

## **2.2.2 Basic Plan**

### **2.2.2.1 Request to Change in Grade of Proposed Bridges**

Several requests to change the grade of the proposed bridges were made from the Vietnamese Government through MOT, PMU2, and the provincial DOTs of Binh Thuan, Ninh Thuan, Dak Lak and Khanh Hoa, based on the result of the joint site investigations of the Study. The major modifications requested are summarized as follows:

- Widening of formation for 4 bridges (Da Dung Bridge, Tran Bridge, Tam Ngan Bridge and Ngoi Ngan Bridge)
- Application of higher live load for all bridges

Both requests were recorded as shown in Appendix 5: Technical Memorandum after the site investigations.

### **2.2.2.2 Response to Request for Widening of Proposed Bridges**

#### **(1) Background of Formation Widening Request**

The background of the request for formation widening for 4 of the 6 bridges is described as follows:

##### **1) Da Dung Bridge (Ninh Thuan Province)**

Binh Thuan Province requested the widening of bridge width to 12.0m comprising of 2-lane of 7m with 1m shoulder and 1.5m walkway (including the installation of railing) at both sides, based on the Provincial Transport Development Plan, 2004. The reasons therefore are:

- This bridge is located on PR 719 in the center of Logi Town, designated as a special town of Binh Thuan Province.
- PR719 is also regarded as a trunk road (Class III) that connects the provincial center of Phan Thiet via NR 55. Access road to Logi Town side is already improved with 8.0-9.0m width.
- Heavy vehicular traffic (including trucks, buses, sedans and motorbikes) and many pedestrian and bicycles of school children are using the bridge.

##### **2) Tran Bridge (Binh Thuan Province)**

Binh Thuan Province requested widening the bridge to 12.0m comprising of 2-lane of 7m carriageway with 1m shoulder and 1.5m walkway (including railing) at both sides, based on the Provincial Transport Development Plan, 2004. The reasons therefore are:

- Sara-Tam Hung route which is approximately 5km long, Class III road is where Tran Bridge is located, this bridge is links to NH1 and NH28, and traffic volume is increasing rapidly.

### **3) Tam Ngan Bridge (Ninh Thuan Province)**

Ninh Thuan Province requested for widening of the bridge width to 7.0m from 5.5m which was set in the previous study. The reasons therefore are:

- This bridge will connect with Lam Son – Phuoc Hoa route which has been upgrading to Class III so far.

### **4) Ngoi Ngan Bridge (Khanh Hoa Province)**

Khanh Hoa Province requested for widening of the bridge width to 7.0m from 5.5m which was set in the previous study. The reasons therefore are:

- This bridge is located along the Class III Nguyen Hue route used as transportation of passengers for Van Thang-Van Khanh-Van Phuoc communes connecting to Van Ninh District administration center and Van Phong Gulf economic zone. There is a development plan for Van Phong economic zone with 2020 as the target year in support to Khanh Hoa province economic development.
- Nguyen Hue route is under upgrading. Some section (centre of Van Ninh District) has already been upgraded with 12.0m width. And its upgrading budget has already been secured at 150,635 milli. VND for 2006-2010 and 2010-2015 respectively.
- The bridge is already dilapidated and in danger of collapse. Motor vehicles are not allowed to use the bridge but motorbikes, bicycles and pedestrians are still using the bridge.

## **(2) Concept of Bridge Formation Width of 5.5m in BD Stage**

Bridge formation width of 5.5m for both provincial and district roads has been adopted in past bridge reconstruction projects (e.g., the Project for Reconstruction of Bridges in both Northern districts and Mekong Delta Area of Vietnam). In a few cases, a formation width of 7m was adopted for bridges town centers. The original bridge width of 5.5m consists of a one-lane carriageway of 3.5m plus a 1m shoulder on both side of the bridge for bicycles or pedestrians allowing the slow passage of a sedan along a heavy truck stopping at the bridge.

## **(3) Criteria to Determine Increase in Bridge Formation Width**

Table 2.2.1 shows the criteria to determine the necessity of widening a bridge's formation from 5.5m, which was adopted in the previous study.

**Table 2.2.1 Criteria to Determine Need to Increase Bridge Formation Width**

Criteria	Contents
① Existing Traffic Volume	300 PCU is the threshold for 2-lane operation according to the Vietnamese Standard
② Access Road Class & Existing Condition	- Provincial or District road? - How wide are other bridges for the same road? - Is there any plan (including budget) for upgrading the road?
③ Bridge Location	- Are many users using the bridge because it is located in the vicinity of populated areas such as a district centers?
④ With or Without Request to Widen from the Vietnamese side.	- Is there a request to widen the bridge from the Central Government through this Study?

#### **(4) Discussion & Conclusions**

Table 2.2.2 shows the evaluation results for bridges based on the criteria in Table 2.2.1.

##### Da Dung Bridge (Binh Thuan Province)

The new bridge will be constructed with 9m (1m+7m+1m) width for the following reasons:

- Other bridges on the same route have already been constructed with 9.0m width (see Figure 2.2.1 (1)).
- This bridge is located in the center of Logi Town, designated as a special town by Binh Thuan Province.
- A large number of bicycles and motorbikes are using the bridge because it is located on the way to a school and market, and widening to 9.0m will provide greater safety for such light vehicles and pedestrians.
- The traffic of large vehicles transporting farm and marine products is anticipated to start with the construction of the new bridge.

##### Tran Bridge (Binh Thuan Province)

The new bridge will be constructed with 5.5m width (same as in the previous study) from the following reason:

- Although Sara-Tam Hung route (approximately 5km length) was upgraded to Class III and is increasing traffic volume, there is not enough ground (see Table2.2.2) to construct in 2 lane road.

##### Tam Ngan Bridge (Ninh Thuan Province)

The new bridge will be constructed with 5.5m width (same as in the previous study) from the following reasons:

- There is no upgrading plan on existing road.

- Lam Son-Phuoc Hoa Route which is under construction can be connected to NH27 in only 3.7 km upstream side. Therefore, there is not enough ground to construct in 2 lane road.

#### Ea Soup Bridge (Dak Lak Province)

The new bridge will be constructed with 7.0m width (same as in the previous study) for the following reasons:

- Traffic volume justifies 2-lane operation.
- The bridge is located on PR1 and has an important role in the road network of the province. Access roads to the bridge had already been paved with 6m width.

#### Krong K'Mar Bridge (Dak Lak Province)

The new bridge will be constructed of 7.0m width (same as in the previous study) for the following reasons:

- Traffic volume justifies 2-lane operation.
- The bridge is located on PR12 and has an important role in the road network of the province. Access roads to the bridge had already been paved with 6m width on the right bank side and 10m width on the left bank side.

#### Ngoi Ngan Bridge (Khanh Hoa Province)

The new bridge will be constructed of 7.0m width based on the following reasons:

- Nguyen Hue route is under upgrading. Some sections (from the centre of Van Ninh District) has already upgraded to 12.0m width. Funding has already secured at 150,635 milli. VND for 2006-2010 and 2010-2015 respectively.
- A large number of bicycles and motorbikes are using the bridge because it is only way to transport passengers from Van Thang-Van Khanh-Van Phuoc communes to Van Ninh District administration center and Van Phong Gulf economic zone.
- The other two bridges on the same route have already been constructed with 6.0m plus walkway on both sides (see Figure 2.2.1 (5)).

