Government of Nepal

District Transport Master Plan (DTMP)

Ministry of Federal Affairs and Local Development

Department of Local Infrastructure Development and Agricultural Roads (DoLIDAR)

District Development Committee,
Bajura

Volume I: Main Report

April, 2013

Prepared by the North Star Engineering Consultant (P) Ltd for the District Development Committee (DDC) and District Technical Office (DTO), Bajura with Technical Assistance from the Department of Local Infrastructure Development and Agricultural Roads (DoLIDAR), Ministry of Federal Affairs and Local Development and grant supported by DFID.

FOREWORD

Government of Nepal
Ministry of Federal Affairs and Local Development
Office of District Development Committee
Martadi, Bajura

Date: - 14th March, 2013

FOREWORD

It is my great pleasure to introduce this revised District Transport Master Plan (DTMP) of Bajura, district which was concurred and approved by the joint meeting of district stakeholder's and DDC board held on 7th March 2013. Before approving the DTMP, DRCN was passed by the joint meeting of district stakeholder's and DDC board held on 4th March 2013. Based on the DTMP Guideline 2012, all together 15 District Road Core Network (DRCN) aiming to connect all Village Development Committee (VDC) headquarters with the district headquarter, either directly or through strategic road network (SRN) have been selected. By bringing the DRCN to a maintainable and all-weather standard, year-round access to all VDCs headquarters can be ensured.

I believe this document will be helpful to materialize Rural Transport Infrastructure Sector Wide Approach (RTISWAp) through sustainable planning, resources mobilization, implementation and monitoring of the road development. The document is anticipated to generate substantial employment opportunities for rural people through conservation, improvement and new construction activities of the existing road network. DRCN plays an important role to strengthen and promote overall economic growth of the district through established and improved year round transport services reinforcing intra and inter-district linkages. It is most crucial to expand DRCN in a planned way as per the DTMP recommendations by considering the framework of available resources in DDC. This document is very essential in lobbying the donor agencies through central government to attract fund gap. Furthermore, this document will be supportive in avoiding prevailing duplication in resources allocation in road network development by considering basket fund approach.

I would, firstly like to express my gratitude to RTI Sector Maintenance Pilot for financial and technical support. Secondly, my thanks go to, District Engineer DTO Mr.Ganesh Kumar Giri, Planning Officer Mr.Ram Badhur Sahi and other DDC/ DTO staff for their valuable efforts in the process of producing this document. Equally, I would like to thank Mr. Shambhu Prasad Yadev,Team Leader from North Star Engineering Consultant for their continuous dedication and hard-work in bringing this DTMP document to this stage. My special thank goes to all the representatives of political parties, who played crucial role in providing constructive feedbacks and valuable support in preparing this document successfully.

Last but not least, I would like to express my heartfelt gratitude to Ministry of Federal Affairs and Local Development (MFALD) and Department of Local Infrastructure Development and Agriculture Road (DoLIDAR/MFALD) for providing valuable suggestions and cooperation to produce this report. Any pioneering and constructive suggestions regarding this document will be highly appreciated.

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Bharat Bahadur Singh
Acting Local Development Officer
नि.स्थानिय विकास अधिकारी

PREFACES/ACKNOWLEDGEMENT

The District Transport Master Plan of Bajura District has been prepared for RTI sector maintenance Pilot, DoLIDAR under the Contract Agreement between RTI sector Maintenance Pilot and North Star Engineering Consultant (P) Ltd, contract no. RTI sector_DTMP/001/012 to carry out the task of updating / preparing of DTMP of Bajura district of Nepal.

We would like to express our sincere gratitude to the Project Co-ordinator Mr. Ganga Bhadur. Basnet (SDE), and Er. Manoj Kumar Sherestha of RTI sector whose valuable co-operation and suggestions guided us to accomplish the agreed task to this level. Account and Administrative personnel of the project are also thankful for their liberal cooperation in the financial and administrative dealings. We would also like to convey our sincere thanks to LDO of Bajura DDC, Mr Bishnu Bdr. Ghimere, DTO Chief Mr. Ganesh Kumar Giri, Planning officer of Bajura DDC Mr. Ram Bdr. Sahi, Engineers, Sub-engineer and other staffs of DDC and DTO, Bajura for their extended help and regular support and coordination at different levels while working at the field level.

The local leaders and local people from Bajura district are also thankful for their help and suggestion for the selection and identification of the District Core Road Network. We hope, this updated / prepared DTMP of Bajura District will be very helpful and a valuable guideline for the planning and development of effective and systematic transport network in Bajura District.

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Dhurba Raj Tripathi
On behalf of
North Star Engineering Consultant Pvt. Ltd

EXECUTIVE SUMMARY

Bajura District is located in Seti Zone of the Far-western Development Region of Nepal. It borders with Mugu and Kalikot district to the East, Bhajang district to the West, Humla to the North and Accham to the South. The district with Martadi as Headquarters has 27 VDCs, 9 Ilakas and 1 constituency areas. The district has total area of 2,188 km² and had a population of 134,912 in 2011 census. Geographically the district is divided in three distinct regions from north to south viz. Higher Himalayan Region, Higher Mountain and mid – Mountains.

The district inventory identified just over 147 km of roads, including 94km of strategic roads and 53km of rural roads. In coordination with the DTICC and DDC, 9 rural roads with a length of 52km were identified as making up the district road core network (DRCN), and the remaining 1.5km were classified as village roads. The existing DRCN roads link up only 7 of the 27 VDC headquarters. All of the DRCN roads are earthen fair-weather roads.

Road Class	Total length	Black Top	Gravel	Earthen
Strategic road network	94.00	13.00	-	81.00
Urban roads	-	-	-	-
District road core network	51.96	-	-	51.96
Village roads	1.49	-	-	1.49
Total	**147.45**	**13.00**	**-**	**134.45**

Annual conservation costs are estimated at NPR 1.559 million based on the first year, and will be updated in the ARMP based on actual annual maintenance needs as determined in the annual road condition survey. For the full five-year period the conservation costs will come to NPR 7.794 million. An analysis of the road network, identified the need for improvement, of all the DRCN roads in order to bring them to a maintainable all-weather standard and provide them with a proper road surface in light of existing traffic volumes. Since, the traffic volume is very low and also the SRN within the district is still not all weather, the major improvement in this DTMP has not been focused except the minor cross drainage and retaining structure work. Although, the existing DRCN demand major cross drainage structure 660m bridges for all weather improvement, due the lack of available budget and very low traffic volume budget has not been allocated for construction of bridges as it requires high construction cost. However, the required improvements and their estimated costs are listed below.

Improvement type	Requirement		Cost (NPR)
Bridges	660	m	-
Slab culverts	0	m	-
Causeways	90	m	900,000
Hume pipes	15	units	150,000
Masonry retaining walls	430	m^3	4,300,000
Gabion retaining walls	3567.5	m^3	8,918,750
Lined drains	0	m	-
Widening	0	m	-
Rehabilitation	0	km	-
Gravelling	0	km	-
Blacktopping	0	km	-
New construction	143.10	km	572,400,000
Total			**586,668,750**

The available budget for the road sector for the coming five years (fiscal year 2070/71 to 2074/75) is estimated to be NPR 230.162 million. Allocation to the district road core network was set at 95% of the total road sector budget, which was subsequently allocated firstly to the annual maintenance needs, secondly to the improvement needs and lastly to new construction. This budget is insufficient to cover all the estimated costs of conservation, improvement and new construction. However, it allows all conservation requirements to be covered throughout the DTMP period and almost all selected improvement works to be completed before the end of the DTMP period. The remaining improvement works will be carried out in the next DTMP. All new construction is not possible within this DTMP period and will also be carried out under the next DTMP.

Within the DTMP period no roads will be gravelled nor blacktopped. The main concentration of this DTMP will be new DRCN construction connecting VDC headquarters to district headquarters or SRN to provide minimum level of access to at least fair weather standard.

At present the number of VDC headquarters with access to the SRN is only 5 with 26% population and DRCN is 2 with 9% population. Moreover, 21 VDC with 71% population has no access to SRN or DRCN. Thus, at the end of DTMP, additional 16 number of VDC will have access to fair-weather DRCN, increasing population from 9% to 73%. The number of VDC headquarters with no access to DRCN roads will remain at 7, while the percentage of the district population with no access to DRCN roads will reduce at 22%.

