Government of Nepal

District Transport Master Plan (DTMP) of Sindhupalchowk

Ministry of Federal Affairs and Local Development (MoFALD)

Department of Local Infrastructure Development and Agricultural Roads (DoLIDAR)

District Development Committee, Sindhupalchowk, Chautara

March 2013

Prepared by the District Technical Office (DTO) for Sindhupalchowk 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.

DTMP

Report

SINDHUPALCHOWK DISTRICT

2013

FOREWORD

It is my great pleasure to introduce this updated version of District Transport Master Plan (DTMP; 2013) of Sindhupalchowk district identifying the District Road Core Network (DRCN) which provides all-weather access to all VDC centres (Headquarters; HQs) of the district with district Headquarter Chautara. Government of Nepal/DoLIDAR had set the policy of "***having at least one all-weather road access to each VDC/HQ from District Headquarter***" and priority for upgrading the identified DRCN to all-weather status in first phase. This policy shall enforce from coming fiscal year 2070/71 in a planned and systematic way. In the mean time, preparation of Village Road Transport master Plan (VTMP) is utmost important as such many constructed roads in the district are not included in DRCN. I believe that this document will be helpful in back-stopping to Rural Transport Infrastructure Sector Wide Approach (RTI SWAp) through systematic planning, resources mobilization, implementation and monitoring of DRCN & Village Roads. The document anticipating for proper utilisation of resources to improve the quality and year round transport services by reinforcing intra and inter-district linkages. It also anticipated generating substantial employment opportunities for rural people through increased and reliable accessibility in on-farm and off-farm livelihood diversification and commercialization of agriculture sector.

Therefore, it is considered most crucial method in executing rural road networks in a planned way as envisaged by District Transport Master Plan (DTMP) considering available resources within DDC and from external sources. Viewing these aspects, DDC Sindhupalchowk has prepared the DTMP by focusing most of the available resources primarily into maintenance and upgrading of the existing road networks. This document is also been assumed to be helpful in lobbing and fascinating the donor agencies through central government towards generating needy resources through basket fund approach. Furthermore, this document not only supportive in avoiding pervasive duplication approach in resources allocation under the rural road network development sector but also helpful in attaining concrete result of fund investment.

I would, firstly like to express my gratitude to RTI Sector Maintenance Pilot (RAP/DFID) and District Roads Support Programme (DRSP/SDC-Nepal) for financial and technical support. Secondly, Mr. Laxman Bhakta Dahi Shrestha, RTI Pilot District Asset Management Engineer for his continuous dedication, hard work, cooperation, negotiation and counselling in bringing up this DTMP document at this final stage successfully. I would like to thank Mr. Kumar Nepal (Mapping/GIS Unit; DRSP-PSU) who assisted in preparing various maps and RTI SAME Mr. Bal Krishna Kharga on the whole process of preparing this DTMP.

I would like to thank to Mr. Sunil Raj Giri, Chief of District Technical Office (DTO), Mr. Ganesh Acharya, Planning and Monitoring Officer (DDC), Mr. Rajendra Prasad Pyakurel, Programme officer (SWAp focal person/Information Centre, DDC) and other DDC and DTO staffs who directly and indirectly supported in the process of preparing this document.

My special thanks goes to all chief and representatives of political parties and other DTICC members for their valuable inputs and comments in bringing up this document.

Last but not least, I would like to express my heartfelt gratitude to Ministry of Federal Affairs and Local Development (MoFALD), Department of Local Infrastructure Development and Agriculture Roads (DoLIDAR), DFID/RTI Sector Maintenance Pilot Central Team and Road Board Nepal for their valuable technical and financial support.

B. R. Dhakal

Bal Ram Dhakal
Local Development Officer
District Development Committee
Sindhupalchowk

स्थानीय विकास अधिकृत

PREFACE / ACKNOWLEDGEMENTS

District Transport Master Plan (DTMP) of Sindhupalchowk District has been prepared with support from DRSP/SDC UKaid/DFID, Technical Assistance by RTI Sector Maintenance Pilot and close coordination with DoLIDAR.

We would like to express our gratitude to Mr. Bal Ram Dhakal, Local Development Officer (LDO), Mr. Sunil Raj Giri, Chief District Technical Officer (DTO), DTO Engineers, DTO sub-engineers and other DDC and DTO staff for their valuable suggestions and co-operation for the preparation of this report.

We would also like to thank Mr. Bhupendra Bahadur Basnet, Director General of DoLIDAR, members of the DoLIDAR Technical Committee, including Mr. Ganga Bahadur Basnet, Coordinator, Mr. Jeevan Guragain, Mr. Krishna Bahadur Katwal, Mr. Kumar Thapa and Mr. Manoj Krishna Shrestha, RTI Planning and Infrastructure Specialist, as well as Serge Cartier Van Dissel, RTI Rural Roads Engineering Specialist, Mr. Michael Green, RTI Team Leader and Mr. Kumar Nepal, Mapping/GIS expert, DRSP all of whom were instrumental in shaping the new, “slim “ version of the DTMP.

The DTMP for Sindhupalchowk was prepared by Mr. Laxman Bhakta Dahi Shrestha, RTI Pilot District Asset Management Engineer and Mr. Bal Krishna Kharga, RTI Pilot Sub Asset Management Engineer. The author and DDC are grateful to all the local people and leaders who have rendered their valuable assistance to the team during the preparation of the DTMP.

EXECUTIVE SUMMARY

Sindhupalchowk District is located in Bagmati Zone of the Central Development Region of Nepal. It borders with Raceway and Nuwakot districts in the West, Rasuwa district and Tibet of China in North, Kavrepalanchok, Kathmandu and Ramechhap district in the south and Dolakha, Ramechhap district and Tibet of China in the east. The district has 79 VDCs, 13Ilakas and 3 constituency areas. The total area of the district is 2,542 km^2. The district lies partly in the *Mid-Hills* and partly in the *High-Hills/Mountain*. The lowest point of the district is Banditar/Majhigaun Sunkoshi basin 747m in Sangachok VDC and the highest peak is Langpoghyang 7085m from mean sea level. The lowest elevation settlement is Danuwar gaun (804 meter) in Sangachok VDC and the highest elevation of settlement point is 4,168 meter from mean sea level. Subsistence agriculture farming, mainly small scale livestock is the main source of occupation and livelihood of the majority of the population, with 79% of the population active in this sector. Due to low level of agricultural production, the majority of the households face acute food shortages for a large part of the year

The district inventory identified 2542.65km of roads, including 145.81km of strategic roads and 2396.84km of rural roads. In coordination with the DTICC and DDC, 55 rural roads with a length of 600.74km were identified as making up the district road core network (DRCN), and the remaining 1796.10km were classified as village roads. The existing DRCN roads link up 77 of the 79 VDC headquarters. Of the 600.74km DRCN roads, 17.15km black top, 41.05km gravel and rest 545.73km are earthen fair-weather roads.

Road Class	Total length	Black Top	Gravel	Earthen
Strategic road network	145.81	122.31	18.00	5.50
District road core network	600.74	17.15	42.85	540.74
Village roads	1796.10	1.30	0.20	1794.60
Total	**2542.65**	**140.76**	**61.05**	**2340.84**

Annual conservation costs are estimated at NPR 205.08millionbased 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 1025.40million. 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. The required improvements and their estimated costs are listed below.

Improvement type	Requirement		Cost (NPR)
Bridges	800	m	435,000,000
Slab culverts	124	m	21,600,000
CC Causeways	1776	m	182,100,000
Stone Causeways	4607	m	47,170,000
Hume pipes	1172	units	46,880,000
Masonry retaining walls	6727.34	m^3	67,273,400
Gabion retaining walls	22189.50	m^3	78,101,000
Lined drains	135083	m	278,926,000
Widening	216980	m	542,450,000
Rehabilitation	0	km	-
Gravelling	540.74	km	1,095,028,000
Blacktopping	66.90	km	111,720,000
New construction	24.30	km	195,660,000
Total			**3,101,908,400**

The available budget for the road sector for the coming five years (fiscal year 2069/70 to 2073/74) is estimated to be NPR 912.325 million. Due to many number of DRCN roads, allocation to the district road core network was reserved at 90% 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 if funds remains. The distribution of district road sector budget set to 90% reserved for the district road core network (DRCN). The remaining 10% is to be used by the DDC for the village roads, giving priority to emergency maintenance and routine/recurrent maintenance. Alternatively, this 10% may be used for the new construction of DRCN roads where this is considered a priority set by the district. The 90% of the district road sector budget for the DTMP is allocated firstly to conservation, secondly improvement, and any remaining funding to new construction. However, the forecasted funds is insufficient even for conservation of existing DRCN and therefore allocation for first and second year has done based on funds received by the district and from 3rd year to 5th year, the budget will be deficit by NPR 292.925 even to cover conservation requirement. Also part of the new construction shall be carried out and the remaining improvement works shall be carried out in the next DTMP.

Of the total DTMP budget of NPR 912.33 million, NPR 775.48 million will be spent for DRCN roads (600.74km; 25% length) and NPR 136.85 million for village roads (1796.10km; 75% in length). The estimated fund is not sufficient even for conservation of DRCN roads (i.e. 821.50 million) and therefore minimum improvement works will be carried out under conservation. Likely the budget proposed for village roads also insufficient for minimum requirement for conservation of track opened roads. With the present scenario of resources availability; Sindhupalchowk district is facing acute shortage of fund (huge funding gap of NPR 318.823 million, i.e. 38.8% deficit) to maintain the existing roads. While funds deficit for conservation, improvement and new construction of DRCN is NPR 3,374.44 million (81.3%).

Within the DTMP period so far planned to conserve the DRCN roads (600.74km), a further 43km of roads will be upgraded to gravel (GR) standard with RRRSDP funding and 18.05km of roads planned to upgrade to blacktop (BT) standard with DOR funding, resulting in a total of 275km being brought to a maintainable all-weather standard (BT, GR, Earthen) from 150.96km. The increase in gravel to 82.50km from 42.85km and that of black top road to 29.40km from 17.15km. Although 2 VDC headquarters remains inaccessible within this DTMP period too, while the percentage of the district population with all weather access will increase from 35% to 65% and the percentage of population with inaccessible area remains only 2.5%.

ABBREVIATIONS

ADT	Average Daily Traffic
ARMP	Annual Road Maintenance Programme
BT	Black Top Roads
DDC	District Development Committee
DOLIDAR	Department of Local Infrastructure Development and Agriculture Road
DOR	Department of Road
DRCN	District Road Core Network
DTICC	District Transport Infrastructure Coordination Committee
DTMP	District Transport Master Plan
DTPP	District Transport Perspective Plan
ER	Earthen Roads
GIS	Geographical Information system
GPS	Global Positioning System
GON	Government of Nepal
GR	Gravel Roads
LGCDP	Local Governance and Community Development Programme
MFALD	Ministry of Federal Affairs and Local Development
MWSP	Melamchi Water Supply Project
NPR	Nepalese Rupees
RAP	Rural Access Programme
RRRSDP	Rural Reconstruction and Rehabilitation Sector Development Project
SWAp	Sector Wide Approach
VDC	Village Development Committee
VPD	Vehicle per Day

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1. INTRODUCTION

Sindhupalchowk District is located in Bagmati Zone of the Central Development Region of Nepal. It borders with Raceway and Nuwakot districts in the West, Rasuwa district and Tibet of China in North, Kavrepalanchok, Kathmandu and Ramechhap district in the south and Dolakha, Ramechhap district and Tibet of China in the east. The district headquarter is Chautara, located at an altitude of 1450 m. The district has 79 VDCs, 13Ilakas and 3 constituency areas. The total land area of the district is about 2542 Sq.km. Out of the total area; agricultural land is 737.10 Sq. km (29.0%). Similarly, snow covered land, forest, grazing land, barren, bush cover land, water bodies and others are 47.00 Sq. Km (1.85%), 775.67 Sq. km. (30.51%), 118.23 Sq. km (4.65%), 456.15 Sq. km (17.94%), 2.34 Sq. km (0.10%), 322.53 Sq. km (12.69%), and 53.91 Sq. km (2.12%) respectively. The district lies partly in the *Mid-Hills*and partly in the *High-Hills/Mountain*. The lowest point of the district is Banditar/Majhigaun Sunkoshi basin 747m in Sangachok VDC and the highest peak is Langpoghyang 7085m from mean sea level. As a result of the elevation differences, the district has three different types of climates viz. tropical up to 1,000 m (16% of area), sub-tropical from 1,000-2,000 m (69%) and temperate above 2,000 m (15%). The annual rainfall is about 2,500 mm and temperatures vary from 7.5 ºC to 32 ºC. Sindhupalchowk is basically agricultural based district. The occupation pattern of the district is approximately 77.3% of the active populations are involved in agricultural sector. Subsistence agriculture farming, mainly small scale livestock is the main source of occupation and livelihood of the majority of the population, with 79% of the population active in this sector. 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 Sindhupalchowkdistrict

According to the latest CBS census data 2011, the total population of the district is 285,770 comprising 149,107 female (51.4%) and 136,663 male (49.6%) residing in 66,635 households. Sindhupalchowk has an average population density of around 141 people per square km. The average family size is 4.32. Life expectancy of the people is 62 years. The average literacy rate is about 59.58% (51.88% female and 67.97% male). Sindhupalchowk district has a multi ethnic composition with Tamang, Chhetri, Brahman,Newar, Bishwokarma, Sanyasi, Sherpa, Darji/Pariyar, Majhi, Magar, Gurung, Hyolmo, Thami, Mijar/Sarki, Danuwar, Pahari, Ghale and others. The dominant language is Nepali (55.31%) followed by Tamang

(31.26%), Newari (6.71%), Sherpa (2.86%), Hyolmo (2.11%), Thami (0.99%) and others (0.76%).

The districts' headquarter Chautara is linked with strategic road from Araniko highway at Bandeu/Dolalghat. The strategic road networks are; (1) Araniko Highway (H03), (2) Panchkhal-Helambu feederroad (F30), (3) Bandeo/Dolalghat-Chautara feeder road (F31), and (4) Lamosanghu-Tamakoshi-Manthali feeder road (F32), plays crucial role in the district for socio-economic and infrastructural development. The strategic roads are either black topped or gravel standard maintained by the DoR.The part of Mid-Hill highway (under construction) will run from Dhandkhola to Chisapani (border with Nuwakot district). The western part of the district is growing up its commercial and developmental efforts due to implementation of Melamchi Water Supply Project which targets to supply water to Kathmandu valley.

Tatopani, Barhabise, Khadichaur, Chautara, Melamchi are the main trading centres and Chaku, Lamosangu, Mude, Balephi, Jalbire, Syaule, Sangachok, Nawalpur, Talamarang, Bahunepati, Tipeni, Gyalthum, Chanaute etc. are other market centers. Tatopani is the major trading point with China/Tibet and Barhabise, Khadichaur, Lamosangu are major market centres for Chinese goods.

2. DISTRICT ROAD CORE NETWORK (DRCN)

This chapter gives an overview of the existing roads in Sindhupalchowk 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

Sindhupalchowk district has an estimated road network of 2542.65kilometres, including 145.81 km of strategic roads managed by DOR and 2396.84 km of rural roads managed by Sindhupalchowk DDC and the 79 VDCs. The strategic roads are mostly black topped and most of the rural roads have an earthen surface. A map of the total road network in Sindhupalchowk district is shown in **Error! Reference source not found.** at the end of this hapter.

