

# Initial Environmental Examination

---

## **PUBLIC**

Document Stage: Updated Draft

Project Number: 55346-001

November 2024

## Nepal: Urban Resilience and Livability Improvement Project

Improvement to Road, Drains and Other Infrastructure in Five Towns (Tilottama, Devdaha, Sainamaina, Lumbini and Sidharthanagar) in Western Urban Corridor

## **CONTENTS**

	<b>Pages</b>
EXECUTIVE SUMMARY	III
I. INTRODUCTION	9
A. Background	9
B. Subproject Scope and Location	10
C. Purpose of Initial Environmental Examination	15
D. Methodology	15
E. Structure of IEE Report	16
II. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK	17
A. ADB Safeguard Policy Statement, 2009	17
B. National Environmental Legislations	20
C. International Environmental Agreements	26
D. Applicable Environmental Standards	28
III. DESCRIPTION OF THE PROJECT	29
A. Tilottama Municipality Subprojects	30
B. Siddharthanagar Municipality Subprojects	44
C. Devdaha Municipality Subprojects	94
D. Sainamaina Municipality Subprojects	113
E. Lumbini Sanskritik Municipality Subprojects	132
IV. DESCRIPTION OF BASELINE ENVIRONMENT	157
A. Project Influence Area	157
B. Physical Environment	157
C. Biological Environment	179
D. Socio-economic and Cultural Environment	191
E. Site Environmental Features	201
V. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES	234
A. Planning and Design Phase	234
B. Pre-Construction Phase Impact and Mitigation Measures	239
C. Construction Phase Impact and Mitigation Measures	241
D. Operational Phase Impacts and Mitigation Measures	254
E. Cumulative Impacts and Mitigation Measures	256
F. Unanticipated Impacts during Construction and Operation	257
VI. ENVIRONMENTAL MANAGEMENT PLAN	258
A. Institutional Arrangement- revert from orig	258
B. Environmental Management Plan (EMP)	264
C. Environmental Monitoring Program	288
D. Capacity Development Training	290
E. Environmental Management and Monitoring Plan Implementation	292
VII. INFORMATION DISCLOSURE, CONSULTATION AND PARTICIPATION	309
A. Consultation and Participation	309
B. Public Consultation Conducted	309
C. Future Consultations during Detailed Design Stage	312
D. Information Disclosure	312
VIII. GRIEVANCE REDRESS MECHANISM	312



IX.	MONITORING AND REPORTING	317
X.	CONCLUSION AND RECOMMENDATION	318
	APPENDIX 1: DETAILS OF TREE SURVEY	323
	APPENDIX 2: COVID 19 GUIDELINE	336
	APPENDIX 3: MINUTES OF CONSULTATIONS AT WESTERN URBAN CORRIDOR TOWNS	339
	APPENDIX 4: SAMPLE GRIEVANCE REGISTRATION FORM	362
	APPENDIX 5: SAMPLE ENVIRONMENTAL SITE INSPECTION REPORT	363
	APPENDIX 6: BASELINE ENVIRONMENTAL MONITORING OF SELECTED SITES	365
	Photographs of sampling and laboratory test	383

## TABLES

This sub-project covers the infrastructure improvements carried out under Output 1 of the URLIP at the five municipalities of Devdaha, Lumbini Sanskritik, Sainamaina, Siddharthanagar and Tilottama. These five municipalities are also known as the West Urban Corridor (WUC), and Figure 1 shows the location of towns. Towns are located close about 10-20 km from each other, The infrastructure improvements carried out under the WUC subproject in five municipalities include are as below: roads and drains works of 73 km long covering 38 roads in five WUC municipalities, and a bus terminal and municipal office building in Lumbini Sanskritik municipality.

Table 1: Proposed Roads in Devdaha	10
Table 2: Proposed Roads in Tilottama	10
Table 3: Proposed Roads in Siddharthanagar	11
Table 4: Proposed Roads in Sainamaina	11
Table 5: Proposed Roads in Lumbini Sanskritik	12
Table 6: Proposed Bus Terminal in Lumbini Sanskritik Municipality	12
Table 7: Subprojects Requiring Environment Assessment as per GoN-EPR, 2020	21
Table 8: Relevant Government Laws and Regulations	21
Table 9: International Environmental Agreements and standards ratified by GoN	27
Table 10: Standards for Ambient Air Quality	28
Table 11: Standards for noise levels for both GoN and WHO	29
Table 12: Existing Condition and Proposed Scope of the Drivertole – Shivapur	30
Table 13: Existing Condition and Proposed Scope of Pathardanda -Tinau Road	31
Table 16: Proposed Scheme Comparison of Simapath – Ranigaun - Sakuni Road	45
Table 17: Proposed Scheme Comparison of Sakunipath to Danda khola Road	46
Table 18: Proposed Scheme Comparison of Bimaanghat to North Road	47
Table 19: Proposed Scheme Comparison of Rahim Path-1 Road	48
Table 20: Proposed Scheme Comparison of Rahim Path-2 Road	49
Table 21: Proposed Scheme Comparison of Bhimkaali Path Road	51
Table 22: Proposed Scheme Comparison of East of Gallamandi to Durga Colony Road	52
Table 23: Proposed Scheme Comparison of Udhogpuri Road	53
Table 24: Proposed Scheme Comparison of Radhakrishna, Annapurna Path All Linked Roads	54
Table 25: Proposed Scheme Comparison of Benipur East South Border Road	55
Table 26: Proposed Scheme Comparison of Ward number 2 and Ward number 4-connecting Road	57
Table 27: Proposed Scheme Comparison of Darkhasuwa West Siddhartha Yatayat Road	58

Table 28: Proposed Scheme Comparison of Siddhartha Colony/Manmohan Path Road	59
Table 29: Proposed Scheme Comparison of Sugar Mill Link Roads	60
Table 30: Proposed Scheme Comparison of Mayadevi Colony Road	62
Table 31: Proposed Scheme Comparison of Durga Colony all linked road to Nirwana Hotel	63
Table 32: Proposed Scheme Comparison of Kishorpur to Airport Road	64
Table 33: Proposed Scheme Comparison of Trisuli Path, Deurali Path, Saptarishi Path	66
Table 34: Proposed Scheme Comparison of Uchami Path to South Road	69
Table 35: Proposed Scheme Comparison of Abhay Durga Path	70
Dumdumuwa Road to Gonahiya Road - 1.145 km. The road starts from Prabat Path, which is an existing RUDP road, and extends to Dumdumuwa. The Road lies in ward 9. This road alignment is a completely new route designed to connect with another RUDP road. The right of way (ROW) for the road varies, with sections having a width of 7 meters and others having a width of 8 meters, as per the provided plan. The purpose of this road is to establish a transportation link between Prabat Path and Dumdumuwa, benefiting the local residents and visitors in the area. Dumdumuwa and Gonahiya are smaller towns or localities located within or near Siddharthanagar. This road likely serves as a crucial commuting route between these areas and potentially connects to other major roads or highways.	
Table 36: Proposed Scheme Comparison of Dumdumuwa Road to Gonahiya Road	71
Table 37: Proposed Scheme Comparison of Doghari Gaau East Chowk to Sahari Bikash Road	73
Table 38: Proposed Scheme Comparison of Suvarna Path Road	74
Table 39: Proposed Scheme Comparison of Bhimkali Path, Janta Path Branch Roads	75
Table 40: Proposed Scheme Comparison of Other Roads	76
68. Lacoul Road (0.321 km) - The Road starts from Siddhartha Highway and ends at OYO Lacoul hotel. The Road lies in ward 13. The Row of road is 6m. The existing road is earthen type road. The width of existing road is 5.6m including drain. The settlement in these is area is low as there are only few houses in these roads.	
Table 41: Proposed Scheme Comparison of Lacoul Road	78
Table 42: Proposed Scheme Comparison of Lacoul Road	78
Table 43: Bahluhipul Medical college Batatol Mukhiya Tol Piparahiya road section	95
Table 44: Banchauki Mayadevi Path Mildanda Buddha Circuit Road Section	96
Table 43: Proposed Scheme Comparison of Shitalnagar-Bhawanipur-Soiya Road	97
Table 47: Existing Condition and Proposed Sainamaina Ring Road 1 (Panbari- Saljhandi)	113
Table 48: Existing Condition and Proposed Saina Maina Ring Road 2 (Duimuhan Chowk- Thali Gaon to Chaudhary Gholi)	114
Table 49: Existing Condition and Proposed Scheme Comparison of Panbari Bhatta to Chafiya Tole Road	115
Table 50: Existing Condition and Proposed Scheme Comparison of Kanchan Pul to Dakshin Barauli Road	116
Table 51: Existing Condition and Proposed Scheme Comparison of Janajyoti Tole Chowk to Peepal Danda Road	118
Table 52: Existing and proposed road inventory of Lumbini Bus Terminal Access Road	132
Table 53: Existing and proposed road inventory of Moglaha-Masina-Anihari-Bhaisaiya	133
Table 54: Details of sampling locations for baseline environmental monitoring	157
Table 55: Description of FAO's Soil Type	170
Table 56: Concentration of air quality parameters in the sites	171
Table 57: Water quality data of ANW1 and ANW2	173
Table 58: Water quality data of surface water	174
Table 59: Noise level data of ANW1 (Lumbini Sanskritik Municipality, Ward No. 8, Rupandehi)	175
Table 60: Noise level data of ANW2 (Siddharthanagar Municipality, Ward No. 8, Rupandehi)	176

Table 61: Noise level data of ANW3 (Sainamaina Municipality, Ward No. 10 (Panbari)	177
Table 62: Noise level data of ANW4 (Tilottama Municipality, Ward No. - 10, (Ganeshnagar)	177
Table 63: Noise level data of ANW5 (Devdaha Municipality, Ward No. 8 (Keureni, Bishalnagar))	178
Table 64: Community Forest along and nearby Panbari-Saljhandi Road -Sainamaina	180
Table 65: Community Forest along and nearby the road alignments -Devdaha	180
Table 66: Major Vegetation found in the Project Area	184
Table 67: List of Mammals found in the Project Area	184
Table 68: List of Birds found in the Project Area	184
Table 69: List of Herpetofauna found in the Project Area	185
Table 70: List of Fishes found in the Project Area	185
Table 71: Number of trees to be cut down and saved in the Road Subprojects	185
Table 72: Key Biodiversity Areas	187
Table 73: Details of Protected Areas	188
Table 74: Species with Potential to Occur	188
Table 75: Present Land Use in Project Area	191
Table 76: Population Distribution in the Project Affected Municipality (Caste/ Ethnicity)	193
Table 77: List of Monuments around the Project Area within Rupandehi District	195
Table 78: Site Environmental Features of the Road Projects Proposed in Devdaha Municipality	204
Table 79: Site Environmental Features of the Road Projects Proposed in Lumbini Sanskritik Municipality	207
Table 80: Site Environmental Features of the Road Projects Proposed in Saina Maina Municipality	213
Table 81: Site Environmental Features of the Road Projects Proposed in Tilottama Municipality	218
Table 82: Site Environmental Features of the Road Projects Proposed in Siddharthanagar Municipality	220
Table 83: Environmental Management Plan Matrix (Construction Phase) – Applicable for all Project Components	265
Table 35: Environmental Management Plan – Operational Phase – Bus Terminal Facility and Municipal Building (Lumbini)	287
Table 89: Indicative Environmental Management Plan Budget for Bill of Quantities (BOQ)	298

## FIGURES

Figure 1: Location of Project Towns	13
Figure 2: Proposed Roads, Drains and Infrastructures in Five Municipalities	14
Figure 3: Typical Road Sections with Footpath, Drain and Retaining walls (11.5m) in Tilottama	33
Figure 4: Typical Road Sections with Footpath, Drain and Retaining walls (9.0 m) in Tilottama	34
Figure 5: Typical Kerbs and Footpath Section in Tilottama	35
Figure 6: Typical Drain Plan and Sections in Tilottama	36
Figure 7: Typical Road Section with Street Light in Tilottama	37
Figure 8: Resting Stations with Sheds	38
Figure 9: Pedestrian Crossing Details in Tilottama	38
Figure 10: Footpath with Ramps for entrances in Tilottama	39
Figure 11: Typical Road Section with Retaining Walls in Tilottama	40
Figure 12: Hand Railings in Footpath in Tilottama	41
Figure 13: Typical Pipe Culvert Plan and Sections in Tilottama	42
Figure 14: Typical Slab Culvert Plan and Sections in Tilottama	43

Figure 15: Location of Subprojects in Tilottama Municipality	44
Figure 16: Typical Road Sections with Footpath, Drain and shoulder (8m) in Siddharthanagar	80
Figure 17: Typical Road Sections with Footpath, Drain and shoulder (11.5m) in Siddharthanagar	81
Figure 18: Typical Road Sections with Rigid Pavement (6m) in Siddharthanagar	82
Figure 19: Typical Road Sections with Median, Footpath and Mix of Asphalt Concrete and Rigid Pavement, (18m) in Siddharthanagar	83
Figure 20: Typical Kerbs and Footpath Section in Siddharthanagar	84
Figure 21: Typical Drain Plan and Sections in Siddharthanagar	86
Figure 22: Typical Road Section with Street Light in Siddharthanagar	87
Figure 23: Resting Stations with Sheds in Siddharthanagar	88
Figure 24: Pedestrian Crossing Details in Siddharthanagar	88
Figure 25: Footpath with Ramps for entrances in Siddharthanagar	89
Figure 26: Typical Road Section with Retaining Walls in Siddharthanagar	90
Figure 27: Hand Railings in Footpath in Siddharthanagar	91
Figure 28: Typical Pipe Culvert Plan and Sections in Siddharthanagar	92
Figure 29: Typical Slab Culvert Plan and Sections in Siddharthanagar	93
Figure 30: Location of Subprojects in Siddharthanagar Municipality	94
Figure 31: Location of Subprojects in Devdaha Municipality	100
Figure 32: Typical Road Sections with Footpath, Drain and Retaining walls (11.5m) in Devdaha	102
Figure 33: <i>Typical Road Sections with Footpath, Drain with Double Arm Street Light (14m) in Devdaha</i>	103
Figure 34: <i>Typical Road Sections with Footpath, Drain and Cycle Track (9.0 m) in Devdaha</i>	104
Figure 35: <i>Typical Kerbs and Footpath Section in Devdaha</i>	105
Figure 36: Typical Drain Plan and Sections in Devdaha	106
Figure 37: Typical Road Section with Street Light	107
Figure 38: <i>Resting Stations with Sheds</i>	108
Figure 39: <i>Pedestrian Crossing Details</i>	108
Figure 40: <i>Footpath with Ramps for entrances</i>	109
Figure 41: <i>Typical Pipe Culvert Plan and Sections</i>	110
Figure 42: Typical Slab Culvert Plan and Sections	111
Figure 43: Typical Box Culvert Plan and Sections	112
Figure 44: Typical Road Sections with Footpath, Drain and Retaining walls (11.5m)	120
Figure 45: Typical Road Sections with Footpath, Drain and Tree (11.5m)	121
Figure 46: Typical Road Section for Embankment (9 m)	122
Figure 47: Typical Kerbs and Footpath Section	123
Figure 48: Typical Drain Plan and Sections	124
Figure 49: Typical Road Section with Street Light	125
Figure 50: Resting Stations with Sheds	126
Figure 51: Pedestrian Crossing Details	126
Figure 52: Footpath with Ramps for entrances	127
Figure 53: Typical Road Section with Retaining Walls	127
Figure 54: Hand Railings in Footpath	128
Figure 55: Typical Pipe Culvert Plan and Sections	129
Figure 56: Typical Slab Culvert Plan and Sections	130
Figure 57 : Location of Subprojects in Sainamaina Municipality	131
Figure 57: Vicinity of Lumbini World Heritage Site from Moglaha Moglaha Masina Aniharuru Bhaisaiya Road	135
Figure 58: Typical Road Sections with Footpath, Drain and Retaining walls (8.0m)	137

Figure 59: Typical Road Sections with Footpath, Drain and Retaining walls (10.5m)	137
Figure 60: Typical Road Sections with Footpath, Drain and Retaining walls (18.0 m)	138
Figure 61: Typical Kerbs and Footpath Section	139
Figure 62: Typical Drain Plan and Sections	140
Figure 63: Typical Road Sections with Street Light	142
Figure 64: Resting Stations with Sheds	143
Figure 65: Pedestrian Crossing Details	143
Figure 66: Footpath with Ramps for entrances	144
Figure 67: Typical Road Sections with Retaining Walls	145
Figure 68: Hand Railings in Footpath	146
Figure 69: Location of Subprojects in Lumbini Sanskritik Municipality	148
Figure 70: Location of Proposed Bus Terminal Area	149
Figure 71: Layout of Lumbini Bus Terminal Development Plan	150
Figure 72: Conceptual drainage design at Bus Terminal	151
Figure 73: Location of Proposed Municipal Building	152
Figure 74: Proposed Municipal Building Site, and Building Footprint	153
Figure 75: Photographs of the Road Sections proposed in Municipalities of West Urban Corridor	154
Figure 76: Sampling sites for baseline environmental monitoring	159
Figure 77: Tilottama Municipality	160
Figure 78: General View of Tilottama Town	161
Figure 79: Devdaha Municipality	162
Figure 80: General View of Devdaha Town	163
Figure 81: Sainamaina Municipality	164
Figure 82: General View of Sainamaina Town	165
Figure 83: Lumbini Municipality	166
Figure 84: General View of Lumbini Town	167
Figure 85: Sidharthnagar Municipality	168
Figure 86: General View of Sidharthnagar Town	169
Figure 87: Soil Classification of the Rupandehi District	170
Figure 88: Monthly Climatology in the Project Area	171
Figure 26: Graphical presentation of air quality data	172
Figure 90: Integrated hydrological hazard map of the Rupandehi District	179
Figure 91: Community Forest along and nearby the Panbari-Saljhandi Road (Sainamaina)	181
Figure 92: Community Forest along and nearby proposed three road alignments (Devdaha)	182
Figure 93: Community Forest nearby the Drivertole-Shivapur Road (Tilottama)	182
Figure 94: Chitwan National Park within the 50-km radius of the Subproject site	188
Figure 95: Lumbini Crane Sanctuary within Lumbini Master Plan Area	190
Figure 96: Present Land Use of the 5 Municipalities	192
Figure 97: Lumbini World Heritage Site	199
Figure 98: Lumbini Master Plan	200
Figure 99: Monuments around the Project Area within Rupandehi District	202
Figure 100: Subproject components nearby the Lumbini World Heritage Site	203
Figure 101: Implementation Arrangement for Safeguard Implementation	258
Figure 102: Public Consultation in the Western Urban Towns	311
Figure 103: Grievance Redress Procedures – URLIP	314

## APPENDICES

Appendix 1: Details of Tree Survey	323
Appendix 2: COVID 19 Guideline	336

Appendix 3: Minutes of Consultations at Western Urban Corridor Towns	339
Appendix 4: Sample Grievance Registration Form	362
Appendix 5: Sample Environmental Site Inspection Report	363



## **CURRENCY EQUIVALENTS**

(as of 6 November 2024)

Currency unit	-	Nepalese rupee (NPR)
NPR 1.00	=	\$ 0.01
\$ 1.00	=	NPR 134.59

## **ABBREVIATIONS**

ADB	-	Asian Development Bank
BES	-	Brief Environment Study
BOQ	-	Bill of Quantities
CBD	-	Convention on Biodiversity
CBS	-	Central Bureau of Statistics
CHS	-	Community Health and Safety
CRO	-	Complaint Receiving Officer
DSC	-	Design Supervision Consultant
DOTM	-	Department of Transport Management
ECC	-	Environmental Clearance Certificate
EHSO	-	Environmental Health and Safety Officer
EIA	-	Environmental Impact Assessment
EMP	-	Environmental Management Plan
EPA	-	Environment Protection Act
EPR	-	Environment Protection Rule
GoN	-	Government of Nepal
GRM	-	Grievance Redress Mechanism
IBAT	-	Integrated Biodiversity Assessment Tool
IEE	-	Initial Environmental Examination
ISCPC	-	Institutional Strengthening and Community Participation Consultant
IUCN	-	International Union for Conservation of Nature
IUDP	-	Integrated Urban Development Plans
LPG	-	Liquefied Petroleum Gas
MoFE	-	Ministry of Forests and Environment
MOM	-	Management, Operation and Maintenance
MoUD	-	Ministry of Urban Development
NWP	-	National Water Plan
OHS	-	Occupational Health and Safety
PCR	-	Physical Coordination Unit
PIU	-	Project Implementation Unit
PMCDC	-	Project Management and Capacity Development Consultant
PCU	-	Project Management Unit
PPE	-	Personal Protective Equipment
REA	-	Rapid Environmental Assessment
RM	-	Rural Municipality
RoW	-	Right of Way
RP	-	Resettlement Plans
RUDP	-	Regional Urban Development Project
SDC	-	Supervision and Design Consultants
SECs	-	Small Ethnic Communities
SPS	-	Safeguard Policy Statement, 2009



WHO	-	World Health Organization
WUC	-	Western Urban Corridor

### **WEIGHTS AND MEASURES**

%	–	Percentage
°C	–	degree Celsius
µg/m <sup>3</sup>	–	Microgram per cubic meter
dBA	–	decibels audible
ha	–	Hectare
km	–	Kilometer
m <sup>3</sup>	–	cubic meter
mm	–	Millimeter

### **NOTE**

In this report, "\$" refers to United States dollars.

This initial environmental examination is a document of the borrower. The views expressed herein do not necessarily represent those of ADB's Board of Directors, Management, or Staff, and may be preliminary in nature. Your attention is directed to the "terms of use" section of ADB's website.

In preparing any country program or strategy, financing any project, or by making any designation of or reference to a particular territory or geographic area in this document, ADB does not intend to make any judgments as to the legal or other status of any territory or area.

## EXECUTIVE SUMMARY

The Urban Resilience and Livability Improvement Project (URLIP) will support to improve municipal infrastructures and governance of the selected project municipalities, thereby contributing to achieve inclusive economic growth and improved livability. This will be achieved through the following three outputs: (i) Output 1: Municipal infrastructure for resilience developed; (ii) Output 2: Tourism assets revitalized, and management improved; and (iii) Output 3: Capacity of municipalities, provincial governments, and Department of Urban Development and Building Construction (DUDBC) strengthened. The DUDBC under the Ministry of Urban Development (MOUD) is the executing agency and is responsible for technical and project management matters including engineering, safeguards, and social aspects. The project will support seven municipalities (Pokhara, Janakpur, Devdaha, Lumbini Sanskritik, Sainamaina, Siddharthanagar, and Tilottama). The Implementing Agencies are municipalities.

**Subproject scope.** This sub-project covers the infrastructure improvements to be carried out under Output 1 of the URLIP at the five municipalities of Devdaha, Lumbini Sanskritik, Sainamaina, Siddharthanagar and Tilottama. These five municipalities form part of West Urban Corridor (WUC). Proposed infrastructure improvements are as follows: **Tilottama Municipality** Improvements to Roads and Drains amounting to a total length of 13.058 km at two locations. **Siddharthanagar Municipality.** Improvements to roads and drains of total length 23.602 km at 26 road sections. **Devdaha Municipality.** Improvements to roads and drains of total length 17.235 km at 3 road sections. **Sainamaina Municipality.** Improvements to roads and drains of total length 17.712 km at five road sections. **Lumbini Sanskritik Municipality** Improvements to roads and drains of total length 12.257 kms at two road sections; Bus terminal building and Municipality office building.

**Categorization.** The proposed WUC Sub-project is classified as Environmental Category “B” per ADB’s Safeguards Policy Statement (SPS), 2009 and accordingly this initial environmental examination (IEE) has been prepared. As per Government of Nepal (GON) regulations, all subprojects of Roads and Drainage components and municipal building requires a Brief Environmental Study (BES) while bus terminal requires an IEE, . The implementing agency shall prepare and submit IEE report to the Ministry of Urban Development, the line agency, for review and approval.

**Description of the Environment.** The improvement of roads and drains works under the sub-project will be implemented along existing road alignments in urban and peri-urban areas in each of the five municipalities. The existing roads are either earthen, damaged bituminous carpet or damaged cement concrete road. Majority of the road lengths have suffered wear and tear with cracks, potholes, broken edges and depressions that impact the safety of the users. Additionally, the drainage system is poor that currently results in localized flooding in the low-lying areas. A brief profile of each of the municipalities is provided in the paragraphs below:

**Tilottama Municipality** is located in Rupandehi District of Lumbini zone. The municipality lies in Lumbini Province spreading between 27°33’ to 27°39’ N latitude and 83°25’ to 83°33’E longitudes. Tilottama municipality has Rohini River and Devdaha municipality in the east, Tinau river and Siyari and Shuddhodhan village in the west, Butwal sub-metropolitan municipality in the north and Omsatiya village and Siddharthanagar municipality in the south. The total area of this municipality is 126.2 sq. km. There are 17 wards with a population of 149,657 (2021 census). Land use of Tilottama Municipality is undergoing changes from agricultural / vacant / open areas to built-up areas. Large tracts are still under agriculture, and community forests.

**Siddharthanagar Municipality** lies on the southern part of Rupandehi District of Lumbini Province and is located at 83°26' E longitude and 27°31' N latitude. With the total area of 36.03 sq. km. the municipality is located at an altitude of 110 meters above MSL and has a tropical climate. The maximum temperature noted is 45.20°C and minimum temperature reached 2.40°C while average rainfall is 1,436.5 mm. Siddharthanagar has 13 wards with a population of 76,307 (Census 2021 Initial Report). 77% of the land area is agricultural and rest are residential and public spaces. However, the Municipality is rapidly developing considering its proximity to the new International Airport and agricultural areas are being converted to residential and commercial areas. There are a number of park spaces within the Municipality besides the plantation along the bank of the Danda River.

**Devdaha municipality** lies in Rupandehi district of Lumbini province. It is located 57 km east of Lumbini, a world-famous Buddhist pilgrimage site. The municipality has a population of 72,457 (NPHC2011) and 173,00 number of households with a population density of 529 person/ sq.km. The municipality is surrounded by Sunwal Municipality (Nawalparasi district) in the east, Butwal sub-metropolis in the west, Tilotama municipality in the west, Mathagadhi Rural Municipality (Palpa district) in the north and Omsatiya rural municipality in the south. The total area covered by the municipality is 136.96 sq. km and is divided into 12 wards. Devdaha is a historically significant place as it is identified as the maternal hometown of Queen Mayadevi, the mother of Lord Sakyamuni Buddha. It is believed that Prince Siddhartha had spent few years of his childhood at Devdaha. The land use of this municipality is dominated by forest which covers approximately 74.89 sq.km (54.69%) followed by cultivation area of 47.41 sq. km (34.62%) and residential area of 9.33 sq. km (6.82%). Municipality has a sub-tropical climate with temperature ranging from minimum 6°C to 43°C. The average annual rainfall is 1174 mm.

**Sainamaina municipality** covers an area of 162.18 sq. km and has a population of 78,393 based on the 2021 census. It consists of 11 wards. The northern portion of the Municipality is hilly and forested (about 57% of the total area) while in the west it is bounded by Banganga Municipality, Butwal sub-metropolitan city in the east, Kanchan, Gaidihawa and Suddhodhan Rural Municipality in the south.

**Lumbini Sanskritik** is a municipality situated in Rupandehi District of Lumbini Province in Nepal. Lumbini, a Buddhist pilgrimage site where Lord Buddha was born, lies at the centre of this Municipality, making the area an important pilgrimage and tourist site. It has a population of 87,383 (Census 2021) within a total area of 112.21 sq.m and is divided into 13 wards. Owing to its religious, cultural and archaeological importance, Lumbini was declared a UNESCO World Heritage Site in 1997. This site is located within the larger Lumbini Master Plan area developed in 1978. To assist in its economic development, it was declared a 'cultural municipality' in 2014, following a notification of the Government of Nepal. The declaration helped to boost tourism activities in the region, which is also one of the major sources of income for the local people.

In Sainamaina, Devdaha and Tilotama, a portion of the road alignments pass through community forest areas. Innovative design solutions such as splitting the road midway and creating tree islands, reducing width of road at certain sections and straightening road alignments etc. are incorporated locally to conserve the trees. In cases where it is not possible to retain, and the trees need to be cut, compensatory afforestation is proposed. Roads passing through forests included in the subproject are existing earthen roads that provide access to habitations and schools located in forests within the municipal area. Project will improve all weather connectivity to local community. No notable impacts envisaged as these are existing, and there will be no notable increase in traffic.

Screening with Integrated Biodiversity Assessment Tool (IBAT) confirms that there is no ecologically sensitive area within 10-km radius of the subproject locations in each of the towns. Lumbini Crane sanctuary located within the Lumbini heritage master plan area and surrounding farmlands are habitat for threatened species of Sarus cranes (IUCN VU category) and is an important bird area. In Lumbini Sanskritik, proposed municipal building site is about 600 m from the outer boundary of Lumbini master plan area within which UNESCO World Heritage Site (the birthplace of Lord Buddha) is located. The nearest project area i.e., access road from proposed bus terminal ends at Vishnupura Road that runs along the periphery wall of the Lumbini heritage area. The work on these project components do not impact the Heritage Site. Mitigation measures for addressing “chance-finds”, dust, noise etc., have been included in the EMP.

**Baseline Environmental Monitoring.** The monitoring of air quality, noise levels, and water quality in the five municipalities of Devdaha, Lumbini Sanskritik, Sainamaina, Siddharthanagar, and Tilottama (West Urban Corridor) has shown that air quality at the monitored locations meets the National Ambient Air Quality Standards (NAAQS). The concentrations of particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>) and gaseous pollutants like sulfur dioxide (SO<sub>2</sub>) and nitrogen dioxide (NO<sub>2</sub>) were within acceptable limits, indicating that the current air quality does not pose significant health risks to residents. Noise levels in the surveyed areas were found to be within national standards for urban residential areas. The noise levels are influenced by vehicle movement and other human activities. Water sample analysis showed that most parameters, including pH, turbidity, and dissolved solids, were within the national drinking water quality standards. However, the detection of *E. coli* in some water samples suggests possible microbial contamination, likely due to human activity or inadequate sanitation in surface water. Immediate action is recommended to address these microbial risks and protect public health.

**Potential Environmental Impacts and Mitigation Measures.** Potential negative impacts were identified, especially those concerning pre-construction, construction and operation phases. Planning principles and design considerations have been reviewed and incorporated into the site planning and design process wherever possible. Measures such as local changes in alignment and cross section design are considered for minimizing the removal of trees. However, 170 of total 226 trees would be impacted from the implementation of the road improvement sub-project. A total of 27 trees in Lumbini Sanskritik, 56 trees in Devdaha, 11 trees in Siddharthanagar, 40 trees in Tilottama and 10 trees in Sainamaina would be impacted. Among the 155 total trees, 56 trees including the Simal (*Bombax cieba*) tree species, which are considered important for providing shelter to small mammals such as bats, squirrels and nesting sites for birds, also preferred habitats for Vultures due to its height and open canopy. As Vultures are common in Lumbini and Siddharthanagar towns, 6 number of trees along the project roads are saved. However, no Simal trees will be cut for the project. There are also Sissoo (*Dalbergia sissoo*) trees, which are popular for housing nests of mainly local birds, some of which are saved, and 11 trees, of which 8 are present in the Siddharthanagar sub-project area, needs to be removed for the project. Various measures such as survey of trees for active nests prior to removal, avoiding breeding season etc., included in the EMP to avoid any impacts. Compensatory plantation in the ratio of 1:10 as per GoN requirement (i.e., 10 trees to be planted for one tree cut) will be taken up. None of the components however are located close to Lumbini crane sanctuary or farmlands. Sites are in urban areas in Lumbini, and the sites of bus terminal and municipal building although has agricultural lands around, these are being converted into residential layouts. No impacts therefore envisaged. Various measures included to avoid any damage or disturbance to flora fauna while working in community forests or works close to agricultural lands in Lumbini.

The road designs are combined with improvements in drainage systems that are achieved by incorporating lateral drains and cross drainage structures to ensure safe conveyance of storm

water during rainfall events. Appropriate drainage planning and design of municipal building and bus terminal components will be ensured to accommodate the existing drainage lines in the sites. Due to low-lying of proposed site with access road on higher elevation, detailed drainage assessment will be conducted during the detailed design of Bus Terminal Building in Lumbini, and a proper drainage system will be put in place to avoid flooding / water logging of the facility and the surrounding area. The existing drainage channel that runs through the site will be suitably accommodated as lined open channel of adequate capacity, along with necessary provision of lateral drains and cross drainage works. Prior permission from Irrigation Department/Canal agency will be obtained. Various design considerations are already included in conceptual designs such as raising ground level of the site, providing a proper drainage channel section to convey water through existing coverts, and taking all necessary measures to avoid flooding in and around the site. These will be further reviewed and finalized during the detailed design. The proposed bus terminal and municipal building facilities are provided with necessary amenities such as water supply, sanitation including on-site treatment, solid waste management facilities, parking etc. The measures taken up ensured that the environmental impacts arising due to the project design or location are not significant. The roads and drain works will involve straightforward construction. Works in densely populated areas and busy roads may have significant but temporary impacts. Potential construction-related impacts include noise, dust generation, silt generation, soil and water contamination from chemicals spills and leaks, construction waste generation, and occupational and community health and safety risks including the spread of diseases like COVID-19, among others. These are localized, temporary and avoidable, mitigated and/or minimized to acceptable limits with the implementation of mitigation measures in the Environmental Management Plan (EMP). All road works will be confined on existing road and side drains alignments, and within existing right-of-way (ROWs). The construction of bus terminal building and municipality building will be confined within the available area.

**Environmental Management Plan.** An Environmental Management Plan (EMP) has been developed and included as part of this IEE, which outlines the following: (i) mitigation measures for environmental impacts during implementation; and (ii) an environmental monitoring program, and the responsible entities for mitigating, monitoring, and reporting. Also, in accordance with this EMP, the Contractor will be required to prepare a site-specific environmental management plan (SEMP). Contractor will submit its SEMP for approval to the Project Implementation Unit (PIU). The EMP and SEMP will (i) ensure that the activities are undertaken in a responsible non-detrimental manner; (ii) provide a pro-active, feasible, and practical working tool to enable the measurement and monitoring of environmental performance on site; (iii) guide and control the implementation of findings and recommendations of the environmental assessment conducted for the subproject; (iv) detail specific actions deemed necessary to assist in mitigating the environmental impact of the subproject; and (v) ensure that safety recommendations are complied with. Copies of the EMP and SEMP shall be kept on-site during the construction phase. The Contractor will be responsible for the organization, direction, and execution of environmental management related activities during construction of the proposed subproject. The Contractor will also undertake all activities in accordance with the relevant environmental requirements, including consent documentation and other regulatory and/or statutory and contractual requirements.

The Environmental Monitoring Program suggested in the EMP would need to be carried out by the Contractor during the construction period. The Environmental Monitoring Program would involve monitoring the air quality, surface water quality, groundwater quality, noise levels etc. The results of the Environmental Monitoring Program should be included in the periodic reports submitted by the Contractor to the PMCDC / PIU / PCU, as the case may be.

**Implementation Arrangement.** The Ministry of Urban Development acting through Department of Urban Development and Building Construction (DUDBC) will be the Executing Agency (EA) and the respective municipalities will be Implementing Agency (IA) of the WUC Sub-project. The Project Coordination Unit (PCU) under the DUDBC will be responsible for the overall implementation of the project and ensure compliance to ADB environmental safeguards requirements. The PCU will work closely with the Project Implementation Unit(s) (PIUs) at the Municipality level. The Project Management and Capacity Development Consultants (PMCDC) and Design and Supervision Consultant (DSC) will each include an Environmental Safeguard Specialist who will support in the efficient overall implementation of environmental safeguards of the project. The PMCDC will submit quarterly monitoring reports to PCU, and the PCU will send semi-annual monitoring reports to ADB. ADB will post the semi-annual environmental monitoring reports on its website as part of its disclosure requirements.

The Contractor will be required to (i) obtain all statutory clearances (other than Environmental Clearance) prior to commencement of civil works; (ii) establish an operational system for managing environmental impacts; (iii) prepare a SEMP based on the EMP of this IEE, and submit to PIU for approval; (iv) carry out all of the monitoring and mitigation measures set forth in the approved SEMP; and (v) implement any corrective or preventative actions set out in safeguards monitoring reports that the PCU will prepare from time to time to monitor implementation of this IEE, EMP, and SEMP. The Contractor shall allocate an adequate budget and resources for compliance with these EMP measures, requirements and actions.

**Consultation, Information Disclosure and Grievance Redress Mechanism.** The WUC Sub-project has undertaken meaningful consultations during the project preparatory stage. Forty-one public consultations were conducted in all the municipalities put together to elicit the stakeholders view on the project. These consultations were held with the public representatives, elected members at the ward level and the residents during December 2022 - June 2023. As part of the process, information on the sub-project components were provided to the participants at these consultations. Their views were incorporated into the IEE and in the planning and development of the subproject. This draft IEE will be made available to the public through the ADB, DUDBC / PCU websites. The consultation process will be continued during project implementation, to ensure that stakeholders are fully engaged in the project and could participate in its development and implementation. A project-specific Grievance Redress Mechanism (GRM), described in this draft IEE, will be established to receive, record, and redress public complaints in a time bound and effective manner.

**Monitoring and Reporting.** PCU and PIU, with support from DSC and PMCDC, will be responsible for monitoring the project implementation and compliance with EMP requirements. The Contractor will submit monthly reports to the PIU with jurisdiction over the subproject. The PIU will submit quarterly environmental monitoring reports to PCU. The PCU shall consolidate quarterly reports from the PIUs and prepare semi-annual environmental monitoring report (SEMRs) which shall be submitted to ADB. PCU and ADB will post the cleared SEMRs on the project website and ADB website, respectively. ADB will monitor the project on an ongoing basis until a project completion report is issued.

**Conclusion and Recommendations.** The proposed subproject is unlikely to cause any significant adverse impacts to the environment and people. Potential negative environmental impacts are mainly associated with construction and can be mitigated through proper engineering practice and the mitigation measures included in the EMP. Various planning and design measures are integrated to mitigate operational phase impacts. Site specific drainage measures are needed at the proposed Bus Terminal in Lumbini, and these are included in the preliminary designs and

specified in the EMP. The citizens of the five towns in WUC will be the major beneficiaries of this subproject that will result in key environmental benefits such as, but not limited to, reduction in flooding areas, improved road and pedestrian safety to users resulting from improved road infrastructure and drainage facilities. This IEE is prepared based on the final designs of roads and drains, and feasibility study /conceptual designs of bus terminal and municipal building. This IEE shall be updated by the PCU, with support from PMCDC, based on final detailed design and submitted to ADB for review, clearance, and disclosure. No work can commence until the updated IEE is approved by ADB and disclosed and provided to the Contractor, and the SEMP is approved by the PIU. Based on the findings of the IEE, the classification of the project as Category “B” is confirmed. PCU will obtain environmental clearance from the Ministry of Urban Development prior to invitation of bids or award of contract

.

## I. INTRODUCTION

### A. Background

1. The Urban Resilience and Livability Improvement Project (the project) aims to improve livability and sustainability of urban services by project municipalities. The project is aligned with the following impact: inclusive economic growth and improved living standards.<sup>1</sup> The project will have the following outcome: improved resilience, livability and sustainability of urban service delivery by project municipalities. The project will develop municipal infrastructures aligned with the priorities set in the municipalities' investment plans. The project supports seven municipalities: Tilottama, Siddharthanagar, Sainamaina, Lumbini Sanskirtik, Devdaha, Janakpur and Pokhara. Five out of seven municipalities are from the West Urban Corridor (WUC) viz, Tilottama, Siddharthanagar, Sainamaina, Lumbini Sanskirtik and Devdaha. The Department of Urban Development and Building Construction (DUDBC) on behalf of Ministry of Urban Development (MoUD) will be the Executing Agency and individual project municipalities will be the Implementing Agency. The project will support the following three outputs.
2. **Output 1: Municipal infrastructure for resilience improved.** Investments will use an integrated approach by ensuring a well-coordinated urban infrastructure system and, where feasible, employing green solutions to reduce inundation, improve mobility, and promote nonmotorized transport through cycle lanes and footpaths. Together, these investments aim to improve the livability of residents, support the sustainable growth of tourism, and enhance local economies. The project will (a) construct or rehabilitate 150 kilometers (km) of stormwater drains; and, (b) reconstruct 100 km of the urban roads with at least 45 km of footpaths with old age, women, children, and people with disabilities responsive features and cycle lane to promote non-motorized transport.
3. **Output 2: Tourism assets revitalized, and management improved.** The project adopts a combination of strategic planning, infrastructure development and customer service to support natural, cultural, and heritage-based tourism by enacting protective zoning around natural and heritage sites, expanding tourism activities and promoting visitor's universal access and positive experience.<sup>2</sup> Output 2 will support to: (a) prepare and execute seven natural and heritage management plans through gender equality and social (GESI)-responsive, participatory approaches, (b) improve seven cultural and natural heritage sites with GESI-responsive tourism infrastructure and recreation amenities such as cycle route connecting seven lakes of Pokhara municipality, Bindabasini area street, Phewa organic trail, Pokhara Santiban Batika (Forest) conservation, Janakpur Ratnasagar, Lumbini global park, and Panchase eco-development, (c) improve 150,000 square meters of green spaces – Siddharthanagar Dandha River Corridor and greening initiatives of public spaces in all municipalities – with gender and climate-resilient inclusive design feature, and (d) ensure at least 30% of the socio-economic development program spend on socioeconomic infrastructure and activities related to tourism and GESI. The project will construct at least seven GESI-friendly public toilets in cultural and natural heritage sites and support Lumbini Sarus Crane Conservation and Biodiversity Awareness.
4. **Output 3: Capacity of communities, municipalities, province, and Department of Urban Development and Building Construction strengthened.** The project supports

<sup>1</sup> Government of Nepal, National Planning Commission. 2020. Fifteenth-Year. Kathmandu.

<sup>2</sup> Cultural, natural, and heritage assets under municipalities' jurisdiction.



implementing prioritized reforms, municipalities' digital transformation, institutional strengthening and capacity building actions. Key actions of output 3 include increasing own source revenue by implementing a comprehensive financial management improvement plan (CFMIP) – an institutional reform measure for revenue enhancement (broadening own source revenue coverage, digital tax billing and collection, and tax administration), budgeting procedure for better expenditure management, internal and external audit, procurement and asset management, and financial management procedures. The second action is to address carbon emissions and climate and disaster-related risks by preparing decarbonization and risk-sensitive urban plans and enforcing development control<sup>3</sup>, preparing seven heat action plans to ensure well-coordinated response actions during an extreme heat event tailored to high-risk groups, establishing Pokhara municipal emergency operation center, installing an electronic building permit system that factors in climate and disaster-risk zoning and will also support the issuance of digital tax bills. The third action is strengthening institutions and capacity by establishing and equipping O&M units in each municipality, maintaining a robust database of public assets, including infrastructure, utilities, cultural and natural heritage sites, and public land, constructing an energy-efficient and disaster-resilient municipal office building for Lumbini Sanskritik municipality, conducting training and workshop for staff, including eligible women staff and female-elected representatives of cities, provinces, and DUDBC, on municipal finance, natural ecosystems, decarbonization, and urban resilience planning, and support internship, skill improvement in traditional and local art, and tourist guide certification programs for women and disadvantage group implemented.<sup>4</sup>

## B. Subproject Scope and Location

This sub-project covers the infrastructure improvements carried out under Output 1 of the URLIP at the five municipalities of Devdaha, Lumbini Sanskritik, Sainamaina, Siddharthanagar and Tilottama. These five municipalities are also known as the West Urban Corridor (WUC), and Figure 1 shows the location of towns. Towns are located close about 10-20 km from each other,

The infrastructure improvements carried out under the WUC subproject in five municipalities include are as below: roads and drains works of 73 km long covering 38 roads in five WUC municipalities, and a bus terminal and municipal office building in Lumbini Sanskritik municipality.

**Table 1: Proposed Roads in Devdaha**

S.N.	Road alignments	Ward	Road Length (km)	Design Width (m)
1.	Bhaluhpul Medical College Bhatatol MukhiyaTol Piparahiya Singha Municipality Road	4,8,9	7.504	11.5
2.	Banchauki - Mayadevi Park - Milldanda - Buddha Circuit Road	3,7,8	4.941	11.5
3.	Shitalnagar-Bhawanipur-Soiya Road	4,7,8	4.79	14
			17.235	

**Table 2: Proposed Roads in Tilottama**

<sup>3</sup> Including seismic microzoning and multi-hazard disaster risk assessment of Pokhara.

<sup>4</sup> GESI action plan (accessible from the list of linked documents in Appendix 2).

S.N.	Road alignments	Ward	Road Length (km)	Design Width (m)
1.	Driver tole-Shivapur Road	1,8	6.813	11.5
2.	Pathardada Tinau Road	15,13,14	6.356	11.5
			13.058	

**Table 3: Proposed Roads in Siddharthanagar**

S.N.	Road alignments	Ward	Road Length (km)	Design width (m)
1.	Simapath Sakunipath Urban Road	1	0.827	8
2.	Sakunipath To Danda Khola Urban Road	1	0.724	8
3.	Bimaanghat To North	4,8	0.885	18
4.	Rahim Path I	6	0.171	7
5.	Rahim Path II	6	0.168	7
6.	Bhimkali Path	12	0.516	8.5, 9
7.	East of Gallamandi to Durga Colony Road	7	0.566	7
8.	Udhyog Puri Road(Buddha Colony)	4	0.724	9
9.	Radhakrishna,annapurna path all linked roads	1	1.397	7
10.	Benipur east south boarder road	1	1.024	8
11.	Ward no 2 - Ward no 4-connecting road	2	1.26	12
12.	Darkhasuwa west siddhartha yatayat	3	2.11	7,8
13.	Siddhartha Colony/Manmohan Path	3	1.659	7
14.	SugarMill link Road	4	3.482	10.5
15.	Mayadevi Colony	4	0.882	7
16.	Durga Colony all linked roads to Nirwana Hotel	6	1.074	7
17.	KishorPur to Airport Road	2,6	0.43	9
18.	Trisuli Path-Deurali Path-Saprishi path1	7,9,12	0.606	6,7
19.	Uchami Path to South (Way to dhurva adhikari	8	0.583	7
20.	Abhay,Durga Path	8	0.357	6
21.	Dumdumuwa road to gonahiya road	9	1.145	7,8
22.	Doghari Gaau east chowk to Sahari Bikash Sadak	10,11	1.218	10
23.	Suvarna Path	12	0.274	6
24.	Bhimkaali path-Janta path Branch Roads(North Side)	12	0.649	7
25.	Other roads	12	0.544	6
26.	Lacoul Path	13	0.321	6
			23.602	

**Table 4: Proposed Roads in Sainamaina**

S.N.	Road alignments	Ward	Road Length (km)	Design Width (m)
1.	Sainamaina Ring Road 1 (Panbari Shaljhandi Road)		9.473	11.5

2.	Saljhandi Duimuhan Chowk To Tali Gaon to Chaudhary Ghola		5.261	11.5
3.	Panbari Bhatta to Chafiya Tole Road		1.56	11.5
4.	Kanchanpul to Dakshin barauli Road		0.45	9
5.	Janajyoti Tole Chowk Peepal Danda Road		0.972	7
			17.712	

**Table 5: Proposed Roads in Lumbini Sanskritik**

S.N.	Road alignments	Ward	Road Length (km)	Design Width (m)
1.	Mahilwar Chowk-Proposed Bus Terminal-Highway Road/ Lumbini Bus Terminal Access Road	10,5,7,11, 13	3.931	10,10.5,8
2.	Moglaha Masina Aniharua Bhaisaiya Road	10,5,7, 11	8.326	10,10.5,8
			12.257	

**Table 6: Proposed Bus Terminal in Lumbini Sanskritik Municipality**

1. Name of the sub-project	Bus Terminal in Lumbini Sanskritik Municipality
2. Location	Ward 04 and 10 of Lumbini Sanskritik Municipality in the plain land in an area of 11,775 sqm.
3. Type of sub-project	Regional economic infrastructure, Essential urban infrastructure
4. sub-project Boundary	Coordinates: 27°28'34.60" N, 83°17'40.17" E
5. Number of users/ visitors	Designed capacity: Bus Park with 24 car parking (private), 10 Intercity buses, 12 Long-term bus parking
6. The area that the bus terminal will cover	11,756.33 m <sup>2</sup>
7. Sub-project Components with dimensions	Intercity Bus Terminal (39.98×17.53) m <sup>2</sup> , Staff Accommodation (19.95×8.83) m <sup>2</sup> , Garage (12.25×9.3) m <sup>2</sup> , Storage (9×5) m <sup>2</sup> , Bus Parking Bay, Clock Tower (4×4) m <sup>2</sup>
8. Gross Floor Area	1,051.93 m <sup>2</sup>
9. Construction materials	Concrete, steel, Timber/wood, stone, glass wool, UPVC roofing, UPVC, Granite/Tile, Sitting chamber(metal)
10. Retaining Structures (if any)	-
11. Earthwork requirement (Cut and fill)	Fill- 25,917 m <sup>3</sup>
12. Muck/ Spoil Volume	No
13. Energy requirement/ management/ Energy source/ Electricity/ Fossil Fuel	132 Nos. of 400wp each panel, Installation of 80KVA solar power generator and LED lights

14. Auxiliary facilities (access roads, Drainage Structures, river training (including the type))	Temporary Living Center RCC Drain
15. Construction Technology	RCC Frame structure/ Steel structure
16. Machinery and Equipment used for construction	Cranes/ Excavator/ RMC/ Mixtures, etc.
17. Type of contract	NCB
18. Expected completion date	2.4 years excluding O and M period

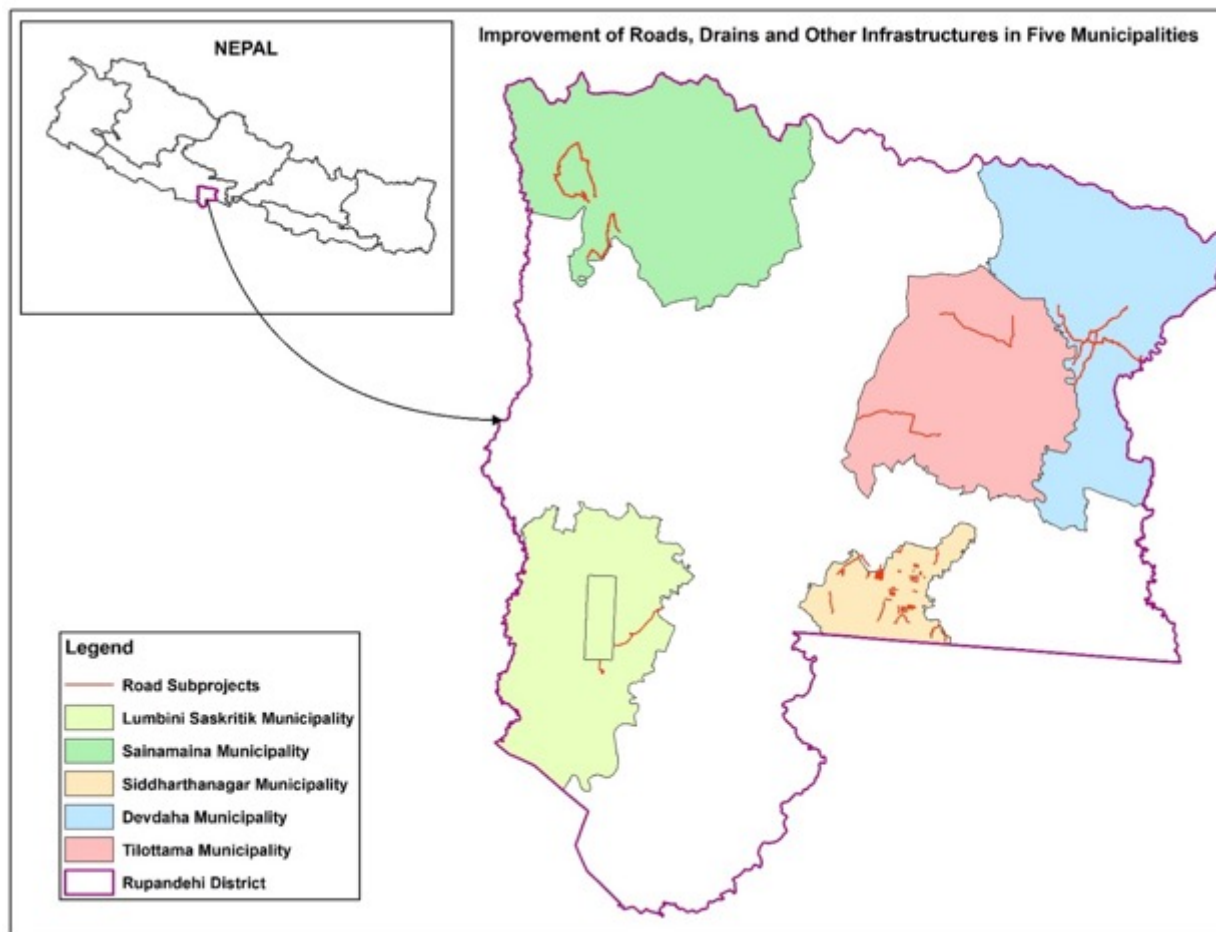
5.

**Figure 1: Location of Project Towns**



**Figure 2: Proposed Roads, Drains and Infrastructures in Five Municipalities**





### C. Purpose of Initial Environmental Examination

- This subproject is classified as Category B for environment per ADB SPS 2009, and this IEE is prepared accordingly. The objective of the IEE is to provide an overview of the environmental issues viz., legal compliance, environmental impacts, mitigation measures to be employed, monitoring and reporting aspects to be covered during the implementation and operation of the WUC subproject by the PCU, PIU, its Consultants and Contractors. This is to ensure that the project is implemented in an environmentally responsible manner, ensuring that all negative effects are prevented or mitigated, and positive impacts are enhanced.

### D. Methodology

- This IEE report was prepared by carrying out site visits, conducting stakeholder consultations, and primary and secondary data collection, assessing the existing environmental conditions at the sub-project locations, identifying the potential environmental impacts that may occur during project implementation and developing the relevant mitigation measures including monitoring. Baseline environmental monitoring for air quality, noise level, surface water quality and groundwater quality were also conducted in selected sites of the project areas. The Integrated Biodiversity Assessment Tool (IBAT) was used to screen potential risks on the protected areas or critical habitat that may exist around the project sites.

8. During the IEE study, public consultations were conducted with the ward representative, officials of respective municipalities and community people. Their views were incorporated into the IEE and in the planning and development of the subproject. This IEE is prepared based on the final designs of roads and drains, and feasibility study /conceptual designs of bus terminal, and municipal building.

#### **E. Structure of IEE Report**

9. The report has been structured to include the following chapters:

- (i) Introduction;
- (ii) Policy, Legal, and Administrative Framework;
- (iii) Description of the Project;
- (iv) Description of the Environment;
- (v) Anticipated Environmental Impacts and Mitigation Measures;
- (vi) Environmental Management Plan;
- (vii) Information Disclosure, Consultation, and Participation;
- (viii) Grievance Redress Mechanism;
- (ix) Monitoring and Reporting;
- (x) Conclusion and Recommendations.

## II. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

### A. ADB Safeguard Policy Statement, 2009

10. ADB requires the consideration of environmental issues in all aspects of ADB's operations, and the requirements for environmental assessment are described in ADB SPS, 2009. ADB environmental safeguards are triggered if a project is likely to have potential environmental risks and impacts. A project is classified based on the most environmentally sensitive component, and assigned with one of the four environmental categories (A, B, C, or FI) defined in the SPS. These categories are as follows.

- (i) **Category A:** Project that is likely to have significant adverse environmental impacts which are irreversible, diverse, or unprecedented. These impacts may affect an area larger than the sites or facilities subject to physical works. An environmental impact assessment (EIA), including an environmental management plan (EMP), is required.
- (ii) **Category B:** Project with potential adverse environmental impacts that are less adverse than those of category A projects. These impacts are site-specific, few if any of them are irreversible, and in most cases mitigation measures can be designed more readily than for category A projects. An initial environmental examination (IEE), including an EMP, is required.
- (iii) **Category C:** Project that is likely to have minimal or no adverse environmental impacts. An EIA or IEE is not required, although environmental implications need to be reviewed.
- (iv) **Category FI:** Project is classified as category FI if it involves the investment of ADB funds to, or through, a financial intermediary (FI).

11. Initial screening using ADB's rapid environmental assessment (REA) checklist was conducted for the subproject and results of the rapid assessment show that the project is unlikely to cause any significant adverse impacts, and therefore classified under Category B per ADB SPS. Thus, this IEE report has been prepared following ADB SPS requirements for project with Category B classification.

12. **Environmental Assessment.** Environmental assessment shall include a description of environmental and social baseline to provide an understanding of current conditions forming the benchmark against which subproject impacts are assessed. Environmental impacts and risks will be analyzed for all relevant stages of the project cycle, including design and planning stage, construction, operations, decommissioning, and post-closure activities such as rehabilitation or restoration. This IEE may be used as a model document for other future roads and roadside drains subprojects.

13. **Environmental Planning and Management.** The PCU shall prepare an environmental management plan (EMP) to be included in the IEE report and Bid Document. The EMP shall describe and address the potential impacts and risks identified by the environmental assessment. The level of detail and complexity of the EMP and the priority of the identified measures and actions will be commensurate with the subproject's impact and risks. The EMP shall include the proposed mitigation measures, environmental monitoring and reporting requirements, emergency response procedures, related institutional or organizational arrangements, capacity development and training measures, implementation schedule, cost estimates, and performance indicators.



**14. Public Disclosure.** The PCU shall submit the following to ADB for review, clearance and disclosure. ADB will disclose acceptable reports received and endorsed by the DUDBC on ADB website so affected people, other<sup>5</sup> stakeholders, and the public can provide meaningful inputs into the subproject design and implementation.

- (i) Draft / updated / final IEE upon receipt;
- (ii) a new or updated IEE and corrective action plan prepared during subproject implementation, if any, upon receipt; and
- (iii) environmental monitoring reports submitted during subproject implementation upon receipt.

**15. Consultation and Participation.** The PCU and PIU shall carry out meaningful consultation<sup>6</sup> with affected people and other concerned stakeholders, including civil society, and facilitate their informed participation. The consultation process and its results are to be documented and reflected in the environmental assessment report.

**16. Grievance Redress Mechanism.** The PCU shall establish a mechanism to receive and facilitate resolution of affected peoples' concerns, complaints, and grievances about the subproject's environmental performance. The grievance mechanism shall be scaled to the risks and adverse impacts of the subproject.

**17. Monitoring and Reporting.** The PCU shall monitor, measure and document the progress of implementation of the EMP. If necessary, PCU will identify the necessary corrective actions, and reflect them in a corrective action plan. PCU will prepare and submit to ADB semi-annual environmental monitoring reports that describe progress with implementation of the EMP and compliance issues and corrective actions, if any. For subprojects likely to have significant adverse environmental impacts during operation, reporting will continue until ADB issues a project completion report.

**18. Unanticipated Environmental Impacts.** Where unanticipated environmental impacts become apparent during subproject implementation, PCU shall update the environmental assessment and EMP or prepare a new environmental assessment and EMP to assess the potential impacts, evaluate the alternatives, and outline mitigation measures and resources to address those impacts.

**19. Pollution Prevention and Control Technologies.** During the design, construction, and operation of the subproject the PCU and PIU shall apply pollution prevention and control technologies and practices consistent with international good practice, as reflected in internationally recognized standards such as the International Finance Corporation (IFC) World Bank Group's Environmental, Health and Safety Guidelines. These standards contain performance levels and measures that are normally acceptable and applicable

---

<sup>5</sup> Per ADB SPS, 2009, prior to disclosure on ADB website, ADB reviews the "borrower's/client's social and environmental assessment and plans to ensure that safeguard measures are in place to avoid, wherever possible, and minimize, mitigate, and compensate for adverse social and environmental impacts in compliance with ADB's safeguard policy principles and Safeguard Requirements 1-4." Upon its receipt of acceptable safeguard documents and endorsement by PCU, ADB discloses the same on ADB website.

<sup>6</sup> Per ADB SPS, 2009, meaningful consultation means a process that (i) begins early in the project preparation stage and is carried out on an ongoing basis throughout the project cycle; (ii) provides timely disclosure of relevant and adequate information that is understandable and readily accessible to affected people; (iii) is undertaken in an atmosphere free of intimidation or coercion; (iv) is gender inclusive and responsive, and tailored to the needs of disadvantaged and vulnerable groups; and (v) enables the incorporation of all relevant views of affected people other stakeholders into decision making, such as project design, mitigation measures, the sharing of development benefits and opportunities, and implementation issues.

to subprojects. When the government regulations differ from these levels and measures, the subproject shall achieve whichever is more stringent. If less stringent levels or measures are appropriate in view of specific subproject circumstances, DUDBC through PCU will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in ADB SPS.

- 20. Occupational Health and Safety.** The PCU shall ensure that workers are provided with a safe and healthy working environment, considering risks inherent to the sector and specific classes of hazards in the subproject work areas, including physical, chemical, biological, and radiological hazards. PCU shall ensure to take steps to prevent accidents, injury, and disease arising from, associated with, or occurring during the course of work by (i) identifying and minimizing, so far as reasonably practicable, the causes of potential hazards to workers; (ii) providing preventive and protective measures, including modification, substitution, or elimination of hazardous conditions or substances; (iii) providing appropriate equipment to minimize risks and requiring and enforcing its use; (iv) training workers and providing them with appropriate incentives to use and comply with health and safety procedures and protective equipment; (v) documenting and reporting occupational accidents, diseases, and incidents; and (vi) having emergency prevention, preparedness, and response arrangements in place.
- 21. Community Health and Safety.** The PCU shall ensure to identify and assess the risks to, and potential impacts on, the safety of affected communities during the design, construction, operation, and decommissioning of the project, and will establish preventive measures and plans to address them in a manner commensurate with the identified risks and impacts.
- 22.** PCU shall ensure to apply preventive and protective measures for both occupational and community health and safety consistent with international good practice, as reflected in available national standards on Environmental, Health and Safety. Where national standards are not available, internationally recognized standards such as the World Bank Group's Environmental, Health and Safety Guidelines will be adhered to<sup>7</sup>. PCU shall also adhere to necessary protocols in response to emerging infectious diseases such as the corona virus disease (COVID-19) consistent with the guidelines of relevant government healthcare agencies and the World Health Organization.
- 23. Physical Cultural Resources.** The PCU is responsible for siting and designing the subproject to avoid significant damage to physical cultural resources. Such resources likely to be affected by the subproject will be identified, and qualified and experienced experts will assess the subproject's potential impacts on these resources using field-based surveys as an integral part of the environmental assessment process. When the proposed location of a subproject component is in areas where physical cultural resources are expected to be found as determined during the environmental assessment process, chance finds procedures shall be included in the EMP.
- 24. Environmental Audit.** When the subproject involves existing activities or facilities, PCU is responsible to ensure that relevant external experts will perform environmental audits to determine the existence of any areas where the subproject may cause or is causing environmental risks or impacts. If the subproject does not foresee any new major expansion, the audit constitutes the environmental assessment for the subproject.

---

<sup>7</sup> World Bank Group, 2007. Environmental, Health, and Safety General Guidelines. Washington, DC. .

**25. Bidding and Contract Documents.** IEE, which contains the EMP, shall be included in bidding and contract documents and verified by PIU. The PCU and PIU shall also ensure that bidding and contract documents include specific provisions requiring contractors to (i) comply with all other conditions required by ADB<sup>8</sup> and (ii) to submit to PIU, for review and approval, a site specific environmental management plan (SEMP), including (i) proposed sites/locations for construction work camps, storage areas, hauling roads, lay down areas, disposal areas for solid and hazardous wastes; (ii) specific mitigation measures following the approved EMP; (iii) monitoring program as per SEMP; and (iv) budget for SEMP implementation, among others as may be required. No work can commence prior to approval of SEMP. A copy of the EMP and/or approved SEMP will be always kept on site during the construction period. Non-compliance with, or any deviation from, the conditions set out in the EMP and/or SEMP constitutes a failure in compliance and shall require corrective actions.

**26. Conditions for Award of Contract and Commencement of Work.** PCU shall not award any works contract under the subproject until (i) relevant provisions from the EMP are incorporated into the works contract; (ii) this IEE is updated to reflect subproject's detailed design and PCU has obtained ADB's clearance of such updated IEE; and (iii) For GoN requirements MoUD approves Brief Environmental Study (BES)/IEE (i.e., compliance with EPR, 2020) and other necessary permits from relevant government agencies shall be obtained. For "design, build, and operate" type contracts, PCU shall ensure no works for a subproject which involves environmental impacts shall commence until (i) relevant provisions from the EMP are incorporated into the works contract; and (ii) this IEE is updated to reflect subproject's detailed design and PCU has obtained ADB's clearance for such updated IEE.

## **B. National Environmental Legislations**

**27.** Most of the national policies and laws of GoN are oriented towards achieving environmentally sound economic development and growth, and conservation of natural resources and cultural heritage of the country. The following are the summaries of the relevant policies, acts and regulations, and guidelines.

**28.** The Constitution of Nepal. This is the fundamental law of the country, and the sections pertaining with environmental protections are as follows:

- (i) Article 30 (1) of the constitution guarantees a "clean environment" as a fundamental right and elaborates that "every citizen shall have the right to live in a clean and healthy environment".
- (ii) Article 30 (3) encourages the state to formulate necessary legal frameworks to balance the environment and development.

**29.** Nepal has enacted comprehensive environmental policies and laws that cover a broad range of environmental and sector issues. Environmental Protection Act (EPA) of 2019 and Environmental Protection Regulations (EPR) of 2020 are two important legal frameworks for environmental protection. According to the EPA and EPR, all

---

<sup>8</sup> Contractors to comply with (i) all applicable labor laws and core labor standards on (a) prohibition of child labor as defined in national legislation for construction and maintenance activities; (b) equal pay for equal work of equal value regardless of gender, ethnicity, or caste; and (c) elimination of forced labor; and with (ii) the requirement to disseminate information on sexually transmitted diseases, including HIV/AIDS, to employees and local communities surrounding the project sites..

development projects should first be screened using criteria that are based on the scale of project stipulated in the Schedules 1, 2 and 3 of EPR to determine the level of environmental assessment required. Projects that could result in some environmental impacts are required to conduct brief environment study (BES) BES, projects having the moderate environmental impacts are required with initial environmental examination (IEE), and large projects that could result in major and adverse environmental impacts are required to go undergo an environmental impact assessment (EIA) process. The EPA makes necessary arrangements to disclose EIA reports to the general public to render opinions and suggestions.

**30. Environment Protection Act 2019 (2076 ).** The act emphasis on new aspects like provisions of BES, IEE and EIA under the jurisdiction of local authority, provincial government, and central government. This act is pre-requirement for any type of development project in the country to comply the environmental safeguards . Article 2 (3) 1 of this act has given provision of environmental assessment. This clearly mentions that the environment assessment is prerequisite before implementation of any project. The detail of the criteria is indicated in Environment Protection Rules 2020.

**31. Environment Protection Rules 2020 (2077 ).** This rule has defined thresholds and equivalent environmental assessment (i.e., BES, IEE and EIA). Since the project pertains to upgrading the existing urban roads rather than creating new alignment, there is no requirement for environmental assessments such as EIA, IEE or BES according to the EPR 2020 of the Government of Nepal.. As per EPR 2020, following criteria for Bus Terminal and Municipal building necessitate an IEE.

**Table 7: Subprojects Requiring Environment Assessment as per GoN-EPR, 2020**

S.N.	Subproject Component	Parameter	Unit	Total Quantity	Environment Study Requirement (EPR,2020)
1	Bus Terminal at Lumbini Sanskritik Municipality	Area	Sq.m	11,775	IEE
2	Municipal Office Building at Lumbini Sanskritik Municipality	Area	Sq.m	3,533	BES

**32. Other relevant government laws and regulations.** The implementation of subprojects proposed under the project will be governed by government environmental acts, rules, policies, and regulations.

**33.** Table 2 summarizes the applicable national and local laws, regulations, and standards for environmental assessment and management, including applicable international environmental agreements.

**Table 8: Relevant Government Laws and Regulations**

S.N.	Policies, Acts, Regulations, Guidelines	Relevant Provisions
	<b>Sixteenth Five-year Plan (2080/81-2085/86), Nepal</b>	<ul style="list-style-type: none"> <li>The 16<sup>th</sup> 5-year plan conceptualizes environment and biodiversity protection, disaster risk management and sustainable development as one of its twelve sectoral structural transformation strategies.</li> <li>Internalizing, mainstreaming and localizing gender equality and empowerment, social justice and inclusion: In order to implement the idea of "leaving no one behind" of the Sustainable Development Goals, all levels and thematic areas of the state shall include</li> </ul>

S.N.	Policies, Acts, Regulations, Guidelines	Relevant Provisions
		<p>women, children, senior citizens, persons with disabilities, gender and sexual minorities, etc.</p> <ul style="list-style-type: none"> <li>• Further the plan envisages building sustainable and environmentally friendly infrastructure, Climate resilience and inclusive development, controlling pollution for a healthy society</li> <li>• Sustainable forest management for environmental services and green development, conserving biodiversity for ecosystems, policy reform and expansion of institutional capacity</li> </ul>
2	<b>National Transportation Policy, 2058</b>	<ul style="list-style-type: none"> <li>• The principal objective of the National Transport Policy is to develop a reliable, cost effective, safe facility oriented and sustainable transport system that promotes and sustains the economic, social, cultural and tourism development of Nepal as a whole.</li> <li>• For the attainment of the above through and objectives the following strategies will be followed: (i) The Government shall clearly indicate the limit and scope of work to be done from the central level and take responsibility of transport structure to be constructed from the central level. (ii) Making the decentralized governance system more strengthened and by maximum utilizing the source and means of local level, the development and promotion of transport system shall be done from the local level itself. (iii) Maximum private Sector involvement will be encouraged in the expansion and preservation of the transport system.</li> </ul>
3	<b>Forest Act 2076 (2019)</b>	<ul style="list-style-type: none"> <li>• Pertaining to the chapter 12, Section 42(1), if there is no other alternative to the using of forest area for the operation of a national priority project, plan of which investment is approved by the Investment Board, project of national pride and it appears from the environment examination referred to in the prevailing law that the operation of such plan does not result in significant adverse effects on the environment, the Government of Nepal may give approval, as prescribed, to use any part of the national forest for the purpose of operating such plan,</li> <li>• Similarly, in providing the forest area for the operation of a plan pursuant to sub-section (1), to the extent possible, a land that is adjoining to the national forest area near the project site and situated in the same geographical and ecological belt and has such landscape where forest can be developed shall be provided for the purpose of planting trees at least in the area equal to the forest area that has to be used.</li> </ul>
4	<b>Forest Regulations, 2079 (2022)</b>	<ul style="list-style-type: none"> <li>• Pertaining to Rule 87 (2) in case of the development project related to the use of forest land, the coordination has to be done with the concerned division forest office during the feasibility study and environmental study.</li> <li>• Rule 88, Application needs to be submitted in case of use of national forest land from the feasibility study and application need to submitted to the Ministry of Forests and Environment through the subjective ministry</li> <li>• Rule 89, following Rule 88, the Ministry of Forests and Environment direct Division Forest Office through its respective department for the detail field information and the that information should also be submitted to provincial ministry.</li> <li>• Rule 90, following Rule 89, Division Forest Office should submit the information with field monitoring (if necessary) to the Ministry of</li> </ul>

S.N.	Policies, Acts, Regulations, Guidelines	Relevant Provisions
		<p>Forests and Environment. The ministry will ensure the use of forest land if the applicable information and letters are received, and give permission to the respective project by binding in the rule's states in the Forest Regulations.</p> <ul style="list-style-type: none"> <li>• Rule 91, following the Rule 90, after the decision made by the government of Nepal for the permission to use the forest land, development project should make the availability of the applicable land for the forest development as per the Forest Act (2076), Section 42 (2).</li> <li>• Rule 92, following the Rule 91, in case of failure in the availability of the applicable land, it has to go through the Land Acquisition Facilitation Committee in the district level.</li> <li>• Rule 93, following the Rule 92, in case failure of the land acquisition through the Committee respective department should give permission to the project for the Collection of amounts in the government fund as per the land purchases for development project specified in Shedule-51.</li> <li>• Rule 93 (5), the compensation of loss of 1 tree loss should be made with plantation of 10 trees with the amount base on the cost of the trees in the ratio of 1:10 and Rule 93 (5), the amount must include bi-annual production or purchase of trees, trees transportation, afforestation of 1600 trees per hectare, fencing and boundary for the protection of trees and require number of people for look after.</li> </ul>
5	<b>Conservation Area Government Management Area Rules 2001</b>	<ul style="list-style-type: none"> <li>• Contains a number of regulatory measures to minimize environmental impacts within the forests, national parks, wildlife reserves and conservation areas. Prior to implementation, the EPA 2076 B.S. (2019 AD) requires a proponent to undertake BES, IEE or EIA for a proposed project and have the report approved by the concerned ministries. The introduction of the exotic species on the specific location may requires an IEE before the implementation of the project as per the EPR, 2020 Appendixes 1, 2 and 3 Rule 3 a, b, and c.</li> </ul>
6	<b>Ancient Monument Preservation Act, 2013 (1956) and Rules, 1989 (and amended till date)</b>	<ul style="list-style-type: none"> <li>• It was enacted to integrate the conservation and protection of ancient monument and archeological properties. The act mentions any ancient monuments and artistic objects of hundred years old shall be regarded archeologically important objects and Department of Archeology (DoA) shall preserve such objects.</li> <li>• As per the Act and rules, works as such excavation, laying of water, sewer lines, repairing road etc., in the monument protection / conservation zone, require prior permission of Department of Archaeology. Application in the prescribed format need to be submitted to DOA.</li> </ul>
7	<b>Water Resource Act, 1992</b>	<ul style="list-style-type: none"> <li>• Water Resource Act, 1992 of clauses 3, 7, 18, 20, 22 and 24 implies state ownership of any surface/stream bodies of Nepal and stresses the utilization of water resources by any individual or organization without causing harm to others. It embodies that the Government of Nepal can fix, monitor and formulate regulations pertaining to water quality standards, pollution tolerance levels and development of water resources. It prohibits any action that may pollute water resources surpassing the threshold value. It has prioritized use of water resources in the successive order: drinking/domestic use, irrigation, fishery, electricity, water transport,</li> </ul>

S.N.	Policies, Acts, Regulations, Guidelines	Relevant Provisions
		and recreation. It urges that utilization of resources should be carried out without causing any considerable damage to the environment such as soil erosion, floods, landslides and other similar natural hazards. The Act fails to address the license mandatory for the extraction of water even from the land owner.
8	<b>Water Resource Regulation, 1993</b>	<ul style="list-style-type: none"> <li>Water Resources Act was published in Nepal Gazette in (2050/5/1). Persons, who interested to use the water resources on institutionalized basis, may form a consumer's association consisting of at least Seven persons as officials and members. There shall be a Water Resources Committee in each District for the purpose of issuing license pursuant to Sub-section (1) of Section 8 of the Act in order for the utilization of Water Resources contained within Nepal. Government of Nepal, may, giving due consideration for the types, structure, capacity of the project relating to utilization of water of the Act, prohibit from using the house or land situated within the area of the project specifying the fixed distance for the site for a specified worker resources for the purpose of Sub-section (3)</li> </ul>
9	<b>Irrigation Rules, 2000 (Amendment in 2060)</b>	<ul style="list-style-type: none"> <li>Irrigation Rules, 2000 Chapter 2 has the provision of the formation of the user's association in a format as prescribed in schedule –1 and the procedure for the transfer of the project. Under Rule 12, Users' association may plant trees on the side or right of way of a Canal, Branch or Secondary Canal, Minor or Tertiary Canal, Water course or Field Channel after the approval of community forest work - plan according to the prevailing Forest Act and Rules from the concerned Forest Office. In the course of determining the place for plantation there shall be coordination with concerned Irrigation Office. Until the work plan pursuant to Sub rule (1) is approved, Users' Association may sell the rotten or fallen trees lying on the side of Canal, Branch or Secondary Canal, Minor or Tertiary Canal, Water course or Field Channel and the trees which need pruning may be pruned upon the approval of committee.</li> <li>Similarly, under the Chapter 6, there is the provision of irrigation project which shall be constituted to implement the large-scale irrigation project as designated by the GoN. It also deals with the function, duties and power of the designated project committee, staff and the establishment of the Project Unit Office.</li> </ul>
10	<b>Irrigation Policy (2013)</b>	<ul style="list-style-type: none"> <li>Irrigation Policy document sets out the rationale for subsector development and policy objectives and approach for project development, water user associations, irrigation service charges and irrigation system operation and maintenance</li> </ul>
11	<b>Soil and Watershed Conservation Act, 2039</b>	<ul style="list-style-type: none"> <li>In order to properly manage the watersheds of Nepal, the Soil and Watershed Conservation Act 1982 was enacted. Section 3 of the Act empowers GoN to declare any area as a protected watershed area. Section 4 of the Act provides that a watershed conservation officer has the authority to implement the following works in protected watershed areas: <ul style="list-style-type: none"> <li>Construct and maintain dam, embankment, terrace improvements, diversion channels and retaining walls,</li> <li>Protect vegetation in landslide-prone areas and undertake afforestation programs, and</li> <li>Regulate agricultural practices pertinent to soil and watershed</li> </ul> </li> </ul>

S.N.	Policies, Acts, Regulations, Guidelines	Relevant Provisions
		<p>conservation.</p> <ul style="list-style-type: none"> <li>Under Section 10 of the Act, power is extended to the Watershed Conservation Officer to grant permission to construct dams, drainage ditches, canals, cut privately owned trees, excavate sand, boulders and soil, discharge solid waste, and establish industry or residential areas within any protected watershed. The Act outlines the essential parameters necessary for proper watershed management (including rivers and lakes). The Act is applicable to protected watersheds.</li> </ul>
12	<b>Soil and Watershed Conservation Regulations, 2042</b>	<ul style="list-style-type: none"> <li>In exercise of the powers conferred by Section 25 of the Soil and Watershed Conservation Act 1982, the Government of Nepal has framed Soil and Watershed Conservation Regulations, 2042 BS. Pursuant to sub-rule (1) of rule 10 natural calamity clause (a), (b), (c), (d), (e), (f), (g) of section 10 of the Act and (h) if anyone has to do the work mentioned in the reason to do so. An application has to be submitted to the Watershed Conservation Officer in the format of open schedule 4 (2) After receiving the application as per sub-rule (1), the watershed protection officer in case of any action contrary to the purpose of the Act, in the format of Schedule 5 as per schedule. will allow.</li> </ul>
13	<b>Water Induced Disaster Management Policy 2015 (2072)</b>	<ul style="list-style-type: none"> <li>The latest policy of Government of Nepal which recognizes the climate change as one of the main causes for the water induced disaster in Nepal.</li> <li>This policy is introduced to achieve the objectives of the National Water Resources Strategy and National Water Plan on water induced disaster management sector through participation and coordination of public, cooperatives and private sector institutions. It encourages people to participate with voluntary contribution of land for flood protection works.</li> <li>It has the main objective of making the infrastructures sustainable and has the policy on involving communities, cooperatives and private sector. It stresses the need for medium and long-term disaster prevention and control programs and make them climate resilient and environment friendly.</li> </ul>
14	<b>Land Acquisition Act, 2034(1978AD)</b>	<ul style="list-style-type: none"> <li>Government can acquire land at any place in any quantity by giving compensation pursuant to the act for any public purposes or for operation of any development project initiated by government institutions.</li> </ul>
15	<b>Labor Act, 2074 (2017 AD)</b>	<ul style="list-style-type: none"> <li>This labor Act was made under the management of parliament under sub-clause 1 of clause 296 of Constitution of Nepal. Sub-section 3 of Section 2 states that the employees should not be compelled to other work other than they are assigned for. In addition, Sub-section 5 of Section 2 states about prohibition of child labor in any organization and sub-section 6 of Section 2 states that there should not be any kind of discrimination among the employee's regard of religion, ethnicity, gender, origin, language or intelligence or other kind of characters.</li> </ul>
16	<b>Child Labor (Prohibition and Regulation) Act, 2056 (2000 AD)</b>	<ul style="list-style-type: none"> <li>As per section 3 of this act, no child having not attained the age of 14 years shall be engaged in works as a laborer.</li> </ul>



S.N.	Policies, Acts, Regulations, Guidelines	Relevant Provisions
17	<b>Solid Waste Management Act, 2068 (2011 AD)</b>	<ul style="list-style-type: none"> <li>This act has been formulated with a goal of minimizing solid waste production from the target area by setting rules and regulation on solid waste management (SWM) in the country in order to develop better environment for the systematic and effective management of solid waste and to involve all the concern stakeholders in SWM practice. The main features of this act are discussion of 3R principle (Reduce, Reuse and Recycle). 3R principle seems to be very beneficial as it not only increases the life of landfill site but also save the money, which could be used for other infrastructure development. Section 4 of the act assign the local body to manage or use the solid waste discharged or dumped in collection center, transfer station or treatment plant or collected during cleaning.</li> </ul>
18	<b>Solid Waste Management Rules, 2070 (2013 AD)</b>	<ul style="list-style-type: none"> <li>The solid waste management rule was formulated as per the provision made in article 50 of the Solid Waste Management Act, 2068. This regulation has emphasized the segregation of waste at source, and mentioned that the responsibility of proper disposal, and management of source belongs to the producers themselves. Section 3 of the rule describes the segregation, and management of solid waste. It has been mentioned that it is essential to segregate degradable, and non-degradable solid waste at the source.</li> </ul>
19	<b>The National Parks and Wildlife Conservation Act, (1973AD)</b>	<ul style="list-style-type: none"> <li>This Act deals with the conservation and management of wildlife and habitat. The Act restricts entry into national parks without prior permission of the concerned authority. Hunting of animals or birds, building or occupying houses, shelters or structures, occupying, clearing or planting or growing in any part, cutting, felling, removing or overshadowing any tree and removing any quarry or any other activities in national parks are banned.</li> <li>Wildlife Reserve Regulation, 1977, entry, construction of houses or sheds, clearance of forest and forest products, quarrying and overnight stay in a reserve area is prohibited unless authorized in writing by the relevant GoN authority.</li> <li>Buffer Zone Management Regulation, 1994, clearance of forests and forest products, acquisition of land, use of quarry sites and hunting in buffer zones is restricted unless written approval of the relevant GoN authority is obtained.</li> </ul>
20	<b>Local Self Governance Act (1999AD)</b>	<ul style="list-style-type: none"> <li>This Act gives Local Government the functions, duties and power to, among others; (i) conserve and protect their local environment and natural resources; (ii) plan, implement and / or operate and maintain local water supply projects; (iii) implement and / or arrange for implementation local sanitation / sewerage and drainage projects; (iv) protect cultural heritage and religious sites and / or (v) monitor project activities within their jurisdictions.</li> </ul>
21	<b>National Tourism Act (1978AD)</b>	<ul style="list-style-type: none"> <li>This Act facilitates to increase tourist arrival in the country and encourages tourists and their handling agents in Nepal to minimize environmental impact during their visit. The Act also shows serious concerns about visitors' health, facilities and welfare and empowers the Government to generate tourism revenue and establish plough-back mechanism for tourism infrastructure development.</li> </ul>

### C. International Environmental Agreements

34. Table 3 below lists of the international environmental agreements that Nepal is party to, and their relevance with WUC Project.

**Table 9: International Environmental Agreements and standards ratified by GoN**

<b>International Convention</b>	<b>Year*</b>	<b>Relevant Provisions</b>	<b>Remarks</b>
World Heritage Convention	1978	Parties to ensure the protection and conservation of the cultural and natural heritage situated on territory of, and primarily belonging to the State. World Heritage sites are identified as per this convention.	The project components will not impact physical cultural resources and natural heritage during project implementation and operation.
Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention)	1987	Parties to conserve and wisely use wetlands (i.e., maintaining their ecological character) as a contribution towards achieving sustainable development locally and throughout the world. This convention will identify the Ramsar areas.	The project components are not located in wetlands as classified as Ramsar site.
Convention on Biodiversity (CBD)	1992	Parties to require the environmental assessment of projects that are likely to have significant adverse effects on biological diversity with a view of avoiding or minimizing such effects. The CBD also identified the biodiversity identified the hot spot areas.	The project will not impact biodiversity hot spot area in the country.
UN Framework Convention on Climate Change	1992	Parties to take precautionary measures to anticipate, prevent or minimize the causes of climate change and mitigate its adverse effects.	The project will help the Government of Nepal comply with this agreement. The project will ensure implementation of resilience of farmers to climate change improved.
Basel Convention on the Control of Trans boundary Movements of Hazardous Wastes and their Disposal	1996	Parties to, among others, minimize the amount and toxicity of hazardous waste generated, manage the hazardous and other wastes they generate in an environmentally sound manner and as close as possible to the source of generation.	The project will ensure implementation of its EMP as measure to avoid or minimize the generation and disposal of any hazardous wastes.
Convention on International Trade in Endangered Species of Wild Fauna and Flora	1975	Parties to control the trade of certain wildlife species to prevent further endangering of their survival. CITES classifies species according to the following criteria viz.,	IBAT reports are generated for all project components to ensure the conservation and protection of endangered species of wild fauna and flora.

International Convention	Year*	Relevant Provisions	Remarks
		species threatened with extinction; species which could become endangered; and species that are protected. Nepal is rich in biodiversity and has number of protected species	
International Labour Organization (ILO) Convention of Indigenous and all Peoples	2007	Highlights the need to recognize indigenous and tribal people's specific knowledge, skills and technologies as the basis for their traditional economies and self-determined development process.	Applicable to projects where indigenous and tribal peoples are present.

\*(Year) - Year last amended.

#### D. Applicable Environmental Standards

**35. National Ambient Air Quality Standards for Nepal, 2003.** As shown in the table below, the air quality standards for Nepal have set standards for 7 parameters: total suspended particles(TSP), PM<sub>10</sub>, Sulphur Dioxide (SO<sub>2</sub>), Nitrogen Oxide (NO<sub>2</sub>), Carbon Monoxide (CO), Lead (Pb) and Benzene. The World Health Organization (WHO) Air Quality Guidelines has set quality standards for 4 parameters PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub> and NO<sub>2</sub>. According to ADB SPS 2009, when host country regulations differ from international levels and measures, the project will achieve whichever is more stringent. Both policies provide guidelines and comply with the more stringent standards during construction period.

**Table 10: Standards for Ambient Air Quality**

Parameter	Averaging Period	Nepal's Ambient Air Quality Standard (µg.m <sup>3</sup> ) *	WHO Air Quality Guidelines (µg.m <sup>3</sup> ) **	
			Global Update 2005	Second Edition <sup>^</sup> 2000
TSP	Annual	-	-	-
	24-hour	230	-	-
PM <sub>10</sub>	Annual	-	20	-
	24-hour	120	50	-
PM <sub>2.5</sub>	1-year	-	10	-
	24-hour	-	25	-
SO <sub>2</sub>	Annual	50	-	-
	24-hour	70	20	-
	10-minutes	-	500	-
NO <sub>2</sub>	1-year	40	40	-
	24-hour	80	-	-
	1-hour	-	200	-
CO	8-hour	10,000	-	10,000
	15-minutes	100,000	-	100,000

Parameter	Averaging Period	Nepal's Ambient Air Quality Standard ( $\mu\text{g.m}^3$ ) *	WHO Air Quality Guidelines ( $\mu\text{g.m}^3$ ) **	
			Global Update 2005	Second Edition^ 2000
Pb	1-year	0.5	-	0.5
Benzene	1-year	20	-	-

Source: \*National Ambient Air Quality Standard for Nepal, 2003. Obtained from Environment Statistics of Nepal, 2011, National Planning Commission Secretariat, Central Bureau of Statistics, Nepal. \*\*Environmental, Health and Safety General Guidelines, 2007. International Finance Cooperation, World Bank Group.

^Air Quality Guidelines for Europe, Second Edition, 2000. WHO Regional Office for Europe, Copenhagen.

36. Emission standard for diesel generator EPA-14, 2020. The emissions standards set for new DGs imports is equivalent to Bharat Stage III standards, and for in-use DGs is equivalent to Bharat S Inventories and Black Carbon Emissions in Kathmandu Valley, Nepal. Emissions standards are set for 4 major pollutants: CO, HC, NOx, and PM.
37. National Noise Standard Guidelines, 2012. The guidelines have set the standards for noise levels, measured in dBA, for industrial, commercial, rural residential, urban residential, mixed residential and quiet areas. It also has provision of standard values for the noise level generated by water pumps and DG as well.
38. For international standards, WHO Noise Level Guidelines has set the noise levels measured in dBA for two areas residential and commercial areas. The project will achieve whichever is more stringent. Both policies provide guidelines to follow and comply with the more stringent standards during construction period.

**Table 11: Standards for noise levels for both GoN and WHO**

Receptor/Source	National Noise Standard Guideline 2012 (dBA)		WHO Guidelines Values for Noise Levels Measured Out of Doors*(One Hour LA <sub>q</sub> in dBA	
	Day	Night	07:00-22:00	22:00-07:00
Industrial Area	75	70	70	70
Commercial Area	65	55		
Rural Settlement Area	45	40		
Urban Residential Area	55	50		
Mixed Residential Area	63	55		
Quiet Area	50	40	-	-
Water Pump	65		-	
Diesel Generator	90		-	

\*Guidelines for Community Noise, WHO, 1999

### III. DESCRIPTION OF THE PROJECT

39. Description of subproject components under the URLIP proposed in five WUC municipalities of Tilottama, Devdaha, Saina Maina, Lumbini and Sidharthnagar provided in this section. These details are based on the final designs of roads and drains, and feasibility study /conceptual designs of bus terminal and municipal building. These will be finalized with detailed site surveys and investigations as needed during the detailed design. This IEE report will be updated with detailed designs to reflect any changes.
40. The drainage system for the proposed roads has been carefully planned to manage changes in road levels and prevent waterlogging, a common issue in many projects. The

design follows established guidelines Nepal Urban Road Standard 2076, IRC and Nepal Bridge Standards to ensure proper water flow. A detailed study was done to estimate rainfall and water discharge using tools like QGIS to map the area where water collects. Based on this, structures like side drains, pipe culverts, slab culverts (as per requirement) have been included where needed. Special attention has been given to areas with big height differences in the road to ensure water doesn't collect and cause problems. These measures aim to provide good drainage and also keep the roads safe and functional during heavy rain.

#### A. Tilottama Municipality Subprojects

The details of four components proposed in Tilottama Municipality are as follows.

**41. Driver tole-Shivapur Road (6.698 km)** - The road starts from Driver Tole which is connected with Siddhartha Highway at one end and Sukhaura Khola Bridge on another end which ultimately joins to East-West Highway. The total road length is 6.81 km. The road alignment is blacktopped with few graveled roads section. The road passes through Ward no 1, 8 and 11 of Tilotamma Municipality. The ROW of road is 13 m, but from Driver Tole to Namuma Tole (From Ch: 0+000 to Ch: 3+000), the RoW is 11.5m. The existing road width varies from 6-10m. There are also existing canals at roadsides of the alignment. In case of existing canal sections, the road cross sections will vary as dismantling of canals are not recommended. The end part of about 800 m, drain is already constructed. It passes through 4.77 km of settlement area and 2.04 km of agricultural land with sparse settlement.

**Table 12: Existing Condition and Proposed Scope of the Drivertole – Shivapur**

SN	Elements of component	Existing Scenario	Proposed Scheme
1	Length of Road	6.81 km	6.81 km
2	Right of Way (ROW) Declared by municipality	13m RoW as per Land Use Standard, 2076 B.S. of Tilottama Municipality	From Ch: 0+000 to Ch: 3+000 (Drivertole to Namuna Tole), RoW is 11.5m; From Ch:3+000, RoW is 13 m.
3	Total Road Width	6 to 10 m	11.5 m (Along the existing canal sections total road width varies)
4	Carriageway	Average 8 m	7.5 m (including tick side drain)
5	Pavement type	Blacktopped with few graveled roads section	Double lane upgradation with the 50mm surface course of asphalt concrete, 150mm of base course and 250mm of sub base course with proper grade and camber
6	Side Drain	-10m of Side Drain along the left side of road. -232m of covered Drain along the left side of the road. -331m of covered Drain along the right side of the road. -66m of Side Drain along the right side of the road. During heavy rainfall, Pluvial flooding in few road sections where road is graveled and blacktopped is damaged Water doesn't flow to drain due to no proper camber slope at some sections	PCC surface drain of width 0.25m (included in carriage way width) Storm water drain size of Type A –0.45 X 0.65m Storm water drain size of Type B –0.6 X 0.8 m Storm water drain size of Type C- 0.75 X 0.95 m

SN	Elements of component	Existing Scenario	Proposed Scheme
7	Cross drainage Structures	-10 Nos Pipe Culverts -6 Nos Side Hume Pipes -8 Nos Slab Culverts -11 Nos of Side RCC Slabs	15 Hume-pipe culverts 12 slab culverts Existing Slab culverts needs to be dismantled and reconstruct Rehabilitation of existing side pipe crossings and slabs in order to make double lane
8	Protection works	Retaining walls at some locations	Retaining wall/slope protection measures as per requirement.
9	Utility	All wires and cable are hanging above ground and are in unmanaged condition	Shifting of electric poles and telephone poles with coordination with municipality and NEA.

Source: Detailed Project Report, 2024

**42. Pathardanda-Tinau Road (6.36 km)-** This road starts from Pathardanda of Ward no. 15 and ends to Tinau River Bridge of ward no. 14 of Tilottama Municipality connecting Siddhartha Highway to Siyari Rural municipality. The majority of road alignment sections is blacktopped. The road alignment passes through Ward no. 15, 13 and 14 of the Municipality. The existing road width varies is 8 m - 12 m. It passes through 3.0 km of agricultural land at left side and other remaining parts are settlement area.

**Table 13: Existing Condition and Proposed Scope of Pathardanda -Tinau Road**

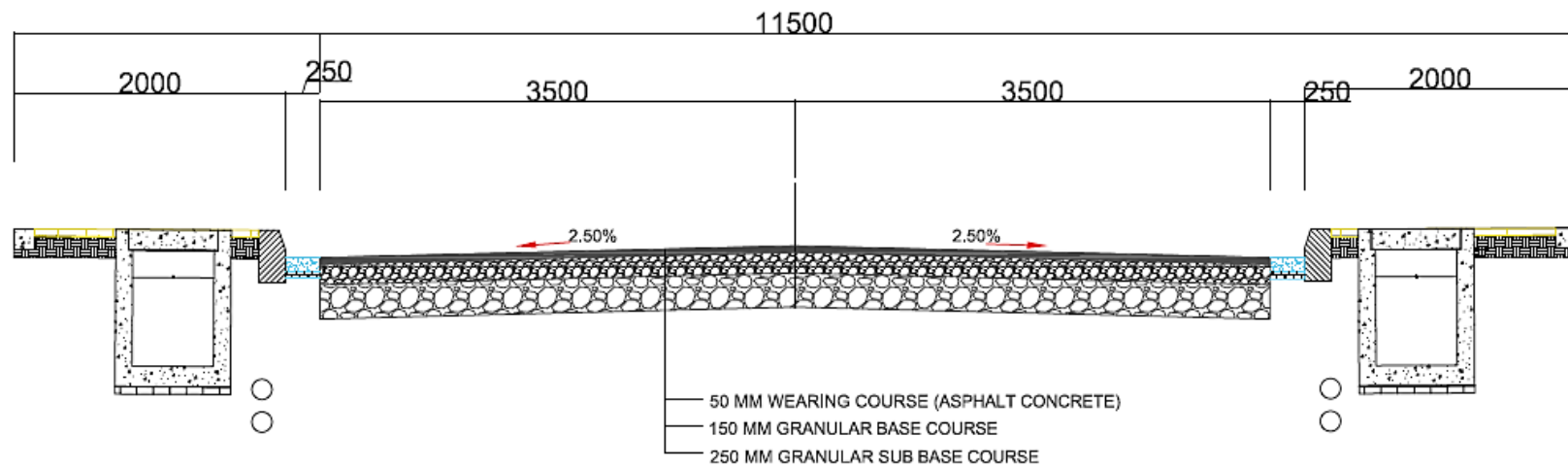
SN	Elements of component	Existing Scenario	Proposed Scheme
1	Length of Road	6.36 km	6.36 km
2	Right of Way (ROW) Declared by municipality	15 m	15 m
3	Total Road Width	8 to 12 m	11.5 m
4	Carriageway	Average 10 m	7.5 m
5	Pavement type	Majority Section is Blacktopped (DBST)	Double lane upgradation with the 50 mm surface course of asphalt concrete, 50 mm DBM, 150 mm of base course and 250 mm of sub-base course with proper grade and camber slope
6	Side Drain	-1,314m of side drain on the left side of the road -28m of the covered drain on the left side of the road -232.33m of side drain on the right side of the road -20m of covered drain on the right side of the road	PCC surface drain of width 0.25m (included in carriage way width) Storm water drain size of Type A – 0.45 X 0.65m Storm water drain size of Type B – 0.6 X 0.8 m Storm water drain size of Type C – 0.75 X 0.95 m
7	Cross drainage Structures	-11 Nos of Pipe culverts -7 Nos of Side Hume Pipes -14 Nos of Slab culverts -1 No of Side RCC Slabs	14 Hume-pipe culverts 9 slab culverts to be dismantled and re-construct. -Rehabilitation of existing side pipe crossings and slabs in order to make double lane
8	Protection works	Retaining walls at some locations	Retaining wall/slope protection measures as per requirement.

SN	Elements of component	Existing Scenario	Proposed Scheme
9	Road furniture (streetlights, delineators etc.)	Only in some sections	Streetlights of height 9 m @ 25 m interval.
10	Utility	All wires and cable are hanging above ground and are in unmanaged condition	Shifting of electric poles and telephone poles with coordination with municipality and NEA.

