Annex I-2

NEPAL RURAL ROAD STANDARDS

The Classification of Rural Transport Linkages

In line with Government of Nepal's decentralisation policy, the overall responsibility for planning, construction (new, rehabilitation and upgrading) and maintenance (periodic and routine) of the rural transport linkages lies with the concerned District Development Committees (DDCs) under the policy advice and guidance of the Ministry of Local Development (MLD). The Department of Local Infrastructure Development and Agricultural Roads (DoLIDAR) under MLD through its decentralised institutions, viz. District Technical Office (DTO) holds the technical responsibility for the development of rural transport network in the country. This document, `Nepal Rural Road Standards" provides the classification and other general standards for **Rural Transport Network** and shall be followed by all concerned (users, users' committees, VDCs, DDCs, DTOs and DoLIDAR) in developing the rural transport linkages in Nepal.

The standards for **Strategic Road Network** (National Highways, Feeder Roads) and Urban Roads which are under the jurisdiction of Department of Roads (DOR) are excluded in this document but are available in the `Nepal Road Standard (2027) - Second Revision'.

1.0 General

1.1 Nepal Rural Road Standard (NRRS) shall apply to all rural transport linkages (roads, trails and rope ways) being constructed within Nepal. The roads other than that of National Strategic Road Network (National Highways, Feeder Roads) and Urban Roads are considered as rural transport linkages, along with the trails and rope ways.

1.2 Under very special circumstances (e.g. an alignment along a highly unstable, landslide-prone area in hills or a path over a flood dam in Terai), Government of Nepal may waive these standards.

1.3 The initial traffic volumes (counted or projected) on most of the rural transport linkages are generally low but are expected to rise considerably over the first 5-10 years as a result of newly opened up access to development functions. Therefore, the linkages that are initially opened up should have the in-built provision for further improvements to meet the rising demand of traffic volumes.

1.4 These considerations conclude that the rural transport linkages should be designed for stage construction, beginning with the lowest standard and gradually upgrading to the highest possible standard. Upgrading, or in other words, gradual modification to the existing standard shall be done as and when the defined criteria for such action is completely satisfied.

1.5 At any development stage of the rural transport linkage, it must operate with the desired traffic volume at the lowest cost per kilometre. The overall annual cost shall comprise of:

i. the amortised cost of the original investment for the linkage and/or that required to upgrade it to the stage under consideration (per vehicle-kilometre);
ii. the annual cost of maintaining the linkage (per vehicle-kilometre);
iii. [α] the annual cost required to operate the linkage (per vehicle-kilometre).

2.0 Classification of Rural Transport Linkages in Nepal

2.1 All rural transport linkages in Nepal are classified into five classes. These classes could generally be separated into three categories, as given below.

- two classes in Road category
- two classes in Trail category, and
- one class in Rope way category

2.2 The criteria for the classification of rural transport linkages are as follows:

1. by the function of linkage

Based on the strategic functions (national integration, public security, access to highly potential development areas - agriculture, tourism, rural hydro power, irrigation, cottage and micro industry, mining, etc.) or as per the public demand on the localised services (marketing, health, education, rural electrification), the class of rural transport linkage shall be decided.

by the level of users

When the link is newly opened up for a particular area, the users begin to grow in number as well as the means of usage differs with the increase in opportunities. As a result, the composition of users becomes more and more complex and the need for an upgrading of linkage will arise. The class of rural transport linkage shall be upgraded when the CRITERIA 'A' is fully satisfied.

3. by the traffic volume

The traffic volume is the ultimate result of having a transport linkage. It has a direct relationship with the geometric (dimensions) and technical standard (earthen, graveled, and paved) of the linkage. When the traffic volume increases above the design capacity, the linkage shall be considered for upgrading based on the CRITERIA 'A'.

4. by the topography

The topography of the terrain influences the selection of a particular class of linkage. For example, a linkage through an environmentally sensitive area in hills may be taken up as a trail and a linkage through a highly difficult mountainous region may be a rope way.