Table:2.1.1 Road length in Sindhupalchowk district (km)

Road Class	Total length	Black Top	Gravel	Earthen
Strategic roads	**145.81**	**122.31**	**18.00**	**5.50**
Rural roads	**2396.84**	**18.45**	**43.05**	**2235.34**
Total	**2542.65**	**140.76**	**53.20**	**2340.84**

2.2 NATIONAL HIGHWAYS AND FEEDER ROADS

Sindhupalchowk district has 1 highway (Araniko Highway-H03;Kathmandu-Dolalghat-Kodari) and three feeder roads viz. Panchkhal-Helambu (F30), Dolalghat/Bandeu-Chautara (F31) and Lamosangu-Tamakoshi-Manthali (F32); totalling 145.81km are treated as strategic roads in this DTMP. Most of the SRN area black topped or gravelled by the DOR. The proposed Mid-Hill Highway is partly overlaps with Araniko Highway (Dolalghat to Panchkhal/0 kilo) and Panchkhal-Helambu feeder road (0 kilo to Gyalthum bazaar).

Table:2.2.1 National Highways and Feeder Roads in Sindhupalchowk district (km)

Code	Description / Road Name	Total length	Black Top	Gravel	Earthen
H03	Arniko Highway	**55.93**	55.93		
F30	Panchkhal Helambu feeder road	**36.50**	13.00	18.00	5.50
F31	Dolalghat Chautara feeder road	**25.11**	25.11		
F32	Lamosangu (Nigale) Tamakoshi Ramechhap	**28.27**	28.27		
Total		**145.81**	**122.31**	**18.00**	**5.50**

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 roads/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 adopted in the existing DTMP.

The resulting District Road Core Network in Sindhupalchowk district is shown in Figure 3 at the end of this chapter. The DRCN consists of 55 district roads with a total length of 600.74km. The remaining 1796.10km of existing rural roads are not considered to be DRCN roads and are classified as village roads under the responsibility of the VDCs. Of the total 55DRCN roads, 6 roads totalling 98.70km are improved or currently under upgrading stages from DoR, RRRSDP, Sunkoshi Hydropower and Melamchi DWSP. The roads are:(a) Bhotechaur-Kauledovan:-11.10km (DoR), (b) Fatkeshwor-Chhapbhanjyang:- 4.10km (RRR-Kathmandu), (c) Sildhunga-Tauthali-Tekanpur:- 22.90km (RRR Sindhupalchowk), (d) 1 Kilo Pangretar-Damsite:- 1.80km (Sunkoshi Hydropower), e) Naubise-Chautara-Melamchi:- 43.00km (RRR Sindhupalchowk) and (f) SindhuAditMarga:- 15.80km (Melamchi DWSP). Majority of DRCN are earthen roads and are considered fair-weather with few of them all-weather status (see Table 2.3.1). A complete list of the DRCN roads and their characteristics is provided in Table:2.3.2.

Table:2.3.1 Road length in Sindhupalchowk district (km)

Road Class	Total length	Black Top	Gravel	Earthen
Strategic road network	**145.81**	**122.31**	**18.00**	**5.50**
Highway	55.93	55.93	-	-
Feeder roads (3)	89.88	66.38	18.00	5.50
District road core network	**600.74**	**17.15**	**42.85**	**540.74**
Village roads	**1796.10**	**1.30**	**0.20**	**1794.60**
Total	**2542.65**	**140.76**	**61.05**	**2340.84**

Table:2.3.2 District road core network in Sindhupalchowk district (km)

Code	Description / Road Name	Total length	Black Top	Gravel	Earthen	New Track	All weather	Fair weather
23DR001	F30-Chanaute-Ichok-Kutumsang	**8.00**			8.00		-	8.00
23DR002	F30-Kiul-Bagar-Nigale-Sermathan	**8.76**			8.76		-	8.76
23DR003	F30-Timbu-Doring Nakote/Helambu	**8.78**			8.78	-	-	8.78
23DR004	Dauchet-Keureni-Banskhaka-Jatan-Baruwa	**18.35**			18.35		-	18.35
23DR005	F30-Melamchi-Tipeni-Bhotang	**30.56**			30.56		-	30.56
23DR006	Majhirumta Tar-Lekharka-Gunsa	**11.00**			11.00		-	11.00
23DR007	Tipeni-Bhotenamlang	**6.00**			6.00		-	6.00
23DR008	Khaldekhola-Lagarche-Okhreni	**5.90**			5.90		-	5.90
23DR009	Melamchi-Jyamire-Sunkhani-Dablang	**5.50**			5.50		-	5.50
23DR010	Syaule-Bhadgaun-Simpalkavre-Nawalpur	**9.85**			9.85		-	9.85
23DR011	F31-Chautara-Syaule-Okhreni-Gobre	**14.60**	0.30		14.30		6.60	8.00
23DR012	F31-Chautara-Batase-Kumbeshwor	**16.00**			16.00		-	16.00
23DR013	Naubise-Chautara-Melamchi	**43.00**			43.00		30.00	13.00
23DR014	Jaudanda-Khutumedanda, Kunchok	**1.57**			1.57		-	1.57
23DR015	H03-Balephi-Jalbire-Tembathan	**28.70**	0.75	10.25	17.70	9.30	11.00	17.70
23DR016	Okhreni-Selang-Golche-Baikunthe	**10.00**			10.00	12.00	-	10.00
23DR017	Toribarichaur-Selang School-Manedanda	**4.85**			4.85		-	4.85

Code	Description / Road Name	Total length	Black Top	Gravel	Earthen	New Track	All weather	Fair weather
23DR018	Sunkhola-Ghunga-Pangtag	**7.91**			7.91		-	7.91
23DR019	Dhande-Biplum-Yanlakot-Hagam	**10.80**			10.80	-	-	10.80
23DR020	Naubise-Fulpingkot-Dhuskot	**4.49**			4.49		-	4.49
23DR021	H03-Kothe-Binjel-Chilaune-Dhuskot ~ Hagam	**9.50**			9.50		-	9.50
23DR022	F32-Kakaling-Pedku-7 Kilo	**2.38**			2.38		-	2.38
23DR023	F32-1 Kilo- Pangretar-Damsite (H03)	**1.80**			1.80		1.80	-
23DR024	H03-Khadichaur-Mangkha-Chimling	**4.00**			4.00		-	4.00
23DR025	Barhabisephant-Puranagaun-Kerabari-Ramche	**4.49**			4.49		-	4.49
23DR026	H03-Barhabise-Maneswara-Ghumthang-Listi-Bhairavkunda	**21.00**			21.00		-	21.00
23DR027	H03-Daklang-Listi-Bhairabkunda	**15.50**			15.50		-	15.50
23DR028	H03-Hindi-Lukusing-Lakchepu-Selangkatti	**2.38**			2.38		-	2.38
23DR029	H03-Chaku-Marming-Chandraku	**4.90**			4.90		-	4.90
23DR030	H03-Bulkote-Tyangthali-Dandakaterii	**7.70**			7.70		-	7.70
23DR031	H03-Khagdal/Barhabise-Thantichaur-Karthali-Dolnsa-Thinsang~Bigu	**10.65**			10.65		-	10.65
23DR032	H03-Barhabise-Budhepa-Bagar-Ghorthali	**15.30**	0.30		15.00		8.30	7.00
23DR033	Bagar-Chokati	**3.00**			3.00		-	3.00
23DR034	Sunkoshi-Dhuskun-Piskar-Tauthali	**14.75**			14.75		-	14.75
23DR035	F32-Sildhunga-Tauthali-Tekanpur(H03)	**22.90**			22.90		18.00	4.90
23DR036	Pyukharka-Thulodhading-Danse	**10.13**			10.13		-	10.13
23DR037	H03-Sukute-Puranckot-Wafal-Lishankhu-Ghyangdanda-21 Kilo(F32)	**44.40**	0.70	6.00	37.70		14.00	30.40
23DR038	H03-Syale-Yamundanda-Sunkhani-Ghichchet-Tamche-Sikre	**11.90**			11.90		-	11.90
23DR039	H03-Sukute-Sheradanda-Mahendrakranti Ma.Vi.	**5.20**			5.20		-	5.20
23DR040	Melchaur(F31)-Bhaise(H03)	**9.03**			9.03			9.03
23DR041	F31-Jalkine-Narsingdanda-Archale-Rolpakha-Jhyadi	**4.46**			4.46		4.46	-
23DR042	Dauthedanda-Bhotsipa-Gaitar-Healthpost	**3.40**			3.40		-	3.40
23DR043	F31-Chautara-Sipaghat(F30)	**26.54**		9.00	17.54		17.84	8.74
23DR044	Nawalpur-Jyamiremane (Sipaghat)	**7.00**			7.00		7.00	-
23DR045	F30-Phatkeshwor-Pandherachaur-Chhapbhanjyang	**3.85**			3.85		-	3.85
23DR046	F30-Phatkeshwor-Chhapbhanjyang	**4.10**	4.10				4.10	-
23DR047	Bhotechaur-Kauledovan	**11.10**	11.10				11.10	-
23DR048	Jaisigaun-Haibung-Patibhanjyang	**7.80**			7.80		-	7.80
23DR049	SindhuAdit (F30-Bahunepati-Thankune)	**15.80**		15.80			15.80	-
23DR050	F30-Bahunepati-Khatritole-Bhanjyang-Thakle-Sindhukot	**4.00**			4.00		-	4.00
23DR051	F30-Melamchi-Selle-Duwachaur-Kakani-Sermathang	**10.13**			10.13		-	10.13
23DR052	SindhuAdit-Bhadaure-Sindhukot-Dhusinichaur-Manebhanjyang-Nepane(F30)	**5.30**			5.30		-	5.30
23DR053	SindhuAdit-Chipling/Palchen-Okhrenichaur-Thakani)	**6.70**			6.70		-	6.70
23DR054	Talamarang-Manebhanjyang-Thakani	**6.39**			6.39			6.39

Code	Description / Road Name	Total length	Black Top	Gravel	Earthen	New Track	All weather	Fair weather
23DR055	Chanaute-Palchowkimai-Nagidanda	**6.90**			6.90		-	6.90
	Total	**600.74**	**17.15**	**42.855**	**540.74**	**24.30**	**150.96**	**449.78**

In addition to above DRCN roads, following roads has recommended by the all party meeting organised by the DDC (for endorsement of DRCN and DTMP) to take as an alternative road to the VDCs mentioned and the DDC should address and consider for funding purpose. Detailed analysis has not been done at present. Need to do later once DDC decided to include in ARMP.

Table: 2.3.3 Proposed Alternate District Road Core Network (DRCN) in Sindhupalchowk

Code	Description / Road Name	Total length	Black Top	Gravel	Earthen	All weather	Fair weather	Remarks
23VR044	9 Kilo-Sherabesi-Kholakharka-Ratankot-Sunkhani	**6.48**			6.48		6.48	For Sunkhani VDC
23DR027	Barhabise-Thotneri-Ramche-Bhattedanda	**12.89**			12.89		12.89	For Ramche VDC
23DR025	Patle-Bungathali-Pabidal-Ghatte khola-Chokati-Latu	**9.50**			9.50		9.50	For Chokati VDC
23DR023	Gaurishankar Himal Motar Bato	**8.16**			8.16		8.16	Tourism Road
	Sub-Total	**37.03**			**37.03**		**37.03**	

Of the above DRCN roads enlisted in table 2.3.2, three roads viz.: (1) Naubise~Chautara section of Naubise-Chautara-Mealmchi (12.50km), (2) Sildhunda-Tauthali-Tekanpur (22.90km), (3) Fatkeshwor-Chhapbhanjyang (4.10km) are undertaken by RRRSDP Sindhupalchowk and Kathmandu for upgrading to gravel, stone soling and black top standard respectively. Similarly, Department of Roads (DoR) has undertaken three roads viz. (4) Bhotechaur-Kauledoven (11.10km), (5) Balephi~Naubise section of Balephi-Jalbire-Tembathan (6.50km) and (6) 21 Kilo~Attarpur section of Sukute-Prankot-wafal-Lishankhu-Ghyangdanda-21 Kilo (6.70km) for upgrading to black top level. Likely, (7) Sindhu Adit Marga (Bahunepati-Thankunebhanjyang) 15.80km is already gravelled and also maintaining by Melamchi Water Supply Project (MWSP) and (8) 1 Kilo-Pangretar-Damsite 1.80km is gravelled and maintaining by Sunkoshi Hydropower Project. However, upgrading to gravel standard of remaining Chautara-Melamchi section (30.50km), Sildhunga-Tauthali-Tekanpur road (22.90km) plus remaining 505.34km shall be considered for upgrading.

2.4 VILLAGE ROADS

The 1796.10 km of remaining roads that do not form part of the identified district road core network (DRCN) are classified as village roads and are under the joint responsibility of the 79 VDCs and DDC in Sindhupalchowk district. These roads are of 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 and tourism as well as religious destinations.

On average each VDC will thus be responsible for 22.74 km of village roads. 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.

Funding for these roads will mainly come from the VDC grants. Some district funding will also be allocated to the village roads (see also chapter 6). However, this district funding will be mainly for maintenance, especially emergency maintenance and routine/recurrent maintenance to keep the village roads open.

Figure 2 : Total road inventory map for Sindhupalchowk district

Figure 3 District Road Core Network (DRCN) map

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 types 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 re-gravelling, resealing or overlays. It is generally carried out with several years interval. Although periodic maintenance is only required for specific sections of the 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.

