Local Government

Office of Rural Municipal Executive

Mahabharat Rural Municipality

Kavrepalanchowk

Final Report

Preparation of Rural Municipal Transport Master Plan of Mahabharat Rural Municipality, Kavrepalanchowk

Ashad, 2082

ABBREVIATION

RMTMP	:	Rural Municipal Transport Master Plan
MTPP		Municipal Transport Perspective Plan
GoN		Government of Nepal
BoQ	:	Bill of Quantity
NLUP	:	National Land Use Project
GIS	:	Geographic Information System
CAD	:	Computer Aided Design
NBC	:	National Building Code
RCC	:	Reinforcement Cement Concrete
VAT	:	Value Added Tax
IS	:	Indian Standard
LGOA	:	Local Governance Operation Act
PWD	:	Project Works Directive
PPA	:	Public Procurement Act
PPR	:	Public Procurement Regulations
CUG	:	Community User Group
ToR	:	Terms of Reference
EIA	:	Environment Impact Assessment
CBS	:	Central Bureau of Statistics
HT	:	High Tension
NEA	:	Nepal Electricity Authority
KVA	:	Kilo Volt Ampere
CI	:	Cast Iron
MCB	:	Miniature Circuit Breaker

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1 Introduction

This chapter presents a brief introduction to the project - its context and background, objectives and scope of work to be done. It also summarizes the content of the chapters in the report.

1.1 Context and Background

The Ministry of Federal Affairs and Local Development (MoFALD) declared 753 local units including 283 municipalities in 2017 A.D. These Municipalities were introduced to replace the previous village development committee system that was in use since 1990. These newly designated municipalities are at the first 5 years' tenure of infrastructure development and thus require ample mentoring and moulding so that organized development occurs in due course of time. This can only be achieved through planned transport network development.

The local governance act 2074 of Nepal provisions for the local government/institution to formulate local development plans as deemed necessary according to needs-based, bottom-up and participatory approach. The main objective of the planning efforts is to make the investments for planned development within each of the local bodies' territory contributing to attaining sustainable livelihood and improved well-being of the people. The people's need for sustainable livelihood and improved well-being are such that they require better access to information, markets and opportunities; they need better access to health, education and other goods and services. Accordingly, gradual investment from state-owned and private entities in physical infrastructure development evolved urbanized and semi-urbanized settlements leading to improved access to various services, opportunities and resources by interior communities. The access can be ensured only with planned transport network as it supports all other infrastructures. Better transport facilities and services provide better access to all other services and economic activities.

To achieve the above-mentioned objectives, Mahabharat Rural Municipality has hired consulting firm to prepare the Municipality Transport Master Plan of Mahabharat Rural Municipality.

1.2 Municipality Transport Master Plan

High quality development plans lie at the heart of a high quality planning system. Although continuous planning (long term and short term) in every development and infrastructure area is not an established system in local authorities in Nepal, the ministry of federal affairs and local development has envisioned the necessity of planned transport network. To achieve a planned

investment in transport sector for the overall development of the municipalities, MoFALD initiated the formulation of Rural Municipality Transport Master Plan (RMTMP).

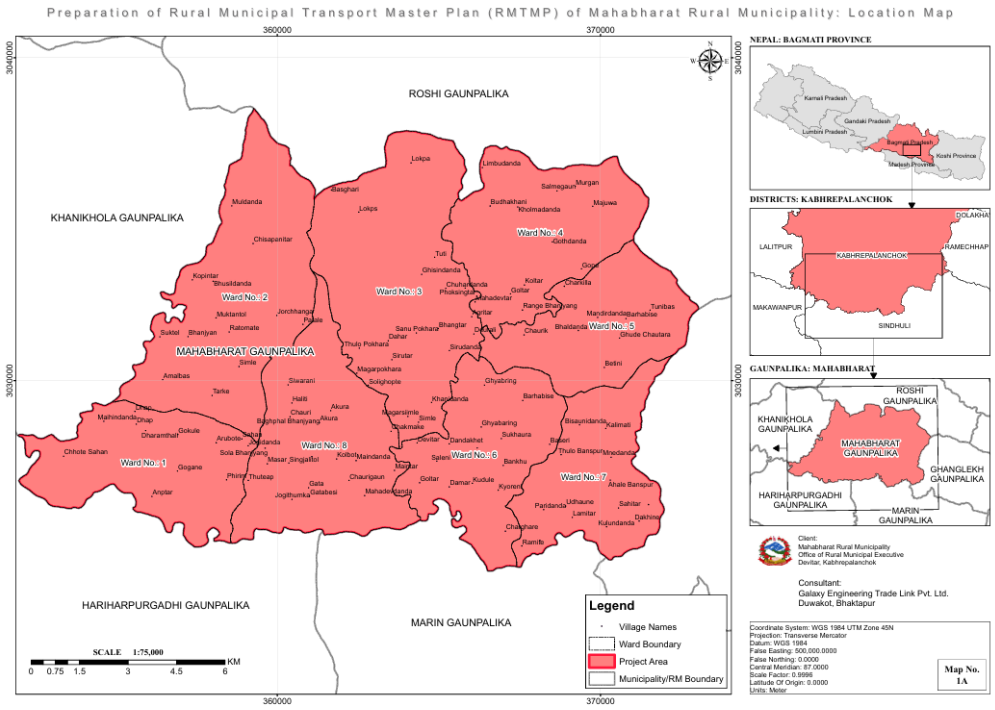
The main purpose of RMTMP is to prepare the inventory of existing infrastructures and plan the investments in transport sector for the overall sustainable development of the municipal economy and environment. As the comprehensive municipal development plan has not been prepared, this study also sets out the visionary city development plan to guide the planning of the transport network. Based on the visionary development plan and existing and potential development areas, the hierarchy of road networks will be planned and prioritized for investment. After a comprehensive study of the available and potential sources of investments, an implementation plan will be prepared for the proposed prioritized interventions.

Therefore, RMTMP incorporates identification, mapping and classification of existing road network in the municipality along with formulation of visionary city development plan; followed by identification of required intervention (new construction/upgrading/rehabilitation/maintenance), prioritization of the road sections and, realistic physical and financial allocation of the available and potential resources.

1.3 Location of study area

Mahabharat Rural Municipality lies in the southern part of Kavrepalanchowk District, within Bagmati Province, Nepal. The municipality derives its name from the Mahabharat hill range that stretches across the region. It was established in 2017 through the merger of several former Village Development Committees (VDCs), namely Gokule, Foksingtar, Budhakhani, Banakhu, and Ghartichhap.

The rural municipality is located approximately 80 kilometers southeast of Kathmandu via road transportation. There is no direct air service available, and the nearest airport is Tribhuvan International Airport in Kathmandu Metropolitan City. Mahabharat spans an area of around 186.06 square kilometers, making it one of the geographically larger rural municipalities in the district.



Administratively, Mahabharat is divided into 8 wards. It is bordered by Sindhuli District to the east and south, Roshi Rural Municipality to the North, and Khanikhola Rural Municipality to the West. As per the 2022 Nepal Census, the total population of Mahabharat Rural Municipality is 18,865.

1.4 Objectives

The prime objective of the study is to prepare the Rural Municipality Transport Master Plan (RMTMP) of Mahabharat Rural Municipality. The planning approach is participatory and bottom-up from the settlement level. The specific objectives are listed below:

- Finalize visionary city development plan if Comprehensive Town Development Plan is not prepared Analyze the accessibility situation.
- Identify and priorities the interventions based on the accessibility situation.
- Prepare Indicative Developmental Potential Map (IDPM)
- Prepare the Municipality Inventory Map (MIM) of Road networks. Collection of demands for new/rehabilitation transport linkages from ward offices to municipality office.
- Prepare the Perspective Plan of transport services and facilities;
- Prepare feasibility study report of the roads project of municipality catchment area.
- Synchronize the draft Perspective Plans of adjoining Rural Municipalities/ Municipalities/ districts develop scoring criteria and its approval from Municipality. Prepare the five-year Rural Municipality Transport Master Plan (RMTMP)
- Prepare a realistic physical and financial implementation plan of prioritized roads for the RMTMP period; and
- Prepare Rural Municipal Transport Perspective Plan (RMTPP)

1.5 Scope of work

The consultant shall provide high quality professional services for the preparation of RMTMP/ MTPP. The scope of services to be carried out by the Consultant shall broadly include, but not be limited to, the followings:

1.5.1 Assist in the Formulation of the Rural Municipality Roads Coordination Committee (RMRCC)

The main task of the RMRCC is to provide support to the municipality in formulating, managing and monitoring Municipality Road transport infrastructure policies, rules and regulations. Generally, the RMRCC was composed of;

▪ Rural Municipality Chairperson	Chairperson RMRCC
▪ Deputy Rural Municipality Chairperson	Member
▪ Chief Administrative Officer of Municipality	Member
▪ One elected or nominated Municipality Members	Member
▪ Representative from Women and ethnic minority groups	Member
▪ Account officer	Member
▪ Planning section chief of municipality	Member
▪ Technical Section Chief	Member Secretary
▪ Sub Engineer	Member

The consultant advised, assist and support the Municipality to form the RMRCC. It ensured involvement of the RMRCC in the entire planning, decision-making, programming etc. processes in the preparation of the RMTMP. Initiating with one introduction/ orientation workshop to the various stakeholders (RMRCC, Ward representative and Tole Lane Organization representatives) about the process and procedures and their respective roles during the Preparation of RMTMP/ MTPP the consultant continued preparation of RMTMP.

1.5.2 Secondary Sources of Information and Review of the existing RMTMP

The consultant collected secondary information from the various strict based line agencies, project/ programs, INGOs/ NGOs, and other regional and central level organizations as required.

The consultant reviewed the available existing RMTMP if any. All the roads identified from secondary sources were assessed and considered seriously for the forthcoming RMTMP. The RMTMP should be updated every 5 years.

1.5.3 Accessibility Data Collection and Analysis

Accessibility data was collected using GPS from settlement level involving enumerator/s. Proper orientation training provided to the enumerator/s for efficient data collection within the prescribed time period.

The collected information was stored on a computer. Primary analysis was done to find the accessibility situation of the Municipality and identify the gaps with the reference to Comprehensive City Development Plan/ Visionary City Development Plan.

1.5.4 Prepare the Indicative Rural Municipality Development Potential Map (IDPM)

The consultant prepared the Rural Municipality's Indicative Development Potential Map (IDPM). The base map will be prepared on a 1:25000 scale topographical map and digitized to prepare GIS Maps. The identification and ranking process of existing/potential areas and services (Please refer Annex-4) shall be carried. The consultant validated the IDPM from the RMRCC and Rural Municipality.

1.5.5 Prepare the Rural Municipality Inventory Map (MIM) of Urban Road, Main Trails and Bridges

The consultant shall prepare Municipality Inventory Map (MIM) of the municipality linking to existing strategic and local road network such as national highways, trunk roads, district core road network (DRCN), main trails and main bridges, wherever pertinent and possible, by plotting one 1:25000 topo-base maps. The consultant carried out, by mobilizing enumerator/s, reconnaissance/walk over surveys. MIM was prepared with reference to form annexed (Please refer Annex-3). The consultant disseminated and discussed MIM with a wider audience through a municipality level workshop. Later, the MIM was discussed and verified through discussion with the municipality technical team and finalized from the municipality.

1.5.6 Collection of Demands for New/ Upgrading/ Rehabilitation Transport Linkages from Wards/ Settlements

The consultant collected formal requests for new construction or rehabilitation of different linkages from wards and settlements, on their need's basis. The demand was collected in the order of priority increase of more than one transport linkage is demanded from each ward. The collected demand was screened, synthesized, synchronized and harmonized at municipality level though a workshop. Similarly, the consultant obtained the socio-economic data of all requested transport linkages by involving enumerator The consultant followed relevant annexes of DoR's simplified approach manual for preparation of DTMP/ DTPP.

Developing Scoring Criteria and its Approval from Municipality

The Consultant mandatorily developed weight system for the scoring and prioritization criteria for screening and prioritized demanded for all interventions. The scoring and prioritization criteria was approved by the municipality. All demanded linkages were processed and undergo through the screening and prioritization process.

1.5.7 Road classification and nomenclature

The consultant prepared road classification criteria, proposed metric system of road nomenclature and accordingly applied the same during data collection and stock taking from field.

1.5.8 Preparation of Perspective Plan of Interventions of Services and Facilities

The consultant prepared perspective plan of interventions of services and facilities, which were identified from the accessibility analysis and municipality level workshops. All the identified interventions were screened and rated on the basis of approved criteria. The consultant discussed with the municipality technical team and the RMRCC relating to interventions of services and facilities for improvement of the access situation and forwarded to Municipality Council meetings with

recommendation. Accordingly, the final perspective plan of municipality roads was developed. The perspective plan is also shown in GIS maps.

1.5.9 Analyze Fund Availability for Roads

The internal and external financial resources available in the municipality were reviewed by the consultant discussing with the municipality authorities so that the financial resources available for the transport interventions during the five-year RMTMP period can be estimated. Sources of funding include annual budget allocated in the municipality; the budget allocated through GoN central agencies such as DoR/ MoFALD etc. Other possible sources of funds could be from road tolls, royalties, land axes etc. Prospects of funding from other external sources, including possible and committed funding from donors, are reviewed and taken into account.

1.5.10 Preparation of the Rural Municipality Transport Master Plan (RMTMP)

Considering the Perspective Plan, the consultant has prioritized the Perspective Plan. Subsequently, the consultant prepared and updated the five-year RMTMP of the municipality by selecting transport interventions (maintenance, upgrading and new construction of main trails, trail bridges and roads) from among top priority in the Perspective Plan starting from first and that could be implemented in the next five years' period. This was based on cost estimates of maintenance, upgrading, rehabilitation and new construction of main trails, bridges and roads and available financial resources.

The consultant presented the findings of the RMTMP and MTPP to municipality and MRCC in a workshop and incorporated the suggestions and recommendations from the Municipality and MRCC in this final report. Subsequently, the municipality will present the final RMTMP report to the municipality council for formal approval that will be approved by municipality council with a strong commitment not to invest in non- RMTMP roads.

1.5.11 Prepare a Realistic Physical and Financial Implementation Plan of Prioritized Roads for the RMTMP Period

The consultant collected information on existing resources spent on transport infrastructure and possible available resources, and make a projection for the next five years' period. From the total projected resources, the consultant discussed with the municipality to find out the appropriate proportion to be spent on on-going roads and new interventions (construction/ rehabilitation/ maintenance etc.) proposed. Based on the five year projected funds availability the financial implementation plan was prepared. This step involved matching the estimated resources that were expected to be available to the municipality over the plan period, with the Interventions for on-going roads and proposed ones. The total numbers of road and interventions proposed for the RMTMP period matches with the projected available resources and was avoided proposing a long list for the RMTMP period.

1.5.12 Conduct Meeting with stakeholders to provide/seek information:

The consultant at the beginning of the project commencement, conducted meeting with local residents and concerned stakeholder agencies such as the Municipality, Department of Roads, Land Revenue office, Department of Survey, Forestry office, Community forest users' committees, Land development users' committees, Tole Lane Organization, Traffic police office etc. to orient them

about the municipal transport study, and to seek information about the public land holdings within the municipal area, and prepare maps of such at ward level.

The consultant collected and reviewed the existing reports on transport planning, Physical development planning, road network planning, District transport master plan (DTMP) etc. and proposed plans and programs of concerned agencies regarding municipal road network.

1.5.13 Conduct Traffic count survey of major streets

The consultant conducted traffic count identifying major traffic count station considering transit stations, vehicular flow of inside and surrounding study area, prepared traffic forecast and prepared plan for sustainable traffic flow system.

1.5.14 Conduct Origin-Destination survey and prepare Travel Demand Forecast:

The consultant prepared and conducted sample questionnaire survey for determining travel origin and travel destination pattern within the municipal area, and to ascertain future travel pattern and travel demand. The consultant used both origin-based survey (household O-D survey, Household member Trip Log etc.) and Destination based survey methods to determine travel behavior of residents within the municipality and to project future travel demand. The consultant correlated trip distribution and traffic flow system to project future travel demand within the municipality.

1.5.15 Prepare Rural Municipal Transport Master Plan (RMTMP) including listing of public property:

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

The consultant also conducted a depth review of the existing transportation network and management system, current situation of public property within the municipal area and proposed and recommended land use plan and alternative transportation management system for the future urban growth.

1.6 Approach and Study Method

The approach for the study is participatory bottom-up and differs from the conventional practices of trickle-down approach. The techno-political interface is incorporated in the planning process, where active participation of the stakeholders including the political parties, line agencies, and municipality officials is ensured during the data collection and in the plan preparation and endorsement process. To ensure such involvement a municipal road coordination committee was formed incorporating all the stakeholders in the municipality.

1.6.1 Preliminary Study

Preliminary study and planning are the first step in the preparation of RMTMP. It includes collection and study of the available secondary data and reports on the study area. The sources of secondary information include census report, DTMP reports, and online maps. During the preliminary planning, detailed methodology and data collection method, instruments and administration process were planned. The preliminary planning identified road inventory, socio-economic data in relation to trip characteristics, traffic vehicle count, and demand survey as major surveys to be conducted. Other necessary information on public transport routes and services, road safety and available budget were collected as well.

1.6.2 Primary Data Collection

As mentioned above, the primary data collected were socio-economic and trip characteristics, traffic vehicle count, demand, road inventory, public transport and safety, and sources of funding and financing as major primary data to be collected during the field visit. The details of these surveys are presented in detail in the later part of this section.

1.6.3 Data Input, Tabulation and Management

The data collected were input in the Microsoft Excel spreadsheets and GIS database for further use. The entered data was verified by the team members and cleaned for incomplete and meaningless information. The collected datasheets were stored safely. To ensure easy access, they were scanned and stored in electronic copy as well. The data entry was done in the predefined template to ensure easy access of information, editing, and analysis.

1.6.4 Data Analysis and Planning

Data analysis was done to derive necessary information from the collected data. These included calculation of central tendencies and range of different parameters at a preliminary level which reflected the existing scenario of the study area. They were represented in graphs and charts. The data in relation to available secondary data was used to forecast future scenario through models and visionary plan. Based on the present and forecasted scenario, the planning of required road hierarchy and its network was done. Need-based infrastructure planning was done to reflect the need and demand of the local users.

1.6.5 Use of Software

As mentioned earlier, Microsoft Excel and GIS are the major software that have been used for the storage, analysis, and mapping of the collected data. Microsoft Excel has been used to store, manage and analyse mainly household data and road data. The preliminary analysis of collected data has been done through Excel itself.

The use of GIS includes data entry (mainly road-related) and field verification, cartography and preparation of different maps. The shape filesfor ward boundary, VDC boundary, and development region were obtained from Department of Survey. Satellite image of the respective municipality was obtained using Image Capture Software and Google Earth. The image was captured in the spatial reference of WGS 1984. It was then transformed into Modified Universal Transverse Mercator (MUTM) in three regions namely MUTM 18, MUTM 84 and MUTM 87. The data from field were

entered for roads, place name, other infrastructures, and verified in the field. The details noted in GPS were converted using GPS Conversion Tool and used in ArcGIS. All the maps are prepared in ArcGIS version 10.5. MUTM 84 is used as a projected coordinate system. The symbols for road classes etc. were used as per ToR for the final maps.

When transformation of datum was done form WGS 84 to Everest 1830, following transformation values were used and the transformations were done using the Molodensky method.

Table 1-1 Datum transformation values

From WGS 84 to Everest 1830		From Everest 1830 to WGS 84	
Direction	Transformation values	Direction	Transformation values
X	-295	X	295
Y	-736	Y	736
Z	-257	Z	257

1.6.6 Presentation of Results

Presentation of results is crucial to communicate the obtained information and prepared plans with all the stakeholders and locals. Therefore, the results are presented through charts, graphs, maps, reports and power point presentation with discussions.

1.7 Fieldwork

Collection of data is one part of a more comprehensive transport planning process. It can be seen that data collection is but one of the tasks leading towards the evaluation, selection and implementation of a particular transport strategy. (Richardson, Ampt, & Meyburg, 1995). Practical plans are prepared only on the base of reliable data that reflects the existing and possible scenario and status of the study area. Such necessary data were collected through different secondary sources and primarily on site. Primary data was collected during the field works based on the preliminary study. The different meetings and surveys conducted during the field work are briefly presented below:

1.7.1 Orientation Meeting

To formally begin the preparation of RMTMP and its field works, an orientation meeting and workshop was organized in the municipality office. It was participated by stakeholders from different sectors including the political parties, line agencies, wardnagarikmanch, social mobilizers and municipality officials.

During the workshop, the study team and the different stakeholder were introduced to each other. The study team presented a power point slide informing the stakeholders on the study topic, its objectives and scope of work, and detail work methodology. Different surveys to be administered was described along with their need and use in the planning process. The road network hierarchy

and standards were also presented. The planning methodology and road standards were discussed, with a major focus on the road standard. After the discussion, road coordination committee (RCC) was formulated.

1.7.2 Formulation of Road Coordination Committee (RCC)

Road coordination committee is the monitoring committee for the preparation of RMTMP. The committee was responsible for guiding, supporting and monitoring the RMTMP preparation process. Thus, RCC was formed during the orientation workshop. The committee was formed under the chairmanship of the Executive Officer of Mahabharat Rural Municipality.