[α] With the increment of traffic volume, the need for upgrading the linkage is to increase the safety and lower the (ii) and (iii). If standards are not raised as per the usage, then (i) shall decrease but there shall be a heavy resultant increase in (ii) and (iii).

2.3 The five classes of the rural transport linkages are defined respectively as follows:

A. District Road Class 'A' (RRA) - DISTRICT ROAD-A

- Market Grade A to Market Grade A
- Market Grade A to Market Grade B
- Connecting more than three VDC/service centres
- Linking Market Grade A with high way , feeder road or RRA
- All rural roads which connect one or more major Growth Centres (market, tourism centre, industry, etc.) or several VDCs with the headquarters of the same/neighbouring district,
  ⇒ directly or
  ⇒ Through the National Strategic Road Network.

B. District Road Class 'B' (RRB) - District Road-B

- Market Grade A to Market Grade C
- Market Grade B to Market Grade C
- Connecting more than one VDC/service centres
- Linking Market Grade B or C with any other linkage
- All rural roads which connect a Village Development Committee Centre (VDC) with any one of the following:
  ⇒ another VDC Centre
  ⇒ National Strategic Road Network
  ⇒ district road
  ⇒ A major Growth Centre of the same/neighbouring district.

- All rural roads which connect a place of a village (river *ghat*, mini-market centre, school, health post, residential area, community forest, mill, factory, rural hydro power plant, a series of tube wells, etc.) with any one of the following:

  ⇒ VDC Centre of the village
  ⇒ another place within the VDC
  ⇒ a place of the neighbouring VDC
  ⇒ National Strategic Road Network
  ⇒ District road.

Village Roads: smaller roads not falling under these categories are village roads. These roads are smaller, shortest roads, with smaller settlements; village roads are not included in detail analysis of DTMP

Urban Roads: All roads within the boundary of municipality are urban roads. Each municipality needs its separate transport infrastructure planning. Therefore urban roads are not included in detail analysis of DTMP

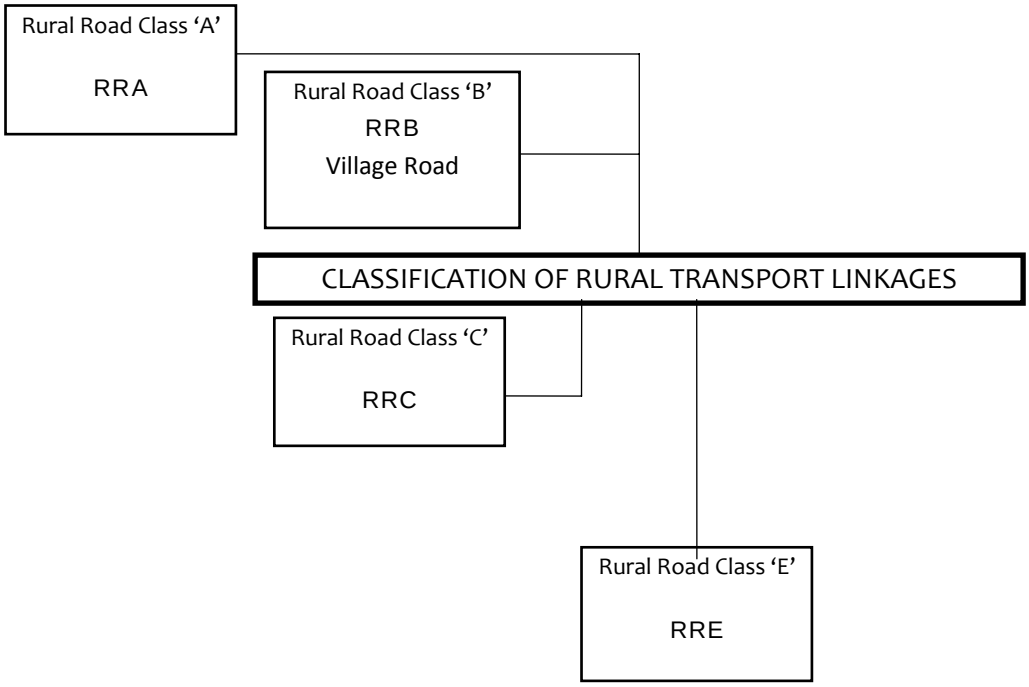
C. Rural Road Class 'C' (RRC) - MAIN TRAIL

