



Government of Nepal

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# ***Municipality Transport Master Plan (MTMP)***

***Of***

***Khandadevi Rural Municipality***



***Volume I: Main Report***

**Khandadevi Rural Municipality Office**

Khandadevi, Ramechhap

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## **ABBREVIATIONS**

ARMP	Annual Road Maintenance Plan
CBS	Central Bureau of Statistics
DDC	District Development Committee
DOLIDAR	Department of Local Infrastructure Development and Agriculture Road
DOR	Department of Road
MIM	Municipality Inventory Map
MTICC	Municipality Transport Infrastructure Coordination Committee
MTMP	Municipality Transport Master Plan
MTPP	Municipality Transport Perspective Plan
MRCN	Municipality Road Core Network
GIS	Geographical Information system
GPS	Global Positioning System
GON	Government of Nepal
LGCDP	Local Governance and Community Development Programme
MoFALD	Ministry of Federal Affairs and Local Development
VDC	Village Development Committee
VPD	Vehicle Per Day

# CONTENTS

<b>ABBREVIATIONS.....</b>	<b>.....</b>
<b>1. INTRODUCTION .....</b>	<b>1</b>
1.1 Background.....	1
1.2 Objectives of MTMP .....	2
1.3 Scope of MTMP .....	2
1.4 Methodology of MTMP .....	3
<b>2. REVIEW OF EXISTING INFRASTRUCTURE SITUATON.....</b>	<b>10</b>
2.1 Road Linkage.....	10
2.2 Other Infrastructure .....	11
2.3 Trend of Urbanization.....	12
<b>3. INDICATIVE DISTRICT DEVELOPMENT POTENTIAL MAP.....</b>	<b>13</b>
3.1 Summary of Municipality Profile.....	13
3.2 Educational Status.....	16
3.3 Health.....	17
3.4 Development Potential Areas.....	17
3.5 Historical, Religious and Tourism Development.....	17
3.6 Existing and Potential Growth Center .....	20
3.7 Industry .....	20
<b>4. MUNICIPALITY INVENTORY MAP.....</b>	<b>21</b>
4.1 Background.....	21
4.2 Overview of Municipality Existing Roads .....	21
4.3 Road Desnsity .....	22
4.4 Public Transport Operation .....	23
4.5 Road Traffic Accidents .....	24
4.6 Parking Stations .....	24
4.7 List of Municipality Road with Coding .....	24
4.8 Bridges.....	24
<b>5. MUNICIPALITY TRANSPORT PERSPECTIVE PLAN.....</b>	<b>33</b>
5.1 Background.....	33
5.2 Visionery City Development Plan .....	33
5.3 Accessibility and Trip Pattern.....	34
5.4 Procedure for Collecing Demand.....	34
5.5 Scoring System and prioritization criteria.....	34
5.6 Grading and Nomenclature of Raods .....	36
5.7 Perspective Plan of Roads.....	40
5.8 Cost of Roads.....	44
5.9 Maintenance of Roads .....	52
5.10 MunicipalityTransperspectivePlan .....	52
<b>6. MUNICIPALITY TRANSPORT MASTER PLAN (MTMP).....</b>	<b>53</b>
6.1 Background.....	53
6.2 Budget Trend.....	53
6.3 Five Year MTMP.....	55
6.4 MTMP Output .....	62
<b>7. MTMP IMPLEMENTATION PLAN .....</b>	<b>63</b>
7.1 Problems and Issues.....	63
7.2 Implementation Modalities.....	63
Appendix A - GIS Drawings (Maps)	
Appendix B - Minutes of Meeting	
Appendix C – Rate Analysis	

## TABLES

Table 3.1	Land Use of Municipality .....	14
Table 3.2	Population of the Municipality .....	14
Table 3.3	Ward Level Population Distribution.....	15
Table 3.4	Cast/Ethnicity Population Distribution.....	15
Table 3.5	Ward Level Education Status.....	16
Table 3.6	Basic Health Indicators .....	17
Table 3.7	Agricultural Development Areas .....	17
Table 3.8	Historical Religious and Touristic Places.....	18
Table 3.9	Existing and Potential Growth Center.....	20
Table 4.1	Distribution of Road with Class at ward.....	22
Table 4.2	Road Density .....	23
Table 4.3	List of Existing Transport Route.....	23
Table 4.4	List of Existing TBridges.....	24
Table 4.3	List of Existing Proposed Bridges .....	25
Table 4.6	Municipality Road Class A .....	26
Table 4.4	Municipality Road Class B .....	227
Table 4.5	Municipality Road Class C .....	28
Table 4.6	Municipality Road Class D .....	30
Table 5.1	Weight for Prioritization of Road .....	35
Table 5.2	Urban Roads Class and Features.....	37
Table 5.3	Perspective Plan of Road Class A.....	40
Table 5.4	Perspective Plan of Road Class B.....	40
Table 5.5	Perspective Plan of Road Class C.....	41
Table 5.6	Perspective Plan of Road Class D.....	42
Table 5.7	Cost of Black Top and Gravel Road Class-A .....	45
Table 5.8	Cost of Black Top and Gravel Road Class-B .....	46
Table 5.9	Cost of Black Top and Gravel Road Class-C .....	47
Table 5.10	Cost of Black Top and Gravel Road Class-D .....	49
Table 5.11	Perspective Plan Projected Expenditure .....	52
Table 6.1	Existing Budget of Municipality .....	53
Table 6.2	Allocated Budget for Road Improvement.....	54
Table 6.3	Projected Baudget for MTMP.....	54
Table 6.4	Prioritization of Class A.....	56

Table 6.5	Prioritization of Class B .....	56
Table 6.6	Prioritization of Class C.....	58
Table 6.7	Five Year MTMP .....	60

# Chapter 1

## Introduction

Municipal Transport Master Plan (MTMP) is a comprehensive planning document for the development of roads in the municipality based on the potentialities of the municipalities and improve the accessibility of road network. It is defined as the process of Identification, classification and prioritization of roads within municipality; construction, upgrading, maintenance and rehabilitation of prioritized roads on the basis of approved criteria with calculation of financial budget. This chapter has stated on the preparation of transport master plan along with the objectives, scope of planning and methodology.

### 1.1 Background.

Road transport is a backbone of the development of municipality which has provided accessibility on transportation and improve the mobility of the people. The perspective of urban transportation is proposed in National Urban Strategy 2015. The strategies include the integration of land use and transportation in urban as well as regional planning and development of related institutional mechanisms and capacity. The provision of hierarchically balanced urban road infrastructure; promotion of sustainable urban public transport, and preparation and implementation of comprehensive transport management standards and plans.

The development endeavors help attaining sustainable livelihood and improved well-being of people. It depends upon the transportation facilities provided by roads to improve the accessibility conditions increasing the mobility of goods and services to the settlements of the municipality. The investment from state for infrastructure development evolved urbanized and semi-urbanized settlements with various services, opportunities and resources by interior communities.

The Local Government Operation Act 2075, has stated on the planning and implementation of road development Plan. The provision on Act has stated on Clause 11 Ta (1) and (2) for the preparation of Master Plan of road development which ultimately a transport plan. Ministry of Federal Affairs and Local Development has approved the Guidelines for Municipality Transport Master Plan (MTMP) on 2071/8/18 and circulated all municipalities in order to prepare the MTMP of the municipalities.

MTMP is highly significant document to plan the roads development in the municipalities with the priority investment on the infrastructure development as well as improve the transport access of the people. Transport is one of the major components to improve the access through the increase on the mobility to the settlement/community of services and facilities and also to provide linkage with market centers, agricultural production pocket areas and other potentialities of the district. Considering the transport sector interventions and planning based on the accessibility planning, Municipality Transport Master Plan (MTMP) is long term perspective plan prepared for the planned development of the roads within the municipality.

MTMP has carried out inventory study of existing roads, improvement plan (rehabilitation, upgrading, periodic maintenance) and new construction of the Municipality Road Core Network (MRCN). The MTMP is to be prepared five years and provides a prioritised list of interventions for the MRCN that can be carried out with the estimated budget for the 5-year period. Each year the planned interventions are further detailed in the Annual Work Programme of the Municipality.