*Source: Detailed Project Report, 2024*

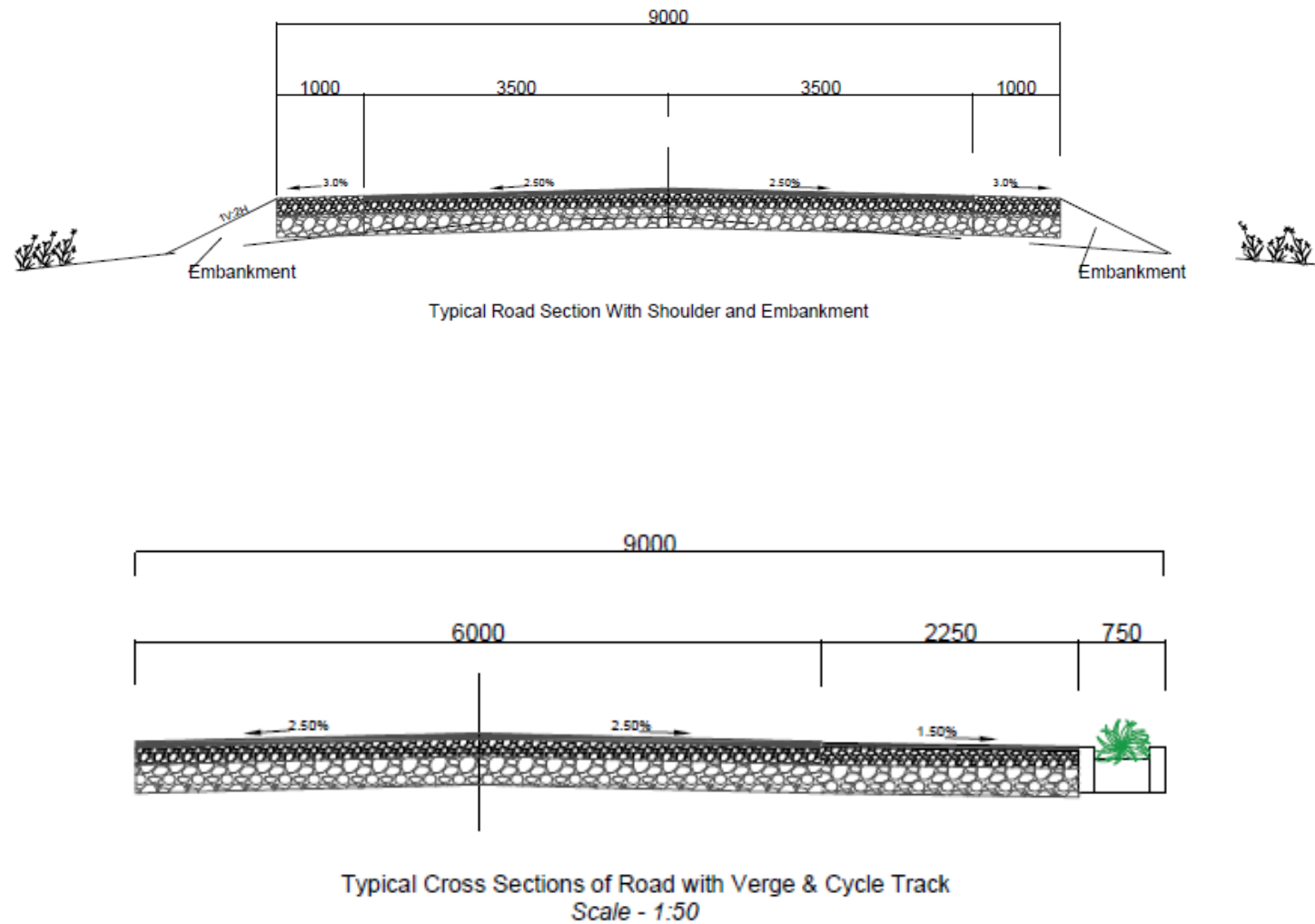
*Source: Detailed Project Report, 2024*

**43. Cross-sectional Elements:** For sections where footpaths are not obligatory, cross sections with cycle track and verge can be provided as shown in the figure below:

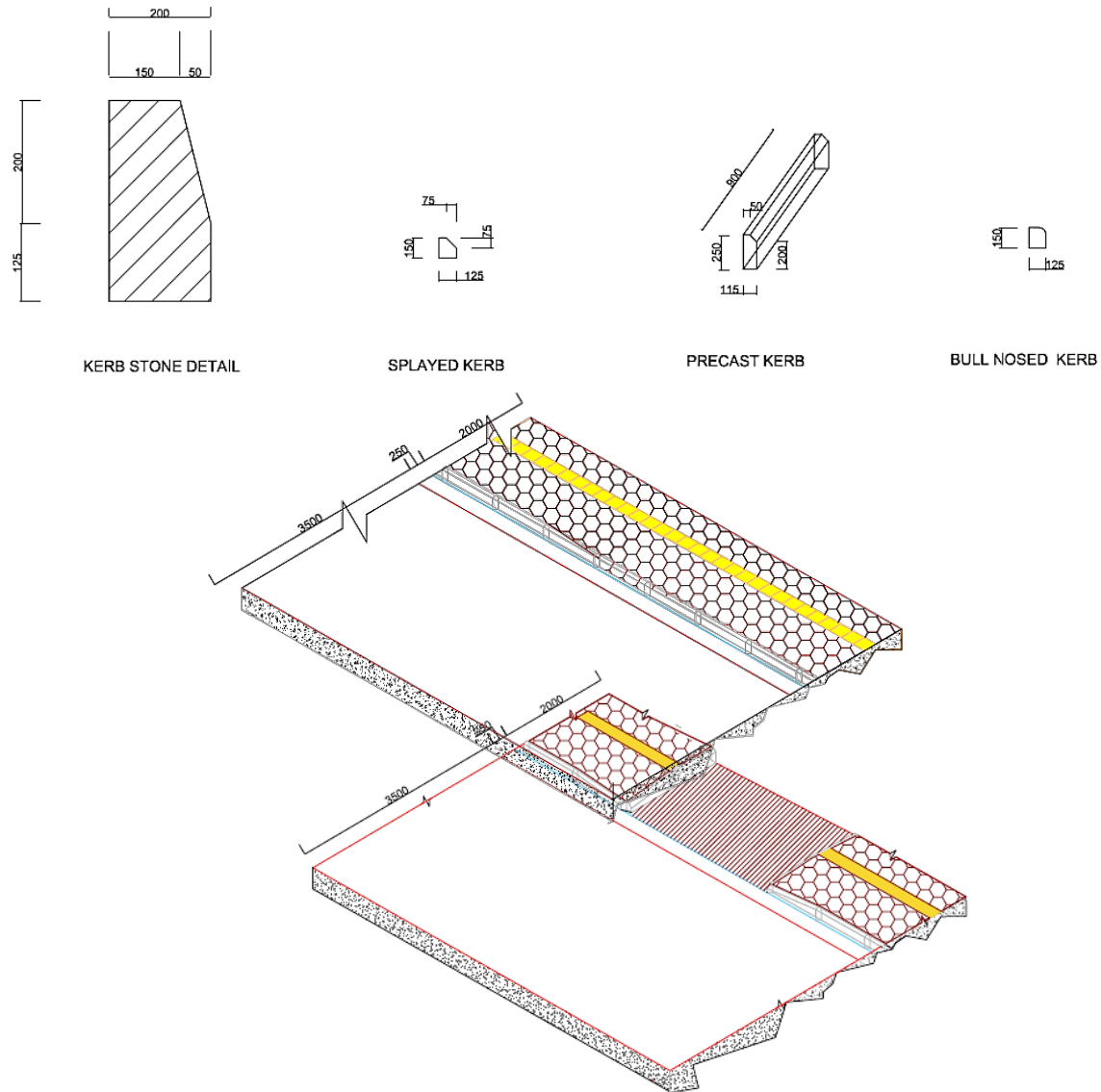


**Figure 3: Typical Road Sections with Footpath, Drain and Retaining walls (11.5m) in Tilottama**

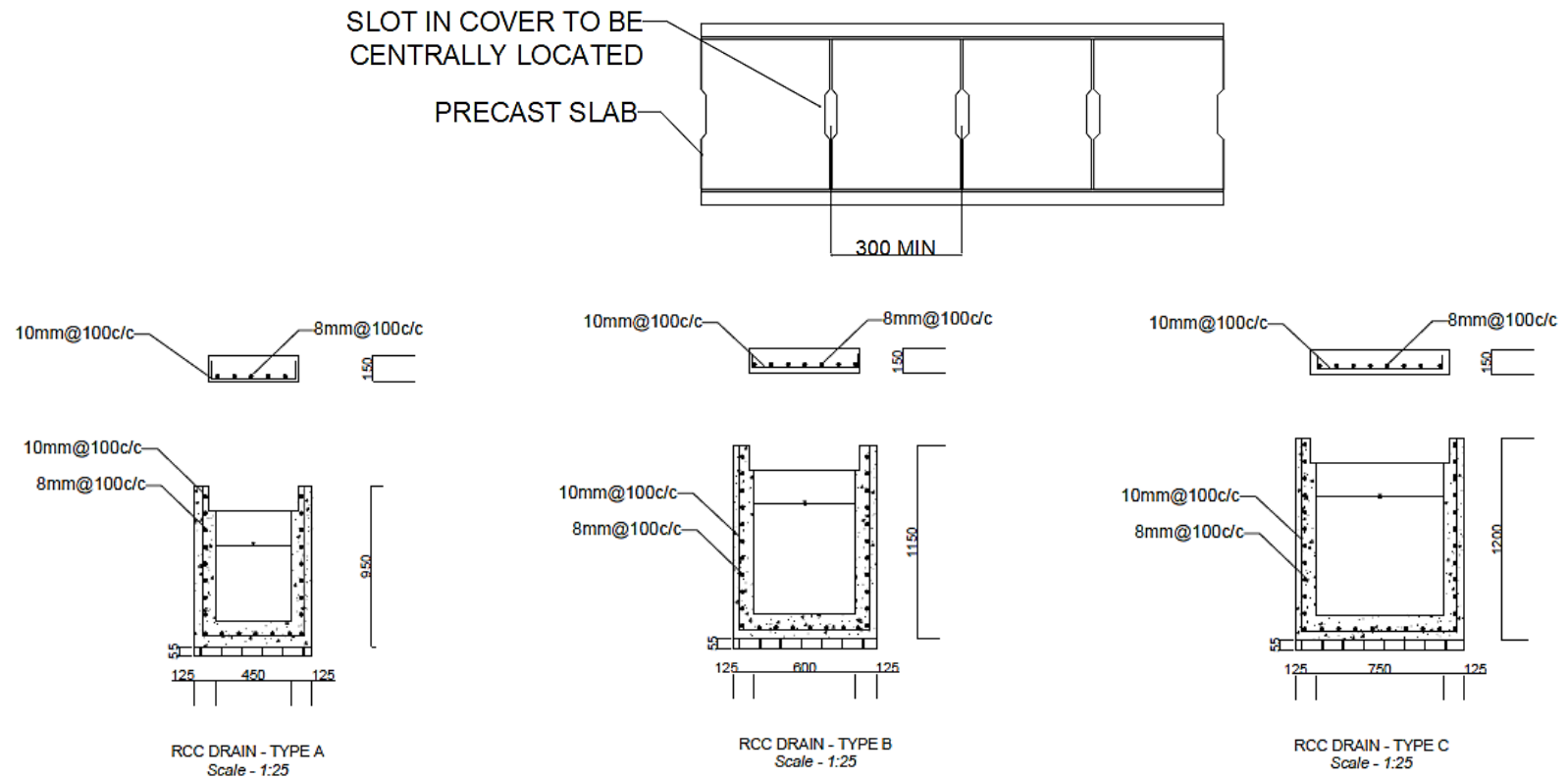




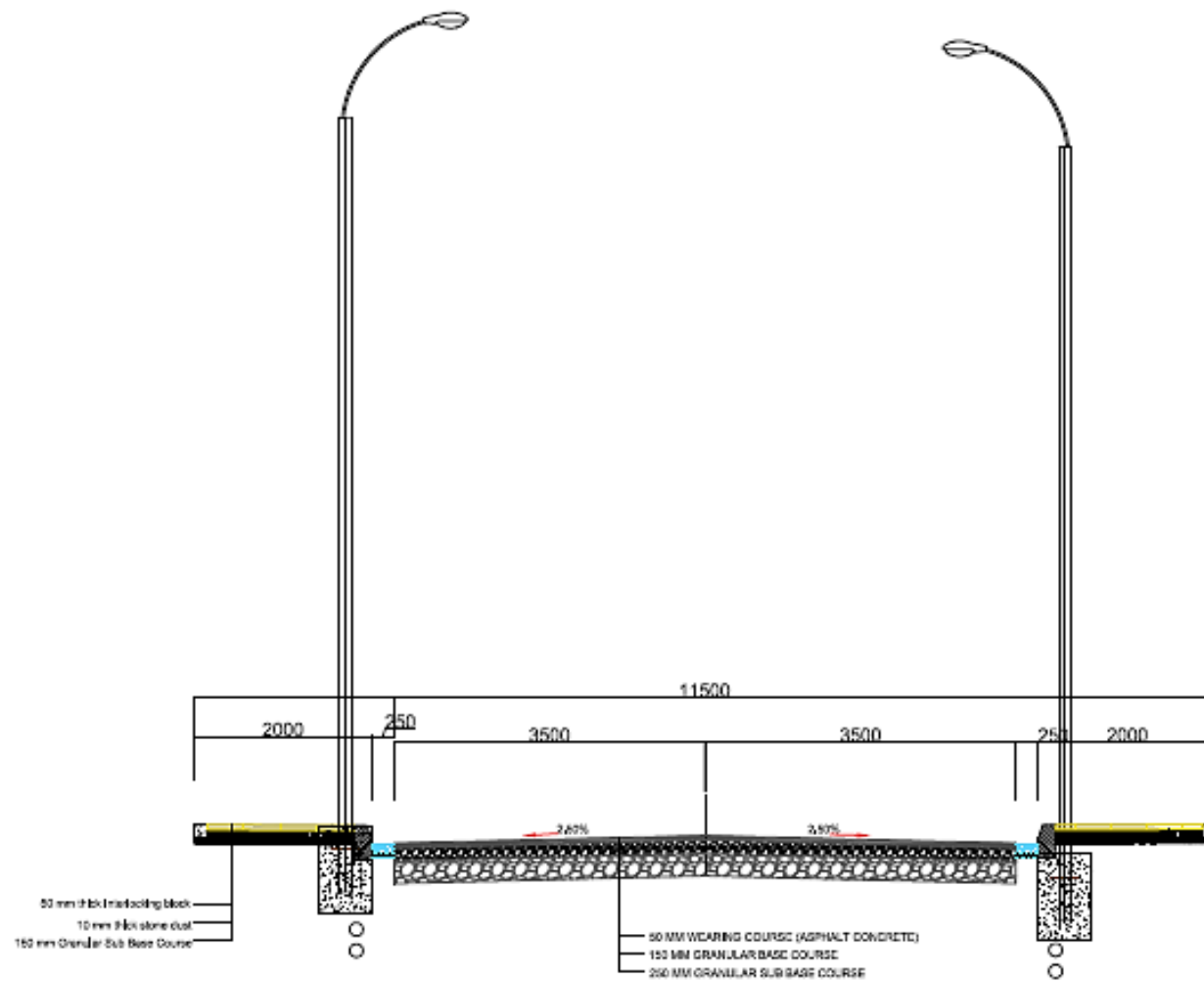
**Figure 4: Typical Road Sections with Footpath, Drain and Retaining walls (9.0 m) in Tilottama**



**Figure 5: Typical Kerbs and Footpath Section in Tilottama**



**Figure 6: Typical Drain Plan and Sections in Tilottama**



**Figure 7: Typical Road Section with Street Light in Tilottama**

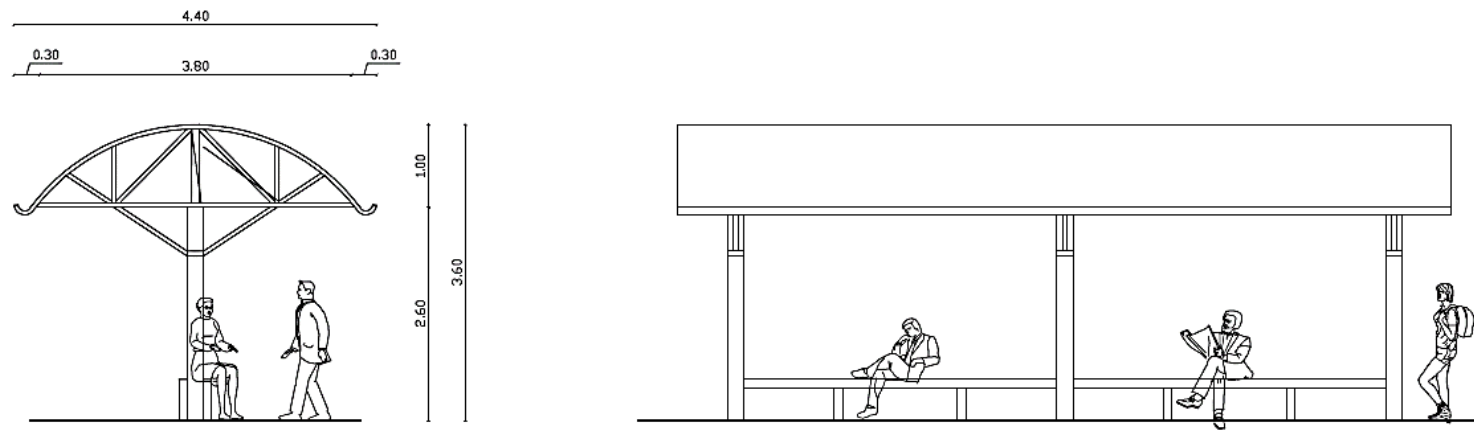


Figure 8: Resting Stations with Sheds

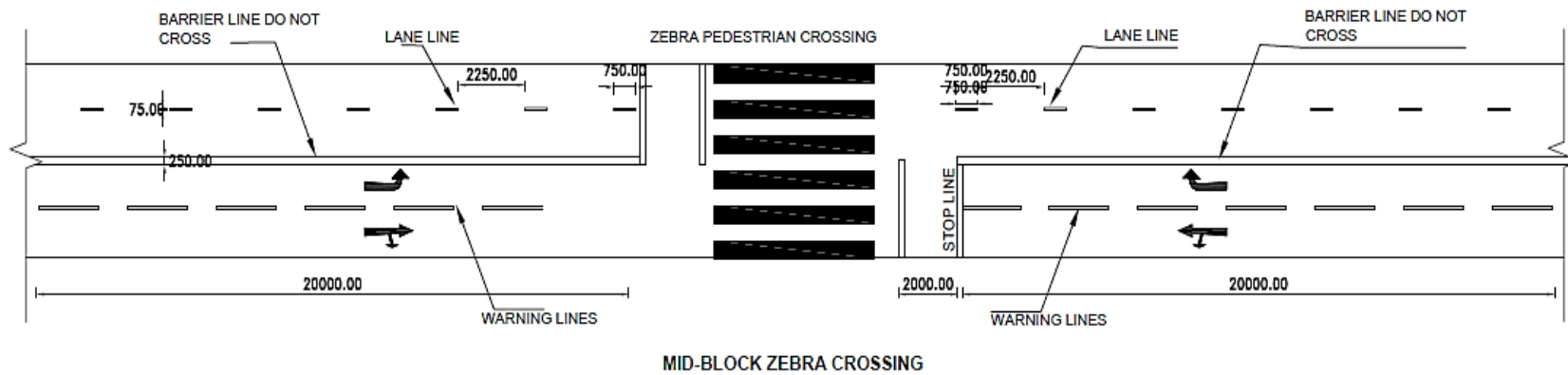
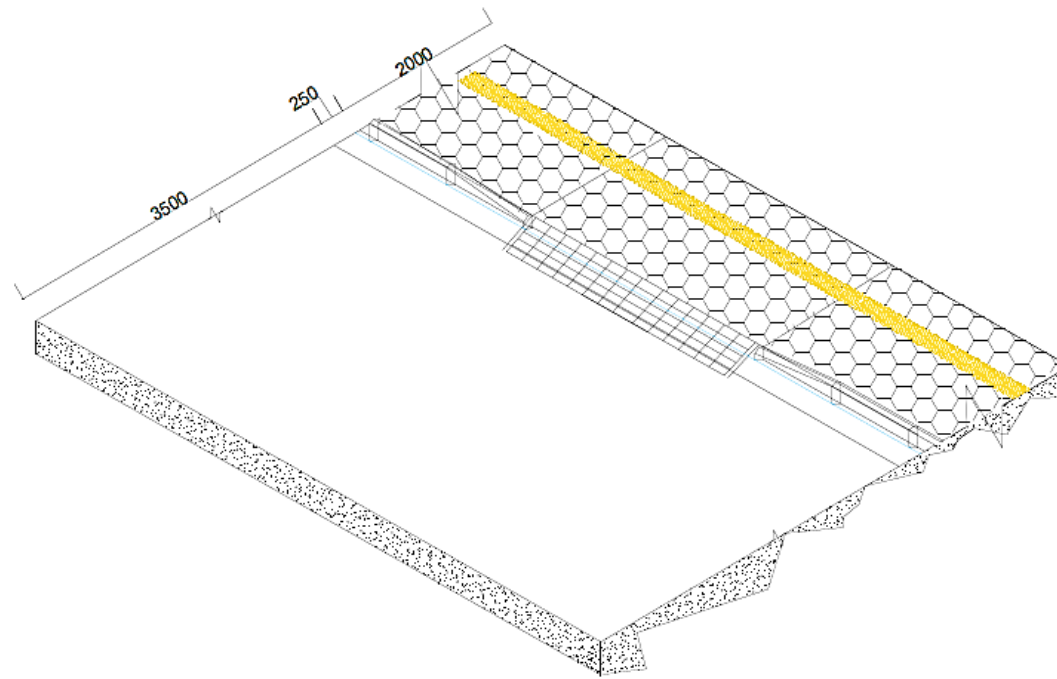
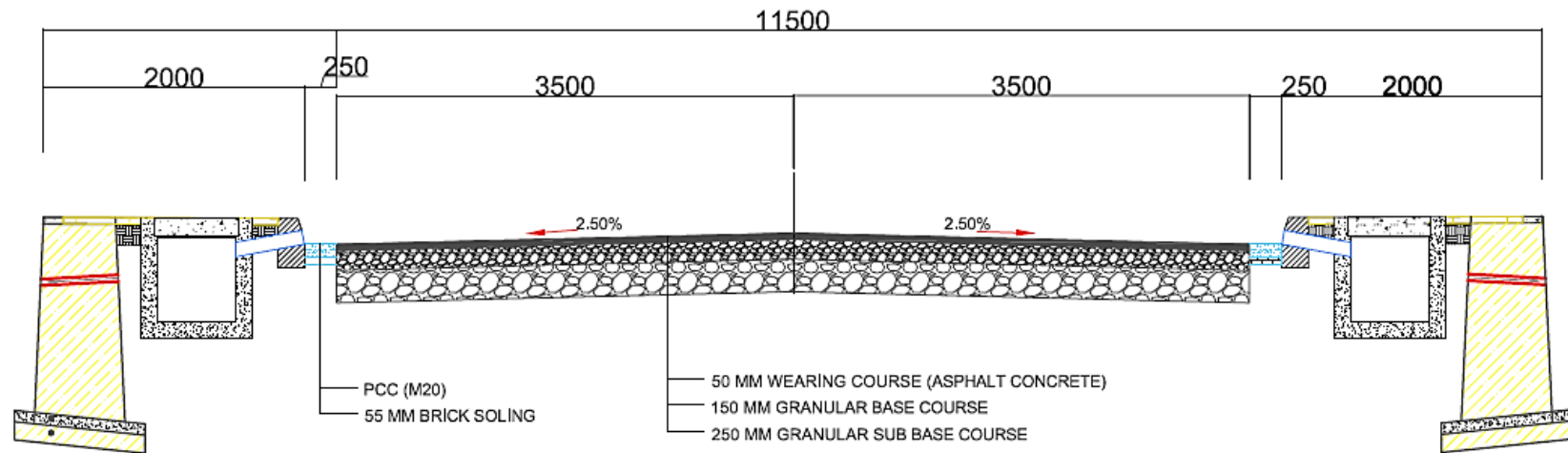


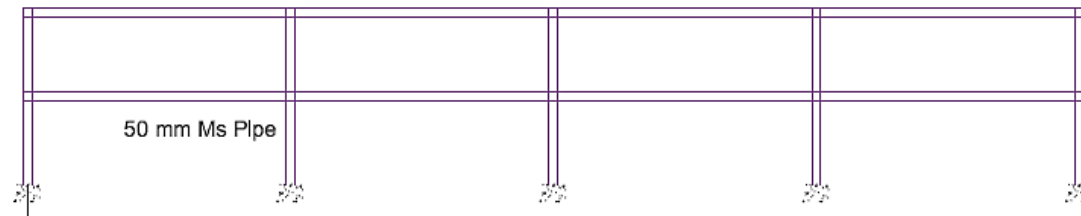
Figure 9: Pedestrian Crossing Details in Tilottama

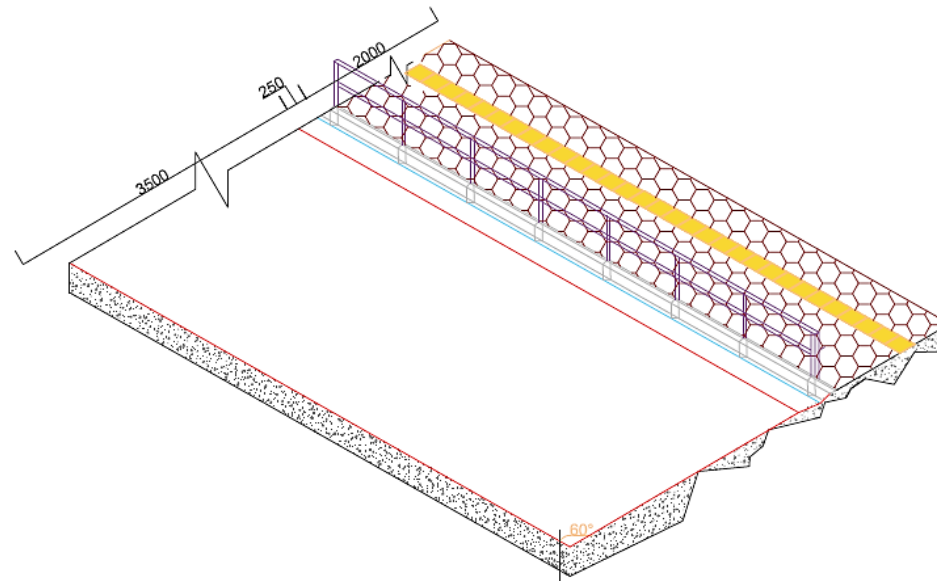


**Figure 10: Footpath with Ramps for entrances in Tilottama**



**Figure 11: Typical Road Section with Retaining Walls in Tilottama**





**Figure 12: Hand Railings in Footpath in Tilottama**



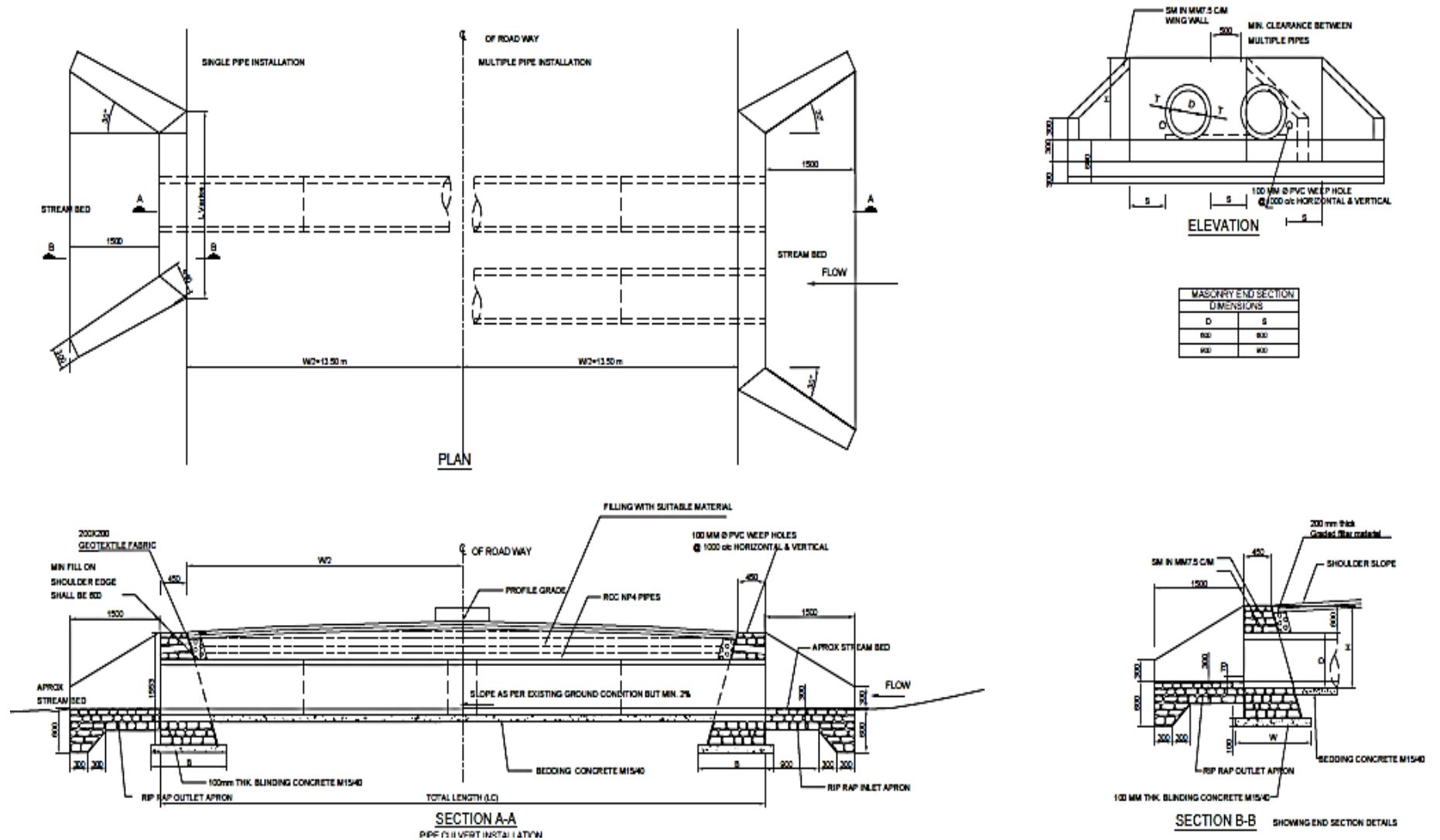


Figure 13: Typical Pipe Culvert Plan and Sections in Tilottama

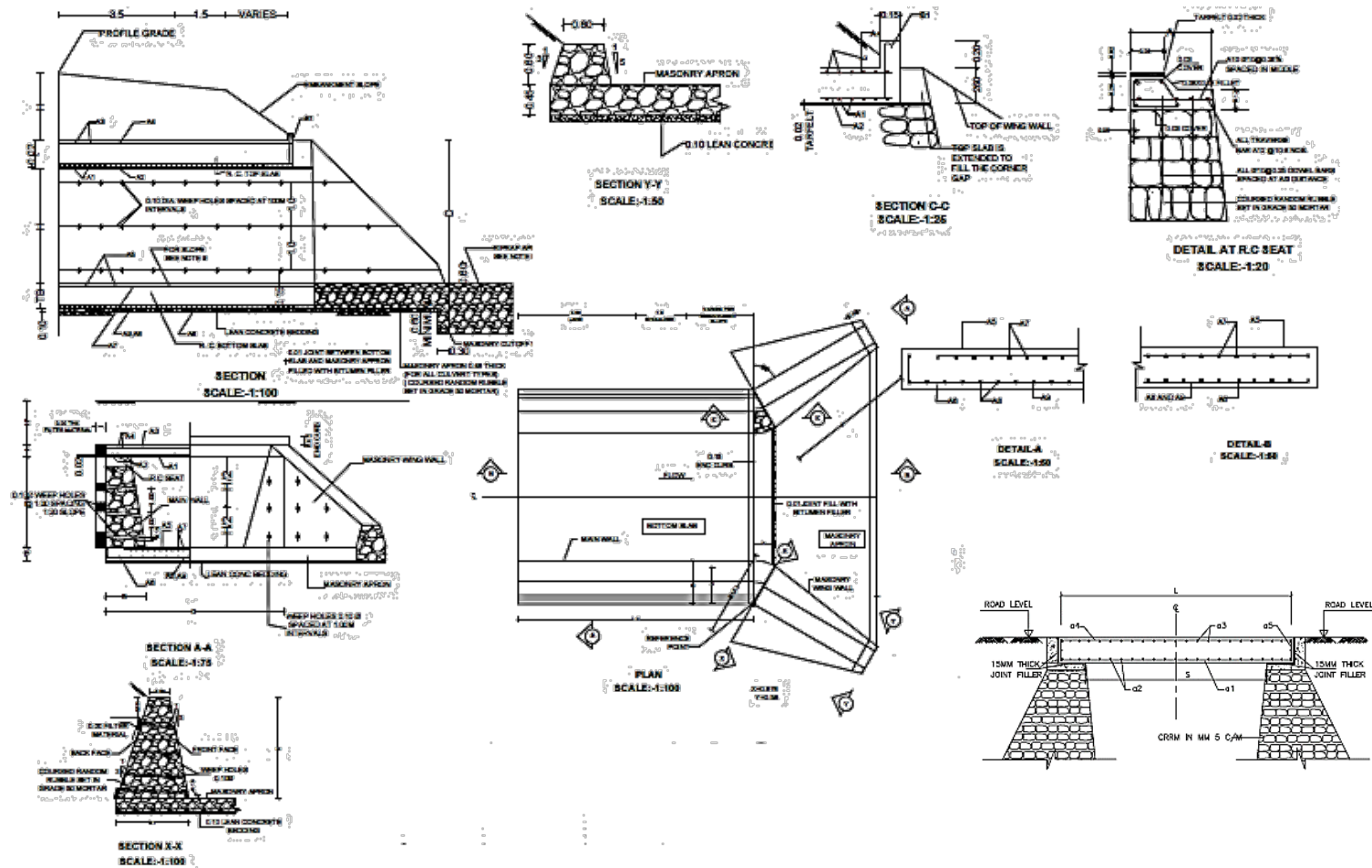
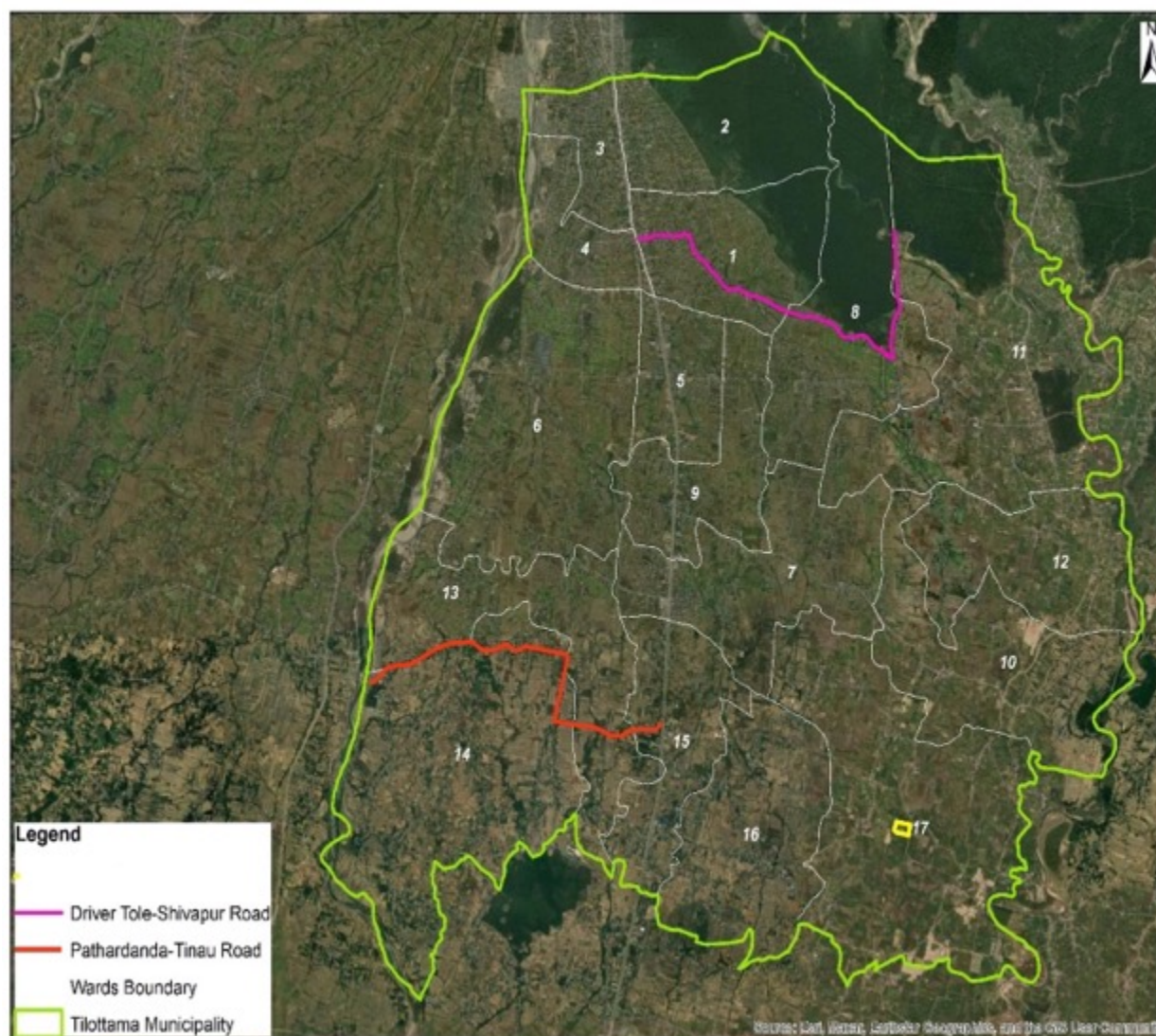


Figure 14: Typical Slab Culvert Plan and Sections in Tilottama

Source: Detailed Project Report, 2024

**Figure 15: Location of Subprojects in Tilottama Municipality**



*Source: Detailed Project Report, 2024*

## **B. Siddharthanagar Municipality Subprojects**

The proposed subprojects lie in the Siddharthanagar Municipality of Rupandehi District. The components are construction of road, drainage, footpath and road furniture in 27 road sections covering 23.7 km within the Municipality. Brief description of each section is as follows.

- 44. Simapath-Ranigaun-Sakuni\_road (0.827 km)** - The Simapath-Ranigaun-Sakuni\_Road Road is regarded as a significant transportation route starts from Sakuni path and ends at Simapath. The entire road section lies in ward no 1. The ROW of this road is 8m. The existing road is gravel Road up to CH 0+700 whereas from CH 0+700 to end, the road is black topped. There is not any existing drain up to Ch 0+700, however a new drain is being constructed at the end section of this road. The drainage flow direction is from Sakuni path to the end.

**Table 14:. Proposed Scheme Comparison of Simapath – Ranigaun - Sakuni Road**

No	Description	Existing Scenario	Proposed Scheme
1	Length of Road	0.827 km	0.827 km
2	Right of Way (ROW) Declared by municipality	8 m	8 m
3	Total Road Width	4 - 6 m at urban sections	8 m
4	Carriageway	Average 3.5 m	5 m
5	Pavement type	Graveled road with few blacktopped roads section	Intermediate lane upgradation with the 50 mm surface course of asphalt concrete, 150 mm of base course and 250 mm of sub base with proper grade and camber
6	Median/Landscape or Green land areas	No median provided and lack of green space	Median is not provided/ Greeneries and plantation shall be done in interval of 10 meters over sidewalks wherever space is available
7	Parking	Haphazard parking on carriageway area obstructing traffic movement	Due to space restriction, separate parking is not provided. However, parking space can be provided in public land available in the road vicinity.
8	Cycle track	Nil	Not provided due to space restriction.
9	Side Drain	58 m of the side drain is present. Mostly earthen drain is present.  During heavy rainfall, pluvial flooding in few road sections where road is gravelled and blacktopped is damaged  Water doesn't flow to drain due to no proper camber slope	PCC surface drain of width 0.25m (included in carriage way width) Storm water drain size of 0.8 X 0.8m 43 HHs directly benefited from the proposed drain
10	Cross drainage Structures	1 Pipe Culvert	2 Hume-pipe culverts
11	Protection works	Nil	Retaining wall below drain as per requirement.
12	Traffic signs/signage and road marking	Nil	Provided all along the road to ensure maximum safety to pedestrian and vehicular traffic.
13	Road furniture (streetlights, delineators etc.)	Nil	Street lights of height 7 m at 25 m interval (staggered/zig-zagged).
14	Utility	All wires and cable are hanging above ground and are in unmanaged condition	Shifting of electric poles and telephone poles with coordination with municipality.
15	<b>Importance of the road</b> (connecting important areas such market, airport, main highway, other facility, and so on),	This road connects Sakuni path with Simapath road and provides access to UCMS College of Dental Surgery.	

No	Description	Existing Scenario	Proposed Scheme
	Value this road will add to the town or the region		

Source: Detailed Project Report, 2024

**45. Sakunipath to Danda khola Road (0.725 km)** - The proposed road starts from Sakuni path and ends at Danda khola with minimal settlement and road is also proposed to link Danda Corridor Boating station. The ROW of this road is 8m. The existing road is a graveled without drain facilities. The majority of the proposed road area sides is cultivation area; this. The drainage flow direction is from Sakuni Path to end. The road passes through the government office (Jal Tatha Mausam Bigyan Karyala) on the left side of road. There are altogether 11 Junctions on this road.

**Table 15: Proposed Scheme Comparison of Sakunipath to Danda khola Road**

No	Description	Existing Scenario	Proposed Scheme
1	Length of Road	0.724 km	0.724 km
2	Right of Way (ROW) Declared by municipality	8 m	8 m
3	Total Road Width	5 - 6 m	8 m
4	Carriageway	Average 3.5 m	5 m
5	Pavement type	Mostly graveled roads sections are present	Intermediate lane upgradation with the 50 mm surface course of asphalt concrete, 150 mm of base course and 250 mm of sub base with proper grade and camber
6	Median/Landscape or Green land areas	No median provided and lack of green space	Median is not provided/ Greeneries and plantation shall be done in interval of 10 meters over sidewalks wherever space is available
7	Parking	Haphazard parking on carriageway area obstructing traffic movement	Due to space restriction, separate parking is not provided. However, parking space can be provided in public land available in the road vicinity.
8	Cycle track	Nil	Not provided due to space restriction. However, alternative typical road section drawings with cycle tracks have been proposed.
9	Side Drain	Mostly Earthen Drain is present. During heavy rainfall, Pluvial flooding in road sections	PCC surface drain of width 0.25m (included in carriage way width) Storm water drain size of 0.8 X 0.8m 15 HHs directly benefited from the proposed drain
10	Cross drainage Structures	Nil	
11	Protection works	Nil	Retaining wall below drain as per requirement.
12	Traffic signs/signage and road marking	Nil	Provided all along the road to ensure maximum safety to pedestrian and vehicular traffic.



No	Description	Existing Scenario	Proposed Scheme
13	Road furniture (streetlights, delineators etc.)	Nil	Street lights of height 7 m at 25 m interval (staggered/zig-zagged).
14	Utility	All wires and cable are hanging above ground and are in unmanaged condition.	Shifting of electric poles and telephone poles with coordination with municipality.
15	Information on the importance of the road (connecting important areas such market, airport, main highway, and more). Value this road will add to the town or the region	The road passes through government office (Office of Hydrology and Meteorology). The end section of this road is proposed for Danda Corridor boating station	

Source: Detailed Project Report, 2024

**46. Bimaanghat to North (0.885 km)** - The Road starts from Bimaanghat and ends at Lumbini road (Feeder Road). This road is located at ward No. 4. The ROW of this road is 18m. There is an existing canal crossing at the road section. The existing slab culvert over the canal is 6.2x12.1m. There is no existing drain. There is a settlement area, but the road is clear. The road serves as a lifeline for the local population, enabling them to access essential facilities such as healthcare, education and employment opportunities.

**Table 16: Proposed Scheme Comparison of Bimaanghat to North Road**

No	Description	Existing Scenario	Proposed Scheme
1	Length of Road	0.885 km	0.885 km
2	Right of Way (ROW) Declared by municipality	18 m	18 m
3	Total Road Width	12-16 m	Road width designed is 18 m including footpath
4	Carriageway	Average 12 m	14 m including median 1m and 2.5 m rigid pavement both sides
5	Pavement type	Blacktopped in almost all sections	Double lane upgradation with the 50 mm surface course of asphalt concrete, 50 mm DBM, 150 mm of base course and 250 mm of sub base with proper grade and camber
6	Median/Landscape or Green land areas	No median provided and lack of green space	Median width 1 m is provided/ Greeneries and plantation shall be done in interval of 10 meters over sidewalks wherever space is available
7	Parking	Haphazard parking on shoulder and carriageway area obstructing traffic movement	RCC pavement 2.5 m width in both sides provided for parking of heavy loaded vehicles in the entrance of the road up to 500 meters
8	Cycle track	Nil	At end section of about 400 meters after canal crossing is proposed for cycle track of width 2.5 meters both sides.

No	Description	Existing Scenario	Proposed Scheme
9	Side Drain	Nil  During heavy rainfall, pluvial flooding in road sections Water doesn't flow due to no proper camber slope	PCC surface drain of width 0.25m (included in carriage way width) Storm water drain size of 0.75 X 0.75 m 46 HHs directly benefited from the proposed drain
10	Cross drainage Structures	1- RCC Slab Culvert-Canal Crossing	RCC Slab Culvert-Canal Crossing renewal
11	Protection works	Nil	Retaining wall/slope protection measures as per requirement.
12	Traffic signs/signage and road marking	Present at some location	Provided all along the road to ensure maximum safety to pedestrian and vehicular traffic.
13	Road furniture (streetlights, delineators etc.)	Nil	Street lights of height 7 m at 25 m interval (staggered/zig-zagged).
14	Utility	All wires and cable are hanging above ground and are in unmanaged condition	Shifting of electric poles and telephone poles with coordination with municipality.
15	Information on the importance of the road (connecting important areas such market, airport, main highway, other facility, and more). Value this road will add to the town or the region	This road connects Bimaanghat and ends at Lumbini road (Feeder Road). This road passes through Survey Department office of Rupandehi and connects some of the leading industries producing polymers, plastic and food products.	

Source: Detailed Project Report, 2024

**47. Rahim Path 1(0.171 km)** - The Road starts in between from Amar path. The ROW of this road is 7m and lies in ward no 6. The Existing condition of road is poor having no drainage system. The road passes through the dense settlement area.

**Table 17: Proposed Scheme Comparison of Rahim Path-1 Road**

No	Description	Existing Scenario	Proposed Scheme
1	Length of Road	0.171 km	0.171 km
2	Right of Way (ROW) Declared by municipality	7 m	7 m
3	Total Road Width	4-5 m at urban sections	Road width designed is 7 m including drain
4	Carriageway	Average 3.5 m	4.5 m
5	Pavement type	Mostly graveled roads section	Pavement upgradation with the 50 mm surface course of asphalt concrete, 150 mm of base course and 210 mm of sub base with proper grade and camber

No	Description	Existing Scenario	Proposed Scheme
6	Median/Landscape or Green land areas	No median provided and lack of green space	Median is not provided/ Greeneries and plantation shall be done in interval of 10 meters over sidewalks wherever space is available
7	Parking	Haphazard parking on carriageway area obstructing traffic movement	Due to space restriction, separate parking is not provided. However, parking space can be provided in public land available in the road vicinity.
8	Cycle track	Nil	Not provided due to space restriction.
9	Side Drain	Nil  During heavy rainfall, pluvial flooding in starting of the road Water doesn't flow due to no proper camber slope.	PCC surface drain of width 0.25m (included in carriage way width) Storm water drain size of 0.55 X 0.45m 21 HHs directly benefited from the proposed drain
10	Cross drainage Structures	1 - Pipe Crossing at the starting chainage	Pipe crossing to be replaced
11	Protection works	Nil	Retaining wall/slope protection measures as per requirement.
12	Traffic signs/signage and road marking	Nil	Provided along the road to ensure maximum safety to pedestrian and vehicular traffic.
13	Road furniture (street lights, delineators etc.)	Only in some sections	Street lights of height 7 m at 25 m interval (staggered/zig-zagged).
14	Utility	All wires and cable are hanging above ground and are in unmanaged condition	Shifting of electric poles and telephone poles with coordination with municipality.
15	Information on the importance of the road (connecting important areas such market, airport, main highway, other facility, and more). Value this road will add to the town or the region.	This road passes through settlement area	

Source: Detailed Project Report, 2024

**48. Rahim Path2 (0.168 km)** - The Road starts in between from Amar path and lies in ward no 6. The ROW of this road is 7m. The Existing condition of road is poor. There is collector drain of 1.5m width at right side design by RUDP and small brick masonry drain at left side of the road.

**Table 18: Proposed Scheme Comparison of Rahim Path-2 Road**

No	Description	Existing Scenario	Proposed Scheme
1	Length of Road	0.168 km	0.168 km



No	Description	Existing Scenario	Proposed Scheme
2	Right of Way (ROW) Declared by municipality	7 m	7 m
3	Total Road Width	3 to 6 m at graveled sections	Road width designed is 6 m including drain at Left side (Road collector drain is present at right side of the road)
4	Carriageway	Average 3.5 m	4.5 m
5	Pavement type	Mostly graveled roads section	Pavement upgradation with the 50 mm surface course of asphalt concrete, 150 mm of base course and 210 mm of sub base with proper grade and camber
6	Median/Landscape or Green land areas	No median provided and lack of green space	Median is not provided/ Greeneries and plantation shall be done in interval of 10 meters over sidewalks wherever space is available
7	Parking	Haphazard parking on carriageway area obstructing traffic movement	Due to space restriction, separate parking is not provided. However, parking space can be provided in public land available in the road vicinity.
8	Cycle track	Nil	Not provided due to space restriction.
9	Side Drain	Collector Drain in the right-hand side of the road Brick drains in the left-hand side of the road No Pluvial flooding in road sections	PCC surface drain of width 0.25m (included in carriage way width) Storm water drain size of 0.55 X 0.45m 21 HHs directly benefited from the proposed drain.
10	Cross drainage Structures	Nil	
11	Protection works	Nil	Retaining wall/slope protection measures as per requirement.
12	Traffic signs/signage and road marking	Nil	Provided along the road to ensure maximum safety to pedestrian and vehicular traffic.
13	Road furniture (streetlights, delineators etc.)	Only in some sections	Street lights of height 7 m at 25 m interval (staggered/zig-zagged).
14	Utility	All wires and cable are hanging above ground and are in unmanaged condition	Shifting of electric poles and telephone poles with coordination with municipality.
15	Information on the importance of the road (connecting important areas such market, airport, main highway, other facility, and more). Value this road will add to the town or the region.	This road passes through settlement area	

Source: Detailed Project Report, 2024

- 49. Bhimkaali Path (0.516 km)** - The Road starts from Bhimkaali Path adjoining Siddhartha Highway and passes through the dense settlement area. The existing condition of the road is poor, although there is drain at right side. The ROW of this road is 8.5 and 9 m. The drainage water flows from start to end and the road. The scarifying of premix carpet is required. The existing road width varies from 7 - 8.5m.

**Table 19: Proposed Scheme Comparison of Bhimkaali Path Road**

No	Description	Existing Scenario	Proposed Scheme
1	Length of Road	0.516 km	0.516 km
2	Right of Way (ROW) Declared by municipality	8.5 m & 9 m	8.5 m & 9 m
3	Total Road Width	7-8.5 m	8.5 m & 9 m
4	Carriageway	Average 4 m	5.5 m
5	Pavement type	Blacktopped with few graveled roads section	Intermediate lane upgradation with the 50 mm surface course of asphalt concrete, 50 mm DBM, 150 mm of base course and 250 mm of sub base with proper grade and camber
6	Median/Landscape or Green land areas	No median provided and lack of green space	Median is not provided/ Greeneries and plantation shall be done in interval of 10 meters over sidewalks wherever space is available
7	Parking	Haphazard parking on shoulder and carriageway area obstructing traffic movement	Due to space restriction, separate parking is not provided. However, parking space can be provided in public land available in the road vicinity.
8	Cycle track	Nil	Not provided due to space restriction.
9	Side Drain	Covered drain in most sections at the right side and Drain in few sections in left side. No Pluvial flooding in road sections	PCC surface drain of width 0.25m (included in carriage way width) Storm water drain size of 0.75 X 0.75 m 37 HHs directly benefited from the proposed drain
10	Cross drainage Structures	3- Slab culverts, 1- Pipe crossing	Nil
11	Protection works	Nil	Retaining wall below drain as per requirement.
12	Traffic signs/signage and road marking	Present at some location	Provided all along the road to ensure maximum safety to pedestrian and vehicular traffic.
13	Road furniture (streetlights, delineators etc.)	Present in some sections	Street lights of height 7 m at 25 m interval (staggered/zig-zagged).
14	Utility	All wires and cable are hanging above ground and are in unmanaged condition	Shifting of electric poles and telephone poles with coordination with municipality.
15	Information on the importance of the road (connecting important areas such market, airport, main	This road is the access road to salt trading corporation's storage area and other factories and connects local settlements to Siddhartha Highway. This road is near to Buddha Jyoti Secondary School and passes through some institutes and offices.	

No	Description	Existing Scenario	Proposed Scheme
	highway, other facility, and more). Value this road will add to the town or the region.		

Source: Detailed Project Report, 2024

**50. East of Gallamandi to Durga Colony (New Colony Road) (0.566 km)** - This road is a short but important transportation route connecting the east of Gallamandi to the Durga colony road. The road lies within ward 13 boundary having densely populated area. The ROW of this road is 7m. In this section there are two roads parallel at IUDP canal line and one road is dead end. The Existing condition of road is poor, and it is earthen road. There is no existing drainage system. There is heavy Settlement area.

**Table 20: Proposed Scheme Comparison of East of Gallamandi to Durga Colony Road**

No	Description	Existing Scenario	Proposed Scheme
1	Length of Road	0.566 km	0.566 km
2	Right of Way (ROW) Declared by municipality	7 m	7 m
3	Total Road Width	4-6 m	7 m
4	Carriageway	Average 3.5 m	4.5 m
5	Pavement type	Earthen Road	Road upgradation with the 50 mm surface course of asphalt concrete, 150 mm of base course and 210 mm of sub base with proper grade and camber
6	Median/Landscape or Green land areas	No median provided and lack of green space	Median is not provided/ Greeneries and plantation shall be done in interval of 10 meters over sidewalks wherever space is available
7	Parking	Haphazard parking on carriageway area obstructing traffic movement	Due to space restriction, separate parking is not provided. However, parking space can be provided in public land available in the road vicinity.
8	Cycle track	Nil	Not provided due to space restriction.
9	Side Drain	Side drain at some few sections During heavy rainfall, Pluvial flooding in graveled road sections and damaged blacktopped Water doesn't flow to drain due to no proper camber slope	PCC surface drain of width 0.25m (included in carriage way width) Storm water drain size of 0.55 X 0.8m 31 HHs directly benefited from the proposed drain
10	Cross drainage Structures	2-RCC Slab crossing at starting chainage	Nil
11	Protection works	Nil	Retaining wall below drain as per requirement.
12	Traffic signs/signage and road marking	Nil	Provided all along the road to ensure maximum safety to pedestrian and vehicular traffic.
13	Road furniture (streetlights, delineators etc.)	Only in some sections	Street lights of height 7 m at 25 m interval (staggered/zig-zagged).

No	Description	Existing Scenario	Proposed Scheme
14	Utility	All wires and cable are hanging above ground and are in unmanaged condition	Shifting of electric poles and telephone poles with coordination with municipality.
15	Information on the importance of the road (connecting important areas such market, airport, main highway, other facility, and more). Value this road will add to the town or the region.	This road section passes through Bishwakarma Kasta Udhoyog and passes through a school and settlement areas.	

Source: Detailed Project Report, 2024

**51. Udhog puri road (Buddha Colony) (0.724 Km):** Udhog Puri Road is a prominent thoroughfare in Siddharthanagar, known for its commercial activities and the presence of various industries and businesses. The road is lined with shops, offices, and factories, contributing to the economic development of the area. The existing road is graveled without drainage system. Junction improvement is required in this road section.

**Table 21: Proposed Scheme Comparison of Udhogpuri Road**

No	Description	Existing Scenario	Proposed Scheme
1	Length of Road	0.724 km	0.724 km
2	Right of Way (ROW) Declared by municipality	9 m	9 m
3	Total Road Width	4-9 m	9 m
4	Carriageway	Average 4.5 m	5.5 m
5	Pavement type	Graveled roads section	Intermediate lane upgradation with the 50 mm surface course of asphalt concrete, 150 mm of base course and 250 mm of sub base with proper grade and camber
6	Median/Landscape or Green land areas	No median provided and lack of green space	Median is not provided/ Greeneries and plantation shall be done in interval of 10 meters over sidewalks wherever space is available
7	Parking	Haphazard parking on carriageway area obstructing traffic movement	Due to space restriction, separate parking is not provided. However, parking space can be provided in public land available in the road vicinity.
8	Cycle track	Nil	Not provided due to space restriction.
9	Side Drain	Side drain along the left side of the road at few sections	PCC surface drain of width 0.25m (included in carriage way width) Storm water drain size of 0.55 X 0.55m 32 HHs directly benefited from the proposed drain
10	Cross drainage Structures	No pipe culverts, 1 Nos of slab culvert	1 Slab to be dismantled and reconstructed

No	Description	Existing Scenario	Proposed Scheme
11	Protection works	Retaining walls at some locations	Retaining wall below drain as per requirement.
12	Traffic signs/signage and road marking	Present at some location	Provided all along the road to ensure maximum safety to pedestrian and vehicular traffic.
13	Road furniture (streetlights, delineators etc.)	Only in some sections	Street lights of height 7 m at 25 m interval (staggered/zig-zagged).
14	Utility	All wires and cable are hanging above ground and are in unmanaged condition	Shifting of electric poles and telephone poles with coordination with municipality.
15	Information on the importance of the road (connecting important areas such market, airport, main highway, other facility, and more). Value this road will add to the town or the region.	Udhyogpuri road is a prominent thoroughfare in Siddharthanagar, known for its commercial activities and the presence of various industries and businesses. The road is lined with RK Agro Industries.	

Source: Detailed Project Report, 2024

**52. Radhakrishna, Annapurna path all linked roads (1.397 KM)** - Radhakrishna and Annapurna Path are connected roads located in Siddharthanagar Municipality ward no. 1. They form part of a network of roads in the area, linking various neighborhoods and establishments. The combined length of the linked roads is 1 km. The road starts from Siddhartha Highway near by Nepal-India boarder (boarder 300m distance) and ends at RUDP road. The ROW of this road is 7m. The existing road is an earthen road. There is newly constructed 130m length and 3.6m width of RCC road. There is no proper drainage system.

**Table 22: Proposed Scheme Comparison of Radhakrishna, Annapurna Path All Linked Roads**

No	Description	Existing Scenario	Proposed Scheme
1	Length of Road	1.397 km	1.397 km
2	Right of Way (ROW) Declared by municipality	7 m	7 m
3	Total Road Width	3 to 7 m at urban sections	7 m
4	Carriageway	Average 4 m	4.5 m
5	Pavement type	Graveled roads and some Newly Constructed RCC road section of 130m	Road upgradation with 50 mm surface course of asphalt concrete, 150 mm of base course and 210 mm of sub base with proper grade and camber
6	Median/Landscape or Green land areas	No median provided and lack of green space	Median is not provided/ Greeneries and plantation shall be done in interval of 10 meters over sidewalks wherever space is available

No	Description	Existing Scenario	Proposed Scheme
7	Parking	Haphazard parking on carriageway area obstructing traffic movement	Due to space restriction, separate parking is not provided. However, parking space can be provided in public land available in the road vicinity.
8	Cycle track	Nil	Not provided due to space restriction.
9	Side Drain	There are few side drains on the both side of road, however, the area is low land and slope of drain is not maintained, so water logging problem exists in the zone	PCC surface drain of width 0.25m (included in carriage way width) Storm water drain size of 0.55 X 0.55m 25 HHs directly benefited from the proposed drain
10	Cross drainage Structures	2 No of pipe culverts	2 Hume-pipe culverts
		1 Drain Crossing	Pipe culverts to be dismantled and reconstructed
11	Protection works	Retaining walls at some locations	Retaining wall/slope protection measures as per requirement.
12	Traffic signs/signage and road marking	Nil	Provided all along the road to ensure maximum safety to pedestrian and vehicular traffic.
13	Road furniture (streetlights, delineators etc.)	Nil	Street lights of height 7 m at 25 m interval (staggered/zig-zagged).
14	Utility	All wires and cable are hanging above ground and are in unmanaged condition.	Shifting of electric poles and telephone poles with coordination with municipality.
15	Information on the importance of the road (connecting important areas such market, airport, main highway, other facility, and more). Value this road will add to the town or the region.	“Radhakrishna, Annapurna Path all linked roads” starts from Siddharthanagar highway nearby India Nepal border and forms part of a network of roads in the area, linking various neighborhoods and establishments for transporting goods. This road is also the access to Ward 1 office building.	

Source: Detailed Project Report, 2024

**53. Benipur East South Boarder Road (1.024km)** - Benipur East South Boarder Road is 1.024 kilometers in length and serves as an important route in the area. The road lies in ward 1 of Siddharthanagar municipality and half of the road section pass through Rohini Rural Municipality. The road starts from Benipur and ends at Nepal India Border. The ROW of this road is 8m. The road passes through cultivation area. The existing condition of road is poor, and it is earthen road. There is no drainage system. There is very low settlement area.

**Table 23: Proposed Scheme Comparison of Benipur East South Border Road**

No	Description	Existing Scenario	Proposed Scheme
1	Length of Road	1.024 km	1.024 km
2	Right of Way (ROW) Declared by municipality	8 m	8 m

No	Description	Existing Scenario	Proposed Scheme
3	Total Road Width	3-6 m	8 m (CW + Shoulder)
4	Carriageway	Average 4.5 m	5 m
5	Pavement type	New earthen roads section	Intermediate lane upgradation with the 50 mm surface course of asphalt concrete, 150 mm of base course and 210 mm of sub base with proper grade and camber
6	Median/Landscape or Green land areas	No median provided and lack of green space	Median is not provided/ Greeneries and plantation shall be done outside shoulder wherever space is available
7	Parking	Haphazard parking on shoulder and carriageway area obstructing traffic movement	Due to space restriction, separate parking is not provided. However, parking space can be provided in public land available in the road vicinity.
8	Cycle track	Nil	Not provided due to space restriction. However, alternative typical road section drawings with cycle tracks have been proposed.
9	Side Drain	Earthen Drain	No drain provided. Embankment slopes is provided in whole section. 4 HHs directly benefited from the proposed drain.
10	Cross drainage Structures	Nil	2 Pipe Culverts
11	Protection works	Nil	Retaining wall/slope protection measures as per requirement.
12	Traffic signs/signage and road marking	Nil	Provided all along the road to ensure maximum safety to pedestrian and vehicular traffic.
13	Road furniture (streetlights, delineators etc.)	Only in some sections	Street lights of height 7 m at 25 m interval (staggered/zig-zagged).
14	Utility	All wires and cable are hanging above ground and are in unmanaged condition	Shifting of electric poles and telephone poles with coordination with municipality.
15	Information on the importance of the road (connecting important areas such market, airport, main highway, other facility, and more). Value this road will add to the town or the region.	Connection of Benipur and local settlements to Nepal-India border, near to Sonauli border in India	

Source: Detailed Project Report, 2024

**54. Ward no 2- Ward no 4-connecting road (1.264 km)** - The Road starts from Meodihawa and ends at airport corridor road. The road lies in ward 2. The ROW of this road is 12m.



This road proposed for airport corridor link up road. The road is completely Gravel Road. From chainage 0+000 to 0+175, there is brick masonry drain of sized 1.5x0.75m at both sides. The Existing Road width is 9.7m. The road passes through cultivation area with minimal settlement.

**Table 24: Proposed Scheme Comparison of Ward number 2 and Ward number 4-connecting Road**

No	Description	Existing Scenario	Proposed Scheme
1	Length of Road	1.264 km	1.264 km
2	Right of Way (ROW) Declared by municipality	12 m	12 m
3	Total Road Width	7-10 m	11.5 m
4	Carriageway	Average 5.5 m	7 m
5	Pavement type	Completely graveled roads section	Double lane upgradation with the 50 mm surface course of asphalt concrete, 150 mm of base course and 250 mm of sub base with proper grade and camber
6	Median/Landscape or Green land areas	No median provided and lack of green space	Median is not provided/ Greeneries and plantation shall be done in interval of 10 meters over sidewalks wherever space is available
7	Parking	Haphazard parking on shoulder and carriageway area obstructing traffic movement	Due to space restriction, separate parking is not provided. However, parking space can be provided in public land available in the road vicinity.
8	Cycle track	Nil	Not provided due to space restriction. However, alternative typical road section drawings with cycle tracks have been proposed.
9	Side Drain	From chainage 0+000 to 0+175, there is brick masonry drain of sized 1.5x0.75m at both sides Earthen drain on the both side of roads	PCC surface drain of width 0.25m (included in carriageway width). Storm water drain size of 0.55 X 0.55m 19 HHs directly benefited from the proposed drain
10	Cross drainage Structures	2 Nos Pipe Culverts, 2 Slab Culverts	Rehabilitation of existing pipe culverts and slabs in order to make double lane. 3 Slab culverts 1 Pipe culvert
11	Protection works	Retaining Walls are at some location	Retaining wall/slope protection measures as per requirement.
12	Traffic signs/signage and road marking	Present at some location	Provided all along the road to ensure maximum safety to pedestrian and vehicular traffic.
13	Road furniture (streetlights, delineators etc.)	Only in some sections	Street lights of height 7 m at 25 m interval (staggered/zig-zagged).
14	Utility	All wires and cable are hanging above ground and are in unmanaged condition	Shifting of electric poles and telephone poles with coordination with municipality.
15	Information on the importance of the	This road is the link road to the airport corridor road and connects two wards.	



No	Description	Existing Scenario	Proposed Scheme
	road (connecting important areas such as market, airport, main highway, other facility, and more). Value this road will add to the town or the region.		

Source: Detailed Project Report, 2024

**55. Darkhasuwa West Siddhartha Yatayat (2.116 km)** - The road starts from Siddharth highway and ends at Laxmi path. The road lies in ward 3. The ROW of this road is 7m and 8m as per provided plan. There are four parallel road sections proposed in this road stretch.

**Table 25: Proposed Scheme Comparison of Darkhasuwa West Siddhartha Yatayat Road**

No	Description	Existing Scenario	Proposed Scheme
1	Length of Road	2.116 km	2.116 km
2	Right of Way (ROW) Declared by municipality	7m and 8m as per provided plan	7 m & 8 m
3	Total Road Width	6-8 m at urban sections	8 m
4	Carriageway	Average 3.5 m	5.5 m & 6 m
5	Pavement type	Graveled roads section	Intermediate lane upgradation with the 50 mm surface course of asphalt concrete, 150 mm of base course and 210 mm of sub base with proper grade and camber
6	Median/Landscape or Green land areas	No median provided and lack of green space	Median is not provided/ Greeneries and plantation shall be done in interval of 10 meters wherever space is available
7	Parking	Haphazard parking on shoulder and carriageway area obstructing traffic movement	Due to space restriction, separate parking is not provided. However, parking space can be provided in public land available in the road vicinity.
8	Cycle track	Nil	Not provided due to space restriction.
9	Side Drain	There are mainly brick masonry side Drain on the both side of road and there is few Earthen drain on the few sections of road The existing drain slope is not sufficient for water flow so no there is no proper flow of water in dry season. There is no pluvial flooding in this area	PCC surface drain of width 0.25m (included in carriage way width) Storm water drain size of 0.55 X 0.55m 73 HHs directly benefited from the proposed drain
10	Cross drainage Structures	5 Nos Pipe Culverts; 1 Slab Culverts and 3 Canal Crossing	Pipe and slab culverts to be dismantled and reconstructed Rehabilitation of existing side pipe crossings and slabs

No	Description	Existing Scenario	Proposed Scheme
			5 Slab Culverts proposed
11	Protection works	Retaining Walls are at some location	Retaining wall/slope protection measures as per requirement.
12	Traffic signs/signage and road marking	Present at some location	Provided all along the road to ensure maximum safety to pedestrian and vehicular traffic.
13	Road furniture (streetlights, delineators etc.)	Only in some sections	Street lights of height 7 m at 25 m interval (staggered/zig-zagged).
14	Utility	All wires and cable are hanging above ground and are in unmanaged condition	Shifting of electric poles and telephone poles with coordination with municipality.
15	Information on the importance of the road (connecting important areas such market, airport, main highway, other facility, and more). Value this road will add to the town or the region.	Connects various local settlements with Siddhartha highway increasing the road connectivity.	

Source: Detailed Project Report, 2024

**56. Siddhartha Colony/Manmohan Path (1.659km)** - The colony road passes through different parallel roads in this section like Manmohan Path, Pragati Path, Shiva Path, Siddhartha Path and Mayadevi Path. The road lies in ward 3. The ROW of this road is 7m. The Existing condition of road is poor and it is earthen road. There is no existing drainage system. There is Average Settlement area. Shifting of one Transformer is required. Dismantling of six building boundary walls is required. One Buddha statue junction improvement is required in Siddhartha colony.

**Table 26: Proposed Scheme Comparison of Siddhartha Colony/Manmohan Path Road**

No	Description	Existing Scenario	Proposed Scheme
1	Length of Road	1.659 km	1.659 km
2	Right of Way (ROW) Declared by municipality	7m	7 m
3	Total Road Width	3-7 m	7 m
4	Carriageway	Average 4.5 m	4.5 m
5	Pavement type	Graveled roads section	Road upgradation with the 50 mm surface course of asphalt concrete, 150 mm of base course and 210 mm of sub base with proper grade and camber
6	Median/Landscape or Green land areas	No median provided and lack of green space	Median is not provided/ Greeneries and plantation shall be done in interval of 10 meters wherever space is available

No	Description	Existing Scenario	Proposed Scheme
7	Parking	Haphazard parking on carriageway area obstructing traffic movement	Due to space restriction, separate parking is not provided. However, parking space can be provided in public land available in the road vicinity.
8	Cycle track	Nil	Not provided due to space restriction.
9	Side Drain	There are mainly brick masonry side drain on the road and there is few earthen drain Water doesn't flow to drain due to no proper camber slope at some sections	PCC surface drain of width 0.25m (included in carriage way width) Storm water drain size of 0.55 X 0.55m & 0.55m X 0.8m in one road section 14A Camber slope 2.5 % for quick disposal of water from road surface
10	Cross drainage Structures	4 Nos Pipe Culverts 2 Slab Culverts	Pipe and slab culverts to be dismantled and reconstructed Rehabilitation of existing side pipe crossings and slabs
11	Protection works	Nil	Retaining wall below drain as per requirement.
12	Traffic signs/signage and road marking	Present at some location	Provided all along the road to ensure maximum safety to pedestrian and vehicular traffic.
13	Road furniture (streetlights, delineators etc.)	Only in some sections	Street lights of height 7 m at 25 m interval (staggered/zig-zagged).
14	Utility	All wires and cable are hanging above ground and are in unmanaged condition	Shifting of electric poles and telephone poles with coordination with municipality.
15	Information on the importance of the road (connecting important areas such market, airport, main highway, other facility, and more). Value this road will add to the town or the region.	Interlinkages of various settlements of Manmohan Path, Pragati Path, Shiva Path, Siddhartha Path and Mayadevi Path	

Source: Detailed Project Report, 2024

**57. Sugarmill Link Road (3.482 km)-** The Row of the road is 10.5 meters with the middle horizontal section having the same width as the remaining portions. This road is at ward 4. The drainage water outflow needs to be planned at each junction point along the Bimanghat to North Road. The current road width is 8 - 10 meters. The ROW of this road is 10.5 m. Due to being situated in a low-lying area, there is an existing issue with drainage on the road. The road's condition is poor. There is no drainage system in place, and there are areas where settlement occurs on average.

**Table 27: Proposed Scheme Comparison of Sugar Mill Link Roads**

No	Description	Existing Scenario	Proposed Scheme
1	Length of Road	3.482 km	3.482 km
2	Right of Way (ROW) Declared by municipality	10.5 m	10.5 m

No	Description	Existing Scenario	Proposed Scheme
3	Total Road Width	8 - 10 m	10.5 m
4	Carriageway	5 to 7 m	7 m
5	Pavement type	Earthen and graveled road	Double lane upgradation with the 50 mm surface course of asphalt concrete, 150 mm of base course and 250 mm of sub base with proper grade and camber
6	Median/Landscape or Green land areas	No median provided and lack of green space	Median is not provided/ Greeneries and plantation shall be done in interval of 10 meters over sidewalks wherever space is available
7	Parking	Haphazard parking on shoulder and carriageway area obstructing traffic movement	Due to space restriction, separate parking is not provided. However, parking space can be provided in public land available in the road vicinity.
8	Cycle track	Nil	Not provided due to space restriction. However, alternative typical road section drawings with cycle tracks have been proposed.
9	Side Drain	200 m side drain is present During heavy rainfall, Pluvial flooding in road sections Water doesn't flow to drain due to no proper camber slope at some sections	PCC surface drain of width 0.25m (included in carriageway width) Storm water drain size of 0.75 X 0.75 m. 140 HHs directly benefited from the proposed drain.
10	Cross drainage Structures	Nil	Nil
11	Protection works	Nil	Retaining wall/slope protection measures as per requirement.
12	Traffic signs/signage and road marking	Present at some location	Provided all along the road to ensure maximum safety to pedestrian and vehicular traffic.
13	Road furniture (streetlights, delineators etc.)	Only in some sections	Street lights of height 7 m at 25 m interval (staggered/zig-zagged).
14	Utility	All wires and cable are hanging above ground and are in unmanaged condition	Shifting of electric poles and telephone poles with coordination with municipality.
15	Information on the importance of the road (connecting important areas such market, airport, main highway, other facility, and more). Value this road will add to the town or the region.	The road interlinks the various settlements to the Bimaanghat road and links to the Lumbini Taulihawa Feeder Road.	

Source: Detailed Project Report, 2024

**58. Maya Devi Colony (0.882 km)** - The Road lies in ward 4 with 7m and extends from Lumbini Road to Mayadevi Colony. The existing earthen road width is slightly wider at 7.1 meters without drain facilities. There are no existing drains along the road. The ROW of this road is 7m. Additionally, electric poles need to be shifted on both sides of the road at a distance of 30 meters. Furthermore, the relocation of one transformer is necessary. It is important to note that the area where these activities will take place is commercially developed.

**Table 28: Proposed Scheme Comparison of Mayadevi Colony Road**

No	Description	Existing Scenario	Proposed Scheme
1	Length of Road	0.882 km	0.882 km
2	Right of Way (ROW) Declared by municipality	7m	7 m
3	Total Road Width	5 – 7 m	7 m
4	Carriageway	Average 3.5 m	4.5 m
5	Pavement type	Earthen Road	Road upgradation with 50 mm surface course of asphalt concrete, 150 mm of base course and 210 mm of sub base with proper grade and camber
6	Median/Landscape or Green land areas	No median provided and lack of green space	Median is not provided/ Greeneries and plantation shall be done in interval of 10 meters wherever space is available
7	Parking	Haphazard parking on shoulder and carriageway area obstructing traffic movement	Due to space restriction, separate parking is not provided. However, parking space can be provided in public land available in the road vicinity.
8	Cycle track	Nil	Not provided due to space restriction.
9	Side Drain	80 m of side drain is present	PCC surface drain of width 0.25m (included in carriage way width) Storm water drain size of 0.55m X0.8 in Road section 16A and in other remaining road sections drain size is 0.55m X 0.55m 49 HHs directly benefited from the proposed drain
10	Cross drainage Structures	Nil	1 Pipe culvert
11	Protection works	Nil	Retaining wall/slope protection measures as per requirement.
12	Traffic signs/signage and road marking	Nil	Provided all along the road to ensure maximum safety to pedestrian and vehicular traffic.
13	Road furniture (streetlights, delineators etc.)	Only in some sections	Street lights of height 7 m at 25 m interval (staggered/zig-zagged).
14	Utility	All wires and cable are hanging above ground and are in unmanaged condition	Shifting of electric poles and telephone poles with coordination with municipality.
15	Information on the importance of the road (connecting	This road interlinks various roads within Mayadevi Colony to Lumbini Taulihawa Feeder Road	

No	Description	Existing Scenario	Proposed Scheme
	important areas such as market, airport, main highway, other facility, and more). Value this road will add to the town or the region.		

Source: Detailed Project Report, 2024

**59. Durga Colony all linked road to Nirwana Hotel (1.074 km)** - The road begins at RUDP Road and ends at Durga Mandir. The Road lies in ward 13. The Row of the road is 7 meters. Currently, the road is in poor condition and the existing road is earthen. There are few drain sections present along the road. There are three parallel roads in the vicinity. The settlement area in this region is moderate, indicating a moderate level of development and population density.

**Table 29: Proposed Scheme Comparison of Durga Colony all linked road to Nirwana Hotel**

No	Description	Existing Scenario	Proposed Scheme
1	Length of Road	1.074 km	1.074 km
2	Right of Way (ROW) Declared by municipality	7 m	7 m
3	Total Road Width	5 - 7 m	7 m
4	Carriageway	Average 3 m	4.25 m due to requirement of bigger drain size and RoW and 4.5m
5	Pavement type	Graveled road section	Road upgradation with the 50 mm surface course of asphalt concrete, 150 mm of base course and 210 mm of sub base with proper grade and camber
6	Median/Landscape or Green land areas	No median provided and lack of green space	Median is not provided/ Greeneries and plantation shall be done in interval of 10 meters wherever space is available
7	Parking	Haphazard parking on shoulder and carriageway area obstructing traffic movement	Due to space restriction, separate parking is not provided. However, parking space can be provided in public land available in the road vicinity.
8	Cycle track	Nil	Not provided due to space restriction.
9	Side Drain	About 200 m of earthen drain, and 300 m of side drain is present Covered collector drain is present in the end along the Nirvana hotel boundary During rainfall, there is pluvial flooding and water doesn't flow to drain due to no proper camber slope	PCC surface drain of width 0.25m (included in carriageway width). Storm water drain size of – 0.75 X 1.1m in Road Section 17C, in Road Section 17A- 0.6 X 0.6m and in Road Section 17B -0.55 X 0.55m 67 HHs directly benefited from the proposed drain

No	Description	Existing Scenario	Proposed Scheme
10	Cross drainage Structures	6 Nos of pipe culverts, 7 Nos of slab	Pipe culverts and slab to be dismantled and reconstructed Rehabilitation of existing and slabs. 1 Slab culvert
11	Protection works	Nil	Retaining wall/slope protection measures as per requirement.
12	Traffic signs/signage and road marking	Nil	Provided all along the road to ensure maximum safety to pedestrian and vehicular traffic.
13	Road furniture (streetlights, delineators etc.)	Only in some sections	Street lights of height 7 m at 25 m interval (staggered/zig-zagged).
14	Utility	All wires and cable are hanging above ground and are in unmanaged condition	Shifting of electric poles and telephone poles with coordination with municipality.
15	Information on the importance of the road (connecting important areas such market, airport, main highway, other facility, and more). Value this road will add to the town or the region.	Interlinks roads within Durga Colony to RUDP roads. This road also links to east of Gallamandi.	

Source: Detailed Project Report, 2024

**60. Kishorpur to Airport Road (0.430km)** - The road begins at RUDP road at Alpha and Omega Chowk and ends at Airport Corridor Road. The Road lies in ward 2 and 6. The road has a right of way (ROW) of 9 meters. Currently, it is an earthen road and is in poor condition. There is an existing drain on the left side of the road at the beginning of the road. The existing road width is 8 - 10 meters, providing a relatively wider path. Additionally, there is extensive cultivation throughout the chainage of the road, indicating a high agricultural presence in the area.

**Table 30: Proposed Scheme Comparison of Kishorpur to Airport Road**

No	Description	Existing Scenario	Proposed Scheme
1	Length of Road	0.430km	0.430 km
2	Right of Way (ROW) Declared by municipality	9m	9 m
3	Total Road Width	8 – 10 m	9 m
4	Carriageway	4 to 5	5.5 m
5	Pavement type	Earthen Road	Road upgradation with the 50 mm surface course of asphalt concrete, 150 mm of base course and 210 mm of sub base with proper grade and camber



No	Description	Existing Scenario	Proposed Scheme
6	Median/Landscape or Green land areas	No median provided and lack of green space	Median is not provided/ Greeneries and plantation shall be done in interval of 10 meters over sidewalks wherever space is available
7	Parking	Haphazard parking on shoulder and carriageway area obstructing traffic movement	Due to space restriction, separate parking is not provided. However, parking space can be provided in public land available in the road vicinity.
8	Cycle track	Nil	Not provided due to space restriction. However, alternative typical road section drawings with cycle tracks have been proposed.
9	Side Drain	Few sections have Covered drain and earthen drain.  During rainfall, there is pluvial flooding and water doesn't flow to drain due to no proper camber slope	PCC surface drain of width 0.25m (included in carriage way width) Storm water drain size of 0.75 X 0.9m. 28 HHs directly benefited from the proposed drain
10	Cross drainage Structures	1 Nos of slab culverts	Dismantle of slab culvert is not required. 1 Slab Culvert proposed
11	Protection works	Retaining walls at some locations	Retaining wall/slope protection measures as per requirement.
12	Traffic signs/signage and road marking	Present at some location	Provided all along the road to ensure maximum safety to pedestrian and vehicular traffic.
13	Road furniture (streetlights, delineators etc.)	Only in some sections	Street lights of height 7 m at 25 m interval (staggered/zig-zagged).
14	Utility	All wires and cable are hanging above ground and are in unmanaged condition	Shifting of electric poles and telephone poles with coordination with municipality.
15	Information on the importance of the road (connecting important areas such market, airport, main highway, other facility, and more). Value this road will add to the town or the region.	The road interlinks RUDP road with Airport Link Road.	

Source: Detailed Project Report, 2024

**61. Trisuli –Path, Deurali-path, Saptarishi- path (0.634 km):** This road comprises of three different urban roads: **1 Trisuli path (0.263 km):** The road starts from the Siddharthanagar Ward office 7 and ends to JanakPath-12. The Road lies in ward 13. The Row of road is 6m. The existing road is an earthen type road and the settlement is good. There is no existing drain on the road. **Deurali – Path (0.223 km)** The road starts



from JanakPath-12 and end at Durga Mandir, Dandagau. The Road lies in ward 13. The Row of road is 7m. The Existing Road is a blacktopped road with drain on both side of road. Drain cover should be provided also; it needs scarifying. The condition of the drain is good. The settlement area is very high. **Saptarishi – path (0.119 km)** The road starts from Himali path and end at Gargi path. The Row of road is 6m. The existing road is Black topped road. The Road lies in ward 7. There is an existing drain on right side of road without cover slab. The settlement area is very high.

**Table 31: Proposed Scheme Comparison of Trisuli Path, Deurali Path, Saptarishi Path**

No	Description	Existing Scenario	Proposed Scheme
<b>19A.</b>	<b>Trisuli –Path</b>		
1	Length of Road	0.263km	0.263km
2	Right of Way (RoW) Declared by municipality	6m	6m
3	Total Road Width	4 – 5 m	6 m
4	Carriageway	3 m	4 m
5	Pavement type	Earthen Road	Road upgradation with the 50 mm surface course of asphalt concrete, 150 mm of base course and 210 mm of sub base with proper grade and camber
6	Median/Landscape or Green land areas	No median provided and lack of green space	Median is not provided/ Greeneries and plantation shall be done in interval of 10 meters wherever space is available
7	Parking	Haphazard parking on carriageway area obstructing traffic movement	Due to space restriction, separate parking is not provided. However, parking space can be provided in public land available in the road vicinity.
8	Cycle track	Nil	Not provided due to space restriction.
9	Side Drain	No Existing drain in Trishuli path	PCC surface drain of width 0.25m (included in carriage way width). Storm water drain size of 0.3 X 0.45m 50 HHs directly benefited from the proposed drain
10	Cross drainage Structures	2 numbers of RCC Slabs	Rehabilitate the RCC slabs
11	Protection works	Nil	Retaining wall as per requirement
12	Traffic signs/signage and road marking	Present at some location	Provided all along the road to ensure maximum safety to pedestrian and vehicular traffic.
13	Road furniture (streetlights, delineators etc.)	Only in some sections	Street lights of height 7 m at 25 m interval (staggered/zig-zagged).
14	Utility	All wires and cable are hanging above ground and are in unmanaged condition	Shifting of electric poles and telephone poles with coordination with municipality.
15	Information on the importance of the	Interconnection of two link roads	

No	Description	Existing Scenario	Proposed Scheme
	road (connecting important areas such as market, airport, main highway, other facility, and more). Value this road will add to the town or the region.		
<b>19B.</b>	<b>Deurali – Path</b>		
1	Length of Road	0.223km	0.223km
2	Right of Way (ROW) Declared by municipality	6 m	7 m
3	Total Road Width	4 – 6 m	7.3 m due to availability of existing drain
4	Carriageway	Average 4 m	5 m
5	Pavement type	Black topped	Road upgradation with the 50 mm surface course of asphalt concrete, 150 mm of base course and 210 mm of sub base with proper grade and camber
6	Median/Landscape or Green land areas	No median provided and lack of green space	Median is not provided/ Greeneries and plantation shall be done in interval of 10 meters wherever space is available
7	Parking	Haphazard parking on carriageway area obstructing traffic movement	Due to space restriction, separate parking is not provided. However, parking space can be provided in public land available in the road vicinity.
8	Cycle track	Nil	Not provided due to space restriction.
9	Side Drain	Drain is present on the both side from start to end. At few sections, covered drain is present. No Pluvial flooding in this road section.	PCC surface drain of width 0.25m (included in carriageway width). Dismantle of existing brick drains and proposed new RCC storm water drains of size 0.45 X 0.6m 50 HHs directly benefited from the proposed drain
10	Cross drainage Structures	3 nos. of Slabs	1 Slab cuvert
11	Protection works	Nil	
12	Traffic signs/signage and road marking	Present at some location	Provided all along the road to ensure maximum safety to pedestrian and vehicular traffic.
13	Road furniture (streetlights, delineators etc.)	Only in some sections	Street lights of height 7 m at 25 m interval (staggered/zig-zagged).
14	Utility	All wires and cable are hanging above ground and are in unmanaged condition	Shifting of electric poles and telephone poles with coordination with municipality.

No	Description	Existing Scenario	Proposed Scheme
15	Information on the importance of the road (connecting important areas such market, airport, main highway, other facility, and more). Value this road will add to the town or the region.	Interlink of Trisuli Path, Deurali Path, Saptarishi path	
19C.	Saptarishi – path		
1	Length of Road	0.119km	0.119km
2	Right of Way (ROW) Declared by municipality	6m	6m
3	Total Road Width	4 – 5 m	6 m
4	Carriageway	Average 4 m	4 m
5	Pavement type	Black topped	Road upgradation with the 50 mm surface course of asphalt concrete, 150 mm of base course and 210 mm of sub base with proper grade and camber
6	Median/Landscape or Green land areas	No median provided and lack of green space	Median is not provided/ Greeneries and plantation shall be done in interval of 10 meters wherever space is available
7	Parking	Haphazard parking on carriageway area obstructing traffic movement	Due to space restriction, separate parking is not provided. However, parking space can be provided in public land available in the road vicinity.
8	Cycle track	Nil	Not provided due to space restriction. However, alternative typical road section drawings with cycle tracks have been proposed.
9	Side Drain	Drain is present on the both side from start to end. No Pluvial flooding in this road section	PCC surface drain of width 0.25m (included in carriageway width). Dismantle of existing brick drains and proposed new RCC storm water drains of size 0.3 X 0.45m 50 HHs directly benefited from the proposed drain.
10	Cross drainage Structures	1 Slab Culvert	Reconstruct the RCC slab
11	Protection works	Nil	As per requirement
12	Traffic signs/signage and road marking	Present at some location	Provided all along the road to ensure maximum safety to pedestrian and vehicular traffic.
13	Road furniture (streetlights, delineators etc.)	Only in some sections	Street lights of height 7 m at 25 m interval (staggered/zig-zagged).

No	Description	Existing Scenario	Proposed Scheme
14	Utility	All wires and cable are hanging above ground and are in unmanaged condition	Shifting of electric poles and telephone poles with coordination with municipality.
15	Information on the importance of the road (connecting important areas such market, airport, main highway, other facility, and more). Value this road will add to the town or the region.	Interlink of Trisuli Path, Deurali Path, Saptarishi path	

Source: Detailed Project Report, 2024

**62. Uchami Path to South (Way to Dhurva Adhikari) 0.583 km** - The road begins at Uchami Path and ends at the southern part of the road. The Road lies in ward 8. It has a right of way (ROW) width of 7 meters. Currently, the road is in poor condition and earthen. The settlement in this area is very low, indicating a sparse population. As part of the project, one boundary needs to shift. Furthermore, there is an existing canal perpendicular to the road, measuring 4.8 meters in width. The area surrounding the road has a significant cultivation area, suggesting that agriculture plays a prominent role in this region.

**Table 32: Proposed Scheme Comparison of Uchami Path to South Road**

No	Description	Existing Scenario	Proposed Scheme
1	Length of Road	0.583 km	0.583 km
2	Right of Way (ROW) Declared by municipality	7 m	7 m
3	Total Road Width	5 - 7 m	7 m
4	Carriageway	Average 4 m	4 m
5	Pavement type	Earthen Road	Road upgradation with the 50 mm surface course of asphalt concrete, 150 mm of base course and 210 mm of sub base with proper grade and camber
6	Median/Landscape or Green land areas	No median provided and lack of green space	Median is not provided/ Greeneries and plantation shall be done wherever space is available
7	Parking	Haphazard parking on carriageway area obstructing traffic movement	Due to space restriction, separate parking is not provided. However, parking space can be provided in public land available in the road vicinity.
8	Cycle track	Nil	Not provided due to space restriction.
9	Side Drain	Few sections have earthen drain at the start of the chainage. During rainfall, there is pluvial flooding and water does not flow	PCC surface drain of width 0.25m (included in carriageway width). Storm water drain size of 0.8 X 0.8m

No	Description	Existing Scenario	Proposed Scheme
		to drain due to no proper camber slope.	13 HHs directly benefited from the proposed drain
10	Cross drainage Structures	4 Nos of pipe culverts, 3 Nos of slab	2 Slab culverts
11	Protection works	Nil	Retaining wall/slope protection measures as per requirement.
12	Traffic signs/signage and road marking	Nil	Provided all along the road to ensure maximum safety to pedestrian and vehicular traffic.
13	Road furniture (streetlights, delineators etc.)	Only in some sections	Street lights of height 7 m at 25 m interval (staggered/zig-zagged).
14	Utility	All wires and cable are hanging above ground and are in unmanaged condition	Shifting of electric poles and telephone poles with coordination with municipality.
15	Information on the importance of the road (connecting important areas such market, airport, main highway, other facility, and more). Value this road will add to the town or the region.	Interlinks settlements to the Uchami path.	

Source: Detailed Project Report, 2024

**63. Abhay Durga Path (0.357 km)-** The road begins at Modern Public School, located on the left side of the road, and ends at a link road called Sachin Path. The road lies in Ward no 8. Along this road, there are three link roads, with the other two being perpendicular to the main road. The right of way (ROW) for the road is 6 meters. Currently, the road is an earthen type road. There are existing drains on both sides of the road, extending from the starting point to the box road, but they lack drain covers. The existing road width, including the drains, is 7 meters, but the actual road width is 5.2 meters. To improve the road, it is necessary to lower the road and drain levels. Additionally, the settlement area along this road is high, indicating a densely populated and developed region.

**Table 33: Proposed Scheme Comparison of Abhay Durga Path**

No	Description	Existing Scenario	Proposed Scheme
1	Length of Road	0.357 km	0.357 km
2	Right of Way (ROW) Declared by municipality	6 m	6 m
3	Total Road Width	4 - 5.5 m	6 m
4	Carriageway	Average 3 m to 3.5 m	4 m
5	Pavement type	Earthen Road	Road upgradation with the 50 mm surface course of asphalt concrete, 150 mm of base course and 210 mm of

No	Description	Existing Scenario	Proposed Scheme
			sub base with proper grade and camber
6	Median/Landscape or Green land areas	No median provided and lack of green space	Median is not provided/ Greeneries and plantation shall be done in interval of 10 meters over sidewalks wherever space is available
7	Parking	Haphazard parking on carriageway area obstructing traffic movement	Due to space restriction, separate parking is not provided. However, parking space can be provided in public land available in the road vicinity.
8	Cycle track	Nil	Not provided due to space restriction.
9	Side Drain	Side drain is present in most of the road section During rainfall, there is pluvial flooding and water doesn't flow to drain due to no proper camber slope	PCC surface drain of width 0.25m (included in carriageway width). Storm water drain size of Type- 0.3 X 0.45m 31 HHs directly benefited from the proposed drain
10	Cross drainage Structures	4 Nos of slabs	Slabs to be dismantled and reconstructed. (1 Slab culvert)
11	Protection works	Nil	Retaining wall/slope protection measures as per requirement.
12	Traffic signs/signage and road marking	Present at some location	Provided all along the road to ensure maximum safety to pedestrian and vehicular traffic.
13	Road furniture (streetlights, delineators etc.)	Only in some sections	Street lights of height 7 m at 25 m interval (staggered/zig-zagged).
14	Utility	All wires and cable are hanging above ground and are in unmanaged condition	Shifting of electric poles and telephone poles with coordination with municipality.
15	Information on the importance of the road (connecting important areas such market, airport, main highway, other facility, and more). Value this road will add to the town or the region.	Interlinks the settlements with other link roads	

Source: Detailed Project Report, 2024

**Dumdumuwa Road to Gonahiya Road - 1.145 km.** The road starts from Prabat Path, which is an existing RUDP road, and extends to Dumdumuwa. The Road lies in ward 9. This road alignment is a completely new route designed to connect with another RUDP road. The right of way (ROW) for the road varies, with sections having a width of 7 meters and others having a width of 8 meters, as per the provided plan. The purpose of this road is to establish a transportation link between Prabat Path and Dumdumuwa, benefiting the local residents and visitors in the area. Dumdumuwa and Gonahiya are smaller towns or localities located within or

near Siddharthanagar. This road likely serves as a crucial commuting route between these areas and potentially connects to other major roads or highways.

**Table 34: Proposed Scheme Comparison of Dumdumuwa Road to Gonahiya Road**

No	Description	Existing Scenario	Proposed Scheme
1	Length of Road	1.145 km	1.145 km
2	Right of Way (ROW) Declared by municipality	7 m & 8 m	7 m & 8 m
3	Total Road Width	7 m	7 m (In Road section having canal) & 8 m
4	Carriageway	Average 4.5 to 6.5 m	5.5 m
5	Pavement type	Earthen roads section	Intermediate lane upgradation with the 50 mm surface course of asphalt concrete, 150 mm of base course and 210 mm of sub base with proper grade and camber
6	Median/Landscape or Green land areas	No median provided and lack of green space	Median is not provided/ Greeneries and plantation shall be done in interval of 10 meters wherever space is available
7	Parking	Haphazard parking on shoulder and carriageway area obstructing traffic movement	Due to space restriction, separate parking is not provided. However, parking space can be provided in public land available in the road vicinity.
8	Cycle track	Nil	Not provided due to space restriction.
9	Side Drain	Nil  Existing Canal at the end of the road section along the alignment. During heavy rainfall, water logging in few sections of the road and cultivation lands in roadsides.	No drain proposed, as there is an existing earthen and stone canal present along the alignment.  5 HHs directly benefited from the proposed drain
10	Cross drainage Structures	2 pipe culverts and 1 slab culvert	Culverts to be dismantled and reconstructed (2 Pipe culverts and 1 Slab culverts)
11	Protection works	Nil	Retaining wall/slope protection measures as per requirement.
12	Traffic signs/signage and road marking	Present at some location	Provided all along the road to ensure maximum safety to pedestrian and vehicular traffic.
13	Road furniture (street lights, delineators et)	Only in some sections	Street lights of height 7 m at 25 m interval (staggered/zig-zagged).
14	Utility	All wires and cable are hanging above ground and are in unmanaged condition	Shifting of electric poles and telephone poles with coordination with municipality.
15	Information on the importance of the road (connecting important areas such market, airport, main highway, other	The purpose of this road is to establish a transportation link between Prabat Path (RUDP road) and Dumdumuwa, benefiting the local residents and visitors in the area	



No	Description	Existing Scenario	Proposed Scheme
	facility, and more). Value this road will add to the town or the region.		

Source: Detailed Project Report, 2024

**64. Doghari Gaau East Chowk to Sahari Bikash Sadak 1.218 km** - The road starts from Doghari Gaau and extends to Bhujauli-Sishwa Road. The Road lies in ward 10 & 11. The right of way (ROW) for the road is 10 meters. Doghari Gaau East Chowk and Sahari Bikash Sadak are both locations within Siddharthanagar. Doghari Gaau East Chowk is likely an intersection or junction within the Doghari Gaau area, while Sahari Bikash Sadak refers to a road associated with urban development. The road currently has a blacktopped (pre-mix) surface, indicating a higher quality road compared to an earthen or gravel road. There are no existing drains along the road. The traffic volume on the road is not heavy.

**Table 35: Proposed Scheme Comparison of Doghari Gaau East Chowk to Sahari Bikash Road**

No	Description	Existing Scenario	Proposed Scheme
1	Length of Road	1.218 km	1.218 km
2	Right of Way (ROW) Declared by municipality	10 m	10 m
3	Total Road Width	6 - 8 m	10 m
4	Carriageway	4 to 4.5 m	7 m
5	Pavement type	Black topped	Double lane upgradation with the 50 mm surface course of asphalt concrete, 150 mm of base course and 210 mm of sub base with proper grade and camber
6	Median/Landscape or Green land areas	No median provided and lack of green space	Median is not provided/ Greeneries and plantation shall be done in interval of 10 meters over sidewalks wherever space is available
7	Parking	Haphazard parking on shoulder and carriageway area obstructing traffic movement	Due to space restriction, separate parking is not provided. However, parking space can be provided in public land available in the road vicinity.
8	Cycle track	Nil	Not provided due to space restriction. However, alternative typical road section drawings with cycle tracks have been proposed.
9	Side Drain	Few sections have Side drain. Mostly Earthen drain is present During heavy rainfall, Water logging in cultivation lands in road sides	PCC surface drain of width 0.25m (included in carriage way width) Storm water drain size of 0.8 X 0.8 m 37 HHs directly benefited from the proposed drain.
10	Cross drainage Structures	7 no of pipe	Pipe culverts and slabs to be reconstructed ( 1 Slab culvert & 1 Pipe culvert)



No	Description	Existing Scenario	Proposed Scheme
11	Protection works	Nil	Retaining wall/slope protection measures as per requirement.
12	Traffic signs/signage and road marking	Present at some location	Provided all along the road to ensure maximum safety to pedestrian and vehicular traffic.
13	Road furniture (street lights, delineators et)	Only in some sections	Street lights of height 7 m at 25 m interval (staggered/zig-zagged).
14	Utility	All wires and cable are hanging above ground and are in unmanaged condition	Shifting of electric poles and telephone poles with coordination with municipality.
15	Information on the importance of the road (connecting important areas such market, airport, main highway, other facility, and more). Value this road will add to the town or the region.	This road interlinks Doghari Gaau East Chowk and Sahari Bikash Sadak	

Source: Detailed Project Report, 2024

**65. Suvarna path 0.274km** - The road starts from Siddhartha Highway and ends at Rudra path. The Road lies in ward 12. The Row of road is 6m. AT the start of the chainage there is a Sai Global Academy on the left side of the road. The existing road is black topped road. There is an existing side drain on both side of the road. Scarifying of existing premix roads should be done. There is High settlement in this section.

**Table 36: Proposed Scheme Comparison of Suvarna Path Road**

No	Description	Existing Scenario	Proposed Scheme
1	Length of Road	0.274km	0.274km
2	Right of Way (ROW) Declared by municipality	6 m	6 m
3	Total Road Width	4– 5 m	6 m
4	Carriageway	Average 4 m	3.5 m
5	Pavement type	Black topped	Road upgradation with the 50 mm surface course of asphalt concrete, 150 mm of base course and 210 mm of sub base with proper grade and camber
6	Median/Landscape or Green land areas	No median provided and lack of green space	Median is not provided/ Greeneries and plantation shall be done in interval of 10 meters wherever space is available
7	Parking	Haphazard parking on shoulder and carriageway area obstructing traffic movement	Due to space restriction, separate parking is not provided. However, parking space can be provided in public land available in the road vicinity.
8	Cycle track	Nil	Not provided due to space restriction.

No	Description	Existing Scenario	Proposed Scheme
9	Side Drain	Few sections have side drain. Mostly covered. No Pluvial flooding occurs in this road section area	PCC surface drain of width 0.25m (included in carriage way width) Storm water drain size of 0.55 X 0.55 m 25 HHs directly benefited from the proposed drain
10	Cross drainage Structures	1 no's of RCC Slab; 1 no of pipe	Nil
11	Protection works	Nil	
12	Traffic signs/signage and road marking	Present at some location	Provided all along the road to ensure maximum safety to pedestrian and vehicular traffic.
13	Road furniture (street lights, delineators et)	Only in some sections	Street lights of height 7 m at 25 m interval (staggered/zig-zagged).
14	Utility	All wires and cable are hanging above ground and are in unmanaged condition	Shifting of electric poles and telephone poles with coordination with municipality.
15	Information on the importance of the road (connecting important areas such market, airport, main highway, other facility, and more). Value this road will add to the town or the region.	Interlinks Rudra path and Siddhartha Highway	

Source: Detailed Project Report, 2024

**66. Bhimkali Path – Janta Path Branch Roads (North side) 0.649 km** - The road starts from the Bhimkali path and ends at Janta path. The Road lies in ward 12. The Row of road is 7m. The existing road is Gravel type road. The existing width of road is 5 - 8 m. The road is in the F shape. There is high settlement in this area. There is a Budhha jyoti school in the left side of the school.

**Table 37: Proposed Scheme Comparison of Bhimkali Path, Janta Path Branch Roads**

No	Description	Existing Scenario	Proposed Scheme
1	Length of Road	0.649km	0.649km
2	Right of Way (ROW) Declared by municipality	7m	7m
3	Total Road Width	5 - 8 m	7 m
4	Carriageway	4.5 to 5.5 m	4.5 m in Road Section 25A 5.5m in Road Section 25B 4.5 m in Road Section 25C
5	Pavement type	Gravel road	Road upgradation with the 50 mm surface course of asphalt concrete, 150 mm of base course and 210 mm of sub base with proper grade and camber

No	Description	Existing Scenario	Proposed Scheme
6	Median/Landscape or Green land areas	No median provided and lack of green space	Median is not provided/ Greeneries and plantation shall be done in interval of 10 meters over sidewalks wherever space is available
7	Parking	Haphazard parking on shoulder and carriageway area obstructing traffic movement	Due to space restriction, separate parking is not provided. However, parking space can be provided in public land available in the road vicinity.
8	Cycle track	Nil	Not provided due to space restriction.
9	Side Drain	Few sections have Earthen drain. Mostly drain is present During rainfall, there is pluvial flooding and water doesn't flow to drain due to no proper camber slope	PCC surface drain of width 0.25m (included in carriage way width) Storm water drain size of 0.55 X 0.55 m 43 HHs directly benefited from the proposed drain
10	Cross drainage Structures	1 number of Slab culvert	1 Slab to be reconstructed
11	Protection works	Nil	Nil
12	Traffic signs/signage and road marking	Nil	Provided all along the road to ensure maximum safety to pedestrian and vehicular traffic.
13	Road furniture (street lights, delineators et)	Only in some sections	Street lights of height 7 m at 25 m interval (staggered/zig-zagged).
14	Utility	All wires and cable are hanging above ground and are in unmanaged condition	Shifting of electric poles and telephone poles with coordination with municipality.
15	Information on the importance of the road (connecting important areas such market, airport, main highway, other facility, and more). Value this road will add to the town or the region.	Interlinks different local settlements	

Source: Detailed Project Report, 2024

**67. Other Roads - 0.544 km** The Row of roads is 6m. The Roads lies in ward 12. The road starts between the Buddha H2O Mineral Plant and Kashi Novel Academy of chainage 0+226. Whereas another road has a change of 0+298. There is existing drain on only one side of Road. The road is clear. There is medium settlement in those area. As there are primary school and College near the road area.

**Table 38: Proposed Scheme Comparison of Other Roads**

No	Description	Existing Scenario	Proposed Scheme
1	Length of Road	0.544km	0.544km

No	Description	Existing Scenario	Proposed Scheme
2	Right of Way (ROW) Declared by municipality	6 m	6 m
3	Total Road Width	5 -6 m	6 m
4	Carriageway	3 to 4 m	4 m
5	Pavement type	Black topped	Road upgradation with the 50 mm surface course of asphalt concrete, 150 mm of base course and 210 mm of sub base with proper grade and camber
6	Median/Landscape or Green land areas	No median provided and lack of green space	Median is not provided/ Greeneries and plantation shall be done in interval of 10 meters over sidewalks wherever space is available
7	Parking	Haphazard parking on carriageway area obstructing traffic movement	Due to space restriction, separate parking is not provided. However, parking space can be provided in public land available in the road vicinity.
8	Cycle track	Nil	Not provided due to space restriction. However, alternative typical road section drawings with cycle tracks have been proposed.
9	Side Drain	Few sections have side drain. No Pluvial flooding occurs in this road section	PCC surface drain of width 0.25m (included in carriageway width). Storm water drain size of 0.3 X 0.45 m 24 HHs directly benefited from the proposed drain
10	Cross drainage Structures	3 no's of Slab	3 Slab culverts to be reconstructed
11	Protection works	Nil	Nil
12	Traffic signs/signage and road marking	Present at some location	Provided all along the road to ensure maximum safety to pedestrian and vehicular traffic.
13	Road furniture (street lights, delineators et)	Only in some sections	Street lights of height 7 m at 25 m interval (staggered/zig-zagged).
14	Utility	All wires and cable are hanging above ground and are in unmanaged condition	Shifting of electric poles and telephone poles with coordination with municipality.
15	Information on the importance of the road (connecting important areas such market, airport, main highway, other facility, and more). Value this road will add to the town or the region.	Interlinks different local settlements	

Source: Detailed Project Report, 2024

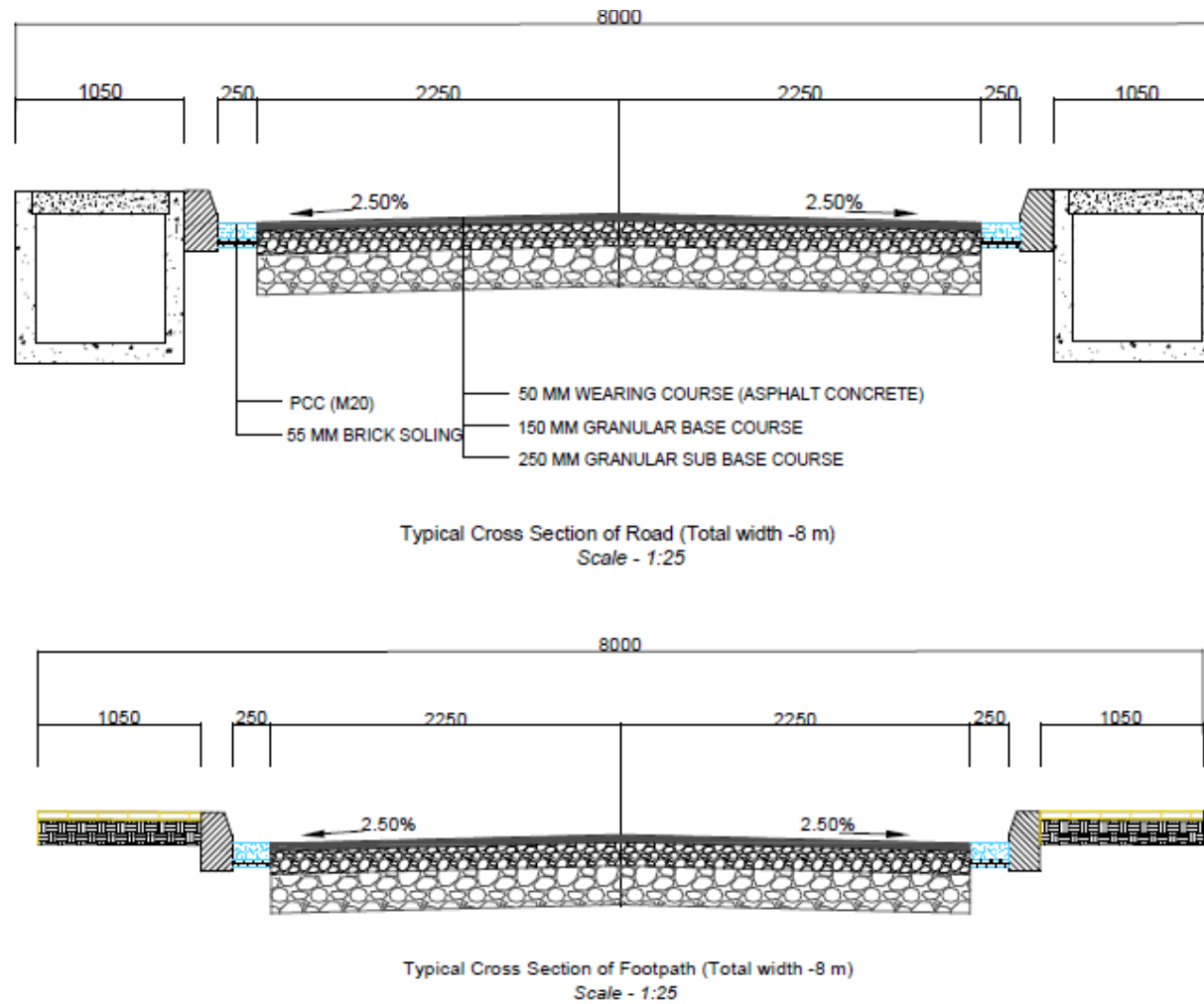
**68. Lacoul Road (0.321 km)** - The Road starts from Siddhartha Highway and ends at OYO Lacoul hotel. The Road lies in ward 13. The Row of road is 6m. The existing road is earthen type road. The width of existing road is 5.6m including drain. The settlement in these is area is low as there are only few houses in these roads. Table 39: 27. Proposed Scheme Comparison of Lacoul Road

**Table 40: Proposed Scheme Comparison of Lacoul Road**

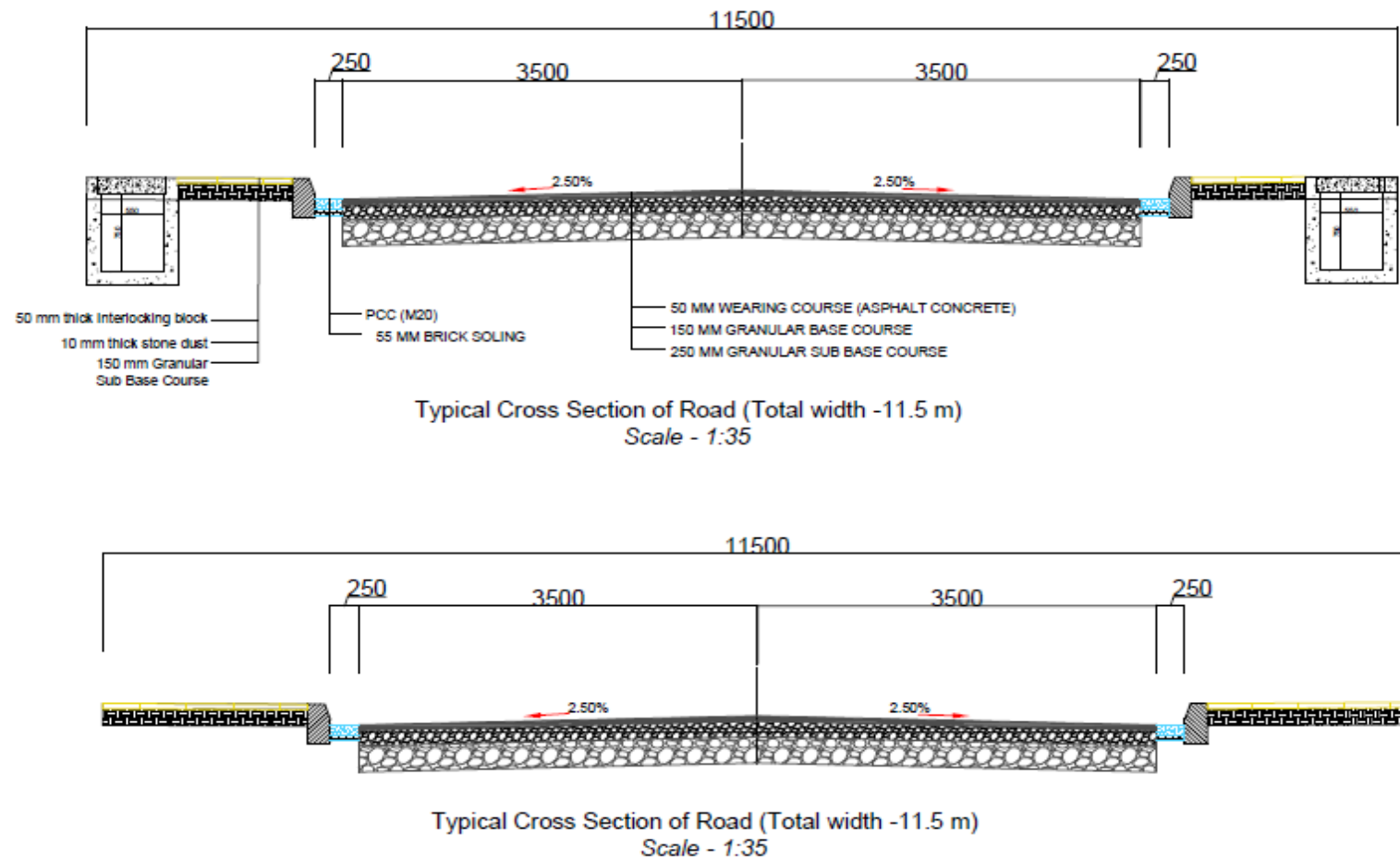
No	Description	Existing Scenario	Proposed Scheme
1	Length of Road	0.321 km	0.321 km
2	Right of Way (ROW) Declared by municipality	6 m	6 m
3	Total Road Width	4 - 6 m	6 m
4	Carriageway	Average 2 to 3 m	3.5 m
5	Pavement type	Earthen roads section	Double lane upgradation with the 50 mm surface course of asphalt concrete, 150 mm of base course and 210 mm of sub base with proper grade and camber
6	Median/Landscape or Green land areas	No median provided and lack of green space	Median is not provided/ Greeneries and plantation shall be done in interval of 10 meters over sidewalks wherever space is available
7	Parking	Haphazard parking on carriageway area obstructing traffic movement	Due to space restriction, separate parking is not provided. However, parking space can be provided in public land available in the road vicinity.
8	Cycle track	Nil	Not provided due to space restriction.
9	Side Drain	Nil During rainfall, there is pluvial flooding and water doesn't flow due to no proper camber slope	PCC surface drain of width 0.25m (included in carriageway width). Storm water drain size of 0.55 X 0.55 m 17 HHs directly benefited from the proposed drain
10	Cross drainage Structures	Nil	1 Pipe culvert
11	Protection works	Nil	Retaining wall/slope protection measures as per requirement.
12	Traffic signs/signage and road marking	Present at some location	Provided all along the road to ensure maximum safety to pedestrian and vehicular traffic.
13	Road furniture (street lights, delineators et)	Only in some sections	Street lights of height 7 m at 25 m interval (staggered/zig-zagged).
14	Utility	All wires and cable are hanging above ground and are in unmanaged condition	Shifting of electric poles and telephone poles with coordination with municipality.
15	Information on the importance of the road (connecting important areas such market, airport, main	Connects settlements and other roads to Siddhartha highway	

No	Description	Existing Scenario	Proposed Scheme
	highway, other facility, and more). Value this road will add to the town or the region.		