- All major non-motorable foot/mule trails which connect a VDC Centre with any one of the following:
  ⇒ the district headquarters of the same/neighboring district
  ⇒ National Strategic Road Network

⇒ district road
⇒ village road
⇒ another VDC Centre
⇒ a major Growth Centre of the same/neighboring VDC.

E. Rural Road Class 'E' (RRE) - ROPE WAY

- In the high mountainous region where construction of trails (with sufficient width) is impossible, rope ways shall be considered. One of the main purposes of such rope ways would be the transportation of goods (consumer items, fuel, fertiliser, agricultural and livestock products) to and from the pocket areas where high value crops are being produced. However, the amortised cost of construction and the annual cost of operation and maintenance of rope way shall be justified by the increased socio-economic benefits of the area[β].



3.0 Traffic

3.1 It is not financially viable to improve the standard of a rural transport linkage by a small margin since the heavy cost involved does not justify the marginal benefits. Therefore, it is the accepted practice to design and construct new transport linkages or upgrade the existing ones that are suitable of undertaking a higher traffic volume which is anticipated at some future date. For rural transport linkages in Nepal, this projected period shall be considered as 10 years.

3.2 Various types of vehicular and pedestrian traffic occupy the surface of rural transport linkage and impose different loads on the structure. Therefore, it is necessary to quantify the various traffic volumes in terms of a standard traffic unit, called `Transport Unit (TU)' or the

β This version of Nepal Rural Road Standard does not cover the technical standards required for the **Rural Road Class 'E'** but hereby makes the provision for future revision when the need arises.

`Passenger Car Unit (PCU)' which is defined as the traffic caused by a normal car, light van, jeep or a pick-up travelling at a speed of 40 km/h.

3.3 The composition of traffic and the respective traffic coefficients are given below. These coefficients shall be followed during the designing process. (Applicable only for Rural Road Class 'A' and 'B').

Type of Traffic	Transport Unit (TU)
Cars, light vans, jeeps and pick-ups	1.0
Light trucks up to 2.5 tonnes gross	1.5
Trucks up to 10 tonnes gross	3.0
Trucks up to 15 tonnes gross	4.0
4W Tractor towed trailers - standard	3.0
2W Tractor towed trailers - standard	1.5
Buses up to 40 passengers	3.0
Buses over 40 passengers	4.0
Bicycles	0.5
Rickshaws and tricycles carrying goods	1.0
Carts pulled/pushed by the human beings	2.0
Bullock carts with pneumatic tyre wheels	6.0
Bullock carts with wooden wheels	8.0
Mule carts or horse drawn carts	6.0
Pack animals and mules	2.0
Pedestrians walking on the link	0.2
Porters walking on the link	0.4

3.4 Composition of traffic is one of the key elements that determine the standard of a rural transport linkage. The length of the longest vehicle plying along the rural transport linkage would be one of the factors that define the geometric standards of the linkage. For example, the longer the vehicle wider the carriageway width is required at the bends.

3.5 Volume of traffic shall be considered while fixing the design standards of a rural transport linkage as the linkage needs to accommodate the estimated number of Transport Units. Traffic volumes are generally the Annual Average Daily Traffic (AADT). While fixing the design standards, however, the other factors like availability of funds, land use pattern of both sides and the restrictions imposed by the nature (forest, water ways, steep hill slopes, etc.) shall be considered. The more the number of traffic, wider is the carriageway width required as there would be frequent passing and overtaking manoeuvres.

