

# **CHAPTER 18**

## **PROJECT IMPLEMENTATION**

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#### 18.1 IMPLEMENTATION PLAN

##### 18.1.1 Implementation Policy

The need for the implementation of improvement measures for the Ayala Bridge is very urgent considering its damage conditions. Therefore, the implementation plan is prepared considering the following policies:

- The detailed design shall start immediately after this Study,
- Considering the importance of the Ayala Bridge for business and political activities and for the transport of people, goods, and services, the implementation period is to be shortened to the possible extent, and
- Load limitation plan shall be studied as discussed in **Section 18.2** taking into account implementation delay due to the present financial constraint of GOP for road and bridge investments.

##### 18.1.2 Outline of the Project

###### (1) Findings in the Study

The Study has revealed major structural weaknesses of the bridge. Its steel members particularly the lower chords and RC slab deck floor systems are already completely damaged and beyond repair so that replacement of the three (3) bottom structural steel components are inevitable and urgently needed. However, its steel members above the deck slab are still in relatively good condition and with reasonable structural strength as discussed in **Section 13.8**.

###### (2) Improvement Measures

In line with the policy of the National Historical Institute to preserve the original structure with its exact configuration and utilize its present materials to the maximum extent possible, several improvement measures including reconstruction schemes were carefully studied. Among these, the scheme which has been finally selected is the “*Replacement of Bottom Structure*” Scheme.

The major improvement measures are shown in **Table 18.1.2-1**.

Table 18.1.2-1 Outline of Improvement Works

	Improvement Measures
Superstructure Steel Truss Bridge with three (3) main trusses and a total length of about 150 m	<ul style="list-style-type: none"> <li>• Replacement of all steel lower chords with new ones.</li> <li>• Replacement of RC slab deck floor system with steel plate deck floor system.</li> <li>• Replacement of bearing shoes.</li> </ul>
Substructure	<ul style="list-style-type: none"> <li>• Replacement of two abutment and one pier</li> <li>• Replacement of timber piles with steel tubular piles with 35 m in length and 1.0 m in diameter</li> </ul>
Approach Road	<ul style="list-style-type: none"> <li>• Replacement of pavement.</li> <li>• Widening 1.0 m of sidewalk width</li> </ul>
Intersection	<ul style="list-style-type: none"> <li>• Replacement of pavement</li> <li>• Improvement of poor geometry of two (2) intersections, a total area of 700 m<sup>2</sup></li> </ul>
Access Road to Hospicio DE San Jose	<ul style="list-style-type: none"> <li>• Replacement of the existing bridge with a new steel girder bridge with a total length of 15 m.</li> <li>• Replacement of existing access road with 50 m in length and 4.0 m in width.</li> </ul>

### 18.1.3 Project Costs

The project costs are as follows:

Description	Cost Component			Unit Million Pesos
	Foreign	Local	Taxes	Amount
Construction Cost				
Superstructure	391.1	33.0	69.9	494.0
Substructure	305.7	75.3	70.4	451.4
Highway	10.0	4.9	2.8	17.7
Detour	74.3	15.2	18.7	108.2
Sub-total	781.1	128.4	161.8	1,071.3
Engineering Cost				
Detailed Design	22.5	14.3	4.1	40.9
Construction Supervision	44.9	28.6	8.2	81.7
Sub-total	67.4	42.9	12.3	122.6
Land Acquisition Cost				
Land Acquisition	-	8.4	0.9	9.3
Land Rental	-	48.2	5.5	53.7
Sub-total		56.6	6.4	63.0
<b>Total</b>	<b>848.5</b>	<b>227.9</b>	<b>180.5</b>	<b>1,256.9</b>

## 18.1.4 Implementation Schedule

### (1) DPWH Budgets

In order to implement the Ayala Bridge Improvement Project, it is necessary to secure the budget for implementing the project. According to the procedure of the implementation of the road and bridge project, construction and rehabilitation works will principally utilize the road and bridge investment budget, while the repair work will make use of the road and bridge maintenance budget. **Table 18.1.4-1** shows the past trend of the DPWH budget. According to this table, the road and bridge budgets are varied ranging from 20 billion pesos to 31 billion pesos. The rate of road and bridge budget to GNP is also varied from 0.48% to 0.89%.

Table 18.1.4-1 Past Trend of DPWH Budget

Unit: Billion Pesos

	1999	2000	2001	2002	2003
DPWH Annual Appropriation	37.72	52.37	52.37	47.99	52.95
Administration	4.25	5.11	4.24	4.65	3.73
Road/Bridge Investment	24.22	21.47	15.36	15.98	25.86
Road/Bridge Maintenance	3.79	4.34	4.09	4.24	5.27
Others	5.46	21.45	28.08	23.12	18.09
GNP	3136.20	3,496.20	3,853.30	4,223.60	4,647.90
Road/Bridge Budget	28.01	25.81	20.06	20.22	31.13
% of Road/Bridge to GNP	0.89	0.74	0.52	0.48	0.67

Source: DPWH, DBH

1) General appropriation of DPWH including infrastructure projects of DPWH.