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	Description / Road Name	Emergency maintenance (km)	Routine maintenance (km)	Recurrent maintenance (km)	Periodic maintenance (km)
23DR001	F30-Chanaute-Ichok-Kutumsang	8.00	8.00	8.00	-
23DR002	F30-Kiul-Bagar-Nigale-Sermathan	8.76	8.76	8.76	-
23DR003	F30-Timbu-Doring Nakote/Helambu	8.78	8.78	8.78	
23DR004	Dauchet-Keureni-Banskhaka-Jatan-Baruwa	18.35	18.35	18.35	-
23DR005	F30-Melamchi-Tipeni-Bhotang	30.56	30.56	30.56	-
23DR006	Majhirumta Tar-Lekharka-Gunsa	11.00	11.00	11.00	-
23DR007	Tipeni-Bhotenamlang	6.00	6.00	6.00	-
23DR008	Khaldekhola-Lagarche-Okhreni	5.90	5.90	5.90	-
23DR009	Melamchi-Jyamire-Sunkhani-Dablang	5.50	5.50	5.50	-
23DR010	Syaule-Bhadgaun-Simpalkavre-Nawalpur	9.85	9.85	9.85	-
23DR011	F31-Chautara-Syaule-Okhreni-Gobre	14.60	14.60	14.60	0.30
23DR012	F31-Chautara-Batase-Kumbeshwor	16.00	16.00	16.00	-
23DR013	Naubise-Chautara-Melamchi	43.00	43.00	43.00	43.00
23DR014	Jaudanda-Khutumedanda, Kunchok	1.57	1.57	1.57	-
23DR015	H03-Balephi-Jalbire-Tembathan	28.70	28.70	28.70	11.00
23DR016	Okhreni-Selang-Golche-Baikunthe	10.00	10.00	10.00	-
23DR017	Toribarichaur-Selang School-Manedanda	4.85	4.85	4.85	-
23DR018	Sunkhola-Ghunga-Pangtag	7.91	7.91	7.91	-
23DR019	Dhande-Biplum-Yanlakot-Hagam	10.80	10.80	10.80	-
23DR020	Naubise-Fulpingkot-Dhuskot	4.49	4.49	4.49	-
23DR021	H03-Kothe-Binjel-Chilaune-Dhuskot~Hagam	9.50	9.50	9.50	-
23DR022	F32-Kakaling-Pedku-7 Kilo	2.38	2.38	2.38	-
23DR023	F32-1 Kilo- Pangretar-Damsite(H03)*	1.80	1.80	1.80	-
23DR024	H03-Khadichaur-Mangkha-Chimling	4.00	4.00	4.00	-
23DR025	Barhabisephant-Puranagaun-Kerabari-Ramche	4.49	4.49	4.49	-
23DR026	H03-Barhabise-Maneswara-Ghumthang-Listi-Bhairavkunda	21.00	21.00	21.00	-
23DR027	H03-Daklang-Listi-Bhairabkunda	15.50	15.50	15.50	-
23DR028	H03-Hindi-Lukusing-Lakchepu-Selangkatti	2.38	2.38	2.38	-
23DR029	H03-Chaku-Marming-Chandraku	4.90	4.90	4.90	-
23DR030	H03-Bulkote-Tyangthali-Dandakaterii	7.70	7.70	7.70	-
23DR031	H03-Khagdal/Barhabise-Thantichaur-Karthali-Dolnsa-Thinsang~Bigu	10.65	10.65	10.65	-
23DR032	H03-Barhabise-Budhepa-Bagar-Ghorthali	15.30	15.30	15.30	0.20
23DR033	Bagar-Chokati	3.00	3.00	3.00	-
23DR034	Sunkoshi-Dhuskun-Piskar-Tauthali	14.75	14.75	14.75	-
23DR035	F32-Sildhunga-Tauthali-Tekanpur(H03)	22.90	22.90	22.90	-
23DR036	Pyukharka-Thulodhading-Danse	10.13	10.13	10.13	-
23DR037	H03-Sukute-Puranckot-Wafal-Lishankhu-Ghyangdanda-21 Kilo(F32)	44.40	44.40	44.40	6.70
23DR038	H03-Syale-Yamundanda-Sunkhani-Ghichchet-Tamche-Sikre	11.90	11.90	11.90	-
23DR039	H03-Sukute-Sheradanda-Mahendrakranti Ma.Vi.	5.20	5.20	5.20	-
23DR040	Melchaur(F31)-Bhaise(H03)	9.03	9.03	9.03	-
23DR041	F31-Jalkine-Narsingdanda-Archale-Rolpakha-Jhyadi	4.46	4.46	4.46	-
23DR042	Dauthedanda-Bhotsipa-Gaitar-Healthpost	3.40	3.40	3.40	-
23DR043	F31-Chautara-Sipaghat(F30)	26.54	26.54	26.54	9.00

Code	Description / Road Name	Emergency maintenance (km)	Routine maintenance (km)	Recurrent maintenance (km)	Periodic maintenance (km)
23DR044	Nawalpur-Jyamiremane (Sipaghat)	7.00	7.00	7.00	-
23DR045	F30-Phatkeshwor-Pandherachaur-Chhapbhanjyang	3.85	3.85	3.85	-
23DR046	F30-Phatkeshwor-Chhapbhanjyang	4.10	4.10	4.10	4.10
23DR047	Bhotechaur-Kauledovan*	11.10	11.10	11.10	-
23DR048	Jaisigaun-Haibung-Patibhanjyang	7.80	7.80	7.80	-
23DR049	SindhuAdit (F30-Bahunepati-Thankune)*	15.80	15.80	15.80	-
23DR050	F30-Bahunepati-Khatritole-Bhanjyang-Thakle-Sindhukot	4.00	4.00	4.00	-
23DR051	F30-Melamchi-Selle-Duwachaur-Kakani-Sermathang	10.13	10.13	10.13	-
23DR052	SindhuAdit-Bhadaure-Sindhukot-Dhusinichaur-Manebhanjyang-Nepane(F30)	5.30	5.30	5.30	-
23DR053	SindhuAdit-Chipling/Palchen-Okhrenichaur-Thakani)	6.70	6.70	6.70	-
23DR054	Talamarang-Manebhanjyang-Thakani	6.39	6.39	6.39	-
23DR055	Chanaute-Palchowkimai-Nagidanda	6.90	6.90	6.90	-
	Total	**600.74**	**600.74**	**600.74**	**74.30**

NOTE: ROADS WITH ASIERIK (*****) ARE MAINTAINING BY SUNKOSHI HYDROPOER, DOR AND MELAMCHI DW PROJECT

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 Sindhupalchowk 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 100passenger 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. But in case of Sindhupalchowk, the constructed width of most roads do not meeting the minimum standard of 5m and therefore considered for widening rather than criteria of 500 passenger car units.

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 / Road name	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. For Sindhupalchowk this concerns the total of 540.74 km of DRCN roads.

Table: 3.2.2 Sections of the district road core network requiring gravelling

Code	Description / Road name	Total length (km)	Gravelling (km)
23DR001	F30-Chanaute-Ichok-Kutumsang	8.00	8.00
23DR002	F30-Kiul-Bagar-Nigale-Sermathan	8.76	8.76
23DR003	F30-Timbu-Doring Nakote/Helambu	8.78	8.78
23DR004	Dauchet-Keureni-Banskhaka-Jatan-Baruwa	18.35	18.35
23DR005	F30-Melamchi-Tipeni-Bhotang	30.56	30.56
23DR006	Majhirumta Tar-Lekharka-Gunsa	11.00	11.00
23DR007	Tipeni-Bhotenamlang	6.00	6.00
23DR008	Khaldekhola-Lagarche-Okhreni	5.90	5.90
23DR009	Melamchi-Jyamire-Sunkhani-Dablang	5.50	5.50
23DR010	Syaule-Bhadgaun-Simpalkavre-Nawalpur	9.85	9.85
23DR011	F31-Chautara-Syaule-Okhreni-Gobre	14.60	14.30
23DR012	F31-Chautara-Batase-Kumbeshwor	16.00	16.00
23DR013	Naubise-Chautara-Melamchi	43.00	43.00
23DR014	Jaudanda-Khutumedanda, Kunchok	1.57	1.57
23DR015	H03-Balephi-Jalbire-Tembathan	28.70	17.70
23DR016	Okhreni-Selang-Golche-Baikunthe	10.00	10.00
23DR017	Toribarichaur-Selang School-Manedanda	4.85	4.85
23DR018	Sunkhola-Ghunga-Pangtag	7.91	7.91
23DR019	Dhande-Biplum-Yanlakot-Hagam	10.80	10.80
23DR020	Naubise-Fulpingkot-Dhuskot	4.49	4.49
23DR021	H03-Kothe-Binjel-Chilaune-Dhuskot~Hagam	9.50	9.50
23DR022	F32-Kakaling-Pedku-7 Kilo	2.38	2.38
23DR023	F32-1 Kilo- Pangretar-Damsite(H03) **	1.80	-
23DR024	H03-Khadichaur-Mangkha-Chimling	4.00	4.00
23DR025	Barhabisephant-Puranagaun-Kerabari-Ramche	4.49	4.49
23DR026	H03-Barhabise-Maneswara-Ghumthang-Listi-Bhairavkunda	21.00	21.00
23DR027	H03-Daklang-Listi-Bhairabkunda	15.50	15.50
23DR028	H03-Hindi-Lukusing-Lakchepu-Selangkatti	2.38	2.38
23DR029	H03-Chaku-Marming-Chandraku	4.90	4.90
23DR030	H03-Bulkote-Tyangthali-Dandakaterii	7.70	7.70
23DR031	H03-Khagdal/Barhabise-Thantichaur-Karthali-Dolnsa-Thinsang~Bigu	10.65	10.65
23DR032	H03-Barhabise-Budhepa-Bagar-Ghorthali	15.30	15.30
23DR033	Bagar-Chokati	3.00	3.00
23DR034	Sunkoshi-Dhuskun-Piskar-Tauthali	14.75	14.75
23DR035	F32-Sildhunga-Tauthali-Tekanpur(H03)	22.90	22.90
23DR036	Pyukharka-Thulodhading-Danse	10.13	10.13
23DR037	H03-Sukute-Puranckot-Wafal-Lishankhu-Ghyangdanda-21 Kilo(F32)	44.40	37.70
23DR038	H03-Syale-Yamundanda-Sunkhani-Ghichchet-Tamche-Sikre	11.90	11.90
23DR039	H03-Sukute-Sheradanda-Mahendrakranti Ma.Vi., Kalka	5.20	5.20
23DR040	Melchaur(F31)-Bhaise(H03)	9.03	9.03
23DR041	F31-Jalkine-Narsingdanda-Archale-Rolpakha-Jhyadi	4.46	4.46
23DR042	Dauthedanda-Bhotsipa-Gaitar-Healthpost	3.40	3.40
23DR043	F31-Chautara-Sipaghat(F30)	26.54	17.54
23DR044	Nawalpur-Jyamiremane (Sipaghat)	7.00	7.00
23DR045	F30-Phatkeshwor-Pandherachaur-Chhapbhanjyang	3.85	3.85
23DR046	F30-Phatkeshwor-Chhapbhanjyang*	4.10	-

Code	Description / Road name	Total length (km)	Gravelling (km)
23DR047	Bhotechaur-Kauledovan*	11.10	-
23DR048	Jaisigaun-Haibung-Patibhanjyang	7.80	7.80
23DR049	SindhuAdit (F30-Bahunepati-Thankune)**	15.80	-
23DR050	F30-Bahunepati-Khatritole-Bhanjyang-Thakle-Sindhukot	4.00	4.00
23DR051	F30-Melamchi-Selle-Duwachaur-Kakani-Sermathang	10.13	10.13
23DR052	SindhuAdit-Bhadaure-Sindhukot-Dhusinichaur-Manebhanjyang-Nepane(F30)	5.30	5.30
23DR053	SindhuAdit-Chipling/Palchen-Okhrenichaur-Thakani)	6.70	6.70
23DR054	Talamarang-Manebhanjyang-Thakani	6.39	6.39
23DR055	Chanaute-Palchowkimai-Nagidanda	6.90	6.90
	Total	**600.74**	**540.74**

NOTE: ROADS WITH SINGLE ASTERIK ARE ALREADY BLACKTOP/ONGOING AND THAT WITH DOUBLE ASTERIK ALREADY AT GRAVEL STATUS.

3.2.3 CROSS DRAINAGE

The need for cross drainage was identified for the different DRCN roads. A total of 2 bridges with a total length of 168m, 7 stone causeways with a total length of 135m, and 98 pipe culverts were identified as being required.

Table: 3.2.3 Required cross drainage structures

Code	Description / Road Name	Bridge (m)	Slab culvert	CC Causeway (m)	Stone Causeway	Pipe culvert (units)
23DR001	F30-Chanaute-Ichok-Kutumsang	30	-	50	60	25
23DR002	F30-Kiul-Bagar-Nigale-Sermathan	-	-	20	90	16
23DR003	F30-Timbu-Doring Nakote/Helambu	25	-	27	64	17
23DR004	Dauchet-Keureni-Banskhaka-Jatan-Baruwa	30	-	60	160	45
23DR005	F30-Melamchi-Tipeni-Bhotang	-	-	96	304	
23DR006	Majhirumta Tar-Lekharka-Gunsa	20	-	48	108	25
23DR007	Tipeni-Bhotenamlang	-	-	36	32	12
23DR008	Khaldekhola-Lagarche-Okhreni	-	-	10	72	15
23DR009	Melamchi-Jyamire-Sunkhani-Dablang	-	-	12	64	23
23DR010	Syaule-Bhadgaun-Simpalkavre-Nawalpur	-	-	84	54	45
23DR011	F31-Chautara-Syaule-Okhreni-Gobre	-	-	36	96	27
23DR012	F31-Chautara-Batase-Kumbeshwor	-	-	50	30	30
23DR013	Naubise-Chautara-Melamchi*	-	-	-	-	-
23DR014	Jaudanda-Khutumedanda, Kunchok	-	-	-	25	4
23DR015	H03-Balephi-Jalbire-Tembathan	120	18	48	75	53
23DR016	Okhreni-Selang-Golche-Baikunthe	125		60	48	22
23DR017	Toribarichaur-Selang School-Manedanda	-	-	24	20	8
23DR018	Sunkhola-Ghunga-Pangtag	-	-	15	40	23
23DR019	Dhande-Biplum-Yanlakot-Hagam	-	-	40	72	27
23DR020	Naubise-Fulpingkot-Dhuskot	-	-	-	60	25
23DR021	H03-Kothe-Binjel-Chilaune-Dhuskot	-	-	40	90	25
23DR022	F32-Kakaling-Pedku-7 Kilo	-	-	10	24	5
23DR023	F32-1 Kilo- Pangretar-Damsite(H03)*	-	-	-	-	-
23DR024	H03-Khadichaur-Mangkha-Chimling	-	-	12	36	9
23DR025	Barhabisephant-Puranagaun-Kerabari-Ramche	-	-	30	48	12
23DR026	H03-Barhabise-Maneswara-Ghumthang-Listi-Bhairavkunda	-	-	132	176	54
23DR027	H03-Daklang-Listi-Bhairabkunda	-	-	21	32	25
23DR028	H03-Hindi-Lukusing-Lakchepu-Selangkatti	-	-	18	18	5

Code	Description / Road Name	Bridge (m)	Slab culvert	CC Causeway (m)	Stone Causeway	Pipe culvert (units)
23DR029	H03-Chaku-Marming-Chandraku	-	-	25	32	12
23DR030	H03-Bulkote-Tyangthali-Dandakaterii	-	-	80	48	15
23DR031	H03-Khagdal/Barhabise-Thantichaur-Karthali-Dolnsa-Thinsang~Bigu	-	-	72	236	42
23DR032	H03-Barhabise-Budhepa-Bagar-Ghorthali	-	-	45	216	46
23DR033	Bagar-Chokati	-	-	16	12	4
23DR034	Sunkoshi-Dhuskun-Piskar-Tauthali	-	-	84	200	35
23DR035	F32-Sildhunga-Tauthali-Tekanpur(H03)	-	-	-	-	-
23DR036	Pyukharka-Thulodhading-Danse	-	-	48	36	20
23DR037	H03-Sukute-Puranckot-Wafal-Lishankhu-Ghyangdanda-21 Kilo(F32)	-	-	84	584	125
23DR038	H03-Syale-Yamundanda-Sunkhani-Ghichchet-Tamche-Sikre	-	12	20	96	30
23DR039	H03-Sukute-Sheradanda-Mahendrakranti Ma.Vi., Kalka	-	-	25	48	9
23DR040	Melchaur(F31)-Bhaise(H03)	-	-	30	32	12
23DR041	F31-Jalkine-Narsingdanda-Archale-Rolpakha-Jhyadi	-	-	-	64	9
23DR042	Dauthedanda-Bhotsipa-Gaitar-Healthpost	-	-	-	32	15
23DR043	F31-Chautara-Sipaghat(F30)	30	-	36	168	43
23DR044	Nawalpur-Jyamiremane (Sipaghat)		-		104	8
23DR045	F30-Phatkeshwor-Pandherachaur-Chhapbhanjyang	-	-	12	15	6
23DR046	F30-Phatkeshwor-Chhapbhanjyang*	-	-	-	-	-
23DR047	Bhotechaur-Kauledovan*	-	-			
23DR048	Jaisigaun-Haibung-Patibhanjyang	-	-	40	200	13
23DR049	SindhuAdit (F30-Bahunepati-Thankune)*	-	-	-	-	-
23DR050	F30-Bahunepati-Khatritole-Bhanjyang-Thakle-Sindhukot	-	-	10	36	8
23DR051	F30-Melamchi-Selle-Duwachaur-Kakani-Sermathang	-	-	30	232	20
23DR052	SindhuAdit-Bhadaure-Sindhukot-Dhusinichaur-Manebhanjyang-Nepane(F30)	-	-	50	120	13
23DR053	SindhuAdit-Chipling/Palchen-Okhrenichaur-Thakani)	-	-	40	48	12
23DR054	Talamarang-Manebhanjyang-Thakani	-	-	25	40	16
23DR055	Chanaute-Palchowkimai-Nagidanda	-	12	25	80	14
	Total	**800**	**124**	**1,776**	**4,607**	**1,172**

NOTE: ROADS WITH ASTERIK ARE ALREADY IMPROVED OR UPGRADING ON PROGRESS AND NO STRUCTURES NEEDS UNTIL FURTHER DAMAGE.

