
1	640+262	Belwagurdawa	63	<i>An additional two lane will be constructed</i>	
2	641+637	Agaiya Nala	7	Dismantled and complete, a 4-lane bridge will be constructed	
3	642+199	Kushma Nala	7	Dismantled and complete, a 4-lane bridge will be constructed	
4	648+157	Dry Nala	14.3	An additional two lane will be constructed	<i>Will be used as a medium-sized animal crossing</i>
5	648+561	Bel Nadi	63	<i>An additional two lane will be constructed</i>	<i>Proposed for large and medium-sized animal crossing</i>

S. N	Chainage	Name of the Bridge	Length	Type of construction	Remarks
6	649+257	Jawai	17	An additional two lane will be constructed	<i>Proposed for medium-sized animal crossing</i>
7	650+768	Dry Nala/Nahar Bridge	7	Dismantled and complete 4 lanes will be constructed lane	
8	651+614	Bantiya Nala	7.5	Dismantled and complete a 4-lane bridge will be constructed	

Source: Design Report of GC Road section 2024

Geometry Improvement

This involves widening of the road to varying widths (24m in rural and forest areas and 50m in urban areas) to meet the design standards, including sections along forest areas, agricultural areas, religious and cultural sites, markets, and built-up areas. Along selected major built-up areas and market fronts, consideration has been made in the preliminary design to widen the road to the full width.

Table 6: Location of Urban Areas as per Road width

S.No.	Location	Chainage		Length(m)
		From	To	
1	Non urban (24m)	640000	640160	160.00
2	Non urban (24m)	640160	640510	350.00
3	Non urban (24m)	640510	640680	170.00
4	Urban (50m width)	640680	641500	820.00
5	Semi urban(27.33m)	641500	641950	450.00
6	Non urban (24m)	641950	642150	200.00
5	Non urban (24m)	642150	642350	200.00
6	Non urban (24m)	642350	642500	150.00
7	Semi urban(27.33m)	642500	642700	200.00
8	Non urban (24m)	642700	643100	400.00
9	Non urban (24m)	643100	644000	900.00
10	Non urban (24m)	644000	644200	200.00
11	Semi urban(27.33m)	644200	644450	250.00
12	Non urban (24m)	644450	644650	200.00
13	Non urban (24m)	644650	649500	4850.00
14	Non urban (24m)	649500	649800	300.00
15	Semi urban(27.33m)	649800	650000	200.00
16	Non urban (24m)	650000	650150	150.00
17	Non urban (24m)	650150	650600	450.00
18	Non urban (24m)	650600	650785	185.00
19	Semi urban(27.33m)	650785	651610	825.00
20	Non urban (24m)	651610	651750	140.00
21	Non urban (24m)	651750	653300	1550.00

S.No.	Location	Chainage		Length(m)
22	Non urban (24m)	653300	653690	390.00
23	Urban (50m width)	653690	654530	840.00
24	Urban (50m width)	654530	655200	670.00
25	Non urban (24m)	655200	655700	500.00
26	Non urban (24m)	655700	658400	2700.00
27	Non urban (24m)	658400	658500	100.00
28	Semi urban(27.33m)	658500	658800	300.00
29	Non urban (24m)	658800	659000	200.00
30	Non urban (24m)	659000	659200	200.00
Total				19200.00

Source: Detailed Design of Gorusinghe-Chandrauta Road, 2024

Road Width for Highway

Adequate roadway widths have been provided beside the shoulders and a central median for dividing the traffic flow directions.

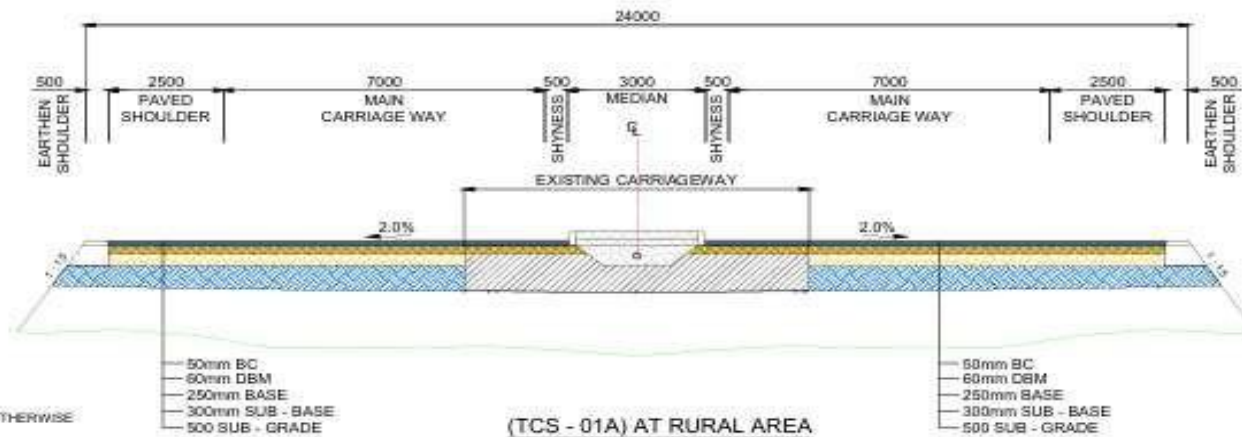
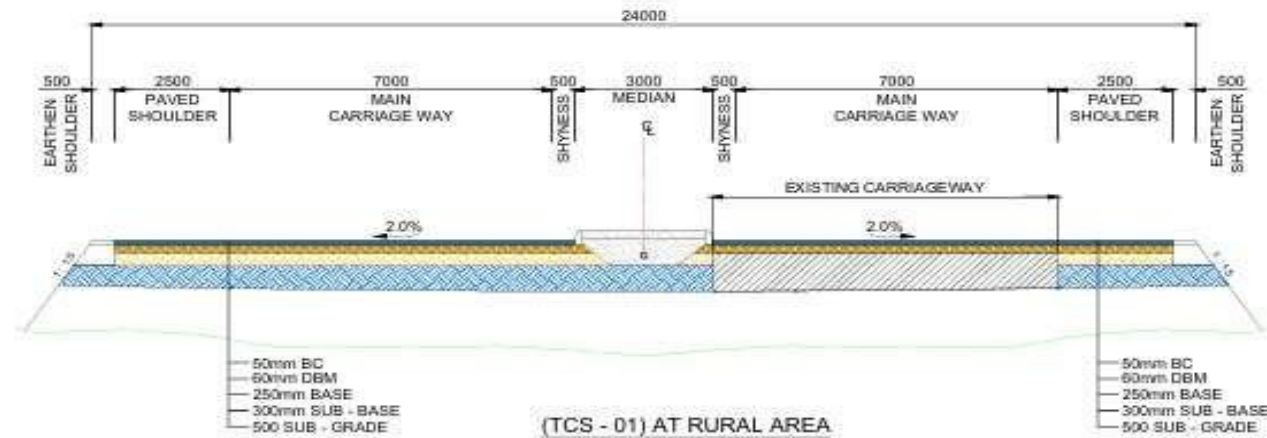
Depending upon the development of the urban and market area along the roadside, three major cross-sections are proposed to upgrade the existing road.

- Cross-section for urban areas
- Cross-section for rural areas

Cross-section for urban areas: For enhancement of the urban environment and drainage off the storm water, three numbers of longitudinal green belts and four numbers of longitudinal drains have been proposed in this type of cross-section. In spite of the main dual carriage way of the width of 7.50 m each with a central median of 3.00 m and both side shoulders of 2.50m, on both sides of the main dual carriage way, a 6.50 m service lane has also been proposed with a median between the main dual carriage way and the service lane. Then, a 4.00 m width is proposed for the foot path and cycle lane. The total width of the urban area cross-section is 50.00m. (Carriageway 4-lane- 2x7.5m Paved Shoulder- 2x2.50m(with Rumble Strip as required) with Central Median - 3.00m, 6.00 m service lane with 3.00 m Side Median and 4.00 m Foot Path.

Cross-section for rural areas: The total width of the semi-urban area cross-section is 24.00m (Carriageway 4-lane- 2x7.5m Paved Shoulder- 2x2.50m (with Rumble Strip as required) with Central Median - 3.00m). Main dual carriage way of the width of 7.50 m each, with a central median of 3.00 m and both side shoulders of 2.50m.

The proposed cross-section of the road is given in Figures 3 and 4 for rural and urban sections, respectively.



NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER UNLESS OTHERWISE MENTIONED.
2. DRAWINGS ARE NOT TO BE SCALED ONLY THE FIGURED DIMENSIONS ARE TO BE FOLLOWED.

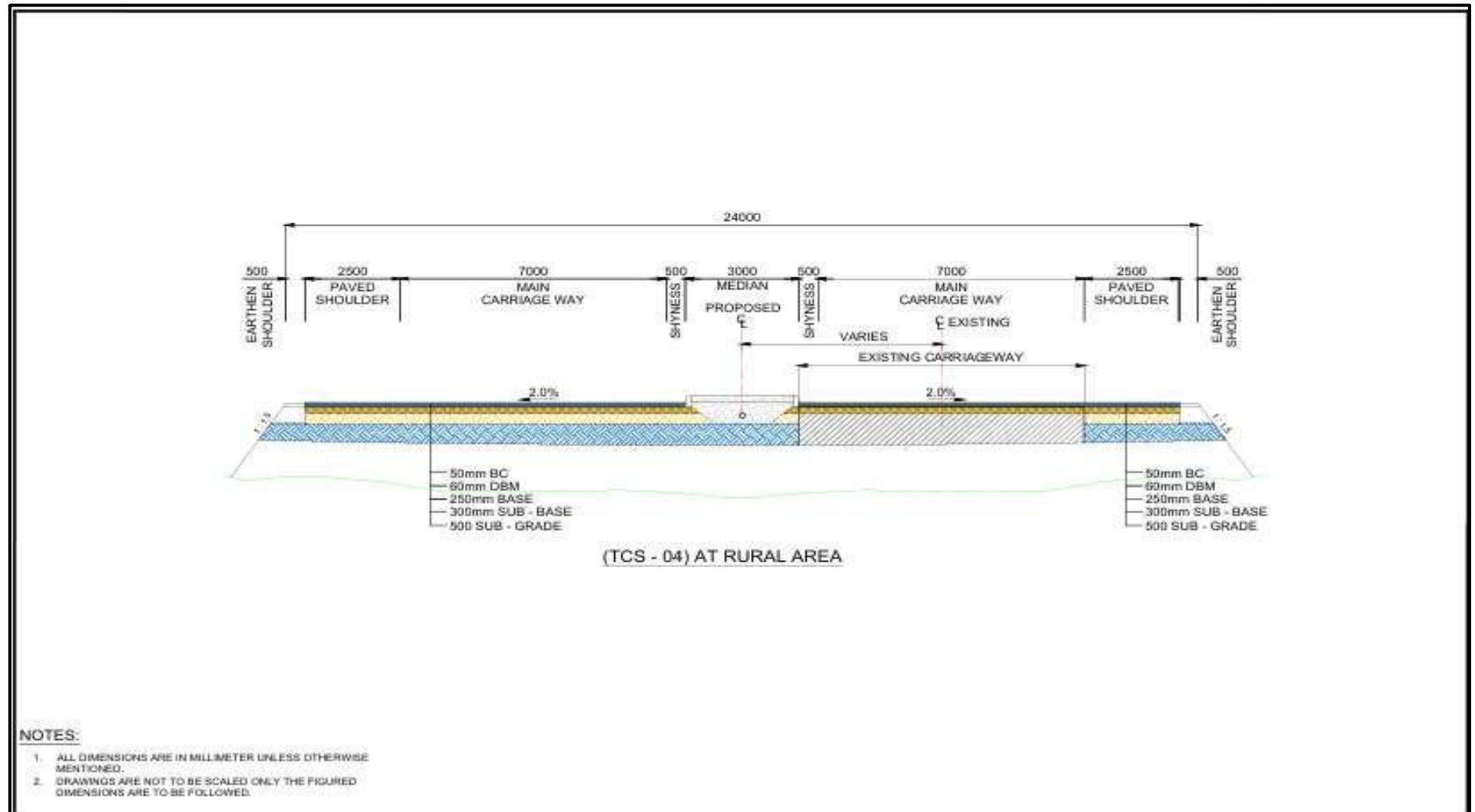


Figure 3: Typical Design of Rural Area (4 Lane Road)

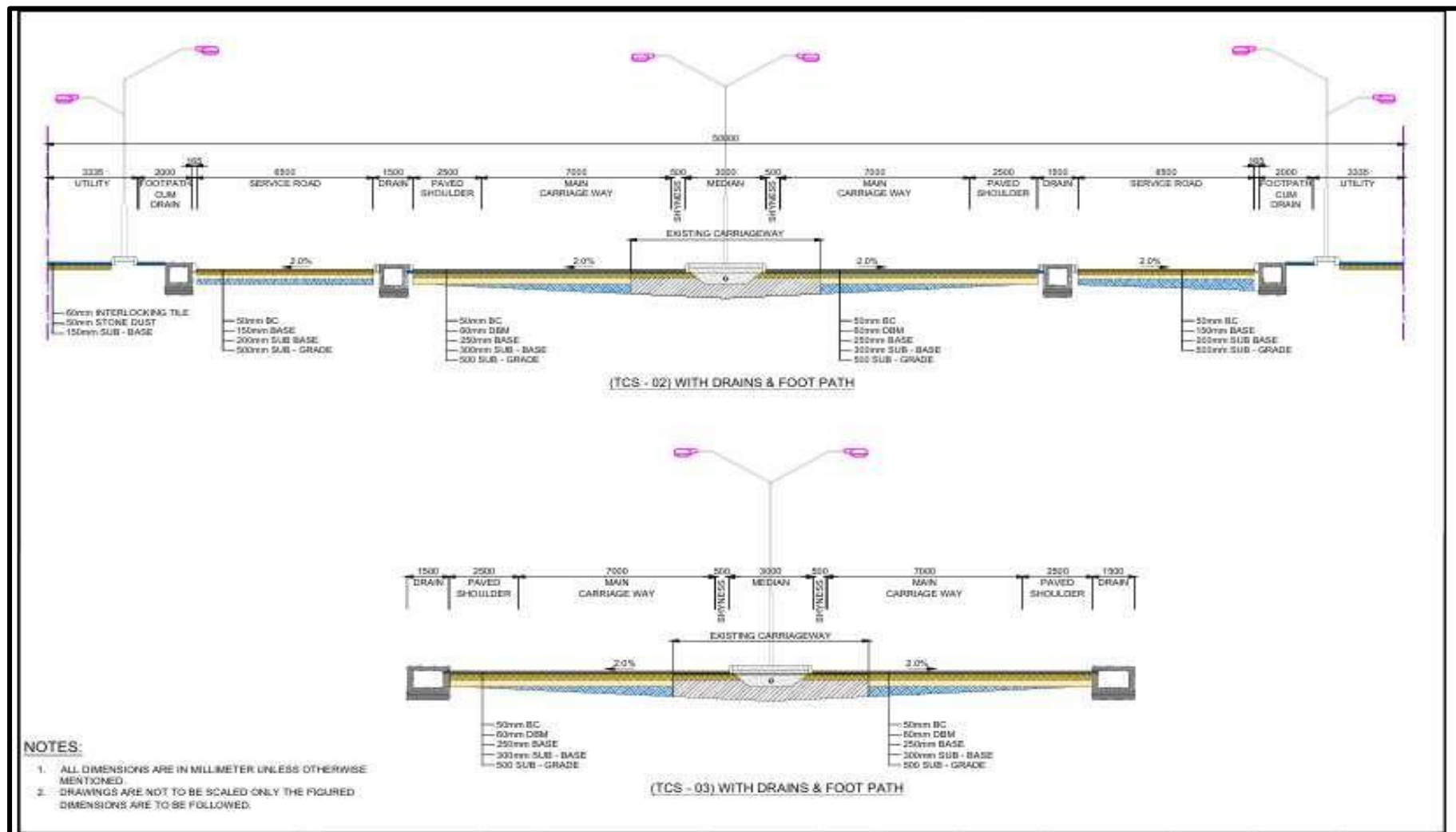


Figure 4: Typical Design of Urban Area (6 Lane Road) with drain and foot path

Culverts

All existing culverts will be dismantled, and new culverts have been designed for a 50-year return period of flood. All together there are 60 slab culverts and 11 pipe culverts in the existing road, which are proposed to be 64 box and 7 pipe culverts that will be wildlife friendly in the final design for cross-drainage of the discharge.

Side Drain

Two types of side drains exist along the road. Drainage at Imilia and Chandrauta bazar is are closed type, whereas an open drain exists at Dumara, Kharendrapur, and west of Chandrauta to Umari chowk. Both drains are observed to be clogged with waste and earth materials. A closed rectangular box-type of side drain has been provided along the roadside. The size of the side drain has been selected on the basis of 25 25-year return period of flood. In the major settlement, there are side drains for longitudinal discharge management. In the Chandrauta west section large number of earthen side drains exist that drain their discharge into nearby cross drains. The hydraulic capacity of roadside drainage has been calculated with a 10% safety coefficient and a 25-year flood return period. In many sections, like Imilia settlement large size of closed drains (1.5m*2m) with RCC walls has also been constructed to drain the discharge into the Belwagurdawa river. The cross-section of the road with side drains is presented in Figures 3 and 4.

Community Health and Safety Measures in Road Design

Climate Change Adaptation Measures

The proposed hydraulic structures are designed based on the historical hydrological data and factoring in climate change predictions. The proposed bridges are designed for 100-year return flows, culverts are designed for 50-year return flows, and side drains are designed for 25-year return flows. For all these flows, an additional 10% flows are added as climate change adaptation.

Footbridge

The footbridge will be primarily located in the market and town area, where schools, colleges, hospitals, and other public facilities are used by pedestrians. Therefore, one simple foot-over bridge has been proposed near the school area at Imelia of Buddhabhumi-9 for school children and pedestrian safety.

Alternatives Considered in the Project Designs

The “Upgrading of the Road Section Alternative” assumes that the road will be improved to 4 lanes. The upgrading of the road will correct the geometric defects and comply with the Asian Highway standard, improve riding quality, increase road capacity, and enhance road safety.

During the feasibility study and detail design stage, several design options were investigated to determine the most feasible options for upgrading for each land use the road will service and the projected traffic. Design parameters like at-grade vs. elevated intersections, pavement materials, lane width, maintenance or improvement of drainage, and bridge type were assessed, and combinations thereof were formulated to come up with the project design that meets the financial, economic, and technical requirements. Based on

these considerations, two options were identified. In the first option, concentric widening of the road with eccentric widening of bridges, and in the second option, eccentric widening in the rural section, concentric in the urban section of the road, with eccentric widening of bridges.

Since the project involves an existing road and not a green field road, the environmental and social implications for the various options were more or less similar. All the design options will have a range of environmental impacts that will require concomitant mitigation measures to ensure residual impacts are not significant. Typical road construction-related impacts of the loss of vegetation, deterioration of water and air qualities, and occupation and community health and safety are expected from all the design options. Furthermore, traffic-related impacts such as accidents and vehicular emissions will be prone to the project site. Mitigation measures of all such impacts are carefully implemented.

The significant adverse impacts of the options are loss of vegetation and risk of further destruction of the wildlife crossing in the forest area. Widening the existing number of lanes from 2 to 4 lanes, the linear barrier for wildlife to cross, and with the projected increase in traffic speed, the significance of wildlife-vehicular crashes will inevitably increase unless mitigation measures are implemented.

A number of site-specific options have been studied related to the upgrading of GC Road from 2-lane to 4-lane with the objective of reducing further environmental and social risks, cost, and impacts of this chosen option. In the forest area, upgrading options for the project also include opening a new road on either the northern or the southern side of the existing road. This will cause a significant loss of natural forest and habitat fragmentation than the existing road. The existing forest of ROW was degraded compared to if a new road were constructed on either the northern or the southern sides of the existing road. The existing road alignment is better than the proposal to construct a new road. The following measures will mitigate the impacts of tree cutting in the forest areas and on wildlife movement.

- Clearing vegetation/trees in the forest area will be confined to 30 m.
- Compensatory tree plantation will be carried out 1:10 ratio.
- Impact on wildlife movement will be reduced by establishing improved and coordinated cross-road structures as wildlife crossings with proper signage, coordination between divisional forest offices, concerned municipalities, and the project office, ensuring the movement of wild animals. Culverts in the forest areas have been designed to facilitate wildlife movement.
- Warning signs, speed limits, and display boards on wildlife protection will be installed in the crossing areas.

Resource Requirements

Labour

As per the WB ESS2, the project will employ direct workers (i.e. Specialised consultants and technical specialists engaged by the DoR to perform direct responsibilities on the project); contracted workers (i.e. workers engaged by civil works contractors and other third parties to perform core functions of the project); and primary supply workers (i.e workers of construction material suppliers such as sand and gravel and loading/construction material transport services). About 26,61,700 md (unskilled) and 2,63,550 md (skilled) will be required throughout the construction period of 3 years. Out of which, it is estimated that some will be from within the project area and some will be from outside the project area, such as from Sudurpachhim and Madhesh Provinces will be more common, and sometimes from India also. Semi-skilled

and unskilled labor deployment priority will be given to locals, also considering the individuals from disadvantaged groups and women, as per requirements. During the peak construction period, the requirement of local labour may increase as per the requirement.

Cut and Fill

Most of the burrowed soil suitable for embankment will be used within the project area. The average distance for most of the borrow area sources from the nearest point on the project road. These deposits are accessible from the project road with little or no improvement of existing accesses. Quantities of soil material for use in the embankment and sub-grade construction of the project road are adequate from the project area. All the proposed bypasses will be constructed, balancing cut and fill considerations. Since the estimated cutting volume is less than the filling volume, it will be used in the filling activities during upgrading works. So, as per the recommendation from the design and safeguard team, there is no requirement for a tipping site to manage the excavated materials.

The approximated required earthwork quantity of cutting and filling is given in Table 7.

Table 7: Approximated Earthworks Quantity

Cutting volume	1,06,242cum
Filling Volume	1,45,652 cum

Source: Detailed Design Report-2024

Source of Construction Materials

The basic materials required for the road upgrade are soil, gravel, and crushed rock. Gravel will be used for sub-base upgrading, crushed stones for base-course upgrading, and for bituminous surfacing; the existing crusher plant will be used. As the project area lies in the terai region, there are some lowland areas along the road. Hence, burrow materials are added to raise the low-lying land area. and also need to manage sufficient burrow and quarry materials in the project area. The burrow pit and quarry area needs to be mapped as a part of the IEE. This study has identified the following sources for the burrow material. Details of the available burrow pit sources are presented in Table 3.7 below. Apart from the listed burrow pit and quarry sites, none of the sites from the Chure range will be utilized without fulfilling the necessary legal requirements of environmental compliance. Also, the respective plans for quarry operation and burrow pit, and other necessary plans have to be prepared by the contractors before commencement of the civil works. Those plans should be prepared by following the WB ESS, GoN's legal framework, and shared with WB for review and clearance via the consultant and DOR. After assuring the quality of the document, the supervision consultant will provide final clearance/approval to the respective contractors prior to the commencement of civil works.

Construction materials such as stone, coarse aggregates, sand, sub-base, base course, and surface dressing/asphalt concrete chips are available locally, and others will be purchased from the local market. The construction materials sourced from third-party suppliers shall be legally permitted to operate the quarry or crusher, have cleared all applicable taxes, and have completed and received approval for environmental and social assessments.

The potential sources of construction materials (stone, coarse aggregates, sand) are given in Table 8.

Table 8: Sources of the Construction Material

S.N.	Location	Coordinates	Methods of extraction
1	Belgarduwa Khola	83° 1'8.12"E, 27°44'28.57"N	Use of local handling tools like a shovel, lever, hammer, tray, etc. Use of equipment, machinery like an excavator, bulldozer for excavation, and trippers, tractors, etc, for transport of materials
2	Agewa Nala	82°57'18.95"E, 27°42'42.46"N	
3	Surahi Khola	82°49'16.78"E, 27°41'48.83"N	
4	Rapti River	82°45'5.29"E, 27°49'44.86"N	
5	Banganga River	83°10'57.35"E, 27°42'44.78"N	

Source: Detailed Design Report of Gorusinghe–Chandrauta Road, 2024



Figure 5: Location showing possible locations of construction materials

Construction Materials requirement

Construction of roads and bridges following materials will be required. Construction materials such as stone, coarse aggregates, sand, sub-base, base course, and surface dressing/asphalt concrete chips will be used from the proposed quarry sites. Manufactured materials such as cement, steel, and bitumen will be mostly sourced from local suppliers. The major construction material with quantity is given in Table 9.

Table 9: Estimation of Quantities of Construction Materials

Type of Material Required	Quantity of Material Required
Cement	286395 bags
Ordinary soil in the Embankment	146000 m3
Sand	11678 m3

Type of Material Required	Quantity of Material Required
Aggregate	24700 m ³
Stone	10912 m ³
Reinforcement	2337 m ³
Subbase	200514 m ³
Base	111915 m ³
Bitumen	610072 lit
Gabion Box	536250 m ³

Source: Detailed Design Report of Goringhe-Chandrauta Road, 2024

Use of Energy and Water in Construction

Gasoline and electrical energy will be used during the construction phase of the project to prevent pressure on natural forests in the project area. The contractor will avoid using fuelwood for construction purposes and for cooking purposes in labour camps. The energy required for the construction works is mainly kerosene, diesel, and petrol. Diesel will be used for the transportation of materials. Kerosene will be used for bitumen heating. Heavy residual fuels such as furnace oil shall not be used in asphalt plants. Vehicles will use diesel or petrol supplied by the contractor from outside the project area.

a. Water Source for Construction

It is essential to have sufficient water for construction works, water boring, as well as drinking and sanitation works. There will be a need for 0.2 - 0.5 L of water per m² area for curing and mixing purposes, similarly, 2-4 L of water each square meter for browsing purposes. It is estimated that a total of 238 KL of water for construction work and 24,300 KL for water browsing purposes will be required. For drinking water, there is a supply of deep water through pipelines in Buddhabhumi as well as Shivaraj Municipality that can be utilized, and also many places have a traditional practice of using a shallow tube well for the drinking water supply that can be utilized after laboratory testing. Water for construction and water browsing purposes will be sourced from the rivers listed in Table 10.

Table 10: Location of Major Water Source for dust control

No.	Location	Water Source	Coordinates
1	Belagarduwa Khola	River	273928.95 N, 825949.43 E
2	Bel Nadi	River	27391.73 N, 825457.41 E
3	Jawai Nadi	River	273856.26 N, 825434.81 E
4	Construction camp/batching plant of the contractor	Underground water	650+200 or 640+000/ 650+200

Source: Detailed Design Report of GC Road Section 2024

b. Fuel Requirements of the Project

There will be petroleum products, especially diesel, petrol, and kerosene, for the project. It is estimated that around 960 KL of diesel, 182 KL of petrol, and 770 KL of kerosene will be required for the construction of the road and bridge.

Table 11: Type and quantity of fuel required

Type of fuel	Quantity (kiloliter)
Diesel	960 KL
Petrol	182 KL
Kerosene	770 KL

Source: Detailed Design Report of Gorusinghe-Chandrauta Road, 2025

The technology used for the construction work will be both machine and labor-based. Machine-based method is mainly used for specialized works like material extraction from borrow/ quarry sites with the use of heavy equipment like an excavator, bulldozer, etc. Heavy equipment like an excavator will also be used for earthwork excavation, a vibrator for surface laying and compacting, a distributor for laying, and a compactor for finishing bituminous seal, etc.

Project Implementation Schedule and Resources

After completion of pre-implementation works such as land acquisition, vegetation clearance, etc., the mobilization of contractors will be done. Construction of roads, major and minor bridges in the project is planned to start in 2026, and completion is estimated in 3 years (**Table 12**). The total cost for the upgradation of GC Road has been estimated to **NRs 5,68,45,10,641.00**, including VAT.

Table 12: Construction Schedule of the Project

TASK DESCRIPTION	Year 1				Year 2				Year 3				Year 4			
	Quarters															
	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4
Construction Phase – Construction Activities																
Site Clearance																
Earthwork Excavation																
Cross Drainage Structures																
Bridges Construction																
Retaining Structures																
Side and Drainage Structures																
Road Pavement Structures																
Bio-engineering																
Environmental Activities																
Traffic Safety, Painting & Road Furniture																
DNP																

Chapter 2-Legal, Regulatory, and Administrative Framework

This chapter provides an overview of the national legislation and the World Bank Environmental and Social Management Framework that are relevant to the environmental and social assessment of the sub-project and actions that are taken (or to be taken) by DOR to meet these requirements.

2.1 Applicable Environmental and Social Regulations

The Environment Protection Act (EPA), 2019, is mandatory and forms the basis for environmental assessment of the development project, and the Environmental Protection Rules (EPR), 2020, establish the process to be followed during the preparation and approval of environmental assessment. Also, the Policy Document of DoR on Environmental Assessment in the Road Sector of Nepal (January 2000) requires an Environmental Assessment for national highways and main feeder roads for any kind of interventions, such as rehabilitation, upgrading, etc. As per Schedule 2, Rule 3, Transport sector E(8), an Initial Environmental Examination (IEE) is required for the upgrading of national highways or feeder roads of length 10-50 km.

The project will be required to comply with relevant existing environmental and social laws and regulations in Nepal throughout the life of the project. The policy, legal, and institutional framework under which the project will be undertaken is outlined in Table 13.

Table 13: Key Provisions and Relevance of National Plans, Strategies, Policies, Acts/Rules and Regulations to GC Road

S.N.	Plans, Policies, Acts, Rules/Regulations, Strategies	Key provisions	Relevance to GC ESIA
Plans			
1	16 th 5-year' Development Plan of Nepal (2024/2025-2028/2029)	Good governance in the political, administrative, and judiciary sectors while maintaining social justice in health, education, employment, and housing. Achievement of prosperity in social life, economic development, and the national economy. Development of quality infrastructure and intensive connectivity.	The development of quality infrastructure and intensive connectivity plays a vital role in economic growth and overall development
2	15 th 5-year Development Plan of Nepal (2019-2024)	Enhancement in socio-economy with fast alleviation of poverty by high economic growth in the next 5 years based on growth in the agriculture, industrial, and services sectors, with a slogan of "Generating Prosperity and Happiness".	Road development and connectivity are vital for economic growth and overall development.
3	20 Year Road Plan, 2002-2022	The objective of the plan, being the development of Strategic Road Networks (SRN), aligns with the priorities set out in the Tenth Five-Year Plan (2002-2007), as that plan gives priority to constructing feeder and strategic roads connecting North to South, encompassing all road development works.	This Act has been established to carry out regular, occasional, periodic, casual repair and maintenance works of roads and levy tolls on, and collect tolls from motor vehicles plying on the road.

S.N.	Plans, Policies, Acts, Rules/Regulations, Strategies	Key provisions	Relevance to GC ESIA
4	Nepal National Biodiversity Action Plan (2014-2020)	The overall goal is to significantly enhance the integrity of Nepal's ecological systems by 2020, thereby contributing to human well-being and sustainable development of the country. This is to be achieved through the implementation of a number of sector-specific and cross-sectoral strategies and priority actions	The Action Plan emphasizes that governance and legal/regulatory implementation are a major underlying factor behind deforestation and forest degradation.
Strategies			
5	Nature Conservational Natural Strategic Framework for Sustainable Development (2015-2030)	The Strategy stresses the need to mitigate the current and potential future effects of the pressure of transportation and other infrastructure development on the habitats of endangered flora and fauna based on the landscape concept.	The Strategy identifies legal and regulatory issues applicable to nature conservation, sustainable development, and biodiversity protection.
6	MoPIT's Five-Year Strategic Plan for Prosperous Nepal through Roads, Rail, and Transport Development, 2016/17-2021/22	Lays out a map for Prosperous Nepal through Roads, Rails, and Transport Development.	The strategy aims to reduce the number of casualties and road accidents on the highways and strategic roads
7	Sustainable Development Goals (SDG) 2016-2030	SDG-9 aims for resilient infrastructure, including roads, SDG 11- aims for inclusive, safe, resilient, and sustainable human settlements SDG 15: Protect, restore, and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, halt and reverse land degradation, and halt biodiversity loss SDG17:to protect women and girls from violence	The SDG provisions for safer roads, biodiversity conservation, and reducing gender disparity.
Policies			
8	Nepal National Environment Policy, 2076 BS(2019 AD)	The policy established the framework for the protection, control, and minimization of pollution, environmental mainstreaming, environmental justice, participation, sustainable development, good governance, and capacity development.	The Policy is aimed at ensuring the rights of the people to live in a clean and healthy environment, controlling pollution, managing solid waste, and enhancing greenery.

S.N.	Plans, Policies, Acts, Rules/Regulations, Strategies	Key provisions	Relevance to GC ESIA
9	Forest Policy (2015 AD)	The forest policy emphasizes the implementation of community and private forestry development, programs, national parks and conservation areas management programs, soil and watershed conservation programs, management and development of medicinal plants, and conservation of biological diversity.	The policy stresses conservation of endangered species and emphasizes avoiding forest destruction or chopping down the trees while constructing infrastructure during implementation of the project, other than in the forest sector.
10	National Climate Change Policy, 2076 BS (2019 AD)	The Government has followed a theme-based approach in formulating Climate Change Policy, 2019 for the inclusion of guiding principles which are related to common but differentiated responsibilities and capabilities, need for internalization of climate change aspects in relevant policies, plans and programs, sustainable development, equity, public participation, coordination and cooperation, science-based decision-making, and balance between national priorities and international relations (with priority on climate change adaptation).	The program will need to incorporate green, resilient infrastructure design and implementation
11	National Transport Policy, 2058 BS(2001AD)	The principal objective of this Policy is to develop a reliable, cost-effective, safe facility facility-oriented, and sustainable transport system that promotes and sustains the economic, social, cultural, and tourism development of Nepal as a whole	The policy puts a high priority on completing the construction of roads connecting all 77 District Headquarters of the Country to the main road network
12	Land Use Policy, 2072 (2015)	The objectives of the policy are to categorize or classify entire lands of the country into various Land Use Zones (LUZs), level wise division (Federal, Provincial and Local), and to ensure the use of Land and Land Resources(LLRs) on the basis of land use plans (LUPs) for protection of agricultural land and maintain beautiful, well- facilitated settlement and sustainable urbanization, forests areas including natural heritages, biodiversity and historical, cultural and religious, archaeological and areas of strategic importance	It ensures the participation of government and public agencies as well as the private sector by linking productivity, environmental balance and conservation, social and economic prosperity, and poverty alleviation.
13	Land Acquisition, Resettlement and Rehabilitation Policy, 2071 BS(2015 AD)	The policy requires that expenses related to land acquisition, compensation, and the implementation of resettlement and rehabilitation plans should be considered as project costs, underlining that the	Policy outlines the need to conduct an economic and social impact assessment of the development projects.

S.N.	Plans, Policies, Acts, Rules/Regulations, Strategies	Key provisions	Relevance to GC ESIA
		compensation amount should be calculated on the market rate.	
14	Public-Private Partnership Policy, 2072 BS (2015 AD)	The objectives of this policy are focused on serving to public interests in developing infrastructure, at the same time creating an environment for private investment and the use of private sector experience, managerial skills, competencies, and technical skills for infrastructure development	The policy covers 6 development areas for partnerships, including infrastructure and transport.
14.	National Gender Equality Policy 2077 BS (2020)	• Ensuring substantive and meaningful participation of women in all sectors and maintaining gender equality through economic and social transformation • To establish equality between women, men, gender, and sexual minorities in legal and practical terms, including economic, social, and political empowerment of women. • Changing the tradition of gender-based division of labor and increasing women's participation in the labor market, and assessing women's contribution to the economy	The policy covers meaningful participation of women and changing the tradition of gender-based division of labor and increasing women's participation in the labor market, and assessing women's contribution in the road upgrading activities
16	National Health Policy, 2076 (2019) & OHS Policy for Road Infrastructure Development and Management, 2023.	Universal health coverage, including prevention, promotion, treatment, rehabilitation, and palliation, Formulate and implement a legal framework, mainstream OHS, strengthen institutional capacity, coordination, and collaboration among stakeholders, and develop standards and codes of practice on OHS.	All kinds of pollution are to be reduced that may impact the general public, and a program is to be implemented and developed along with relevant agencies on the basis of scientific planning. Specialized in the OHS implementation at the site, and the compliance level of OHS at the site will be improved.
Acts			
17	Environment Protection Act, 2076 BS (2019 AD)	The law contains several provisions to internalize the environmental assessment system and to maintain a clean and healthy environment by minimizing the adverse impacts on human beings and other life forms, and physical objects.	The act highlights that any development project, before its implementation, has to pass through environmental assessment, which will be either BES, IEE, or EIA, depending upon the location, type, and size of the project.

S.N.	Plans, Policies, Acts, Rules/Regulations, Strategies	Key provisions	Relevance to GC ESIA
			The Act has included three tiers of provisions (Section 3.2.a) on conducting “environmental study as a brief environmental study (BES), IEE, and EIA.
18	Sexual Harassment at Workplace (Prevention) Act, 2015	Section 3: Not to commit or cause to commit Sexual Harassment Section 4. To be considered as Sexual Harassment	No person shall commit or cause to be committed sexual harassment in the workplace. (1) If anyone commits or causes to be committed, the following acts by abusing one’s position, power or authority to any employee or customer in the workplace by creating any form of pressure, influence or enticement or by discouraging, it shall be considered that sexual harassment has been committed: - (a) To touch or attempt to touch any organ of the body with sexual intent, (b) To use or display word, picture, newspaper, audio, visual, other information technology, medium, object or material related to obscene and sexual activity, (c) To display or express obscene and sexual intent by writing, speaking or gesticulating, (d) To make an offer for sexual activity, (e) To tease or annoy with sexual intent (2) Notwithstanding anything contained in clauses (a), (b), or (c) of sub-section (1), anything done in the course of educational, informative, research-oriented, treatment, or lifesaving activity shall not be considered to be sexual harassment.
19	Public Road Act, 2031 BS(1974 AD)	The Public Road Act is the governing legislation for the construction and operation of roads in Nepal.	The Act prohibits the construction of permanent structures (buildings) within a defined distance from the road,

S.N.	Plans, Policies, Acts, Rules/Regulations, Strategies	Key provisions	Relevance to GC ESIA
			i.e. the road agency has the authority over everything within the right-of-way
20	Forest Act, 2076 BS(2019 AD)	Section 49 of the Act prohibits reclaiming lands, setting fires, grazing, removing or damaging forest products, felling trees or plants, hunting wild animals hunting and extracting boulders, sand, and soil from the National forest without prior approval.	Section 42 of the act has made three provisions for the use of forest areas: (i) the project should be of national priority, sub-Section (1), (ii) there is no alternative other than to use the forest area, sub-section (1/2), and (iii) the project should not have a significant impact on the environment, sub-section (1)
21	Local Government Operation Act, 2074 BS (2017AD)	The Act provides the functions, rights, and duties of local government, such as Municipalities, rural municipalities, and their wards.	This act empowers the local bodies for the conservation of soil, forest, and other natural resources and implements environmental conservation activities.
22	Soil and Water Conservation Act, 2039 BS (1982 AD)	Provisions to construct and maintain dams, embankments, terrace improvements, diversion channels, and retaining walls, protect vegetation in landslide-prone areas and undertake deforestation programs, and regulate agricultural practices pertinent to soil and watershed conservation	Section 13 of the act empowers the authority to prohibit the commission of any acts that may cause soil erosion or soil cutting in a land where any of the acts have been done under Section 4 and in the vicinity of such land.
23	Plant Protection Act 2064 BS (2007 AD)	legal provisions for preventing the introduction, establishment, prevalence, and spread of pests while importing and exporting plants and plant products, promoting trade in plants and plant products by adopting appropriate measures for their effective control	The act may impose prohibitions/restrictions on the import of plants or plant products, transport from one district to another of any plant or plant product.
24	Aquatic Life Protection Act, 2017BS (1960 AD)	Recognition of the value of wetlands and aquatic animals.	Section 3 of the act renders no person shall knowingly use any kind of electric current, explosive substance, or poisonous substance with the intention of catching and killing any aquatic animal in any water.
25	Control of International Trade of Endangered Wild Fauna and Flora	The act prohibits on Trade or Transaction of threatened or Vulnerable wild fauna or flora or specimens thereof	The act states that no person shall purchase, sell, possess, use, plant, rear, captive breed, transport, import, export, or cause to be done so a threatened or vulnerable wild fauna or flora

S.N.	Plans, Policies, Acts, Rules/Regulations, Strategies	Key provisions	Relevance to GC ESIA
	Act, 2074 BS (2017 AD)		or a specimen, except in the cases when a license is obtained
26	Water Resources Act, 2049 BS (1992AD)	To make legal arrangements for determining beneficial uses of water resources, preventing environmental and other hazardous effects thereof, and also keeping water resources free from pollution.	Section 19 of the act clearly mentions that no one shall pollute water resources by way of using or putting any litter, industrial wastes, poison, chemical, or toxic substances to the extent that the pollution tolerance limit of the water resource as prescribed pursuant to Sub-section (1) is exceeded.
27	Land Acquisition Act, 2034 BS(1977AD)	The Act is the main legislation to guide the involuntary acquisition of land in the country.	Government can acquire land at any place in any quantity by giving compensation pursuant to the Act for the land required for any public purpose or for the operation of any development project initiated by the government, authorized institution (sections 3 and 4).
28	Land Use Act, 2076 BS(2019 AD)	Section 4.1 of the act classifies lands into 10 categories, such as agricultural, residential, industrial, commercial, mining and mineral, forest, river, stream, pond and wetland, public use, cultural and archaeological, and others.	The act provisions for the need for economic development and infrastructure building, among others, to ensure that land is properly used and managed, and that land set aside for one purpose is not used for another.
29	Labour Act, 2074 BS (2017AD)	The Act has been passed for provisions for the rights, interests, facilities, and safety of workers and employees working in various sectors, and thus ensures the good working conditions and welfare of the workers. Also, encompasses the workers' grievances and incident reporting system, safety at work.	Section 11 (3) of the Labour Act provides for the employment contract and the matters to be covered under the employment contract, <i>and the</i> Act requires the employment contract to include (a) remuneration, (b) benefits, and (c) terms of the employment of the Employee and such other matters as prescribed. Section 64 (1) states that the main employer must obtain the employees from a licensed labour supplier. Section 68 – 83 mandated on OHS provision that will guide the respective contractor for legal implementation/compliances.

S.N.	Plans, Policies, Acts, Rules/Regulations, Strategies	Key provisions	Relevance to GC ESIA
30	Child Labour (Prohibition and Regulation) Act, 2056 BS(2000AD)	The Child Labour (Prohibition and Regulation) Act 2000 is the main legal expedient to prohibit engaging children in factories, mines, or similar risky activities and to make necessary provisions with regard to their health, security, services, and facilities while engaging them in other activities.	Under Section 3 of the Act, a child who has not attained the age of 14 years is strictly prohibited from being engaged in work as a laborer. Equally, under Section 4, engagement of a child in work as a laborer against his/her will by way of persuasion, misrepresentation, or by subjecting him/her to any influence or fear or threat or coercion or by any other means is prohibited. Under Section 6, in case any Enterprise engages a child in work, it must get approval from the concerned labour office or any authority or official prescribed by that office and from the fathers, mother, or guardian of the child.
31	Act related to Children, 2075 BS (2018AD)	The act provisions the children's fundamental rights provided in the constitution into a legislative provision, which then allows children to exercise their rights legally.	any child under the age of 14 is not allowed to work in hazardous labour or the worst form of child labour
32	Road Board Act, 2058 BS(2002AD)	The act makes necessary provisions for having the roads repaired and maintained, making cost-effective the expenditures to be incurred in repairing and maintaining the roads, and making transparent and effective the repairing and maintenance works of the roads	The Act aims to provide a sustainable fund for the planned maintenance of the roads. The aim of planned maintenance is to keep existing maintainable roads in serviceable condition, reduce vehicle operating cost, and provide more comfort to the road users.
Rules/Regulations			
33	Labour Rules, 2075 BS (2018 AD)	The Labour Rules demand the Employment Contract to cover (a) the nature of employment, (b) the primary work of the Employee and his/her position, (c) a statement that the Employee's Service Rule will be an integral part, (d) date, time, place of contract, and its effective date. Other important terms and conditions related to the work or service of the Employee	The Labour Rules regulate the Employee's work schedule, providing rest periods for certain female employees with the submission of certain certificates, determining the percentage of disability associated with an accident in the workplace, other issues relevant to sickness or accident while working, associated with

S.N.	Plans, Policies, Acts, Rules/Regulations, Strategies	Key provisions	Relevance to GC ESIA
			occupational safety and health, etc.
34	Environment Protection Rules (2020)	Elaborates procedures to be adopted for environmental protection and punishments/fines in case of not meeting the criteria. As per Schedule 2 pertaining to rule 3 of EPR 2020, IEE is required for the upgradation of National Highways or Feeder Roads of up to 50 Km	As per schedule 2 pertaining to rule 3 of EPR 2020, GC's section is 19 km long. This EPR also guides in conducting IEE with all the steps required to follow, data to be included, alternatives to be assessed, methods of impact assessment, process of public consultations, and approval processes.
35	Forest Regulation, 2022	As the project passes through forest sections and there are trees to be cut down within the RoW of the road, the project has to follow provisions as included in the Forest Act and Forest Rules. Counting of affected trees due to the project has been done as per this rule. Further, as per this rule, compensatory plantation in the ratio 1:10 has been proposed, and the cost required for plantation and care for five years will be deposited in the Forest Development Fund.	As per rule 102 of the forest regulation, the tree along the RoW of the road can be cleared for upgrading works with permission from the Department of Forest and Soil Conservation and respective divisional forest offices. Compensatory plantation in the ratio 1:10 has to be done by the proponent, and the cost required for plantation and care for five years has to be deposited in the Forest Development Fund.
36	Water Resources Regulation, 2050 BS (1993 AD)	Measures are to be taken for the conservation of aquatic life and the water environment, and for mitigating the social and economic effects of the project in the concerned area.	It is mandatory under Rule 7 (e) that appropriate measures should be taken to lessen the adverse effects of the project on the overall environment
37	Wildlife Friendly Infrastructure Construction Guidelines 2021	This guideline assists in constructing wildlife-friendly infrastructure in linear nature projects to secure the movement of animals and reduce accidents and conflicts between humans and wildlife. This guideline has suggested minimum guideline dimensions for underpass and overpass structures required for different categories of wildlife.	This guideline is relevant to road construction works, especially when such projects intersect with natural habitats, forests, or wildlife corridors. The guidelines recommend safe crossing structures like underpasses, overpasses, canopy bridges, and fencing to reduce accidents

National Environmental Standards

National Ambient Air Quality Standard, 2069, The new National Ambient Air Quality Standard (NAAQS) 2012 that came into effect requires effective monitoring and collection of eight-hour and 24-hour samples of air pollutants like Total Suspended Particulates (TSP), Particulate Matter (PM10 and PM2.5), carbon monoxide, lead and ozone levels for at least 347 days out of a 365-day year. The NAAQS further states that no particular place should fail to monitor air samples for two consecutive days. TSP consists of solid and liquid particles in the air that are harmful to health, while PM10 is an air particle with a volume less than 10 microns that can easily enter the end of the respiratory tract and cause serious health impacts. Both TSP and PM10 are considered major air pollutants.

