JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

THE PROJECT FOR COMPREHENSIVE TRAFFIC MANAGEMENT PLAN FOR METRO MANILA

TECHNICAL REPORT NO. 2

QUESTIONNAIRE SURVEY TO MMDA AND LGUS

November 2022

ALMEC CORPORATION
ORIENTAL CONSULTANTS GLOBAL CO., LTD.
TRANSPORTATION RESEARCH INSTITUTE CO., LTD.

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ABBREVIATIONS

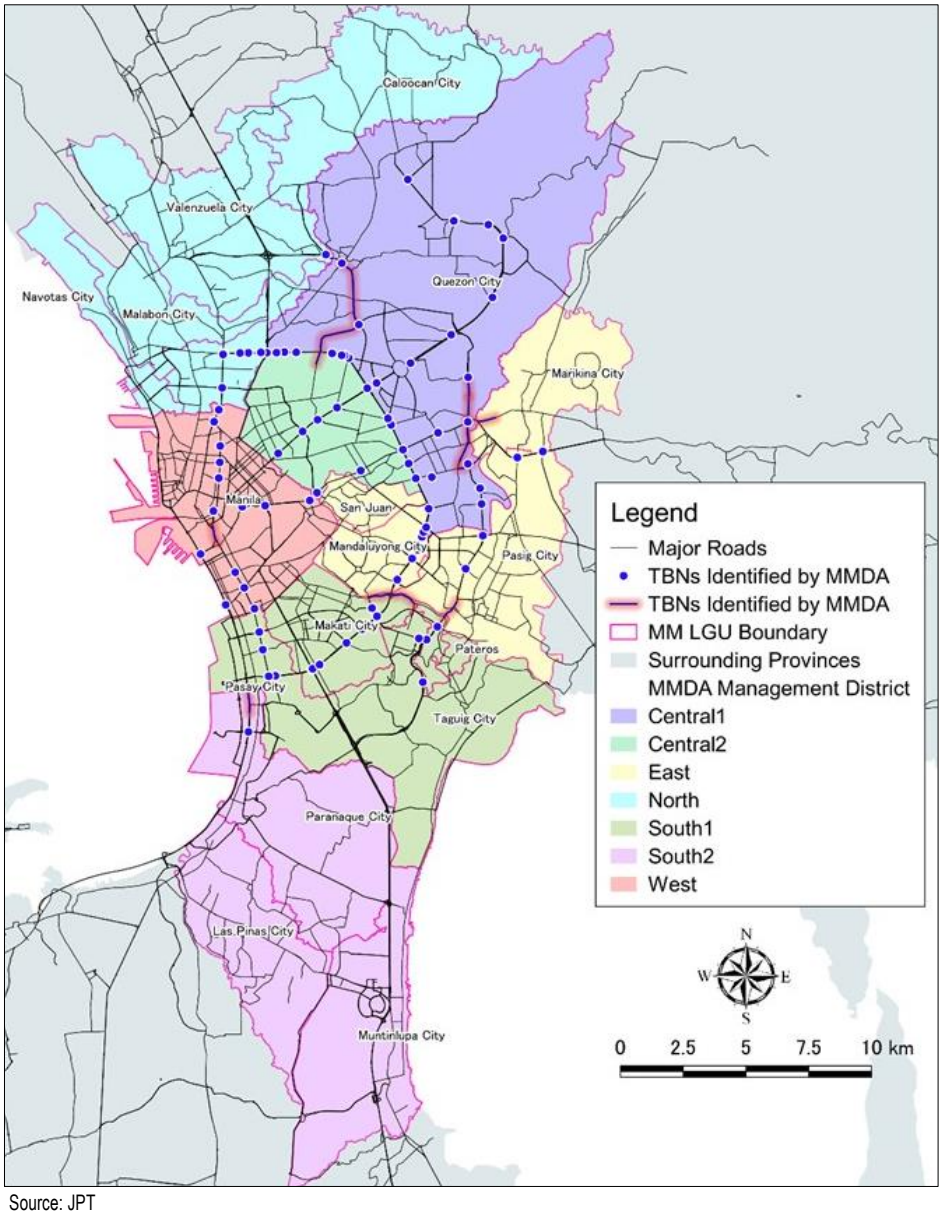
CTMP	Comprehensive Traffic Management Plan
JICA	Japan International Cooperation Agency
JPT	JICA Project Team
LGU	local government unit
MMDA	Metropolitan Manila Development Authority
PUJ	public utility jeepney
EDSA	Epifanio de los Santos Avenue
C-road	circumferential road
R-road	radial road
NLEX	North Luzon Expressway

1 TRAFFIC BOTTLENECKS IDENTIFIED BY MMDA

Currently, traffic congestion is a serious problem on national roads managed by the Metropolitan Manila Development Authority (MMDA). MMDA does not have a clear definition of traffic bottleneck, and it is not clear where is the origin of traffic congestion, i.e., traffic bottleneck. Therefore, as first activity of understanding the situation, a questionnaire survey was conducted for MMDA to clarify the actual situation of MMDA traffic management. The questionnaire survey on traffic bottlenecks on roads under the management of MMDA was conducted by the JPT from 6 June 2019 to the end of October 2019. For the next section, the questionnaire survey responses will be summarized.

1.1 Location of Traffic Bottlenecks Identified by MMDA

Figure 1.1 shows the location of the traffic bottleneck identified by MMDA. There is a total of 102 traffic bottlenecks and these are concentrated on large-scale national roads. They are categorized as 91 points and 11 lines.

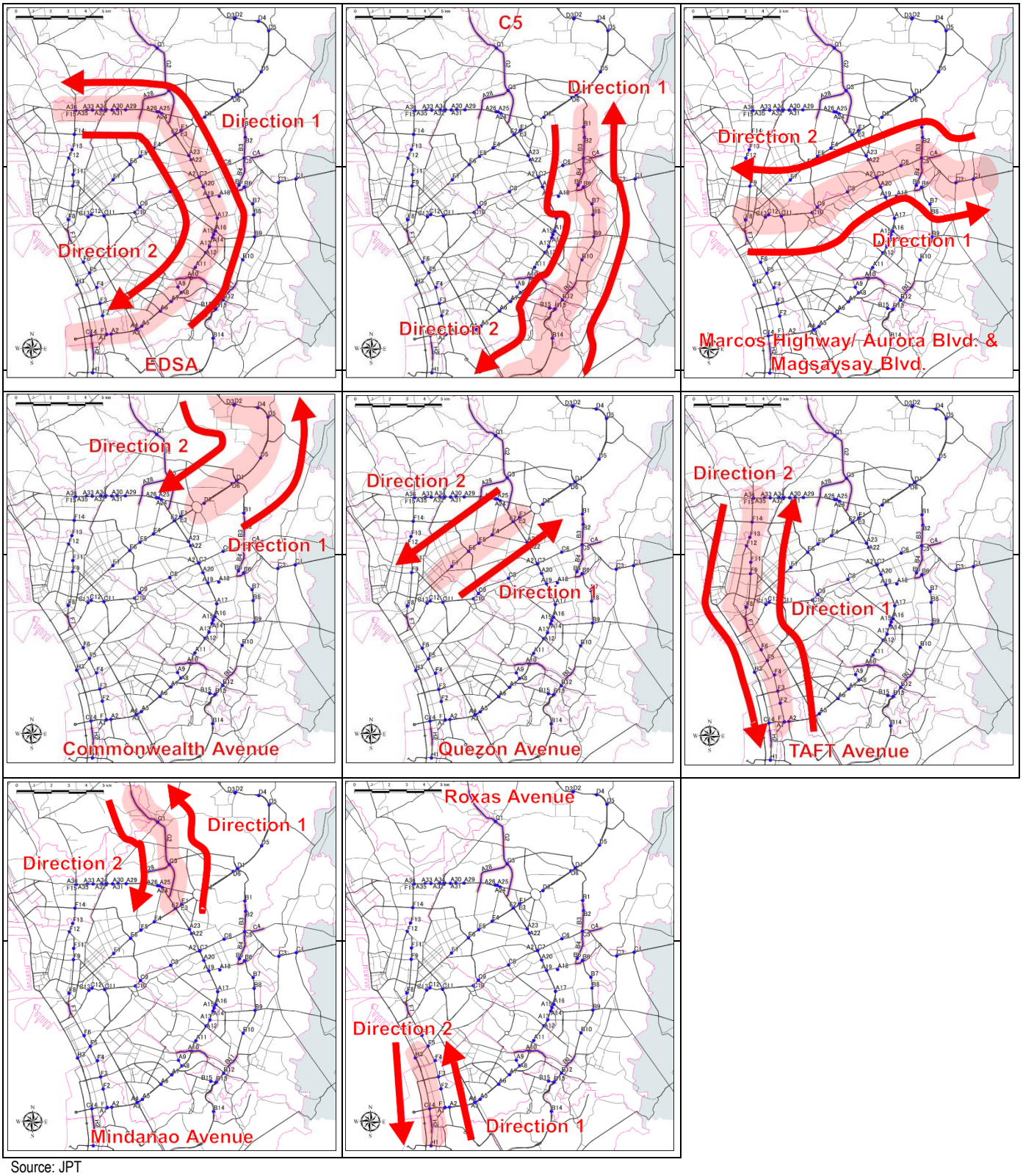


Source: JPT

Figure 1.1: Location of the Traffic Bottlenecks Identified by MMDA

1) Definition of Direction of Traffic Flow

The traffic bottlenecks mentioned above have a different situation for every direction. The traffic flow was defined along major roads directionally as shown in Figure 1.2 for the following analysis.

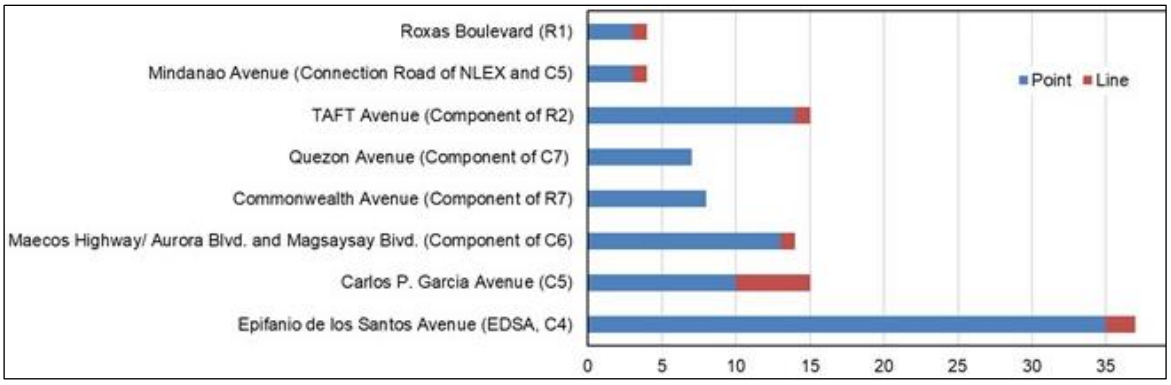


Source: JPT

Figure 1.2: Direction of Traffic Flow along Major Corridors

2) Number of Traffic Bottlenecks Identified by MMDA

Figure 1.3shows the distribution of the traffic bottlenecks by roads. One out of three traffic bottlenecks is concentrated along Epifanio de los Santos Avenue (EDSA).

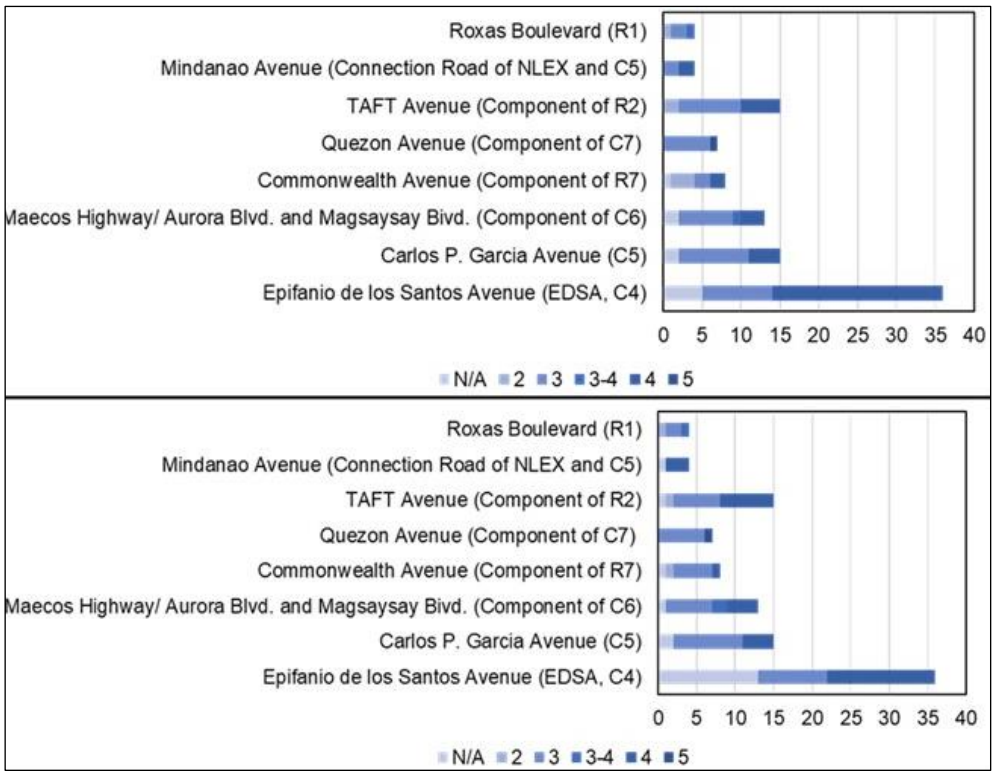


Source: JPT

Figure 1.3: Number of the Traffic Bottlenecks Identified by MMDA by Corridor

3) Severity of Traffic Bottlenecks Identified by MMDA along Major Roads

The severity here is defined as the congestion level divided into 5 from level 1: slight severity to level 5: high severity. Along EDSA, over 50% of the traffic bottlenecks are indicated as traffic bottlenecks with high severity. C5, Marcos Highway/ Aurora Blvd. & Magsaysay Blvd. and Taft Avenue also have a considerable number of intersections with high severity as shown in Figure 1.4.



1) Severity of each direction at the traffic bottlenecks is merged. 2) The upper figure is for major roads, and the lower figure is for minor roads.
Source: JPT

Figure 1.4: Severity of the Traffic Bottlenecks Identified by MMDA by Corridor

1.2 Physical Characteristic of Traffic Bottlenecks Identified by MMDA

1) Epifanio de los Santos Avenue (EDSA, C4)

In order to understand the physical characteristics of the traffic bottleneck identified by MMDA, multiple items were shown in the survey form which MMDA filled in. The physical characteristics of traffic bottlenecks identified by MMDA along EDSA, C4 are shown in Table 1.1.

Table 1.1: Physical Characteristics of Bottlenecks Identified by MMDA on EDSA and Rest of C4

ID	Main Road Name	Minor Road Name	Minor Road Name 2	Structure	Major Road								Minor Road 1							
					Facilities						Pedestrian Safety		Facilities						Pedestrian Safety	
				Segregated/ At-grade	Traffic Signal (Vehicle)	Traffic Signal (Pedestrian)	Side walk (m)	Lane Marking	U-turn Slots	Traffic Signs	Pedestrian Bridges	Pedestrian Crossing	Traffic Signal (Vehicle)	Traffic Signal (Pedestrian)	Side walk (m)	Lane Marking	U-turn Slots	Traffic Signs	Pedestrian Bridges	Pedestrian Crossing
01	EDSA	Taft Avenue	N/A	At-grade	Yes	No	1-2	Yes	Yes	Yes	Yes	No	Yes	No	1	Yes	Yes	Yes	Yes	No
02	EDSA	Tramo Service Road (Tramo Road)	N/A	Segregated	No	No	1-2	Yes	No	No	No	No	No	No	1-2	Yes	No	No	No	No
03	EDSA	Magallanes Off Ramp (Magallanes Interchange)	N/A	Segregated	No	No	0	Yes	No	Yes	No	No	No	No	0	Yes	Yes	Yes	No	No
04	EDSA	Magallanes U-turn at Fly over	N/A	Segregated	No	No	0	Yes	Yes	Yes	No	No	No	No	0	Yes	Yes	Yes	No	No
05	EDSA	Magallanes after MRT Station	N/A	Segregated	No	No	1	Yes	No	Yes	No	No	No	No	1	Yes	Yes	Yes	No	No
06	EDSA	Ayala Avenue	N/A	Segregated	Yes	No	1.5	Yes	Yes	Yes	Yes	No	Yes	No	1	Yes	Yes	Yes	Yes	No
07	EDSA	Buendia Avenue	N/A	Segregated	No	Yes	0	Yes	Yes	No	No	No	Yes	Yes	0	Yes	Yes	Yes	No	No
08	EDSA	Kalayaan Avenue	N/A	Segregated	No	No	1	Yes	Yes	Yes	Yes	No	No	No	1	Yes	Yes	Yes	Yes	No
09	EDSA	Estrella Rockwell	N/A	Segregated	No	No	1	Yes	No	Yes	No	No	No	No	1	Yes	No	Yes	No	No
10	EDSA	Guadalupe Tulay (JP Rizal - Cloverleaf)	N/A	Segregated	No	No	1	Yes	Yes	Yes	No	No	Yes	Yes	1-3	Yes	Yes	Yes	No	No
11	EDSA	Pioneer MRT Station	N/A	Segregated	No	Yes	1.5	Yes	Yes	Yes	Yes	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
12	EDSA	Shaw Boulevard	N/A	Segregated	Yes	Yes	1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	1	Yes	Yes	Yes	Yes	Yes
13	EDSA	Julia Vargas Ave	N/A	Segregated	No	No	2	Yes	No	Yes	No	No	No	No	2	Yes	No	Yes	No	No
14	EDSA	Guadix	N/A	Segregated	No	No	1	Yes	Yes	Yes	No	No	No	No	1	Yes	No	Yes	No	No
15	EDSA	Poveda / Ortigas Bus Stop	N/A	Segregated	No	No	1	Yes	No	Yes	No	No	No	No	1	Yes	No	Yes	No	No
16	EDSA	Ortigas Avenue LEFT turning ramp to Rosario	N/A	Segregated	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	0-1	Yes	No	Yes	No	No
17	EDSA	White plains	N/A	Segregated	No	No	1.5	Yes	No	No	No	No	No	No	1.5	Yes	No	No	No	No
18	Santolan Crame U-turn slot		N/A	At-grade	No	Yes	1	Yes	No	Yes	No	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
19	EDSA	Santolan / Boni Serrano Avenue	N/A	Segregated	Yes	Yes	0.5-1	Yes	No	No	No	Yes	No	Yes	1	Yes	No	Yes	Yes	Yes
20	EDSA	P. Tuazon Intersection	N/A	At-grade	No	Yes	1	Yes	No	Yes	No	Yes	No	Yes	1	Yes	No	Yes	No	Yes
21	EDSA	Aurora Boulevard	N/A	At-grade	Yes	No	1-1.5	Yes	Yes	Yes	Yes	No	Yes	No	1-1.5	Yes	Yes	Yes	Yes	No
22	EDSA	GMA Kamuning / Kamias intersection/ Uturn slot	N/A	Segregated	Yes	Yes	1-1.5	Yes	No	Yes	Yes	Yes	Yes	Yes	1-1.5	Yes	No	Yes	Yes	Yes
23	EDSA	Timog Avenue/ East Avenue intersection	East Ave	Segregated	Yes	Yes	0.5-1	Yes	No	Yes	Yes	Yes	Yes	Yes	0.5-1	Yes	No	Yes	Yes	Yes
24	North Ave/ Trinoma U-turn Slot		N/A	At-grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	0.5/3	Yes	Yes	Yes	Yes	No
25	SN North Loading Bay (Bus Stop)		N/A	At-grade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	No	No	2	Yes	No	Yes	No	Yes
26	SM North Annex - U-turn Slot		N/A	At-grade	No	No	1.5	Yes	No	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
27	Corregidor – U-turn Slot		N/A	At-grade	Yes	Yes	1	Yes	Yes	No	No	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
28	EDSA	Roosevelt Ave/ Congressional Avenue	N/A	At-grade	Yes	No	1.5-2	Yes	Yes	Yes	No	Yes	Yes	No	1.5-2	Yes	Yes	Yes	No	Yes
29	EDSA	Kaingin / Royal (right turn)	N/A	At-grade	No	No	1	Yes	Yes	Yes	Yes	No	No	No	0.5	Yes	No	No	No	No

ID	Main Road Name	Minor Road Name	Minor Road Name 2	Structure	Major Road								Minor Road 1							
					Facilities						Pedestrian Safety		Facilities						Pedestrian Safety	
				Segregated/ At-grade	Traffic Signal (Vehicle)	Traffic Signal (Pedestrian)	Side walk (m)	Lane Marking	U-turn Slots	Traffic Signs	Pedestrian Bridges	Pedestrian Crossing	Traffic Signal (Vehicle)	Traffic Signal (Pedestrian)	Side walk (m)	Lane Marking	U-turn Slots	Traffic Signs	Pedestrian Bridges	Pedestrian Crossing
30	EDSA	Oliveros U-turn Slot	N/A	At-grade	No	No	1	Yes	Yes	No	Yes	No	No	No	0	No	No	No	No	No
31	Balintawak Light Rail Transit (LRT 1) Station		N/A	At-grade	No	No	2	Yes	No	No	Yes	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
32	EDSA	Balintawak Cloverleaf	N/A	Segregated	No	No	0.5	Yes	No	No	Yes	No	No	No	1	Yes	No	No	No	No
33	EDSA	General Malvar - U -turn Slot	N/A	At-grade	No	No	1.5	Yes	Yes	Yes	Yes	No	No	No	0.5	Yes	No	No	No	No
34	EDSA	De Jesus	N/A	At-grade	No	No	2	Yes	No	No	No	No	No	No	0	Yes	No	No	No	No
35	EDSA	General Tinio U-turn Slot	N/A	At-grade	No	No	2	Yes	Yes	No	No	No	No	No	0.5	No	No	No	No	No
36	EDSA	Moumento	N/A	At-grade	No	No	1-2	Yes	No	Yes	Yes	No	No	No	1-2	Yes	No	Yes	Yes	No

Source: JPT

(i) Two-thirds of the traffic bottlenecks identified along EDSA are segregated structures.

(ii) At-grade structure traffic bottlenecks are mainly U-turn slot sections. According to on-site observations, the U-turn slot is formed by MMDA-owned blocks, therefore the structure can be modified (Figure 1.5).

(iii) At the identified traffic bottlenecks, there are a few places where signals are installed, however vehicles and pedestrians are separated at almost all traffic bottlenecks by pedestrian facilities. Therefore, it is considered that a low signal installation rate does not make the pedestrian environment worse.

(iv) The sidewalks are generally wide at the identified traffic bottlenecks.

(v) Pedestrian bridge is installed in many sections.

No. 27	No. 33
	

Source: Google Street View

Figure 1.5: Examples of U-turn Slot by Blocks

2) Carlos P. Garcia Avenue (C5)

The physical characteristics of traffic bottlenecks identified by MMDA along C5 are shown in Table 1.2.

Table 1.2: Physical Characteristics of Bottlenecks Identified by MMDA along C5

ID	Main Road Name	Minor Road Name	Minor Road Name 2	Structure	Major Road								Minor Road 1							
					Facilities						Pedestrian Safety		Facilities						Pedestrian Safety	
				Segregated/ At-grade	Traffic Signal (Vehicle)	Traffic Signal (Pedestrian)	Side walk (m)	Lane Marking	U-turn Slots	Traffic Signs	Pedestrian Bridges	Pedestrian Crossing	Traffic Signal (Vehicle)	Traffic Signal (Pedestrian)	Side walk (m)	Lane Marking	U-turn Slots	Traffic Signs	Pedestrian Bridges	Pedestrian Crossing
01	C5	C. P. Garcia Avenue	N/A	At-grade	Yes	Yes	1.5	Yes	No	Yes	No	No	Yes	No	1.5	Yes	No	Yes	No	No
02	C5	Mirriam College Gate	N/A	At-grade	Yes	No	1.5	Yes	No	Yes	Yes	No	No	No	1.0	Yes	No	No	No	No
03	C5	Atteneo Gate	N/A	At-grade	Yes	No	1.5	Yes	No	Yes	Yes	No	No	No	0	Yes	No	No	No	No
04	C5	Katipunan Flyover	Aurora Blvd	Segregated	Yes No (on flyover)	No	1.0-2.0	Yes	Yes	Yes	Yes No (on flyover)	Yes No (on flyover)	Yes No (on flyover)	No	1.0	Yes	No	No	No	No
05	C5	Libis Tunnel	N/A	Segregated	No	No	0	Yes	No	Yes	No	No	No	No	No	Yes	No	Yes	No	No
06	C5	Libis Service Road (FVR Road - Blue Ridge subd)	N/A	Segregated	Yes	Yes	0.5	Yes	No	Yes	No	Yes	Yes	Yes	0.5	Yes	No	Yes	No	Yes
07	C5	Eastwood	N/A	At-grade	Yes	No	1.5	Yes	No	Yes	Yes	No	No	No	2.0	Yes	No	Yes	N/A	N/A

ID	Main Road Name	Minor Road Name	Minor Road Name 2	Structure	Major Road								Minor Road 1							
					Facilities						Pedestrian Safety		Facilities						Pedestrian Safety	
				Segregated/ At-grade	Traffic Signal (Vehicle)	Traffic Signal (Pedestrian)	Side walk (m)	Lane Marking	U-turn Slots	Traffic Signs	Pedestrian Bridges	Pedestrian Crossing	Traffic Signal (Vehicle)	Traffic Signal (Pedestrian)	Side walk (m)	Lane Marking	U-turn Slots	Traffic Signs	Pedestrian Bridges	Pedestrian Crossing
08	C5	Green Meadows	N/A	At-grade	Yes	No	1.0	Yes	No	Yes	No	Yes	Yes	No	1.0	Yes	No	Yes	Yes	No
09	C5	Ortigas Flyover	Ortigas Ave	Segregated	Yes No (on flyover)	Yes	1.5	Yes	No	Yes	No	Yes No (on flyover)	Yes No (on flyover)	Yes	1.5-2.0	Yes	No	Yes	No	Yes
10	C5	Lanuza	N/A	At-grade	Yes	Yes	1.0-1.5	Yes	No	Yes	No	Yes	Yes	No	1.5	Yes	No	Yes	No	No
11	C5	Bagong Ilog - Bridge	Pasig Blvd Ext	Segregated	Yes No (on flyover)	No	0.5-1.5	Yes	No	Yes	No	Yes No (on flyover)	Yes	No	0.5-1.5	Yes	No	Yes	No	Yes
12	C5	Kalayaan	San Guillermo Ave	At-grade	No	No	0.5-1.0	Yes	Yes	Yes	Yes	No	No	No	0.5-1.5	Yes	No	No	Yes	No
13	C5	32nd Avenue	N/A	Segregated	No	No	0.5	Yes	No	No	N/A	N/A	No	No	0.5	Yes	No	No	N/A	N/A
14	C5	Blue Bos (Blue Vos)	N/A	At-grade	No	No	1.0	Yes	No	No	Yes	No	No	No	0.5	No	No	No	No	No
15	C5	Mc Kinley Road (Mc Kinley Park Way)	N/A	At-grade	Yes	Yes	1.0	Yes	No	Yes	No	Yes	Yes	Yes	1.5	Yes	No	Yes	Yes	Yes

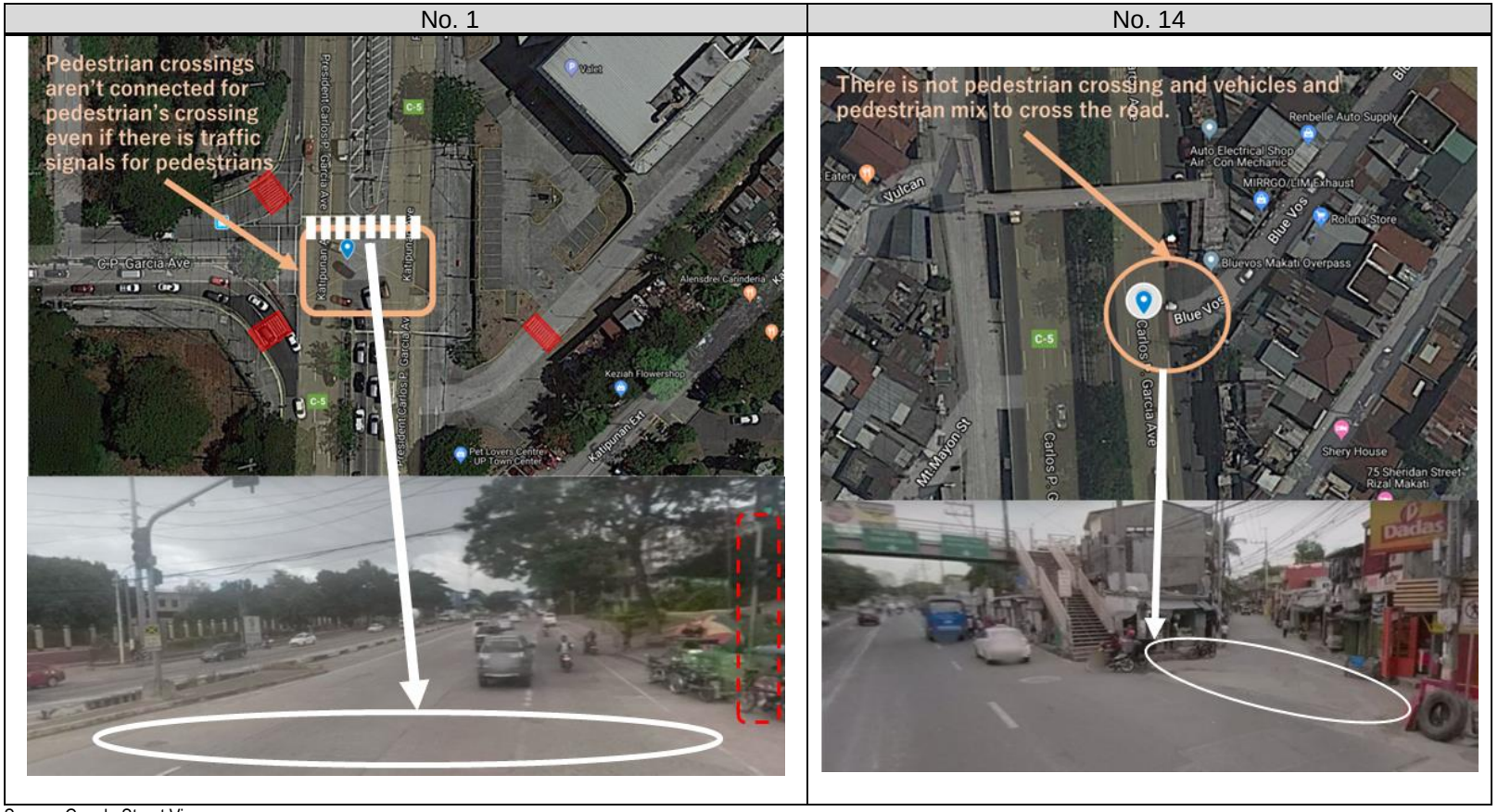
Source: JPT

(i) About one-third of the traffic bottlenecks identified are segregated.

(ii) There is a huge number of installations of traffic signals for vehicles. On the other hand, traffic signals for pedestrians are not installed well.

(iii) The sidewalk is generally wide enough for pedestrians.

(iv) In one traffic bottleneck, both pedestrian bridges and pedestrian crossings are not installed. In addition, there are some places where it is difficult to cross the road (Figure 1.6). No. 05 is also a tunnel, so pedestrians cannot cross the road.



Source: Google Street View

Figure 1.6: Examples of No Pedestrian Crossing

3) Marcos Highway/ Aurora Blvd. and Magsaysay Blvd. (Component of C6)

The physical characteristics of traffic bottlenecks identified by MMDA along Marcos Highway/ Aurora Blvd. and Magsaysay Blvd. are shown in Table.1.3.

Table 1.3: Physical Characteristics of Bottlenecks Identified by MMDA along Marcos Highway/ Aurora Blvd. and Magsaysay Blvd.

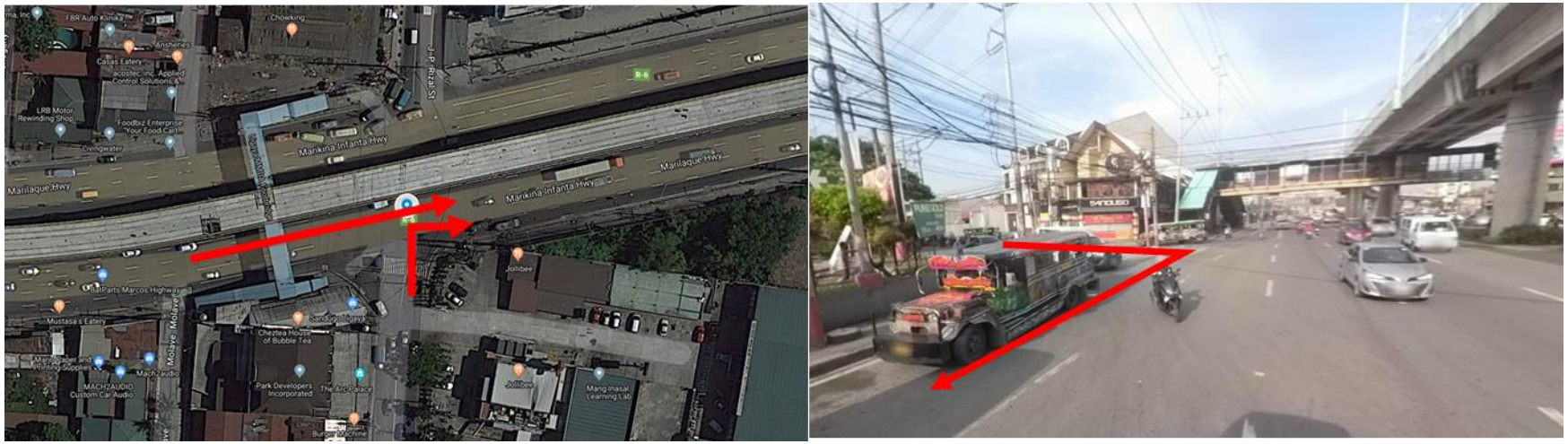
ID	Main Road Name	Minor Road Name	Minor Road Name 2	Structure	Major Road								Minor Road 1							
					Facilities						Pedestrian Safety		Facilities						Pedestrian Safety	
				Segregated/ At-grade	Traffic Signal (Vehicle)	Traffic Signal (Pedestrian)	Side walk (m)	Lane Marking	U-turn Slots	Traffic Signs	Pedestrian Bridges	Pedestrian Crossing	Traffic Signal (Vehicle)	Traffic Signal (Pedestrian)	Sidewalk (m)	Lane Marking	U-turn Slots	Traffic Signs	Pedestrian Bridges	Pedestrian Crossing
01	R6	Felix Ave. (Imelda Ave.)	G. Fernando (A. Tuazon)	At-grade	No	No	1.5	Yes	No	Yes	Yes	No	No	No	1.0	Yes	No	Yes	Yes	No
02	R6	Fernando	N/A	At-grade	No	No	1.0	Yes	No	Yes	Yes	No	No	No	1.5	Yes	No	Yes	Yes	No
03	R6	Ligaya	J. P. Rizal Ave.	At-grade	No	No	2.0	Yes	No	Yes	No	No	No	No	1.0	Yes	No	Yes	Yes	No
04	R6	A. Bonifacio	N/A	Segregated	No	No	1.0	Yes	No	Yes	No	No	No	No	1.0	Yes	Yes	Yes	Yes	No
05	R6	Katipunan Bonifacio	N/A	Segregated	Yes No (on flyover)	No	1.0	Yes	No	No	No	No	Yes No (on flyover)	No	1.0-2.0	Yes	Yes	Yes	Yes No (on flyover)	Yes No (on flyover)
06	R6	Anonas	N/A	At-grade	Yes	Yes	1.0	Yes	No	Yes	No	Yes	Yes	No	1.5	Yes	No	Yes	No	No
07	R6	EDSA	N/A	Segregated	Yes	No	1.5	Yes	No	Yes	Yes	No	Yes No(on underpass)	No	1.5	Yes	Yes No(on underpass)	Yes	Yes No(on underpass)	No
08	R6	Gilmore	N/A	At-grade	Yes	No	1.5	Yes	No	Yes	No	Yes	Yes	Yes	1.0	Yes	No	Yes	No	Yes
09	R6	G. Araneta Ave.	N/A	At-grade	Yes	No	1.0-2.0	Yes	No	Yes	Yes	No	Yes	No	1.5	Yes	No	Yes	Yes	No
10	R6	V. Mapa	N/A	At-grade	Yes	No	1.5	Yes	No	Yes	No	Yes	Yes	Yes	1.0	Yes	No	Yes	No	Yes
11	R6	Nagtahan	A. H. Lacson	Segregated	Yes	Yes	1.5	Yes	No	Yes	No	Yes	Yes	Yes	1.0	Yes	No	Yes	No	Yes
12	R6	Bustillos - Regalado	N/A	At-grade	Yes	No	1.0	Yes	No	Yes	No	Yes	Yes	Yes	1.0	Yes	No	Yes	No	Yes
13	R6	Mendiola	C. M. Recto	At-grade	Yes	Yes	1.5	Yes	No	Yes	No	Yes	Yes	Yes	1.0	Yes	No	Yes	Yes	No
14	C1	P. Burgos - Roxas Blvd.	Katigbak Drive	At-grade	Yes	Yes	2.0	Yes	No	Yes	No	Yes	Yes	No	2.0-3.0	Yes	No	Yes	No	Yes

Source: JPT

(i) Traffic bottlenecks identified by MMDA are mostly at-grade traffic bottlenecks.

(ii) The sidewalk is generally wide enough for pedestrians.

(iii) Major roads do not have both traffic signals and pedestrian bridges for vehicles and pedestrians, respectively, to maximize the traffic volume passing through this section. Therefore, the flow of vehicles and pedestrians is separated completely. However, the flow of vehicles along major and minor roads have conflicts at the junction (Figure 1.7).

No. 3


Source: Google Street View

Figure 1.7: Examples of Traffic Conflict

4) Commonwealth Avenue (Component of R7)

The physical characteristics of traffic bottlenecks identified by MMDA along Commonwealth Avenue are shown in Table 1.4.

(i) The traffic bottlenecks identified by MMDA are all at-grade traffic bottlenecks except for No. 07.

(ii) Traffic signals are mostly not installed. As mentioned above in the 3) Marcos Highway/ Aurora Blvd. and Magsaysay Blvd. (Component of C6), the flow of vehicles and pedestrians are completely separated by a pedestrian bridge without any installation of traffic signals for the maximization of traffic flow along the major road. To solve the conflict of vehicle flow along major and minor roads, the installation of traffic signals or priority lanes must be considered.

(iii) Additionally, the congestion at the junction is remarkable because the road width and the number of lanes had been reduced due to the ongoing construction of Metro Rail Transit (MRT7) (Figure 1.8).

(iv) The sidewalk is generally wide enough for pedestrians.

Table 1.4: Physical Characteristic of Bottlenecks Identified by MMDA along Commonwealth Avenue

ID	Main Road Name	Minor Road Name	Minor Road Name 2	Structure	Major Road								Minor Road 1							
					Facilities						Pedestrian Safety		Facilities						Pedestrian Safety	
				Segregated/ At-grade	Traffic Signal (Vehicle)	Traffic Signal (Pedestrian)	Side walk (m)	Lane Marking	U-turn Slots	Traffic Signs	Pedestrian Bridges	Pedestrian Crossing	Traffic Signal (Vehicle)	Traffic Signal (Pedestrian)	Side walk (m)	Lane Marking	U-turn Slots	Traffic Signs	Pedestrian Bridges	Pedestrian Crossing
01	Commonwealth Avenue	Mindanao Avenue	Mindanao Ave East	At-grade	Yes	Yes	1.0-1.5	Yes	No	Yes	No	Yes	Yes	Yes	1.0	Yes	No	Yes	No	Yes
02	Commonwealth Avenue	Regalado Avenue	N/A	At-grade	No	No	1.0-1.5	Yes	No	No	Yes	Yes	No	No	1.0	Yes	No	Yes	Yes	No
03	Commonwealth Avenue	Fairview Mall	N/A	At-grade	No	No	1.0	Yes	No	No	No	No	No	No	N/A	Yes	No	No	No	N/A
04	Commonwealth Avenue	Dona Carmen	N/A	At-grade	Rotunda	No	1.5	Yes	No (Rotunda)	Yes	No	No	Rotunda	No	0.5	No	No	No	No	No
05	Commonwealth Avenue	Litex road	Batasan Rd	At-grade	No	No	1.0	Yes	No	No	No	No	No	No	1.0	No	No	No	Yes	No
06	Commonwealth Avenue	Don Antonio (Drive)	N/A	At-grade	No	No	1.0-1.5	Yes	No	No	Yes	No	No	No	1.0-1.5	No	No	No	Yes	No
07	Commonwealth Avenue	Tandang Sora	N/A	Segregated	Yes No (on flyover)	No	1.5	Yes	Yes	Yes	Yes No (on flyover)	Yes No (on flyover)	Yes	No	1.0-1.5	Yes	No	Yes	Yes	No
08	Commonwealth Avenue	Philcoa	N/A	At-grade	No	No	1.0-2.0	Yes	No	No	No	No	No	No	1.0	Yes	No	No	Yes	No

Source: JPT

No. 2

Source: Google Street View

Figure 1.8: Images of Lanes Occupied by Construction Work

5) Quezon Avenue (Component of C7)

The physical characteristics of traffic bottlenecks identified by MMDA along Quezon Avenue are shown in Table 1.5.

Table 1.5: Physical Characteristics of Bottlenecks Identified by MMDA along Quezon Avenue

ID	Main Road Name	Minor Road Name	Minor Road Name 2	Structure	Major Road								Minor Road 1							
					Facilities						Pedestrian Safety		Facilities						Pedestrian Safety	
				Segregated/ At-grade	Traffic Signal (Vehicle)	Traffic Signal (Pedestrian)	Side walk (m)	Lane Marking	U-turn Slots	Traffic Signs	Pedestrian Bridges	Pedestrian Crossing	Traffic Signal (Vehicle)	Traffic Signal (Pedestrian)	Side walk (m)	Lane Marking	U-turn Slots	Traffic Signs	Pedestrian Bridges	Pedestrian Crossing
01	Quezon Avenue	Agham St.	BIR Road	Segregated	Yes No (on Underpass)	Yes	1.5	Yes	No	Yes	No	Yes	Yes	Yes	1.0	Yes	No	Yes	No	Yes
02	Quezon Avenue	EDSA (Q. Ave)	N/A	Segregated	Yes No (on underpass)	No	3.0	Yes	No	Yes	Yes No (on underpass)	No	Yes	No	2.0-3.0	Yes	Yes	Yes	Yes	No
03	Quezon Avenue	BIR Uturn Slot	N/A	At-grade	No	N/A	2.5	Yes	Yes	Yes	No	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

ID	Main Road Name	Minor Road Name	Minor Road Name 2	Structure	Major Road								Minor Road 1							
					Facilities						Pedestrian Safety		Facilities						Pedestrian Safety	
				Segregated/ At-grade	Traffic Signal (Vehicle)	Traffic Signal (Pedestrian)	Side walk (m)	Lane Marking	U-turn Slots	Traffic Signs	Pedestrian Bridges	Pedestrian Crossing	Traffic Signal (Vehicle)	Traffic Signal (Pedestrian)	Side walk (m)	Lane Marking	U-turn Slots	Traffic Signs	Pedestrian Bridges	Pedestrian Crossing
04	Quezon Avenue	TIMOG / WEST Avenue (Q.Ave)	Timog Ave.	At-grade	Yes	Yes	1.0	Yes	No	Yes	No	Yes	Yes	No	1.0-3.0	Yes	No	Yes	Yes	No
05	Quezon Avenue	Roosevelt Avenue (Q. Ave)	N/A	At-grade	No	Yes (Not Working)	2.0	Yes	No	No	No	Yes	No	No	1.0	Yes	No	Yes	No	No
06	Quezon Avenue	Araneta Avenue (Q. Ave)	N/A	Segregated	Yes No (on underpass)	Yes	1.0	Yes	No	Yes	No	Yes	Yes	No	1.5	Yes	No	Yes	Yes	Yes
07	Quezon Avenue	D. Tuazon U-turn Slot (Q. Ave)	N/A	At-grade	No	No	N/A	Yes	Yes	Yes	N/A	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Source: JPT

(i) Half of the traffic bottlenecks identified by MMDA are segregated traffic bottlenecks.

(ii) Traffic signals are installed well compared to other major corridors.

(iii) The sidewalk is generally wide enough for pedestrians.

6) Taft Avenue (Component of R2)

The physical characteristics of traffic bottlenecks identified by MMDA along TAFT Avenue are shown in Table 1.6.

(i) All traffic bottlenecks are at-grade traffic bottlenecks.

(ii) The installation rate of traffic signal is high.

(iii) The sidewalk is generally wide enough for pedestrians.

(iv) As for traffic bottlenecks that do not have both traffic signals for vehicles and pedestrians such as No. 8 and No. 11, mixed traffic with pedestrians happens. This is the case of No. 11 especially where there is a large-scale market nearby. Many pedestrians enter and exit the market then cross this section (Figure 1.9).

Table 1.6: Physical Characteristics of Bottlenecks Identified by MMDA along Taft Avenue

ID	Main Road Name	Minor Road Name	Minor Road Name 2	Structure	Major Road								Minor Road 1							
					Facilities						Pedestrian Safety		Facilities						Pedestrian Safety	
				Segregated/ At-grade	Traffic Signal (Vehicle)	Traffic Signal (Pedestrian)	Sidewalk (m)	Lane Marking	U-turn Slots	Traffic Signs	Pedestrian Bridges	Pedestrian Crossing	Traffic Signal (Vehicle)	Traffic Signal (Pedestrian)	Sidewalk (m)	Lane Marking	U-turn Slots	Traffic Signs	Pedestrian Bridges	Pedestrian Crossing
01	Taft Avenue	EDSA	N/A	At-grade	Yes	No	1.0-1.5	Yes	Yes	Yes	Yes	No	Yes	No	0.5-1.5	Yes	No	Yes	Yes	No
02	Taft Avenue	Libertad	Antonio S. Arnaiz Ave.	At-grade	Yes	Yes	1.5	Yes	No	Yes	No	Yes	Yes	Yes	1.0-1.5	Yes	No	Yes	No	Yes
03	Taft Avenue	Buendia Avenue	N/A	At-grade	No	No	2.0	Yes	No	Yes	Yes	No	Yes	No	0.5-1.5	Yes	Yes	Yes	No	No
04	Taft Avenue	Vito Cruz (Ocampo St.)	N/A	At-grade	Yes	Yes	1.0-1.5	Yes	No	Yes	No	Yes	Yes	Yes	1.0-1.5	Yes	No	Yes	No	Yes
05	Taft Avenue	Quirino Avenue	N/A	At-grade	Yes	Yes	2.0	Yes	No	Yes	No	Yes	Yes	Yes	2.0	Yes	No	Yes	No	Yes
06	TAFT Avenue	Pedro Gil	N/A	At-grade	Yes	No	2.0	Yes	No	Yes	No	Yes	Yes	Yes	1.0	Yes	No	Yes	No	Yes
07	Taft Avenue (Manila City Hall/ Lawton)		N/A	Segregated	No	No	2.0	Yes	No	No	No	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
08	Taft Avenue	Rizal Avenue - Carriedo	N/A	At-grade	No	No	1.0	Yes	No	No	No	No	No	No	1.0	Yes	No	No	No	No
09	Taft Avenue	Tayuman	N/A	At-grade	Yes	Yes	1.0-1.5	Yes	No	Yes	No	Yes	Yes	Yes	1.5	Yes	No	Yes	No	Yes
10	Taft Avenue	Bambang	N/A	At-grade	Yes	Yes	1.5	Yes	No	Yes	No	Yes	Yes	Yes	1.0	Yes	No	Yes	No	Yes
11	Taft Avenue	Blumentritt	N/A	At-grade	No	No	1.0	No	No	No	No	No	No	No	0	Yes	No	No	No	Yes
12	Taft Avenue	Abad Santos	N/A	At-grade	Yes	No	2.0	Yes	No	Yes	Yes	Yes	Yes	Yes(Not working)	2.0	Yes	No	Yes	No	Yes
13	Taft Avenue	R. Papa	N/A	At-grade	Yes	Yes(Not working)	1.0	Yes	No	Yes	No	Yes	Yes	Yes	0.5	Yes	No	Yes	No	Yes
14	Taft Avenue	C3 - 5th Avenue	N/A	At-grade	Yes	Yes	1.5	Yes	No	Yes	No	Yes	Yes	Yes	1.0	Yes	No	Yes	No	Yes
15	Taft Avenue	EDSA (Monumento)	N/A	At-grade	No (Rotunda)	No	1.0-3.0	Yes	No	Yes	Yes	No	No (Rotunda)	No	1.0-3.0	Yes	No (Rotunda)	Yes	Yes	No

Source: JPT

No. 11

Source: Google Street View

Figure 1.9: Examples of Mixed Traffic with Pedestrians

7) Mindanao Avenue (Connection Road of North Luzon Expressway (NLEX) and C5)

The physical characteristics of traffic bottlenecks identified by MMDA along Mindanao Avenue are shown in Table 1.7.

Table 1.7: Physical Characteristics of Bottlenecks Identified by MMDA along Mindanao Avenue

ID	Main Road Name	Minor Road Name	Minor Road Name 2	Structure	Major Road								Minor Road 1							
					Facilities						Pedestrian Safety		Facilities						Pedestrian Safety	
				Segregated/ At-grade	Traffic Signal (Vehicle)	Traffic Signal (Pedestrian)	Side walk (m)	Lane Marking	U-turn Slots	Traffic Signs	Pedestrian Bridges	Pedestrian Crossing	Traffic Signal (Vehicle)	Traffic Signal (Pedestrian)	Sidewalk (m)	Lane Marking	U-turn Slots	Traffic Signs	Pedestrian Bridges	Pedestrian Crossing
01	Mindanao Avenue	Quirino Highway		Segregated	Yes	No	1	Yes	Yes	Yes	Yes	No	Yes	No	1	Yes	Yes	Yes	Yes	No
02	Mindanao Avenue	All U-turn Slots (Tandang Sora)	Sauyo UTS	At-grade	No	No	1.5	Yes	Yes	Yes	Yes	No	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
03	Mindanao Avenue	Congressional Ave.		At-grade	Yes	Yes	1.5	Yes	Yes	Yes	Yes	Yes	Yes	Yes	1.5	Yes	Yes	Yes	Yes	Yes
04	Mindanao Avenue	NLEX - SB		At-grade	Yes	No	0.5	Yes	No	Yes	No	No	Yes	No	0.5	Yes	No	Yes	No	No

Source: JPT

(i) All traffic bottlenecks are at-grade traffic bottlenecks except for No. 1. The traffic signals are also installed well.

(ii) The pedestrian facilities are completely not installed at No. 4 (see Figure 1.10).

No. 4

Source: Google Street View

Figure 1.10: Examples of No-pedestrian Facilities

8) Roxas Boulevard (R1)

The physical characteristics of traffic bottlenecks identified by MMDA along Mindanao Avenue are shown in Table 1.8.

Table 1.8: Physical Characteristics of Bottlenecks Identified by MMDA along Mindanao Avenue

ID	Main Road Name	Minor Road Name	Minor Road Name 2	Structure	Major Road								Minor Road 1							
					Facilities						Pedestrian Safety		Facilities						Pedestrian Safety	
				Segregated/ At-grade	Traffic Signal (Vehicle)	Traffic Signal (Pedestrian)	Side walk (m)	Lane Marking	U-turn Slots	Traffic Signs	Pedestrian Bridges	Pedestrian Crossing	Traffic Signal (Vehicle)	Traffic Signal (Pedestrian)	Side walk (m)	Lane Marking	U-turn Slots	Traffic Signs	Pedestrian Bridges	Pedestrian Crossing
01	Roxas Boulevard	NAIA/MIA Road - Coastal intersection	N/A	Segregated	Yes	No	1.5	Yes	Yes	Yes	Yes	No	Yes	No	1.5	Yes	Yes	Yes	Yes	No
02	Roxas Boulevard	Baclaran Area	N/A	At-grade	Yes	Yes	0.5-2	Yes	Yes	Yes	No	Yes	Yes	Yes	0.5-2	Yes	Yes	Yes	No	Yes
03	Roxas Boulevard	President Quirino Avenue	N/A	At-grade	Yes	Yes	10	Yes	No	Yes	No	Yes	Yes	Yes	5	Yes	No	Yes	No	Yes

Source: JPT

(i) Pedestrian facilities and traffic signals are installed well.

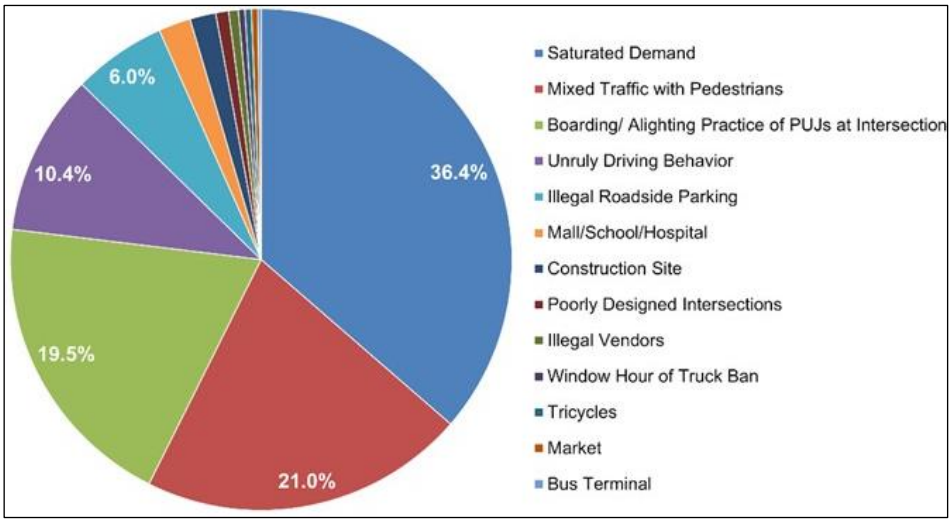
(ii) No. 1 is the intersection selected for the first round of the Case study. It is the only segregated intersection of traffic bottlenecks along Roxas Boulevard. The Ninoy Aquino International Airport (NAIA) Expressway flyover passes over the intersection, and the pillars of the flyover affect the structure of the intersection.

1.3 Causes of Traffic Bottlenecks Identified by MMDA

1) Overall Causes

Figure 1.11 shows the causes of the traffic bottlenecks identified by MMDA. The three major causes add up to over 75%. Although the biggest cause is the lack of road capacity as compared to the saturated demand, other major causes, such as mixed traffic with pedestrians, boarding/alighting practice of Public Utility Jeepneys (PUJs) at intersections, unruly driving behavior, and illegal roadside parking, also make the road capacity decrease.

Therefore, there might be a huge possibility that we can ease the traffic congestion without constructing large-scale roads and bridges. In other words, traffic management can be an effective way in Metro Manila.