ABBREVIATIONS

DDC	District Development Committee
DOLIDAR	Department of Local Infrastructure Development and Agriculture Road
DOR	Department of Road
DTICC	District Transport Infrastructure Coordination Committee
DTMP	District Transport Master Plan
DTPP	District Transport Perspective Plan
GIS	Geographical Information system
GPS	Global Positioning System
GON	Government of Nepal
LGCDP	Local Governance and Community Development Programme
MFALD	Ministry of Federal Affairs and Local Development
SWAp	Sector Wide Approach
VDC	Village Development Committee

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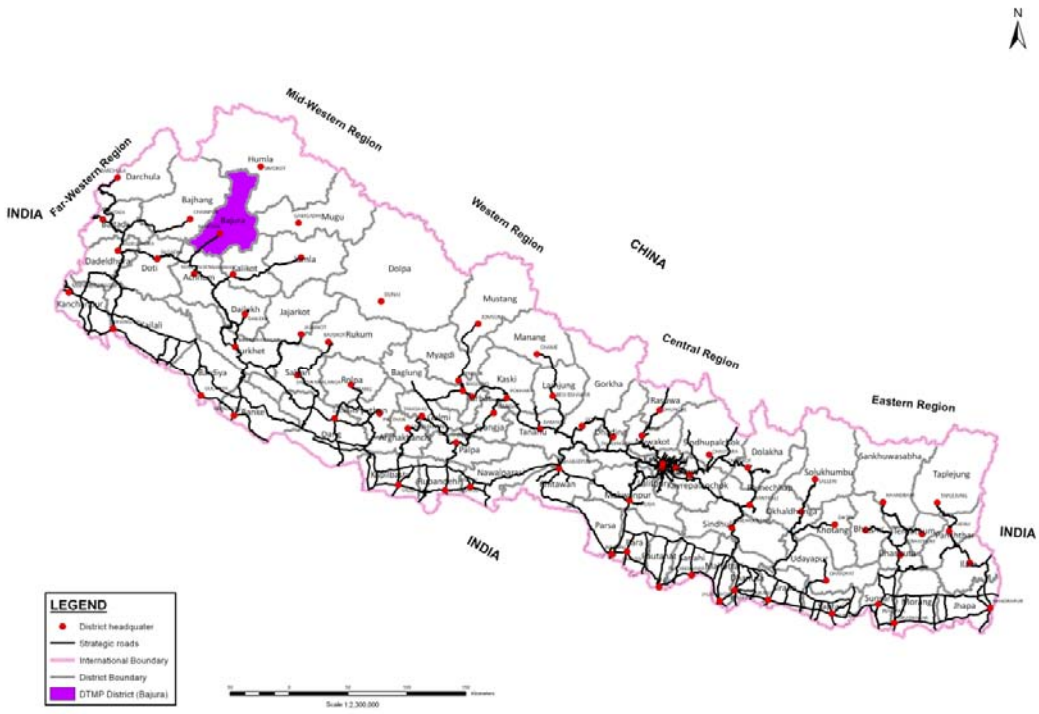
1. INTRODUCTION

Bajura District, a part of Seti Zone, of Far western Region (Sudur Pashchimanchal), is one of the seventy-five districts of Nepal, a landlocked country of South Asia. The district, with Martadi as its district headquarters, covers an area of 2,188 km² and had a population of 134,912 in 2011 census. The district has 27 VDCs, 9 Ilakas and 1 constituency areas. The district is situated in Longitude between 81º 10' 20" to 81º 48' 27" East and Latitude 29º 16' 21" to 29º 56' 56" North. Geographically the district is divided in three distinct regions from north to south viz. Higher Himalayan Region, Higher Mountain and mid – Mountains. The Higher Himalayan region comprises of Saipal Himalayan range; High Mountain region comprises of Doha Lekh and Ghori Lekh. Similarly, Mid Mountain range comprises different ranges of mountains e.g. Malika Temple. The annual rainfall is about 13,433 mm and temperatures vary from 0 ºC to 40 ºC. The livelihood of more than 80% of the district population depends on agriculture farming, mainly small scale livestock. Due to low level of agricultural production, the majority of the households face acute food shortages for a large part of the year.

Figure 1 Map of Nepal indicating Bajura District



According to the National Census 2011, the total population of the district is 134,912 comprising 69,106 female (51%) and 65,806 male (49%) residing in 24,908 households. Bajura district has an average population density of around 62 people per square km. The average family size is 5.4. Life expectancy of the people is 58 years. The average literacy rate is about 32%. Bajura district has a multi ethnic composition with Chhetri, Kami, Thakuri, Brahman, Magar, Damai, Sarki, Newar, Sherpa, Rai kirati and Sanyashi (Giri and Puri). The common language is Nepali (96%) followed by Bhote Sherpa (0.46%) and Tamang (0.42 %).

Although accessibility to Bajura is very poor, this is improving rapidly. The Government strategy is mainly focused on the connection of VDC headquarters with all weather motor able roads to SRN or District headquarters. Moreover, the DDC body of Bajura district has given higher priority on rural roads.

2. DISTRICT ROAD CORE NETWORK (DRCN)

This chapter gives an overview of the existing roads in Bajura district, distinguishing between strategic roads and rural roads. It goes on to identify those rural roads that make up the district road core network (DRCN) that will form the basis for this DTMP. The remaining rural roads are classified as village roads.

2.1 TOTAL ROAD NETWORK

Bajura district has an estimated road network of 147 kilometres, including 94 km of strategic roads managed by DOR and 53 km of rural roads managed by Bajura DDC and the VDCs. Most of the strategic roads and all of the rural roads have an earthen surface. A map of the total road network in Bajura district is shown in Figure 2 at the end of this chapter.

Table 2.1.1 Total road length in Bajura Distict(km)

Road Class	Total length	Black Top	Gravel	Earthen
Strategic roads	94.00	13.00	-	81.00
Urban roads	-	-	-	-
Rural roads	53.45			53.45
Total	**147.45**	**13.00**	**-**	**134.45**

2.2 NATIONAL HIGHWAYS AND FEEDER ROADS

Bajura district has only one feeder roads totalling 94 km, treated as strategic roads in this DTMP.

Table 2.2.1 National Highways and Feeder Roads in Bajura District (km)

Code	Description	Total length	Black Top	Gravel	Earthen
F146	Ikadigad(Achham Distr. Boarder) - Martadi	43.00	13.00		30.00
F146	Martadi - kolti	51.00			51.00
Total		**94.00**	**13.00**	**0.00**	**81.00**

2.3 DISTRICT ROAD CORE NETWORK

As part of the preparation of this DTMP, the District Road Core Network (DRCN) was identified together with the DTICC and DDC. This DRCN is the minimum network that allows all VDC headquarters to be connected with the strategic road network and the district headquarters, either directly or through other VDCs. In the selection of the DRCN roads, account was taken of the road conditions and the existing traffic levels. The identified DRCN roads were subsequently provided with road codes according to national standards.

The resulting District Road Core Network in Bajura district is shown in Figure 3 at the end of this chapter. The DRCN consists of 9 district roads with a total length of 52 km. The remaining 1.50 km of existing rural roads are not considered to be DRCN roads and are classified as village roads under the responsibility of the VDCs (see also section 2.3). All DRCN roads are currently earthen roads and are considered fair-weather only (see **Error! Not a valid bookmark self-reference.**Table 2.3.1). A complete list of the DRCN roads and their characteristics is provided in

Table 2.3.1 Total Road Length in Bajura District (km)

Road Class	Total length	Black Top	Gravel	Earthen
Strategic road network	**94.00**	**13.00**	**-**	**81.00**
Highways	-			
Feeder roads	94.00	13.00		81.00
Urban roads	**-**	**-**	**-**	**-**
	-			
District road core network	**51.96**	-	-	51.96
Village roads	**1.49**	-	-	1.49
Total	**147.45**	**13.00**	**-**	**134.45**

Table 2.3.2 District Road core network in Bajura District (km)

Code	Description	Total length	Black Top	Gravel	Earthen	All weather	Fair weather
67DR001	Dhap - Khaptad Tourism Road	**4.00**			4.00	-	4.00
67DR002	Barahbise- Dhanalta-Delta-Lamgaun(Aatichaur) Road	**7.35**			7.35	-	7.35
67DR003	Maure- Kailashmandu- Badimalika Road	**8.22**			8.22	-	8.22
67DR004	Shera - Aatichaur Agriculture Road	**11.70**			11.70	-	11.70
67DR005	Martadi-Majhigaun(Jugada)-Pinalek-Aatichaur-Thamlek Road	**5.89**			5.89	-	5.89
67DR006	Pandusain- VDC center Link Road	**0.90**			0.90	-	0.90
67DR007	Kolti - Kuru- Budinanda Tourism Road	**2.40**			2.40	-	2.40
67DR008	Piluchur-Baddhau- Boldhik -Kawadi - Bichhaiya Road	**8.00**			8.00	-	8.00
67DR009	Piluchur-Jukot - Sappata Road	**3.50**			3.50	-	3.50
Total		**51.96**			**51.96**		**51.96**

2.4 VILLAGE ROADS

Bajura district is one of the 74th less developed and remote district of Nepal. The district headquarter is still not connected to all weather SRN. The district has very low road density and existing road identified are moreover district road core network (DRCN). There are very few village roads (1.5km in Bramhtola VDC) of a lower importance that does not form the main link between the VDC headquarters and the district headquarters or strategic road network. Instead they provide additional access to other parts of the VDCs.

In addition to village road some additional branch road has been recommended from DTICC/DDC meeting and listed below.

i) Martadi – Lalepatan Tourism Road
ii) Nateshwori –Bishnupani- Road
iii) Porkkkhe- Triveni Tourism Road
iv) Porkhe – Buddhinanda Tourism Road
v) Jadanda- Kordha- Buddhinanda Road
vi) Tipada- Jalpa –Kinnichaur Road
vii) Karnali- Berma- Narkot-Mallika Road
viii) Melkandh- Rajali- Amlise- Dahakot Road

It is recommended that the VDCs organise maintenance workers to carry out the emergency and routine/recurrent maintenance of these roads to ensure they remain accessible. Any upgrading or new construction of village roads falls outside the scope of this DTMP and is the responsibility of the VDCs.

