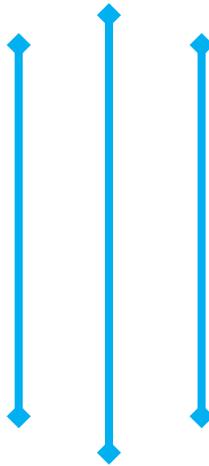




**Mandavi Rural Municipality**  
**Office of the Rural Municipal Executive**

Nayagaun, Pyuthan  
Province No.:5, Nepal

**Rural Municipality Transport Master Plan (RMTMP)**  
**(Final Report)**



**SUBMITTED BY:**

**Integrated Studies and Research Center Pvt Ltd**

Anamnagar, Kathmandu

July, 2018

## **Acknowledgement**

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## Acronyms/Abbreviations

DDC	District Development Committee
DTMP	District Transport Master Plan
GIS	Geographic Information System
GPS	Global Positioning System
IDPM	Indicative Development Potential Map
MIM	Municipality Road Inventory Map
MRCC	Municipality Road Coordination Committee
NMT	Non- Motorized Transport
RMTMP	Rural Municipality Transport Master Plan
RMTPP	Rural Municipality Transport Perspective Plan
VDC	Village Development Committee
RMTPP	Rural Municipality Transport Perspective Plan
PCU	Passenger Car Unit
DOLIDAR	Department of Local Infrastructure Development and Agricultural Roads
OD	Origin and Destination
ToR	Terms of Reference
HH	Household
VDCs	Village Development Committees
PT	Public Transport
Min.	Minute
Km.	Kilometre
Sq. km	Square Kilometre
Ha	Hectare

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## Executive Summary in English

Transport facilities help in developing access with the rural-urban linkages. Road accessibility can reduce isolation, stimulate crop production and marketing activities, encourage public services and help to transfer technology. Road building has been seen to bring about notable enthusiasm and visible changes in rural life. Road infrastructure is considered as “the infrastructure for infrastructure”. However, in the absence of notable criteria and rational guidelines, road construction is carried out in adverse manner resulting in haphazard use and wastage of limited resources. Rural Municipal Transport Master Plan is prepared for assessing and planning the present road and transport infrastructures and facilities within the rural municipality and its surrounding.

The Mandavi Rural Municipality was established by merging the existing Markawang, Nayagaun, Ramdi, Udayapurkot and Tiram(1-4) village development committees (VDCs) having a total of 113.08 square km. The center of the Rural Municipality is established at Nayagaun of ward number 3. After merging the three VDCs population it had a total population of 15,508 according to 2011 Nepal census. The population density of Mandavi is 133 person/sq. km. Mandavi Rural Municipality has altogether 5 wards.

क्र.सं.	नयाँ वडा	समावेश गाविस / नगरपालिका	जनसंख्या	क्षेत्रफल(वर्ग कि.मी.)
१	१	तिराम(१-४)	२८८९	१८.५५
२	२	मर्कावाड(१-९)	३११८	२२.०७
३	३	नयाँगाउँ(१-९)	३४६२	१९.६२
४	४	उदयपुरकोट(१-९)	३१५५	३१.३७
५	५	रम्दी(१-९)	२४३४	२१.४७
जम्मा			१५०५८	११३.०८

RMTMP started with the setup of Rural Municipal Road Coordination Committee (RMRCC) and the collection of demand and inventory of road within the municipality. Road inventory survey was done and total length of road surveyed was 207.44 km. Out of which 35.6 km is blacktop and rest 177.84 km are earthen.

Ward	Blacktop	Earthen	Total
1	15.99	34.62	50.61
2	3.72	35.61	39.33
3	9.70	30.30	40.00
4		36.62	36.62
5	6.20	34.68	40.88
Grand Total	35.60	171.84	207.44

Visionary city development and Indicative Development Potential Plan is prepared showing the existing and potential market center/service centers (key growth centers) and the areas having various development potentials such as agro-based industries, high value cash crops and tourism. This city may be developed as the agricultural-cultural-historical centre and with promoting this, the tourism can be improved. By improving the agriculture and tourism sector we have to develop the health, education and environment of the people of this municipality.

This study formulated the road hierarchy for the various roads namely Class A, B, C and D. . Class C and D basically deals with access while Class A and B basically deal with mobility and accessibility to higher services. The minimum right of way, setback, pavement width and footpath width provisions for the different classes of roads are recommended as follows:-

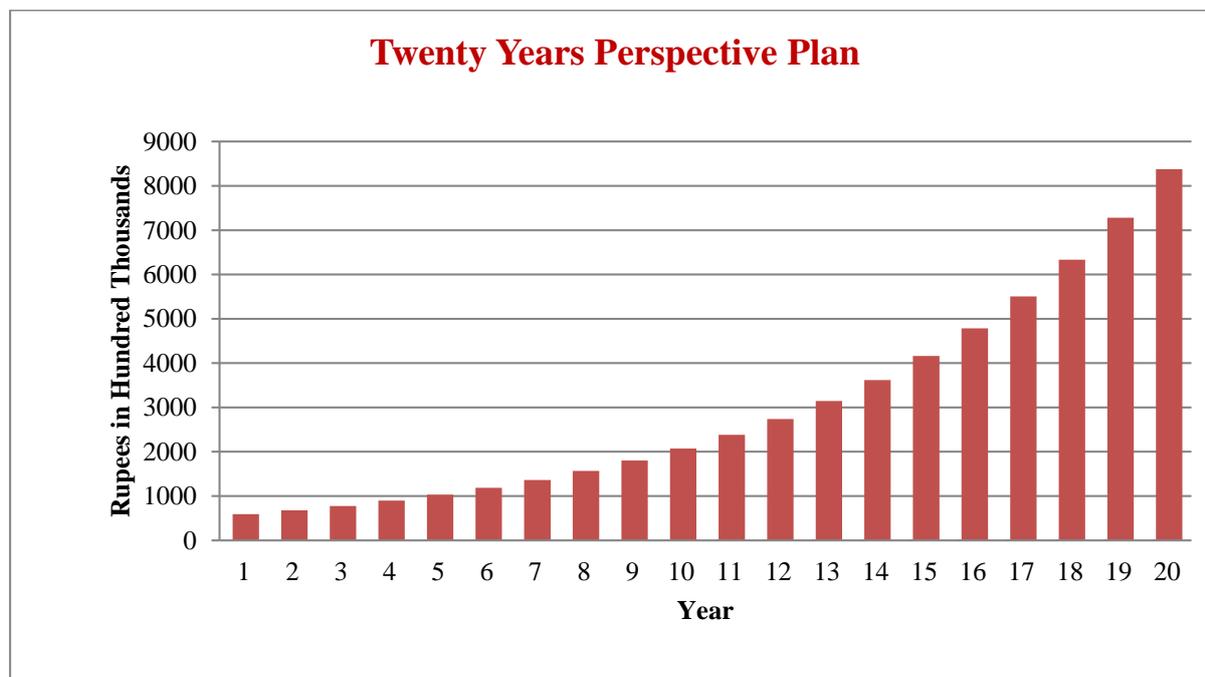
SN	Road Class	Min.RoW(m)	Setback(m)	Pavement(m)
1	A	15	3	11
2	B	10	2.5	7
3	C	8	2	6
4	D	6	1.5	4

The total lengths of Class A, B, C and D roads are summarized as shown in the table below.

Class	Blacktop	Earthen	New	Total
A		52.69		52.69
B		38.88	6.22	45.10
C		50.38	6.17	56.55
D		36.08	2.41	38.49
FEEDER	35.60			35.60
Total	35.60	178.02	14.81	228.43

There are total 35.6 km length of feeder passing through this rural municipality which plays important role for inter-municipality and long distance mobility.

For the long-term vision, for the development of the entire road network to all weather condition there is need of 602 Crore of budget is for the period of twenty years. For this long-term vision, the implementation plan is prepared as given under:



For the short term five-year implementation plan, all the rural municipal roads are prioritized based on the criteria as presented in the chapter 1 of this report. Then with the projected budget of five-year, Class A, B and C roads are planned for intermediate lane, and Class D for single lane. For the five-year period, based on the capacity of rural municipality and to provide minimum accessibility condition total of 39.67 Crore of NRs is estimated which is distributed as under:

Year	Projected Budget (in Hundred Thousand)		
	Construction	Maintenance	Total
1	413	177	590
2	473	203	676
3	543	233	776
4	627	269	896
5	720	309	1,029
Total	2,776	1,191	3,967

From the above estimated budget, the following interventions in different road hierarchy is planned as given below:

Length in Km			
Class	New track	Gravelling	Blacktop
A	-	26.57	-
B	5.13	23.25	-
C	4.57	23.60	-
D	0.99	12.56	-
	10.69	85.97	-

## सारांश

नेपाल जस्तो विकासोन्मुख देशमा गाउँपालिकाहरु विकासको दृष्टिकोणबाट पछाडी छन् । त्यसमाथि सडकको विकासको पक्षबाट भन्ने पछाडी छन् । देशभरी छरिएर रहेका गाउँपालिकाहरुको संख्या ४६० रहेको अवस्थामा ती केन्द्रहरुमा यातायातलाई प्रभावकारी र सुलभ रुपमा संचालन गराउनु निशर्त पहिलो आवश्यकता हो । सडक र यातायात सम्पूर्ण पुर्वाधारहरुको लागी चाहिने पुर्वाधार हो । यसले जनतासमक्ष विभिन्न सेवा तथा सुविधाको पहुँचलाई सुनिश्चित गर्छ । ग्रामिण यातायात प्रणालीलाई एकिकृत रुपमा संचालन गर्नुको सट्टा पारम्परिक रुपमा टुके योजनाहरु मार्फत अगाडी बढाइएको छ । माण्डवी गाउँपालिका मा यातायातका पुर्वाधारहरुलाई आवास, बजार, कृषि, पर्यटन र अन्य सामाजिक आर्थिक लगायतका क्षेत्रमा टेवापुग्ने गरी विकास गर्नु आवश्यक देखिन्छ । गाउँपालिकाको जनसंख्या बर्तमान माग र भविष्यमा आउनसक्ने मागलाई मध्यनजर गरेर माण्डवी गाउँपालिकाको ग्रामिण यातायात गुरुयोजना बनाउनु अहिलेको आवश्यकता हो, जसले एउटा उचित संरचनामा रहेर तहगत रुपमा निर्णय गर्न सहयोग पुऱ्याउछ ।

माण्डवी गाउँपालिका प्रदेश नं ५ मा अबस्थित गाउँपालिका हो । यस गाउँपालिकाको स्थापना नेपाल सरकारको निर्णय अनुसार मिति २०७३ साल फागुन २९ गते निम्न गा.वि.स. समावेश गरी घोषणा भएको हो ।

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१	१	तिराम(१-४)	२८८९	१८.५५
२	२	मर्कावाड(१-९)	३११८	२२.०७
३	३	नयाँगाउँ(१-९)	३४६२	१९.६२
४	४	उदयपुरकोट(१-९)	३१५५	३१.३७
५	५	रम्दी(१-९)	२४३४	२१.४७
जम्मा			१५०५८	११३.०८

स्थलगत सर्वेक्षण अनुसार यस गाउँपालिकामा हाल भएको सडकहरुको कुल लम्बाइ लगभग २०७ कि.मि रहेको पाइएको छ । जसमध्ये करिव ३५ कि.मि सडक कालोपत्रे, र बाँकी १७२ कि.मि.सडक धुले अवस्थामा रहेको पाइयो । गाउँपालिका सडक समन्वय समिति १९८० को निर्णय अनुसार क-वर्गको सडकको न्युनतम क्षेत्राधिकार १५ मिटर,ख-वर्गको १० मिटर , ग वर्गको ८ मिटर र घ वर्गको ६ मिटर रहने निर्णय गरिएको छ । “क” वर्गको सडक ४ वटा, “ख” वर्गको सडक ६ वटा, “ग” वर्गका सडक १६ र घ वर्गका

सडक ५५ वटा रहेको छ भने लम्वाई क्रमशः ५२.६९ किमि, ४५.१ किमि ,५६.५५ किमि र ३८.४९ किमि रहेको छ । सडकको वर्ग अनुसारको क्षेत्राधिकार र सेटब्याक निम्न तालिकामा प्रस्तुत गरिएको छ :

क.स.	सडकको वर्ग	न्यूनतम च्यष्ट १०	सेटब्याक १०	सडक चौडाइ	सडकपेटिको चौडाइ
१	क	१५	३	११	१.५/१.५ दुवैतर्फ
२	ख	१०	२.५	७	१.५ एकतर्फ
३	ग	८	२	६	
४	घ	६	१.५	४	

सडकको वर्ग अनुसारको लम्वाई र स्तर निम्न तालिकामा प्रस्तुत गरिएको छ:

सडकको वर्ग	धुले सडक	नयाँ ट्रयाक	जम्मा लम्वाई कि.मी.
क	५२.६९		५२.६९
ख	३८.८८	६.२२	४५.१०
ग	५०.३८	६.१७	५६.५५
घ	३६.०८	२.१४	३८.४९

गाउँपालिका सडक समन्वय समिति को बैठकबाट सडकहरुको निर्माण र मर्मत संभार गर्ने प्राथमिकता आधारहरु चयन गरिएको छ भने ग्रामिण विकास योजनालाई पनि अन्तिम रुप दिईएको छ ।

सडकहरुको निर्माण र मर्मत संभार गर्न आर्थिक विश्लेषण गर्दा यस ग्रामिण यातायात गुरुयोजनाले समेटेको सबै सडकको निर्माण तथा मर्मत संभार २० वर्ष भित्र पुरा हुने दुरगामी लक्ष्य राखि करिब रु.६ अर्ब ०२ करोडको विस्तृत आर्थिक योजना प्रस्तुत गरेको छ ।

गाउँपालिका स्तरमा श्रोत साधनको कमि ले गर्दा सबै सडकहरु लाई एकै पटक निर्माण गर्न असम्भव हुने हुदाँ सडकहरु लाई प्राथमिकता निर्धारण गरीएको छ र यसै अनुसार कार्यन्वयनको योजना तयार गरीएको छ । त्यसमा पनि अपुग हुने बजेट विभिन्न बाहिरी श्रोत बाट जुटाउनु पर्ने हुन्छ ।ग्रामिण यातायात गुरुयोजनाले राखेको ५ वर्षको लक्ष्य अनुसार करिब रु ३९ करोड ६७ लाखको सम्भावित लागतलाई निर्माणमा ७० प्रतिशत र मर्मत संभारमा ३० प्रतिशत विभाजन गरिएको छ । निर्माणतर्फको रकमलाई पनि “क” वर्गलाई ३० प्रतिशत “ख” वर्गलाई ३० प्रतिशत “ग” वर्गलाई ३० र “घ” वर्गलाई १० प्रतिशत रकम छुट्याइ सडकको काम सम्पन्न गर्ने लक्ष्य राखिएको छ ।

## Chapter 1: Introduction

### 1.1 Background

Life organized human settlements, which are mostly referred to as communities, is only possible if people have mobility in daily basis. Residential area is spatially separated from workplaces, major shopping is concentrated in identifiable centers, and larger entertainment and relaxation facilities are found at specific locations. They have to have accessibility.

Transport facilities help in developing access with the rural-urban linkages. Road accessibility can reduce isolation, stimulate crop production and marketing activities, encourage public services and help to transfer technology. Road building has been seen to bring about notable enthusiasm and visible changes in rural life. Road infrastructure is considered as “the infrastructure for infrastructure”. However, in the absence of notable criteria and rational guidelines, road construction is carried out in adverse manner resulting in haphazard use and wastage of limited resources.

Haphazard development of settlement in the urban area is a great problem which we learned from the past earthquake. From disaster risk management and reducing the problem of congestion we should go for planned development. Construction of roads after the settlement is made or extension of road only after the congestion problem creates different types of problem in the society which we are closely observing from different metropolitan cities. In this regard, formulation of Rural Municipal Transport Master Plan was initiated for assessing the present road and transport infrastructures and facilities within the Rural Municipality and the surrounding Municipalities. So as to be presented as proper municipality or a city, it must have a very good mobility and accessibility by public or private means of transportation.

### 1.2 Objective of RMTMP

The prime objective of this study is to prepare the Rural Municipality Transport Master Plan (RMTMP) of Mandavi Rural Municipality. The planning approach is participatory and bottom-up from the settlement level. It will include a constructive plan to incorporate all the transportation needs and facilities for now and tomorrow. The specific objectives of the RMTMP are mentioned below:

1. Prepare the Municipality Inventory Map (MIM) of all road networks.
2. Identify the major road networks linking the Rural Municipality with the surrounding areas.
3. Prepare Indicative Development Potential Map (IDPM).

4. Finalize visionary city development plan if Comprehensive Town Development Plan is not prepared.
5. Collection of demands for new/rehabilitation transport linkages from Municipalities/settlements based on city development plan.
6. Analyze the present mobility and accessibility situation.
7. Identify and prioritize the interventions based on mobility and accessibility situation.
8. Develop scoring criteria and its approval from Rural Municipality.
9. Prepare the Perspective Plan of transport services and facilities (Rural Municipal Transport Perspective Plan)
10. Prepare physical and financial implementation plan of prioritized roads for the RMTMP period.
11. Prepare a five years Rural Municipality Transport Master Plan (RMTMP).

### 1.3 Scope and Limitation of RMTMP

The scope of this work and service the consultant will provide for the project is given below:

**a. Accessibility data Collection and Analysis.**

The accessibility situation shall be evaluated from the settlement level and data shall be collected using a GPS. Various surveys may be carried out to gain such data including their travel patterns, questionnaire surveys and origin-destination survey.

**b. Analyze Mobility status of the municipality**

The consultant will also conduct mobility study, incorporated in the O-D survey. This is important especially because the road network in capital has provided access to majority of the population. The question then arises on how -efficiently, economically and safely the goods and passengers are transported, which is indicated by mobility.

**c. Access the condition of public transportation**

The consultant will collect data on different public transportation routes and their operation characteristics, which operate within the municipal area and to other adjoining area.

**d. Access safety status and issues**

The consultant shall also access the road safety status and issues. For this, roadside condition survey during road inventory survey and other accident data will be reviewed. Possible interventions to make the roads safer will be proposed and recommended.

**e. Prepare the Indicative Municipality Development Potential Map (IDPM)**

The consultant shall prepare IDPM using topographical base maps and digitized GIS maps. In the IDPM, the consultant shall identify potential areas for development and prioritize through ranking. The consultant shall validate the IDPM from the MRCC and Municipality.

**f. Prepare Rural Municipality Inventory Map (RMIM) of existing roads within Mandavi Rural Municipality.**

The consultant will prepare the Rural Municipality Inventory Map linking to strategic road networks such as national highways, district core road network, main trails and bridges. This shall be done by walkover surveys using enumerators. The inventory map shall include the road names, total length and breadth of the roads, surface type, existing condition, Right of way, vehicular traffic and pedestrian traffic flow etc.