*Source: Detailed Project Report, 2024*

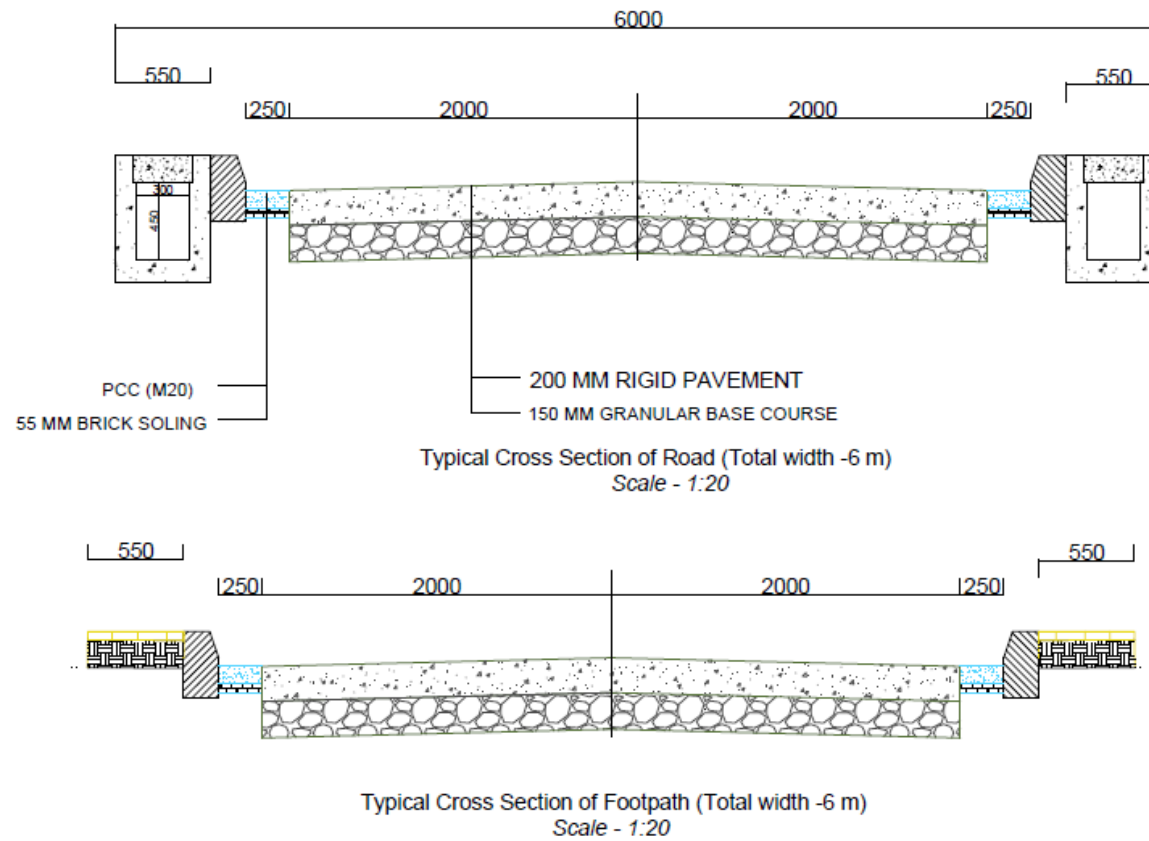


**Figure 16: Typical Road Sections with Footpath, Drain and shoulder (8m) in Siddharthanagar**

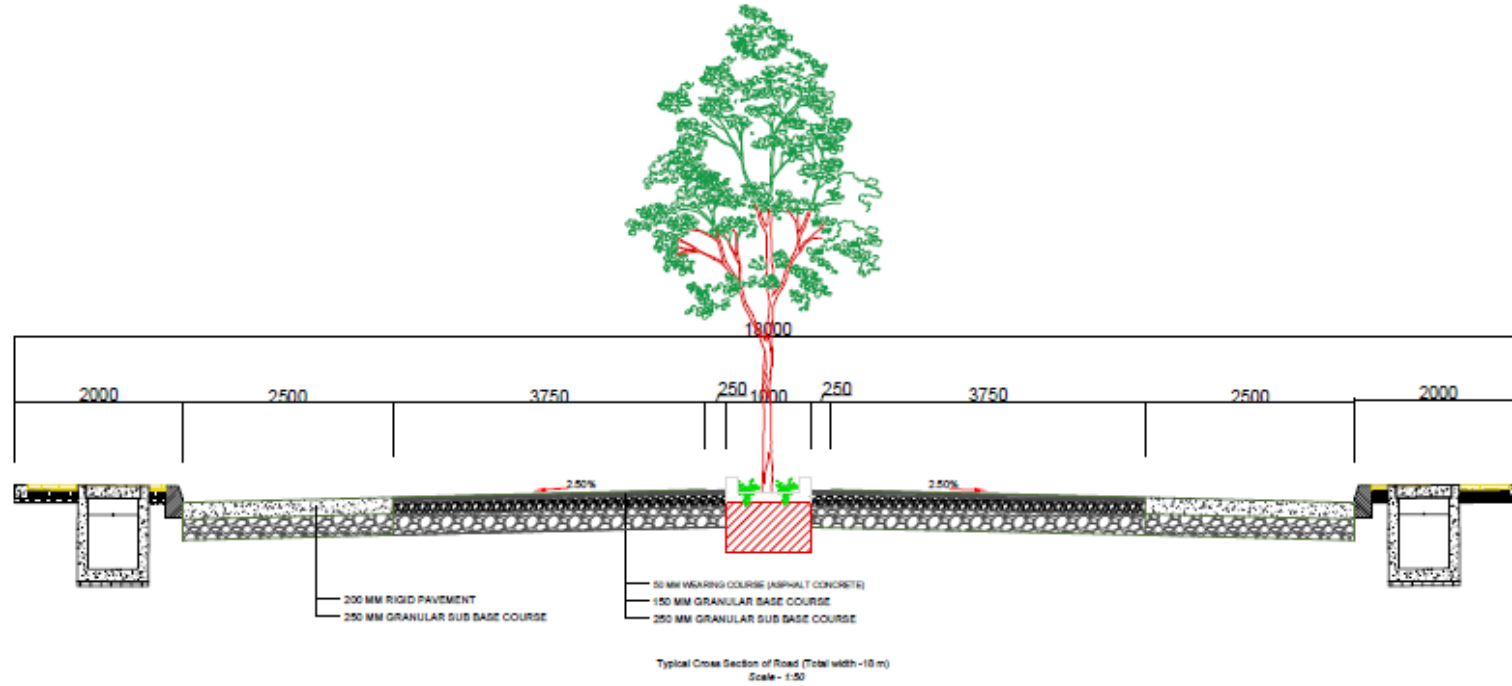


**Figure 17: Typical Road Sections with Footpath, Drain and shoulder (11.5m) in Siddharthanagar**

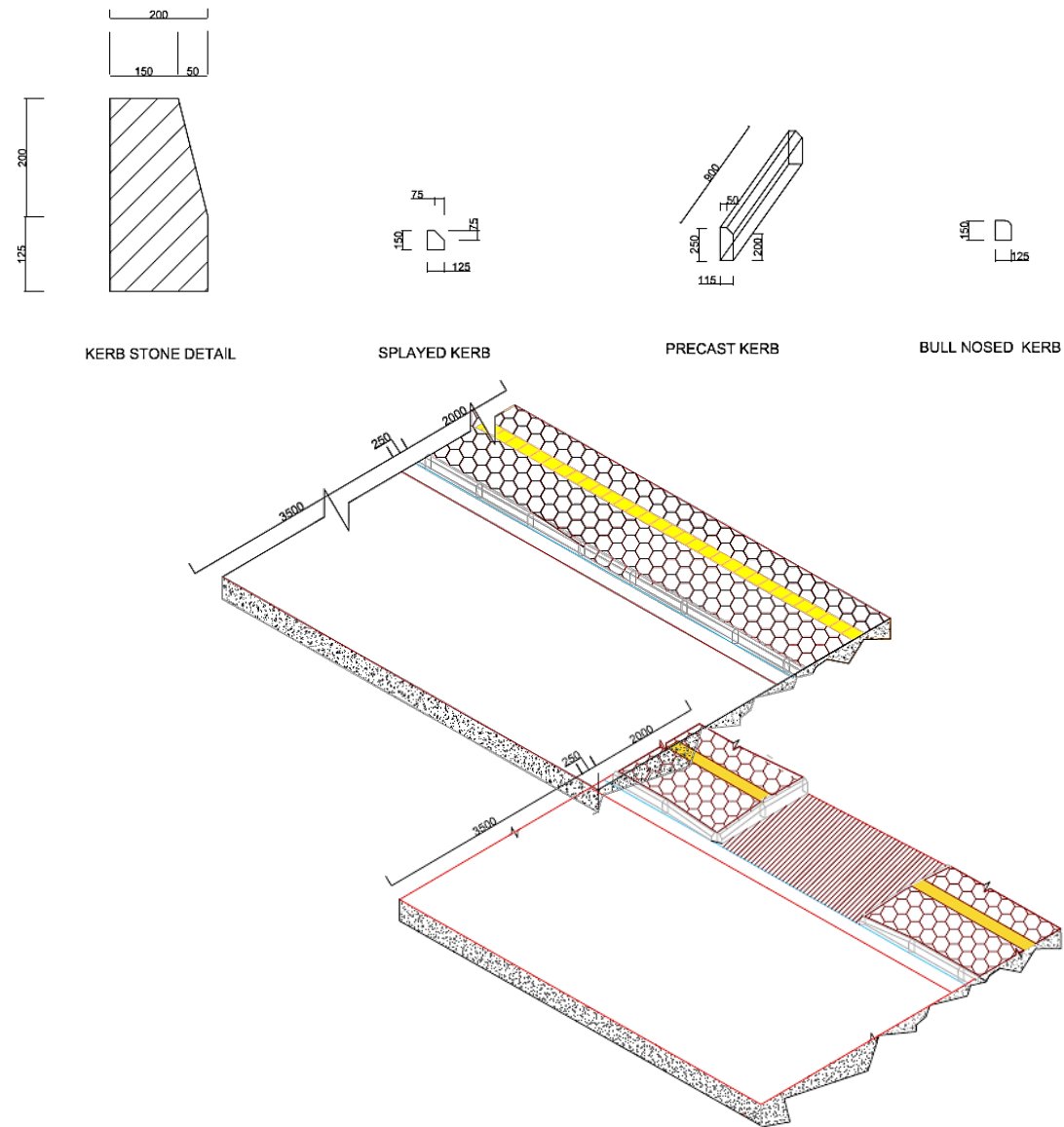




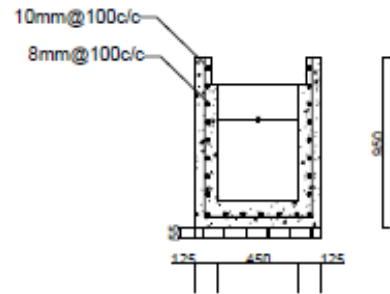
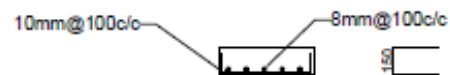
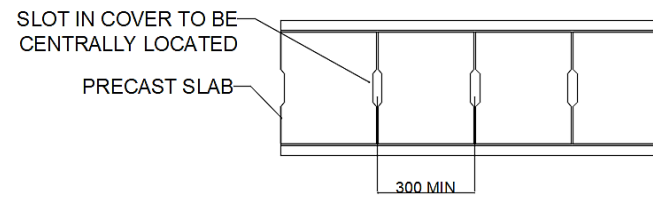
**Figure 18: Typical Road Sections with Rigid Pavement (6m) in Siddharthanagar**



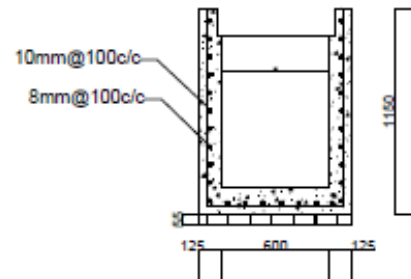
**Figure 19: Typical Road Sections with Median, Footpath and Mix of Asphalt Concrete and Rigid Pavement, (18m) in Siddharthanagar**



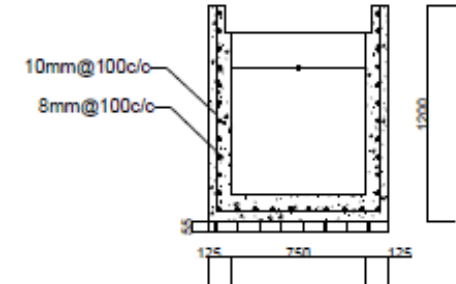
**Figure 20: Typical Kerbs and Footpath Section in Siddharthanagar**



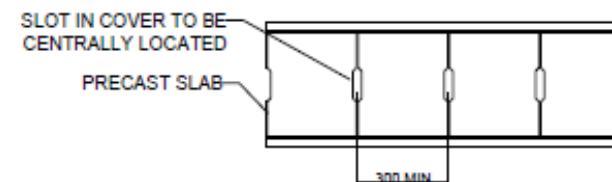
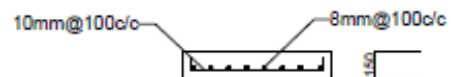
RCC DRAIN - TYPE A  
Scale - 1:25

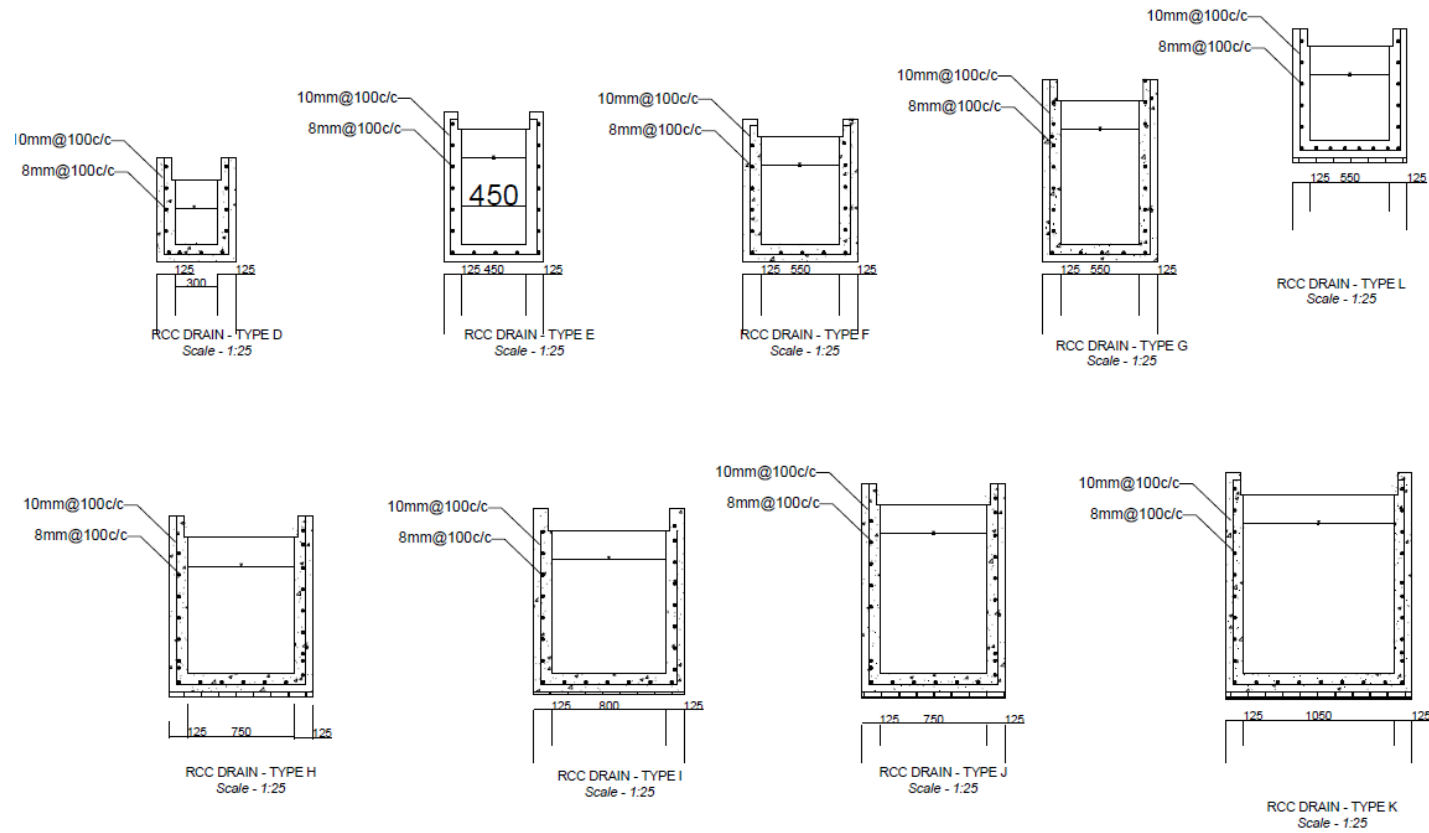


RCC DRAIN - TYPE B  
Scale - 1:25



RCC DRAIN - TYPE C  
Scale - 1:25





**Figure 21: Typical Drain Plan and Sections in Siddharthanagar**

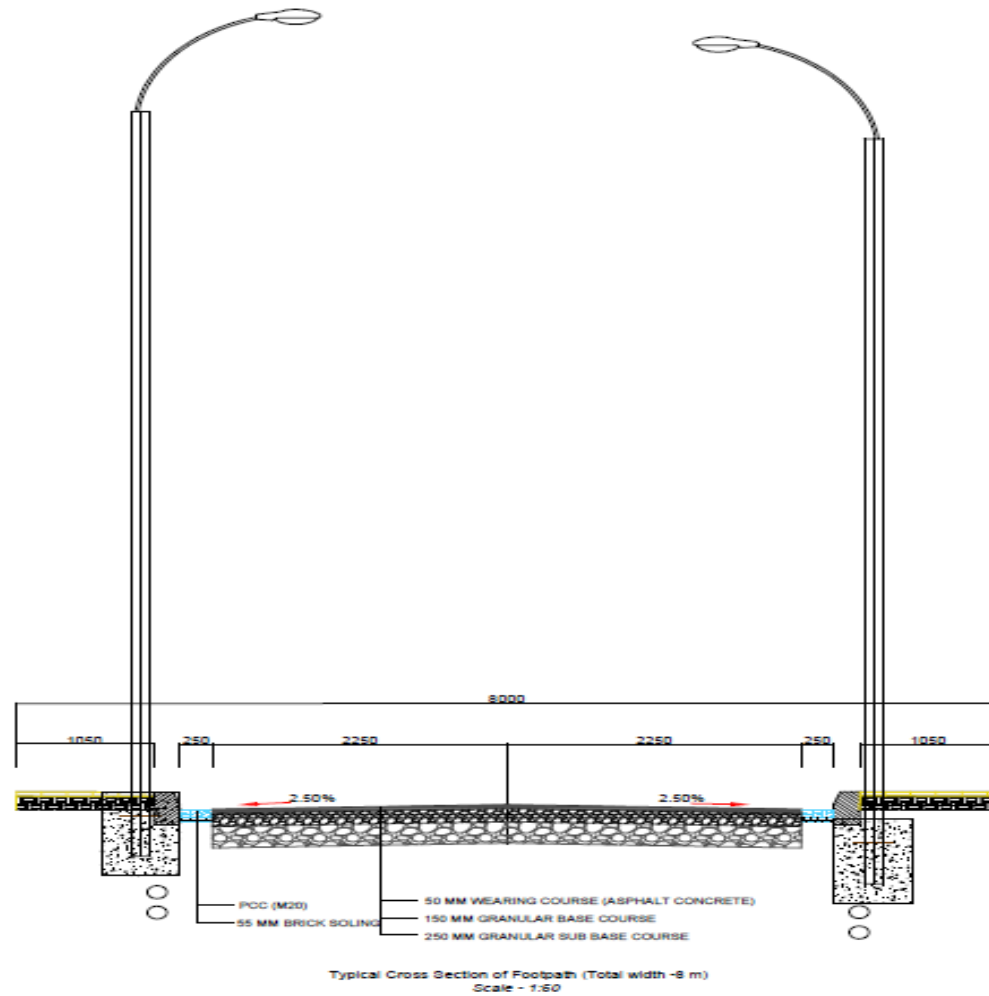


Figure 22: Typical Road Section with Street Light in Siddharthanagar

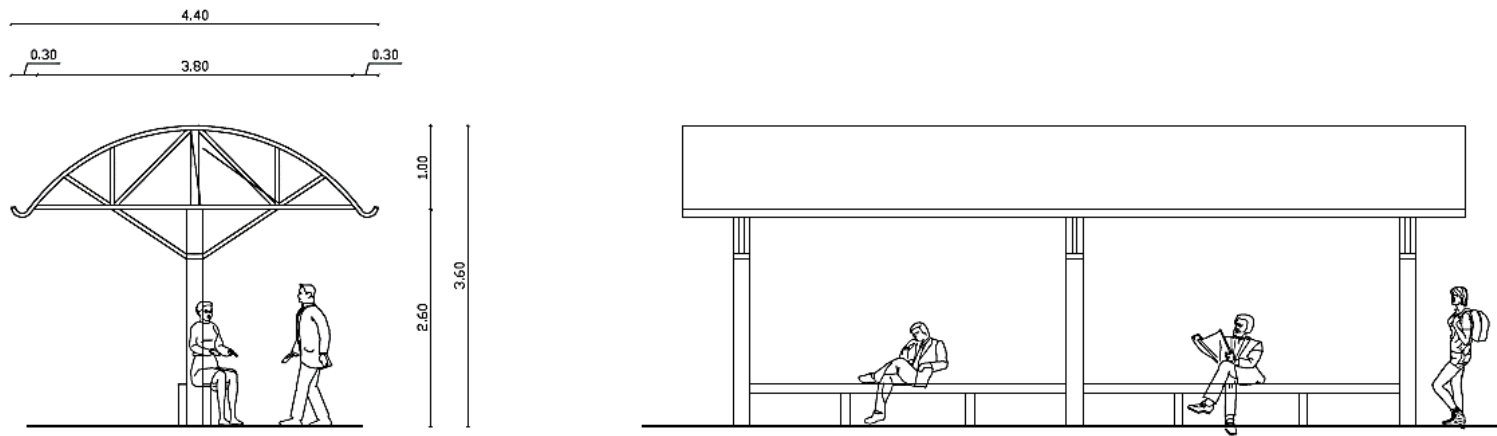


Figure 23: Resting Stations with Sheds in Siddharthanagar

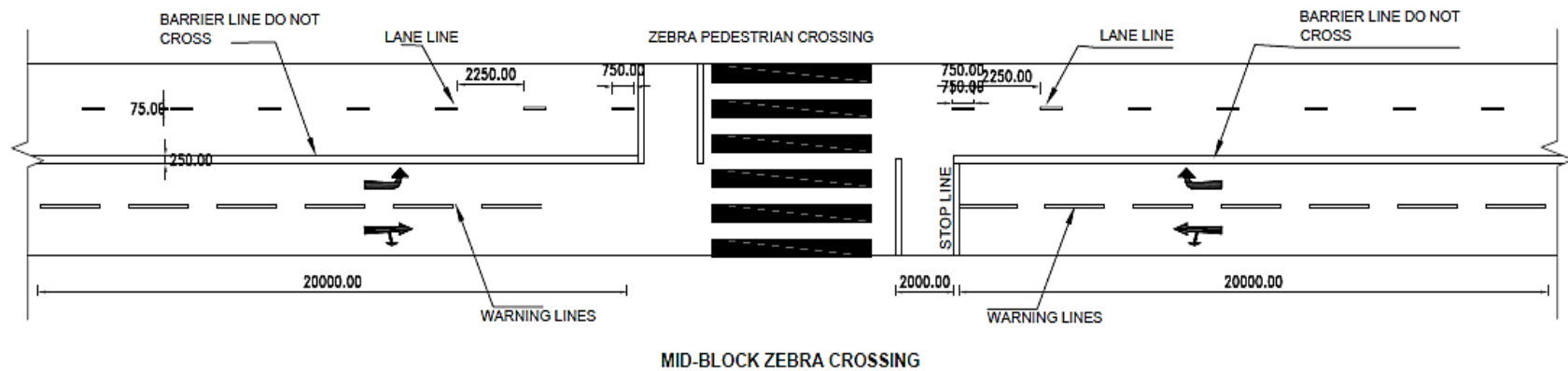
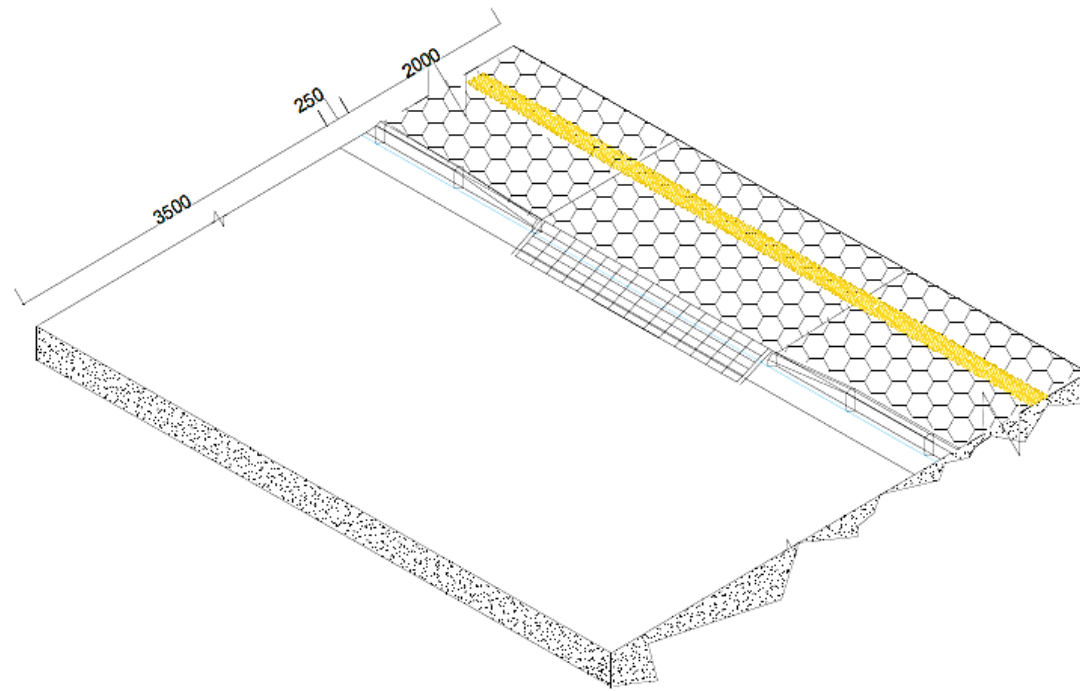
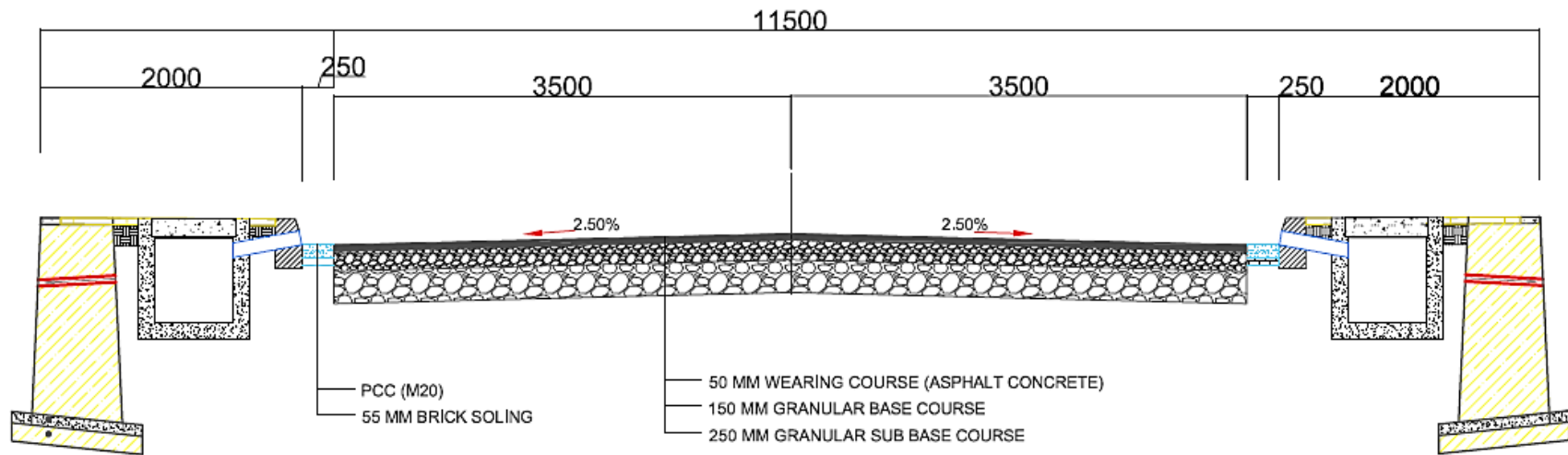


Figure 24: Pedestrian Crossing Details in Siddharthanagar

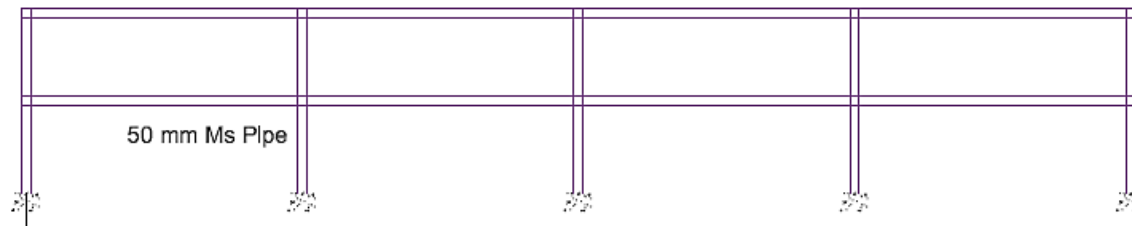


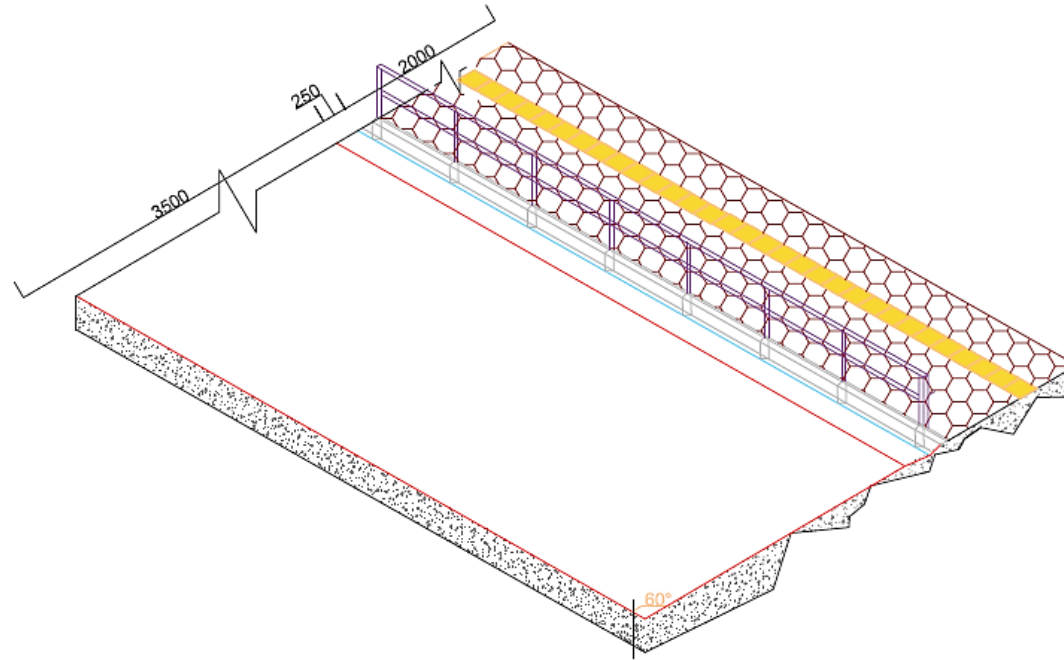
**Figure 25: Footpath with Ramps for entrances in Siddharthanagar**



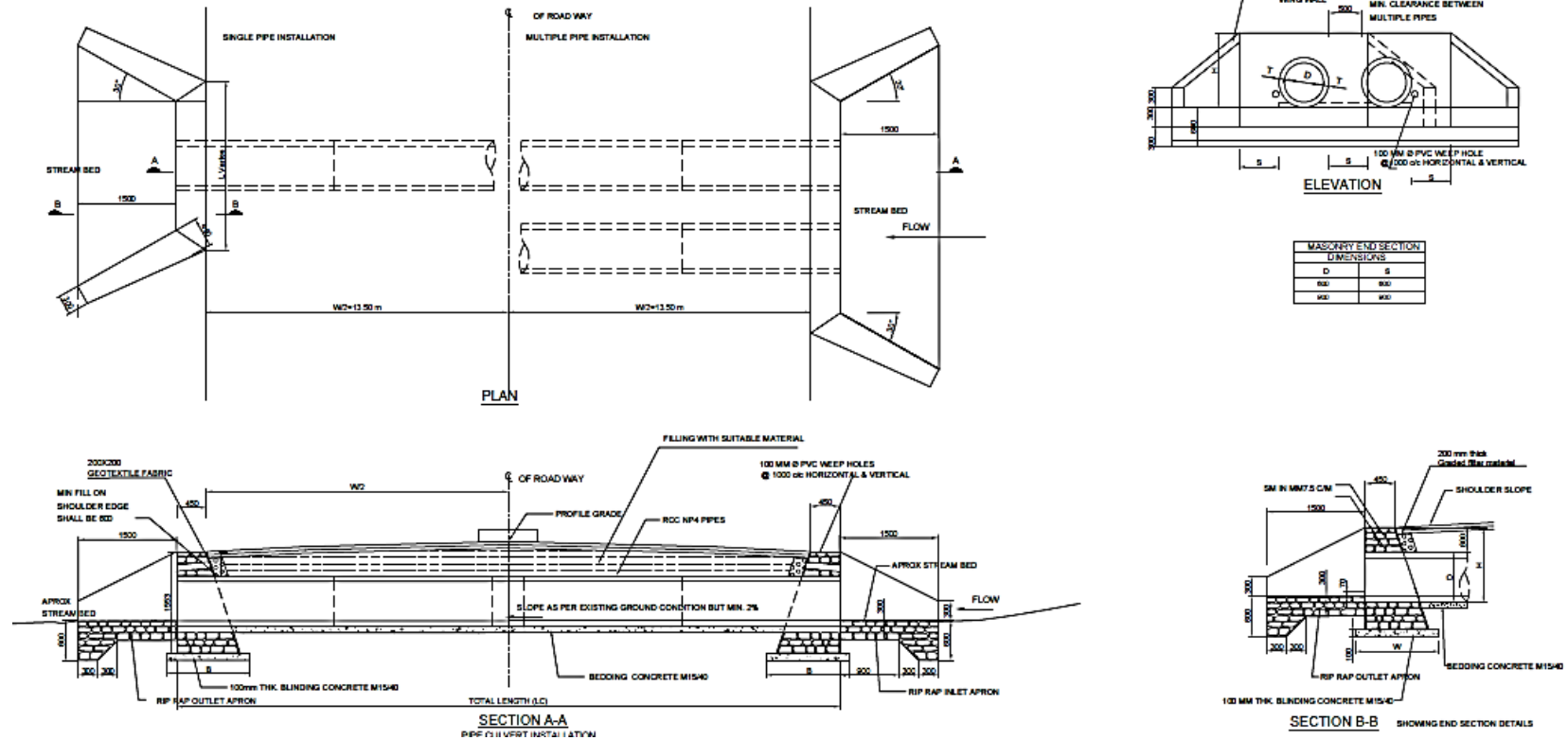


**Figure 26: Typical Road Section with Retaining Walls in Siddharthanagar**





**Figure 27: Hand Railings in Footpath in Siddharthanagar**



**Figure 28: Typical Pipe Culvert Plan and Sections in Siddharthanagar**

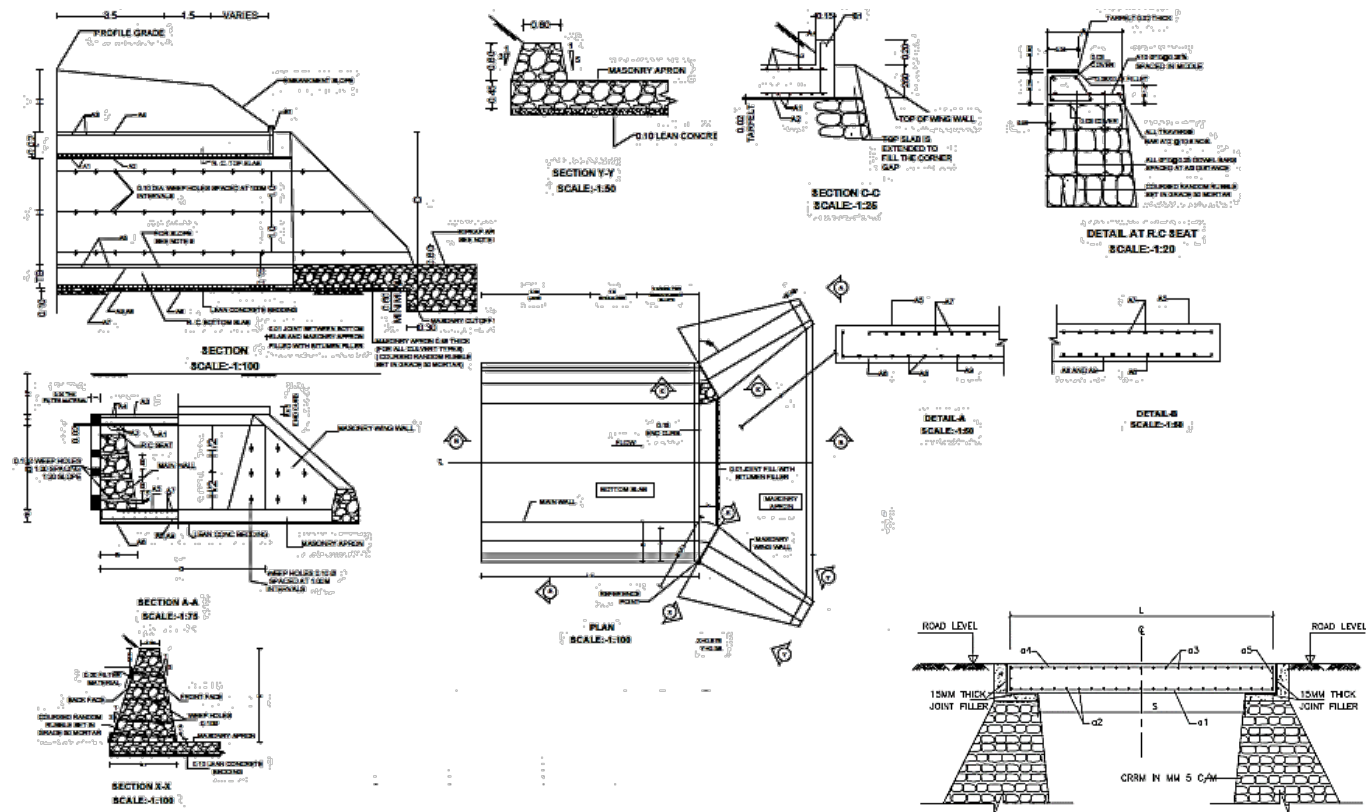
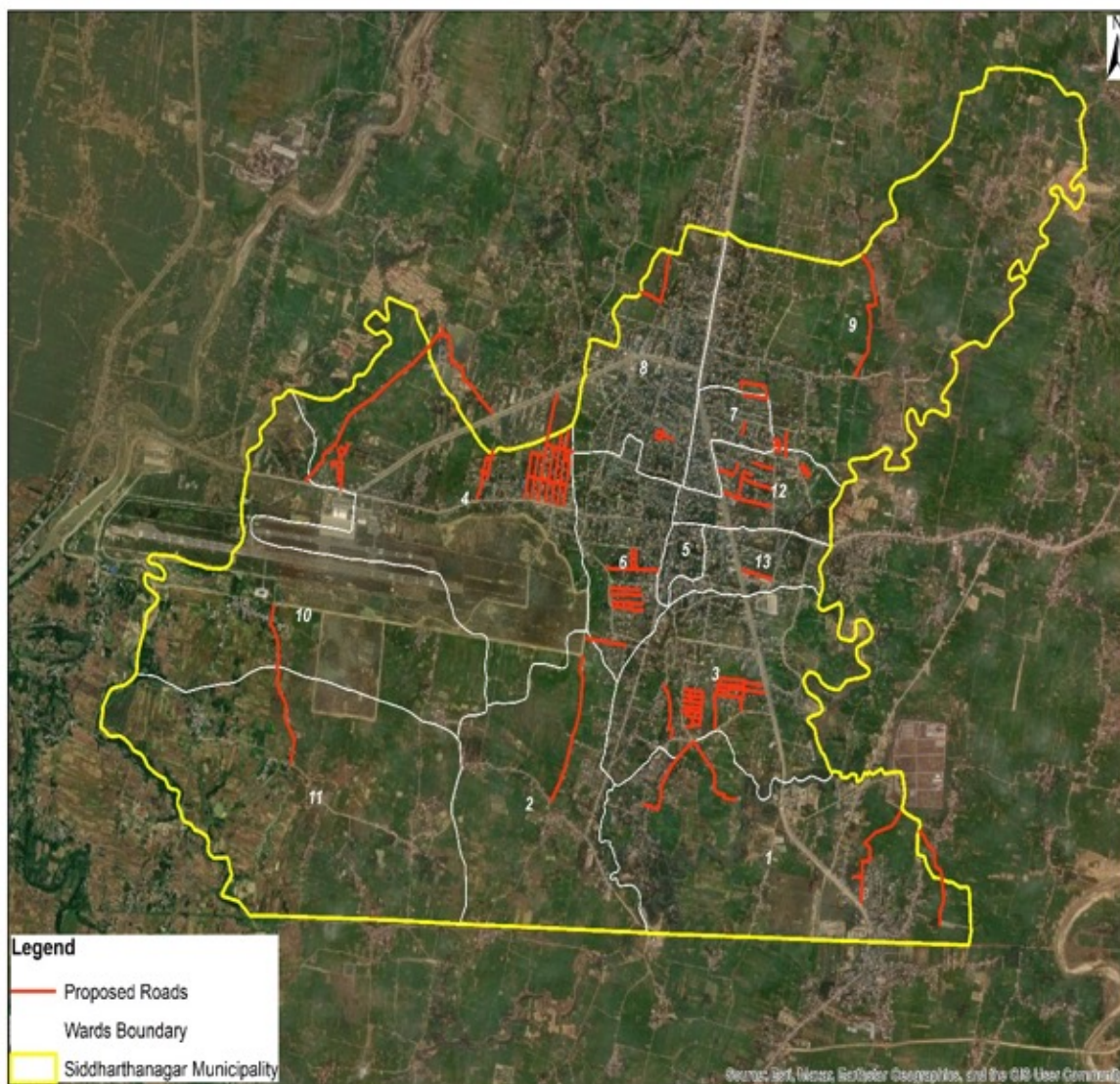


Figure 29: Typical Slab Culvert Plan and Sections in Siddharthanagar

**Figure 30: Location of Subprojects in Siddharthanagar Municipality**



Source: Detailed Project Report, 2024

### **C. Devdaha Municipality Subprojects**

**69.** Under the scope of URLIP, three roads are proposed to rehabilitate and reconstruct integrating drainage and road component. Three road sections (i) Banchauki Mayadevi-Mildanda Buddha Circuit Road of 4.94 km, (ii) Bhaluhipul Medical College Bhatatol Mukhiya Tol Piparahiya Singha-Municipality of 7.50 km and (iii) Shitalnagar-Bhawanipur-Soiya road of 4.77 km are proposed for project financing. Brief description of each section is as follows:

**70. Bhaluhipul Medical College-Bhatatol-Mukhiya Tol- Piparahiya Singha-Municipality Road (7.504 km):** The Bhaluhipul Medical College – Bhatatol - Mukhiya



Tol - Piparahiya Singha - Municipality Road is significant transportation route located in Devdaha Municipality. This road is the easy access to reach the medical college and an alternative route to reach Devdaha Municipality office. The road serves as a vital link connecting East- West Highway and serves communities within the region. The main motive of proposing this road is to make a connecting road to Devdaha Medical College.

71. The Road starts from Bhaluhpul connecting East West Highway and ends at Singha after 100m of Devdaha Municipality office. The RoW of this road is 12 m. The proposed road passes through Ward no 3, Ward no 4, Ward no 8 & Ward no 9. The existing road passes through Milan Community Forest in Ward no 9 having least settlement.

**Table 41: Bhaluhpul Medical college Batatol Mukhiya Tol Piparahiya road section**

SN	Elements of component	Existing Scenario	Proposed Scheme
1	Length of Road	7.22 km	7.22 km
2	Right of Way (ROW) Declared by municipality	12 m	12 m
3	Total Road Width	5-11 m	11.5 m
4	Carriageway	Average 5.5 m	7.5 m
5	Pavement type	Most of the road sections are poor premix carpet and remaining sections are gravel road.	Double lane upgradation with the 50 mm surface course of asphalt concrete, 150 mm of base course and 250 mm of sub base with proper grade and camber
6	Side Drain	There is 3.85 Km earthen drain in both side and 54m length of canal along the road and canal (Singha Canal) crossing in road sections. During heavy rainfall, Pluvial flooding in few road sections where road is graveled and blacktopped is damaged.	PCC surface drain of width 0.25m (included in carriageway width) Storm water drain size of Type A – 0.45 X 0.65m Storm water drain size of Type B – 0.6 X 0.8 m Storm water drain size of Type C – 0.75 X 0.95 m. The size of side drain will be different in Canal sections. 289 households directly get benefit from the proposed drain.
7	Cross drainage Structures	- 7 Nos Pipe Culverts - 20 Nos Slab Culverts - 2 Nos of Side RCC Slabs - Bhaluhi Khola Bridge (30m) - Ghodaha Khola Bridge (74 m) - Bangali Khola Bridge (37.5m)	Rehabilitation of existing pipe culverts and slabs in order to make double lane and adding structures as per requirement.
8	Protection works	Protection works like river training works are only at passing bridge area of river	Retaining wall/slope protection measures as per requirement.
9	Road furniture (streetlights, delineators et)	Nil	Streetlights of height 9 m @ 25 m interval.
10	Utility	All wires and cable are hanging above ground and are in unmanaged condition - 1 Transformer	Shifting of electric poles, transformers and telephone poles with coordination with municipality.

Source: Detailed Project Report, 2024

**72. Banchauki Mayadevi - Mildanda Buddha Circuit Road (4.94 Km):** The Road is one of the important roads, which connects the Buddha Circuit route in Devdaha Municipality of Nepal. The road directly connects to the East- west highway and passes through Buddha Circuit serves as a vital link connecting several important areas and communities within the religion. The road starts from Sheetalnagar adjoining East-West Highway and ends at Devdaha marga, which directly connects to the Buddha Circuit. The RoW of this road is 12 m. The proposed road passes through Ward no 3, Ward no 7 & Ward no 8. The existing road stretched passes through Buddha Maya Community Forest. The settlement is scattered in this road section area.

**Table 42: Banchauki Mayadevi Path Mildanda Buddha Circuit Road Section**

SN	Elements of component	Existing Scenario	Proposed Scheme
1	Length of Road	4.94 km	4.94 km
2	ROW Declared by municipality	12 m	12 m
3	Total Road Width	4-11.5 m	11.5 m
4	Carriageway	Average 6 m	7.5 m
5	Pavement type	The road sections are combination of premix carpet section and gravel section.	Double lane upgradation with the 50 mm surface course of asphalt concrete, 150 mm of base course and 250 mm of sub base with proper grade and camber
6	Side Drain	There is drain and 35 m of brick canal at both side in road sections. -455m of Drain along the left side of the road. -655m of Drain along both side of the road. The proposed road is not in flooded zone.	PCC surface drain of width 0.25m (included in carriage way width) Storm water drain size of Type A – 0.45 X 0.65m Storm water drain size of Type B – 0.6 X 0.8 m Storm water drain size of Type C – 0.75 X 0.95 m.
7	Cross drainage Structures	- 2 Nos Pipe Culverts - 12 Nos Pipe Crossings - 26 Nos of Side RCC Slabs	Rehabilitation of existing pipe culverts and slabs in order to make double lane and adding structures as per requirement.
8	Protection works	Nil	Retaining wall/slope protection measures as per requirement.
9	Traffic signs/signage and road marking	Nil	Provided all along the road to ensure maximum safety to pedestrian and vehicular traffic.
10	Road furniture (streetlights, delineators et)	Nil	Streetlights of height 9 m @ 25 m interval.
11	Utility	All wires and cable are hanging above ground and are in unmanaged condition -1 Transformer	Shifting of electric poles, transformer and telephone poles in coordination with municipality.

Source: Detailed Project Report, 2024

### **Shitalnagar-Bhawanipur-Soiya Road (4.77 km)**

The project area consists of most of the parts are settlements and remaining part is agriculture area. It passes through 3.7 km of settlement area at right side and left side is the cultivation area.

Remaining about 1 km is cultivation area. The proposed road would directly serve about 340 households of the municipality.

The proposed scheme of Shitalnagar-Bhawanipur-Soiya Road compared to the existing scenario is described below:

**Table 43:** Proposed Scheme Comparison of Shitalnagar-Bhawanipur-Soiya Road

S. No	Description	Existing Scenario	Proposed Scheme
1.	Length of Road	4.79 km	4.77 km
2.	Right of Way (ROW) Declared by municipality	12 m	14 m
3.	Total Road Width	3.7-7.5 m	11.5 m
4.	Carriageway	Average 6.0 m	7.5 m
5.	Pavement type	Premix Carpet	Double lane upgradation with the 50 mm surface course of asphalt concrete, 150 mm of base course and 250 mm of sub base with proper grade and camber
6.	Median/Landscape or Green land areas	No median provided and lack of green space	Median is provided. Greeneries and plantation shall be done in interval of 10 meters over sidewalks wherever space is available
7.	Parking	Haphazard parking on shoulder and carriageway area obstructing traffic movement	Due to space restriction, separate parking is not provided however, parking space can be provided if public land available in the road vicinity.
8.	Cycle track	Nil	Not provided due to space restriction. However, alternative typical road section drawings with cycle tracks are proposed.

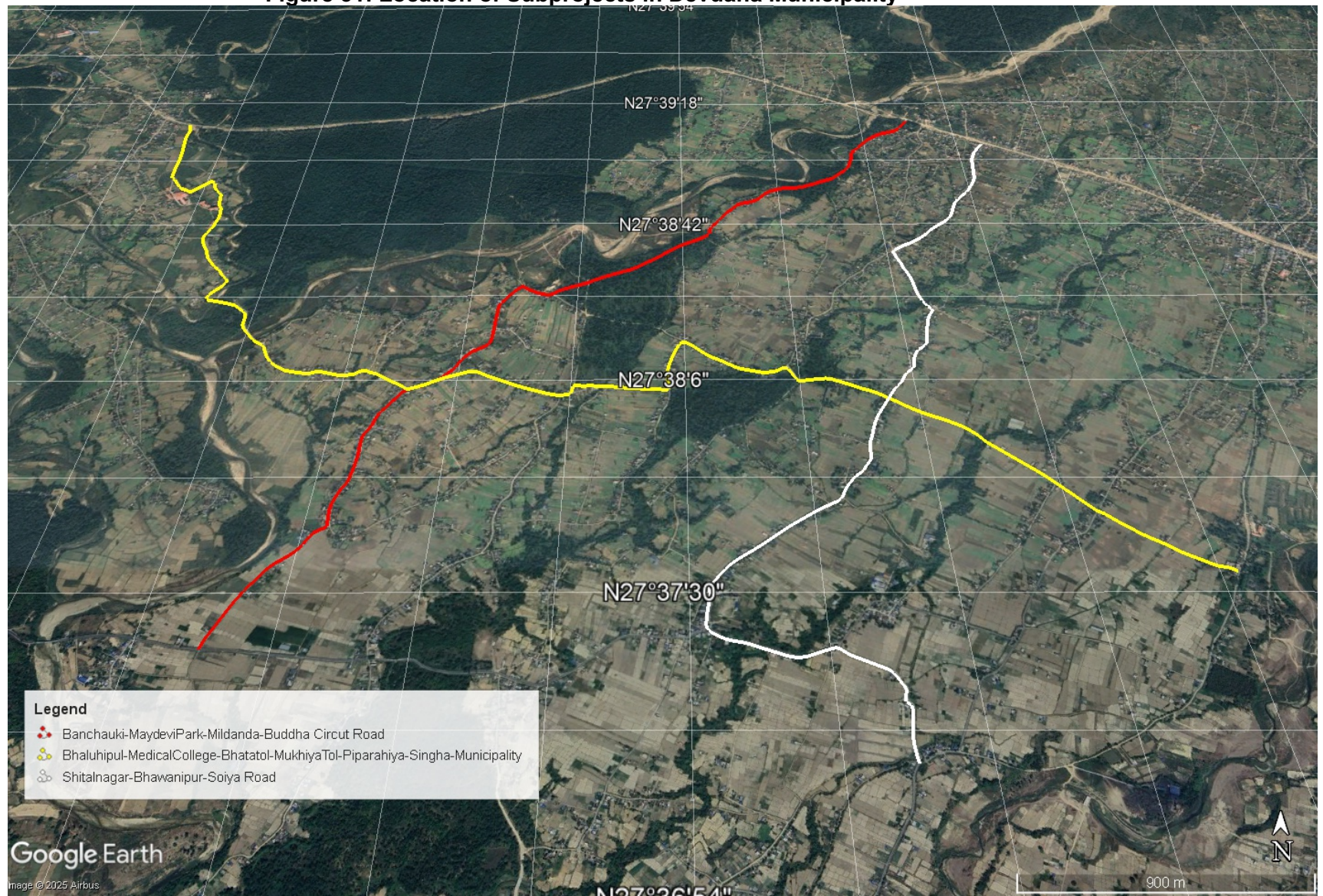


S. No	Description	Existing Scenario	Proposed Scheme
9.	Side Drain	<p>There is drain and earthen canal in road sections.</p> <p>-1397 m of earthen canal along the right side of the road.</p> <p>-2330 m of earthen canal along the left side of the road.</p> <p>-510m of Drain along the left side of the road.</p> <p>-200 m of Drain along the right side of the road.</p> <p>-560 m of covered Drain along the left side of the road.</p> <p>140 m of covered Drain along the right side of the road.</p>	<p>PCC surface drain of width 0.25m (included in carriageway width) Storm water drain size of Type A – 0.45 X 0.65m Storm water drain size of Type B – 0.6 X 0.8 m Storm water drain size of Type C – 0.75 X 0.95 m. The size of side drain will be different in Canal sections.</p> <p>Camber slope 2.5 % for quick disposal of water from road surface</p> <p>Road and storm water drain level checked simultaneously with proper drain size for drainage water flow without obstructions.</p>
10.	Cross drainage Structures	<p>- 5 No Pipe Culvert</p> <p>- 23 Nos Pipe Crossing</p>	<p>13 Hume-pipe culverts proposed</p> <p>Both side -2 No Metal deck for expansion joint</p> <p>One slab culvert is in good condition so no need to reconstruct.</p> <p>Rehabilitation of existing pipe culverts and slabs in order to make double lane and adding cross drainage structures as per requirement.</p>
11.	Protection Works	Protection works like river training works are only at passing bridge area of river	Retaining wall/slope protection measures as per requirement.
12.	Traffic signs/signage and road marking	No traffic signs/signage and road marking	Provided all along the road to ensure maximum safety to pedestrian and vehicular traffic.
13.	Road furniture (streetlights, delineators, etc.)	Nil	Street lights of height 7 m @ 25 m interval.

S. No	Description	Existing Scenario	Proposed Scheme
			Double Arm 120 Watt Street Light of height 8m@ 25m interval in median
14.	Utility	<p>All wires and cable are hanging above ground and are in unmanaged condition</p> <p>- 3 Transformers</p>	Shifting of electric poles, transformers and telephone poles in coordination with municipality.

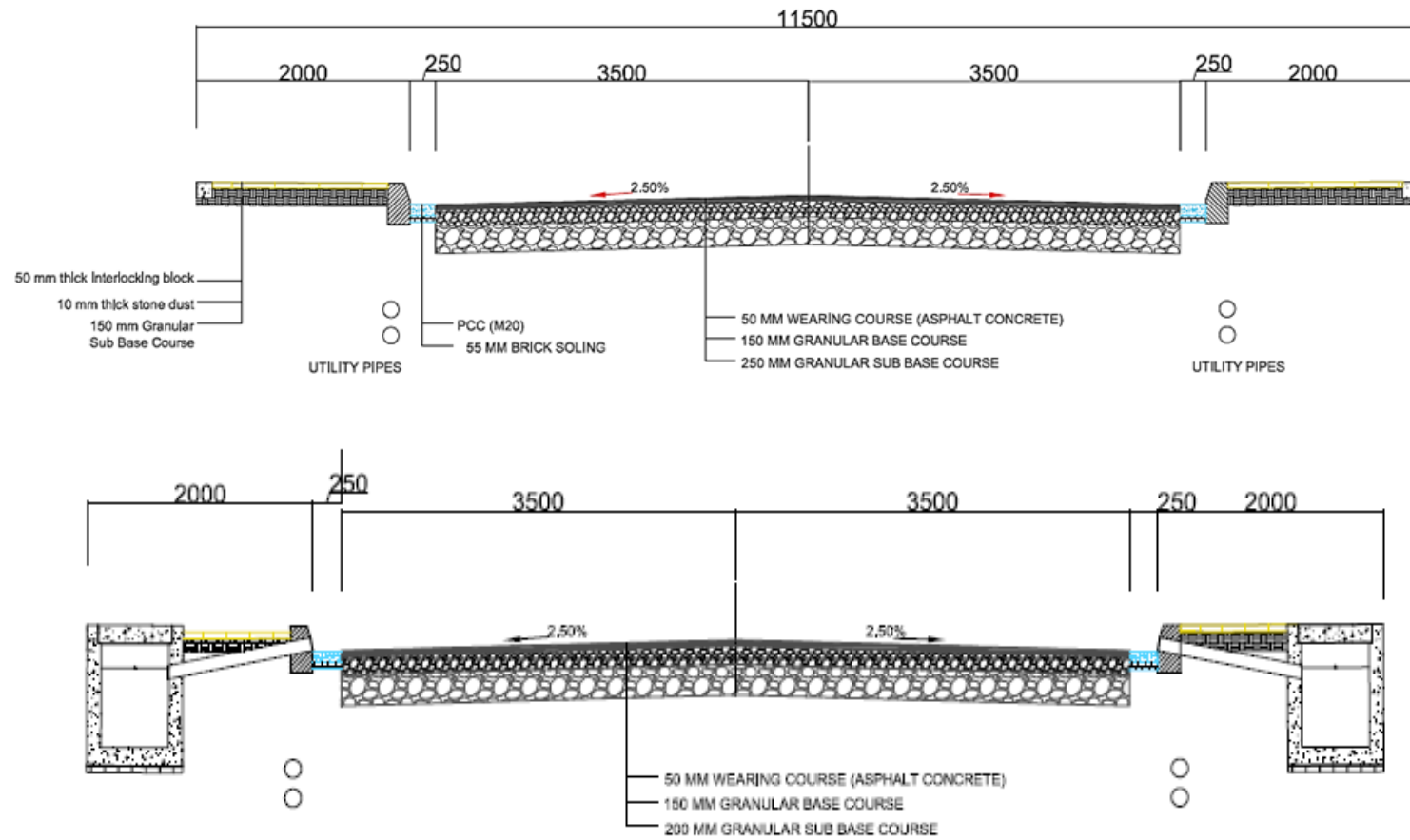
*Source: Detailed Project Report, 2024*

**Figure 31: Location of Subprojects in Devdaha Municipality**



Source: Detailed project Report, 2024





Typical Cross Section of Road with RCC Covered Drain  
Scale - 1:50

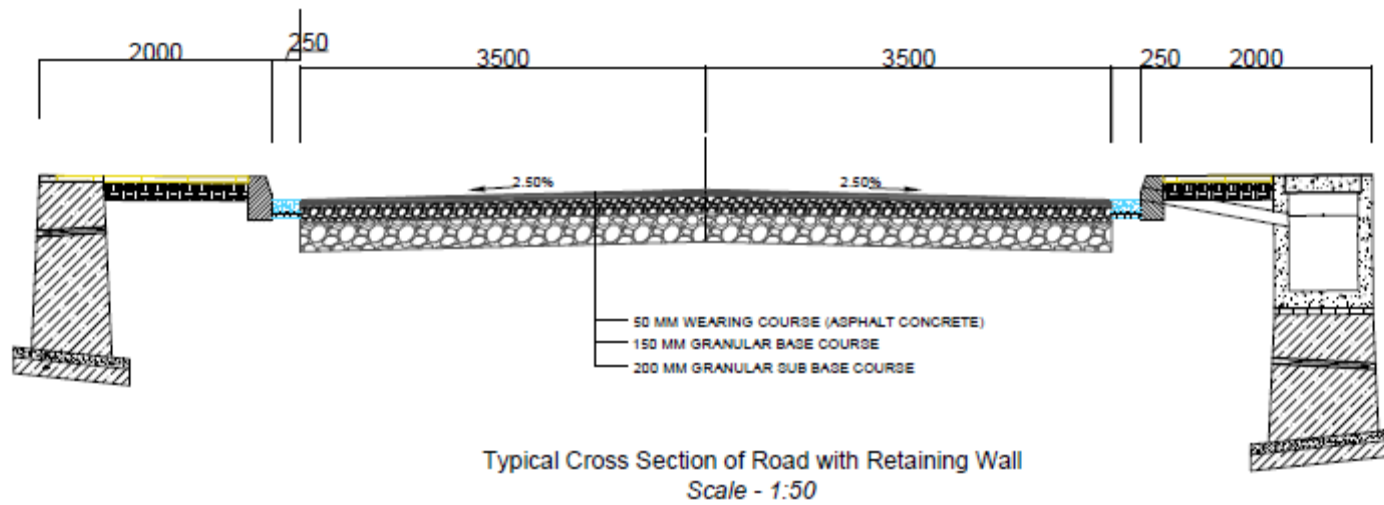
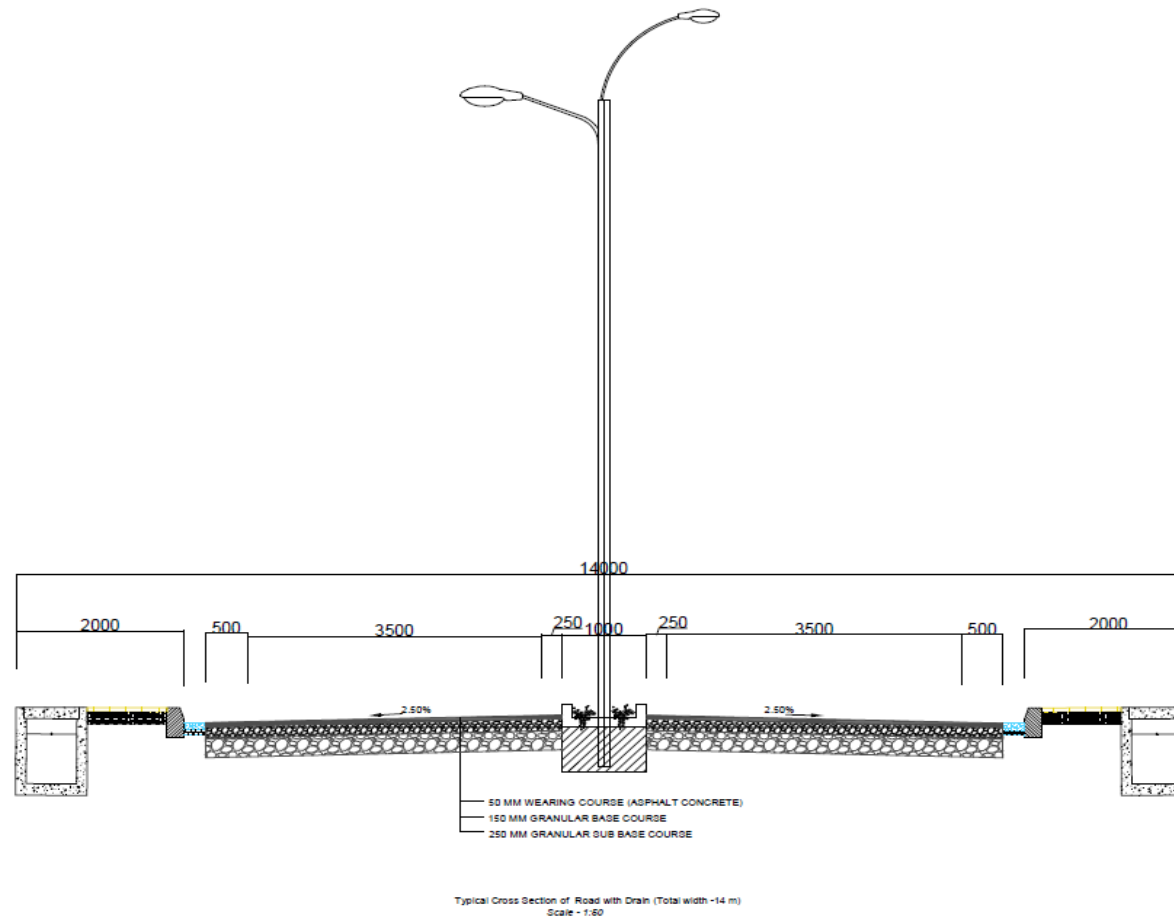
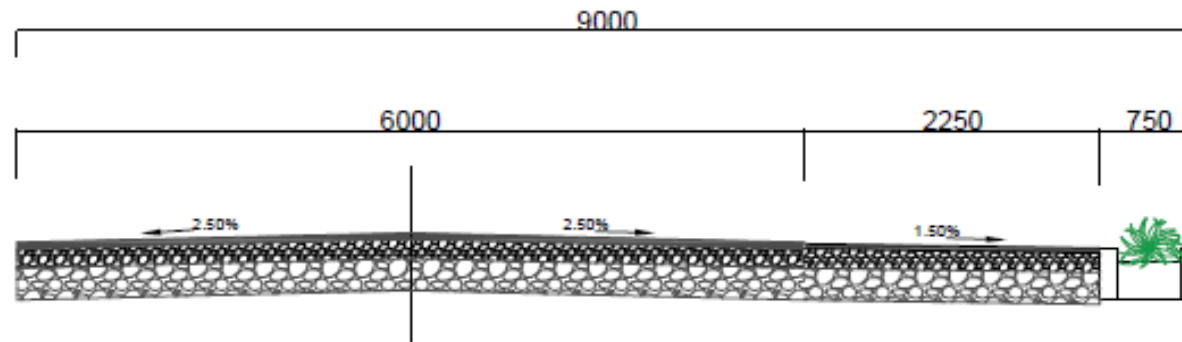


Figure 32: Typical Road Sections with Footpath, Drain and Retaining walls (11.5m) in Devdaha

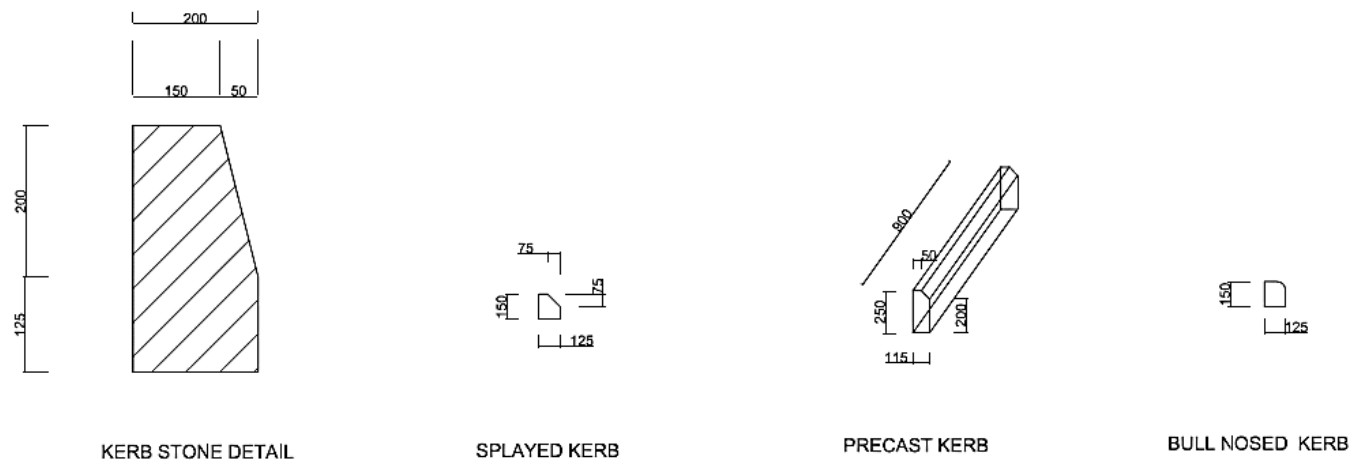


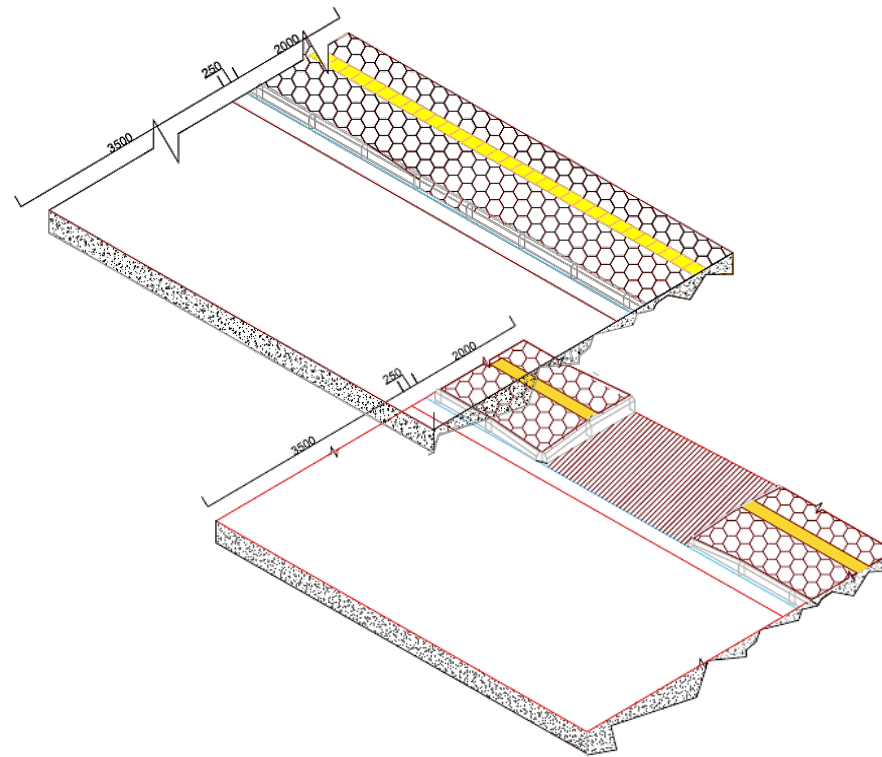
**Figure 33: Typical Road Sections with Footpath, Drain with Double Arm Street Light (14m) in Devdaha**



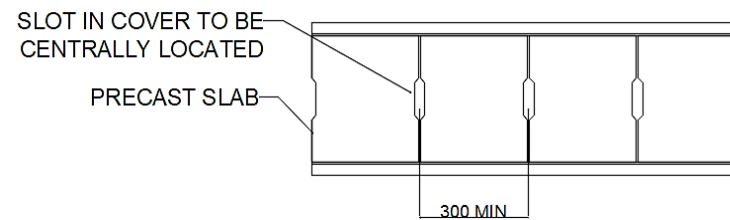
Typical Cross Sections of Road with Verge & Cycle Track  
Scale - 1:50

**Figure 34: Typical Road Sections with Footpath, Drain and Cycle Track (9.0 m) in Devdaha**





**Figure 35: Typical Kerbs and Footpath Section in Devdaha**







**Figure 36: Typical Drain Plan and Sections in Devdaha**

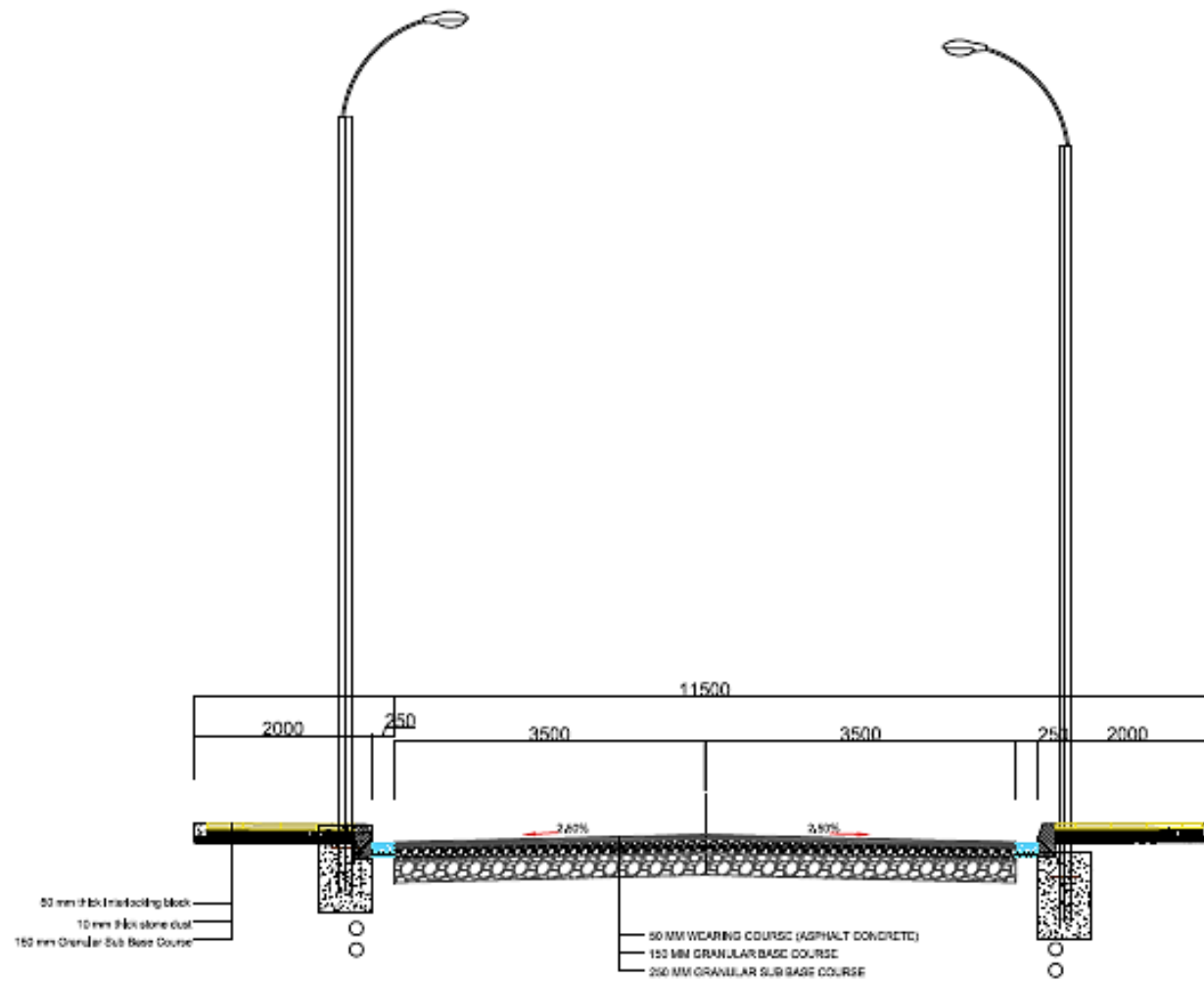
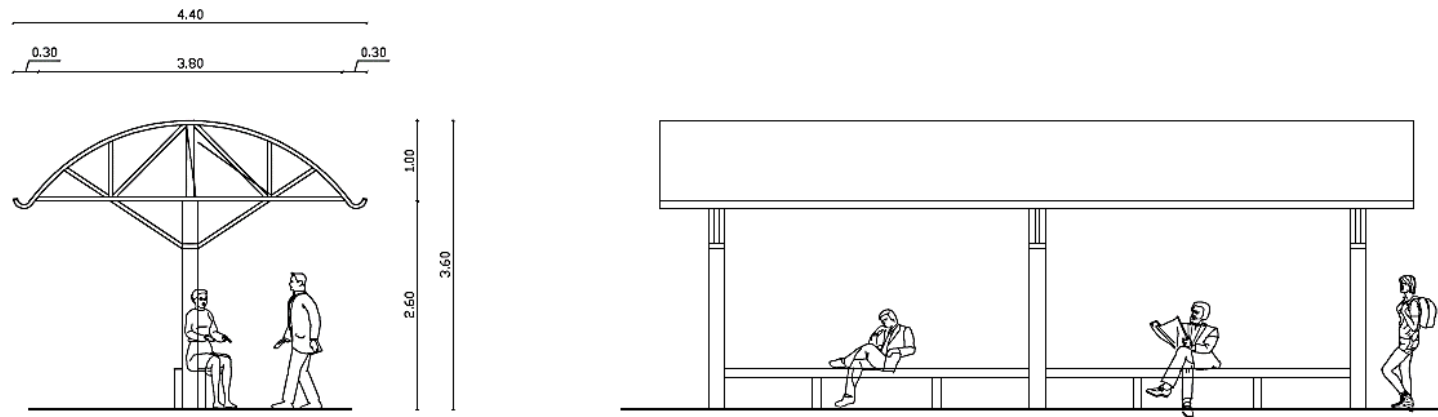
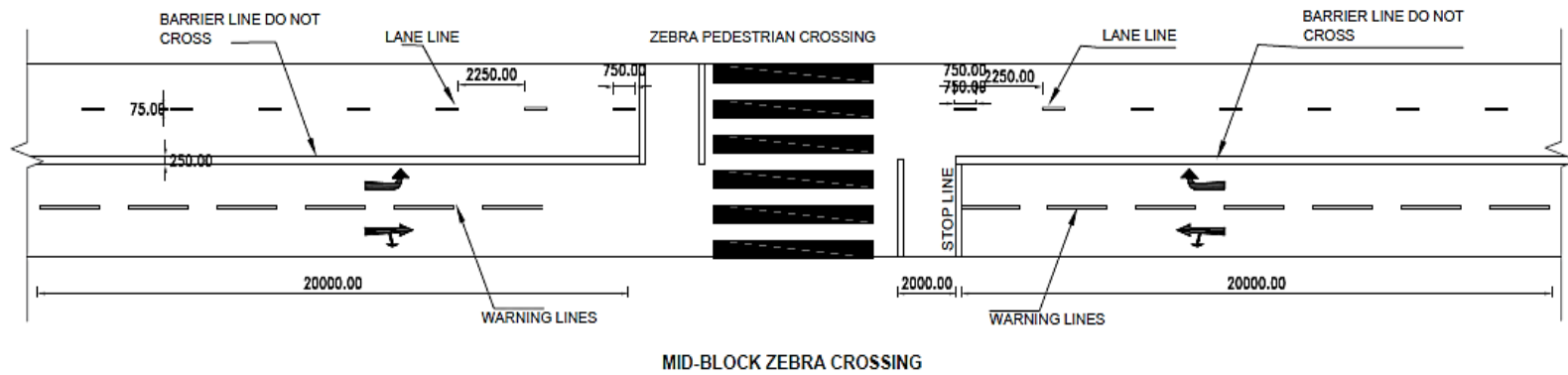


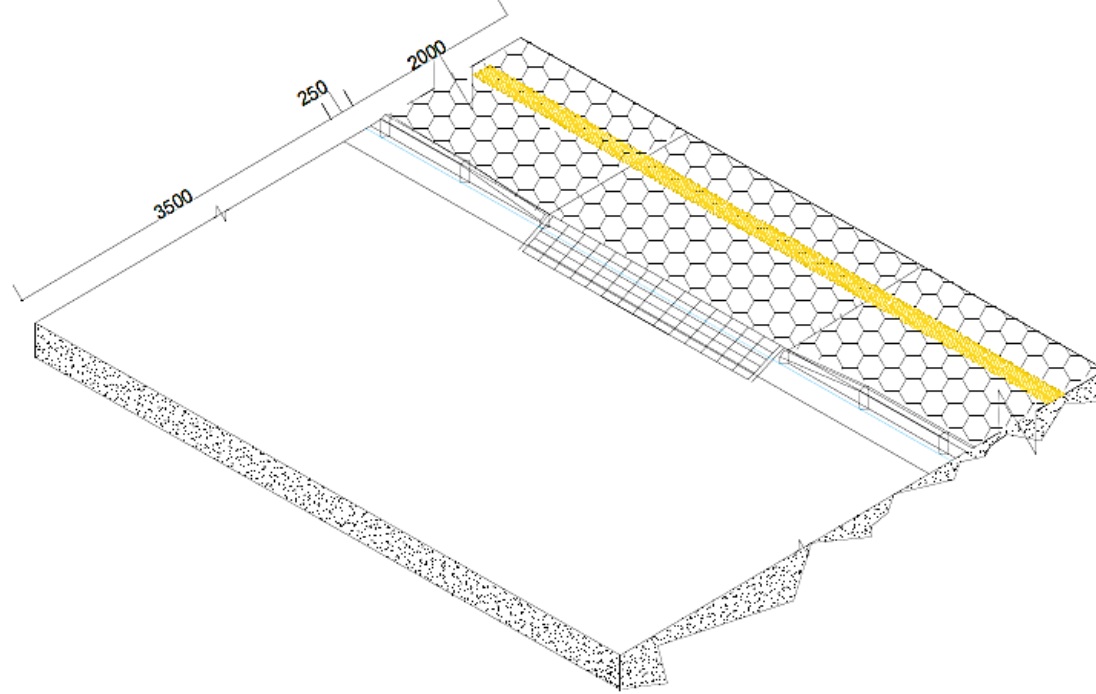
Figure 37: Typical Road Section with Street Light



**Figure 38: Resting Stations with Sheds**



**Figure 39: Pedestrian Crossing Details**



**Figure 40: *Footpath with Ramps for entrances***

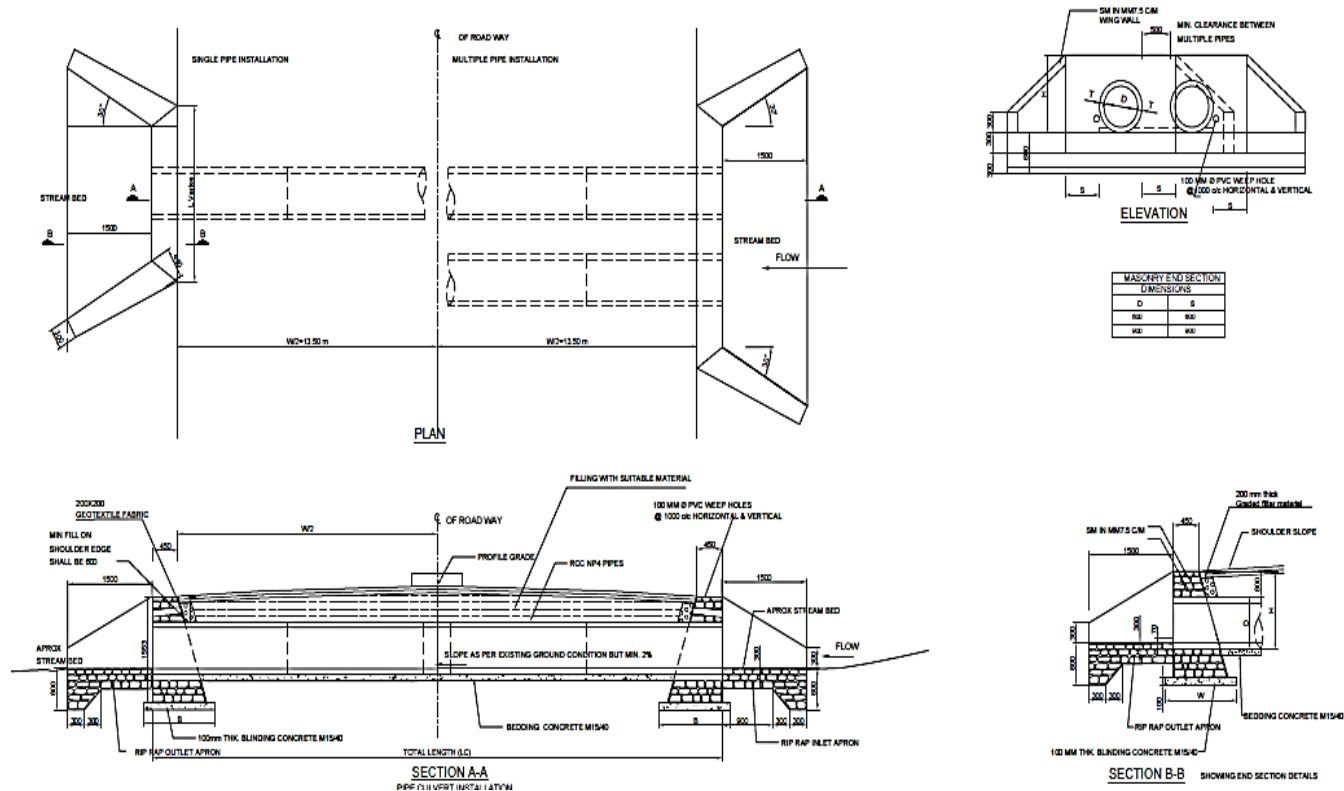


Figure 41: Typical Pipe Culvert Plan and Sections

### Figure 42: Typical Slab Culvert Plan and Sections

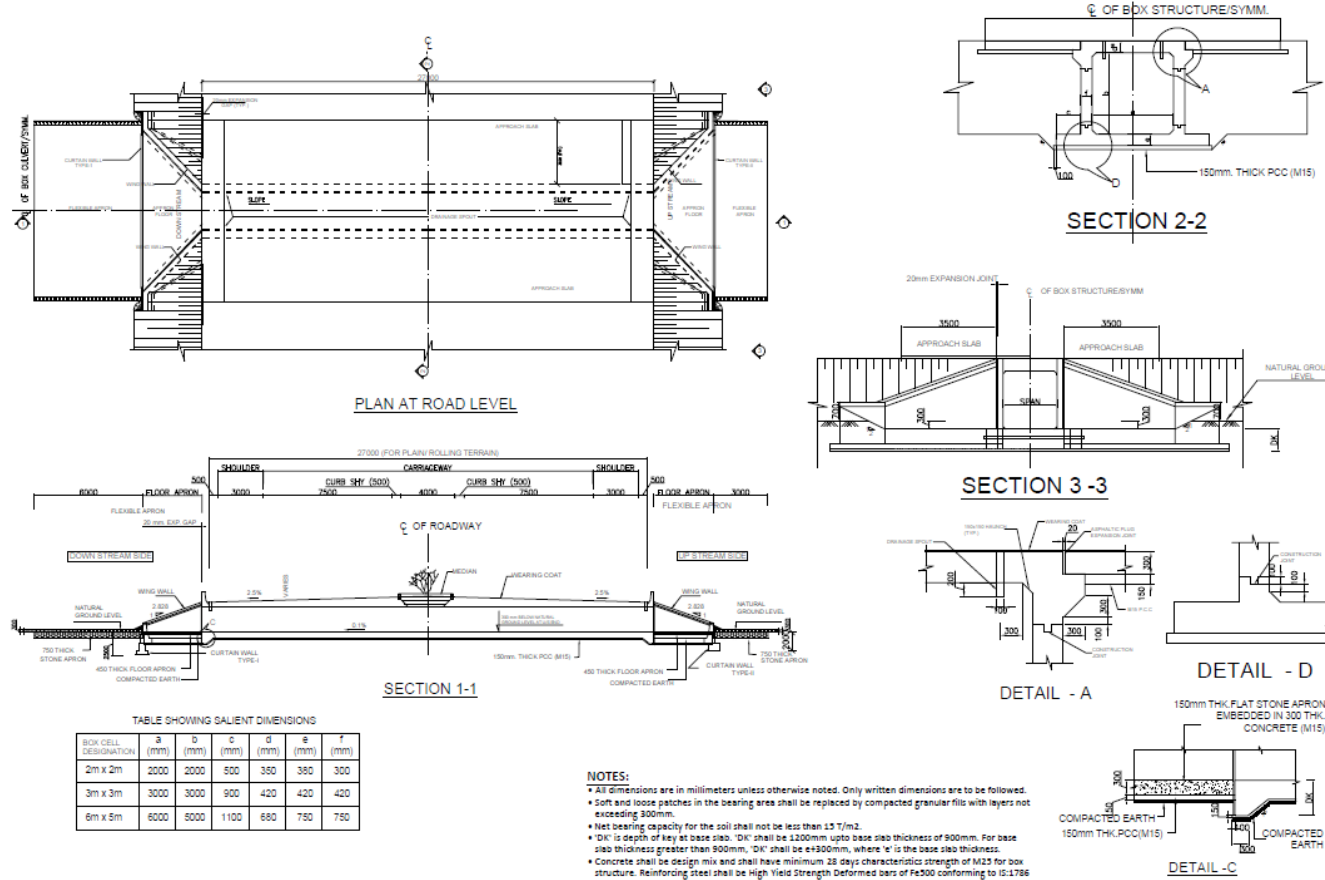


Figure 43: Typical Box Culvert Plan and Sections

Source: Detailed Project Report, 2024

#### D. Sainamaina Municipality Subprojects

73. Under the scope of URLIP, two road sections under Sainamaina Municipality are proposed to rehabilitate and reconstruct integrating drainage and road component. The proposed road section passes through flat lands with almost plain slopes and moves through mostly settlements and agricultural lands.

74. **Sainamaina Ring Road 1 (Panbari - Saljhandi Section, 9.47 km)**-The road starts from Panbari wetland near Kanchan River bridge and ends at Pahili Khola bridge, Saljhandi near Bankatti of ward number 10 in Saina Maina Municipality. The road is 9,473 m in length. Both the starting and end point of the road meets the East – West Highway (NH -01). The existing road width varies from 10 m to 12 m with blacktopped road at urban sections and 5 – 7 m width for gravel road of the alignment section. The proposed scheme of Panbari - Saljhandi Road compared to the 57

75. existing scenario is described in the table below.

**Table 44: Existing Condition and Proposed Sainamaina Ring Road 1 (Panbari- Saljhandi)**

S. N.	Description	Existing Scenario	Proposed Scheme
1.	Length of Road	9.47 km	9.47 km
2.	Right of Way (RoW)-Declared by municipality	15m (11 m road is clear in site)	15m Road width designed is only 11.5m including footpath.
3.	Total Road Width	-4 to 8 m at urban sections. -3.5 to 8.5m at graveled and earthen road at most sections.	11.5 m
4.	Carriageway	Average 4.5 m	7.5 m
5.	Pavement type	Some sections are blacktopped and most of the sections are graveled and earthen.	Double lane upgradation with the 50mm surface course of asphalt concrete, 150mm of base course and 250mm of sub base course with proper grade and camber.
6.	Side Drain	-50m of side drain along the left side of the road. -252.54m of side drain along the right side of the road. -35m of covered drain along the right side of the road.	PCC surface drain of width 0.25m (included in carriage way width). Storm water drain size of Type A – 0.45 X 0.65m Storm water drain size of Type B – 0.6 X 0.8 m Storm water drain size of Type C – 0.75 X 0.95 m
7.	Cross drainage Structures	- 26 Pipe Culverts -11 Side RCC Slabs -18 Slab Culverts -1 under construction bridge	32 Hume-pipe culverts 18 slab culverts to be dismantled & reconstructed. Rehabilitation of existing side pipe crossings & slabs in order to make double lane.
8.	Protection Works	Retaining walls at some locations.	Retaining wall/slope protection measures as per requirement.
9.	Traffic signs/signage and road marking	Present at some locations.	Provided all along the road to ensure maximum safety to pedestrian and vehicular traffic.



S. N.	Description	Existing Scenario	Proposed Scheme
10.	Road furniture (streetlights, delineators, etc.)	Only in some sections.	Street lights of height 9m at 25 m interval.
11.	Utility	All wires and cable are hanging above ground and are in unmanaged condition	Shifting of electric poles and telephone poles with coordination with municipality and NEA.

Source: Detailed Project Report, 2024

**Saina Maina Ring Road 2 (Duimuhan chowk - Thali Section, 5.26 km)** The road starts from Duimuhan Chowk and ends at Thali of ward number 11 of Saina Maina Municipality. The total length of the road is 5,261 m. The existing road from Ch: 0+000 to Ch: 0+540, is graveled and the remaining all is blacktopped except under construction bridge section at Ch: 2+980. A new bridge is being constructed at Ch: 0+420 over Kanchan River and with 7.5 m width and footpath 1.5 m on either side. The current clear road width is 30 feet (9 meters) only with 7 m carriage way and 2 m shoulder width.

**Table 45: Existing Condition and Proposed Saina Maina Ring Road 2 (Duimuhan Chowk- Thali Gaon to Chaudhary Ghola)**

SN	Description	Existing Scenario	Proposed Scheme
1.	Length of Road	5.26 km	5.26 km
2.	Right of Way (RoW)-Declared by municipality	15m (11 m road is clear in site)	15m Road width designed is only 11.5m including footpath
3.	Total Road Width	-4.5 to 8 m for blacktopped sections -4 to 9 m for graveled sections	11.5 m
4.	Carriageway	Average 4.5 m	7.5 m
5.	Pavement type	Some sections are graveled and some are blacktopped.	Double lane upgradation with the 50mm surface course of asphalt concrete, 150mm of base course and 250mm of sub-base course with proper grade and camber.
6.	Side Drain	-13m of side drain along the left side of the road.	PCC surface drain of width 0.25m (included in carriage way width) Storm water drain size of Type A – 0.45 X 0.65m Storm water drain size of Type B – 0.6 X 0.8 m Storm water drain size of Type C- 0.75 X 0.95 m
7.	Cross drainage Structures	-9 pipe culverts -1 side Hume pipe -4 slab culverts -1 Bridge -1 under construction bridge.	14 Hume-pipe culverts 9 slab culverts to be dismantled & reconstructed. Rehabilitation of existing side pipe crossings and slabs in order to make double lane.
8.	Protection Works	Retaining walls at some locations.	Retaining wall/slope protection measures as per requirement.
9.	Traffic signs/ signage and road marking	Present at some locations.	Provided all along the road to ensure maximum safety to pedestrian and vehicular traffic.
10.	Road furniture (street lights,	Only in some sections.	Street lights are provided of height 9m at 25 m interval.

SN	Description	Existing Scenario	Proposed Scheme
	delineators, etc.)		
11.	Utility	All wires and cable are hanging above ground and are in unmanaged condition.	Shifting of electric poles and telephone poles with coordination with municipality and NEA.

Source: Detailed Project Report, 2024

### Panbari Bhatta to Chafiya Tole Road (1.560 km)

The proposed study area is located within Sainamaina Municipality of Rupandehi district. The total length of the proposed road is 1.56 km. The road alignment passes through Ward no. 10 of Sainamaina Municipality. It is a plain terrain road with average carriageway width of 7 m and right of way of 15 m. The existing road network and their destinations through 3 Nos of other junctions. Main settlement connecting the route includes Panbaari & Saljhandi.

**Table 46: Existing Condition and Proposed Scheme Comparison of Panbari Bhatta to Chafiya Tole Road**

S.N.	Description	Existing Scenario	Proposed Scheme
1.	Length of Road	1.560 km	1.560 km
2.	Right of Way (RoW)- Declared by municipality	15 m	15 m
3.	Total Road Width	4-8 m at urban sections	11.5 m
4.	Carriageway	Average 6 m	7 m
5.	Pavement type	Graveled road section	Intermediate lane upgradation with the 50 mm surface course of asphalt concrete, 150 mm of base course and 200 mm of sub base with proper grade and camber
6.	Median/Landscape or Green land areas	No median provided and lack of green space	Median is not provided/ Greeneries and plantation shall be done in interval of 10 meters wherever space is available
7.	Parking	Haphazard parking on shoulder and carriageway area obstructing traffic movement	Due to space restriction, separate parking is not provided. However, parking space can be provided in public land available in the road vicinity.
8.	Cycle track	Nil	Not provided due to space restriction.
9.	Side Drain	No Drain	PCC surface drain of width 0.25m (included in carriage way width) Storm water drain size of Type A – 0.45 X 0.65m Storm water drain size of Type B – 0.6 X 0.8 m

S.N.	Description	Existing Scenario	Proposed Scheme
10.	Cross drainage Structures	No Cross drainage structures	5– 900 mm Ø pipe culverts proposed.
11.	Protection Works	Nil	No need of Retaining wall
12.	Traffic signs/signage and road marking	Nil	Provided all along the road to ensure maximum safety to pedestrian and vehicular traffic.
13.	Road furniture (streetlights, delineators, etc.)	Nil	Street lights of height 7m at 25 m interval.
14.	Utility	All wires and cable are hanging above ground and are in unmanaged condition	Shifting of electric poles in coordination with municipality.

Source: Detailed Project Report, 2024

#### 76. Kanchanpul to Dakshin Barauli Road (0.45 km)

The proposed study area is located in Sainamaina Municipality of Rupandehi district. The overall length of the proposed road is 0.450 km. The road alignment passes through Ward no. 11 of Sainamaina Municipality. It is a plain terrain road with average carriageway width of 7 m and right of way of 15 m.

The existing road network and their destinations through one No of other junctions. Main settlement connecting the route includes Kanchan Pul and end at Dakshin Barauli Road.

**Table 47: Existing Condition and Proposed Scheme Comparison of Kanchan Pul to Dakshin Barauli Road**

S.N.	Description	Existing Scenario	Proposed Scheme
1	Length of Road	0.45 km	0.45 km
2	Right of Way (ROW) Declared by municipality	15 m	15 m
3	Total Road Width	4.5 - 6 m	9 m
4	Carriageway	Average 5m	7 m
5	Pavement type	Graveled Road	Double lane upgradation with the 50 mm surface course of asphalt concrete, 150 mm of base course and 250 mm of sub base with proper grade and camber
6	Median/Landscape or Green land areas	No median provided and lack of green space	Median is not provided/ Greeneries and plantation shall be done in interval of 10 meters

S.N.	Description	Existing Scenario	Proposed Scheme
			over sidewalks wherever space is available
7	Parking	Haphazard parking on shoulder and carriageway area obstructing traffic movement	Due to space restriction, separate parking is not provided. However, parking space can be provided in public land if available in the road vicinity.
8	Cycle track	Nil	Not provided due to space restriction.
9	Side Drain	Nil	No drain proposed, as there is not any settlement area.
10	Cross drainage Structures	Nil	1-900 mm Ø Pipe Culvert.
11	Protection works	Existing 55m of Masonry wall	Retaining wall/slope protection measures as per requirement.
12	Traffic signs/signage and road marking	Nil	Provided all along the road to ensure maximum safety to pedestrian and vehicular traffic.
13	Road furniture (streetlights, delineators etc.)	Nil	Street lights of height 7m at 25 m interval.
14	Utility	All wires and cable are hanging above ground and are in unmanaged condition	Shifting of electric poles and telephone poles with coordination with municipality.
15	Information on the importance of the road (connecting important areas such market, airport, main highway, other facility, and more). Value this road will add to the town or the region.	Connects various local settlements with Siddhartha highway increasing the road connectivity and connecting to future ring road.	

Source: Detailed Project Report, 2024

### 77. Janajyoti Tole Chowk Peepal Danda Road (0.972 km)

The proposed study area is located in Sainamaina Municipality of Rupandehi district. The overall length of the proposed road is 0.972 km. The road alignment passes through Ward no.

11 of Sainamaina Municipality. It is a plain terrain road with average carriageway width of 7 m and right of way of 15 m.

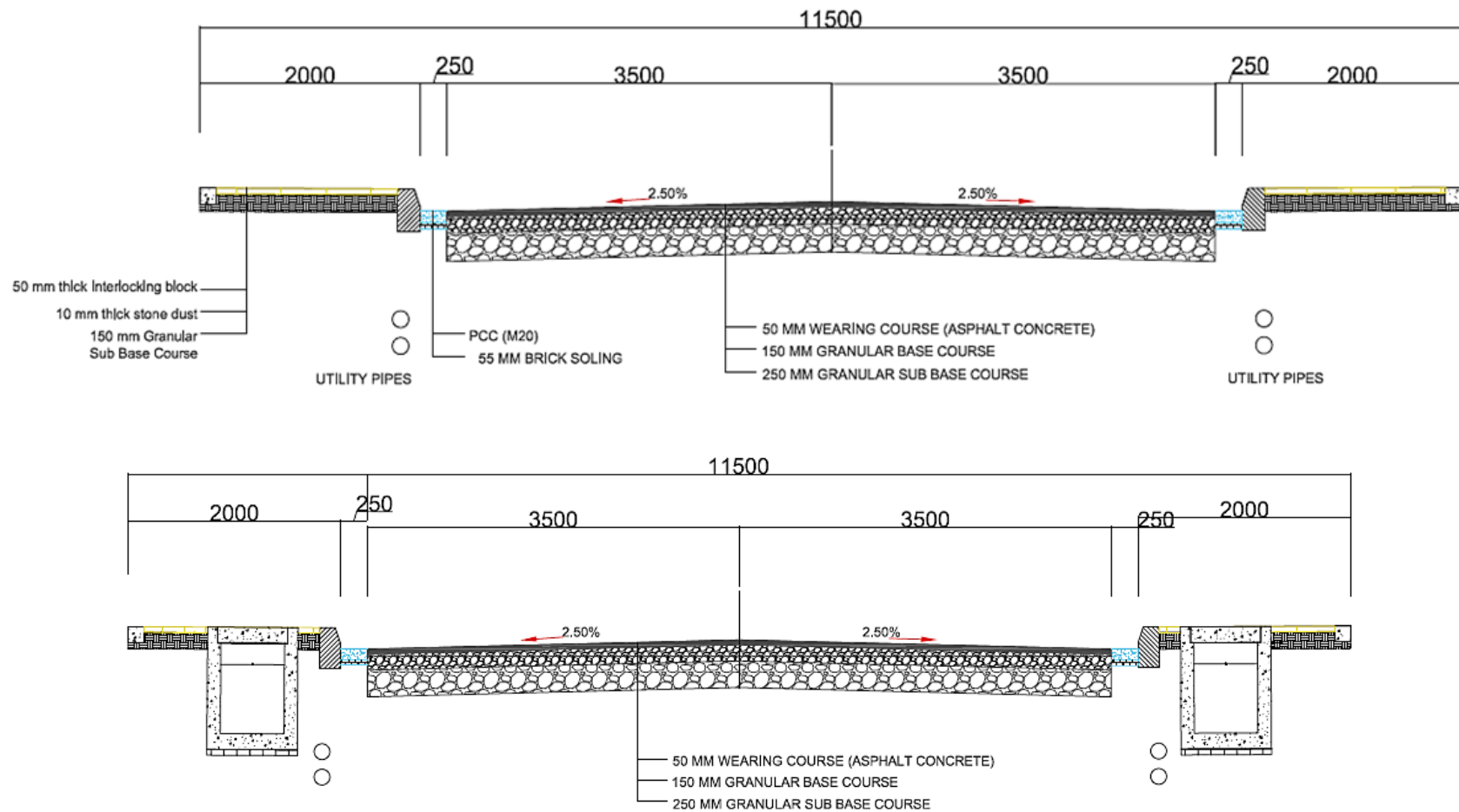
The existing road network and their destinations through two Nos of other junctions. Main settlement connecting the route includes Janajyoti Tole and end connected to East West Highway.