3.2.4 PROTECTIVE STRUCTURES

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

Table: 3.2.4 Required protective structures

Code	Description / Road Name	Masonry walls (m3)	Gabion walls (m3)	Lined drain (m)
23DR001	F30-Chanaute-Ichok-Kutumsang	159.3	250	1,500
23DR002	F30-Kiul-Bagar-Nigale-Sermathan	249.0	525	3,450
23DR003	F30-Timbu-Doring Nakote/Helambu	175.0	360	1,500

Code	Description / Road Name	Masonry walls (m3)	Gabion walls (m3)	Lined drain (m)
23DR004	Dauchet-Keureni-Banskhaka-Jatan-Baruwa	269.5	423	5,200
23DR005	F30-Melamchi-Tipeni-Bhotang	227.7	-	6,000
23DR006	Majhirumta Tar-Lekharka-Gunsa	269.4	481	-
23DR007	Tipeni-Bhotenamlang	87.6	410	1,750
23DR008	Khaldekhola-Lagarche-Okhreni	75.0	820	3,100
23DR009	Melamchi-Jyamire-Sunkhani-Dablang	90.0	592	4,300
23DR010	Syaule-Bhadgaun-Simpalkavre-Nawalpur	-	1,073.5	3,200
23DR011	F31-Chautara-Syaule-Okhreni-Gobre	291.0	1,865	4,850
23DR012	F31-Chautara-Batase-Kumbeshwor	125.0	450	2.000
23DR013	Naubise-Chautara-Melamchi*	-	-	-
23DR014	Jaudanda-Khutumedanda, Kunchok	77.0	155	360
23DR015	H03-Balephi-Jalbire-Tembathan	229.1	1,608.5	16,843
23DR016	Okhreni-Selang-Golche-Baikunthe	150.0	425	3,200
23DR017	Toribarichaur-Selang School-Manedanda	102.6	269	1,850
23DR018	Sunkhola-Ghunga-Pangtag	170.5	385	1,350
23DR019	Dhande-Biplum-Yanlakot-Hagam	158.0	410	1,870
23DR020	Naubise-Fulpingkot-Dhuskot	140.0	325	1,960
23DR021	H03-Kothe-Binjel-Chilaune-Dhuskot~Hagam	130.0	375	2,500
23DR022	F32-Kakaling-Pedku-7 Kilo	45.6	76	750
23DR023	F32-1 Kilo- Pangretar-Damsite(H03)*	-	-	300
23DR024	H03-Khadichaur-Mangkha-Chimling	75.0	122	1,860
23DR025	Barhabisephant-Puranagaun-Kerabari-Ramche	120.0	225	1,700
23DR026	H03-Barhabise-Maneswara-Ghumthang-Listi-Bhairavkunda	221.2	858	2,550
23DR027	H03-Daklang-Listi-Bhairabkunda	47.0	600	3,000
23DR028	H03-Hindi-Lukusing-Lakchepu-Selangkatti		1,045	1,020
23DR029	H03-Chaku-Marming-Chandraku	60.0	425	1,950
23DR030	H03-Bulkote-Tyangthali-Dandakaterii	-	525	1,030
23DR031	H03-Khagdal/Barhabise-Thantichaur-Karthali-Dolnsa-Thinsang~Bigu	144.4	390	2,705
23DR032	H03-Barhabise-Budhepa-Bagar-Ghorthali	243.7	1,795	2,890
23DR033	Bagar-Chokati	75.0	325	2,000
23DR034	Sunkoshi-Dhuskun-Piskar-Tauthali	271.2	588	2,450
23DR035	F32-Sildhunga-Tauthali-Tekanpur(H03)	-	-	-
23DR036	Pyukharka-Thulodhading-Danse	106.0	350	2,100
23DR037	H03-Sukute-Puranckot-Wafal-Lishankhu-Ghyangdanda-21 Kilo(F32)	415.3	560	3,643
23DR038	H03-Syale-Yamundanda-Sunkhani-Ghichchet-Tamche-Sikre	213.5	480	5,270
23DR039	H03-Sukute-Sheradanda-Mahendrakranti Ma.Vi., Kalika	135.0	250	2,190
23DR040	Melchaur(F31)-Bhaise(H03)	190	275	1,280
23DR041	F31-Jalkine-Narsingdanda-Archale-Rolpakha-Jhyadi	87.6	108	2,140
23DR042	Dauthedanda-Bhotsipa-Gaitar-Healthpost	83.5	167	1,400
23DR043	F31-Chautara-Sipaghat(F30)	151.2	413	2,522
23DR044	Nawalpur-Jyamiremane (Sipaghat)	81.2	171	980
23DR045	F30-Phatkeshwor-Pandherachaur-Chhapbhanjyang	57.6	157	980
23DR046	F30-Phatkeshwor-Chhapbhanjyang	-	-	-
23DR047	Bhotechaur-Kauledovan	-	-	-
23DR048	Jaisigaun-Haibung-Patibhanjyang	63.8	195	1,560
23DR049	SindhuAdit (F30-Bahunepati-Thankune)	-	-	-
23DR050	F30-Bahunepati-Khatritole-Bhanjyang-Thakle-Sindhukot	72.0	175	800
23DR051	F30-Melamchi-Selle-Duwachaur-Kakani-Sermathang	165.6	330	3,050
23DR052	SindhuAdit-Bhadaure-Sindhukot-Dhusinichaur-	85.0	250	1,300

Code	Description / Road Name	Masonry walls (m3)	Gabion walls (m3)	Lined drain (m)
	Manebhanjyang-Nepane(F30)			
23DR053	SindhuAdit-Chipling/Palchen-Okhrenichaur-Thakani)	125.0	375	2,000
23DR054	Talamarang-Manebhanjyang-Thakani	147.0	310	3,510
23DR055	Chanaute-Palchowkimai-Nagidanda	73.3	240	1,250
Total		**6,727.3**	**22,189.5**	**135,083**

NOTE: ROADS WITH ASTERIK ARE ALREADY IMPROVED OR UPGRADING ON PROGRESS AND NO STRUCTURES NEEDS UNTIL FURTHER DAMAGE.

3.2.5 WIDENING

Widening of the district road core network in Sindhupalchowk 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 traffic volumes remain low.

Table: 3.2.5 Sections of the district road core network requiring widening

Code	Description / Road Name	Total length (km)	Widening (m)
23DR001	F30-Chanaute-Ichok-Kutumsang	8.00	3,500
23DR002	F30-Kiul-Bagar-Nigale-Sermathan	8.76	5,500
23DR003	F30-Timbu-Doring Nakote/Helambu	8.78	4,260
23DR004	Dauchet-Keureni-Banskhaka-Jatan-Baruwa	18.35	8,100
23DR005	F30-Melamchi-Tipeni-Bhotang	30.56	12,240
23DR006	Majhirumta Tar-Lekharka-Gunsa	11.00	5,200
23DR007	Tipeni-Bhotenamlang	6.00	2,470
23DR008	Khaldekhola-Lagarche-Okhreni	5.90	2,380
23DR009	Melamchi-Jyamire-Sunkhani-Dablang	5.50	2,300
23DR010	Syaule-Bhadgaun-Simpalkavre-Nawalpur	9.85	5,800
23DR011	F31-Chautara-Syaule-Okhreni-Gobre	14.60	5,200
23DR012	F31-Chautara-Batase-Kumbeshwor	16.00	6,500
23DR013	Naubise-Chautara-Melamchi*	43.00	-
23DR014	Jaudanda-Khutumedanda, Kunchok	1.57	855
23DR015	H03-Balephi-Jalbire-Tembathan	28.70	13,500
23DR016	Okhreni-Selang-Golche-Baikunthe	10.00	6,000
23DR017	Toribarichaur-Selang School School-Manedanda	4.85	1,065
23DR018	Sunkhola-Ghunga-Pangtag	7.91	3,500
23DR019	Dhande-Biplum-Yanlakot-Hagam	10.80	2,000
23DR020	Naubise-Fulpingkot-Dhuskot	4.49	3,890
23DR021	H03-Kothe-Binjel-Chilaune-Dhuskot~Hagam	9.50	3,500
23DR022	F32-Kakaling-Pedku-7 Kilo	2.38	850
23DR023	F32-1 Kilo- Pangretar-Damsite (H03)*	1.80	-
23DR024	H03-Khadichaur-Mangkha-Chimling	4.00	1,860
23DR025	Barhabisephant-Puranagaun-Kerabari-Ramche	4.49	3,500
23DR026	H03-Barhabise-Maneswara-Ghumthang-Listi-Bhairavkunda	21.00	8,470
23DR027	H03-Daklang-Listi-Bhairabkunda	15.50	5,000
23DR028	H03-Hindi-Lukusing-Lakchepu-Selangkatti	2.38	700
23DR029	H03-Chaku-Marming-Chandraku	4.90	1,090
23DR030	H03-Bulkote-Tyangthali-Dandakaterii	7.70	4,000
23DR031	H03-Khagdal/Barhabise-Thantichaur-Karthali-Dolnsa-Thinsang~Bigu	10.65	5,250
23DR032	H03-Barhabise-Budhepa-Bagar-Ghorthali	15.30	7,500
23DR033	Bagar-Chokati	3.00	800
23DR034	Sunkoshi-Dhuskun-Piskar-Tauthali	14.75	6,240
23DR035	F32-Sildhunga-Tauthali-Tekanpur(H03)	22.90	-

Code	Description / Road Name	Total length (km)	Widening (m)
23DR036	Pyukharka-Thulodhading-Danse	10.13	4,000
23DR037	H03-Sukute-Puranckot-Wafal-Lishankhu-Ghyangdanda-21 Kilo(F32)	44.40	23,500
23DR038	H03-Syale-Yamundanda-Sunkhani-Ghichchet-Tamche-Sikre	11.90	4,680
23DR039	H03-Sukute-Sheradanda-Mahendrakranti Ma.Vi.	5.20	2,300
23DR040	Melchaur(F31)-Bhaise(H03)	9.03	3,420
23DR041	F31-Jalkine-Narsingdanda-Archale-Rolpakha-Jhyadi	4.46	850
23DR042	Dauthedanda-Bhotsipa-Gaitar-Healthpost	3.40	2,800
23DR043	F31-Chautara-Sipaghat(F30)	26.54	4,430
23DR044	Nawalpur-Jyamiremane (Sipaghat)	7.00	2,730
23DR045	F30-Phatkeshwor-Pandherachaur-Chhapbhanjyang	3.85	2,000
23DR046	F30-Phatkeshwor-Chhapbhanjyang*	4.10	-
23DR047	Bhotechaur-Kauledovan*	11.10	-
23DR048	Jaisigaun-Haibung-Patibhanjyang	7.80	2,750
23DR049	SindhuAdit (F30-Bahunepati-Thankune)*	15.80	-
23DR050	F30-Bahunepati-Khatritole-Bhanjyang-Thakle-Sindhukot	4.00	1,900
23DR051	F30-Melamchi-Selle-Duwachaur-Kakani-Sermathang	10.13	4,320
23DR052	SindhuAdit-Bhadaure-Sindhukot-Dhusinichaur-Manebhanjyang-Nepane(F30)	5.30	2,900
23DR053	SindhuAdit-Chipling/Palchen-Okhrenichaur-Thakani)	6.70	4,500
23DR054	Talamarang-Manebhanjyang-Thakani	6.39	3,850
23DR055	Chanaute-Palchowkimai-Nagidanda	6.90	3,180
Total			**216,980**

NOTE: ROADS WITH ASTERIK ARE ALREADY IMPROVED OR UPGRADING ON PROGRESS AND NO STRUCTURES NEEDS UNTIL FURTHER DAMAGE.

3.2.6 BLACKTOPPING

An analysis of the traffic data for the different roads making up the district road core network (see 0) shows that there are 2 roads that are eligible for blacktopping (traffic volume exceeds 50 PCU). The total length for blacktopping is 69.90 km. The blacktopping of these 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 / Road Name	Total length (km)	Traffic (VPD)	Blacktopping (km)
23DR005	F30-Melamchi-Tipeni-Bhotang	30.56	139	9.20
23DR013	Naubise-Chautara-Melamchi	43.00	144	30.56
23DR015	H03-Balephi-Jalbire-Tembathan	28.70	125	4.40
23DR037	H03-Sukute-Puranckot-Wafal-Lishankhu-Ghyangdanda-21 Kilo(F32)	44.40	111	7.00
23DR049	SindhuAdit (F30-Bahunepati-Thankune)	15.80	181	15.80
Total		**162.46**		**69.90**

3.3 NEW CONSTRUCTION

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 provide access to 2 VDC HQs that do not currently have road access. Additional 24.30 km of new construction is required to connect 2 VDC headquarters currently without road access.

