3 EXISTING SITUATION OF THE ROAD SUBSECTOR

3.1 Road Subsector Administrative Framework

The different government agencies, institutions and offices involved in the management of the transport sector are as follows:

1) **Ministry of Transport (MOT).** The MOT was reorganized as part of the 1994 state sector reforms to redirect policy orientation from the previous centralist and interventionist role to a role that is more responsive to the needs of a market-led economy. Thus, the MOT's functions include not only the formulation and implementation of transport policies, standards, guidelines on planning and programming and capital budgeting, but also the management of its transport sector infrastructure, facilities and services.

   There are separate administrative agencies which were established to supervise each subsector (road, inland waterways, air, maritime), and each agency was given autonomy and broad powers to supervise centrally administered transport infrastructure.

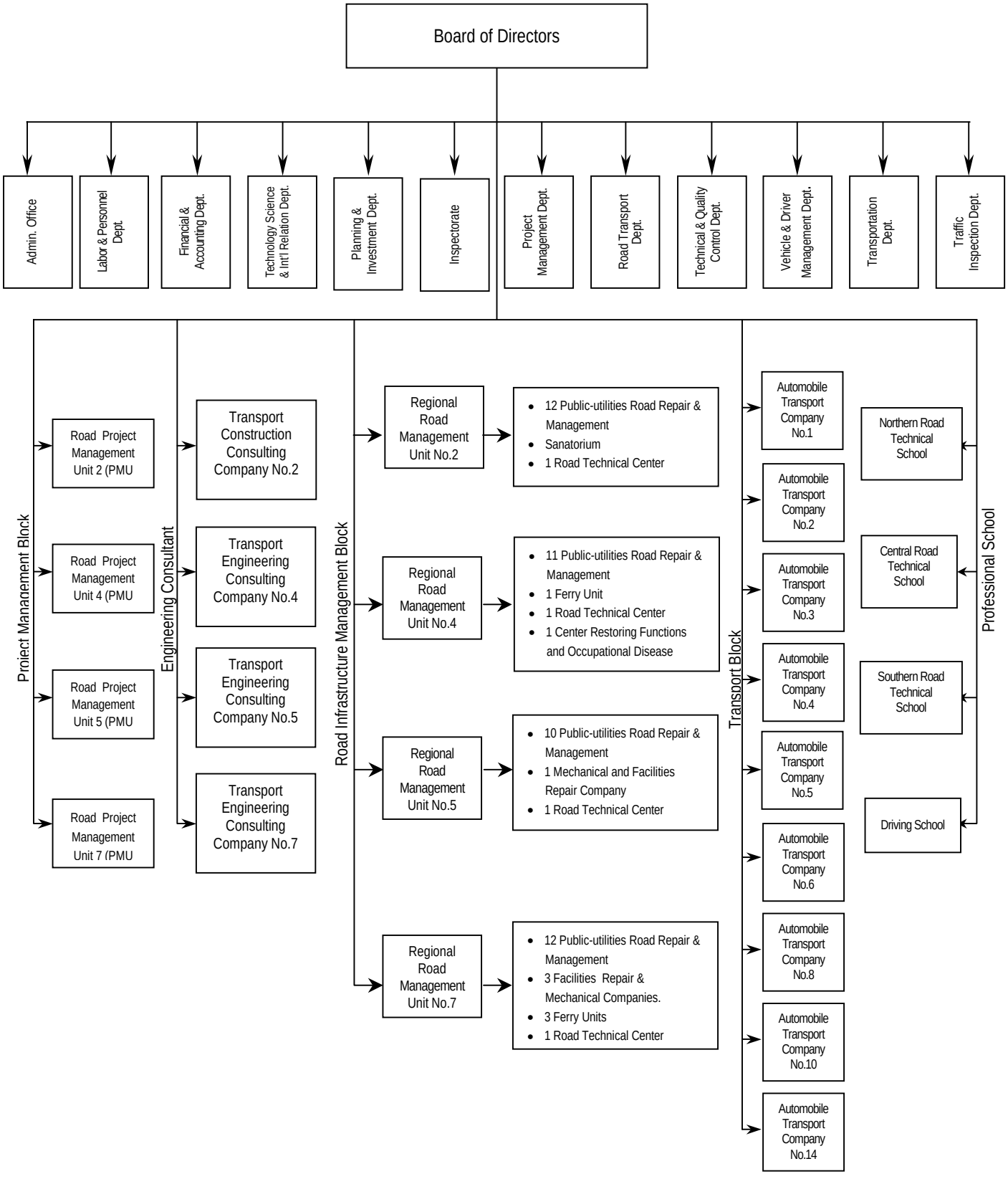
2) **Vietnam Road Administration (VRA).** The VRA was established in 1993 as one of the MOT's subordinate administrative agencies to administer and supervise the road transportation system in Vietnam. It is responsible for the management, planning and implementation of road maintenance program through its four regional road management units. Its major task is to develop strategic, legal and technical directions in road management. Each department within the VRA reports directly either to the Chairman or the four Vice Chairmen (refer to Figure 3.1.1).

3) **Regional Road Management Units (RRMUs).** The RRMUs are in-charge of the management of road maintenance work on 5,275 km of national roads. It is noted that RRMUs differ in their organizational structure with each RRMU comprising about nine to fourteen sub-RRMUs. Sub-RRMUs allocate maintenance works to depots which are directly under their jurisdiction. Each sub-RRMU may have about three to seven depots.

4) **Project Management Units (PMUs).** The PMUs were formed to manage the larger-scale road construction projects such as the National Road No. 1 rehabilitation project and My Thuan Bridge project. The number of PMUs can be increased based on the requirements of internationally funded road construction projects.

5) **Provincial Transport Authorities (PTAs).** The PTAs are established in each province and are directly responsible to the Provincial People's Committee (PPC) which is assisted by the Provincial Planning and Investment Committee (PPIC). These PTAs have substantial power over transport management issues within the province and are involved with the development, management and maintenance of provincial and district roads.

Figure 3.1.1
Organizational Chart of the Vietnam Road Administration (VRA)



However, the PTAs still depend on the MOT for technical specifications and legal transport standards as well as on their respective PPCs to manage, operate and rehabilitate provincial roads which are funded by the provinces. In addition, PTAs have a regulatory function by issuing both passenger and freight transport license to transport operators based in the province.

3.2 Road Network

Road Classification and Administration

Pursuant to the Council of Ministers Organizational Law dated 4 July 1981, Decree No. 35/CP dated 9 February 1981 and Decision 158/CP dated 4 July 1974, the MOT had established a classification and administration of road systems in Vietnam to effectively undertake the construction and repair of road infrastructure. Road classification is thus established to officially respond to road infrastructure and service demands of the country's economic sectors, to safeguard national security and to strengthen the existing road network system.

The entire road system in Vietnam is administered by the MOT but the different PPCs at all levels are responsible for the management of the road system within their administrative boundaries based on the decentralized state administration system. To assist the MOT in its mandate, there are various state organizations, economic bodies, army units, and citizens who are likewise tasked to protect and maintain the existing road system and to strictly observe the established rules and regulations of road transportation management.

The road network comprises the following six categories:

1) National Road System (QL): This is considered as the principal road system in the whole country and plays a key role in integrating the national economy, promoting stability in political affairs and culture and ensuring national security. The system includes roads which link Hanoi with the administrative centers of different provinces and other cities, industrial and special zones, and with neighboring countries, such as Laos and Cambodia.

2) Provincial Road System (DT): This road system comprises roads located within a province, through a provincial network with linkages to important areas considered as traffic generators. It also serves to protect the economic, cultural and security interests of the province. Provincial roads connect all district towns with the provincial capital as well with the districts of its neighboring provinces.

3) District Road System (designated DH): This road system is within a district and connects it with other district centers. It serves to protect the economic, cultural, political, and security requirements and supports the overall economic activities of the district.

4) Commune/ Village Road System (designated DX): This road system is within a commune/village and links neighboring communes/villages. It also provides access to rice fields, other road systems as well as production and market centers within the commune/village.

5) Urban Road System (designated DDT): This road system includes all kinds of streets and roads (except highways) that are within a city or town, with their respective functions. It is the MOT and the PPCs which jointly set the classification of these roads.

6) Special Road System (designated CD): This road system comprises roads that are used solely by one or more state organizations or enterprises located in construction sites, state farms and logging sites. These roads are being used as exit and entry roads of new economic zones, military bases, ports, railway stations, and state-owned warehouses. Roads that fall under the jurisdiction of certain organizations, enterprises, factories, and educational institutions are also included.

It is noted that there is a relatively set standards and mutually agreed upon criteria in classifying the road network which is more according to the administrative coverage and not according to road functional hierarchy. Thus, it follows that the division of responsibility among different government agencies and provincial authorities to regulate the road network has been established accordingly:

- The MOT is directly responsible for the classification of the highway system;
- The Chairman of the PPC determines the classification of their respective provincial, urban and special road systems;
- The Chairman of the DPC determines the classification of the district and village road systems.

Road and Bridge Design Standards

1) Road Design Standard

Road design standards which are the basis of the technical designs are stipulated in the Existing Highway Design Standards (TCVN 4050-85). They provide the geometric guidelines for each of the six road categories which are classified by function and importance, as shown in Table 3.2.1:

Table 3.2.1
Highway Function and Category

Importance of Highway	Technical Category
1. National highways that are particularly important to the national economy, politics, cultural affairs, international communications, and defense of the nation. -International highways	I-II
2. National highways - Main axis connecting political, economic, cultural centers of the country - Highways connecting important industrial areas - Highways connecting important transit centers	II-III
3. Secondary axis connecting important regional political, economic, cultural centers - Highways connecting large industrial and agricultural areas - Highways connecting major maritime ports, railway stations, airports	III-IV
4. International provincial roads - Roads connecting medium-size industrial and agricultural areas - Roads connecting regional transit centers - Roads connecting secondary maritime ports, railroad station and airports	V
5. Regional provincial roads and interregional centers - Roads connecting small industrial centers, agricultural cooperatives	VI

Source: Vietnam Design Standards

The Road Design Standards are defined according to road category in terms of the specific geometric standards and guidelines on the average daily traffic and design speed (refer to Table 3.2.2). These standards are currently being reviewed and revised by the VRA to reflect Vietnam's local conditions.

Appendix C presents the methodology used to determine the road traffic capacity of each link of the road network. **Appendix D** discuses the existing highway and bridge design standards which are being followed and applied by VRA.

Table 3.2.2
Road Design Standards by Category of Roads

Class	I	II	III	IV	V	VI
Number of Lanes	4	2	2	2	1	1
Width of Lane (m)	3.75	3.75	3.5	3.0	3.5	3.5
Width of Road side (m)	2x3.0	2x2.5	2x2.5	2x1.5	2x1.5	2x1.5
Width of road (m)	2x7.5	7.5	7.0	6.0	3.5	3.5
Width of Road Surface Base (m)	26.0	13.5	12.0	9.0	6.5	6.0
Minimum Horizontal radius (m)	600	400	250	130	60	25
Maximum Gradient (%)	4	5	6	7	8	9
Average Daily Traffic	>6000	3000~ 6000	1000~ 3000	300~ 1000	50~ 300	< 50
Design Speed (km/h) Normal Topography Mountainous Topography	 120 -	 100 80	 80 60	 60 40	 40 25	 25 15

Source: Vietnam Design Standards

2) Bridge Design Standard

The design of bridges in Vietnam is covered by a design document entitled "Specification for Bridge and Culvert Design to Ultimate Limit State" which is based on the 1962 Russian bridge design code of practice. The bridge design standards are currently being reviewed.

On 11 October 1996, the MOT issued the guidance for road maintenance and operation for Detailed Works and include the preparation plan, monthly schedule, performance, repair work as well as acceptance of the works undertaken. However, the evaluation of road damage seems to be neglected.

Road Network Characteristics

Vietnam's road network is relatively well developed with a road density of 0.32-km/ km^2 which is comparable to that of Thailand (0.2 km/ km^2) and Malaysia (0.25 km/ km^2). On the other hand, the quality is far from adequate.

Table 3.2.3
Availability of Roads in Vietnam

Availability Indicator	Value
Km of national roads per 1,000 people	0.196
Km of national roads per km^2	0.0496
Km of NR + PR + DR per 1,000 people	0.721
Km of NR + PR + DR per km^2	0.170
Km of NR + PR + DR + VR per 1,000 people	1.317

Thus, the Government's main focus is to upgrade the existing road quality, through road widening, strengthening of existing pavement and rehabilitation of the existing road structures. More than one-third of existing bridges need either structural strengthening or replacement of deteriorated structures. At present, there are 178 ferries which are in operation to connect the existing road network, however, vessels used and terminal facilities are in need of major rehabilitation work. (see Figures 3.2.1, 3.2.2, 3.2.3 and 3.2.4).

Following are the major findings from field surveys undertaken to determine the existing physical conditions of the road network of Vietnam:

1) Lack of roads and bridges in most areas: It is noted that in most parts of Vietnam, particularly in the provinces and rural areas/communes in the Mekong delta, roads and bridges are virtually non-existent, which led to development and use of inland waterway as a viable option for both passenger and goods transport. Whatever roads and bridges are existing, they are of relatively poor standard and majority are in deteriorated physical condition. Transport services likewise are lacking and whenever it is provided, transport cost is prohibitive.

2) Lack of an effective, functional hierarchy of the road network: The present road classification is based mainly on administrative jurisdiction, eg: national, provincial, district, and communes. To enhance planning and monitoring capability of transport institutions and organizations in all levels, a more rational classification based on road hierarchical function is necessary. Such functional road classification will likewise rationalize the budget allocation to roads by the different government agencies – on the national, provincial and district levels. Such functional hierarchy will also serve as a guide in a more rational prioritization of road projects particularly by provinces and in the effective allocation of limited local and donor funds in some cases.

3) Lack of a more contiguous road network (see Figure 3.2.2): Due to the natural and physical constraints existing in most areas where there are rivers and mountainous terrain, it may not be possible and cost effective to provide a contiguous road network particularly in the Red River delta and Mekong delta areas, where major economic activities are concentrated. Thus, "more circuitous" road network is provided, resulting in higher cost of transport services. In major urban areas, such as Hanoi and HCMC, a contiguous road network is possible since the population density merits the provision of such network. However, in Central Region Vietnam, providing a more contiguous road network is relatively more difficult with higher investment cost considering the mountainous terrain. Whenever possible and economical, ferry services in major river crossings "connect" the existing roads and fill in the "missing road links".

4) Poor reliability of the network: Many road sections are still in poor condition in terms of the physical pavement, road width and existing lanes. When natural disasters occur, such as flooding (in the Mekong Delta) and even landslides particularly during the rainy season, less maintained provincial roads are heavily damaged due to water seepage and which virtually "disappear" when waters subside. Such situation thus reflects the poor construction and even design of roads which did not take into account the occurrence of such disasters. It is noted that in the Mekong delta, and even in Central Region of Vietnam (Dong Ha-Hue) certain road sections particularly in coastal areas where roads are affected by tidal changes, there is a need to elevate these road sections since flooding is a common problem. There are provinces which have constructed roads at a higher elevation to prevent road closure and service interruption during bad weather condition.

5) Poor accessibility in rural areas (see Figure 3.2.5): There are many inaccessible communes, especially in rural areas, since majority of road development projects are along the national trunk road. This road development strategy is expected to continue due to limited funds and considering that most rural areas still have very low population density, houses are relatively far apart and flooding is a common problem, provision of quality roads can become very expensive.

   However, in order to promote a more balanced development throughout the country and spur economic activities in remote and rural areas, it is necessary to

undertake road development projects that will mainly serve these poorer areas. Due to the difficulty in justifying road improvement projects in these areas due to higher construction costs and the relatively much lower traffic demand, donor agencies particularly those involved in rural infrastructure (health, sanitation, water supply, and rural roads) such as the UNDP, JICA and AUSAID, have recognized the need to provide a limited number of rural road connections and bridges such as within Mekong Delta provinces where using inland waterway connection is considered to be more affordable to rural communities with greater frequency of ferry services.

Due to inadequate source of local funds, the local governments have to allocate funds according to hierarchy of economic and social needs of its constituents since roads have to compete with other sectors for funding support. Further, the private sector is more keen to put their investments in urban areas. In such cases, the local communities can be mobilized to build local roads with local materials that can be provided by the local communes, districts or provincial governments. Such scheme of financing road infrastructure may eventually result in establishing a contiguous road network to provide access with minimum standards.