2) GNP 2002 is a provisional estimated and that for 2003 is an official target.

### (2) Projection for Road and Bridge Budgets between 2004 and 2007.

The budget for roads and bridges from 2004 to 2007 was projected in **Table 18.1.4-2**. This projection was made on the basis of the following assumptions:

- The road and bridge budget in 2003 is estimated using the GNP and an average percentage (0.66%) of the road and bridge budget to the GNP between 1999 and 2003.
- The road and bridge budget is assumed to increase in proportion to GNP growth rate.
- GNP growth rate of low and high growth rate is based on the Medium-Term Philippine Development Plan 2001-2004.

Table 18.1.4-2 Projected Road and Bridge Budget between 2004 and 2007

		Unit: Billion Pesos				
		2003	2004	2005	2006	2007
GNP	High		4,913	5,193	5,489	5,802
	Low	4,647.90	4,889	5,143	5,410	5,692
Road/Bridge Budget	High		32.43	34.28	36.23	38.30
	Low	30.68	32.27	33.95	35.72	37.58
Road/Bridge Investment	High		27.10	28.64	30.27	31.99
	Low	25.64	26.97	28.37	29.85	31.40
Road/Bridge Maintenance	High		5.33	5.64	5.96	6.31
	Low	5.04	5.30	5.58	5.87	6.18

- Notes:
- 1) GNP growth rate of low and high growth rate is based on the Medium-Term Philippines Development Plan 2001-2004.
  - 2) It is assumed that the investment and maintenance costs of the road/bridge will grow in proportion to the average GNP growth rate.
  - 3) Road and bridge budget in 2003 is estimated using GNP times an average rate to the GNP between 1999 and 2003.

### (3) Implementation Schedule

Table 18.1.4-3 shows the implementation schedule and annual fund requirement.

Table 18.1.4-3 Implementation Schedule and Annual Requirement

Construction Stage		Unit: Million Pesos				
		2004	2005	2006	2007	
1. Implementation Schedule	Detailed Design					
	ROW Acquisition					
	Tender					
	Construction					
2. Annual Fund Requirement Million Pesos at 2003 price	Detailed Design	20.5	20.4	-	-	
	ROW Acquisition/Rental	-	9.3	26.9	26.8	
	Construction	-	-	535.6	535.7	
	Construction Supervision	-	-	40.9	40.8	
	Total	20.5	29.7	603.4	603.3	

Table 18.1.4-4 shows the comparison of the road and bridge investment budget and the required investments for the Ayala Bridge Improvement Project. Even if the low growth rate scenario is taken into account, percent share to total investment budget is only 2.02 % as a maximum in one year. Therefore, the budget for implementing the Ayala Bridge Improvement Project will be able to be secured.

Table 18.1.4-4 Comparison on Road and Bridge Budget and Annual Investment Requirements

Year	(1) Road and Bridge Investment Budget (Billion Pesos)	(2) Annual Investment Requirement for Ayala (Million Pesos)	(2)/(1) (%)
2004	26.97	20.5	0.08
2005	28.37	29.7	0.10
2006	29.85	603.4	2.02
2007	31.40	603.3	1.92

## 18.2 VEHICLE LOAD LIMITATION PLAN

### 18.2.1 Traffic Analysis

#### (1) Procedure

Although it is very urgent to improve the Ayala Bridge immediately, actual implementation might be delayed due to some reasons such as the financial constraints. Therefore, this Section discusses the vehicle load limitation plan of Ayala Bridge in case of delay of implementation.

Figure 18.2.1-1 shows the study procedure for vehicle load limitation plan in case of delay of implementation of the Ayala Bridge improvement work.