**Table 48: Existing Condition and Proposed Scheme Comparison of Janajyoti Tole Chowk to Peepal Danda Road**

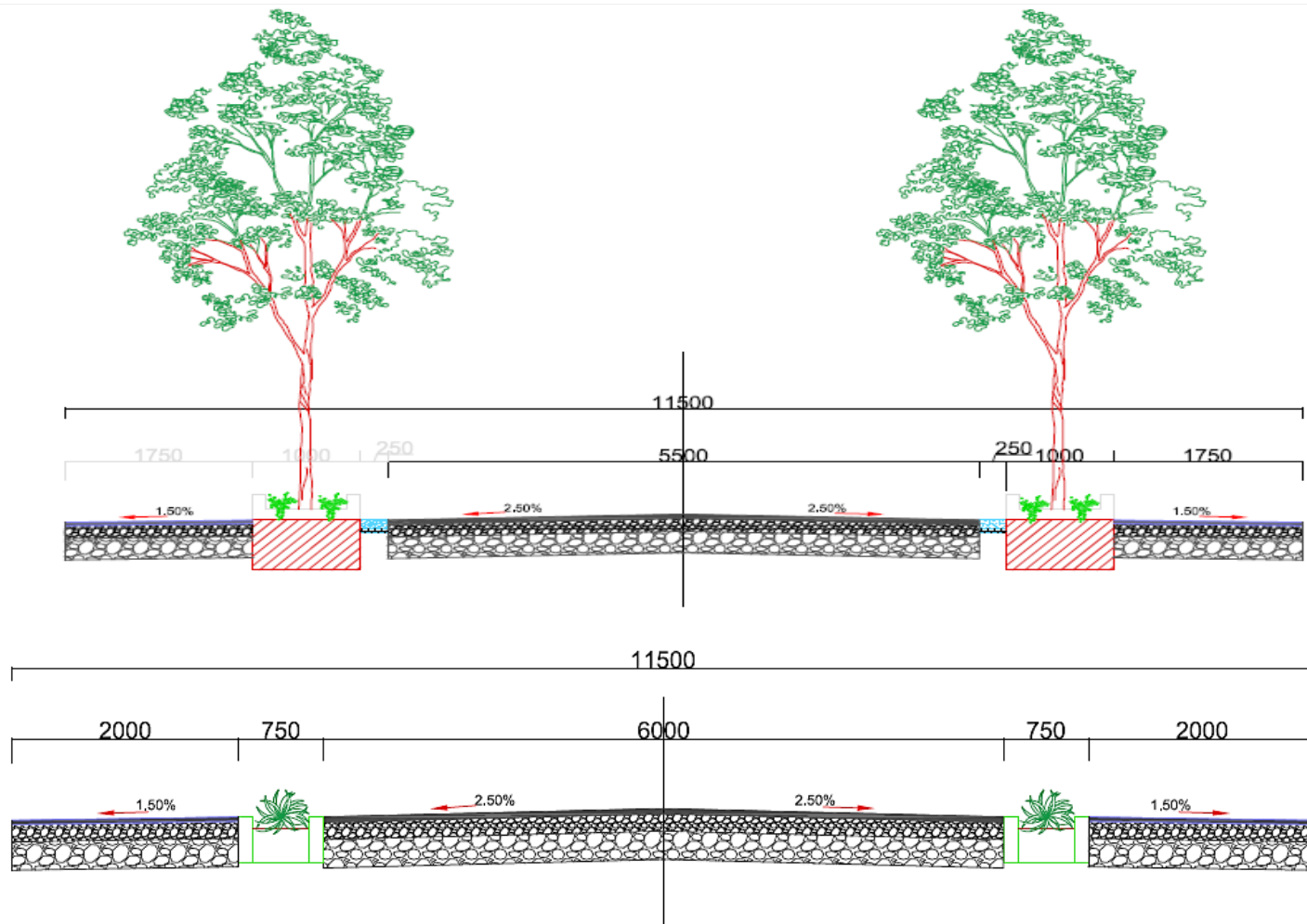
S.N.	Description	Existing Scenario	Proposed Scheme
1	Length of Road	0.972 km	0.972 km
2	Right of Way (ROW) Declared by municipality	15m	15 m
3	Total Road Width	6.5-8 m	7 m
4	Carriageway	Average 7 m	7 m
5	Pavement type	Blacktopped DBST road	Road upgradation with the 50 mm surface course of asphalt concrete, 150 mm of base course and 200 mm of sub base with proper grade and camber
6	Median/Landscape or Green land areas	No median provided and lack of green space	Median is not provided/ Greeneries and plantation shall be done in interval of 10 meters wherever space is available
7	Parking	Haphazard parking on carriageway area obstructing traffic movement	Due to space restriction, separate parking is not provided. However, parking space can be provided in public land available in the road vicinity.
8	Cycle track	Nil	Not provided due to space restriction.
9	Side Drain	Nil	No drain is proposed as it passes through Jungle area.
10	Cross drainage Structures	No existing Cross drainage	2 – 900mm Ø Pipe Culverts proposed 1 – 600mm Ø Pipe Culverts proposed
11	Protection works	Nil	No protection works required in this section.
12	Traffic signs/signage and road marking	Present at some location	Provided all along the road to ensure maximum safety to pedestrian and vehicular traffic.

S.N.	Description	Existing Scenario	Proposed Scheme
13	Road furniture (streetlights, delineators etc.)	Nil	Street lights of height 7m at 25 m interval.
14	Utility	All wires and cable are hanging above ground and are in unmanaged condition	Shifting of electric poles and telephone poles in coordination with municipality.
15	Information on the importance of the road (connecting important areas such market, airport, main highway, other facility, and more). Value this road will add to the town or the region.	Connects various local settlements with Siddhartha highway increasing the road connectivity and connecting to future ring road.	

Source: Detailed Project Report, 2024

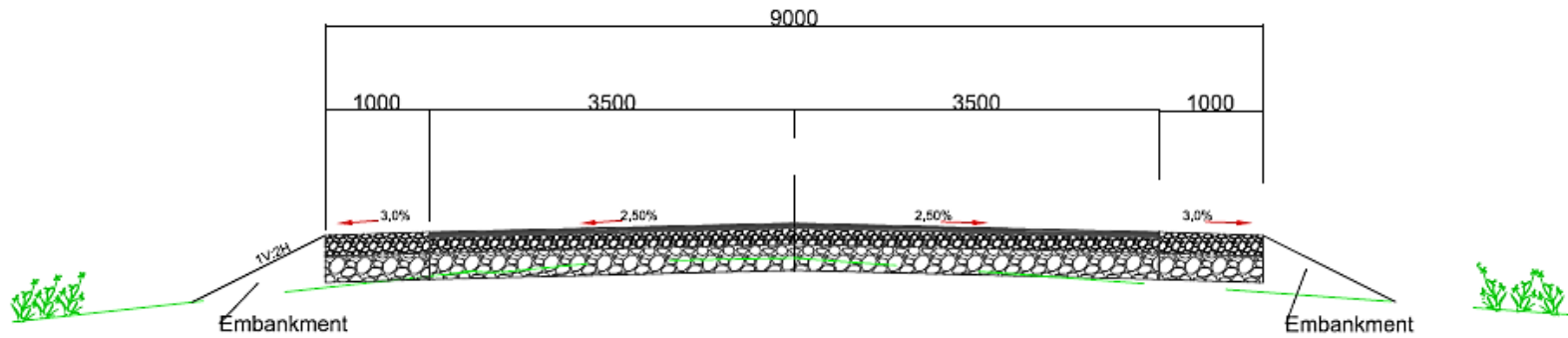


**Figure 44: Typical Road Sections with Footpath, Drain and Retaining walls (11.5m)**

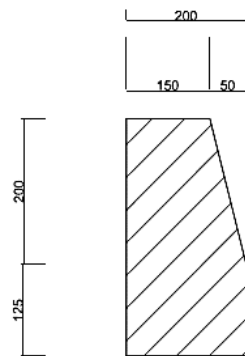


**Figure 45: Typical Road Sections with Footpath, Drain and Tree (11.5m)**

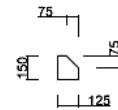




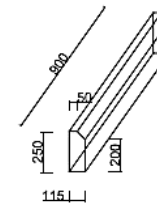
**Figure 46: Typical Road Section for Embankment (9 m)**



**KERB STONE DETAIL**



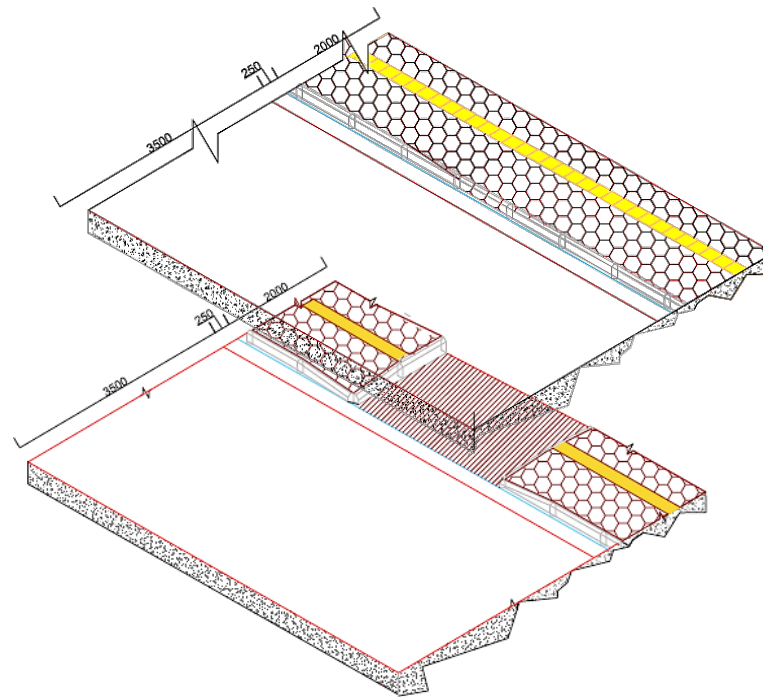
**SPLAYED KERB**



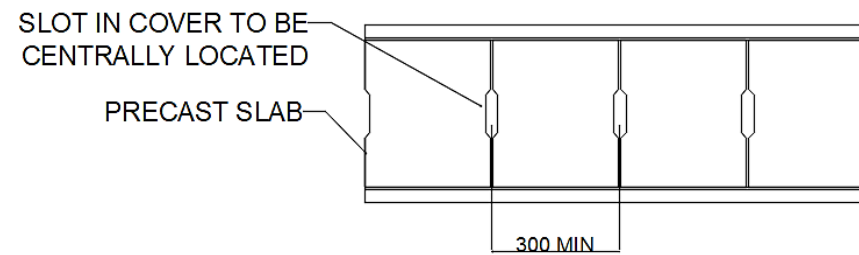
**PRECAST KERB**

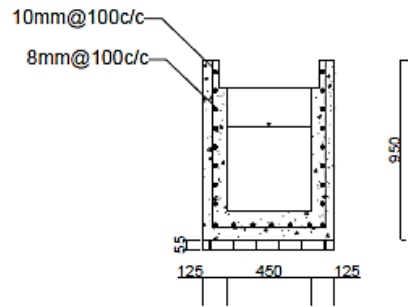
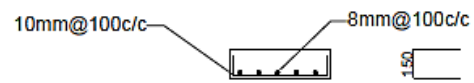


**BULL NOSED KERB**

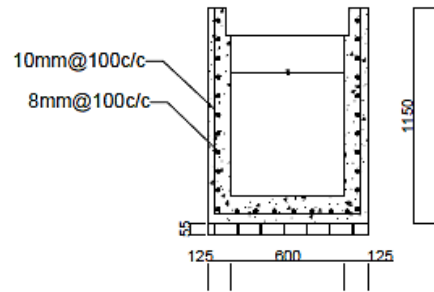


**Figure 47: Typical Kerbs and Footpath Section**

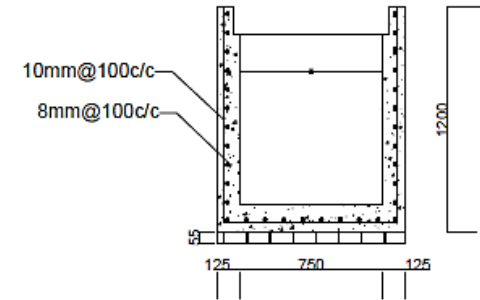
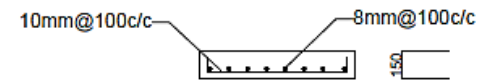




RCC DRAIN - TYPE A  
Scale - 1:25

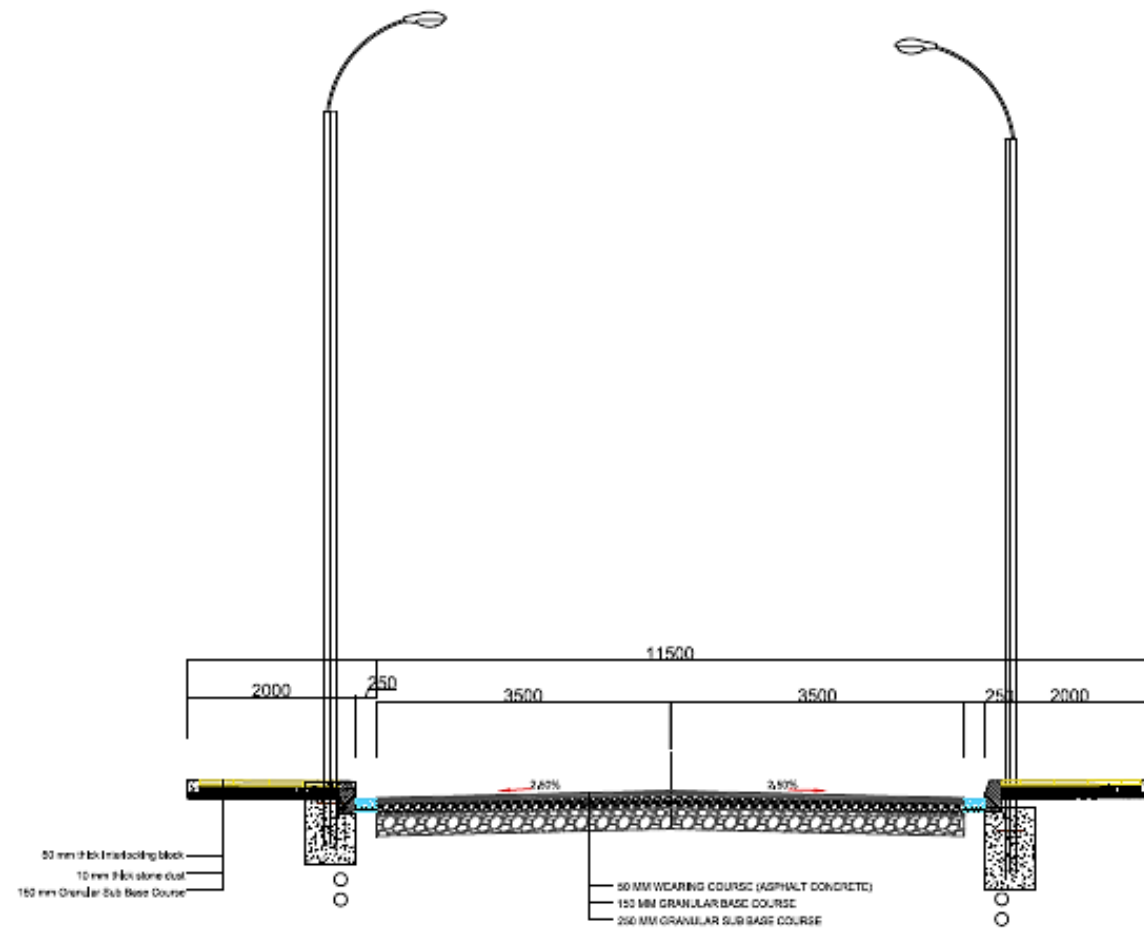


RCC DRAIN - TYPE B  
Scale - 1:25

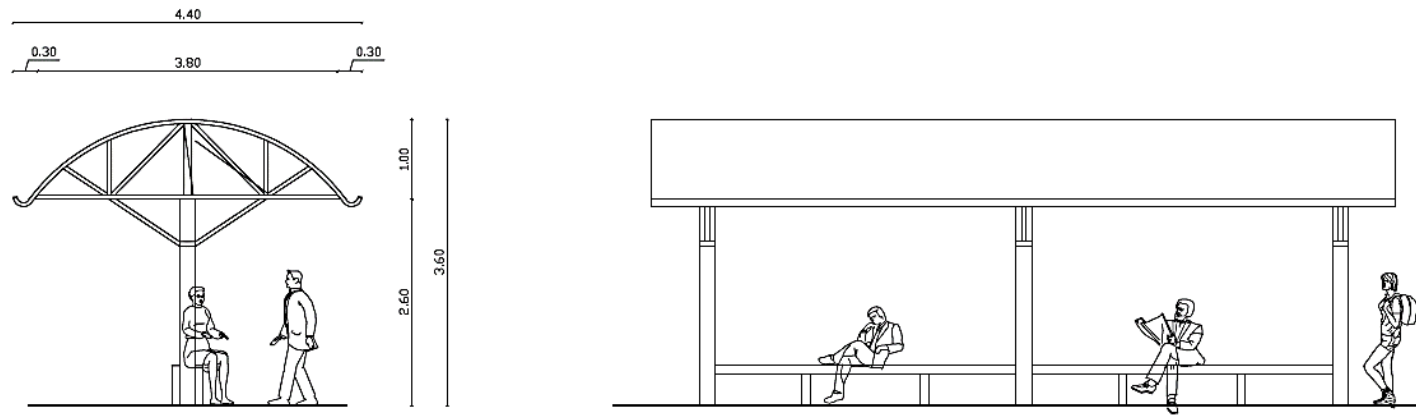


RCC DRAIN - TYPE C  
Scale - 1:25

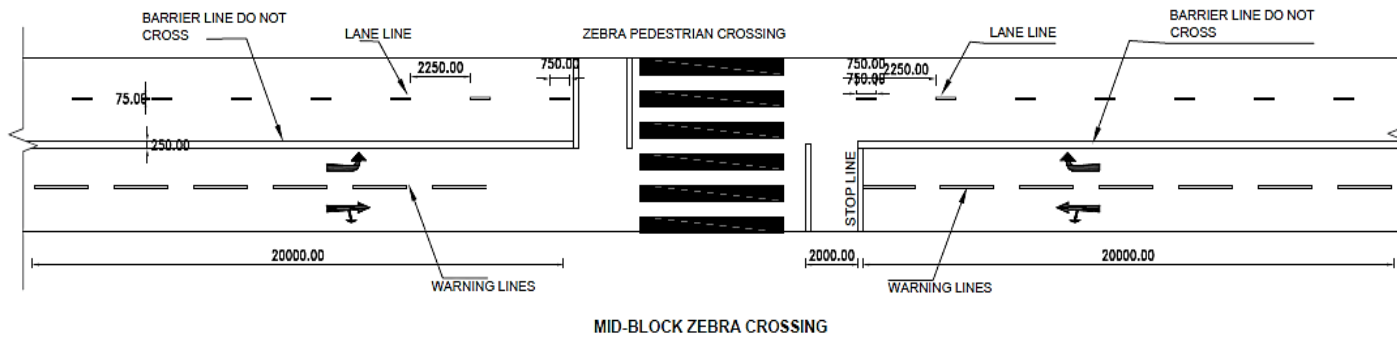
Figure 48: Typical Drain Plan and Sections



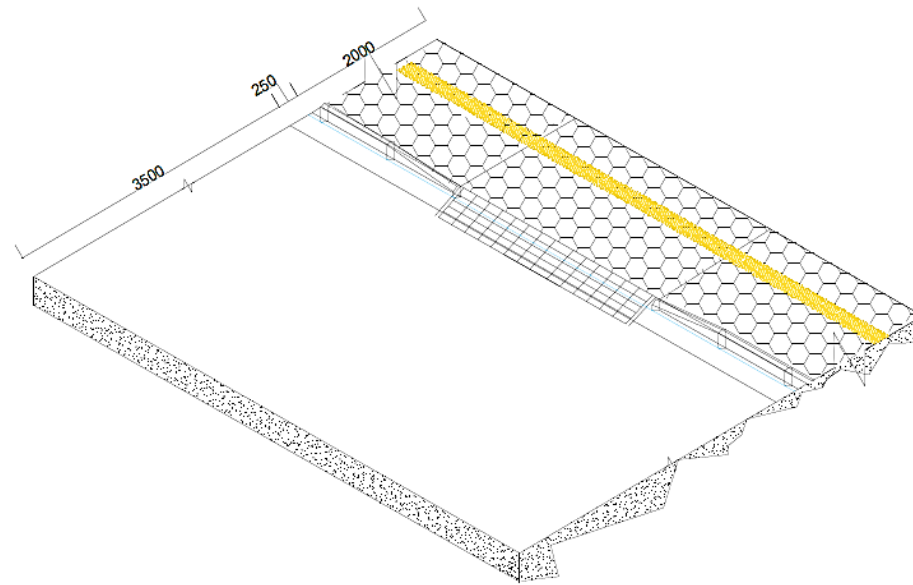
**Figure 49: Typical Road Section with Street Light**



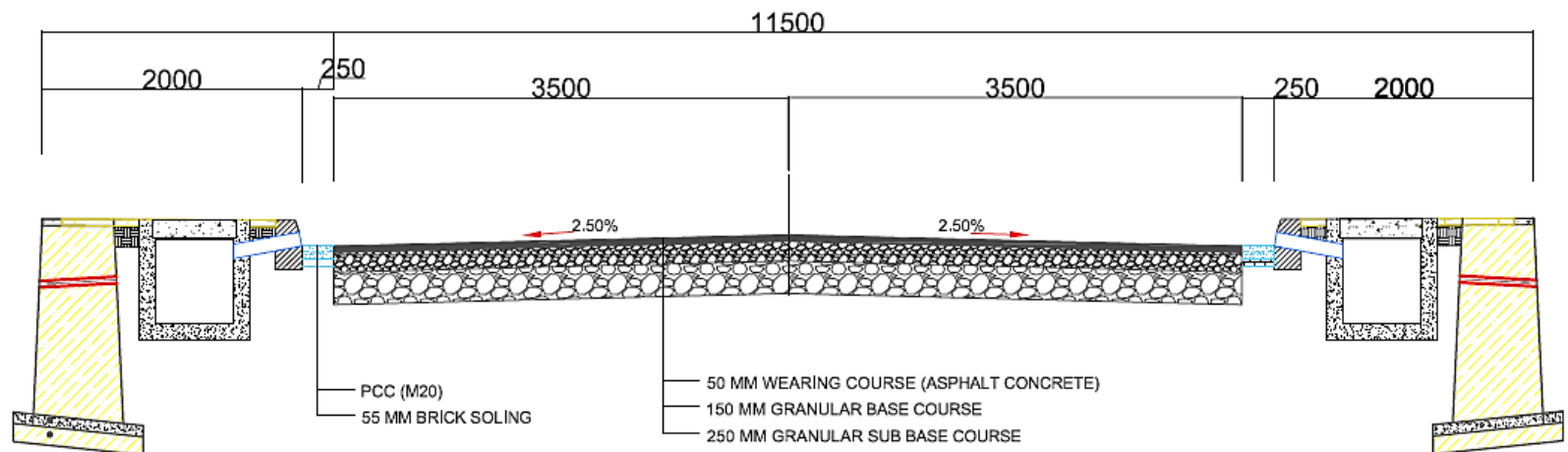
**Figure 50: Resting Stations with Sheds**



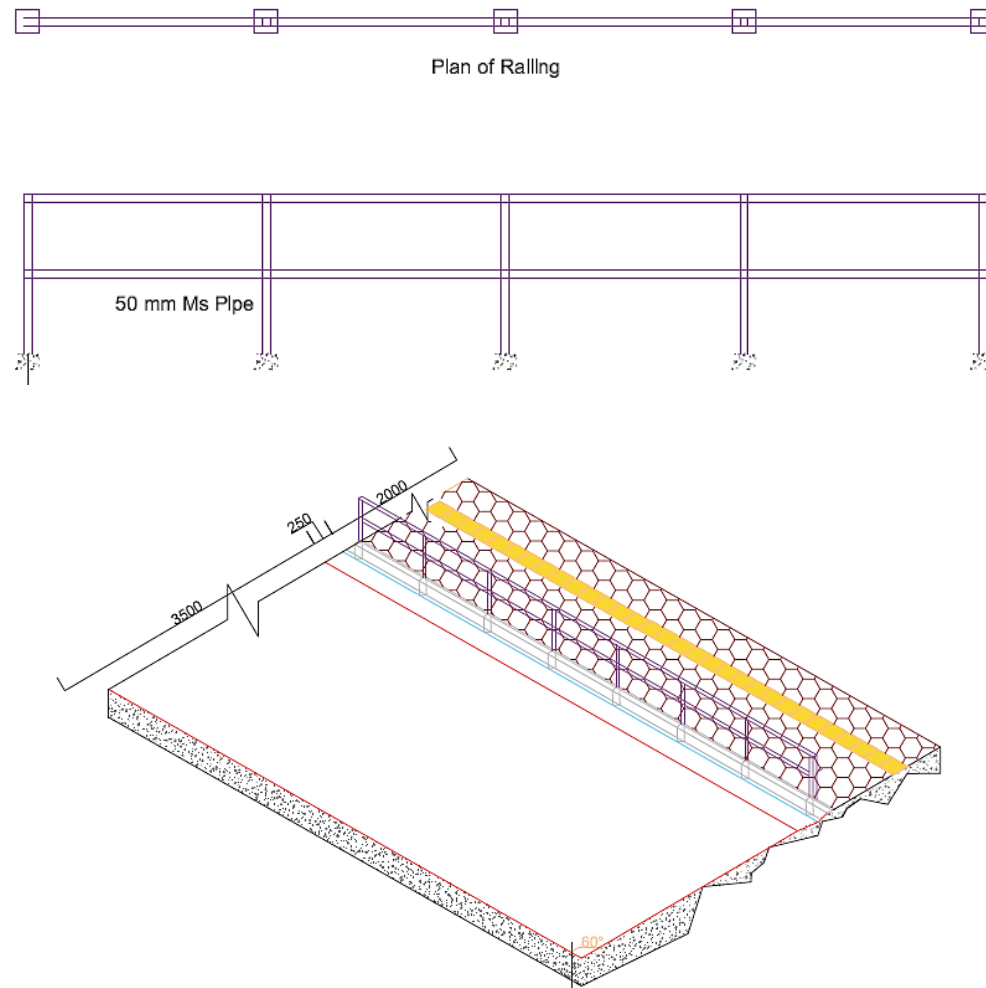
**Figure 51: Pedestrian Crossing Details**



**Figure 52: Footpath with Ramps for entrances**



**Figure 53: Typical Road Section with Retaining Walls**



**Figure 54: Hand Railings in Footpath**

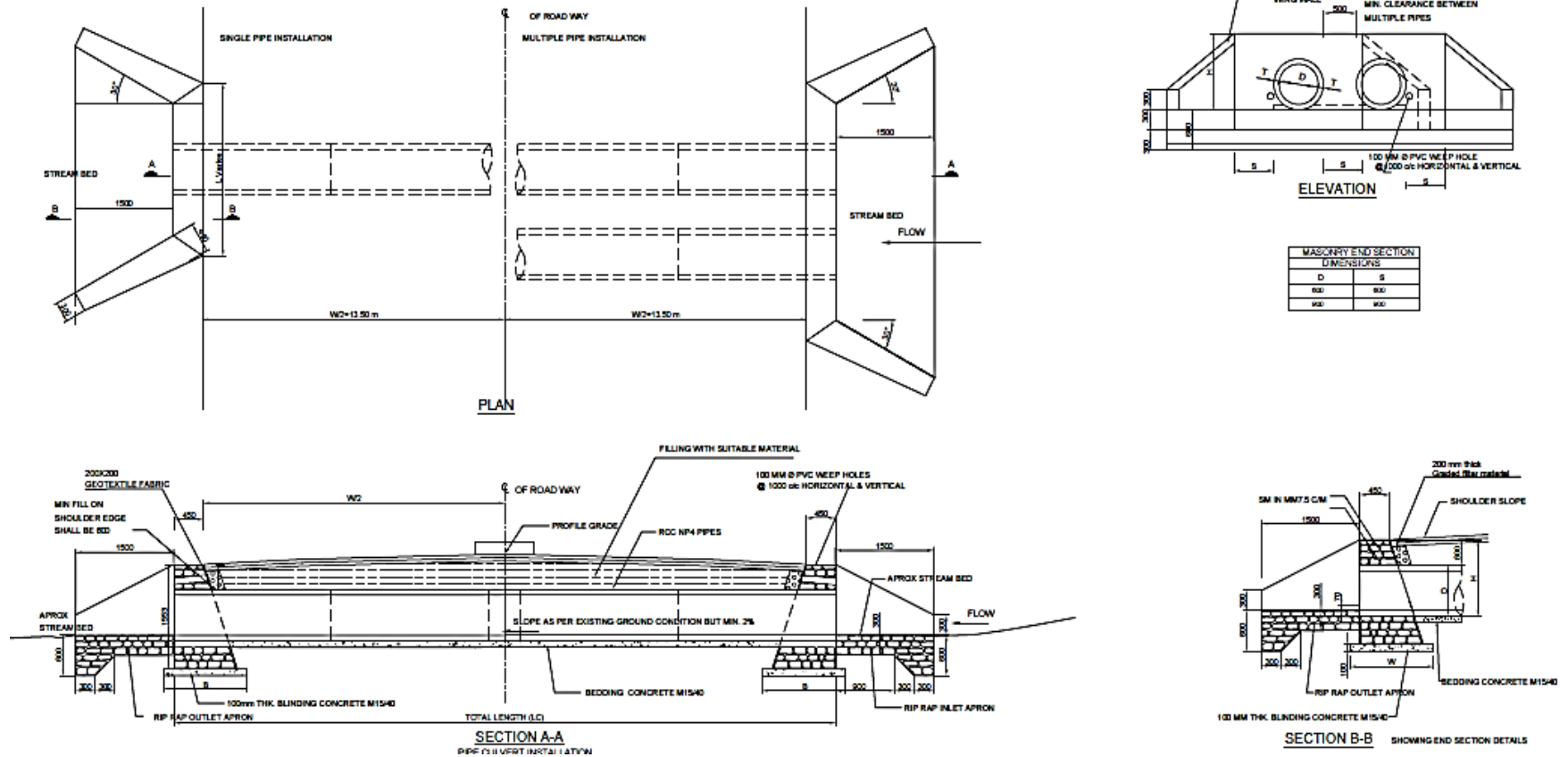


Figure 55: Typical Pipe Culvert Plan and Sections



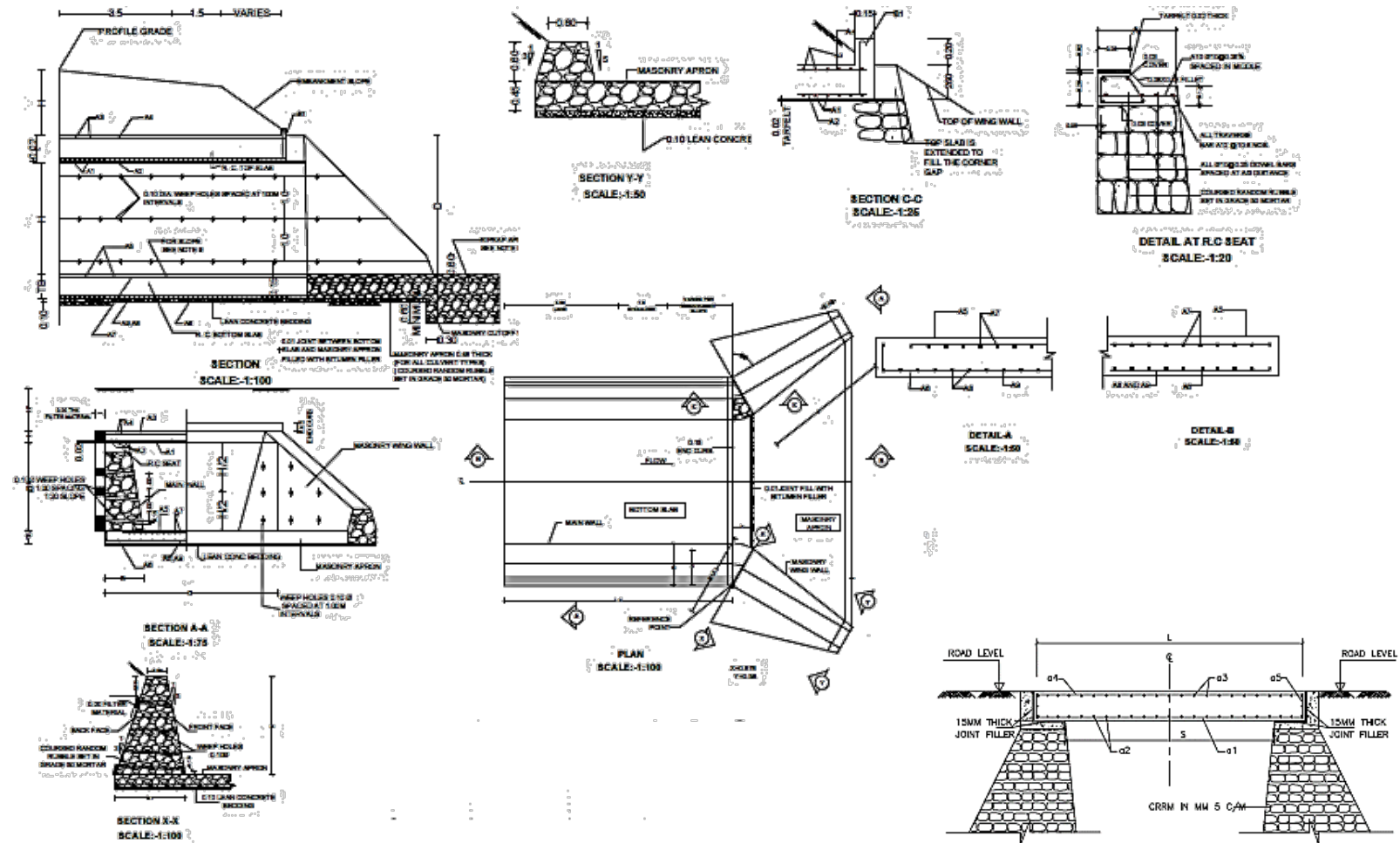
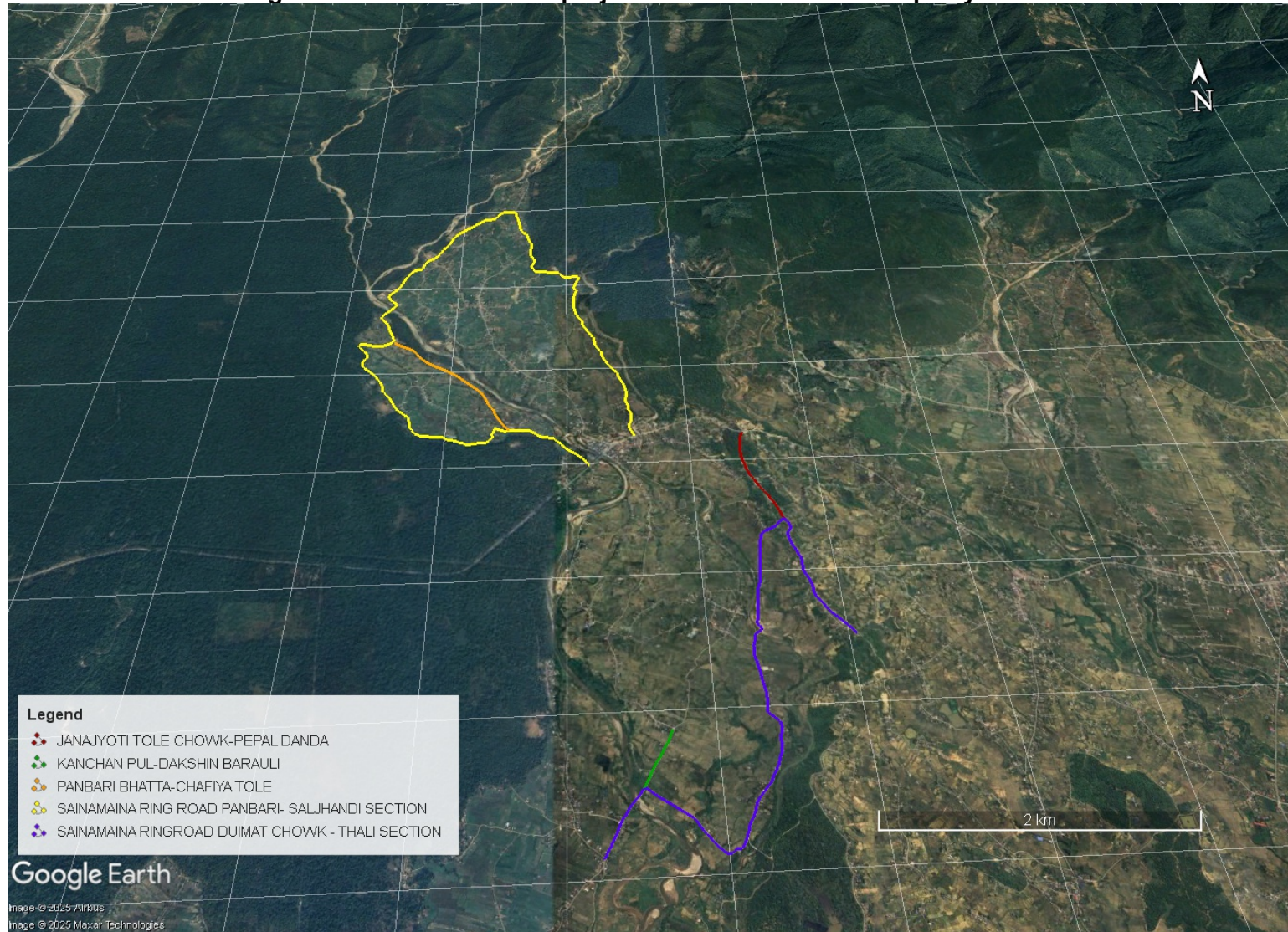


Figure 56: Typical Slab Culvert Plan and Sections

Source: Detailed Project Report, 2024

**Figure 57 : Location of Subprojects in Sainamaina Municipality**



Source: Detailed Project Report, 2024

## E. Lumbini Sanskritik Municipality Subprojects

**78.** Under the scope of URLIP, roads, Municipal Building and Bus terminal in Lumbini Sanskritik Municipality. The 92 proposed roads, bus terminal and municipal building are located within 1 km distance from the Lumbini World Heritage Site (Figure 7). The nearest project component is the Mahilwar Chowk-Bus Terminal Road that starts from Vishnupura road which border the Lumbini World Heritage Site.

**79. Mahilwar Chowk-Proposed Bus Terminal-Highway Road (3.931 km):** The starting location of the proposed road to bus terminal is Mahilwar chowk from Vishnupura road. The Vishnupura road is the main road that surrounds the Lumbini world heritage site. The proposed road is the existing road located within ward number 10 and 4 of Mayadevi Rural Municipality and ends at Jhulanipur. The RoW is 13 m as per Land Use Standard, 2076 B.S. of Lumbini Sanskritik Municipality but the proposed RoW is 18m. All wires and cable are hanging above ground and are in unmanaged condition. Shifting of electric poles and telephone poles; coordination with municipality and NEA is proposed. The proposed scheme for Lumbini Bus Terminal Access Road compared to the existing scenario is described in the table below:

**Table 49: Existing and proposed road inventory of Lumbini Bus Terminal Access Road**

No	Description	Existing Scenario	Proposed Scheme
1.	Length of Road	3.931 km	3.931 km
2.	Right of Way (ROW) -Declared by municipality	18.0 m	18 m
3.	Total Road Width	6-14 m	18 m
4.	Carriageway	Average 9 m	13.5 m including shoulder
5.	Pavement type	Combination of premix carpet section and gravel section.	Double lane upgradation with the 50 mm surface course of asphalt concrete, 150 mm of base course and 250 mm of sub base with proper grade and camber
6.	Median/Landscape or Green land areas	No median provided and lack of green space	Median is not provided/ Greeneries and plantation shall be done in interval of 10 meters over sidewalks wherever space is available
7.	Parking	Haphazard parking on shoulder and carriageway area obstructing traffic movement	Due to space restriction, separate parking is not provided. However, parking space can be provided in public land available in the road vicinity.
8.	Cycle track	Nil	Not provided due to space restriction. However, alternative typical road section drawings with cycle tracks have been proposed.
9.	Side Drain	-948m of total Length of Covered Drain along the side of the road. -103m of Drain along the side of the road. -59m of Earthen Drain along the side of the road.	PCC surface drain of width 0.25m (included in carriageway width) Storm water drain size of Type A – 0.45 X 0.65m Storm water drain size of Type B – 0.6 X 0.8 m Storm water drain size of Type C – 0.75 X 0.95 m. Camber slope 2.5 % for quick disposal of water from road surface.



No	Description	Existing Scenario	Proposed Scheme
			Road and storm water drain level were checked simultaneously with proper drain size for drainage water flow without obstructions.
10.	Cross drainage Structures	- 6 Nos Pipe Culverts - 2 Nos Pipe Crossings - 3 Nos of Slab Culverts	Rehabilitation of existing pipe culverts and slabs in order to make double lane and adding structures as per requirement.
11.	Protection Works	Nil	Retaining wall/slope protection measures as per requirement.
12.	Traffic signs/ signage and road marking	Nil	Provided all along the road to ensure maximum safety to pedestrian and vehicular traffic.
13.	Road furniture (Streetlights, delineators, etc.)	Nil	Streetlights - Single arm height 7 m @ 25 m interval. Double arm height 8 m @ 25 m interval. Mini Mast Pole with Flood Light as per requirement.
14.	Utility	All wires and cable are hanging above ground and are in unmanaged condition -2 Transformers	Shifting of electric poles, transformer and telephone poles in coordination with municipality.

Source: Detailed Project Report, 2024

### 80. Moglaha Masina Aniharu Bhaisaiya Road (8.326 km)

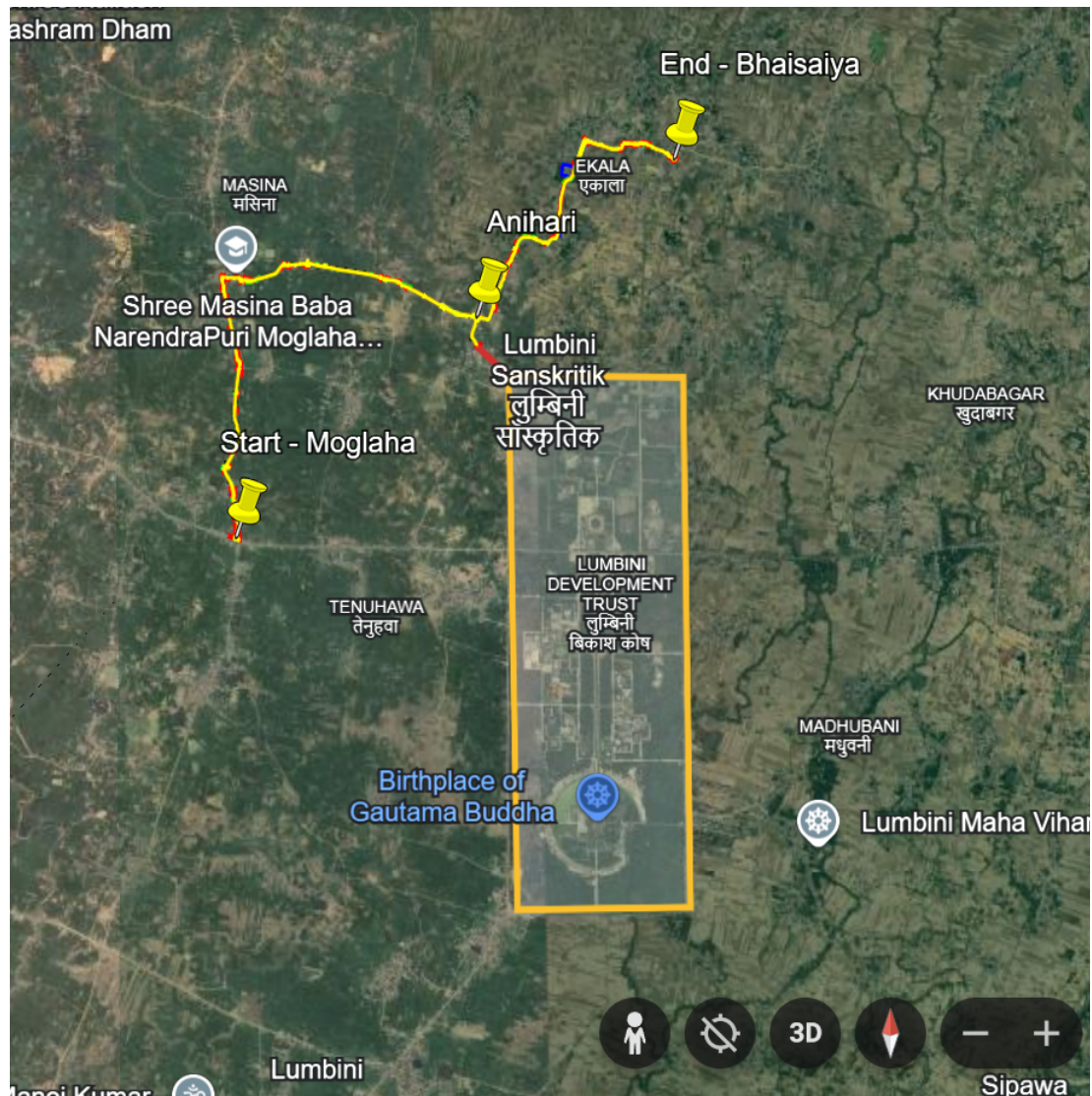
The proposed road is Situated within Lumbini Sanskritik Municipality of Rupandehi district, spanning a total length of 8.326 Km. The road alignment passes through Ward no. 5, 7 and 11 of Municipality. It is a plain terrain road with average carriageway width of 4 m and right of way of 8m & 10.5m. The current road network provides access to various destinations through 15 junctions. The road directly connects to Lumbini Taulihawa road and East-West Highway (Ramapur-Lumbini Road section). Main settlement connecting the route includes Panditpur, Gadhidin, Bichauwapur, Naukadiya, Kukarbhukka, Anihari & Bhaisahiya.

**Table 50: Existing and proposed road inventory of Moglaha-Masina-Anihari-Bhaisaiya**

No	Description	Existing Scenario	Proposed Scheme
1.	Length of Road	8.326 km	8.326 km
2.	Right of Way (ROW) -Declared by municipality	8 & 9 m	8 & 10.5 m
3.	Total Road Width	3-5 m	8m & 10.5m
4.	Carriageway	Average 4.0 m	7.0 m & 5.5m
5.	Pavement type	This road section is poor premix carpet	Double lane upgradation with the 50 mm surface course of asphalt concrete, 150 mm of base course and 250 mm of sub base with proper grade and camber
6.	Median/Landscape or Green land areas	No median provided and lack of green space	Median is not provided/ Greeneries and plantation shall be done in interval of 10 meters over sidewalks wherever space is available

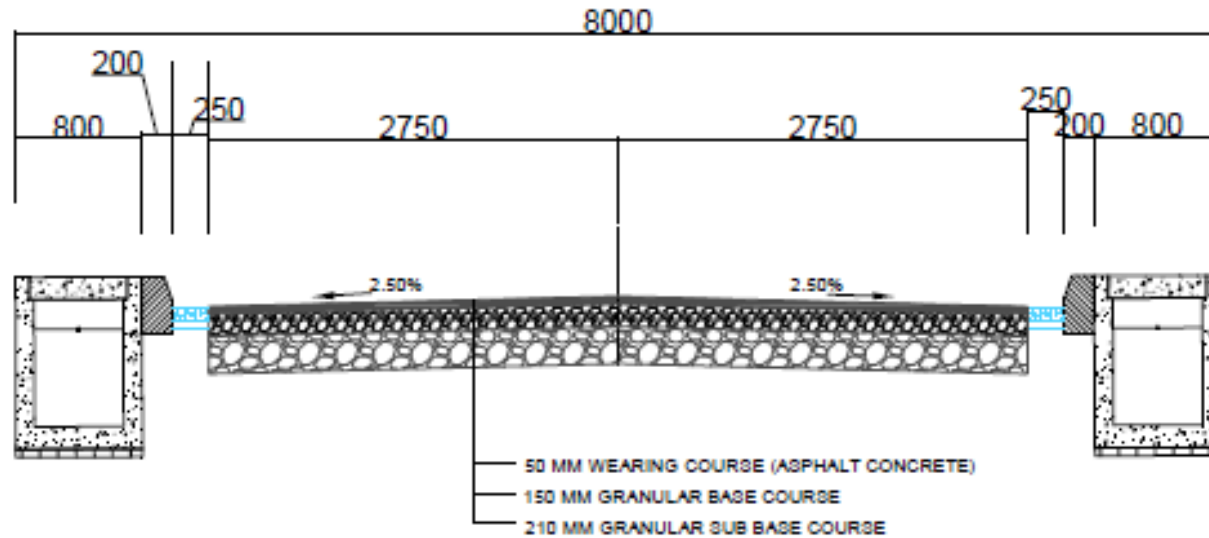
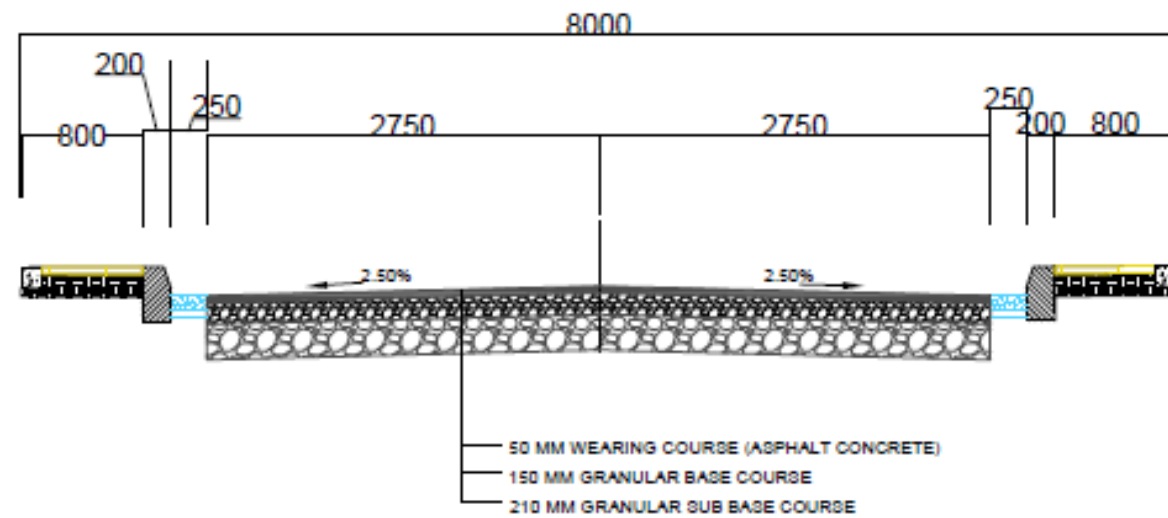
No	Description	Existing Scenario	Proposed Scheme
7.	Parking	Haphazard parking on shoulder and carriageway area obstructing traffic movement	Due to space restriction, separate parking is not provided. However, parking space can be provided if public land available in the road vicinity.
8.	Cycle track	Nil	Not provided due to space restriction. However, alternative typical road section drawings with cycle tracks have been proposed.
9.	Side Drain	-38m of Drain along the left section of road. -23m of Drain along the right section of road.	PCC surface drain of width 0.25m (included in carriageway width) Storm water drain size of Type F – 0.55 X 0.75m & Storm water drain size of Type G – 0.55 X 1.0m Camber slope 2.5 % for quick disposal of water from road surface. Road and storm water drain level were checked simultaneously with proper drain size for drainage water flow without obstructions.
10.	Cross drainage Structures	- 1 No Pipe Culverts - 15 Nos Pipe Crossings - 2 Nos of Slab Culverts	Rehabilitation of existing pipe culverts and slabs in order to make double lane and adding structures as per requirement.
11.	Protection Works	Nil	
12.	Traffic signs/signage and road marking	Nil	Provided all along the road to ensure maximum safety to pedestrian and vehicular traffic.
13.	Road furniture (Streetlights, delineators, etc.)	Nil	Streetlights - Single arm height 7 m @ 25 m interval. Mini Mast Pole with Flood Light as per requirement.
14.	Utility	All wires and cable are hanging above ground and are in unmanaged condition	Shifting of electric poles, transformer and telephone poles in coordination with municipality.

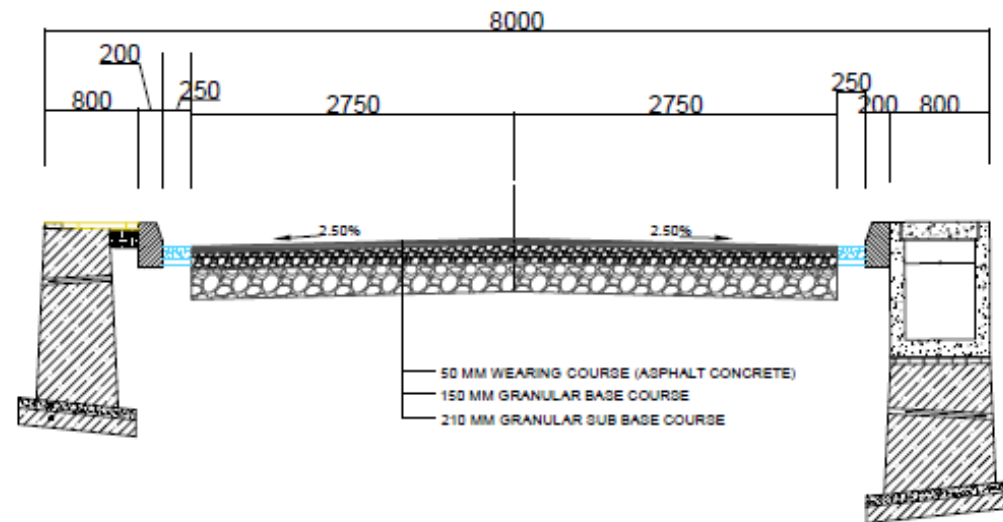
Source: Detailed Project Report, 2024



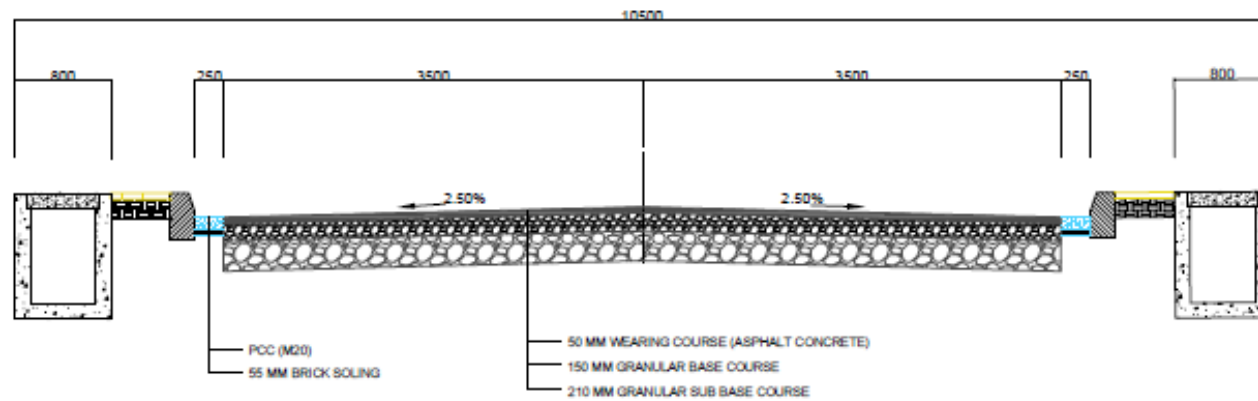
**Figure 58: Vicinity of Lumbini World Heritage Site from Moglaha Moglaha Masina Aniharuru Bhasaiya Road**

**81.** Detailed cross-sectional elements proposed in each of these roads are as shown in the figures below:



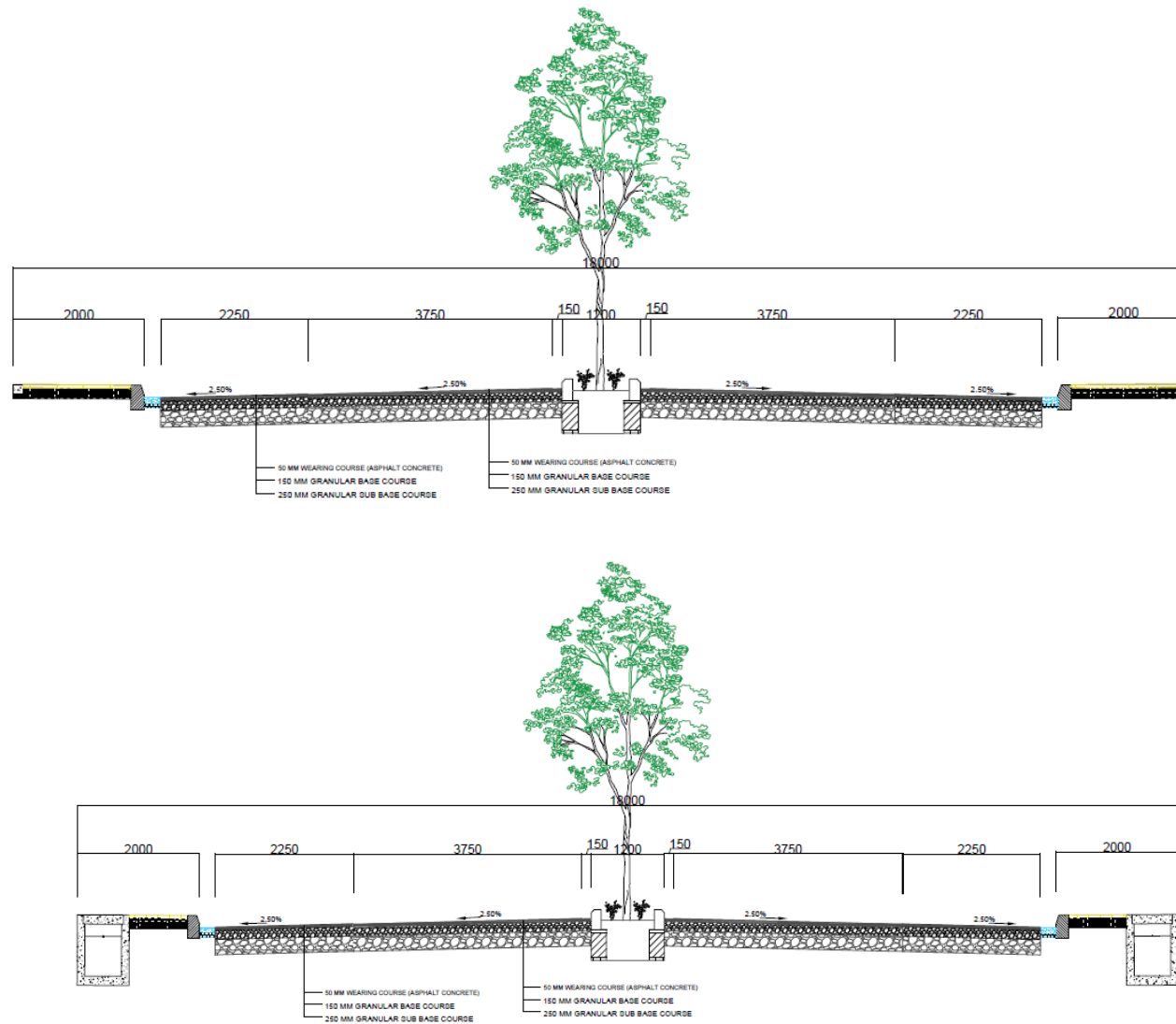


**Figure 59: Typical Road Sections with Footpath, Drain and Retaining walls (8.0m)**

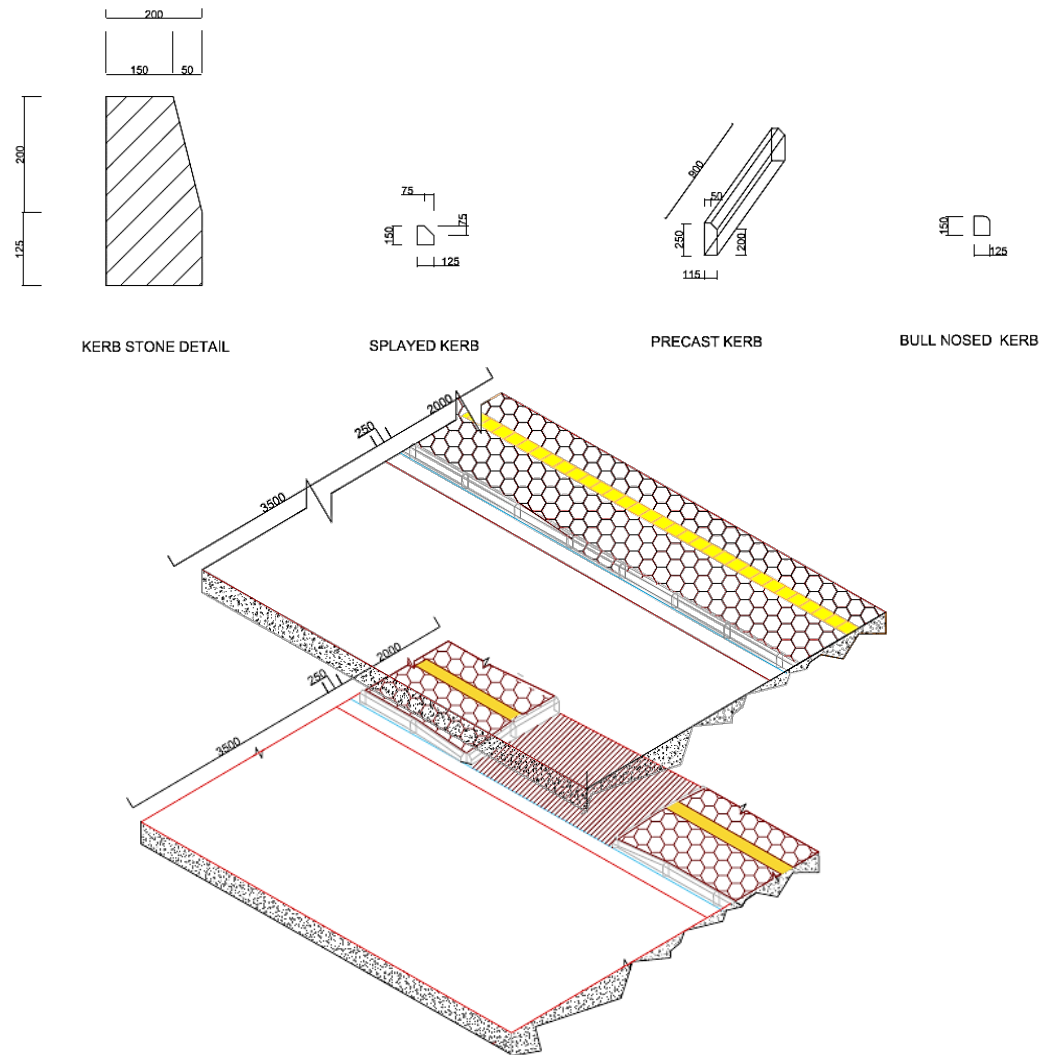


**Figure 60: Typical Road Sections with Footpath, Drain and Retaining walls (10.5m)**

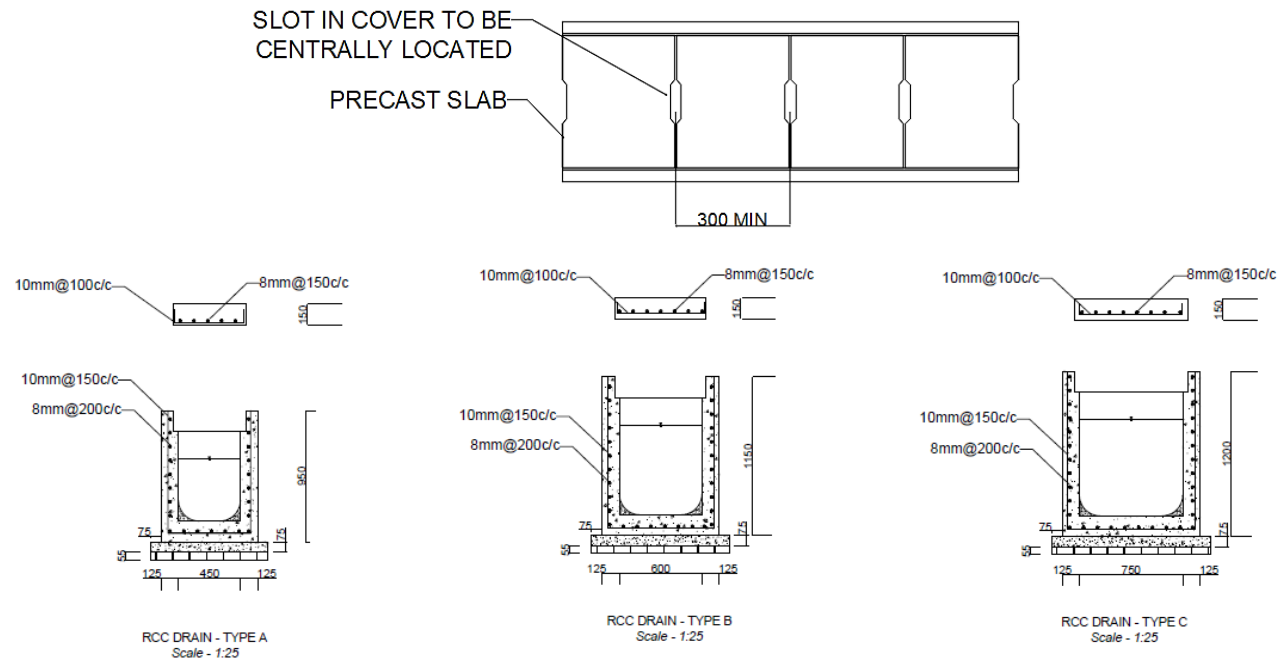




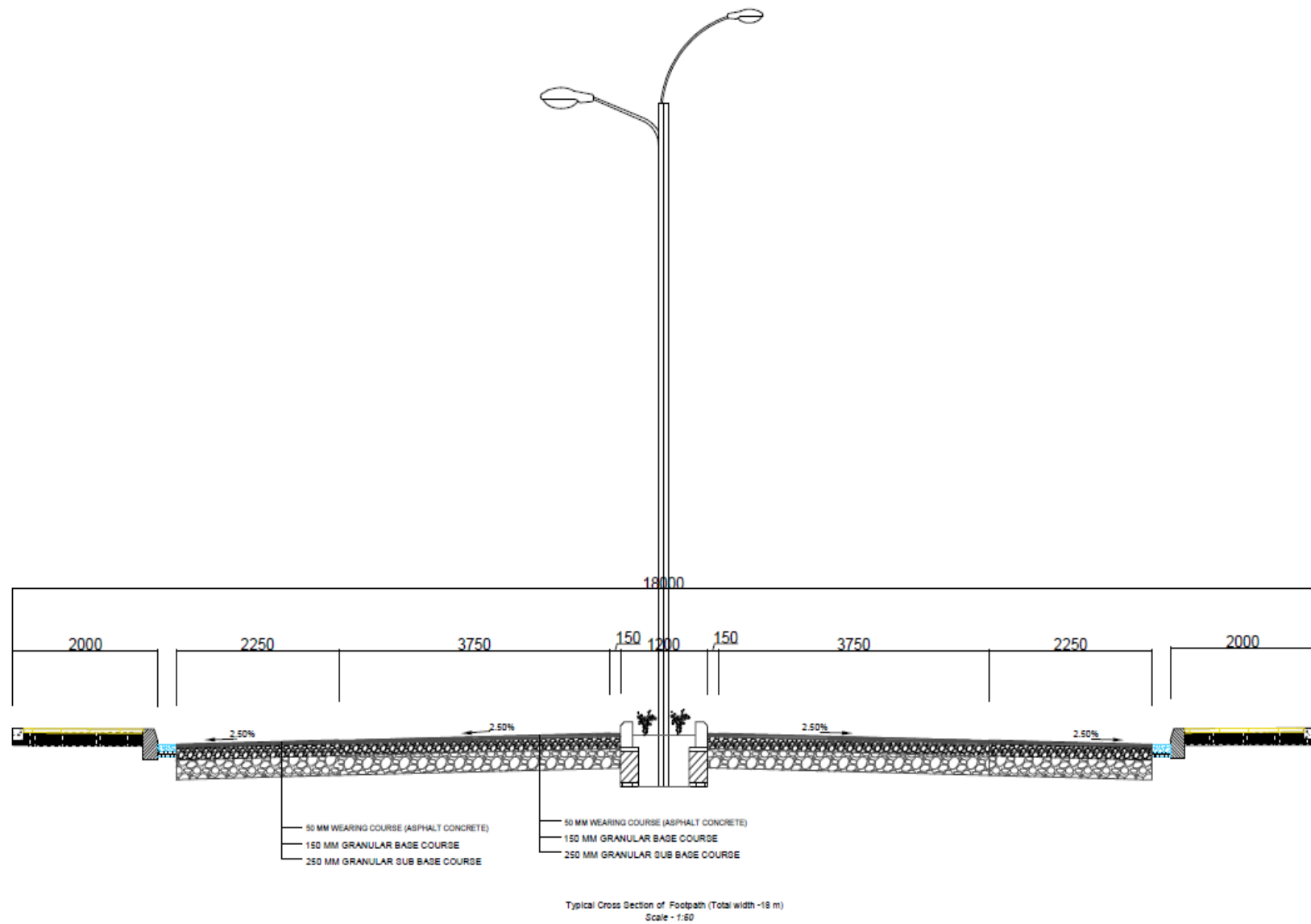
**Figure 61: Typical Road Sections with Footpath, Drain and Retaining walls (18.0 m)**

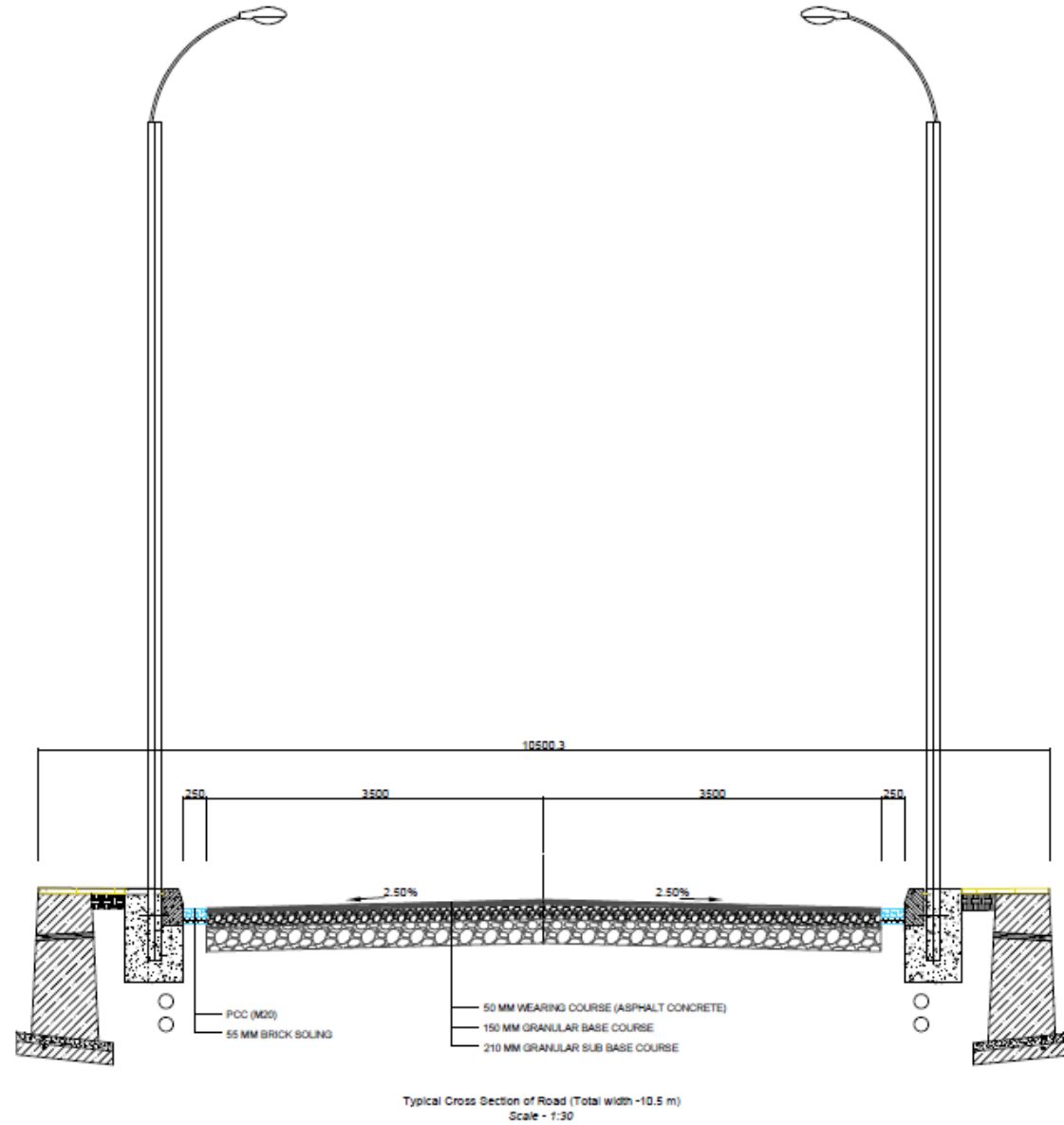


**Figure 62: Typical Kerbs and Footpath Section**



**Figure 63: Typical Drain Plan and Sections**





**Figure 64: Typical Road Sections with Street Light**

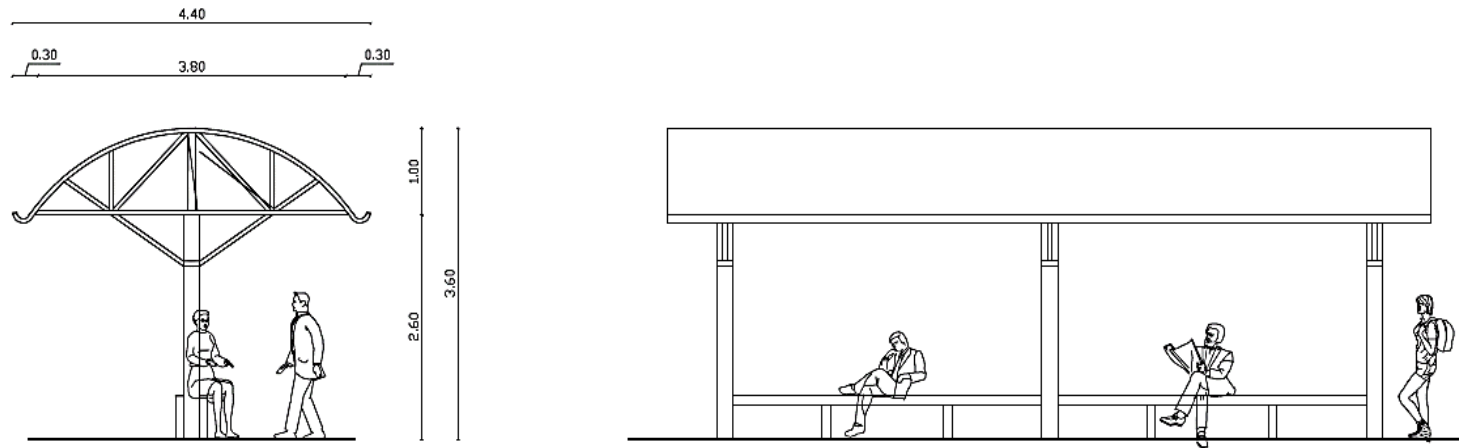
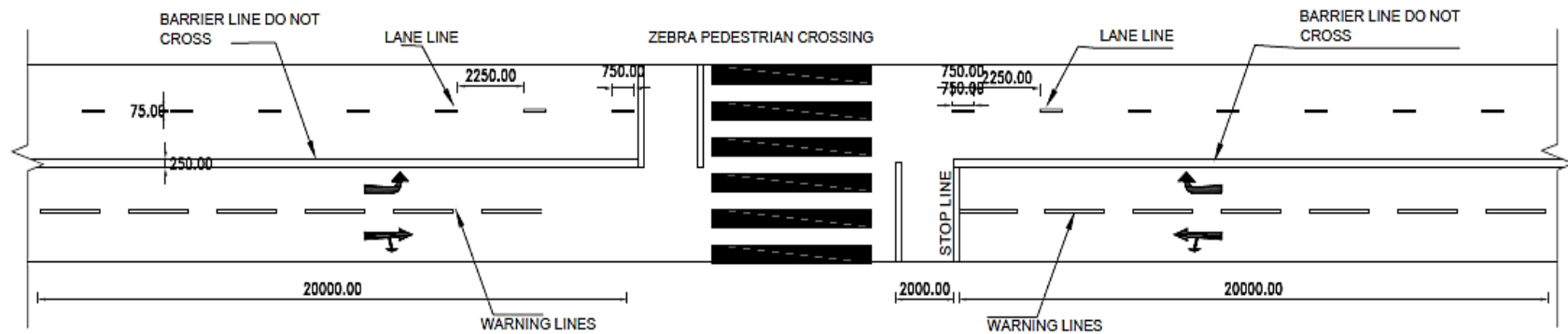
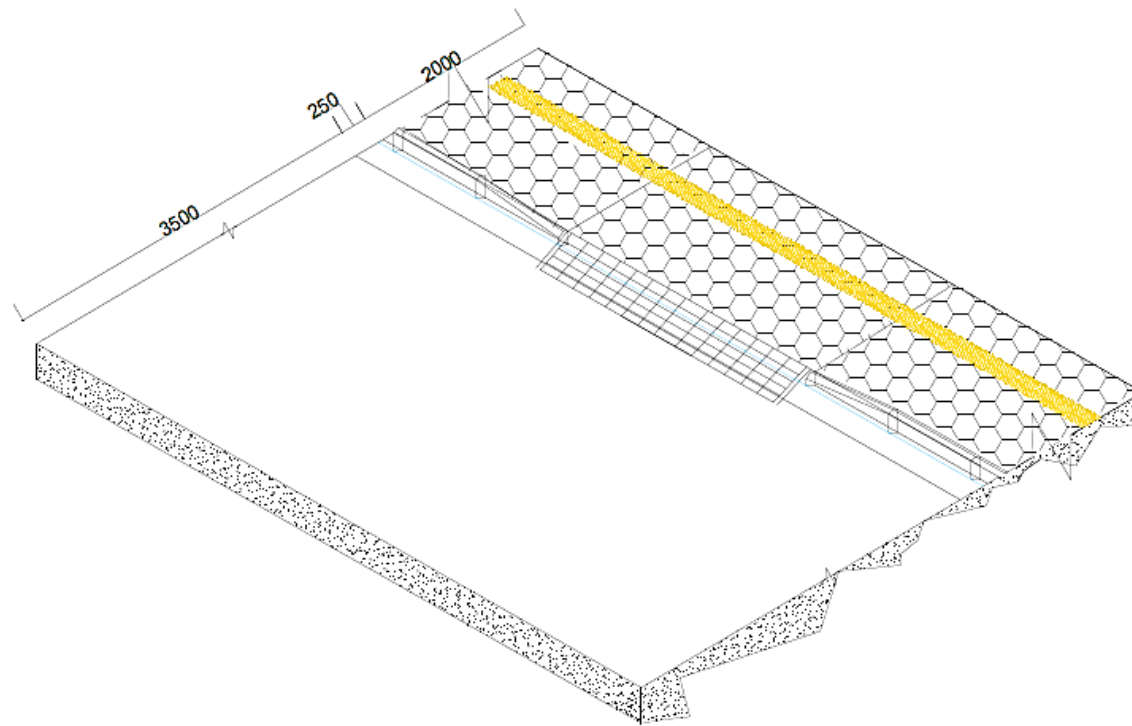


Figure 65: Resting Stations with Sheds



MID-BLOCK ZEBRA CROSSING  
Figure 66: Pedestrian Crossing Details



**Figure 67: Footpath with Ramps for entrances**

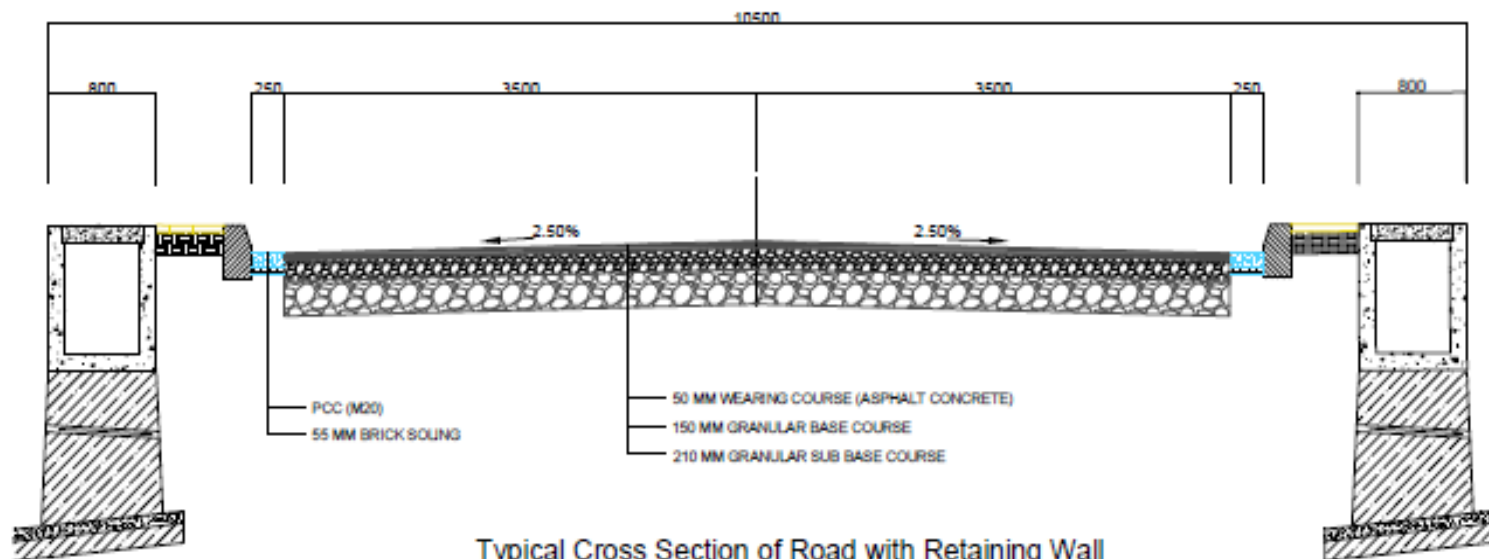
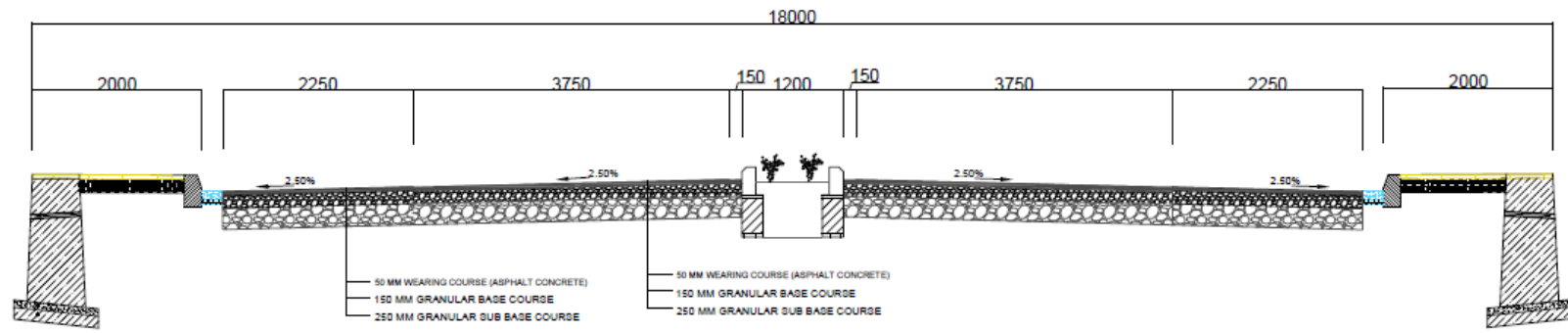
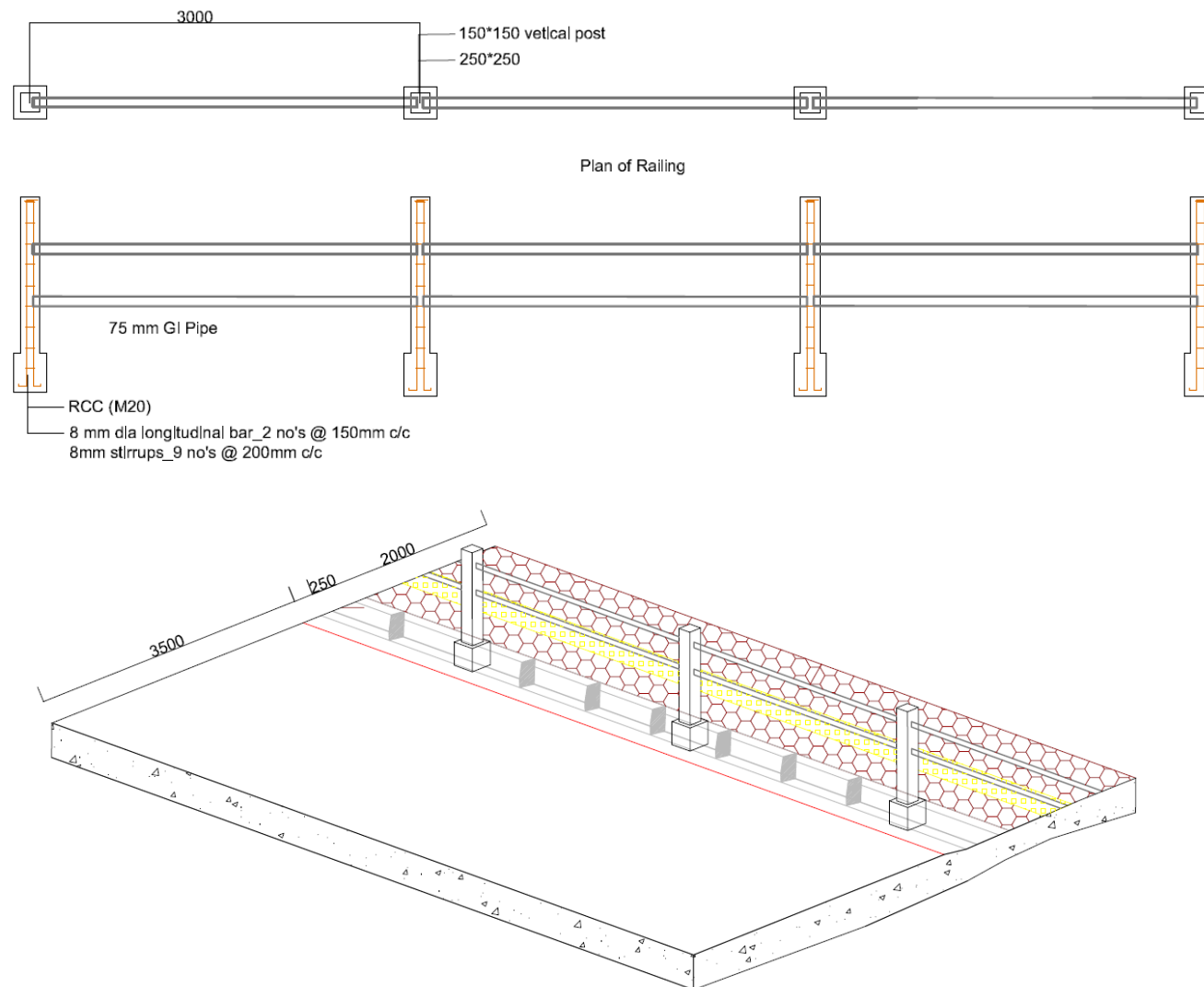


Figure 68: Typical Road Sections with Retaining Walls

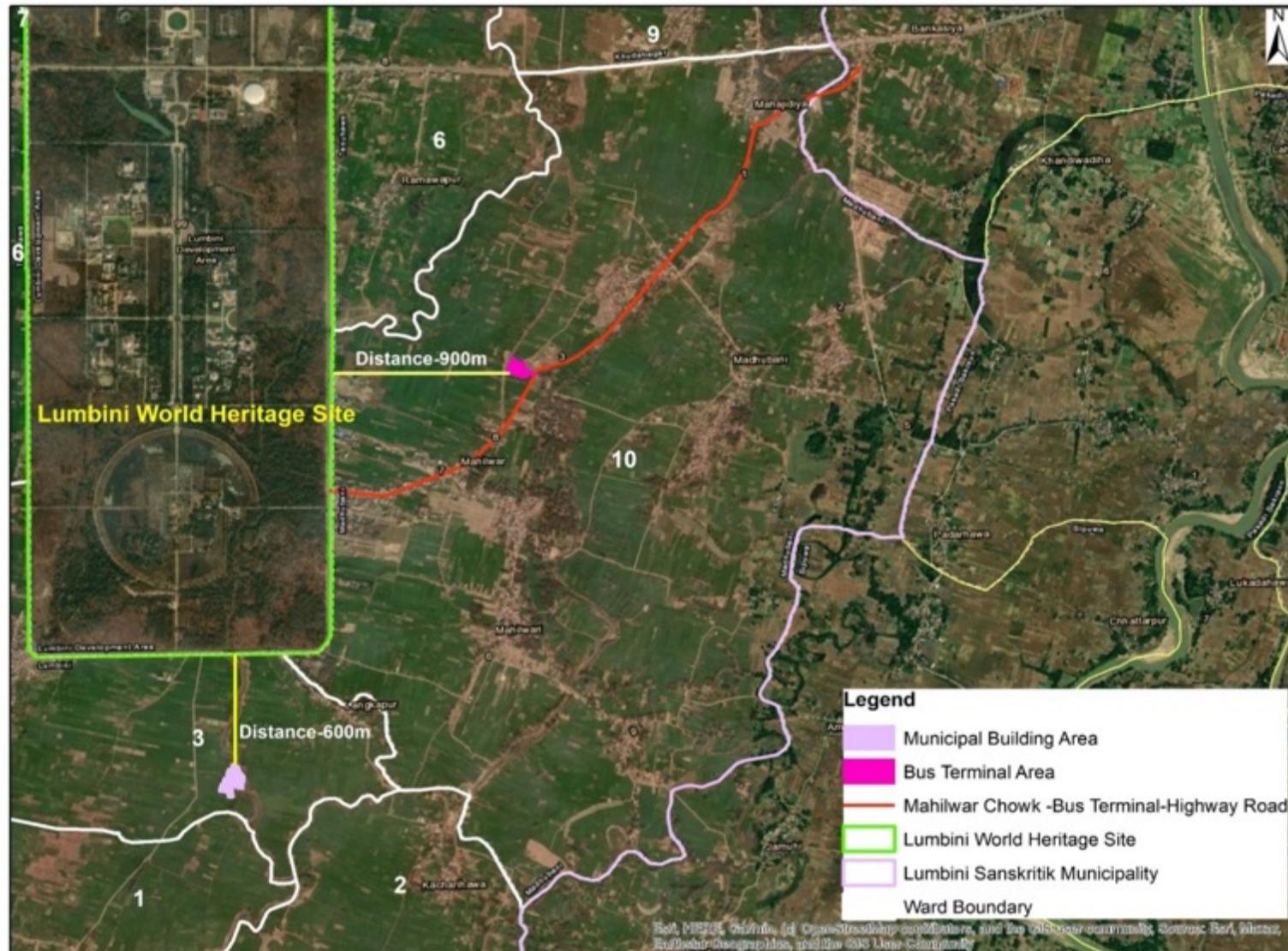




**Figure 69: Hand Railings in Footpath**

- 82. Bus Terminal:** The Bus Terminal is located in Ward-10, Madhubani of the Lumbini Sanskritik Municipality. Geographically the proposed location is situated at 27°40'45.1164" North and longitudes 83°30'25.272". It lies at a distance of 2.5 km from Jhulanipur, the nearest place on the Siddhartha Highway. The site size of the proposed Bus Terminal is 11,775m<sup>2</sup>. The main concept of the Bus Terminal is to separate the area into two main zones. The primary objective is to accommodate the daily departures and arrivals of driving buses. Its gross floor area (GFA) is 735m<sup>2</sup> with 1 story, the inside accommodate ticket booths, cafeteria, shops, waiting lounge, and administrative office. The sub-function of the Bus Terminal is to provide long-term parking for buses and trucks. The entrances to the two zones are separated by different gates. In front of the terminal building will be a pick-up and drop-off point for taxis and private vehicles as well as the intra-bus stop. The bus terminal will be developed with all the amenities and facilities for terminal users, staff, drivers and other vehicle operators and workers. These include drinking water, sanitation, adequate lighting, etc., Given the low-lying nature of land, and a drain flowing through the into Koiliwaha river, a proper drainage system will be provided to avoid flooding of terminal or surrounding area. It is proposed to raise the ground level of the site by 2-3 m. A conceptual drainage design is developed as part of feasibility study is given in Fugure 15. Detailed site investigations and surveys will be conducted during the detailed design, and drainage system design will be finalized.
- 83. Municipal Building:** The Lumbini Sanskritik Municipality has proposed the construction of the Municipal building in ward no. 3 of Lumbini Sanskritik Municipality and is 600m distance at southern side from the Lumbini World Heritage Site. The proposed building area is 158817.19 sq.km. The proposed building will cover an area of about 1400 sq. m(approximately 30 m x 45 m), which is about 9% of the total available land area. Site is located close to River Telar, and a minimum 20 m distance will be maintained from the riverbank. The building will be of three floors (ground + 4 floors) and will be provided with all necessary amenities and facilities, including drinking water supply, toilets / sanitation with on-site septic tank (sealed bottom and sides) and soak pit, solid waste collection bins, parking, lighting, fencing etc

Figure 70: Location of Subprojects in Lumbini Sanskritik Municipality



Source: Detailed Project Report, 2024



Figure 71: Location of Proposed Bus Terminal Area

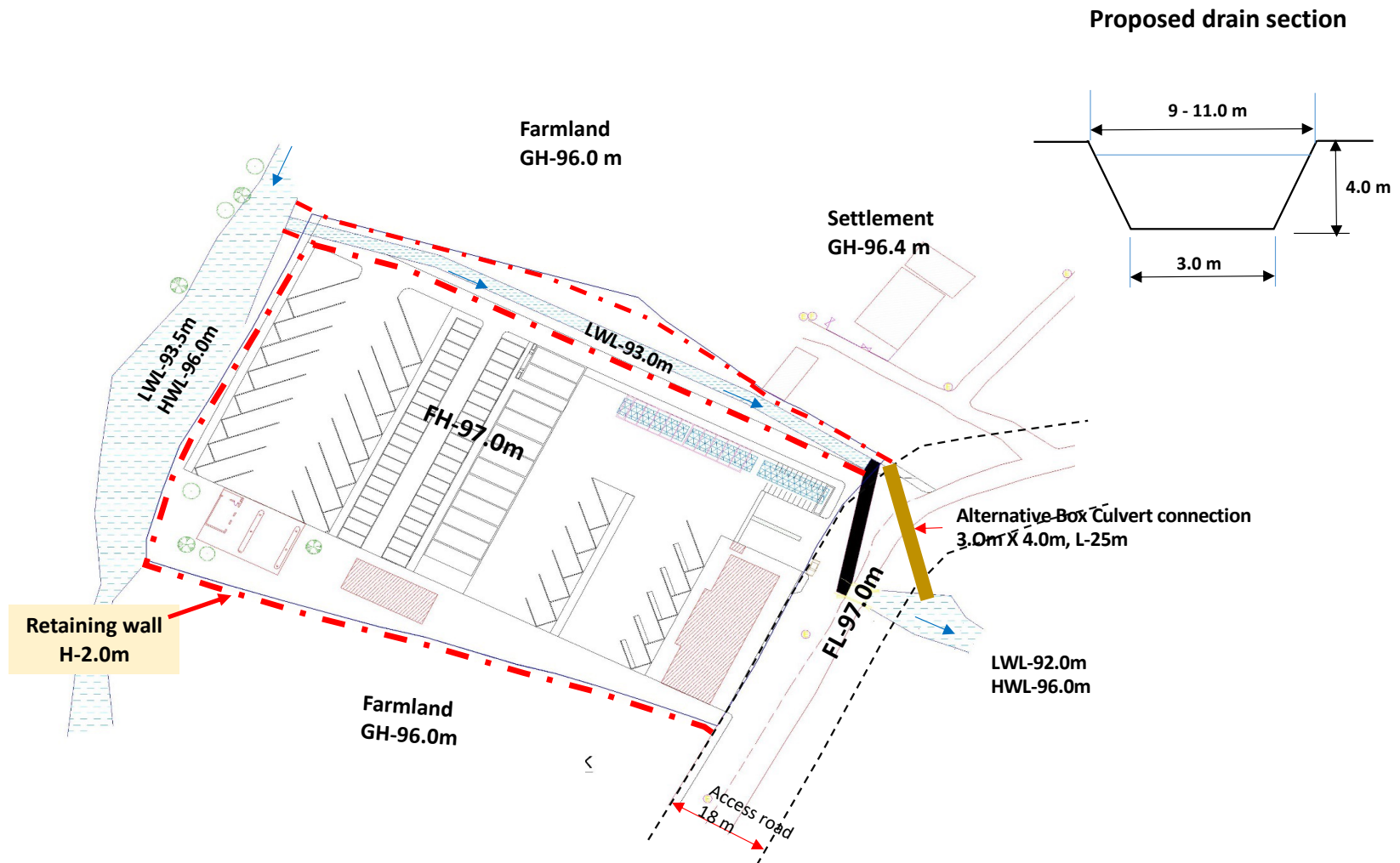


Source: Detailed Project Report, 2024

**Figure 72: Layout of Lumbini Bus Terminal Development Plan**

*Source: Detailed Project Report, 2024*

Figure 73: Conceptual drainage design at Bus Terminal



Note: This figure is as per the conceptual design and feasibility study and dimensions and levels of units shown are tentative; the drainage design will be finalized during the detailed design after the detailed site surveys to ensure proper collection and conveyance of canal emergency discharges and surface runoff from the site and surrounding area to river via existing culvert on the access road.

Figure 74: Location of Proposed Municipal Building






Source: Detailed Project Report, 2024





**Figure 76: Photographs of the Road Sections proposed in Municipalities of West Urban Corridor**

	
<p>Road Section of Panbari to Saljhandi Road (Sainamaina)</p>	<p>Road Section of Duimuhan Chowk to Thali Road (Sainamaina)</p>
	
<p>Road Section of Udhyog puri Road (Siddharthanagar)</p>	<p>Road Section of Benipur East South Boarder Road (Siddharthanagar)</p>
	

Road Section of Bhaluhpul Medical College-Bhatatol-Mukhiya Road (Devdaha)	Road Section of Haatbazar-Mayadevi-Banaha-Tilottama (Devdaha)
	
Road Section of Bus Terminal Road (Lumbini Sanskritik)	Road section of Bhimkali Janta Path of Siddharthanagar Municipality
	
Road Section of Benipur Alignment of Siddharthanagar Municipality	





Road section of Sugar mill in Siddharthanagar Municipality  
(Simal Trees Protected)



Starting point of Shitalnagar-Bhawanipur-Soiya Road  
in Devdaha



Road Section of Driver Tole - Shivapur Road (Tilottama)



Road Section of Pathardanda-Tinau Road (Tilottama)

Source: Field Visits conducted by Team

#### IV. DESCRIPTION OF BASELINE ENVIRONMENT

##### A. Project Influence Area

84. The primary objective in this chapter is to provide an environmental baseline of the proposed subprojects in Tilottama, Devdaha, Sainamaina, Siddharthanagar and Lumbini Sanskritik Municipalities. Baseline data includes an inventory of physical, ecological and socio-economic parameters. Samplings for air quality, noise and water quality were conducted at 5 locations (sampling points detailed below in Table 13) (Location Map in the Appendix 6).

Table 51:Details of sampling locations for baseline environmental monitoring

Sampling point code	GPS Coordinates	Location
ANW1	27°28'38.12"N 83°17'46.33"E	Lumbini Sanskritik Municipality, Ward No. 8, Rupandehi
ANW2	27°30'34.22"N 83°26'29.99"E	Siddharthanagar Municipality, Ward No. 8, Rupandehi
ANW3	27°42'10.76"N 83°15'13.84"E	Sainamaina Municipality, Ward No. 10 (Panbari)
ANW4	27°38'47.33"N 83°30'41.48"E	Tilottama Municipality, Ward No. - 10, (Ganeshnagar)
ANW5	27°38'11.89"N 83°32'46.58"E	Devdaha Municipality, Ward No. 8 (Keureni, Bishalnagar)

85. The primary impact area will be confined along the alignment of the roads and proposed project sites for bus terminal and municipal building. Delivery of construction materials to the site would extend the project influence area. This means that during transport of construction materials, the impact area is extended along the roads being traversed by the transporting equipment.

##### B. Physical Environment

86. **Location and Topography.** Tilottama, Devdaha, Sainamaina, Siddharthanagar and Lumbini Sanskritik Municipalities lie in Rupandehi district of Lumbini Province. Tilottama Municipality is surrounded by Rohini River and Devdaha Municipality in the east, Tinau River and Siyari and Sudhodhan Rural Municipality in the west, Butwal Sub-metropolitan City in the north and Omsatiya and Siddharthanagar Municipality in the south. The six lane Belahiya-Siddharthanagar-Butwal road section of the Siddhartha Highway passes through the mid of Tilottama Municipality and divides the Municipality into eastern and western part. Similarly, Sainamaina Municipality is situated in the lap of Chure hills and is 15 km north from the birthplace of Lord Buddha, Lumbini. It is surrounded by Butwal sub-metropolitan city in the east, Baandganga Municipality of Kapilvastu district in the west, Sitganga Municipality of Arghakhanchi district, Rainadevi Chahara and Tinau Municipality of Palpa district in the north and Shudhdodhan, Kanchan and Gaidhawa municipalities in the south. Siddharthanagar is considered as an industrial town as well as an economic center for the Western Nepal. The topography of three municipalities Lumbini Sanskriti, Tilottama and Siddharthanagar are on the flat lands with elevation ranges 120m to 200m. Other two Municipalities Devdaha and Sainamaina are located on both flat land and chure hill with elevation ranges 130m to 980m.