National Standard About Noise Level, 2069, The National Noise Standard 2012, which came into effect as per Rule 15 of the Environmental Protection Regulation, requires effective monitoring and collection of daytime and nighttime noise level permitted limits.

Nepal Vehicle Mass Emission Standard, 2069, Government of Nepal has prescribed different National standards for emissions from vehicles. There are limit values for the emission of harmful gases from vehicles as mentioned in the standards.

National Drinking Water Quality Standards, 2005, Major tasks during monitoring to be performed by water supplier are cited as follows: Controlling regularly the quality to ascertain that the water supplied complies with the NDWQS; Periodic monitoring of all the components of the water supply system from the perspective of sanitation and risk to health; Proper supervision, inspection and maintenance as part of operation of the water supply systems; Development of necessary infrastructure like water quality testing laboratory and quality control. Following factors should be considered while monitoring: Type and quality of water sources i.e. surface water, springs, dug-wells, shallow wells, deep wells; Type and size of the water supply system (pipe system, treatment facilities); Local environmental settings (physical infrastructure, geography, etc.); Sanitation and hygienic condition surrounding the water supply system; Socio-economic environment at the local level; Site specific conditions for complying with the standards; User's opinion and suggestions regarding water quality; Health and Hygiene Information (information on water related diseases).

National OHS-related standards include the handling of heavy loads (Labour Regulation, 2018), workplace noise and light (2016), and minimum wage based on the job category (2023).

Based on all national documents stated above, this ESIA aligns and complies with the aforesaid national policy framework, indicating across various sectors and fields of expertise, the requirement for the assessment and effective management of environmental and social impacts related to the construction of the GC road.

Regulatory Institutions

The following institutions are responsible for Environmental and Social issues in the project.

Table 14: Responsible Institutions for E&S Issues in the Project

Institution	Role and Responsibility on E&S issues
Ministry of Physical Infrastructure and Transport (MoPIT)	MoPIT is the mother agency of the DoR and is mandated by the EP Act to review and approve IEEs for projects in the public works and transport sector. It also reviews and endorses EIA reports for review and approval by the MoFE. The Ministry will also be the one to authorize the Project Management Office (PCU) to initiate preliminary action for land acquisition. This function is handled by the Environment and Social section under the Planning, Monitoring, and Evaluation Division.
Department of Roads (DoR)/DCID	The DoR-DCID prepares and implements the ESIA/ESMP, which has to be reviewed and approved by the World Bank as the financing agency of the project. DoR-DCID is directly responsible for managing the E&S risks of individual projects under the program, i.e., from assessment, mitigation planning, implementation, to monitoring. DoR-DCID also applies the obligation mentioned in the DoR's updated ESMF 2024.
Geo-Environment and Social Unit (GESU)	The focal point for the E&S risk management at DoR is GESU. GESU provides advisory services to units of DoR on geological, environmental, and social safeguards matters. Its main role is to prepare IEEs and EIAs for the DoR projects and have the map approved by the MoPIT in the case of IEEs and by the MoFE in the case of EIAs. Because of this role, GESU interacts with the Environment Unit of MoPIT as well as that of MoFE. GESU also undertakes compliance monitoring and auditing of projects.
EIA Unit under the Ministry of Forest and Environment (MoFE)	This unit is tasked to undertake reviews and approve EIAs. It is reporting directly to the Ministry and not part of the Department of Environment. This unit convenes and engages a multidisciplinary team to constitute the EIA Review Committee for each EIA submitted for approval. The EIA approvals typically include conditions that the project must comply with or implement in addition to the EMP/ESMP
Department of Forestry and Soil Conservation (DoFSC)	DoFSC under the MoFE reviews and approves applications for RoW of road sections falling within areas classified as public forest. The DoFSC imposes conditions on the acquisition of right-of-way on forest lands, such as the replacement of cut trees.
Department of Labour and Occupational Safety (DoLOS)	DoLOS under the Ministry of Labour and Social Security is currently not involved in the E&S risk management (i.e., it has no role in the EIA process) of development projects. Its role is mainly on the regulatory side. It can formulate and issue policies, rules, and standards for OHS consistent with the law. As such, it can occasionally conduct monitoring and audit of workplaces, construction sites, and offices of contractors and project management. Support for wages for the workers, work permit for the international employees.
District Coordination Committees (DCC)	DCCs can regulate soil and water conservation activities. DCCs are also responsible for reviewing applications of eminent domain land acquisitions and confirming public use. It will be responsible for the issuance of land acquisition notice; the formation of Compensation Fixing Committee, which would determine fair compensation; finalize the list of land owners to receive compensation; and receive grievances for submission to the Ministry of Home Affairs
Municipalities and Rural Municipalities	The municipalities are responsible for conducting public hearings on the EIA results and, based on them, endorsing the project. The MoFE will not approve EIAs without the endorsement of municipalities. It will be responsible for the approval of the quarry borrow area.

2.2 Environmental Approvals, Permits, and Clearances

The environmental approval, permit, and clearance are an important part of the project. **Table 15** summarizes the responsible agency for environmental approval, permits, and clearances to obtain for the implementation of the construction works.

Table 15: Responsible Agency for Environmental Approval, permits, and clearances

Purpose and status	Responsible party	Timeframe
ESIA Approval	GoN/WB	Before signing of loan agreement/prior to finalizing the bidding document
IEE Approval	MoPIT	Prior to the invitation to bid to contractors
Permission to relocate the affected electric poles along the alignment	Nepal Electricity Authority	Prior to construction (6 months to one year)
Private property and Acquisition of land	Landowners	Prior to construction(6 months to one year)
Land acquisition and land ownership issues	Department of Land Management and Archive, Ministry of Land Reform, Cooperatives and Poverty Alleviation	Prior to construction(6 months to one year)
Operation of quarry/borrow sites and watershed activities in the community forest	Ministry of Forestry and Environment/DFO	Prior to, and during construction (6 months)
Approval of tree cutting	MoFE/Department of Forest and Soil Conservation/Divisional Forest Offices	Prior to, and during construction (the re-verification and initiation of the cutting process takes 6 months)
Approval of Quarry/borrow operation in the River	Municipality and DCC	Prior to, and during construction(minimum 2 to 3 months)
Establishing crusher plants and batching plants	Municipality and DCC	Prior to, and during construction (minimum 3 to 6 months)
Labour camps on private land	Land owners	Prior to, and during construction (2 to 3 months)
Labour camps on public land	Municipality and DCC	Prior to, and during construction (2 to 3 months)
Solid Waste Disposal Sites	Municipality	Prior to, and during construction (2 to 3 months)

Relevant International Treaties

Nepal is a signatory party to many international conventions and other treaties. In the current review, only those relevant to sustainable development were analyzed and have importance, because they address vital environmental and social issues, which are trans-boundary or global in nature, such as pollution, climate change, biodiversity conservation, address social inequality, and provide principles of environmental justice. The table below provides a brief review of international treaties and their provisions, relevant to environmental and social issues during the road construction process, and applicable in the case of the ESIA of the GC road.

- As international policies, a number of protocols and conventions have guided this study. These protocols and conventions are as mentioned below:
- Convention on Biological Diversity (CBD), 1992
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), (1973, amended 1979)
- Plant Protection Convention, 1952(Second Amendment,1997)
- World Heritage Convention, 1975
- United Nations Framework Convention on Climate Change (UNFCCC), 1992.
- Strategic Approach to International Chemicals Management, 2006
- Convention on the Rights of the Child, 1989
- International Labour Organization Convention, 1989
- The United Nations Declaration on the Rights of Indigenous Peoples, UNDRIP, 2007
- UN Declaration on the Elimination of Violence against Women, 1993

The above international protocols and conventions provide guidance on international best practice and focus on the conservation of natural resources and biological diversity, protecting and promoting the environment as well as social issues, including the group of conventions of the International Labour Organization and Gender Based Violence (GBV).

2.3 World Bank Environmental and Social Framework and Guidelines

The WB ESF sets out the WB's commitment to sustainable development and mandatory requirements for the bank's finance projects. The Bank's ESF is used to assess and manage the environmental and social risks and impacts of the projects. ESSs are designed to avoid, minimize, or reduce, mitigate, and compensate/offset the adverse environmental and social risks and impacts. The projects supported by the WB are required to meet the 10 ESSs as relevant to the project.

The ESIA has been undertaken in compliance with ESS1 requirements and other relevant ESSs, as follows:

ESS1: Management of Environmental and Social Risks, which identifies risk categories and Impacts: The ESIA has assessed all risks and impacts related to relevant standards (ESS2, ESS3, ESS4, ESS5, ESS6, ESS7, ESS8, and ESS10), and management of environmental and social risks and impacts.

ESS2: Labor and Working Conditions: The ESIA has assessed labor risks and working conditions on different types of project workers as per ESS2.

ESS3: Resource Efficiency and Pollution Prevention and Management: The ESIA has assessed the risks and impacts related to ESS3, including identification of the use of resource-efficient technologies and techniques during construction and operation.

ESS4: Community Health and Safety: ESIA has assessed the potential risks what are the potential risk related to the community and impacts of the project in relation community health and safety.

ESS5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement: The ESIA has been assessed and identified the major impact, here the risks and impacts related to land acquisition as well as physical and economic displacement.

ESS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources: The ESIA has collected baseline information on biodiversity, including identification and assessment of any critical habitats, natural habitats, and modified habitats in accordance with ESS6 within the project area of influence (50-m ROW, 300-m direct impact area, and 2-km indirect impact area).

ESS7: Indigenous Peoples: ESIA has identified the presence of indigenous people (IPs) within the project's Direct Area of Influence; collect baseline information on such populations; assess potential project impacts on them; and provide recommendations for mitigating impacts and extending project benefits to such IPs.

ESS8: Cultural Heritage: The cultural heritage baseline survey is part of the ESIA, and project impacts on CH have also been covered by the ESIA.

ESS9: Financial Intermediaries: Since no financial intermediary is involved in this project, ESS9 is not applicable.

ESS10: Stakeholder Engagement and Information Disclosure: A Stakeholder Engagement Plan (SEP) developed for the overall project has been used to map out stakeholders and engage them all throughout the life of the project.

SEA/SH: Addressing SEA/SH is an integral part of ensuring comprehensive E&S compliance. SEA/SH risks are assessed at the onset of the project design, using WB's standard risk screening tools and with additional assessment on the local context and key features of the project. ESS 1, ESS 2, ESS 4, and ESS 10 primarily align with and guide the project's SEA/SH risks and mitigation measures accordingly. The SEA/SH risk for the project is assessed to be 'moderate' based on the labor influx, contextual prevalence of GBV, namely domestic violence and human trafficking, which is the highest in Lumbini Province, and the absence of an institutional mechanism to address SEA/SH. An SEA/SH action plan has been developed, incorporating sensitization and training sessions, code of conduct, SEA/SH responsive GRM, mapping of services, etc.

2.3.1 WB General EHS Guidelines, 2007

The WB General EHS Guidelines 2007 guide users on common EHS issues potentially applicable to all industry sectors. This guideline provides an approach to the management of significant sources of emissions, including specific guidance for assessment and monitoring of impacts. The EHS guidelines also provide guidance on the prevention and control of community health and safety impacts that may occur during new project development, at the end of the project life-cycle, or due to expansion or modification of existing project facilities. The guideline highlights a general approach to the management of EHS issues at the facility or project level. The guideline entails the inclusion of EHS considerations into corporate and facility-level business processes in an organized, hierarchical approach, highlighting the identification of EHS project hazards and associated risks. Further, the risk management strategies will incorporate engineering and management controls to reduce or minimize the possibility and magnitude of undesired consequences when impact avoidance is not feasible.

2.4 Environmental Health and Safety Guidelines for Toll Roads and Construction Materials Extraction

The EHS guidelines for Toll Roads include information relevant to the construction, operation, and maintenance of large, sealed road projects, including associated bridges and overpasses. The guideline highlights the environmental issues specific to the construction and operation of roads, including habitat alteration and fragmentation, stormwater, waste, noise, air emissions, and wastewater. The guidelines also highlight occupational and community health and safety, and performance indicator monitoring of the environment and occupational health and safety. The issues associated with the construction and operation of roads primarily include physical hazards, chemical hazards, and noise.

The EHS guidelines for construction materials extraction include information relevant to construction materials extraction activities such as aggregates, limestone, slates, sand, gravel, clay, gypsum, feldspar, silica sands, and quartzite, as well as to the extraction of dimension stone. It addresses stand-alone projects and extraction activities supporting construction, civil works, and cement projects. Although the construction materials extraction guidelines emphasize major and complex extraction schemes, the concepts are also applicable to small operations. The guideline highlights the environmental issues specific to the development, operation, and decommissioning of construction material extraction, including habitat alteration and fragmentation, stormwater, waste, noise, air emissions, and wastewater. The guidelines also highlight occupational and community health and safety, and performance indicator monitoring of the environment and occupational health and safety.

World Bank Good Practice Note on Road Safety

The World Bank is providing a series of Good Practice Notes (GPN) to accompany the ESF to support its implementation. This note focuses on addressing road safety on World Bank-financed operations. GPNs are developed in partnership with specialists from inside and outside the Bank and are designed to be reviewed and updated periodically, when appropriate. This note should be read in conjunction with the ESF, including the Policy, the Environmental and Social Standards (ESS1-10), and the accompanying Guidance Notes for Borrowers.

Comparison of WB ESSs and National Regulations

Table 16 provides a comparison of the ESSs with the national legislative framework and requirements. ESSs create mechanisms for the integration of environmental and social issues into decision-making. They provide a set of specialized tools to support development. No financial intermediaries are involved in the GC Road project, so ESS9 is not applicable. The comparative analysis of national regulatory frameworks with ESS1 to ESS8, and ESS10, found that the requirements in regulatory frameworks were aligned with ESSs; however, the issues of GHG emission calculation, resource efficiency, community health and safety, and workers' GRM have not been adequately addressed. These aspects are considered in different themes of impact assessment in line with international best practices, but not mandatory under existing regulatory frameworks.

Table 16: WB ESSs and Comparison with relevant National Laws

World Bank ESS requirements		Nepal's policy framework and requirements	Gaps between ESSs and GoN & legal and policy requirements	Gap-Bridging Measures
ESS	Requirements			
ESS 1: Assessment and management of Environmental and Social Risks and Impacts	ESS 1 requires the Borrower will assess, manage, and monitor the environmental and social risks and impacts of the project throughout the project life cycle so as to meet the requirements of the ESSs in a manner and within a timeframe acceptable to the Bank. The Borrower will: (a) Conduct an environmental and social assessment of the proposed project, including stakeholder engagement; (b) Undertake stakeholder engagement and disclose appropriate information in accordance with ESS10; (c) Develop an ESCP, and implement all measures and Actions set out in the legal agreement, including the ESCP, and (d) Conduct monitoring and reporting on the environmental and social performance.	Environment Protection Act (EPA), 2019; Environment Protection Regulation (EPR), 2020; and National Environmental Impact Assessment Guidelines, 1993 are legal instruments for the requirements of Environmental and Social Assessment of any development projects.	The Schedules are based on activity type, threshold/size, as well as location. The potential risks associated with the project are omitted in the GoN policy. No provision for associate project projects/activities; large projects can be split into smaller projects to avoid a full ESIA study. The EPA 2019 and EPR 2020 lack provisions for establishing a comprehensive social impact assessment framework that facilitates effective engagement with affected individuals and implements tailored measures to address disadvantage and vulnerability The EA requirement in Nepal is primarily based on the project's size, location, and financial threshold, irrespective of the level of potential risks. It gives total freedom to proponents to design and implement EA on their own (for example, all documents, including Scoping, ToR, EIA reports, are prepared by the proponent and approved	• SESA is prepared covering some sections of East-West highway and separate ESMF of ACCESS Phase -1 is prepared in compliance with WB ESF • separate ESIA study for GC road section has been carried out to bridging the gaps in compliance with WB ESF • IEE is being prepared as per the GoN act and rules • The ESMPs has been prepared and developed outline of C-ESMPs an integral part of the bidding document so that the Contractor (as for the provision of services) adheres to the provisions prescribed in the ESMP during the execution of the project.

World Bank ESS requirements		Nepal's policy framework and requirements	Gaps between ESSs and GoN & legal and policy requirements	Gap-Bridging Measures
ESS	Requirements			
			by concerned government offices. Experiences have shown that not all projects need for EA is justified based on size, location, or thresholds. The scope of EIA may not cover all WB ESS. EPA/EPR does not allow the use of other types/forms of assessments. Does not emphasize the hierarchy of measures in ES risk management planning	
ESS 2: Labour and Working Conditions	There are a number of requirements of ESS2 under the following headings, which are applicable to this road section: • Working conditions and management of worker relationships; • Protecting the workforce; • Grievance mechanism; • Occupational Health and Safety • Contracted workers; • Primary supply workers	Labor Act (2017) and Labor Rules 2018; and Child Labor Act (Prohibition and Regulation) Act, 2001, OHS Policy, 2019, and OHS Policy for Road Infrastructure Development and Management, 2018 are legal instruments.	Current OHS legislation is not adequate (No separate legislation on OHS). The current OHS mandate is provided only in Chapter 12 of the Labor Act. The department has endorsed the OHS policy for road projects, which has not fully come into practice for all road projects except international financing projects. Lack of industry-specific standards implemented by DoLOS, except standard for heavy load handling, workplace	• The ACCESS project's Labour Management Procedures (LMPs) have already been developed and implemented in the project implementation phase • site- specific OHS plans and labour management plan for the GC road section will be developed by the contractors during the project implementation phase

World Bank ESS requirements		Nepal's policy framework and requirements	Gaps between ESSs and GoN & legal and policy requirements	Gap-Bridging Measures
ESS	Requirements			
			noise, light, and work directive on OHS for Brick Workers.	
ESS 3: Resource Efficiency and Pollution Prevention and Management	The Borrower shall consider ambient conditions and apply technically and financially feasible resource efficiency and pollution prevention.	EPA (2019), EPR (2020), National Ambient Air Quality Standards (2003), Nepal Vehicle Mass Emission Standard (2012), National Ambient Sound Quality Standard (2012), Standard on Emission of Smoke in Air by New and Existing Diesel Generator (2012), National Water Quality Standard (2008), Tolerance Limits for Industrial Effluents to be Discharged into Inland Surface Waters (2003), The Solid Waste Management Act (2011), Solid Waste Management Rule (2013), Water Resources Act (1992), Water Resources Rules (1993), Drinking Water Regulation (1998), Drinking Water Quality Standards	Lack of suitable enforcement mechanisms for legislation on resource use efficiency in projects	- Resource efficiency and pollution prevention in any project activity will be captured in ESIA/ESMP preparation that includes site-specific ESMPs and contractors' pollution prevention plans. - WGC EHS guidelines or/ National standards (depending on which one is stricter) related to environmental protection and resource efficiency will be complied with by the project.
ESS 4: Community Health and Safety	There are a number of requirements of ESS4 under the following headings: Community health and safety, including sexual exploitation and sexual abuse (SEA/SH) and	The EPA identifies the direct and indirect human health impact as one of the components in assessing the effect of development projects. Sexual Harassment at Workplace (Prevention) Act	- There is limited coverage as the scope of ESIA's does not necessarily include community safety issues, including issues of SEA/SH - Public health legislation does not specifically impose requirements for	- ESIA/ESMPs developed under the project will address all community health and safety issues, including SEA/SH that arise during the execution and operation of the project. - A comprehensive SEA/SH Mitigation Plan has been

World Bank ESS requirements		Nepal's policy framework and requirements	Gaps between ESSs and GoN & legal and policy requirements	Gap-Bridging Measures
ESS	Requirements			
	- Security personnel - community exposure to project-related traffic and road safety risks, diseases, and hazardous materials, Traffic management, and emergencies.	2015-prohibits sexual harassment in the workplace EPA Section 7: Nobody shall create pollution in such a manner as to cause significant adverse impacts on the environment or be likely to be hazardous to public life and people's health.	development and infrastructure projects. There is no requirement for GBV risk assessment & the legal framework for GBV does not specifically refer to impacts arising from the interaction of project workers with local communities.	created to guide contractors in formulating their own SEA/SH mitigation strategies. Comprehensive plan for traffic risk, along with possible safety and health risks that will guide to contractor for their management
ESS 5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	There are a number of requirements of ESS 5 under the following headings: - General (Eligibility classification; Project design; Compensation and benefits for affected persons; Community engagement; Grievance mechanism; Planning and implementation); - Displacement (Physical displacement; Economic displacement); - Collaboration with other responsible agencies or subnational jurisdictions; and; - Technical and financial assistance.	Land Acquisition Act (1977), Guthi Corporation Act (1976), Land Acquisition Guidelines (1989), Land Reform Act (1964) Clause 3 of the Land Acquisition Act states that any asset that is required for public purposes shall be acquired by providing compensation. The Compensation Fixation Committee shall establish the Compensation rates. Guthi Corporation Act, 2033 (1976). Section 42 of this Act states that Guthi land (religious trust land) acquired for the purpose of development shall be replaced with other land, rather than being compensated in cash Compensation shall be provided for loss of crop, damage, and income source.	- Does not require preparation of RAP - Does not allow for PAP consultation in the compensation options - Does not allow non-cash compensation options such as land-for-land and replacement homes, only “arrangements for rehabilitation” and “priority in employment”. - Only compensation in cash, not in kind, is considered - Valuation of lost assets considers depreciation and hence is not at replacement cost - Does not make mention of compensating non-titleholders (tenants, long-	- Resettlement Action Plan (RAP) has been prepared for the GC road section, covering resettlement impacts data segregation by the project intervention. - The project also provides a livelihood restoration program for the project-affected vulnerable people who have been impacted on their livelihood after losing their business. - Followed the outline and guidance given in the Resettlement Framework and prepared the Resettlement Action Plan for the GC road - The project will provide assistance/training to mitigate those impacts on livelihoods during RAP implementation

World Bank ESS requirements		Nepal's policy framework and requirements	Gaps between ESSs and GoN & legal and policy requirements	Gap-Bridging Measures
ESS	Requirements			
			term land users, encroachers, and squatters). limited opportunities for addressing grievances and complaints, and does not include an independent mechanism to manage issues related to compensation, displacement, and resettlement. Furthermore, there is only a minimal requirement for disclosing information about land acquisition and compensation	- The lost assets need to be fully compensated with replacement value and restored livelihoods. - The pragmatic livelihood and business disruption assistance program has been designed by the project. - The project also put alternative forms of compensation or assistance for adversely affected non-title holders, encroachers, and squatters in the Resettlement Action Plan along with temporary losses - Employment opportunities and skill training are provided in ESIA & RAP
ESS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	There are a number of requirements of ESS 6 under the following headings: - General (Assessment of risks and impacts following a precautionary approach); - Conservation of biodiversity and habitats; - Habitats are classified as the Modified habitat; Natural habitat; and Critical habitat; - No Net Loss is achieved to mitigate the loss of natural habitats, where critical habitats are impacted, Net	Aquatic Animal Protection Act (1961), National Park and Wildlife Conservation Act (1973), National Park and Wildlife Conservation Regulations (1974), Soil and Watershed Conservation Act (1982), Himalayan National Park Regulation (1979), National Trust for Nature Conservation Act (1983), Forest Act (2019), Conservation Area Management Rules (1996), Buffer Zone Management Rules (1996), Plant Protection Act (2007)	- Natural habitats are not specifically required to be assessed in the EIA - Does not specifically require a Biodiversity Management Plan even where biodiversity impact is found significant in the EIA	- All the provisions of relevant laws will be complied with by the project. - A separate Biodiversity Management Plan needs to be developed for project activities that have potential impacts on biodiversity and critical/natural habitats. A biodiversity assessment, including a critical habitat assessment, and a biodiversity management plan, as appropriate, following the mitigation hierarchy as part of the comprehensive ESIA, will be prepared for this project.

World Bank ESS requirements		Nepal's policy framework and requirements	Gaps between ESSs and GoN & legal and policy requirements	Gap-Bridging Measures
ESS	Requirements			
	Gain will be demonstrated for the biodiversity values for which critical habitat is designated. - Legally protected and internationally recognized areas of high biodiversity value; - Invasive alien species; - Sustainable management of living natural resources and primary suppliers.			
ESS 7: Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities	There are a number of requirements of ESS 7 under the following headings: General (Projects designed solely to benefit indigenous peoples/Sub-Saharan African historically underserved traditional local communities; Projects where indigenous peoples/Sub-Saharan African historically underserved traditional local communities are not the sole beneficiaries; Avoidance of adverse impacts; Mitigation and development benefits; Meaningful consultation tailored to indigenous peoples/Sub-Saharan African historically	National Foundation for the Development of Indigenous Nationalities Act (2002), Local Self-Governance Act (1999), ILO Convention 169 (2007) The GoN encourages to include and consider IPPF's concerns in each development and infrastructure programs and formulate a plan or mechanism to incorporate income generation program targeted to IPs.	- The GoN encourages development programs to incorporate income generation schemes for IPs. - The provision of FPIC and broad community support in relation to IPs is absent. Nonetheless, the GoN has ratified ILO 169 and the United Nations Declaration of Rights of Indigenous People (UNDRIP). - The GoN is in the process of preparing National Action Plan to implement these international commitments.	- Only (2) project affected IPs households out of 50 PAH) have minor loss category however, they will be paid cash compensation at replacement value along with livelihood restoration training as provisioned in GC ESIA & RAP - An Indigenous People Planning Framework (IPPF) of ACCESS will also be followed with guidance to mitigate any impacts on Project affected IPs - However, this project has only (3) IPs groups, Newar, Magar and Tharu and they follow mixed cultural practice - Impact/ risk on IPs households is low, so IPDP is not required and developed for this project.

World Bank ESS requirements		Nepal's policy framework and requirements	Gaps between ESSs and GoN & legal and policy requirements	Gap-Bridging Measures
ESS	Requirements			
	underserved traditional local communities; • Circumstances requiring free, prior and informed consent, FPIC (Impacts on lands and natural resources subject to traditional ownership or under customary use or occupation; Relocation of indigenous peoples/ Sub-Saharan African historically underserved traditional local communities from lands and natural resources subject to traditional ownership or under customary use or occupation; Cultural heritage); Grievance mechanism; and; Indigenous peoples/Sub-Saharan African historically underserved traditional local communities and broader development planning.			In addition, will follow IPPF DoR's ESMF- 2024.
ESS 8: Cultural Heritage	There are a number of requirements of ESS 8 under the following headings: • General • Stakeholder consultation and identification of cultural heritage	• The EPA (2019) and EPR (2020) provisions state that physical and cultural resources shall not be disturbed or damaged without the prior approval of the concerned authority.	• Does not include intangible cultural heritage • Does not provide for the development of a Cultural Heritage Plan • Does not provide for the application of globally	• Will follow the "Chance Finds" procedure as specified in DoR's ESMF-2024 and incorporate "Chance Finds" provisions and requirements • ESMPs will be updated under the project to address any issues

World Bank ESS requirements		Nepal's policy framework and requirements	Gaps between ESSs and GoN & legal and policy requirements	Gap-Bridging Measures
ESS	Requirements			
	(Confidentiality; Stakeholders' access); - Legally protected cultural heritage areas; - Provisions for specific types of cultural heritage (Archaeological sites and material; Built heritage; Natural features with cultural significance; Movable cultural heritage); and - Commercial use of cultural heritage	The Ancient Monument Act (1956) has provisions on cultural heritage	recognized practices in the study, documentation, and protection of cultural heritage Does not provide for the adoption of chance find procedures	of cultural heritage that may be affected by the execution and operation of the project. This ESMF-24 has also developed procedures for cultural heritage sites. However, through a collaborative approach community will be consulted in identifying cultural heritage sites with local significance/importance and documented, and follow CHP-CFP.
ESS 10: Stakeholder Engagement and Information Disclosure	There are a number of requirements of ESS 10 under the following headings: - Engagement during project preparation (Stakeholder identification and analysis; Stakeholder Engagement Plan; Information disclosure; Meaningful consultation); - Engagement during project implementation and external reporting; \Grievance mechanism; and; - Organizational capacity and commitment	Prevailing national policies, including EPA 2019 and EPR 2020, have envisaged stakeholder engagement at different stages of the project design and implementation. Stakeholder consultation, disclosure, and grievance hearing systems are provisioned.	- Does not require stakeholder analysis and preparation of stakeholder engagement plan - Does not provide for continuous stakeholder engagement/consultations beyond the EIA process during the construction and operation phase	The project has prepared a Stakeholder Engagement Plan (SEP) to ensure that stakeholder engagement activities are effective and meaningful consultation is carried out, including guidelines for establishing a comprehensive GRM with clear, safe, and accessible procedures to identify and respond to grievances, including SEA/SH cases.

Chapter 3-Environment and Social Baseline

This chapter defines the project influence area and presents a detailed overview of the physical, biological, and socio-economic environment within the project influence area, and the results of the primary investigations.

3.1 Zone of Influence (ZoI)

The project affected municipalities (Buddhabhumi and Shivaraj) and their affected Wards: 9, & 1, 3, 4 & 5, respectively, are considered as ZoI of the project. Indirect Impact Area (IIA), covering the area between 300 m on either side of the center of the road. The Right of Way (RoW) is considered a Direct Impact Area (DIA). The Direct Impact Area (DIA) and Indirect Impact Area (IIA) of the project include all the areas where activities related to the construction will take place. The area includes

- 50 m ROW (25 m on either side of the center of the road), because the footprints of the proposed activities are located in this ROW, and changes in the current land use within this area. During the operation stage, this area will be impacted by the increased level of traffic volume, which can have repercussions on the safety of people.
- Further 300m on either side of the center of the road will have a greater likelihood of impact on the nearby human population, private land and resources, and impacts on physical, biological, as well as socio-economic and cultural environment, and, thus, it is subjected to high impacts.

In this area, the physical and biological environment will experience impacts during the time of construction. The Indirect Impact Area is evaluated as the area of avoidance of the road by wildlife, which varies from 1,000 m for small animals to 5,000 m for some large predators (Transportation Research Board and National Research Council, 2005). Besides, indirect impacts will appear as cumulative effects during the operation stage in the form of adverse impacts linked to better access to the area, such as increased poaching, fodder collection, deforestation, unplanned human encroachment along the road, and other similar activities. Impacts inadvertently during the construction phase are likely in these areas due to various construction activities. **Figure 7** presents the direct impact zone and indirect impact zone of the project.



Figure 6: Direct Impact and Indirect Impact area along the Road

3.2 Physical Environment

Terrain

The project area lies in the Siwalik and Terai, with an elevation of 150 amsl (above mean sea level). The alignment begins from the end of the Belwagurdawa Bridge near Gorusinghe at an elevation of 100 m amsl and ends at Umari Chowk at an elevation of 150 m amsl. The road lies in Kapilbastu District and the length is 19 km. The project lies about 350 km south-west of Kathmandu, 300 km south-west of Pokhara, and 170 km west of Chitwan. and the sub-project area lies in the outer Terai.

Kapilvastu district lies in Lumbini Province, on south-western Nepal between coordinates 27 028' to 27 055' N and 82 042' to 83 014' E. Geographically, the district can be divided into the lowland plains of Terai and the low Chure hills. The district is situated at an elevation of 93 masl to 1,491 masl. The Topographical Map showing road alignment has been given in **Figure 8**.

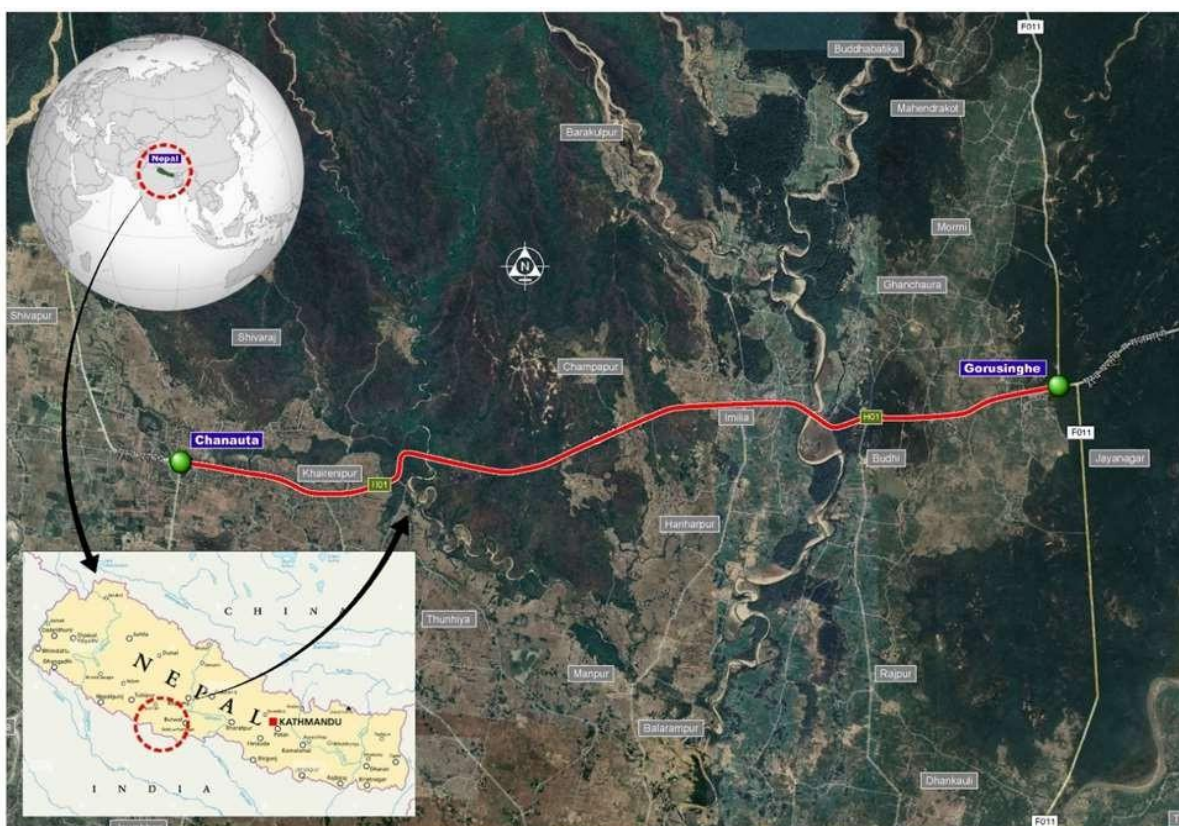


Figure 7: Road Alignment in Google Earth Map of GC Road

Land Use Pattern

The existing land use patterns along the GC road alignment are predominantly urban and peri-urban settlements, followed by agricultural farmlands, forests, barren areas, and water bodies. The area along the highway is highly populated, which is confirmed by analysis of land use in the road corridor with 60.8% of the total area occupied by settlements with agricultural land (mostly villages and small towns located along the highway), 15.8% agricultural land, 20.6% forest/grassland, and the remaining is water bodies and others. However, the 50 RoW (25m on both sides from the centre line) of road is almost clear, and the existing formation width of the road is 7 to 12m, which means road upgrading will occur, requiring minimal additional land use changes. With reference to the preliminary design, there is no additional forest area and agricultural land needed beyond RoW. The ROW's land has already been transferred to DoR/GoN. The land use map of the GC road is shown in Figure 9.

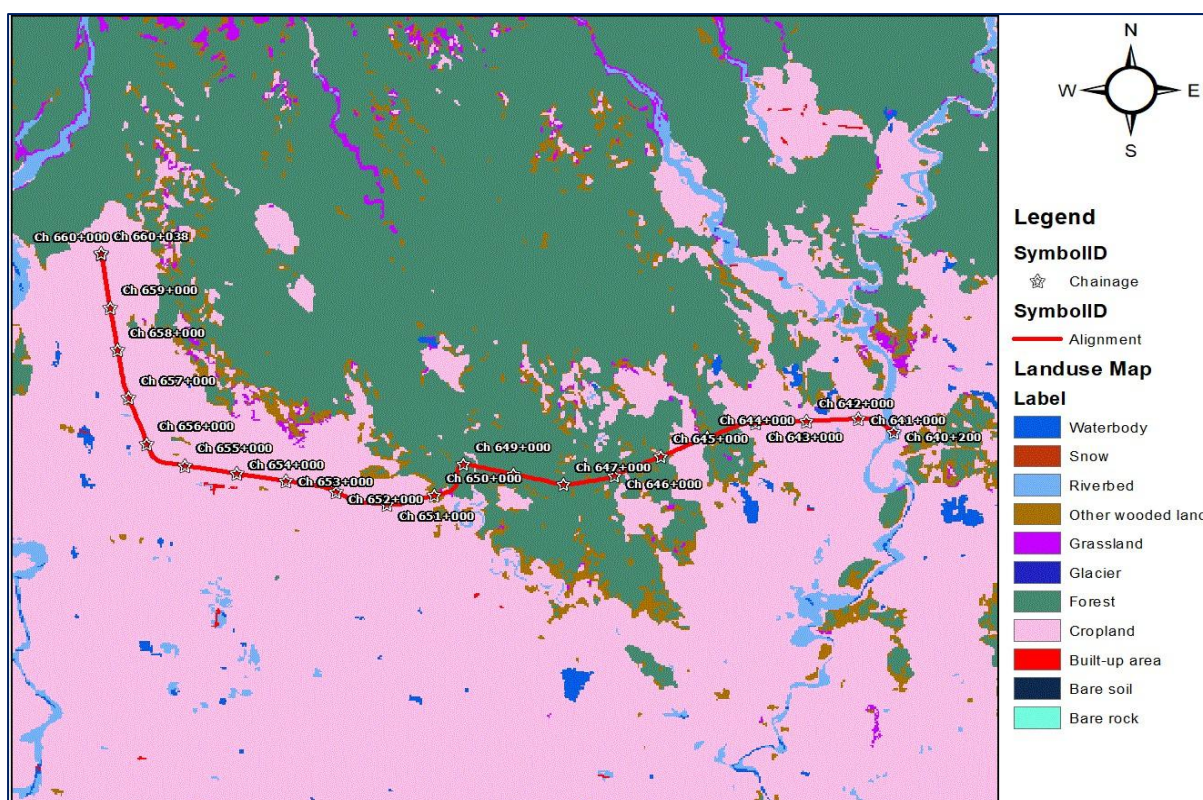


Figure 8: Land Use Map of Project Area

The land use characteristics of the project districts are given in Table 17. The total area of the districts is 173,800 ha, while the total area of the land under ROW is approximately 71.60 ha (excluding the existing road surface). Compared with the district forest cover, forest land loss in the RoW is about 0.034%.

Table 17: Land Use Pattern of Project Districts

District	Forest Area (Ha)	Pasture Land (Ha)	Agricultural land/grass (Ha)	Others (Ha)	Total (Ha)
Kapilbastu	77838	933	93855	3068	175,694

Adapted from: Environment Statistics of Nepal, Central Bureau of Statistics, 2021

Table 18: Land Use Pattern of Project Districts

LHS				RHS			
Chainage		Land Use	Length	Chainage		Land Use	Length
From	To			From	To		
640+200	640+290	River		640+200	640+290	River	
640+290	640+400	Barren land		640+290	640+440	Barren land	
640+400	640+500	Settlement		640+440	640+500	Agricultural land	
640+500	641+500	Barren land		640+500	641+500	Barren land	
641+500	641+540	Agricultural land		641+500	642+000	Barren land	
641+540	641+800	Barren land		642+000	642+200	Agricultural land	
641+800	642+300	Agricultural land		642+200	642+930	Barren land	
642+300	643+650	Barren land adjacent to forest		642+930	643+200	Barren land adjacent to forest	
643+650	643+900	Forest Area		643+200	643+740	Forest Area	
643+900	644+510	Agricultural land		643+740	644+300	Agricultural land	
644+510	645+000	Forest Area		644+300	644+500	Barren land	
645+000	645+210	Barren land adjacent to forest		644+500	644+700	Forest Area	
645+210	645+400	Forest Area		644+700	645+400	Barren land adjacent to forest	
645+400	645+660	Barren land adjacent to forest		645+400	645+860	Forest Area	
645+660	645+800	Forest Area		645+860	648+520	Barren land adjacent to forest	
645+800	645+900	Barren land adjacent to forest		648+520	648+600	River	
645+900	647+760	Forest Area		648+600	649+080	Barren land adjacent to forest	
647+760	648+050	Barren land adjacent to forest		649+080	649+260	Forest Area	
648+050	648+520	Forest Area		649+260	649+330	Barren land	
648+520	648+600	River		649+330	649+800	Forest Area	
648+600	649+100	Forest Area		649+800	650+000	Barren land	
649+100	650+000	Barren land adjacent to forest		650+000	650+440	Vegetation	
650+000	650+100	Barren land		650+440	651+100	Agricultural land	
650+100	650+440	Vegetation		651+100	652+300	Barren land	
650+440	651+100	Agricultural land		652+300	652+500	Agricultural land	
651+100	651+600	Barren land		652+500	653+600	Barren land	
651+600	652+040	Agricultural land		653+600	654+800	Barren land adjacent to settlement	
652+040	652+150	Vegetation		654+800	654+940	Vegetation	
652+150	652+200	Barren land		654+940	658+000	Agricultural land	

LHS				RHS			
Chainage		Land Use	Length	Chainage		Land Use	Length
From	To			From	To		
652+200	652+330	Vegetation		658+000	659+300	Barren land adjacent to settlement	
652+330	652+840	Barren land		659+300	659+570	Agricultural land	
652+840	652+910	Agricultural land		659+570	660+000	Barren land adjacent to settlement	
652+910	653+200	Barren land with sparse vegetation		660+000	660+038	Agricultural land	
653+200	654+800	Barren land adjacent to settlement					
654+800	654+940	Vegetation					
654+940	655+700	Barren land					
655+700	655+900	Vegetation					
655+900	655+970	Agricultural land					
655+970	656+160	Barren land					
656+160	656+240	Pond (Water Body)					
656+240	656+400	Agricultural land					
656+400	656+500	Settlement					
656+500	658+600	Agricultural land					
658+600	658+700	Settlement					
658+700	659+270	Agricultural land					
659+270	659+340	Barren land					
659+340	659+830	Agricultural land					
659+830	659+940	Settlement					
659+940	660+038	Agricultural land					

Source: Detailed Design report and field visit 2024

Climate

The road lies in a tropical and sub-tropical climate with humid and hot characteristics. In general, the rainy season starts in June and ends in September. About 80% of the rainfall occurs in this season. In the dry season, the Northwest wind brings dry and cold wind bearing little moisture and accounts for the remaining 20% of the annual rainfall.

- Winter – November – February
- Spring – March to May
- Summer – June – August
- Autumn – September - November

Temperature

Based on the temperature data of Kapilbastu (Taulihawa- station number 716) from 2007-2016, the average minimum temperature of Kapilbastu is 18.79 °C and the average maximum temperature is 30.93 °C. Throughout the year Kapilvastu district has a temperature range from around 10°C to 43°C, with the lowest temperatures occurring in December-January and peak temperatures in May-June.

Rainfall

The average annual rainfall in Kapilbastu District is 1622 mm. There is high rainfall in July and gradually decreases from August to October.

Table 19: Rainfall Stations in the Project Area

Station name	Road Section	Index No.	Record Length, years	Rainfalls, mm	
				Annual	Monsoon
Taulihawa	25+563to 50+000	0716	45	1622	1411

Hydrology

All major rivers in the project area are characterized by large floods with heavy suspended loads during the monsoon from June to September. Most of the major rivers in the project area are perennial. However, some rivers have low flows during the dry period. The project alignment starts from the banks of the Belwagurdawa River.

The meandering nature of the Belwagurdawa rivers signifies the unstable banks, hence river bank erosion and scouring are imminent in those rivers, and a similar nature Bel river. Moreover, the high groundwater table and the flat terrain exacerbate the situation during flooding. The surrounding areas of these rivers are prone to flooding every year.

Belwagurdawa and Bel River are the major rivers in the GC section. It is characterized by floods with suspended loads from June to September during the monsoon. Some small rivers and streams that originate from the Siwalik Hills are prone to flash floods during the monsoon but have no flows during the rest of the time.

Flood Estimation for Drainage Structures

Bridges will be designed taking a 100-year return period. DoR (2017) estimated the design flood discharge passing through the existing bridges using the rational formula and compared it with the flood discharge estimated using several empirical methods.

The climate-friendly design of bridges, culverts, and side drains has been designed considering the following things.

- Bridges: flood return frequency of 100 years;
- Box culverts ≤ 10 m span: flood return frequency of 50 years;
- Road and pipe culvert < 2 m diameter: flood frequency of 25 years;
- Side drains and ditches: flood frequency of 25 years

Box culverts have been designed for 50 50-year return period flood (DoR, 2017). Based on the estimation of discharges, the feasibility study pointed out the necessity of new crossing structures along with replacing existing culverts that are inadequate to pass the design discharge. DoR (2017) also found that the existing side drains are more or less adequate for a flood of 25 25-year return period, but might be increased for an increased return period of flood.

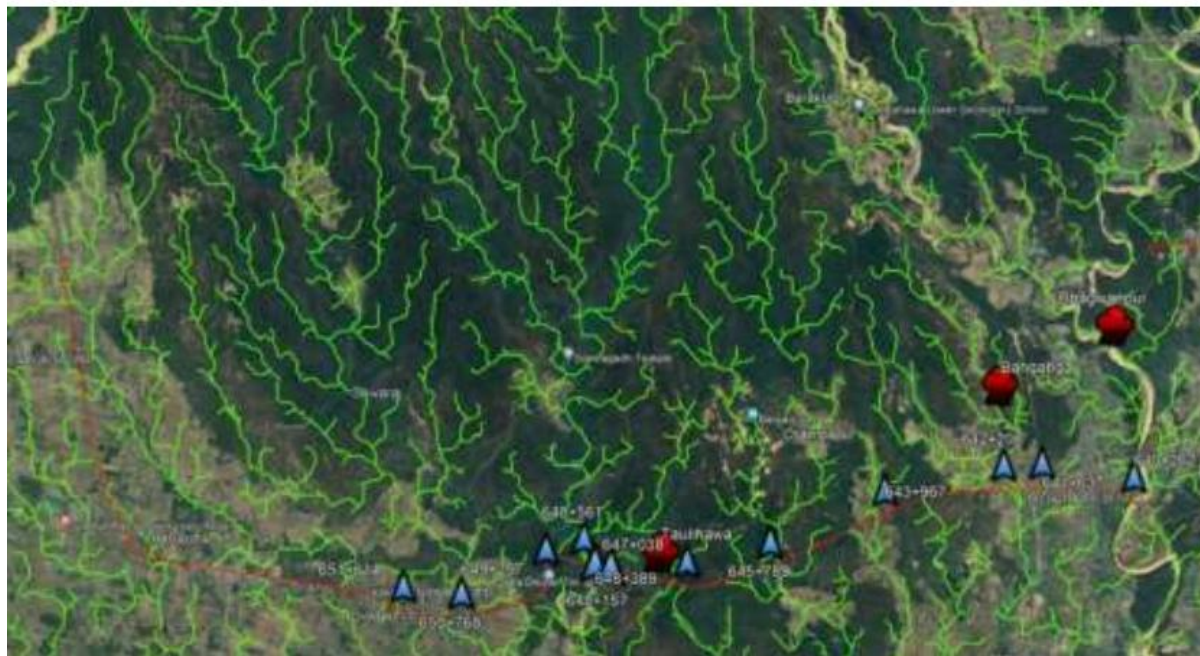


Figure 9: Catchment area of the rivers of the Gorusinghe-Chandrauta road

Groundwater

The project area lies in the Terai region. This area has abundant groundwater resources and fertile soil. Groundwater is the primary source of drinking water supply and irrigation. The aquifers are mainly recharged by rainwater and perennial streams like the Belwagurdawa River, Bel River, and their seasonal tributaries. The foothills of the Siwaliks, which consist of coarse materials and thick vegetation (Bhabar Zone), also act as a major recharge zone. The seasonal range of depth to the water table in the Terai varies from 0 to 10m.