Table 2.2.2 Evaluation Results of Bridge Formation Widening (1/2)

Bridge Name (Bridge Length) Province	Road Name	① Traffic Volume > 300 PCU <sup>1</sup>	② Existing Road Conditions/ Road Class	③ Bridge Location (Near populated area?)	Bridge Width		
					Implementation Review Study (2006)	④ Width Request (by DOT)	Evaluation
Da Dung Bri. (92.3m) Binh Thuan Pro.	Provincial Road No. 719	4405 > 300PCU	<ul style="list-style-type: none"> <li>Other Bridges on the same road was constructed with 8-9m wide Class III roads</li> </ul>	Within Log Town	7.0m (1+3+3+1)	12m (1.5+9.0+1.5)	9.0m (1+3.5+3.5+1)
Tran Bri. (65.3m) Binh Thuan Pro.	Provincial Road Sara-Tam Hung Route	969 > 300PCU	<ul style="list-style-type: none"> <li>5km length road which connect NH28 with NHI</li> <li>Although the road was set in Class III, the existing width is 4m, and no budget was allocated for road upgrading</li> </ul>	7km from district center of Ma Lam	5.5m	12m (1.5+9.0+1.5)	5.5m
Tan Ngan Bri. (65.3m) Ninh Thuan Pro.	District Road	600 > 300PCU	<ul style="list-style-type: none"> <li>This road will connect with Lam Son – Phuoc Hoa route which has been upgraded to Class III road</li> <li>This is the access road leading to the ethnic minority village on the left side bank</li> <li>Access road connecting to NH27 on the right bank side is 3m width. No plan for upgrading</li> </ul>	15km from district center of Tan Son	5.5m	8.0m	5.5m
Ea Soup Bri. (59.3m) Dak Lak Pro.	Provincial Road No.1	1287 > 300PCU	<ul style="list-style-type: none"> <li>Road and other bridges on the same route was constructed with 7.0m width or more</li> </ul>	Outer edge of district center of Ea Soup	7.0m	7.0m	7.0m

<sup>1</sup> Passenger Car Unit (PCU) value for a bus, truck and motorbike is 3.0, 2.0 and 0.3, respectively, and is calculated based on the passenger car serving as the base mode with a PCU value equivalent to one.

Table 2.2.2 Evaluation Results of Bridge Formation Widening (2/2)

Bridge Name (Bridge Length) Province	Road Name	① Traffic Volume >300 PCU	② Existing Road Conditions/ Road Class	③ Bridge Location (Near populated area?)	Bridge Width		
					Implementation Review Study (2006)	④ Width Request (by DOT)	Evaluation
Krong K'Mar Bri. (71.3m) Dak Lak Pro.	Provincial Road No.12	2033 > 300PCU	<ul style="list-style-type: none"> <li>A <b>6m wide road was constructed</b></li> <li>5 out of 8 bridges on the same route was constructed with 7m width after 2000</li> </ul>	Outer edge of district center Krong K'mar	7.0m	7.0m	7.0m
Ngoi Ngan Bri. (49.55m) Khanh Hoa Pro.	Provincial Road Nguyen Hue Route	1227 > 300PCU	<ul style="list-style-type: none"> <li>This road was upgraded to Class III in 2001</li> <li>This road was designated in the 2020 Van Phong Industrial Zone provincial master plan</li> <li>Although the width of the existing road is 3-3.5m, upgrading budget has already been secured at 150,635 milli. VND for 2006-2010 and 2010-2015 respectively. Moreover, some section (centre of Van Ninh District) has already been upgraded to 12.0m width</li> <li>2 bridges on the same road was constructed with more than 6m plus of walkways at both side after 2000.</li> </ul>	10km from district center of van Ninh  Van Phong Industrial Zone	5.5m	9.0m (1+3.5+3.5+1)	7.0m