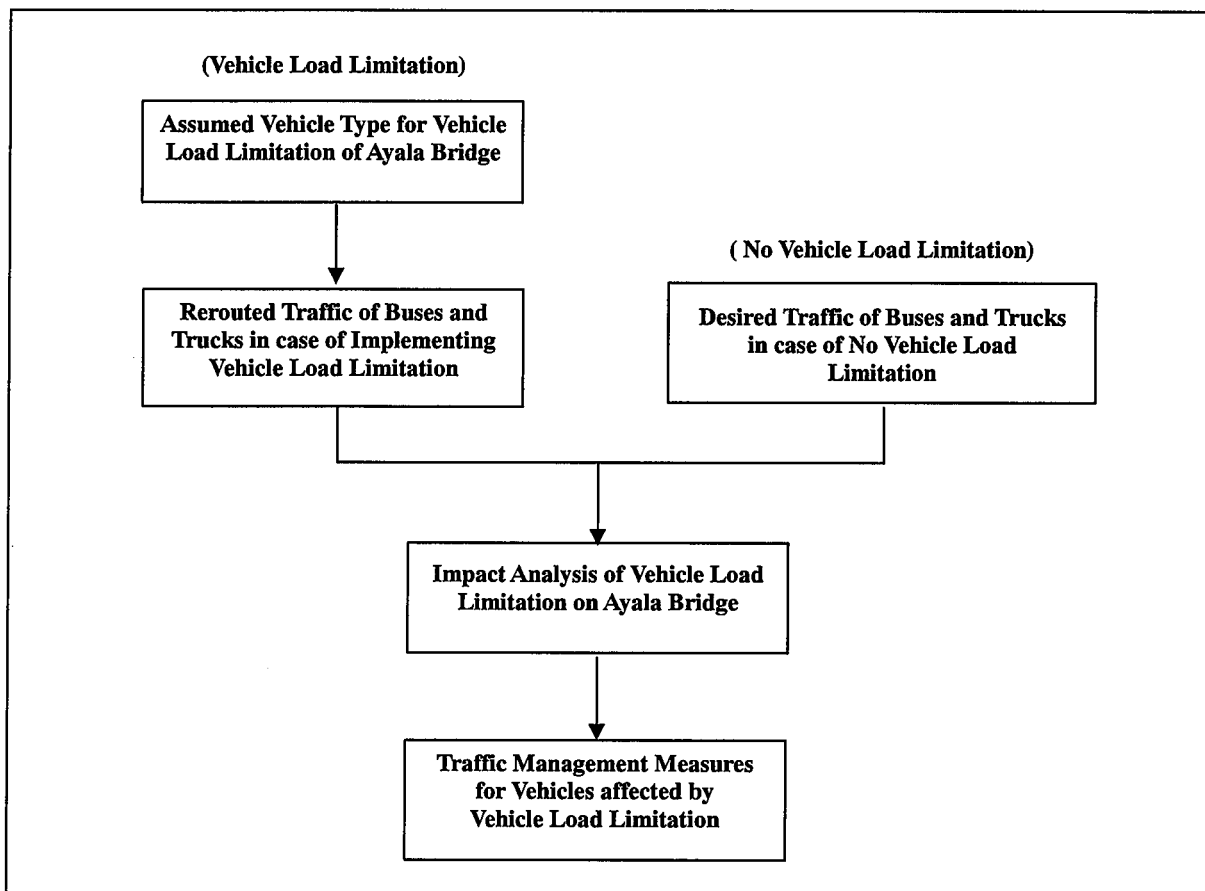


Figure 18.2.1-1 Study Procedure for Vehicle Load Limitation Plan

#### (2) Type of Vehicle for Vehicle load limitation

Based on the intersection traffic survey conducted in this study, the vehicle composition of traffic on Ayala Bridge can be expressed as Figure 18.2.1-2 and Table 18.2.1-1.

Table 18.2.1-1 Traffic Volume by Vehicle Type, 2003

	Traffic Volume (Veh / day)	%
Car	35,060	92.0
Jeepney	806	2.0
Large Bus	909	2.4
Truck	1,331	3.6
Total	38,105	100.0

Note: Box with hatching shows vehicle to be rerouted in case of vehicle load limitation

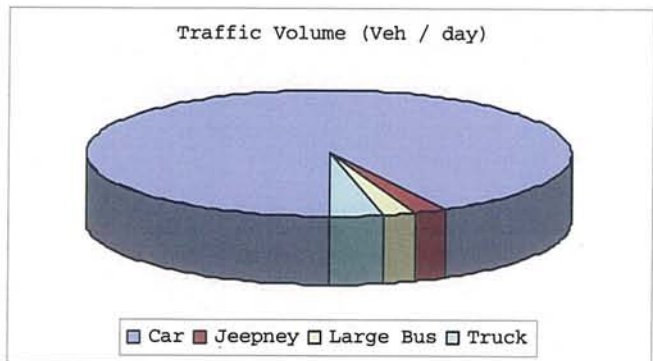


Figure 18.2.1-2 Vehicle Composition of Traffic Volume on Ayala Bridge 2003

The traffic composition of Ayala Bridge can be characterized as follows:

- Composition of car traffic is predominated and its share is 92%.
- Composition of bus and truck traffic is not large and their shares are 2.4% and 3.6% respectively.

Taking into account the weight of vehicle impacts to Ayala Bridge, the target types of vehicle for vehicle load limitation of Ayala Bridge is assumed to be **Large Buses, and trucks** which are more than 3 tons per vehicle. Cars and jeepneys which are less than 3 tons per vehicle will be allowed to pass on the bridge.