- 87.** Project towns are located in the western part of Nepal, about 250 km west of capital city Kathmandu. Largest town is Sidharthangar, spread over 36.03 sq. km and housing 76,307 population. Area and the population of the other four towns are as follows: Tilottama 126.2 sq.km and 149,657 population, Sainamaina 162.18 sq.km and 55,822 population, Devdaha 136.96 sq.km and 75,658 population and Lumbini Sanskritik 112.21 sq.km and 72,497 population (Census 2011). Municipalities are spread over large expanses of lands covered with urban areas, peri-urban and small habitations, agriculture and forest areas within the municipal jurisdiction. Municipal jurisdiction and general view of project towns are shown in Figure 18 to Figure 27



**Figure 77: Sampling sites for baseline environmental monitoring**

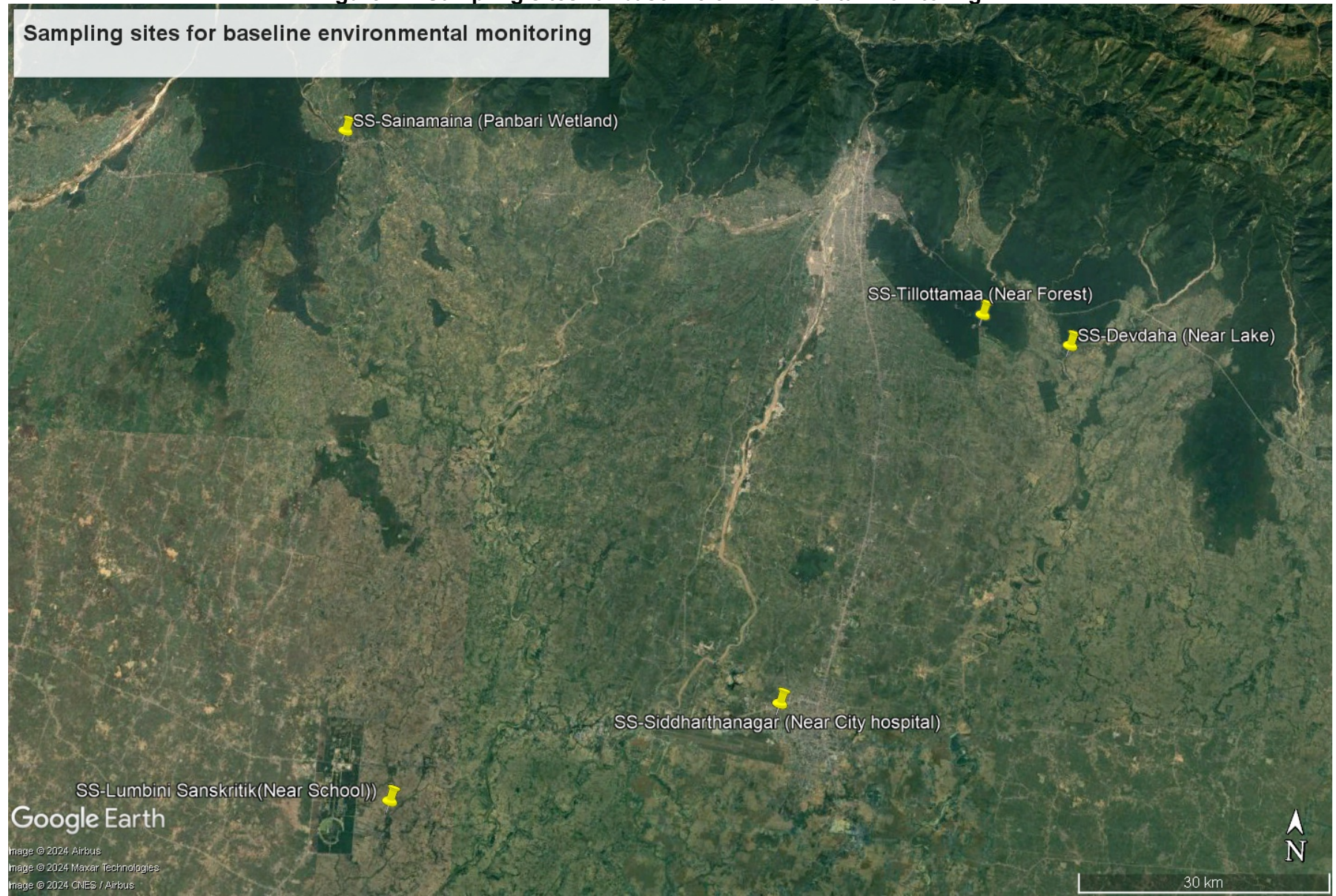




Figure 78: Tilottama Municipality

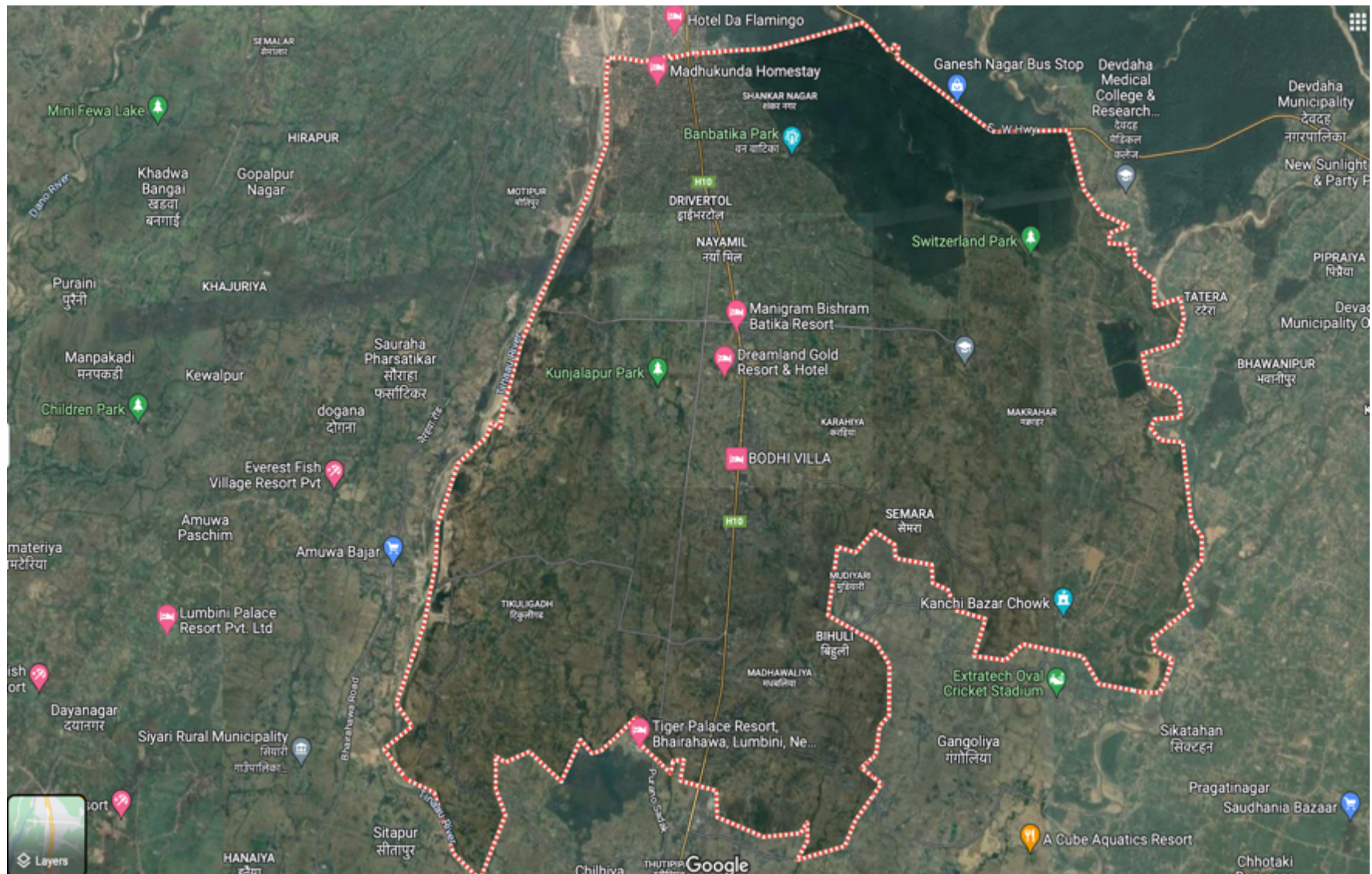




Figure 79: General View of Tilottama Town

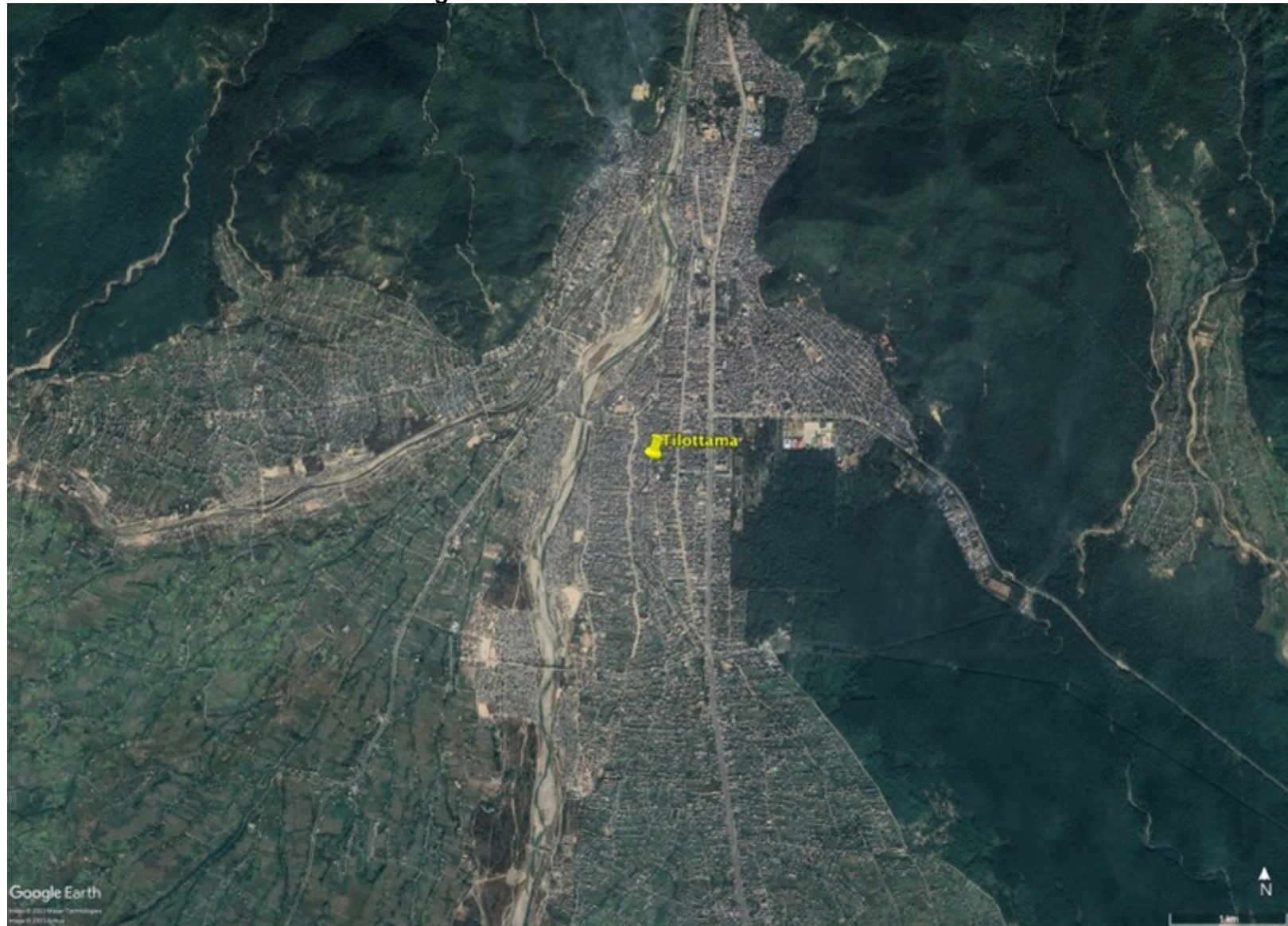




Figure 80: Devdaha Municipality

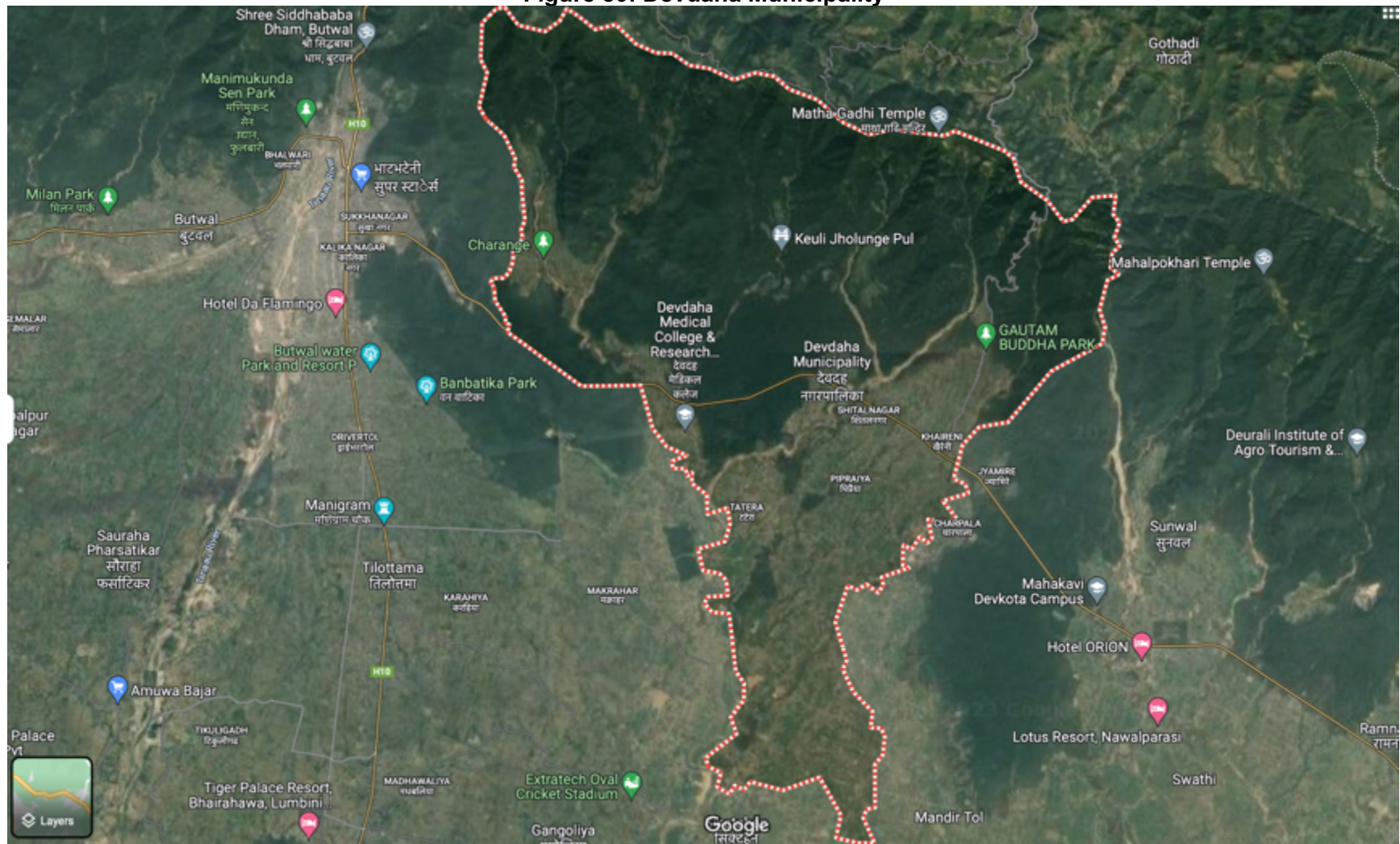




Figure 81: General View of DevdahaTown



**Figure 82: Sainamaina Municipality**



Figure 83: General View of Sainamaina Town





Figure 84: Lumbini Municipality

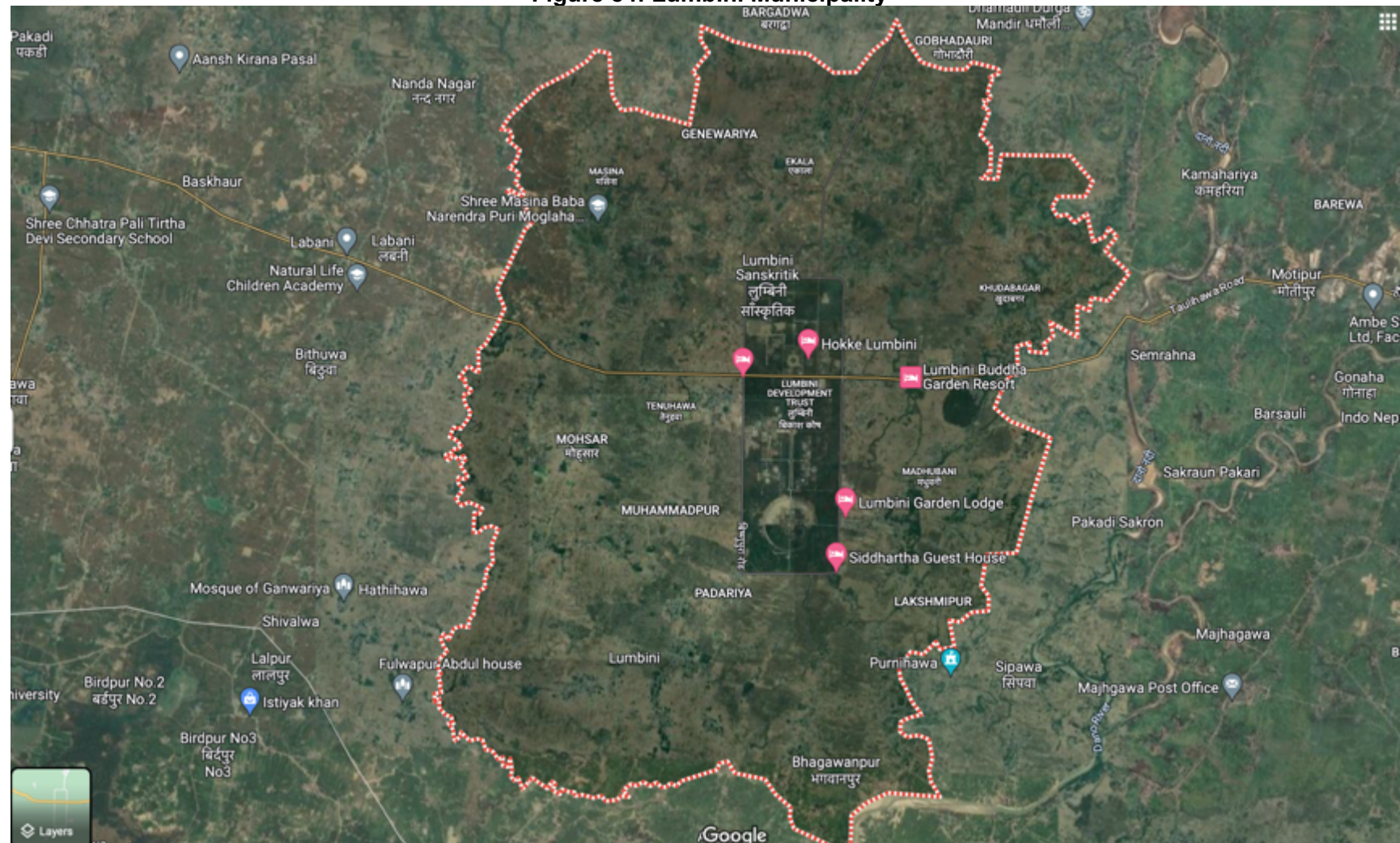




Figure 85: General View of LumbiniTown





Figure 86: Sidharthnagar Municipality

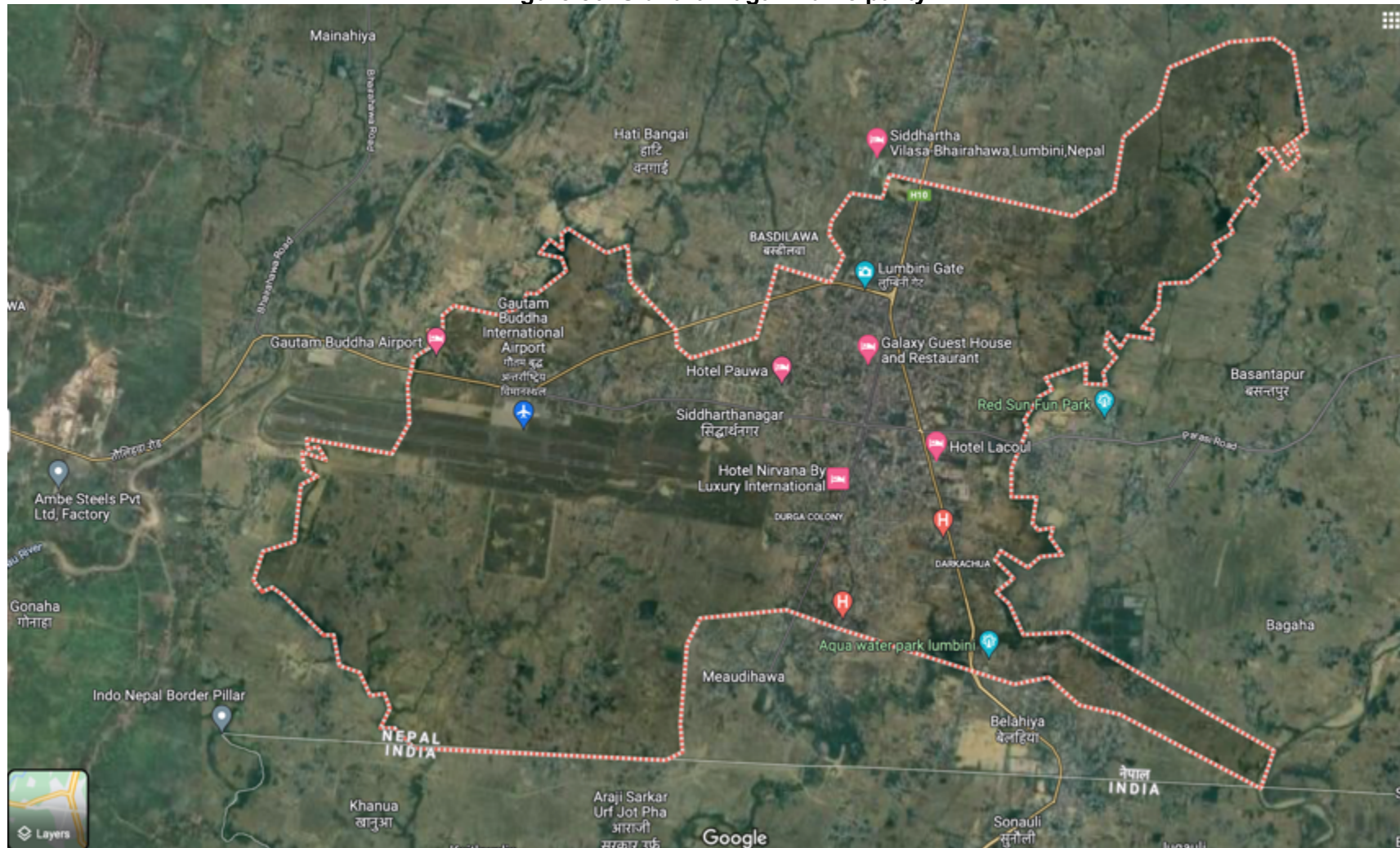


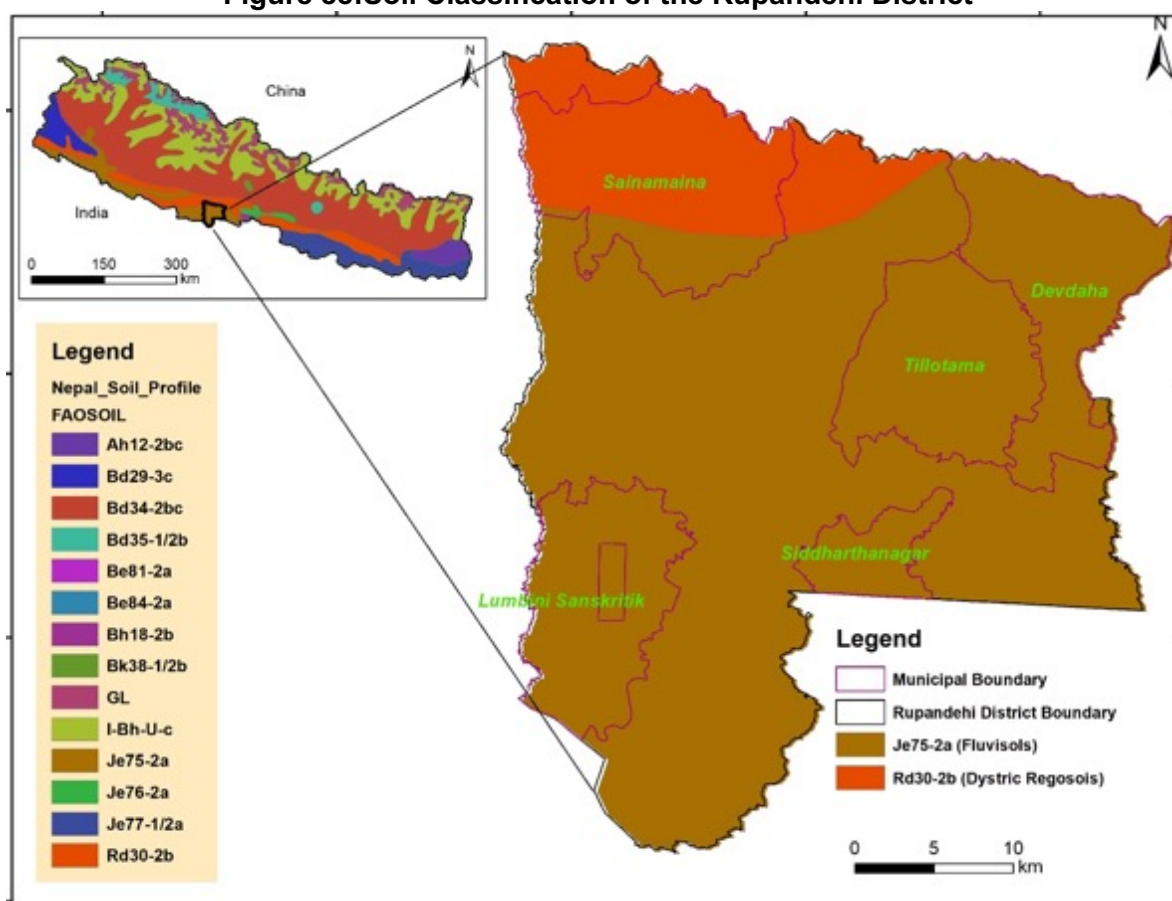


Figure 87: General View of Sidharthnagar Town



**88. Geology and Soils.** The geological formation of the project area is of Quaternary era with the recent alluvium deposit consisting of the boulders, gravels, sands and clays. According to FAO/UNESCO's SOTER (Soil and Terrain) database, calcareous phaeozems and eutric gleysols are the dominant soil type found in Drivertole-Shivapur road section. Similarly, in Patthardanda-Tinau road, eutric gleysols and eutric fluvisols are the dominant soil type. The soil classifications of the project area are described in Table 15 and Figure 29.

**Figure 88: Soil Classification of the Rupandehi District**



Source: FAO/UNESCO's SOTER (Soil and Terrain) database

**Table 52: Description of FAO's Soil Type**

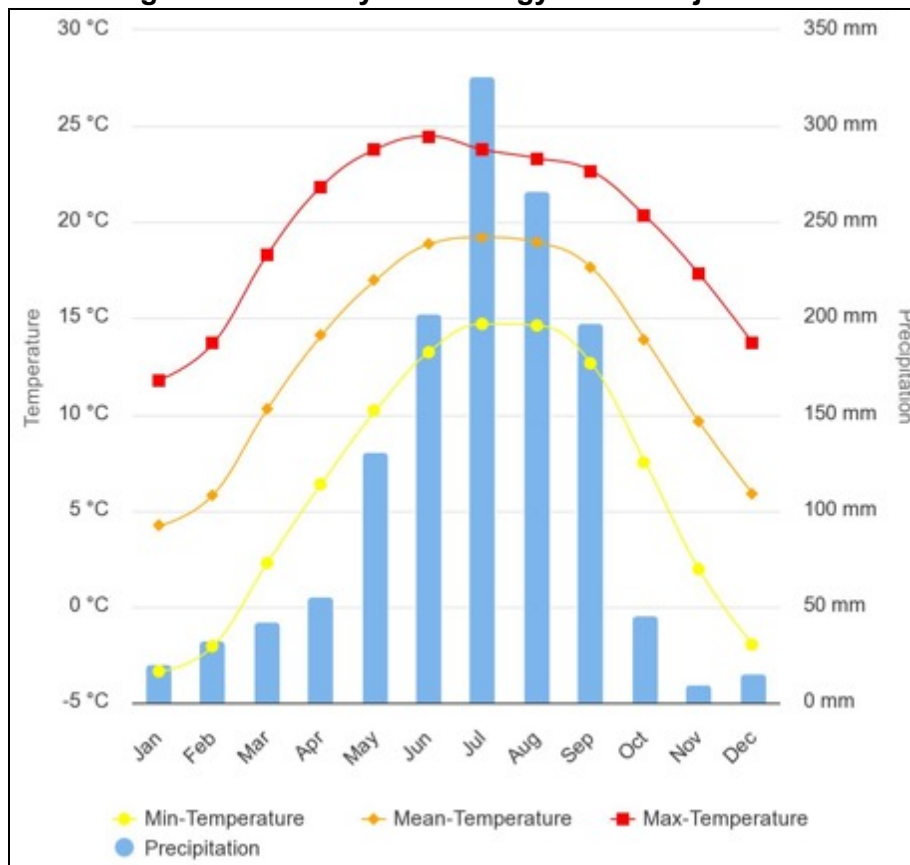
<b>Gleysols</b>	They are formed under waterlogged conditions and is produced by rising <a href="#">groundwater</a> .
<b>Phaeozem</b>	Phaeozoms are marked by a <a href="#">humus</a> -rich surface layer covered in the natural state with abundant grass or <a href="#">deciduous forest</a> vegetation. They have a high content of available calcium ions bound to soil particles.
<b>Fluvisols</b>	Fluvisols are found typically on level <a href="#">topography</a> that is flooded periodically by surface waters or rising groundwater, as in river <a href="#">floodplains</a> .

Source: FAO/UNESCO's SOTER

**89. Weather and Climatic Condition.** The project area has a sub-tropical and tropical climate. The temperature gets hotter starting from the month of March and continues to be hot until the month of August. The maximum temperature reaches up to 42.4°C and

minimum temperature up to 8.75°C. In the months of mid-December and mid-January, the project area experiences cold weather along with the incidence of cold wave. Monsoon winds bring ample rainfall from June to August. The average annual rainfall in the area is 1,160 mm.

**Figure 89: Monthly Climatology in the Project Area**



Sources: Climate Change Knowledge Portal, 2023

**90. Air Quality.** Lab report on baseline data on air quality for the subproject area is provided in the Annex 6. The subproject location is in a mixed-use area (residential, commercial and institutional). There are no heavy polluting industries in the area. Non-point sources of air pollution in the subproject site include emissions from vehicles, and dust from loose soil.

**91.** Concentration of air quality parameters measured at the sites is in Table 15 with code ANW1, ANW2, ANW3, ANW4 and ANW5. The data reveals that the concentration of particulate matters and the gaseous substances complies the limit with respect to the National Ambient Air Quality guideline value.

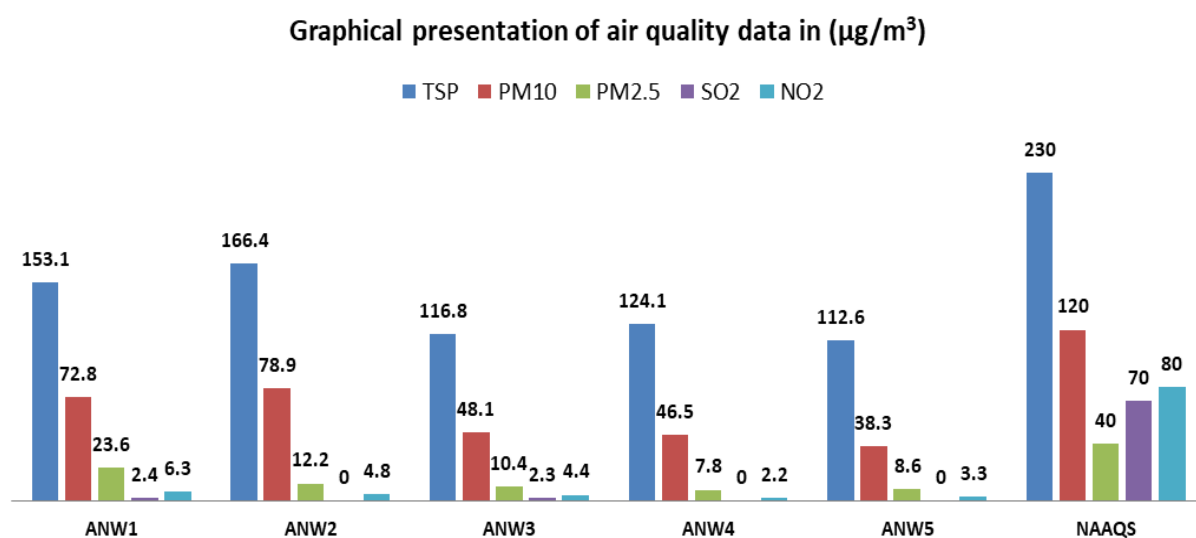
**Table 53: Concentration of air quality parameters in the sites**

Parameters	Unit	NAAQS	Locations				
			ANW1	ANW2	ANW3	ANW4	ANW5
TSPM	µg/m <sup>3</sup>	230.0	153.1	166.4	116.8	124.1	112.6



Parameters	Unit	NAAQS	Locations				
			ANW1	ANW2	ANW3	ANW4	ANW5
PM <sub>10</sub>	µg/m <sup>3</sup>	120.0	72.8	78.9	48.1	46.5	38.3
PM <sub>2.5</sub>	µg/m <sup>3</sup>	40.0	23.6	12.2	10.4	7.8	8.6
SO <sub>2</sub>	µg/m <sup>3</sup>	70.0	2.4	<1.0	2.3	<1.0	<1.0
NO <sub>2</sub>	µg/m <sup>3</sup>	80.0	6.3	4.8	4.4	2.2	3.3

92. At the ANW2 location, the concentration of Total Suspended Particulate Matter (TSPM) reaches its peak at 166.4 µg/m<sup>3</sup>, making it the highest among the observed locations. This is followed by ANW1 with 153.1 µg/m<sup>3</sup>, ANW4 with 124.1 µg/m<sup>3</sup>, ANW3 with 116.8 µg/m<sup>3</sup>, and the lowest at ANW5 with 112.6 µg/m<sup>3</sup>. For PM<sub>10</sub> concentrations, ANW2 also records the highest value at 78.9 µg/m<sup>3</sup>, followed by ANW1 at 72.8 µg/m<sup>3</sup>, ANW3 at 48.1 µg/m<sup>3</sup>, ANW4 at 46.5 µg/m<sup>3</sup>, and ANW5 with the lowest concentration at 38.3 µg/m<sup>3</sup>. Regarding PM<sub>2.5</sub> level, ANW1 has the highest concentration at 23.6 µg/m<sup>3</sup>, with ANW2 at 12.2 µg/m<sup>3</sup>, ANW3 at 10.4 µg/m<sup>3</sup>, ANW5 at 8.6 µg/m<sup>3</sup>, and ANW4 at 7.8 µg/m<sup>3</sup>. The gaseous pollutants, sulfur dioxide (SO<sub>2</sub>) and nitrogen dioxide (NO<sub>2</sub>), are present in concentrations significantly below their respective limits of 70.0 µg/m<sup>3</sup> and 80.0 µg/m<sup>3</sup>. Figure 2 presents a graphical representation of these data points, offering a visual comparison across the different locations.



**Figure 90: Graphical presentation of air quality data**

93. ANW1 and ANW2 are located in the core urban areas of Lumbini Sanskrithik Municipality and Siddharthanagar Municipality, close to Bhairahawa city, which contributes to higher pollutant concentrations. However, these concentrations remain within allowable limits, and no development activities have been initiated by the project. In contrast, ANW3, ANW4, and ANW5 are situated within or on the outskirts of forested areas with sparse settlements, resulting in relatively lower concentrations. These values serve as baseline data.

**94. Water Quality:** At the specified project location, five water samples were collected for analysis to ensure compliance with relevant quality standards. Two of these samples were obtained from groundwater sources, specifically tube wells, while the remaining three were collected from surface water bodies in the vicinity. The groundwater samples were evaluated against the criteria outlined in the "National Drinking Water Quality Standard 2079." This standard is designed to ensure that water is safe for human consumption by setting maximum permissible levels for various contaminants, including heavy metals, microbial content, and chemical pollutants. The results of this assessment confirmed that the groundwater samples met all safety criteria, with values falling within the acceptable limits for drinking water. Similarly, the surface water samples were assessed according to the "Generic Standard for Effluent Discharge into Surface Water," which governs the quality of water that may be released into natural water bodies from industrial or municipal sources and World Health Organization for drinking water. The analysis revealed that all measured parameters were within the permissible limits, indicating that the surface water is not adversely affected by external pollution sources, such as industrial discharges or agricultural runoff. The detailed results for the tube well water samples are presented in Table 16, and the data for the surface water samples can be found in Table 17.

**Table 54: Water quality data of ANW1 and ANW2**

Parameters	Unit	NDWQS	World Health Organization	Observed Values	
				ANW1	ANW2
pH	-	6.5 - 8.5*	6.5 - 8.5*	6.3	6.5
Colour	-	5 (15)	5	0.4	<0.1
Turbidity	NTU	5 (10)	1	<1.0	<1.0
Electrical Conductivity	µS/cm	1500	300	458.0	392.0
Total Suspended Solids	mg/l	-	-	<1.0	<1.0
Total Dissolved Solids	mg/l	1000	1500	280.0	246.0
Total Hardness	mg/l as CaCO <sub>3</sub>	500	-	154.0	128.0
Chloride	mg/l	250	250	5.9	4.3
Ammonia	mg/l	1.5		0.03	0.14
Nitrate	mg/l as NO <sub>3</sub>	50	50	5.2	2.8
Nitrite	mg/l as NO <sub>2</sub>	3	3	0.02	<0.02
Iron	mg/l	0.3 (3)	0.3	0.21	0.06
Manganese	mg/l	0.2	0.08	0.04	<0.02
Calcium	mg/l	200	-	46.8	36.8
Magnesium	mg/l	-	-	8.9	8.7
Arsenic	mg/l	0.05	0.01	<0.01	<0.01
Fluoride	mg/l	0.5-1.5*	1.5	0.03	0.07
Aluminium	mg/l	0.2	0.9	<0.01	<0.01
Total Coliform	CFU/100 ml	Nil	Nil	Nil	Nil
E.Coli	CFU/100 ml	Nil	Nil	Nil	Nil

**95.** The water samples collected from ANW1 exhibited a slightly lower pH level compared to the benchmark set by the National Drinking Water Quality Standard (NDSQS) and World Health Organization (WHO), while the pH level of the sample from ANW2 was

within the acceptable range. This indicates that the water from ANW1 is slightly more acidic but still close to the standard threshold.

96. In terms of dissolved solids, the concentration was higher in the ANW1 sample compared to that in ANW2. This difference could be attributed to variations in the geological formations or natural mineral content in the areas where the samples were collected.
97. Importantly, both water samples were free from microbial contamination, as evidenced by the absence of Total Coliforms and E. coli. This finding is crucial because it indicates that the water is safe from pathogenic bacteria, which are common indicators of fecal contamination.
98. Additionally, the low concentrations of chloride, ammonia, and metals such as arsenic and aluminum in both samples suggest that the water sources are not impacted by external pollution sources. These results confirm the environmental integrity of the water, indicating no significant influence from industrial discharges, agricultural runoff, or other potential contaminants that could compromise water quality.
99. Overall, the analysis of the water samples from ANW1 and ANW2 demonstrates their suitability for consumption and environmental health, underscoring their compliance with national standards and highlighting their protection from external pollution.

**Table 55: Water quality data of surface water**

Parameters	Unit	Generic	World Health Organization (WHO)	ANW3	ANW4	ANW5
pH	-	5.5 - 9	6.5-8.5	6.6	6.8	7.1
Turbidity	NTU	-	1	4.0	23.0	<1.0
Electrical Conductivity	µS/cm	-	300	142.0	144.0	102.0
Total Suspended Solids	mg/l	200	500	<1.0	8.0	<1.0
Total Dissolved Solids	mg/l	-	1500	84.0	90.0	66.0
Oil & Grease	mg/l	10	-	<1.0	<1.0	<1.0
Phenol	mg/l	1	-	<0.02	<0.02	<0.02
Total Hardness	mg/l as CaCO <sub>3</sub>	-	100	46.0	52.0	34.0
Fluoride	mg/l	2	1.5	<0.02	0.04	<0.02
Ammonia	mg/l	50		0.04	0.33	0.04
Lead	mg/l	0.1	1.0	<0.01	<0.01	<0.01
Chromium	mg/l	0.1	0.05	<0.01	<0.01	<0.01
Sulphide	mg/l	2.0		0.66	0.42	<0.2
Total Residual Chlorine	mg/l	1	1.5	<0.1	<0.1	<0.1
Arsenic	mg/l	0.2	0.01	<0.01	0.02	<0.01
Zinc	mg/l	5	-	0.14	0.21	0.08
Total Coliform	CFU/100 ml	-	Nil	94	210	88
E.Coli	CFU/100 ml	-	Nil	8	14	Nil



- 100.** The water samples collected from ANW3 (Panbari wetland), ANW4 (Ganesh River), and ANW5 (Ghodaha Khola) were analyzed, and all tested parameters met the criteria set by the generic standard. However, the presence of *E. coli* in the samples from ANW3 and ANW4 is noteworthy and raises concerns about potential microbial contamination.
- 101.** The Ganesh River and Panbari wetland have recreational value, and local residents often use these water bodies for various purposes, including domestic and agricultural activities. This human interaction could be a significant factor contributing to the contamination, as public usage can lead to the introduction of pollutants, particularly fecal bacteria like *E. coli*, into the water.
- 102.** The proximity of a landfill site to the sampling point at ANW4 further increases the risk of river pollution from landfill runoff. This risk is exacerbated by recent rainfall, which occurred two days before sampling, possibly causing the river water to become turbid and increasing the presence of suspended solids. Rain can wash pollutants from the surrounding land into the water, highlighting the need for proper management and monitoring of potential pollution sources.
- 103.** In contrast, the ANW5 sample showed low levels of dissolved solids, indicating that the river water was clear and free from suspended particles at the time of sampling. This suggests that ANW5 might be less impacted by anthropogenic activities compared to the other sites.
- 104.** While the presence of total coliforms in surface water is common and often expected due to environmental factors, the findings from these samples suggest that surface water sources are vulnerable to pollution from both human activities and natural processes. Nevertheless, no other significant activities were observed that would severely compromise the water quality status.
- 105.** Overall, while the current water quality is within acceptable standards, the potential risks identified, such as microbial contamination and pollution from nearby landfills, highlight the need for ongoing monitoring and proactive measures to protect these valuable water resources from future degradation.
- 106. Noise Level.** Baseline data on noise for the subproject area is provided in the Annex 6 . Some sources of noise pollution in the subproject site may include motor vehicles, construction work, audio entertainment systems, loudspeakers and noisy people.
- 107.** Noise levels were measured over a 24-hour period at five selected locations, identified as ANW1, ANW2, ANW3, ANW4, and ANW5. The recorded noise levels are within the permitted limits for urban residential areas, which are 55.0 dBA for daytime and 50.0 dBA for nighttime. The noise at these monitoring points primarily originates from human activities and regular vehicular traffic. Table 9 presents the hourly noise levels for ANW1, including maximum, minimum, and equivalent noise levels. The daytime period is defined as 07:00 AM to 6:00 PM, while the nighttime period is from 7:00 PM to 6:00 AM.

**Table 56: Noise level data of ANW1 (Lumbini Sanskritik Municipality, Ward No. 8, Rupandehi)**

Time	Sound Level (dBA)			Time	Sound Level (dBA)		
	Lmax	Lmin	Leq		Lmax	Lmin	Leq
7:00 AM	56.1	40.5	43.2	19:00 PM	68.1	41.9	45.3
8:00 AM	60.0	41.4	43.8	20:00 PM	65.4	43.4	47.1
9:00 AM	57.5	42.8	46.8	21:00 PM	60.4	43.9	46.4
10:00 AM	62.8	42.0	45.8	22:00 PM	55.7	43.8	45.1
11:00 AM	61.9	41.1	46.5	23:00 PM	53.3	42.4	44.4
12:00 PM	60.3	43.1	48.5	12:00 AM	54.0	43.6	45.6
13:00 PM	51.8	43.1	49.2	1:00 AM	54.1	42.7	44.4
14:00 PM	55.8	44.1	48.5	2:00 AM	55.9	40.7	44.3
15:00 PM	66.9	47.6	50.6	3:00 AM	54.3	43.6	45.5
16:00 PM	56.9	44.3	48.4	4:00 AM	57.8	43.4	44.9
17:00 PM	54.2	44.3	48.7	5:00 AM	56.0	41.6	44.9
18:00 PM	62.3	43.7	46.1	6:00 AM	56.4	43.8	44.4

**108.** The highest equivalent noise levels recorded were 50.6 dBA during the day and 44.3 dBA at night. The location is within the Lumbini Sanskrithik Municipality, which has a low population density and limited noise-generating activities. The primary noise sources during the sampling period included the frequent passage of light vehicles, bird chirping, animal sounds, and the rustling of wind. Noise levels were lower at night due to decreased activity during off-hours.

**Table 57: Noise level data of ANW2 (Siddharthanagar Municipality, Ward No. 8, Rupandehi)**

Time	Sound Level (dBA)			Time	Sound Level (dBA)		
	Lmax	Lmin	Leq		Lmax	Lmin	Leq
7:00 AM	52.6	41.7	46.7	19:00 PM	52.5	42.0	45.1
8:00 AM	51.7	40.3	45.3	20:00 PM	56.9	42.8	49.0
9:00 AM	51.1	41.4	45.6	21:00 PM	55.6	44.9	46.6
10:00 AM	54.1	40.2	45.9	22:00 PM	52.5	41.1	47.6
11:00 AM	52.5	42.4	46.9	23:00 PM	60.7	41.1	45.7
12:00 PM	53.2	41.0	44.0	12:00 AM	60.7	40.5	45.9
13:00 PM	50.7	42.4	46.0	1:00 AM	61.6	41.6	45.2
14:00 PM	55.8	43.8	47.2	2:00 AM	60.7	41.8	45.7
15:00 PM	52.0	45.3	48.5	3:00 AM	56.3	44.2	46.6
16:00 PM	59.1	42.6	47.5	4:00 AM	58.9	42.4	47.4
17:00 PM	52.3	43.7	48.6	5:00 AM	57.2	42.9	46.1
18:00 PM	51.9	41.8	47.4	6:00 AM	55.4	42.7	46.3

**109.** Table 10 shows the noise levels at the ANW2 site, where the highest recorded levels were 48.6 dBA during the day and 45.1 dBA at night. Located in the densely populated area of Mayadevi Rural Municipality, the site is characterized by agricultural activities and a natural vegetation pattern. The lower noise levels are attributed to limited human activities. The main sources of noise are cattle-related activities, frequent vehicle traffic, and sirens from nearby industries and hotels.

**Table 58: Noise level data of ANW3 (Sainamaina Municipality, Ward No. 10 (Panbari)**

Time	Sound Level (dBA)			Time	Sound Level (dBA)		
	Lmax	Lmin	Leq		Lmax	Lmin	Leq
7:00 AM	53.6	41.7	49.2	19:00 PM	54.6	40.3	48.6
8:00 AM	54.7	42.3	48.8	20:00 PM	53.6	39.7	49.9
9:00 AM	56.3	44.6	52.3	21:00 PM	51.9	40.8	49.8
10:00 AM	55.0	44.1	49.3	22:00 PM	54.3	41.9	48.0
11:00 AM	57.1	45.0	52.0	23:00 PM	51.7	42.3	46.1
12:00 PM	54.7	46.5	53.0	12:00 AM	52.4	41.7	46.8
13:00 PM	58.6	45.4	50.4	1:00 AM	54.1	40.4	44.8
14:00 PM	58.2	46.8	50.7	2:00 AM	51.0	40.7	43.7
15:00 PM	55.8	48.6	54.0	3:00 AM	53.8	40.7	44.5
16:00 PM	57.4	46.0	50.1	4:00 AM	54.4	43.4	46.0
17:00 PM	52.8	41.7	47.1	5:00 AM	55.1	42.8	47.7
18:00 PM	54.4	41.4	47.2	6:00 AM	53.5	42.4	45.4

- 110.** Sainamaina Municipality, located in ANW3, is a tranquil area characterized by its forested surroundings, sparse settlements, and large agricultural lands, which limit vehicular traffic. The proximity to the forest means that the predominant noises come from natural sources, such as the wind, birds chirping, and animal sounds, rather than human activity. Despite the scattered population, natural phenomena are the main contributors to noise. Table 10 provides data on noise levels, showing that the maximum recorded noise level is 54.0 dBA during the day and 49.9 dBA at night.

**Table 59: Noise level data of ANW4 (Tilottama Municipality, Ward No. - 10, (Ganeshnagar)**

Time	Sound Level (dBA)			Time	Sound Level (dBA)		
	Lmax	Lmin	Leq		Lmax	Lmin	Leq
7:00 AM	54.3	44.2	49.1	19:00 PM	63.2	44.9	46.9
8:00 AM	53.6	43.7	48.3	20:00 PM	62.5	43.6	44.9
9:00 AM	61.6	42.7	48.3	21:00 PM	59.5	43.3	45.6
10:00 AM	58.7	42.2	49.3	22:00 PM	58.3	44.1	47.4
11:00 AM	54.6	41.7	50.3	23:00 PM	63.1	43.7	45.6
12:00 PM	63.3	43.5	51.1	12:00 AM	66.4	45.4	48.2
13:00 PM	58.8	41.3	52.1	1:00 AM	60.5	46.8	48.7
14:00 PM	61.1	42.6	50.9	2:00 AM	55.1	46.1	48.6
15:00 PM	64.7	42.8	50.2	3:00 AM	57.0	46.2	47.9
16:00 PM	69.5	43.6	50.5	4:00 AM	60.1	47.9	49.8
17:00 PM	62.3	42.5	47.5	5:00 AM	57.5	46.0	50.8
18:00 PM	65.0	44.5	45.9	6:00 AM	58.3	45.8	49.8

- 111.** The ANW4 point is located within Tilottama Municipality in forested area with sparse settlements and agricultural land. To the north, Ganesh Khola adds to the area's

tranquility. The highest recorded equivalent noise level at this point is 52.1 dBA during the day and 50.8 dBA at night. Vehicular movement is limited, and the primary noise sources are the wind blowing through the forest, as well as the sounds of birds and animals. Public activities related to agriculture also contribute to the noise.

**Table 60: Noise level data of ANW5 (Devdaha Municipality, Ward No. 8 (Keureni, Bishalnagar))**

Time	Sound Level (dBA)			Time	Sound Level (dBA)		
	Lmax	Lmin	Leq		Lmax	Lmin	Leq
7:00 AM	63.0	40.8	45.9	19:00 PM	59.2	42.2	46.2
8:00 AM	62.7	38.2	46.1	20:00 PM	56.7	45.0	48.4
9:00 AM	56.4	42.8	48.8	21:00 PM	56.5	44.7	47.4
10:00 AM	61.8	42.1	48.1	22:00 PM	57.7	48.2	51.8
11:00 AM	60.4	43.0	48.8	23:00 PM	63.2	46.4	49.4
12:00 PM	55.9	46.9	52.6	12:00 AM	60.4	46.5	49.0
13:00 PM	60.7	44.1	46.6	1:00 AM	61.7	49.3	51.9
14:00 PM	61.8	45.4	48.7	2:00 AM	65.3	46.7	50.7
15:00 PM	63.1	43.1	47.7	3:00 AM	62.3	42.1	47.4
16:00 PM	62.8	42.9	49.6	4:00 AM	68.7	41.4	47.3
17:00 PM	63.2	46.8	50.6	5:00 AM	64.9	42.0	44.8
18:00 PM	63.8	48.8	51.8	6:00 AM	64.5	42.5	46.6

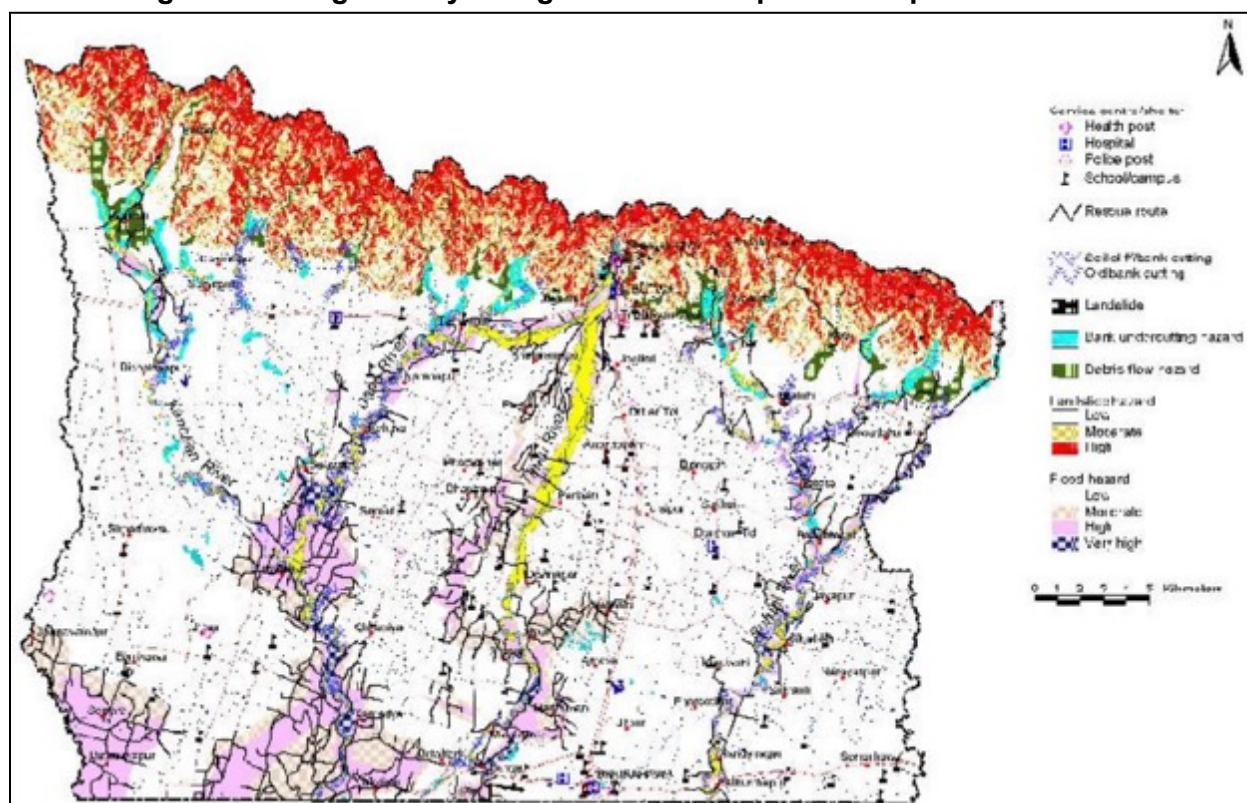
**112.** The ANW5 area, located in Devdaha Municipality, is surrounded by sparsely populated settlements and agricultural land. To the north, it borders a forest and Devdaha Lake, just beyond the Ghodaha River. The limited human activities and vehicular movement make the area calm and peaceful. The highest equivalent noise level recorded is 52.6 dBA during the day and 51.9 dBA at night. No other significant noise sources were observed during the sampling period.

**113. Hydrology.** Tinau River is the major watershed area present in the western part of the Tilottama Municipality. Tinau River originates from the range of Chure, Siwalik and Mahabharat hills. It is a perennial river system. 16 and 13 Mauja Irrigation System and 4 Tapaha (main canal) irrigation system is in operation in the Municipality due to the continuous flow of water from Tinau River. In addition to irrigating agricultural land, the Tinau River has contributed positively to the environment. Tinau River is flashy and floods frequently, which has resulted in casualties in Rupandehi district during the monsoon seasons with high rainfall. Areas nearby Tinau river bank and Bhalwari are flood-prone areas during monsoon. However, the project area lies in the highland region from Tinau River, thus road damage due to flooding in the river is unlikely.

**114.** Tenar River, Danda Khola and Ghagara Khola are others major natural drainages in the project area. The existing water courses serve as canals for providing water to farmlands located at the downstream drains that collect surface run-off from major parts of the city. Over the years, with increasing development of buildings and paved areas, run-off has increased, which has made the drainage situation progressively worse. At present, the sizes of these water courses have been reduced significantly due to encroachment, lack of proper maintenance and dumping of waste in existing drains reducing their capacity to effectively function as drains during the monsoons.

115. There are various ponds and lakes in the project areas, especially in Lumbini Sanskritik municipality. Panbari and Rajapani are two water bodies / wetlands located in Sainamaina. Panbari is close to a project road. This is now in poor condition, and holds only limited water, and is used for fishing. The Integrated hydrological hazard map of the Rupandehi District is presented in Figure 27.

**Figure 91: Integrated hydrological hazard map of the Rupandehi District**



Source: Hydrological hazard mapping of Rupandehi district, *Journal of Nepal Geological Society*.

### C. Biological Environment

116. The project site does not lie within any protected areas and ecologically sensitive areas. The nearest protected area, i.e., Chitwan National Park is located about 50 Km aerial distance away from the project area. Three municipalities Sainamaina, Devdaha and Tilottama have the community forest area coverages whereas Lumbini Sanskritik and Siddharthanagar has no major forest coverages areas with few small patches only. The details of the biological environment and the community forests information are mentioned in the following sections.

117. **Community Forests.** Community forestry is a highly popular program in Nepal's forestry sector. Initially, community forest management focused on protection, but it has now shifted towards production-oriented practices with the implementation of scientific forest management plans. Local communities attach great importance to community forest management. The National Forest Plan (1976) was the first policy document to recognize the significance of people's participation in forest management. Community forestry was prioritized as a major program in the Master Plan for the Forestry Sector (1989) and has been widely implemented following the enactment of the Forest Act

(1993) and the Forest Regulation (1995), which have amended as the Forest Act (2019) and the Forest Regulation (2022). These act and regulation provide a clear framework for the protection, management, and utilization of all types of national forests, including community forests. These forests play a vital role in maintaining environmental services such as erosion control, watershed protection, wind protection, species habitat, and carbon storage. The Ministry of Forests and Environment, along with its respective departments, provincial ministries, community forestry user groups (CFUGs), and District Forest Office (DFO), are the major executing agencies for forest management in Nepal. The production and harvesting of forest products can have a significant benefit on community development, forest management activities, and pro-poor programs (including indirect benefits such as environmental and ecosystem services).

- 118.** In Sainamaina Municipality the proposed existing Panbari-Saljhandi Road section passes through the two community forest areas Kanchan CF and Jhimjhimiya-Bhulkepani CF (Figure 28). The upgrading works of the proposed road will have no major impacts to the vegetations in Sainamaina. In Devdaha municipality the proposed three roads passes through the four community forests; Milan CF, Buddha Mawali CF, Shristhi CF and Srijana CF (Figure 29). In Tilottama Municipality the Drivertole-Shivapur Road does not pass through the forest areas but the 1 km of road stretches runs nearby the Karahiya CF (Figure 30). Only following road sections pass through CF.

**Table 61: Community Forest along and nearby Panbari-Saljhandi Road -Sainamaina**

Chainage	Name of CF	Remarks
Ch.0+000 to Ch.0+370	Saljhandi CF	Road does not pass through this CF but nearby.
Ch.0+370 (Singha Darja CF's starting point is Panbari wetland) to Ch.1+750	Singha Darja CF	Road does not pass through this CF. CF adjacent to Panbari wetland.
Ch.1+760 to Ch.4+140	Kanchan CF	Road passes through the CF.
Ch.4+140 to Ch.5+670	Jhimjhimiya-Bhulkepani CF	Road passes through the CF.
Above Ch.5+670	Pahila Khola CF	Road does not pass through this CF but nearby.

Source: Field Study, 2023

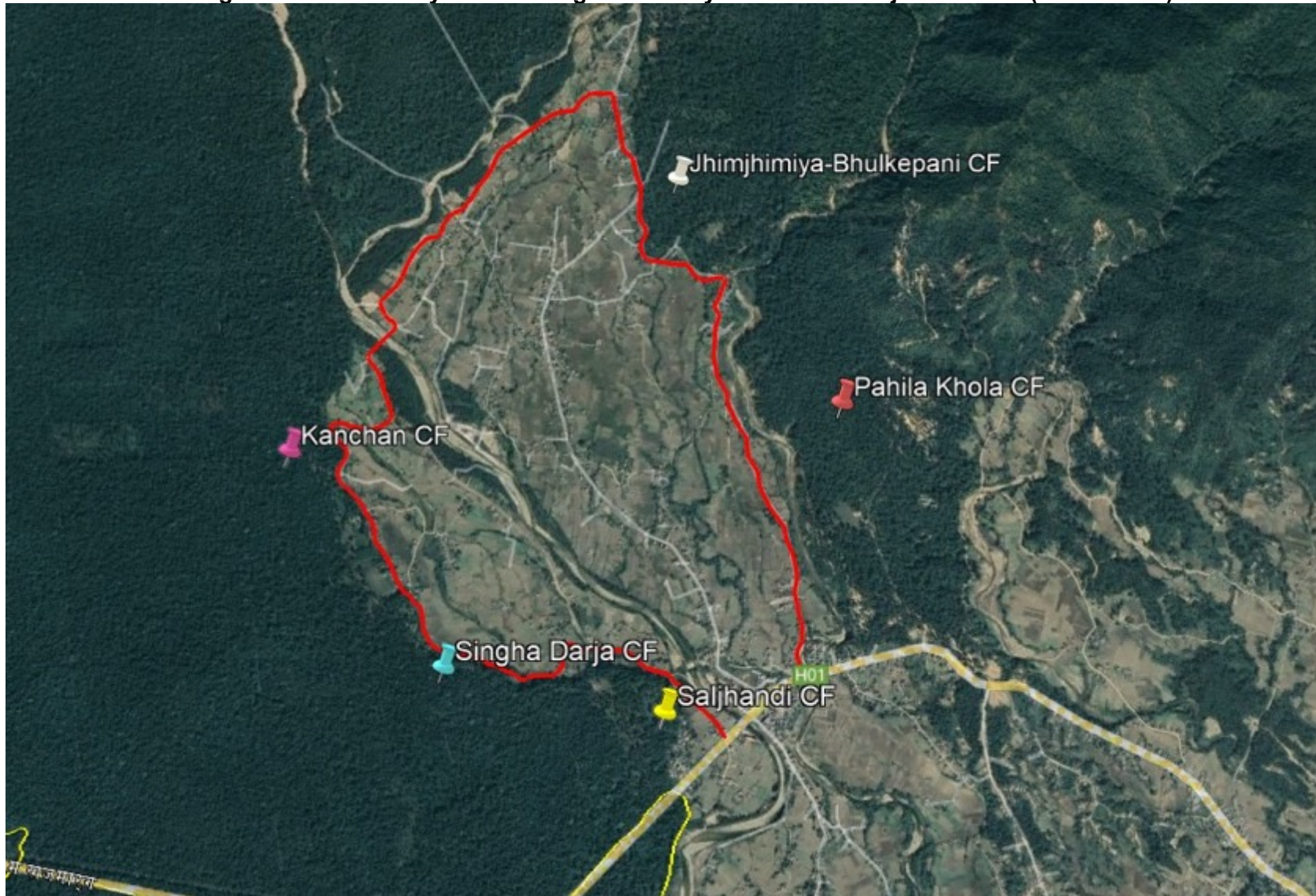
**Table 62: Community Forest along and nearby the road alignments -Devdaha**

Chainage	Name of CF	Remarks
<b>Bhaluhpul- Medical College-Bhatatol-Mukhiya Tol Piparahiya-Singha Road</b>		
Ch.2+170	Milan CF	Road pass through this CF.
Ch.4+000 to Ch.4+110	Buddha Mawali CF	Road passes through the CF.
Ch.5+040	Shristhi CF	Road passes through the CF.
<b>Banchauki-MaydeviPark-Mildanda- Buddha Circut Road</b>		
Ch.4+000 to Ch.4+110	Srijana CF	Road passes through the CF.
Ch.1+595 to Ch.2+470	Buddha Mawali CF	Road passes through the CF.

Source: Field Study, 2023



Figure 92: Community Forest along and nearby the Panbari-Saljhandi Road (Sainamaina)





**Figure 93: Community Forest along and nearby proposed three road alignments (Devdaha)**



**Figure 94: Community Forest nearby the Drivertole-Shivapur Road (Tilottama)**





- 119. Vegetation.** The major floras recorded along the road alignments and within the community forests are Sal (*Shorea robusta*), Simal (*Bombax ceiba*), Kyamuno (*Eugenia operculata*), Khayer (*Senegalia catechu*), Teak (*Tectona grandis*), Botdhayero (*Lagerstroemia parviflora*), Asna (*Terminalia tomentosa*), Jaamun (*Syzygium cumini*), Harro (*Terminalia chebula*), Barro (*Terminalia balearica*) and Sissoo (*Dalbergia sissoo*).

**Table 63: Major Vegetation found in the Project Area**

S.N.	Common/Local Name	Scientific Name	GoN	IUCN
1.	Sal	<i>Shorea robusta</i>	P	LC
2.	Simal	<i>Bombax ceiba</i>	P	LC
3.	Kyamuno	<i>Eugenia operculata</i>	-	LC
4.	Khayer	<i>Senegalia catechu</i>	-	LC
5.	Teak	<i>Tectona grandis</i>	-	DD
6.	Botdhayero	<i>Lagerstroemia parviflora</i>	-	LC
7.	Sisau	<i>Dalbergia sissoo</i>	-	LC
8.	Asna	<i>Terminalia tomentosa</i>	-	LC
9.	Jaamun	<i>Syzygium cumini</i>	-	LC
10.	Harro	<i>Terminalia chebula</i>	-	LC
11.	Barro	<i>Terminalia balearica</i>	-	LC
12.	Sissoo	<i>Dalbergia sissoo</i>	-	LC

Source: Field Study, 2023

Note: LC: Least Concern, DD: Data Deficient, and P; Protected

- 120. Mammals.** In the community forest areas, the major mammals to be in existence are mentioned in **Table 19**. The information was collected from the local people and the community forest representatives during consultation.

**Table 64: List of Mammals found in the Project Area**

S.N.	Local Name/English Name	Scientific Name	GoN	IUCN
1.	Ratuwa (Barking Deer)	<i>Muntiacus muntjak</i>	-	LC
2.	Syal (Golden Jackel)	<i>Canis aureus</i>	-	LC
3.	Rato Badar (Rhesus Macaque)	<i>Macaca mulatta</i>	-	LC
4.	Spotted Deer (Chittal)	<i>Axis axis</i>	-	LC
5.	Kharayo (Indian Hare)	<i>Lepus nigricollis</i>	-	LC
6.	Bandel (Wild Boar)	<i>Sus scrofa</i>	-	LC
7.	Dumsi (Indian Crested Porcupine)	<i>Hystrix indica</i>	-	LC

Source: Field Study, 2023

- 121. Aves.** In the project areas the following species of birds were recorded from project site, and its peripheral area.

**Table 65: List of Birds found in the Project Area**

S.N.	Local Name	Scientific Name	GoN	IUCN
1.	Bakulla (Cattle Egret)	<i>Bubulcus ibis</i>	-	LC
2.	Ghar Bangera (House sparrow)	<i>Passer domesticus</i>	-	LC
3.	Parewa (House Pigeon)	<i>Columba livia</i>	-	LC
4.	Dhukur (Spotted dove)	<i>Streptopelia chinensis</i>	-	LC
5.	Dangre Ruppi (Common Myna)	<i>Acridotheres tristis</i>	-	LC
6.	Ghar Kaag	<i>Corvus splendens</i>	-	LC
7.	Bulbul (Red-vented Bulbul)	<i>Pycnonotus cafer</i>	-	LC
8.	Koili (Asian koel)	<i>Eudynamis scolopaceus</i>	-	LC
9.	Jureli (Nightangle)	<i>Hypsipetes leucocephalus</i>	-	LC

S.N.	Local Name	Scientific Name	GoN	IUCN
10.	Sugaa (Rose-ringed Parakeet)	<i>Alexandrinus krameri</i>	-	LC
11.	Sarus Crane (Native Bird)	<i>Grus antigone</i>	V	V

Source: Field Visit, 2023

- 122. Herpetofauna.** There are six species of herpetofauna listed during the field visit in the project site and the detail of those with their protected status is shown in the following table.

**Table 66: List of Herpetofauna found in the Project Area**

S.N.	Local Name	Scientific Name	GoN	IUCN
1.	Bhyaguta (Asian Common toad)	<i>Duttaphrynus melanostictus</i>	-	LC
2.	Cheparo (Common Garden Lizard)	<i>Calotes versicolor</i>	-	LC
3.	Ajingar (Asiatic Rock Python)	<i>Python molurus molurus</i>	P	V
4.	Sun Gohoro (Golden Monitor Lizard)	<i>Varanus flavescens</i>	P	EN
5.	Krait (Common krait)	<i>Bungarus caeruleus</i>	-	LC
6.	Dhaman (Oriental rat-snake)	<i>Ptyas mucosa</i>	-	LC

Source: Field Study, 2023

- 123. Fishes.** Tinau River, Danda Khola and Ghagara Khola are the major natural drainages nearby project areas. The species of fish found in nearby water bodies of the project area is given in the following table.

**Table 67: List of Fishes found in the Project Area**

S.N.	Local Name/English Name	Scientific Name	GoN	IUCN
1.	Rohu (Major Carp)	<i>Labeo rohita</i>	-	LC
2.	Rewa (Reba Carp)	<i>Cirrhinus reba</i>	-	LC
3.	Budhuna (Gotyla)	<i>Garra gotyla</i>	-	LC
4.	Titai (River Stone Carp)	<i>Psilorhynchus sucatio</i>	-	LC
5.	Nepti (Danio)	<i>Danio dangila</i>	-	LC

Source: Field Study, 2023

- 124. Total Tree to be cut down and saved.** From the field study it is estimated that there 170 trees of different species to be cut down whereas 56 trees can be saved during the construction of proposed subproject. The detail of species to be cut and saved as per the subproject is shown in following table.

**Table 68: Number of trees to be cut down and saved in the Road Subprojects**

Chainage		No. of Trees		Tree Species
From	To	Cut	Saved	
Drivertole-Shivapur Road, Tilottama				
0+000	1+000	9	3	Mango ( <i>Mangifera indica</i> ), Peepal ( <i>Ficus religiosa</i> ), Neem ( <i>Azadirachta indica</i> ), Shwami ( <i>Prosopis cineraria</i> ), Sarifa ( <i>Annona squamosal</i> ), Bakaino ( <i>Melia azedarach</i> ), Kalki Phul ( <i>Callistemon citrinus</i> )
1+001	2+000	17	1	Neem ( <i>Azadirachta indica</i> ), Shwami ( <i>Prosopis cineraria</i> ), Sarifa ( <i>Annona squamosal</i> ), Bakaino ( <i>Melia azedarach</i> ), Kalki Phul ( <i>Callistemon citrinus</i> ), Dabdabe ( <i>Garuga pinnata</i> ), Kalki Phul ( <i>Callistemon citrinus</i> ), Amala ( <i>Phyllanthus emblica</i> ), Ashoka ( <i>Saraca asoca</i> )

Chainage		No. of Trees		Tree Species
From	To	Cut	Saved	
2+001	3+000	10	0	Neem ( <i>Azadirachta indica</i> ), Bakaino ( <i>Melia azedarach</i> ), Mango ( <i>Mangifera indica</i> ), Kadam ( <i>Neolamarckia cadamba</i> ), Katahar ( <i>Artocarpus heterophyllus</i> )
3+001	4+000	0	0	
4+001	5+000	3	3	Bar ( <i>Ficus benghalensis</i> ), Peepal ( <i>Ficus religiosa</i> ), Shwami ( <i>Prosopis cineraria</i> ), Jamun ( <i>Syzgium cumini</i> )
<b>Patthardanda-Tinau, Tilottama</b>				
0+000	0+880	7	0	Ashoka ( <i>Saraca asoca</i> ), Cherry ( <i>Muntingia calabura</i> ), Neem ( <i>Azadirachta indica</i> )
<b>Bhaluhipul-Medical College, Devdaha</b>				
0+000	0+190	6	0	Neem ( <i>Azadirachta indica</i> ), Bhellar ( <i>Trewia nudiflora</i> ), Mango ( <i>Mangifera indica</i> ),
0+217	1+050	14	0	Bhellar ( <i>Trewia nudiflora</i> ), Sisso ( <i>Dalbergia sisso</i> ), Bakaino ( <i>Melia azedarach</i> ), Neem ( <i>Azadirachta indica</i> ), Mango ( <i>Mangifera indica</i> )
2+465	2+490	2	0	Unknown
4+100	4+110	2	0	Sal ( <i>Shorea robusta</i> ), Peepal ( <i>Ficus religiosa</i> )
5+330	5+430	4	0	Sal ( <i>Shorea robusta</i> )
5+705	5+710	1	1	Amaro ( <i>Spondias pinnata</i> )
6+170	7+170	7	0	Karma ( <i>Adina cordifolia</i> ), Peepal ( <i>Ficus religiosa</i> ), Kadam ( <i>Neolamarckia cadamba</i> ), Tilkar ( <i>Coccinia grandis</i> ),
<b>Banchauki-MayaDeviPark Road, Devdaha</b>				
0+000	1+090	2	0	Shami ( <i>Prosopis cineraria</i> ), Mango ( <i>Mangifera indica</i> )
1+600	2+440	3	15	Asna ( <i>Terminalia elliptica</i> ), Sal ( <i>Shorea robusta</i> )
2+530	3+940	15	0	Sal ( <i>Shorea robusta</i> ), Asna ( <i>Terminalia elliptica</i> ), Dumri ( <i>Ficus racemosa</i> ), Mango ( <i>Mangifera indica</i> ), Neem ( <i>Azadirachta indica</i> ), Bakaino ( <i>Melia azedarach</i> )
<b>Shitalnagar-Bhawanipur-Soiya Road: Tree cutting not required for this section</b>				
<b>Panbari to Saljhandi Ring Road, Saina Maina</b>				
0+000	1+330	1	0	Ephiphytes on Asna ( <i>Terminalia elliptica</i> )
2+520	2+890	1	2	Sal ( <i>Shorea robusta</i> ), Asna ( <i>Terminalia elliptica</i> )
5+560	8+862	2	13	Sal ( <i>Shorea robusta</i> ), Bar ( <i>Ficus benghalensis</i> ), Peepal ( <i>Ficus religiosa</i> ), Mango ( <i>Mangifera indica</i> ),
<b>Duimuhan chowk to Thali Ring Road, Saina Maina</b>				
0+000	0+180	6	0	Bakaino ( <i>Melia azedarach</i> ), Neem ( <i>Azadirachta indica</i> ), Sissoo ( <i>Dalbergia sissoo</i> ), Jamun ( <i>Syzgium cumini</i> ), Dabdabe ( <i>Garunga pinnata</i> )
0+180	1+820	0	1	Peepal ( <i>Ficus religiosa</i> )
<b>Bus Terminal Access Road, Lumbini Sanskritik</b>				
0+000	3+960	32	6	Mango ( <i>Mangifera indica</i> ), Neem ( <i>Azadirachta indica</i> ), Bakaino ( <i>Melia azedarach</i> ), Amaro ( <i>Spondias pinnata</i> ), Kadam ( <i>Neolamarckia cadamba</i> ), Saijan ( <i>Moringa oleifera</i> ), Peepal ( <i>Ficus religiosa</i> ), Bhellar ( <i>Trewia nudiflora</i> ), Sisso ( <i>Dalbergia sisso</i> ), Babur ( <i>Acacia nilotica</i> ), Guava ( <i>Psidium guajava</i> ), Jamun ( <i>Syzgium cumini</i> ), Simal ( <i>Bombax ceiba</i> ), Imli ( <i>Tamarindus indica</i> ),
<b>Urban Roads, Siddharthanagar</b>				



Chainage		No. of Trees		Tree Species
From	To	Cut	Saved	
27 Road Sections		11	7	Simal ( <i>Bombax ceiba</i> ), Mango ( <i>Mangifera indica</i> ), Sisso ( <i>Dalbergia sisso</i> )
<b>Total</b>		<b>166</b>	<b>52</b>	

Source: Field Study, 2023

- 125. Integrated Biodiversity Assessment Tool (IBAT).** As per IBAT screening, there is one key biodiversity area (KBA) within 1 km of project area, and within 50 km, there is one protected area and eight KBAs, details of which are provided in the table below. Farmland within Lumbini area is a KBA.

**Table 69: Key Biodiversity Areas**

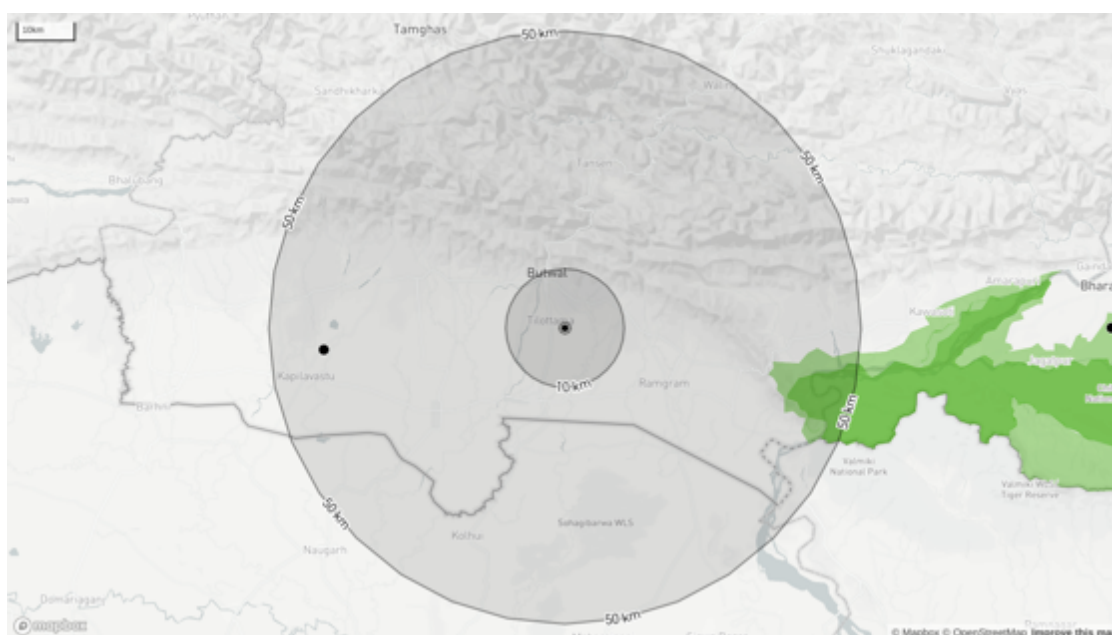
Area name	Distance	IBA
Dang Deukhuri foothill forests and west Rapti wetlands	50 km	Yes
Chitwan National Park	50 km	Yes
Farmland in Lumbini area	1 km	Yes
Gainda Tal	50 km	No
Jagdishpur Reservoir	50 km	Yes
Nawalparasi forests	50 km	Yes
Rampur Valley	50 km	Yes
Shivapur Forest	50 km	No
Sohagibarwa Wildlife Sanctuary	50 km	Yes
Valmaiki Tiger Reserve and Saraiyaman Lake	50 km	Yes

Source: IBAT PS6 & ESS6 Report, 2023

**Table 70: Details of Protected Areas**

Area name	Distance	IUCN	Status	Designation
Chitwan	50 km	II	Designated	National Park
Chitwan - Buffer Zone	50 km	VI	Designated	National Park-Buffer Zone
Chitwan National Park	50 km	Not Applicable	Inscribed	World Heritage Site (natural or mixed)
Jagadishpur Reservoir	50 km	Not Reported	Designated	Ramsar Site, wetland of International Importance

Source: IBAT PS6 & ESS6 Report, 2023

**Figure 95: Chitwan National Park within the 50-km radius of the Subproject site**

**126. Species with potential to occur.** The following Species are potential to occur in the project area.

**Table 71: Species with Potential to Occur**

Area Taxonomic group	Total assessed species	Total (CR, EN & VU)	C R	E N	V U	N T	L C	D D
REPTILIA	80	16	4	7	5	6	58	0
AVES	608	29	9	6	4	7	55	0
MAMMALIA	113	23	1	9	3	0	75	5
ACTINOPTERYGII	76	4	0	1	3	6	61	5
GASTROPODA	54	1	0	0	1	0	44	9
AMPHIBIA	28	0	0	0	0	0	27	1
INSECTA	107	0	0	0	0	0	10	4
MALACOSTRACA	17	0	0	0	0	0	15	2

Area Taxonomic group	Total assessed species	Total (CR, EN & VU)	C R	E N	V U	N T	L C	D D
BIVALVIA	41	0	0	0	0	0	36	5
POLYPODIOPSIDA	4	0	0	0	0	0	4	0
MAGNOLIOPSIDA	56	1	1	0	0	0	53	2
LILIOPSIDA	60	4	0	1	3	0	54	2
AGARICOMYCETES	2	1	0	0	1	0	1	0
ARACHNIDA	3	0	0	0	0	0	3	0
LECANOROMYCETES	1	0	0	0	0	0	1	0

Source: IBAT PS6 & ESS6 Report, 2023

- 127. Lumbini Crane Sanctuary and surrounding Farmlands IBA.** The farmlands around Lumbini cover a large rural area where agriculture is the main land use (68%) followed by forests which covers 21.6% of the area. The forest, scrubs, wetlands and grasslands surrounding Lumbini are especially important refuge for wildlife. This area has been best known population of the globally threatened Sarus Crane (*Grus Antigone*, IUCN red list – vulnerable, VU) in Nepal and is the only known site in the country where the species breed regularly. An area covering 256 acres (about 100 hectare, Figure 36) within the Lumbini Master Plan area (Figure 38) is declared as a Sarus Crane and bird sanctuary. Lumbini Crane Sanctuary and surrounding farmlands has been declared as an Important Bird and Biodiversity Area (IBA) by Birdlife International, Presently, Lumbini Crane Sanctuary serves as an important habitat for resident and migratory birds. In a survey conducted in 2012, globally threatened birds were recorded at the Lumbini IBA which include White-rumped Vulture, Indian Spotted Eagle and Lesser Adjutant that breed and are all seen regularly. The mixed farmland, crops and livestock), forests, grassland, rivers and wetlands found in Lumbini IBA support a rich and diverse assemblage of birds including globally threatened birds. These birds are very dependent on these habitats and therefore vulnerable to any changes or loss. All the project components are located within the urban and developing areas, and none are located close to Lumbini Crane Sanctuary.

**Figure 96: Lumbini Crane Sanctuary with in Lumbini Master Plan Area**



## D. Socio-economic and Cultural Environment

**128. Land Use.** The proposed roads project area consists of settlements and agricultural lands. The roads pass through different land use like commercial, residential, agriculture and open /barren land. Marshes and barren land are also present along the road alignment and some areas experience water logging conditions.

**129.** There are some private trees along the road alignment at some places. Pathardanda-Tinau Road consists of different land use like commercial, residential, agriculture and open /barren land. Similarly, most of the area of the Devdaha road sections, Sainamaina Ring Road 1 and 2 mostly consists of cultivated land. Additionally, the project area also consists of scattered settlements, barren land and community forest.

**130.** The current land use has been broadly categorized as built-up area, agricultural area, vegetation cover, grassland, barren land and water bodies. Out of total area cover by 5 project municipalities, 64.73% of the land is cultivable one whereas 31.47% of land is covered by vegetation, 2.20% of land is built up, 0.97% is barren, 0.44% is grassland and 0.20% is cover by water bodies including river, lakes and marsh land. The detail of land use and land cover is shown in following figure and the Table 27 and Figure 36.

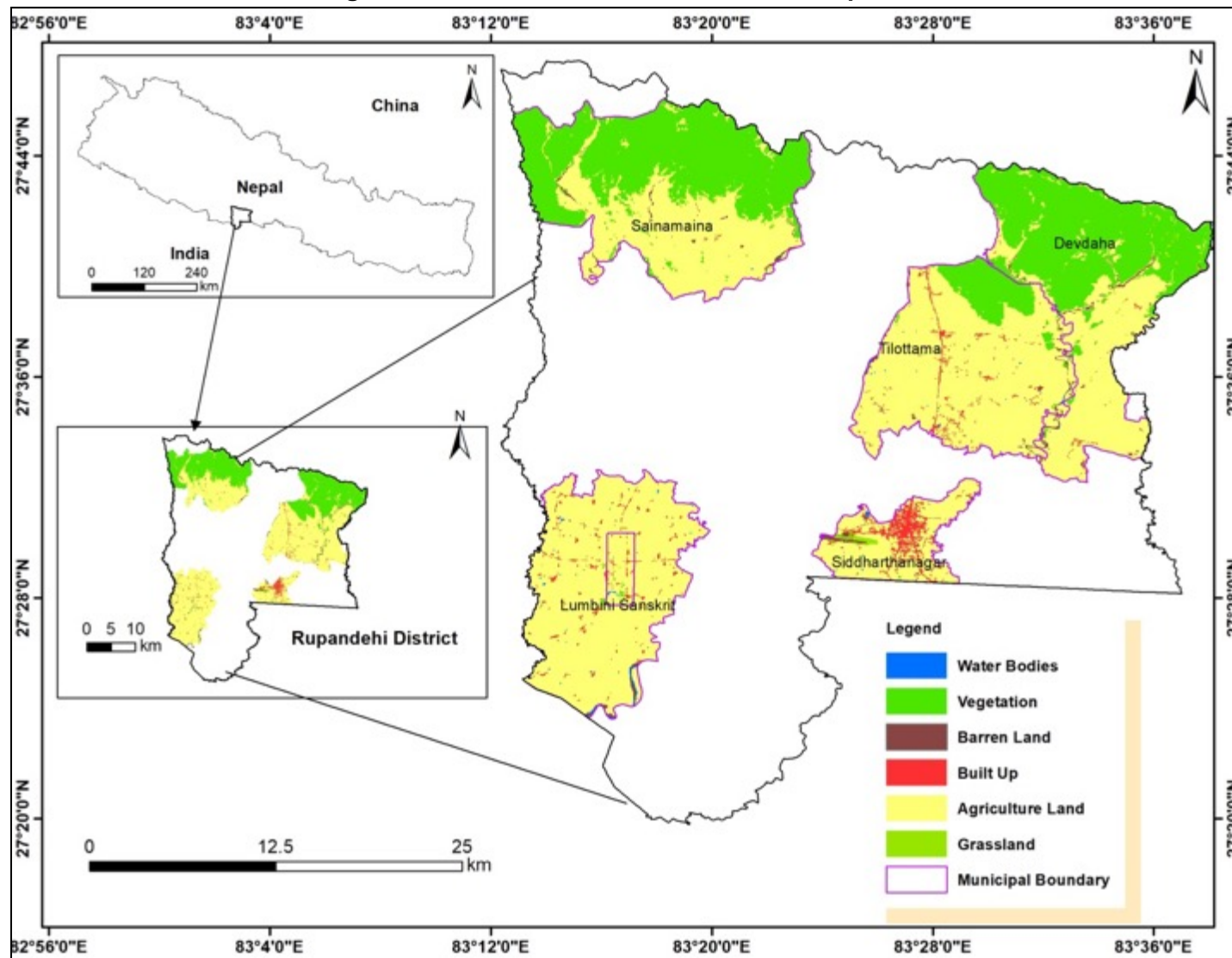
**Table 72: Present Land Use in Project Area**

Land Use Type	Area (sq. km)	Percentage
Water Bodies	1.14	0.20
Vegetation	182.64	31.47
Barren Land	5.61	0.97
Built Up Area	12.79	2.20
Agricultural Land	375.71	64.73
Grassland	2.55	0.44

Sources: Esri Landcover (2022) and Topographic Map, Department of Survey Nepal



Figure 97: Present Land Use of the 5 Municipalities



Sources: Esri Landcover (2022) and Topographic Map, Department of Survey Nepal



**131.** The general demographic information of the affected local level profile is presented below under different sub-headings.

**132. Demography.** As per the National Population and Housing Census 2021, Rupandehi District has a population of 1,121,957. Of the total population, 550, 478 are male, and 571,479 are female. The population of project affected Municipality is 462148 where 222413 are male and 239735 are female. the average population density of the project affected local level is 908.4 persons per square km. There are 388,317 Hindu, 43,012 Muslim, 23,513 Buddhists, 3,907 Christians and 3,399 with other religions in the project affected local bodies. The population density of the project municipalities is 908.4 where Sidhharthanagar has the highest population density i.e., 100.17 persons square kilometres.

**133. Caste and Ethnicity.** Rupandehi district has a multi-ethnic composition of different casts with Brahmin hills, Magar, Tharu, Kshetri, Musalman, and Yadav as the dominant ethnic groups. As per the National Population and Housing Census, 2021 of Nepal, the distribution of this ethnic composition is led by Brahmin hills (16.84%), followed by Magar (10.86%), Tharu (8.24%), Kshetri (7.85%), Musalman (7.69%), Yadav (6.73%) and remaining 8.53 % in other groups. In project affected Municipality, it's also the Brahmin hills (21%), followed by Magar (13.15%), Musalman (9.86%), Kshetri (8.25%), Tharu (8.04%), Yadav (4.49%), Gurung (2.53%), Bishwokarma (3.95%), Gurung (2.53%), Chamar/Harijan/Ram (2.36%) and remaining 12.78 % in other groups.

**Table 73: Population Distribution in the Project Affected Municipality (Caste/ Ethnicity)**

S.N.	Caste/Ethnicity	Municipality					Overa ll
		Devda ha	Sainamai na	Tilotta ma	Siddharthana gar	Lumbini Sanskrit ik	
1	Kshetri	7.94	12.28	11.99	8.33	0.68	8.25
2	Brahman - Hill	22.05	34.08	34.79	13.69	0.40	21.00
3	Magar	24.06	17.56	17.00	7.02	0.11	13.15
4	Tharu	8.71	14.71	13.57	1.98	1.22	8.04
5	Newa:(Newar)	1.85	1.51	2.04	3.16	0.09	1.73
6	Bishwokarma	7.18	7.51	2.71	2.21	0.15	3.95
7	Pariyar	2.61	2.97	1.78	0.5	0.07	1.59
8	Thakuri	0.85	1.34	1.06	1.24	0.10	0.92
9	Mijar	1.64	1.80	1.10	0.34	0.02	0.98
10	Yadav	1.52	0.37	1.51	5.73	13.33	4.49
11	Gurung	4.56	0.62	3.36	4.04	0.06	2.53
12	Musalman	1.63	0.20	0.59	13.18	33.71	9.86
13	Teli	0.28	0	0.37	3.22	2.78	1.33
14	Chamar/Harijan/Ra m	1.64	0.18	0.54	3.23	6.22	2.36
15	Kurmi	0.43	0.06	0.16	2.05	3.45	1.23
16	Mallaha	1.52	0.97	0.30	2.55	2.71	1.61
17	Brahman - Tarai	0.62	0.41	0.74	3.79	2.93	1.70
18	Lodh	0.22	0.12	0	0	8.12	1.69

S.N.	Caste/Ethnicity	Municipality					Overall
		Devdaha	Sainamaina	Tilottama	Siddharthanaagar	Lumbini Sanskritik	
19	Others	10.68	3.30	6.38	23.74	23.85	13.59

Source: National Population and Housing Census, 2021


- 134. Literacy rate and educational institutions.** The average literacy of the project municipalities is at 83.86% with male literacy rate at 89.42%, and female literacy rate at 76.48%. Noted educational institutions include the Lumbini Technical Institute (1989), Tilottama Campus (2095), Butwal Public School (2008), St. Joseph College (1978), Devdaha Adarsha Multiple College (2008), Devdaha Buddha English Boarding (2001), Green Plant English Boarding Secondary School (1990), Sagarmatha College (2007), Sungava Public School (2012), Pashupati Secondary School (1961), Samata Shikha Niketan (2010), Sanskrit Vidyashram Bhairahawa, Brishaspati College (1999), Lumbini Buddhist University (2004), Lumbini Cultural Academy and Khudabagar Secondary School (1956).
- 135. Main sources of income.** The main occupations of the people in project Municipality include Skilled Agriculture, Forestry and Fishery Workers (35.48%), Elementary Workers (29.87%), Managers (8.28%), Craft and related trades workers (6.81), service and sales workers (6.53%), Plant and machine operators and assemblers (4.35%) Professionals (4.25%), technical and associate professional (2.45%), Office assistance (1.07%) and armed forces (0.21%) (Nepal Housing and Population Census, 2021).
- 136. Access to electricity.** All the wards of the project affected municipalities have electrification network. Where, 98.86% of the households used electricity for lighting purposed and 13.45% of the household used electricity for the cooking purposes.
- 137. Sources of drinking water.** Sources of water in the project affected municipalities include Tap/piped water (within premises) (48.76%), Tap/piped water (outside premises) (14.57%), Tube well/handpump (34.71%), spout water (1.03%) and other (0.93%).
- 138. Sanitation.** About 67.20% of the household in the project municipalities use flush toilets with septic tank to dispose wastewater. Similarly, 27.20% of the households used Pit toilet, 3.11% household used flush toilet (Public sewerage), 0.44% of the household used public toilet whereas 2.05% household still without toilet facilities. Siddharthanagar and Tilottama Municipality also consist of a wastewater network that collects and treats sewage from households, businesses, and industries in the area. Households use on-site sanitation facilities like septic tanks, and discharge septic tank outflow and sullage into existing drains and open plots/areas in the Rupandehi. Except during rains, drains mostly carry wastewater from town area.
- 139. Solid Waste Management.** Door to door collection system is practiced in project municipalities. There are tractors for the collection of waste with helpers and driver in each vehicle. Segregation at source is not in practice. Waste is collected daily in the urban areas (main road areas) while in the rest of the settlements; waste is collected once in a week. However, in rural areas the generated organic waste is managed within the household, they are either used for animal fed or composted in a pit. Hospital wastes are managed by the hospital themselves while the rest of the waste from supermarkets, health posts, commercial areas, hotels are collected by the municipalities. The waste





collected by the municipalities is disposed at the dumping site, such as; for Siddharthanagar Municipality, it is disposed in Paklihawa. The solid waste disposed are not managed or treated in the site but once a year, it is compacted followed by layer of soil. The dumping site is the temporary dumping site.




**140. Health centers.** The project affected district consists of several hospitals, including Lumbini Zonal Hospital, Siddhartha Children and Women's Hospital, Butwal Hospital, and Siddhartha Ayurveda Hospital. In addition to these hospitals, there is a Nursing Home called Lumbini Nursing Home, along with 21 polyclinics, creating a network of healthcare facilities. Collectively, these establishments provide a total of 460 beds for patients. Currently, the sewage disposal system in the area relies on on-site sanitation, employing septic tanks and soak pits. However, this system has limitations. At the ward sub-health post, the prevalent illnesses reported are gastroenteritis and diarrhoea, which can be attributed to factors such as inadequate water quality, the absence of proper surface drainage systems, and insufficient management of solid waste.

**141. Physical Cultural Resources.** The WUC Project incorporates the five major towns of the Rupandehi district. Rupandehi is named after Rupadevi, King Suddhodana's queen. The birthplace of Buddha, Lumbini, is located in the Rupandehi district. Rupandehi district also has Devdaha, the birthplace of Mayadevi (the Buddha's mother). In project towns there are other monuments where the people from different other district and country come to visit and worshipping the monuments. The list of monuments found in the Rupandehi district are listed in Table 29 and Figure 37. None of the components are located in the protected areas.

**Table 74: List of Monuments around the Project Area within Rupandehi District**

S · N ·	Name	Location and Coordinates	Monument Recognition / Project Components Distance	Image
1	Lumbini	Lumbini Sanskritik Municipality;  Latitude- 27.46964, Longitude- 83.27584	UNESCO Heritage Site / Project components are not located in the site. A road proposed for improvement ends at the boundary, while proposed municipal building and bus termina are located 600 m and 900 m away from Lumbini master plan area boundary respectively. The Lumbini WHS is about 350 m inside the boundary of master plan area	

S · N ·	Name	Location and Coordinates	Monument Recognition / Project Components Distance	Image
2	Kanyamai Temple	Devdaha Municipality; Latitude- 27.64264, Longitude- 83.57862	National Archaeological Importance / one project component in Devdaha (Banchauki Mayadevi - Mildanda Buddha Circuit Road) is 900m distance from the temple location.	
3	Bhawanipur	Devdaha Municipality; Latitude- 27.62396, Longitude- 83.56631	National Archaeological Importance/ one project component in Devdaha (Bhaluhpul Medical College-Bhatatol -Mukhiya Tol- Piparahiya Singha- Municipality Road) is 930m distance from the temple location.	
4	Bhavani Temple premise	Sainamaina Municipality Latitude- 27.69820, Longitude- 83.33885	Religious with Cultural Importance/ one project component in Saina Maina (Ring Road 2) is 6 km distance from the temple location.	
5	Bhimsen Temple	Butwal Sub- metropolitan City Latitude- 27.705551, Longitude- 83.459131	Religious with Cultural Importance/ one project component of Tilottama (Driver Toll – Shivapur) Road) is 6.5 km distance from the temple location.	

S · N ·	Name	Location and Coordinates	Monument Recognition / Project Components Distance	Image
6	Narayan Mandir	Maya Devi Rural Municipality Latitude-27.52313, Longitude-83.44502	Religious with Cultural Importance/ one project component in Siddharthanagar (Sugar Mill Link Road) is 980m distance from the temple location.	
7	Bairimai	Devdaha Municipality Latitude-27.64141, Longitude-83.57593	National Archaeological Importance / one project component in Devdaha (Banchauki Mayadevi - Mildanda Buddha Circuit Road) is 850 m distance from the temple location.	
8	Jitgadi Fort - National Heritage	Butwal Sub-metropolitan City Latitude-27.70337, Longitude-83.45937	National Heritage / one project component in Tilottama (Driver Toll – Shivapur Road) is 6.3 km distance from the temple location.	

Source: [https://en.wikipedia.org/wiki/Department\\_of\\_Archaeology\\_\(Nepal\)](https://en.wikipedia.org/wiki/Department_of_Archaeology_(Nepal))

- 142.** Lumbini which is considered to be one of the most important UNESCO World Heritage sites in Asia, is the birthplace of the Buddha lies within the Lumbini Province. Devdaha, which is nearby the project area, was the capital of the ancient Koliya kingdom, is situated in the Devdaha Municipality of Rupandehi. It is positioned approximately 35 km northeast of Lumbini, the birthplace of Gautama Buddha. Devdaha holds significant historical and religious significance as a revered Buddha shrine. The name of Lord Gautama Buddha's mother, Mawli, is derived from Devdaha, which served as the capital of the Koliya state. The site is now being developed as a Buddhist pilgrimage center, where the archaeological remains associated with the birth of the Lord Buddha form a central feature.

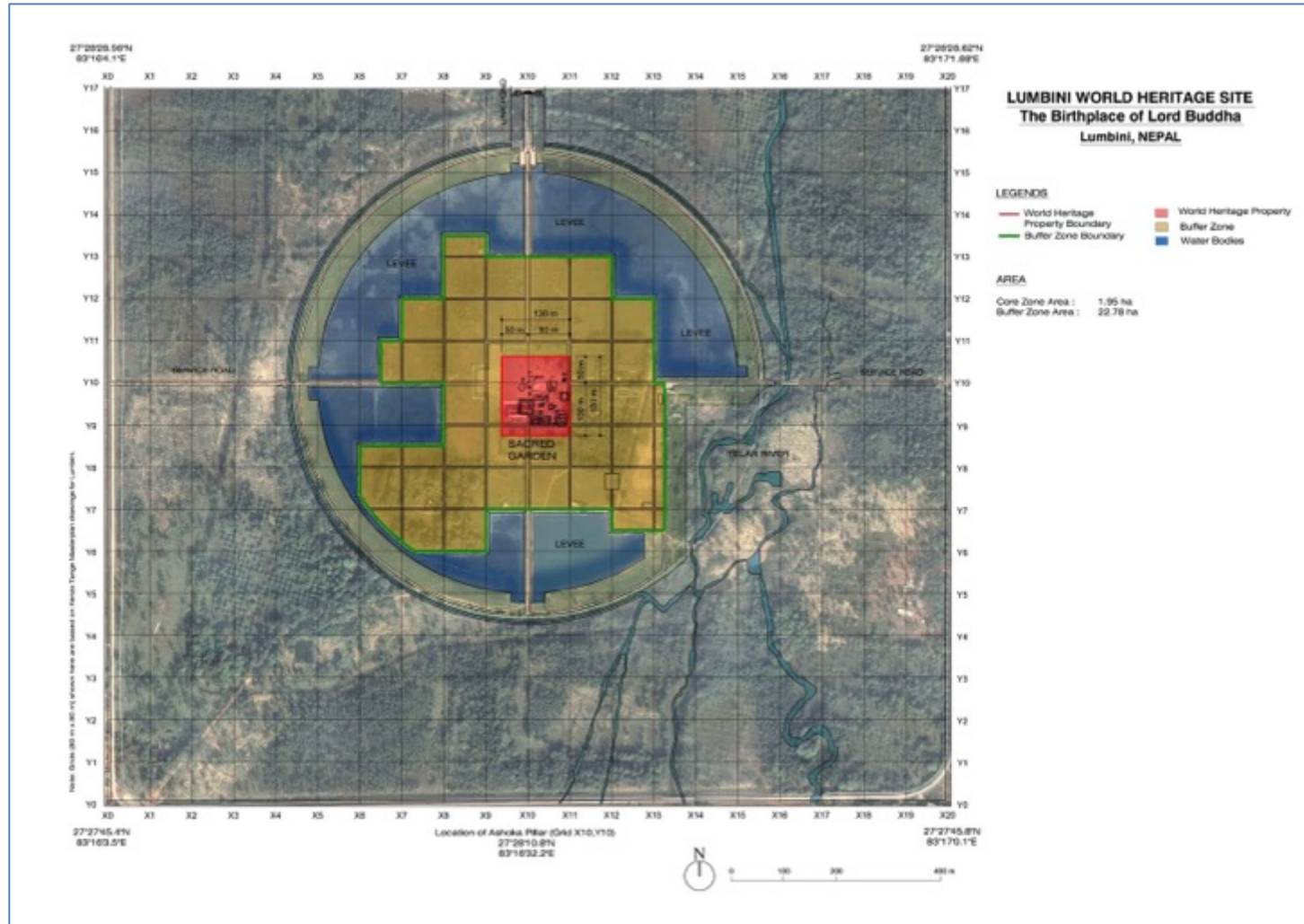
- 143. Lumbini World Heritage Site.** Siddhartha Gautama, the Lord Buddha, was born in 623 B.C. in the famous gardens of Lumbini, which soon became a place of pilgrimage. Among the pilgrims was the Indian emperor Ashoka, who erected one of his commemorative pillars there. The site is now being developed as a Buddhist pilgrimage centre, where the archaeological remains associated with the birth of the Lord Buddha form a central feature. This is a World Heritage Site since 1997(Figure 30). Situated in Rupandehi district of Western Nepal, it represents an outstanding universal value in terms of religious importance, culture, spirituality and archaeology<sup>9</sup>.
- 144. Lumbini Master Plan.** Buddhist literature describes Lumbini, the birthplace of the Buddha as a Pradimoksha vana, a place blessed with blooming Sal trees and bees of five colors humming among the masses of beautiful flowers. Under the aegis of United Nations, a Master Plan was conceptualized by famed architect Kenzo Tange and approved in 1978. This master Plan covers an area of 5×5 miles with the central square mile being the Sacred Garden within which now lies the UNESCO World Heritage Site. Of the Master Plan, the 1×3 mile area includes the following three zones: (i) the sacred garden zone, (ii) the monastic zone, and (iii) the new Lumbini village zone (Figure 31) . the sacred garden zone includes the World Heritage property, Maya Devi temple, the Asokan Pillar, various stupas, chaityas and old remains of the garden and its trees. The monastic zone includes monasteries and stupas. The Lumbini village zone is allocated for physical facilities like hotels, pilgrims' inns, and other facilities and amenities, a museum, an international Buddhist research center,etc. ([www.serveLumbini.org](http://www.serveLumbini.org))

---

<sup>9</sup> <https://www.unesco.org/en/articles/lumbini-living-world-heritage-site>

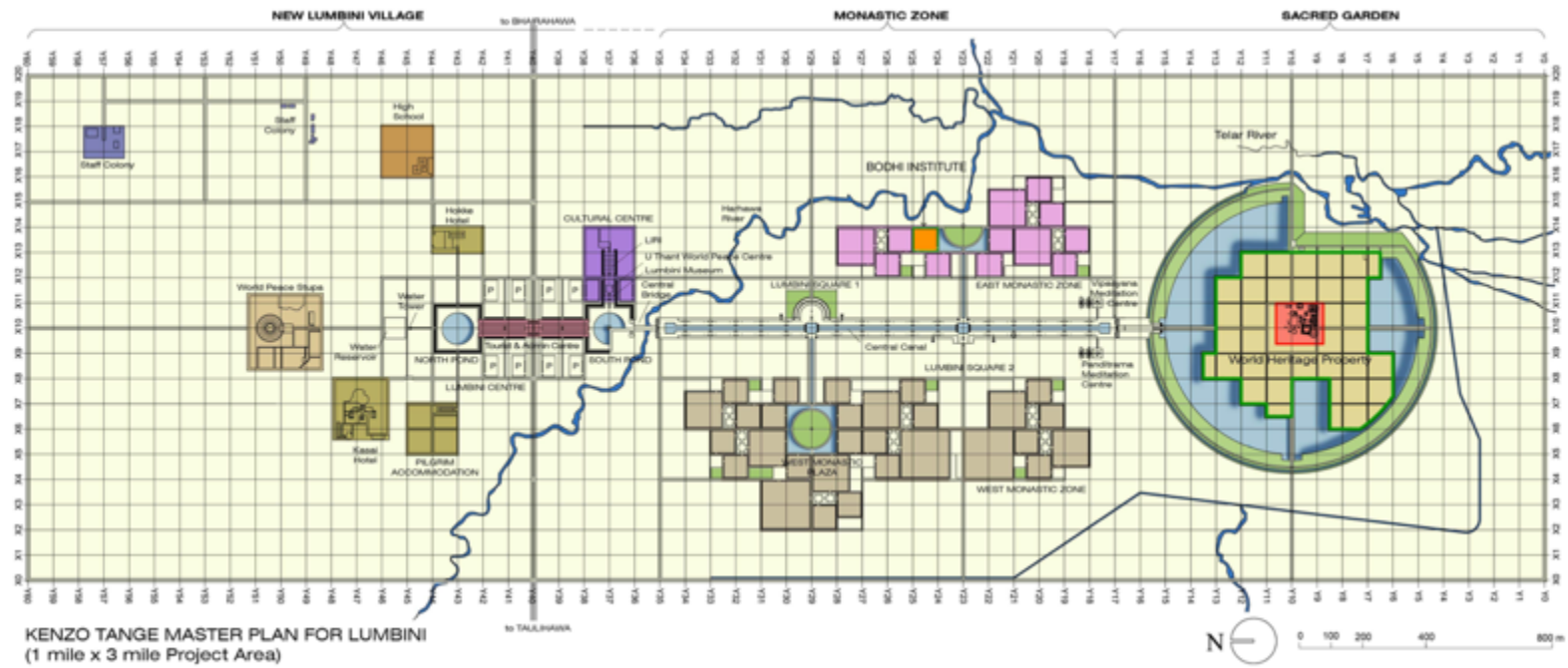


Figure 98: Lumbini World Heritage Site



Source: <https://whc.unesco.org/en/list/666/indicators/>

Figure 99: Lumbini Master Plan



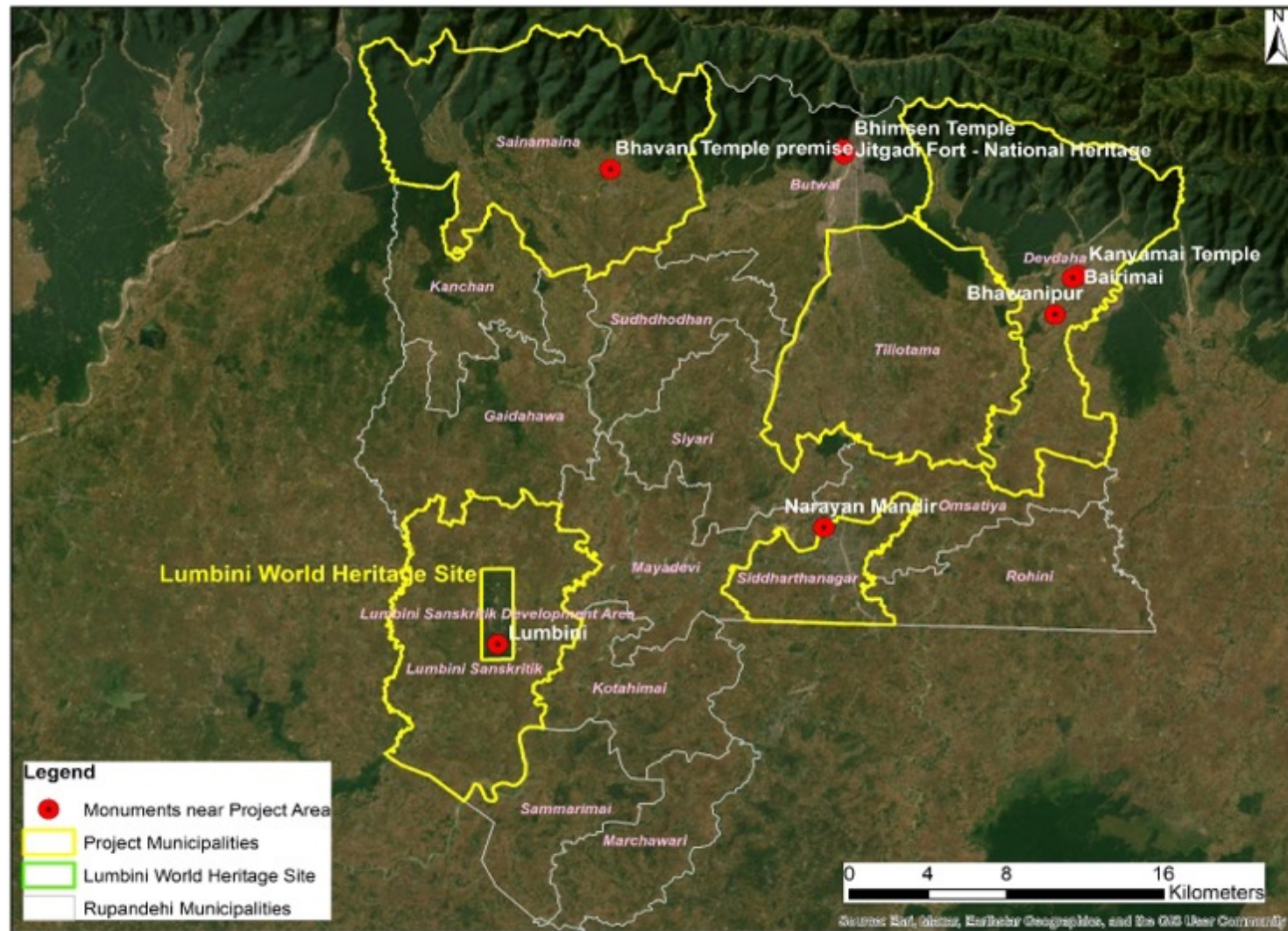
Source: <http://servelumbini.org/the-masterplan/>

- 145.** The project components of the Lumbini Sanskritik mainly the proposed roads, bus terminal and municipal building (Figure 40). The nearest project component is the Mahilwar Chowk-Bus Terminal Road that ends at Vishnupura road which border the Lumbini Master Plan area. The distance of the proposed Municipal building is 600m and Bus terminal is 900m distance from the Lumbni master plan area. Lumbini World Heritage Site is about 350 m inside the boundary of Lumbini master plan area.