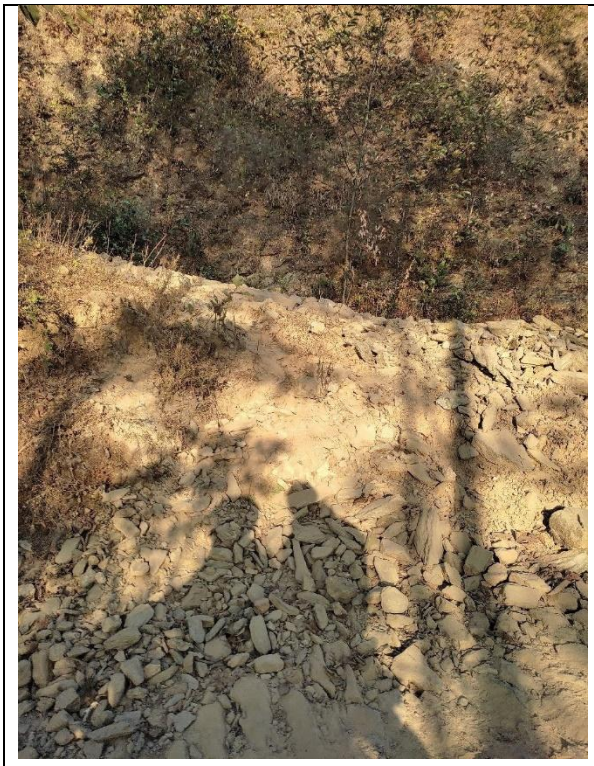
1.7.3 Household Survey

Household survey method was used to collect data on socio-economic status of the people in relation to the trip making characteristics. The questionnaire was used as a survey instrument to collect the required data. The questions were selected and the questionnaire was designed for minimum write-up requirement while surveying for efficient and quick survey time. The questionnaire consisted of questions related to socio-economic and demographic characteristics of the individual household. The socio-economic data included vehicular ownership, monthly family income, and expenditure on transport and occupation of the individual. It also included the trip details of the reason for travel, use of vehicles, timetaken and destination of travel. The household survey was conducted in 230 households and details of 518 individuals were collected.

The survey gives the overall scenario of socio-economic structure of the settlements, their choice of vehicle for specific routine trips and preferred destinations for a different purpose.

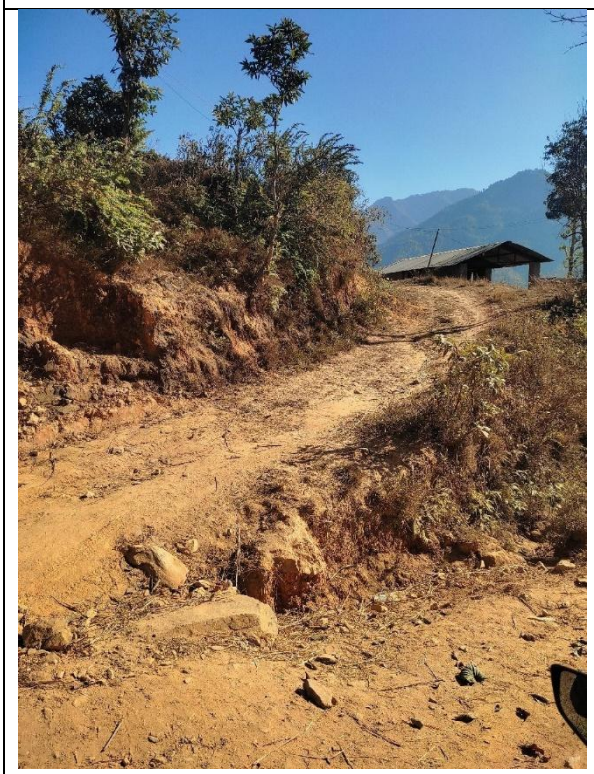
1.7.4 Road Inventory Survey

Collection of information on the existing condition of roads and their mapping is one of the major scopes of this study. For this, road inventory survey was done and details of all the roads were collected. The details include total and carriageway width, length, surface type, cross drainage structures, etc.

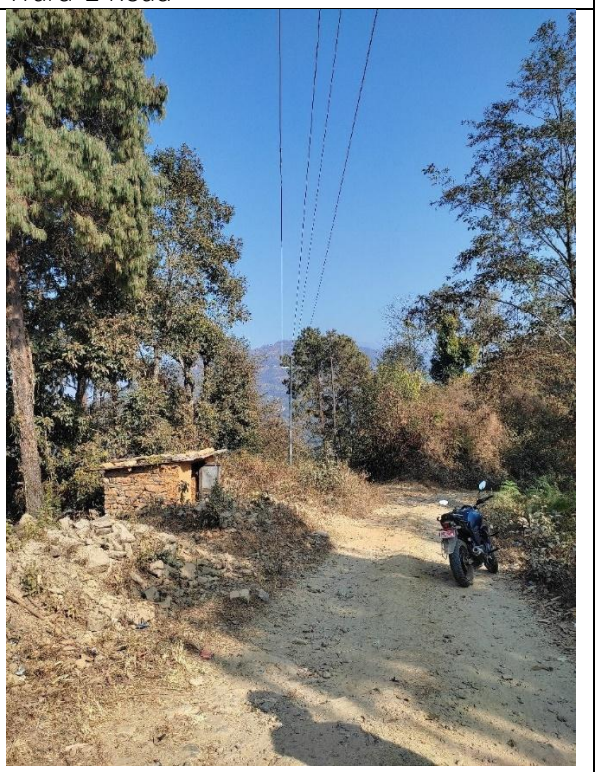


Ward-1 Road

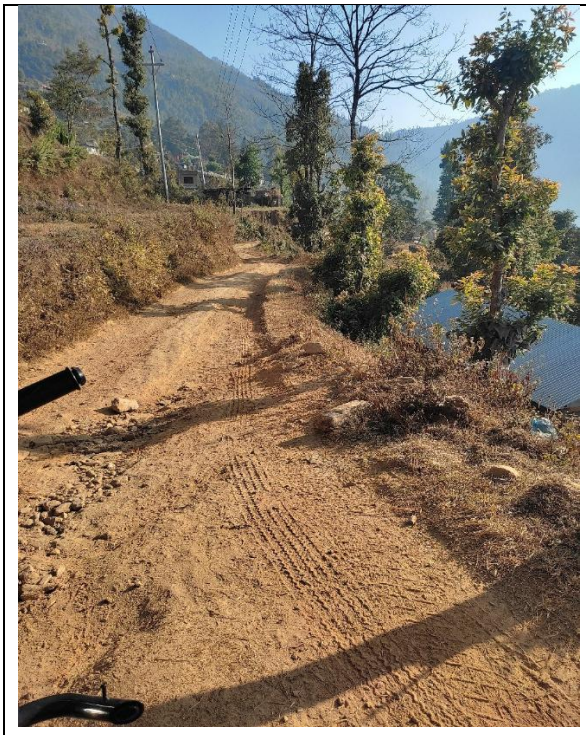
Ward-2 Road



Ward-3 Road



Ward-4 Road



Ward -5 Road

Ward-6 Road

Figure 1-1 Conduction road inventory survey

1.7.5 Demand Survey

To collect demand for interventions from the local people, demand survey was conducted in each ward. The platform was used to share the information on the preparation process of RMTMP, the objectives and scope, and the road standards and its infrastructures with the local people. The meeting was organized individually in each ward. The demand survey includes filling up a form by the local ward representatives. The form includes demand for five major roads of the ward based on priority and their details. It also includes details of other development plans and projects in the ward. The form also asks to highlight the possible involvement of the local people in developing the demanded roads.

The demand form highlighted major roads and their necessity in terms of priority given by the wards. The priority order resembles the necessity for immediate interventions in some roads as they are in bad condition or some roads are for new construction. The form also asks to explain why the road was prioritized with possible benefits from the proposed interventions. The map showing the roads demanded by different wards in their priority order is shown in MAPS.

1.7.6 Traffic Vehicle Count Survey

To assess the existing use of the major roads and their possible future demand, traffic vehicle count at the station in major streets was done. Traffic vehicle count was done at two stations: one at Pinthali and the other at Phaparbari, Makwanpur, near the border of Mahabharat Rural Municipality.

1.7.7 Other Survey

Other surveys were conducted to collect information on existing public transport service (formal and informal), freight movement, road safety status, municipal budget, etc. Data on the public

transport were collected through discussion with the MRCC and with the service operators. Status of the service provided were observed directly by the study team and also through interaction with the local people and stakeholders during various level of data collection, meetings and workshops. Similar method was used to observe and collect information on safety issues and incidents and freight movement.

1.8 Report outline

Chapter 1 of the report gives the brief introduction and background of the study under consideration and the study area. The objectives and scope of the study are explained. This is followed by brief methodology used to conduct the study and details of the field works done. Chapter 2 describes the study area through the collected data and its analysis. Chapter 3 sets out the basis for the Rural Municipal Transport Master Plan through visionary city development plan, population and traffic forecast and indicative development plan. This is followed by developed road hierarchy and its network and prioritization criteria for investments to be made. The developed hierarchy and corresponding development plan is explained by elaborating on the land use, transport and infrastructure development. The last part of the section summarized the plans and development process in long term, medium term and short term plan. Chapter 4 sets out the potential sources for funding and financing investments and their role. The detail of projected budget required and its year wise allocation to different class of road for different intervention is presented. Chapter 5 elaborates on the recommendations for successful implementation of the plans prepared through implementing framework and strategies.

2 EXISTING SCENARIO OF MAHABHARAT RURAL MUNICIPALITY

This section presents the existing scenario of Mahabharat Rural Municipality based on different figures and photographs collected and taken during the field works.

2.1 Location

Mahabharat Rural Municipality is located in the southern part of Kavrepalanchowk District within Bagmati Province, Nepal. It is bordered by Roshi Rural Municipality to the north, Khanikhola Rural Municipality to the west, Hariharpurgadhi Rural Municipality of Sindhuli District to the southwest, Marin Rural Municipality of Sindhuli to the south, and Ghangalekhi Rural Municipality to the southeast. Geographically, the municipality lies in the Mahabharat hill range, which gives the area its name. It is situated approximately 80 kilometers southeast of Kathmandu, the capital city of Nepal, accessible mainly by road as there are no direct air services available. The terrain is predominantly hilly and forested, with scattered rural settlements, and plays a significant role in the socio-economic and environmental landscape of southern Kavrepalanchowk.

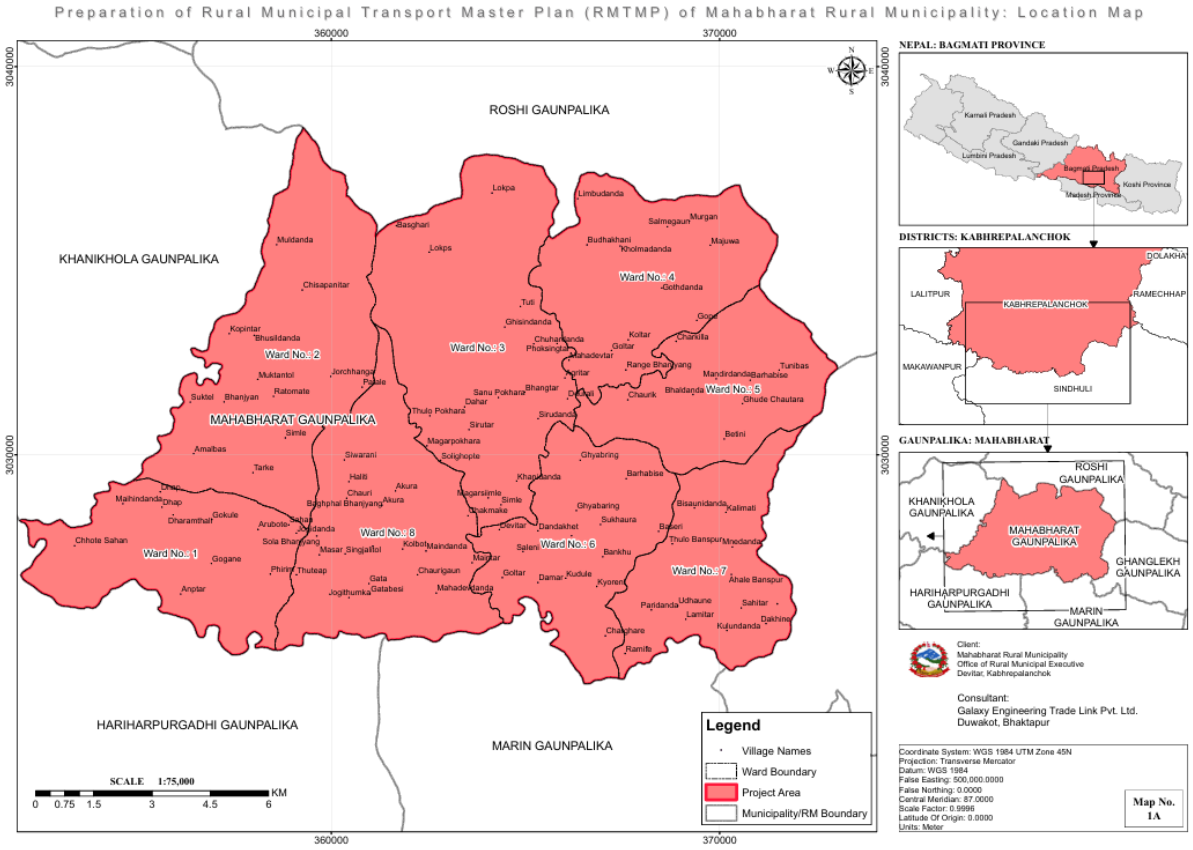


Figure 2-1 Location of Mahabharat Rural Municipality. in Kavrepalanchowk Districts

2.2 Climate, Topography and Geology

As the municipality lies in the Middle Hills region, it experiences Humid Tropical climate with dry winters and hot summers. The annual temperature averages about 20-28 degree Celsius. The mean annual rainfall is about 1500mm-3200mm.

The municipality ranges from south of Middle Hills range to the Mahabharata Range in the north. We can see the texture of soils of the entire municipality. Most of the area is consists of sandy loam and secondarily by loamy sand.

It's clear that the elevation varies from high 2266m to low 638m within the rural municipality. So, the northern and mid part of the rural municipality has mild slopes areas which have rocks.

2.3 Socio-economic and Demographic Status

2.3.1 Demography

Mahabharat Rural Municipality has a total population of 16,079 residing in 3,174 households, as per the National Census 2021/2078. Females slightly outnumber males, making up 51% of the population compared to 49% males. The average household size is 5.11, and the population density is approximately 86.45 people per square kilometer. The ward with the highest population is Ward No. 8 (15.6%), while Ward No. 4 has the lowest (10.1%). Notably, about 63.1% of the population falls within the working-age group (15–64 years), indicating a strong labor potential.

However, the municipality faces a high rate of outmigration. Many youths seek employment and education opportunities in urban centers like Kathmandu, Dhulikhel, and Banepa, or abroad. This has led to 5.19% of the total population being recorded as absent in the census. The population pyramid shows a larger proportion of younger age groups, especially between ages 10–19, while the elderly population is minimal. This demographic trend reflects a dynamic but migrating population that could impact local development and planning.

2.3.2 Education

There are 50 schools in Mahabharat Rural Municipality, comprising 23 primary, 10 basic (grades 1–8), and 7 secondary (grades 1–10 or 1–12) schools. Around 4,708 students are enrolled, taught by 168 teachers. Despite this presence, educational access and quality are challenged by the municipality's difficult terrain and inadequate transportation. Students in remote areas often walk for hours to reach schools, discouraging continued attendance, particularly at higher levels.

The literacy rate in the municipality stands at 70.3%, which is lower than the national average of 76.2%. Male literacy is at 76.7%, while female literacy lags behind at 64.1%, indicating gender disparities in education. After the 2015 earthquake, many schools were damaged but have since been rebuilt with government and donor support. Despite these efforts, dropout rates remain high in secondary education due to poverty, migration, and lack of educational incentives.

2.3.3 Employment Pattern and Income

Employment is an important factor that governs the demand of road and public transport for daily commute. The employment pattern dictates the economy of the area. Higher the number of employee (people involved in service sector) and business generate higher number of daily commuting trips along with educational trips.

On the other hand, lower number of such employment is connected with greater unemployment and agricultural trips (generally local and short distance, made on foot).

The employment pattern obtained from the Mahabharat Rural Municipality Profile. It shows that students with 37% accounted for the portion of the residents. The people involved in business is very low (<1%) while that of people involved in service sector is 7%. While 57% of the people are found to be involved in agriculture, 3% are unemployed. The proportion of people involved in agriculture is underestimated in the figure, as many people involved in other occupation are also involved in agriculture as their secondary occupation, which is completely reasonable since agriculture is mostly seasonal.

2.3.4 Vehicle Ownership

The ownership and use of privately owned vehicles also dictate the level of economic activity taking place in the study area. As per the household survey, only 15 households do not possess either two wheeler or four wheelers, and 1320 households own two wheelers. Figure 2-10 and Figure 2-11 illustrates the ownership of vehicles by the households. 82% households do not own a single four wheelers. Similarly, households owning one two wheelers and one four wheelers are 37% and 12% respectively. Moreover, only 2% households have multiple four wheelers, while 8% households have multiple two wheelers.

Furthermore, to investigate the impact of household income on four wheelers ownership, household income has been superposed with four wheeler ownership, which is shown in figure. As can be observed, 11% of the households earning below 20,000 do not have a two wheeler. On the other hand, as income increases, the tendency of households owning multiple two wheelers increases which are vindicated by the ownership of two or more two wheelers by more than 70% of the households having income 30,000 and more. Thus, two wheelers ownership and household income have a very high correlation.

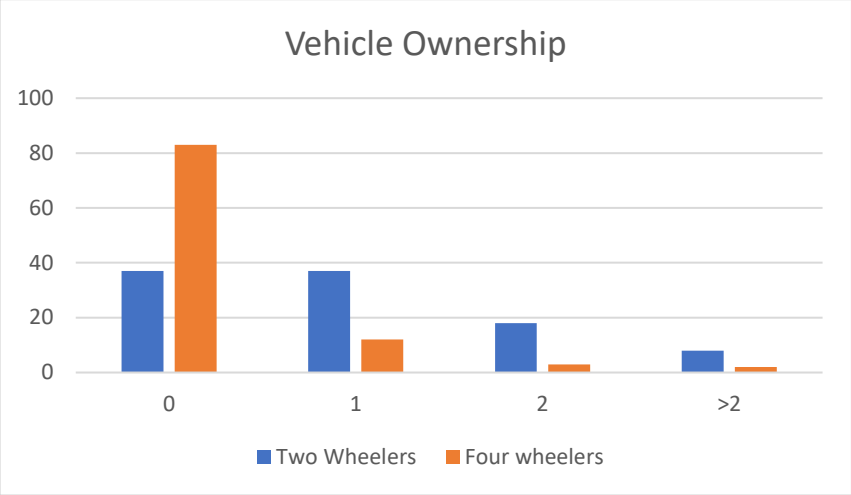


Figure 2-2 Two wheelers and four wheelers Ownership

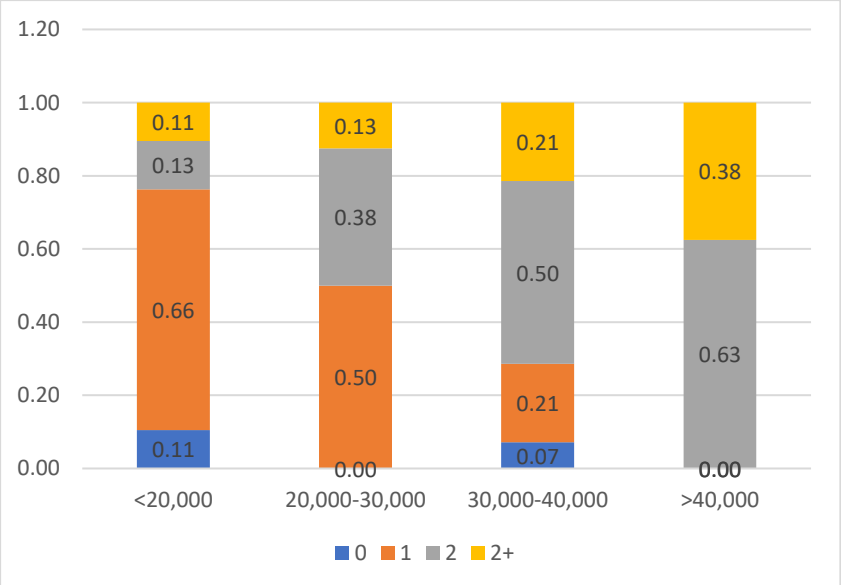


Figure 2-3 Income and Two wheelers Ownership

2.4 Land Use Pattern

Mahabharat Rural Municipality spans 185.97 sq. km, with the majority of its land, about 74.47%, covered by forests. Agricultural land occupies only 18.77%, indicating the dominance of natural vegetation and limited cultivable area. Other land types include grasslands (2.58%), sandy areas (1.89%), and shrublands (1.34%), with only 0.01% of the area categorized as built-up settlement.

This land use pattern reflects the municipality's rugged topography and rural character. The extensive forest cover presents opportunities for forestry-based livelihoods and environmental conservation. However, the limited agricultural land and scattered settlements challenge food production and service delivery. To promote balanced development, the municipality needs integrated land use planning that aligns with its ecological zones while expanding productive agricultural and settlement areas sustainably.