**g. Collection of demands for New/Upgrading/Rehabilitation transport Linkages from Wards/Settlements**

The consultant shall collect data regarding the construction, maintenance or rehabilitation of roads according to the existing condition and demand. The consultant will also seek to collect these data through ward meeting or community level discussion. The demand data shall be collected in priority order for each ward. The roadside condition of all the linkages will be noted during the road inventory survey.

**h. Scoring criteria**

The consultant shall develop scoring criteria to screen and prioritize all interventions potential interventions for proper allocation of limited budget. Scoring and prioritization criteria shall be checked with all linkages and interventions and approved by the municipality.

**i. Road classification and Nomenclature**

The consultant shall use metric system of nomenclature and apply the same classification throughout the data collection.

**j. Preparation of perspective plan of interventions of services and facilities.**

The data collected through accessibility survey, demand survey and inventory maps shall be used to prepare a perspective plan of interventions of services and facilities. All the identified interventions shall be screened and rated on the basis of approved criteria and forwarded to Municipality council meetings. The final perspective plan shall be shown in GIS maps.

**k. Prepare a realistic physical and Financial Implementation Plan of Prioritised Roads for the RMTMP period**

The consultant shall collect information on the resources that can be spent on the construction or rehabilitation of transportation infrastructures by the municipality. The consultant may also carry out studies to project the resources to fund the transport infrastructures for the next five years. From the total projected resources, the consultant shall discuss with the municipality to find out the appropriate proportion to be spent on ongoing roads and new interventions proposed. The projected resources should be able to cope with the total number of roads and new interventions proposed.

**l. Prepare Rural Municipal Transport Master Plan (RMTMP) of Mandavi Municipality**

The consultant shall prepare Rural Municipal Transport Master Plan (RMTMP) for Mandavi Municipality with due consideration to the existing situation of: vehicular parking, travel routes, modes of transport, etc and propose for future urban growth. The consultant shall prepare a base scenario of the existing road and transport network and management based on the O-D survey and O-D matrix and prepare road inventory map and transport infrastructure network and management plan based on the travel demand forecast, population growth forecast, and growth rate of vehicular and transport infrastructure.

**m. Prepare framework for medium term and long-term planning**

The consultant shall also forecast the demand for medium term (10 years) and long term (20 years) and recommend a framework to guide future interventions and planning processes. The long-term plan shall consider the proposed East-West Railway and other major transport sector interventions in the long term.

## 1.4 Approach and Methodology

Rural roads are supposed to provide both access and mobility to all possible and potential areas. RMTMP will help to assist the planning of such roads to fulfil the stated objectives. Better planning is incomplete without relevant quality data and quality data can only be acquired by use of properly selected survey methods. The chapter deals with the methodological framework adopted for data collection covering all used survey method, sampling techniques, quality and quantity of data along with data processing, analysis and presentation methodology.

### 1.4.1. Approach

Rural Municipal Transport Master Plan has been prepared using participatory bottom-up approach and differs from conventional practices of trickle down approach. Techno-Political interface has been incorporated in the planning process, where active participation from representatives of political parties, line agencies, municipality officials is crucial. The Rural Municipal Road Coordination Committee (RMRCC) has been constituted as authorized legislative body of municipality. This body, comprising all political parties' representatives and concerned technical officials, helps in necessary policy decisions during the RMTMP preparation and implementation process.

### 1.4.2. Methodological Framework:

The study started with preliminary planning or desk study where basic background of municipality is studied with help of secondary data including census data, GIS data. The study got acceleration with formation of RMRCC and inspection report. Various field surveys were carried out with objective of collecting primary data on transportation network, trip characteristics and service facilities. Along with the primary data, demands for various transportation projects (construction/upgrading/maintenance) were obtained from each ward. Also, potential areas/locations for various facilities were also identified based on interaction with local people and MRCC. The scoring criteria for prioritizing road network was identified based on ToR and will be approved by municipality. Then, the hierarchy of roads will be purposed and perspective plan of various interventions will be purposed and analysed based on available fund and finally physical and financial implementation plan of prioritized roads for RMTMP period. After analysis, the study will come up with potential roads, that need

immediate intervention and roads that need to be given consideration for effective future planning.

All the above-mentioned strategy adopted for data collection, processing and analysis is summarized in the following figure in next page.

### **Secondary Data Collection**

Any sorts of data that were collected from secondary sources are called secondary data. These data were collected from annual report published by district level offices and consultation with various concerned stakeholders. Rural Municipal Road Coordination Committee (RMRCC), which comprises people from various fields and political parties, is the next source for various secondary data. Field study was also carried out for general socio-economic assessment of the Municipality that includes collection of data regarding high development potential areas such as extensive agriculture, horticulture, livestock farming, high value cash crops, cottage and agro-based industries, centre for business/commerce/markets places, tourism area, service centres (hospital, health post, agriculture service sub-centre etc.). The information about demographic data of municipality, various maps showing service centres, transport infrastructure inventory, past plans and sector study reports, sector standards and policy targets were collected from the secondary sources, which includes Bureau of Statistics, Survey Department, Local NGOs, line agencies, DDC, municipality etc. Digitized topographic maps, administrative map of municipality, strategic road network map prepared by DoR, etc. were some other secondary data that were used during the study.

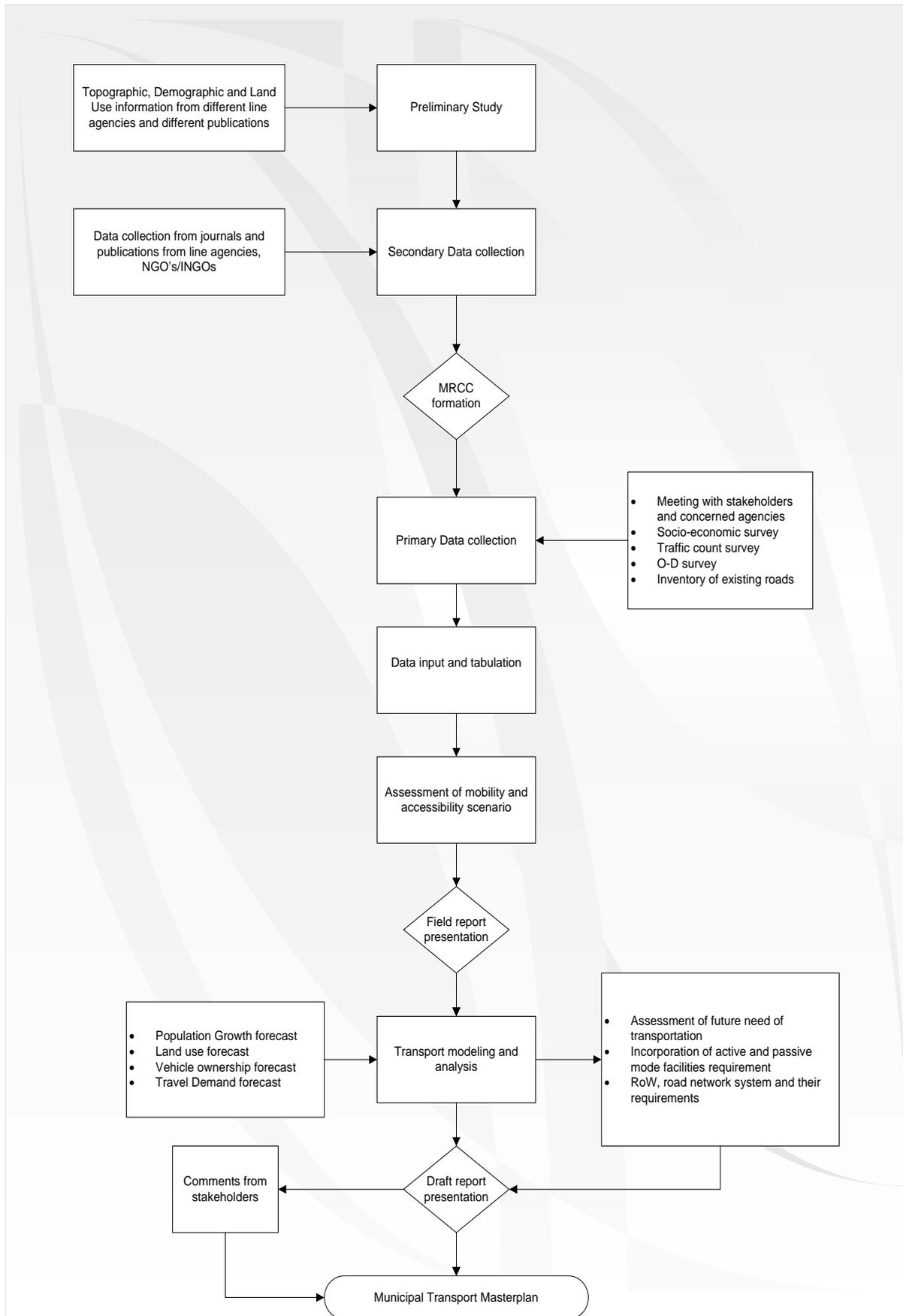


Figure 1: Methodological framework

## Primary Data Collection

Primary information on present household and trip characteristics, traffic characteristics, existing accessibility and mobility level of settlements, prioritized road network required for each ward are obtained via various reliable methods. Tracking of the existing road network along with detail information of its width, surface type and possible intervention required for the effectiveness of services is also carried out.

The primary data collection methods carried out in the field was:

- Origin and Destination (OD) Survey
- Road Inventory Survey
- Demand Survey
- Public Transport and Services Study

**Household questionnaire method** is used to conduct the OD surveys which give various information on questionnaire reflecting personal, household and trip making characteristics. This survey will also help to visualize the accessibility and mobility scenario of road network and to public transportation from the settlement/wards. As all the household can't be covered a realistic and statistically significant sample size was calculated based on probabilistic method.

**Road inventory survey** was conducted to collect data on its condition of road, road linkage, road safety status and issues that need to be highlight. It helps in field validation of base maps and also assists in preparation of road inventory map, nomenclature and coding of the road linkages and to propose various interventions.

**Road Demand survey** comprised of interaction session with the members of ward committee followed by asking them to fill up demand survey form, which includes demand of new facility or interventions to improve existing roads based on priority.

**Classified vehicle counts** have been conducted so as to reflect the usage of various vehicles in the certain route, especially where maximum volume occurs. Twelve-hour count has been done at five locations and the vehicles have been classified to different types and finally traffic volume have been converted to passenger car unit (PCU) to visualize the exact condition.

**Public Transport and Services Study** highlights the services provided by public transportation and location of various services and facilities. It was carried out by directly interviewing the route operators.

## **Data Processing, Analysis and Presentation of Reports**

Data collected at field were first entered at MS office tools (MS excel and Word) and GIS database. All the complete and reliable sets of data were transformed into useable information and the present scenario of municipality are shown through graphs, figures and tables. Similarly, those which were entered into GIS database provide various types of maps. Population and traffic were forecasted for the RMTMP and RMTTP time period. Various transportation models were used for interpretation and forecasting. And, finally various intervention was purposed and their economic analysis were also performed.

## **Preparation of Visionary city development plan**

A creative description of Mandavi future, the vision guides our decisions, helps us set direction and encourages us to align our priorities as we work to make Mandavi Gaupalika, the rural we want it to become in the year 2094/95 is the visionary city development plan. This will be finalised by the municipality. Based on this vision, the urban transportation planning is to be done.

## **Preparation of Indicative Development Potential Map (IDPM)**

IDPM is basically the indication of the existing and potential market/service centres (key growth centres) and the areas having various development potentials such as high value cash crops, agro-based industries and tourism. Thus, IDPM shows the areas of high value cash crops, tourism potential, extensive agriculture, extensive horticulture, livestock farming, fisheries, hydropower location and the other social service centres areas such as hospital, post office, telecommunication, school, campus, VDC centres, security offices and large settlements, important historic and religious places. Finally, it indicates the grading of various markets of the district thus providing the basis of network planning.

## **Digital Name Coding**

Digital Name is a code given to each road which is unique and generated by an order of alphabetical and numerical digits. Each code is different to the other and forms the basis of differentiating from other road.

The first step taken in naming the streets is to identify the start and end point of a street. This was done with the help of municipal officials and local participation. A start point may be defined as a point located in the western end of a street, if the street is aligned in the West-East alignment and vice-versa. Similarly, in case of a street aligned in the North-South alignment, the start point shall be located in the Northern end of the street.

If the alignment of a street is not exactly North-South or West-East then the start point is defined by the angle by which a street is deviated from the North-South or the West-East line. If a street's deviation is within 45 degrees from North-South line then its start point shall be on the Northern end, else on the Western end of the West-East line. Although the above convention was followed, the situation of streets in some places can imply the method to be impractical. Hence, major service centres and markets or thoroughfares are also considered as the reference point for start point of a street.

After the designation of the start and end points, streets are assigned a unique code in the format A010101. The first letter in the Code represents a major road network (SRN, DRCN or Feeder Roads) in the municipality, which shall be taken as the reference for the Digital Name Coding of the Rural Municipal roads. The 2<sup>nd</sup> and 3<sup>rd</sup> number represent the number of primary branches from this major road network. Similarly, 4<sup>th</sup> and 5<sup>th</sup> number represent the number of secondary branches from the primary branches linking the major road and so on which maintains a hierarchy in coding. Each code may contain 1 letter only to a combination of 15 numbers and letters or more.

While coding, the streets branching from the main streets to the left are given only odd numbers (A01 or A13) and those branching from the right are given even numbers (A02 or A10). The major issue in Digital Name Coding process arises in the coding of new roads in the future. This issue is important as the codes are allocated progressively to each street and any new street shall be given a subsequent code after the last assigned code depending upon the left or right side of the street. The new Digital codes will break the continuity of the Digital naming of the streets but whatsoever these codes will be used for computer database as the local people only use street names for the recognition of the roads in the rural municipality.

### **Scoring Criteria for Prioritization**

A network consists of several links. It is not possible to construct all roads at a time due to resource and time constraint. Therefore, each link in a network needs to be prioritized. After developing a municipal level network, the cost estimate of the road is prepared. Existing population within the zone of influence, present road demand, future potential route, accessibility situation, land use pattern, environmental and social safeguard, proximity to the market/service centres, religious and tourism places were taken as the indicators for prioritization. The scoring criteria will be finalized after rigorous study and approval from Rural Municipality and RMRCC.

**Table 1: Scoring Criteria for prioritization of Rural Municipal roads**

S.N	Scoring Criteria	Scoring Unit	Score
1	Link providing service to large settlement areas/population	Population served/km	30
2	Link providing service to existing	No of areas	20
	· Market center Agriculture		
	· Tourist attraction areas Animal Husbandry		
	· other obligatory centres as decided by the municipality		
3	Link providing service to the existing service centres such as health centres, education centres (schools/campuses), offices (municipality office/Government office, etc.),	Number of different service sector	20
4	Priority of ward	Ranking of priority from 1 to 5	20
5	Link providing service to the areas recognised by the municipality as areas for special consideration, such as areas inhabited by backward and poor ethnic groups/communities, isolated remote areas, historic sites, religious sites etc	Connection to the settlement of such criteria	10
<b>Sub Total</b>			<b>100</b>

## Chapter 2: Review of existing infrastructure situation

The chapter deals with the present condition and scenario of the rural municipality based on various primary and secondary data sources. Socio-economic, trip, land use and transportation characteristics are basically dealt in this chapter along with analysing accessibility and mobility scenario within the rural municipality. The basic data source of the analysis is the collected primary data.

### 2.1 Location

Mandavi Rural Municipality lies in Pyuthan district of Province number 5. In Falgun 22, 2073, the government of Nepal implemented a new local administrative structure consisting of 744 local units. With this implementation of the new local administrative structure, VDCs have been replaced with the municipal and rural municipal councils.

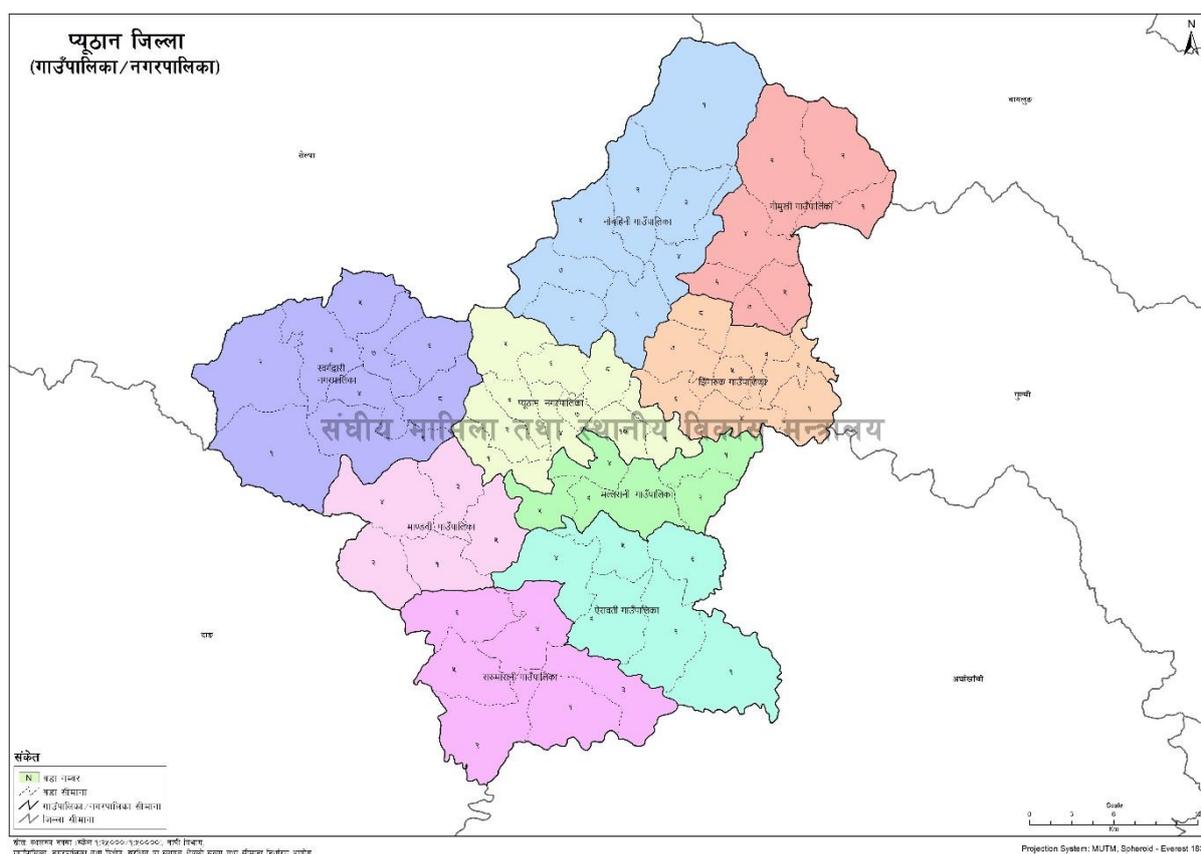
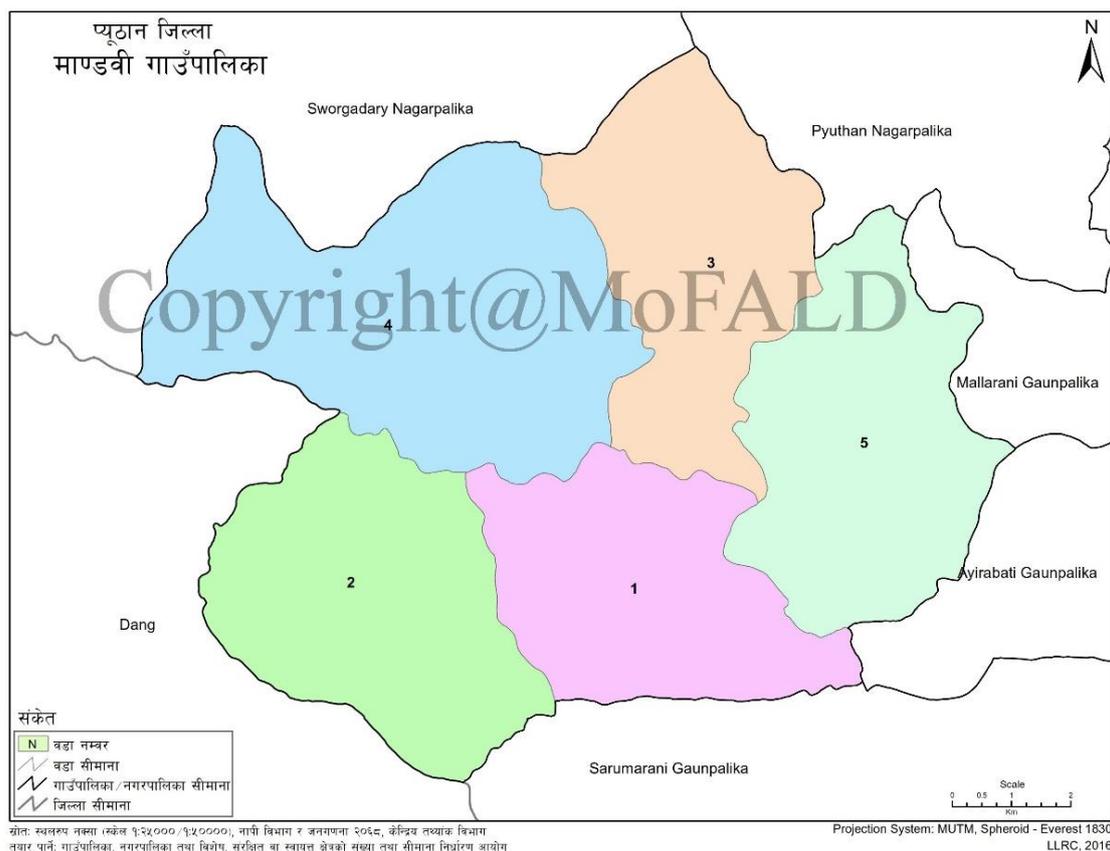