## **1.2 Objective of MTMP**

The main objective of MTMP is to prepare a sustainable urban transport development and management plan for the Municipality. The preparation of a scientific and environmentally compatible development plan requires consideration of all components of the environment that exists today and to be created tomorrow. Thus a comprehensive land use plan should inter-relate all elements that from a community. The specific objectives of the study is as follows;

- to identify the present transportation system (eg. prepare/update an inventory of present road infrastructure within Municipality including the roads/street length, width, present condition,, road category and vehicular traffic on those roads
- to identify the major road and analyse the majority of people and vehicles, conditions of road and transport infrastructure
- to identify the different aspects of municipal transport and traffic management. Traffic Volume, Bus parks, Bus stops, parking route and Taxation system etc.
- To develop the present and future scenario considering development pattern and trend of population settlement and road traffic and required network.

## **1.3 Scope of Work**

The scope of the services of MTMP provides sequence of steps to be followed in the preparation of a MTMP as per the MoFALD Guidelines. The consultants will carry out these steps in accordance with the guidelines and practices. The scope of work for the preparation of MTMP is as follows;

- Assist in the Formulation of the Municipality Roads Coordination Committee.
- Secondary Sources of Information and Review of the existing MTMP
- Accessibility Data Collection and Analysis
- Prepare the Indicative Municipality Development potential Map (IDPM)
- Prepare the Municipality Inventory Map (MIM)
- Identification of the District Road Core Network (DRCN)
- Collection of Demands for New/upgrading/Rehabilitation Transport Linkage
- Developing Scoring Criteria and its Approval from Municipality
- Road classification and nomenclature
- Preparation of Perspective Plan of Interventions of Services and Facilities
- Analyse Fund Availability for Roads
- Preparation of the Municipality Transport Master Plan (MTMP)
- MTMP implementation plan

## 1.4 Methodology

The methodology is based on the MTMP Guidelines for the preparation of Municipality Transport Master Plan of MOFALD dated 2071/8/18. The process of MTMP preparation and activities is carried out as follows;

### 1.4.1 Orientation of MTMP

The consultant carried out an orientation program at Municipality in order to provide the information of MTMP preparation methodology, activities and process. The participants were Chief Executive of Municipality, representative of political parties, women, Engineers, municipality staffs.

### 1.4.2 Collect and Review Secondary Sources of Information

The consultant collected the secondary information for the existing reports, guidelines, plan related to the MTMP. The consultant collected information as follows;

S.N	Particulars	Source	Attribute
1.	Maps		
1.1	District Map	SBD	
1.2	Topographical Map	Dept. of Survey	1:25,000
1.3	GIS Map		
2	Information on socioeconomic population, settlement, industries.	District based Reports, CBS-Publication, Govt. Line agencies, Project Offices.	
4	Financial resource of the district	Khandadevi Rural Municipality	
5.	Accessibility data	Settlements/ward of municipality	
6.	DTMPs of other districts	DoLIDAR	

### 1.4.3 Accessibility Data Collection and Analysis

The consultant collected the accessibility data from the settlement /wards of the municipality using the Integrated Rural Accessibility Plan (IRAP) tools with the participatory discussion. The data collection format is used where the basic accessibility information is collected like; travel time, services and facilities, access conditions etc.

### 1.4.4 Prepare the Indicative Municipality Development Potential Map (IDPM)



The consultant has prepared a comprehensive city Development plan/visionary city Development plan based on the development potentialities of the municipality as per the Annex 1-5 of the guidelines.

**The major steps and process adopted for preparation of IDPM are as follows:**

- a. Preparation of District topographical map 1:25,000 scale indicating;
  - DDC boundary
  - Municipality boundary
  - Major settlements
  - Existing roads
  - Existing Bridges
  
- b. Based on the secondary data collected from various line agencies and municipality, the following development potential areas are identified and plotted on a map:
  - Existing/Potential areas for Agriculture  
The existing and potential agriculture production, productivity and areas are analyzed. Based on the information provided by District Agricultural Office, the agricultural areas were determined.
  - Existing/Potential areas for Horticulture  
Horticulture production, productivity and areas were identified based on the secondary source of information.
  - Existing/Potential areas for Livestock  
Existing livestock population, production and pocket areas were included in IDPM.
  - Existing/Potential Key Growth Center  
Based on the available services and facilities in the growth centers, the total number was obtained. The existing key growth centers which scored more than 55 points were classified into the growth centers, and those that scored less than 55 were identified as potential key growth.
  - Service centers  
The existing services of education, health, postal services, telecom services, etc were included in IDPM.
  - Existing/Potential areas for High Valued Cash Crops  
Existing/potential high valued crops, like apple, ginger, potato, walnuts were included in the areas and production in the district.
  - Forest area  
Forest areas of the district were classified with the community forestry.
  - Potential site for tourism
  - Historical/Religious places

- c. The above information is plotted in the base map (1:25,000) and presented for discussion. The IDPM was discussed and approved by MRCC

#### **1.4.5 Prepare the Municipality Inventory Map (MIM)**

First of all, the inventory of the existing road network needs to be identified in order to assess the transport accessibility of the district with different category and standard of roads with their linkage in municipality and strategic road network. The consultant carried out the steps and activities as follows;

##### **Listing of the Existing Roads**

The consultant collected the secondary information from DDC and concerned Division office of DOR. The list of the existing roads is prepared with table format including; road code, name of roads, length and connected municipality areas.

##### **Field Survey**

The consultant team (Engineer and Sub-engineer) are mobilized in the field for the survey of existing roads. List of the roads and working map is used for the field survey. The inventory of the existing road network is surveyed using a GPS device in order to track the coordinates of each road and to allow the preparation of a map of all existing roads. At the same time, basic information for each road shall be recorded, including road code, road name, surface type (earthen, gravel, blacktop, other), condition (good/fair, poor, bad/impassable) and fair/all weather. Although the surface categories are quite straightforward, the condition categories are more subjective and therefore the following definitions should be applied:

- Good/Fair - Road is passable by normal car
- Poor - Road is only passable by 4x4, bus, truck or tractor
- Temporarily Impassable - Road is temporarily not passable to 4-wheeled motorized vehicles
- Permanently Impassable – Road is permanently impassable to 4- wheeled motorized vehicles.

##### **Preparation of Map**

A topo map (1:25000 or 1:50000) is prepared as working map to draw the road alignment. It is clearly marked and references of different layers which is easy to discuss with municipality personnel and public. The existing roads is plotted in the topo map.

Using the GPS data collected, GIS map of A3 size is prepared and included in the report indicating all roads in the district as well as their surface type. Both maps should indicate the following

- District boundaries (thin black line)
- Municipality boundaries (thin dashed black line)
- Names of surrounding districts/states/countries
- Municipality headquarters (yellow circle, including name)
- Major waterways and water bodies (light blue lines or shapes)

- SRN roads (thick black line, including road code)
- Blacktopped local roads (thick red line)
- Gravel local roads (slightly thinner green line)
- Earthen roads (thin orange line)
- Scale

Based on the Topo map and GPS data, a Road Inventory Map is prepared indicating above layers.

### **Municipality Road Inventory**

After Field Survey of the existing roads, the Municipality Road Inventory is prepared with the list of roads, total length, surface conditions, required interventions, on Excel Template and discussed on MRCC meeting.

#### **1.4.6 Identification of the Municipality Road Core Network**

Once all the existing roads in the municipality have been inventoried, the Municipality Road Core Network (MRCN) is identified. The identification of the MRCN roads involves the selection of one road linking each wards to the SRN, to another municipality roads.

#### **Synchronize Road Core Network**

The final list of existing roads is prepared and plotted in the topo map showing the alignment. It shows the road network of municipality which indicates the road access and linkage with strategic roads, district roads and other municipal roads. The existing roads will synchronize and develop with the core network of the municipality.

In case of SRN roads, priority is given to the blacktop road given the higher standard of this road.

#### **Identification of New Construction Roads**

Where certain areas are not yet linked by road and needs to be connected the development potential areas, settlement and future land development area new road construction is required to provided the access with a complete the network. The consultant filled up the demand FORMAT for new construction roada for the alignment to link the area to the municipality and plotted in the MRCN map. This exercise serves only to determine a tentative length for new construction and not to determine the exact alignment and control points for the new construction. The final alignment and control points will be determined at a later stage based on a thorough walk over and feasibility studies.

#### **MRCN Map**

Once the MRCN roads have been selected, an A3 size DRCN map is prepared as per the Guidelines. The MRCN map indicates the different roads network, road standard according to the legends provided in the Guidelines. The consultant shall facilitate for the approval of MRCN map by the municipality.

#### **Road Code**

MRCN roads needs to be assigned a code in line with the national road code standards. The consultant has given the road code to each road referring the Guidelines.

#### 1.4.7 Developing Scoring Criteria and its Approval from Municipality

The scoring criteria has fixed and approved by MRCC and Municipality for the prioritization of municipality roads. The consultant is prepared the criteria based on the Guidelines (Criteria B-Annex 4) and presented for approval.

