REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS (DPWH)
METROPOLITAN MANILA DEVELOPMENT AUTHORITY (MMDA)

MEGA MANILA REGION HIGHWAY NETWORK INTELLIGENT TRANSPORT SYSTEM (ITS) INTEGRATION PROJECT

FINAL REPORT

Annexes

JULY 2013

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

CTI ENGINEERING INTERNATIONAL CO., LTD
ORIENTAL CONSULTANTS CO., LTD
METROPOLITAN EXPRESSWAY CO., LTD
MITSUBISHI RESEARCH INSTITUTE, INC.

EI
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Mega Manila Region Highway Network Intelligent Transport System (ITS) Integration Project

FINAL REPORT

ANNEXES

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Annex 1.1 ITS SEMINAR

1.1.1 1st Seminar

(1) Objective

Objectives of the 1st seminar is to explain the objective, scope, work, schedule, study procedure and methodology of the Study and to introduce the current status and future directions of ITS in the Philippines.

(2) Seminar Program

FIRST ITS SEMINAR PROGRAM

29 August 2012

Muralla 1, The Bayleaf, Muralla corner Victoria Streets, Intramuros, Manila

8:30 – 9:00	Registration	
9:00 – 9:15	Opening Ceremony National Anthem and Invocation	
9:15 – 9:30	Opening Remarks	Asec. Ma. Catalina E. Cabral Planning & PPP Office, DPWH
9:30 – 9:45	Welcome Remarks	Mr. Floro P. Adviento Program Manager JICA Philippine Office
9:45 – 10:00	Introduction of ITS Study	Mr. Ryuichi Ueno Deputy Team Leader
10:00 – 10:05	Open Forum	
10:05 – 10:35	The Concept of ITS: Improving LOS of Transport Sytems	Dr. Hussein S. Lidasan JICA Study Member
10:35 – 10:40	Open Forum	
10:40 – 11:10	Effectiveness of Intelligent Transport Systems (ITS) Experiences in Japan	Mr. Masaaki Goto JICA Study Member

11:10 – 11:15	Open Forum	
11:15 – 11:45	Traffic Control and Information	Mr. Mitsuo Kiuchi Team Leader on behalf of Dr. Hiroshi Warita JICA Study Member
11:45 – 11:50	Open Forum	
	*** LUNCH BREAK ***	
13:00 – 13:30	Direction of ITS Application in DPWH	Engr.Remedios G. Belleza Proj. Director, PMO-TEAM, DPWH
13:30 – 13:35	Open Forum	
13:35 – 14:05	Traffic Control & Information Provision System of MMDA	Atty. Yves Randolph P. Gonzalez Director III, OIC-TDO, MMDA Engr. Francisco R. Pesino Jr. A. Engr. V, TEC, MMDA
14:10 – 14:15	Open Forum	
14:15 – 14:45	ITS Priorities in the Philippines	Dr. Ricardo G. Sigua JICA Team Member
14:45 – 14:50	Open Forum	
14:50 – 15:05	Closing Remarks	Atty. Yves Randolph P. Gonzalez Director III, OIC-TDO, MMDA

Master of Ceremony: Mr. Carmelino Jesus C. Tizon

(3) Attendance

DPWH	19
MMDA	2
DOTC	1
NEDA	2
TRB	4
NCTS	1
O&M Company	18
Embassy of Japan	1
JICA Manila	3
JICA Study Team	10
Total	**61**

(4) Minutes

Open forums were conducted after each presenter of the topics. The Comments (C), Question and Answer (Q & A) are as follows;

1. C, Q & A – Introduction of ITS Study

1.1 C: The Expressway's ETC system are compatible with the North and South should both operators allows the interoperability. Tags of both the North and South Expressways are readable to both since they operate in the same frequencies.

Technically speaking, the system of interoperability can be done within 24 hours. But of course, interoperability would depend on both political will and commercial will of the operators.

1.2 Q: How's the interoperability of expressways in the North and in the South?

A: Interoperability of expressways in the North and in the South is but a matter of operators' willingness to interoperate or not. Operators will be invited for a meeting regarding interoperability.

C: The San Miguel Corporation - Infrastructure are willing to interconnect with the North. In the South, expressways are already interoperable in their system (meaning only those expressways under the San Miguel Corporation). San Miguel Corporation has expressways both in the North and the South, so in a way, North and South expressways are interoperable.

1.3 C: The Land Transportation Office (LTO) being the enforcement agency, must be

included/involved in all the meetings/seminars of the Study.

A: The LTO was involved in the conduct of the ITS Needs Survey and was invited in the seminar but unable to attend.

1.4 C: Please explain "Central Clearing House". Who should maintain the central clearing house, private or government?

A: If operators agree then the government should guide the interoperability of the expressways.

2. C, Q & A - The Concept of ITS: Improving LOS of Transport System

2.1 C: The Telephone Companies (TELCOs) should likewise be included in the study. While we could use taxis for collecting traffic information as probe, TELCOs could be used for traffic data collection because their cell sites are strategically located where it could cover the entire Metro Manila.

A: The Study Team is looking at the inclusion of nomenclature and architecture of the ITS infrastructure. It was likewise included in the Needs Assessment Survey which was presented by Mr. Ueno to be among the interview questions.

3. C, Q & A – Effectiveness of ITS Experiences in Japan

3.1 C: The inter-linkage with the radio stations in terms of traffic information dissemination. Filipinos generally open their radios/TV upon waking up or radios while driving just to monitor traffic situation in the Metro Manila. So, the Study must consider including the inter-linkage with the Radio and TV Stations.

3.2 Q: Who installed the weigh-in motion facility (toll operators or government)?

A: It is both the Government and the private companies who are in-charge of installing weigh-in motion facilities. The Private/Toll Operators installed weigh-in motion facility in the Expressways/Toll Roads, while the government installed weigh-in motion facility along National Roads.

The installation of weigh-in motion facility is good because it does not include human intervention. Usually in the Philippines, despite the Anti-overloading campaign, overloaded trucks are accompanied with some escorts that made it very difficult for enforcers to apprehend. Thus, weigh-in motion facility installation will do well in the Philippines.

4. C, Q & A – Traffic Control and Information Provision in Tokyo Metropolitan Expressways

4.1 Q: What are the criteria for the selection of Pilot Projects? Does the Study include installation of ITS hardware?

A: The Pilot Project maybe the adoption of ETC system. However, the Study does not include installation of any ITS hardware. Study only.

5. C, Q & A – Direction of ITS Application in DPWH

No Questions Asked.

6. C, Q & A – Traffic Control and Information Provision System of MMDA

6.1 Q: How does MMDA collect traffic information?

A: The collection of traffic information is manual and subjective, information are based on sent traffic reports by IP cameras, radio reports and user generated reports (volunteered traffic field reporters).

6.2 Q: How is the interpretation of traffic report?

A: The interpretation is very subjective. However, MMDA is geared towards providing estimated travel time and re-routing that would give road users informed decisions.

6.3 C: The road traffic reporters are encouraged of using celphone while driving. It would then be in conflict with MMDA's thrust of "No texting, while driving."

A: It is wise to assume that road traffic reporters are passengers and not drivers, thus it does not encourage using celphones while driving just so they could report traffic updates. There are "No Contact" technologies where a lone driver could easily keep track of the traffic information just by going to the MMDA's website, clicked on the Metro Manila Traffic Navigator then put down the smart phone and be able to get traffic updates without holding again the smart phone. Don't use your celphones while driving.

6.4 Q: Is it possible to see the intersection report in the Metro Manila Traffic Navigator?

A: There is an intersection section in the Traffic Navigator which state if traffic is light, medium, or heavy. The goal of MMDA is to be able to give travel time.

The subjectivity of interpretation of Light to Medium to Heavy varies from one person to another, so there is a necessity for inclusion of travel speed in the information provided.

7. C, Q & A – ITS Priorities in the Philippines

7.1 Q: Is it alright for the toll operators not to put toll barriers as it adds up to a longer processing time at the toll booths?

A: Expressways have different situations and configurations. Taking the case of the Bicutan Interchange under the Skyway's jurisdiction, where it has 139 conflicts. If there will be no toll barriers, cars just pass through the tellers without paying. Toll booth tellers would be short of revenue when compared with the automatic vehicle count. Even though there is the use of E-pass, some are not automatically replenished; there are still those who use manual reloading, if they have zero or negative balance and there is no toll barrier, vehicle owners could just pass through several times without paying. With toll barriers, toll operators could deactivate the E-pass once no more balance so that they would be forced to pay. Deactivation can only be made possible because there is a toll barrier. The idiosyncrasies here in the Philippines compared to other countries are different. Thus, in the design of ITS, there is a necessity of incorporating the enforcement; tollways abroad are tied-up with enforcers so that once there is a violation, it could easily be forwarded to enforcers. Once vehicle owners renew their license, violation could be seen, that one has absconded from paying toll. There is really a need to tie-up with enforcers, which is the Land Transportation Office (LTO). Part also of the enforcement is the implementation against over speeding violation, right now it is only the tollways and only along Commonwealth that over-speeding violation is implemented. Database of these violations should be tied-up with LTO.

C: The features of toll barriers at toll booths does not necessarily mean a hindrance, it is simple, affordable and cut costs; rather it is good and it works in the Philippine set-up. The Video Recording System is already in place. Data gathered from these videos are given to LTO. The disposition on what to do now with the gathered data depend on LTO.

7.2 Q: How about giving **varying** toll rates depending on time. A higher toll rates in peak hours and a lower toll rates during lean hours. This will decongest traffic during peak hours (6 o'clock to 7 o'clock)

A: Pricing cannot be dictated upon by the volume of traffic, contrary to public perception that operators are earning more when there is congestion; it is the other way around. Through-put is limited when there is congestion. Operators are on the losing end when there is traffic congestion at toll booths because they could just processed a limited number of vehicles while they are paying much on overhead cost.

7.3 Q: Will road pricing be ever a reality? It is a common knowledge that anyone among the legislators who would legislate road pricing has to kiss goodbye of being reelected. Will road pricing ever happen in the Philippines?

A: Indeed road pricing will have a very tough time. The **Unified Vehicular Volume Reduction Program (UVVRP)** or the Number Coding, a strong political will is a must. Road pricing along EDSA would be very tough because there are many entry and exit points. There is a need to look at more innovative ways to be able to implement road pricing.

A combination of both hard and soft infrastructure is needed.

7.4 C: There is a need earmark ITS infrastructure that would geared toward mass transit infrastructure.

(5) Pictures

	
Sixty-two participants in 1st Seminar	**Presentation of ITS in Tokyo Metro Expressway**

1.1.2 2nd Seminar

(1) Objective

Objectives of the 2nd seminar are to introduce Japan's ITS technologies to all Filipino stakeholders.

(2) Seminar Program

Venue: City state hotel, Manila City
Date 25 and 26, September 2012.

DAY-ONE (September 25, 2012) Technical Session

TIME	PROGRAM/TOPICS		SUB-TOPICS		SPEAKER
8:30 - 9:00	Registration		-		**DPWH Secretariat / CTII**
9:00 - 9:05	Philippine National Anthem		-		
9:05 - 9:20	Opening Remarks		-		**DPWH Assistant Secretary Maria Catalina E. Cabral**
9:20 - 9:35	Welcome Address		-		**Mr.Susumu ITO Senior Representative JICA PHILIPPINES OFFICE**
9:35 - 9:45	Introduction of Seminar		**1.**	**Objective of Seminar**	**Mr.Mitsuo KIUCHI JICA Study Team**
9:45 - 10:05	Session-1	Application of ITS	**2.**	**Role of ITS Japan**	**Mr. Nobukazu KANESAKI ITS Japan**
10:05 - 10:15			**Question / Answer**		
10:15 - 10:45			**3.**	**Transport Issues and ITS Application in the Philippines**	**Mr.Mitsuo KIUCHI JICA Study Team**
10:45 - 11:00	*Break Time*				
11:00 - 11:30	Session-2	Japan's ITS Applications for Expressway	**4.**	**Technical Cooperation for ITS by JICA**	**Mr. Yoshihiro KAKISHITA JICA**
11:30 - 12:00			**5.**	**Traffic Control System for Expressway in Japan**	**Dr. Hiroshi WARITA Metropolitan Expressway Co. Ltd**
12:00 - 12:10			**Question / Answer**		
12:10 - 13:10	*Lunch Time*				
13:10 - 13:30	Session-3	Japan's ITS Applications for Urban Road	**6.**	**Traffic Signal System in Thailand**	**Mr. Hajime SAKAKIBARA ITS Japan / Suimtomo Electric Industries, Ltd.**
13:30 - 13:50			**7.**	**Intelligent Transport Infrastructure (Towards Resolution of Traffic Congestion in Urban Area)**	**Mr. Ikuo ETOH ITS Japan / Panasonic**
13:50 - 14:10			**8.**	**Introduction of Electronic Road Pricing System in Singapore**	**Mr. Masayuki YAMAMOTO ITS Japan / Mitsubishi Heavy Industry Corp.**
14:10 - 14:20			**Question / Answer**		
14:20 - 14:40	Information		-		**Mr. Carmelino Jesus C. Tizon DPWH**

Master of Ceremony: **Mr. Carmelino Jesus C. Tizon**

DAY-TWO (September 26, 2012) ITS Seminar

TIME	PROGRAM/TOPICS		SUB-TOPICS		SPEAKER
8:30 - 9:00	Registration		-		DPWH Secretariat / CTII
9:00 - 9:05	Philippine National Anthem		-		
9:05 - 9:15	Welcome Address		-		Chief Representative JICA Philippine Office Takahiro SASAKI
9:15 - 9:30	Opening Remarks		-		MMDA Chairman Francis N. TOLENTINO
9:30 - 9:45	Keynote Speech		-		DPWH Secretary Rogelio L. SINGSON
9:45 - 10:20	*Break Time & Photo Session*				
10:20 - 10:45	Session-4	Why ITS is necessary?	1.	Proposal for ITS Development in the Philippines	Mr. Yasuhiro OKUMURA Ministry of Land, Infrastructure, Transport and Tourism
10:45 - 11:05	Session-5	ITS Development in the Philippines	2	ITS Directions in the Philippines	Dr. Ricardo G. SIGUA JICA Study Team
11:05 - 11:25			3.	MMDA ITS : Past, Present, and Future	Atty. Yves Randolph P. GONZALEZ MMDA
11:25 - 11:45			4.	ITS Application for Toll Expressway	Mr. Raul IGNACIO and Mr. Glen CAMPOS MNTC
11:45 - 11:55			Question / Answer		
11:55 - 13:25	*Lunch Time*				
13:25 - 13:45	Session-6	Possible Japan's ITS Applications in the Philippines	5.	Traffic Signal and Information Control Systems	Mr. Hajime SAKAKIBARA ITS Japan / Suimtomo Electric Industries, Ltd.
13:45 - 14:05			6.	Introduction Material of Bus Location System	ITS Japan/NEC presented by Dr. Yoichi SAKURADA JICA Study Team
14:05 - 14:25			7.	Introduction of Japanese ETC System	Mr. Takeshi NAKAMURA ITS Japan / Mitsubishi Heavy Industry Corp.
14:25 - 14:55			Question / Answer		
14:55 - 15:15	Fill up Questionnaire		-		DPWH Secretariat / CTII
15:15 - 15:35	Wrap-up		Conclusion and Recommendations		Engr. Remedios G. BELLEZA DPWH
15:35 - 15:50	Closing Statement		-		Ms. Corazon T. Jimenez MMDA

Master of Ceremony: **Mr. Carmelino Jesus C. Tizon**

(3) Attendance

Attendance	Day-1(25 September,2012)	Day-2(26 September,2012)
DPWH	45	39
MMDA	8	15
DOTC	1	1
NEDA		
TRB	4	4
NCTS	1	1
O&M Company	8	11
TV & Radio	2	2
LTO	2	2

Attendance	Day-1(25 September,2012)	Day-2(26 September,2012)
LTFRB	1	2
LRTA	2	2
Bus	1	1
Key Informants	3	2
LGU	16	19
Bureau of Fire Protection	2	1
Daily Manila Newspaper		1
Japanese Company & Guest	7	5
Secretariat	6	6
Embassy of Japan	1	1
Speakers	7	7
JICA Manila	3	3
JICA Study Team	8	8
Total	**128**	**133**

(4) Question and Answer Results

Open forums were conducted after each of the six (6) sessions. The Comments (C), Question and Answer (Q & A) are as follows;

1.1.3 – Application of ITS (*Transport Issues and ITS Application in the Philippines presented by* ***Mr. Mitsuo Kiuchi)***

1.1.3-1 C: Engr. Alberto H. Suansing of **Safety Organizations of the Philippines, Inc.** suggested that the word ROAD CRASH should be used instead of the word ACCIDENT. Accident as defined by Mr. Webster means as something that happens unexpectedly or undecided or without root cause. Those situations as presented do not qualify to be called accidents.

A: The comment/suggestion was noted. *(Mr. Carmelino Jesus C. Tizon, DPWH PMO-FS, ITS TWG Vice Chairperson)*

1.3.8 – Japan's ITS Applications for Urban Roads (*Introduction of Electronic Road Pricing System in Singapore presented by* ***Mr. Masayuki Yamamoto)***

1.3.8-1 Q: How about proposals of road pricing in the Philippines? *(Mr. Carmelino Jesus C. Tizon, DPWH PMO-FS, ITS TWG Vice Chairperson)*

A: ERP is one kind of road pricing in Singapore. In the Philippines, it was not a proposal but

concepts presented in the MMUTIS (Metro Manila Urban Transport Integration Study) Project way back in 2000. They tested the possibility of road pricing, three schemes were looked into. It was suggested that road pricing be implemented in some highly urbanized areas in Metro Manila. One is, when entering Makati, road users has to pay one (1) dollar. Second, when going to EDSA, you also have to pay. Third is, if you cross or run along EDSA through C-4, road users has to pay. To decongest EDSA, road pricing would really be one of the most effective way of decongesting traffic. So maybe it's about time to reconsider road pricing in the Philippines. As the motto of DPWH, "Right Project at the Right Cost at the Right Time with the Right People." Probably now is the right time with the right people to implement road pricing. *(Dr. Ricardo G.Sigua, JICA Study Team Member, UP-NCTS)*

1.3.8-2 Q: Why did it took one (1) year for Singapore just to install a clock from the gantry? 1998 then 1999, it took one year. *(Atty. Yves Randolph Gonzalez)*

A: After we contract the ERP**,** we need to install first the gantry; 32 gantry, also around 700,000 people have to be consulted first. In 1998, the ERP system was introduced; and in 1999 is the second phase, a clock display on the gantry was introduced, but also in 1999 there was a relocation of the gantry based on the government plan. *(Mr. Masayuki Yamamoto)*

This ERP system is under the Land Transport Authority of Singapore. ERP is just one of the ITS in Singapore. *(Mr. Carmelino Jesus C. Tizon, DPWH PMO-FS, ITS TWG Vice Chairperson)*

1.3.8-3 Q: Before you introduce ERP in Singapore, what is the rate of congestion before you introduce ERP? What is the rate after the introduction? How effective is ERP? You likewise mentioned about graduated charging rate in CBDs, first in the day time then at the night time, how much? How did it reduce the congestion? *(Dir. Rebecca T. Garsuta, DPWH PMO-BOT, JCC Member)*

A: I cannot answer all but I will try to answer those I know. Road pricing is to control traffic. So, if traffic is congested, it could charge more. Every three months. Like for example, in Singapore June is school holiday, ERP charge is reduced. Every time, charge is changed so I cannot give the exact amount. Usually Sgd 1 or Sgd 2. Also depending on vehicle types, motorcycle is 2/3 charged. Around 20% of the traffic was reduced. *(Mr. Masayuki Yamamoto)*

2.5-1 Q: Is the maintenance of equipment for long term use part of our objective? *(Mr. Felix Leyson of LRTA)*

A: That objective came directly from the committee. Maintenance is very important. Operation part is OK, but maintenance, we must be innovative. *(Dr. Ricardo G. Sigua of JICA*

Study Team)

2.5-2 Q: How about Sustainability? *(Mr. Felix Leyson of LRTA)*

A: Sustainability is always in question, like the SCATS, acquisition of spare parts is necessary. There is the further deterioration of the system. *(Dr. Ricardo G. Sigua of JICA Study Team)*

2.5-3 Q: Can we have the seminar in Region VII?*(Engr. Rogelio Oracoy of DPWH Region VII)*

A: The Study Team will look into that as long as the invitation still holds. *(Mr. Carmelino Tizon of PMO-FS, ITS TWG Vice Chairperson)*

2.5-4 Q: How about ITS to local government units since MMDA is for National Roads only? How would it be and how much will LGUs spend for an ITS? *(Engr. Alfredo Garin of LGU - Pasig City)*

A: As to the MMDA's traffic navigator, LGUs can be a part in the system of the navigator. We are open to technological or knowledge transfer. *(Atty. Yves Randolph Gonzalez)*

2.5-5 Q: How much will it cost for a navigator? *(Engr. Alfredo Garin of LGU - Pasig City)*

A: Pasig has already a system. You could always tie-up with TV-5 and tell them you also want to have your roads in the navigator system. MMDA always adhere to Private-Public Partnership as it always makes faster implementation. With the Pasig's available analytic and command center, you could hire and have a navigator system with barely around 1 Million Pesos. *(Atty. Yves Randolph Gonzalez)*

2.5-6 Q: Will color coding be lifted up? *(Engr. Alfredo Garin of LGU - Pasig City)*

A: Only on Holidays. *(Atty. Yves Randolph Gonzalez)*

2.5-7 Q: How can we limit fleet of vehicles? Regulate and phasing out of old vehicles, tricycles in the major thoroughfares, and vendors at the streets that adds up to congestion.

A: Efficient public transport

2.5-8 Q: What is RFID? *(undisclosed participant)*

A: RFID stands for Radio Frequency Identification Device. It is a good traffic management

tool to monitor Public Utility Vehicles. It hopes to cover not only PUVs but all vehicles, a tool which can be used for enforcement. But they think that it's invasion of privacy, so it was stopped by the Supreme Court. *(Alberto Suansing of Automobile Association)*

2.5-9 Q: ITS is an Application on transport that involves architectural infrastructures, one. It must be economical and useful. While it has been mentioned that the study would cover up Mega Manila Region, if we really want to improve ITC in Metro Manila, it seems to me that C-4 is being left out. There is a need to widen Samson Road as it is only 2-lanes. *(Engr. Joel Barroga of LGU-Kalookan City)*

A1: C-4 EDSA is very congested with an average traffic of 270,000 vehicles per day. CITRA Skyway runs parallel to NLEX-SLEX connector road. By 2016, Monumento down to Roxas Boulevard will have total rehabilitation as a high standard highway network. *(Mr. Carmelino Jesus Tizon, DPWH PMO-F, ITS TWG Vice Chairperson)*

A2: Samson Road is under an Overseas Economic Cooperation Fund (OECF). It's part and parcel as a component of R-10. Letre – C-4 will be revived. Due to corporation proceedings and funding constraints that C-4 can't be done yet, thus C-4 is not being left out. *(Engr. Ruperto Sg. Cruz, DPWH PMO-URPO)*

C: Just for the information of everybody, C-4 is composed of 70% Local Road. 67% of its length is PNR. Sangandaan, almost 80% is already paid by DPWH. The only problem is the Araneta Center. *(Engr. Joel Barroga of LGU-Kalookan City)*

2.5-10 Q: How is the overweight system, is it static or weigh-in motion? *(Cesario C. Vicente of Soerelle Consult)*

A: MNTC is using static devices that are DOST-accredited which passed the DOTC accuracy requirement. *(Mr. Glen Campos of MNTC)*

2.5-11 Q: What happened to violators of overloaded vehicles? *(Cesario C. Vicente of Soerelle Consult)*

A: We don't allow overloaded vehicles to pass through the entire stretch of the expressway. What we do is escort vehicles outside the nearest exit. *(Mr. Glen Campos of MNTC)*

(5) Analysis of Questionnaire

The answers given on the questionnaire sheets showed the participants' high interest on Japan's ITS technology that was provided by each topic, as well as satisfaction on the management of the Seminar as over all.

The Seminar was evaluated as satisfactory- implemented/completed.

Total responders was seventy eight (78, both days attend responders was 72 and 2nd day-only attend responders was 6.)

Q.How would you rate the seminar?

- More than fifty percent for each item are very good.

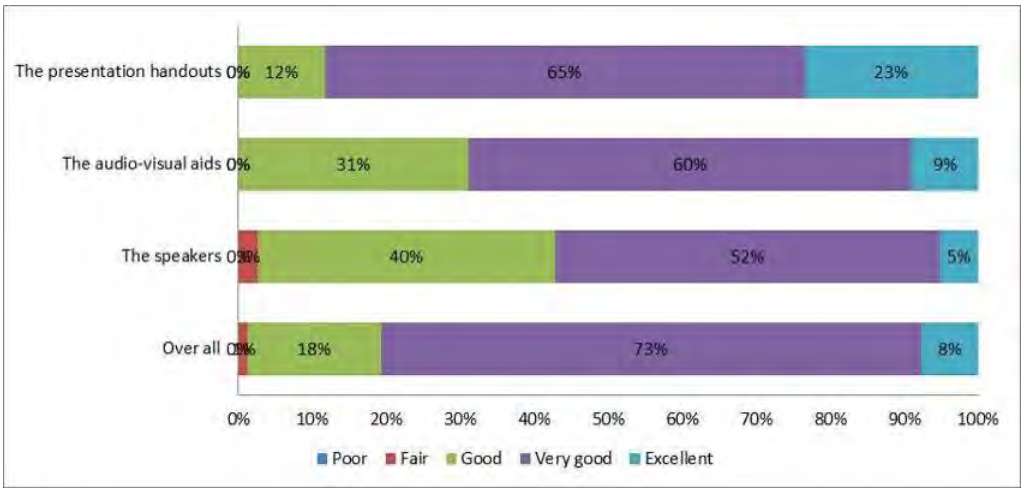


FIGURE 1.1-1 SEMINAR'S SATISFACTION (1)

Q.On a personal level, how important was the seminar to you?

- More than eighty percent said "Very important seminar."

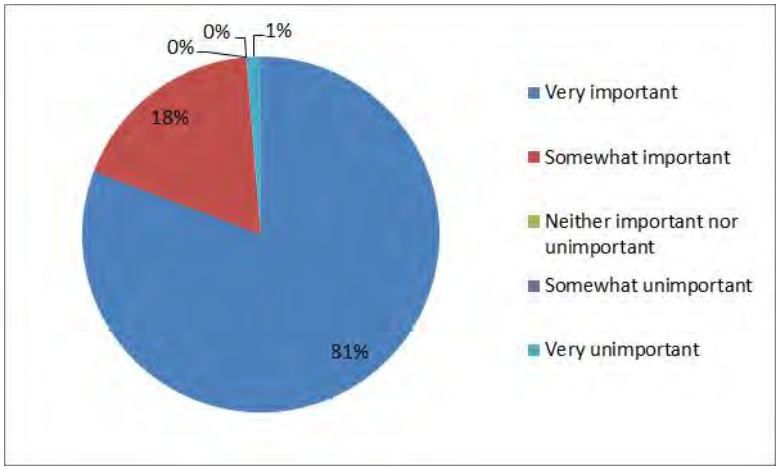


FIGURE 1.1-2 SEMINAR'S SATISFACTION (2)

Q How difficult were the presentations to understand?

- More than seventy responders said “Just right”. It was understandable presentations for them.

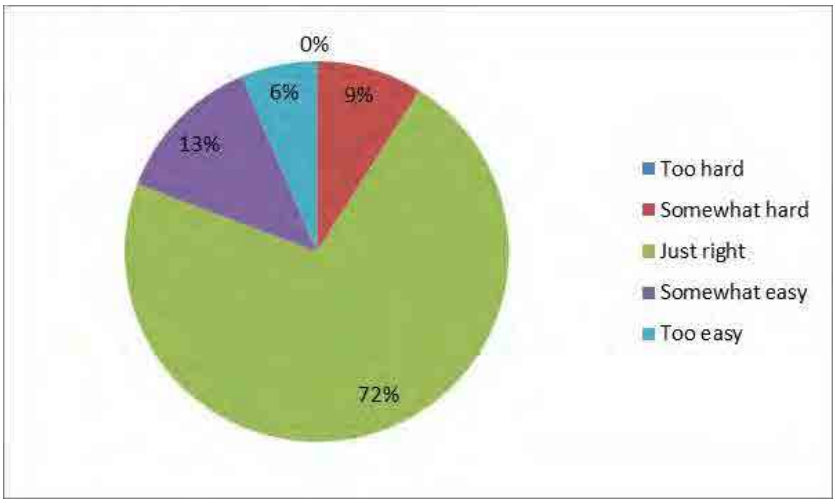
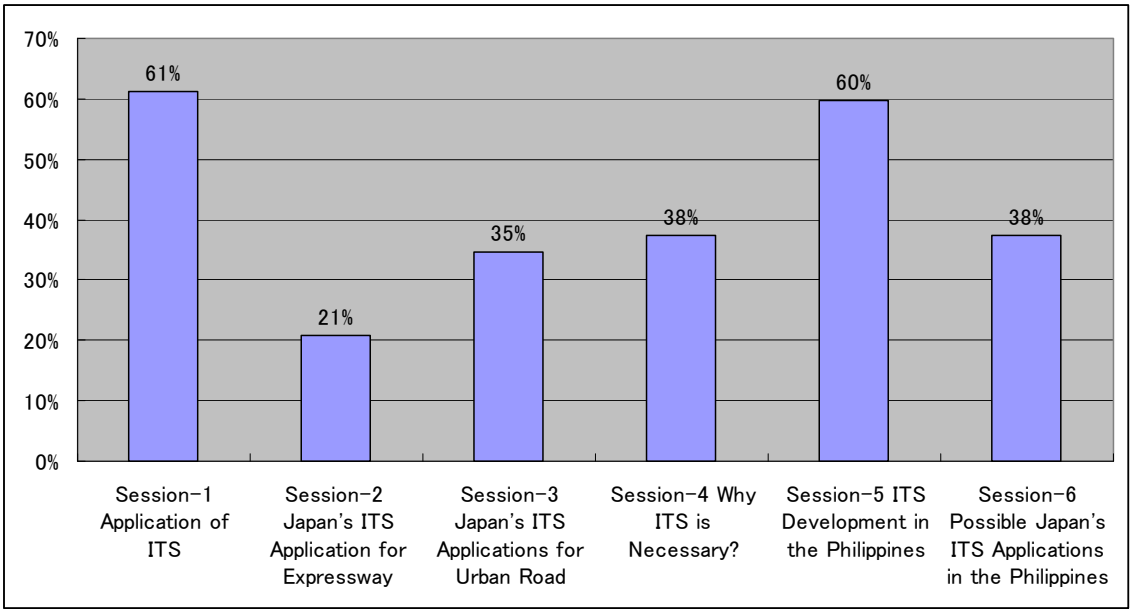


FIGURE 1.1-3 SEMINAR’S SATISFACTION (3)

Q.In this Seminar, which subject interests you the most?

- Highly interests’ session was Session-1 and Session-5, which more than sixty percent responders answered as ranked No.1.



Note; Some responders answered multi session was rank 1.

FIGURE 1.1-4 MOST INTEREST SESSION

Q. What do you think is the most important for the DPWH/MMDA/other government agencies to do in order to improve the traffic situation in Metro Manila?

[Physical Solution]

- Though Widen existing road is the highest, all items were relatively high percentage to be selected as important solution.

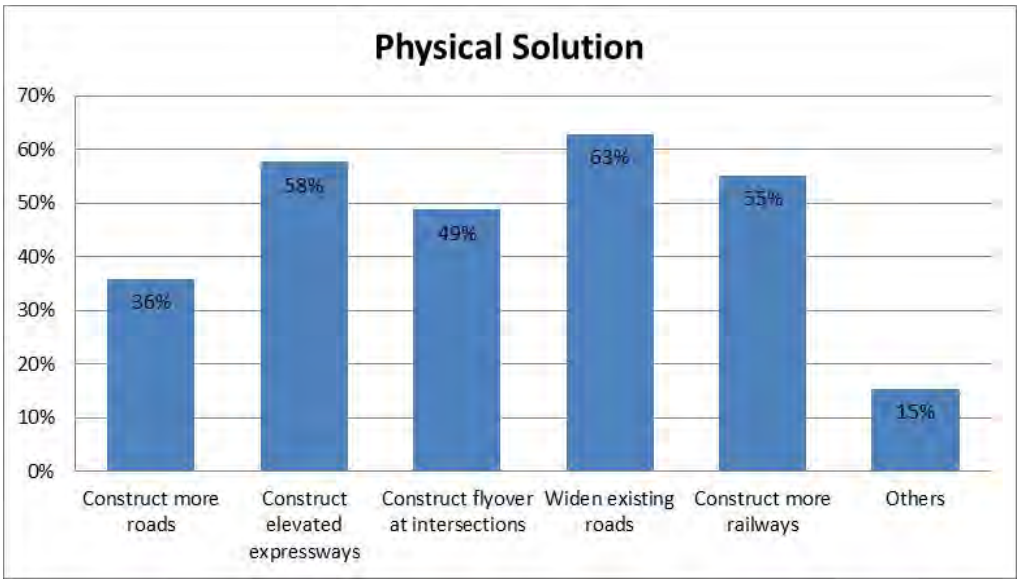


FIGURE 1.1-5 IMPORTANT PHYSICAL SOLUTION

[Soft Solution]

- Strict enforce traffic rules and regulation was the highest percentage. In order to implement the ITS application, enforce traffic rules and regulation should be fully considered.

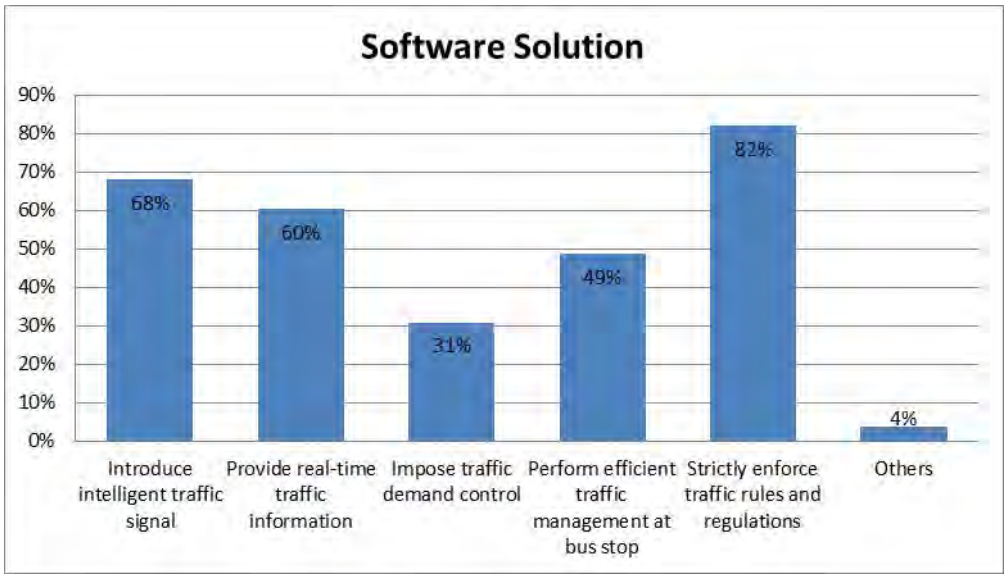


FIGURE 1.1-6 IMPORTANT SOFTWARE SOLUTION

Q. What do you think the road users can do to improve the traffic situation of Metro Manila?

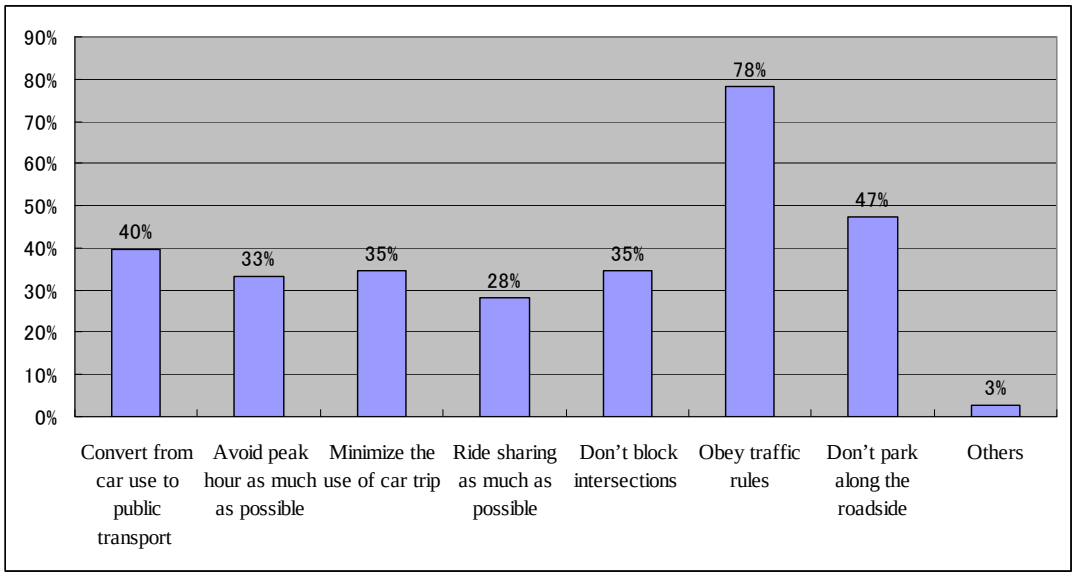


FIGURE 1.1-7 SEMINAR'S SATISFACTION (1)

Q.Do you have any comments or suggestions for the next seminar to be more successful and useful?

[Comments and Suggestion for next seminar]

- How about presentation this in Cebu with all the stakeholders.
- The attendance of all who were invited must be present to hear from them their suggestions and comments and subsequently to have a dialogue with them to push through ITS in the Philippines.
- Actual field trip with existing ITS in the Philippines. MNTC and SLEX
- It would also be appreciated it if a site visit to one of the existing Toll ways with in-place ITS should be considered. Because of the highly technical presentation of the ITS hardware aspect, it would be comprehensive if actual observations and presentation of the technological aspect to be pursued.
- How about the issue the synchronization of construction of DPWH, PLDT, Maynilad, etc.?
- Presentation should be converted to English. (Some of the important slides showing screens captures of the ITS application could have been more appreciated of it was in English.
- PowerPoint of some resource speaker are not readable at the back due to small font used and the combination of font color against background color is not good (contrast)
- Include representatives from the academic since students, teachers,/researchers can also be tapped as valuable key players in the development of ITS-Phils.
- Discuss ITS technology applicable to Philippines in more detail including technical systems, costing, sources of fund for project implementation
- My comments or is to have enough days to undertake this seminar and actual field

observation to this (ITS) system/devices. Thank you for inviting us.

- More traffic devices to be introduce relative ITS in order to improve traffic situation and ITS application environment in Metro Manila
  - Some of the guest was not appeared to the seminar, how we address the questions or problems
  - - But the overall presentation was great
- ITS adopt of all local government unit to cost traffic congestion in the city or within Metro Manila
- I would suggest the presenter to be all Filipino speaker, so it could be delivered or expound the subject clearly.
- The results of these seminars must be disseminated to all concern government agencies and will start the next phase based on these results.
- Coordinate with LTFRB/LTO (to control the number of vehicles (buses) in major roads; also their part in addressing the issue.
- Smaller focus attendees
  - To present the most workable/implementable ITS application on the present/existing situation of traffic and the existing facilities/structure (short term)
    '- To present the most effective and efficient ITS application to improve the traffic situation in Metro Manila both physical solution and software solution (long term)
- This seminar shall be replicated in some other field so that information dissemination will be done to every Filipino citizen to do their part. More software's or a more comparative analysis on the traffic situation in Metro Manila to be highlighted for us to be able to contribute some ideas and more interaction during the session.
- To respect speakers (foreigners) must speaks aloud and more clear. Do not rush.
- Improve presentation of lectures
- A larger venue for better accommodation
- Public Information dissemination
- May I suggest that you give us information on the real traffic situation within Quezon City for us to be able to address the traffic problem in the City.
- Congratulations to the JICA Study Team for the very successful ITS Seminar the Speakers were all impressive and excellent hopefully the 3rd seminar will be in Japan so we can actually see the ITS efficiency and effectiveness. Thank you very much.
- We belong to the railways sector but the information/knowledge gained will be more very useful in the preparation of our Development Rail Map for LRTs in all Metropolitan areas in the country. In the succeeding seminars can you please include an integrated system which covers the LRT (elevated) railway systems like AFCS.
- Seminar should be conducted in conjunction with a benchmarking visit to ITS installations in an ITS member country.
- More materials/information on the possible Japan ITS application in the Philippines - more

on its technology what should be done and how much will it cost. Can it be augmented to the project on ITS that at present is MMDA wish to accomplish

- The venue of the seminar must have enough parking to the attendees and must be accessible
- Allow private motorist to participate and voice their comments and suggestions
- More detailed discussion/presentation to include LGU input to completely study the ITS in Mega Manila
- Keep up the good work
- DOTC Involvement
- I do like to have more seminars to make more knowledge/experience of different systems regarding this Intelligent Systems or Intelligent Transport System (ITS). More power to JICA/MMDA/DPWH. Thanks for being a part of this seminar.
- Appropriate representative from DOST, DOTC, MMDA from different Unit, telecommunication companies, etc. must attend for the next seminar to address issues and concerns (re: ITS) and to have an effective and more meaningful discussion.
- This seminar was well conducted! Congratulations! =)
- More audio-visuals and simulation presentation for better appreciation especially on ITS applications on expressways and urban highways
- Field Inspection at Japan
- Good English Speaking Speakers
- A detailed presentation is a must for 3rd sessions emphasis on policy LGU participation, LTFRB review on existing line, franchise to maximize public utility vehicles, if needed re-map/re-define so not duplicate or double the service to public
- Try to invite more toll way operators and LGU's traffic management department to learn and appreciate their insight and ideas on the same matter and add more interaction activation
- Establish permanent members of ITS-Philippines and conduct a regular meeting venues in different agencies to be fully aware of the existing system being utilized.

(6) Pictures

<table>
<tr>
<td> 
1st day Opening Remarks
DPWH, Assistant Secretary
Maria Catalina E. Cabral</td>
<td> 
1st day Welcome Address
JICA Philippine Office
Senior Representative
Susumu ITO</td>
</tr>
<tr>
<td> 
2nd day Keynote Speech
DPWH Secretary
Rogelio L. SINGSON</td>
<td> 
2nd day Welcome Address
JICA Philippine Office
Chief Representative
Takahiro SASAKI</td>
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<td> 
2nd day Closing Remarks
MMDA General Manager
Ms. Corazon T. Jimenez</td>
<td> 
JICA Study Team
Mitsuo KIUCHI</td>
</tr>
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1.1.3 3rd Seminar

(1) Objective

Objective of the 3rd seminar is to explain the proposed ITS Master Plan in Metro Manila and Mega Manila and Standardization of ETC.

(2) Seminar Program

Minutes of the 3rd Seminar on Intelligent Transport Systems (ITS)

26 February 2013

Basil 1 and 2, The Bayleaf Intramuros, Muralla corner Victoria Streets, Intramuros, Manila

08:30 - 09:00	**Registration**	
09:00 - 09:15	**Opening Ceremony** **National Anthem and others**	
09:15 – 09:30	**Opening Remarks**	**Dir. Remedios G. BELLEZA *in behalf of*** **Asec. Ma. Catalina E. CABRAL** ***Planning & PPP Office, DPWH***
09:30 – 09:45	**Welcome Remarks**	**Mr. Floro ADVIENTO** ***JICA Philippine Office***
09:45 – 10:15	**Proposed ITS Master Plan in Mega Manila**	**Mr. Ryuichi UENO** ***Deputy Team Leader***
10:15 – 10:30	**Open Forum**	
10:30 – 11:00	**Measures for Sustainable ITS Dev't and Pilot Projects for F/S**	**Mr. Mitsuo KIUCHI** ***JICA Team Leader***
11:00 – 11:20	**Global Trend of ITS - "Present and Future"**	**Dr. Hiroshi WARITA** ***JICA Team Member***
11:20 – 11:45	**Open Forum**	
	***** LUNCH BREAK *****	
13:00 – 13:20	**Standardization of ETC**	**Mr. Mitsuo KIUCHI** ***JICA Team Leader***
13:20 – 13:45	**Open Forum**	
13:45 – 14:15	**SOMCO Intelligent Transport System**	**Ramon M. BORROMEO** ***President/CEO, SOMCO***
14:15 – 14:30	**Open Forum**	
14:30 – 15:00	**Update to Traffic Information Provision System of MMDA**	**Atty. Yves Randolph P. GONZALEZ** ***Director III, OIC-TDO, MMDA***
15:00 – 15:30	**Tool for Assessment of ITS and Overview of an ITS Study on Advanced Information System**	**Dr. Ricardo G. SIGUA** **JICA Team Member**
15:30 – 15:50	**Open Forum**	
15:50 – 16:20	**Closing Remarks**	**Mr. Michael M. GISON *in behalf of*** **Usec. Corazon T. JIMENEZ** ***General Manager, OGM, MMDA***

Master of Ceremony: Mr. Carmelino Jesus C. TIZON

(3) Attendance

DPWH	24
MMDA	4
NEDA	1
TRB	2
NCTS	1
O&M Company	17
Embassy of Japan	1
JICA Manila	2
JICA Study Team	10
Total	**62**

(4) Minutes

Open forums were conducted after each presenter of the topics. The Comments (C), Question and Answer (Q & A) are as follows;

1. C, Q & A – Proposed ITS Master Plan in Mega Manila

1.1 Q: MMDA

- What will be your (JICA Study Team) approached to your Study about the Spanish System?

A: JICA Study Team

- SCATS, they have their own system. They don't have to disclose their system.
- We are actually targeting Phase-3, maybe it can be implemented using Yen Loan.
- My presentation (Tool for Assessment of ITS and Overview of an ITS Study on Advance Information System) attempts to address that issue this afternoon.

1.2 Q: DOTC

- For the ITS Development Area and ITS User Services, under the Public Utility Vehicle (PUV) Management, you have identified bus monitoring and control information system, is this similar with what we see abroad, in each bus terminal, a passenger can see what time a certain bus is arriving, will this information on time of arrival be included in your study?

A: JICA Study Team

- We will be proposing two (2) kinds of monitoring system. One is for passengers; they will be informed when the bus is arriving. Another one which is already what MMDA

is implementing, how to control problem buses, there are some illegal buses in operation sometimes they cut their trips, this needs to be controlled, more on surveillance purposes. MMDA is going to control such operation.

C: DOTC

- We will be working closely with MMDA because we are the one giving franchise to the bus operators so we have to control bus operation.

1.3 Q: DOTC

- What is the coverage of Mega Manila?

A: JICA Study Team

- Coverage of Mega Manila are Regions III and IV-A, our study area.

1.4 Q: Toll Operator (Easytrip)

- On the Automated Toll and Fare Collection in the Implementation Schedule, I've noticed that in the interoperability system, the Skyway and SLEX has already started implementing this interoperability. Will this system be implemented in other expressways outside the scope of SLEX and Skyway, meaning will the North be welcome to join them with the South, and the Cavitex, will also be welcome to join them?

A: JICA Study Team

- With regards to toll expressway, we are actually proposing three kinds, one is standardization of ETC, another one is interoperability agreement among toll operators and third one, Standardization of traffic data collection and information system.
- Right now individual toll operators is doing on their own. I am expecting though it might take a long time but it is best to create consensus among operators, so in that sense TRB and DPWH should do good effort. Maybe it might take a long time until consensus is created but hopefully, toll operators would agree soon.

C: Toll Operators (Easytrip)

- In the Implementation Schedule for the Automated Toll and Fare Collection, Interoperability and Standardization of Toll Collection System, it says here that systems development is expected around 2015 – 2019. Technically, I think all three parties are in agreement that interoperability will come sooner than later than everybody has expected because technically speaking we have already adopted a unified ETC system, that one from DSRC, sticker RFID tags. So, technically, San Miguel will agree with me, so probably it's just about commercial agreement.

1.5Q: Toll Operators (Cavitex)

- Just a clarification, during the implementation of the project, interagency cooperation is very much needed, what will be the approach for the by-in of all these inter-agency agreement, will it be in the form of Legislation or in the form of regulation? Technically, everybody has different system, and everybody has their own benefits and weaknesses. Now upon the recommendation of JICA team for example, what will be the approached of the Government in terms of deadlock in the decision-making?

A: JICA Study Team

- We have explained the ETC system, which one you choose will depend on you. We have presented the different characteristics of each ETC system. And I hope TRB, DPWH, and toll operators will talk closely, and select the best one, on the part of the operators but maybe it might be very difficult to agree but hopefully consensus will be created so that standardization will be achievable.

A: JICA Philippines

- Just what JICA has been doing for almost 20 years, all we can do is a recommendation; it's up to you what to choose. We don't want to intervene to any internal affairs. So, it's the coordination is the key but it is a very difficult as to which agency must take a lead and which one will follow. But it's all we can do.
- With MMDA as well, we all know that the traffic jam causing such a huge weight has been in the MMDA area and they are losing so much opportunity but even though we can introduce some of the most effective traffic flow system but still there are so many people that will not follow the direction or even traffic enforcers doesn't follow the rules.

2. C, Q & A – Measures for Sustainable ITS Development and Pilot Projects for F/S

2.1 Q: DOTC

- In the Institutional Arrangement, is it a combination of both public and private sectors? Is it similar with DOTC?

A: JICA Study Team

- It would be a third party, not necessarily private; it is more on Government controlled. It would be more on public sector involvement. Yes, more on something like that.

3. C, Q & A – Global Trend of ITS "Present and Future"

3.1 Q: Toll Operators (Easytrip)

- Regarding the Traffic Condition Prediction, this is somewhat very sensitive issue, with the current infrastructure that we have, do you think that this kind of technology or application can be employed in the near future if ever there will be an upgrade of this infrastructure, how affordable can this be?
- In Tokyo, how do you relay the message to the users? What kind of infrastructure?

A: JICA Study Team

- Based on the accuracy, it is very important compared with the current situation
- In Tokyo, case of internet, Variable Message Signboards (VMS), and car navigation system with useful information but actually just result, only travel time and congestion length is provided.
- I think here in Metro Manila, we can achieve it. This traffic information can be sensitive, it depends on the driver. Very different, but here in Manila, people can provide a little bit low of accuracy, internet side can provide this traffic result.

3.2 Q: DOTC

- You introduced the use of smartphones, do you (users) have to pay a certain amount to get this kind of information in your smartphones? Do you need to pay more?

A: JICA Study Team

- In case of Japan, there are cases you (users) have to pay to get information or get information free of charge. But here in the Philippines, it's free, in the case of Waze, you need not pay.

C: DOTC

- They are proposing something that users/Passengers need to pay a certain amount to access this information. In using their smartphone they have to pay.

C: JICA Study Team

- There are many private companies who would like to get money from users. However, most of the time private company can also provide some advertisement. Private company can collect advertisement fee from other company so they can provide the application free of charge. So there are two cases, sometimes you pay, sometimes without pay.

3.3 Q: DOTC

- On the proposal for transportation fare collection, you are proposing for an integrated system, like taxi, bus, rail, jeepney, do you think we can do this in the Philippines?

A: JICA Study Team

- Just public transportation, only rail.
- I think DOTC is already in the process of selecting company. In that case only common ticketing system for the three rails. In Japan, not only rails, it can be used in buses, sometimes can be used at the convenience stores and so on. As presented, it can also be use even for ETC. However, applications for Bus Company here, I doubt a little bit, because Bus Company is rather a very small company, I think they need cash every day. So I don't know applicability or if it will be done in this country or not.
- Likewise, Taxi is more or less individual company, another problem, the taxi driver and Taxi Company has contract. The taxi driver pay money to the company and he will operate the taxi for a day, extra income is for his own. Such kind of system is very common here, so I don't know if common ticketing system for bus and taxi companies is a little problematic or doubtful. Definitely for rails it is very possible, no problem, but application for buses, taxi and jeepney, I doubt it.