Figure 2: Local Levels of Pyuthan District



**Figure 3 : Location Map of Mandavi Gaunpalika**

The Mandavi Rural Municipality was established by merging the existing Markawang, Nayagaun, Ramdi, Udayapurkot and Tiram(1-4) village development committees (VDCs) having a total of 113.08 square km. The center of the Rural Municipality is established at Nayagaun of ward number 3. After merging the three VDCs population it had a total population of 15,508 according to 2011 Nepal census. The population density of Mandavi is 133 person/sq. km. Mandavi Rural Municipality has altogether 5 wards.

**Table 2: Formation of wards of Mandavi Rural Municipality**

क्र.सं.	नयाँ वडा	समावेश गाविस / नगरपालिका	जनसंख्या	क्षेत्रफल(वर्ग कि.मी.)
१	१	तिराम(१-४)	२८८९	१८.५५
२	२	मर्कावाड(१-९)	३११८	२२.०७
३	३	नयाँगाउँ(१-९)	३४६२	१९.६२
४	४	उदयपुरकोट(१-९)	३१५५	३१.३७
५	५	रम्दी(१-९)	२४३४	२१.४७
जम्मा			१५०५८	११३.०८

## 2.2 Socio-demographic

Population of this municipality in the year of 2068 was 15058 out of which 6577 are male and 8481 are female. The population of this municipality ward wise is as follows:

**Table 3: Population of Mandavi Rural Municipality**

Ward	Household	Population	Male	Female	Area
1	573	2889	1265	1624	18.55
2	606	3118	1373	1745	22.07
3	760	3462	1496	1966	19.61
4	604	3155	1364	1791	31.36
5	525	2434	1079	1355	21.47
Total	3068	15058	6577	8481	113.07

(Source: National Population Census 2068, CBS Nepal)

The population density of this municipality is 133 persons per square kilometre.

The rate of increment of population yearly is increasing as people of this Rural Municipality tend to migrate from other places in search of opportunities and better infrastructure facilities.

## 2.3 Landuse condition

Being a rural area of hill range almost 69.41% of the land is covered with forest area and nearly 19.2% of the land is used for agriculture. The detail land use pattern of Mandavi Rural Municipality is shown in table below.

**Table 4: Land use condition in the study area**

SN	Type	Area sq km	Percentage
1	Forest	78.49	69.41
2	Cultivation	21.71	19.20
3	Bush	8.27	7.32
4	Sand	2.04	1.80
5	Grass	1.30	1.15
6	Waterbody	0.93	0.83
7	Builtup	0.31	0.28
8	Cliff	0.02	0.02
9	Pond	0.00	0.00
	Total	113.08	100.00

## 2.4 Transportation

### a. Road inventory

For the collection of existing road infrastructure data, GPS survey was used and total length of road surveyed was 207.44 Km, out of which 35.60 Km is blacktopped, and remaining 171.84 Km of road is earthen.

**Table 5: Existing Road condition based on Surface Type**

Ward	Blacktop	Earthen	Total
1	15.99	34.62	50.61
2	3.72	35.61	39.33
3	9.70	30.30	40.00
4		36.62	36.62
5	6.20	34.68	40.88
Grand Total	35.60	171.84	207.44

Based on the data collected, it can be seen that the road density per 1000 population is 14.05 km per 1000 population and 1.87 km per square kilometre of area. This value is high as compared to national statistics such as 1.91 km per 1000 population and 0.344 km per square kilometre.

**Table 6: Road Density ward wise**

Road density						
Sn	Ward	Population	Area (sq km)	Road length	Per 1000 Population	Per sq km
1	1	2889	18.55	50.61	17.52	2.73
2	2	3118	22.07	39.33	12.61	1.78
3	3	3462	19.62	40.00	11.55	2.04
4	4	3155	31.37	36.62	11.61	1.17
5	5	2434	21.47	40.88	16.80	1.90
Total		15058	113.08	207.44	13.78	1.83

In this road inventory survey, it was found that the roads of this rural municipality are narrow and their width is insufficient to cross two vehicles from opposite direction at a time. Also, the actual width of feeder road and district roads is very small in comparison to their right of way. This rural municipality is supported by two feeder road of 35.73km within this gaunpalika known as Bhaluwang Liwang road and Pyuthan Gorahi road.

According to the District Transport Master Plan (DTMP) of Pyuthan District, three roads of total length **77.87 Km** of this municipality are listed as district road core networks (DRCN) and Village Road Core Network (VRCN).

These District Roads were under the responsibility of the District Development Committee and now they are under the responsibility of Rural Municipality itself.

#### b. Road Priority

From the ward level workshop, the most demanding five roads for each ward are collected and these roads will be used for the road priority and while developing road hierarchy.

**Table 7: Priority road length based on order of priority (in Km)**

Ward	1	2	3	4	5	Total
1	4.73	5.73	4.35	5.60	0.94	21.34
2	10.82	5.06	3.09	4.60	3.10	26.67
3	7.25	5.28	2.64	5.84	1.69	22.70
4	12.57	8.08	1.88	1.10	9.05	32.69
5	5.75	4.99	0.99	1.10	0.41	13.24
Total	41.13	29.14	12.94	18.24	15.20	116.65

**Table 8: Priority Road list**

Priority	Road Name	Length Km
	<b>Ward:1</b>	<b>21.34</b>
1	Damri Khola Ganesh Mabi Kharibang Markabang - Murkutti Dang Road	4.73
2	Khaireni Chowk To Devi Mandir Ganesh Mabi Ward Office	5.73
3	Tallo Simalchaur Dekhi Upallo Simal Chaur - Pipal Danda	4.35
4	Lampokhari - Siskhola Kudapani Jyamure Ghurke Chaur Hudai Sharmarani Pangbang Road	5.60
5	Pipal Danda To Ganesh Mabi Road	0.94
	<b>Ward:2</b>	<b>26.67</b>
1	Kondrachaur Ratapani Murkutti Road	10.82

2	Milan Chowk Dhodkhola Dharteju Khet Gang Kuwa Pani Bhatmare(Tourism Road)	5.06
3	Pukruk Odar Gaun Khuklichaur Hampal Murkutti Dang	3.09
4	Ratapani Dhanchaur Goganpani To Ward 1 Road	4.60
5	Ratapani Upallo Dhanchaur Belipokhari Dhanda Taribang Baghe Khola	3.10
	<b>Ward:3</b>	<b>22.70</b>
1	Naya Gaun Udayapur Kot Swargadwari Road	7.25
2	Saulighari Sallikot Sirubari Swargadwari Road	5.28
3	Lamachaur Marsibang - Dibang Road	2.64
4	Jaspur Jaspur Kot Udayapur Kot Swargadwari Road	5.84
5	Devisthan Udayepurkot - Swargadwari Road	1.69
	<b>Ward:4</b>	<b>30.53</b>
1	Nya Gaun 3 No Wada Office Bata Aapchaur Dhanchaur Udayapur Dadakateri Road	12.57
2	Saulighari Sallikot Sallikharka Sirubari- Dharampa Road	8.08
3	Jaspur Jaspur Kot Udayapur Kot Swargadwari Road	1.88
4	Basundhara Tilkine - Muka Chaur	1.10
5	Ward Office Sirubari Narsu Road	6.89
	<b>Ward:5</b>	<b>13.24</b>
1	Cherneta Jujeneta Bayedanda Sirubari Sandhpokhari Road	5.75
2	Tigra Thati Shivalaye - Yari Khola Sadhpokhari Road	4.99
3	Ek Chote Kalikhola Aairawati Chhatiban Road	0.99
4	Bukedanda Dungdunge Tigra Road	1.10
5	Chaurpani Boulagadhi Chackche Road	0.41
	<b>Grand Total</b>	<b>114.49</b>

### c. Traffic condition

This rural municipality possess mixed traffic. The traffic in Bhaluwang Liwang road is high.. Public vehicles are easily available in highway but they are barely seen on other areas. Due to low number of public vehicles, motorcycle number is

increasing rapidly within the rural municipality. For the goods transportation purpose, large and small trucks are being used and for the transportation of construction materials such as sand, stone and gravel, tractors and trippers are being used.

## 2.5 Visionary city development plan

The vision of this Mandavi Rural Municipality should be to develop an environment friendly and clean city by fostering its cultural and religious history and importance with modern urban facilities. However, this plan is yet to be prepared.

For this the main visionary city development plan of the rural municipality should be to develop/preserve the following:

1. Tourism
2. Agriculture

## 2.6 Indicative development potential

IDP is basically the indication of the existing and potential market center/service centers (key growth centers) and the areas having various development potentials such as agro-based industries, high value cash crops and tourism. Thus, IDP shows high value cash crops, tourism area, and area of service centers such as hospital, post office, telecommunication, school, campus, security offices and large settlements, important historic and religious places. Finally, it prepares the ranking of the markets of the municipality as the basis of network planning. The IDPM of this rural municipality is yet to be prepared.

Existing/potential areas are defined as:

- Existing/potential areas for development of large industries.
- Areas with extensive small cottage industries.
- Area with service centers such as hospital, post office, telecommunication, school, campus, security offices, Bus Park, sport and recreational centers etc.
- Potential areas for tourism development.
- Area with large settlements.
- Area with important historic and religious places.
- Areas with extensive high value cash crops
- Areas with extensive horticulture.
- Areas with extensive livestock farming.

## **Chapter 3: Rural Municipality Road Network Planning**

The Rural Municipal Transport Master Plan (RMTMP) that covers the next five years is prepared based on the projected financial requirement to fulfil the perspective plan. Year-wise targets are prepared for the different roads and intervention types.

### **3.1 Road Classification**

Roadways serve a variety of functions, including but not limited to the provision of direct access to properties, pedestrian and bicycle paths, bus routes and catering for through traffic that is not related to immediate land uses. Many roads serve more than one function and to varying degrees, but it is clear that the mixing of incompatible functions can lead to problems. Thus it is important to distinguish road in different class or type based on various criteria. 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 can be implemented. It is an important tool of road network and land use planning to asset management.

Road hierarchy restricts or reduces direct connections between certain types of links, for example residential streets and arterial roads, and allows connections between similar order streets (e.g. arterial to arterial) or between street types that are separated by one level in the hierarchy (e.g. arterial to highway and collector to arterial.) These hierarchical distinctions of road types become clearer when considering the recommended design specifications for the number of through lanes, design speed, intersection spacing and driveway access.

A well-formed road hierarchy will reduce overall impact of traffic by concentrating longer distance flow onto routes in less sensitive locations, ensuring land uses and activities that are incompatible with traffic flow are restricted from routes where traffic movement should predominate and preserving areas where through traffic is discouraged.

The road hierarchy principles will assist planning agencies via orderly planning and provision of public transport routes, pedestrian and bicycle routes. It also identifies the effects of development decisions in and on surrounding areas and roadways within the hierarchy and also facilitates urban design principles such as accessibility, connectivity, efficiency, amenity and safety. Further, it also identifies treatments such as barriers, buffers and landscaping to preserve amenity for adjacent land uses.

This study also formulates the road hierarchy for the various roads. After going through large number of literature, the study has proposed four level hierarchy roads namely Class A, B and C. Class C basically deals with access while Class A and B basically deals with mobility and accessibility to higher services.

Based on various literature, the recommended right of way of ToR doesn't seem to be justifiable one as there is necessity of arterial road within the municipality. Also, the road space needs to be distributed to all road users equally with provision of green belt, cycle track thus there need to be a provision for green belt cycle track and footpath. After proper study the RoW of 14, 10, 8 and 6m is recommended for class A, B, C and D road respectively.

Type of City	Criteria	ROW based on Road Hierarchy (m)				
		Expressway	Arterial	Sub arterial	Collector	Local
Sub city	10,000-40,000	-	-	30	20	10
City	40,000-100,000	-	50	30	20	10
Sub Metro City	100,000-300,000	50	30	20	10	10
Ref: Planning Norms and Standard 2015, GoN, DUDBC						
ROW based on Road Hierarchy (m)						
Expressway	Arterial	Sub arterial		Collector	Local	
-	50-60	30-40		20-30	10-20	
Ref: Nepal Urban Road Standard 2068 (draft)						
Standard	Cycle Track	Footpath (Minimum)		Median Strip		
NURS 2068 draft	2 m on both side	2 m on both side		5 m		
NRS 2070	2 m on both side	1.5 m on both side		5 m		

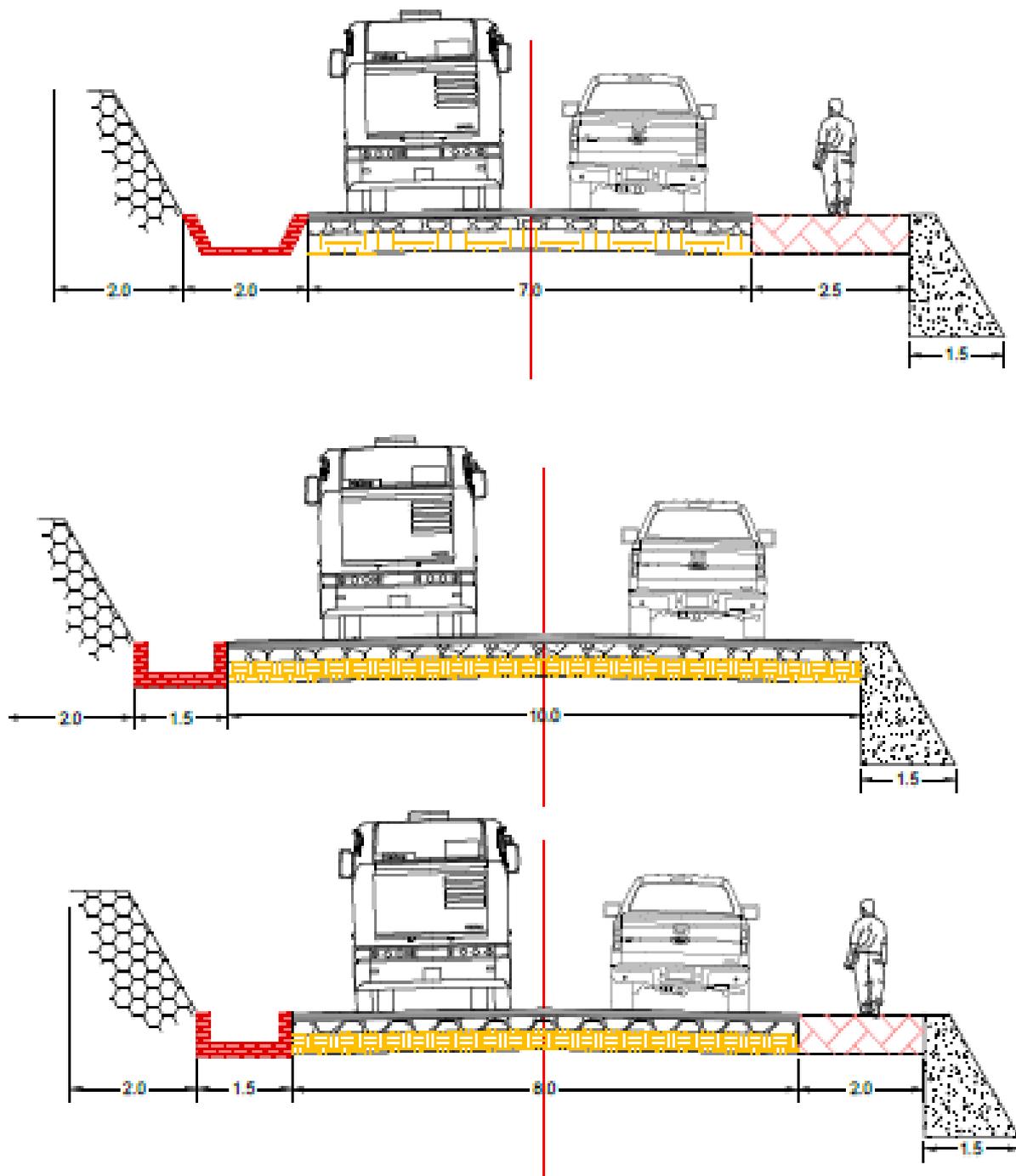
**Table 9: Comparison of Criterion of Road hierarchy**

Criteria	Class A	Class B	Class C	Class D
Purpose	Mobility	Mobility and control access	Access and mobility	Access
Function	Through and long distance movement	Connection between Class A and C roads; and also Provide alternative connection routes between Class A	Connects higher order roads and mobility to local trips	Connect local trips to higher level roads

	High network coverage	Support through movement of traffic	Access to property	direct access to property
	Segregated NMT facilities and Bus lay-bys	Segregated NMT facilities and Bus lay-bys	Segregated NMT facilities	Local NMT movement
	Complete access to public transport	High access to Public transport	Limited access to public transport	
Maintenance Responsibility	Municipality	Municipality	Municipality & Community	Community
Design Speed (Kmph)	40	30	25	25
Minimum Right of Way(m)	15	10	8	6*
Extra width at curve (m)	3	2.5	1.5	1
Setback distance (m)	3	2.5	2	1.5
Access Control	Applicable	Applicable	Not Applicable	Not Applicable
Public transport services	Local Public transport	Local Public transport	No public transportation	No public transportation

#### a. Class A Roads

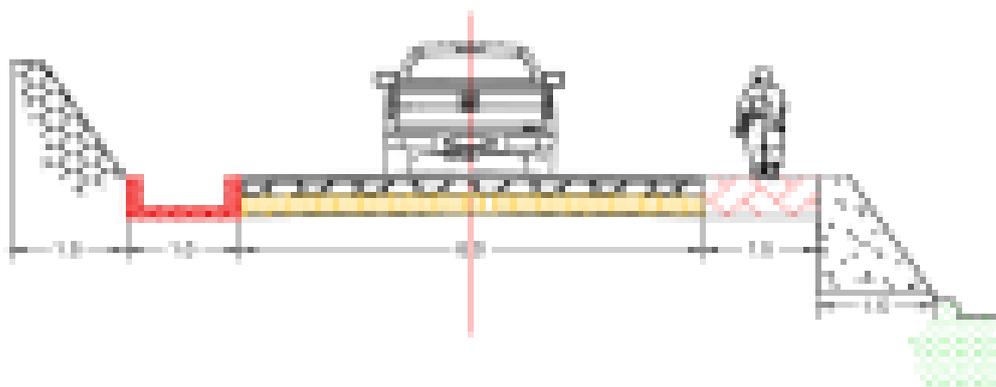
All major roads which connect one or more major Growth Centres (market, tourism Centre, industry, etc.) or several Wards with high network coverage, connected directly or through the National Strategic Road Network or district road falls on the road class A. The proposed right of way for this class of road is 15 m which includes footpath, greenery, and the carriageway as shown below in the cross section.