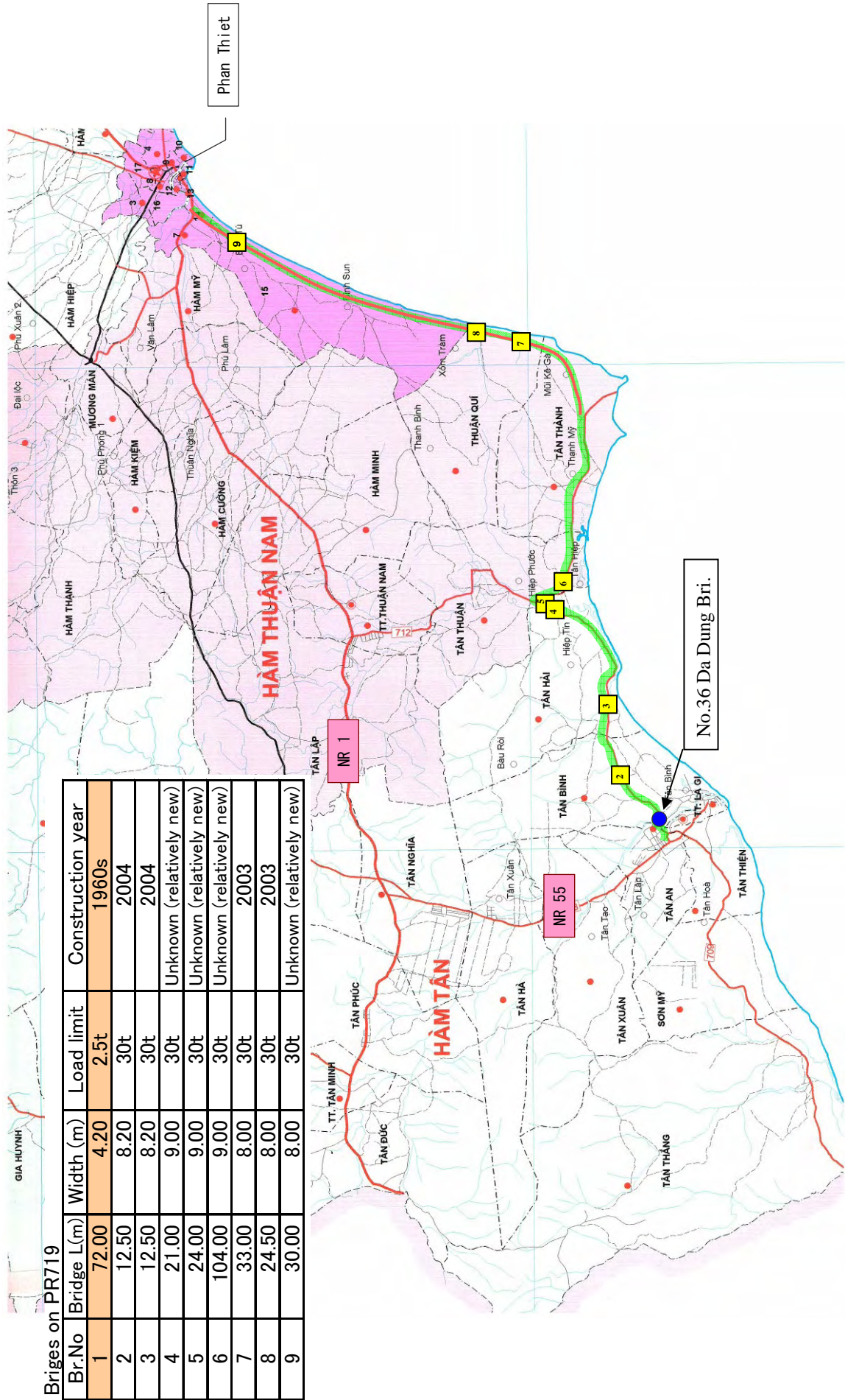


Figure 2.2.1 (1) Existing Conditions of Other Bridges

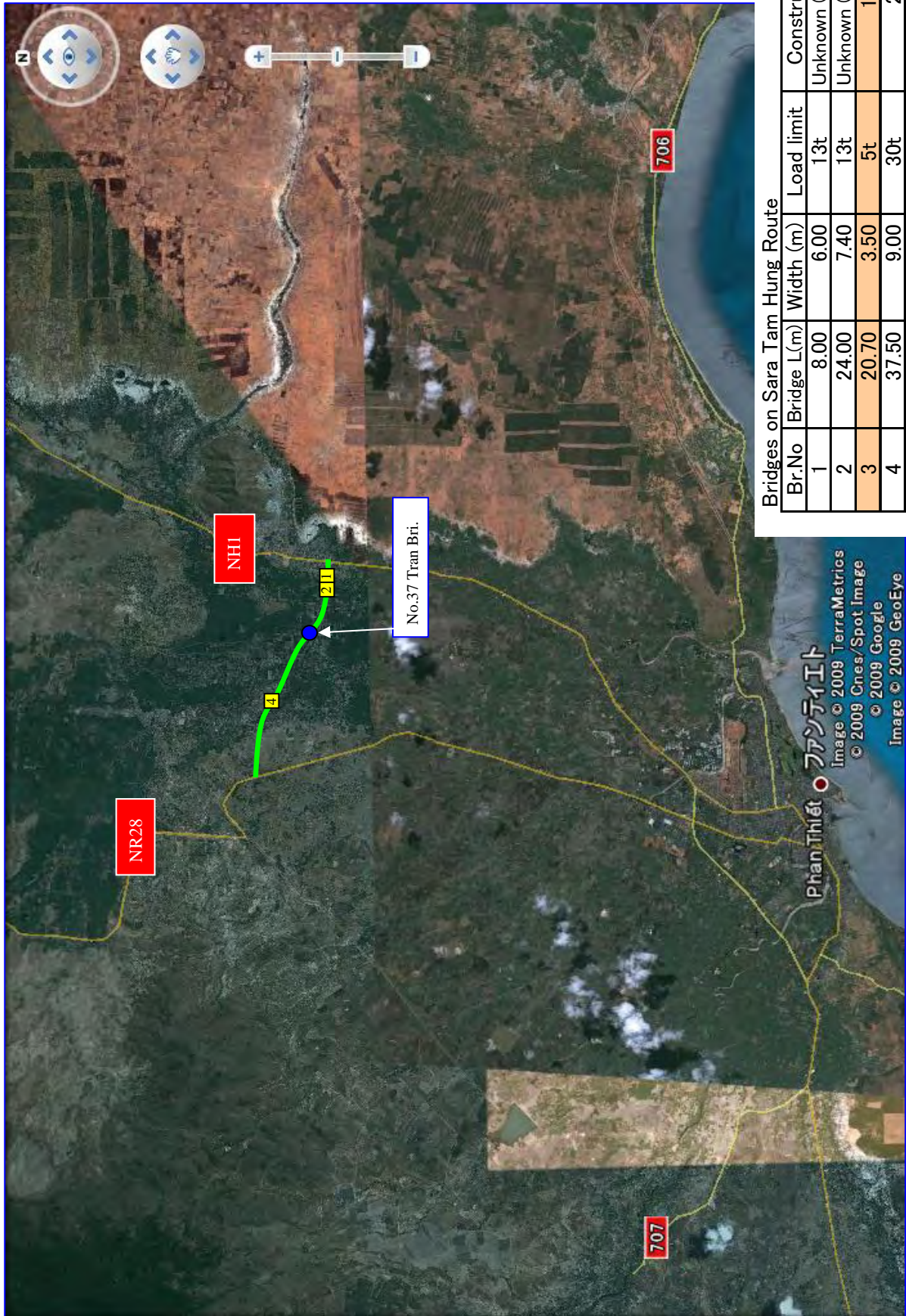


Figure 2.2.1 (2) Existing Conditions of Other Bridges



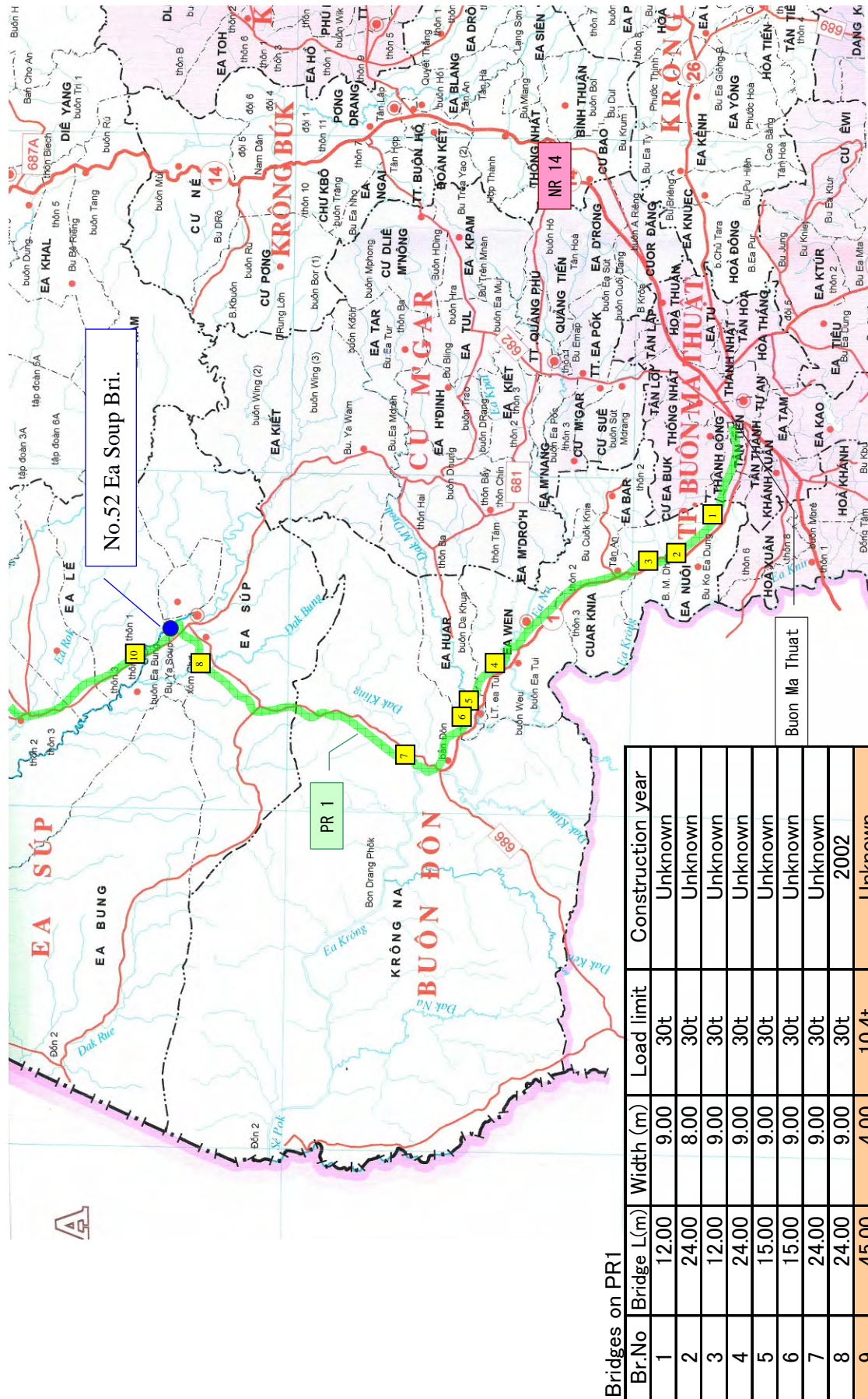


Figure 2.2.1 (3) Existing Conditions of Other Bridges

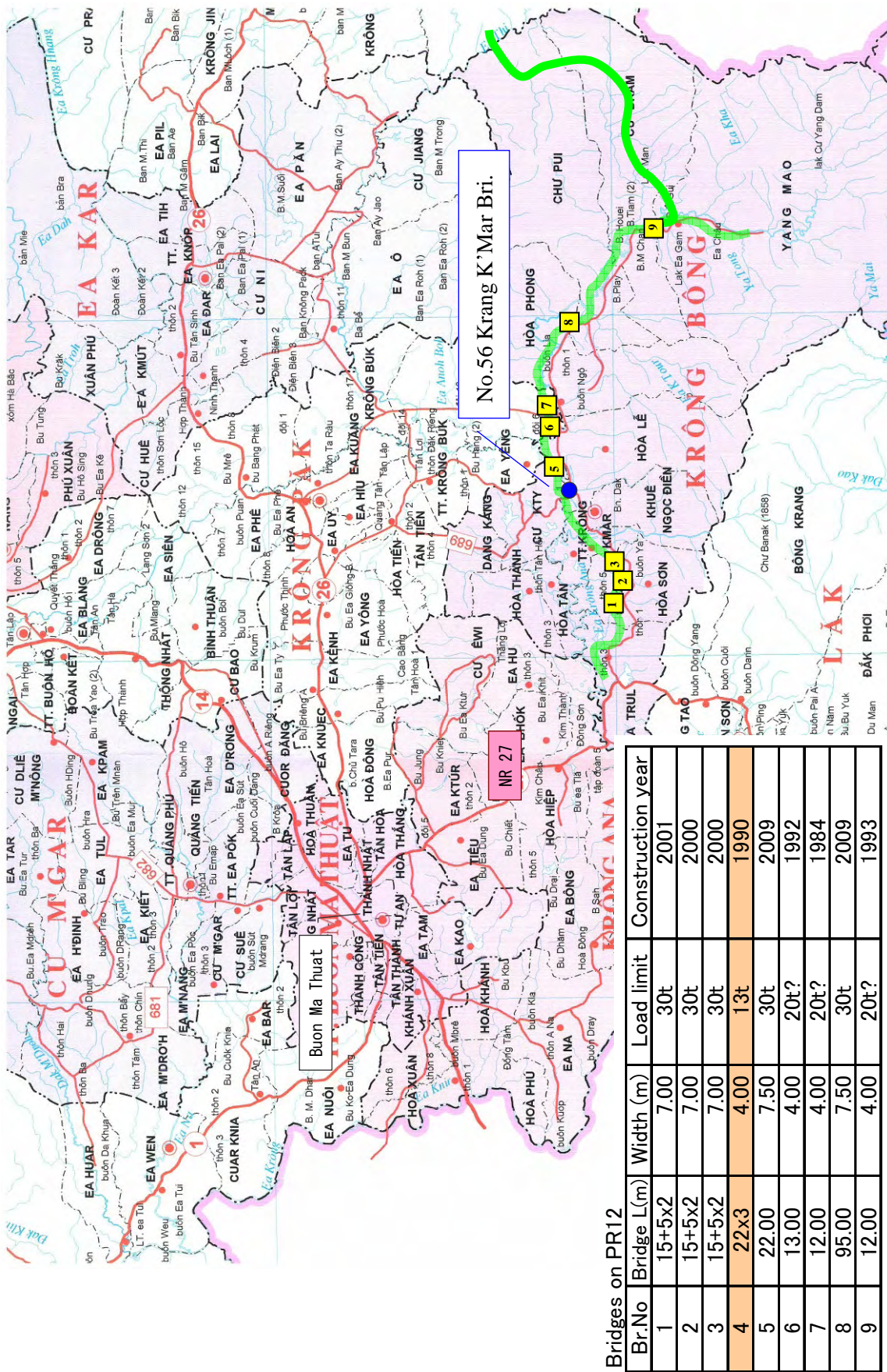


Figure 2.2.1 (4) Existing Conditions of Other Bridges



Figure 2.2.1 (5) Existing Conditions of Other Bridges

## (5) Widening of Bridge Formation Width

The application for bridge widening is conceived as follows:

- 7.0m width : 6.0m (carriageway 3.0m x 2 lane) + 0.5m shoulder (considering pedestrian refuge space) on both sides (see Figure 2.2.2).
- 9.0m width : 7.0m (carriageway 3.5m x 2 lane) + 1.0m shoulder (considering pedestrian and bicycle traffic space) on both sides (see Figure 2.2.3).

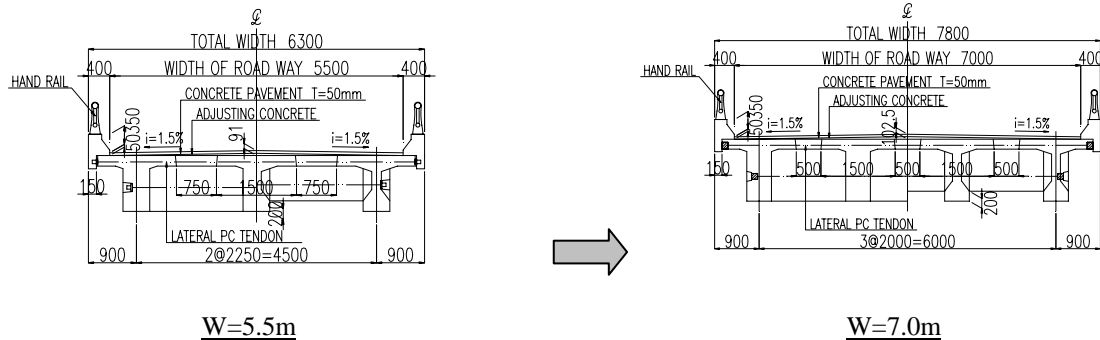


Figure 2.2.2 Widening of Bridge Formation Width (Ngoi Ngan Bridge)

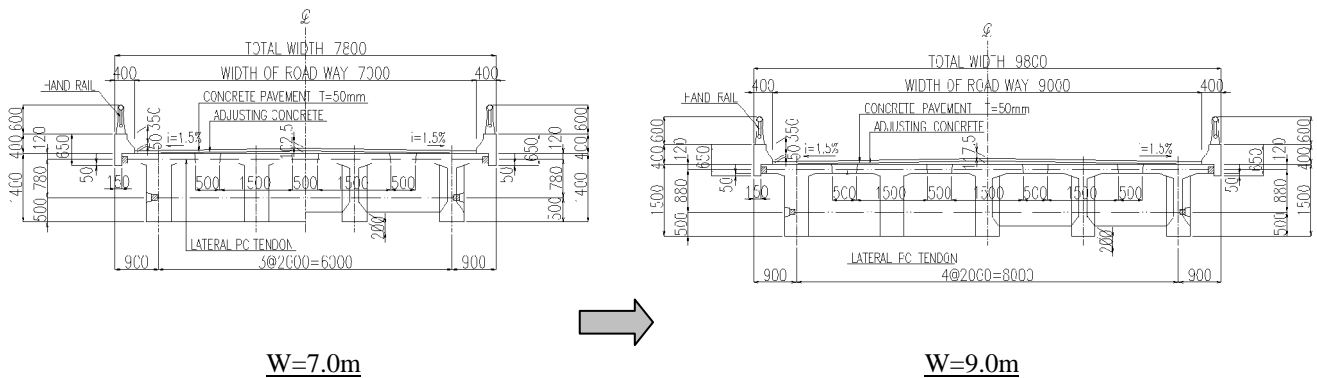


Figure 2.2.3 Widening of Bridge Formation Width (Da Dung Bridge)