Figure 3.2.1
Road Network

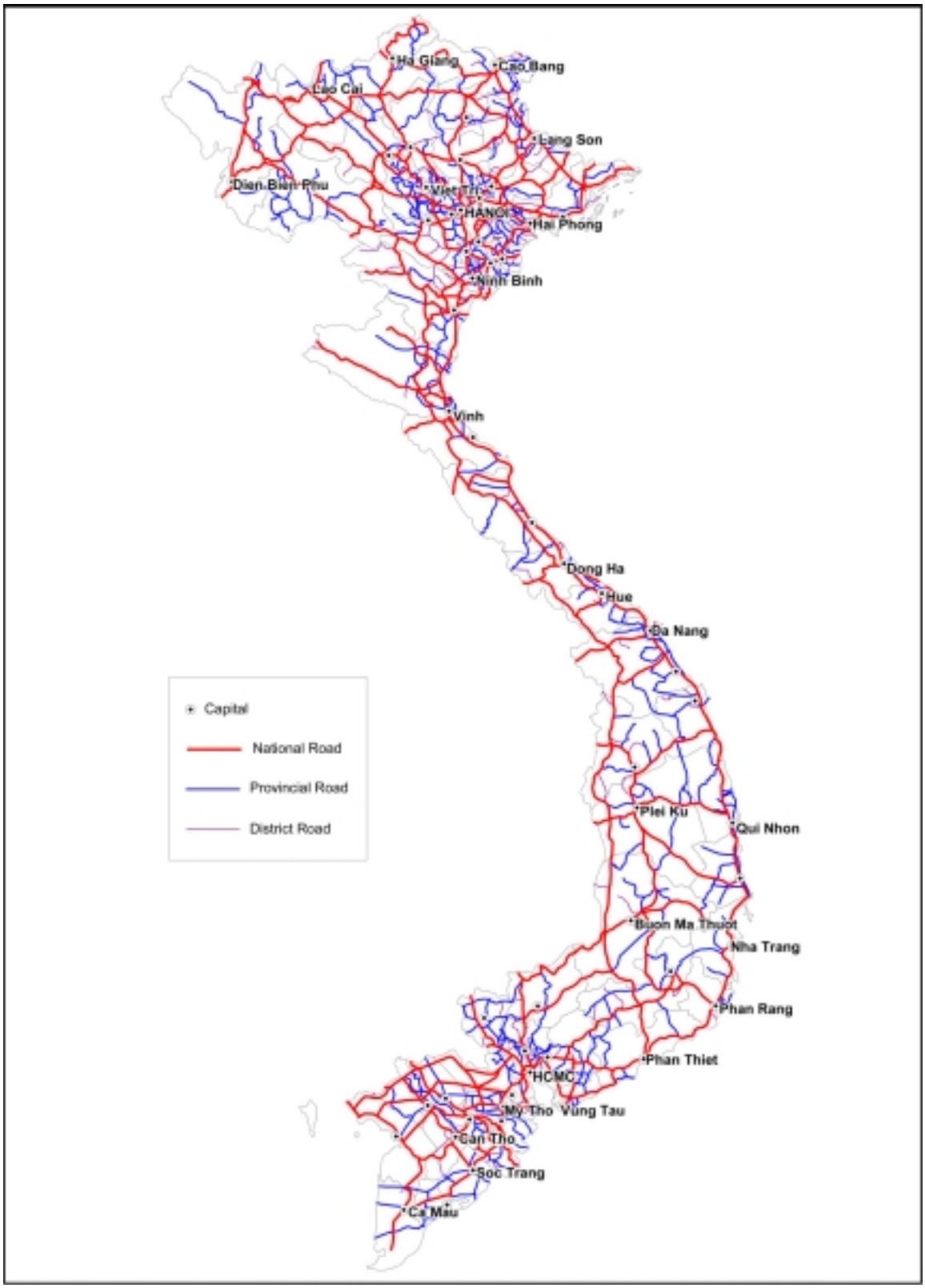


Figure 3.2.2
Road Network and Topography

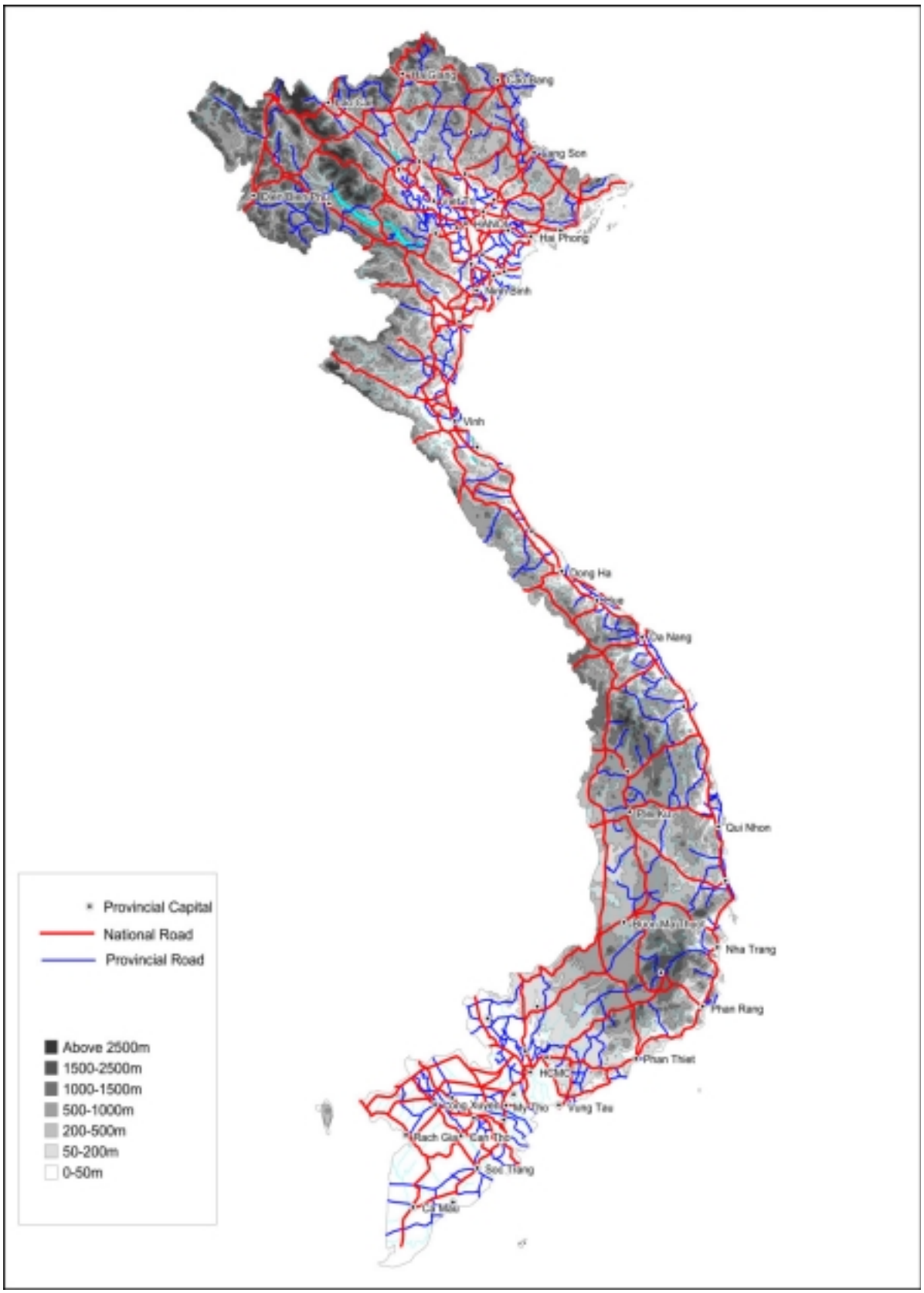
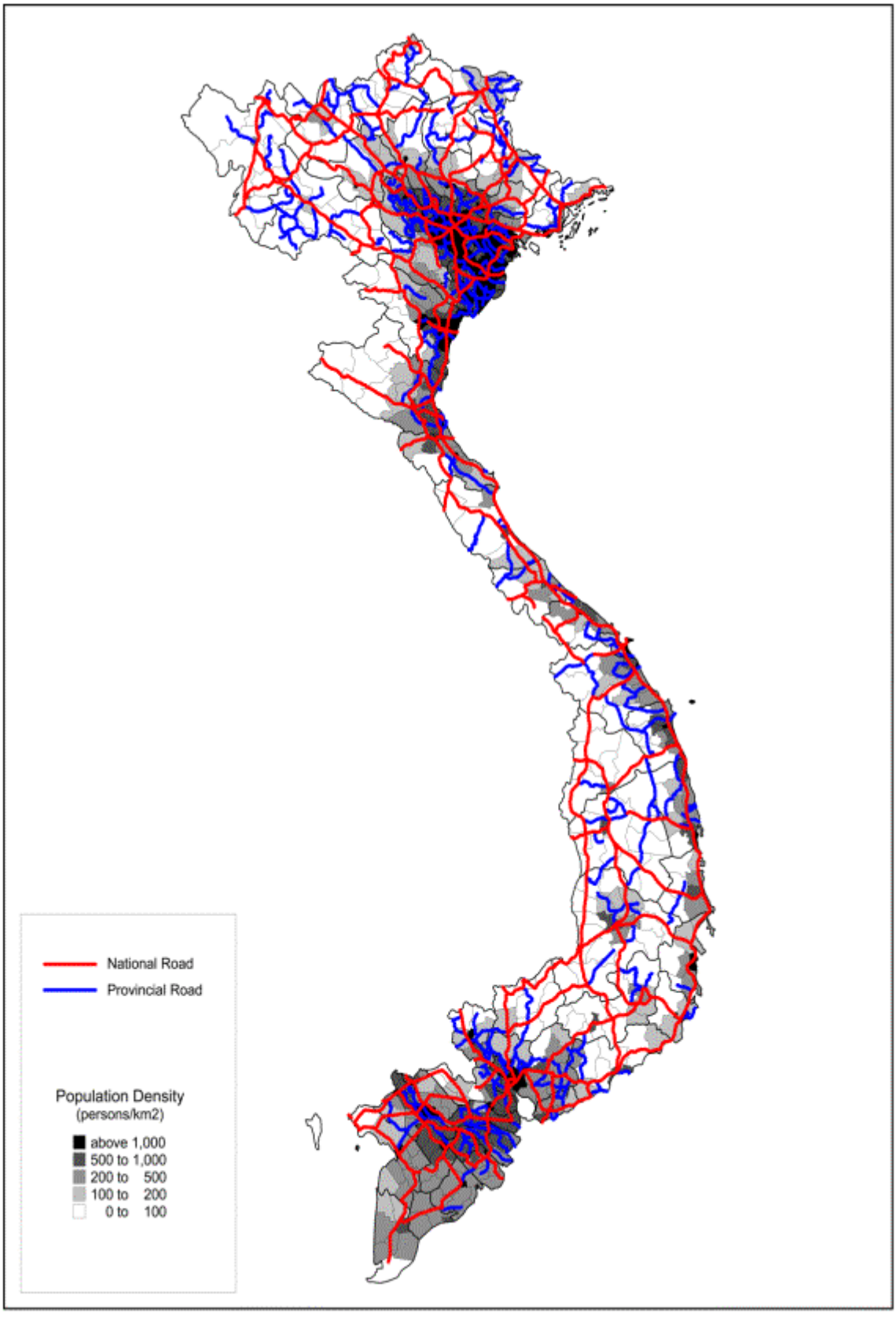


Figure 3.2.3
Road Network and Population Density by District



Figue 3.2.4
Road Network and Existing Land Use

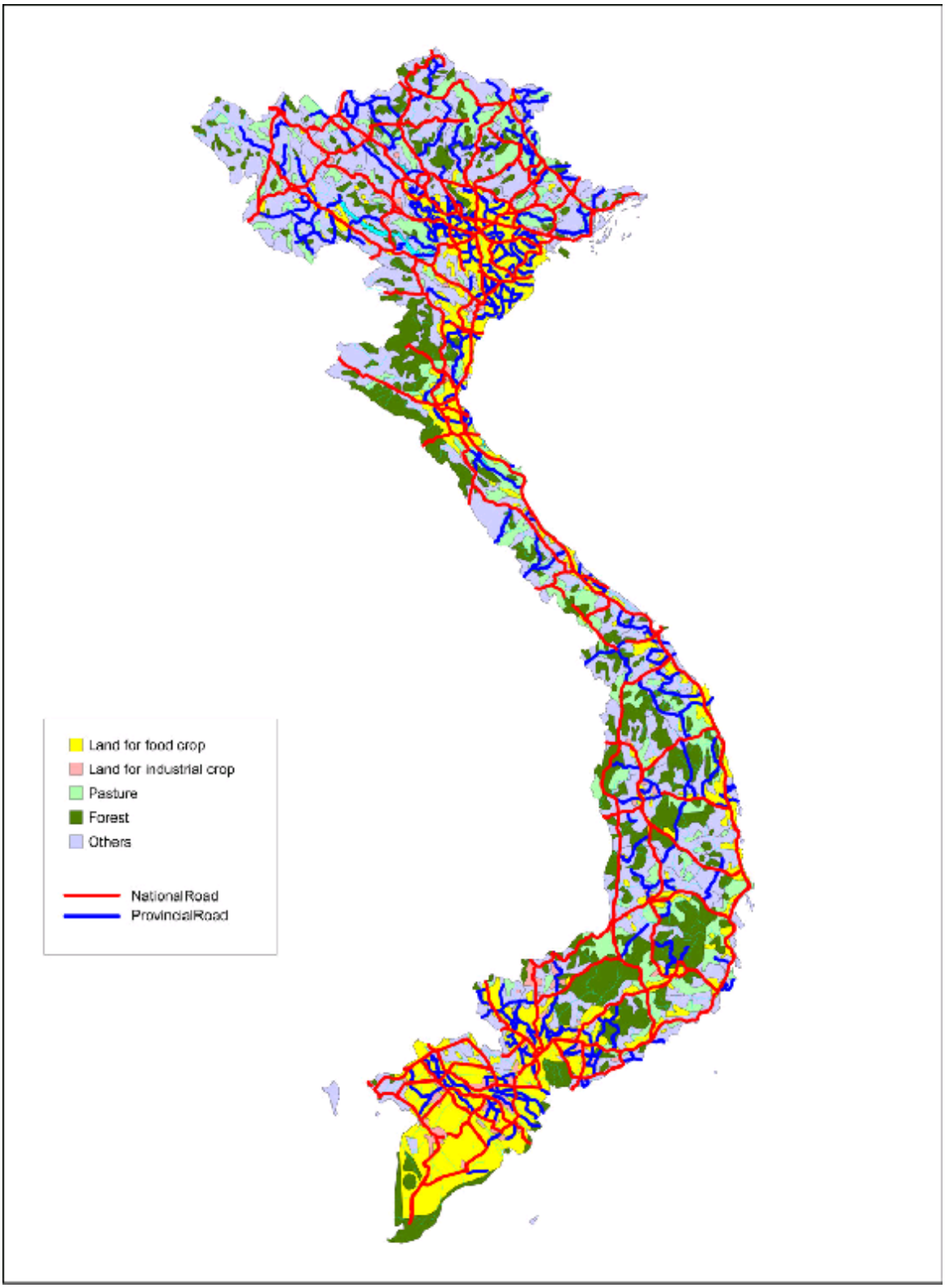


Figure 3.2.5
Connectivity of Districts by National/Provincial Roads

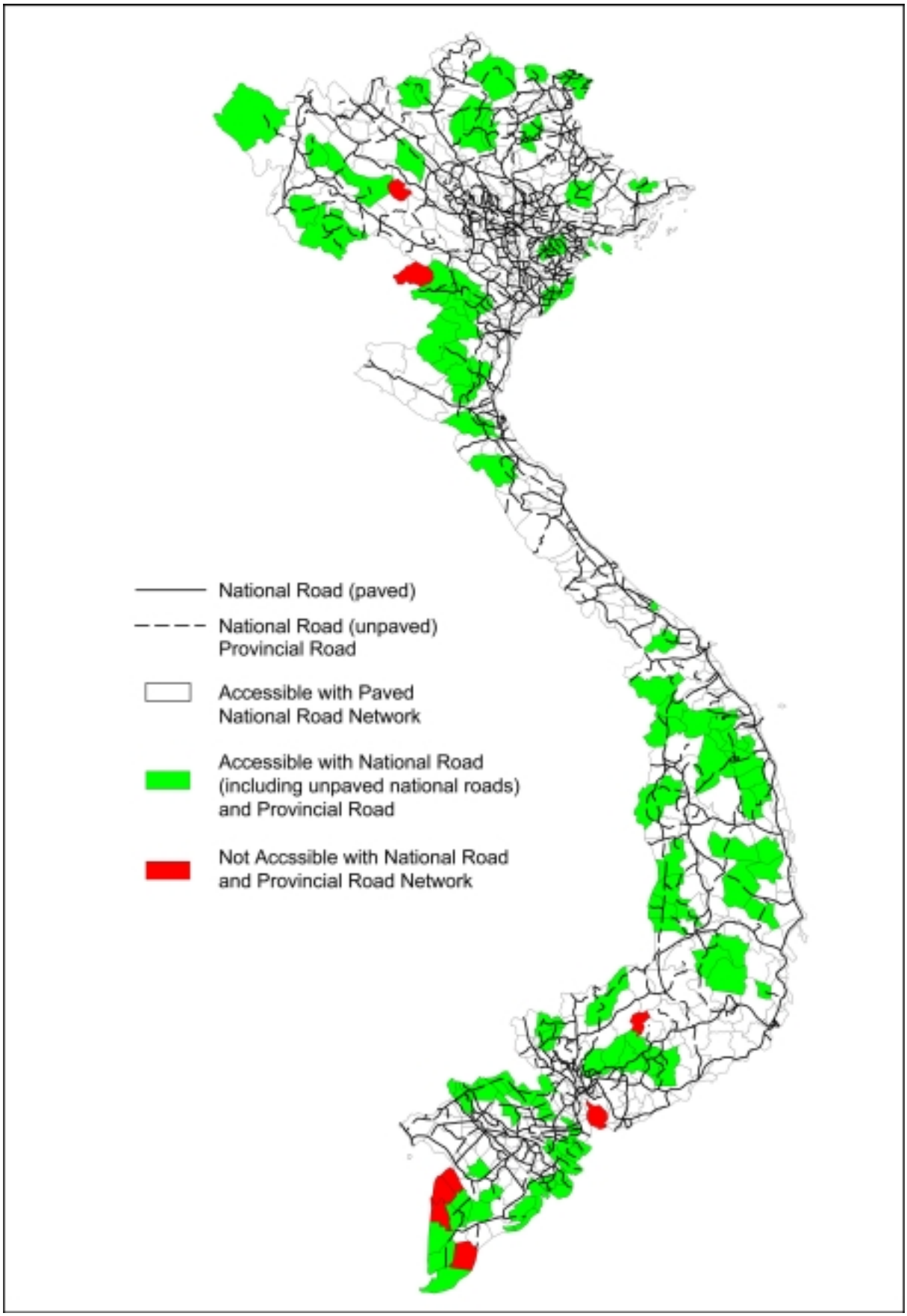


Figure 3.2.6
Photos Showing Existing Physical Conditions
of the Road Network

(a) National Highway No. 10
in Nam Dinh Province

National Highway No. 1A
Quang Ngai Province: Bridge Construction

(b) National Highway No. 10
Haiphong Province near to
Haiphong City

National Highway No. 1
Dong Nai Province near to HCMC higher
traffic volume, 4 lanes with separator

(c) National Highway No. 10
Haiphong Province, Quy Cao Ferry
on Thai Binh River

National Highway No. 10
Haiphong Province, Quy Cao Ferry
on Thai Binh River

(d) National Highway 10
Thanh Hoa Province

National Highway 91, Can Tho Province
in Suburban Area of Can Tho City

(e) National Highway 91
Can Tho Province, Rural Section

National Highway No. 10
in Nam Dinh Province

The road network in the three regions of Vietnam is briefly described as follows. The national road profile by region is presented in Table 3.2.4 according to length and pavement type.

In the North of Vietnam, the major road connects the port city of Haiphong and Hanoi which is located at the heart of the Red River Delta, considered the hub of the transportation network consisting of roads, inland waterways and railways, radiating over northern Vietnam. It is noted that the road has been upgraded to concrete pavement, comprising 60.7 km of concrete roads, to accommodate container traffic to facilitate both domestic and international trade. In the mountainous areas, road access is based on minimum design standards (mainly gravel) due to lower traffic volume and non-motorized travel is still common among local population. It is noted that the northern region has the most dense road network in combination with a good inland waterway network which provide the missing road links.

In the Central region of Viet Nam some road sections are still not passable even in "good weather" condition. In particular, some sections of Road No.15 are not being used due to existing bad road conditions and the lack of bridge infrastructure in some critical river crossings. There are very long road sections with steep terrain which result in high gradient, such as:

- the Hai Van Pass section of NR1 where in most cases the old and poorly maintained trucks slow down the flow of traffic;
- the very steep 25-km long section of NR8 leading to the Lao border which is so difficult to traverse that only very few trucks use this paved road which relatively, is in very good condition;
- the 115-km long ascent on NR14 through the Truong Son Mountains from Thanh My to Ngoc Hoi north of Kon Tum, which is not being used by trucks.

There are other transport difficulties resulting from the lack of bridges or insufficient ferry service, in particular on NR15. At present, all road users traveling between northern and southern Vietnam, including the Central Highlands, use coastal road NR1. The actual maximum speed ranges from 60 to 80km/ hr on this 7-m wide paved road, and along this road, it takes three days for bus passengers to travel from Hanoi to HCMC. The road conditions are generally good although some road sections are in poor condition due to flooding. In terms of traffic problems, road users experience the following:

- Urban and suburban traffic in city centers and suburbs. NR1 passes through 14 provincial capitals and traffic flow through major cities such as Hue and Danang, is very slow and difficult. In general, traffic is slow if within more than 10 kms from the city (refer to Figure 3.2.6);
- Too high gradient, especially at Hai Van Pass (i.e., more than 10%); and
- Traffic mix between motorized and non-motorized vehicles.

The alternate route to travelling between northern and southern Vietnam is to use NR15 from Hoa Binh province in the north to Dong Ha, NR1 from Dong Ha to Danang, and NR14B and NR14 from Danang to Binh Duong province and HCMC in

the south. However, there are many unpaved and hilly sections of NR15 which are impassable. Between Ngoc Lac and Dong Ha, about 70% of its total length cannot be used by light cars. There are certain sections which are only 3 m wide with high gradients and tight curves. Thus, the maximum practicable speed does not exceed more than five or 10 km/hr.

River crossings on NR15 are also not easy to traverse. There are 76 bridges which are less than 5 m wide and 25 larger bridges. Maintenance work on these roads is inadequate. Further, there are about 80 road sections that get perennially flooded and require bridge connections. There are also 250-m to 400-m wide river crossings where three ferries operate and also need to be replaced by bridges.

In the south of Danang, NR14B and NR14 are in better physical condition, although there are sections from Danang to Ngoc Hoi and from Ban Me Thuot to Dong Xoai near HCMC which are still unpaved. The 255-km long road between Danang and Ngoc Hoi comprises the ferry crossing of the 150-m wide Vu Gia river on one hand and a 193-km long mountainous section from Thach My to Ngoc Hoi on the other hand. Only the local traffic uses this road section while inter-provincial traffic between Danang and Kon Tum uses the NR14 from Plei Ku to Kon Tum (491-km long route) which is 171 km longer than the direct route through NR14B and NR14 Ha Nha between Danang and Thach My.