#### 1.4.8 Road classification and nomenclature

The municipality roads are classified as per the Guidelines (Criteria A) as follows;

Main Collector Road class A; -----RoW-7m total 14 m and setback 1.5 m

Collector Road class B: -----RoW-5m total 10m and setback 1.5 m

Main Ward Road class C: -----RoW- 4m total 8 m and setback 1.5 m

Tole and ward roads Road class D -----RoW- 3m total 6 m and setback 1.5 m

#### 1.4.9 Municipality Transport Perspective Plan (MTPP)

The Municipality Transport Perspective Plan (MTPP) is simply the list of all the identified interventions that are necessary to bring the roads to a maintainable all-weather standard and keep them there, as well as the construction of any new roads considered necessary to complete the MRCN. The consultant is prepared MTPP considering the existing inventory and future perspective development transport network for 20 years.

The approach for the MTPP is to improve the access transport condition of municipality by providing the required interventions of repair and maintenance of existing roads, upgrading with gravel and blacktopping of the existing roads and new construction of roads. Municipality has set a vision that each and every household shall be accessed with road within 10 minutes and within 15 minutes for all weather roads.

##### **MTPP Map preparation**

A map of A3 size is prepared, based on the map of the existing MRCN. In addition, this map indicates the sections of road requiring gravelling, blacktopping or new construction. The map is further indicate bridges, causeways and slab culverts that need to be constructed.

#### **COST ESTIMATION OF INTERVENTIONS**

With the MTPP providing the full list of required interventions to bring the MRCN to a maintainable all-weather standard and keep it there, the costs of these interventions can be calculated using the standard costs as per the MTMP Guidelines and District Rate. The cost estimation was discussed with Engineer and finalize. Based on the finalized cost estimation, the total cost of the different interventions of all roads is presented on Excel Template.

### **Prioritization for MTMP**

The approved prioritization criteria is developed based on the Guidelines which is used for prioritization of the municipality roads for. The prioritization criteria was passed from MRCC and Municipality which is applied for prioritization for the preparation of MTMP.

### **Prioritization for Conservation**

For **conservation**, the periodic maintenance, routine maintenance and rehabilitation of the existing roads will be carried out as per the guidelines..

### **Prioritization for Improvement**

For **improvement**, it is recommended to divide the works into two parts: the first to bring the road to gravel standard and all other improvement works, and the second to bring the road to blacktop standard. This will avoid the road being given very low priority due to the excessive costs involved in gravelling and subsequently blacktopping the road.

### **Prioritization for New Construction**

Lastly, where **new construction** of MRCN roads is required, the new construction roads will be prioritized.

#### 1.4.10 Municipality Transport Master Plan (MTMP)

The final part of the MTMP process is the balancing of the available budget and the estimated costs of the required interventions, to determine which interventions can be carried out in the 5-year period. The financial resource is estimated based on available budget of municipality which will be invested in the road sector to carry out the MTMP.

### **Budget Allocation for MTMP**

The consultant is prepared the budget allocation for MTMP planning process. This step is to determine the percentage of the available budget that will be allocated to the MRCN and be used in the MTMP. This percentage is discussed and finalized with MRCC. In the allocation of the MTMP budget, priority is given to maintenance works, followed by improvement works

### **MTMP for five Year**

The five year MTMP is prepared based on the allocation budget and the priority ranking of the conservation, improvement and new construction interventions of the road. The roads planned for five year matching with the budget available for the MTMP. The consultant is facilitated to prepare the MTMP and discussed with the municipality personnel and MRCC

### **MTMP Map**

MTMP map of A3 size is prepared indicating the existing DRCN and the interventions included in the MTMP. This is similar to the DTPP map, except that it does not necessarily include all interventions. This map effectively shows the situation in the district after the 5-year MTMP period. An example MTMP map is provided on the next page.

### **MTMP Approval**

The draft MTMP is presented to the MRCC and Municipality for approval. The consultant team is facilitated and presented the draft MTMP report on power point presentation. The draft report was presented on Technical Division of MoFALD and incorporated the comments and prepared Final Report. The presentation shall be organized with MTMP maps (working map -topo map 1:25000), MTPP roads, MTMP interventions (conservation, improvement and new construction), MTMP budget etc.

## Chapter 2

### Review of existing infrastructure situation

This chapter review the existing road and roadside infrastructure, bridges and structures along with their current condition. Municipality has its road network providing the accessibility to the ward and settlement. The road has direct effect to the transportation system for the development of urbanization, housing and settlement etc.

#### 2.1 Road Linkage

The municipality is connected by B.P. Highway (at riverbank of Sunkoshi River) from Sitkha Bridge at Sunkoshi River in the southern part of the rural municipality. Khandadevi Rural Municipality is connected from the Manthali from the Manthali Bridge over Tamakoshi. Municipality wards and settlement are connected from these roads bifurcating in many places by various roads. The rural municipality road is further connected to wards and various settlements.

##### *Strategic Road Network*

The strategi road of the municipality is connected with Mid- Hill Highway (Eastern part) which is under construction stage. The tentative length of the road is 31.5 km at left bank of Sunkoshi River of Khandadevi Rural Municipality, Bieside this highway, BP highway is also connecting the roads in the rural municipality and provides the transportation services to people.

##### *Distrit Road Core Network (DRCN)*

There are some DRCN roads linkage in the Khandadevi rural municipality which is mentioned in the District Transport Master Plan of Ramechhap as follows:

- 21A005R- Manthali-Galpa (Manthali-Pakarbas-Galpa section)- 34 km
- 21A007R- Khairenighat-Rakathum-Galpa – 20 km
- 21A008 R- Luvu-Bethan-Galpa (Galpa-Hiledevi-Bethan-Luvu section)- 38 km
- 21A006 R- Fulpa-Sitkha (Sitakhaghat-Bhirpani-Lakap-Durali-Fulpa section) – 17 km
- 21A070R- Gothapani-Majhuwa Schoo Road – 9.5 km
- 21A079R- Sitkha-Nigalpani-Kuladanda Road- 9 km
- 21B008 R- Khairenighat-Bethan-Galpa (Chapadi-Khaniyapani Section) – 6 km
- 21B062R- Manthalighat-Mugitar-Madimuhan-Tribeni Road – 9 km
- 21B039R- Aapchour-Chulthepani Road- 6 km
- Sitkha-Aapchour- Goganpani Dada- 12 km
- Goganpani-Bhirpani Road – 11 km
- Sitkha-Lapka-Sanne-Rajgaun Road – 25 km
- Khairabote-Majhuwa M.V.-Khandadevi Mandir Road – 10 km
- Furkesalla-Dhulebesi-Megarpa Road -8 km
- Makadhumb-Timu-Doramba Road -18 km

## 2.2 Review of Municipality Strategy for road development

The strategy of road development in Khandadevi Rural Municipality has been considered top priority to develop existing roads to connect the settlements, to improve the access condition of the settlement. The road density will be increased. The overall strategy of municipality roads will be focused on the following aspects;

- Upgrading into black topped and gravel condition of the existing main roads of the Khandadevi Rural Municipality.
- Integration of land use and transportation
- Provision of hierarchical and balanced urban road infrastructure development
- Sustainable public transportation system
- Standards for urban road management

The strategy has been based on the urbanization and transport services of the municipality to make sustainable and integrated transport system. Nepal Urban Development Strategy, 2015 has stated the development of urban road as below;

४०. सडक/परिवहन: शहरी यातायात संबन्धमा एउटा फराकिलो दृष्टिकोण राखिएको छ । यस अन्तर्गत प्रमुख रूपमा भूउपयोग र यातायात/परिवहनलाई शहरी तथा क्षेत्रीय योजना तर्जुमा प्रकृत्यामा एकीकृत गर्दै तत्सम्बन्धी संस्थागत संयन्त्र र क्षमताको विकास गर्ने, तहगत र सन्तुलित शहरी सडक पूर्वाधारको प्राबधान गर्ने, दिगो शहरी सार्वजनिक परिवहनको प्रबन्ध गर्ने, शहरी यातायात व्यवस्थापनका लागि मानकहरूका साथै बिस्तृत योजना तयार/कार्यान्वयन गर्ने, र प्राथमिकता प्राप्त प्रदेशहरूमा उच्च-गति अन्तर-शहरी यातायात पूर्वाधारको प्राबधान गर्ने जस्ता रणनीतिहरू रहेका छन् ।

## 2.3 Trend of urbanization

The urbanization in the Khandadevi Rural Municipality has been increasing trend at the market centers of the Goganpani, Makadum, Galpa, Dhulebesi, Madi Muhan areas. The trend of urbanization of the municipality has evolved the pertinent reasons as follows;



1. Urbanization based on residential settlement of new housing
2. Market growth center development in the many places like;Sitkha, Goganpani etc.