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

Code	Description / Road Name	New VDCs	Existing length	New length	Bridge (m)
23DR015	H03-Balephi-Jalbire-Tembathan	Gumba	28.70	9.30	-
23DR016	Okhreni-Selang-Golche-Baikunthe	Golche	10.00	15.00	75
Total			**38.70**	**24.30**	**75**

3.4 DISTRICT TRANSPORT PERSPECTIVE PLAN

The DTPP foresees bringing the entire existing district road core network to maintainable all-weather status, and expanding it to provide access to an additional 2 VDC headquarters. For this purpose, 505.34 km shall be gravelled and 69.90km shall be blacktopped and a number of different cross drainage and protective structures will be constructed. A further 24.30 km of new road will be constructed to maintainable all-weather gravel standard providing access to 2remaining VDC HQs. The district road core network will subsequently consist of 600.74 km of maintainable all-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)	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)
23DR001	8.00	8.00	8.00	-	8.00	-	3,500	30	-	50	60	25	159.3	250	1,500	-
23DR002	8.76	8.76	8.76	-	8.76	-	5,500	-	-	20	90	16	249.0	525	3,450	-
23DR003	8.78	8.78	8.78		8.78	-	4,260	25	-	27	64	17	175.0	360	1,500	
23DR004	18.35	18.35	18.35	-	18.35	-	8,100	30	-	60	160	45	269.5	423	5,200	-
23DR005	30.56	30.56	30.56	-	30.56	9.20	12,240	-	-	96	304		227.7	-	6,000	-
23DR006	11.00	11.00	11.00	-	11.00	-	5,200	20	-	48	108	25	269.4	481	-	-
23DR007	6.00	6.00	6.00	-	6.00	-	2,470	-	-	36	32	12	87.6	410	1,750	-
23DR008	5.90	5.90	5.90	-	5.90	-	2,380	-	-	10	72	15	75.0	820	3,100	-
23DR009	5.50	5.50	5.50	-	5.50	-	2,300	-	-	12	64	23	90.0	592	4,300	-
23DR010	9.85	9.85	9.85	-	9.85	-	5,800	-	-	84	54	45	-	1,073.5	3,200	-
23DR011	14.60	14.60	14.60	0.30	14.30	-	5,200	-	-	36	96	27	291.0	1,865	4,850	-
23DR012	16.00	16.00	16.00	-	16.00	-	6,500	-	-	50	30	30	125.0	450	2.000	-
23DR013	43.00	43.00	43.00	43.00	43.00	30.50	-	-	-	-	-	-	-	-	-	-
23DR014	1.57	1.57	1.57	-	1.57	-	855	-	-	-	25	4	77.0	155	360	-
23DR015	28.70	28.70	28.70	11.00	17.70	4.40	13,500	120	18	48	75	53	229.1	1,608.5	16,843	9.30
23DR016	10.00	10.00	10.00	-	10.00	-	6,000	125		60	48	22	150.0	425	3,200	15.00
23DR017	4.85	4.85	4.85	-	4.85		1,065	-	-	24	20	8	102.6	269	1,850	
23DR018	7.91	7.91	7.91	-	7.91	-	3,500	-	-	15	40	23	170.5	385	1,350	-
23DR019	10.80	10.80	10.80	-	10.80	-	2,000	-	-	40	72	27	158.0	410	1,870	-
23DR020	4.49	4.49	4.49	-	4.49	-	3,890	-	-		60	25	140.0	325	1,960	-
23DR021	9.50	9.50	9.50	-	9.50		3,500	-	-	40	90	25	130.0	375	2,500	-
23DR022	2.30	2.30	2.30	-	2.38	-	850	-	-	10	24	5	45.6	76	750	-
23DR023	1.80	1.80	1.80	-	-	-	-	-	-	-	-	-	-	-	300	-
23DR024	4.00	4.00	4.00	-	4.00	-	1,860	-	-	12	36	9	75.0	122	1,860	-
23DR025	4.49	4.49	4.49	-	4.49	-	3,500	-	-	30	48	12	120.0	225	1,700	-
23DR026	21.00	21.00	21.00	-	21.00	-	8,470	-	-	132	176	54	221.2	858	2,550	-
23DR027	15.50	15.50	15.50	-	15.50	-	5,000	-	-	21	32	25	47.0	600	3,000	-
23DR028	2.38	2.38	2.38	-	2.38	-	700	-	-	18	18	5		1,045	1,020	-
23DR029	4.90	4.90	4.90	-	4.90	-	1,090	-	-	25	32	12	60.0	425	1,950	-

Code	Emergency maintenance (km)	Routine maintenance (km)	Recurrent maintenance (km)	Periodic maintenance (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)
23DR030	7.70	7.70	7.70	-	7.70	-	4,000	-	-	80	48	15	-	525	1,030	-
23DR031	10.65	10.65	10.65	-	10.65	-	5,250	-	-	72	236	42	144.4	390	2,705	-
23DR032	15.30	15.30	15.30	0.20	15.30	-	7,500	-	-	45	216	46	243.7	1,795	2,890	-
23DR033	4.82	4.82	4.82	-	3.00	-	800	-	-	16	12	4	75.0	325	2,000	-
23DR034	14.75	14.75	14.75	-	14.75	-	6,240	-	-	84	200	35	271.2	588	2,450	-
23DR035	22.90	22.90	22.90	-	22.90	-	-	-	-				-	-	-	-
23DR036	10.13	10.13	10.13	-	10.13	-	4,000	-	-	48	36	20	106.0	350	2,100	-
23DR037	44.40	44.40	44.40	6.70	37.70	7.00	23,500	-	-	84	584	125	415.3	560	3,643	-
23DR038	11.90	11.90	11.90	-	11.90	-	4,680	-	12	20	96	30	213.5	480	5,270	-
23DR039	5.20	5.20	5.20	-	5.20	-	2,300	-	-	25	48	9	135.0	250	2,190	-
23DR040	9.03	9.03	9.03	-	9.03	-	3,420	-	-	30	32	12	190	275	1,280	-
23DR041	4.46	4.46	4.46	-	4.46	-	850	-	-		64	9	87.6	108	2,140	-
23DR042	3.40	3.40	3.40	-	3.40	-	2,800	-	-		32	15	83.5	167	1,400	-
23DR043	26.54	26.54	26.54	9.00	17.54	-	4,430	30	-	36	168	43	151.2	413	2,522	-
23DR044	7.00	7.00	7.00	-	7.00	-	2,730	-	-		104	8	81.2	171	980	-
23DR045	3.85	3.85	3.85	-	3.85	-	2,000	-	-	12	15	6	57.6	157	980	-
23DR046	4.10	4.10	4.10	4.10	-	-	-	-	-	-	-	-	-	-	-	-
23DR047	11.10	11.10	11.10	-	-	-	-	-	-	-	-	-	-	-	-	-
23DR048	7.80	7.80	7.80	-	7.80	-	2,750	-	-	40	200	13	63.8	195	1,560	-
23DR049	15.80	15.80	15.80	-	-	15.80	-	-	-	-	-	-	-	-	-	-
23DR050	4.00	4.00	4.00	-	4.00	-	1,900	-	-	10	36	8	72.0	175	800	-
23DR051	10.13	10.13	10.13	-	10.13	-	4,320	-	-	30	232	20	165.6	330	3,050	-
23DR052	5.30	5.30	5.30	-	5.30	-	2,900	-	-	50	120	13	85.0	250	1,300	-
23DR053	6.70	6.70	6.70	-	6.70	-	4,500	-	-	40	48	12	125.0	375	2,000	-
23DR054	6.39	6.39	6.39	-	6.39	-	3,850	-	-	25	40	16	147.0	310	3,510	-
23DR055	6.90	6.90	6.90	-	6.90	-	3,180	-	12	25	80	14	73.3	240	1,250	-
Total	**600.74**	**600.74**	**600.74**	**74.30**	**540.74**	**69.90**	**216,980**	**800**	**124**	**1,776**	**4,607**	**1,172**	**6,727.3**	**22,189.5**	**135,083**	**24.30**

Figure 4 District Transport Perspective Plan (DTPP)

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 164.30 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 821.50 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
23DR001	8.00	-	-	8.00	240	160	-	-	2,000	-	-	**2,400**	**12,000**
23DR002	8.76	-	-	8.76	262.8	175.2	-	-	2,190	-	-	**2,6280**	**13,140**
23DR003	8.78	-	-	8.78	263.4	175.6	-	-	2,195	-	-	**2,634**	**13,170**
23DR004	18.35	-	-	18.35	550.5	367	-	-	4,587	-	-	**5,505**	**27,525**
23DR005	30.56	-	-	30.56	916.8	611.2	-	-	7,640	-	-	**9,186**	**45,840**
23DR006	11.00	-	-	11.00	330	220	-	-	2,750	-	-	**3,300**	**16,500**
23DR007	6.00	-	-	6.00	180	120	-	-	1,500	-	-	**1,800**	**9,000**
23DR008	5.90	-	-	5.90	177	118	-	-	1,475	-	-	**1,770**	**8,850**
23DR009	5.50	-	-	5.50	165	110	-	-	1,375	-	-	**1,650**	**8,250**
23DR010	9.85	-	-	9.85	295.5	197	-	-	2,462.5	-	-	**2,955**	**14,775**
23DR011	14.60	0.30	-	14.30	438	292	-	-	3,575	-	-	**4,305**	**21,525**
23DR012	16.00	-	-	16.00	480	320	-	-	4,000	-	-	**4,800**	**24,000**

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
23DR013	43.00	-	-	43.00	430	287	-	-	3,583	-	-	**4,300**	**21,500**
23DR014	1.57	-	-	1.57	47,10	31.4	-	-	392.5	-	-	**471**	**2,355**
23DR015	28.70	0.75	10.25	27.70	561	374	-	-	4,425	-	-	**5,360**	**26,800**
23DR016	10.00	-	-	10.00	300	200	-	-	2,500	-	-	**3,000**	**15,000**
23DR017	4.85	-	-	4.85	145.5	97	-	-	1,212	-	-	**1,455**	**7,275**
23DR018	7.91	-	-	7.91	237.3	158.2	-	-	1,977.5	-	-	**2,373**	**11,865**
23DR019	10.80	-	-	10.80	324	216	-	-	2,700	-	-	**3,240**	**16,200**
23DR020	4.49	-	-	4.49	135	90	-	-	1,123	-	-	**1,347**	**6,735**
23DR021	9.50	-	-	9.50	285	190	-	-	2,375	-	-	**2,850**	**14,250**
23DR022	2.30	-	-	2.30	69	46	-	-	575	-	-	**690**	**3,450**
23DR023	1.80	-	-	1.80	-	-	-	-	-	-	-	**-**	**-**
23DR024	4.00	-	-	4.00	120	80	-	-	1,000	-	-	**1,200**	**6,000**
23DR025	4.49	-	-	4.49	135	90	-	-	1,123	-	-	**1,347**	**6,735**
23DR026	21.00	-	-	21.00	630	420	-	-	5,250	-	-	**6,300**	**31,500**
23DR027	15.50	-	-	15.50	465	310	-	-	3,875	-	-	**4,650**	**23,250**
23DR028	2.38	-	-	2.38	71	48	-	-	595	-	-	**714**	**3,570**
23DR029	4.90	-	-	4.90	147	98	-	-	1,225	-	-	**1,470**	**7,350**
23DR030	7.70	-	-	7.70	231	154	-	-	1,925	-	-	**2,310**	**11,550**
23DR031	10.65	-	-	10.65	320	213	-	-	2,663	-	-	**3,195**	**15,975**
23DR032	15.30	-	-	15.30	459	306	-	-	3,775	-	-	**4,540**	**22,700**
23DR033	4.82	-	-	4.82	145	96	-	-	1,205	-	-	**1,446**	**7,230**
23DR034	14.75	-	-	14.75	443	295	-	-	3,688	-	-	**4,425**	**22,125**
23DR035	22.90	-	-	22.90	687	458	-	-	5,725	-	-	**6,870**	**34,350**
23DR036	10.13	-	-	10.13	304	203	-	-	2,533	-	-	**3,039**	**15,195**
23DR037	44.40	0.70	6.0	44.40	1332	888	-	2400	9,425	-	1500	**15,545**	**77,725**
23DR038	11.90	-	-	11.90	357	238	-	-	2,975	-	-	**3,570**	**17,850**
23DR039	5.20	-	-	5.20	156	104	-	-	1,300	-	-	**1,560**	**7,800**
23DR040	9.03	-	-	9.03	271	181	-	-	2,258	-	-	**2,709**	**13,545**
23DR041	4.46	-	-	4.46	134	89	-	-	1,115	-	-	**1,338**	**6,690**
23DR042	3.40	-	-	3.40	102	68	-	-	850	-	-	**1,020**	**5,100**
23DR043	26.54	-	9.00	17.54	796.2	530.8	-	3600	4,385	-	2250	**11,562**	**57,810**
23DR044	7.00	-	-	7.00	210	140	-	-	1,750	-	-	**2,100**	**10,500**
23DR045	3.85	-	-	3.85	116	77	-	-	962.5	-	-	**1,155**	**5,775**
23DR046	4.10	4.10	-	4.10	41	27	-	-	-	-	-	**68.33**	**342**
23DR047	11.10	11.10	-	11.10	333	222	-	-	-	-	-	**-**	**-**
23DR048	7.80	-	-	7.80	234	156	-	-	1,950	-	-	**2,340**	**11,700**
23DR049	15.80	-	15.80	15.80	-	-	-	-	-	-	-	**-**	**-**
23DR050	4.00	-	-	4.00	120	80	-	-	1,000	-	-	**1,200**	**6,000**
23DR051	10.13	-	-	10.13	304	203	-	-	2,533	-	-	**3,039**	**15,195**
23DR052	5.30	-	-	5.30	159	106	-	-	1,325	-	-	**1,590**	**7,950**
23DR053	6.70	-	-	6.70	201	134	-	-	1,675	-	-	**2,010**	**10,050**
23DR054	6.39	-	-	6.39	192	128	-	-	1,598	-	-	**1,917**	**9,585**
23DR055	6.90	-	-	6.90	207	138	-	-	1,725	-	-	**2,070**	**10,350**
Total	**600.74**	**17.15**	**42.85**	**540.74**	**18022**	**12014.8**	**8,575**	**17,140**	**135185**	**3,340**	**10,712**	**164,300**	**821,502**

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	2,500
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	40,000
Masonry wall construction	m^3	10,000
Gabion wall construction	m^3	32,500
Lined drain construction	m	2,000

The resulting estimated costs come to NPR 1,120 million as indicated in the table below.