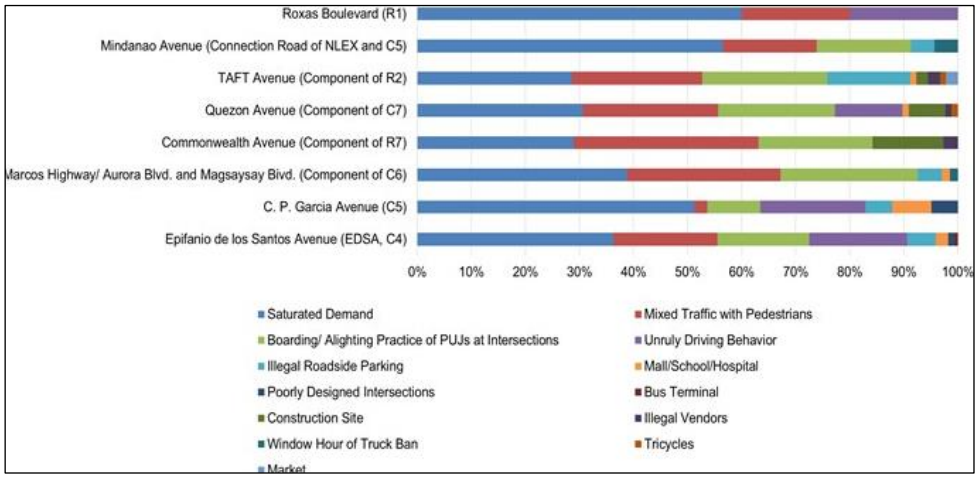
1) Causes of major roads and minor roads are merged.
Source: JPT

Figure 1.11: Causes of Traffic Bottlenecks Identified by MMDA

2) Causes by Corridor

Figure 1.12 shows the causes of the Traffic Bottlenecks by road. Along almost all roads, the three major causes are the Saturated Demand, Mixed Traffic with Pedestrians, and Boarding/ Alighting Practice of PUJs at Intersections. Along C5, Mindanao Avenue and Roxas Boulevard, Saturated Demand occupies over 50% of all the causes.

As mentioned earlier, traffic management is an effective means of reducing traffic congestion in Metro Manila. However, the construction and widening of new roads, and the addition of new lanes night be more important along C5, Mindanao Avenue and Roxas Boulevard than the other major corridors.

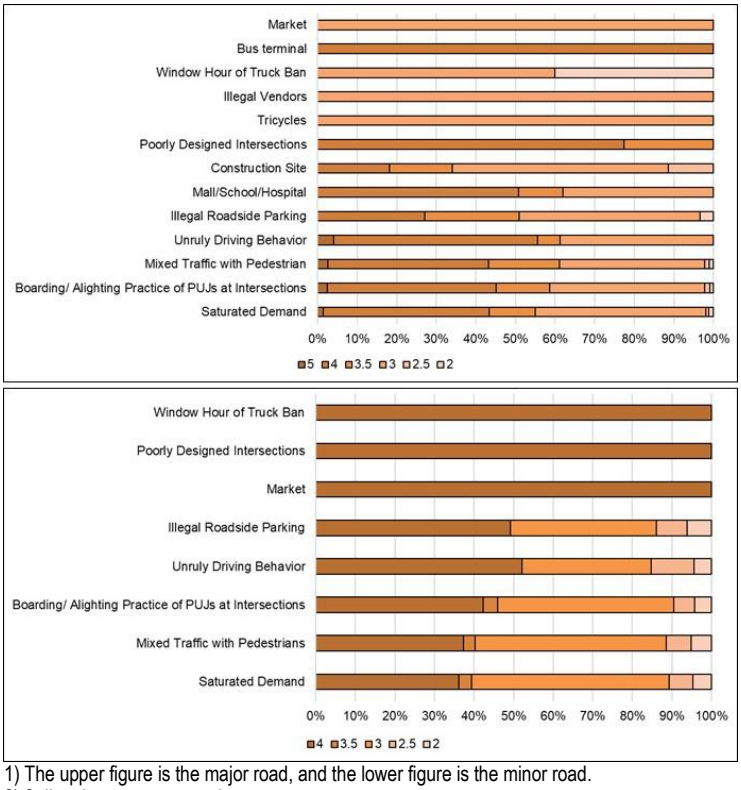


1) Causes of major roads and minor roads are merged.
Source: JPT

Figure 1.12: Causes of Traffic Bottlenecks by Corridor

3) Relationship between Causes and Severity

Figure 2.13 shows the severity of measures along major and minor roads. For either road, Saturated Demand, Boarding/ Alighting Practice of PUJs, Mixed Traffic with Pedestrians and Unruly Driving Behavior are considered as the serious causes. In particular, along major roads, they may reach up to the most serious level: Level 5. In addition, malls/schools/hospitals, and bus terminals, which are the specific causes of traffic bottlenecks in major roads, also affect the severity. On the other hand, tricycles, illegal vendors, window hours of truck ban, and markets may cause a relatively light level of severity.

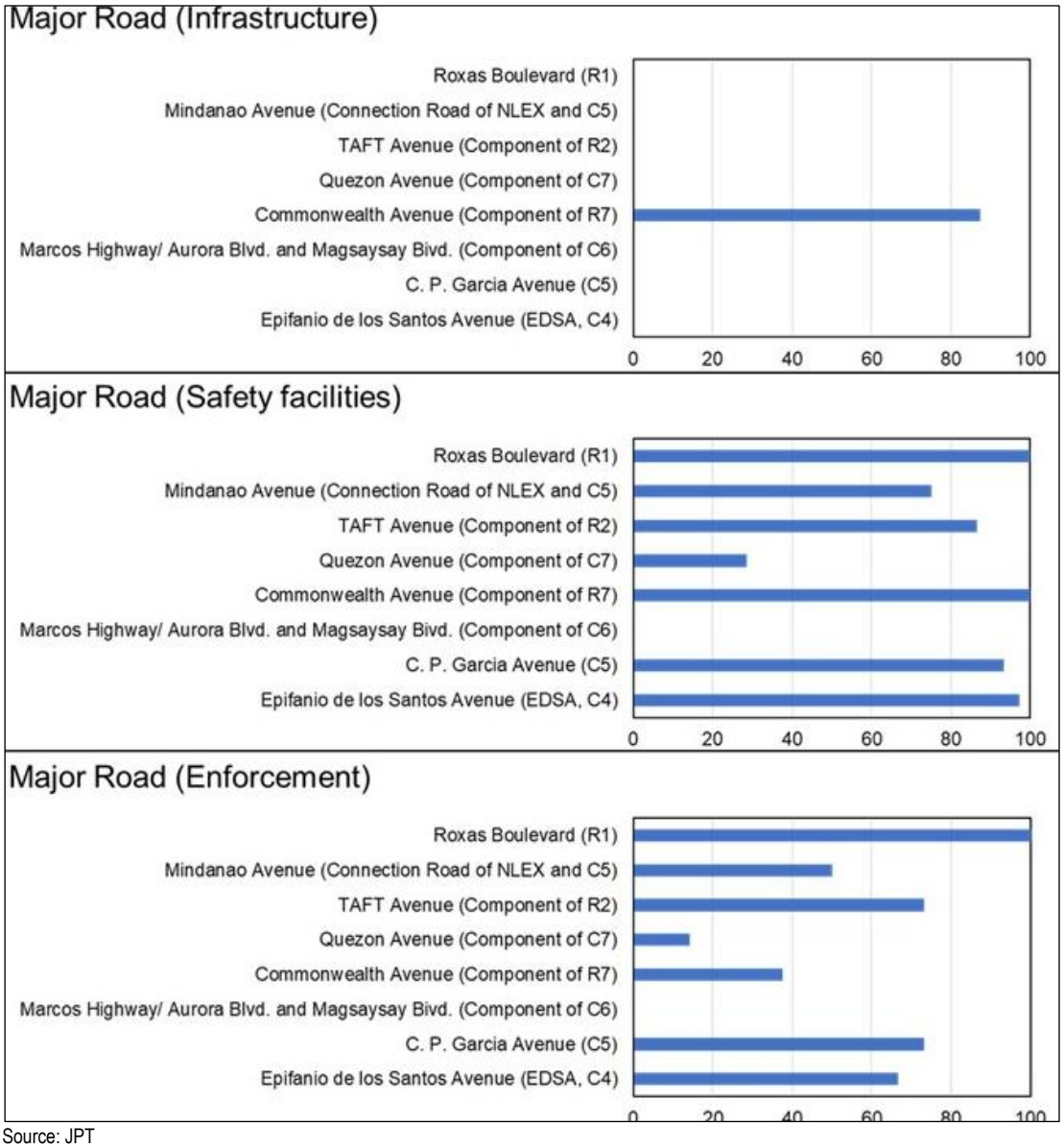


1) The upper figure is the major road, and the lower figure is the minor road.
2) 2 directions are averaged.
Source: JPT

Figure 1.13: Severity by Evaluated Measurements along Major and Minor Roads

1.4 Existence of Planned Measures

JPT studied whether MMDA is planning traffic management measures for traffic bottlenecks identified by MMDA in this questionnaire survey. The planned traffic management measures are divided into three categories: infrastructure, safety facilities, and enforcement, and each traffic bottleneck are divided into major road and minor road to clarify the formulation status of measure planning.



Source: JPT

Figure 1.14: Existing Rate of Planned Improvement Measures along Major Roads

(a) **Infrastructure:** MMDA planned traffic management measures for approximately 90% of the intersections along Commonwealth Avenue. On the other hand, no other measures are planned along the other corridors.

(b) **Safety Facilities:** MMDA was not planning any traffic management measures at Marcos Highway, Aurora Blvd., and Magsaysay Blvd. However, most of the other corridors have plans with high rates. Therefore, one can see that MMDA is developing traffic management plans in consideration of the walking environment of pedestrians.

(c) **Enforcement:** As shown in Chapter 1, the LGUs planned the traffic management measures with a high rate for traffic bottlenecks in their own city. On the other hand, the planning rate of traffic improvement measures by MMDA in terms of enforcement was low except for some corridors. The reason for this might be that roads under the management of MMDA are vast, unlike LGUs, and there might also be a limit to the number of personnel.

For minor roads, the planning rate of traffic control measures was lower than that of major roads at almost all corridors. This condition is very different from Metro Manila LGUs. As shown in Chapter 1, the planning rate of each method was almost the same in the LGU questionnaire survey, regardless if it is a major road or a minor road. On the other hand, the planning of traffic management measures concentrates on major roads and the concerns of MMDA are the major roads such as radial roads and circumferential roads.

Source: JPT

Figure 1.15: Existing Rate of Planned Improvement Measures along Minor Road

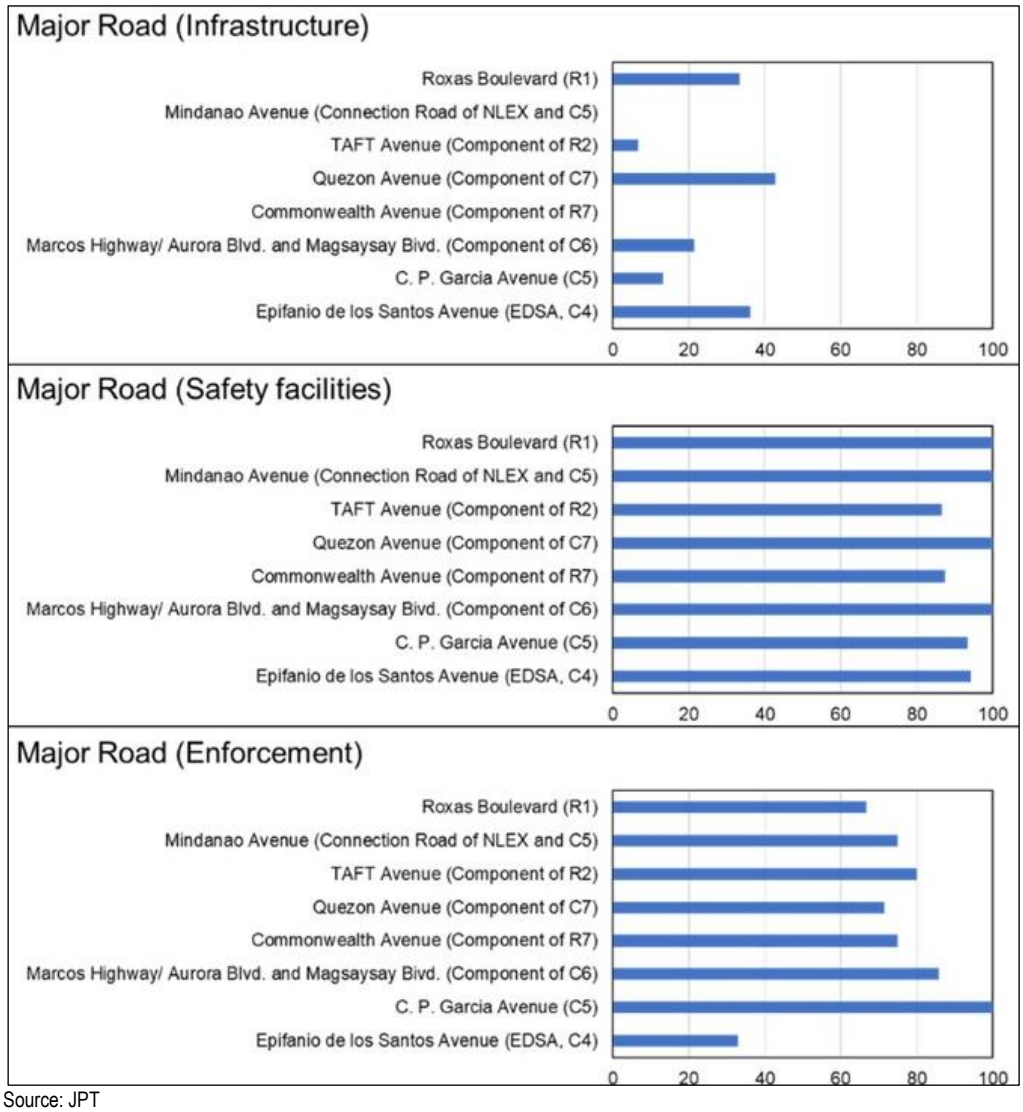
1.5 Evaluation of Implemented Measures

Compared to the current planning situation of traffic management measures, the evaluation rate of implemented traffic management measures is high on average.

(a) **Infrastructure:** The planning of traffic management measures only had a high formulation rate for traffic bottlenecks along Commonwealth Avenue. However, the evaluation rate of implemented traffic management measures was zero at the traffic bottlenecks along Commonwealth Avenue. No other corridor had an evaluation rate of more than 50%.

(b) **Safety Facilities:** All corridors had high evaluation rates (about 90%) for traffic management measures. In the LGU questionnaire survey, there were only 8 LGUs with an evaluation rate of 80% or more, so it can be said that the evaluation rate by MMDA was particularly high.

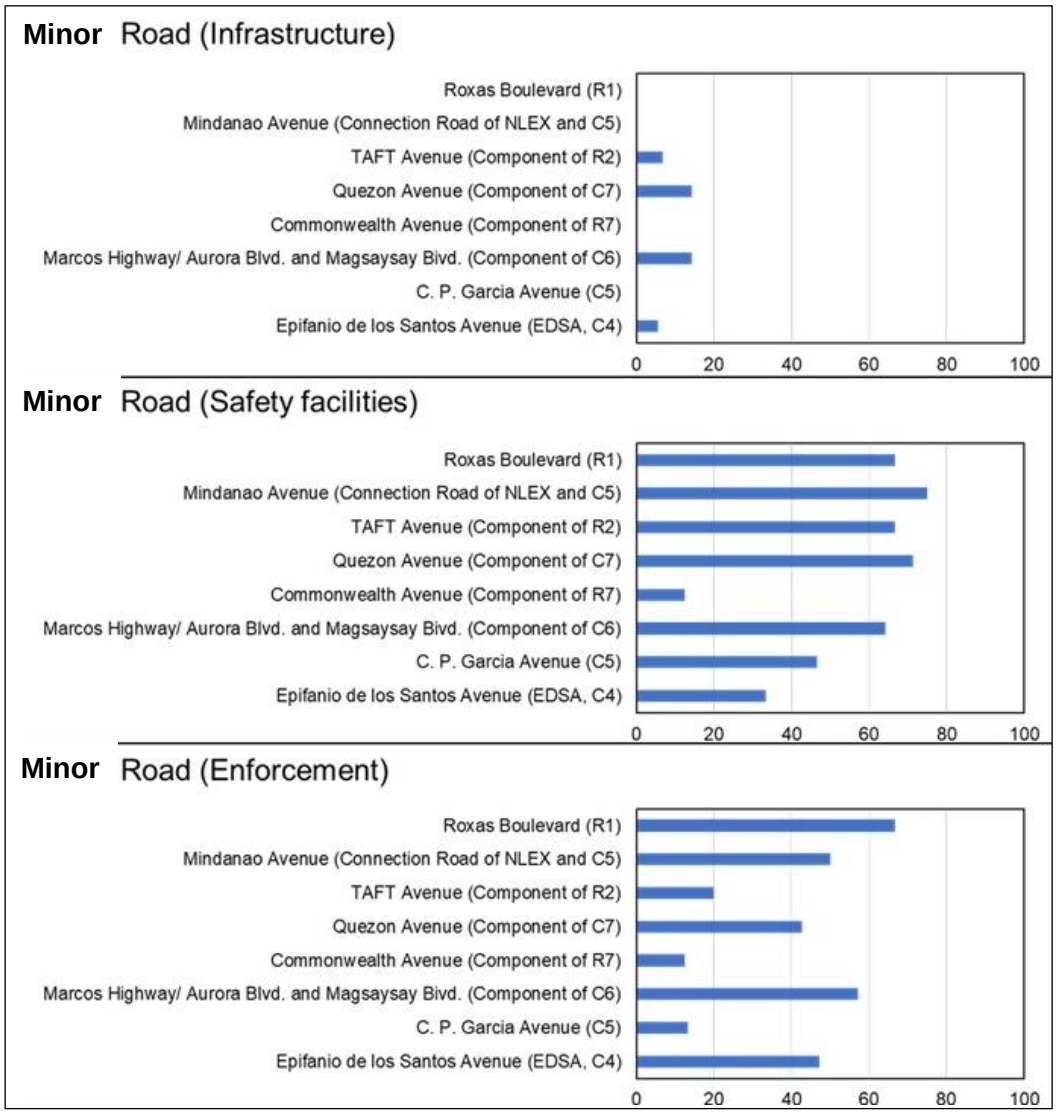
(c) **Enforcement:** All corridors except for EDSA had a rating of over 70%. The evaluation rate of traffic management measured by the enforcers was almost the same value as those of the LGUs.



Source: JPT

Figure 1.16: Evaluation Rate of Implemented Measures along Major Roads

The evaluation rate for the implemented traffic management measures is significantly lower than those of the LGUs, and the evaluation of measure implementation by infrastructure is rarely executed. This situation is similar to the planning rate of traffic management measures wherein minor roads have lower evaluation rates than major roads. This result supports the possibility that the MMDA's interest is concentrated on major roads.

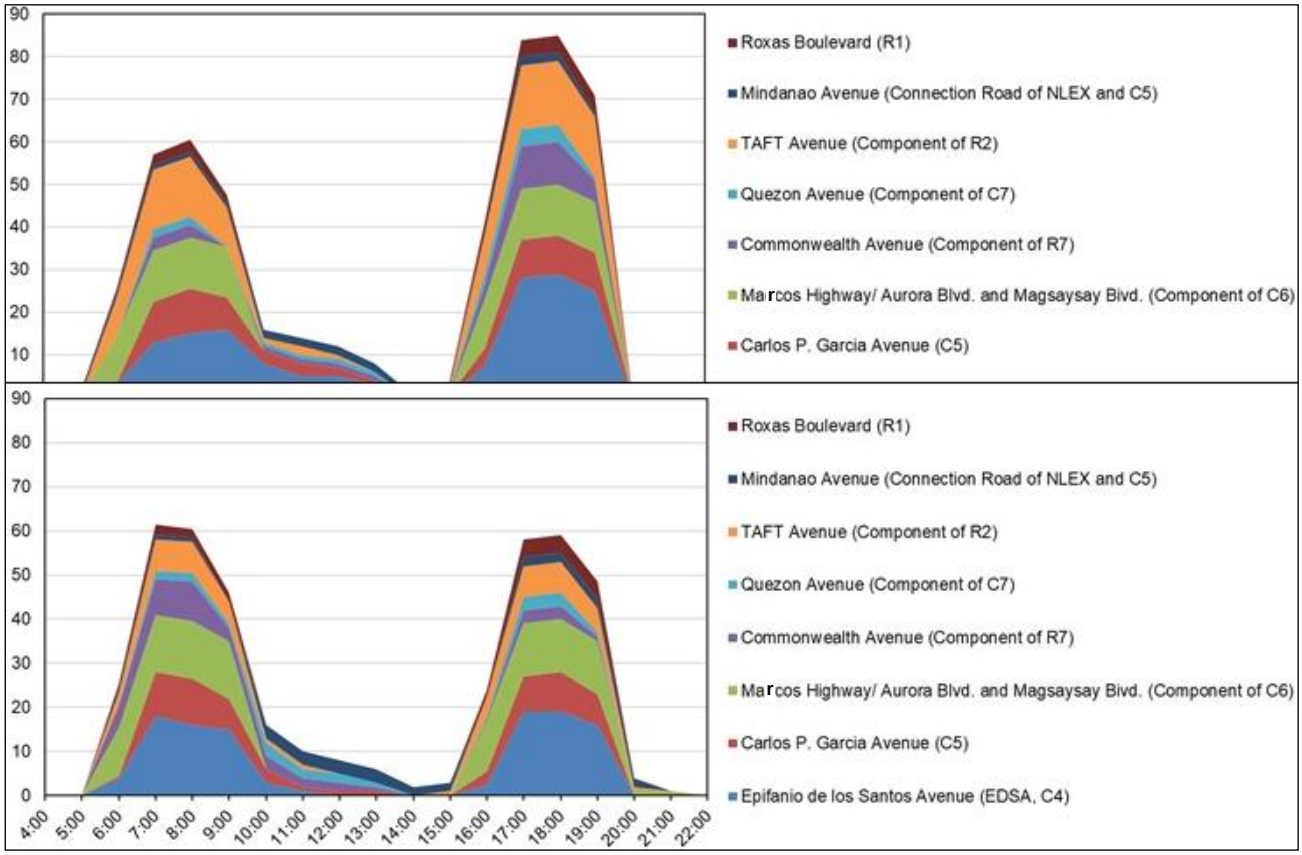


Source: JPT

Figure 1.17: Evaluation Rate of Implemented Measures along Minor Roads

1.6 Analysis on Distribution of Road Congestion Over Time

Figure 1.18 shows the distribution of road congestion over time. Based on the figure, rush hours happen from 6:00 to 9:00 in the morning and from 16:30 to 19:00 in the evening. In contrast, 14:00 to 15:00 is regarded as off-peak in which there is less traffic on the roads. By comparing the morning and the evening rush hours, Direction 1 has more traffic in the evening while Direction 2 has more in the morning. The maximum congestion in Direction 1 reaches up to 80 bottlenecks while Direction 2 only reaches up to 60 bottlenecks. This indicates that evening peak hours in Direction 1 are the most congested time of the day. Also, by comparing the traffic volume by roads, EDSA accounted a large ratio in both Directions 1 and 2 during the morning and evening rush hours. In addition, TAFT in Direction 1 and Marcos Highway/ Aurora Blvd. and Magsaysay Blvd. in direction 2 also have high traffic volume. For the other notable features of each road, there is an increase on the traffic volume in Mindanao Ave. during off-peak hours while it decreases for all the other roads. Also, Commonwealth Ave. can be regarded as a road that changes the direction of the congested traffic flow from Direction 2 to Direction 1, from morning to evening.



1) The upper figure is direction1 and the lower figure is direction2.
Source: JPT

Figure 1.18: Degree of Congestion Over Time

1.7 Summary of and Comment on Traffic Bottlenecks Identified by MMDA

1) Location

The traffic bottlenecks identified by MMDA were all concentrated on eight (8) large roads. As a result, these traffic bottlenecks do not overlap with the traffic bottlenecks identified by the LGUs described in the next section.

This might be caused mainly by the following issues:

(i) Different definitions of traffic bottlenecks between MMDA and LGUs;

(ii) These organizations are only concerned with the roads they are in charge of; and

(iii) These organizations are not concerned with the roads managed by other agencies even if the roads pass through the area under their own jurisdiction.

2) Number and Severity

One out of three traffic bottlenecks is concentrated along EDSA. Along EDSA, over 50% of the traffic bottlenecks are indicated as traffic bottlenecks with high severity. C5, Marcos Highway/ Aurora Blvd. & Magsaysay Blvd. and Taft Avenue all have a considerable number of intersections with high severity.

3) Physical Characteristics

As for the physical characteristics of the current traffic bottlenecks, it is necessary to consider the following for future traffic management measures.

(i) Installation of U-turn slots based on scientific evidence (including frequent opening and closing of U-turn slots)

(ii) Relevance of setting up pedestrian facilities such as pedestrian bridges and pedestrian crossings (a comfortable walking environment for pedestrians including persons with disabilities, children and the elderly)

(iii) Proper traffic signal installation (signal installation for cars or pedestrians only)

(iv) Number of traffic signals installed

4) Causes

The major 3 causes amount to over 75%. Although the biggest cause is about lack of road capacity as compared to the demand, other major causes, such as mixed traffic with pedestrians, boarding/alighting practice of PUJs at intersections, unruly driving behavior, illegal roadside parking, also make the road capacity decrease.

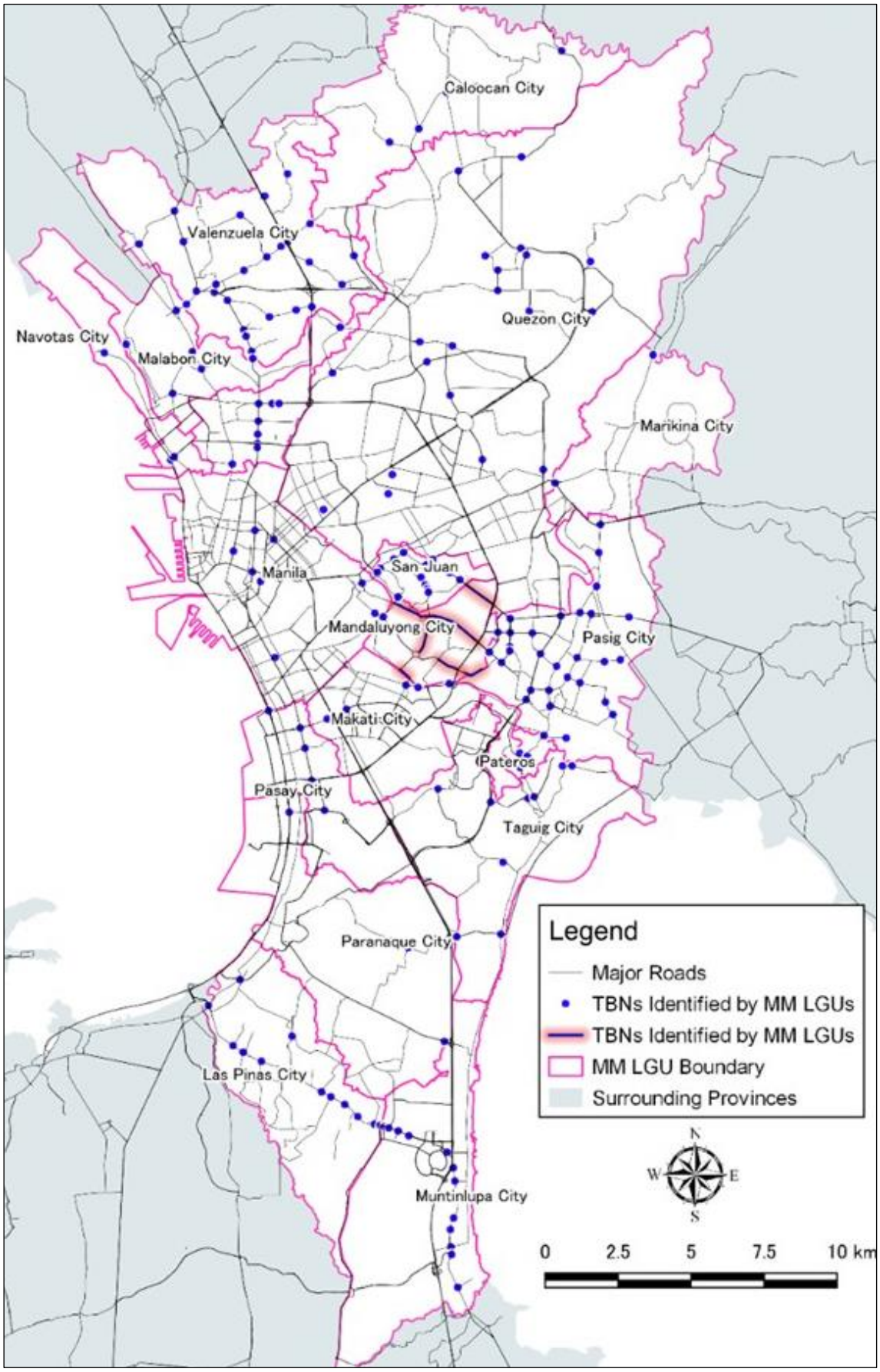
Therefore, there might be a huge possibility that the traffic congestions can be eased without constructing large scale roads and bridges. In other words, traffic management can be an effective solution for Metro Manila.

2 TRAFFIC BOTTLENECKS IDENTIFIED BY LGUs IN METRO MANILA

Although traffic congestion is a major social problem in Metro Manila, the location and causes of the traffic congestion are not clear. To come up with countermeasures, it is important to identify the location of traffic bottlenecks that causes the traffic congestion. Therefore, a questionnaire survey was conducted for each LGU in Metro Manila to clarify the actual situation there. JICA Study Team (JPT) conducted the questionnaire survey on traffic bottlenecks in 17 LGUs in Metro Manila. The questionnaire survey was conducted from 26 April 2019 to 31 October 2019.The responses were obtained from all LGUs (Partial data was obtained from some of the 17 LGUs). For the next section, the questionnaire survey responses will be summarized.

2.1 Location of Traffic Bottlenecks Identified by LGUs in Metro Manila

First, all the traffic bottlenecks identified by 17 LGUs are placed on the map. Figure 2.1 shows the location of the traffic bottlenecks in Metro Manila. 187 traffic bottlenecks were identified based on the questionnaire survey.

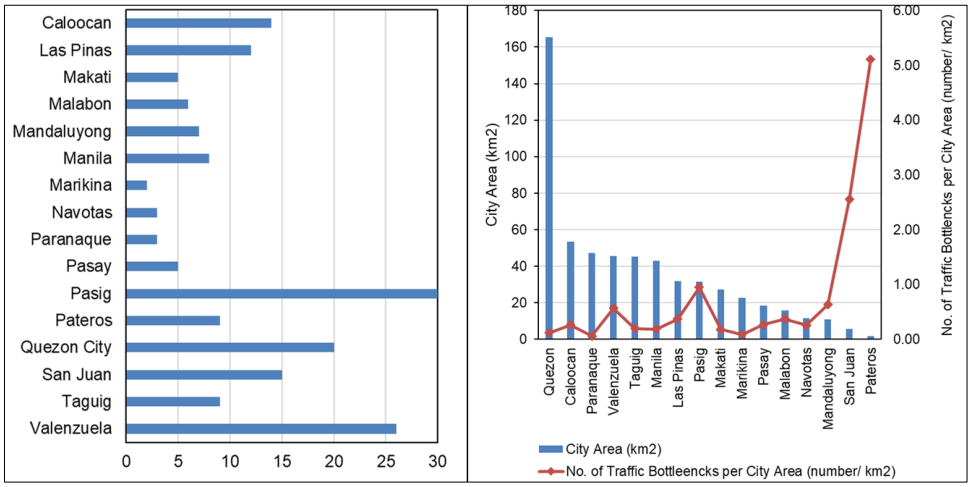


Source: JPT

Figure 2.1: Location of Traffic Bottlenecks in Metro Manila

1) Number of the Traffic Bottlenecks in Each LGU

Figure 2.2 shows the number of traffic bottlenecks which was proposed by each LGU. Pasig City, Valenzuela City, and Quezon City identified not less than 20 traffic bottlenecks. On the other hand, 6 LGUs identified 2 to 5 traffic bottlenecks each. There is a huge difference among LGUs and it is assumed that the definition of the LGUs' traffic bottleneck is largely different. Therefore, to clarify the unrelatedness of the city area, the correlation between the number of proposed traffic bottlenecks and city area was surveyed. The results show that the no. of traffic bottlenecks per city area (number/ km^2) varies greatly among LGUs. This is especially the case for San Juan City and the Municipality of Pateros wherein they have a much higher rate of existing traffic bottlenecks compared with other LGUs.

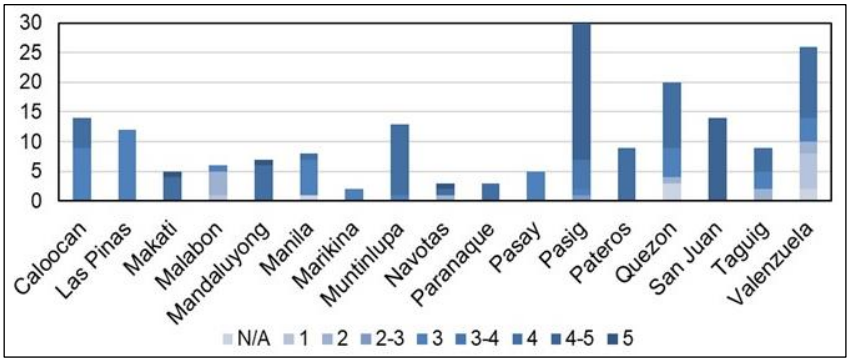


1) Unit: number of traffic bottlenecks proposed by LGUs (above left).
Source: JPT

Figure 2.2: Number of Traffic Bottlenecks in Each LGU

2) Severity of the Traffic Bottlenecks along Major Roads in Each LGU

The difference in the existence of traffic bottlenecks was shown earlier. For this part, the differences in severity for each traffic bottleneck will be specified. Figure 2.3 shows the severity of the traffic bottlenecks proposed by LGUs. Muntinlupa City, Pasig City, and San Juan City indicated that almost all their traffic bottlenecks are highly congested. It may also show that the definition of severity of traffic bottlenecks is different among LGUs.



1) Severity of direction 1 on the major roads are shown in this figure.
2) Bigger figure means higher severity
Source: JPT

Figure 2.3: Severity of Traffic Bottlenecks in Each LGU

2.2 Physical Characteristic of Traffic Bottlenecks Identified by Metro Manila LGUs

1) Caloocan City

In order to grasp the physical characteristics of the traffic bottleneck identified by each LGU in Metro Manila, multiple items were shown in the survey form that each LGU filled in. The result of the physical characteristics of traffic bottlenecks identified by Caloocan City is shown in Table 2.1.

Table 2.1: Physical Characteristics of Bottlenecks Identified by Caloocan City

ID	Main Road Name	Minor Road 1	Minor Road 2	Structure	Facilities					Pedestrian Safety	
				Segregated/ At grade	Traffic Signal (Vehicle)	Traffic Signal (Pedestrian)	Sidewalk (m)	Lane Marking	U-turn Slots	Pedestrian Bridges	Pedestrian Crossing
CLN001	Teofilo Samson Ave (Brgy. 168)	Deparo Road	Llano Road	At-grade	No	Np	0	No	0	No	No
CLN 002	Camarin Road	Congressional Road (VCAS)	n/a	At-grade	No	No	0	Yes	0	No	No
CLN 003	Almar Road	Camarin Road	Zabarte Road	At-grade	No	No	0	Yes	0	Yes	No
CLN 004	Zapote Road	Camarin Road	n/a	At-grade	No	No	0	Yes	0	No	Yes
CLN 005	Quirino Hi-Way	Malaria Road	n/a	At-grade	No	No	0	Yes	0	No	No
CLS001	EDSA	McArthur Highway	Rizal Ave Extension	At-grade	No	No	3	Yes	2	Yes	No
CLS002	EDSA	B. Serrano (5th Street)	n/a	At-grade	No	No	4	Yes	2	Yes	No
CLS003	EDSA	A. de Jesus (8th Street)	n/a	At-grade	No	No	4	Yes	2	No	No
CLS004	Rizal Avenue Extension	10th Avenue (East)	10th Avenue (West)	At-grade	Yes	Yes	4	Yes	0	No	Yes
CLS005	Rizal Avenue Extension	7th Avenue (East)	7th Avenue (West)	At-grade	Yes	Yes	4	Yes	0	No	yes
CLS006	Rizal Avenue Extension	C-3 Road (East)	C-3 Road (West)	At-grade	Yes	Yes	4	Yes	0	No	Yes
CLS007	A. Mabini Street	J.P. Rizal Street	n/a	At-grade	No	No	4	Yes	0	No	No
CLS008	Rizal Avenue Extension	4th Avenue (East)	4th Avenue (West)	At-grade	Yes	Yes	4	Yes	0	No	Yes
CLS009	Santa Quiteria (Tullahan Road)	Baesa (Reparo Road)	n/a	At-grade	No	No	1	Yes	0	No	Yes

Source: JPT

(a) All traffic bottlenecks identified in Caloocan City are at-grade intersections.

(b) Many of them do not have traffic signals.

(c) The traffic bottleneck identified in Caloocan City (North) is mostly extremely narrow and pedestrians are forced to walk on the roadway. Although the answers regarding lane markings indicate that it was maintained in all intersections, pedestrian crossings were not maintained at several intersections. This means that the lane markings are most likely not appropriate.

(d) Large traffic bottlenecks have pedestrian bridges.

(e) There are three intersections where both the pedestrian bridge and crossing is not in place and pedestrians are at risk when crossing the road.

2) Las Piñas City

The physical characteristics of traffic bottlenecks identified by Las Piñas City are shown in Table 2.2.

Table 2.2: Physical Characteristics of Bottlenecks Identified by Las Piñas City

ID	Main Road Name	Minor Road 1	Minor Road 2	Structure	Facilities					Pedestrian Safety	
				Segregated / At grade	Traffic Signal (Vehicle)	Traffic Signal (Pedestrian)	Sidewalk (m)	Lane Marking	U-turn Slots	Pedestrian Bridges	Pedestrian Crossing
LP001	Alabang-Zapote Rd	Quirino Avenue	n/a	At grade	Yes	No	2	Yes	2	No	Yes
LP002	Alabang-Zapote Rd	Dona Manuela	n/a	At grade	No	No	2	Yes	0	No	No
LP003	Alabang-Zapote Rd	CV Starr Avenue	n/a	At grade	No	No	2	Yes	2	No	Yes
LP004	Alabang-Zapote Rd	Aria Street	Manila Times	At grade	No	No	2	Yes	0	Yes	No
LP005	Alabang-Zapote Rd	BF Drive	J. Aguilar	At grade	Yes	No	2	Yes	0	Yes	Yes
LP006	Alabang-Zapote Rd	Palace Street	Rizal Ave. Extension	At grade	No	No	2	Yes	0	No	No
LP007	Alabang-Zapote Rd	Marcos Alvarez Avenue	n/a	At grade	Yes	No	2	Yes	0	No	No
LP008	Alabang-Zapote Rd	Metrocor Subdivision	Manila Doctors Subd	At grade	No	No	2	Yes	0	Yes	No
LP009	Alabang-Zapote Rd	CRM Avenue	n/a	At grade	No	No	2	Yes	0	No	Yes
LP010	Alabang-Zapote Rd	Concha Cruz	n/a	At grade	No	No	2	Yes	0	No	Yes
LP011	J. Aguilar Ave (Southville)	Tropical Avenue	n/a	At grade	No	No	2	Yes	0	No	Yes
LP012	C-5 Extension	Quirino Avenue	n/a	At grade	No	No	2	Yes	2	No	Yes

Source: JPT

(a) Almost all traffic bottlenecks identified by Las Piñas City are located along Alabang-Zapote Road.

(b) All traffic bottlenecks are at-grade intersections.

(c) Traffic signals are not installed in almost all intersections.

(d) The sidewalks have enough space in all intersections. However, there are three intersections where both the pedestrian bridge and crossing is not in place and pedestrians are at risk when crossing the road.

3) Makati City

The physical characteristics of traffic bottlenecks identified by Makati City are shown in Table 2.3.

Table 2.3: Physical Characteristics of Bottlenecks Identified by Makati City

ID	Main Road Name	Minor Road 1	Minor Road 2	Structure	Facilities					Pedestrian Safety	
				Segregated / At grade	Traffic Signal (Vehicle)	Traffic Signal (Pedestrian)	Sidewalk(m)	Lane Marking	U-turn Slots	Pedestrian Bridges	Pedestrian Crossing
MK001	J.P. Rizal Street	Carballo	n/a	At grade	No	No	1	Yes	No	No	No
MK002	Makati Avenue	JP Rizal Avenue	Jupiter Street	At grade	Yes	Yes	1	Yes	No	No	Yes
MK003	Sen. Gil Puyat Avenue	Filmore Street	Dian	At grade	Yes	Yes	3.5	Yes	No	No	Yes
MK004	Sen. Gil Puyat Avenue	Chino Roces Avenue	Ayala Avenue	At grade	Yes	Yes	3.5	Yes	No	No	Yes
MK005	J.P. Rizal Avenue	Escuela	Estrella	At-grade	Yes	Yes	1	Yes	No	No	Yes

Source: JPT

(a) Since MK001 is not a typical intersection, no traffic signals or pedestrian facilities have been installed.

(b) In the other intersections, traffic signals, sidewalks, lane markings, and pedestrian facilities are all well maintained.

4) Malabon City

The physical characteristics of traffic bottlenecks identified by Malabon City are shown in Table 2.4.

Table 2.4: Physical Characteristics of Bottlenecks Identified by Malabon City

ID	Main Road Name	Minor Road 1	Minor Road 2	Structure	Facilities					Pedestrian Safety	
				Segregated / At grade	Traffic Signal (Vehicle)	Traffic Signal (Pedestrian)	Sidewalk (m)	Lane Marking	U-turn Slots	Pedestrian Bridges	Pedestrian Crossing
MB001	M. H. Del Pilar Street	Sanciangco Street	n/a	At grade	No	No	1	Yes	0	No	No
MB002	M. H. Del Pilar Street	Rodriguez Street	n/a	At grade	No	No	2	Yes	0	No	No
MB003	Gov. Pascual Avenue	Sisa Street	n/a	At grade	No	No	1	Yes	0	No	Yes
MB004	Gov. Pascual Avenue	M.H. Del Pilar Street	n/a	At grade	Yes	No	2	Yes	0	No	Yes
MB005	P. Quirino Avenue	Sanciangco Street	n/a	At grade	No	No	1	Yes	0	No	No
MB006	Women's Club	M. Naval Street	n/a	At grade	No	No	1	No	0	No	No

Source: JPT

(a) All traffic bottlenecks identified by Malabon City are at-grade intersections.

(b) Traffic signals are almost uninstalled, and pedestrian facilities are scarce.

(c) The walking environment of pedestrians is considerably extremely poor.

5) Mandaluyong City

The physical characteristics of traffic bottlenecks identified by Mandaluyong City are shown in Table 2.5.

Table 2.5: Physical Characteristics of Bottlenecks Identified by Mandaluyong City

ID	Main Road Name	Minor Road 1	Minor Road 2	Structure	Facilities					Pedestrian Safety	
				Segregated / At grade	Traffic Signal (Vehicle)	Traffic Signal (Pedestrian)	Sidewalk (m)	Lane Marking	U-turn Slots	Pedestrian Bridges	Pedestrian Crossing
MD001	Gen. Kalentong	Rev. G. Aglipay	NA	At-grade	No	No	1	Yes	0	No	No
MD002	Coronado Street	Makati-Mandaluyong Bridge	San Francisco Street	At-grade	No	No	1	Yes	1	No	Yes
MD003	Boni Avenue	EDSA	Barangka Drive	Segregated	No	No	1-2	Yes	5	No	Yes
MD004	Shaw Blvd	Kalentong	EDSA	Segregated	Yes	No	1-2	Yes	0	Yes	Yes
MD005	Ortigas Avenue	Connecticut	EDSA	Segregated	Yes	No	0.5-1	Yes	1	Yes	Yes
MD006	Martinez	9 De Febrero	San Rafael Street	At-grade	No	No	1	Yes	0	Yes	Yes
MD007	Pioneer Street	Reliance	Madison	Segregated	No	No	1	Yes	0	No	No

Source: JPT

(a) Mandaluyong City identified 7 traffic bottlenecks.

(b) The traffic bottlenecks are identified as corridors except for MD001.

(c) Three (3) corridors reached EDSA and have segregated section.

(d) Traffic signals are not installed at almost all traffic bottlenecks, even if they are long sections (corridors).

(e) Sidewalks are generally wide; however pedestrians must cross the roads carefully due to the road structure that prioritizes vehicles.

6) Manila City

The physical characteristics of traffic bottlenecks identified by Manila City are shown in Table 2.6.

Table 2.6: Physical Characteristics of Bottlenecks Identified by City of Manila

ID	Main Road Name	Minor Road 1	Minor Road 2	Structure	Facilities					Pedestrian Safety	
				Segregated / At grade	Traffic Signal (Vehicle)	Traffic Signal (Pedestrian)	Side-walk(m)	Lane Marking	U-turn Slots	Pedestrian Bridges	Pedestrian Crossing
MN001	Lubiran	Bagumbayan	Gabby's Junction	At grade	No	No	1	Yes	0	No	No
MN002	Quezon Blvd	G. Puyat (Raon)	Paterno Street	At grade	No	No	2	Yes	0	Yes	No
MN003	Tayuman Street	Rizal Aven/Juan Luna/Puregold	Abad Santos Avenue	At grade	Yes	Yes	2	Yes	0	No	Yes
MN004	Abad Santos Avenue	Mayhaligue Street	Recto Avenue	At grade	Yes	Yes	1	Yes	0	No	Yes
MN005	C.M. Recto Avenue	Rizal Avenue	Morayta (FEU only)	At grade	Yes	Yes	1	Yes	0	No	Yes
MN006	Espana & Lacson	Laong Laan Street	Lacson Street	At grade	Yes	Yes	2	Yes	0	Yes	Yes
MN007	Pedro Gil Taft	Leon Guinto	Agoncillo	At grade	No	No	1	Yes	0	No	No
MN008	V. Mapa/Mendiola/ Old Sta. Mesa	Stop & Shop	n/a	At grade	Yes	No	1	Yes	0	No	Yes

Source: JPT

(a) All traffic bottleneck identified by Manila City are at-grade intersections.

(b) There are no traffic signals at small intersections.

(c) The markings of pedestrian crossings were not appropriate.

7) Marikina City

The physical characteristics of traffic bottlenecks identified by Marikina City are shown in Table 2.7.

Table 2.7: Physical Characteristics of Bottlenecks Identified by Marikina City

ID	Main Road Name	Minor Road 1	Minor Road 2	Structure	Facilities					Pedestrian Safety	
				Segregated / At grade	Traffic Signal (Vehicle)	Traffic Signal (Pedestrian)	Sidew alk(m)	Lane Marking	U-turn Slots	Pedestrian Bridges	Pedestrian Crossing
MR001	Marikina-Infanta Hi-Way	A. Bonifacio Avenue	n/a	At grade	No	No	1	Yes	0	Yes	Yes
MR002	J.P. Rizal Street	Nangka Bridge	n/a	At grade	Yes	No	2	Yes	0	No	Yes

Source: JPT

(a) There are only two traffic bottlenecks identified by Marikina City.

(b) Traffic signals are not installed properly, but pedestrian facilities are installed.

8) Muntinlupa City

The physical characteristics of traffic bottlenecks identified by Muntinlupa City are shown in Table 2.8.

Table 2.8: Physical Characteristics of Bottlenecks Identified by Muntinlupa City

ID	Main Road Name	Minor Road 1	Minor Road 2	Structure	Facilities					Pedestrian Safety	
				Segregated / At grade	Traffic Signal (Vehicle)	Traffic Signal (Pedestrian)	Sidewalk (m)	Lane Marking	U-turn Slots	Pedestrian Bridges	Pedestrian Crossing
ML001	Manila South Road	Rodriguez Street	n/a	At-grade	No	No	0.5	Yes	0	No	Yes
ML002	Manila South Road	Susana Heights Access Road	n/a	At-grade	Yes	No	2	Yes	0	Yes	No
ML003	Manila South Road	Rizal-Katihan Street	n/a	At-grade	Yes	No	2	Yes	0	Yes	No
ML004	Manila South Road	Bruger Street	Estanisla o Street	At-grade	No	No	2	Yes	0	No	No
ML005	Manila South Road	Roman Cruz Dr (Soldiers' Hills Access Road)	n/a	At-grade	No	No	2	Yes	0	No	Yes
ML006	Manila South Road	Bautista Street	n/a	At-grade	No	No	1	Yes	0	No	Yes

ID	Main Road Name	Minor Road 1	Minor Road 2	Structure	Facilities					Pedestrian Safety	
				Segregated / At grade	Traffic Signal (Vehicle)	Traffic Signal (Pedestrian)	Sidewalk (m)	Lane Marking	U-turn Slots	Pedestrian Bridges	Pedestrian Crossing
ML007	Manila South Road	NA	n/a	At-grade	No	No	2	Yes	0	No	No
ML008	Alabang-Zapote Road	Market Drive (Muntinlupa City Public Market)	n/a	At-grade	No	No	4	Yes	0	Yes	Yes
ML009	Alabang-Zapote Road	Theater Dr-St. Mary Street (Alabang Town Center Intersection)	n/a	At-grade	No	No	1	Yes	0	No	Yes
ML010	Alabang-Zapote Road	Madrigal Avenue	n/a	At-grade	Yes	No	1	Yes	0	No	Yes
ML011	Alabang-Zapote Road	Don Manolo Blvd (Alabang Hills Intersection)	n/a	At-grade	Yes	Yes	2	Yes	0	No	Yes
ML012	Alabang-Zapote Road	Acacia Avenue-Corregidor Street	n/a	At-grade	Yes	Yes	1	Yes	0	No	Yes
ML013	Alabang-Zapote Road	Buencamino St-Investment Dr	n/a	At-grade	No	No	1	Yes	0	No	Yes

Source: JPT

(a) The traffic bottlenecks identified by Muntinlupa City are located along Manila South Road or Alabang-Zapote Road. Along the Alabang-Zapote Road, 10 traffic bottlenecks have also been identified in Las Piñas City. It is found that the Alabang-Zapote Road is crowded as a whole corridor.

(b) All traffic bottlenecks are at-grade intersections.

(c) There are no traffic signals for vehicles and pedestrians in more than half of the intersections.

(d) The sidewalks are well-spaced at most intersections.

(e) Pedestrian facilities are also maintained at most intersections, but it doesn't mean that they provide comfortable walking environments for pedestrians.

9) Navotas City

The physical characteristics of traffic bottlenecks identified by Navotas City are shown in Table 2.9.

Table 2.9: Physical Characteristics of Bottlenecks Identified by Navotas City

ID	Main Road Name	Minor Road 1	Minor Road 2	Structure	Facilities					Pedestrian Safety	
				Segregated / At grade	Traffic Signal (Vehicle)	Traffic Signal (Pedestrian)	Sidewalk (m)	Lane Marking	U-turn Slots	Pedestrian Bridges	Pedestrian Crossing
NV001	R-10 Road	C-3	n/a	At grade	No	No	1	Yes	0	No	Yes
NV002	C-3	North Bay Blvd / H. Lopez Street	North Bay Blvd (Agora)	At grade	No	No	2	Yes	0	No	Yes
NV003	M. Naval Street	E. Pascual Street	n/a	At grade	No	No	0.5	Yes	0	No	No

Source: JPT

(a) There are only three traffic bottlenecks identified by Navotas City.

(b) All traffic bottlenecks are at-grade intersections.

(c) There are no traffic signals at all intersections. Although there is a pedestrian crossing, the lane markings are scraped, and they are not maintained enough.

10) Parañaque City

The physical characteristics of traffic bottlenecks identified by Parañaque City are shown in Table 2.10.

Table 2.10: Physical Characteristics of Bottlenecks Identified by Parañaque City

ID	Main Road Name	Minor Road 1	Minor Road 2	Structure	Facilities					Pedestrian Safety	
				Segregated / At grade	Traffic Signal (Vehicle)	Traffic Signal (Pedestrian)	Sidewalk (m)	Lane Marking	U-turn Slots	Pedestrian Bridges	Pedestrian Crossing
PN001	Airport Road	Roxas Boulevard	n/a	At-grade	Yes	Yes	2	Yes	0	No	Yes
PN002	Sucat Road	South Super Highway	n/a	Segregated	Yes	No	1	Yes	2	Yes	No
PN003	Dona Soledad Avenue	France Street	n/a	At-grade	Yes	No	1	Yes	0	No	Yes

Source: JPT

(a) There are only three traffic bottlenecks identified by Parañaque City.

(b) PN002 is a segregated intersection, and it includes theSouth Luzon Expressway Southbound Exit.

(c) The other intersections are signalized for vehicles.

11) Pasay City

The physical characteristics of traffic bottlenecks identified by Pasay City are shown in Table 2.11.

Table 2.11: Physical Characteristics of Bottlenecks Identified by Pasay City

ID	Main Road Name	Minor Road 1	Minor Road 2	Structure	Facilities					Pedestrian Safety	
				Segregated / At grade	Traffic Signal (Vehicle)	Traffic Signal (Pedestrian)	Sidewalk (m)	Lane Marking	U-turn Slots	Pedestrian Bridges	Pedestrian Crossing
PS001	Taft Avenue	Gil Puyat Avenue	n/a	At-grade	Yes	No	1	Yes	0	Yes	No
PS002	EDSA	Taft Avenue	n/a	At-grade	Yes	No	1	Yes	0	Yes	No
PS003	A. Arnaiz Avenue	Taft Avenue	n/a	At-grade	Yes	Yes	1	Yes	0	Yes	Yes
PS004	Roxas Boulevard	Ocampo Street	n/a	At-grade	Yes	Yes	1	Yes	0	No	Yes
PS005	Andrew Avenue	Aurora Boulevard	n/a	At-grade	Yes	Yes	0.5	Yes	0	No	No

Source: JPT

(a) All traffic bottlenecks identified by Pasay City are at-grade intersections.

(b) They are mainly large-scale intersections that have multiple lanes.

(c) However, the sidewalks are narrow and the vehicle driving speed tends to be high, which is dangerous.

(d) The lane markings degraded over time. In PS005, it is difficult to understand where the pedestrians should walk and cross.

12) Pasig City

The physical characteristics of traffic bottlenecks identified by Pasig City are shown in Table 2.12.