Figure 2 Total Road Inventory

Road Class	Total length	Black Top	Gravel	Earthen
Strategic roads	94.00	13.00	-	81.00
Urban roads	-	-	-	-
Rural roads	53.45			53.45
Total	**147.45**	**13.00**	**-**	**134.45**

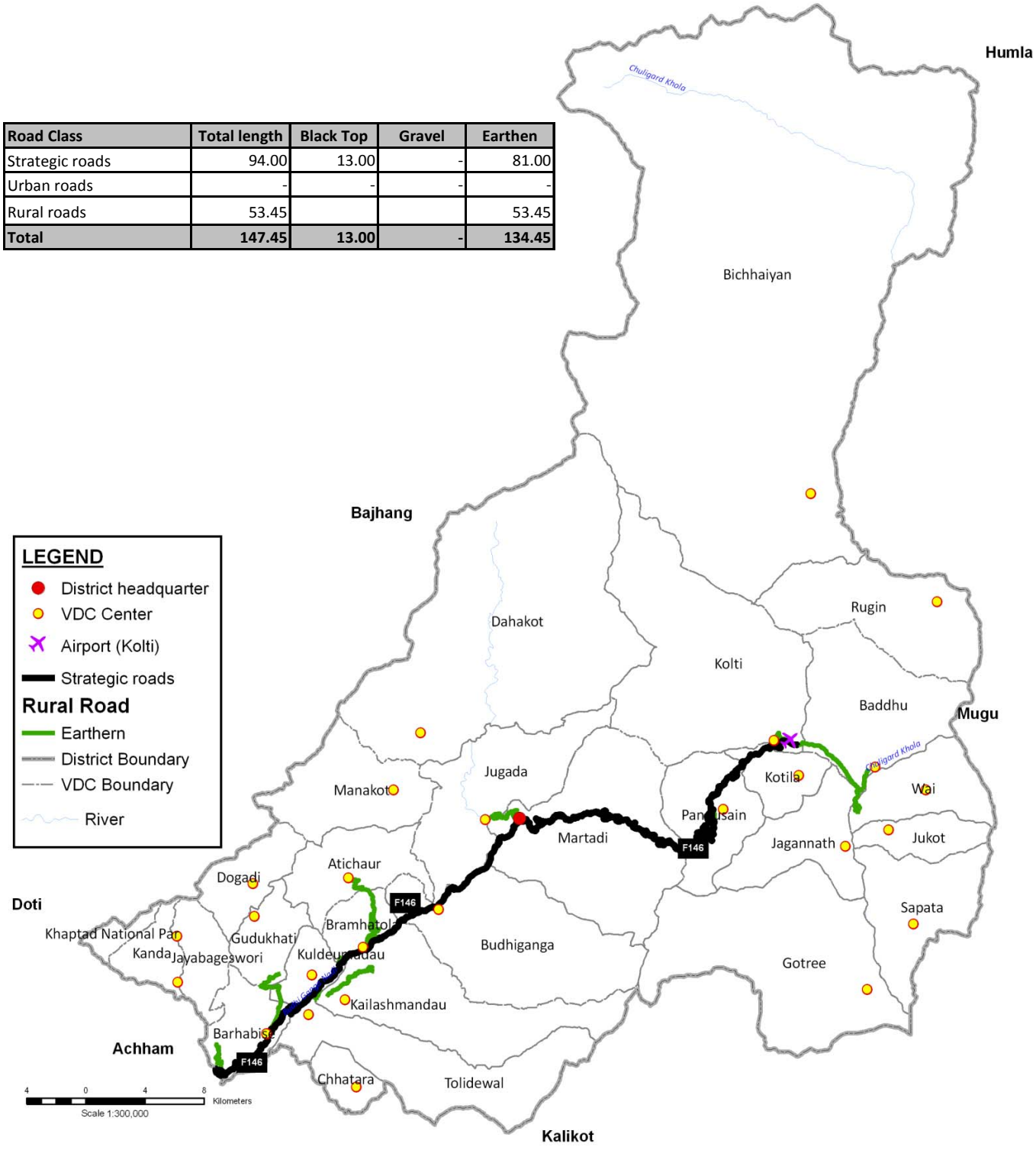
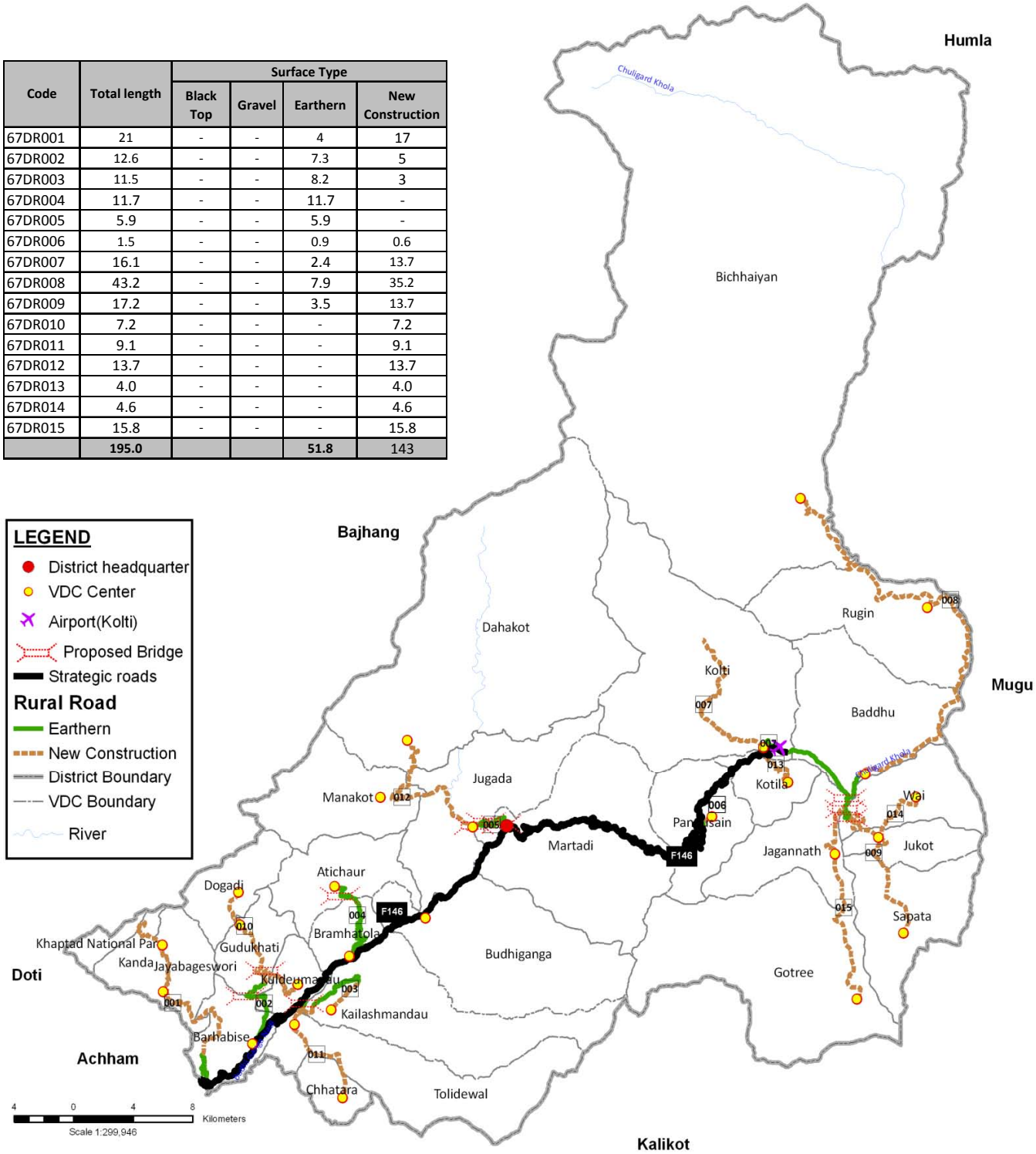


Figure 3 District Road Core Network (DRCN)

Code	Total length	Surface Type			
		Black Top	Gravel	Earthern	New Construction
67DR001	21	-	-	4	17
67DR002	12.6	-	-	7.3	5
67DR003	11.5	-	-	8.2	3
67DR004	11.7	-	-	11.7	-
67DR005	5.9	-	-	5.9	-
67DR006	1.5	-	-	0.9	0.6
67DR007	16.1	-	-	2.4	13.7
67DR008	43.2	-	-	7.9	35.2
67DR009	17.2	-	-	3.5	13.7
67DR010	7.2	-	-	-	7.2
67DR011	9.1	-	-	-	9.1
67DR012	13.7	-	-	-	13.7
67DR013	4.0	-	-	-	4.0
67DR014	4.6	-	-	-	4.6
67DR015	15.8	-	-	-	15.8
	195.0			**51.8**	143



3. DISTRICT TRANSPORT PERSPECTIVE PLAN (DTPP)

This chapter looks at the required interventions regarding conservation, improvement and new construction of the district road core network. It provides a complete list of all works required in the DRCN, which together form the District Transport Perspective Plan (DTPP). For the works forming part of the DTPP, chapter 4 will subsequently provide cost estimation, while chapter 5 will rank the works according to priority and chapter 6 will select those priority works that can be carried out in the next 5 years and thus form part of the District Transport Master Plan (DTMP).