## Chapter 3

# Indicative Development Potential Map

### 3.1 Summary Municipality Profile

#### 3.1.1 Historical Background

Khandadevi Rural Municipality is located at Ramechhap district of the Province no. 3 of Nepal. The municipality has named with the historical place of Khandadevi Mandir which is located at the ward no 7 of the municipality.

Khandadevi Rural Municipality was established under the restructure of the local levels on the 2074.11.27 (Rajpatra) by the Government of Nepal merging the existing Rakathum, Majhuwa, Bhirpani, Pakarbas, Makadhun, Khandadevi, Galgal Bhaudaure and Pinkhuri VDCs of the Ramechhap district. The municipality has administratively divided into 9 wards.

The municipality is bordered with Manthali Municipality in the east, Kabhrepalanchowk district in the west, Sunapati Rural Municipality and Doramba Rural Municipality in the north and Sunkoshi River (Sindhuli district) in the south.

#### **Geo-physical location**

The municipality is located in Ramechhap district, Province no. 3. of Nepal. The geographic position of the municipality is located at 85<sup>0</sup> 40' to 86<sup>0</sup> 00' east longitude and 27<sup>0</sup> 22' to 27<sup>0</sup> 30' north latitude.

Geographically, the municipality is river valley plain area located at river bank of Tamakoshi and Sunkoshi River. The hill and high hill areas is located in the northern part of the municipality having topographic slopes in the terrain.

#### **River and Rivulets**

The main rivers of the Khandadevi Rural Municipality is Tamakoshi and Sunkoshi River located in the border of municipality. There are other rivulates; Bhatauli Khola, Goganekhola, Majuwakhola, Sadi Khola, Sitkha Khola, Nigalpani Khola, Kalemale Khola, Kalpu khola etc.

#### 3.1.2 Climate

The average temperature of the municipality is found as maximum of 35<sup>0</sup> C to minimum of 1<sup>0</sup> C . The average rainfall of the municipality is 123.1mm. The climate of the municipality is tropical in the river valley plain and sub-tropical in the hill areas.

### 3.1.3 Land Use

The land use pattern of the municipality comprises with the residence, agriculture land, bush, settlement, rivers etc. The total land area of the municipality is 150.70 sq. Km. The distribution of land use of the municipality is given below;

**Table 3.1: Land Use of the Municipality**

S.N.	Land Use	Area in sq. Km.
1	Forest Land	44.75
2	Agricultureland	60.4
3	Bushes	40.13
4	Barren land	0.32
5	Sand	1.64
6	Water body	3.11
	Total	150.36

Source: Department of Survey, Topographic map

The above table indicates that there is highest arable land in the municipality with the plain valley in river bank of Sunkoshi and Tamakoshi river. There is significant potentialities of agriculture farming mainly on the vegetable production, cash crops and cereal crops.

### 3.1.4 Population

The population of the municipality is 25761 and total household of 5372 (census 2011). The distribution of male population is 11762 (46 %) and female are 13999 (54 %). The population characteristics of the municipality is given below;

**Table 3.2: Population of Municipality**

S.N.	Particular	Population
1	Total Population	25761
2	Male	11762
3	Female	13999
4	Total Household	5372
5	Household Family size	4.8
6	Sex Ratio	1:1.2
7	Population Density (per sq.km)	170.9

Source: Census 2011, CBS

#### 3.1.4.1 Ward Level Population

The ward level population distribution of the the municipality are drawn from the previous VDC ward population of the Census 2011. The districution of population in ward level is given below;

**Table 3.3: Ward Level Population Distribution**

Ward No	HH	Male	Female	Total
1	716	1550	1884	3434
2	453	1054	1239	2293
3	764	1392	1861	3253
4	651	1964	1945	3909
5	526	1131	1352	2483
6	422	825	1086	1911
7	838	1814	2111	3925
8	574	1129	1346	2475
9	428	903	1175	2078
Total	5372	11762	13999	25761

Source: Population Census, 2011.

The highest population are found in ward no 7 and lowest in the ward no 6 of the Khandadevi Rural Municipality.

#### 3.1.4.2 Cast/Ethnicity of Population

The population distribution of the cast/ethnicity of the Khandadevi Municipality is comprises with the Chhetri, Brahmin, Magar, Tamang, Newar, Kami etc. The distribution of cast/ethnic population is given below;

**Table 3.4: Cast/Ethnic Population Distribution**

Cast /ethnicity	Male	Female	Total
Chhetri	2973	3744	6717
Brahmin –Hill	293	293	586
Magar	811	1052	1863
Tamang	3053	3658	6711
Newar	2680	3155	5835
Kami	354	398	752
Rai	6	5	11
Damai	314	368	682
Sarki	160	143	303
Sanyashi/Dasnami	79	57	136
Gharti Bhujel	46	49	95
Sunuwar	18	22	40
Dhobi	17	21	38
Majhi	779	844	1623
Thami	106	111	217
Pahari	21	38	59
Badhi	11	12	23
Other	34	16	50
Terai Others	7	13	20

Total	11762	13999	25761
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Source: Population Census, 2011.

### 3.2 Education Status

The education status of the Kandadevi Rural Municipality has found the literacy rate of 61.75 % comprises with male 72.78 % and female 52.3 % which has minimum of the national literacy rate of 65.9 %. (Census 2011). The ward level literacy distribution of male and female is given below;

**Table 3.5: Ward Level Education status**

Ward No	Male				Female				Literacy %
	Read and Write	Read only	Not read and write	not stated	Read and Write	Read only	Not read and write	not stated	
1	901	122	400	2	855	155	747	6	55.2
2	696	51	218	0	592	65	470	0	61.6
3	948	38	277	1	960	40	730	0	63.7
4	1430	57	362	0	935	55	799	0	65.0
5	854	22	154	0	733	27	494	0	69.5
6	635	25	97	0	619	37	362	0	70.6
7	1176	59	455	1	945	81	945	2	57.9
8	650	56	332	0	590	47	638	0	53.6
9	623	33	175	0	569	38	468	0	62.5
Total	7913	463	2470	4	6798	545	5653	8	61.7

Source: Population Census, 2011.

The above table indicates the educational status of wards which comprises the literacy rate of the ward. It is found that the highest literacy rate if 70.6 % at ward no 6 (makadum) and lowest of 53.6 % at ward no. 8 (Gagal Bhadaure).

The educational institutions at Khandadevei Rural Municipality is found 65 number of ECD, 52 Basic Educational Institutions, 12 Secondary School (general) and 6 Community Learning centres.

### 3.3 Health

The health indicators of the Ramechhap district has been outlined with different indicators of F.Y. 2073/74.

**Table 3.6: Basic Helath Indicators**

S.N	Indicators	2073/74
1	BCG coverage %	57.4
2	Polio 3 coverage %	61.3
3	Measles Coverage %	60.9
4	Total OPD new visit as % if total population	105.04

5	Contraceptive Prevalence Rate (CPR) MWAR	32/63
6	VSC cases target vs achievement	23.8
7	TB cases finding rate	96

Source: CBS, Census 2011.

### 3.4 Development Potential Areas

#### Agriculture Development Potentiality

The potentialities of the municipality consists on the agriculture, livestock, industries, forest products in the area. There is existing and potential agriculture area located in various pocket area of the municipality.

