4.4 PRELIMINARY DESIGN OF TRAFFIC MANAGEMENT PROGRAM

4.4.1 Bus Priority System Plan

This section discusses the bus priority system by introducing a median bus lane system, the bus priority signal light system and the improvement of bus stops and terminals.

(1) General

Buses are one of the most space-efficient and cost-efficient means of transporting large numbers of people. In Cairo, where road traffic volume is high in relation to road capacity, buses suffer from the congestion and delay caused by other road users. Priority measures are required to release buses from traffic congestion and to improve the bus system itself. Passenger demand exceeds the bus supply in the current system, especially in the peak periods. The current buses are not comfortable for travel. In order to divert car owners to public transport, it is necessary to improve the service level through concrete measures,. Therefore, it is highly recommended that the bus commercial speed and service frequency should be improved by introducing bus priority system links to decrease the waiting time at bus stops. It is also indispensable to maintain bus punctuality from the reliability point of view. The bus priority system will be proposed on Port Said St., Salah Salem St. and Ahram St., the installation of the median bus lane system on Malek Feisal St. should be avoided due to insufficient road space.

(2) Objectives and Planning Approach

Public transport requires space for many types of facilities; and a high priority for public space usage for bus facilities must be given for the new bus system. The purpose of a bus priority system is to realize punctual public transportation, improve convenience for bus users and promote car owners to use public bus transportation, giving priority to bus transportation. By implementing the system, public transportation will become more dominant, road traffic will be reduced, and the traffic flow will become more efficient. The bus priority system is comprised of the Median Bus Lane System (An example of the median bus lane system for Bogota City in the Republic of Colombia is presented in Appendix A.), the Bus Priority Signal light System (refer to the relevant section "Plan of Traffic Signal Control System") and Improvement of Bus Stops/or Terminals.

(3) Plan Locations

The plan for the bus priority system in the study area involves the five (5) following streets.

- Port Said Street: Ring Road - Yoosef El Sebaey St. (19.4km)

- Qalaa Street: Port Said St. - Salah Salem St. (2.6km)
- Salah Salem Street: Sayeda Aisha Br. - Ahram St. (5.7km)
- Ahram Street: Salah Salem St. - Mansooreya Road (7.2km)
- Malek Feisal Street: Mansooreya Road - Nady St. (8.0km)

(4) Facility Plan

This section deals with the main design of the bus priority system, with a review of the road conditions and the traffic flow conditions. The facility plan is comprised of the installation of median bus lanes, bus priority signal lights, and the design of bus stop stations and bus terminals.

1) Median Bus Lane System

System Functions and Concept

The median bus lane system supplies good performance as part of a Busway. The median bus lane system involves construction in central lanes where schemes should be fully segregated from other traffic by "paint and sign" and curbs or fences. Sheltered bus stops are provided on median strips located at the entrance of signalized intersections. In order to ensure the smooth operation of the median bus lane system at major intersections, bus priority signals are installed and traffic signals are provided for individual lanes of bus and other traffic, indicating direction of vehicle traffic flow. With the aim of facilitating the operation of bus services while ensuring a smooth flow of buses, traffic signal lights are synchronized using a bus priority signal light system. To ensure a smooth flow of buses, and the establishment of an average bus stop interval of 800-1,000 m like an ordinary urban railway, the average operating speed target is approximately 25km/h. The main advantages of the median bus lane system are:

- Buses will be unaffected by road congestion;
- Buses will be capable of travelling at a scheduled speed that far exceeds that of a conventional bus;
- It will only incur a small development cost as the existing road infrastructure is suitable for bus;
- The necessary construction period will be short, with a possibility of commencing operation before the completion of exclusive lanes throughout the route;
- Considerable transportation capacities can be obtained through the adoption of large capacity vehicles (e.g. articulated bus);
- A switch to other systems, which may be necessitated in the future by demand growth, will be relatively easy;
- Conventional techniques can be used as far as bus operations are concerned, and
- The loss of middle lanes to a median bus lane service will result in a reduction in the overall level of motor vehicle traffic.

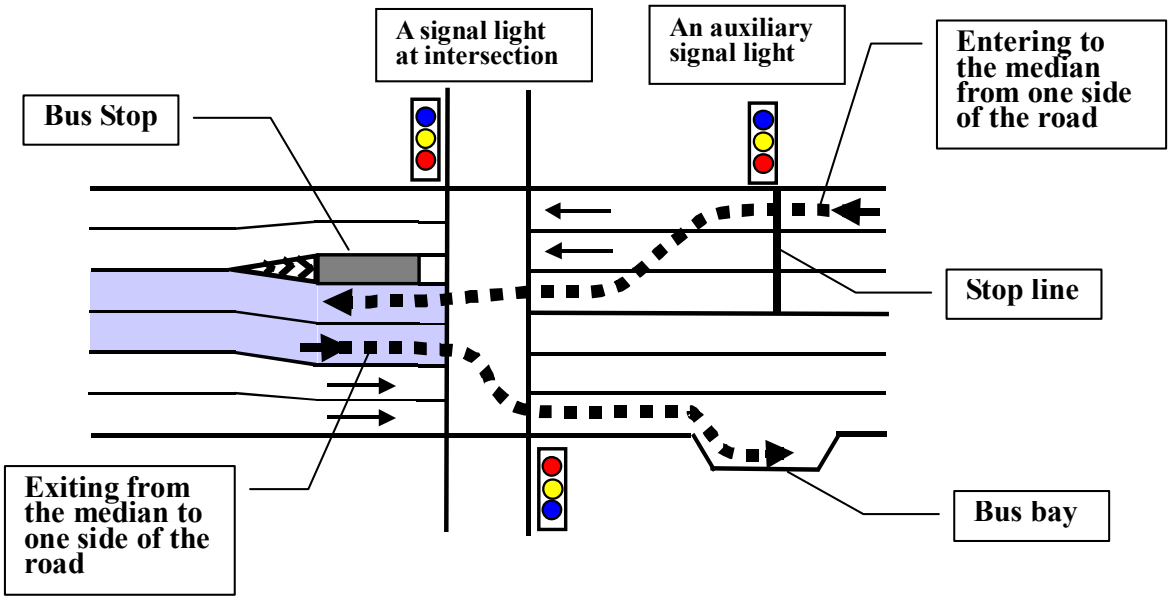
a. Bus Track System of Median Bus Lane

In the Study, the bus track for a median bus lane is located along an existing right-of-way. For an existing right-of-way, the bus track is generally planned both in the center of the road (median) and along the sides (lateral), depending on the road width. The type of bus track system was selected based on the existing road width. In determining the sections for the installation of a middle-lane traveling system, the following criteria was used:

Criteria for determining sections of middle-lane traveling system:

1. Possible to secure 2-lanes for median bus lane and 4-lanes for other vehicles; and
2. It will be unaffected by on-street parking vehicles, or on-street parking can be prohibited.

For change of lanes when buses exit from the median to one side of the road, the bus priority signal gives a phasing for buses at signalized intersection. On the other hand, when buses enter to median from one side of the road, buses change lane by controlling an auxiliary signal light at roadside. Figure 4.4.1 illustrates how buses will change lanes safely to/from the median side of the road.