3.1 CONSERVATION

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

1. Emergency maintenance - Basic repairs aimed at removing landslides and repairing damage to the road that inhibit the proper use of the road and make it impassable. This mainly takes place during and after the rainy season. A provisional lump sum is reserved for the entire district road core network based on the network length. Allocation to specific road sections is based on the actual need for clearing landslides or repairing washouts and cuts in the road.
2. Routine maintenance - General maintenance of the road aimed at preventing damage by ensuring the proper working of the different road elements (retaining walls, drainage system, carriageway, etc.) and cutting vegetation. This is carried out each year on a more or less continuous basis. Routine maintenance is required for the entire district road core network. The specific requirements for routine maintenance are determined on an annual basis through the road condition survey and defined in the ARMP.
3. Recurrent maintenance - Repairs of minor damage to the road surface and road structures to bring them back to good condition. This is generally carried out once or twice a year. Recurrent maintenance is required for the entire district road core network, whereby distinction is made according to the surface type. The specific requirements for recurrent maintenance are determined on an annual basis through the road condition survey and defined in the ARMP.
4. Periodic maintenance - Larger repairs to the road largely aimed at renewing the road surface through regravelling, resealing or overlays. It is generally carried out with several years interval. Although periodic maintenance is only required for specific sections of the district road core network, a lump sum allocation is made for the entire district road core network based on average annual requirements, distinguishing between different surface types. The specific periodic maintenance requirements are determined on an annual basis through the annual road condition survey and defined in the ARMP.

In case of Bajura District, volume of traffic is very low and also the SRN within the district is still not all weather. Moreover, there are only two DRCN on which traffic ply over and traffic volume is negligible, thus it doesn't requires all four type of conservation. Hence, only the emergency maintenance has been recommended from DTICC and included in this DTMP. The length of roads to be included under each conservation type for the first year is indicated below. This is basically the entire district road core network in as far as it does not require rehabilitation.

Table 3.1.1 Conservation requirements

Code	Emergency maintenance (km)	Routine maintenance (km)	Recurrent maintenance (km)	Periodic maintenance (km)
67DR001	4.00			
67DR002	7.35			
67DR003	8.22			
67DR004	11.70			
67DR005	5.89			
67DR006	0.90			
67DR007	2.40			
67DR008	8.00			
67DR009	3.50			
Total	**51.96**			

3.2 IMPROVEMENT

Improvement refers to actions required to improve a road to bring it to a maintainable all-weather standard. It includes the following actions, which for Bajura are described in more detail in the subsequent sections.

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

3.2.1 REHABILITATION

No rehabilitation needs were identified in the district road core network.

Table 3.2.1 Sections of the district road core network requiring rehabilitation

Code	Description	Total length (km)	Gravelling (km)
Total		**0.00**	**0.00**

3.2.2 GRAVELLING

As the entire district road core network needs to be brought to an all-weather status, gravelling of the road surface is required for all the earthen sections in the DRCN. Since, there is only two DRCN in district on which vehicle ply over, also the volume of traffic is very low. Moreover, the SRN is still not all weather, in such situation no DRCN has been recommended and projected for gravelling. For Bajura this concerns the total of 0 km of DRCN roads.

Table 3.2.2 Sections of the district road core network requiring gravelling

Code	Description	Total length (km)	Gravelling (km)
Total			

3.2.3 CROSS DRAINAGE

Although, the existing DRCN demand major cross drainage structure 660m bridges for all weather improvement, due the lack of available budget and very low traffic volume budget has not been allocated for construction of bridges as it requires high construction cost. The need for minor cross drainage was identified for the different DRCN roads. A total of 90m stone causeway and 15 units of pipe culverts were identified as being required to bring the DRCN as for fair weather standard.

Table 3.2.3 Required cross drainage structures

Code	Description	Bridge (m)	Slab culvert (m)	CC Causeway (m)	Stone Causeway (m)	Pipe culvert (units)
67DR001	Dhap - Khaptad Tourism Road				15	
67DR002	Barahbise- Dhanalta-Delta-Lamgaun(Aatichaur) Road					3
67DR003	Maure- Kailashmandu- Badimalika Road				10	3
67DR004	Shera - Aatichaur Agriculture Road				30	7
67DR005	Martadi-Majhigaun(Jugada)-Pinalek-Aatichaur-Thamlek Road				15	2
67DR006	Pandusain- VDC center Link Road					
67DR007	Kolti - Kuru- Budinanda Tourism Road					
67DR008	Piluchur-Baddhau- Boldhik -Kyari - Bichhaiya Road				10	
67DR009	Piluchur-Jukot - Sappata Road				10	
Total					**90.00**	**15.00**

3.2.4 PROTECTIVE STRUCTURES

Based on the road survey carried out in Bajura, the following retaining walls were identified as being required to ensure the protection of the district road core network.

Table 3.2.4 Required protective structures

Code	Description	Masonry walls (m^3)	Gabion walls (m^3)	Lined drain (m)
67DR001	Dhap - Khaptad Tourism Road	80	120	
67DR002	Barahbise- Dhanalta-Delta-Lamgaun(Aatichaur) Road		270	
67DR003	Maure- Kailashmandu- Badimalika Road		300	
67DR004	Shera - Aatichaur Agriculture Road	30	720	
67DR005	Martadi-Majhigaun(Jugada)-Pinalek-Aatichaur-Thamlek Road	320	758	
67DR006	Pandusain- VDC center Link Road		300	
67DR007	Kolti - Kuru- Budinanda Tourism Road		500	
67DR008	Piluchur-Baddhau- Boldhik -Kyari -Bichhaiya Road		300	
67DR009	Piluchur-Jukot - Sappata Road		300	
Total		**430**	**3,568**	**-**

3.2.5 WIDENING

Widening of the district road core network in Bajura is required only in specific locations to bring it up to the minimum standard and to ensure sufficient space in the curves. Additional widening to a higher standard is not required because of very low traffic volumes.

Table 3.2.5 Sections of the district road core network requiring widening

Code	Description	Total length (km)	Widening (m)
Total			

3.2.6 BLACKTOPPING

An analysis of the traffic data for the different roads making up the district road core network (see **Annex 1**) shows that there are no roads that are eligible for blacktopping (traffic volume exceeds 50 PCU). The total length for blacktopping is 0 km. The blacktopping of the roads will be treated as a second phase of improvement after they have been gravelled.

Table 3.2.6 Sections of the district road core network requiring blacktopping

Code	Description	Total length (km)	Blacktop (km)	Traffic (VPD)	Blacktopping (km)
Total					

3.3 NEW CONSTRUCTION

Due to the very low road density in the district, only few VDC has access to SRN and District headquarters. Thus, new construction of DRCN roads is required to connect the remaining VDC headquarters. A list of proposed roads for new construction is provided below. These roads will provide access to 16 VDC HQs that do not currently have road access. This list is not complete, however, and additional new construction is required to connect all 27 VDC headquarters currently without road access.

Table 3.3.1 Sections of the district road core network requiring new construction

Code	Description	New VDCs	Existing length	New length	Bridge (m)
67DR001	Dhap - Khaptad Tourism Road	Jaybageshwori, Kanda	4.00	17.00	
67DR002	Barahbise- Dhanalta-Delta-Lamgaun(Aatichaur) Road	Kuldemandu, Aatichaur	7.35	5.30	120
67DR003	Maure- Kailashmandu- Badimalika Road	Kailashmandu	8.22	3.20	120
67DR004	Shera - Aatichaur Agriculture Road	Brahmtola	11.70		60
67DR005	Martadi-Majhigaun(Jugada)-Pinalek-Aatichaur-Thamlek Road	Jugada	5.89		130
67DR006	Pandusain- VDC center Link Road	Pandusain	0.90	0.60	
67DR007	Kolti - Kuru- Budinanda Tourism Road	kolti	2.40	13.70	
67DR008	Piluchur-Baddhau- Boldhik -Kyari - Bichhaiya Road	Baddhu,Rugin,Bicchay	8.00	35.20	80
67DR009	Piluchur-Jukot - Sappata Road	Jukot, Sappata	3.50	13.70	150
67DR010	Pudubaula (Gudukhati) - Dogadi VDC Center	Dogadi	-	7.20	
67DR011	Maure-Toli - Chhatra Road	Toli,Chhatara	-	9.10	
67DR012	Jugada - Manakot -Dahakot Road	Manakot,Dahakot	-	13.70	
67DR013	Kolti - kotila VDC center Road	Kotila	-	4.00	
67DR014	Jukot - Wai VDC Link Road	Wai	-	4.60	
67DR015	Piluchur - Jagnnath - Gortee Road	Jaganath,Gortee	-	15.80	
Total			**51.96**	**143.10**	**660**

