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**Guidelines on Road Classification
System and Delineation of
Construction and Maintenance
Responsibilities**

2009

དཔལ་ལྷན་འབྲུག་གཞུང་།

ཞབས་ཏོག་ལྷན་ལག

**Royal Government of Bhutan
Ministry of Works & Human Settlement**



དཔལ་ལྷན་འབྲུག་གཞུང་། འབས་ཏོག་ལྷན་ཁག།
ROYAL GOVERNMENT OF BHUTAN
MINISTRY OF WORKS & HUMAN SETTLEMENT
THIMPHU: BHUTAN
“Towards Quality Infrastructure”



MINISTER

Dated: 1st May 2009

Foreword

The national road network has expanded rapidly since the construction of the Phuentsholing-Thimphu Highway the country's first road. At present there are over 5300 km of motorable roads of 15 different categories constructed and maintained by various agencies. A comprehensive road classification system is therefore essential to delineate ownership and roles of various agencies involved in planning, budgeting, implementation and maintenance of the national road network.

The objectives of the road classification system is to help establish: i) clear understanding and definition of various road categories; ii) clear understanding among stakeholders and agencies as regards to their role in road sector development; and iii) increased transparency in decision making.

Preparation of the road classification system was initiated in August 2008 by the Gross National Happiness Commission with the help of a Multi-Sectoral Committee. In October 2008 the Ministry of Works and Human Settlement received the directives of the Royal Government to take the lead role in preparation of a road classification guidelines in consultation with relevant stakeholders. Accordingly, several rounds of consultation meetings were held with the stakeholders such as the Gross National Happiness Commission, Ministry of Home and Cultural Affairs, Ministry of Agriculture, Dzongkhag Administrations and Department of Roads. A committee was formed comprising of members from relevant stakeholders to draft the guidelines. This guidelines is therefore the product of the joint effort and hard work of all the stakeholders.

The draft guidelines was submitted to the Cabinet Secretariat for consideration in February 2009 and was approved in the 31st Session of the *Lhengye Zhungtshog* Meeting held on 24th February 2009.

The Ministry of Works and Human Settlement is pleased to issue the *Guidelines on Road Classification System and Delineation of Construction and Maintenance Responsibilities* for the information of the stakeholders as well as the general public. It is my sincere hope that the guidelines would serve as a useful reference to the stakeholders in understanding their role in road sector development and result in increased transparency in decision making related to further expansion of the road network in the country.

Tashi Delek,

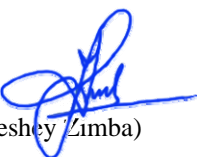

(Yeshey Limba)

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Guidelines on Road Classification System and Delineation of Construction and Maintenance Responsibilities

1.0 Introduction

The Road Act of the Kingdom of Bhutan, 2004, includes the following fifteen road types:

- National Highway
- District Road
- Feeder Road
- Farm Road
- Forest Road
- Health Road
- Education Road
- Telecommunications Road
- Power Road
- Private Road
- Project Road
- Public Road
- Power Tiller Road
- Urban Road
- International Road

2.0 Objectives

A comprehensive road classification system is required delineating ownership and roles of various agencies involved in planning and budgeting, implementation and maintenance of the national road network. A proper road classification will help establish:

- clear understanding and definition of various road classes;
- clear understanding among stakeholders and agencies as regards to their role in road sector development;
- increased transparency in decision making

3.0 Classification of Roads

The entire road network of the country will be classified into 5 categories as follows.

Category 1: National Highways

- Asian Highway/International Road (currently the existing Phuentsholing-Thimphu Highway)
- Primary National Highway (existing East-West Highway and North-South highways)
- Secondary National Highway (currently District Roads)

Category 2: Dzongkhag Roads (currently feeder Roads)

Category 3: Farm Roads (currently Farm Roads and Power Tiller Roads)

Category 4: Thromde Roads (currently Urban Roads)

Category 5: Access Roads

- Forest Roads
- Health Roads
- Education Roads
- Telecommunications Road
- Power Road
- Private Road
- Project Road
- Public Road

Re-designation of roads will be done by the Department of Roads (DoR) in consultation with the relevant agencies. Upgrading of an existing road to a higher class will be done based on the traffic thresholds / minimum traffic levels specified in Annex –1 and other socio-economic considerations. All proposed roads should link to an existing road of equal or higher classification to ensure logical planning and investment in the network.

3.1 Asian Highway (AH)

The Phuentsholing-Thimphu Highway is designated by the Royal Government as the Asian Highway route No.48 within Bhutan. The design standards for the Asian Highway specified in the *Intergovernmental Agreement on the Asian Highway Network* are equivalent to the design standards of Primary National Highway (PNH). See Annex-1.

3.2 PNH

PNHs are roads of strategic importance carrying high traffic volume. It should be the shortest possible route between two designated points and provide width for two lanes of traffic.

3.3 Secondary National Highways (SNHs)

SNHs are those roads that:

- connect a Dzongkhag centre to a road of equal or higher classification;
- provide connectivity between two Dzongkhag centres.