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

Code	Total length (km)	Widening	Gravelling	Blacktopping	Bridges	Slab & CC Causeways	Stone causeways	Pipe culvert	Masonry walls	Gabion walls	Lined drains	Total cost
23DR001	8.00	8,750	17,600	-	18000	5000	600	1000	1593	875	3000	**56,418**
23DR002	8.76	13,750	19,272	-	-	2000	900	640	2490	1838	6900	**47,790**
23DR003	8.78	10,650	19,316	-	15000	2700	640	680	1750	1260	6300	**58,296**
23DR004	18.35	20,250	40,370	-	18000	6000	1600	1800	2694	1932	15600	**108,246**
23DR005	30.56	30,600	67,232	52440	-	9600	3040	2720	2277	1944	17920	**187773**
23DR006	11.00	13,000	24,200	-	12000	4800	1080	1000	2654	1068	6980	**66,782**
23DR007	6.00	6,175	13,200	-	-	3600	320	480	876	511	3780	**28,942**
23DR008	5.90	5,950	12,980	-	-	1000	720	600	750	438	4760	**27,198**
23DR009	5.50	5,750	12,100	-	30000	1200	640	920	900	875	4600	**26,985**
23DR010	9.85	14,500	21,670	-	-	8400	540	1800	0	3757	6400	**87,067**
23DR011	14.60	13,000	31,460	-	-	3600	960	1080	2910	6528	9700	**69,238**
23DR012	16.00	16,250	35,200	-	72000	5000	300	1200	1250	1575	4000	**73,775**
23DR013	43.00	-	234,145	-	-	-	-	-	-	-	-	**234,145**
23DR014	1.57	2,138	3,454	-	-	-	250	160	770	543	720	**8,034**
23DR015	28.70	33,375	38,940	54435	72,000	7500	750	2120	2291	5630	33686	**250,727**
23DR016	10.00	15,000	22,000	-	-	6000	480	880	1500	1488	6400	**83,748**
23DR017	4.85	2,663	10,670	-	-	2400	200	320	1026	942	3700	**21,920**
23DR018	7.91	8,750	17,402	-	-	1500	400	920	1705	1348	2700	**34,725**
23DR019	10.80	5,000	23,760	-	-	4000	720	1080	1580	1435	3740	**41,315**
23DR020	4.49	9,725	9,878	-	-	-	900	1000	1400	1138	3920	**27,961**
23DR021	9.50	8,750	20,900	-	-	4000	900	1000	1300	1313	5000	**43,163**
23DR022	2.30	2,125	5,060	-	-	1000	240	200	456	266	1500	**10,847**
23DR023	1.80	-	-	-	-	-	-	-	-	-	600	**600**
23DR024	4.00	4,650	8,800	-	-	1200	360	360	750	427	3720	**20,267**
23DR025	4.49	8,750	9,878	-	-	3000	480	480	1200	788	3400	**27,976**
23DR026	21.00	21,175	46,200	-	15000	13200	1760	2160	2212	3003	5100	**109,810**
23DR027	15.50	12,500	34,100	-	-	2100	320	1000	470	2100	6000	**58,590**

Code	Total length (km)	Widening	Gravelling	Blacktopping	Bridges	Slab & CC Causeways	Stone causeways	Pipe culvert	Masonry walls	Gabion walls	Lined drains	Total cost
23DR028	2.38	1,750	5,236	-	-	1800	180	200	-	3658	2040	**14,864**
23DR029	4.90	2,725	10,780	-	-	2500	320	480	600	1488	3900	**24,293**
23DR030	7.70	10,000	16,940	-	-	8000	480	600	-	1838	2060	**39,918**
23DR031	10.65	13,125	23,430	-	-	7200	2360	1680	1444	1365	5410	**56,014**
23DR032	15.30	18,750	33,220	-	60000	4500	2160	1840	2437	6283	5780	**138,570**
23DR033	4.82	2,000	10,604	-	63000	1600	120	160	750	1138	4000	**83,372**
23DR034	14.75	15,600	32,450	-	63000	8400	2000	1400	2712	2058	4900	**135.220**
23DR035	22.90	-	50,380	-	-	7500	1100	1200	-	438	8760	**69,378**
23DR036	10.13	10,000	22,286	-	12000	4800	360	800	1060	1225	4200	**56,731**
23DR037	44.40	58,750	82,940	48450	0	12900	5840	5000	4153	1960	7286	**227,279**
23DR038	11.90	11,700	26,180	-	-	2000	960	1200	2135	1680	10540	**58,195**
23DR039	5.20	5,750	11,440	-	-	2500	480	360	1350	875	4380	**27,135**
23DR040	9.03	8,550	19,866	-	-	3000	320	480	1900	963	2560	**37,639**
23DR041	4.46	2,125	9,812	-	-	-	640	360	876	378	4280	**18,471**
23DR042	3.40	7,000	7,480	-	-	-	320	600	835	585	2800	**19,620**
23DR043	26.54	11,075	38,588	-	18000	3600	1680	1720	1512	1446	5044	**82,665**
23DR044	7.00	6,825	15,400	-	-	-	1040	320	812	599	1960	**26,956**
23DR045	3.85	5,000	8,470	-	-	1200	150	240	576	550	1960	**18,146**
23DR046	4.10	-	-	-	-	-	-	-	-	-	-	**0**
23DR047	11.10	-	-	-	-	-	-	-	-	-	-	**0**
23DR048	7.80	6,875	17,160	-	-	4000	2000	520	638	683	3120	**34,995**
23DR049	15.80	-	-	-	-	-	-	-	-	-	-	**0**
23DR050	4.00	4,750	8,800	-	-	1000	360	320	720	613	1600	**18,163**
23DR051	10.13	10,800	22,286	-	-	3000	2320	800	1656	1155	6100	**48,117**
23DR052	5.30	7,250	11,660	-	-	5000	1200	520	850	875	2600	**29,955**
23DR053	6.70	11,250	14,740	-	-	4000	480	480	1250	1313	4000	**37,513**
23DR054	6.39	9,625	14,058	-	-	2500	400	640	1470	1085	7020	**36,798**
23DR055	6.90	7,950	15,180	-	-	2500	800	560	733	840	2500	**32,863**
Total	**600.74**	**542,450**	**1,189,628**	**381330**	**435,000**	**177,600**	**46070**	**46880**	**67273**	**77663**	**270166**	**3,132,758**

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 1,117 million.

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

Code	Description	Length (km)	Opening up	Gravelling	Bridges	Total cost
23DR015	H03-Balephi-Jalbire-Tembathan	9.30	37,200	20,460	-	**57,660**
23DR016	Okhreni-Selang-Golche-Baikunthe	15.00	60,000	33,000	45,000	**138,000**
Total		**24.30**	**97,200**	**53,460**	**45,000**	**195,660**

4.4 DTPP COSTS

The total costs for the District Transport Perspective Plan come to NPR 2,298 million as indicated in the table below.

Table: 4.4.1 DTPP costs (NPR '000)

Code	Conservation	Improvement	New construction	Total
23DR001	12,000	56,418	-	68,418
23DR002	13,140	47,790	-	60,930
23DR003	13,170	58,296	-	71,466
23DR004	27,525	108,246	-	135,771
23DR005	45,840	135,333	-	181,173
23DR006	16,500	66,782	-	83,282
23DR007	9,000	28,942	-	37,942
23DR008	8,850	27,198	-	36,048
23DR009	8,250	26,985	-	35,235
23DR010	14,775	87,067	-	101,842
23DRO11	21,525	69,238	-	90,763
23DRO12	24,000	73,775	-	97,775
23DRO13	21,500	234,145	-	255,645
23DR014	2,355	8,034	-	10,389
23DR015	26,800	250,727	57,660	335,187
23DR016	15,000	83,748	138,000	236,748
23DR017	7,275	21,920	-	29,195
23DR018	11,865	34,725	-	46,590
23DR019	16,200	41,315	-	57,515
23DR020	6,735	27,961	-	34,696
23DR021	14,250	43,163	-	57,413
23DR022	3,450	10,847	-	14,297
23DR023	0	600	-	600
23DR024	6,000	20,267	-	26,267
23DR025	6,735	27,976	-	34,711
23DR026	31,500	109,810	-	141,310
23DR027	23,250	58,590	-	81,840
23DR028	3,570	14,864	-	18,434
23DR029	7,350	24,293	-	31,643
23DR030	11,550	39,918	-	51,468
23DR031	15,975	56,014	-	71,989
23DR032	23,400	138,570	-	161,970
23DR033	7,230	83,372	-	90,602
23DR034	22,125	135,220	-	157,345
23DR035	34,350	69,318	-	103,728
23DR036	15,195	56,731	-	71,926
23DR037	77,725	227,279	-	305,004
23DR038	17,850	58,195	-	76,045
23DR039	7,800	27,135	-	34,935
23DR040	13,545	37,639	-	51,184
23DR041	6,690	18,471	-	25,161
23DR042	5,100	19,620	-	24,720
23DR043	57,810	82,665	-	140,475
23DR044	10,500	26,956	-	37,456
23DR045	5,775	18,146	-	23,921
23DR046	342	-	-	342
23DR047	-	-	-	-
23DR048	11,700	34,995	-	46,695
23DR049	-	-	-	-

Code	Conservation	Improvement	New construction	Total
23DR050	6,000	18,163	-	24,163
23DR051	15,195	48,117	-	63,312
23DR052	7,950	29,955	-	37,905
23DR053	10,050	37,513	-	47,563
23DR054	9,585	36,798	-	46,383
23DR055	10,350	32,863	-	43,213
Total	**1,025,398**	**3,252,661**	**195,660**	**4,149,920**

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 1**.

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)
23DR047	11.10	333	222	-	-	-	-	-	-	52607	-
23DR049	15.80	474	316	-	-	-	-	-	-	52067	-
23DR023	1.80	54	36	-	-	-	-	-	-	2952	-
23DR046	4.10	123	82	-	-	-	-	-	-	35072	2
23DR014	1.57	47	31	-	-	393	-	-	471	3967	119
23DR024	4.00	120	80	-	-	1000	-	-	1200	7752	155
23DR015	28.7	561	374	-	-	4425	-	-	5360	29848	180
23DR028	2.38	71	48	-	-	595	-	-	714	3297	217
23DR042	3.40	102	68	-	-	850	-	-	1020	4618	221
23DR041	4.46	134	89	-	-	1115	-	-	1338	5987	223
23DR050	4.00	120	80	-	-	1000	-	-	1200	5056	237
23DR051	10.13	304	203	-	-	2533	-	-	3039	12418	245
23DR045	3.85	116	77	-	-	963	-	-	1155	4286	269
23DR009	5.50	165	110	-	-	1375	-	-	1650	5553	297
23DRO13	43.00	1290	860	-	-	3583	-	-	4300	14258	302
23DR025	4.49	135	90	-	-	1123	-	-	1347	4092	329
23DR020	4.49	135	90	-	-	1123	-	-	1347	3815	353
23DRO11	14.60	438	292	-	-	3575	-	-	4305	11396	378
23DR044	7.00	210	140	-	-	1750	-	-	2100	5353	392
23DR022	2.30	69	46	-	-	575	-	-	690	1600	431
23DR001	8.00	240	160	-	-	2000	-	-	2400	5387	446
23DR029	4.90	147	98	-	-	1225	-	-	1470	3255	452
23DR005	30.56	917	611	-	-	7640	-	-	9168	18365	499
23DR043	2654	796	531	-	3600	4385	-	2250	11562	23002	503
23DR007	6.00	180	120	-	-	1500	-	-	1800	3551	507
23DR052	5.30	159	106	-	-	1325	-	-	1590	3125	509
23DR017	4.85	146	97	-	-	1213	-	-	1455	2613	557
23DR030	7.70	231	154	-	-	1925	-	-	2310	4026	574
23DR033	4.8	145	96	-	-	1205	-	-	1446	2497	579
23DR053	6.70	201	134	-	-	1675	-	-	2010	3439	584
23DR021	9.50	285	190	-	-	2375	-	-	2850	4802	594

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)
23DR054	6.39	192	128	-	-	1598	-	-	1917	3141	610
23DR008	5.90	177	118	-	-	1475	-	-	1770	2590	683
23DR034	14.75	443	295	-	-	3688	-	-	4425	6461	685
23DR039	5.20	156	104	-	-	1300	-	-	1560	2251	693
23DR026	21.00	630	420	-	-	5250	-	-	6300	8810	715
23DR040	9.03	271	181	-	-	2258	-	-	2709	3372	803
23DR016	10.00	300	200	-	-	2500	-	-	3000	3611	831
23DR037	44.40	1332	888	-	2400	9425	-	1500	15545	18492	841
23DR019	10.80	324	216	-	-	2700	-	-	3240	3847	842
23DR038	11.90	357	238	-	-	2975	-	-	3570	4027	887
23DR002	8.76	263	175	-	-	2190	-	-	2628	2950	891
23DR048	7.80	234	156	-	-	1950	-	-	2340	2484	942
23DR032	15.30	459	306	-	-	3775	-	-	4540	4819	942
23DR031	10.65	320	213	-	-	2663	-	-	3195	3347	955
23DR018	7.91	237	158	-	-	1978	-	-	2373	2481	956
23DRO12	16.00	480	320	-	-	4000	-	-	4800	4882	983
23DR003	8.78	263	176	-	-	2195	-	-	2634	2564	1027
23DR010	9.85	296	197	-	-	2463	-	-	2955	2777	1064
23DR055	6.90	207	138	-	-	1725	-	-	2070	1927	1074
23DR004	18.35	551	367	-	-	4588	-	-	5505	4090	1346
23DR027	15.50	465	310	-	-	3875	-	-	4650	3305	1407
23DR036	10.13	304	203	-	-	2533	-	-	3039	2115	1437
23DR006	11.00	330	220	-	-	2750	-	-	3300	1902	1735
23DR035	22.90	687	458	-	-	5725	-	-	6870	2251	3052
Total	**600.74**	**18,022**	**12,015**	**8,575**	**17,140**	**135,185**	**3,430**	**10,713**	**205,080**		

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 gravel 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)
23DR046+	4.10	-	35,072	-
23DR047+	11.10	-	52,607	-
23DR049*	15.80	-	52,067	-
23DR023*	1.80	600	2,952	203
23DR014	1.57	8,034	3,967	2,025
23DR024	4.00	20,267	7,752	2,614
23DR041	4.46	18,471	5,987	3,085
23DR050	4.00	18,163	5,056	3,592
23DR043**	26.54	82,665	23,002	3,594
23DR051	10.13	48,117	12,418	3,875
23DR045	3.85	18,146	4,286	4,234
23DR042	3.40	19,620	4,618	4,248
23DR028	2.38	14,864	3,297	4,508
23DR009	5.50	26,985	5,553	4,860
23DR044	7.00	26,956	5,353	5,036
23DRO11**	14.60	69,238	11,396	6,076
23DR022	2.30	10,847	1,600	6,779
23DR025	4.49	27,976	4,092	6,837
23DR020	4.49	27,961	3,815	7,329
23DR005	30.56	135,333	18,365	7,369
23DR029	4.90	24,293	3,255	7,463
23DR007	6.00	28,942	3,551	8,150
23DR017	4.85	21,920	2,613	8,389
23DR015**	28.70	250,727	29,848	8,400
23DR021	9.50	43,163	4,802	8,988
23DR035	22.90	69,378	7,666	9,050
23DR052	5.30	29,955	3,125	9,586
23DR030	7.70	39,918	4,026	9,915
23DR001	8.00	56,418	5,387	10,473
23DR008	5.90	27,198	2,590	10,501
23DR019	10.80	41,315	3,847	10,740
23DR053	6.70	37,513	3,439	10,908
23DR040	9.03	37,639	3,372	11,162
23DR054	6.39	36,798	3,141	11,715
23DR039	5.20	27,135	2,251	12,055
23DR037**	44.40	227,279	18,492	12,291
23DR026	21.00	109,810	8,810	12,464
23DR018	7.91	34,725	2,481	13,996
23DR048	7.80	34,995	2,484	14,088
23DR038	11.90	58,195	4,027	14,451
23DRO12	16.00	73,775	4,882	15,112
23DR002	8.76	47,790	2,950	16,200
23DRO13	43.00	234,145	14,258	16,422
23DR031	10.65	56,014	3,347	16,736
23DR055	6.90	32,863	1,927	17,054
23DR027	15.50	58,590	3,305	17,728
23DR034	14.75	135,220	6,461	20,929
23DR003	8.78	58,296	2,564	22,736
23DR016	10.00	83,748	3,611	23,192
23DR004	18.35	108,246	4,090	26,466
23DR036	10.13	56,731	2,115	26,823
23DR032**	15.30	138,570	4,819	28,755
23DR010	9.85	87,067	2,777	31,353
23DR033	4.82	83,372	2,497	33,389
23DR006	11.00	66,782	1,902	35,111
Total	**600.74**	**3,162,601**		

+ Phase 3: Already blacktop; ** Phase 2: Gravel to blacktop standard; Phase1: Earth to gravel standard

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)
23DR015	9.30	57,660	29,848	1,932
23DR016	15.00	138,000	3,611	38,217
Total	**24.30**	**195,660**		

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 912.325 million for the five-year period.