3.4 DISTRICT TRANSPORT PERSPECTIVE PLAN

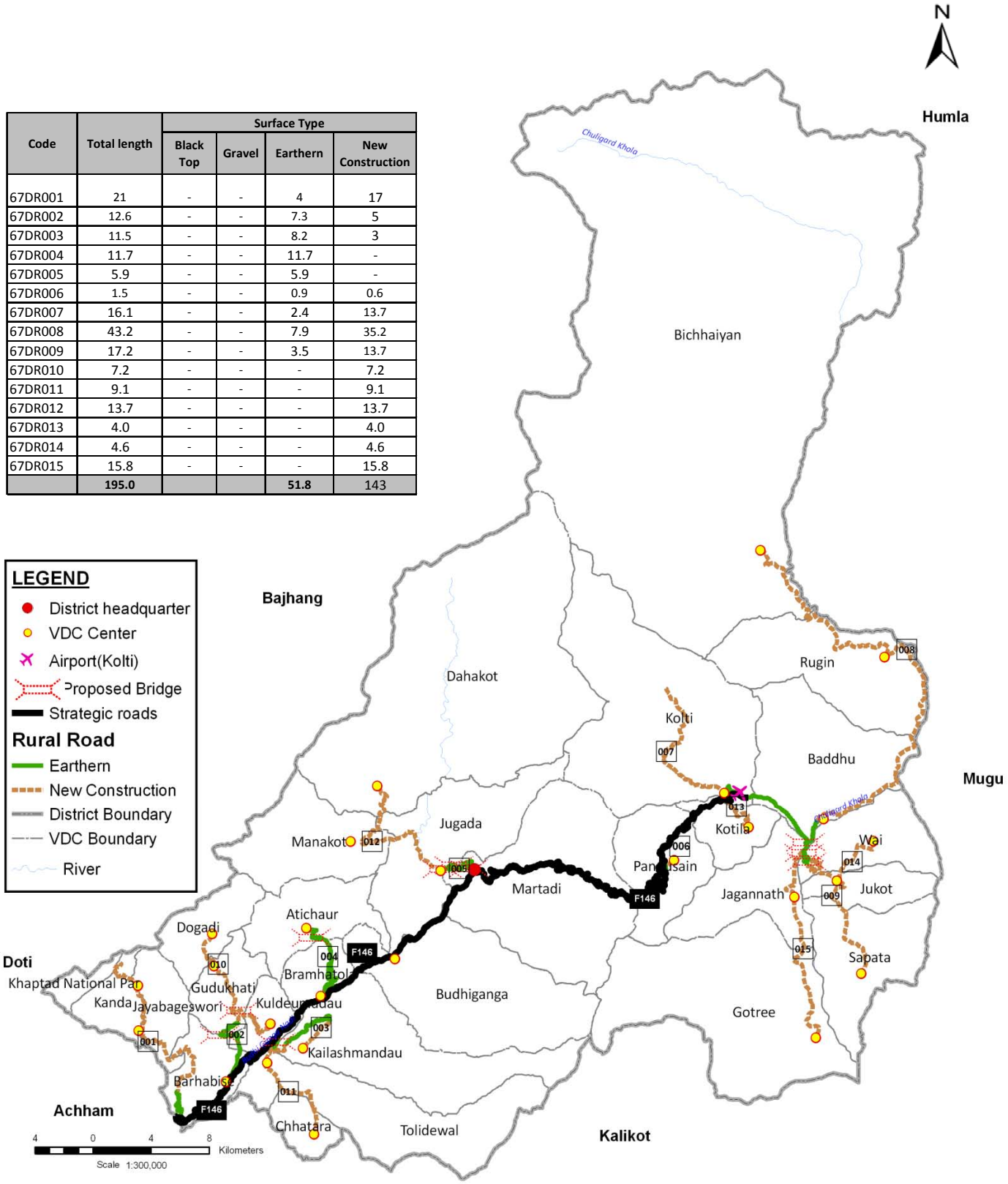
The DTPP forces bringing the entire existing district road core network to maintainable all-weather status, and expanding it to provide access to all VDC headquarters. In the case of Bajura district, where the SRN is still fair weather and the road density is very low, the attempt has made to provide the access to all VDC headquarters considering new DRCN construction instead of improving existing DRCN. For this purpose, the existing DRCN will be plan only for emergency maintenance and number of different cross drainage and protective structures will be constructed for minor improvement. A further 143.10 km of new road will be constructed to maintainable fair-weather earthen standard providing access to 16 additional VDC HQs. The district road core network will subsequently consist of 195 km of maintainable fair-weather roads. The following table lists the required interventions, while the proposed network is shown in the DTPP map in Figure 4.

Table 3.4.1 District Transport Perspective Plan

Code	Emergency maintenance (km)	Routine maintenance (km)	Recurrent maintenance (km)	Periodic maintenance (km)	Rehabilitation (km)	Gravelling (km)	Blacktopping (km)	Widening (m)	Bridge (m)	Slab culvert (m)	CC Causeway (m)	Stone Causeway (m)	Pipe culvert (units)	Masonry walls (m3)	Gabion walls (m3)	Lined drain (m)	New construction (km)
67DR001	4.00	-	-	-	-	-	-	-	-	-	-	15.00	-	80.00	120.00	-	17.00
67DR002	7.35	-	-	-	-	-	-	-	120.00	-	-	-	3.00	-	270.00	-	5.30
67DR003	8.22	-	-	-	-	-	-	-	120.00	-	-	10.00	3.00	-	300.00	-	3.20
67DR004	11.70	-	-	-	-	-	-	-	60.00	-	-	30.00	7.00	30.00	720.00	-	-
67DR005	5.89	-	-	-	-	-	-	-	130.00	-	-	15.00	2.00	320.00	757.50	-	-
67DR006	0.90	-	-	-	-	-	-	-	-	-	-	-	-	-	300.00	-	0.60
67DR007	2.40	-	-	-	-	-	-	-	-	-	-	-	-	-	500.00	-	13.70
67DR008	8.00	-	-	-	-	-	-	-	80.00	-	-	10.00	-	-	300.00	-	35.20
67DR009	3.50	-	-	-	-	-	-	-	150.00	-	-	10.00	-	-	300.00	-	13.70
67DR010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.20
67DR011	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.10
67DR012																	13.70
67DR013																	4.00
67DR014																	4.60
67DR015																	15.80
Total	**51.96**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**660**	**-**	**-**	**90**	**15**	**430**	**3,568**	**-**	**143.10**

Figure 4 District Transport Perspective Plan (DTPP)

Code	Total length	Surface Type			
		Black Top	Gravel	Earthern	New Construction
67DR001	21	-	-	4	17
67DR002	12.6	-	-	7.3	5
67DR003	11.5	-	-	8.2	3
67DR004	11.7	-	-	11.7	-
67DR005	5.9	-	-	5.9	-
67DR006	1.5	-	-	0.9	0.6
67DR007	16.1	-	-	2.4	13.7
67DR008	43.2	-	-	7.9	35.2
67DR009	17.2	-	-	3.5	13.7
67DR010	7.2	-	-	-	7.2
67DR011	9.1	-	-	-	9.1
67DR012	13.7	-	-	-	13.7
67DR013	4.0	-	-	-	4.0
67DR014	4.6	-	-	-	4.6
67DR015	15.8	-	-	-	15.8
	195.0			**51.8**	143



4. COST ESTIMATION

For the cost estimation, use has been made of standard costs for the different activities required. For the conservation activities this results in an estimation of annual costs, while for improvement and new construction activities this result in an estimation of the total costs required.

4.1 CONSERVATION

The costs of the required conservation measures have been calculated using the following standard costs. These standard costs have been applied to the entire district road core network, whereby distinction is made based on the surface type in the case of recurrent and periodic maintenance. It must be noted here that the standard costs for periodic maintenance are the average annual costs, but that the cost for applying periodic maintenance in a specific section every several years will be higher (the cumulative cost of several years). The estimated costs for the first year are presented below, while the costs for subsequent years will vary slightly as road surface types change as a result of improvements. Detailed cost estimations for the actual maintenance needs in any given year will be presented in the ARMP.

Table 4.1.1 Standard unit costs for conservation

Activity	Unit	Unit cost (NPR/km)
Emergency maintenance	km	30,000
Routine maintenance	km	20,000
Recurrent maintenance (blacktop)	km	500,000
Recurrent maintenance (gravel)	km	400,000
Recurrent maintenance (earthen)	km	250,000
Periodic maintenance (blacktop)	km	200,000
Periodic maintenance (gravel)	km	250,000

For the first year the estimated costs for conservation of the DRCN come to NPR 1.559 million. Based on this cost for the first year, the costs for conservation of the DRCN for the next 5 years are estimated at NPR 7.794 million. These costs will change slightly as the roads are improved and the standard conservation costs change. This will be updated in the ARMP on an annual basis.

Table 4.1.2 Estimated conservation costs for the first year (NPR '000)

Code	Total length (km)	Blacktop (km)	Gravel (km)	Earthen (km)	Emergency	Routine	Recurrent (blacktop)	Recurrent (gravel)	Recurrent (earthen)	Periodic (blacktop)	Periodic (gravel)	Total annual cost	Total 5-year cost
67DR001	4.00			4.00	120		-	-		-	-	**120**	**600**
67DR002	7.35	-	-	7.35	221					-	-	**221**	**1,103**
67DR003	8.22			8.22	247					-	-	**247**	**1,233**
67DR004	11.70	-	-	11.70	351					-	-	**351**	**1,755**
67DR005	5.89			5.89	177		-	-		-	-	**177**	**884**
67DR006	0.90			0.90	27		-	-		-	-	**27**	**135**
67DR007	2.40			2.40	72		-	-		-	-	**72**	**360**
67DR008	8.00			8.00	240		-	-		-	-	**240**	**1,200**
67DR009	3.50			3.50	105		-	-		-	-	**105**	**525**
Total	**51.96**	**-**	**-**	**51.96**	**1,559**	**-**	**-**	**-**	**-**	**-**	**-**	**1,559**	**7,794**

4.2 IMPROVEMENT

The costs of the required improvement measures have been calculated using the following standard costs. These standard costs have been applied to the identified improvement requirements presented in the previous chapter.