Source: JICA Study Team

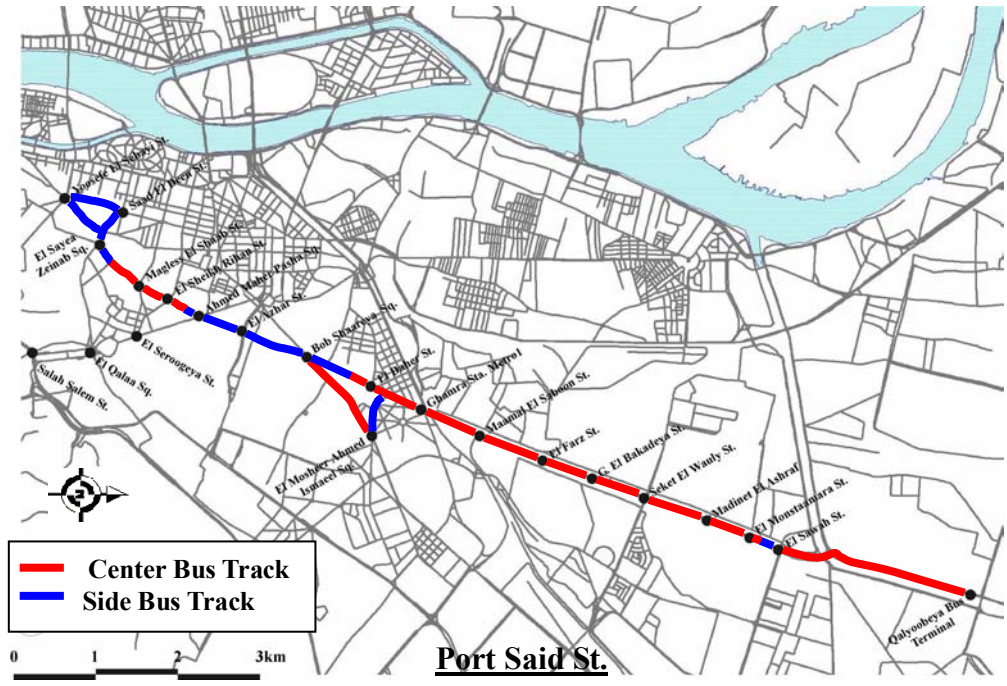
Figure 4.4.1 Illustration of Traveling System

The track system of the median bus lane is shown in Table 4.4.1 and Figure 4.4.2 (1)(2).

Table 4.4.1 Design Streets of Median Bus Lane by Type of Bus Track

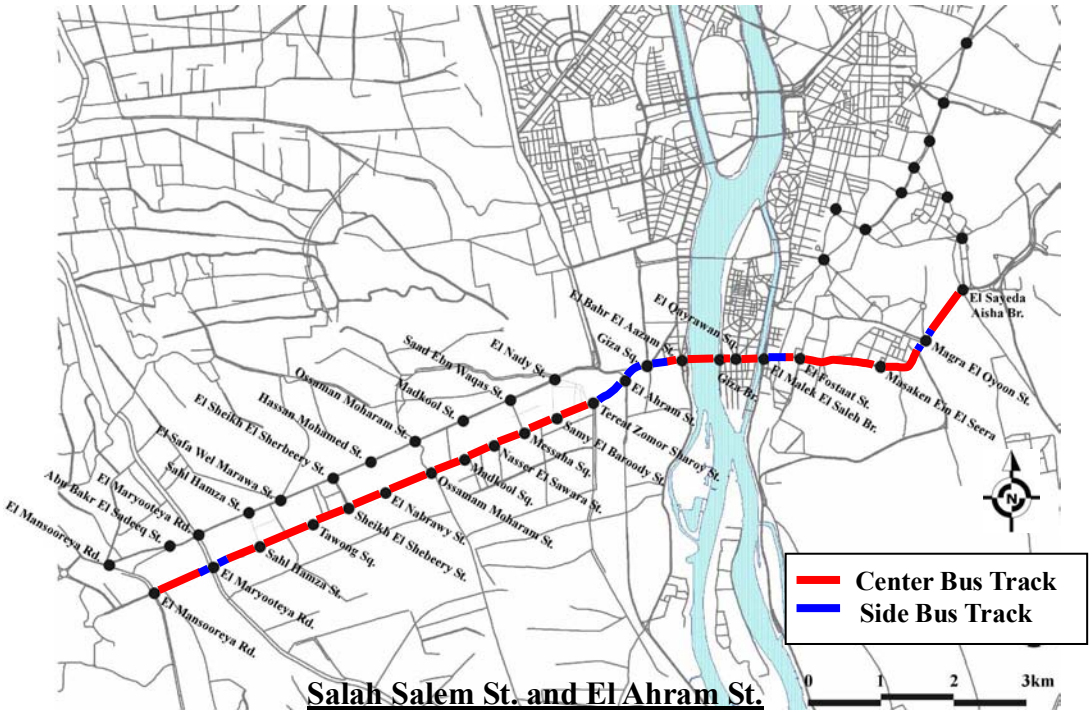
Name of Street	Section	Type of Bus Track		
		Distance (km)	Center	Sides
Port Said	Ring Road-Qalyobeya B.T	4.20		o
	Qalyobeya B.T-Sawah St.	2.75	o	
	Sawah St.-0.11km before Monstaamara St.	0.29		o
	0.11km before Monstaamara St.-0.3km after Daher St.	5.51	o	
	0.30km after Daher St.–0.29km after Ahmed Maher Pasha Sq.	2.28		o
	Bab El Shaareya Sq.-Mosheer Ahmed Ismail Sq.	1.27	o	
	Mosheer Ahmed Ismail Sq.-Port Said St.	0.63		o
	0.29km after Ahmed M Pasha Sq.-0.31km after Magles El Shaab St.	0.89	o	
	0.40km before Magles El Shaab St.-Yoosef El Sebaey St.	2.57		o
Salah Salem	Sayeda Aisha Br.-0.3km before Magra El Oyoon St.	0.89	o	
	0.3km before/after Magra El Oyoon St.	0.60		o
	0.3km after Magra El Oyoon St.-0.15km after Fostat St.	1.84	o	
	0.15km after Fostat St.-0.11km after Malek El Saleh Br.	0.47		o
	0.11km after Malek El Saleh Br.-0.16km after Bahr El Aazam St.	1.20	o	
	0.16km after Bahr El Aazam St.-entrance of Ahram St.	0.68		o
Ahram	Entrance of Ahram St.-Tereat El Zomor El Sharqy Road	0.59		o
	Tereat El Zomor El Sharqy Road-0.29km before Maryoteya Road	5.43	o	
	0.29km before Maryoteya Road-0.29km after Maryoteya Road	0.58		o
	0.29km after Maryoteya Road -Mansooreya Road	0.60	o	

Source: JICA Study Team



Source: JICA Study Team

Figure 4.4.2 (1) Plan for Bus Track System of Median Bus Lane System



Source: JICA Study Team

Figure 4.4.2 (2) Plan for Bus Track System of Median Bus Lane System

b. Typical Cross Section on Median Bus Lane

Usage of Bus Track and Segregation

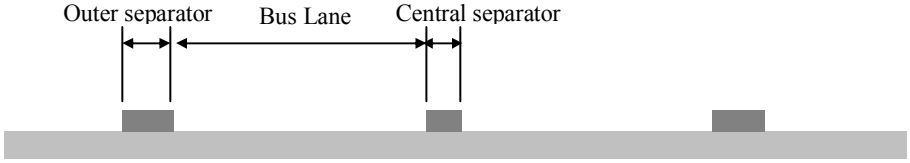
The proposed median bus lane system physically segregates buses and other traffic by using fence curbs. As for the median lanes, bus operation speeds on such lanes are faster than for the lateral lanes. In general, a segregated bus lane decreases turbulence for both the traffic flow of buses and other vehicles (especially shared taxis). It, therefore, often increases speeds of not only buses but of other vehicles in other lanes as well.