Geology

The general geomorphic profile of Nepal is shown in Figure 4.6. The Mahabharat range, on the northern side, consists of high mountains. The Chure Range or Siwalik hills are small hill ranges on the southern side of the Mahabharat range. Terai is an approximately 20 m wide flat region, filled with the sediments of the Gangetic plain, located on the south side of the Siwalik hills. The East-West Highway mainly passes through the Terai region.

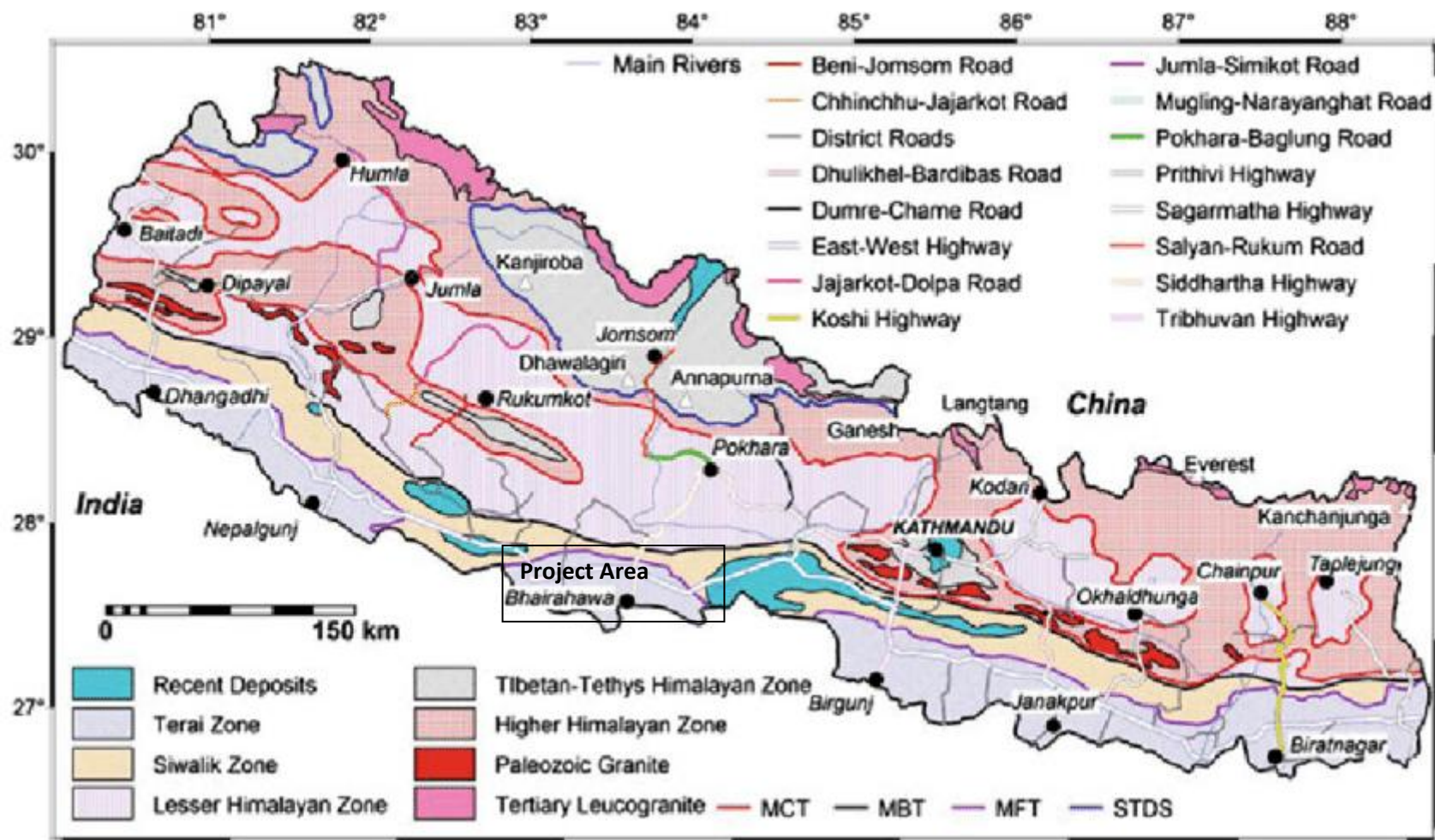


Figure 10: Geological Map of Nepal

Landslide and Slope Stability

The road alignment falls on the sediment of the Gangetic Plain (Upper Terai). The area consists of coarse sediments, developing a gently sloping surface toward the south. Soils along the road section are mostly of recent alluvial deposits, represented by silt, clay, gravel also including boulder and cobble. Soil is mostly stable, but it is possible for erosion to occur mostly along riverbanks. The project site is in plain areas, and no slides or unstable areas can be found in this project site. The geology and soil type maps are shown in Figures 12 and 13, respectively.

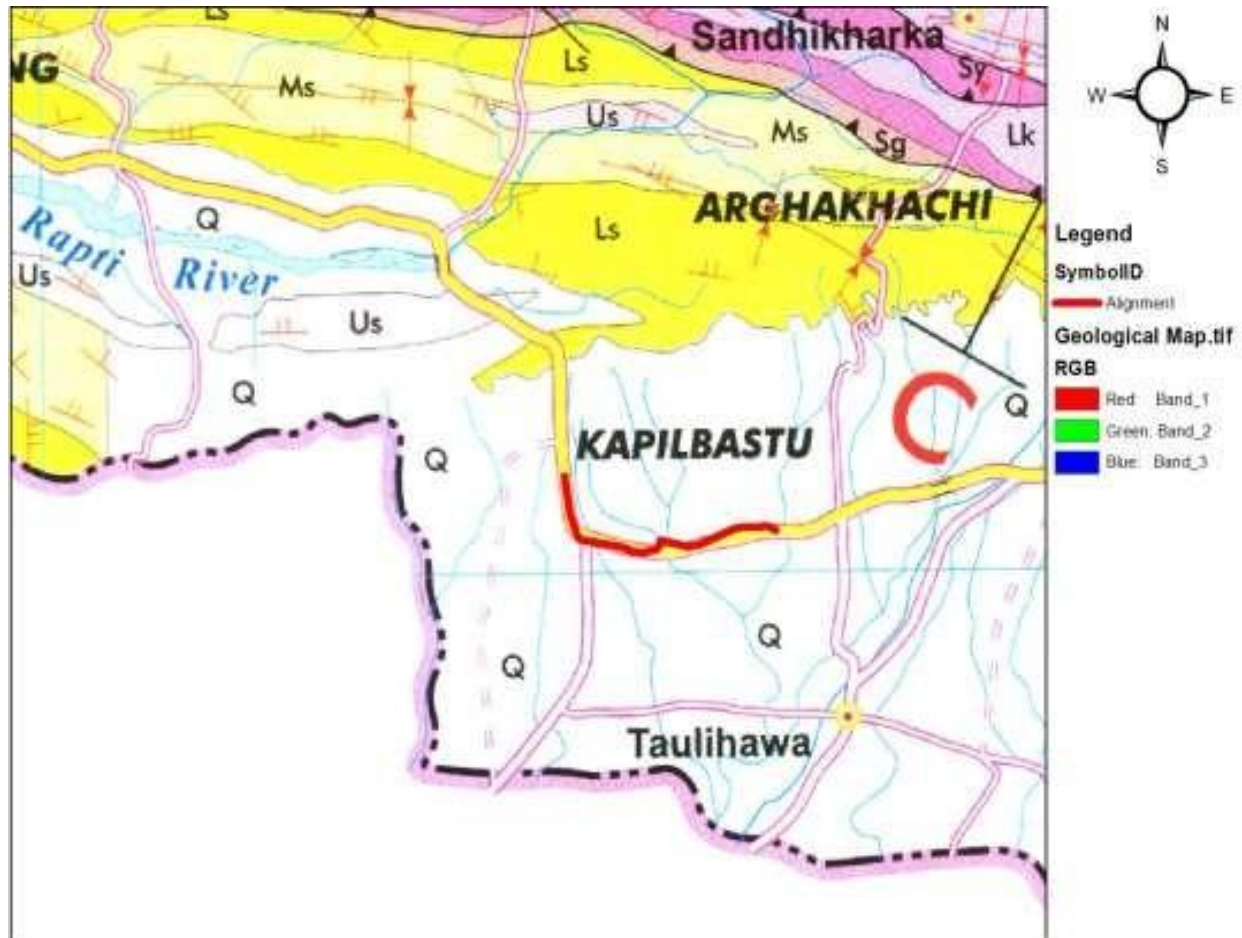


Figure 11: Geology map of the project area

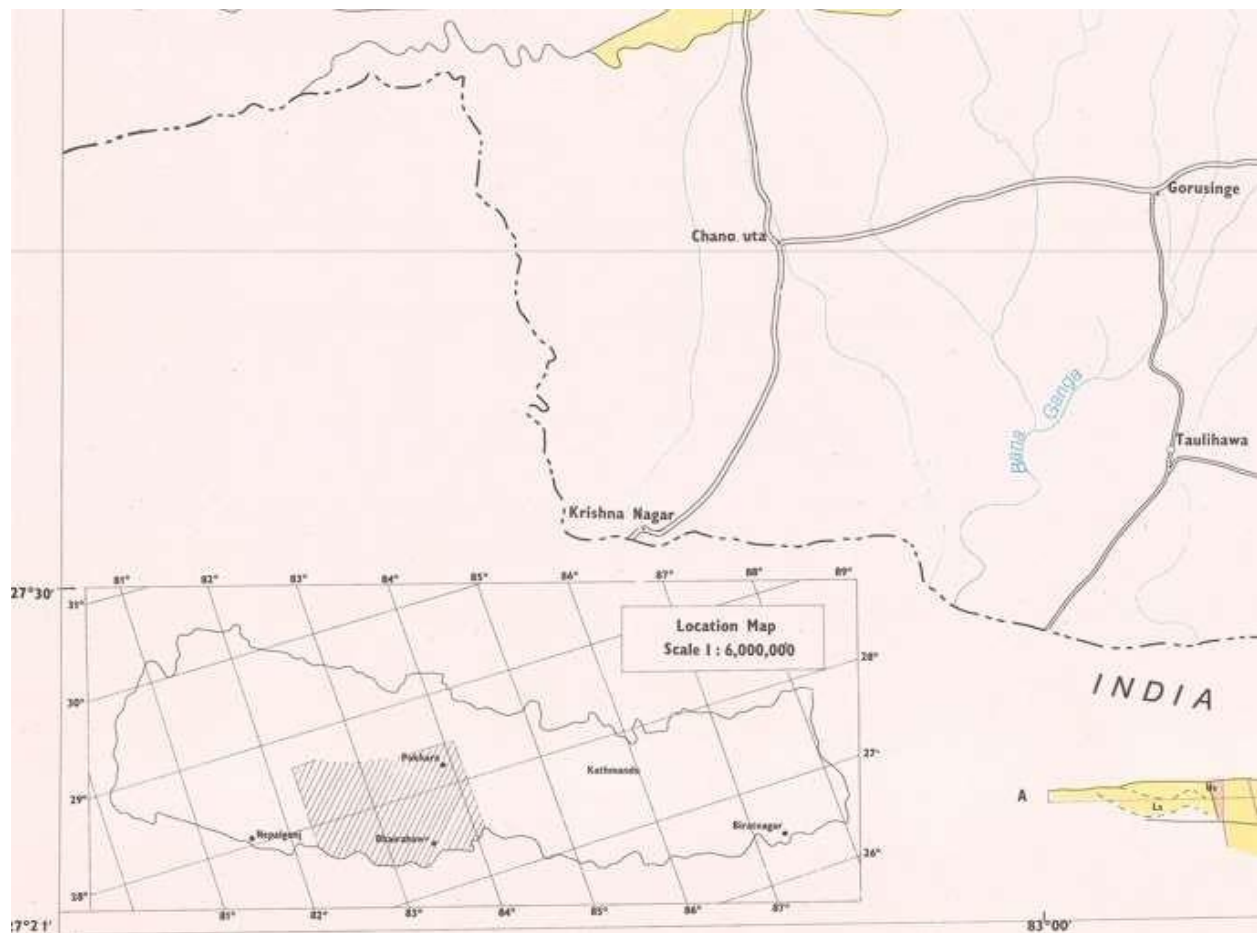


Figure 12: Recent Alluvial soil found in the project area

Seismicity

In Nepal, specific standards for constructing large infrastructures to withstand seismic tremors have not yet been developed. However, the national building code published by the Government of Nepal can be used as general guidelines. According to Bajracharya (1994), the Nepal Himalaya has been subdivided into five seismic zones (Zone 1, Zone 2, Zone 3, Zone 4, Zone 5) with relation to the seismic hazard (Low, Moderate, and High). The road alignment falls in the seismic low to moderate hazard area (Seismic zone 3 to 4). The Peak Gravitational Acceleration (PGA) value in the project area ranges from 0.095 to 0.115g (Figure 14).

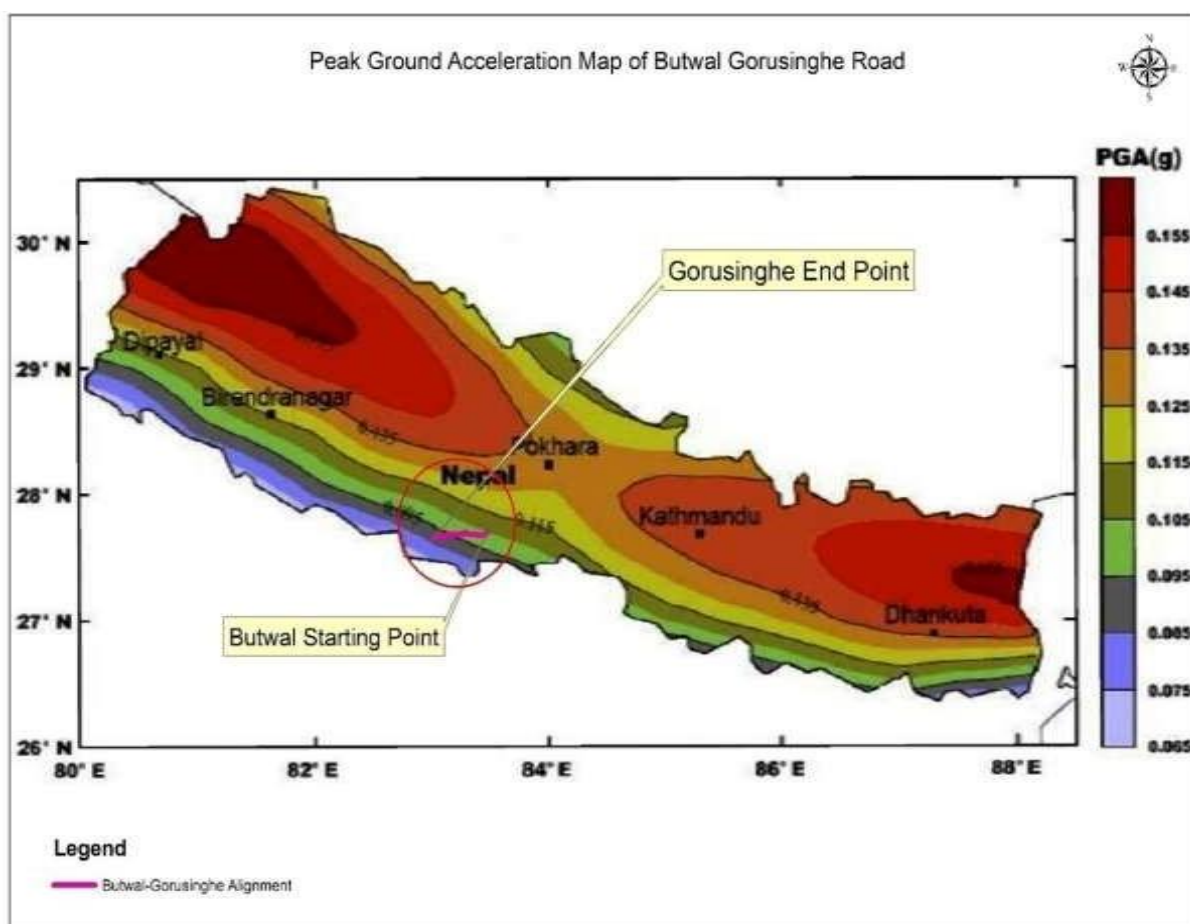


Figure 13: Peak ground acceleration map of Nepal indicating project areas

Sources of Construction Material

The construction material will be sourced from the existing quarry and borrow sites, and potential locations of these sites are given in Table 18. These sources are mainly rivers that carry huge sediment loads during the monsoon and are dry during the remaining seasons or with limited flows in narrow channels. The sediments, such as sand, gravel, cobbles, and boulders, deposited in the riverbeds are commercially extracted with necessary government approvals. The annual availability of the materials at these sources is estimated to be 2.7 million m³, and the proposed construction works will require about 0.4 million m³ of these materials.

The basic materials required for the road upgradation are soil, gravel, and crushed rock. Gravel will be used for sub-base upgrading, crushed stones for base-course upgrading, and for bituminous surfacing; the existing crusher plant will be used. As the project area lies in the terai region, there are some lowland areas along the road. Hence, borrow materials are added to raise the lowland area, and also need to manage sufficient borrow and quarry materials in the project area. The borrow and quarry area needs to be mapped as part of the ESIA. This study has identified the following sources for the borrow material. Details of the available borrow pit sources are presented in Table 20 below. Apart from the listed borrow pit and quarry sites, none of the sites from the Chure range will be utilized without fulfilling the necessary legal requirements of environmental compliance.

Table 20: Borrow pit sources

S.N.	Location/Name of Village	Co-ordinate	Material Type	Site identification					Approximate Quantity (Cum)				Available land/	Surrounding land/ Terrain
				Offset	Distance from E/W Highway (km)				Length (m)	Breadth (m)	Depth (m)	Total (cum)		
					BT	Grav	Earth	Total						
1	Pirapani, Arghakhanchi	27°46'25.03"N, 83° 3'32.87"E	Soil Sample	4 km	19			23	300	70	20	42000 00		
2	Buddhabhumi	27°37'57.06"N, 82°57'42.02"E		-	2.3		0.8	3.1	400	200	2	16000 0	Agricultural	Agricultural land
3	Shivaraj	27°41'7.87"N, 82°50'2.43"E		-			0.5	0.5	380	400	1.5	22800 0		
4	Belgardawa Khola	83° 1'8.12" E, 27°44'28.57" N						River Source						barrer
5	Agewa Nala	82°57'18.95" E, 27°42'42.46" N						River Source						
6	Surahi Khola	82°49'16.78" E, 27°41'48.83" N						River Source						
7	Rapti River	82°45'5.29" E, 27°49'44.86" N						River Source						
8	Banganga River	83°10'57.35" E, 27°42'44.78" N						River Source						

3.3 Chemical Environment

Air Quality

The main sources of air pollution in the project area were windblown dust either from agricultural land or from the highway, moving vehicles, and fuelwood for cooking.

The air quality monitoring was carried out in 3 locations: Imeliya, Jawai Khola, and Chandrauta. The three locations along the alignment were selected to represent the typical land use conditions, such as highly crowded areas and sensitive receptors, settlements, forest areas, and rural areas.

The air quality parameters that were measured during the monitoring were: Total Suspended Particles (TSP), Respirable Particulate Matter (PM₁₀), Respirable Fine Particles (PM_{2.5}), Nitrogen Oxides (NO_x), and Sulphur dioxide (SO₂). Baseline Air Quality of the project area is given in Table 21, and the Lab analysis report for air quality is given in Annex II. It is noticed that all the monitored parameters were within the National Air Quality Standard (NAQS), Ministry of Forests and Environment, 2012.

Table 21: Baseline Air Quality (24-hour averaging time)

S.N.	Parameters	Unit	Observed Value			Tolerance Limit (National Air Quality Standard, Ministry of Forests and Environment, 2012) (µg/m3)	Remarks
			M1	M2	M3		
1.	TSP	(µg/m3)	110	75	85	230	Within the limit
2.	PM ₁₀	(µg/m3)	70	55	65	120	Within the limit
3.	PM _{2.5}	(µg/m3)	25	15	20	40	Within the limit
4.	SO ₂	(µg/m3)	N.D.	N.D.	N.D.	70	
5.	NO ₂	(µg/m3)	N.D.	N.D.	N.D.	80	

Field survey: Laboratory report, 2024

Note: N.D.: Not Detected, Where: M1- Imiliya, M2- Jwai Khola, M3 – Chandrauta

The main sources of air pollution within the project area are vehicular emissions, construction activities, industrial pollution, and loading and unloading of sand from riverbeds. During the construction phase, dust level is expected to be high due to construction activities, transportation of construction material, loading and unloading of construction material, excavation of soil, and movement of vehicles & equipment.

Noise Level

Noise Level of the project area as measured in three different locations, viz Imaliya settlement, Jawai Khola, and Chandrauta settlement along the road, and presented in **Table 22** below. It is noticed that both the sound level as well as the equivalent noise level are higher at Chandrauta Chowk than in other places. The maximum noise level is in Chandrauta, and the minimum is in the Jaawai River. It is found that all three different locations have not exceeded the National Standard for Noise Level 2069 for urban residential areas and were within the range of commercial areas. The measured noise level in other places was within an urban residential area. Some sensitive receptors like schools, health centers exist along the road; similarly, the road alignment passes close to three major settlements, namely Imiliya, Chandrauta, where the sound level is within the national standard. Peak noise is recorded when vehicles (mainly trucks and buses) blow a pressure horn, and the impact is high at night when background noise is low.

Table 22: Noise Level within Project Area

SN	Name of area	Imiliya	Jawai River	Chandrauta
1.	GPS	N27°39.593' E082°59.607'	N27°38.900' E082°54.609'	N27°38.959' E082°51.859'
2.	Start time	2024-11-24; 10:30	2024-11-24; 10:30	2024-11-25; 10:30
3.	End time	2024-11-25; 10:30	2024-11-25; 10:30	2024-11-26; 10:30
Noise level dB				
4.	Maximum	72	55	75
5.	Minimum	43	35	45
Equivalent Noise dB				

6.	<i>Leq(day)</i>	66	52	70
7.	<i>Leq(night)</i>	53	40	55

Source: Field Measurement and Lab Analysis 2024

Table 23: National Ambient Sound Quality Standard, 2012, and WB-EHS Standard 2007

S.N.	Area/Zone	NASQS limit (dBA)		WB-EHS limit (dBA)	
		Day	Night	Day	Night
1	Commercial	75	70	70	70
2	Residential	65	55	55	45

Movement of heavy vehicles and use of machinery/equipment and construction activities during the construction phase will increase the noise level in the project area.

Greenhouse Gas (GHG) Emission Analysis for GC Road

Road construction generates significant greenhouse gas (GHG) emissions from activities such as site clearing, material production, transportation, and maintenance. Key materials-especially asphalt, concrete, and steel-contribute most to life-cycle emissions. Studies show that road construction can account for 10–20% of total lifetime road-related emissions. For the proposed GC road, GHG emissions were estimated based on material quantities using ADB's *Guidelines for Estimating GHG Emissions of Transport Projects*. Results indicate that cement and steel have the highest embodied carbon, reflecting a higher number of structural components in the project.

The estimation of GHG due to construction material is given in **Table 24**.

Table 24: Estimation of GHG Emission by Construction Material Requirement

Material	Unit	Quantity required	Unit conversion	Kg CO2 equivalent	Emission factor
Soil	Cum	942,820.18	1,697,076,321.71	3,394,152.64	0.002 kg CO2 per kg
Steel	MT	3,181.79	3,181,794.22	4,645,419.56	1.460 kg CO2 per kg
Aggregate	Cum	548,477.77	1,426,042,196.71	5,704,168.79	0.004 kg CO2 per kg
Bitumen	Ton	5,445.93	5,445,926.18	359,431.13	0.066 kg CO2 per kg
Cement	Ton	40,063.26	40,063,261.76	30,528,205.46	0.762 kg CO2 per kg
Sand	Cum	34,163.04	61,493,479.24	122,986.96	0.002 kg CO2 per kg
Total				44,754,364.54 Or 44,754 Tons	

Source: Detailed Design Report, 2025, and Calculations from ADB Guidelines

Water Quality

Surface water quality of the three rivers where major bridge construction has to be done was monitored, and the results of surface water quality are presented in Table 24. The different parameters like pH, Temperature, TDS, Electrical conductivity, COD, DO, and TSS were measured. All water quality parameters were compared with the national drinking water quality standard for industrial release and found that none of the parameters exceeded the permissible standard value of potable water.

Table 25: Water Quality of the surface water body along the Project Area

S. N.	Category	Parameters	Method	NWQS (MOE 2010)	Belwagurdawa river	Bel River	Jawai River
1.	Physical	pH	4500 H.B. APHA 23 rd edition	5.5-9.0	8.0	7.6	7.5
2.		Temp. °C	Thermometric	-	300	21.7	21.6
3.		TDS (mg/L)	2540 C. APHA 23 rd edition		162	286	395
4.		Electrical Conductivity (µS/cm)	2540 C. APHA 23 rd edition		1.49	528	730
5.	Chemical	Total Suspended Solids, TSS (mg/L)	Filtration	50	0.041	25	18
6.		Chemical Oxygen Demand (mg/L)	Dichromate method	250	38.68	65	75
7.		Dissolved Oxygen (mg/L)	Iodometric method		107.52	7.88	7.82

Source: Field Measurement and Lab Analysis 2024

Surface Water Quality

Water quality sampling and analysis were carried out from 3 rivers that cross the GC Road. There are 7 water quality guidelines in Nepal, covering various aspects and goals of water standards for different categories of water use.

Waste Management and Sanitation Practices

Roadside markets, small shops, groceries, restaurants, and teashops are the main sources of waste along the roadside. The major percentage of waste generated from the roadside market and hotels is organic waste such as waste food materials, fruits and vegetables, wood pieces, etc., whereas the remaining percentage of waste is plastics, PET bottles, beer/whisky glass bottles, tin cans, broken pieces of glass, rubber, iron pieces, etc. The current practice of waste management observed in the project area is that organic waste is managed locally by composting. Non-biodegradable wastes are collected by municipalities and are disposed of in dedicated locations. At some places, it was noticed that the waste is thrown along the roadside and into the rivers. All municipalities and rural municipalities allocate a budget for the collection and management of solid waste. There is no centralized sewerage collection and treatment system in the project area. Generally, all households have individual toilets with septic tanks.

3.4 Biological Environment

General ecosystem and biodiversity – Terai Landscape

Nepal is a mountainous country with mountain ridges and deep valleys, supporting a wide range of floral and faunal habitats. Nepalese wetlands have high ecological value, as they provide habitat for many threatened and endemic species of flora and fauna, and serve as resting places for many migratory and globally threatened birds. Fishes, amphibians, and reptiles are no exception. These diversities face a severe threat to their level of extinction due to anthropogenic development, associated with soil and water pollution, deforestation, habitat loss, unsustainable extraction, etc. Nepal has accelerating activities such as construction of dams for hydropower and irrigation, road and other linear infrastructure development, in addition to recent population growth, climate change, land use changes have direct impact on the ecology of these Himalayan mountains and snow caps. Among many of the human activities, building roads is a significant activity in process in Nepal. Roads travel through the Forests and Farmland, grassland and wetlands, etc. Major impacts of road construction/upgradation on ecosystems include loss, degradation, and fragmentation of ecosystems due to construction, road kills, injuries and casualties of wildlife, wildlife – vehicle collisions, among others.

The East-West Highway is largely located in the Terai Arc Landscape (TAL). The TAL extends for over 900 km from the Bagmati River, Nepal in the east to the Yamuna River in Uttaranchal, India in the west, with an area of 51,002 km² (approx. 16% of Nepal). The TAL was created to better protect species such as tiger, rhino and elephant that cannot be effectively conserved within protected areas alone but require a landscape-scale approach. The TAL exists as a transboundary landscape that extends into India. The TAL features in Nepal's National Biodiversity and Strategic Action Plan (NBSAP).

The TAL harbors globally important biodiversity and conserves several of Asia's large mammals, birds, reptiles, and freshwater fishes; sustain environmental flows in important rivers; and provides ecosystem services that support the socio-economic well-being of people and development in the Terai and Churia region of Nepal. The scale of the landscape also allows for ecosystem-based climate change adaptation strategies. Key species for conservation in the TAL are tiger, greater one-horned Rhinoceros, swamp deer, Asian elephant, blackbuck, Gangetic dolphin, gharial, great hornbill, sarus crane, Bengal florican, lesser adjutant stork and several vulture species. The TAL is also densely populated. According to the 2011 census there were more than 7.5 million people in the TAL. The average annual population growth rate is 2.1%.

The GC Road section covered under this ESIA is located centrally within the TAL that is within a densely populated part of the TAL. The GC Road does not overlap with any protected areas or wildlife corridors and does not fragment any significant natural habitats identified within the TAL.

The Goringhale-Chandrauta Section largely traverses residential areas, farms, community forests and rivers crossings. There are two major forest blocks –one is 0.9 km long section from Ch 642+900 to 643+800 (Barkalpur-Champapur Forest block –in Figure 4.12) and the other one is 5.3 km long section from Ch 644+500 to 649+800 (Champapur-Kharendrapur Forest block-in Figure 4.12). Both forest blocks are a good Sal (*Shorea robusta*), Sajh (*Terminalia alata*) and mixed deciduous forest with. Both forest blocks are already degraded along the highway. Wildlife mobility is noted in Champapur-Kharendrapur forest block. Both forest blocks extends southward from Churia/Siwalik Forest with movement of wildlife south-north and vice versa. The highway runs through most of the seasonal rivers except the Belwagurdawa River and Bel River, which had a very limited flow during the dry season, times of field study. Most of the other rivers were dry. Majority of springs/streams/ rivers remain dry most of the time in year. Prime habitat for the fish species is in Belwagurdawa River and Bell River. The riverine

ecosystem in the project site is influenced by anthropogenic activities; Fishing, extraction of river deposits, laundering and bathing, direct sewage disposal, discarded trash deposits, riverbank encroachment and recreational gathering at the riverbanks.

There are 118 identified ecosystems in Nepal, including 112 forest ecosystems, 4 cultivation ecosystems, 1 water body ecosystem, and 1 glacier or rock ecosystem. These ecosystems range from the tall grasslands, marshlands, and tropical and subtropical broadleaf forests along the Terai and Siwalik Hills to the subtropical and tropical broadleaf and conifer forests in the Middle Mountains.

Flora

Different vegetation compositions were found on both sides of the road. The road alignment of the project falls in the tropical zone with the forest dominated by *Shorea robusta* (Sal) forest and patches of *Dalbergia-Acacia* Forest along the riverine sections. *Terminalia* sp., *Lagerstroemia parviflora*, and *Phyllanthus emblica* have the major associated species of *Shorea robusta* forest. In the *Dalbergia-Acacia* Forest, *Dalbergia sissoo*, *Acacia catechu* and *Bombax ceiba* are the major species. Both native and introduced plant species are found along the road. Native species were mainly found in natural forests, whereas local people have planted exotic species in their home yard for different purposes.

Different patches of vegetation were found on both sides of the road. The major blocks of forest area distributed from from Ch 642+900 to 643-800 (Barkalpur-Champapur Forest block and Ch 644+500 to 649+800 (Champapur-Kharendrapur Forest block-in Figure 4.12. in Kapilbastu district. The forest is managed by the Government, community and collaboration forest. Approximately 6 ha of forest land will be changed into the road.

Tree Species

A Tree Census Survey (TSE) has been done to count the tree species along the ROW of the road. TSE identified all the tree species and documented. All the tree species were categorically measured at breast height for diameter, height, and GPS coordinates. Trees were classified into sapling, pole, and trees based on diameter breast height (dbh). Tree species with a dbh less than 10 cm is categorized as a sapling, from 10 to 30 cm as a pole and above 30 cm as a tree. The distribution of trees along the alignment, both sides of the road, was counted and recorded in the data sheets. More than 80 species were recorded during the survey, and the list of these species is given in **Table 26**.

Table 26: Major Tree species within the project area

S. N	Common Name	Scientific Name	IUCN Status	CITES	GoN Protection Status
1.	Sal	<i>Shorea robusta</i>	LC	-	Protected
2.	Asana/Saj	<i>Terminalia alata</i>	LC	-	Non-protected
3.	Simal	<i>Bombax ceiba</i>	LC	-	Non-protected
4.	Khayar	<i>Acacia catechu</i>	LC	-	Non-protected
5.	Sisoo	<i>Dalbergia Sisoo</i>	LC	-	Non-protected
6.	Sindure	<i>Mallotus philipensis</i>	LC	-	Non-protected
7.	Bot Dhayero	<i>Lagerstroemia</i>	LC	-	Non-protected

S. N	Common Name	Scientific Name	IUCN Status	CITES	GoN Protection Status
		<i>Parviflora</i>			
8.	Karma	<i>Haldina cordifolia</i>	LC	-	Non-protected
9.	Kusum	<i>Schleichera oleosa</i>	LC	-	Non-protected
10	Jamun	<i>Syzygium cumini</i>	LC	-	Non-protected
11	Mauwa	<i>Engelhardia spicata</i>	LC	-	Non-protected
1 2	Kutmero	<i>Litsea monopetala</i>	LC	-	Non-protected
1 3	Bhalayo	<i>Semecarpus anacardium</i>	LC	-	Non-protected
1 4	Peepal	<i>Ficus religiosa</i>	LC	-	Non-protected
1 5	Bar	<i>Ficus benghalensis</i>	LC	-	Non-protected

Note: LC – Least Concern, NT – Near Threat, EN – Endangered, VU – Vulnerable, DD – Data Deficit

Source: Field Survey/ Consultation 2024

Table 27: Details of tree loss from the RoW

SN	Species	Number		SN	Species	Number
1	Sal	2060		24	Sirish	57
2	Asana	1338		25	Kimbu	56
3	Raini/ Rohani	1082		26	Tiju	56
4	Bajhi	648		27	Simal	55
5	Ramun	556		28	Jhingat	55
6	Sisahu	335		29	Dabdabe	54
7	Aap	241		30	Bar	52
8	Khayar	212		31	Tik	48
9	Barro	209		32	Kadam	42
10	Botghayaro	204		33	Khirro	39
11	Neem	187		34	Epil	38
12	Bakaino	174		35	Dumri	31
13	Kushum	165		36	Bhalayo	31
14	Asiddha	132		37	Bhellar	23
15	Pyari	122		38	Lichi	22
16	Rajbrixa	110		39	Kumbhi	19
17	Mauwa	97		40	Palas	18
18	Bel	95		41	Sital chini	17
19	Amba	90		42	Taki	16
20	Dhamila	89		43	Ashoka	12
21	Kajrauta	89		44	Panan	12
22	Karma	77		45	Swami	11
23	Pipal	62		46	Others	670
Total						9808

Source: Field survey 2025

Quadrat Analysis of Vegetation Along the Road Alignment

Out of the trees found adjacent to the RoW of the highway, Sal, Shajh, and Botdhairo are the most dominant species. The importance value index of Sal is the highest, indicating the most valued tree species in the area, as presented in Table 28.

Table 28: Species-wise importance value index (IVI)

Local Name of Species	Scientific Name	Density (trees/ha)	R-Density (%)	Frequency	R-Frequency	Abundance	R-Abundance	IVI
Sal	<i>Shorea robusta</i>	196	39.35	70.59	10.62	11.08	23.17	73.14
Shajh	<i>Terminalia alata</i>	71	14.20	82.35	12.39	3.43	7.17	33.76
Botdhairo	<i>Lagerstroemia Parviflora</i>	43	8.58	58.82	8.85	2.90	6.06	23.49
Pyari	<i>Ficus glaberrima</i>	25	5.03	52.94	7.96	1.89	3.95	16.94
Sindure	<i>Mallotus philippensis</i>	25	5.03	35.29	5.31	2.83	5.92	16.26
Jamuna	<i>Syzygium cumini</i>	18	3.55	35.29	5.31	2.00	4.18	13.04
Mauwa	<i>Madhuca longifolia</i>	18	3.55	35.29	5.31	2.00	4.18	13.04
Khayer	<i>Acacia catechu</i>	16	3.25	23.53	3.54	2.75	5.75	12.54
Banjhi	<i>Anogeissus latifolia</i>	15	2.96	41.18	6.19	1.43	2.99	12.14
Genger	<i>Dillenia pentagyna</i>	15	2.96	41.18	6.19	1.43	2.99	12.14
Kusum	<i>Schleichera oleosa</i>	10	2.07	23.53	3.54	1.75	3.66	9.27
Karam	<i>Adina cordifolia</i>	9	1.78	35.29	5.31	1.00	2.09	9.18
Bhalayo	<i>Semecarpus anacardium</i>	7	1.48	17.65	2.65	1.67	3.48	7.62
Sisoo	<i>Dalbergia sissoo</i>	7	1.48	17.65	2.65	1.67	3.48	7.62
Bel	<i>Aegle marmelos (L.)</i>	4	0.89	17.65	2.65	1.00	2.09	5.63
Chipple/Bakla Pate	<i>Cinnamomum tamala</i>	3	0.59	11.76	1.77	1.00	2.09	4.45
Kutmiro	<i>Litsea monopetala</i>	3	0.59	11.76	1.77	1.00	2.09	4.45
Rajbrikshya	<i>Cassia fistula</i>	3	0.59	11.76	1.77	1.00	2.09	4.45
Sajan	<i>Moringa oleifera</i>	3	0.59	11.76	1.77	1.00	2.09	4.45
Amala	<i>Phyllanthus emblica</i>	1	0.30	5.88	0.88	1.00	2.09	3.27
Bar	<i>Ficus benghalensis</i>	1	0.30	5.88	0.88	1.00	2.09	3.27
Gindari	<i>Premna integrifolia</i>	1	0.30	5.88	0.88	1.00	2.09	3.27
Patpate	<i>Macaranga pustulata</i>	1	0.30	5.88	0.88	1.00	2.09	3.27
Pipal	<i>Ficus religiosa</i>	1	0.30	5.88	0.88	1.00	2.09	3.27

Source: Field survey 2024

Non-Tree Species (herbs and shrubs)

Details of non-tree species, such as herbs and shrubs, are given in Table 29.

Table 29: Shrub species found in the project site

S. N	Common Name	Scientific Name	IUCN Status	CITES	GoN Protection Status
1.	Dhairo	<i>Woodwardia fruticosa</i>	LC	-	Non-protected
2.	Kera	<i>Musa paradisiac</i>	LC	-	Non-protected
3.	Aasuro	<i>Adhatoda vasica</i>	LC	-	Non-protected
4.	Tite Pati	<i>Artemissia vulgaris</i>	LC	-	Non-protected
5.	Nagbeli	<i>Lycopodium clavatum</i>	LC	-	Non-protected
6.	Kurilo	<i>Asparagus racemosus</i>	LC	-	Non-protected
7.	Karbir	<i>Nerium oleander</i>	LC	-	Non-protected
8.	Jhadibanmara	<i>Lantana camara</i>	LC	-	Non-protected
9.	Jhingani	<i>Eurya acuminata</i>	LC	-	Non-protected
10	Bansuli	<i>Dichroa febrifuga</i>	LC	-	Non-protected
11.	Rudhilo	<i>Pogostemon Benghalensis</i>	LC	-	Non-protected

Note: LC – Least Concern, NT – Near Threat, EN – Endangered, VU – Vulnerable, DD – Data Deficit
(Source: Field Survey/ Consultation 2024)

a. Herb or Ground Vegetation

Major herb or ground vegetation in the proposed project area is detailed in Table 30.

Table 30: Major herb species found around the project vicinity

S. N	Common Name	Scientific Name	IUCN Status	CITES	GoN Protection status
1.	Banmara	<i>Eupatorium Adenophorum</i>	LC	-	Non-protected
2.	Bukiphool	<i>Osbeckia nepalensi</i>	LC	-	Non-protected
3.	Datiwan	<i>Achyranthes aspera</i>	LC	-	Non-protected
4.	Tulsi	<i>Ocimum sanctum</i> (L.	LC	-	Non-protected
5.	Gandhe	<i>Ageratum conyzoides</i>	LC	-	Non-protected
6.	Kuro	<i>Bidens Pilosa</i>	LC	-	Non-Protected
7.	Lajwar	<i>Mimosa pudica</i> (L.)			
8.	Gurjo	<i>Tinospora sinesis</i>			
9.	Cogongrass	<i>Imperata cylindrica</i>	LC	-	Non-protected
10.	Bermuda Grass	<i>Cynodon dactylon</i>	LC	-	Non-protected

Note: LC – Least Concern, NT – Near Threat, EN – Endangered, VU – Vulnerable, DD – Data Deficit

Protected Flora Species

Shorea robusta (Sal) and *Pterocarpus marsupium* (Indian kino), a protected species as per the Government of Nepal, are banned for felling, transportation, and export, and *Shorea robusta* is a least concern, and *Pterocarpus marsupium* is a near-threatened species as per IUCN.

Forest Types

Forest type by ownership was studied along the road just outside of RoW. The government-managed forest, Community forest³, and Collaborative forest⁴ were the three management types found along the RoW, with dominance of the Community forest. The project site runs through the Kharendrapur collaborative forest, which covers a larger forest area along the GC road section.

Fauna

Mammals

GC road section passes through two isolated forest patches, i.e., Barakalpur-Champapur forest patches (642+900-643-800) and Champapur-Kharendrapur forest patch (644+500-649+800). Both forest blocks are fairly in good condition, and the Champapur-Kharendrapur forest area extends northward, connected with the Churia range, from where mammal species can be observed.

The fishing cat present in the project area is globally threatened, while nine species included of the Indian Spotted Deer (*Axis axis*), Nilgai (*Boselaphus tragocamelus*), Barking Deer (*Muntiacus vaginalis*), Striped hyaena (*Hyaena hyaena*), Honey badger (*Mellivora capensis*), Fishing Cat (*Prionailurus viverrinus*), Crab-eating mongoose (*Herpestes urva*), Common Leopard (*Panthera pardus*), Bengal Fox (*Vulpes bengalensis*) are nationally threatened species. Striped Hyaena present in the project area is a nationally protected mammal. Detailed information on the Indian crested porcupine (*Hystrix indica*) is a nationally Data Deficient species.

A total of 14 mammal species were recorded at the project site. The Common Leopard is classified as a Vulnerable species, and the Terai Grey Langur is a Near Threatened species, while the remaining species fall under the Least Concern category in the IUCN Red List. The detailed list of mammal species observed in the project area is provided in Table 31.

³ Community forest is a participatory forest management system, the control, protection and management of forest resources by local communities.

⁴ Collaborative forest management (CFM) is a 'community-based' forest tenure regime that works in partnership between the central government, local government and local forest user groups

Table 31: Mammal species in the Project Area

S. N	Common Name	Scientific Name	IUCN Status	CITES		GoN Protection status
1.	Common Leopard	<i>Panthera pardus</i>	Vulnerable	Appendix I		Non-protected
2.	Blue Bull	<i>Boselaphus tragocamelus</i>	Least Concern (LC)	-		Non-protected
3.	Spotted Deer	<i>Axis axis</i>	LC	-		Non-protected
4.	Golden Jackal	<i>Canis aureus</i>	LC	-		Non-protected
5.	Jungle Cat	<i>Felis chaus</i>	LC	-		Non-protected
6.	Wild Boar	<i>Sus scrofa</i>	LC	-		Non-protected
7.	Yellow-throated Marten	<i>Martes flavigula</i>	LC	-		Non-protected
8.	Rhesus Macaque	<i>Macaca mulatta</i>	LC	-		Non-protected
9.	Terai Grey Langur	<i>Semnopithecus hector</i>	Near Threatened	-		Non-protected
10	Northern Pal Squirrel	<i>Funambulus pennantii</i>	LC	-		Non-protected
11.	Indian Crested Porcupine	<i>Hystrix indica</i>	LC	-		Non-protected
12.	Gray Mongoose	<i>Herpestes edwardsii</i>	LC	-		Non-protected
13.	Barking Deer	<i>Muntiacus muntjak</i>	LC	-		Non-protected
14.	Indian Flying Fox	<i>Pteropus giganteus</i>	LC	-		Non-protected

Source: Field survey 2024

S. N	Common Name	Scientific Name	IUCN Status	CITES	GoN Protection status
1.	Common Leopard	<i>Panthera pardus</i>	Vulnerable	Appendix I	Non-protected
2.	Blue Bull	<i>Boselaphus tragocamelus</i>	Least Concern (LC)	-	Non-protected
3.	Spotted Deer	<i>Axis axis</i>	LC	-	Non-protected
4.	Golden Jackal	<i>Canis aureus</i>	LC	-	Non-protected
5.	Jungle Cat	<i>Felis chaus</i>	LC	-	Non-protected
6.	Wild Boar	<i>Sus scrofa</i>	LC	-	Non-protected
7.	Yellow-throated Marten	<i>Martes flavigula</i>	LC	-	Non-protected
8.	Rhesus Macaque	<i>Macaca mulatta</i>	LC	-	Non-protected
9.	Terai Grey Langur	<i>Semnopithecus hector</i>	Near Threatened	-	Non-protected
10.	Northern Pal Squirrel	<i>Funambulus pennantii</i>	LC	-	Non-protected
11.	Indian Crested Porcupine	<i>Hystrix indica</i>	LC	-	Non-protected
12.	Gray Mongoose	<i>Herpestes edwardsii</i>	LC	-	Non-protected
13.	Barking Deer	<i>Muntiacus muntjak</i>	LC	-	Non-protected
14.	Indian Flying Fox	<i>Pteropus giganteus</i>	LC	-	Non-protected

Source: Field survey 2024

Avifauna



Photo Plate 1: Photo captured during field survey, First Gray Mongoose and second digging sign of wild boar

The GC Road alignment passes through farmland and tropical Sal forest that are rich in bird species (Grimmett et al., 2016). The survey reported 93 species across the road alignment. The reported birds are 26.