Table 4.2.1 Standard unit costs for improvement activities

Activity	Unit	Unit cost (NPR)
Rehabilitation	km	800,000
Widening	m	25,000
Gravelling	km	2,200,000
Blacktopping	km	5,700,000
Bridge construction	m	600,000
Slab culvert construction	m	150,000
CC Causeway construction	m	100,000
Stone Causeway construction	m	10,000
Pipe culvert placement	unit	10,000
Masonry wall construction	m^3	10,000
Gabion wall construction	m^3	2,500
Lined drain construction	m	1,000

The resulting estimated costs come to NPR 14.269 million as indicated in the table below

Table 4.2.2 Cost estimate for improvement measures (NPR '000)

Code	Total length (km)	Rehabilitation	Widening	Gravelling	Blacktopping	Bridges	Slab culverts	CC causeways	Stone causeways	Pipe culvert	Masonry walls	Gabion walls	Lined drains	Total cost
67DR001	4.00	-	-	-	-	-	-	-	150	-	800	300	-	**1,250**
67DR002	7.35	-	-	-	-	-	-	-	-	30	-	675	-	**705**
67DR003	8.22	-	-	-	-	-	-	-	100	30	-	750	-	**880**
67DR004	11.70	-	-	-	-	-	-	-	300	70	300	1,800	-	**2,470**
67DR005	5.89	-	-	-	-	-	-	-	150	20	3,200	1,894	-	**5,264**
67DR006	0.90	-	-	-	-	-	-	-	-	-	-	750	-	**750**
67DR007	2.40	-	-	-	-	-	-	-	-	-	-	1,250	-	**1,250**
67DR008	8.00	-	-	-	-	-	-	-	100	-	-	750	-	**850**
67DR009	3.50	-	-	-	-	-	-	-	100	-	-	750	-	**850**
Total	**51.96**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**900**	**150**	**4,300**	**8,919**	**-**	**14,269**

4.3 NEW CONSTRUCTION

For new construction, the following standard costs have been applied to estimate the costs involved.

Table 4.3.1 Standard unit costs for new construction

Activity	Unit	Unit cost (NPR)
Opening up	km	4,000,000
Gravelling	km	2,200,000
Bridge construction	m	600,000

The resulting estimated costs for new construction come to NPR 572.400 million.

Table 4.3.2 Cost estimate for new construction (NPR '000)

Code	Description	Length (km)	Opening up	Gravelling	Bridges	Total cost
67DR001	Dhap - Khaptad Tourism Road	17.00	68,000			**68,000**
67DR002	Barahbise- Dhanalta-Delta-Lamgaun(Aatichaur) Road	5.30	21,200			**21,200**
67DR003	Maure- Kailashmandu- Badimalika Road	3.20	12,800			**12,800**
67DR004	Shera - Aatichaur Agriculture Road	-	-			**-**
67DR005	Martadi-Majhigaun(Jugada)-Pinalek-Aatichaur-Thamlek Road	-	-			**-**
67DR006	Pandusain- VDC center Link Road	0.60	2,400			**2,400**
67DR007	Kolti - Kuru- Budinanda Tourism Road	13.70	54,800			**54,800**
67DR008	Piluchur-Baddhau- Boldhik -Kawadi - Bichhaiya Road	35.20	140,800			**140,800**
67DR009	Piluchur-Jukot - Sappata Road	13.70	54,800			**54,800**
67DR010	Padubaula (Gudukhati) - Dogadi VDC Center	7.20	28,800			**28,800**
67DR011	Maure-Toli - Chhatra Road	9.10	36,400			**36,400**
67DR012	Jugada - Manakot -Dahakot Road	13.70	54,800			**54,800**
67DR013	Kolti - kotila VDC center Road	4.00	16,000			**16,000**
67DR014	Jukot - Wai VDC Link Road	4.60	18,400			**18,400**
67DR015	Piluchur - Jagnnath - Gortee Road	15.80	63,200			**63,200**
Total		**143.10**	**572,400**			**572,400**

4.4 DTPP COSTS

The total costs for the District Transport Perspective Plan come to NPR 594.463 million as indicated in the table below.

Table 4.4.1 DTPP costs (NPR '000)

Code	Conservation	Improvement	New construction	Total
67DR001	600	1,250	68,000	69,850
67DR002	1,103	705	21,200	23,008
67DR003	1,233	880	12,800	14,913
67DR004	1,755	2,470	-	4,225
67DR005	884	5,264	-	6,147
67DR006	135	750	2,400	3,285
67DR007	360	1,250	54,800	56,410
67DR008	1,200	850	140,800	142,850
67DR009	525	850	54,800	56,175
67DR010	-	-	28,800	28,800
67DR011	-	-	36,400	36,400
67DR012	-	-	54,800	54,800
67DR013	-	-	16,000	16,000
67DR014	-	-	18,400	18,400
67DR015	-	-	63,200	63,200
Total	**7,794**	**14,269**	**572,400**	**594,463**

5. RANKING

The ranking of the required interventions determines the order in which they will be carried out. This ranking is done separately for conservation, improvement and new construction. Ranking is done according to the cost per person served, whereby the costs are the estimated costs of the previous chapter. For the calculation of the population served, use is made of the population data for the VDCs linked by the road concerned. This data is presented in **Annex 2**.

5.1 CONSERVATION

Ranking of roads for conservation is based on the total conservation costs per person served by the road. This ranking of roads will be updated each year in the ARMP based on the actual cost estimates for the year concerned. An example ranking is provided in the table below based on standard costs for the first year.

Table 5.1.1 Ranking of conservation works (NPR '000)

Code	Total length (km)	1. Emergency	2. Routine	3. Recurrent (paved)	4. Recurrent (gravel)	5. Recurrent (earth)	6. Periodic (blacktop)	7. Periodic (gravel)	Total cost (NPR '000)	Population served	Cost/person (NPR)
67DR006	0.90	27	-	-	-	-	-	-	27	6,751	4
67DR001	4.00	120	-	-	-	-	-	-	120	14,086	9
67DR007	2.40	72	-	-	-	-	-	-	72	7,134	10
67DR002	7.35	221	-	-	-	-	-	-	221	20,376	11
67DR009	3.50	105	-	-	-	-	-	-	105	9,401	11
67DR005	5.89	177	-	-	-	-	-	-	177	14,165	12
67DR003	8.22	247	-	-	-	-	-	-	247	16,458	15
67DR008	8.00	240	-	-	-	-	-	-	240	15,107	16
67DR004	11.70	351	-	-	-	-	-	-	351	10,708	33

The allocation of maintenance funding will follow a specific sequence indicated below, and will be applied to the road ranking as defined in the ARMP. This will be of particular importance where funding is insufficient to cover all conservation costs.

1. Emergency maintenance
2. Routine maintenance
3. Recurrent maintenance paved roads
4. Recurrent maintenance gravel roads
5. Recurrent maintenance Earthen roads
6. Periodic maintenance blacktop roads
7. Periodic maintenance gravel roads

5.2 IMPROVEMENT

In the case of improvement activities, ranking is again based on the basis of the total cost per person served. The resulting order of the roads is shown in the table below. In the case of roads requiring blacktopping, the improvement of the road has been split into two phases. The first phase includes all improvements to bring the road to a maintainable all-weather standard (gravelling, widening, cross drainage and protective structures), while the second phase only includes the blacktopping. This has been done to avoid unnecessarily delaying

the improvement of such roads to all-weather gravel standard due to the additional cost of blacktopping (increasing the cost per person served).

Table 5.2.1 Ranking of improvement works (NPR '000)

Code	Total length (km)	Total cost (NPR '000)	Population served	Cost/person (NPR)
67DR002	7.35	705	20,376	35
67DR003	8.22	880	16,458	53
67DR008	8.00	850	15,107	56
67DR001	4.00	1,250	14,086	89
67DR009	3.50	850	9,401	90
67DR006	0.90	750	6,751	111
67DR007	2.40	1,250	7,134	175
67DR004	11.70	2,470	10,708	231
67DR005	5.89	5,264	14,165	372

5.3 NEW CONSTRUCTION

For the roads proposed for new construction, ranking is also according to the cost per person served by the new road. The resulting ranking is indicated in the table below.

Table 5.3.1 Ranking of construction works (NPR '000)

Code	Length (km)	Total cost (NPR '000)	Population served	Cost/person (NPR)
67DR004	-	-	10,708	-
67DR005	-	-	14,165	-
67DR006	0.60	2,400	6,751	356
67DR003	3.20	12,800	16,458	778
67DR002	5.30	21,200	20,376	1,040
67DR013	4.00	16,000	10,358	1,545
67DR011	9.10	36,400	18,363	1,982
67DR014	4.60	18,400	6,613	2,782
67DR010	7.20	28,800	8,586	3,354
67DR012	13.70	54,800	12,484	4,390
67DR001	17.00	68,000	14,086	4,827
67DR015	15.80	63,200	12,841	4,922
67DR009	13.70	54,800	9,401	5,829
67DR007	13.70	54,800	7,134	7,682
67DR008	35.20	140,800	15,107	9,320

6. DISTRICT TRANSPORT MASTER PLAN (DTMP)

The District Transport Master Plan (DTMP) that covers the next five years is prepared based on the projected financial resources available and the prioritized transport interventions as listed in the DTPP. Year-wise targets are prepared for the different roads and intervention types.

6.1 FIVE YEAR PROJECTED FINANCIAL RESOURCES

The projected financial resources for the next five years are estimated by considering all possible funding sources. The funding levels are based on the existing trend of funding. An annual increase in funding of 10% is assumed for all funding sources. The total district budget for the road sector is NPR 230.162 million for the five-year period.