The 288-km long, 7-m wide central section from Ngoc Hoi to Buon Ma Thuot is paved and enables actual speeds to be higher than 80 kph. The 250-km section from Buon Ma Thuot to Dong Xoai is in fair physical condition and allows vehicle speed of 60 kph. On this section, only three bridges have an insufficient width (i.e under 5 m) and there is no ferry crossing. This section lies in a hilly or flat terrain.

Based on data in Table 3.2.3, the North central coast still maintain laterite pavement particularly those sections with low traffic demand. But majority of the national road network comprise of AC, laterite and asphalt pavement due to the relatively lower traffic density and the flooding problems in this region.

In the South of Vietnam, the road network is very developed around Ho Chi Minh City and nearby provinces but in the Mekong Delta areas, the criss-cross pattern of inland waterway network takes a major role in the transport of goods and people (refer to Figure 3.2.6). Thus, total road length in Mekong River Delta is only 11.1 percent of the total road length and comprise mainly of AC and asphalt pavement. HCM City urban road network is connected to Hanoi in the North and the central cities of Danang and Hue through NR1.

Most road sections have been widened to accommodate much larger traffic volume in anticipation of the transport needs of major export and domestic industries in the south. In the northeastern south and in Mekong River Delta provinces, majority of the roads comprise of AC and asphalt pavement and only a small percentage is concrete. It is noted that there are portions of the national road network in the Mekong Delta which are still earth roads and provide access to local population.

Table 3.2.4
Summary of Road Characteristics by Region

A. Length of National Road by Region and Pavement Type

Region	Length by Pavement Type (km)						
	Total	Concrete	AC	Asphalt	Gravel	Laterite	Earth
Red River Delta	1,051.1	2.2	338.7	613.5	53.1	43.6	-
Northeast	1,957.3	60.7	88.6	1,011.0	92.0	515.0	190.0
Northwest	3,205.3	5.9	272.4	1,365.5	789.0	512.1	260.4
North Central Coast	2,759.4	1.8	466.3	1,113.7	91.9	1,027.5	58.2
South Central Coast	1,155.9	0.7	764.7	68.8	47.8	193.4	80.6
Central Highlands	1,636.4	-	488.0	164.6	104.3	879.5	-
North Eastern South	1,675.2	1.0	1,046.5	249.3	104.2	132.4	141.8
Mekong River Delta	1,680.3	-	571.2	460.3	150.4	236.8	261.6
Total	15,120.9	72.3	4,036.4	5,046.6	1,432.7	3,540.4	992.5
% to Total	100.0	0.5	26.7	33.4	9.5	23.4	6.6

B. Composition of National Road by Region and Pavement Type

Region	Pavement Type (%)						
	All Type	Concrete	AC	Asphalt	Gravel	Laterite	Earth
Red River Delta	7.0	3.0	8.4	12.2	3.7	1.2	-
Northeast	12.9	84.0	2.2	20.0	6.4	14.5	19.1
Northwest	21.2	8.2	6.7	27.1	55.1	14.5	26.2
North Central Coast	18.2	2.5	11.6	22.1	6.4	29.0	5.9
South Central Coast	7.6	0.9	18.9	1.4	3.3	5.5	8.1
Central Highlands	10.8	-	12.1	3.3	7.3	24.8	-
North Eastern South	11.1	1.4	25.9	4.9	7.3	3.7	14.3
Mekong River Delta	11.1	-	14.2	9.1	10.5	6.7	26.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

C. Length of National Road by Region and Pavement Type

Region	Length by Pavement Type (km)						
	Total	Concrete	AC	Asphalt	Gravel	Laterite	Earth
North	6,213.7	68.8	699.7	2,990.0	934.1	1,070.7	450.4
Central	5,551.7	2.5	1,719.0	1,347.1	244.0	2,100.4	138.8
South	3,355.5	1.0	1,617.7	709.6	254.6	369.2	403.4
Total	15,120.9	72.3	4,036.4	5,046.6	1,432.7	3,540.4	992.5
% to Total	100.0	0.5	26.7	33.4	9.5	23.4	6.6

D. Regional Distribution of National Road by Pavement Type

Region	Pavement Type (%)						
	All Type	Concrete	AC	Asphalt	Gravel	Laterite	Earth
North	41.1	95.2	17.3	59.2	65.2	30.2	45.4
Central	36.7	3.4	42.6	26.7	17.0	59.3	14.0
South	22.2	1.4	40.1	14.1	17.8	10.4	40.6
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

3.3 Assessment of the Physical Condition of Roads and Bridges

Existing Road Inventory

The VRA maintains the road inventory data[1] but it encounters difficulties in updating these records due to on-going rehabilitation works not only on the national level but also on provincial and district levels. Thus, discrepancies exist in the statistics reported but for purposes of analysis, the official data from VRA was obtained to provide the existing road inventory profile in Vietnam which is considered the most comprehensive road network database.

Road Conditions

1) Pavement Type of the National Road Network: About 60% of national roads are paved with either concrete or asphalt. The remaining parts of the national road system consist of either gravel roads or earth roads. Many of the unpaved national roads are located in mountainous or remote areas where there is a relatively low traffic demand. In the case of provincial and district roads, the percentage of concrete/asphalt-paved roads is much lower than that of the national roads, which is 26.6% for provincial roads and 9.9% for district roads. (see Table 3.3.1 and Figure 3.3.1)

Table 3.3.1
Road Length (km) by Jurisdiction and Pavement Type, 1999

Jurisdiction by Management	Total	Concrete	AC	Asphalt	Gravel	Laterite	Earth
National Road[1/]	15,121	72	3,950	5,139	1,491	3,707	762
Provincial Road	17,449	22	668	3,948	3,041	4,874	4,896
District Road	36,372	-	53	3,558	4,976	12,956	14,829
Urban Road	3,211	-	1,246	1,965	-	-	-
Subtotal	72,153	94	5,917	14,609	9,509	21,537	20,487
Special Road	5,451	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Village Road	46,910	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Subdivision Road	84,545	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Total	209,059	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Source: MOT, and VRA

1/ 50% of national road lengths are administered by PTAs.

2) Paved Width of the National Road Network: Most paved national roads have a two-lane carriageway in both directions. The pavement width of the two-lane roads is around seven meters (see Figure 3.3.2). However, a seven-meter width is not sufficient since the larger vehicles such as trucks and buses must overtake the slow and small vehicles, since in a number of road sections of national roads, a significant number of motorcycles and bicycles are still traveling alongside the larger four-wheel vehicles.

[1] See **Appendix A** and **B** which presents the existing national road and bridge inventory data, which indicates the length (in km), width, type of pavement, and existing physical condition of each road section.

At present, some sections of National Road No.1 have an 11 or 12-meter width, a 3.5-meter lane in each direction and an additional 2-meter or 2.5-meter wide shoulder on both sides of the roads. Thus, upgrading the roads to such standards enable motorcycles and bicycles to travel on the shoulder, and four-wheel and two-wheel vehicle traffic are now separated from non motorized vehicles, which has resulted in a much improved traffic condition and increase in travel/operating speeds of four-wheel vehicles such as trucks.

It is noted that the four-lane roads are mainly located in urban areas and fall under the classification of urban roads. It was observed that on national roads four-lane sections are limited and only the more important national roads with relatively higher traffic volumes have four-lane carriageway. These roads include sections of National Road Nos. 1, 5 and 51.

3) Physical Condition of National Roads : It is noted that national roads in good condition are those within the surrounding areas of Hanoi City and Ho Chi Minh City. The road condition in mountainous areas is generally poor and the roads are inaccessible during the rainy season. It is shown that most areas are accessible with gravel national roads, but there are a few areas with both national and provincial roads which are still inaccessible and these include the border provinces in the north and south of the country. In the past years, both central and southern Vietnam provinces have been frequently visited by storms which result in flooding of a number of road sections (see Table 3.3.2 and Figure 3.3.3).

The road and bridge quality in Vietnam is in poor condition and does not meet the demands of economic development, particularly in integrating Vietnam's road traffic with other regions and countries.

Table 3.3.2
Road Physical Condition, in %

Condition	1997	1998	1999
Good (Level 1)	23.6	24.2	25.3
Quite Good (Level 2)	14.9	16.4	18.6
Fair (Level 3, 4)	38.6	37.6	35.7
Poor (Level 5)	15.6	14.9	13.4
Very Poor (Level 6)	7.3	7.1	7.0
Total	100.0	100.0	100.0

Source: VRA

Figure 3.3.1
Pavement Type of the National Road Network

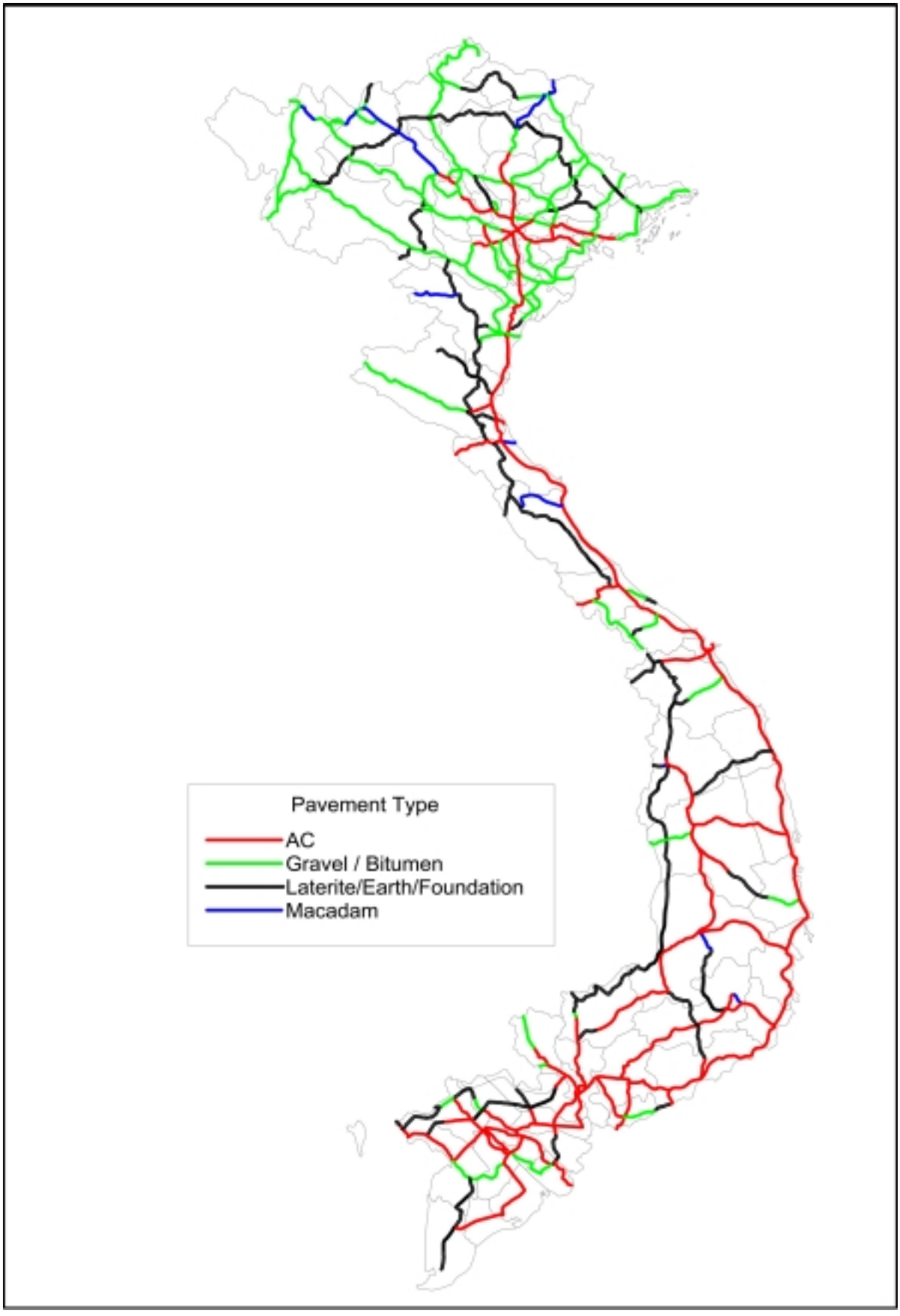


Figure 3.3.2
Pavement Width of the National Road Network

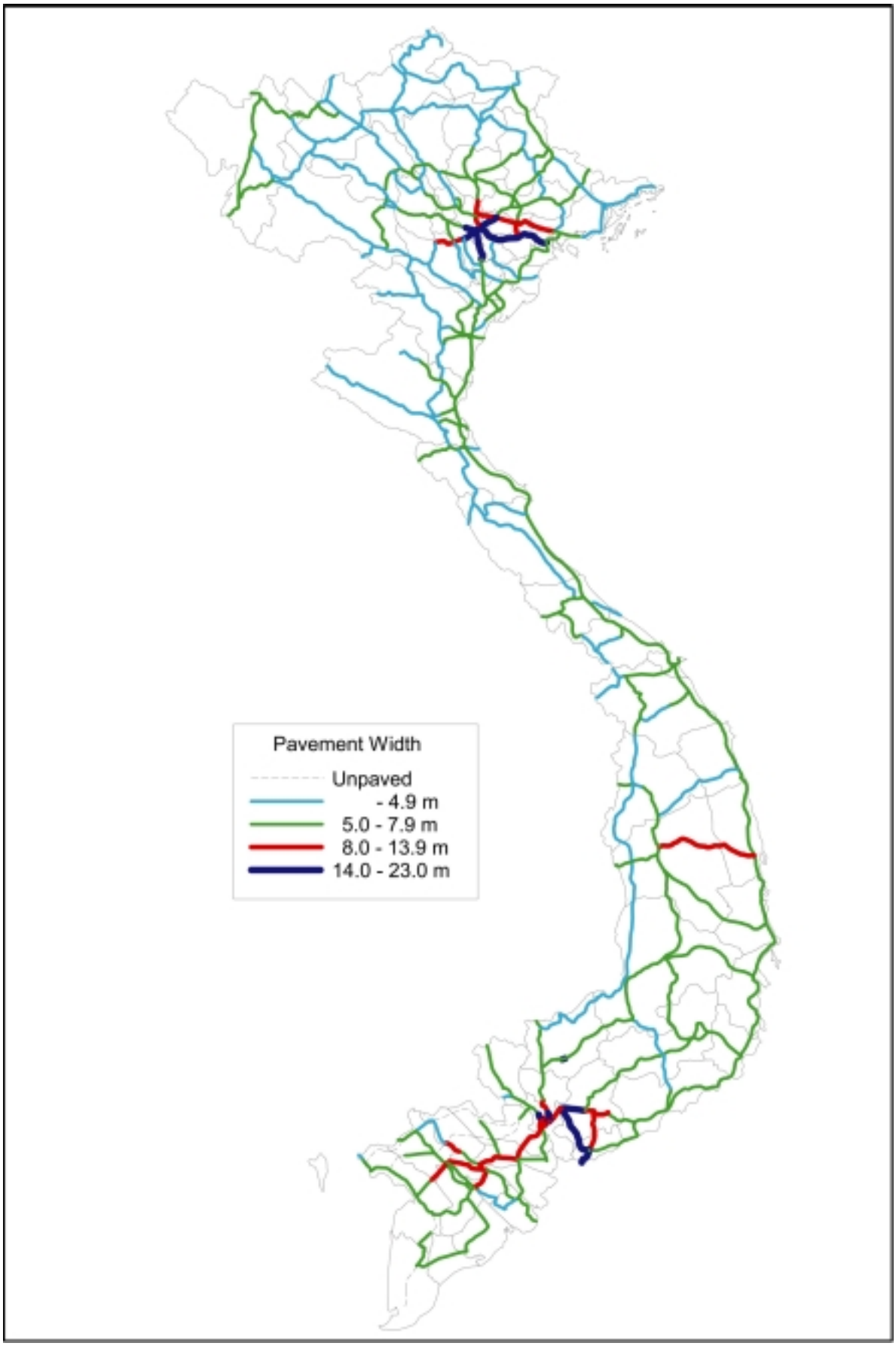
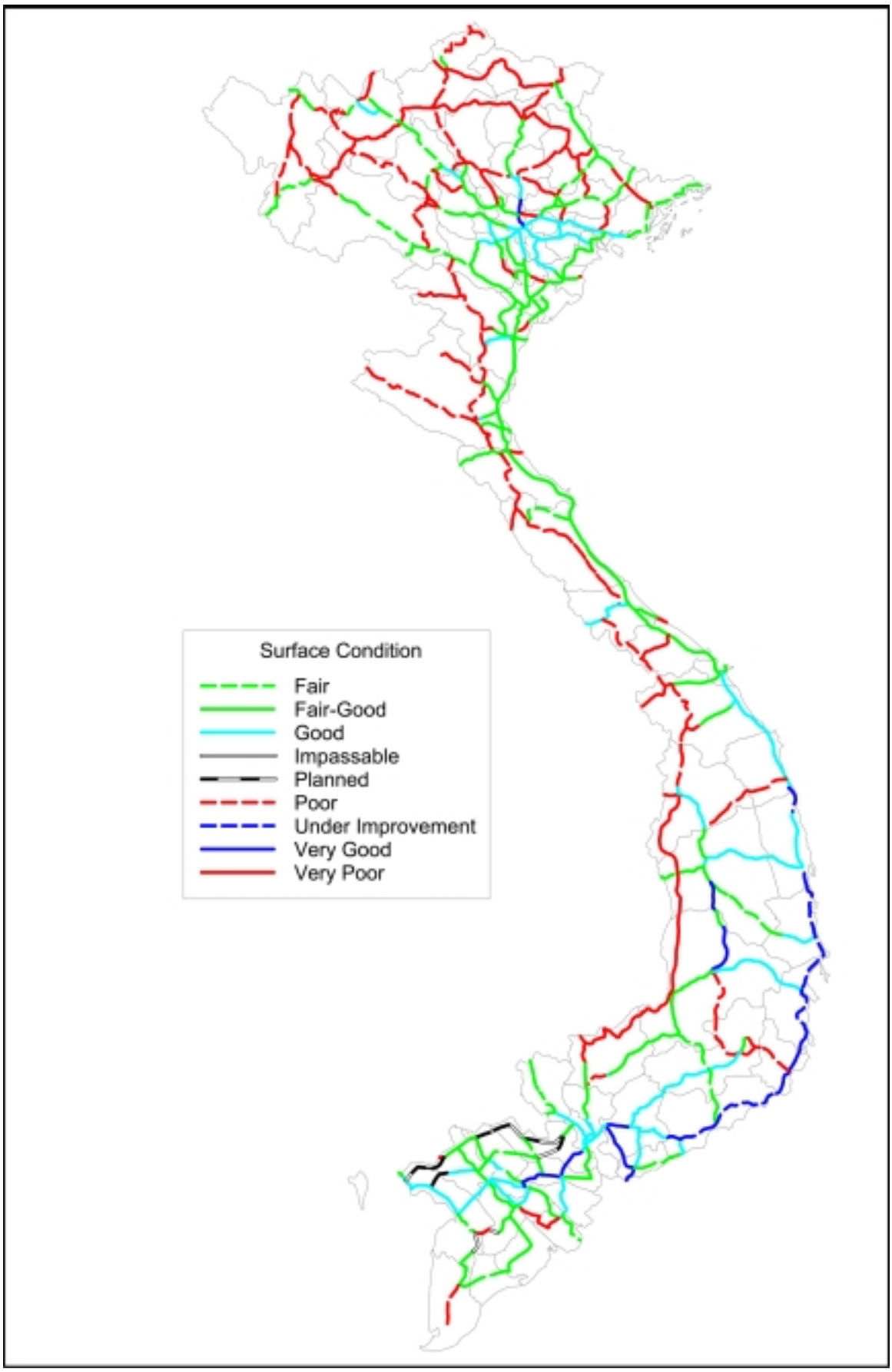


Figure 3.3.3
Surface Condition of the National Road Network



Bridge Condition

1) Condition of Bridges[1]: There are about 38,000 bridges all over Vietnam with a total length of 103,441 m. Of these, only 2,829 bridges are considered in good condition with a total length of 58,537 m. About 971 bridges totaling 44,904 m in length are in deteriorated condition. Of these, 42% needs immediate repair and 45% needs strengthening for full operationalization and must be replaced by new bridges in the immediate future.