### 2.2.2.3 Response to Request for Higher Live Load for Bridge Design

#### (1) Background of Request

All provinces requested for a meeting with the Study Team for the application of higher live loads (HL93 equivalent to H-30) for the bridges than the present H-13 or H-18 live load that was set for the Implementation Review Study. The major reasons for the request are as follows:

##### 1) Da Dung Bridge (Ninh Thuan Province)

Binh Thuan Province requested the application of HL93 load for the bridge design for the following reasons:

- The Road Class is III.
- Other bridges on PR 719 were constructed with load limit of 30t.
- Current traffic operating regulations do not allow vehicles of more than 2.5 tons to pass the bridge. Accordingly, large trucks carrying farm products and marine products are requested to a large detour.

## **2) Tran Bridge (Binh Thuan Province)**

Binh Thuan Province requested the application of HL93 load for the bridge design based on the following reasons:

- Sara-Tam Hung route, which is a class III road and approximately 5km long, is where Tran Bridge is located that links NH1 to NH28, and passage of heavy vehicles can not be avoided.
- Heavy vehicles carrying farm products cannot pass through this route if H-13 live load (load limit 16.9 tons) is adopted for bridge design.

## **3) Tam Ngan Bridge (Ninh Thuan Province)**

Ninh Thuan Province requested the application of HL93 load for the bridge design based on the following reasons:

- This bridge will connect with Lam Son – Phuoc Hoa route which has been upgraded to Class III. Therefore, the new bridge must be designed based on Class III (HL93) standard.

## **4) Ea Soup Bridge (Dak Lak Province)**

Dak Lak Province requested the application of HL93 load for the bridge design based on the following reasons:

- Although the Road Class is classified as Class IV, other bridges along PR 1 were constructed with load limit of 30 tons.
- This bridge is located at the outer edge of the district center of Ea Soup with heavy vehicle traffic transporting farm products and timbers.
- Current traffic operating regulations do not allow vehicles of more than 18 tons to pass over the bridge. Accordingly, such vehicles must cross the river near the bridge at low water level.

## **5) Krong K'Mar Bridge (Dak Lak Province)**

Dak Lak Province requested the application of HL93 load for the bridge design based on the following reasons:

- Although the Road is Class IV, 8 of 15 bridges along PR 12 were constructed with more than load limit of 15 tons, and other bridges were constructed with load limit of 30 tons.

- This bridge is located at the outer edge of the district center of Krong K'mar with heavy vehicle traffic transporting farm products, timbers and construction materials.
- Current traffic operating regulations do not allow vehicles the passage of more than 5 tons over the bridge. Accordingly, such vehicles must cross river near the bridge at low water level.

## 6) Ngoi Ngan Bridge (Khanh Hoa Province)

Khanh Hoa Province requested the application of HL93 load for the bridge design based on the following reasons:

- This bridge is located along the Nguyen Hue route (Class III), as the only means of transporting passengers from Van Thang-Van Khanh-Van Phuoc communes to Van Ninh District administration center and Van Phong Gulf economic zone.
- Nguyen Hue route is under upgrading. Budget has already been allocated at 150,635 milli. VND for 2006-2010 and 2010-2015 respectively.
- The existing bridge is extremely dilapidated and is in state of collapse. Passage is limited to motorbikes, bicycles and pedestrians.

## (2) Reasons for Using H-13 Live Load for Bridge Design in BD Study

### Background of the Application of Design Live Load (H-13) at the time of the Basic Design

The Vietnamese Bridge Design Code TCN018-79, Ministry of Transport and Communication No2057 QD/Kt14 1979, specifies 5 classes of live load for bridge design (as shown in Table 2.2.3 hereunder).

**Table 2.2.3 Live Load for BD Study (2001)**

Live Load Class	Capacity
H-8	10.4 ton vehicle in the center and an 8 ton vehicle at the front and back
H-10	13 ton vehicles can continuously pass
H-13	16.9 ton vehicle in the center and a 13 ton vehicle at the front and back
H-18	30 ton vehicle in the center and a 16.9 ton vehicle at the front and back
H-30	30 ton vehicles can continuously pass

The H-13 live load was generally applied to bridges for provincial and district roads in 2001.

### Design Live Load to be Applied

The bridge design standard in Vietnam was revised in 2005 based on AASHTO, that specifies the application of HL93 live load to Class III or higher roads, and 50% or 65% of HL93 live load is also applicable to Class IV or lower roads. However, as shown in Table 2.2.4, 80% of HL93 live load was applied to Class III bridges for the Improvement of Rural Bridges Project in Northern

Mountainous Provinces carried out by the same Japans Grant Aid scheme in 2007. This is made for the purpose of using appropriate live load for bridge design under Japan Grant Aid assistance by subdividing the live load of bridges to more than class III for the new design standard. The proposed live load in Table 2.2.4 (HL93x80%) was confirmed by the Vietnamese side and recorded in the Minutes of Discussions (see Appendix 4).

**Table 2.2.4 Proposed Design Live Loads**

Current Spec. 22-TCN-273-01			Current Spec. 22-TCN-272-05			Previous Spec.
Road Category	Daily Traffic Volume(PCU)	Design Speed (km/hr)			Live Road	
		Plains Area	Hills Area	Mountains Area		
Expressway	>25,000	120-100	100-80	80-60	HL93 x 100%	H-30
Rural Trunk Road	Class I 15,000-25,000	110-100	90-80	70-60		
	Class II 6,000-15,000	100-80	80-60	60-40		
	<b>Class III</b> 1,000-6,000	80-60	60-40	50-30	<b>HL93 x 80%</b> <small>*Agreement under Project for Improvement of Rural Bridges in Northern Mountainous Provinces in 2007</small>	H-18
	<b>Class IV</b> 200-1,000	60-40	40-30	30-20	HL93 x 65%	H-13
	<200 , 1-lane					
Village Road	category A ( Previous Spec. 22TCN-210-92)					

Under the arrangement, live load HL93x65% is equivalent to H-13 in previous Vietnamese design standard, with load limit of 16.9 tons.

Live load HL93x80% is equivalent to H-18 in previous Vietnamese design standard, with load limit of 30.0 tons.

Live load HL93 is equivalent to H-30 in previous Vietnamese design standard, with load limit of 30.0 tons.

### (3) Criteria to Determine Higher Bridge Live Load

The preliminary study for the application of the higher level of live load found that only one vehicle with 30 ton total weight can pass a bridge with H-13 live load at one time. Accordingly, there was an option for the application of new traffic operation that would allow the passage of one vehicle only if it has the total weight is more than 16 tons instead of adopting the higher level of live load. However, it is difficult to strictly control the operation without an on-site operator, and the widening of the width of bridge may enable the passage of two heavy vehicles simultaneously along the bridge, despite with the restriction signs posted before the bridge. Consequently, it was determined that this scheme will not virtually work.

The following criteria were conceived for the application of higher level of live load for the bridges.