Securing the safety of bus operations when buses stop due to engine trouble or puncture is important. The segregation by fence curbs will be provided by setting open section intervals at 500 meters on average, and these open section intervals are also segregated by a temporary fence with a length of at least 12.0m.

The width of a median bus lane depends on the design speed, vehicle width and operational characteristics. The width of a bus lane on the study roads is classified into 2 ranks, ranging between 3.25 and 3.50 meters. Table 4.4.2 gives proposed lane widths for the median bus lane system, in order to carry in excess of 60 buses per hour, according to design speeds.

Table 4.4.2 Proposed Cross-Section Width for Median Bus Lane

Design Speed (km/h)	Width (m)		
	Bus Lane (m)	Central Separator (between bus lanes) (m)	Outer Separator (between bus lane and other vehicles lane) (m)
70-80	3.50-3.75	0.30-0.40	0.30-0.50
40-60	3.00-3.25	0.30-0.40	0.20-0.30



Source: JICA Study Team

Typical Cross Section of Median Bus Lane by Study Road

Port Said Street

The existing right-of-way ranges between 17.0 and 24.0 m wide, and consists of either 4-lanes or 6-lanes. This road will be generally planned both in the center of the road and along the sides, depending on the road width.

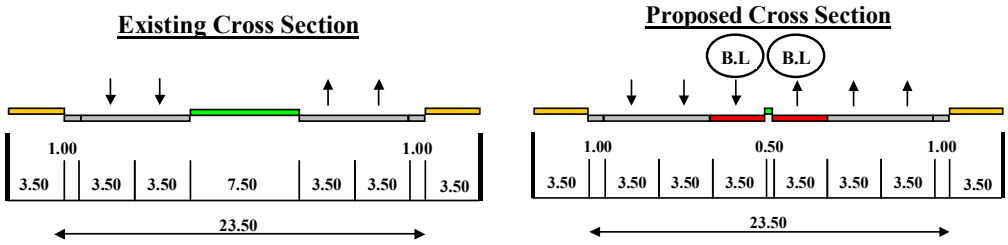
In the section of 6-lane per two directions, the bus lane is located in the center of the road, the sections are: Qalyobeya B.T-Sawah St., 0.11km before Monstaamara St.-0.3km after Daher St., Bab El Shaareya Sq.-Mosheer Ahmed Ismail Sq., and 0.29km after Ahmed M Pasha Sq.-0.31km after Magles El Shaab St.. In the section of 4-lane per two directions, buses will be used in the side lane with other vehicles (referred to as a "mixed lane"), and the bus priority system is not specified in order to avoid turbulence from parked vehicles on the sides. They are: Ring Road-Qalyobeya B.T, Sawah St.-0.11km before Monstaamara St., 0.30km after Daher St.–0.29km after Ahmed Maher Pasha Sq., Mosheer Ahmed Ismail Sq.-Port Said St., and 0.40km before Magles El Shaab St.-Yoosef El Sebaey St.. The typical cross section for the median bus lane is established as follows (See Figure 4.4.3 to Figure 4.4.5).

- Section Qalyobeya B.T-entrance of Amireya bridge: 1-lane median bus lane per direction in the center of the road is provided. It is necessary to use the whole median in order to provide 2-lanes for a median bus lane.

- Section entrance of Amireya bridge-Magles El Shaab St.: 1-lane median bus lane per direction in the center of the road is provided.

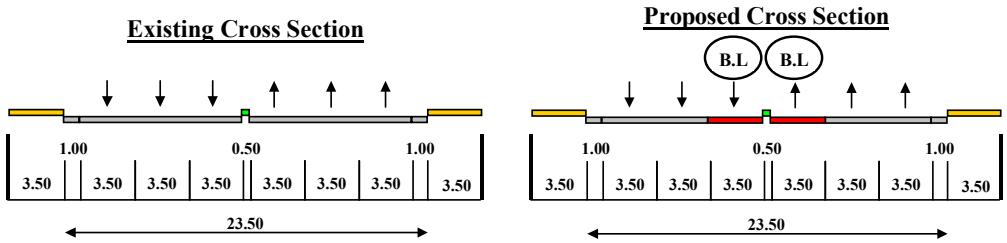
- Section Daher St.-Bab El Shaareya Sq.: 1-lane median bus lane in the center of the one-way road is provided.

- Section Bab El Shaareya Sq.-Mosheer Ahmed Ismail Sq.: 1-lane median bus lane in the enter of the one-way road is provided.



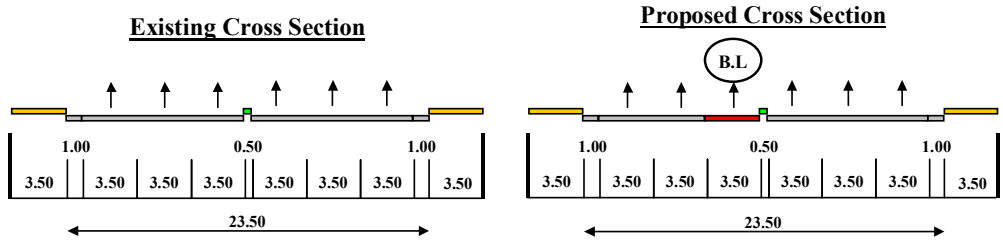
Source: JICA Study Team

Figure 4.4.3 Typical Cross Section between Qalyobeya B.T. and Amireya Bridge



Source: JICA Study Team

Figure 4.4.4 Typical Cross Section between Amireya Bridge and Magles El Shaab St.



Source: JICA Study Team

Figure 4.4.5 Typical Cross Section between Daher St. and Bab El Shaareya Sq. & Between Bab El Shaareya Sq. and Mosheer Ahmed Ismail Sq.

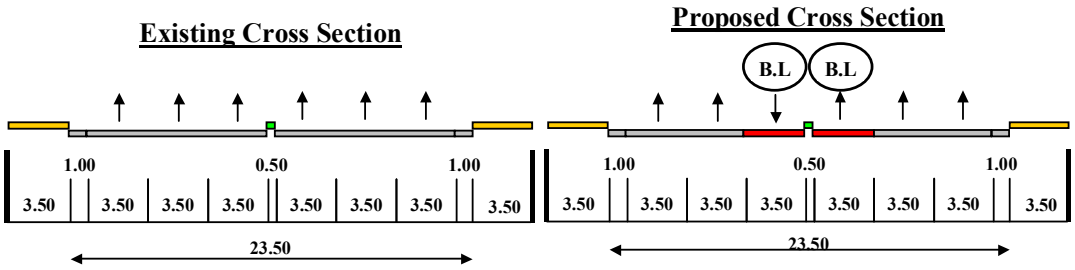
Currently, the section between Daher St. and Bab El Shaareya Sq. on Port Said St. is operated by a one-way system. The proposed track system is based on one-way regulation. The alternative of a track system for the median bus lane system can be proposed by introducing the following system.