Table 2.12: Physical Characteristics of Bottlenecks Identified by Pasig City

ID	Main Road Name	Minor Road 1	Minor Road 2	Structure	Facilities					Pedestrian Safety	
				Segregated / At grade	Traffic Signal (Vehicle)	Traffic Signal (Pedestrian)	Sidewalk (m)	Lane Marking	U-turn Slots	Pedestrian Bridges	Pedestrian Crossing
PG001	Marcos Highway	A. Rodriguez Avenue	n/a	At-grade	No	No	3	Yes	0	Yes	No
PG002	A. Rodriguez Avenue	Evangelista Avenue	Octagon Avenue	At-grade	Yes	No	1	Yes	0	No	Yes
PG003	A. Rodriguez Avenue	East Bank Road	n/a	At-grade	Yes	Yes	0.5	Yes	0	No	Yes
PG004	A. Rodriguez Avenue	Ortigas Avenue	n/a	At-grade	No	No	1	Yes	1	Yes	No
PG005	Ortigas Avenue	Countryside	n/a	At-grade	Yes	No	0.5	Yes	0	No	Yes
PG006	Ortigas Avenue	C. Raymundo Avenue	n/a	At-grade	No	No	1	Yes	0	Yes	Yes
PG007	Ortigas Avenue	C-5 Road	n/a	Segregated	Yes	Yes	1	Yes	4	No	Yes
PG008	Ortigas Avenue	Meralco Avenue	n/a	At-grade	Yes	Yes	1	Yes	0	No	Yes
PG009	Meralco Avenue	Julia Vargas Avenue	n/a	At-grade	Yes	Yes	1	Yes	2	No	Yes
PG010	Meralco Avenue	St. Paul Road	n/a	At-grade	Yes	No	0.5	Yes	1	Yes	No
PG011	Meralco Avenue	Capt. Henry Javier	n/a	At-grade	Yes	Yes	1	Yes	0	No	Yes
PG012	Julia Vargas Avenue	ADB Avenue	n/a	At-grade	Yes	Yes	2	Yes	0	No	Yes
PG013	Julia Vargas Avenue	Lanuza Avenue	n/a	At-grade	Yes	Yes	1	Yes	0	Yes	Yes
PG014	Shaw Blvd	San Miguel Avenue	n/a	At-grade	Yes	Yes	1	Yes	0	No	Yes
PG015	Shaw Blvd	Meralco Avenue	n/a	At-grade	Yes	No	1	Yes	0	Yes	No
PG016	Lanuza Avenue	C-5 Road	n/a	At-grade	Yes	No	1	Yes	0	Yes	No
PG017	C-5 Road	Pasig Blvd Extension	n/a	Segregated	Yes	No	1	Yes	0	Yes	Yes
PG018	C-5 Road	Pasig Blvd	n/a	Segregated	Yes	No	0.5	Yes	0	No	Yes
PG019	Dr. Sixto Antonio Avenue	Pag-Asa Street	n/a	At-grade	No	No	0.5	Yes	0	No	Yes
PG020	Dr. Sixto Antonio Avenue	Pasig Blvd Extension	n/a	At-grade	Yes	Yes	1	Yes	0	No	Yes
PG021	C. Raymundo Avenue	F. Legaspi Street	n/a	At-grade	Yes	No	1	Yes	0	No	Yes
PG022	C. Raymundo Avenue	Mercedes Avenue	n/a	At-grade	Yes	Yes	0.5	Yes	0	No	Yes
PG023	F. Legaspi Street	Jenny's Avenue	n/a	At-grade	No	No	0.5	Yes	0	No	Yes
PG024	F. Legaspi Street	West Bank Road	n/a	At-grade	No	No	0.5	Yes	0	No	Yes
PG025	Market Avenue	Mercedes Avenue	n/a	At-grade	Yes	Yes	0.5	Yes	0	No	Yes
PG026	Sandoval Avenue	N Cruz Street	n/a	At-grade	No	No	0.5	No	0	No	Yes
PG027	Sandoval Avenue	Urbano Velasco Avenue	n/a	At-grade	No	No	0.5	Yes	0	No	Yes
PG028	A. Mabini Street	Col. Flores Street (Plaza Rizal)	n/a	At-grade	Yes	Yes	0.5	Yes	0	No	Yes
PG029	R. Jabson Street	Elisco Road	M. Concepcion Street	At-grade	Yes	Yes	0.5	Yes	0	No	Yes
PG030	Elisco Road	M. Jimenez Street	n/a	At-grade	No	No	0.5	No	0	No	No

Source: JPT

(a) Pasig City identified 30 traffic bottlenecks.

(b) This number is the highest among all the LGUs in Metro Manila.

(c) These traffic bottlenecks are composed of various types of intersections in terms of structure (at-grade and segregated) and scale (large and small).

(d) In general, the installation rate of traffic signals for vehicles is high, but it is low for pedestrians.

(e) If there is a pedestrian bridge at an intersection, able-bodied pedestrians do not have any problems to crossing a road with no pedestrian signals. However, it would not be easy for pedestrians with disabilities and bicycle riders to cross that road. There are 6 intersections that have this kind of characteristic as mentioned above.

(f) There are 10 intersections without pedestrian bridges and pedestrian signals. This type of situation always prioritizes cars wherein the pedestrian environment is extremely bad.

(g) The width of the sidewalk is approximately 0.5m to 1m except for PG001. It can be dangerous for pedestrians especially during early mornings and nights when the driving speed of the car increases.

13) Municipality of Pateros

The physical characteristics of traffic bottlenecks identified by the Municipality of Pateros are shown in Table 2.13.

Table 2.13: Physical Characteristics of Bottlenecks Identified by Pateros

ID	Main Road Name	Minor Road 1	Minor Road 2	Structure	Facilities					Pedestrian Safety	
				Segregated / At grade	Traffic Signal (Vehicle)	Traffic Signal (Pedestrian)	Sidew alk(m)	Lane Marking	U-turn Slots	Pedestrian Bridges	Pedestrian Crossing
PT001	B. Morcilla Street	P. Herrera	NA	At grade	Yes	Yes	0.5	Yes	0	No	Yes
PT002	B. Morcilla Street	P. Tangco Street	NA	At grade	No	No	0.5	Yes	0	No	No
PT003	P. Herrera Street	C. Almeda Street	NA	At grade	No	No	0.5	No	0	No	No
PT004	M. Almeda Street	B. Morcilla Street	NA	At grade	Yes	No	0.5	Yes	0	No	Yes
PT005	M. Almeda Street	Martirez Street	NA	At grade	Yes	Yes	0.5	Yes	0	No	Yes
PT006	C. Almeda Extension	P. Tangco Street	NA	At grade	No	No	0.5	No	0	No	No
PT007	M. Almeda Street	E. Hermosa Street	NA	At grade	No	No	0.5	Yes	0	No	Yes
PT008	C. Almeda	D. Rosales Street	NA	At grade	No	No	0.5	No	0	No	No
PT009	M. Almeda Street	San Joaquin	NA	At grade	Yes	Yes	0.5	Yes	0	No	Yes

Source: JPT

(a) Municipality of Pateros is the smallest LGU of Metro Manila. However, Pateros identified 9 traffic bottlenecks, the seventh most common.

(b) The intersection is very small except for one, and there are many one-way streets. Due to its small size, the width of the sidewalk is also small and there is no road with a sidewalk exceeding 1m. While there are many intersections where signals are not installed, there are efforts for vehicle and pedestrian separation such as lane markings and pedestrian crossings. However, they are not properly implemented.

(c) The sign "Slow down, accident-prone area" can also be observed at the road. The safety of pedestrians is not ensured in an environment where the driving speed of the car tends to increase due to the absence of a signal.

14) Quezon City

The physical characteristics of traffic bottlenecks identified by Quezon City are shown in Table 2.14

Table 2.14: Physical Characteristics of Bottlenecks Identified by Quezon City

ID	Main Road Name	Minor Road 1	Minor Road 2	Structure	Facilities					Pedestrian Safety	
				Segregated / At grade	Traffic Signal (Vehicle)	Traffic Signal (Pedestrian)	Sidew alk(m)	Lane Marking	U-turn Slots	Pedestrian Bridges	Pedestrian Crossing
QZ001	Congressional Avenue	Jupiter Street	NA	At grade	No	No	1	Yes	0	No	Yes
QZ002	Cordillera	M. Cuenco	NA	At grade	No	No	1	Yes	0	No	Yes
QZ003	Visayas Avenue	Road 1	NA	At grade	No	No	2	Yes	0	No	Yes

ID	Main Road Name	Minor Road 1	Minor Road 2	Structure	Facilities					Pedestrian Safety	
				Segregated / At grade	Traffic Signal (Vehicle)	Traffic Signal (Pedestrian)	Sidew alk(m)	Lane Marking	U-turn Slots	Pedestrian Bridges	Pedestrian Crossing
QZ004	IBP Road	Filinvest Road	NA	At grade	No	No	0.5	Yes	0	No	No
QZ005	Payatas Road	Hon. B Soliven	NA	At grade	No	No	1	No	0	No	No
QZ006	Luzon Avenue	Sampaguita	NA	At grade	No	No	0.5	No	0	No	No
QZ007	Katipunan Avenue	Rosa Alvero	NA	At grade	No	No	0.5	Yes	0	Yes	No
QZ008	Kalayaan Road	Matalino Street	NA	At grade	No	No	1	Yes	0	No	Yes
QZ009	Mo. Ignacia	Sct. Reyes	NA	At grade	No	No	1	No	0	No	No
QZ010	Sct. Chuatoco	Sct. Reyes	NA	At grade	No	No	1	Yes	0	No	Yes
QZ011	Accountant Street	Engineer Street	NA	At grade	No	No	0.5	No	0	No	No
QZ012	Commonwealt h Avenue	Fairlane	NA	At grade	No	No	1	Yes	0	No	Yes
QZ013	Dahlia Avenue	Chestnut Street	NA	At grade	No	No	1	No	0	No	No
QZ014	Quirino Highway	Asuncion Street	NA	At grade	No	No	0.5	Yes	0	No	Yes
QZ015	Quirino Highway	Commonwealth Avenue	NA	At grade	No	No	1.5	Yes	0	No	Yes
QZ016	Regalado Avenue	Poniac Street	NA	At grade	No	No	1	Yes	0	No	Yes
QZ017	Republic Avenue	Chestnut Street	Ilang-Ilang Street	At grade	No	No	0.5	No	0	No	No
QZ018	Quirino Highway	Baesa Road	Howmart Road	At grade	No	No	1	Yes	0	No	Yes
QZ019	Tandang Sora	Banlat Road	Venus Street	At grade	No	No	1	Yes	0	No	No
QZ020	Tandang Sora	San Miguel Road	NA	At grade	No	No	1	Yes	0	No	No

Source: JPT

(a) Quezon City identified 20 traffic bottlenecks, all intersections are at-grade and do not have traffic signals at all.

(b) About half of the identified intersections are small-scale intersections consisting of residential roads used by residents. For these kinds of roads, sidewalks are narrow and there are many spots where the lane markings are scraped.

(c) There are a few roads that are prominently cracked due to the aging of the pavement.

(d) There is only one intersection with a pedestrian bridge and the pedestrian crossings are not maintained for half of the intersections.

15) San Juan City

The physical characteristics of traffic bottlenecks identified by San Juan City are shown in Table 2.15.

Table 2.15: Physical Characteristics of Bottlenecks Identified by San Juan City

ID	Main Road Name	Minor Road 1	Minor Road 2	Structure	Facilities					Pedestrian Safety	
				Segregated / At grade	Traffic Signal (Vehicle)	Traffic Signal (Pedestrian)	Sidewalk (m)	Lane Marking	U-turn Slots	Pedestrian Bridges	Pedestrian Crossing
SJ001	Ortigas Avenue	Wilson Street	NA	At-grade	Yes	Yes	2	Yes	0	No	Yes
SJ002	Ortigas Avenue	Roosevelt Street	NA	At-grade	Yes	Yes	1	Yes	0	No	Yes
SJ003	Ortigas Avenue	Madison Street	NA	At-grade	Yes	Yes	1	Yes	0	Yes	No
SJ004	Santolan Road	Paterno Street	Pasadena Street	At-grade	Yes	Yes	1	Yes	0	No	No
SJ005	Santolan Road	Pinaglabanan Street	P. Guevarra Street	At-grade	Yes	Yes	0.5	Yes	0	No	Yes
SJ006	P. Guevarra Street	Mons Street	Maclang Street	At-grade	No	No	0.5	Yes	0	No	Yes
SJ007	P. Guevarra Street	P. Parada Street	Ibanez Street	At-grade	Yes	Yes	0.5	No	0	No	Yes
SJ008	P. Guevarra Street	V. Cruz Street	NA	At-grade	No	No	0.5	Yes	0	No	No
SJ009	P. Guevarra Street	Wilson Street	NA	At-grade	No	No	0.5	Yes	0	No	Yes
SJ010	N. Domingo Street	Pinaglabanan Street	N. Domingo Street	At-grade	Yes	Yes	1	Yes	0	No	Yes

ID	Main Road Name	Minor Road 1	Minor Road 2	Structure	Facilities					Pedestrian Safety	
				Segregated / At grade	Traffic Signal (Vehicle)	Traffic Signal (Pedestrian)	Sidewalk (m)	Lane Marking	U-turn Slots	Pedestrian Bridges	Pedestrian Crossing
SJ011	N. Domingo Street	Paterno Street	N. Domingo Street	At-grade	No	No	0.5	Yes	0	No	Yes
SJ012	N. Domingo Street	Blumentritt Street	N. Domingo Street	At-grade	Yes	Yes	1	Yes	0	No	Yes
SJ013	N. Domingo Street	Araneta Avenue	N. Domingo Street	At-grade	Yes	No	0.5	Yes	0	No	No
SJ014	F. Blumentritt Street	F. Manalo Street	NA	At-grade	Yes	No	0.5	Yes	0	No	No
SJ015	Ortigas Avenue	Santolan Road	Boni Serrrano	At-grade	Yes	Yes	1	Yes	0	No	No

Source: JPT

(a) All traffic bottlenecks identified by San Juan City are at-grade intersections.

(b) Installation rate of traffic signals is comparatively higher than other LGUs in Metro Manila, however, 5 intersections do not have both pedestrian bridges and pedestrian crossings.

16) Taguig City

The physical characteristics of traffic bottlenecks identified by Taguig City are shown in Table 2.16.

Table 2.16: Physical Characteristics of Bottlenecks Identified by Taguig City

ID	Main Road Name	Minor Road 1	Minor Road 2	Structure	Facilities					Pedestrian Safety	
				Segregated / At grade	Traffic Signal (Vehicle)	Traffic Signal (Pedestrian)	Sidewalk	Lane Marking	U-turn Slots	Pedestrian Bridges	Pedestrian Crossing
TG001	M.L. Quezon Avenue	Lower Bicutan	NA	At-grade	No	No	0.5	No	0	No	No
TG002	Gen. Santos Avenue	DOST Circle	NA	At-grade	No	No	0.5	Yes	0	No	No
TG003	Gen. Luna Street	Tuktukan	NA	At-grade	No	No	1	No	0	No	No
TG004	F. Manalo Street	F. Manalo Street	NA	At-grade	No	No	0.5	Yes	0	No	No
TG005	Dr. Natividad Street	Labao	NA	At-grade	No	No	0.5	No	0	No	No
TG006	J.P. Rizal Avenue	Bagong Calzada	NA	At-grade	No	No	1	No	0	No	No
TG007	Cayetano Blvd	Corner C5 Service Road	NA	At-grade	No	No	1	Yes	0	No	No
TG008	MRT Avenue	Cuasay MRT Avenue	NA	At-grade	No	No	0.5	Yes	0	No	No
TG009	Lawton Avenue	Army Gym	NA	At-grade	No	No	0.5	Yes	0	No	No

Source: JPT

(a) Traffic signals are not installed at all the traffic bottlenecks identified by Taguig City.

(b) Approximately half of the identified intersections have no lane markings, and the sidewalks are narrow. In addition, pedestrian facilities aren't completely developed as well.

17) Valenzuela City

The physical characteristics of traffic bottlenecks identified by Valenzuela City are shown in Table 2.17.

Table 2.17: Physical Characteristics of Bottlenecks Identified by Valenzuela City

ID	Main Road Name	Minor Road 1	Minor Road 2	Structure	Facilities					Pedestrian Safety	
				Segregated / At grade	Traffic Signal (Vehicle)	Traffic Signal (Pedestrian)	Sidewalk (m)	Lane Marking	U-turn Slots	Pedestrian Bridges	Pedestrian Crossing
VL001	McArthur Highway	M.H. Del Pilar Road	NA	At-grade	Yes	No	0.5	Yes	0	No	Yes
VL002	McArthur Highway	G. Lazaro Street	T. Santiago Street	At-grade	Yes	No	0.5	Yes	0	Yes	No
VL003	McArthur Highway	Gov. I. Santiago Road	Rincon Road	At-grade	Yes	Yes	0.5	Yes	0	No	Yes
VL004	McArthur Highway	C.J. Santos Street	NLEX Segment 9	At-grade	Yes	Yee	1-1.5	Yes	0	No	Yes
VL005	McArthur Highway	Karuhatan Road	A. Pablo Street	At-grade	Yes	No	1.5-2	Yes	0	Yes	No
VL006	McArthur Highway	Fatima Avenue	NA	At-grade	Yes	Yes	1	Yes	0	No	Yes
VL007	McArthur Highway	Tamaraw Hills Road	NA	At-grade	No	No	1	Yes	0	Yes	No
VL008	McArthur Highway	Pio Valenzuela Street	NA	At-grade	Yes	No	0.5	Yes	0	Yes	No
VL009	McArthur Highway	A. Fernando Street	NA	At-grade	Yes	Yes	1	Yes	0	No	Yes
VL010	Gov. I. Santiago Road	NA	NA	At-grade	No	No	0.5	No	0	No	No

ID	Main Road Name	Minor Road 1	Minor Road 2	Structure	Facilities					Pedestrian Safety	
				Segregated / At grade	Traffic Signal (Vehicle)	Traffic Signal (Pedestrian)	Sidewalk (m)	Lane Marking	U-turn Slots	Pedestrian Bridges	Pedestrian Crossing
VL011	M.H. Del Pilar Road	P. Deato Street	NA	At-grade	No	No	0.5	Yes	0	No	Yes
VL012	Maysan Road	I. Francisco Street	A. Pablo Street	At-grade	No	No	1	No	0	No	No
VL013	Maysan Road	Tongco Street	Interior 103	At-grade	No	No	0.5	Yes	0	No	Yes
VL014	Paso De Blas Road	T. Santiago Street	NA	At-grade	No	No	0.5	No	0	No	No
VL015	Paso De Blas Road	L. San Diego Street	NA	At-grade	No	No	0.5	Yes	0	No	Yes
VL016	Paso De Blas Road	East Service Road	West Service Road	At-grade	No	No	1	Yes	0	No	Yes
VL017	Bagbaguin Road	A. Mariano Street	NA	At-grade	No	No	1	Yes	0	No	No
VL018	Gen. T. De Leon Road	Lorex Avenue	Urrutia Street	At-grade	No	No	0.5-1	Yes	0	No	No
VL019	Gen. T. De Leon Road	Santolan Road	NA	At-grade	No	No	1-1.5	No	0	No	No
VL020	Gen. T. De Leon Road	Que Grande	NA	Segregated	No	No	0.5	No	0	No	No
VL021	Que Grande Road	F. Bautista Street	Hillside Subdivision	At-grade	No	No	0.5	No	0	No	No
VL022	Apolonia Street	G. Angeles Street	NA	At-grade	No	No	0.5	No	0	No	No
VL023	Mindanao Avenue	P. Dela Cruz / Tatalon	NA	At-grade	No	No	1	No	0	No	No
VL024	T. Santiago Street	F. Dulalia Street	NA	At-grade	No	No	0.5	No	0	No	No
VL025	Sapang Bakaw Street	Arty Subdivision	Turn Around Slot	At-grade	No	No	0.5	No	0	No	No
VL026	Malinis Road	Mulawinan Street	NA	At-grade	No	No	0.5	Yes	0	No	No

Source: JPT

(a) Valenzuela City identified 26 traffic bottlenecks and they are all at-grade intersections except for VL020.

(b) A traffic signal for vehicles was installed at 8 intersections and traffic signal for pedestrians is installed at 4 intersections. This is a very low installation rate compared with the 17 LGUs.

(c) Almost half of the intersections do not have both pedestrian bridges and crossings. Physical facility installation must be promoted.

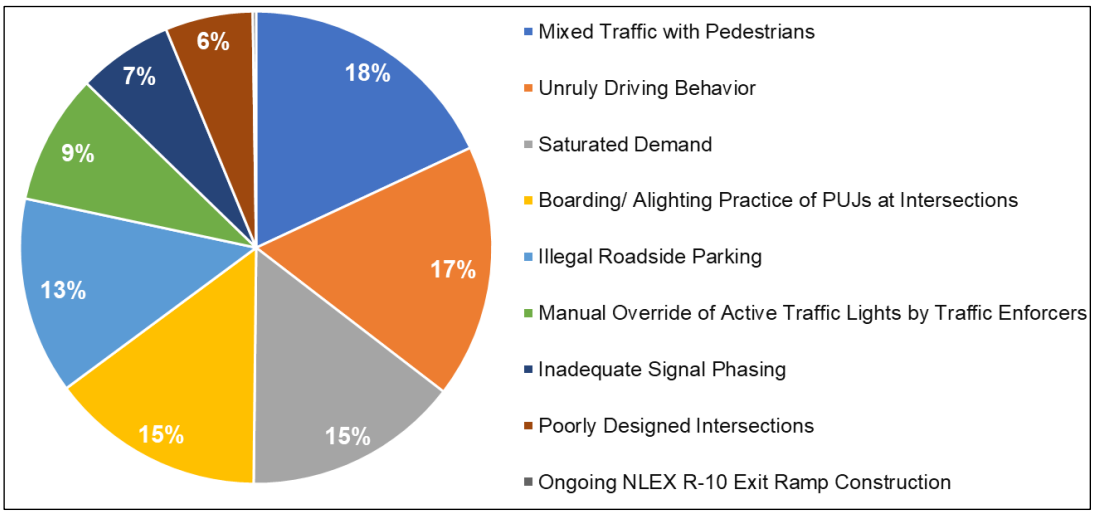
2.3 Causes of Traffic Bottlenecks Identified by Metro Manila LGUs

In order to understand the cause of the traffic bottleneck identified by each LGU in Metro Manila, the JPT conducted a questionnaire survey to the LGU showing several possible causes as choices. Figure 2.4 shows the causes of the traffic bottlenecks in Metro Manila. The five (5) major causes comprise over 75% of the causes. Among these major causes, only “Saturated Demand” with 15% is related to the demand itself. This is in accordance with the answers in the questionnaire.

Therefore, there is a high possibility to mitigate the traffic congestion without a new large-scale construction to improve the road capacity. (Figure 2.5 shows the causes of the traffic bottlenecks in each LGU).

However, the major causes proposed by the LGUs are more diverse than the ones from MMDA. As mentioned earlier, only three (3) major causes account for over 75% of causes on the results of the MMDA survey. On the other hand, eight (8) causes are raised as major causes in the LGU survey.

Therefore, it’s necessary to apply various countermeasures to ease the traffic congestion at the small-scale traffic bottlenecks identified by LGUs.



1) Causes of major roads and minor roads are merged.
Source: JPT

Figure 2.4: Causes of Traffic Bottlenecks in Metro Manila

A breakdown of the causes of traffic bottlenecks identified by LGUs shows that each LGU has several unique features.

(a) **Feature 1:** In the traffic bottlenecks listed by the LGUs, the excess of traffic demand is not a major cause. However, in the 5 LGUs below, the reduced road capacity reduced is the main cause for some reason. In these LGUs, measures by traffic management are considered to be more effective.

(i) Caloocan City
(ii) Malabon City
(iii) Pasay City
(iv) Municipality of Pateros
(v) Taguig City

(b) **Feature 2:** On the other hand, for the following two LGUs, the excess of traffic demand is relatively a major cause, as in the traffic bottlenecks proposed by MMDA.

(i) Las Piñas City

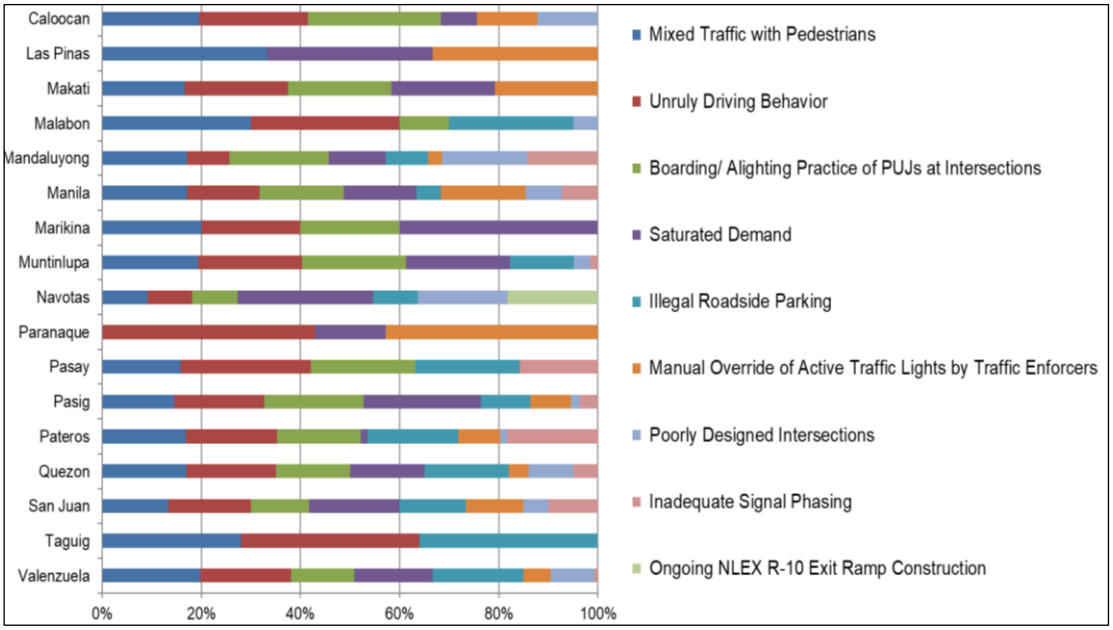
(ii) Marikina City

(c) **Other Features:** In addition, there are three other LGUs that do not fit into the above two features, each feature is described below.

(i) **Navotas City:** Poorly designed intersections account for about 20% of the causes, which is the highest percentage among 17 LGUs. In addition, since Saturated Demand accounts for about 40%, the measures by physical construction are necessary compared to other LGUs. On the other hand, some traffic bottlenecks may be eliminated or reduced as the ongoing NLEX construction is completed.

(ii) **Parañaque City:** The results of this LGU are extremely characteristic, accounting for nearly 90% of the causes due to Unruly Driving Behavior and Manual Override of Active Traffic Lights by Traffic Enforcers. As a result, the behavior of both road users and road managers was raised as the cause, and it can be said that it is highly necessary to take educational measures.

(iii) **Taguig City:** Only three causes have been identified: Mixed Traffic with Pedestrians, Unruly Driving Behavior, and Illegal Roadside Parking. However, all three are due to violation of the regulations by road users (pedestrians and drivers), so the necessity of educational measures is considered.

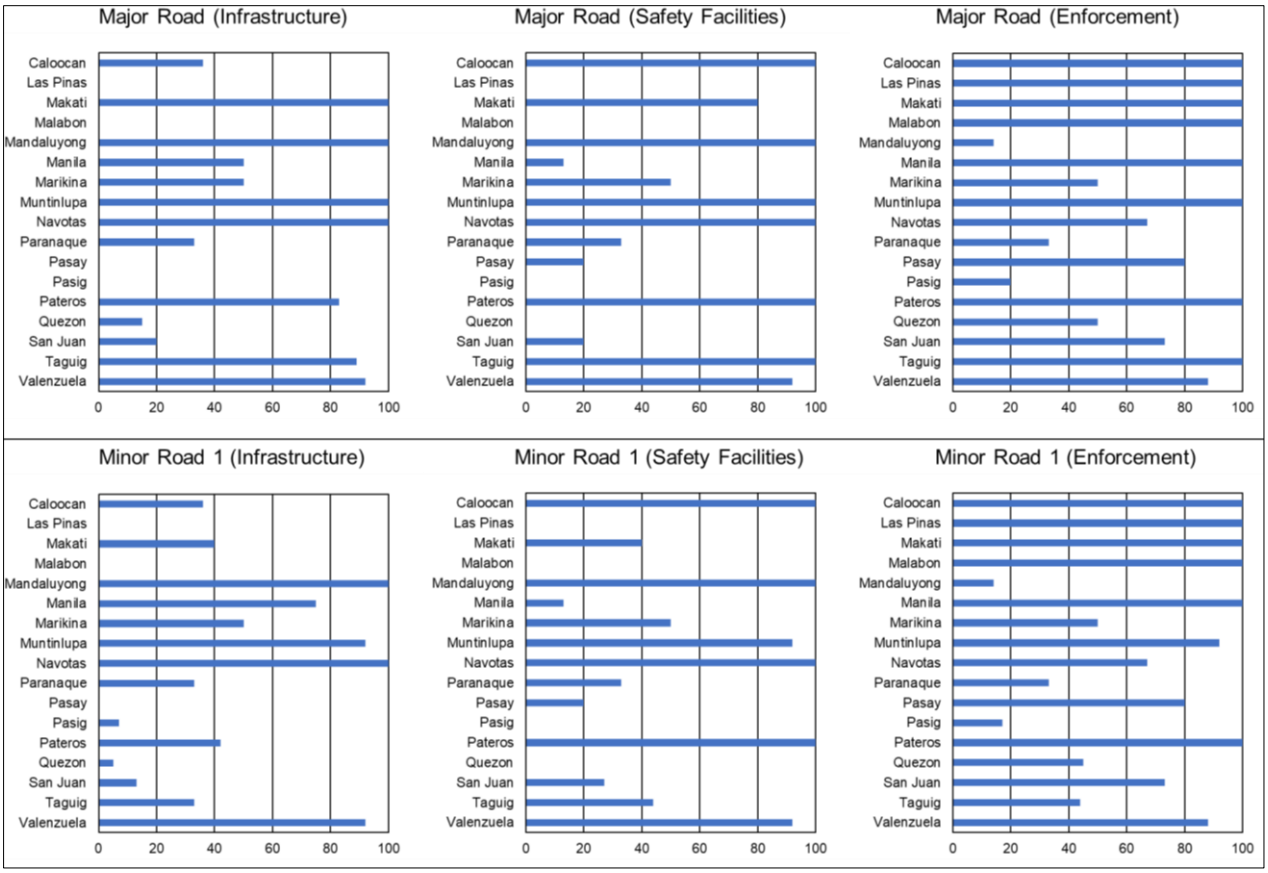


1) Causes of major roads and minor roads are merged.
Source: JPT

Figure 2.5: Causes of Traffic Bottlenecks in Each LGU

2.4 Existence of Planned Measures

In order to know the existence of a plan for improvement measures in the traffic bottlenecks identified by each LGU in Metro Manila, interviews were conducted with LGUs. Figure 2.6 shows the existing rate of planned improvement measures at the traffic bottlenecks identified by 17 LGUs.



1) Unit is %
Source: JPT

Figure 2.6: Existence Rate of Planned Improvement Measures at Identified Traffic Bottlenecks

Traffic management measures were divided into three types: infrastructures with physical improvements, safety facilities aimed at improving the pedestrian environment, and enforcement to strengthen regulatory compliance.

(a) **Infrastructures:** The traffic management countermeasure plan by infrastructures was hardly formulated in 5 LGUs, and the average value for 17 LGUs was as low as approximately 50%. There were no planned traffic management measures in Las Piñas City and Pasig City.

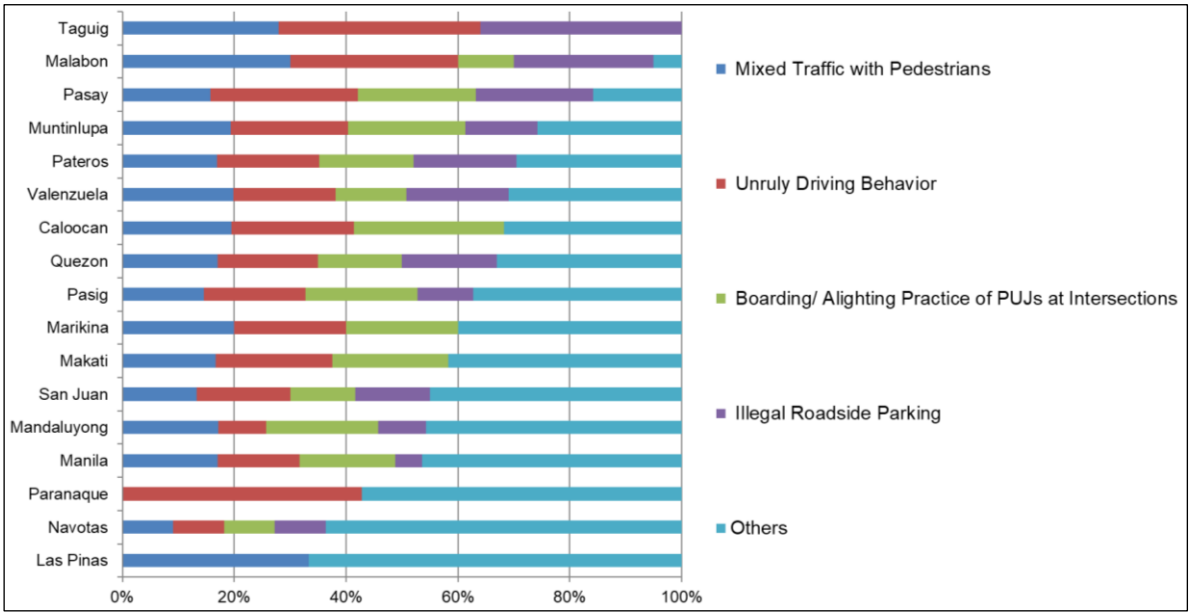
In particular, Pasig City has few plans for countermeasure by infrastructures despite the fact that Saturated Demand is one of the major causes of traffic bottlenecks. Similarly, in Las Piñas City, since Manual Override of Active Traffic Lights by Traffic Enforcers accounts for one-third of the causes of traffic bottlenecks, effective signal installation and operation are desired urgently.

(b) **Safety Facilities:** Although the traffic management countermeasure plan by safety facilities was formulated at a high rate in 6 LGUs (Caloocan City, Mandaluyong City, Muntinlupa City, Navotas City, and Municipality of Pateros), it was found that the

average of 17 LGUs was only approximately 50% on both major and minor roads.

(c) **Enforcement:** The traffic management countermeasure plan by enforcement was formulated for more than 80% of the traffic bottlenecks in 9 LGUs, and the average of 17 LGUs was formulated for more than 70% of traffic bottlenecks. On the other hand, Mandaluyong City and Pasig City did not make plans well, and the rate was approximately 20%.

Although Mandaluyong City and Pasig City did not plan enforcement measures well, the causes that should be decreased by enforcement measures such as Mixed Traffic with Pedestrians, Unruly Driving Behavior, Boarding / Alighting Practice of PUJs at L Intersections, and Illegal Roadside Parking, count for over 50% (see Figure 3.7). They would need to focus on planning enforcement measures.

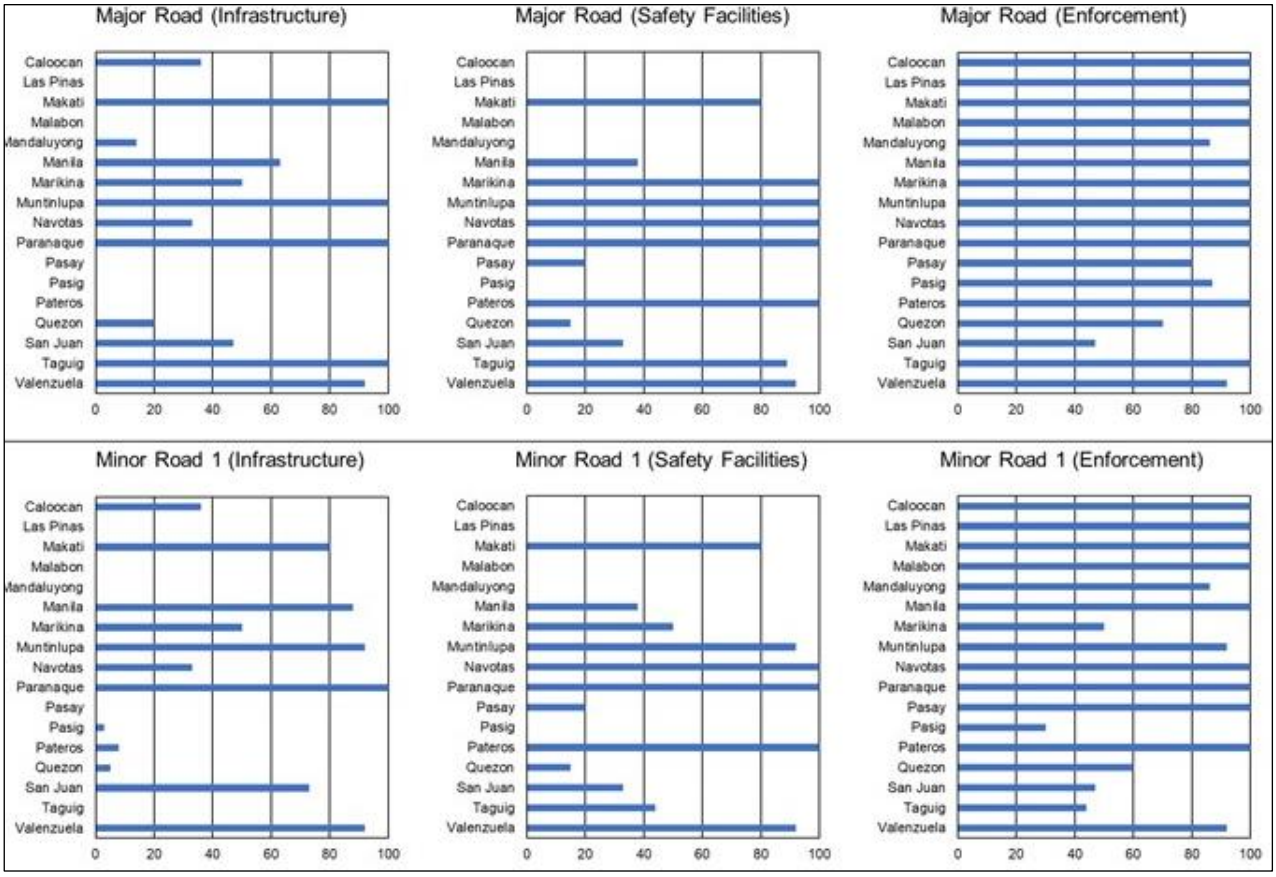


Source: JPT

Figure 2.7: Share of Causes Decreased by Enforcements

2.5 Evaluation of Implemented Measures

In order to evaluate the status of improvement measures in the traffic bottlenecks identified by each LGU in Metro Manila, interviews with LGUs were conducted. Figure 3.8 shows the evaluation rate of traffic management measures Implemented by 17 LGUs.



1) Unit is %
Source: JPT

Figure 2.8: Evaluation Rate of Traffic Management Measures Implemented by 17 LGUs

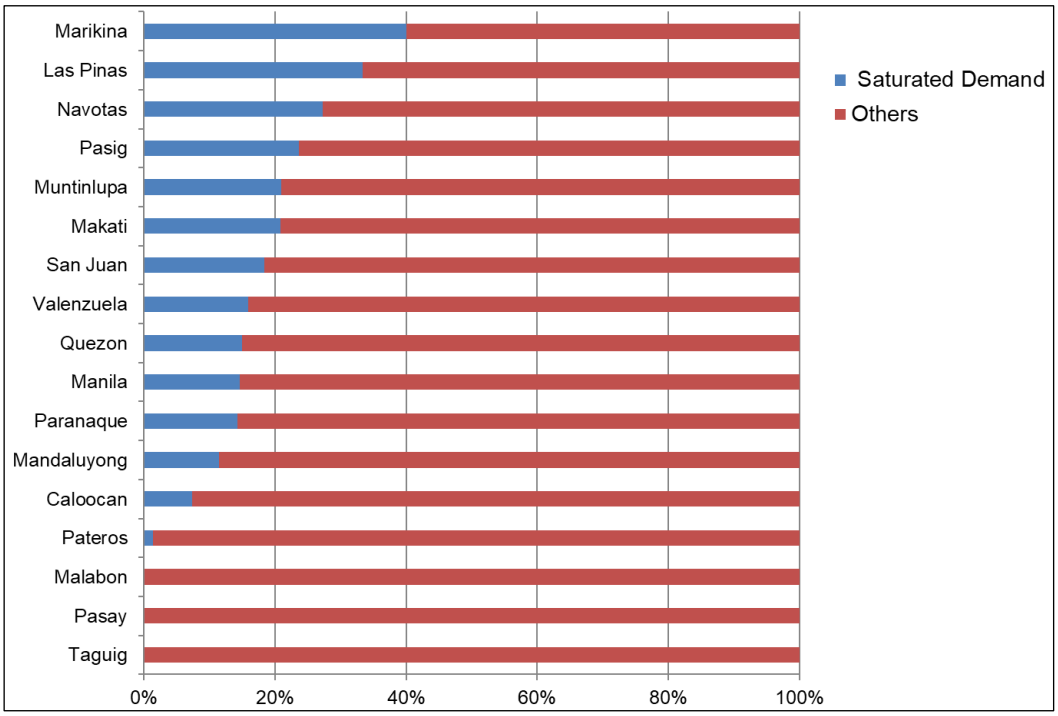
Traffic management measures were divided into three types: infrastructures with physical improvements, safety facilities aimed at improving the pedestrian environment, and enforcement to strengthen regulatory compliance.

(a) **Infrastructures:** The evaluation of traffic management measures by infrastructures was carried out at a high rate only in 4 LGUs (Makati City, Muntinlupa City, Parañaque City, and Valenzuela City).

Evaluation of measures is important to determine whether the implementation was effective. However, Marikina City, which accounts for about 40% of the causes of traffic bottlenecks due to saturated demand and was expected to be decreased by infrastructure measures, evaluated only half of the implemented measures (see Figure 2.9).

Similarly, Las Piñas City, Navotas City, and Pasig City, where saturated demand accounts for about 30% of the causes of traffic bottlenecks, did not implement the ex-post evaluation.

On the other hand, Makati City, Muntinlupa City, Parañaque City, and Valenzuela City, where saturated demand accounts for about 15 to 20% of causes of traffic bottlenecks, implemented almost all measures during ex-post evaluation. The continuous improvement of measurements is expected to contribute to the reduction of the traffic bottleneck.

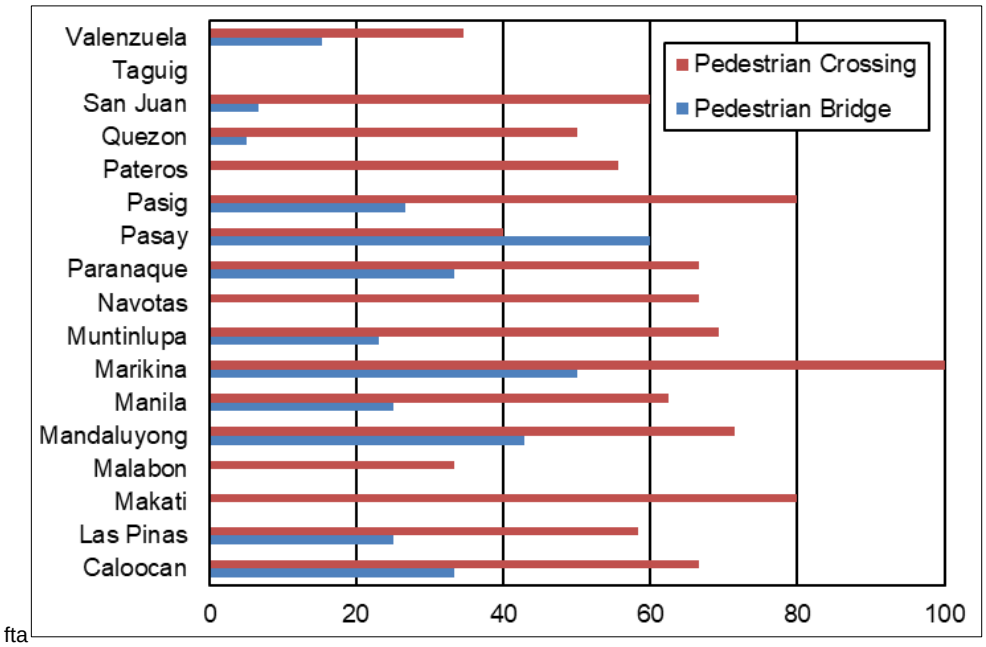


1) Unit is %
Source: JPT

Figure 2.9: Share of Saturated Demand among Causes of Traffic Bottlenecks by LGU

(b) **Safety Facilities:** Evaluation of traffic management measures by safety facilities was conducted at a high rate in 7 LGUs (Makati City, Marikina City, Muntinlupa City, Navotas City, Parañaque City, Municipality of Pateros and Valenzuela City). On the other hand, it was found that there was only an average of approximately 50% for both major and minor roads.

Although the 7 LGUs mentioned above have a high rate of measurement evaluation of safety facilities, Valenzuela City still has problems with the walking environment of pedestrians. Their identified intersections with traffic bottlenecks do not have a pedestrian bridge or pedestrian crossing (see Figure 2.10). They would need to reconsider their safety facilities measurements from the beginning of the plan.



fta
Unit is % Source: JPT
Source: JPT

Figure 2.10: Share of Lack of Safety Facilities among Causes of Traffic Bottlenecks by LGU

(c) **Enforcement:** Evaluation of traffic management measures by enforcement was carried out well in almost all LGUs and averaged over 80%. On the other hand, the evaluation on both major and minor roads were not carried out in half of the traffic bottlenecks in San Juan City.

2.6 Human Resources Related Traffic and Transportation

In order to understand the current state of human resources related to traffic management in each LGU in Metro Manila, the number of staff and the status of training of staff were studied. Table 2.18 shows the human resources-related traffic and transportation in 17 LGUs. No useful data could be collected from 10 LGUs (Cities of Caloocan, Las Piñas, Manila, Marikina, Muntinlupa, Pasay, Pasig, Quezon, Taguig, and Valenzuela)and almost all LGUs had no or very few traffic management staff other than Enforcement. On the other hand, there is a considerable number of officers in the enforcement sector in each LGU.

Table 2.18: Human Resources Related Traffic and Transportation

Cities / Municipality	Staffing		Traffic Management			
			Planning	Engineering	Enforcement	Other
Caloocan City	No. of Staff	College graduate	n/a	n/a	n/a	
		Others	n/a	n/a	n/a	
	No. of Staff by Assessment	Properly trained	n/a	n/a	n/a	
		Insufficiently trained	n/a	n/a	n/a	
	Training Needs: H (high), M (medium), L (low)		n/a	n/a	n/a	
Las Piñas City	No. of Staff	College graduate	n/a	n/a	n/a	
		Others	n/a	n/a	n/a	
	No. of Staff by Assessment	Properly trained	n/a	n/a	n/a	
		Insufficiently trained	n/a	n/a	n/a	
	Training Needs: H (high), M (medium), L (low)		n/a	n/a	n/a	
Makati City	No. of Staff	College graduate	4	1	n/a	
		Others	0	3	n/a	
	No. of Staff by Assessment	Properly trained	4	1	n/a	
		Insufficiently trained	0	3	n/a	
	Training Needs: H (high), M (medium), L (low)		H	M	n/a	
Malabon City	No. of Staff	College graduate	0	0	4	
		Others	2	2	118	1 (Traffic Division)
	No. of Staff by Assessment	Properly trained	0	0	36	
		Insufficiently trained	0	0	87	
	Training Needs: H (high), M (medium), L (low)		H	H	M	
Mandaluyong City	No. of Staff	College graduate	1	2	4	
		Others	0	0	0	
	No. of Staff by Assessment	Properly trained	n/a	n/a	n/a	
		Insufficiently trained	n/a	n/a	n/a	
	Training Needs: H (high), M (medium), L (low)		H	H	H	
Manila City	No. of Staff	College graduate	n/a	n/a	n/a	
		Others	n/a	n/a	n/a	
	No. of Staff by Assessment	Properly trained	n/a	n/a	n/a	
		Insufficiently trained	n/a	n/a	n/a	
	Training Needs: H (high), M (medium), L (low)		n/a	n/a	n/a	
Marikina City	No. of Staff	College graduate	n/a	n/a	n/a	
		Others	n/a	n/a	n/a	
	No. of Staff by Assessment	Properly trained	n/a	n/a	n/a	
		Insufficiently trained	n/a	n/a	n/a	
	Training Needs: H (high), M (medium), L (low)		n/a	n/a	n/a	
Muntinlupa City	No. of Staff	College graduate	n/a	n/a	n/a	
		Others	n/a	n/a	n/a	
	No. of Staff by Assessment	Properly trained	n/a	n/a	n/a	
		Insufficiently trained	n/a	n/a	n/a	
	Training Needs: H (high), M (medium), L (low)		n/a	n/a	n/a	
Navotas City	No. of Staff	College graduate	0	0	23	
		Others	0	0	133	
	No. of Staff by	Properly trained	0	0	107	

Cities / Municipality	Staffing		Traffic Management			
			Planning	Engineering	Enforcement	Other
	Assessment	Insufficiently trained	0	0	49	
	Training Needs: H (high), M (medium), L (low)		H	H	H	
Navotas City	No. of Staff	College graduate	5	0	95	Continuing traffic Education & Leadership competencies
		Others	0	0	51	
	No. of Staff by Assessment	Properly trained	n/a	n/a	30	
		Insufficiently trained	n/a	n/a	116	
	Training Needs: H (high), M (medium), L (low)		n/a	n/a	H	
Pasay City	No. of Staff	College graduate	n/a	n/a	n/a	
		Others	n/a	n/a	n/a	
	No. of Staff by Assessment	Properly trained	n/a	n/a	n/a	
		Insufficiently trained	n/a	n/a	n/a	
	Training Needs: H (high), M (medium), L (low)		n/a	n/a	n/a	
Pasig City	No. of Staff	College graduate	n/a	n/a	n/a	
		Others	n/a	n/a	n/a	
	No. of Staff by Assessment	Properly trained	n/a	n/a	n/a	
		Insufficiently trained	n/a	n/a	n/a	
	Training Needs: H (high), M (medium), L (low)		n/a	n/a	n/a	
Municipality of Pateros	No. of Staff	College graduate	0	0	44	
		Others	0	0		
	No. of Staff by Assessment	Properly trained	n/a	n/a	41	
		Insufficiently trained	n/a	n/a	3	
	Training Needs: H (high), M (medium), L (low)		H	H	H	
Quezon City	No. of Staff	College graduate	n/a	n/a	n/a	
		Others	n/a	n/a	n/a	
	No. of Staff by Assessment	Properly trained	n/a	n/a	n/a	
		Insufficiently trained	n/a	n/a	n/a	
	Training Needs: H (high), M (medium), L (low)		n/a	n/a	n/a	
San Juan City	No. of Staff	College graduate	n/a	n/a	5	
		Others	n/a	n/a	65	
	No. of Staff by Assessment	Properly trained	n/a	n/a	68	
		Insufficiently trained	n/a	n/a	2	
	Training Needs: H (high), M (medium), L (low)		n/a	n/a	M	
Taguig City	No. of Staff	College graduate	n/a	n/a	n/a	
		Others	n/a	n/a	n/a	
	No. of Staff by Assessment	Properly trained	n/a	n/a	n/a	
		Insufficiently trained	n/a	n/a	n/a	
	Training Needs: H (high), M (medium), L (low)		n/a	n/a	n/a	
Valenzuela City	No. of Staff	College graduate	n/a	n/a	n/a	
		Others	n/a	n/a	n/a	
	No. of Staff by Assessment	Properly trained	n/a	n/a	n/a	
		Insufficiently trained	n/a	n/a	n/a	
	Training Needs: H (high), M (medium), L (low)		n/a	n/a	n/a	

Source: JPT

2.7 Understanding LGUs Responsibility by Metro Manila LGUs

Currently, the coordination of agencies related to traffic management is not working well in Metro Manila. In particular, traffic management based on unified regulations is not performed between national agencies and LGUs, and inter-LGUs as well. In this section, the results of the questionnaire survey on each LGU's role in traffic management would be described to clarify the roles and responsibilities of each LGU in Metro Manila.

Table 2.19 shows the results of understanding the LGU's responsibility by the 17 LGUs in Metro Manila. Responses from the 6 LGUs, Cities of Manila, Pasay, Pasig, Quezon, Taguig, and Valenzuela could not be collected within the survey period. However, it was found that there was a large variation in the recognition of the responsibility in traffic management among the 11 LGUs that could collect the responses.

In this survey, JPT examined the LGUs about five items: Intersection Improvement, Traffic Signal, Traffic Control, Roadside Parking, and Pedestrians Environment.

(1) Intersection Improvement (Channelization and Lane Marking)

Of the 11 LGUs that responded, 10 LGUs answered that intersection improvement was a means of traffic management that could be undertaken by LGUs on national roads and/or local roads. Only Malabon City answered that the intersection improvement was outside the scope of the LGU.

(2) Traffic Signal (Installation, Operation, and Maintenance)

According to another survey on traffic signals conducted separately from the questionnaire survey in this project, currently, many traffic signals are installed and managed by different organizations in Metro Manila. The main installers are MMDA, LGUs (Makati City and Pasig City), and Ayala Corporation, however, they do not collaborate for the signal harmonization as of this moment.

On the other hand, according to the results of the questionnaire survey, in addition to the 2 LGUs above, 4 LGUs of Navotas City, Parañaque City, Pateros City and San Juan City answered that the installation, operation, and maintenance of traffic signals were within the scope of LGUs.

If these 4 LGUs do not develop common rules for coordination before starting to install traffic signals in the future, inefficient operation of traffic signals might be further exacerbated. For this reason, it is necessary to clarify the demarcation between the institutions of signal installation, operation, and maintenance as soon as possible.

(3) Traffic Control (Regulation and Enforcement)

All of the 11 LGUs responded that traffic control is within the scope of the LGU. On the other hand, in many LGUs, the choice to implement traffic control changes depends on the road manager. There are also a few LGUs that did not conduct traffic control on national roads.

(4) Roadside Parking (Parking Ban and Pricing)

Similar to traffic control, all of the 11 LGUs answered they will do some sort of roadside parking management.

The installation possibilities of pricing would be determined depending on the location though, it is necessary to establish common rules for the parking ban among the implementing agencies in Metro Manila. Currently, the types of roads where agencies

conduct parking bans are varied among LGUs.

(5) Pedestrians Environment (Safety Facilities, Sidewalk Improvement, and Street Signaling)

As with Traffic control, all of the 11 LGUs that answered will conduct some sort of improvement of the pedestrians' environment. Currently, due to the road manager, roads that implement the improvement of pedestrians' environment vary among LGUs. Since the permanent installation of facilities and physical improvements is a direct measure, it is also important to have common standards for structures in order to prevent pedestrian confusion.