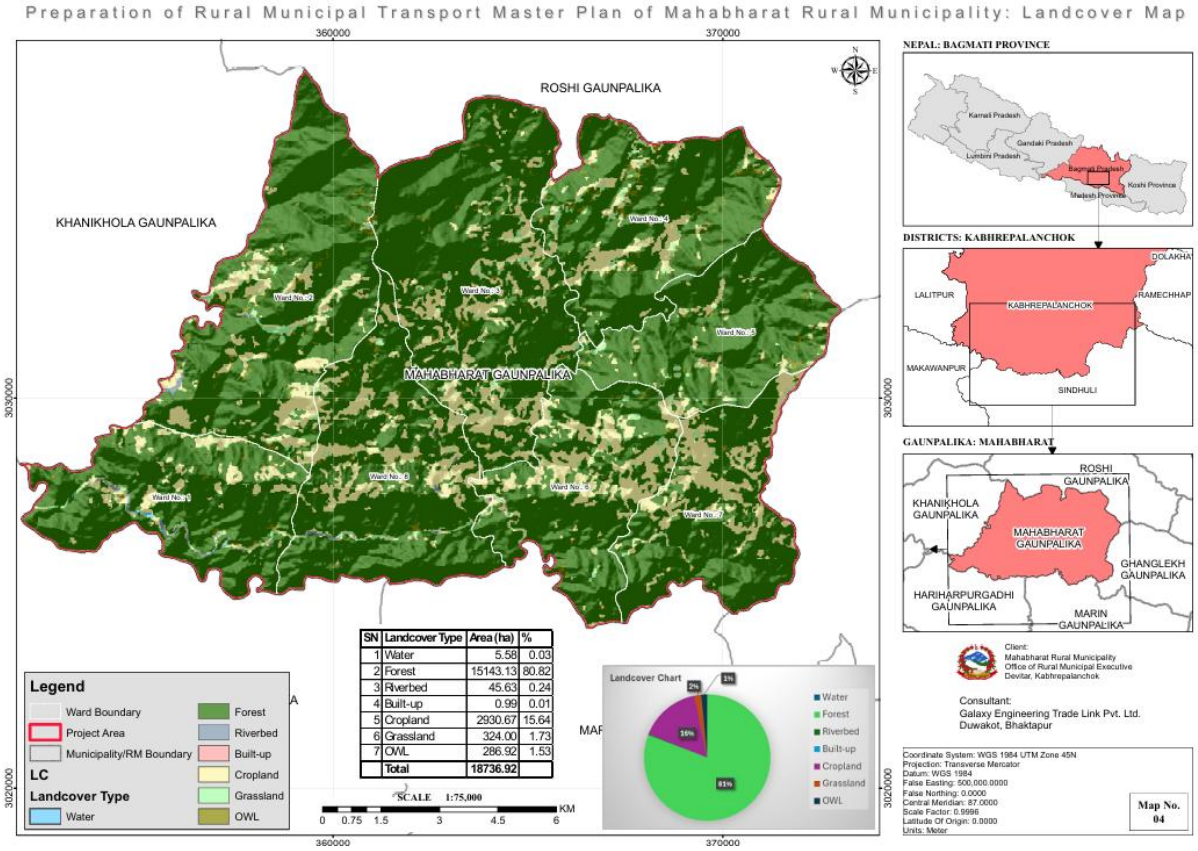


Figure 2-4 Land use Distribution

2.5 Trip Characteristics

Any trips made can be directly or indirectly linked to economic activity. Trips are generally made to go to educational institutions, workplace, markets and shopping centers and other places. They directly or indirectly contribute to barter of information, knowledge, goods and money. Transport is demanded to fulfill other needs and services. Transport is a service rarely in demand for its own characteristics(Development Plans, Guidelines for planning authorities, 2007). Most individuals travel because they wish to benefit from the social, recreational, educational, employment and other opportunities which become accessible with movement. Similarly, freight transport opens up opportunities for greater efficiency in production and permits extensive geographical specialization with the accompanying benefits of increased division of labor(Cole, 2005). The demand depends on the spatial distribution and location of various infrastructures such as educational institutions, market and business centers, customer service outlets, industries etc. The trips are characterized by the reason for which it is made, trip distance, the choice of available mode options, etc.

According to the household survey, the trip rate in Mahabharat Rural Municipality is 0.6 trips per capita; 2.4 trips per household. Above 50% of the people do not make a trip each day. This shows a low level of economic activity. The main reasons may be developing market centers, lack of proper infrastructures and unemployment. The trip making characteristics such as the reason for travel, the vehicle used, etc. dictates the number of trips generated and the demand for proper road space. The details of the trip characteristics are elaborated below.

2.5.1 Reason for Travel

Figure 2-4 demonstrates the distribution of trips for different purpose purposes by male and female. The table shows that education trips with more than 40 % comprise the maximum amount of trips. Due to the agrarian economy of the region, work trips were segregated into farm trips and work trips to offices. Unsurprisingly, trips to farmland with 21.9% outnumber work trips, which shares just 6.57%. Furthermore, shopping trips and other trips both comprising 2.55% of the total trips are least produced trips. Other trips include trips other than mentioned in the table.

Apparently, the male seems to make significantly higher trips compared to female, as male shares almost 65% of the trips. Moreover, male dominate in all categories of trips. The share of work and business trips by male above 90% depicts that female contribution in income generating trips is significantly less. Likewise, 6% difference in education trips by male and female shows that female is less privileged when it comes to getting enrolled in school or college. Unsurprisingly, male and female shares almost identical proportion of trips to farmland.

Table 2-1 Reason for travel

Trip Purpose	All Trips %	Trips by Male%	Trips by Female%
Work	6.57	94.44	5.56
Business	18.61	90.20	9.80
Education	42.70	52.99	47.01
Shopping	2.55	71.43	28.57
Leisure	5.11	71.43	28.57
Farm	21.90	51.67	48.33
Others	2.55	85.71	14.29
Total	100%	64.60	35.40

2.5.2 Mode Sharing

Another important aspect of transportation is the use of different modes and means of transportation for the daily commute. The household survey shows that of the total trips made daily, about 54% are made on foot and more than a quarter on a bicycle as shown in. Motorcycle shares only about 21% of the daily trip, and public transport has 18% of the share. Since most of the trip makers are students, it is not unexpected that school bus also has a presence in the region – about 4% make their trips on the school bus. Public transport, operates on Pinthali-Rajbas-Charkilla-Tinkhutte-Devitar-Ghartichhap-Gokule-Dhap. It is clear that the active mode of transport (walking) dominates the mode share of daily trips. But the current infrastructure and their development do not support these users.

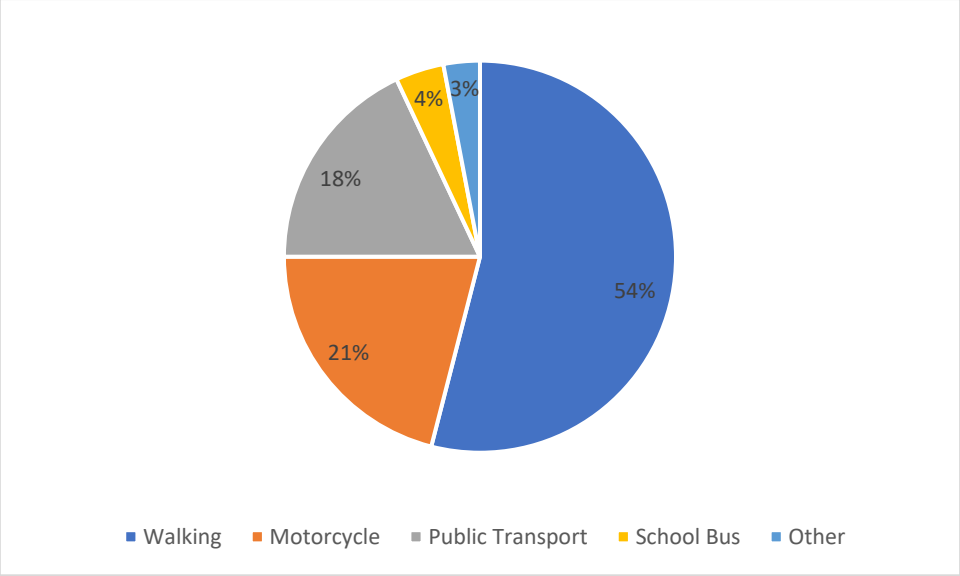


Figure 2-5 Use of different vehicles for daily trips

2.5.3 Trip Duration

Figure 2-6 Cumulative preparation of trips for specified durations demonstrates the cumulative proportion of trips of specific duration. The distribution of trip duration of all trips shows that more than 90% of all the trips made are of duration 30 minutes or less. The breakdown according to the vehicle used shows a similar trend. Almost 100% of the trips made by walking and more than 80% of the trips mad by remaining modes are below 30 minutes. The curve seems to steady as travel time exceeds 30 minutes for all modes, which shows 30 minutes is the preferred travel time budget of the people.

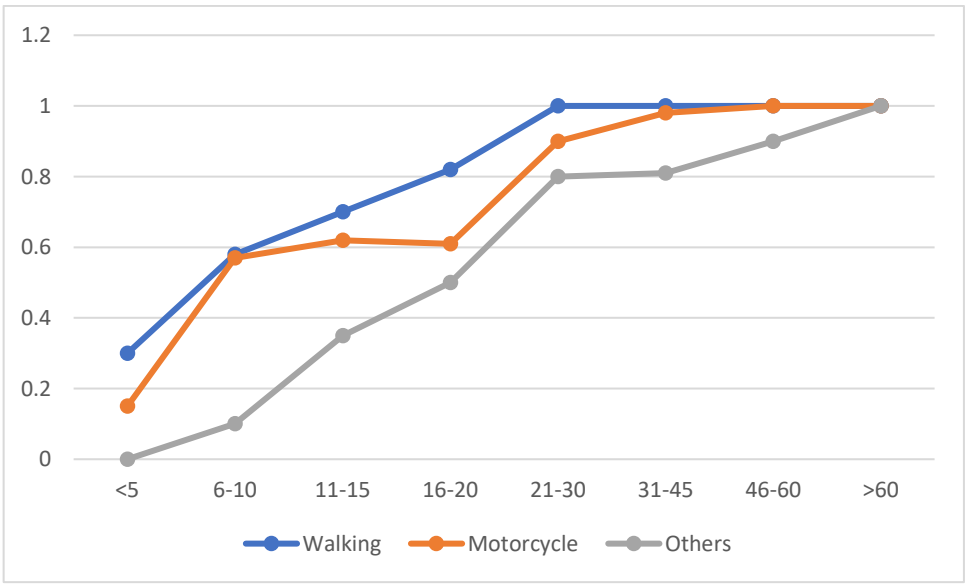


Figure 2-6 Cumulative preparation of trips for specified durations

2.6 Road and Traffic

2.6.1 Inventory of Roads

The inventory of roads of Mahabharat Rural Municipality shows that 26% of the total road length is gravel, 71% of total road length is earthen, 3% of total road length is having bituminous surface.

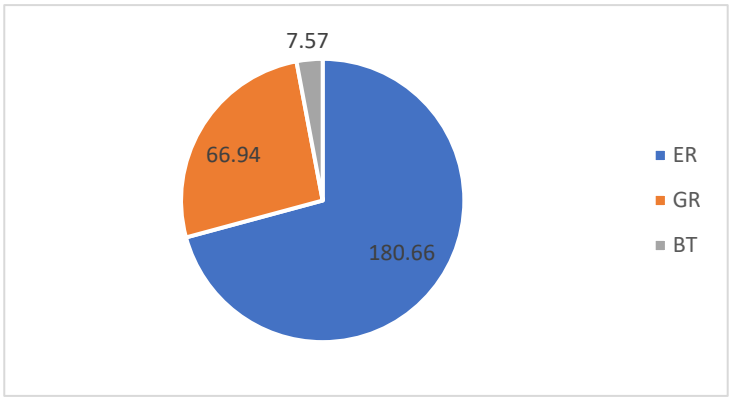


Figure 2-7 Proportion of roads of different surface type by length

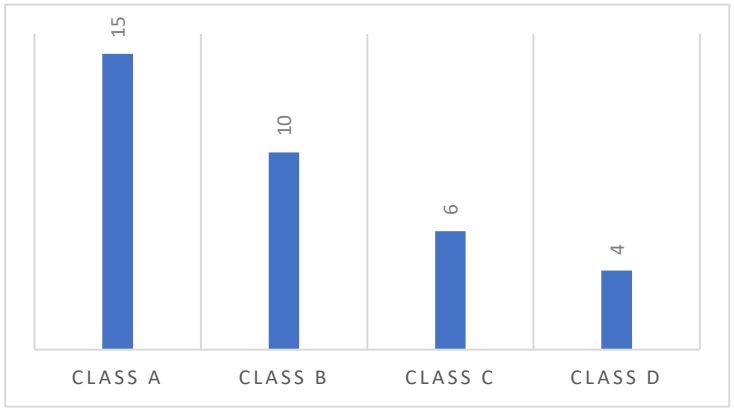


Figure 2-8 Right of Way for Different Class of Road

2.6.2 Road Demand

The demanded roads from different wards form an interconnected road network with varying priority order in different wards. Most of the demand seek upgrading of the existing road surface as most of the roads are earthen or graveled. The roads that provide people the access to the municipal building office, agricultural products to major markets and to the highway are prioritized by all wards. All the prioritized roads link the major settlement of each ward to the school/college, hospital, and of her facilities. The discussion with the locals highlighted the need for cross drainage structures along with many road segments as the overflowing water during monsoon renders the road unfit for use. The map showing the roads demanded according to the priority placed is given in the Maps.

Apart from roads, other development plans and need as indicated in the ward forms are bridges, drinking water supply and drainage system, agro-based farm and industries, etc.

To support the development process of the demanded roads, wards 1, 3 and 4 suggested that they are willing to contribute 20%, 10%and5% of the total costs, while remaining wards did not confirm their contribution. Likewise, wards 2,5,6 and 7 agreed to offer local labour investment ranging from 5%to 10%.

2.6.3 Road Traffic

The roads are used by different users. It includes the pedestrians, truck, Bus, Car/Jeep/Taxi, Rickshaw, Tractor etc. The development of road and roadside infrastructure should consider the users demanding the road space. The animal cart, tractor have a very low composition. The reason might be the rise in use of jeep in the municipality. Truck, utility have also a considerable composition which shows the status of materials transportation.

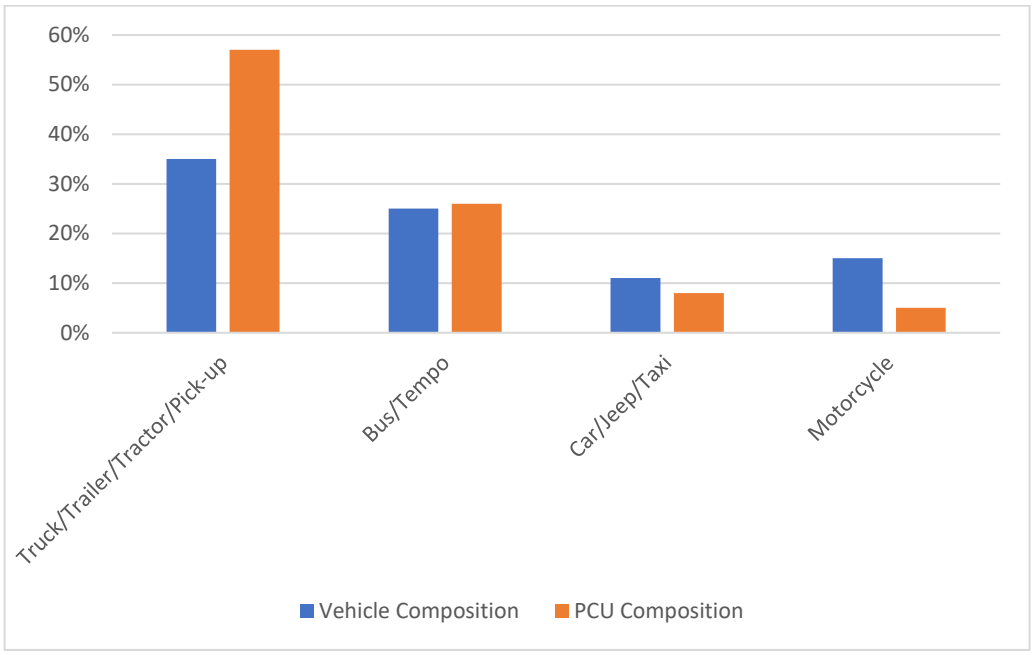


Figure 2-9 Vehicle and PCU composition at the municipality

2.6.4 Road Safety

Road Safety is one of the burning issues in the transport sector of Nepal and the globe as well. Lack of infrastructure for a different type of road users is one of the reasons the most vulnerable users- pedestrians and cyclists are caught in accidents. The increasing density of vehicles is of concern to maintain the safety of travel in the municipality. The highway has a paved road surface and supports large number of motorized vehicles that run at high speeds. The road width limited to the blacktopped carriageway width has forced the pedestrians and cyclists to share the common road space.

The unsafe situation also arises from unlawful acts such as overloading of vehicles and ignorance of rules and regulations. Unregulated parking, overloading of buses and freight vehicles, ignorance of signs and markings, and helmet are a most common violation of rules and regulations which increases the risk of accident and fatality.

2.6.5 Public Transport

It is seen that time required to access the nearest public transport of the municipality. The highest time required to reach the local transport is seen in ward 2, which is about 45 minutes. Similarly, wards 1,3,4,6 require 50 minutes in average and ward 1 (40 minutes) which is the lowest value among the different wards.

Services by different means of public transport are as follows:

- Bus (for means of public transport)
- Van/jeep (non-formal means of transport)

3 Forecast and Planning

This section elaborates on the planning tools and process. The guiding plans and development potential of the municipality is presented in the beginning; followed by projected population and traffic for the period of five years, ten years and twenty years. The indicative development potential has been outlined. The latter part of the section presents the proposed road hierarchy and its network. The proposed and finalized prioritization criteria have been introduced. The resulting land use, transport and infrastructure/service condition has been elaborated in the end of the section along with the framework for long term, short term and medium-term period.

3.1 Visionary city development plan

City development plan is the guiding plan for the preparation of all other development plans. The plan sets out the vision of the people and spread out the necessary infrastructures and services in space. It considers the existing land use, development potential, social, physical, economic and environmental infrastructural requirement to plan the potential land use and other parameter consideration for the overall development of the municipality. As the comprehensive city development of Mahabharat Rural Municipality has not been prepared, the visionary plan to guide the RMTMP and other plans (prepared before the comprehensive plan is prepared) has been developed. The existing scenario and, plans proposed and discussed with the MRCC and the municipality has been summarized below.

3.1.1 Existing Land Cover and Land Use

Among 7,269 hectares. area of Mahabharat Rural Municipality, built up area constitutes about 107.714 ha of the total land area which is 1% of the rural municipality. Furthermore, settlement seems to be developed along the roads giving a ribbon-like pattern. This seems to impede the authorities to provide basic infrastructures to the inhabitants.

Cultivation area covers about 55.88% of the total land area. Considering the current haphazard sprawl of the settlement, it is highly likely that the already depleted cultivated land will decrease more in the future. The southern parts of the municipality belong to the protected region of forest, this in the event of keeping the impeachment to the minimum, no more land will get depleted. Similarly, the northern part is hilly, so the cultivable land in between needs to be preserved controlling the haphazard settlements.

3.1.2 Carrying Capacity

Carrying capacity refers to maximum number of individuals who can be sustained in a given region without permanently inhibiting the productivity of that region (Elgar, 2002; Rees & Wackernagel, 1996). Municipality has limited resources and land therefore it can withstand certain population with adequate facilities and quality of life, based on its carrying capacity. Carrying capacity of the municipality has been analyzed on the basis of existing land cover, natural resources and topology, and desired maximum population density for each municipality has been assigned.

80 % of land is identified for natural resources while 20 % are settlement promoted area as per Planning Norms and Standards, 2015 by DUDBC. Available settlement area is distributed in 30% and 70% for medium and low density. Population density for medium and low density is assumed as 200 and 100 Ppha respectively.

Table 3-1 Carrying Capacity

Mahabharat	Natural resource	Settlement promoted	High density(400 Ppha)	Medium density (200 Ppha)	Low density (100 Ppha)
Percentage	80 %	20 %	0%	30%	70%
Area in ha	5,815.904	1,453.97	-	436.19	1017.78
Carrying capacity	-		87,238	1,01,778	
Total carrying capacity			1,89,016		

This shows that carrying capacity of Mahabharat rural municipality is One Lakh Eighty-Nine Thousand and Sixteen people.

3.1.3 Lead Sectors

The field observation and discussion with the municipality, RCC and other stakeholders confirmed the major lead sectors for the Mahabharat Rural Municipality as (in sequence of relative importance):

- Agriculture
- Tourism
- Industry

Agriculture is the leading sector of Mahabharat Rural Municipality as majority of the people earn their bread from it. Agricultural products are the major exports of the municipality; they are exported to nearby big market places and even to Kathmandu. However, facilities such as cold storage, perennial supply of water for irrigation, necessary seeds and fertilizers seems to be limited which as a result has inhibited the growth of agriculture in the region. Furthermore, agro-based industry and technical education on agriculture are highly demanded by the locals.

Secondly, the possibility of developing the municipality into a tourism hub needs to be exploited. The municipality provides a gateway connecting the lower plains and river basin to the steadily rising Middle Hills. The proximity of Mahabharat river offers the major attraction potential for adventure tourism. The vivid cultures present can be of significant attraction as well. The adequate infrastructures essential for the tourism industry to flourish needs to be addressed and developed accordingly according to the locals.