### (3) Traffic Affected by Vehicle Load Limitation

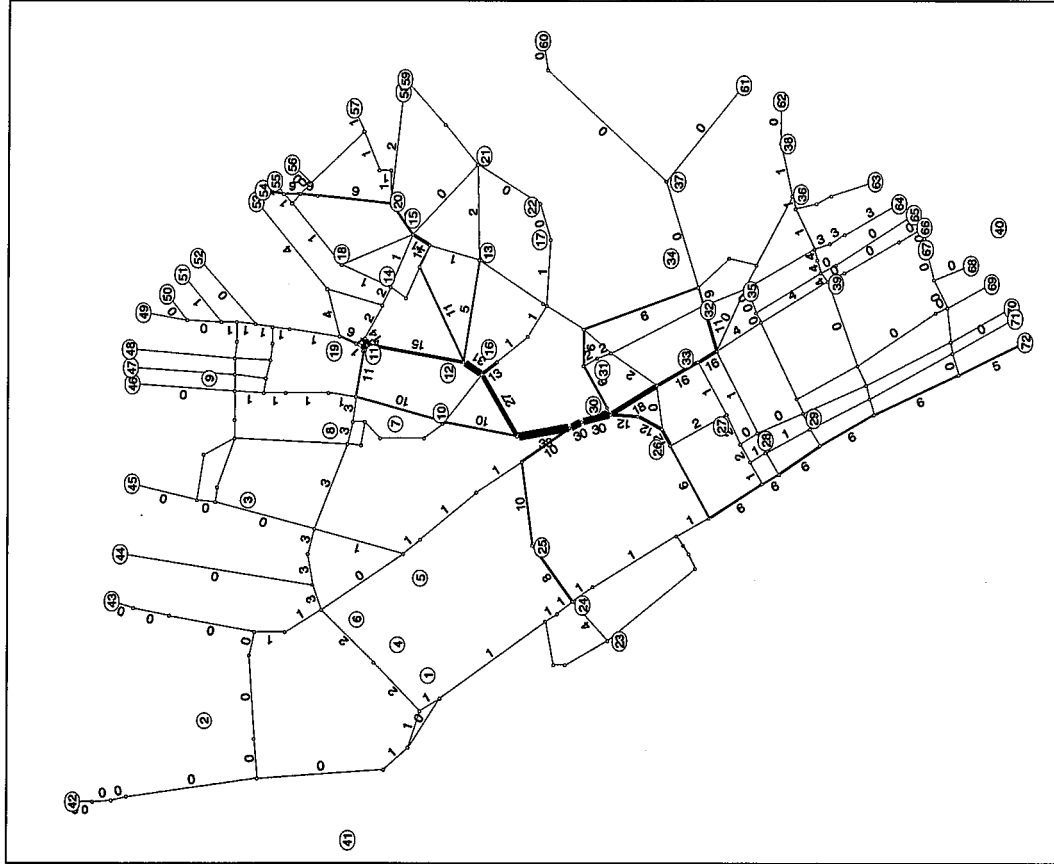
The traffic affected by the vehicle load limitation can be expressed for the following cases:

- With vehicle load limitation on Ayala Bridge (Rerouted Case)
  - Rerouted route and traffic under the "with vehicle load limitation on Ayala Bridge" scheme.
- Without vehicle load limitation on Ayala Bridge (Desired Route Case)
  - Desired route and traffic under the "without vehicle load limitation on Ayala Bridge" scheme.

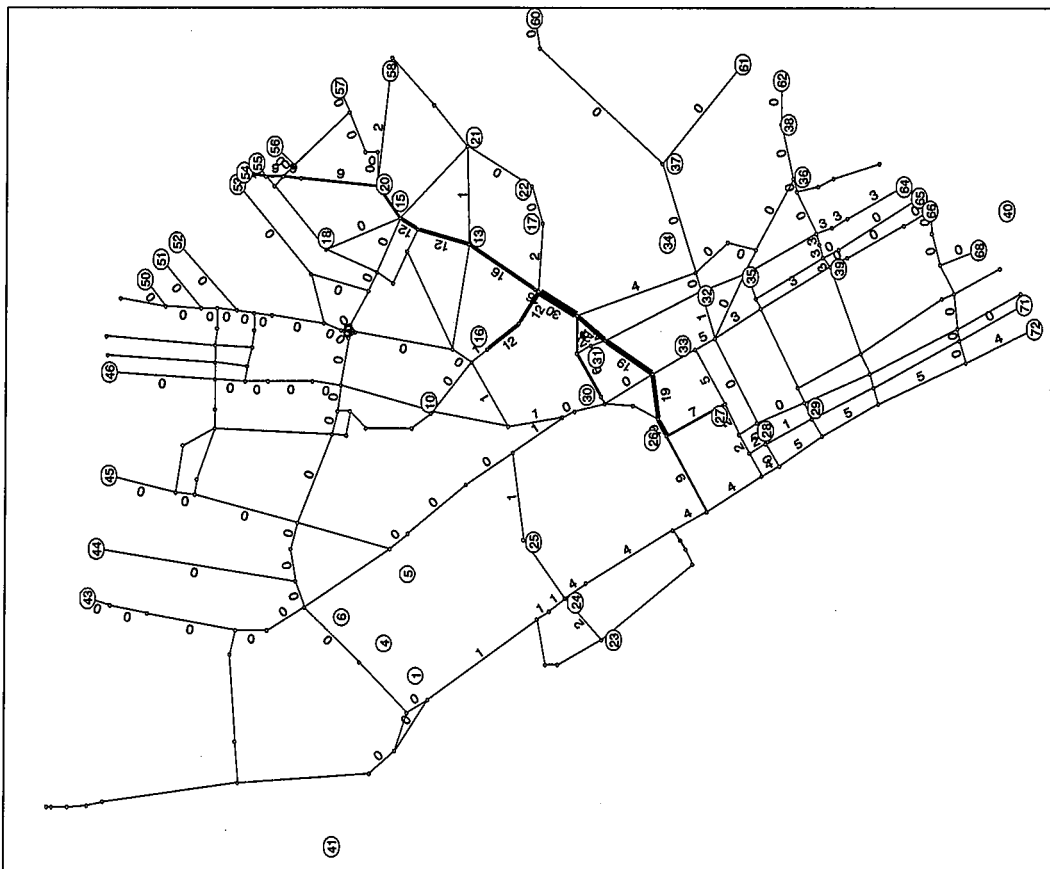
The traffic assignment to the road network incorporated with and without vehicle load limitation on Ayala Bridge was made using the highway-type traffic assignment software (STRADA). Results of the traffic assignment of both cases are shown in **Figure 18.2.1-3**.