**Table 3.7: Agriculture Development Area**

S.N.	Agriculture Products	Pocket Area
1	Green vegetable	Madi Muhan, Pakarbas, Dhulebesi, Galpa
2	Potato	Galpa, Timu, Makadum, Pakarbas
3	Ginger	Pakarbas, Bhirpani, Majhuwa, Rakathum
4	Mustard	Galpa area

### 3.5 Historical, Religious and Tourism area

Khandadevi Rura Municipality is one of the historical and religious place which is religious temples of Khandadevi. There are touristic places located in the municipality. The historical, religious and touristic places are as follows:

**Table 3.8: Historical Religious and Touristic Places**

S.N.	Historical, Religious and Touristic Places	Location
1	Khandadevi Manir	Ward 7
2	Agaleshor Dada	Ward 7
3	Baudha Gumba	Ward 5
4	Pemachorling Gumba	Ward 1
6	Bishwamitra Mandir	Ward 1
7	Kireteshor Mahadev Mandir	Ward 1
8	Shree Krishna Mandir	Ward 1
9	Thupten Tangwa Rikpiling Gumba	Ward 1

<b>S.N.</b>	<b>Historical, Religious and Touristic Places</b>	<b>Location</b>
10	Halo Dhunga	Ward 1
11	Thanapati Manidr	Ward 9
12	Indrawati Mandir	Ward 9
13	Talkusing Budha Gumba	Ward 9
14	Nepal Tamang Gumba	Ward 9
15	Mahadev Mandir	Ward 8
16	Mahakali Mandir	Ward 8
17	Pashupati Mandir	Ward 8
18	Golmathan	Ward 8
19	Sasol Sindru Gumba	Ward 8
20	Chirankhu Gumba	Ward 8
21	Ward no 2 Gumba	Ward 8
22	Krishna Pranami Mandir	Ward 2
223	Jaldevi Mandir	Ward 2
24	Khanda Devi Mandir	Ward 2
25	Kundilen Chorthel Gumba	Ward 2
26	Mahadev Mandir (Kuranthali)	Ward 2
27	Kadhadevi Mandir (Sitkha)	Ward 3
28	Sidheshori Mandir	Ward 3
29	Pancheshor Mahadev Mandir	Ward 3
30	Pashupati Mandir	Ward 3
31	Bhimsen Mandir	Ward 3
32	Krishna Mandir (Chisapani)	Ward 3
33	Tarakeshor Mandir	Ward 3
34	Sidhadevi Mandir	Ward 6
35	Kalidevi Mandir	Ward 6
36	Sunadevi Mandir	Ward 6
37	Setidevi Mandir	Ward 6

S.N.	Historical, Religious and Touristic Places	Location
38	Sano Khandadevi Mandir	Ward 6
39	Singh Bhairab	Ward 6
40	Cirta Ghyang	Ward 6
41	Ganeshmandir (Gogane)	Ward 6
42	Punyashor Mahadev Mandir	Ward 6
43	Tarakeshor Mahadev Mandir	Ward 6
44	Rudreshor Mahadev Mandir	Ward 6
Tourist and Natural spots		
45	Agaleshor Dada Toursim Area	ward 7
46	Khanda Devi Mandir Tourism Area	ward 7
47	Sunkoshi River Rafting Tourism	
48	Tamakoshi River Rafting and Tourism	

**Land  
pooling  
and**

### development

There is potentiality of land pooling and land development area in Madi Muhan and Sitkha, Bhirpani

### 3.6 Existing and Potential Growth Centres

There are number of existing and potential growth centres located in various places which provides the market and trade flow in the municipality comprising the sale of local products in these markets and buy the necessary items. The existing market centres are as follows:

**Table 3.9: Existing and Potential Growth Center**

S.N.	Existing Growth Centre
1	Galpa bazar
2	Madi Muhan bazar
3	Fulpa bazar
4	Sitkha bazar
5	Goganpani Bazar
6	Luvu Bazar
7	Chulthepani bazar
8	Ghyangsing Dada Bazar (Potential)

Source: Field survey, 2019.

### 3.7 Industry

There are number industries potential in the municipality. These industries have provided the employment and production of goods. The major industries are food and beverage industries, brick manufacturing, diary industries etc.

## Chapter 4

# Municipality Inventory Map

### 4.1 Background

There are number of existing roads located in various major settlements, wards of the municipality. The road inventory comprises the existing roads with the road conditions, structures and road length of the municipality. The field survey was carried out to each and every roads of the municipality and collects the technical data of the roads. The existing municipality roads are identified during the Ward level workshop and simultaneously carried out the field conditional survey. GPS tracking and technical information was collected of prescribed format. The road Inventory of the municipality is given below;

### 4.2 Overview of the Municipality Existing Roads

The number of existing roads are providing the road accessibility and transport services to all parts of the municipality categorically with black topped, gravelled and earthen roads as well as bridges. The strategic road connected with major areas like; Sitkha from B.P. Highway, Luvu from B.P. Highway.

#### **Strategic and Feeder Roads**

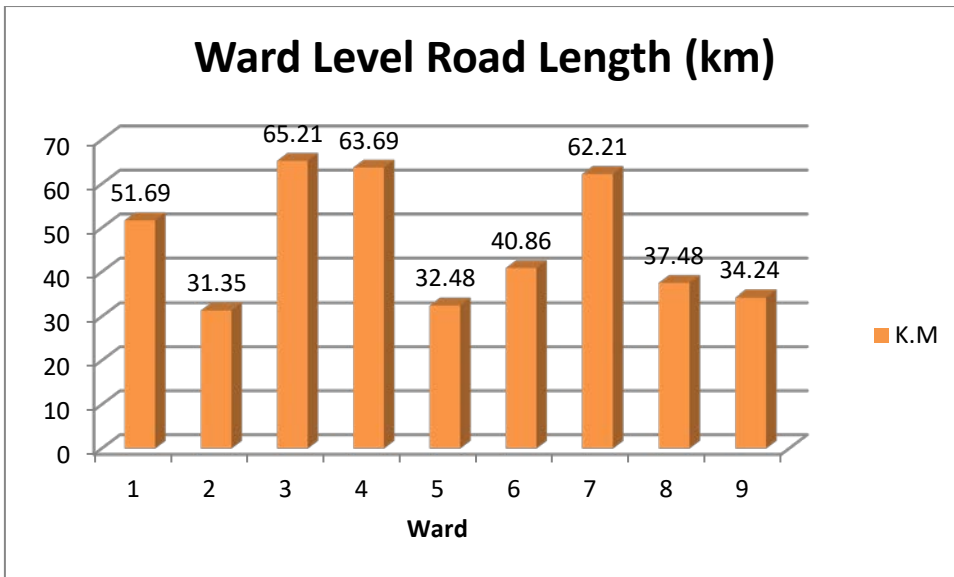
Puspalal Mid Hill Highway (Eastern Part) is located in the river bank of Sunkoshi from Tribeni to Khaireni. The connection linkage is from the B.P. Highway and existing district roads are providing the services. The district roads are under the municipality.

#### **Municipality Roads**

There are number of municipality roads providing the road linkage to the settlement with the market center, strategic roads and urban roads. The roads of the municipality has surveyed and based on the survey data, the roads surface has been outlined with earthen conditions.

#### **Chart 1: Distribution of ward level Road**





### Ward Level Road Distribution

The roads located in the ward level has been classified as per the surface type of black top, and earthen. The ward level road distribution is given below;

Table 4.1: Distribution of roads with Road Class at Ward Level

Ward	Class A	Class B	Class C	Class D	Total
1	16.35	10.70	9.15	15.49	51.69
2	4.27	18.89	5.65	2.54	31.35
3	23	11.38	9.79	21.04	65.21
4	24.20	14.37	13.99	11.13	63.69
5	16.00	1.59	7.96	6.93	32.48
6	20.55	2.29	3.55	14.47	40.86
7	34.45	7.75	16.28	3.73	62.21
8	21.70		9.69	6.09	37.48
9	13.00	7.47	6.2	7.57	34.24
Total	173.52	74.44	82.26	88.99	419.21

### 4.3 Road Density of Municipal Roads

Road density of the municipality comprises with the status of the road network in the municipality. According to national urban strategy the target of urban road density is 7.5 km per square km land area. The most of the roads are earthen and are very narrow (<4.0 m) to address the trip generated from various area. The ward wise distribution of road and land-use pattern has presented.

Table 4.2: Road density of Municipality Roads

Ward	Population	Area sq.km	Length km	Road Density km/sq.km	Desity population/
1	5175	20.56	51.69	2.5	100.1
2	2739	17.17	31.35	1.8	87.4
3	5117	26.83	65.21	2.4	78.5
4	3942	22.5	63.69	2.8	61.9
5	3015	8.64	32.48	3.8	92.8
6	2835	8.11	40.86	5.0	69.4
7	5085	21.34	62.21	2.9	81.7
8	3045	15.63	37.48	2.4	81.2
9	2430	9.68	34.24	3.5	71.0
Total	33383	150.46	419.21	2.8	79.6

The road density of the municipality is 2.8 km per square km of land area. The existing road situation of the municipality is very low which needs to increase the road length in the future plan. Another aspect is the forest and unused areas where road construction is less priority and not been carried out the construction work.

#### 4.4 Public Transport Operation

The transportation facilities and travel pattern of people in the municipality area is going towards various settlement and market centers. Typically, the nature of transport operation is higher at morning shift and evening time. The major settlements of generating public transport trips are dense settlement area as stated earlier.