Table 3.3.3
Physical Condition of Bridges on the National Road Network

Item	Quantity (unit)	Length (m)	Expenditure on Repair (US$'000)
Total	38,000	103,441	1,674,450
Good condition	2,829	58,537	
Weak bridges needs repair	971	44,904	1,674,450
Bridges are classified according to condition:			
A – Needs immediate repair (42%)	412	16,368	818,400
B – Needs repair or strengthening for full operationalization despite existing limits in their operating capacity; build new bridges in the immediate future (45%)	441	22,116	663,480
C – Needs repair or strengthening from year 2000 to 2005 (13%)	118	6,419	192,570

Source: MOT

2) Type of Bridges: The existing bridges in northern Vietnam are divided into six major structural groups:

(a) Reinforced Concrete Structures: Due to the lack of road maintenance for long periods and the increase in axle loads of vehicles, many reinforced concrete bridge handrails were broken, expansion joints damaged, and the pavement condition on carriageway slab had deteriorated. However, there are narrow reinforced concrete bridges with carriageway widths of 2.5 m to 2.8 m which are still being used in remote areas, even if their 0.7-m wide cantilever slabs for pedestrians were broken. The loading capacity in most bridges is only 8 tons.

Gie bridge located in 213 km + 234 m of NR1 is one of the old cantilever bridges. Its carriageway slab, cantilever slab, stringer, and pier have been damaged in the last war due to bombings. Its main beams are supported by two temporary columns and its precast small-size slabs are still in poor condition. Exposed reinforcements have corroded. Precast T-beams without any cross beams which were constructed after 1964 are not stable and the quality of their construction is poor except for some bridges along NR6. Cast-in-situ T-beams with cross beams are generally in good condition similar to Bung bridge located in 89 km + 129 m of NR6.

(b) Prestressed Concrete Structures: In northern Vietnam, pre-stressed concrete beams up to 33 m long are fabricated by the Union of Enterprises Thang Long. In general, cross beams are not generally utilized for prestressed concrete

[1] Bridge inventory is shown in Appendix B

structures, and for easier fabrication and construction, the function of cross beams has been neglected completely. The quality of in situ reinforced concrete slabs used to fill the spaces between main beams is generally poor. Where required distances between piers are more than 33 m, previously constructed bridges utilize a Gerber-type structure which is a combination of cantilever prestressed concrete box girders on piers, together with simple prestressed concrete beams with Gerber hinges. Niem bridge located in 36 km of NR10 was constructed using this type of bridge. The cantilever portions of prestressed concrete box girders on the piers were damaged due to the lack of concrete strength and poor quality of construction. The deck slab concrete was removed and replaced by new concrete, and additional PC cables were installed using the Freyssinet system. Phu Luong bridge (1993) located in 54 km + 210 m of NR5 was designed using the VSL system of Switzerland for prestressing.

(c) Steel Plate Girders: Steel girders with precast reinforced concrete slabs and composite girders are still being used but these steel girders are old. In such structures, one girder lies on top of another, and the two girders are fastened by partial welding or riveting of two flange plates. Lower lateral bracings are welded directly to lower flanges of girders. Nghin bridge located in 75 km + 227 m of NR10 is an example.

Van Dien bridge located in 183 km +200 m of NR1 was under construction in September 1993 for bridge widening; and it is a composite girder that is 29.5-m long. Rivets are used to fasten lower flange and cove plates and for field joints of girders. Prime coat is not used. Main girders are already rusted before they are installed. For plat cutting, automatic gas-cutting machine is likewise not used. Cut edges are not finished because grinder is not available. No allowance is given in case the steel weakens due to the effect of horizontal forces.

Nguyen bridge located in 89 km + 500 m of NR10 is made of multispans of I-beams with reinforced concrete deck slabs. The center of the bridge is a lift span with wooden deck, which is lifted manually to allow small vessels to pass. All steel materials are rusted.

(d) Steel Truss: Military beams intended for temporary structure, such as Bailey and YUKM bridges were used together with precast RC slabs as semi-permanent structures. Ordinary bolts and drift pins have corroded due to lack of maintenance. Truss bridges with a single-track railway/road are used in several areas and the carriage way is made of precast RC slabs. Joints between stringers and slabs have loosened resulting to the slabs collapsing. Bac Giang bridge and Dap Cau bridge located in 121 km + 800 m and 136 km + 600 m of NR1, respectively, are through trusses, and Phu Luong bridge located in 54 km + 210 m of NR5 is a pony truss. Viet Tri bridge located in 52 km + 890 m of NR2 is a deck truss. All steel materials are rusted. Traffic jams frequently occur at the approaches of the above bridges. Duong bridge located in 160 km + 700 m of NR1 is a through truss for both railway and road. The railway track is located inside the truss, and carriageways are located outside, supported by cantilever beams and stringers. No serious damages are observed although trusses are rusted in general.

(e) Other Steel Structures: Suspension bridges are located in remote areas. Nam Muc bridge located in 150 km of NR12 is a suspension bridge 80 m long. There are no handrails on the wooden deck. There is no protection of cables, hangers, anchorage, or floor beam against corrosion. A suspension bridge in Lai Chau town is in good condition with loading capacity of 8 tons. Hanger, floor beams, handrails, and wooden deck are well maintained although the cables are not painted. Suspension bridges on district and village roads are generally poor. Joints between hangers and cables and between hangers and floor beams are not stable. Bridges are used by pedestrians, bicycles and motorcycles only.

(f) Substructures: Many reinforced concrete-pile bent-type abutments and piers are used but judging from the size and number of piles, no horizontal forces due to earthquake were considered in building these structures, even though the seismic intensity indicated by the Modified Mercalli Scale is 6 through 8 in northern Vietnam. Approaches to bridges are generally sunken, because there are no approach slabs that were installed behind the abutments. Slopes of embankments of approaches are sometimes collapsed, because suitable wing walls were not constructed.

River crossings

Some river crossings serve as bridges to connect missing road links. There are 16 such sites where ferries are operating on national roads in northern Vietnam, with major crossings in eight sites located on Routes 10, 18 and 32. Several long-span bridges are still under construction or have been completed recently. Construction of new bridges is currently not required at five ferry sites located in Gia Phu, Xon Lom and Van Yen on Route 36, at Pac Uom on Route 279 and at Ta Khoa on Route 379 due to low traffic volume (refer to Table 3.3.4).

Table 3.3.4
Ferries on National Roads in Northern Vietnam

National Road No.	No. of River Crossing	Location of River Crossing (River Width)
10	5	Rung (1,200m), Binh (480m), Tien Cuu (250), Quy Cao (560m), Tan De (500m)
18	2	Pha Lai (350m), Bai Chay (400)
32	1	Trung Ha (300m)
36	3	Gia Phu (50m), Xon Lom (50m), Van Yen (250)
279	4	Chung (100), Bac Cuong (50), Tan An (250m), Pac Uom (250)
379	1	Ta Khoa (300)
Total	16	

Source: MOTC

3.4 Road Traffic Demand

Registered Vehicles

In Vietnam, vehicle registration is concentrated in two large cities, Hanoi City and Ho Chi Minh City. Approximately 40% of the vehicles are registered in these two cities (see Table 3.4.1). The truck is a dominant type of vehicle, accounting for more than 50% of the total number of vehicles registered in the country (see Table 3.4.2).

However, the registered number of vehicles from 1989 to 1996 is increasing rapidly at an average annual growth rate of 16.5% recently (see Table 3.4.3). For 1997 and 1998, total vehicles registered are 431,026 (7.6% increase) and 432,896 (0.4% increase in 1998), respectively.

Table 3.4.1
Percentage Distribution of Registered Vehicles

Province	Vehicle Composition in 1996			
	Car (%)	Bus (%)	Truck	Total
Hanoi	13.0	7.1	15.9	13.5
Danang	3.0	3.5	1.8	2.5
Ho Chi Minh	33.0	26.2	22.7	26.7
Total Vietnam	100.0	100.0	100.0	100.0

Source: VRA

Table 3.4.2
Percentage Composition of Registered Vehicles, 1996

Province	Vehicle Composition in 1996			
	Car (%)	Bus (%)	Truck (%)	Total (%)
Hanoi	31.9	8.7	59.4	100.0
Danang	39.8	23.7	36.5	100.0
Ho Chi Minh	41.0	16.3	42.7	100.0
Total Vietnam	33.1	16.6	50.3	100.0

Source: VRA

Table 3.4.3
Number of Registered Vehicle Types in Vietnam

Vehicle Type	Year										Annual Growth Rate (%) 1989 – 96
	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	
Car	45,604	56,128	67,451	95,221	67,366	106,320	118,015	132,765	n.a	n.a	16.5
Bus	31,239	32,318	34,305	37,911	34,305	42,566	60,356	66,453	n.a	n.a	11.4
Truck	138,910	163,284	201,849	161,044	201,332	174,412	186,796	201,368	n.a	n.a	5.4
Total	215,753	251,730	303,605	294,176	303,003	323,298	365,167	400,586	431,026	432,896	9.2

Source: VRA

Traffic Demand

1) Traffic Demand on the Road Network

Traffic demand is concentrated in two major cities, Hanoi and HCMC and their surrounding areas. The northern mountainous region, central highlands and central coastal regions do not exhibit significant volumes of traffic demand. At present, the traffic volume of four-wheel vehicles is still moderate on majority of the sections of the road network, except those that are located in urbanized areas. Among the 39

VITRANSS traffic count survey stations, 14 stations registered traffic volumes of less than 1,000 vehicles per day (refer to Table 3.4.4).

Table 3.4.4
Traffic Volume on Selected Stations

Traffic Volume (vehicle/day)	Number of Stations
0-1,000	14
1,001-3,000	12
3,001 – 5,000	9
5,001-10,000	2
10,001-	2

Source: VITRANSS Traffic Count Survey, 1999

It is noted that a considerable number of two-wheel vehicles, such as motorcycles and bicycles still run on national roads (see Table 3.4.5). This mixed mode of transport reduces the actual road capacity significantly. In addition, the use of the truck roads by smaller types of vehicles running at different speeds causes traffic accidents, in most cases. Vehicle composition varies from station to station. However, in most survey stations, trucks comprise more than 50% of the total number of four-wheel vehicles. The shares of passenger cars and buses are approximately 20% and 30%, respectively.

2) Cross-border Road Traffic

Although there are quite a number of roads linking Vietnam with its neighboring countries, China and Cambodia, cross-border traffic is still limited. Vehicles are not allowed to cross except commuter traffic like interstate regular bus operations. With Lao PDR, its government only allows state-owned truckers to enter the country. However, the three neighboring countries do not report any trade statistical data, only data on cross-border traffic by Vietnamese vehicles are available, as shown in Table 3.4.6.

At the Vietnam-Cambodia border, passenger traffic is declining relative to air traffic. According to the Ministry of Public Works and Transport of Cambodia, before 1990, about 60 to 80 trucks per day plied the border and carried 50,000-70,000 tons of cargo a year. The Ministry estimates the same volume of cargo movement at present. At the Vietnam-China border, road transport does not play an important role compared with railway and shipping but the number of passengers is increasing. At the Vietnam-Laos border, traffic volume is larger since road transport is more liberalized compared with the other two countries. Within Vietnam, a considerable number of Laotian trucks exporting goods and carrying transit goods have been observed.

Table 3.4.5
Road Traffic Volume by Section, 1999

24 hours, both directions

Stn. No.	Road No.	Location	Province	Car	Bus	Truck	Total	MC	Bicycle
1	6	North of Thuan Chau	Son La	52	54	89	194	641	326
2	70	South Bao Yen	Lao Cai	77	69	130	276	772	713
3	2	North of Ham Yen (Tan Yen)	Tuyen Quang	72	178	237	487	2,142	3,050
4	2	South of Viet Tri Bridge	Vinh Phuc	812	862	1,985	3,660	3,405	2,731
5	3	Dong Phu (South of Cho Moi)	Thai Nguyen	146	172	245	563	860	1,363
6	3	South of Pho Yen (Ba Hang)	Thai Nguyen	488	559	1,137	2,184	2,762	2,628
7	1	South of Dap Cau	Bac Ninh	1,224	1,255	1,827	4,306	4,843	2,820
8	1	North of Kep	Bac Giang	504	669	1,020	2,193	1,888	2,878
9	18	East of Sao Do (Chi Linh)	Hai Duong	517	735	1,398	2,650	3,126	3,915
10	4B	East of Dinh Lap	Lang Son	10	15	41	66	673	1,185
11	6	North East of Tong Dau	Hoa Binh	87	164	335	587	324	99
12	6	East of Xuan Mai	Ha Tay	487	471	994	1,951	2,993	3,064
13	37	Thuong Bang La	Yen Bai	11	6	32	50	464	486
14	1	South of Dong Van	Ha Nam	1,340	1,773	3,245	6,357	4,343	2,578
15	21	North of Lac Thuy (Chi Ne)	Hoa Binh	34	12	120	166	1,339	3,408
16	1	North of Ninh Binh town	Ninh Binh	904	1,010	2,177	4,091	3,225	2,994
17	1	North of Bim Son	Thanh Hoa	851	993	2,581	4,425	3,552	4,463
18	10	South of Nghin bridge	Thai Binh	95	160	291	545	1,963	1,792
19	5	East of Du Nghia	Hai Phong	1,099	854	2,087	4,041	3,895	2,743
20	10	West of Yen Hung (Quang Yen)	Quang Ninh	141	185	143	469	912	511
21	9	West of Dong Ha	Quang Tri	114	262	427	804	1,090	674
22	1	Lang Co	Thua Thien Hue	238	562	1,439	2,239	989	953
23	14B	East of Dai Loc (Ai Nghia)	Quang Nam	15	98	149	263	2,080	3,369
24	1	North of Tam Ky	Quang Nam	405	791	1,926	3,121	3,195	1,717
25	19	East of An Khe pass (Phu Phong)	Binh Dinh	167	537	938	1,642	746	339
26	26	East of Phuong Hoang pass	Khanh Hoa	59	139	745	943	1,458	1,640
27	14	North of Dong Xoai	Binh Phuoc	148	285	736	1,170	2,774	1,203
28	20	South of Ma Da Gui	Dong Nai	149	802	1,181	2,132	2,333	1,971
29	1	South of Ham Thuan Nam	Binh Thuan	310	987	1,972	3,270	2,020	995
30	51	North of Phu My (Tan Thanh)	Ba Ria Vung Tau	957	1,373	1,935	4,265	5,473	2,228
31	1	North of Dong Nai bridge	Dong Nai	3,906	6,341	10,937	21,183	31,131	2,819
32	13	South of Thu Dau Mot	Binh Duong	1,507	2,126	3,187	6,820	15,467	2,523
33	1	Noth of Tan An	Long An	1,976	4,062	5,645	11,683	14,005	1,902
34	22	East of Trang Bang	Tay Ninh	758	857	1,669	3,284	6,336	2,317
35	60	South of Rach Mieu ferry	Ben Tre	187	346	399	932	11,806	9,995
36	30	East of Cao Lanh	Dong Thap	276	628	482	1,387	8,062	3,249
37	1	North of Can Tho Ferry	Vinh Long	440	1123	1,069	2,632	2,945	1,438
38	80	South of Thach Hung(Lap Vo)	Dong Thap	238	645	1,244	2,128	4,925	6,253
39	91	West of Long Xuyen	An Giang	354	1,177	734	2,265	14,763	11,906

Source: VITRANSS Traffic Survey, 1999.

Table 3.4.6
Cross-border Road Traffic by Vietnamese Vehicles

Country	Year	Freight Traffic		Passenger Traffic	
		Ton	Ton-km	No.	Pass-km
Cambodia	1995	0	-	70,287	n.a.
	1996	0	-	83,129	n.a.
	1997	0	-	61,464	n.a.
	1998	0	-	41,627	n.a.
China	1995	0	-	14,732	n.a.
	1996	0	-	14,811	n.a.
	1997	0	-	18,178	n.a.
	1998	0	-	24,169 (584)	n.a.
Lao PDR	1995	(139)	(28,850)	66,823 (11,519)	n.a. (6,039,800)
	1996	(148)	(45,510)	68,549 (14,007)	n.a. (6,570,198)
	1997	(203)	(60,649)	55,649 (16,722)	n.a. (7,069,411)
	1998	(154)	(57,734)	118,376 (10,818)	n.a. (5,136,285)

Source: Ministry of Defense, Provincial Transport Departments, Ministry of Transport
Note: Figures in ( ) refer to traffic volume by state-owned enterprises.

3) OD Pattern by Vehicle Type

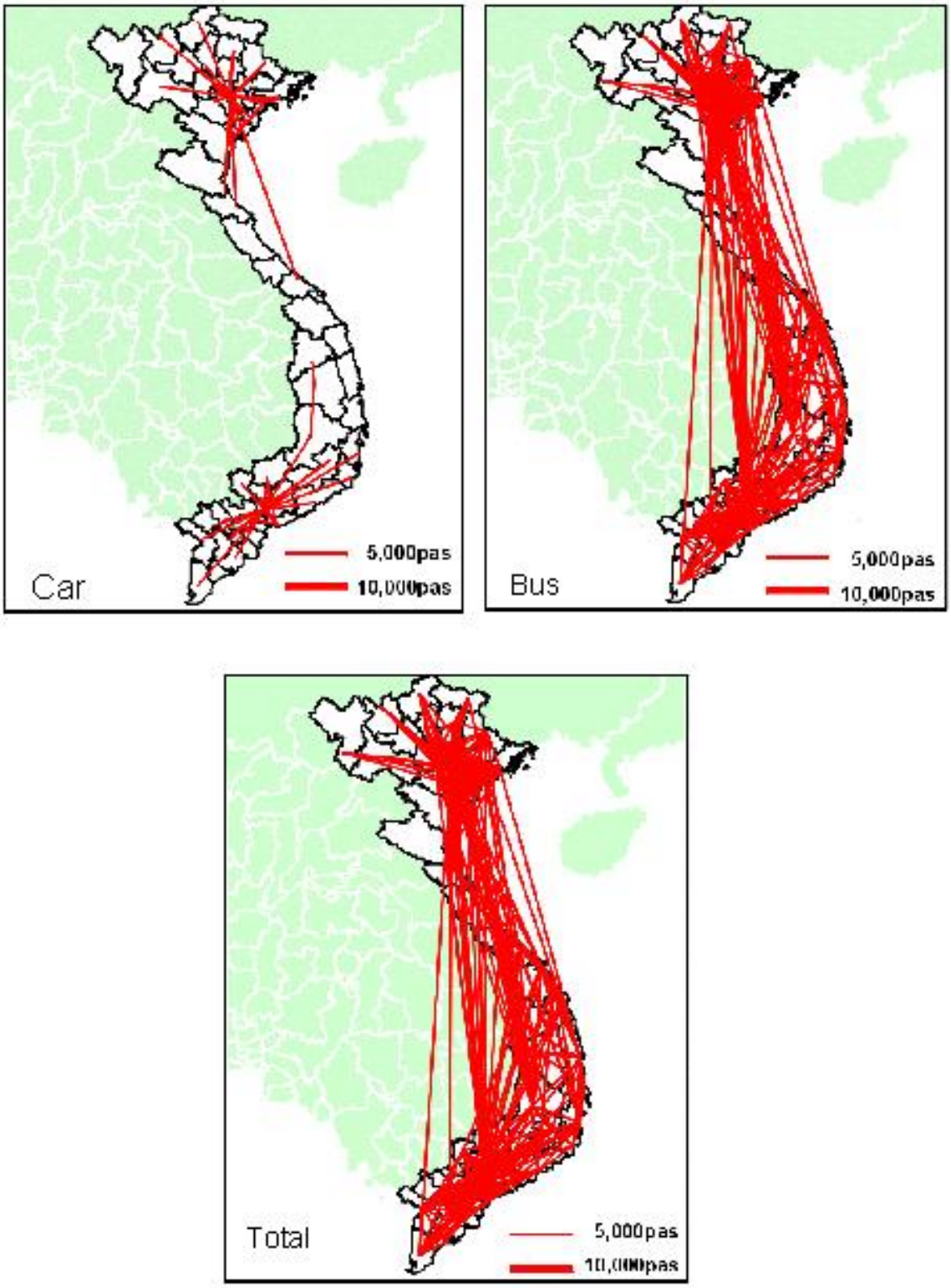
According to the VITRANSS, the OD patterns of certain types of road vehicles are as follows:

Passenger Car OD Pattern: Passenger car trips are concentrated in areas surrounding Hanoi and Ho Chi Minh City. Due to the characteristics of private passenger cars, the composition of long distance trips between Hanoi and Danang and between Hanoi and Ho Chi Minh City is fairly small. Figure 3.4.1 on the interprovincial passenger traffic for cars shows that it is not a commonly used vehicle as compared to bus.