### (4) Impact of Vehicle Load Limitation

The impact of vehicle load limitation was calculated in **Tables 18.2.1-2, 18.2.1-3 and 18.2.1-4**.



(b) Rerouted Route of Bus and Truck under "with Vehicle Load Limitation (Routed Case)"



(a) Desired Route of Bus and Truck under "without Vehicle Load Limitation (Desired Route Case)"

Figure 18.2.1-3 Traffic Impact of Vehicle Load Limitations on Ayala Bridge



Table 18.2.1-2 Traffic Volume on Ayala Bridge W/ and W/O Vehicle Load Limitation, 2003

No.	Bridge Name	Rerouted Case (A)	Desired Route Case (B)	Balance (A - B)
		* W/ Vehicle load limitation	* W/O Vehicle load limitation	
2	Jones Bridge	57,400	57,400	0
3	McArthur Bridge	56,200	55,300	900
4	Quezon Bridge	79,300	76,200	3,100
5	Ayala Bridge	36,900	41,100	- 4,200

Table 18.2.1-3 Traffic Congestion of Road Network in cases of W/ and W/O Vehicle Load Limitation of Ayala Bridge, 2003

Unit: %

Traffic Congestion Degree	2003	
	Rerouted Case	Desired Route Case
	* W/O Vehicle Load Limitation	* W/ Vehicle Load Limitation
>0.5	24.3%	>0.5
0.50-0.75	8.7%	0.50-0.75
0.75-1.00	20.3%	0.75-1.00
1.00-1.25	22.8%	1.00-1.25
1.25-1.50	9.2%	1.25-1.50
1.50<=	14.7%	1.50<=
Total	100.0%	Total

Table 18.2.1-4 Travel Speed of Road Network in Cases of W/ and W/O Vehicle Load Limitation of Ayala Bridge

Bridge Name	2003	
	Rerouted Case	Desired Route Case
>10	5.9%	5.9%
10-14.9	9.6%	9.5%
15.0-19.9	14.8%	14.1%
20.0-24.9	20.8%	22.0%
25-29.9	20.6%	19.9%
30<=	28.4%	28.6%
Total	100.0%	100.0%

Based on the projected traffic volume on bridges of Pasig River, the levels of service (LOS) and V/C Ratio were calculated and shown in Table 18.2.1-5.

Table 18.2.1- 5 Level of Service (LOS) and V/C Ratio in cases of W/ and W/O Vehicle Load Limitation of Ayala Bridge

No.	Bridge Name	2003					
		Rerouted Case			Desired Route Case		
		* W/ Vehicle load limitation			* W/O Vehicle load limitation		
		Traffic Volume (PCU/Day)	Level of Services (LOS)	V/C	Traffic Volume (PCU/Day)	Level of Services (LOS)	V/C
2	Jones Bridge	57,400	E	0.95	57,400	E	0.93
3	McArthur Bridge	56,200	D	0.63	55,300	D	0.62
4	Quezon Bridge	79,300	F	1.08	76,200	F	1.12
5	Ayala Bridge	36,900	D	0.64	41,100	D	0.71

Figure 18.2.1-4 shows the traffic volume, Level of Service (LOS) and congestion degree of Quezon Bridge and Quezon Boulevard.

From the above-mentioned traffic analysis, the following facts can be said:

- If vehicle load limitation on the Ayala Bridge (more than 3 tons per vehicle) is implemented, affected number of vehicles are very small. (6% to total traffic or 2,200 vehicles per day in 2003).
- Due to the vehicle load limitation, the rerouted traffic (large bus and truck) will not be forced to take a longer distance compared with their desired route.
- Level of Service (LOS) on the related road and bridge links such as Quezon Bridge and Quezon Boulevard will not be affected by the re-routed traffic.