4. C, Q & A – Standardization of ETC

4.1 Q: JICA Study Team

- To all expressway operators, do you think standardization is necessary?

A: Toll Operators and other attendees

- Yes.

4.2 Q: JICA Study Team

- If standardization is necessary, what is the stand of TRB? The Executive Director has once told about summit conference regarding Interoperability, what is the plan of TRB, could you explain?

A: TRB

- The plan for Interoperability Summit is still there.
- Has some discussions for some groups to push through with the systems interoperability because at the end point there is really a need for interoperability for toll expressways. Right now our toll expressways are connected one by one, so as to lessen the burden of the user. The interoperability of toll system is very important.

C: Toll Operator (CAVITEX)

– We are one with the TRB's direction of pursuing interoperability. In fact, we are actually very new in this ETC system. We have just implemented our E-tap system at a very low cost, middle of 2012 and there seems to be some headway, we are looking forward for the summit that the Director is planning. We will surely be engage in those discussions.

4.3 Q: JICA Study Team

– By the way, how many cars?

A: CAVITEX

– I think we're over 30,000.

4.4 Q: JICA Study Team

– And what has been done with the many passengers are reloading at toll gates, do you think to add some reloading stations or some stores for reloading?

A: Toll Operator (CAVITEX)

– Yes. As I have mentioned earlier, we are quite new in this E-tap, so we were actually surprised with the outcome that's why we are planning for building some locations other than our toll booths to put up loading stations, and in fact we are having some discussions with some establishments probably for loading of our E-tap cards.

4.5 Q: JICA Study Team

– Are you planning that card can be used for other purposes? Like restaurants, gasoline stations and so on.

A: Toll Operators

– Yes. Definitely. The platform that we are using is very much interoperable. Like when you go to Singapore and Hongkong, they use smart card in paying rails, etc, so, we are heading in that direction, with some more establishments cooperation, well, definitely we are in that direction.
– In addition on E-tap, if our deal with RCBC Bank will push through, your credit card bearing VISA can now be used in the expressway, so just one card to use in many transaction like banks, restaurants, so it's no longer be taking into consideration of about having no balance. Automatic loading station at the banks. Unless of course if the credit card already reach its credit limit.

4.6 Q: Toll Operator

– Regarding the comparison between the devices all the way to the smart card, regarding cost of OBU for the DSRC it's about 2,000 Php, for passive it ranges from

1,400 to 1,700 Php and the RFID from 50 to 75 Php which will be shouldered by users, may we know especially the RFID, is it using 6C or 6B Standard?

A: JICA Study Team

- 6C Standard

4.7 Q: Toll Operator

- The 6C Standard from China, would more than cost that much, but for the Silit and Transcore may be just 200 pesos. One experience here in the Philippines why we have very low penetration rate is not preference but cost, so what do you think if we introduce a highest priced DSRC, would you expect that penetration rate of the ETC would go up or go down?

A: JICA Study Team

- Actually we presented it just for comparison; it is up to you to decide which system to be adopted by talking with each other. Very difficult for us to recommend one system and hopefully TRB would lead in the discussion. For the Philippines, which system is the most recommendable or not.

4.8 Q: Toll Operators

- Regarding the vehicle speed, the TRB will have to decide either a Free-flow traffic or barrier type? Because if the TRB would like to adopt a free-flow traffic just like in the other country, then speed would be a factor, although I'm not really sure about the speed limitation of the RFID because recently we said it's something like 60 km/hr, an RFID you can do that because it could read right away, but the question is would TRB require the adoption of a free-flow, then we need to adopt a device that can be read high speed , but if TRB would say let's keep the barriers, all the vehicles would have stop so even for all the devices would not matter.

A: TRB

- Actually as much as possible we do not want the barriers but it's because we have different toll operators, that' why the barriers are needed, as much as possible we want a free-flow.

C: Toll Operator

- So it means that from the operators' point of view, TRB is also looking into a free-flow.

A: TRB

- Because we are also looking for the convenience of the motorist.

C: Toll Operator

- So, if the policy of TRB would be for free flow, therefore we reduce the number of barriers and we must increase the number of ETC, to consider the requirement of TRB.

4.9 Q: Toll Operators

- Updating the speed, is really dependent not on the device but based on the back end system of the system employed by the operator so therefore if the system design is status trained between the DSRC Active all the way to the smart card, although the smart card would be easy because it is front loaded, so no need for back end processing, therefore your DSRC Active is not also front loaded meaning there is a balance in the DSRC.

A: JICA Study Team

- It's a credit card, so postpaid system, but when there is no balance in the bank, there are certain lanes for no balance; they could still record the exiting.

C: Toll Operators

- For the DSRC Active what makes it instant is it can be fast updated at the end of the day then charge to the credit card, that's why it has no back end communication. Your smart card is front loaded like an e-purse that's why it's instant.
- So as far as the DSRC active and the RFID passive because there are certain active in V-drive, it all depends on the system configuration or the back end system.
- As far as reading and updating the system

4.10 Q: Toll Operators

- What frequency is the DSRC Active operating in Japan right now?

A: JICA Study Team

- 5.82

C: Toll Operators

- So similar with E-taps here in the Philippines while the RFID range from 9.18 to 9.20 Mhz difference in power requirements for the system being proposed.

4.11 Q: Toll Operators

- Regarding the Supplemental Toll Operation Agreement (STOA), may require some adjustment because of the ETC, will the adjustment be going down or going up?

A: JICA Study Team

– This refers to additional investment required, so usually toll rate will be adjusted upward.

4.12 Q: Toll Operators

– But in the long term, because in the Philippines the DSRC is shouldered by the motorist, so if the device is shouldered by the motorist and therefore additional investment required for toll booths so would it be actually cheaper to increase ETC penetration because the operating system in the long run is cheaper? It should actually make the cost of the operator lower.

A: JICA Study Team

– In that case TRB will not need toll rate adjustment. So toll rate can be lowered. But anyway, you have to think of many options.

C: Toll Operator (SOMCO)

– What I just noticed in all the discussion about moving toward standardizing it, with the involvement of the TRB, the DPWH, toll operators, so maybe the toll rate concessionaire should be considered because if there will cost that will be involved as they would be included. The other one, we also need to involve the motorist. We need to hear it from them that they would be ready to do this, that they would be willing. You have a very interesting data there that says that should there be a integration that would involve the Northern part of Luzon with the Southern part of Luzon with the use of an OBU, 61% said they are very much willing, this is a very interesting data…when we had a survey on this, 5% or even less are interested. We are really happy to see some development like this. So, could you likewise enlighten us how the data was obtained, because this is really a game changer? We have never seen such an interesting data of interested party.

A: JICA Study Team

– We send our surveyors at restaurants and gasoline stations and we collected around 2000 samples. Then that's the result of the 2000 samples, so the answer is quite realistic answer.

C: Toll Operator (Easytrip)

– It would be very good if we can see the 61%. My appeal to everybody is that currently we only have two toll road system with the ETC system, in the fast 6 to 8 months we will have CALA, Daang Hari, etc. How many of the ETC technology will be introduced. If we wait for the time for everybody to come in with their own technology, we will be like Europe in the year 1990 where they have a lot of currencies and nobody capable of handling it. So if I may, the time is now for us to

act on the ETC interoperability. I know it's mandated in the PPP Project but I do not understand why it is not being followed or why they are like some sort of leadership who should take the driver seat to be driving everybody, leading them to what kind of technology that should be used. It doesn't matter whether it is DSRC active/passive/RFID/smartcard, what is important thing is, for everybody to follow a single kind of technology for the benefit of the motorist.

A: JICA Study Team

- That is very important, especially in this country that there are many different operators, Standardization is definitely needed. I hope TRB will take the lead in this issue.

C: Toll Operators (MNTC)

- I agree with Skyway's concern on interoperability. I also agree that the best way to adopt the interoperability is to have a mandate from the TRB or DOTC. As far as I know, the DOTC is developing an ASTS for the Metrorail Transit. I think that will be a good start for interoperability. However, when we talk about interoperability it does not necessarily mean that two toll road networks should be interoperable, it could also mean that one medium can also be used in parking system or access system and exit, it could be a multi-application that can be embraced by all.

5. C, Q & A – SOMCO Intelligent Transport System

5.1 Q: JICA Study Team

- Is your (SOMCO) staff doing enforcement?

A: SOMCO

- Yes, sort of.

5.2 Q: JICA Study Team

- We are studying two locations if we can install traffic signal there. What do you think?

A: SOMCO

- Traffic signals, it depends. If they are manual, we are probably investing in that location. What needs to done there is to know the traffic volume of vehicles, look at the configurations there, look at the number of exits available by way of the different subdivisions and commercial establishments all found in there. We have already started discussing with TRB on at least to add one lane each on the exit just to manage all the traffic all the way. And when we talk about managing traffic, some of

you who live the DF area, or even in the Better Living area, you may notice that even some of our traffic enforcers are still all the way even a few kilometers inside the street in the Better Living and even the President's Avenue which we have the motorcycles largely because we need to manage the route of the tricycle drivers there who probably lost their waiting/turn around area to another large establishment. So it's that kind of proactiveness that one needs to do because mainly because we are an urban toll road, and I guess we is more problematic than any other toll roads that are not, but I guess it's a good idea to see those possibilities, we are always open. We even need to get the help of MMDA because recently we've been trying to get in this section going already to the C-6, the Taguig area, there is a round about there, a rotunda, that has probably overgrown the type of vehicle that passes because there is now a new route for a lot of trucks and probably the rotunda is a little bit large. We have already allocated money, and we already told the Local Government if nobody wants to make it, we will make the rotunda a little smaller to give the vehicles an easier turn around. But then again, as it is for some reason, the Local Government would say a Final no objection papers. So there you are, and when we thought that there are no more hindrance, At no cost to government, at no cost to motorist, pure public service, but obviously at all cost to me and probably additional cost to me, but I don't know why I have to pay extra for that, but this are the things that we do and it can be frustrating at times.

5.3 Q: Toll Operator (Easytrip)

- What is the ETC penetration now in the Skyway? I was told that as you increase the ETC there will be savings on the operation and maintenance of any toll roads, say when you increase 10% on the ETC, you will also be savings on your part?

A: SOMCO

- Savings, you would think that more use of ETC would mean more savings, in general yes. But it doesn't follow to all toll roads. But in our case, it may be not. You move them faster into the main stream of the traffic like in Bicutan and Sucat, so I need to move them faster. But for me, what is important is where is the motorist in all these? What do you want the motorist to experience? Essentially is that, in most toll roads, anything that move the motorists in the toll roads is a good thing.
- Only a yes, only to the extent that to move vehicles that would otherwise be blocking other vehicles that are say in Bicutan. You want to move them fast from the exit so that more vehicles could passed through faster to Sucat.
- Putting them into the Doña Soledad exit faster. But then again to get everybody out all the way is a good thing, savings, as the way that my company is set up is I'm a pure cost centered, any money that comes my way, I convert it to improve service, maintain the road, have better equipment, things like that. That's our orientation, 35%

in penetration; we could use that particularly to Skyway going to Makati and Manila on a Monday. I'm not too sure in going back , but in Bicutan maybe not. Overall, it's a plus.

- Savings is very limited, there could be Savings for some areas, for others it's just a little saving. But if it goes something better for the motorist experience, then it's a yes, therefore it could be a go.

5.4 Q: DOTC

- Patrol vehicles do not have traffic enforcement function, meaning they do not apprehend violators in the highway?

A: SOMCO

- No, we do have quite a number of operations for apprehension of vehicles that violate the law particularly the laws of the LTO. We are one of the leading providers of LTO because of the number of apprehensions that we do on a daily basis. We do not however, apprehend in the middle of the tollways. We do have designated areas to apprehend, while we do this just like in NLEX, we also have the laser guns and also in SLEX. To be able to monitor those who overspeed. Lately, what we have been doing also is to enforce the Truck Ban because I think not too many of them want to recognize the 10 o'clock extended time of MMDA, we have to enforce this because we really need to help unclog the EDSA which is the vital artery for everybody.

5.5 Q: DOTC

- So you are deputized by our agency?

A: SOMCO

- Yes.

5.6 Q: DOTC

- How many of these violators? Up to how many percent of the motorist are violating, for example the speed limit?

A: SOMCO

- When we started this about a year ago, we were doing of about 50 on the limited time that we conducted this, we were conducting this for 2 – 3 hours on a daily basis, we are happy to report that this has gone down to about 22 a day, largely because of the realization of motorist that they cannot get away with this. One of what we do is that with the use of the CCTVs to improve our enforcement procedures and to avoid embarrassing motorist, what we do is in the designated areas, we have laser guns, our spotters, when you get spotted in one area, this will be relayed over in a radio to

the area where we have our traffic enforcers, even to the highway patrol group awaiting for your happy arrival. And this is conducted in a safe spot, that's where we have a CCTV camera or two that's closely monitoring, I have somebody, there is actually someone who writes down the plate number because later on every time you stop a vehicle, there must have a ticket issued each time you stopped a motorist. We do not allow a non-issue of ticket because we are not supposed to stop any vehicle that has not been spotted earlier.

- Typically the reaction can be somewhat comical, because you see somebody there, we have a particular distance, we have to stay away from the motorist, you can see from the movement of the person is, if there is a way out of it, so the next action of our traffic enforcer is to point at our camera. And would say you are on TV, so don't make it anywhere. So the next action is the motorist scratching the head, then the next action of course is to give his license.

5.7 Q: JICA Study Team

- Usually At-grade expressway is crowded, and elevated section not crowded, are you planning to do some traffic condition information so that some traffic would utilized the elevated section or traffic would be guided to use elevated?

A: SOMCO

- What we do is that except in extreme situations, like in the past, there use to be flooded areas in Magallanes, and there will be a severe traffic incident, that's the only time we tell the motorists to take the elevated expressway. Because traffic conditions changed so fast, if you tell the users to use the elevated is a little sensitive. So telling the people to use the elevated because taking the elevated is usually the choice of the motorist. On the quick consideration of which is the fastest, of course the elevated, the most economical may or may not be the one which has the least traffic. Traffic actually may be based on actual situation and some perception, I can tell you why you can go to the upgrade when you take the elevated section, the ramp itself could get you maybe 200 to 300 m ahead, but the problem is this, if still you get stuck in the traffic, you would say, why did I believe in the first place, that is why we just find ways to move traffic towards your direction home. And while it may not always work simply because of sheer volume. We still get confidence from people that we know even from the local government that "hey, you make a little bit of effort"
- We can't do much, especially when doing a lot of improvement in waterworks, telecoms, sometimes one after another, after three months of having to contend with one lane then there will be another waterworks the next month. Well, I guess that's the challenge, and that's what keeps me employed.

6. C, Q & A – Update to Traffic Information Provision System of MMDA

6.1 Q: DOTC

- With the traffic accident, will this result to a speed analysis?

A: MMDA

- Of course, one of the main goals of our enforcement of anti-speeding is to reduce accidents along Killer Highways, and I think we have conducted in the past year, even before implementing the over speeding. So, of course as long as there is data, we can do correlation. The average speed today is 66kph and there are 5 accidents, and the average speed yesterday was 50kph and there was zero accident, and so of course having all these data collected together will always be good in the correlations of data.

7. C, Q & A – Tool for Assessment of ITS and Overview of an ITS Study on Advanced Information System

7.1 Q: JICA Study Team

- For the Basic Components of Traffic Simulation, you have mentioned about Users Behavior, local settings and issues. As a matter of fact we have conducted traffic observation survey, and we visited more than 20 intersections and we observe the actual traffic behavior of some large buses and jeepneys are deteriorating in some capacity not only in the tracing of the road but also in traffic signalized intersection. We thought that such kind of traffic behavior of jeepneys and large buses has a very big impact and creating really very chaotic urban traffic condition. It may be out of the scope of the ITS Master Plan presentation project but for discussion point to be discussed in order to find out some ways to improve the current chaotic traffic condition in Metro Manila. As of the moment, the traffic simulation model can be one of the how-to to find out the solution to improve the traffic condition. Did you take into account such traffic behavior of large buses and jeepneys in your traffic simulation or not? or is it included?

A: JICA Study Team

- The issue on the behavior of the drivers of jeepneys and buses should be incorporated in the traffic simulation. A number of research works has been done in the past together with some of my colleagues in NCTS with regard to simulating the different behaviors but not yet with the buses. The simulation that has been presented, as I've said still requires some fine-tuning, I injected as much as possible some conditions or probability distribution for example but these are based on prior research done at NCTS, there is still a need to look at the drivers' behaviors such as lane changing,

swerving, weaving, and so on, those have to be carefully studied, the stopping, those are supposed to be simulated. VISSIM for example is capable of looking at stops of any public transport vehicles. That is still under development. But for high speed roads, highways we may have to look at the distribution, the gap acceptance.

- In the past, I was trying to compile different studies done by the NCTS students who took Masters and PhD and I'm trying to inject in the simulation program. But still a lot of work to be done before we could say that we have modeled the local driver or condition.

7.2 Q: Toll Operator (Easytrip)

- In the whole study of ITS, will there be any part here that will strategize on the solution for the traffic that we have, from an ITS point of view that we can look at?

A: JICA Study Team

- Yes, there are many ideas, proposals which could be very well said, putting maybe a BRT system, or there is a suggestion of making the EDSA one-way, there are these ideas floating but I tend to believe that almost anything can be done thru microscopic simulation. Comparison or assessment of different scenarios can be tested.
- In connection with the question this morning, the Philmatis is an attempt to kind of predict traffic condition. Maybe not one urgent but our estimate is it could predict maybe some 20 to 30 minutes of what will be the expected condition combining with the information on weather and existing traffic condition.

C: DPWH

- Along EDSA, there was a study being proposed that would cost something like Php 170 Billion to put up an elevated highway along EDSA, and I think around Php 400 Billion to put up a tunnel. There are some conceptual studies that was prepared, there are efforts by the government like that of DOTC and MMDA, to minimize the flow of bus traffic along EDSA. This was announced by the President that we will be working about the Integrated Bus Terminal System, with three specific locations, interventions that need to be addressed to minimized traffic along EDSA.
- The Philmatis that has been presented is with what we discussed with DOTC and MMDA yesterday, I think they are just looking for funds; maybe an agency can be tap for funding on that so that they could start their project as scheduled, to be realized by December 2013. Hopefully DOTC will provide the funds or MMDA will be the one to provide.

A: JICA Study Team

- Just to clarify that, the Study has some funds already. I think DOST is looking at the expansion or extension of the project. For these, we are just looking at a Pilot corridor.

For this to be realized, just like any other ATIS system would have, it has to be instituted, involving network so the system could recommend any alternative routes in times of good or bad weather. So, just an extension of the project.

7.3 Q: JICA Study Team

- Very interesting presentation, I think that simulation can be used not only for information provision but also for evaluation, traffic congestion tool. Do you have any plan to use this simulation as evaluation tool?

A: JICA Study Team

- Actually that is the first part of my presentation, as an evaluation tool. The Philmatis, advanced information system is an entirely a different topic. Although we could have some simulation later on once we have installed detectors, we should be getting automatically data that can be inputted into the simulation program.
- In fact the SCATS system that is still being used in Cebu. It can be put in this system, simulation software. I don't know exactly if Hermes system is the one to be used/introduced eventually. But I heard, Hermes system is very effective especially for system involving public transport system. Just like BRT, bus priority system. So, I think this can be hooked to any simulation program like VISSIM for evaluation purposes, I hope MMDA would try to look at this. So that we can assess the performance of the advanced traffic control system, there should be a facility to get data automatically to be send to the simulation program. There is a need to make use of this tool. It took us millions of pesos when we procure VISSIM, I heard MMDA has two (2) licenses, DPWH has another one, full licenses maybe we need to make use of this tools in the near future

7.4 Q: DPWH

- How much is this Philmatis?

A: JICA Study Team

- Philmatis is 14Million Php

C: DPWH

- They are requesting 18.9 Million Php.

A: JICA Study Team

- That would be maybe for Phase 2 , this one would requires development of system, sensors, the inclusion of rain gauges, CCTV cameras and so on.

1.1.4 4th Seminar

(1) Objective

Objective of the 4th seminar is to explain the pre-feasibility study result and overall recommendation of ITS Master Plan.

<pre-feasibility study>

- Phase III Metro Manila Traffic Signal Control Project
- Experimental Project of Traffic Signal Control
- Metro Manila Route Guidance System
- Experimental Project of Traffic Information Provision along MNR/NLEX Corridor
- Standardization of ETC
- Pilot Project Proposal on RFID based EDSA City Travel Time

(2) Seminar Program

4TH (FINAL) ITS SEMINAR PROGRAM
29 April 2013
Muralla I, The Bayleaf, Muralla corner Victoria Streets, Intramuros, Manila

08:30 - 09:00	Registration	
09:00 - 09:15	Opening Ceremony National Anthem and others	
09:15 – 09:30	Opening Remarks	Dir. Constante A. Llanes in behalf of Asec. Ma. Catalina E. Cabral *Planning & PPP Office, DPWH*
09:30 – 09:45	Welcome Remarks	Mr. Floro O. Adviento Program Manager *JICA Philippine Office*
09:45 – 10:15	- Phase III Metro Manila Signal Control Project - Experimental Project of Traffic Signal Control	Mr. Ryuichi UENO Deputy *Team Leader*

10:15 – 10:30	Open Forum	
10:30 – 11:00	- Metro Manila Route Guidance System - Experimental Project of Traffic Information Provision System along MNR/NLEX Corridor	Mr. Tetsuya SATO JICA Team Member
11:00 – 11:15	Open Forum	
11:15 – 11:40	- Standardization of ETC System - Overall Recommendations	Mr. Mitsuo KIUCHI JICA Team Leader
11:40 – 11:55	Open Forum	
	*** LUNCH BREAK ***	
13:00 – 13:20	Development of PhilMATIS (Philippine Metropolitan Advanced Information System	Dr. Ricardo G. SIGUA JICA Team Member
13:20 – 13:45	Open Forum	
13:45 – 14:00	Pilot Project Proposal on RFID-base EDSA City Bus Travel Time	Atty. Yves Randolph P. GONZALEZ OIC Director III, TDO, MMDA
14:00 – 14:15	Open Forum	
14:15 – 14:30	Review of 4 Seminars (Opinions/Suggestions)	Engr. Jonathan Araullo in behalf of Dir. Remedios G. BELLEZA Director, PMO-TEAM, DPWH
14:30 – 14:40	Closing Remarks	Ms. Corazon T. JIMENEZ General Manager, OGM, MMDA
	Master of Ceremony:	Mr. Carmelino Jesus C. Tizon

(3) Attendance

DPWH	21
MMDA	17
DOTC	1
NEDA	3
TRB	2
NCTS	2
O&M Company	7
Embassy of Japan	1
JICA Manila	3
JICA Study Team	8
Total	**65**

(4) Minutes

Open forums were conducted after each presenter of the topics. The Comments (C), Question and Answer (Q & A) are as follows;

I. Phase III Metro Manila Traffic Signal Control Project and Experimental Project of Traffic Signal Control

1. Phase I to III of Traffic Signal Control Project

- MMDA submitted a proposal to NEDA for the Phase I to III funding of greater than 1 Billion pesos including Traffic Signalization.
- Phase 1 is already with the Department of Budget and Management (DBM), Phase II was requested again. Likewise, a Feasibility Study (F/S) is being prepared.

2. Environmental Impact Computation

- The CO_2 emission reduction was computed using the Japanese standard. The Tokyo Local Government uses fuel consumption as a parameter.
- The Philippines has no updated environmental standard. It was recommended that the Department of Transportation and Communication (DOTC) together with the University of the Philippines – National Center for Transportation Studies (UP-NCTS) should make an updated standard applicable to the Philippine settings. However, UP-NCTS informed the body that there were studies regarding Environmental Standards which was conducted by ADB.

3. Capacity of the Traffic Control Center in Phase I

- MMDA's Traffic Control Center in Phase I have a capacity that could accommodate around 800 intersections. This is relatively at par with Tokyo's Control Center.

4. Image Recognition Type

- Phase I adopts a loop-coil type of traffic detector but in Phase III it is recommended to adopt an image recognition type.
- Image recognition type could really help a lot in recognition of major accidents, it's image processing could help in assessing real condition of traffic and optimizing traffic settings.

5. Bicutan and Sucat Intersection

- Bicutan and Sucat Intersection have more than 200 conflicts. The configuration is near exit toll roads.
- It was recommended that cost should be a comparison between traffic signal and traffic enforcers.
- Reducing the traffic volume in these intersections should likewise be looked into, like tricycles and motorcycles should not be allowed in these intersections.

6. Moratorium on Tricycles

- DOTC at present do not issue a moratorium on tricycles, they only register.
- Tricycles are under the local government units, the LGU are in-charge of its operations' control.

II. Metro Manila Route Guidance System and Experimental Project of Traffic Information Provision along MNR/NLEX

1. NLEX as a Test Case

- The Traffic Information Provision along MNR/NLEX is just a test case, if successful, this can also be adopted at the south (SLEX).

2. NLEX as a Test Case

- The Traffic Information Provision along MNR/NLEX is just a test case, if successful; this can also be adopted at the south (SLEX).

III. Standardization of ETC and Recommendations

1. Standardization of ETC

- It is the Toll Regulatory Board (TRB)'s role to come up with the standards for ETC.
- With ETC standardization, there is no need to buy all the different OBUs from different expressway operators. Likewise the existing systems need not be removed; they just need to be updated.
- All expressways are with short distances only, so there is a need to standardize.
- In Turkey (for example), their system of government is controlled by the government, but in the Philippines' system of government which is democratic, like US, the
- Standardization is really very difficult but if we will just think of the users' convenience it would be alright.
- Touch and Go is recommended for the first phase of standardization then non-stop in the next phase.
- If the system will use IC card, it can be used for other purposes.
- For the creation of Standardization Committee, the concessionaires must be included in the committee.
- There is a provision on interoperability in the concession agreement which is a manifestation that the operators and the board have a pre-conceived idea that the time will come for all the expressways to be interconnected. Interoperability is not an easy task that can be done overnight. An agreement must be entered into by the operators and the Concessionaires and not to be imposed with something. The TRB's role is to guide the operators and Concessionaires to come up with discussions. This seminar has helped in opening up about the matter on interoperability.
- By 2015, all expressways will be interconnected already. The OBUs economic life is consumed already in 5 years.

2. Recommendations

- Private vehicles for Floating Car Data (FCD), taxis may likewise be looked into as possible FCD.
- There is a New Plate Number scheme which will be implemented from the middle of this year.
- Strengthening of Drivers/Pedestrian Education and Enforcement of Traffic Rules and Regulations are part of the Recommendation of the Philippine Road Safety Action Plan (PRSAP) is of DOTC but no funding yet. Strengthening maybe possible by

concentrating first on the high priority among the list and likewise asking for additional funds.

- Where will the funds come from for the experimental projects? A grant from JICA maybe requested by the Philippine government through DPWH/MMDA/TRB.

IV. Development of PHILMATIS

- *No questions asked.*

V. Pilot Project Proposal on RFID-base EDSA City Bus Travel Time

1. Communication with the Users

- Similar to the lessons learned from TNAV, the city bus travel time will be integrated into the mobile applications, personal computers (pc), LED boards, and LED advisory boards at bus stops. It would be available to any developer to develop.

2. Anomaly could easily be detected.

- The System will be enhanced so that it could detect any anomaly. Like, if the normal travel time is but one hour and it's taking an hour and a half already, the traffic manager could easily detect that there is anomaly somewhere, maybe a re-blocking has happened or maybe there is a pot-hole that the drivers are just evading.

3. Colorum Buses

- Even with the use of RFID, colorum buses cannot be crashed out as it could not be detected with its use of any hi-technologies.
- Colorum buses are likewise not brave enough to ply along EDSA mainly because they are easily seen compared with colorum taxis/jeepneys. Should there be any colorum buses, their number is very minimal.

4. Type of RFID

- It could either be 6C or 6D, the type is not significant for as long as it could serve its purpose.

5. Detection of reasons for the delay

- Should there be any delay; reasons behind it cannot be known.

- There is no automatic detection of delay, the system could just alert that there is abnormality.
- In Japan, private companies are providing this kind of service. But in the Philippines since bus companies are only small-scale, they cannot provide such kind of service.

Annex 4.1 BASIC LAWS RELATED TO ROAD TRANSPORT

4.1.1 Public Service Act (CA 136)

Commonwealth Act (CA) No. 146, otherwise known as the Public Service Act (PSA), which was approved in November 7, 1936, created a Public Service Commission (PSC) which *shall have jurisdiction, supervision, and control over all **public services** and their franchises, equipment, and other properties, and in the exercise of its authority, it shall have the necessary powers and the aid of the public force ...*

The PSA defines "public service" in Section 13(b) Chapter II, as follows:

> *The term "public service" includes every person that now or hereafter may own, operate, manage, or control in the Philippines, **for hire or compensation**, with general or limited clientele, whether permanent, occasional or accidental, and done for general business purposes, any **common carrier**, railroad, street railway, traction railway, sub-way motor vehicle, either **for freight or passenger, or both** with or without fixed route and whether may be its classification, freight or carrier service of any class, express service, steamboat or steamship line, pontines, ferries, and water craft, engaged in the **transportation of passengers or freight or both**, shipyard, marine railways, marine repair shop, [warehouse] wharf or dock, ice plant, ice-refrigeration plant, canal, irrigation system, gas, electric light, heat and power water supply and power, petroleum, sewerage system, wire or wireless communications system, wire or wireless broadcasting stations and **other similar public services***

Based on this provision, public service includes, among others, public road transportation – e.g., services provided by public utility buses, jeepneys, taxis, and trucks.

The PSA further provides in Section 15 that:

> *no public service shall operate in the Philippines without possessing a valid and subsisting certificate from the Public Service Commission known as **"certificate of public convenience," or "certificate of public convenience and necessity,"** as the case may be, to the effect that the **operation of said service and the authorization to do business** will **promote the public interests in a proper and suitable manner.***

In addition, the PSA requires that the public service be owned by Filipino citizens, or corporations, co-partnerships, associations or joint-stock companies, 60 percent of the stock or paid-up capital of which is owned by Filipino citizens.

It appears that the standard of the *"promotion of public interest in a proper and suitable manner"* is intended to be ensured by the requirement of proof of "public necessity" and "financial capacity," which the courts have consistently recognized and sustained as valid requirements for the issuance of a Certificate of Public Convenience (CPC) or Certificate of Public Convenience and Necessity (CPCN).

The PSC has the following powers with regard to the quality of the public service to be furnished by the service provider:

- *To fix and determine individual or joint **rates, tolls, charges, classifications, or schedules** thereof, as well as commutation, mileage, kilometrage, and other special rates which shall be imposed observed and followed thereafter by any public service.*

- *To fix just and **reasonable standards**, classifications, **regulations**, practices, measurement, or service to be furnished, imposed, observed, and followed thereafter by any public service.*

- *To compel any public service to furnish **safe, adequate, and proper service** as regards the manner of furnishing the same as well as the maintenance of the necessary material and equipment.*

The role of the PSC is pervasive in all aspects of public service - from authorization, to operation, service standards, rates, schedules, financial systems and records, functions of officers and key personnel, transfer of ownership, and expansion of business, and even to compelling owners to sell the service and equipment to the Government. The PSA prescribes a strict regulatory control on both the economic and the technical aspects of transport. The economic regulation in the PSA, however, goes against the current policy direction to liberalize the entry and pricing of transport services on a competitive basis in order to promote efficiency. The PSA provides that services that can be reasonably demanded and furnished cannot be withheld or refused under pain of penalty. Violators would be subject to sanctions under the law.

For road-based public transport, the present successor agency of the PSC is the Land Transportation Franchising and Regulatory Board (LTFRB) which was created by Executive Order (EO) No. 202, dated 19 June 1987 (see **Annex 4.3.7** below).

Based on the provisions of the PSA, it can be gleaned that, among the reasonable service standards and regulations that the PSC/LTFRB can require of public road transport operators - in order to promote "safe, adequate, and proper" transportation service - is the installation and use of appropriate ITS devices that will provide the operators and their passengers and drivers basic travel information on, among other things, vehicle location, travel route, trip schedule,

loading and unloading points, and road and traffic conditions.

4.1.2 Limited Highway Access Act (RA 2000)

Republic Act (RA) No. 2000, dated June 22, 1957, otherwise known as the Limited Highway Access Act, defines a limited access facility as *a **highway or street especially designed for through traffic**, and over, from, or to which owners or occupants of abutting land or other persons have **no right or easement or only a limited right or easement of access**, light, air, or view by reason of the fact that their property abuts upon such limited access facility or for any other reason. Such highways or streets may be parkways, from which trucks, buses, and other commercial vehicles shall be excluded; or they may be freeways open to use by all customary forms of street and highway traffic.*

Under RA 2000, the then Department of Public Works and Communications or DPWC (now Department of Public Works and Highways or DPWH) has the following authority:

- *Plan, designate, establish, regulate, vacate, alter, improve, maintain, and provide limited access facilities for public use wherever it is of the opinion that traffic conditions, present or future, will justify such special facilities: Provided, That within provinces, cities and towns, the establishment of such limited access facilities insofar as they affect provincial, city and municipal streets and plazas shall have the consent of provincial board, city or municipal council as the case may be.*

- *Design any limited access facility and to so regulate, restrict, or prohibit access as to best serve the traffic for which such facility is intended; and its determination of such design shall be final. In this connection, it is authorized to divide and separate any limited access facility into separate roadways by the construction of raised curbings, central dividing sections, or other physical separations, or by designating such separate roadways by signs, markers, stripes, and the proper lane for such traffic by appropriate signs, markers, stripes, and other devices. No person shall have any right of ingress or egress to, from or across limited access facilities to or from abutting lands, except' at such designated points at which access may be permitted, upon such terms and conditions as may be specified from time to time.*

- *Designate and establish limited access highways as new and additional facilities or (may) designate and establish an existing street or highway as included within the limited access facility. The Department of Public Works and Communications shall have authority to provide for the elimination of intersection at grade of limited access facilities with existing national and provincial roads, and city and town or barrio streets, by grade separation or service road, or by closing off such roads and streets at the right-of-way boundary line of such limited access facility; and after the*

establishment of any limited access facility, no highway or street which is not part of said facility shall intersect the same at grade. No city, town, or barrio street, provincial or national highways, or other public way shall be opened into or connected with any such limited access facility without the consent and previous approval of the Department of Public Works and Communications, having jurisdiction over such limited access facility. Such consent and approval shall be given only if the public interest shall be served thereby.

Limited access highways include **expressways** since, under the road classification criteria of the DPWH (see **Annex 4.3.1** below), they are defined as *highways with limited access, normally with interchanges,* (which) *may include facilities for levying tolls for passage in an open or closed system*. Limited access highways are generally fenced on both sides to restrict entry and prevent roadside friction.

Several major projects were designed, built, and regulated by the DPWC and its successor agencies (the Department of Public Highways and the DPWH) as limited access highways. They include the following:

- In 1968-1970, the DPWC-Bureau of Public Highways (BPH), together with the Armed Forces of the Philippines Corps of Engineers, constructed the initial 22-kilometer (km) section of the Manila North Diversion Road – later called the Manila North Expressway, from Balintawak in Quezon City to Tabang in Bulacan, as a limited access highway. In 1976-1980, the DPWC-BPH improved and extended this highway to Mabalacat, Pampanga, with loan financing from the World Bank (WB), still as a limited access highway with several interchanges. In 1977, through Presidential Decree (PD) No. 1113, the Government granted to the Construction and Development Corporation of the Philippines (CDCP) the franchise for the construction, operation and maintenance of the Manila North Expressway as a toll facility.

- Similarly, in 1968-1970 the DPWC-BPH, together the CDCP, built the initial 14-km section of the Manila South Diversion Road – later called the Manila South Expressway - from Nichols (now Villamor) to Alabang. This was then extended to Calamba in Laguna. The road was designed, built, and operated as a limited access highway with entries/exits at seven interchanges. In 1977, PD 1113 granted to the CDCP the franchise to construct, operate, and maintain the Manila South Expressway as a toll facility.

- In 1972-1976, the DPWC-BPH built the 56-km Bataan Superhighway (Roman Highway) from Layac, Dinalupihan to Mariveles in Bataan, as a limited access

highway, bypassing congested town centers of the province and leading directly to the Bataan Export Processing Zone.

- Several urban bypasses were designed, built, and maintained as limited access highways. They include, among others, those in Tarlac City, Gerona, and Paniqui on the Manila North Road, Plaridel and Cabanatuan along the Pan-Philippine Highway, and Silang on Aguinaldo Highway in Cavite. Most of these bypasses were originally fenced on both sides of the road to prevent access. But, over time, as urban development intensified, the fences were taken down and the bypasses eventually reverted to function as ordinary access-free roads.

Up to this time, the Limited Access Highway Act is in effect. Thus, where justifiable to improve the traffic flow, the DPWH may use its powers under this Act to designate existing or proposed roads with current or projected high traffic volumes as limited access highways, with no or little roadside friction, between points of ingress and egress, and to plan, design, construct, and operate them as such, whether they be ordinary non-toll highways or tollways. The design for these roads may include appropriate ITS in order to enhance their function as high-speed highways with free flowing traffic.

In this regard, the present Concessionaires/Operators of the North Luzon Expressway and the South Luzon Expressway have adopted certain provisions of the Limited Access Highway Act as part of the regulations for their tollways, which include promoting the use of Electronic Toll Collection (ETC) systems and other ITS applications for their operations..

4.1.3 Build-Operate-and-Transfer Law (RA 7718)

The Build-Operate-and-Transfer (BOT) Law is embodied in RA 7718 (approved on 5 May 1994), which amended RA 6957, entitled "An Act Authorizing the Financing, Construction, Operation and Maintenance of Infrastructure Projects by the Private Sector, and for Other Purposes." The provisions of the BOT Law are carried out through its Implementing Rules and Regulations (IRR) (20 July 2012).

The BOT Law applies to “private sector infrastructure or development projects,” defined in Section 2 as:

> *the general description of infrastructure or development projects normally financed and operated by the public sector but which will now be wholly or partly implemented by the private sector, including but not limited to, power plants,* ***highways****, ports, airports, canals, dams, hydropower projects, water supply, irrigation, telecommunications, railroads and railways,* ***transport systems****, land reclamation projects, industrial estates or townships, housing, government buildings, tourism projects, markets, slaughterhouses,*

warehouses, solid waste management, ***information technology networks and database infrastructure****, education and health facilities, sewerage, drainage, dredging, and other infrastructure and development projects as may be authorized by the appropriate agency pursuant to this Act. Such projects shall be undertaken through contractual arrangements as defined hereunder and such other variations as may be approved by the President of the Philippines.*

The term "private sector infrastructure or development projects' is analogous to the more popular "public-private partnership" (PPP), which is a generic term for relationships formed between a public or government entity and a private sector entity with the aim of introducing private sector resources and/or expertise in order to help provide and deliver public sector assets and services. PPP includes BOT projects.

The portions in bold font in the second paragraph above show that the BOT Law can be used in the following ITS aspects of the current Mega Manila Region Highway ITS Integration Project:

- Highways – both ordinary (non-toll) roads and tollways, in terms of ITS infrastructure, including road and traffic information collection (e.g., detectors, sensors, counters), processing, and provision facilities (e.g., beacons, FM systems), closed circuit television (CCTV) cameras, and ETC systems.

- Transport systems - such as public buses, jeepneys, and taxis, as well as private cars and trucks, including vehicle navigation systems, ETC, and similar facilities.

- Information technology networks and database infrastructure – such as ITS and ETC.

Projects authorized under the BOT Law may be undertaken through various contractual arrangements as defined in the BOT Law. The following arrangements or modalities specifically stated in the BOT Law may be applicable to the Mega Manila ITS Project:

- ***Build-operate-and-transfer (BOT)*** *- A contractual arrangement whereby the project proponent undertakes the* ***construction, including financing****, of a given infrastructure facility, and the* ***operation and maintenance*** *thereof. The project proponent operates the facility over a fixed term during which it is allowed to* ***charge facility users appropriate tolls, fees, rentals, and charges*** *not exceeding these proposed in its bid or as negotiated and incorporated in the contract to enable the project proponent to recover its investment, and operating and maintenance expenses in the project. The project proponent transfers the facility to the government agency or local government unit concerned at the end of the fixed term which shall not exceed fifty (50) years: Provided, That in case of an infrastructure or development facility whose operation requires a public utility franchise, the proponent must be Filipino or, if a corporation,*

must be duly registered with the Securities and Exchange Commission and owned up to at least sixty percent (60%) by Filipinos. This build-operate-and-transfer shall include a supply-and-operate situation which is a contractual arrangement whereby the supplier of equipment and machinery for a given infrastructure facility, if the interest of the Government so requires, operates the facility providing in the process technology transfer and training to Filipino nationals.

- ***Build-and-transfer***. - *A contractual arrangement whereby the project proponent undertakes the* ***financing and construction*** *of a given infrastructure or development facility and* ***after its completion turns it over*** *to the government agency or local government unit concerned, which shall pay the proponent on an agreed schedule its total investments expended on the project, plus a reasonable rate of return thereon. This arrangement may be employed in the construction of any infrastructure or development project, including critical facilities which, for security or strategic reasons, must be operated directly by the Government.*

- ***Build-transfer-and-operate (BTO)***. - *A contractual arrangement whereby the Agency/LGU contracts out the* ***building*** *of an infrastructure facility to a private entity such that the contractor builds the facility* ***on a turn-key*** *basis, assuming cost overrun, delay and specified performance risks. Once the facility is commissioned satisfactorily, title is* ***transferred to the implementing agency****. The* ***private entity, however, operates*** *the facility on behalf of the implementing agency under an agreement.*

- ***Contract-add-and-operate***. - *A contractual arrangement whereby the project proponent* ***adds to an existing infrastructure*** *facility which it is renting from the government. It* ***operates*** *the expanded project over an agreed franchise period. There may, or may not be, a transfer arrangement in regard to the facility.*

- ***Rehabilitate-operate-and-transfer***. - *A contractual arrangement whereby an existing facility is turned over to the private sector to* ***refurbish, operate and maintain*** *for a franchise period, at the expiry of which the legal title to the facility is* ***turned over*** *to the government.*

Aside from the above modalities, other variations of contractual arrangements may be employed for ITS, subject to the approval of the President. These may, for example, include an **operate-and-maintain** arrangement whereby the Government enters into a management contract with a qualified private firm to manage, operate, and maintain an existing facility owned by the government – e.g., ITS infrastructure or traffic information and communications center - for a fixed period. Fees may be set by the Government to be paid by users of the information – private cars, public buses, taxis, and trucks = and the facility operator shall collect the fees on behalf of the Government. The Government shall pay the facility operator for

its services in any of several forms – e.g., (a) fixed management fee, or (b) percentage of the collected user fees, or (c) a combination of (a) and (b).

Tollway projects so far undertaken by the DPWH under the BOT Law - using the BTO modality - are the following;

- Southern Tagalog Arterial Road (STAR) Project
- Tarlac-Pangasinan-La Union Expressway (TPLEX) Project
- Daang Hari-South Luzon Expressway (SLEX) Link Road Project

In the case of the STAR, the first stage - Sto. Tomas to Lipa – was implemented by the DPWH, with Japan Official Development Assistance (ODA) through conventional procurement (i.e., non-BOT). But the second stage – Lipa to Batangas City – was undertaken by the DPWH through the BTO scheme which also includes the upgrading of the first stage to tollway standards and the operation of the entire expressway covering both stages as a toll facility.

The Subic-Clark-Tarlac Expressway (SCTEX) was built by the Bases Conversion Development Authority (BCDA) to tollway standards using conventional procurement with ODA funding. The operation of this expressway, including toll collections, however, has been outsourced by the BCDA to a private operator under the BOT Law.

These BTO projects include provisions for the introduction of ITS/ETC systems by tollway operators, as further discussed in **Annex 4.4** below.

4.1.4 Toll Operation Decree (PD 1112)

PD 1112 (dated 31 March 1977), otherwise known as the Toll Operation Decree, authorized the establishment of toll facilities on public improvements, and created the Toll Regulatory Board (TRB) for the regulation thereof.

The TRB has the following powers and duties under PD 1112:

*(a) Subject to the approval of the President of the Philippines, to enter into **contracts** in behalf of the Republic of the Philippines with persons, natural or juridical, for the **construction, operation and maintenance of toll facilities** such as but not limited to **national highways, roads, bridges, and public thoroughfares**. Said contract shall be open to citizens of the Philippines and/or to corporations or associations qualified under the Constitution and authorized by law to engage in toll operations;*

*(b) Determine and decide the **kind, type and nature of public improvement that will be constructed and/or operated as toll facilities**;*

*(c) **Condemn private property for public use** subject to the provisions of existing law;*

*(d) Issue, modify and promulgate from time to time the **rates of toll** that will be charged the direct users of toll facilities and upon notice and hearing, to approve or disapprove petitions for the increase thereof. Decisions of the Board on petitions for the increase of toll rate shall be appealable to the Office of the President within ten (10) days from the promulgation thereof. Such appeal shall not suspend the imposition of the new rates, provided however, that pending the resolution of the appeal, the petitioner for increased rates in such case shall deposit in a trust fund such amounts as may be necessary to reimburse toll payers affected in case a reversal of the decision.*

*(e) To grant authority to operate a toll facility and to issue therefore the necessary "**Toll Operation Certificate**" subject to such conditions as shall be imposed by the Board.*

xxx

In accordance with the Toll Operations Decree, the TRB has entered into a Toll Operations Agreement (TOA) and/or a Supplemental Toll Operation Agreement (STOA) with the concerned Tollway Concessionaire/Operator, and has granted Toll Operation Certificates (TOCs) for the following tollway projects:

- North Luzon Expressway (NLEX)
- SLEX
- Metro Manila Skyway
- STAR
- SCTEX
- Manila-Cavite Toll Expressway (MCTE).

The TOA, STOA, and TOC define the standards and conditions for the operation of these facilities. In general, these standards and conditions may specify the type and level of ITS/ETC which are to be adopted in the design and operation of the following systems:

- Toll collection systems
- Traffic control systems
- Information service and customer service programs, and information and message sign boards

- Vehicle regulation facilities (e.g., load, height detectors)

On 19 December 2007, the President issued EO 686 which states that the first three functions (a) to (c) of the TRB in PD 1112 are not regulatory functions, but are instead administrative, planning, and implementation functions, while the last two functions are regulatory in nature. EO 686 also states that, for purposes of government rationalization, regulation should be separated from administration, planning or implementation. Hence, the following delineation of functions has been made in EO 686:

- Administration, planning, and implementation functions under the DPWH

  - *By virtue of the required approval of the President for the Board to exercise its power to enter into **contracts** in behalf of the Republic of the Philippines for the **construction, operation and maintenance of toll facilities for highways, roads, bridges and public thoroughfares**, such power is hereby removed from the Board and **vested in the DPWH**.*

  - *The power to determine and decide the kind, type and nature of highways, roads, bridges and public thoroughfares is hereby vested in the DPWH.*

  - *The power to **condemn private property** for highways, roads, bridges and public thoroughfares is hereby **vested in the DPWH**.*

- Regulatory functions under the TRB

  - *The **Board** (i.e., TRB) shall concentrate on the following powers:*

    *(a) The power to issue, modify and proclaim from time to time the **rates of toll** that will be charged the direct users of toll facilities and upon notice and hearing, to approve or disapprove petitions for the increases.*

    *(b) The power to grant authority to operate a toll facility and to issue the necessary **"Toll Operation Certificate."***

On 14 March 2012, however, the Department of Justice (DOJ) rendered a Legal Opinion which, among other things, states in effect that EO 686 is not valid (This was in connection with the DPWH proposal for the NLEX-SLEX Connector Road vis-a-vis the TRB-franchised Skyway Stages 3 and 4.) The DPWH filed a Motion for Reconsideration but this was denied by the DOJ on 6 June 2012. On 6 July 2012, the DPWH filed a Notice of Appeal to the Office of the President. As of this date, there is no decision yet on the matter.

Meanwhile, the DPWH is proceeding with its plan to bid out, contract, and supervise the

execution of tollway projects in accordance with the provisions of the BOT Law which authorizes it as an implementing agency for such projects. For these projects, the DPWH, however, still provides for the TRB to issue the TOC and to approve toll rate adjustments in accordance with PD 1112.

4.1.5 Land Transportation and Traffic Code or LTTC (RA 4136)

RA 4136, approved on 20 June 1964, otherwise known as the Land Transportation and Traffic Code (LTTC), controls the registration and operation of motor vehicles and the licensing of owners, dealers, conductors, drivers, and related matters. The LTTC created the Land Transportation Commission – later reorganized into the present Land Transportation Office (LTO) – headed by a Commissioner which had the following powers and duties, which essentially have been assumed by the present LTO:

- *With the approval of the Secretary of Public Works and Communications, to issue rules and regulations ... prescribing the procedure for the* ***examination, licensing and bonding of drivers****; the* ***registration and re-registration of motor vehicles****, transfer of ownership, change of status; the replacement of lost certificates, licenses, badges, permits or number plates; and to prescribe the* ***minimum standards and specifications including allowable gross weight, allowable length, width and height or motor vehicles, distribution of loads, allowable loads on tires, change of tire sizes, body design or carrying capacity subsequent to registration*** *and all other special cases...*

- *To compile and arrange all applications, certificates, permits, licenses, and to enter, note and record thereon transfers, notifications, suspensions, revocations, or judgments of conviction rendered by competent courts concerning violations of this Act, with the end in view of preserving and making easily available such documents and records to public officers and private persons properly and legitimately interested therein.*

- *The Commissioner of Land Transportation, with the approval of the Secretary of Public Works and Communications, may* ***designate as his deputy and agent any employee of the Land Transportation Commission, or such other government employees*** *as he may deem expedient to assist in the carrying out the provisions of this Act.*

- *The Commissioner of Land Transportation and his deputies are hereby authorized* ***to make arrest for violations*** *of the provisions of this Act in so far as motor vehicles are concerned; to issue subpoena and subpoena duces tecum to compel the appearance of motor vehicle operators and divers and/or other persons or conductors; and to use all*

reasonable means within their powers to ***secure enforcement of the provisions of this Act.***

- *The Commissioner of Land Transportation or his deputies may at any time examine and inspect any motor vehicle to determine whether such motor vehicle is registered, or is unsightly, unsafe, overloaded, improperly marked or equipped, or otherwise unfit to be operated because of possible excessive damage to highways, bridges and/or culverts.*

- *The Philippine Constabulary* (now the Philippine National Police) *and the city and municipal police forces are hereby given the authority and the primary responsibility and duty to prevent violations of this Act, and to carry out the police provisions hereof within their respective jurisdiction: Provided, That all apprehensions made shall be submitted for final disposition to the Commissioner and his deputies within twenty-four hours from the date of apprehension.*

- *All cases involving violations of this Act shall be endorsed immediately by the apprehending officer to the Land Transportation Commission ...*

The LTTC includes major provisions on the traffic and transportation aspects shown in **Table 4.1-1**.