A total of 62 bird species were recorded within the project site. Among these, three globally threatened species-White-rumped Vulture, Slender-billed Vulture, and Egyptian Vulture were observed. Notably, nesting activity of the White-rumped Vulture was documented approximately 800 meters from the road's right-of-way. The majority of the recorded bird species are classified as Least Concern under the IUCN Red List. No nesting activity was observed in the roadside trees. A detailed list of the bird species identified in the project area is provided in Table 32.

Table 32: Bird species found in the project area

S. N	Common Name	Scientific Name	IUCN Status	CITES	GoN Protection status
1.	White-rumped Vulture	<i>Gyps benghalensis</i>	Critically Endangered	Appendix II	Non-protected
2.	Slender-billed Vulture	<i>Gyps tenuirostris</i>	Critically Endangered	Appendix II	Non-protected
3.	Egyptian Vulture	<i>Neophron percnopterus</i>	Endangered	Appendix II	Non-protected
4.	Indian Gray Hornbill	<i>Ocyrceros birostris</i>	Least Concern	-	Non-protected
5.	Lesser Adjutant	<i>Leptoptilos javanicus</i>	Near Threatened	-	Non-protected
6.	Asian Openbill	<i>Anastomus oscitans</i>	Least Concern	-	Non-protected
7.	Common Myna	<i>Acridotheres tristis</i>	Least Concern	-	Non-protected
8.	Little Cormorant	<i>Microcarbo niger</i>	Least Concern	-	Non-protected
9.	Red-napped Ibis	<i>Pseudibis papillosa</i>	Least Concern	-	Non-protected
10.	Brahminy Starling	<i>Sturnia pagodarum</i>	Least Concern	-	Non-protected
11.	Large Cuckooshrike	<i>Coracina macei</i>	Least Concern	-	Non-protected
12.	Asian Koel	<i>Eudynamys scolopaceus</i>	Least Concern	-	Non-protected

S. N	Common Name	Scientific Name	IUCN Status	CITES	GoN Protection status
13.	Common Hawk Cuckoo	<i>Hierococcyx varius</i>	Least Concern	-	Non-protected
14.	Coppersmith Barbet	<i>Psilopogon haemacephalus</i>	Least Concern	-	Non-protected
15.	Blue-throated Barbet	<i>Magalaima asiatica</i>	Least Concern	-	Non-protected
16.	House Crow	<i>Corvus splendens</i>	Least Concern	-	Non-protected
17.	Jungle Crow	<i>Corvus macrorhynchos</i>	Least Concern	-	Non-protected
18.	Rock Pigeon	<i>Columba livia</i>	Least Concern	-	Non-protected
19.	House Sparrow	<i>Passer domesticus</i>	Least Concern	-	Non-protected
20.	Black Kite	<i>Milvus migrans</i>	Least Concern	Appendix II	Non-protected
21.	Shikra	<i>Accipiter badius</i>	Least Concern	Appendix II	Non-protected
22.	Spotted Dove	<i>Spilopelia chinensis</i>	Least Concern	-	Non-protected
23.	Gray-hooded Warbler	<i>Seicercus anthoschistos</i>	Least Concern	-	Non-protected
24.	Red-vented Bulbul	<i>Phycnonotus cafer</i>	Least Concern	-	Non-protected
25.	Red-whiskered Bulbul	<i>Phycnonotus jocosus</i>	Least Concern	-	Non-protected
26.	Himalayan Bulbul	<i>Phycnonotus leucogenys</i>	Least Concern	-	Non-protected
27.	White-throated Kingfisher	<i>Halcyon smyrnensis</i>	Least Concern	-	Non-protected
28.	Oriental Magpie Robin	<i>Copsychus saularis</i>	Least Concern	-	Non-protected
29.	Rufous Treepie	<i>Dendrocitta vagabunda</i>	Least Concern	-	Non-protected

30.	Long-tailed Shrike	<i>Lanius schach</i>	Least Concern	-	Non-protected
31.	Plumbious Water Redstart	<i>Rhyacornis fuliginosus</i>	Least Concern	-	Non-protected
32.	Black Drongo	<i>Dicrurus macrocercus</i>	Least Concern	-	Non-protected
33.	White-bellied Drongo	<i>Dicrurus caerulescens</i>	Least Concern	-	Non-protected
34.	Hair-crested Drongo	<i>Dicrurus hottentottus</i>	Least Concern	-	Non-protected
35.	Lesser Racket-tailed Drongo	<i>Dicrurus remifer</i>	Least Concern	-	Non-protected
36.	Cattle Egret	<i>Bubulcus ibis</i>	Least Concern	-	Non-protected
37.	Paddyfield Pipit	<i>Anthus rufulus</i>	Least Concern	-	Non-protected
38.	Chestnut-headed Bee-Eater	<i>Merops leschenaulti</i>	Least Concern	-	Non-protected
39.	Green Bee-eater	<i>Merops orientalis</i>	Least Concern	-	Non-protected
40.	Brown Rock Chat	<i>Oenanthe fusca</i>	Least Concern	-	Non-protected
41.	Indian Roller	<i>Coracias benghalensis</i>	Least Concern	-	Non-protected
42.	Gray-throated Martin	<i>Riparia chinensis</i>	Least Concern	-	Non-protected
43.	Greater Coucal	<i>Centropus sinensis</i>	Least Concern	-	Non-protected
44.	Jungle Babbler	<i>Argya striata</i>	Least Concern	-	Non-protected
45.	Cinereous Tit	<i>Parus cinereus</i>	Least Concern	-	Non-protected
46.	Black-hooded Oriole	<i>Oriolus xanthornus</i>	Least Concern	-	Non-protected

S. N	Common Name	Scientific Name	IUCN Status	CITES	GoN Protection status
47.	Indian Golden Oriole	<i>Oriolus oriolus</i>	Least Concern	-	Non-protected
48.	Barn Swallow	<i>Hirundo rustica</i>	Least Concern	-	Non-protected
49.	Red-wattled Lapwing	<i>Vanellus indicus</i>	Least Concern	-	Non-protected
50.	Crimson Sunbird	<i>Aethopyga siparaja</i>	Least Concern	-	Non-protected
51.	Common Tailorbird	<i>Orthotomus sutorius</i>	Least Concern	-	Non-protected
52.	Rose-ringed Parakeet	<i>Psittacula krameri</i>	Least Concern	-	Non-protected
53.	Plum-headed Parakeet	<i>Psittacula cyanocephala</i>	Least Concern	-	Non-protected
54.	Scaly-breasted Munia	<i>Lonchura punctulata</i>	Least Concern	-	Non-protected
55.	White-rumped Munia	<i>Lonchura striata</i>	Least Concern	-	Non-protected
56.	Himalayan Flameback	<i>Dinopium shorii</i>	Least Concern	-	Non-protected
57.	Black Francolin	<i>Francolinus francolinus</i>	Least Concern	-	Non-protected
58.	Common Hoopoe	<i>Upupa epops</i>	Least Concern	-	Non-protected
59.	White-throated Fantail	<i>Rhipidura albicollis</i>	Least Concern	-	Non-protected
60.	Grey-brested Prinia	<i>Prinia hodgsonii</i>	Least Concern	-	Non-protected
61.	Oriental White-eye	<i>Zosterops palpebrosus</i>	Least Concern	-	Non-protected
62.	Chestnut-bellied Nuthatch	<i>Sitta cinnamoventris</i>	Least Concern	-	Non-protected

Source: Field survey, 2024



Photo Plate 5- 2: Photo of White-rumped Vulture feeding carcass in the roadside and Asian Openbill roosting in the roadside trees.

Herpetofauna

Altogether 12 species of herpetofauna were recorded from the project area. Both species Burmese Python and the Indian flapshell turtle, are listed in the Vulnerable category in the IUCN Red List. Other species found in the project site are of least concern according to the IUCN conservation status and not protected according to the GoN. Details of the herpetofauna found in the project site are summarised in Table 33.

Table 33: Herpetofauna found in the project site

S. N	Common Name	Scientific Name	IUCN Status	CITES	GoN Protection status
1.	Common Rat Snake	<i>Ptyas mucosus</i>	Least Concern (LC)	-	Non-protected
2.	Buff-striped Keelback	<i>Amphiesma stolatum</i>	LC	-	Non-protected
3.	White Lipped Pit Viper	<i>Trimeresurus albolabris</i>	LC	-	Non-protected
1.	Burmese Python	<i>Python bivittatus</i>	Vulnerable	CITES Appendix II	Non-protected
2.	Banded Krait	<i>Bungarus fasciatus</i>	LC	-	Non-protected
6.	Bengal Monitor Lizard	<i>Varanus bengalensis</i>	LC	CITES Appendix I	Non-protected
7.	Common Garden Lizard	<i>Calotes versicolor</i>	LC	-	Non-protected
8.	House Gecko	<i>Hemidactylus spp</i>	-	-	Non-protected

9.	Asian Toad	<i>Hoplobatrachus rugulosus</i>	LC	-	Non-protected
10..	Jerdon's Bullfrog	<i>Hoplobatrachus Crassus</i>	LC	-	Non-protected
11.	Skittering Frog	<i>Euphlyctis Cyanophlyctis</i>	LC	-	Non-protected
12.	Indian flapshell Turtle	<i>Lissemys punctata</i>	Vulnerable	CITES Appendix I	Non-protected

Source: Field survey, 2024



Photo Plate 2: Photo of Burmese Python and Jerdon's Bullfrog

All fish species recorded present in the water bodies of the study are classified as of least concern. Major fish species found in the project area are listed in Table 34, including their IUCN, CITES and GON protection status.

Table 34: Fish species found in the project site

S. N	Common Name	Scientific Name	IUCN Status	CITES	GoN Protection status
1.	Gotyla	<i>Garra gotyla</i>	Least Concern	-	Non-protected
2.	Asiatic Snakehead	<i>Channa gachua</i>	Least Concern	-	Non-protected
3.	Stinging Catfish	<i>Heteropneustes Fossilis</i>	Least Concern	-	Non-protected
4.	Walking Catfish	<i>Clarias batrachus</i>	Least Concern	-	Non-protected
5.	Spotfin Swamp barb	<i>Puntius sophore</i>	Least Concern	-	Non-protected
6.	Barred Baril	<i>Barilius barila</i>	Least Concern	-	Non-protected
7.	One-stripe spiny Eel	<i>Macrogathus aral</i>	Least Concern	-	Non-protected
8.	swamp barb	<i>Puntius chola</i>	Least Concern	-	Non-protected
9.	Chana Sps.				Non-protected



Photo Plate 3: Photo of One-stripe spiny eel and Chana Sps

Other Important Wildlife Information

In 2021, a study identified a male and a female tiger in the Churia forest range spanning Kapilbastu, Rupandehi, and Palpa. The male was located in northern Kapilbastu, while the female was photographed at multiple sites in Rupandehi and along the Rupandehi-Palpa border. In February 2024, WWF Nepal reported three tigers captured on camera during an ecological survey in the central Terai Arc Landscape (TAL) in Kapilbastu. These tigers were recorded more than 10 kilometres away from the project area within the Churia range. The Fishing Cat and Four-horned Antelope, both listed as Vulnerable on the IUCN Red List, have been recorded in Kapilbastu district. However, they have not been observed within the project site, and the area is not suitable for either species.

Wildlife Habitat and Movement Corridor

The road stretches approximately seven kilometers through forest patches that extend into the Churia region but do not continue significantly to the south. The longest forest patch, about four kilometers, extends southward from the road but gradually transitions into farmland and settlements further south. As a result, there is likely to be north-south wildlife movement across the road for feeding or breeding purposes. Therefore, we identified the following locations as the most promising wildlife crossing areas.

- Herpetofauna and small Mammals Crossing Culvert at Chainage: 645+789, 646+233, and 647+791
- Animal Crossing at Bel River (648+561), Jwai Khola (649+257) and minor bridge-Dry Nala (648+157)
- Terai Gray Langur Movement at Chainage: - 649+085

The wildlife in the project area primarily consists of medium-sized species. As per the Wildlife Friendly Infrastructure Construction Directives 2022, culverts or bridge underpasses should have a minimum width of 8 meters and a height of 3 meters.

Legally Protected and Internationally Recognized Areas of High Biodiversity Value

An IBAT⁵ (Integrated Biodiversity Assessment Tool) report was used to assess the proximity of the GC road to Legally protected and Internationally Recognized Area of High Biodiversity Value (collectively referred to as protected areas). The Goringhate-Chandrauta road section does not pass through any protected areas but traverses diverse habitats, including settlements, farmlands, rivers, and forests. The project area falls within the Terai Arc Landscape (TAL), with its eastern half located in the globally significant Kapilvastu Important Bird and Biodiversity Area (IBA). This IBA was designated due to its importance as a breeding habitat for the critically endangered White-rumped Vulture, other threatened bird species, and its role as a biodiversity hotspot (BCN, DNPWC and DoFSC 2024). Additionally, the project site serves as an important groundwater reservoir, featuring several small wetlands and connected forests that facilitate wildlife dispersal.

The Integrated Biodiversity Assessment Tool (IBAT; <https://www.ibat-alliance.org/>) was used to assess biodiversity risks within or close to a project area. The IBAT proximity analysis with 1, 10, and 50 km buffers identified Key Biodiversity Area (KBA) that includes five Important Bird and Biodiversity Area (IBA) and a single Jagdishpur Ramsar site and one Gaidahawa Lake wetland but not include any protected area (Figure 15).

⁵ The Integrated Biodiversity Assessment Tool (IBAT) provides key decision-makers with access to critical information on biodiversity priority sites to inform risk management and decisionmaking processes that address potential biodiversity impacts. Developed through a partnership of BirdLife International, Conservation International, International Union for Conservation of Nature (IUCN) and United Nations Environment World Conservation Monitoring Centre (UNEP-WCMC), the vision of IBAT is that decisions affecting critical natural habitats are informed by the best scientific information and in turn decision makers will support the quest to collect and enhance the underlying datasets and maintain that scientific information



Figure 14: Map of the project route and KBA provided by IBAT showing 1 km, 10 km and 50 km buffers

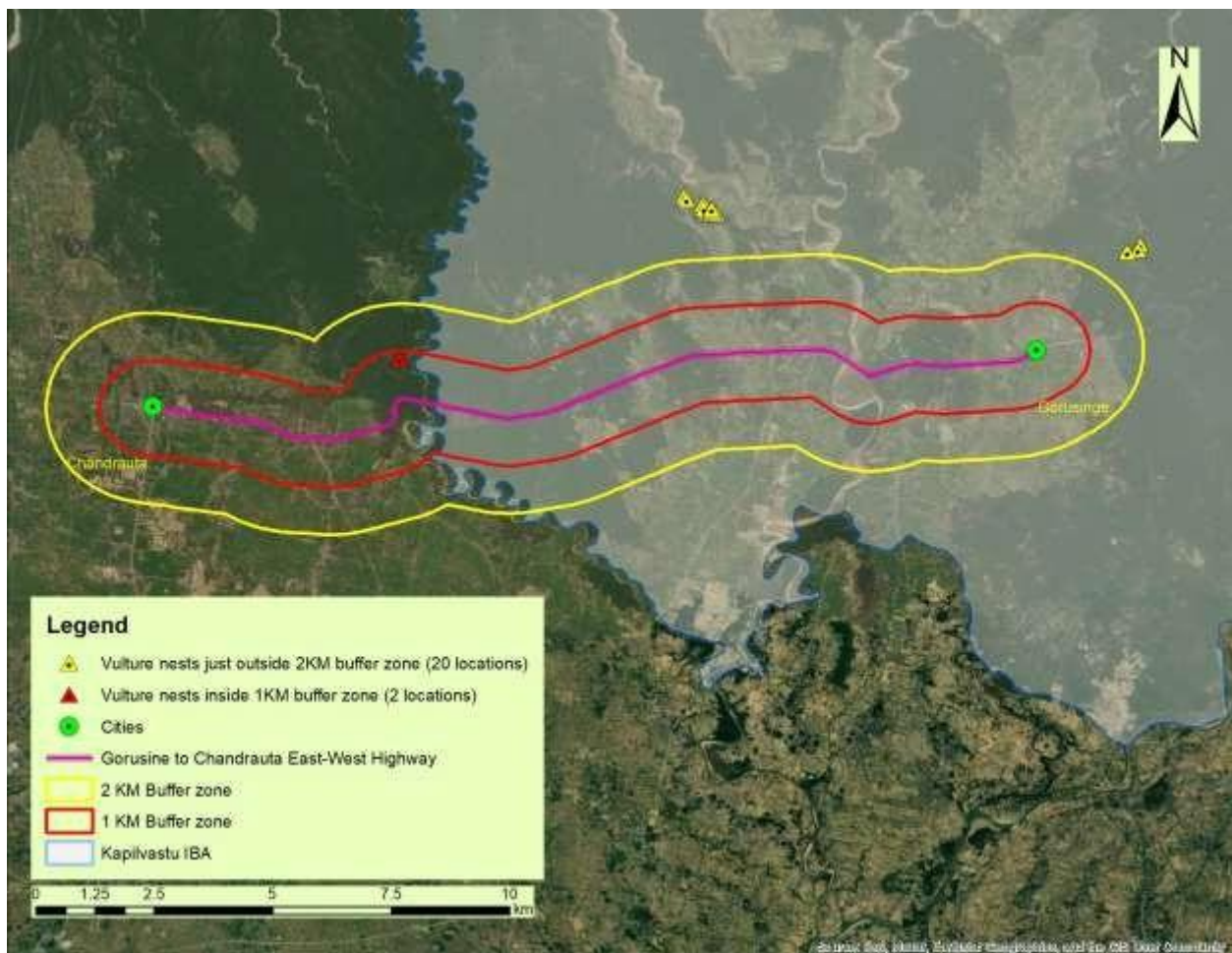


Figure 15: Map showing area of Kapilbastu IBA and nesting location of White-rumped Vulture

The study has obtained satellite telemetry data on White-rumped Vulture movements from Bird Conservation Nepal, which indicates frequent vulture activity within the project site (Figure). Disposing of dead cattle near the road could attract vultures, increasing the risk of vehicle collisions.

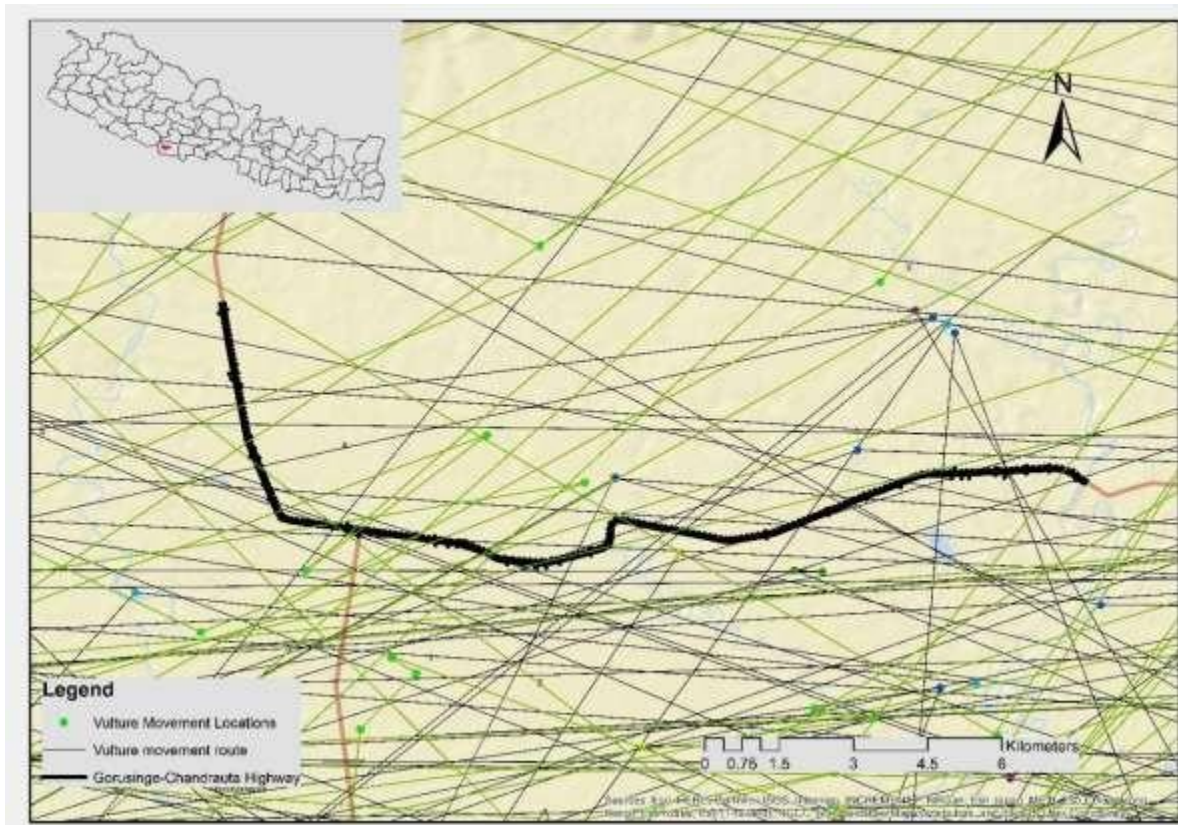


Figure 16: Movement of satellite tagged vultures in the project site

Terai Arc Landscape Conservation Initiative

The Terai Arc Landscape (TAL) is recognized by the Government of Nepal as a priority conservation landscape since 2001. The second Strategy and Action Plan for the TAL (TALSAP) for the period 2015 to 2025 has been prepared by the Ministry of Forests and Soil Conservation to address persisting and emerging threats to ensure the socio-ecological integrity of the TAL. The TALSAP has a defined goal, seven outcomes, 16 strategies each with specific strategic actions, numerous targets, and a monitoring and evaluation plan. The TALSAP budget was estimated at NPR 28,111 million (USD 281 million).

Critical Habitat Assessment

This section aims to identify the occurrence of critical habitat features based on the five critical habitat criteria defined in the World Bank ESS6.

Critical Habitat Criteria

Critical habitat is defined in the World Bank ESS as: the areas with high biodiversity importance or value, including: (a) habitat of significant importance to Critically Endangered (CR) or Endangered (EN) species, as listed in the IUCN Red List of threatened species or equivalent national approaches; (b) habitat of significant importance to endemic or restricted-range species; (c) habitat supporting globally or nationally significant

concentrations of migratory or congregator species; (d) highly threatened or unique ecosystems; (e) ecological functions or characteristics that are needed to maintain the viability of the biodiversity values described in (a) to (d).

Guidance notes to the ESS6 are available, but do not include guidance on methods or thresholds for critical habitat determination. The following approach has therefore been developed for assessment of critical habitat for the terrestrial conditions applicable to this project:

- Key Biodiversity Areas (KBA), including Important Bird Areas (IBA) and Alliance for Zero Extinction (AZE) sites, provide important indicators of potential critical habitat. Careful consideration is also to be given to legally protected areas, Ramsar wetlands of international importance, UNESCO-recognized world heritage sites and government-recognized conservation initiatives.
- ESS6 Criterion (a) requires an assessment against both global (IUCN) and national red list ratings. ESS6 critical habitat criterion (a) places an emphasis on national red lists, while footnote 13 proposes that national red list ratings should be given priority over IUCN (global) red list ratings.
- Where a significant proportion ($\geq \pm 0.5\%$) of the national or global population of a species has a likely presence within the project area, consideration is to be given for the habitat to have significant importance for the species under ESS6 Criterion (a), (b) or (c).
- By IUCN definition, a CR species faces an extremely high risk of extinction and its continued survival in the wild is in a critical state. Therefore, evidence of use of habitats within the project-affected area by a surviving population of a CR species suggests that these habitats have a significant importance for the species under ESS6 Criterion (a).
- ESS6 Criterion (b) can be achieved for range-restricted species with evidence or believed to occur within the project-affected area where the full extent of that area overlaps a significant proportion ($\pm 1\%$) of a species' distribution range.
- There is no specific guidance for the assessment of Criteria (d) and (e) and each situation needs to be assessed on a case-by-case basis.

The greater project area, defined by an area within an approximately 50 km radius of the project route, potentially supports an exception diversity of CR and EN species. A list of CR and EN species consolidated from both the IUCN Red List (provided by IBAT) and the Nepal National Red List Series of Mammals (single volume, 2012) and Birds (six volumes, 2016) provides a list of 107 species. A structured screening of these species and assessment against the ESS6 critical habitat criteria is provided in Annex 2. These species are discussed in terms of the critical habitat criteria below.

Criterion (a) - habitat of significant importance to Critically Endangered or Endangered species, as listed in the IUCN Red List of threatened species or equivalent national approaches.

Fishing Cat (*Prionailurus viverrinus*) and Striped Hyaena (*Hyaena hyaena*) both have an EN status on the Nepal Red List for mammals and there is evidence of their presence within the project area. These carnivores are threatened by poaching and persecution, reduction in their food availability (fish and carrion respectively) and habitat loss. The project could potentially threaten these carnivores through an increased incidence of road kills and/or fragmentation within the habitat. Mitigation is required to address these impacts and demonstrate net gain as

required by ESS6.

Three vulture species with CR and EN red list ratings have the potential to qualify as critical habitats under Criterion (a). Vultures are diverse and abundant in the project area as they are attracted to a nearby vulture feeding station where carcasses are routinely placed at by Bird Conservation of Nepal. However, the feeding station is away from the project route and these birds are unlikely to be significantly impacted by construction or operation of the road section covered by this ESIA. Specific mitigation is not required, and vultures are therefore not a critical habitat feature of concern for this project.

Yellow-breasted Bunting have not been recorded during baseline however habitats are suitable to support the species and online data reveals their presence in the area. The population of these buntings has declined as they are frequently trapped and illegally traded as cage birds. Indirect impacts of the project may influence these threats, and mitigation is presented to address potential illegal wildlife trade, however the species has not been confirmed in the project area and net gain requirements are not applied.

Criterion (b) - habitat of significant importance to endemic or restricted-range species.

There are no endemic or restricted-range species likely to qualify as critical habitat features for this project.

Criterion (c) – habitat supporting globally or nationally significant concentrations of migratory or congregatory species.

One migratory bird species, the Steppe Eagle (*Aquila nipalensis*) qualifies as a critical habitat feature as the project is located within a broad migratory bird corridor that follows the base of the Himalayas mountain chain. Greater than 25% of the global population of this eagle may migrate along this corridor twice per year, however migrating raptors pass at an altitude whereby they are not impacted by ground activities. Construction and operation of the road section covered by this ESIA is not expected to impact this eagle and no specific mitigation is required. The Steppe eagle is therefore not listed a critical habitat feature of concern for this project and net gain is not required to be demonstrated.

Criterion (d) - highly threatened or unique ecosystems.

Habitats in the project-affected area are disturbed and there is no reason for recognition of unique characteristics. The project area is therefore not considered as a critical habitat under this criterion.

Criterion (e) - ecological functions or characteristics that are needed to maintain the viability of the biodiversity values described above in (a) to (d).

No specific ecological functions or characteristics have been identified that are essential to maintain the above critical habitat features, no critical habitat is recognized under this criterion.

3.5 Socioeconomic and Cultural Environment

General profile of Project Area

The project is part of the East-West highway and lies in the Kapilvastu district of Lumbini province. Kapilvastu is famous for Lumbini which is the birthplace of lord Gautam Buddha, a major tourist destination. The road starts from the Belwagurdawa river of Kapilvastu district and passes through Imeliya, Champapur of Buddhabhumi municipality, Kharendrapur, Chandrauta bazar of Shivaraj municipality and ends at Umari Chowk of Kapilvastu district. The proposed road also links Gautam Buddha International Airport (70 km from Chandrauta via Butwal) and Lumbini (around 40 km from our road) via Bhairahawa, which is adjacent to the Indian border. Most of the road passes through built-up and urban settlements, connecting district headquarters and further providing access to outside markets in Terai and India. Except near Chandrauta bazar, the settlements along the road are semi-urban and rural. Semi-urban settlements can be seen along the alignment, while rural settlements can be seen a little away from the road head. The major settlements (Table 35) along the road include Imeliya bazar, Champapur, Kharendrapur, Chandrauta and Umari Chowk.

Table 35: GC Road (District, Municipality and Major Settlements)

S.N.	Name of Road Section	Length of the Road (KM)	Name of Province	Covered Districts	Covered Municipality and Rural Municipality	Major settlement/Market area
3	Gorusinghe-Chandrauta	19	Lumbini	Kapilvastu	Buddhabhumi Municipality Shivaraj Municipality	Imeliya bazar, Champapur, Kharendrapur, Chandrauta and Umari Chowk.

Source: Municipality Profile 2020

A. Demography

Buddhabhumi Municipality

According to the National Census 2021, the total population of Buddhabhumi Municipality is 76,507, with 48.3% male and 51.7% female, and the population density is 209 persons per square kilometer. Similarly, there are a total of 15,379 households in the municipality, with an average household size is 5.2. The literacy rate of the municipality is 71.5%. Only one ward- 9 of Buddhabhumi Municipality is project affected ward and lies in GC road alignment. The total population of ward -9 is 11043. The male-female ratio is quite similar to the municipality, with 47.28 % male and 52.71% female. This shows the female participation in each field is very essential. The detail information is presented in table 36.

Table 36: Demographic information of Buddhabhumi Municipality

Local Government	Number of HH	Population			Sex ratio	Literacy
		Total	Male	Female		

Buddhabhumi Municipality	15,379	76,507	36,951	39,556	95.05	71.5
Ward no. 9	2441	11043	5222	5821	89.80	Not available

Source: CBS- 2021

Shivaraj Municipality

According to the CBS 2021, the total population of Shivaraj Municipality is 84,810, followed by 48.7% male and 51.3% female, and the population density is 299 people per square kilometer. Similarly, there are a total of 16,241 households in the municipality, with an average household size is 5.22. The literacy rate of the municipality is 72.7%. There is a total of 4 project-affected wards: 1, 3, 4, and 5 of this municipality lie in the GC road alignment. The total population of project project-affected wards is 42739 with 48. 48% and females 51.51% this is also quite similar to own Shivaraj Municipality, and again, it shows that female participation in each and every area is very important. The detailed information is presented in Table 37.

Table 37: Demographic information of Shivaraj Municipality

Local Government	Number of households	Population			Sex ratio	Literacy
		Total	Male	Female		
Shivaraj Municipality	16,241	84,810	41,328	43,482	95.05	72.7
Ward no. 1	2,183	9,712	4,645	5,067	91.67	Not Available
Ward no. 3	1,914	9,320	4,488	4,832	92.88	
Ward no. 4	1,347	8,141	4,074	4,067	100.17	
Ward no. 5	3,367	15,566	7,514	8,052	93.32	
Total (Affected Wards)	8,811	42,739	20,721	22,018		

Source: CBS, 2021

Populations of Surveyed Households followed by Municipality and Ward

The total surveyed/sampled Population is 1643 of 312 surveyed households (@ 20% of the total universe 1562 HHs) within the Indirect Impact Zone (300m.either side of the center line of the road), with an average household size is 5.3. The total surveyed population in Buddhabhumi (ward-9) is 560 whereas 1083 in Shivaraj municipality (Wards-1, 3, 4 & 5). The total male population of surveyed households is (847) which is slightly higher with (52%) than female population is (796) with (48%). This is somehow reverse situation with national average level (male 48.9%) and female 51.1%)Details of the population with gender disaggregated data is presented in table 38.

Table 38: Population Surveyed by Municipality and Ward

Municipality	Ward No	HHs	Population					
			Male	%	Female	%	Total	Sex Ratio
Buddhabhumi	9	105	274	48.9	286	51.1	560	95.8
Shivaraj	1	23	55	51.9	51	48.1	106	107.8

Municipality	Ward No	HHs	Population					
			Male	%	Female	%	Total	Sex Ratio
	3	36	107	58.2	77	41.8	184	139.0
	4	36	99	51.3	94	48.7	193	105.3
	5	112	312	52.0	288	48.0	600	108.3
Total		312	847	51.6	796	48.4	1643	

Source: Household Survey, 2024

Population of Project Affected Households (Direct Impact Area (RoW))

Regarding project-affected households, there are a total of 50 households going to lose their structures because some sections of the right of way are encroached by people, especially in urban areas. The total population of the project-affected households is 316, and the average family size is 6.3.

Caste/ Ethnic Composition

The project area has a multi-ethnic and caste composition. Brahmin, Chetri, Janjati (Magar, Newar, and Tharu), Muslim and Madhesi (Tarai Caste) are major caste and ethnic groups in the project municipalities. The Brahmins and Chhetri are the dominant group covering around 53% followed by Janajati (27%), Dalit 8%, Terai-Caste around 7%, Muslim 4% and others 1%. The survey data indicate that the Janjati along the RoW of the road are mixed (including indigenous and non-indigenous people), living as part of mainstream communities with no collective attachment to land and/or distinct cultural and social institutions. Details of the population are presented in Table 39.

Table 39: Caste and Ethnicity in the area

Caste/Ethnicity	Buddhabhumi		Shivaraj		Total	
	HHs	%	HHs	%	HHs	%
Brahmin and Chhetri	54	51.42	110	52.4	164	52.56
Dalit	4	3.8	20	9.7	24	7.62
Muslim	0	0.0	12	5.8	12	3.9
Janjati	38	36.18	46	22.8	84	26.92
Tarai Caste	5	4.8	18	8.7	23	7.4
Other	4	3.8	1	0.5	5	1.6
Total	105	100	207	100.0	312	100

Source: Household Survey, 2024

Indigenous Peoples

Nepal is a multi-ethnic, multilingual, and multicultural country. Stretching from the Himalayas to the Terai, the people residing here exhibit diverse languages and cultures. According to the Aadiwaasi/Janajati Utthan

Rastriya Partisthan Act, 2058 (2002 AD), a total of 60 ethnic groups are officially recognized as Adivasi/Janajati (Indigenous Nationalities). Furthermore, the Nepal Federation of Indigenous Nationalities (NEFIN) classifies these listed indigenous groups into five categories: advanced, disadvantaged, marginalized, highly marginalized, and endangered. In the baseline survey 2024, a total of 312 households were studied (sampled), among which 76 households belonged to Indigenous Nationalities (Newar-lies in advanced, Magar-disadvantage, Tharu, and Tamang are marginalized), was recorded with a total population (195 male and 188 female) of 383. The population distribution by indigenous group is presented in Table 40.

Table 40: IP Population by Municipality and Ward

Indigenous Nationalities	Household		Total HH	Male Population		Female Population		Total population
	Buddhab humi	Shivraj		Buddhab humi	Shivraj	Buddhab humi	Shivraj	
Newar	2	2	4	3	7	5	9	24
Magar	8	22	30	15	57	10	45	127
Tamang	1	0	1	4	0	3	0	7
Tharu	26	15	41	69	40	77	39	225
Total	37	39	76	91	104	95	93	383

Source: Household Survey, 2024

Mother Tongue/ Language

The table below represents the distribution of households (HHs) based on their mother tongue across affected municipalities, as well as the combined total for both areas. Nepali is the most widely spoken mother tongue in project areas, accounting for about 60%, followed by Tharu (14%). Hindi 10%, Tharu 6%, Magar 4%, Newar 3 % and Bhojpuri 3 %. Language diversity and relative population sizes among different language-speaking communities are found in the project area.

Table 41: Mother Tongue/ Language of Surveyed HHs.

Mother Tongue	Buddhabhumi		Shivaraj		Total	
	HHs	%	HHs	%	HHs	%
Nepali	61	58%	126	61%	187	60%
Tharu	17	16%	27	13%	44	14%
Maithili	9	9%	11	5%	20	6%
Newar	4	4%	5	2%	9	3%
Magar	3	3%	9	4%	12	4%
Hindi	7	7%	23	11%	30	10%
Bhojpuri	4	4%	6	3%	10	3%
Total	105	100%	207	100%	312	100%

Source: Household Survey, 2024

Religion

Nepal is a multi-lingual, multi-cultural, and multi-religious country. Religions practiced in Nepal are Hinduism, Buddhism, Islam, Christianity, Jainism, and Sikhism. The majority population, around 69 % is Hindu, followed by Buddhist (18.3%), and around 7% are Islam, and 4.% are Christian, and a nominal number is in other religions. The project area also follows almost the same kind of representation as per the national figure.

Table 42: Religion

Religion	Buddhabhumi		Shivaraj		Total	
	HHs	%	HHs	%	HHs	%
Hindu	77	73.3	138	66.7	215	68.9
Buddhist	19	18.1	38	18.4	57	18.3
Christian	7	6.7	14	6.8	21	6.7
Muslim	0	0.0	13	6.3	13	4.2
Other	2	1.9	4	1.9	6	1.9
Total	105	100.0	207	100.0	312	100.0

Source: Household Survey, 2024

B. Literacy Status and Education

Based on baseline surveyed households, a total of 4.8 percent population is illiterate, among them, males are 1.7 percent, and females are 3.8 percent. The population of graduate and above is 2.8 percent. The majority of the population in both Buddhabhumi and Shivraj municipalities is educated, with most individuals having completed at least read and write or higher secondary education. However, there are notable differences in educational attainment between males and females. Educational status of school-going age and above of the surveyed population is presented in Table 43.

Table 43: Educational Status of the family member

Educational Status	Male		Female		Total populations	Percentage
	Buddhabhumi	Shivraj	Buddhabhumi	Shivraj		
Illiterate	0.4	1.3	1.0	2.1	75	4.8
Read and write	5.4	12.3	7.2	13.6	600	38.5
Higher Secondary	9.4	17.3	6.9	12.4	719	46.1
Bachelor's Degree	1.0	3.0	1.4	2.4	121	7.8
Master's Degree	0.5	0.5	0.2	0.3	23	1.5
Above Master's Degree	0.3	0.3	0.3	0.4	21	1.3
Total	17.1	34.6	17.1	31.2	1559	100.0

Source: Household Survey, 2024

C. Occupational Status

The project area is characterized as a plain Terai area, and most of the people of the area are engaged in agriculture-based economic activities. The main occupation of the study area is agriculture, followed by foreign jobs, service, and business. Among the total population, 46.1 percent is involved in agriculture. Similarly, 24.4 percent of people are engaged in a foreign job, which is the main source of remittance. Likewise, 17.5 and 12.1 percent population are involved in business and Service. There are notable gender differences, with males dominating foreign jobs and business, while females are more involved in agriculture. The following table provides information regarding the occupational status of the project area.

Table 44: Occupation of Household Member Occupation	Buddhabhumi		Shivraj		Total economically active population	Total
	Male	Female	Male	Female		
Agriculture	5.9	14.4	7.5	18.3	375	46.1
Service	3.0	1.7	4.9	2.5	98	12.1
Foreign job	7.0	0.7	15.3	1.4	198	24.4
Business	2.8	1.2	10.3	3.1	142	17.5
Total	18.7	18.1	38.0	25.2	813	100.0

Source: Household Survey, 2024

Land Value and Holding Status

Table 45 presents the distribution of land ownership in Buddhabhumi and Shivraj municipalities from a gender perspective, including categories for Male, Female, and both (representing joint ownership or other gender identities). The data reveal a clear gender disparity in land holding, with men controlling nearly two-thirds of the land in both municipalities. Women own less than one-third. The table below summarizes the landholding pattern by gender in the project area.

Table 45: Land holding status

Municipality	Male	Percent	Female	Percent	Both	Percent	Total
Buddhabhumi	64	20.5	34	10.9	7	2.4	105
Shivraj	130	41.7	66	21.2	11	3.5	207
Total	194	62.2	100	32.1	18	5.8	312

Source: Household Survey, 2024

Agriculture Land Holding Status

It is found that about 50.96 percent of the surveyed households have no agricultural land holdings. Only 6.09% of the HHs have agricultural land above 0.6 ha, as shown in Table 46.

Table 46: Status of Agricultural Land Holding

Agricultural Land Holding Status	Buddhabhumi		Shivaraj		Total	%
	HHs	%	HHs	%	HHs	
No Agriculture	36	34.29	123	59.42	159	50.96
Less than 0.015 ha	3	2.86	4	1.93	7	2.24
0.015-0.03 ha	4	3.81	14	6.76	18	5.77
0.03- 0.3 ha	44	41.90	51	24.64	95	30.45
0.3 – 0.6 ha	8	7.62	6	2.90	14	4.49
> 0.6 ha	10	9.52	9	4.35	19	6.09
Total	105	100.00	207	100	312	100.00

Source: Household Survey, 2024

Agriculture and Livestock Practices

Agricultural practice in the project area is mostly traditional, and the agricultural production system is conventional. Farmers are producing mainly rice, wheat, and maize as cereal crops, and mustard, wheat as cash crops at the subsistence level. Irrigation and fertilizer are the main problems of farmers in the project area. Other agricultural problems prevailing in the project area are uncertain rainfall, flooding, and riverbank cutting.

Table 47: Cropping Pattern in Municipality

Crops	Buddhabhumi		Shivaraj		Total	%
	HHs	%	HHs	%	HHs	
Garlic	0	0.0	1	0.5	1	0.3
Lentils	12	11.4	5	2.4	17	5.4
Maize	8	7.6	4	1.9	12	3.8
Mustard	5	4.8	8	3.9	13	4.2
Onions	0	0.0	1	0.5	1	0.3
Paddy	23	21.9	26	12.6	49	15.7
Rice	6	5.7	6	2.9	12	3.8
Vegetable	8	7.6	5	2.4	13	4.2
Wheat	17	16.2	23	11.1	40	12.8

Source: Household Survey, 2024

Livestock

It is found that among 312 surveyed households, 260 households are involved in livestock rearing, and the rest do not have any livestock. Most of the households (126) are rearing goats, followed by buffalo (65 households),

cow/ox (52 households), poultry (12 households), and pig (5 households). It is found that there are 4 animals per HH on average. The average number of poultry per household is 11. The average number of goats and pigs per HH is 4 each, whereas the average number of cows/oxen and buffalo per HH is only 2.

Food Sufficiency Status

Among the surveyed HHs, only 13.78% HHs of households have food sufficiency throughout the year from their own production. 43.91% of households do not have their own food production, hence depending absolutely on other sources for food, i.e., trade and business, foreign employment, and service. Details of the status of food sufficiency from their own production are presented as shown in Table 48.

Table 48: Food sufficiency in the project area your own production

Food Sufficiency from own production	Buddhabhumi	Shivaraj	Total HHs	%
	HHs	HHs		
Less than 3 months	17	42	59	18.91
3-6 months	16	20	36	11.53
6-9 months	12	25	37	11.87
9-12 months	20	23	43	13.78
Other sources	40	97	137	43.91
Total	105	207	312	100

Source: Household Survey, 2024

House Structure and Household Assets: Types of House Structures

It is found that all the surveyed households have shelter for living. Modern housing is the most common across both Municipalities, accounting for 91%. Semi-modern and traditional housing together represent only 9.0% of the total, as shown in the table. Modern housing structure unit is made of reinforced cement concrete with pillar foundation, cement-bonded bricks/stone outer wall, and reinforced cement concrete roof. Semi-modern housing structure unit is made by cement-bonded bricks/stone foundation, cement or mud-bonded bricks/stone outer wall, and galvanized sheet or tile, or Unplasticized Polyvinyl Chloride (UPVC) roof. Traditional housing structure unit is made by mud bonded bricks/stone foundation, mud bonded bricks/stone or wood/planks or mud bonded bamboo outer wall, and galvanized sheet or tile or UPVC, or thatched/straw roof. Temporary sheds/Jhupra are made by metal poles or wooden pillars foundation, a stick or bamboo or galvanized sheet outer wall, and a galvanized sheet or thatched/straw roof. The definition of a housing unit is adopted from the Nepal Population and Housing Census (NPHC), 2021.

Table 49: Types of House Structure

Type of House	Buddhabhumi		Shivaraj		Total	
	HHs	%	HHs	%	HHs	%
Traditional (stone/and mud wall with straw roof)	3	2.9	3	1.4	6	1.9
Semi-modern (stone/block/brick and cement wall with Jasta/slate roof)	8	7.6	14	6.8	22	7.1
Modern (stone/brick/block and cement wall with RCC roof)	94	89.5	190	91.8	284	91.0
Total	105	100.0	207	100.0	312	100.0

Source: Household Survey, 2024

Average Annual Income

Average Annual Income per Household is NRs 572,086 in the project area, which is significantly higher than the average of the national poverty line income (NLSS 2021), as per the revised official poverty line in 2022-2023, is estimated at NRs. 72,908 average annual income per person per year. It has also aggregated the food items and non-food items, and expenses required to be above the poverty line. Accordingly, the income required for providing adequate calories (2,236 kilocalories) for an average Nepali to be active is NRs 35,029 at 2023 prices. For Non-food items, on average, the required income is NRs. 37879 at 2022/23 prices. Details of the average annual income for both the affected municipalities, including different income sources, are presented in *Table 50* below.

Table 50: Annual income by income category

Income Category	Buddhabhumi		Shivaraj		Total	
	HHs	Amount	HHs	Amount	HHs	Amount
Cereal Crop sale	8	472,000	11	1,115,000	19	1,587,000
Vegetables sale	1	120,000	2	40,000	3	160,000
Cash Crop sale	2	220,000	3	700,000	5	920,000
Livestock	11	591,000	14	1,087,000	25	1,678,000
Wage Labour	26	4,952,000	20	4,029,200	46	8,981,200
Service	23	9,196,230	53	17,686,000	76	26,882,230
Trade/Business	29	11,045,000	70	28,998,000	99	40,043,000
Remittance	49	29,794,000	103	55,458,000	152	85,252,000
Pension/rent/interest/ Social Allowance	28	4,110,000	50	8,877,500	78	12,987,500
Total	105	60,500,230	207	117,990,700	312	178,490,930
Annual Average Income Per Household		576,193		570,003		572,086
Annual Per Capita Income		108,036		108,948		108,637

Source: Household Survey, 2024

Household Expenditure Pattern

The majority of the HHs spent more money on food and clothing, followed by education. The total expenditure amount of the surveyed HHs is NPR 91,287,850. The survey reveals that people have a tendency to celebrate festivals and rituals more often and spend more money as compared to basic necessities.

Table 51: Annual expenditure by expenses category

Expenses Category	Buddhabhumi		Shivaraj		Total	
	HHs	Amount	HHs	Amount	HHs	Amount
Foods	105	11,297,000	207	23,893,000	312	35,190,000
Clothing	105	3,574,000	207	6,181,000	312	9,755,000
Education	85	4,971,000	157	9,176,000	242	14,147,000
Health	100	3,707,600	206	6,260,200	306	9,967,800
Facilities	102	2,482,200	205	4,579,600	307	7,061,800
Accessories	5	535,000	13	643,000	18	1,178,000
Agricultural tools, fertilizers	59	597,500	72	1,538,600	131	2,136,100
Transportation and Communication	101	1,693,200	201	2,883,700	302	4,576,900
Festivals/rituals	104	2,049,000	204	3,306,250	308	5,355,250
Alcohol, tobacco	14	696,000	16	351,000	30	1,047,000

Expenses Category	Buddhabhumi		Shivaraj		Total	
	HHs	Amount	HHs	Amount	HHs	Amount
Others	5	103,000	6	770,000	11	873,000
Total	105	31,705,500	207	59,582,350	312	91,287,850
Annual Average Expenditure Per Household						292589.26

Source: Household Survey, 2024

D. Migration Status

In-Migration

In-migration is a common phenomenon in the Terai region, as they tend to migrate from hilly areas to the Terai over a period to seek different facilities. Around 60% of the HH interviewed migrated from different places outside the district to ensure their better livelihood, education, health, and other facilities. Buddhabhumi has a large proportion of originally settled households compared to Shivaraj, including that Buddhabhumi is relatively more stable in retaining its native population. On the other hand, Shivaraj has a higher proportion of households from outside the district, suggesting it might be a more attractive destination for migrants. Details are presented in Table 52.