#### **E. Site Environmental Features**

- 146.** The Site Environmental Features of each of the project components implemented in the each of the five municipalities are provided in Tables 30 to 34 following the Figures 39 and 40.

Figure 100: Monuments around the Project Area within Rupandehi District







Source: Google Earth and [https://en.wikipedia.org/wiki/Department\\_of\\_Archaeology\\_\(Nepal\)](https://en.wikipedia.org/wiki/Department_of_Archaeology_(Nepal))


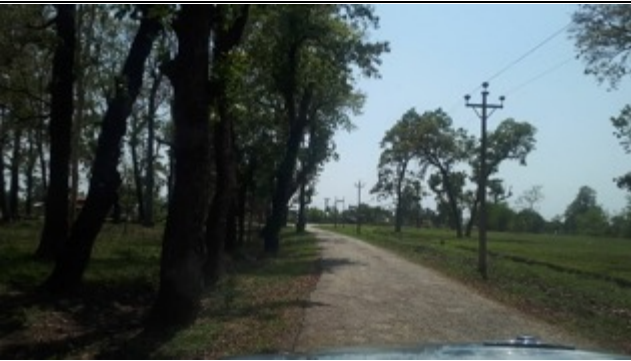






**Table 75: Site Environmental Features of the Road Projects Proposed in Devdaha Municipality**





Subproject, Location and Environment Features	Site Photographs	
<b>Devdaha</b>		
<b>1. Bhaluhipul Medical College-Bhatatol-Mukhiya Tol- Piparahiya Singha-Municipality Road (7.47 Km):</b> The Bhaluhipul Medical College – Bhatatol - Mukhiya Tol - Piparahiya Singha - Municipality Road is significant transportation route located in Devdaha Municipality. This road is the easy access to reach the medical college and an alternative route to reach Devdaha Municipality office. The road serves as a vital link connecting East- West Highway and serves communities within the region. The main motive of proposing this road is to make a connecting road to Devdaha Medical College. The road widening activities will impact with loss of few trees like Sal ( <i>Shorea robusta</i> ), Mango ( <i>Mangifera indica</i> ), and Kadam ( <i>Neolamarckia cadamba</i> ). Thus, Compensatory afforestation should be implemented, in such cases.	 <p><i>Existing Road Section at Ch.1+000</i></p>	 <p><i>Another section of the Existing Road at Ch.4+050</i></p>
	 <p><i>Sal trees along the road sections at Ch.5+380</i></p>	 <p><i>Road section along the agriculture field at Ch.6+800</i></p>







Subproject, Location and Environment Features	Site Photographs	
<b>Devdaha</b>		
<p><b>2. Banchauki Mayadevi - Mildanda Buddha Circuit Road (4.96 Km):</b> The Road is one of the important roads, which connects the Buddha Circuit route in Devdaha Municipality of Nepal. The road directly connects to the East- west highway and passes through Buddha Circuit serves as a vital link connecting several important areas and communities within the religion. The road starts from Sheetalnagar adjoining East-West Highway and ends at Devdaha marga, which directly connects to the Buddha Circuit. The RoW of this road is 12m. The proposed road passes through Ward no 3, Ward no 7 &amp; Ward no 8. The existing road stretched passes through Srijana Community Forest and forest area under Lumbini Buddhist University. Most of the road stretches passes through the settlement and agriculture land area. The road widening activities will impact with loss of few trees like Sal (<i>Shorea robusta</i>), Asna (<i>Terminalia elliptica</i>), Dumri (<i>Ficus racemosa</i>), Mango (<i>Mangifera indica</i>), Neem (<i>Azadirachta indica</i>) and Bakaino (<i>Melia azedarach</i>). Thus, Compensatory afforestation should be implemented, in such cases.</p>	 <p>A Section of the exsiting road at Ch. 0+200</p>  <p>Sal tree at Ch.2+350 to be cut down</p>	 <p>Road section near Mayadevi Park at Ch. 1+700</p>  <p>Road section along the agriculture field at Ch. 4+800</p>





Subproject, Location and Environment Features	Site Photographs	
Devdaha		
<p><b>Shitalnagar-Bhawanipur-Soiya Road:</b></p> <p>It passes through 3.7 km of settlement area at right side and left side is the cultivation area. Remaining about 1 km passes along the cultivation area. So, no tree cutting is required in this section.</p>		

**Table 76: Site Environmental Features of the Road Projects Proposed in Lumbini Sanskritik Municipality**





Subproject, Location and Environment Features	Site Photographs	
<b>Lumbini Sanskritik</b>  <b>1. Mahilawar Chowk to New Bus Terminal:</b> The road starts Mahilawar Chowk (near the existing Old Municipal Building) and ends at the proposed New Bus Terminal. The road is 1,560 m length. The existing road width varies from 7.5m with blacktopped road at urban sections. Upto the New Bus Terminal the road passes through urban sections. The proposed carriage way is 7.5m with the ROW maintained at 11m in the urban sections and designed to meet the local conditions at the other sections. Initially, at the Mahilawar Chowk point, the road sections are in commercial areas while later the sections go across residential areas. The road sections are in medium-dense traffic areas. There are certain trees that would be impacted and if the road alignments / sections cannot be altered to protect the trees, the same needs to be cut and compensatory afforestation should be implemented, in such cases.	 <p><i>Existing Road Section View from the Mahilawar Chowk where Commercial establishments and existing Municipality Office is located</i></p>	 <p><i>Another Road section where trees and utilities may be impacted</i></p>
	 <p><i>Another section of the Existing Road along the residential areas</i></p>	 <p><i>Another section of the road (near the bus terminal) that pass through rural setting</i></p>






Subproject, Location and Environment Features	Site Photographs	
<p><b>Lumbini Sanskritik</b></p> <p><b>2. New Bus Terminal to Highway:</b> The road starts from the New Bus Terminal and terminates at Mahajidiya Chowk. The total length of the road is 2.46kms. The road passes through sparsely populated areas. Presently, majority of the surrounding areas are agricultural in nature. However, the areas are increasingly getting urbanized and is indicated by the residential plots being marked on the agricultural fields. The existing road section is graveled and certain sections near the urban areas are blacktopped. The current clear road width is 9 m. The proposed carriage way is 7.5m and the ROW maintained at 11.5m. There are a few trees including Sissoo and Mango Trees that may be impacted. Also, there is a sacred Peepal tree that would need to be protected.</p>	 <p><i>A section of the road near the Bus Terminal</i></p>	 <p><i>A Sissoo Tree at the edge of the ROW that may be impacted</i></p>
	 <p><i>Another Section the Existing Road</i></p>	 <p><i>Another road section passing through agricultural fields, a Mango tree within the TOW and an educational institution at the far end</i></p>



Subproject, Location and Environment Features	Site Photographs	
<b>Lumbini Sanskritik</b>		
	 <p><i>A sacred Peepal Tree beside the ROW that would need to be protected</i></p>	 <p><i>A view of the existing road section from the End-Point</i></p>
<p><b>3. New Bus Terminal</b> - The Bus Terminal is located in Ward-10, Madhubani of the Lumbini Sanskritik Municipality. Geographically the proposed location is situated at 27°40'45.1164" North and longitudes 83°30'25.272". It lies at a distance of 2.5 km from Jhulanipur, the nearest place on the Siddhartha Highway. The site size of the proposed Bus Terminal is 11,775m<sup>2</sup>. The site is selected based on the availability of government land. Surrounding area being developed as residential area, converted from the existing agricultural use. The access road is on the higher elevation</p>	 <p><i>Board indicating the site to have been selected for the Bus Terminal and the Access Road from the Mahilawar Chowk</i></p>	 <p><i>A view of the Bus Terminal Site</i></p>







Subproject, Location and Environment Features	Site Photographs	
<p><b>Lumbini Sanskritik</b></p> <p>compared to the site and surrounding area. A drainage channel is passing through the site in the southern site. This has no defined banks, and as per the local information, it flows only during rains. It also acts as bypass channel during heavy canal flow (during heavy rains) to discharge into River Koiliwaha in the downstream. A proper drainage system is needed for the facility and surroundings.</p>	 <p><i>Closeup view of the drainage channel located at the periphery of the site and the residential plots being marked on the agricultural field indicating increasing urbanization</i></p>	 <p><i>A closeup view of the barrage gates that open into the natural drainage channel located at the periphery of the site</i></p>
<p>The drainage channel needs to be well defined with proper banks, and adequate capacity provided to smoothly convey water from upstream to downstream without leading to water logging or flooding. This will be ensured in the design. Existing culvert position will not be changed so that flow downstream is uninterrupted.</p>	 <p><i>Drain and low lying area partly in the site</i></p>	 <p><i>Existing culvert</i></p>





Subproject, Location and Environment Features	Site Photographs	
<b>Lumbini Sanskritik</b>		
	 <p>Irrigation canal on the western side of the site</p>	
<p><b>Moglaha-Masina-Anihari-Bhaisaiya Road</b></p> <p>The road originates from Lumbini Taulihawa Road and ends at the Ramapur-Lumbini Road section of the East West Highway. The Right of Way (RoW) for this road is 8 and 10.5 meters. It traverses through Ward numbers 7, 9, and 11, with minimal settlement presence. Approximately 100 households, totaling around 500 inhabitants, stand to benefit directly from this road. The existing surface of the proposed road consists of approximately 8.326 kilometers of poor blacktopped surface, with the remaining portion being gravel road. The majority of the area along the road route is dedicated to cultivation,</p>		





Subproject, Location and Environment Features	Site Photographs	
<b>Lumbini Sanskritik</b>		
with scattered settlement areas occupying the rest.		
<p><b>4. New Municipality Office Building</b> - The Lumbini Sanskritik Municipality has proposed the construction of the Municipal building in ward no. 3 and is 600m distance at southern side from the Lumbini World Heritage Site. The proposed building area is 14,762 sq.m. This site is located near river Telar that flows on the eastern side of the proposed site. There are few trees on the site.</p>	 <p><i>The site for the Proposed New Municipality Office Building with a lone tree at the site that may be impacted</i></p>	 <p><i>Another view of the site for the proposed New Municipality Office Building with a river at the periphery of the site (near the tree in the photo above)</i></p>



**Table 77: Site Environmental Features of the Road Projects Proposed in Saina Maina Municipality**

Subproject, Location and Environment Features	Site Photographs	
<b>Saina Maina</b>		
<p><b>1. Saina Maina Ring Road 1 – Panbari to Saljhandi Section (9.47 km)</b> The road starts from Panbari lake near Kanchan River bridge and ends at Pahili Khola bridge, Saljhandi near Bankatti of ward number 10 in Saina Maina Municipality. The road is 9,473 m in length. Both the starting and end point of the road meets the East – West Highway (NH -01). The existing road width varies from 10 m to 12 m with blacktopped road at urban sections and 5 – 7 m width for graveled road of the alignment section. The proposed carriage way is 7.5m with the ROW maintained at 11m in the urban sections and designed to meet the local conditions at the other sections. The road passes through the Panbari Lake that irrigates 300 Bighas of Land which is source of livelihood for 500 households. Half of the road sections passes through the Saljhandi Community Forests where majority of the trees are Sal. The rest pass through urban areas and agricultural lands. The road sections are in low-dense traffic areas. There are certain trees that would be impacted and if the road alignments / sections cannot be altered to protect the trees, the same needs to be cut and compensatory afforestation should be implemented, in such cases.</p>	 <p><i>Existing Road Section</i></p>	 <p><i>A View of the Panbari lake</i></p>
	 <p><i>Another section of the Existing Road</i></p>	 <p><i>Another section of the road passing through the Saljhandi Community Forests where tree islands have to be used to save the trees</i></p>



Subproject, Location and Environment Features	Site Photographs	
Saina Maina		
	 <p><i>Banyan Tree at the edge of the ROW along the road section</i></p>	 <p><i>Another section of road within the Community Forests where road alignments need to be altered to ensure safety of users as well as conserve the trees</i></p>





Subproject, Location and Environment Features	Site Photographs	
<p><b>Saina Maina</b></p> <p><b>2. Saina Maina Ring Road 2 – Duimuhan Chowk to Thali Section: (5.26 km)</b> The road starts from Duimuhan Chowk and ends at Thali of ward number 11 of Saina Maina Municipality. The total length of the road is 5,261 m. The existing road from Ch: 0+000 to Ch: 0+540, is graveled and the remaining all is blacktopped except under construction bridge section at Ch: 2+980. A new bridge is being constructed at Ch: 0+420 over Kanchan River and with 7.5 m width and footpath 1.5 m on either side. The current clear road width is 30 feet (9 meters) only with 7 m carriage way and 2 m shoulder width. The proposed carriage way is 7.5m and the ROW maintained at 11.5m. There are a few utilities (electric poles) along the road that would need to be shifted. There are a few local streams that cross the road for which there are existing culverts, as well.</p>	 <p><i>A section of the road with culverts and utilities</i></p>	 <p><i>Another road section passing through agricultural fields</i></p>
	 <p><i>Another section of the the existing Road passing through areas that have a rural setting</i></p>	 <p><i>Another section of the Road with a Transmission Tower that cannot be shifted.</i></p>





Subproject, Location and Environment Features	Site Photographs	
<p><b>Saina Maina</b></p> <p><b>3. Janajyoti Tole Chowk Peepal Danda Road (0.972 km)</b></p> <p>The proposed study area is located in Sainamaina Municipality of Rupandehi district. The overall length of the proposed road is 0.972 km. The road alignment passes through Ward no. 11 of Sainamaina Municipality. It is a plain terrain road with average carriageway width of 7 m and right of way of 15 m.</p>		
<p><b>Kanchan Pul to Dakshin Barauli Road (0.45 km)</b></p> <p>The proposed study area is located in Sainamaina Municipality of Rupandehi district. The overall length of the proposed road is 0.450 km. The road alignment passes through Ward no. 11 of Sainamaina Municipality. It is a plain terrain road with average carriageway width of 7 m and right of way of 15 m.</p>		



Subproject, Location and Environment Features	Site Photographs	
Saina Maina		
<p><b>Panbari Bhata to Chafiya tole road</b> (1.560 km)</p> <p>The proposed length of the road is 1.56 km. The road alignment passes through Ward no. 10 of Sainamaina Municipality. It is a plain terrain road with average carriageway width of 6 m.</p>		





**Table 78: Site Environmental Features of the Road Projects Proposed in Tilottama Municipality**




Subproject, Location and Environment Features	Site Photographs	
<b>Tilottama</b>  <b>1. Driver Tole - Shivapur Road (6.81 km)</b> The road starts from Driver Tole and ends to Sukhaura Khola Bridge on another end which ultimately joins to East-West Highway. The total road length is 6.81 km. Majority of the road sections is coming up in residential areas interspersed with agricultural fields as well. The road alignment is blacktopped with few graveled roads section. The existing road width varies from 6-10m and the proposed RoW is 11.5m. There is existing canal at road sides of the alignment, dismantling of canal is not proposed. Presence of Neem, Asana and Mango Tree Species at certain locations and few are to be cut down. The majority of the roads are in medium-dense traffic areas. Hence, appropriate arrangements should be provided during the construction period to ensure that the existing traffic movement is not impacted to a large extent.	 <p><i>Existing Road Section</i></p>	 <p><i>Irrigation Canal along the Road Section</i></p>
	 <p><i>Mango Tree at the edge of the Road</i></p>	 <p><i>Another section of the road with canal on the right amid residences</i></p>

Subproject, Location and Environment Features	Site Photographs	
<p><b>Tilottama</b></p> <p><b>2. Pathardanda-Tinau Road (6.36 km)</b> This road starts from Pathardanda of Ward no. 15 and ends to Tinau River Bridge of ward no. 14 of Tilottama Municipality connecting Siddhartha Highway to Siyari Rural municipality. The majority of road alignment sections is blacktopped. The road alignment passes through Ward no. 15, 13 and 14 of the Municipality. The existing road width varies is 8 m - 12 m. Presence of Neem, Asana and Mango Tree Species at certain locations and few are to be cut down. The road is in medium-dense traffic areas.</p>	 <p>A Section of the existing road</p>	 <p>Neem tree to be cut down at Ch.0+860</p>
	 <p>Existing Material Sourcing Centre that can impact Baseline Air Quality near the Tinau River Bridge</p>	 <p>Existing Religious Structure within the ROW that may be impacted</p>







**Table 79: Site Environmental Features of the Road Projects Proposed in Siddharthanagar Municipality**

Subproject, Location and Environment Features	Site Photographs	
<b>Siddharthanagar</b>  <b>1. Simapath-Ranigaun-Sakuni_road (0.82 km)</b> - The Simapath-Ranigaun-Sakuni Road is regarded as a significant transportation route starts from Sakuni path and ends at Simapath. The entire road section lies in ward no 1. The ROW of this road is 8m. The existing road is gravel Road up to CH 0+700 whereas from CH 0+700 to end, the road is black topped. There is not any existing drain up to Ch 0+700, however a new drain is being constructed at the end section of this road. The drainage flow direction is from Sakuni path to the end. <b>Few pole size tree of sisso needs to be cut down nearby the road section.</b>	 <p><i>Existing Road Section at Ch.0+800</i></p>	 <p><i>Pole size trees to be cutdown at Ch.0+550</i></p>
<b>2. Sakunipath to Danda khola Road (0.725 km)</b> - The proposed road starts from Sakuni path and ends at Danda khola with minimal settlement and road is also proposed to link Danda Corridor. The ROW of this road is 8m. The existing road is a graveled without drain facilities. The majority of the proposed road area sides is cultivation area and no impact to the vegetations. The drainage flow direction is from Sakuni Path to end.	 <p><i>Existing Road Section at Ch. 0+150</i></p>	 <p><i>End section of Road at Ch. 0+725</i></p>

Subproject, Location and Environment Features	Site Photographs	
Siddharthanagar		
<p><b>3. Bimaanghat to North (0.902 km)</b> - The Road starts from Bimaanghat and ends at Lumbini road (Feeder Road). This road is located at ward No. 4. The ROW of this road is 18m. There is an existing canal crossing at the road section. There is no existing drain. There is a settlement area, but the road is clear. The road serves as a lifeline for the local population, enabling them to access essential facilities such as healthcare, education and employment opportunities. No impact</p>	 <p><i>Start of Road Section</i></p>	 <p><i>Canal crossing the roadsection at Ch.850</i></p>
<p><b>4. Rahim Path 1(0.171 km)</b> - The Road starts in between from Amar path. The ROW of this road is 7m and lies in ward no 6. The Existing condition of road is poor having no drainage system. The road passes through the dense settlement area.</p>		

Subproject, Location and Environment Features	Site Photographs	
Siddharthanagar		
<p>5. <b>Rahim Path2 (0.168 km)</b> - The Road starts in between from Amar path and lies in ward no 6. The ROW of this road is 7m. The Existing condition of road is poor. There is collector drain of 1.5m width at right side design by RUDP and small brick masonry drain at left side of the road.</p>		
<p>6. <b>Bhimkaali Path (0.519 km)</b> - The Road starts from Bhimkaali Path adjoining Siddhartha Highway and passes through the dense settlement area. The existing condition of the road is poor, although there is drain at right side. The drainage water flows from start to end and the road. The scarifying of premix carpet is required. The existing road width varies from 7 - 8.5m.</p>		





Subproject, Location and Environment Features	Site Photographs	
Siddharthanagar		
<p>7. <b>East of Gallamandi to Durga Colony (New Colony Road) (0.580 km)</b> - This road is a short but important transportation route connecting the east of Gallamandi to the Durga colony road. The road lies within ward 13 boundary having densely populated area. The ROW of this road is 7m. In this section there are two roads parallel at IUDP canal line and one road is dead end. The Existing condition of road is poor, and it is earthen road. There is no existing drainage system. There is heavy Settlement area.</p>		
<p>8. <b>Udhyog puri road (Buddha Colony) (0.710 Km)</b>: Udhyog Puri Road is a prominent thoroughfare in Siddharthanagar, known for its commercial activities and the presence of various industries and businesses. The road is lined with shops, offices, and factories, contributing to the economic development of the area. The existing road is graveled without drainage system. Junction improvement is required in this road section.</p>		





Subproject, Location and Environment Features	Site Photographs	
Siddharthanagar		
<p><b>9. Radhakrishna, Annapurna path all linked roads (1 KM)</b> - Radhakrishna and Annapurna Path are connected roads located in Siddharthanagar Municipality ward no. 1. They form part of a network of roads in the area, linking various neighborhoods and establishments. The combined length of the linked roads is 1 km. The road starts from Siddhartha Highway near by Nepal-India boarder (boarder 300m distance) and ends at RUDP road. The ROW of this road is 7m. The existing road is an earthen road.</p>		
<p><b>10. Benipur East South Boarder Road (0.892 km)</b> - Benipur East South Boarder Road is 0.892 kilometers in length and serves as an important route in the area. The road lies in ward 1 of Siddharthanagar municipality and half of the road section pass through Rohini Rural Municipality. The road starts from Benipur and ends at Nepal India Border. The ROW of this road is 8m. The road passes through cultivation area. The existing condition of road is poor, and it is earthen road. There is no drainage system. There is very low settlement area.</p>		

Subproject, Location and Environment Features	Site Photographs	
Siddharthanagar		
<p><b>11. Ward no 2- Ward no 4-connecting road (0.892 km)</b> - The Road starts from Meodihawa and ends at airport corridor road. The road lies in ward 2. The ROW of this road is 12m. This road proposed for airport corridor link up road. The road is completely Gravel Road. From chainage 0+000 to 0+175, there is brick masonry drain of sized 1.5x0.75m at both sides. The Existing Road width is 9.7m. The road passes through cultivation area with minimal settlement.</p>		
<p><b>12. Darkhasuwa West Siddhartha Yatayat (0.892 km)</b> - The road starts from Siddharth highway and ends at Laxmi path. The road lies in ward 3. The ROW of this road is 7m and 8m as per provided plan. There are four parallel road sections proposed I this road stretch.</p>		





Subproject, Location and Environment Features	Site Photographs	
Siddharthanagar		
<p><b>13. Siddhartha Colony/Manmohan Path (1.2 km) -</b>  The colony road passes through different parallel roads in this section like Manmohan Path, Pragati Path, Shiva Path, Siddhartha Path and Mayadevi Path. The road lies in ward 3. The ROW of this road is 7m. The Existing condition of road is poor and it is earthen road. There is no existing drainage system. There is Average Settlement area. Shifting of one Transformer is required. Dismantling of six building boundary walls is required. No impact on vegetation</p>		









Subproject, Location and Environment Features	Site Photographs	
Siddharthanagar		
<p><b>14. Sugarmill Link Road (3.432 km)-</b> The Row of the road is 10.5 meters with the middle horizontal section having the same width as the remaining portions. This road is at ward 4. The drainage water outflow needs to be planned at each junction point along the Bimanghat to North Road. The current road width is 8 - 10 meters. Due to being situated in a low-lying area, there is an existing issue with drainage on the road. The road's condition is poor. There is no drainage system in place, and there are areas where settlement occurs on average.</p>		 <p><i>Simal tree will be saved</i></p>

Subproject, Location and Environment Features	Site Photographs	
Siddharthanagar		
<p><b>15. Maya Devi Colony (1.033 km)</b> - The Road lies in ward 4 with 7m and extends from Lumbini Road to Mayadevi Colony. The existing earthen road width is slightly wider at 7.1 meters without drain facilities. There are no existing drains along the road. Additionally, electric poles need to be shifted on both sides of the road at a distance of 30 meters. Furthermore, the relocation of one transformer is necessary. It is important to note that the area where these activities will take place is commercially developed.</p>		
<p><b>16. Durga Colony all linked road to Nirwana Hotel (1.399 km)</b> - The road begins at RUDP Road and ends at Durga Mandir. The Road lies in ward 13. The Row of the road is 7 meters. Currently, the road is in poor condition and the existing road is earthen. There are few drain sections present along the road. There are three parallel roads in the vicinity. The settlement area in this region is moderate, indicating a moderate level of development and population density.</p>		





Subproject, Location and Environment Features	Site Photographs	
Siddharthanagar		
<p><b>17. Kishorpur to Airport Road (0.426km)</b> - The road begins at RUDP road at Alpha and Omega Chowk and ends at Airport Corridor Road. The Road lies in ward 2 and 6. The road has a right of way (ROW) of 9 meters. Currently, it is an earthen road and is in poor condition. There is an existing drain on the left side of the road at the beginning of the road.</p>		
<p><b>18. Trisuli –Path, Deurali-path, Saptarishi- path (0.634 km):</b> This road comprises of three different urban roads: The Road lies in ward 7 and 13. The Row of road is 7m. The Existing Road is a blacktopped road with drain on both side of road. Drain cover should be provided also; it needs scarifying. The settlement area is very high.</p>		

Subproject, Location and Environment Features	Site Photographs	
Siddharthanagar		
<p><b>19. Uchami Path to South (Way to Dhurva Adhikari) 0.607 km</b> - The road begins at Uchami Path and ends at the southern part of the road. The Road lies in ward 8. It has a right of way (ROW) width of 7 meters. Currently, the road is in poor condition and earthen. The settlement in this area is very low, indicating a sparse population. As part of the project, one boundary needs to shift. Furthermore, there is an existing canal perpendicular to the road, measuring 4.8 meters in width. The area surrounding the road has a significant cultivation area, suggesting that agriculture plays a prominent role in this region.</p>		
<p><b>20. Abhay Durga Path (0.333 km)</b>- The road begins at Modern Public School, located on the left side of the road, and ends at a link road called Sachin Path. The road lies in Ward no 8. Along this road, there are three link roads, with the other two being perpendicular to the main road. The right of way (ROW) for the road is 6 meters. To improve the road, it is necessary to lower the road and drain levels. Additionally, the settlement area along this road is high, indicating a densely populated and developed region.</p>		

Subproject, Location and Environment Features	Site Photographs	
Siddharthanagar		
<p><b>21. Dumdumuwa Road to Gonahiya Road - 1.167 km</b> The road starts from Prabat Path, which is an existing RUDP road, and extends to Dumdumuwa. The Road lies in ward 9. This road alignment is a completely new route designed to connect with another RUDP road. The right of way (ROW) for the road varies, with sections having a width of 7 meters and others having a width of 8 meters, as per the provided plan. The purpose of this road is to establish a transportation link between Prabat Path and Dumdumuwa benefiting the local residents and visitors in the area.</p>		
<p><b>22. Doghari Gaau East Chowk to Sahari Bikash Sadak 1.373 km</b> - The road starts from Doghari Gaau and extends to Bhujauli-Sishwa Road. The Road lies in ward 10 &amp; 11. The right of way (ROW) for the road is 10 meters. Doghari Gaau East Chowk and Sahari Bikash Sadak are both locations within Siddharthanagar. Doghari Gaau East Chowk is likely an intersection or junction within the Doghari Gaau area, while Sahari Bikash Sadak refers to a road associated with urban development. The road currently has a blacktopped (pre-mix) surface, indicating a higher quality road compared to an earthen or gravel road. There are no existing drains along the road. The traffic volume on the road is not heavy.</p>		



Subproject, Location and Environment Features	Site Photographs	
Siddharthanagar		
<p><b>23. Suvarna path 0.28km</b> - The road starts from Siddhartha Highway and ends at Rudra path. The Road lies in ward 12. The Row of road is 6m. AT the start of the chainage there is a Sai Global Academy on the left side of the road. The existing road is black topped road. There is an existing side drain on both side of the road. Scarifying of existing premix roads should be done. There is High settlement in this section.</p>		
<p><b>24. Others Road - 0.632km</b> The Row of roads is 6m. The Roads lies in ward 12. The road starts between the Buddha H2O Mineral Plant and Kashi Novel Academy of chainage 0+226. Whereas another road has a change of 0+298. There is existing drain on only one side of Road. The road is clear. There is medium settlement in those area.</p>		

Subproject, Location and Environment Features	Site Photographs	
Siddharthanagar		
<p><b>25. Lacoul Road</b> - The Road starts from Siddhartha Highway and ends at OYO Lacoul hotel. The Road lies in ward 13. The Row of road is 6m. The existing road is earthen type road. The width of existing road is 5.6m including drain. The settlement in these is area is low as there are only few houses in these roads</p>		



## V. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

**147.** Environmental impact assessment is the systematic identification and evaluation of the potential impacts (effects) of proposed projects, plans, programs, or legislative actions relative to the physical, chemical, biological, cultural, and socioeconomic components of the total environment. ADB SPS (2009) requires the assessment of environmental impacts during the different stages of the project, including Project Planning and Design, Pre-Construction, Construction and Operation Phases and the formulation of corresponding mitigation measures to avoid, minimize or offset environmental impacts. All the project components taken up under Output 1 viz., Improvement to Roads and Drains at all the five municipalities within the WUC, Construction of New Bus Terminal and New Municipality Office Building at Lumbini Sanskritik Municipality are evaluated for its environmental impacts and accordingly mitigation measures have been developed.

### A. Planning and Design Phase

**148. Design of the Proposed Components:** Technical design of all the components (roads, drains, footpath, municipal building and bus terminal) will follow the relevant national planning and design guidelines. Road designs comply with the applicable standards to meet the needs of the road users, keeping in view the road function, type and volume of traffic, potential traffic hazards and safety, capital cost, maintenance costs, vehicle operating costs, environment impacts, aesthetics as well as convenience of the road users. The principal geometric features for fulfilment of these objectives are road classification, the horizontal alignment, vertical alignment and the road cross-section. Roads will be designed with traffic control and safety measures commensurate with the traffic. These include road markings ensuring consistency, clarity, and sufficiency; facilities for pedestrians to cross are ensured by road markings; traffic signs (mandatory/regulatory signs, cautionary/warning signs and information signs); road delineators; lighting, etc.,

**149. Impacts to local hydrology.** Water logging during rainy season is a common feature in the project area. This has been corroborated during discussions with the local community. The waterlogging of the roads is often attributed to poor drainage system resulting from failure to consider the local hydrology in the planning and design phase of the project. The site of the proposed New Municipality Office Building in Lumbini is allocated on the bank of River Telar. Although consultation with local people indicated no flooding of site, proper measures are needed to protect the site from heavy floods. Designing a good drainage system would be imperative to prevent flooding of the site during rainfall events. To address these impacts, the detailed design will consider the following:

- (i) Conduct detailed assessment of the micro hydrology and topography of the project site;
- (ii) Design the roads according to the slope and elevation relative to the water bodies that may exist in the area; ensure that necessary cross drainage structures are provided to avoid water logging or flooding
- (iii) Provide the appropriate design of drains for road stretches that do not have existing drainage or where persistent flooding has been recorded;
- (iv) Plan and design the facilities at the New Municipality Building at Lumbini Sanskritik in a way that would prevent flooding during rainfall events.
- (v) Ensure proper site protection measures at Municipal building to safeguard against heavy floods in Telar river and to avoid flooding / water logging

- (vi) Accommodate existing drainage lines within the layout design to ensure uninterrupted flow; provide peripheral drains to carry the runoff from upstream areas where required to avoid flooding / water logging.

**150. Impact on local drainage at Bus terminal site.** While access road is on the higher elevation, the proposed site and surroundings are on lower elevation (about 2-3 m). A drainage channel is passing through the site in the southern side. This has no defined banks, and as per the local information, it flows only during rains. It also acts as bypass channel during heavy canal flow (during heavy rains) to discharge into River Koiliwaha in the downstream. The existing road formed as a ridge in the vase flat landscape restricting the free movement of runoff. The runoff flow is facilitated via an existing culvert on the access road. Any disturbance to the culvert will lead to water logging and flooding. The surrounding area is converted from the existing agricultural use to residential uses, and formation of residential layouts can be seen around the proposed site. Site is mainly selected based on the availability of government land. Given its location, site and surroundings are prone to water logging/flooding during heavy rains and proper measures will be needed. Proposed increase in ground level of the site to avoid flooding of bus terminal facility may also disturb the surrounding drainage system, which requires detailed review and planning to address the issue. Any disruption of natural flow in the drain may affect the area, and therefore it needs to be ensured that it is properly restored with minor geometrical changes. Following measures are suggested:

- (i) Conduct detailed assessment of the micro hydrology and topography of the bus terminal site and surrounding area during the detailed design
- (ii) Design proper drainage system for the bus terminal site and surroundings low land that drains into existing channel drain to ensure that there is no flooding or water logging during rains.
- (iii) avoid changing the alignment of drainage channel as far as possible by channelizing and accommodating within the site
- (iv) In unavoidable cases, ensure the realignment is minor and do not affect the flow through existing culvert
- (v) Obtain prior permission from Canal authority / Irrigation Department for realignment and channelizing the drain within the site
- (vi) Ensure that drainage system is designed with adequate capacity duly account to the climate change risks; liaison with Canal authority / irrigation department and design the drainage channel appropriately.
- (vii) Design peripheral/lateral drains and cross drainage works (such as additional culverts) as required to ensure that elevated bus terminal area do not block the free flow from surrounding areas into existing culvert
- (viii) No facilities such fuel, oil, lubricant stores, or maintenance facilities, garage should be located close to the drain.

**149 Damage /Disturbance to physical cultural resources.** The five subproject municipalities (Devdaha, Lumbini Sanskritik, Sainamaina. Siddharthanagar, and Tilottama) are part of the Greater Lumbini Buddhist Circuit in the western Terai region of Nepal. Lumbini, the birthplace of Lord Buddha, situated in Lumbini Sankritik municipality is a UNESCO World Heritage Site (since 1997). None of the subproject components are located in the world heritage site. The WHS is protected with a boundary fencing of larger Lumbini Master Plan area. WHS site is about 350 m inside the boundary wall. A road (known as Vishnupura road) runs on all four sides outside the boundary fencing of the

master plan area. Proposed municipal building site, and bus terminal site are located at about 600 m, and 900 m (areal distance) respectively from the out outer boundary of the master plan area. The existing road proposed improvement (Maliwar Chowk – Bus terminal – Highway) is the closest, as the Maliwar Chowk is located at the boundary of the WHS. This road joins the Vishnupur Road, forming boundary, from where the WHS is about 350 m inside. Therefore, no impacts envisaged. Damage to common properties, and physical cultural resources such as temples and the sacred Peepal Trees (*Ficus religiosa*) located along the Panbari to Saljandhi Ring Road in Sainamaina and near New Bus Terminal Building site in Lumbini Sanskritik will be avoided. There are other monuments and places of religious cultural importance, however, none of the components located in or close to those sites. No impacts envisaged. There are places like temples, schools, hospitals, etc., along the road. Except one small temple within the right of way, none of the temples or PCRs are located in the subproject sites. Construction phase disturbances like safety risk, access, noise and dust will need to be managed properly. The following mitigation measures have been adopted during the detailed design to ensure no impacts:

- (i) Consult with Lubmini WHS and museum authorities and tourist agencies prior to scheduling of works
- (ii) Ensure that all works are confined to existing roads right-of-way (ROWs).
- (iii) For small local temples of recent origin located within the ROW, as far as possible ensure no relocation by appropriate design; if relocation is needed conduct further meaningful consultation with stakeholders and take mitigation measures accordingly including reconstruction in nearby land
- (iv) ensure implementation of construction phase EMP to avoid disturbance / damage to common property resources and PCRs.

**150 Chance finds.** As stated earlier, subproject area is part of Greater Lumbini Buddhist Circuit and Lumbini and Devdaha are significant cultural centers of international repute. Given its historical and cultural significance, chances of finding items of archaeological importance in the subproject area, particularly in the town of Lumbini and Devdaha cannot be ruled out. Accordingly, the Contractor, as a precautionary approach, will be required to implement the following measures in the event of a chance finds:

- (i) Strictly follow the protocol by coordinating immediately with PIU and Nepal Department of Archaeology for any suspicion of chance finds during excavation works;
- (ii) Create awareness among the workers, supervisors and engineers about the chance finds during excavation work;
- (iii) Stop work immediately to allow further investigation if any finds are suspected; and
- (iv) Inform the Nepal Department of Archaeology (NDA) if a find is suspected and take any action, they require to ensure its removal or protection in situ
- (v) Follow the written instructions of NDA for continuation of works.

**151 Impact on Forests, Terrestrial Flora and Fauna:** Some roads proposed for improvement in Saina Maina and Devdaha are traversing community forests. In the Rupandehi District (where the five project municipalities are located), 15,820 ha. of national forest has been handed over to 97 community forest user groups benefitting 64,410 households. Similarly, 2084 ha. of national forest has been managed as two collaborative forests, and 24.8 ha. of national forest has been handed over as three religious forests in the district. In a case study conducted on five community forests of Sainamaina Municipality (previously, Saljhandi Village Development Committee) and two community forests of Devdaha Municipality of Rupandehi district, it was found that the forests in Saljhandi and Bhaluhi (Devdaha) area are one of the most productive forest areas in the district. Forest products especially timber and fuel wood are available during regeneration felling operation of each community forest. Road improvement is unlikely to increase the traffic significantly, therefore road improvement may not have any notable impacts on forests. These are mostly existing earthen roads connecting habitations, and proposed for improvement. Traffic on the roads is very minimal and limited mostly to pedestrians, bicycles and two-wheelers. Roads are also used occasionally for transport (mainly agricultural produce). The works will however require cutting of few trees, which are located within the roadway. During the works presence and movement of workers, and machinery may damage / disturb the vegetation and wildlife. None of the components are located in the farmlands in Lumbini, habitat for protected Sarus cranes. Municipal building site is close to farmlands, although the surrounding area is being already converted into residential uses, no active farmlands noted during the visits. Following measures shall be implemented:

- (i) Develop a protocol for workers and staff for working in forest areas and in sites close to Lumbini farmlands, and for workers engaged in site clearance and tree cutting; this should clearly list do's and don't and procedures and reporting mechanism
- (ii) Do not remove trees or clear vegetation outside the actual area of construction; all works, construction material storage/ancillary works shall be confined to the demarcated areas of the road, no movement of workers, vehicles, equipment allowed outside this area
- (iii) Ensure proper barricading, and measures to prevent entry of wildlife into work area
- (iv) No labour camps or construction facilities, storage areas, shall be established in or within 250 m of forest area; no debris/waste disposed within forest or within 1 km of forests
- (v) Limit the work to daylight hours only; no works after sunset
- (vi) No workers /personnel shall be confined to the construction area, and shall not enter forest area; it is the contractor responsibility to take necessary precautions & prevent workers removing/damaging trees/vegetation,

- hunting / harming animals; PMDSC and PIU should strictly monitor and ensure
- (vii) Create awareness among workers on environment, human-wildlife conflicts, safety; workers should be made aware of the wildlife and birds (especially protected species such as Sarus cranes and vultures) present in the local areas; photographs of such species shall be provided in the sites, and construction workers shall be instructed to move away from the areas when such species are spotted and do not disturb them in anyway, and immediately report to the supervising engineer and PMC experts to record such events
- (viii) No noisy works shall be conducted, especially during night time.

**152 Impact to Local Vegetation and Trees:** Proposed project roads are mainly urban roads, there are trees along the roads in some sections. Road widening may impact some trees. The road alignment from Bhaluhipul Medical College-Bhatatol-Mukhiya Tol- Piparahiya Singha-Municipality Road in Devdaha passes through the Shristi Community Forest and a number of trees, Sal (*Shorea robusta*) in particular, may be impacted. Similarly, in Siddharthanagar, a Sissoo (*Dalbergia sissoo*) tree will be impacted. Sissoo tree houses nests of birds such as crows and hence it is important to avoid cutting of these tree species. Further, the Simal (*Bombax cieba*) tree is a protected species and cutting of the simal tree (like the one located along the Bus Terminal access road in Lumbini) will be prevented under the project. Additionally, efforts will be made to minimize tree cutting to a large extent. Municipal building site in Lumbini is mostly barren, and there is one tree on the site. This will be preserved as much as possible by incorporating into the layout design as large vacant land is available, and the requirement for municipal building is only 9% of total area. Following mitigation measures are implemented and will be further be followed during implementation as appropriate:

- (i) Conduct investigation along the proposed road alignment with final design to confirm the number and type of tree species that will be impacted;
- (ii) Identify the trees that plays a beneficial role in the local environment i.e., those trees that house bird nests or whose foliage is used by animals etc.
- (iii) Conduct meaningful consultation with stakeholders to determine the trees that would need to be protected;
- (iv) consider alternative and innovative road alignments to avoid tree cutting and where tree cutting is unavoidable, appropriate compensatory afforestation measures should be implemented
- (v) Avoid cutting of tree in municipal building site by adapting site-sensitive layout building
- (vi) Do not cut protected trees such as Simal (*Bombax cieba*); retain the tree / alter the alignment/layout of road/drain locally to preserve the trees;
- (vii) Obtain any necessary approval from appropriate agencies such as Forest Department, to implement the Tree Conservation measures for the sub-project.



- (viii) Conduct survey of trees for bird nests prior to cutting; if any active nests, ensure that trees are not disturbed until young birds fly away from the nests; do not cut trees during the breeding season.

**153 Municipal Building and Bus Terminal at Lumbini:** Proposed site for bus terminal is located away from habitation and is already connected with an access road. To avoid any negative impacts, following measures needs to be incorporated into detailed design:

- (i) Avoid / minimize tree cutting by integrating the existing trees in the layout plans as far as possible; plan trees and create green areas within the facility to the extent possible
- (ii) Adapt energy efficient design;
- (iii) Follow local building bylaws in planning and design, ensure all necessary clearances and approvals
- (iv) Develop facility with all necessary amenities like drinking water, sanitation, segregated solid waste management, etc.,
- (v) Ensure that areas designed for vehicle / bus emergency maintenance (garage), refuelling, repairs etc are provided with impervious surface, and oil/fuel spill collection system; train staff, mechanics, drivers etc., in safe operations
- (vi) Ensure that wastewater outlets of washrooms and toilets are connected to a on-site treatment system such as septic tank and soak pit for treatment and safe disposal; ensure that septic tank is designed water tight to avoid seepage into groundwater; ensure that location of septic tank is at least 50 m away from nearest well
- (vii) Ensure that collected solid waste is disposed properly.

## **B. Pre-Construction Phase Impact and Mitigation Measures**

**154 Consents, Permits and Clearances.** The sub-project Bus Terminal at Lumbini Sanskritik Municipality require Environmental Clearance (IEE) from the Line Agency viz., Ministry of Urban Development, Government of Nepal. Environmental clearance shall be obtained by the PCU from the MoUD. Failure to obtain necessary consents, permits, and other appropriate regulatory clearances can result in design revisions and work stoppage. All the necessary consents, permits, and clearances shall be obtained before the start of civil works.

**155 Integration of EMP in bidding documents and contracts.** Lack of awareness by contractors on ADB SPS requirements may result in insufficient budget and non-implementation of EMP. To ensure that EMP will be provided with sufficient budget and implemented:

- (i) The PCU will incorporate the costs of implementing OHS and the EMP as well as specific provisions requiring contractors to comply with all other conditions required by ADB into the bidding and contract document.
- (ii) Once the Contractor is selected, the PIU with support from PMCDC will inform contractors on their responsibilities in EMP implementation, in compliance with ADB and government requirements, self -monitoring and reporting procedures.

**156 EMP Implementation Training.** If the contractors and construction supervision engineers are not aware about the requirements of this EMP, the project may not proceed and comply with ADB and GoN environmental policies. The PCU, PIU and contractors will be required to undergo training on EMP implementation. The capacity building program will be participatory to the extent possible to make it more effective, with learning by doing, role playing, group exercises, on-the-job training, etc. Pre- and post-training assessment will be conducted to measure the effectiveness of the program.

**157 Updating of IEE.** The PCU shall update the IEE in case of change in design/based on the final detailed design and submit the same for review and clearance of ADB.

**158 Community awareness on project activities and impacts.** Lack of community awareness on project activities may result in potential community health and safety concerns and complaints. Before the start of project construction, a meaningful consultation with the affected communities will be conducted. This meaningful consultation will aim to engage community stakeholders, listen to their views, and arrive at a common understanding on the ways to implement the project. To aid in the consultation process, it is important that the community should be made aware of the details of project activities. Important information to be disseminated to the people are, among others, the following:

- (i) Overview and objectives of the proposed project;
- (ii) Preliminary and/or final detailed design of proposed project components;
- (iii) Potential environmental and social impacts (positive and negative) of the project, and the proposed mitigation measures for the perceived negative impacts; and
- (iv) Grievance redress mechanism and contact details of the project.

**159 Construction materials.** Significant quantities of construction material will be required for the project, especially for the proposed raising of ground level of bus terminal site in Lumbini. Extraction of materials can disrupt natural land contours and vegetation resulting in accelerated erosion, disturbance in natural drainage patterns, ponding and water logging, and water pollution. To mitigate the potential environmental impacts, locations of quarry site/s and borrow pit/s (for loose material other than stones) would be assessed by PIU. Priority would be sites already permitted by Department of Mines and Geology (DMG) of Nepal. If new sites are necessary, these would be located away from population centres, drinking water intakes and streams, cultivable lands, and natural drainage systems; and in structurally stable areas. It will be the construction contractor's responsibility to verify the suitability of all material sources and to obtain the approvals of DMG and from the local revenue administration. If additional quarries will be required after construction

is started, then the construction contractor shall use the mentioned criteria to select new quarry sites, with written approval of PCU/PIU. Contractor will identify sources of water for construction purposes and obtain necessary permissions as required, and approval of PIU before the use. Details of material sources and water sources will be provided in SEMP. The construction contractor will be required to:

- (i) Reuse the excavated soils and road material as much as possible in the construction and raising ground, and minimize the need for new material. Lumbini and Tilotama municipalities /PIUs to coordinated with other construction works/projects in the respective areas to source the excess soil
- (ii) If new material is needed, use only the existing material sources and borrow areas permitted by government (DMG)
- (iii) Avoid creation of new borrow areas as much as possible, in unavoidable cases, obtain all permissions and clearances, including conduct of environmental assessment studies and obtaining environmental clearances
- (iv) Ensure that borrow areas are not located in environmentally sensitive areas; conduct baseline assessment prior to selecting a site
- (v) Prepare borrow area management plan and implement
- (vi) Verify suitability of all material sources and obtain approval of PIU;
- (vii) Ensure that the loading and unloading of the materials and the transportation of the materials from source to construction site does not cause impact on health and safety of the workers and the community; and
- (viii) Submit to PIU on a monthly basis documentation of sources of materials. . If contractor is purchasing ready mix concrete, asphalt/macadam and aggregates from third party, contractor will ensure that all the parties/ suppliers necessary clearances and permission as per the Nepal law and will provide the documentary evidence to PIU/consultants.

### **C. Construction Phase Impact and Mitigation Measures**

**160** The construction phase involves site preparation, transportation of materials, equipment and labor to the site and carrying out the required construction activities while adhering to the Environmental Management Plan (EMP)

**161 Construction Planning.** It has been observed that inadequate planning could lead to non-implementation of EMP during the construction phase and result in significant environmental impacts leading to non-compliance with ADB's environmental safeguard requirements. To ensure that EMP will be implemented during the construction phase, the contractor should, prior to start of construction activities undertake the following:

- (i) Appoint an Environmental Health and Safety (EHS) supervisor;
- (ii) Develop a Site-Specific Environmental Management Plan (SEMP) and get it approved from the Client;
- (iii) Conduct training on the rationale for and implementation of the SEMP and EMP to enhance general understanding and clarify responsibilities regarding implementation, including monitoring and reporting, must also be provided to all relevant staff of contractors;

- (iv) While the locations of all project components have been finalized, the locations for labour campsites, batching plant site etc. that would be required by the Contractor temporarily during the construction period, have not been finalized. The Contractor should select the locations for the campsites, batching plant sites etc. in consultation with local municipalities and get it approved from the PCU and PIU. The Contractor should provide all infrastructure and services necessary to ensure that the labourers' needs are addressed throughout their stay at the campsites. Also, the Contractor should deploy construction equipment, plant and machinery in good condition, provided with necessary pollution control apparatus, and operate as per standards and meet all environmental standards specified by the GoN for such operations; Contractor shall ensure necessary fitness, pollution under control certificates, and are operated by qualified / licensed drivers/operators.
- (v) The Contractor will be required to submit to PCU, for review and approval, a SEMP including (a) proposed sites/locations for construction work camps, storage areas, hauling roads, lay down areas, disposal areas for solid and hazardous wastes, (b) specific mitigation measures following the approved EMP; (c) monitoring program as per EMP; and (d) budget for SEMP implementation. No works can commence prior to approval of SEMP. The SEMP will include the following, among others:
  - (a) Construction Compound Management Plan;
  - (b) Construction Health and Safety Plan (including COVID-19 H&S guidance);
  - (c) Emergency Incident Response Plan.

**162 Disruption of Existing Utilities.** Along majority of the road lengths where the road improvements are being taken up in the WUC, utilities such as electric poles, water lines etc. are present. Construction activities may disrupt the existing utilities installed. To avoid/minimize or manage the disruption of existing utilities, the following measures will be implemented:

- (i) conduct investigation at site to determine all the existing utilities that are likely to be disturbed during construction phase;
- (ii) all underground utilities should be marked prior to any construction works to be taken up at the locations; and
- (iii) coordinate with agencies responsible for the maintenance of the utilities and formulate a plan to minimize disruption of services during construction phase. The plan must be formulated in coordination with PCU and stakeholders at the site. Where required, the responsible agency shall be requested by PIU to carry out the necessary works at the time required and at cost of the subproject. For essential supplies like water supply, any disruption more than 24 hours, shall be minimized by providing alternative water supply, e.g., via mobile tankers.

**163 Tree Conservation:** A tree survey was conducted along the road alignment and other locations which has revealed the presence of 226 trees belonging to Ambha (*Psidium guajava*), Amaro (*Spondias pinnata*), Amla (*Phyllanthus emblica*), Asna (*Terminalia eliptica*), Ashoka (*Saraca asoca*), Bakaino (*Meria azedarach*), Bar (*Ficus benghalensis*), Bhellar (*Trewia nudiflora*), Cherry (*Muntingia calabura*), Dhabdhabe (*Garuga pinnata*), Dumri (*Ficus racemose*), Guava (*Psidium guajava*), Imli (*Tamarindus indica*), Jamun (*Syzgium cumini*), Kabhro (*Ficus lacor*), Kadam

(*Neolamarckia cadamba*), Karma (*Adina cordifolia*), Kalki Phul (*Callistemon citrimus*), Katahar (*Artocarpus heterophyllus*), Mango (*Mangifera indica*), Neem (*Azadirachta indica*), Peepal (*Ficus religiosa*), Saijan (*Moringa oleifera*), Sal (*Shorea robusta*), Sarifa (*Annona squamosa*), Shami (*Prosopis cineraria*), Sissoo (*Dalbergia sissoo*), Simal (*Bombax cieba*) and Tilkar (*Coccinia grandis*).

**164** Amongst these, 52 trees are saved with various measures incorporated in the design. Sissoo (*Dalbergia sissoo*) trees house bird nests and hence all efforts would be made to save the sissoo trees. There are 11 trees, of which 8 are present in the Siddharthanagar sub-project areas. Another tree species, the Simal (*Bombax cieba*) tree species, are important species as they provide habitat for birds of prey. The Simal trees are 6 in number and are present in Lumbini and Siddharthanagar towns. The Simal trees will not be cut for the project. Also, Neem (*Azadirachta indica*) and Peepal (*Ficus religiosa*) trees are considered sacred and changes in road design will be incorporated to conserve the trees.

**165** Despite these efforts, the project impacts 166 trees which would need to be cut. Accordingly, compensatory plantation in the ratio of 1:10 as per GoN requirement (i.e., 10 trees to be planted for one tree cut) would be incorporated as a mitigation measure in the respective municipalities where the trees need to be cut. In Sainamaina, Devdaha and Tilottama, a portion of the road alignments pass through community forest areas. Along the road alignments passing through the community forests, innovative design solutions shall be incorporated to conserve the trees and in extreme cases when trees need to be cut, compensatory afforestation shall be carried out. The details of the tree survey including the species that are present and those that need to be cut, saved etc. have been provided in **Appendix 1**.

**166** The following actions are proposed to mitigate the impact of tree removal and promote tree conservation:

- (i) The first priority is to avoid cutting of trees through changes in design and road alignments. This is in particular important when the tree species is protected or considered sacred by the community and / or houses nests for birds;
- (ii) Do not cut protected trees such as Simal (*Bombax cieba*); retain the tree / alter the alignment/layout of road/drain locally to preserve the trees;
- (iii) after the finalization of the designs and layout of the project components, the trees within proposed construction areas will be marked;
- (iv) trees within area required for construction will be felled after prior approval;



- (v) replacement of the tree shall be undertaken by the project i.e., PIU at the replacement ratio of ten trees for every tree that is cut (i.e., 1:10 ratio as per Forest Regulations<sup>10</sup>, 2022) Indigenous/native species will be preferred in tree planting;
- (vi) only trees that will require removal within the proposed construction areas of the sites will be cut;
- (vii) For trees that will not be cut, take all precautions to protect them from any damage from construction activities
- (viii) Conduct survey of trees for bird nests prior to cutting; if any active nests, ensure that trees are not disturbed until young birds fly away from the nests; do not cut trees during the breeding season
- (ix) prevent workers from removing / damaging any other flora and fauna found in the project vicinity; and
- (x) prohibit employees and workers from poaching animals and cutting of trees for firewood in the vicinity of the construction sites.

**167 Excavation Works.** Excavations are inevitable considering that the WUC Sub-project involves improving the drainage network along the road alignments as well as at the New Bus Terminal and Municipality Building locations at Lumbini Sanskritik. Excavations may affect local drainage patterns if surface and groundwater collect in voids as they are being dug. Further, it may cause safety issues for the local community using the road alignments for their daily commute. To mitigate, the contractor will ensure the following:

- (i) All excavations shall be done to the minimum dimension as required for safety and working facility;
- (ii) Excavations should be carried out after identifying the location of all utilities that exist along the project area;
- (iii) The excavation shall be executed in such manner, that the contractor does not damage or interfere with existing services or structures. If damage or interference is so caused, the contractor shall make arrangements with the supply and/or building owner to execute the repairs at the contractor's own cost;
- (iv) Explore working in off-peak hours or night on busy road sections with prior permission and with proper lighting and safety measures; however, no noisy works shall be conducted in the night
- (v) Road drains and channels shall be kept free from obstructions at all times;
- (vi) Excavated areas should be sufficiently demarcated so as not to affect the health and safety of workers and the people using the road alignment for their daily activities.

**168 Excavated Earth Management:** Excavations are inevitable considering that the WUC Sub-project involves improving the drainage network along the road alignments as well as at New Bus Terminal and Municipality Building locations at Lumbini Sanskritik. Excavation during construction will generate loose soil which can be carried through surface run-off during a rainfall. During construction phase, the

---

<sup>10</sup> Forest Regulations 2022-Rule 93 (5), loss of 1 tree should be compensated by planting 10 trees and Rule 93 (5), the amount must include bi-annual production or purchase of trees, trees transportation, afforestation of 1600 trees per hectare, fencing and boundary for the protection of trees and require number of people for look after.

Contractor shall implement the measures at all times to control soil erosion that shall include, but not be limited to the following:

- (i) The Contractor shall plan the works in a way that minimizes surface excavation works during the rainy season, where practicable.
- (ii) Precautions to be taken at any time of year when rainstorms are likely, actions to be taken when a rainstorm is imminent or forecast, and actions to be taken during or after rainstorms shall be developed by the Contractor.
- (iii) The earthwork sites where exposed land surface is vulnerable to runoff shall be consolidated and/or covered.
- (iv) Channels, earth bunds, netting, tarpaulin and or sandbag barriers shall be used on site to manage surface water runoff and minimize erosion.
- (v) The overall slope of the works areas and construction yards shall be kept to a minimum to reduce the erosive potential of surface water flows.
- (vi) Monitor water quality that could exist close to the working areas to ensure compliance.

**169 Impact on Air Quality.** Air quality is impacted at the construction sites because of vehicle movements, operations of construction equipment, generator sets etc., and generation of dust. Dust and gaseous emissions will be generated by the construction machinery. Construction work also involves breaking up, digging, transporting, and dumping large quantities of dry material. The particulate matter from these can cause health impacts, i.e., respiratory problems, irritation in eyes and reduction in visibility. During the construction period, the Contractor shall implement the following mitigation measures:

- (i) Take every precaution to reduce the levels of dust at construction sites;
- (ii) Fit all heavy equipment and machinery with air pollution control devices that are operating correctly;
- (iii) Construction vehicles must travel at speeds that minimizes dust generation;
- (iv) Reduce dust by spraying water on stockpiled soil, excavated materials, and spoils;
- (v) Cover with tarpaulin vehicles transporting soil and sand;
- (vi) Cover stockpiled construction materials with tarpaulin or plastic sheets;
- (vii) Water spraying to access roads, camp sites and work sites to reduce dust emissions;
- (viii) Machines and vehicles must be regularly examined and maintained to comply with requirements of technical specifications;
- (ix) All vehicles, equipment, and machinery used for construction will be regularly maintained to ensure that pollution emission levels comply with the relevant standards;
- (x) Repair and maintain access roads, as necessary.
- (xi) Monitor air quality according to the environmental monitoring plan.
- (xii) prohibit burning firewood in work and labor camps (promote liquified petroleum gas for cooking purposes and electric heater for heating purposes;
- (xiii) use vehicles that have government-issued permits and registrations; and
- (xiv) prohibit open burning of solid waste.

**170 Noise.** Noise-emitting construction activities include earthworks, road cutting,

concrete mixing, concrete formation works, movement and operation of construction vehicles and equipment, and loading and unloading of coarse aggregates, among others. All the road alignment locations in the five municipalities are located in primarily residential areas and hence the local communities are susceptible to construction noise. Sensitive receptors such as hospitals and schools are also located on some of the road alignments. Additionally, the onsite workers are also exposed to noise levels that may be higher than the permitted levels due to their proximity to the noise sources. The significance of noise impact will be higher at the immediate vicinity of the subproject site where sensitive receptors is situated. Mitigation measures to reduce the noise impacts off-site at the nearest sensitive receptors include the following:

- (i) Arrive at the construction schedule upon discussions with the nearby stakeholders, especially when works are carried out near sensitive receptors such as hospitals, schools, places of worship etc.;
- (ii) Install noise barriers between the source and receptor, where necessary;
- (iii) Enclose and locate generators away from sensitive receptors;
- (iv) Operate construction machines / conduct noise operations sequentially rather than all together;
- (v) spread out the schedule of material, spoil and waste transport;
- (vi) minimize drop heights when loading and unloading coarse aggregates;
- (vii) avoid use of horns unless absolutely necessary;
- (viii) Select electrically powered plant that is quieter than diesel or petrol-driven plant, if interchangeable;
- (ix) Use modern vehicles and machinery with standard adaptations to reduce noise and exhaust emissions, and ensure they are maintained to manufacturers' specifications;
- (x) Noise-generating equipment must be fitted with silencers;
- (xi) Optimize the use of noisy construction equipment and turn off any equipment if not in use;
- (xii) Regular maintenance of all equipment and vehicles;
- (xiii) Stop all construction activities during at night;
- (xiv) Implement a complaint handling system;
- (xv) Workers should be provided with Ear muffs / protective hearing equipment in noise critical areas;
- (xvi) Place visually clear instructions in areas where noise levels are significant;
- (xvii) Measure noise levels periodically as per the Environmental Monitoring Plan;

**171 Drainage Management.** Construction material getting into surface run off or uncontrolled disposal may cause drainage congestion. The impact of these on hydrology is expected to be more pronounced during post monsoon period with rapid movement of rainwater through existing drainage structures, which if blocked by construction waste and debris may cause flooding or waterlogging in neighboring areas. The following mitigation measures should be adopted by the Contractor:

- (i) The contractor shall adopt a site clearance procedure; dispose debris / waste soil only in designated and pre-approved locations by the PIU

- (ii) Wastes and construction debris will not be disposed in a manner that these would end up in drainage canals.
- (iii) The on-site storage of excessive quantities of unwanted spoil and aggregate materials should be avoided. Where storage is necessary, the Contractor shall ensure heaps and stockpiles are located at sites that they do not permit direct runoff into watercourses and are on land sloping at less than 1.5%.
- (iv) All heaps shall be of a size and stability that will ensure the risk of mass movement during period of heavy rainfall is minimized.

**172 Impact on Surface Water Quality:** During project implementation, the Contractor shall be setting campsites, material storage areas and vehicle washing areas. Silt-laden run-off from stockpiled materials, solid wastes and domestic wastewater from the construction camp, and leaks from chemical storage areas and machineries may contaminate or result in water pollution if disposed or discharged to nearby receiving bodies of water. Solvents and vehicle maintenance fluid (oil, coolant) and diesel fuel may contaminate surface and groundwater if these are spilled on ground, disposed of directly into the ground or washed into the streams. Human waste from construction workers may also contaminate surface water and groundwater if there are no adequate sanitary facilities. To mitigate these impacts, the contractor will be required to:

- (i) Provision of temporary sedimentation canal and/or silt traps along construction areas, particularly alignments that are adjacent to receiving bodies of water or canals;
- (ii) The measures to address soil erosion at the proposed facilities will consist of measures as per design, or as directed by the PMCDC to control soil erosion, sedimentation, and water pollution. All temporary sedimentation, pollution control works, and maintenance thereof will be deemed incidental to the earthwork or other items of work;
- (iii) All temporary discharge points shall be located, designed and constructed in a manner that will minimize erosion in the receiving channels;
- (iv) Ensure proper compaction of refilled soil and there shall not be any loose soil particles on the top; the material shall be refilled in layers and compacted properly layer by layer;
- (v) Use surplus soil for beneficial purposes such as in any other construction activities, or to raise the level of low-lying areas;
- (vi) Avoid scheduling of excavation work during the monsoon season;
- (vii) Confine construction area including the material storage (sand and aggregate) so that runoff will not enter the site;
- (viii) Ensure that drains are not blocked with excavated soil or other materials;
- (ix) Stockyards at least 50 meters (m) away from watercourses;
- (x) Fuel and other petroleum products stored at storage areas away from water drainage and protected by impermeable lining and bunded 110%;
- (xi) Effective maintenance of machinery and vehicles to avoid leakages;
- (xii) For effluents from workplace, camps, and offices, provide treatment arrangements such as retention ponds and septic tanks which should be incorporated in the facility designs; provide proper systems for collection, treatment and safe disposal of wastewater from construction camps and facilities; no pit latrines shall be

allowed; toilets. And wastewater outlets shall be connected to city sewerage systems (if available) or septic tanks and soak pit systems developed within the site. Septic tanks should be sealed from bottom and sides to prevent seepage.

- (xiii) Solid waste management, as detailed in the approved Site Environmental Management Plan, should be implemented throughout the construction period;
- (xiv) Monitor water quality according to the environmental monitoring plan.

**173 Impact on Groundwater.** During the construction period, there is an increased demand for groundwater arising from water required for various civil works and for personal consumption by the workers. The Contractor will be required to source the groundwater from approved sources so as to avoid impact on availability of the water to the local community, in particular, when the local community are dependent on the same aquifer. Additionally, material storage areas, equipment and vehicle maintenance areas, solid waste disposal and the like, if not managed effectively, can result in the contamination of the groundwater. Mitigation measures will include:

- (i) Use the groundwater resources judiciously and with the prior approval of competent authority;
- (ii) All tube wells, test holes, monitoring wells that are no longer in use or needed shall be properly decommissioned;
- (iii) Storage of lubricants and fuel at least 50 m from water bodies and in double-hulled tanks;
- (iv) Effective maintenance of machinery and vehicles to avoid leakages;
- (v) Effective management of solid waste and construction debris as per an approved SEMP;
- (vi) Provide uncontaminated water for dust suppression;

**174 Construction Wastes Management.** Solid wastes will include construction wastes (solid wastes: piece of rods, woods, bricks, stones, containers, electric wire, pipes etc. liquid waste: paint, bitumen, oil etc.) and general wastes (solid wastes: papers, plastic containers, residues of food, fruits etc. and liquid waste: from kitchen and bathroom etc.). These wastes will be generated due to construction camps, construction activities and materials used for construction. Inadequate management of construction wastes will result in negative impact on the soil, surface water, groundwater, aesthetic beauty of area and workers' health and safety. To mitigate the impacts, the contractor will implement the following to manage wastes:

- (i) Prepare Construction Waste Management Plan as part of the SEMP;
- (ii) Identify and seek approval for the areas where construction waste could be disposed;
- (iii) The contractors should take every opportunity to reduce the amounts of waste generated and collect recyclable material for processing by local operators.
- (iv) Contractor shall implement waste segregation on site.
- (v) Receptacles for solid waste should be provided for the use of workers, and their contents should be disposed properly.
- (vi) Clean construction waste such as excess soil or rubble should be used in landscaping on site or given to landowners and developers seeking fill material.



- (vii) Waste auditing. The contractor will record the quantity in tons and types of waste and materials leaving site during the construction phase;
- (viii) Waste fuels/oils may be generated from equipment used on-site during construction and may be classified as hazardous waste. Such wastes will be stored in a secure, bunded area on-site prior to collection by relevant parties.

**175 Impacts on aquatic ecology.** Some of the subproject alignments are near or adjacent to irrigation canals (Tilottama) and also near Tinau River (Siddharthanagar) and ponds. The construction of the subproject may affect these water bodies due to siltation and chemical spills, and improper waste disposal, and therefore may impact the quality of the water and any thriving aquatic species. To mitigate this impact, contractor will be required to:

- (i) Provide temporary protection at sections near the river/ponds to avoid sliding of soils;
- (ii) Store spoils away from the side of the river/pond;
- (iii) Implement proper storage/disposal of materials, chemicals and waste
- (iv) Implement mitigation measures for excavation, soil erosion and sediment mobilization, surface water pollution, and construction waste generation;
- (v) Conduct sampling and analysis of the surface water near to the construction sites as part of the Environmental Monitoring Plan.

**176 Impact on Traffic and Access.** Improvements to the road alignments in the five municipalities would impact the regular traffic movements during the construction period. This can create traffic congestion and disturbance to pedestrians and motorists in the vicinity of the affected area if not properly managed. Majority of the construction activities in all the five municipalities in the WUC are in residential areas where the local community need to have access to their properties. However, public access along these road alignments may be disrupted during construction activities. Mitigation measures to ensure safe access shall be implemented by the contractor. A generic Traffic Management Plan can be presented in the SEMP which can be updated in consultation with the local stakeholders to incorporate the site-specific needs at each site. The Contractor should carry out the following activities as part of the mitigation measures:

- (i) Plan roads and drain works minimizing traffic disturbance/blockades; work planning is crucial to minimize the inconvenience to public due to road works; provide diversions / alternative roads where required
- (ii) Schedule road works close to the Lumbini heritage area in consultation with WHS, museum authorities, tourist agencies and traffic police; works that may affect the tourist places shall not be conducted during the tourist season
- (iii) A Site-Specific Traffic Management Plan should be drawn up in consultation with the local community on construction operations and work schedules.;
- (iv) Coordinate with traffic police for temporary road diversions and for provision of traffic aids;

- (v) Notify public and provide sign boards informing nature and duration of construction works and contact numbers for concerns/complaints;
- (vi) Maintain sufficient access to houses and shopkeepers (commercial establishments) during works; provide proper and safe pedestrian access.
- (vii) Awareness should be built amongst the community on the implementation of the Site-Specific Traffic Management Plan;
- (viii) Emergency response plan must be prepared for any traffic accident during construction and should be included in the SEMP.
- (ix) As necessary, increase workforce for speedy completion;
- (x) Schedule material deliveries on low pedestrian traffic hours;
- (xi) Restore damaged properties and utilities;
- (xii) Erect and maintain barricades if required;
- (xiii) Pedestrian access will be maintained with the use of walking boards. Wheelchair and disabled access shall be maintained.
- (xiv) Surfaced roads shall be subject to road cleaning and unsurfaced roads to dust suppression, the methodology and frequency of which shall be included in the SEMP.

**177 Impacts on socio-cultural resources, tourism and chance finds.** The project area, especially Lumbini, attracts large number of tourists during April – May when Buddha Jayanti is celebrated on a grand scale. Works may disturb the tourism activity, however, it is unlikely to be significant as works are mostly located outside the tourism areas. There are local religious places, like temples and mosques, access to which may be disrupted. Lumbini and Devdaha are significant cultural centers of international repute. And, Lumbini hosts the UNESCO Heritage Area that marks the birthplace of Lord Buddha. Hence, there are chances of finding items of archeological importance in the towns of Lumbini and Devdaha. Accordingly, the Contractor, as a precautionary approach, will be required to implement the following measures in the event of a chance finds.

- (i) Prior to commencement of construction, consult with concerned religious authorities of these temples, nearby people and devotees and explain the work method and duration of proposed works, take their suggestions and comments in scheduling and conducting the works
- (ii) Schedule road works close to the Lumbini heritage area in consultation with museum authorities and traffic police; works that may affect the tourist places shall not be conducted during the tourist season
- (iii) No construction camps (workers accommodation, material / waste / soil storage) should be established within 1 km of the monuments in Lumbini
- (iv) Put in place proper dust and noise control measures
- (v) Adjacent to religious/social/historical buildings, undertake excavation and construction work in such a way that no structural damage is caused to the structures
- (vi) Schedule and plan works considering the tourist season and tourist areas
- (vii) Observe the local rituals and important dates of festivals, weekly/monthly/annual religious occasions in the religious places and do not make any disturbance/hindrances/obstacles during such time to the religious places
- (viii) Provide proper signage, barricades etc. to protect public and devotees from dangers of construction works.

- (ix) Ensure proper traffic management planning to minimize the disruption to the normal traffic flow in the area and ensure the safety of the people.
- (x) Clear the work site of unnecessary material, equipment, and debris / surplus soil; do not stock material / soil at the sites
- (xi) Conduct continuous consultations with the local people during the works
- (xii) Strictly follow the protocol by coordinating immediately with PIU and Nepal Department of Archaeology for any suspicion of chance finds during excavation works;
- (xiii) Create awareness among the workers, supervisors and engineers about the chance finds during excavation work;
- (xiv) Stop work immediately to allow further investigation if any finds are suspected; and
- (xv) Inform the Department of Archaeology (DOA) if a find is suspected and take any action they require to ensure its removal or protection in situ
- (xvi) Follow the written instructions of DOA for continuation of works.

**178 Impacts on socio-economic activities.** All the project components in the five municipalities are located in residential areas with significant economic activities taking place on a daily basis. The impacts that will result from construction works including excavation, stockpiling, construction equipment and vehicle operation and accidental damage to utilities are significant, but temporary. The potential impacts include disturbance to economic activities, particularly to the businesses operating along the alignments of construction works. Contractor will be required to:

- (i) Develop the construction schedule in discussions with the community so that movement of construction vehicles can be avoided during school travel timings, festival times and /or any other local events that would require local communities to travel;
- (ii) Implement the traffic management plan in collaboration with local authorities;
- (iii) Where traffic congestion will likely occur, place traffic flagmen during working hours;
- (iv) Avoid full road closures by applying the construction method on section-wise and/or chainage-wise approach during excavation, concreting and/or curing periods;
- (v) If full road closure is not possible, especially on very narrow roads, ensure that alternate routes are identified and that affected residents and establishments are informed prior to conducting the construction activities;
- (vi) Provide convenient access to pedestrians when works occur in front of residential, commercial or institutional establishments. Examples are planks with handrails that should be provided to cross excavated areas.
- (vii) At all points of time, ensure that the local communities have at a minimum, access to their households;
- (viii) Manage stockpile;
- (ix) Manage pumped water from excavations either to drains or drums for later use;
- (x) Relocate the affected power supply poles, and
- (xi) Advise the concerned authority during accidental damage to utilities.

**179 Occupational health and safety risks.** Safety risks and health issues arise from storage, handling and transport of hazardous construction material. Construction workers are also at risk of accidents due to moving vehicles, and other construction related activities. Workers are also exposed to high level of pollution from dust, exhaust of vehicles and machinery and noise exposed to pathogens contained in

wastewater and untreated sewage and septic tank effluents flowing through the roadside drains. Further, if workers do not keep to regulated working hours, the risk of accident events will be higher due to fatigue. Insufficient supply and improper use of personal protective equipment (PPE) and lack of safety procedures may cause injuries or fatal accidents. Spread of COVID-19 is also a risk to manage among workers. There is also a risk of transmitting COVID-19 to the residents. The contractor will be required to implement the following measures:

- (i) Contractor to prepare health and safety plan prior to commencement of works, and part of SEMP
- (ii) All relevant provisions of the National Health Care Waste Management Standards and Operating Procedure<sup>11</sup>-2020 and relevant WHO guidelines will be adhered to, concerning the provision of adequate measures to avoid contracting and/or spreading diseases during construction phase;
- (iii) Follow international best practices on occupational health and safety such as those in Section 4.2 of World Bank EHS Guidelines on Construction and Decommissioning Activities; and EHS Guidelines on Waste Management Facilities<sup>12</sup>. These practices include recommended measures to prevent, minimize and control pathogens from inflicting workers through training and use of appropriate PPEs, clothing and equipment when working along the drainage system, and immunization and health monitoring (e.g., hepatitis B and tetanus).
- (iv) Existing drains may present hazardous working conditions in some places due to lack of oxygen and flammable nature of methane emissions which will be detrimental to the health and safety of workers. Put in place standard operating procedures with appropriate equipment, and workers are provided with necessary training and personnel protection equipment to safeguard health and safety
- (v) Follow established occupational health and safety protocol on emerging infectious diseases such as the corona virus disease (COVID19). See **Appendix 2** for a sample guidance note in responding to COVID19;
- (vi) A readily available first aid unit, including an adequate supply of sterilized dressing material and appliances, will be provided as per the factory rules. Suitable transport will be provided to facilitate the transfer of injured or ill persons to the nearest hospital;
- (vii) Other first aid medical equipment and nursing staff will be made available or arranged on-call;
- (viii) The contractor will, at his own expense, conform to all disease prevention instructions as may be given by PCU/PIU;
- (ix) Provide regular health check-ups, sanitation and hygiene, health care, and control of epidemic diseases to the workforce;
- (x) The contractor shall provide all labor and materials and construct/install and maintain site safety, hard barricading, flexible green net, signboards, temporary day/light traffic diversions throughout the construction activities according to the specifications and provide personal protective equipment (PPE) to all the laborers working at the construction site;

<sup>11</sup> National Health Care Waste Management Standards and Operating Procedures-2020-Documents developed based on the "Health Care Waste Management Guideline 2014", "The Public Health Service Act, 2018, Public Health Service Regulation 2020 and National Health Policy, 2019.

<sup>12</sup> IFC World Bank Group. 2007. Environmental, Health and Safety (EHS) Guidelines – General EHS Guidelines: Environmental – Noise Management.

- (xi) Launch awareness programs concerning human trafficking and the possibility of spread of sexually transmitted diseases (STDs) and HIV/AIDS using brochures, posters, and signboards;
- (xii) Make available first aid kits, ambulance facilities, and fire extinguishers in camp sites, if any;
- (xiii) Compensation for the loss of life (a zero tolerance to loss of life policy should be developed and implemented) or for any type of injuries; and
- (xiv) Provide adequate insurance to the workers that is current throughout the construction period;
- (xv) Conduct Health and safety training periodically and Daily Tool Box Training for all site personnel.

**180 Community health and safety risks.** Communities will be moderately exposed to threats due to impacts on air and water quality, ambient noise level; mobility of people, goods, and services; accesses to properties, economic activities, and social services; service disruptions, etc. Construction workers may potentially bring communicable diseases in the community, including COVID-19. To mitigate these impacts, the contractor will be required to implement the following measures:

- (i) Code of conduct for workers includes restricting workers in designated areas, no open defecation, no littering, no firewood collection, no fire except designated places, no trespassing, no residence at construction sites, and no obligation to potentially dangerous work;
- (ii) Follow International best practices on community health and safety such as those in Section 4.3 of World Bank Environmental Health and Safety (EHS) Guidelines on Construction and Decommissioning Activities<sup>13</sup>.
- (iii) Follow established community health and safety protocol on emerging infectious diseases such as COVID19.
- (iv) Implement measure to prevent proliferation of vectors of diseases at work site;
- (v) Maintain a complaint logbook in worker's camp and take action promptly of complaints. Follow the established GRM of the overall project (URLIP);
- (vi) Schedule transportation activities by avoiding peak traffic periods;
- (vii) Clean wheels and undercarriage of haul trucks prior to leaving construction site;
- (viii) Educate drivers: enforce vehicle speed limit in settlements and avoid use of horn;
- (ix) Earmark parking place for construction equipment and vehicles when idling; no parking shall be allowed on the roads, that may disturb the traffic movement;
- (x) Provide prior information to local people, particularly the Temples, Madrasa and mosques nearby about work schedules;
- (xi) Avoid heavy noisy works near sensitive areas; if needed, noise barriers be installed in between the construction site and any community halls or places of worship to reduce the noise level;
- (xii) Provide adequate space and lighting, temporary fences, reflectorized barriers and signages at the work site; and
- (xiii) Ensure contractor has staff trained on emergency response.

**181 Post-construction clean-up and reinstatement.** Construction debris, spoils, and

<sup>13</sup> IFC World Bank Group. 2007. Environmental, Health and Safety (EHS) Guidelines – General EHS Guidelines: Environmental – Noise Management.

excess construction materials may pose hazards to properties, community and environment if left unattended after construction. The contractor will reinstate all working areas and access routes as work proceeds during construction. All plant, equipment, materials, temporary infrastructure and vehicles will be removed at the earliest opportunity and the surface of the ground restored as near as practicable to its original condition. The following generic measures should be taken:

- (i) Remove all spoils wreckage, rubbish, or temporary structures (such as buildings, shelters, and latrines) which are no longer required;
- (ii) All excavated roads shall be reinstated to original condition;
- (iii) All disrupted utilities restored;
- (iv) All affected structures rehabilitated/compensated;
- (v) The area that previously housed the construction camp is to be checked for spills of substances such as oil, paint, etc. and these shall be cleaned up;
- (vi) All hardened surfaces within the construction camp area shall be ripped;
- (vii) All imported materials removed, and the area shall be top soiled and regressed using guidelines set out in the re-vegetation specification that forms part of this document;
- (viii) The contractor must arrange the cancellation of all temporary services;
- (ix) Request PIU to report in writing that worksites and camps have been vacated and restored to pre-project conditions before acceptance of work.

#### **D. Operational Phase Impacts and Mitigation Measures**

**182 Impact from O&M of Roads and Drains.** In the operations and maintenance (O&M) phase, the roads will operate with routine maintenance, which should not affect the environment. Routine repairs will be very small in scale, to be conducted manually by small teams of men with simple equipment (shovels, wheelbarrows, etc.) and works will be very short in duration thus will not cause significant physical impacts. Traffic may be interrupted temporarily but this work will be very small in scale, infrequent, and short in duration, so there will be no economic or other implications. The infrastructures will need to be repaired from time to time, but environmental impacts will be much less than those of the construction period as the work will be infrequent, affecting small areas only.

**183** To maintain the safety of workers and road-users, such work should be coordinated with the local traffic department so that adequate warning signs and traffic diversions can be set up when necessary. Debris need to be collected and disposed at a designated site. Community participation will be encouraged in ensuring drainage canals are clog-free through information and behavior change campaigns and incentives, if possible.

**184 Air pollution and noise.** Improved roads may result in elevated noise level and air emissions from increased vehicular traffic over time. However, the extent of air pollution will depend upon i) the rate of vehicular emission and ii) the prevailing



meteorological conditions. Air quality is likely to improve in the initial years after commissioning because of saving of fuel in the vehicular traffic riding on smooth and improved roads with much less interruption.

**185 Community safety.** Improved roads may give way to faster vehicle speeds which could endanger people and households along the road alignments. Damage in roads may also cause accidents to motorists. To mitigate these impacts, the PIU will be required to:

- (i) Conduct regular inspection of the roads to check for damages, and undertake rehabilitation measures for any damages found;
- (ii) Inspect and maintain the integrity of road barriers, especially at critical curves or locations that are prone to vehicular accidents;
- (iii) Inspect and maintain speed limiters such as humps installed on road sections near residential areas, schools, and religious establishments.
- (iv) Inspect and maintain all road signages, including appropriate warning signages at silent zones, and ensure that these are reflectorized and visible even during night time; and
- (v) Ensure pedestrian crossings are maintained.

**186 Impact from O&M of New Bus Terminal at Lumbini Sanskritik:** In the operations and maintenance (O&M) phase, the operations of the New Bus Terminal at the Lumbini Sanskritik can impact the environment. The air quality near the facility is impacted by the continuous movement of buses to and from the facility. The impacts would be from the bus emissions as well as dust that is generated during the bus movements. Also, the operations of the DG sets at the facility will impact the air quality and the noise levels, as well. Moreover, the solid waste discarded at the site by the bus terminal users which can be an eyesore at first and later the decomposition of these wastes can impact the air quality, as well. Waste may also enter drains / stream leading to blockages. Additionally, the operation of the sanitation infrastructure at the facility should be efficient in order to avoid any impact on the surface and groundwater quality in the area. Bus maintenance operations (if any) at the New Bus Terminal can lead to discharge of oil and other hazardous materials that can impact the surface and groundwater quality. Ensure that these works are conducted only in designated places with impervious floods and spill collection systems.

**187** Impact on air quality can be mitigated by ensuring that all buses that enter the Bus Terminal are issued Pollution Under Control (PUC) certificate by the relevant agency. Additionally, the roads and the pavement within the Bus Terminal should be sprayed with water periodically to prevent generation of dust. Impact on noise can be mitigated by appropriate sound-dissipating equipment near the DG sets and also by ensuring that the bus engines are switched off during idle time.

**188** Impact on Surface and Groundwater quality can be mitigated by managing the solid wastes, and any maintenance related wastes in an environmentally-friendly

manner. Accordingly, these wastes should be disposed at a pre-identified and approved landfill facility.

**189** To maintain the safety of workers and the local community arising from the movement of buses and bus-terminal facility operations, standard operating procedures should be developed and implemented at all levels. Adequate awareness and training should be provided to all bus terminal facility users, visitors and workers to ensure the safety of workers and the local community.

**190** To ensure that the environmental impact from the operational phase is at a minimum, the design accommodates adequate parking space for the buses that ply to and from the facility. Also, adequate parking for the visitors to the facility is also provided. Further, design ensures that adequate water and sanitation services and solid waste management services is provided for the users of the facility.

**191 Impact from O&M of New Municipality Office Building at Lumbini Sanskritik:** In the operations and maintenance (O&M) phase, the operations of the New Municipality Building at the Lumbini Sanskritik can impact the environment. The air quality near the facility is impacted by the continuous movement of vehicles to and from the facility. The impacts would be from the vehicle emissions as well as dust that is generated during the vehicle movements. Also, the operations of the DG sets at the facility will impact the air quality and the noise levels, as well. Moreover, the solid waste discarded at the site by the users which can be an eyesore at first and later the decomposition of these wastes can impact the air quality, as well. Waste may also enter drains / stream leading to blockages. Additionally, the operation of the sanitation infrastructure at the facility should be efficient in order to avoid any impact on the surface and groundwater quality in the area.

**192** To ensure that the environmental impact from the operational phase is at a minimum, the design accommodates adequate parking space for the users and visitors to the facility is also provided. Further, design ensures that adequate water and sanitation services and solid waste management services is provided for the users of the facility.

#### **E. Cumulative Impacts and Mitigation Measures**

**193** There are no notable other construction or project activities in the area that would result in cumulative environmental impacts. Direct impacts during construction phase, including, among others, increase in noise levels, fugitive dust, and common air emissions near the construction areas, are temporary in nature and will not result in cumulative adverse impacts to people and environment with the implementation of mitigation measures discussed in this IEE report.

**F. Unanticipated Impacts during Construction and Operation**

**194** In the event of unanticipated environmental impacts not considered as significant during implementation and not considered in the IEE and EMP, the PCU shall prepare a corresponding time-bound and budgeted corrective action plan acceptable to ADB and ensure that these are implemented by the contractor/s and reported accordingly in environmental monitoring reports to ADB. If unanticipated environmental impacts deemed as significant become apparent during project implementation, the PCU will: (i) inform and seek ADB's advice, wherever necessary; (ii) assess the significance of such unanticipated impacts; (iii) evaluate the options available to address them; and (iv) update the IEE including EMP.

## VI. ENVIRONMENTAL MANAGEMENT PLAN

**195** This Environmental Management Plan (EMP) has been prepared in accordance with the ADB's Safeguard Policy Statement 2009. This EMP identifies the minimum requirements with regard to the appropriate mitigation, monitoring, inspection and reporting mechanisms that need to be implemented throughout design, construction and operation periods of the project, to avoid, minimize or mitigate the potential environmental impacts identified in the chapter on Anticipated Environmental Impacts and Mitigation Measures of this IEE. This chapter also discusses the institutional arrangement, roles, and responsibilities for the effective implementation of the EMP.

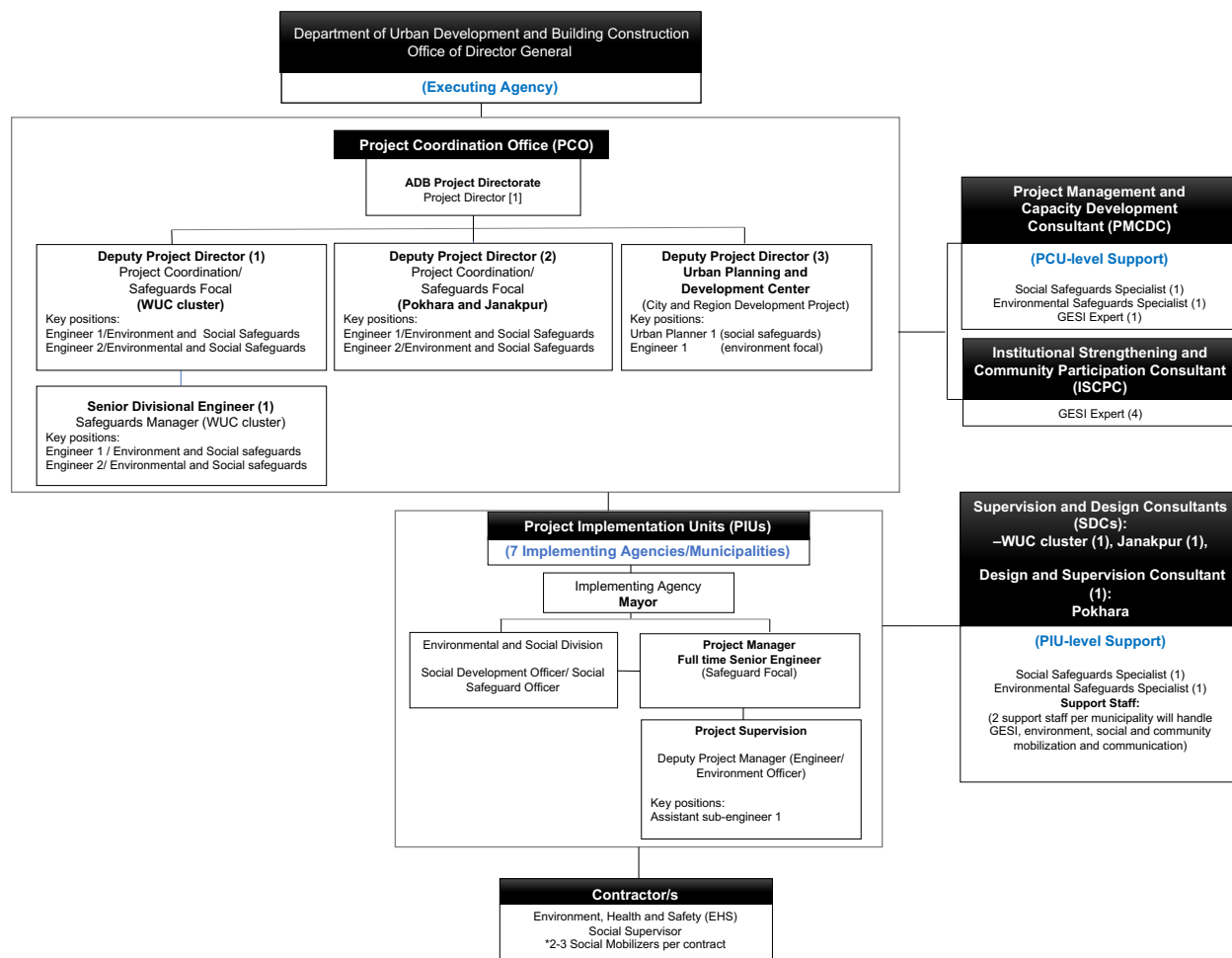
### A. Institutional Arrangement- revert from orig

**196** The Ministry of Urban Development through the Department of Urban Development and Building Construction will be the executing agency of the project, which will be supported by the Project Management and Capacity Development Consultant (PMCDC), and Institutional Strengthening and Community Participation Consultant (ISPC). The PCO will be responsible for the overall management of the project. The municipalities will be the key implementing units of the project. The PIU with the support of the Supervision and Design Consultant (SDC) will be responsible for social safeguards compliance, monitoring, and reporting to ADB.

### Safeguards Implementation Arrangement

**197 Project Coordination Office (PCO).** The PCO will be headed by a Project Director, who will be responsible for the overall project management. The Project Director shall be supported by three Deputy Project Directors (DPDs) – DPD WUC cluster, DPD Pokhara and Janakpur cluster, and DPD for Urban Planning and Development. The PCO will have an environment safeguards officers of engineer rank, who will be responsible for environmental safeguards compliance, planning, and implementation as per the agreed environmental assessment and review framework, IEEs and EMPs prepared consistent with the ADB's SPS and GON rules and regulations. Implementation arrangements for safeguards in implementation in URLIP presented in Figure 3.

**Figure 102: Implementation Arrangement for Safeguard Implementation**



**198 Project Coordination Office (PCO). Roles and responsibilities of PCO (environmental safeguards) are:**

- (i) Ensure subprojects comply with the national and local statutory and legal environmental requirements, ADB SPS 2009, EARF and environmental safeguards provisions of the ADB loan covenants;
- (ii) Ensure subprojects conform to exclusion criteria and subproject selection guidelines as stipulated in this EARF;
- (iii) Review and approve the environmental categorization of future subprojects;
- (iv) Engage additional experts (heritage and biodiversity experts) if project conditions warrant such expertise to prepare safeguard documents
- (v) Review and approve subproject IEE reports, including EMPs, and ensure that subproject IEEs and EMPs are updated based on final detailed designs and submit to ADB for review, clearance, and disclosure prior to bid invitation;
- (vi) Ensure that robust chance-find protocol is put in place and implemented properly;
- (vii) Ensure that updated/final IEEs based on final detailed design are provided to the construction contractor prior to start of construction;
- (viii) Ensure that the IEEs including EMPs are updated in case of changes in detailed design that may occur during implementation phase, and submitted to ADB for review, clearance and disclosure;

- (ix) Ensure that IEEs with EMPs are included in bidding documents and civil works contracts;
- (x) Ensure that the requirement for contractors to prepare their respective Health and Safety (H&S) Plans including COVID-19 H&S Plans is included in bidding documents and civil works contracts;
- (xi) Review and approve site-specific EMP (SEMP) of selected contractor;
- (xii) Provide oversight on environmental management aspects of the project, and ensure EMP and SEMP is implemented by contractors;
- (xiii) Establish a system to monitor environmental safeguards of the Project including monitoring the indicators set out in the monitoring plan of the IEE;
- (xiv) Facilitate timely and ensure overall compliance with all national and local government rules and regulations regarding site and environmental permits/clearances/approvals as well as any other environmental requirements as relevant;
- (xv) Review, monitor and evaluate effectiveness with which the EMP, SEMP, and Health and Safety Plan are implemented, and recommend necessary corrective actions to be taken;
- (xvi) With support from PMCDC, consolidate quarterly monitoring reports from the PIUs and submit semi-annual environmental monitoring reports (SEMRs) to ADB;
- (xvii) Ensure availability of budget for safeguards activities;
- (xviii) Ensure adequate awareness campaigns, information disclosure among affected communities and timely disclosure of final IEEs/EMPs and SEMRs, including corrective action plans, if any, in project website and in a form accessible to the public;
- (xix) Address any grievances brought through the grievance redress mechanism (GRM) described in this IEE report in a timely manner;
- (xx) Undertake regular review of safeguards-related loan covenants, and the compliance during project implementation; and
- (xxi) Organize periodic capacity building and training programs on safeguards for stakeholders, PIUs and contractors.

**199 Project Coordination Unit (PCU).** The municipalities will act as the implementing agencies of the project, under the guidance and overall management of the PCO. The roles and responsibilities of the PIU (Environmental Safeguards) are as follows:

- (i) Ensure subprojects comply with the national and local statutory and legal environmental requirements, ADB SPS 2009, EARF and environmental safeguards provisions of the ADB loan covenants;
- (ii) Ensure subprojects location and design confirms with exclusion criteria and subproject selection guidelines as stipulated in this EARF; closely work with design teams to ensure compliance
- (iii) Review subproject IEE reports, including EMPs, and ensure that subproject IEEs and EMPs are updated based on final detailed designs and submit to ADB for review, clearance, and disclosure prior to bid invitation;
- (iv) Ensure compliance with government and ADB requirements on environmental safeguards;
- (v) With support from SDC, review and approve SEMP prepared by contractor;
- (vi) Conduct regular site visits, including spot checks, to ensure the proper implementation of EMP;
- (vii) Review monthly reports from contractor;



- (viii) Prepare Quarterly Reports on all aspects concerning environmental assessment, management, and monitoring obtain approval from PIU and submit approved reports to the PCU;
- (ix) Address any grievances brought about through the GRM as described in the IEE report in a timely manner; and
- (x) Support all other environmental safeguards-related activities and tasks of the PCU as may be needed.

## **200 Project Management and Capacity Development Consultants (PMCDC).**

PMCDC will provide capacity building support on safeguards, and safeguards compliance in line with ADB procedures. PMCDC will appoint an environmental safeguards specialist to carry out all environmental safeguards related tasks and provide support to PCO safeguards team to oversee the implementation of the safeguards framework/safeguards planning documents. The environmental safeguards specialist will guide the safeguards officers at the PCO and shall coordinate with the SDC's Environmental Safeguards Specialist (PIU-support) for carrying out all social safeguards related tasks. The Environmental Safeguards Specialist (PMCDC) will be responsible for carrying out following tasks:

- (i) Support PCU and PIUs in selecting the output 2 components in compliance with subproject selection criteria; ensure that no components falling under exclusion criteria are considered for implementation under the project
- (ii) Screen and categorize output 2 subprojects based on this EARF;
- (iii) Guide PIUs / prepare the initial environmental examination (IEE) reports including environmental management plans (EMPs) based on design of the subprojects and in accordance with ADB SPS and national laws, regulations, policies and guidelines;
- (iv) Advise PCO in engaging additional experts (heritage and biodiversity) where required if the project conditions warrant
- (v) Support PCU/PIU in obtaining clearances and permissions per GON regulations
- (vi) Update/Finalize the IEE report including EMP based on final detailed design of the subproject and in accordance with ADB SPS and national laws, regulations, policies and guidelines;
- (vii) Conduct due diligence of associated facilities and/or audit of existing facilities, if any, during the detailed design phase, as defined in ADB SPS;
- (viii) Conduct of meaningful consultations and ensure issues/concerns/suggestions raised are incorporated in the design and updated/final IEE report;
- (ix) Ensure relevant provisions from the updated/final IEE report and EMP are incorporated in the bid and contract documents;
- (x) Establish grievance redressal mechanism and ensure members of the grievance committee have the necessary capacity to resolve project-related issues/concerns;
- (xi) Together with the social safeguard experts, conduct safeguards capacity building to ensure PCU and PIU have the capacity to implement, monitor, and report on implementation of EMP, resettlement plans and indigenous peoples plans (if any); and
- (xii) Monitor implementation of EMP at all work sites, including all potential safeguard issues identified in the safeguard documentation mentioned above;

- (xiii) Monitor any unanticipated environmental risks or impacts that arise during construction, implementation or operation of the subproject that were not considered in the IEE report and EMP. Prepare corrective action plans and ensure that these are implemented by the contractor and reported accordingly in environmental monitoring reports to ADB; and
- (xiv) Undertake other relevant tasks to ensure the subproject complies with ADB SPS and national environmental laws, rules, and regulations.

**201 Supervision and Design Consultant (SDC).** Two SDCs will be established – (i) the WUC cluster, covering Devdaha, Siddharthanagar, Tilottama, Sainamaina and Lumbini; and (ii) Janakpur. SDCs will be responsible to support the PIU in the implementation and monitoring of safeguards compliance. They will also be responsible to prepare Output 2 designs, prepare safeguards documents in line with the EARF for Output 2 components. The SDCs will be supported by two support staff per municipality who will handle gender, environment and social safeguards, community mobilization, and communication.

**202 Design Supervision Consultant (DSC).** The DSC will support Pokhara municipality in the design and supervision of infrastructure and greens solutions, implementing heritage and cultural improvement plans, and design of tourism infrastructure components. The DSC environmental safeguards specialist will be involved in detailed design and safeguards documents preparation of output 2 components.

**151.** The key environmental safeguards tasks of SDCs and DSC include:

- (i) Work closely with technical teams, and assist PIUs in selecting the output 2 components in compliance with subproject selection criteria; ensure that no components falling under exclusion criteria are considered for implementation under the project
- (ii) Prepare categorization checklists and assist in categorization of the project output 2 components in respective municipality
- (iii) Update/Finalize the initial environmental examination (IEE) report including environmental management plans (EMP) based on final detailed design of the subproject and in accordance with ADB SPS and national laws, regulations, policies and guidelines;
- (iv) Conduct due diligence of associated facilities and/or audit of existing facilities, if any, during the detailed design phase, as defined in ADB SPS;
- (v) take proactive action to anticipate and avoid delays in implementation;
- (vi) under the guidance of PMCDC, develop system of indicators to monitor implementation of resettlement activities and ensure corrective actions are undertaken, if and as required;
- (vii) obtain environmental safeguard related information with the help of field support staff and consolidate them; prepare periodic environmental safeguard monitoring reports;
- (viii) compile all monitoring inputs at PIU level for quarterly progress reports, for onward transmission to PCU and PMCDC;
- (ix) assist PIUs in conducting public consultation and disclosure activities related to social safeguards; and

- (x) actively participate, assist in resolving all grievance redress activities; and support ISPC in all training and capacity building activities.

**203 Civil Works Contract and Contractor.** The IEE with EMP will form part of bidding and contract documents and verified by PMU. The Contractor will be required to designate an Environment, Health and Safety (EHS) Officer (or equivalent) with relevant qualifications and adequate experience to ensure implementation of EMP during construction period. Contractor is to carry out all environmental mitigation and monitoring measures outlined in their contract and the IEE. The Contractor will be required to submit to PIU, for review and approval, a SEMP including (i) proposed sites/locations for construction work camps, storage areas, hauling roads, lay down areas, disposal areas for solid and hazardous wastes; (ii) specific mitigation measures following the approved EMP; (iii) monitoring program per EMP; and (iv) budget for SEMP and EMP implementation. No works can commence until SEMP is approved by PIU.

**204** Specifically, the Contractor will have the following responsibilities, among others that will be included in the bid and contract documents.

- (i) Ensure that the infrastructure development works are carried out in an environmentally friendly manner, minimizing environmental impacts while ensuring the health and safety of all its workers and the minimizing disturbance to the surrounding environment and communities;
- (ii) Consideration of ADB SPS, national regulations and the EMP during bid preparation and cost estimation;
- (iii) Appoint a full time EHS Officer with relevant qualifications and adequate experience to carryout responsibilities for complying with the ADB SPS requirements, national regulations and the EMP. The officer/staff must have a clear term of reference and responsibilities to ensure proper management of environmental issues;
- (iv) Ensure regular reporting to the PIU on work progress and alert management on any potential issues or delays;
- (v) Strictly follow COVID 19 protocols and other COVID-19 related instructions issued by the GoN at all construction sites and campsites and provide periodic reports to PIU on its compliance;
- (vi) Obtain the necessary permits and clearances, if any is required for the contractor, to implement the subproject;
- (vii) Ensure that all worker recruitment and OHS requirements are complied with;
- (viii) Take necessary corrective action to rectify any non-conformance, including actions related to grievances;
- (ix) Institute an emergency plan for natural calamities/disasters and accidents at the site; and
- (x) Follow chance finds procedures to discovery of any physical cultural artifact.

**205** A copy of the EMP/approved SEMP will be kept on-site during the construction period at all times. Non-compliance with, or any deviation from, the conditions set out in the EMP/SEMP constitutes a failure in compliance and will require corrective

actions.

- 206** PCU will ensure that bidding and contract documents include specific provisions requiring contractors to comply with: (i) all applicable labor laws and core labor standards on (a) prohibition of child labor as defined in national legislation for construction and maintenance activities; (b) equal pay for equal work of equal value regardless of gender, ethnicity, or caste; and (c) elimination of forced labor; and with (ii) the requirement to disseminate information on sexually transmitted diseases, including HIV/AIDS, to employees and local communities surrounding the proposed project sites

## **B. Environmental Management Plan (EMP)**

- 207** The EMP is necessary on the grounds that it will manage the environment by offsetting the negative impacts with possible mitigation measures and enhancing the positive impacts within the allocated fund from the project. Thus, the main objectives of the EMP for the construction of the access road project are:

- (i) Define the responsibilities of the project proponents in accordance with all project phases viz., (design, pre-construction, construction and operation);
- (ii) Facilitate the implementation of the mitigation measures by providing the technical details of each project impact, and proposing an implementation schedule of the proposed mitigation measures;
- (iii) Define a monitoring mechanism and identify monitoring parameters to ensure that all proposed mitigation measures are completely and effectively implemented;
- (iv) Identify training requirements at various levels and provide a plan for the implementation of training sessions;
- (v) Identify the resources required to implement the EMP and outline corresponding financing arrangements; and providing a cost estimate for all proposed EMP actions.

- 208** The Environmental Management Plan (EMP) Matrix for Construction Phase and applicable to all project components is presented in Table 83, and Table 84, provides the EMP Matrix for Operational Phase to cover (i) Road and Drains in all municipalities and (ii) Bus Terminal at Lumbini Sanskritik, respectively.