TABLE 4.1-1 MAJOR PROVISIONS OF RA 4136

Article	Subject
	Registration of Motor Vehicles
I	Duty to Register, Reports, Applications, Classifications
II	Registration Fees – including permissible weights and dimensions of vehicles
III	Registration Certificates, Records, Number Plates
	Operation of Motor Vehicles
I	License to Drive Motor Vehicles – including issuance, suspension and revocation
II	Illegal Use of Licenses, Number Plates, etc.
III	Passenger and Freight – including registered carrying capacity
IV	Accessories of Motor Vehicles
	Traffic Rules
I	Speed Limit and Keeping to the Right
II	Overtaking and Passing a Vehicle, and Turning at Intersections
III	Right of Way and Signals
IV	Turning and Parking
V	Miscellaneous Traffic Rules
	Penal and Other Provisions
I	Penalties
II	Collection of Fees, Taxes and Fines, Liens, Allotment of Funds
III	Final Provisions

Some of the provisions of the LTTC, being 48 years old, are obsolete, and the LTTC does not cover the latest developments in traffic management. For example, its speed limits are no longer practical and, therefore, generally not been followed or enforced - e.g., a speed limit of 40 kph on *through streets or boulevards, clear of traffic, with no blind corners, when so designated* or 30 kph on *city and municipal streets, with light traffic, when not designated through streets*. LGUs and the MMDA are not even allowed to modify speed limits under Section 36. The law does have not any provision concerning traffic signals, pedestrian facilities and non-motorized transport. These requirements, however, may be provided through local traffic ordinances. The penalties for violation of the rules in the LTTC are also based on the prices at the time the code was enacted, abut these are being updated by the LTO through a DOTC Department Order.

Moreover, the LTTC has been outpaced by the developments in vehicle technology and business practices – e.g., the use of multi-axle trucks carrying heavy containerized cargo. The maximum allowable axle load of 8,000 kg specified in the LTTC, however, has been amended to 13,500 kg under RA 8794 (Motor Vehicles User's Charge or MVUC Act),

Nonetheless, RA 4136/LTTC remains as the basic law governing road transport and traffic management, with the LTO as the primary implementing agency working closely with other concerned agencies including the MMDA, LTFRB, LGUs, DOTC, and DPWH. The institutional arrangements for the introduction or upgrading of ITS in Mega Manila will have to be developed within the framework of the LTTC, among other laws.

The enforcement of the LTTC is further discussed in **Annex 4.5**.

4.1.6 Proposed Transportation Policy Act (House Bill No. 2222)

House Bill No. 2222 seeks to enact a Transportation Policy Act which will set the directions of and parameters for the development and regulation of transportation in the Philippines. The proposed Act provides, as its vision, that the transportation system of the country shall be *safe, efficient, viable, dependable, integrated environmentally sustainable, and people-oriented*. It aims to lay the foundation for better economic governance in the transport sector, and its specific objectives are to strengthen transport sector planning and implementation by adopting transport policies to serve as boundary objectives, and to establish the structure and methodology for national transport planning. Among the basic principles that the proposed Act will pursue in transportation are general reliance on market economy, competition, public interest, and transparency.

In urban transport, the proposed Act gives priority to public transportation, over private transportation, to ensure accessibility, comfort, convenience, reliability, safety, security, and affordability to urban travellers, and to maximize the use of road space, High-capacity public

transport will be given priority in high passenger density corridors. Inter-connectivitv among transport modes shall be considered. In addressing congestion, the Act accords priority to low-cost traffic engineering and management measures over high-cost infrastructure. In large areas where the traffic capacity expansion strategy is no longer sufficient to handle the supply-demand gap, the DOTC, regulatory body, or LGUs concerned can employ traffic demand management measures.

Obviously, ITS will play a significant role in achieving the abovementioned objectives and priorities of the proposed Transportation Policy Act

4.1.7 Charters of Transport-Related Agencies

The charters or laws creating the various transport-related agencies provide the legal bases for the exercise of their powers and duties which include those pertaining to ITS. These charters are listed in **Table 4.1-2**.

TABLE 4.1-2 CHARTERS OF TRANSPORT-RELATED AGENCIES

Charters/Laws	Agencies
Executive Order (EO) 124 (30 January 1987)	Department of Public Works and Highways (DPWH)
EO 125 (30 January 1987), as amended by EO 125-A (13 April 1987)	Department of Transportation and Communications (DOTC)
RA 7924 (March 1, 1995)	Metropolitan Manila Development Authority (MMDA)
RA 8794 (27 June 2000)	Road Board (RB)
PD 1112 (31 May 1977)	Toll Regulatory Board (TRB)
EO 125 (30 January 1987), as amended by EO 125-A (13 April 1987)	Land Transportation Office (LTO)
EO 202 (19 June 1987)	Land Transportation Franchising and Regulatory Board (LTFRB)
Local Government Code (LGC) of 1991, as amended	Local Government Units (LGUs)

The powers and functions, organization, budgets, and related aspects of the agencies under their charters are discussed in greater detail in **Annex 4.3** below.

4.1.8 PD 1113, as Amended by PD 1894 (CDCP/PNCC Franchise)

PD 1113 dated 31 March 1977, as amended by PD 1894 dated 22 December 1983. granted the Construction and Development Corporation of the Philippines (CDCP), which was succeeded by the Philippine National Construction Corporation (PNCC), a franchise to operate, construct and maintain toll facilities in the North Luzon Expressway from Balintawak to Rosales in Pangasinan, the South Luzon Expressway from Nichols (Villamor) to Lucena City, and the Metro Manila Expressway from Bicutan to Meycauayan in Bulacan.

The PNCC was also granted the right to construct, maintain and operate any and all such extensions, linkages or stretches, together with the appurtenant toll facilities, from any part of the North Luzon Expressway, South Luzon Expressway and/or Metro Manila Expressway and/or to divert the original route and change the original end-points of the North Luzon Expressway and/or South Luzon Expressway as may be approved by the TRB.

The franchise for the North Luzon Expressway and the South Luzon Expressway was to have a term of 30 years from 1 May 1977, while the franchise for the Metro Manila Expressway and all extensions linkages, stretches and diversions of the three expressways that may be constructed after the date of approval of PD 1894 shall have a term of 30 years commencing from the date of completion of the project.

The PNCC has used the provisions of PD 1113, as amended by PD 1894, to associate or enter into three joint ventures (JVs) with local and foreign investor-partners for tollway projects - namely, Skyway, NLEX, and SLEX. The partners of the PNCC have provided most of the financial resources needed to invest in the tollway projects, while the PNCC has assigned the usufruct over its franchise in favor of the JV corporations/operators formed with its partners. These projects are further discussed in **Annex 4.4** below (Toll Expressway Concessionaires).

Annex 4.2 OVERALL DELINEATION OF AGENCY RESPONSIBILITIES

For road transport, **Table 4.2-1** is matrix of the responsibilities of the main agencies/groups concerned. Eight areas of responsibility are considered - namely, policy, planning, financing, construction/implementation, operation, maintenance, economic regulation, and technical regulation. Eight principal Government agencies are involved – viz., DPWH, DOTC, MMDA, RB, TRB, LTO. LTFRB, and LGUs. Three main private sector groups are concerned – viz., Tollway Concessionaires, Private Contractors, and Public Road Transport Operators

The portions in bold italics are responsibilities pertaining to ITS which are not explicitly stated in the charters of the agencies concerned, but are deemed to be inherent in their respective mandates.

TABLE 4.2-1 EXISTING AGENCY RESPONSIBILITIES FOR ROAD TRANSPORT

AGENCY	POLICY	PLANNING	FINANCING	CONSTRUCTION/ IMPLEMENTATION	OPERATION	MAINTENANCE	ECONOMIC REGULATION	TECHNICAL REGULATION
DPWH	Policies & standards on road infra planning, design, const & maint; road classification system, ***promotion of ITS***	Road network & proj planning for national roads (NR), incldg tollways; databases for NR inventory/ condition, traffic, accidents, ***ITS infra***	General Appropriations Act (GAA) funding of NR const. & maint; Motor Vehicle User Charge (MVUC) funding for NR maint and safety, ***incldg ITS***	Const. (incldg design) of NR, mainly by contract; ***incldg ITS infrastructure***	Operation of traffic survey eqpt & weighbridges; ***opn of ITS facilities on NR & opns center; supvn of tollway opns incldg ITS/ETC***	Maint. of NR (GAA/MVUC-funded***), incldg ITS***, mainly by contract; ***supvn of tollway maintenance***		Engineering, const., maint., quality, & safety standards & regulations on NR & tollways; vehicle load limits; ***incldg ITS***
DOTC	Policies on road/ other modal transport systems & services, ***promotion of ITS***	Planning & proj. devt, for road transport services;	GAA funding of planning & regulation of road transp. services				Setting of Route Measured Capacity (RMC); appeals body for LTFRB decisions	
Metropolitan Manila Development Authority (MMDA)	Policies & standards on transport & traffic mgt in MM, ***promotion of ITS***	MM devt planning; prepn & coordn of transp./ traffic mgt. projs, incl ***IT database***	Funding of MMDA operations from GAA and other sources	Const./installation of traffic control systems, pedestrian facilities, ***incldg ITS infrastructure***	Provision of mass transp. system, admn of traffic engg & education. ITS traffic info to motorists		Enforcement of public utility transp franchise reglns	Regulation of road users; admn of traffic enforcement operations in MM
Land Transportation Office (LTO)			GAA funding of LTO opns; collection of MVUC for govt.		Operation of motor vehicle inspection systems; opn of database for vehicles & drivers	Maintenance of MVIS	Enforcement of franchise reglns	Registrn of vehicles & drivers; enforcement of traffic & transport rules; ***reqts forvehicle ITS***
Land Transportation & Franchising Board (LTFRB)	Policies on franchising of public land transp. services (buses, jeepneys, taxis)		GAA funding of LTFRB opns				Franchises for entry (routes & capacity) & approval of fares of public utility transp.; enforcement of franchise reglns	Setting of safety & service standards for public utility transp.; ***reqts for Public Transport ITS***
Road Board (RB)	Policies on allocation & use of MVUC funds	Annual/multi-yr work programs for MVUC –funded road maint & road safety, ***incldg ITS***.	MVUC funding of road maintenance and road safety devices, ***incldg ITS operation***					MVUC fund utilization

AGENCY	POLICY	PLANNING	FINANCING	CONSTRUCTION/ IMPLEMENTATION	OPERATION	MAINTENANCE	ECONOMIC REGULATION	TECHNICAL REGULATION
Toll Regulatory Board (TRB)	Policies on toll rates & operations				Monitoring of tollway opera-tions, ***incldg ITS/ETC***		Approval of toll rates; grant of fran chises/Toll Opn Certificates (TOCs) to TCs	
LGUs	Policies & guidelines for local roads (LR), local transport & traffic mgt	Planning for LR, local transport services & traffic mgt	Funding of LR, traffic mgt (IRA/ local funds)	Const. of LR, traffic engg & transport devt. projs at local level	Traffic mgt. at local level	Maint. of LR and LGU transport assets	Permits for tricycles	Use of LR, traffic enforcement & public transp reglns at local level
Tollway Con-cessionaries (TCs)			Financing of tollways	Design & construction of tollways, incldg ITS/ETC	Operation of toll-ways, including toll collections, traffic control, use of ITS/ETC	Maint. of tollways incldg ITS/ETC facilities		
Private Contractors				Road design & const. by contract		Road mainte-nance. by contract		
Public Road Transport Operators					Operation of pub-lic road transport services, ***incldg use of ITS***	Maintenance of public road transport services		

Sources: DOTC and DPWH, AusAid PEGR RA 008-01- 2008, and charters of agencies.

Annex 4.3 ROAD TRANSPORT-RELATED GOVERNMENT AGENCIES

4.3.1 Department of Public Works and Highways

Legal Basis

The present Department of Public Works and Highways (DPWH) was created under EO 124, dated 30 January 1987.

Mandate

The principal mandate of the DPWH under EO 124 is to serve as:

> *the **State's engineering and construction arm** and continuously develop its technology, for the purposes of ensuring the **safety of all infrastructure facilities and securing for all public works and highways the highest efficiency and the most appropriate quality in construction**. The **planning, design, construction and maintenance** of infrastructure facilities, especially **national highways**, flood control and water resource development systems, and other public works in accordance with the national development objectives, shall be the responsibility of such an engineering and construction arm.*

Powers and Functions

As defined in EO 124, the DPWH has the following overall powers and functions:

- Provide technical services for the planning, design, construction, maintenance, and/or operation of highways/roads and other infrastructure facilities.
- Develop and implement effective codes, standards, and reasonable guidelines to ensure the safety of all public and private structures, including roads, in the country and assure efficiency and proper quality in the construction of public works and roads.
- Ascertain that all public works and road plans and project implementation designs are consistent with current standards and guidelines.
- Identify, **plan, secure funding for, program, design, construct** or undertake prequalification, bidding, and **award** of contracts of **public** works and **road** projects.
- Provide the works supervision for all public works and road construction and ensure that actual construction is done in accordance with approved government plans and specifications.

- **Maintain or cause to be maintained all highways**, flood control, and other public works throughout the country except those that are the responsibility of other agencies as directed by the President or as provided by law.

- Provide an **integrated planning for highways**, flood control and water resources development systems, and other public works.

- **Classify highways and roads** into national, provincial, city, municipal, and barangay roads, based on objective criteria it shall adopt; provide or authorize the conversion of roads and highways from one category to another.

Road Classification

In exercising its power under EO 124 to classify roads, the DPWH categorizes roads as shown in **Table 4.3-1**, based on the criteria indicated in the table, together with the corresponding agencies having administrative jurisdiction over the construction and maintenance of the roads.

TABLE 4.3-1 ROAD CLASSIFICATION AND JURISDICTION

Classification	Criteria	Administrative Jurisdiction
National Arterial Road	Connects Major Cities (at least around 115,000 people)	DPWH
National Secondary Road	• Connects Cities to National Arterial/ Primary Roads except in Metropolitan Areas • Connects Major Ports and Ferry • Terminals to National Arterial/ Primary Roads • Connects Major Airports to National Arterial Primary Roads • Connects Tourist Service Centers to National Primary/ Arterial Roads or other National Secondary Roads • Connects Cities (not categorized as Major Cities) • Connects Provincial Capitals within the same Region • Connects Major National Government Infrastructure to National Primary/Arterial Roads or Other National Secondary Roads • Connects National Road to another parallel National Road at least 20 km away, provided that a population of at least 25,000 are within a 3.0 km buffer radius along the first 3 km of the proposed National Road. • Connects National Road to another parallel National Road at least 0.30-0.50 km away in the city central business district; or to another National Road at least 3.0-5.0 km away within the city but outside the business district. • Connects gap portion of adjoining national roads to form a continuous road network • For island with only one major population or activity center, extends linearly either completely around the island or to the next municipal growth center or traffic generator with at least 34,000 population	DPWH

Classification	Criteria	Administrative Jurisdiction
Provincial Road	• Connects Cities and Municipalities without traversing National Roads • Connects National Roads to Barangays through rural areas • Connects to Major Provincial Government Infrastructure	Provincial Government
City Road	• Roads within the Poblacion (city center) • Roads that connect to Provincial and National Roads • Roads that provide inter-Barangay connections to Major City Infrastructure without traversing Provincial Roads	City Government
Municipal Road	• Roads within the Poblacion (municipal center) • Roads that connect to Provincial and National Roads • Roads that provide inter-Barangay connections to Major • Municipal Infrastructure without traversing Provincial Rds	Municipal Government
Barangay Road	• Other Public Roads (officially turned over) within the Barangay and not covered in the above definitions	Barangay
Non-Toll Expressway	• Highways with limited access, normally with interchanges; without tolls for passage	DPWH
Toll Road/ Expressway	• Highways with limited access, normally with interchanges; may include facilities for levying tolls for passage in an open or closed system	Concessionaire

Source: DPWH

As may be noted above, the DPWH is directly responsible for the administration of National Roads, which includes the financing, design, construction, maintenance, and regulation of the use of these National Roads.

Organization

Figure 4.3-1 shows the organizational chart of the DPWH.

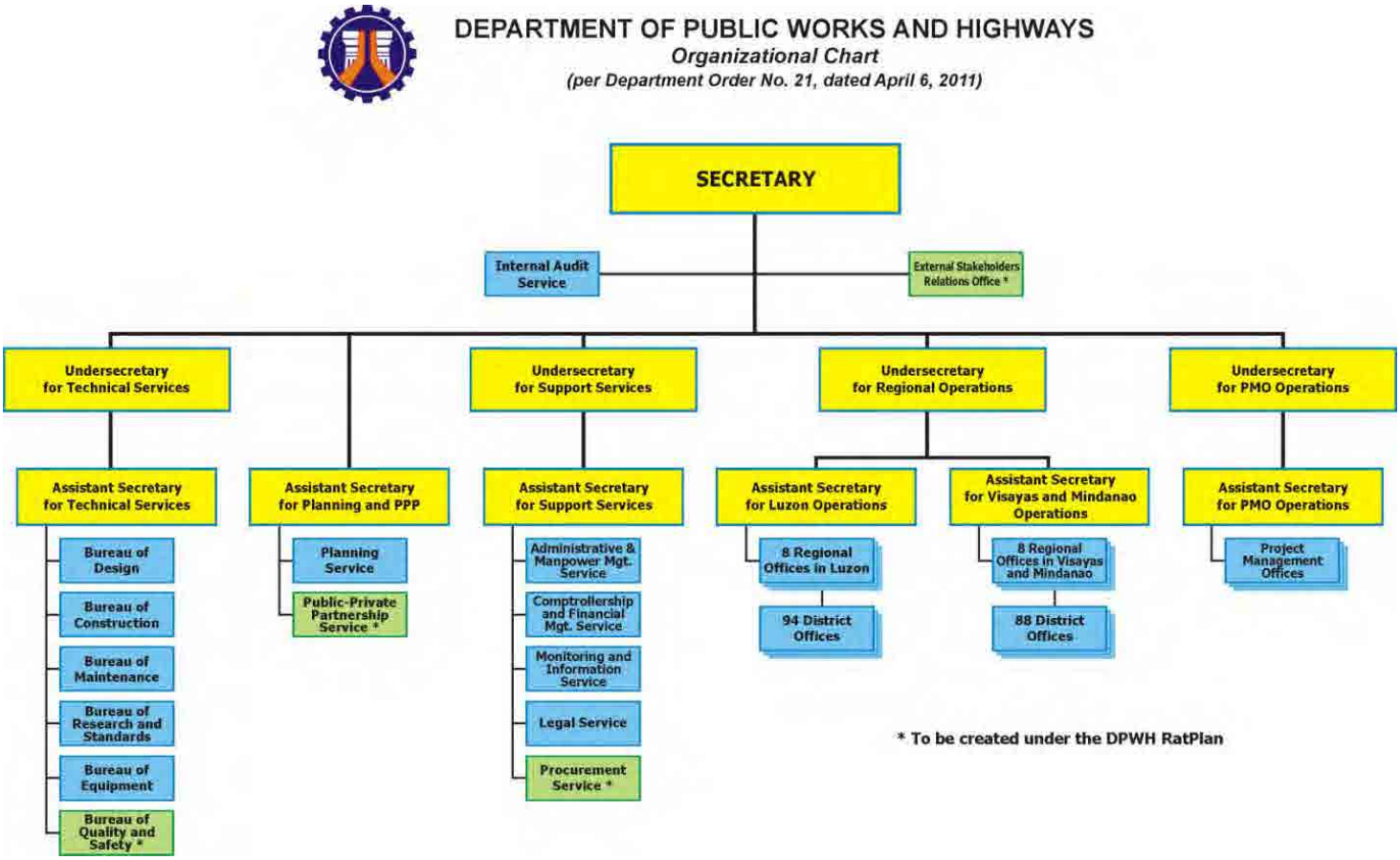


FIGURE 4.3-1 DPWH ORGANIZATIONAL CHART

The DPWH is headed by a Secretary. He is assisted by four Undersecretaries - in charge of Regional Operations, Project Management Office Operations, Technical Services, and Administrative and Financial Services – and four Assistant Secretaries. These officials are supported in the Central Office by the following staff units:

- Six Staff Services – namely, Planning Service, Comptrollership and Financial Management Service, Administrative and Manpower Management Service, Monitoring and Information Service, Legal Service, and Internal Audit Service – which provide planning and administrative services for the Secretary and exercise technical oversight on their counterpart units in the Regional and District Offices.

- Five Bureaus – namely, Bureau of Design, Bureau of Construction, Bureau of Maintenance, Bureau of Equipment, and Bureau of Research and Standards – which provide technical staff support to the Secretary and exercise technical oversight on their counterpart units in the Regional and District Engineering Offices.

The implementing units of the DPWH for construction and maintenance programs and projects consist of the following:

- 16 Regional Offices (ROs) – which supervise the construction and maintenance activities of their component District Engineering Offices and are authorized to approve designs, programs of work, and contracts up to Php 50 million each; and to conduct procurement of contracts up to PhP 150 million each.

- 174 District Engineering Offices (DEOs) – which actually undertake construction and maintenance projects, mainly by contract, and are authorized to approve designs, programs of work, and contracts up to Php 20 million each; and to conduct procurement of contracts up to PhP 50 million each.

- 15 Project Management Offices (PMOs) based in the Central Office – which implement, mainly by contract, foreign-assisted projects and special locally-funded projects.

Metro Manila coincides with the DPWH National Capital Region (NCR), while Mega Manila includes the NCR and parts of Region III (Central Luzon) and Region IV-A (Southern Luzon mainland).

PMO-TEAM

The DPWH PMO most concerned with traffic systems is the PMO for Traffic Engineering and Management (TEAM). The mandate of PMO-TEAM is to promote fast, safe, and efficient transfer of commodities, people and services. It has the following functions:

- Traffic Management – which includes the planning, design, construction and maintenance of geometric improvements of intersections, road signs, lane markings and other traffic engineering facilities/equipment, rerouting schemes, traffic surveys, traffic studies, inter-agency functions and technical assistance for LGUs and other agencies.

- Frontline Services – which include year-round, 24-hour operation and maintenance of traffic signal systems.

Starting in the 1980s, the PMO-TEAM had performed the functions mentioned above mainly in Metro Manila through the Traffic Engineering Center (TEC) which was then directly under the DPWH. The PMO-TEAM was responsible for planning and supervising the installation of traffic lights, mostly of the demand-actuated type, in 311 intersections in Metro Manila. In 2003, however, the MMDA, invoking its charter, took over the DPWH traffic engineering and management functions in Metro Manila, notably the operations of the TEC. The PMO-TEAM now operates mainly outside of Metro Manila, including parts of Mega Manila, but still provide technical assistance to the MMDA as requested.

Through the PMO-TEAM, the DPWH has selected the Manila North Road (MacArthur Highway) from Bulacan to Tarlac for immediate widening with doable traffic management because of the increased traffic demand and high frequency of traffic accidents on this road. This also seeks to address the public clamour for a good toll-free alternate to the NLEX and to provide an effective access to tourist destinations in the north. The DPWH has completed traffic management measures in 53 signalized intersections and 13 unsignalized intersections along the Manila North Road. Five of the signalized intersections have video camera sensors.

The DPWH is conducting the bidding for the supply and installation of five CCTV cameras at major intersections along the Manila North Road in Bulacan, Pampanga, and Tarlac, where traffic lights had been installed. The CCTV cameras will be connected to the TEAM Traffic Monitoring Center which will be further equipped and improved. The purpose of this project, which is expected to be implemented in September-December 2012, is to monitor the flow of traffic and check the performance of the signal lights at those intersections.

Other DPWH PMOs closely concerned with road projects in Mega Manila include the following.

- Urban Roads Project Office – which implements, mainly by contract, major road projects, including grade separation structures.
- PMO for Build-Operate-Transfer (BOT) Projects – which plans and implements, by contract, expressway and related projects financed through BOT/PPP schemes.
- PMO for Road Upgrading and Preservation Project (JICA-assisted).
- PMO for National Roads Improvement and Management Project (WB-assisted).

Personnel

The DPWH maintains a total work force of 29,569, of which 19,134 hold permanent positions, 1,402 are hired under contract, and 9,033 are daily-paid casual workers.

Road Network

As shown in **Table 4.3-2,** as of 2011 the Philippines had a total road network of about 215,123 km, of which 214,831 km are ordinary (non-toll) roads and 292 km are toll roads. Of this network, the DPWH is responsible for National Roads totalling about 31,341 km. About 79.2 percent of the National Roads is paved.

TABLE 4.3-2 OVERALL PHILIPPINE ROAD NETWORK, 2011

Category	Length, km			% Paved
	Total	Paved	Unpaved	
National Roads	31,341	24,834	6,507	79.2
Provincial Roads	31,233	9,775	21,458	31.3
City Roads	14,739	9,202	5,537	62.4
Municipal Roads	15,816	5,394	10,422	34.1
Barangay Roads	121,702	8,020	113,682	6.6
Sub-Total, Ordinary Roads	214,831	57,225	157,606	26.6
Toll Roads	292*	292	0	100.0
Grand Total	215,123	57,517	157,606	26.7

*4-6 lanes

Source: DPWH and Toll Regulatory Board

In the National Capital Region (or Metro Manila), Region III, and Region IV-A – which includes Mega Manila – the total length of National Roads is about 5,733 km, of which 93.1 percent is paved. This is summarized in **Table 4.3-3**.

TABLE 4.3-3 NATIONAL ROADS IN NCR, REGION III, AND REGION IV-A, 2011

	Length, km			% Paved
	Total	Paved	Unpaved	
National Capital Region	1,120	1,120	-	100.0
Region III	2,273	2,006	177	91.9
Region IV-A	2,430	2,208	222	90.9
Total	5,733	5.334	399	93.1

Source: DPWH, 2011

Planning and Data Systems

The DPWH has developed and been using a Highway Planning Manual, 2004/2006. The HPM process covers all stages and levels - strategic analysis, long-term planning, multi-year planning, and annual programming for the National Roads network.

The DPWH planning process has been strengthened by modern Information Technology (IT)-based technical planning and information systems and tools, mostly established under the Road Improvement and Management Support System (RIMSS) with WB and Asian Development Bank assistance. Of particular relevance to transport information systems are the following databases established in the DPWH Planning Service:

- Road and Bridge Information Application (RBIA) – This is the main highway database of the DPWH. It is a repository of data on the National Road network inventory and conditions – e.g., layout, length, width, number of lanes, type of surface, right-of-way, bridges, drainage, etc. The data are used for planning and programming road construction and maintenance, at the network and project levels, through the

different planning systems mentioned below. The database includes the use of Geographic Information System (GIS). Road condition data are based on the Visual Road Condition (ROCOND) system adapted from Australia, but supplemented by the International Roughness Index (IRI) system. The RTIA (see below) feeds traffic data to the RBIA. Eventually, the TARAS (see below) will also be linked and feed traffic accident data to the RBIA.

- Road Traffic Information Application (RTIA) – This is a database of traffic volumes and vehicle axle load information along National Roads collected from regular traffic counting surveys, using manual counts at 1,499 sites and automatic counts at 1,250 sites, or a total of 2,849 sites. Automatic traffic counts are collected through in-ground road sensors at 578 sites and on-ground rubber tube sensors at 772 sites; the sensors include traffic classifiers. Out of 578 in-ground sensors, 60 are permanent which can provide real time data as they automatically record traffic volumes by type of vehicle, 24 hours a day. Axle load data are obtained from periodic surveys using 87 portable weighing scales. Except for the data generated "24/7" by the 60 permanent sensors, the traffic volume and axle load data collected are valid only on the specific dates of the traffic surveys, e.g., 12, 4, 2, and 1 times a year. The traffic data collected in the field are stored in the RTIA and used mainly for traffic demand projections, project analyses, and programming of projects.

- Traffic Accident Recording and Analysis System (TARAS) – This is a test and graphic data entry and statistical query system which provide access to accumulated information involving traffic accidents on National Roads. The system stores and analyses traffic accident data to help identify accident black spots and hazardous locations, generates summaries and trends regarding traffic accidents for input into road plans and designs, and produces analysis reports that will assist in strategic road planning and road safety policy development processes. Basic data on accidents is supplied by the Philippine National Police (PNP).

The DPWH operates 24 permanent or fixed weighbridges and 86 portable weighing machines in strategic locations along National Roads to check the axle loads and gross vehicle weights of heavy trucks. Two of the permanent weighbridges are in Mega Manila – viz., along the Pan-Philippine Highway at Cabanatuan City, and along the Famy-Infanta Road at Famy, Laguna. Of the portable weighing machines, 11 are operated in Metro Manila.

Trucks detected by the weighbridges and portable weighing machines as carrying an axle load exceeding the legal limit of 13,500 kg under RA 8794 (Motor Vehicle User's Charge or MVUC Act) are prohibited from proceeding with their trips and subjected to fines. The LTO is tasked with enforcing the anti-overloading law. Issues associated with the enforcement of the anti-overloading regulations are further discussed in **Annex 4.5.4.**

The DPWH communication network supports the RBIA, RTIA and TARAS database. The network connects the Central Office with all Regional Offices thru leased line with 2,048 kbps. Each Regional Office in turn will eventually be connected to its component District Engineering Offices by 2014 by a leased line of 512 kbps; while only 52 District Engineering Offices are so far connected with their mother Regional Offices, all District Engineering Offices in the NCR and Regions III and IV-A are already connected with their Regional Offices.

The DPWH RBIA, RTIA, and TARAS databases can be enhanced to incorporate traffic data generated by an ITS, and/or they can be interfaced with separate ITS – e.g., the MMDA system – in order to collect, process, and deliver to users relevant traffic information.

With information imported from these databases, the DPWH employs the following planning systems to systematically generate priority lists of road construction and maintenance projects based on objective criteria using life cycle cost-benefit analyses under alternative budget envelopes.

- Pavement Management System (PMS)
- Highway Development and Management Version 4 (HDM-4)
- Bridge Management System
- Multi-Year Programming and Scheduling System
- Routine Maintenance Management System

Funds for the data collection and processing for the RTIA, RBIA, TARAS and related systems come from the budget of the DPWH under the General Appropriations Act (GAA) and the Motor Vehicle User's Charge (MVUC) Special Funds (see detailed discussion below).

While the DPWH collects information on National Roads, including inventory, condition, traffic, and accident data, and maintains databases for this purpose – mainly RBIA, RTIA, and TARAS – other agencies are also involved in related data collection.

- The LGUs collect information on their respective Local Roads

- The MMDA gathers data on National Roads and traffic in Metropolitan Manila.

- The toll road operators – viz., (a) Manila North Tollways Corporation (MNTC) for the NLEX, (b) South Luzon Tollway Corporation (SLTC) and Manila Toll Expressway Systems for the SLEX, (c) Citra Metro Manila Tollways Corporation (CMMTC) for the Skyway and SLEX from Magallanes to Alabang, (d) Philippine Reclamation - UEM MARA Corporation for the MCTE, (e) Bases Conversion Development Authority (BCDA) for the SCTEX, and (f) Star Infrastructure Development

Corporation (SIDC) for the STAR - also collect road and traffic information for their respective toll roads.

Delineation of Functions among Units

In terms of institutional responsibilities, the core processes and functions of the DPWH pertaining to road planning and management are delineated and delegated among the concerned Central, Regional and District units as shown in **Table 4.3-4**.

TABLE 4.3-4 DELINEATION OF DPWH ROAD PLANNING AND MANAGEMENT PROCESSES AND FUNCTIONS

Process/Function	Central Office (CO)	Regional Office (RO)	District Engineering Office (DEO)
Policy and standards setting	Formulation		
Needs assessment Road inventory & condition Traffic	Integration & analysis – IPRSD Integration & analysis – PED	Supervision & consolidation of DEO surveys & data Supervision & consolidation of DEO surveys & data	Road surveys & data collection Traffic surveys
Strategic analysis	Initiation & coordination – DPD		
Long-term planning	Plan formulation & integration – DPD	Preparation & integration of Reg. long-term plan inputs	Preparation of District long- term plan inputs
Multi-year programming (MYP)	MYP formulation & integration – DPD	Preparation & integration of Reg. MYP inputs	Preparation of District MYP inputs
Annual programming: Network development/ construction Asset preservation/maintenance	AIP initiation & integration - PrD AMWP initiation & integration – BOM	Preparation & integration of Reg. AIP Preparation & integration of Reg AMWP	Preparation of Dist. AIP Preparation of Dist AMWP
Feasibility studies	Preparation – PMO FS; Review of FS	Preparation < P 50 M	Preparation < P20 M
Detailed engineering	Design supervision; Approval >P50 M	Design approval < P50 M	Design approval < P20 M
Contract procurement	Supervision of all procurement; Procurement >P150 M	< P150 M	< P 50 M
Construction management	Supervision of construction; FAPs mgt – PMOs	< P50 M	< P 20 M
Maintenance management	Supervision	Inspection & coordination	Administration & supervision

Note: IPRSD – Infrastructure Planning, Research and Statistics Division; PED – Project Evaluation Division; DPD – Development Planning Division; AIP – annual Infrastructure Program; PrD – Programning Division; AMWP – Annual Maintenance Work Program; BOM – Bureau of Maintenance; FAPs – Foreign-assisted Projects; AIP –Annual Infrastructure Program; AWMP – Annual Maintenance Work Program

Insofar as traffic information is concerned, under the present organization the DPWH Planning Service, particularly the Road Safety and Traffic Analysis Division (Project Evaluation Division), is tasked to manage the implementation of the Nationwide Road Traffic Surveys Program, RTIA database, and TARAS; and analysis of road traffic data for internal and external stakeholders; and to supervise and assist ROs and DEOs in the conduct of regular and special traffic surveys, accidental black spot investigations, and road safety audit (road traffic prevention). The Bureau of Maintenance supervises the ROs and DEOs in the operation of the permanent weighbridges and portable weighing machines.

Under the proposed reorganization or rationalization plan, these traffic-related planning and supervision functions of the Planning Service and Bureau of Maintenance will be transferred to the Bureau of Quality and Safety, but actual conduct of field surveys and data collection will still be done by the ROs and DEOs.

Medium-Term Program

Under its Medium-Term Public Investment Program, the DPWH has set the medium-term targets for National roads as shown in **Table 4.3-5**.

TABLE 4.3-5 MEDIUM-TERM PHYSICAL TARGETS FOR NATIONAL ROADS

	Baseline (2010)	2011	2012	2013	2014	2015	2016	Requirement
National Arterial Roads (15,872 km)	90.9% Paved 14,429 km	93.6% Paved 14,864 km	96.5% Paved 15,315 km	99.0% Paved 15,709 km	100.0% Paved 15,872 km			▪ Paving of 1,443 km ▪ Rehab/ widening/ upgrading/ construction of 2,828 km.
National Secondary Roads (15,370 km)	70.6% Paved 10,852 km	71.9% Paved 11,052 km	74.6% Paved 11,463 km	78.6% Paved 12,088 km	85.4% Paved 13,130 km	94.0% Paved 14,445 km	100% Paved 15,370 km	▪ Paving of 4,518 km ▪ Rehabilitation of 1,798 km including newly converted national roads)
National Bridges (345,978 lm) (7,958 bridges)	96.0% permanent 332,139 lm 7,321 br	96.8% permanent 335,043 lm 7,440 br	97.5% permanent 337,329 lm 7,560 br	98.5% permanent 340,788 lm 7,679 br	99.0% permanent 342,518 lm 7,799 br	99% perma-nent 344,248 lm 7,878 br	100% perma-nent 345,978 lm 7,958 br	▪ Replacement of 10,935 lm of temporary bridges ▪ Reconstruction of 10,594 lm of permanent bridges ▪ Repair/rehab. of 40,675 lm bridges

The DPWH has adopted the following Strategic Policies and Programs in carrying out its infrastructure operations:

- Good Governance Reform and Anti Corruption Program
- Upgrading the Quality and Safety of National Roads Program

- Strategic Convergence Program
- Public Private Partnership (PPP) Program

In Upgrading the Quality and Safety of National Roads, the DPWH has set the following directions:

- Upgrading of concrete pavement thickness from 230 mm to 280 mm.
- Outsourcing of project inspection and quality assurance of projects.
- Upgrading of design standards and specifications, including drainage, slope protection and soil erosion control, and widening of national arterial roads.
- Provision of loading and unloading bays for road safety.
- Improvement of road safety using the Traffic Accident Recording and Analysis System (TARAS) and International Road Assessment Program (iRAP).
- Stricter enforcement of anti-overloading provisions of the law.

To implement its PPP Program, the DPWH is pursuing the following thrusts:

- Implementation of High Standard Highway Master Plan for Metro Manila and 200-km radius to develop priority expressway projects thru PPP.
- Various modes of undertaking these priority expressways.
- Long-term road maintenance program for national roads under PPP.
- Bridge Replacement Program under PPP.

As may be deduced from the above policies and strategies, the DPWH has placed heavy emphasis on the enhancement of the quality and safety of the National Roads System, including the adoption of applicable high design and international safety standards. These standards may include the use of appropriate ITS for National Roads.

Budget

Funds for DPWH programs and operations are mainly drawn from the GAA. In addition, for road maintenance, DPWH derives funds from the Special Funds under the MVUC Act (R.A. 8794), particularly the Special Road Support Fund (SRSuF) for the maintenance of National Roads and the Special Road Safety Fund (SRSaF) for road safety and traffic light devices. The MVUC funds are further discussed under the section on Road Board.

For 2012 alone, the DPWH has a total budget of PhP 123.526 billion as shown in **Table 4.3-6**. This consists of PhP 99.490 billion for infrastructure construction financed from the General Appropriations Act (GAA), PhP 19.536 billion for infrastructure maintenance financed from the GAA and MVUC funds, and PhP 4.500 billion for supporting non-infrastructure programs funded from the GAA.

TABLE 4.3-6 DPWH 2012 BUDGET

Program/Projects	Amount in PhP Million
A. Infrastructure Construction Program, funded from General Appropriations Act (GAA)-Capital Outlays (CO)	**99,490**
National Roads	82,762
PPP Projects (Government Counterpart)	3,000
Other Projects	13,728
B. Infrastructure Maintenance Program, funded from GAA-Current Operating Expenditures (COE) and Motor Vehicle User's (MVUC) Act	**19,536**
National Roads	17,693
GAA	4,000
MVUC (SRSuF and SRSaF)	13,693
Other Projects, GAA	1,843
C. Non-Infrastructure Program funded from GAA-COE	**4,500**
General Administration and Support Services	865
Support to Operations	802
Operations	2,833
Total, A+B+C	**123,526**

Source: 2012 GAA, DPWH, and Road Board

Of the PhP 99.490-billion infrastructure construction program (under GAA-CO), about 83.2 percent or PhP 82.762 billion is allocated for National Roads, and PhP 3.000 billion is intended as Government counterpart funds for PPP projects, mainly tollways.

The PhP 82.762 billion for the construction of National Roads (CO) is programmed for the categories of projects shown in **Table 4.3-7**.

TABLE 4.3-7 DPWH 2012 BUDGET FOR CONSTRUCTION OF NATIONAL ROADS

Categories	Amount in PhP Million
Asset preservation of National Roads, based on PMS/HDM-4, consisting of preventive maintenance and rehabilitation/reconstruction of damaged paved National Roads	20,623
Road upgrading (gravel to concrete) based on traffic benchmark and HDM-4 Project Analysis	15,876
Roads to access critical bottlenecks, including National Roads traffic decongestion and access roads to airports, roll on-roll off ports, and declared tourism destinations	18,919
Construction/rehabilitation/reconstruction/strengthening/replacement of National Bridges	8,289
Other highway projects	19,064
Total	**82,762**

Source: 2012 GAA and DPWH

For the maintenance of National Roads, about PhP 25 billion is needed yearly based on DPWH/World Bank studies. On the other hand, in 2012, the available MVUC budget consists of (a) PhP 12.479 billion under the Special Road Support Fund (SRSuF) for preventive and routine maintenance of National Roads, and (b) PhP 1.214 billion under the Special Road Safety Fund (SRSaF) for road safety projects, or a total of PhP 13.693 billion. The MVUC funds are supplemented by GAA-COE appropriations of PhP 4.000 billion for routine maintenance, which brings the total available maintenance funds under COE to PhP 17.692 billion. This is about 71 percent of the total maintenance needs of PhP 25 billion.

If the GAA-CO funding of PhP 20.623 billion for asset preservation which includes preventive maintenance and rehabilitation is considered, however, the available funds for road maintenance/asset preservation would total PhP 38.316 billion, which on the aggregate is more than sufficient to cover the total maintenance needs of PhP 25 billion.

For the medium-term period, the DPWH road construction program to be funded from the GAA capital outlays budget will increase by about 10 percent a year, from PhP 101.1 billion in 2013 to PhP 134.499 billion in 2016, as shown in **Table 4.3-8**:

TABLE 4.3-8 DPWH ROAD CONSTRUCTION BUDGET, 2013-2016

Year	Amount in PhP Million
2013	101,126
2014	113,239
2015	122,362
2016	134,599

Source: DPWH

Toll Road Projects

Aside from its responsibility over regular road programs, the DPWH is authorized by the BOT Law as implementing agency for toll road projects. Consequently, as mentioned above, the DPWH has so far bid out and awarded three tollway projects under the BOT Law using the BTO arrangement, namely, STAR, TPLEX, and Daang Hari-SLEX Link Road. In addition, the DPWH will soon bid out the implementation of the NAIA Expressway (NAIAX) Project and the Cavite-Laguna Expressway (CALAX) Project under the BOT Law.

For its BOT tollway projects, the DPWH is responsible for prescribing the Minimum Performance Standards and Specifications (MPSS) for the design, construction, and operation and maintenance, and the draft Concession Agreement. It also reviews and approves the Concessionaire's detailed engineering design, and supervises the construction, operation and maintenance. The MPSS provides that the Concessionaire may adopt its own ITS and ETC system for as long as they comply with the set performance standards for toll collections and

traffic management. However, as in the case of the Daang Hari-SLEX Link Road and NAIAX projects, the DPWH requires the Concessionaire to cooperate with the DPWH in case Government authorities decide on a policy that will require physical inter-connection and inter-operability of the toll collection systems of these expressways with those of other existing and future expressways.

DPWH Role in ITS

From the foregoing discussion of the mandate, functions, and budget of the DPWH, the following may be deduced insofar as the role of the DPWH in ITS is concerned:

The DPWH, as the State's engineering and construction arm, may develop and implement standards and guidelines to ensure the safety of public roads and the efficiency and quality of construction. These standards/guidelines may include standards, where feasible, for the use of ITS and ETC for public roads – whether National or Local Roads, and whether ordinary (non-toll) or toll roads – in order to promote public safety, convenience, and efficiency in transportation and traffic flow.

The DPWH is directly responsible for the funding, design, construction and maintenance of National Roads. These activities inherently include "street furniture" and other appurtenant on-road and off-road facilities necessary for the safe and efficient use of these National Roads, such as ITS infrastructure, e.g., traffic lights, CCTV, traffic sensors, monitoring centers, etc.

The DPWH shall also carry out the integrated or network planning for highways of all categories – National/Local Roads, and ordinary non-toll roads/tollways – which may include accessory facilities, e.g., ITS, that will promote the coordinated flow of traffic within the road network.

The DPWH envisions to have pilot ITS projects involving the following services:

- A Traffic Control System and Traffic Control Center outside Metro Manila. This will initially cover the Manila North road, Pan-Philippine Highway, and National Roads in Cavite and Laguna, and eventually include major material roads nationwide.
- Expansion of Incident and Accident Monitoring System with the use of CCTV cameras.
- Provision of Variable Message Signboards.
- Adoption of Video Camera Technology with both vehicle counting/ classification and monitoring functions

If the construction/installation and operation/maintenance of ITS infrastructure along National

Roads are to be done by the DPWH, they may be considered for financing from the GAA and MVUC funds for National Roads, subject to DPWH priorities within the DPWH budget ceilings. The 2012 budget summarized in **Table 4.3-6** gives an indication of the total potential amounts that may be partly tapped for this purpose - viz., PhP 82.762 billion for construction and PhP 17.693 billion for maintenance. In addition, if the installation of ITS is to be undertaken by the DPWH through PPP, Government counterpart funding may partly come from the GAA-CO for PPP Projects - e.g., PhP 3.000 billion for 2012.

4.3.2 Department of Transportation and Communications

Legal Basis

The Department of Transportation and Communications (DOTC) was created by Executive Order (EO) No. 125 dated 30 January 1987, as amended by EO 125-A dated 13 April 1987.

Mandate

The mandate of the DOTC under EO 125 is to serve as:

> *the **primary policy, planning, programming, coordinating, implementing, regulating and administrative entity** of the government in the **promotion, development and regulation of dependable and coordinated networks of transportation** (and communications**) systems** in the country.*

Powers and Functions

To achieve its mandate insofar as road transportation is concerned, the DOTC under EO 125-A has the following powers and functions:

a. *Formulate and recommend **national policies and guidelines** for the preparation and implementation of **integrated and comprehensive transportation** and communications systems at the national, regional and local levels;*

b. *Establish and administer **comprehensive and integrated programs for transportation** and communications, and for this purpose, may call on any agency, corporation, or organization, whether public or private, whose development programs include transportation and communications as an integral part thereof, to participate and assist in the preparation and implementation of such program;*

c. *Assess, review and provide direction to **transportation** and communications **research and development programs** of the government in coordination with other institutions concerned;*

d. *Administer and enforce all laws, rules and regulations in the field of transportation and communications;*

e. ***Coordinate with the Department of Public Works and Highways** in the design, location, development, rehabilitation, improvement, construction, maintenance and repair of **all infrastructure projects and facilities of the Department**. However, government corporate entities attached to the Department shall be authorized to undertake specialized telecommunications, ports, airports and railways projects and facilities as directed by the President of the Philippines or as provided by law*

f. *Issue certificates of public convenience for the operation of public land and rail transportation utilities and services;*

g. *Establish and prescribe rules and regulations for identification of routes, zones and/or areas of operations of particular operators of public land services;*

h. *Establish and prescribe rules and regulations for issuance of certificates of public convenience for public land transportation utilities, such as motor vehicles, trimobiles and railways;*

i. *Establish and prescribe rules and regulations for the inspection and registration of air and land transportation facilities, such as motor vehicles, trimobiles, railways and aircrafts;*

j. *Establish and prescribe rules and regulations for the issuance of licenses to qualified motor vehicle drivers, conductors, and airmen;*

k. *Establish and prescribe the corresponding rules and regulations for the enforcement of laws governing land transportation, air transportation and postal services, including the penalties for violations thereof, and for the deputation of appropriate law enforcement agencies in pursuance thereof;*

l. *Determine, fix and/or prescribe charges and/or rates pertinent to the operation of public air and land transportation utility facilities and services, except such rates and/or charges as may be prescribed by the Civil Aeronautics Board under its charter, and, in cases where charges or rates are established by*

international bodies or associations of which the Philippines is a participating member or by bodies or associations recognized by the Philippine government as the proper arbiter of such charges or rates;

m. *Establish and prescribe the rules, regulations, procedures and standards for the accreditation of* ***driving schools****;*

The DOTC generally exercises most of the line powers and functions through its sectoral offices, as follows:

- The LTO for the powers and functions in items d, i, j, k, and m above.
- The LTFRB for the powers and functions in items d, f, g, h, k, and l above, as amended by EO 202 dated 19 June 1987.
- The DOTC Proper (Office of the Secretary) focuses on the powers and functions pertaining to policies, directions, and general administration in items a, b, c, d, and e, although it can directly exercise all of the abovementioned powers and functions under EO 125-A.

Organization

Figure 4.3-2 shows the organizational chart of the DOTC.

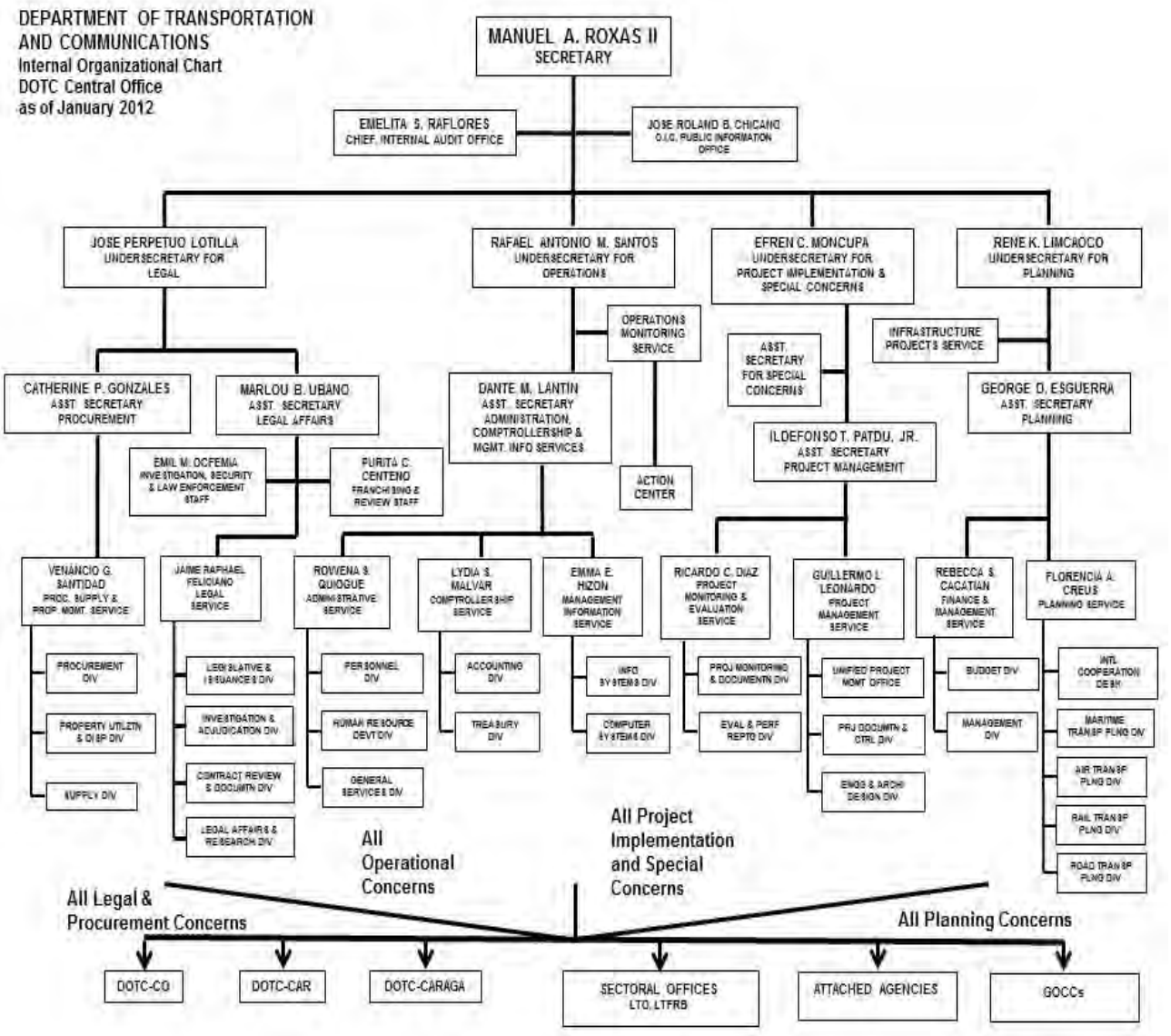


FIGURE 4.3-2 DOTC ORGANIZATION CHART

The DOTC is headed by a Secretary of cabinet rank. It has five Undersecretaries covering Land Transport, Rail Transport, Maritime Transport, Air Transport, and Staff Services. The DOTC has four offices directly under its supervision. These include two sectoral offices related to road transportation, namely, the LTO for vehicle registration and driver licensing, and the LTFRB for franchising and regulating road passenger transport. The DOTC directly operates the EDSA mass rail transit or MRT-3 which is separate from the Light Rail Transit Authority (LRTA).

The transport planning functions in the DOTC are primarily exercised by the Project Development Office and the Planning Service, which report to the Assistant Secretary for Planning and Project Development, who in turn reports directly to the Secretary.

In addition to these in-house offices, attached to the DOTC for policy and program coordination is the Toll Regulatory Board (TRB), which issues franchises for toll roads and sets toll rates - aside from several attached corporations specializing in particular non-road modes of transport, some of which are related to road transportation in Mega Manila, viz.,

- LRTA – which operates LRT 1 (Taft-Rizal Ave., 15 km) and LRT 2 (Recto-Santolan, 14 km), with proposed extensions.