**Figure 4: Typical cross section of roads**

**b. Class B road**

All roads which connect to a major road network and other roads of similar hierarchy with a road connecting major Growth Centre of the same or neighbouring wards which provide access between Class A and class C road falls on the category of class B. The right of way of this class road is 10m.



**Figure 5: typical cross section for class C road**

**c. Class C Roads**

All roads which provide connection to higher order roads with all agricultural roads which connect a farm with a mini-market Centre or a agro-based production Centre and means for mobility of local trips are understood as road class C. For this the proposed right of way for class c roads is 8m.

**d. Class D Roads**

All other small roads present inside the rural municipality lie under class D roads. Such roads provide service to very small population and are for mobility inside a small area. The proposed right of way for class D roads is 6 m

### 3.2 List Of Rural municipality Roads Class A

There are 4 rural municipal roads of class A of total length 52.69km which is all earthen. Detail of inventory of Class A roads is illustrated in table below:

**Table 10: List of Municipal roads A**

SN	Code	Road Name	Earthen	Total
1	A001	Kumaltar-Kondrachaur-Ratpani-Murkutti Road	16.70	16.70
2	A002	Naya Gaun(Ward Office)- Udayapur Kot-Swargadwari Road	19.82	19.82
3	A003	Cherneta-China-Jabune Road	9.61	9.61
4	A004	Cherneta Puran Thati Baraula (Argakhachi ) Road	6.56	6.56
			52.69	52.69

### 3.3 List of Rural municipality Roads Class B

There are 7 rural municipal roads of class B of total length 48.95 km out of which 47.23 Km is earthen, and 1.72 Km is to be track opened. The detail of road inventory of Class B roads is illustrated in table below:

**Table 11: List of Rural municipality roads of Class B**

SN	Code	Road Name	Earthen	New	Total
1	B001	Damri Khola Chowk-Ganesh Ma Vi-Kharibang-Dhanchaur-Markawang(Ward Office) Road	9.33		9.33
2	B002	Lampokhari - Siskhola Kudapani Jyamure Ghurke Chaur Hudai Sharmarani Pangbang Road	3.50	2.59	6.09
3	B003	Kondra Chaur -Dhikawang- Kochibang Road	7.44		7.44
4	B004	Ratapani Upallo Dhanchaur Belipokhari-Danda-Tita-Taribang Road	3.20	3.63	6.83
5	B005	Saulighari Sallikot Sallikharka Sirubari - Dharampa Road	12.97		12.97
6	B006	Lamachaur Marsibang - Dibang Road	2.44		2.44
			38.88	6.22	45.10

### 3.4 List of Ward Roads of Class C

The following is the list of ward roads of class C. Total length of Class c road is 40.16 Km out of which 31.09 Km is earthen and 9.07 Km is proposed new track.

**Table 12: List of ward roads Class C**

SN	Code	Road Name	Earthen	New	Total
1	C001	Tallo Simalchaur Dekhi Upallo Simal Chaur - Pipal Danda	4.35		4.35
2	C002	Khaireni Chowk To Devi Mandir Ganesh Mabi Ward Office	5.73		5.73
3	C003	Pukruk Odar Gaun Khuklichaur Hampal Murkutti Dang	3.42	0.96	4.38
4	C004	Damare Kalikate Dumin Danda	1.51		1.51
5	C005	Devisthan Udayepurkot - Swargadwari Road	4.56		4.56
6	C006	Jaspur Jaspur Kot Udayepur Kot Swargadwari Road	7.73		7.73
7	C007	Jaspur Besi Ring Road	0.78		0.78

8	C008	Pokharo Dekhi Tahara - Pokhar Chaur Motor Road	0.72		0.72
9	C009	Raj Pokhara Sirubari Narsu Road	6.89		6.89
10	C010	Chakchake Ring Road	0.62		0.62
11	C011	Cherneta-Chaur Pani-Baulagadhi-Chakchake Road	0.79	1.60	2.39
12	C012	Cherneta Jujeneta Bayedanda Sirubari Sandhpokhari Road	3.77		3.77
13	C013	Tigra Thati Shivalaye - Yari Khola Sadhpokhari - Sikhre Basti	2.61	1.72	4.33
14	C014	Milan Chowk Dhodkhola Dharteju Khet Gang Kuwa Pani Bhatmare(Tourism Road)	5.06	1.89	6.95
15	C015	Bukedanda Dungdunge Tigra Road	1.10		1.10
16	C016	Danda Bhedi Tol To Shivalaye Road	0.74		0.74
			50.38	6.17	56.55

### 3.5 List of Ward Roads of Class D

The following is the list of ward roads of class D. Total length of Class D road is 42.26 Km out of which 40.83 Km is earthen and 1.43 Km is proposed new track.

**Table 13: List of Class D roads**

SN	Code	Road Name	Earthen	New	Total
1	D001	Damai Tol-Gokarna Chowk To Damrikhola Chowk Toganesh Ma Vi Conncting Road	1.52		1.52
2	D002	Pipal Danda To Ganesh Mabi Road	0.48		0.48
3	D003	Chedapokhari Ghorkhanne(Football Ground Road)	0.44		0.44
4	D004	Chhedapokhari Sattale Road	0.71		0.71
5	D005	New Track(Dadri Khola Dewali Danda - Dhanare)		0.99	0.99
6	D006	Bhitri Road	0.55		0.55
7	D007	Damai Tol Lakuri Dada	0.80		0.80
8	D008	Damai Tol To Dotegaira	0.44		0.44
9	D009	Ward Office Ko Ring Road	0.59		0.59
10	D010	Majhtol To Ward Office	0.39		0.39
11	D011	Khatri Marg(Track Open)		0.43	0.43
12	D012	Chitra Bdr Khatri Ghar Road	0.53		0.53
13	D013	Lakuri Dada Bata Ntc Tower Road	0.66		0.66

14	D014	Lum Bdr Ko Ghar To Dotegaira Road	0.22		0.22
15	D015	Thakleni Bazar Dekhi School - Gaun Ring Road	1.01		1.01
16	D016	Aadhar Prabi Road	0.40		0.40
17	D017	Bal Bikash Chauke Sajhapani Gaun Milan Chowk	0.89		0.89
18	D018	Simal Gaira Nera Prabi Markabang	0.74		0.74
19	D019	Bhume Than Samudhayek Bhawan Aandheri Cheda Road	0.57		0.57
20	D020	Badechaur Tallo Kharibang Ganesh Mabi Road	0.56		0.56
21	D021	Golbang Gogan Pani	2.17		2.17
22	D022	Ne Ra Pra Vi To Mandali Gram Road		0.99	0.99
23	D023	Ek Chote Kalikhola Airawati Chhatiban Road	1.17		1.17
24	D024	Sisneri Motor Road(Tallo Simal Chaur)	0.54		0.54
25	D025	Pokhara To Guwakhola (West Part) Road	0.34		0.34
26	D026	Health Post Road	0.44		0.44
27	D027	Kolbot Saitar Road	0.26		0.26
28	D028	Ek Chote Bal Bikash Road	0.10		0.10
29	D029	Kolbot Bharam Tol Ekchote Road	0.91		0.91
30	D034	Bineta Bheda Bari Fulbari Road	2.16		2.16
31	D035	Churibot Talla Bari Road	0.79		0.79
32	D036	Kamachi Mabi Road	0.28		0.28
33	D037	Basundhara Tilkine - Muka Chaur	1.10		1.10
34	D038	Kochibang Road	1.82		1.82
35	D039	Aishworye Prabi Road	0.89		0.89
36	D040	Dharampani Road	0.22		0.22
37	D041	Alternative Road	0.47		0.47
38	D042	Pipal Pata Dekhi Mandawi Nadi Jharne Road	0.24		0.24
39	D043	Guwa Khola Dekhi Mandawi Nadi Jharne Motor Road	0.70		0.70
40	D044	Sauli Ghari Guthi Bata Fulghat Road	0.47		0.47
41	D045	Darim Chaur Kirshi Motor Road	0.20		0.20
42	D046	Sauli Ghari Fulghat Road	0.60		0.60
43	D047	Bpc Bata Khola Road	0.25		0.25
44	D048	Ramdi Besi Dam Site Road	1.53		1.53

45	D049	Sano Chaur Road	0.30		0.30
46	D050	Xeda Pokhari To Bazar	0.71		0.71
47	D051	Marsibang Bagaicha Dekhi Sanochaur Road	0.79		0.79
48	D052	Belarukha Thakur Tol Road	0.34		0.34
49	D053	Ratchaur Football Ground Road	0.21		0.21
50	D054	Golkhadi Gharti Tol Road	0.88		0.88
51	D055	Lamachaur Shiva Mandir To Battare Chaupari Road	0.54		0.54
52	D056	Aapchaur Chisapani Wada Office	0.25		0.25
53	D057	Lamachaur Shiva Mandir Dekhi Bhalabang Road	0.34		0.34
54	D058	Power House Road	1.79		1.79
55	D060	Aairawati Sirubari Chowk To Chisapani Road	0.77		0.77
		Total	178.02	14.81	228.43

### 3.6 Rural municipality Inventory Map Of Road Network

Road inventory survey was conducted through the rural municipality as far as possible except the new construction considered. In the inventory survey, the surface condition, width of road, and intervention required were collected. These data are presented in rural municipality inventory map of road by surface condition, by width and invention needed. Similarly the map of road infrastructure is also prepared. Refer annex of this report for map in detail.

**Table 14: Length of Roads based on surface condition**

Class	Blacktop	Earthen	New	Total
A		52.69		52.69
B		38.88	6.22	45.10
C		50.38	6.17	56.55
D		36.08	2.41	38.49
FEEDER	35.60			35.60
Total	35.60	178.02	14.81	228.43

## Chapter 4: Perspective Plan of Rural Municipality Transport Network

### 4.1 Process and procedure for collection of demand

For the collection of ward road demand, ward level workshop on each ward was conducted. With discussion with the concerned stakeholders of each ward, five roads from each ward with their significance were selected as the ward road for the RMTMP period.

### 4.2 Scoring system for screening, grading and prioritization

As the financial resources of rural municipality is less as compared to the demand of people there is always conflict among the leaders from different parts for the development of road infrastructure. For this we have to prioritize roads, based on the certain conditions. For this RMTMP, we have adopted the criteria given by the ministry with discussion and minor modification with the concerned stakeholders. Based on this criteria, municipal and ward roads have been prioritized class wise. The details of prioritization criteria are included in chapter 1 of Volume II of this report and prioritized roads are shown in Annex with detail of score on each criteria and ranking.

### 4.3 Possible inter-rural municipality/district linkages

This rural municipality is supported with 35.6Km long Bhaluwang Liwang Highway and Pyuthan Ghorahi feeder road sections which are under Department of Road . This highway and district roads mainly serve for the inter municipality and inter district mobility. The following is the list of DRCN in Pyuthan district(Source: LRN:- 2015, DoLIDAR)

**Table 15:List of District roads Pyuthan**

District Road Class A					
Code	Name of Road	Total length; Km	Gravel	Earthen	New Construction
52A001	Bagdula-Thulabesi-Arkha-Baglung, Bhimgitthe	22.63		22.63	
52A002	Bagdula-Damti-Bahane Syaulibang Road	13.16	13.16		20.00
52A003	Khalanga-Chujathati-Jogitar-Arghakhachi Road	19.10	5.32	13.78	
52A004	Cherneta-Puranthati-Jogitari-Arghakhachi	24.00	24.00		

52A005	Bijuwar, Bijay Nagar, Jumrikada	10.24		10.24	
52A006	Dakhkwadi-Barjibang-Sotrre-Sari Road	21.10		21.10	
52A007	Kumaltar-Kondrachaur-Ratapani-Murkuti-Dang	18.00		18.00	
52A008	Machchhi-Bangephedi-Sautamare Road	15.00		15.00	
52A009	Bhingri-Sawargaduvari Road	13.00		13.00	
52A010	Cherneta-Chin-Jamune-Dangwang Road	29.41		29.41	
52A011	Narikot-Pathihalna-Khung-Pokhra-Rupa-Gulmi	12.70		12.70	
52A012	Dharmawati-Gejwang-Phopli-Mainamare-Rolpa	12.77		12.77	
52A013	Kumaltar-Kochiwang-Road	13.20		13.20	7.21
52A014	Aglung Phedi-Rajwara-Dhorpatan (Baglung)	10.81		10.81	
52A015	Bahane-Damri-Chisapani-Ligha-Sayaulibang	9.50		9.50	
52A016	Cherneta-Khaira-Khalanga--Road	14.00	14.00		
52A017	Debisthan-Tiram-Murkuti-Dang Road	14.81	7.84	6.97	
52A018	Dhandh-Badikot-Dewrali-Malagiri-Gulmi Road	15.00	4.19	10.81	
52A019	Kutichaur-Ratatari-Kuta-Tusara Road	5.01		5.01	
52A020	Kharibot-Majuwa-Markawang-Solhalna-Arghakhachi Road	15.80		15.80	
52A021	Nayagaun-Udaypurkot-Swargadwari-Gramin	20.13		20.13	
52A022	Salthati-Chaurpani-Bijuli-Baraula Road	14.00	14.00		
52A023	Baddanda-Hansapur-Aerabati Road	13.00		13.00	
52A024	Bahane-Lung-Tusara-Dhand-Road	9.04		9.04	

52A025	Baddanda-Juspur-Hatikhal-Dang Road	7.06		7.06	
52A026	Thakleni-Murkuti-Dang Road	10.45		10.45	
26	Total	382.92	82.51	300.41	27.21

## 4.4 Interventions for MTPP

### a. Maintenance

Maintenance refers to the actions required to repair a road and keep it in good and passable condition. For RMTMP planning purposes standard costs per kilometre for each maintenance type are applied to the entire road network, whereby for certain maintenance type's distinction is made according to the surface type of the road. Maintenance activities include:

**Emergency maintenance** - Basic repairs aimed at removing landslides and repairing damage to the road that inhibit the proper use of the road and make it impassable. This mainly takes place during and after the rainy season. A provisional lump sum is reserved for the entire road network based on the network length. Allocation to specific road sections is based on the actual need for clearing landslides or repairing washouts and cuts in the road.

**Routine maintenance** - General maintenance of the road aimed at preventing damage by ensuring the proper working of the different road elements (retaining walls, drainage system, carriageway, etc.) and cutting vegetation. This is carried out each year on a more or less continuous basis. Routine maintenance is required for the entire road network. The specific requirements for routine maintenance are determined on an annual basis through the road condition survey.

**Recurrent maintenance** - Repairs of minor damage to the road surface and road structures to bring them back to good condition. This is generally carried out once or twice a year. Recurrent maintenance is required for the entire municipal road network, whereby distinction is made according to the surface type. The specific requirements for recurrent maintenance are determined on an annual basis through the road condition survey.

**Periodic maintenance** - Larger repairs to the road largely aimed at renewing the road surface through re-gravelling, resealing or overlays. It is generally carried out with several years interval. Although periodic maintenance is only required for specific sections of the road network, a lump sum allocation is made for the entire road network based on average annual requirements, distinguishing between different surface types. The specific periodic maintenance requirements are determined on an annual basis through the annual road condition survey.

## **b. Improvement**

Improvement refers to actions required to improve a road to bring it to a maintainable all-weather standard. It includes the following actions:

- 1. Rehabilitation** - Significant repairs required to bring a very poor road back to a maintainable standard. This does not include any changes to the original surface type.
- 2. Gravelling** - Placement of gravel layer to make it all-weather and ensure that the road remains passable during the rainy season.
- 3. Cross drainage** - Placement of suitable cross-drainage structures with the aim of making the road all-weather and ensuring that the road remains passable even during the rainy season.
- 4. Protective structures** - Placement of retaining walls and lined side drains to avoid excessive damage to the road during the rainy season and bring it to a maintainable standard.
- 5. Blacktopping** - Placement of a blacktop layer in roads with traffic volumes exceeding 50 passenger car units (PCU) to reduce damage to the road surface.
- 6. Widening** - Increase of the road width in roads with traffic volumes exceeding 500 passenger car units (PCU) to ensure the proper flow of traffic.