Although this limitation will have minimal effect on the traffic, it will have large or considerable effect to people daily life and industrial, commercial and economic activities. Under this condition, the Ayala Bridge should be improved as soon as possible.

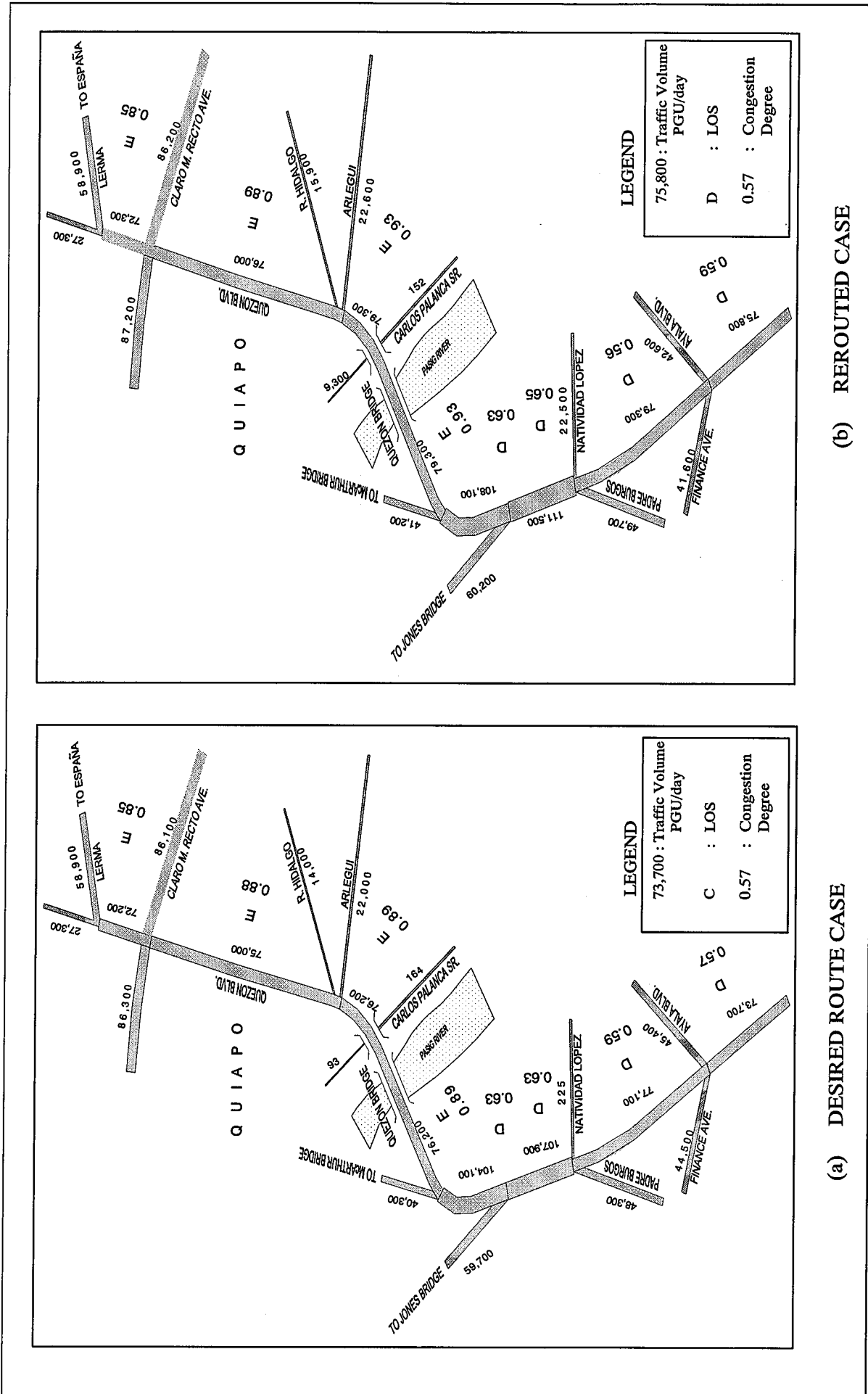


Figure 18.2.1-4 Traffic Volume, LOS and Congestion Degree on Road Links of Quezon Bridge and Quezon Boulevard

## 18.2.2 Traffic Management Measure

In order to secure the vehicle limitations on the Ayala Bridge (vehicles more than 3 tons), the following traffic management measures are recommended to be implemented:

- Vehicle barrier at Entry Points of the Ayala Bridge
- Traffic information board
- Traffic congestion measure on Quezon Boulevard.

### (1) Vehicle Barrier at Entry Points of the Ayala Bridge

In order to secure the vehicle load limitation on the Ayala Bridge the vehicle barrier is recommended to be installed at both entry points of the Ayala Bridge as shown in **Figure 18.2.2-1**.