Table 2.19: Understanding LGUs Responsibility by Metro Manila LGUs

Cities / Municipality	Task				National Road to National Road	National Road to Local Road		Local Road to Local Road	Residential Subdivision Road
						Nat'l	Local		
Caloocan City	Intersection Improvement		Channelization		✓	✓	✓		
			Lane marking		✓	✓	✓		
	Traffic Signal		Installation						
			Operation						
			Maintenance						
	Traffic Control	PUJ	Regulation		✓	✓	✓		
			Enforcement		✓	✓	✓		
		Tricycle	Regulation		✓	✓	✓		
			Enforcement		✓	✓	✓		
		Other:	Regulation		✓	✓	✓		
			Enforcement		✓	✓	✓		
	Roadside Parking		Parking ban	Regulation	✓	✓	✓		
				Enforcement	✓	✓	✓		
			Pricing						
	Pedestrians Environment		Safety Facilities		✓	✓	✓		
			Sidewalk Improvement		✓	✓	✓		
			Street Signaling		✓	✓	✓		
Las Piñas City	Intersection Improvement		Channelization		✓				
			Lane marking		✓				
	Traffic Signal		Installation						
			Operation						
			Maintenance						
	Traffic Control	PUJ	Regulation		✓				
			Enforcement		✓				
		Tricycle	Regulation		✓				
			Enforcement		✓				
		Other:	Regulation		✓				
			Enforcement		✓				
	Roadside Parking		Parking ban	Regulation	✓				
				Enforcement	✓				
			Pricing		✓				
	Pedestrians Environment		Safety Facilities		✓				
			Sidewalk Improvement		✓				
			Street Signaling		✓				
Makati City	Intersection Improvement		Channelization						
			Lane marking		✓		✓	✓	
	Traffic Signal		Installation				✓		
			Operation				✓		
			Maintenance						
	Traffic Control	PUJ	Regulation			✓	✓		
			Enforcement			✓	✓		
		Tricycle	Regulation			✓	✓		
			Enforcement			✓	✓		
		Other:	Regulation						
			Enforcement						
	Roadside Parking		Parking ban	Regulation		✓	✓		
				Enforcement		✓	✓		
			Pricing						
	Pedestrians Environment		Safety Facilities				✓		
			Sidewalk Improvement				✓		
			Street Signaling						

Cities / Municipality	Task				National Road to National Road	National Road to Local Road		Local Road to Local Road	Residential Subdivision Road
						Nat'l	Local		
Malabon City	Intersection Improvement		Channelization						
			Lane marking						
	Traffic Signal		Installation						
			Operation						
			Maintenance						
	Traffic Control	PUJ	Regulation						
			Enforcement						
		Tricycle	Regulation				✓	✓	
			Enforcement				✓	✓	
		Other:	Regulation				✓	✓	
			Enforcement				✓	✓	
	Roadside Parking		Parking ban	Regulation					
				Enforcement			✓	✓	
			Pricing						
	Pedestrians Environment		Safety Facilities				✓	✓	
			Sidewalk Improvement						
			Street Signaling				✓	✓	
Mandaluyong City	Intersection Improvement		Channelization				✓	✓	✓
			Lane marking				✓	✓	✓
	Traffic Signal		Installation						
			Operation						
			Maintenance						
	Traffic Control	PUJ	Regulation				✓	✓	✓
			Enforcement			✓	✓	✓	✓
		Tricycle	Regulation				✓	✓	✓
			Enforcement				✓	✓	✓
		Other:	Regulation				✓	✓	✓
			Enforcement				✓	✓	✓
	Roadside Parking		Parking ban	Regulation	✓	✓	✓	✓	✓
				Enforcement	✓	✓	✓	✓	✓
			Pricing						
	Pedestrians Environment		Safety Facilities					✓	✓
			Sidewalk Improvement				✓	✓	✓
			Street Signaling				✓	✓	✓
Manila City	Intersection Improvement		Channelization		n/a	n/a	n/a	n/a	n/a
			Lane marking		n/a	n/a	n/a	n/a	n/a
	Traffic Signal		Installation		n/a	n/a	n/a	n/a	n/a
			Operation		n/a	n/a	n/a	n/a	n/a
			Maintenance		n/a	n/a	n/a	n/a	n/a
	Traffic Control	PUJ	Regulation		n/a	n/a	n/a	n/a	n/a
			Enforcement		n/a	n/a	n/a	n/a	n/a
		Tricycle	Regulation		n/a	n/a	n/a	n/a	n/a
			Enforcement		n/a	n/a	n/a	n/a	n/a
		Other:	Regulation		n/a	n/a	n/a	n/a	n/a
			Enforcement		n/a	n/a	n/a	n/a	n/a
	Roadside Parking		Parking ban	Regulation	n/a	n/a	n/a	n/a	n/a
				Enforcement	n/a	n/a	n/a	n/a	n/a
			Pricing		n/a	n/a	n/a	n/a	n/a
	Pedestrians Environment		Safety Facilities		n/a	n/a	n/a	n/a	n/a
			Sidewalk Improvement		n/a	n/a	n/a	n/a	n/a
			Street Signaling		n/a	n/a	n/a	n/a	n/a
Marikina City	Intersection Improvement		Channelization						
			Lane marking				✓	✓	
	Traffic Signal		Installation					✓	
			Operation					✓	
			Maintenance					✓	
	Traffic Control	PUJ	Regulation					✓	
			Enforcement					✓	
		Tricycle	Regulation					✓	
			Enforcement					✓	
		Other:	Regulation					✓	
			Enforcement					✓	
	Roadside Parking		Parking ban	Regulation				✓	
				Enforcement				✓	
			Pricing					✓	
	Pedestrians Environment		Safety Facilities					✓	
			Sidewalk Improvement					✓	
			Street Signaling				✓	✓	

Cities / Municipality	Task				National Road to National Road	National Road to Local Road		Local Road to Local Road	Residential Subdivision Road
						Nat'l	Local		
Muntinlupa City	Intersection Improvement		Channelization		✓	✓	✓	✓	
			Lane marking			✓	✓	✓	
	Traffic Signal		Installation						✓
			Operation						✓
			Maintenance						✓
	Traffic Control	PUJ	Regulation						
			Enforcement		✓	✓	✓	✓	
		Tricycle	Regulation		✓	✓	✓	✓	✓
			Enforcement		✓	✓	✓	✓	✓
		Other:	Regulation		✓	✓	✓	✓	
			Enforcement		✓	✓	✓	✓	
	Roadside Parking		Parking ban	Regulation	✓	✓	✓	✓	
				Enforcement	✓	✓	✓	✓	
			Pricing		✓	✓	✓	✓	
	Pedestrians Environment		Safety Facilities		✓	✓	✓	✓	
			Sidewalk Improvement		✓	✓	✓	✓	
			Street Signaling			✓	✓	✓	
Navotas City	Intersection Improvement		Channelization				✓	✓	✓
			Lane marking				✓	✓	✓
	Traffic Signal		Installation				✓	✓	✓
			Operation				✓	✓	✓
			Maintenance				✓	✓	✓
	Traffic Control	PUJ	Regulation						
			Enforcement		✓	✓	✓	✓	✓
		Tricycle	Regulation		✓	✓	✓	✓	✓
			Enforcement		✓	✓	✓	✓	✓
		Other:	Regulation		✓	✓	✓	✓	✓
			Enforcement		✓	✓	✓	✓	✓
	Roadside Parking		Parking ban	Regulation	✓	✓	✓	✓	✓
				Enforcement	✓	✓	✓	✓	✓
			Pricing				✓	✓	✓
	Pedestrians Environment		Safety Facilities				✓	✓	✓
			Sidewalk Improvement				✓	✓	✓
			Street Signaling			✓	✓	✓	✓
Parañaque City	Intersection Improvement		Channelization		✓	✓	✓	✓	
			Lane marking		✓	✓	✓	✓	✓
	Traffic Signal		Installation		✓	✓	✓	✓	
			Operation		✓	✓	✓	✓	
			Maintenance		✓	✓	✓	✓	
	Traffic Control	PUJ	Regulation		✓	✓	✓	✓	
			Enforcement		✓	✓	✓	✓	
		Tricycle	Regulation					✓	✓
			Enforcement					✓	✓
		Other:	Regulation						
			Enforcement						
	Roadside Parking		Parking ban	Regulation	✓	✓	✓		
				Enforcement	✓	✓	✓		
			Pricing		✓	✓	✓		
	Pedestrians Environment		Safety Facilities		✓	✓	✓		
			Sidewalk Improvement		✓	✓	✓		
			Street Signaling		✓	✓	✓		
Pasay City	Intersection Improvement		Channelization		n/a	n/a	n/a	n/a	n/a
			Lane marking		n/a	n/a	n/a	n/a	n/a
	Traffic Signal		Installation		n/a	n/a	n/a	n/a	n/a
			Operation		n/a	n/a	n/a	n/a	n/a
			Maintenance		n/a	n/a	n/a	n/a	n/a
	Traffic Control	PUJ	Regulation		n/a	n/a	n/a	n/a	n/a
			Enforcement		n/a	n/a	n/a	n/a	n/a
		Tricycle	Regulation		n/a	n/a	n/a	n/a	n/a
			Enforcement		n/a	n/a	n/a	n/a	n/a
		Other:	Regulation		n/a	n/a	n/a	n/a	n/a
			Enforcement		n/a	n/a	n/a	n/a	n/a
	Roadside Parking		Parking ban	Regulation	n/a	n/a	n/a	n/a	n/a
				Enforcement	n/a	n/a	n/a	n/a	n/a
			Pricing		n/a	n/a	n/a	n/a	n/a
	Pedestrians		Safety Facilities		n/a	n/a	n/a	n/a	n/a

Cities / Municipality	Task				National Road to National Road	National Road to Local Road		Local Road to Local Road	Residential Subdivision Road
						Nat'l	Local		
	Environment		Sidewalk Improvement		n/a	n/a	n/a	n/a	n/a
			Street Signaling		n/a	n/a	n/a	n/a	n/a
Pasig City	Intersection Improvement		Channelization		n/a	n/a	n/a	n/a	n/a
			Lane marking		n/a	n/a	n/a	n/a	n/a
	Traffic Signal		Installation		n/a	n/a	n/a	n/a	n/a
			Operation		n/a	n/a	n/a	n/a	n/a
			Maintenance		n/a	n/a	n/a	n/a	n/a
	Traffic Control	PUJ	Regulation		n/a	n/a	n/a	n/a	n/a
			Enforcement		n/a	n/a	n/a	n/a	n/a
		Tricycle	Regulation		n/a	n/a	n/a	n/a	n/a
			Enforcement		n/a	n/a	n/a	n/a	n/a
		Other:	Regulation		n/a	n/a	n/a	n/a	n/a
			Enforcement		n/a	n/a	n/a	n/a	n/a
	Roadside Parking		Parking ban	Regulation	n/a	n/a	n/a	n/a	n/a
				Enforcement	n/a	n/a	n/a	n/a	n/a
			Pricing		n/a	n/a	n/a	n/a	n/a
	Pedestrians Environment		Safety Facilities		n/a	n/a	n/a	n/a	n/a
			Sidewalk Improvement		n/a	n/a	n/a	n/a	n/a
			Street Signaling		n/a	n/a	n/a	n/a	n/a
Municipality of Pateros	Intersection Improvement		Channelization						
			Lane marking		✓	✓	✓	✓	
	Traffic Signal		Installation		✓	✓	✓		
			Operation		✓	✓	✓		
			Maintenance		✓	✓	✓		
	Traffic Control	PUJ	Regulation		✓	✓	✓		
			Enforcement		✓	✓	✓		
		Tricycle	Regulation		✓	✓	✓	✓	
			Enforcement		✓	✓	✓	✓	
		Other:	Regulation		✓	✓	✓		
			Enforcement		✓	✓	✓		
	Roadside Parking		Parking ban	Regulation	✓	✓	✓	✓	✓
				Enforcement	✓	✓	✓	✓	✓
			Pricing						
	Pedestrians Environment		Safety Facilities		✓	✓	✓	✓	✓
			Sidewalk Improvement		✓	✓	✓	✓	✓
			Street Signaling		✓	✓	✓	✓	
Quezon City	Intersection Improvement		Channelization		n/a	n/a	n/a	n/a	n/a
			Lane marking		n/a	n/a	n/a	n/a	n/a
	Traffic Signal		Installation		n/a	n/a	n/a	n/a	n/a
			Operation		n/a	n/a	n/a	n/a	n/a
			Maintenance		n/a	n/a	n/a	n/a	n/a
	Traffic Control	PUJ	Regulation		n/a	n/a	n/a	n/a	n/a
			Enforcement		n/a	n/a	n/a	n/a	n/a
		Tricycle	Regulation		n/a	n/a	n/a	n/a	n/a
			Enforcement		n/a	n/a	n/a	n/a	n/a
		Other:	Regulation		n/a	n/a	n/a	n/a	n/a
			Enforcement		n/a	n/a	n/a	n/a	n/a
	Roadside Parking		Parking ban	Regulation	n/a	n/a	n/a	n/a	n/a
				Enforcement	n/a	n/a	n/a	n/a	n/a
			Pricing		n/a	n/a	n/a	n/a	n/a
	Pedestrians Environment		Safety Facilities		n/a	n/a	n/a	n/a	n/a
			Sidewalk Improvement		n/a	n/a	n/a	n/a	n/a
			Street Signaling		n/a	n/a	n/a	n/a	n/a
San Juan City	Intersection Improvement		Channelization			✓			
			Lane marking			✓			
	Traffic Signal		Installation		✓				
			Operation		✓				
			Maintenance		✓				
	Traffic Control	PUJ	Regulation				✓		
			Enforcement				✓		
		Tricycle	Regulation				✓		
			Enforcement				✓		
		Other:	Regulation						
			Enforcement				✓		
	Roadside Parking		Parking ban	Regulation			✓		
				Enforcement			✓		
			Pricing			✓			
	Pedestrians Environment		Safety Facilities			✓			
			Sidewalk Improvement			✓			

Cities / Municipality	Task				National Road to National Road	National Road to Local Road		Local Road to Local Road	Residential Subdivision Road
						Nat'l	Local		
			Street Signaling			✓			
Taguig City	Intersection Improvement		Channelization		n/a	n/a	n/a	n/a	n/a
			Lane marking		n/a	n/a	n/a	n/a	n/a
	Traffic Signal		Installation		n/a	n/a	n/a	n/a	n/a
			Operation		n/a	n/a	n/a	n/a	n/a
			Maintenance		n/a	n/a	n/a	n/a	n/a
	Traffic Control	PUJ	Regulation		n/a	n/a	n/a	n/a	n/a
			Enforcement		n/a	n/a	n/a	n/a	n/a
		Tricycle	Regulation		n/a	n/a	n/a	n/a	n/a
			Enforcement		n/a	n/a	n/a	n/a	n/a
		Other:	Regulation		n/a	n/a	n/a	n/a	n/a
			Enforcement		n/a	n/a	n/a	n/a	n/a
	Roadside Parking		Parking ban	Regulation	n/a	n/a	n/a	n/a	n/a
				Enforcement	n/a	n/a	n/a	n/a	n/a
			Pricing		n/a	n/a	n/a	n/a	n/a
	Pedestrians Environment		Safety Facilities		n/a	n/a	n/a	n/a	n/a
			Sidewalk Improvement		n/a	n/a	n/a	n/a	n/a
			Street Signaling		n/a	n/a	n/a	n/a	n/a
Valenzuela City	Intersection Improvement		Channelization		n/a	n/a	n/a	n/a	n/a
			Lane marking		n/a	n/a	n/a	n/a	n/a
	Traffic Signal		Installation		n/a	n/a	n/a	n/a	n/a
			Operation		n/a	n/a	n/a	n/a	n/a
			Maintenance		n/a	n/a	n/a	n/a	n/a
	Traffic Control	PUJ	Regulation		n/a	n/a	n/a	n/a	n/a
			Enforcement		n/a	n/a	n/a	n/a	n/a
		Tricycle	Regulation		n/a	n/a	n/a	n/a	n/a
			Enforcement		n/a	n/a	n/a	n/a	n/a
		Other:	Regulation		n/a	n/a	n/a	n/a	n/a
			Enforcement		n/a	n/a	n/a	n/a	n/a
	Roadside Parking		Parking ban	Regulation	n/a	n/a	n/a	n/a	n/a
				Enforcement	n/a	n/a	n/a	n/a	n/a
			Pricing		n/a	n/a	n/a	n/a	n/a
	Pedestrians Environment		Safety Facilities		n/a	n/a	n/a	n/a	n/a
			Sidewalk Improvement		n/a	n/a	n/a	n/a	n/a
			Street Signaling		n/a	n/a	n/a	n/a	n/a

Source: JPT

2.8 Summary and Comments on Traffic Bottlenecks Identified by Metro Manila LGUs

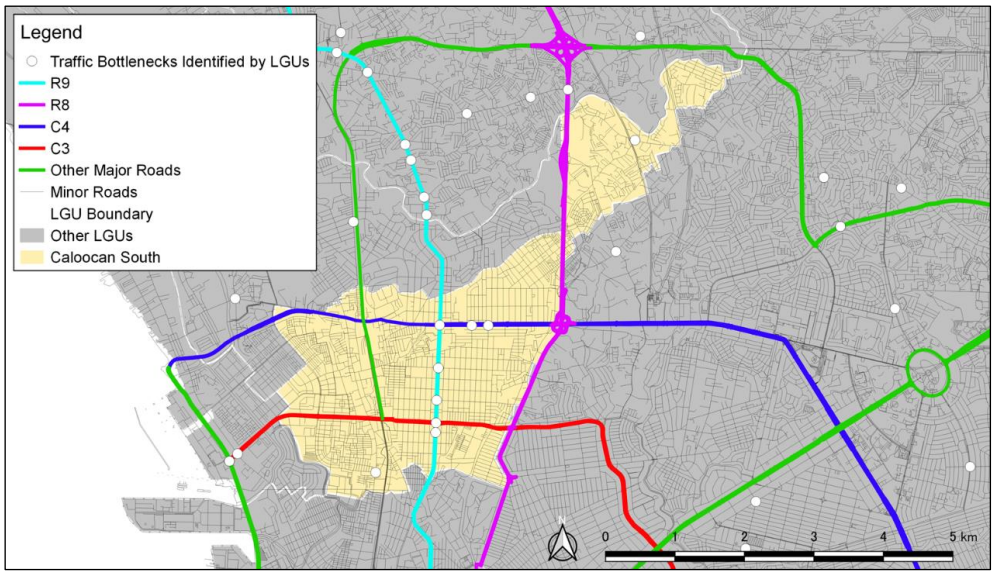
As mentioned at the beginning of this report, JPT conducted the questionnaire survey on traffic bottlenecks in 17 LGUs in Metro Manila from 26 April 2019 to 31 October 2019.

Until this section, the response items with relatively high collect rates were described, but JPT also investigated the organization and budget related to traffic management. From here on, JPT describes the findings and considerations that are difficult to express as data, such as the positiveness of project participation and capacity.

Also, the location map of traffic bottlenecks in each LGU and list of each traffic bottleneck are shown with the congestion causes proposed by LGUs and found through the observational survey.

1) Caloocan City

Caloocan City is divided into two, the north and south areas. The southern area is smaller than the northern area. However, it exceeds the northern area in the number and severity of traffic bottlenecks since the northern part is located at the northernmost end of Metro Manila, while the southern part is surrounded by 5 LGUs, and the major roads such as C3, C4, R8, and R9 mesh in the area. The identified traffic bottlenecks are concentrated on the major roads (Figure 2.11).



Source: JPT

Figure 2.11: Traffic Bottlenecks in the Southern Part of Caloocan City

(a) **Physical Issues on Traffic Bottlenecks:** Traffic signals, sidewalks, and pedestrian crossing must be improved to avoid mixed traffic with pedestrians and secure pedestrian's safety.

(b) **Cause of Traffic Bottlenecks:** Mixed traffic with pedestrians, unruly driving behavior and boarding/alighting practices of PUJs at intersections compose of approximate 70% of cause.

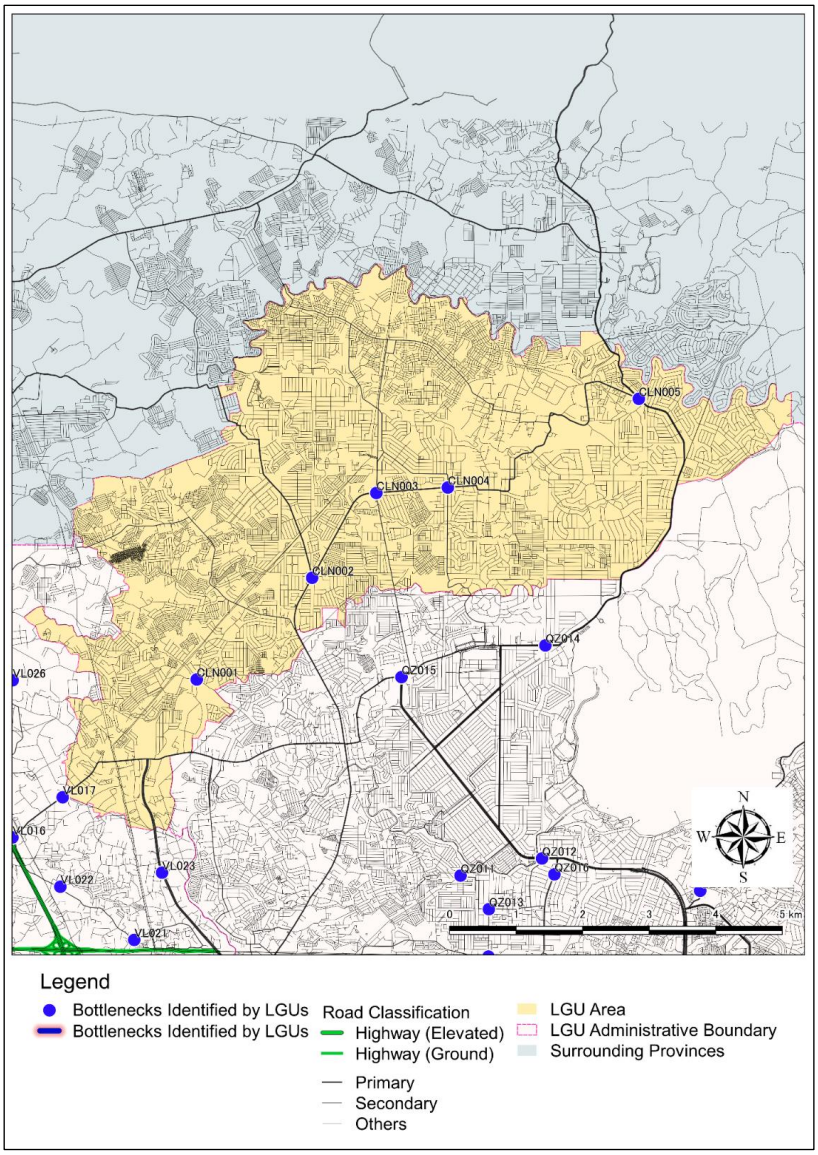
(c) **Improvement Measure Planning:** All identified traffic bottlenecks have measure plans by safety facilities and enforcement. On the other hand, measure plan by infrastructure is limited.

(d) **Evaluation of Implemented Measures:** Only evaluation of measures by enforcement was implemented well.

(e) **Human Resources and Understanding of LGU's Responsibility:** No data is available on human resources. Caloocan City's traffic management covers various ways except for traffic signal installation, operation, and maintenance. Intersections composed of only local roads and residential/ subdivision roads are not included in their coverage.

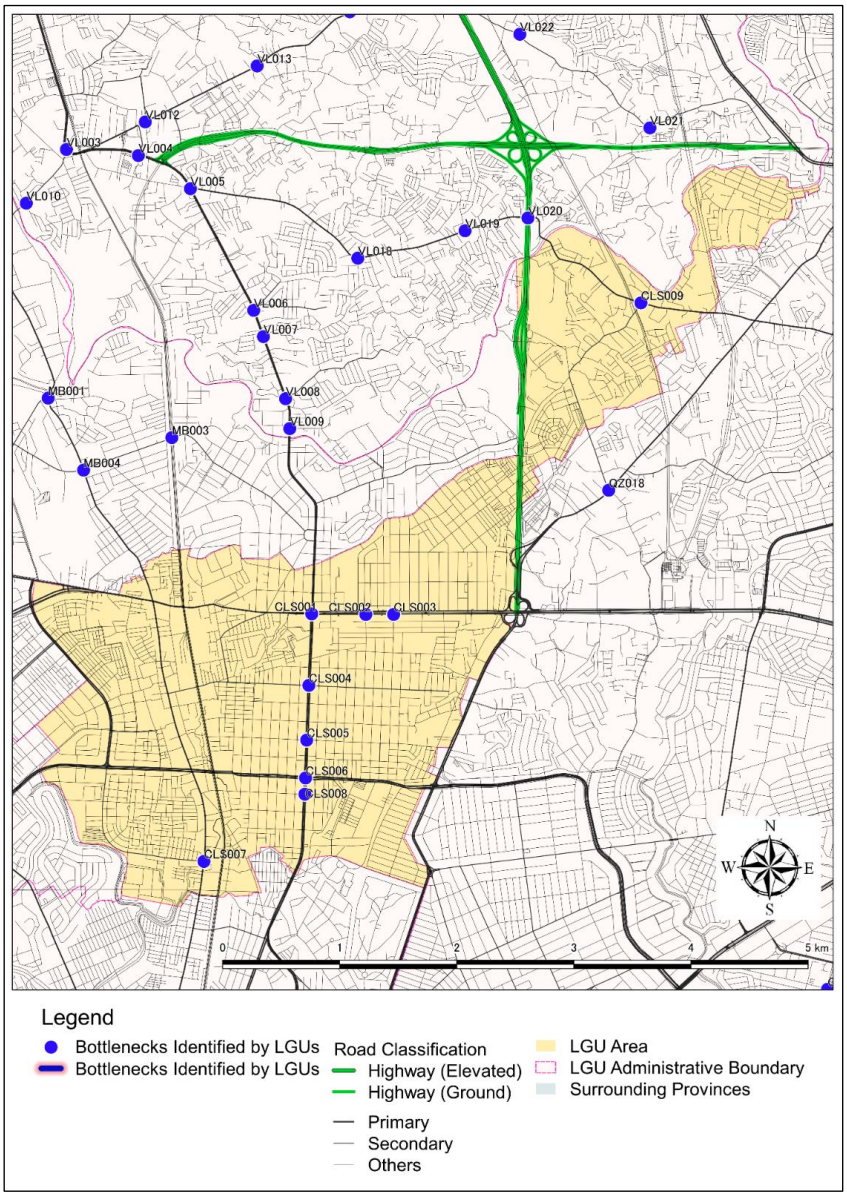
(f) **Budget and Positiveness:** No data is available on the budget. LGU's response to the questionnaire was comparatively slow, especially the response from the Southern area. Several data are still missing.

(g) **List of Traffic Bottlenecks Identified by Caloocan City:** Figure 2.12 and Figure 2.13 show the location of traffic bottlenecks in Caloocan City. Five (5) traffic bottlenecks in the north and nine (9) traffic bottlenecks in the south were identified based on the questionnaire survey. Figure 2.14 to Figure 2.16 show the characteristics of traffic bottlenecks in Caloocan City.



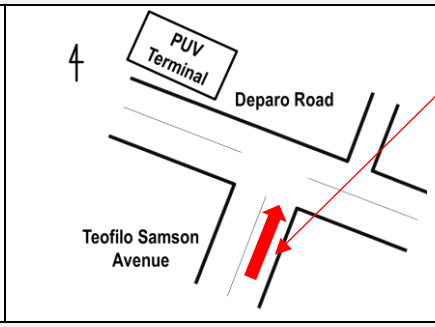
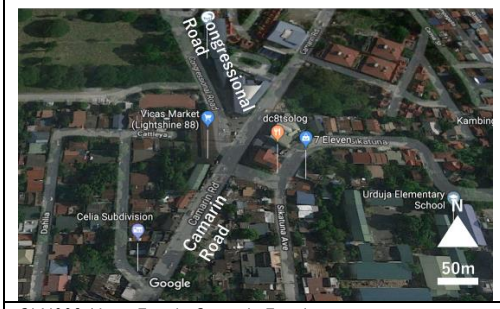
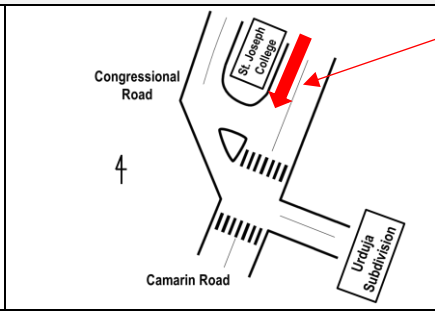
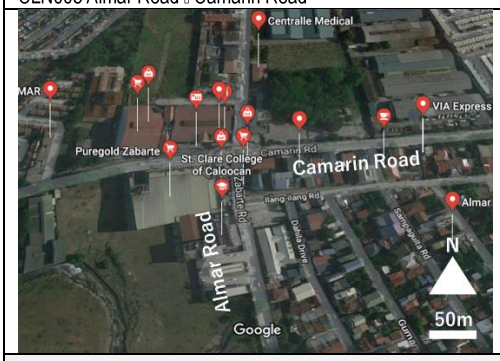
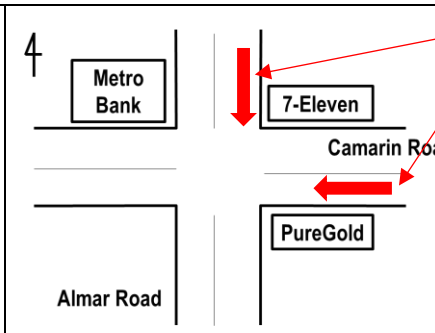
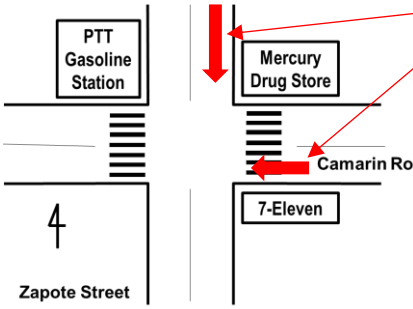
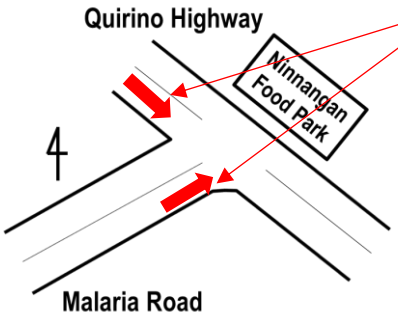
Source: JPT

Figure 2.12: Location of Traffic Bottlenecks in Caloocan City (North)



Source: JPT

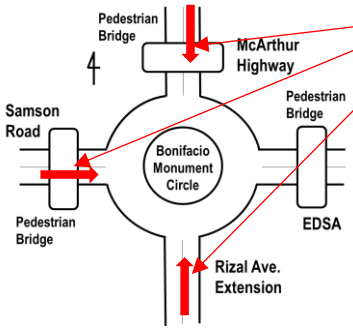
Figure 2.13: Location of Traffic Bottlenecks in Caloocan City (South)

CLN001 Teofilo Samson Ave – Deparo Road		
		● High traffic demand (truck, PUV, MC, PUJ and private cars) coming from Llano Road.
CLN002 Camarin Road – Congressional Road		
		● Congestion during rush hour. High traffic demand coming from Quezon City and Bagong Silang.
CLN003 Almar Road – Camarin Road		
		● Congestion during rush hour. High traffic demand coming from Quezon City and Bagong Silang.
CLN004 Zapote Road – Camarin Road		
		● High traffic demand coming from Quezon City and Bagong Silang.
CLN005 Quirino Hi-way – Malaria Road		
		● High traffic demand coming from San Jose Delmonte, Bulacan and Tala Caloocan City. ● MRT-7 project along Quirino Hi-way, coupled by girder erection, movement of heavy equipment and procuring operation

Source: Google and JPT

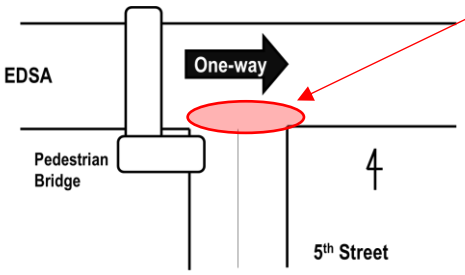
Figure 2.14: Characteristics of Traffic Bottlenecks in Caloocan City (1)

CLS001 EDSA – McArthur Hi-way



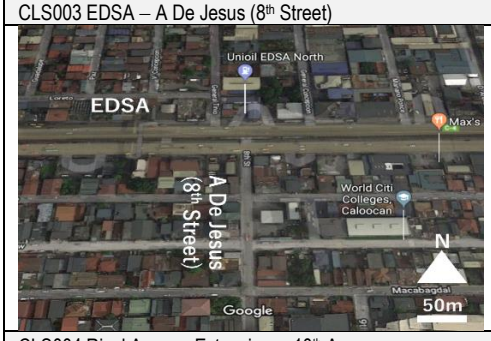
- Intersecting traffic flow originating from EDSA via Samson Road and Avenida Rizal Extension. Against vehicles coming from Avenida Rizal Extension via McArthur Hway.

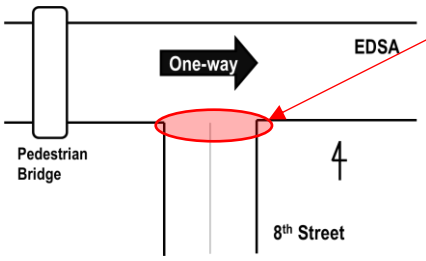
CLS002 EDSA – B. Serrano (5th Street)



- No traffic signal

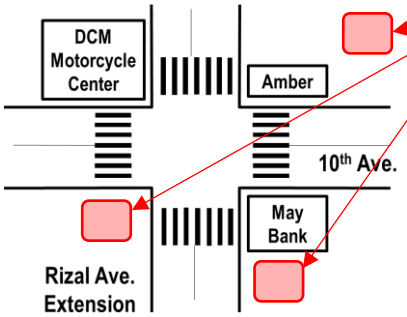
CLS003 EDSA – A De Jesus (8th Street)





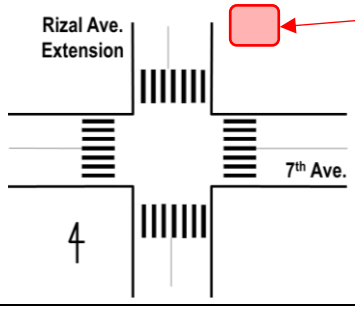
- No traffic signal

CLS004 Rizal Avenue Extension – 10th Avenue



- Opening school classes in Caloocan Higschool, starting 6:00AM in the morning, 12:00NN and 5:00PM to 6:00PM in the afternoon which are same peak hours during rush hour periods.

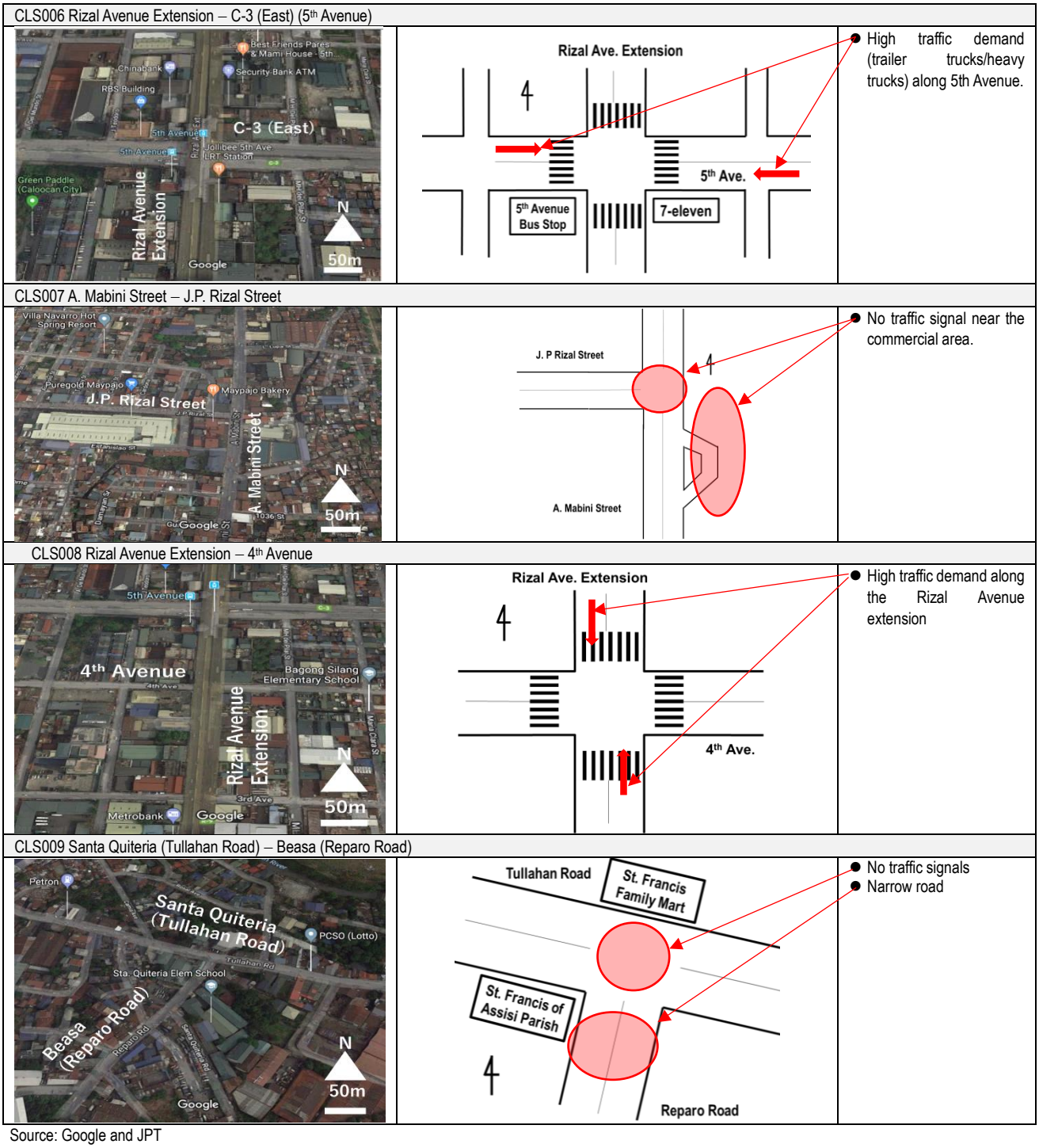
CLS005 Rizal Avenue Extension – 7th Avenue



- Opening school classes in Caloocan Highschool, starting 6:00AM in the morning, 12:00NN and 5:00PM to 6:00PM in the afternoon which are the sa tme peak hours during the rush hour periods.

Source: Google and JPT

Figure 2.15: Characteristics of Traffic Bottlenecks in Caloocan City (2)



Source: Google and JPT

Figure 2.16: Characteristics of Traffic Bottlenecks in Caloocan City (3)

2) Las Piñas City

All traffic bottlenecks are located along the Alabang-Zapote Road except for two (Figure 2.17).

(a) **Physical Issues on Traffic Bottlenecks:** Traffic signals and pedestrian crossing must be improved to secure pedestrian safety.

(b) **Cause of Traffic Bottlenecks:** Only three causes, mixed traffic with pedestrians, saturated demand, and manual override of active traffic lights by traffic enforcers were

identified.

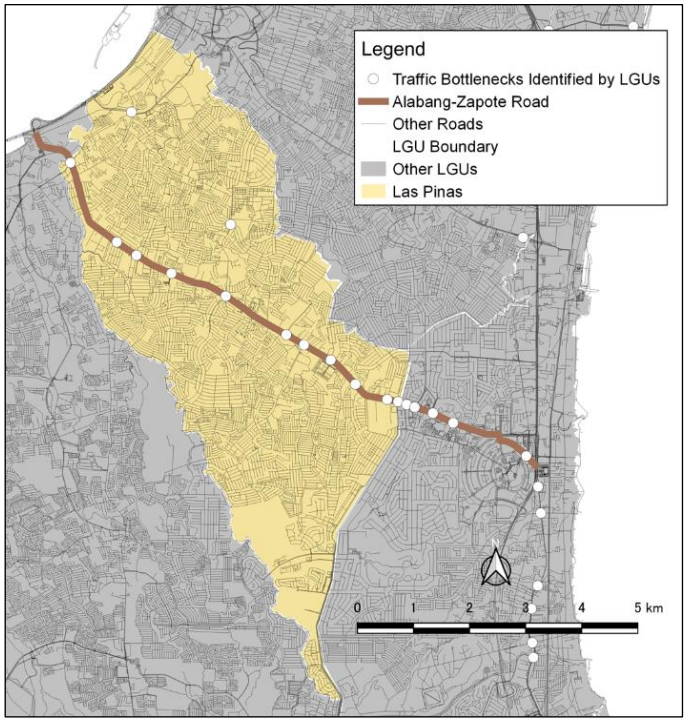
(c) I**mprovement Measure Planning:** All identified traffic bottlenecks have measure plans by enforcement. On the other hand, the measure plans by infrastructure and safety facilities are zero.

(d) **Evaluation of Implemented Measures:** Only evaluation of measures by enforcement was implemented well.

(e) **Human Resources and Understanding of LGU's Responsibility:** No data is available on human resources. Las Piñas City's traffic management covers various ways except for traffic signal installation, operation, and maintenance along national roads only. Other roads are not included in their coverage.

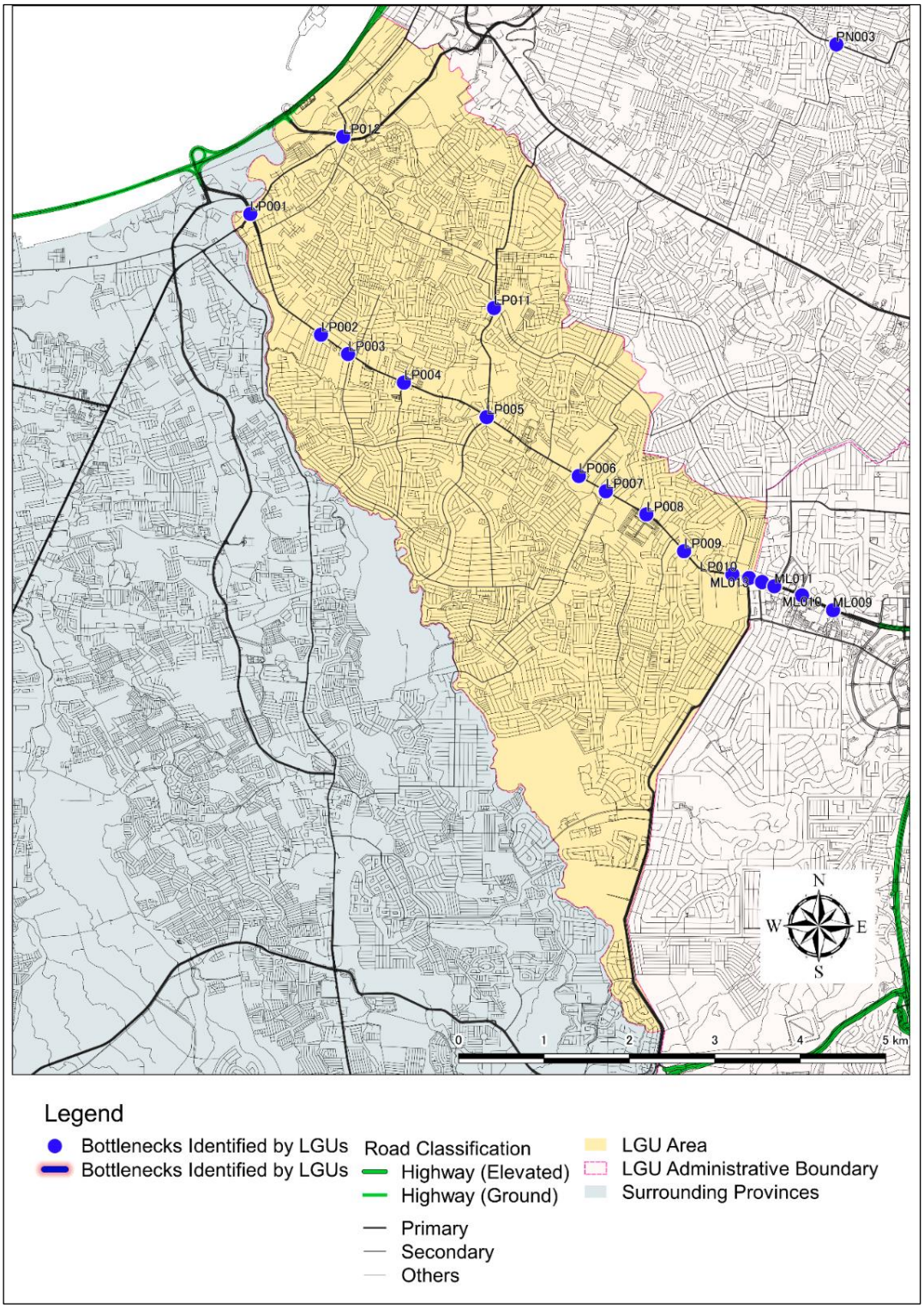
(f) **Budget and Positiveness:** Las Piñas City censured approximately 26.2 million PHP for personnel expenses and approximately 4.9 million PHP for facility expenses in 2019. LGU's response on the questionnaire was prompt and the missing data was also small.

(g) **List of Traffic Bottlenecks Identified by Las Piñas City:** Figure 2.17 shows the location of the traffic bottlenecks in Las Piñas City. Twelve (12) traffic bottlenecks were identified based on the questionnaire survey. Figure 2.18 to Figure 2.21 show the characteristics of traffic bottlenecks in Las Piñas City.



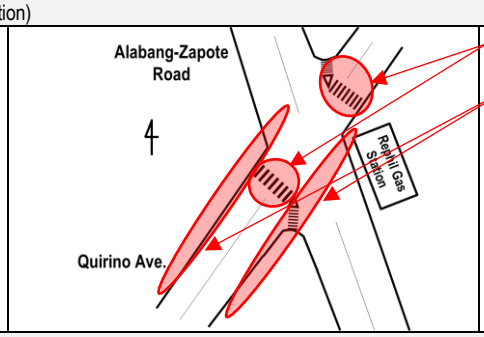
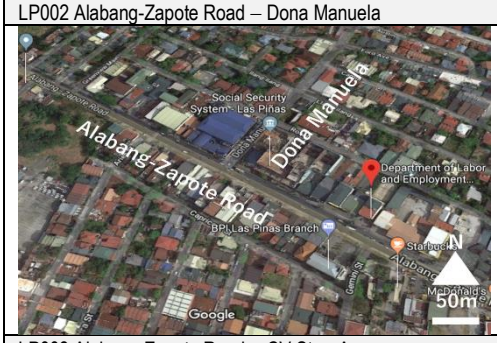
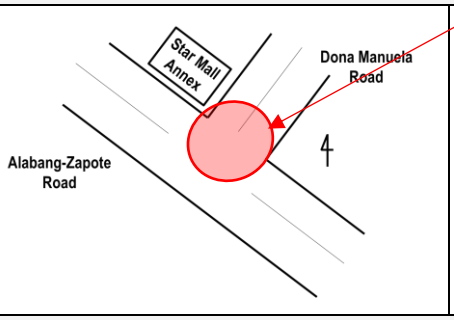
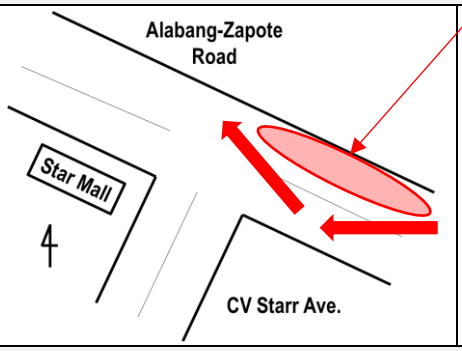
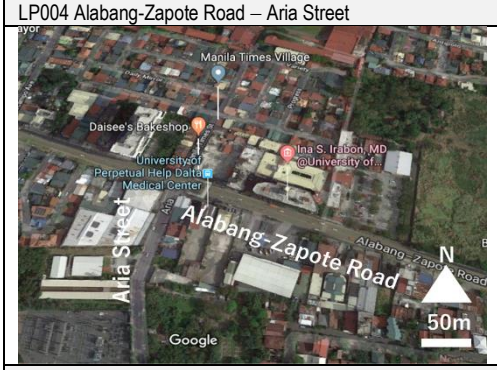
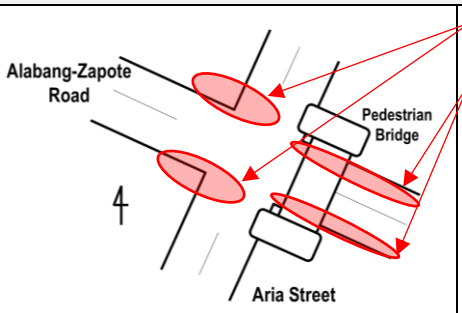
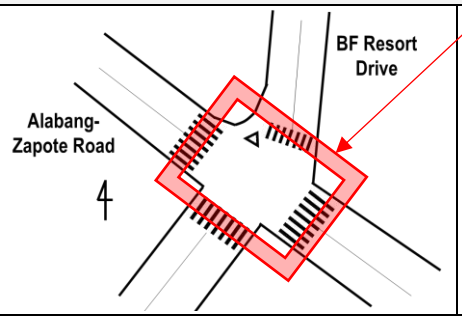
Source: JPT

Figure 2.17: Traffic Bottlenecks Identified by Las Piñas City along Alabang-Zapote Road



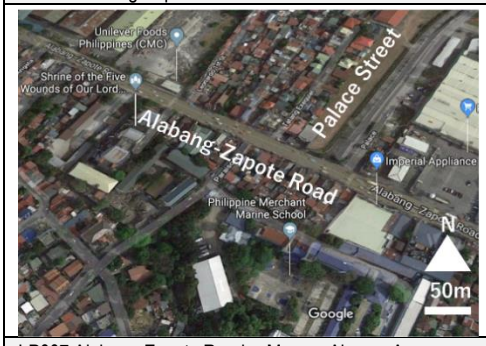
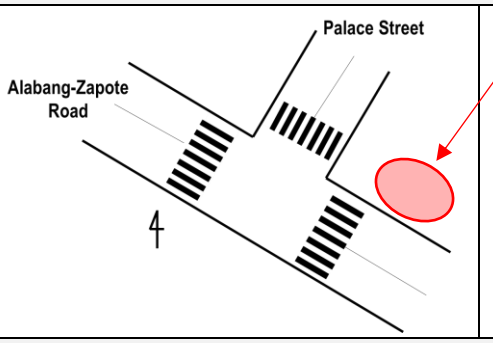
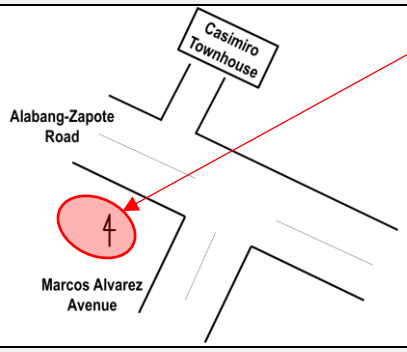
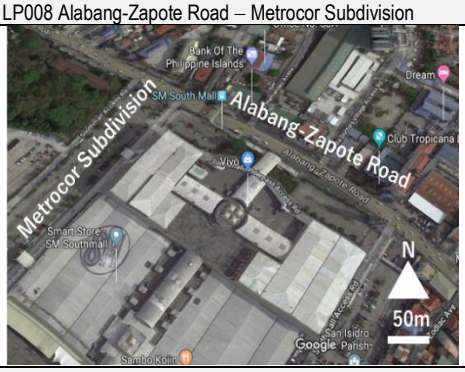
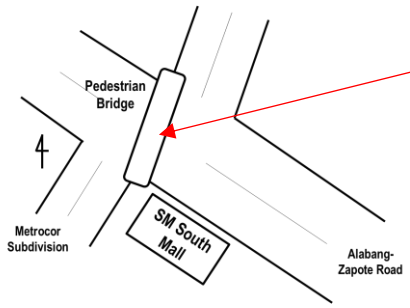
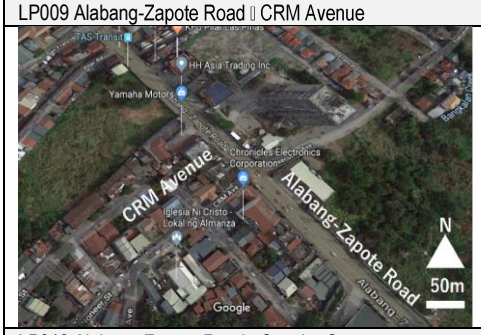
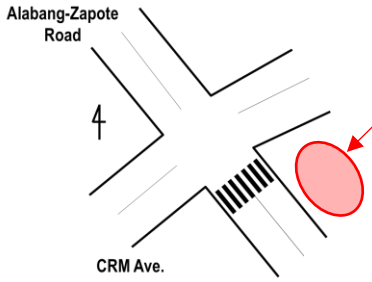
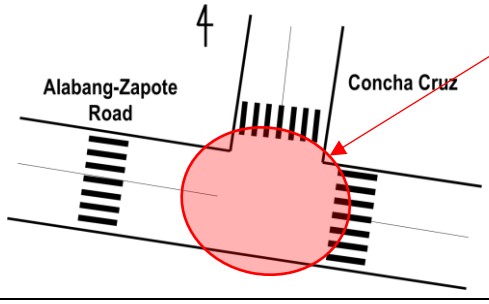
Source: JPT

Figure 2.18: Location of Traffic Bottlenecks in Las Piñas City

LP001 Alabang-Zapote Road – Quirino Avenue (Zapote Junction)		
		● Heavy pedestrian movement ● Unruly behavior of drivers ● Loading and unloading along Quirino Avenue ● Uncontrolled motorcycles during peak hours
LP002 Alabang-Zapote Road – Dona Manuela		
		● Dona Manuela has an insufficient radius restricting further the turning movement at the intersection.
LP003 Alabang-Zapote Road – CV Starr Avenue		
		● Illegal PUJ boarding at the middle lane blocks through traffic.
LP004 Alabang-Zapote Road – Aria Street		
		● Heavy pedestrian movement ● Unruly behavior of drivers ● Loading, unloading, and parking along Alabang-Zapote Road
LP005 Alabang-Zapote Road – BF Resort Dr.		
		● Heavy volume pedestrian movement ● Unruly behavior of drivers and jeepney ● Lack of signage

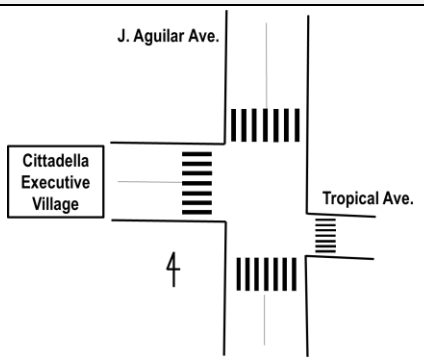
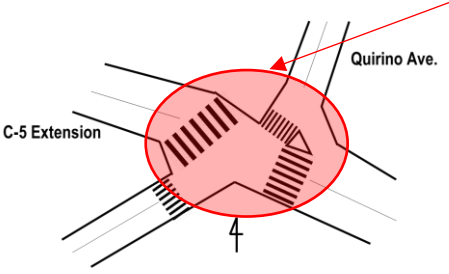
Source: Google and JPT

Figure 2.19: Characteristics of Traffic Bottlenecks in Las Piñas City (1)

LP006 Alabang-Zapote Road – Palace Street		
		● Heavy volume of pedestrians ● Misbehavior of driver ● Lack of parking at business establishments.
LP007 Alabang-Zapote Road – Marcos Alvarez Avenue		
		● Lack of parking of business establishment ● Heavy pedestrian movement ● Unruly behavior driver ● Large volume of vehicles during peak hours.
LP008 Alabang-Zapote Road – Metrocor Subdivision		
		● Undisciplined driver ● Lack of loading and unloading signage ● Pedestrians don't use pedestrian bridge.
LP009 Alabang-Zapote Road – CRM Avenue		
		● Lack of signage ● Lack of traffic enforcer ● Lack of parking business establishment.
LP010 Alabang-Zapote Road – Concha Cruz		
		● Lack of traffic enforcer ● Lack of traffic lights

Source: Google and JPT

Figure 2.20: Characteristics of Traffic Bottlenecks in Las Piñas City (2)

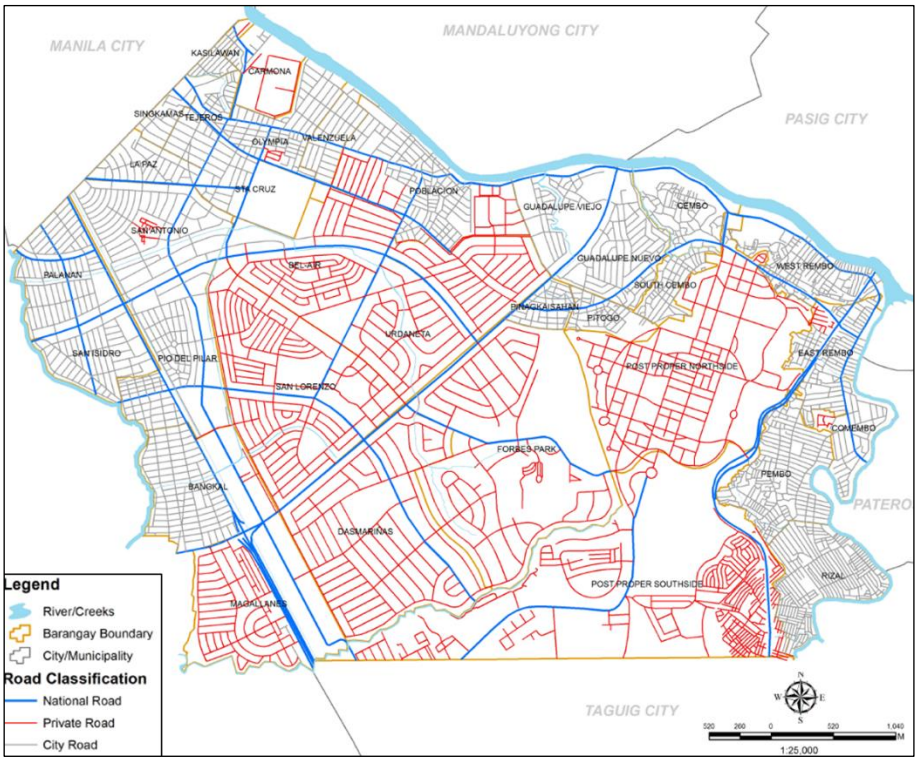
LP011 J. Aguilar Avenue – Tropical Avenue		
		● Lack of traffic enforcer
LP012 C-5 Extension – Quirino Avenue		
		● Lack of traffic lights and officer

Source: Google and JPT

Figure 2.21: Characteristics of Traffic Bottlenecks in Las Piñas City (3)

3) Makati City

Makati City's roads have characteristics that are not found in other LGUs. As shown in Figure 2.22, most roads in Makati City are private roads.