Alternative A

Alternative A adopts the median bus lane per direction in the center of the road, based on the current one-way traffic regulations. It is necessary to operate by using a contra-lane system. The typical cross section for a median bus lane is shown in Figure 4.4.6.

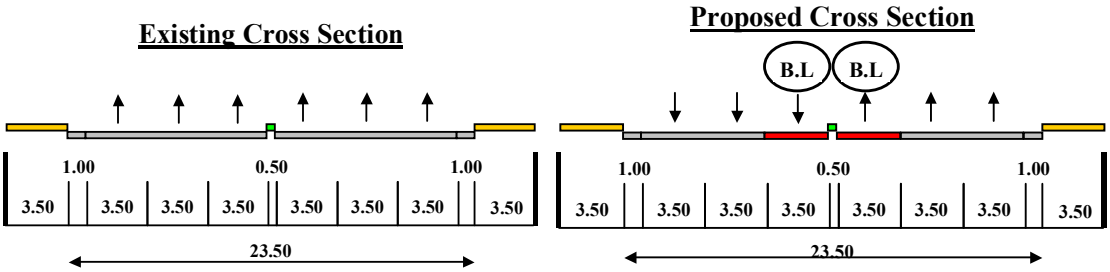
Alternative B

The median bus lane per direction is provided in the center of the road. It is necessary that the existing one-way system will be changed to a two-way road system. The typical cross section for the median bus lane is shown in Figure 4.4.7.



Source: JICA Study Team

Figure 4.4.6 Typical Cross Section for "Alternative A" between Daher St. and Bab El Shaareya Sq.



Source: JICA Study Team

Figure 4.4.7 Typical Cross Section for "Alternative B" between Daher St. and Bab El Shaareya Sq.

The Study Team recommends introducing effectiveness of traffic flow conditions and equipment facilities. The alternatives were evaluated in terms of vehicle traffic, traffic facilities, and pedestrian/passenger traffic as shown in Table 4.4.3. As a result of this evaluation, it was found that the proposed track system, which scored relatively well on all the evaluation items, is the more desirable. Under the proposed track system, the median bus lane system on Port Said between Daher and Bab El Shaareya Sq. will be operated.

Table 4.4.3 Evaluation for Alternatives of Track System on Port Said between Daher St. and Bab El Shaareya Sq.

Evaluation Item		Proposed Track system	Alternative A	Alternative B
From View of Vehicle Traffic	1. Efficiency of bus operating. 2. Conflict between buses and other traffic. 3. Effective use of traffic capacity for other traffic	**Strength** **Strength** **Strength**	**Strength** Weakness Weakness	**Strength** **Strength** Weakness
From View of Traffic Facilities	1. Maximal use of existing infrastructure. 2. Connection with bus stop on the median.	**Strength** **Strength**	**Strength** **Strength**	**Strength** **Strength**
From View of Pedestrian/ Passenger	1. Convenience of transferring 2. Safety of pedestrian/passenger for crossing at intersection.	**Strength** **Strength**	**Strength** Weakness	**Strength** **Strength**

Source: JICA Study Team

Salah Salem Street

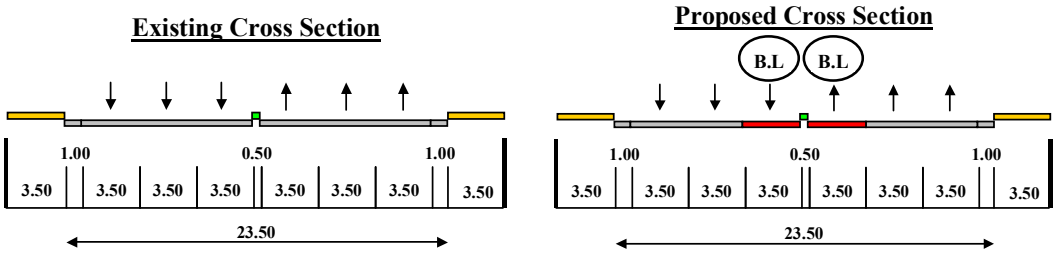
The existing right-of-way ranges between 19.0 and 22.0 meters in width, and consists of either 4-lanes or 6-lanes. This road will be generally planned both in the center of the road and along the sides, depending on the road width.

In the section of 6-lane per two directions, the bus lane is located in the center of the road, the sections are: Sayeda Aisha Br.-0.3km before Magra El Oyoon St., 0.3km after Magra El Oyoon St.-0.15km after Fostat St., and 0.11km after Malek El Saleh Br.-0.16km after Bahr El Aazam St.. In the section of 4-lane per two directions, buses will be used in a mixed lane, and a bus priority system is not specified where there is a section of flyover or underpass with 4-lanes road per two directions. They are: 0.3km before/after Magra El Oyoon St., 0.15km after Fostat St.-0.11km after Malek El Saleh Br., and 0.16km after Bahr El Aazam St.-entrance of Ahram St.. The typical cross section for the median bus lane is established as follows (See Figure 4.4.8 to Figure 4.4.10).

- Section Sayeda Aisha Br.-Magra El Oyoon St.: 1-lane median bus lane per direction in the center of the road is provided.

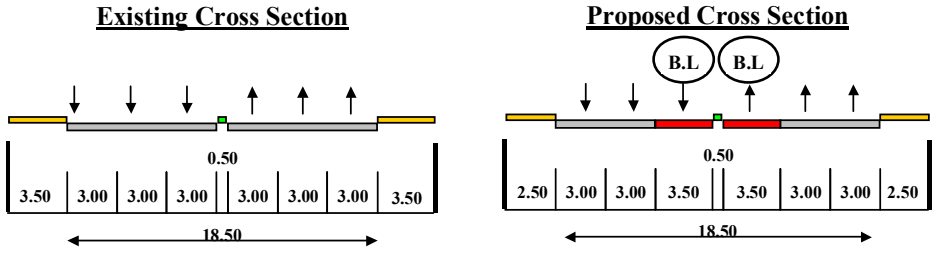
- Section Magrar El Oyoon St.-Fostat St: 1-lane median bus lane per direction in the center of the road is provided. It is necessary to widen 1.0m on both sides in order to provide a 3.50m-lane width per direction for the median bus lane.

- Section Malek El Saleh Br.-Bahr El Aazam St.: 1-lane median bus lane per direction in the center of the road is provided.



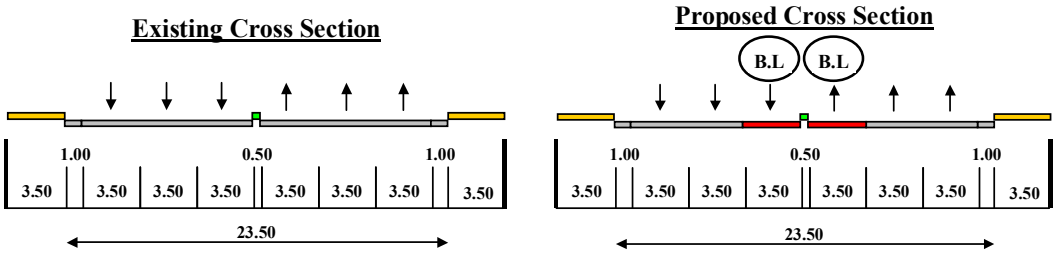
Source: JICA Study Team

Figure 4.4.8 Typical Cross Section between Sayeda Aisha Br. and Magra El Oyoon



Source: JICA Study Team

Figure 4.4.9 Typical Cross Section between Magra El Oyoon and Fostat St.