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

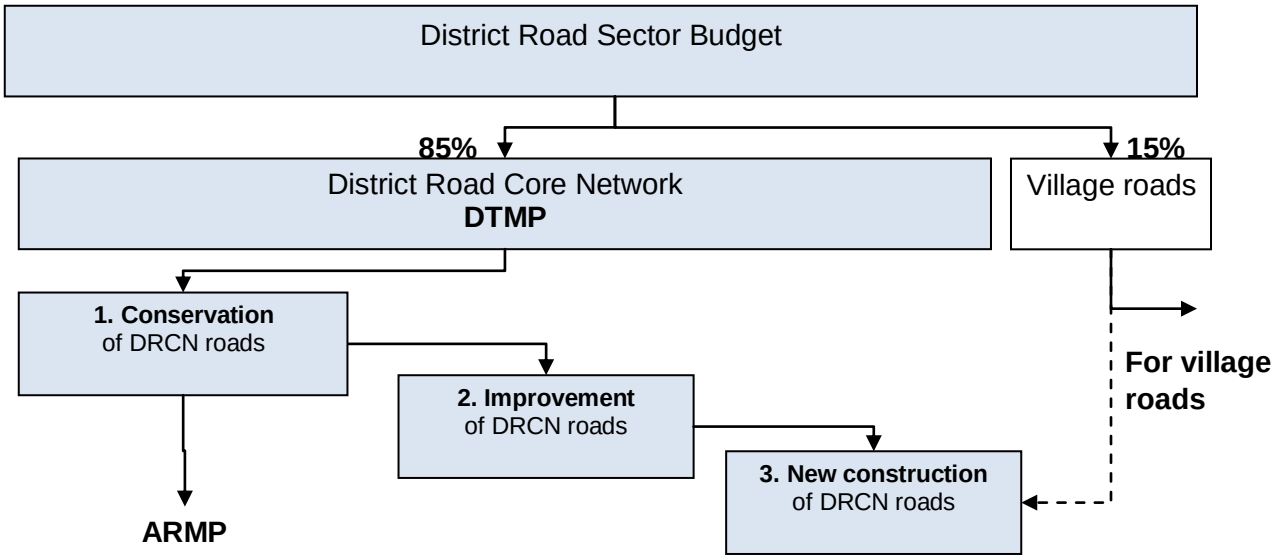
Funding source	069/70	070/71	071/72	072/073	073/074
DDC's Central block grant	4,000	4,400	4,840	5,324	5,856
SWAp regular	24,000	50,000	55,000	60,500	66,550
RBN	1,950	2,500	2,750	3,025	3,328
DDC Internal resources (25%)	2,500	2,750	3.025	3,328	3,660
* Central Grant- carry over roads (MoFALD)	1,800	2,500	2,750	3,025	3,328
**Road sector central grants (MoPIT)	0	0	0	0	0
**VDCs' grant for road sector ~30%	0	0	0	0	0
**MP's Development Fund	0	0	0	0	0
Sub-total	**34,250**	**62,150**	**68,365**	**75,202**	**82,721**
+Peoples' contribution ~20%	6,850	12,430	13,673	15,043	16,544
++RRRSDP/Others	122,800	150,000	0	0	0
DFID/RTI Sector	20,250	50,000	55,000	60,500	66,550
Total	**184,150**	**274,580**	**137,038**	**150,742**	**165,816**
Grand Total for 5 years =	**912,325**				

NOTE: 1) SOURCES OF FUNDING WITH (*) ASTERIK IS NOT GOES TO DRCN ROADS
2) ** PEOPLE'S CONTRIBUTION IS VALUATED IN KIND NOT IN CASH
3) +RRRSDP FUND IS ONLY TO NEXT YEAR AND OTHERS SOURCE OF FUNDING IS NOT SURE
4) ++DFID FUND for RTI SECTOR IS BASED ON ASSUMPTION

6.2 BUDGET ALLOCATION

The distribution of the available district road sector budget is indicated in the figure below. Due to the many number of village roads, 90% of the total budget is reserved for the district road core network (DRCN). The remaining 10% is to be used by the DDC for the village roads, giving priority to emergency maintenance and routine/recurrent maintenance. Alternatively, this 10% may be used for the new construction of DRCN roads where this is considered a priority by the district. The 90% 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. However, the forecasted resources is insufficient even for conservation of existing DRCN and therefore allocation for first and second year has done based on possible funding trend and after 3rd to 5th year the budget will be deficit by NPR 292.925 even to cover conservation requirement.

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 Investment plan

Item				Fiscal Year													
Fiscal year				**2069/70**			**2070/71**			**2071/72**			**2072/073**			**2073/074**	
Total budget				244,510			351,776			386,954			425,649			468,213	
Non-DRCN roads				36,677			52,766			58,043			63,847			70,232	
DRCN budget				**207,834**			**299,010**			**328,911**			**361,802**			**397,981**	
Core network length (km)				**600.74**			**600.74**			**600.74**			**600.74**			**600.74**	
Blacktop (km)				17.15			26.05			32.40			32.40			32.40	
Gravel (km)				42.85			55.35			71.70			91.54			109.68	
Earthen (km)				540.74			519.34			496.64			476.80			458.66	
Conservation (NPR '000)				**20,053**			**79,781**			**226,452**			**226,452**			**226,452**	
Emergency				2,653			18,022			18,022			18,022			18,022	
Routine				2,725			12,015			12,015			12,015			12,015	
Recurrent (blacktop)				-			-			14,700			14,700			14,700	
Recurrent (gravel)				2,400			6,642			33,000			33,000			33,000	
Recurrent (earthen)				12,274			38,951			122,210			122,210			122,210	
Periodic (blacktop)				-			-			5,880			5,880			5,880	
Periodic (gravel)				-			4,151			20,625			20,625			20,625	
Improvement	**Cost**	**BT**	**GR**	**136,475**	**BT**	**GR**	**153,612**	**BT**	**GR**	**-109,970**	**BT**	**GR**	**-98,321**	**BT**	**GR**	**-85,509**	**BT**	**GR**
23DR046	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23DR047	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-
23DR023	600	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-
23DR049	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-
23DR014	8,034	-	1.57	-	-	-	-	-	-	-	-	-	-	-		-	-	-
23DR024	20,267	-	4.00	-	-	-	-	-	-	-	-	-	-	-		-	-	-
23DR041	18,471	-	4.46	742	-	-	-	-	-	-	-	-	-	-		-	-	-
23DR050	18,163	-	4.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23DR043	82,665	-	17.54	1,794	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23DR051	48,117	-	10.13	1,561	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23DR045	18,146	-	3.85	1,087	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23DR042	19,620	-	3.40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23DR028	14,864	-	2.38	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23DR009	26,985	-	5.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23DR044	26,956	-	7.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23DRO11	69,238	-	14.30	863	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23DR035	69,378	-	22.90	6,349	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23DR022	10,847	-	2.30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23DR025	27,976	-	4.49	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23DR020	27,961	-	4.49	-	-	-	-	-	-	-	-	-	-	-		-	-	-
23DR015	221,372	-	17.70	2,332	5.90	-	1,200	3.65	-	-	-	-	-	-	-	-	-	-
23DR029	24,293	-	4.90	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

23DR007	28,942	-	6.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23DR017	21,920	-	4.85	-	-	-	-	-	-	-	-	-	-	-		-	-	-
23DR021	43,163	-	9.50	976	-	-	-	-	-	-	-	-	-	-		-	-	-
23DR052	29,955	-	5.30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23DR030	39,918	-	7.70	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23DR005	187,773	-	30.56	8,767	-	-	1,200	-	-	-	-	-	-	-		-	-	-
23DR001	56,418	-	8.00	1,211	-	-	-	-	-	-	-	-	-	-		-	-	-
23DR008	27,198	-	5.90	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23DR019	41,315	-	10.80	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23DR053	37,513	-	6.70	-	-	-	-	-	-	-	-	-	-	-		-	-	-
23DR040	37,639	-	9.03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23DR054	36,798	-	6.39	985	-	-	-	-	-	-	-	-	-	-		-	-	-
23DR037	213,029	-	37.70	2,259	1.50	-	1,212	1.50	-	-	1.50	-	-	2.00		-	2.00	-
23DR039	27,135	-	5.20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23DR026	109,810	-	21.00	433	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23DR018	34,725	-	7.91	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23DR048	34,995	-	7.80	608	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23DR038	58,195	-	11.90	880	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23DRO12	73,775	-	16.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23DR002	47,790	-	8.76	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23DR031	56,014	-	10.65	846	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23DR055	32,863	-	6.90	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23DR027	58,590	-	15.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23DRO13	234,145	-	43.00	100,490	-	12.50	150,000	-	22.70	-	-	-	-	-		-	-	-
23DR034	135,220	-	14.75	766	-	-	-	-	-	-	-	-	-	-		-	-	-
23DR003	58,296	-	8.78	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23DR016	83,748	-	10.00	-	-	-	-	-	-	-	-	-	-	-		-	-	-
23DR004	108,246	-	18.35	1,002	-	-	-	-	-	-	-	-	-	-		-	-	-
23DR036	56,731	-	10.13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23DR032	138,570	-	15.10	1,449	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23DR010	87,067	-	9.85	1,077	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23DR033	83,372	-	4.82	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23DR006	66,782	-	11.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3,141,593	**-**	**540.74**	**136,474**	**8.90**	**12.50**	**153,612**	**6.35**	**22.70**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Total improvement				**136,474**	**8.90**	**12.50**	**153,612**	**6.35**	**22.70**	**105,429**	**-**	**19.84**	**130,385**	**-**	**18.14**	**159,308**	**-**	**21.87**
Construction	**Cost**	**Length**		**-**			**-**			**-**			**-**			**-**		
23DR015	57,660	9.30		57,660		9.30		-	-		-	-		-	-		-	-
23DR016	138,000	15.00		138,000		15.00		-	-		-	-		-	-		-	-
Total new construction				**195,660**		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

6.3 DTMP OUTPUTS

Based on the investment plan presented above, all DRCN roads (600.74km) will be conserved for the duration of the DTMP period. A further 43km will be improved to gravel standard (RRRSDP funds) and subsequently 18.05km will be upgraded to blacktop standard (with DoR funding) but cost incurred is not included in this DTMP. Besides, these roads as well as other few roads will also receive the cross drainage and protective structures required to make them maintainable all-weather roads. The remaining 325.74 km of earthen roads at the end of the DTMP period will be improved in the successive DTMPs. 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. But funds set aside to village roads may use for track construction to new roads.

Table: 6.3.1 DTMP output

Conservation	Improvement gravel	Improvement blacktop	New construction
600.74	43.00	18.05	-

Of the total DTMP budget of NPR 912.33 million, NPR 775.48 million will be spent for DRCN roads (600.74km; 25% of total road length) and NPR 136.85 million for village roads (1796.10km; 75% length). The estimated fund is not sufficient even for conservation of DRCN roads (i.e. 821.50 million) and therefore minimum improvement works will be carried out under conservation. Likely the budget proposed for village roads also insufficient for minimum requirement for conservation of track opened roads. With the present scenario of resources availability; Sindhupalchowk district is facing acute shortage of fund (huge funding gap of NPR 318.823 million, i.e. 38.8% deficit) for conservation of DRCN. While funds deficit for conservation, improvement and new construction of all DRCN is NPR 3,374.44 million (81.3%).

6.4 DTMP OUTCOME

As a result of the activities planned in this DTMP, the percentage of all-weather maintainable DRCN roads increases by 82.17% from 150.96km to 275km, with 50.95% (306km) remaining fair weather roads.

Table: 6.4.1 Standard of DRCN roads

	Total length	Fair-weather		All-weather gravel		All-weather blacktop		All-weather earthen	
	km	km	%	km	%	km	%	km	%
Start of DTMP	600.74	449.78	74.88%	42.85	7.13%	17.15	2.85%	90.96	15.14%
End of DTMP	600.74	306.05	50.95%	82.50	13.73%	29.40	4.89%	163.10	27.15%
Difference	-	-143.73	-23.93%	39.65	6.60%	12.25	2.04%	72.14	12.01%

The number of VDC headquarters with access to the SRN or all-weather DRCN roads will remain same i.e. 77 of 79, but the district population with access to the SRN or all-weather DRCN roads will increase from 35% to 65%. The percentage of the district population with no access to DRCN roads will remain only at 2.5%.

Table: 6.4.2 Population with access to road network

	Direct access to SRN			Access to fair-weather DRCN roads			Access to all-weather DRCN roads			No access to DRCN		
	VDCs	Population	%	VDCs	Population	%	VDCs	Population	%	VDCs	Population	%
Start of DTMP	20	89,620	31.4%	53	178,848	62.6%	24	99,980	35.0%	2	7,042	2.5%
End of DTMP	20	89,620	31.4%	27	86,870	30.4%	49	186,794	65.4%	2	7,042	2.5%
Difference	-	-	0%	-26	-91,978	-32.2%	25	86,914	30.4%	-	-	0%

Figure 6 District Transport Master Plan (DTMP)

ANNEXES

Annex-1:	**Population Served**
Annex-2:	**Traffic Data**
Annex 3:	**Approved DRCN**
Annex 4:	**DDC decisions on the DTMP Approval and DDC Council endorsement**

ANNEX 1 POPULATION SERVED

SN	VDC	Population	23DR001	23DR002	23DR003	23DR004	23DR005	23DR006	23DR007	23DR008	23DR009	23DR010	23DR011	23DR012	23DR013	23DR014	23DR015	23DR016	23DR017	23DR018	23DR019	23DR020	23DR021	63DR022	23DR023	23DR024	23DR025	23DR026	23DR027	23DR028	23DR029	23DR030
1	Attarpur	2,182																														
2	Badegaun	5,353																														
3	Bansbari	5,056																														
4	Banskharka	2,259				x																										
5	Baramchi	3,248															x															
6	Barhabise	7,117																														
7	Baruwa	1,831				x																										
8	Batase	4,882												x																		
9	Bhimtar	4,526																														
10	Bhotsipa	4,618																														
11	Bhotang	2,582					x																									
12	Bhotenamlang	3,551							x																							
13	Bhotechaur	4,752																														
14	Chokati	2,497																														
15	Chautara	5,952													x																	
16	Dubachaur	5,713																														
17	Dhuskun	2,926																														
18	Fataksila	4,286																														
19	Fulpingdanda	4,802																					x									
20	Fulpingkatti	3,297																												x		
21	Fulpingkot	3,815																				x										
22	Gati	4,026																														x
23	Ghorthali	1,897																														
24	Ghumthang	3,780																										x				
25	Golche	3,611																														
26	Gumba	3,431															x	x														
27	Gunsakot	1,902						x																								
28	Hagam	3,847																			x											