Thirdly, although not significant, few industries are running in the proximity of the municipality which if extended to within the municipality could change the life of the local residents. The close distance to Kavre, Bhaktapur, Kathmandu etc has been providing the employment to the residents. The abundance of agricultural products has increased the need of agro-based industries.

3.2 Population Projection

Any planning process begins with the estimation and forecasting of the population. It is the estimated population that demands for and should be provided with infrastructure and services. The demand for transport depends on the population, its density and the distribution of other services and facilities. Therefore, it is necessary to estimate the population and the corresponding level of demand for the infrastructure, facility and services. Based on the known facts and figures, possible scenarios of the future are predicted so that the required infrastructures can be planned and built based on the worst-case scenario and the available resources to address the predicted demand.

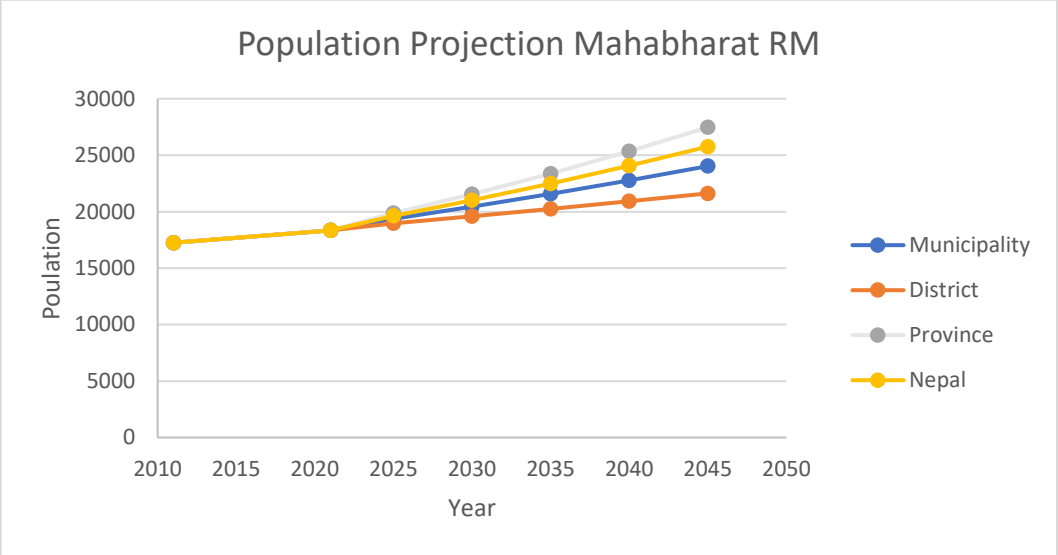


Figure 3-1 Population Projection of Mahabharat rural Municipality

3.3 Road Hierarchy

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. 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. 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 use. There is always a conflict between accessibility and mobility. Therefore, to

cater both, a network of roads serving the function of accessibility and mobility has to be planned. The roads of class D and C provides access while the roads of Class B and A are for mobility. The hierarchy from A to D shows reduction in mobility at the same time increased accessibility to land use.

The ToR has given set of road hierarchy that classifies the municipal roads into four classes as follows:

Table 3-2 Road hierarchy as per ToR

Class of road	Category	RoW
Class A	Main Collector Road	10 m
Class B	Other Collector Road	8 m
Class C	Main Tole Road	6 m
Class D	Other Road	4 m

This hierarchy is outdated as the national code for local roads dictated that the roads should be at least 6 m wide. Further, other documents suggest the necessity of higher hierarchy of roads in an urban context. The planning norms and standards published by DUDBC in 2015 (2072 B.S.) describes the necessity of following road hierarchy based on the population of the city.

Table 3-3 Road hierarchy based on planning norms and standards, 2015

Type of city	Population criteria	RoW of Road (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

Source: Planning Norms and Standards 2015, GoN, DUDBC

Similarly, according to the urban road standard 2068 (draft), the road of the hierarchy of greatest width is an Arterial Road with RoW of 50-60 m for any urban area as tabulated below:

Table 3-4 Road hierarchy based on Nepal Urban Road Standard 2068 (Draft)

RoW of Road (m)				
Expressway	Arterial	Sub-arterial	Collector	Local
-	50-60	30-40	20-30	10-20

The proposed road hierarchy is in line with the above-mentioned standards. Further, the required arterial roads of 50 m roads are sufficed by the existing highway that passes through the municipality.

Nepal Road Standard 2070 states that major frontage roads that opens in the highway should be spaced at least 750 m apart. Adhering to this and forming a block of at least 1 square kilometer by the network of Class A and Class B roads of proposed hierarchy a number of Class A and Class B roads are to be identified and discussed with the MRCC and the municipality.

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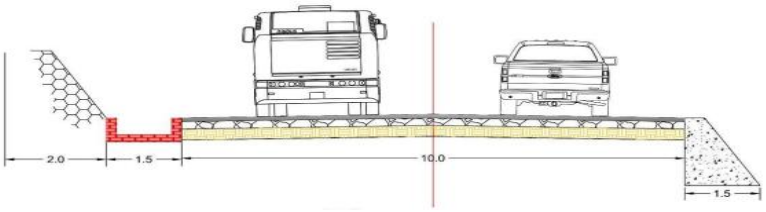
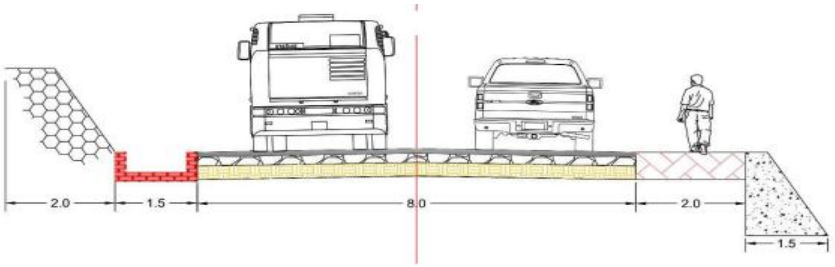
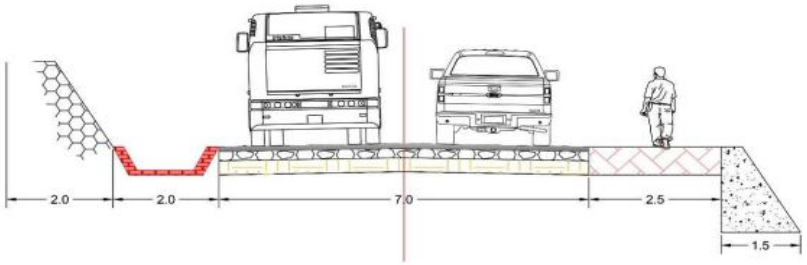
The description of the roads of different class are as follows:

<table>
<tr><td>Class A</td><td>Major roads which connect one or more major Growth Centers or several words with any one of the following:
High network coverage
Major function: Mobility
The right of way is at least 20 m
Direct connected to the National Strategic Road Network or district road.
Complete access to public transport
Segregated NMT facilities
Accessibility - 20 minutes
Some of the possible cross-section are shown in the annex.  </td></tr>
<tr><td>Class B</td><td>Roads which connects major road network and other roads of similar hierarchy with one another with any one of the following,
Road connecting major growth centre of the same or neighbouring wards which provides access between Class A and Class C roads.
Major function: Mobility
The right of way is at least 14 m.
Access to public transport
Segregated NMT facilities
Accessibility – 10 minutes
Some of the typical section of class B roads are shown in the Annex.  </td></tr>
</table>

Class C	Collector roads which connects local roads with higher hierarchy roads; have at least one of the following: • All roads connecting local roads to roads of Class A, B or SRN. • Major function: Access and mobility • The right of way is 10 m • Roads for mobility of local trips • May and may not have segregated NMT facility • Accessibility- 5 minutes Some of the typical sections of Class C roads are shown in the Annex. 
Class D	All minor roads which provides access to an individual household, cluster or *tole* with at least one of the following: • Major function: Access • Right of way is 6 m • Provides direct access to property

Note:

- *If the existing width of the road is higher than that defined by the above road hierarchy, the existing width should be enforced. The available extra width should be allocated to the pedestrians and cyclists as short wide section for motor vehicles in the network can result in bottlenecks and traffic congestion.*
- *Similarly, any higher road width (higher than that of RMTMP) proposed by other plans from the past should be followed according to the corresponding plan. Revision of such plans in the future should consider the road hierarchy and road network proposed by RMTMP.*

Table 3-5 Criteria for Class Classification of Road

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 laybys	Segregated NMT facilities and Bus laybys	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)	80	60	50	30
Radius (m)	210	110	40	20
Minimum Right of Way(m)	10	8	6	4
Extra width at curve (m)	3	2.5	1.5	1
Setback distance (m)	3	2	1.5	1.5
Access Control	Applicable	Applicable	Not Applicable	Not Applicable
Public transport services	Mass Transit facilities	Mass Transit, Local Public transport	No public transportation	No public transportation

Policy documents review:

Urban Environment Management Regulation, 2069

The Paragraph 4 Section 7 dictates the related institutions to adopt Polluter Pays Principle (PPP) to control/minimize pollution and provide compensation. It also gives guidelines to promote use of public transport and demoralize the use of private motor vehicles, manage the traffic for minimization of air pollution and easy use by the pedestrian and cycle users, conduct awareness programs to inform the drivers of the pollution caused by the vehicles and, remove the old and damaged vehicles which do not meet the standards set by the government. Further, Section 9 restricts the use of pressure horn in the urban area. According to Section 10, activities to make the city beautiful, plantation and development of parks should be done. This can be done along the median strips in the major urban roads.

Regulation for accessible physical infrastructure and communication service for the differently abled people, 2069

The regulation was prepared to ensure access of the differently abled people to the different physical infrastructure and communication services in all sectors. According to the Paragraph 2, Section 3 of the regulation document speaks to make the external service and facility accessible. It necessitates the provision of facilities to make the public roads accessible for the differently abled for easy movement. It dictates that the roads should be easily accessible to wheelchair user, crutch user, blind people and other such people. New construction roads should all have these facilities; while the existing roads should be upgraded gradually to meet these necessities. Change in grade while accessing adjoining plot or for crossing the roads should have proper ramp. At locations where overhead bridges are provided for road crossings, special provisions should be made for the differently abled people as they cannot use the facility.

Nepal Urban Development Strategy, 2015

The underlying and interconnected guiding principles for the national urban development strategy (2015) is sustainability, inclusivity, resilience, green and efficient urban infrastructure.

The milestones set by the strategy for urban sub-sector- Transportation is as follows:

- 7.5 Km/sq.km. of road density for existing municipalities and 5 km/sq.km for new municipalities.
- 80% of roads in existing municipalities and 50% in new municipalities to be paved.

National Transport Policy, 2058

The principal objective of the National Transport Policy is to develop reliable, cost effective, safe facility oriented and sustainable transport system that promotes and sustains the economic, social, cultural and tourism development of the Kingdom of Nepal as a whole.

The major policies set to achieve the objective are summarized below.

The policy set for the central and local level are as follows:

a. The short term, medium term and long term master plan of the transport infrastructure to be constructed in central level shall be prepared and constructed accordingly.
b. The development of transport infrastructure in the local level shall be carried out in accordance with the master plan prepared therefor.
c. To develop the transport infrastructure of the urban area in accordance with the master plan prepared for the urban development. The central level shall perform the role of supporter in the work to be done from the local level.
d. To manage the organizational structure as to develop the capacity self-reliance for the arrangement of source of investment in the construction, repairing, maintenance and strengthening of the transport infrastructures and operate the same by providing required service.

Other policies are:

- Special attention shall be given to the maintenance and repair of the existing transport infrastructure to ensure that appropriate service levels are sustained.
- Except the central level transport infrastructure and strategic network, the local level transport infrastructure shall be constructed and maintained from the local level itself.
- The construction, improvement and management of the means of transport shall be done in harmony with the traffic safety and environmental effect.
- In order to conduct the transport service and facility in an effective manner, the skill and working capacity of the concerned labour force shall be enhanced.
- The utilization of means of transport to be conducted by the solar power and electricity shall be expanded throughout the kingdom.
- Special attention shall be given to improving 'the comfort, reliability, safety, frequency, availability and affordability of public transport and to reducing harmful emissions arising from public transport operations.
- Efforts shall be made in making private sector involvement as more as possible, in the development and expansion of services of the transport infrastructure.
- The provision of a minimum level of transport infrastructure will be made in the remote areas for administrative and social development reasons even where the justification on purely economic grounds is negligible.
- Develop various means of transportation and infrastructure in a coordinated manner.

Some of the major action plans presented by the strategy are:

Transport infrastructure:

- In order to deliver an appropriate level of service from the existing transport infrastructure, necessary maintenance, repair and protection shall be implemented.
- In constructing new roads in urban areas, public utility services like sewage, drinking water, telephone, electricity, shall be managed separately away from the road pavement to the possible extend. Cycle lane shall be managed separately.
- Private sector participation shall be encouraged in the construction of wire road, cable car and environment friendly green road as a short distance transport infrastructure related with pilgrimage and tourism destination.

The study of the existing road network and land use along with existing and potential infrastructure followed by discussion with the MRCC and municipality finalized a preliminary network of roads of different hierarchy. The road network was first studied and proposed by the study team to the MRCC and the municipality. The proposed road network was modified based on the MRCC's perception of requirements. While doing so, the requirement of the road network as not compromised.

3.4 Features of the Planned Road Network

Roads planned according to rank are listed below:

.

Table 3-6 List of proposed roads of class A, B and C

Name	Road Class	Surface	Width	Length	R_Code	Priority Rank
Rancha Khola- Udhyaune-Kudulebeshi-Kaule-Goltar-Maintar-Chauri-GataBesi-Thuteaap-Sindure-Phirim-Aaptar-Dhap Sadak	A	Gravel	4	28647.72	324RM07A001	1
Daunne-Kalwang-JanamuktiMarga	A	Gravel	4	3083.308	324RM07A002	1
Charkilla-Gurase-Bhaldanda-chaudik-ghyabring-Janamukti Marga	A	Gravel	3.5	13229.88	324RM07A003	1
SanoPokhara-Masane-Khanitar-Koltar-Janamuktimarga	A	Earthen	3.5	5145.133	324RM07A004	1
Tarakhase-Ward no 2 Office- Amalbas- Maindada	A	Earthen	3.5	20882.68	324RM07A005	1
Chaitepani-Tunibas-Ghude-Beteni-Kalimati-Ale Baspur- Udhayne-Adheri Dovan	A	Earthen	3.5	20848.04	324RM07A006	1
Chaukidanda-Budakhani-ward4 office-Mahadevtar-Tinkhutte	A	Earthen	3.5	9360.365	324RM07A007	1
Gaupalika-Banakhu-Singara Bhanjyang- AleBaspur-Rangcha Khola	A	Gravel	3.5	12162.11	324RM07A008	1
2 no Ward office- Ratmate-Patle-Thulopokhara-Dahar- SanoPokhara-Masane Bhanjyang-MahadevTar	A	Earthen	6	19794.93	324RM07A009	1
Chaukidanda-Budakhani-ward4 office-Mahadevtar-Tinkhutte	A	Paved	3.5	4778.158	324RM07A010	1
Budakhani-Salme-Bhuwaneshowri School	B	Earthen	3.5	4897.7	324RM07B001	2
sola Bhanjyang-halite-Siwrani_Palte - Tham Sadak	B	Earthen	3.5	6285.307	324RM07B002	2
Sirutar-Magarpokhara-Solghoptte-Akurakhola-Akura-Patle	B	Earthen	3.5	9435.012	324RM07B003	2
Chuhardanda-GishingDanda-Tarakhase	B	Earthen	3.5	4281.1	324RM07B004	2

Charkilla-Gopekhola-GopeDanda-Panidhar	B	Earthen	3.5	3418.914	324RM07B005	2
Sirutar-Simle-Devitar	B	Earthen	3.5	4963.602	324RM07B006	2
Sola Bhanjyang-Simle-ratomate	B	Earthen	3.5	7423.926	324RM07B007	2
Patle-sirantol- Jhorchhaga	B	Earthen	3.5	5107.213	324RM07B008	2
4 no Ward office- Majuwa Sadak	B	Earthen	3.5	5440.129	324RM07B009	2
Betini-Gude-Chapurdanda	B	Earthen	3.5	5331.654	324RM07B010	2
Salmetar-bajradev	B	Earthen	3.5	3978.616	324RM07B011	2
Bhangtar-Phoksintar-Mailung-Barabishe	B	Earthen	3.5	7540.447	324RM07B012	2
Simle- Tarke- Sahan	B	Earthen	3.5	4384.58	324RM07B013	2
Devitar-Goltar	B	Earthen	3.5	2109.889	324RM07B014	2
SanoPokhara-GhisingDada- Fedi	B	Earthen	3.5	3946.99	324RM07B015	2
LaftanChowk-Hospital Dada-Maindanda-Chaurigaun-Maintar-Goltar	B	Earthen	3.5	4714.201	324RM07B016	3
Charkilla-Chaudik-Kholaghari-Devitar	B	Gravel	3.5	6487.043	324RM07B017	3
Gude-Barabise-Mandirdanda-Bhaldanda	B	Earthen	3.5	3556.039	324RM07B018	3
arubot- Phirim Sadak	B	Earthen	3.5	4151.182	324RM07B019	3
Sola Bhanjhyang-Sahan-Thingtole-Gokule	B	Gravel	3.5	3338.467	324RM07B020	3

Bhanjyang-Kopintar Sadak	B	Earthen	3.5	4996.218	324RM07B021	3
Chhote Sahan-Kokha Jor Khola	B	Paved	6	1484.907	324RM07B022	3
Saleni-Janamohan Ma Vi (+Laxmi Sunsire Bank)	C	Earthen	3.5	453.9281	324RM07C001	2
Ramite- Chismantar-Rachidada	C	Earthen	3.5	2717.963	324RM07C002	2
Gogane-AapTar Sadak	C	Earthen	3.5	1545.6	324RM07C003	2
chhirka-Kokha Jor Sadak	C	Earthen	3.5	1728.452	324RM07C004	2
Saitar-kulungDanda Sadak	C	Earthen	3.5	1375.464	324RM07C005	2
MainDanda- gumba Danda	C	Earthen	3.5	488.2754	324RM07C006	2
Hai Danda - Kulung Sadak	C	Earthen	3.5	1847.844	324RM07C007	2
Singara- Gara Danda Sadak	C	Earthen	3.5	383.3013	324RM07C008	2
DhapMagartole-School Danda	C	Earthen	3.5	242.654	324RM07C009	3
Udhaune- Paridnada-Charghare	C	Earthen	3.5	2785.731	324RM07C010	3
Thulo Baspur- Baseri Sadak	C	Earthen	3.5	2150.62	324RM07C011	3
Singara Bhanjyung-KhalDanda Sadak	C	Earthen	3.5	890.2448	324RM07C012	3
Gatabesi-KokhaKhola	C	Earthen	3.5	2403.32	324RM07C013	3
Deurali-Dhap Sadak	C	Earthen	3.5	721.8584	324RM07C014	3

Bhola Bhayanjang-ThuteAap	C	Earthen	3.5	2809.851	324RM07C015	3
Dabali-AkuraKhola-Saptol	C	Earthen	3.5	2131.508	324RM07C016	3
Dote-Lamatol-Chakmake	C	Earthen	3.5	2667.739	324RM07C017	3
Amalbas-Besitol Sadak	C	Earthen	3.5	2917.749	324RM07C018	3
Sola(Tarakhase)- Muldada	C	Earthen	3.5	3353.935	324RM07C019	3
aarubote Sadak	C	Earthen	3.5	587.1354	324RM07C020	4
DadaGau-Goltar-Kaule-Barhabise-Marin	C	Earthen	3.5	2616.134	324RM07C021	4
goledada- Marin Sadak	C	Earthen	3.5	1300.563	324RM07C022	4
Deurai-KhaniTar-Palika	C	Earthen	3.5	2123.838	324RM07C023	4
HaiDanda- Rangcha Khola	C	Earthen	3.5	1375.549	324RM07C024	4
Simle-Dote	C	Earthen	3.5	871.5582	324RM07C025	4
Ghude-Majhgaun-Bhaldanda	C	Earthen	3.5	2853.727	324RM07C026	4
charkilla-Aaamghote Sadak	C	Earthen	3.5	1184.788	324RM07C027	4
Charkilla-Gurase-bhaldanda-Chaudik-tinkhutte-Devitar	C	Earthen	3.5	788.7641	324RM07C028	4
Connection Major Road	C	Earthen	3.5	1769.026	324RM07C029	4
Akura Khola- Ghugitar-MainDada Bhajyang	C	Earthen	3.5	2650.304	324RM07C030	4

Dhap- Ramite Sadak	C	Earthen	3.5	1139.981	324RM07C031	4
Barhabise-Toke Sadak	C	Earthen	3.5	2523.894	324RM07C032	4
gokule-kaichale-sukaura dovan	C	Earthen	3.5	2731.804	324RM07C033	4
KuduleBesi-Ratomate-Keurani	C	Earthen	3.5	1604.828	324RM07C034	4
SwasthaChauki-Besi Sadak	C	Earthen	3.5	1125.15	324RM07C035	4
Chauki Sadak	C	Earthen	3.5	165.8787	324RM07C036	4
SiranTol-MajhTol Sadak	C	Earthen	3.5	1841.676	324RM07C037	4
gokule-kaichale-sukaura dovan	C	Earthen	3.5	170.4794	324RM07C038	4
MahadevTar-PoksintarSadak	C	Earthen	3.5	783.4468	324RM07C039	4
RachiDanda-Bhusildanda Sadak	C	Earthen	3.5	2985.286	324RM07C040	4
MuktanTol-Kopintar Sadak	C	Earthen	3.5	2018.542	324RM07C041	4
Bhanjyang-Suktel Sadak	C	Earthen	3.5	2622.265	324RM07C042	4
Banakhu Danda- Udhayne-Lamitar- Marin Gaupalika - Madan Bhandari Hignway	C	Earthen	3.5	1137.845	324RM07C043	4
Janamukti Marga-Ghaibari Sadak	C	Paved	6	692.6859	324RM07C044	4
Daramthali -Dhap Bhayanjang Sadak	C	Earthen	3.5	382.524	324RM07C045	4
SanoPokhara-Bhangtar	C	Earthen	3.5	2300.75	324RM07C046	4

3.5 Land use, Transport and Infrastructures

Need of travel is a derived demand, not being end in itself but a means to fulfil something. Accessibility is the means by which an individual can accomplish some economic or social activity through access to that activity while mobility is the ability and knowledge to travel from one location to another in a reasonable amount of time and for acceptable costs. A sustainable transport system must meet the mobility and accessibility needs of people by providing safe and environmentally friendly modes of transportation **Invalid source specified.**. Land use demands transport and provision of transport changes the land use. In reality, transportation system often needs to trade-off between accessibility and mobility. The present network of public transport has not provided access to a majority of the settlements and the condition is highly questionable. Less frequent trips by the public transport operators where available also adds to inaccessibility during off-peak hours. Therefore, people have to rely on private modes.