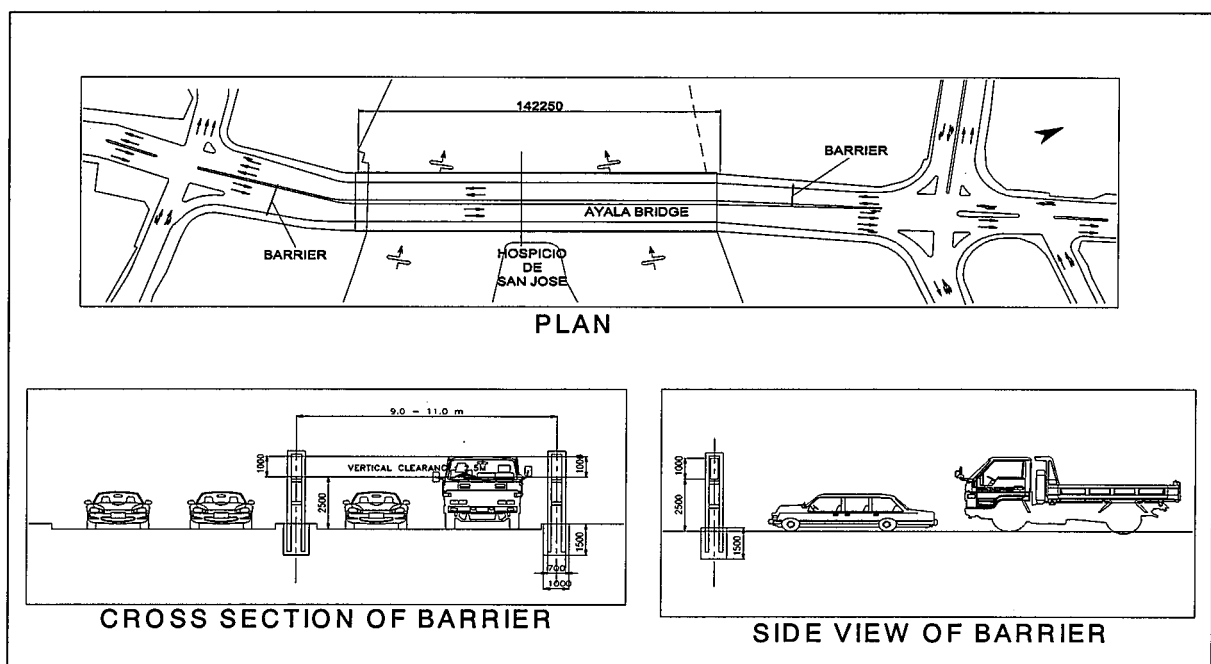


Figure 18.2.2-1 Plan of Vehicle Barrier

However, the following exceptions shall be allowed to pass the Ayala Bridge.

- Delivery traffic to Hospicio de San Jose.
- Fire engine traffic.
- Other emergency vehicles.

### (2) Traffic Information Board

In order to give large bus and truck drivers notice of the vehicle load limitation of the Ayala Bridge, it is recommended that traffic information board shall be installed at major entry points of the affected area. An example of the traffic information board and its proposed location is shown in **Figure 18.2.2-2**