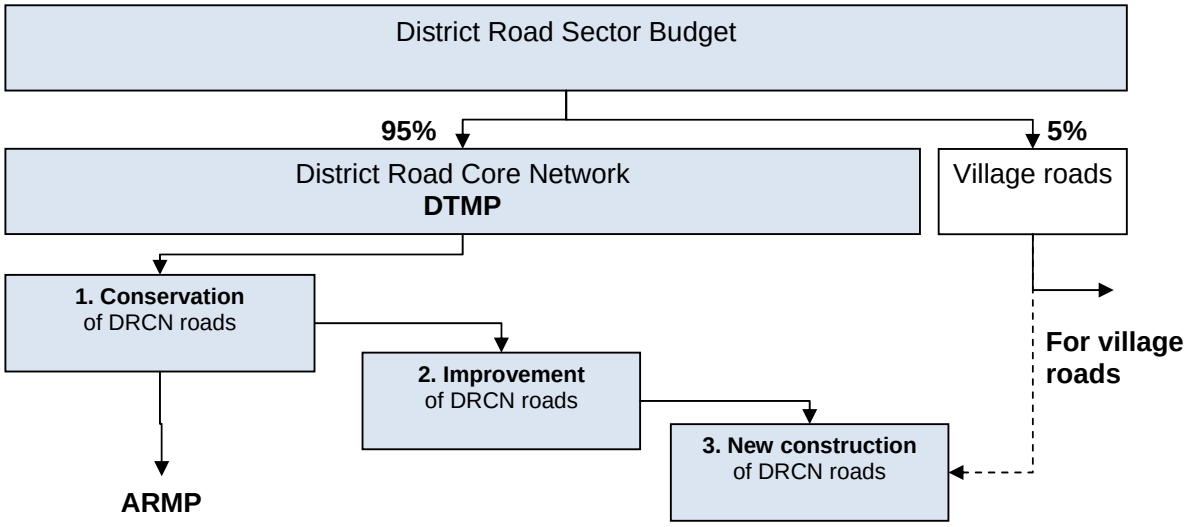
Table 6.1.1 Estimated funding levels (roads) for next five years (in NPR '000)

Funding source	2070/71	2071/72	2072/73	2073/74	2074/75
DDC Internal Fund	4,000	4,400	4,840	5,324	5,856
Local Agricultural Road Program	5,900	6,490	7,139	7,853	8,638
RCIW	2,000	2,200	2,420	2,662	2,928
DRILIP	14,800	16,280	17,908	19,699	21,669
VDC Fund (40%)	11,000	12,100	13,310	14,641	16,105
Total	**37,700**	**41,470**	**45,617**	**50,179**	**55,197**
Grand total	**230,162**				

6.2 BUDGET ALLOCATION

The distribution of the available district road sector budget is indicated in the figure below. Due to the low number of village roads, 95% of the total budget is reserved for the district road core network. The remaining 5% is to be used by the DDC for the village roads, giving priority to emergency maintenance and routine/recurrent maintenance. Alternatively, this 5% may be used for the new construction of DRCN roads where this is considered a priority by the district. The 95% of the district road sector budget for the DTMP is allocated firstly to conservation, secondly improvement, and any remaining funding is allocated to new construction

Figure 5 District Road sector budget allocation



Based on this distribution of the estimated budget, the available annual budget for each intervention type and the resulting district road core network length by surface type can be calculated. The results are shown in the following table.

Table 6.2.1 DTMP investment plan

Item				**Year**													
Fiscal year				**2070/71**			**2071/72**			**2072/73**			**2073/74**			**2074/75**		
Total budget				37,700			41,470			45,617			50,179			55,197		
Non-DRCN roads				1,885			2,074			2,281			2,509			2,760		
DRCN budget				**35,815**			**39,397**			**43,336**			**47,670**			**52,437**		
Core network length (km)				**51.96**			**51.96**			**51.96**			**51.96**			**51.96**		
Blacktop (km)				-			-			-			-			-		
Gravel (km)				-			-			-			-			-		
Earthen (km)				51.96			51.96			51.96			51.96			51.96		
Conservation (NPR '000)				**1,559**			**1,559**			**1,559**			**1,559**			**1,559**		
Emergency				1,559			1,559			1,559			1,559			1,559		
Routine																		
Recurrent (blacktop)																		
Recurrent (gravel)																		
Recurrent (earthen)																		
Periodic (blacktop)				-			-			-			-			-		
Periodic (gravel)				-			-			-			-			-		
Improvement	**Cost**	**BT**	**GR**	**34,256**	**BT**	**GR**	**37,838**	**BT**	**GR**	**41,777**	**BT**	**GR**	**46,111**	**BT**	**GR**	**50,878**	**BT**	**GR**
67DR002	705	-	-	705	-	-	-	-	-	-	-	-	-	-	-	-	-	-
67DR003	880	-	-		-	-	880	-	-	-	-	-	-	-	-	-	-	-
67DR008	850	-	-		-	-	850	-	-	-	-	-	-	-	-	-	-	-
67DR001	1,250	-	-		-	-		-	-	1,250	-	-	-	-	-	-	-	-
67DR009	850	-	-		-	-		-	-	850	-	-	-	-	-	-	-	-
67DR006	750	-	-		-	-		-	-		-	-	750	-	-	-	-	-
67DR007	1,250	-	-		-	-		-	-		-	-	1,250	-	-	-	-	-
67DR004	2,470	-	-		-	-		-	-		-	-		-	-	2,470	-	-
67DR005	5,264	-	-		-	-		-	-		-	-		-	-	5,264	-	-
Total improvement				**705**	**-**	**-**	**1,730**	**-**	**-**	**2,100**	**-**	**-**	**2,000**	**-**	**-**	**7,734**	**-**	**-**
New Construction	**Cost**		**ER**	**33,551**	**ER**		**36,108**	**ER**		**39,677**	**ER**		**44,111**	**ER**		**43,144**	**ER**	
67DR004	-		-	-	-		-	-		-	-		-	-		-	-	
67DR005	-		-	-	-		-	-		-	-		-	-		-	-	
67DR006	2,400		0.60	2,400	0.60		-	-		-	-		-	-			-	
67DR003	12,800		3.20	12,800	3.20		-	-		-	-		-	-			-	
67DR002	21,200		5.30	18,351	4.59		2,849	0.71		-	-		-	-			-	
67DR013	16,000		4.00		-		16,000	4.00		-	-		-	-			-	
67DR011	36,400		9.10		-		8,400	2.10		28,000	7.00		-	-			-	
67DR014	18,400		4.60		-		8,859	2.21		9,500	2.38			-			-	
67DR010	28,800		7.20		-			-		2,177	0.54		20,000	5.00			-	
67DR012	54,800		13.70		-			-			-		24,111	6.03			-	
67DR001	68,000		17.00		-			-			-			-		26,000	6.50	
67DR015	63,200		15.80		-			-			-			-		17,144	4.29	
67DR009	54,800		13.70		-			-			-			-		-	-	
67DR007	54,800		13.70		-			-			-			-		-	-	
67DR008	140,800		35.20		-			-			-			-		-	-	
			143.1															
Total new construction = 49.15 km				**33,551**	**8.39**		**36,108**	**9.03**		**39,677**	**9.92**		**44,111**	**11.03**		**43,144**	**10.79**	

6.3 DTMP OUTPUTS

Based on the investment plan presented above, all DRCN roads (51.96km) will be conserved for the duration of the DTMP period. All of these roads will also receive the cross drainage and protective structures required to make them maintainable fair-weather roads. Due to low road density and less traffic volume all the existing earthen roads will not be improved to grave standard at the end of the DTMP period and will be improved in the next DTMP. The same goes for the new construction which will only take place after the existing DRCN roads have been improved to maintainable all weather standards (some of these roads may be constructed using VDC funding).

Table 6.3.1 DTMP output

Conservation	Improvement gravel	Improvement blacktop	New construction
51.96	-	-	49.15

Of the total DTMP budget, NPR 7.794 million will be spent on conservation; NPR 14.269 million on improvements and NPR 196.591 million. This will use up the entire DTMP budget for the five-year period.

6.4 DTMP OUTCOME

As a result of the activities planned in this DTMP, the percentage of fair-weather maintainable DRCN roads at the end of this DTMP will be 101.11 km (51.96km old and 49.15km new), remaining fair weather.

Table 6.4.1 Standard of DRCN roads

	Total length	Fair-weather		All-weather gravel		All-weather blacktop	
	km	km	%	km	%	km	%
Start of DTMP	51.96	51.96	100%	-	0%	-	0%
End of DTMP	51.96	51.96	100%	-	0%	-	0%
Difference	-	-	0%	-	0%	-	0%

The number of VDC headquarters with access to the SRN is 5 with 26% population. Similarly, the number of VDC with access to fair-weather DRCN roads will increase from 2 to 18 and the district population with access to the fair-weather DRCN roads will increase from 9% to 73%. The number of VDC headquarters with no access to DRCN roads will remain at 7, while the percentage of the district population with no access to DRCN roads will remain at 22%.