It should be the shortest route between two designated points and provide width for one lane traffic. The design standards for SNH will be as per Annex-1. The existing District Roads will be re-designated as SNHs.

3.4 Responsibilities for AH, PNH, and SNH

DoR will be solely responsible for planning and implementation of AH, PNH and SNH. DoR shall also be the authority for development of the national road network with full authority to set technical standards for all classes of roads and bridges, including re-classification of roads, as and when it is necessary to match the socio-economic development of the country.

All AHs, PNHs and SNHs shall have necessary safety measures including road signs and guardrails as per the DoR standards.

4.0 Dzongkhag Roads

The Dzongkhag Road will be one that:

- connects a Dzongkhag Centre and an Integrated Gewog Centre/Gewog Administration Office;
- connects a Dzongkhag Centre and a Dungkhag Centre not otherwise designated as AH, PNH, SNH;
- connects a Dungkhag Centre with another Dungkhag Centre within the Dzongkhag not otherwise designated as AH, PNH, SNH;
- connects a Dungkhag Centre with a Gewog Centre/Gewog Administration Office;
- connects an Integrated Gewog Centre/Centres to an existing road of equal or higher classification.

Due to current resource constraint, in the Tenth Plan priority will be accorded to connect Gewog Centres by any type of road. The existing Farm Roads connecting Gewog Centres will be upgraded to Dzongkhag Roads in a phased manner during the subsequent Plans depending on availability of resources. The design standards for Dzongkhag Road are specified in Annex-1.

4.1 Responsibilities for Dzongkhag Roads

Planning, prioritization and budgeting of the Dzongkhag Roads will be done by respective Dzongkhag Tshogdu.

The Ministry of Home & Cultural Affairs, Ministry of Agriculture, Ministry of Works & Human Settlement and the Royal Civil Service Commission will initiate measures starting Tenth Plan to strengthen the institutional capacities in the Dzongkhag Administrations to take over the construction and maintenance responsibilities of Dzongkhag Roads. The Dzongkhag Administrations will take over the responsibility for construction and maintenance of Dzongkhag Roads as and when their capacity is sufficiently enhanced.

In the interim period, in view of the limited in-house capacity of the Dzongkhags, pre-investment studies, survey, design, procurement, construction and maintenance of Dzongkhag Roads will be carried out by DoR.

5.0 Farm Roads

Farm Roads are roads that link farmland areas/villages to an existing road of equal or higher classification to enable the transportation of inputs to the farm and agriculture produce to the market. Like other higher classes of roads, construction of Farm Roads should be inclusive of cost of appropriate bridges.

Prioritization/selection of Farm Roads will be done by the Gewog Tshogde based on the criteria set by the Department of Agriculture (DoA). The design standards for Farm Roads will be set by DoR in consultation with MoA. See Annex-1 for proposed design standards for Farm Roads.

5.1 Responsibilities for Farm Roads

Due to the limited capacity of the Gewog Administration, the Dzongkhag Administration will carry out pre-investment studies, geotechnical investigations, survey, design and procurement for Farm Roads with technical backstopping from DoA.

Planning, prioritization, budgeting and implementation of Farm Roads will be done by the respective Gewogs with technical backstopping from Dzongkhag Administration/DoA.

Technical backstopping in terms of in-house on-the-job training and technical guidance to DoA/Dzongkhag engineers for bridges on Farm Roads will be provided by DoR as and when required. DoA should employ full-time bridge engineers and build their own in-house capacity.

Major maintenance including monsoon damage restoration, pavement rehabilitation and improvement works will be carried out by the concerned Dzongkhag Administration. Budget for major maintenance should be maintained with the Dzongkhag Administration.

Routine maintenance of Farm Roads will be the responsibility of the concerned beneficiaries. Budget for routine maintenance will be provided based on the norms of DoA. Maintenance of Farm Roads will be carried out as prescribed in the latest DoA *Maintenance Manual*. See Annex-2 for activities included in the routine maintenance of roads.

6.0 Access Roads

Access Roads are roads listed in road category 5 above.

6.1 Design standards for Access Roads

Technical backstopping such as provision of design standards and specifications for Access Roads will be provided by DoR in consultation with the concerned agencies. Design and take off point for access roads shall be approved by the Department of Roads. Access Roads should be constructed to a minimum of Farm Road standard.

6.2 Responsibilities for Access Roads

Pre-investment studies, geological investigation, survey, design, procurement, construction, and maintenance of Access Roads will be done by the agencies/communities/individuals concerned.

7.0 Thromde Roads

Thromde road means all types of roads located within the municipal boundary not otherwise designated as AH, PNH and SNH. Roads located within the municipal boundaries shall be governed by the rules and regulations of the concerned municipality.

7.1 Responsibilities for Thromde Roads

Thromde Roads will be executed either by the Thromde or Dzongkhag Administration wherever relevant including maintenance. Design standards for Thromde Roads will be set by DUDES in consultation with DoR.