Table 52: Status of Migration in the affected Municipality

Origin	Buddhabhumi		Shivaraj		Total	
	HHs	%	HHs	%	HHs	%
Own Rural Municipality	5	4.8	11	5.3	16	5.1
Own District	4	3.8	15	7.3	19	6.1
Outside of the District	54	51.4	134	64.7	188	60.4
Originally Settle	42	40	47	22.7	89	28.4
Total	105	100	207	100	312	100

Source: Household Survey, 2024

Purpose of In-Migration

The table highlights the purpose of immigration in two areas, Buddhabhumi and Shivaraj Municipality, with percentages calculated for each category relative to the total number of households in each area. People have been migrating to project-affected municipalities mainly for employment, education, and business.

Table 53: Purpose of In-migration

Purpose of Migration	Buddhabhumi		Shivaraj		Total	
	HHs	%	HHs	%	HHs	%
Employment	30	28.6	74	35.7	104	33.3

Business/Trade	21	20.0	55	26.6	76	24.4
Education	24	22.9	54	26.1	78	25.0
Facilities	13	12.4	17	8.2	30	9.6
Others (multiple answers other than mentioned)	17	16.2	7	3.4	24	7.7
	105	100.0	207	100.0	312	100.0

Source: Household Survey, 2024

Out-Migration Status (outside the country)

Among surveyed households (312 HHs), 78.5% HHs have at least one member of the family out of the country for work, education, and family visits. The economy of the project area is gradually shifting from a rural agricultural economy to business, service, and foreign employment.

E. Sanitation and Water Supply

This sub-chapter includes the findings about the availability of sanitation and water facilities within the surveyed households, which include toilets and a water source for domestic use, which have a direct relation with the community and their accessibility for good health over time.

Toilet Facility

Most of the households surveyed (93.6%) have toilet facilities at their home compound, whereas only 0.3 percent of HHs have no toilet facility and go to the nearby forest or field for toilet as reported by the respondents. The Nepal Government has declared an “Open Defecation Free (ODF) Nation” in 2019; however, 0.3 percent of households still do not have a toilet facility in the project area. About 6.0 percent of households have a pit toilet, as shown in Table 54.

Table 54: Toilet Facilities in the Surveyed Households

Sanitation Facilities	Buddhabhumi		Shivaraj		Total	
	HHs	%	HHs	%	HHs	%
Permanent Structure with pan/commode	101	96.2	191	92.3	292	93.6
Temporary pit	4	3.8	15	7.2	19	6.1
No toilet, go open defecation	0	0.0	1	0.5	1	0.3
Total	105	100.0	207	100.0	312	100.0

Source: Household Survey, 2024

Sources of Water for Domestic Use

Among the surveyed households, the majority of the HHs are using Piped/tap water (71.2%), followed by hand pump water (22.4%), and Deep tube well (6.4%) as sources of water for domestic use. The detailed information about the sources of water used by surveyed households in the project area is shown in Table 55.

Table 55: Sources of Water Use

Water Source	Buddhabhumi		Shivaraj		Total	
	HHs	%	HHs	%	HHs	%
Piped Tap	71	69.60	126	68.1	197	63.14
Natural (Well/Spring/Spout)	1	0.98	0	0.0	1	0.32
Ground (Deep tube Well)	6	5.88	12	5.8	18	5.78
Jar	1	0.98	9	4.3	10	3.21
Tanker	8	7.86	6	2.9	14	4.48
Hand pump	17	13.72	46	27.1	63	20.19
Others	1	0.98	8	3.9	9	2.88
	105	100	207		312	100

Source: Household Survey, 2024

F. Energy Sources Lightning Sources

Electricity is the main source of lighting energy within the surveyed household. Out of 312 surveyed HHs, 310 HHs (99.4%) are using electricity for lighting and cooking purposes. The households using Kerosene for both lighting and cooking purposes are 0.3 percent, and using kerosene is 0.3 percent only, which shows the decreasing use of kerosene and other sources of energy and increasing use of electricity for lighting and cooking, as shown in *Table 56*.

Table 56: Sources of Lightning Energy

Lighting Sources	Buddhabhumi		Shivaraj		Total	
	HHs	%	HHs	%	HHs	%
Electricity	103	98.1	207	100.0	310	99.4
Kerosene	1	1.0	0	0.0	1	0.3
Others	1	1.0	0	0.0	1	0.3
Total	105	100.0	207	100.0	312	100.0

Source: Household Survey, 2024

Cooking Sources

Major sources of energy for cooking used by the surveyed households are Liquefied Petroleum Gas (LPG), which is 87.8 percent, followed by firewood (42.9%), bio-gas (0.3%), and cow dung/straw (1.3%), as shown in Table 3-63. Decreasing use of cow dung/straw within the surveyed households is noticed, which is good for human health and the local environment.

Table 57: Sources of Energy for Cooking

Source of Cooking Energy	Buddhabhumi		Shivaraj		Total	
	HHs	%	HHs	%	HHs	%
Fire wood	6	5.71	20	9.68	26	8.33
LPG Gas	93	88.59	180	86.95	273	87.5
Bio-gas plant	0	0.0	1	0.48	1	0.32
Dung cake	3	2.85	1	0.48	4	1.28
Electricity	3	2.85	5	2.41	8	2.57
Total	105	100	207	100	312	100

Source: Household Survey, 2024

G. Public Service Facilities, Public Utilities, and Public Structures

Public services available in the project area include market centers, industries, municipality offices, ward offices, police stations, transportation and infrastructure development, and ongoing and future projects, which are presented in the following sub-chapters. Major public and private sector services are presented in Table 57. Similarly, major market centers within the project area are Gorusinghe, Imaliya, Kharendrapur, Chamdrauta, and Shivapur. These market centers have the availability of small shops, hotels, lodges, restaurants, and so on are involved and have been facilitating the adjoining villages. Weekly Hat bazars in all above-mentioned major settlements play a vital role in the transaction of goods and products such as clothing, home appliances, agricultural products (grain, meat, fish, fruits and vegetables), food and beverages, etc. There is frequent mobility of the public for business as well as public services in these areas. The total number of electric poles is 1202, public structures is 82, and Haatbazar is 2.

Table 58: Services available in the project area

S.N.	Occupation	HH visit frequencies	No. of Service center
1	Health post	15	4
2	Hospital	5	3
3	School (primary/secondary)	26	10
	Nepal police and traffic police		
4	Market center	10	4
5	Veterinary center	5	1
6	Maternal facility	1	4
7	Electricity office	1	1

S.N.	Occupation	HH visit frequencies	No. of Service center
8	Public transport (Bus, microbus, safari, tempo)	30	3
9	Electric-pole		1202
10	Public structures (Chautaro-15, waiting shed-18, police bit-3, public toilet-2 temple-5 boundary wall-3, school gate-1 and handpump-35)		82
11	Haat bazar		2

Source: Baseline report-2024

H. Industries within the project area

As per FGD participants, there were different types of industries were reported within the project area, which include carpet, grill, crusher, rice mill, oil mill, vehicle repair, furniture, garment, bakery, soap, cement and brick block, dalmoth, spice, incense stick and candle, hume pipe, oxygen gas, bag, dairy, poultry, banana product, toothpick, water processing etc.

I. Transportation Facilities

There are rural roads connecting to the Indian border as well as the district headquarters and neighboring districts. The mode of transportation used by local people is bus, car, tempos, microbus, for local transport long route transport. Motorcycles and bicycles are commonly used for daily activities. Municipality offices, all ward offices, and Police Stations for the people of the GC corridor are easily accessible. Similarly, schools, hospitals, and government offices that provide public services are connected by the local roads with motorized and non-motorized modes of transportation.

J. Tourism

Tourism in Nepal holds great potential to establish itself as a means of significant economic activity. The project area is one of the main tourist destinations due to the birthplace of Lord Gautam Buddha. Due to this reason, a number of tourism-based businesses like Hotels, Cottages, Homestays, etc. are being conducted by locals and by outsiders at different settlements along the road alignment. Many Buddhist temples exist in many places, which are visited by both national and international tourists. Harihar Tal Briza Tal is the tourist point of the project area

K. Demography of Project Affected Families

All the people who lose their property, especially structure, have been considered as PAFs and conducted a census survey for the preparation of the Resettlement plan of the project. Based on the census survey following statuses were observed in the project area.

Households and Population

A total of 50 households were project-affected households comprising 316 people. Among them, 161 are male, and 155 are female, with an average household size of 6.3.

Table 59: Household and Population of affected Households

S. N	Settlement	No. of HHs	Population	Male	Female	Average Family size
1	Imaliya	7	52	27	25	7.4
2	Kharendrapur	13	71	33	38	5.4
3	Bankatti	10	73	36	37	7.3
4	Chanuta	20	120	65	55	6.0
Total		50	316	161	155	6.3

Source: Household Survey, 2024

Case /Ethnicity

Baseline survey shows that 39 individuals (78.0%) are Brahmin/Chhettri, 1 individual (2.0%) is Janajati, 1 individual (2.0%) is Dalit, and 9 individuals (18.0%) belong to the "Others" category, which includes Muslim and Madhesi groups (Table 60).

Table 60: Distribution of surveyed households by Caste and Ethnicity

S. N	Settlement	Caste/Ethnicity	HH	Percent
1	Gorusinghe - Chandrauta Road	Brahmin /Chhettri	39	78.0
2		Janajati	1	2.0
3		Dalit	1	2.0
4		Others (Muslim/Madhesi)	9	18.0
Total			50	100.0

Source: HH Survey 2024

Literacy and Education

Out of the total households surveyed, the majority of the family members of households (48.7%) reported that they have literate/elementary literacy, followed by 29.4% have completed secondary level of education. Likewise, 15.8% have encompassed higher education, and a mere 6% are illiterate.

Table 61: Educational Status of the family member

Educational Status	No. of HH Head	Percent
Illiterate	19	6.0
Literate / Elementary	154	48.7
Secondary school level	93	29.4
Higher Education	50	15.8
Total	316	100.00

Source: HH Survey 2024

Household Economy and Modes of Livelihood

Since the economy of the area is gradually shifting from a rural agricultural economy to a business and service-based based, the major sources of income for the majority of households are non-farm activities. However, the overall livelihood strategy of the surveyed households is characterized by a mixture of farm and non-farm

activities. Farm activities are carried out for food supply, whereas other requirements of the household are fulfilled through non-farm activities. The households surveyed are largely relying on more than one source of income for the fulfillment of their livelihood needs. Non-agriculture activities like business and services are the main contributors to the household economy. The main source of income for the majority of households surveyed (60 %) is business. Remittance from foreign employment is the secondary source of income (26%), whereas 8 percent of HH were involved in agriculture and only 4 percent and 2 percent of HH are engaged in service and small industry, respectively (Table 62).

Table 62: Main sources of income of the households surveyed

S.N.	Occupation	No. of HH	Percent
1	Agriculture	4	8.0
2	Business	30	60.0
3	Service	2	4.0
4	Wage Labor	0	0.0
5	Remittance	13	26.0
6	Entrepreneur/small industry	1	2
Total		50	100.00

Source: HH Survey 2024

Chapter 4- Potential Environmental and Social Impacts and Risks and Their Mitigation

Impact Assessment Methodology

Potential environmental and social impacts were identified on the basis of a review of baseline study reports, field visits, stakeholder consultations, and experiences from the construction of road projects in Nepal. The significance of potential impacts was assessed using the criteria and methodology given below.

Impact Magnitude

The potential impacts of the project have been categorized as major, moderate, minor, or minimal based on consideration of the parameters such as: i) duration of the impact; ii) the spatial extent of the impact; iii) reversibility; iv) likelihood; and v) legal standards and established professional criteria.

The magnitude of the potential impacts of the project has generally been identified according to the categories outlined in **Table 63**.

Table 63: Parameters for Determining Magnitude

Parameter	Major	Moderate	Minor	Minimal
Duration of the potential impact	Long term Beyond the life span of the project	Medium Term The lifespan of the project	Limited to the construction period	Temporary with no detectable potential impact
The spatial extent of the potential impact	Widespread far beyond project boundaries	Beyond immediate project components, site boundaries, or local area	Within the project boundary	A specific location within the project component or site boundaries with no detectable potential impact
Reversibility of potential impacts	The potential impact is effectively permanent, requiring considerable intervention to return to baseline	Baseline requires a year or so with some interventions to return to baseline	Baseline returns naturally or with limited intervention within a few months	Baseline remains constant
Legal standards and established professional criteria	Breaches national standards and or international guidelines/obligations	Complies with limits given in national standards but breaches international lender guidelines	Meets minimum national standard limits or international guidelines	Not applicable

Parameter	Major	Moderate	Minor	Minimal
		in one or more parameters		
Likelihood of potential impacts occurring	Occurs under typical operating or construction conditions (Certain)	Occurs under worst-case (negative impact) or best-case (positive impact) operating conditions (Likely)	Occurs under abnormal, exceptional, or emergency conditions (occasional)	Unlikely to occur

Sensitivity of Receptor

The sensitivity of a receptor has been determined based on a review of the population (including proximity/numbers/vulnerability) and the presence of features on the site or the surrounding area. Each detailed assessment has defined sensitivity in relation to the topic. The criteria for determining receptor sensitivity of the Project's potential impacts are outlined in **Table 64**.

Table 64: Criteria for Determining Sensitivity

Sensitivity Determination	Definition
Very High	The vulnerable receptor with little or no capacity to absorb proposed changes or minimal opportunities for mitigation.
High	The vulnerable receptor with little or no capacity to absorb proposed changes or limited opportunities for mitigation.
Medium	The vulnerable receptor with some capacity to absorb proposed changes or moderate opportunities for mitigation
Low	The vulnerable receptor with good capacity to absorb proposed changes and/or good opportunities for mitigation

Assigning Significance

Following the assessment of magnitude, the quality and sensitivity of the receiving environment or potential receptor have been determined, and the significance of each potential impact has been established using the impact significance matrix shown in **Table 65**.

Table 65: Criteria for Determining Significance of Impacts

Magnitude of Impact	Sensitivity of Receptors			
	Very High	High	Medium	Low
Major	Critical	Major	Moderate	Minimal
Moderate	Major	Major	Moderate	Minimal
Minor	Moderate	Moderate	Minimal	Minimal
Minimal	Minimal	Minimal	Minimal	Minimal

4.1 Summary of Assessed Impacts

The project's potential impacts and their significance have been assessed using the methodology described in the Section above. A summary of these impacts and their significance is presented in **Table 66**, along with the key mitigation measures. A detailed assessment of impacts and proposed mitigation measures is given in the subsequent sections.

Table 66: Potential Impacts and their Significance

The impact of various activities	Sensitivity	Magnitude	Significance Prior to Mitigation	Key Mitigation and Enhancement Measure	Residual Significance
Environmental and Social Considerations in the Project Design					
1. Improvement in Road Safety (at 1 major junction and other minor junctions)	Very High	Major	Critical beneficial	• Raised pedestrian footpaths and cycle lanes in urban areas • Installation of traffic lights in all major intersections, along with zebra crossings and road humps • Footbridges at one location near schools at Imeliya bazar, service lane, and utility corridor in urban area, and shoulder in rural area that can be used for a bicycle lane. • Other safety measures, such as the provision of zebra crossings and traffic lights at the major settlements such as Imeliya, Dumara, Kharendrapur, and Umari Chowk areas, road signs, delineators, barriers, and pavement markings throughout the alignment, minor realignment at identified black spots, including pedestrian foot paths in market areas, have been included in the final detailed design report • Universal access measures for the disabled and elderly • Provision of bus shelters at short stoppage areas • Road safety intervention in schools and urban/commercial locations jointly with the school and the local chamber of commerce and industries.	Critical beneficial
2. Protection of the river bank from erosion (River bank cutting at Ch 640+262, 642+637, 642+199, 643+976, 645+789, 647+038, 648+157, 648+561, 649+257, 650+768)	Very High	Major	Critical beneficial	• Implementation of Bioengineering and retaining structures, specifically RCC Modified Wall, Geo-Grid Wall, and Semi-Flexible 3D Galvanized Steel Mat. Other measures, such as terracing and weep holes to maintain sub-surface drainage, etc., will also be implemented • Avoid haphazard excavation of slopes.	Critical beneficial

The impact of various activities	Sensitivity	Magnitude	Significance Prior to Mitigation	Key Mitigation and Enhancement Measure	Residual Significance
				- Bank protection works near the proposed bridge sites. - Implement slope protection measures such as using geotextiles or erosion control blankets, drainage with downspouts, and diversions - Stabilizing the excavated slopes and riverbanks with retaining structures	
3. Impact on Wildlife Movement Ch 648+561 and 649+257. Also at, 644+552, 645+789, 646+233 646+233, 647+791, 648+073	High	Moderate	Major	- Construction of new, reinstallation, and predator-proofing of existing fences affected by widening in the forest areas. - Conduct daily monitoring of all roadkill incidents over several months to understand the risks to wildlife and identify key locations of roadkill risk. - Installation of traffic signage and coordination with respective municipalities to minimize the roadkill accidents - Assessment of forest habitats before commencement of the civil works by the experts of the consultant and contractors' team. - Construction of wildlife crossings in forest areas - Speed limits for construction vehicles in the forest areas (limited to 40 km per hour) with warning signboards	Minimal adverse
Environmental impacts due to the Project siting					
1. Improvement of Trade and Communication between Nepal and neighboring countries.	Very high	Major	Critical beneficial	Implementation of the ESMP and RAP to mitigate impacts associated with the construction of the project	Critical beneficial
2. Clearance of about 6 ha of forest trees along 5 km of road (located in the forest areas)	Medium	Major	Moderate adverse	Compensation for the Department of Forests for replantation of trees in the same areas (at a ratio of 10 new trees for each tree cut.	Minimal adverse

The impact of various activities	Sensitivity	Magnitude	Significance Prior to Mitigation	Key Mitigation and Enhancement Measure	Residual Significance
9808 trees will be felled from the community forests collaborative forest, government-managed forest, and public land/settlement area within the RoW.				- The cost for the compensatory plantation and care for those plants will be deposited in the Forest Development Fund (as per Forest Regulation-2022), and as per the consultation with DFO Kapilvastu, the tentative location for the compensatory plantation could be the bank of the Banganga River. - Plantation of shrubs in the median of the road and at the end of the RoW by the contractor - Provision of a budget for the above plantation programs	
3. Impact on existing public utilities such as drinking water supply pipelines, electrical poles, power lines, and telephone lines, resting places, tube wells, and access roads to some villages	Very high	Major	Critical adverse	- Tube wells - new tube well before demolishing the existing one - Water supply lines – contractor will relocate the pipelines beyond the ROW – provision in the engineering costs - Electric poles and power lines – coordination with Nepal Electricity Authority for relocation - Telephone lines – Communication Department - Resting places – Coordination with local government. These resting places are around the trees - Access roads – Realign the roads before demolition of the existing roads	Minimal adverse
4. Impact on Wildlife	High	Minor	Moderate adverse	- Installation of fencing in the Champapur and Bel-Jawai Forest patches (from Champapur up to Jawai-Kharendrapur) to avoid entry of animals on the road around a 12.7 km section (including both sides). - Conduct daily monitoring of all roadkill incidents over several months to understand the risks to wildlife and identify key locations of roadkill risk.	Minimal adverse

The impact of various activities	Sensitivity	Magnitude	Significance Prior to Mitigation	Key Mitigation and Enhancement Measure	Residual Significance
				• Design and construction of wildlife-friendly culverts to allow passage of species such as herpetofauna and fish. • Construction of underpasses (in Bel, Jawai river, and minor bridge dry nala and via modified box Culvert at Chainage: 645+789, 646+233, and 647+791) to allow freedom of movement for large carnivore species in the areas of risk • Searches conducted by trained ecologists to check for fauna prior to vegetation clearing and ground-breaking works. • Worker's induction and awareness programs will emphasize the need to protect biodiversity. • Faunal construction hazards (pits and trenches) to be mitigated and checked by appropriately trained staff. • Speed limits for construction vehicles in the forest areas (limited to 40 km per hour) with warning sign boards	
5. Impacts on the Terai Arc Landscape (TAL)	High	Moderate	Moderate	• Engagement with local TAL management authorities to understand their concerns, potential impacts, and develop agreed approaches. • Collaboration with TAL authorities in wildlife monitoring, including their participation and/or sharing of findings and lessons learnt.	Critical beneficial
Social impacts due to the Project's siting					
6. Altogether, (53) private structures belonging to (50) project-affected households (PAHs) will be affected due to encroachment within the existing RoW. Among these projects affected households, physically	Very high	Major	Critical adverse	• Cash compensation for affected households as per the entitlement matrix in the RAP and CDC decisions. • Implementation of income and livelihood restoration activities • Implementation of a social development plan, including IPPF, where relevant.	

The impact of various activities	Sensitivity	Magnitude	Significance Prior to Mitigation	Key Mitigation and Enhancement Measure	Residual Significance
displaced PAH (5) residential structures and partially of minor loss PAH (45) structures (small business sheds, kitchen, verandas, and toilet),					
Risk in both worker and community health and safety.				Contractor will develop workers' and community health and safety management plans, and also emergency response, traffic management, before commencement of work	
Environmental impacts and risks during construction					
1. Generation of spoil from excavation works for road widening and removal of road material from existing damaged roads	Minor	Minimal	Minimal adverse	- Existing excavations will be reused for filling purposes. The required filling volume is 1.17 billion cubic meters - Excess of these cut soils will be dumped in approved tipping sites	Minimal adverse
2. Generation of construction waste, including hazardous waste Unused bitumen and concrete Lubricants, used oils,	High	Moderate	Major adverse	- Containers of adequate size and numbers in place for the collection of various types of wastes (metal, rubber, used fuels, batteries, etc.) - Procurement of services of a waste management contractor for transport and treatment of recyclable and hazardous waste - Empty containers will be returned to vendors	Minimal adverse
3. Generation of solid waste from campsites and offices (160.26 kg/day) 505 persons/day skilled/unskilled labor force (both local community and outsiders, who reside in camps).	Very High	Moderate	Major adverse	- Implementation of the waste management plan - Segregation of solid waste into kitchen waste (organics), paper and plastic (recyclable), and garbage (non-recyclable). Placement of containers of adequate size and numbers.	Minimal adverse

The impact of various activities	Sensitivity	Magnitude	Significance Prior to Mitigation	Key Mitigation and Enhancement Measure	Residual Significance
				- Organic waste will be treated through on-site composting, in-vessel composters - Recyclable waste will be compressed through bailers and will use the services of the vendors - Disposal of the garbage at the local municipal disposal site	
4. Wastewater discharges from the construction camps, sites, and batching plants	Medium	Moderate	Moderate adverse	- Construction of wastewater treatment facilities at the campsite (e.g., septic tank and soak pit) and at the worksites (sedimentation tanks for batching and crushing plants, and discharges from site drainage) - Monitoring of wastewater quality to ensure compliance with World Bank EHSs	Minimal adverse
5. The potential risk of soil and water pollution by construction works	Medium	Moderate	Moderate adverse	- Storage of fuels and chemicals in contained facilities - Availability of spill kits and trained personnel for immediate cleanup of any oil spills	Minimal adverse
6. Air and noise pollution from construction and traffic	Very High	Moderate	Major adverse	- Air and noise pollution control measures at the worksites and regular monitoring of ambient and noise quality to ensure compliance with National Ambient Air Quality Standards and Noise Standards - Compliance with Nepal Vehicle Emission Standards 2012 on vehicle and machinery emissions	Minimal adverse
7. Sourcing of borrow material for earth embankment and aggregates for the road (including base and subbase) and bridge works	High	Moderate	Major adverse	- Reuse of excavated material to the extent feasible - Use of licensed quarry sites having approved E&S assessments - Use of river bed sediments from the licensed borrow sites, with approved E&S assessments and sourced away from the active channels and during no or low flow seasons	Minimal adverse

The impact of various activities	Sensitivity	Magnitude	Significance Prior to Mitigation	Key Mitigation and Enhancement Measure	Residual Significance
8. Impact on river habitat due to quarrying and bridge construction (Banganga River, Bel River, Rapti River)	High	Moderate	Major adverse	- Control of wastewater and sediment releases to the river - Using dry river beds for excavation - Using licensed quarry sites having approved E&S assessments - No quarrying during the rainy season or high flow seasons - Restoration of the borrow sites after completion of the works	Minimal adverse
9. Impacts on flora, including community forests	High	Minimal	Minimal adverse	- No siting of any temporary facilities in the forest areas - Use of non-wood fuel for cooking and heating - Code of conduct for workers and employees' protection of flora and fauna, and a ban on tree cutting and hunting. Any violation of the code of conduct leads to strict punishment, including termination of employment - Awareness-raising among workers on the wildlife - Spread of invasive alien species	Minimal adverse
10. Spread of Invasive Alien Species	Moderate	High	Moderate	- Construction vehicles will be brought into the site in an as-clean-as-new condition to ensure that invasive plant material and seed-bearing soil are not introduced. - All vehicles will be cleaned on a regular basis. - Invasive alien species will be regularly controlled in construction vehicle parking areas. - Construction sites will be rehabilitated at the earliest opportunities, and rehabilitation plans will IAS control measures appropriate to the IAS risks prevailing in the project area.	Minimal adverse
11. Impact on fauna, including wildlife movement	High	Moderate	Moderate adverse	Installation of fence and culvert in forest areas (in Chanmapur and Bel-Jawai forest block)	Minimal adverse

The impact of various activities	Sensitivity	Magnitude	Significance Prior to Mitigation	Key Mitigation and Enhancement Measure	Residual Significance
				• Additional ecological survey on mammals and herpetofauna during detailed design • Capacity building and awareness raising of forest communities • Compensatory tree plantation using locally indigenous species • Continuous monitoring of animal crossings and road kills in the forest areas • Avoiding contractor facilities within or near the forest areas	
12. Illegal wildlife trade	High	Moderate	Moderate adverse	• All bidding documents and construction contracts are to include specific provisions forbidding hunting or collecting natural resources of workers. • The PCU will provide a safe and anonymous line for reporting activity for workers, communities, or any stakeholders, whereby they are safe from retribution from other community members, organized crime, or government officials	Minimal adverse
Occupational Health and Safety Risks					
13. Occupational safety risks to workers due to hazards associated with the construction activities (in-stream, working on heights and trenches, cold weather, hot work, handling of hazardous chemicals, hazardous operations, working on water, working under stress, poor sanitation and hygiene, worksite/traffic accident, etc.)	High	high	Moderate adverse	• Develop and implement an occupational health and safety plan • Regular training program for workers on occupational health safety (monthly training and daily toolbox talks) • Incident investigation and reporting • Conduct a 'job hazard analysis' at the new construction site to identify potential hazards and implement necessary control measures. • Use of relevant and quality personal protection equipment at all times	Minimal adverse

The impact of various activities	Sensitivity	Magnitude	Significance Prior to Mitigation	Key Mitigation and Enhancement Measure	Residual Significance
				• Availability of firefighting, fully equipped ambulance, first-aid, and rescue facilities at the site. • Provide hygienic sanitation (toilet) facilities at the worksite and labour camp. • Provide adequate water at the site for drinking and cleaning facilities. • Development and implementation of an emergency response plan. • Introduce work-rest facilities while at work. • Provide barricades, signage, and information at the site and make people aware of all concerns, including the community. • Follow OHS Operating Manual, 2024 (Department of Roads).	
14. Potential health risks due to inadequate facilities in the campsites (about 300 non-locals live in construction camps)	High	Moderate	Moderate adverse	• Development of a labor management plan based on guidance from the labor management procedure • A construction camp will be built with all adequate facilities (safe drinking water and sanitation, kitchen, well-ventilated rest areas, first aid kits recreation) for labor. Cleaning of the campsite on a daily basis. • The Contractor shall establish a mechanism to collect the complaints from the workers and address those complaints through the approved GRM plan • Drinking water complying National Drinking Water Quality Standard 2005 • Provide First aid/primary health care at each camp. • Provide safety and security facilities in the camp area. • Manage labour influx by providing required facilities within the camp.	Minimal adverse

The impact of various activities	Sensitivity	Magnitude	Significance Prior to Mitigation	Key Mitigation and Enhancement Measure	Residual Significance
				Follow OHS Operating Manual, 2024 (Department of Roads).	
Social Impacts and risks during construction					
15. Impact on traffic from road construction and temporary traffic diversion. Increased traffic congestion and safety hazards due to increased traffic on local roads, especially for children and elderly people	High	Moderate	Major adverse	- Implement a traffic management plan (e.g., avoiding school hours, following speed limits, hiring licensed drivers, etc.), including awareness-raising and safety measures - Carry out road safety campaigns with local people, children, and elderly people along the RoW	Minimal adverse
16. Community exposure to work hazards and communicable diseases such as HIV/AIDs, COVID-19 (about 19 villages and bazars along the project road)	Very high	Moderate	Major adverse	- Barricade the work areas (near the settlements) with hard fencing to prevent the entry of the community into the construction areas. - Placing adequate signboards and flagmen to divert the community away from the construction works. - Community awareness programs on construction-related hazards, including awareness programs in schools	Minimal adverse
17. Dust from earth works and construction vehicular movement, and construction equipment	Very high	Moderate	Major adverse	- Frequent sprinkling as per the weather requirements of water on the local roads and worksites to control dust emissions - Dust control measures at the worksites	Minimal adverse
18. Employment generation for the local community (mostly construction-related jobs)	Very high	Moderate	Major beneficial	- The hiring of the local community during construction works (about 300 workers on average regularly and about 500 during peak construction for five years) - Implement a labor management plan - Formal contracts to be signed with labor.	Major beneficial
19. Risk of child labor	moderate	Minimal	Minimal adverse	No hiring of workers less than 18 years of age	Minimal adverse

The impact of various activities	Sensitivity	Magnitude	Significance Prior to Mitigation	Key Mitigation and Enhancement Measure	Residual Significance
20. Impacts from labour influx and potential cultural conflicts between communities and workers	High	Moderate	Moderate adverse	- The contractor's code of conduct shall cover a program to promote awareness among the construction workers on respecting the local community. - Construction camps will be built in the designated areas, located away from the local settlements - The Contractor's monthly training program will cover topics related to a respectful attitude while interacting with the local community - Follow health, hygiene, and sanitation protocol, including communicable diseases such as COVID-19, STD protocols.	Minimal adverse
21. Risk of gender-based violence (GBV), sexual exploitation and abuse (SEA), and sexual harassment (SH)	moderate	Minimal	Minimal adverse	- Community sensitization. - Socio-economic development of women. - Orientation to the labour force. - Code and conduct to guide the workers on how to relate with the community. - Orientation of Supervision Consultant and Contractors on GBV - Mapping of GBV service providers for prevention and response. - implement the SEA/SH Mitigation Plan	Minimal adverse
22. Chance finds during construction	High	Minimal	Minimal adverse	Inclusion of chance find procedures in the ESMP and bidding documents	Minimal adverse
Environmental and Social impacts during the Operational stage					
1. Workers' health and safety during maintenance	High	Moderate	Moderate adverse	- Establishment of work zones to separate workers on foot from traffic and equipment - Reduction of vehicle speeds in construction areas - Training of workers	Minimal adverse

The impact of various activities	Sensitivity	Magnitude	Significance Prior to Mitigation	Key Mitigation and Enhancement Measure	Residual Significance
				• Barricade the area where maintenance is in operation, along with the proper signage. • Mandate on safety and health protocol. • Provide adequate water and sanitation facilities at the site. • Provide and use PPE while at work.	
2. Community health and safety during maintenance	Very high	Minor	Moderate adverse	• Provision of safe corridors for pedestrian movement • Backfill trenches or secure barricades to prevent children and wildlife from falling in. • Traffic calming measures • Road safety signs • Avoid unnecessary access of community people to the site while at work. Community awareness of safety at work.	Minimal adverse
3. Impact on Flora and Fauna	High	Minimal	Minimal adverse	• Recording the roadkill at three forest blocks in coordination with the divisional forest offices • Monitoring the use of culverts by wildlife species, especially snakes and other reptiles • Assessment of the need for additional culvert/wildlife crossing structures along the road based on the monitoring results • Compensatory plantation (including monitoring and maintenance of saplings) • Regular cleaning/ clearing and maintenance of all culverts to reduce the chances of failures and blocking • Regular inspection and maintenance of fencing installed/maintained in the forest areas • Maintain speed limits and signboards	Major beneficial

4.2 Environmental Issues Mainstreamed in the Project Design

Environmental and social aspects have been considered in the planning and design of the Project facilities. These include:

- Road safety has been considered all along the road, especially at the major intersections with the local roads and near the major villages and market areas. These measures include:
 - Raised pedestrian footpaths and cycle lanes in urban areas
 - Installation of traffic lights in all major intersections, along with zebra crossings and road humps
 - Footbridges have been proposed at one location (Ch. 641+410) at intersections where schools, colleges, and hospitals are located
 - Other safety measures such as provision of road signs, delineators, barriers, and pavement markings, minor realignment at identified black spots, including pedestrian footpaths in market areas.
 - Universal access measures for the disabled and elderly for accessing the footbridges and road crossings.
- Protection of landslides and riverbanks from erosion
 - Implementation of Bioengineering and retaining structures, specifically RCC Modified Wall, Geo-Grid Wall, and Semi-Flexible 3D Galvanized Steel Mat. Other measures, such as terracing and weep holes to maintain sub-surface drainage, etc., will also be implemented
 - Avoid haphazard excavation of slopes.
 - Bank protection works near the proposed bridge sites
 - Stabilizing the excavated slopes and riverbanks with retaining structures
- Impact on wildlife movement
 - Reinstallation of existing barbed wire fences affected by widening in the Champapur-Kharendrapur forest.
 - Construction of a barbed wire fence in the forest areas near Gorusinghe
 - Speed limits in the forest areas (limited to 40 km per hour) with warning signboards
 - Developing Underpass structures under the Bel and Jawai rivers in the Champapur-Kharendrapur forest block
 - system, and riverbed scour protection

4.3 Impacts from Project Siting

A. Beneficial Impacts

Improvement of Trade and Communication

The proposed road upgrading works will improve the connectivity on the East-West High and the trade with the neighboring countries. The road is located (within 20km) close to the border crossing point Krishnanagar with India. The road provides access to Butwal city (within 50 km) and its educational, medical, and other emergency facilities. The implementation of the proposed project will address the existing environmental problems along the proposed alignments, such as bank cutting, erosion, dust pollution, and waste management. The life of vehicles will be increased due to the improved road conditions. The price of adjacent lands after the improvement of the transportation corridor will increase

significantly, especially in places with fertile soils and scenic landscapes, due to an increase in economic activities. The landowners will benefit directly from the increase in the price of land. More shops, hotels, and other economic activities will be developed along the new proposed highway alignment. The poor people will benefit indirectly through the growth of demand in jobs such as services, agriculture, and industry.

Employment Opportunities in Construction Activities

About 300 skilled and 200 unskilled workers will be required during construction on a continuous basis for about five years. During the peak construction period, the requirement for unskilled labour will be about 500. The project offers good opportunities for local residents to apply for employment as unskilled and skilled construction workers. The local communities during the stakeholder consultations have shown great interest in the construction activities. The contractor will be recommended to employ local workers and technicians to the extent possible. In addition to maintaining good relations with the local communities, maximizing local employment may also be cost-effective since engaging the workforce from other parts of the Country could be costlier. All these new opportunities for work for local residents could boost employment and improve the social and economic position of the population for a short time. This will be a major and significant positive impact of the project.

B. Adverse Impacts

Loss of Forest Vegetation

The road alignment of the project falls in the tropical zone with the forest dominated by *Shorea robusta* (Sal) forest and patches of *Dalbergia-Acacia* Forest along the riverine sections. The major blocks of forest area are distributed from the chainage Barkalbur–Champapur (642+900 to 643+800) (900m) and Champapur-Kharendrapur (644+500 to 649+900) (5400 m) in the Kapilbastu district. The proposed road widening in this 6.3 km road length requires the clearing of about felling of 9808 forest trees. The affected trees in the forest are mainly wood trees.

As presented in Table 26, the maximum number of species removed is Sal (*Shorea robusta*) (2,060), which is one of the most important sources of hardwood timber in Nepal. There will be the removal of 62 numbers of *Ficus religiosa* (*Pipal*) trees loss which are used by local people for resting places along the settlement area. The project will apply the mitigation hierarchy to avoid, minimize, mitigate, and compensate for damage to forests and trees that need to be cut.

Mitigation:

DoR will implement the following compensation and enhancement measures as per the environmental and social management plan

- The loss of vegetation from forests (within RoW) will be compensated through cash compensation to the Department of Forest and Soil Conservation for the loss of trees and replantation of trees (a mandatory requirement of planting 10 new trees of indigenous species for each tree cut).
- The project will maintain greenery in the median of the road. Indigenous shrub species will be planted all along the median and rehabilitated sites (suggested distance between each tree is 3 m, but may be adjusted to be appropriate for the species being planted). The tree plantation will be carried out by the contractor and will be later maintained by DOR

- Budget has been allocated in the project budget for the above measures. Details of activities to be implemented under this budget will be worked out during the project implementation by the E&S staff of DCID in consultation with the Department of Forest and Soil Conservation, and the final list of activities will be shared with the World Bank prior to their implementation.

With the above compensation and enhancement measures, the residual impacts of vegetation clearance have been assessed as minimal.

The project road does not pass through any documented wildlife corridors. However, some road kills are reported in the three forest zones that the road crosses, which provide habitat for some mammals (not threatened species). Road kills of some animals, such as jackals and jungle cats, are reported in the Gorusinghe Forest area, and there is therefore some fragmentation of wildlife populations occurring, particularly for small predators. Widening of the road corridor will increase this impact. Road kills of cattle are reported in the Champapur-Kharendrapur forest block. No road kills are reported in the other section of the GC road. However, the existing fence is a barbed wire fence that may injure the animals during the night. The existing box culverts and bridges in the highway, primarily at the forest areas, serve as the underpass for wildlife movement; installation of wider box culverts will further minimize the wild mammal roadkill. The proposed road improvement works may pose more risks to the animals, and these impacts are assessed as moderate.

Mitigation

The following measures will be implemented to address possible road kills of mammals

- The location of fencing in the Bel-Jawai and Champapur forest patch has been proposed with mesh wire, the base dug into the ground, and sufficient height, for the road alignment through the forest blocks
- The best locations for wildlife crossings has been proposed along the road alignment through monitoring of possible locations, assessment of forest habitats and wildlife modelling to allow freedom of movement for species up to the size of large carnivores occurring in the area (wild boar and leopard) at Chainages 648+561 (Bel river), 649+257 (Jawai Khola) as well as at Ch 645+ 789 and 647+157. To support the crossing of herpetofauna from Hariharpur Lake in the south and Birja Lake in the north, the box culvert will be modified at Ch 643+336 so that herpetofauna like snakes, lizards, as well as small-sized mammals can use this crossing.
- The identified location and designs for the wildlife crossing underpass mentioned above are sufficient to accommodate large carnivores, and incorporate the recommended wildlife crossing locations and structures into the detailed road design
- Canopy bridge has been proposed for the crossing of near-threatened Terai Gray Langur at the Chainage 648+900, and Rhesus Monkey has also been observed in the area.
- Selection of compensatory planting location considering ecological connectivity and potential wildlife movement
- Bridge foundation design considering terrestrial and aquatic species movement and habitat
- Additional field surveys/monitoring will be conducted during project implementation for better capture of mammal movement/roadkill in the forest blocks

Impacts on Terai Arc Landscape

The East-West Highway traverses through the Terai Arc Landscape (TAL) and has been identified as one of the major threats to this area. The TAL Strategy and Action Plan (2015 to 2025) identifies the operation of the road (referred to as the Postal Highway) as a primary to the TAL through the intersection of wildlife corridors obstructing the movement of wildlife. Improved protection and conservation of TAL provides opportunities for compensating impacts to biodiversity to achieve no net loss and net gain outcomes required by ESS6.

Mitigation

- Ongoing engagement with local TAL management authorities will be maintained during project design, construction, and operations to understand their concerns, potential impacts, and identify opportunities for collaborative approaches to alleviate adverse impacts of the project and improve the protection and management of the TAL.
- Establish collaboration with TAL authorities in wildlife monitoring, including the participation of TAL staff and sharing of findings and lessons learnt.

Impacts on Critical Habitat Features

Where critical habitat features are subjected to project impacts, ESS6 requires a net gain to be demonstrated for the biodiversity values for which critical habitat was designated. Net gains are defined within ESS6 as additional conservation outcomes that can be achieved for the biodiversity values for which the natural or critical habitat was designated and may be achieved through the implementation of additional programs *in situ* to enhance habitat and protect and conserve biodiversity.

An assessment of critical habitat identified three faunal species, namely Fishing Cat (*Prionailurus viverrinus*) and Striped Hyena (*Hyaena hyaena*) that qualify under ESS6 critical habitat Criterion (a) and are potentially impacted by the project. These species are threatened by poaching, direct persecution, and illegal trade. There is no evidence of direct impact on these species due to the project; however, these species are potentially adversely impacted through road kills or disturbance by construction activities.

Data is not available to quantify impacts to these species; however, impacts are expected to be minimal as these species are rare, and limited forest habitat exists on the south side of the project road, providing limited incentive for tortoise and hyena to cross the road. Fishing cats are strongly associated with wetland and river habitats. Large bridges are installed at river crossings that allow movement along rivers, and these cats have minimal incentives to cross the road.

Mitigation:

- Installation of predator and reptile-proof fencing to keep animals off the road,
- Provision of wildlife crossings, for which the locations and design of crossings will be optimized through further studies during the design phase,
- Measures recommended by the World Bank Paper⁶ to address illegal wildlife trade at the project level shall be implemented. These include requirements on contractors to implement induction and awareness programs for staff and workers to highlight the importance of biodiversity and provide the

⁶ World Bank Paper - Illegal Logging, Fishing, and Wildlife Trade : The Costs and How to Combat it. (<https://openknowledge.worldbank.org/handle/10986/32806>)

basis for enforcement of policies that prohibit the killing of animals, taking of pets, and any engagement in consumption or trade in wildlife products.

Many additional measures, such as wildlife fencing, wildlife underpasses, and maintaining roadside greenery provided within this ESIA to address environmental, biodiversity, and social impacts, will indirectly benefit these critical habitat species.

Residual impacts similarly cannot be quantified; however, the residual impact on these species is expected to be minimal. Limited measures are therefore needed to demonstrate the net gain required under ESS6.

This project is an early phase of the wider development of the East-West Highway that traverses the full length of the Terai Arc Landscape (TAL), and impacts to the TAL are identified among the cumulative impacts. The TAL Strategy and Action Plan (2015 to 2025) includes a broad set of actions for improved management and conservation of the TAL. These include strengthening the surveillance and monitoring capacity. This ESIA includes requirements to develop wildlife crossings and to monitor their use by wildlife. Collaboration with and involvement of TAL management staff in the design, location, and development of crossings provides an opportunity to improve their capacity for addressing similar cumulative impacts associated with the East-West Highway. Collaboration with and involvement of TAL field staff in monitoring the use of wildlife crossings is also proposed to grow capacity at the grassroots level.

Improved protection of prey populations will contribute towards improved conservation of carnivores, and collaborative actions with TAL authorities proposed here will exceed the expected impacts to critical habitat species and contribute towards their net gain.

4.4 Social Impacts from Project Siting

a.) Construction Phase:

Loss of private structures and their management issues

The proposed road project will affect a total of 53 private structures of 50 PAHs. Out of this project total affected private structures, only (5) structures are fully affected, and (48) structures are partially⁷ affected. *The impact is expected to be direct, high in magnitude, local in extent, and long-term in duration, and thus overall impact is highly significant and has very critical adverse impacts.* Details of resettlement impacts are given in Table 67 below.

Table 67: loss of private structures

Descriptions	PAHs	Total No. of affected Structures	Fully Affected Structures	Partially Affected structures	Remarks
Residential Structures	9	12	2	10	

⁷ Partially loss includes up to 30% of the structures, and remaining or viable part for using is more than 70%. In the case of impact in temporary and associated structures , counted as full loss only

Descriptions	PAHs	Total No. of affected Structures	Fully Affected Structures	Partially Affected structures	Remarks
Small Business Structure	4	4	1	3	
Residential/Business structure	33	33	-	33	
Other structures: Shed-1, Kitchen-2 and 1 temple	4	4	2	2	
Total	50	53	5	48	

Source: Draft RAP 2025

Mitigation:

The family that loses their structures will get cash compensation at replacement value as provided in RAP.

Loss of Public Structures and damage to public utilities

Altogether (82) public structures will be damaged by these project interventions. Public structures include temples, waiting sheds, chautaras, police stations, public toilets, boundary walls, and hand pumps. The proposed widening works also impact existing public utilities such as drinking water supply pipelines run by the water users committee and (1202) electrical poles, solar lines, and telephone lines. If the public utilities are not located prior to construction works, there will be significant impacts on the public services provided to the local communities.

The impact is expected to be direct, medium in magnitude, local in extent, and short-term in duration, and thus the overall impact is substantially significant and has critical adverse impacts. Details are given below:

Table 68 Loss of Public structures and public utilities

S. N	Description of structure	No of Structure	Affected Area (Sqm.)
1	Public Chautara	15	282
2	Police Bit and Check-post	3	46
3	Waiting shed	18	211
4	Boundary wall/Temple Wall	3	63
5	School Gate	1	9
6	Temple at Barkulpur, Imilya, Dumura, Chainpur, and Umari Chowk	5	80

S. N	Description of structure	No of Structure	Affected Area (Sqm.)
7	Public Toilet	2	8
8	Public Hand-pump	35	-
9	Electric pole	1202	

Source: Final RAP 2025

Mitigation:

It needs to be relocated and rehabilitation during the project implementation phase. Relocation and rehabilitation costs are in the BoQ as a Provisional Sum item. An appropriate relocation and rehabilitation plan will be developed before relocation and rehabilitation work. Consultation and communication with the local community and the concerned authority will be done on a regular basis as part of the relocation plan.

The DOR will take the following actions to address the utilities relocation. These works will be carried out through the road contractor prior to the start of the main construction works. The DOR will coordinate with the relevant agencies for utility relocations.