Source: Makati City

Figure 2.22: Road Classification in Makati City

(a) **Physical Issues on Traffic Bottlenecks:** Physical issues are not observed much.

(b) **Cause of Traffic Bottlenecks:** Five causes: mixed traffic with pedestrians, unruly driving behavior, boarding/ alighting practice of PUJ at intersections, saturated demand, and manual override of active traffic lights by traffic enforcers compose all the causes which occupy approximately 20% each.

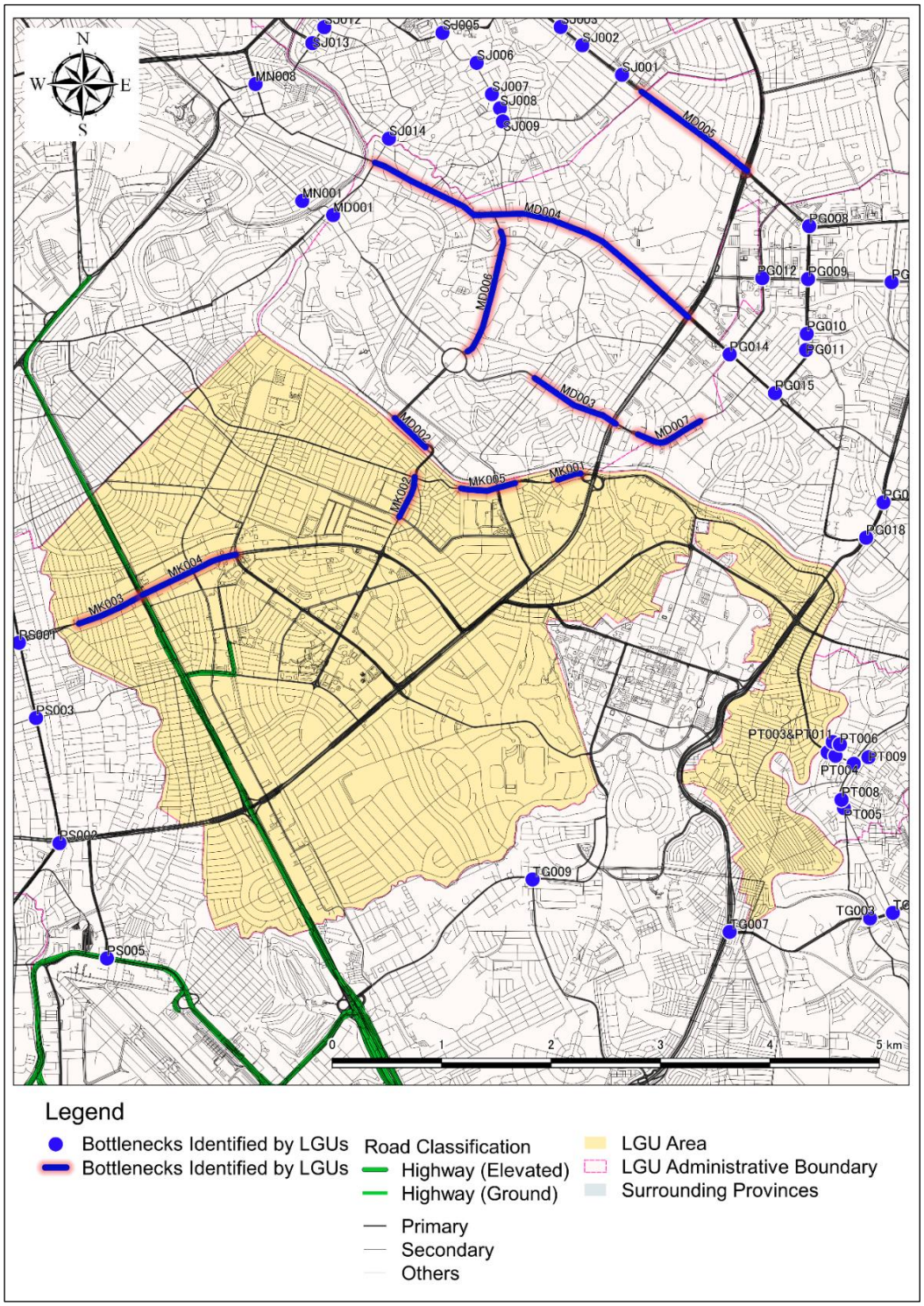
(c) **Improvement Measure Planning:** measure plans by infrastructure, safety facilities, and enforcement exist with almost all traffic bottlenecks that are largely above the advantage of 17 LGUs.

(d) **Evaluation of Implemented Measures:** measure plans by infrastructure, safety facilities, and enforcement exist with almost all traffic bottlenecks that are largely above the advantage of 17 LGUs.

(e) **Human Resources and Understanding of LGU's Responsibility:** Makati City has comparatively many staff, especially in the planning sector. Makati City's traffic management covers various ways at the intersections composed of national roads and local roads.

(f) **Budget and Positiveness:** According to Makati City, they secured approximately 14 million PHP for the preventive maintenance of traffic signals, approximately 18 million PHP for the traffic signal rehabilitation project, and 183 million PHP for the Makati city Intelligent Transportation and Road Administration Center Project in 2019. LGU's response to the questionnaire was prompt and the missing data was also small.

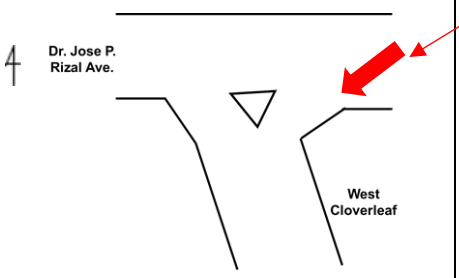
(g) **List of Traffic Bottlenecks Identified by Makati City:** Figure 2.23 shows the location of the traffic bottlenecks in Makati City. Five traffic bottlenecks were identified based on the questionnaire survey. Figure 2.24 shows the characteristics of the traffic bottlenecks in Makati City.



Source: JPT

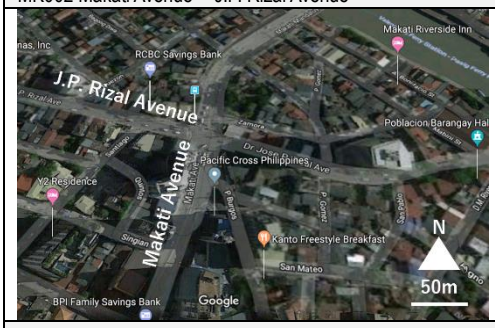
Figure 2.23: Location of Traffic Bottlenecks in Makati City

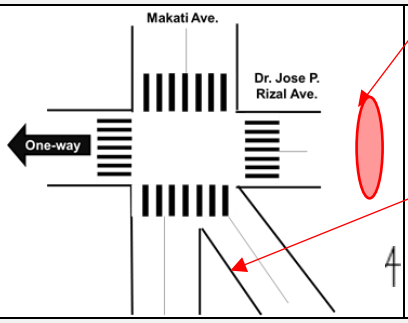
MK001 J.P. Rizal Avenue – Carballo Street



- High traffic demand coming from EDSA southbound going to Bonifacio Global City (BGC)
- From J.P Rizal Ave, vehicles turn to other streets to cut their trip short and merge back to J.P Rizal Ave. This merging cause additional traffic.

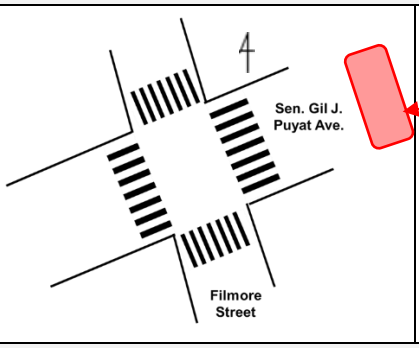
MK002 Makati Avenue – J.P. Rizal Avenue





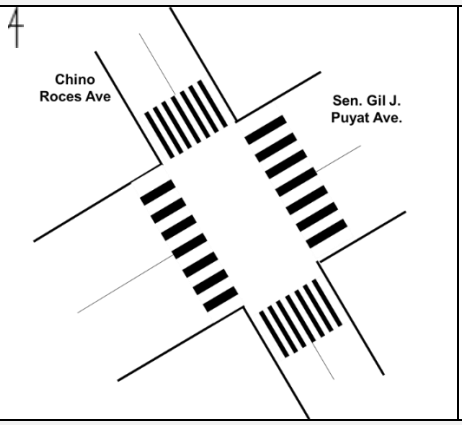
- The rehabilitation of the Pantaleon-Estrella Bridge
- Trip cutting by PUJs (usually by Guadalupe–L. Guinto jeepneys)
- Counter flows or crowding by motorcycles at the intersection.
- Heavy volume of pedestrians
- Sharp corner in the intersection

MK003 Sen. Gil Puyat Avenue – Filmore Street



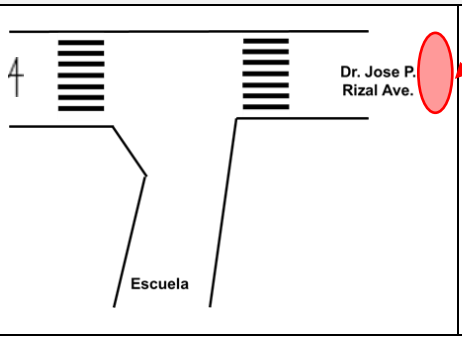
- High traffic demand especially at peak hours
- The channelized structural design like the outlet and inlet misalignments of these roads
- PNR railway line nearby
- The road conditions worsen due to flooding during the rainy days.

MK004 Sen. Gil Puyat Avenue – Chino Roces Avenue



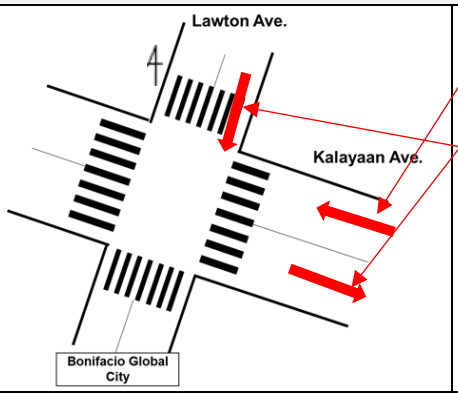
- High Traffic Demand
- Traffic enforcer manual override of traffic signal
- Highly commercial area

MK005 J.P. Rizal Street – Escuela



- Under construction buildings reclaiming the sidewalks and carriageways
- Illegal loading and unloading of PUJs
- From J.P Rizal Ave, vehicles turn to other streets to cut their trip short and merge back to J.P Rizal Ave. This merging causes additional traffic.

MK006 Kalayaan Avenue–Lawton Avenue



- High traffic demand from C5 road and commercial area in Pasig City in the morning (AM)
- While in the rush hour of the afternoon (PM), high traffic demand for C5 and Pasig City
- In the morning, high traffic demand from J.P. Rizal Avenue going in Bonifacio Global City, Taguig City.

Source: Google and JPT

Figure 2.24: Characteristics of Traffic Bottlenecks in Makati City

4) Malabon City

(a) **Physical Issues on Traffic Bottlenecks:** The walking environment of pedestrians is extremely poor due to the insufficiency of traffic signals and pedestrian facilities.

(b) **Cause of Traffic Bottlenecks:** Three causes: mixed traffic with pedestrians, unruly driving behavior, boarding/ alighting practice of PUJ at intersections and illegal roadside parking accounts for approximately 90%. The percentage of illegal roadside parking is very high among 17 LGUs.

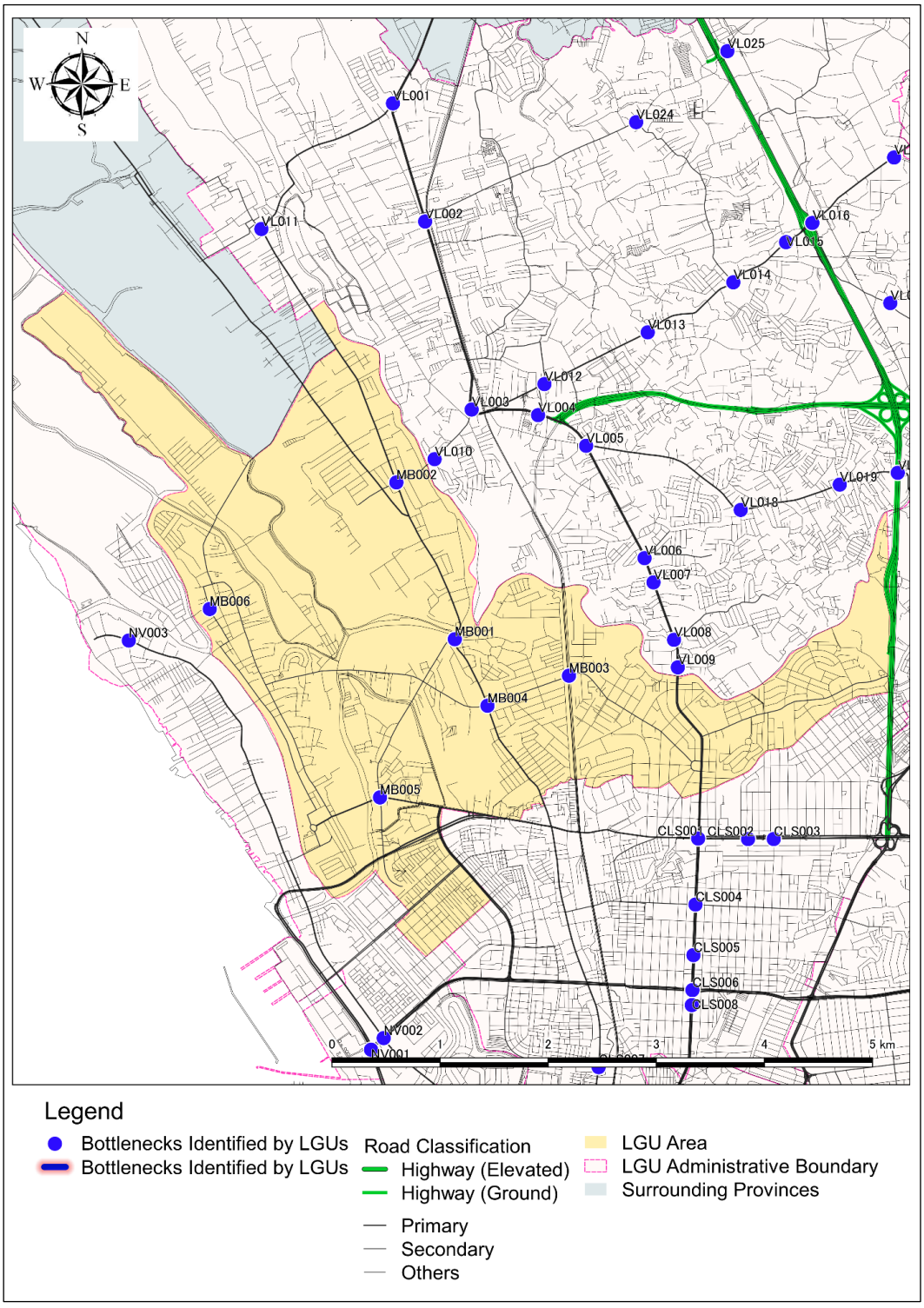
(c) **Improvement Measure Planning:** All identified traffic bottlenecks have measure plans by enforcement. On the other hand, the measure plans by infrastructure and safety facilities are zero.

(d) **Evaluation of Implemented Measures:** Only evaluation of measures by enforcement was implemented well.

(e) **Human Resources and Understanding of LGU's Responsibility:** Malabon City has plenty of human resources for enforcement, however, there is no planning and engineering staff who graduated from college level. Malabon City's traffic management covers traffic control (except for PUJs), roadside parking, and pedestrian facilities on the local roads.

(f) **Budget and Positiveness:** Malabon City secured approximately 60 million PHP budget for traffic management. LGU's response to the questionnaire was prompt and the missing data was also small.

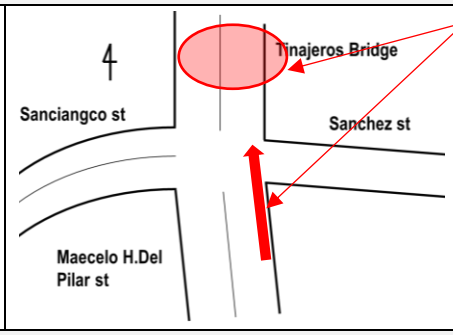
(g) **List of Traffic Bottlenecks Identified by Malabon City:** Figure 2.25 shows the location of the traffic bottlenecks in Malabon City. Six traffic bottlenecks were identified based on the questionnaire survey. Figure 2.26 shows the characteristics of the traffic bottlenecks in Malabon City.



Source: JPT

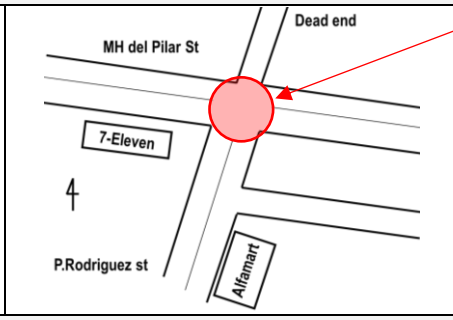
Figure 2.25: Location of Traffic Bottlenecks in Malabon City

MB001 M. H. Del Pilar Street - Sanciangco Street



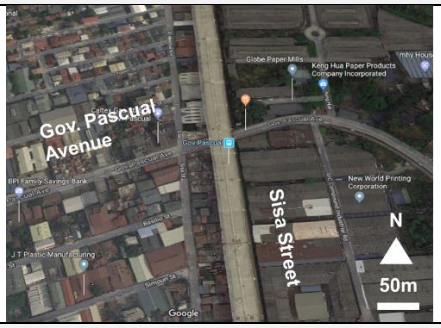
- The bridge is elevated and near the intersection.
- Vehicles approaching the bridge move very slowly.

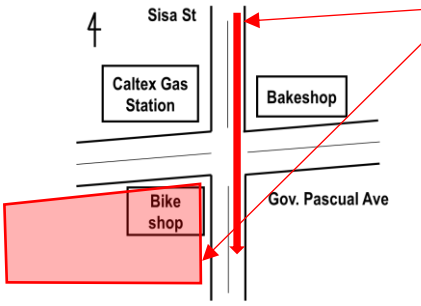
MB002 M. H. Del Pilar Street - Rodriguez Street



- The intersection is too narrow for 20 to 40 footer container trucks and heavy equipment.

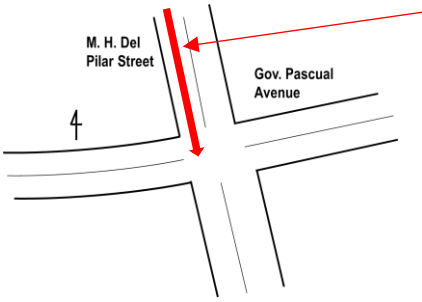
MB003 Gov. Pascual Avenue - Sisa Street





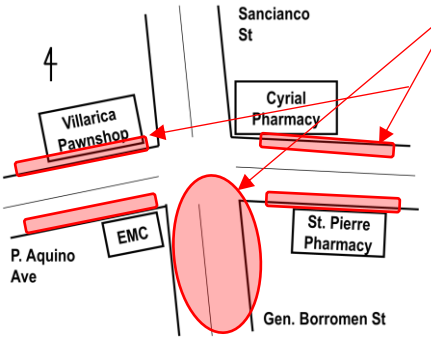
- Sisa Street and the whole Barangay Acacia is an industrial area.
- Tinajeros area are warehouse area where most of the vehicles used are trucks.

MB004 Gov. Pascual Avenue ▯ M.H. Del Pilar Street



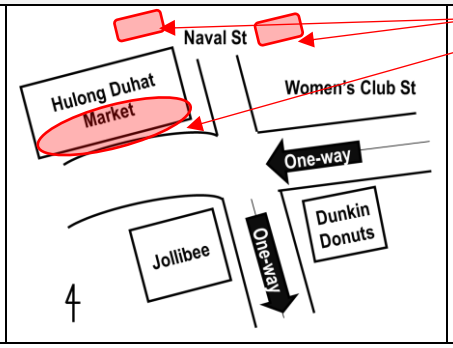
- This intersection is very busy since all types of vehicles are coming from Bulacan, Caloocan, Valenzuela, Quezon City and other near towns.
- Pedestrians do not follow traffic rules and regulations.

MB005 P. Aquino Avenue - Sancianco Street



- Roads are narrow and the sidewalk is for private use (obstruction in the sidewalk).

MB006 Women's Club Street - M. Naval Street



- Loading/ unloading bay near school.
- Mixed traffic with pedestrians around commercial establishments.

Source: Google and JPT

Figure 2.26: Characteristics of Traffic Bottlenecks in Malabon City

5) Mandaluyong City

(a) **Physical Issues on Traffic Bottlenecks:** Almost all roads at identified traffic bottlenecks are vehicle-prioritized road structures.

(b) **Cause of Traffic Bottlenecks:** The causes are various, wherein 7 causes are over 10% of the total cause. Poorly designed intersections occupy a high percentage of causes among 17 LGUs.

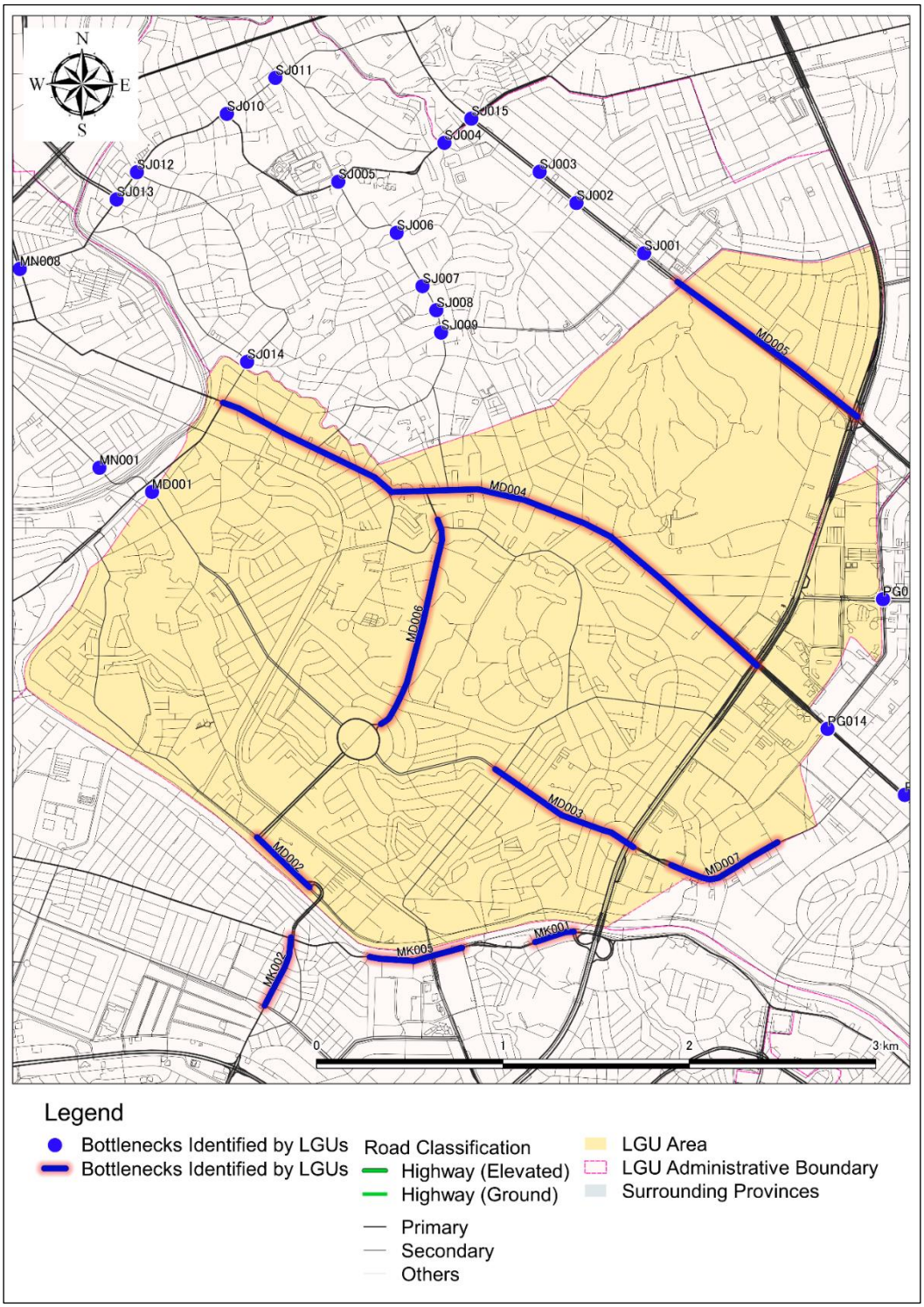
(c) **Improvement Measure Planning:** All identified traffic bottlenecks have measure plans except for enforcement.

(d) **Evaluation of Implemented Measures:** Only evaluation of measures by enforcement was implemented well.

(e) **Human Resources and Understanding of LGU's Responsibility:** Mandaluyong City is the only LGU that has staff who graduated from college level in all sections of planning, engineering, and enforcement among 17 LGUs. Mandaluyong City's traffic management covers various ways except for traffic signal installation, operation and maintenance, and pricing. Their responsibilities are mainly local, residential, and subdivision roads. There are limited activities on national roads.

(f) **Budget and Positiveness:** No data on budget is available. LGU's response to the questionnaire was comparatively slow. Several data are still missing.

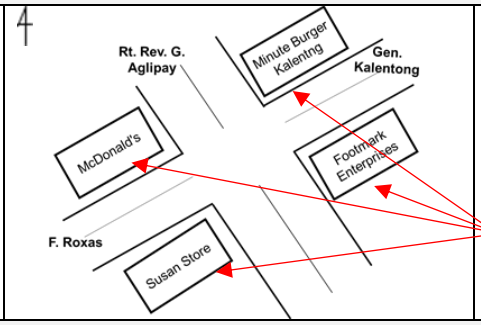
(g) **List of Traffic Bottlenecks Identified by Mandaluyong City:** Figure 2.27 shows the location of the traffic bottlenecks in Mandaluyong City. Seven (7) traffic bottlenecks were identified based on the questionnaire survey. Figure 2.28 and Figure 2.29 show the characteristics of traffic bottlenecks in Mandaluyong City.



Source: JPT

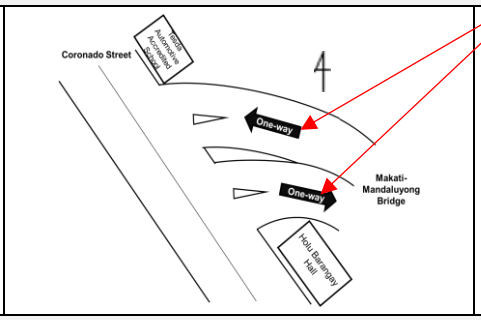
Figure 2.27: Location of Traffic Bottlenecks in Mandaluyong City

MD001 Gen. Kalentong – Rev. G. Aglipay



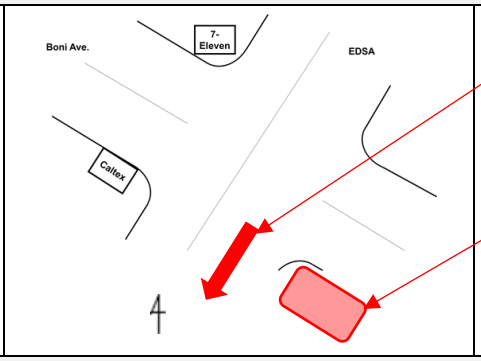
- High Traffic Demand mixed with Pedestrian
- Sidewalk vendors
- Illegal loading and unloading of PUJs at intersection
- Unruly driving behavior
- Manual override of traffic light by traffic enforcers
- Business establishment in the intersection
- Boundary of Manila and Mandaluyong

MD002 Coronado Street – Makati-Mandaluyong Bridge



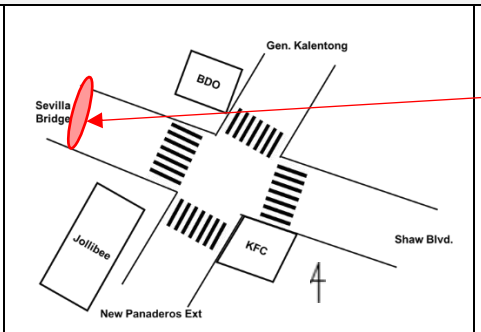
- High Traffic Demand coming and going to Makati Central Business District (CBD)
- Unruly driving behavior
- Illegal roadside parking

MD003 Boni Avenue – EDSA



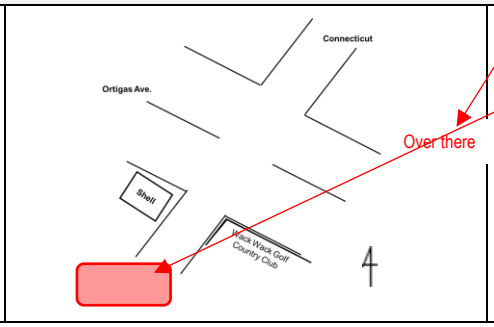
- Road construction along Boni Avenue.
- Due to the closure of Rockwell bridge, intersection serves as alternate route for motorist from Mandaluyong, Manila, San Juan and Pasig going to Makati.
- Secondary roads leading to Boni are used as PUJ Terminal
- Shopping mall at the intersection

MD004 Shaw Blvd – Kalenton



- High traffic demand
- Boundary of Mandaluyong, Manila and San Juan.
- Construction of Sevilla Bridge and Skyway 3 Project.
- Loading and Unloading of passengers at intersections
- Designated Truck route

MD005 Ortigas Avenue – Connecticut

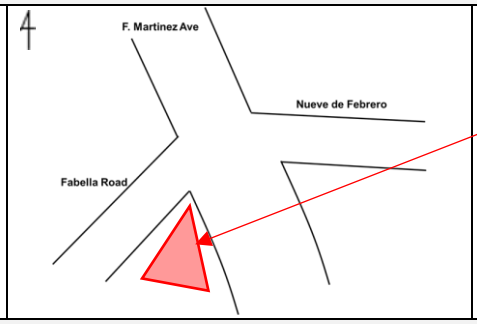


- High traffic demand
- Nearby De La Salle Greenhills school
- Designated truck route
- Greenhills West residential area

Source: Google and JPT

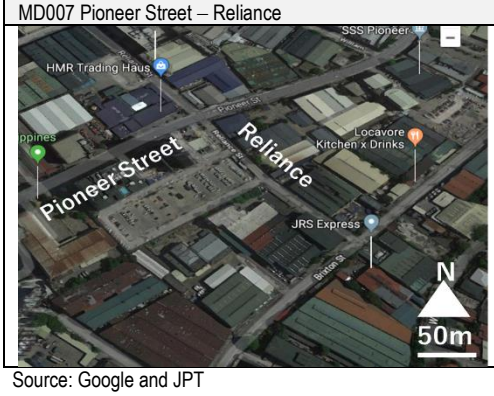
Figure 2.28: Characteristics of Traffic Bottlenecks in Mandaluyong City (1)

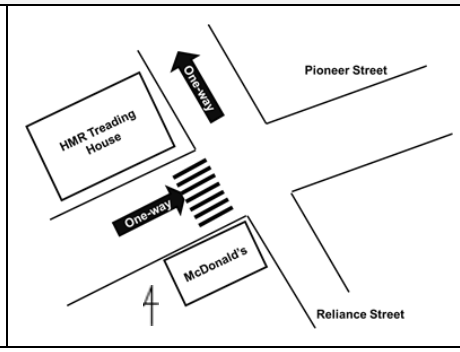
MD006 Martinez Avenue – 9 De Febrero



- High traffic demand mixed with pedestrians.
- Unruly tricycle driver's behaviors
- Illegal sidewalk and roadside parking
- Public market in the intersection

MD007 Pioneer Street – Reliance





- High traffic demand mixed with pedestrians
- Pedestrians not using pedestrian lane
- Unruly driving behavior
- Delivery trucks passing area due to proximity to warehouses.

Source: Google and JPT

Figure 2.29: Characteristics of Traffic Bottlenecks in Mandaluyong City (2)

6) Manila City

(a) **Physical Issues on Traffic Bottlenecks:** Traffic signals, sidewalks, and pedestrian crossing must be improved to secure pedestrian safety.

(b) **Cause of Traffic Bottlenecks:** Five causes: mixed traffic with pedestrians, unruly driving behavior, boarding/ alighting practice of PUJs at intersections, saturated demand, and manual override of active traffic lights by traffic enforcers compose 80% of causes.

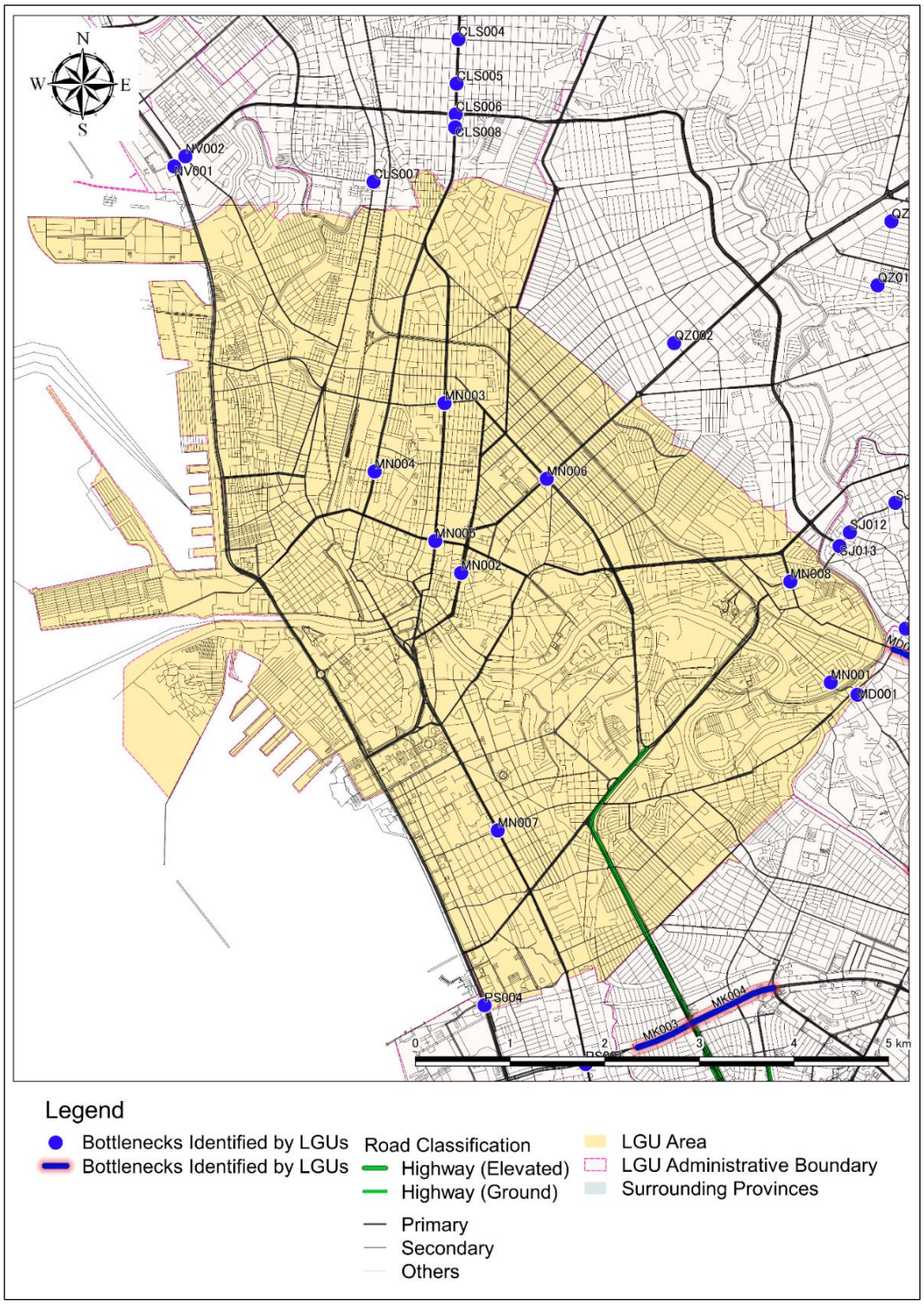
(c) **Improvement Measure Planning:** Measure plans by infrastructure and enforcement are prepared well.

(d) **Evaluation of Implemented Measures:** Evaluation of measure plans by infrastructure and enforcement are implemented with a high percentage.

(e) **Human Resources and Understanding of LGU's Responsibility:** No data is available on human resources and understanding of LGU's responsibility.

(f) **Budget and Positiveness:** No data is available on budget. LGU's response to the questionnaire was comparatively slow. Several data are still missing.

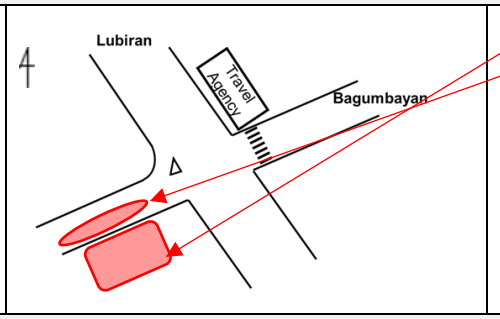
(g) **List of Traffic Bottlenecks Identified by Manila:** Figure 2.30 shows the location of the traffic bottlenecks in Manila City. Eight (8) traffic bottlenecks were identified based on the questionnaire survey. Figure 2.31 and Figure 2.32 show the characteristics of traffic bottlenecks in the City of Manila.



Source: JPT

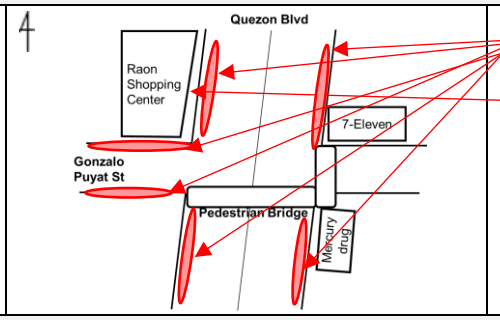
Figure 2.30: Location of Traffic Bottlenecks in Manila

MN001 Lubiran – Bagumbayan



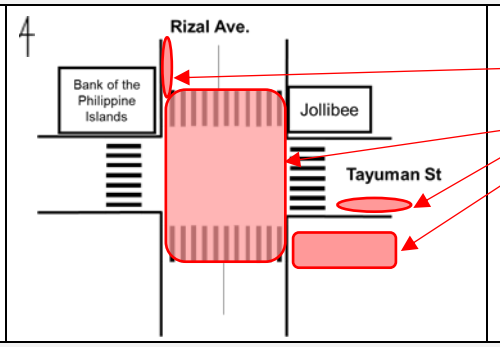
- High traffic demand
- Residential area
- Cars parked along the roads

MN002 Quezon Boulevard – Gonzalo Puyat Street (Raon)



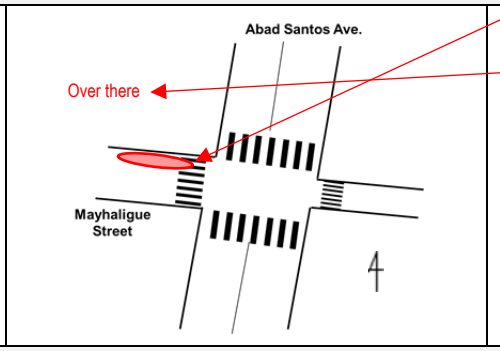
- Unruly driving behavior
- One lane occupied by vendors or parked vehicles
- Shopping mall in the intersection

MN003 Tayuman Street – Rizal Avenue



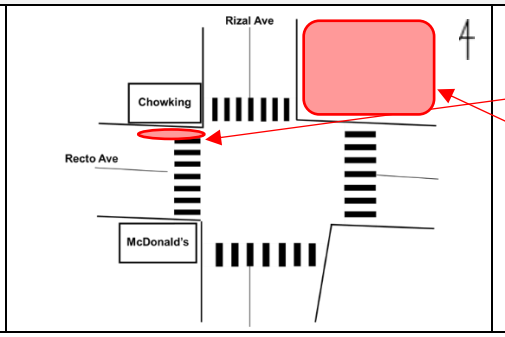
- Illegal loading and unloading of PUJ
- Terminal of pedicabs and tricycles on the roads
- Train station
- Vendors on the roads
- Shopping mall in the intersection

MN004 Abad Santos Avenue – Mayhaligue Street



- Illegal parking along Mayhaligue
- Unruly driving behavior
- Heavy pedestrian volume during rush hour at Philippine National Railways (PNR) station.
- Road construction at Mayhaligue st

MN005 Claro M. Recto – Rizal Avenue

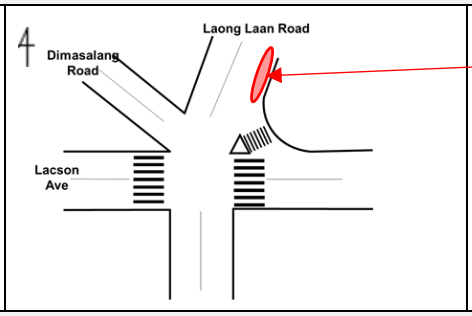


- High traffic demand
- Vendors occupy sidewalks, pedestrians use roads instead
- Illegal tricycle terminal
- Shopping mall in the intersection

Source: Google and JPT

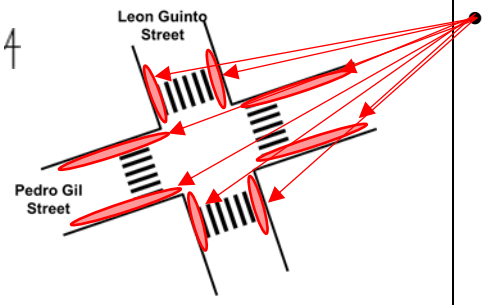
Figure 2.31: Characteristics of Traffic Bottlenecks in Manila (1)

MN006 Lacson Avenue – Laong Laan Road



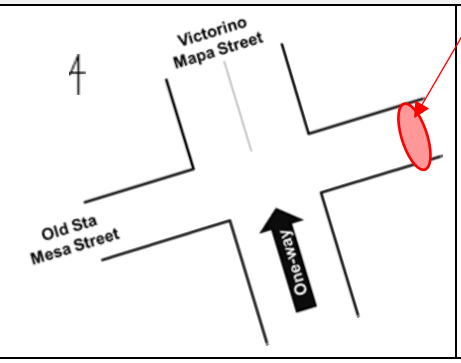
- High traffic demand especially trucks in Lacson Ave
- Illegal parking of cars

MN007 Pedro Gil Street – Leon Guinto Street



- High traffic demand
- Vendors on the roads and sidewalks

MN008 Victorino. Mapa Street – Old Sta. Mesa Street



- Bridge repair of Old Sta Mesa

Source: Google and JPT

Figure 2.32: Characteristics of Traffic Bottlenecks in Manila (2)

7) Marikina City

(a) **Physical Issues on Traffic Bottlenecks:** Traffic signals are not installed properly.

(b) **Cause of Traffic Bottlenecks:** Saturated demand is the most major cause with a value of 40% of all the causes. In other words, it might be hard to improve the traffic congestion in Marikina City by only traffic management such as enforcement.

(c) **Improvement Measure Planning:** Measure plans in all way is prepared at one out of two intersections.

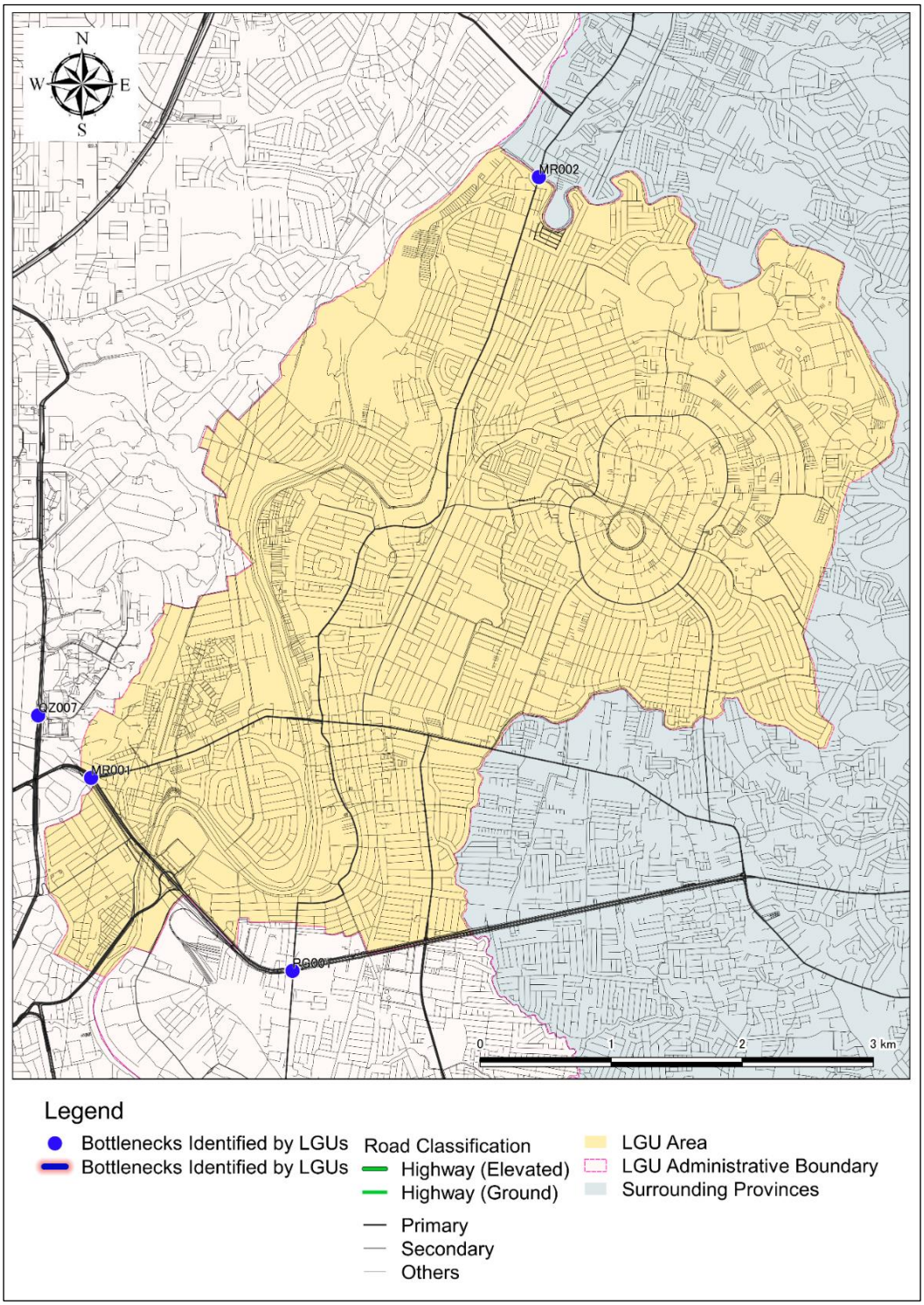
(d) **Evaluation of Implemented Measures:** Evaluation of measure plans by safety facilities and enforcement are implemented at all identified traffic bottlenecks.

(e) **Human Resources and Understanding of LGU's Responsibility:** No data is available on human resources and understanding of LGU's responsibility.

(f) **Budget and Positiveness:** No data is available on budget. LGU's response to the questionnaire was comparatively slow. Several data are still missing.

(g) **List of Traffic Bottlenecks Identified by Marikina City:** Figure 2.33 shows the

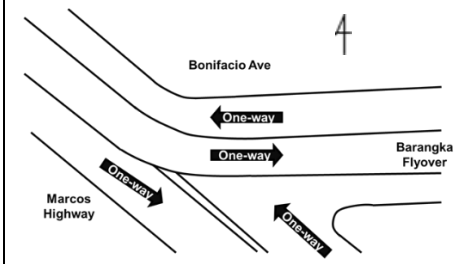
location of the traffic bottlenecks in Marikina City. Two traffic bottlenecks were identified based on the questionnaire survey. Figure 2.34 shows the characteristics of traffic bottlenecks in Marikina City.



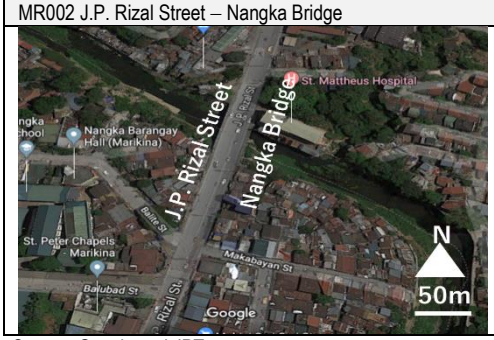
Source: JPT

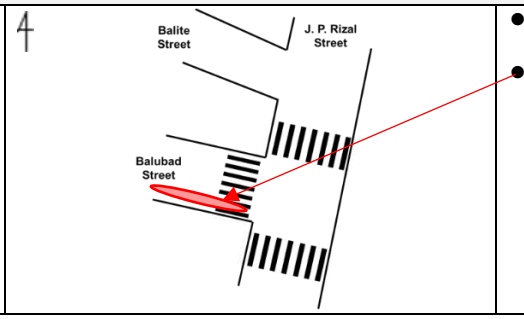
Figure 2.33: Location of Traffic Bottlenecks in Marikina City

MR001 A. Bonifacio Avenue – Marikina-Infanta Hi-way



MR002 J.P. Rizal Street – Nangka Bridge





- No PUJ loading and unloading areas
- Pedicab terminal along the road

Source: Google and JPT

Figure 2.34: Characteristics of Traffic Bottlenecks in Marikina City

8) Muntinlupa City

All traffic bottlenecks identified are located along Manila South Road and Alabang-Zapote Road (Figure 2.35).

(a) **Physical Issues on Traffic Bottlenecks:** Traffic signals must be installed more to improve the pedestrian's walking environment. The traffic bottlenecks in Muntinlupa might be solved better by traffic management than physical improvement.

(b) **Cause of Traffic Bottlenecks:** Four causes: mixed traffic with pedestrians, unruly driving behavior, boarding/ alighting practice of PUJs at intersections, and saturated demand compose 80% of the causes. However, saturated demand only accounts for 20%. Therefore, it is important to optimize vehicle and pedestrian behavior at intersections.

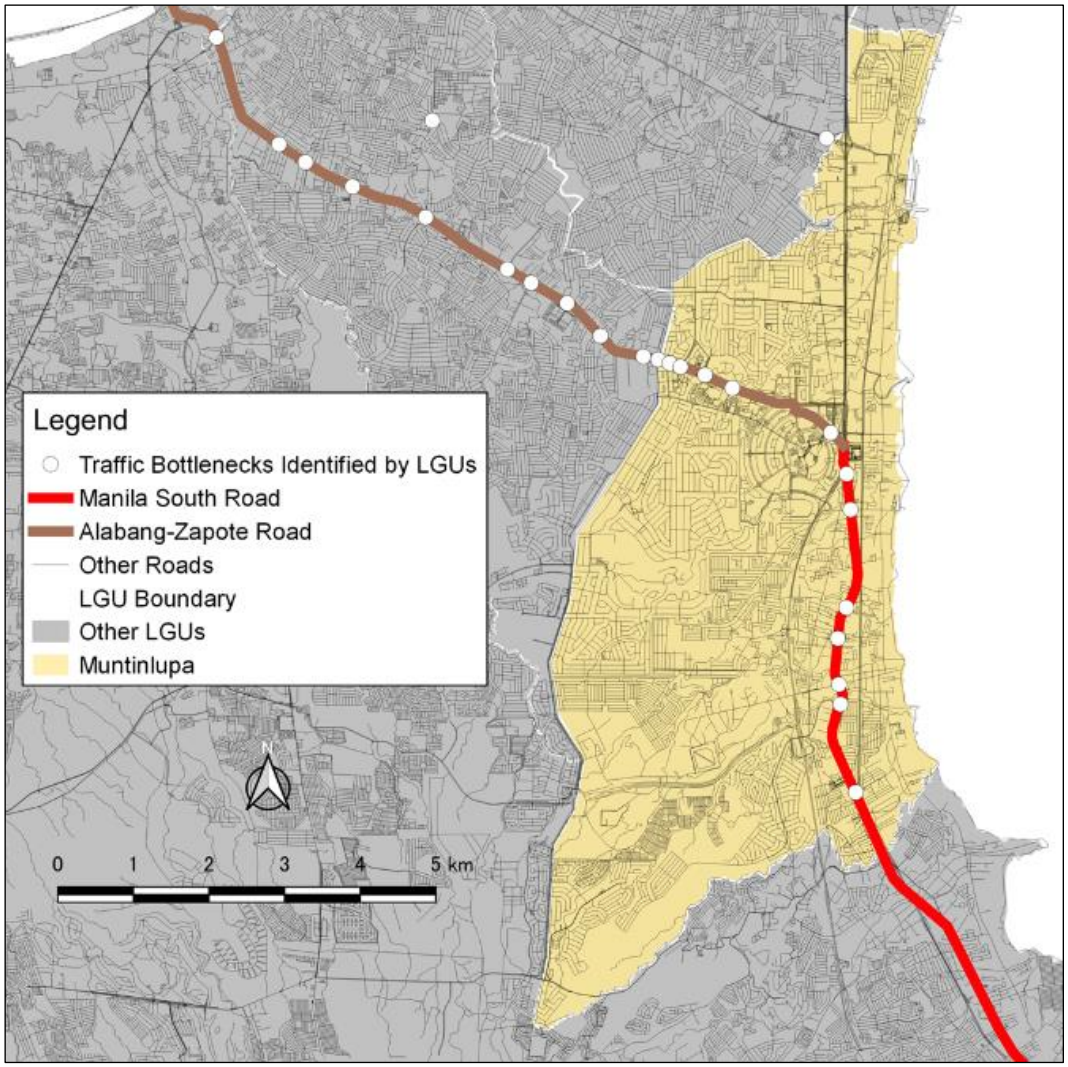
(c) **Improvement Measure Planning:** Measure plans by all way is prepared at almost all intersections. This is the highest rate among 17 LGUs.