- Philippine National Railways – which operates the Metro Manila commuter service to Calamba City, and the long-distance service to the Bicol region.

- Philippine Ports Authority – which is responsible for financing, construction, and operation of public ports in the Philippines, including the Manila Port complex, Batangas Port, and Batangas Ferry Terminal, and regulation of port operations.

- Maritime Industry Authority – which is responsible for the development, promotion and regulation of the maritime industry in the country.

- Civil Aviation Authority of the Philippines – which develops, regulates, and operates national airports and aircraft.

- Manila International Airport Authority – which operates the Ninoy Aquino International Airport.

- Clark International Airport Corporation – which operates the Diosdado Macapagal International Airport (Clark) in Pampanga.

- Mactan-Cebu International Airport Authority – which operates the Mactan-Cebu International Airport.

- Philippine Aerospace Development Corporation - which provides support and research for aerospace development and aircraft assembly, maintenance, repair and overhaul facilities.

The DOTC also coordinates with, but does not control, the DPWH – a co-equal national line department - on the latter's planning and operations relating to National Roads. The DOTC has no direct control, either, of other agencies created after the enactment of EO 125-A, such as the Bases Conversion Development Authority (BCDA), which are involved in the provision and/or operation of road, rail, airport, and port infrastructure.

Inter-Modal Operations

The DOTC is the prime agency for intermodal operations. This is confirmed under EO 67,

dated 21 February 2012, which states that t*he DOTC, pursuant to its mandate to promote, develop and regulate dependable and coordinated networks of transportation system, is (hereby) designated as the lead agency in the planning, implementation and monitoring of the* Integrated Transport System Project. This Project aims to establish two integrated transport terminals at par with international standards, located North and South of Metro Manila, to *provide effective interconnections between different transport modes and services thereby ensuring efficient and seamless travel for the commuting public*. Other integrated transport terminals may be established for the same purpose. To provide a mechanism for coordination, EO 67 also created an Inter-Agency Committee to serve as an advisory body and consultative forum for the Project. The committee is composed of the DOTC as chair, the MMDA as co-chair, and the DOTC, Department of Interior and Local Government, National Economic and Development Authority, LTFRB, and LTO as members.

Data Systems

The DOTC collects statistics from its internal sources and in-house offices as well as attached agencies, all of which maintain their own databases for their operations. These databases of the LTO, LTFRB, LRT-1, LRT-2, MRT-3, and PNR are not interconnected on-line, nor do they provide the public real time information on trip schedules. The DOTC, in coordination with the JICA, is now updating the origin-destination traffic data for Metro Manila and surrounding areas under the Metro Manila Urban Integrated Transport Information Study (MMUTIS). The data will be used mainly for planning projects.

In addition, the DOTC has initiated the bidding for a Road Transportation IT Infrastructure Project that will include, among others, a new Motor Vehicle Registration System (see **Annex 4.3.6** below under LTO). The bidding, however, has been stymied by a pending Temporary Restraining Order (TRO) issued by the court.

Budget

Under the 2012 GAA, the budget of the DOTC amounts to a total of PhP 32.787 billion, consisting of the programs and projects shown in **Table 4.3-9**.

TABLE 4.3-9 DOTC 2012 BUDGET UNDER THE GAA

Programs/Projects	Amount in PhP Million
A. PROGRAMS	
I. General Administration and Support Services (GASS)	1,438.429
II. Support to Operations	
1. Policy Formulation (Office of the Secretary)	114.974
2. Land Transportation Services (LTO)	801.933
3. Regulation of Public Land Transportation (LTFRB)	0.300
4. Protection of Philippine Coast (PCG)	6.400

Programs/Projects	Amount in PhP Million
III. Operations	
1. Land Transportation Services (LTO)	482.231
2. Regulation of Public Land Transportation (LTFRB)	235.108
3. Protection of Philippine Coast (PCG)	3,254.728
Total Programs	**6,334.103**
B. PROJECTS	
I. Locally-Funded Projects –Airports, Ports, MRT, LTO, LTFRB, PPP	20,434.894
II. Foreign-Assisted Projects – Airports, Maritime Disaster Response Helicopter	6,017.974
Total Projects	**26,452.868**
TOTAL DOTC	**32,786.971**

Source: 2012 GAA

Funding for the operations of the DOTC Office of the Secretary, including planning related activities, may be drawn from appropriate items under the GASS and Support to Operations-Policy Formulation (Office of the Secretary) shown in **Table 4.3-9**. The budgets for the LTO and the LFTRB are further discussed below under the sections pertaining to these agencies.

4.3.3 Metropolitan Manila Development Authority

Legal Basis

RA 7924, approved on 01 March 1995, created the Metropolitan Manila Development Authority (MMDA).

Mandate

Under RA 7924, the MMDA shall administer the affairs of Metropolitan Manila which is composed of 16 cities - Caloocan, Las Piñas, Malabon, Manila, Mandaluyong, Makati, Marikina, Muntinlupa, Navotas, Parañaque, Pasig, Pasay, Quezon, San Juan, Tagig, and Valenzuela - and one municipality - Pateros. The MMDA shall perform planning, monitoring and coordinative functions, and in the process exercise regulatory and supervisory authority over the delivery of metro-wide services within Metro Manila without diminution of the autonomy of the local government units concerning purely local matters.

Metro-wide services under the jurisdiction of the MMDA are ***those services which have metro-wide impact*** *and transcend legal political boundaries or entail huge expenditures such that it would not be viable for said services to be provided by the individual local government units (LGUs) comprising Metropolitan Manila. These services include, among other things,* ***transport and traffic management*** *which includes the formulation, coordination and monitoring of* ***policies, standards, programs and projects*** *to* ***rationalize the existing transport operations, infrastructure requirements, the use of thoroughfares, and promotion of safe and convenient***

movement of persons and goods: provision for the mass transport system and the institution of a system to regulate road users; administration and implementation of all traffic enforcement operations, traffic engineering services and traffic education programs, including the institution of a single ticketing system in Metropolitan Manila.

Powers and Functions

Among the powers and functions of the MMDA under RA 7924 and its IRR pertaining to transport and traffic are the following:

- ***Formulate, coordinate and regulate*** *the implementation of* ***medium and long-term plans and programs for the delivery of metro-wide services****, land use and physical development within Metropolitan Manila, consistent with national development objectives and priorities.*

- ***Prepare, coordinate and regulate*** *the implementation of* ***medium term investment programs for metro-wide services*** *which shall indicate sources and uses of funds for priority programs and projects, and which shall include the packaging of projects and presentation to funding institutions.*

- ***Undertake and manage*** *on its own* ***metro-wide programs and projects for the delivery of specific services*** *under its jurisdiction, subject to the approval of the Council. For this purpose, MMDA can create appropriate project management offices.*

- ***Coordinate and monitor*** *the implementation of such* ***plans, programs and projects*** *in Metro Manila; identify bottlenecks and adopt solutions to problems of implementation.*

- *Set the* ***policies concerning traffi****c in Metro Manila, and* ***coordinate and regulate*** *the implementation of all programs and projects concerning* ***traffic management****, specifically pertaining to enforcement, engineering and education. Upon request, it shall be extended assistance and cooperation, including but not limited to, assignment of personnel, by all other government agencies and offices concerned;*

- *Install and administer a* ***single ticketing system****, fix, impose and collect fines and penalties for all kinds of violations of traffic rules and regulations, whether moving or non-moving in nature, and confiscate and suspend or revoke driver's licenses in the enforcement of such traffic laws and regulations, the provisions of RA 4136, and PD 1605 to the contrary notwithstanding.*

- *For this purpose, the Authority shall* ***enforce all traffic laws and regulations*** *in Metro Manila,* ***thru its traffic operation center****, and may* ***deputize*** *members of the PNP,*

traffic enforcers of local government units, duly licensed security guards, or members of non-governmental organizations to whom may be delegated certain authority, subject to such conditions and requirements as the Authority may impose.

Organization

The MMDA is under the Office of the President and headed by a Chairman (with a cabinet rank) who is appointed by the President. The Chairman is assisted by a Deputy Chairman, General Manager and three Assistant General Managers (AGMs) in-charge of Planning, Operations and Finance and Administration. The policy making body of the MMDA is the Metro Manila Council, headed by the Chairman of MMDA, and composed of the Mayors of the 16 cities and one municipality within Metro Manila, and the presidents of the leagues of vice-mayors and councilors.

Transport planning and traffic management is within the mandate of the MMDA and is directly under the Office of the General Manager. Transport planning functions are assigned to the Assistant General Manager (AGM) for Planning, and traffic management and operations are performed by the AGM for Operations. The enforcement of traffic rules and regulations is the responsibility of the Traffic Discipline Office (TDO) under the AGM for Operations.

Planning Systems

A number of technical assistance studies or projects have been initiated to improve the planning systems of the MMDA. The MMUTIS, which developed the metro-wide comprehensive transport database system, was undertaken through JICA assistance. The WB also provided assistance in enhancing transport planning and traffic management systems of the MMDA, which include the Metro Manila Urban Road Transport Improvement Project and the Metro Manila Air Quality Project. Other information systems relevant to transport planning that were developed for Metro Manila are the GIS and disaster management information systems, with technical assistance from the JICA.

A significant development is the recent launching by the MMDA, together with the World Bank and the Australian Agency for International Development, of the formulation of the Metro Manila Greenprint 2030 plan. This will be a two-decade plan that will provide the development framework and regional spatial strategies for the metropolis. An environmental-united blueprint, the Greenprint will guide the form of the urban region in terms of “trunk” infrastructure, “green” systems and “cluster” economic activities. The Greenprint aims to provide guidance to the policy formulation process of LGUs and sectoral agencies on matters of importance for Metro Manila; including major infrastructure, investment programs and land use. The Greenprint‘s spatial framework will extend over Metro Manila‘s boundaries to neighboring areas in the CALABARZON and Central Luzon regions. Scheduled to be completed and

approved in June 2013, the formulation of Greenprint 2030 will provide a framework for integrated management of complex issues within Metro Manila, including coordination among the 17 LGUs that make up the NCR, as well as the surrounding LGUs. So far, the Greenprint has formulated a vision statement which focuses on the following future roles of Metro Manila:

- Global center for knowledge process outsourcing.
- Green large scale city building to address housing, mobility and environmental infrastructure needs and bring people closer to jobs and services.
- Peri-urbanization by increasing mobility and livelihood in the periphery.
- Retrofitting communities by increasing densities outward especially near rapid transit stations and in-situ -redevelopment of low-income communities.
- Reducing vulnerabilities to natural disasters, especially flooding and earthquakes.
- Making Metro Manila the first destination for newly rich regional neighbors for shopping, convention and entertainment.
- Reclaiming Metro Manila's role as center for high-end services, such as higher education, medical services/tourism, and creative services.

To support this vision, the structural plan for Metro Manila to be formulated under Greenprint will include, among others, the major transport/connectivity network. The proposed ITS master plan should be consistent with this network as well as the other elements of the Greenprint structural plan. This network would emphasize high-capacity public transport systems, including mass rail transit, bus rapid transit, and other high-occupancy vehicle systems with low-carbon impact, as well as high-standard highways, interconnecting the planned major activity centers within Metro Manila and towards the periphery. The ITS plan is expected to come up with appropriate ITS technologies to support the envisioned transport and transit systems in Metro Manila that need to be properly integrated with the country's transport and transit system. The ITS systems sustain reasonably high levels of services of the transport systems, though a harmonized transport and traffic database that will provide real-time information on transport and traffic condition so that people can decide their travels appropriately and transport providers can deliver foods and services on time in Metro Manila.

Linkages with Other Agencies

With respect to the linkages of the MMDA with other agencies on transport and traffic, the following provisions of the IRR for RA 7924 apply:

- *The Authority shall undertake transport and traffic management and enforcement operation in Metropolitan Manila in coordination with the Department of Transportation and Communication.*

- *It shall formulate a* ***uniform set of rules and regulation for traffic*** *in Metropolitan Manila and establish and regulation thereof,* ***in coordination with DOTC and DPWH*** *and in consultation with all* ***other agencies*** *concerned.*

- *It shall deputize LGU traffic enforcers, duly licensed security guards, members of the Philippines National Police and non-governmental organizations and personnel of national agencies concerned to implement a single ticketing system.*

- *The Authority shall likewise formulate standards for route capacity and volume of motor vehicles for main thoroughfares.*

- *The Land Transportation Franchising and Regulatory Board of the DOTC shall evaluate, approve and issue franchise applications using the standards on route measured capacity, and prescribe and regulate transportation routes and areas of operation of public land transportation, pursuant to the Metro Manila transport plan.*

- *The* ***Land Transportation Office*** *of the DOTC shall be responsible for the registration of motor vehicles and licensing of drivers, conductors and dealers.*

- *The DPWH may effect the gradual transfer of the operation, maintenance and improvement of the* ***Traffic Engineering Center*** *facilities to the Authority, subject to mutual agreement of the parties concerned.*

The last item above – transfer of the Traffic Engineering Center (TEC) from the DPWH to the MMDA – was completed in 2003.

Traffic Monitoring and Management Measures

The MMDA has since enhanced the TEC, now part of the overall MMDA Communication and Command Center or Metrobase, which also includes the Flood Control Operations Center. The main facilities and functions of the TEC are schematically depicted in **Figure 4.3-3.**

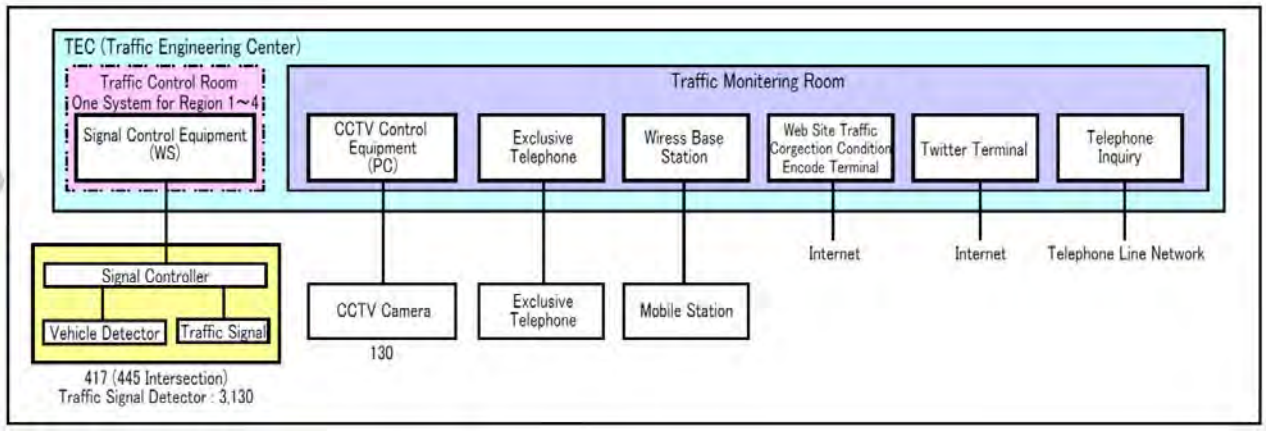


FIGURE 4.3-3 MMDA TRAFFIC ENGINEERING CENTER

The TEC manages 436 signalized intersections, of which 374 are operational.

Through the TEC and the Traffic Discipline Office, the MMDA launched in 2010 the highly successful and reliable @MMDA Twitter Account which had more than 261,000 followers as of August 2012. It also established the MMDA Facebook Page as an avenue to directly communicate with constituents in more than 140 characters. The MMDA likewise set up a redesigned website containing relevant and up-to-date information for Metro Manila.

In 2011, the MMDA launched the country's first digitized traffic information system – the MMDA-TV5 Metro Manila Traffic Navigator. Through the Metro Manila Traffic Navigator, the MMDA monitors the traffic situation on nine major roads – viz., EDSA, Commonwealth, Quezon, España, C-5, Ortigas, Roxas Boulevard, and South Luzon Expressway (SLEX), and provides basic travel information to motorists, particularly (a) levels of congestion on sections of each road – viz., heavy, moderate, and light traffic – and (b) location of major incidents - such as road works, accidents, and flooded sections.

The MMDA collects information on traffic conditions mainly using manual methods which are quite subjective – i.e., by observation from CCTV cameras (presently 99) and by roadside reports from MMDA traffic enforcers, as well as information fed by the public through Twitter, call center agents, and the website. The MMDA tries to update the information every five minutes, and the maximum time lag for the traffic information is 15 minutes. The level of congestion is determined by the traffic enforcer concerned based on his judgment of the traffic situation, but his assessment is counterchecked by the Metrobase through the CCTV and other means.

The plan of the MMDA is to automate traffic data collection by using roadside and other applicable sensors. It also aims to provide estimated travel time information to the public.

The traffic information is accessible for free, through the MMDA Traffic Navigator System, by users using smartphones (iphone, Android and Blackberry), ipads, and computers, and through the Twitter and Facebook accounts. As of August 2012, the download numbers for Blackberry, Android and iOS has reached about 250,000 users. In addition, traffic information is also posted on message boards along the roads as well as on TV Channel 5.

Other important measures taken by the MMDA to improve the traffic situation include the following:

- Unified Vehicle Volume Reduction Program (UVVRP), more popularly known as the vehicle plate number coding scheme. This bans vehicles, both private and public (except certain types), from using roads in Metro Manila from 7 to 10 am and from 3 to 7 pm, Monday to Friday, depending on the last digit of vehicle license plate. In effect, it aims to reduce the number of vehicles plying the roads by about 20 percent.

- Uniform Ticketing System for traffic violations in all 17 LGUs. This aims to harmonize the existing national and local laws on traffic enforcement and to prevent confusion among motorists. This scheme, however, has not been fully implemented, since the LGUs use varying forms of the Ordinance Violation Receipt (OVR) with different schedules of fines and penalties, while the LTO still uses the Temporary Operation Permit (TOP) system.

- Designation of motorcycle lanes at EDSA, Commonwealth Avenue, and Macapagal Avenue.

- Anti-*kotong* (extortion) campaign. This will deter traffic enforcers from committing extortion or receiving bribes.

- Tagging of public utility buses and AUV taxis, through painting of the license plate numbers on the roof and sides of the vehicles. This will enable CCTV monitors to identify those involved in traffic violations, accidents, *colorum* and out-of route operations, and apprehension of the erring parties.

- Amendment of the truck ban to be effective at certain hours from Monday to Saturday and to apply to cargo trucks with a gross capacity weight of 4,500 kg.

- Construction of pedestrian footbridges and rotundas and geometric improvements of selected main roads (e.g., Commonwealth Avenue). This aims to improve pedestrian safety and vehicle speed.

- Operation of a Traffic Academy which provides traffic personnel with training and seminars as well as strengthens the capacities of drivers with regard to the rules of the

road, awareness of traffic laws/regulations, including defensive driving, to upgrade their capabilities and competence in traffic management. From January to April 2012 alone, the Academy conducted 11 courses and 740 trainings wherein 10,053 MMDA personnel, company employees, and delinquent drivers participated.

The MMDA has undertaken or programmed for implementation within the year 2012 the following IT-based traffic management projects:

- Internet Protocol (IP) Camera Livestream via Web and Applications
- New Metrobase
- Traffic Signalization Upgrade, covering 85 major intersections and 25 additional CCTV cameras
- Enhancement of MMDA Applications to include Cloud-sourced Information
- Fiber Optic Backbone along major thoroughfares.
- Light Emitting Diode (LED) Variable Message Signs to inform the motoring public of traffic conditions and road incidents, via 4G network.
- Interconnectivity tie-up (completed) with all major networks – ABS-CBN, TV5, GMA7, and PTV4 – for broadcast of traffic video fees.
- MMDA mobile applications in all major mobile platforms – added WP7, Java, Symbian.
- AGILA1 and AGILA3 mobile command centers for remote monitoring

A more detailed discussion of the role of the MMDA in the enforcement of traffic laws and rules, including issues and problems, is given in **Annex 4.5.2.**

Budget

Under the IRR of RA 8794, funds needed for the operations of the MMDA shall come from the following sources:

a. *National Government Subsidy in the form of regular appropriations, grants and other contributions as provided in the General Appropriations Act (GAA)...*

b. *Internal Revenue Allotment, currently allocated to the defunct Metro Manila Authority which shall continue to be allocated to the Authority...*

c. *Fines, imposed as penalty in the exercise of regulatory and supervisory authority over the delivery of metro-wide services enumerated...*

d. *Fees and charges, collected for services rendered.*

e. *Proceeds from sale, lease or rental of real property and assets owned by the Authority...*

f. *Mandatory contributions from component LGUs, equivalent to 5% of the total annual gross revenue of the preceding year, net of the internal revenue allotment. Total gross annual revenue shall refer to LGU collections derived from taxes, including surcharges and penalties accruing to the LGUs for each calendar year after deducting the share of the barangay from the real property and other local taxes.*

g. *Grants and Donations, from national and lower levels of government, foreign or domestic institutions and private individuals.*

h. *Loan proceeds, credits and other forms of indebtedness.*

For 2012, the National Government subsidy to the MMDA under the GAA for its operations amount to PhP 1,374 million as shown in **Table 4.3-10**.

TABLE 4.3-10 MMDA 2012 BUDGET UNDER THE GAA

PROGRAMS/ PROJECTS	Amount in PhP Million
A. PROGRAMS	
Operations	
a. Metro-wide Solid Waste Disposal and Management	743.068
b. Metro-wide Transport and Traffic Management	29.512
c. Operational Support, Maintenance, Repair and Rehabilitation of Flood Control and Drainage Systems	229.015
Total Operations	1,051.595
B. PROJECTS	
Locally-Funded Projects – Flood Control and Drainage	322.000
TOTAL MMDA	**1,373.595**

Source: 2012 GAA

Hence, under the 2012 GAA alone, Php 29.512 million for maintenance and other operating expenses is provided to the MMDA for metro-wide transport and traffic management. This appears inadequate since, as of the end of the first quarter of 2012 alone, 77 percent of this amount has already been utilized.

In addition to the eight sources of funds for MMDA mentioned above, the DPWH may transfer

part of its regular GAA and MVUC funds to the MMDA to implement selected road and traffic management projects. This is effected through Memoranda of Agreement (MOAs) between the DPWH and the MMDA. The latest MOA (April 2012) related to ITS involves the transfer of PhP 65 million in DPWH MVUC funds to the MMDA to be used for the installation of CCTV devices along major thoroughfares in Metro Manila. This will help monitor the traffic situation, road emergencies, and public safety situations, and expand the coverage of the digital and IP-based Surveillance System established by the MMDA for the purpose. At the same time, a DPWH-MMDA MOA was also forged for the transfer of PhP 213 million in DPWH MVUC funds to the MMDA for roadside maintenance projects to improve safety and mobility on streets in Metro Manila.

4.3.4 Road Board

Legal Basis

The Road Boated (RB) was created under Section 7 of RA 8794 (otherwise know as the Motor Vehicle User's Charge or MVUC Act), dated 27 June 2000.

Mandate

Section 7 of RA 8794 organized the RB ***to implement the prudent and efficient management and utilization of the special funds*** established under the MVUC Act which accrue from the fees collected by the LTO for the registration of motor vehicles.

Organization

The RB is composed of seven members – with the Secretary of the DPWH as ex officio head, and the Secretaries of the Department of Finance, Department of Budget and Management, and DOTC as ex officio members, and three members from transport and motorist organizations appointed by the President. The RB is assisted by a Secretariat headed by an Executive Director and is responsible for the day-to-day management of the Funds and for the implementation of the Board decisions. Technical support to the RB is provided by the DPWH through the Planning Service which determines road conditions and needs using the RBIA, and prepares of preventive maintenance and rehabilitation programs with the aid of the HDM-4.

Administration of Special Funds

The RB administers four Special Funds from the MVUC collections, as follows:

- Special Road Support Fund (SRSuF) under the DPWH – 80.0 percent of the collections revenue to be used for the maintenance and drainage improvement of

National Roads (70 percent to national primary roads and 30 percent to national secondary roads).

- Special Road Safety Fund (SRSaF) under the DPWH – 7.5 percent of the collections to be used for installation of traffic lights and safety devices.

- Special Local Road Fund (SLRF) under the DPWH – 5.0 percent of the collections to be used for maintenance of local roads of provincial and city governments in accordance with the vehicle population and road network size.

- Special Vehicle Pollution Control Fund (SVPCF) under the DOTC – 7.5 percent of the collections.

MVUC Budget

The total MVUC funds budgeted for 2012 amount to Php 15.367 billion, broken down as shown in **Table 4.3-11**.

TABLE 4.3-11 MVUC BUDGET FOR 2012

Agency/Fund	Amount in PhP Million
DPWH	**14,543**
Special Road Support Fund (SRSuF)	**12,479**
Routine Maintenance	3,300
Regular Routine Maintenance	1,500
Roadside Maintenance	1,800
Preventive Maintenance	9,179
WB-assisted Projects	1,852
JICA-assisted Projects	902
Regular Preventive Maintenance	6,425
Special Road Safety Fund (SRSaF)	**1,214**
Regular Road Safety Projects	950
Special Road Safety Activities	264
Special Local Road Fund (SLRF)	**850**
DOTC	**767**
Special Vehicle Pollution Control Fund (SVPCF)	**767**
Road Board Secretariat	**57**
Administrative Overhead Expenses	**57**
Grand Total	**15,367**

Source: DPWH and Road Board

The MVUC funds are increasing by about 5 percent a year in line with the growth in the

number of motor vehicles being registered with the LTO.

Utilization of Funds

Based on the Operating Procedures Manual of the Road Board, these funds can be utilized for the following eligible purposes:

1. Special Road Support Fund (SRSuF) under the DPWH

   The SRSuF can be used for the following eligible activities on National Roads:

   - Carriageway Maintenance: **pavement maintenance** (normal care to maintain the structural integrity and serviceability), regraveling, bridge and structures maintenance (to maintain the structural condition and appearance).

   - Roadside Maintenance: shoulder maintenance (normal care to maintain support to the carriageway and safety standards), drainage maintenance (normal care to maintain its effectiveness), vegetation control, **traffic services maintenance (normal care of road furniture to promote a safe and efficient road system** - e.g., maintenance of signs**,** road markers, pavement markings; maintenance of guardrails).

   - Preventive Maintenance: pavement resurfacing, limited concrete reblocking, seal widening, **preventive works** (non-routine works to protect the serviceability of the road network from damage from natural phenomena and minimize the threat of road closure – e.g., protection from sea or river damage, drainage, etc.).

   - Rehabilitation and Improvement: **rehabilitation** (restoration to original condition), drainage improvement, **rehabilitation plus improvement** (where improvement cost not greater than 25 percent of total cost).

   - Emergency Reinstatement: emergency reinstatement.

   - Road Management: professional services e.g., road condition surveys, traffic surveys, feasibility studies, etc.), administration.

2. Special Road Safety Fund (SRSaF) under the DPWH

   The SRSaF can be used for the following eligible activities on National and Local Roads:

   - Safety Devices

     - **Installation of devices that assist in the management and safety of the road network – e.g., traffic signals, advanced traffic management signals (ATMS),**

variable message signs (VMS), local area traffic management schemes (LATMS), surveillance devices, vehicle weighing devices.

- **Operation and maintenance of road management and safety devices – e.g., traffic signals, traffic monitoring equipment such as area-wide traffic control systems and closed circuit television systems, emergency telephones on motorways, vehicle weighing devices.**

- Safety Projects: **installation or construction of new traffic signs and markings,** small isolated geometric improvements, intersection improvements, traffic calming measures, lighting improvements, guard railing, sight benching to improve visibility, pedestrian crossings and pedestrian under- or over-passes, stock underpasses, trailer parks, safety sidewalks, rockfall protection.

- Road Safety Education and Training: development and delivery of **education and training** in road safety.

- Road Safety Management: **professional services and management activities relating to road safety**, including **accident reduction studies** and design and implementation of remedial treatments including **traffic safety devices**, DPWH management activities in collecting and analysing road **accident information**, DPWH Road Program Office activities in preparing, submitting, monitoring and reporting on the road safety annual work program and multi-year work program.

3. Special Local Road Fund (SLRF) under the DPWH

The SRLF can be used for the **same eligible activities stated in item 2 above** (National Roads) but applied to Provincial and City Roads.

4. Special Vehicle Pollution Control Fund (SVPCF) under the DOTC

The SVPCF can be used for the following eligible activities:

- Vehicle Standards and Enforcement: development of vehicle **standards for control of vehicle emissions** and other vehicle pollution; enforcement of vehicle standards particularly emission testing by private testing centers, Land Transportation Office testing centers or motor vehicle inspection stations.

- Vehicle Pollution Control Education and Training: development and delivery of education and training in vehicle pollution control.

- Vehicle Pollution Control Management: **professional services and management activities**, e.g., **vehicle pollution surveys** and studies and design and implementation of vehicle pollution control works, DOTC management activities in collecting and analysing **vehicle pollution control information**, management activities of the Vehicle Pollution Control Fund Committee, Technical Working Group and Secretariat in preparing, submitting, monitoring and reporting on the vehicle pollution control annual work program and multi-year work program.

From the foregoing, it will be noted that aspects of the construction/installation and operation/maintenance of ITS facilities along National and Local Roads, which meet the eligibility requirements for MVUC funding mentioned above - especially the activities shown above in bold font - may be considered for financing from the SRSuF, SRSaF, SLRF, and SVPCF, subject to the approval of the Road Board. In fact, as mentioned under **Annex 4.3.3** above, PhP 65 million in DPWH MVUC funds is to be transferred to the MMDA for the installation of additional CCTV devices to monitor traffic along major thoroughfares.

It should also be noted that RA 8794, through its Section 6, raised the maximum allowable vehicle axle load to 13,500 kg, from the previous 8,000 kg limit set in RA 4136, and provides for penalties for vehicle overloading beyond the new allowable axle load.

4.3.5 Toll Regulatory Board

Legal Basis

As mentioned in **Section 1.4** above, the Toll Regulatory Board (TRB) was created by PD No.1112 (Toll Operation Decree), dated 31 May 1977.

Mandate, Powers and Duties

The mandate, powers and duties of the TRB are defined in PD 1113, as stated in **Annex 4.1.4**. The TRB regulates all toll roads in the country, particularly by granting them franchises and setting toll rates.

Organization

The TRB is currently attached to the DOTC, but was originally attached to DPWH from its creation in 1977 until the early 2000s. The TRB is composed of the DOTC Secretary as Chairman, and the DPWH Secretary, DOF Secretary, NEDA Director-General, and a private sector representative as members. The TRB staff is headed by an Executive Director. The organization chart of the TRB is shown in **Figure 4.3-4**.

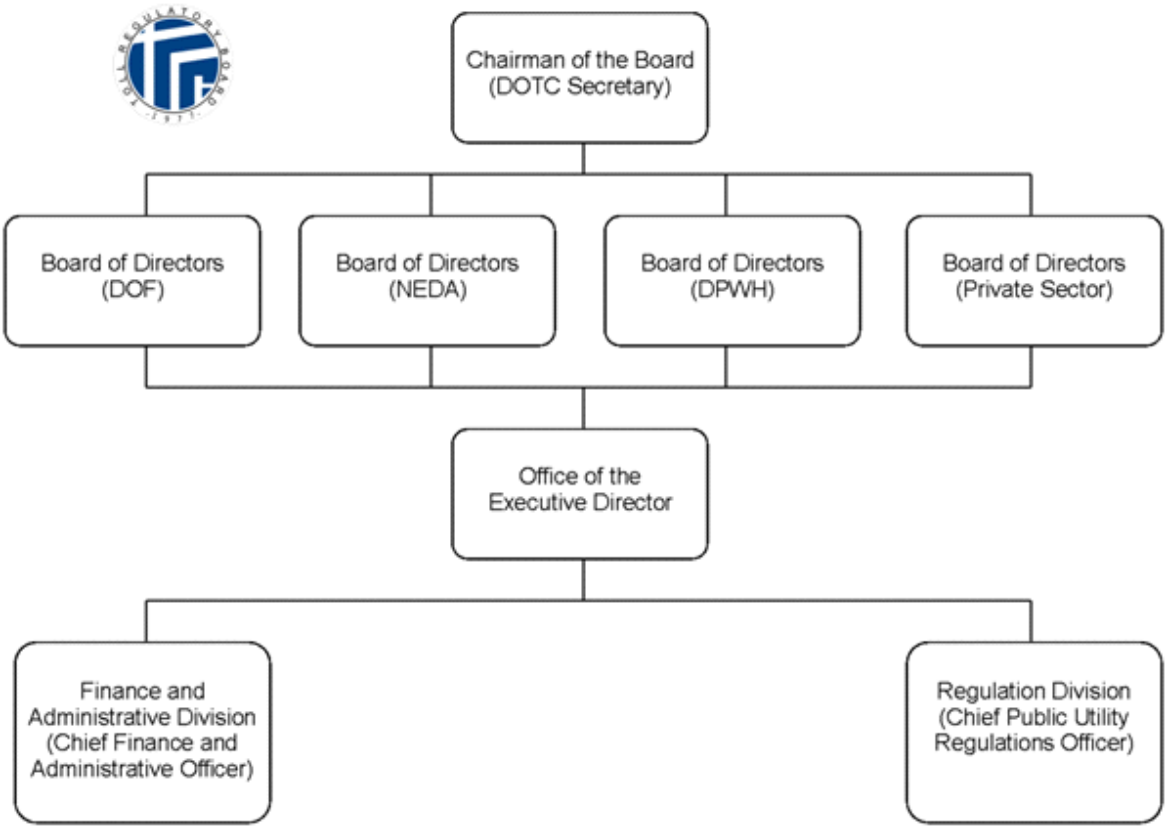


FIGURE 4.3-4 TRB ORGANIZATION CHART

The TRB has 15 technical personnel under the Regulation Division, of which nine are assigned to monitor and supervise the operations of the Toll Roads, and six to monitor and supervise the maintenance of the Toll Roads.

Toll Operation Certificates Granted

Pursuant to its powers under PD 1112, the TRB has granted Toll Operation Certificates (TOCs) for the expressways shown in **Table 4.3-12**.

TABLE 4.3-12 EXPRESSWAY SYSTEMS WITH TOLL OPERATING CERTIFICATES

Toll Road/Expressway	Length, km	No. of Lanes	Concessionaire
North Luzon Expressway (NLEX), Balintawak-Sta. Ines	82.62	2-8	Manila North Tollways Corporation (MNTC)
Tipo-Subic Link	8.50	4	MNTC
Subic-Clark-Tarlac Expressway (SCTEX)	93.77	4	Bases Conversion Development Authority (BCDA)
South Luzon Expressway (SLEX), Magallanes-Alabang	13.43	6	Citra Metro Manila Tollways Corporation (CMMTC)
SLEX, Alabang-Calamba	28.53	4-8	South Luzon Tollway Corporation and Manila Toll Expressway Systems

Toll Road/Expressway	Length, km	No. of Lanes	Concessionaire
Skyway I, Bicutan-Buendia	9.30	6	CMMTC
Southern Tagalog Arterial Road (STAR), Sto. Tomas-Batangas City	41.90	2-4	Star Infrastructure Development Corporation
Manila-Cavite Toll Expressway (MCTE), Seaside-Zapote	6.75	6	Philippine Reclamation Authority (PRA)-UEM MARA Corporation
MCTE (CAVITEX), Zapote-Kawit	7.00	4	PRA-UEM MARA Corporation
Total	291.80		

Minimum Operation and Maintenance (O&M) Requirements and Standards

Under PD 1112, the TRB can set in the Toll Operations Agreement (TOA) or Supplemental Operations Agreement (STOA) the standards for the operation of the tollways, particularly for joint venture projects undertaken by the PNCC and the PEA pursuant to their respective charters (PD 1113 and PD 1084, respectively). For projects undertaken by the DPWH through the BOT Law, the DPWH coordinates with the TRB in the development and use of performance standards for the operation of tollways, including toll collection systems and traffic management facilities, and includes these in the overall Minimum Performance Standards and Specifications (MPSS) which are part of the bidding and contract documents.

Each Toll Road Operator or Operation and Maintenance (O&M) company carries out its O&M independently of those other companies. This applies to both the ETC and traffic control systems. The O&M standards used have varied from tollway to tollway as defined in the respective TOA or STOA. The TRB, though, has used as general reference a set of guidelines developed by a Consultant in the 2000s.

According to the TRB Executive Director, the existing TOA and STOAs need to be updated since they are very old, and the TRB wants to particularly enhance the safety requirements. The TRB has already proposed a list of proposed minimum O&M standards. Some of the Toll Road Operators have given their comments on these proposed standards. The negotiation process is ongoing because the TRB said that it must listen to the Concessionaires.

The TRB Executive Director explained that, much as the TRB wants to standardize toll operations, it has to consider and balance several factors. Among these is the fact that the Toll Road Operators have varying degrees of technical and financial capability. They also face different scalability considering the width and geometry of the toll road as well as different business volume opportunities. Big ones like the NLEX and the SLEX may be able to upgrade their systems with less additional expense. But smaller Operators like those of STAR and CAVITEX which have less traffic volumes will have a more difficult time to comply with

higher standards. To deal with this problem, the TRB is considering the classification of Toll Roads according to their traffic volumes and service levels, and then setting standards for each class.

The TRB is also planning to institute a schedule of Key Performance Indicators (KPIs) for O&M with corresponding sanctions or penalties for non-compliance, which will be embedded in the TOA/STOA; this is similar to the schedule of KPIs and penalties provided in the Toll Concession Agreement for the Daang Hari-SLEX Link Road and in that proposed for the NAIAX project..

The Toll Road Operators have explained to the TRB that for them to comply with the new standards would mean higher capital expenditures which would need an increase in toll rates to recover their additional costs. In the end, the motorists would suffer because the Operators might just pass on the costs to them. The Operators also brought up the possibility of subsidies by the Government, but this is greatly constrained by the small budget of the TRB.

Another constraint is the capability of the TRB to monitor the Operators' compliance with the standards. Since the TRB is a small agency, monitoring by remote means (radio and communications) is not sufficient because of the distances of these tollways. The TRB would have to conduct more frequent inspections and traffic volume audits, create more teams to do these, and upgrade its radio equipment.

Electronic Toll Collection (ETC)

There are currently two working ETC systems: EC-tag/Easytrip for the NLEX and E-pass for the SLEX/Skyway, which are not compatible. CAVITEX has E-tap, but it is still under beta testing and demonstration. The three systems are separate and independent for commercial reasons, since the Operators apparently want to manage their own revenues.

According to the TRB, to achieve interoperability among the ETC systems, the main difficult requirement is the clearing house, which could be a bank or any third party. If there is a clearing house, the operations will definitely be more transparent, but there appears to be some resistance from Toll Road Operators. The TRB's concept for the clearing house is to get the private parties to do it, with as little government involvement as possible. Also, the TRB envisions the clearing house to have as little commission as possible and not too many layers, so that the gross toll fee will not become too high.

The current utilization of ETC in the Philippines is below 20 percent. In Japan, a discount of up to 50 percent has been introduced for ETC payments. This induced people to shift to ETC rather than make cash payments. The Japanese government gives compensation to the

Operators to enable them to provide the discounts. This policy is quite successful so that more than 80 percent of expressway users in Japan are now utilizing ETC. The TRB Executive Director commented that, if discounted ETC is effective in Japan, it is more likely to work in the Philippines because the people here are price-sensitive. The issue is how the Toll Road Operators will recover the discounts, considering that the Government, with its limited funds, may not be able to provide subsidies similar to Japan.

If there would be a clearing house, monitoring by the TRB would not be very difficult since traffic volumes and incomes will be transparent.

Interoperability

Only the SLEX and the Skyway have an interoperability agreement. Interoperability refers to the state where all transit media used by the Manual Toll Collection System and/or ETC system can be accepted by reading devices operated at the SLEX and/or the Skyway, in compliance with the TRB standards. According to the TRB, the interoperability agreement was initiated because the two Toll Roads have the same vested interest to increase the number of users. The interoperability agreement was realized through bilateral discussions between the two entities, and is subject to the TRB guidelines on interoperability of the Toll Collections Systems (TCSs) of the two Toll Roads.

These TRB guidelines were issued pursuant to PD 1112 which mandates the TRB to issue rules and regulations, among others, to closely supervise and regulate the collection of fees and operation of the toll facilities in the interest of the public, and are consistent with the provisions of the respective STOA of the SLEX and the Skyway. The TRB guidelines for the SLEX-Skyway interoperability agreement prescribe, among others, the following:

- The TCSs shall adopt the Dedicated Short Range Communication (DSRC) 5.8 Ghz SU TC278 standard for the interoperability of ETC equipment.
- TCS upgrades shall be initiated by either Concessionaire and/or the TRB to ensure that the TCS complies with the TRB standards.
- Except for obsolescence, the TRB shall not require the Concessionaires to replace the TCS adopted in compliance with the TRB guidelines within seven years.
- The TCSs of the two Concessionaires shall be compatible in terms of equipment, data, and transaction aspects.
- Non-default ticketing system shall be used for inter-concession travel to allow origin and destination transactions at both entry and exit plazas.

- To achieve technical interoperability, the Concessionaires shall have the common minimum level of functionality of the equipment – transit media for manual toll collection, manual toll equipment, lane enforcement system to verify exceptional transactions, compatible ETC equipment for the read-and-write features of ETC tags, security keys of ETC tags and transit media.

- Interoperability at the data level of the TCS shall allow the Concessionaires to transfer and share accurate data without loss – including procedure for encoding transit cards, card format, headquarter computer system to monitor and audit operations at all plazas, determine transactions travelling on the same concession or inter-concession, data to be relayed to the other headquarter computer system..

- Transactional interoperability shall cover card management, lane enforcement system, audit, maintenance and repair, dispute settlement, toll fee exemptions and vehicle classification, customer service, control of fraudulent acts, uncleared transactions, and traffic management.

- The Concessionaires shall comply with the minimum performance standards for TCS which include accuracy of (a) the Automatic Vehicle Identification and/or the Automatic Vehicle Classification System (99.95%), (b) availability of lane controller (98%), and (c) lane system throughput (900 vehicles/hour for ETC lane and 400 vehicles/hour for exact tool lane).

The TRB is planning to hold an Interoperability Summit before the end of the year. It will invite Toll Road Operators, candidates for clearing house (e.g., Megalink or Expresssnet), telecommunication companies, and O&M and service providers for account management system and tags/cards. The summit is needed because individually the Toll Road Operators may not take the initiative for interoperability. This event is expected to discuss and come to a consensus on the systems and procedures to achieve standard ETC facilities and services which are compatible and interoperable among the different Toll Roads, including a clearing system for toll collections. The TRB looks forward to realizing the objectives of the summit as the TRB has a very limited capacity to make volume and financial audits. Current oversight by the TRB does not specifically mention interoperability but just a general catch-all mandate based on promoting customer convenience and safety; this mandate may be attained by specific means such as shorter queuing time. On the other hand, the interoperability system would be self-monitoring.

Traffic Control and Management on Expressways

Each Toll Road Operator has its own traffic control and management system. For example, some Operators have a Traffic Control Center/Room. The TRB admitted that the traffic

information systems of the Toll Roads are not very accurate, are not on real-time basis, and cannot tell the travel time through a certain road section. The exception is the Skyway which, in cooperation with the MMDA, gives some real time but subjective information on traffic conditions. Presently, only the NLEX and the SLEX have Variable Message Sign (VMS) boards, but these are few and the traffic information they show are limited.

As part of the common O&M standards that it is now formulating, the TRB plans to require all Toll Road Operators to adopt a standard traffic control/management system with minimum requirements. This will include the provision of real time traffic information, including level of congestion, incidents, and estimated travel times. The information should be disseminated though, among others things, roadside VMS boards installed at sufficient intervals.

On its own, the TRB is also monitoring conditions and relaying to the public some safety advisories and warnings through Facebook and Twitter, especially during abnormal situations like during holidays, bad weather and accidents.

Issues pertaining to enforcement, including truck overload control, are further discussed in **Annex 4.5.6**.

In conclusion, as also pointed out in **Annex 4.4** (Tollway Concessionaires) below, while the TRB has the power to require an existing Toll Road Concessionaire or Operator to adopt new or upgraded standards for ITS and ETC, in order to allow interoperability of its toll collection systems with those of other tollway operators, this may need an amendment of the TOA/STOA and adjustment of the toll rates and/or extension of the concession period to cover the extra cost of the system revision or upgrading.

The TRB aims to monitor compliance with the new or upgraded standards for O&M by fielding its staff to conduct both technical and financial audits. The TRB will also monitor and evaluate the reports automatically generated by the proposed clearing house and traffic control centers.

Budget

Under the 2012 GAA, the TRB has a total budget of PhP 12.772 million, broken down as shown in **Table 4.3-13**.

TABLE 4.3-13 TRB 2012 BUDGET UNDER THE GAA

Programs/Projects	Amount in PhP Million
A. PROGRAMS	
I. General Administration and Support Services	4,433
II. Operations	
1. Evaluation/Examination of Tollway Facilities and Regulation/ Examination of Tollway Operations and BOT Projects	3,962
2. Regulation and Construction Supervision of Tollways, Toll Facilities and BOT Projects	3,227
3. Conduct of Public Hearings for Toll Rate Setting and Adjustment	1,150
Total Programs, TRB	**12,772**

Source: 2012 GAA

4.3.6 Land Transportation Office

Legal Basis

The LTO has assumed the administrative powers and functions of the defunct Land Transportation Commission under EO 1011 dated 20 March 1985, pursuant to EO No. 125 dated 30 January 1987, as amended by EO 125-A dated 13 April 1987.

Organization

The LTO is a sectoral office of DOTC and performs line functions. The LTO is headed by the DOTC Assistant Secretary for Land Transportation and is assisted at the Central Office by the Traffic Enforcement Service, Traffic Adjudication Service, and Operations Division. Its field operations are performed by its district offices.

Powers and Duties

The LTO exercises the following powers and duties of the DOTC. as stated in **Annex 4.3.2** above:

- *Administer and enforce all laws, rules and regulations in the field of transportation;*
- *Establish and prescribe **rules and regulations for the inspection and registration l**and transportation facilities, such as motor vehicles.*
- *Establish and prescribe rules and regulations for the issuance of **licenses** to qualified motor vehicle drivers, conductors.*
- *Establish and prescribe the corresponding rules and regulations for the **enforcement of laws governing land transportation**, including the penalties for violations thereof, and for the deputation of appropriate law enforcement agencies in pursuance thereof.*

- *Establish and prescribe the rules, regulations, procedures and standards for the accreditation of driving schools.*

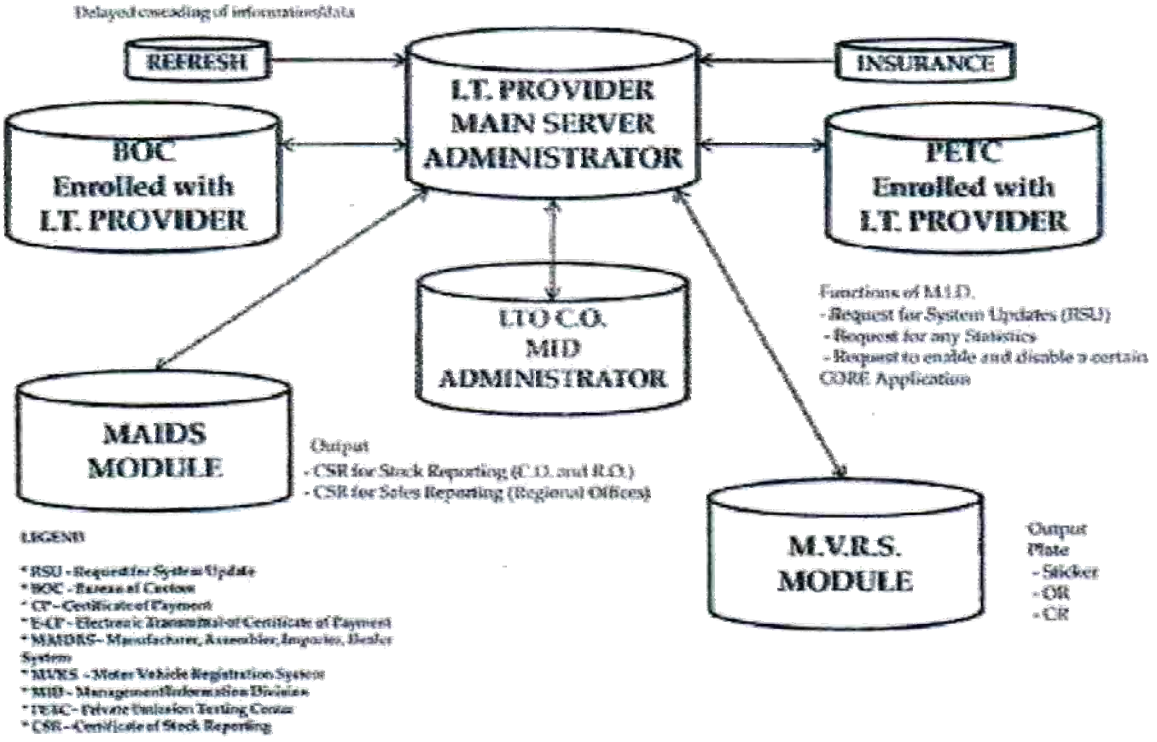
The services rendered by the LTO fall under the following categories:

- Inspection and registration of motor vehicles.
- Issuance of licenses and permits.
- Enforcement of land transportation and traffic rules and regulations.
- Adjudication of traffic cases; and collection of revenues for the government.

The LTO serves as the principal agency responsible for implementing traffic-related laws and rules under the LTTC. This is further discussed below under **Annex 4.5** on Enforcement.

Data Systems

The existing data network set-up of the LTO for the registration of motor vehicles is shown in **Figure 4.3-5**. The set-up has the IT Provider as the core. It has direct links, gets input data from, and provides output data, to the LTO Management Information Division or MID, the Bureau of Customs (for payment of import duties), the Private Emission Testing Centers or PETCs (for emission tests), the Manufacturers, Assemblers, Importers, Dealers System (MAIDS) Module, and the Motor Vehicle Registration System (MVRS) Module, and the insurance group (for insurance policies). The system also provides data on public utility vehicles – particularly, information about the franchise owner/operator and his vehicles.