SN	VDC	Population	23DR001	23DR002	23DR003	23DR004	23DR005	23DR006	23DR007	23DR008	23DR009	23DR010	23DR011	23DR012	23DR013	23DR014	23DR015	23DR016	23DR017	23DR018	23DR019	23DR020	23DR021	63DR022	23DR023	23DR024	23DR025	23DR026	23DR027	23DR028	23DR029	23DR030
29	Haibung	2,484																														
30	Helambu	2,564			x																											
31	Ichok	5,387	x																													
32	Irkhu	3,443																														
33	Jalbire	2,540															x															
34	Jethal	2,553																														
35	Jyamire	5,553									x																					
36	Kadambas	3,372																														
37	Kalika	2,251																														
38	Karthali	3,347																														
39	Kiul	2,950		x																												
40	Kubinde	3,009													x																	
41	Kunchok	3,967														x																
42	Langarche	2,590								x																						
43	Lisankhu	3,774																														
44	Listikot	3,305																											x			
45	Mahankal	4,843																														
46	Maneswara	3,393																														
47	Mankha	7,752																								x						
48	Marming	3,255																													x	
49	Melamchi	5,230																														
50	Nawalpur	3,471													x																	
51	Pangretar	2,952																							x							
52	Palchok	1,927																														
53	Pangtang	2,481																		x												
54	Petku	1,600																						x								
55	Pipaldanda	3,371													x																	
56	Piskar	2,286																														
57	Ramche	4,092																									x					
58	Sangachok	9,577																														
59	Sanosirubari	3,274																														

SN	VDC	Population	23DR001	23DR002	23DR003	23DR004	23DR005	23DR006	23DR007	23DR008	23DR009	23DR010	23DR011	23DR012	23DR013	23DR014	23DR015	23DR016	23DR017	23DR018	23DR019	23DR020	23DR021	63DR022	23DR023	23DR024	23DR025	23DR026	23DR027	23DR028	23DR029	23DR030
60	Selang	2,613																	x													
61	Sikharpur	2,564													x																	
62	Simpalkavre	2,777										x																				
63	Sindhukot	3,125																														
64	Sipapokhare	3,805																														
65	Sunkhani	2,520																														
66	Syaule	3,630											x																			
67	Talamarang	3,141																														
68	Tatopani	6,774																														
69	Tauthali	2,762																														
70	Tekanpur	1,609																														
71	Thakani	3,439																														
72	Thampaldhap	3,510					x	x																								
73	Thangpalkot	2,635					x																									
74	Thokarpa	4,373																														
75	Thulodhading	2,115																														
76	Thulopakhar	2,909																														
77	Thulosirubari	5,987																														
78	Thumpakhar	3,643																														
79	Yamunadanda	1,507																														
	Total population	**285,770**	**5,387**	**2,950**	**2,564**	**4,090**	**18,365**	**3,657**	**3,551**	**2,590**	**5,553**	**2,777**	**11,396**	**4,882**	**14,258**	**3,967**	**29,848**	**3,611**	**2,613**	**2,841**	**3,847**	**3,815**	**4,802**	**1,600**	**2,952**	**7,752**	**4,092**	**8,810**	**3,305**	**3,297**	**3,255**	**4,026**
	Total VDCs	**79**	**1**	**1**	**1**	**2**	**3***	**1***	**1**	**1**	**1**	**1**	**1**	**1**	**5**	**1**	**1**	**2**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**2**	**1**	**1**	**1**	**1**

Source: 2011 Census

- Asterisk indicates zone of influence VDC and population (direct beneficiary of the road named)

SN	VDC	Population	23DR031	23DR032	23DR033	23DR034	23DR035	23DR036	23DR037	23DR038	23DR039	23DR040	23DR041	23DR042	23DR043	23DR044	23DR045	23DR046	23DR047	23DR048	23DR049	23DR050	23DR051	23DR052	23DR053	23DR054	23DR055	SRN-4#s
1	Attarpur	2,182							x																			
2	Badegaun	5,353													*	x												
3	Bansbari	5,056																										
4	Banskharka	2,259																										
5	Baramchi	3,248																										
6	Barhabise	7,117																										x
7	Baruwa	1,831																					*					
8	Batase	4,882																										
9	Bhimtar	4,526													x													
10	Bhotsipa	4,618													*													
11	Bhotang	2,582																										
12	Bhotenamlang	3,551																										
13	Bhotechaur	4,752																	x									
14	Chokati	2,497			x	*																						
15	Chautara	5,952																										
16	Dubachaur	5,713																					x					
17	Dhuskun	2,926				x																						
18	Fataksila	4,286															x											
19	Fulpingdanda	4,802																										
20	Fulpingkatti	3,297																										
21	Fulpingkot	3,815																										
22	Gati	4,026																										
23	Ghorthali	1,897		x																								
24	Ghumthang	3,780																										
25	Golche	3,611																										
26	Gumba	3,431																										
27	Gunsakot	1,902																										
28	Hagam	3,847																										
29	Haibung	2,484																		x								
30	Helambu	2,564																										
31	Ichok	5,387																										

SN	VDC	Population	23DR031	23DR032	23DR033	23DR034	23DR035	23DR036	23DR037	23DR038	23DR039	23DR040	23DR041	23DR042	23DR043	23DR044	23DR045	23DR046	23DR047	23DR048	23DR049	23DR050	23DR051	23DR052	23DR053	23DR054	23DR055	SRN-4#s
32	Irkhu	3,443																										x
33	Jalbire	2,540																										
34	Jethal	2,553					x		*																			*
35	Jyamire	5,553																										
36	Kadambas	3,372										x																
37	Kalika	2,251							*		x																	
38	Karthali	3,347	x	*																								
39	Kiul	2,950																					*					
40	Kubinde	3,009																										
41	Kunchok	3,967																										
42	Langarche	2,590																										
43	Lisankhu	3,774							x																			
44	Listikot	3,305																										
45	Mahankal	4,843																										x
46	Maneswara	3,393																										
47	Mankha	7,752																										
48	Marming	3,255																										
49	Melamchi	5,230																										x
50	Nawalpur	3,471													*	*												
51	Pangretar	2,952																										
52	Palchok	1,927																									x	
53	Pangtang	2,481																										
54	Petku	1,600																										
55	Pipaldanda	3,371																										
56	Piskar	2,286			x																							
57	Ramche	4,092																										
58	Sangachok	9,577																										x
59	Sanosirubari	3,274													x													
60	Selang	2,613																										
61	Sikharpur	2,564																										
62	Simpalkavre	2,777																										

SN	VDC	Population	23DR031	23DR032	23DR033	23DR034	23DR035	23DR036	23DR037	23DR038	23DR039	23DR040	23DR041	23DR042	23DR043	23DR044	23DR045	23DR046	23DR047	23DR048	23DR049	23DR050	23DR051	23DR052	23DR053	23DR054	23DR055	SRN-4#s
63	Sindhukot	3,125																						x				
64	Sipapokhare	3,805													x													
65	Sunkhani	2,520								x																		
66	Syaule	3,630																										
67	Talamarang	3,141																								x		
68	Tatopani	6,774																										x
69	Tauthali	2,762					x																					
70	Tekanpur	1,609					x																					
71	Thakani	3,439																							x			
72	Thampaldhap	3,510																										
73	Thangpalkot	2,635																										
74	Thokarpa	4,373							x																			
75	Thulodhading	2,115						x																				
76	Thulopakhar	2,909																										x
77	Thulosirubari	5,987											x															
78	Thumpakhar	3,643																										x
79	Yamunadanda	1,507								x																		
	Total population	**285,770**	**3,347**	**4,819**	**2,497**	**6,461**	**7,666**	**2,115**	**18,492**	**4,027**	**2,251**	**3,372**	**5,987**	**4,618**	**23,002**	**5,353**	**4,286**	**35,072**	**52,607**	**2,484**	**52,607**	**5,056**	**12,418**	**3,125**	**3,439**	**3,141**	**1,927**	**43,536**
	Total VDCs	**79**	**1**	**1***	**1**	**2***	**3**	**1**	**3***	**2**	**1**	**1**	**1**	**1**	**3***	**1***	**1**	**0***	**1***	**1**	**0***	**1**	**1***	**1**	**1**	**1**	**1**	**8***

Source: 2011 Census

- Asterisk indicates zone of influence VDC and their population (direct beneficiary of the road named)

Annex-2: TRAFFIC DATA

Code	Description	Total length (km)	Motor-cycle	Car-Jeep-Minibus	Tractor	Truck-Bus	Vehicle per Day	PCU
23DR001	F30-Chanaute-Ichok-Kutumsang	8.00	17	4	0	9	**30**	**49**
23DR002	F30-Kiul-Bagar-Nigale-Sermathan	8.76	13	4	0	6	**23**	**35**
23DR003	F30-Timbu-Doring Nakote/Helambu	8.78	15	2	0	4	**21**	**26**
23DR004	Dauchet-Keureni-Banskhaka-Jatan-Baruwa	18.35	22	4	0	6	**32**	**39**
23DR005	F30-Melamchi-Tipeni-Bhotang	30.56	86	4	0	23	**113**	**139**
23DR006	Majhirumta Tar-Lekharka-Gunsa	11.00	43	4	0	6	**53**	**50**
23DR007	Tipeni-Bhotenamlang	6.00	10	2	0	2	**14**	**15**
23DR008	Khaldekhola-Lagarche-Okhreni	5.90	12	2	0	2	**16**	**16**
23DR009	Melamchi-Jyamire-Sunkhani-Dablang	5.50	27	2	0	4	**33**	**32**
23DR010	Syaule-Bhadgaun-Simpalkavre-Nawalpur	9.85	12	3	0	2	**17**	**17**
23DRO11	F31-Chautara-Syaule-Okhreni-Gobre	14.60	38	6	0	11	**55**	**69**
23DRO12	F31-Chautara-Batase-Kumbeshwor	16.00	18	2	0	4	**24**	**27**
23DRO13	Naubise-Chautara-Melamchi*	43.00	50	6	8	4	**68**	**63**
23DR014	Jaudanda-Khutumedanda, Kunchok	1.57	6	2	0	1	**9**	**9**
23DR015	H03-Balephi-Jalbire-Tembathan	28.70	92	8	0	25	**125**	**154**
23DR016	Okhreni-Selang-Golche-Baikunthe	10.00	15	2	1	0	**18**	**12**
23DR017	Toribarichaur-Selang School-Manedanda	4.85	9	2	0	2	**13**	**15**
23DR018	Sunkhola-Ghunga-Pangtag	7.91	18	3	0	6	**27**	**36**
23DR019	Dhande-Biplum-Yanlakot-Hagam	10.80	14	4	0		**18**	**11**
23DR020	Naubise-Fulpingkot-Dhuskot	4.49	10	3	0	3	**16**	**20**
23DR021	H03-Kothe-Binjel-Chilaune-Dhuskot	9.50	27	4	0	8	**39**	**50**
23DR022	F32-Kakaling-Pedku-7 Kilo	2.30	15	3	0	2	**20**	**19**
23DR023	F32-1 Kilo- Pangretar-Damsite (H03)*	1.80	19	2	0	8	**29**	**44**
23DR024	H03-Khadichaur-Mangkha-Chimling	4.00	17	2	0	2	**21**	**19**
23DR025	Barhabisephant-Puranagaun-Kerabari-Ramche	4.49	12	2	0	2	**16**	**16**
23DR026	H03-Barhabise-Maneswara-Ghumthang-Listi-Bhairavkunda	21.00	32	4	0	10	**46**	**60**
23DR027	H03-Daklang-Listi-Bhairabkunda	15.50	14	4	0	2	**20**	**19**
23DR028	H03-Hindi-Lukusing-Lakchepu-Selangkatti	2.38	6	2	0	3	**11**	**17**
23DR029	H03-Chaku-Marming-Chandraku	4.90	8	2	0	4	**14**	**22**
23DR030	H03-Bulkote-Tyangthali-Dandakaterii	7.70	12	4	0	4	**20**	**26**
23DR031	H03-Khagdal/Barhabise-Thantichaur-Karthali-Dolnsa-Thinsang~Bigu	10.65	37	4	0	11	**52**	**67**
23DR032	H03-Barhabise-Budhepa-Bagar-Ghorthali	15.30	31	3	0	10	**44**	**59**
23DR033	Bagar-Chokati	4.82	6	2	0	4	**12**	**21**
23DR034	Sunkoshi-Dhuskun-Piskar-Tauthali	14.75	35	3	0	10	**48**	**61**
23DR035	F32-Sildhunga-Tauthali-Tekanpur(H03)	22.90	40	6	0	11	**57**	**70**
23DR036	Pyukharka-Thulodhading-Danse	10.13	14	2	0	2	**18**	**17**
23DR037	H03-Sukute-Puranckot-Wafal-Lishankhu-Ghyangdanda-21 Kilo(F32)	44.40	83	6	0	22	**111**	**136**
23DR038	H03-Syale-Yamundanda-Sunkhani-Ghichchet-Tamche-Sikre	11.90	20	2	0	8	**30**	**44**
23DR039	H03-Sukute-Sheradanda-Mahendrakranti Ma.Vi., Kalika	5.20	16	2	0	2	**20**	**18**

Code	Description	Total length (km)	Motor-cycle	Car-Jeep-Minibus	Tractor	Truck-Bus	Vehicle per Day	PCU
23DR040	Melchaur(F31)-Bhaise(H03)	9.03	19	4	0	2	**25**	**22**
23DR041	F31-Jalkine-Narsingdanda-Archale-Rolpakha-Jhyadi	4.46	26	4	0	7	**37**	**45**
23DR042	Dauthedanda-Bhotsipa-Gaitar-Healthpost	3.40	16	3	0	3	**22**	**23**
23DR043	F31-Chautara-Sipaghat(F30)	26.54	69	7	0	16	**92**	**106**
23DR044	Nawalpur-Jyamiremane (Sipaghat)	7.00	24	3	0	9	**36**	**51**
23DR045	F30-Phatkeshwor-Pandherachaur-Chhapbhanjyang	3.85	21	2	0	4	**27**	**29**
23DR046	F30-Phatkeshwor-Chhapbhanjyang*	4.10	70	8	0	36	**114**	**187**
23DR047	Bhotechaur-Kauledovan*	11.10	130	22	0	56	**208**	**311**
23DR048	Jaisigaun-Haibung-Patibhanjyang	7.80	14	2	0	5	**21**	**29**
23DR049	SindhuAdit (F30-Bahunepati-Thankune)*	15.80	120	20	0	41	**181**	**244**
23DR050	F30-Bahunepati-Khatritole-Bhanjyang-Thakle-Sindhukot	4.00	8	2	0	2	**12**	**14**
23DR051	F30-Melamchi-Selle-Duwachaur-Kakani-Sermathang	10.13	46	4	0	16	**66**	**91**
23DR052	SindhuAdit-Bhadaure-Sindhukot-Dhusinichaur-Manebhanjyang-Nepane(F30)	5.30	13	4	0	4	**21**	**27**
23DR053	SindhuAdit-Chipling/Palchen-Okhrenichaur-Thakani)	6.70	6	2	0	1	**9**	**9**
23DR054	Talamarang-Manebhanjyang-Thakani	6.39	26	3	0	9	**38**	**52**
23DR055	Chanaute-Palchowkimai-Nagidanda	6.90	15	4	0	6	**25**	**36**
Total		**600.74**						