Bus OD Pattern: Compared with the OD pattern of passenger cars, that of bus is relatively dispersed all over the country, although Hanoi and Ho Chi Minh City are considered hubs for inter-city bus services. This is attributable to the current direct bus operation between these two cities and this results in greater passenger movement by bus.

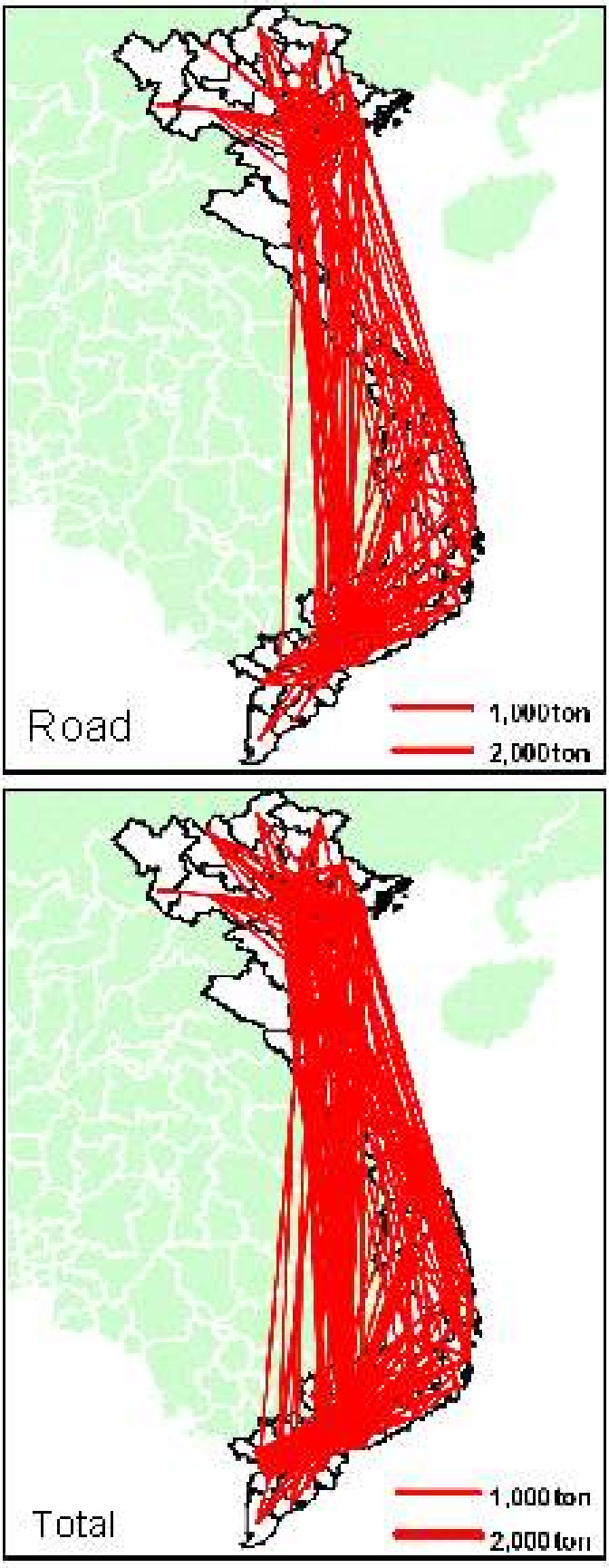
Truck OD Pattern: Truck trips are also concentrated in the surrounding areas of Hanoi and Ho Chi Minh City. The number of truck trips is relatively small in the central region. With regard to Hanoi, strong linkages are observed between Hanoi and Quang Ninh (1,100 trips) and Hanoi and Hai Phong (900 trips). In the case of Ho Chi Minh City, many trucks are operating between Ho Chi Minh and Don Nai (more than 6,000 trips) and Ho Chi Minh and Binh Duong (2,200 trips). Figure 3.4.2 shows that majority of freight movement is by road transport considering the use of larger and more efficient trucks.

Figure 3.4.1
Interprovincial Passenger Movement, 1999



Source: VITRANSS

Figure 3.4.2
Interprovincial Freight Movement, 1999



Source: VITRANSS

3.5 Existing Road Transport Services

Passenger Transport

1) Inter-city bus operation

In Vietnam, inter-city bus services are provided mostly by direct service from the origin to destination area, and connecting small cities. This results in a great number of bus routes but few bus services serving minor routes due to relatively smaller passenger demand. Buses normally operate once a day, twice or thrice a week on these minor routes as in the case of Kon Tum province where daily services are available only to large cities, such as HCMC, Danang and Hanoi, and neighboring provinces such as Quang Ngai, Quy Nhon, Binh Dinh, Bong Son, Dak Lak, Vinh, and Hue (more or less once a day). Most frequent services are to/from Gia Lai (480 trips/month). For other provinces, including Thai Binh, Hai Duong, Lang Son, Hoa Binh, Bac Giang, Nam Dinh, Phu Tho, Thai Nguyen, Cao Bang, etc., service frequencies are very low (once or twice a week). Figure 3.4.1 presents the interprovincial movement in 1999, where buses handled majority of passengers in interprovincial routes.

Following are the characteristics of interprovincial bus transport operations:

- There is no official fare rate for inter-city bus services set by the central government but each province sets guidelines for inter-city bus fares.

- Guidelines set by provinces are basically used in estimating the maximum fare. The guidelines differ depending on the route (terrain type, road surface condition, etc.) and service type offered (e.g. air-conditioned). Most bus routes have fare of VND 100 – 150 per km.

- A bus operator who wants to open a route must obtain permission from origin and destination provinces. Moreover, the bus operator should get permission from intermediate provinces where the bus will stop to unload/load passengers en route to its destination.

- For issuing a route license, the origin and destination provinces may conduct negotiations to ensure mutual benefit (similar to an international air negotiation). The amount paid to intermediate provinces is generally higher than the agreed rate (determined per passenger loading or seating capacity of bus).

- Plying the same route, it was found that small buses with 14 or 24 seats charge a higher fare than ordinary buses with 40-45 seats.

There were 11 bus companies which responded to the VITRANSS Transport Industry Survey – eight state-owned, two joint venture corporations and one private company. Most of their employees are drivers and assistants. On the average, bus

operators own 37 large and 11 minibuses with an average total seating capacity of 1,900. Average age of existing bus fleet is seven years. Identified problems for bus operations include stiff competition from other buses, difficulties in financing new vehicles and poor road conditions.

Freight Transport

At present, eight state-owned freight transport enterprises under VRA provide freight transport services in the country but the share of these enterprises in the trucking industry is, however, small. Table 3.5.1 presents the profile of state-owned trucking companies and they account for only 10% of the number of cargo trucks. This implies that cargoes are mainly transported by private trucking companies and manufacturing companies themselves. These state-owned trucking companies do not obtain sufficient profit from their businesses due to the severe competition which results in lower freight rates and they therefore, do not fully recover their operating and depreciation costs. The profit ratio against working capital is within the range of between three to five (refer to Table 3.5.2).

Out of the total operating costs, fuel cost accounts for 35% to 45% of total operating costs, whereas depreciation cost is relatively small, about 7% to 16%, due to the utilization of old vehicles. This financial situation encourages private trucking companies to invest in new vehicles. Existing information on private trucking companies is limited. In the transport industry survey conducted by the VITRANSS, only 10 trucking companies, all of them SOEs, including Automobile Transport Companies No. 1, 2, 3, 4, 6, and 8, responded partially to the questions. Problems encountered include competition from other transporters, tolls and other road charges, difficulties in financing new vehicles, and qualification of truck drivers.

Table 3.5.1
Profile of State-owned Trucking Companies, 1999

Name of Company	Automobile Transport Company No. 1		Automobile Transport Company No. 2		Automobile Transport Company No. 3		Automobile Transport Company No. 4	
Location	Hai Phong		Hanoi		Hanoi		Ninh Binh	
Number of Vehicles		92		110		140		102
Tonnage		659		638		838		736
Ave. Tonnage		7.2		5.8		6.0		7.2
Handling Capacity								
Ton (thousand)		95		121		86		16
Ton*km (million)		15		15		21		14.9
Ave. Distance		158		124		244		931
Type of Vehicles								
	Maz 5335	48	Zin 130	61	KAMAZ	9	Kamaz Tipper	4
	Maz 500	15	IFA W50	25	HINO	3	Kamaz Van	6
	Maz 5429	19	Maz 5335	11	Cheng Long	10	Maz 5335	18
	Maz 540	3	Cheng Long	13	Hyundai	15	Maz 500, 504	30
	KaMaz	5			IFA W50	45	Zin 130	32
					Zin 1430	58	IFA W50	8
							Cheng Long	4

Name of Company	Automobile Transport Company No. 5		Automobile Transport Company No. 6		Automobile Transport Company No. 8		Automobile Transport Company No. 10	
Location	Nghe An		Danang		Hanoi		Thai Nguyen	
Number of Vehicles		140		334		152		104
Tonnage		1009		2176		920		650
Ave. Tonnage		7.2		6.5		6.1		6.3
Handling Capacity								
Ton (thousand)		105		148		97		90
Ton-km (million)		20.5		45		17		16
Ave. Distance		195		304		175		178
Type of Vehicles								
	Kamaz	13	IFA W50	23	Kamaz	6	Kamaz	1
	Maz 5335	18	Zin 130	188	Maz 5335	46	Hino	1
	Zin 130 B1	28	Zin 130 B1	11	Zin B1	26	Giai Phong	13
	Zin 130	36	Maz 5335	32	Zin 130	39	Dong Phong	6
	Cheng Long	9	Kamaz	67	IFA W50	2	IFA W50	51
	IFA W50	9	Semi-towing Kamaz	13	Cheng Long	2	Zin 130	32
					Hyudai (1.5 ton)	4		

Source: VRA

Table 3.5.2
Operating Costs and Revenue of State-owned Trucking Companies, 1997

In million VND

Name of Company	Automobile Transport Company No. 2		Automobile Transport Company No. 3		Automobile Transport Company No. 4		Automobile Transport Company No. 6		Automobile Transport Company No. 10	
Annual Revenue (A)	7,415	%	9,123	%	6,274	%	17,002	%	9,228	%
Annual Operating Cost (B)	7,099	100.0	8,851	100.0	6,299	100.0	16,436	100.0	8,823	100.0
Wage	981	13.8	1,007	11.4	402	6.4	2,100	12.8	713	8.1
Insurance	59	0.8	171	1.9	60	1.0	225	1.4	106	1.2
Fuel	3,237	45.4	3,204	36.2	2,197	34.9	7,816	47.6	3,731	4.2
Lubricant	149	2.1	205	2.3	153	2.4	434	2.6	70	0.8
Tires	426	6.0	695	7.9	750	11.9	1,320	8.0	990	11.2
Routine Repair	373	5.3	445	5.0	1,135	18.0	375	2.3	1,251	14.1
Depreciation	895	12.6	1,405	5.9	549	8.7	1,187	7.2	847	9.6
Major Repair	275	3.9	252	2.8	121	1.9	909	5.5	169	1.9
Administration	704	9.9	1,466	16.6	931	14.8	2,071	12.6	945	10.7
Profit (C): (A)-(B)	316		273		-25		566		405	
Profit/Cost (C)/(A)	4.3		3.0		-0.4		3.3		4.4	

Source: VRA

The freight tariff for truck (haulage of goods) is regulated by Decision No. 36/VGCP-CNTDDV dated 8 May 1997 signed by the Chairman of the Government Pricing Committee (GPC). The freight tariff is given per km and based on MOT's five road categories and three goods categories (see Table 3.5.3 and Table 3.5.4). The tariff indicates maximum fares based on the current conditions and actual transportation expenses. If provincial authorities need to impose tariffs higher than the prescribed rates, they should be approved by the GPC.

Tariff

The actual fares and charges commercially imposed on transport users have been obtained from field surveys, interviews and cost quotations conducted in the VITRANSS. About 20 freight forwarders in selected routes (by different transport modes and commodity types) were surveyed, of which 10 forwarders (6 from Hanoi and 4 from HCMC) offered quotations. Some forwarders seem to have little experience in goods transport in some routes or by other modes. Most forwarders did not show an accurate or sound basis for their cost quotations. As a result, the quoted rates greatly differ, although the freight forwarders who are well equipped with modern facilities, such as truck fleet, warehouse and branch office, tend to offer relatively higher prices.

Table 3.5.3
Official Freight Tariff by Category

Category	Items	Tariff
Category 1	stone, sand, gravel and earth	VND 19,700/ton for distance of <30kms VND 135/ton km if distance ≥31kms
Category 2	tile, food in bag, material of construction, timber, coal, ore, and metals	Category 1 tariff plus 10%
Category 3[1/]	food in bulk, cement, limestone, salt, fertilizer, gasoline and petroleum, insecticide, paper, medicines, equipment for health care, seeds, machines and special equipment.	Category 1 plus 30%

1/ Container goods will be calculated separately based on this category.

Table 3.5.4
Official Road Tariff

(VND/ton – km)

Hauling Distance	Categories of Roads				
	1	2	3	4	5
15	794	865	1,150	1,438	1,869
56 – 60	460	518	725	979	1,371
61- 70	453	510	714	967	1,354
91 – 100	438	493	692	938	1,314
101 and above	435	489	686	930	1,304

Source: Decision 36/VGCP – CNTDDV of 8 May 1997

Although the actual cargo transport charge may not be clear, it can be pointed out that the truck is the most expensive but most widely used means of freight transport. For cross-border routes, such as to Kunming and Phnom Penh, the charge for trucking has considerably increased. Some forwarders even claimed that they cannot offer a price quotation because cross-border procedures are unclear and entail additional cost.

Issues on Road Transport Services

Following are the major issues that relate to the provision of road transport services:

1) Poor Quality Transport Services

There were government reforms which resulted in service improvements in road transport such as better efficiency at still low transport costs, such as in the case of freight transport which is low at about USD 0.30 per ton-km compared to similar service in other countries. This was achieved despite modest utilization rates, which is about 40,000 km per vehicle per year with an average load factor of 60%. It is noted that such low tariff rates had been sustained for several years even though there were substantial new investments made by the private sector in acquiring new trucks. Both the trucking and passenger transport industries are now dominated by the private sector, although the state sector retains a significant proportion of the trucking fleet since most private operators are small with only one or two trucks.

Only 15 road transport enterprises have been equitized so far (including some bus operators), although there were plans to equitize more transport enterprises in 1999. It is widely considered that many SOEs are difficult to equitize because of unprofitable operations and overvalued assets. It is noted that in order to survive, other SOEs had diversified to other related activities such as vehicle maintenance services. Quite a number of road transport SOEs are almost bankrupt.

In the case of bus transport, the cost of bus services varies considerably, apparently due to variations in competition, quality of service and the local operating conditions. The officially approved fares for ordinary services vary from USD 0.80 to USD1.20 per passenger-km which are considered high compared to similar bus services in other countries. But with competition, these rates can be as low as USD 0.50 per passenger-km which is already low by international standards. Private bus operators are increasing their role in the provision of scheduled services but state sector bus transport services still continue to dominate routes in the north due to entry restrictions in certain routes and the slow rate of equitization.

Most bus services do not have regular schedule, but there are some services which operate from designated bus stations at regular intervals, which are mostly controlled by local cooperatives. However, once these buses are on the road they make frequent stops for long periods, or other operators even change routes to get additional passengers. In longer distance bus routes, there are cases when passengers are transferred from one bus to another if there are only few passengers on board. There is a limited protection given to passengers since there are no clear regulations with regard to which authority is responsible for passenger complaints.

There is generally an adequate supply of buses, with little overloading in the main routes, based on VITRANSS surveys (although overloading appears to be common in secondary bus routes). However, due to low passenger demand in more remote areas, frequencies are often low and unpredictable. An increasing number of high-quality buses are being introduced in the vehicle fleet serving major urban centers where there is an opportunity to charge higher fares. Nevertheless, majority of passengers still prefer the minimum cost of travel and the opportunity to carry a large number of baggage which is a common practice. It was observed that most passengers carry bags of rice, bicycles and even motorbikes which shows that majority of passengers reach bus terminals by bicycle or motorbike.

The results of passenger interviews in bus stations (discussed in the Transport Survey Technical Report) suggested that majority of passengers are not satisfied on the general state of bus stations and services, which are often overcrowded and dirty. Almost all passengers, however, rated favorably passenger services, which include bus availability, frequency, comfort, safety, and punctuality. Over 90% of respondents rated these aspects as relatively good or acceptable.

For freight transport, despite the reported low operating costs, it was noted that quality of services provided is still relatively poor. There are notable exceptions such as the growing number of private operators with existing fleet of 20 vehicles that offer total transport services to customers including special requirements such as container handling. Only few trucking operators seem to offer reliable services.

It was the consensus that there exists an adequate freight transport supply, with the provision of heavy trucks for long distances and special purpose trucks for container haulage. However, the management of these trucking companies is generally weak since many truck owners in SOEs, cooperatives and small-scale private operations subcontract marketing to drivers who then collect all revenues, pay truck owners the monthly rental for the use of the vehicle and running expenses, while trucking companies just maintain some profit for vehicle maintenance.

Almost all truck drivers interviewed complained about the road's physical condition and configuration such as the limited width and layout of roads situated in the ports. Other complaints relate to road tolls, fierce competition, poor traffic conditions, and slow loading/unloading facilities (especially at ports).

2) Inefficient Interprovincial Bus Services

Most interprovincial bus services are direct services. From the viewpoint of national passenger transport efficiency, if interprovincial bus transport services are divided into trunk or feeder routes, there can be more efficient services that could be provided.

3) Lack of Monitoring Capacity of Bus Transport Services

The PTAs gives permission to bus companies to operate on certain bus routes, even without exactly knowing the actual bus operating conditions. The VRA which should obtain reports on interprovincial bus routes from each PTA also does not have full understanding of existing levels of bus services and the desired levels of service required by passengers for each route.

4) Inadequate Authority to Regulate Interprovincial Bus Services

Currently, new interprovincial bus routes are being planned by transport authorities both in the origin and destination provinces. However, these provinces are unable to recognize the existing passenger demand and bus services provided by other provinces. Since the agencies at the provincial level are not able to understand the situation of inter-city or interregional bus passenger demand and supply, a specialized agency at the central government should take over the planning for improvement of existing provincial bus services as well introduction of new services.

5) Lack of Investment in the Trucking Industry

Due to severe competition in the trucking industry, many transport companies are not able to earn sufficient revenues to improve their existing freight transport services and they are not financially capable to invest in new, modern and more efficient vehicles.

Road User Charges

Road user charges are not the actual transport official rates/tariffs, but they are officially levied on road users and influence significantly the actual fares/tariffs. Following are the existing road user charges (based on the 1999 World Bank Transport Sector Report):

(1) Import duty on road vehicle and fuel (Decision 470, 10 September 1991);
(2) Taxes applicable to trade-related transport businesses, such as trading petroleum products, vehicles and spare parts (Decision 470, 10 September 1991);
(3) Taxes applicable to transport services, such as trading petroleum products, vehicles and spare parts;
(4) Taxes applicable to property transfer (Circular 778/TC);
(5) Transport fee on the price of fuel (Decree No. 186-CP amended in 1997);
(6) Fee for vehicle ownership registration;
(7) Fee for periodic technical safety inspection (Decision 01/VGCP, 8 February 1996);
(8) Fee for issuing driver's license; and
(9) Road and bridge user charge.