(d) **Evaluation of Implemented Measures:** Evaluation of measure plans by all way are prepared at almost all intersections. This is the highest rate among 17 LGUs.

(e) **Human Resources and Understanding of LGU's Responsibility:** No data is available on human resources. Muntinlupa City's traffic management covers various ways except for traffic signal installation and operation and maintenance at national and local roads. However, they handle all tasks regarding traffic signals at residential/ subdivision roads.

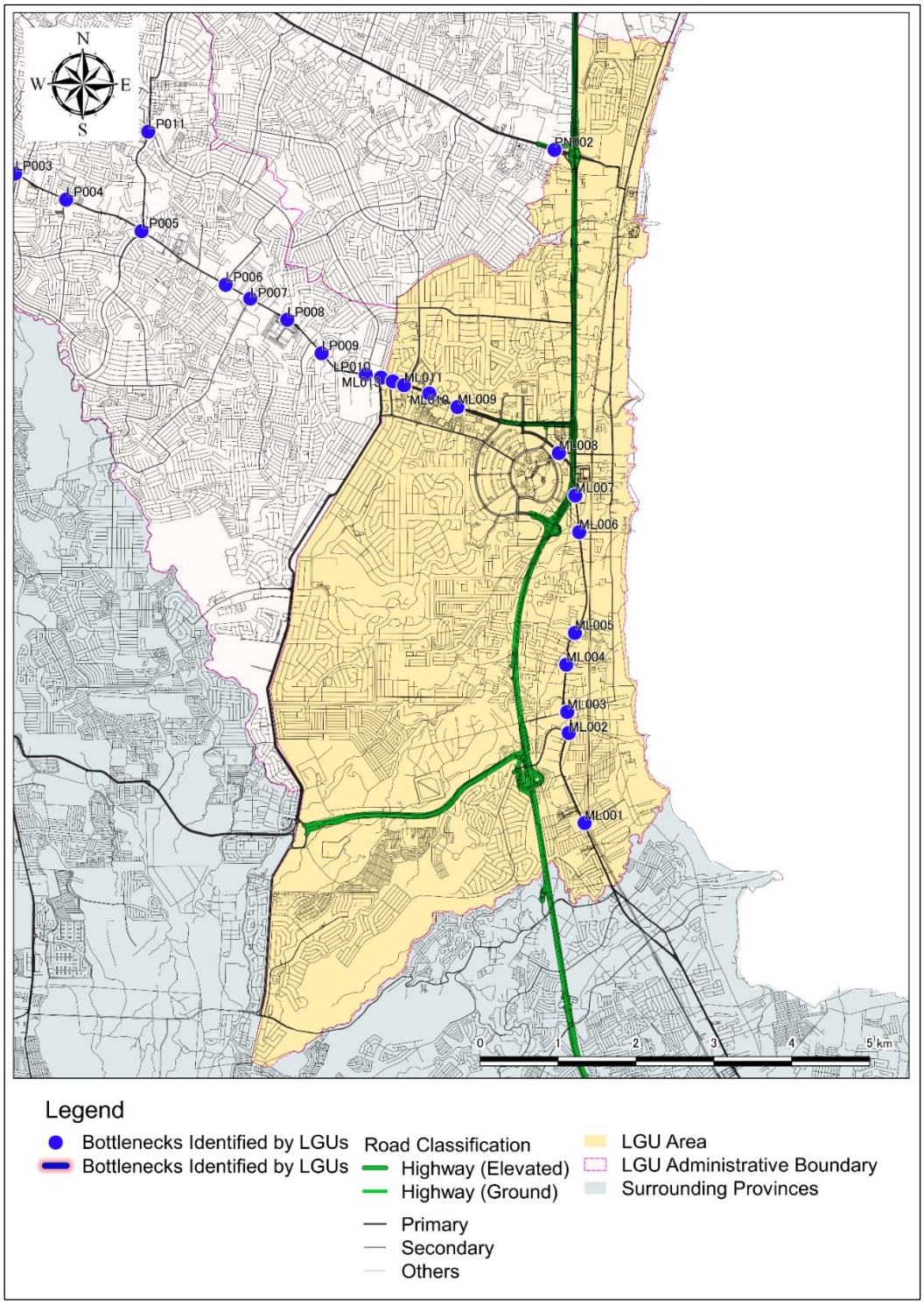
(f) **Budget and Positiveness:** Muntinlupa City secured approximately 52.2 million PHP for traffic management in 2019. The main areas of expenditure are personnel expenses, maintenance and other operating expenses, trainings of traffic personnel and purchase of traffic supplies and equipment. LGU's response to the questionnaire was comparatively slow, however, most data are provided properly.

(g) **List of Traffic Bottlenecks Identified by Muntinlupa City:** Figure 2.36 shows the location of the traffic bottlenecks in Muntinlupa City. Thirteen (13) traffic bottlenecks were identified based on the questionnaire survey. Figure 2.37 to Figure 2.39 show the characteristics of traffic bottlenecks in Muntinlupa City.



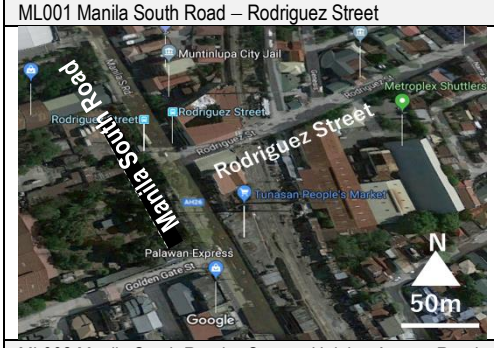
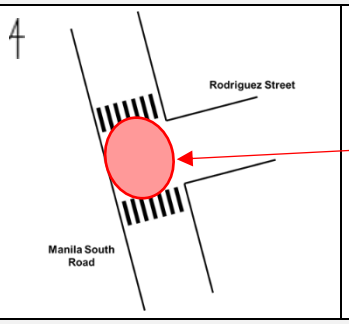
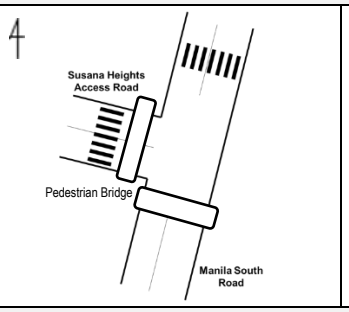
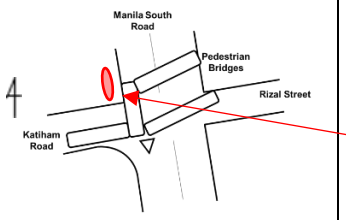
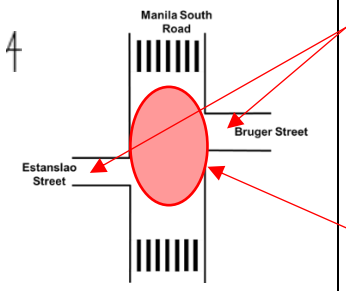
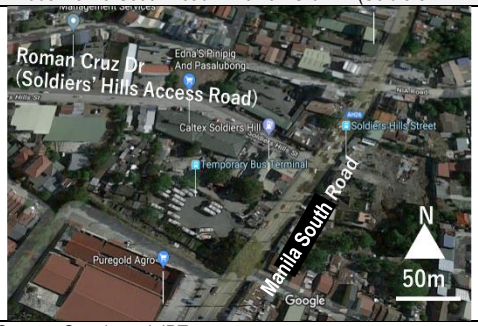
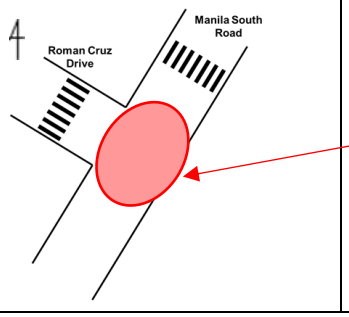
Source: JPT

Figure 2.35: Traffic Bottlenecks Identified by Muntinlupa City along Alabang-Zapote Road and Manila South Road



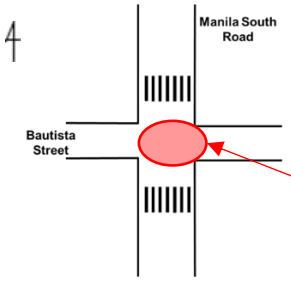
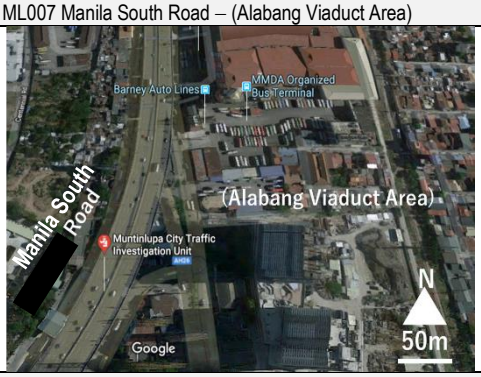
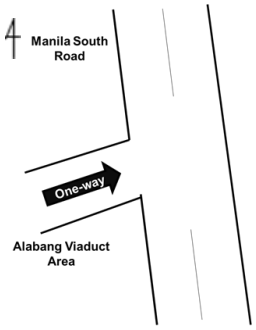
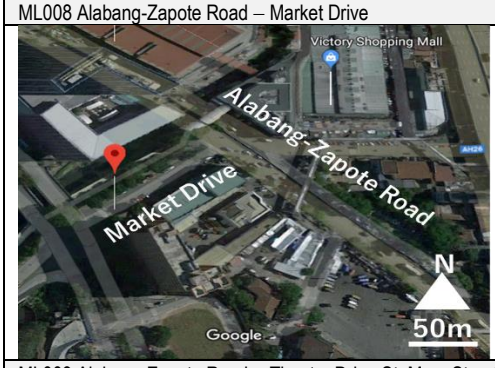
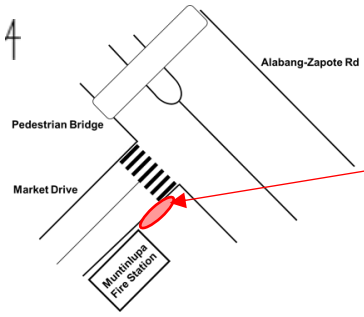
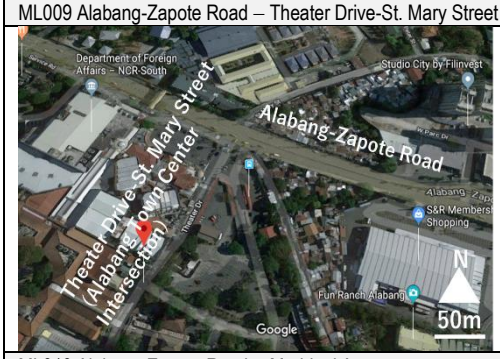
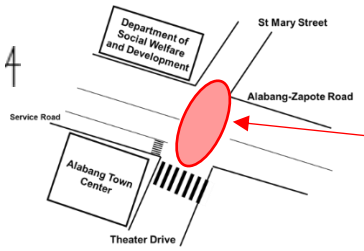
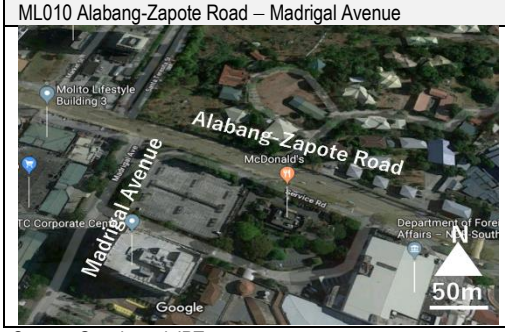
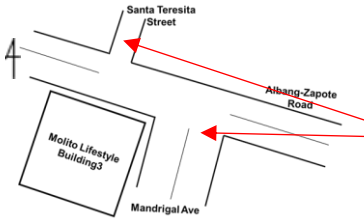
Source: JPT

Figure 2.36: Location of Traffic Bottlenecks in Muntinlupa City

ML001 Manila South Road – Rodriguez Street		
		● High traffic demand ● Lack of knowledge and discipline of all road users (drivers/motorists, and pedestrians), e.g., loading and unloading in prohibited areas, illegal parking of vehicles, jaywalking, among others. ● No traffic signal
ML002 Manila South Road – Susana Heights Access Road		
		● High traffic demand ● Lack of knowledge and discipline of all road users (drivers/motorists, and pedestrians), e.g., loading and unloading in prohibited areas, illegal parking of vehicles, jaywalking, among others. ● Possible inaccuracy of traffic signal light phasing
ML003 Manila South Road – Rizal Street-Katihan Road		
		● High Traffic Demand ● Lack of knowledge and discipline of all road users (drivers/motorists, and pedestrians), e.g., loading and unloading in prohibited areas, illegal parking of vehicles, jaywalking, among others. ● Too much conflict (four-legged intersection) compared to the size of the intersection itself ● Illegal vendors occupying parts of the sidewalk and/or roads ● Possible inaccuracy of traffic signal light phasing
ML004 Manila South Road – Bruger Street		
		● High traffic demand ● Poorly designed intersection (skewed/offset intersection) ● Lack of knowledge and discipline of all road users (drivers/motorists, and pedestrians), e.g., loading and unloading in prohibited areas, illegal parking of vehicles, jaywalking, among others. ● Illegal vendors occupying parts of the sidewalk and/or roads ● No traffic signal
ML005 Manila South Road – Roman Cruz Dr (Soldiers' Hills Access Road)		
		● High traffic demand ● Lack of knowledge and discipline of all road users (drivers/motorists, and pedestrians), e.g., loading and unloading in prohibited areas, illegal parking of vehicles, jaywalking, among others. ● No traffic signal

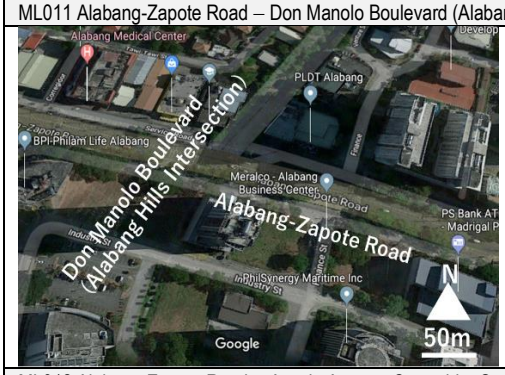
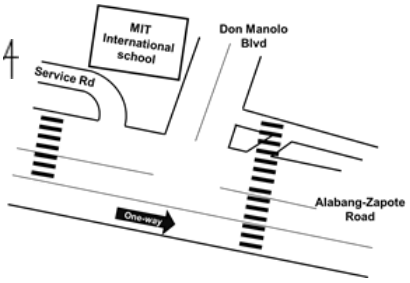
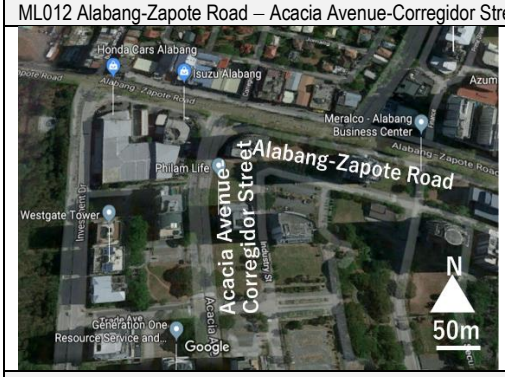
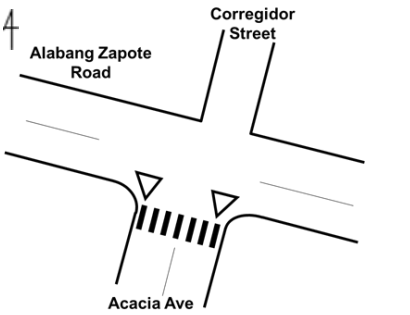
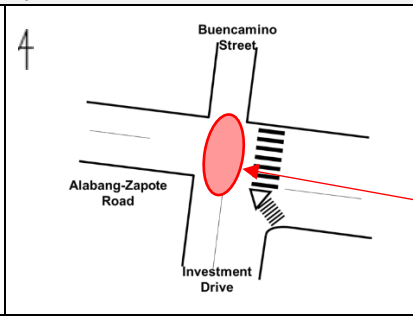
Source: Google and JPT

Figure 2.37: Characteristics of Traffic Bottlenecks in Muntinlupa City (1)

ML006 Manila South Road – Bautista Street		
		● High traffic demand ● Lack of knowledge and discipline of all road users (drivers/motorists, and pedestrians), e.g., loading and unloading in prohibited areas, illegal parking of vehicles, jaywalking, among others. ● Illegal vendors occupying parts of the sidewalk and/or roads ● No traffic signal
ML007 Manila South Road – (Alabang Viaduct Area)		
		● High traffic demand ● Lack of knowledge and discipline of all road users (drivers/motorists, and pedestrians), e.g., loading and unloading in prohibited areas, illegal parking of vehicles, jaywalking, among others.
ML008 Alabang-Zapote Road – Market Drive		
		● High traffic demand ● Lack of knowledge and discipline of all road users (drivers/motorists, and pedestrians), e.g., loading and unloading in prohibited areas, illegal parking of vehicles, jaywalking, among others. ● Illegal vendors occupying parts of the sidewalk and/or roads
ML009 Alabang-Zapote Road – Theater Drive-St. Mary Street (Alabang Town Center Intersection)		
		● High traffic demand ● Lack of knowledge and discipline of all road users (drivers/motorists, and pedestrians), e.g., loading and unloading in prohibited areas, illegal parking of vehicles, jaywalking, among others. ● No traffic signal
ML010 Alabang-Zapote Road – Madrigal Avenue		
		● High traffic demand ● Lack of knowledge and discipline of all road users (drivers/motorists, and pedestrians), e.g., loading and unloading in prohibited areas, illegal parking of vehicles, jaywalking, among others. ● Poorly designed intersection (skewed/offset intersection) ● Possible inaccuracy of traffic signal light phasing

Source: Google and JPT

Figure 2.38: Characteristics of Traffic Bottlenecks in Muntinlupa City (2)

ML011 Alabang-Zapote Road – Don Manolo Boulevard (Alabang Hills Intersection)		
		● High traffic demand ● Lack of knowledge and discipline of all road users (drivers/motorists, and pedestrians), e.g., loading and unloading in prohibited areas, illegal parking of vehicles, jaywalking, among others. ● Possible inaccuracy of traffic signal light phasing
ML012 Alabang-Zapote Road – Acacia Avenue-Corregidor Street		
		● High traffic demand ● Lack of knowledge and discipline of all road users (drivers/motorists, and pedestrians), e.g., loading and unloading in prohibited areas, illegal parking of vehicles, jaywalking, among others. ● Possible inaccuracy of traffic signal light phasing
ML013 Alabang-Zapote Road – Buencamino Street-Investment Drive		
		● High traffic demand ● Lack of knowledge and discipline of all road users (drivers/motorists, and pedestrians), e.g., loading and unloading in prohibited areas, illegal parking of vehicles, jaywalking, among others. ● No traffic signal

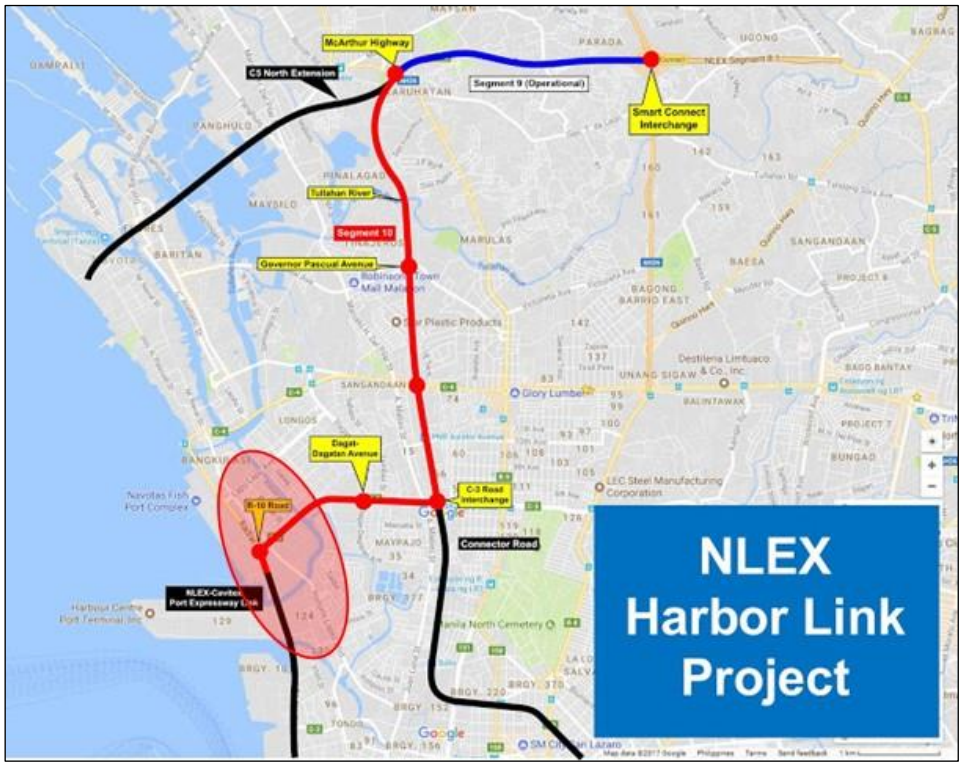
Source: Google and JPT

Figure 2.39: Characteristics of Traffic Bottlenecks in Muntinlupa City (3)

9) Navotas City

(a) **Physical Issues on Traffic Bottlenecks:** Traffic signals, pedestrian crossing and lane markings must be installed and maintained properly.

(b) **Cause of Traffic Bottlenecks:** Three causes: saturated demand, poorly designed intersections and ongoing NLEX R-10 exit ramp construction compose over 60% of the total causes. Ongoing NLEX R-10 exit ramp construction is only raised as a cause in Navotas City (Figure 2.40).



Source: Inquirer.com

Figure 2.40: Ongoing NLEX R-10 Exit Ramp Construction (Part of NLEX Harbor Link Project)

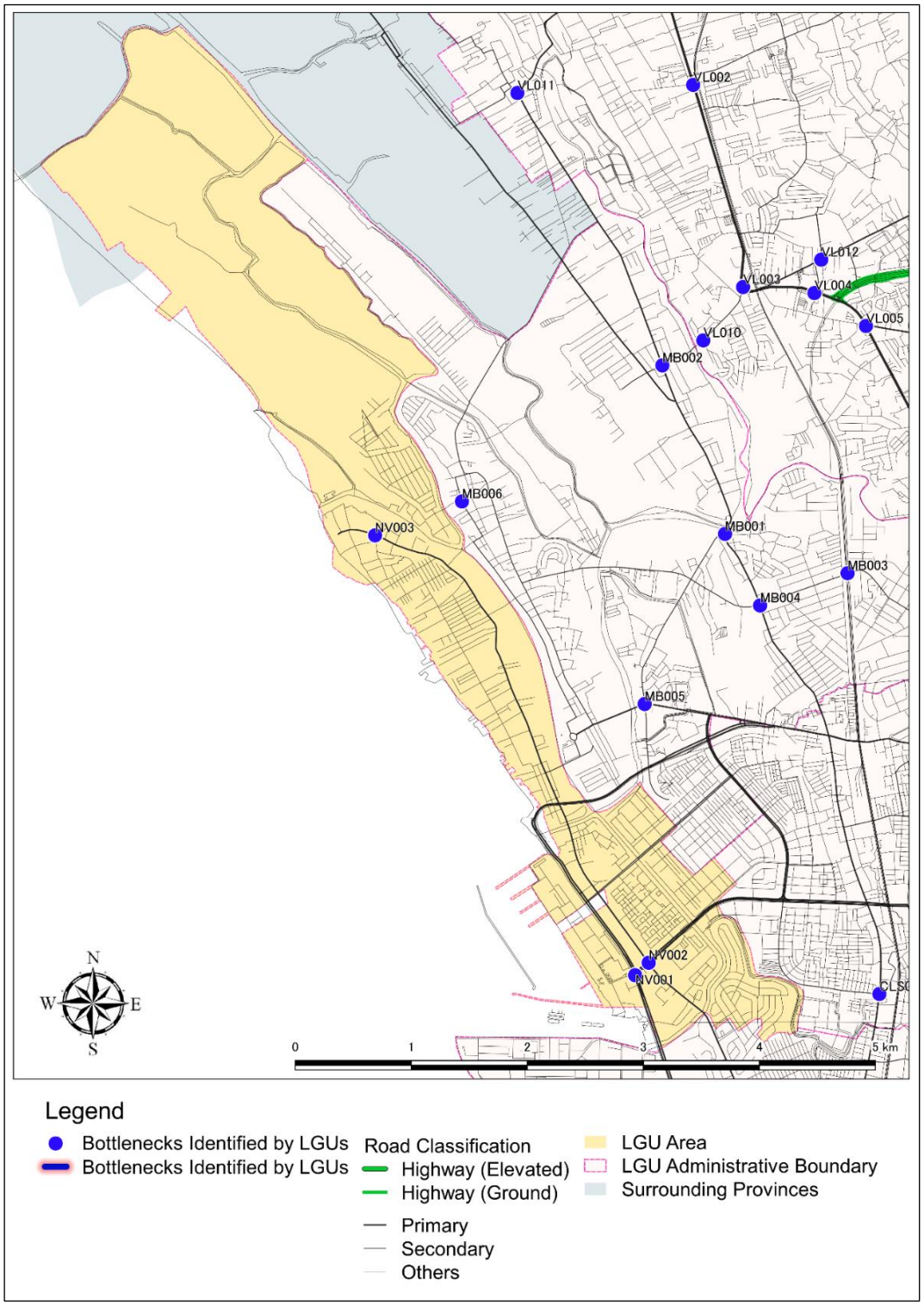
(a) **Improvement Measure Planning:** Measure plans by all way is prepared at almost all intersections.

(b) **Evaluation of Implemented Measures:** Evaluation of measure plans by safety facilities and enforcement is prepared at almost all intersections.

(c) **Human Resources and Understanding of LGU's Responsibility:** There are plenty of human resources in the enforcer section, however there are no staff in other 2 sections. Navotas City's traffic management covers various way except for PUJ regulation at local and residential/subdivision roads. At national roads, their activities are limited only to traffic control, parking ban and street lighting.

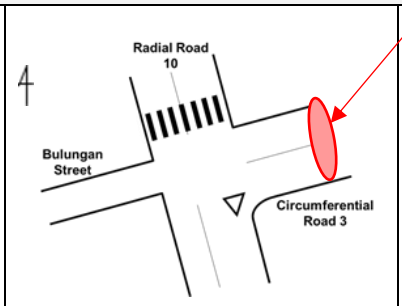
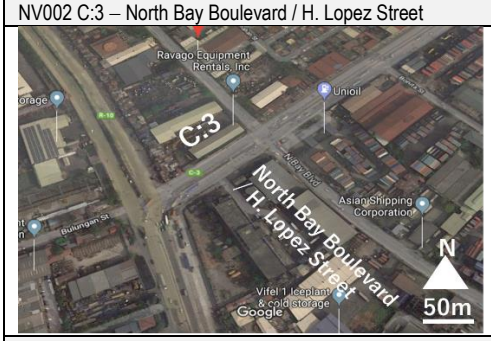
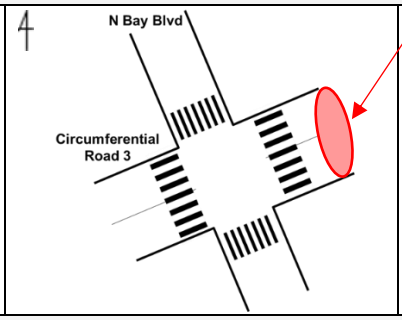
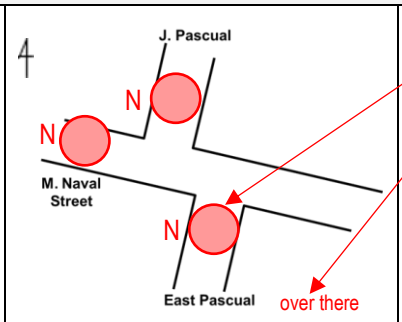
(d) **Budget and Positiveness:** Navotas City secured approximate 32.2 million PHP for traffic management in 2019. Main area of expenditure is for personnel expenses. LGU's response on questionnaire was comparatively slow, but the data missing is limited.

(e) **List of Traffic Bottlenecks Identified by Navotas City:** Figure 2.41 shows the location of the traffic bottlenecks in Navotas City. Three traffic bottlenecks were identified based on the questionnaire survey. Figure 2.42 shows the characteristics of traffic bottlenecks in Navotas City.



Source: JPT

Figure 2.41: Location of Traffic Bottlenecks in Navotas City

NV001 R:10 – C:3		
		● The construction of the NLEX Segment 10 R-10 Exit Ramp Project might be completed but the current situation is still monitored ● Allowable routes of heavy vehicles (e.g., trailer trucks) consequent to the truck ban policies along other major roads
NV002 C:3 – North Bay Boulevard / H. Lopez Street		
		● The construction of the NLEX Segment 10 R-10 Exit Ramp Project might be completed but the current situation is still monitored ● Allowable routes of heavy vehicles (e.g., trailer trucks) consequent to the truck ban policies along other major roads
NV003 M. Naval Street – E. Pascual Street		
		● Illegal loading and unloading of jeepneys anywhere ● Very narrow road which only allows one lane only ● Narrow roads ● Nearby marketplace

Source: Google and JPT

Figure 2.42: Characteristics of Traffic Bottlenecks in Navotas City

10) Parañaque City

(a) **Physical Issues on Traffic Bottlenecks:** Sidewalks and pedestrian crossingss must be improved.

(b) **Cause of Traffic Bottlenecks:** Unruly driving behavior and manual override of active traffic lights by traffic enforcers compose approximately 85%.

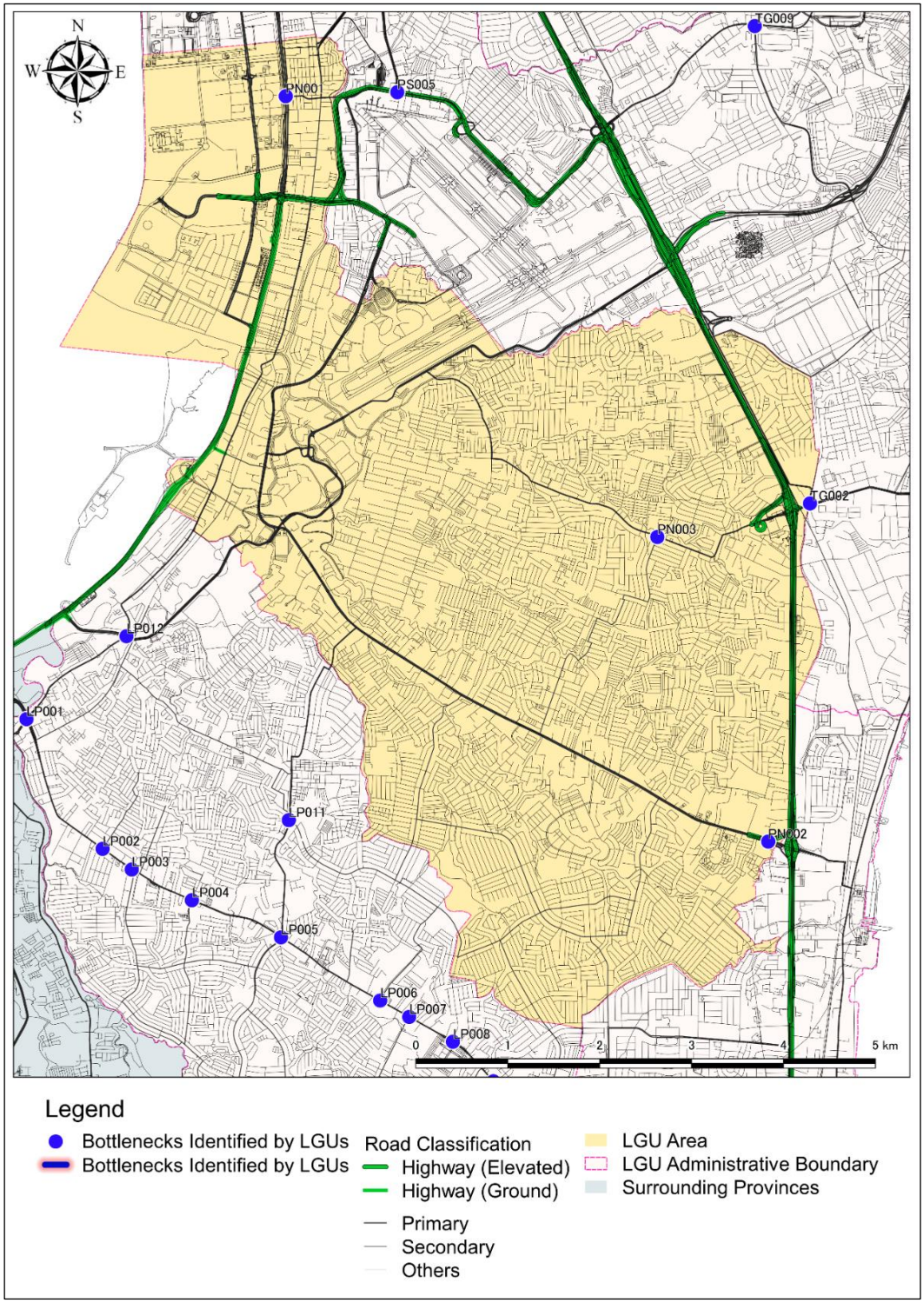
(c) **Improvement Measure Planning:** Measure plans by all way are not prepared well and it was only for one out of three intersections.

(d) **Evaluation of Implemented Measures:** Evaluation of measure plans in all ways is implemented at all intersections.

(e) **Human Resources and Understanding of LGU's Responsibility:** Parañaque City has sufficient staff except for the engineering section. Parañaque City's traffic management covers various ways except for traffic control at national and local roads. At residential/ subdivision roads, they carry out lane marking and regulation and enforcement of tricycles.

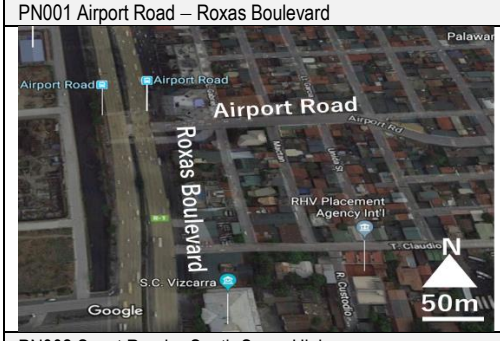
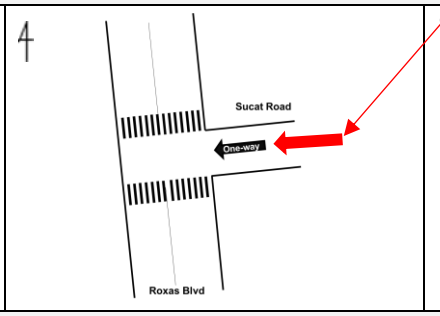
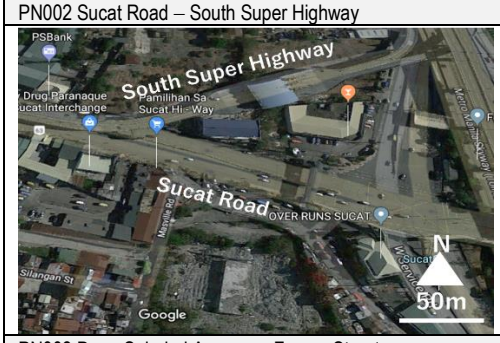
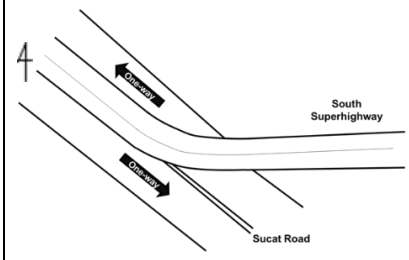
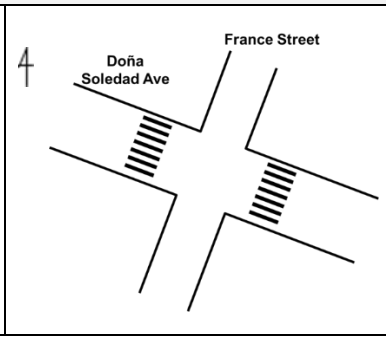
(f) **Budget and Positiveness:** No data is available on budget. LGU's response to the questionnaire was comparatively slow. Several data are still missing.

(g) **List of Traffic Bottlenecks Identified by Parañaque City:** Figure 2.43 shows the location of the traffic bottlenecks in Parañaque City. Three traffic bottlenecks were identified based on the questionnaire survey. Figure 2.44 shows the characteristics of traffic bottlenecks in Parañaque City.



Source: JPT

Figure 2.43: Location of Traffic Bottlenecks in Parañaque City

PN001 Airport Road – Roxas Boulevard		
		● High traffic demand due to trucks/containerized trucks coming from Airport for distribution routes
PN002 Sucat Road – South Super Highway		
		● High traffic demand from medium to heavy during peak hours at 5:00pm – 7:00pm for all types of vehicles
PN003 Dona Soledad Avenue – France Street		
		● High traffic demand during weekdays 7:00am – 11:00am and during peak hours at 7:00am – 4:00pm everyday

Source: Google and JPT

Figure 2.44: Characteristics of Traffic Bottlenecks in Parañaque City

11) Pasay City

(a) **Physical Issues on Traffic Bottlenecks:** The sidewalk is narrow and lane marking has been degraded over time. The guide for both vehicles and pedestrians by road facilities is unclear.

(b) **Cause of Traffic Bottlenecks:** Three causes: Unruly driving behavior, boarding/ alighting practice of PUJs at intersections and illegal roadside parking compose approximatelyly 70% of the total causes. All major causes seem to be solved by enforcement and regulation. However, it's important to make road users understand where they should drive or walk clearly with proper physical facilities such as lane marking and signage.

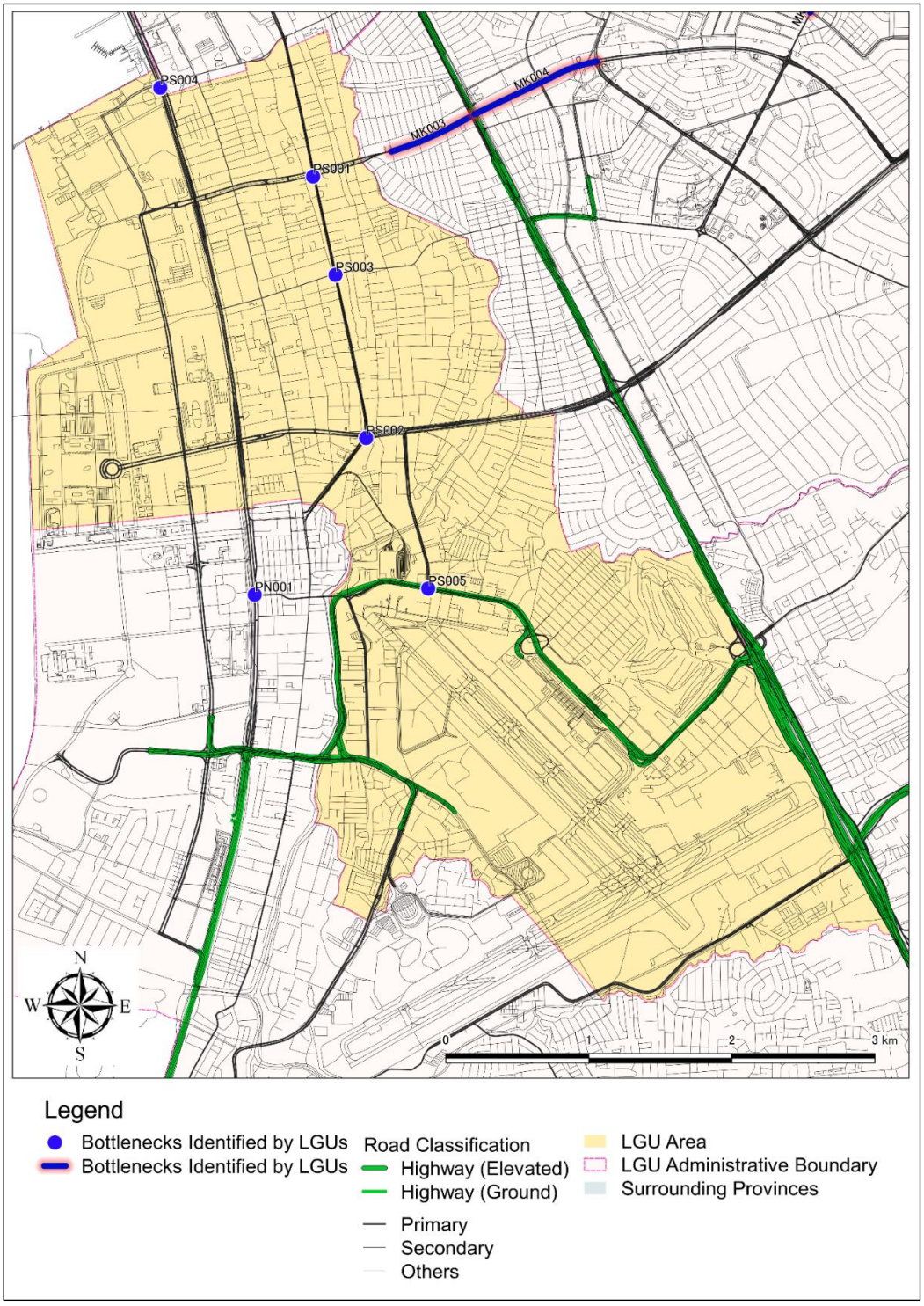
(c) **Improvement Measure Planning:** Measure plans by enforcement are prepared well however, other measures are not prepared at almost all intersections.

(d) **Evaluation of Implemented Measures:** Evaluation of measure plans by enforcement is prepared well however, other measures are not prepared at almost all intersections.

(e) **Human Resources and Understanding of LGU's Responsibility:** No data is available on human resources and understanding of LGU's responsibility.

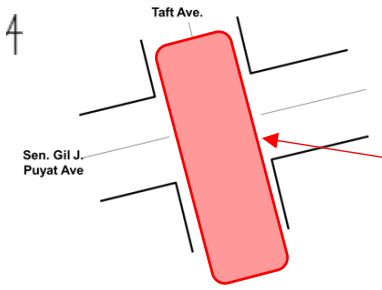
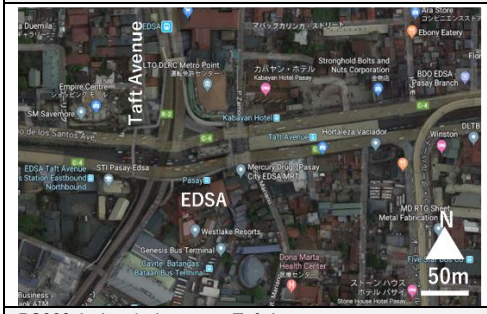
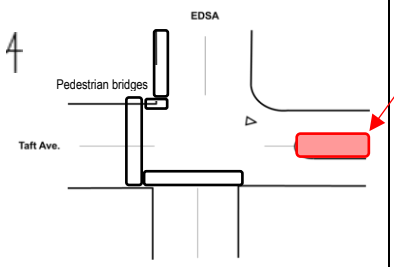
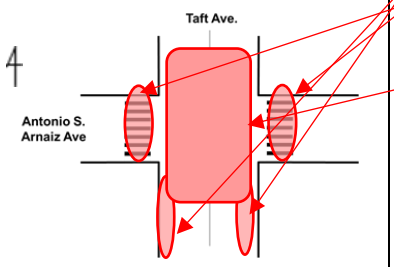
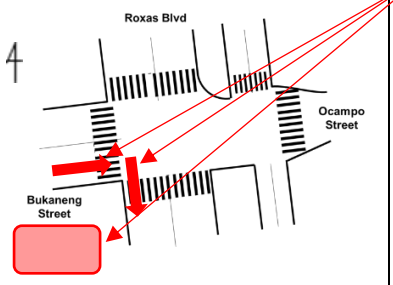
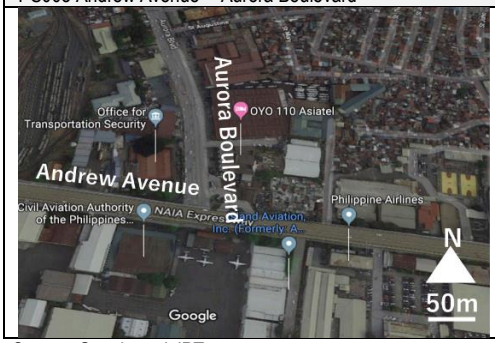
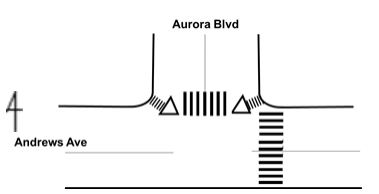
(f) **Budget and Positiveness:** No data is available on budget. LGU's response to the questionnaire was comparatively slow. Several data are still missing.

(g) **List of Traffic Bottlenecks Identified by Pasay City:** Figure 2.45 shows the location of the traffic bottlenecks in Pasay City. Five traffic bottlenecks were identified based on the questionnaire survey. Figure 2.46 shows the characteristics of traffic bottlenecks in Pasay City.



Source: JPT

Figure 2.45: Location of Traffic Bottlenecks in Pasay City

PS001 Taft Avenue – Gil Puyat Avenue		
		● Provincial buses queueing along Gil Puyat Avenue (Southbound) to enter their terminals ● Heavy pedestrian movement that disregards traffic signal ● PUJ's bound for Manila, Pasay and Makati use the street corners as loading bays. ● Train Station
PS002 EDSA – Taft Avenue		
		● Public utility jeepneys and city buses load and unload passengers near the intersection. ● Rampant jaywalkers. ● Train Station
PS003 A. Arnaiz Avenue – Taft Avenue		
		● Tricycle terminals near the intersection ● Heavy pedestrian traffic. ● PUJ's loading and unloading at intersection. ● Vendors occupying the sidewalk. ● Train Station
PS004 Roxas Boulevard – Ocampo Street		
		● High traffic demand coming from the Cultural Center making right turns to Roxas Boulevard at peak hours.
PS005 Andrew Avenue – Aurora Boulevard		
		● Poor geometry resulting to slow vehicle turning flow ● Slow moving pedicabs and tricycles mixed with fast moving vehicles.

Source: Google and JPT

Figure 2.46: Characteristics of Traffic Bottlenecks in Pasay City

12) Pasig City

Pasig City identified 30 traffic bottlenecks. This number is the highest among all LGUs in Metro Manila.

(a) **Physical Issues on Traffic Bottlenecks:** Traffic signals for pedestrians are not installed well. Ten (10) intersections don't have pedestrian bridges and pedestrian signals. Pedestrians must always be careful in crossing a road. The width of the sidewalk is generally narrow.

(b) **Cause of Traffic Bottlenecks:** Three causes: Unruly driving behavior, boarding/ alighting practice of PUJs at intersections and saturated demand.

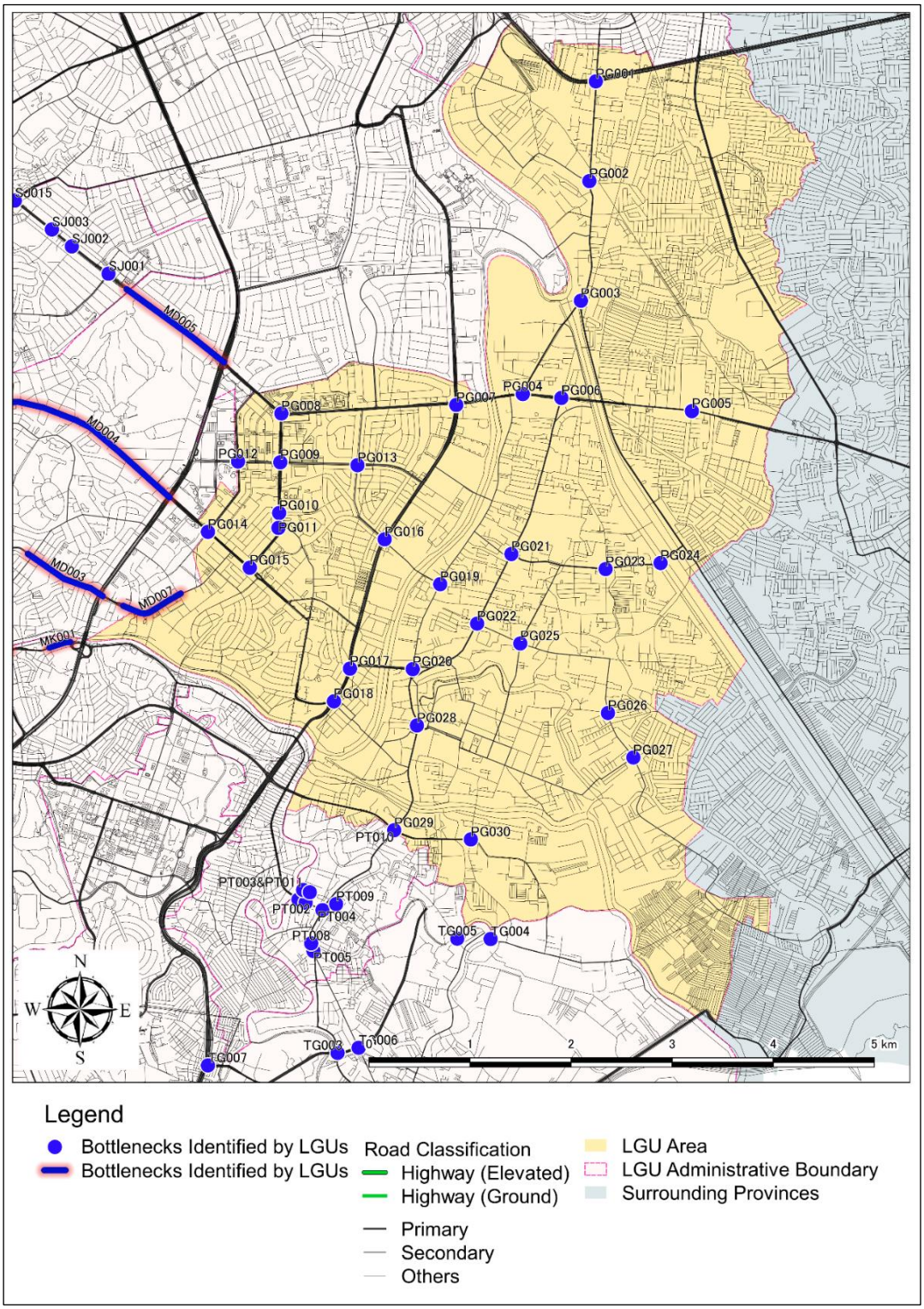
(c) **Improvement Measure Planning:** Measure plans by all way, infrastructure, safety facilities and enforcement is not prepared at almost all intersections.

(d) **Evaluation of Implemented Measures:** Evaluation of measure plans by enforcement is implemented at 26 out of 30 intersections, however evaluation of measure plans by other ways are not implemented so far.

(e) **Human Resources and Understanding of LGU's Responsibility:** No data is available on human resources and understanding of LGU's responsibility.

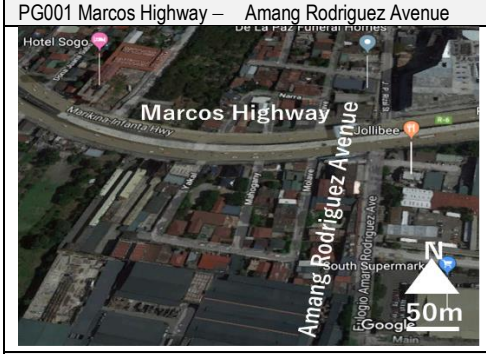
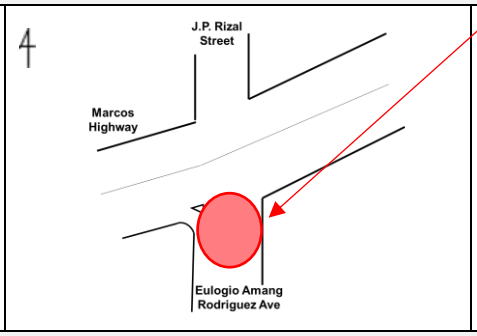
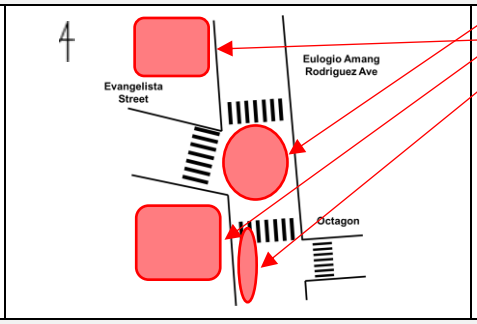
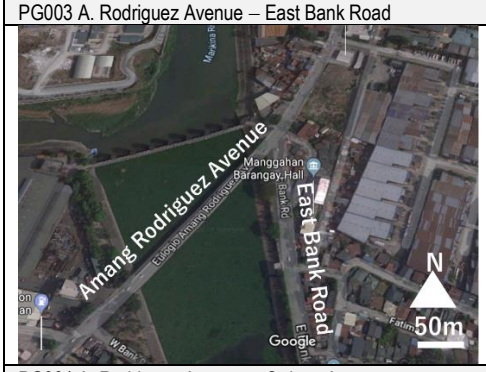
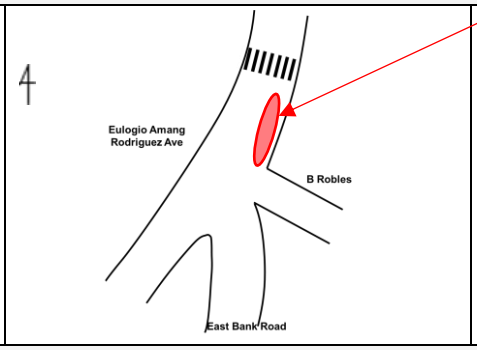
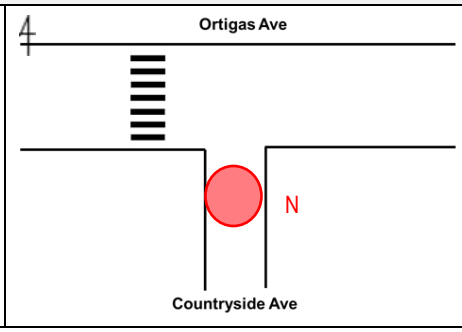
(f) **Budget and Positiveness:** No data is available on budget. LGU's response to the questionnaire was comparatively slow. Several data are still missing.

(g) **List of Traffic Bottlenecks Identified by Pasig City:** Figure 2.47 shows the location of the traffic bottlenecks in Pasig City. Thirty (30) traffic bottlenecks were identified based on the questionnaire survey. Figure 2.48 to Figure 2.53 show the characteristics of traffic bottlenecks in Pasig City.