Table 6.4.2 Population with access to road network

	Direct access to SRN			No access DRCN roads			Access to fair-weather DRCN roads			Access to all-weather DRCN roads		
	VDCs	Population	%	VDCs	Population	%	VDCs	Population	%	VDCs	Population	%
Start of DTMP	5	34,526	26%	21	95,351	71%	2	12,651	9%	0	-	0%
End of DTMP	5	34,526	26%	7	29,714	22%	18	97,857	73%	0	-	0%
Difference	-	-	0%	-14	-65,637	-49%	16	85,206	64%	-	-	0%

Figure 6 District Transport Master Plan (DTMP)

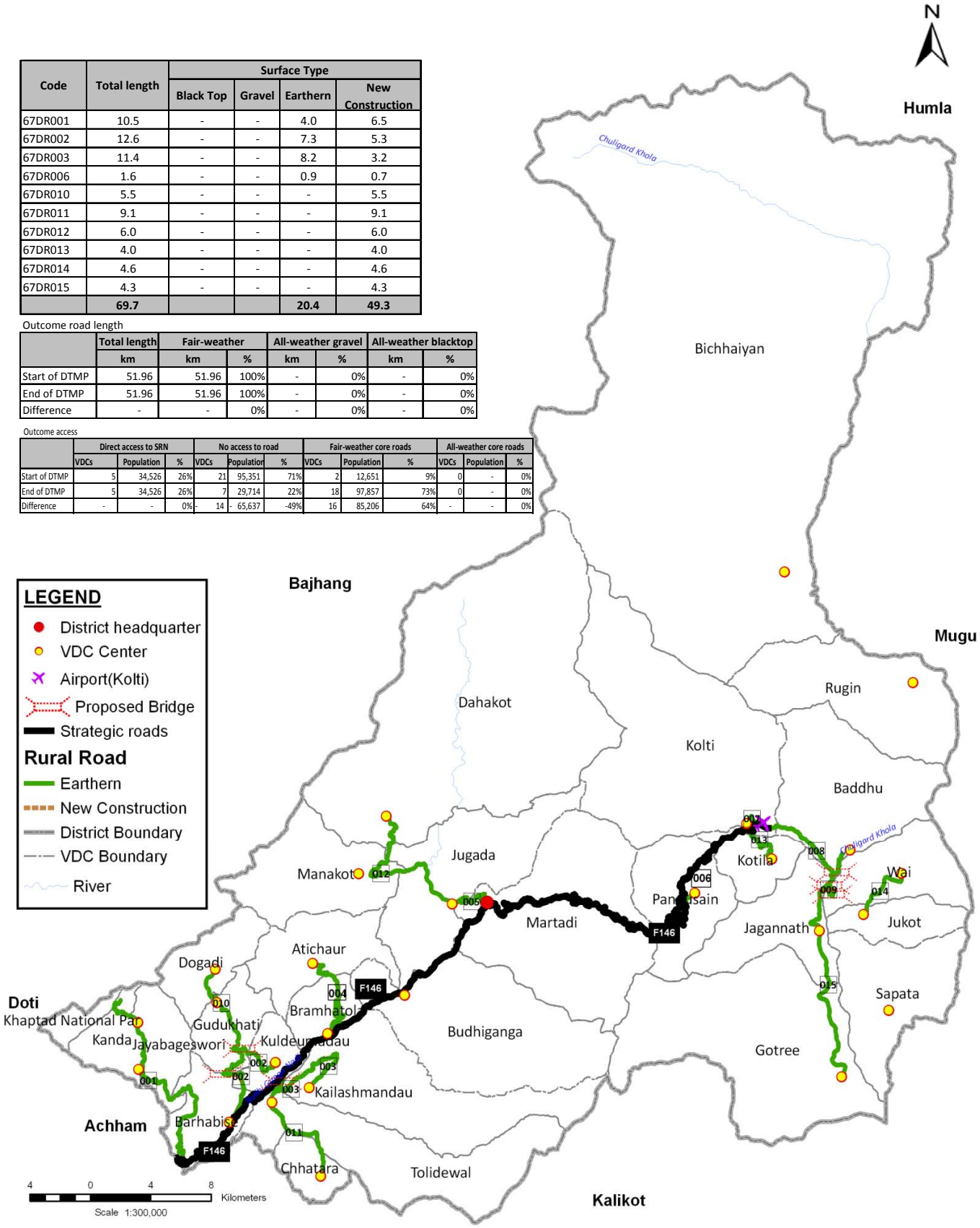
Code	Total length	Surface Type			
		Black Top	Gravel	Earthern	New Construction
67DR001	10.5	-	-	4.0	6.5
67DR002	12.6	-	-	7.3	5.3
67DR003	11.4	-	-	8.2	3.2
67DR006	1.6	-	-	0.9	0.7
67DR010	5.5	-	-	-	5.5
67DR011	9.1	-	-	-	9.1
67DR012	6.0	-	-	-	6.0
67DR013	4.0	-	-	-	4.0
67DR014	4.6	-	-	-	4.6
67DR015	4.3	-	-	-	4.3
	69.7			**20.4**	**49.3**

Outcome road length

	Total length	Fair-weather		All-weather gravel		All-weather blacktop	
	km	km	%	km	%	km	%
Start of DTMP	51.96	51.96	100%	-	0%	-	0%
End of DTMP	51.96	51.96	100%	-	0%	-	0%
Difference	-	-	0%	-	0%	-	0%

Outcome access

	Direct access to SRN			No access to road			Fair-weather core roads			All-weather core roads		
	VDCs	Population	%	VDCs	Population	%	VDCs	Population	%	VDCs	Population	%
Start of DTMP	5	34,526	26%	21	95,351	71%	2	12,651	9%	0	-	0%
End of DTMP	5	34,526	26%	7	29,714	22%	18	97,857	73%	0	-	0%
Difference	-	-	0%	- 14	- 65,637	-49%	16	85,206	64%	-	-	0%



ANNEX 1 TRAFFIC DATA

Code	Total Length (km)	Motorcycle	Car-Jeep-Minibus	Tractor	Truck-Bus	PCU	VPD
67DR001	4.00					-	-
67DR002	7.35	4	2	4		**12**	**6**
67DR003	8.22					-	-
67DR004	11.70	5	2	6		**17**	**8**
67DR005	5.89					-	-
67DR006	0.90					-	-
67DR007	2.40					-	-
67DR008	8.00					-	-
67DR009	3.50					-	-
0	0.00					-	-
Total	**51.96**						

ANNEX 2 POPULATION SERVED

SN	VDC/municipality	Population	Road																							
			67DR001	67DR002	67DR003	67DR004	67DR005	67DR006	67DR007	67DR008	67DR009	67DR010	67DR011	67DR012	67DR013	67DR014	67DR015	0	0	0	0	0	0	0	0	SRN
1	Atichaur	4,277				X																				
2	Baddhu	5,059								X																
3	Wai	3,383														X										
4	Barhabis	8,374	X	X																						X
5	Bichhaiya	2,723																								
6	Bramhatola	6,431				X																				X
7	Budhiganga	4,042																								X
8	Chhatara	3,712											X													
9	Dahakot	4,438												X												
10	Dogadi	3,456										X														
11	Gotree	6,030															X									
12	Gudukhati	5,130		X								X														
13	Jagannath	3,587															X									
14	Jayabageswori	2,512	X																							
15	Jugada	5,358					X							X												
16	Jukot	3,230									X					X										
17	Kailasjmandau	9,586			X								X													
18	Kanda	3,200	X																							
19	Kolti	7,134							X	X					X											
20	Kotila	3,224													X		X									
21	Kuldeumandau	6,872		X	X																					X
22	Manakot	2,688												X												
23	Martadi	8,807					X																			X
24	Pandusain	6,751						X																		
25	Rugin	2,914								X																

SN	VDC/municipality	Population	Road																							
			67DR001	67DR002	67DR003	67DR004	67DR005	67DR006	67DR007	67DR008	67DR009	67DR010	67DR011	67DR012	67DR013	67DR014	67DR015	0	0	0	0	0	0	0	0	SRN
26	Sappata	6,171									X															
27	Tolidewal	5,065											X													
	Total population	**134,154**	14,086	20,376	16,458	10,708	14,165	6,751	7,134	15,107	9,401	8,586	18,363	12,484	10,358	6,613	12,841	-	-	-	-	-	-	-	-	34,526
	Total VDCs/municipalities	**27**	**3**	**3**	**2**	**2**	**2**	**1**	**1**	**3**	**2**	**2**	**3**	**3**	**2**	**2**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**5**

Source: ***Census data 2011***

ANNEX 3 LOCATION OF PROPOSED INTERVENTIONS

Road code	Road Name	Length (km)	Start chainage (km) or X-coordinate	End chainage (km) or Y-coordinate	Rehabilitation (km)	Gravelling (km)	Blacktopping (km)	Widening (m)	Bridge (m)	Slab culvert (m)	CC Causeway (m)	Stone Causeway (m)	Pipe culvert (units)	Masonry walls (m3)	Gabion walls (m3)	Lined drain (m)
67DR001	Dhap - Khaptad Tourism Road	4.00										15		80	120	
67DR002	Barahbise- Dhanalta-Delta-Lamgaun(Aatichaur) Road	7.35							120				3		270	
67DR003	Maure- Kailashmandu- Badimalika Road	8.22							120			10	3		300	
67DR004	Shera - Aatichaur Agriculture Road	11.70							60			30	7	30	720	
67DR005	Martadi-Majhigaun(Jugada)-Pinalek-Aatichaur-Thamlek Road	5.89							130			15	2	320	757.5	
67DR006	Pandusain- VDC center Link Road	0.90													300	
67DR007	Kolti - Kuru- Budinanda Tourism Road	2.40													500	
67DR008	Piluchur-Baddhau- Boldhik -Kyari -Bichhaiya Road	8.00							80			10			300	
67DR009	Piluchur-Jukot - Sappata Road	3.50							150			10			300	
VR																
67VR001	Guligard - Basalikot Village Road	1.18														
67VR002	Tapari shera - Brahmatola VDC Road	0.311														
Total		**53.45**			**0**	**0**	**0**	**0**	**660**	**0**	**0**	**90**	**15**	**430**	**3568**	**0**

Photo 01: Participants in the Orientation workshop in Bajura District

Photo 02: Participants in the Final workshop in Bajura District

Photo03: GPS Tracking of Bajura district

Photo04: GPS Tracking of Bajura district