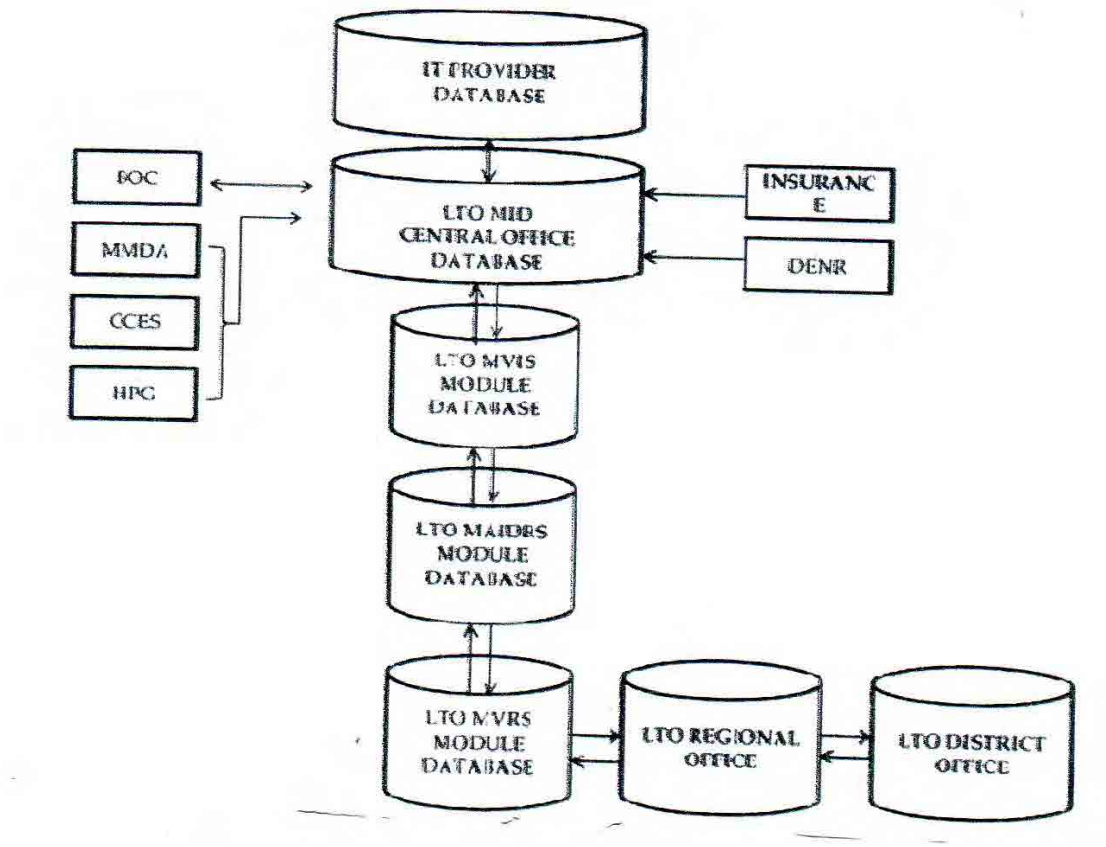


Source: DOTC-LTO

FIGURE 4.3-5 PRESENT LTO MOTOR VEHICLE REGISTRATION NETWORK SET-UP

LTO officials find that this set-up is disadvantageous to the Government: while the LTO owns the assets and the database, it does not have direct control over the database and has no immediate access to specific information in the database – e.g., vehicles of a certain type in a certain area. Control of the operation of the database is said to be in the hands of the IT Provider, which generates and provides specific data upon request by the LTO.

The DOTC/LTO, therefore, proposes to modify its system for motor vehicle registration into the network shown in **Figure 4.3-6**. The core of the network would be the LTO MID Central Office which would manage the database. The IT Provider would provide IT services to the MID. The MID would directly interface with the BOC, MMDA, PNP, DENR, LTO MVIS Module, MAIDS Module, MVRS Module, and the LTO Regional and District Offices. The proposed system would be part of the DOTC Road Transportation IT Infrastructure Project that the DOTC has started to bid out, but the bidding has been stymied by a Temporary Restraining Order (TRO) issued by the court.



Source: DOTC-LTO

FIGURE 4.3-6 PROPOSED LTO MOTOR VEHICLE REGISTRATION SYSTEM NETWORK

Budget

Under the 2012 GAA, the LTO has a total budget of PhP 1.595 billion, broken down as shown

in **Table 4.3-14**.

TABLE 4.3-14 LTO 2012 BUDGET UNDER THE GAA

Programs/Projects	Amount in PhP Million
A. PROGRAMS	
I. Support to Operations – Land Transportation Services	801.923
II. Operations - Land Transportation Services	482.231
Total Programs	**1,284.154**
B. PROJECTS	
I. Locally-Funded Projects – LTO Buildings	311.300
Total Projects	311.300
TOTAL, LTO	**1,595.454**

Source: 2012 GAA

4.3.7 Land Transportation Franchising and Regulatory Board

Legal Basis

The LTFRB was created through EO 202, dated 19 June 1987

Mandate

The LTFRB is the agency of the DOTC vested with quasi-judicial powers and functions with respect to regulation of road-based public transport services and the enforcement of land transport laws. The LTFRB derives its basic powers and functions from the Public Service Act (1936) as discussed in **Annex 4.1.1** above. Its mandate is to promulgate, administer, enforce, and monitor compliance of policies, laws, and regulations of public land transportation services.

Powers and Functions

The main powers and functions of the LTFRB are provided in EO 202 and include the following which are most relevant to the ITS study: **(Emphasis, thru bold font, supplied)**

- *To **prescribe and regulate routes of service, economically viable capacities and zones or areas of operation of public land transportation services provided by motorized vehicles** in accordance with the **public land transportation development plans and programs** approved by the Department of Transportation and Communications.*

- *To issue, amend, revise, suspend or cancel Certificates of Public Convenience or permits authorizing the operation of public land transportation services provided by motorized vehicles, and to prescribe the appropriate terms and conditions therefor.*

- *To determine, prescribe and approve and periodically review and adjust,* ***reasonable fares, rates and other related charges****, relative to the operation of public land transportation services provided by motorized vehicles.*

- *To formulate, promulgate, administer, implement and enforce rules and regulations on land transportation public utilities, standards of measurements and/or design, and rules and regulations requiring operators of any public land transportation service to equip, install and provide in their utilities and in their stations such devices, equipment, facilities and operating procedures and techniques as may promote safety, protection, comfort and convenience to persons and property in their charges as well as the safety of persons and property within their areas of operations.*

Organization

The powers and functions of the LTFRB are exercised by the Board Proper, which is composed of a Chairman, and two members, all of whom are presidential appointees. One member of the Board must be a lawyer, another a civil engineer, and the third a holder of a degree in economics, finance or management.

The Board is assisted in the exercise of its powers and functions by Regional Franchising and Regulatory Offices, each headed by a Regional Director. The Regional Office shall hear and decide uncontested applications/petitions for routes within its region, but applications/petitions for routes extending beyond is territorial jurisdiction shall be heard and decided by the Board.

Regulatory System

The provision of road public transport services in the country is in the hands of the private sector, with the Government exercising regulatory functions to protect public interest. The LTFRB adopts a quasi-judicial process in regulating public transport. An applicant for public transport service must prove the need for such a service in addition to the requirements of financial capacity and Filipino citizenship. The Board practices the "Prior Operator Rule" which is also based on Supreme Court decisions. This means that existing operators on the route or area being applied for have priority in providing additional services to meet any supply gaps.

The LTFRB issues franchises or CPCs for the following types of public transport services:

- Buses
- Minibuses
- Jeepneys
- Ordinary taxis (sedan type)

- Express taxis (Asian Utility Vehicle or AUV type)
- Trucks for hire
- School buses

To provide a technical basis for the consideration of franchise applications, the Government has introduced the Route Measured Capacity (RMC) formula. Upon request, the DOTC conducts a field survey and computes the RMC for a particular route to determine its supply-demand situation. The LTFRB usually uses the RMC computations of the DOTC to justify the opening or closure of routes. The intervention of the DOTC in public service specifications and in RMC application is intended to develop an optimum network of public transport services. The strict regulatory framework is expected to result in a balanced supply-demand situation.

Studies show, however, that the public transport system in Metro Manila is far from being optimum. According to the 2007 Mega Manila Public Transport Study (MMPTS) Report, many public utility jeepney (PUJ) routes have excess capacity, as shown by the low number of km run per vehicle, except for long-distance and inter-regional PUJ routes. The situation is aggravated by *colorum* (illegal/unfranchised) vehicles as noted below. EDSA has a large over-supply of buses fielded by more than 100 operators. Market competition will not strictly work here since passengers cannot differentiate the services provided by too many operators.

Furthermore, based on the route inventory undertaken by the MMPTS, only 516 out of 641 PUJ routes, and 21 out of 36 bus routes, are operating. But more AUV Express (taxi) routes are operating than the 130 in the DOTC list. Most public utility vehicles stop at every designated bus/jeepney stop, and virtually no operators run limited-stop and express services.

As noted by the 2008 Austrailan-assisted National Transport Policy and Planning Report, the supply-demand imbalance suggests that the RMC system is not effective. This results in inefficient operation and waste of fuel and other resources. The income of drivers is low since the load factor is low and operating cost is high. Passengers bear the poor condition of public transport vehicles as operators and drivers try to reduce their operating costs.

Fare and rate setting is likewise the subject of regulation. Operators have to file a petition before the LTFRB each time they wish to make fare adjustments. The petition follows the same quasi-judicial process as in the processing of franchise applications.

As stated above, among the powers of the LTFRB is to promulgate and enforce rules and regulations on public land transport services, including standards of measurements and design, and requirement for operators to equip, install and provide in their vehicles and in their terminals/stations such devices, equipment, facilities and operating procedures as may promote safety, protection, comfort and convenience to passengers or users and property within their

areas of operations. These rules and regulations may include requirements for the operators to install and use appropriate ITS devices and facilities that will provide relevant and real-time information to commuters, drivers, and operators on routes, schedules of trips, and incidents for the convenience and safety of all concerned,

There is no operating on-line connection between the databases of LTFRB and the LTO. Much of the interface between the two agencies is done manually. For each vehicle covered by a franchise, issued by the LTFRB, the vehicle owner submits to the LTO a copy of the franchise document. The LTO then issues the yellow plate which will identify the vehicle as a public utility vehicle. Some vehicles, however, bear yellow plates and operate as public transport units, but are not covered by authentic LTFRB franchises. These vehicles are *colorum* units.

The enforcement of franchise requirements for public utility vehicles is discussed further in **Annex 4.5** below on Enforcement.

With regard to the database, the MMPTS recommends that, while pursuing the long-term goal of merging the functions of the LTO and LTFRB through a National Land Transport Authority, the DOTC should pursue the integration of LTO driver license and vehicle registration records with the LTFRB franchise database, initially for Mega Manila, to achieve effective and efficient administration of the public transport system.

Budget

With respect to funding, under the 2012 GAA, the LTFRB has a total budget of PhP 270 million, as shown in **Table 4.3-15**.

TABLE 4.3-15 LTFRB 2012 BUDGET UNDER THE GAA

Programs/Projects	Amount in PhP Million
A. PROGRAMS	
I. Support to Operations – Regulation of Public Land Transportation	0.300
II. Operations - Land Transportation Services	30.767
Total Programs	**31.067**
B. PROJECTS	
Locally-Funded Projects – LTFRB Buildings	239.076
Total Projects	**239.076**
TOTAL, LTFRB	**270.143**

Source: 2012 GAA

As mentioned, the LTFRB finds that its budget for operations of only PhP 31 million is too small to enable it to effectively perform its mandated functions, particularly in the enforcement of franchise rules and regulations.

4.3.8 Local Government Units

Legal Basis

The Local Government Code (LGC) of 1991 provides in Section 6 that *a local government unit may be created, divided, merged, abolished, or its boundaries substantially altered either by law enacted by Congress in the case of a province, city, municipality, or any other political subdivision ...*

Mandate

The LGC implemented the decentralization policy of the government to increase the extent of autonomy of LGUs. This is pursuant to the State policy declared in Section 2 of the LGC *that the territorial and political subdivisions of the State shall enjoy genuine and meaningful local autonomy to enable them to attain their fullest development as self−reliant communities and make them more effective partners in the attainment of national goals. Toward this end, the State shall provide for a more responsive and accountable local government structure instituted through a system of decentralization whereby local government units shall be given more powers, authority, responsibilities, and resources....*

Powers and Functions

Under Section 17 of the LGC, LGUs shall exercise such powers, functions and responsibilities as are necessary, appropriate, or incidental to efficient and effective provision of the following **basic services and facilities pertaining to roads and traffic management**. **(Emphasis, thru bold font, supplied.)**

- For a Municipality
    - *Infrastructure facilities intended primarily to service the needs of the residents of the municipality and which are funded out of municipal funds including but not limiters to* ***municipal roads and bridges, ... traffic signals and road signs; and similar facilities****.*
- For a City
    - *Infrastructure facilities intended primarily to service the needs of the residents of the city and which are funded out of municipal funds including but not limiters to city* ***roads and bridges, ... traffic signals and road signs; and similar facilities****.*
    - *Adequate communication and transportation facilities.*

The powers and functions of LGUs to enforce traffic rules and regulations are discussed in

Annex 4.5 on Enforcement.

Data Systems

Except for a few cities in Metro Manila, road inventory data of LGUs are generally inadequate for use in local road planning and administration. There is no comprehensive, accurate and timely database for local roads that shows a complete and reliable inventory of roads and bridges, their locations, geometric and structural features, physical conditions, extent of deterioration, and related data. Good information on road traffic volumes and loads on local roads is also wanting.

Funding

In accordance with Chapter 2, Section 17 of the LGC, the basic services and facilities to be provided by LGUs shall be funded from their share in the proceeds of national taxes and other local revenues and support from the national government. Under Section 284 of the LGC, LGUs shall have a share in the national internal revenue taxes. This share is called Internal Revenue Allotments (IRA). Presently, the total IRA is 40 percent of the total national taxes collected. The total shares of LGUs in the IRA are fixed by Section 285 of the LGC, as follows:

- Provinces – 23%
- Cities – 23%
- Municipalities – 34%
- Barangays – 40%

The share of each province, city and municipality shall be determined on the basis of the following formula:

- Population – 50%
- Land area – 25%
- Equal sharing – 25%

Each LGU is required, under Section 287 of the LGC, to allocate at least 20 percent of its IRA for development projects; these include roads.

LGUs are empowered to create their own sources of revenue and to levy taxes, fees, and charges subject to the provisions of the LGC. They include, among others, the following:

- Taxes on real property
- Taxes on business
- Franchise tax

- Tax on sand, gravel, and other quarry resources
- Professional tax
- Amusement tax
- Tax on delivery vehicles
- Fees and charge on business, occupation, and profession
- Fees for sealing and licensing of weights and measures
- Fishery rental, fees and charges
- Service fees and charges
- Charges on public utilities owned and operated by the LGU
- Toll fees and charges on public road and other facilities funded and constructed by the LGU

These local revenues accrue to the LGU general fund. LGUs may use part of their 20 percent share in the IRA and their local revenues for infrastructure projects and operations, including road development and maintenance. For the more developed cities, e.g., Manila. Makati, Quezon City, and other LGUs in Metro Manila, the development and maintenance of local roads may include the use of ITS, such as automatic traffic lights.

For example, Quezon City approved a general fund budget for 2012 of PhP 682.4 million for the construction/improvement of its local roads and PhP 100.0 million for the maintenance of its local roads. Part of the LGU budget can potentially be programmed for ITS projects on local roads.

Annex 4.4 TOLL EXPRESSWAY CONCESSIONAIRES

4.4.1 Manila North Tollways Corporation: for NLEX

Under the Supplemental Toll Operation Agreement (STOA), dated 30 April 1998, among the Government represented by the TRB (Grantor), the Philippine National Construction Corporation or PNCC (Franchisee), and the Manila North Tollways Corporation or MNTC (Concessionaire), the MNTC is obliged to operate and maintain the North Luzon Expressway (NLEX) Project Roads 24 hours a day throughout the Concession period and is responsible for the following physical aspects of Operations through it Operator, the Tollways Management Corporation (TMC):

- Toll collection and accounting
- Traffic control and management
- Toll road patrol
- Facilities for answering emergencies
- Information service
- Weighing facilities
- Communication, water and power facilities

With respect to toll collection, aside from paying in cash, motorists using the NLEX can also pay through the following ETC modes:

- EC Tag. The EC Tag is a cashless toll collection system exclusively available for Class 1 vehicles (including cars, jeepneys, and one-axle pick-ups and vans). An electronic gadget, called a transponder attached to the vehicle's windshield, contains account information that can be read by an antenna at dedicated toll lanes. It allows private motorists quick, cashless entry and exit at designated toll booths. .

- Magnetic Swipe Cards. The magnetic swipe cards are available for Class 2 (two-axle trucks, buses and vans) and Class 3 (three or more axles) vehicles. It acts like a prepaid card loaded with a certain amount from which the corresponding toll is debited each time the vehicle passes through the toll plazas. These cards are ideal for those who operate a fleet of jeepneys, buses and trucks that frequently ply the expressway. Several cards can be made available under one account.

Of 128 toll lanes at the NLEX, 59 are ETC lanes and 9 are cash/ETC lanes. The current utilization of ETC is about 20 percent.

All EC tags at the NLEX are to be issued, managed and promoted by Easytrip Services Corporation on behalf of the MNTC.

The MNTC has adopted other modes of ETC payment, particularly to reduce the operating costs of passenger jeepneys that make several trips between entries/exits of the NLEX, thereby also increasing the ETC utilization:

- Pass-Ada. This is an unlimited day pass for the use of accredited jeepneys in Bulacan plying the NLEX. For P190 a day, any accredited passenger jeepney can have unlimited access to the Open System of the NLEX the whole day.

- Tsuper Card. This is the counterpart of the Pass-ada in Pampanga. Accredited jeepney associations that go through the NLEX Closed System in Pampanga can enjoy rebates every month.

To further encourage ETC utilization, the MNTC is considering a proposal to the TRB for regular toll fee adjustments where the toll increase for ETC users will be lower than the toll increase for those making cash payments.

The MNTC targets for maximum transaction time at the toll gate are 12-16 seconds for manual cash payments and 3-4 seconds for ETC payments. Vehicle queues are targeted to be not more than 10 vehicle lengths in 20 minutes.

With regard to traffic data collection, the MNTC, through its Operator, collects traffic volume between interchanges through automatic traffic counters with the use of loop coil detectors. Vehicle speed data are obtained by using loop coil detectors and video cameras. Vehicle queues are monitored visually by the Operator's traffic control supervisors with the aid of CCTV.

Accidents, vehicle breakdown, and other incidents are monitored by CCTV and patrol cars throughout the day. These incidents, as well as any request for assistance, may also be reported by motorists through Emergency Call Boxes connected to the Traffic Control Room, and through a call center and Twitter account. The MNTC maintains records of accidents broken down by cause. Maximum response time for accidents is targeted by the MNTC to be 20 minutes.

Overloaded trucks are weighed by three fixed weighbridges – at Balintawak northbound, Bocaue southbound, and San Fernando southbound. Trucks with an axle load exceeding the legal limit of 13,500 kg are issued the violation tickets, their drivers' licenses and vehicle plates confiscated by LTO-deputized MNTC personnel, and are escorted out by patrol vehicles to the nearest exit. Since trucks can enter and exit between the three fixed weighbridges, patrol cars and spotters try to visually identify moving trucks suspected of being overloaded, which are then stopped, weighed by mobile weighing scales, and, if found overloaded, also penalized.

The MNTC runs a Traffic Control Room (TCR) on a 24/7 basis. The TCR monitors the traffic situation through 63 CCTVs, 40 of which are in the Open System section from Balintawak to Bocaue. The TCR also gets traffic information from 13 patrol vehicles and the automatic traffic counters, and can also receive calls from distressed motorists. The information in the TCR is almost real time, with a maximum lag time of two minutes. The traffic counters automatically determines if the traffic volume is heavy, i.e., less than 60 km per hour. Information about inclement weather conditions and major incidents – accidents, vehicle breakdown, flooded sections, etc. – are also obtained through the CCTV, patrol vehicles, and information reported by the public. The TCR feeds the traffic information – mainly heavy traffic and major incidents - to the motorists through 34 VMS boards and the media – TV, radio, and social networks such as Facebook and Twitter.

The MNTC ITS is not yet electronically linked to external agencies - e.g., other expressways, LTO, TRB, MMDA, DPWH - and its Toll Collection System/ETC is not yet interoperable with those of other expressways. The MNTC said that is willing to share traffic information with other expressway operators, as well as government agencies, provided that the other operators also share their traffic data with the MNTC. Furthermore, the MNTC welcomes arrangements to make its ETC interoperable with those of other expressways, as this will encourage the overall use of ETC and improve public service. For this purpose, the MNTC suggests a clearing house among operators and service providers

The TRB has the power to require the MNTC to adopt new or upgraded standards for ETC, particularly to provide for interoperability with the systems of other expressways. Moreover, the TRB may require the MNTC to interchange its traffic information with those of government agencies and other expressway operators through its existing or improved ITS. These requirements, however, may call for an amendment of the STOA and adjustment of the toll rates to cover the extra cost of the revision or upgrading of the toll collection and traffic control systems beyond those provided for in the original agreement.

4.4.2 South Luzon Tollway Corporation and Manila Toll Expressway Systems: for SLEX

Under the STOA, dated 30 April 1998, among the Government represented by the TRB (Grantor), the PNCC, the Manila South Luzon Tollway Corporation or SLTC (Investor), and the Manila Toll Expressway Systems (Operator), the Investor and/or Operator are required to perform the Operation of the South Luzon Expressway (SLEX) 24 hours a day, by providing the following systems, facilities and services:

- Toll collection systems
- Traffic control systems
- Toll road patrol and vehicle control with communication systems

- Facilities for assistance of disabled vehicles and in case of emergencies
- Information service and customer service programs, and information and message sign boards
- Vehicle regulation facilities (e.g., load, height detectors)
- Emergency facilities
- Emergency operation facilities
- Traffic management and administration of the Project Toll Road and Toll Road Facilities
- Selection, supply, installation and upgrading and maintenance of all toll collection facilities, toll monitoring and revenue validation, and establishment of governing protocols, rules and regulations, including at all times the right of monitoring, audit and overseeing the collection of Toll.
- When necessary and on a periodic basis., upgrading, refurbishing, repair and replacement of the toll collection system, including all equipment, hardware, and software
- Physical collection of the Gross Toll Revenue.

The Operation shall be subject to the guidelines and standards prescribed in the Operations and Maintenance Manual, the Basic Design, and such additional regulations or standards imposed by the Grantor (TRB).

The toll collection systems of the SLEX and the Skyway are interoperable upon the initiative of their Concessionaires/Operators, as discussed in **Annex 4.3.6** above. Thus, they have installed an ETC system, called E-Pass, along sections of the two expressways. Of the 154 toll lanes in the SLEX, 106 are equipped with an ETC system and 18 have lanes dedicated to E-pass users (viz., Skyway toll plazas, C–5, Nichols A and B, Sucat, Bicutan, Alabang, Doña Soledad, and Calamba).

A reloadable transponder or tag attached to the car's windshield under the rearview mirror, the E-Pass allows a vehicle to just slow down through E-Pass lanes. According to the SLEX Operator, the tag is read by a sensor at the E-Pass lanes in 1.5 seconds—about one-tenth of the 15 seconds it usually takes for manual toll transactions. Payments for E-pass transactions are made through pre-paid accounts registered with the designated customer service center.

In Section 2.05, the STOA prescribes DPWH standards and specifications relating to the Design, Construction, Operation, and Maintenance. This shall be *without prejudice to the right of the TRB to exercise its regulatory power in respect to the Operation and Maintenance, but the imposition by the TRB of any amended or new regulations or standards shall be upon prior consultation with the Operator.*

Section 2.05 further provides that the PNCC, Investor, and Operator shall cooperate with the Grantor in the event that the latter, through the relevant government agency, adopts a policy that will require the interoperability of the SLEX toll collection system with those of other existing and prospective toll roads. If that event occurs where the new Government regulations and/or standards requiring such interoperability will result in a financial burden on the Investor or the Operator, in addition to or other than that considered in the Financial Projections, the Toll Rates shall be adjusted as determined in Section 7 of the STOA.

Based on the above provisions, the TRB may set new or amended standards for the toll collection system of the SLEX, including its ETC, to provide for its interoperability with the system of other tollway operators (apart from the system of the Skyway with which it is already interoperable), and require the Investor and Operator to adopt and implement these standards. Similarly, the TRB may oblige the SLEX to share its traffic data with concerned government agencies and other expressway through an appropriate ITS. These measures may require an amendment of the Toll Rates to cover the additional costs of ETC/ITS systems upgrading.

4.4.3 Citra Metro Manila Tollways Corporation: for SKYWAY

Under the STOA, dated 17 November 1995, among the Government represented by the TRB (Grantor), the PNCC (Operator), and the Citra Metro Manila Tollways Corporation or CMMTC (Investor), the Operator is required to perform the Operation of the Metro Manila Skyway 24 hours a day, by providing the following physical aspects:

- Toll collection and accounting system
- Traffic control and management system
- Toll road patrol and vehicle control communication system
- Facilities for assistance of disabled vehicles and in case of emergencies
- Information service/message sign boards
- Vehicle regulation facilities (e.g., weight, load, height)
- Emergency call and lighting facilities
- Emergency operation facilities
- Traffic management and administration of the project roads facilities
- Personnel and staff management development and control

The physical aspects of the Operations shall be subject to the guidelines as may be promulgated by the Grantor without prejudice to the right of the Operator and/or the Investor to propose any additions, supplements and/or amendments to the Grantor-prescribed guidelines.

As mentioned above (see **Annex 4.3.6**), the Skyway has an ETC system which is interoperable with that of the SLEX. As in the case of the SLEX, the TRB may require the Skyway Operator

to make its ETC system interoperable with those of other existing and proposed expressways in the network, particularly the Ninoy Aquino International Airport Expressway (NAIAX), the Manila-Cavite Toll Expressway (MCTE), and the NLEX.

4.4.4 Philippine Reclamation Authority-UEM MARA Corporation: for MCTE

Under the Toll Operation Agreement (TOA), dated 26 July 1996, among the Government represented by the TRB (Grantor), the Public Estates Authority or PEA - now Philippine Reclamation Authority or PRA - (Grantee) and its Joint Venture Partner UEM-MARA Corporation, the Grantee is required to perform the Operation of the Manila-Cavite Toll Expressway (MCTE) - now also known as CAVITEX - 24 hours a day, by providing the following systems, facilities and services:

- Toll collection systems
- Traffic control systems
- Toll road patrol and vehicle control communication system
- Facilities for assistance to disabled vehicles and in case of emergencies
- Information service/message sign boards
- Vehicle regulation facilities (e.g., weight, load, height)
- Lighting facilities
- Emergency operation facilities
- Administration of toll road facilities including ancillary facilities
- Communication, water and power facilities

The Cavite Infrastructure Corporation, the Operator of CAVITEX, launched on 20 July 2012 its electronic toll fee payment system using the “e-tap” card, a reloadable electronic wallet that uses a contactless technology similar to a credit card. This is claimed to be a fast and cheap cashless toll collection system. As stated in **Annex 4.3.4** above, the TRB in effect urges toll roads to follow the example of CAVITEX in adopting electronic or cashless toll collection systems as this will eventually lead to interoperability of the toll collection systems of the different tollways.

4.4.5 STAR Infrastructure Development Corporation: for STAR

Under the Toll Concession Agreement (TCA), dated 18 June 1998, between the Government (Grantor), represented by the DPWH and the TRB, and Star Infrastructure Development Corporation or SIDC (Grantee), the Grantee, through is Operation Company, shall perform the perform the Operation of the STAR 24 hours a day every day, by providing the following activities, services, systems, and facilities:

- Toll collection and accounting system
- Traffic control and management system
- Toll road patrol and vehicle control communication system
- Facilities for assistance of disabled vehicles and in case of emergencies
- Information service/message sign boards
- Vehicle regulation facilities (e.g., weight, load, height)
- Emergency call and lighting facilities
- Emergency operation facilities
- Traffic management and administration of the project roads facilities
- Personnel and staff management development and control

The physical aspects of the Operation shall be governed by the terms of the TCA, the Toll Operation Certificate, the Toll Operation and Maintenance Manual and Procedures, and pertinent rules and regulations including such guidelines as may be promulgated by the Grantor, through the TRB, upon prior consultation with the Grantee and the Operation Company. These rules and regulations may include the use of suitable ITS and ETC systems.

4.4.6 Ayala Corporation: for Daang Hari- SLEX Link Road

Under the Concession Agreement (CA), dated 04\3 April 2912, between the Government, represented by the DPWH, and Ayala Corporation (Concessionaire), the latter has the right and obligation to undertake the Operation of the Daang Hari-SLEX Link Road and to impose and collect tolls on it during the Operation Period. The Concessionaire shall undertake the Operation according to the prescribed Minimum Performance Standards and Specifications (MPSS) and the approved Operation and Maintenance Manuals.

Under the MPSS for the Daang Hari-SLEX Link Road, the use of ETC systems is provided as one of the means of payment of tolls, thus:

Means of Payment

The established method of payment is "stop and pay." New methods of toll collection that may be adopted where the driver is not required to stop; instead, the vehicle is identified by a remote control system as it passes, with or without stopping, through a special lane. The transaction is automatically recorded and the toll is debited from the subscriber's account..

The following forms of payment may then be adopted for the Project:

(1) Cash payment.

(2) Magnetic cards - Such cards include national or foreign bank cards, credit cards, and private cards such as vehicle fuel company cards or automobile club cards.

(3) For subscribers, specific payment systems - stored-value magnetic cards (chips or stripe), automatic vehicle identification (AVI) systems, etc. could be used.

Furthermore, the Concessionaire is required to comply with the following performance requirements for Operation as defined in the MPSS:

a. Toll collection system

- *The Concessionaire/Operator, must ensure that the prescribed design standards of the Road are met and the following performance standards are observed:*
  - *The electronic toll collection and control equipment is operational 24 hours every day.*
  - *The waiting/transaction time at toll plazas does not exceed an average of 20 seconds per user from 6 am to 8 pm daily.*
  - *The transaction capacity at toll plazas is not less than 400 vehicles/hour/ lane for mixed manual/E-pass system and 900 vehicles/lane/hour for E-pass.*
  - *There is no interruption to normal traffic, except during major repairs and accidents.*
- *The Concessionaire shall implement the following operational activities which shall be included in the Operations Manual:*
  - *Supervision of shifts, lanes and toll plazas.*
  - *General items of responsibility for operating and non-operating toll lanes.*
  - *Operation of E-pass and manual toll lanes.*
  - *Lane closing and opening procedures.*
  - *Traffic queue supervision and management.*
  - *Vehicle classification.*
  - *Transaction receipts operation.*
  - *User toll display operation.*

- *Traffic control gate operation.*
- *Lane status gate operation.*
- *Toll collection system administration, including database.*
- *Toll accounting and reporting.*

b. Traffic Safety and Control System

- *The Concessionaire/Operator shall attain the following operating performance standards for the traffic safety and control system:*
  - *The patrol system shall be operated 24 hours every day. The patrol shall observe the traffic situation and road conditions at all times, undertake emergency aid for road users with broken down vehicles, and perform emergency handling of traffic accidents.*
  - *The Toll Operations Center shall be operational and permanently staffed 24 hours daily.*
  - *The emergency telephone network and surveillance camera network linked to the Toll Operations Center shall be operational 24 hours a day.*
  - *The response time between the receipt of emergency call for accidents/vehicle breakdown and arrival on the site shall not exceed 30 minutes.*
  - *The time from the receipt of emergency call to clear the accident/vehicle breakdown site and restore normal traffic flow shall not exceed 60 minutes.*
  - *Temporary safety equipment shall be deployed at the accident/vehicle breakdown sites within a maximum time of 10 minutes after the notification of the incident.*
  - *The average accident rate shall not be more than one per day.*
  - *During maintenance works, at least one lane for one direction shall be kept open for vehicles.*
  - *Announcement of ramp closure shall be made at least five days in advance.*
  - *Dynamic weighbridges/weigh-in-motion machines shall operate 24 hours a day to weigh and detect vehicles that exceed the allowable axle load of 13.5*

tons and gross vehicle weight. Overloaded trucks shall not be allowed to continue.

- *Variable message signs shall be operating 24 hours daily, providing information on accidents and road works, traffic conditions, dangerous weather conditions warning, and toll rate changes.*
- *Defects shown in DPWH's inspection reports shall be remedied within 30 days.*
- *Monthly operating reports shall be accurate and submitted on time.*

- The Concessionaire's/Operator's personnel assigned to enforce traffic regulations and safety measures in the Expressway, including anti-overloading rules, must have been duly deputized by the Land Transportation Office.

In the Concession Agreement for the SLEX-Daang Hari Link Road, the Concessionaire is obliged to cooperate with the DPWH in case the Government authorities decide on a policy that will require interoperability of the toll collection systems of existing and future toll roads.

In this regard, if the DPWH decides, in the interest of the public, to set new or higher standards and specifications or additional scope of work beyond those prescribed in the current MPSS - e.g., upgraded ETC with interoperability arrangements, improved ITS with traffic data sharing with government agencies and other expressways - the DPWH may issue the corresponding Variation Order. The Concessionaire shall submit a Variation Proposal to meet the DPWH requirements and, once the Variation Proposal is approved, the Concessionaire shall execute the Variation. Any additional costs incurred by the Concessionaire to implement the approved Variation shall be recovered through any or a combination of the following methods – (a) direct payment from the DPWH, (b) adjustments of the Toll Rate, (c) extension of the Concession Period, and (d) other methods to be mutually agreed upon by the Parties.

4.4.7 Ninoy Aquino International Airport Expressway (NAIAX)

The Ninoy Aquino International Airport Expressway (NAIAX) Project was approved in June 2012 by the National Economic and Development Authority Board and is scheduled by the DPWH for bidding as a BTO project before the end of 2012. The project physically connects with the Skyway and the MCTE.

In the draft Concession Agreement for the NAIAX, the Concessionaire/Operator is required to undertake essentially the same obligations as those in the Concession Agreement for the Daang Hari-SLEX Link Road Project, including the MPSS requirements for means of toll payment and

toll collection systems mentioned in Annex 4.6 above – e.g., use of ETC. These also include the following provision:

> *Coordination with Other Toll Roads. The Concessionaire shall cooperate with the DPWH in case the Government authorities decide on a policy that will require physical interconnection and inter-operability of the toll collection system of the NAIA Expressway with those of the Manila-Cavite Toll Expressway, the Metro Manila Skyway, and other existing and future toll roads.*

Under the draft Concession Agreement for the NAIAX, the DPWH may issue a Variation that requires the Concessionaire to undertake works needed to meet new or higher standards and specifications that may be set by the DPWH, say, improved ITS and ETC, including interoperability arrangements and interfacing of traffic data with government entities and other expressways. The Concessionaire shall submit a Variation Proposal to meet the DPWH requirements and, if the Variation Proposal is approved, the Concessionaire shall implement the Variation. The incremental costs of the approved Variation shall be recovered by the Concessionaire through any or a combination of the following methods – (a) direct payment from the DPWH, (b) adjustments of the Toll Rate, (c) extension of the Concession Period, and (d) other methods to be mutually agreed upon by the Parties.

Annex 4.5 ENFORCEMENT OF TRAFFIC AND TRANSORT-RELATED LAWS AND REGULATIONS

4.5.1 General

The regime for the enforcement of laws and regulations related to traffic and transport in Metro Manila is characterized by several Government agencies vested with and exercising powers and responsibilities that are interrelated and sometimes overlap across agencies. The main agencies involved are the MMDA, LGUs, LTO, LTFRB, LGUs, and TRB.

This section evaluates the traffic and transport-related enforcement powers and functions of these agencies. It also identifies major issues and problems on enforcement. The views of a road user are also presented. All of these are discussed in the light of possible ways by which ITS can address the problems and issues.

4.5.2 MMDA

Powers and Functions

As stated in **Annex 4.3.3**, by virtue of its charter (RA 7924) and its IRR, the MMDA has the following powers and functions pertaining to transport and traffic are the following: (**Emphasis, thru bold font, supplied**)

- *Set the **policies concerning traffi**c in Metro Manila, and **coordinate and regulate** the implementation of all programs and projects concerning **traffic management**, specifically pertaining to enforcement, engineering and education. Upon request, it shall be extended assistance and cooperation, including but not limited to, assignment of personnel, by all other government agencies and offices concerned;*

- *Install and administer a **single ticketing system**, fix, impose and collect fines and penalties for all kinds of violations of traffic rules and regulations, whether moving or non-moving in nature, and confiscate and suspend or revoke driver's licenses in the enforcement of such traffic laws and regulations, the provisions of RA 4136, and PD 1605 to the contrary notwithstanding.*

- *For this purpose, the Authority shall **enforce all traffic laws and regulations** in Metro Manila, **thru its traffic operation center**, and may **deputize** members of the PNP, traffic enforcers of local government units, duly licensed security guards, or members of non-governmental organizations to whom may be delegated certain authority, subject to such conditions and requirements as the Authority may impose.*

One issue facing the MMDA is its unclear relationships with other transport agencies. While the

MMDA charter mandates it to exercise transport and traffic management, and to set policies and formulate, coordinate and regulate the implementation of medium and long-term plans, programs and projects for metro-wide transport and traffic management services, the MMDA powers are not exclusive and the MMDA has found it challenging to make its acts binding on other agencies with transport-related functions – e.g., LGUs, DOTC and its agencies, DPWH, and PNP, among others. The MMDA charter did not explicitly divest the other agencies of the affected transport-related functions and transfer these to the MMDA, except in specific cases decided by jurisprudence or as directed by the President. The other agencies, therefore, tend to pursue their own transport-related programs and operations according to their mandates, in loose coordination with the MMDA.

Thus, based on its charter, the MMDA is authorized to enforce all traffic laws and regulations in Metro Manila. This authority covers traffic on both National and Local Roads. The MMDA contends that its traffic enforcers do not need to be deputized by the LTO since its enforcement powers proceed directly from its charter. On the other hand, the MMDA is also empowered by its charter to deputize LGUs to enforce the traffic rules and regulations in Metro Manila.

At the same time, as stated in **Annex 4.5.3**, the LGUs are authorized by the Local Government Code (LGC) to regulate the use of all streets and regulate traffic on all streets in their respective cities/municipalities – including Local and National Roads. The LGUs maintain that they need not be deputized by any agency – LTO or MMDA – as their enforcement powers are inherent in the LGC.

In the case of the LGUs, Section 13 of the IRR of the MMDA charter provides for consultation and agreement process between the MMDA and the LGUs, as follows: (**Emphasis, thru bold font, supplied**)

> *Where the **cities or municipalities** in Metropolitan Manila, by virtue of the provisions of the Local Government Code [Republic Act No. 7160] or individual city charters, are invested with and are **exercising or discharging similar or identical powers or functions**, the Authority, shall in observance of the policy of local autonomy, **consult with local chief executives** concerned in order to identify the **areas for the delivery of metro-wide services**. Thereafter, the Authority shall conclude, upon **prior authorization or concurrence of the Sanggunian** concerned, the appropriate agreements, and when necessary and proper, the LGUs shall amend or repeal existing local ordinances on the matter.*

Thus, unless the City or Municipal Council concerned authorizes or concurs with the MMDA that certain local roads or traffic management services are metro-wide in character and enters into agreement with the MMDA to the effect that the latter will deliver those services, the LGUs will enact and implement their own local ordinances on local road use and traffic

management, which may be inconsistent with MMDA traffic rules. For example, Makati and Las Pinas enforce a vehicle plate number coding scheme continuously from 7 am to 7 pm, unlike the MMDA's scheme which provides for an exception window from 10 am to 3 pm.

On top of this, as mentioned in **Annex 4.5.4**, the LTO is the main agency tasked to implement the provisions of the Land Transportation and Traffic Code or LTTC (RA 4136), which includes the enforcement of traffic rules, licensing of drivers, and registration and operation of motor vehicles, covering all types of roads, in Metro Manila as well as all other parts of the country. The LTO further contends that

Each of these agencies – MMDA, LGUs, and LTO – claims that it has the legal right to enforce traffic laws throughout Metro Manila. On paper, therefore, there would be overlaps and conflicts in enforcement if all these agencies assert their claimed legal powers.

In practice, however, these agencies have reached a *modus vivendi* through an informal agreement, whereby the enforcement functions are to be exercised by the agencies as follows, which aims to avoid overlaps and instead promote complementary activities:

- The MMDA shall enforce traffic laws and regulations on National Roads. If requested by an LGU, the MMDA may also enforce traffic laws and regulations on specific Local Roads.

- The LGUs shall enforce traffic laws and regulations on Local Roads. As requested by the MMDA, the LGUs may also enforce specific sections of National Roads.

- The LTO shall focus on special enforcement operations – e.g., anti-smoke belching, anti-*colorum*, etc., with proper notification to the MMDA and the LGUs concerned.

The Traffic Discipline Office (TDO) under Atty. Yves P. Gonzales is the main MMDA entity responsible for the enforcement of traffic laws and rules. The TDO has over 1,700 enforcers. The TDO implements the provisions of RA 4136 which, in substance, is similar to the Uniform Traffic Management Code (TMC) used by LGU enforcers.

To qualify as an enforcer, one must have attained at least 72 units of tertiary education and possess a driver's license. It is not certain if these requirements are strictly applied.

According to the TDO, one of the most critical problems in enforcement is the low pay of MMDA enforcers. With a monthly compensation of only about PhP 7,000 per month, some enforces are tempted or forced to commit *kotong* and other illegal practices to obtain extra money to support their families. Given this situation, the MMDA has taken steps to increase the compensation of enforcers, as well as to institute performance rewards and non-monetary

incentives, such as free uniforms. The private sector has also helped by donating raincoats.

The TDO is against the practice of some LGUs of providing additional pay to an enforcer in the form of a percentage of the fines that he imposes. This is because the practice might lead to abuse where the enforcer would concoct violations just to raise the amount of fines that he will impose, and neglect his main duty to provide order in traffic flow.

There are still complaints and reports of corrupt MMDA personnel, although to a lesser extent. As soon as it receives a complaint, the MMDA immediately investigates it, assigns undercover agents to check the claim, and, if this is confirmed, the MMDA sets up an entrapment, the enforcer is arrested and summarily dismissed, without prejudice to the filing of charges against him.

The MMDA enforcers are now no longer allowed to hold a motorist's license, except if a motorist is involved in an accident, or is a repeat offender, having three violations for the same count without having paid his previous fines.

Atty. Gonzales said that many enforcers act like shepherds, and many motorists see them that way. Only when the enforcer is around and does his job properly will some order take place; otherwise, the motorists tend to disregard the traffic rules.

The TDO explained that the primary duty of enforcers is *traffic direction and control*, not apprehension and sanctions. For this reason, during peak hours and especially along EDSA and other major thoroughfares, the enforcers' main objective and priority is to make the traffic move in an *orderly, fast, and safe* manner. For example, buses that obstruct the lanes to load or unload passengers are directed to move on quickly to ease congestion. On the other hand, if the emphasis were to strictly enforce the rules, the enforcers would have to order the erring buses to pull over, apprehend them, and issue citation tickets, which would only add to the congestion, since the ticketing process would take at least five minutes, while the apprehended buses would in the meantime occupy valuable road space. This explains the apparent laxity of enforcers to arrest violators and issue tickets during the rush hours.

It is during off-peak hours that the enforcers are expected to strictly enforce the rules, including apprehensions and ticketing, as this process will not significantly cause or add to congestion.

With respect to the ticketing system, the LGUs, coordinated by the MMDA, are nearing agreement on a single ticketing system, particularly as to form. A single accountable ticket form – i.e., a uniform Ordinance Violation Receipt (OVR) - will provide for security and preclude the uncertainty of spurious tickets being used. The fines and penalties will also be eventually be standardized across all LGUs. The uniform set of fines and penalties will be adopted by a

Resolution of the Metropolitan Manila Council, and subsequently legislated through ordinances of the individual *Sangguniang Panlungsod* (City Council) and *Sangguniang Pambayan* (Municipal Council).

Atty. Gonzales stressed the need for bus management in Metro Manila using ITS in order to facilitate the enforcement of traffic laws and rules, and make the traffic flow faster, safer, and more orderly. This will also reduce opportunities for corruption. The scheme that he proposes has the following features:

- Each bus will have a console and LED panels.
- The movements of the bus will be recorded in the console, though GPS, and monitored in the Metrobase, as well as in the bus operators' terminals/offices.
- The system will be able to automatically monitor the following:
  - Out-of-line operations
  - Trip-cutting
  - Dispatching of buses at the Organized Bus Routes (OBR) terminals at Alsbang, Coastal Mall, Fairview, and Navotas.
  - Overspeeding
- The scheme will implement the no contact policy.
- Interconnectivity with the LTO database will have to be provided to automatically obtain information on the vehicles and drivers committing offenses.
- Notices of violations will be sent to the driver/operator concerned, together with the proofs of violations (based on the computerized records), demand for payment of fines and penalties or hearings, and summons for hearings
- Any fine unpaid after two weeks will trigger an alarm for the LTO not to renew the driver's license, thus creating a virtual fence. A similar alarm system for vehicles is needed.
- For public utility vehicles, both the driver and the operator are to be held accountable for the violation.

- *Colorum* operations can be identified by tagging all buses with their plate number, color code, and requiring public buses to display a secret message at the LED panels during anti-*colorum* operations.

- The system described above, which involves little human intervention, will motivate the drivers/operators to behave. It will instill discipline in them.

4.5.3 LGUs

Under Annex 458 of the LGC, the *Sangguniang Panlungsod* and *Sangguniang Pambayan* are empowered to approve ordinances which shall ensure effective and efficient delivery of the basic services and facilities as provided under Section 17, and in addition to said services and facilities, shall: **(Emphasis, thru bold font, supplied.)**

xxx

(v) ***Regulate the use of streets, avenues, alleys, sidewalks****, bridges, parks and other public places and approve the* ***construction, improvement, repair and maintenance of the same; establish bus and vehicle stops and terminals or regulate the use of the same by privately-owned vehicles which serve the public****; regulate garages and the operation of conveyances for hire****; designate stands to be occupied by public vehicles when not in use; regulate the putting up of signs, signposts, awnings and awning posts on the streets; and provide for the lighting, cleaning and sprinkling of streets and public places;*

(vi) ***Regulate traffic on all streets and bridges****; prohibit encroachments or obstacles thereon and, when necessary in the interest of public welfare, authorize the removal of encroachments and illegal constructions in public places;*

xxx

Hence, the City and Municipal Governments can, by virtue of the LGC, enact ordinances defining the provision and use of their local roads, including traffic management. The exception, as mentioned in **Annex 4.5.2**, is where the City/Municipal Council authorizes and agrees with the MMDA that certain local roads and traffic management services are metro-wide in nature and, thus, to be provided by the MMDA, in which case the Council ordinances will have to be formulated or amended accordingly..

Traffic Rules and Regulations

In Metro Manila, all LGUs have adopted the Uniform Traffic Management Code (TMC) which

is enacted under their respective City/Municipal Ordinances.

The TMC contains specific rules and regulations as summarized in **Table 4.5-1**:

TABLE 4.5-1 PROVISIONS FOR MAJOR RULES AND REGULATIONS UNDER THE UNIFORM TRAFFIC MANAGEMENT CODE

Article/Section	Subject
Art. III, Sec. 8-9	Direction and Operation of Traffic Control Items
Art. IV, Sec. 10-11	Obedience and Operation to Traffic Control Signals and Signs
Art. V, Sec. 12-23	General Driving Rules
Art. VI, Sec. 24-29	Giving Way
Art. VII, Sec. 30-31	Speed Restriction
Art. VIII, Sec. 32-33	One-Way Streets
Art. IX, Sec. 34-39	Turning, Reversing and Stopping
Art. X, Sec. 40-49	Stopping and Parking of Vehicles
Art. XI, Sec. 50-55	Parking Zones and Facilities
Art. XII, Sec. 56-58	Careless and Dangerous Driving under the Influence of Liquor
Art. XIII, Sec. 59-69	Accidents
Art. XIV, Sec. 70-75	Operation of Animal-Drawn Carriages, Bicycles and Tricycles
Art. XV, Sec. 76-86	Lighting, Warning Signs, Equipment, etc.
Art. XVI, Sec. 87-92	Weight, Size and Load
Art. XVII, Sec. 93-96	Truck Bans and Public Transport Routes
Art. XVIII, Sec.97-101	Duties and Responsibilities while Operating a Motor Vehicle
Art. XIX, Sec.102-104	Public Utility Vehicle Operations
Art. XX, Sec. 105-108	Pedestrian Rights and Duties
Art. XXI, Sec. 109-123	Miscellaneous Provisions
Art. XXII, Sec. 124-131	Procedures and Penalties
Art. XXIII, Sec. 132-135	Guidelines and Procedures for Towing Operations
Art. XXIV, Sec. 136-140	Vehicular Volume Reduction Scheme
Art. XXV, Sec.141-144	Traffic Administration
Art. XXVI, Sec. 145-148	Final Provisions
Appendix I	One-Way Streets
Appendix II	No Left Turn
Appendix III	No U-Turns
Appendix IV	No Parking Streets
Appendix V	Parking Zones
Appendix VI	Streets with Limited Truck Ban
Appendix VII	Schedule of Fines and Penalties

The TMC differs among the LGUs only in the Schedule of Fines and Penalties corresponding to the violation of the traffic rules and regulations in the different sections of the TMC, as well as in the specific streets and areas in the Appendices which are designated one-way streets, no left-turn streets, no U-turn streets, no parking streets, parking zones, and streets with limited truck ban.

Organization and Powers

Under the Uniform TMC, each LGU should have a Traffic and Parking Management Office

(TPMO) under the direct supervision and control of the Mayor. The TPMO is *solely vested with the power to enforce and implement this Ordinance* (embodying the TMC) *and such traffic management plans* and programs *that may hereafter be drawn or prepared.*

The TPMO has five Divisions – viz., Traffic Engineering, Transportation Planning, Traffic Enforcement, Facilities Management, and Support Services Divisions. The Traffic Enforcement Division has the following functions (as stated in the TMC of Pasay City):

a. *Assign personnel to direct or control traffic at intersections and other locations requiring such intervention.*

b. *Execute the enforcement component of any traffic scheme devised or conceived by the Traffic Engineering Divisi and approved by the Advisory Committee.*

c. *Enforce applicable traffic rules and regulations, including apprehension and issuance of traffic citation tickets to drivers found in violation of any provisions of this Ordinance.*

d. *Conduct an investigation of any vehicular accidents that occur within the city.*

e. *Coordinate with the Metropolitan Manila Development Authority ((MMDA) and the Philippine National Police (PNP), traffic enforcement and other affiliating agencies to harmonize personnel deployment and field operations within the city.*

f. *Initiate the towing or removal of vehicles obstructing traffic.*

g. *Suggest changes in any traffic scheme, including provision of traffic signals.*

h. *Formulate and implement a local traffic education and road safety program.*

To illustrate the issues and problems in the enforcement of traffic and transport-related laws and rules at the LGU level, the cases of Pasig and Pasay are discussed below.

Pasig City

The TPMO in Pasig is headed by Col. (Retired) Alberto Dulay. The TPMO has some 670 traffic enforcers, all of whom are contractual personnel whose tenure is subject to renewal once a year. The enforcers are distributed into the four sectors – North, East, South, and West – and the market complex. They are deployed in two shifts, from 6 am to 10 pm, in the sectors, while three shifts are fielded in the busy market complex which operates round the clock.

The enforcers are bound to implement the TMC of Pasig City, which the Pasig Government has approved under its Ordinance No. 01, series of 2004. .

Based on the LGC, Pasig is empowered to enforce its TMC on all public roads in the city – i.e., both City Roads and National Roads. The MMDA, because of its mandate, also enforces traffic regulations on National Roads in Pasig City, with its enforcers being deputized by the LTO. According to Col. Dulay, in order to avoid conflicts and overlaps, Pasig City and the MMDA have agreed on the specific National Roads that each agency shall cover for purposes of traffic enforcement.

While Pasig City and the MMDA essentially implement the same basic traffic and transport rules, they differ in certain aspects. For example:

- Since Pasig is an autonomous LGU, its traffic enforcers do not need any deputation from other agencies.

- The amounts of fines for traffic violations are different: For "out-of-line: public utility vehicles – i.e., those that operate outside their authorized routes - Pasig imposes a fine of PhP 2,500, which is the maximum amount allowed by the LGC, while the MMDA imposes a higher fine at PhP 6,000, which is the maximum authorized by the LTO.

- Under the number coding scheme, while the MMDA adopts a 10 am to 3 pm "window" when the coding is lifted, Pasig applies a longer window of 9 am to 4 pm so that vehicles coming from adjacent cities during the 10 am-3 pm window will have enough time to pass through Pasig.

- Pasig does not allow any exception from the truck ban, save for special cases with the written permission of the Mayor (e.g., for transport of concrete mix for on-going large scale construction projects).

- Pasig, thru the TPMO, operates its own towing trucks and does not use private tow trucks which they said are prone to abuse. It also operates parking buildings and areas, including on-street parking for a fee which is less than the commercial rates.