3.6 Road Buffer Analysis:

A buffer analysis of the roads in the municipality was carried out using ArcGIS. The following table shows the distribution of land cover according to road buffer of 250m, 500m and 750m. The distance for road buffer was calculated for a walking distance of 5 min, 10 min and 20 min respectively, considering an average walking speed of 3 km/hr for flat terrain. From the table below, it can be seen that the roads of classes A, B, C and SRN collectively covers 171 sq. km. (out of 212.3 sq.km.) which is about 71.5% of the area of municipality. The remaining area is covered by D class roads, with most of the area being occupied by forest. A built-up area of 7.26 sq.km. is incorporated within this buffer zone of 1200m.

Table 3-7 Buffer distance of A, B, C and SRN intersection with land cover

Buffer distance of A, B, C and SRN intersection with landcover					
S.N.	Time estimated (min)	Distance assumed(m)	Total Land cover (sq.km.)	Buildable area (sq.km.)	Built Up area (sq.km.)
1	0-5	250	39	50.41	6.45
2	5-10	500	59	14.04	0.61
3	10-20	750	72.698	9.47	0.20
Total			**171.698**	**73.92**	**7.26**

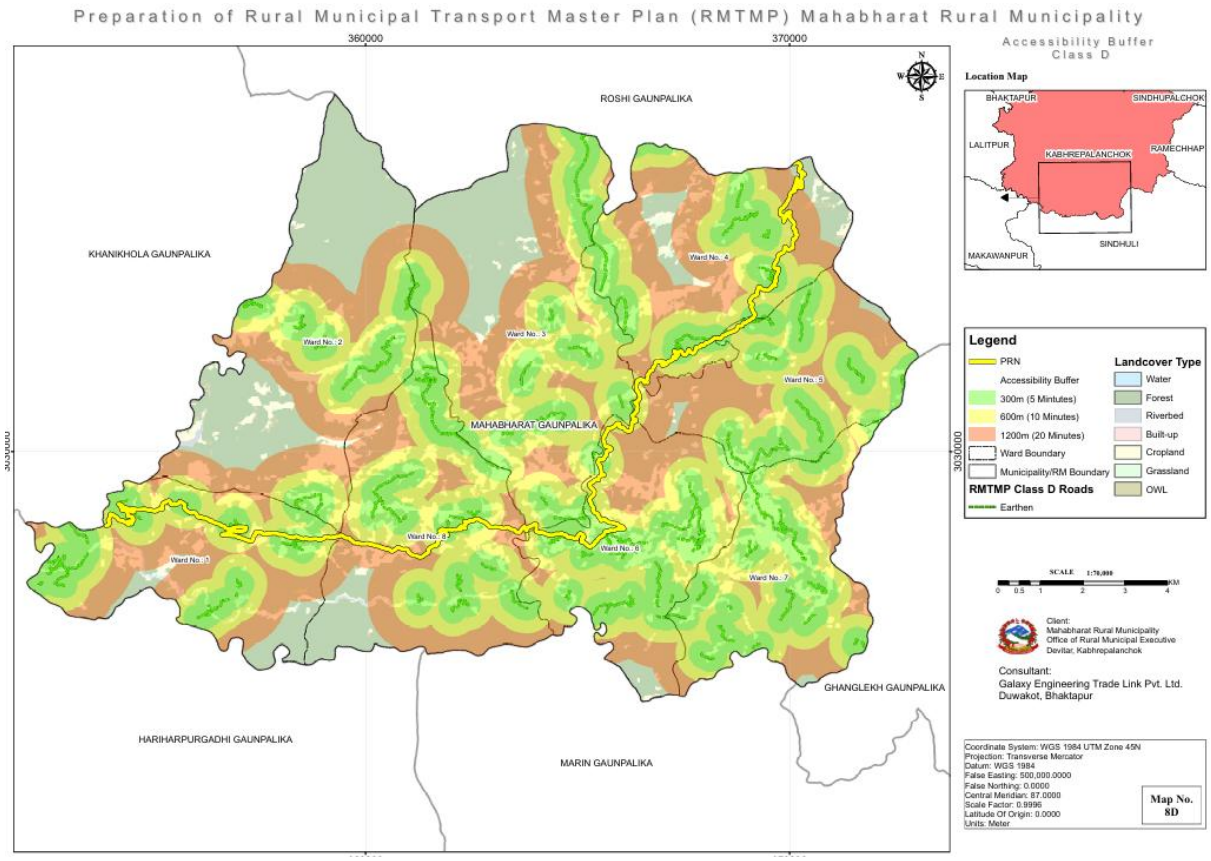


Figure 3-2 Buffer distance of A, B, C

The following tables show further breakdown of coverage area of Road Classes A, B and C individually.

Table 3-8 Buffer distance of A intersection with land cover

Buffer distance of A intersection with land cover					
S.N.	Time estimated (min)	Distance assumed(m)	Total land cover (sq.km.)	Buildable area (sq.km.)	Built Up area (sq.km.)
1	0-5	250	28.47	18.98	2.68
2	5-10	500	54.62	13.49	1.51
3	10-20	750	81.10	13.48	2.05
Total			**164.19**	**45.95**	**6.25**

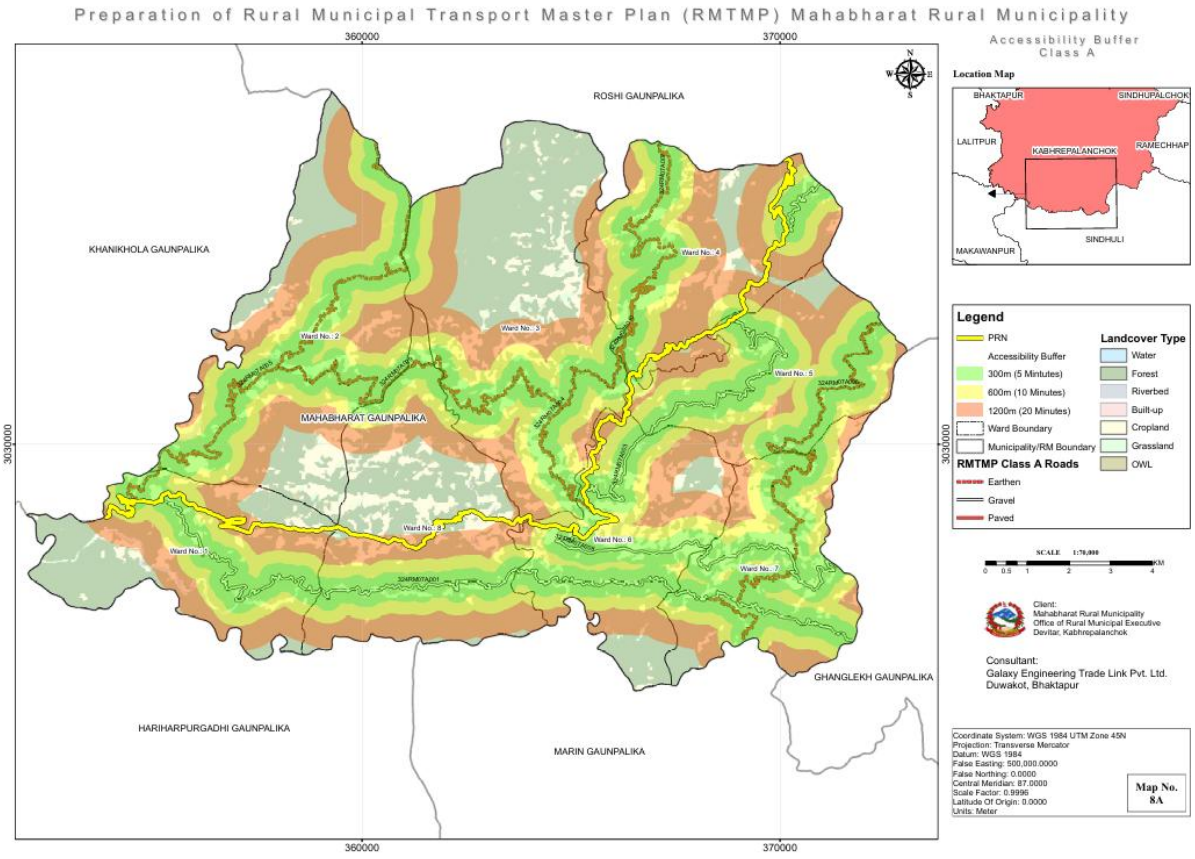


Figure 3-3 Buffer distance of A

Table 3-9 Buffer distance of B intersection with land cover

Buffer distance of B intersection with land cover					
S.N.	Time estimated (min)	Distance assumed(m)	Total Land cover (sq.km.)	Buildable area (sq.km.)	Built Up area (sq.km.)
1	0-5	250	16.90	17.14	2.58
2	5-10	500	34.13	14.04	0.61
3	10-20	750	53.00	12.99	1.83
Total			**104.039**	**44.17**	**5.01**

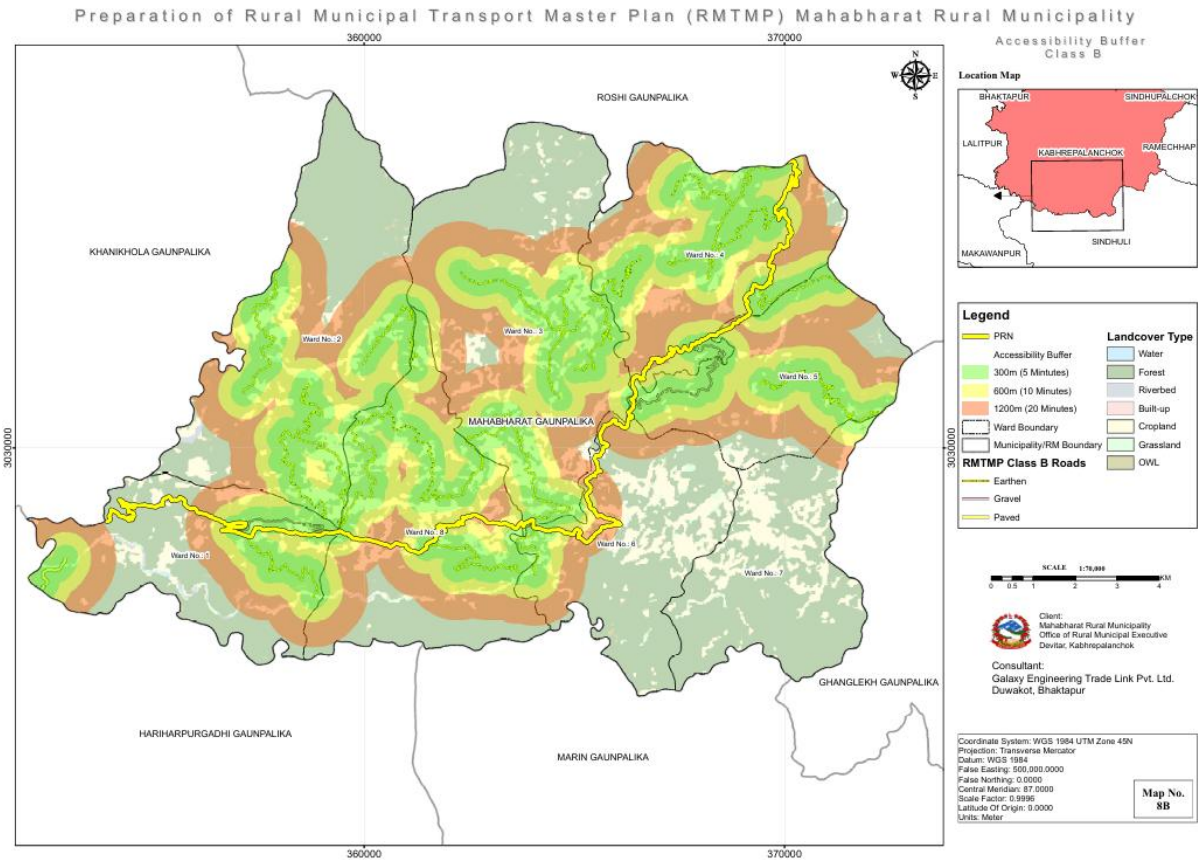


Figure 3-4 Buffer distance of B

Table 3-10 ***Buffer distance of C intersection with land cover***

Buffer distance of C intersection with land cover					
S.N.	Time estimated (min)	Distance assumed(m)	Total land cover (sq.km.)	Buildable area (sq.km.)	Builtup area (sq.km.)
1	0-5	250	25.82	19.99	2.76
2	5-10	500	57.68	15.32	1.60
3	10-20	750	97.56	17.18	1.90
Total			**181.07**	**52.48**	**6.26**

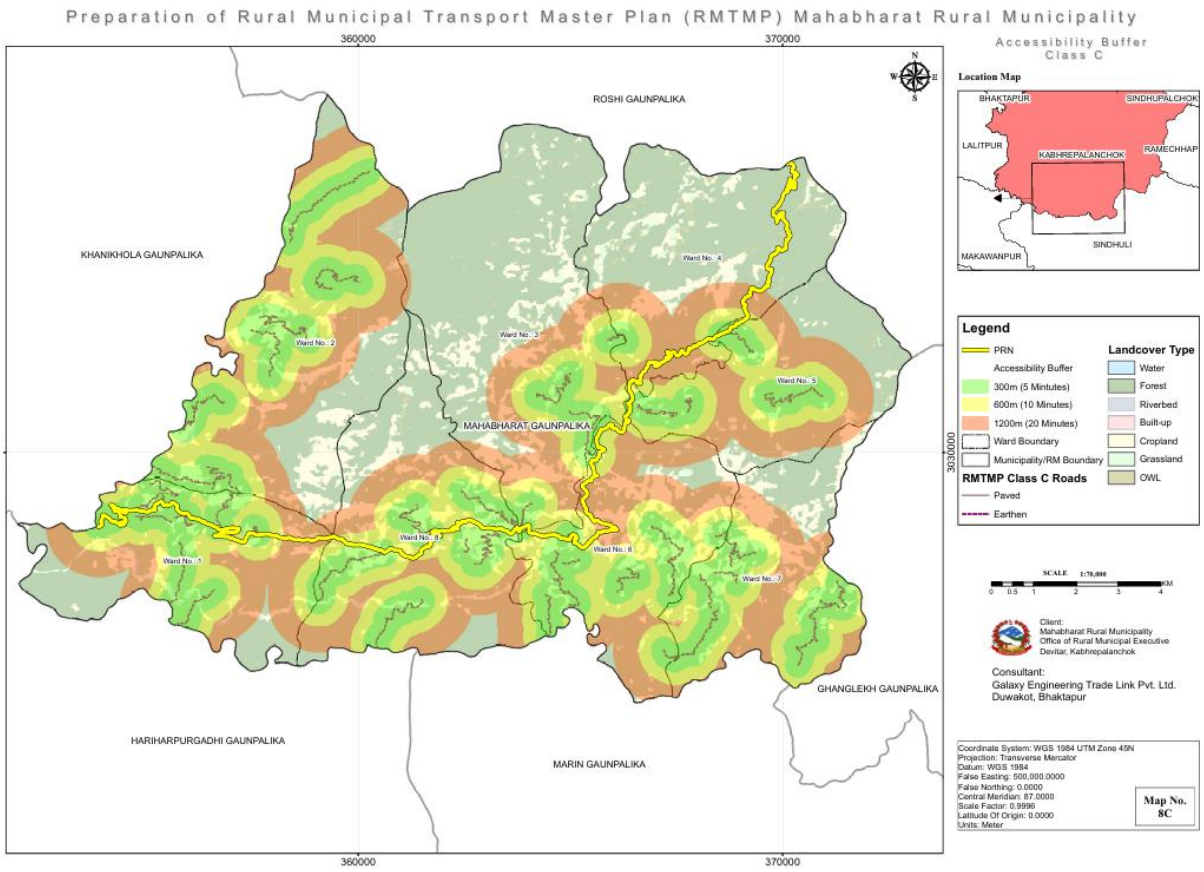


Figure 3-5 Buffer distance of C

3.7 Perspective plan of transportation

Rural Municipality Transport Perspective Plan (RMTPP) is the long-term strategic plan which sets the long-term objective, target and milestone for a focused direction of better coordination, guidance and harmonization of the investment for the prosperity of the municipality and development in the regional context. The RMTMP is prepared for five years with a perspective of twenty years. The RMTPP gives a framework for the period of 20 years; a broad outline on how the transport sector should evolve and look like so that local and regional harmony on accessibility and mobility is achieved.

The long-term perspective plan is segregated into short term plan, medium term plan and long term plan. The perspective plan should be revised every five years with the revision of RMTMP.

3.7.1 Short term

Short term planning elements generally known as transportation system management (TSM) are basically meant for efficient use of existing and proposed infrastructure. Short term plan of RMTMP refers to maintenance and upgrading of the existing road networks to the proposed standards to support the present and future (5 years) transport demand paving the demand for the implementation of medium and long-term plan. If the current road network and/or future road network demands, short term plan also includes construction of new linkages but have a scope over medium term time period.

The short-term plan gives a physical and financial implementation plan to implement the planned road network and services. The interventions are prioritized according to developed prioritization criteria and available annual budget. The applied interventions in the short term plan maintains and generates the demand for higher hierarchy roads with proposed infrastructures. The generated demand justifies the construction of higher hierarchy roads in the medium and long term period to their full extent. During this period, all the class A roads will be upgraded to all-weather condition. All the Class B roads will also be upgraded.

3.7.2 Medium term

Medium term plan is for the time period of ten years - from year one to year ten from the preparation of RMTMP. This period should formulate the necessary policies and strategies for the implementation of the wider road and the road side infrastructures. Based on these policies and strategies, the RMTMP will be periodically updated. As the current policies and regulations do not elaborate on the compensation for road expansion, urban road discipline enforcement, pedestrian friendly infrastructures, environment friendly roads, differently abled and age friendly roads, etc. Such ideas and policies needs to be formulated for better implementation of the long term vision of sustainable transport and sustainable economic growth of Mahabharat Rural Municipality.

This time period will also see development of the Class A and Class B roads to their existing width and clearing of their designated RoW for improved supply of pedestrian and other urban infrastructure along these roads.

3.7.3 Long term

The long term vision of the municipality is to develop all the road network identified by the study to their proposed width and cross-section. With all the necessary policies and strategies developed, the second ten-year period will implement the strategies in developing the roads. The long term plan is focused in developing and achieving long term visions for the overall development of the municipality. The long term plan is focused in providing the transport infrastructure and services to people residing within the designated boundary of the municipality.

Full growth of the planned land uses supported by full growth of the proposed road network will provide safe, efficient and comfortable transport service. Further, the road networks will link the remote settlements particularly in ward 1 and 2 to the service areas and major market centers. The improvement of roads linking with other neighboring local bodies will profoundly help in promoting local economy. Upgradation of several roads passing through the cropland will certainly aide the farmers.

On the other hand, the preserved agricultural land will continue to produce agricultural and small agro-based products to satiate the local demand and exported to local markets outside the municipality. The developed road network will be instrumental in transporting these products to major market centers.

4 RURAL MUNICIPAL TRANSPORT MASTER PLAN

4.1 Financial Institutions for Implementation

Road space is a public space and is also the basic infrastructure that drives the economy of any area or region. Therefore, it is the responsibility of the government to provide the necessary road infrastructure for the uninterrupted and smooth movement goods and people for better economic activities. But the government alone cannot finance or fund the investments as road investments are huge. Therefore, it is necessary to explore other possible financial institutions who can invest in the road infrastructure.