Source: JICA Study Team

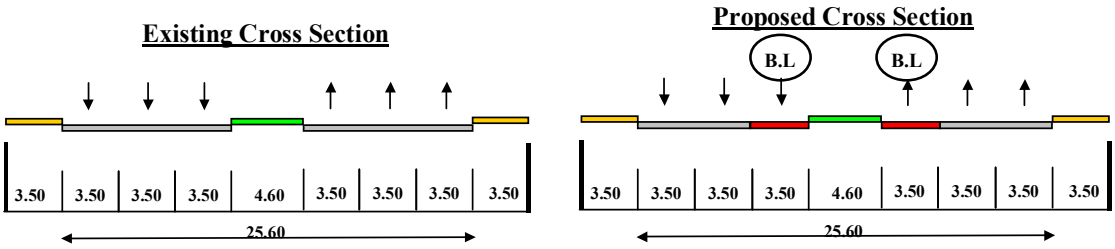
Figure 4.4.10 Typical Cross Section between Fostat St. and Ahram St.

Ahram Street

The existing right-of-way averages about 26.0 meters in width, and consists of 6-lanes. The median is about 4.6 meters wide. This road will be generally planned in the center of road, depending on the road width.

In the section of 6-lane per two directions, the bus lane is located in the center of the road, these sections are: Tereat El Zomor El Sharqy Road-0.29km before Maryoteya Road, and 0.29km after Maryoteya Road -Mansooreya Road. In the section on the flyover structure or underpass structure, the bus priority system is not specified, these sections are: Entrance of Ahram St.-Tereat El Zomor El Sharqy Road, and 0.29km before Maryoteya Road-0.29km after Maryoteya Road. The typical cross section for the median bus lane is as follows (See Figure 4.4.11).

- Section Tereat El Zomor El Sharqy Rd.-Mansooreya Rd.: 1-lane median bus lane per direction in the center of the road is provided.



Source: JICA Study Team

Figure 4.4.11 Typical Cross Section between Fostat St. and Ahram St.

c. Bus Stop

The locations and designs of bus stops have a major influence on operating efficiency and on passenger convenience. Planning of bus stops along a median bus lane system involves three major aspects i.e. the distance of the bus stop, location and the design of the bus stop.

Distance of Bus Stops

The distance between bus stops has a large influence on commercial speed. To ensure a smooth flow of buses, and to establish an average bus stop interval of 800-1,000 m as an ordinary urban railway, the average operating speed is targeted to be approximately 25 km/h. In addition, the locations of existing bus stop were considered in detail.

Locations of Bus Stops

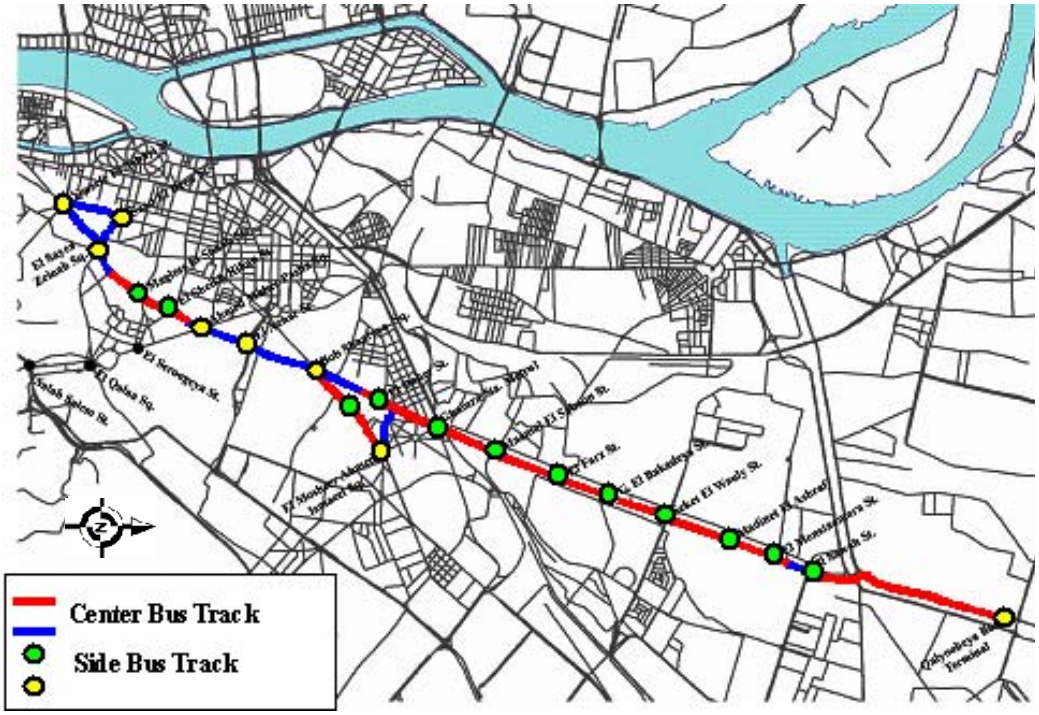
The plan of the locations of bus stop will be determined for the study roads, and for the important points with the most passengers, based on an analysis of the current situation. The locations of bus stops by road are shown in Figure 4.4.12. In determining the locations for installation of bus stops, the following criteria was used taking the current locations of bus stops into consideration:

- Average distance of bus stop ranges between 800 to 1,000 meters;
- Inter modal point between the Metro and railway;
- Heavy attraction and generation of passengers; and
- Major intersection.
- Design of Bus Stop

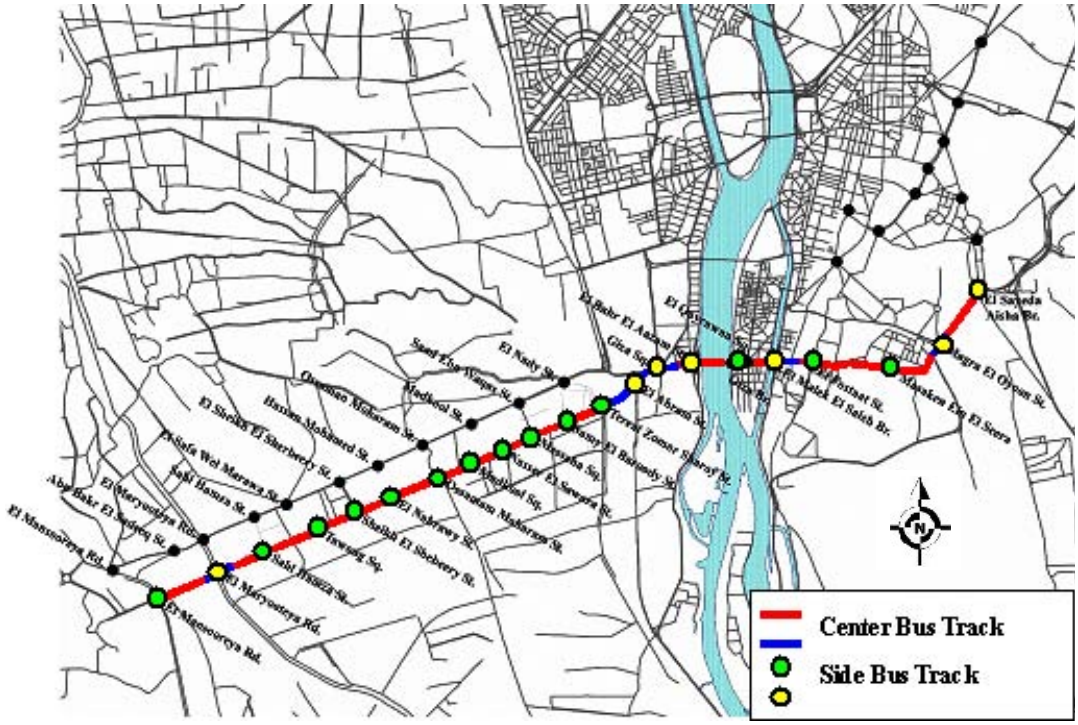
The basis for the design of bus stops are described below:

- Bus stops for the median bus lane system, on wide roads with 6-lanes, should be generally installed on the central part;
- On sections where road width is not sufficient, bus stops will be installed on curb lane along the roadside. In the case of such bus stops, the stopping area will be distinguished by road markings or a bus bay;
- Bus stops at signalized intersections will be located at the exit of the intersection; and
- In this context, two types of bus stops are considered for the median bus lane system, based on the conditions of road width and the parking situation.

Port Said St.



Salah Salem St. and Ahram St.

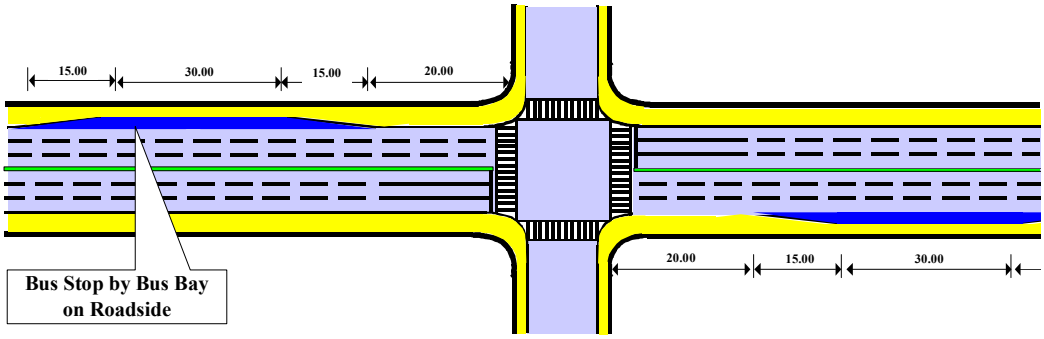


Source: JICA Study Team

Figure 4.4.12 Proposed New Bus Stop for Median Bus Lane System

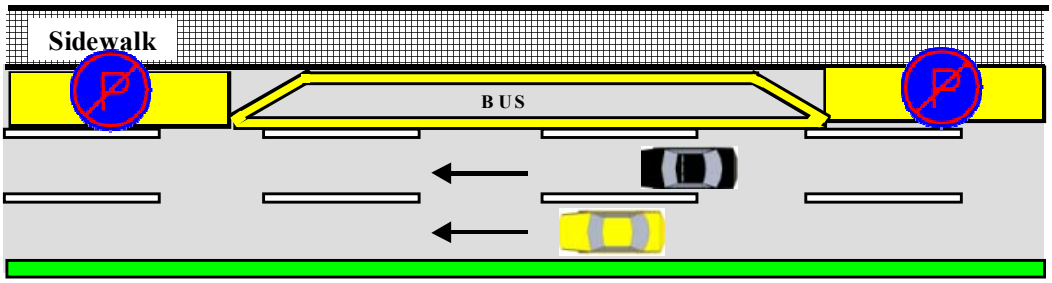
1. Type of Bus Stops by Road Marking or Bus Bay on Roadside

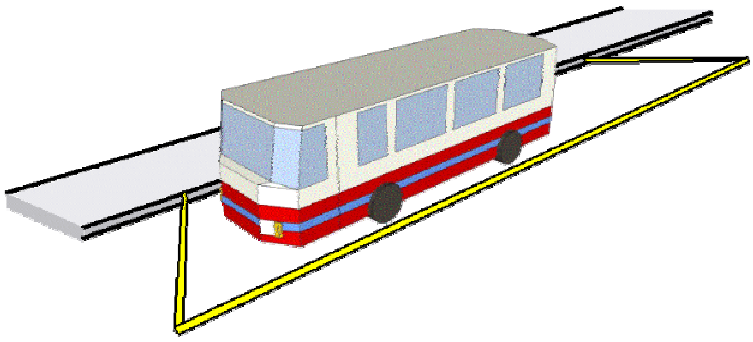
The simplest type of bus stop is where buses travel and stop in the curb lane. This type is classified into two types by introducing the segregation of a bus bay and markings. On the section where the sidewalk width is insufficient for providing a bay space, a bus stop will be separated by road markings. In addition, parking prohibition on the street in the affected area will be strongly enforced. Figure 4.4.13 and Figure 4.4.14 shows the type of bus stops on the roadside.