**Table 16: Roads requiring cross drainage structures**

Road Code	Culvert	Causeway	Bridges
A001	7	2	
A002	-	2	
A004	3	2	
B001	2	3	
B002	1	3	
B003	6	7	1
B004	1	1	
B005	-	1	
C001	1	2	
C002	1	1	
C004	-	2	
C009	2	-	
C011	1	-	
C012	2	-	
C013	-	1	2
C014	-	2	
D023	-	-	1
Total	27	29	4

#### 4.5 Perspective plan of rural municipality transport network with score and ranking

In total there are roads of length 228.43 Km within the rural municipality excluding feeder roads and National Highway, either in planned or existing condition. All the standards set by the rural municipality council are assumed not to decrease its RoW whenever these roads fall on the lower class in this RMTMP.

**Table 17: Arrangement of Road width**

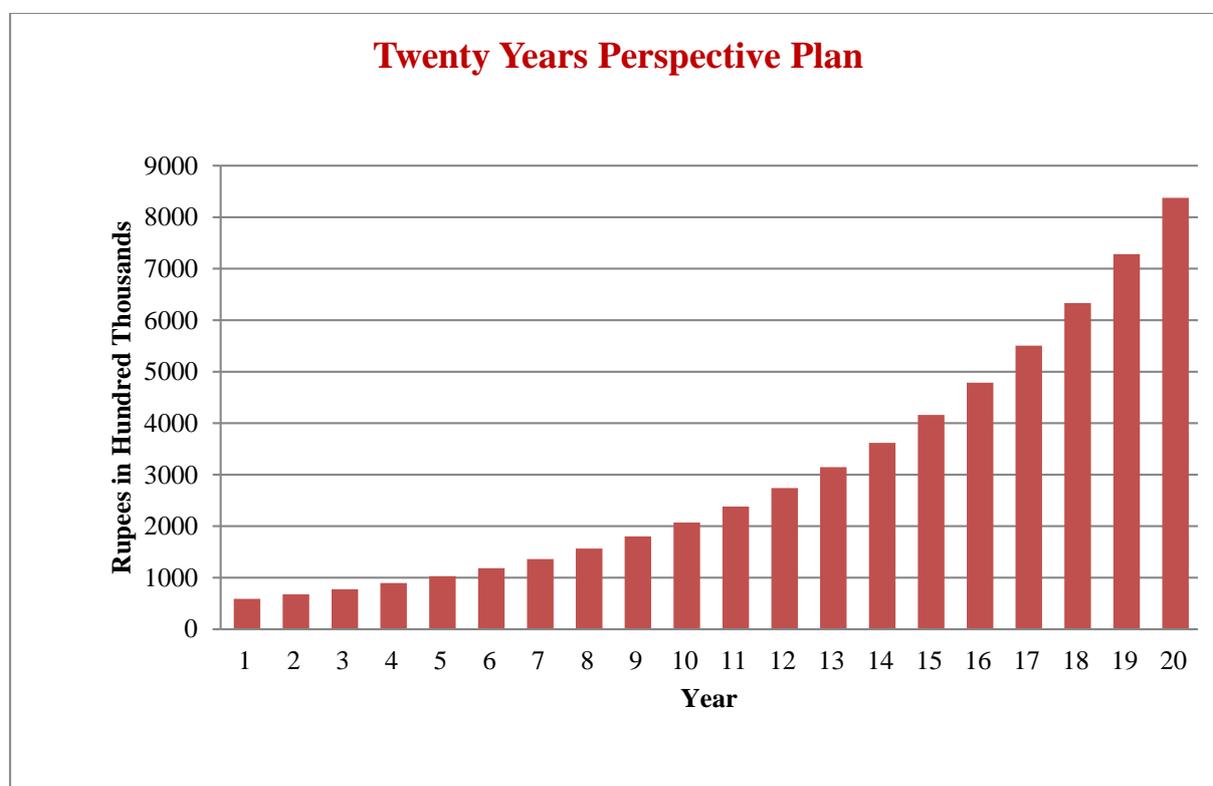
SN	Class of Road	Minimum RoW(m)	Setback(m)	Pavement(m)
1	A	15	3	11
2	B	10	2.5	7
3	C	8	2	6
4	D	6	1.5	4

Urban Development Strategy 2015 aims to pave 50% of the municipal roads by the end of 2031AD for New Municipalities and this RMTMP planned to pave all roads within the perspective period of 20 years i.e. by the year of 2038AD in its full width.

For the financial requirement, the rate of different interventions as given by the ToR is used. For the financial planning the following assumptions are made:

- 10% of length of hilly road requires retaining wall on hill and valley side and the cross section of retaining is taken as 1.5 square meter
- 10% of the length of hilly road requires gabion wall and the cross section of gabion is taken as 1 square meter
- full length of road requires longitudinal drainage structures
- Length of bridge in average taken as 30m
- Financial capacity of rural municipality increases by 15% each year

Based on this rate of item and total required interventions, a total of 602 crore of Nepalese rupees is projected to be required to develop road infrastructure and maintain road infrastructures. For this the assumption made is that the financial capacity of rural municipality increases by 15% each year. These costs will change slightly as the roads are improved and the standard costs change. This should be updated on annual basis.



**Figure 6: Perspective financial plan for 20 years**

Table 18: Projected budget for perspective plan class wise

Year	Projected Budget in Hundred Thousands						
	Class A	Class B	Class C	Class D	Construction	Maintenance	Total
1	124	124	124	41	413	177	590
2	142	142	142	47	473	203	676
3	163	163	163	54	543	233	776
4	188	188	188	63	627	269	896
5	216	216	216	72	720	309	1,029
6	249	249	249	83	830	356	1,186
7	286	286	286	95	953	408	1,361
8	329	329	329	110	1,097	470	1,567
9	378	378	378	126	1,260	540	1,800
10	435	435	435	145	1,450	621	2,071
11	500	500	500	167	1,667	714	2,381
12	575	575	575	192	1,917	822	2,739
13	661	661	661	220	2,203	944	3,147
14	760	760	760	253	2,533	1,086	3,619
15	874	874	874	291	2,913	1,248	4,161
16	1,005	1,005	1,005	335	3,350	1,436	4,786
17	1,156	1,156	1,156	385	3,853	1,651	5,504
18	1,330	1,330	1,330	443	4,433	1,900	6,333
19	1,529	1,529	1,529	510	5,097	2,184	7,281
20	1,759	1,759	1,759	586	5,863	2,513	8,376
Total	12,660	12,660	12,660	4,220	42,200	18,080	60,280

For the perspective implementation plans, the municipal and ward roads have been prioritized and ranked. Based on these ranking, the implementation should be done. The ranking of the municipal and ward roads with the score are as given under:

Table 19: Prioritization of roads

Code	Score	Overall Rank	Rank In Class
A001	93.70	2	2
A002	99.96	1	1
A003	90.81	3	3
A004	60.81	14	4
B001	62.26	13	5
B002	48.36	20	6
B003	67.98	10	3
B004	66.98	11	4
B005	88.96	4	1
B006	75.91	8	2
C001	55.36	17	8
C002	50.36	18	9
C003	83.57	7	3
C004	25.36	60	14
C005	57.91	15	6
C006	71.93	9	4
C007	47.91	21	11
C008	29.91	46	12
C009	87.99	6	2
C010	20.81	70	16
C011	22.86	62	15
C012	63.56	12	5
C013	88.00	5	1
C014	56.57	16	7
C015	49.81	19	10
C016	26.81	56	13
D001	36.74	28	7
D002	35.36	31	10
D003	36.00	30	9
D004	19.36	71	45
D005	19.36	73	47
D006	31.36	36	15

D007	19.36	73	47
D008	19.36	73	47
D009	25.36	60	37
D010	19.36	71	45
D011	19.36	73	47
D012	19.36	73	47
D013	19.36	80	54
D014	19.36	73	47
D015	31.36	36	15
D016	31.93	34	13
D017	31.57	35	14
D018	33.25	32	11
D019	37.57	27	6
D020	19.36	73	47
D021	25.57	59	36
D022	32.00	33	12
D023	38.81	26	5
D025	30.00	44	23
D026	41.91	24	3
D027	20.81	64	39
D028	26.81	56	34
D029	20.81	64	39
D034	30.74	38	17
D035	20.81	64	39
D036	29.99	45	24
D037	46.99	22	1
D038	30.57	39	18
D039	30.09	43	22
D040	29.26	54	32
D041	29.63	53	31
D042	29.91	46	25
D043	30.21	41	20
D044	29.71	52	30
D045	30.20	42	21

D046	36.74	28	7
D047	29.91	46	25
D048	30.37	40	19
D049	29.91	46	25
D050	20.81	63	38
D051	29.91	46	25
D052	20.81	64	39
D053	45.91	23	2
D054	20.81	64	39
D055	40.07	25	4
D056	20.81	64	39
D057	29.91	46	25
D058	26.81	56	34
D060	27.11	55	33

## Chapter 5: First Five Year Rural Municipality Transport Master Plan

The Rural Municipal Transport Master Plan (RMTMP) that covers the next five years is prepared based on the projected financial requirement to fulfil the perspective plan. Year-wise targets are prepared for the different roads and intervention types.

### 5.1 Five Year Projected Financial Plan

To fulfil the required interventions implementation plan, financial requirements should be collected from the possible funding sources. For this the present financial capacity of the rural municipality is considered to increase by 15% each year. The rural municipality aims to invest approximately 5.9 Crore of budget in road infrastructure in the following fiscal year and this budget will increase on the years following.

### 5.2 Sharing of Funds

The distribution of the available road sector budget for the RMTMP period is given by ToR is as given below figure. Out of 100% budget, 70% is allocated for the construction of roads and 30% is allocated for maintenance work. As this amount of budget for maintenance work is huge, this amount can also be used for the construction of drain and retaining structures while in the initial RMTMP period. After large network of road is developed, this amount will be used in maintenance work.

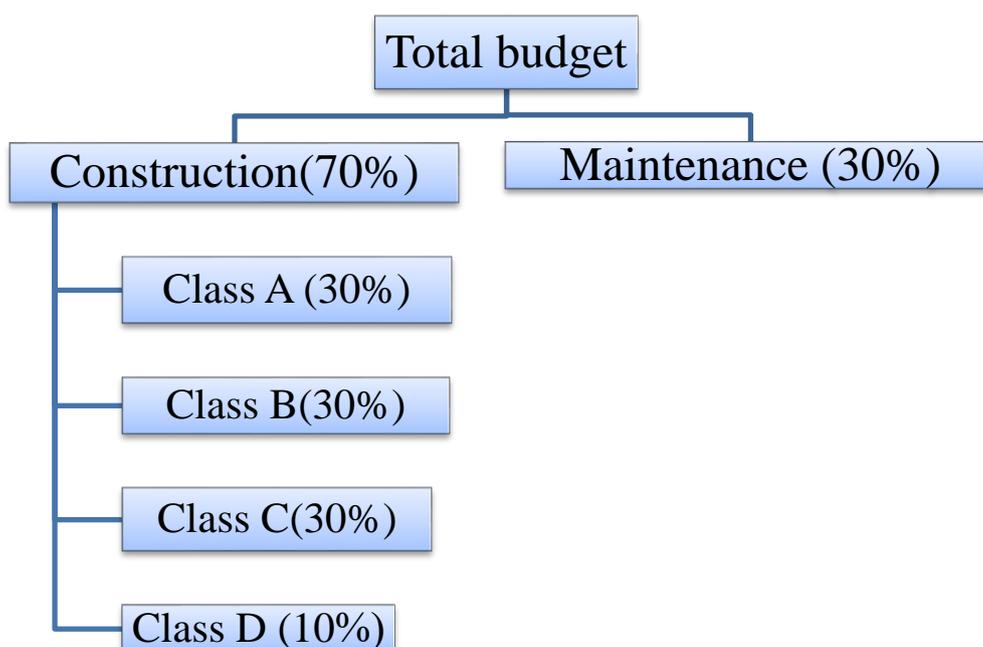


Figure 7: Distribution of Budget in RMTMP period

Based on the above distribution scheme of the budget, the required annual budget will be as follows:

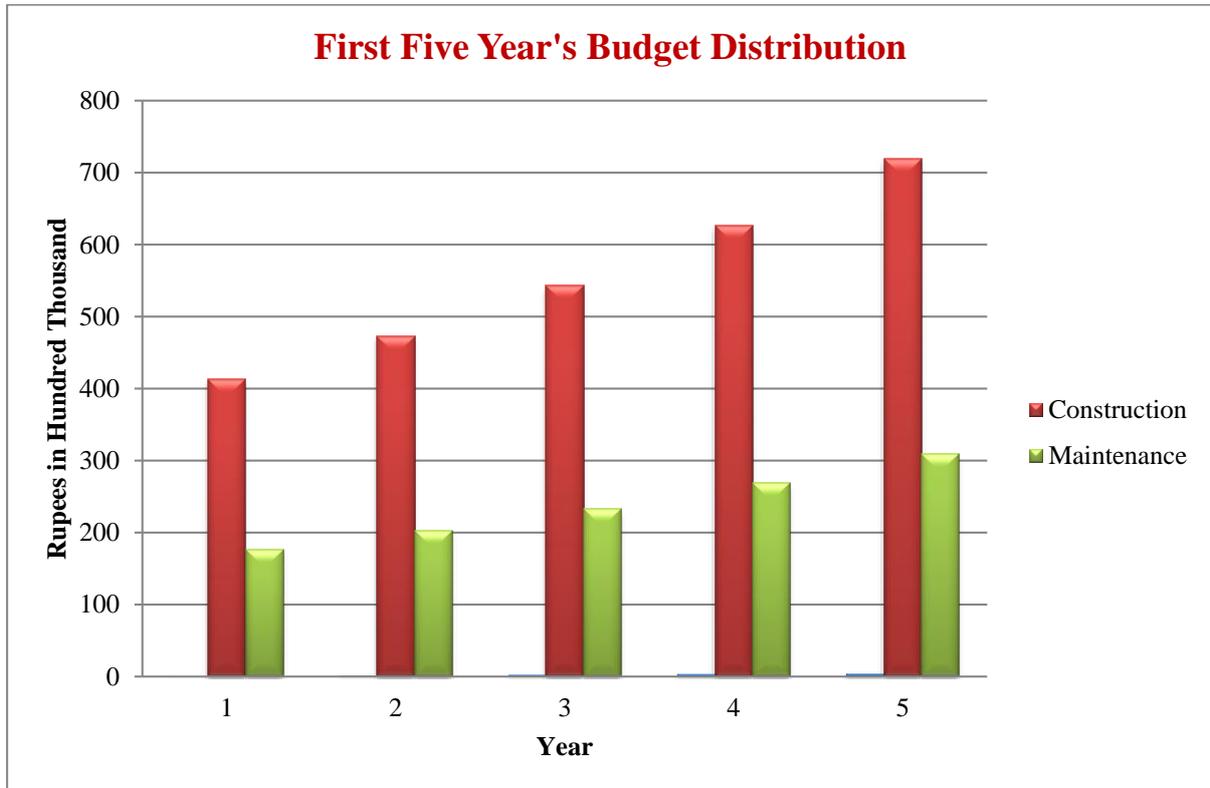


Figure 8: Short term plan for construction and Maintenance

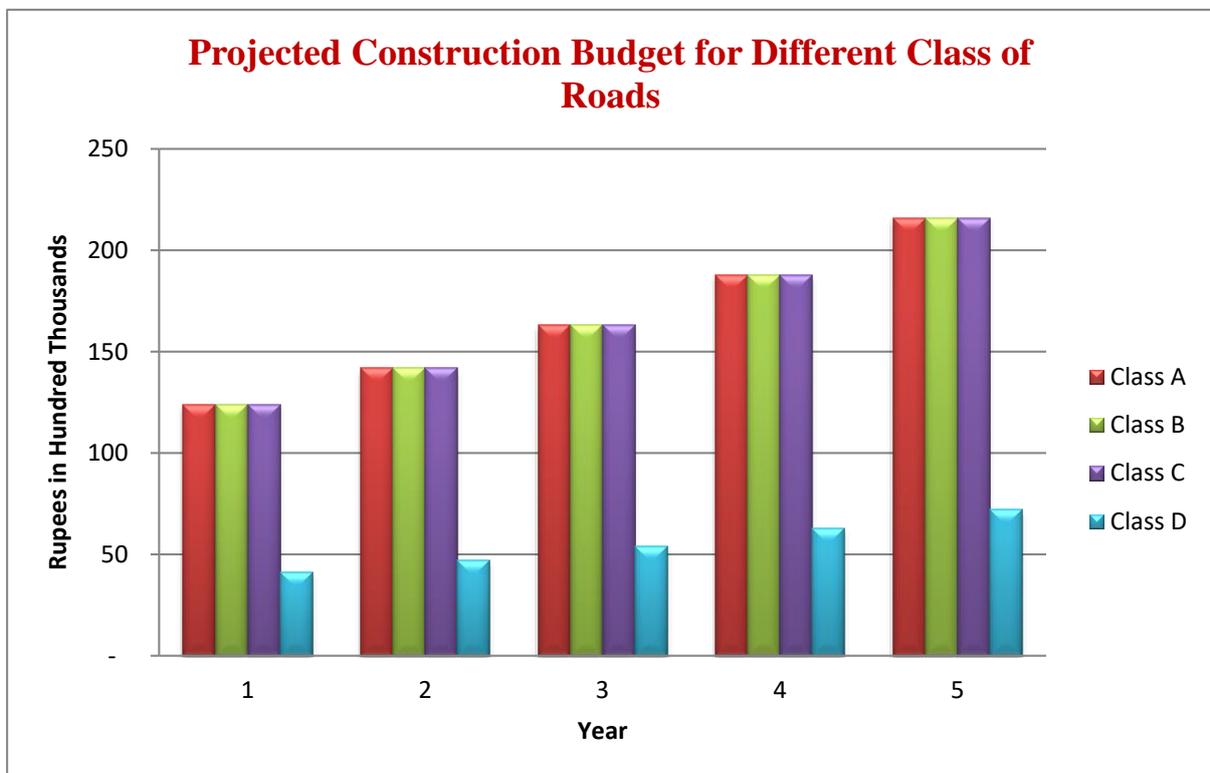


Figure 9: Investment Plan for RMTMP period

### 5.3 First Five Year Rural municipality Transport Implementation Plan

For the implementation plan of RMTMP period, the following assumptions have been made:

- Class 'A' , 'B' and 'C' roads are planned for intermediate lane.
- Class 'D' roads are planned for single lane.
- All class of roads are planned for upto all weather condition only
- Emphasis given to accessibility.
- Maintenance budget is considered to use in the construction/management of drain and retaining structures.