The Pasig TPMO concentrates more on "moving" violations, e.g., disregarding traffic signs, obstruction, etc. - rather than administrative offenses, e.g., unfranchised public utility units, etc. The TPMO makes some 200-300 arrests per day.

A major concern of the Pasig TPMO is the enforcement of traffic regulations involving public buses and jeepneys.

- Many buses/jeepneys try to load/unload outside the designated spots, thereby hindering traffic flow.

- They spend a lot of time in the vicinity of loading areas to pick up as many passengers as possible.

- Some buses/jeepneys operate outside their designated franchise routes.

- Some jeepneys cut trips.

Col. Dulay said that drivers are motivated to do these unlawful practices to maximize their passenger loads since they get their earnings through the pervasive boundary/ commission arrangement. He also noted that the LTFRB has approved routes of public buses/jeepneys without consulting the Pasig Government, resulting in certain routes being congested, while others are underutilized.

Another concern identified by the Pasig TPMO is the absence of interconnectivity among the databases of the LGUs and the LTO. Thus, a driver may obtain several licenses; if his license is confiscated and an OVR is issued to him, he can easily obtain and use another license to operate his vehicle, without being detected.

While there are reports and complaints on *kotong* practices in Pasig, they are said to be relatively less than those in most other parts of Metro Manila. This is partly because the enforcers are reshuffled at random almost daily among the areas and shifts in order to prevent them from being too familiar with the traffic patterns in their assigned area, which might induce them to allow friendly public bus/jeepney drivers to violate traffic rules for a consideration, and to entrap motorists into committing common violations which provide opportunities for extortion. (By contrast, in the MMDA and in many other LGUs, the enforcers are assigned over a longer period in specific routes or zones.)

Col Dulay said that their 670 enforcers are not enough to handle the heavy volume of traffic in Pasig. He added that the enforcers are underequipped: they have only 70 motorcycles, whereas at least 100 are needed for better mobility, and only 124 two-way hand-held radios.

Pasig has about 20 intersections with traffic signals. The TPMO said that these are not adequate and seeks to install more signals.

The enforcers assigned to the intersection may change the signal cycle times from time to time to adapt to the actual traffic situation, by giving priority to the traffic flow with the biggest volume. They also have designated one-way streets and allow traffic counterflow during morning peak hours on certain major streets, depending on the volume of rush hour traffic. Some motorists complain that the cycle times, counterflow and related traffic mitigation measures are too variable and unpredictable which upset their trip plans.

Pasig City has a Communication Command and Control Center (CCCC). This Center is multipurpose: it is mainly used to monitor the traffic situation, but it is also used to observe river levels for impending floods, to check unusual incidents, and to deter and track criminal activities. The CCCC is linked to 165 CCTV cameras, mostly the Pan-Tilt-Zoom (PTZ) type. Most cameras are installed at major streets. The Center has 24 big monitors, each capable of being subdivided into nine screens which simultaneously show the real time situation in the areas covered by the CCTVs. If the CCCC staff observes any traffic congestion, accident, stalled vehicle, or traffic violation, the CCCC dispatcher immediately contacts the enforcer nearest to the area involved with the instruction to promptly take remedial steps – e.g., clear the congestion, apprehend any erring motorist, etc.

Pasig plans to expand and modernize its CCCC network by adding more CCTVs and monitors.

The TPMO Director said that there are still cases of corruption among enforcers. Whenever he receives reports about *kotong* enforcers, he conducts a surveillance and investigation and, if necessary, entraps the suspect, and institutes sanctions.

Pasay City

According to Ms. Elena Chua, Assistant Chief and Administrative Officer of the TPMO, Pasay City (like Pasig and all other LGUs in Metro Manila) uses the Uniform Traffic Management Code (TMC) as its "bible" for enforcement. The TMC is covered by City Ordinance No. 2916, series of 2004. Every enforcer carries a handy TMC booklet as ready reference for him and any traffic violator that he may accost. The TPMO gives copies of the TMC booklet to some motorists to orient them on the traffic rules.

Pasay has 424 enforcers, of which 202 are casuals, 192 are volunteers (working 2-4 hours during the peak period in busy streets, including the vicinity of big schools), and 30 are permanent. About 320 of these enforcers are deployed in the field, distributed among seven sectors, and mostly working in two shifts from 6 am to 10 pm, with about 20 enforcers assigned to the 10 pm–6 am shift. Ms. Chua said that ideally they should have a total of at least 500 enforcers to effectively manage the traffic in the city.

For communication, the TPMO has only 80 two-way hand held radios, so that enforcers are often compelled to use their personal cellular phones for official communications. The TPMO has only 12 government motorcycles, such that some enforcers have to use their private motorcycles. Pasay has no CCTV cameras to monitor traffic conditions or a traffic control center with computerized monitors similar to that of Pasig.

The Pasay enforcers concentrate on City Roads, while the MMDA enforcers are assigned to

National Roads within the city.

Pasay issues the OVR to violators whose licenses are confiscated. Pasay enforcers apprehend about 100-200 motorists a day, and the confiscated licenses are returned to the violators after paying the penalties at the Pasay Redemption Center. The Center is a very small room and most of the procedure, including payments, recording, announcements, and retrieval of licenses, is done with little order outside in the corridor which is crowded by waiting drivers and other persons.

The most frequent offenses are disobedience to traffic control signals (Section 10 of the TMC) and disobedience to signs (Section 11). Out-of-line operation of public vehicles (Section 94) and loading/unloading outside the designated zones (Annex 47) are also common offenses.

In Pasay, if a motorist is found to commit several offenses in one incident, he is required to pay only the offence with the highest fine. (By comparison, in Makati, the violator would pay the fines for all offenses.) If the offender fails to redeem his license within five working days, he is made to pay an additional 5 percent of the fine per day, provided that the total fine shall not exceed PhP 5,000.

Traffic enforcement at intersections is largely done manually as Pasay has only five functioning traffic signals.

While the Pasay enforcers generally use the TMC to perform their duties, there appears to be no strict or consistent enforcement of the traffic rules and penalties, and some amount of discretion is exercised. Thus, it was explained that, for certain offenses where the enforcer finds the violator to be *mabait* (kind) and remorseful, the enforcer may invoke a lighter violation with a lower fine than the violation actually committed, or releases the violator without any penalty. Out of compassion, enforcers in some cases allow out-of-line AUVs to continue their trips if the passengers are elderly or with small children, even if the violation warrants the issuance of an OVR with fine plus impounding. The unofficial advice given to enforcers, in case of minor violations where erring motorists plead not to be apprehended, is either to stick to the prescribed penalties or to let the violators go without being penalized, instead of negotiating for a lower fine which could breed *kotong* practices; it is not certain to what extent this advice is actually heeded.

4.5.4 LTO

As stated in **Annex 4.3.6** above, the LTO is mandated by RA 4136 and EO 125, series of 1987, as amended, to act as the principal agency that shall ***administer and enforce all laws, rules and regulations*** *in the field of transportation*. These include principally the provisions of RA 4136

or the Land Transportation and Traffic Code (LTTC) which, as mentioned in **Section 1.5** above, include the following:

- Registration of Motor Vehicles – including vehicle classification, application, permissible weights and dimensions, and fees.

- Operation of Motor Vehicles – including licensing of drivers, examination, fees, registration certificates, and number plates

- Passenger and Freight – including allowable carrying capacity, and vehicle accessories.

- Traffic Rules – including speed limits and keeping to the right, overtaking/passing and turning, right-of-way and signals, turning and parking, and other rules.

- Penal and Other Provisions - including penalties and collection of fees.

In addition to enforcing RA 4136, the LTO also enforces the following provisions of the law:

- Emission standards for motor vehicles.

  These are set by the Department of Environment and Natural Resources (DENR) under the Clean Air Act (RA 8749). For new vehicles, issuance by the DENR of a Certificate of Confomity with emission standards is a requirement before the LTO registers the vehicles. In the case of in-use or old vehicles, the LTO shall conduct emission tests on the vehicles through its Motor Vehicle Inspection System (MVIS) at the LTO Motor Vehicle Inspection Centers or Private Emission Testing Centers, and shall renew the registration of the vehicles only if they pass the tests. (The MVIS also checks to ensure that the vehicle complies with other requirements for roadworthiness, such as safety.)

- Maximum allowable vehicle load.

  RA 8794 (MVUC Act) provides that *a penalty of 25% of the MVUC shall be imposed on trucks and trailers for loading beyond their prescribed gross vehicle weight: provided, That no axle load shall exceed thirteen thousand five hundred kilograms (13,500 kgs)*. At the same time, RA 4136 (LTTC) provides that the maximum gross vehicle weight (GRV) shall be determined by the LTO.

  For National Roads, the DPWH operates the permanent weighbridges and portable weighing machines to detect trucks carrying axle loads in excess of the legal load limit, and the LTO apprehends the violators. With regard to Toll Roads, only the

NLEX and SLEX are operating weighbridges, with LTO-deputized personnel apprehending overloaded trucks at the NLEX.

There is still a significant incidence of truck overloading, which causes premature deterioration of roads. The drive to prevent truck overloading is hampered by the following issues and weaknesses :

- Inadequate operating anti-overloading facilities.

  The existing DPWH weighbridges (24) are insufficient, and many are not functioning effectively. The DPWH personnel operating them are not enough and lack training. Weighing and recording are not always properly done. LTO and PNP enforcers assigned to the weighbridges are few and their enforcement is weak and spotty. Surveys show that 25-50 percent of three-axle trucks carry loads exceeding 35 tons. The generally unchecked overloading, together with inadequate road maintenance, has significantly contributed to the large proportion of roads still in poor to bad condition. As pointed out in the Australian-assisted Managing Truck Overloading Project Report (February 2010), in the short-term, the DPWH must take measures to ensure that its weighbridges are functional and fully calibrated to record the correct vehicle weights, and employ adequate qualified staff to man the weighbridges; the LTO must also assign qualified LTO or LTO-deputized enforcers at the weighbridges to strictly enforce the anti-overloading rules, including apprehension of violators and pursuing them through litigation and adjudication. In this regard, the current DPWH operations in Metro Manila to weigh heavy trucks and prevent those overloaded from proceeding with their travel is a step in the right direction, and should be intensified. In the medium- and long-term, the Managing Truck Overloading Project Report recommends that the DPWH consider outsourcing the installation and operation of the weighbridges, including enforcement.

- Relevant weight limit. It is not clear which vehicle weight is to be considered to determine if a vehicle is overloaded: whether (a) prescribed GVW of the vehicle to be registered with the LTO which is supposed to reflect the manufacturer's specified maximum GVW, or (b) GVW as actually registered with the LTO which is reportedly often lower than the vehicle manufacturer's specified GVW, or (c) the axle load limit of 13,500 kg as specified in RA 8794, or (d) a combination thereof. The DPWH uses axle load alone as the basis for determining overload; the NLEX also adopts axle load, while the SLEX uses the GVW as actually registered with LTO plus axle load. The Managing Truck Overloading Project Report cited above recommends that these limits be harmonized, and suggests the use of the prescribed GVW based on the manufacturer's specification, but combining this with the maximum axle load limit as a control on the maximum GVW and to achieve optimum economic benefits

considering road maintenance costs. Once the weight limits are harmonized – which might require legislation –the standard weight limits should be uniformly enforced on all roads – ordinary non-toll roads and toll roads.

- Deputation of toll road enforcers. According to RA 4136, the LTO may deputize any employee of the government to enforce the provisions of that Act. Although some sectors believe that the deputation does not necessarily exclude private personnel, the DOTC and LTO interpretation of the present law is that private individuals are not qualified to be deputized. Hence, in the NLEX and SLEX, only LTO-deputized government personnel are supposed to be assigned to apprehend violations of the anti-overloading rules. (Thus, according to the LTO Enforcement Division Chief, the existing deputation of MNTC personnel apprehending violators of the anti-overload regulations may be legally challenged.) To allow deputation of private individuals would require legislation.

- Regulations for the operation of public utility transport services,

  This refers to the enforcement by the LTO of the conditions under the franchises granted by the LTFRB for public buses, jeepneys, and taxis, such as adherence to routes, safety and anti-*colorum* requirements. This matter is further discussed in **Annex 4.5.5**.

For the systematic performance of its functions, the LTO has issued several Administrative Orders which provide detailed rules and regulations to implement the provisions of the LTTC. For example, the LTO has issued Administrative Order No. AOI-2009-018 on the new MVIS. This Order sets the rules and regulations to provide a systematic, reliable and effective testing of motor vehicles through computerization and automation for compliance with safety and emission requirements; and to integrate all motor vehicle inspection reports into a central motor vehicle database.

The schedule of LTO administrative fees and charges for violation of the provisions of RA 4136 are embodied in DOTC Department Order No. 93-693.

To implement the provisions of the traffic and transport-related laws and regulations, the LTO deploys more than 400 enforcers nationwide. Only about 30 of these are assigned in Metro Manila. In addition, as stated in **Annex 4.1.5**, in accordance with RA 4136, the LTO deputizes other qualified Government agencies/personnel to perform its enforcement responsibilities. These include the MMDA and the PNP for traffic rules, LTFRB for franchise regulations, the DPWH for vehicle overloading, and the DENR for vehicle emission control.

According to Director Edgar Cabase, Chief of the LTO Enforcement Division, since the LTO is

the sole agency that is authorized by law (RA 4136) to grant drivers' licenses, only the LTO is legally authorized to confiscate licenses. On this basis, he contends that the practice of the LGUs, as well as the MMDA, of confiscating licenses for violations of their traffic ordinances is not in accordance with the law, unless the LGU and MMDA enforcers are deputized by the LTO. He added that the LGUs may apprehend traffic violators, but are not empowered to confiscate licenses. Nonetheless, the LTO has tolerated the current LGU practice since the LGUs help enforce traffic rules.

Director Cabase finds the current unified ticketing system useful, where the LGUs adopt a uniform set of rules and procedures for apprehending traffic violators, issuing OVRs as tickets, and retaining the fines as local revenues. But he believes that the LGUs should use the revenues derived from the fines to improve the road and traffic conditions – which, he noted, has not been the general case. While the LGUs use the OVRs, the LTO uses the Temporary Operator's Permit (TOP) as ticket. Director Cabase would have preferred a single ticketing system with centralized collection of fines under the MMDA to be apportioned later among the LGUs and the MMDA for use in traffic improvement measures according to a agreed program.

Going after *colorum* vehicles is a major concern of the LTO. What makes *colorum* operations difficult to stop, according to Director Cabase, is the fact that about 40 percent of the operators of *colorum* jeepneys and AUVs are policemen or enforcers. In addition, there is a discrepancy between the LTO and the LTFRB records of franchised public utility vehicles; there are about 1,000 more vehicles (*colorum*) in the LTO records than registered with the LTFRB, apparently because of spurious franchise documents presented by operators to the LTO and/or fake or *kambal* (twin) vehicle plates. Director Cabase advocates that a comprehensive program against *colorum* be launched which would include education, provision of terminals with Mayor's permits where *colorum* vehicles can be easily detected, and interface of the LTO and LTFRB databases to ensure consistency of records; this requires a Memorandum of Agreement among the agencies concerned.

Director Cabase finds the need for connectivity of the databases of the LTO, LTFRB, MMDA and LGUs to enable more efficient checking of information needed in the enforcement of traffic rules.

To combat the *kotong* practices of some enforcers. Director Cabase suggests that, more than improving systems and procedures, an effective solution is to strengthen values among enforcers through a moral formation drive that will build up character and instill discipline.

4.5.5 LTFRB

As stated in **Section 3.7** above, the main powers and functions of the LTFRB as provided in EO

202, series of 1987, include, among other things, *to issue, amend, revise, suspend or cancel Certificates of Public Convenience or permits* (or franchises) *authorizing the operation of public land transportation services provided by motorized vehicles, and to prescribe the appropriate terms and conditions therefor.* These terms and conditions include *routes of service, ... capacities, ...zones or areas of operation, ... fares, rates and other related charges,* and *such devices, equipment, facilities and operating procedures and techniques as may promote safety, protection, comfort and convenience to persons and property in their charges as well as the safety of persons and property within their areas of operations.*

The regulation of public transportation is apparently weakest in enforcement. Many operators do not comply with the detailed requirements of their LTFRB franchises. Some vehicles operate without a franchise or as *colorum* or *kabit* (illegally attached) units, especially in bus, minibus, jeepney, and AUV services. Some public utility vehicles operate outside their franchised routes – which is another type of *colorum* operation.

It is noted that the LTFRB has practically no in-house capability to enforce the conditions of the franchises for public transport services, because of its meager budget of only PhP 31 million for operations and its small organization of about 300 personnel nationwide. Hence, the LTFRB relies on the LTO, as well as the MMDA and the PNP, to enforce its decisions pertaining to franchises. The LTFRB also gets a few of its personnel deputized by the LTO to enforce LTFRB rules. The LTO, however, with its limited resources has to perform a myriad of enforcement tasks covering all types of vehicles, such that enforcement pertaining to public transportation franchises does not always receive high priority.

According to LTFRB Chairman, the enforcement regime could be rationalized and made more manageable by assigning to the LTFRB the enforcement of rules pertaining to public utility vehicles – which account for only about 10 percent of the vehicle population – and by leaving to the LTO the enforcement of laws and rules pertaining to private vehicles. This requires, however, that the enforcement capability of the LTFRB be beefed up by augmenting its budget and organization.

Furthermore, the LTFRB is considering to start on a clean slate by conducting a public bidding of franchises for public buses, possibly for specific routes, given certain pe4rformance standards for safety, service level, and environmental impact. It may be feasible to include in the performance standards the installation and use of ITS facilities in the buses and stations/terminals.

Meanwhile, the LTFRB has declared a moratorium on the issuance of franchises, except for trucks and school buses, and unless the DOTC issues an available Route Measured Capacity.

4.5.6 TRB

Under its mandate, powers and duties defined in PD 1113, as discussed in **Annex 4.1.4 and 4.3.5,** the TRB regulates all toll roads in the country, particularly by granting franchises and setting toll rates for these roads. The TRB is authorized *to grant authority to operate a toll facility and to issue therefore the necessary "Toll Operation Certificate" subject to such conditions as shall be imposed by the Board.* Inherent in these regulatory powers of the TRB is its power to enforce the conditions under which the franchise for the Toll Road is granted through the TOA/STOA and the TOC. These conditions include the performance standards and specifications for Toll Road O&M, including traffic control and management and toll collection systems.

As pointed out by its Executive Director, the TRB has a limited capability to monitor and enforce the Toll Road Operators' compliance with the standards set by the TRB under the TOA/STOA. This is because of the TRB is a small agency with only 15 technical personnel under the Regulatory Division, which apart from their other regular functions, are tasked to monitor and supervise the O&M of all seven Toll Roads to check their compliance with the O&M Manuals and other provisions of the TOA/STOA. Of the 15, nine are assigned to monitor and audit the operations aspects, including traffic control and toll collections, while six engineers are assigned to monitor and inspect the maintenance aspects. These personnel are required to enforce the measures needed to correct any deviations from the prescribed standards – e.g., long queues at toll plazas, potholes on the pavement – mostly decided on the spot, with follow up written instructions to the Toll Road Operators.

The TRB personnel are handicapped by their limited equipment (vehicles, communication systems, etc.) and budget. Monitoring by remote means – via radio and telecommunications - is not efficient because of the distances of these tollways.

The TRB seeks to conduct more frequent inspections and audits of the O&M, create more teams to do these, and upgrade its radio-telecommunications equipment. Aside from traffic volume audits, the TRB intends to undertake financial audits on toll collections. Ideally, for proper supervision, the TRB said that there should be at least be one chief resident TRB engineer for each Toll Road, apart from the central-based technical personnel.

While the TOA/STOA includes general provisions to address non-adherence to the contractual obligations of the Operators, in practice these are difficult to enforce and tend to be subject to discretion – as they mainly involve warning and in extreme cases termination - since there are no detailed guidelines on the sanctions that should be imposed on particular cases of non-compliance. Thus, there is a need for a specific schedule of KPIs to objectively measure compliance as well as a corresponding

schedule of calibrated sanctions and penalties for non-compliance with the O&M Manuals and other provisions of the TOA/STOA. These schedules should be embedded in the TOA/ STOA/Toll Concession Agreement.

There is no regulation on overloading issued by the TRB, but the expressways have implemented their own rules and procedures against overloading based on the provisions of the MVUC Act (RA 8794) in order to protect their pavements and structures from premature damage due to excessive truck loads. As mentioned, the NLEX allows a maximum of 13.5 tons per axle as prescribed by the MVUC Act, while the SLEX permits a maximum of 45.0 tons of gross vehicle weight and 13.5 tons per axle. Both Toll Roads use the conventional stop-and-weigh machines to determine if trucks are overloaded. On the other hand, the Skyway does not allow Class 3 trucks on its viaduct because it might unduly raise the maintenance cost and these trucks are very slow and old.

According to the TRB, there are no operational weigh-in-motion (WIM) facilities on existing Toll Roads that allow the non-stop passage of vehicles while measuring their loads.

The TRB, however, has plans to implement the truck anti-overloading laws. For example, it is considering to require the Toll Road Operators, as part of the proposed new common O&M standards, to provide and operate WIM machines or similar devices to weigh trucks with minimum disruption to traffic. As stated in **Annex 4.5.5**, as part of the proposed reform of the entire enforcement regime against truck overloading, there is also a need to standardize across all Roads – non-toll and toll roads – the weight limits to be used to enforce anti-overloading, and to provide for the deputation of non-government private individuals, e.g., Toll Road staff.

4.5.7 Road User's Viewpoint

Many studies, papers and reports have been prepared and published concerning the views of road users with regard to the traffic problems in Metro Manila that they experience as well as measures that they offer to relieve the situation.

One such paper, which deserves close attention because of its incisive analysis, was authored by Michael Brown, a retired law enforcement officer and long time resident of Metro Manila, and was posted in the internet on April 12, 2011. From his point of view as a road user and former enforcer, the major issues on traffic enforcement in Metro Manila are summarized below:

- Lack of driver discipline and weak enforcement. *The average driver is not disciplined and does not feel bound by the rules of the road. Those rules exist but enforcement is weak. Enforcers loosely manage the general flow of traffic, but ignore most violations. As a result ..., drivers believe they have the freedom to disregard regulations and*

drive aggressively, which in turn creates a competitive environment where drivers feel they need to disregard regulations and drive aggressively. It's a 'law of the jungle' environment which, in the absence of effective enforcement, leaves each driver both fending for himself and deciding for himself how to interact with the network... Order simply does not exist on Metro Manila roadways ... because it is not enforced.

- Need for behaviour control and self-compliance. *In terms of sheer cost effectiveness, the first-stage solution to Manila traffic congestion lies, not in increased capacity, but in behavior control. The current traffic management mind-set in Metro Manila places absolutely no responsibility on drivers to self-comply with traffic rules.*

    - *Enforcers use a 'cattle-herding' approach (focusing almost exclusively on public buses), resulting in a semblance of order **only** when an enforcer is present and actively engaging with drivers. This 'catch me if you can' approach simply cannot effectively control the behavior of more than a million aggressively-driven vehicles.*

    - *To create a disciplined, ordered traffic environment, it is necessary to place the primary responsibility for compliance squarely on the shoulders of the drivers... Drivers simply must be forced to obey traffic regulations on their own.*

- Need to strongly assert the rule of law. *The enforcers, with little training and less motivation, do only what is necessary to keep the flow moving. As long as traffic is not in gridlock, everyone seems to think that nothing more can or should be done. The most effective method for encouraging compliance is deterrence, which can only be achieved through aggressive enforcement. Enforcers must actively work to detect violations of all types, and then take corrective action. If a certain behavior consistently results in a negative consequence, that behavior will change.*

- Lack of attention on all violations and on driver behavior *The average traffic enforcer seems to see himself as a kind of shepherd, loosely managing the general flow of traffic, but not concerning himself with the minutiae of individual driver behavior. Operating under the same 'this is how it's always been' paradigm as most drivers, traffic enforcers simply do not notice, or act on, most violations. There seems to be a short list of preferred violations that do attract their attention, including driving through a red light, number coding violations, and public bus loading/unloading violations, but most other behaviors do not even warrant a stern look. Turning from a non-turn lane, driving without headlights, and pedestrians standing (in crowds) in the roadway are simply 'the way it works.' Traffic management authorities also operate under this mind-set.*

- Inadequate management of ticketing and fines. *The seemingly mundane traffic ticket is, in fact, a very effective tool for deterrence. It's not necessary, or even desirable, to catch and cite all violators. What is more important is to create an environment wherein non-compliance results in the certainty of penalty. The entire traffic enforcement system is already in place. It's just not being managed properly. The idea that a violator can just throw a ticket away, and get a replacement driver's license by claiming he lost the original, should be unacceptable. And the fact that a properly issued traffic ticket can disappear in that process should be equally unacceptable. This is a simple administration issue.*

- Congestion due to public utility vehicle behaviour. *The aggressive driving behavior of public bus and jeepney drivers is a major contributor to congestion on Metro Manila roadways. Operating in competition, public buses race each other from one loading point to the next, each trying to capture the largest share of passengers. As the biggest vehicles on the road, bus drivers routinely operate with utter disregard for the presence of other, smaller vehicles.*

    - *Public bus drivers operate ... to (a) complete the loading/unloading process, and move to the next stop, as quickly as possible ... stopping (or only slowing down) to load/unload while still in the flow of traffic ... cutting into the line of other buses waiting at a stop ... maneuvering out of a line of stopped buses ahead of turn ... each of (which) creates a chokepoint that disrupts the free flow of traffic ... (b) linger at a stop, waiting for additional passengers ... (which) creates chokepoints ... (c) block other buses at loading points ... to prevent the competition from moving ahead to the next stop ...*

    - *It is often mentioned that this type of competitive behavior is a result of the commission-based salary scheme for bus drivers ... To address this specific concern, government has now implemented a fixed-salary requirement ... While this is an important step, it's unlikely to produce the desired result. Competition for passengers is driven by the bus companies, rather than the drivers alone. And the fixed-salary scheme ... includes a "performance" element, partially based on number of passengers carried. In the end, drivers will continue to compete for passengers to increase their earnings.*

    - To improve traffic safety and efficiency, *there is a need for aggressive and consistent enforcement of (a) bus lanes,* even if only one lane, with buses required to operate *in a single file within that lane, and (b) queuing discipline at bus stops.*

    - *Any bus, observed to be violating the guidelines ... should be directed to the side of the road and issued a traffic ticket without a second thought. During the traffic*

stop procedure, the driver's license, along with the vehicle's registration and insurance documents, should be examined, and, if warranted, the vehicle should be inspected for safety equipment violations. After issuing the ticket, the bus should then be allowed to proceed. This will not be a quick process for the driver, and the risk of a lengthy delay may serve to motivate driver compliance with the rules outlined here.

- *For violations involving driver behavior, the driver should be the subject of the ticket, but ... hold employers accountable as well. For violations involving equipment or documentation, the bus owner should be fined. For tickets to be effective in motivating compliance, accumulated violations must result in loss of driving privileges for drivers, and must be cause to deny a bus owner's application for renewal of operating permit.*

- Congestion factor due to turn-lane behaviour. *Turn-lane discipline is spotty at best. It is common to see all (or most) straightaway lanes blocked by vehicles waiting to turn. The chokepoints created by this behavior cause considerable congestion as straight-moving vehicles try to squeeze through a reduced number of straightaway lanes. Turn-lane chokepoints occur for one of two reasons: (a) poor driver planning ... and (b) simple lack of discipline ... Traffic enforcers try to decongest these chokepoints by directing violators to continue the turn, often ahead of those waiting in proper turn-lanes. In effect, violators are rewarded by being allowed to bypass the line. This is a counter-productive enforcement strategy.*

- Congestion due to intersection behaviour. *Naturally frustrated by a long wait, drivers at the head of the line often attempt to cross through the intersection even after being directed to stop. Unable to cross completely, they find themselves sitting in the middle of the intersection, blocking the path of the newly crossing traffic. Cross-traffic must now navigate around this chokepoint, forcing many drivers to wait an additional cycle... This causes cascading congestion on the roads leading to intersections... This particular problem results from the simple fact that intersection discipline has never been truly enforced on Metro Manila roadways.*

  - *Signal-lights must be properly timed and maintained, and enforcers must be properly trained in traffic control techniques... It is common to see as many as 4 or 5 enforcers manning a large intersection, with each enforcer handling the flow from a single direction. This is the same 'cattle-herding' strategy used in managing buses at loading points. And, as with buses, it places no responsibility on the drivers for self-discipline. It also wastes resources (enforcers) that could be used elsewhere.*

- *Although there are certainly times when human intervention is needed at an intersection, it should not be common practice. Drivers must be trained to comply with automated traffic signals (as well as with the instructions of live enforcers), and again, the best way to do this is through consistent ticket-based enforcement. This will initially require teams of enforcers, performing two distinct tasks. One group should direct traffic in the intersection, while the second group detects and cites violators. Acting with zero-tolerance, the citation team should stop drivers and issue tickets for any and all intersection violations. As explained earlier, the idea is to shift the responsibility for order and compliance onto the shoulders of the drivers.*

- Congestion due to pedestrian behaviour. *Pedestrians are largely ignored by enforcers... Enforcers do not stop traffic to allow pedestrians to cross safely ... Pedestrians crossing against a red crossing light, or through moving traffic, are never stopped by enforcers... Pedestrians are also ignored by drivers... Crossing in a marked cross-walk is no safer ... vehicles simply do not yield to pedestrians... Not denying the fact that pedestrians are generally undisciplined with regard to traffic, this lack of protection must also be recognized as part of the reason for their non-compliance. Pleas from authorities for discipline, and even the inherent risks associated with crossing at non-designated points, will not change the behavior of pedestrians who feel they have no safe alternative. Passengers waiting in large numbers for public transportation constitute another congestion-causing problem... crowds standing in the actual roadway, blocking one or more lanes ... One of the main causes of this behavior is the fact that buses and jeepneys do not move to the edge of the roadway when stopping to load and unload passengers.*

- Need for active enforcement focused on behavior-based congestion. *Behavior-based congestion ... can be significantly reduced much more quickly and at a much, much lower cost than volume-based congestion... Enforcers are already employed and equipped, but they are not being utilized effectively. Active enforcement, backed by a properly managed system of tickets and penalties, will result in order. And that order will result in improved efficiency, safety and civility. Improving the efficiency of the flow, through the simple act of enforcing traffic laws and procedures, is the logical first step ... before spending billions of pesos on construction projects that may have little permanent effect on the problem they are intended to solve.*

4.5.8 Summary of Issues and Problems

From the discussions in **Annex 4.5.1 to 4.5.7**, the main issues and problems concerning the enforcement of traffic and transport-related laws and rules in Metro Manila may be synthesized as follows:

- Overlapping enforcement powers and functions

  - Based on its charter (RA 7294), the MMDA can enforce all traffic laws and regulations in Metro Manila, covering National and Local Roads. On the other hand, pursuant to the Local Government Code, LGUs in Metro Manila can regulate the use of all streets and regulate traffic on all streets – City and National. At the same time, the LTO is authorized to enforce the provisions of the Land Transportation and Traffic Code (RA 4136) throughout the country – on both Local and National Roads.

  - Although the powers and functions of these agencies overlap, they have reached an informal working agreement delineating their enforcement functions as follows:

    - The MMDA concentrates on selected major National Roads.

    - The LGUs focus on Local Roads.

    - The LTO may enforce traffic laws and rules anywhere, and deputize enforcers of the MMDA, PNP, and other agencies. The LTO also allows the MMDA and LGUs to confiscate drivers' licenses even if it believes that this is LTO's sole power.

    While this arrangement is currently working, it is the result of *ad hoc* consensus among the agencies. Hence, it may be legally challenged or modified anytime, especially with changes in administration and/or policies of the agencies.

- Basic traffic rules

  - The LTO and the MMDA use the provisions of RA 4136 (LTTC) as the basis of their enforcement activities. On the other hand, the LGUs employ the Uniform Traffic Management Code (TMC) covered by specific city/municipal ordinances as their guide for enforcement. The LTTC and the TMC are substantially similar in terms of basic regulations and areas of enforcement.

  - The LGUs and the MMDA, however, differ in their schedules of fines and penalties and in their OVR forms. There are also differences in the application of special rules among the LGUs and the MMDA - e.g., windows under the number coding scheme, truck ban exemptions.

  - The MMDA and all LGUs in Metro Manila, however, are close to reaching an agreement that will harmonize their ticketing system, including the schedule of fines and penalties and the use of standard and accountable OVR forms.

- To effectively implement the anti-truck overloading regulations, there is a need to harmonize the current standards in determining overloading – viz., prescribed GVW based on manufacturer's specifications, GVW as registered with the LTO, and axle load – and to enforce the harmonized standards in all roads, both ordinary and toll roads. There is also a need for the TRB to enforce toll road standards that require the use of WIMS or similar devices to weigh trucks. The DPWH should immediately augment and make operational its weighbridges, man them with trained personnel and enforcers, and, in the longer term, consider outsourcing weighbridge operations including anti-overload enforcement.

- <u>Nature and quality of enforcement</u>

  - While the LGUs adopt the same TMC, the actual level and quality of enforcement of the traffic rules therein appears to vary significantly among LGUs, as shown n the Pasig and Pasay cases.

    - For example, Pasig appears better organized and has proportionally more and better enforcement facilities than Pasay, e.g., traffic signals, motorcycles, License Redemption Center, CCTV cameras, and traffic control center.

    - Pasay, however, has required each of its enforcers to carry a handy TMC booklet for ready reference by the enforcer and motorists. Pasig does not have this requirement.

    - There appears to be a greater degree of discretion by enforcers in citing violations and fines in Pasay than in Pasig, e.g., negotiating for lighter offenses and fines than actually applicable.

    - Reports of *kotong* appear to be less prevalent in Pasig than in Pasay.

  - Both Pasig and Pasay concentrate on "moving" violations, and the most frequent cited are those against the TMC rules requiring obedience to traffic control signals and signs.

  - Both LGUs also give special attention to the regulation of public utility vehicles. The most common offenses cited are loading and unloading outside designated areas, *colorum* units, and out-of-line operations by buses, jeepneys, and AUVs.

  - The MMDA enforcers place higher priority in getting the traffic to move fast on major thoroughfares, particularly during peak hours – than in apprehending offenders which would only add to the congestion.

- Weak enforcement to address behavior-based congestion

  - Many drivers are not disciplined and do not feel governed by traffic rules. While those rules exist, their enforcement is weak. Traffic enforcement does little to make drivers self-comply with the rules. Order in traffic is hard to come by because it is not enforced properly.

  - Many enforcers act as shepherds, lightly managing the traffic flow, and disregarding driver behavior. This approach creates some order only when the enforcer is around and actively engaging with drivers. Enforcers do not act on most violations.

  - There is a need to make drivers primarily responsible for compliance with traffic rules. They must be motivated to obey traffic regulations on their own. The most effective method to encourage compliance is deterrence, through aggressive enforcement.

  - Ticketing and fines are not properly managed. The traffic ticket is a very effective deterrence. Strict ticketing and imposition of fines will create an environment wherein non-compliance results in the certainty of penalty.

  - Congestion is caused by (a) aggressive driving behavior of public bus and jeepney drivers, (b) improper turn-lane behaviour, (c) poor intersection behaviour, and (d) disorderly pedestrian behaviour.

  - The MMDA enforcers consider their primary duty to be traffic direction and control in order to achieve orderly, fast and safe travel. Thus, during peak hours, the enforcers give higher priority to making the traffic move fast, than to apprehending traffic violations which would only add to congestion.

- Subjectivity in enforcement

  - Despite the specific TMC provisions, some enforcers exercise their discretion and judgment in determining the type of violations and sanctions to be cited, and their decision is subject to negotiations with the motorists concerned. This practice is fraught with likely corruption.

  - This situation exists as enforcement is heavily done by manual means.

- Inadequate enforcers and facilities

    - MMDA and LGU enforcers are insufficient in number, need permanency in tenure, and have to be better screened and trained. They are also poorly compensated.

    - To address the *kotong* and other corrupt practices, aside from modernizing enforcement systems and upgrading compensation, there is a need for a sustained moral reformation program to inculcate proper values and self-discipline among the enforcers.

    - Basic enforcement facilities of the LGUs – e.g., two-way hand-held radios and motorcycles – must be augmented to improve efficiency in enforcement.

    - To complement the manual means of enforcement by the LGUs and the MMDA, more traffic signals need to be deployed at major intersections, and existing non-functioning ones have to be repaired or replaced. More CCTV cameras need to be installed, and each LGU must have a properly equipped traffic control center. In the medium- and long-term, a suitable ITS is essential to facilitate enforcement.

    - The TRB is handicapped in enforcing the standards in the TOA/STOA by its limited staff, facilities, and budget. The TRB personnel and other se resources must be reinforced to enable them to perform asequate technical and financial audits of the Toll Roads vis-à-vis the O&M Manuals and other provisions of the Concession Agreements.

- Difficulty in providing accurate and real-time traffic information

    - While the MMDA has successfully introduced the use of the internet, mobile applications, and related technologies to disseminate to the public traffic information on selected National Roads, the collection and evaluation of daa on traffic conditions – e.g., congestion levels - are still largely manual and subjective, based on the judgment made by roadside enforcers, visual monitoring through feeds from CCTV cameras, and information from the public, as monitored by the MMDA Metrobase. The MMDA intends to upgrade and expand ITS applications to provide precise and teal-time traffic information to the motorists and commuters. Priority will be given to improved bus management to track and control bus locations, routes and schedules, among others.

    - At the LGU level, Pasig operates some multi-purpose CCTV cameras and a Communication Command and Control Center, but the traffic information is also

inadequate and subjective and is used mainly for internal purposes and not for public dissemination. Pasay has neither CCTV cameras nor a traffic control center.

- Lack of connectivity of agency databases

  - The enforcement agencies - LTO, LTFRB, MMDA, LGUs, and TRB - find a strong need to provide on-line interconnection of their traffic and transport databases as well as to be linked with the databases of public utility operators, Toll Road companies, and the DPWH.

  - If realized, this data interconnectivity will enable the agencies to automatically interface and cross-check records on licenses, vehicle registration, franchises, bus/jeepney routes and schedules, traffic violations, penalties, and the like, in order to facilitate the enforcement of traffic laws and regulations, and reduce opportunities for irregularities.

The crafting and planning of an appropriate ITS for Mega Manila will carefully consider the measures needed to address and overcome the outstanding issues and weaknesses in enforcement identified above, with a view to creating a feasible system that will promote safer, faster, predictable, and more efficient mobility in the region.

Annex 6.1 ITS APPLICATIONS IN OTHER COUNTRIES

6.1.1 General

As to the ITS development conditions in other countries, the situation of Japan, Vietnam, United States of America, and European Union are shown below. Each ITS development condition describes the development policy of ITS, promotion organization, and user service of each country.

6.1.2 ITS Applications in Asian Countries

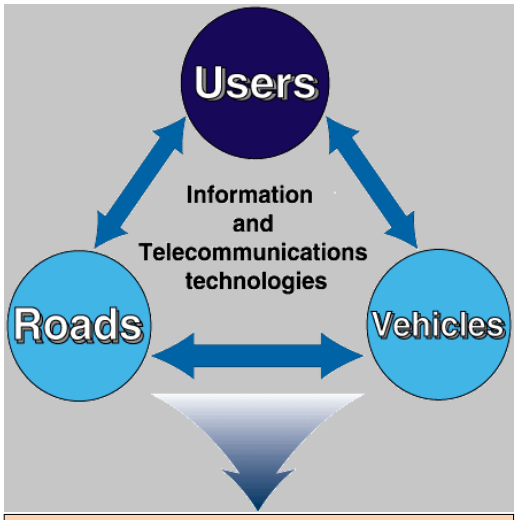
6.1.2.1 ITS in Japan

(1) Concept of Japanese ITS

ITS is a new transport system which is comprised of an advanced information and telecommunications network for users, roads and vehicles. ITS contributes much to solving problems such as traffic accidents and congestions.

ITS consists of nine development areas such as advances in navigation systems, electronic toll collection system, assistance for safe driving and so forth.

ITS is appreciated as one of the most promising multimedia businesses, and the potential market is estimated at about 50 trillion JPY.



Source: MLIT (Ministry of Land, Infrastructure, Transport and Tourism)

FIGURE 6.1-1 CONCEPT OF JAPANESE ITS

(2) Development Area and User Services

Japan's ITS is involved in nine development areas in the ITS-services. These areas are the following:

- Advances in navigation systems
- Electronic toll collection systems
- Assistance for safe driving
- Optimization of traffic management
- Increasing efficiency in road management
- Support for public transport

- Increasing efficiency in commercial vehicle operations
- Support for pedestrians
- Support for emergency vehicle operations

In order to classify the information and functions necessary for ITS services, 21 user services in 9 development areas were divided into 56 specific user services, and then into 172 specific user sub-services thus comprising a whole system of user services in Japan (almost the same as the United States). The nine development areas are shown below.

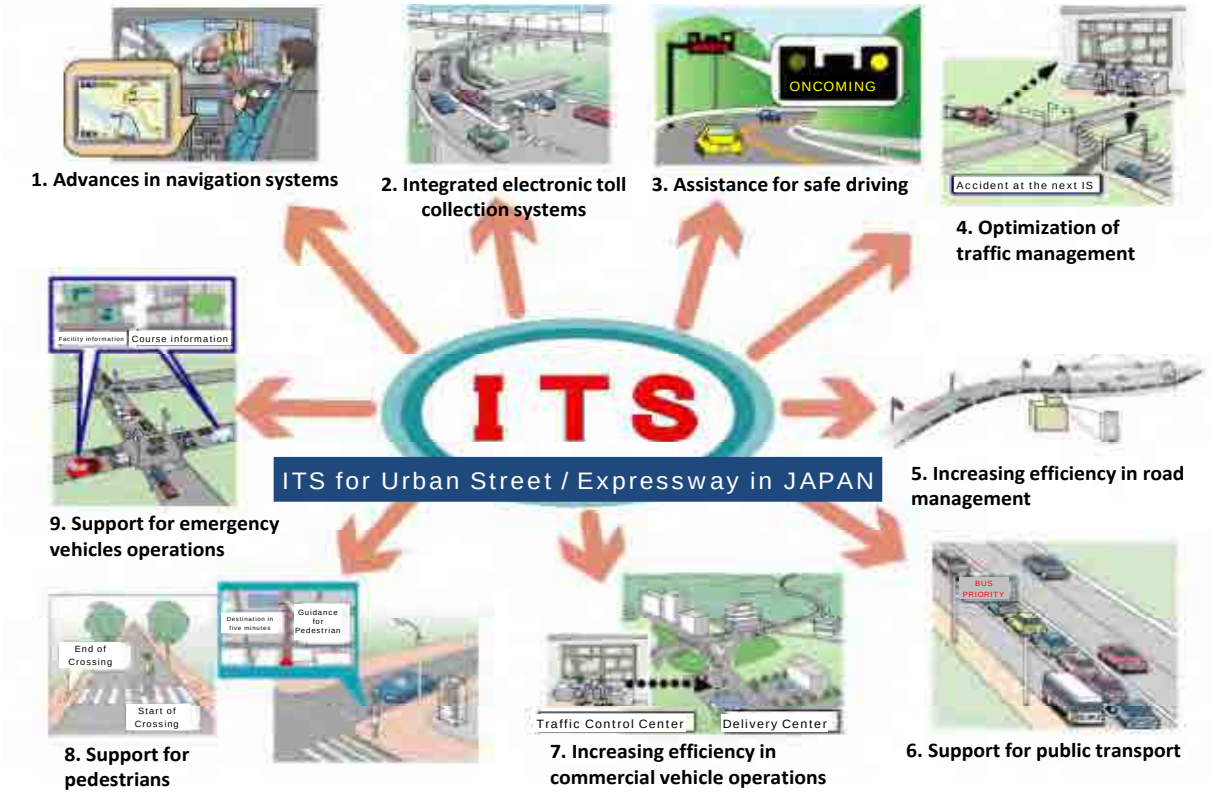


FIGURE 6.1-2 ITS DEVELOPMENT AREA

(3) ITS Development and Deployment Milestones

ITS is an advanced information network system for road traffic indispensable to the national lifestyle. Thus, in accordance with its deployment, Japan's standard of living is expected to improve greatly in all phases of transport safety and amenities. The relation between ITS and the national lifestyle in the 21st century is assumed as described below.

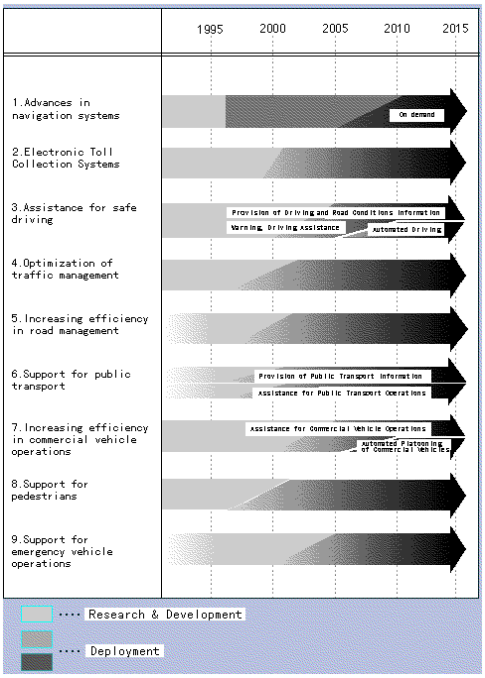


FIGURE 6.1-3 TIME-TABLES FOR THE DEPLOYMENT OF ITS IN JAPAN

- First Phase (around 2000)

"Service Start of Part of Leading Systems Including the Navigation System" -- Beginning of ITS

In this period, which is the initial stage of ITS, traffic information will be distributed via VICS and similar systems which have already begun service. Traffic congestion information and optimum routes will be displayed on the in-vehicle navigation system so that the driver can achieve pleasant travel including travel time reduction. In the last half of the first phase, electronic toll collection will be started so that traffic congestion at the tollgate will begin to be eliminated.

- Second Phase (around 2005)

"Start of User Services" -- Traffic System Revolution

In this period of the 21st century, user services of ITS will be introduced gradually, starting a traffic system revolution. Information distributed to the users by ITS will include service information and public transport information about the destination, which will have enhanced content to further improve the user services. For example, when a trip is being planned, a destination that meets the stated needs and requests of the user is retrieved such that the optimum route and transport facilities up to the destination can be easily selected by considering travel time and other important factors.

The number of traffic accidents on the expressways and ordinary roads will be reduced by supporting the driver's safe driving and improving the pedestrian's safety. If a traffic accident occurs, quick notification and proper traffic restrictions will prevent further damage. Quick response of emergency and rescue activities will save the life of a person who would have not survived in the traditional situation.

On the other hand, the fixed-schedule character of public transport organizations will be

maintained and information services will be enhanced to greatly improve the convenience of public transportation. An attempt will be made to improve the efficiency of transactions concerning transport operators so that the nation will benefit from reduced logistics costs.

- Third Phase (around 2010)

"Advances in ITS and Enhanced Social System" -- Automated Highway Systems- Realization of a Dream

In the third phase, ITS is advanced to a higher level. As well as the spread of infrastructure and in-vehicle equipment, legal and social systems will be enhanced to firmly establish ITS as a social system, so that the effects will be nationwide. With the realization of further advanced functions, automated driving will be started for full-scale service; the inside of the vehicle will be a safer and more pleasant place.

- Fourth Phase (after 2010)

"Maturity of ITS" -- Innovation of Social Systems

In the fourth phase, which is the final period of this project, all systems of ITS will already have been deployed. A full-scale advanced information and telecommunications society will be established with the nationwide optic fiber network and innovative social systems.

In this period, the number of automated driving users will have started to increase such that automated driving will be established as a general system. ITS will come to a period of maturity and be accepted by the nation as a basic system pertinent to road and other means of transport. With full-scale ITS deployment, it is expected that the number of deaths caused by traffic accidents will greatly decrease from that of the present in spite of increased traffic volumes and density. All roads including those within cities will have less traffic congestion, enabling pleasant and smooth travel. In addition, a reduction in business traffic will enable harmonization with the roadside environment and the global environment.

(4) Promotion System of Japanese ITS

In Japan, four governmental bodies concerned with ITS, namely, the Ministry of Land, Infrastructure and Transport (MLIT), National Police Agency (NPA), Ministry of Internal Affairs and Communications (MIC), and Ministry of Economy, Trade and Industry (METI), are involved in promoting ITS under the Strategic Headquarters for the Advanced Information and Telecommunications Network Society (IT Strategic Headquarters), which is spearheading the IT revolution in Japan. The IT Strategic Headquarters was established in January 2001, headed by the Prime Minister and the decisions including the Promotion of ITS made by the former Advanced Information and Telecommunications Society Promotion Headquarters, which was set up in 1994, are carried over to the IT Strategic Headquarters. In addition, the four governmental

bodies also collaborate in the promotion of ITS with ITS Japan, which is an industry-academic ITS promotion organization, and ITS Standardization Committee that promotes international standardization of ITS.

The Organizational structure for promoting ITS in Japan is shown below.