In addition to various charges and fees imposed on road users, the government has recently increased the number of toll gates for collecting road user charges. The VRA plans to add more toll collection roads particularly those roads located in the southern part of Vietnam.

3.6 Road Safety

Road Traffic Accidents

As of 1999, there were more than 20,000 accidents recorded, which claimed 6,670 lives and caused about 23,911 physical injuries (see Table 3.6.1). Despite the number of accidents which occurred, the accident data did not reflect physical injuries by severity, i.e. minor or serious, nor was there complete information provided on the number of fatalities from road accidents.

A recent study revealed the underreporting of accident cases by the Traffic Police. As can be seen from the data of Viet Duc hospital in Hanoi, the recorded total number of patients of vehicle accidents is unbelievably equivalent to 70% of reported road casualties for the whole Vietnam. Thus, it can be concluded that the high ratio of casualties indicates that only the more serious accidents have been reported by the Traffic Police.

It is noted that in recent years, the number of accidents has not increased despite the rapid increase in the vehicle fleet. Further, Vietnam's official fatality rate from accidents has declined as well. However, the rapid increase in motorization will inevitably make the roads less safe to smaller vehicles since faster vehicle speeds and increased congestion might increase the frequency and severity of accidents.

According to the 1994 Police Accident Report, about 50% of all accidents occurred on national highways and 30% on urban roads where there is a higher traffic density. Only 7% of accidents were reported to have occurred on rural roads although the road categories on the current accident report form do not include rural roads (refer to Table 3.6.2).

It has been found that about 75% of road traffic accidents were caused by human error or mistakes of vehicle drivers. Of this number, 62% are caused by motorbike drivers and it was noted that motorbikes carrying three to four people caused accidents. By vehicle type, motorcycles because of their number, are mostly involved in road traffic accidents or 60% of the total number of accidents reported, while car accidents comprise 26% of the total road traffic accidents (see Tables 3.6.3 and 3.6.4).

Table 3.6.1
National Traffic Accident Statistics, 1990-1998

Year	Number			Total Casualties	Percentage of Fatalities
	Accidents	Fatalities	Injuries		
1990	5,565	2,087	4,668	6,755	30.9
1991	6,865	2,395	6,846	9,241	25.9
1992	8,910	2,755	9,040	11,795	23.4
1993	11,016	3,440	11,519	14,959	23.0
1994	13,118	4,533	13,056	17,589	25.8
1995	15,376	5,430	16,920	22,350	24.3
1996	19,075	5,581	21,556	27,137	20.6
1997	19,159	5,680	21,905	27,585	20.6
1998	19,975	6,067	22,723	28,790	21.1
1999	20,733	6,670	23,911	20,581	21.8

Source: Traffic Police

Table 3.6.2
Number of Accidents by Road Category, 1999

Type of Road	Accidents	
	Number	%
National Road	6,694	48.6
Provincial Road	2,784	20.2
Urban Road	2,676	19.4
Others	1,630	11.8
Total	1,3784	100.0

Source: Traffic Police

Table 3.6.3
Road Traffic Accidents by Cause, 1999

Causes	Accidents	
	Number	%
Human error by Vehicle Users	10,359	74.4
(1) Exceeding speed limits	4,761	34.2
(2) Carelessness and/or wrong	3,722	26.7
turning/overtaking	945	6.8
(3) Drunkenness	612	4.4
(4) Inadequate observation	319	2.3
Vehicles could not ensure traffic safety	185	1.3
Others	3,378	24.3

Source: Traffic Police

Table 3.6.4
Road Traffic Accidents by Vehicle Type

Vehicle Type	Accidents	
	Number	%
Car	3,425	26.2
Motorcycle	8,130	62.3
Others	1,493	11.4

Source: Traffic Police

Institutions on Road Safety

On the national level, both the MOT and Ministry of Information (MOI) share the responsibility of promoting road safety in Vietnam. The Government of Vietnam has recognized the need to coordinate the work of different agencies in the field of transport safety. In 1991, Decree No. 104/QD-2B was issued jointly by the MOT and MOI to establish the National Traffic Safety Committee (NTSC). In 1994, the VRA established a Traffic Safety Department and the MOT declared 1995 as the National Road Safety Year. The NTSC is likewise responsible in planning safety activities in all transport sectors, comprising road, rail, air, sea, and inland waterways. Its main functions (based on Article 2 of Decree 104) are as follows:

- To draw up plans and guide all organizations within the MOT and MOI and other organizations in the country to implement traffic safety measures which include safety education and development of countermeasures; and

- To ensure the strict implementation of traffic safety measures by Provincial Traffic Safety Committees.

It is observed that there are no specific pressure groups that lobby for improved traffic safety, but the public is encouraged to complain about traffic problems to road authorities and the media supports government initiatives by publishing news on serious traffic accidents. However, a great number of road users remain to be relatively undisciplined compared with those in industrialized countries, which thus implies the relatively low public awareness about road safety issues.

In order to have an effective road safety program, a comprehensive accident database system must first be established by undertaking the following activities:

- Organization of a joint working party to revise the accident report form, identify associated hardware or software requirements and establish the dissemination process of accident report forms to the TSD (VRA);
- Provision of accident maps at both local traffic police offices and RRMUs to identify accident hazard zones or its locations;
- Publication and wide dissemination of accident reports on a regular basis;

- Systematic connection of accident data which include driver's age and road user characteristics/behavior to enable road safety education to target the most vulnerable age groups considered as high- risk groups.

Further, as part of the road safety program, a component on road engineering and planning must consider the following:

- Training courses must be provided in each RRMU to cover safety engineering, accident investigation and identification of remedial measures and recommended evaluation methods;
- The Highway Design Standards must be revised to reflect the actual operating environment of highways and highway sections that traverse towns due to lack of alternative roads. Likewise, the following measures must be undertaken:

    - inclusion of all vehicle modes and pedestrians in traffic counts;
    - determination of passenger car equivalents (PCU) in all vehicle classes;
    - formulation of speed reduction measures for main urban streets;
    - development of HDS standards for the provision of bicycle lanes to take account of traffic volume;
    - development, implementation and monitoring of a remedial engineering program by the TSD to improve highway network safety, with particular attention on the identification and investigation of hazardous locations.
    - conduct of a road safety study and establishment of a database that includes traffic volume, road geometry, mean speed, and accident frequency; and
    - conduct of a road safety audit together with local RRMU engineers to identify potential safety hazards.

3.7 Financing Road Infrastructure Investments

Budget Allocation by Central Government

This Section discusses the financing mechanisms that are currently adopted by the government in funding road investment projects as well as road maintenance activities.

(1) Capital Construction - National, Provincial and Other Roads

The Ministry of Planning and Investment (MPI) allocates and directly specifies the planning quota to projects categorized under Group A or B. Group B projects are those whose total investment costs amount to VND 30 billion up to VND 400 billion. Group A projects are those with total investment costs of more than VND 400 billion.

The MOT allocates and assigns the planning quota to Group C projects based on the total budget allocated by the MPI. Group C projects are those whose total investment costs are below VND 30 billion. The Ministry of Finance's General

Department for Investment and Development, through its provincial department for investment and development, disburses the allocated funds in accordance with the basic work quantity completed by the projects' contractors.

Provincial Roads: The MPI allocates and directly specifies the planning quota to provinces and cities based on the list of identified projects. Disbursement of funds is similar to that used for national roads.

District Roads: Provinces and cities balance the funding allocation for these roads. The disbursement of fund is done through the financial systems of each province and city.

(2) Roads and Bridges Maintenance

National Roads: The MOF allocates and directly specifies the planning quota to the MOT where the allocation for the road subsector is concretely identified. Based on the allocated funds, the VRA allocates and assigns the planning quota to the RRMUs and Provincial Transport Divisions which are authorized to manage the national road system. Disbursement is done through the Department of Treasury (in-charge of the funds) and the Provincial Division for Finance and Pricing of provinces and cities. Thus, major road construction projects are funded by the State Planning Committee and are implemented by independent PMUs within the MOT.

Provincial Roads: The MOF allocates and directly specifies the planning quota to the provincial transport sector agencies. The province tries to have a balanced allocation among different local transport activities through their provincial transport divisions. Disbursement of funds is similar to that used for national roads. There are no central government funds specifically allocated to the construction and maintenance of the provincial road network. Funds from central government are transferred to provinces but it is up to the latter to decide how much to spend on the maintenance of their provincial road network. In addition to central government funding, some districts make financial contributions, while the public or local communities contribute labor.

(3) Investment in the Road Network 1995 – 1997

During the period 1995 and 1997, the State has made substantial investments on the maintenance and development of the road network (refer to Table 3.7.1). Capital resources were diversified. Besides the domestic capital resource, other foreign resources were tapped which include soft loans from foreign countries and international finance organizations. Contributions for rural transport from the local people were also huge in the form of local materials, labor days or monetary contribution.

On the average, more than VND 600 billion and several million working days/year were mobilized. As a result, the road condition was considerably improved; major national road links were rehabilitated, upgraded or newly constructed. Urban transport was also improved. However, investment capital resource for road network maintenance and development is still relatively limited. The basic capital for construction can meet only 60% of the required investment amount while in the case of road repair, only 40% of total maintenance and repair expenditure requirements can be met.

(4) New Government Initiatives

In order to provide additional financial sources for road construction and maintenance, the government has recently implemented some measures to source funds and create a sustainable funding source which are as follows:

- Loan for road maintenance and toll collection to repay the loan (Decision No. 3170/KTN dated 25 June 1997 and Decision No 1038/KTN dated 3 September 1998).
- Toll collection on some national road sections, newly constructed roads or bridges that were upgraded using state budget funds (Decision No. 3328 KTN dated 3 July 1997).
- Toll collection applied to three projects namely, National Highway No. 11, National Highway No. 51 and Lang Hoa Lac expressway (Decision No. 111/TTg dated 2 July 1996).

Table 3.7.1
Sources of Funds for the Road Network, 1995 - 1997

(Unit: VND billion)

No.	Resources	1995		1996		1997	
		Amount	%	Amount	%	Amount	%
1	For Construction	3,215		3,666		4,158	
	- for National Roads	2,015	43.0	2,446	47.3	2,558	45.0
	- for Local Roads	1,200	25.6	1,220	23.6	1,600	28.1
2	For Repair and Maintenance	819		909	17.6	929	16.3
	- for National Roads	419	8.9	459	8.9	479	8.4
	- for Local Roads	400	8.8	450	8.7	450	7.9
3	People's Contribution	650	13.9	600	11.6	600	10.6
Total Amount		4,684	100.0	5,175	100.0	5,687	100.0
% Increase		-		10.5		9.90	

Source: TDSI

Road Maintenance

Vietnam maintains separate budgets for current and capital expenditures for the road network, with maintenance falling under the current budget, while the rehabilitation and construction of new roads fall under the capital budget.

The budget (i.e, current and capital budgets) for the national roads is prepared by the MOT while that for provincial and district roads are prepared by the respective provinces. These two budget systems are institutionalized in the two budget-making bodies: the MOF which is responsible for the current budget, and the MPI which is in charge of the capital budget.

Both budgets are consolidated in the national budget which is then submitted by the Prime Minister to the National Assembly for approval. The state administrative budget is disbursed through the Treasury Department of the MOF to provinces while the capital investment budget is disbursed by the MPI.

Maintenance work has three categories: routine, medium and major repairs. Major repairs are essentially pavement overlays, whereas routine and medium maintenance covers the conventional and recurrent maintenance activities (which include ditch clearing, shoulder repair, pavement patching, and sealing).

The overall responsibility for the maintenance of the national road network is assigned to VRA which is responsible for four RRMUs. Both the VRA and RRMUs are essentially administrative bodies. Sub-RRMUs, of which there are 33, report to the RRMUs to carry out routine and medium repairs. Major road repairs are normally carried out by the Transport Construction Companies (TCCs) which are on contract to the RRMUs or VRA. These TCCs report directly to the MOT and are not part of the VRA.

Provincial governments, through their Provincial Transport Authorities (PTAs), are responsible for the maintenance of the provincial road network. The PTAs are administrative bodies and responsible for the maintenance of 50% of national road network. The maintenance of the entire provincial network is undertaken by provincial maintenance units, while medium and major repair works are carried out by the financially autonomous TCCs in each province.

Some important activities that need to be undertaken in relation to road maintenance are as follows:

- a full review of plant requirements is needed to determine future plant procurement policy with the objective of obtaining good quality equipment at reasonable prices, from local service company, with full customer support and full range of skills training.
- technically, the maintenance company should coordinate plant operation, maintenance and management with other public sector agencies. For

maintenance purposes, it is clear that most urgent plant needs include vibrating rollers and machine to spray bitumen.

- there is a need to provide centralized plant depots in each of the RRMUs to maintain and repair the plants owned by the VRA organizations. Some RRMUs operate mechanical road equipment.
- consideration must be given to centralize plant and equipment which are used less frequently in certain locations. These equipment can then be made available by internal lease arrangements to each sub-RRMU as required.
- there is a need for surface sealing works and mechanism units for periodic surface dressing as required, starting with roads that have the highest traffic density.
- technical skills for using mechanized surface dressing technology must be developed.

It is noted that existing maintenance activities are generally appropriate but they are often being carried out relatively too late and with inadequate design and quality. The result is often reduced road service life expectancy which accelerates deterioration of the road.

There are frequent road patching activities being undertaken in some areas, which is quite expensive and wasteful. There must be a more systematic approach toward undertaking periodic maintenance to prevent road damage. Although costly, this timely intervention is much better than undertaking repairs of even more expensive patching with low construction standards.

In terms of organization, there are sub-RRMUs which compete with existing contractors to some extent. All RRMUs should be given the opportunity to become road works contractor. Resources which are necessary for road inspection, quality control and contract supervision (i.e. the “client-side” functions) should be identified from within the sub-RRMU or RRMU to form “Local Branch Offices” which report to the RRMU concerned. These offices should be allowed to fine-tune work plans.

If the sub-RRMU chose to become a contractor, its section in the organization would have the choice of joining the sub-RRMU or becoming a small-scale contractor in its own right. If the decision of the sub-RRMU is not to become a contractor then the section could still opt to become a small-scale contractor. The RRMUs could undertake contract management of former sub-RRMUs/sections. This would extend to those sub-RRMUs that remained “in-house” but are reconfigured as parastatals (with similar function).

The control of planning works and regional contract management, other than major construction works, should be under the RRMUs and implemented via the local branch office which could act on RRMU instructions, fulfil the local regulatory functions and supply all necessary data to RRMU HQ for consolidation and forwarding to the VRA, as necessary.

To conclude, inadequate financing for road maintenance is partly the reason for the poor state of a relatively large part of the road network but other factors are equally important. These are the lack of a competitive road construction industry and maintenance organizations using modern maintenance equipment and methods, inadequate management information and planning systems based on comprehensive road inventories and inadequate financial and management accounting methods to control the costs of maintenance and monitor performance.

3.8 Road Sector Management Issues

Overview

Commercialization is a concept applied to the road subsector and refers to putting them on a "fee-for-service basis". In other words, commercialization means that road administration should reflect the demands of different road users who are the customers of the road network.

Presently, the institutional framework, within which roads are being managed, does not differ from what was noted by the World Bank Road Maintenance Initiative. According to the *Management and Financing of Roads, An Agenda for Reform* (World Bank, 1995), "Roads are not managed as part of the market economy and this biases managerial incentives. There is no clear pricing for road infrastructure. Road expenditures are financed from general tax revenues and the road agency is not subjected to any rigorous market discipline. Roads are being managed like a social service."

However, since roads are considered to be a public monopoly and the ownership of most roads still remain in government hands, the commercialization of the road subsector requires an approach which implies reforms with the following objectives (i.e. the four basic "building blocks" of the WB):

- clarifying the responsibility by establishing who is responsible for what,
- strengthening management of roads by providing effective systems and procedures and strengthening managerial accountability,
- establishing road maintenance financing by securing an adequate and stable flow of funds, and
- creating ownership by involving road users in the management of roads.

Major reforms related to the above objectives include:

- setting up of new administrative and functional classification of the road network to clarify responsibility and provide structures and objectives for road management;
- implementation of technical management tools such as a Pavement Management System (PMS);
- strengthening of PTAs to enhance road management not only at central level but also at provincial and district levels; and

- setting up of a road maintenance fund involving road users in management and financing.

Administrative Responsibility Based on Road Functional Classification

1) Administration Classification

The current responsibilities for the road network are complicated since there are several overlaps of responsibility for different classes of roads. The Council of Ministers Decree No. 10/DBT on Classification of Budget Allocation and the Decentralized Administration of the Road System dated 20 January 1982 defined the classification of the road network and provided the administrative responsibilities in terms of regulation, funding and management. However, it did not provide for the precise definition of functions of the different classes of road to reflect evolving political and economic situation, economic growth and progress toward decentralization and commercialization based on recent experience.

Consequently, road administrative classification can only provide a conceptual basis for the legal and regulatory structure for the road subsector to a limited extent which include road network development, responsibility in road works, financing, management, and right of usage. There is a need to undertake a fundamental review of the road administrative classification in line with management requirements. Hence, the administrative classification should be able to identify the size of the road network that both the national and local authorities are currently in charge of, along with (i) their existing administrative responsibility, (ii) their technical capability to manage and (iii) their financial capacity.

In order to establish this administrative classification, a road functional classification must be initially defined. Table 3.8.1 outlines the main road categories as well as the main issues to be considered under the administrative classification.

Table 3.8.1
Framework for a Road Administrative Classification

Issues to be Addressed	Possible Classification of Inter Urban Road by Jurisdiction		
	National Roads	Provincial Roads	District Roads
Road Hierarchy	Main, strategic or trunk roads to serve national needs	Function related to respective geographic region; serve regional needs	Purely local function to serve mainly local needs
Funding	State budget	Local allocation from state budget and budget	Local allocation from provincial and district budget
Management	VRA under MOT	PTA under Provincial People's Committee	PTA under Provincial and District People Committees.

2) Road Functional Classification

A road functional classification enables the systematic ranking of roads according to their socio-economic significance. This functional classification allows a definition of technical standards for each type of road and can become an important tool for investment planning. Functional and administrative classification can coincide, which is the case in some developing countries, or in most OECD countries. However, differences exist such as: (i) functional classification can include a greater number of road classes to define more road standards; (ii) the administrative and socio-economic ranking of a road might differ for historical reasons; (iii) a functional classification can be changed more easily than an administrative classification. However, a single classification may be preferred to simplify its use by management bodies.

It is recommended that a comprehensive Road Classification Study be undertaken to define the functional and administrative reclassification of the Vietnamese road network to:

- rank roads according to their socio-economic importance (functional classification) and associate design and maintenance standards to each road class;
- identify short-, medium- and long-term financial needs of each road class;
- prepare on this basis an administrative reclassification of the network to rationalize the responsibility of VRA and the provinces for managing the road network; and
- formalize methods of setting priorities in the short term by implementing a Pavement Management System.

Table 3.8.2 is an example of a possible hierarchy to be considered under the functional classification.

Table 3.8.2
Framework for a Road Functional Classification

Issues to be Addressed	Possible Functional Classification of Interurban Roads			
	Primary Roads	Secondary Roads	Feeder Roads	Local Roads
Road Hierarchy	Roads linking first-class traffic- generator center (TGC)	Roads linking 2nd-class TGC to primary network	Roads linking 2nd- and 3rd-class TGCs to primary and secondary networks	Other roads
Possible standard	Paved road with international standard	Paved road	Gravel road	Earth road

Source: Highway Functional Classification Study Guidelines (World Bank)

Planning Capacity of VRA

The capability of the VRA to propose and implement road subsector plans is very limited because it lacks the management system to plan and supervise implementation of the subsector plan. Further, it has not started to develop its function of road network planning. The institutional weakness lies in the lack of both management/planning systems and trained staff. It needs institutional strengthening to develop its capacity in formulating road network plans for endorsement to the MOT.