The projected budget for first five year plan is as follows:

**Table 20: Projected budget distribution for first five years**

Year	Projected Budget (in Hundred Thousand)		
	Construction	Maintenance	Total
1	413	177	590
2	473	203	676
3	543	233	776
4	627	269	896
5	720	309	1,029
<b>Total</b>	<b>2,776</b>	<b>1,191</b>	<b>3,967</b>

**Table 21: Projected construction budget for different class of roads**

Year	Projected Budget (in Hundred Thousand)			
	Class A	Class B	Class C	Class D
1	124	124	124	41
2	142	142	142	47
3	163	163	163	54
4	188	188	188	63
5	216	216	216	72
<b>Total</b>	<b>833</b>	<b>833</b>	<b>833</b>	<b>278</b>

Table 22: RMTMP first three year construction Budget Class A

Road Code	Score	Rank	Proposed Improvement			I year			II year			III year		
			New Track	Gravelling	Blacktopping	Length completed (Km)	Cost	Intervention	length completed (Km)	Cost	Intervention	Length completed (Km)	Cost	Intervention
A002	99.96	1	-	19.82	19.82	2.00	6,285,714	Gravelling	2.30	7,228,571	Gravelling	3.00	9,428,571	Gravelling
A001	93.70	2	-	16.70	16.70	1.95	6,112,857	Gravelling	2.22	6,977,143	Gravelling	2.20	6,914,286	Gravelling
A003	90.81	3	-	9.61	9.61	-	-	Gravelling	-	-	Gravelling	-	-	Gravelling
A004	60.81	14	-	6.56	6.56	-	-	Gravelling	-	-	Gravelling	-	-	Gravelling

Table 23: RMTMP fourth and fifth year construction Budget Class A

Road Code	Score	Rank	Proposed Improvement			IV year			V year		
			New Track	Gravelling	Blacktopping	Length completed (Km)	Cost	Intervention	Length completed (Km)	Cost	Intervention
A002	99.96	1	-	19.82	19.82	3.20	10,057,143	Gravelling	4.00	12,571,429	Gravelling
A001	93.70	2	-	16.70	16.70	2.80	8,800,000	Gravelling	2.90	9,114,286	Gravelling
A003	90.81	3	-	9.61	9.61	-	-	Gravelling	-	-	Gravelling
A004	60.81	14	-	6.56	6.56	-	-	Gravelling	-	-	Gravelling

Table 24 RMTMP first three year construction Budget Class B

Road Code	Proposed Improvement			I year			II year			III year		
	New Track	Gravelling	Blacktopping	Length completed (Km)	Cost	Intervention	length completed (Km)	Cost	Intervention	Length completed (Km)	Cost	Intervention
B005	-	12.97	12.97	1.00	3,142,857	Gravelling	1.00	3,142,857	Gravelling	1.08	3,378,571	Gravelling
B006	-	2.44	2.44	1.00	3,142,857	Gravelling	1.00	3,142,857	Gravelling	0.44	1,374,277	Gravelling
B003	-	7.44	7.44	1.00	3,142,857	Gravelling	1.00	3,142,857	Gravelling	1.00	3,142,857	Gravelling
B004	3.63	6.83	6.83	1.00	2,000,000	New Track	1.00	2,000,000	New Track	1.63	3,266,278	New Track
B001	-	9.33	9.33	0.31	974,286	Gravelling	0.57	1,775,714	Gravelling	1.00	3,142,857	Gravelling

<b>B002</b>	2.59	6.09	6.09		-	New Track	0.50	1,000,000	New Track	1.00	2,000,000	New Track
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Table 25: RMTMP fourth and fifth year construction Budget Class B

Road Code	Proposed Improvement			IV year			V year		
	New Track	Gravelling	Blacktopping	Length completed (Km)	Cost	Intervention	Length completed (Km)	Cost	Intervention
B005	-	12.97	12.97	2.00	6,285,714	Gravelling	2.90	9,114,286	Gravelling
B006	-	2.44	2.44	-	-	Gravelling	-	-	Gravelling
B003	-	7.44	7.44	1.90	5,955,714	Gravelling	2.55	8,004,414	Gravelling
B004	3.63	6.83	6.83	-	-	Gravelling	-	-	Gravelling
B001	-	9.33	9.33	1.00	3,142,857	Gravelling	1.43	4,494,286	Gravelling
B002	2.59	6.09	6.09	1.09	3,418,831	Gravelling	-	-	Gravelling

Table 26: RMTMP five year construction Budget Class C

Road Code	Proposed Improvement			I year			II year			III year		
	New Track	Gravelling	Blacktopping	Length completed (Km)	Cost	Intervention	length completed (Km)	Cost	Intervention	Length completed (Km)	Cost	Intervention
C013	1.72	5.04	5.04	1.00	2,000,000	New Track	0.72	1,435,420	New Track	-	-	New Track
C009	-	6.89	6.89	1.00	3,142,857	Gravelling	1.06	3,331,429	Gravelling	1.00	3,142,857	Gravelling
C003	0.96	4.38	4.38	0.96	1,925,724	New Track	-	-	New Track	-	-	New Track
C006	-	7.73	7.73	1.00	3,142,857	Gravelling	1.00	3,142,857	Gravelling	1.00	3,142,857	Gravelling
C012	-	3.77	3.77	0.70	2,193,714	Gravelling	1.00	3,142,857	Gravelling	1.00	3,142,857	Gravelling
C005	-	4.56	4.56	-	-	Gravelling	1.00	3,142,857	Gravelling	1.00	3,142,857	Gravelling

C014	1.89	6.95	6.95		-	New Track	-	-	New Track	1.00	2,000,000	New Track
C001	-	4.35	4.35		-	Gravelling	-	-	Gravelling	0.55	1,728,571	Gravelling

Table 27: RMTMP fourth and fifth year construction Budget Class C

Road Code	Proposed Improvement			IV year			V year		
	New Track	Gravelling	Blacktopping	Length completed (Km)	Cost	Intervention	Length completed (Km)	Cost	Intervention
C013	1.72	5.04	5.04	-	-	New Track	-	-	New Track
C009	-	6.89	6.89	1.00	3,142,857	Gravelling	1.00	3,142,857	Gravelling
C003	0.96	4.38	4.38	-	-	New Track	-	-	New Track
C006	-	7.73	7.73	1.00	3,142,857	Gravelling	1.00	3,142,857	Gravelling
C012	-	3.77	3.77	1.07	3,377,409	Gravelling	-	-	Gravelling
C005	-	4.56	4.56	1.00	3,142,857	Gravelling	1.56	4,914,423	Gravelling
C014	1.89	6.95	6.95	0.89	1,771,060	New Track	-	-	New Track
C001	-	4.35	4.35	1.00	3,142,857	Gravelling	1.00	3,142,857	Gravelling
C002	-	5.73	5.73	0.34	1,081,143	Gravelling	1.00	3,142,857	Gravelling
C015	-	1.10	1.10	-	-	Gravelling	1.10	3,466,131	Gravelling
C007	-	0.78	0.78	-	-	Gravelling	0.21	647,429	Gravelling

Table 28: RMTMP five year construction Budget for Class D

Road Code	Proposed Improvement				I year			II year			III year		
	New Track	Gravelling	Blacktopping	Periodic Maintenance	Length completed (Km)	Cost	Intervention	length completed (Km)	Cost	Intervention	Length completed (Km)	Cost	Intervention
D037		1.10	1.10	-	1.10	2,423,564	Gravelling	-	-	Gravelling	-	-	Gravelling
D053		0.21	0.21	-	0.21	463,943	Gravelling	-	-	Gravelling		-	Gravelling
D026		0.44	0.44	-	0.44	978,074	Gravelling	-	-	Gravelling		-	Gravelling
D055		0.87	0.87	-	0.10	220,000	Gravelling	0.77	1,691,195	Gravelling		-	Gravelling
D023		1.71	1.71	-			Gravelling	1.37	3,014,000	Gravelling	0.34	753,547	Gravelling

D019		0.57	0.57	-			Gravelling		-	Gravelling	0.57	1,244,065	Gravelling
D001		1.52	1.52	-			Gravelling			Gravelling	1.52	3,333,090	Gravelling

Table 29: RMTMP fourth and fifth year construction Budget Class D Roads

Road Code	Proposed Improvement				IV year			V year		
	New Track	Gravelling	Blacktopping	Periodic Maintenance	Length completed (Km)	Cost	Intervention	Length completed (Km)	Cost	Intervention
D046	-	0.60	0.60	-	0.60	1,316,161	Gravelling	-	-	Gravelling
D003	-	0.44	0.44	-	0.44	975,658	Gravelling	-	-	Gravelling
D002	-	0.48	0.48	-	0.48	1,066,217	Gravelling	-	-	Gravelling
D018	-	0.74	0.74	-	0.74	1,633,920	Gravelling	-	-	Gravelling
D022	0.99	0.99	0.99	-	0.99	-	New Track	-	-	New Track
D016	-	0.40	0.40	-	0.40	873,165	Gravelling	-	-	Gravelling
D017	-	0.89	0.89	-	0.20	440,000	Gravelling	0.69	1,509,497	Gravelling
D006	-	0.55	0.55	-	-	-	Gravelling	0.55	1,208,449	Gravelling
D015	-	1.01	1.01	-	-	-	Gravelling	1.01	2,211,396	Gravelling
D034	-	2.16	2.16	-	-	-	Gravelling	1.03	2,266,000	Gravelling

## Chapter 6: Conclusion

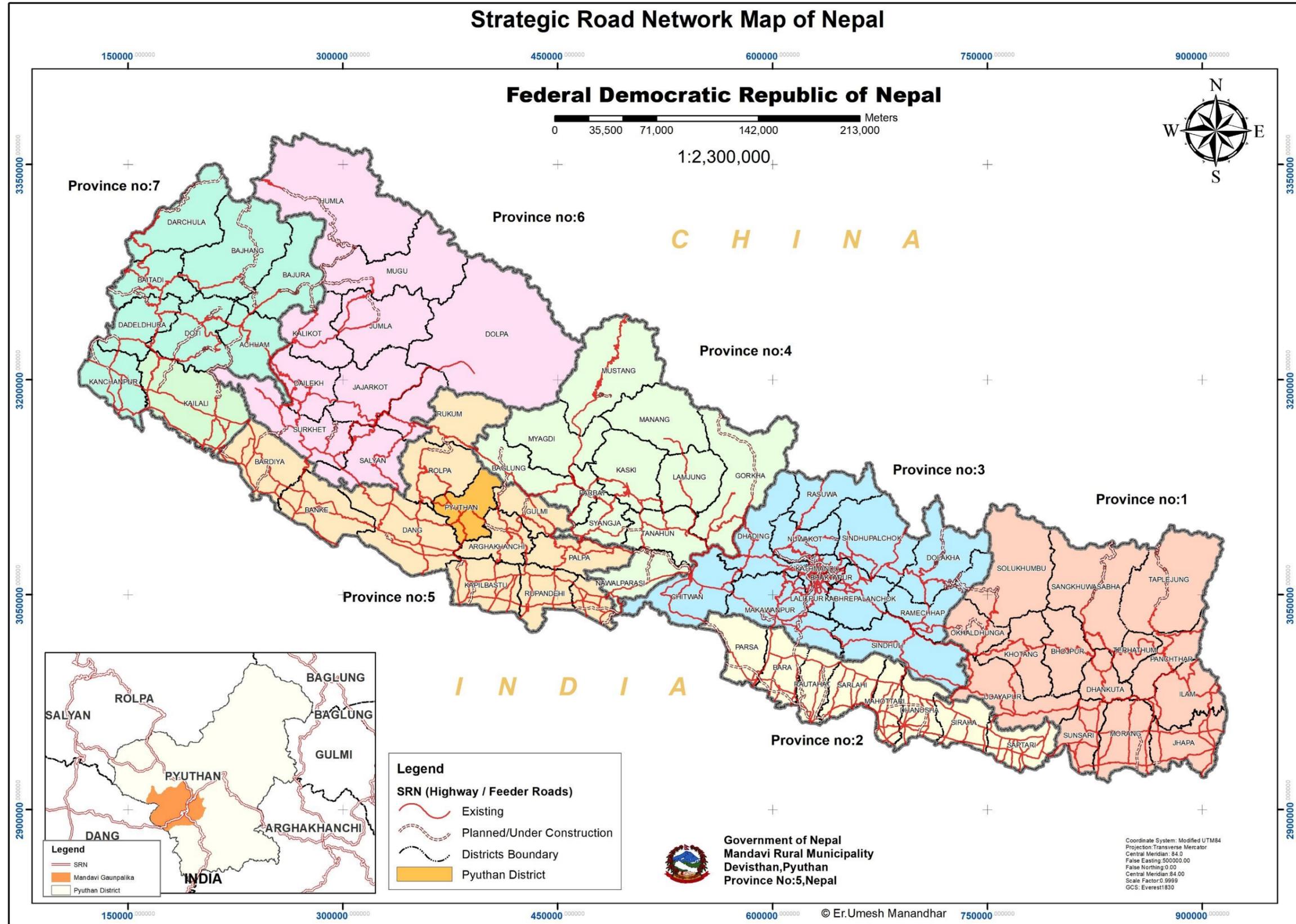
The Rural Municipal Transport Master Plan (RMTMP) of Mandavi Rural Municipality is prepared after the analysis of field data and requirement of the rural municipality itself. The short term and long term plan is prepared for five year and twenty years period. As in the present condition there is no any blacktop condition road within this Guanpalika except that of national highway and feeder road, this RMTMP plans for all weather roads in all five ward. This RMTMP aims to gravel 85.97 Km of road and open 10.69Km of new track in first five year period. This planning is based on the assumption that the spending capacity of Rural Municipality increases by 15% per year. The total budget for 20 years of implementation of this RMTMP is projected to be 602 Crore, 70% of which is allocated for construction and 30% is allocated for maintenance of existing structures. The ultimate goal of this RMTMP is to blacktop all the rural municipality roads to their full extent in the long term planning.

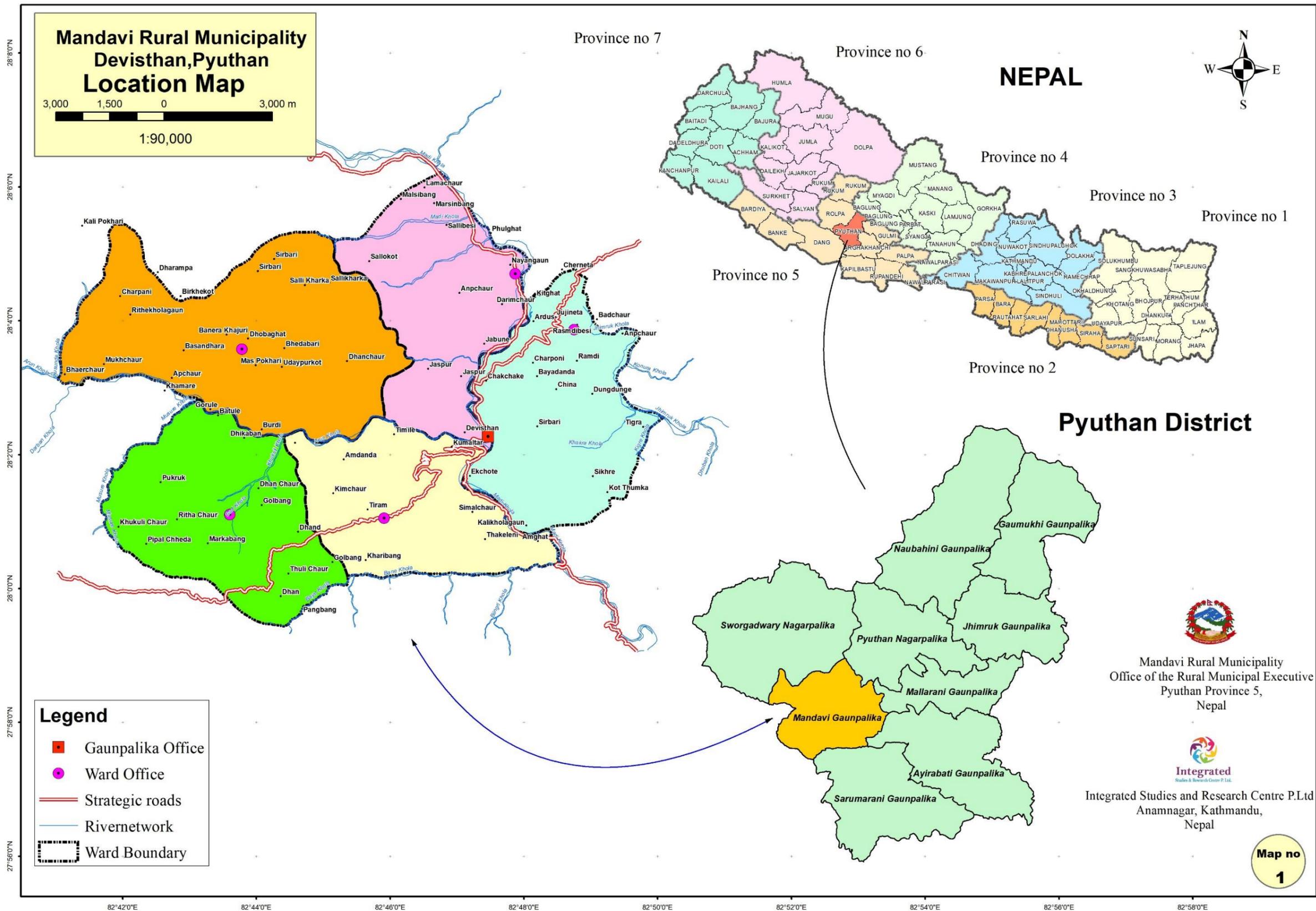
The concept of RMTMP is to develop sustainable and economic road network, therefore the Rural Municipality should focus on strengthening existing road network to operate them in all weather conditions rather than opening new tracks. Moreover, strategically important tracks should be opened after proper planning and design.. Rural Municipality should take immediate action to operate local transport system inside the Rural municipality by Rural municipality itself or with collaboration with private entities. Similarly, the rural municipality should allocate different land use zones based on their present and future use, which will be applicable in future planning of infrastructure facilities inside Rural Municipality.