**Table 2.2.5 Criteria to Determine Higher Live Load**

	<b>Items to be Checked</b>	<b>Contents</b>
National Policy & Current Situation	① Policy on Live Load Levels for Provincial Road Bridges	What is the policy of the MOT 2010 Transport Master Plan on live load levels for bridge improvement?
	② Live Load Levels Applied by Other Donors for Bridge Projects	What type of live load is applied in current ADB road improvement projects in the central area and JBIC bridge reconstruction projects?
Provincial Policy & Current Situation	③ Policies & Plans for Applying Design Specifications for Bridges on same route of a proposed Bridge	What does the provincial Transport Master Plan mention about the design standards and specifications for bridges to be improved?
	④ Design Specifications for Other Bridges on the Same Route of a Proposed Bridge	Existing conditions of other bridges on the same route.
	⑤ No. of Trucks more than 16 Tons using Proposed Bridge	Whether or not the present traffic volume of trucks requires an increase in the live load level?
Adequacy as a Japan Grand Aid Scheme	⑥ Consistency with Previous Terms 1 and 2 Bridges	Whether or not the consistency with Term 1 & 2 bridges already completed is possible?
	⑦ Increase in Initial Construction Cost to Improve Live Load Level	What is initial cost increase after the upgrading of live load level?

#### **(4) Discussion & Conclusions**

Except for Tan Ngan Bridge, there is an increasing trend in traffic volume including heavy vehicles and upgrading of the road is seen.

Numerous bridges on several sites were constructed with 30 tons load limit which most likely could become traffic bottleneck in the near future if the bridge plans do not consider the needs of the local development and the road improvement condition.

The conclusions for the development for each bridge are described below. The results of the analysis for each item are summarized in Table 2.2.6 (1)-(6).

##### Da Dung Bridge (Binh Thuan Province)

The new bridge will be constructed with live load of HL93x80% for the following reasons:

- Other bridges on the same route were already constructed with 30 tons as shown in Figure 2.2.1 (1).
- The bridge is located in the center of Logi Town, which is designated as a special town by Binh Thuan Province.
- Traffic of large vehicles transporting farm and marine products is anticipated to start with the construction of the new bridge.



#### Tran Bridge (Binh Thuan Province)

The new bridge will be constructed with live load of HL93x80% for the following reasons:

- The Sara-Tam Hung route which is approximately 5km long was upgraded to Class III, and 1 out of 3 Bridges along the same route was already improved to 30 tons load limit as shown in Figure 2.2.1 (2).
- Because this route is link to NH28 and NH1 as the shortest distance, it passing of heavy vehicle along this route is unavoidable.
- Passage of large truck for transporting farm products along this road will require the upgrading of load limitation.

#### Tam Ngan Bridge (Ninh Thuan Province)

The new bridge will be constructed with live load of HL93x65% (same as the previous study) for the following reasons:

- There is no upgrading plan for existing road.
- Lam Son-Phuoc Hoa Route which is under construction can be connected to NH27 3.7km upstream. Therefore, there is no sufficient ground to upgrade the load limit.

#### Ea Soup Bridge (Dak Lak Province)

The new bridge will be constructed with live load of HL93x80% (same as the previous study) for the following reasons:

- The other bridges along the same route were constructed with 30 tons load limit as shown in Figure 2.2.1 (3).
- There is much traffic of heavy vehicles (75 vpd).
- The bridge is located at the outer edge of the district center of Ea Soup.

#### Krong K'Mar Bridge (Dak Lak Province)

The new bridge will be constructed with live load of HL93x80% for the following reasons:

- The other bridges constructed after 2000 on the same route have 30 tons load limit as shown in Figure 2.2.1 (4).
- Passage of heavy vehicles (146 vpd) over the existing bridge is not possible and must cross river near the bridge at low water level.
- The bridge is located at the outer edge of the district center of Krong K'Mar.

#### Ngoi Ngan Bridge (Khanh Hoa Province)

The new bridge will be constructed with live load of HL93x65% (same as the previous study) for the following reason:

- Nguyen Hue route is under upgrading. Some section (centre of Van Ninh District) was

already upgraded. Budget at 150,635 milli. VND was already allocated for 2006-2010 and 2010-2015 respectively. However 2 bridges constructed after 2000 on the same route are at limited to 15 tons load as shown in Figure 2.2.1 (5) and heavy vehicles can use NH1 route running parallel with Nguyen Hue route.

#### **(5) Effect of Higher Level of Live Load**

The application of higher level live load (HL93x80%) for a bridge will result to a larger girder depth, and the span-girder depth ratio will change from 1/20 to 1/18 in order to secure sufficient girder stiffness for increased vehicle loading. However, it is possible to minimize the impact on construction cost.

**Table 2-2.6 (1) Study Result on Application of Higher Level of Live Load**

**Da Dung Bridge Binh Thuan Province Provincial Road 719 (Class III)**

	Items to be checked	Plan, Spec. or Others	Contents	Evaluation
National Policy & Current Condition	1. National policy	<ol style="list-style-type: none"> <li>1) Transportation Development Plan (by MOT)</li> <li>2) Road Development Plan (by MOT)</li> <li>3) Previous Spec. (Design Specification of Bridges and Culver No2057 QD/Kt14-97)</li> <li>4) Current Spec. (Specification of Bridge Design 22TCN-272-05)</li> </ol>	<ul style="list-style-type: none"> <li>• No information about live load.</li> <li>• No information about live load.</li> <li>• H-30 is for Class III or more (national road and provincial main road), H-18 is for Class IV and H-13 is for Class V or less.</li> <li>• HL93 is for Class III or more, and 65% or 50% of HL93 is for Class IV or less.</li> </ul>	—
National Policy & Current Condition	2. Other Donor projects	<ol style="list-style-type: none"> <li>1) Transportation Improvement Sector Project (ADB fund)</li> <li>2) Highway and bridge Rehabilitation Project (JBIC fund)</li> </ol>	<ul style="list-style-type: none"> <li>• H-30 to be adopted regardless of road Class.</li> <li>• HL93 is for Class III or more, and 65% or 50% of HL93 is for Class IV or less.</li> </ul>	Upgrading of live load is desirable
Provincial Policy & Current Condition	3. Provincial Policy	1) DOT's Request	<ul style="list-style-type: none"> <li>• Based on the Master Plan of Binh Thuan province, HL93 should be applied to Class III roads.</li> </ul>	Upgrading of live load is desirable
Adequacy of Japan Grant Aid Scheme	4. Condition of Other Bridges. On the Same Route	-	<ul style="list-style-type: none"> <li>• Other bridges on the same route were constructed with load limit of 30 tons.</li> </ul>	Upgrading of live load is desirable
	5. Traffic Volume (truck)	-	<ul style="list-style-type: none"> <li>• Passage of heavy vehicles is restricted due to the dilapidated condition of the existing bridge deteriorates.</li> </ul>	—
	6. Consistency with Terms 1 & 2 Bridges	-	<ul style="list-style-type: none"> <li>• Other bridges on the same route were constructed with load limit of 30 tons so that upgrading of live load is justifiable.</li> </ul>	Upgrading of live load is desirable
	7. Construction Cost	-	<ul style="list-style-type: none"> <li>• Approximately 10% increase in construction cost</li> </ul>	—
Conclusion	<b>Application of Live Load HL93x80% (equivalent to H-18)</b>			