Note:

- (i) The existing East-West highway and North-South highways, which are presently of single lane, will have to be widened to PNH standard. Financial implication arising from upgrading existing national highways to PNH standard needs to be assessed. Similarly, financial implications for upgrading existing District Roads to SNH standard and upgrading Farm Roads to Dzongkhag Road standard will have to be assessed.

- (ii) The Road Act of the Kingdom of Bhutan, 2004, will have to be amended appropriately and rules and regulations framed.

Road Design Standards

Road Classification		Primary National Highway				Secondary National Highway				Dzongkhag Road				Farm Road			
Terrain classification		L	R	M	S	L	R	M	S	L	R	M	S	L	R	M	S
Design speed (km/h)		60	50	40	30	50	40	30	20	40	30	20	15	30	25	15	10
Traffic volume (vpd)		>200				100-200				30-100				<30			
Width (m)	Right of way	30				30				30				30			
	Carriageway	6.5				3.5				3.5				3.5			
	Shoulder	1.5x2				1.5x2				0.5x2				0.5x2			
	Drain	1.0				1.0				0.6				0.6			
Min. radii of horizontal curve (m)		115	80	50	30	75	75	25	15	75	25	15	15	15 Exceptional =10			
Pavement slope (%)		2-5				2-5				4				4			
Shoulder slope (%)		3-6				4				5				5			
Type of pavement		Double bituminous treatment				Dense bituminous premix				Base Course				Single Layer Base Course			
Max. super-elevation (%)		10				10				10				10			
Max. vertical grade (%)		4	5	6	7	5-9				6-10				6-10			
Structure loading (minimum)		HS20-44				As per DoR standard				As per DoR standard				As per DoR standard			

Note:

1. Thromde Roads – Design standards to be prepared by DUDES in consultation with DoR
2. Access Road - Design standard to be set by DoR in consultation with the concerned agencies
3. The Design standards for AH are at par with the design standards for PNH.
4. Design standard of Farm Roads are equivalent to the design standards of Dzongkhag Roads.

vpd = vehicles per day

L= Level terrain (0 to 10 per cent)

R= Rolling terrain (10 to 25 per cent)

M= Mountainous terrain (25 to 60 per cent)

S = Steep terrain (More than 60 per cent)

ACTIVITIES INCLUDED IN THE ROUTINE MAINTENANCE OF ROADS

Routine Maintenance Activities

- The following are the details of routine maintenance activities pertaining to AH, PNH, SNH, Dzongkhag Roads and Access Roads. Budget for routine maintenance of roads and bridges will be allocated based on DoR norms, except for Access Roads.

Sno.	Road Component	Maintenance Activities
1	Pavement	Repair of: <ul style="list-style-type: none"> • Potholes • Rutting • Cracks • Surface
2	Shoulders	Correction of: <ul style="list-style-type: none"> • Cross-falls/levels • Depressions/undulations • Clear vegetation & debris
3	Drains (Cross Drains/Side Drains)	<ul style="list-style-type: none"> • Clear vegetation • Clear debris • Repair drains • Reshaping of earthen drains
4	Road Signs, markings and Road Furniture	<ul style="list-style-type: none"> • Repair of parapets/ walls/km posts • White washing/painting

		<ul style="list-style-type: none"> • Clear vegetation • Road marking • Road Safety
5	Right of Way (50 ft from Center either side of road and other road control areas)	<ul style="list-style-type: none"> • Clear vegetation for sight distance • Clearing obstructions from line of sight • Maintenance of demarcations
6	Others	<ul style="list-style-type: none"> • Removal of logs, boulders, etc. • Cleaning of vegetation from road structures and white washing etc • Snow Clearance

2. Routine maintenance activities for Farm Roads refer to simple activities that need to be attended to all the time. The work can be done by manual labour, using basic hand tools. No special skills are required, and all materials should be readily available.

However, although it is simple, it does require proper organization and regular implementation according to a plan. Delayed Routine Maintenance quickly turns into serious emergency maintenance.

The following works are considered as routine maintenance:

- Clear obstructions (including Minor slides less than 5 cubic metres per 20 metres stretch)
- Clear culverts and other cross drainage structures
- Cleaning of structures
- Clear and maintain side drains
- Repair scour checks and drain lining
- Collection, transport and stacking of material for road surface repair
- Road surface repair with collected material

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- Masonry work/repairs (RRM or DRM)
- Whitewashing
- Maintain carriageway cross-falls/cambers
- Maintain shoulder cross-falls
- Clear vegetation
- Bioengineering

3. The activities for bridge maintenance depend on the type of bridge to be maintained (see table below).

Bailey or other steel bridge	RCC bridge/large culvert
Greasing and tightening of bolts	Clearing of obstructions within culvert and inlet/outlet
Cleaning joints, planks	Cleaning of masonry – headwalls, wing-walls etc including clearing of weep-holes
Hammering nails which protrude above plank surface (timber planks)	Minor repairs to masonry
Checking presence of all pins and bolts	Whitewashing of parapets
	Cleaning of guardrail

Budget for routine maintenance of roads and bridges will be allocated based on DoA norms.