- Tube wells - new tube well before demolishing the existing one
- Water supply lines – contractor will relocate the pipelines beyond the ROW – provision in the engineering costs
- Electric poles and solar lines – coordination with Nepal Electricity Authority for relocation
- Telephone lines – Nepal Telecom Department
- Resting places /Chautara– Coordination with local government. These resting places are around the trees

Impact on access to cremation sites at Bel Nadi

The construction of the bridge at Bel Nadi may cause damage to the access to cremation sites and a small shed near cremation sites at Bel Nadi, both upstream and downstream sites, due to the project's impact intervention. *The impact is expected to be indirect, medium in magnitude, local in extent, and short-term in duration, and thus the overall impact is moderately significant.*

Mitigation:

So this needs to be taken care of and the access rehabilitated, along with a small shed. The cost is allocated in the BoQ as a PS item and also included in ESMP

Labor influx-related issues

The upgrading works of the GC road may have labor influx-related issues. The workers from diverse places and backgrounds will have to stay together in temporary accommodations near the settlement area with the community, which can lead to pressure on social service facilities and public utilities. The presence of

individuals from different regions or cultural contexts may result in differences in social norms, communication styles, and daily practices, potentially causing conflicts or misunderstandings. The project's Labour Management Procedure will be followed, and develop site-specific labour management plan during the project implementation phase.

Impact on religious and cultural sites

Impact on Shiva temple-Imilia, Diar of Tharu community-Dumara, small Shiva temple at Champapur, Supadeurali temple-after Jawai khola at the turning and Mothersa at Chandrauta with religious value due to this project intervention.

The magnitude of the impact is high, with local exposure and long-term influence; hence, it is a significant impact for the project

Mitigation

So this needs to be taken care of and the religious structures with obtaining rituals. The cost is allocated in the BoQ as a PS item and also included in ESMP. During consultation with local people and the temple management committee, they are ready to relocate and rehabilitate the temple nearby area. Before relocation and rehabilitation of public properties, an appropriate remedial action plan will be developed.

Relocation of the electric pole, solar lights, and telecom cable

There are distribution lines of electricity along both sides of the road, which contain 24 transformers and 805 electric poles (concrete), 193 electric poles (steel), 5 electric poles (wooden), solar street light -21, and telecom cable and poles 154, which need relocation during the project pre-construction phase. Transmission lines and telephone lines may need to be moved or repaired, leading to interruptions in electricity and communication services.

The impact is expected to be direct, medium in magnitude, local in extent, and short-term in duration; thus, the overall impact is moderately significant.

Mitigation

The cost is allocated in the BoQ as a PS item and also mentioned in ESMP. In addition, correspondence, communication, and an MoU will be developed with NEA, and relocation costs will be deposited into the NEA account. NEA will award a contract for the relocation of the electric pole. Regarding the telecom poles, they will shift by themselves in coordination with the project.

Issues related to Gau Samrakshan Kshetra near the Bel River

Along the road, there is a Gau Samrakshan Kshetra that has been operated by a priest of the Hindu religion from the Tharu community. It is located towards the south in the mid part of the forest towards south. The grazing area of the cow has extended towards the north, where the cow has to cross the road to access the forest to graze. During construction, if the construction area remains open for a long time or due to excavation, deposition, scarification, or other project works, there will be an obstruction to the movement of the cows. Similarly, unsafe driving, increased vehicles, and decreased visibility can lead to collisions

with the vehicles resulting in accidents, casualties as well and fatalities of the cows and vice versa. *The impact is direct/indirect, medium in magnitude, local in extent, short-term in duration, and thus the overall impact is moderately significant*

Mitigation

Cattle crossing has been proposed by modifying the box culvert, and a necessary traffic sign will be established .

Community Exposure to Worksite Hazards and Communicable Diseases

Communities will be exposed to construction-related hazards due to excavation, heavy vehicular movements, and other project-related routine and non-routine activities. Furthermore, they will be at risk due to the waste discharge and emissions from the camp and the batching & asphalt plant. These risks will be more prevalent at the construction works located close to the existing settlement (near 19 major villages and bazars).

Mitigation

The following mitigation measures will be implemented:

- Barricade the work areas with hard fencing to prevent the entry of the community into the construction areas.
- Placing of adequate signboards and flagmen to divert the community away from the construction works.
- Implementation of the traffic management plan near the construction sites
- Community awareness programs on construction-related hazards, including awareness programs in schools. Construction activities such as blasting and excavation, particularly at the borrow areas, may pose safety risks to the nearby population.
- First aid medical facilities will be made available at the worksite.
- Campaigns on STIs and communicable diseases (e.g., HIV/AIDs, COVID-19)
- With the above mitigation measures, the residual impacts have been assessed as minimal.

Health and sanitation of workers, as well as community health

Workers in infrastructure projects face multiple hazards, including physical risks from heavy machinery, heights, electrical tools, water work, trenches, and falling objects, as well as exposure to dust, noise, and vibrations. They also encounter chemical hazards during tasks like earthwork and bridge construction, and exposure to hazardous chemicals while handling and storing. Moreover, they will be in contact with insects, snakes, wild animals, etc., while at work, and working under stressful conditions could also be an additional risk among the workers. Without adequate PPE, they are at increased risk of accidents, respiratory problems, and eye injuries. Poor living conditions in temporary camps can lead to diseases like dysentery and cholera, while migrant workers often experience mental stress from harsh work environments and harassment.

The impact is expected to be direct/indirect, medium in magnitude, local in extent, and short-term in duration, and thus the overall impact is moderately significant.

Mitigation

The OHS and Community Health and Safety Plan will be developed by the contractor before the commencement of work.

Issues related to the creation of dead traps

Road upgrading often involves the excavation of materials from quarry or borrow areas, which can lead to the creation of "dead traps" or dangerous pits if not properly managed. These open pits pose safety risks for both humans and wildlife, as they can fill with water, becoming drowning hazards, or collapse, causing accidents. Without proper rehabilitation or filling of these areas after construction, they may remain as permanent hazards, negatively impacting the landscape and community safety. In a similar manner, people in these areas have been using the cycle as a means of local transport. If the highway does not have a cycle lane, there could be a high chance of accidents of those cyclists. Furthermore, due to disobeying traffic rules, they could also have road accidents.

The impact is expected to be direct, high in magnitude, local in extent, and long-term in duration, and thus overall impact is very significant.

Mitigation

Reclaiming and reinstatement the land to its previous condition should be done. Proper rehabilitation or filling of these areas is essential after completion of work. During construction hard barricade must be done.

4.5 Environmental Impacts and Risks during Construction

Generation of spoils

Excavations for earthworks for road widening and drainage structures, and removal of road material from the damaged sections of existing roads, will generate cut material. Most of the cut material can be used as fill material for embankment construction, and road material can be used as the base or subbase or for retaining structures, provided the fragmented rock meets the quality standards needed for the work. Disposal of spoils is not anticipated due to the potential use of all cut material.

Mitigation

The contractor will implement the following mitigation measures to minimize the generation of spoils:

- Minimize the generation of spoil by reusing it for the construction of the road embankment
- recycling the excavated road material to the maximum extent possible by using it as the aggregate material in the base subbase, concrete works, and filling of embankments and retaining structures
- If spoil disposal is needed, the project will confirm the sites based on the recommendation of ESIA/IEE.

With the above mitigation measures, the residual impacts have been assessed as minimal.

Generation of Construction and Hazardous Waste

The construction works generate large quantities of excess materials from construction sites (concrete, discarded material, etc.) and wastes from workers' camps and construction yards, including other debris. In

addition, small quantities of hazardous waste will also be generated mainly from the vehicle maintenance activities (liquid fuels, lubricants, hydraulic oils, chemicals, such as anti-freeze; contaminated soil; spillage control materials used to absorb oil and chemical spillages; machine/engine filter cartridges; oily rags, spent filters, contaminated soil, etc.). It is imperative that such waste is responsibly disposed of to avoid adverse environmental and human health impacts.

Mitigation

The following mitigation measures will be implemented:

- Before commencing the construction activities, the contractor will be required to prepare a Waste Management Plan, including hazardous waste management, and submit it to the PCU for their review and approval. The plan will cover managing hazardous material use, storage, transport, and disposal.
- The contractor will place containers of adequate size and numbers in place for the collection of various types of wastes (metal, rubber, used fuels, batteries, etc.) from the worksites, and transport these wastes regularly to a centralized facility.
- The contractor will return the empty containers to the suppliers.
- Handling chemicals properly. Storage of chemicals is 100 meters away from any water sources.

With the above mitigation measures, the residual impacts have been assessed as minimal.

Generation of Solid Waste

Solid waste will be generated from the construction camps and offices, which include food waste, paper and plastic, and garbage. About 300 workers live in the construction camp, and the average solid waste generation per worker is 0.5kg per day. Thus, the total quantity of waste generated from the camps will be 100 kg per day. Most of these wastes will be food waste. If these wastes are not properly managed, they may harm the environment and the health of workers and nearby communities.

Mitigation

The following mitigation measures will be implemented by the contractor:

- Before commencing the construction activities, the contractor will be required to prepare a Waste Management Plan and submit it to the PCU for their review and approval.
- Collection and segregation of solid waste into kitchen waste (organics), paper and plastic (recyclable), and garbage (non-recyclable). Three kinds of waste bins (with different colors) with adequate numbers and capacities will be placed at the campsite (kitchen, offices, rooms) for the segregation of the waste at source.
- Organic waste will be treated through on-site composting
- Procure the services of waste management contractors for the collection and management of recyclable waste. Recyclable waste will be compressed through balers to minimize the volume of waste to be stored and transported.
- Local municipal waste disposal sites will be used for the disposal of garbage. No disposal sites will be established by the contractor.

With the above mitigation measures, the residual impacts have been assessed as minimal.

Wastewater Discharges from Construction Sites

The potential sources of wastewater generation in the construction sites are batching plants, crusher plants, construction yards, and workers' camps. The wastewater discharges from the batching plants contain high sediment loads and high pH values. The wastewater used in the crushing plants also generates high sediment yield. These discharges will impact the soil and groundwater quality and aquatic environment if they are discharged into rivers and streams without any prior treatment. The groundwater located within the riverbed would be affected by the wastewater discharges. Other wastewater discharges from the construction sites include sanitary effluents from the workers' camp, and vehicle and machinery washing facilities.

Mitigation

The following mitigation measures will be implemented:

- Sedimentation ponds, of adequate size and capacity, will be built for the treatment of discharges from the batching plants and the crushing plants to allow the sediments to settle. Final discharges from the sedimentation ponds shall comply with World Bank EHSG standards for wastewater. The settled sediments will be periodically removed and disposed of at the designated spoil disposal sites.
- Construction of wastewater treatment facilities at the campsite (e.g., septic tank and soak pit) and site drainage)
- The contractor will be required to take appropriate measures to avoid and contain any spillage and pollution of the water
- Quarterly monitoring of wastewater quality to ensure compliance with the standards.

With the above mitigation measures, the residual impacts have been assessed as minimal.

Risk of Soil and water pollution from Construction Works

During construction, there is a high risk of accidental spills and leakages from fuel and oil tanks, vehicles, machinery, and stored chemicals that are used in construction areas, yards, batching plants, worker camps, and storage sites. Earthworks for site preparation and foundation during rainy periods may carry the sediment load to the nearby water bodies. Other potential sources of soil and surface water and groundwater pollution are improper storage and handling of materials, including hazardous materials, discharges from the construction sites and material storage, lack of proper drainage facilities, spillage of fuels, erosion from material stockpiles, etc.

Mitigation

The following mitigation measures will be carried out by the contractor to minimize soil and water pollution.

- Storage of fuels and chemicals in contained facilities and take appropriate measures to avoid and contain any spillage
- confine the contaminants immediately after such accidental spillage and cleanup of oil spills using spill kits.
- Collect contaminated soils, treat and dispose of them as hazardous waste

- Topsoil from cultivated lands in the construction areas to be stripped and stockpiled where practical for later use for restoration of spoil disposal sites.
- Temporary stockpiles to be protected from erosion.
- Contractor will develop a pollution prevention and emergency response plan as part of C-ESMP and submit for PCU approval. The plan will detail procedures to minimize and address the risk of soil and water pollution.

With the above mitigation measures, the residual impacts have been assessed as minimal.

Air and Noise Pollution from Construction

During construction, air and noise emissions from the construction activities will cause temporary nuisances to the residents along the Project road. Due to ribbon development along the project road, many residences and businesses are located adjacent to the road and will be subjected to air and noise pollution from construction activities. Major sources of air and noise pollution are earthworks, emissions from construction-related traffic, and equipment. The construction activities will also generate airborne dust and particulate matter. The dust raised from the above activities will have impacts on crops, animals, and public health.

Mitigation

The following mitigation measures will be implemented;

- Construction equipment and vehicles will be well-maintained so that emissions are minimal and comply with the emission standards of Nepal Vehicle Emission Standards 2012.
- Crushing and batching and asphalt plants will be located a minimum of 500 m away from residential areas and will have appropriate dust/emission suppression mechanisms, such as wet scrubbers
- Dust generation from construction sites would be restricted as much as possible, and water sprinkling would be carried out throughout the construction period.
- Construction activities near the settlements will be limited to daytime only
- High noise-producing equipment will be provided with mufflers or acoustic enclosures.
- A GRM will be put in place to receive complaints from the public on various aspects of environmental issues, including noise pollution. These grievances will be addressed by the contractor by adopting the necessary measures.
- Quarterly air and noise quality monitoring will be carried out in the project area to ensure compliance with national standards on ambient air and noise quality.

With the above mitigation measures, the residual impacts have been assessed as minimal.

Impacts of Quarry and Borrow Activities

About 24,700 m³ of aggregates and 11,678 cubic meters of sand material will be required for construction activities. Improper sitting and extraction of these construction materials will have significant impacts on the physical and biological environment in the quarry and borrow areas. Locations of potential borrow and quarry sites and the estimated quantity of materials available at these sites are given in Table 9.

Mitigation

The following mitigation measures will be implemented:

- The contractor will develop a quarry and borrow areas procurement and management plan submit it for approval of PCU.
- The contractor shall use the government-approved quarry sites with approved E&S assessments for the procurement of aggregates.
- Reuse of excavated material from the construction sites to the extent feasible.
- Source the riverbed sediments from the licensed borrow sites, sourced away from the active channels and during no or low flow seasons, and non-perennial streams.
- Although the material is widely available, the quarrying/mining activities will be limited to fewer areas to reduce the extent of area affected by quarrying activities. If any mining activities are to be carried out outside the project area, they should not be located in any sensitive areas.
- Maintain a buffer zone of 5 to 10m between the low flow channel and the mining operations to minimize the downstream impacts and limit the excavation activities to the low flow season (non-monsoon).
- Borrow sites will be restored after completion of the works

With the above mitigation measures, the residual impacts have been assessed as minimal.

Impact on River Habitat due to Instream Construction Activities

Construction activities in the river, for bridges and bank protection works, have the potential to adversely affect aquatic biota by the release of high concentrations of sediment during the construction of cofferdams, erosion/run off from the riverbank, and accidental spillage of fuels. Quarrying activities for the procurement of material from rivers also generate high sediment loads, impacting the water quality. Potential quarry sites in the project area that can be used during construction are the Banganga River, Belwagurdawa River, and Rapti River. Government-approved existing quarry sites are located near these rivers.

Mitigation

The following mitigation measures will be implemented:

- Contractor will use the existing quarry sites operated with the government licenses.
- No new sites will be established by the contractor. If any new sites are to be developed, the contractor will develop a quarry and borrow pit operation plan and obtain approval from the supervising engineers prior to the operation of the quarry.
- Avoid haphazard quarrying along the riverbank and hills. Permanent barricade at quarry location for safety, established safety signage boards, and installed noise barrier.
- Control of wastewater and sediment releases to the river
- Prevent the release of silt, sediment, sediment-laden water, raw concrete, concrete leachate, or any other deleterious substances into the River.
- Ensure equipment and machinery are in good operating condition (power washed), free of leaks, excess oil and lubricants, and grease.

- Machinery leaking fuel, lubricants, hydraulic fluids, or solvents shall not work within the river.
- Keep a spill containment kit readily accessible onsite in the event of a release of a deleterious substance to the environment. Train onsite staff in its use.
- Restoration of the borrow sites after completion of the works

With the above mitigation measures, the residual impacts have been assessed as minimal.

Impact on Flora

The potential impacts on flora during construction include cutting of the trees by workers for fuel, and clearing of vegetation for establishing the temporary construction facilities, such as workers' camps, material storage sites, and other facilities.

Mitigation

The following mitigation measures will be implemented:

- The contractor's code of conduct for workers will include conditions on the protection of flora and fauna, and ban on cutting trees, and a ban on hunting and poaching of wildlife. Employees found violating would be subject to strict actions, including fines and termination of employment.
- Use of non-wood fuel for cooking and heating.
- No temporary construction facilities will be established in the forest areas
- Awareness-raising to workers on the protection of flora and fauna
- Compensatory plantation of locally indigenous trees and shrubs (mainly, identification of location, selection of appropriate species, preparation of nursery, and availability of horticultural skills)

With the above mitigation measures, the residual impacts have been assessed as minimal.

Spread of Invasive Alien Species

Invasive alien species (IAS) present a significant risk to biodiversity and are easily spread by linear projects unintentionally or intentionally, through a lack of awareness of the risks. Measures are therefore required to not intentionally introduce any new alien species (not currently established in the country) unless this is carried out in accordance with the existing regulatory framework for such introduction. Species with a high risk of invasive behavior must not be introduced, regardless of whether such introductions are permitted. Measures will be implemented to avoid the potential for accidental or unintended introductions, including the transportation of substrates and vectors (such as soil and weed-infested machinery) that may harbor IAS. Where IAS are already established in the region of the project, efforts are required to reduce their spread into areas in which they have not already become established.

Mitigation

- All introductions of alien species (for example, as part of a rehabilitation program) will be subject to a risk assessment to determine the potential for invasive behavior with consideration of the Nepal regulatory framework for species introduction.
- Construction sites will be rehabilitated at the earliest opportunities, and rehabilitation plans will IAS control measures appropriate to the IAS risks prevailing in the project area.

- Construction vehicles will be brought into the site in an ‘as-clean-as-new’ condition to ensure that invasive plant material and seed-bearing soil are not introduced.
- All vehicles will be cleaned on a regular basis to prevent the unintentional spread of IAS within the project area.
- IAS will be regularly controlled in construction vehicle parking and operational areas.

Impact on Fauna

Impact on Mammals. The tree clearance within RoW in the forest blocks would degrade wildlife habitat. The construction workers living in the camps are likely to use firewood for cooking and also, to some extent, in the winter season for heating purposes. Wildlife poaching would be possible without proper awareness-raising. Accidental spillage of oil and lubricant from construction equipment/vehicles and waste dumping in the forest areas, particularly from camp sites, would cause negative impacts on wildlife.

Impact on Birds. The construction phase will have limited impacts on the avifauna. Tree clearance within RoW will slightly reduce bird habitat, foraging, and roosting trees. Increased people mobility and noise during construction might disturb the bird species and affect their behaviors. Dumping of wastes/chemicals and accidental spillage in springs, rivers, and wetlands could affect the bird habitat at site site-specific level.

Mitigation

The following mitigation measures will be implemented to address the impacts on mammals:

- For road widening, the dense vegetation will only be cleared once it has been established that any individuals present have fled. Surveys will be conducted by trained ecologists before and during vegetation clearance or tree felling and major ground-breaking activities to check for active burrows, tortoises, snakes, and lesser fauna. Any animals found will be removed and released to appropriate and predetermined safe locations. There should be no burning of natural vegetation. The borrowed animals, if found during excavation, shall also be transported to a safe place.
- No workers' camps and construction facilities should be constructed in or adjacent to the forest areas
- Rehabilitation of existing barbed wire fence in Bel-Jawai and Champapur forest patch, considering wildlife protection and designs appropriate to the affected wildlife species
- Culvert/tunnel installation in the forest blocks based on the additional study on mammal movement/roadkill, location, and design assessments
- Installation of traffic signs alerting speed limit
- Installation of wildlife crossing information/display board at 1km span and speed breakers in the forest blocks
- Pits and trenches during construction present faunal hazards and will be avoided where possible, capped, and/or provided with an escape route for small fauna. Unavoidable hazards will be regularly checked for small fauna by appropriately trained staff.
- A staff member trained as a snake handler and equipped to capture and translocate dangerous snakes and other reptiles without harm shall be available during vegetation clearing, ground-breaking activities, and major construction works.
- Awareness-raising workshops with the forest user groups at the forest blocks regarding wildlife behaviors, road kills, wildlife poaching, human-wildlife conflict, and traffic regulations

- Induction programmes and provision of regular training to workers on the potential impacts of their behavior and emphasize the need to protect biodiversity, abstain from wildlife poaching, avoid habitat degradation/ pollution, and outline procedures and penalties that prohibit the killing of fauna and/or any form of trade in bush meat or wildlife products.
- Inclusion of wildlife protection clauses in the code of conduct for contractors
- The construction site should be fenced to prevent wildlife entry to the construction site
- Regular visual inspection of wildlife will be conducted by an ecologist appointed by the contractors.
- Spill kits should be provided at each construction site where oils and chemicals are used.
- Regular maintenance of construction equipment and vehicles will be undertaken
- Oils and chemicals should be stored at designated storage with proposed spill/accident prevention and response measures, such as the provision of secondary containment, MSDS, and spill kit
- The organic waste should be properly stored and composted.

The following mitigation measures will be implemented to address the impacts on avifauna and snakes:

- The construction materials and their by-products should be stored away from watercourses. Especially during summer/monsoon time, good care should be taken.
- No construction activities during the nighttime
- Large sapling plantation at road roadside should be carried out as soon as the construction work is completed. This will increase bird habitat, foraging, and roosting trees, especially in semi-urban and rural areas
- Roadside plantation be made of the species that bear seed/fruit and have an open/light canopy like simal (*Bombax ceiba*), etc.
- Ensure the use of machines that produce low noise where feasible.
- Unnecessary noise generation during the construction work and post-construction should be avoided through regular awareness and traffic no-horn zones.
- Training provision to workers on the potential impacts of their behavior, including wildlife poaching and habitat degradation/pollution
- Inclusion of wildlife protection clauses in the code of conduct for contractors

Potential risks associated with an illegal wildlife trade

The project is located within an area that supports exceptionally rich biodiversity, which includes many threatened species. Critically Endangered and Endangered species are potentially present, although many more species have a lesser threatened status. One of the primary reasons for species to be threatened is the ongoing illegal trade in wildlife and natural resources.

Road projects have the potential to exacerbate such threats through increasing access to natural areas, which, without adequate protection, can greatly increase hunting and collection pressure on sought-after species. Species groups of greatest concern include medicinal and health products, turtles, raptors, pangolins, orchids, illegal timber, and others. The influx of labor can be a major source of poaching. Construction workers are often mobile, well-resourced, and coming from far away, often with little incentive to conserve local resources. Demand for timber for construction work can be a driver of deforestation, and the traceability of such timber can be difficult.

Mitigation

- All bidding documents and construction contracts are to include specific provisions forbidding hunting or collecting natural resources of workers. Contracts can also include articles that require the use of access controls/checkpoints, zero tolerance of any illegal biodiversity resources in worker camps (such as wildlife products sold to construction workers; products of illegal hunting along access roads; pets taken from the wild), and offer workers appropriate food/canteen options that will reduce demand for seeking local food options.
- The PCU will provide a safe and anonymous line for reporting activity for workers, communities, or any stakeholders, whereby they are safe from retribution from other community members, organized crime, or government officials.
- If a crime is committed, national authorities need to be alerted immediately. In addition, sometimes, live animals can be rehabilitated, and the appropriate national authorities or non-government organizations need to be contacted to collect the animals to avoid risks of harm to people and the animal(s).
- Contractors shall be responsible for demonstrating that timber procurement is limited to those suppliers that can demonstrate that timber is legitimately sourced and does not contribute to significant conversion or degradation of natural or critical habitats.

4.6 Occupational Health and Safety Risks during Construction

The workers may be exposed to various Occupational Health and Safety risks that are likely to arise during the construction phase. The possible risks include: exposure to physical hazards from use of heavy equipment including cranes; working at height and electrical equipment; working on water, trip and fall hazards; exposure to dust, noise and vibrations; falling objects; exposure to hazardous materials; and exposure to electrical hazards from the use of tools and machinery, insects and snakes bite, wild and stray animal hit/contact may cause injury and zoonotic diseases while at work. Potential health issues among workers are associated with the use of temporary accommodation sites, poor sanitation and hygiene facilities, water-related diseases, fire, cultural alienation, sleeping space, quality and quantity of food, risk of stress on workers due to long working hours and working under stress, personal safety and security, temperature control, and recreation.

Mitigation

The following mitigation measures will be implemented:

- The contractor will be required to prepare and implement an occupational health and safety (OHS) plan after getting approval. These plans will be prepared in compliance with the World Bank Group's EHSs and national regulations. If these guidelines cannot address any specific aspect of OHS, international good practices such as OSHA and ILO will be applied. OHS Plan should contain general guidance for all identified hazards under each work activity, and site-specific OHS hazards and risks during construction, and control and preventive Measures proposed by the Contractor. The Plan shall be reviewed and updated if there are any changes in the construction methodologies.

- OHS Plan should contain general guidance for all identified hazards under each work activity, and they should be presented in three discrete headings: (a) Contractor's Standards on the identified hazard management, (b) Expected Site-specific OHS hazards and risks during construction, and (c) Control and Preventive Measures proposed by the Contractor.
- The OHS plan will be reviewed and approved by the Construction Supervision Consultant and the World Bank
- The contractor will develop and implement a camp management plan.
- The construction camp will be built with all adequate facilities (safe drinking water and sanitation, kitchen, rest areas, etc.), including entertainment facilities for all the workers. Also, provide hygienic sanitation (toilet) facilities at the worksite and labour camp. This should be separate for men and women workers.
- Conduct a 'job hazard analysis' at the new construction site to identify potential hazards that may arise from the proposed works or working conditions to the project workers and implement necessary control measures. The job hazard analysis should be part of the contractor's method statements, which will be reviewed and approved by the supervision consultants. The specialists of the supervision consultant will also visit the construction sites, prior to the start of construction, to ensure the control measures are in place.
- Regular site inspections and safety audits by the construction supervision team, both by the OHS specialist and the site engineers. Since the site engineers will be present at the worksites all the time, they will be trained by their OHS team on monitoring safety aspects of the construction works. Develop a calendar for each monitoring event and produce an event report with corrective actions observed at each visit.
- Regular training program for workers on occupational health safety (monthly training and daily toolbox talks). Special attention will be focused on safety training for workers to prevent and restrict accidents and on the knowledge of how to deal with emergencies. Develop a training event calendar and resource materials applicable to each event.
- Incident investigation and reporting, including a complete record of accidents and near misses, will be maintained.
- In order to protect all project personnel and visitors, the Contractor will provide personal protective equipment (PPE) for workers, such as safety boots, helmets, masks, gloves, body harness, protective clothing, goggles, fully face eye shields, and ear protection. The contractor will also provide training to workers on how to use them and maintain them in a sanitary and reliable condition, and replace the damaged ones immediately with the new ones.
- Availability of firefighting, ambulance, medical, and rescue facilities at the site for implementation of an emergency response plan. Adequate water supply and mobile toilets, medical and first aid care facilities at the worksites
- Contractors will have dedicated and qualified staff for ensuring compliance with the OHS Plan
- Introduce work-rest facilities while at work
- Develop, distribute, and posting of awareness-raising material will be used, including posters, signage, booklets, and others, at the worksites
- A complete record of accidents and near misses will be maintained.
- Provide First aid facilities and primary healthcare facilities at the worksites and in the camps. The contractors will engage qualified first aider(s).

- Provide barricades, signage, and information at the site and make people aware of all concerns, including the community.
- The Contractor shall establish a mechanism to collect the complaints from the workers and address those complaints through the approved GRM plan.
- Follow OHS Operating Manual, 2024 (Department of Roads).
- With the above mitigation measures, the residual impacts have been assessed as minimal.

4.7 Social Impacts and Risks during the Operation Phase

Safety Hazards due to Increased Traffic

The road widening activities will affect the normal traffic on the highway and local traffic and could lead to traffic congestion. Road, particularly the movement and safety of school children and the elderly. Due to the increased use of trucks and other vehicles on the narrow roads in the project area, pedestrians, particularly elderly people and children, will be more exposed to dangerous situations, leading to traffic accidents.

Mitigation

- The contractor will develop and implement a traffic management plan with adequate measures, such as proposing traffic diversion measures, alternate routes for local traffic, avoiding school hours, following speed limits, hiring licensed drivers, etc. The plan will be implemented with the aim of ensuring access to residential areas and preventing unsafe situations, especially near schools, housing areas, and construction areas
- The road should not be stopped for existing traffic. The contractor will maintain the traffic on both sides of the highway by placing appropriate control measures and flagmen.
- Road signage will be fixed at appropriate locations to reduce safety hazards associated with project-related vehicular traffic.
- Develop a Zebra crossing near to school area for easy crossing of roads.
- Develop a signalized traffic system with lighting facilities at the junction and school area.
- Liaison with the traffic police will be maintained
- Project drivers will be trained in defensive driving.
- Ensure that all construction vehicles observe speed limits on the construction sites and on public roads
- Provide adequate signage, barriers, and flag persons for traffic control.

With the above mitigation measures, the residual impacts have been assessed as minimal.

Risk of Gender-Based Violence

The interaction between the Project construction labor force and the communities, and especially among the women workers, may lead to Sexual Exploitation and Abuse (SEA) and Sexual Harassment (SH)

Mitigation:

Commensurate with this risk level and also to be proactive, the Project has proposed several proactive measures. SEA/SH Action Plan will be designed and implemented, and will include the following measures:

- Inclusion of a clause on GBV/SEA/SH behavior obligations in the employment contracts of all employees and construction workers aimed at strengthening measures to address and prevent SEA/SH in the workplace and construction areas;
- Awareness training of DOR CSC, contractor, sub-contractor, and service providers' staff to sensitize them about SEA, SH, and their responsibilities to prevent;
- Posting of CoC standards in public spaces at contractor's work camps and living areas, and village information centers and public places of adjoining/neighborhood communities in the Nepali language;
- Raising awareness that SEA/SH is prohibited;
- Awareness to explain suspicious situations and the signs of SEA/SH;
- Provide information on the use of GRM to report cases of SEA/SH, Code of Conduct breaches, and assist victims of SEA, if signs of SEA are identified/a victim approaches them to complain about SEA;
- Awareness to communities, particularly women, and male and female children to understand risks of SEA and SH and the roles and responsibilities of parties involved in project implementation on SEA and SH prevention, processes for reporting incidents of project-related SEA/SH, and the corresponding accountability structures;
- Strengthen the Contractors' obligations and capacity to mitigate public health and safety risks and ensure contractor supervision capacity to monitor the mitigation of these risks;
- Proactive GBV/SEA prevention measures will be put in place, such as GBV/SEA-related training to sensitize workers and the local population along the project implementation area, and ensuring that GRM for the project will also take care of GBV-related issues, if any.
- There will be adequate mechanisms in place to protect the local vulnerable population, especially women and minors, from risks associated with the influx of workers (harassment, underage sex). This mechanism will ensure the sensitization and enforcement of the code of conduct by the Contractor employees and workers and all other parties that are involved in the project implementation.
- Additionally, the Contractor will employ their skilled staff and apply unskilled construction labor from the local population as far as possible to minimize an influx of outsiders into the communities.

Impacts from Labour Influx

For the proposed project activities, the average labour requirement per day is 500. Unskilled workers will be hired locally; however, the skilled workers will be brought by the contractor from other parts of Nepal or abroad. It is estimated that about 200 migrant workers work on this project. labor influx may lead to negative impacts on the host community. Pre-existing social issues in the host community can easily be worsened by the influx of labor. The potential risks associated with labour influx are social tension arise between the local community and the construction workers, which may be related to differences due to

competition for local resources, increase the rate of crimes and/or a perception of insecurity by the local community, increased burden on and competition for public service provision, and influx of people may bring communicable diseases to the project area, including sexually transmitted diseases (STDs), infectious diseases such as COVID19, or the incoming workers may be exposed to diseases to which they have low resistance. The presence of workers in local communities can also result in intimate relations, as well as sexual exploitation and abuse, and sexual harassment.

Mitigation

The following mitigation measures will be implemented:

- The contractor will prepare a labour management plan prior to construction works for approval by PCU. This also includes the detailed plan for recruitment for each category of employment, considering priority to local people. And, develop a labour registration book for each. This situation will be addressed by an awareness campaign implemented at the beginning of the construction phase. The Contractors will be aware of the possibility and risks of miscommunications between local residents and workers, which could easily lead to conflicts. This will be prevented by raising awareness and implementing a Code of Conduct for the workers. The Contractor shall develop a Worker Code of Conduct to govern the behavior of workers on-site, in camps, and in local communities.
- The awareness campaign will also be aimed at the risk of interaction between the resident population and the construction workforce, including the spreading of sexually transmitted diseases such as HIV/AIDS.
- The contractor's code of conduct shall cover the program to promote awareness among the construction workers on respecting the local community.
- Construction camps will be built in the designated areas, located away from the local settlements
- The contractor will ensure local water usage will not be affected by the project's water usage by the project or compete with the water requirements of the local community
- The Contractor's monthly training program will cover topics related to a respectful attitude while interacting with the local community
- COVID-19 protocol measures, specified in the national and WHO guidelines, will be complied with.

With the above mitigation measures, the residual impacts have been assessed as minimal.

Cumulative Developments on the East-West Highway

The World Bank is thus supporting the Government of Nepal to address infrastructure and non-infrastructure constraints to improve regional trade under the ongoing Nepal-India Regional Trade and Transport Project (NIRTTP) and the Strategic Road Connectivity and Trade Improvement Project (SRCTIP). Under the NIRTTP, the improvement of the 2-lane 33-km Narayanghat-Mugling (i.e., N-M) road was supported while SRCTIP will support the improvement of the 2-lane 94.7-km Nagdhunga-Naubise-Mugling (NNM) Road on the pivotal north-south (N-S) trade corridor connecting Kathmandu and Birgunj (both NM and NNM Roads do not involve any widening or upgrading to 4-lane), the widening of the 130-km Kamala-Dhalkebar-Pathlaiya Road (KDP) of the East West Highway into a four-lane road and widening of the 50-km Butwal-Gorusinghe Road (BG) of the East West Highway into a four-lane road.

Other improvements of other sections of the East-West Highway are either ongoing or will commence soon with funding from different multilateral donor partners, such as ADB, WB, or JICA. List of some of the ongoing upgrading/construction works is as follows:

- Kanchanpur-Kamala, 87 Km (ADB - Expected completion: December 2025)
- Narayanghat- Butwal, 115 Km (ADB - Expected completion: January 2026)
- Nagdhunga Tunnel on NNM road, 5.05 Km (JICA - Expected completion: December 2025)
- Mugling-Pokhara Road, 81 Km (ADB - Expected completion: December 2025)

Besides these, the part of the Mechi-Mahakali electrified railway is parallelly connected with the section of the GC road. The alignment of the railway line of the Butwal-Lamahi (110 km) section is a part of Mechi-Mahakali electrified railway alignment, which lies in Dang, Kapilvastu, and Rupendehi Districts and covers the land area covered estimated at 169.22Ha and 429 settlements. Since the project components occupy approximately 60% of forest land out of the total land requirement, a very sensitive approach during construction has to be employed, so that the ecological balance is the major concern after the project comes into operation. Similarly, the New Butwal-Lamahi 400 KV transmission line, which is parallel to GC road, might have an impact on the bird species, especially on vultures, in the Lalmatiya area of Dang district, which in the western side of the Gorusinghe-Chandratua road.

Environmental Sensitivity of the East-West Highway

The East-West Highway and North-South Road network traverse environmentally and socially sensitive areas, wetlands, and different types of forests that harbor important biodiversity resources and species of global and national significance, such as important bat roosting areas, etc. Between Pathlaiya and Narayanghat, the road passes through several protected areas, including the Chitwan National Park (a UNESCO World Heritage Site), Parsa National Park, and Bharandabaha Forest, as well as other areas of natural forest habitat not currently under formal protection. Habitats not under formal protection are important for maintaining viable meta-populations of large wildlife species such as tiger, rhino, and elephant that cannot be effectively conserved within the available protected area network of Nepal. Important wildlife corridors have been identified within the TAL, some of which are intersected by the East-West Highway, and full operation of the road is identified as a major risk to the TAL (Strategy and Action Plan 2015 to 2025). Areas of particular sensitivity include the approximately 10km stretch from Pathlaiya to Ahmaleckganj (between Birgunj and Hetauda, in the buffer zone to the Parsa National Park) is a critical area for biodiversity and reportedly part of a wildlife corridor for elephants and rhinos that migrate seasonally from the National Park to the Bagmati River. There are regularly reported road crossings as well as traffic-related wildlife fatalities along this stretch involving these and other important species such as tigers, leopards, and wild boar. The approximately 4.5 km Tikauli Forest stretch through Bharandabaha Forest-which links Chitwan National Park with forest to the north of the road in the Mahabharat hills, is another reported hotspot for wildlife migration and movement, and the buffer zone has continued up to some sections of Narayanghat-Butwal road also. Tigers and rhinos reportedly cross here, mostly in late summer. On the other hand, while the Fast Track and Tunnel Road alignments would both divert traffic away from at least some of the protected areas and known sensitive zones for wildlife movement, all identified alignments would still cross through some portion of an important elephant and rhino migratory corridor that extends from the Parsa National Park eastward towards the Bagmati River.

Table 69: Valued Environmental Components (VECs)

VECs	Relevance
Forest cover	Total forest area lost (directly or from induced land use change) Reduction in measurable associated forest-based ecosystem services (such as slope stability/erosion control, provision of non-timber forest products to local communities, etc.)
Terai Arc Landscape and associated key wildlife species	Long-term health and population viability of large wildlife species (tiger, rhino, elephant, and others) that have a major ecological role in the health of national parks and their economic viability require the maintenance of wildlife corridors that are threatened by the ongoing development of the East-West Highway.
Geomorphology and landscape	Number of landslide events Total area affected by soil erosion/landslides and slope instability Kilometers of road affected by landslides/slope instability, and the number of days (or time) roads are obstructed (no traffic movement)
Water and watershed conditions	Surface water and groundwater conditions Changes in streamflow Increase or reduction in irrigated area Increase or reduction in consumptive water use
Human Health and Safety	Traffic-related fatalities, the number of wildlife collisions, and damage costs
Land and Property	Value of assets lost, including agricultural land and structures (residential and commercial) that may be affected Number of people affected by the loss of assets

Cumulative Impacts

Development of all these projects will have a significant cumulative impact on the identified VECs. The World Bank has initiated a Strategic Environmental and Social Assessment (SESA) study to support the Government of Nepal (GoN) in enhancing the overall performance of selected critical road sections of the East-West Highway, and the capacity of the DOR for better planning, management, and improved transport efficiency of the country's Strategic Road Network. The project was completed in September 2023. The detailed objectives of this study are:

- To provide a basis for DoR to factor in priority environmental and social considerations and key stakeholder perspectives into upstream strategic decision-making about the improvements/upgrading of the East-West Highway (KDP) and North-South (NNM)-alongside financial, technical, and social considerations;
- To assess the cumulative impacts of proposed highway projects together with other past, ongoing, and planned development interventions within the KDP Road section of the East-West Highway and the NNM Road within the North-South Road Network, identified and prioritized Valued Environmental and Social Components (VECs);
- To contribute towards embedding good practices on greening the road sector, biodiversity conservation and protection, building resilience, and overall environmental and social management into road sector development in Nepal generally, as well as specifically into the updated feasibility studies, ESIs, engineering designs, and implementation of selected specific corridor investments

along East-West Highway and North-South Road Network. All of these will be embodied in a Strategy/Road Map for Greening the Selected Corridor of the East-West Highway and North-South Road Network.

The SESA recommends using it to assess the impacts of the introduction of policies/strategies, network plans, corridor plans, and programmes. SESA has highlighted the concept of a green, resilient road along the East-West highway. SESA also recommends integrating issues of siltation.

Chapter 5 Environmental and Social Management Plan

This chapter describes the proposed institutional mechanism, mitigation, and monitoring plans for management of environmental, social, safety, and health issues of the Project, and inclusion of mitigation and monitoring measures in contractors' bidding documents. The basic objective of the ESMP is to manage the adverse impacts of project interventions in a way that minimizes the adverse impact on the environment and people of the project area. The key objectives of the ESMP are to facilitate the implementation of the mitigation measures identified during the present ESIA and discussed earlier in the document, assign responsibilities for DOR, contractors, consultants, and the safeguard team of the Project, and define a monitoring mechanism and identify monitoring parameters in order to ensure the complete implementation of all mitigation measures.

5.1. Inclusion of ESMP in contract documents

In order to make the Contractors fully aware of the implications of the ESMP and responsible for ensuring compliance, technical specifications in the tender documents will include compliance with mitigation measures proposed in the ESMP. The Contractor will be made accountable through contract documents for the obligations regarding the environmental and social components of the project.

PCU will include the following Environmental, Social, Health, and Safety (ESHS) Conditions in the bidding documents:

- Past performance of the Contractor on ESHS aspects, including sexual exploitation and abuse and gender-based violence;
- ESHS Staff with the Contractor;
- Performance Security;
- C-ESMPs and mitigation measures to address construction impacts;
- Payments for implementation of ESHS measures;
- Code of Conduct of Contractor's Personnel;
- Management Strategies and Implementation Plans (MSIP) to manage the ESHS Risks.

Each of the above conditions is elaborated in **Table 70**.

Table 70: ESHS Conditions in the Bidding Documents

Condition	The rationale for the inclusion of this Condition in the Contract	Specifications to be included in the Bidding Documents	Responsibility	
			Bidders	PCU
1. Past performance of the Contractor on ESHS is one of the eligibility criteria for the shortlisting process	The Contractor's past performance on compliance with ESHS is an indicator of the Contractor's commitment and capability for implementation of the ESMP	The Bidder shall "declare any civil work contracts that have been suspended or terminated and/or performance security called by an employer for reasons related to the non-compliance of any environmental, or social (including sexual exploitation and abuse (SEA) and gender-based violence (GBV) or health or safety requirements or safeguards in the past five years".	Bidder to make the Declaration	PCU uses this information to seek further information or clarification in carrying out its due diligence
2. Contractor shall propose adequate ESHS Specialists in his team (Environmental Specialist, OHS specialist, Social specialist, site supervisors)	The Contractor's staff should include adequate ESHS specialists who are responsible for the implementation of all mitigation measures on ESHS risks and compliance with ESMP	The Bidder shall propose an Environmental, Social, Health and Safety (ESHS) Specialist as the Contractor's Key Personnel at the Site. The Bidder shall provide details of the proposed ESHS specialist, including academic qualifications and work experience. The ESHS Specialist should have a minimum bachelor's degree in engineering or a master's degree in sciences related to environmental management. The Specialist should have 5 years of experience working on monitoring and managing ESHS risks related to infrastructure projects.	The bidder is to submit the CV of the proposed ESHS Specialist	PCU will review and approve
3. Contractor shall submit ESHS Performance	The Contractor should have a financial implication	The Bidder shall submit the ESHS Performance Security in the form of a	The bidder will submit a	

Condition	The rationale for the inclusion of this Condition in the Contract	Specifications to be included in the Bidding Documents	Responsibility	
			Bidders	PCU
Security for compliance with ESHS obligations	if they cannot comply with ESHS requirements. Hence, performance security will be collected from the Contractor	"demand guarantee" in the amount of three percent (1-3%) of the Contract Amount.	Performance Security	
4. Implement Mitigation Measures to Address Construction-Related Impacts given in ESMP	The mitigation measures to address potential ESHS risks and impacts should be included in the bidding documents. The Contractor shall be made responsible for the implementation of the mitigation measures through the necessary conditions in the contract.	PCUs will ensure the ESMP in the General Specifications of the Bidding Document, and the reference to this document will be provided in the Conditions of the Contract as follows: - The Contractor shall implement the mitigation and monitoring measures given in the ESMP to address ESHS risks associated with the construction works. The Consultant shall refer to the ESIA of the Project, which is available on the PCMU website for further guidance. - The Contractor shall comply with the World Bank Group's General Environmental Health and Safety Guidelines and applicable sector-specific guidelines		PCU will include this condition in the bidding document
5. Payments for implementation of ESHS Mitigation and Monitoring Measures	BOQs on ESHS implementation are included in the Bidding Documents	A lump sum budget will be allotted for the preparation and implementation of C-ESMP (including OHS plans), environmental monitoring, etc.	Bidder will quote for the ESHS Management	

Condition	The rationale for the inclusion of this Condition in the Contract	Specifications to be included in the Bidding Documents	Responsibility	
			Bidders	PCU
6. Code of Conduct for Contractor's Personnel	All workers hired by the Contractor should sign a code of conduct to ensure compliance with ESHS obligations of the Contract	The Bidder shall submit the Code of Conduct that will apply to the Contractor's employees and subcontractors. The Code of Conduct will state that the workers will comply with the following ESHS requirements: • Wearing of Personal Protective Equipment (PPE) in the workplace at all times • Non-discrimination in dealing with the local community by race, ethnicity, gender, religion, disability, sexual orientation, gender identity, socioeconomic status, or health status • Respectful attitude while interacting with the local community • Prohibit sexual harassment, particularly towards women and children • Prohibit violence, including sexual and/or gender-based violence • Respecting the reasonable work instructions • Protection and Proposer's use of the property The suitability of the Code of Conduct can be assessed and discussed as part of the Bid/Proposal evaluation and negotiations	Bidder shall submit the Code of Conduct with the bid documents	

Condition	The rationale for the inclusion of this Condition in the Contract	Specifications to be included in the Bidding Documents	Responsibility	
			Bidders	PCU
		The successful bidder is required to implement the agreed code of conduct upon contract award		
7. Contractor's Management Strategies and Implementation Plans (MSIP) to manage the ESHS Risk	The Contractor proposal should include their understanding of the ESHS requirements of the project and the proposed strategies to manage the ESHS risks	The Bidder shall submit Management Strategies and Implementation Plans (MSIP) to manage the following key ESHS risks: • Strategy for the protection of workers and the community from the construction-related hazards inside the terminal • Borrow area management and restoration plan • Construction Material Sourcing Plan • Pollution prevention (wastewater, air, and noise emissions) and management • A waste management plan for the proper collection and disposal of waste • Traffic management plan to ensure the safety of local communities from construction traffic • Hazardous material management plan, safe storage and handling • Strategy to address labor influx impacts on the local communities • Gender-based violence and sexual exploitation, and	The bidder will submit MSIP along with the Bid Documents	

Condition	The rationale for the inclusion of this Condition in the Contract	Specifications to be included in the Bidding Documents	Responsibility	
			Bidders	PCU
		abuse prevention and response action plan Emergency response plan and early warning system The Contractor shall be subsequently required to submit (before mobilization) the Contractor's Environment and Social Management Plan (C-ESMP) by the above strategies and Condition 4 of this Table.		

5.2 Environmental and Social Management Plan (ESMP) During Construction

Pre-construction Stage Mitigation Plans

Pre-construction stage will mainly include the mobilization of the contractor and the finalization of the following conditions/documentation by the Contractor. Specially, Contractor's Environmental and Social Management Plan (C-ESMP) with other site-specific management plans. The mobilization of ESHS Specialists and conducting E & S screening of workers' campsites and hiring of workers as provided in Labour Management procedures.