Planning of the investment is essential to support local government in developing good and best practice in construction, upgrading, overall asset management and especially operation and maintenance of the road projects. The most common sources of funding which are investing in the road sectors in Mahabharat Rural Municipality and other cities in Nepal are listed and summarized below:

- Users' participation
- Rural Municipality office
- District and divisional line agencies
- DoR
- Donor agencies, NGO, INGO, etc.
- Town Development Fund (TDF)
- Department of Urban Development and Building Construction (DUDBC)

In recent days, the involvement of the local users (end beneficiaries) of the road projects and interventions have been the driving factor for the construction and maintenance of the road infrastructure. Their involvement helps to create informed and responsible citizens in the community. It also generates a sense of ownership and thus promote preservation and proper use of the infrastructure and the facilities. Such involvement is essential to construct and maintain the local roads if not higher hierarchy roads. People's participation can be ensured through different methods – direct investment, free labor, maintenance, tree plantation, cleanliness, etc.

Rural Municipality has the major role in developing the overall infrastructure within the municipal boundary. It is the local government responsible of preparing the necessary framework

and implementing policies and strategies for the planned and sustainable development of the necessary infrastructures and facilities. As road infrastructure supports other infrastructure and facilities, the role of municipality in the development and maintenance of the road infrastructure is further pronounced. A major share of the municipal budget should be allocated to maintain the roads and construction of wider roads to meet the planned class and ROW. The annual program should address the local need and the need of emergency and specific maintenance. Specific roads should be constructed as a whole and not in parts for longer period of time.

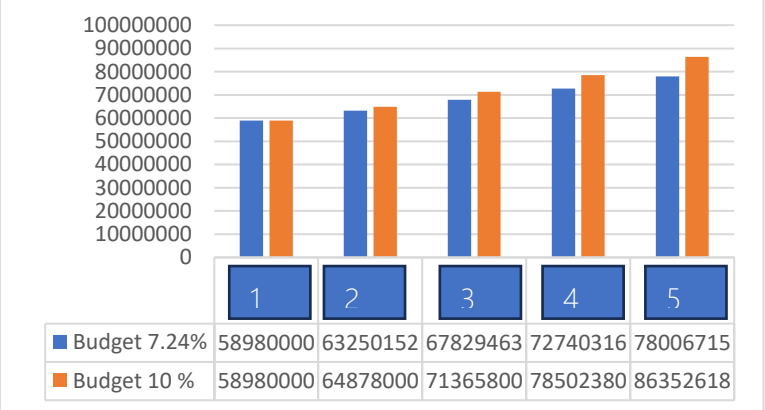
Other institutions and line agencies working in the field of development of local and regional roads also play important role in the development of the municipal roads. Normally, these institutions invest in the roads that are important in a regional context, rather than local small area context. DDC and DoR are such institutions. DDC are responsible for most of the DRCN roads and few local roads as well. DoR also invests in agricultural and other local roads.

Town Development Fund (TDF), Department of Urban Development, Building Construction (DUDBC) and Infrastructure Development Office (IDO) are governmental funding agencies which contributes to the development of emerging town and cities. They can be a major source of fund for major urban road projects in Mahabharat Rural Municipality.

Like the line agencies, there are many donors funded projects run by NGOs and INGOs in the sector of road and other infrastructure development. The development of wider roads of higher hierarchy required greater amount of investment and, technical and administrative capacity which may be lacking with the local body and institutions. Such projects are implemented through donor funded projects. SNRTP, RAP, etc. are examples of such projects. They can be important sources of investment for major roads of the municipality.

4.2 Five Year Budget Estimation

The unclear historical data of the municipality budget allocation and expenditure is available only makes it impossible to forecast the budget and investment in the transport sector in the future. Therefore, a basic assumption has been done to forecast possible future investment in the transport sector. The projection in based on the necessary budget for the first year, assumed to increase by 10% every consecutive year whereas it is seen that yearly budget is increasing by 7.24% every consecutive year. The yearly value of the investment is shown in the adjoining figure.



	1	2	3	4	5
Budget 7.24%	58980000	63250152	67829463	72740316	78006715
Budget 10 %	58980000	64878000	71365800	78502380	86352618

Figure 4-1 Forecasted budget of municipal investment on road sector for five years

The budget required to develop the roads of the municipality based on the visionary city development plan and perspective plan of transport infrastructures dictates higher investments. The budget forecast assumes the existing trend in investment in the absence of a comprehensive transport development plan. With the plan, the investment is taken to increase. As elaborated in the previous sub-heading there are many possible sources of such funds and investments. Based on the perspective plan, the total budget to be invested from Mahabharat Rural Municipality within 5 years is NRs. 360,500,000. Of this, 216,300,000 is for maintenance and the

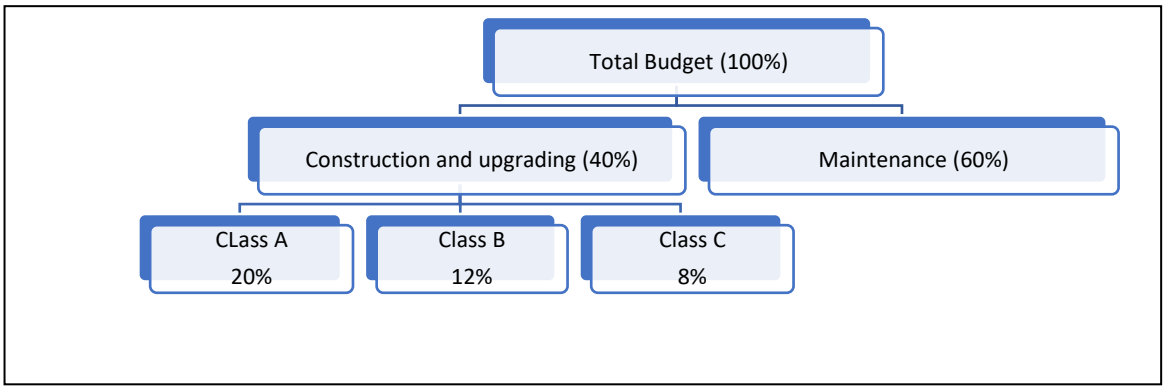


Figure 4-2 Budget allocation for different intervention and class of road

remaining for upgrading and construction of roads. The remaining budget is to be funded from central and provincial government. The budget is allocated to different class of roads as shown in the given figure.

The budget of the rural municipality is divided into two parts, with 60% allocated for maintenance and 40% for construction. Within the construction budget, 20% is designated for class A roads, 12% for class B roads, and 8% for class C roads. However, due to the higher cost per kilometer for construction of class A and B roads, it is advisable for the rural municipality to primarily invest its budget into maintenance activities. As such, funding for road construction should be sought from the central and provincial government and class C roads can be constructed with the budget of the rural municipality.

For the first five year of investment, 3 of class A roads, 3 of class B roads and 2 of class C roads have been prioritized to undergo intervention to reach the target proposed in the perspective plan of the municipality. The detailed intervention has been provided in the table below. However, the municipality consists of full authority in case there is a need to modify the proposed sequence of development contained within the five years. The following table shows the expenditure in different roads in different years in the municipality. The table only specifies the A, B and C class roads. A and B class roads requires fund raises from central and provincial government due to insufficient budget of the rural municipality. The D class roads expenditure is raised from the associated people's participation.

5 RECOMMENDATION

The preparation of Municipality Transport Master Plan is a milestone step towards planned investment in the transport sector. Management of transport infrastructures and traffic services depends on the long term policies and their implementation. Continuous preparation and updating of plans is necessary to incorporate the changing demand and environment within the plans. The basic strategic framework for such practice and staging of implementation plan are described below.

5.1 Strategic Framework

5.1.1 Hierarchy of Settlement and Market

A hierarchy of settlement and market should be developed to segregate the commercial and business centers from settlement areas and industrial area. Land use plan is necessary for this purpose. Promotion of bi-nuclear or multi-nuclear city is necessary for even development of the settlements within the municipality.. Such agglomeration supports economic growth as well as brings many services and facilities closer to the demand and reduce the need to travel to the main market center. Co-operation with the nearby markets from other bordering municipalities and rural municipalities could also help the residents in taking the services for which connectivity is vital.

5.1.2 Hierarchy of Roads

A well-planned network of road hierarchy provides robust road network supporting required accessibility and mobility. In any urban area, provision of well-formed road hierarchy of roads at proper spacing helps to reduce traffic congestion and reduce overall impact of traffic on the land use and at the same time guide the planned change of the land use. Allocation of hierarchy to the network of roads is necessary also to define their purpose and function which ultimately determines their cross-section and design parameters.

According to the Nepal Road Standard (2070), major frontages roads that opens to a Highway or feeder road should have a spacing of at least 750 m. The SRN are higher hierarchy roads with regional/national importance. The major municipal roads that open to these roads should be spaced according to the NRS. The space within the roads should have direct access control for safety and efficient use of the SRN. Such spacing may not be ideally possible in case of hilly terrain.

The proposed hierarchy of road network provides a robust road for mobility through interconnected Class A and Class B roads. Serving a settlement of about 500 m on either side of

the road, their network generally forms a grid of about 1 to 2 sq. km depending upon the urban sprawl. The development of road sector should consider this fact and should be aligned to attain the designated width with necessary infrastructure for all sort of users.

5.1.3 Segregation

The roads that passes through the municipality should be segregated in terms of their function and thus their use. Highways and higher hierarchy roads are meant for greater mobility with high volume and thorough traffic. Direct property access through these roads will result in reduced mobility, unsafe road environment and may also result in temporary breakdowns. Thus, according to the purpose and use of the roads, they should be segregated and operated accordingly.

Further, within road cross-section it is necessary to segregate different road users for safety and efficiency. Urban roads are used by all sorts of users including pedestrians, cyclists, motorists, private and public buses, differently abled and elderly people. Their volume, speed and necessity of road furniture varies significantly. Thus, it is necessary to address the need of all the users. Depending upon their speed, the allocated road space should be segregated for safety. For, example the cyclists should be segregated from motorized vehicles and from the pedestrians as well. Provision narrow greed belt provides necessary segregation as well as provide a green landscape along the urban road environment.

5.1.4 Principle Guidelines of Road Planning

The comprehensive city development plan along with other development plans such as land use plan, drainage plan, tourism development plan, etc. are the principle guideline for road planning. The land use plan is the most significant plan as the provision of road corridor defines the land use change along that corridor and at the same time, the land use demands necessary road infrastructure. The population growth rate of Mahabharat Rural Municipality is average rate. As the population increases, the settlements grow both horizontally and vertically. Horizontal expansion increases the built up area while vertical expansion increases the population density. The wide expanded settlements require longer length of roads, while higher density settlements require better and efficient transport services. Increase in built up area demands bigger network of local and collector roads which ultimately demands wider roads of higher hierarchy.

5.1.5 Introduction of Basic Road-side Infrastructures

The perception of local people about “road space” is normally that, roads are constructed for the motorized vehicles. While the pedestrians, who are the major road users are often left out; the road space for motorized vehicles makes it unsafe to use by the other users. Such perception bolstered by the lack of basic road-side infrastructures provided for these users has exacerbated the situation of road safety. It has also fueled the motorization process. Similarly, as the urban environment management act dictates that facilities should be vulnerable people friendly – elderly people and friendly and differently abled people, as they are also a part of the society and should have access to mobility.

Thus, for creating the urban environment sustainable and liveable, it is necessary to provide basic road side infrastructure that supports all sort of users and ensures their safety.

5.1.6 Public transport

Public transport provides access to all the citizens at an equitable cost. The public transport network coverage is limited in Mahabharat Rural Municipality. However, the headway of bus services is two bus per day, in different times which is not convenient from passengers' perspective. Although private jeep services are trying to fill the void created by unavailability of public transport, travelling in these vehicles to the far ends of the municipality becomes costly.

Poor road maintenance and seemingly low passenger volume has restricted public transport services in other roads. Well-maintained roads and new routes to increase the coverage provided by public transport network is must to provide basic access to mobility so that the people are exposed to wider opportunities and economic activity.

The roads of class A, B and Highway make an interconnected road network that supports large buses for public transport service. This provides a basic guidance for the development of public transport routes and its service throughout the municipality.

5.1.7 Green Belt

Green belt is an important road infrastructure which not only provides green space along the wide paved roads but also provides landscaping options for the road corridor. It makes the road environment more user friendly. With rapid urbanization and increased built up area, green belt along the roads contribute to greenery in the city.

Apart from providing greenery to the urban road environment, the green belt also provides open space for excess rain water percolation contributing to ground water recharge and reduce the pressure on storm water drainage system. It also acts as median to segregate speeding vehicles moving in opposite direction and/or vehicles moving in the same direction at different speeds. Thus, green belts are an integral part of the urban roads. It is obvious that the greenery adds fresh air to the urban environment at the expense of carbon dioxide produced from other human activity. The well grown green belt also acts as screen for blocking the negative effects of the road environment such as noise, pollution and lights (during night) produced from the motor vehicles on the road.

5.1.8 Development Phases of Road

A brief possible phase of development of the road cross-section has been shown, but the actual development phase will depend on the existing scenario of land use and available space throughout the road section. This makes it to be treated separately for individual roads and cannot be generalized. But, the general idea is that the available open space should be first demarked. The drainage system and water supply pipes should be laid. Then, where possible construction should be started from the outer edges. Construction should start with construction of a lane each for motorized vehicles, pedestrian way and cycle tracks (where applicable). Construction at the center initially may result in wastage as the center part will be replaced by a median strip after full development of the road section. Thus, site/road specific road development phases should be formulated and implemented accordingly.

5.1.9 Intersection Design

The intersections are one of the major determinants of the efficiency of the road network. Improperly designed intersections can result in congestion and break down of vehicular flow. Such design should be considered at the intersection of Class A and Class B roads with each other and with the SRN. An extra width should be provided at the intersections for better sighting of vehicles in the adjoining leg of the intersection. Similarly, proper channelization for efficient flow of traffic in different direction along with possible application of traffic lights should also be considered during the intersection design.

Intersections are spots in the road network which is most prone to accidents as there are multiple conflict points. The islands and, road markings and signage should be properly installed for most efficient communication and safe passage through the intersection.

5.1.10 Road Safety Audit

Road safety audit is an important aspect to be considered while constructing a road. Safety audit can be at different stages i.e. inception, design, pre-opening, post-construction and existing road. Care should be taken that the provided infrastructure does not conflict the interest of the users and provides safe usage for all users. Although, maximum benefit of the safety check is obtained if the audit is done during the design phase, this cannot be done as all the roads in the municipality are existing roads. To support local innovative solutions, the municipal technical section should be equipped with proper tools and methods to conduct the safety audit of the local roads and develop local low cost solutions to mitigate or reduce the risk level.

5.1.11 Vehicle Parking

Inhabitants of Mahabharat Rural Municipality are predominantly farmers, and most people own two wheelers and very few own 4-wheeler vehicles. Although the problem of parking is not significant now, it is likely that proper parking might be needed in the future.

Provision of good quality public transportation integrated with environment friendly means such as bicycle and walking can eliminate the necessity of use of private modes. Policies to support such intervention in the future should be developed. At the moment, two wheelers parking in commercial areas, institutional buildings, and market places if available could facilitate the users.

5.1.12 Urban Road Discipline

The proper and efficient functioning and safety of the road space depends primarily on the road and road side environment conditions and user behavior. User behavior is one of the major pillar in determining the safe road use. One cannot immediately enforce the urban road discipline. The culture of road discipline and road safety needs to be gradually developed. There are no pedestrian ways and zebra-crossings and the movement of the people is random. Such habits lead to crash and temporary road congestions. Therefore, enforcement of the road discipline should also be gradually done for safer and vibrant streets. Proper use of road markings, signs and signals assists in enforcing different road disciplines.

5.1.13 Integrated Service Planning

Transport is one of the many services that allows urban area to exist. Without its integration with other urban services such as water supply and drainage, electricity and telecommunication, etc. the overall cost of construction, operation and maintenance of all the service infrastructures will be very much higher. The infrastructures for these services runs alongside the roads. Location of other services such as service utility outlets, educational institutions, etc. also affects the provision of road side infrastructures. All these services should be integrated in planning, operation and maintenance so that the loss or investment can be minimized. Integration should be done among the electricity authority, cable provider, drinking water pipelines, drainage, telecommunication, etc.

5.1.14 Grass Root Institutions

The RMTMP envisions the investment of huge capital, formulation of policies for national and local government, and implementation and enforcement of better rules and regulations. These are to be implemented, supervised and enforced by the local government. With the current capacity of local institutions and the municipality, the required performance cannot be met. Thus, it is necessary to empower the local grass root institutions with time for capacity building and development of local bodies. It includes the capacity building of the municipality (planning, technical, and administration), local technicians, consumers' groups, ward level and municipal level committees and others. Further planning of land use, drainage, building by laws, etc. will require better management and technically sound team of skilled staffs to advocate and inform the locals of the prepared plans and their implementation.

5.1.15 Use of Strategic Road Networks

The strategic road network (SRN) roads are centrally constructed and maintained. As the major backbone for movement for the whole country, their infrastructure requirement is completely different from that of local/municipal roads. These roads only support long distance movement with higher traffic volume, load and speed. But, the unchecked ribbon development along these roads have allowed urbanization along the roads making those sections of the SRN a major part of the local urban road network. As the major market area are developed alongside these roads, high volume of pedestrians uses the road for making local short trips.

Hence, even though the SRN have a separate purpose and controlling authority, their use by the local commuters have made them local roads. Therefore, necessary urban infrastructures such as pedestrian way, cycle tracks, pedestrian crossings, etc. should be constructed along the urban sections to ensure safety, efficiency and smooth operation of traffic. Different road standards and guidelines shows that the urban road network consists of arterial roads/ expressways. With the existing built-up environment, provision of new roads or extension of existing roads to such RoW is very challenging. The existing highways can be developed as the urban expressways. The East-West Highway that passes through the municipality supports large number of long distance trips. It is also the most used road for local trips within the municipality. As such, large number of cyclist and pedestrians use the road. But the limited built-up width presents safety issues for such vulnerable users.

5.2 Staging Implementation Plan

5.2.1 Mid Period Review

The RMTMP alone cannot be a complete document for the overall development of the services and facilities in the municipality. The RMTMP has been prepared with certain framework of development of other infrastructures and services. The plans to develop and implement such infrastructure and services should be integrated with RMTMP. It is a general practice to develop such plans in isolation or little consideration of the plans already prepared. Thus, it is necessary to conduct a mid-period review to check the implementation and development made since the implementation of the plan and the corresponding deviations. The review can be used to integrate the land use plan, RMTMP and other regional/municipal plans prepared during that period. Further, the surveys conducted during the preparation of RMTMP are baseline survey for future planning. In reference to the database, the mid-period review can track the changes in the formulated five-year plan. This will help to strengthen the RMTMP and support further investments.

The next RMTMP will be prepared in the sixth year which will create a void in continuity of TMP during that year. The mid-period review can prepare the implementation plan for that year which will be carried over the next RMTMP.

The transportation master plan is a living document accommodating changes from other planning efforts. This intention of the City of Boulders help integrate small research findings and planning efforts which makes the master plan a better plan. Such integration may not be possible in context of Mahabharat Rural Municipality, but periodic integration can be done to make the plans more effective and realistic in every aspect possible.

5.2.2 Yearly Maintenance Plan

The RMTMP is mainly focused on the construction and upgrading of the existing roads. Although budgets for yearly maintenance plan has been estimated, the investment in specific roads cannot be exactly predicted. So, a maintenance plan should be prepared yearly based on the status of the roads and their maintenance requirements. The maintenance plan should address the recurrent maintenance, specific maintenance and emergency maintenance requirements of the municipal roads.

5.2.3 Stages of Development of Roads

Visualization of different stages of development of municipal roads is one of the important aspects of long term plan. As the current built up and land use do not allow immediate implementation of wide roads, their development should be determined in different stages. The phases will depend on the existing road RoW available, extent of build-up and other land use environmental constraints, etc. So different phases will have to be developed for different road sections.

The roads of Class D and some of Class C which already have the proposed RoW available can be fully developed to the proposed road sections. But, for wider roads, implementation of the proposed cross section may not be as easy. The prime stage for development of such roads is the formulation of policies and plans. This stage formulates the hierarchy and their geometric and

physical characteristics depending upon their purpose/function. The next task is to enforce the prepared plans and hierarchy through bylaws. With proper policies and plans at hand, the clearing of the required RoW can be done. This should be done through strong land acquisition and compensation, method, and stages of construction of roads and road side infrastructures plans and policies. Development of such policies will support continuous development of the roads. After the required RoW are cleared, the full extent construction can be done. The roads can be gradually developed in stages with the clearing of the required RoW.

A general stage of development can be visualized as – the higher hierarchy roads will be gradually upgraded from the lower hierarchy infrastructure to higher hierarchy infrastructure as the road space and funding is available. That is, Class A roads will first be developed to the width of Class D roads, then to Class C, followed by Class B and finally into Class A. The development phases will also be guided by the increase in demand and necessity of the road side infrastructures.