In practice, road construction projects are implemented through PMUs which are responsible to the MOT rather than to the VRA. In the long term, after the PMUs have performed their function and are disbanded after the project, there will be no project management expertise left in the road transport subsector. In terms of road transport planning, VRA's ability to assess the needs of road users is very weak since it lacks even the basic road information, eg vehicle fleet characteristics, which is due partly to the lack of effective cooperation between the VRA and the traffic police and the lack of an effective computer database system. The VRA staff also lack the expertise to monitor road transport conditions and to continue adopting the conventional approach which relies on detailed information being collected from all transport operators. However, a completely new approach is required to monitor and collect actual traffic statistics about the road transport industry. Implementation of such proposed system could be complicated, due to the lack of an agreed division of responsibilities between the MOT's Legal and Transport Department and the VRA.

Until recently, VRA's future role was still unclear but with the introduction of Government Decision No 3525/QD-BGTVT/1998 dated December 23, 1998 VRA's responsibilities and powers have been defined in more detail than in the past. This decision noted that VRA's future role should be managing road construction projects and assisting MOT in developing road network plans, investment plans, policies, laws, and regulations. Other functions include: (a) providing technical and professional assistance to the localities in developing communications and transport in the localities; and (b) organizing and directing the management and maintenance of road infrastructure including a system of local roads. However, in practice, there are still no existing guidelines or procedures to implement these powers at provincial and district levels.

There is also a lack of adequate database for R&D and results of foreign-funded transportation studies were the only ones that provide many useful road data but such information still needs to be organized. Development of a traffic database collected from technical cooperation studies, which includes the VITRANSS, will be an important and indispensable reference in preparing transport plans on all levels. Thus, there is a need for the MOT to develop a road database system that will link various national and provincial plans not only for the road subsector but also other transport subsectors.

Legal Framework to Regulate the Road Transport Industry

The legal framework for the road subsector is not yet fully established. There is a proposed Road Act that is now in its seventh draft but further work is required to complete it. The final draft shall take into account various other regulations introduced in recent years, modifying them within the framework of the Act and/or amendment of the Act itself. However, even with the completion of the Road Act, additional work is still required to further improve implementing regulations.

Road transport business licensing regulations must be simplified to avoid time-consuming application procedures which impose very high costs on the transport sector. Until recently, to operate a bus or truck required, in addition to the basic business license, a road transport license for each vehicle operated for business purposes (under MOT Decision No 2076/QD-BGTVT/1998 dated July 18, 1998). There are separate categories for vehicles used for public freight or passenger transport and for vehicles used for own-account purposes (or any vehicle with over nine seats). Applications for these licenses require a completed application form, a valid business certificate and a vehicle registration certificate.

Buses used on scheduled bus routes require permission to operate on particular routes from the respective PTA for intraprovincial bus routes and some short interprovincial routes, and the VRA for longer interprovincial routes. They are required to present an agreement to operate from a bus station. Separate provisions apply for for-hire vehicles and tourist buses.

Licenses may be issued for one year for state-owned operators, transport cooperatives, joint ventures, and private companies whereas the maximum period for private individual operators is only for six months. The licensing authority may issue licenses for shorter periods if they want and they may also specify the area of operation. In practice, licenses are issued for shorter periods, especially in the case of private operators, and restrictions in the area of operations are often imposed. Thus, restriction of scheduled buses to particular routes limits does not allow the full utilization of buses and an efficient schedule to enable buses to operate on more than one route. Operators report that it takes about 2 days to renew their licenses due to complicated bureaucratic procedures and they incur additional administrative charges (about VND 30,000 per bus/ truck plus unofficial payments if they want faster processing).

If all licenses are to be issued for one year, total cost savings could amount to VND 30 billion, assuming that the number of licenses issued could be reduced by 50% from about 600,000 to 300,000 (from about two per vehicle to one per vehicle) and the cost of a license is VND 30,000 (license charge) plus VND 70,000 (cost of management time, overhead and expenses). Even greater savings could be achieved if only one license is issued for each particular service, rather than for each bus. Further, substantial benefits could be achieved if the area and route restrictions were removed and greater incentives were given to operators to open up new services.

Under Prime Minister Decree No. 03/2000/ND-CP dated February 2000, all these transport licenses were scrapped, together with about 80 licenses in other sectors. If the MOT/VRA wishes to reintroduce this kind of license it must reapply under the terms of the new Enterprise Law. This offers a good opportunity to simplify the licensing system.

The VRA recognizes that there is a need to simplify the licensing system not only for bus and truck vehicles, but also in other areas such as vehicle importation, vehicle registration and driver licensing where specific tasks of the agencies must be clearly defined. Tariff controls still exist which apply to the movement of trucks in remote areas. For buses, the VRA has the power in principle to set fares for interprovincial services but there are no specific regulations. This provides some flexibility for operators to adjust their fares. The fares for services within provinces are set by the provincial government, although PPCs cannot enforce these fares in an effective manner.

A new approach is thus required in planning and regulating bus services which is largely based on “quantity licensing” approach. A more effective approach that allows bus operators to plan and develop their own services in competition with other operators must be developed to enable them to comply with minimum safety requirements. The continued adoption of this approach in Vietnam may reflect the concern of ensuring that bus services in remote areas are available. VRA tries to achieve this by restricting entry of transport operations into more profitable routes in the hope that operators will transfer their operations to less profitable routes. This further ensures that profits earned on profitable routes can be used to cross-subsidize unprofitable ones. However, illegal competition will inevitably deprive licensed operators of achieving the desired excess profits and they will be unable to cross-subsidize services in less profitable routes. Even if it were practical, this would not provide subsidy efficiently. Rather, it would (a) reduce competition and increase transport costs and (b) protect existing inefficient state operators from much needed commercial pressure to make their operations more efficient.

The problems with the current approach were brought up in the recent conference of the VRA and PTAs in northern Vietnam (VRA Document No 1043/DBVN-VT dated June 21, 1999). It was noted that normal bus fares should be raised to VND 145 per passenger-km (about VND 20 higher than the average of about VND 125 found in the 1999 VITRANSS survey) and that VAT must be charged assuming this level of revenues even for efficient operators which can operate with lower costs. If such fare increases were to be implemented throughout the country on all interprovincial bus routes, the overall annual increase in interprovincial bus transport costs in Vietnam would be about VND 900 billion, based on the VITRANSS estimate of 120 million passenger-km/ day for bus transport (or equivalent to about 0.3% of GDP).

In road safety, there is a need to replace certain road engineering and technical regulations to further strengthen traffic safety aspects. Further, cooperation between the VRA and the traffic police must be placed on a firmer legal basis.

1) Strengthening Technical Management

Considering the importance of the provincial and district road networks as part of the national network, an action plan must be formulated to enhance technical road management at both national and provincial levels. It should include the setting up of an integrated tool to assess the annual financial needs for road maintenance at national and provincial levels and to prioritize projects to match available funds. This tool consists of a pavement management system (PMS) to be implemented at national and provincial levels and must be based on an annual inventory of actual road network condition and should allow the optimization of limited funds of each province.

Figure 3.8.1 shows the decision-making process under the PMS. The PTA budget should be handled by the MOT, but this is not the case at present where the PTA budget is directly transferred from the MOF without the control of the MOT. The proposed action plan should include a technical assistance to the PTA to implement a road database system and basic PMS in the provinces and which should be consistent in all provinces. There is an ongoing pilot project of defining a more comprehensive PMS, the Highway Rehabilitation Project II under the World Bank loan, which includes a technical assistance to the RRMUs and the establishment of a PMS in the Hanoi-based RRMU No. 2.

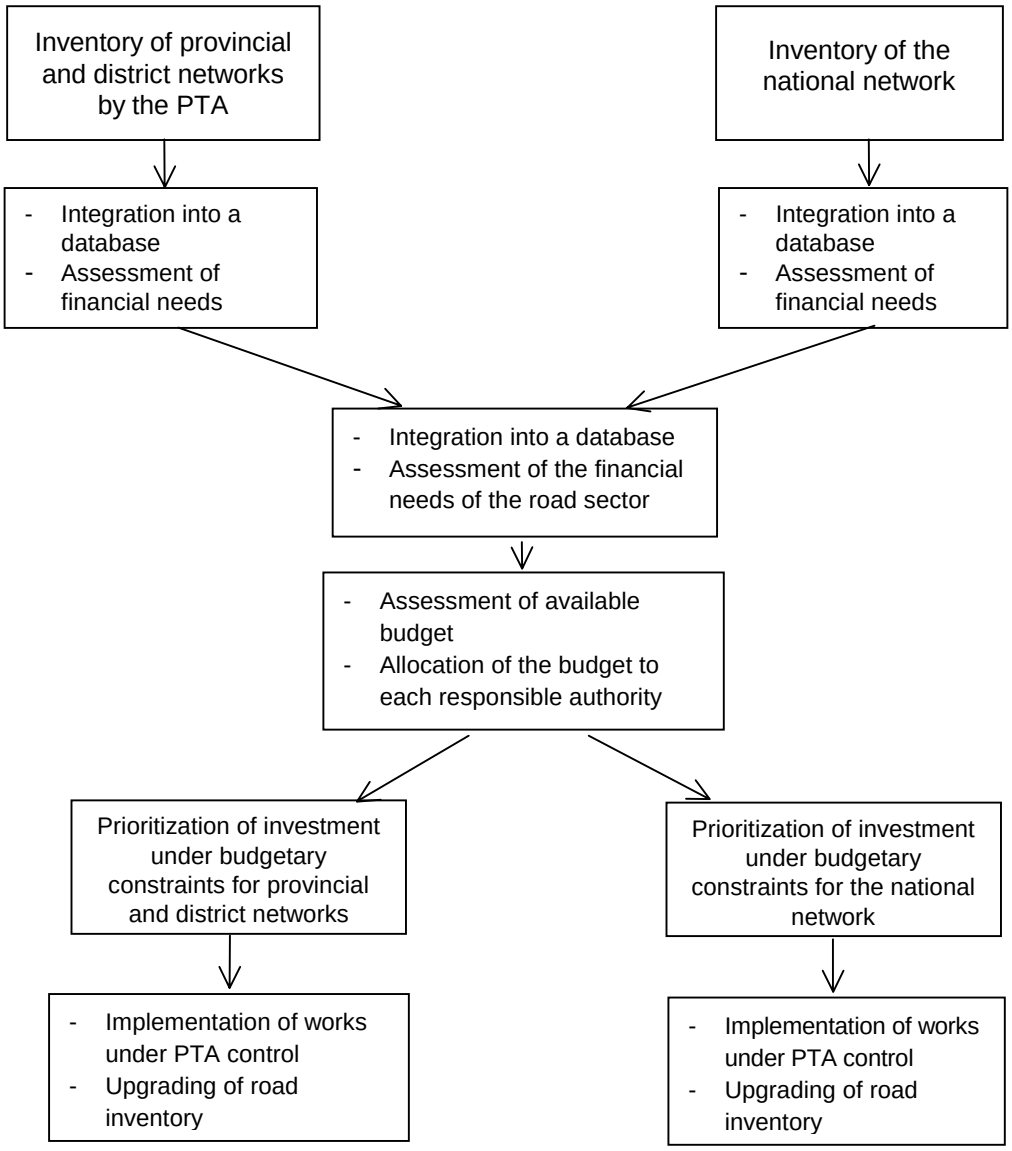
It is recommended that computerized technical management tools be implemented at both national and provincial levels that should include a road database and financial tool for decision-makers. The objectives of the PMS should be to:

- closely monitor road network condition;
- assess the financial needs for road maintenance/rehabilitation on a medium-term basis (2 to 3 years);
- prioritize investment under budget constraint; and,
- assess and compare the quality of works on a long-term basis.

2) Strengthening Provincial Road Management

The MOT is responsible for administering the national road network, developing technical standards and approving the country's overall transport plans. Its day-to-day responsibility of the administration of national roads has been delegated to the VRA. It is noted that the management of provincial and district roads which has been decentralized up to provincial level is a positive development since it is

Figure 3.8.1
Decision-making Process under a Pavement Management System



at this level that the effects of a weak transport system on the social and economic development of a province can be best addressed. Further, it is the provinces which are in a better position to ensure a more effective use of resources for road maintenance. In each of the 61 provinces, each PTA is under the hierarchical and functional responsibility of the PPC which is the executing body of the People's Council or the elected Provincial Assembly. The PPC, which is assisted by the Department of Planning and Investment, has substantial powers over all transport issues affecting the province and plays a key role in the development and management of the provincial road network.

Routine maintenance and medium repairs are carried out by provincial road management companies belonging to the PTA, each of which is responsible for a

certain geographical area of the road network. Major repairs and capital construction are undertaken by provincial construction companies, which are wholly state-owned, and report to the PTA. The PTA also manages the maintenance of a part of the national road network in many provinces, a responsibility that should be reconsidered under the road classification study.

Although the PTA must conform to the professional, technical and general transport policy guidelines issued by the MOT, PTAs report to the provincial government and act as its administrative arm in the planning, programming, preparation, and operation of provincial roads.

Assessment of the status of the provincial road network in Vietnam and field survey results indicate the following:

(1) There is an urgent need to rehabilitate provincial roads and this need is well beyond the maintenance capacity of provinces. Corrective measures require new skills, technologies and management process involving a sharp departure from traditional practices.

(2) PTAs are poorly structured, lacking modern management procedures and hampered by insufficient relevant data. They are also overstaffed and their personnel are underpaid and lack the necessary motivation.

(3) The division of responsibility for the maintenance of roads between provincial and district transport departments is not clearly defined and varies from one province to another. In most provinces, the PTA is also responsible for some of the district roads. At district level, district transport departments are directly responsible for district roads and all commune roads, but they are relatively too small to be able to provide a viable management organization with a full range of required technical skills.

(4) In some cases, road construction and maintenance works are based on social and political, rather than economic, considerations. Most road plans have been developed by districts and communes and their proposed budgets are often overestimated and unrealistic.

(5) The quality of road maintenance works is sometimes poor, hampered by the lack of appropriate standards, methods and modern equipment. Supervision is also inadequate, with a poor understanding of the relative costs. There is often a lack of effective control mechanism since there is a general lack of awareness of modern techniques and no systematic monitoring of results to feed back to management.

To conclude, considering the importance of provincial and district road networks in the total road transport network of Vietnam, it is noted that the PTAs are in need of a technical assistance to review their responsibility, mission, organization, and existing

operating methods and management system. This assistance could take the following form:

- a review of the maintenance procedures in the PTA and provision of recommendations on how these organizations could be more cost-effective; and
- a series of policy workshops to be developed on a pilot basis in a number of selected provinces in Vietnam. These must be attended not only by the PTA staff but should include PPC representatives. The PTAs must be provided assistance in reviewing their mission tasks, assessing their organization and modes of operation from a customer-oriented approach and in setting up a planning, programming and budgeting (PPB) process.

3.9 Ongoing and Planned Road Projects

This Section shall discuss ongoing and planned road projects, rrecognizing the need for further improvement of the road infrastructure network. To undertake such projects, the government's investment in road development amounted to VND 3,384 billion in 1997, VND 3,822 billion in 1998 and VND 3,080 billion in 1999. In addition to this, loans from the WB and ADB to construct new roads were obtained to finance the more rapid expansion of the road network.

It is noted that these capital sources made possible the construction and maintenance of major roads which include National Road No. 5, 1A, 51 and 18. The My Thuan bridge in Mekong delta to link the provinces of Vinh Long and Tien Giang, and the Gianh River bridge in the central province of Quang Binh were constructed through ODA. For example, total Yen loan packages through credit agreements signed during 1993-1999 fiscal years managed by Vietnam's Ministry of Transport reached JPY 189.7 billion (around USD 1.73 billion). This was invested in the following roads and bridges:

Project	Amount (JPY billion)	Duration
1. National Highway No.5 Improvement Project	20.96	1/1995 – 7/2000
2. National Highway No.1 Bridge Rehabilitation Project	15.54	12/1994 – 7/2001
3. Second National Highway No.1 Bridge Rehabilitation Project	7.15	6/1997 – 9/2002
4. Hai Van Tunnel Construction	15.50	12/1997 – 9/2002
5. National Highway No. 10 improvement Project	17.74	1998 – 2003
6. National Highway No. 18 Improvement Project	11.86	1998 – 2003
7. Hanoi – Ho Chi Minh City Railway Bridge Rehabilitation	11.44	1995 – 2001

Japan has also pledged to help Vietnam build several other bridges and road works such as the Can Tho and Bai Chay bridges, Thu Thiem Tunnel and the East-West Avenue of HCM City.

The local transport sector has been implementing three technical support and general assistance projects through JICA with non-refundable aid amounting to USD 105 million. These include building bridges in northern rural areas (USD 35 million) and bridges in the Cuu Long, Mekong delta (USD 60 million) and upgrading the Transport Professional Technical School (USD 10 million). Below are other completed and ongoing projects:

Projects	Amount (USD million)	Duration
1. Reconstruction of Bridges in Northern Districts (Grant-Aid)	37.0	1995-1998
2. Transport Development in Northern Vietnam (M/P)		1995-1998
3. Highway No. 18 Improvement Project (F/S)	184.0	7/1995-3/1996
4. Urban Transport Plan for Hanoi City (M/P)	2.5	3/1995 –5/1998
5. Construction of Thanh Tri Bridge (F/S)	1.7	3/1997-10/1998
6. Can Tho Bridge Construction Project (F/S)	1.6	3/1997-9/1998
7. National Transport Development Strategy		2/1999-6/2000

Ongoing Road Projects

1) National Road No. 1 (NR1)

The project Ho Chi Minh highway which will serve as an alternative highway linking north and south Vietnam started work in April 2000 and requires VND 5,300 billion for the first phase. The road is about 1,690 km from Ha Tay in the north to HCMC in the south. However, the MARD has requested the MOT to study the potential environmental impact of the 8.5-km section of the highway which will pass through Cuc Phuong Park, the country's oldest park.

Generally, NR1 has relatively good geometric characteristics, with the exception of bridge approaches, mountain pass and flood-prone sections. Road capacity is reduced because of the inappropriate traffic management. To cope with the increasing transport demand, the government, with the assistance of international funding agencies, decided to upgrade NR1 to Class III standard, i.e. a 12-m wide road (refer to Table 3.9.1).

Table 3.9.1
Completion Status and Schedule of NR1 Rehabilitation Works

Section or Project	Length (km)	Final Completion Date
Hanoi-Vinh	291	1999
Vinh-Dong Ha	291	2000-2001
Dong Ha-Quang Ngai	303	2005*
Quang Ngai-Nha Trang	396	2003*
Nha Trang-HCMC	439	2000-2001
Bridge	764	1998
Bridges over 20 m		2000

Table 3.9.2 presents the status of ongoing road and bridge construction projects.