**Table 2.2.6 (2) Study Result on Application of Higher Level of Live Load**

**Tran Bridge**      **Binh Thuan province**      **Provincial Road Sara-Tam Hung Route (Class III)**

	Items to be checked	Plan, Spec. or Others	Contents	Evaluation
National Policy & Current Condition	1. National policy	<ol style="list-style-type: none"> <li>1) Transportation Development Plan (by MOT)</li> <li>2) Road Development Plan (by MOT)</li> <li>3) Previous Spec. (Design Specification of Bridges and Culver No2057 QD/K114-97)</li> <li>4) Current Spec. (Specification of Bridge Design 22TCN-272-05)</li> </ol>	<ul style="list-style-type: none"> <li>• No information about live load.</li> <li>• No information about live load.</li> <li>• H-30 is for Class III or more (national road and provincial main road), H-18 is for Class IV and H-13 is for Class V or less.</li> <li>• HL93 is for Class III or more, and 65% or 50% of HL93 is for Class IV or less.</li> </ul>	—
National Policy & Current Condition	2. Other Donor projects	<ol style="list-style-type: none"> <li>1) Transportation Improvement Sector Project (ADB fund)</li> <li>2) Highway and bridge Rehabilitation Project (JBIC fund)</li> </ol>	<ul style="list-style-type: none"> <li>• H-30 to be adopted regardless of road Class.</li> <li>• HL93 is for Class III or more, and 65% or 50% of HL93 is for Class IV or less.</li> </ul>	Upgrading of live load is desirable
Provincial Policy & Current Condition	3. Provincial Policy	1) DOT's Request	<ul style="list-style-type: none"> <li>• Based on the Master Plan for Binh Thuan province, HL93 should be applied to Class III roads.</li> </ul>	Upgrading of live load is desirable
Provincial Policy & Current Condition	4. Condition of Other Bridges. On the Same Route	-	<ul style="list-style-type: none"> <li>• 1 out of 3 bridges on the same route was already improved with load limit of 30 tons</li> </ul>	Upgrading of live load is desirable
Provincial Policy & Current Condition	5. Traffic Volume (truck)	-	<ul style="list-style-type: none"> <li>• Although the load limit of the existing bridge is only 5.0 tons, some heavy trucks are passing.</li> </ul>	—
Adequacy of Japan Grant Aid Scheme	6. Consistency with Terms I & 2 Bridges	-	<ul style="list-style-type: none"> <li>• Upgrade of live load limit will justify the standard of the bridge and the upgrading result of one bridge on the same route.</li> </ul>	Upgrading of live load is desirable
Adequacy of Japan Grant Aid Scheme	7. Construction Cost	-	<ul style="list-style-type: none"> <li>• Approximately 10% increase in construction cost</li> </ul>	—
Conclusion	<b>Application of Live Load HL93x80% (equivalent to H-18)</b>			

Table 2.2.6 (3) Study Result on Application of Higher Level of Live Load

Tam Ngan Bridge Ninh Thuan Province District Road (Class IV)

Items to be checked	Plan, Spec. or Others	Contents	Evaluation
National Policy & Current Condition	1) Transportation Development Plan (by MOT) 2) Road Development Plan (by MOT) 3) Previous Spec. (Design Specification of Bridges and Culver No2057 QD/Kt14-97) 4) Current Spec. (Specification of Bridge Design 22TCN-272-05)	<ul style="list-style-type: none"> <li>No information about live load.</li> <li>No information about live load.</li> <li>H-30 is for Class III or more (national road and provincial main road), H-18 is for Class IV and H-13 is for Class V or less.</li> <li>HL93 is for Class III or more, and 65% or 50% of HL93 is for Class IV or less.</li> <li>H-30 to be adopted regardless of road Class.</li> <li>HL93 is for Class III or more, and 65% or 50% of HL93 is for Class IV or less.</li> </ul>	—
	2) Other Donor projects	<ul style="list-style-type: none"> <li>Transportation Improvement Sector Project (ADB fund)</li> <li>Highway and bridge Rehabilitation Project (JBIC fund)</li> </ul>	Upgrading of live load is not desirable
Provincial Policy & Current Condition	1) DOT's Request	<ul style="list-style-type: none"> <li>Although this road will connect to Lam Son –Phouc Hoa Route to NH27, there is no upgrading plan.</li> </ul>	No justified reasons for upgrading of live load
	4) Condition of Other Bridges. On the Same Route	<ul style="list-style-type: none"> <li>There is no other bridge on the same route.</li> </ul>	No justified reasons for upgrading of live load
Adequacy of Japan Grant Aid Scheme	5) Traffic Volume (truck)	<ul style="list-style-type: none"> <li>Existing bridge is only for pedestrian, bicycle and motorbike.</li> </ul>	—
	6) Consistency with Terms I & 2 Bridges	<ul style="list-style-type: none"> <li>Difficult to justify because there is no upgrading plan of road.</li> </ul>	No justified reasons for upgrading of live load
	7) Construction Cost	<ul style="list-style-type: none"> <li>Approximately 10% increase in construction cost</li> </ul>	—
Conclusion	<b>Application of Live Load HL93x65% (equivalent to H-13)</b>		

Table 2.2.6 (4) Study Result on Application of Higher Level of Live Load

**Ea Soup Bridge**      **Dak Lak Province**      **Provincial Road No.1 (Class IV)**

Items to be checked	Plan, Spec. or Others	Contents	Evaluation
National Policy & Current Condition	<ol style="list-style-type: none"> <li>1) Transportation Development Plan (by MOT)</li> <li>2) Road Development Plan (by MOT)</li> <li>3) Previous Spec. (Design Specification of Bridges and Culver No2057 QD/Kt14-97)</li> <li>4) Current Spec. (Specification of Bridge Design 22TCN-272-05)</li> </ol>	<ul style="list-style-type: none"> <li>• No information about live load.</li> <li>• No information about live load.</li> <li>• H-30 is for Class III or more (national road and provincial main road), H-18 is for Class IV and H-13 is for Class V or less.</li> <li>• HL93 is for Class III or more, and 65% or 50% of HL93 is for Class IV or less.</li> </ul>	-
National Policy	<ol style="list-style-type: none"> <li>1) Transportation Improvement Sector Project (ADB fund)</li> <li>2) Highway and bridge Rehabilitation Project (JBIC fund)</li> </ol>	<ul style="list-style-type: none"> <li>• H-30 to be adopted regardless of road Class.</li> <li>• HL93 is for Class III or more, and 65% or 50% of HL93 is for Class IV or less.</li> </ul>	Upgrading of live load is desirable
Provincial Policy & Current Condition	<ol style="list-style-type: none"> <li>1) DOT's Request</li> </ol>	<ul style="list-style-type: none"> <li>• Based on the Road Master Plan for DaK LaK province, H-18 or more should be applied to Provincial roads.</li> </ul>	Upgrading of live load is desirable (Same as previous study)
Condition of Other Bridges. On the Same Route	-	<ul style="list-style-type: none"> <li>• All other bridges on the same route were already improved with load limit of 30 tons</li> </ul>	Upgrading of live load is desirable (Same as the previous study)
Traffic Volume (truck)	-	<ul style="list-style-type: none"> <li>• Heavy vehicles: 75vpd</li> <li>• Average daily traffic: 1754vpd (1287PCU/day)</li> </ul>	Upgrading of live load is desirable (Same as the previous study)
Consistency with Terms I & 2 Bridges	-	<ul style="list-style-type: none"> <li>• There is no difference with the previous study so upgrading of live load is justifiable.</li> </ul>	Upgrading of live load is desirable (Same as the previous study)
Construction Cost	-	<ul style="list-style-type: none"> <li>• No increase cost</li> </ul>	-
Conclusion	<b>Application of Live Load HL93x80% (equivalent to H-18)</b>		