**Table 4.3: List of Existing Transport Routes linking of Municipality**

S. N.	Route Description	Vehicle Type
1	Kathmandu-Sitkha-Goganpani-Galpa and Reverse	Mini Bus, TATA Sumo
2	Kathmandu-Sitkha-Goganpani-Fulpa-Pinkhuri/Bhadaure and Reverse	Mini Bus, TATA Sumo
3	Kathmandu-Luvu-Rakathum and Revers	TATA Sumo
4	Manthali-Pakarbas-Goganpani-Galpa Reverse	Mini Bus, TATA Sumo
5	Kathmandu-Sitkha-Majhuwa and Revers	TATA Sumo

#### 4.5 Road Traffic Accidents

Road accident is happened mostly in the roads of the Khandadevi Municipality area. The rural roads with earthen surface with high grade and overloaded passenger caused the accident. There was a serious accidents in the couple of years at Bhirpani and other minor accidents.

The road condition is not engineering standard and earthen surface is mainly cause of the accidents.

#### 4.6 Parking Situation

There are not specified location for parking at Bus Stop is observed in all the road alignment of municipality. Similarly, parking of the vehicles on the side of the market area is the problem and most of the market centres does not have sufficient parking spaces. It is noted that there is parking problem for the bus operation in future.

The parking and terminal could be developed at Makadum, Sitkha, Goganpani, Fulpa, Galpa and Madimuhan areas.

#### 4.7 List of Major Municipality Roads with Coding

Municipality road inventory has identified the roads in all wards with its surface conditions and length of the roads as well as width of the roads. These existing roads are classified as Class A, Class B, Class C and Class D accordingly with its surface conditions of Black top, Gravelled, Earthen, Stone Laying, Brick Laying and RCC slabs. The existing inventory of municipality roads are given below;

#### 4.8 Bridges

There are number of bridges located at Sikta of Sunkoshi River which linked the road crossing from B.P. Highway and boarder of Khandadevi Municipality. . The existing bridges are as follows;

**Table 4.4: List of Existing Bridges**

S.N.	Bridge	River
1	Sikta Bridge	Sunkoshi River
2	Khaireni Bridge	Sunkoshi River
3	Tribeni Suspension Bridge	Tamakoshi River
4	Dhulibeshi Bridge	Bhatauli River
5	Juamiretar Bridge	Bhatauli River
6	Belghari Suspension Bridge	Sunkoshi River
7.	Baseri Truss Bridge	Kalemale khola
8	Ghatte Khola Suspension Bridge	Ghattekhola

**Table 4.5 : List of Proposed Bridge**

S.N.	Bridge	River	Road
1	Khalpukhola Motorable Bridge	Khalpu khola	Galpa-Taldung-Thansingh-Kharidhunga-Chirankhu Road
2	Kothape Suspended Bridge		

3	Ghatte Khola Dovan Motorable Bridge	Ghatte Khola	
4	Gopikhola Truss Bridge	Gopikhola	Khanigaun-Deshar Gaoun (Sunapati 5)
5	Gogane Khola Motorable Bridge	Gogane Khola	Barbote-Besitole-Ward office Road
6	Kalemale Khola Suspension Bridge	Kalemale Khola	
7	Bhatauli Khola Motorable Bridge	Bhatauli Khola Barabise-Swara	Ghyangsingdada- Dhulebesi Road
8	Balpa Khola Motorable Bridge	Balpa Khola Dhansar tole 5	Dhusal-Nigalpani Road
9	Yogmar Khola Bridge	Yogmar Khola, Todke	Aapchour-Bhirpani
10	Kajjeli Khola (Thulokhola)_Suspension Bridge	Thulokhola ward 3	

**Table 4.6: Municipality Road Class A-Main Road with surface condition**

**Table 4.7: Municipality Road Class B-Main Road with surface condition**

**Table 4.8: Municipality Road Class C- Ward main road with surface condition**

**Table 4.9: Municipality Road Class D- Tole road with surface condition**

## Chapter 5

# Municipality Transport Perspective Plan

### 5.1 Background

Municipality Transport Perspective Plan (MTMP) is a long term plan to develop the municipality roads which will improve the access condition by interventions of the municipality roads. Municipality has east west main road and north south roads which is connected from highway and feeder roads and providing the transport access to the people. The existing road width is narrow and not in standard which needs to widen and maintain the standard as far as possible. The perspective plan of the MTMP is considering the road widening, upgrading and improving the road conditions with required interventions of repair and maintenance of existing roads, upgrading with gravel and blacktopping of the existing roads and new construction of roads. Municipality has set a vision that each and every household shall be accessed with road within 10 minutes and within 15 minutes for all weather roads.

## 5.2 Visionary City Development Plan

In order to develop the MTMP, a visionary city development plan has to be considered for the integration of the development perspective of the municipality. The visionary development of the municipality has been set out the mission, vision and strategy of the municipality with policies adopted in the plan. The development visionary plan of the municipality is as follows;

Khandadevi Rural Municipality, is adjoining with Manthali Municipality and align with B.P. Highway is growing city. The visionary plan includes its future development pattern, the possible income sources of municipality and the future land use pattern. There are potentiality of land pooling and development projects in Madi Muhan, Bhirpani, Goganpani, Galpa areas.

The vision of the municipality is to address the basic needs of the people with specific identity to enhance the development, secured, sustainable development, and a prosperous municipality.

The municipality has stated the aims as “ Beautiful, Civilized and Prosperious Khandadevi”. The strategy has been outlined for utilization of resources as integrated manner for the development of the total development of municipality in line with the Sustainable Development Goals (SDGs).

The visionary plan of the city is mixed type as the different kind of land use and the development potentials. The visionary city plan stated in the infrastructure sector is as follows;

- The municipality has considered the sustainable development, managed and long term perspective city with enviromental friendly approach. For this, municipality will prepare a comprehensive integrated master plan of drinking water supply, Municipal Transport Master Plan of the municiplaity.
- Municipality have policy to protect the culture and heritage of Core Area.
- Municipality will develop the integrated green belt on the river corridor and plan to upgrade the existing roads of the municipality into black topped, gravel standard.

There are some provision on prioritization of the projects as follows;

- Projects prioritized for the economic development and alleviation of poverty of the people
- Production oriented and quick result
- Revenue mobilization and increase on the internal revenue
- Local resource mobilization, institutional development and public participation

## 5.3 Accessibility and Trip Pattern

Accessibility of road transport assess the mobility of people's ability to reach the goods, services and activities they required. Transport network effect on the accessibility conditions of the people to take the time to reach nearest all weather road.

There are different methods of transport users and modes, different land use patterns, and different solutions to transport problems. *Mobility and Accessibility* considers physical movement of the people from starting point to end in itself from one road to the destination. The existing accessibility situation will give the scenario of the transport situation of the settlements which has linked with the roads. Based on the access situation, the improvement of the accessibility will be considered by transport interventions of upgrading the road conditions and/or additional transport linkage.

#### 5.4 Procedure for collecting demands from wards

The existing roads and transport services was discussed at ward level meeting in every ward and collect the informations related to road name and road surface conditions. The meeting was carried out by the study team in the ward at presence of ward chairperson and ward members and local people. The discussion was concluded with the identification of the existing roads in the ward.

#### 5.5 Scoring System and Prioritization Criteria

Development of the scoring criteria and prioritization criteria based on the provided guidelines are prepared and its approval from the municipality. The existing road inventory has found different surface and width in the municipality roads. The roads need to be categorized and prioritized according to the interventions (upgrading) for the five year master plan. The prioritization approach is adopted for the rational allocation of limited funds for the upgrading of various categories of road linkage.