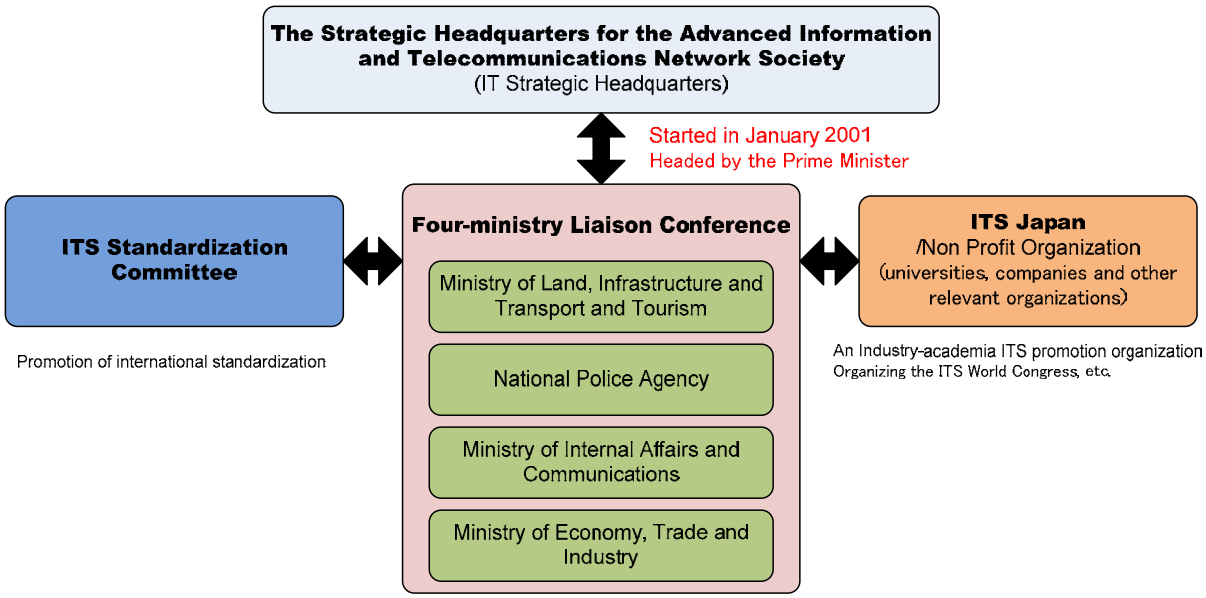


FIGURE 6.1-4 ORGANIZATIONAL STRUCTURE FOR PROMOTING ITS

TABLE 6.1-1 DETAILED DEFINITION OF USER SERVICES OF JAPAN'S ITS (1/3)

Development Area	User Services	Specific User Services	Specific User Sub- Services
1 Advances in Navigation Systems	1) Provision of route guidance traffic information	(1) Provision of route guidance information to drivers	1 Provide optimum route information
			2 Provide road traffic information
			3 Provide required travel time when congested
			4 Guide along with the selected route
			5 Exchange information between running vehicles
		(2) Provision of information on other modes of transportation to drivers	6 Provide information on other modes operations
			7 Provide information on parking availability
			8 Reserve Parking lot
			9 Provide information on availability of otherpublic transportation service during emergency
		(3) Advance provision of route guidance information	10 Provide optimum route information in advance
			11 Provide traffic road information in advance
		(4) Advanced provision of information on other modes of transportation	12 Provide information on other modes of transportation operations in advance
			13 Provide information on parking availability in advance
			14 Reserve parking lot in advance
	2) Provision of destination related information	(5) Advanced provision of destination related information	15 Provide detailed information and reservation on destination and reservation on destination facility and others in advance
			16 Provide information on the facility of destination available for the disabled, the elderly and small children and others
		(6) Provision of destination related information for drivers and others	17 Provide detailed information and reservation on the facility of destination and others
			18 Provide information on the facility of destination available for the disabled, the elderly and small children and others
			19 Provide weather information on the given area
		(7) Provision of destination-related information at service areas, parking areas and others	20 Provide detailed information and reservation on the facility of destination and others at service area etc
			21 Provide information on the facility of destination for the disabled , the elderly and small children and others at service area etc
			22 Provide weather information on the given area at service area and others
2 Electronic toll collection systems	3) Electronic toll collection	(8) Electronic toll collection on toll roads	23 Collect toll electronically on toll roads
			24 Collect motorcycle tolls electronically
			25 Collect tolls of the disabled electronically on toll road
			26 Issue receipts in various way
		(9) Electronic charge of fare collection of parking lot, ferry and others	27 Collect parking charges electronically
			28 Collect the charges for roadside parking electronically
			29 Collect fares for ferry and car-train electronically
3 Assistance for safe driving	4) Provision of driving and roadconditionsinformation	(10) Provision of information on road conditions	30 Provide weather information
			31 Provide information on road surface condition
			32 Provide information on road alignment
		(11) Provision of information on vehicles in the vicinity and others	33 Provide information on obstacles ahead and behind
			34 Provide information on vehicles passing in another lane
			35 Provide information on intersection in city
			36 Provide information on vehicles in the vicinityon expressway
			37 Provide information on railroad crossing
			38 Provide information on traffic signals and others
	5) Danger warning	(12) Danger warning of vehicles ahead and others	39 Warn of danger due to road alignment and others
			40 Warn of danger due to vehicles ahead and following
			41 Warn of danger due to obstacles and pedestrians
		(13) Danger warning of vehicles in neighboring areas and others	42 Warn of danger due to changing lanes
			43 Warn of vehicles lane departure
		(14) Danger warning of vehicles crossing ahead and others	44 Warn of danger at intersection
			45 Warn of danger at merging or demerging section
		(15) Danger warning of condition of drivers or vehicles	46 Warn a driver of danger
			47 Warn vehicles in the vicinity of danger
	6) Assistance for driving	(16) Assistance for driving againstdanger due to vehicles ahead and others	48 Assist driving against danger due to road alignment and others
			49 Assist driving against danger due to vehicles ahead and following
			50 Assist driving against danger due to obstacles or pedestrians
			51 Assist driving to maintain space with a leading vehicles and to maintain specified speed
			52 Assist stopping vehicles during emergency stops
		(17) Assistance for driving against danger due to vehicles in neighboring areas	53 Assist driving when changing lanes
			54 Assist driving when changing lanes
		(18) Assistance for driving against danger due to vehicles crossing ahead and others	55 Assist driving at intersection
			56 Assist driving at merging or demerging
		(19) Assistance for driving against in driver's unusual situations	57 Assist drivers when driving in abnormal conditions
	7) Automated highway systems	(20) Automated cruise of general vehicles	58 Cruise automatically in dedicated lane
			59 Cruise automatically when congested
			60 Cruise automatically through a long tunnel
			61 Cruise automatically in harsh weather
			62 Park automatically in parking lot
		(21) Automated cruise of service vehicles	63 Cruise services vehicles automatically
			64 Cruise snowplow automatically

TABLE 6.1-2 DETAILED DEFINITION OF USER SERVICES OF JAPAN'S ITS (2/3)

Development Area	User Services	Specific User Services	Specific User Sub- Services
4 Optimization of traffic management	8) Optimization of traffic flow	(22) Assistance for traffic management	65 Assisttraffic management planning for wide area
			66 Traffic management planning for local area
			67 Assist decision-making process on traffic management
			68 Collect and provide basic information on traffic demand management
		(23) Assistance for traffic management and traffic management facility operations	69 Analyse and evaluate traffic restriction plans
			70 Assist operation and maintenance of traffic control facility
			71 Assist design and installation of traffic control facility
			72 Assist advancement for road usage approval operation
		(24) Assistance for parking policy and others	73 Provide guidance to parking lots
			74 Conduct traffic control suitable for residential zone
			75 Assist efficiency of illegal parking enforcement
			76 Assist parking control plan
			77 Controltrafficto maintain environment along roads
		(25) Advancement of driver assistance	78 Advance driver assistance
			79 Assist in planning and recording of vehicles operations
		(26) Assistance for police activities	80 Discover and retrieve the theft vehicles
			81 Improve management of police vehicles
			82 Assist police activities
		(27) Maintenance of traffic order	83 Improve conducting after accident procedure
			84 Advance analyzation of accident results
			85 Make Operational recording automatically
			86 Detect, warn and prevent dangerous driving control
		(28) Optimization of traffic signal control	87 Control traffic signal at an intersection
			88 Control traffic signal at arterial roads
			89 Control wide-area traffic
			90 Control traffic signals at railroad crossing
			91 Control corresponding to a lane
		(29) Route guidance	92 Guide to a routecorresponding to the needs to trafficmanagement
			93 Guide to a lane corresponding to a vehicle type
		(30) Dynamic lane control	94 Reversible lane control
			95 Control bus lane dynamically
			96 Control bicycle lane dynamically
			97 Control lanes allowed for parking
			98 Control one-way driving dynamically
	9) Provision of traffic restrictioninformation in case of incident	(31) Assistance for trafficmanagement under usual conditions	99 Manage traffic when disaster occurs
			100 Manage traffic under atypical traffic conditions
			101 Manage traffic under usual weather
			102 Manage traffic under atypical traffic conditions
5 Increasing efficiency in road management	10) Improvement ofmaintenance operations	(32) Assistance for roadmanagement works	103 Assist traffic survey
			104 Assist road maintenance inspection
			105 Assist environmental maintenance along road
			106 Provide information on road maintenance
		(33) Improvement of road management works	107 Collect information on road surface
			108 Assist service vehicles operations
		(34) Optimization of implementing traffic restrictions	109 Collect information on unusual weather and disaster
			110 Assist decision-makingon implementing traffic restrictions
			111 Assist decision-making on lifting oftrafficrestrictions
		(35) Improvement of efficiency in disaster restoration	112 Assist collecting information when disaster occurs
			113 Assist vehicles allocation for disasterrestoration
			114 Provide road traffic information when restoring
	11) Management of specially permitted commercial vehicles	(36) Management of specially permitted commercial vehicles and others	115 Improve approval works for specially permitted commercial vehicle
			116 Provide route information available for vehicles operations
			117 Monitor overloaded vehicles operations
		(37) Collecting information on dangerous load vehicle operations	118 Collect information on dangerous load vehicle operations
	12) Provision of roadway hazard information	(38) Provision of roadway hazard information	119 Provide information on traffic restrictions and lifts
			120 Provide information on bypass
6 Support for public transport	13) Provision of public transport information	(39) Provision of information on public transport operations or other transit transfer	121 Provide information on public transport in advance
			122 Provide information on public transport en route
			123 Provide information on other public transportation service while on board public transportation
			124 Provide information on delay or accidents ofpublic transport
		(40) Assistance for taxi and on demand bus use	125 Assistance for bus use on demand
			126 Assistance for taxi use
	14) Assistance for public transport operations and operations management	(41) Implementation of priority passing for public transport	127 Provide signal priority to bus and tram
			128 Monitor operations on dedicated lanes such as for a bus
		(42) Provision of public transport operations and others	129 Provide road traffic information and others
			130 Provide information on public transportoperations
			131 Provide information on emergency occurrence on transit
			132 Provide information on expressway bus users

TABLE 6.1-3 DETAILED DEFINITION OF USER SERVICES OF JAPAN'S ITS (3/3)

Development Area	User Services	Specific User Services	Specific User Sub- Services
7 Increasing efficiency in commercial vehicle operations	15) Assistance for commercial vehicle operations management	(43) Provision of information on commercial vehicle operations and others	133 Provide commercial vehicles with road traffic information and others
			134 Provide information on commercial vehicles operations
			135 Provide information on commercial vehicles emergency when occurs
		(44) Provision of freight information	136 Providefreight information
		(45) Provision of operation information on other modes	137 Provide information on other modes of transportation operations
	16) Automated platooning of commercial vehicles	(46) Automated platooning of commercial vehicles	138 Implement platooning of truck
			139 Implement platooning of truck on the dedicated lane
8 Support for pedestrians	17) Pedestrian route guidance	(47) Provision of information on pedestrian facilities routes and others	140 Provide information on pedestrian self-location and facility location
			141 Provide information on pedestrian route along to the given destination
			142 Provide information on pedestrian refuge places
		(48) Pedestrian route guidance	143 Provide guidance to pedestrians to the given destination
			144 Provide guidanceto the visually impairedto avoid dangerous locations
			145 Provide guidance to wheel chair users
	18) Vehicle – pedestrian accident avoidance	(49) Ensuring pedestrian safety by traffic signal control	146 Provide longer green lights and information on waiting time and traffic signal colors
		(50) Ensuring safety of pedestrian andothers in cooperation with vehicles	147 Warn pedestrians of approachingvehicles and others
			148 Restrict speed of vehicles concerning pedestrians
			149 Provide pedestrian with information on approaching train at railroad crossing
			150 Ensure safety passing of the wheelchair users
		(51) Provision of information on location of pedestrian and others	151 Provide pedestrian emergency notification automatically
			152 Provide information on current location of the elderly and others automatically
9 Support for emergency vehicles	19) Automated emergency notification	(52) Emergency notification	153 Notify of disasters and accidents
			154 Notify vehicles in the vicinity of accidents
	20) Route guidance for emergency vehicles and support for relief activities	(53) Guidance for emergency vehicles and support for relief activities	155 Guide emergency vehicles along the optimum routes
			156 Control traffic signals for priority guidance of emergency vehicles
			157 Inform vehicles of an emergency vehicles approaching
			158 Manage emergency vehicles operations
			159 Assist vehicles for restoration and rescue works during disasters
-	21) Utilisation of advanced information enabled in the advanced and telecommunications society	(54) Utilisation of information in the advanced information and telecommunications society	160 Utilise information on shopping and amenities en route
			161 Access to the network information when travelling
			162 Utilize banking service information on board
			163 Utilise information on the sight-spot guidance
		(55) Utilization of information related to multi-modal transport	164 Warn train of danger due to rail-crossing
			165 Reserve on public transportation and use check-in serve en route
			166 Reservepublic transportation at home or office and use ticket issue service
			167 Reserve public transportation and use check-in service
			168 Utilize public transportation with cashless payment
		(56) Coordination of ITS functions with advanced information and telecommunications society	169 Utilize all-purpose transaction method including for toll roads
			170 Coordinate with the functions provided by facilities along routes
			171 Utilize information on emergency relief activity
			172 Assist for efficient logistics by EDI

In Japan, several systems, such as ETC (Electronic Toll Collection System), Bus Location System, and Area Traffic Control System etc., are already utilized among the above 172 services.

Moreover, Automated Cruise Systems have been tested on the expressways.

6.1.2.2 ITS in Viet Nam

(1) User services of Vietnamese ITS

The user services and their road-map of Vietnamese ITS are shown below. They consist of three stages proposed in the ITS Master Plan of VITRANSS2 to allow stepwise ITS implementation responding to progress of the expressway network construction, quantitative/qualitative changes in road traffic and changes in user needs.

ITS systems (equipment) are already installed in the urban area. (e.g., 1-1: Incident information by monitoring, 1-2: Traffic congestion information focusing on bottle-neck spots, and 2-1:. Non-stop toll collection at toll-island)

TABLE 6.1-4 DEFINITION OF USER SERVICES OF VIETNAMESE ITS

Development Area		User Services			
1	Traffic Information/Control	1-1	Incident information by monitoring	(1)	1st Stage -2015
		1-2	Traffic congestion information focusing on bottle-neck spots	(2)	1st Stage -2015
		1-3	Weather information	(3)	1st Stage -2015
		1-4	Traffic control assistance responding to incidents	(4)	1st Stage -2015
		1-5	Traffic congestion information continuously along the expressways	(5)	2nd Stage -2020
		1-6	Travel time information	(6)	2nd Stage -2020
		1-7	Traffic control assistance responding to incidents	(7)	2nd Stage -2020
		1-8	Automated incident identifivcation continuously along the expressways	(8)	3rd Stage -2030
2	Non-Stop Toll Collection	2-1	Non-stop toll collection at toll island	(9)	1st Stage -2015
		2-2	Center-to-center data exchange for non-stop toll collection	(10)	1st Stage -2015
		2-3	Non-stop toll collection on free-flow lanes	(11)	3rd Stage -2030
		2-4	Parking fee collection	(12)	3rd Stage -2030
		2-5	Integrated fee collection for park & bus-ride	(13)	3rd Stage -2030
		2-6	Center-to-center data exchange for park & bus-ride fee collection	(14)	3rd Stage -2030
3	Heavy Truck Control	3-1	Overloading regulation by automatic vehicle weighing	(15)	1st Stage -2015
		3-2	Center-to-center data exchange for overloading regulation	(16)	1st Stage -2015
		3-3	Heavy/hazardous-material truck tracking	(17)	2nd Stage -2020
		3-4	Center-to-center data exchange for truck tracking	(18)	2nd Stage -2020
4	Public Transportation Control	4-1	Public bus tracking informtion provision	(19)	2nd Stage -2020
5	Parking Control	5-1	Parking-lot information provision	(20)	2nd Stage -2020
6	Road Pricing	6-1	Coorperation with road pricing in urban areas	(21)	3rd Stage -2030

Source: VITRANSS2 by JICA

6.1.3 ITS Applications in Developed countries

6.1.3.1 ITS in United States of America

(1) ITS America

Intelligent Transportation Society of America (ITS America) was established in 1991 as a not-for-profit organization to foster the use of advanced technologies in surface transportation systems. It is the leading advocate for the development and deployment of Intelligent Transportation Systems (ITS) in the United States.

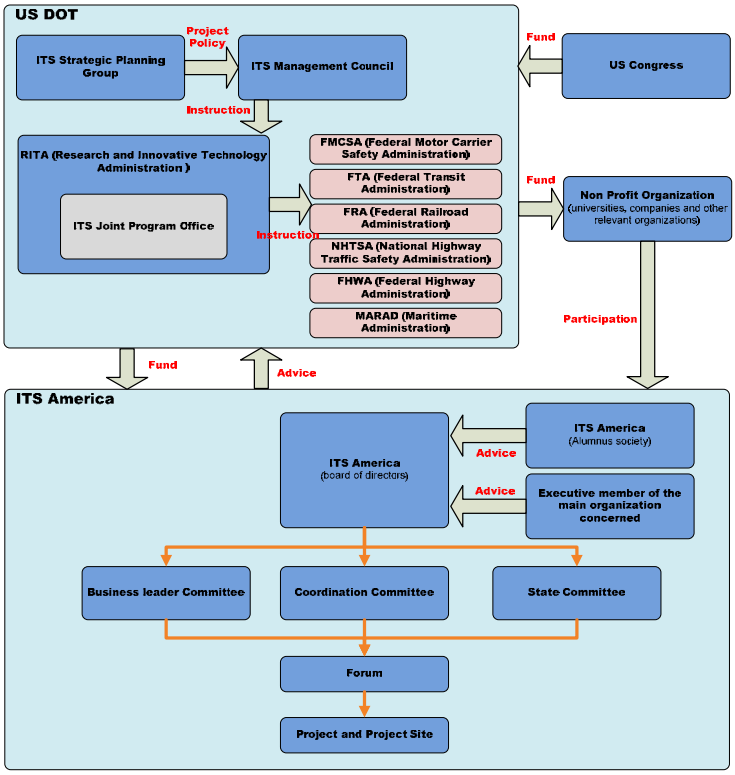


FIGURE 6.1-5 ORGANIZATIONAL STRUCTURE FOR PROMOTING ITS

ITS America's members include private corporations, public agencies, academic institutions and research centers involved in the research, development and design of Intelligent Transportation Systems technologies that enhance safety, increase mobility and sustain the environment.

(2) User services of USA's ITS

In the USA, ITS's user services are considered by a broad range of users, including the traveling public as well as many different types of system operators. User services, including the corresponding user service requirements, form the basis for the National ITS Architecture development effort.

The initial user services were jointly defined by USDOT and ITS America with significant stakeholder input and documented in the National Program Plan. The concept of user services allows system or project definition to begin by establishing the high level services that will be provided to address identified problems and needs. New or updated user services are continued to be satisfied by the National ITS Architecture over time.

In the United States of America, ITS service by the Internet has been developed throughout the country.

By 2005, ITS infrastructure (traffic signal control, traffic control on the expressways, public transport management, electronic toll collection, and emergency information provision, etc.) was installed in 75 cities.

Moreover, the development of VII (Integrated Telecom Infrastructure Deployment of the road transportation system) has progressed. The actual proof of a "Probe-Car" (car which transmits intermittently the running speed information and position information on vehicles, the weather bulletin through the operation of the wiper, etc. in a wireless network, etc.), DSRC, etc. is being carried out.

TABLE 6.1-5 DEFINITION OF USER SERVICES OF USA'S ITS

Development Area		User Services		
1	Travel And Traffic Management	1-1	Pre-trip Travel Information	(1)
		1-2	En-route Driver Information	(2)
		1-3	Route Guidance	(3)
		1-4	Ride Matching And Reservation	(4)
		1-5	Traveler Services Information	(5)
		1-6	Traffic Control	(6)
		1-7	Incident Management	(7)
		1-8	Travel Demand Management	(8)
		1-9	Emissions Testing And Mitigation	(9)
		1-10	Highway Rail Intersection	(10)
2	Public Transportation Management	2-1	Public Transportation Management	(11)
		2-2	En-route Transit Information	(12)
		2-3	Personalized Public Transit	(13)
		2-4	Public Travel Security	(14)
3	Electronic Payment	3-1	Electronic Payment Services	(15)
4	Commercial Vehicle Operations	4-1	Commercial Vehicle Electronic Clearance	(16)
		4-2	Automated Roadside Safety Inspection	(17)
		4-3	On-board Safety And Security Monitoring	(18)
		4-4	Commercial Vehicle Administrative Processes	(19)
		4-5	Hazardous Materials Security And Incident Response	(20)
		4-6	Freight Mobility	(21)
5	Emergency Management	5-1	Emergency Notification And Personal Security	(22)
		5-2	Emergency Vehicle Management	(23)
		5-3	Disaster Response And Evacuation	(24)
6	Advanced Vehicle Safety Systems	6-1	Longitudinal Collision Avoidance	(25)
		6-2	Lateral Collision Avoidance	(26)
		6-3	Intersection Collision Avoidance	(27)
		6-4	Vision Enhancement For Crash Avoidance	(28)
		6-5	Safety Readiness	(29)
		6-6	Pre-crash Restraint Deployment	(30)
		6-7	Automated Vehicle Operation	(31)
7	Information Management	7-1	Archived Data	(32)
8	Maintenance And Construction Management	8-1	Maintenance And Construction Operations	(33)

Source: National ITS Architecture by FHWA

6.1.3.2 ITS in European Union

(1) ITS Europe

ERTICO (ITS Europe) is Europe's Intelligent Transportation System (ITS) organization that funds research and defines ITS industry standards.
It is a network of ITS and Services stakeholders in Europe.

It connects together public authorities, industry players, infrastructure operators, users, national ITS associations and other organizations.

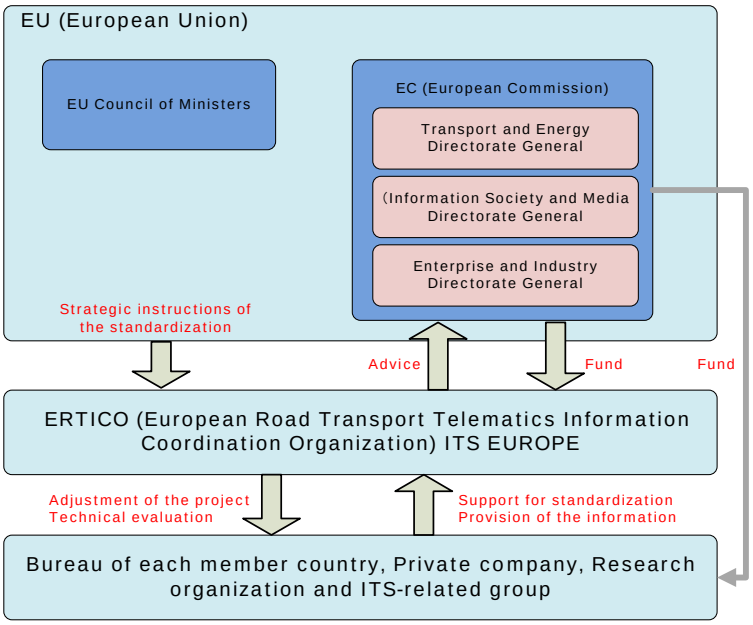


FIGURE 6.1-6 ORGANIZATIONAL STRUCTURE FOR PROMOTING ITS

The organization was founded in 1991 at the initiative of leading members of the European Commission, Ministries of Transport and the European Industry.

The ERTICO Partners and ERTICO team work on a portfolio of activities to accelerate the development and deployment of ITS across Europe and beyond. In the past, ERTICO-ITS Europe has played a leading role in advancing the following :

- The TMC (Traffic Message Channel) standards
- An open framework for telematics services
- Next generations of preventive safety systems
- The technical framework for interoperable tolling in Europe
- Global implementation of ITS together with ITS America and ITS Japan

(2) User services of European ITS

In Europe, ERTICO offers ITS Toolbox, which aims to be a first source describing how ITS can be used to attain transport policy and business objectives. The Toolbox describes a number of ITS application tools and contains supplementary information about the selection of appropriate tools for particular objectives and about the benefits of integrated ITS tools. Tools are grouped into six areas (ERTICO, 1998b):

The concept of European ITS is based on advanced communication technologies, that are used in

the fields of each user service or application tool. The main developing technologies are :

- Advanced cruise-assist highway systems (AHS) aim to reduce traffic accidents, enhance safety, improve transportation efficiency as well as reduce the operational work of drivers.
- Automatic incident detection (AID) aims to detect incidents automatically and quickly in order that the problem can be dealt with and the roads returned to normal operation as soon as possible. The detection system could be CCTV using image processing.
- Electronic data interchange (EDI) is a standardized form of electronic communication used mainly for electronic commerce and document interchange.
- Automatic vehicle location (AVL) systems are needed in many ITS application. There are many technological possibilities, such as GPS, vehicle-beacons, map matching and dead reckoning.
- Electronic toll collection (ETC) system is non-stop payment transaction at a tollgate utilizing bi-lateral radio communication between roadside unit and on-board unit. ETC is almost same technology as Electronic Road Pricing (ERP).
- Radio data system - Traffic message channel (RDS-TMC). RDS is a one-way broadcast, point-to-point transmission system. No information is sent back from the vehicles to the RDS service provider. With RDS it is possible to transmit additional digital information alongside normal FM radio transmission by superimposing a silent data channel. RDS-TMC provides a common European facility for transmitting dynamic and event related traffic and weather information.
- Real-time driver information systems and route guidance are covered in a separate section.
- Smart cards are a generic term for a credit card size device that contains several semiconductor devices including memory and an associated microprocessor. Data can be written to be read from and stored upon the card and manipulated in conjunction with other devices such as a smart card reader. Smart cards have been used for public transport payment contact and contactless.
- Variable message signs (VMS) are covered in a separate section.
- Weather data monitoring systems are designed to monitor current meteorological conditions. The information is then used to forecast poor weather. They enable network managers to act in good time, informing drivers of likely bad weather and initiating appropriate winter maintenance or emergency procedures.

As the trend of European ITS, telematics services (traffic information provision, emergency information provision and road/expressway service, etc.) have taken the lead. Terminal PND (Portable Navigation Device, Personal Navigation Device) becomes main-stream.

And the European ITS Business has been changing from the function of driving to being

"Pleasure," "Convenience" and "Comfortable". The informational service business by new information communication technology (off-board cellular-phone-Navi) has been gaining power in the European countries.

TABLE 6.1-6 DEFINITION USER SERVICES OF EUROPEAN ITS

Development Area		User Services		
1	Traffic Management	1-1	Access control	(1)
		1-2	Environmental traffic management	(2)
		1-3	Highway management	(3)
		1-4	Intersection control	(4)
		1-5	Parking management	(5)
		1-6	Ramp metering	(6)
		1-7	Supervisory management	(7)
		1-8	Traffic regulation enforcement	(8)
		1-9	Urban incident management	(9)
		1-10	Urban intelligent speed adaptation	(10)
		1-11	Urban traffic control	(11)
		1-12	Vulnerable road user facilities	(12)
2	Payment Systems	2-1	Public transport payment systems	(13)
		2-2	Parking payment systems	(14)
		2-3	Urban tolling	(15)
		2-4	Advanced urban road pricing	(16)
3	Collective and Public Transport Management	3-1	Fleet and resource management	(17)
		3-2	Public transport priority	(18)
		3-3	Car pooling/sharing management	(19)
		3-4	Demand-responsive transport	(20)
4	Traffic and Travel Information	4-1	Pre-trip journey planning	(21)
		4-2	Public transport information	(22)
		4-3	Route guidance and navigation	(23)
		4-4	Traffic information	(24)
5	Freight Transport Management	5-1	Co-ordinated city logistics	(25)
		5-2	Fleet management	(26)
		5-3	Freight management	(27)
		5-4	Hazardous goods management	(28)
6	Security and Emergency Management	6-1	Rescue service incident management	(29)
		6-2	Breakdown and emergency alert	(30)
		6-3	Public transport security	(31)

Source: ITS Architecture by ERTICO, Europe

Annex 7.1 NON-TOLL ROAD USERS INTERVIEW RESULTS

The main results are summarized below.

a) A total of 1,137 respondents were interviewed, distributed by survey location as follows:

TABLE 7.1-1 SAMPLE DISTRIBUTION BY LOCATION

Location	Sample	Share (%)
LTO - Caloocan	20	1.8%
LTO - Makati	86	7.6%
LTO - Manila	327	28.8%
LTO - Marikina	98	8.6%
LTO - Pasig	60	5.3%
LTO - Quezon City	486	42.7%
LTO - San Juan	60	5.3%
Total	1,137	100.0%

Source: JICA Study Team

b) Of the total respondents, 79.3% were males and 20.7% were females.

c) The age distribution of the respondents are:

TABLE 7.1-2 AGE DISTRIBUTION: NON-TOLL ROAD USERS

Age	Sample	Share (%)
1. 18-29	231	20.3%
2. 30-39	320	28.1%
3. 40-49	301	26.5%
4. 50-59	192	16.9%
5. Over 60	93	8.2%
Total	1,137	100.0%

Source: JICA Study Team

d) Car ownership distribution, as shown below, indicates that more than half (54%) own one (1) car only and 37% own 2 to 3 cars.

TABLE 7.1-3 CAR OWNERSHIP DISTRIBUTION: NON-TOLL ROAD USERS

No. of Cars	Sample	Share (%)
1	608	53.9%
2	278	24.6%
3	144	12.8%
4	50	4.4%
5	25	2.2%
6	9	0.8%
7	7	0.6%
8	2	0.2%
9	6	0.5%
Total	1,129	100.0%

Source: JICA Study Team

e) Car usage frequency is shown below. About 72% use their car everyday.

TABLE 7.1-4 FREQUENCY OF CAR USE: NON-TOLL ROAD USERS

Frequency	Sample	Share (%)
1. Always (everyday)	820	72.1%
2. Often (almost every other day)	129	11.3%
3. Occasionally (once a week)	153	13.5%
4. Seldom	35	3.1%
Total	1,137	100.0%

Source: JICA Study Team

f) Majority of the respondents (84%) are self-driving and only 16% have drivers.

g) The majority occupation types, as shown below are professionals (25%) and sales/service workers (14%). A good number (36%), classified as others, as engaged in various occupations as enumerated below.

TABLE 7.1-5 OCCUPATION DISTRIBUTION: NON-TOLL ROAD USERS

Occupation	Sample	Share (%)
1. Admin	49	4.3%
2. Clerk	13	1.1%
3. Craftsman	6	0.5%
4. Student	45	4.0%
5. Professional	281	24.7%
6. Sale/Services	158	13.9%

Occupation	Sample	Share (%)
7. Production	30	2.6%
8. Housewife	25	2.2%
9. Tech./Assistant	38	3.3%
10. Farmer/fisherman	1	0.1%
11. Unskilled	11	1.0%
12. Retired	73	6.4%
13. Others:	407	35.8%
Total	1,137	100.0%

Source: JICA Study Team

h) Majority of the respondents have monthly incomes of P20,000 and above, as shown below.

TABLE 7.1-6 INCOME DISTRIBUTION: NON-TOLL ROAD USERS

Income	Sample	Share (%)
1. Under 5,000	3	0.3%
2. 5,000-9,999	20	1.9%
3. 10,000 - 19,999	91	8.7%
4. 20,000-29,999	173	16.6%
5. 30,000 - 39,999	147	14.1%
6. 40,000 -59,999	207	19.9%
7. 60,000 -99,999	211	20.3%
8. 100,000 and above	189	18.2%
Total	1,041	100.0%

Source: JICA Study Team

i) The communication tools used by the respondents are distributed as follows:

TABLE 7.1-7 COMMUNICATION TOOLS CURRENTLY USED: NON-TOLL ROAD USERS

Communication Tools	Sample	Share (%)
1. Cellphone/ Mobile phone	1,046	92.0%
2. I pad	389	34.2%
3. Smartphone (IPhone, Android, Blackberry etc.)	545	47.9%
4. Personal Computer	1,006	88.5%
5. Others	70	6.2%
Total	1,137	100.0%

Source: JICA Study Team Note: Multiple answers

j) The communication tools the respondents would want to use in the future, are distributed as follows:

TABLE 7.1-8 COMMUNICATION TOOLS WANTED IN THE FUTURE: NON-TOLL ROAD USERS

Communication Tools	Sample	Share (%)
1. Cellphone/ Mobile phone	154	15.3%
2. I pad	416	41.4%
3. Smartphone (IPhone, Android, Blackberry etc.)	314	31.3%
4. Personal Computer	102	10.2%
5. Others	18	1.8%
Total	1,004	100.0%

Source: JICA Study Team

k) Regarding their knowledge and use of MMDA/TV5 traffic information service, the responses of the respondents are as follows:

TABLE 7.1-9 KNOWLEDGE AND USE OF MMDA/TV5 TRAFFIC INFORMATION SERVICE: NON-TOLL ROAD USERS

Response	Sample	Share (%)
1. Yes	389	38.7%
2. No	615	61.3%
Total	1,004	100.0%
Q10-1: If Yes, how often do you access traffic information?		
Frequency	Sample	Share (%)
1. Everyday	145	37.3%
2. 2 to 3 Times a Week	64	16.5%
3. Occasionally	180	46.3%
Total	389	100.0%
Q10-2: Kind of information do you access MMDA/TV5?		
Information	Sample	Share (%)
1. Traffic congestion info	342	87.9%
2. Road closure info/event	14	3.6%
3. Twitter info	29	7.5%
4. FAQ	4	1.0%
5. Others	0	0.0%
Total	389	100.0%
Q10-3: Where and how do you access MMDA/TV5?		
Information	Sample	Share (%)
1. at home, by PC	236	60.7%
2. at office, by PC	15	3.9%
3. at home, by Smartphone	51	13.1%
4. at office, by Smartphone	4	1.0%
5. in the car, by smartphone	39	10.0%
6. Others	44	11.3%
Total	389	100.0%

Source: JICA Study Team

l) Description of traffic problems experiences by the respondents in Metro Manila are shown below:

TABLE 7.1-10 TRAFFIC PROBLEMS EXPERIENCED IN METRO MANILA: NON-TOLL ROAD USERS

Traffic Problem	Sample	Share (%)
1. Traffic congestions on road	905	79.6%
2. Delays at intersections	352	31.0%
3. Slow travel speed	222	19.5%
4. Frequent/irregular stops of buses/jeepneys	516	45.4%
5. Driver's behavior	816	71.8%
6. Lack of traffic information	236	20.8%
7. Very difficult to estimate arrival time at destination	104	9.1%
8. Crowding/long stay of buses at bus stops	541	47.6%
9. Others	166	14.6%
Total	1,137	100.0%

Source: JICA Study Team *Note: Multiple answers*

m) The respondents' perception regarding the major bottlenecks in Metro Manila are shown below:

TABLE 7.1-11 MAJOR BOTTLENECK IN METRO MANILA: NON-TOLL ROAD USERS

Location of Bottlenecks	Sample	Share (%)
1. Intersection	530	46.6%
2. U-turn	494	43.4%
3. Bus Stop	602	52.9%
4. Reduced number of traffic lanes ahead	115	10.1%
5. Shopping malls/ commercial establishments	246	21.6%
6. Too many intersections	102	9.0%
7. Construction work site	287	25.2%
8. Road Maintenance worksite	471	41.4%
9. Underground utility digging	68	6.0%
10. Deteriorated pavement	123	10.8%
11. Traffic disturbed by pedestrian due to no or narrow sidewalk	84	7.4%
12. Near MRT/LRT stations	97	8.5%
13. Traffic accident	181	15.9%
14. Flooding	258	22.7%
15. Bad driver's manner	333	29.3%
16. At around big schools	53	4.7%
17. Others	70	6.2%
Total	1,137	100.0%

Source: JICA Study Team *Note: Multiple answers*

n) The respondents suggestions for physical solution of Metro Manila traffic problems are shown below:

TABLE 7.1-12 SUGGESTIONS FOR PHYSICAL SOLUTIONS TO METRO MANILA'S TRAFFIC PROBLEMS: NON-TOLL ROAD USERS

Solution	Sample	Share (%)
1. Construct more roads	905	79.6%
2. Construct elevated expressways	352	31.0%
3. Construct flyovers at intersections	173	15.2%
4. Widen existing roads	379	33.3%
5. Construct more railways	406	35.7%
6. Others	112	9.9%
Total	1,137	100.0%

Source: JICA Study Team *Note: Multiple answers*

o) The respondents suggestions for soft solutions to Metro Manila's traffic problems are shown below:

TABLE 7.1-13 SUGGESTED SOFT SOLUTIONS TO METRO MANILA'S TRAFFIC PROBLEMS: NON-TOLL ROAD USERS

Solutions	Sample	Share (%)
1. Introduce traffic signal control at intersections	688	60.5%
2. Provide real-time traffic information for more effective use	406	35.7%
3. Impose traffic demand control such as color coding,	470	41.3%
4. Perform efficient traffic management at bus stops	598	52.6%
5. Introduce of one-way system for the applicable area	198	17.4%
6. Strictly enforce traffic rules and regulations	804	70.7%
7. Provide real-time public operation information to encourage	186	16.4%
8. Others	108	9.5%
Total	1,137	100.0%

Source: JICA Study Team *Note: Multiple answers*

p) The kinds of information regarding the traffic situation the respondents wish to get are as follows:

TABLE 7.1-14 KINDS OF TRAFFIC SITUATION INFORMATION WISHED TO GET: NON-TOLL ROAD USERS

Traffic Information	Sample	Share (%)
1. Traffic congestion of roads	949	83.5%
2. Travel route with the shortest distance	567	49.9%
3. Travel route with the shortest travel time	485	42.7%
4. Estimated time to arrive at the destination	134	11.8%
5. Traffic regulation (one-way, no left turn at an intersection…)	297	26.1%
6. Traffic accident location	414	36.4%
7. Road construction/rehabilitation area	513	45.1%
8. Underground utility construction/relocation area	106	9.3%
9. Flooded area	632	55.6%
10. Traffic accident- prone spots	204	17.9%
11. Weather Conditions	312	27.4%
12. Others	15	1.3%
Total	1,137	100.0%

Source: JICA Study Team *Note: Multiple answers*

q) The respondents' suggestion as to how traffic information be provided are shown below:

TABLE 7.1-15 HOW TRAFFIC INFORMATION BE PROVIDED: NON-TOLL ROAD USERS

Information Medium	Sample	Share (%)
1. Thru radio	806	70.9%
2. Thru TV	785	69.0%
3. Thru Roadside Variable Message Board	308	27.1%
4. Thru a car navigation	117	10.3%
5. Thru internet	454	39.9%
6. Thru Smartphone (I-phone, blackberry)	386	33.9%
7. Thru I-pad	136	12.0%
8. Others	20	1.8%
Total	1,137	100.0%

Source: JICA Study Team *Note: Multiple answers*

r) Information regarding navigation unit installed in car is summarized below:

TABLE 7.1-16 INFORMATION REGARDING NAVIGATION UNIT INSTALLED IN CAR: NON-TOLL ROAD USERS

Response	Sample	Share (%)
1. Yes	197	20.4%
2. No	771	79.6%
Total	968	100.0%
Q16-1: If Yes, how often do you get information?		
Frequency	Sample	Share (%)
1. Everyday, before travel	43	21.8%
2. Everyday, during travel	62	31.5%
3. Occasionally	76	38.6%
4. Rarely	16	8.1%
Total	197	100.0%
Q16-2: If No, do you want to install on-board unit?		
Response	Sample	Share (%)
1. Yes	493	50.9%
2. No	278	28.7%
Total	771	79.6%

Source: JICA Study Team

s) The respondents' perception as to what ITS applications they think are necessary in Metro Manila and suburbs are summarized below:

TABLE 7.1-17 ITS APPLICATIONS RESPONDENTS THINK ARE NECESSARY IN METRO MANILA AND SUBURBS: NON-TOLL ROAD USERS

ITS Application	Sample	Share (%)
1. Advanced traffic signal control system	898	79.0%
2. Advanced traffic information system (route guidance,...)	809	71.2%
3. Driving safety support system (danger warning, assistance...)	525	46.2%
4. Electronic Toll Collection system for toll roads	155	13.6%
5. Pedestrians support system (safety for pedestrian...)	295	25.9%
6. Emergency vehicles priority system	298	26.2%
7. Commercial vehicles efficiency operations system…	175	15.4%
8. Public transport priority system	258	22.7%
9. Public transport information systems	251	22.1%
10. In case of incident, traffic restriction information system	335	29.5%
11. Advanced road operation and maintenance system	582	51.2%
12. Others	21	1.8%
Total	1,137	100.0%

Source: JICA Study Team Note: Multiple answers

Annex 7.2 TOLL ROAD USERS INTERVIEW RESULTS

The main results are summarized below.

a) A total of 1,022 respondents were interviewed, distributed by survey location as follows:

TABLE 7.2-1 SAMPLE DISTRIBUTION BY LOCATION

Location	Sample	Share (%)
NLEX - Petron (SB)	142	13.9%
NLEX - Petron Marilao (NB)	198	19.4%
NLEX - Shell of Asia (SB)	216	21.1%
SLEX - Petron (SB)	291	28.5%
SLEX - Shell (SB)	84	8.2%
SLEX - Shell Mamplasan (NB)	91	8.9%
Total	1,022	100.0%

Source: JICA Study Team

b) Of the total respondents, 87% were males and 13% were females.

c) The age distribution of the respondents are:

TABLE 7.2-2 AGE DISTRIBUTION: TOLL ROAD USERS

Age	Sample	Share (%)
1. 18-29	155	15.5%
2. 30-39	289	29.0%
3. 40-49	314	31.5%
4. 50-59	175	17.6%
5. Over 60	64	6.4%
Total	997	100.0%

Source: JICA Study Team

d) Car ownership distribution, as shown below, indicates that more than half (52%) own one (1) car only and 37% own 2 to 3 cars.

TABLE 7.2-3 CAR OWNERSHIP DISTRIBUTION: TOLL ROAD USERS

No. of Cars	Sample	Share (%)
1	499	51.5%
2	262	27.0%
3	116	12.0%
4	46	4.7%
5	27	2.8%

No. of Cars	Sample	Share (%)
6	11	1.1%
7	5	0.5%
8	2	0.2%
9	1	0.1%
Total	969	100.0%

Source: JICA Study Team

e) Car usage frequency is shown below. About 76% use their car everyday.

TABLE 7.2-4 FREQUENCY OF CAR USE: TOLL ROAD USERS

Frequency	Sample	Share (%)
1. Always (everyday)	756	76.0%
2. Often (almost every other day)	111	11.2%
3. Occasionally (once a week)	114	11.5%
4. Seldom	14	1.4%
Total	995	100.0%

Source: JICA Study Team

f) Majority of the respondents (85%) are self-driving and only 15% have drivers.

g) The majority occupation types, as shown below are professionals (29%) and sales/service workers (17%). A good number (30%), classified as others, as engaged in various occupations as enumerated below.

TABLE 7.2-5 OCCUPATION DISTRIBUTION: TOLL ROAD USERS

Occupation	Sample	Share (%)
1. Admin	56	5.6%
2. Clerk	24	2.4%
3. Craftsman	6	0.6%
4. Student	16	1.6%
5. Professional	289	28.7%
6. Sale/Services	173	17.2%
7. Production	32	3.2%
8. Housewife	18	1.8%
9. Tech./Assistant	24	2.4%
10. Farmer/fisherman	8	0.8%
11. Unskilled	13	1.3%
12. Retired	49	4.9%
13. Others:	299	29.7%
Total	1,007	100.0%

Source: JICA Study Team

h) Majority of the respondents have monthly incomes of P20,000 and above, as shown below.

TABLE 7.2-6 INCOME DISTRIBUTION: TOLL ROAD USERS

Income	Sample	Share (%)
1. Under 5,000	3	0.3%
2. 5,000-9,999	15	1.6%
3. 10,000 - 19,999	94	10.2%
4. 20,000-29,999	144	15.6%
5. 30,000 - 39,999	135	14.7%
6. 40,000 -59,999	175	19.0%
7. 60,000 -99,999	170	18.5%
8. 100,000 and above	185	20.1%
Total	921	100.0%

Source: JICA Study Team

i) The communication tools used by the respondents are distributed as follows:

TABLE 7.2-7 COMMUNICATION TOOLS CURRENTLY USED: TOLL ROAD USERS

Communication Tools	Sample	Share (%)
1. Cellphone/ Mobile phone	977	95.6%
2. I pad	387	37.9%
3. Smartphone (IPhone, Android, Blackberry etc.)	442	43.2%
4. Personal Computer	851	83.3%
5. Others	73	7.1%
Total	1,022	100.0%

Source: JICA Study Team Note: Multiple answers

j) The communication tools the respondents would want to use in the future, are distributed as follows:

TABLE 7.2-8 COMMUNICATION TOOLS WANTED IN THE FUTURE: TOLL ROAD USERS

Communication Tools	Sample	Share (%)
1. Cellphone/ Mobile phone	86	10.4%
2. I pad	332	40.1%
3. Smartphone (IPhone, Android, Blackberry etc.)	272	32.9%
4. Personal Computer	112	13.5%
5. Others	25	3.0%
Total	827	100.0%

Source: JICA Study Team

k) Regarding their knowledge and use of MMDA/TV5 traffic information service, the responses of the respondents are as follows:

TABLE 7.2-9 KNOWLEDGE AND USE OF MMDA/TV5 TRAFFIC INFORMATION SERVICE: TOLL ROAD USERS

Response	Sample	Share (%)
1. Yes	404	39.5%
2. No	618	60.5%
Total	1,022	100.0%
Q10-1: If Yes, how often do you access traffic information?		
Frequency	Sample	Share (%)
1. Everyday	154	38.1%
2. 2 to 3 Times a Week	77	19.1%
3. Occasionally	173	42.8%
Total	404	100.0%
Q10-2: Kind of information do you access MMDA/TV5?		
Information	Sample	Share (%)
1. Traffic congestion info	334	85.2%
2. Road closure info/event	18	4.6%
3. Twitter info	37	9.4%
4. FAQ	3	0.8%
Total	392	100.0%
Q10-3: Where and how do you access MMDA/TV5?		
Information	Sample	Share (%)
1. at home, by PC	211	53.8%
2. at office, by PC	26	6.6%
3. at home, by Smartphone	55	14.0%
4. at office, by Smartphone	9	2.3%
5. in the car, by smartphone	60	15.3%
6. Others	31	7.9%
Total	392	100.0%

Source: JICA Study Team

l) The distribution of toll roads used is shown below:

TABLE 7.2-10 TOLL ROAD USED

Toll Road	Sample	Share (%)
1. NLEX	770	75.3%
2. SCTEX	370	36.2%
3. CAVITEX	152	14.9%
4. Skyway	311	30.4%
5. SLEX	769	75.2%
6. STAR	185	18.1%
Total	1,022	100.0%

Source: JICA Study Team

m) The respondents' frequency of toll road use is distributed as follows:

TABLE 7.2-11 TOLL ROAD USED

Frequency	Sample	Share (%)
1. Daily	351	34.3%
2. 2-3 times a week	325	31.8%
3. 1 time a week	114	11.2%
4. 2-3 times a week	0	0.0%
5. Occasionally	232	22.7%
Total	1,022	100.0%

Source: JICA Study Team

n) The respondents' trip purpose are distributed as follows:

TABLE 7.2-12 TRIP PURPOSE - TOLL ROAD USED

Purpose	Sample	Share (%)
1. Commuting to work/school	346	33.9%
2. Business	395	38.6%
3. Shopping	17	1.7%
4. Visiting friends, relatives	159	15.6%
5. Recreation, sight seeing	53	5.2%
6. Others (please specify) :	52	5.1%
Total	1,022	100.0%

Source: JICA Study Team

o) The respondents perception as traffic problems experiences in Metro Manila are shown below:

TABLE 7.2-13 TRAFFIC PROBLEMS EXPERIENCED IN METRO MANILA: TOLL ROAD USERS

Traffic Problem	Sample	Share (%)
1. Traffic congestions on road	887	86.8%
2. Delays at intersections	347	34.0%
3. Slow travel speed	244	23.9%
4. Frequent/irregular stops of buses/jeepneys	357	34.9%
5. Driver's behavior	629	61.5%
6. Lack of traffic information	209	20.5%
7. Very difficult to estimate arrival time at destination	76	7.4%
8. Crowding/long stay of buses at bus stops	321	31.4%
9. Others	120	11.7%
Total	1,022	100.0%

Source: JICA Study Team *Note: Multiple answers*

p) The respondents' perception regarding the major bottlenecks in Metro Manila are shown below:

TABLE 7.2-14 MAJOR BOTTLENECK IN METRO MANILA: TOLL ROAD USERS

Location of Bottlenecks	Sample	Share (%)
1. Intersection	534	52.3%
2. U-turn	437	42.8%
3. Bus Stop	585	57.2%
4. Reduced number of traffic lanes ahead	107	10.5%
5. Shopping malls/ commercial establishments	198	19.4%
6. Too many intersections	113	11.1%
7. Construction work site	263	25.7%
8. Road Maintenance worksite	388	38.0%
9. Underground utility digging	69	6.8%
10. Deteriorated pavement	100	9.8%
11. Traffic disturbed by pedestrian due to no or narrow sidewalk	75	7.3%
12. Near MRT/LRT stations	46	4.5%
13. Traffic accident	159	15.6%
14. Flooding	175	17.1%
15. Bad driver's manner	214	20.9%
16. At around big schools	32	3.1%
17. Others	37	3.6%
Total	1,022	100.0%

Source: JICA Study Team *Note: Multiple answers*

q) The respondents have expressed the following situations as to the traffic problems they have experienced in toll road:

TABLE 7.2-15 SUGGESTIONS FOR PHYSICAL SOLUTIONS TO METRO MANILA'S TRAFFIC PROBLEMS: NON-TOLL ROAD USERS

Toll Road Problem	Sample	Share (%)
1. Traffic congestion during peak hours	547	53.5%
2. Traffic congestion near interchanges	307	30.0%
3. Difficult to access to a toll road due to substd…	171	16.7%
4. After getting off from a toll road, access road…	184	18.0%
5. Fatal traffic accidents	274	26.8%
6. Toll gate area is congested, travel is…	213	20.8%
7. Speeding vehicles	128	12.5%
8. Guide signs sometimes is improper	128	12.5%
9. No emergency (or no) telephone	52	5.1%
10. Very limited information on traffic condition	121	11.8%
11. Difficult to select which road to select, a toll…	43	4.2%
12. Difficult to estimate arrival time to destination	31	3.0%
13. Others (please specify) :	137	13.4%
Total	1,022	100.0%

Source: JICA Study Team *Note: Multiple answers*

r) Recommendations made by the respondents to improve traffic condition in all toll roads are shown below:

TABLE 7.2-16 RECOMMENDATIONS TO IMPROVE TRAFFIC CONDITION ON THE TOLL ROAD: TOLL ROAD USERS

Solutions	Sample	Share (%)
1. To provide more traffic information	587	57.4%
2. To promote/increase ETC in order to reduce traffic cong…	305	29.8%
3. To add more toll gates	263	25.7%
4. To respond faster to traffic accidents and break…	279	27.3%
5. To improve/add guide signs	274	26.8%
6. To improve at-grade intersection of access road…	122	11.9%
7. Others	135	13.2%
Total	1,022	100.0%

Source: JICA Study Team *Note: Multiple answers*

s) Regarding the use of ETC, the respondents are shown below:

TABLE 7.2-17 USED OF ETC: TOLL ROAD USERS

Response	Sample	Share (%)
1. Yes	362	35.4%
2. No	660	64.6%
Total	1,022	100.0%

Q18-1a: If Yes, which one are you using?		
ETC	**Sample**	**Share (%)**
1. E-tag (NLEX)	75	20.7%
2. Easy trip (NLEX)	103	28.5%
3. E-pass (SLEX, Skyway)	184	50.8%
Total	362	100.0%

Source: JICA Study Team

t) Regarding toll fee discount for ETC users, the respondents' responses are summarized as follows:

TABLE 7.2-18 TOLL FEE DISCOUNT FOR ETC USERS: TOLL ROAD USERS

Response	Sample	Share (%)
1. Yes	373	65.6%
2. No	196	34.4%
Total	569	100.0%

Q18-2c: If Yes, how much discount (%)?		
Discount (%)	**Sample**	**Share (%)**
1%	1	0.3%
5%	6	1.6%
7%	1	0.3%
9%	1	0.3%
10%	91	24.5%
12%	2	0.5%
15%	29	7.8%
20%	115	31.0%
25%	16	4.3%
30%	42	11.3%
40%	9	2.4%
45%	1	0.3%
50%	54	14.6%
60%	1	0.3%

Discount (%)	Sample	Share (%)
75%	1	0.3%
80%	1	0.3%
Total	371	100.0%
Q18-2d: If the on-board unit can be commonly used for all toll road will you use it?		
Response	**Sample**	**Share (%)**
1. Yes	361	63.4%
2. No	209	36.7%
Total	570	100.2%
Q.18-2e: How much are you willing to pay for ETC equipment (on-board unit)?		
Amount (P)	**Sample**	**Share (%)**
50	1	0.3%
100	5	1.4%
200	4	1.2%
300	3	0.9%
500	46	13.3%
700	3	0.9%
750	2	0.6%
800	8	2.3%
900	3	0.9%
1000	127	36.7%
1200	7	2.0%
1250	1	0.3%
1300	1	0.3%
1500	31	9.0%
2000	45	13.0%
2500	9	2.6%
2800	1	0.3%
3000	27	7.8%
3500	2	0.6%
3600	1	0.3%
4000	3	0.9%
5000	13	3.8%
6000	2	0.6%
7000	1	0.3%
Total	346	100.0%

Source: JICA Study Team

u) The kinds of traffic information the respondents would wish to get are shown below:

TABLE 7.2-19 KINDS OF TRAFFIC INFORMATION WISHED TO GET: TOLL ROAD USERS

Traffic Information	Sample	Share (%)
1. Traffic congestion of roads	873	85.4%
2. Travel route with the shortest distance	557	54.5%
3. Travel route with the shortest travel time	430	42.1%
4. Estimated time to arrive at the destination	168	16.4%
5. Traffic regulation (one-way, no left turn at an intersection…)	228	22.3%
6. Traffic accident location	301	29.5%
7. Road construction/rehabilitation area	381	37.3%
8. Underground utility construction/relocation area	85	8.3%
9. Flooded area	423	41.4%
10. Traffic accident- prone spots	155	15.2%
11. Weather Conditions	208	20.4%
12. Others	6	0.6%
Total	1,022	100.0%

Source: JICA Study Team Note: Multiple answers

v) The respondents' preferences on how they want the traffic information be provided are summarized below:

TABLE 7.2-20 PREFERENCE ON HOW THE TRAFFIC INFORMATION TO BE PROVIDED: TOLL ROAD USERS

Information Medium	Sample	Share (%)
1. Thru radio	645	63.1%
2. Thru TV	544	53.2%
3. Thru Roadside Variable Message Board	230	22.5%
4. Thru a car navigation	151	14.8%
5. Thru internet	364	35.6%
6. Thru Smartphone (I-phone, blackberry)	308	30.1%
7. Thru I-pad	116	11.4%
8. Others	30	2.9%
Total	1,022	100.0%

Source: JICA Study Team Note: Multiple answers

w) Regarding the navigation unit installed in their cars, the respondents' responses are shown below:

TABLE 7.2-21 CAR NAVIGATION UNIT INSTALLED IN CAR: TOLL ROAD USERS

Response	Sample	Share (%)
1. Yes	231	22.6%
2. No	791	77.4%
Total	1,022	100.0%
Q21-1: If Yes, how often do you get information?		
Frequency	Sample	Share (%)
1. Everyday, before travel	64	27.7%
2. Everyday, during travel	96	41.6%
3. Occasionally	64	27.7%
4. Rarely	7	3.0%
Total	231	100.0%
Q21-2: If No, do you want to install on-board unit?		
Response	Sample	Share (%)
1. Yes	457	44.7%
2. No	334	32.7%
Total	791	77.4%

Source: JICA Study Team

x) ITS application the respondents thinks are necessary in Metro Manila and suburbs are summarized below:

TABLE 7.2-22 ITS APPLICATION THE RESPONDENTS THINKS ARE NECESSARY IN METRO MANILA: TOLL ROAD USERS

ITS Application	Sample	Share (%)
1. Advanced traffic signal control system	816	79.8%
2. Advanced traffic information system (route guidance,...)	679	66.4%
3. Driving safety support system (danger warning, assistance...)	407	39.8%
4. Electronic Toll Collection system for toll roads	328	32.1%
5. Pedestrians support system (safety for pedestrian...)	230	22.5%
6. Emergency vehicles priority system	215	21.0%
7. Commercial vehicles efficiency operations system…	125	12.2%
8. Public transport priority system	198	19.4%
9. Public transport information systems	209	20.5%
10. In case of incident, traffic restriction information system	197	19.3%
11. Advanced road operation and maintenance system	352	34.4%
12. Others	33	3.2%
Total	1,022	100.0%

Source: JICA Study Team Note: Multiple answers

Annex 7.3 PUBLIC TRANSPORT USERS INTERVIEW RESULTS

7.3.1 Bus

The main results are summarized below.

a) A total of 533 samples were interviewed, distributed by survey routes and locations as follows:

TABLE 7.3-1 SAMPLE DISTRIBUTION BY ROUTES AND LOCATIONS

Bus Route	Sample	Share (%)
Alabang - Malanday (via Edsa, Mc Arthur)	30	5.6%
Alabang - Navotas Terminal (via Edsa)	61	11.4%
Alabang - Plaza Lawton	2	0.4%
Alabang - SM Fairview (via Edsa)	31	5.8%
Baclaran - SM Fairview via Edsa	30	5.6%
Baclaran - SM Fairview via Quezon Ave.	30	5.6%
Lagro/Fairview - Alabang (via Edsa)	30	5.6%
Lagro/Fairview - Ayala (via Edsa)	31	5.8%
Lagro/Fairview - Baclaran (Vvia Edsa)	25	4.7%
Las Pinas - Lawton	53	9.9%
Monumento/Malabon - Baclaran (Via Edsa)	30	5.6%
Monumento/Malabon -Ayala (via Edsa)	29	5.4%
Taytay - Quiapo (via Ortigas Ave)	30	5.6%
Sub-Total	412	77.3%
Bus Terminal	Sample	Share (%)
2nd Ave Terminal (Plaridel/Baliwag)	60	11.3%
Doroteo Jose Terminal (San Jose del Monte/ Bocaue/Malinta/etc)	61	11.4%
Sub-Total	121	22.7%
Total	**533**	**100%**

Source: JICA Study Team

b) Of the total respondents, 61% were males and 39% were females.

c) The age distribution of the respondents are:

TABLE 7.3-2 AGE DISTRIBUTION: BUS PASSENGERS

Age	Sample	Share (%)
1. 18-29	199	37.3%
2. 30-39	166	31.1%
3. 40-49	104	19.5%
4. 50-59	39	7.3%
5. Over 60	25	4.7%
Total	533	100.0%

Source: JICA Study Team

d) Frequency in the use of buses is shown below.