Table 3.9.2
List of Major Ongoing/Committed Road Projects

Project	Original Schedule	Implementing Agency	Project Cost (USD million)		Fund Source
			Total	2001-	
1. Highway Rehabilitation Project II (Vinh-Dong Ha; 100km)	1997-2000	MOT	236.6	23.7	WB
2. Highway Rehabilitation Project III (Can Tho-Nam Can; 230km)	2000-2004	MOT	180.0	180.0	WB
3. Highway Rehabilitation Project (Hanoi-Lang Son; 190km)	1997-2000	MOT	162.5	16.3	ADB
4. 2nd Road Development (Nha Trang-Quang Ngai; 600km)	1999-2002	MOT	163.0	81.5	ADB
5. Trans-Asia Highway Project (NH22 to Cambodia; 80km)	1999-2002	MOT	144.7	144.7	ADB
6. East-West Corridor Project (ASEAN 8; NH9; 75km)	1999-2003	MOT	30.0	24.0	ADB
7. Bridge Rehabilitation Project - Phase I (435km)	1995-2000	MOT	162.2	16.2	JBIC
8. National Highway No.5 Improvement Project (remaining section, 91km)	1995-2000	MOT	215.6	21.6	JBIC
9. Bridge Rehabilitation Project - Phase II (752km)	1996-2001	MOT	211.0	105.5	JBIC
10. Hai Van Pass Tunnel (2 lanes, 14km)	1998-2003	MOT	251.0	225.9	JBIC
11. NH No.18 Widening Projects - Phase 2 (remaining section, 70km)	1998-2003	MOT	232.0	232.0	JBIC
12. National Highway No.10 Upgrading Project (147km)	1998-2003	MOT	302.0	302.0	JBIC
13. Can Tho Bridge Construction	2000-2004	MOT	294.0	294.0	JBIC
14. Thanh Tri Bridge Construction	2000-2004	MOT	410.0	410.0	JBIC
15. Bai Chay Bridge Construction	2000-2004	MOT	98.0	98.0	JBIC
16. Binh Bridge Construction	2000-2004	MOT	80.0	80.0	JBIC
17. Trans HCMC Highway Project (21.4km)	2000-2004	MOT	758.6	758.6	JBIC
18. My Thuan Bridge (1,535m)	1997-2000	MOT	79.3	15.9	Australia
19. East-West Corridor Project (ASEAN 7A; NH12A, 29; 120km)		MOT	65.0	39.0	GOV
20. Rehabilitation and Upgrading of Ho Chi Minh Highway (Hoa Lac – Ngoc Hoi)	2000-2003	MOT	380.0	380.0	GOV
21. Rehabilitation of NH 14	2000-2003	MOT	15.0	15.0	GOV
Total			**4,470.5**	**3,463.9**	

2) North-South Highway

The principle of building a new north-south highway which is parallel to NR1, from Hoa Lac (Ha Tay province) to HCMC, was approved by the Prime Minister through a decision dated 24 September 1997. According to the feasibility study undertaken by TEDI, the alignment of this 1,776-km long highway includes the following four main stretches:

- From Hoa Lac to Cam Lo on NR9 in Quang Tri province, this alignment includes some new sections and, whenever possible, existing sections of Road No. 15. The distance between the proposed alignment and Road No. 1 varies from 5 km (e.g near Dong Hoi) to 40 km (e.g near Tam Ky in Ha Tinh province or near Thanh Hoa).
- From Cam Lo to Danang, the alignment includes a new section up to Chan May junction, bypassing Dong Ha and Hue at a distance of about 5 km from Road No. 1. Beyond Chan May junction, up to Danang, the project alignment coincides with that of NR1, including the planned tunnel under the Hai Van Pass.
- From Danang to Kon Tum, the alignment which passes through Than My partly follows Road No. 14B and Road No. 14, including the mountainous section through the Truong Son range.
- From Kon Tum to HCMC, the alignment mainly follows existing roads (i.e Road No. 14 up to Chon Thanh and Road No. 13 from Chon Thanh to HCMC). South of Buon Ma Thuot, some new sections are included in the planned alignment.

The Study was based on Class III standard (i.e. 12-m wide road surface base) for the whole road length. Standards for plains are generally used except on the section between Thanh My (Km 947) and Dak Glei (Km 1,070) in the Truong Son mountain range where standards for mountainous areas (i.e. 9-m wide road surface base) are used. Some sections are new, but whenever feasible, existing roads are used. Many bridges have to be constructed, especially 30 long ones (i.e. over 100 m long). The longest (i.e. 406 m) will be the bridge over Cu De river on the Danang bypass. Four other bridges exceeding 300 m long are required.

The project includes many bypasses in large cities like Dong Hoi, Hue, Danang, Kon Tum, Plei Ku, and Buon Ma Thuot. For Dong Hoi, Hue and Danang, these bypasses may be needed immediately to alleviate congestion on NR1. From nearby Chan May junction (Km 858) to Danang, the project alignment coincides with that of NR1, including the planned tunnel under the Hai Van Pass. Taking into account the road traffic expected in this section, it is estimated that a Class III standard (two-lane carriageway) may not be adequate.

North of Danang the planned highway clearly competes with NR1 and may alleviate traffic congestion on this road. South of Danang, the planned highway will serve the central highlands. Although it does not directly compete with NR1, traffic congestion on this road will be lessened provided the traffic flows to

Danang, further north and to HCMC are diverted to the planned highway. The road section from Hue to Danang is being studied to address the following:

- the consistency of the road works with the protected area around the Hue royal tombs;
- the congestion problems which may arise on the road leading to the tunnel under the Hai Van Pass and in this tunnel; and
- the security requirement (i.e. to eliminate the risk of natural disaster or other hazards) which may lead to an alignment different from Road No. 1 (e.g. a possible alignment south of Bac Ma Park may be considered).

Table 3.9.3 summarizes the main characteristics of the project under study.

Table 3.9.3
Main Characteristics of the North-South Highway Project

General	
Total length	1,776 km
Mountainous area standard	123 km
New roads	404 km
Total approximate length of tunnels	5 km
Total length of 575 bridges	21,711 km
Over 100 m long bridges	
Quantity	30
Total length	6,553 m
Average length	218 m
Medium and small bridges	
Total length for 233 medium bridges (20-100m)	10,049 m
Total length for 312 small bridges (< 20m)	5,109 m

Source: North-South Highway Feasibility Study (TEDI, September 1997)

The start-up of the project was delayed in 1997 because preparatory work was not completed until the end of 1999. According to the MOT's feasibility study, the scale of the project in the first phase is limited to a two-lane highway, mostly overlapping existing national roads, which are proposed for upgrading. A second route to ensure normal traffic even in the worst weather condition will be put in place.

With limited capital funds amounting to VND 4,912 billion or USD 350 million for Phase 1, according to the MOT's feasibility study, the Vietnamese government decided to start up Phase 1 of the North-South Highway Project, at first to assure a two-lane line from Ha Tinh to Kon Tum. Based on recent reports, road construction has been in progress for the past five months and land acquisition has also started. However, the technical and engineering designs have to be modified to ensure quality of the works. Slowly, construction of the following road sections are being implemented: Pheo-Bung junction (Quang Binh), Xoi bridge-Kham Duc (Quang Nam) by TEDI, Dan Don-Dak Pet, Khi bridge-Khe Sanh (Trung Son Company) and Dak Trong-Ta Rut (533 Consulting Company). The MOT has appointed the Department of Inspection and Quality Control for

Transport since July 2000 to undertake inspection works on the sections which are being constructed.

Phase 1 will be carried out in three years (2000 – 2003) over a length of 1,690 km from Ha Lac (Ha Tay) to Binh Phuoc (HCM City) with a large workload including upgrading and restoring 1,094 km of existing roads (83% of the total length to be fortified in Phase 1), building 220 km of new roads to get through the bottleneck from Xuan Mai (Ha Tay) to Ngoc Hoi (Kontum) and 341 new bridges with total length of 15,985 m. After Phase 1, the section from Ngoc Hoi (Kon Tum) to HCM City will be developed on the existing NR14. It is reported that this section will be upgraded to a four-lane highway with ODA from OECF (Overseas Economic Cooperation Fund, Japan).

Although this new trans-Vietnam road is essential and its economic efficiency is certain in the future, investment efficiency is still of utmost concern. Considering the design of the road, transport experts said that the new road under Phase 1 might suffer from landslides and there is great concern that the investment cost is very high due to the expansion of existing roads which include site clearance and compensation for resettlement activities.

Planned Road Projects

1) National Road No. 12 (NR12)

According to a Vietnam-Lao agreement, the development of a port project serving Lao traffic is contemplated at Vung Ang in Ha Tinh province. The project NR12 will connect this port through Ha Tinh and Quang Binh provinces with the Lao border at Mu Gia Pass via Ky Anh on NR1, and Dong Le and Khe Ve on NR15.

TEDI undertook the pre-feasibility study of this project based on a Class III standard road for plain area with some sections in mountainous areas where reduced standards will be applied. Among the possible optional layouts, the shortest route has been selected for a 150 km total length. Following are the main characteristics of the projects.

Table 3.9.4
Main Characteristics of NR12 Project

Characteristics	Length
Total Length	150 km
Standard for Mountainous Area	< 25 km
New Roads	69 km
Total Length for 2 New 100-m and 180-m Bridges	280 m

Source: Pre-feasibility Study for Vung Ang Port and Road to Lao PDR (TEDI, May 1996)

The pre-feasibility study of this project has been completed and the next steps will depend on the implementation schedule of the Vung Ang Port project.

2) Asian Highway Network

The Economic and Social Commission for Asia and the Pacific (ESCAP) at its Forty-eight Section approved the Asian Land Transport Infrastructure Development (ALTID) project as an umbrella project comprising the Asian Highway, the Trans-Asian Railway and the facilitation of land transport projects. The long-term objective of this ALTID project is to provide reliable and efficient land transport linkages within the region and with western Asia and Europe.

Vietnam proposes the following routes for inclusion in the Asian Highway network:

- The 2,140-km long route connecting the Chinese border to the Cambodian border through Hai Phong, Hanoi, Vinh, Dong Ha, Danang, Quy Nhon, and HCMC. This route includes the whole length of Road No. 1 which is included in the study area. From HCMC, this road connects through Road No. 22 with Phnom Penh and further with Bangkok, Yangon, New Delhi, Islamabad, Kabul, Tehran, Ankara, Istanbul, and Europe.
- The 1,020-km long route connecting the Lao border at Dak Kon on Road No. 40 north of Kon Tum, with Ha Tien on the Cambodian border through Plei Ku, Chon Thanh on Road No. 13 and HCMC. This route includes Road No. 14 which is included in the study area.
- The road (i.e. NR8) connecting Vot on NR1 near Vinh with Keo Nua on the Loa border and further with Ban Lao in Lao PDR.
- A 75-km long road connecting a deep-sea port (possibly Vung Ang) with Mu Gia on the Lao border and further with Thakhek in Lao PDR. This road is identified as NR12.
- The road (i.e. NR9) connecting Dong Ha on NR1 with Lao Bao on the Lao border and further with Savannakhet in Lao PDR.
- The 240-km long route connecting through Road Nos. 14B and 14, Hoi An/Danang with the Lao border at Dak Kon on NR40 at north of Kon Tum and further with Pakse in Lao PDR.
- The road (i.e NR19) connecting Quy Nhon with Plei Ku and the Cambodian border and further with Stung Treng in Cambodia.

The improvement of some of the above routes is supposed to be funded under regional or bilateral ODA programs as follows:

- The rehabilitation of the full length of NR1 is ongoing.
- Further to the East-West Transport Corridor Study sponsored by the ADB, the concerned parties agreed to prioritize the corridor including NR9 from Savannakhet to Dong Ha.
- ADB has financed the preliminary design studies of (i) the Mekong River Bridge which will connect Savannakhet with Mukdahan in Thailand, (ii) the road from Savannakhet to Lao Bao and (iii) and the extension of Tien Sa port and the access to this port in Danang. However, these studies do not include those related to the improvement of NR9 from Lao Bao to Dong Ha.
- OECF (JBIC) is financing the construction of the Mekong River Bridge to connect Pakse to Ubon Ratchatani in Thailand.

Following are the proposed roads for improvement and which are encountering some difficulties in obtaining the required financing:

- NR 8 in Lao PDR from Ban Lao to Keo Nua on the Vietnamese border. The western section of this road (i.e. from Ban Lao on NR13 to 10 km west of Nam Theun River) had been upgraded to Class IV standards. Due to the difficult topography through which the road passes, it has long steep grades (i.e. 10%) with small radius curves (i.e 30 to 60 m). Its eastern section (i.e. from 10 km west of Nam Theun River to Keo Nua) has a 6-m wide sealed pavement with tight curves. The general alignment allows operating speeds of 50 kph or as low as 35 kph in some areas.
- NR12 in Lao PDR from Thakek on NR13 to Mu Gia on the Vietnamese border. This road is impassable due to the lack of two major bridges. During the dry season, some vehicle types are capable of passing through a 0.5- to 1.0-m deep flooded road. Average running speed in this route is only 35 kph and about 75% of the length of this route has a carriageway width of only 4.0 to 4.5 m.
- The road in Lao PDR connecting Pakse via Attapeu with the Vietnamese border at the starting point of NR40 comprise mostly dirt roads.
- NR78 in Cambodia connecting Stung Treng with the Vietnamese border at the starting point of NR19. This road is in poor condition, passable in the dry season but not in the wet season. The section contains 22 bridges, 20 of which are simple timber structures; a large number have been damaged during the war and have been temporarily repaired. Two of the longer bridges are destroyed. Because of these missing bridges, strong vehicles (four-wheel-drive vehicles) must be used to pass 0.4-0.5-m deep flooded sections during the wet season. Thus, the use of this route is restricted to the dry season except for high-clearance vehicles which may use it in the wet season as long as the road is not flooded.

It should be noted that any improvement on roads connecting with the border (i.e. NR8, 12, 40 and 19) must be coordinated with border countries to prevent any waste of resources, if beyond the border the connecting road remains impassable due to lack of funding in the neighboring country. Table 3.9.5 shows the selected links of the Asian Highway network.

3) Cross-Border Roads

From the north to the south of Central Vietnam east-west cross-border roads are being proposed, the status of which is summarized in Table 3.9.6:

Table 3.9.5
Selected Links of the Asian Highway

From	To	Via	Length (km, rounded)
Vientiane	Cua Lo	NR8	390
	Vung Ang	NR8, NR1	550
	Vung Ang	NR12	670
	Bangkok		630
	Laem Chabang		730
Thakhek	Vung Ang	NR12	320
	Da Nang	NR9 and NR1	580
	Bangkok		800
	Laem Chabang		900
Udon Thani	Vung Ang	NR12	560
	Bangkok		560
	Laem Chabang		660
Savannakhet	Vung Ang	NR9 and NR1	510
	Da Nang	NR9 and NR1	510
	Bangkok		850
	Laem Chabang		950
Pakse	Da Nang	NR40, NR14 and NR14B	570
	Quy Nhon	NR40, NR14 and NR19	600
	Bangkok		810
	Laem Chabang		910
Ubon Ratchasani	Da Nang	NR40, 14 and 14B	690
	Quy Nhon	NR40, 14 and 19	720
	Bangkok		690
	Laem Chabang		790
Stung Treng	Quy Nhon	NR19	430
	Quy Nhon	NR13 and 51	510

Table 3.9.6
Cross-Border Roads

Road No.	From Laotian/Cambodian Provincial Capital	To	Length		
			Total	Paved	Bad*
217	Sam Neua (Houa Phan)	Le Mon Port (Thanh Hoa)	295	211	84
		Vientiane	629	236	393
7	Phone Savanh (Xieng Khouang	Cua Lo Port (Nghe An)	377	90	262
		Vientiane	376	236	140
8	Paksane (Bolikhamsay)	Cua Lo Port (Nghe An)	237	237	
		Vientiane	151	151	
12	Thakhek (Khamoune)	Vung Ang	325		325
		Vientiane	354	354	
		Savannakhet	118		
9	Savannakhet (Savannakhet)	Cua Viet Port (Quang Tri)	336	96	240
606/14B	Pakse (Champassak)	Danang	269		200
40/14/14B	Pakse (Champassak)	Danang	569		500
40/14/24		Dung Quat (Quang Tri)	602	111	491
40/14/19		Quy Nhon (Binh Dinh)	596	282	314
19	Stung Treng (Cambodia)	Quy Nhon (Binh Dinh)	433	230	203
13/51		Vung Tau	514	278	236

* Bad condition or earth road.

Table 3.9.7 describes the physical characteristics of each cross-border road.

Table 3.9.7
Physical Characteristics of Cross-border Roads

Road No.	Description
217	• The 88-km long, 5-m wide road is paved and connects Road No. 15 to the Lao border through a difficult, mountainous terrain. Through his road, the distance between Sam Neua, capital city of the Laotian province of Houa Phan, and Le Mon Port in Thanh Hoa province is 236 km while the distance from Sam Neua to Vientiane is 558 km.
7	• This 225-km long road, 36 km of which are paved connects Road No. 1 to Lam Can on the Lao border. Through this road, the distance between Phone Savanh, capital city of the Lao province of Xieng Khouang, and Cua Lo Port in Nghe An province is 377 km wile the distance from Phone Savanh to Vientiane is 376 km.
8	• This is a 72-km long, 6-m wide paved road which connects Road No. 1 to Keo Nua on the Lao border. Through this road, the distance between Paksane, capital city of the Lao province of Bolikhamsay, and Cua Lo Port in Nghe An province is 237 km while the distance from Paksane to Vientiane is 140 km. • The lowland section of Road No. 8 in Vietnam has a better alignment and sight distances than those of the mountainous section. However, a significant volume of low-speed local traffic usually restricts travel speed to 60 kph or less. From the lowlands, Road No. 8 climbs quickly up a mountain section of road for a distance of about 25 km with moderate to steep grades. This section has numerous tight radius curves which require vehicles to proceed with caution. Long lengths of consistent grade occur which are very difficult for underpowered vehicles to climb and potentially dangerous for most heavy vehicles to descend. • All bridges are Class III standards bridges. Pre-casting has been used for most of the concrete forms of construction. All bridges are in good condition. • The eastern section of Road No. 8 in Lao PDR, from Keo Nua to 10 km west of Nam Theun River, has a 6-m wide sealed pavement with tight curves in place. The general alignment allows operating speeds of 50 kph with some areas as low as 35 kph. The western section, from 10 km west of Nam Theun River to Road No. 13, is currently being upgraded to Class IV standards. However, because of the difficult topography of the area, the road has long steep grades (i.e. 10%) with small radius curves (I.e. 30 to 60 m and occasionally as tight as 15 m).
12	• This road from Road No. 1 to Mu Gia on the Lao border is still under study. From Tho Don (or Ky Anh) on Road No. 1 to Dong Le on Road No. 15, a new alignment is considered, while from Khe Ve to Mu Gia the alignment will follow an existing earth road. Between Dong Le and Khe Ve, the proposed includes the existing Road No. 15. The existing roads included in this route are generally single-lane gravel roads. • The length of this route from Vung Ang to Phu Kien in Lao PDR would be 275 km. Through this road, the distance of Vung Ang in Ha Tinh province would be 325 km while the distance from Thakhek to Savannakhet is 118 km. • On the Lao PDR side, this route is impassable due to the lack of major river crossing structures. In the dry season, four-wheel drive vehicle can cross the water depth of 0.5 to 1.0 m. The average running speed on this route is

Road No.	Description
	estimated at 35 kph. Seventy-five percent (75%) of he length of this route has a carriageway width of only 4.0 to 4.5 m.
9	• This 96-km paved road with a bad surface condition connects Cua Viet Port to Lao Bao on the Lao border. Through this road, the distance between Savannakhet, capital city of the Lao province of Savannakhet, and Cua Viet Port in Quang Tri Province is 337 km. • Its lowland section in Vietnam has better alignment and sight distances than those of the mountainous section. However, significant volumes of low-speed local traffic usually restrict travel speed in the Dong Ha suburb along Thach Han River. The 5-km Dak Rong - Khe Sanh section has tight radius curves and steep gradient. Ongoing works will improve road traffic condition in the short term. • Its section in Lao PDR was constructed in two stages between 1982 and 1988 with a seal width of 6 and 7m. The seal did not last and began breaking up within a few years after construction.
Quang Nam Provincial Road No. 606 (to become Road No.14D)	• This 58-km earth road connects Giang on Road No.14 west of Thach (also Thanh) My to the Lao border. Through this road, the distance between Pakse, capital of the Lao province of Champasak, and Danang via Banphon, capital of the Lao province of Sekong, would be 269 km. However, the related roads in Laos either do not exist, or are dirt roads.
Road Nos. 40 and 24	• This 21-km unpaved road connects Ngoc Hoi on Road No. 14 north of Kon Tum to the Lao border. The distance from Pakse, capital of the Lao province of Champasak, via Attapeu in Lao PDR to Danang would be 569 km and to the port of Quy Nhon through Road No. 19, 569 km. However, as already stressed, the related roads in Laos either do not exist or are dirt roads. • In Vietnam, an alternate to Road No. 19 may be Road No. 24. This 164-km unpaved road in poor condition connects An Chau on Road No. 1 south of Quang Ngai and Dung Quat to Kon Tum. Through this road, the distance from Pakse to the port site of Dung Quat would be 602 km.

Source: TEDI and ADB East West Transport Corridor Study (1996).