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Glossary

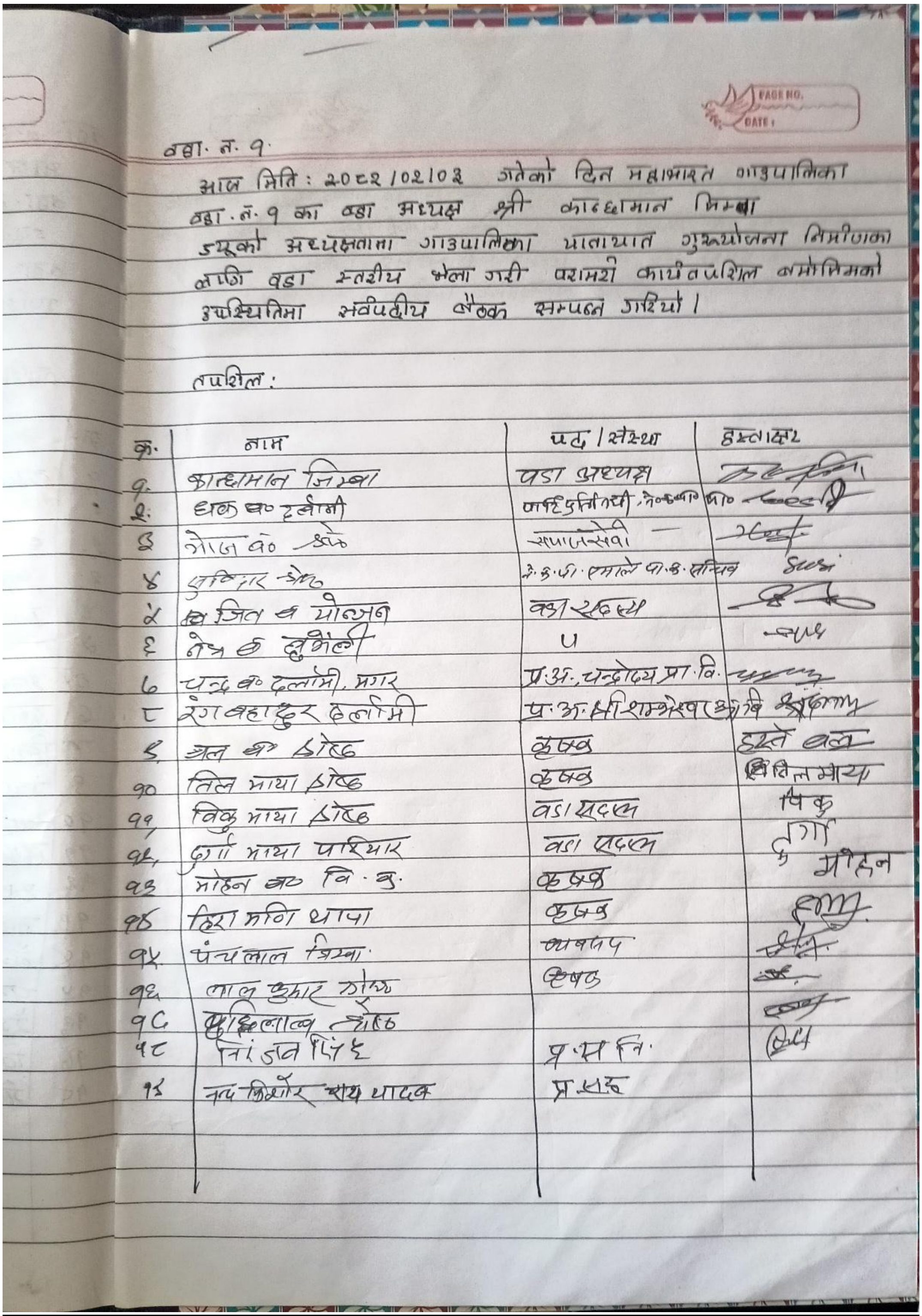
Active transport user	Active transport (also called non-motorized transport, NMT and human powered transport) refers to walking, cycling, and variants such as wheelchair, scooter and handcart use. It includes both utilitarian and recreational travel activity, plus stationary uses of pedestrian environments such as standing on sidewalks and sitting at bus stops
Base map	A map depicting background reference information such as landforms, roads, landmarks, and political boundaries, onto which other thematic information is placed. A base map is used for locational reference and often includes a geodetic control network as part of its structure. (source: support.esri.com) Google earth has been used to digitize the base map used for the study.
Capacity	The maximum number of vehicles that can pass over a given section of a lane or roadway in one direction (or in both directions for a two-lane or three-lane highway) during conditions.
Collector road	Collector roads provide both access and movement within residential, commercial and industrial areas. They are typically discontinuous between residential areas, so as to avoid traffic infiltration through neighbourhoods. Lower density developments and community land uses such as schools and convenience retail are often located on collector streets.
Emergency maintenance	Maintenance works that are to be carried out due to unexpected and sudden blockage of roads that stop vehicular movement due to natural disaster
Forecasting	The process of determining the future values of land use, socioeconomic, and trip making variables within the study area.
Inventory	A complete list of items including its descriptions, statements and characteristics.
Local road	Local roads provide direct property access in residential, industrial, commercial and downtown areas. With local streets connecting primarily to collector roads, travel distances are short, speeds are relatively low and volumes are modest, as their primary function of accommodating traffic from adjacent lands.
Maintenance	The process of preserving the original condition or function of an asset
RMTMP	The RMTMP is a strategic planning document designed to identify and address the municipality's needs to the year 2020 and beyond. The RMTMP is the document that identify, classify and prioritize the municipal roads; identify possible sources of funds and materials for the construction of the prioritized roads

	according to their respective standards and scientific mobilization of the available resource.
Network	Set of nodes and connecting links that represent transportation facilities in an area.
New construction	The work of building
Origin	The location of the beginning of a trip or the zone in which a trip begins.
Periodic maintenance	Maintenance works to be carried out in intervals of years and of large-scale
Recurrent maintenance	Small maintenance works not falling under routine maintenance that are carried out a few times a year in all roads to repair minor damage resulting from traffic and rainfall
Road hierarchy	An arrangement or classification of roads according to their relative importance, function and characteristic in the road network
Routine maintenance	Small maintenance works that are to be carried out in all the seasons on all roads on a regular basis
Specific maintenance	Spot treatments and repairs that do not occur every year or in every road, and which are very specific in nature and location.
Travel time budget	A steady daily travel time that people make made available for daily movement.
Trip	A one-direction movement which begins at the origin at the start time, ends at the destination at the arrival time, and is conducted for a specific purpose.
Trip rate	Number of traffic/people moving in and out of a development or within a development area. It is generally expressed in terms of number of trips per capita or per 100 m^2 gross floor area.
Upgrading	The process of addition or change that makes something better than it was before
Usable area	The area that can be used for human construction. It includes cultivated and built up area. Environment sensitive area and barren lands are not usable area.

Annex

<u>वैशाख २६,२०८२ का दिन गाउँ स्तरिय अभिमुखीकरण कार्यक्रमको भेला</u>

जेष्ठ ०३,२०८२ का दिन गाउँपालिका यातायात गुरुयोजनाका लागि वडा स्तरीय भेला, वडा १



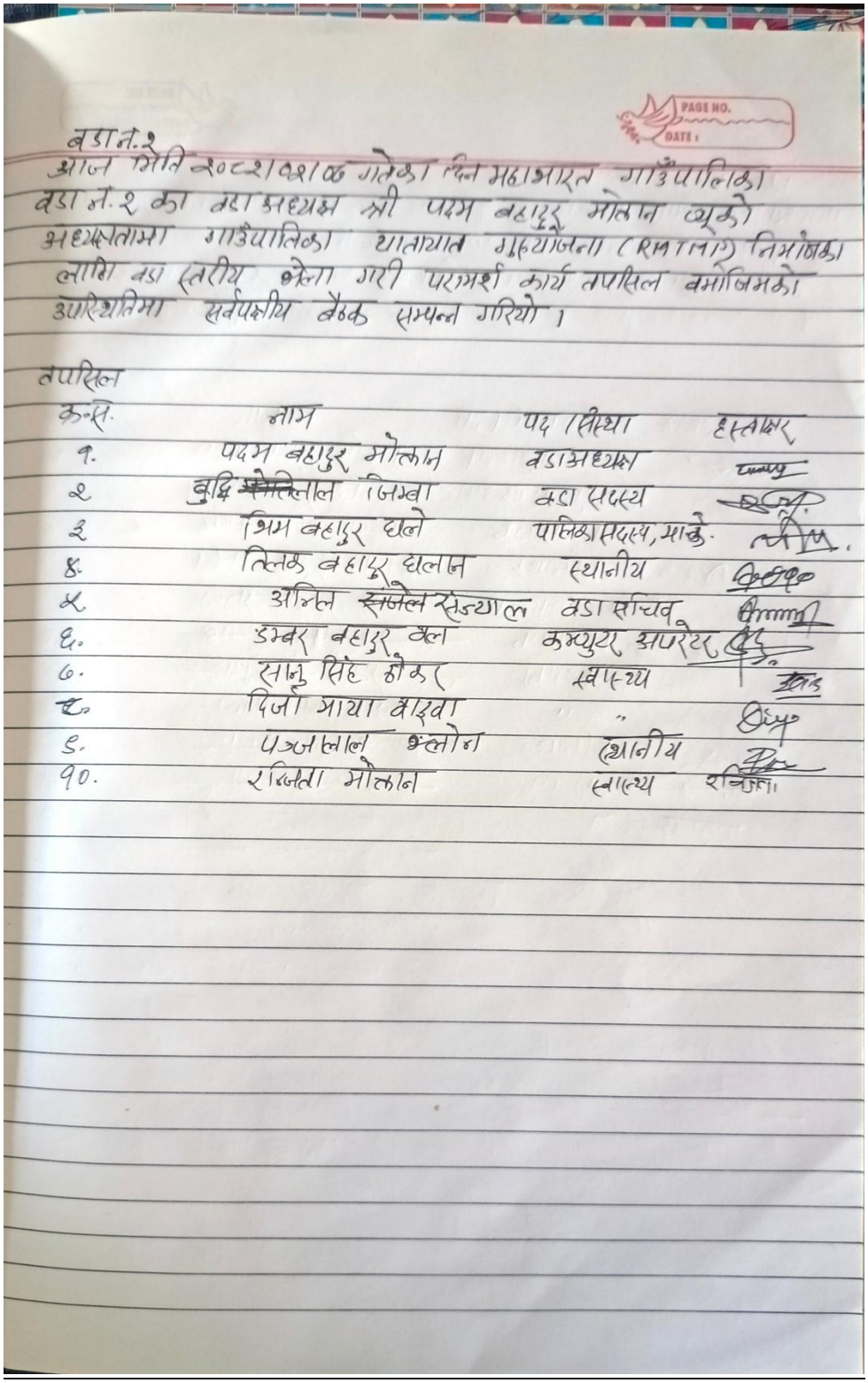
वडा. नं. १

आज मिति : २०८२/०२/०३ गतेको दिन महाभारत गाउपालिका वडा.नं. १ का वडा अध्यक्ष श्री कान्छामान जिम्बा ज्यूको अध्यक्षतामा गाउपालिका यातायात गुरूयोजना निर्माणका लागि वडा स्तरीय भेला गरी परामर्श कार्यतपशिल बमोजिमको उपस्थितिमा सर्वपक्षीय बैठक सम्पन्न गरियो।

तपशिल :

क्र.	नाम	पद/संस्था	हस्ताक्षर
१.	कान्छामान जिम्बा	वडा अध्यक्ष	[illegible]
२.	धन ब० दुर्लामी	पार्टी प्रतिनिधी, नेकपा माओ	[illegible]
३	मोज ब० श्रेष्ठ	समाजसेवी	[illegible]
४	सुविनार श्रेष्ठ	ने.क.पा. एमाले पा.क. सचिव	[illegible]
५	जित ब योञ्जन	वडा सदस्य	[illegible]
६	नेत्र ब दुमिजी	"	[illegible]
७	चन्द्र ब० दर्लामी, मगर	प्र.अ. चन्द्रोदय प्रा.वि.	[illegible]
८	रंग बहादुर दर्लामी	प्र.अ. श्री शम्भेश्वर आ.वि.	[illegible]
९	बल ब० श्रेष्ठ	कृषक	हस्ते बल
१०	तिल माया श्रेष्ठ	कृषक	तिल माया
११	पिकु माया श्रेष्ठ	वडा सदस्य	पिकु
१२	दुर्गा माया परियार	वडा सदस्य	दुर्गा
१३	मोहन ब० वि.क.	कृषक	मोहन
१४	हिरा मणि थापा	कृषक	[illegible]
१५	पंचलाल जिम्बा	व्यवसाय	[illegible]
१६	लाल कुमार श्रेष्ठ	कृषक	[illegible]
१७	बुद्धिलाल श्रेष्ठ		[illegible]
१८	निरंजन सिंह	प्र.स.नि.	[illegible]
१९	नन्द किशोर राय यादव	प्र.स.ह.	

जेष्ठ ०७,२०८२ का दिन गाउँपालिका यातायात गुरुयोजनाका लागि वडा स्तरीय भेला, वडा २

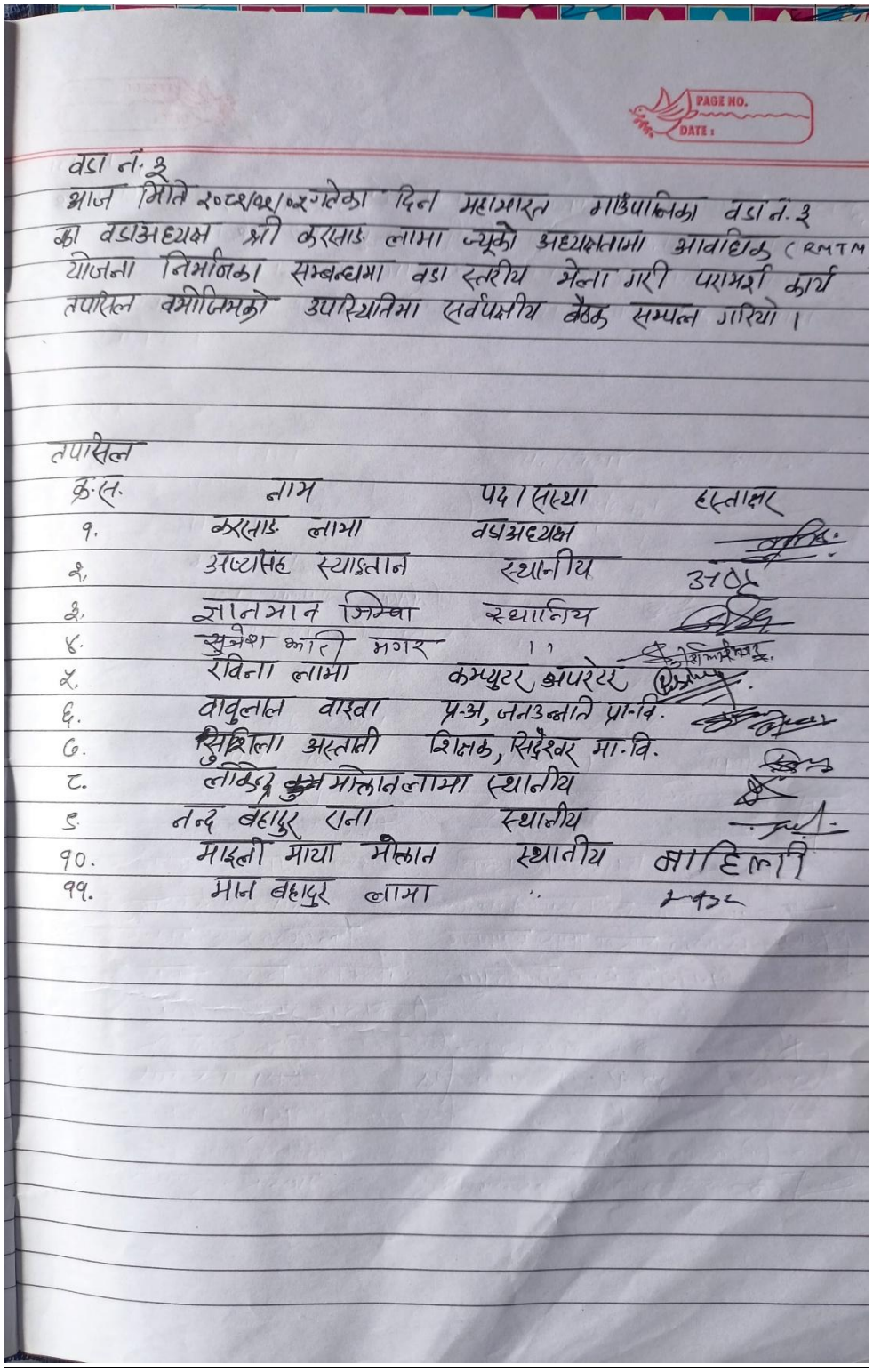


वडा नं.२
आज मिति २०८२।०२।०७ गतेका दिन महाभारत गाउँपालिका वडा नं.२ का वडा अध्यक्ष श्री पदम बहादुर मोल्लान ज्यूको अध्यक्षतामा गाउँपालिका यातायात गुरुयोजना (RMTMP) निर्माणका लागि वडा स्तरीय भेला गरी परामर्श कार्य तपसिल बमोजिमको उपस्थितिमा सर्वपक्षीय बैठक सम्पन्न गरियो ।

तपसिल

क्र.सं.	नाम	पद / संस्था	हस्ताक्षर
१.	पदम बहादुर मोल्लान	वडा अध्यक्ष	
२	बुद्धि ~~मोल्लालाल~~ जिम्वा	वडा सदस्य	
३	भिम बहादुर घले	पालिका सदस्य, साबे.	
४.	तिलक बहादुर घलान	स्थानीय	
५	अनिल ~~सुमेल~~ सेड्याल	वडा सचिव	
६.	डम्बर बहादुर बल	कम्प्युटर अपरेटर	
७.	सानु सिंह होमर	स्वास्थ्य	
८.	दिजो माया बाइवा	"	
९.	पञ्जलाल ~~श्लोन~~	स्थानीय	
१०.	रजिता मोल्लान	स्वास्थ्य	रजिता

जेष्ठ ०५,२०८२ का दिन गाउँपालिका यातायात गुरुयोजनाका लागि वडा स्तरीय भेला, वडा ३

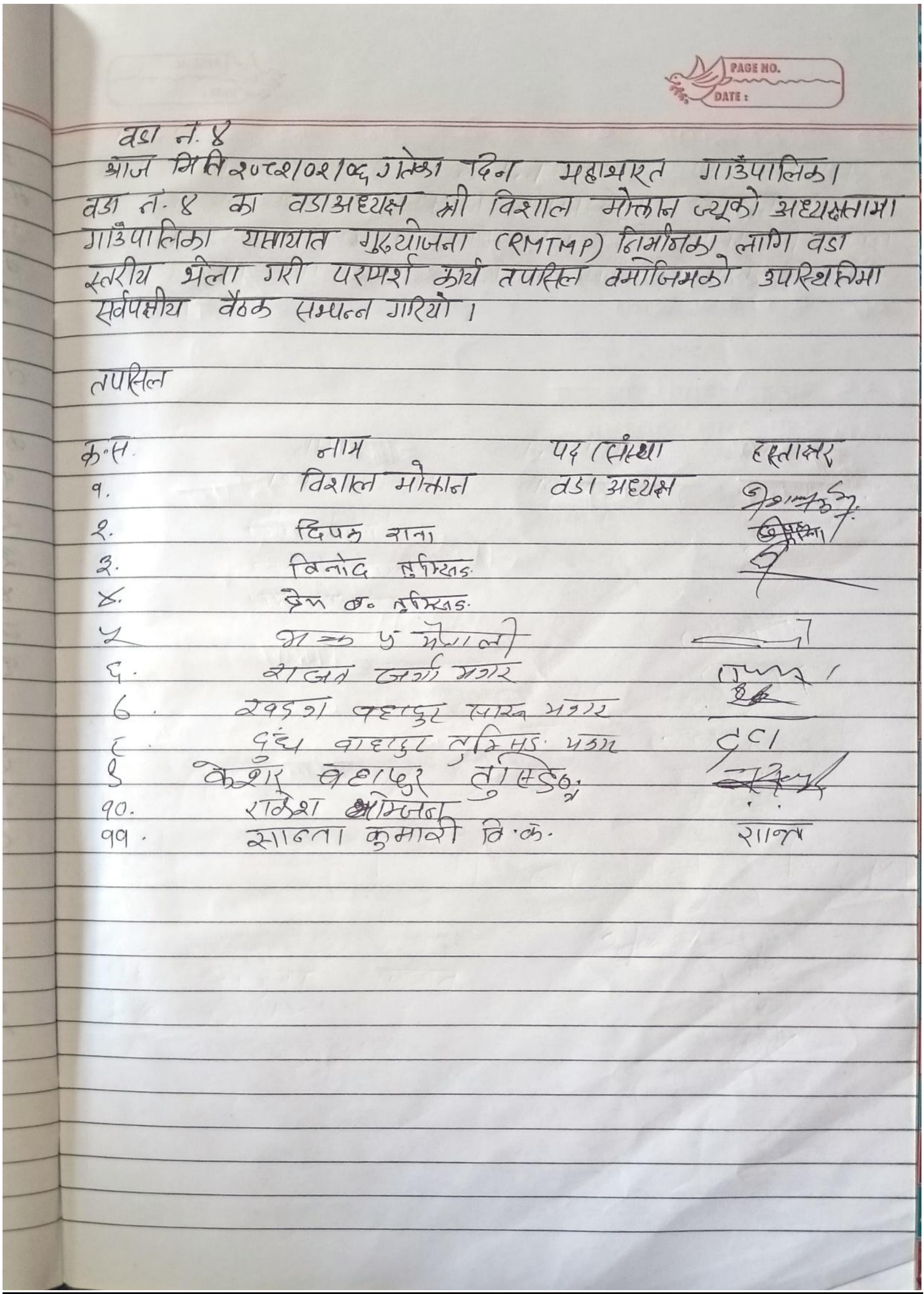


वडा नं. ४
आज मिति २०८२/०२/०६ गतेका दिन महाभारत गाउँपालिका वडा नं. ४ का वडाअध्यक्ष श्री करनाङ लामा ज्यूको अध्यक्षतामा आवधिक (RMTM योजना निर्माणका सम्बन्धमा वडा स्तरीय भेला गरी परामर्श कार्य तपसिल बमोजिमको उपस्थितिमा सर्वपक्षीय बैठक सम्पन्न गरियो ।