**Table 80: Environmental Management Plan Matrix (Construction Phase) – Applicable for all Project Components**

Table 66: Environmental Management Plan Matrix (Construction Phase) Applicable for all Project Components				
Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/ Supervision
1. Design phase				
Design of project components	Improper design leading to safety, environmental pollution and health concerns during operation phase	<ul style="list-style-type: none"><li>• Ensure that technical design of all the components (roads, drains, footpath, cold storage, municipal building and bus terminal will follow the relevant national planning and design guidelines.</li><li>• Ensure that road designs comply with the applicable standards to meet the needs of the road users, keeping in view the road function, type and volume of traffic, potential traffic hazards and safety, environment impacts, aesthetics as well as convenience of the road users..</li><li>• Ensure that roads are designed with traffic control and safety measures commensurate with the traffic. These include road markings ensuring consistency, clarity, and sufficiency; facilities for pedestrians to cross are ensured by road markings; traffic signs (mandatory/regulatory signs, cautionary/warning signs and informatory signs); road delineators; lighting, etc.,</li></ul>	PIU, DSC	PCU, PMCDC
Impacts to Local hydrology	Local waterlogging problems and obstruction of natural water flows in the vicinity	<ul style="list-style-type: none"><li>• Detailed assessment of the micro-hydrology and topography of the project site;</li><li>• Design the roads according to the slope and elevation relative to the water bodies that may exist in the area; ensure that necessary cross drainage structures are provided to avoid water logging or flooding</li><li>• Provide the appropriate design of drains for road stretches that do not have existing drainage or where persistent flooding has been recorded;</li><li>• Plan and design the facilities at the New Municipality Building at Lumbini in a way that would prevent flooding during rainfall events</li><li>• Ensure proper site protection measures at Municipal building to safeguard against heavy floods in Telar river and to avoid flooding / water logging</li><li>• Accommodate existing drainage lines within the layout design to ensure uninterrupted flow; provide peripheral</li></ul>	PIU, DSC	PCU, PMCDC

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/ Supervision
		<p>drains to carry the runoff from upstream areas where required to avoid flooding / water logging;</p> <ul style="list-style-type: none"> <li>No facilities such fuel, oil, lubricant stores, or maintenance facilities, garage should be located close to the drain</li> </ul>		
Impacts to Local hydrology – proposed bus terminal building	Low-lying site along a drainage channel – risk of flooding and water logging	<ul style="list-style-type: none"> <li>Conduct detailed assessment of the micro hydrology and topography of the bus terminal site and surrounding area during the detailed design</li> <li>Design proper drainage system for the bus terminal site and surroundings low land that drains into existing channel drain to ensure that there is no flooding or water logging during rains.</li> <li>avoid changing the alignment of drainage channel as far as possible by channelizing and accommodating within the site</li> <li>In unavoidable cases, ensure the realignment is minor and do not affect the flow through existing culvert</li> <li>Obtain prior permission from Canal authority / Irrigation Department for realignment and channelizing the drain within the site</li> <li>Ensure that drainage system is designed with adequate capacity duly account to the climate change risks; liaison with Canal authority / irrigation department and design the drainage channel appropriately.</li> <li>Design peripheral/lateral drains and cross drainage works (such as additional culverts) as required to ensure that elevated bus terminal area do not block the free flow from surrounding areas into existing culvert</li> <li>No facilities such fuel, oil, lubricant stores, or maintenance facilities, garage should be located close to the drain</li> </ul>	PIU, DSC	PCU, PMCDC



Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/ Supervision
Damage / Disturbance of private and common properties and physical cultural resources.	Disturbance of private and common properties (such as ramps, drainage, boundary walls, houses, soak well, lamp post), and physical cultural resources such as graveyards and places of worship will be avoided.	<ul style="list-style-type: none"> <li>Consult with Lubmini WHS and museum authorities and tourist agencies prior to scheduling of works</li> <li>Ensure that all works are confined to existing roads right-of-way (ROWs).</li> <li>For small local temples of recent origin located within the ROW, as far as possible ensure no relocation by appropriate design; if relocation is needed conduct further meaningful consultation with stakeholders and take mitigation measures accordingly including reconstruction in nearby land.</li> <li>ensure implementation of construction phase EMP to avoid disturbance / damage to common properly resources and PCRs.</li> </ul>	PIU, DSC	PCU, PMCDC
Chance Finds	Damage to archeological items / PCRs	<ul style="list-style-type: none"> <li>Strictly follow the protocol by coordinating immediately with PIU and Nepal Department of Archaeology for any suspicion of chance finds during excavation works;</li> <li>Create awareness among workers, supervisors and engineers about the chance finds during excavation work;</li> <li>Stop work immediately to allow further investigation if any finds are suspected; and</li> <li>Inform the Nepal Department of Archaeology if a find is suspected and take any action they require to ensure its removal or protection in-situ;</li> <li>Follow the written instructions of Nepal Department of Archaeology for continuation of works.</li> </ul>	PIU, DSC	PCU, PMCDC
Impact on Forests, Terrestrial Flora and Fauna	Impact to local biological environment including forests, terrestrial flora and fauna will be avoided.	<ul style="list-style-type: none"> <li>Develop a protocol for workers and staff for working in forest areas and in sites close to Lumbini farmlands, and for workers engaged in site clearance and tree cutting; this should clearly list do's and don't and procedures and reporting mechanism</li> <li>Do not remove trees or clear vegetation outside the actual area of construction; all works, construction material storage/ancillary works shall be confined to the demarcated areas of the road, no movement of workers, vehicles, equipment allowed outside this area</li> </ul>	PIU, DSC	PCU, PMCDC

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/ Supervision
		<ul style="list-style-type: none"> <li>• Ensure proper barricading, and measures to prevent entry of wildlife into work area</li> <li>• No labour camps or construction facilities, storage areas, shall be established in or within 250 m of forest area; no debris/waste disposed within forest or within 1 km of forests</li> <li>• Limit the work to daylight hours only; no works after sunset</li> <li>• No workers /personnel shall be confined to the construction area, and shall not enter forest area; it is the contractor responsibility to take necessary precautions &amp; prevent workers removing/damaging trees/vegetation, hunting / harming animals; PMDSC and PIU should strictly monitor and ensure</li> <li>• Create awareness among workers on environment, human-wildlife conflicts, safety; workers should be made aware of the wildlife and birds (especially protected species such as Sarus cranes and vultures) present in the local areas; photographs of such species shall be provided in the sites, and construction workers shall be instructed to move away from the areas when such species are spotted and do not disturb them in anyway, and immediately report to the supervising engineer and PMC experts to record such events</li> <li>• No noisy works shall be conducted, especially during night time.</li> </ul>		
Impact to Local Vegetation and Trees	Impact to local biological environment including trees, birds and other animals will be avoided.	<ul style="list-style-type: none"> <li>• Conduct investigation along the proposed road alignment to determine the number and the kind of tree species that would be impacted;</li> <li>• Identify the trees that plays a beneficial role to the local environment i.e., those trees that house bird nests or whole foliage is used by animals or protected tree species etc.</li> <li>• Conduct meaningful consultations with stakeholders to determine the trees that would need to be protected;</li> <li>• Consider alternative and innovative road alignments (that fully complies with design standards) to avoid tree cutting and where tree cutting is unavoidable, appropriate</li> </ul>	PIU, DSC	PCU, PMCDC

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/ Supervision
		<p>compensatory afforestation measures should be implemented;</p> <ul style="list-style-type: none"> <li>Do not cut protected trees such as Simal (<i>Bombax cieba</i>), retain the tree, alter the road alignment /layout of road / drain locally to preserve the trees; and</li> <li>Obtain any necessary approval from appropriate agencies such as Forest Department to implement the Tree Conservation measures for the sub-project.</li> <li>Conduct survey of trees for bird nests prior to cutting, if any active nests, ensure that trees are not disturbed until young birds fly away from the nests, do not cut trees during the breeding season.</li> </ul>		
<b>2. Pre-Construction Phase</b>				
Consents, permits and clearances	Failure to obtain necessary consents, permits, and clearances can result in design revisions and/or stoppage of the Works.	<ul style="list-style-type: none"> <li>All necessary local clearances and no objection certificates will be obtained prior to award of contract.</li> <li>Environmental clearance will be obtained prior to award of contract.</li> </ul>	PCU, PMCDC	PIU, EA, ADB
Integration of EMP in bidding documents and contracts	Lack of awareness by contractors on ADB SPS requirements may result in insufficient budget and non-implementation of EMP	<ul style="list-style-type: none"> <li>The PCU will incorporate the costs of implementing OHS and the EMP as well as specific provisions requiring contractors to comply with all other conditions required by ADB into the bidding and contract document.</li> <li>Once the Contractor is selected, the PCU/PIU with support from PMCDC will inform contractors of their responsibilities in EMP implementation, in compliance with ADB and government requirements, self-monitoring and reporting procedures.</li> </ul>	PCU, PMCDC	EA, ADB
EMP Implementation Training	If the contractors and construction supervision engineers are not aware about the requirements of this EMP, the project may not proceed and	<ul style="list-style-type: none"> <li>The PCU, PIU and contractors will be required to undergo training on EMP implementation.</li> </ul>	PCU, PMCDC	PIU, EA, ADB

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/ Supervision
	comply with ADB and GoN environmental policies.			
Updating of IEE	IEE and EMP out of date due to changing conditions or design	<ul style="list-style-type: none"> <li>The PCU shall update the IEE in case of change in design/based on the final detailed design and submit the same for review and clearance of ADB.</li> </ul>	PCU, PMCDC	EA, ADB
Community Awareness on Project Activities and Impacts	Lack of community awareness on project activities may result in potential community health and safety concerns and complaints.	<ul style="list-style-type: none"> <li>Before the start of project construction, a meaningful consultation with the affected communities will be conducted. This meaningful consultation will aim to engage community stakeholders, listen to their views, and try to come to a common understanding about the need for an improved drainage system and the sacrifices that need to be made to achieve it. To aid in the consultation process, it is important that the community should be made aware of the details of project activities. Important information to be disseminated to the people are, among others, the following: <ul style="list-style-type: none"> <li>Overview and objectives of the proposed project;</li> <li>Preliminary and/or final detailed design of proposed project components;</li> <li>Potential environmental and social impacts (positive and negative) of the project, and the proposed mitigation measures for the perceived negative impacts; and</li> <li>Grievance redress mechanism and contact details of the project.</li> </ul> </li> </ul>	PIU, Contractor	PCU, PMCDC
Construction schedule	Impact on tourism activities	<ul style="list-style-type: none"> <li>Schedule road works close to the Lumbini heritage area in consultation with museum authorities and traffic police; works that may affect the tourist places shall not be conducted during the tourist season</li> </ul>	PIU, Contractor	PCU, PMCDC
Construction materials	Impacts due to mining and borrow areas	<ul style="list-style-type: none"> <li>Reuse the excavated soils and road material as much as possible in the construction and raising ground, and minimize the need for new material. Lumbini and Tilottama municipalities /PIUs to coordinated with other construction works/projects in the respective areas to source the excess soil</li> </ul>	PIU, Contractor	PCU, PMCDC

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/ Supervision
		<ul style="list-style-type: none"> <li>• If new material is needed, use only the existing material sources and borrow areas permitted by government(DOMG)</li> <li>• Avoid creation of new borrow areas as much as possible, in unavoidable cases, obtain all permissions and clearances, including conduct of environmental assessment studies and obtaining environmental clearances</li> <li>• Ensure that borrow areas are not located in environmentally sensitive areas; conduct baseline assessment prior to selecting a site</li> <li>• Prepare borrow area management plan and implement</li> <li>• Verify suitability of all material sources and obtain approval of PIU;</li> <li>• Ensure that the loading and unloading of the materials and the transportation of the materials from source to construction site does not cause impact on health and safety of the workers and the community; and</li> <li>• Submit to PIU on a monthly basis documentation of sources of materials. . If contractor is purchasing ready mix concrete, asphalt/macadam and aggregates from third party, contractor will ensure that all the parties/ suppliers necessary clearances and permission as per the Nepal law and will provide the documentary evidence to PIU/consultants.</li> </ul>		
<b>3. Construction phase</b>				
Construction Planning	Inadequate planning could lead to non-implementation of EMP during the construction phase and result in significant environmental impacts leading to non-compliance with ADB's environmental	<ul style="list-style-type: none"> <li>• Appoint an Environmental Health and Safety (EHS) Supervisor;</li> <li>• Develop a Site-Specific Environmental Management Plan (SEMP) and get it approved from the Client;</li> <li>• Conduct training on the rationale for and implementation of the SEM and EMP to enhance general understanding and clarify responsibilities regarding implementation, including monitoring and reporting, must also be provided to relevant staff of contractors;</li> </ul>	Contractor	DSC, PIU, PMCDC, PCU

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/ Supervision
	safeguard requirements.	<ul style="list-style-type: none"> <li>While the locations of all project components have been finalized, the locations of labour campsites, batching plant site etc. have not been finalized. The Contractor should select the locations in consultation with local municipalities and get the approval of PCU and PIU. All necessary infrastructure should be provided at the facility for effectively operating the infrastructure during the construction period;</li> <li>The Contractor will be required to submit to PCU, for review and approval, a SEMP including (a) proposed sites/locations for construction work camps, storage areas, hauling roads, lay down areas, disposal areas for solid and hazardous wastes, (b) specific mitigation measures following the approved EMP; (c) monitoring program as per EMP; and (d) budget for SEMP implementation. No works can commence prior to approval of SEMP. The SEMP will include the following: (i) Construction Compound Management Plan; (ii) Construction Health and Safety Plan (including COVID-19 H&amp;S guidance); and (iii) Emergency Incident Response Plan.</li> </ul>		
Disruption of Existing Utilities	Disruption of infrastructure and services	<ul style="list-style-type: none"> <li>conduct investigation at site to determine all the existing utilities that will likely be disturbed during construction phase;</li> <li>all underground utilities should be marked prior to any construction works to be taken up at the locations; and</li> <li>coordinate with agencies responsible for the maintenance of the utilities and formulate a plan to minimize disruption of services during construction phase. The plan must be formulated in coordination with PCU and stakeholders at the site. Where required, the responsible agency shall be requested by PIU to carry out the necessary works at the time required and at cost of the subproject.</li> </ul>	Contractor	PCU, PMCDC
Excavation Works	Excavations may affect local drainage patterns if surface and	<ul style="list-style-type: none"> <li>All excavations shall be done to the minimum dimension as required for safety and working facility.</li> </ul>	Contractor	DSC, PIU, PMCDC, PCU



Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/ Supervision
	groundwater collect in voids as they are being dug.	<ul style="list-style-type: none"> <li>Excavations should be carried out after identifying the location of all utilities that exist along the project area;</li> <li>The excavation shall be executed in such manner, that the contractor does not damage or interfere with existing services or structures. If damage or interference is so caused, the contractor shall make arrangements with the supply and/or building owner to execute the repairs at the contractor's own cost.</li> <li>Explore working on off-peak hours or night on busy road sections with prior permission and proper lighting and safety measures, however, no noisy works shall be conducted during night;</li> <li>Road drains and channels shall be kept free from obstructions at all times.</li> <li>Excavated areas should be sufficiently demarcated so as not to affect the health and safety of workers and the people using the road alignment for their daily activities.</li> </ul>		
Tree Conservation	There are 226 trees belonging to various species along road alignment which may be affected by the road construction/ improvement. Out of these 170 trees may be impacted by the project activities.	<ul style="list-style-type: none"> <li>The first priority is to avoid cutting of trees through changes in design and road alignments. This is in particular important when the tree species is protected or considered sacred by the community and / or houses nests for birds;</li> <li>Don not cut protected trees such as Simal (<i>Bombax cieba</i>) retain the tree / alter the alignment / layout of road / drain locally to preserve the trees;</li> <li>after the finalization of the designs and layout of the project components, the trees within proposed construction areas will be marked;</li> <li>trees within area required for construction will be felled after prior approval;</li> <li>replacement of the tree shall be undertaken by project office PIU at the replacement ratio of ten trees for every tree that is cut (i.e., 1:10 ratio) Indigenous/native species will be preferred in tree planting;</li> <li>only trees that will require removal within the proposed construction areas of the sites will be cut; and</li> </ul>	Contractor	DSC, PIU, PMCDC, PCU

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/ Supervision
		<ul style="list-style-type: none"> <li>For trees that will not be cut, take all precautions to protect them from any damage from construction activities.</li> <li>Conduct survey of trees for bird nests prior to cutting, if any active nests, ensure that trees are not disturbed until young birds fly away from the nests, do not cut trees during the breeding season;</li> <li>Prevent workers from removing / damaging any other flora and fauna found in the project vicinity; and</li> <li>Prohibit employees and workers from poaching animals and cutting of trees for firewood in the vicinity of the construction site.</li> </ul>		
Excavated Earth Management	Excavation during construction will generate loose soil which can be carried through surface run-off during a rainfall.	<ul style="list-style-type: none"> <li>The Contractor shall plan his works to minimize surface excavation works during the rainy season where practicable.</li> <li>Precautions to be taken at any time of year when rainstorms are likely, actions to be taken when a rainstorm is imminent or forecast, and actions to be taken during or after rainstorms shall be developed by the Contractor.</li> <li>The earthwork sites where exposed land surface is vulnerable to runoff shall be consolidated and/or covered.</li> <li>Channels, earth bunds, netting, tarpaulin and or sandbag barriers shall be used on site to manage surface water runoff and minimize erosion.</li> <li>The overall slope of the works areas and construction yards shall be kept to a minimum to reduce the erosive potential of surface water flows.</li> <li>Monitor groundwater quality that could exist close to the working areas to ensure compliance.</li> </ul>	Contractor	DSC, PIU, PMCDC, PCU
Impact on Surface Water Quality	Silt-laden run-off from stockpiled materials, solid wastes and domestic wastewater from the construction camp, and leaks from chemical storage	<ul style="list-style-type: none"> <li>Provision of temporary sedimentation canal and/or silt traps along construction areas, particularly alignments that are adjacent to receiving bodies of water or canals</li> <li>The measures to address soil erosion at the proposed facilities will consist of measures as per design, or as directed by the PMCDC to control soil erosion, sedimentation, and water pollution. All temporary</li> </ul>	Contractor	DSC, PIU, PMCDC, PCU

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/ Supervision
	areas and machineries may contaminate or result in water pollution if disposed or discharged to nearby receiving bodies of water.	<p>sedimentation, pollution control works, and maintenance thereof will be deemed incidental to the earthwork or other items of work.</p> <ul style="list-style-type: none"> <li>• All temporary discharge points shall be located, designed and constructed in a manner that will minimize erosion in the receiving channels.</li> <li>• Ensure proper compaction of refilled soil and there shall not be any loose soil particles on the top; the material shall be refilled in layers and compacted properly layer by layer.</li> <li>• Use surplus soil for beneficial purposes such as in any other construction activities, or to raise the level of low-lying areas.</li> <li>• Avoid scheduling of excavation work during the monsoon season.</li> <li>• Confine construction area including the material storage (sand and aggregate) so that runoff will not enter the site.</li> <li>• Ensure that drains are not blocked with excavated soil</li> <li>• Stockyards at least 50 meters (m) away from watercourses.</li> <li>• Fuel and other petroleum products stored at storage areas away from water drainage and protected by impermeable lining and bunded 110%.</li> <li>• Effective maintenance of machinery and vehicles to avoid leakages;</li> <li>• For effluents from workplace, camps, and offices, provide treatment arrangements such as retention ponds and septic tanks which should be incorporated in the facility designs. A sewage management plan has to be prepared by the contractor and agreed with the PMCDC.</li> <li>• Solid Waste Management, as detailed in the SEMP, should be implemented throughout the construction period;</li> <li>• Monitor water quality according to the environmental monitoring plan.</li> </ul>		

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/ Supervision
Impact on Groundwater	Increased groundwater demand for construction and consumption use can deplete the Groundwater Table; Unscientific Solid Waste and Construction Waste Disposal can lead to contamination of ground water,	<ul style="list-style-type: none"> <li>• Use groundwater resources judiciously and as per the approved Groundwater Management Plan defined in the SEMP;</li> <li>• All tube wells, test holes, monitoring wells that are no longer in use or needed shall be properly decommissioned;</li> <li>• Storage of lubricants and fuel at least 50m from water bodies and in double-hulled tanks;</li> <li>• Effective maintenance of machinery and vehicles to avoid leakages;</li> <li>• Effective management of solid waste and construction debris as per an approved SEMP;</li> <li>• Provide uncontaminated water for dust suppression;</li> <li>• Monitor Groundwater Quality according to the Environmental Monitoring Plan.</li> </ul>	Contractor	DSC, PIU, PMCDC, PCU
Drainage Management	Construction material getting into surface run off or uncontrolled disposal may cause drainage congestion, flooding or waterlogging in neighboring areas.	<ul style="list-style-type: none"> <li>• The contractor shall adopt a site clearance procedure that separates topsoil and stores it under appropriate conditions for reuse as instructed by the Engineer.</li> <li>• Wastes and construction debris will not be disposed in a manner that these would end up in drainage canals.</li> <li>• The on-site storage of excessive quantities of unwanted spoil and aggregate materials should be avoided. Where storage is necessary, the Contractor shall ensure heaps and stockpiles are located at sites that they do not permit direct runoff into watercourses and are on land sloping at less than 1.5%.</li> <li>• All heaps shall be of a size and stability that will ensure the risk of mass movement during period of heavy rainfall is minimized.</li> </ul>	Contractor	DSC, PIU, PMCDC, PCU
Impact on Air Quality	Construction activities including transport and storage of raw materials will likely create dust and emissions that could	<ul style="list-style-type: none"> <li>• Take every precaution to reduce the levels of dust at construction sites, and not exceeding the pre-project ambient air quality standards.</li> <li>• Fit all heavy equipment and machinery with air pollution control devices that are operating correctly.</li> <li>• Construction vehicles must travel at speeds that minimizes dust generation;</li> </ul>	Contractor	DSC, PIU, PMCDC, PCU

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/ Supervision
	deteriorate ambient air quality in the area.	<ul style="list-style-type: none"> <li>• Reduce dust by spraying water stockpiled soil, excavated materials, and spoils.</li> <li>• Cover with tarpaulin vehicles transporting soil and sand.</li> <li>• Cover stockpiled construction materials with tarpaulin or plastic sheets.</li> <li>• Water spraying to access roads, camp sites and work sites to reduce dust emissions.</li> <li>• Machines and vehicles must be regularly examined and maintained to comply with requirements of technical specifications.</li> <li>• All vehicles, equipment, and machinery used for construction will be regularly maintained to ensure that pollution emission levels comply with the relevant standards;</li> <li>• Repair and maintain access roads, as necessary.</li> <li>• prohibit burning firewood in work and labor camps (promote liquified petroleum gas for cooking purposes and electric heater for heating purposes;</li> <li>• use vehicles that have government-issued permits and registrations; and</li> <li>• prohibit open burning of solid waste.</li> <li>• Monitor air quality according to the environmental monitoring plan.</li> </ul>		
Impact on Noise	Noise generation may disturb nearby sensitive receptors	<ul style="list-style-type: none"> <li>• Arrive at the construction schedule upon discussion with nearby stakeholders, especially when works are carried out near sensitive receptors such as hospitals, schools, places of worship etc.</li> <li>• Install noise barriers between the source and receptor, as necessary;</li> <li>• Enclose and locate generators away from sensitive receptors;</li> <li>• Start machines and vehicles sequentially rather than all together;</li> <li>• spread out the schedule of material, spoil and waste transport;</li> </ul>	Contractor	DSC, PIU, PMCDC, PCU

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/ Supervision
		<ul style="list-style-type: none"> <li>• minimize drop heights when loading and unloading coarse aggregates;</li> <li>• avoid use of horns unless absolutely necessary;</li> <li>• Select electrically powered plant that is quieter than diesel or petrol-driven plant, if interchangeable;</li> <li>• Use modern vehicles and machinery with standard adaptations to reduce noise and exhaust emissions, and ensure they are maintained to manufacturers' specifications;</li> <li>• Noise-generating equipment must be fitted with silencers.</li> <li>• Optimize the use of noisy construction equipment and turn off any equipment if not in use;</li> <li>• Regular maintenance of all equipment and vehicles;</li> <li>• Stop all construction activities during night;</li> <li>• Implement a complaint handling system;</li> <li>• Workers should be provided with earmuffs/protective hearing equipment in noise critical areas</li> <li>• Place visually clear instructions in areas where noise emissions are significant.</li> <li>• Measure noise level according to the environmental monitoring plan.</li> </ul>		
Construction Waste Management	Inadequate management of construction wastes will result in negative impact on the soil, aesthetic beauty of area and workers' health and safety.	<ul style="list-style-type: none"> <li>• Develop and seek approval for the Construction Waste management Plan as part of the SEMP;</li> <li>• Identify and seek approval for the areas where the construction waste could be disposed;</li> <li>• The contractors should take every opportunity to reduce the amounts of waste generated and collect recyclable material for processing by local operators.</li> <li>• Contractor shall implement waste segregation on site.</li> <li>• Receptacles for solid waste should be provided for the use of workers, and their contents should be disposed properly; .</li> <li>• Construction waste should also be disposed of in legal local landfills</li> </ul>	Contractor	DSC, PIU, PMCDC, PCU



Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/ Supervision
		<ul style="list-style-type: none"> <li>• Clean construction waste such as excess soil or rubble should be used in landscaping on site or given to landowners and developers seeking fill material.</li> <li>• Waste auditing. The contractor will record the quantity in tons and types of waste and materials leaving site during the construction phase;</li> <li>• Waste fuels/oils may be generated from equipment used on-site during construction and may be classified as hazardous waste. Such wastes will be stored in a secure, banded area on-site prior to collection by relevant parties;</li> </ul>		
Impact on Aquatic Ecology	Siltation, chemical spills, improper waste disposal may affect the water quality of nearby canals, ponds/river, and any thriving aquatic species.	<ul style="list-style-type: none"> <li>• Provide temporary protection at sections near the river/ponds to avoid sliding of soils;</li> <li>• Store spoils away from the side of the river/pond;</li> <li>• Implement proper storage/disposal of materials, chemicals and waste</li> <li>• Implement mitigation measures for excavation, soil erosion and sediment mobilization, surface water pollution, and construction waste generation; and</li> <li>• Conduct sampling and analysis of surface water near to the construction sites as part of the Environmental Monitoring Plan.</li> </ul>	Contractor	DSC, PIU, PMCDC, PCU
Impact to Traffic and Access	Road rehabilitation works will render some portions of the road unusable at periods of time resulting in traffic congestion and inconveniences to pedestrians and motorists in the vicinity of the affected area.	<ul style="list-style-type: none"> <li>• Plan roads and drain works minimizing traffic disturbance/blockades; work planning is crucial to minimize the inconvenience to public due to road works; provide diversions / alternative roads where required</li> <li>• Schedule road works close to the Lumbini heritage area in consultation with WHS, museum authorities, tourist agencies and traffic police; works that may affect the tourist places shall not be conducted during the tourist season</li> <li>• A Site-Specific Traffic Management Plan should be drawn up in consultation with the local community on construction operations and work schedules.;</li> <li>• Coordinate with traffic police for temporary road diversions and for provision of traffic aids;</li> </ul>	Contractor	DSC, PIU, PMCDC, PCU

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/ Supervision
		<ul style="list-style-type: none"> <li>• Notify public and provide sign boards informing nature and duration of construction works and contact numbers for concerns/complaints;</li> <li>• Maintain sufficient access to houses and shopkeepers (commercial establishments) during works; provide proper and safe pedestrian access.</li> <li>• Awareness should be built amongst the community on the implementation of the Site-Specific Traffic Management Plan;</li> <li>• Emergency response plan must be prepared for any traffic accident during construction and should be included in the SEMP.</li> <li>• As necessary, increase workforce for speedy completion;</li> <li>• Schedule material deliveries on low pedestrian traffic hours;</li> <li>• Restore damaged properties and utilities;</li> <li>• Erect and maintain barricades if required;</li> <li>• Pedestrian access will be maintained with the use of walking boards. Wheelchair and disabled access shall be maintained.</li> <li>• Surfaced roads shall be subject to road cleaning and unsurfaced roads to dust suppression, the methodology and frequency of which shall be included in the SEMP.</li> </ul>		
Impact on Socio-Cultural Resources, Tourism and Chance Finds	There are no notified PCR in the sub-project area. However, Lumbini and Devdaha are significant cultural centres of international repute. And, Lumbini is a designated UNESCO Heritage Site. Hence, chances of finding items of archeological	<ul style="list-style-type: none"> <li>• Prior to commencement of construction, consult with concerned religious authorities of these temples, nearby people and devotees and explain the work method and duration of proposed works, take their suggestions and comments in scheduling and conducting the works</li> <li>• No construction camps (workers accommodation, material / waste / soil storage) should be established within 1 km of the monuments in Lumbini</li> <li>• Put in place proper dust and noise control measures</li> <li>• Adjacent to religious/social/historical buildings, undertake excavation and construction work in such a way that no structural damage is caused to the structures</li> </ul>	Contractor	DSC, PIU, PMCDC, PCU

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/ Supervision
	importance are high in these two towns.	<ul style="list-style-type: none"> <li>• Schedule and plan works considering the tourist season and tourist areas</li> <li>• Observe the local rituals and important dates of festivals, weekly/monthly/annual religious occasions in the religious places and do not make any disturbance/hindrane/obstacles during such time to the religious places</li> <li>• Provide proper signage, barricades etc. to protect public and devotees from dangers of construction works.</li> <li>• Ensure proper traffic management planning to minimize the disruption to the normal traffic flow in the area and ensure the safety of the people.</li> <li>• Clear the work site of unnecessary material, equipment, and debris / surplus soil; do not stock material / soil at the sites</li> <li>• Conduct continuous consultations with the local people during the works</li> <li>• Strictly follow the protocol by coordinating immediately with PIU and Nepal Department of Archaeology for any suspicion of chance finds during excavation works;</li> <li>• Create awareness among the workers, supervisors and engineers about the chance finds during excavation work;</li> <li>• Stop work immediately to allow further investigation if any finds are suspected; and</li> <li>• Inform the Nepal Department of Archaeology (NDA) if a find is suspected and take any action they require to ensure its removal or protection in situ</li> <li>• Follow the written instructions of DOA for continuation of works .</li> </ul>		
Impact on socio-economic activities	Disturbance to economic activities may result from excavation works, stockpiling, the operation of construction vehicles	<ul style="list-style-type: none"> <li>• Develop the construction schedule in discussions with the community so that movement of construction vehicles can be avoided during school timings, festival times and / or any other local events that would require local communities to travel;</li> <li>• Implement Traffic Management Plan in collaboration with local authorities;</li> </ul>	Contractor	DSC, PIU, PMCDC, PCU

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/ Supervision
	and equipment, and accidental damage to utilities	<ul style="list-style-type: none"> <li>• Where traffic congestion will likely occur, place traffic flagmen during working hours;</li> <li>• Avoid full road closures by applying the construction method on section-wise and/or chainage-wise approach during excavation, concreting and/or curing periods;</li> <li>• If full road closure is not possible, especially on very narrow roads, ensure that alternate routes are identified and that affected residents and establishments are informed prior to conducting the construction activities;</li> <li>• Provide convenient access to pedestrians when works occur in front of residential, commercial or institutional establishments. Examples are planks with handrails that should be provided to cross excavated areas.</li> <li>• Provide appropriate compensation to qualified affected people or businesses per approved resettlement plan for the subproject;</li> <li>• Manage stockpile;</li> <li>• Manage pumped water from excavations either to drains or drums for later use;</li> <li>• Relocate the affected power supply poles, and</li> <li>• Advise the concerned authority during accidental damage to utilities.</li> </ul>		
Occupational Health and Safety	Construction activities could create health and safety risks to construction workers	<ul style="list-style-type: none"> <li>• All relevant provisions of the National Health Care Waste Management Standards and Operating Procedure-2020 and relevant WHO guidelines will be adhered to, concerning the provision of adequate measures to avoid contracting and/or spreading diseases during construction phase;</li> <li>• Follow international best practices on occupational health and safety such as those in Section 4.2 of World Bank EHS Guidelines on Construction and Decommissioning Activities; and EHS Guidelines on Waste Management Facilities. These practices include recommended measures to prevent, minimize and control pathogens from inflicting workers through training and use of appropriate PPEs, clothing and equipment when working</li> </ul>	Contractor	DSC, PIU, PMCDC, PCU

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/ Supervision
		<p>along the drainage system, and immunization and health monitoring (e.g. hepatitis B and tetanus).</p> <ul style="list-style-type: none"> <li>Existing drains may present hazardous working conditions in some places due to lack of oxygen and flammable nature of methane emissions which will be detrimental to the health and safety of workers. Put in place standard operating procedures with appropriate equipment, and workers are provided with necessary training and personnel protection equipment to safeguard health and safety</li> <li>Follow established occupational health and safety protocol on emerging infectious diseases such as the corona virus disease (COVID19).</li> <li>A readily available first aid unit, including an adequate supply of sterilized dressing material and appliances, will be provided as per the factory rules. Suitable transport will be provided to facilitate the transfer of injured or ill persons to the nearest hospital;</li> <li>Other first aid medical equipment and nursing staff will be made available or arranged on-call;</li> <li>The contractor will, at his own expense, conform to all disease prevention instructions as may be given by PCU/PIU;</li> <li>Provide regular health check-ups, sanitation and hygiene, health care, and control of epidemic diseases to the workforce;</li> <li>The contractor shall provide at cost all labor and materials and construct/install and maintain site safety, hard barricading, flexible green net, signboards, temporary day/light traffic diversions throughout the construction activities according to the specifications and provide personal protective equipment (PPE) to all the laborers working at the construction site;</li> <li>Launch awareness programs concerning human trafficking and the possibility of spread of sexually transmitted diseases (STDs) and HIV/AIDS using brochures, posters, and signboards;</li> </ul>		

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/ Supervision
		<ul style="list-style-type: none"> <li>• Make available first aid kits, ambulance facilities, and fire extinguishers in camp sites, if any;</li> <li>• Compensation for the loss of life (a zero tolerance to loss of life policy should be developed and implemented) or for any type of injuries; and</li> <li>• Provide adequate insurance to the workers that is current throughout the construction period;</li> <li>• Conduct Health and Safety Training periodically and Daily Tool Box Training for all site personnel.</li> </ul>		
Community Health and Safety	Construction activities could create health and safety risks to community people.	<ul style="list-style-type: none"> <li>• Code of conduct for workers should be developed and implemented throughout the construction period;</li> <li>• Follow International best practices on community health and safety such as those in Section 4.3 of World Bank Environmental Health and Safety (EHS) Guidelines on Construction and Decommissioning Activities;</li> <li>• Follow established community health and safety protocol on emerging infectious diseases such as COVID19.</li> <li>• Implement measure to prevent proliferation of vectors of diseases at work site;</li> <li>• Maintain a complaint logbook in worker's camp and take action promptly of complaints. Follow the established GRM of the overall project (URLIP);</li> <li>• Schedule transportation activities by avoiding peak traffic periods;</li> <li>• Clean wheels and undercarriage of haul trucks prior to leaving construction site;</li> <li>• Educate drivers: limit speed not more than 30 km/h in settlements and avoid use of horn;</li> <li>• Earmark parking place for construction equipment and vehicles when idling; no parking shall be allowed on the roads, that may disturb the traffic movement;</li> <li>• Provide prior information to local community, temples and other places of worship about work schedules;</li> <li>• Noise barriers must be installed in between the construction site and any community locations to reduce the noise level;</li> </ul>	Contractor	DSC, PIU, PMCDC, PCU



Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/ Supervision
		<ul style="list-style-type: none"> <li>• Provide adequate space and lighting, temporary fences, reflectorized barriers and signages at the work site; and</li> <li>• Ensure contractor has staff trained on emergency response.</li> </ul>		
Post-construction clean-up and reinstatement	Construction debris, spoils, and excess construction materials may pose hazards to properties, community and environment if left unattended after construction.	<ul style="list-style-type: none"> <li>• The contractor will reinstate all working areas and access routes as work proceeds during construction. All plant, equipment, materials, temporary infrastructure and vehicles will be removed at the earliest opportunity and the surface of the ground restored as near as practicable to its original condition. The following generic measures should be taken:</li> <li>• Remove all spoils wreckage, rubbish, or temporary structures (such as buildings, shelters, and latrines) which are no longer required;</li> <li>• All excavated roads shall be reinstated to original condition;</li> <li>• All disrupted utilities restored;</li> <li>• All affected structures rehabilitated/compensated;</li> <li>• The area that previously housed the construction camp is to be checked for spills of substances such as oil, paint, etc. and these shall be cleaned up;</li> <li>• All hardened surfaces within the construction camp area shall be ripped;</li> <li>• All imported materials removed, and the area shall be top soiled and regressed using guidelines set out in the re-vegetation specification that forms part of this document;</li> <li>• The contractor must arrange the cancellation of all temporary services;</li> <li>• Request PIU to report in writing that worksites and camps have been vacated and restored to pre-project conditions before acceptance of work.</li> </ul>	Contractor	DSC, PIU, PMCDC, PCU

**Table 84: Environmental Management Plan – Operational Phase – Roads and Drains Component**

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring / Supervision
Routine Maintenance	Traffic may be interrupted temporarily but this work will be very small in scale, periodic, and short in duration, so there will be no economic or other implications. Also, the environmental impacts will be much less than those during the construction period.	<ul style="list-style-type: none"> <li>To maintain the safety of workers and road-users, such work should be coordinated with the local police department so that adequate warning signs and traffic diversions can be set up when necessary</li> <li>Debris need to be collected and disposed at a designated site such as the landfill.</li> <li>Continue to encourage community participation in ensuring drainage canals are clog-free through information and behavior change campaigns and incentives, if possible.</li> </ul>	Respective Municipality	PCU, DUDBC
Community Safety	Improved roads may give way to faster vehicle speeds which could endanger people and households along the road alignments. Damage in roads may also cause accidents to motorists.	<ul style="list-style-type: none"> <li>Conduct regular inspection of the roads to check for damages, and undertake rehabilitation measures for any damages found;</li> <li>Inspect and maintain the integrity of road barriers, especially at critical curves or locations that are prone to vehicular accidents;</li> <li>Inspect and maintain speed limiters such as humps installed on road sections near residential areas, schools, and religious establishments;</li> <li>Inspect and maintain all road signages, including appropriate warning signages at silent zones, and ensure that these are reflectorized and visible even during night time; and</li> <li>Ensure pedestrian crossings are maintained.</li> </ul>	Respective Municipality	PCU, DUDBC

**Table 81: Environmental Management Plan – Operational Phase – Bus Terminal Facility and Municipal Building (Lumbini)**

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring / Supervision
Routine Operations	Operations of the facility will impact the environment.	<ul style="list-style-type: none"> <li>The O&amp;M of the facility should be performed as per Standard Procedures</li> <li>Develop and emergency response plan; train staff in emergency procedures</li> <li>Ensure proper maintenance of facilities and amenities like drinking water, sanitation, and necessary personnel protection equipment are provided to workers (sanitation, electrical safety etc.)</li> <li>Provide necessary first aid facilities</li> <li>Ensure road safety, and ensure provisions and maintenance of road safety infrastructure, caution and information boards.</li> </ul>	Respective Asset Owner	PCU, DUDBC
Impact on Air Quality	Air quality will be impacted by the operation buses because of exhaust, dust generation etc. Noise levels will also be impacted because of the operation of DG sets and vehicles	<ul style="list-style-type: none"> <li>All vehicles should obtain Pollution Under Control certificate from the relevant line agency;</li> <li>DG sets should be housed in areas with appropriate sound-dissipating equipment nearby</li> <li></li> </ul>	Respective Asset Owner	PCU, DUDBC
Impact on Surface and Ground Water Quality	Inadequate Management of Sanitation Infrastructure and Solid Waste will impact the surface and groundwater quality.	<ul style="list-style-type: none"> <li>Sanitation Infrastructure should be maintained as per the Standard Operating Procedures;</li> <li>Wastes (including fecal sludge) should be disposed to designated areas and operated as per Standard Operating Procedures;</li> </ul>	Respective Asset Owner	PCU, DUDBC

### C. Environmental Monitoring Program

**209** Monitoring of mitigation measures during construction is the responsibility of the PIU and PCU, supported by the PMCDC Environmental Specialist. However, monitoring of mitigation measures during operation phase is the responsibility of the Asset Owner. Table 38 and 39 shows the proposed Environmental Monitoring Program for this subproject, which specifies the various monitoring activities, indicating location, frequency of monitoring and responsibility.

**Table 85: Environmental Monitoring Program**

Activities or Items to Monitor	Location	Responsible for Activities	Monitoring Method	Monitoring Frequency	Monitoring Responsibility
<b>PRE-CONSTRUCTION</b>					
Secure Environmental Clearance Certificate (ECC) from MoUD	PCU office	PCU, PMCDC	Copy of approved ECC	Before construction activities	PCU, PMCDC
IEEs and EMPs are included in bid and contract documents	PCU office	PCU, PMCDC	Copies of bid and contract documents	Before approval tender document	PCU, PMCDC
Site-specific EMP (SEMP) submitted by Contractor for approval by PIU	PIU office	Contractor, PIU	Copy of approved SEMP	Before construction activities commence	PCU, PMCDC
Spoil management plan (SMP) submitted by Contractor for approval by PIU	PIU office	Contractor, PIU	Copy of approved SMP	Before construction activities commence	PCU, PMCDC
Traffic management plan (TMP) submitted by Contractor for approval by PIU	PIU office	Contractor	Copy of approved TMP	Before construction activities commence	PCU, PMCDC
Secure all other necessary permits and licenses from relevant government agencies		Contractor	Copies of permits and licenses	Before construction activities commence	PCU, PMCDC
Conduct of baseline ambient air quality and noise level monitoring	Subproject site	Contractor	Site visits and observations, Contractor records, Results of Air Quality Sampling and Noise Level measurements.	Before construction activities commence	PCU, PIU, PMCDC
Conduct of baseline surface water and ground water quality monitoring	Subproject site	Contractor	Site visits and observations, Contractor records, Results of	Before construction activities commence	PCU, PIU, PMCDC

Activities or Items to Monitor	Location	Responsible for Activities	Monitoring Method	Monitoring Frequency	Monitoring Responsibility
			laboratory analyses		
<b>CONSTRUCTION</b>					
Implementation of SEMP; including implementation of community and occupational health and safety measures.	Subproject site	Contractor	Site visits, Contractor records,	Weekly or as needed	PCU, PIU, PMCDC
Implementation of SMP	Subproject site	Contractor	Site visits, Contractor records,	Weekly or as needed	PIU, PMCDC
Implementation of TMP	Subproject site	Contractor	Site visits, Contractor records,	Weekly or as needed	PIU, PMCDC
Tree Removal and Replacement	Subproject site and planting site	Contractor	Site visits, Contractor records,	Monthly, or as needed	PCU, PIU, PMCDC
Conduct of ambient air quality and noise level monitoring	Subproject site	Contractor	Site visits and observations, Contractor records, Results of laboratory analyses, Results of noise level measurements	Quarterly or as needed	PCU, PIU, PMCDC
Conduct of surface water quality monitoring	Subproject site	Contractor	Site visits and observations, Contractor records, Results of laboratory analyses	At least semi-annual or as needed	PCU, PIU, PMCDC
Develop and apply archaeological protocol to protect chance finds	Subproject site	Contractor, PCU, PIU, PMCDC	Contractor records	Once until protocol is approved	PCU, PIU, PMCDC
Provide EHS training for all personnel	Subproject site	Contractor	Contractor records; Interviews to workers	Monthly	PIU, PMCDC
Keep accident reports and records	Subproject site	Contractor	Contractor records; Interviews to workers and community people	Monthly	PIU, PMCDC
Employ workforce from communities near sites	Subproject site	Contractor	Contractor records	Monthly	PIU, PMCDC

Activities or Items to Monitor	Location	Responsible for Activities	Monitoring Method	Monitoring Frequency	Monitoring Responsibility
Implementation of EHS measures at construction camps	Construction camp site	Contractor	Site visits; Interviews to workers at camp	Monthly	PIU, PMCDC

**Table 86 : Environmental Monitoring Plan (Sampling & Analysis)**

Monitoring field	Monitoring location	Monitoring parameters	Frequency	Responsibility	Cost & Source of Funds
Ambient air quality	5 locations – selected for each sampling program depending on the active construction sites at the time of the sampling program	PM10, PM2.5, NO2, SO2, CO	Once before start of construction and quarterly (yearly 4-times) during construction	Contractor	Cost for implementation of monitoring measures responsibility of contractor
Ambient noise	5 locations – selected for each sampling program depending on the active construction sites at the time of the sampling program.	Day time and night time noise levels	Once before start of construction and quarterly (yearly 4-times) during construction	Contractor	Cost for implementation of monitoring measures responsibility of contractor
Surface water quality	5 locations - selected for each sampling program depending on the active construction site at the time of the sampling program	pH, Oil & grease, Cl, F, NO3, TC, FC, Hardness, Turbidity BOD, COD, DO, Total Alkalinity	Once before start of construction and quarterly (yearly 4-times) during construction	Contractor	Cost for implementation of monitoring measures responsibility of contractor

#### **D. Capacity Development Training**

**210** The PMCDC Environment Specialist will be responsible for training the PCU, PIU and contractors. Training modules will need to cover safeguards awareness and management in accordance with both ADB and government requirements as specified



below.

- (i) sensitization on ADB's safeguard policy on environment;
- (ii) introduction to environment and environmental considerations in urban infrastructures;
- (iii) review of IEEs and integration into the project detailed design;
- (iv) improved coordination within nodal departments; and
- (v) monitoring and reporting system. The contractors will be required to conduct environmental awareness and orientation of workers prior to deployment to work sites.

**211 Methodology.** Capacity building activities will be achieved through combination of practical methodologies available such as lecture and workshop training by experts, on-the-job training and mentoring, and continuing team meetings and exercises. The PMCDC Environment Specialist will spearhead the designing of specific programs appropriate for the target participants or stakeholders, including the execution of these programs during the different implementation phases of the URLIP, which includes the subproject. Pre-training and post-training assessment will be an integral part of the overall program to measure its effectiveness, and identify any other needed interventions to improve effectiveness, if necessary.

**212** As fundamental component for the capacity building program, basic lectures and seminar training sessions will be provided by the PMCDC Environment Specialist to strengthen the awareness of project stakeholders on the requirements of ADB SPS and government environmental laws, rules and regulations. Modules will be prepared and customized based on the skills set and needs of the different stakeholders. The entire training will cover basic principles of environmental assessment and management mitigation plans and programs, implementation techniques, monitoring methods and tools. A proposed lecture and seminar training program along with the frequency of sessions is presented in the following table.

**Table 87: Sample Lecture and Seminar Training Program for Environmental Management**

Items	Pre-construction	Construction	
<b>Training Title</b>	Orientation workshop	Orientation program/ workshop for contractors and supervisory staff	Experiences and best practices sharing
<b>Purpose</b>	To make the participants aware of the environmental safeguard requirements of ADB and Government of Nepal and how the project will meet these requirements	To build the capacity of the staff for effective implementation of the designed EMPs aimed at meeting the environmental safeguard compliance of ADB and Government of Nepal	Improving implementation of EMP

Items	Pre-construction	Construction	
<b>Contents</b>	Module 1: Orientation ADB Safeguards Policy Statement Government of Nepal Environmental Laws and Regulations Module 2: Environmental Assessment Process ADB environmental process, identification of impacts and mitigation measures, formulation of an environmental management plan (EMP), implementation, and monitoring requirements Review of environmental assessment report to comply with ADB requirements Incorporation of EMP into the project design and contracts	Roles and responsibilities of officials/contractors/consultants towards protection of the environment Environmental issues during construction Implementation of EMP Monitoring of EMP implementation Reporting requirements	Experiences on EMP implementation – issues and challenges
<b>Duration</b>	1day	1day	Best practices followed
<b>Participants</b>	PCU and PIU staff (technical and environmental) involved in the project implementation	PCU, PIU, Contractors	PCU, PIU, Contractors

## E. Environmental Management and Monitoring Plan Implementation

**213** Most of environmental mitigation and enhancement measures are integrated into the design and cost are included as part of the civil works contract. Some items need to be incorporated in the Bill of Quantities (BOQ) of this subproject including the environmental monitoring costs. The environmental costs presented in table below are tentative provisions based on experience of undertaking similar works under different DUDBC projects. For the details of environmental costs under civil works contract, individual contract package bid document may be consulted. Contractors will bear the direct costs of all mitigation measures during construction, which will be included in the tender and contract documents; this includes features built into facility designs to prevent environmental impacts from arising. The PIU will bear the costs related to mitigation measures during operation. Costs related to environmental supervision during construction will be borne by the PIU, the PCU (for the activities of the environmental consultants) and by the contractors (for monitoring work carried out by the EHS Officer/s). During the operation phase, monitoring costs will be borne by the Tiltottama Municipality and/or the PIU.

Table 88: Environmental Monitoring Cost

Environmental Parameter	Sampling Criteria	No. of Samples	Frequency	Total # of Samples	Cost of Analysis / Sample	Total Cost
<b>Lumbini Sanskritik Roads</b>						
Air Quality	One Sample at each alignment	2	Quarterly for 2.5 Years (10 Quarters)	20	NPR 10,000.00	NPR 200,000
Noise Quality	One Sample at alignment + Control Sample may not be necessary as it needs to be compared with noise levels to be met	2	Quarterly for 2.5 Years (10 Quarters)	20	NPR 6,000	NPR 120,000
Surface Water Quality	One Sample near alignment + Control Samples may not be necessary as it needs to be compared with water quality standards	1	Quarterly for 2.5 Years (10 Quarters)	10	NPR 10,000	NPR 100,000
Ground Water Quality	One Sample at Solid Waste Disposal Facility, Campsite and storage facility + Control Samples outside of the SWD, Campsite and storage facility	3	Quarterly for 2.5 Years (10 Quarters)	30	NPR 10,000	NPR 300,000
Soil Quality	One Sample at Solid Waste Disposal Facility, Campsite and storage facility + Control Samples outside of the SWD, Campsite and storage facility	3	Quarterly for 2.5 Years (10 Quarters)	30	NPR 10,000	NPR 300,000
				110		
					<b>TOTAL AMOUNT</b>	<b>NPR 1,020,000</b>

Environmental Parameter	Sampling Criteria	No. of Samples	Frequency	Total # of Samples	Cost of Analysis / Sample	Total Cost
<b>Lumbini Bus Terminal</b>						
Air Quality	One Sample at each alignment	1	Quarterly for 2.5 Years (10 Quarters)	10	NPR 10,000.00	NPR 100,000
Noise Quality	One Sample at alignment + Control Sample may not be necessary as it needs to be compared with noise levels to be met	1	Quarterly for 2.5 Years (10 Quarters)	10	NPR 6,000	NPR 60,000
Surface Water Quality	One Sample near alignment + Control Samples may not be necessary as it needs to be compared with water quality standards	1	Quarterly for 2.5 Years (10 Quarters)	10	NPR 10,000	NPR 100,000
Ground Water Quality	One Sample at Solid Waste Disposal Facility, Campsite and Storage Facility + Control Samples outside of the SWD, Campsite and Storage Facilities	3	Quarterly for 2.5 Years (10 Quarters)	30	NPR 10,000	NPR 300,000
Soil Quality	One Sample at Solid Waste Disposal Facility, Campsite and Storage Facility + Control Samples outside of the SWD, Campsite and Storage Facilities	3	Quarterly for 2.5 Years (10 Quarters)	30	NPR 10,000	NPR 300,000
				110		
					<b>TOTAL AMOUNT</b>	<b>NPR 860,000</b>
<b>Siddharthanagar</b>						
Air Quality	9 Sample for 27 Road Construction Sites (1 sample for 3 sections) + 9 Control Samples	18	Quarterly for 2.5 Years (10 Quarters)	180	NPR 10,000.00	NPR 1,800,000

Environmental Parameter	Sampling Criteria	No. of Samples	Frequency	Total # of Samples	Cost of Analysis / Sample	Total Cost
	outside the construction site - Each Quarter					
Noise Quality	9 Sample for 27 Road Construction Sites (1 sample for 3 sections) + Control Samples may not be necessary as it needs to be compared with noise levels to be met	9	Quarterly for 2.5 Years (10 Quarters)	90	NPR 6,000	NPR 540,000
Surface Water Quality	9 Samples near a Surface Water Body at each of the Construction Site + Control Samples may not be necessary as it needs to be compared with water quality standards	9	Quarterly for 2.5 Years (10 Quarters)	90	NPR 10,000	NPR 900,000
Ground Water Quality	9 Sample at each Solid Waste Disposal Facility, Campsite and Storage Facility + 9 Control Samples outside each of the SWD, 6 Campsite and 4 Storage Facilities	29	Quarterly for 2.5 Years (10 Quarters)	290	NPR 10,000	NPR 2,900,000
Soil Quality	9 Sample at each Solid Waste Disposal Facility, Campsite and Storage Facility + 9 Control Samples outside each of the SWD, Campsite and Storage Facilities	18	Quarterly for 2.5 Years (10 Quarters)	180	NPR 10,000	NPR 1,800,000
					<b>TOTAL AMOUNT</b>	<b>NPR 7,940,000</b>
<b>Devdaha</b>						
Air Quality	Two Samples at Road Construction Sites + 1 Control Samples outside one of each of the construction sites	3	Quarterly for 2.5 Years (10 Quarters)	30	NPR 10,000.00	NPR 300,000

Environmental Parameter	Sampling Criteria	No. of Samples	Frequency	Total # of Samples	Cost of Analysis / Sample	Total Cost
Noise Quality	One Sample at each Road Construction Site + Control Samples may not be necessary as it needs to be compared with noise levels to be met	3	Quarterly for 2.5 Years (10 Quarters)	30	NPR 6,000	NPR 180,000
Surface Water Quality	One Sample at near a Surface Water Body at each of the Construction Site + Control Samples may not be necessary as it needs to be compared with water quality standards	3	Quarterly for 2.5 Years (10 Quarters)	30	NPR 25,000	NPR 750,000
Ground Water Quality	One Sample at each Solid Waste Disposal Facility, Campsite and Storage Facility + Control Samples outside each of the SWD, Campsite and Storage Facilities	8	Quarterly for 2.5 Years (10 Quarters)	80	NPR 10,000	NPR 800,000
Soil Quality	One Sample at each Solid Waste Disposal Facility, Campsite and Storage Facility + Control Samples outside each of the SWD, Campsite and Storage Facilities	8	Quarterly for 2.5 Years (10 Quarters)	80	NPR 10,000	NPR 800,000
					<b>TOTAL AMOUNT</b>	<b>NPR 2,830,000</b>
<b>Sainamaina</b>						
Air Quality	One Sample at each Road Construction Site + Control Samples outside at each of the construction site	10	Quarterly for 2.5 Years (10 Quarters)	100	NPR 10,000.00	NPR 1,000,000.00
Noise Quality	One Sample at each Road Construction Site + Control Samples may not be necessary	5	Quarterly for 2.5 Years (10 Quarters)	50	NPR 6,000.00	NPR 300,000.00



Environmental Parameter	Sampling Criteria	No. of Samples	Frequency	Total # of Samples	Cost of Analysis / Sample	Total Cost
	as it needs to be compared with noise levels to be met					
Surface Water Quality	One Sample at near a Surface Water Body at each of the Construction Site + Control Samples may not be necessary as it needs to be compared with water quality standards	5	Quarterly for 2.5 Years (10 Quarters)	50	NPR 25,000.00	NPR 1,250,000.00
Ground Water Quality	One Sample at each Solid Waste Disposal Facility, Campsite and Storage Facility + Control Samples outside each of the SWD, Campsite and Storage Facilities	10	Quarterly for 2.5 Years (10 Quarters)	100	NPR 10,000.00	NPR 1,000,000.00
Soil Quality	One Sample at each Solid Waste Disposal Facility, Campsite and Storage Facility + Control Samples outside each of the SWD, Campsite and Storage Facilities	10	Quarterly for 2.5 Years (10 Quarters)	100	NPR 10,000.00	NPR 1,000,000.00
					<b>TOTAL AMOUNT</b>	<b>NPR 4,550,000</b>
<b>Tilottama</b>						
Air Quality	One Sample at each Road Construction Site + Control Samples outside at each of the construction site	6	Quarterly for 2.5 Years (10 Quarters)	60	NPR 10,000.00	NPR 600,000.00
Noise Quality	One Sample at each Road Construction Site + Control Samples may not be necessary as it needs to be compared with noise levels to be met	3	Quarterly for 2.5 Years (10 Quarters)	30	NPR 6,000.00	NPR 180,000.00

Environmental Parameter	Sampling Criteria	No. of Samples	Frequency	Total # of Samples	Cost of Analysis / Sample	Total Cost
Surface Water Quality	One Sample at near a Surface Water Body at each of the Construction Site + Control Samples may not be necessary as it needs to be compared with water quality standards	3	Quarterly for 2.5 Years (10 Quarters)	30	NPR 25,000.00	NPR 750,000.00
Ground Water Quality	One Sample at each Solid Waste Disposal Facility, Campsite and Storage Facility + Control Samples outside each of the SWD, Campsite and Storage Facilities	6	Quarterly for 2.5 Years (10 Quarters)	60	NPR 10,000.00	NPR 600,000.00
Soil Quality	One Sample at each Solid Waste Disposal Facility, Campsite and Storage Facility + Control Samples outside each of the SWD, Campsite and Storage Facilities	6	Quarterly for 2.5 Years (10 Quarters)	60	NPR 10,000.00	NPR 600,000.00
					<b>TOTAL AMOUNT</b>	<b>NPR 2,730,000</b>

**Table 829: Indicative Environmental Management Plan Budget for Bill of Quantities (BOQ)**

S.No.	Description of Items	Unit		Quantity	Unit of Rate (NPR)	Item Total (NPR)
<b>Lumbini Sanskritik Roads</b>						
i.	Environmental Monitoring Cost a) Air Quality, b) Noise level, c) Surface Water Quality d) Ground Water Quality e) Soil Quality	Lumpsum		1	1,020,000	1,020,000

S.No.	Description of Items	Unit		Quantity	Unit of Rate (NPR)	Item Total (NPR)
ii.	Tree Replacement (Providing, planting containerized tree and shrub seedlings, including pitting, transplanting, composting and placing tree guards, curing and maintenance) <i>Compensatory plantation as per Forest Regulations 2022-Rule 93 (5), loss of 1 tree should be compensated by planting 10 trees (total 27 trees need to be cut)</i>	Nos. (as per actual loss of trees)		270	4500	1215000
iii	Providing and maintaining adequate potable water supply facilities at camp site and work site to the entire satisfaction of engineer-in-charge (Considering 1 Construction Sites and 1 Campsite)	Days	600	900	2000	1,800,000
iv.	Personal Protective Equipment's (PPE) to the entire satisfaction of the engineer-in-charge (at the Construction Site)	Nos.	1	1	300000	300,000
v.	Traffic management during construction, equipment for traffic management (Barricade with green nets, Visible warning and danger signs in construction sites)	Nos.	1	1	100000	100,000
vi.	Dust suppression measures by Spraying Water (excluding watering for compaction) to the entire satisfaction of the engineer-in-charge (3 times a day at the construction sites for 1.5 years excluding monsoon and planning period)	Nos.		54	500	27,000
vii.	Debris disposal and waste management on camp sites to the entire satisfaction of the engineer-in-charge (Only Campsite)	Nos.		1	100000	100,000
viii.	Restoration of ancillary sites including stockpile sites, borrow areas, workforce camp, to the entire satisfaction of the engineer-in-charge (Including campsites - assuming 2 locations)	Nos.		2	100000	200,000
ix.	Maintain First aid box and fire extinguisher at camp site to the entire satisfaction of the	Nos.	2	3	150000	450,000

S.No.	Description of Items	Unit		Quantity	Unit of Rate (NPR)	Item Total (NPR)
	engineer-in-charge. (Campsite, Storage Site, and 1 Construction Site)					
x.	Separate male female toilet facilities for camp and worksite to the entire satisfaction of the engineer-in-charge (1 Construction Site and 1 Campsite)	Nos.		4	150000	600,000
xi.	Implementation of additional occupational health and safety measures related to prevention of COVID-19	Lumpsum		-	500000	500,000
	<b>Indicative Cost (Total Amount)</b>					<b>6,312,000</b>
<b>Lumbini Bus Terminal</b>						
i.	Environmental Monitoring Cost a) Air Quality, b) Noise level, c) Surface Water Quality d) Ground Water Quality e) Soil Quality	Lumpsum		1	1,020,000	860,000
iii	Providing and maintaining adequate potable water supply facilities at camp site and work site to the entire satisfaction of engineer-in-charge (Considering 1 Construction Sites and 1 Campsite)	Days	600	900	2000	1,800,000
iv.	Personal Protective Equipment's (PPE) to the entire satisfaction of the engineer-in-charge (at the Construction Site)	Nos.	1	1	300000	300,000
v.	Traffic management during construction, equipment for traffic management (Barricade with green nets, Visible warning and danger signs in construction sites)	Nos.	1	1	100000	100,000
vi.	Dust suppression measures by Spraying Water (excluding watering for compaction) to the entire satisfaction of the engineer-in-charge (3 times a day at the construction sites for 1.5 years excluding monsoon and planning period)	Nos.		54	500	27,000
vii.	Debris disposal and waste management on camp sites to the entire satisfaction of the engineer-in-charge (Only Campsite)	Nos.		1	100000	100,000

S.No.	Description of Items	Unit		Quantity	Unit of Rate (NPR)	Item Total (NPR)
viii.	Restoration of ancillary sites including stockpile sites, borrow areas, workforce camp, to the entire satisfaction of the engineer-in-charge (Including campsites - assuming 2 locations)	Nos.		2	100000	200,000
ix.	Maintain First aid box and fire extinguisher at camp site to the entire satisfaction of the engineer-in-charge. (Campsite, Storage Site, and 1 Construction Site)	Nos.	2	3	150000	450,000
x.	Separate male female toilet facilities for camp and worksite to the entire satisfaction of the engineer-in-charge (1 Construction Site and 1 Campsite)	Nos.		4	150000	600,000
xi.	Implementation of additional occupational health and safety measures related to prevention of COVID-19	Lumpsum		-	500000	500,000
	<b>Indicative Cost (Total Amount)</b>					<b>4,937,000</b>
<b>Siddharthanagar</b>						
i.	Environmental Monitoring Cost a) Air Quality, b) Noise level, c) Surface Water Quality d) Ground Water Quality e) Soil Quality	Lumpsum		-	7,940,000.00	7,940,000.00
ii.	Tree Replacement (Providing, planting containerised tree and shrub seedlings, including pitting, transplanting, composting and placing tree guards, curing and maintenance) <i>Compensatory plantation as per Forest Regulations 2022-Rule 93 (5), loss of 1 tree should be compensated by planting 10 trees (total 11 trees need to be cut)</i>	No's (as per actual loss of trees)		110	4,500.00	495,000.00
iii	Providing and maintaining adequate potable water supply facilities at camp site and work site to the entire satisfaction of engineer-in-charge (Considering 27 Construction Sites and 1 Campsite)	Days		900	33,000.00	29,700,000.00

S.No.	Description of Items	Unit		Quantity	Unit of Rate (NPR)	Item Total (NPR)
iv.	Personal Protective Equipments (PPE) to the entire satisfaction of the engineer-in-charge (at 27 Construction Sites)	Nos.		27	300,000.00	8,100,000.00
v.	Traffic management during construction, equipment for traffic management (Barricade with green nets, Visible warning and danger signs in construction sites) (at 27 Construction Sites)	Nos.		27	100,000.00	2,700,000.00
vi.	Dust suppression measures by Spraying Water (excluding watering for compaction) to the entire satisfaction of the engineer-in-charge (3 times a day at 27 construction sites for 3 years excluding monsoon and planning period)	Nos.		2160	500.00	1,080,000.00
vii.	Debris disposal and waste management on camp sites to the entire satisfaction of the engineer-in-charge (Only 6 Campsite)	Nos.		6	100,000.00	100,000.00
viii.	Restoration of ancillary sites including stockpile sites, borrow areas, workforce camp, as per instruction of the Engineer appointed by PIU (Including campsites)	PS		1	500,000.00	500,000.00
ix.	Maintain First aid box and fire extinguisher at camp site to the entire satisfaction of the engineer-in-charge. (6 Campsite, 4 Storage Site, and 27 Construction Sites)	Nos.		37	150,000.00	5,550,000.00
x.	Separate male female toilet facilities for camp and worksite to the entire satisfaction of the engineer-in-charge (9 Construction Sites assuming 9 sites will be opened at once; and 6 Campsite and two toilets in each site)	Nos.		30	150,000.00	4,500,000.00
xi.	Implementation of additional occupational health and safety measures related to prevention of COVID-19	Lumpsum		-	500,000.00	500,000.00
xii.	Plantation and greenary promotion works as per instruction of Engineer appointed by PIU	PS		1	2,000,000.00	2,000,000.00



S.No.	Description of Items	Unit		Quantity	Unit of Rate (NPR)	Item Total (NPR)
xiii.	Standard Traffic Cones with necessary ropes/ribbon and Traffic Barricades (1.00 m height) fabricated with MS pipes of 50mm with necessary traffic sign in both ends	Nos		50	3,000.00	150,000.00
xiv.	Use of 6 numbers of Standard LED Traffic Control Batons, 4 numbers of Standard Reflective Traffic Regulatory sign Such as "STOP & GO" and "KEEP RIGHT/LEFT" and Standard reflective traffic warning sign Such as "DIVERSION AHEAD", "SHARP BEND" and other Sign as required, 6 numbers along working stretches per gang during construction.	set		30	5,000.00	150,000.00
x.	EMP implementation Trainings for the awareness of the environmental safeguard requirements of ADB and GoN during the pre-construction stage and to build capacity of the staff for effective implementation of designed EMPs during construction period.	Days		4	100,000.00	400,000.00
	<b>Indicative Cost (Total Amount)</b>					<b>63,865,000</b>
<b>Devdaha</b>						
i.	Environmental Monitoring Cost a) Air Quality, b) Noise level, c) Surface Water Quality d) Ground Water Quality e) Soil Quality	Lumpsum		-	<b>2,830,000</b>	<b>2,830,000</b>
ii.	Tree Replacement (Providing, Planting containerised tree and shrub seedlings, including pitting, transplanting, composting and placing tree guards, curing and maintenance) <i>Compensatory plantation as per Forest Regulations 2022-Rule 93 (5), loss of 1 tree should be compensated by planting 10 trees (total 71 trees need to be cut)</i>	No's.(as per actual loss of trees)		560	4,500	<b>2,520,000</b>
iii	Providing and maintaining adequate potable water supply facilities at camp site and work site to the entire satisfaction of engineer-in-	Days		1800	4000	7,200,000

S.No.	Description of Items	Unit		Quantity	Unit of Rate (NPR)	Item Total (NPR)
	charge (Considering 6 Construction Sites and 1 Campsite)					
iv.	Personal Protective Equipments (PPE) to the entire satisfaction of the engineer-in-charge (at 6 Construction Sites)	Nos.		6	300000	1,800,000
v.	Traffic management during construction, equipment for traffic management (Barricade with green nets, Visible warning and danger signs in construction sites) (at 6 Construction Sites)	Nos.		6	100000	600,000
vi.	Dust suppression measures by Spraying Water (excluding watering for compaction) as per instruction of Engineer appointed by PIU (3 times a day up to contact period excluding monsoon and planning period)	Nos		2160	500	1,080,000
vii.	Debris disposal and waste management on camp sites to the entire satisfaction of the engineer-in-charge (Only Campsite)	Nos.		1	100000	100,000
viii.	Restoration of ancillary sites including stockpile sites, borrow areas, workforce camp, to the entire satisfaction of the engineer-in-charge (Including campsites - assuming 6 locations)	Nos.		6	100000	600,000
ix.	Maintain First aid box and fire extinguisher at camp site to the entire satisfaction of the engineer-in-charge. (Campsite, Storage Site, and 6 Construction Sites)	Nos.		8	150000	1,200,000
x.	Separate male female toilet facilities for camp and worksite to the entire satisfaction of the engineer-in-charge (6 Construction Sites and One Campsite and two toilets in each site)	Nos.		8	150000	1,200,000
ix.	Plantation and greenery promotion works as per instruction of Engineer appointed by PIU	PS		1	2,000,000.00	2,000,000.00
x.	Standard Traffic Cones with necessary ropes/ribbon and Traffic Barricades (1.00 m	Nos		50	3,000.00	150,000.00

S.No.	Description of Items	Unit		Quantity	Unit of Rate (NPR)	Item Total (NPR)
	height) fabricated with MS pipes of 50mm with necessary traffic sign in both ends					
xi.	Use of 6 numbers of Standard LED Traffic Control Batons, 4 numbers of Standard Reflective Traffic Regulatory sign Such as "STOP & GO" and "KEEP RIGHT/LEFT" and Standard reflective traffic warning sign Such as "DIVERSION AHEAD", "SHARP BEND" and other Sign as required, 6 numbers along working stretches per gang during construction.	set		30	5,000.00	150,000.00
xii.	Implementation of additional occupational health and safety measures related to prevention of COVID-19	Lumpsum		-	500000	500,000
xiii	EMP implementation Trainings for the awareness of the environmental safeguard requirements of ADB and GoN during the pre-construction stage and to build capacity of the staff for effective implementation of designed EMPs during construction period.	Days		4	100,000.00	400,000.00
	<b>Indicative Cost (Total Amount)</b>					<b>22,330,000</b>
<b>Sainamaina Roads</b>						
i.	Environmental Monitoring Cost a) Air Quality, b) Noise level, c) Surface Water Quality d) Ground Water Quality e) Soil Quality	Lumpsum		-	4,550,000.00	4,550,000.00
ii.	Tree Replacement (Providing, Planting containerised tree and shrub seedlings, including pitting, transplanting, composting and placing tree guards, curing and maintenance) <i>Compensatory plantation as per Forest Regulations 2022-Rule 93 (5), loss of 1 tree should be compensated by planting 10 trees (total 10 trees need to be cut)</i>	No's.(as per actual loss of trees)		100	4,500.00	450,000.00
iii	Providing and maintaining adequate potable water supply facilities at camp site and work	Days		1800	4,000.00	7,200,000.00

S.No.	Description of Items	Unit		Quantity	Unit of Rate (NPR)	Item Total (NPR)
	site to the entire satisfaction of engineer-in-charge (Considering 6 road sections and 1 Campsite)					
iv.	Personal Protective Equipments (PPE) to the entire satisfaction of the engineer-in-charge (at 6 Construction Sites)	Nos.		6	300,000.00	1,800,000.00
v.	Traffic management during construction, equipment for traffic management (Barricade with green nets, Visible warning and danger signs in construction sites) (at 6 Construction Sites)	Nos.		6	100,000.00	600,000.00
vi.	Dust suppression measures by Spraying Water (excluding watering for compaction) as per instruction of Engineer appointed by PIU (3 times a day upto contact period excluding monsoon and planning period)	Nos		2160	500.00	1,080,000.00
vii.	Debris disposal and waste management on camp sites to the entire satisfaction of the engineer-in-charge (Only Campsite)	Nos.		1	100,000.00	100,000.00
viii.	Restoration of ancillary sites including stockpile sites, borrow areas, workforce camp, to the entire satisfaction of the engineer-in-charge (Including campsites - assuming 6 locations)	Nos.		6	100,000.00	600,000.00
ix.	Maintain First aid box and fire extinguisher at camp site to the entire satisfaction of the engineer-in-charge. (Campsite, Storage Site, and 6 Construction Sites)	Nos.		8	150,000.00	1,200,000.00
x.	Separate male female toilet facilities for camp and worksite to the entire satisfaction of the engineer-in-charge (6 Construction Sites and One Campsite and two toilets in each site)	Nos.		8	150,000.00	1,200,000.00
ix.	Plantation and greenary promotion works as per instruction of Engineer appointed by PIU	PS		1	2,000,000.00	2,000,000.00

S.No.	Description of Items	Unit		Quantity	Unit of Rate (NPR)	Item Total (NPR)
x.	Standard Traffic Cones with necessary ropes/ribbon and Traffic Barricades (1.00 m height) fabricated with MS pipes of 50mm with necessary traffic sign in both ends	Nos		50	3,000.00	150,000.00
xi.	Use of 6 numbers of Standard LED Traffic Control Batons, 4 numbers of Standard Reflective Traffic Regulatory sign Such as "STOP & GO" and "KEEP RIGHT/LEFT" and Standard reflective traffic warning sign Such as "DIVERSION AHEAD", "SHARP BEND" and other Sign as required, 6 numbers along working stretches per gang during construction.	set		30	5,000.00	150,000.00
xii.	Implementation of additional occupational health and safety measures related to prevention of COVID-19	Lumpsum		-	500,000.00	500,000.00
	EMP implementation Trainings for the awareness of the environmental safeguard requirements of ADB and GoN during the pre-construction stage and to build capacity of the staff for effective implementation of designed EMPs during construction period.	Days		4	100,000.00	400,000.00
	<b>Indicative Cost (Total Amount)</b>					<b>21,980,000.00</b>
<b>Tilottama</b>						
i.	Environmental Monitoring Cost a) Air Quality, b) Noise level, c) Surface Water Quality d) Ground Water Quality e) Soil Quality	Lumpsum		-	2,730,000.00	2,730,000.00
ii.	Tree Replacement (Providing, planting containerised tree and shrub seedlings, including pitting, transplanting, composting and placing tree guards, curing and maintenance) <i>Compensatory plantation as per Forest Regulations 2022-Rule 93 (5), loss of 1 tree should be compensated by planting 10 trees (total 40 trees need to be cut)</i>	Nos. (as per actual loss of trees)		400	4,500.00	1,800,000
iii.	Providing and maintaining adequate potable water supply facilities at camp site and worksite to the	Days		900		

S.No.	Description of Items	Unit		Quantity	Unit of Rate (NPR)	Item Total (NPR)
	entire satisfaction of engineer-in-charge (Considering 3 road sections and 1 Campsite)				4,000.00	3,600,000.00
iv.	Personal Protective Equipment (PPE) to the entire satisfaction of the engineer-in-charge (at 3 Construction Sites)	Nos.		3	300,000.00	900,000.00
v.	Traffic management during construction, equipment for traffic management (Barricade with green nets, Visible warning and danger signs in construction sites) (at 3 Construction Sites)	Nos.		3	100,000.00	300,000.00
vi	EMP implementation Trainings for the awareness of the environmental safeguard requirements of ADB and GoN during the pre-construction stage and to build capacity of the staff for effective implementation of designed EMPs during construction period.	Days		4	100,000.00	400,000.00
<b>Total:</b>						<b>9,730,000.00</b>



## VII. INFORMATION DISCLOSURE, CONSULTATION AND PARTICIPATION

### A. Consultation and Participation

**214** Meaningful consultation is an essential part of the environmental assessment process which enables the incorporation of all relevant views of affected people and other stakeholders into decision making, such as project design, mitigation measures, and the sharing of development benefits and opportunities, and implementation issues. The process also helps avoid potential conflicts with stakeholders for smooth project implementation. The findings from the public consultations are documented and considered in the development of the EMP, especially in identifying the significant impacts of the proposed Project and developing the corresponding mitigation measures. The key stakeholders consulted were:

- (i) Project beneficiaries;
- (ii) Elected representatives, community leaders and representatives of community-based organizations;
- (iii) Local government and relevant government agency representatives, including local authorities responsible for land acquisition, protection and conservation of forests and environment, archaeological sites, religious sites, and other relevant government departments;
- (iv) Residents, shopkeepers, businesspeople, and farmers who live and work near the sub-project.

### B. Public Consultation Conducted

**215** Consultations were conducted with key stakeholders and community members in line with ADB's requirements pertaining to environmental and social considerations. These consultations helped in identifying the felt needs, concerns and apprehensions of the communities related to the project and their priorities and likely environmental and social safeguards issues and mitigation measures. The summary of consultation date, place and number of participants is given in the following table.

**Table 90: Summary of Public consultations conducted for the subprojects in Western Urban Towns**

S.N	Municipality /Sub-Projects	Date and No. of Meetings	Number of Participant			Key discussion points/issues raised
			Male	Female	Total	
1	Tilottama Municipality-3 Subprojects	Dec 2022-June 2023 (8 Meetings)	332	48	380	<ul style="list-style-type: none"> <li>- Shared overall scope of the project to municipal authorities.</li> <li>- All the participants were highly positive toward the ADB funded WUC and expressed their willingness to</li> </ul>
2	Siddrathnagar Municipality-27 Road Sections	April-June 2023 (12 Meetings)	757	216	973	

S.N	Municipality /Sub-Projects	Date and No. of Meetings	Number of Participant			Key discussion points/issues raised
			Male	Female	Total	
3	Devdaha Municipality-3 Road Subprojects	April-June 2023 (6 Meetings)	55	23	78	provide the required land area within the declared ROW for all the proposed roads.
4	Sainamaina Municipality-2 Road Subprojects	Dec 2022-June 2023 (10 Meetings)	241	47	288	- The mass meeting concluded that there will not be any impact upon livelihood upgrading of the proposed road sections.
5	Lumbini Sanskritik Municipality – 2 Road stretches and Bus Terminal	April-June 2023 (5 Meetings)	1385	334	1719	- All the project affected wards agreed to conduct mass meeting at tole/settlement level and provide minutes of meeting together with the list of likely projects affected persons.

**216** During the consultations, the project, its benefits, social and environmental impacts were presented to the community. The participants were encouraged to be open and make known their concerns and claims. The meeting minutes of the consultations held at WUC towns are presented in **Appendix 3**. The presentation highlighted the project background, objectives, expected upcoming activities, social economic information, and environmental information. The meetings were conducted to:

- (i) Create awareness of the project;
- (ii) Obtain stakeholders responses, feedback and concerns on the project;
- (iii) Obtain environmental information on the community

**217** After the presentations, the community was given opportunity to give their views, comments, and queries. The following lists the topics, issues and concerns discussed during the consultations:

- (i) Awareness of the local community about the Project;
- (ii) Community benefits realized as a result of the road schemes;
- (iii) Opinion of the local people about its need;
- (iv) Community support and participation;
- (v) Prospects of jobs and income generating activities;
- (vi) Road connectivity and access;
- (vii) Construction impacts such as dust and noise;
- (viii) Resettlement and social issues and mitigation measures;
- (ix) Roles and responsibilities of different stakeholders for realizing desired outcome; and
- (x) Construction and maintenance of the roads

**Figure 103: Public Consultation in the Western Urban Towns**



Ward-level joint consultation meeting with the key stakeholders of Tilottama



Discussion with PAPs, Drivertol-Shivapur Road Chainage 0+200



ADB mission and WUC consultant teams meeting at Devdaha Municipality Key Personals



Consultation with the people at Lumbini Sanskritik



Meetings - Lumbini Sanskritik members, ADB mission and WUC team

### **C. Future Consultations during Detailed Design Stage**

**218** Stakeholder consultations will continue during the project implementation. PCU, PIU, DSC and PMCDC will ensure that consultations will be conducted as meaningful per definition of ADB SPS 2009. The summary of IEE will be locally disclosed in an accessible place and in a form and language(s) understandable to affected people and other stakeholders before consultations to give stakeholders a chance to read it and consult experts.

### **D. Information Disclosure**

**219** Information shall be disclosed through public consultation and making available relevant documents in public locations. The following documents will be submitted by the PCU to ADB for review and disclosure on its website. ADB will disclose upon receipt of acceptable reports and endorsement from the PCU<sup>14</sup>:

- (i) IEE report (including subproject EMP);
- (ii) Updated IEE (including EMP); and
- (iii) Semi-annual environmental monitoring reports, and corrective action plans prepared during project implementation, if any.

**220** The EA/IA will send a written endorsement to ADB for disclosing these documents on the ADB website. The PIUs will provide relevant safeguard information in a timely manner, in an accessible place and in a form and language understandable to affected people and other stakeholders. For illiterate people, other suitable communication methods will be used. For the benefit of the community, the summary of the IEE will be translated in Nepali and made available at: (i) office of PCU; and (ii) offices of the contractors. Hard copies of the IEE report will also be available at the PCU and accessible to citizens as a means of disclosing the document and at the same time creating wider public awareness. On demand, the person seeking information can obtain a hard copy of the complete IEE document at the cost of photocopy from the office of the Project Office, on a written request and payment for the same. Electronic version of the IEE will be placed in the official website of DUDBC after approval of the documents by Government and clearance from ADB. Disclosure will follow ADB's Access to Information Policy, 2018.

## **VIII. GRIEVANCE REDRESS MECHANISM**

**221** A project-specific grievance redress mechanism (GRM) will be established to receive, evaluate, and facilitate resolution of affected persons' concerns, complaints,

<sup>14</sup> Per ADB SPS, 2009, prior to disclosure on ADB website, ADB reviews the "borrower's/client's social and environmental assessment and plans to ensure that safeguard measures are in place to avoid, wherever possible, and minimize, mitigate, and compensate for adverse social and environmental impacts in compliance with ADB's safeguard policy principles and Safeguard Requirements 1-4." Upon its receipt of acceptable safeguard documents and endorsement by PCU, ADB discloses the same on ADB website.

and grievances related to social, environmental, and other concerns on the project. The project adopts a three- tier GR and will ensure greater accountability of the project authorities towards affected persons. Grievances may be routed through letters, emails, text messages, verbal narration, grievance box and registers. The GRM is not intended to bypass the government's own legal process, but to provide a time-bound and transparent mechanism to resolve such concerns that is readily accessible to all segments of the affected persons and community. The aggrieved party shall be free to approach the national legal system at any given time. All costs involved in resolving the complaints (meetings, consultations, communications, and reporting/information dissemination) will be borne by the project.

**222** PIU will ensure local community meetings are held to notify users and affected persons and other stakeholders about grievance redress mechanism of the project. Awareness of grievance redress procedures will be created through the public awareness campaign, with the help of print and electronic media and radio. The key functions of the GRC are to (i) provide support for affected persons or any aggrieved party to lodge their complaints; (ii) record the complaints; (iii) facilitate grievance resolution in consultation with affected persons and concerned authorities; (iv) report to the aggrieved parties about the decision/solution; and (v) forward the unresolved cases to higher levels.

**223** Grievance redress committees (GRCs) will be formed at three levels viz. ward/field level, PIU level and PCO level as under:

**224 First Level GRC (Field/Ward-Level):** The contractors, PIU safeguards personnel can immediately resolve issues on-site in consultation with each other with the support of the designated municipal ward chairperson and will be required to do so within seven days of receipt of a complaint/grievance. In addition, contractors will place complaint boxes at prominent places viz. public places, contractor camp site etc. where local community members can put their complaints/grievances and contractor's personnel should be in charge to collect and process the complaints/grievances as necessary. The PIU safeguards personnel, SDC safeguards consultants and contractor can immediately resolve the complaint on site. If the grievance remains unresolved within the stipulated time, the matter will be referred to the next GRC level. The field/ward-level GRC will comprise of the following:

- (i) Ward Chairperson (Committee Chairperson)
- (ii) PIU Engineer
- (iii) Ward Member representing vulnerable community (one women and one *janjanati* representative, if required)
- (iv) Contractor's Representative
- (v) SDC Safeguards Specialist
- (vi) Ward Chairperson's secretary will act as complaint receiving office and provide secretarial services to GRC.

**225** The ward-level GRC shall have at least one women member. For project-related grievances, representatives of affected persons, and community-based organizations will be invited as observers during GRC meetings. In case of impact on indigenous peoples, the grievance team must have representation of the affected indigenous peoples, and or CSOs/NGOs working with the indigenous peoples' groups.

**226 Second Level GRC (Municipality/PIU-Level):** Any unresolved issues at ward level will be referred to the second level GRC chaired by Mayor/Deputy Mayor. The complainant will be notified by the ward-level GRC that the grievance is forwarded to the municipality (PIU) level. All evidence submitted while lodging the complaint by the affected will also be forwarded. After proper examination and verification of the grievances, the committee will facilitate affected persons, and concerned parties to agree on a time-bound action plan to resolve the grievance if found to be valid. The GRC at this level will have to respond to its decision within 14 days of receipt of complaint from first level. The second level GRC will comprise the following:

- (i) Mayor/Deputy Mayor (Committee Chairperson)
- (ii) PIU safeguard personnel
- (iii) SDC social/environment specialist
- (iv) Contractor's representative
- (v) Ward member representing vulnerable community (one women and one *janjanati* representative, if required)
- (vi) Project manager of the PIU will act as a secretariat.

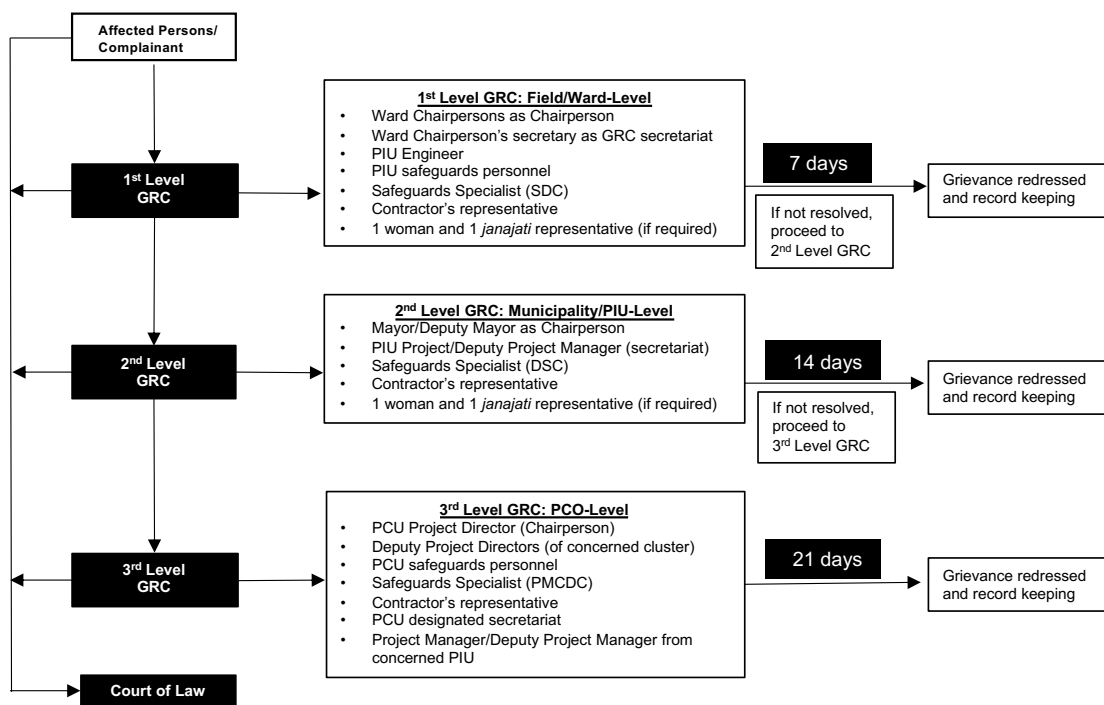
**227 Third Level GRC (PCO-Level):** If the grievance remains unresolved within the stipulated time, the matter will be referred to the PCO level. The PIU safeguards team will refer any unresolved or major issues to the PCO-level GRC. The PCO-level will comprise the following:

- (i) Project Director (Committee Chairperson)
- (ii) Deputy Project Directors
- (iii) PCO Safeguards Personnel
- (iv) Safeguards Specialist
- (v) Contractor's Representative
- (vi) Project Manager/Deputy Project Manager from concerned PIU/municipality
- (vii) PCO-designated personnel who will act as secretariat.

**228** The grievance redress process is represented in Figure 2.

**Figure 104: Grievance Redress Procedures – URLIP**





**229 Record-keeping.** The PIU/PCO/PMCDC will keep records of grievances received, including contact details of complainant, date the complaint was received, nature of grievance, agreed corrective actions and the date these were affected and final outcome. All complaints should be signed with complete information on name, contact address, phone number if any so that the person can be contacted when required. A sample template is provided in Appendix 4. An acknowledgement to the effect that the complaint has been received by the coordinator's office should be promptly sent to the complainants. All complaints received should be first registered, categorized and prioritized. They should be analysed and assessed the concerns raised by the affected parties and have discussion and consultation with them. Records of all such proceedings should be maintained, for future reference, and the attendance of all participants with their signature, in particular the complaints and affected groups should be recorded. The number of grievances recorded and resolved, and the outcomes will be displayed/disclosed in the PCO, PIU offices, and on the web, as well as reported in monitoring reports submitted to ADB on a semi-annual basis.

**230 Periodic review and documentation of lessons learned.** The PCO project officers (Social and Environment) will periodically review the functioning of the GRM in each municipality and record information on the effectiveness of the mechanism, especially on the project's ability to prevent and address grievances.

**231 Costs.** All costs involved in resolving the complaints (meetings, consultations, communication and reporting/information dissemination) will be borne by the PCO and

concerned PIU.

**232 Accountability Mechanism.** Despite the project GRM, an aggrieved person shall have access to the country's legal system at any stage and accessing the country's legal system can run parallel to accessing the GRM and is not dependent on the negative outcome of the GRM. In the event that the established GRM is not in a position to resolve the issue, the affected person also can use the ADB Accountability Mechanism (AM) through directly contacting (in writing) the Complaint Receiving Officer (CRO) at ADB headquarters or the ADB Nepal Resident Mission (NRM).<sup>15</sup> Before submitting a complaint to the Accountability Mechanism, it is necessary that an affected person makes a good faith effort to solve the problem by working with the concerned ADB operations department and/or NRM. Only after doing that, and if they are still dissatisfied, will the Accountability Mechanism consider the complaint eligible for review. The ADB Accountability Mechanism information will be included in the project-relevant information to be distributed to the affected communities, as part of the project GRM.

---

<sup>15</sup> ADB. Accountability Mechanism. <https://www.adb.org/who-we-are/accountability-mechanism/main>

## IX. MONITORING AND REPORTING

- 233** PCU will monitor the overall progress of EMP implementation of the entire URLIP through the different subproject jurisdictions, including the roads subproject in Tilottama Municipality. The PCU, and PIU will undertake their respective roles in site inspections and document review to verify compliance with the EMP and SEMP, and progress toward the final outcome. The contractor will conduct day to day implementation of the SEMP.
- 234** The contractor will submit monthly reports to the PIU. The monthly reports will include compilation of copies of monitoring sheets accomplished and duly signed by the contractor's EHS Supervisor on a daily basis. A sample daily monitoring sheet shall be provided in the SEMP.
- 235** The PIU will submit quarterly environmental monitoring reports to PCU, which will include summary of monthly monitoring activities of contractor and results of any independent monitoring or inspection activities of the PIU. In the conduct of these independent inspection activities, PIU will be supported by PMCDC in this regard. A sample inspection checklist is in **Appendix 5**. This checklist is indicative which can be further enhanced depending on the actual situations at subproject construction site.
- 236** PCU shall consolidate quarterly reports from the PIUs including PIU in Tilottama Municipality, and results of its independent monitoring or inspection activities. PCU shall accomplish semi-annual environmental monitoring report (SEMRs) starting from the effectivity date up to the end of construction phase, which shall be submitted to ADB for review and disclosure on ADB website. The template for the SEMR is attached as **Appendix 6**. The PCU shall prepare and submit annual environmental monitoring report during the operation phase until ADB issues a project completion report. Submission of these reports to ADB will be within thirty (30) days from the end date of reporting period.

## **X. CONCLUSION AND RECOMMENDATION**

- 237** The process described in this document has assessed the environmental impacts of all elements of the roads, drainage and other infrastructure subproject proposed in the towns of Siddharthanagar, Tilottama, Devdaha, Sainamaina and Lumbini Sanskritik under the ADB funded Urban Resilience and Livability Improvement Program (URLIP). The infrastructure improvements include improvement of 84 kms of roads and drains across the five municipalities, and construction of a New Bus Terminal and New Municipality Building at Lumbini Sanskritik.
- 238** All potential impacts were identified in relation to planning / design, pre-construction, construction, and operation phases. Potential environmental impacts were assessed based on secondary data, stakeholder consultations, and field visits. The WUC Sub-Project components are located in built-up/mixed use area (residential, commercial, agricultural) and there is no sensitive ecological area (protected area or critical habitats) within at least 10-km radius of the subproject location. Few roads are passing through community forest lands, however, no notable impacts envisaged as the proposal involve improvement of existing roads, and no new roads are proposed. Lumbini Crane sanctuary located within the Lumbini heritage master plan area and surrounding farmlands are habitat for threatened species of Sarus cranes (IUCN VU category) and is an important bird area. None of the components however are located close to the sanctuary or farmlands. Sites are in urban areas in Lumbini, and the sites of bus terminal and municipal building although has agricultural lands around, these are being converted into residential layouts. No impacts therefore envisaged. Various measures included to avoid any damage or disturbance to flora fauna while working in community forests or works close to agricultural lands in Lumbini. Lumbini world heritage site is situated in the project area, however, none of the components are located in this site. No impacts envisaged due to road works located outside the boundary of Lumbini world heritage site. Chance finds procedures are put in place and will be implemented during the construction.
- 239** Project area is mostly flat, water logging during the rainy season is a common feature in the project areas which is often attributed to poor drainage system. Road improvements in the proposed subproject are combined with drainage improvement, and necessary lateral drains and cross drainage structures already included in the feasibility / preliminary designs. During the detailed design, local hydrology will be further assessed and accordingly the designs of the drainage system should be finalized to mitigate water logging and the flooding on project roads. Due to low-lying site with access road on higher elevation, detailed drainage assessment will be conducted during the detailed design of Bus Terminal Building in Lumbini, and a

proper drainage system will be put in place to avoid flooding / water logging of the facility and the surrounding area. The existing drainage channel that runs through the site will be suitably accommodated as lined open channel of adequate capacity, along with necessary provision of lateral drains and cross drainage works. Prior permission from Irrigation Department/Canal agency will be obtained. It will be ensured that no land part of drainage channel /water body is utilized for construction of bus terminal, and all necessary measures will be taken to avoid flooding / water logging of facility and surroundings. There are 256 trees along the roads per final project design, of which 170 are required to be cut. Tree cutting is minimized through proper alignment and design. There are 6 trees of Simal (*Bombax cieba*) species in or close to project alignments / sites, which are of protected tree category in Nepal. These trees will not be removed and adapted within the road and drain alignment / designs.

- 240** Most of the predicted impacts during construction. Road and drain will be conducted on the public roads in urban areas, some of which are congested with people, activities and traffic, and therefore likely to significant impacts during construction. Construction-related impacts include noise, dust, construction waste generation, disturbance to residents, businesses, traffic by the construction work, construction material sourcing, hauling of material and equipment, and occupational and community health and safety risks including the spread of COVID-19, among others. These are localized and temporary and can be readily mitigated through the measures indicated in the EMP. Other construction activities will be confined to the selected sites, and the interference with the general public and community around is minimal.
- 241** During the project operation phase, roads and drains are not expected to have any significant impacts. Regular maintenance will be ensured to avoid operational related impacts. Drains will be regularly cleaned, and awareness programs will be conducted to prevent disposal of solid and liquid waste into the road side drains. The proposed bus terminal and municipal building includes and necessary access roads, and parking facilities. Also, necessary facilities such as water supply, sanitation including septic tanks with soak pits, etc., included in the design. Operations need to be carried out using standard engineering practices and in compliance with the applicable standards to avoid any adverse impacts.
- 242** An Environmental Management Plan (EMP) that defines the mitigation measures to be implemented across all project phases, the institutions responsible for its implementation and monitoring has been developed. One of the key mitigation measures include the compensatory afforestation that should be implemented to account for 170 trees that would need to be cut during the construction phase. Additionally, an Environmental Monitoring Program has been incorporated as part of

the EMP to measure the impact of the project on the environmental media viz., air, noise, water, groundwater during the construction period.

- 243** The EMP will assist the PMU, PIU, Consultant and contractors in mitigating the environmental impacts, and guide them in the environmentally sound execution of the proposed project. The EMP will also ensure efficient lines of communication between PIU/ULB, PMU, consultants and contractor. A copy of the EMP shall be kept on-site during the construction period at all times. The EMP shall be made binding on all contractors operating on the site, and will be included in the contractual clauses. Non-compliance with, or any deviation from, the conditions set out in this document shall constitute a failure in compliance.
- 244** Public consultation was conducted as part of the environmental assessment process. The stakeholders expressed support for the proposed subproject site. Results of the consultation were documented and considered in the formulation of the project and environmental management plan. Public consultation will continue throughout the project implementation. The IEE will be made available at public locations and will be disclosed to a wider audience via the PCU and ADB websites.
- 245** The project's Grievance Redress Mechanism (GRM) will provide the citizens with a platform for redress of their grievances, and describes the channels, time frame, and mechanisms for resolving complaints about environmental performance.
- 246** PCU and PIU, with support from DSC and PMCDC, will be responsible for monitoring the project implementation and compliance with the EMP. Also, the periodic reporting requirements would enable meeting the disclosure needs as per ADB SPS 2009, as well.
- 247** The WUC Sub-Project in the WUC corridor will result in key environmental benefits such as, but not limited to, reduction in flooding areas, improved road and pedestrian safety to users resulting from improved road infrastructure and drainage facilities. This will also improve storage facilities for agricultural produce, commuters and citizens will be provided with better bus terminal, and municipality office. The subproject is unlikely to cause any significant adverse impacts to environment and community. And, potential negative environmental impacts associated with construction and operation are being mitigated through proper engineering practice, incorporation of recommended mitigation measures in the EMP and implementing the same effectively.
- 248** Therefore, as per ADB SPS, 2009, this subproject is classified as environmental category B and does not require further environmental impact assessment. Draft IEE of this subproject was prepared based on preliminary designs of roads and drains, and feasibility study /conceptual designs of bus terminal, municipal building. This is the updated IEE with detailed designs roads and drains components in 5 towns. There



are changes in subproject during detailed design, the total roads length increase from 72 to 84 km, one with road replaced in Devdhah while 3 road sections added in Sainamaina, and one road added in Lumbini. These component are located in the same areas, and impacts identified, and assessment made and mitigation measures and the EMP apply to the added road components also. The PCU, with support from PMCDC, will further update this IEE based on final detailed design of Bus Terminal Facility and Municipal Building component in Lumbini and submit to ADB for review, clearance and disclosure. The IEE will be updated during implementation if there is a need depending on the changes and likely impacts. To conform to government guidelines, subproject components require environmental clearance from the Ministry of Urban Development for Lumbini Bus Terminal and Lumbini Municipal Building. This will be obtained prior to invitation of bids.

**249 Recommendations.** The following are recommendations applicable to the subproject to ensure no significant impacts:

- (i) Update the IEE with detailed design of remaining components prior to bidding and submit to ADB for review, clearance and disclosure
- (ii) For components will be designed by the contractor under design built contract modality, those components in IEE may be updated after the contract award but prior to commencement of works
- (iii) Ensure that updated/revised reflect the detailed designs and/or, change in scope, alignment, or location;
- (iv) Ensure that detailed designs duly integrates the design measures suggested in this IEE based on preliminary or conceptual designs
- (v) Obtain all statutory clearances timely
- (vi) No Simal (*Bombax cieba*) or Sissoo (*Dalbergia sissoo*) trees should be cut, pruned or harmed
- (vii) Conduct bird survey before cutting of any trees; trees with active bird nests shall not be cut until the young birds fly away.
- (viii) Conduct detail drainage assessment of bus terminal site and surroundings, and design robust surface drainage system for safe disposal of runoff from the bus terminal and surrounding area; design shall ensure that there is no water logging / flooding
- (ix) Ensure that bus terminal and municipal buildings are design and built with proper facilities and amenities including water supply, sanitation, access roads, parking, solid waste management etc.,
- (x) Conduct safeguards induction to the contractor upon award of contract; create awareness among the workers, working especially in forest areas, and Lumbini area about the chance of encountering wildlife, and the protocol to be followed to avoid any disturbance / damage to flora or fauna
- (xi) Strictly supervise EMP implementation;
- (xii) Ensure contractor appointed qualified EHS supervisor prior to start of works;
- (xiii) Documentation and reporting on a regular basis as indicated in the IEE;
- (xiv) Continuous consultations with stakeholders;
- (xv) Timely disclosure of information and establishment of grievance redressal mechanism (GRM);

- (xvi) Involvement of contractors, including subcontractors, in first level GRM; and
- (xvii) Commitment from PMU, PIUs, project consultants, and contractors to protect the environment and the people from any impact during project implementation.