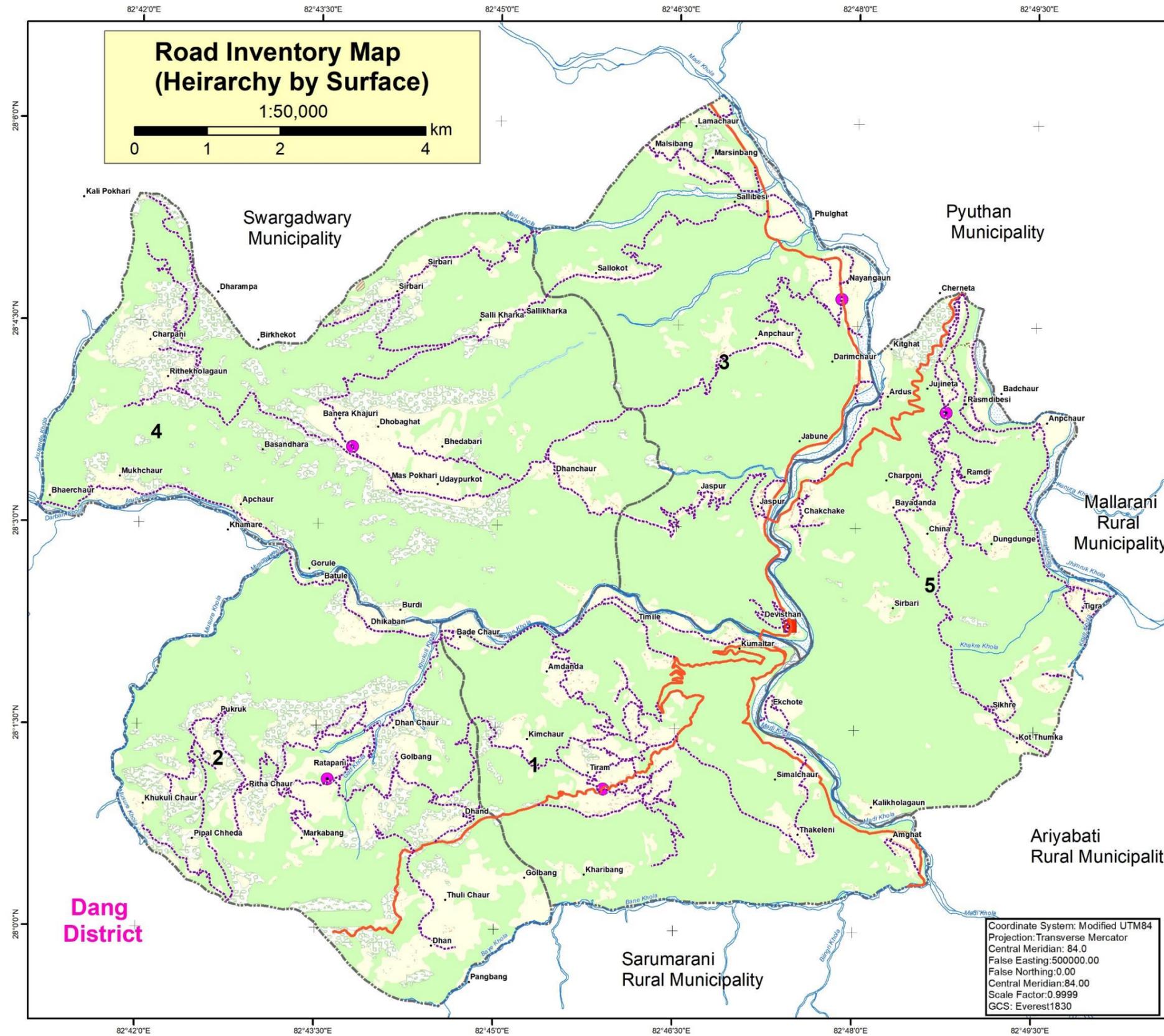
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- District Transport master Plan of Pyuthan District

## **ANNEX-I Maps**







**Mandavi Rural Municipality  
Pyuthan, Nepal**



**Legend**

- Gaunpalika Office
- Ward Office
- Ward\_Boundary
- Rivernetwork

**Landuse**

<span style="background-color: orange; width: 15px; height: 10px; display: inline-block;"></span> Builtup	<span style="background-color: lightgreen; width: 15px; height: 10px; display: inline-block;"></span> Grass
<span style="background-color: green; width: 15px; height: 10px; display: inline-block;"></span> Bush	<span style="background-color: blue; width: 15px; height: 10px; display: inline-block;"></span> Pond
<span style="background-color: brown; width: 15px; height: 10px; display: inline-block;"></span> Cliff	<span style="background-color: lightblue; width: 15px; height: 10px; display: inline-block;"></span> Sand
<span style="background-color: yellow; width: 15px; height: 10px; display: inline-block;"></span> Cultivation	<span style="background-color: blue; width: 15px; height: 10px; display: inline-block;"></span> Waterbody
<span style="background-color: lightgreen; width: 15px; height: 10px; display: inline-block;"></span> Forest	

**Road Surface**

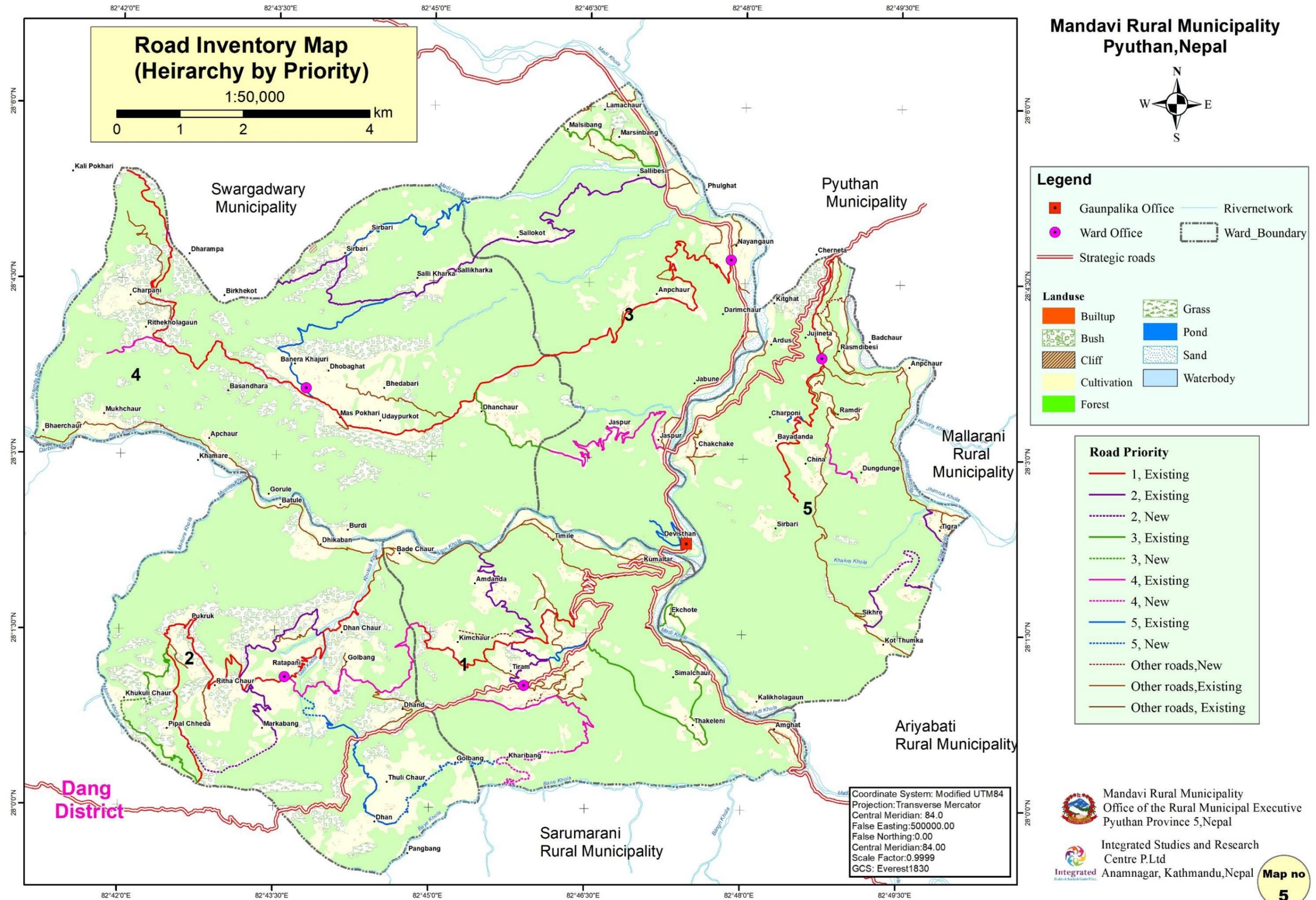
- Blacktop
- - - Earthen
- . . . foot trail

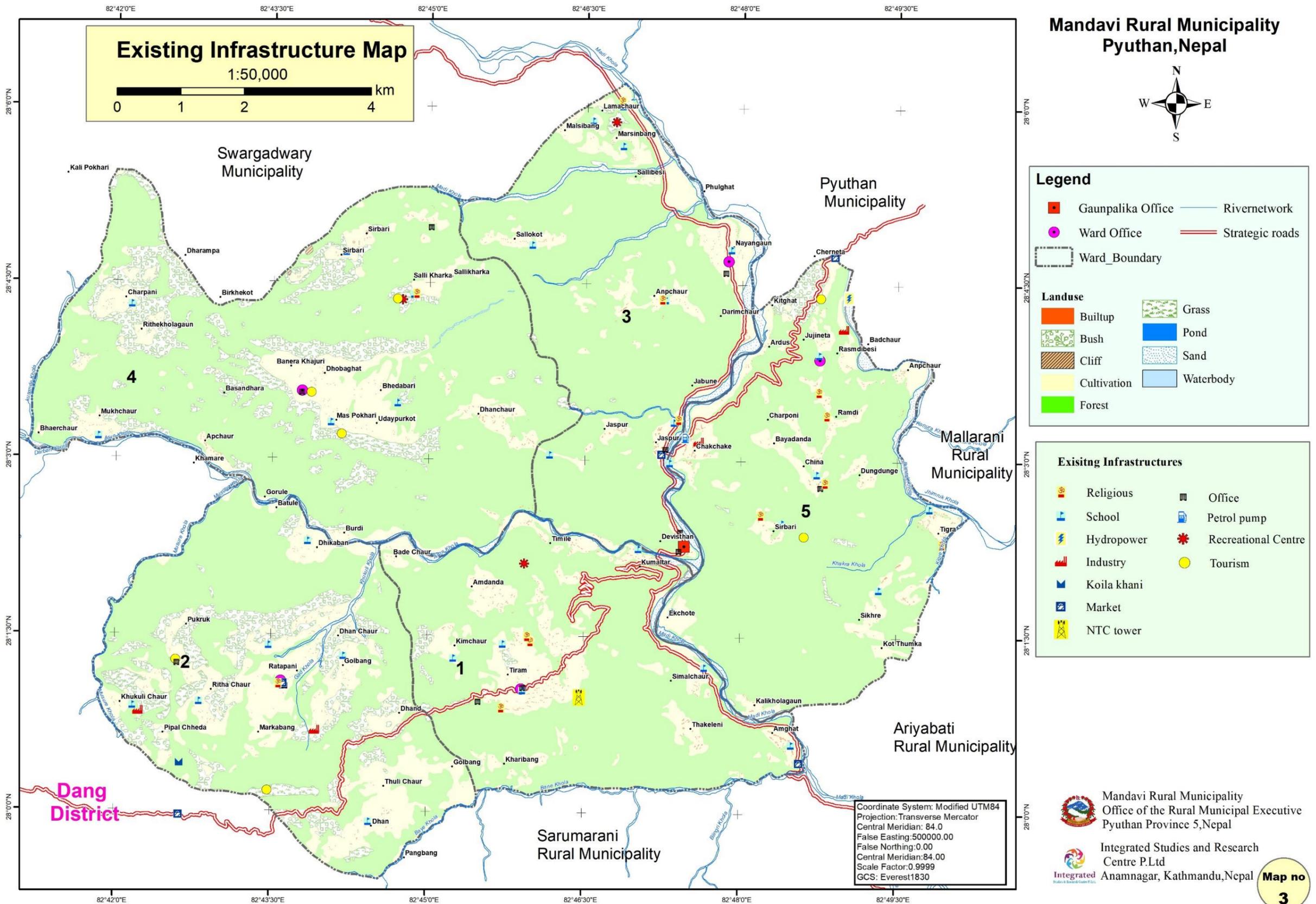
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 Scale Factor: 0.9999  
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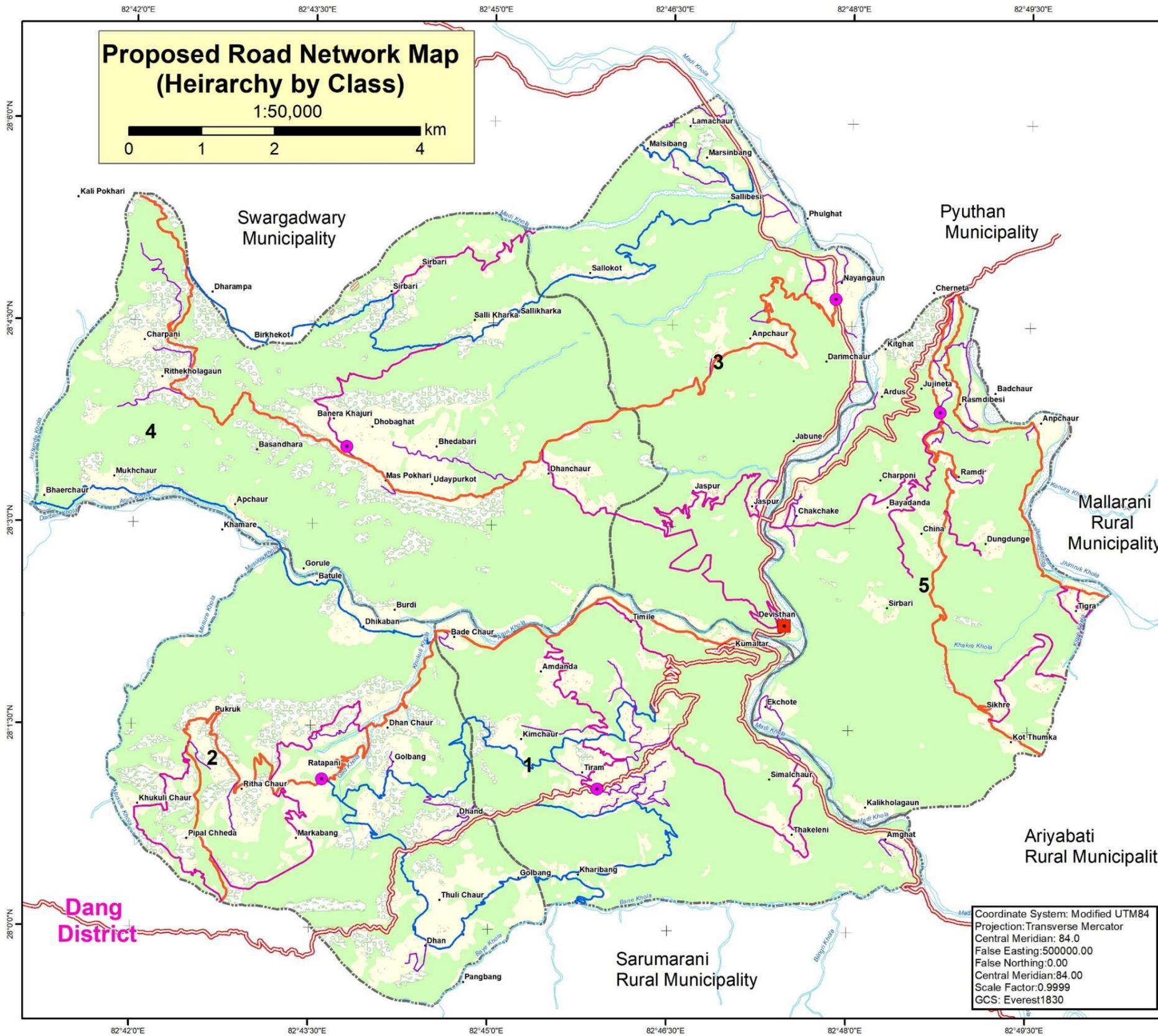
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 Office of the Rural Municipal Executive  
 Pyuthan Province 5, Nepal

Integrated Studies and Research  
 Centre P.Ltd  
 Anamnagar, Kathmandu, Nepal

**Map no  
4**







**Mandavi Rural Municipality  
Pyuthan, Nepal**



**Legend**

- Gaunpalika Office
- Ward Office
- Strategic roads
- Rivernetwork
- Ward\_Boundary

**Landuse**

<span style="background-color: orange; width: 15px; height: 10px; display: inline-block;"></span> Builtup	<span style="background-color: lightgreen; width: 15px; height: 10px; display: inline-block;"></span> Grass
<span style="background-color: lightgreen; border: 1px solid green; width: 15px; height: 10px; display: inline-block;"></span> Bush	<span style="background-color: blue; width: 15px; height: 10px; display: inline-block;"></span> Pond
<span style="background-color: yellow; border: 1px solid black; width: 15px; height: 10px; display: inline-block;"></span> Cultivation	<span style="background-color: lightblue; width: 15px; height: 10px; display: inline-block;"></span> Sand
<span style="background-color: lightblue; width: 15px; height: 10px; display: inline-block;"></span> Waterbody	
<span style="background-color: brown; width: 15px; height: 10px; display: inline-block;"></span> Cliff	
<span style="background-color: green; width: 15px; height: 10px; display: inline-block;"></span> Forest	

**Road class**

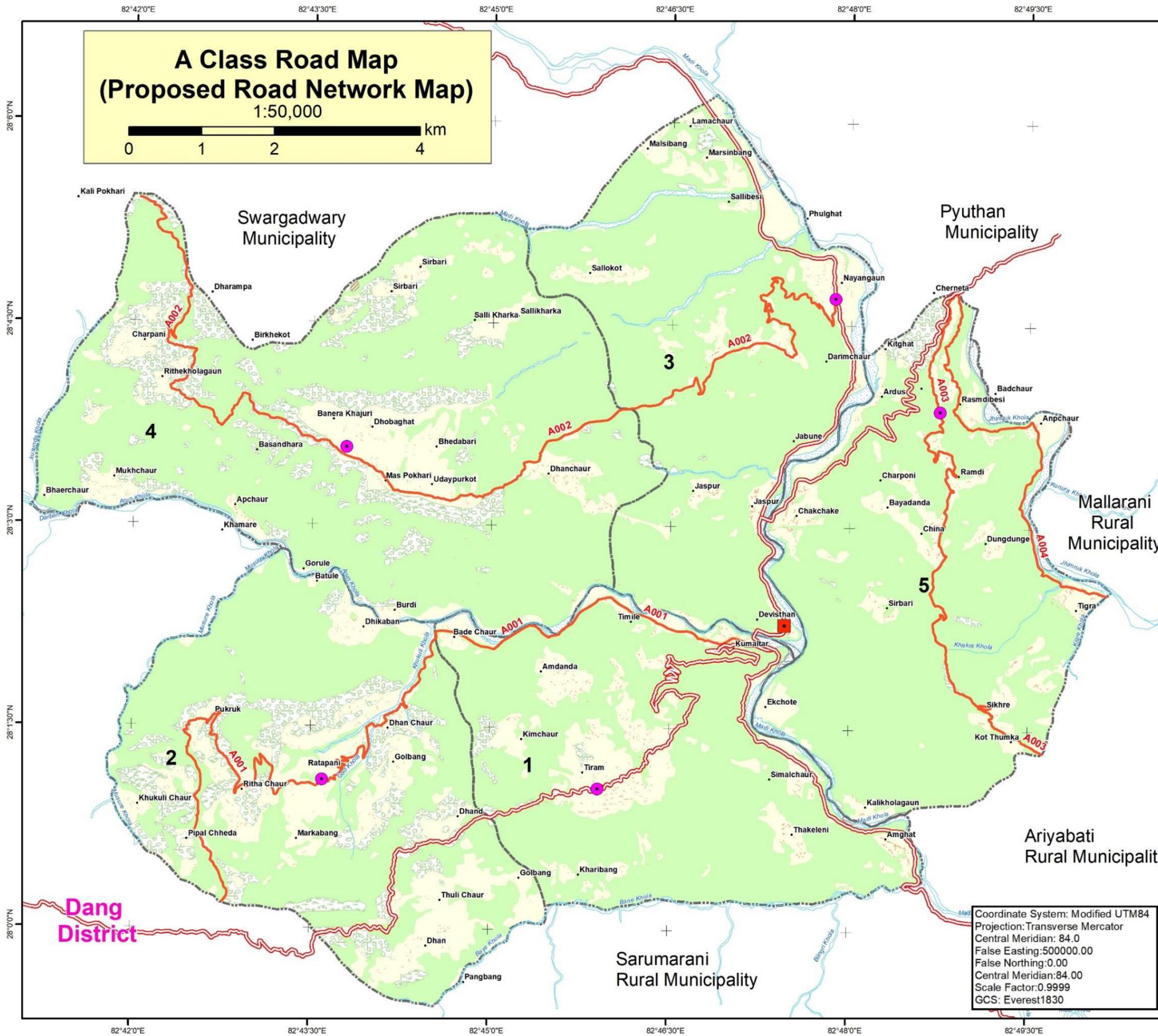
- A
- B
- C
- D

Coordinate System: Modified UTM84  
 Projection: Transverse Mercator  
 Central Meridian: 84.0  
 False Easting: 500000.00  
 False Northing: 0.00  
 Central Meridian: 84.00  
 Scale Factor: 0.9999  
 GCS: Everest1830