तपसिल

क्र.स.	नाम	पद/संस्था	हस्ताक्षर
१.	करनाङ लामा	वडाअध्यक्ष	
२.	अप्पासिंह स्याङतान	स्थानीय	
३.	ज्ञानमान जिम्बा	स्थानीय	
४.	सुनेश क्षेत्री मगर	।।	
५.	रविना लामा	कम्प्युटर अपरेटर	
६.	बाबुलाल वाइवा	प्र.अ, जनजाति प्रा.वि.	
७.	सुशिला अस्तली	शिक्षक, सिद्धेश्वर मा.वि.	
८.	लोकेन्द्र मोक्तान लामा	स्थानीय	
९.	नन्द बहादुर राना	स्थानीय	
१०.	माइली माया मोक्तान	स्थानीय	
११.	मान बहादुर लामा		

जेष्ठ ०६,२०८२ का दिन गाउँपालिका यातायात गुरुयोजनाका लागि वडा स्तरीय भेला, वडा ४



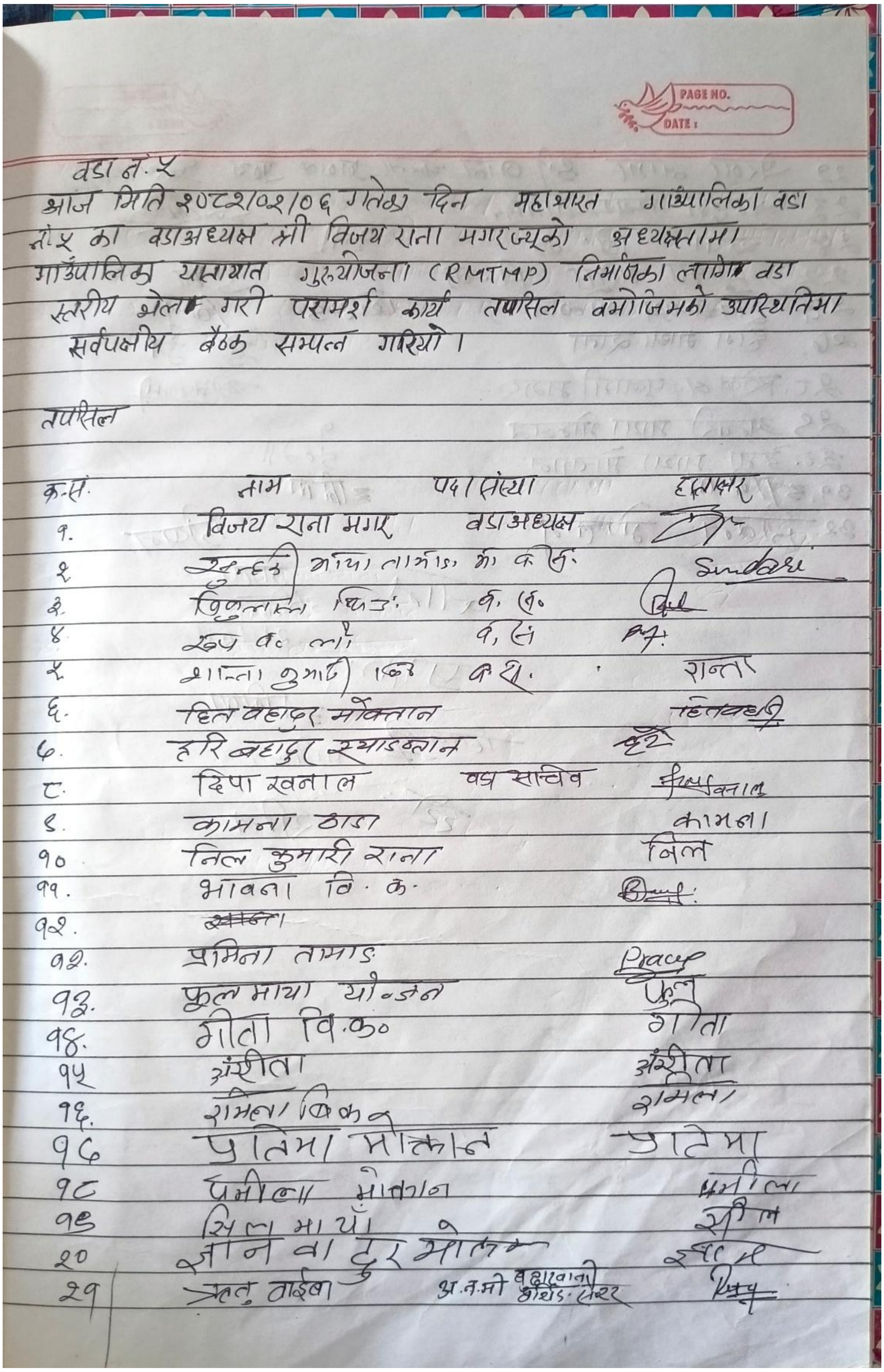
वडा नं. ४

आज मिति २०८२/०२/०६ गतेका दिन महाभारत गाउँपालिका वडा नं. ४ का वडाअध्यक्ष श्री विशाल मोक्तान ज्यूको अध्यक्षतामा गाउँपालिका यातायात गुरुयोजना (RMTMP) निर्माणका लागि वडा स्तरीय भेला गरी परामर्श कार्य तपसिल बमोजिमको उपस्थितिमा सर्वपक्षीय बैठक सम्पन्न गरियो।

तपसिल

क्र.सं.	नाम	पद/संस्था	हस्ताक्षर
१.	विशाल मोक्तान	वडा अध्यक्ष	
२.	दिपक राना		
३.	विनोद तुम्बिहाङ		
४.	प्रेम ब. तुम्बिहाङ		
५	भक्त ब. नेपाली		
६.	राजन जर्गा मगर		
७.	रुपेश बहादुर सारु मगर		
८.	पुष्प बहादुर तुम्बिहाङ पकला		
९	केशर बहादुर तुम्बिहाङ		
१०.	राकेश आम्जन		
११.	सान्ता कुमारी वि.क.		सान्ता

जेष्ठ ०६,२०८२ का दिन गाउँपालिका यातायात गुरुयोजनाका लागि वडा स्तरीय भेला, वडा ५



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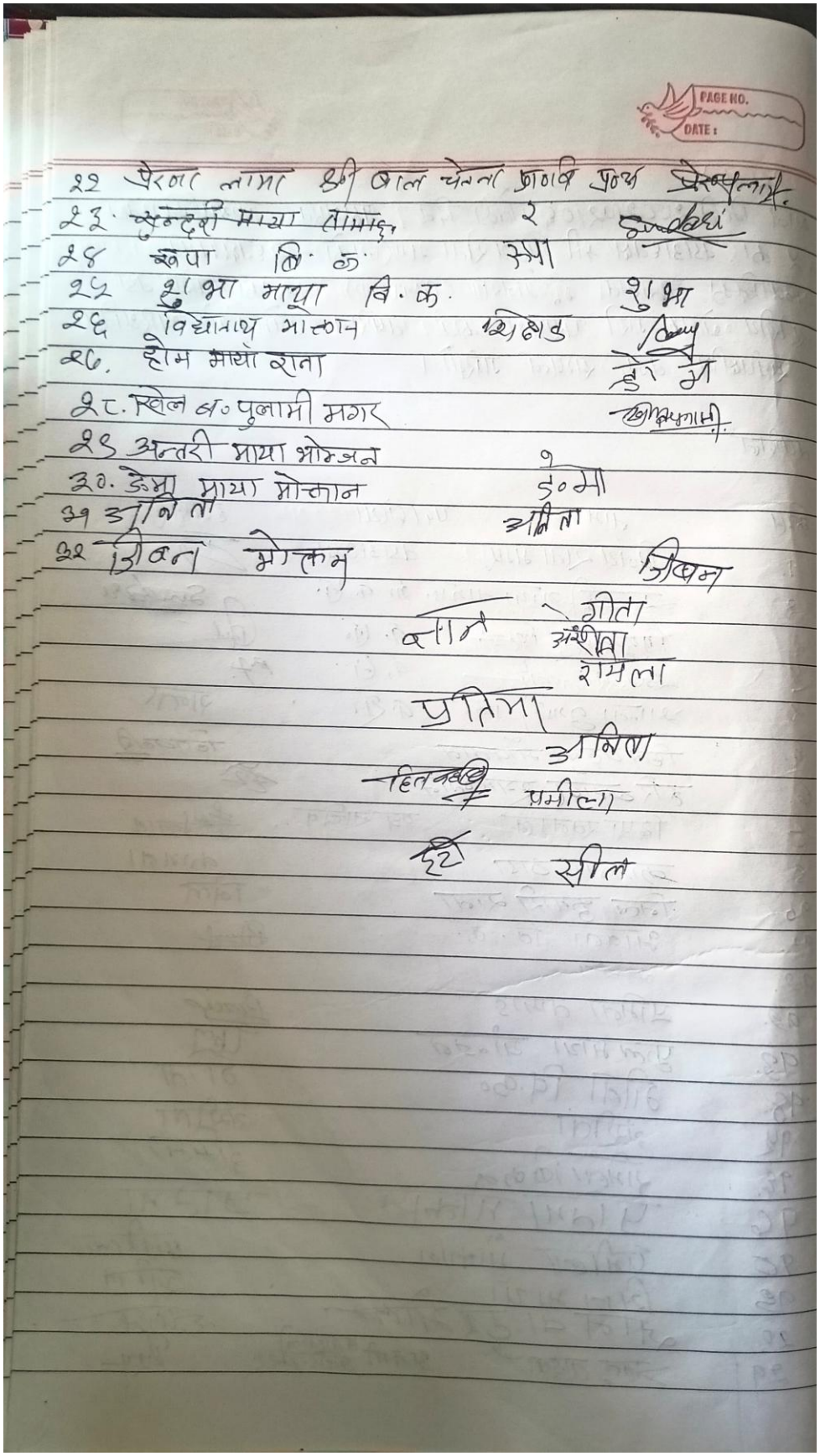
वडा नं. ५

आज मिति २०८१/०२/०६ गतेका दिन महाभारत गाउँपालिका वडा नं.५ का वडाअध्यक्ष श्री विजय राना मगरज्यूको अध्यक्षतामा गाउँपालिका यातायात गुरुयोजना (RMTMP) निर्माणका लागि वडा स्तरीय भेला गरी परामर्श कार्य तपसिल बमोजिमको उपस्थितिमा सर्वपक्षीय बैठक सम्पन्न गरियो।

तपसिल

क.सं.	नाम	पद/संस्था	हस्ताक्षर
१.	विजय राना मगर	वडाअध्यक्ष	[signature]
२	सुन्दरी माया तामाङ	का. स.	Sundari
३.	[illegible]	वि. स.	[signature]
४	रूप ब. लामा	व. सं	[signature]
५	शान्ता कुमारी [illegible]	क. श.	शान्ता
६.	हित बहादुर मोक्तान		हितबहादुर
७.	हरि बहादुर स्याङतान		हरि
८.	दिपा खनाल	वडा सचिव	दिपा खनाल
९.	कामना थापा		कामना
१०	निल कुमारी राना		निल
११.	भावना वि. क.		[signature]
१२.	~~[illegible]~~		
१३.	प्रमिना तामाङ		Pramina
१३.	फुल माया योन्जन		फुल
१४.	गीता वि.क.		गीता
१५	अंशीता		अंशीता
१६.	रामेला बिक		रामेला
१७	प्रतिमा मोक्तान		प्रतिमा
१८	प्रमीला मोक्तान		प्रमीला
१९	सिला मायाँ		सील
२०	ज्ञान बहादुर मोक्तान		[signature]
२१	ऋतु वाइबा	अ.न.मी बझारबोर्डी बर्थिङ सेन्टर	[signature]



जेष्ठ ०४,२०८२ का दिन गाउँपालिका यातायात गुरुयोजनाका लागि वडा स्तरीय भेला, वडा ६

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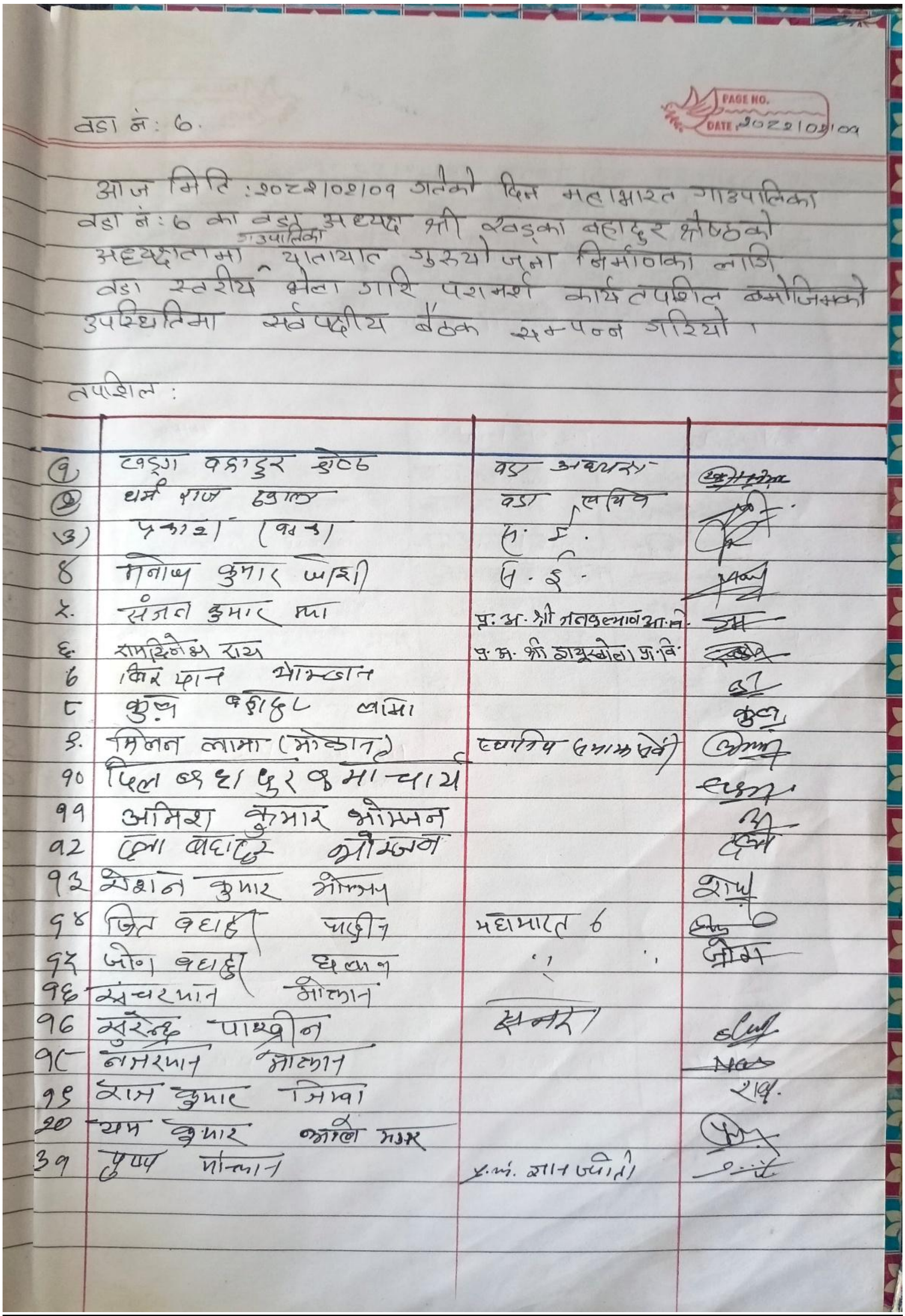
वडा नं: ६,

आज मिति : २०७८।०१।०४ गतेको दिन महाभारत गाउपालिका वडा नं ६ का अध्यक्ष श्री रमेश कुमार लुडेली ज्यूको अध्यक्षतामा गाउपालिका यातायात गुरुयोजना (RMTMP) निर्माणका लागि वडा स्तरीय भेला गरी परामर्श कार्य तपसिल बमोजिमको उपस्थितीमा सर्वपक्षीय बैठक सम्पन्न गरियो।

तपसिल

क्र.स	नाम	पद/संस्था	हस्ताक्षर
१.	रमेश कुमार लुडेली	वडा अध्यक्ष	[signature]
२.	मकर बहादुर थिङ्	वडा सदस्य	
३.	कुमार थिङ्	,,	
४	~~सुभद्र~~ सुभद्रा माझी	,,	[signature]
५	मनकुमारी वि.क	,,	[signature]
६.	कर्ण बहादुर थिङ्	,,	[signature]
७.	रुपचन्द्र लामा		[signature]
८.	प्रेम थिङ.	शिक्षक	[signature]
९.	राम ब० माझी	व्य. सं. ध्यकि	[signature]
१०.	निम बहादुर पुरी	प्र०अ आजाद आ०वि०	[signature]
११)	श्याम क० लुइँटेल	शि.अ० स	[signature]
१२	विकास कुमार खड्का	वि.व्य.स. अध्यक्ष	[signature]
१३	कुमार सिं लि लामा	ने.क. पार्टी (स्थानीय) वडा कमी अ.	[signature]
१४	गणेश कुमार यमाली	महाभारत खाताजिवान ह. सिर्प	[signature]
१५	तुल बहादुर बर्देवा	भानुदापाउडे व०के०म० प्रि	[signature]
१६	प्रेम कुमार गौतम	,, ,,	[signature]
१७.	लाल छिरिङ लामा	श्री जनमोहन मा.वि. बे.द.	[signature]
१८	रामबल्ली सिंह	श्री ,, ,, ,, प्र.अ.	[signature]
१९	पुष्प नारायण श्रेष्ठ	श्री सगर-श्री कल्हडाडा बेनसन्तुष्ट को अध्यक्ष	[signature]
२०	दिलबहादुर विश्वकर्मा	वि०व्य०स० अध्यक्ष (आजाद आ.वि.)	[signature]

जेष्ठ ०१,२०८२ का दिन गाउँपालिका यातायात गुरुयोजनाका लागि वडा स्तरीय भेला, वडा ७



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आज मिति : २०८२।०२।०१ गतेको दिन महाभारत गाउँपालिका वडा नं: ७ का वडा अध्यक्ष श्री खड्का बहादुर श्रेष्ठको अध्यक्षतामा गाउँपालिका यातायात गुरुयोजना निर्माणका लागि वडा स्तरीय भेला गरि परामर्श कार्य तपशिल बमोजिमको उपस्थितिमा सर्वपक्षीय बैठक सम्पन्न गरियो ।

तपशिल :

१	खड्का बहादुर श्रेष्ठ	वडा अध्यक्ष
२	धर्म राज हुमागाईं	वडा सचिव
३)	प्रकाश (पाख्रीन)	सि. ई.
४	मनोज कुमार खत्री	सि. ई.
५.	संजन कुमार झा	प्र. अ. श्री गणेश्वराध्याय आ.वि.
६.	रामविनोद राय	प्र. अ. श्री डाँडाखोला प्रा.वि.
७	किरण थोकर	
८	कुल बहादुर लामा	
९.	मिलन लामा (मोक्तान)	स्थानीय (नागरिक समाज)
१०	[illegible]	
११	अनिश कुमार थोकर	
१२	[illegible] बहादुर थोकर	
१३	[illegible] कुमार थोकर	
१४	जित बहादुर पाख्रीन	महाभारत ७
१५	जोग बहादुर [illegible]	"
१६	[illegible] मोक्तान	
१७	सुरेन्द्र पाख्रीन	समाज
१८	[illegible] मोक्तान	
१९	राम कुमार [illegible]	
२०	यम कुमार [illegible]	
२१	पुष्प मोक्तान	प्र.अ. ज्ञान ज्योति

जेष्ठ ०२,२०८२ का दिन गाउँपालिका यातायात गुरुयोजनाका लागि वडा स्तरीय भेला, वडा ८

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वडा नं. ८

आज मिति: २०८२/०२/०२ गतेको दिन महाभारत गाउपालिका वडा न. ८ का वडा अध्यक्ष श्री टंक बहादुर आले ज्यूको अध्यक्षतामा गाउँपालीका यातायात गुरुयोजना निर्माणका लागि वडा स्तरीय भेला गरि परामर्श कार्यतपशिल बमोजिमको उपस्थिती सर्वपक्षीय बैठक सम्पन्न गरियो।

तपशिल :

S.N	नाम	पद	हस्ताक्षर
①	टंक बहादुर आले	वडा अ. ८	[signature]
②	गोकुल कुमार दर्लामी	वडा सचिव	[signature]
③	टगु मायाँ घलान	जन प्रतिनिधि	[signature]
④	खेल बहादुर आलामी	जनवालाहित प्राथ	[signature]
५	देवराज पुलामी मगर	ईस्तानीय	[signature]
६.	बिसाल रम्भौली मगर	इस्टानीय	[signature]
७.	दिपेशा अस्लानी	स्व. से. उ.	[signature]
८.	फुल बहादुर अस्लानी	वडा सदस्य	[signature]