Source: JICA Study Team

Figure 4.4.13 Type of Bus Stops by Bus Bay



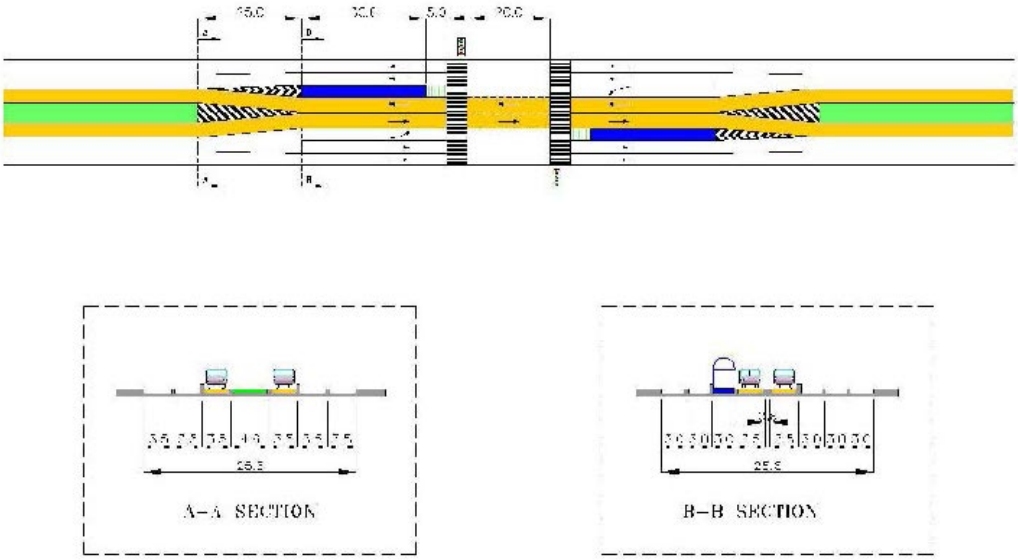


Source: JICA Study Team

Figure 4.4.14 Type of Bus Stops by Marking

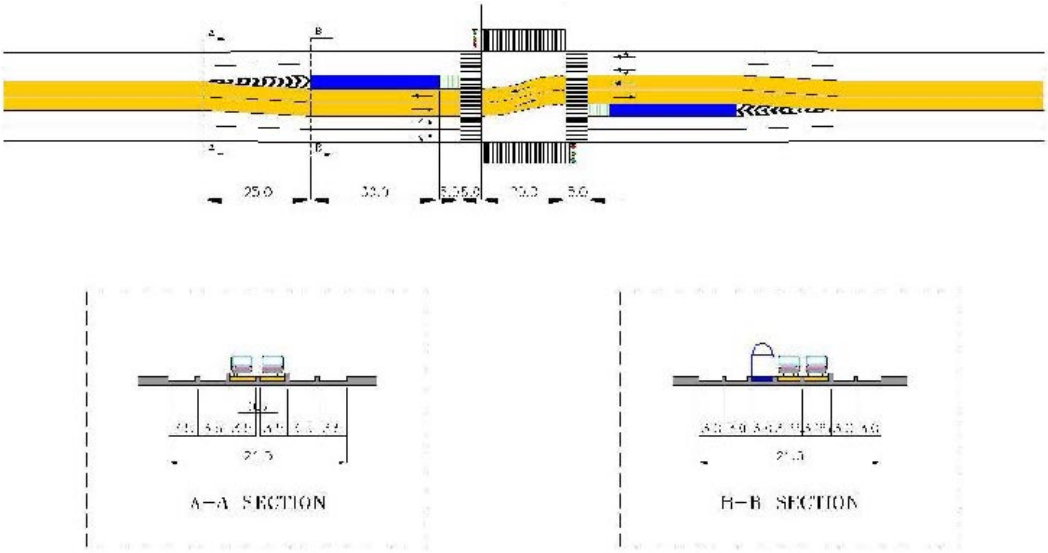
2. Type of Bus Stops in the Center of Road

In the case of bus stops for the median bus lane system on the median in a section, this type aims at separating bus traffic from other vehicle traffic. There are two types as follows: bus stop on a median section and bus stop at a signalized intersection. The type of bus stop on a median is shown in Figure 4.4.15, which covers Ghamra station on Port Said St. and most of the stations on Ahram St.. Signal light control should be installed for pedestrians crossing and U-turn vehicles. This type of bus stop at a signalized intersection is proposed on Port Said St. and Salah Salem St. (See Figure 4.4.16).



Source: JICA Study Team

Figure 4.4.15 Type of Bus Stop on Median Section (Ahram St.)

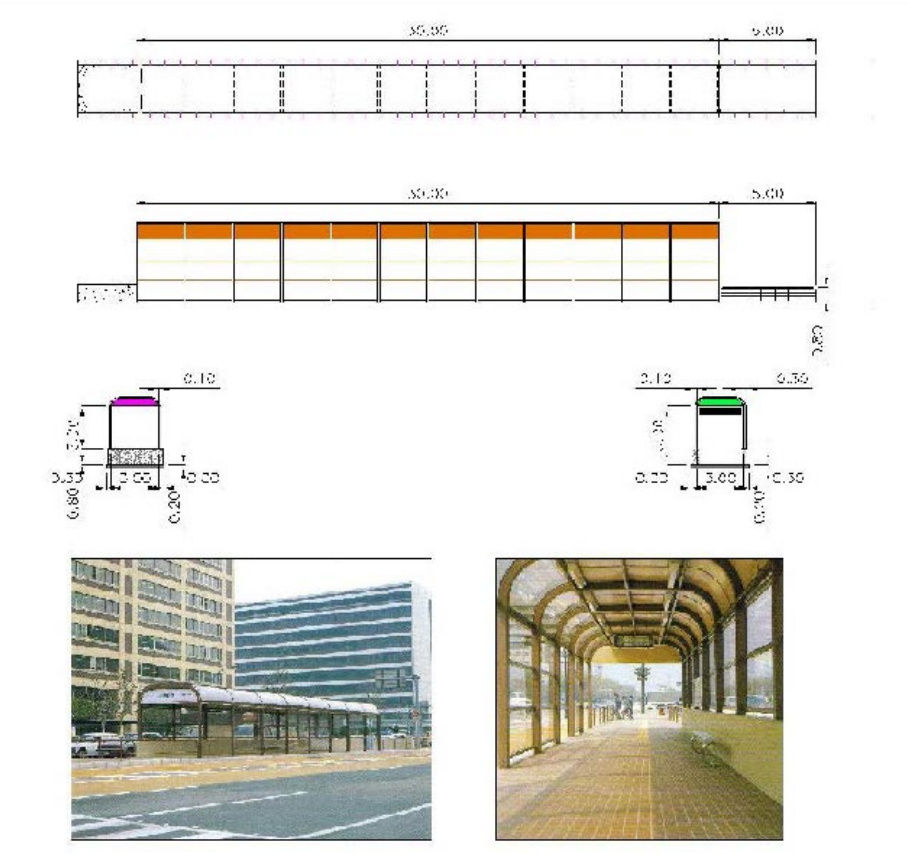


Source: JICA Study Team

Figure 4.4.16 Type of Bus Stop at Signalized Intersection (Port Said St.)

Plan of Bus Platform

Figure 4.4.17 shows the plan of the platform on a median bus lane. The length of the platform is to be 30 meters for stopping space for two buses at the same time. The accompanying facilities include a shelter and a bench.



Source: JICA Study Team

Figure 4.4.17 Plan of Bus Platform on Median Bus Lane

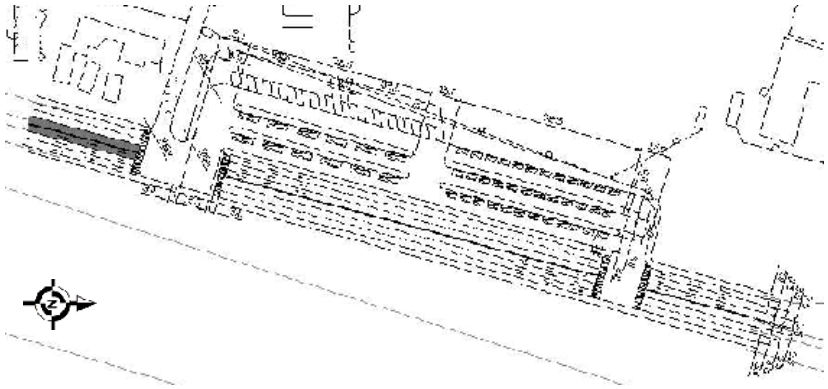
2) Improvement of Bus Stop and Terminal

As previously pointed out in the analysis of the current traffic status on Metro 4 Corridor, the most serious cause of the traffic congestion is the conflict of buses and shared taxies near a bus stop. Traffic congestion is caused by buses and shared taxies that occupy 2 lanes or 3 lanes for alighting and boarding passengers. Qalyobeya bus terminal and Ghamra station on Port Said are key bottlenecks where there is a conflict of buses and shared taxies near a bus stop. In order to mitigate the traffic congestion along Metro 4 Corridor, it is necessary to increase road traffic capacity through the improvement of bus stops and bus terminal facilities.

a. Improvement Plan for Qalyobeya Bus Terminal

At Qalyobeya bus terminal, transferring bus passengers can be seen on the street, which is a bottleneck point. Bus terminal facilities will be planned outside Port

Said St.. The number of berths and the area required was estimated, based on current conditions. The total number of berths for Qalyobeya bus terminal is 72 berths (local bus, 12 berths; shared taxi, 36 berths; taxi, 12 berths; and cars, 12 berths). The total land area required will be 9,500 square meters, the area of vehicle way and footway are: 3,500m^2, 6,000m^2 respectively. Figure 4.4.18 shows the plan of the bus terminal facility.