Table 2.2.6 (5) Study Result on Application of Higher Level of Live Load

**Krong K'Mar Bridge 橋**      **Dak Lak Province**      **Provincial Road No.12 (Class IV)**

	Items to be checked	Plan, Spec. or Others	Contents	Evaluation
National Policy & Current Condition	1. National policy	1) Transportation Development Plan (by MOT) 2) Road Development Plan (by MOT) 3) Previous Spec. (Design Specification of Bridges and Culver No2057 QD/K114-97) 4) Current Spec. (Specification of Bridge Design 22TCN-272-05)	<ul style="list-style-type: none"> <li>No information about live load.</li> <li>No information about live load.</li> <li>H-30 is for Class III or more (national road and provincial main road), H-18 is for Class IV and H-13 is for Class V or less.</li> <li>HL93 is for Class III or more, and 65% or 50% of HL93 is for Class IV or less.</li> </ul>	—
	2. Other Donor projects	1) Transportation Improvement Sector Project (ADB fund) 2) Highway and bridge Rehabilitation Project (JBIC fund)	<ul style="list-style-type: none"> <li>H-30 to be adopted regardless of road Class.</li> <li>HL93 is for Class III or more, and 65% or 50% of HL93 is for Class IV or less.</li> </ul>	Upgrading of live load is desirable
Provincial Policy & Current Condition	3. Provincial Policy	1) DOT's Request	<ul style="list-style-type: none"> <li>Based on the Road Master Plan for Dak Lak province, H-18 or more should be applied to Provincial road.</li> </ul>	Upgrading of live load is desirable
	4. Condition of Other Bridges. On the Same Route	-	<ul style="list-style-type: none"> <li>8 bridges on the same route were already constructed with H-15 or more live load, and 5 bridges were improved based on H-30 standard (load limit 30 ton) after 2000.</li> </ul>	Upgrading of live load is desirable
Adequacy of Japan Grant Aid Scheme	5. Traffic Volume (truck)	-	<ul style="list-style-type: none"> <li>Heavy vehicles: 134vpd</li> <li>Average daily traffic: 3921vpd (2033PCU/day)</li> </ul>	Upgrading of live load is desirable
	6. Consistency with Terms I & 2 Bridges	-	<ul style="list-style-type: none"> <li>Some bridges on the same route were improved with load limit of 30 tons so that upgrading of live load is justifiable.</li> </ul>	Upgrading of live load is desirable
Conclusion	7. Construction Cost	-	<ul style="list-style-type: none"> <li>Approximately 10% increase in construction cost</li> </ul>	—
			<b>Application of Live Load HL93x80% (equivalent to H-18)</b>	

**Table 2.2.6 (6) Study Result on Application of Higher Level of Live Load**

**Ngoi Ngan Bridge      Khanh Hoa Province      Provincial Road Nguyen Hue Route (Class III)**

	<b>Items to be checked</b>	<b>Plan, Spec. or Others</b>	<b>Contents</b>	<b>Evaluation</b>	
National Policy & Current Condition	1. National policy	1) Transportation Development Plan (by MOT)	<ul style="list-style-type: none"> <li>No information about live load.</li> <li>No information about live load.</li> <li>H-30 is for Class III or more (national road and provincial main road), H-18 is for Class IV and H-13 is for Class V or less.</li> <li>HL93 is for Class III or more, and 65% or 50% of HL93 is for Class IV or less.</li> <li>H-30 to be adopted regardless of road Class.</li> <li>HL93 is for Class III or more, and 65% or 50% of HL93 is for Class IV or less.</li> </ul>	—	
		2) Road Development Plan (by MOT)			
		3) Previous Spec. (Design Specification of Bridges and Culver No2057 QD/K114-97)			
		4) Current Spec. (Specification of Bridge Design 22TCN-272-05)			
	2. Other Donor projects	1) Transportation Improvement Sector Project (ADB fund)	<ul style="list-style-type: none"> <li>H-30 to be adopted regardless of road Class.</li> <li>HL93 is for Class III or more, and 65% or 50% of HL93 is for Class IV or less.</li> </ul>	Upgrading of live load is desirable	
		2) Highway and bridge Rehabilitation Project (JBIC fund)			
		3) DOT's Request			
Provincial Policy & Current Condition	3. Provincial Policy	1) DOT's Request	<ul style="list-style-type: none"> <li>Road improvement budget at 150.635 milli. VND has already been for 2006-2010 and 2010-2015 respectively.</li> </ul>	Upgrading of live load is desirable	
	4. Condition of Other Bridges. On the Same Route	-	<ul style="list-style-type: none"> <li>2 bridges constructed after 2000 on the same route are limited to 15 tons load. Heavy vehicles can use NH1 which runs parallel with Nguyen Hue route.</li> </ul>	No justifications to upgrade live load	
		-	<ul style="list-style-type: none"> <li>Passage of vehicles are prohibited because of the existing bridge is dilapidated.</li> </ul>	—	
	6. Consistency with Terms & 2 Bridges	-	<ul style="list-style-type: none"> <li>Difficult to justify due to the load limitations of other bridges on the same route.</li> </ul>	No justifications to upgrade live load	
		-	<ul style="list-style-type: none"> <li>Approximately 10% increase in construction cost</li> </ul>	—	
	Adequacy of Japan Grant Aid Scheme	-	-	-	-
		-	-	-	-
Conclusion	<b>Application of Live Load HL93x65% (equivalent to H-13)</b>				



## 2.2.2.4 Response to Other Requests

### (1) Considerations of Other Requests for Approach Roads & Ancillary Facilities

Requests regarding approach roads and ancillary facilities for bridges from the Vietnamese Government are summarized in Table 2.2.7. Since all the requests are concerned with mitigating measures for affected inhabitants and efficiency of the Project implementation, these are incorporated into the detailed design as had been considered in the Implementation Review Study.

**Table 2.2.7 Evaluation of Other Requests for Approach Roads & Ancillary Facilities**

Request	Judgment	Reason
1. Da Dung Bridge - Consideration of water pipes for detailed design	○	- Load of water pipes should be considered in the detailed design of the bridge - Little effect on construction cost as it is quite small compared to size of girders.
2. Tran Bridge - Improvement of ancillary facilities on left bank (BxHxL = 3mx1.5mx12m)	○	- No improvement of the canal will result in the necessity of a retaining wall, because the approach road elevation will be raised at the crossing point with the canal. - No improvement of the canal will require excavation of a new approach road after completion, which should be avoided from the viewpoint of Project efficiency - The canal can be improved within the affected areas of the Project, resulting in the minimization of cost - The impact on the construction cost will be minimal.
3. Tam Ngan Bridge - Securing function of small canal crossing new approach road on right bank.	○	- New approach road construction will require a change in structure of the canal, with the replacement cost to be borne by the Japanese side. - Existing open canal to be replaced by a pipe culvert and its cost is minimal
4. Krong K'Mar Bridge - Installing a drainage facility along the approach road on the right bank	○	- The existing drainage system will malfunction due to the change in the location of the new approach road. Installation of new drainage system can be made at the upstream side of the new approach road (approximately 100m). - The additional cost will have little effect on the overall construction cost.
5. Ngoi Ngan Bridge - Installation of drainage along the upstream side of the new approach road.	○	- An increase in the elevation of the new approach road will result to discharges of drain water towards houses along the road, and a drainage system approximately 80m in length is needed to mitigate this condition. - Additional cost will have a minimum effect on the overall construction cost.