4.0 Design Standards

4.1 **Design Capacity:** (Applicable only for Rural Road Class 'A' and 'B')

Design capacity (Design Service Volume) shall provide the basis for determining the class of the rural road. The rural roads are classified in Section 2.3 on the basis of connectivity. However, in order to ensure the serviceability of the road, the class may change depending upon the volume of traffic (counted or projected). For example, a road classified as 'B' on the basis of connectivity might be changed into a class 'A' road, if the volume of traffic is found to be higher. Design capacity shall further provide the criteria for determining the intervals of lay-byes (passing zones).

4.2 **Design Speed:** (Applicable only for Rural Road Class 'A' and 'B')

When the design speed is higher, the design standards should be of higher order which ensures the road safety, capacity, comfort and decreases the users' operational expenditure. The choice of design speed, however, would be influenced by the class of road, traffic volume, available budget and the terrain.

4.3 **Terrain:** (Applicable only for Rural Road Class 'A', and 'B',)

The terrain through which the rural transport linkage passes directly influences the selection of geometric standards (formation width, carriageway width, right of way, free board, radius of horizontal curves, gradient, intervals of passing zones, etc.). Depending upon the terrain, the factors such as land use pattern of either sides, availability of land, the restrictions imposed by the nature (forest, steep hill slopes, rapid-flow water ways, complex geological structure, etc.) would vary considerably thereby governing the choice of many geometric standards. For example, a road in hills may suffer due to the limitation in land availability whereas a road in Terai may not face such difficulty.

4.4 **Design Standards:** (Applicable only for Rural Road Class 'A' and 'B')

Below mentioned standards shall be followed while designing the rural transport linkages.

S. No.	Design Parameters	Class 'A' District Road		Class 'B' Village Road		Class 'C' Main Trail
		Hill	**Terai**	**Hill**	**Terai**	
1.	Design capacity- in both directions (Vehicle per day/T.U per day)	200 (400)	400 (800)	100 (200)	200 (400)	
2.	Design speed (km per hour)	20	40	15	30	
3.	Right of way, either side from the road centre (m)	10	10	7.5	7.5	2.5
4.	Formation width (m) - includes 0.6 m drainage & 0.4m parapet which will be kept wherever needed.	5.0	6.0	4.0	4.5	2.0
5.	Carriageway width (m)	3.0	3.0	3.0	3.0	2.0
6.	Shoulder width, either side (m)	1.0	1.5	0.5	0.75	0
7.	Paving the earthen surface by	Broken stones or Gravel	Gravelling or Brick Soling	None	None	None
8.	Minimum radius in horizontal curve (m)	10	20	10	20	
9.	Maximum average gradient (%)	8	5	8	5	
10.	Maximum gradient (%)	12	7	12	7	
11.	Easing of gradient for every 500 m increment in altitude (rate of easing)	0.50	-	0.50	-	
12.	Minimum gradient on hill roads (for better drainage) (%)	1	-	1	-	
13.	Free Board from HFL (m)	0.5	0.5	0.5	0.5	0.5
14.	Minimum stopping sight distance (m)	20	40	15	30	
15.	Cross slope in carriageway camber (%)	4	4	5	5	

S. No.	Design Parameters	Class 'A' District Road		Class 'B' Village Road		Class 'C' Main Trail
		Hill	**Terai**	**Hill**	**Terai**	
16.	Cross slope in shoulder camber (%)	5	5	5	5	
17.	Carriageway width at culvert/bridge* (m)	3.0	3.0	3.0	3.0	2.0
18.	Dimensions (width x length) of Lay-byes/passing zones (m x m)	3.0 x 20	3.0 x 20	3.0 x 20	3.0 x 20	
19.	Lay-byes/passing zone strips at interval of (m)	300	500	300	500	

*.....Suspension or suspended bridges are not considered.