## Appendix 1: Details of Tree Survey

Bhaluhipul-Medical College, Devdaha

S. No.	Chain age	Number of trees to be cut down		Land Ownership /	Name of Tree	Scientific Name	Average circumference (cm)	Dbh (cm)	Cut/Save	Remarks
		Left	Right							
0+080 to 0+190: Bush and road side pole size trees in majority left of the road										
1	0+100		1	Roadside	Neem	<i>Azadirachta indica</i>	45	14.32	Cut	
2	0+150		1	Roadside	Neem	<i>Azadirachta indica</i>	49	15.60	Cut	
3	0+152		1	Roadside	Bhellar	<i>Trewia nudiflora</i>	40	12.73	Cut	
4	0+160		1	Roadside	Mango	<i>Mangifera indica</i>	62	19.74	Cut	
5	0+170		1	Roadside	Mango	<i>Mangifera indica</i>	55	17.51	Cut	
6	0+190		1	Roadside	Bhellar	<i>Trewia nudiflora</i>	90	28.65	Cut	
0+220 to 0+350: Bush and road side pole size trees in majority (left of the road)										
7	0+217		1	—	Bhellar	<i>Trewia nudiflora</i>	62	19.74	Cut	
8	0+260		1	—	Bhellar	<i>Trewia nudiflora</i>	79	25.15	Cut	
9	0+300		1	—	Mango	<i>Mangifera indica</i>	30	9.55	Cut	
10	0+325		2	—	Bhellar	<i>Trewia nudiflora</i>	40	12.73	Cut	
11	0+342	1		—	Sisoo	<i>Dalbergia sissoo</i>	Pole size	<10 cm	Cut	
12	0+850	1		—	Bakaino	<i>Melia azedarach</i>	60	19.10	Cut	
13	0+890	1		—	Neem	<i>Azadirachta indica</i>	65	20.69	Cut	
14	0+960	1		—	Neem	<i>Azadirachta indica</i>	76	24.19	Cut	
15	0+940	2		—	Bakaino	<i>Melia azedarach</i>	52	16.55	Cut	
16	0+990	1		—	Bakaino	<i>Melia azedarach</i>	54	17.19	Cut	
17	1+050	1		—	Neem	<i>Azadirachta indica</i>	60	19.10	Cut	
		1		—	Mango	<i>Mangifera indica</i>	70	22.28	Cut	
Bush in 1+130 to 1+150 (Left)										
1+880 to 1+930 Bhaluhi Khola Bridge										
Milan CF boundary and gate at 2+170 (Right)-Not affected										
2+220 to 2+300 Ghodaha Nadi Bridge										
18	2+465	1		Roadside	Unknown	—	103	32.79	Cut	

**Bhaluhpul-Medical College, Devdaha**

S. No.	Chain age	Number of trees to be cut down		Land Ownership /	Name of Tree	Scientific Name	Average circumference (cm)	Dbh (cm)	Cut/Save	Remarks
		Left	Right	Name of the Forest						
19	2+490		1	Roadside	Unknown	—	90	28.65	Cut	
4+010 Land of Lumbini Buddhist University on left (previously Buddha Mawali CF)										
21	4+100	1		University	Sal	Shorea robusta	255	81.17	Cut	Only CW required from 4+010 to 4+110
22	4+110	1		University	Peepal	Ficus religiosa	404	128.60	Cut (in CW)	
5+240 to 5+285 Bangali Khola Bridge										
23	5+330		1	Shristi CF	Sal	Shorea robusta	235	74.80	Cut	Only CW required from 5+330 to 5+440 to prevent loss of more trees
24	5+350		1	Shristi CF	Sal	Shorea robusta	220	70.03	Cut	
25	5+420	1		Shristi CF	Sal	Shorea robusta	216	68.75	Cut	
26	5+430		1	Shristi CF	Sal	Shorea robusta	450	143.24	Cut	
5+520 End of Shristi CF										
27	5+705	1		—	Amaro	Spondias pinnata	98	31.19	Saved	
28	5+710	1		—	Amaro	Spondias pinnata	115	36.61	Cut	
6+060 Bushing										
29	6+170	1		—	Karma	Adina cordifolia	160	50.93	Cut	
30	6+690	1		Religious tree (worshipped)	Peepal	Ficus religiosa	294	93.58	Cut (in CW)	No space available, House to the right
31	6+700		1	Private	Mango	Mangifera indica	72	22.92	Cut	
32	7+090		1	—	Kadam	Neolamarckia cadamba	100	31.83	Cut	
33	7+140		1	—	Kadam	Neolamarckia cadamba	76	24.19	Cut	
			1	—	Tilkar	Coccinia grandis	64	20.37	Cut	
34	7+170		1	—	Kadam	Neolamarckia cadamba	87	27.69	Cut	
	Total	17	20							

Banchauki-MayaDeviPark Road, Devdaha										
S. No	Chainage	Number of trees to be cut down		Land Ownership/	Name of Tree	Scientific Name	Average circumference (cm)	Dbh (cm)	Cut/Save	Remarks
		Left	Right	Name of the Forest						
0+000 to 1+025 Srijana CF: No trees of the CF affected										
1	1+060	1		Roadside	Shami tree	<i>Prosopis cineraria</i>	186	59.21	Cut	
2	1+090		1	Private	Mango Tree	<i>Mangifera indica</i>	66	21.01	Cut	
1+595 to 2+470: Land of Lumbini Buddhist University (Previously Buddha Mawali CF)										
3	1+600		1	Lumbini Buddhist University	Asna	<i>Terminalia elliptica</i>	226	71.94	Cut	Space available on right side throughout the university's land section
4	1+960	1		Lumbini Buddhist University	Sal	<i>Shorea robusta</i>	253	80.53	Can be saved	Shift CL to right
5	2+060	1		Lumbini Buddhist University	Sal	<i>Shorea robusta</i>	227	72.26	Can be saved	Shift CL to right
6	2+070	1		Lumbini Buddhist University	Sal	<i>Shorea robusta</i>	300	95.49	Can be saved	Shift CL to right
7	2+090	1		Lumbini Buddhist University	Sal	<i>Shorea robusta</i>	280	89.13	Can be saved	Shift CL to right
8	2+130		1	Lumbini Buddhist University	Sal	<i>Shorea robusta</i>	248	78.94	Cut	As CL shifted to right
9	2+150	1		Lumbini Buddhist University	Sal	<i>Shorea robusta</i>	390	124.14	Can be saved	Shift CL to right
10	2+180	1		Lumbini Buddhist University	Sal	<i>Shorea robusta</i>	316	100.59	Can be saved	Shift CL to right
11	2+200	1		Lumbini Buddhist University	Sal	<i>Shorea robusta</i>	198	63.03	Can be saved	Shift CL to right
12	2+240	1		Lumbini Buddhist University	Sal	<i>Shorea robusta</i>	259	82.44	Can be saved	Shift CL to right

Banchauki-MayaDeviPark Road, Devdaha										
S. No	Chainage	Number of trees to be cut down		Land Ownership/	Name of Tree	Scientific Name	Average circumference (cm)	Dbh (cm)	Cut/Save	Remarks
		Left	Right	Name of the Forest						
13	2+250		1	Lumbini Buddhist University	Sal	<i>Shorea robusta</i>	300	95.49	Can be saved	Shift CL to right
14	2+260		1	Lumbini Buddhist University	Sal	<i>Shorea robusta</i>	290	92.31	Cut	As CL shifted to right
15	2+270	1		Lumbini Buddhist University	Sal	<i>Shorea robusta</i>	237	75.44	Can be saved	Shift CL to right
16	2+350	1		Lumbini Buddhist University	Sal	<i>Shorea robusta</i>	170	54.11	Can be saved	Shift CL to right
17	2+360	1		Lumbini Buddhist University	Sal	<i>Shorea robusta</i>	166	52.84	Can be saved	Shift CL to right
18	2+370	1		Lumbini Buddhist University	Sal	<i>Shorea robusta</i>	205	65.25	Can be saved	Shift CL to right
19	2+420	1		Lumbini Buddhist University	Sal	<i>Shorea robusta</i>	198	63.03	Can be saved	Shift CL to right
20	2+440	1		Lumbini Buddhist University	Sal	<i>Shorea robusta</i>	268	85.31	Can be saved	Shift CL to right
2+470 End of University Land and start of settlement										
21	2+530		1		Sal	<i>Shorea robusta</i>	260	82.76	Cut	Lies in FW
22	2+560		1		Epiphyte Bar grown on Asna	<i>Terminalia elliptica</i> (Dead)	300	95.49	Cut	Lies in FW
23	2+650	1			Dumri	<i>Ficus racemosa</i>	100	31.83	Cut	Lies in FW
24	2+660	1			Sal	<i>Shorea robusta</i>	100	31.83	Cut	Lies in FW
25	2+680	1			Sal	<i>Shorea robusta</i>	100	31.83	Cut	Lies in FW
26	3+770	1			Mango Tree	<i>Mangifera indica</i>	80	25.46	Cut	Lies in FW
27	3+780	1			Mango Tree	<i>Mangifera indica</i>	66	21.01	Cut	Lies in FW
28	3+790	1			Mango Tree	<i>Mangifera indica</i>	120	38.20	Cut	Lies in FW



Banchauki-MayaDeviPark Road, Devdaha										
S. No	Chainage	Number of trees to be cut down		Land Ownership/	Name of Tree	Scientific Name	Average circumference (cm)	Dbh (cm)	Cut/Save	Remarks
		Left	Right	Name of the Forest						
29	3+800	1			Near	<i>Azadirachta indica</i>	76	24.19	Cut	Lies in FW
30	3+820	1			Bakino	<i>Meliazodarach</i>	60	19.10	Cut	Lies in FW
31	3+840	1			Mango Tree	<i>Mangifera indica</i>	160	50.93	Cut	Lies in FW
32	3+850	1			Mango Tree	<i>Mangifera indica</i>	90	28.65	Cut	Lies in FW
33	3+900	1			Bakino	<i>Meliazodarach</i>	110	35.01	Cut	Lies in FW
34	3+910	1			Bakino	<i>Meliazodarach</i>	90	28.65	Cut	Lies in FW
35	3+940	1			Near	<i>Azadirachta indica</i>	110	35.01	Cut	Lies in FW
	<b>Total</b>	<b>28</b>	<b>7</b>							

## Drivertole-Shivapur Road, Tilottama

S. No.	Chainage	Number of trees to be cut down		Land Ownership/	Name of Tree	Scientific Name	Average circumference (cm)	Dbh (cm)	Cut/Save	Remarks
		Left	Right	Name of the Forest						
1	0+260		1	Private	Mango	<i>Mangifera indica</i>	163	51.88	Cut	
2	0+320		1		Mango	<i>Mangifera indica</i>	146	46.47	Cut	
3	0+340		1		Mango	<i>Mangifera indica</i>	82	26.10	Save d	
4	0+346		1		Mango	<i>Mangifera indica</i>	60	19.10	Save d	
5	0+500		1		Bakaino	<i>Melia azedarach</i>	68	21.65	Cut	
6	0+540		1		Sarifa	<i>Annona squamosa</i>	<30	<10	Cut	
7	0+600	1			Neem	<i>Azadirachta indica</i>	<30	<10	Save d	
8	0+900	1			Shami	<i>Prosopis cineraria</i>	<30	<10	Cut	
9	0+903	1			Kalki Phul	<i>Callistemon citrinus</i>	<30	<10	Cut	
10	0+920	1			Kalki Phul	<i>Callistemon citrinus</i>	<30	<10	Cut	
11	0+960	1			Kalki Phul	<i>Callistemon citrinus</i>	<20	<10	Cut	
12	1+000	1			Peepal	<i>Ficus religiosa</i>	<10	<5	Cut	
13	1+020	1			Dabdabe	<i>Garuga pinnata</i>	138	43.93	Cut	
14	1+024	1			Dabdabe	<i>Garuga pinnata</i>	66	21.01	Cut	
15	1+039	1			Dabdabe	<i>Garuga pinnata</i>	90	28.65	Cut	
16	1+040	1			Dabdabe	<i>Garuga pinnata</i>	120	38.20	Cut	
17	1+057	1			Kabhro	<i>Ficus lacor</i>	248	78.94	Cut	
18	1+120	1			Kalki Phul	<i>Callistemon citrinus</i>	<10	<5	Cut	
19	1+123	1			Kalki Phul	<i>Callistemon citrinus</i>	<10	<5	Cut	
20	1+145	1			Bakaino	<i>Melia azedarach</i>	110	35.01	Cut	
21	1+158	1			Amba, Sarifa, Amala	<i>Psidium guajava</i> , <i>Annona squamosa</i>	<30	<10	Cut	

## Drivertole-Shivapur Road, Tilottama

S. No.	Chainage	Number of trees to be cut down		Land Ownership/	Name of Tree	Scientific Name	Average circumference (cm)	Dbh (cm)	Cut/Save	Remarks
		Left	Right	Name of the Forest						
						<i>Phyllanthus emblica</i>				
22	1+210	1			Kalki Phul	<i>Callistemon citrinus</i>	<10	<5	Cut	
23	1+250	1			Neem	<i>Azadirachta indica</i>	<10	<5	Cut	
24	1+255	1			Neem	<i>Azadirachta indica</i>	<10	<5	Cut	
25	1+260	1			Neem	<i>Azadirachta indica</i>	69	21.96	Cut	
26	1+483	1			Ashoka	<i>Saraca asoca</i>	117	37.24	Saved	Lies in footpath end
<b>1+560 to 1+620: Total 10 pole size Ashoka trees in right side= Can be saved</b>										
27	1+660		1		Imli	<i>Tamarindus indica</i>	94	29.92	Cut	
28	1+810	1			Katahar	<i>Artocarpus heterophyllus</i>	150	47.75	Cut	
29	1+840		1		Bakaino	<i>Melia azedarach</i>	96	30.56	Cut	
30	1+190		1		Neem	<i>Azadirachta indica</i>	120	38.20	Cut	
31	2+120		1		Neem	<i>Azadirachta indica</i>	94	29.92	Cut	
32	2+158	1			Bakaino	<i>Melia azedarach</i>	63	20.05	Cut	
33	2+160	1			Mango	<i>Mangifera indica</i>	117	37.24	Cut	
34	2+300		1		Kadam	<i>Neolamarckia cadamba</i>	48	15.28	Cut	
35	2+310	1			Katahar	<i>Artocarpus heterophyllus</i>	80	25.46	Cut	
36	2+320	1			Bakaino	<i>Melia azedarach</i>	60	19.10	Cut	
37	2+680		1		Katahar	<i>Artocarpus heterophyllus</i>	142	45.20	Cut	
38	2+750		1		Mango	<i>Mangifera indica</i>	90	28.65	Cut	

**Drivertole-Shivapur Road, Tilottama**

S. No.	Chainage	Number of trees to be cut down		Land Ownership/	Name of Tree	Scientific Name	Average circumference (cm)	Dbh (cm)	Cut/Save	Remarks
		Left	Right	Name of the Forest						
39	2+980		1		Katahar	<i>Artocarpus heterophyllus</i>	54	17.19	Cut	
40	2+986		1		Katahar	<i>Artocarpus heterophyllus</i>	40	12.73	Cut	
41	4+440	1			Peepal	<i>Ficus religiosa</i>	310	98.68	Cut	
42	4+460	3			Bar, Peepal, Shami	<i>Ficus benghalensis</i> , <i>Ficus religiosa</i> , <i>Prosopis cineraria</i>			To be saved	Not in CW, in footpath (Should be saved during construction)
43	4+520	1			Peepal	<i>Ficus religiosa</i>	330	105.04	Cut	
44	4+660	1			Jamun	<i>Syzgium cumini</i>	180	57.30	Cut	
	<b>Total</b>	<b>31</b>	<b>15</b>							

**Patthardanda-Tinau, Tilottama**

S. No.	Chainage	Number of trees to be cut down		Land Ownership /	Name of Tree	Scientific Name	Average circumference (cm)	Dbh (cm)	Cut/Save	Remarks
		Left	Right	Name of the Forest						
1	0+220	1		Roadside	Ashoka	<i>Saraca asoca</i>	50	15.92	Cut	
2	0+223	1		Roadside	Ashoka	<i>Saraca asoca</i>	50	15.92	Cut	
3	0+299	1		Roadside	Ashoka	<i>Saraca asoca</i>	60	19.10	Cut	
4	0+230	1		Roadside	Ashoka	<i>Saraca asoca</i>	46	14.64	Cut	
5	0+470	1		Roadside	One type of Cherry	<i>Muntingia calabura</i>	67	21.33	Cut	
6	0+860		1	Roadside	Neem	<i>Azadirachta indica</i>	60	19.10	Cut	
7	0+880	1		Roadside	Neem	<i>Azadirachta indica</i>	80	25.46	Cut	

Total 6 1

Panbari to Saljhandi Ring road, Sainamaina										
S. No.	Chainage	Number of trees to be cut down		Land Ownership/	Name of Tree	Scientific Name	Average circumference (cm)	Dbh (cm)	Cut/Save	Remarks
		Left	Right	Name of the Forest						
1	1+330		1	—	Epiphyte peepal on Asna	<i>Terminalia elliptica</i>	>280	>89	Cut	
1+760 to 3+840: Kanchan CF on the left										
2	2+520		1	Kanchan CF	Sal	<i>Shorea robusta</i>	350	111.41	Cut	within CW
3	2+880	1		Kanchan CF	Sal	<i>Shorea robusta</i>	300	95.49	Save	Can be saved
4	2+890	1		Kanchan CF	Asna	<i>Terminalia elliptica</i>	260	82.76	Save	
3+875 to 3+915 Under Construction Bridge										
5	5+560	1		Jhimjhime & Bhulkepani CF	Sal	<i>Shorea robusta</i>	350	111.41	Save	
6	6+560	1		Jhimjhime & Bhulkepani CF	Sal	<i>Shorea robusta</i>	310	98.68	Save	
7	6+760		1	Jhimjhime & Bhulkepani CF	Sal	<i>Shorea robusta</i>	310	98.68	Save	
8	6+770	1		Jhimjhime & Bhulkepani CF	Sal	<i>Shorea robusta</i>	250	79.58	Cut	In CW
9	6+780		1	Jhimjhime & Bhulkepani CF	Sal	<i>Shorea robusta</i>	280	89.13	Save	
10	6+820	1		Jhimjhime & Bhulkepani CF	Sal	<i>Shorea robusta</i>	270	85.94	Save	
11	6+905		1	Jhimjhime & Bhulkepani CF	Sal	<i>Shorea robusta</i>	275	87.54	Save	
		2		—	Bar, Peepal	<i>Ficus benghalensis</i> , <i>Ficus religiosa</i>	N/A		Save	
12	7+200		1	Jhimjhime & Bhulkepani CF	Sal	<i>Shorea robusta</i>	280	89.13	Save	
13	8+010		2	—	Bar Peepal Chaupari	<i>Ficus benghalensis</i> ,	N/A		Save	Out of CW

Panbari to Saljhandi Ring road, Sainamaina										
S. No.	Chainage	Number of trees to be cut down		Land Ownership/	Name of Tree	Scientific Name	Average circumference (cm)	Dbh (cm)	Cut/Save	Remarks
		Left	Right	Name of the Forest						
						<i>Ficus religiosa</i>				
14	8+030		1	Private	Mango	<i>Mangifera indica</i>	N/A		Cut	
15	8+860	1		Roadside	Sal	<i>Shorea robusta</i>	260	82.76	Save	
16	8+862	1		Roadside	Sal	<i>Shorea robusta</i>	270	85.94	Save	Out of CW
	<b>Total</b>	<b>10</b>	<b>9</b>							



Dui Muhan chowk to Talhi Ring Road to Chaudhary Gola, Sainamaina										
S. No.	Chain age	Number of trees to be cut down		Land Ownership /	Name of Tree	Scientific Name	Average circumference (cm)	Dbh (cm)	Cut/Save	Remarks
		Left	Right	Name of the Forest						
1	0+020		1		Bakaino	<i>Melia azedarach</i>	100	31.83	Cut	Not in CW
2	0+120		1		Neem	<i>Azadirachta indica</i>	97	30.88	Cut	In CW
3	0+110	1			Bakaino	<i>Melia azedarach</i>	90	28.65	Cut	In CW
4	0+130	1			Sissoo	<i>Dalbergia sissoo</i>	80	25.46	Cut	In CW
5	0+160	1			Jamun	<i>Syzygium cumini</i>	101	32.15	Cut	Not in CW
6	0+180	1			Dabdbe	<i>Garuga pinnata</i>	103	32.79	Cut	Not in CW
0+380 to to 0+460: Kanchan Bridge										
7	1+820		1		Peepal				Save	Not in CW
2+970 to 3+010 Pahili Khola Bridge										
	Total	4	3							

Bus Terminal Access Road, Lumbini Sanskritik										
S. No.	Chain age	Number of trees to be cut down		Land Ownership /	Name of Tree	Scientific Name	Average circumference (cm)	Dbh (cm)	Cut/Save	Remarks
		Left	Right	Name of the Forest						
1		1		Roadside/Private	Mango	<i>Mangifera indica</i>	150	47.75	Cut	
2		1		Roadside/Private	Mango	<i>Mangifera indica</i>	127	40.43	Cut	
3			1	Roadside/Private	Mango	<i>Mangifera indica</i>	88	28.01	Cut	
4			1	Roadside/Private	Amaro	<i>Spondias pinnata</i>	120	38.20	Cut	
5		1		Roadside/Private	Neem	<i>Azadirachta indica</i>	127	40.43	Cut	
6		1		Roadside/Private	Kadam	<i>Neolamarckia cadamba</i>	80	25.46	Cut	
7		1		Roadside/Private	Neem	<i>Azadirachta indica</i>	82	26.10	Cut	
8		1		Roadside/Private	Neem	<i>Azadirachta indica</i>	85	27.06	Cut	
9			1	Roadside/Private	Saijan	<i>Moringa oleifera</i>	90	28.65	Cut	

Bus Terminal Access Road, Lumbini Sanskritik										
S. No.	Chai nage	Number of trees to be cut down		Land Ownershi p/	Name of Tree	Scientific Name	Average circumference (cm)	Dbh (cm)	Cut/S ave	Remarks
		Left	Right	Name of the Forest						
10		1		Roadside/ Private	Peepal	<i>Ficus religiosa</i>	300	95.49	To be saved	Religious significance
11		1		Roadside/ Private	Neem	<i>Azadirachta indica</i>	20	6.37	Cut	
12			1	Roadside/ Private	Bhellar	<i>Trewia nudiflora</i>	67	21.33	Cut	
13		1		Roadside/ Private	Bhellar	<i>Trewia nudiflora</i>	65	20.69	Cut	
14			1	Roadside/ Private	Babur	<i>Acacia nilotica</i>	144	45.84	Cut	
15			1	Roadside/ Private	Babur	<i>Acacia nilotica</i>	90	28.65	Cut	
16		1		Roadside/ Private	Mango	<i>Mangifera indica</i>	165	52.52	Cut	
17		1		Roadside/ Private	Mango	<i>Mangifera indica</i>	135	42.97	Cut	
18		1		Roadside/ Private	Mango	<i>Mangifera indica</i>	109	34.70	Cut	
19		1		Roadside/ Private	Guava	<i>Psidium guajava</i>	120	38.20	Cut	
20			1	Roadside/ Private	Neem	<i>Azadirachta indica</i>	138	43.93	Cut	
21			1	Roadside/ Private	Neem	<i>Azadirachta indica</i>	94	29.92	Cut	
22		1		Roadside/ Private	Jamun	<i>Syzygium cumini</i>	92	29.28	Cut	
23		1		Roadside/ Private	Simal	<i>Bombax ceiba</i>	254	80.85	Save	Protected tree
24		1		Roadside/ Private	Sissoo	<i>Dalbergia sissoo</i>	75	23.87	Cut	
25			1	Roadside/ Private	Simal	<i>Bombax ceiba</i>	105	33.42	Save	Protected tree
26			1	Roadside/ Private	Simal	<i>Bombax ceiba</i>	120	38.20	Save	Protected tree
27			1	Roadside/ Private	Simal	<i>Bombax ceiba</i>	100	31.83	Save	Protected tree
28		1		Roadside/ Private	Imli	<i>Tamarindus indica</i>	173	55.07	Cut	
29			1	Roadside/ Private	Mango	<i>Mangifera indica</i>	270	85.94	Cut	
30		1		Roadside/ Private	Mango	<i>Mangifera indica</i>	152	48.38	Cut	
31		1		Roadside/ Private	Sissoo	<i>Dalbergia sissoo</i>	450	143.24	Cut	

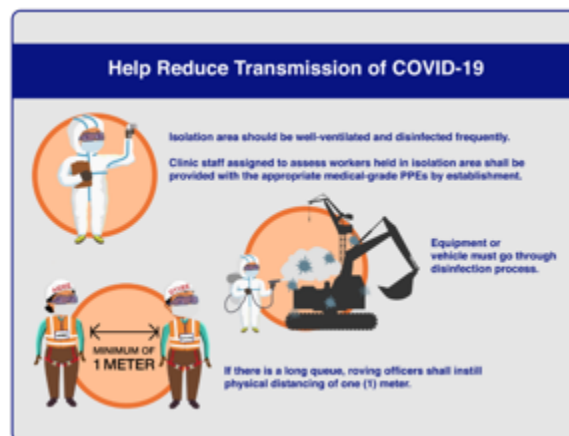
Bus Terminal Access Road, Lumbini Sanskritik										
S. No.	Chainage	Number of trees to be cut down		Land Ownership/	Name of Tree	Scientific Name	Average circumference (cm)	Dbh (cm)	Cut/Save	Remarks
		Left	Right	Name of the Forest						
32			1	Roadside/Private	Peepal Chaupari	<i>Ficus religiosa</i>	540	171.89	To be Saved	Religious significance
	Total	19	13							

Urban Roads, Siddharthanagar Municipality										
S. No.	Chainage	Number of trees to be cut down		Land Ownership/	Name of Tree	Scientific Name	Average circumference (cm)	Dbh (cm)	Cut/Save	Remarks
		Left	Right	Name of the Forest						
Sugar Mill_All Link Roads										
1				Roadside	Simal	Bombax ceiba	1.2	0.38	Save	Protected tree
2				Roadside	Simal	Bombax ceiba	1.25	0.40	Save	Protected tree
Darkhaswa										
3		8		Roadside	Sissoo	Dalbergia sissoo	Pole size	<10	Cut	lies in CW
Benipur_east										
4		3		Roadside	Mango	Mangifera indica	80-85		Cut	lies in CW

## Appendix 2: COVID 19 Guideline

### A. PREPARATION BEFORE WORK

- Worksite and camp will be secured with gated fence
- Photo Identity Card will be issued to all workers with unique identification number
- Preparation will be made for daily medical screening (thermal check and symptoms assessment) of all workers and report to H&SO
- COVID Marshal will measure temperature by wearing facemask and gloves for their gang of workers before leaving camp
- Worker with high fever and frequent cough will not be allowed to work. The worker will be asked to stay in quarantine (for residential worker) or sent back home (non-residential worker).



COVID-19 लक्षणहरू		
सबैभन्दासामान्यलक्षणहरू:	सामान्यतयाकमैदेखिनेलक्षणहरू:	गम्भीरलक्षणहरू:
<ul style="list-style-type: none"> <li>– ज्वरोआउने</li> <li>– सुक्खाखोकीलाग्ने</li> <li>– थकाइलाग्ने</li> </ul>	<ul style="list-style-type: none"> <li>– पीडाहुनेवादुख्ने</li> <li>– घाँटीदुख्ने</li> <li>– पखालालाग्ने</li> <li>– आँखापोल्ने</li> <li>– टाउकोदुख्ने</li> <li>– स्वादवागन्धथाहान्ने</li> <li>– छालामादागहुनेवाहातवाखुट्टाकाऔँलाकोरडउड्ने</li> </ul>	<ul style="list-style-type: none"> <li>– सासफेर्नगाहोहुनेवापटकपटकसासफेर्नुपर्ने</li> <li>– छातीदुख्नेवाछातीमादबाबपर्ने</li> <li>– बोल्नवाहिँडुलगर्नसक्ने</li> <li>–</li> </ul>
<p>तपाईंमागम्भीरलक्षणहरूदेखिएमातुरुन्तैचिकित्साजाँचगराउनुहोस्। जहिलेपनिआफ्नोडाक्टरवास्वास्थ्यसुविधाप्रदायककहाँजानुअधिकलगनुहोस्</p>		

- COVID Test (PCR Test) will be conducted for the staff and workers who have the symptom related to covid-19 (if required)
- Register record will be maintained

- Quarantine and isolation tents will be established at sufficient distance in the camp from regular shelters
- Specific and separate worksite will be assigned to the new group of workers away from regular workers for a minimum of 14 days to minimize risk
- Work will be arranged in shifts to avoid crowding of workers. Teams will be divided based on (i) workers residing in the same camp (ii) workers residing outside the camp (iii) new group of workers etc.
- Consumption of liquor and chewable like Khaini, Surti, Paan etc. (those generating urge for frequent spitting) will be strictly restricted inside office and work areas



## B. PROCEDURE AT ENTRY

- Guards will be oriented by the H&SO on (i) checking temperature, (ii) observing health symptoms, (iii) record personal details and travel history, and (iv) taking emergency procedure, if required
- Unauthorized person and visitors will not be allowed to enter
- All new group of workers will be allowed to enter the site only after showing COVID Test certificate from authorized government hospital issued within the last 7 days, which will be checked by the Assistant Health Worker at the Medical Center
- Guards will wear prescribed PPEs at all the times and regularly disinfect their hand
- Visitor having COVID symptoms will be sent back, and immediately call HW from Medical Center for staff and worker showing symptoms
- Personnel should maintain a distance of 1 meter at all times following the floor-marking wherever queue is required
- Guard will direct vehicles supplying materials to the delivery zone



Guard will inform the visitors on fulltime use of mask and hand washing/sanitizing



## C. MINIMIZE WORKER AND COMMUNITY CONTACT

The Contractor will be fully responsible to ensure taking all preventive measures and safety precautions for COVID-19 risks such as following:

- Project Manager will work closely with the Site In-charge and Resident Engineer for planning special measures and expedite work implementation at high risk areas and areas requiring work in close proximity with the communities
- Physical barricades will be made mandatory to separate and minimize contact between workers and local people
- Arrangements will be made to minimize movement of workers from barricaded work areas and camps and visiting settlement areas
- Work sites will be separated into working zones to keep the groups of workers physically separated. Not more than 20 workers will be allowed to work in one group. A group

- leader will be identified as COVID Marshal and given orientation to keep close watch of workers and trigger emergency protocol in emergency case
- Emphasis will be given to establish sufficient size of labor camp to keep all workers inside the camp to minimize contact with community.

#### **D. TRAVEL TO WORK SITE**

The workers will observe precaution and the contractor will arrange following measures for arranging transport for workers to the worksite:

- Travel between sites and labor camps will be arranged through official vehicle
- All workers will wear facemask when travelling in a shared vehicle, including the driver who will wear mask and glove
- Driver will sanitize had regularly and before & after every trip
- Only 40% capacity of vehicle will be used and a seat will be kept empty in between passengers
- Windows will be opened for natural ventilation
- Workers will stay facing away from each other while in the vehicle
- Vehicle will be cleaned and disinfected thoroughly after every shift- with emphasis on handles, steering wheel, gear etc.
- All workers prior to entering the vehicle and exiting will sanitize their hands
- Prior to entering the vehicles all nonresidential staff and workers must self-certify that they do not have any COVID-19 symptoms



## Appendix 3: Minutes of Consultations at Western Urban Corridor Towns

### Devdaha Municipality Roads

आज मिति २०७९/११/०४ गते देवदह नगरपालिकामा एशियाली विकास बैंक (ADB) को सहयोगमा नगरपालिकाको चक्रपथ निर्माण कार्यको लागि यस नगरपालिका र WUC कन्सल्ट्यान्ट बीच छलफल कार्यक्रम र देवदह नगरपालिकाको नगर उपप्रमुख श्री विद्या लक्ष्मी गुरुङ ज्यू को अध्यक्षतामा तपसिल बमोजिमको उपस्थितिमा सम्पन्न भयो।

उपस्थिती:

क्र.स.	नाम थर	पद	दस्तखत
१.	श्री विद्या लक्ष्मी गुरुङ	उप प्रमुख	
२.	श्री टिकाराम शर्मा	उप-सचिव	
३.	श्री गणेश डुम्रे	नगर प्रवक्ता/ वडा अध्यक्ष वडा नं. ५	
४.	श्री दिपक प्रसाद नेपाल	वडा अध्यक्ष, वडा नं. १	
५.	श्री दल बहादुर राक्सकोटी	वडा अध्यक्ष, वडा नं. २	
६.	श्री यज्ञ प्रसाद अर्याल	वडा अध्यक्ष, वडा नं. ३	
७.	श्री दमन नाथ रेग्मी	वडा अध्यक्ष, वडा नं. ४	
८.	श्री खेम बहादुर थापा मगर	वडा अध्यक्ष, वडा नं. ६	
९.	श्री कृष्ण प्रसाद अधिकारी	वडा अध्यक्ष, वडा नं. ७	
१०.	श्री हरि प्रसाद पाण्डेय	वडा अध्यक्ष, वडा नं. ८	
११.	श्री मोहन बहादुर जि.सी.	वडा अध्यक्ष, वडा नं. ९	
१२.	श्री यक बहादुर सुनार	वडा अध्यक्ष, वडा नं. १०	
१३.	श्री दुधनाथ यादव	वडा अध्यक्ष, वडा नं. ११	
१४.	श्री डेग बहादुर सुनार	वडा अध्यक्ष, वडा नं. १२	
१५.	श्री चन्द्र बहादुर भाट	अधिकृत आठौं	
१६.	वर्षा तिवारी	प्रगती सा.प.को सचिव	
१७.	बुढा सा.प.को २१	अध्यक्ष: अनिमित्त हो.व.	
१८.	सुनार के. थापा	अध्यक्ष: पाल्पाली लोक.	
१९.	विष्णु काल	अध्यक्ष: डुम्रे लोक. " "	
२०.	भरत रेग्मी	अध्यक्ष: हाथकोट स.	
२१.	ठा. प्रसाद लोपोपात्रे	वा.ड. सदस्य	
२२.	प्रसाद गुरुङ	वा.ड. सदस्य	
२३.	जोविन्द पासी	वा.ड. ११ कार्यकारी सदस्य	



વાતાવરણીય ડાસરહસ્તો યહિયાન ગારિ સુચી મિતિ 2013 ફાલ્ગુન  
૧૭ મિત્ર ઉપલબ્ધ ગરાડને નિર્ણય ગરિયો ।

નિર્ણય નં. ૪.

મહુલી દેસ નામપાત્ર પુલ દેસ મેડિકલ કલેજ ગ્રાહ સમ-  
જો ઘાટો નિમાણ ગર્જા હુલે કંચર, રેનવાંગાંગ વવા લગાડ સુદ્ધ  
કો વાતર ઉલ્લ ગરાડ કુલાલો કુલાન હુનલાત જોગાડ નિમાણ  
કાર્ય ગર્જ પર્ને કાલે નિર્ણય ગરિયો ।

મહુલી

મહુલી



**Pragati CF along Banchauki-Mayadevi Park-Mildanda-Buddha Circuit Road**

समिति

आज मिति २०७९ रत्नाल फाल्गुण २० जेठको दिन यस  
सिर्जना समुदायीक वन उपमोक्षा समूहको देवदह-७ वा  
कार्यालय अन्तर्गत श्री शालिकराम तिवारी ज्यूको अध्यक्षता  
मा वैकल्पिक रुपमा RUDP(WUC) आयोजना अन्तर्गत वनचौकी  
मायादेवी पार्क मिलाइ दुई वृद्ध सर्किट जोड्ने कार्य  
आयोजना सम्बन्धमा निम्न प्रस्तावमाथि छलफल गरी  
निर्णय गरियो।  
शेखर बडाधरा श्री कृष्ण प्रसाद अधिकारी

उपस्थिति

१. श्री शालिकराम तिवारी - का.वा.अध्यक्ष ९८४७९७४०७०
२. " रिष्का मोपाने - सचिव - ९८४७०२०८९८
३. " समनथ पौडेल - स.सचिव ९८४७९४९४२
४. " जेविक प्रसाद तिवारी - कोषाध्यक्ष ९८४७०४८८२४
५. " फाताराम अर्मील - सदस्य ९८४७०३२९४९
६. " सुमीत्रा अर्मील - "
७. " मुनीलाल थापा - "
८. " भीम कार्की ढोला - "
९. " पवित्री लामिछाने - "
१०. " विष्णुकला भुसाल - "
११. " शोभा श्रेष्ठ - "
१२. " हिमा कुमाल - "

प्रस्तावहरू

१. प्रतिवृत्ता सम्बन्धमा
२. विविध

निर्णयहरू

प्रस्ताव १ माथि छलफल गर्दा RUDP(WUC) आयोजना अन्तर्गत  
वनचौकी मायादेवी पार्क मिलाइ दुई वृद्ध सर्किट जोड्ने कार्य  
(४० फुट) आयोजना कार्यान्वयन गर्दा पूर्व पश्चिम राजमार्ग वनचौकी  
देखि दक्षिण तर्फ देवदह मा.वि.० सम्म रूकातर्फ (पश्चिम साइड)  
र देवदह मा.वि.० अगाडी रूकातर्फ (पूर्व साइड) र देवदह  
मा.वि.० देखि दक्षिण वनचौकीको आवादी क्षेत्र सम्म दुवै  
तर्फ सृजना सामुदायिक वन क्षेत्र रहेकोमा सो क्षेत्रमा  
आयोजना कार्यान्वयन गर्न समुदायीक वन समूह/समितिलाई

समिति

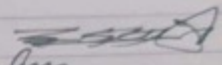
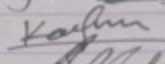
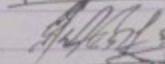
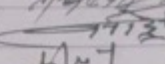
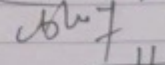
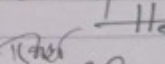
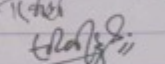
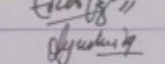
कुनै पनि बाधा अवरोध नजारी आभोजन। रजमालन  
 एवं कार्य-व्यवस्था सहयोग गर्ने प्रतिवद्धता सर्व-  
 सम्मत निर्णय गरियो।  
 प्रस्ताव २ सम्म-धमा कलफल गर्दा उक्त आभोजन कार्य-  
 नपन हुदा कलान हुन गएको कुरा काठ दाउरा सामुदायिक  
 वन समूहको हुनुपर्ने सम्म-धमा समेत निर्णय गरियो।  
 र वन पैसाको समूहले विनिधमानुसार विक्रीवितरण गर्ने  
 निःसर्वसम्मत निर्णय गरियो।

२०७५/०५/०५  
 उपस्थित  
 सावित्री  
 बीम  
 श्री.

Lumbini Sanskritik Municipality

आज मिति २०७३/११/०३ गतेको दिन लुम्बिनी सांस्कृतिक नगरपालिका वडा नं १० का नगर प्रमुख श्री राजसुद्धीन मुसलमान न्यूको अध्यक्षतामा एसियाली विकास बैंकको West Urban Corridor (WUC) अन्तर्गतको लुम्बिनी सांस्कृतिक न.पा.मा प्रस्तावित आयोजनाहरू बारे विभिन्न बमोजिम उपस्थिती तथा निर्णय गरियो ।

उपस्थिति :

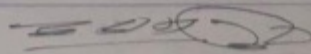
१. श्री राजसुद्धीन मुसलमान	लुम्बिनी सांस्कृतिक नगर प्रमुख	
२. श्री कल्पना ठरिजन	उप नगर प्रमुख	
३. श्री तुलसी राम लामिछाने	समान्वय अधिकृत	
४. श्री विनोद कठार	वडा अध्यक्ष - वडा १०	
५. श्री आशिष यादव	ई. एम. सी. बिर्देशक	
६. श्री हेम विष्ट राप्ती	वतावरण विज्ञ	
७. श्री बिकेश चित्रकार	सामाजिक विज्ञ	
८. श्री चन्द्र बा. पुरखु	वातावरण Consultant	
९. आयुष्मिता पोखरेल		

प्रस्ताव :

१. बसपार्कको जग्गा सम्बन्धमा ।
२. प्रस्तावित पाँच पोखरीको पहुँच मार्गको जग्गाको विषयमा ।
३. नापी नक्सा उपलब्ध गराउने सम्बन्धमा ।
४. वडा स्तरीय आम्र भेला सम्बन्धमा ।

निर्णय :

१. नगरपालिकाले आजको मितिबाट १ हप्ता भित्र नापी विभागासँग समन्वय गरि प्रस्तावित बस पार्कको जग्गा साथै वरिपरिको कुलोहरूको क्षेत्रफल स्कीन गरि WUC आयोजनालाई उपलब्ध गराउने निर्णय गरियो ।
२. उक्त प्रस्तावमा दलफूल गर्दा एक हप्ता भित्र न.पा.बाट पहुँच मार्गको जग्गाको विषयमा चर्किन गरि WUC आयोजनालाई उपलब्ध गर्ने निर्णय गरियो ।
३. प्रस्तावित पाँच पोखरी र त्यसमा पहुँच मार्ग, बस पार्क र त्यसको पहुँच मार्ग, जलबल पार्कको नापी नक्सा र प्रत्येक आयोजनाको क्षेत्रफल





प्रस्तावहरू :

१. आयोजनाको उद्देश्यको चार किल्ला यकिन गर्ने
२. आयोजनाको कार्यन्वयन

निर्णयहरू :

१. उक्त प्रस्तावमा दलफल गर्दा यस जलोष्ण पार्कको चार किल्ला यकिन गरि नापी नमूना सहित आयोजना क्षेत्रको क्षेत्रफल यस NUC आयोजनालाई एक हप्ता भित्र नगरपालिका, वडा नं ११ बाट उपलब्ध गराउने निर्णय गरियो।
२. उक्त प्रस्तावमा दलफल गर्दा आयोजनाको कार्यन्वयनले कसैलाई व्यतिरिक्त असर नपर्ने र सबै स्थानीयसहमत भएको साथै आयोजना कार्यन्वयन गर्दा स्थानीय सबैले सहयोग गर्ने निर्णय गरियो।

[illegible]



પદાર્થને નિર્ધારિત કરીશો

૮. પ્રસ્થાવિત આયોજના કાર્યાલયના ગ્રાહી અધિકારી  
સંસ્કારી, જિલ્લાના કો સમુદાયનાઈ કે કોઈ  
અન્ય પદે સો સારવણ સમારપાલિકા અધ્યક્ષ  
ગરી સંસ્કારી પદાર્થને નિર્ધારિત કરીશો

૯. પ્રસ્થાવિત આયોજના કાર્યાલયના વડાનું  
પ્રાકૃતિક સમુદાય, વડાનું પ્રાકૃતિક સમુદાય  
ના કોઈ અન્ય પદે કે અન્ય અધ્યક્ષ  
ગરી નિર્ધારિત કરીશો

૧૦. પ્રસ્થાવિત આયોજના કાર્યાલયના પ્રાકૃતિક  
સમુદાયના અધ્યક્ષના ગરી કોઈ અધિકારી  
પાલીકો સુદા અધિકાર કે - કોઈ અન્ય પદે  
સો સારવણ અધ્યક્ષ ગરી નિર્ધારિત કરીશો

૧૧. પ્રસ્થાવિત આયોજના કાર્યાલયના અધિકારી  
અધ્યક્ષ પદે સમુદાયના અધ્યક્ષના સમુદાયના  
સમાજના ગરીના અધિકારી સમુદાયના અધિકારી  
અધ્યક્ષના ગરીના અધિકારી ગરીના અધિકારી  
ગરીના નિર્ધારિત કરીશો

૧૨. આયોજનાના નિર્ધારિત ગરીના અધિકારી  
ગરી ૨૦૬૬/૧૧/૨ ગરીના પદાર્થને નિર્ધારિત કરીશો

*[Signature]*

*[Signature]*





Minutes of meeting from Shanti CFUG regarding at ward 11 of Sainamaina municipality

आज मिति २०७९/१०/०५ गतेका दिन यस श्री शांती  
मुद्रायेक वल उपभोक्ता समूहका अध्यक्ष श्री हिम-  
लाल अर्यालको अध्यक्षतामा वरिष्ठ बैठकले तपाइएको  
गतिविधिमा निम्न प्रस्तावहरू माथी छलफल गरी  
नेर्लग गरियो ।

### उपाध्यक्ष

पहचान - श्री हिमलाल अर्याल

पहचान - श्री बुद्धि प्रसाद घिमिरे

गचिय - श्री सुशीला अर्याल

नेसाध्यक्ष - श्री वमा पौडेल

सचिव - श्री यमलाल सापकाय

सदस्य - श्री हेमकुमारी धारु

" श्री प्रेम नारायण काइला

" श्री हिमलाल अर्याल

" श्री देवकी सापकाय

वडा अध्यक्ष श्री राम प्रसाद भुसाल

कार्यपालीका अध्यक्ष श्री सीता धारु

वडा सदस्य श्री अशोक कुमार भुसाल

कार्यलय सचिव श्री प्रेम नारायण घिमिरे

श्री रिकाराम खनाल

### प्रस्तावहरू

तामेली लो वार को - चक्रपथ सम्बन्धमा ।

### निर्णय

चाव नं १ माथी छलफल तथा सरसल्लाह गर्दा तामेली  
रपालीकाको चक्रपथ निर्माण तथा विस्तार गर्ने क्रममा  
पि आर हुने अवस्थामा रहेकोले स्थानीय जनप्रतिनिधी र  
गठित समिति मिली तथा लेखी समिति कार्य समिति अनु-  
न समिति सल्लाहकार समितिको मिति २०७९/०९/२३ गतेको  
प्रमा उक्त विषयमा छलफल तथा सरसल्लाह गर्दा उक्त वार्ड  
गर्दा समूह सा. व. को कार्य क्षेत्र भित्र पर्ने करिब १.१ कि.मि  
विस्तार गर्दा अविक विविधता भन्ने प्रस्ताव दिइने तथा  
पवरणीमा कुनै विविधता हुने लो वारको वार्ड प्रतिकुल आएर  
ने ठहर्ने गर्दा यस सा. व. को वार्ड सरसल्लाह तथा प्रयास  
मा हात ठोक्काई भर्तिकुल अर्थ पर्ने उक्त निर्णय गरियो ।

सहयोग गर्दा फरक पर्ने लोपोत्पत्तिको मागो पुर्ल्लोयित  
 शब्दहरूको पालन गर्दै धन पैसा विपरीतको सुविधा  
 रही सहयोग गर्ने हत लम्पन विर्णय गरियो ।

को/ हा कमा रान  
 ५/६/२०११



*Recommendation Letter from Jhimjhimiya-Bhulkepani CFUG situated along the proposed Panbari-Saljhandi Ring Road, ward 10, Sainamaina Municipality*

इति नं ५९

**जिमजिमिया भुल्केपानी सामुदायिक वन उपभोक्ता समूह**

सैनामैना-१०, जिमजिमिया, रुपन्देही

पत्र संख्या: २०६९/०८०  
खता नं: ५३

स्था: २०६०

मिति: २०६९/१२/१४


श्रीमान नगर प्रमुख ज्यू,  
सैनामैना न.पा. नगरपालीकाको कार्यालय,  
वडनगर, रुपन्देही

विषय : जानकारी सम्बन्धमा ।

उपरोक्त सम्बन्धमा सैनामैना न.पा. वडा नं-१०, अन्तर्गत साविक जिमजिमिया सा.व. र भुल्केपानी सा.व. एकिकरण भै वनेको यस जिमजिमिया भुल्केपानी सा.व. क्षेत्रमा सहरी विकास मन्त्रालय सहरी विकास तथा भवन निर्माण विभागको आयोजना अन्तर्गत प्रस्तावित चक्रपथ सडक आयोजना कार्यान्वयन हुने नगर पालीकाबाट अवगत भयो र उक्त प्रस्तावित आयोजनाले यस सा.व. वन क्षेत्रमा नकारात्मक असर नपर्ने देखिएकोले उक्त आयोजना सञ्चालन गर्न सहमति रहेको व्यहोरा जानकारी साथ अनुरोध गरिन्छ ।

आचार्य

*Recommendation Letter from Singha Darja CFUG situated along the proposed Panbari-Saljhandi Ring Road, ward 10, Sainamaina Municipality*

  
**श्री सिंहदर्जा सा.ब.उ.स**  
 सैनामैना-१०, बालमण्डी, रुपन्देही  
 स्वा:-२०४८

मिति: २०७९/१२/६ गी

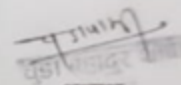
पत्र संख्या: ०७९/०८०  
चलानी नं: २९

---

श्रीमान् नगर प्रमुख ज्यू  
सैनामैना नगरपालिका बुद्धनगर, रुपन्देही

विषय: सहमती दिइएको सम्बन्धमा ।

उपरोक्त सम्बन्धमा यस सैनामैना नगरपालिका वार्ड नं. १० सिंहदर्जा सामुदायिक वन अन्तर्गत निर्माणाधिन सैनामैना चक्रपथ आयोजना बाटो निर्माण गर्दा यस सिंहदर्जा सा.ब.उ.स को सिमानामा कुनै पनि हानी नोक्सानी नहुने भएको हुदाँ चक्रपथ निर्माणको लागि सहमती दिने भनि कार्यसमितिको बैठक नं. १३ को निर्णय अनुसार सहमती दिइएको व्यहोरा अनुरोध ।

  
 अध्यक्ष  
 चुडा बहादुर बापा

बोधार्थ: सैनामैना नगरपालिका वार्ड नं. १० को कार्यालय

*Recommendation Letter from Kanchan CFUG situated along the proposed Panbari-Saljhandi Ring Road, ward 10, Sainamaina Municipality*

दर्ता नं. ७३

श्री कञ्चन सामुदायिक वन उपभोक्ता समुह  
सैनामैना-१०, रुपन्देही  
स्थापना २०६५

पत्र संख्या :- ०७९/०८०  
चलानी नं. :- ५०

मिति :- २०७९/१२/१४

श्रीमान नगर प्रमुख ज्यू  
सैनामैना नगरपालिका कार्यालय  
बुद्धनगर, रुपन्देही

विषय :- सहमति दिइएको सम्बन्धमा ।

उपरोक्त विषयमा यस सैनामैना १० पानवारीमा सैनामैना नगरपालिका द्वारा निर्माणाधिन चक्रपथ वर्षौंदेखिको चलि आएको बाटोमा पर्ने र केही दुरी सा.व.को सिमाना सँग पनि जोडिएको हुदा उक्त चक्रपथ निर्माण गर्दा यस कञ्चन सामुदायिक वनलाई कुनै क्षति नपर्ने गरी निर्माण गर्नको लागि सहमति दिने भनी यस कञ्चन सा.व.उ.समुहको मिति २०७९/१२/०७ गतेको बैठकमा निर्णय भएको हुदा यो सहमति पत्रको व्यहोरा अनुरोध छ ।

लिलामणी पाण्डे  
अध्यक्ष  
कञ्चन सामुदायिक वन उपभोक्ता समुह  
सैनामैना-१०, पानवारी, रुपन्देही

Siddharthanagar Municipality

आज मिति २०७३/१०/०४ गतेका दिन यस सिङ्गापुर्नगर नगरपालिकाका  
नगर प्रमुख श्री डा. विद्याल अहमद खान, रेल्वे अध्यक्षतामा WUC  
Site visit Schedule for Feasibility study work सम्बन्धित अध्ययन  
लागि WUC consultant का प्रतिनिधि रेल्वे स्टाफ तथा अन्तरक्रिया  
कार्यक्रम हेराय-सामोबिचको उपस्थितिमा सम्पन्न भयो।

उपस्थिति :

श्री डा. विद्याल अहमद खान - नगर प्रमुख, सि. न. पा.  
श्री उमा अधिकारी - नगर उपप्रमुख " "  
श्री नवराज पौड्याल - प्रमुख प्रशासकीय अधिकृत " "  
श्री Dong Joo Lee, Team Leader, WUC Consultant  
Urban Planner, DOHWA Eng.  
श्री उज्जवल पोखरेल, वडा अध्यक्ष, वडा नं. १, सि. न. पा.  
श्री नारायण प्रसाद, उपाध्यक्ष, वडा अध्यक्ष, वडा नं. २, " "  
श्री सोम बहादुर गुरुङ, वडा अध्यक्ष, वडा नं. १३ " "  
श्री ओमेश कुमार गैरे, लेखा अधिकृत " "  
श्री साकार श्रेष्ठ, Project Manager, RUP, PIU, " "  
श्री शैलेंद्र प्रसाद श्रेष्ठ, वैदेशिक सल्लाहकार " "  
श्री देव प्रसाद शर्मा - अधिकृत स्तर सल्लाह " "  
श्री विष्णु प्रसाद पन्थी - इन्जिनियर " "  
श्री अविश्व डकाल - स. ई. " "  
श्री रमेश नारायण शर्मा - स. ई. " "

~~श्री~~ श्री Lim Siwoo, Landscape Architect, WVC Consultant

श्री Bikram Singh Bisht, Project Manager

श्री Soniya Bhondari, Civil Engineer

श्री Kripa Shukla, Architect

श्री रिकेश चित्रकार, वातावरणविज्ञ, टीएस

श्री Ayushmita Pokhrel, Environment Expert

श्री Ashok Shukla, SWM Expert

श्री विवेक गौतम, Architect

~~श्री~~ श्री रुद्रकिश अग्रवाल, जग्गा एजी, Danda Corridor

श्री रीनक अग्रवाल " " " ~~श्री~~

~~श्री~~ श्री वाइसाह अग्रवाल, स्वकीय सचिव, जग प्रमुख, सि. न. पा.

श्री रिपोन कार्की - हि. न. पा. ग. २

श्री आशा गुरुङ्ग, Stack Holder, सि. न. पा. ३

~~श्री~~ श्री लक्ष्मी कोइराला - स्वकीय सचिव, उप प्रमुख, सि. न. पा.



Tilottama Municipality

आज मिति २०७३/१०/१० गतेको दिन यस तिलोत्तमा नगरपालिका  
भर्तृगत हाइमरटोल देहले शिवपुर रामको बड्क स्तरीनतीको  
विषयमा यस कडाका कडा भईपुनः श्री कृष्ण प्रसाद पौडेल  
जुनै भईपुनः लपडिले कर्मचारीको उपस्थितिमा देहाप  
कर्मचारीको विषयमा हुलफल गरियो।

उपस्थिति:-

१. श्री कृष्ण प्रसाद पौडेल यस भईपुनः कर्मचारी
२. श्री कर्मचारीको गौतम प्रसाद वरुण
३. श्री कृष्ण प्रसाद पौडेल यस भईपुनः
४. श्री कर्मचारीको गौतम प्रसाद वरुण
५. श्री कृष्ण प्रसाद पौडेल यस भईपुनः
६. श्री कृष्ण प्रसाद पौडेल यस भईपुनः
७. श्री कृष्ण प्रसाद पौडेल यस भईपुनः
८. श्री कृष्ण प्रसाद पौडेल यस भईपुनः
९. श्री कृष्ण प्रसाद पौडेल यस भईपुनः
१०. श्री कृष्ण प्रसाद पौडेल यस भईपुनः
११. श्री कृष्ण प्रसाद पौडेल यस भईपुनः
१२. श्री कृष्ण प्रसाद पौडेल यस भईपुनः
१३. श्री कृष्ण प्रसाद पौडेल यस भईपुनः
१४. श्री कृष्ण प्रसाद पौडेल यस भईपुनः
१५. श्री कृष्ण प्रसाद पौडेल यस भईपुनः
१६. श्री कृष्ण प्रसाद पौडेल यस भईपुनः
१७. श्री कृष्ण प्रसाद पौडेल यस भईपुनः
१८. श्री कृष्ण प्रसाद पौडेल यस भईपुनः
१९. श्री कृष्ण प्रसाद पौडेल यस भईपुनः
२०. श्री कृष्ण प्रसाद पौडेल यस भईपुनः
२१. श्री कृष्ण प्रसाद पौडेल यस भईपुनः
२२. श्री कृष्ण प्रसाद पौडेल यस भईपुनः

निर्णय नं. १.

तिळोत्तमा नगरपालिका अन्तर्गत द्वाइभरोलेले देखि शिवपुर  
सम्मको सडक स्तरोन्नतीको लागि एम्प कडामा पर्ने सडकमा रहेका  
चरोकापालाहुरा संग चारो निर्माण प्रकृशमा खुलेको बहा प्रत्यन  
नरहेको चारो आपत्तो जग्गा परेमा पनि उक्त जग्गा चारो  
निर्माणमा स्पर्धिक दान गर्ने सहमतिको लागि विभिन्न रेल  
विकास संस्थासंग आज्ञा मिति देखि सडकमा त्रि राखि  
छलफल गरी प्रकृश अगली पठाउनको लागि सहयोग गर्ने  
निर्णय गरियो।

निर्णय नं. २.

सडक स्तरोन्नतीको लागि केहि जग्गा कुरहियाथामुको  
वन से डोउ पर्ने भएकोले उक्त वननर्त चारो निर्माण प्रकृशमा  
वन डोउको कुनै कुरा काटु नपर्ने तथा वनको कुनै पनि  
आपत्ति नरहेको मिति पर आवश्यक पर्ने गरने हुने  
वन संग आवश्यक छलफल गरि का लागि जानकारी  
गएउने निर्णय गरियो।

निर्णय नं. ३.

सडक स्तरोन्नतीको लागि सडकमा पर्ने विभिन्न  
सिंवाई खुले, बली (दलित तथा असजाली) पर्ने गरने हुने।  
उक्त विषयलाई पनि संवेधान गर्ने गरी सडक स्तरोन्नती  
गर्नुको लागि आवश्यक सहजीकरण गर्ने निर्णय  
गरियो।

Handwritten signatures and stamps, including names like 'मोदीना', 'H. P. K.', and 'S. P. K.', along with official stamps.

Recommendation Letter from Karahiya CF situated along the proposed Drivertole-  
Shivapur Road, Tilottama Municipality



दर्ता नं.: ८/०५३/५४

फोन नं.: ०७१-४१६१४२



# करहिया सामुदायिक वन उपभोक्ता समुह १-८

तिलोत्तमा-११, दिपनगर, रुपन्देही

स्था.: २०५२

पत्र संख्या : ०७९/०८०

मिति.....२०७९/११/१५.....

चलानी नं :- २५

श्री मान् प्रमुख ज्यू,  
तिलोत्तमा नगर पालिका कार्यालय,

विषय:-  
अनुमति दिइएको बारे ।

महोदय,  
उपर्युक्त सम्बन्धमा त्यस तिलोत्तमा नगर पालिका कार्यालयको पहलमा ड्राइवरटोल देखि शिवपुर सम्मको बाटो निर्माण सुदृढीकरण गर्नको लागि यस करहिया सामुदायिक वनको वन क्षेत्रमा कुनै किसिमको हानिनोक्सानी नहुने किसिमले बाटो बिस्तार गर्नको लागि यस समुह बाट अनुमति दिइएको यसै पत्रसाथ अनुरोध गरिन्छ ।

  
हरिलाल पाण्डे

अध्यक्ष

करहिया सा. व. उ. समुह ७ - ९

## Minutes of meeting of consultation conducted at municipality office

TILOTTAMA

Meeting Date: 18<sup>th</sup> January, 2023

**Mayor:** Ram Krishna Khand

**Deputy Mayor:** Jageshor Devi Chaudhary

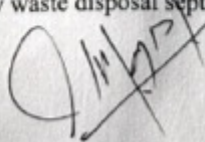
**Chief Administrative Officer:** Narayan Aryal

**Chief Engineer/Project Manager:** Pradip Ban, Planning Section

The meeting started after a formal introduction from Municipality Team and WUC Team. The WUC team showed the presentation on the design concept of Cold Storage. Then the following comments and feedback were passed from the Municipality team.

### 1. Cold Storage

- Municipality liked the initial design of the cold storage made by the WUC team; they just wanted a few additions.
- Municipality wanted a **Weighbridge** at the entrance of the cold storage for weighing the loaded vehicle. The WUC team agreed to incorporate it into the designs.
- Municipality wanted to revise the space allocated for office blocks, and staff quarters. They want those facilities to be incorporated into a multistorey building to reduce the building footprint inside the cold storage. So that it would provide the possibility for future expansion. The WUC team agreed to reflect on it.
- Municipality was concerned about the flood issue in the subproject area. The WUC team informed they considered the possibility of flooding and have provided a needed solution.
- The WUC team informed the municipality that this subproject would go for Design-Build (DB) contract. So, they requested the municipality to list the requirements for the Cold storage in formal written form to the WUC team. After that WUC team would go further with the design process.
- WUC team proposed a 15m access road from the present existing road at the northeast corner but the municipality fixed the ROW of the access road as 13m so the WUC team finalized the discussion by keeping 15m wide road at the eastern side which is inside the boundary of subproject and the remaining portion of the road with 13 m span.
- The municipality was concerned about the management of sanitary waste generated from the cold storage complex. The WUC team justified that there would be a central sanitary waste disposal septic tank and soak pit.



Date: 2023-1-18

The meeting of the WUC team with the Municipality team of Tilottama held at 4:00 PM, on Wednesday, January 18<sup>th</sup>, 2023 in the Municipality office premise under the chairmanship of Mr. Ram Krishna Khand, the Mayor of Tilottama Municipality to discuss about the Cold storage design and the Land issues for the Subproject. The following members were present:

Signature:

Members present:

Mayor

Ram Krishna Khand

Deputy mayor Jagdish devi Chaudhary

Chief executive officer Mrs. Narayan Aryal

Ward chairman Mr. Ramesh Dumbre

Ward chairman Mr. Ganesh Pathak

Section Officer Mrs. Sita Ghimire Bhandari

Engineer Mr. Pradeep Ban

Architect Kripa Shakya

Environment Specialist Ayushmita Pokhrel

Landscape Architecture Siwoo Lim

Rikesh Chitrakar, Environment Expert.

Soniya Bhandari, Engineer

David So Lee, TEAM LEADER

Bibek Gautam, Architect

## Appendix 4: Sample Grievance Registration Form

(To be available in Nepali and English)

The \_\_\_\_\_ Project welcomes complaints, suggestions, queries, and comments regarding project implementation. We encourage persons with grievance to provide their name and contact information to enable us to get in touch with you for clarification and feedback.

Should you choose to include your personal details but want that information to remain confidential, please inform us by writing/typing *\*(CONFIDENTIAL)\** above your name. Thank you.

Date	Place of registration	Project Town			
		Project:			
Contact information/personal details					
Name		Gender	* Male * Female	Age	
Home address					
Place					
Phone no.					
E-mail					
Complaint/suggestion/comment/question Please provide the details (who, what, where, and how) of your grievance below:					
If included as attachment/note/letter, please tick here:					
How do you want us to reach you for feedback or update on your comment/grievance?					

### FOR OFFICIAL USE ONLY

Registered by: (Name of official registering grievance)	
Mode of communication: Note/letter E-mail Verbal/telephonic	
Reviewed by: (Names/positions of officials reviewing grievance)	
Action taken:	
Whether action taken disclosed:	Yes No
Means of disclosure:	

## Appendix 5: Sample Environmental Site Inspection Report

Project Name  
Contract Number

NAME: \_\_\_\_\_ DATE: \_\_\_\_\_  
TITLE: \_\_\_\_\_ DMA: \_\_\_\_\_  
LOCATION: \_\_\_\_\_ GROUP: \_\_\_\_\_

WEATHER: \_\_\_\_\_

Project Activity Stage	Survey	
	Design	
	Implementation	
	Pre-Commissioning	
	Guarantee Period	

MONITORING ITEMS	COMPLIANCE
<b>Compliance marked as Yes / No / Not applicable (NA) / Partially Implemented (PI)</b>	
EHS supervisor appointed by contractor and available on site	
Construction site management plan (spoils, safety, schedule, equipment etc.,) prepared	
Traffic management plan prepared	
Dust is under control	
Excavated soil properly placed within minimum space	
Construction area is confined; no traffic/pedestrian entry observed	
Surplus soil/debris/waste is disposed without delay	
Construction material (sand/gravel/aggregate) brought to site as & when required only	
Tarpaulins used to cover sand & other loose material when transported by vehicles	
After unloading , wheels & undercarriage of vehicles cleaned prior to leaving the site	
No chance finds encountered during excavation	
Work is planned in consultation with traffic police	
Work is not being conducted during heavy traffic	
Work at a stretch is completed within a day (excavation, pipe laying & backfilling)	
Pipe trenches are not kept open unduly	
Road is not completely closed; work is conducted on edge; at least one line is kept open	
Road is closed; alternative route provided & public informed, information board provided	
Pedestrian access to houses is not blocked due to pipe laying	
Spaces left in between trenches for access	
Wooden planks/metal sheets provided across trench for pedestrian	
No public/unauthorized entry observed in work site	

MONITORING ITEMS	COMPLIANCE
Children safety measures (barricades, security) in place at works in residential areas	
Prior public information provided about the work, schedule and disturbances	
Caution/warning board provided on site	
Guards with red flag provided during work at busy roads	
Workers using appropriate PPE (boots, gloves, helmets, ear muffs etc)	
Workers conducting or near heavy noise work is provided with ear muffs	
Contractor is following standard & safe construction practices	
Deep excavation is conducted with land slip/protection measures	
First aid facilities are available on site and workers informed	
Drinking water provided at the site	
Toilet facility provided at the site	
Separate toilet facility is provided for women workers	
Workers camps are maintained cleanly	
Adequate toilet & bath facilities provided	
Contractor employed local workers as far as possible	
Workers camp set up with the permission of PIU	
Adequate housing provided	
Sufficient water provided for drinking/washing/bath	
No noisy work is conducted in the nights	
Local people informed of noisy work	
No blasting activity conducted	
Pneumatic drills or other equipment creating vibration is not used near old/risky buildings	

Signature

\_\_\_\_\_

**Sign off**

\_\_\_\_\_  
**Name**  
**Position**

\_\_\_\_\_  
**Name**  
**Position**



## Appendix 6: Baseline Environmental Monitoring of selected sites

Google map of the sampling points





## Description of Sampling points

### ANW1

The sampling point is located in Ward No. 8 of Lumbini Sanskritik Municipality in the Rupandehi district. It is approximately 3 kilometers west of the Padariya bus stop at the Lumbini Development Trust. The site is characterized by agricultural land with sparse settlements and patches of trees along the Koilihawa River. For the operation of the monitoring instrument and for security purposes, the air sampler was placed in front of a local house owned by Ram Mohan Mishra, where electricity was available. No rain was recorded during the sampling period, although the weather remained partly cloudy. Due to the sub-road location, vehicular movement was minimal, with only light vehicles passing by. No open burning was observed during the sampling hours, though local residents indicated it is a common practice. The nearest densely populated area and market are approximately half a kilometer away. No industries or significant pollution sources were observed during the sampling period. The environment reflects natural conditions with some human activities.

### ANW2

The sampling point is situated in Ward No. 8 of Siddharthanagar Municipality in the Rupandehi District. It is conveniently located approximately two kilometers west of Buddha Chowk in Bhairahawa city and near Gautam Buddha International Airport. The area is characterized by dense settlements and a network of roads, surrounded by some industries and fish ponds. It features patches of tree gardens with bamboo, a mix of agricultural and commercial activities, and diverse residential properties. The area offers numerous public amenities, including schools, hospitals, and recreational facilities. For the operation of the monitoring instrument and for security purposes, the air sampler was placed nearby area of the Hotel Pauwa. No rain was recorded during the sampling period, although the weather was partly cloudy. Despite the road network being connected to the main highway, vehicular traffic was limited to light vehicles such as motorbikes, jeeps, and vans. Open burning was not observed, as this practice is rare and only performed during certain rituals. The area reflects a blend of urban and commercial activities.

### ANW3

The sampling point is located in Ward No. 10 of Sainamaina Municipality in the Rupandehi District. It is easily accessible via Saljhandi along the Mahendra Highway, at a distance of nearly one kilometer. The area is surrounded by dense forest with sparse settlements and agricultural land. The Panbari Wetland, which holds environmental significance, is approximately 200 meters from the sampling point. Locally known as Kanchan Khola, a river is about 300 meters north of the site. Open burning was observed about 500 meters away and persisted for nearly two hours during the daytime, due to the area's prominent agricultural activities. The sampling day was sunny with partial cloud cover and no rain. The road networks are limited, with minimal vehicular traffic. No industrial activities or other sources of air, noise, and water pollution were observed. The air sampler was placed in front of a house owned by Radha Devi Adhikari, ensuring access to electricity and security. Noise levels were measured at the adjacent house, and a water sample was collected from the outlet of the Panbari Wetland. The location is characterized by an absence of external pollution influences and remains naturally calm with limited light vehicular movement.

### ANW4

The sampling point is located at Ganeshnagar in Ward No. 10 of Tilottama Municipality. It is accessible approximately four kilometers southwest of the Butwal Industrial Area, near a landfill site along Ganesh Khola. The area is surrounded by dense forest, agricultural land, and sparse settlements. A subway crosses the river and forest, resulting in limited vehicular traffic. Although open burning is practiced, it was not observed during the sampling period. A light rain occurred

for about an hour in the evening, while the day remained partly cloudy and sunny. The air sampler was placed on land owned by Sukhaura Hotel, chosen for its access to electricity and security. Noise levels were measured near the bridge over Ganesh Khola, and a water sample was collected from the river. The location is characterized by a natural environment with no external pollution influences and no internal activities that increase pollution levels.

**ANW5**

The sampling point is located at Keureni, Bishalnagar, in Ward No. 8 of Devdaha Municipality. It is a plain agricultural area with sparse settlements, bordered on the west by the Ghodaha River. The site is accessible via a subway heading north from the East-West Highway at Kalika Chowk, Butwal city, approximately 10 kilometers away, passing the Butwal Industrial Area and Devdaha Medical College along the way. The point is situated about three meters west from the Devdaha Lake, which is surrounded by a small forest. The area is open, with limited human activity and vehicle traffic. Light rain fell for about an hour in the evening, while the day was partly cloudy and sunny. The air sampler was placed in front of a house just after crossing the bridge over the Ghodaha River. Noise sampling was conducted near the bridge, and a water sample was collected from the Ghodaha River below the bridge. Public and vehicle traffic increases on weekends as people visit Devdaha Lake for recreational purposes.

**Sampling dates**

Field sampling was conducted from July 24 to July 26, 2024, using three sets of monitoring instruments. Simultaneous measurements were taken at ANW1 and ANW2 from July 24 to July 25, 2024, using two sets of instruments. Likewise, simultaneous measurements were carried out at ANW3, ANW4, and ANW5 from July 25 to July 26, 2024, using three sets of instruments.

**Baseline Environmental Monitoring: Devdaha**

**ENVIRONMENT MANAGEMENT  
&  
ANALYSIS SERVICES P. LTD**

Regd No.: 127787/071/72

Dillibazar - 29, Sarbochha Galli, Kathmandu, Nepal

Contact No.: +977 9851126060

Email: emas@emas.com.np, emasenv@gmail.com

**Noise Level Monitoring Report**

Report No.: 09N/81/82				Report Date: 31 July 2024			
Sample No.: 09-N/081/82							
Work Order No.: Email (Date: 24 July, 2024)							
Name and address of Client: Environment & Resource Management Consultant Pvt. Ltd., Kathmandu							
Sampling Location: Devdaha Municipality, Ward No. 8 (Keureni, Bishalnagar)							
Type of sampling: Ambient Noise level Monitoring (24 Hours)							
Instrument used: Sound Level Meter (SL - 4023SD), Lutron							
Sampling date: 25 - 26 July 2024							
Sampled by: Environment Management And Analysis Services P. Ltd., Dillibazar, Kathmandu							
Result							
Time	Sound Level (dBA)			Time	Sound Level (dBA)		
	Lmax	Lmin	Leq		Lmax	Lmin	Leq
7:00 AM	63.0	40.8	45.9	19:00 PM	59.2	42.2	46.2
8:00 AM	62.7	38.2	46.1	20:00 PM	56.7	45.0	48.4
9:00 AM	56.4	42.8	48.8	21:00 PM	56.5	44.7	47.4
10:00 AM	61.8	42.1	48.1	22:00 PM	57.7	48.2	51.8
11:00 AM	60.4	43.0	48.8	23:00 PM	63.2	46.4	49.4
12:00 PM	55.9	46.9	52.6	12:00 AM	60.4	46.5	49.0
13:00 PM	60.7	44.1	46.6	1:00 AM	61.7	49.3	51.9
14:00 PM	61.8	45.4	48.7	2:00 AM	65.3	46.7	50.7
15:00 PM	63.1	43.1	47.7	3:00 AM	62.3	42.1	47.4
16:00 PM	62.8	42.9	49.6	4:00 AM	68.7	41.4	47.3
17:00 PM	63.2	46.8	50.6	5:00 AM	64.9	42.0	44.8
18:00 PM	63.8	48.8	51.8	6:00 AM	64.5	42.5	46.6

*Shirha*  
Sampled by

*Shirha*  
Analyzed by

*Shirha*  
Authorized by



**Environment Management  
&  
Analysis Services P. Ltd**





**ENVIRONMENT MANAGEMENT  
&  
ANALYSIS SERVICES P. LTD**

Regd No.: 127787/071/72  
Dillibazar - 29, Sarbochha Galli, Kathmandu, Nepal  
Contact No.: +977 9851126060  
Email: emas@emas.com.np, emasenv@gmail.com

## Air Quality Test Report

<b>Report No.:</b> 04A/81/82	<b>Report Date:</b> 31 July 2024
<b>Sample No.:</b> 04-A/081/82	
<b>Work Order No.:</b> Email (Date: 24 July, 2024)	
<b>Name and address of Client:</b> Environment & Resource Management Consultant Pvt. Ltd., Kathmandu	
<b>Sampling Location:</b> Devdaha Municipality, Ward No. 8 (Keureni, Bishalnagar)	
<b>Type of sampling:</b> Ambient Air Quality Monitoring (24 Hours)	
<b>Instrument used:</b> Combine Sampler (GTI - 241) & Respirable Dust Sampler (GTI - 151), Greentech Instruments, India	
<b>Sampling date:</b> 25 - 26 July, 2024	
<b>Sampled by:</b> Environment Management And Analysis Services P. Ltd., Dillibazar, Kathmandu	

## Result

Parameters	Result	NAAQS	Unit	Method
Total Suspended Particulate Matter (TSPM)	112.6	230.0	µg/m <sup>3</sup>	IS 5182 (Part -23):2006
Particulate Matter (PM <sub>10</sub> )	38.3	120.0	µg/m <sup>3</sup>	IS 5182 (Part -23):2006
Particulate Matter (PM <sub>2.5</sub> )	8.6	40.0	µg/m <sup>3</sup>	Federal Reference Method: 5(4):339-342, USEPA
Sulphur Dioxide (SO <sub>2</sub> )	<1.0	70.0	µg/m <sup>3</sup>	IS 5182 (Part - 02):2006
Nitrogen Dioxide (NO <sub>2</sub> )	3.3	80.0	µg/m <sup>3</sup>	IS 5182 (Part - 06):2006

NAAQS: National Ambient Air Quality Standard, 2012

**Remarks:** The observed values complies with the NAAQS prescribed limits.

*Rishu*  
Sampled by

*Bhupendra*  
Analyzed by

*Sh. Rishu*  
Authorized by  
**Environment Management  
&  
Analysis Services P. Ltd**







# ENVIRONMENT MANAGEMENT & ANALYSIS SERVICES P. LTD

Regd No.: 127787/071/72

Dillibazar - 29, Sarbochha Galli, Kathmandu, Nepal

Contact No.: +977 9851126060

Email: emas@emas.com.np, emasenv@gmail.com

## Water Quality Analysis Report

Report No	: 14/W/081-82	Date of sampling	: 26 - 07 - 2024	
Sample No.	: 14-W/081/82	Date completed	: 30 - 07 - 2024	
Sample source	: Surface Water (Ghodaha Khola)	Sampled by	: EMAS P. Ltd.	
Client	: Environment & Resource Management Consultant Pvt. Ltd., Kathmandu			
Sampling Location	: Devdaha Municipality, Ward No. 8 (Keureni, Bishalnagar)			
Parameters	Unit	Generic*	Observed Values	Test Methods
pH	-	5.5 - 9	7.1	4500-H <sup>+</sup> B, APHA, 22nd EDITION
Turbidity	NTU	-	<1.0	2130 B, APHA, 22nd EDITION
Electrical Conductivity	μS/cm	-	102.0	2510 B, APHA, 22nd EDITION
Total Suspended Solids	mg/l	200	<1.0	2540 D, APHA, 22nd EDITION
Total Dissolved Solids	mg/l	-	66.0	2540 C, APHA, 22nd EDITION
Oil & Grease	mg/l	10	<1.0	5520 B., APHA, 17 <sup>TH</sup> EDITION
Phenol	mg/l	1	<0.02	5530 D., APHA, 22nd EDITION
Total Hardness	mg/l as CaCO <sub>3</sub>	-	34.0	2340 C, APHA, 22nd EDITION
Fluoride	mg/l	2	<0.02	4500F- D, APHA, 22nd EDITION
Ammonia	mg/l	50	0.04	4500-NH <sub>3</sub> C., APHA, 17 <sup>TH</sup> EDITION
Lead	mg/l	0.1	<0.01	3111 B., APHA, 22nd EDITION
Chromium	mg/l	0.1	<0.01	3111 B., APHA, 22nd EDITION
Sulphide	mg/l	2.0	<0.2	3112 B., APHA, 22nd EDITION
Total Residual Chlorine	mg/l	1	<0.1	4500-Cl G, APHA, 22nd EDITION
Arsenic	mg/l	0.2	<0.01	3114 C, APHA, 22nd EDITION
Zinc	mg/l	5	0.08	4500F- D, APHA, 22nd EDITION
Total Coliform	CFU/100 ml	-	88	9221 C., APHA, 22nd EDITION
E.Coli	CFU/100 ml	-	Nil	9221 C., APHA, 22nd EDITION

\* - Generic Standard values for water quality to be discharged into surface water. APHA – American Public Health Association

**Remarks:** Observed values of the specified parameters are within the limit of Generic standard.

*Krishna*  
Analyzed by

*Pratima*  
Checked by

*[Signature]*  
Authorized Signature  
**Environment Management  
&  
Analysis Services P. Ltd**



## Baseline Environmental Monitoring: Lumbini Sanskritik



**ENVIRONMENT MANAGEMENT  
&  
ANALYSIS SERVICES P. LTD**

Regd No.: 127787/071/72

Dillibazar - 29, Sarbochha Galli, Kathmandu, Nepal

Contact No.: +977 9851126060

Email: emas@emas.com.np, emasenv@gmail.com

## Noise Level Monitoring Report

Report No.: 06N/81/82				Report Date: 31 July 2024			
Sample No.: 06-N/081/82							
Work Order No.: Email (Date: 24 July, 2024)							
Name and address of Client: Environment & Resource Management Consultant Pvt. Ltd., Kathmandu							
Sampling Location: Lumbini Sanskritik Municipality, Ward No. 8, Rupandehi							
Type of sampling: Ambient Noise level Monitoring (24 Hours)							
Instrument used: Sound Level Meter (SL - 4023SD), Lutron							
Sampling date: 24 - 25 July 2024							
Sampled by: Environment Management And Analysis Services P. Ltd., Dillibazar, Kathmandu							
Result							
Time	Sound Level (dBA)			Time	Sound Level (dBA)		
	Lmax	Lmin	Leq		Lmax	Lmin	Leq
7:00 AM	56.1	40.5	43.2	19:00 PM	68.1	41.9	45.3
8:00 AM	60.0	41.4	43.8	20:00 PM	65.4	43.4	47.1
9:00 AM	57.5	42.8	46.8	21:00 PM	60.4	43.9	46.4
10:00 AM	62.8	42.0	45.8	22:00 PM	55.7	43.8	45.1
11:00 AM	61.9	41.1	46.5	23:00 PM	53.3	42.4	44.4
12:00 PM	60.3	43.1	48.5	12:00 AM	54.0	43.6	45.6
13:00 PM	51.8	43.1	49.2	1:00 AM	54.1	42.7	44.4
14:00 PM	55.8	44.1	48.5	2:00 AM	55.9	40.7	44.3
15:00 PM	66.9	47.6	50.6	3:00 AM	54.3	43.6	45.5
16:00 PM	56.9	44.3	48.4	4:00 AM	57.8	43.4	44.9
17:00 PM	54.2	44.3	48.7	5:00 AM	56.0	41.6	44.9
18:00 PM	62.3	43.7	46.1	6:00 AM	56.4	43.8	44.4

*Asisha*  
Sampled by

*Asisha*  
Analyzed by

*Asisha*  
Authorized by

**EMAS Environment Management  
&  
Analysis Services P. Ltd**







# ENVIRONMENT MANAGEMENT & ANALYSIS SERVICES P. LTD

Regd No.: 127787/071/72  
Dillibazar - 29, Sarbochha Galli, Kathmandu, Nepal  
Contact No.: +977 9851126060  
Email: emas@emas.com.np, emasenv@gmail.com

## Air Quality Test Report

Report No.: 01A/81/82	Report Date: 31 July 2024
Sample No.: 01-A/081/82	
Work Order No.: Email (Date: 24 July, 2024)	
Name and address of Client: Environment & Resource Management Consultant Pvt. Ltd., Kathmandu	
Sampling Location: Lumbini Sanskritik Municipality, Ward No. 8, Rupandehi	
Type of sampling: Ambient Air Quality Monitoring (24 Hours)	
Instrument used: Combine Sampler (GTI - 241) & Respirable Dust Sampler (GTI - 151), Greentech Instruments, India	
Sampling date: 24 - 25 July, 2024	
Sampled by: Environment Management And Analysis Services P. Ltd., Dillibazar, Kathmandu	

## Result

Parameters	Result	NAAQS	Unit	Method
Total Suspended Particulate Matter (TSPM)	153.1	230.0	$\mu\text{g}/\text{m}^3$	IS 5182 (Part -23):2006
Particulate Matter ( $\text{PM}_{10}$ )	72.8	120.0	$\mu\text{g}/\text{m}^3$	IS 5182 (Part -23):2006
Particulate Matter ( $\text{PM}_{2.5}$ )	23.6	40.0	$\mu\text{g}/\text{m}^3$	Federal Reference Method: 5(4):339-342, USEPA
Sulphur Dioxide ( $\text{SO}_2$ )	2.4	70.0	$\mu\text{g}/\text{m}^3$	IS 5182 (Part - 02):2006
Nitrogen Dioxide ( $\text{NO}_2$ )	6.3	80.0	$\mu\text{g}/\text{m}^3$	IS 5182 (Part - 06):2006

NAAQS: National Ambient Air Quality Standard, 2012

Remarks: The observed values complies with the NAAQS prescribed limits.

*Keisha*  
Sampled by

*Shiferu*  
Analyzed by

*Sh*  
Authorized by  
**Environment Management  
&  
Analysis Services P. Ltd**





# ENVIRONMENT MANAGEMENT & ANALYSIS SERVICES P. LTD

Regd No.: 127787/071/72  
Dillibazar - 29, Sarbochha Galli, Kathmandu, Nepal  
Contact No.: +977 9851126060  
Email: emas@emas.com.np, emasenv@gmail.com

## Water Quality Analysis Report

Report No	: 11/W/081-82	Date of sampling	: 25 - 07 - 2024	
Sample No.	: 11-W/081/82	Date completed	: 30 - 07 - 2024	
Sample source	: Ground Water (Tube Well - Hand Pump)	Sampled by	: EMAS P. Ltd.	
Client	: Environment & Resource Management Consultant Pvt. Ltd., Kathmandu			
Sampling Location: Lumbini Sanskritik Municipality, Ward No. 8, Rupandehi				
Parameters	Unit	NDWQS	Observed Values	Test Methods
pH	-	6.5 - 8.5*	6.3	4500-H <sup>+</sup> B, APHA, 22nd EDITION
Colour	-	5 (15)	0.4	2120 B, APHA, 22 <sup>nd</sup> EDITION
Turbidity	NTU	5 (10)	<1.0	2130 B, APHA, 22nd EDITION
Electrical Conductivity	μS/cm	1500	458.0	2510 B, APHA, 22nd EDITION
Total Suspended Solids	mg/l	-	<1.0	2540 D, APHA, 22nd EDITION
Total Dissolved Solids	mg/l	1000	280.0	2540 C, APHA, 22nd EDITION
Total Hardness	mg/l as CaCO <sub>3</sub>	500	154.0	2340 C, APHA, 22nd EDITION
Chloride	mg/l	250	5.9	4500-Cl <sup>-</sup> B, APHA, 22nd EDITION
Ammonia	mg/l	1.5	0.03	4500-NH <sub>3</sub> C, APHA, 17 <sup>th</sup> EDITION
Nitrate	mg/l as NO <sub>3</sub>	50	5.2	4500-NO <sub>3</sub> - B, APHA, 22nd EDITION
Nitrite	mg/l as NO <sub>2</sub>	3	0.02	4500-NO <sub>2</sub> - B, APHA, 22nd EDITION
Iron	mg/l	0.3 (3)	0.21	3112 B, APHA, 22nd EDITION
Manganese	mg/l	0.2	0.04	3112 B, APHA, 22nd EDITION
Calcium	mg/l	200	46.8	3500 - Ca B, APHA, 22nd EDITION
Magnesium	mg/l	-	8.9	3500-Mg B, APHA, 22nd EDITION
Arsenic	mg/l	0.05	<0.01	3114 C, APHA, 22nd EDITION
Fluoride	mg/l	0.5-1.5*	0.03	4500F- D, APHA, 22nd EDITION
Aluminium	mg/l	0.2	<0.01	3500-Al B, APHA, 22nd EDITION
Total Coliform	CFU/100 ml	Nil	Nil	9221 C, APHA, 22nd EDITION
E.Coli	CFU/100 ml	Nil	Nil	9221 C, APHA, 22nd EDITION

**NDWQS:** National Drinking Water Quality Standard (2079), \* - Values are upper and lower limit, () - Values are acceptable only when alternative is not available.

**Remarks:** Observed values of the specified parameters are within the limit of NDWQS, except low pH.

Analyzed by

Checked by

Authorized Signature

**Environment Management  
&  
Analysis Services P. Ltd**



## Baseline Environmental Monitoring: Sainamaina



**ENVIRONMENT MANAGEMENT  
&  
ANALYSIS SERVICES P. LTD**

Regd No.: 127787/071/72

Dillibazar - 29, Sarbochha Galli, Kathmandu, Nepal

Contact No.: +977 9851126060

Email: emas@emas.com.np, emasenv@gmail.com

## Noise Level Monitoring Report

Report No.: 10N/81/82				Report Date: 31 July 2024			
Sample No.: 10-N/081/82							
Work Order No.: Email (Date: 24 July, 2024)							
Name and address of Client: Environment & Resource Management Consultant Pvt. Ltd., Kathmandu							
Sampling Location: Sainamaina Municipality, Ward No. 10 (Panbari)							
Type of sampling: Ambient Noise level Monitoring (24 Hours)							
Instrument used: Sound Level Meter (SL - 4023SD), Lutron							
Sampling date: 25 - 26 July 2024							
Sampled by: Environment Management And Analysis Services P. Ltd., Dillibazar, Kathmandu							
Result							
Time	Sound Level (dBA)			Time	Sound Level (dBA)		
	Lmax	Lmin	Leq		Lmax	Lmin	Leq
7:00 AM	53.6	41.7	49.2	19:00 PM	54.6	40.3	48.6
8:00 AM	54.7	42.3	48.8	20:00 PM	53.6	39.7	49.9
9:00 AM	56.3	44.6	52.3	21:00 PM	51.9	40.8	49.8
10:00 AM	55.0	44.1	49.3	22:00 PM	54.3	41.9	48.0
11:00 AM	57.1	45.0	52.0	23:00 PM	51.7	42.3	46.1
12:00 PM	54.7	46.5	53.0	12:00 AM	52.4	41.7	46.8
13:00 PM	58.6	45.4	50.4	1:00 AM	54.1	40.4	44.8
14:00 PM	58.2	46.8	50.7	2:00 AM	51.0	40.7	43.7
15:00 PM	55.8	48.6	54.0	3:00 AM	53.8	40.7	44.5
16:00 PM	57.4	46.0	50.1	4:00 AM	54.4	43.4	46.0
17:00 PM	52.8	41.7	47.1	5:00 AM	55.1	42.8	47.7
18:00 PM	54.4	41.4	47.2	6:00 AM	53.5	42.4	45.4

*Asifan*  
Sampled by

*Blafem*  
Analyzed by

*SL*  
Authorized by  
**Environment Management  
&  
Analysis Services P. Ltd**







**ENVIRONMENT MANAGEMENT  
&  
ANALYSIS SERVICES P. LTD**

Regd No.: 127787/071/72  
Dillibazar - 29, Sarbochha Galli, Kathmandu, Nepal  
Contact No.: +977 9851126060  
Email: emas@emas.com.np, emasenv@gmail.com

## Air Quality Test Report

<b>Report No.:</b> 05A/81/82	<b>Report Date:</b> 31 July 2024
<b>Sample No.:</b> 05-A/081/82	
<b>Work Order No.:</b> Email (Date: 24 July, 2024)	
<b>Name and address of Client:</b> Environment & Resource Management Consultant Pvt. Ltd., Kathmandu	
<b>Sampling Location:</b> Sainamaina Municipality, Ward No. 10 (Panbari)	
<b>Type of sampling:</b> Ambient Air Quality Monitoring (24 Hours)	
<b>Instrument used:</b> Combine Sampler (GTI - 241) & Respirable Dust Sampler (GTI - 151), Greentech Instruments, India	
<b>Sampling date:</b> 25 - 26 July, 2024	
<b>Sampled by:</b> Environment Management And Analysis Services P. Ltd., Dillibazar, Kathmandu	

## Result

Parameters	Result	NAAQS	Unit	Method
Total Suspended Particulate Matter (TSPM)	116.8	230.0	µg/m <sup>3</sup>	IS 5182 (Part -23):2006
Particulate Matter (PM <sub>10</sub> )	48.1	120.0	µg/m <sup>3</sup>	IS 5182 (Part -23):2006
Particulate Matter (PM <sub>2.5</sub> )	10.4	40.0	µg/m <sup>3</sup>	Federal Reference Method: 5(4):339-342, USEPA
Sulphur Dioxide (SO <sub>2</sub> )	2.3	70.0	µg/m <sup>3</sup>	IS 5182 (Part - 02):2006
Nitrogen Dioxide (NO <sub>2</sub> )	4.4	80.0	µg/m <sup>3</sup>	IS 5182 (Part - 06):2006

NAAQS: National Ambient Air Quality Standard, 2012

**Remarks:** The observed values complies with the NAAQS prescribed limits.

*Sampled by*  
Sampled by

*Analyzed by*  
Analyzed by

*Authorized by*  
Authorized by  
**Environment Management  
&  
Analysis Services P. Ltd**





# ENVIRONMENT MANAGEMENT & ANALYSIS SERVICES P. LTD

Regd No.: 127787/071/72

Dillibazar - 29, Sarbochha Galli, Kathmandu, Nepal

Contact No.: +977 9851126060

Email: emas@emas.com.np, emasenv@gmail.com

## Water Quality Analysis Report

Report No	: 15/W/081-82	Date of sampling	: 26 - 07 - 2024	
Sample No.	: 15-W/081/82	Date completed	: 30 - 07 - 2024	
Sample source	: Surface Water (Panbari Wetland)	Sampled by	: EMAS P. Ltd.	
Client	: Environment & Resource Management Consultant Pvt. Ltd., Kathmandu			
Sampling Location: Sainamaina Municipality, Ward No. 10 (Panbari)				
Parameters	Unit	Generic*	Observed Values	Test Methods
pH	-	5.5 - 9	6.6	4500-H <sup>+</sup> B, APHA, 22nd EDITION
Turbidity	NTU	-	4.0	2130 B, APHA, 22nd EDITION
Electrical Conductivity	µS/cm	-	142.0	2510 B, APHA, 22nd EDITION
Total Suspended Solids	mg/l	200	<1.0	2540 D, APHA, 22nd EDITION
Total Dissolved Solids	mg/l	-	84.0	2540 C., APHA, 22nd EDITION
Oil & Grease	mg/l	10	<1.0	5520 B., APHA, 17 <sup>TH</sup> EDITION
Phenol	mg/l	1	<0.02	5530 D., APHA, 22nd EDITION
Total Hardness	mg/l as CaCO <sub>3</sub>	-	46.0	2340 C, APHA, 22nd EDITION
Fluoride	mg/l	2	<0.02	4500F- D, APHA, 22nd EDITION
Ammonia	mg/l	50	0.04	4500-NH <sub>3</sub> C., APHA, 17 <sup>TH</sup> EDITION
Lead	mg/l	0.1	<0.01	3111 B., APHA, 22nd EDITION
Chromium	mg/l	0.1	<0.01	3111 B., APHA, 22nd EDITION
Sulphide	mg/l	2.0	0.66	3112 B., APHA, 22nd EDITION
Total Residual Chlorine	mg/l	1	<0.1	4500-Cl G, APHA, 22nd EDITION
Arsenic	mg/l	0.2	<0.01	3114 C, APHA, 22nd EDITION
Zinc	mg/l	5	0.14	4500F- D, APHA, 22nd EDITION
Total Coliform	CFU/100 ml	-	94	9221 C., APHA, 22nd EDITION
E.Coli	CFU/100 ml	-	8	9221 C., APHA, 22nd EDITION

\* - Generic Standard values for water quality to be discharged into surface water. APHA – American Public Health Association

**Remarks:** Observed values of the specified parameters are within the limit of Generic standard.

Analyzed by

Checked by

Authorized Signature

**Environment Management  
&  
Analysis Services P. Ltd**



## Baseline Environmental Monitoring: Siddharthanagar



**ENVIRONMENT MANAGEMENT  
&  
ANALYSIS SERVICES P. LTD**

Regd No.: 127787/071/72

Dillibazar - 29, Sarbochha Galli, Kathmandu, Nepal

Contact No.: +977 9851126060

Email: emas@emas.com.np, emasenv@gmail.com

## Noise Level Monitoring Report

Report No.: 07N/81/82				Report Date: 31 July 2024			
Sample No.: 07-N/081/82							
Work Order No.: Email (Date: 24 July, 2024)							
Name and address of Client: Environment & Resource Management Consultant Pvt. Ltd., Kathmandu							
Sampling Location: Siddharthanagar Municipality, Ward No. 8, Rupandehi							
Type of sampling: Ambient Noise level Monitoring (24 Hours)							
Instrument used: Sound Level Meter (SL - 4023SD), Lutron							
Sampling date: 24 - 25 July 2024							
Sampled by: Environment Management And Analysis Services P. Ltd., Dillibazar, Kathmandu							
Result							
Time	Sound Level (dBA)			Time	Sound Level (dBA)		
	Lmax	Lmin	Leq		Lmax	Lmin	Leq
7:00 AM	52.6	41.7	46.7	19:00 PM	52.5	42.0	45.1
8:00 AM	51.7	40.3	45.3	20:00 PM	56.9	42.8	49.0
9:00 AM	51.1	41.4	45.6	21:00 PM	55.6	44.9	46.6
10:00 AM	54.1	40.2	45.9	22:00 PM	52.5	41.1	47.6
11:00 AM	52.5	42.4	46.9	23:00 PM	60.7	41.1	45.7
12:00 PM	53.2	41.0	44.0	12:00 AM	60.7	40.5	45.9
13:00 PM	50.7	42.4	46.0	1:00 AM	61.6	41.6	45.2
14:00 PM	55.8	43.8	47.2	2:00 AM	60.7	41.8	45.7
15:00 PM	52.0	45.3	48.5	3:00 AM	56.3	44.2	46.6
16:00 PM	59.1	42.6	47.5	4:00 AM	58.9	42.4	47.4
17:00 PM	52.3	43.7	48.6	5:00 AM	57.2	42.9	46.1
18:00 PM	51.9	41.8	47.4	6:00 AM	55.4	42.7	46.3

*K. S. B. S.*  
Sampled by

*Sh. P. S.*  
Analyzed by

*Sh. P. S.*  
Authorized by  
**Environment Management  
&  
Analysis Services P. Ltd**







# ENVIRONMENT MANAGEMENT & ANALYSIS SERVICES P. LTD

Regd No.: 127787/071/72  
Dillibazar - 29, Sarbochha Galli, Kathmandu, Nepal  
Contact No.: +977 9851126060  
Email: emas@emas.com.np, emasenv@gmail.com

## Air Quality Test Report

Report No.: 02A/81/82	Report Date: 31 July 2024
Sample No.: 02-A/081/82	
Work Order No.: Email (Date: 24 July, 2024)	
Name and address of Client: Environment & Resource Management Consultant Pvt. Ltd., Kathmandu	
Sampling Location: Siddharthanagar Municipality, Ward No. 8, Rupandehi	
Type of sampling: Ambient Air Quality Monitoring (24 Hours)	
Instrument used: Combine Sampler (GTI - 241) & Respirable Dust Sampler (GTI - 151), Greentech Instruments, India	
Sampling date: 24 - 25 July, 2024	
Sampled by: Environment Management And Analysis Services P. Ltd., Dillibazar, Kathmandu	

## Result

Parameters	Result	NAAQS	Unit	Method
Total Suspended Particulate Matter (TSPM)	166.4	230.0	$\mu\text{g}/\text{m}^3$	IS 5182 (Part -23):2006
Particulate Matter (PM <sub>10</sub> )	78.9	120.0	$\mu\text{g}/\text{m}^3$	IS 5182 (Part -23):2006
Particulate Matter (PM <sub>2.5</sub> )	12.2	40.0	$\mu\text{g}/\text{m}^3$	Federal Reference Method: 5(4):339-342, USEPA
Sulphur Dioxide (SO <sub>2</sub> )	<1.0	70.0	$\mu\text{g}/\text{m}^3$	IS 5182 (Part - 02):2006
Nitrogen Dioxide (NO <sub>2</sub> )	4.8	80.0	$\mu\text{g}/\text{m}^3$	IS 5182 (Part - 06):2006

NAAQS: National Ambient Air Quality Standard, 2012

Remarks: The observed values complies with the NAAQS prescribed limits.

Sampled by

Analyzed by

Authorized by  
Environment Management  
&  
Analysis Services P. Ltd





# ENVIRONMENT MANAGEMENT & ANALYSIS SERVICES P. LTD

Regd No.: 127787/071/72

Dillibazar - 29, Sarbochha Galli, Kathmandu, Nepal

Contact No.: +977 9851126060

Email: emas@emas.com.np, emasenv@gmail.com

## Water Quality Analysis Report

Report No	: 12/W/081-82	Date of sampling	: 25 - 07 - 2024	
Sample No.	: 12-W/081/82	Date completed	: 30 - 07 - 2024	
Sample source	: Ground Water (Tube Well - Hand Pump)	Sampled by	: EMAS P. Ltd.	
Client	: Environment & Resource Management Consultant Pvt. Ltd., Kathmandu			
Sampling Location	: Siddharthanagar Municipality, Ward No. 8, Rupandehi			
Parameters	Unit	NDWQS	Observed Values	Test Methods
pH	-	6.5 - 8.5*	6.5	4500-H <sup>+</sup> B, APHA, 22nd EDITION
Colour	-	5 (15)	<0.1	2120 B, APHA, 22 <sup>nd</sup> EDITION
Turbidity	NTU	5 (10)	<1.0	2130 B, APHA, 22 <sup>nd</sup> EDITION
Electrical Conductivity	μS/cm	1500	392.0	2510 B, APHA, 22 <sup>nd</sup> EDITION
Total Suspended Solids	mg/l	-	<1.0	2540 D, APHA, 22 <sup>nd</sup> EDITION
Total Dissolved Solids	mg/l	1000	246.0	2540 C, APHA, 22 <sup>nd</sup> EDITION
Total Hardness	mg/l as CaCO <sub>3</sub>	500	128.0	2340 C, APHA, 22 <sup>nd</sup> EDITION
Chloride	mg/l	250	4.3	4500-Cl <sup>-</sup> B, APHA, 22 <sup>nd</sup> EDITION
Ammonia	mg/l	1.5	0.14	4500-NH <sub>3</sub> C, APHA, 17 <sup>th</sup> EDITION
Nitrate	mg/l as NO <sub>3</sub>	50	2.8	4500-NO <sub>3</sub> - B, APHA, 22 <sup>nd</sup> EDITION
Nitrite	mg/l as NO <sub>2</sub>	3	<0.02	4500-NO <sub>2</sub> - B, APHA, 22 <sup>nd</sup> EDITION
Iron	mg/l	0.3 (3)	0.06	3112 B, APHA, 22 <sup>nd</sup> EDITION
Manganese	mg/l	0.2	<0.02	3112 B, APHA, 22 <sup>nd</sup> EDITION
Calcium	mg/l	200	36.8	3500 - Ca B, APHA, 22 <sup>nd</sup> EDITION
Magnesium	mg/l	-	8.7	3500-Mg B, APHA, 22 <sup>nd</sup> EDITION
Arsenic	mg/l	0.05	<0.01	3114 C, APHA, 22 <sup>nd</sup> EDITION
Fluoride	mg/l	0.5-1.5*	0.07	4500F- D, APHA, 22 <sup>nd</sup> EDITION
Aluminium	mg/l	0.2	<0.01	3500-Al B, APHA, 22 <sup>nd</sup> EDITION
Total Coliform	CFU/100 ml	Nil	Nil	9221 C, APHA, 22 <sup>nd</sup> EDITION
E.Coli	CFU/100 ml	Nil	Nil	9221 C, APHA, 22 <sup>nd</sup> EDITION

NDWQS: National Drinking Water Quality Standard (2079), \* - Values are upper and lower limit, () - Values are acceptable only when alternative is not available.

Remarks: Observed values of the specified parameters are within the limit of NDWQS.


Analyzed by

Checked by

Authorized Signatory  
Environment Management  
&  
Analysis Services P. Ltd



## Baseline Environmental Monitoring: Tilottama




**ENVIRONMENT MANAGEMENT  
&  
ANALYSIS SERVICES P. LTD**

Regd No.: 127787/071/72  
Dillibazar - 29, Sarbochha Galli, Kathmandu, Nepal  
Contact No.: +977 9851126060  
Email: emas@emas.com.np, emasenv@gmail.com

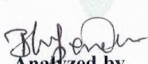
---

### Noise Level Monitoring Report


<b>Report No.:</b> 08N/81/82				<b>Report Date:</b> 31 July 2024			
<b>Sample No.:</b> 08-N/081/82							
<b>Work Order No.:</b> Email (Date: 24 July, 2024)							
<b>Name and address of Client:</b> Environment & Resource Management Consultant Pvt. Ltd., Kathmandu							
<b>Sampling Location:</b> Tilottama Municipality, Ward No. - 10, (Ganeshnagar)							
<b>Type of sampling:</b> Ambient Noise level Monitoring (24 Hours)							
<b>Instrument used:</b> Sound Level Meter (SL - 4023SD), Lutron							
<b>Sampling date:</b> 25 - 26 July 2024							
<b>Sampled by:</b> Environment Management And Analysis Services P. Ltd., Dillibazar, Kathmandu							
Result							
Time	Sound Level (dBA)			Time	Sound Level (dBA)		
	Lmax	Lmin	Leq		Lmax	Lmin	Leq
7:00 AM	54.3	44.2	49.1	19:00 PM	63.2	44.9	46.9
8:00 AM	53.6	43.7	48.3	20:00 PM	62.5	43.6	44.9
9:00 AM	61.6	42.7	48.3	21:00 PM	59.5	43.3	45.6
10:00 AM	58.7	42.2	49.3	22:00 PM	58.3	44.1	47.4
11:00 AM	54.6	41.7	50.3	23:00 PM	63.1	43.7	45.6
12:00 PM	63.3	43.5	51.1	12:00 AM	66.4	45.4	48.2
13:00 PM	58.8	41.3	52.1	1:00 AM	60.5	46.8	48.7
14:00 PM	61.1	42.6	50.9	2:00 AM	55.1	46.1	48.6
15:00 PM	64.7	42.8	50.2	3:00 AM	57.0	46.2	47.9
16:00 PM	69.5	43.6	50.5	4:00 AM	60.1	47.9	49.8
17:00 PM	62.3	42.5	47.5	5:00 AM	57.5	46.0	50.8
18:00 PM	65.0	44.5	45.9	6:00 AM	58.3	45.8	49.8




Sampled by




Analyzed by



Authorized by



**Environment Management  
&  
Analysis Services P. Ltd**







**ENVIRONMENT MANAGEMENT  
&  
ANALYSIS SERVICES P. LTD**

Regd No.: 127787/071/72

Dillibazar - 29, Sarbochcha Galli, Kathmandu, Nepal

Contact No.: +977 9851126060

Email: emas@emas.com.np, emasenv@gmail.com

## Air Quality Test Report

<b>Report No.:</b> 03A/81/82	<b>Report Date:</b> 31 July 2024
<b>Sample No.:</b> 03-A/081/82	
<b>Work Order No.:</b> Email (Date: 24 July, 2024)	
<b>Name and address of Client:</b> Environment & Resource Management Consultant Pvt. Ltd., Kathmandu	
<b>Sampling Location:</b> Tilottama Municipality, Ward No. - 10, (Ganeshnagar)	
<b>Type of sampling:</b> Ambient Air Quality Monitoring (24 Hours)	
<b>Instrument used:</b> Combine Sampler (GTI - 241) & Respirable Dust Sampler (GTI - 151), Greentech Instruments, India	
<b>Sampling date:</b> 25 - 26 July, 2024	
<b>Sampled by:</b> Environment Management And Analysis Services P. Ltd., Dillibazar, Kathmandu	

## Result

Parameters	Result	NAAQS	Unit	Method
Total Suspended Particulate Matter (TSPM)	124.1	230.0	$\mu\text{g}/\text{m}^3$	IS 5182 (Part -23):2006
Particulate Matter (PM <sub>10</sub> )	46.5	120.0	$\mu\text{g}/\text{m}^3$	IS 5182 (Part -23):2006
Particulate Matter (PM <sub>2.5</sub> )	7.8	40.0	$\mu\text{g}/\text{m}^3$	Federal Reference Method: 5(4):339-342, USEPA
Sulphur Dioxide (SO <sub>2</sub> )	<1.0	70.0	$\mu\text{g}/\text{m}^3$	IS 5182 (Part - 02):2006
Nitrogen Dioxide (NO <sub>2</sub> )	2.2	80.0	$\mu\text{g}/\text{m}^3$	IS 5182 (Part - 06):2006

NAAQS: National Ambient Air Quality Standard, 2012

**Remarks:** The observed values complies with the NAAQS prescribed limits.

*Bisha*  
Sampled by

*Bhupendra*  
Analyzed by

*Sh. B.*  
Authorized by

**Environment Management  
&  
Analysis Services P. Ltd**





# ENVIRONMENT MANAGEMENT & ANALYSIS SERVICES P. LTD

Regd No.: 127787/071/72  
Dillibazar - 29, Sarbochha Galli, Kathmandu, Nepal  
Contact No.: +977 9851126060  
Email: emas@emas.com.np, emasenv@gmail.com

## Water Quality Analysis Report

Report No	: 13/W/081-82	Date of sampling	: 26 - 07 - 2024	
Sample No.	: 13-W/081/82	Date completed	: 30 - 07 - 2024	
Sample source	: Surface Water (Ganesh Khola)	Sampled by	: EMAS P. Ltd.	
Client	: Environment & Resource Management Consultant Pvt. Ltd., Kathmandu			
Sampling Location: Tilottama Municipality, Ward No. - 10, (Ganeshnagar)				
Parameters	Unit	Generic*	Observed Values	Test Methods
pH	-	5.5 - 9	6.8	4500-H <sup>+</sup> B, APHA, 22nd EDITION
Turbidity	NTU	-	23.0	2130 B, APHA, 22nd EDITION
Electrical Conductivity	μS/cm	-	144.0	2510 B, APHA, 22nd EDITION
Total Suspended Solids	mg/l	200	8.0	2540 D, APHA, 22nd EDITION
Total Dissolved Solids	mg/l	-	90.0	2540 C., APHA, 22nd EDITION
Oil & Grease	mg/l	10	<1.0	5520 B., APHA, 17 <sup>TH</sup> EDITION
Phenol	mg/l	1	<0.02	5530 D., APHA, 22nd EDITION
Total Hardness	mg/l as CaCO <sub>3</sub>	-	52.0	2340 C, APHA, 22nd EDITION
Fluoride	mg/l	2	0.04	4500F- D, APHA, 22nd EDITION
Ammonia	mg/l	50	0.33	4500-NH <sub>3</sub> C., APHA, 17 <sup>TH</sup> EDITION
Lead	mg/l	0.1	<0.01	3111 B., APHA, 22nd EDITION
Chromium	mg/l	0.1	<0.01	3111 B., APHA, 22nd EDITION
Sulphide	mg/l	2.0	0.42	3112 B., APHA, 22nd EDITION
Total Residual Chlorine	mg/l	1	<0.1	4500-Cl G, APHA, 22nd EDITION
Arsenic	mg/l	0.2	0.02	3114 C, APHA, 22nd EDITION
Zinc	mg/l	5	0.21	4500F- D, APHA, 22nd EDITION
Total Coliform	CFU/100 ml	-	210	9221 C., APHA, 22nd EDITION
E.Coli	CFU/100 ml	-	14	9221 C., APHA, 22nd EDITION

\* - Generic Standard values for water quality to be discharged into surface water. APHA – American Public Health Association

**Remarks:** Observed values of the specified parameters are within the limit of NDWQS.

Analyzed by

Checked by

Authorized Signature

**Environment Management  
&  
Analysis Services P. Ltd**

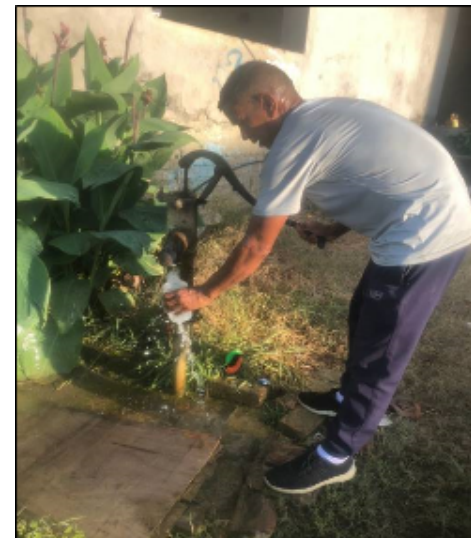




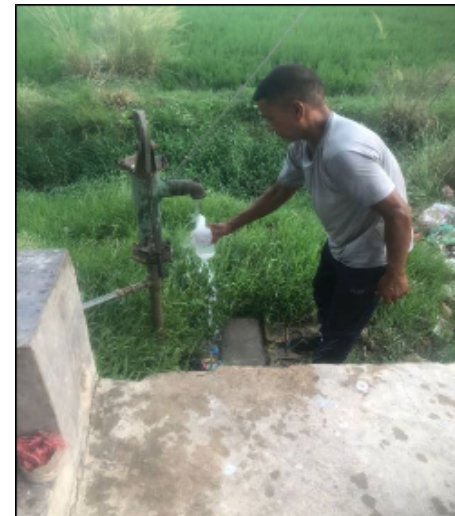
# Photographs of sampling and laboratory test



Sampling Site: ANW1



Sampling Site: ANW1







Sampling Site: ANW3



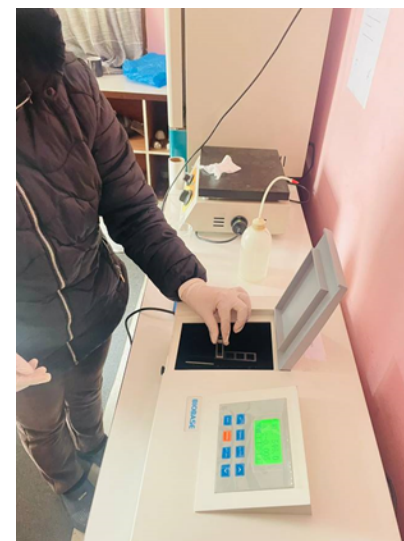
Sampling Site: ANW4







Sampling Site: ANW5



Heavy metal analysis using AAS in Laboratory; Preparation of sample for analysis in laboratory; Spectrophotometric analysis of water samples at laboratory