For the prioritization of the roads, the scoring criteria was applied as per the MTMP Guidelines. The criteria for the prioritization of roads are given below:

**Table 5.1: Weights for the Prioritization Criteria**

S. No.	Criteria	Scoring Unit	Method of Measurement	Score
1.	Link providing service to large areas/population.	Population served/km (continuously Scored)	Measurement of served HH from map and multiplying with HH occupancy of respective wards	15
2.	Link providing service to areas with high potential for agriculture, horticulture, livestock production.	Annual production equivalent to NRs...../km (continuously Scored)	Measurement of Agriculture land area from map, livestock from inventory and multiplying with unit rate of production	10

3.	Link providing service to existing market centers: 1. commerce and business centers or market sites (local haat) 2. tourism attraction centers 3. Areas having agro-based and cottage industries 4. Other obligatory centers as decided by the municipality.	Estimated annual transaction in these centres equivalent to NRs...../km (continuously Scored)	Inventory survey along with consultation with people (MRCC) and land cover map are used to identify their location and transactions.	20
4.	Link providing service to the existing service centers: 1. health centers, 2. education centers (school/campus), 3. Office (municipality/government) 4. Communication centre (post office communication)	Population served by these service centres expressed as persons per km per year.(continuously Scored)	Inventory survey, Map along with consultation with people (MRCC) identifies their location and served population.	20
5.	Link providing service to the potential growth or service centers identified by municipality (IDPM) such as Waste management site.	Anticipated number of people to be directly benefited expressed as persons per km per. (scored continuously)	Consultation with MRCC and IDPM shall also be used	10
6.	Link providing service to the potential future development sites such as: 1. Potential tourism center 2. Land pooling 3. Potential industrial area	It is technically sound to score these service discretely based on existence. For each service centers, a score of 2.5 is allocated.	Consultation with MRCC and IDPM shall also be used	10
7.	Link providing service to the areas recognized by the municipality as areas for special consideration, such as areas inhabited by backward and poor ethnic groups/communities,	Very important =5 Important =2.5 less important =0 (Scored discretely)	Inventory survey along with consultation with local people identifies their location and Importance.	10

8.	Direct link with another linkage	National Highway=5 Feeder Roads=3 District Roads=2 Neighboring Municipality /district= 2 Otherwise= 0	Road Network Map and attribute table.	5
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## 5.6 Grading and Nomenclature of Roads

Road network serve for direct access to the particular land-use by the provision of pedestrian footpaths, bicycle tracks, bus and vehicle routes and cater through traffic that is not related to immediate land uses. Functional provisions of passenger and goods movement mainly define the hierarchy of roads and their classification. On the basis of this concept, roads are classified as per their function. Road class is related to the technical standard and functional requirements. A road hierarchy is a means of defining each roadway in terms of its function such that appropriate objectives for that roadway can be set and appropriate design criteria.



१४.३१ अब निर्माण हुने सडकको कुनै पनि बाटोको न्यूनतम चौडाई ६ मी. हुनु पर्नेछ र नापी तथा मालपोत कार्यालयहरूलाई सोही बमिजिमले सेस्ता, नक्सा तथा अभिलेखहरूमा बाटो कायम गरी यस व्यवस्थाको कार्यन्वयन गर्न लेखि पठाउनु पर्नेछ। । यस्ता बाटोमा भवन निर्माण स्वीकृत दिँदा केन्द्रबाट कम्तिमा ३ मीटर सडकको क्षेत्राधिकार (RoW) र सडक क्षेत्राधिकार सिमाबाट १.५ मीटर सेट ब्याक छाडेर मात्र निर्माण स्वीकृति दिनु पर्नेछ । तर हिमाली/पहाडी जिल्लाका उपत्यका (valley) एवं समथल भू-भाग देखि बाहेकका भिरालो क्षेत्रमा प्राविधिकरूपमा उक्त ६ मिटर चौडाई कायम गर्न सम्भव नभएमा प्राविधिकको प्रतिवेदनको आधारमा सम्बन्धित स्थानीय निकायको परिषद्को निर्णयबाट ४ मिटरमा नघट्ने गरी निर्धारण गर्न सक्नेछ।



१४.३६ नगरपालिका क्षेत्रमा सडक सम्बन्धी ऐन लगायत प्रचलित कानूनले तोकेमा सोही अनुसार र सो नभएमा नगर यातायात गुरुयोजनाले निर्धारण गरे अनुरूप सेटब्याक  
 Municipality road network नगरपालिकाले पर्याप्त सेटब्याक सडक किनारबाट १.५ मिटर  
 hierarchy as arterial, sub-arterial and urban roads of various categories such as Class  
 भन्दा कम हुने गरी निर्धारण गर्ने छैन।  
 A, Class B, Class C and Class D.

१४.३८ नयाँ बाटोको घम्ति वा मोडको न्यूनतम अर्धव्यास बाटोको चौडाई भन्दा २०% ले बढी  
**Right of Way for Roads of different Classes:**

चौडा भएको हुनु पर्नेछ।

The DTMP guideline has expected roads under category of National Highway (NH), Feeder Roads (FR) and District Roads (DRCN) within the municipality area. The RoW of these roads are considered as per respective Guidelines. i.e the RoW of National Highways, Feeder Roads and District Roads are 50.0 m, 30.0 m and 20.0 m. The guideline has clearly stated about the setback distance for these roads (having RoW  $\geq$  20.0 m) as 6.0 m on either side. All of these standards shall be applied to the municipality accordingly.

**Table 5.2: Urban Road Class and Features**

Road Class	Descriptions	Minimum RoW (m)	Minimum Set-back Distance (m)
NH	National Highways	As prescribed	As Prescribed
FR	Feeder Roads		
DRCN	District Roads	20	2
A	Main Collector	14	1.5m (Building Guideline)
B	Other Collector	10	
C	Main Tole Road	8	
D	Other Tole Road	6	

Based on DTMP guideline, the building line or setback shall be maintained 6.0 m for roads having RoW equal to or more than 20.0 m and 2.0 m for other roads. However Nepal Road Standards-2070 has considered the setback distance at curved section only and that should be sufficient to provide the adequate sight distance. It is silent about the building line.

(Source: Fundamental Guidelines for Settlement Development, Urban Planning and Building Construction-2072 (2015 AD))

However, according to **Fundamental Guidelines for Settlement Development, Urban Planning and Building Construction-2072 (2015 AD)**, the minimum setback distance for urban roads as 1.5 m on either side. Again the minimum of RoW of roads has set as 6.0 m. i.e. 3.0 m on either side from the centerline. A portion of this guideline has presented herewith.

### **Urban Road Classification**

Roads under jurisdiction of Municipal authority are referred as urban roads. The classification practices of urban roads basically are guided by the functional hierarchy of roads. In the context of Nepal, Department of Roads (DoR) has classified urban roads as Arterial, Sub-arterial, Collector and Local/Residential Street in its Urban Road Standard 2068 (draft). The ToR provided for the preparation of MTMP has formulated the class of roads into A, B, C and D. The fundamental parameters of the urban road are National Highways, Feeder Roads, District Roads and Urban Roads of all four classes.

#### ***National Highways***

Arterial roads in Municipality are taken as the links of National Highways. The technical standards of these roads are taken from the DoR directives for Right of Way (RoW) and other features.

#### ***Feeder Roads***

Feeder roads are taken as the sub-arterial road in Municipality. The technical standards for this category are taken as mentioned by the DoR road Standard. These roads have relatively higher traffic with through movement of local vehicles.

#### ***Class A Roads***

Class A roads serve as the major collector roads. These roads start either from the Arterial or Sub-Arterial road. These roads are of relatively long distance which connect big market or settlement areas or two or more wards centers within the Municipality.

#### ***Class B Roads***

Class B roads are of secondary type of collector roads. These may serve as the collector to the Class A roads with the relatively lower geometric standard. Intersection and other parameters may be taken as similar as Class A roads.

#### ***Class C and Class D Roads***

Class C roads are residential street and they provide access to the private property and small industrial or public place. These roads serve mainly for small/light vehicular movement for low volume intensity. If these roads connect one or more residential blocks then they are taken as Class C. If they collect from or end to the single residential block then they are referred as Class D roads. These serve for internal traffic movement without through traffic movement.

### **Coding of Municipality Roads**

All road links within the Municipality are given unique code number consisting of ten digits

The coding system for particular road link is described below:

- First digit (1 to 7) represents the number of Province. Code 3 stands for Province No. 3.
- Second code RM represents for the Rural Municipality.
- Third represent the municipality in the district. Khandadevi Rural Municipality is coded by 03.
- Fourth code indicates letter A to D for particular Class of road.
- Next three digits (001 to 999) represent the particular transport linkage.

After all the code numbers, road name is written. An example of the code number and road in Khandadevi Rural Municipality is shown as

3	RM	0	3	A	0	0	1
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### **5.7 Perspective Plan of Roads**

The municipality roads are classified as A, B, C and D class based on the road width as per the Guidelines. The inventory has identify the interventions as maintenance, upgrading of the roads for 20 years. The perspective plan has envisioned the upgrading of the roads with black top and gravel as follows.