TABLE 7.3-3 FREQUENCY IN THE USE OF BUSES

Frequency	Sample	Share (%)
1. Always (everyday)	302	56.7%
2. Often (almost every other day)	67	12.6%
3. Occasionally (once a week)	99	18.6%
4. Seldom	65	12.2%
Total	533	100.0%

Source: JICA Study Team

e) Occupation distribution of the respondents is as follows.

TABLE 7.3-4 OCCUPATION DISTRIBUTION: BUS PASSENGERS

Occupation	Sample	Share (%)
1. Admin	13	2.4%
2. Clerk	30	5.6%
3. Craftsman	1	0.2%
4. Student	75	14.1%
5. Professional	50	9.4%
6. Sale/Services	115	21.6%
7. Production	11	2.1%
8. Housewife	43	8.1%
9. Tech./Assistant	15	2.8%
10. Farmer/fisherman	6	1.1%
11. Unskilled	108	20.3%
12. Retired	16	3.0%
13. Others:	50	9.4%
Total	533	100.0%

Source: JICA Study Team

f) Household monthly income distribution is as follows

TABLE 7.3-5 INCOME DISTRIBUTION: BUS PASSENGERS

Income	Sample	Share (%)
1. Under 5,000	51	9.7%
2. 5,000-9,999	113	21.5%
3. 10,000 - 19,999	166	31.6%
4. 20,000-29,999	118	22.4%
5. 30,000 - 39,999	38	7.2%
6. 40,000 -59,999	31	5.9%
7. 60,000 -99,999	6	1.1%
8. 100,000 and above	3	0.6%
Total	526	100.0%

Source: JICA Study Team

g) Respondents perception on traffic problems encountered in Metro Manila is shown below:

TABLE 7.3-6 PERCEPTION ON TRAFFIC PROBLEMS ENCOUNTERED: BUS PASSENGERS

Traffic Problem	Sample	Share (%)
1. Traffic congestions on road	432	81.1%
2. Delays at intersections	222	41.7%
3. Slow travel speed	172	32.3%
4. Frequent/irregular stops of buses/jeepneys	222	41.7%
5. Bad driving behavior	277	52.0%
6. Lack of traffic information	130	24.4%
7. Very difficult to estimate arrival time at destination	134	25.1%
8. Crowding/long stay of buses at bus stops	240	45.0%
9. Others	18	3.4%
Total	533	100.0%

Source: JICA Study Team Note: Multiple answers

h) Locations of major bottlenecks as perceived by the respondents are shown below:

TABLE 7.3-7 LOCATION OF MAJOR BOTTLENECKS: BUS PASSENGERS

Location of Bottlenecks	Sample	Share (%)
1. Intersection	271	50.8%
2. U-turn	139	26.1%
3. Bus Stop	280	52.5%
4. Reduced number of traffic lanes ahead	56	10.5%
5. Shopping malls/ commercial establishments	105	19.7%

Location of Bottlenecks	Sample	Share (%)
6. Too many intersections	83	15.6%
7. Construction work site	166	31.1%
8. Road Maintenance worksite	153	28.7%
9. Underground utility digging	35	6.6%
10. Deteriorated pavement	47	8.8%
11. Traffic disturbed by pedestrian due to no or narrow sidewalk	47	8.8%
12. Near MRT/LRT stations	49	9.2%
13. Traffic accident	127	23.8%
14. Flooding	167	31.3%
15. Bad driver's manner	145	27.2%
16. At around big schools	31	5.8%
17. Others	16	3.0%
Total	533	100.0%

Source: JICA Study Team *Note: Multiple answers*

i) Suggested physical solutions to traffic problems are shown below:

TABLE 7.3-8 SUGGESTED PHYSICAL SOLUTIONS TO TRAFFIC PROBLEMS: BUS PASSENGERS

Solution	Sample	Share (%)
1. Construct more roads	305	57.2%
2. Construct elevated expressways	267	50.1%
3. Construct flyovers at intersections	288	54.0%
4. Widen existing roads	220	41.3%
5. Construct more railways	172	32.3%
6. Others	20	3.8%
Total	533	100.0%

Source: JICA Study Team *Note: Multiple answers*

j) Suggestion soft solutions to traffic problems are shown below:

TABLE 7.3-9 SUGGESTION TO IMPROVE TRAIN SERVICE: BUS PASSENGERS

Solutions	Sample	Share (%)
1. Introduction of advance traffic signal control at intersections	322	60.4%
2. Provide real-time traffic information for more effective use…	233	43.7%
3. Traffic demand control such as color coding, truck ban…	285	53.5%
4. Efficient traffic management at bus stops	299	56.1%
5. Introduction of one-way system for the applicable area	129	24.2%
6. Strictly enforcement of traffic rules and regulations	359	67.4%
7. Provide real-time public operation information to encourage…	118	22.1%
8. Others	39	7.3%
Total	533	100.0%

Source: JICA Study Team *Note: Multiple answers*

k) Problems encountered in using buses are shown below:

TABLE 7.3-10 PROBLEMS ENCOUNTERED BY USING BUS TRANSPORT: BUS PASSENGERS

Traffic Information	Sample	Share (%)
1. I can't predict my arrival time to destination because of traffic…	282	52.9%
2. At bus stops, I can't predict when to get a ride due to lack…	119	22.3%
3. At bus stops, waiting time is too long and often hard to get…	249	46.7%
4. At the terminal or inside the bus, I can't find information showing…	77	14.4%
5. When I have to use two modes to get to my destination…	74	13.9%
6. Bad driving manner of bus driver exposed me to danger…	147	27.6%
7. Others	9	1.7%
Total	533	100.0%

Source: JICA Study Team *Note: Multiple answers*

l) Suggested improvements to bus services are shown below:

TABLE 7.3-11 SUGGESTED IMPROVEMENTS TO BUS SERVICES: BUS PASSENGERS

Traffic Information	Sample	Share (%)
1. Introduction of bus routes with corresponding fares, timetable…	267	50.1%
2. Introduction of Passenger Information Display System (PIDS)	216	40.5%
3. Improve terminal connections between modes (e.g. bus stops...)	127	23.8%
4. Introduction of Bus priority traffic control system (green time...)	116	21.8%
5. Introduction of Bus monitoring system for adequate bus operation	93	17.4%
6. Others	17	3.2%
Total	533	100.0%

Source: JICA Study Team *Note: Multiple answers*

m) Information needed from public transport operators are shown below:

TABLE 7.3-12 INFORMATION NEEDED FROM PUBLIC TRANSPORT OPERATORS: BUS PASSENGERS

Traffic Information	Sample	Share (%)
1. Bus routes (including transfer point), travel time and fare…	290	54.4%
2. Estimated departure and arrival times from/ to major…	248	46.5%
3. Operation conditions of LRT and MRT	98	18.4%
4. Conditions of road (such as closed road due to maintenance...)	178	33.4%
5. Real-time bus location system	71	13.3%
6. Others	4	0.8%
Total	533	100.0%

Source: JICA Study Team *Note: Multiple answers*

n) Suggested means to provide traffic information are shown below:

TABLE 7.3-13 SUGGESTED MEANS TO PROVIDE TRAFFIC INFORMATION OPERATORS: BUS PASSENGERS

Information Medium	Sample	Share (%)
1. Thru passenger information display at major…	353	66.2%
2. Thru internet	79	14.8%
3. Thru smartphone	74	13.9%
4. Thru TV	229	43.0%
5. Thru radio	118	22.1%
6. Others	9	1.7%
Total	533	100.0%

Source: JICA Study Team *Note: Multiple answers*

o) Suggested ITS applications by the respondents are shown below:

TABLE 7.3-14 SUGGESTED ITS APPLICATIONS BY THE RESPONDENTS OPERATORS: BUS PASSENGERS

ITS Application		Sample	Share (%)
1.	Advanced traffic signal control system	341	61.7%
2.	Advanced traffic information system (route guidance,...)	317	57.3%
3.	Driving safety support system (danger warning, assistance...)	297	53.7%
4.	Electronic Toll Collection system for toll roads	110	19.9%
5.	Pedestrians support system (safety for pedestrian...)	223	40.3%
6.	Emergency vehicles priority system	154	27.8%
7.	Commercial vehicles efficiency operations system…	107	19.3%
8.	Public transport priority system	207	37.4%
9.	Public transport information systems	231	41.8%
10.	In case of incident, traffic restriction information system	134	24.2%
11.	Advanced road operation and maintenance system	160	28.9%
12.	Others	4	0.7%
Total		553	100.0%

Source: JICA Study Team *Note: Multiple answers*

7.3.2 LRT/MRT Passenger

The main results are summarized below.

a) A total of 365 samples were interviewed, distributed by survey location as follows:

TABLE 7.3-15 SAMPLE DISTRIBUTION BY STATION: LRT/MRT PASSENGERS

LRT/MRT Station	Sample	Share (%)
LRT 1 - Baclaran	58	15.9%
LRT 1 - Roosevelt	63	17.3%
LRT 2 - Recto	61	16.7%
LRT 2 - Santolan	61	16.7%
MRT 3 - EDSA/Taft	60	16.4%
MRT 3 – North Avenue	62	17.0%
Total	365	100.0%

Source: JICA Study Team

b) Of the total respondents, 70% were males and 30% were females.

c) The age distribution of the respondents are:

TABLE 7.3-16 AGE DISTRIBUTION: LRT/MRT PASSENGERS

Age	Sample	Share (%)
1. 18-29	219	60.0%
2. 30-39	69	18.9%
3. 40-49	48	13.2%
4. 50-59	25	6.8%
5. Over 60	4	1.1%
Total	365	100.0%

Source: JICA Study Team

d) Frequency in the use of LRT/MRT as public transport is shown below.

TABLE 7.3-17 FREQUENCY IN THE USE OF LRT/MRT

Frequency	Sample	Share (%)
1. Always (everyday)	251	68.8%
2. Often (almost every other day)	38	10.4%
3. Occasionally (once a week)	54	14.8%
4. Seldom	22	6.0%
Total	365	100.0%

Source: JICA Study Team

e) Occupation distribution of the respondents is as follows.

TABLE 7.3-18 OCCUPATION DISTRIBUTION: LRT/MRT PASSENGERS

Occupation	Sample	Share (%)
1. Admin	7	1.9%
2. Clerk	10	2.7%
3. Craftsman	1	0.3%
4. Student	91	24.9%
5. Professional	18	4.9%
6. Sale/Services	37	10.1%
7. Production	5	1.4%
8. Housewife	8	2.2%
9. Tech./Assistant	5	1.4%
10. Farmer/fisherman	0	0.0%
11. Unskilled	14	3.8%
12. Retired	6	1.6%
13. Others:	163	44.7%
Total	365	100.0%

Source: JICA Study Team

f) Household monthly income distribution is as follows

TABLE 7.3-19 INCOME DISTRIBUTION: LRT/MRT PASSENGERS

Income	Sample	Share (%)
1. Under 5,000	6	2.0%
2. 5,000-9,999	31	10.2%
3. 10,000 - 19,999	121	39.9%
4. 20,000-29,999	68	22.4%
5. 30,000 - 39,999	37	12.2%
6. 40,000 -59,999	25	8.3%
7. 60,000 -99,999	10	3.3%
8. 100,000 and above	5	1.7%
Total	303	100.0%

Source: JICA Study Team

g) Problems encountered by the respondents in using train service are as follows:

TABLE 7.3-20 PROBLEMS ENCOUNTERED IN USING THE TRAIN SERVICE: LRT/MRT PASSENGERS

Problem	Sample	Share (%)
1. Long queue at ticketing booth	136	37.3%
2. If I transfer to another train, I need to buy another ticket	26	7.1%
3. Train stations are not properly connected (e.g. line 1 and line 2)	10	2.7%
4. Train trip interval is too long and very crowded during peak hour	240	65.8%
5. Train is sometimes late and no information is given on the delay	84	23.0%
6. Others	66	18.1%
Total	365	100.0%

Source: JICA Study Team Note: Multiple answers

h) Suggested solutions to the problems encountered in train services are shown below:

TABLE 7.3-21 SUGGESTED SOLUTIONS TO THE PROBLEMS ENCOUNTERED: LRT/MRT PASSENGERS

Solution	Sample	Share (%)
1. Introduction of automated ticketing machine (to replace manual…	104	28.5%
2. Introduction of common ticketing system	159	43.6%
3. Improvement of station accessibility like providing of elevators…	111	30.4%
4. Increasing number of train couches	242	66.3%
5. Introduction of Message Board at stations…	93	25.5%
6. Others	15	4.1%
Total	365	100.0%

Source: JICA Study Team Note: Multiple answers

i) The method used in purchasing a train ticket is shown below:

TABLE 7.3-22 METHOD IN PURCHASING A TRAIN TICKET: LRT/MRT PASSENGERS

Method	Sample	Share (%)
1. I buy a single journey ticket every time I use train	217	59.5%
2. I keep pre-paid card of the line I always use	139	38.1%
3. I keep pre-paid cards of all trains I frequently use	8	2.2%
4. Others	1	0.3%
Total	365	100.0%

Source: JICA Study Team

j) Suggestion to improve train service are shown below:

High ranked countermeasures were “Introduction of common ticketing system”,” Increasing number of train coaches (to reduce waiting time)” and “Improvement of station accessibility like providing elevators”

TABLE 7.3-23 SUGGESTION TO IMPROVE TRAIN SERVICE: LRT/MRT PASSENGERS

Countermeasures	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5	Rank 6	Rank 7	Sample
1. Introduction of automated ticketing machine	41	55	50	110	54	51	3	364
2. Introduction of common ticketing system…	**119**	72	68	56	35	14	0	364
3. Improvement of station accessibility like providing elevators…	**74**	88	64	62	52	23	1	364
4. Increasing number of train coaches (to reduce waiting time)	**100**	60	66	31	55	50	2	364
5. Introduction of VMS at stations (train information…)	15	63	79	69	89	47	2	364
6. Integration of bus/jeepney stops to train stations…	13	23	35	33	75	181	4	364
7. Others	2	4	2	0	1	0	0	9
Total	364	365	364	361	361	366	12	2,193

Source: JICA Study Team *Note: Multiple answers*

7.3.3 Jeepney Passenger

The main results are summarized below.

a) A total of 297 samples were interviewed, distributed by survey routes and locations as follows:

TABLE 7.3-24 SAMPLE DISTRIBUTION BY ROUTES AND LOCATIONS

Jeepney Route	Sample	Share (%)
Angono/Binangonan - Crossing	30	10.1%
Antipolo-Cubao	16	5.4%
Baclaran - Blumentritt (Via Taft Ave)	17	5.7%
Blumentritt-Baclaran	13	4.4%
Cubao - Antipolo (Via Marcos Highway)	14	4.7%
Cubao - Divisoria	22	7.4%
Cubao - Vito Cruz/Libertad	17	5.7%
Divisoria-Cubao	8	2.7%
Fairview/Lagro-Quiapo	8	2.7%
Fairview-Quiapo	6	2.0%
Guadalupe - Taft Ave (Via J.P. Rizal St)	19	6.4%
L.Guinto-Guadalupe	11	3.7%
Libertad-Cubao	13	4.4%
Muñoz - Vito Cruz (Via Sta. Cruz, Mabini)	32	10.8%
Pasig - Quiapo (Via Shaw Blvd)	28	9.4%

Jeepney Route	Sample	Share (%)
Project 8 - Quiapo (Via Roosevelt Ave)	27	9.1%
Quiapo - Fairview/Lagro	16	5.4%
Total	297	100.0%

Source: JICA Study Team

b) Of the total respondents, 48% were males and 52% were females.

c) The age distribution of the respondents are:

TABLE 7.3-25 AGE DISTRIBUTION: JEEPNEY PASSENGERS

Age	Sample	Share (%)
1. 18-29	134	45.1%
2. 30-39	82	27.6%
3. 40-49	50	16.8%
4. 50-59	17	5.7%
5. Over 60	14	4.7%
Total	297	100.0%

Source: JICA Study Team

d) Frequency in the use of jeepney is shown below.

TABLE 7.3-26 FREQUENCY IN THE USE OF JEEPNEY

Frequency	Sample	Share (%)
1. Always (everyday)	186	62.6%
2. Often (almost every other day)	39	13.1%
3. Occasionally (once a week)	35	11.8%
4. Seldom	37	12.5%
Total	297	100.0%

Source: JICA Study Team

e) Occupation distribution of the respondents is as follows.

TABLE 7.3-27 OCCUPATION DISTRIBUTION: JEEPNEY PASSENGERS

Occupation	Sample	Share (%)
1. Admin	4	1.5%
2. Clerk	15	5.5%
3. Craftsman	3	1.1%
4. Student	62	22.6%
5. Professional	23	8.4%
6. Sale/Services	62	22.6%

Occupation	Sample	Share (%)
7. Production	8	2.9%
8. Housewife	39	14.2%
9. Tech./Assistant	12	4.4%
10. Farmer/fisherman	1	0.4%
11. Unskilled	35	12.8%
12. Retired	10	3.6%
13. Others:	0	0.0%
Total	274	100.0%

Source: JICA Study Team

f) Household monthly income distribution is as follows

TABLE 7.3-28 INCOME DISTRIBUTION: JEEPNEY PASSENGERS

Income	Sample	Share (%)
1. Under 5,000	10	3.4%
2. 5,000-9,999	44	15.0%
3. 10,000 - 19,999	116	39.5%
4. 20,000-29,999	61	20.7%
5. 30,000 - 39,999	42	14.3%
6. 40,000 -59,999	19	6.5%
7. 60,000 -99,999	2	0.7%
8. 100,000 and above	0	0.0%
Total	294	100.0%

Source: JICA Study Team

g) Respondents perception on traffic problems encountered in Metro Manila is shown below:

TABLE 7.3-29 PERCEPTION ON TRAFFIC PROBLEMS ENCOUNTERED: JEEPNEY PASSENGERS

Traffic Problem	Sample	Share (%)
1. Traffic congestions on road	246	82.8%
2. Delays at intersections	108	36.4%
3. Slow travel speed	78	26.3%
4. Frequent/irregular stops of buses/jeepneys	102	34.3%
5. Bad driving behavior	144	48.5%
6. Lack of traffic information	63	21.2%
7. Unpredictable arrival time	86	29.0%
8. No specific loading/unloading zone for jeepneys	150	50.5%
9. Crowding/long stay of buses at bus stops	115	38.7%
10. Others	0	0.0%
Total	297	100.0%

Source: JICA Study Team Note: Multiple answers

h) Locations of major bottlenecks as perceived by the respondents are shown below:

TABLE 7.3-30 LOCATION OF MAJOR BOTTLENECKS: JEEPNEY PASSENGERS

Location of Bottlenecks	Sample	Share (%)
1. Intersection	191	64.3%
2. U-turn	73	24.6%
3. Bus Stop	51	17.2%
4. Reduced number of traffic lanes ahead	18	6.1%
5. Shopping malls/ commercial establishments	68	22.9%
6. Too many intersections	68	22.9%
7. Construction work site	106	35.7%
8. Road Maintenance worksite	102	34.3%
9. Underground utility digging	15	5.1%
10. Deteriorated pavement	17	5.7%
11. Traffic disturbed by pedestrian due to no or narrow sidewalk	44	14.8%
12. Near MRT/LRT stations	35	11.8%
13. Traffic accident	83	27.9%
14. Flooding	147	49.5%
15. Bad driver's manner	94	31.6%
16. At around big schools	23	7.7%
17. Others	1	0.3%
Total	297	100.0%

Source: JICA Study Team Note: Multiple answers

i) Suggested physical solutions to traffic problems are shown below:

TABLE 7.3-31 SUGGESTED PHYSICAL SOLUTIONS TO TRAFFIC PROBLEMS: JEEPNEY PASSENGERS

Solution	Sample	Share (%)
1. Construct more roads	169	56.9%
2. Construct elevated expressways	122	41.1%
3. Construct fly overs at intersections	110	37.0%
4. Widen existing roads	180	60.6%
5. Construct more railways	108	36.4%
6. Others	1	0.3%
Total	297	100.0%

Source: JICA Study Team Note: Multiple answers

j) Suggestion soft solutions to traffic problems are shown below:

TABLE 7.3-32 SUGGESTION TO SOFTWARE SOLUTION TO TRAFFIC PROBLEMS: JEEPNEY PASSENGERS

Solutions	Sample	Share (%)
1. Introduction of advance traffic signal control at intersections	221	74.4%
2. Provide real-time traffic information for more effective use…	124	41.8%
3. Traffic demand control such as color coding, truck ban…	126	42.4%
4. Efficient traffic management at bus stops	83	27.9%
5. Introduction of one-way system for the applicable area	100	33.7%
6. Strictly enforcement of traffic rules and regulations	238	80.1%
7. Provide real-time public operation information to encourage…	93	31.3%
8. Others	1	0.3%
Total	297	100.0%

Source: JICA Study Team Note: Multiple answers

k) Problems encountered in using jeepney are shown below:

TABLE 7.3-33 PROBLEMS ENCOUNTERED BY USING BUS TRANSPORT: JEEPNEY PASSENGERS

Traffic Information	Sample	Share (%)
1. I can't predict my arrival time to destination because of traffic…	199	67.0%
2. At bus stops, I can't predict when to get a ride due to lack…	73	24.6%
3. At bus stops, waiting time is too long and often hard to get…	49	16.5%
4. At the terminal or inside the bus, I can't find information showing…	117	39.4%
5. Others	18	6.1%
Total	297	100.0%

Source: JICA Study Team Note: Multiple answers

l) Suggested improvements to jeepney services are shown below:

TABLE 7.3-34 SUGGESTED IMPROVEMENTS TO JEEPNEY SERVICES: JEEPNEY PASSENGERS

Traffic Information	Sample	Share (%)
1. Introduction of bus/jeepney routes with corresponding fares, timetable…	152	51.2%
2. Introduction of Passenger Information Display System (PIDS) at…	69	23.2%
3. Improvement of terminal interconnectability between modes…	73	24.6%
4. Introduction of jeepney monitoring system for adequate operation	129	43.4%
5. Others	3	1.0%
Total	297	100.0%

Source: JICA Study Team Note: Multiple answers

m) Information needed from public transport operators are shown below:

TABLE 7.3-35 INFORMATION NEEDED FROM PUBLIC TRANSPORT OPERATORS: JEEPNEY PASSENGERS

Traffic Information	Sample	Share (%)
1. Bus/jeepney routes(including transfer point), travel time and…	150	50.5%
2. Estimated departure and arrival times from/ to major…	65	21.9%
3. Operation conditions of LRT and MRT	40	13.5%
4. Conditions of road(such as closed road due to maintenance...)	167	56.2%
5. Real-time jeepney location system	48	16.2%
6. Others	0	0.0%
Total	297	100.0%

Source: JICA Study Team Note: Multiple answers

n) Suggested means to provide traffic information are shown below:

TABLE 7.3-36 SUGGESTED MEANS TO PROVIDE TRAFFIC INFORMATION OPERATORS: JEEPNEY PASSENGERS

Information Medium	Sample	Share (%)
1. Thru passenger information display at major…	165	55.6%
2. Thru internet	49	16.5%
3. Thru smartphone	50	16.8%
4. Thru TV	180	60.6%
5. Thru radio	59	19.9%
6. Others	0	0.0%
Total	297	100.0%

Source: JICA Study Team Note: Multiple answers

o) Suggested ITS applications by the respondents are shown below:

TABLE 7.3-37 SUGGESTED ITS APPLICATIONS BY THE RESPONDENTS OPERATORS: JEEPNEY PASSENGERS

ITS Application	Sample	Share (%)
1. Advanced traffic signal control system	231	77.8%
2. Advanced traffic information system (route guidance,...)	189	63.6%
3. Driving safety support system (danger warning, assistance...)	152	51.2%
4. Electronic Toll Collection system for toll roads	25	8.4%
5. Pedestrians support system (safety for pedestrian...)	99	33.3%
6. Emergency vehicles priority system	100	33.7%
7. Commercial vehicles efficiency operations system…	55	18.5%
8. Public transport priority system	77	25.9%
9. Public transport information systems	129	43.4%
10. In case of incident, traffic restriction information system	100	33.7%
11. Advanced road operation and maintenance system	126	42.4%
12. Others	0	77.8%
Total	297	100.0%

Source: JICA Study Team Note: Multiple answers

Annex 7.4 KEY INFORMANTS INTERVIEW RESULTS

Inasmuch as this analysis is more of a practical one not an academic exercise, a straight forward KII (Key Informant Interview) method was applied to meet the objectives of the overall study. The KII was done for fourteen individuals, selected from the various relevant stakeholders that are aware of the issues, problems and concerns besetting transportation and logistics networks in Metro Manila, including the academe.

The results of the KII were properly checked for consistencies, summarized and tabulated for analysis. Descriptive analysis is employed to meet the objectives:

a. Identify the transport problems and issues besetting Metro Manila and its periphery;
b. Perceived measures to address the identified transport problems;
c. Identify existing ITS applications in the Philippines; and
d. Determine appropriate ITS measures for Metro Manila and its periphery

Apart from the above, the key interviewees were also asked of their perceptions on practices in the other ASEAN cities on how to address transport problems.

Based on the results of the KII, the study would be able to come up with a menu of ITS applications that will be responsive in addressing transport problems and thereby improve the LOS of the transport systems in Metro Manila. The succeeding section will summarize the results of the KII and base on these come up with the menu of ITS applications that can be recommended for further study for their applicability.

7.4.1 RESULTS OF THE KII

(1) Traffic Problems Besetting Metro Manila, Their Causes and Measures

The following table shows the problems related to transport and traffic perceived to be faced by Metro Manila. It showed that it is still congestion that Metro Manila is facing, followed by accidents, pollution (environment), poor conditions of the roads and lack of discipline of drivers. However, if we look further on the table, we can note that the other issues or concerns identified are related to those already mentioned.

TABLE 7.4-1 PERCEIVED MAJOR TRAFFIC PROBLEMS IN METRO MANILA

Perceived Problems	No. of Key Interviewees
Congestion	**14**
Accidents	**6**
Pollution	**5**

Perceived Problems	No. of Key Interviewees
Poor Road Condition	**5**
Undisciplined Drivers	3
Flooding	3
Parking on Side Streets	2
Poor Public Transport Service	2
Poor Traffic Management	1
Others: e.g., undisciplined pedestrians, declining reliance to public transport, growth & increasing reliance on vehicles, less importance of non-motorized vehicles, etc.	1

It could be noted further that the other problems perceived are actually not problems but more of results of the effects of the root causes of the problems. Based on the above table, Table 2 highlights the causes of the major problems identified and the perceived causes and how these can be addressed or mitigated. Surprisingly, poor traffic management is rated low; however this can be attributed to lack of appropriate understanding of the term traffic management. Similarly, traffic enforcement was not among the issues in **Table 7.4-1**. **Table 7.4-2** was constructed from the KII results so as to have a better understanding.

TABLE 7.4-2 CAUSES OF PERCEIVED MAJOR TRAFFIC PROBLEMS AND SUGGESTIONS TO ADDRESS THEM

Perceived Problems	Causes	Perceived Measures/Schemes to Address Problems
1. Congestion	• Too many vehicles on the road at the same route and time; road design not appropriate for the traffic volume and users; road users don't give way to each other. • Lack of policy to control car ownership • Undisciplined drivers especially public transport drivers (i.e. buses, jeepneys, taxis, auvs);Parked/Stalled vehicles/ambulant vendors/Informal terminals along sideroads, sidewalks; etc.Uncoordinated/Non-optimized signal system, Ill-designed U-turns, PT stops, terminals; • High volume of vehicles,	• Government should limit the registration of new cars and motorcycles • Invest on good public transport system • Paradigm shift in thinking that more roads is better • Car restriction policy should be a voluntary initiative esp. of big rich companies • Traffic education; Clearing of side roads/sidewalks/implementation of laws/removal of informal terminals; Optimization and coordination of traffic signals; Removal of unnecessary U-turns/further studies on U-turns; etc. • Development and improvement of

Perceived Problems	Causes	Perceived Measures/Schemes to Address Problems
	protracted period of road/utility works that reduces available lanes for traffic • Undisciplined and inconsiderate drivers, loading and unloading of passengers anywhere, waiting too long for passengers at the stops, uncontrolled parking, changeable policies on use of fly-overs, road diggings, cracked pavements, flooding, cutting into the lane at the last possible place • Limited real-time road traffic information to drivers • Increasing volume of private and public transport vehicles • Volume or No. of vehicles are increasing but the no. of streets remain and limited • Overconcentration of economic and social activities in Metro Manila without corresponding improvements to transportation system capacity as evidenced by the low levels of infrastructure provision vis-à-vis the increasing use of private motorized transport • High mix of slow moving and fast moving motorized and non-motorized transport using the road	mass transit systems to encourage use of public transport, proper traffic management during periods of road/utility works and enforcement of penalty system for contractors in case of delays in completion of works • Educational advocacy campaign, Strictly implement bus and jeepney stops, Limit stay of buses/jeepneys to only 2 minutes maximum, Implement parking controls, Provide parking spaces, Make a permanent policy, Traffic management plan should be part of the project cost, Review design criteria on axle load, implement axle load limits, Maintain the road drainage system, Police enforcement • Reduce vehicles or life span of it • Improve quality of public transport services, particularly LRT and MRTservices. • Introduce Bus Rapid Transit (BRT) system • Construct elevated highways and railways promote mass transit • One operator of buses. Systematic interval of buses.fixed wages for bus drivers • Clearing operation on sidewalks • Re-configuration, modification of some intersections if possible channelization. Signalization if warrants. Improvement of drainage system. Construction of elevated pedestrian crossing on intersection with heavy pedestrian volume. Sidewalk improvement. • Use vehicle info communication system (VICS), car navigation • 1) promotion of economic activities in other areas of the Philippines; 2) promotion of public transport (including

Perceived Problems	Causes	Perceived Measures/Schemes to Address Problems
		investment in mass transit as well as pedestrian facilities) use in Metro Manila - further supported by education of the public on the social merits of having public transport; 3) rationalization of land use to promote living and working in proximate locations - through the promotion of new employment centers in the "bedroom" towns of Metro Manila • We need an honest-to-goodness research on these issues and problems to find the correct answers to these problems
2. Traffic Accidents	• Road users don't gave way, vehicles not properly maintained, lacking appropriate traffic control devices and some are not even visible • Overspeeding motorists; undisciplined drivers especially PT drivers; Badly designed road geometries; etc. • Driver ignorance and /or disregard of traffic safety rules • Undisciplined drivers especially public sector. • Increasing level of motorization • Slow response on traffic accidents due to improper designation of traffic enforcers	• Change of attitude and behavior. Value formation. Do road safety audit on all roads &/or blackspot investigation then implement measures • Stricter requirements for driver licensing to ensure that they have full knowledge and correct understanding of traffic rules; information campaign for drivers, commuters, pedestrians on traffic rules; more in depth training and uplifting of morale of traffic enforcement officers to minimize and eradicate corruption and improve public image; MMDA, DPWH, LGUs to ensure that roads are safe to travel through proper design, construction and installation of necessary signages for driver information; DOTC/LTO/LTFRB to improve and strictly enforce policy on ensuring road worthiness of private and public transport vehicles. • Strict enforcement of traffic/overspeeding laws; Higher fees for repeat offenses/banning of PT drivers with repeat offenses; Strict adherence to road standards • Government should conduct more seminars on road safety driving

Perceived Problems	Causes	Perceived Measures/Schemes to Address Problems
		• Good coordination of traffic enforcers
3. Environment	*Flooding* • Weather conditions • Not good drainage system • Pollution • Smoke belching • Emission of toxic gas because of poor maintenance of vehicles • Lack/limited vehicle inspection and maintenance and testing programs • Long Service life of cars • Dilapidated vehicles emit toxic gases	*Flooding* • Have a good drainage system • Use strong and good quality materials • Pollution • Strict enforcement of vehicle emission, maintenance and testing regulations • Planning for eventual application/transition to alternative/renewable fuels • Proper waste management/ discipline • Strict implementation on emission testing
4. Public Transport	*Buses* • Provincial buses congests city along with city buses *Declining Reliance on Public Transportation* • Dilapidated, second hand buses prone to accidents *Poor Public Transport Services* • Waiting time is very long, too crowded, long travel time. • Lack of infrastructure to support PT • Problem of management and no coordination and scheduling *Improper Use of Roads as Public Transport Terminals* • Poor planning of public transport system and low priority given by government to these public transport modes	• Improvement of public transport infrastructure, modes and services • To address improper use of roads as public transport terminals, an honest-to-goodness research on these issues and problems to find the correct answers to these problems is needed • Tricycles should only be used on tertiary roads
5. Levels of Service of Road Network	*Intersection Delay* • Unsignalized intersection • Lack of foot bridges, obstructions *Limitations to Road Expansions*	*Poor Road Condition* • Use new technologies. • Strict adherence to road design standards; proper monitoring of contractors/Penalty system for contractors; etc.

Perceived Problems	Causes	Perceived Measures/Schemes to Address Problems
	• Right-of-Way problem for new road construction *Parking on Side Streets* • Side streets are impassable because of parked vehicles *Poor Road Condition* • Uneven pavement • Badly and insufficiently designed roads and furniture; Cost-cutting/unscrupulous contractors; etc. • Unmaintained roads • Not good materials used	• Don't let LGU's handle the budget • Use strong and good quality materials
6. Poor Traffic Management	• MMDA using trial & error method; then no advance info on what they will be doing, thus surprising the road users • Enforcers focus on violators, not in mobilizing traffic • Design of signal light is pre-timed or not optimized given the vehicular flow per direction in a typical intersection • It is not a priority; maybe each city has its own set of standard (if there is) • Wrong Locations of U-Turn Slots due to wrong studies/experimental studies	• Plan land use and transport together • Strict and proper implementation on traffic rules and regulations • Further studies on installation of U-turn slots
7. Road User Behavior	*Undisciplined Drivers* • Most of the drivers don't even know the traffic signs. Some of the motorists feel that they are above the law • Lack of proper information before registration • Design of signal light is pre-timed or not optimized given the vehicular flow per direction in a typical intersection • Poor/lack of driver discipline • Undisciplined Pedestrians • Either no facilities for them or they don't want the extra effort	• Education, enforcement • Re-information • Improve driving licensing standards and procedures • Discipline and proper education must be taught starting primary • Strict implementation on rules • Education, provide pedestrian facilities that ensures safety of pedestrians not only from vehicles but also from snatchers, enforcement

Perceived Problems	Causes	Perceived Measures/Schemes to Address Problems
	to use the right facilities • Lack of proper information before registration • Both drivers and pedestrian	

Table 7.4-2 indeed showed that the perceived transport/traffic problems are inter-related and in addressing them, the mitigating measures and schemes are likewise the same. As such, the complexities of the causes of the transport and traffic problems should be viewed on a wider perspective. The solutions in mitigating them should consider not only the hard measures but also the institutional and technological schemes that will be able to respond in alleviating the problems.

(2) Transport Policies and Measures in ASEAN Cities

The key interviewees were further asked on what they think should the Philippines, in particular, Metro Manila learn from other cities, notably in the ASEAN, in coming up with policies and measures towards improving their transport systems. **Table 7.4-3** provides the various policies and measures being adopted in the ASEAN cities, with some other cities mentioned, that can be applied in Metro Manila, as perceived and/or suggested by the key interviewees. The suggested policies or measures are given, as provided by the key interviewees and indeed suggest that, based on best practices approach, can be looked at and see their appropriateness to addressing Metro Manila's traffic problems and issues.

TABLE 7.4-3 PERCEIVED POLICIES AND MEASURES IN ASEAN CITIES (AND OTHERS) FOR METRO MANILA

Good public transport service - meaning identified stations, scheduled trips, travel time somewhat fast and constant, comfortable Provision of the interconnected rail system like HK that is very accessible. Connected also to the shopping and other recreational facilities
Singapore's congestion pricing Carless day of Indonesia Road sharing initiatives
Develop more urban rail routes, Modernize the design of jeepneys, Improve public transport, Unified ticketing system, ITS
U.K. there are specific lanes for each type of vehicles Round about policy
More public transport services that are run and management by professional, Government agencies task in solving traffic problems should provide research funds for those in the academe/private groups to find solutions to these problems. Should be done on a

competitive basis. Thailand is doing this where Chulalongkorn University professors can get research funds to solve a particular transport problem, Government agencies like DOTC, DPWH and similar agencies should encourage their young employees to pursue higher degrees in traffic engineering/transport planning and they should provide scholarship funds for this. This is where we are being left behind by Thailand, Malaysia and Indonesia and soon Vietnam.
BRT application (e.g. Jakarta) Electronic fare payment for transit services (LRT/MRT)
Thailand is worst Follow technology and flow system of Singapore.adopt policies applicable to present situation at rail transits adopt having exact location of doors. Prioritize protection
Singapore- systematic transport system. Only one operator of public vehicles
Loading and unloading on both approaches of Ortigas Bridge and Rosario Bridge. Creative pedestrian crossings Carless day
In line with the solutions recommended in Q2 - Bangkok, Jakarta, Singapore and Kuala Lumpur have invested large amounts in their Mass Transit systems in the form of MRT, LRT, or BRT. Other cities like Ho Chi Minh are already pursuing investment in mass transit. If Metro Manila is to grow further, continued investment in Mass Transit is needed. Furthermore, public transport will only gain increased use among car users if the complementary pedestrian facilities are improved - so that they could comfortably and safely complete their trip. (Many of Metro Manila cities have poor quality pedestrian facilities that is seen as one of the reasons that public transport is unattractive to those who can afford to use cars.

The perceptions of the key interviewees on policies and measures in ASEAN are a combination of investments on hard infrastructure and technology that will help alleviate traffic problems and improve the levels of services (LOS) of the transportation system. A major factor in this regard is the combination of technology, in particular information and communication, and infrastructure developments. This indeed indicates that the introduction and development of ITS for Metro Manila is a priority and the time has come for this.

(3) Perceived Transport Development Vision for Metro Manila

To further provide a comprehensive picture of how to address transport and traffic problems and improves the LOS of the transport problem in the Philippines, particularly in Metro Manila and it periphery, the key interviewees provided their insights on what should be the vision for transport development, as summarized in **Table 7.4-4.**

TABLE 7.4-4 SUGGESTED TRANSPORT DEVELOPMENT VISION FOR METRO MANILA

Metro Manila to have an inclusive and efficient transportation system with low crash rates.
An innovative, creative mega city that promotes inclusive growth and priortizes the convenience of its citizens
Efficient, Effective, Economically and Environmentally-friendly transport system for Metro Manila
Metro Manila having more efficient and safe transport system through its stronger public transport network, with users having the discipline to follow traffic rules and traffic enforcers commanding respect from the public.
More rail-based public transport
* having disciplined motorist and enforcers * strictly implementing rules and regulations
More mass transit system being managed by professionals. More pedestrians street networks especially in very dense urban centers (for example the pedestrian walkay system of Ayala CBD) More parking buildings to put vehicles parked on the road. To clear the streets of parked vehicles and increase its capacity. Provide better pay for those with higher/graduate degrees in DOTC, DPWH, MMDA and other related agencies tasked to solve the traffic problems.
* to have interconnected mass transport system * To have a functional traffic and road management * To have discipline drivers * To have vehicle information communication system
Seamless, safer, more efficient and sustainable transport for Metro Manila
* Vission should be long range, not band-aid type solution * Direction should be traffic free
* connecting roads- from north to south * construct more roads
Future Visions and Directions of your City to be adopted: *** Systematic transport system**
*traffic-free *inter connected rail system * intermodal *provincial buses should only be allowed to the city limits/boundaries *interconnected railway system

* syncronized traffic lights * disciplined drivers * functional traffic and road managements * vehicle information communication system
Overall vision is that Metro Manila become a more liveable place that gives its residents a high quality of life In support of the above vision, urban planning and project/program implementation should promote the use of public transport and the use of non-motorized transport (especially walking) in order to, respectively, make more rational use of limited road facilities and to promote a more healthy lifestyle where physical activities (or exercise) are built-into everyday activities (rather than as something for the weekend or after work). The design of such systems should take into account the cultural and climactic conditions of Metro Manila, to assure appropriateness/relevance and sustainability

The key interviewees highlighted the need for an inclusive and efficient transport system that is available to all that will promote growth in an innovative and creative megacity. Further to this, they perceived Metro Manila to have a more efficient and safe transport system through its stronger public transport network, with users having the discipline to follow traffic rules and traffic enforcers commanding respect from the public. A professionalized and properly compensated transport bureaucracy is likewise envisioned to improve the provision of transport services and better transport infrastructure.

Related to transportation infrastructure, the key interviewees envisioned an interconnected mass transport system supported by a functioning traffic and road management system anchored on a vehicle information communication system. Moreover, the key interviewees see the need to provide rational urban planning that will look at how the limited road facilities can be efficiently utilized for the promotion of high quality of life with minimal impacts on the environment.

Given the above observations, one can therefore deduce that the transport vision should be long-range and not a 'band aid' type one. The transport vision has to be consistent with the overall development vision set for Metro Manila and likewise in consonance with the country's development vision as defined in the Philippine Development Plan, the medium term plan set by the current administration. The pronouncements on the transport development vision, therefore, implied that an efficient supportive transport technology, such as the ITS, is appropriate and timely in ensuring that the vision is carried out.

(4) ITS Applications for Metro Manila and its Suburbs

The previous sections provided a summary on the perceptions of the key interviewees on the

various transport and traffic problems besetting Metro Manila and its periphery. It can be noted that the issues are closely related on how to address the growing rate of vehicles, improve the LOS of the transport systems, reduce the impacts on the environment by the transport systems, enhance traffic discipline and travel behaviour so as to have high quality of life in Metro Manila. The perceived approaches in meeting the transport vision are a combination of infrastructure development and institutional measures supported by efficient and responsive technological innovations. This section discusses the results of the KII on the various ITS applications that meet the requirements of an efficient transport system.

TABLE 7.4-5 SPECIFIC ITS APPLICATIONS FOR METRO MANILA AND ITS SUBURBS

Public transport information systems	**12**
Advanced traffic information system (route guidance, traffic congestion etc.)	**11**
In case of incident, traffic restriction information system	**11**
Advanced traffic signal control system	**10**
Electronic Toll Collection system for toll roads	**10**
Pedestrians support system (safety for pedestrian and provision for pedestrian)	**10**
Public transport priority system	**10**
Driving safety support system (danger warning, assistance for driving etc.)	9
Emergency vehicles priority system	8
Commercial vehicles efficiency operations system (provision freight information,	8
Advanced road operation and maintenance system	7

Table 7.4-5 summarizes the ITS applications that the key interviewees perceived to be appropriate for addressing traffic problems and improving the levels of services of transport systems in Metro Manila. ITS applications that will improve public transport systems top the list, followed by advanced traffic information systems, then ETC system for toll roads. One can therefore deduce that the ITS applications that are needed for meeting the requirements of Metro Manila's transportation system are ITS applications on: a) advance traffic management systems, b) public transport systems, and c) ETC systems. Other ITS applications are related to the provision of information to road users (commuters, pedestrians, and drivers) that will not only improve the LOS of the transport systems but also ensuring traffic and road safety and seamless movement of people (and commodities).

Table 7.4-6 shows the results of the query related to how the promotion of ITS in other countries can be applied in addressing transport issues in the country. The table further validated the responses given in Table 5 that technology anchored on information is among the major ITS applications that can be promoted in the country. Table 6 further emphasized on the need to provide further elaboration on the benefits of ITS and how the various ITS applications can

contribute not only in improving the levels of services of the transport system; but also in coming up with soft measures on how to instil discipline to the road users. Likewise, for implementation of ITS, PPP is worth considering.

Another notable observation is the emphasis on economic valuation that will support ITS development in the Philippines. As such, economic measures supported by ITS are worth contemplating on.

TABLE 7.4-6 ADDRESSING TRANSPORT ISSUES IN THE PHILIPPINES THROUGH THE PROMOTION OF ITS BASED ON EXPERIENCES IN OTHER COUNTRIES

Serious Transport Issues:	Promote ITS field
Very serious - road crashes and traffic congestion	ITS for public transportation system to make them efficient and safe. ITS used in transportation management.
Lack of seamless transport system connectivity	Utilize all mobile phones, work with mall owners and private companies
Congestion, Accidents, Road quality	Congestion pricing, Auto detection of overspeeding vehicles/violations/etc
Traffic safety and driver education as explained above.	
Franchising of public transport	Provide funding support, Provide maintenance budget, Provide technical staff
Proliferation of motorcycles	Information dissemination and educating motorist
We have very few transport/traffic experts. Poor maintenance of ITS technology, and hence after a few days/months, these ITS gadget would not work anymore. Better put ITS projects under the PPP program of the government.	Should be under the PPP program of the government and let those who get these projects promote their technology/product.
Undiscipline drivers specially the public transportation	
Congestion Road crashes/accidents	Road congestion pricing Public transport planning and operation Freight/commercial vehicle route network planning and operation
-	Show historical data, 5 decades ago volume of vehicles vs. now, population and roads Do not focus on present, plan ahead, 20-40 years from now
Congestion Volume of buses	Advertisement on TV, radio and newspapers

Serious Transport Issues:	Promote ITS field
Congestion	explain the benefits and uses of its
Undisciplined drivers especially public transport	explain the benefits and uses of ITS
Motor vehicle driver behavior - not all drivers drive safely; special concern is the large vehices Large vehicles with poor maintenance - make them more likely to cause or be involved in an accident	Make a local evaluation of the potential economic benefits against the costs - and educate the potential users on this.

7.4.2 Summary of KII

The results of the KII survey on how ITS developments can be promoted in addressing transport and traffic problems in Metro Manila and the Philippines, in general, showed that though there were already initial applications, these were not fully utilized. The results of the survey further elaborated the need to come up with a framework on how ITS can be promoted and developed further in Metro Manila. Given this note, it is therefore of essence that the promotion of ITS in Metro Manila be supported; and the needed institutional backing be provided.

The study to which this KII survey was carried out focused only on the ITS application for highway development. It is therefore recommended that a follow up study towards coming up with a more comprehensive examination on the promotion of ITS in Metro Manila and the country in general be pushed. As such, the follow up study should now be in the context of how ITS will enhance the country's intermodal logistics network system. The follow up study should also include the institutional framework and financial scheme on the implementation of the ITS nomenclature in the Philippines and Metro Manila in particular.