Table 71: ESHS Conditions in the Pre-Construction Stage

Condition	The rationale for the inclusion of this Condition	Description of the Condition	Responsibility	
			Implementation	Supervision
1. Preparation of Contractor's Environmental and Social Management Plan (C-ESMP)	The Contractor shall submit site-specific management plans to address ESHS risks following the ESMP requirements and the MSIP proposed in the bid documents.	The Contractor is to submit for approval and subsequently implement their Environment and Social Management Plan (C-ESMP). The C-ESMP should be submitted prior to the commencement of construction and siting works, and no construction activities will be carried out under the project until approval of the C-ESMP. The C-ESMP will include the following <u>site-specific</u> management plans: - Occupational health and safety management plan - Community health and safety management plan - Quarry side operation and management plan	Contractor	PCU, CSC, Project

Condition	The rationale for the inclusion of this Condition	Description of the Condition	Responsibility	
			Implementation	Supervision
		- Burrow pit operation and management plan - Camp management plan - Waste management plan - Wastewater discharges management plan - Air and noise emissions management plan - Hazardous material management and spill control plan - Water supply and sanitation management at the worksites and workers' accommodations - Management of labour influx and facilities for the foreign workers - Labour recruitment procedures and labour management - Traffic management plan - Training plan for ESHS risks including HIV/AIDS, sexual exploitation and abuse, and gender-based violence - Emergency Response Plan - Grievance Redress Mechanism - Demobilization plan after completion of works		
2. Mobilization of ESHS Specialists	The ESHS Specialists should be mobilized during pre-construction for the preparation of C-ESMP	The Contractor shall submit the CVs of the following ESHS Specialists for PCU through the supervision consultant for review and approval, and mobilize them - Environmental Officer - OHS Officer - Social Officer The ESHS Specialists should be present at the site throughout the construction period.	Contractor	PCU, CSC, Project
3. The hiring of Construction Labour	Hiring procedure for construction workers, including the signing of the code of conduct	Provisions in labour management procedures (LMP) will be followed. The Procedures will include terms and conditions of employment, including hours of work, wages, overtime, compensation and benefits, holidays, leaves, and so on. The procedures will set out measures to prevent and address harassment, intimidation, and/or exploitation.	Contractor	PCU, CSC, Project

Condition	The rationale for the inclusion of this Condition	Description of the Condition	Responsibility	
			Implementation	Supervision
		All workers shall sign the code of conduct, and they will be terminated from employment if not comply with the code of conduct.		
5. Construction camp and storage facilities	The contractor will need areas for setting up camp and storage areas.	Contractor shall set up camp and storage facilities within sites approved by the PCU, with adequate facilities	Contractor	PCU, CSC, Project

Construction Stage Mitigation Plans

Detailed mitigation plans for construction stage impacts have been prepared on the basis of the detailed impact assessment covered under Chapter 5 and presented in **Table 72**. These plans are project-specific and, to the extent possible, site-specific; however, contractors will be required to carry out further detailing of the key aspects, to prepare site-specific management plans as part of C-ESMP for review and approval of PCU.

Table 72: ESHS Impacts and Risks and Mitigation Measures

Impact	Mitigation Measures	Responsibility	
		Implementation	Supervision
Physical Environment			
1. Generation of spoils (excess road excavation materials) and their disposal	- Recycling the excavated road material (scarifying) to the maximum extent possible by using it as the aggregate material in the base sub-base, concrete works, and filling of embankments and retaining structures, nearby local roads (in coordination with local government), using modern technology - If spoil disposal is it will be disposed of in the designated sites. The spoils will be used for the restoration of the borrow sites	Contractor	PCU CSC Project
2. Generation of construction waste, including hazardous waste	- Before commencing the construction activities, the contractor will be required to prepare a Waste Management Plan, including hazardous waste management, and submit it to the CSC and PCU for their review and approval. The plan will cover managing hazardous material use, storage, transport, and disposal. - The contractor will place containers of adequate size and numbers in place for the collection of various types of waste containers (metal, rubber, used fuels, batteries, etc.) from the worksites, and transport these wastes regularly to a centralized facility. - The contractor will return the empty containers to the scrap vendors. - For the proper handling of chemicals, the material safety data sheet(MSDS) will be followed and communicated to concerned personnel, including workers. Storage of chemicals 100 meters away from any water sources	Contractor	PCU CSC Project
3. Generation of solid waste from workers' campsites and offices	- Before commencing the construction activities, the contractor will be required to prepare a Waste Management Plan and submit it to the PCU for their review and approval. - Collection and segregation of solid waste into kitchen waste (organics), paper and plastic (recyclable), and garbage (non-recyclable). Three kinds of waste bins (with different colors) with adequate numbers and capacities will be placed at the campsite (kitchen, offices, rooms) for the segregation of the waste at source. - Organic waste will be treated through on-site composting - Procure the services of waste management scrap vendors for the collection and management of recyclable waste, and follow the	Contractor	PCU CSC

Impact	Mitigation Measures	Responsibility	
		Implementation	Supervision
	ESHS guidelines. Recyclable waste will be compressed through balers to minimize the volume of waste to be stored and transported. Local municipal waste disposal sites will be used for the disposal of garbage as per the policy of the local government. No disposal sites will be established by the contractor.		
4. Wastewater discharges from the construction camps, sites, and batching plants	- Sedimentation ponds, of adequate size and capacity, will be built for the treatment of discharges from the batching plants and the crushing plants to allow the sediments to settle. Final discharges from the sedimentation ponds shall comply with World Bank EHS standards for wastewater standards. The settled sediments will be periodically removed and disposed of at the designated spoil disposal sites. - Construction of wastewater treatment facilities at the campsite (e.g., septic tank and soak pit, and site drainage) - The contractor will be required to take appropriate measures to avoid and contain any spillage and pollution of the water - Bi-annual monitoring of wastewater quality to ensure compliance with the standards, and the report will be shared with the CSC and PCU. In addition to that supervisor safeguards expert checks and weekly visual monitoring as part of the environmental monitoring	Contractor	PCU CSC
5. The risk of soil pollution by construction works	- Storage of fuels and chemicals in contained facilities and take appropriate measures to avoid and contain any spillage - Confine the contaminants immediately after such accidental spillage and cleanup of oil spills using spill kits. This will be embedded in the contractor's management plans as part of their responsibility and addressed by the plans under C-ESMP. - Collect contaminated soils, treat and dispose of them as hazardous waste - Topsoil from cultivated lands in the construction areas to be stripped and stockpiled where practical for later use for restoration of spoil disposal sites. - Temporary stockpiles to be protected from erosion. - Contractor will develop a pollution prevention and emergency response plan as part of C-ESMP and submit CSC and PCU	Contractor	PCU CSC

Impact	Mitigation Measures	Responsibility	
		Implementation	Supervision
	approval. The plan will detail procedures to minimize and address the risk of soil and water pollution.		
6. Air and noise pollution from construction	- Construction equipment and vehicles will be well-maintained so that emissions are minimal and comply with the emission standards of Nepal Vehicle Emission Standards 2012, and should also comply with international standards. - Crushing, batching, and asphalt plants will be located a minimum of 500 m away from residential areas and water sources, and will have appropriate dust/emission suppression mechanisms such as wet scrubbers (with modern technology) - Dust generation from construction sites would be restricted as much as possible, and water sprinkling would be carried out (as per requirement to control dust nuisances) throughout the project construction period, and local exhaust ventilation systems with bag filters built on machines will be used. While using the work related to batching and wet mixing plants, masks like N95 will be preferred for the workers during construction to prevent the risk of silicosis and airborne diseases - Construction activities near the settlements will be limited to daytime only. However, construction works in other areas can also be carried out at night time also with the permission from the concerned authorities - High noise-producing equipment will be provided with mufflers or acoustic enclosures. - A GRM will be put in place to receive complaints from the public on various aspects of environmental, social issues, including noise and dust pollution. These grievances will be addressed by the contractor by adopting the project grievance mechanism. - Biannually, air and noise quality monitoring will be carried out in the project area to ensure compliance with national ambient air and noise quality	Contractor	PCU CSC
7. Sourcing of aggregates for concrete works and earth for embankment filling	- The contractor shall develop a quarry and borrow areas procurement plan and management plan and submit it for approval of CSC. - The contractor shall use the government-approved quarry sites for the procurement of aggregates.	Contractor	PCU CSC

Impact	Mitigation Measures	Responsibility	
		Implementation	Supervision
	• Reuse of excavated material from the construction sites to the extent feasible. • Source the river bed sediments from the licensed borrow sites, sourced away from the active channels and during no or low flow seasons, and the non-perennial streams. • Although the material is widely available, the quarrying/mining activities will be limited to fewer areas to reduce the extent of extent affected by quarrying activities. • The quarrying/burrow plan should be submitted by contractors with proper location and chainages, avoiding sensitive areas • Maintain a buffer zone of 5 to 10 m between the low flow channel and the mining operations to minimize the downstream impacts and limit the excavation activities to the low flow season. • Borrow sites will be restored after completion of the works		
8. Impact on river habitat due to bridge construction activities and quarrying	• Contractor will use the existing quarry sites operated with the government licenses. The contractor will develop a quarry site operation plan, site-specific erosion and sediment plan, and obtain approval from supervision engineers prior to commencement of civil works. • No new sites will be established by the contractor. • Avoid haphazard quarrying along the riverbank and hills. Permanent barricade at quarry location for safety, established safety signage boards, and installed noise barrier. • The direct release of wastewater and sediment to the river or water body will be prevented by the construction of a retention pond at the operation location of batching and crusher plants. That retention pond will be constructed in the respective plant locations wherever required. • Prevent the release of silt, sediment, sediment-laden water, raw concrete, concrete leachate, or any other deleterious substances into the River. • Ensure equipment and machinery are in good operating condition (power washed), free of leaks, excess oil and lubricants, and grease. • Machinery leaking fuel, lubricants, hydraulic fluids, or solvents shall not work within the river.	Contractor	PCU CSC

Impact	Mitigation Measures	Responsibility	
		Implementation	Supervision
	- Keep a spill containment kit readily accessible onsite in the event of a release of a deleterious substance to the environment. Train on-site staff in its use - Restoration of the borrow sites after completion of the works		
Biological Environment			
9. Impacts on flora (clearance of 9808 trees)	- The contractor's code of conduct for workers will include conditions on the protection of flora and fauna and on cutting of trees, and on hunting and poaching of wildlife. Employees found violating would be subject to strict actions, including fines and termination of employment. - Use of non-wood fuel for cooking and heating. - No temporary construction facilities shall be established in the forest areas - Awareness-raising to workers on the protection of flora and fauna - For road widening, the census trees and poles will be cleared after getting permission from the Department of Forest and Soil Conservation and the concerned Divisional Forest Office. Before and during vegetation clearance or tree felling, any animals found will be released to a safe place. There should be no burning of natural vegetation. - Compensatory plantation will be done in a 1:10 ratio of cleared trees (98080 number), with care for 5 years, and for that cost will be deposited in the forest development fund	Contractor	PCU CSC
10. Spread of Invasive Alien Species	- All introductions of alien species (for example, as part of a rehabilitation program) will be subject to a risk assessment to determine the potential for invasive behavior with consideration of the Nepal regulatory framework for species introduction. - Construction sites will be rehabilitated at the earliest opportunities, and rehabilitation plans will IAS control measures appropriate to the IAS risks prevailing in the project area. - Construction vehicles will be brought into the site in an 'as-clean-as-new' condition to ensure that invasive plant material and seed-bearing soil are not introduced.	Contractor	PCU CSC

Impact	Mitigation Measures	Responsibility	
		Implementation	Supervision
	- All vehicles will be cleaned on a regular basis to prevent the unintentional spread of IAS within the project area. - IAS will be regularly controlled in the construction vehicle parking and operational areas		
11. Impact on fauna, including wildlife movement	- For road widening, the dense vegetation will only be cleared once it has been established that any individuals present have fled. Surveys will be conducted by trained ecologists before and during vegetation clearance or tree felling and major ground-breaking activities to check for active burrows, tortoises, snakes, and lesser fauna. Any animals found will be removed and released to appropriate and predetermined safe locations. There should be no burning of natural vegetation. The borrowed animals, if found during excavation, shall also be transported to a safe place. - No workers' camps and construction facilities should be constructed in or adjacent to the forest areas - Rehabilitation of existing barbed wire fence in Champapur-Kharendrapur forest, considering wildlife protection and designing appropriately for the affected wildlife species - Culvert/tunnel installation in the forest blocks based on the additional study on mammal movement/roadkill, location, and design assessments - Installation of traffic signs alerting speed limit - Installation of wildlife crossing information/display board at 1km span and speed breakers in the forest blocks - The existing bridge will be modified for wildlife crossing for medium-sized animals at Belnadi (648+561) and Jwaikhola (649+257), and also Minor Bridge (645+789) and (647+157) will be modified for wildlife crossings. One Canopy bridge has been proposed near the Bel River (Ch 648+561) - Pits and trenches during construction present faunal hazards and will be avoided where possible, capped, and/or provided with an escape route for small fauna. Unavoidable hazards will be regularly checked for small fauna by appropriately trained staff. - A staff member trained as a snake handler and equipped to capture and translocate dangerous snakes and other reptiles without harm		

Impact	Mitigation Measures	Responsibility	
		Implementation	Supervision
	shall be available during vegetation clearing, ground-breaking activities, and major construction works. • Awareness-raising workshops with the forest user groups at the forest blocks regarding wildlife behaviors, road kills, wildlife poaching, human-wildlife conflict, and traffic regulations • Induction programmes and provision of regular training to workers on the potential impacts of their behavior and emphasize the need to protect biodiversity, abstain from wildlife poaching, avoid habitat degradation/ pollution, and outline procedures and penalties that prohibit the killing of fauna and/or any form of trade in bush meat or wildlife products. • Inclusion of wildlife protection clauses in the code of conduct for contractors • The construction site should be fenced to prevent wildlife entry to the construction site • Regular visual inspection of wildlife will be conducted by an ecologist appointed by the contractors. • Spill kits should be provided at each construction site where oils and chemicals are used. • Regular maintenance of construction equipment and vehicles will be undertaken • Oils and chemicals should be stored at designated storage with proposed spill/accident prevention and response measures, such as the provision of secondary containment, MSDS, and spill kit • The organic waste should be properly stored and composted. The following mitigation measures will be implemented to address the impacts on <u>avifauna and snakes</u>: • The construction materials and their by-products should be stored away from watercourses. Especially during summer/monsoon time, good care should be taken. • No construction activities during nighttime in the sensitive areas • Large sapling plantation at road roadside should be carried out as soon as the construction work is completed. This will increase bird habitat, foraging, and roosting trees, especially in semi-urban and rural areas		

Impact	Mitigation Measures	Responsibility	
		Implementation	Supervision
	- Roadside plantation be made of the species that bear seed/fruit and have an open/light canopy like simal (Bombax ceiba), etc. - Ensure the use of machines that produce low noise where feasible. - Unnecessary noise generation during the construction_work and post-construction should be avoided through regular awareness and traffic no-horn zones. - Training provision to workers on the potential impacts of their behavior, including wildlife poaching and habitat degradation/pollution - Inclusion of wildlife protection clauses in the code of conduct for contractors		
Illegal wildlife trade	- All bidding documents and construction contracts are to include specific provisions forbidding workers from hunting or collecting natural resources. Contracts can also include articles that require the use of access controls/checkpoints, zero tolerance of any illegal biodiversity resources in worker camps (such as wildlife products sold to construction workers; products of illegal hunting along access roads; pets taken from the wild), and offer workers appropriate food/canteen options that will reduce demand for seeking local food options. - The PCU will provide a safe and anonymous line for reporting activity for workers, communities, or any stakeholders, whereby they are safe from retribution from other community members, organized crime, or government officials. - If a crime is committed, national authorities need to be alerted immediately. In addition, sometimes, live animals can be rehabilitated, and the appropriate national authorities or non-government organizations need to be contacted to collect the animals to avoid risks of harm to people and the animal(s). - Contractors shall be responsible for demonstrating that timber procurement is limited to those suppliers that can demonstrate that timber is legitimately sourced and does not contribute to significant conversion or degradation of natural or critical habitats	Contractor	PCU CSC
Socio-economic and Cultural Environment			

Impact	Mitigation Measures	Responsibility	
		Implementation	Supervision
1. Impact on 53 Private structures of 50 Households	- Resettlement Action Plan has been prepared, and cash compensation will be provided as per the decision of the compensation determination committee - Develop a relocation plan for temporary acquisitions of project-affected people	Project/CSC	DCID & CSC
2. Impact on 82 Public Structures (Temple-5, Chautara-15, Resting place-18, Public toilets-3, police checkpoint-3, compound wall-3 and handpump-35	- Develop a project information sharing and communication plan - Prepare an appropriate and remedial relocation and rehabilitation plan for management of public and cultural resources: - Community consultation will be conducted before relocation and rehabilitation work - The cost is allocated at the BoQ item, in Provisional Sum (PS)	contractor	CSC, DCID, Project
3. Impact on existing 8 Hattbazar/market sheds	Improvement work will be done after consultation with Hattbazar management committee	contractor	PCU CSC, Project
4. 856 Electric pole caused damage	- Relocation work will be done by NEA - Coordination with the project, - draft MoU will be prepared	contractor	PCU CSC, Project
5. Damage drinking water pipeline and irrigation canal during the construction phase	- Prepare an appropriate and remedial relocation and rehabilitation plan - Relocation and Rehabilitation work will be done after consultation with the water users group and the irrigation canal	contractor	PCU, CSC, Project & DWSS
6. Impact on the livelihoods of roadside vendors and vulnerable groups	- Livelihood restoration program and placement at improved market sheds/Hattbazar as part of the livelihood restoration program - Income generation training and entrepreneurship development. - encourage to engage local workers/laborers to engage with the same terms and conditions as outside workers/laborers;	contractor	PCU CSC, Project
7. Project GRM	- Keeping the lodge and maintaining public grievances - Putting a grievance box at different locations of the project (PIC office, RE office, contractor's office) - Nominate focal persons and open the grievance box on a monthly basis		

Impact	Mitigation Measures	Responsibility	
		Implementation	Supervision
	- Formulation of GRC and GRC will handle lodging grievances in facilitation of the CSC Safeguards team - integrating provisions to redress labour-related grievances in the Grievance Redress Mechanism (GRM), which should be well known to the laborers/workers and accessible to the community		
8. Workers' Safety Risks	- The contractor will be required to prepare, obtain approval of, and implement an occupational health and safety (OHS) plan. These plans will be prepared in compliance with the World Bank's ESS-2 and national regulations Labor Act, 2074, and IFC EHS Guidelines. OHS Plan should contain general guidance for all identified hazards under each work activity, and site-specific OHS hazards and risks during construction, and control and preventive Measures proposed by the Contractor. The Plan shall be reviewed and updated if there are any changes in the construction methodologies. - OHS Plan should contain general guidance for all identified hazards under each work activities and they should be presented in three discrete headings, (a) Contractor's Standards on the identified hazard management, (b) Expected Site-specific OHS hazard and risks during construction, and (c) Control and Preventive Measures proposed by the Contractor (d) monitoring and training, (e) incident management - The OHS plan will be reviewed and approved by the Construction Supervision Consultant and the World Bank - Conduct a 'job hazard analysis' at the new construction site to identify potential hazards that may arise from the proposed works or working conditions to the project workers and implement necessary control measures. The job hazard analysis should be part of the contractor's method statements, which will be reviewed and approved by the supervision consultants. The specialists of the supervision consultant will also visit the construction sites, prior to the start of construction, to ensure the control measures are in place. - Toolbox talks and regular site inspections and safety audits by the construction supervision team, both by the OHS specialist and the site engineers. Since the site engineers will be present at the worksites all the time, they will be trained by their OHS team on monitoring safety aspects of the construction works.	Contractor	PCU CSC, Project

Impact	Mitigation Measures	Responsibility	
		Implementation	Supervision
	- Regular training program for workers on occupational health safety (monthly training and daily toolbox talks). Special attention will be focused on safety training for workers to prevent and restrict accidents and on the knowledge of how to deal with emergencies. - Incident investigation and reporting, including a complete record of accidents and near misses, will be maintained. - In order to protect all project personnel and visitors, the Contractor will provide personal protective equipment (PPE) for workers, such as safety boots, helmets, masks, gloves, body harness, protective clothing, goggles, fully face eye shields, and ear protection. The contractor will also provide training to workers on how to use them and maintain them in a sanitary and reliable condition, and replace the damaged ones immediately with new ones. - Development and implementation of an emergency response plan - Availability of firefighting, ambulance, medical, and rescue facilities at the site for implementation of an emergency response plan - Adequate water supply and mobile toilets, medical and first aid care facilities at the worksites - Contractors will have dedicated and qualified staff to ensure compliance with the OHS Plan - Awareness-raising material will be used, including posters, signage, booklets, and others at the worksites - A complete record of accidents and near misses will be maintained. - First aid facilities will be made available at the worksites and in the camps. The contractors will engage qualified first aider(s).		
9. Occupational health risks in construction	- The contractor will develop and implement a camp management plan - The construction camp will be built with all adequate facilities (safe drinking water and sanitation, kitchen, rest areas, etc.), including entertainment facilities, so that there will be minimal interaction between them and local communities. Also, provide facilities for toilets, water, and sanitation at the worksite. - Separate facilities will be provided to men and women workers	Contractor	PCU CSC, Project

Impact	Mitigation Measures	Responsibility	
		Implementation	Supervision
	The Contractor shall establish a mechanism to collect the complaints from the workers and address those complaints through the approved GRM plan.		
10. traffic, especially for children and elderly people	- The contractor will develop and implement a traffic management plan with adequate measures, such as proposing traffic diversion measures, alternate routes for local traffic avoiding school hours, following speed limits, hiring licensed drivers, etc. The plan will be implemented with the aim of ensuring access to residential areas and preventing unsafe situations, especially near schools, housing areas, and construction areas - The existing traffic will be managed by retaining the existing lane and by traffic diversion, but in case of unusual conditions, the traffic might be closed with prior public notice. The contractor will maintain the traffic on both sides of the highway by placing appropriate control measures and flagmen. - Road signage will be fixed at appropriate locations to reduce safety hazards associated with project-related vehicular traffic. - Liaison with the traffic police will be maintained - Project drivers will be trained in defensive driving. - Ensure that all construction vehicles observe speed limits on the construction sites and on public roads - Provide adequate signage, barriers, and flag persons for traffic control.	Contractor	PCU CSC, Project
11. Community exposure to work hazards, SEA/SH, and communicable diseases	- Develop a community health and Safety Management Plan. - Barricade the work areas with hard fencing to prevent the entry of the community into the construction areas; - Placing of adequate signboards and flagmen to divert the community away from the construction works; - Implementation of the traffic management plan near the construction sites; - Community awareness programs on construction-related hazards, including awareness programs in schools. Construction activities such as blasting and excavation, particularly at the borrow areas, may pose safety risks to the nearby population. - First aid medical facilities will be made available at the worksite.	Contractor	PCU CSC, Project

Impact	Mitigation Measures	Responsibility	
		Implementation	Supervision
	Campaigns on SEA/SH and communicable diseases (e.g., HIV/AIDs, COVID-19)		
12. Risk of child labor	- No hiring of workers less than 18 years of age - Provision of a child care center	Contractor	PCU CSC, Project
13. Impacts from the influx of labor from the outside areas	- The Contractor's daily toolbox, monthly training program will cover topics related to a respectful attitude while interacting with the local community, as well as working methods and conditions - This situation will be addressed by an awareness campaign implemented at the beginning of the construction phase. The Contractors will be aware of the possibility and risks of miscommunications between local residents and workers, which could easily lead to conflicts. This will be prevented by raising awareness and implementing a Code of Conduct for the workers. The Contractor shall follow the project's LMP for Worker Code of Conduct to govern the behavior of workers on-site, in camps, and in local communities. - The awareness campaign will also be aimed at the risk of interaction between the resident population and the construction workforce, including the spreading of sexually transmitted diseases such as HIV/AIDS. - The contractor will prepare a site-specific labour management plan prior to construction works for approval by PCU. - The contractor's code of conduct shall cover the program to promote awareness among the construction workers on respecting the local community. - Construction camps will be built in the designated areas, located away from the local settlements - The contractor will ensure local water usage will not be affected by the project's water usage by the project or compete with the water requirements of the local community - Follow health, hygiene, and sanitation protocol, including communicable diseases such as COVID-19, STDs.	Contractor	PCU CSC

Impact	Mitigation Measures	Responsibility	
		Implementation	Supervision
14. Risk of gender-based violence GBV/Sexual Exploitation and Abuse (SEA)/Sexual Harassment (SH)	• Inclusion of a clause on GBV/SEA/SH behavior obligations in the employment contracts of all employees and construction workers aimed at strengthening measures to address and prevent SEA/SH in the workplace and construction areas. • Posting of CoC standards in public spaces at contractor's work camps and living areas, and village information centers and public places of adjoining/neighborhood communities in the Nepali language • Raising awareness that SEA/SH is prohibited • Code of Conduct breaches and assist survivors of SEA with necessary services; • Awareness to communities, particularly women, and male and female children to understand risks of SEA and SH and the roles and responsibilities of parties involved in project implementation on SEA and SH prevention, processes for reporting incidents of project-related SEA/SH, and the corresponding accountability structures. • Proactive GBV/SEA mitigation and prevention measures with survivor survivor-centric approach will be put in place, such as GBV/SEA-related training to sensitize workers and the local population along the project implementation area, and ensuring that GRM for the project will also take care of GBV-related issues, if any.	Contractor	PCU CSC
15. Chance finds during construction	Chance find procedures that will be used during this Project are as follows: • Stop the construction activities in the area of the chance find; • Delineate the discovered site or area; • Secure the site to prevent any damage or loss of removable objects. In cases of removable antiquities or sensitive remains, a night-guard shall be present until the responsible local authorities and the relevant Department of Archaeology take over. • Notify the supervisory Engineer, who in turn will notify the responsible local authorities and the relevant Department of Archaeology immediately (within 24 hours or less); • Responsible local authorities and the relevant Department of Archaeology would be in charge of protecting and preserving the site before deciding on subsequent appropriate procedures. This would require a preliminary evaluation of the findings to be performed by	Contractor	PCU and CSC

Impact	Mitigation Measures	Responsibility	
		Implementation	Supervision
	the archaeologist (within 72 hours). The significance and importance of the findings should be assessed according to the various criteria relevant to cultural heritage; those include the aesthetic, historical, scientific or research, social, and economic values. • Decisions on how to handle the finding shall be taken by the local authorities and the relevant Department of Archaeology. This could include changes in the layout (such as when finding an irremovable remnant of cultural or archaeological importance), conservation, preservation, restoration, and salvage; • Implementation of the authority decision concerning the management of the finding shall be communicated in writing by the relevant Department of Archaeology; and • Construction work could resume only after permission is given by the local authorities and the relevant Department of Archaeology concerning the safeguarding of the heritage.		

5.3 Construction Stage Monitoring Plans

The proposed monitoring plan to be carried out during the construction stage of the Project to ensure contractors are complying with the mitigation measures is given in **Table 73**, along with the monitoring indicators and frequency. CSC will be responsible for the supervision of the implementation of the plan. The total cost of monitoring has been estimated at USD 0.1million.

Table 73: Effects Monitoring Plan During Construction

(Note: PCU will include this Table in the Contract Specifications of the Bidding Documents)

E&S components	Monitoring parameters	Monitoring Agency	Timeline
Physical Environment			
Air quality	Ambient air quality: TSP and PM ₁₀ , daily visual observation of dust	PCU/CSC	Baseline information during the preconstruction stage and during the construction stage, once a month
Water quality	Turbidity, Conductivity, pH, and Color will be conducted at the site with the help of portable kits, effluents from construction camps /sites/ waste from batching plants, etc., and the visual observation will be carried out on a weekly basis by experts of supervision and self-monitoring from the contractor's team.	PCU/CSC	Baseline information during the preconstruction stage of nearby water bodies and during the construction stage, once every month
Noise	Noise level at regular interval: assessment and interpretation for L _{max} , L _{min} , L _{eq} , L ₅ , L ₁₀ , L ₅₀ , L ₉₀ , and L ₉₅ parameters.	PCU/CSC	Baseline information during the preconstruction stage and during the construction stage, once every month
Operation of Borrow pits/ Quarry sites/ Stone crushing plants	Quantity of extracted material, restoration of borrow pit areas, and Grievance Redressal of the locals	PCU/CSC	Daily during the construction stage
Extraction of riverbed materials	Distance of extraction sites from the river banks (5-10 m) Depth of the ditch for excavation (1m)	PCU/CSC	Daily during the construction stage
Obstruction of drainage	Roadside drainage discharge, water impounding area during rain, waterlogging	PCU/CSC	Daily during the construction stage

E&S components	Monitoring parameters	Monitoring Agency	Timeline
Hazardous wastes, bitumen/asphalt	List of chemicals, storage, and handling practices. Records of accident/ spillage of chemicals, surface and groundwater contamination	PCU/CSC	Daily during the construction stage
Biological Environment			
Number of felled trees	Statistics of removed and planted trees, nurseries, and plantations	PCU/CSC, Divisional Forest Office (DFO)	During the time of tree felling on a daily basis
Compensatory Plantation	Compliance with the compensatory plantation plan using locally indigenous trees and shrubs	PCU/CSC, Divisional Forest Office (DFO)	Plantation time during the monsoon (before and after carrying out the plantation)
Control of Invasive Alien Species (IAS)	Risk assessments are conducted prior to species introductions, regular equipment and vehicle cleaning, and control of IAS.	PCU/CSC	Daily during and after the construction stage
Wildlife	Identification of flora and fauna with ecological importance identified in the project area, roadkill, occurrence of fauna trapped in pits/trenches, and any capture and translocation of tortoises, snakes, or other fauna	PCU/CSC	Daily during the construction stage
Fire-hazard	Project management checklists, site monitoring, and fire extinguishers in labour camps	PCUs/CSCs	Daily during the construction stage
Social Environment			
Community Health and Safety	Nuisance to adjoining communities from the construction-related works, and grievances due to annoyance from the construction-related works.	PCU/CSC	Daily during the construction stage
Establishment of camps	Compliance with the Camp management plan of the Contractor	PCU/CSC	Daily during the construction stage
Property/land acquisition/compensation and rehabilitation	Implementation of compensation and rehabilitation measures provided by the RAP, including compliance with construction-induced impact procedures	PCU/CSC	During the preconstruction and construction stage
Indigenous Peoples	Compliance with ESIA, RAP & IPPF of ACCESS: Only (2IP PAH) out of (50 PAH) have a minor loss category; however, they will be paid cash	PCU/CSC	Daily during the construction stage

E&S components	Monitoring parameters	Monitoring Agency	Timeline
	compensation at replacement value along with livelihood restoration training as provided in GC ESIA, RAP & IPPF of ACCESS a. However, this project has only (3) IP groups, Newar, Magar, and Tharu, and they follow mixed cultural practices b. Impact/ risk on IPs households is low, so IPDP is not required and developed for this project.		
Safety of workers	Accident Group Insurance of Workers, provision of personal protective equipment earmuffs, ear muffs and other personal protective equipment by the workers Regular health check-ups for workers. Regular monitoring and assessment of worksite risk and developing corrective action for mitigation. Follow standard operating procedure/ protocol for operation of hazardous work, materials, and equipment, such as working at height, confined space, etc. Provide a work-rest provision for workers, including a break while working. Provide safety barricades, signage, and information at each site Provide on-site first aid facilities for primary care Provide orientation, toolbox talk, and training on safety for all workers. Awareness of emergency preparedness and response mechanisms, including emergency contact details Workers grievance registration in practice Accident reporting and recording system in place	PCU/CSC	Daily during the construction stage

E&S components	Monitoring parameters	Monitoring Agency	Timeline
Road safety	Traffic Signals, no horn signs, road signals and markings, speed control and GPS-tracking, traffic diversion, bus sheds	PCU/CSC	Daily during the construction stage
Grievance Redressal	Management of Grievance Redress Mechanism	PCU/CSC	During the construction stage
Traffic Management	Compliance with the Traffic Management Plan	PCU/CSC, Traffic Police, and Respective Chief District Officers	Daily during the construction stage
Gender-based violence and human trafficking	Living status of women and vulnerable households after the implementation of the project	PCU/CSC	Daily during the construction stage
Stakeholder engagement	Compliance with SEP	PCU/CSC	During the preconstruction and construction stage

5.4 Reporting on ESMP Compliance

PCU and its Contractors will prepare periodic monitoring reports on the status of implementation of ESMP and will submit them to the World Bank for their review and feedback. Details of these reports and their content are given in **Table 74**

Table 74: ESMP Monitoring and Compliance Reports

#	Title of the Report	Contents of the Report	Frequency of Report Preparation	Report to be prepared by
1	ESHS Monitoring Report	The compliance status of the Project with environmental and social mitigation and monitoring measures. Besides, the report also covers: • environmental incidents; • wildlife-related incidents, • health and safety incidents, • SEA/SH incident • health and safety supervision: H&S specialist/officer hours spent on site by the PCU, CSC, and contractor • Compliance with the health and safety management plan • Usage of PPEs by workers • worker accommodations	Monthly	Contractor

#	Title of the Report	Contents of the Report	Frequency of Report Preparation	Report to be prepared by
		• Training was conducted, and workers participated Incidents, including a summary of the incident investigation, preventative actions identified, and their implementation status OHS inspections have been completed, and a summary of their findings • Workers grievances • Community grievances • Chance find (if any)		
2	ESMP Monitoring Report	The compliance status of the overall Project with ESMP requirements	Quarterly	PCU
3	Incident Reports	Incident investigation reports for all major incidents covering details of the incident, root cause analysis, and actions taken to address the future recurrence of this event	Initial investigation report within 24 hours Detailed Investigation Report within ten days A summary of all incidents (including minor and near misses) will be included in monthly reporting	Contractor

5.5 Environmental and Social Management During Operation

O&M Stage Mitigation Plans

Detailed mitigation plans for the operation and maintenance (O&M) stage impacts have been prepared on the basis of the detailed impact assessment covered under Chapter 4.

Table 75: ESHS Impacts and Risks in O&M and Mitigation Measures

Impact	Mitigation Measures	Responsibility for implementation
1. Workers' health and safety during routine maintenance works	- equipment by: - Routing of traffic to alternative roads when possible - Closure of lanes and diversion of traffic to the remaining lanes if the road is wide enough (e.g. rerouting of all traffic to one side of a multi-lane highway) - Where worker exposure to traffic cannot be completely eliminated, use of protective barriers to shield workers from traffic vehicles, or installation of channeling devices (e.g., traffic cones and barrels) to delineate the work zone - Regulation of traffic flow by warning lights, avoiding the use of flaggers if possible - Design of the workspace to eliminate or decrease blind spots - Reduction of maximum vehicle speeds in work zones; - Training of workers in safety issues related to their activities, such as the hazards of working on foot around equipment and vehicles; and safe practices for work at night and in other low-visibility conditions, including the use of high-visibility safety apparel and proper illumination for the work space (while controlling glare so as not to blind workers and passing motorists).	DOR O&M Staff
2. Community health and safety from exposure to maintenance works	- Provision of safe corridors along the road alignment and construction areas, including bridges (e.g., paths separated from the roadway), and safe crossings (preferably over or under the roadway) for pedestrians and bicyclists during operation. Crossing locations should take into account community preferences, including those related to convenience or personal safety (e.g., the prevalence of crime at potential crossing point locations). - Installation of barriers (e.g., fencing, plantings) to deter pedestrian access to the roadway except at designated crossing points; - Installation and maintenance of speed control and traffic calming devices at pedestrian crossing areas;	DOR O&M Staff

Impact	Mitigation Measures	Responsibility for implementation
	○ Installation and maintenance of all signs, signals, markings, and other devices used to regulate traffic, specifically those related to pedestrian facilities or bikeways ● Installation and maintenance of all signs, signals, markings, and other devices used to regulate traffic, including posted speed limits, warnings of sharp turns, or other special road conditions; ○ Setting of speed limits appropriate to the road and traffic conditions ● Installation of measures to reduce collisions between animals and vehicles (e.g., use of signs to alert drivers on road segments where animals frequently cross; construction of animal crossing structures; installation of fencing along the roadway to direct animals toward crossing structures; and use of reflectors along the roadside to deter animal crossings at night when vehicles are approaching) ● Implementation of No Blowing of Horn Zones, particularly in settlement areas ● Installation of Signages ● Monitoring noise level maintained at the national standard ● The detailed design of GC road improvements integrates the findings and recommendations of the road safety audits undertaken in multiple stages ● Road safety will also be undertaken post-completion of works ● Road safety awareness ● Speed control and regulations (especially in populated areas, near schools, and other public places). ● Road crossing infrastructures incorporating the principle of universal access. ● Speed control mechanisms in place, such as zebra crossings, speed breakers, speed limits at crowded places, etc. ● Establishment of traffic signals, GPS tracking, and CC cameras for speed control for public buses plying the highway. ● Vehicle maintenance and inspection. Control loud horns to avoid sound pollution. ● Training of first-aid services in the case of an accident. ● Manage temporary bypass while constructing the road. ● Road safety awareness training to the general public. ● Capacity enhancement for traffic police and locals.	
3. Impact on Flora and Fauna	● Recording the road kill at three forest blocks in coordination with the divisional forest offices ● Monitoring the use of the culvert by wildlife species, especially carnivores, snakes, and other reptiles	

Impact	Mitigation Measures	Responsibility for implementation
	- Assessment of the need for additional culvert/wildlife crossing structures along the road based on the monitoring results - Compensatory plantation (including monitoring and maintenance of saplings) - Regular cleaning/ clearing and maintenance of all culverts to reduce the chances of failures and blocking - Regular inspection and maintenance of fencing installed/maintained in the forest areas - Installation of a signboard to raise awareness to reduce waste dumping from vehicles in the forest blocks. - Holding workshops for awareness-raising on wildlife protection, such as prevention of waste dumping from vehicles, speed limit, and potential collision with animals. - Continuous monitoring of herpetofauna species movement/crossing and road kill in the forest area - Introduction of a no-horn zone in the forest blocks - Installation of traffic signs alerting speed limit - Installation of wildlife crossing information/display board at 1km span and traffic calming measures in the forest blocks	

O&M Stage Monitoring Plans

The proposed monitoring plan to be carried out during the O&M stages of the Project is given in **Table 76**, along with the monitoring indicators and frequency. PCU's ESU staff will be responsible for the implementation of the plan.

Table 76: Effects Monitoring Plan During O&M

Parameter	Means of Monitoring	Frequency	Responsibility	
			Implementation	Supervision
Noise Quality	Field Measurements	Yearly	DOR O&M Staff	DCID
Air Quality	Field Sampling and Analysis	Yearly	DOR O&M Staff	DCID
Traffic Safety	CC TV Cameras, site monitoring	Continuous monitoring	DOR O&M Staff	DCID
Wildlife	Trail camera, site monitoring	Continuous monitoring	MoFE, Divisional Forest Office	DCID

Capacity Building and Training

The environmental and social training will help to ensure that the requirements of the ESMP are clearly understood and followed by all project personnel. The competencies of the Consultant to be selected for

capacity building training will include thorough knowledge and experience of the WB Environmental and Social Framework (ESF) and ESHGS guidelines. The training will be provided to different professional groups separately, such as managers, skilled personnel, unskilled laborers, and camp staff. Capacity building will be aimed at strengthening the PCU staff in the field of environmental management and social development. Safeguard staff of PCU responsible for the supervision of environmental and social mitigation measures would be trained in environmental management, environmental quality control, ecology, environmental awareness, labor and working conditions, and social development. The contractor will also be required to provide environmental and social training to its staff to ensure the effective implementation of the ESMP. The training plan shall include a program for the delivery of intermittent training to cover the subjects included in **Table 77**. Training should be carried out initially at the induction of staff and repeated throughout the project.

Table 77: Environmental and Social Training Programs

Contents	Participants	Trainer	Schedule
Environmental and social impacts of the Project and ESMP requirements of the Contractor. World Bank Group Environmental Health and Safety Guidelines. The contents for the second and subsequent training programs will cover topics related to the issues associated with ongoing construction activities.	All the technical Staff of PCU, DCID, and the relevant technical staff of DRO who are involved in the management of environmental and social issues associated with the routine operation and maintenance of the airport. Site Engineers of the Supervision Consultants/Engineer.	ESHS staff of the CSC, and an external training agency that has a thorough knowledge of the WB safeguard policies and guidelines	During the initial stages of the Project implementation. The training will be repeated every six months.
Environmental and Social issues associated with the ongoing construction works; Workers' health and safety; worksite risk assessment, first aid; accident investigation, reporting and recording; safe operation of hazardous work, process, and machineries.	Site Engineers of the Contractor, PCU, and the CSC	E&S staff of the CSC, PCU	On a monthly basis
Code of Conduct Occupational Health and Safety	Construction crew	Contractors ESHS Staff	Prior to the start of the construction activities and during the construction activities (To be repeated as needed.)

Budget for Implementation of ESIA

The total cost of the ESMP implementation is estimated to be NRs **148,334,192** (Table 78).

Table 78: Cost Estimates for ESMP Implementation

SN	Mitigation and enhancement activities	Estimated cost (NRs)	Remarks
A	Capacity building Training (Toolbox talk sessions/labour force leaders, affected persons/local stakeholders)	1,500,000	Covered by BoQ
B	Budget for environmental-social related civil works that are included in the project cost		
	Cost for tree cutting		Covered by BoQ
	Bioengineering works and turfing	26,346,920	Covered by the BoQ item
	River training and protection works		Covered by BoQ
	Community safety structure (such as footsteps, approach to property, boundary wall, culvert, etc)		Covered by BoQ
	Wild animal crossing		Covered by in BoQ
	Drainage management work		Covered by in BoQ
	Installation of road safety signs/		Covered by in BoQ
	Road Furniture and Traffic Safety Measures		
	Pedestrian overhead crossing		Covered by in BoQ
	Safety installation at the worksite		
	Mobile toilets at the worksite for workers		
C	Budget for the environmental social mitigation, compensation, and monitoring to be included as BOQ items in the contract		
	Mitigations and compensation		
	Fencing in a forest area	18,553,452	Covered by BoQ
	Funnel fencing	3,289,065	Covered by BoQ
	Implementation of ESMP	5,000,000	Covered by BoQ
	Compensatory tree plantation	70,495,000	Covered by BoQ
	Improvement of Haat Bazar at Imiliya		Covered by BoQ
	Compensation of Private structures		Included in RAP

SN	Mitigation and enhancement activities	Estimated cost (NRs)	Remarks
	Livelihood restoration training		Covered by BoQ
	Relocation and rehabilitation of public structures,		Covered by BoQ
	Public utilities relocation/shifting		Covered by in BoQ
	Monitoring cost for compliance		
	Air and noise quality monitoring, including worksites	1,800,000	3*4*3=36*50000, Covered by BoQ
	Water quality monitoring	600,000	5*4*3=120*10000, Covered by BoQ
	Workers health checkup		
D	Monitoring of wildlife activities using camera traps, roadkill survey	3600000	Two years (@150000 per month)
E	Monitoring through Ministries, Departments, and Local bodies	500000	
	Total Cost	148,334,192	

Source: Design Report of the Road 2024

Chapter 6- Institutional Arrangements

Details of institutional arrangements for the implementation of the ESMP are given in this chapter.

6.1 Existing institutional arrangements for the implementation of ESMP during the project construction.

Ministry of Physical Infrastructure and Transport (MoPIT)

The principal responsibility for the implementation of ESMP is the Department of Roads (DoR) and the Ministry of Physical Infrastructure and Transport (MoPIT). MoPIT is the mother agency of the DoR and is mandated by the Environmental Protection Act and Regulation to review and approve IEEs for projects in the public works and transport sectors. It also reviews and endorses EIA reports for review and approval by the MoFE. The Ministry will also be the one to authorize the Project Management Unit (PCU) to initiate preliminary action for land acquisition. This function is handled by the Environment and Social section under the Planning, Monitoring, and Evaluation Division of the MoPIT, Department of Roads

DoR is thus directly responsible for managing the E&S risks of individual projects during implementation.

DoR has five (5) deputy directorships /branches that develop and implement projects. These are: (1) the Planning and Design Branch, which develops and implements all GoN-funded roads; (2) the Bridges Branch, which is in charge of the development of bridges; (3) the Maintenance Branch, which is in charge of the repair and rehabilitation of roads and bridges; (4) the Development Cooperation Implementation Division, which handles donor- funded projects; and, (5) the ADB Directorate, which handles all roads and bridges projects funded by ADB. To implement a project, a project management unit (PMU), in the case of donor-funded projects, is usually created within related branches.

DCID/Project Management Office (PCU)

Development Cooperation Implementation Division (DCID)/PCU handles donor-funded projects. The DCID/PCU will organize ESMP implementation according to agreed with the donor, usually prepare their own ESIA, RAPs, and other E&S Risk Management Plans by hiring their own consultants. PCU would often seek GESU's involvement to fulfil legal requirements, particularly in bringing the IEE/ESIA through the formal review-approval process with MoPIT and MoFE, and, depending on the specifications agreed with the donor, the PCU may tap GESU to undertake the EIA/IEE preparation process for their projects and/or provide compliance monitoring in the field. DCID/PCU has an Environmental Safeguard Expert, Social Development Expert, Occupational Health and Safety Specialist, and Gender Specialist.

Geo-Environment and Social Unit (GESU)

The focal point for the E&S risk management of DoR is GESU. GESU is currently under the Planning and Design branch. GESU provides advisory services to units of DoR on environmental and social safeguards matters. Its main role is to prepare IEEs and EIAs for the DoR projects and coordinate with MoPIT in the case of IEEs and by the MoFE in the case of EIAs. GESU interacts with the Environment Unit of MoPIT as well as that of MoFE. For donor-funded projects, the GESU also undertakes compliance monitoring and auditing of projects and, as a result, also interacts with Project Management Units (PCUs). The role of the GESU is very important not only in environmental and social analyses, but also and ensuring stakeholders' participation in the planning and implementation process, but also for improved efficiency, effectiveness,

and sustainability of the projects. Although the need for right-of-way acquisition is identified in EIA/ESIA, GESU is not normally involved in the land acquisition, and hence, rarely, if at all, interacts with the land agencies. Sometimes, RAPs from donor-funded projects are submitted to the GESU for review. GESU has a dedicated Environmental Inspector and Social Officer, and supporting consultants.

EIA Unit under the Ministry of Forest and Environment (MoFE)

This unit's tasks are to undertake the review and approval of EIAs. It is reporting directly to the Ministry and not part of the Department of Environment. This unit convenes and engages a multidisciplinary team to constitute the EIA Review Committee for each EIA submitted for approval. The EIA approvals typically include conditions that the project must comply with or implement in addition to the EMP/ESMP. The Department of Environment is responsible for monitoring the project.