**Table 5.3: Perspective Plan of Road –Class A**

**Table 5.4: Perspective Plan of Road –Class B**

**Table 5.5: Perspective Plan of Road –Class C**

**Table 5.6: Perspective Plan of Road –Class D**

Summary of Perspective Plan of the urban roads as follows:

S.N.	Road Conditions	Length K.m.
1	Black top	233.99
2	Gravel	185.22
	Total	419.21

## 5.8 Cost of Roads

The cost of roads has been calculated for the black top, gravel, widening of the municipality roads. The cost calculation is based on the district rate, DoLIDAR's standard and DOR's specifications. The cost construction of roads are given below;

**Table 5.7: Cost of Blacktop and gravel of Class-A Roads**

**Table 5.8: Cost of Blacktop and gravel of Class-B Roads**

**Table 5.9: Cost of gravel road for Class-C Roads**

**Table 5.10: Cost of gravel for Class-D Roads**

## 5.9 Maintenance of Roads

The existing roads need to be maintained for the road improvement and serviceability of the roads. The maintenance of the roads consists of Periodic Maintenance and Regular Maintenance urban roads.

## 5.10 Municipality Transport Perspective Plan

Municipality Transport Perspective Plan (MTPP) has been prepared for the development of urban roads within the municipality. The roads are categorized with the road class of A, B, C and D according to MTMP Guidelines. The perspective plan has outlined the upgrading of the roads as earthen to gravel and gravel to blacktopped roads as well as the maintenance of the roads. The cost of the perspective plan is given below;

**Table 5.11: Perspective Plan projected expenditure**

(Rs 000)

Upgrading of Road Class	A	B	C	D	Total
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Black Top	3331584	864721.00			4196305
Gravel		120142	707436	596233	1423811
Total	3331584	984863	707436	596233	5620116

## Chapter 6

# Municipality Transport Master Plan

### 6.1 Background

Municipality Transport Master Plan has been started from couple of years in order to develop the municipality roads on integrated planning approach and investment priority on road development. Municipalities in Nepal is increasing which needs to develop the infrastructure of roads, sewerage, water supply, solid waste management for the growing urban residence in the municipality area. Road transport is the backbone of the development first hand impact to increase the access of the people which increases the economic activities of the municipality.

Municipality Transport Master Plan (MTMP) is a transport infrastructure plan document which identifies the existing and demanded roads in the municipality and integrated plan of roads with priority basis for the implementation of five year period. Based on the resources of the municipality, the five year investment plan will be prepared. It has mainly three components; a) Municipality Inventory Map (MIM), b) Municipality Transport Perspective Plan (MTPP) and c) Municipality Transport Master Plan (MTMP).

### 6.2 Budget Trend

Municipality has been established recently which has not adequate internal resources. Majority of budget is provided by the Government of Nepal in different headings. The budget of the municipality is given below;

**Table 6.1: Existing Budget of Municipality (Rs. in 000)**

S.N.	Budget Heading	2075/76
1	Central Government Grant	149000
2	Province Government Grant	8055
3	Internal Resources	50000
4	Allocated budget for Road Development	55410.5
5	Maintenance Fund	808
	Total	743751

Source: Khandadevi Rural Municipality Office, 2019

#### 6.2.1 Allocated Budget on Road Development

Municipality has allocated budget for the development of urban roads mainly on the upgrading and maintenance of roads. The budget allocated on the annual plan of municipality is given below;

**Table 6.2: Allocated Budget for Road Improvement for F.Y. 2075/76**

S.N	Budget for MTMP	Amount Rs(000)
1	Central Government Grant (50 %)	74500
2	Province Government Grant	8055
3	Internal Resources (80 %)	40000
4	Allocated budget for Road Development	55410
5	Maintenance Fund	808
	Total	178773

### 6.2.2 Projected Financial Resources

For the implementation of the MTMP for the first five year period, the budget is projected based on the previous year's budget-trend of the municipality and future resources which can be used for the MTMP. The projected financial budget for the MTMP is given below:

**Table 6.3: Projected Budget for MTMP**

S.N.	Budget	2076/77	2077/78	2078/79	2079/80	2080/81	Total
1	Central Government Grant (50 %)	74500	81950	90145	99159.5	109075.5	454830
2	Province Government Grant	8055	8860	9746	10721	11793	49176
3	Internal Resources (80 %)	40000	44000	48400	53240	58564	244204
4	Allocated budget for Road Development	55410	60951	6704	73750	81125	338283
5	Maintenance Fund	808	1000	1100	1210	1331	5449
	Total	178773	196761	216437	238081	261889	1091943

Note: Annual increment is projected as 10 %

Source: Annual Plan, KhandadeviRural Municipality Office, 2019

The municipality present budget status is not sufficient for the implementation of MTMP for the five year period. So, the municipality should increase the financial sources from government, road projects and government authorities from the additional funding.

## **6.4 Five Year MTMP**

The first five year MTMP is prepared with available budget from different sources for the five year period and the priority of Municipality roads for maintenance, upgrading of blacktopping and gravelling.

### **Upgrading Programme**

Improvement of the municipality roads are taken into consideration for the upgrading the black top and gravel roads for all weather condition. The improvement program of the first five year is calculated. The budget available after deduction for maintenance will be used for the improvement program. Municipality Road Class A and B are taken into consideration for the improvement program.

**Municipality Road Class - C and Class- D is not consider for the first five year MTMP because of the limited resources in one hand and these roads are Ward Level roads which can be carried out by the Ward Budget.**

### **Core Area Road Development**

There are stone laying and brick laying roads in the core area located at ward no 4,5,6,7,8 of the Madhyapur Thimi Municipality. The traditional brick laying system with the underground drainage was found in most of the core areas like; Lachi, Bahal, Nani etc. The stone was also found in the roads of core area. The condition of the brick laying area is partially damaged in some places and damaged fully in some roads. Thus, the rehabilitation and repair should be carried out during the implementation of MTMP.

It is suggested that instead of brick laying and/or rehabilitation of brick, we can apply the stone laying with the RCC surface for the long life of the roads. Considering this point, there are provision of rehabilitation of brick roads and RCC stone on core area.

#### **6.4.1 Prioritization of Road for MTMP**

The prioritization of the roads for the upgrading of the urban roads has been carried out for the investment priority of the roads development. The urban roads are prioritized as per the prioritization criteria as follows:

**Table 6.4: Prioritization of Class A Roads**

**Table 6.5: Prioritization of Class B Roads**

**Table 6.6: Prioritization of Class C Roads**

### 6.4.2 MTMP

MTMP is prepared with the required intervention of upgrading program of the municipality roads into Black topped and Gravel for the first five year. As per the available budget and financial projections for MTMP investment, there are 2 scenario of the plan. The investment plan of the MTMP is prepared for the yearly implementation program.

**Table 6.7 : Five Year Implementation of Municipality Transport Master Plan (MTMP)**

(NRs 000)

### 6.5 MTMP Output and Outcomes

MTMP implementation has been envisaged to improve the road condition and increase the transport facilities in the municipality. After completion of first five year period, the outcomes of the MTMP will be as follows;

Balck topping (km)	Gravelling (km)
119.52	0

## Chapter 7

# MTMP Implementation Plan

### 7.1 MTMP Implementation Problem and Issues

There are number of issues arises for the implementation of the MTMP with new version of integrated transport plan of the municipality in the context of improving the road conditions. There are pertinent issues has been identified during the workshop and discussion with stakeholders for preparation of MTMP.

- The budget of municipality is **not enough** to carry out the MTMP. The deficit budget is the problem of the municipality for MTMP plan. Khandadevi Municipality should seek external resources for MTMP from the central government, state government and donor agencies.
- The technical manpower available in the municipality is not enough for the construction supervision and technical audit of the municipality roads.



- There are number of existing main trail and local trails in all wards which is not developed as road should need for widening which cost very high in one hand and problems in the narrow gully in core area where road extension is not possible and not mentioned in ROW.

## **7.2 Implementation Modalities**

The implementation of the MTMP has envisaged for the planning and implementation for the development of the municipal roads which will improve the access condition of transport to provide better services and mobility as well as help to develop on various potentialities of the municipality. The implementation of MTMP comprises with the following aspects;

- There is shortage of financial resources for the implementation of the upgrading the existing roads in the municipality. The municipality shall discuss with the ministry and other stakeholders for the additional resources for the implementation of MTMP.
- The technical section of the municipality shall be equipped with the required manpower for the close supervision and monitoring of activities and provide the instruments like; GPS, Total Station, quality control equipment and test equipments.
- Khandadevi Rural Municipality should coordinate strongly with the Province Government, Department of Roads for the integrated funding and development of the roads.

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### Photographs

A section of Municipality Road at Makadum

Road alignment view from Goganpani (Bhatauli-Makadum-Galpa Road)

Road Bifurcation at Goganpani towards Bhirpani-Sitkha and Pakarbas-Bhatauli

MTMP Final Report Presentation at Municipality