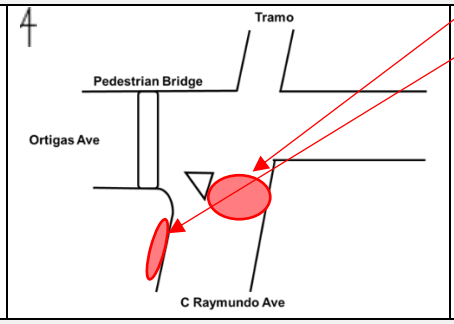
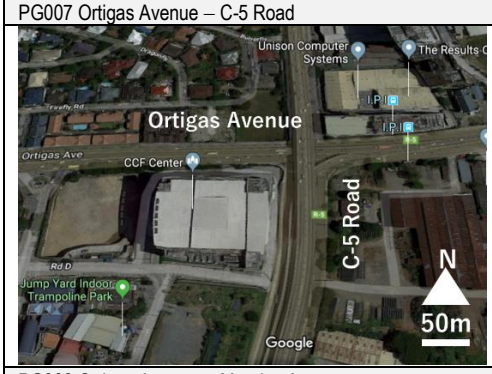
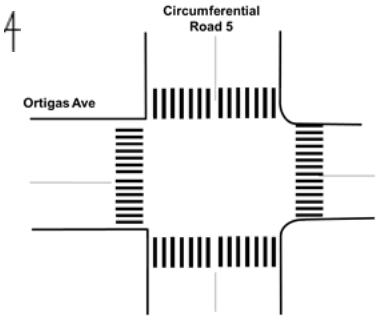
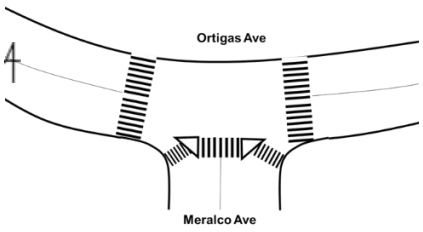
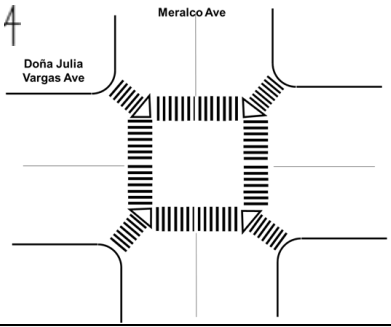
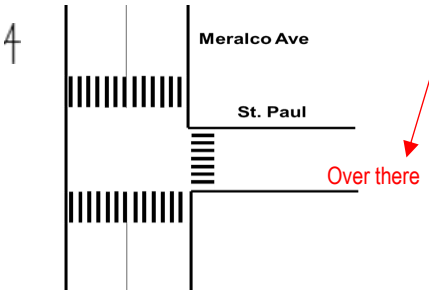
Source: JPT

Figure 2.47: Location of Traffic Bottlenecks in Pasig City

PG001 Marcos Highway – Amang Rodriguez Avenue		
		• No traffic signal
PG002 A. Rodriguez Avenue – Evangelista Street		
		• Fast food Chains at the intersection • Illegal loading and unloading area • No traffic signal
PG003 A. Rodriguez Avenue – East Bank Road		
		• Waiting shed near the intersection
PG004 A. Rodriguez Avenue – Ortigas Avenue		
		
PG005 Ortigas Avenue – Countryside Avenue		
		• Narrow road

Source: Google and JPT

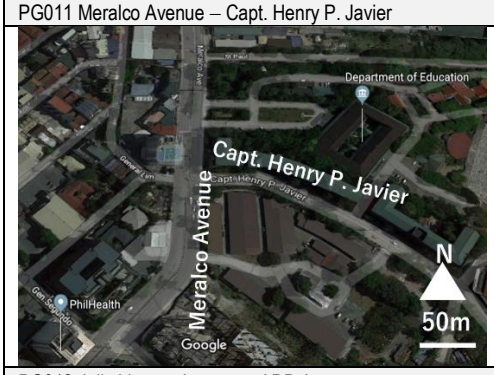
Figure 2.48: Characteristics of Traffic Bottlenecks in Pasig City (1)

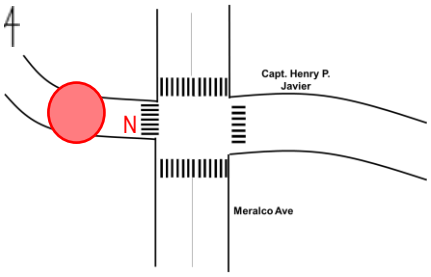
PG006 Ortigas Avenue – C. Raymundo Avenue		
		• No traffic signals • Waiting shed near the intersection
PG007 Ortigas Avenue – C-5 Road		
		
PG008 Ortigas Avenue – Meralco Avenue		
		
PG009 Meralco Avenue – Julia Vargas Avenue		
		
PG010 Meralco Avenue – St. Paul Road		
		• St. Paul College nearby

Source: Google and JPT

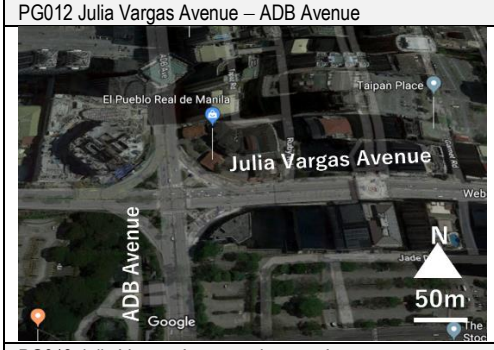
Figure 2.49: Characteristics of Traffic Bottlenecks in Pasig City (2)

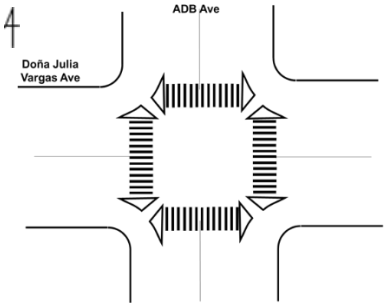
PG011 Meralco Avenue – Capt. Henry P. Javier



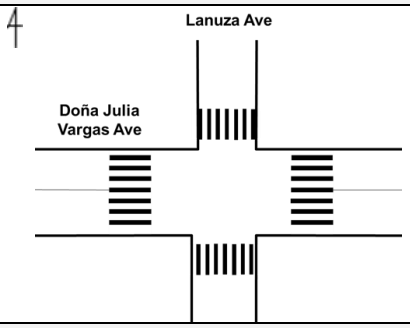


PG012 Julia Vargas Avenue – ADB Avenue

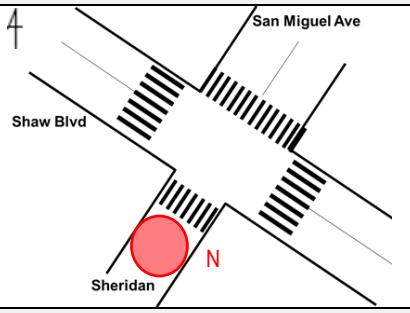




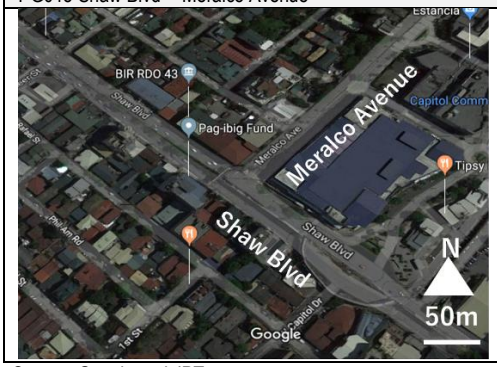
PG013 Julia Vargas Avenue – Lanuza Avenue

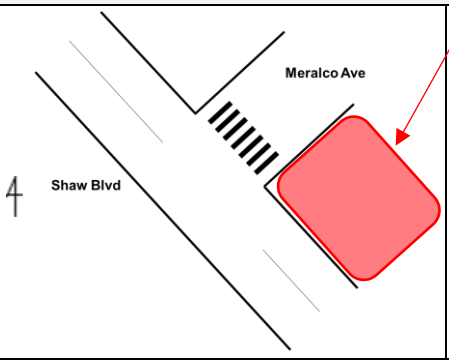


PG014 Shaw Blvd – San Miguel Avenue



PG015 Shaw Blvd – Meralco Avenue

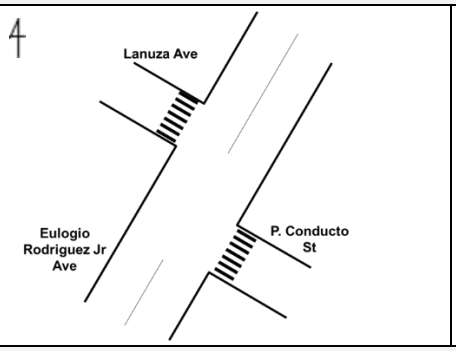




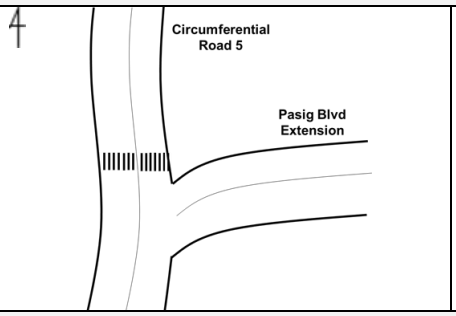
Source: Google and JPT

Figure 2.50: Characteristics of Traffic Bottlenecks in Pasig City (3)

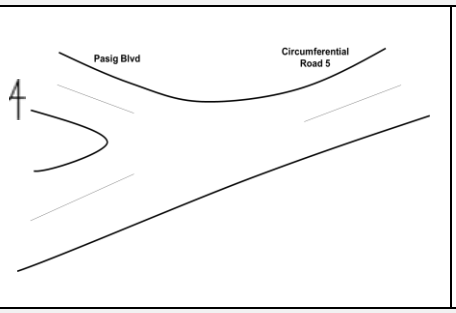
PG016 Lanuza Avenue – C-5 Road



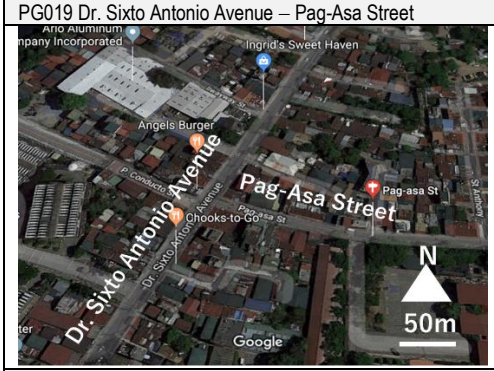
PG017 C-5 Road – Pasig Blvd Extension

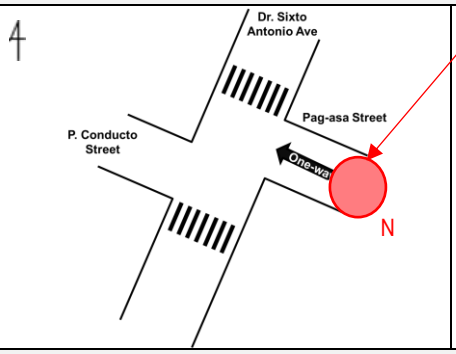


PG018 C-5 Road – Pasig Blvd



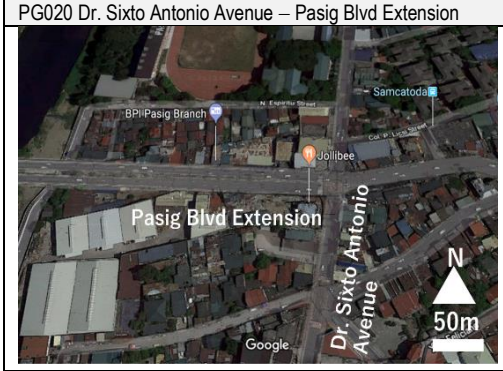
PG019 Dr. Sixto Antonio Avenue – Pag-Asa Street

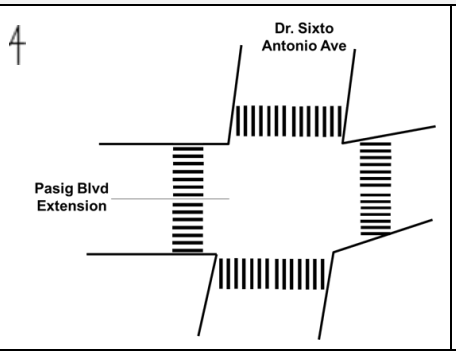




- Narrow Roads
- Very narrow road

PG020 Dr. Sixto Antonio Avenue – Pasig Blvd Extension

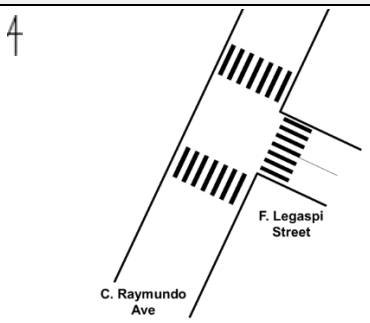




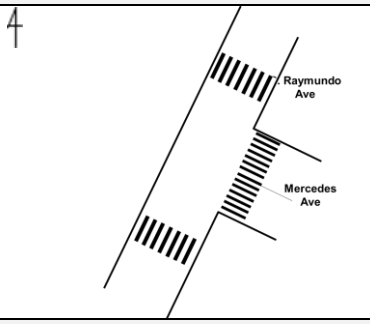
Source: Google and JPT

Figure 2.51: Characteristics of Traffic Bottlenecks in Pasig City (4)

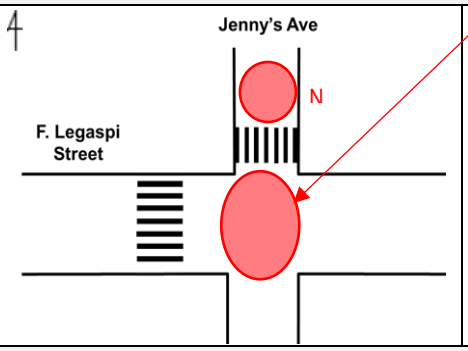
PG021 C. Raymundo Avenue – Francisco Legaspi Street



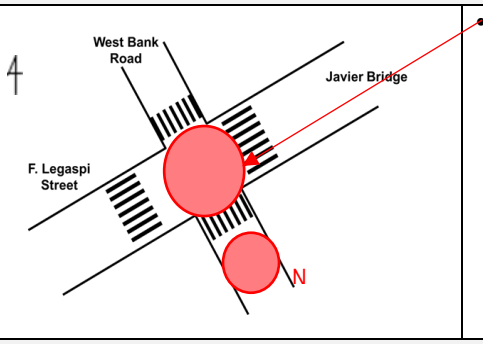
PG022 C. Raymundo Avenue – Mercedes Avenue



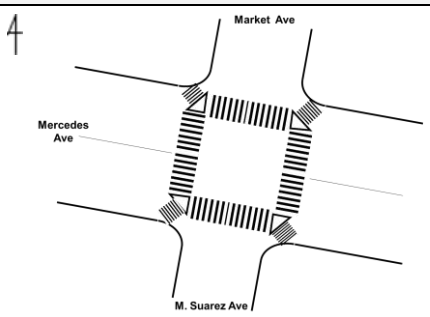
PG023 Francisco Legaspi Street – Jenny's Avenue



PG024 Francisco Legaspi Street – West Bank Road

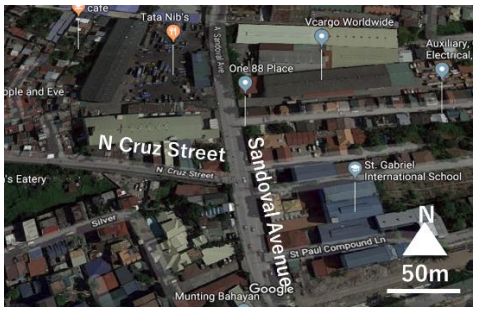
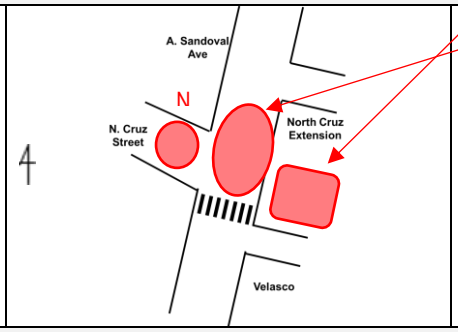
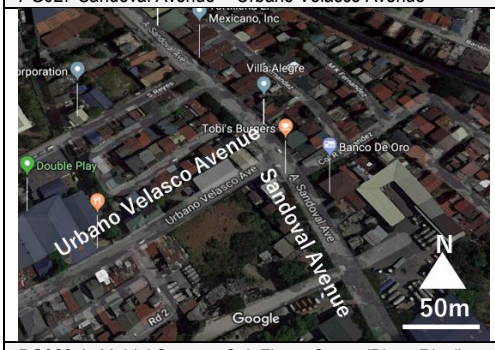
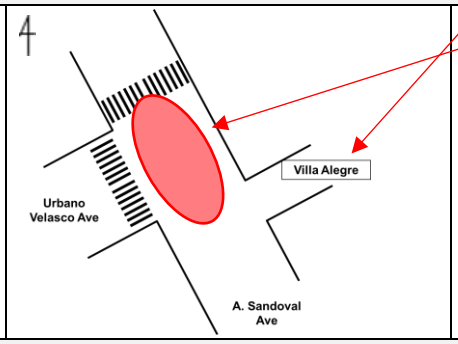
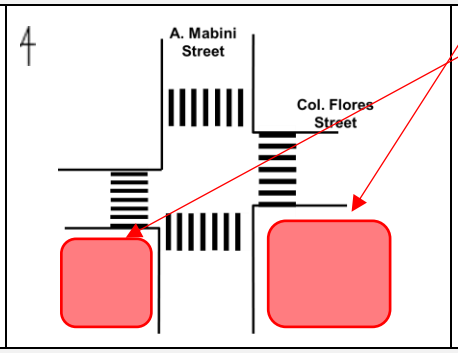
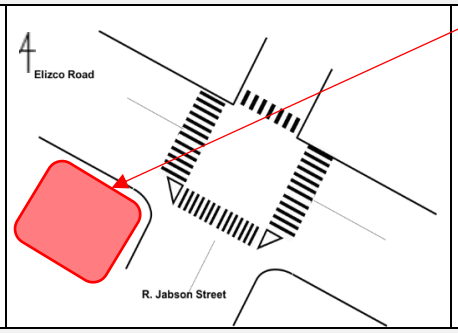
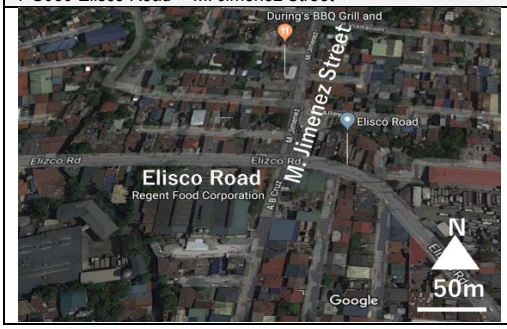
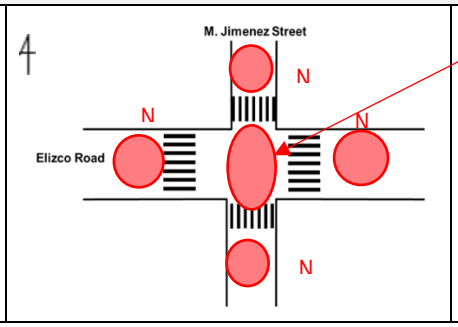


PG025 Market Avenue – Mercedes Avenue



Source: Google and JPT

Figure 2.52: Characteristics of Traffic Bottlenecks in Pasig City (5)

PG026 Sandoval Avenue – N Cruz Street		
		• School in the intersection • No traffic signal
PG027 Sandoval Avenue – Urbano Velasco Avenue		
		• Residential Area • No traffic signal
PG028 A. Mabini Street – Col. Flores Street (Plaza Rizal)		
		• Church in the intersection • Plaza Rizal
PG029 R. Jabson Street – Elisco Road		
		• Fast food in the intersection
PG030 Elisco Road – M. Jimenez Street		
		• Narrow roads • No traffic signal

Source: Google and JPT

Figure 2.53: Characteristics of Traffic Bottlenecks in Pasig City (6)

13) Municipality of Pateros

(a) **Physical Issues on Traffic Bottlenecks:** Lane markings and pedestrian crossing must be improved. Pedestrian safety must be secured at small intersections.

(b) **Cause of Traffic Bottlenecks:** Five causes: mixed traffic with pedestrians, unruly driving behavior, boarding/ alighting practice of PUJs at intersections, illegal roadside parking and poorly designed intersections comprise approximately 90% of causes. Percentage of illegal roadside parking and inadequate signal phasing is much higher than the average of other 17 LUGs.

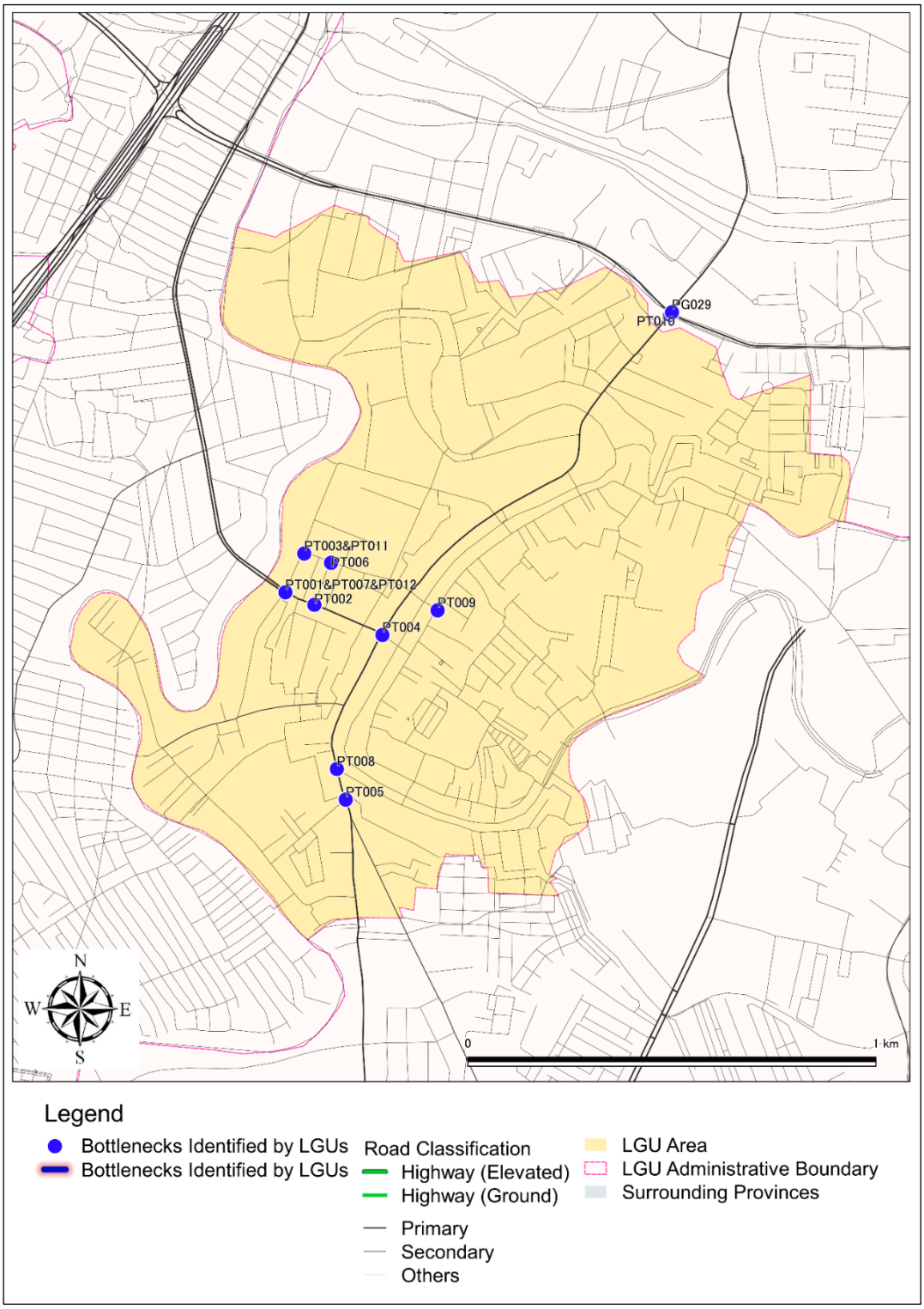
(c) **Improvement Measure Planning:** Measure plans by all way, infrastructure, safety facilities and enforcement are prepared at almost all intersections.

(d) **Evaluation of Implemented Measures:** Evaluation of measure plans by safety facilities and enforcement is implemented at almost all intersections.

(e) **Human Resources and Understanding of LGU's Responsibility:** Municipality of Pateros has plenty of staff in the enforcement section. Municipality of Pateros traffic management covers various ways except for traffic control at national and local roads. At residential/subdivision roads, they work on tricycle management, roadside parking, and pedestrian management.

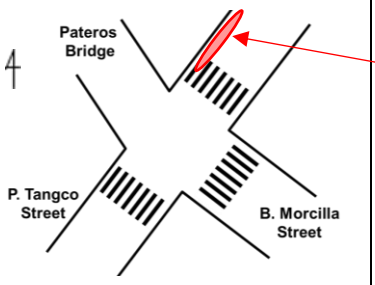
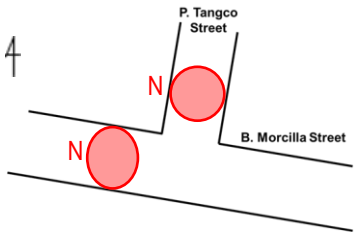
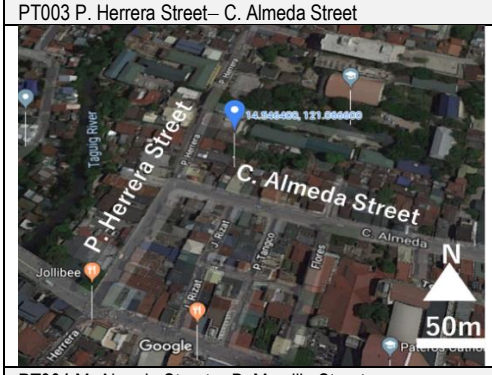
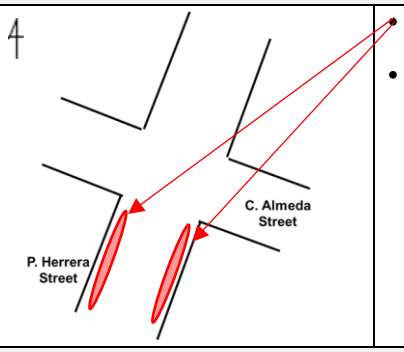
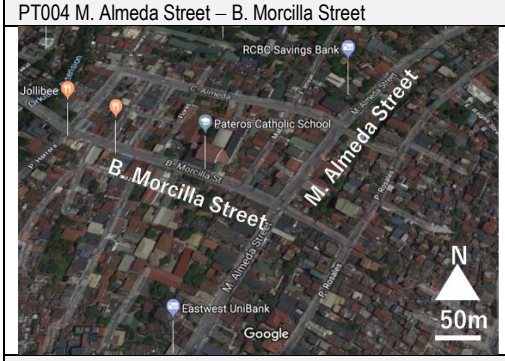
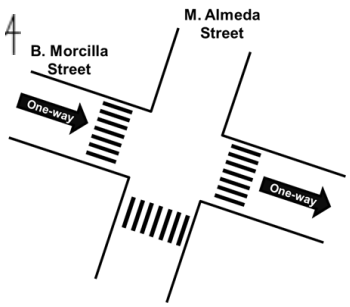
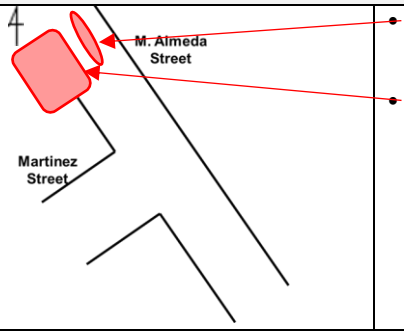
(f) **Budget and Positiveness:** Municipality of Pateros secured approximately 6.3 million PHP for traffic management in 2019. LGU's response to the questionnaire was comparatively slow, but the data missing is limited.

(g) **List of Traffic Bottlenecks Identified by Pateros:** Figure 2.54 shows the location of the traffic bottlenecks in Municipality of Pateros. Nine (9) traffic bottlenecks were identified based on the questionnaire survey. Figure 2.55 and Figure 2.56 show the characteristics of traffic bottlenecks in the municipality of Pateros.



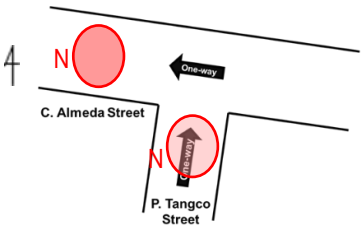
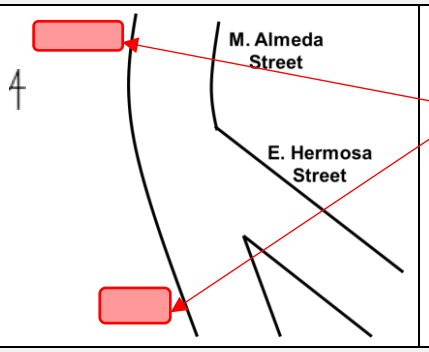
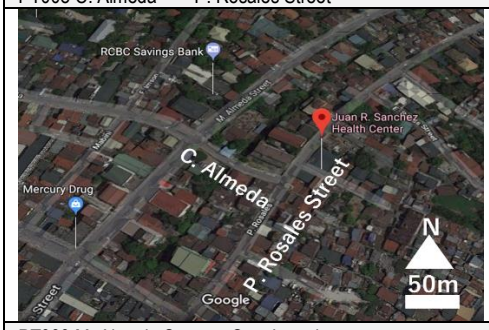
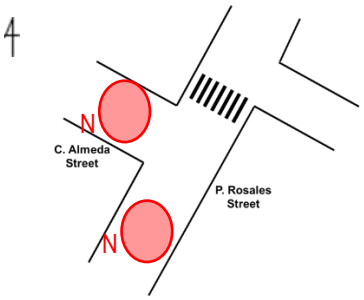
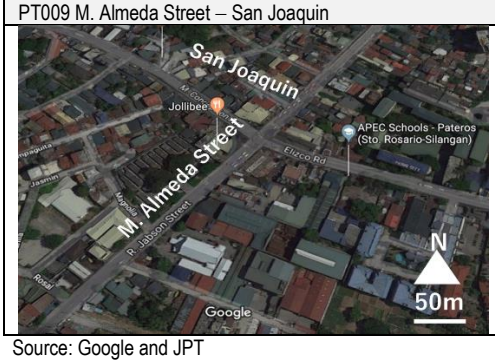
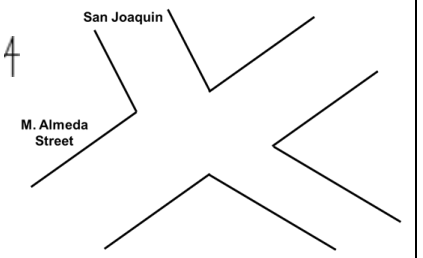
Source: JPT

Figure 2.54: Location of Traffic Bottlenecks in Pateros

PT001 P. Herrera Street - B. Morcilla Street		
		• There are some illegal parking and terminal in both sides • Intersection has narrow roads • Waiting shed near the intersection
PT002 B. Morcilla Street – P. Tangco Street		
		• Commuters are not riding in the right loading area. • Intersections have narrow roads
PT003 P. Herrera Street– C. Almeda Street		
		• Parking on both side of the street and lack of signages. • Intersection has narrow roads
PT004 M. Almeda Street – B. Morcilla Street		
		• Pedestrians crossing the street while it is in "Go" signal. • Intersection has narrow roads
PT005 M. Almeda Street – Martirez Street		
		• Illegal terminal of tricycle in the left side while waiting as a service in Saint Genevieve School. • Nearby school

Source: Google and JPT

Figure 2.55: Characteristics of Traffic Bottlenecks in Pateros (1)

PT006 C. Almeda Extension– P. Tangco Street		
		● Some residence with owned cars have no "Garage" and the side of the street was used to be their garage. ● Intersection has narrow roads
PT007 M. Almeda Street – E. Hermosa Street		
		● PUJ are loading commuters in waiting shed for almost 3 minutes causing obstruction and congestion. ● Residential area ● Nearby school
PT008 C. Almeda – P. Rosales Street		
		● T-intersection, the entrance and exit point specially in rush hour. ● Intersection has narrow roads
PT009 M. Almeda Street – San Joaquin		
		● Temporary stop due to the left turn going P. Rosales St.

Source: Google and JPT

Figure 2.56: Characteristics of Traffic Bottlenecks in Pateros (2)

14) Quezon City

(a) **Physical Issues on Traffic Bottlenecks:** Traffic signals, lane markings and pedestrian facilities must be improved. Also, the pavement must be maintained frequently.

(b) **Cause of Traffic Bottlenecks:** Five causes: mixed traffic with pedestrians, unruly driving behavior, boarding/ alighting practice of PUJs at intersections, saturated demand, and illegal roadside parking comprise approximately 80% of causes. This is the most average characteristics among 17 LUGs.

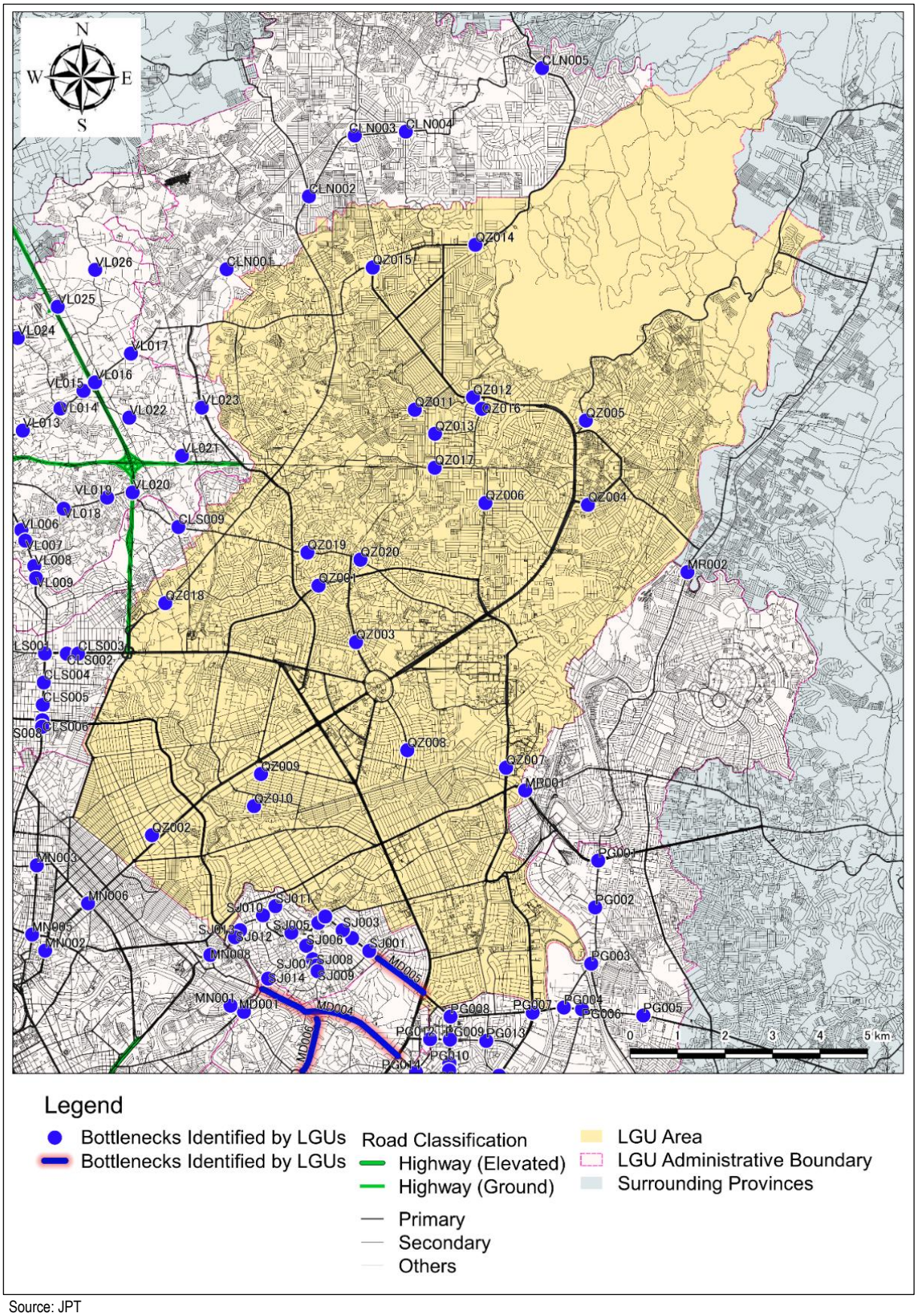
(c) **Improvement Measure Planning:** Measure plans by all way, infrastructure, safety facilities and enforcement are not prepared at almost all intersections.

(d) **Evaluation of Implemented Measures:** Evaluation of measure plans by enforcement is comparatively implemented well.

(e) **Human Resources and Understanding of LGU's Responsibility:** No data is available on human resources and understanding of LGU's responsibility.

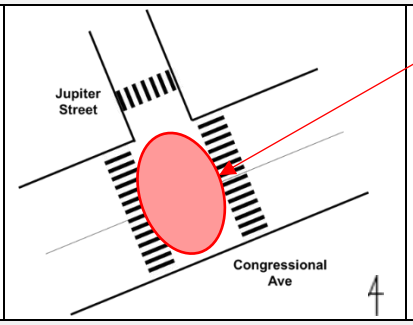
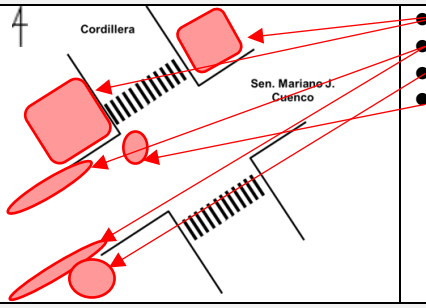
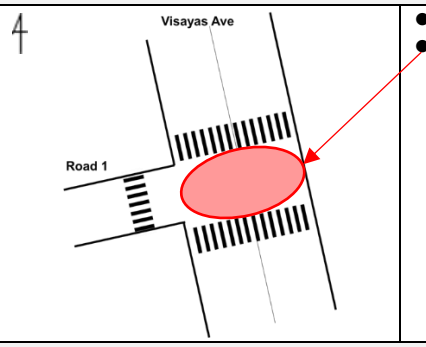
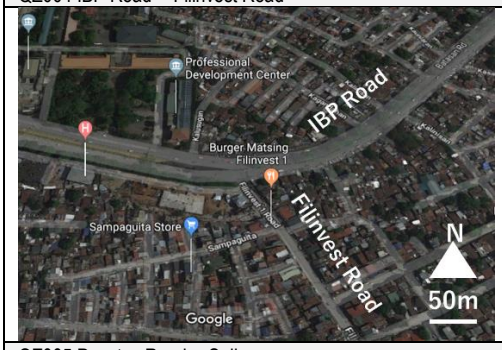
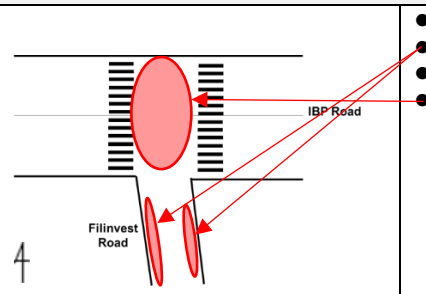
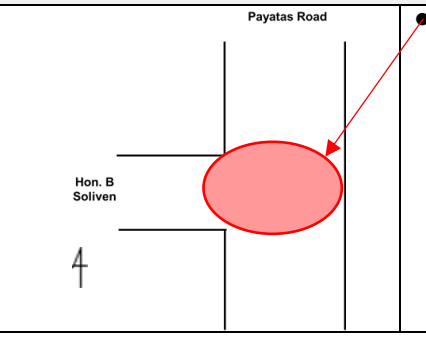
(f) **Budget and Positiveness:** No data is available on budget. LGU's response to the questionnaire was comparatively slow. Several data are still missing.

(g) **List of Traffic Bottlenecks Identified by Quezon City:** Figure 2.57 shows the location of the traffic bottlenecks in Quezon City. Twenty (20) traffic bottlenecks were identified based on the questionnaire survey. Figure 2.58 to Figure 2.61 show the characteristics of traffic bottlenecks in Quezon City.



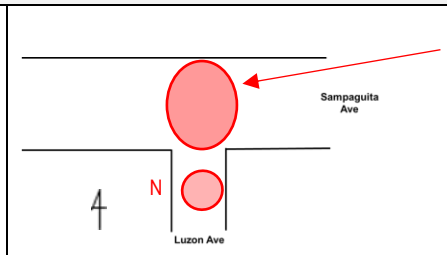
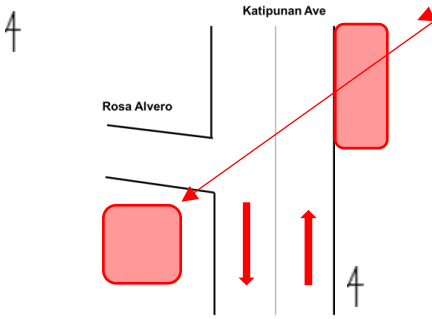
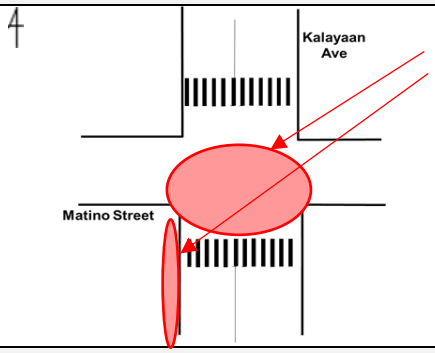
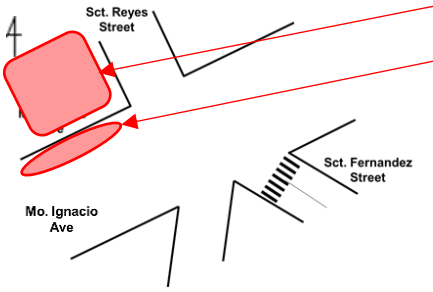
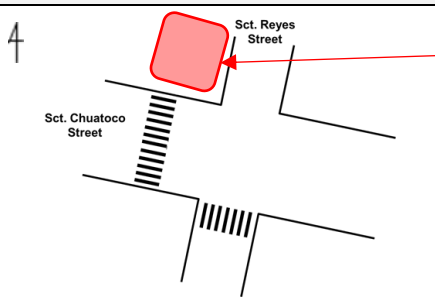
Source: JPT

Figure 2.57: Location of Traffic Bottlenecks in Quezon City

QZ001 Congressional Avenue – Jupiter Street		
		● High Traffic Demand ● No traffic signal
QZ002 Cordillera – Sen. Mariano J. Cuenco		
		● Residential Area ● Cars parked on the road sides ● Nearby School ● Gate closes at times, closing the road for a one-way access only
QZ003 Visayas Avenue – Road 1		
		● Commercial area ● No traffic signal
QZ004 IBP Road – Filinvest Road		
		● High Traffic Demand ● Cars parked on the road sides ● Commercial Area ● No traffic signal
QZ005 Payatas Road – Soliven		
		● No traffic signal

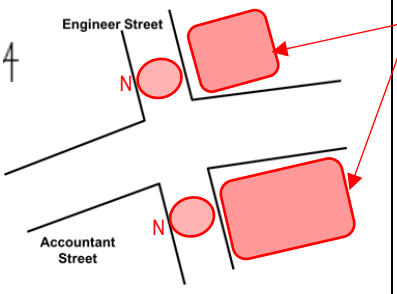
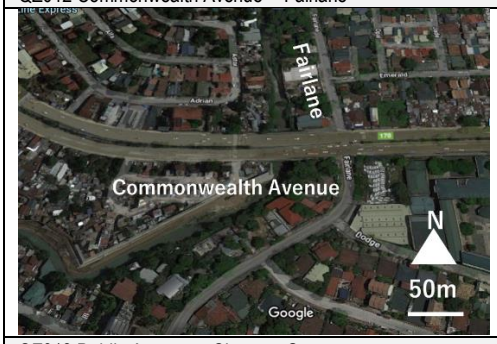
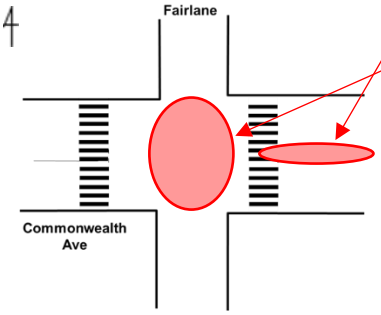
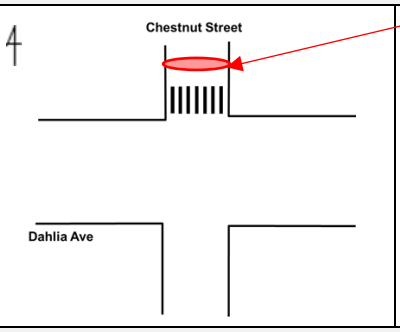
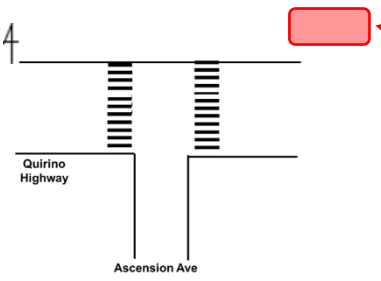
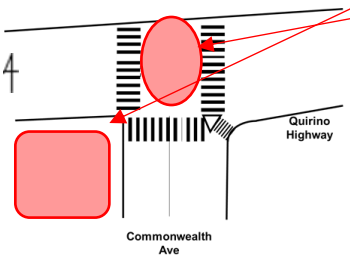
Source: Google and JPT

Figure 2.58: Characteristics of Traffic Bottlenecks in Quezon City (1)

QZ006 Luzon Avenue – Sampaguita		
		● Narrow Road ● No traffic signal
QZ007 Katipunan Avenue – Rosa Alvero		
		● Near Ateneo de Manila University and other schools ● Highly commercial area
QZ008 Kalayaan Road – Matalino Street		
		● High traffic demand ● No traffic signal ● Waiting shed near the intersection
QZ009 Mo. Ignacia – Sct. Reyes		
		● St. Mary's College of Quezon City found in the intersection ● Cars parked near the school
QZ010 Sct. Chuatoco – Sct. Reyes		
		● Commercialized area ● Public Highschool in the intersection ● Heavy pedestrian volume due to the public school

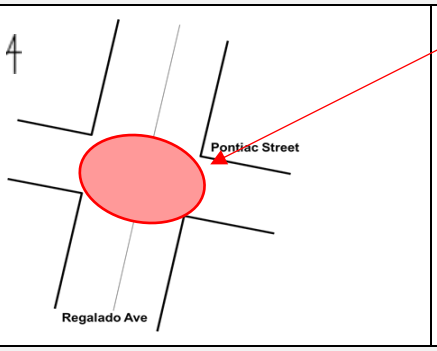
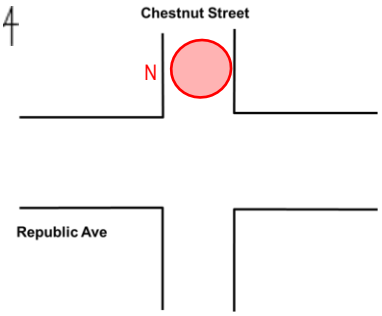
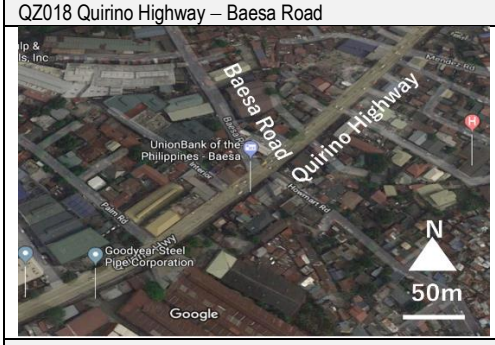
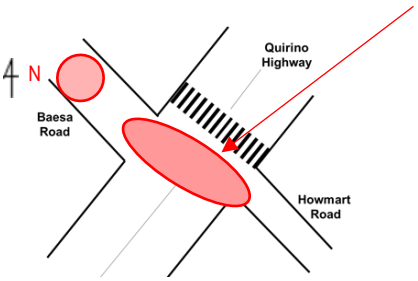
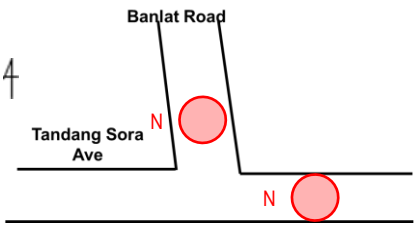
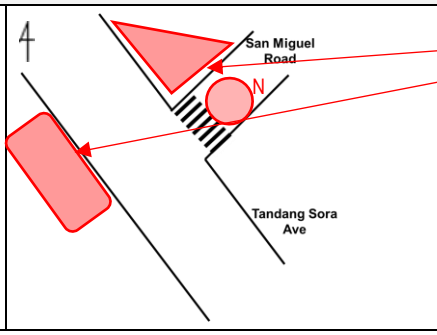
Source: Google and JPT

Figure 2.59: Characteristics of Traffic Bottlenecks in Quezon City (2)

QZ011 Accountant Street – Engineer Street		
		● Narrow roads ● Residential area and commercial area
QZ012 Commonwealth Avenue – Fairlane		
		● Construction of MRT-7 at Commonwealth Ave. ● No traffic signals
QZ013 Dahlia Avenue – Chestnut Street		
		● Gate at Chesnut St. closes ● Commercial Area
QZ014 Quirino Highway – Asuncion Street		
		● Commercial Area ● Sacred Heart Village and Market
QZ015 Quirino Highway – Commonwealth Avenue		
		● Shopping Mall in the intersection ● No traffic signal

Source: Google and JPT

Figure 2.60: Characteristics of Traffic Bottlenecks in Quezon City (3)

QZ016 Regalado Avenue – Poniac Street		
		● High traffic demand ● No traffic signal
QZ017 Republic Avenue – Chestnut Street		
		● Narrow road
QZ018 Quirino Highway – Baesa Road		
		● No traffic signal ● Commercial Area
QZ019 Tandang Sora – Banlat Road		
		● Narrow roads
QZ020 Tandang Sora – San Miguel Road		
		● Narrow Road ● Commercial Plaza ● Shopping Mall

Source: Google and JPT

Figure 2.61: Characteristics of Traffic Bottlenecks in Quezon City (4)

15) San Juan City

(a) **Physical Issues on Traffic Bottlenecks:** Pedestrian bridge and pedestrian crossing are both not installed at 5 intersections.

(b) **Cause of Traffic Bottlenecks:** Regardless of the specific cause, eight (8) types of causes were identified to some extent.

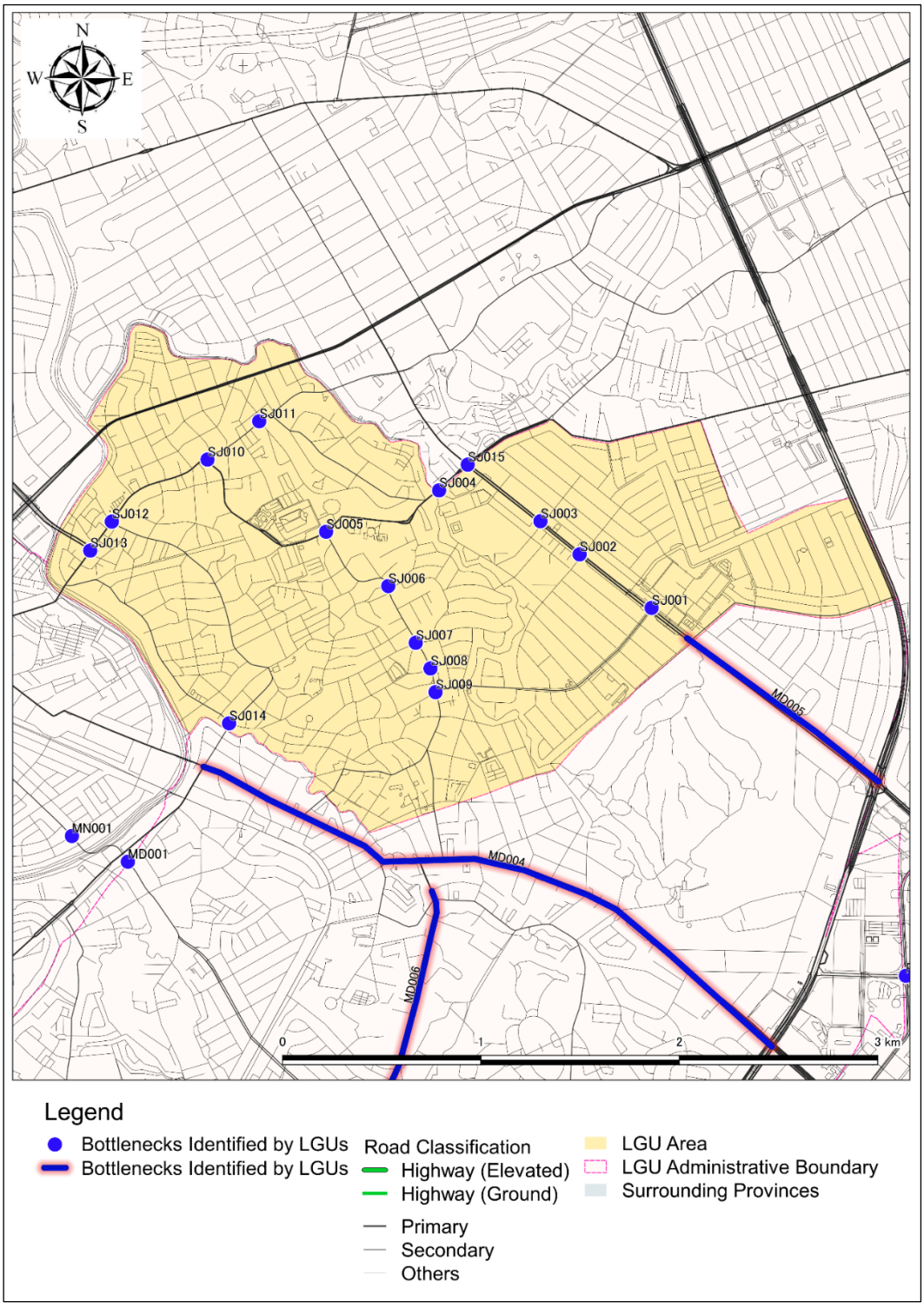
(c) **Improvement Measure Planning:** Measure plans by enforcement are prepared at almost all intersections.

(d) **Evaluation of Implemented Measures:** Evaluation of measure plans by infrastructure is comparatively implemented well.

(e) **Human Resources and Understanding of LGU's Responsibility:** San Juan City has plenty of staff in the enforcement section. San Juan City's traffic management covers activities related to traffic signal at intersections that consists of national roads. They also handle intersection improvement, traffic control, and pedestrian management of other national and local roads.

(f) **Budget and Positiveness:** San Juan City secured approximately 19.5 million PHP for traffic management in 2019. Main areas of expenditure are accountable forms, trainings and seminars and communication equipment. LGU's response to the questionnaire was comparatively quick with limited data missing.

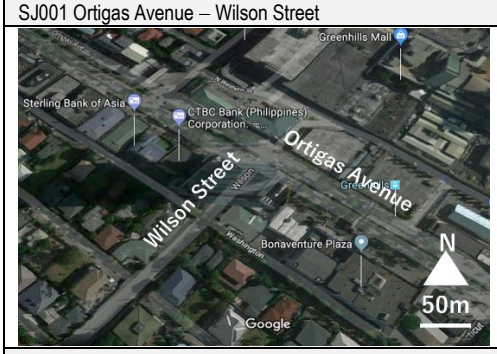
(g) **List of Traffic Bottlenecks Identified by San Juan City:** Figure 2.62 shows the location of the traffic bottlenecks in San Juan City. Fifteen (15) traffic bottlenecks were identified based on the questionnaire survey. Figure 2.63 to Figure 2.65 show the characteristics of traffic bottlenecks in San Juan City.