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**Map no  
6**



**Mandavi Rural Municipality  
Pyuthan, Nepal**



**Legend**

- Gaunpalika Office
- Ward Office
- Strategic roads
- Rivernetwork
- Ward\_Boundary

**Landuse**

- Builtup
- Bush
- Cliff
- Cultivation
- Forest
- Grass
- Pond
- Sand
- Waterbody

**Road class**

- A, Upgrade

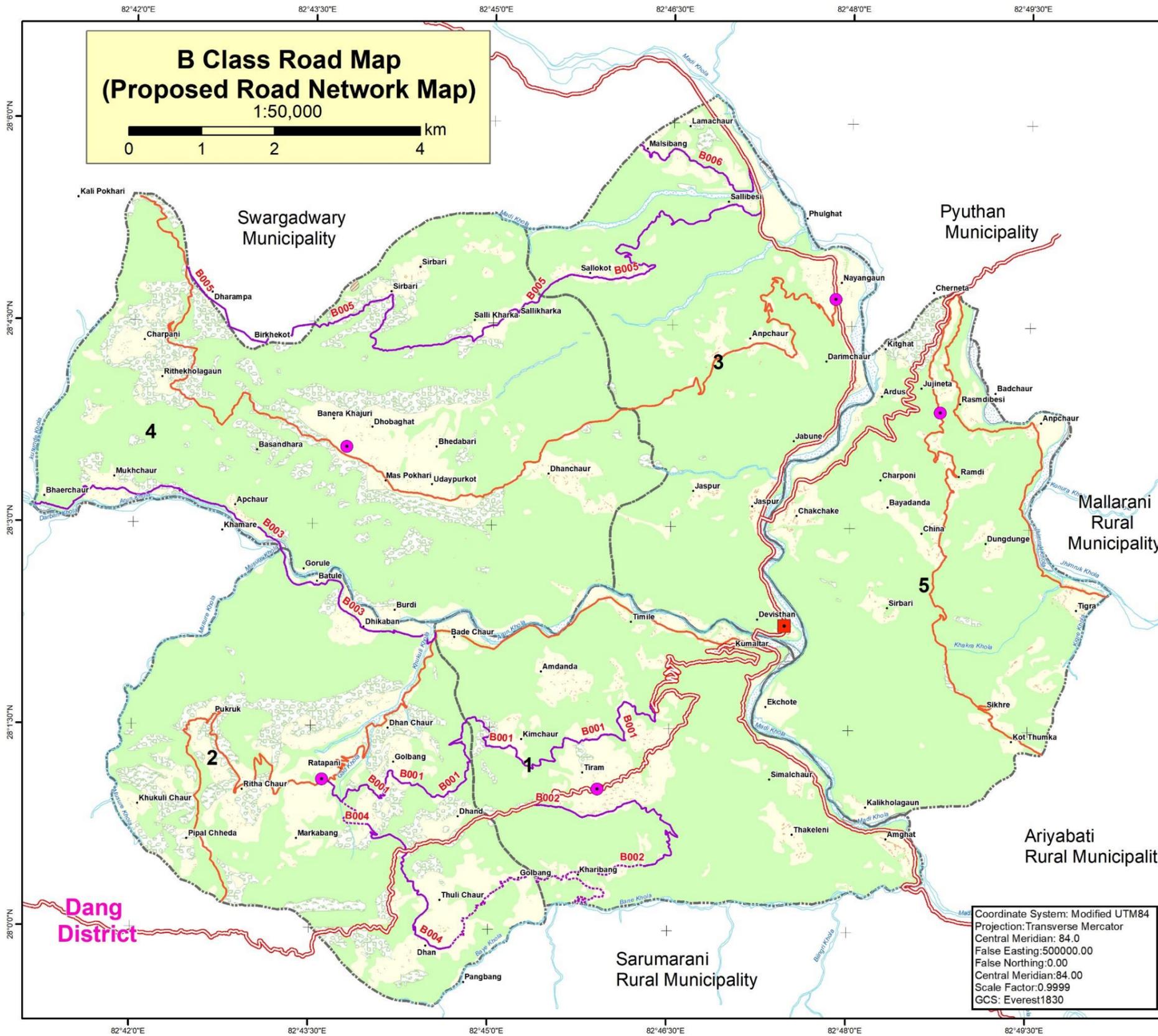
Road code	Road name	Existing Road Length,km
A001	Kumaltar-Kondrachaur-Ratpani-Murkutti road	16.697
A002	Naya gaun(ward office)- Udayapur kot-swargadwari road	19.824
A003	Cherneta-China-Jabune road	9.606
A004	Cherneta puran thati Baraula (Argakhachi ) Road	6.558
Total		52.686

Coordinate System: Modified UTM84  
 Projection: Transverse Mercator  
 Central Meridian: 84.0  
 False Easting: 500000.00  
 False Northing: 0.00  
 Central Meridian: 84.00  
 Scale Factor: 0.9999  
 GCS: Everest1830

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**Map no  
7**



**Mandavi Rural Municipality  
Pyuthan, Nepal**



**Legend**

- Gaunpalika Office (Red square)
- Ward Office (Purple circle)
- Ward\_Boundary (Dashed line)
- Strategic roads (Red line)
- Rivernetwork (Blue line)

**Landuse**

- Builtup (Orange)
- Bush (Green with dots)
- Cliff (Brown with diagonal lines)
- Cultivation (Yellow)
- Forest (Green)
- Grass (Green with horizontal lines)
- Pond (Blue)
- Sand (Light blue with dots)
- Waterbody (Blue)

**Road class**

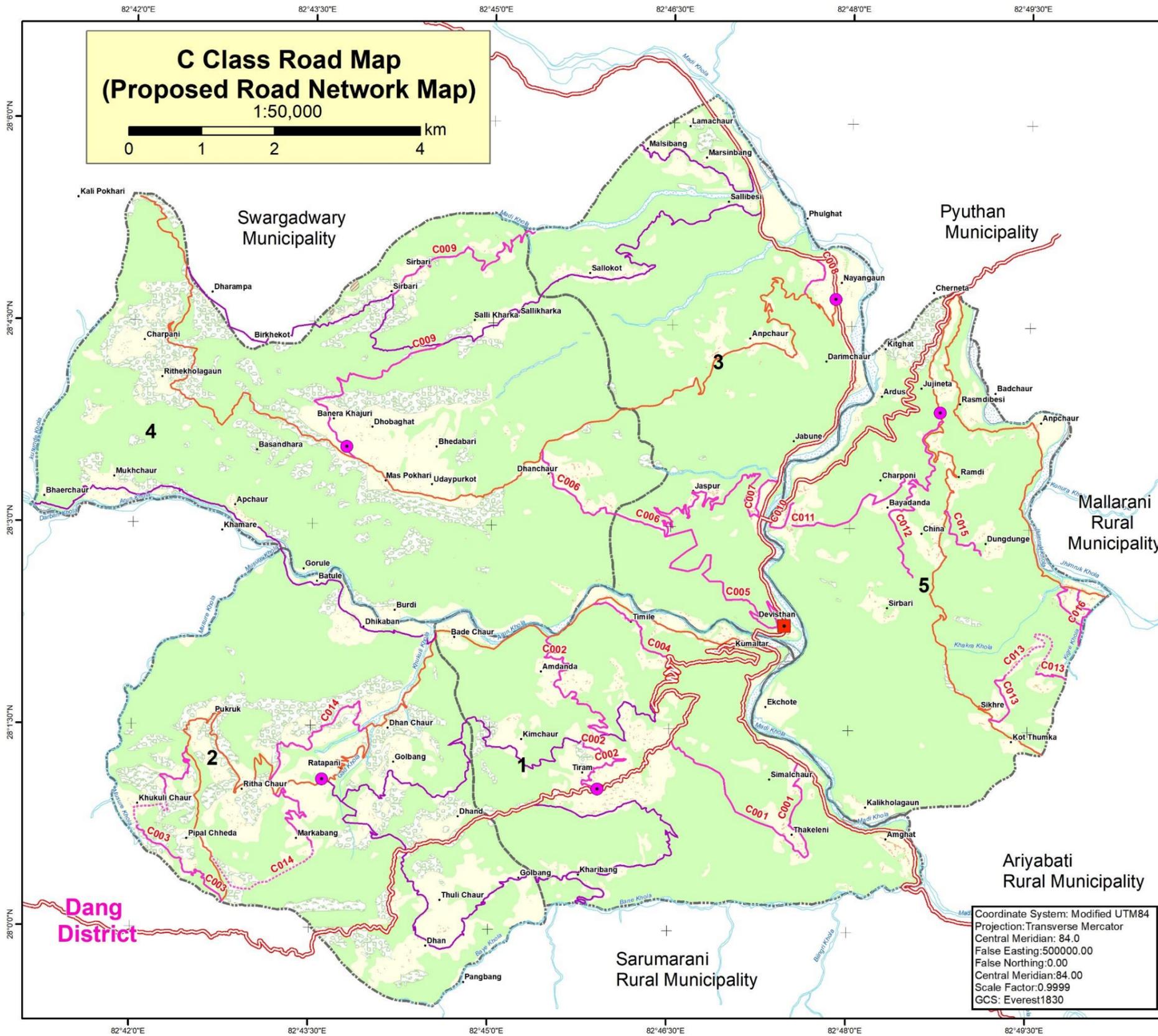
- B, Upgrade (Purple line)
- B, New Construction (Dotted purple line)
- A\_class (Red line)

Road code	Roadname	Road length,km		
		Existing	New	Grand Total
B001	Damri Khola Chowk-Ganesh Ma Vi-Kharibang-Dhanchaur-Markawang(ward office) road	9.332		9.332
B002	lampokhari - siskhola kudapani jyamure gurke chaur hudai sharmarani pangbang Road	3.502	2.588	6.090
B003	Kondra chaur -Dhikawang-kochibang road	7.442		7.442
B004	Ratapani upallo dhanchaur belipokhari-danda-Tita-taribang road	3.198	3.633	6.831
B005	Saulighari sallikot salikharka sirubari - dharampa road	12.969		12.969
B006	lamachaur marsibang - dibang Road	2.437		2.437
Total		38.880	6.221	45.101

Coordinate System: Modified UTM84  
 Projection: Transverse Mercator  
 Central Meridian: 84.0  
 False Easting: 500000.00  
 False Northing: 0.00  
 Central Meridian: 84.00  
 Scale Factor: 0.9999  
 GCS: Everest1830

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**Mandavi Rural Municipality  
Pyuthan, Nepal**



**Legend**

- Gaunpalika Office
- Ward Office
- Ward\_Boundary
- Strategic roads
- Rivernetwork

**Landuse**

- Builtup
- Bush
- Cliff
- Cultivation
- Forest
- Grass
- Pond
- Sand
- Waterbody

**Road class**

- C, Upgrade
- C, New
- B Class
- A\_class

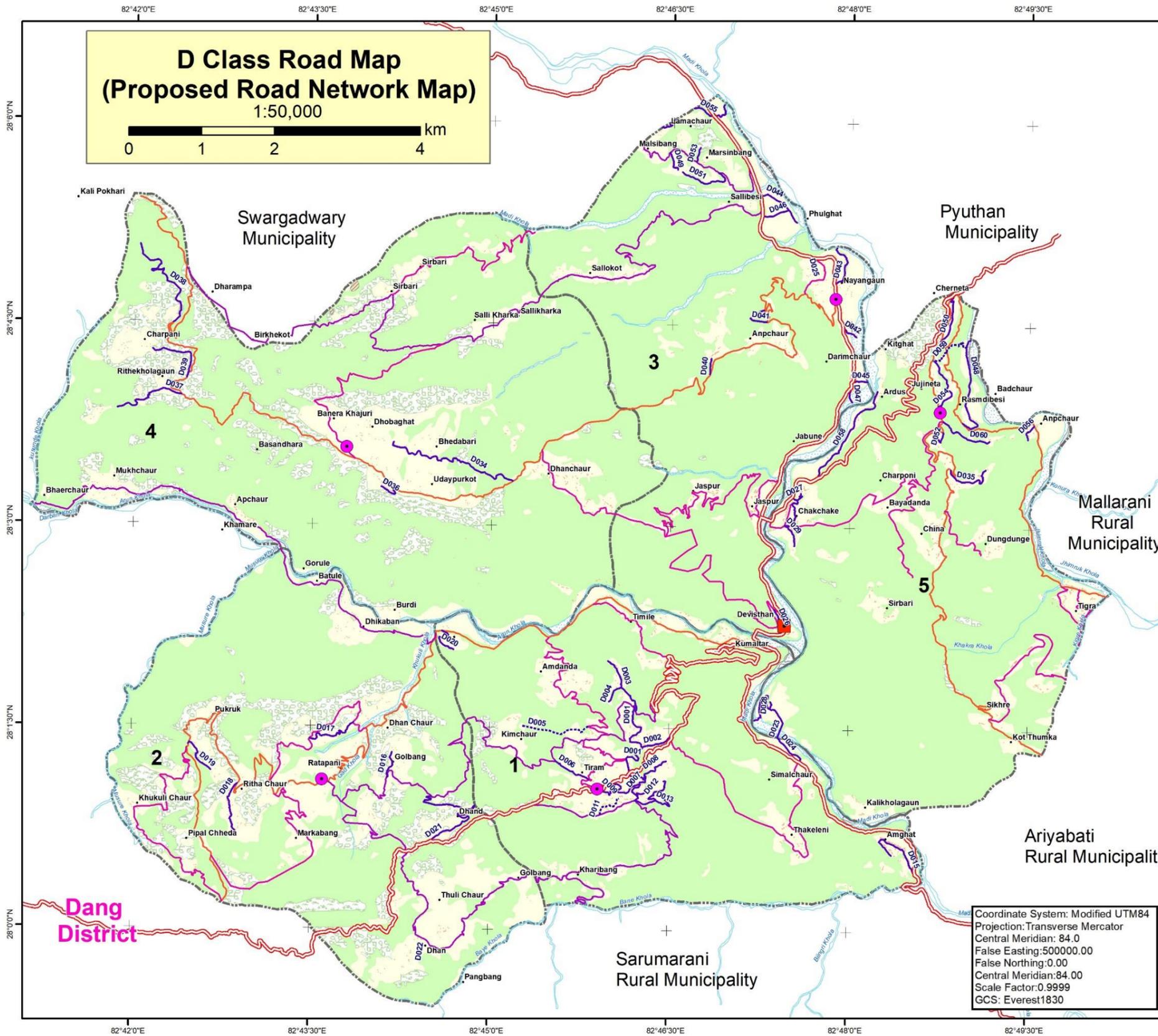
Road code	Road name	Road length,km		
		New	Upgrade	Grand Total
C001	Tallo Simalchaur Dekhi Upallo Simal Chaur - Pipal Danda		4.345	4.345
	Khaireni Chowk To Devi Mandir Ganesh Mabi Ward Office		5.727	5.727
C002	Pukruk Odar Gaun Khuklichaur Hampal			
C003	Murkutti Dang	0.963	3.421	4.384
C004	Damare Kalikate Dumin Danda		1.506	1.506
C005	Devisthan Udayepurkot - Swargadwari		4.564	4.564
C006	Jaspur Jaspur Kot Udayepur Kot			
C007	Swargadwari Road		7.727	7.727
C008	Jaspur Besi Ring Road		0.779	0.779
C009	Pokharo Dekhi Tahara - Pokhar Chaur			
C010	Motor Road		0.722	0.722
C011	Raj Pokhara Sirubari Narsu Road		6.893	6.893
C012	Chakchake Ring Road		0.620	0.620
C013	Cherneta-Chaur Pani-Baulagadhi-Chakchake Road		2.393	2.393
C014	Cherneta Jujeneta Bayedanda Sirubari Sandhpokhari Road		3.773	3.773
C015	Tigra Thati Shivalaye - Yari Khola	1.718	2.609	4.327
C016	Sadhpkhari Sikhre Basti			
C017	Milan Chowk Dhodkhola Dharteju Khet			
C018	Gang Kuwa Pani Bhatmare(Tourism Road)	1.886	5.062	6.948
C019	Bukedanda Dungdunge Tigra Road		1.103	1.103
C020	Danda Bhedi Tol To Shivalaye Road		0.739	0.739
<b>Grand Total</b>		<b>4.566</b>	<b>51.984</b>	<b>56.550</b>

Coordinate System: Modified UTM84  
 Projection: Transverse Mercator  
 Central Meridian: 84.0  
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 False Northing: 0.00  
 Central Meridian: 84.00  
 Scale Factor: 0.9999  
 GCS: Everest1830

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 Office of the Rural Municipal Executive  
 Pyuthan Province 5, Nepal

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Map no  
9



**D Class Road Map**  
**(Proposed Road Network Map)**  
 1:50,000  
 0 1 2 4 km

**Mandavi Rural Municipality**  
**Pyuthan, Nepal**



**Legend**

- Gaunpalika Office
- Ward Office
- Ward\_Boundary
- Strategic roads
- Rivernetwork

**Landuse**

- Builtup
- Bush
- Cliff
- Cultivation
- Forest
- Grass
- Pond
- Sand
- Waterbody

**Road class**

- D, New
- D, Upgrade
- C
- B Class
- A\_class

Coordinate System: Modified UTM84  
 Projection: Transverse Mercator  
 Central Meridian: 84.0  
 False Easting: 500000.00  
 False Northing: 0.00  
 Central Meridian: 84.00  
 Scale Factor: 0.9999  
 GCS: Everest1830

Mandavi Rural Municipality  
 Office of the Rural Municipal Executive  
 Pyuthan Province 5, Nepal

Integrated Studies and Research  
 Centre P.Ltd  
 Anamnagar, Kathmandu, Nepal

**Map no**  
**10**