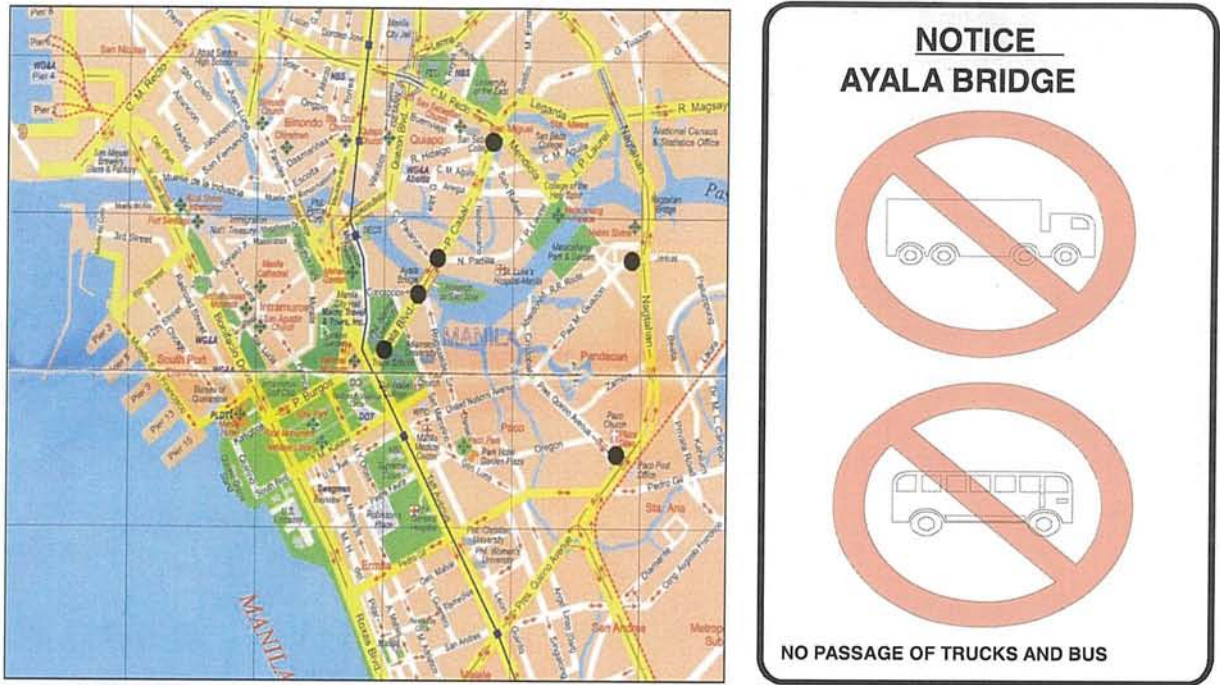


Figure 18.2.2-2 Proposed Locations and Example of Traffic Information Board

**(3) Traffic Congestion Measures on Quezon Bridge and Quezon Boulevard**

According to the traffic analysis, there is not much difference in the LOS and congestion degree between the desired route case and the rerouted case. However, in order to provide enough traffic capacity enough for the traffic volume on Quezon Boulevard, it is proposed to implement the parking control along the Quezon Boulevard as shown in **Figure 18.2.2-3**.

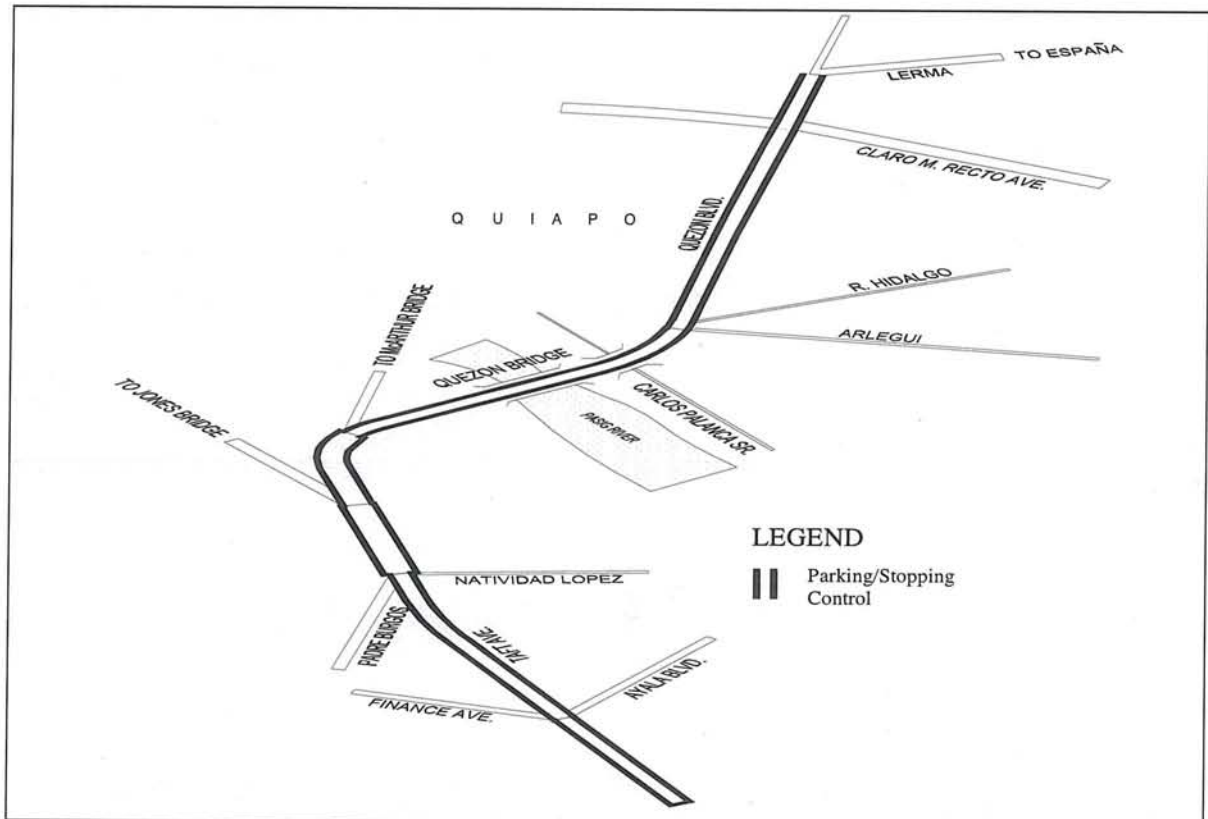


Figure 18.2.2-3 Proposed Parking/Stopping Control on Quezon Bridge and Quezon Boulevard