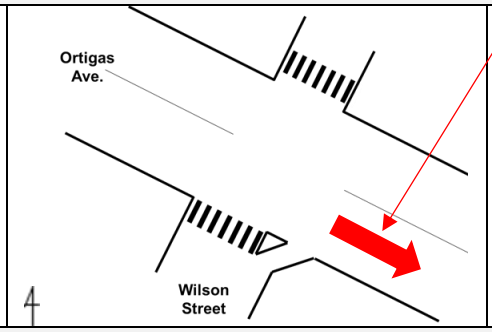


Source: JPT

Figure 2.62: Location of Traffic Bottlenecks in San Juan City

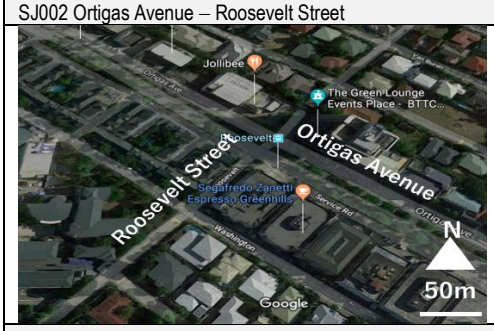
SJ001 Ortigas Avenue – Wilson Street

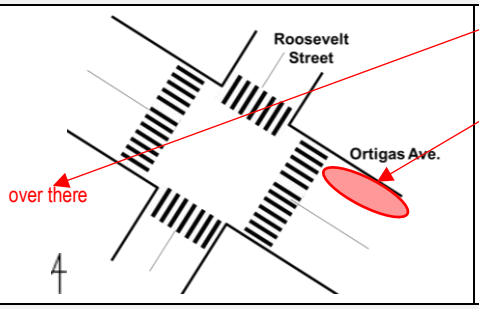




- Alternative route going to Mandaluyong and Makati
- Commercial Area

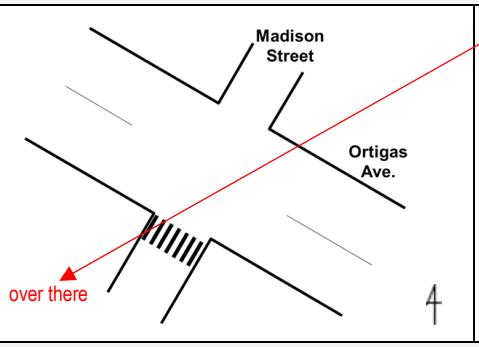
SJ002 Ortigas Avenue – Roosevelt Street





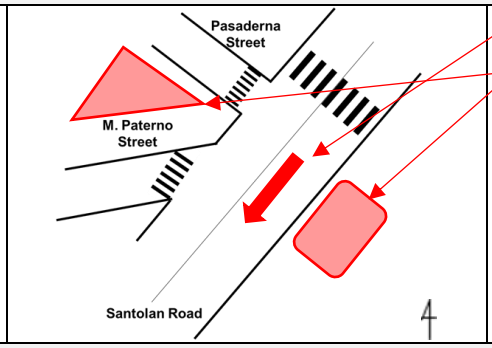
- Route of school services to Xavier School and Immaculate Concepcion Academy (ICA)
- Loading and Unloading Area
- Commercial Area

SJ003 Ortigas Avenue– Madison Street



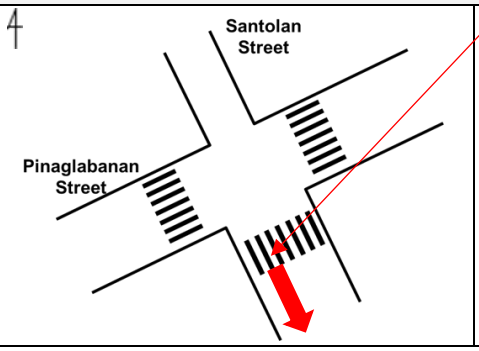
- Route of school services to Xavier School and Immaculate Concepcion Academy (ICA)
- Commercial Area

SJ004 Santolan Road– Paterno Street



- Route of vehicles from Quezon City going to South.
- Residential areas

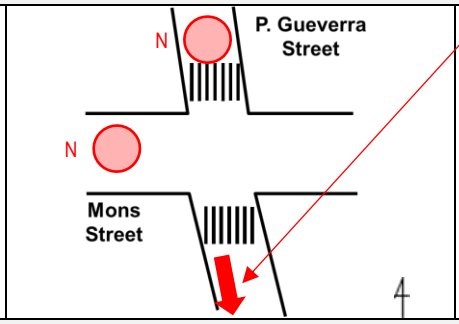
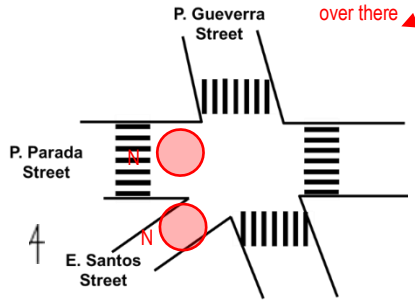
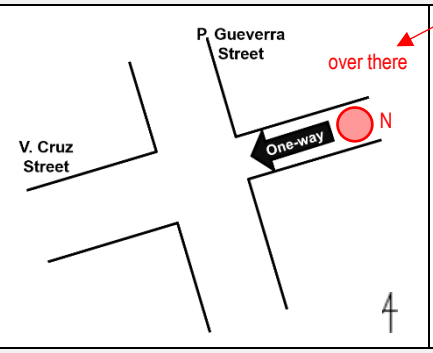
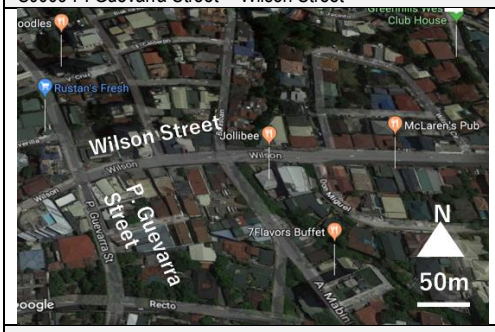
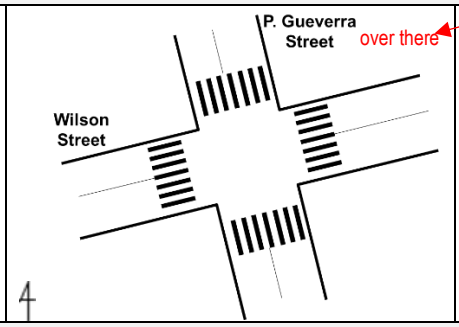
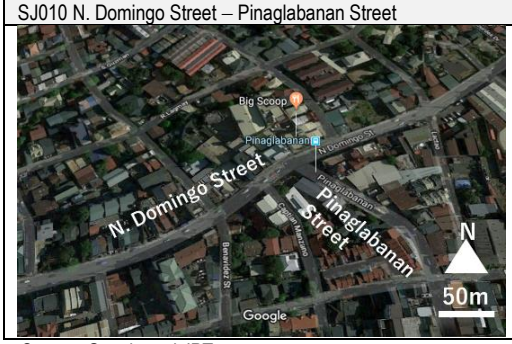
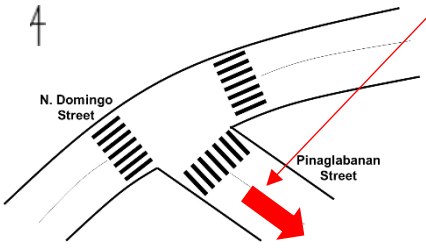
SJ005 Santolan Road – Pinaglabanan Street



- Route of vehicles from Quezon City going to South.

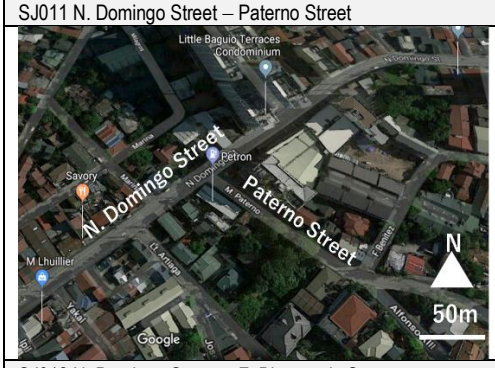
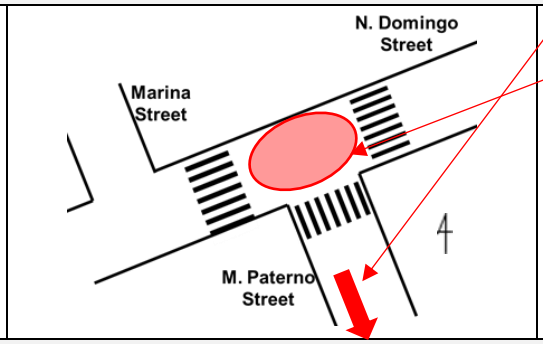
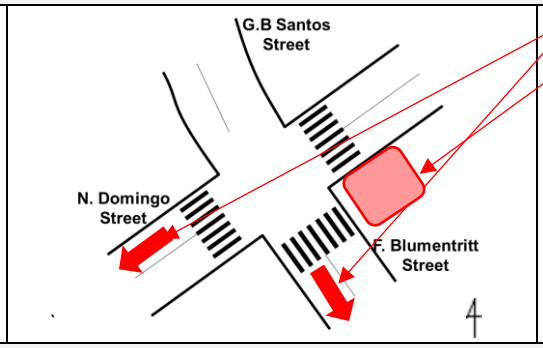
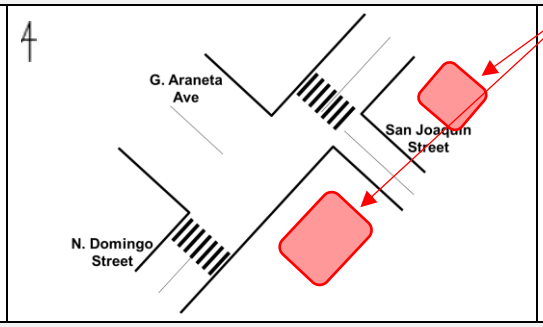
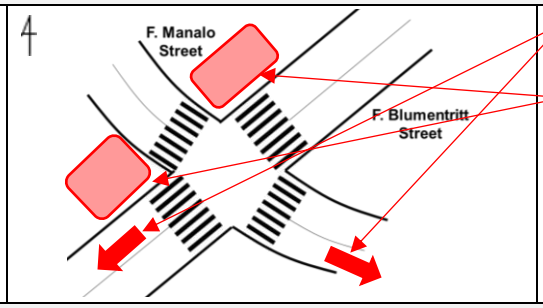
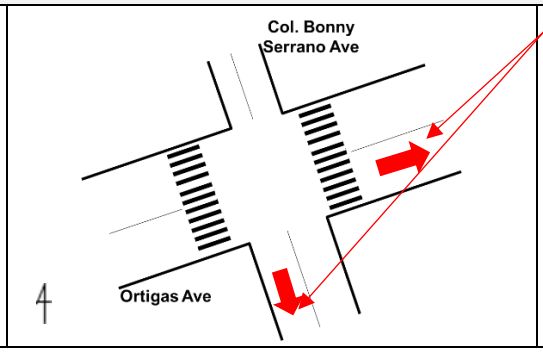
Source: Google and JPT

Figure 2.63: Characteristics of Traffic Bottlenecks in San Juan City (1)

SJ006 P. Guevarra Street – Mons Street		
		● Route of vehicles from Quezon City going to South. ● Narrow roads
SJ007 P. Guevarra Street – P. Parada Street		
		● Route of school services to Xavier School and Immaculate Concepcion Academy (ICA) ● Narrow roads
SJ008 P. Guevarra Street – V. Cruz Street		
		● Route of school services to Xavier School and Immaculate Concepcion Academy (ICA) ● Narrow road
SJ009 P. Guevarra Street – Wilson Street		
		● Route of school services to Xavier School, Immaculate Concepcion Academy (ICA), OB Montessori and Fountain International School (Greenhills) ● Commercial Area
SJ010 N. Domingo Street – Pinaglabanan Street		
		● Route of vehicles from Quezon City going to south and schools, market, hospitals, church, and City Hall ● Commercial Area

Source: Google and JPT

Figure 2.64: Characteristics of Traffic Bottlenecks in San Juan City (2)

SJ011 N. Domingo Street – Paterno Street		
		● Route of vehicles from Quezon City going to South. ● No traffic signal
SJ012 N. Domingo Street – F. Blumentritt Street		
		● Alternative route going to Manila and Mandaluyong ● Shopping Mall in the intersection
SJ013 N. Domingo Street – Araneta Avenue		
		● Near schools and shopping mall
SJ014 F. Blumentritt Street – F. Manalo Street		
		● Alternative route going to Manila, Mandaluyong and Makati. ● Commercial areas
SJ015 Ortigas Avenue – Santolan Road		
		● Route going to East and South

Source: Google and JPT

Figure 2.65: Characteristics of Traffic Bottlenecks in San Juan City (3)

16) Taguig City

(a) **Physical Issues on Traffic Bottlenecks:** Traffic signals, lane markings and pedestrian facilities must be improved.

(b) **Cause of Traffic Bottlenecks:** 3 causes, missed traffic with pedestrians, unruly driving behavior and illegal roadside parking comprise 100% of the causes.

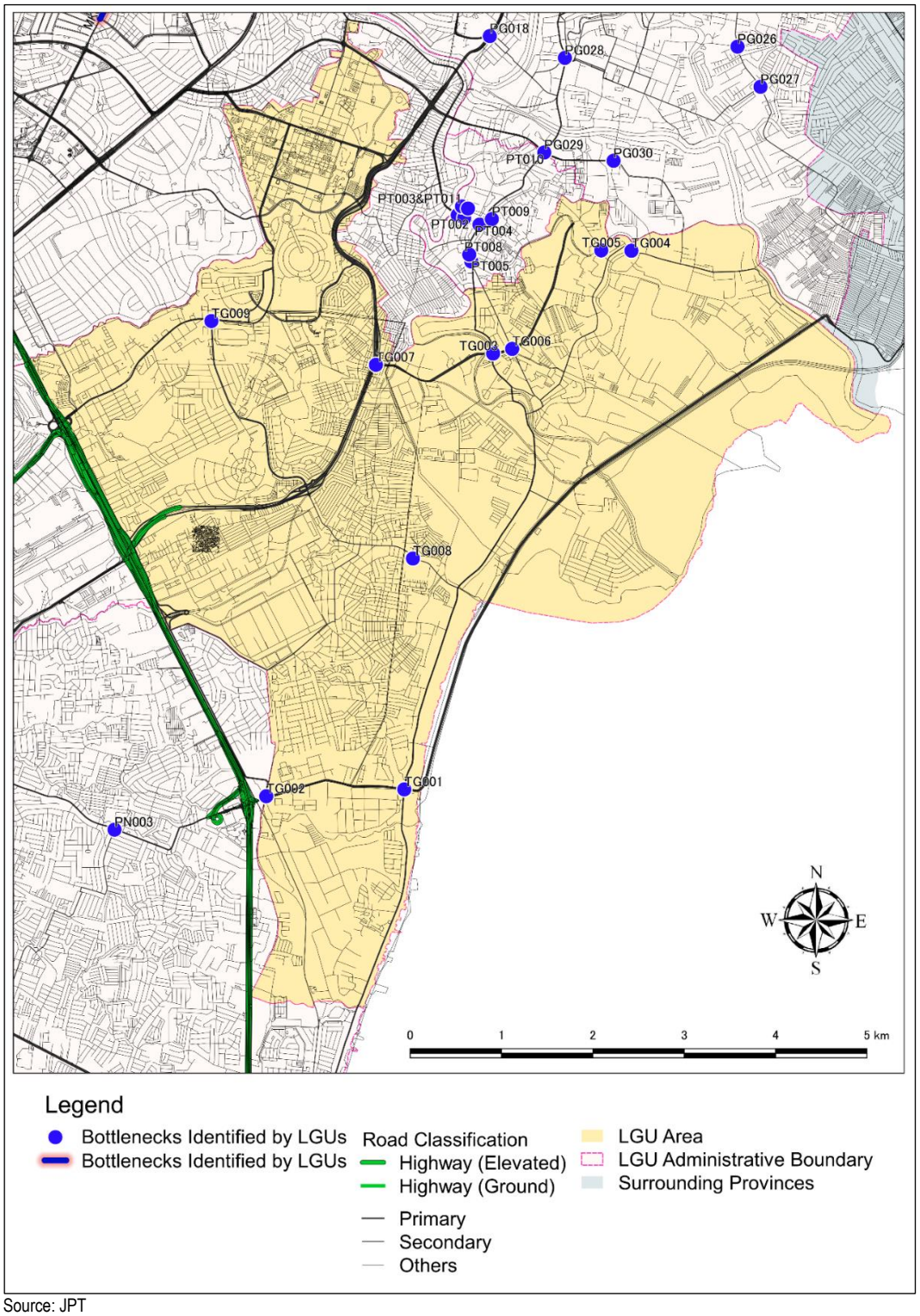
(c) **Improvement Measure Planning:** Measure plans by all way, infrastructure, safety facilities and enforcement are prepared at almost all intersections.

(d) **Evaluation of Implemented Measures:** Evaluation of measure plans by all way, infrastructure, safety facilities and enforcement are implemented at almost all intersections.

(e) **Human Resources and Understanding of LGU's Responsibility:** No data is available on human resources and understanding of LGU's responsibility.

(f) **Budget and Positiveness:** No data is available on budget. LGU's response to the questionnaire was comparatively slow. Several data are still missing.

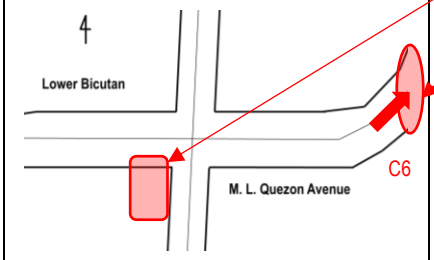
(g) **List of Traffic Bottlenecks Identified by Taguig City:** Figure 2.66 shows the location of the traffic bottlenecks in Taguig City. Nine (9) traffic bottlenecks were identified based on the questionnaire survey. Figure 2.67 and Figure 2.68 show the characteristics of traffic bottlenecks in Taguig City.



Source: JPT

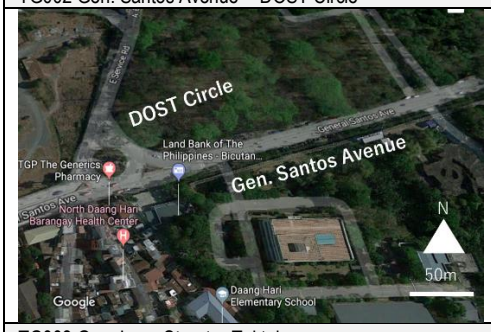
Figure 2.66: Location of Traffic Bottlenecks in Taguig City

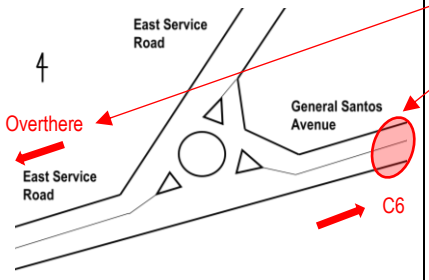
TG001 M.L. Quezon Avenue – Lower Bicutan (Gen. Santos Avenue)



- No traffic lights around commercial establishment
- Heavy volume of vehicles during rush hour
- Road repair near C6 interchange

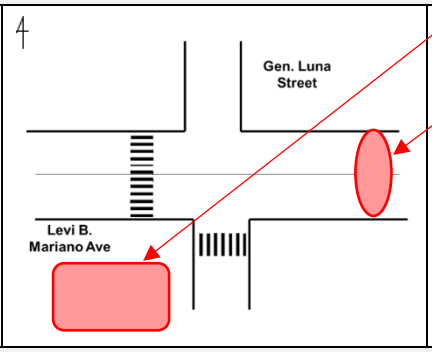
TG002 Gen. Santos Avenue – DOST Circle





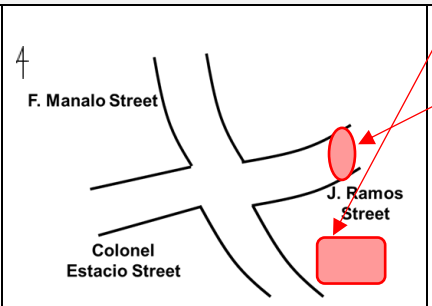
- No traffic lights around commercial establishment
- Heavy volume of vehicles during rush hour
- Road repair near C-6 interchange

TG003 Gen. Luna Street – Tuktukan



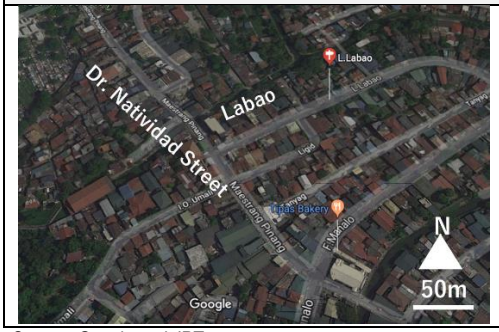
- No traffic lights. Existence of commercial establishment
- Heavy volume of vehicles during rush hour
- Road repair near C-6 interchange

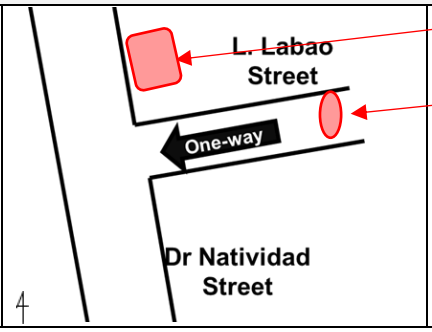
TG004 F. Manalo Street – F. Manalo Street



- No traffic lights. Existence of commercial establishment
- Heavy volume of vehicles during rush hour
- Road repair near C-6 interchange

TG005 Dr. Natividad Street – Labao

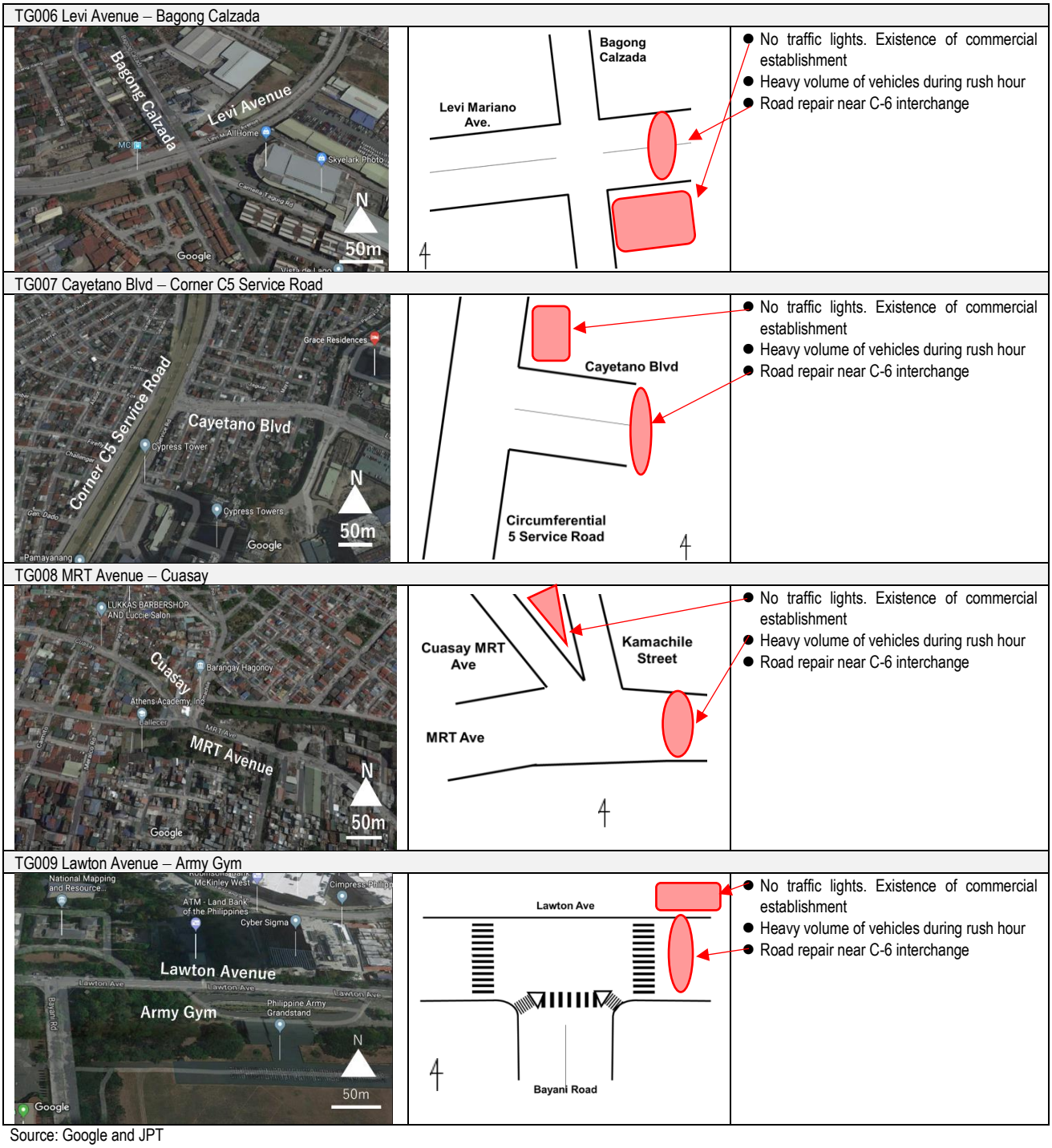




- No traffic lights. Existence of commercial establishment
- Heavy volume of vehicles during rush hour
- Road repair near C-6 interchange

Source: Google and JPT

Figure 2.67: Characteristics of Traffic Bottlenecks in Taguig City (1)



Source: Google and JPT

Figure 2.68: Characteristics of Traffic Bottlenecks in Taguig City (2)

17) Valenzuela City

(a) **Physical Issues on Traffic Bottlenecks:** Traffic signal especially for pedestrians is not installed at almost all intersections. Pedestrian facilities must be improved.

(b) **Cause of Traffic Bottlenecks:** Five causes: mixed traffic with pedestrians, unruly driving behavior, boarding/ alighting practice of PUJs at intersections, saturated demand and illegal roadside parking comprise approximately 80% of the causes. This is the most average characteristics among 17 LUGs.

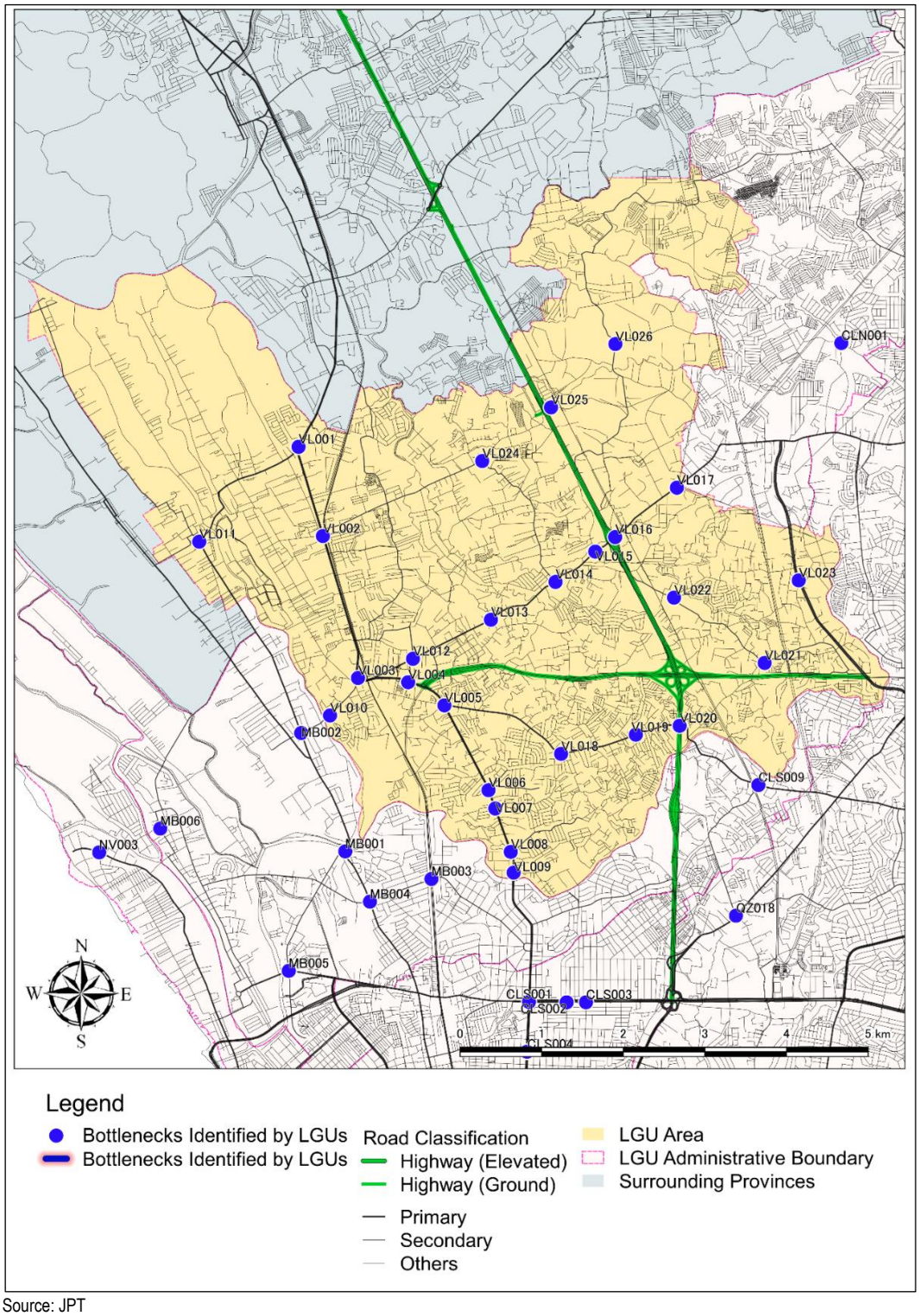
(c) **Improvement Measure Planning:** Measure plans by all way, infrastructure, safety facilities and enforcement are prepared at almost all intersections.

(d) **Evaluation of Implemented Measures:** Evaluation of measure plans by all way, infrastructure, safety facilities and enforcement are implemented at almost all intersections.

(e) **Human Resources and Understanding of LGU's Responsibility:** No data is available on human resources and understanding of LGU's responsibility.

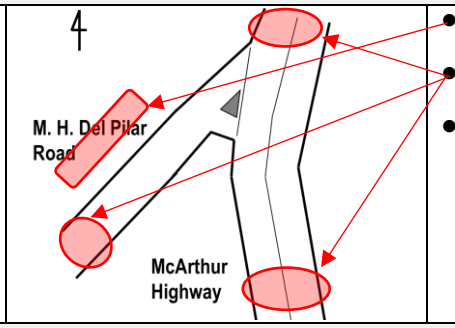
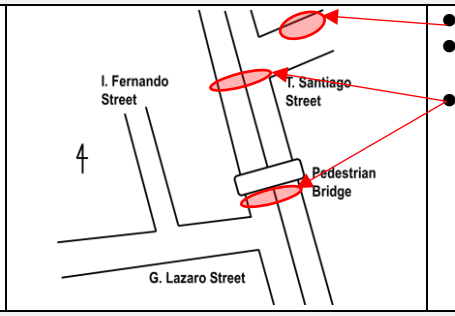
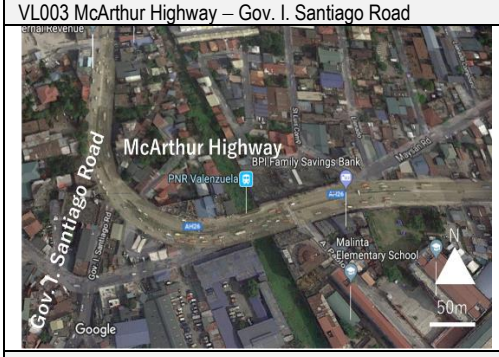
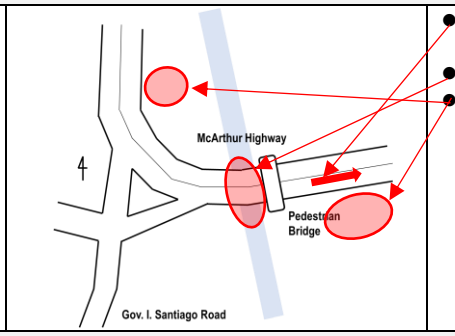
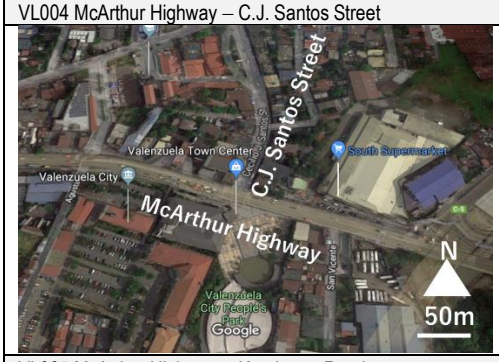
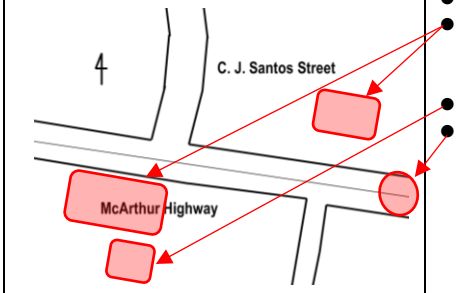
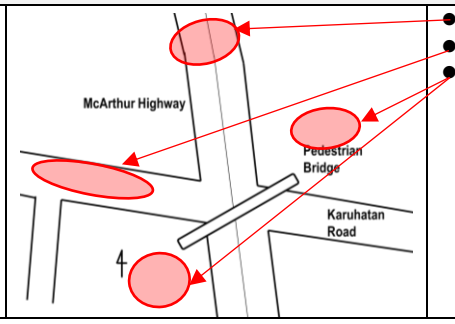
(f) **Budget and Positiveness:** No data is available on budget. LGU's response to the questionnaire was comparatively slow. Several data are still missing.

(g) **List of Traffic Bottlenecks Identified by Valenzuela City:** Figure 2.69 shows the location of the traffic bottlenecks in Valenzuela City. A total of 26 traffic bottlenecks were identified based on the questionnaire survey. Figure 2.70 to Figure 2.75 show the characteristics of traffic bottlenecks in Valenzuela City.



Source: JPT

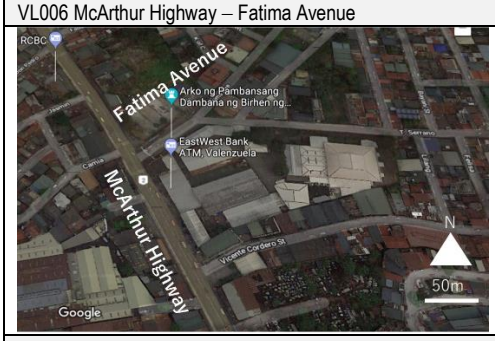
Figure 2.69: Location of Traffic Bottlenecks in Valenzuela City

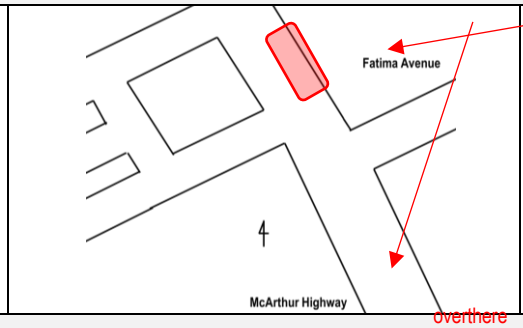
VL001 McArthur Highway – M.H. Del Pilar Road		
		● Toda & Poda Terminal along M.H. Del Pilar road ● The distance of Y-junction to other roads is too close. ● Heavy commercial area
VL002 McArthur Highway – G. Lazaro Street		
		● Market nearby ● The distance of Y-junction to other roads is too close. ● Existence of two traffic light
VL003 McArthur Highway – Gov. I. Santiago Road		
		● Serves as passageway of all vehicles going to Malabon City. ● Narrow bridge nearby ● Near public schools
VL004 McArthur Highway – C.J. Santos Street		
		● Occasional traffic situation. ● Near commercial establishment (South Supermarket and Valenzuela Town Center) ● Near City Government Facilities ● Near NLEX Segment 9 & 10 entry/exit point.
VL005 McArthur Highway – Karuhatan Road		
		● Near NLEX Segment 9 entry/exit point ● Narrow & Stiff road curvature ● Near commercial establishments (Jeepney Market, Karuhatan Market)

Source: Google and JPT

Figure 2.70: Characteristics of Traffic Bottlenecks in Valenzuela City (1)

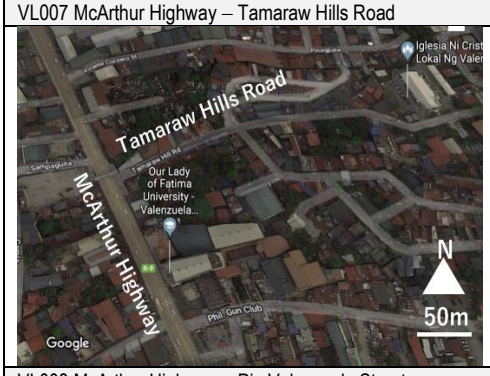
VL006 McArthur Highway – Fatima Avenue

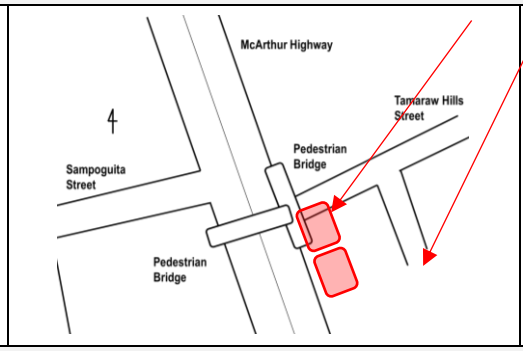




- Private Hospital & University nearby
- Heavy commercial & industrial area

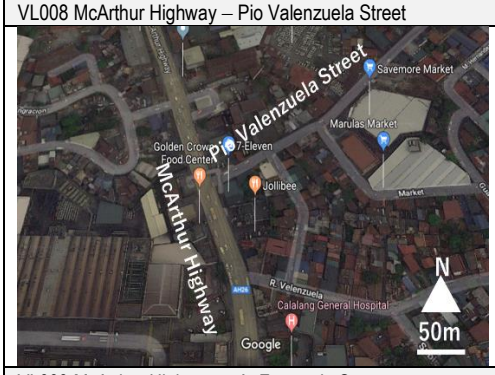
VL007 McArthur Highway – Tamaraw Hills Road

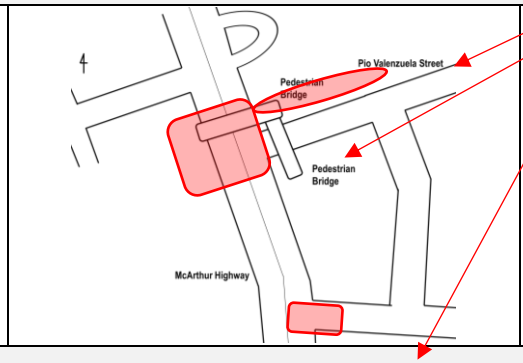




- Private Hospital & University nearby
- Heavy commercial & industrial area

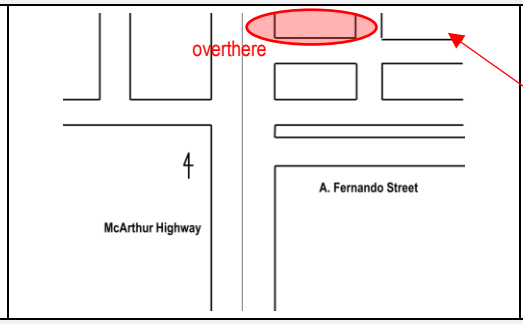
VL008 McArthur Highway – Pio Valenzuela Street





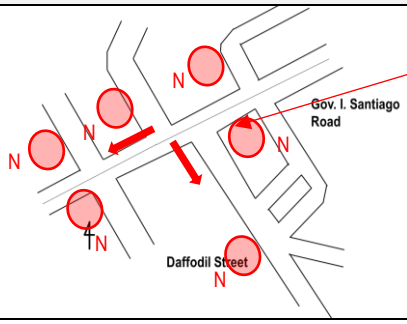
- Narrow going to Pio Valenzuela St.
- Existing pedestrian bridge
- Private Hospitals nearby
- Heavy commercial & industrial area

VL009 McArthur Highway – A. Fernando Street



- Occasional traffic directly affected by Malabon or Caloocan traffic situation.
- Industrial & commercial area
- Private Hospitals nearby

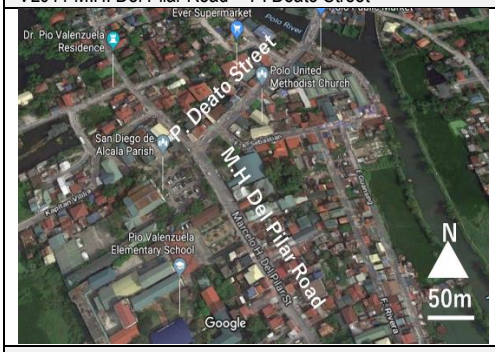
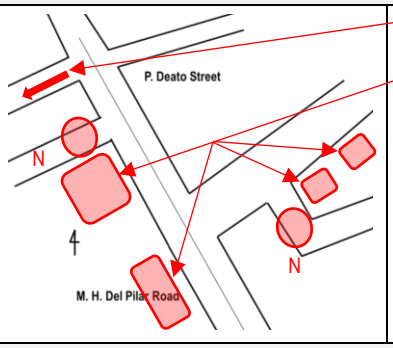
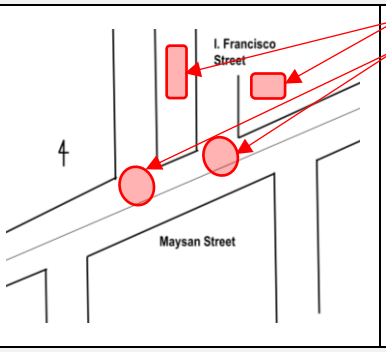
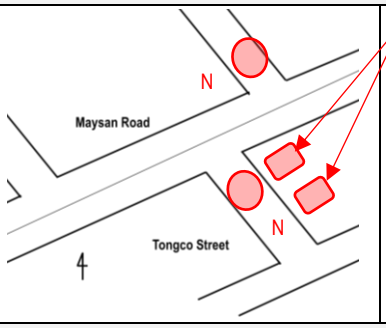
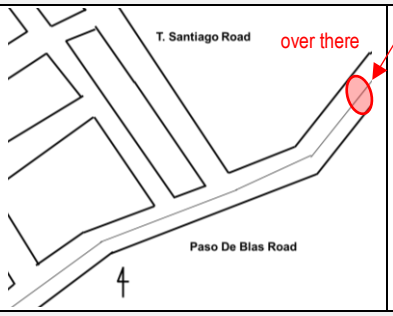
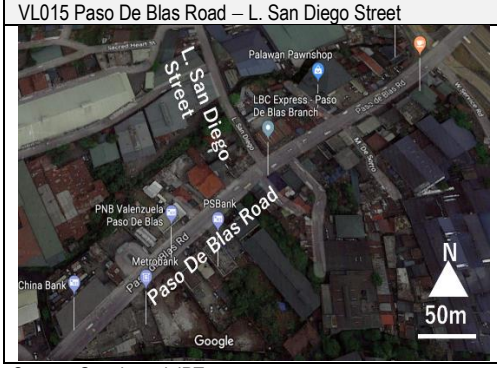
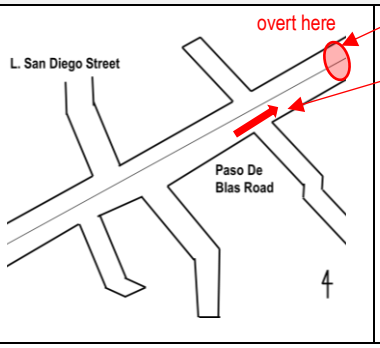
VL010 Gov. I. Santiago Road – Daffodil Street



- Narrow road
- Serves as passageway going to Malabon City.

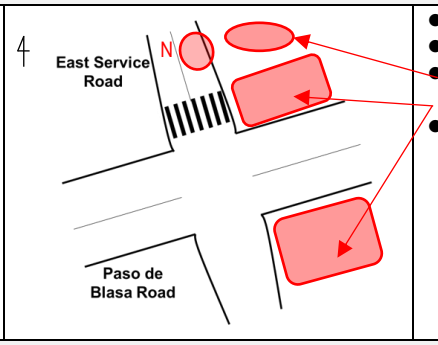
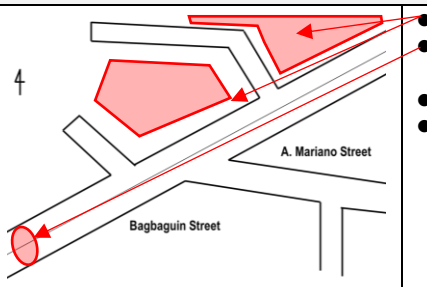
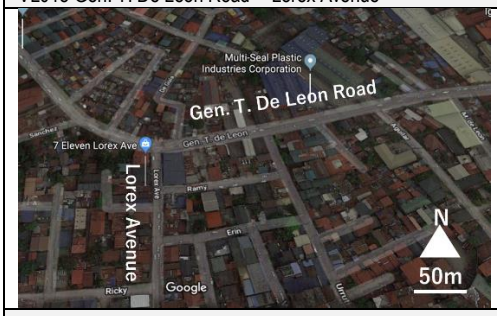
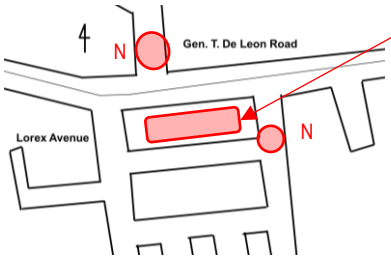
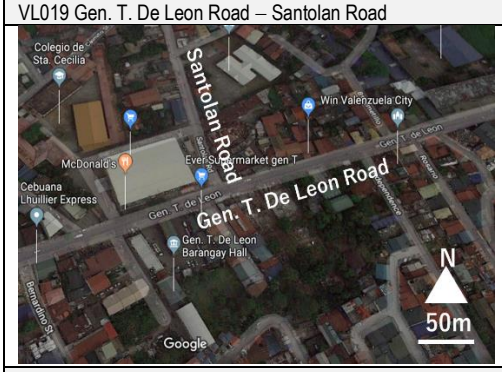
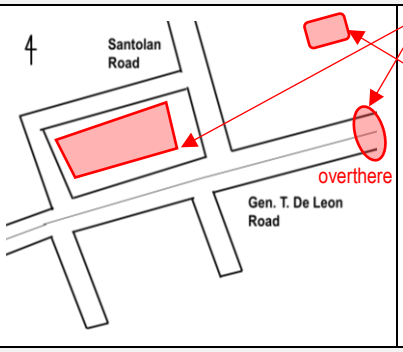
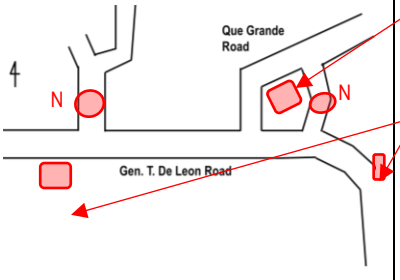
Source: Google and JPT

Figure 2.71: Characteristics of Traffic Bottlenecks in Valenzuela City (2)

VL011 M.H. Del Pilar Road – P. Deato Street		
		● Serves as passageway going to Obando area. ● Narrow road ● Schools & market nearby
VL012 Maysan Road – I. Francisco Street		
		● Private School & University nearby ● The distance of T. Junction to another is too close. ● Heavy commercial & industrial area
VL013 Maysan Road – Tongco Street		
		● Public School & University nearby ● Narrow road ● Heavy commercial & Industrial area
VL014 Paso De Blas Road – T. Santiago Street		
		● Valenzuela Gateway Complex Central Integrated Terminal nearby ● Serves as passageway going to Novaliches area & NLEX entry/ exit point.
VL015 Paso De Blas Road – L. San Diego Street		
		● Valenzuela Gateway Complex Central Integrated Terminal nearby ● Serves as passageway going to Novaliches area & NLEX entry/exit point.

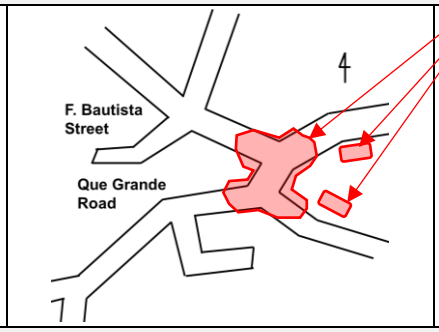
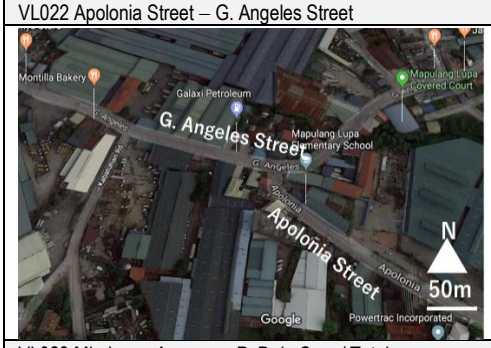
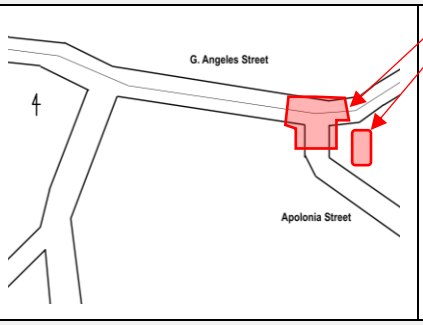
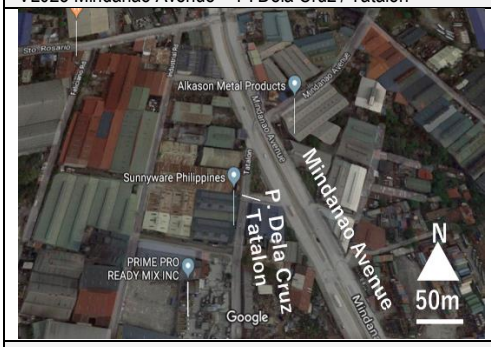
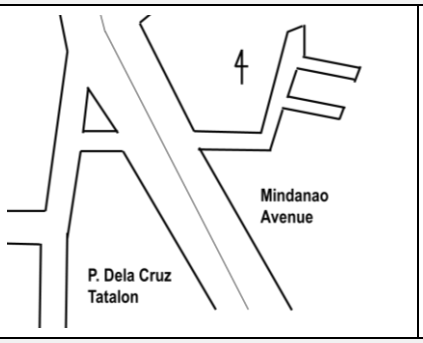
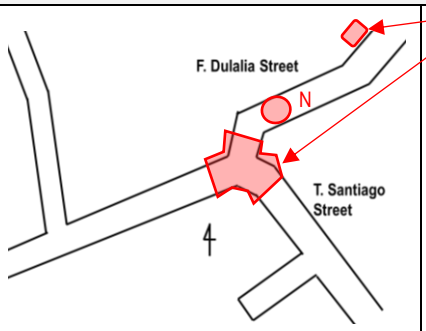
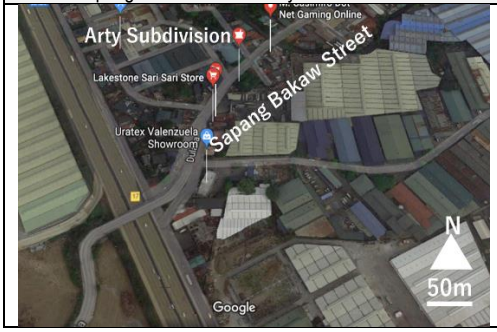
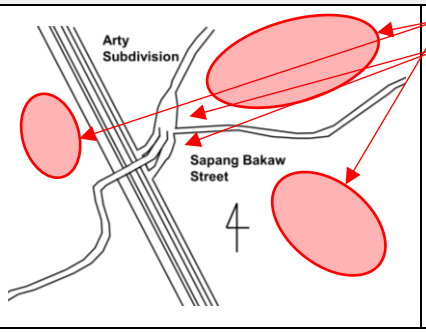
Source: Google and JPT

Figure 2.72: Characteristics of Traffic Bottlenecks in Valenzuela City (3)

VL016 Paso De Blas Road – East Service Road		
		● Near NLEX entry/exit point ● Narrow service road ● VGC Interim Public Utility Vehicle (P.U.V.) Terminal nearby ● Heavy residential & industrial area.
VL017 Bagbaguin Road – A. Mariano Street		
		● Residential & commercial area ● Serves as passageway in & out of Valenzuela City. ● Near NLEX entry/exit point. ● Heavy Industrial area
VL018 Gen. T. De Leon Road – Lorex Avenue		
		● Narrow road ● Near Toda Terminal ● Industrial & residential area ● Wet & Dry Market nearby
VL019 Gen. T. De Leon Road – Santolan Road		
		● Presence of Malls & junctions ● Mix of commercial & industrial area. ● Private schools nearby
VL020 Gen. T. De Leon Road – Que Grande		
		● Narrow road ● Near Tricycle Operators and Drivers' Association (TODA) terminal ● Serves as passageway going to Quezon City area & Valenzuela proper. ● Private Schools & Wet & dry Market nearby

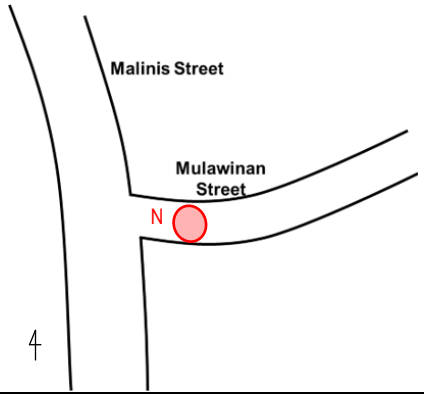
Source: Google and JPT

Figure 2.73: Characteristics of Traffic Bottlenecks in Valenzuela City (4)

VL021 Que Grande Road – F. Bautista Street		
		● Blind spot T-junction ● Public School nearby ● Heavy Industrial & residential area
VL022 Apolonia Street – G. Angeles Street		
		● Blind spot Y-Junction ● In front of a public school building ● Mix of residential & Heavy Industrial area
VL023 Mindanao Avenue – P. Dela Cruz / Tatalon		
		● Mix of residential & heavy industrial area ● Occasional traffic volume
VL024 T. Santiago Street – F. Dulalia Street		
		● Near Public High school campus ● Blind spot ● Narrow & steep Y-Junction ● Mix of residential & heavy industrial area
VL025 Sapang Bakaw Street – Arty Subdivision		
		● Heavy industrial area ● Blind spot narrow road ● Truck/s alternate route due to truck ban along Maysan road to Gen. Luis road

Source: Google and JPT

Figure 2.74: Characteristics of Traffic Bottlenecks in Valenzuela City (5)

VL026 Malinis Road – Mulawinan Street		
		● Narrow road ● Heavy industrial area ● Truck/s alternate route due to truck ban along Maysan road to Gen. Luis road.

Source: Google and JPT

Figure 2.75: Characteristics of Traffic Bottlenecks in Valenzuela City (6)