Department of Forestry and Soil Conservation (DoFSC)

DoFSC under the MoFE reviews and approves applications for RoW of road sections falling within areas classified as public forest. The DoFSC imposes conditions on the acquisition of right-of-way on forest lands, such as the replacement of cut trees. After complying with the requirements, the ownership of the right-of-way is transferred to the concerned agency (for roads: MoPIT).

Department of National Parks and Wildlife Conservation (DNPWC)

DNPWC under the MoFE reviews and approves sections of roads within National Parks and protected areas (The project done does not require approval from DNPWC).

Department of Labour and Occupational Safety (DoLOS)

DoLOS under the Ministry of Labour and Social Security is currently not involved in the E&S risk management (i.e., it has no role in the IEE/EIA process) of development projects. Its role is mainly on the regulatory side. It can formulate and issue policies, rules, and standards for OHS consistent with the law. As such, it can occasionally conduct monitoring and audit of workplaces, construction sites, and offices of contractors and project management. It can also provide an expert review of the occupational and community health and safety aspects of the IEE or the ESMP.

District Coordination Committees (DCC)

DCCs can regulate soil and water conservation activities. DCCs are also responsible for reviewing applications of eminent domain land acquisitions and confirming public use. It will be responsible for the issuance of land acquisition notice; the formation of Compensation Fixing Committee, which would determine fair compensation; and finalizing the list of land owners to receive compensation.

Municipalities and Rural Municipalities

The respective Municipality can regulate quarry, soil, and water conservation activities that support stabilizing the road slopes and minimizing likely adverse impacts on the road and by the road. Public hearings of the IEE/EIA shall be done in the municipalities/ rural municipalities results and based on it endorse the project. The MoPIT/MoFE will not approve IEE/EIAs without the endorsement/ providing a recommendation letter from municipalities.

Department of Archaeology

It regulates all archaeological activities in the country as per the provisions of the Ancient Monument Preservation Act (1956). The department is also charged with the protection, preservation, and management of the World Cultural Heritage Sites and maintains an inventory of the cultural heritage sites.

Construction Supervision Consultant (CSC)

The Supervision Consultant will be responsible for supervision of environmental and social mitigation measures as per ESMP and compliance monitoring of the construction contractor's activities, and prepare periodic monitoring reports for submission to WB and DCID/PCU. Review monthly monitoring report submitted by Contractors, identify needed corrective actions and follow-up actions, conduct regular site inspection to validate monitoring reports and identify unanticipated environmental impacts, compel contractors to take corrective actions within the specified timeframe to address non-compliances, and organize stakeholder consultation workshops that will serve as the external monitoring mechanism for the project. The CSC's team includes one Environmental Safeguard Expert and one Social Safeguards Expert, and one Occupational Health and Safety Officer who shall directly assist the PCU with its duties.

Contractor

The Contractor shall be primarily responsible for the implementation and internal monitoring of all environmental and social management measures associated with Project design and construction, develop a Contractor's Environmental and Social Management Plan CESMP based on the ESMP of the project, which addresses all applicable construction phases, and revise it as needed in order to obtain approval from CSC/PCU. The Contractor shall have the sole responsibility for all activities on sites under its control for the duration of construction. This includes the activities of all subcontractors, whether employed or contracted directly or indirectly by the Contractor. Accordingly, it shall be the Contractor's responsibility to ensure that all activities are compliant with Project plans, permit and approval conditions, and any other statutory requirements. Employ qualified Environmental Social Health and Safety (ESHS) Officers (one Environmental Officer, one Social Officer, and one OHS Officer) to oversee the Project's ESHS performance and ensure that staffing and resources are adequate, commensurate with the magnitude and timing of work and potential ESHS risks. Submit a monthly report to CSC/PCU on the status of ESMP implementation. Implement corrective actions as instructed by CSC/PCU.

An organizational chart showing different organizations associated with project activities and providing an overview of the institutional setup related to the implementation of the ESMP is shown in Figure 18.

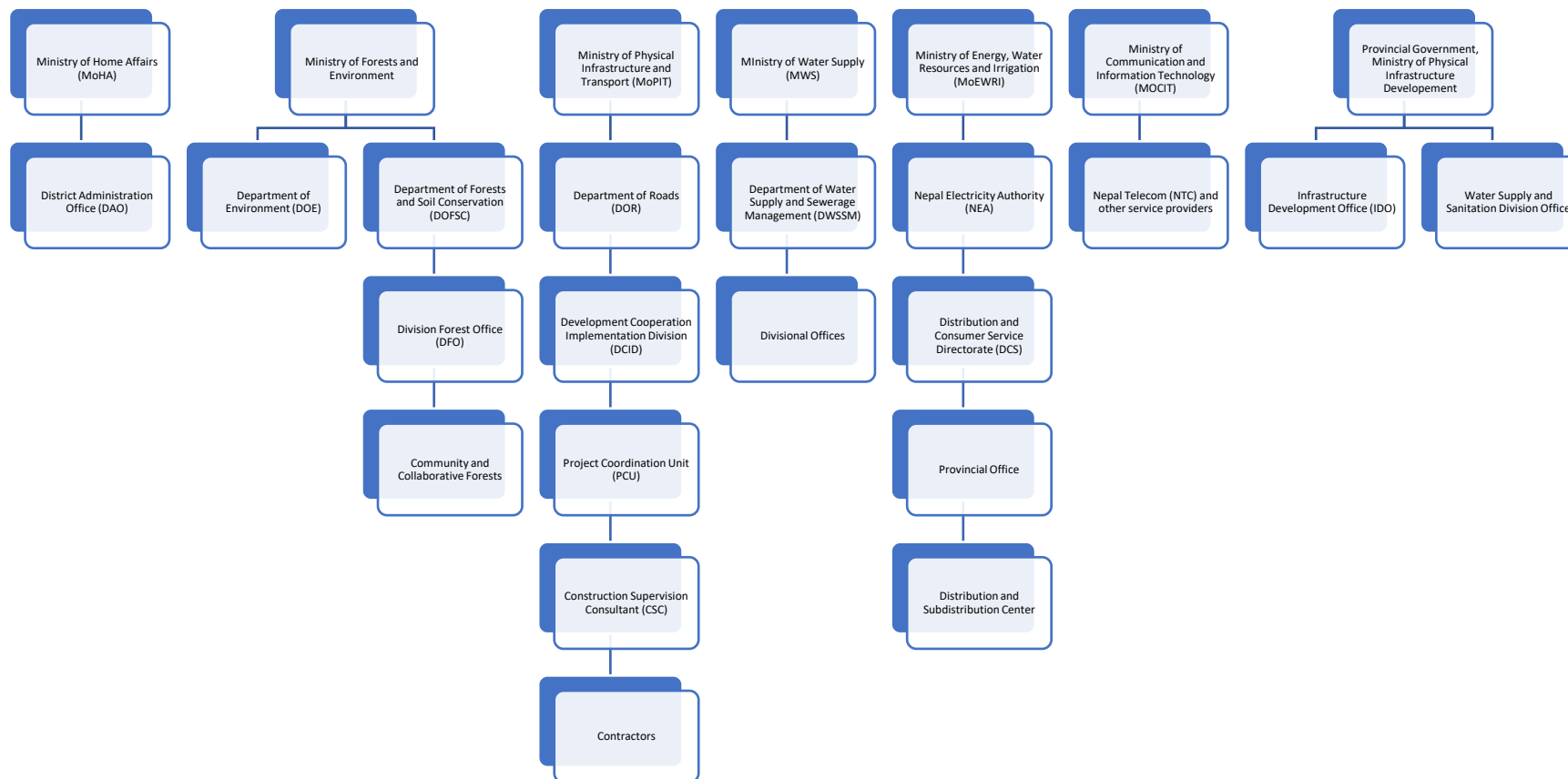


Figure 17: Implementation Arrangements for ESMP

6.2 Environmental and Social Commitment Plan

The key commitments of the government to be given in the ESCP include

- Quarterly submission of reports on the ESHS performance of the project
- Reporting of any incidents no later than 48 hours after the incident
- Maintaining the PCU with one environment, one social, and one OHS specialist
- Preparation of monthly reports by the contractor
- Incorporating the ESMP in the bidding documents
- Implementing the Contractors-ESMP, including LMP and other relevant documents
- Stakeholder engagement and consultations according to SEP
- Establishing a grievance mechanism
- Capacity building of the project staff on World Bank ESF requirements

Capacity building

DCID/PCU has the responsibility to manage the implementation and monitoring of safeguard compliance in GC Road through the proper safeguard staffing. Three staff, one for environment, one for social, and an occupational health and safety specialist will be engaged to support the existing E&S specialists of DCID.

DCID/PCU will conduct capacity building for the staff, including DoR, DCIP, PCU, GESU, SC, and the Contractor's for managing and monitoring of environmental and social risk and impacts associated with the project activities. The capacity building will focus on the following:

- Management of Environmental and Social Risks and Impacts
- WB's Environmental and Social Standards (ESS1-10)
- Provision of the Environment Protection Act (EPA), Environmental Protection Rules (EPR), 2020 National Environmental Standards on pollution
- Occupational Health and Safety in road construction
- DoR's ESMF
- Project's ESMP
- Land Acquisition, Restriction on Land Uses, and Involuntary Resettlement
- Biodiversity Conservation and Sustainable Management of Living Natural Resources

6.3 Grievance Mechanism

Project-related grievances

The project Grievance Redress Mechanism (GRM) addresses overall project-related grievances. The construction-related issues, impacts related to land, private structures acquisition and compensation, relocation and rehabilitation of public utilities, impact on private and public structures, impacts on forest and natural resources, issues of landslide, draining management, road safety, traffic management, and community-related grievances, etc., will be covered by the project-level GRM.

Any household or stakeholder who feels that they are impacted by adverse and material harm caused by the project may contact municipality leaders or local leaders of affected municipalities or rural municipalities, who would then forward the complaint to the SC, or the stakeholder may contact DCID/PCU or DOR. The

Municipality and SC staff will also be ready to receive a complaint and resolve and will take it to the higher level of authority if necessary.

Every PAP can appeal to the court if they feel that they were not compensated appropriately. They may appeal to the appellate court within 35 days of the public notice given to them.

Workers related Grievance

A GRM will be established specifically for worker-related grievances, in accordance with ESS2. This includes all issues of the project workers. The accommodation (health and sanitation), availability of safety gazettes, equal wages to male and female for works of similar nature, delay in payments, hiring of labourers without a contract document, and GBV. The project workers related to GRM will be detailed in the Labour Management Procedures (LMP).

GBV/SEA/SH Related Grievances

This includes issues of Gender Based Violence within the project, workers, and at the community level (PAP), where a well-equipped mechanism for reporting and responding to cases of SEA/SH will also be integrated within the project GRM, with linkage to workers' GRM. All relevant project personnel and contractors will need to sign a Code of Conduct (CoC), which outlines penalties for violations. Proper documentation of each worker, including social sanctions, will also be maintained

Implementation of GRM in the Project Cycle

Under the DCID, the Project Management Unit (PCU) and Supervision Consultant (SC) will establish the project GRM within 1 month from the start of the project and before construction work begins. The types of grievances expected to be handled concern all, either land acquisition or more generally, construction-related grievances, and any other social and environmental issues brought up during construction by affected people who live relatively close to construction sites.

Local households and stakeholders will be informed about the setting up of the Grievance mechanism by the PCU, SC, before the start of any construction as part of the community mobilization process. Besides, the information board will be in place at the construction site with specific information related to the construction works and will provide in the local language the description of the project and grievance mechanism, where and to whom stakeholders can deliver their complaints, and in what form: verbal or written.

When obtaining the information from the complainant, in verbal or written form, either directly or from the Municipality/District Coordination Committee (DCC) and Community offices, the PCU/SC office will complete a Grievance Action Form (GAF) to record all grievances and actions taken in a Grievance log. Minimal information recorded in this form will include (i) basic data about the affected person (name, address, contact number); (ii) category of grievance filed (legal, social, environmental, technical/engineering, financial, etc.); (iii) detailed description of grievance; and (iv) type of action taken. The GAF will be filled out by the person receiving a grievance and signed by the affected party and the receiver of the complaint. The affected party will receive a copy signed by both.

DCID/PCU will handle received grievances related to work on the road construction in collaboration with the SC and the construction contractor. In each case, DCID/PCU will be supported by the SC, DOR. The

construction contractor will clarify if the construction works cause the complaint. The SC will inform and update the complainant about the progress of grievance mitigation within 24 hours for urgent issues and 7 days for non-urgent issues.

Once verified problem/complaint is well-founded and due to the construction works, the decision will be implemented together with the PCU, SC, and Contractor. Contractor will take the necessary corrective actions and try to resolve the grievance informally, directly with the complainant. If any sort of filled level grievance is not possible to redress or, at the choice of the complainant, a formal redress can be forwarded to the Grievance Redress Committee (GRC).

The GRC will be formed to review complaints that cannot be resolved immediately. The committee will be formed by the Project Director of the proponent as the chair, PCU, (SC), and members of local stakeholders involved: Municipality representative, community members, etc. A complainant has the right to appear in person, to be accompanied by a family member, and/or to request to be represented by a senior community member. In the event that the contractor, PCU, or SC does not address a grievance, the affected person can seek legal redress of the grievance in the appropriate courts under the formal legal court system.

In the case the established GRM is not in a position to resolve the issue, affected people can also use the World Bank Accountability Mechanism through direct contact (in writing) to the World Bank or the Government of Nepal (GoN). The complaint can be submitted in any of the official languages of WB or in the local Nepali language.

Depending on the complaints and the mitigation measures decided and implemented, if necessary, the ESMP will be updated in order to avoid similar problems afterwards. The SC Safeguard unit will provide monthly reports of any complaints registered and how they have been dealt with to the local authorities. The SC Safeguard unit will regularly provide information for dissemination to the local stakeholders and communities of any grievances received and how they have been resolved, through the community mobilization process or through the Communication Strategy Plan implementation.

The grievance recording register will be established at the project office, Contractor's Office, and Consultant's RE office as well. Project-affected people, as well as local people, can lodge their complaints at these Offices related to asset acquisition and other social and environmental concerns due to construction-related activities.

Special project grievance mechanisms, such as on-site provision of complaint hearings, allow project-affected persons to get fair treatment on time. The GRC will be established in each road section covering the affected Rural Municipality/Municipality to handle initial grievances of the project-affected people. The grievant will have unhindered access to the grievance redress office to forward and file complaints. The provision of a Social Mobilizer in the project implementation is a good practice in this regard. Social Mobilizer can be mobilized in order to help the grievant to file the complaints to the concerned agency. Grievant will be exempted from all administrative fees incurred, pursuant to the grievance redressal procedures, except for cases filed in court. The proposed mechanism for grievance resolution is given below:

Stage 1: Complaints of the grievant on any aspect of compensation, relocation, or unaddressed losses will be settled in the first instance verbally or in written form in the field-based project office. The concerned personnel to settle the issues at the local level can discuss the complaint in an informal meeting with the grievant. The community consultation, involvement of social and resettlement specialists, and

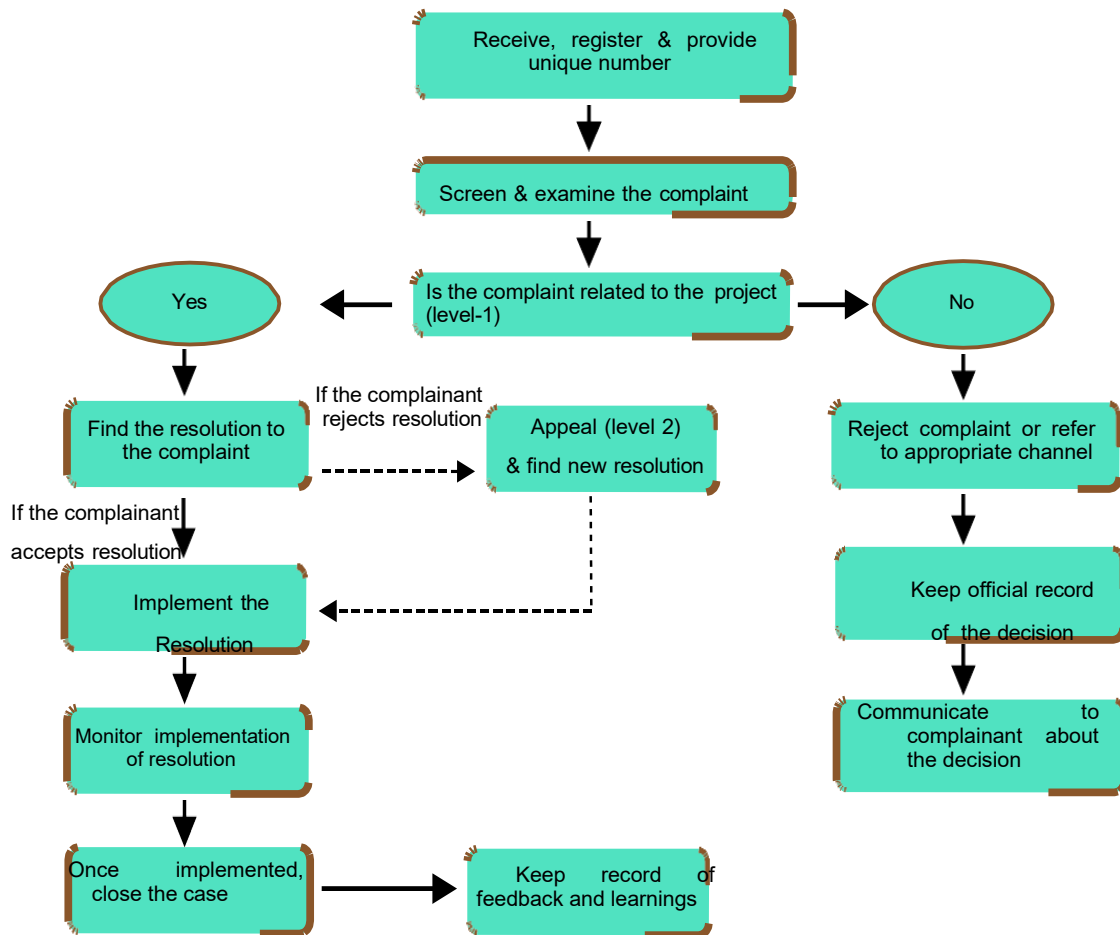
environmental specialists will be helpful in this regard. It will be the responsibility of the GRC and the Project In-Charge to resolve the issue within 15 days from the date of the complaint received.

Stage 2: If no understanding or amicable solution is reached or no response from the project office, the grievant can appeal to the project proponent/DOR for compensation, Determination Committee (CDC). While lodging the complaint, the grievant must produce documents to support his/her claim. The CDC will provide the decision within 15 days of registering the appeal. In the case that established GRM is not in a position to resolve the issue, affected people can also use the World Bank Accountability Mechanism through direct contact (in writing) to the World Bank or the Government of Nepal (GoN).

If the grievant is not satisfied with the decision of CDC and the project proponent, or in the absence of any response from its representatives, within 35 days of the complaint, the grievant, in his/her last resort, may submit their case to the court.

CDC= Compensation Determination Committee, PAPs= Project Affected Persons, GRC= Grievance Redress Committee, SC= Project Management and Supervision Consultant, DOR= Department of Roads, GESU= Geo-Environment and Social Unit. *Aggrieved person may also access the country's legal system at any stage (of the three stages) of the grievance redress mechanism.

Figure 19: Grievance Redress Mechanism structure in the project cycle



A separate mechanism will be integrated within the Project GRM to address SEA/SH-related grievances, which will be primarily handled by an appointed GBV focal person with the GRM committee. The appointed focal person will be fully trained on managing such cases with a survivor-centric approach and will be equipped to coordinate with local service providers and external relevant actors to respond to SEA/SH-related cases.

Chapter 7 Stakeholder Engagement and Public Consultations

Details of stakeholder consultations and feedback received from the stakeholders and actions taken or to be taken up by DOR to address their concerns are described in this chapter.

7.1 Project Stakeholders

The project stakeholders are categorized as:

Affected parties:

They include individuals, groups, and entities within the project's Corridor of Impact, which is set as the area within 150 meters on each side of the central line of the proposed road, that may be directly impacted by the project activities and/or have been identified as most susceptible to the change associated with the project. So, the project-affected parties need to be closely engaged in identifying impacts, as well as in decision-making on mitigation and management measures. They include:

- Local populations living or public service providers located within an area of 150 meters on each side of the central line of the proposed road, and may be adversely affected mainly by noise, dust, vibration, and the vehicular movements that will be used for the construction activities,
- Persons or households who may lose temporary or permanent access to land and/or will be restricted from accessing natural resources because of the project, e.g., farmers, landowners, informal settlers, businesses, forest user groups, etc.
- Local health centers that provide basic health support to the project staff and migrant workers.

Interested Parties:

The interested parties in this project, other than those directly affected, include:

- Government officials (elected and non-elected), regulatory, and permit awarding agencies at the federal, provincial, and local levels, including environmental, technical, and labor authorities. E.g., Ministry of Forest and Environment
- Government officials at District level offices of key ministries, including Divisional Forest Offices, Road Offices, Survey Office, Land Revenue Offices, and Electricity Authority, etc.
- Non-elected officials with wide recognition within the community, such as headteachers of local schools, religious leaders, or leaders of local cooperatives
- Leaders of informal or traditional community institutions such as women groups, Dalit Samaj, water consumer groups, village councils, etc.
- NGOs and CBOs at national, provincial, and local levels on the welfare and rights of indigenous people and vulnerable groups such as Dalits and other minorities, gender/GBV issues, etc.
- Residents and communities within the project area that can benefit from increased economic opportunities, employment, and training opportunities stemming from the project; and,
- Media, including district and local press clubs.

7.2 Disadvantaged/vulnerable individuals or groups:

The project recognizes the need to understand whether impacts may disproportionately fall on disadvantaged or vulnerable individuals or groups that are often unable to express their concerns or not in

a position to react to the impacts due to various social barriers, or may not even understand the impacts of a project. The vulnerability may stem from an individual's gender, race, age, health condition, ethnicity or caste, education and income levels, and other elements of marginalization. The stakeholder engagement activities in this project will consider these elements of vulnerability and deploy strategies such as periodic disclosure of information in a way comprehensible to local communities and meaningful consultations in a culturally appropriate manner to ensure that the disadvantaged and vulnerable individuals fully understand the potential impacts and mitigation measures of the project. The project will also take special measures to ensure that disadvantaged and vulnerable groups have the opportunity to participate in accessing project benefits, provide feedback, and submit grievances. These groups may include and are not limited to the following:

- Physically-challenged and visually-impaired people
- Individuals with chronic diseases and pre-existing medical conditions
- Minority groups, including Dalits and Muslims
- Indigenous peoples and groups
- Disaster-affected populations
- Poor households, including female-headed, homeless, and landless families
- People/children with disabilities; and,
- School children, especially in relation to safety in crossing roads

7.3 Consultation Meetings

Consultations have been carried out with all the above stakeholders during the preparation of the ESIA (from May 2024 to January 2025). Issues raised during these consultations are given in Table 8.1. The participants include households that have encroached into the ROW, the local population, public service providers, and local health facilities. The other interested parties are local governments (2 Municipalities), local non-governmental organizations (NGOs), civil society, teachers, political leaders, women groups, local entrepreneurs, local user groups (forest, water, irrigation etc.), security personnel (traffic police and army), drivers and road users (including travelers); and vulnerable and marginalized groups, including those who are differently-abled. After the approval of this ESIA, the government planned to disclose publicly, i.e, on the DoR's website.

During the project's initial phase, a quick site visit and a few consultations with above mentioned stakeholders have been carried out as part of Rapid Rural Appraisal (RRA) dated March 2024. Altogether (12) Focus Group Discussions (FGD) and (11) Key Informant Interviews were also conducted, and discussions project potential impact and its mitigation provision dated August 2024. Similarly, a Public hearing has been conducted during IEE preparation at Buddhabhumi and Shivaraj Municipality dated 3 to 4 January 2025. During IEE and ESIA preparation, a separate consultation and discussion meeting with (2) Tharu women groups has also been conducted at Barkalpur, and the Gauriya Tharu community has been consulted. Beside this the separate consultation has also been carried out with Division forest office Buddhabhumi including sub-division at Kherdarpur and Champapur, Kapilbastu collaborative forest management committee and community forest users group (Hariyali and Kanchan CFUG), local Indigenous (Magar and Newar) community, NGOs working on wild life environmental and social issues (Bird Conservation Nepal), Wildlife researcher and activists, NEA, Nepal telecom, Business groups, local Jiggery (traditional unrefined sweetener made from the juice of sugarcane or centrifugal cane sugar consumed in southeast Asia) coal cottage yards, labor union, media, political leader, Chair of Barkalpur Tharu Hastakala,

Haatbazar management team, school teacher and traffic police. A total of 410 stakeholders, 240 men and 170 women, were consulted through all these meetings.

7.4 Feedback from Consultations

Feedback from the consultations was overall supportive of the project from both local communities and the government agencies. All participants unanimously agreed that the draft environmental and social reports were very comprehensive and extensively covered all environmental and social aspects, including measures for the protection of wildlife, conservation of natural resources, and entitlements for resettlement and rehabilitation assistance. The feedback from the public consultations (during the preparation of the ESIA is summarized in Table 79.

Table 79: Feedback from Public Consultations and Response

SN	Issues	Redressal section/Response
1	Existing highway should be demolished only after the new lane is constructed and operated.	Addressed in section 6.2.2, issue no 14.
2	Cycle lane and utility duct must be provided along the road.	Impact associated with road safety and the need for a cycle lane has been included in the section 4.2.1 (Issue no 1 of the operation phase) and Mitigation is addressed in section 6.2.1.
3	There shall be a pedestrian overhead crossing for pedestrians at Imilia Chowk.	It has been added to the design report
4	The length of the bridge in the Belwagurdawa River (640+000) will be extended by 50 to 60 meters on the east side of the road, as it is cutting the agricultural land.	It is under discussion and will be finalized as per the provisions of DoR and national governing laws. However, a culvert has been provisioned towards the east for the discharge of the flooded water.
5	External drainage for stormwater management shall be provided for the discharge of the US/DS discharge into the cross-drain structure.	Provisioned as per the designed report (section 4.2.2 (2 of operation phase)
6	Inundation problem west of Chandratta Chowk shall be addressed, and the size of the culvert in the Kanchhania stream shall be increased.	There will be a side earthen drain in the semi-urban road section. The size of the culvert has been increased in the design.
7	Water supply pipelines piled along the highway shall not be disturbed without assuring an uninterrupted water supply.	Mechanism of relocation and maintenance has been assured section 4.2.1 (7) for the impacts and section 6.2.1 (7) for the mitigation issues
8	Extension of the six-lane highway should be done to the Buddhabhumi campus chowk (642+600) in	Between Imilia and Umari Chowk project has increased the stretch of the 6-lane

SN	Issues	Redressal section/Response
	the Imilia section and further extended to the Range post in the Chandrauta section.	highway. However, extension to 6- 6-lane highway from Umari Chowk to the range post is beyond the scope of the project.
9	Management of Hatbazar in Imilia and Chandrauta area.	The issue has been addressed in section 6.2.2 (3) for the operation phase.
10	The project shall support the community for the livelihood and income generation activities, including the improvement of Hat Bazar at Imilia and Chandrauta, and also give priority to the local workers in construction.	The project has arranged to improve the Hatbazar at Imilia and Chandrauta along with the road construction. Similarly pedestrian overhead bridge has been proposed at Imilia Chowk, considering the safety Aspect
11	The dilemma of the central line of the road at Imilia, Chandrauta, and Balapur mode shall be properly addressed, and damage to the structures due to a shift in the central line has to be addressed through joint verification with the land revenue and Napi office prior to construction.	It was committed that proper verification will be done prior to road construction, and compensation for the lost structures will be made available.
12	The Barkalpur and Champapur area has not traced out the road alignment into the cadastral map, due to which people have been paying revenue; hence project shall take the initiative to make arrangements to remove the land from their land ownership certificate.	The project will make arrangements to take the action of handing over the land to the project's name in support of the locals.
13	There shall not be storage of construction material along the road, especially at the market area, which deteriorates the visual as well as physical environmental condition, and also obstructs people from their activities	Separate storage areas as well as stockpiling sites will be provisioned in the project, and supervision consultants will instruct the contractor to manage those materials at specified places.
14	Proper consultation shall be done to relocate the Diar of Chaudhary community at Dumara	It is committed to shifting it in consultation with the priest of the Chaudhary community

Annex

Some Standards.

खण्ड ६२ संख्या १९ नेपाल राजपत्र भाग ५ मिति २०६९।४।२९

नेपाल सरकार

वातावरण, विज्ञान तथा प्रविधि मन्त्रालयको

सूचना २

नेपाल सरकारले वातावरण संरक्षण नियमावली, २०५४ को नियम १५ ले दिएको अधिकार प्रयोग गरी देहाय बमोजिमको वायुको गुणस्तर सम्बन्धी राष्ट्रिय मापदण्ड, २०६९ (National Ambient Air Quality Standard, 2012) तोकेको छ ।

Parameters	Units	Averaging time	Concentration max	Test Methods
TSP	$\mu\text{g}/\text{m}^3$	Annual	-	
		24-hours*	230	High Volume Sampling and Gravimetric Analysis
PM ₁₀	$\mu\text{g}/\text{m}^3$	Annual	-	
		24-hours*	120	High Volume Sampler and Gravimetric Analysis, TOEM, Beta Attenuation
Sulfur Dioxide	$\mu\text{g}/\text{m}^3$	Annual**	50	Ultraviolet Fluorescence, West and Gaeke Method
		24-hours*	70	Same as annual
Nitrogen Dioxide	$\mu\text{g}/\text{m}^3$	Annual	40	Chemiluminescence
		24-hours*	80	Same as annual
Carbon Monoxide	$\mu\text{g}/\text{m}^3$	8 hours*	10,000	Non Dispersive Infra Red spectrophotometer (NDIR)
Lead	$\mu\text{g}/\text{m}^3$	Annual**	0.5	High Volume Sampling, followed by atomic absorption spectrometry
Benzene	$\mu\text{g}/\text{m}^3$	Annual**	5	Gas Chromatographic Technique
PM _{2.5}	$\mu\text{g}/\text{m}^3$	24-hours*	40	PM _{2.5} sampling gravimetric analysis
Ozone	$\mu\text{g}/\text{m}^3$	8-hours*	157	UV spectrophotometer

नेपाल राजपत्र

नेपाल सरकारद्वारा प्रकाशित

खण्ड ६२) काठमाडौं कात्तिक १३ गते, २०६९ साल (संख्या ३०)

नेपाल सरकार

वातावरण, विज्ञान तथा प्रविधि मन्त्रालयको

सूचना १

नेपाल सरकारले वातावरण संरक्षण नियमावली, २०५४ को नियम १५ ले दिएको अधिकार प्रयोग गरी देहाय बमोजिम ध्वनिको गुणस्तर सम्बन्धी राष्ट्रिय मापदण्ड, २०६९ तोकेको छ :-

(क) ध्वनिको सीमा

क्षेत्रको	ध्वनि सीमा Leq (डेसिबेल)	
	दिवा	रात्रि
औद्योगिक क्षेत्र	७५	७०
व्यापारिक क्षेत्र	६५	५५
ग्रामीण आवास क्षेत्र	४५	४०
शहरी आवास क्षेत्र	५५	५०
मिश्रित आवास क्षेत्र	६३	५५
शान्त क्षेत्र	५०	४०

(ख) घरेलु उपकरणहरूका अधिकतम ध्वनि उत्सर्जन सीमा

क्र.सं.	उपकरण	अधिकतम सीमा (डेसिबेल)
१	पानी तान्ने पम्प	६५
२	डिजेल जेनरेटर	९०
३	मनोरञ्जनका साधन	७०

वाञ्छाले,

कृष्ण ज्ञवाली

नेपाल सरकारको सचिव

Noise standard for Workplace



२०६४/३१२५ मा मन्त्र प्राप्त भएको

खण्ड ६६) संख्या ६३ नेपाल राष्ट्रिय भाग ५ मिति २०७३/१२/१४



नेपाल सरकारले श्रम ऐन, २०४८ को दफा ३६ ले दिएको अधिकार प्रयोग गरी कार्यस्थलमा हुने ध्वनिको स्तर (मापदण्ड) देहाय बमोजिम तोकेकोले यो सूचना प्रकाशन गरेको छ :-

कार्यस्थलको लागि अधिकतम ध्वनिको स्तर (मापदण्ड), २०७३
(Permissible Exposure Limit (PEL) of Noise for Workplace)

प्रभावित हुने कुल समय (लगातार रुपमा निस्कने ध्वनि) प्रति दिन घण्टामा (Total time of exposure (continuous or a number of short term Exposures) per day, in hours.)	ध्वनिको स्तर, dBA मा (Sound Pressure Level in dBA) (decibels A-weighted)
८	९०
४	९५
२	१००
१	१०५
३० मिनेट	११०
१५ मिनेट	११५

पुनश्च: (१) ११५ dBA भन्दा अधिक ध्वनिमा प्रभावित हुन नपाउने।

(No exposure in excess of 115 dBA is to be permitted.)

Annexure 2: Air Quality of the Project Area



Lumbini Agro Environment Lab Pvt. Ltd.

लुम्बिनी एग्रो इन्भाएरमेन्ट ल्याब प्रा. लि.



Ref No: 871084/082

Helping the land to help the people
Sunwal-12, Nawalparasi, Estd: 2020

Regd No.: 239602/077/078
Vat No.: 609773466

Issue Date: 2024-05-14

Quality Test Report

Entry No.: LAEL-382-2081

Client: Geocom International Pvt. Ltd.

Address: Kapilvastu

Contact no. of Client: 9843950840



Sample Type: Ambient Air

Sampling Start Date: 2024-08-15

Sampling End Date: 2024-08-16

Sampled By: Laboratory

Test Results

S.N.	Parameters	Unit	Observed Value			Tolerance Limit (National Air Quality Standard, Ministry of Forests and Environment, 2012) ($\mu\text{g}/\text{m}^3$)	Remarks
			M1	M2	M3		
1.	TSP	($\mu\text{g}/\text{m}^3$)	110	75	85	230	Within the limit
2.	PM10	($\mu\text{g}/\text{m}^3$)	70	55	65	120	Within the limit
3.	PM2.5	($\mu\text{g}/\text{m}^3$)	25	15	20	40	Within the limit
4.	SO ₂	($\mu\text{g}/\text{m}^3$)	N.D.	N.D.	N.D.	70	
5.	NO ₂	($\mu\text{g}/\text{m}^3$)	N.D.	N.D.	N.D.	80	

Note: N.D.: Not Detected

M1- Imiliya, GPS Location: N27°39.593' E082°59.607'

M2- Jwai Khola, GPS Location: N27°38.900' E082°54.609'

M3 - Chandrauta, GPS Location: N27°38.959' E082°51.859'

Analyzed By

Checked By

Authorized By

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Annexure 3: Lab Analysis of Water Quality of Project Area



Lumbini Agro Environment Lab Pvt. Ltd.

लुम्बिनी एग्रो इन्भाएरमेन्ट ल्याब प्रा. लि.

Helping the Land, Water and the People
Summit-12, Haridwar, India, 2020

Regd No.: 239602/077/078
Vat No.: 609773466



Ref No: 082/081/082

Issued Date: 2081-09-01

Quality Test Report

Name of Client:	Balla Khola	Lab Code:	LAEL-377-2081
Collector:	Pareendra Gupta	Location:	Kapilvasta, N27°39.051' E082°54.965'
Source:	Surface water	Sampled By:	Laboratory
Sampling Date:	2081-08-15	Test Performance Date:	2081-08-16 to 2081-08-21
Receipt Date:	2081-08-16		

S.N.	Category	Parameters	Method	Observed value	Wastewater Discharge Guidelines, Nepal (MOE 2010)
1.	Physical	pH	4500-H ⁺ .B. APHA, AWWA, WEF, 24 th Edition	7.6	5.5-9.0
2.		Temp. °C	Thermometric	21.7	-
3.		TDS (mg/L)	2540 C. APHA, AWWA, WEF, 24 th Edition	286	
4.		Electrical Conductivity (µS/cm)	2510 B. APHA, AWWA, WEF, 24 th Edition	528	
5.	Chemical	Total Suspended Solids, TSS (mg/L)	2540 D. APHA, AWWA, WEF, 24 th Edition	25	50
6.		Chemical Oxygen Demand (mg/L)	5220 B. APHA, AWWA, WEF, 24 th Edition	65	250
7.		Dissolved Oxygen (mg/L)	4500-O C. APHA, AWWA, WEF, 24 th Edition	7.88	

Note:

1. This report is based on the sample submitted to this laboratory by the client
2. The integrity of the sample and results are dependent on the quality of sampling. The results refer only to the parameters tested of the samples provided/collected for analysis.

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Analyzed By
Dipesh Sahani
BSc. Ag

.....
Checked By
Dipesh Sahani
BSc. Ag

.....
Authorized By
Sudip Paudel
MSc. Env. Sci

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Regd. No. 53875/064/065

ASTHA SCIENTIFIC RESEARCH SERVICE PVT. LTD.

Maitidevi, Kathmandu, Nepal, Tel: +977-1-4533748
E-mail: aasthalab2079@gmail.com

(Center for complete scientific solution)

Test Report



Report No. : 405C
Entry No. : AASTHA - 491 - 2081/82
Sample : Water
Client : Lumbini Agro Environment Lab
Source : Goru Singhe Khola

Date received : 21/08/2081
Date completed : 22-23/08/2081
Sampled By : Client
Issue Date : 24/08/2081

S. N.	Parameter	Test Method	Observed Values
1.	Iron (mg/l)	3111 B, APHA, AWWA, WEF, 24 th Edition.	0.51
2.	Manganese (mg/l)	3111 B, APHA, AWWA, WEF, 24 th Edition.	0.13
3.	Lead (mg/l)	3111 B, APHA, AWWA, WEF, 24 th Edition.	<0.01
4.	Cadmium (mg/l)	3111 B, APHA, AWWA, WEF, 24 th Edition.	<0.003
5.	Nickel (mg/l)	3111 B, APHA, AWWA, WEF, 24 th Edition.	<0.01
6.	Chromium (mg/l)	3111 B, APHA, AWWA, WEF, 24 th Edition.	<0.05
7.	Copper (mg/l)	3111 B, APHA, AWWA, WEF, 24 th Edition.	0.01
8.	Zinc (mg/l)	3111 B, APHA, AWWA, WEF, 24 th Edition.	0.02
9.	Arsenic (mg/l)	3114 C, APHA, AWWA, WEF, 24 th Edition.	<0.01

Analyzed By

Checked By

Authorized By
(Chairperson)

- Note :
1. The issued report refers only to the tested sample and applicable parameters. Endorsement of products is neither inferred nor implied.
 2. Liability of our institute is limited to the invoiced detrimands and amount only.
 3. Even in the case of stable samples such as limestone, minerals, soil etc. they will not be stored more than two months unless specially requested by the client.
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E-mail: aasthalab2079@gmail.com

(Center for complete scientific solution)



Report No. : 405A
Entry No. : AASTHA - 491 - 2081/82
Sample : Water
Client : Lumbini Agro Environment Lab
Source : Balla Khola

Date received : 21/08/2081
Date completed : 22-23/08/2081
Sampled By : Client
Issue Date : 24/08/2081

S. N.	Parameter	Test Method	Observed Values
1.	Iron (mg/l)	3111 B, APHA, AWWA, WEF, 24 th Edition.	0.15
2.	Manganese (mg/l)	3111 B, APHA, AWWA, WEF, 24 th Edition.	0.13
3.	Lead (mg/l)	3111 B, APHA, AWWA, WEF, 24 th Edition.	<0.01
4.	Cadmium (mg/l)	3111 B, APHA, AWWA, WEF, 24 th Edition.	<0.003
5.	Nickel (mg/l)	3111 B, APHA, AWWA, WEF, 24 th Edition.	<0.01
6.	Chromium (mg/l)	3111 B, APHA, AWWA, WEF, 24 th Edition.	<0.05
7.	Copper (mg/l)	3111 B, APHA, AWWA, WEF, 24 th Edition.	0.01
8.	Zinc (mg/l)	3111 B, APHA, AWWA, WEF, 24 th Edition.	0.02
9.	Arsenic (mg/l)	3114 C, APHA, AWWA, WEF, 24 th Edition.	<0.01

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(Chairperson)

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E-mail: aasthalab2079@gmail.com

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Report No. : 405B
Entry No. : AASTHA - 491 - 2081/82
Sample : Water
Client : Lumbini Agro Environment Lab
Source : Jwai Khola

Date received : 21/08/2081
Date completed : 22-23/08/2081
Sampled By : Client
Issue Date : 24/08/2081

S. N.	Parameter	Test Method	Observed Values
1.	pH	4500-H*, B, APHA, AWWA, WEF, 24 th Edition.	7.5
2.	Temperature (°C)	Thermometer	21.6
3.	TDS (mg/l)	2540 C, APHA, AWWA, WEF, 24 th Edition	395
4.	Electrical Conductivity (µmhos/cm)	2510 B, APHA, AWWA, WEF, 24 th Edition.	730
5.	Total Suspended Solids (mg/l)	2540 D, APHA, AWWA, WEF, 24 th Edition	18
6.	COD (mg/l)	5220 B, APHA, AWWA, WEF, 24 th Edition	75
7.	DO (mg/l)	4500-O C, APHA, AWWA, WEF, 24 th Edition	7.82
8.	Iron (mg/l)	3111 B, APHA, AWWA, WEF, 24 th Edition.	0.27
9.	Manganese (mg/l)	3111 B, APHA, AWWA, WEF, 24 th Edition.	0.08
10.	Lead (mg/l)	3111 B, APHA, AWWA, WEF, 24 th Edition.	<0.01
11.	Cadmium (mg/l)	3111 B, APHA, AWWA, WEF, 24 th Edition.	<0.003
12.	Nickel (mg/l)	3111 B, APHA, AWWA, WEF, 24 th Edition.	<0.01
13.	Chromium (mg/l)	3111 B, APHA, AWWA, WEF, 24 th Edition.	<0.05
14.	Copper (mg/l)	3111 B, APHA, AWWA, WEF, 24 th Edition.	0.01
15.	Zinc (mg/l)	3111 B, APHA, AWWA, WEF, 24 th Edition.	0.02
16.	Arsenic (mg/l)	3114 C, APHA, AWWA, WEF, 24 th Edition.	<0.01

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Analyzed By

Shila
Checked By

MSL
Authorized By
(Chairperson)

- Note :
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Annexure 4: Lab Report for Sound level measurement

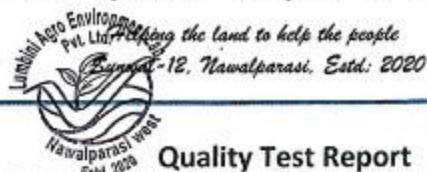


Lumbini Agro Environment lab Pvt. Ltd.

लुम्बिनी एग्रो इन्भाएरमेन्ट ल्याब प्रा. लि.



Ref No: 86/081/082



Regd No.: 239602/077/078
Vat No.: 609773466

Issue Date: 2081-09-01

Quality Test Report

Entry No.: LAEL-381-2081	Type of sample: Sound Level
Client: Geomac International Pvt. Ltd	Sampling Date: 2024-11-26
Address: M3 - Chandrauta, N27°38.959' E082°51.859'	Date completed: 2024-11-27
Contact No.: 9843950840	Location: Chandrauta road Premises
Contact Person: Sachin Jha	Sampled By: LAEL-field person
Device: SL-1352	Run Time: 24 hrs
Basic Functions	Range
Accuracy	±1.4dB
Resolution	0.1dB
Frequency Range	3.5-8KHz
Dynamic Range	50dB
Level Range	Low:30-80dB Medium:50-100dB
	High:80-130dB Auto:30-130dB
Time Weighing	FAST (125ms) SLOW(1s)

Test Results

Start Time: 2024-11-24	10:30:00	
End Time: 2024-11-25	10:30:00	
	Max: 75 dB(A)	
	Min: 45 dB(A)	

Description	Sound Level dB(A)
<i>L_{eq}(day)</i>	70
<i>L_{eq}(night)</i>	55

Day denotes 7:00 to 22:00 hours
Night denotes 22:00 to 7:00 hours

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Lumbini Agro Environment Lab Pvt. Ltd.

लुम्बिनी एग्रो इन्भाएरमेन्ट ल्याब प्रा. लि.



Ref No: 85/084/082



Regd No.: 239602/077/078

Vat No.: 609773466

Issue Date: 2081-09-01

Quality Test Report

Entry No.: LAEL-380-2081	Type of sample: Sound Level
Client: Geomac International Pvt. Ltd	Sampling Date: 2024-11-26
Address: M2- Jwai Khola, N27°38.900' E082°54.609'	Date completed: 2024-11-27
Contact No.: 9843950840	Location: Jwai Khola road Premises
Contact Person: Sachin Jha	Sampled By: LAEL-field person
Device: SL-1352	Run Time: 24 hrs
Basic Functions	Range
Accuracy	±1.4dB
Resolution	0.1dB
Frequency Range	3.5-8KHz
Dynamic Range	50dB
Level Range	Low:30-80dB Medium:50-100dB
	High:80-130dB Auto:30-130dB
Time Weighing	FAST (125ms) SLOW(1s)

Test Results

Start Time: 2024-11-26	10:30:00	
End Time: 2024-11-27	10:30:00	
	Max: 55 dB(A)	
	Min: 35 dB(A)	

Description	Sound Level dB(A)
<i>L_{eq}(day)</i>	52
<i>L_{eq}(night)</i>	40

Day denotes 7:00 to 22:00 hours
Night denotes 22:00 to 7:00 hours

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Lumbini Agro Environment lab Pvt. Ltd.

लुम्बिनी एग्रो इन्भाएरमेन्ट ल्याब प्रा. लि.



Ref No: 84/2081/082

Helping the land to help the people

Sunwal-12, Nawalparasi, Estd: 2070



Regd No.: 239602/077/078

Vat No.: 609773466

Issue Date: 2081-09-01

Quality Test Report

Entry No.: LAEL-379-2081	Type of sample: Sound Level
Client: Geomac International Pvt. Ltd	Sampling Date: 2024-11-24
Address: m1- Imiliya, N27°39.593' E082°59.607'	Date completed: 2024-11-25
Contact No.: 9843950840	Location: Imiliya road Premises
Contact Person: Sachin Jha	Sampled By: LAEL-field person
Device: SL-1352	Run Time: 24 hrs
Basic Functions	Range
Accuracy	±1.4dB
Resolution	0.1dB
Frequency Range	3.5-8KHz
Dynamic Range	50dB
Level Range	Low: 30-80dB Medium: 50-100dB
	High: 80-130dB Auto: 30-130dB
Time Weighing	FAST (125ms) SLOW(1s)

Test Results

Start Time: 2024-11-25	10:30:00	
End Time: 2024-11-26	10:30:00	
	Max: 72 dB(A)	
	Min: 43 dB(A)	

Description	Sound Level dB(A)
<i>L_{eq}(day)</i>	66
<i>L_{eq}(night)</i>	53

Day denotes 7:00 to 22:00 hours
Night denotes 22:00 to 7:00 hours

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