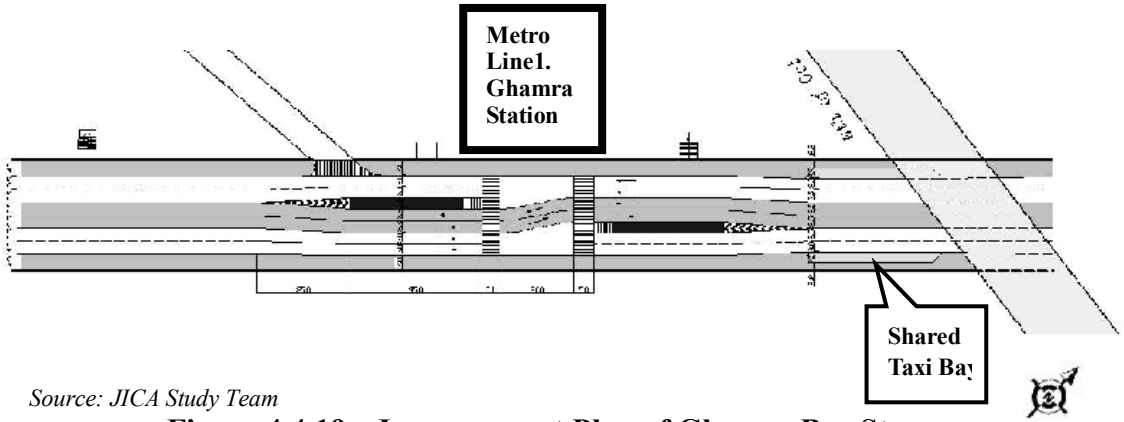


Source: JICA Study Team

Figure 4.4.18 Plan of Qalyobeya Bus Terminal Facility

b. Improvement Plan of Ghamra Bus Stop

Ghamra bus stop, in front of Metro 1 Station, is also bottleneck point due to the conflict of buses and shared taxies near a bus stop. The conflict between buses and shared taxies near a bus stop can be improved by the installation of a bus platform on the median bus lane. The signal light control should be installed for crossing pedestrians. In addition, a shared taxi bay on the roadside will be constructed for separating the affected area at the bus stop. Figure 4.4.19 shows the improvement plan for Ghamra bus stop.



Source: JICA Study Team

Figure 4.4.19 Improvement Plan of Ghamra Bus Stop

4.4.2 Plan of Traffic Signal Control System

This section discusses the improvement of the traffic signal control system by introducing the improvement of the traffic signal phase system, the installation of

traffic signal lights, the bus priority signal light system, the synchronized traffic signal light system and the independent traffic-actuated control system.

(1) General

During peak periods, most major signalized intersections were manually controlled by traffic policemen. This is because the current traffic congestion may be difficult to control under the existing system due to near-saturation conditions. However, this manual control is difficult to keep to signal synchronization and leads to long cycle times. In addition, traffic to and from side roads without traffic lights disturb the main traffic flows. In particular, traffic congestion at U-turn points is caused by conflicts between through traffic and entering traffic. Thus, the technical improvement of the signal control system at these bottlenecks will be necessary.

In order to ensuring a smooth bus operation, a bus priority signal light system should considered on the major bus routes, in accordance with the plan of the median bus lane system. The purpose of the bus priority signal control system is to realize punctual public transportation, improve convenience for bus users, and give priority to bus transportation. In the study, as a low cost solution, the bus priority signal light system for Metro 4 Corridor should be introduced using the method of a synchronized control system for bus priority signals and the independent traffic-actuated control system for bus priority.

(2) Objectives and Planning Approach

The objectives and the planning approach for the improvement of the traffic signal control system are as follows:

- The technical improvement of the signal control system[1], such as the synchronized system, the improvement of the traffic signal phase system and the bus priority system, to manage the signalized bottlenecks will be necessary instead of manual operation by traffic police.
- Non-signalized intersections and U-turn points will be considered for the installation of signals, in order to control both motor vehicles and pedestrian traffic, or such type of intersection will be improved using an adequate design.
- Pedestrian safety should be secured for crossing the road and also bus passengers. In order to improve pedestrian safety, a traffic signal phase for pedestrians and bus passengers should be designed.
- For suitable bus operation, it is necessary to shorten the stopping times at the intersections in order to maintain the punctual operating speed. Traffic signal systems should be considered to prioritize bus operation along the routes of the median bus lane system.

[1] Regarding to traffic data for the design of signal control system, twenty-one (21) locations including U-turn points on Metro 4 Corridor were selected for the vehicle traffic count survey as shown in Table 4.2.2. For the traffic data at the other major intersections, the results of traffic count survey on major locations conducted in the Master Plan were used.

The saturation flow rate at 56 target intersections was checked, and currently found that all of them indicate a value of "under-saturation", based on results of saturation flow rate at each intersection. The problem of the existing traffic congestion is caused by inadequate road capacity including the lack of well-developed traffic management. For instance, there are manual signal control systems used by traffic police, pedestrians cross the street ignoring signal lights, heavy traffic congestion near bus stops, traffic conflict at non-signalized intersections, a high occupancy of on-street parking. Therefore, in the short-term, the management of over-saturation was not highlighted in this study. Given the over-saturation, traffic management measures would not be effective and another substantial solution should be employed. However, in middle/long-term, owing to increase of traffic on Metro 4 Corridor, the traffic condition of over-saturation will come soon. Therefore, an Area Traffic Signal Control System should be proposed in order to manage the problem of over-saturation; in addition, public transport system such as Metro Line should be developed in order to induce commuters to shift from private vehicles to public transportation.

(3) Plan Locations

The plan of the bus priority system in the study area involves the following five streets.

- Port Said Street: Ring Road - Yoosef El Sebaey St. (19.4km)
- Qalaa Street: Port Said St. - Salah Salem St. (2.6km)
- Salah Salem Street: Sayes Aisha Br. - Ahram St. (5.7km)
- Ahram Street: Salah Salem St. - Mansooreya Road (7.2km)
- Malek Feisal Street: Mansooreya Road - Nady St. (8.0km)

(4) Facility Plan

1) Installation of Signal Lights

The installation of signal lights will be planned based on the proposed traffic management programs. The subject intersections are divided into the nine types shown in Table 4.4.4.

Table 4.4.4 Type of Intersection

Type				Approach	
				Major road	Minor road
A		With bus lane	(1)	6 lanes	6 lanes
		Without bus lane	(2)		
B-1	4-legs	With bus lane	(1)	6 lanes	4 lanes
		Without bus lane	(2)		
B-2	3-legs	With bus lane	(1)	6 lanes	4 lanes
		Without bus lane	(2)		
C				3-4 lanes	3-4 lanes
D		With bus lane	(1)	Median bus lane station points	
		Without bus lane	(2)	U-turn signal points	

Source: JICA Study Team

In total, traffic signal lights should be installed on fifty four intersections along the Metro 4 Corridor, based on the plan of the median bus lane system and the improvement plan for the intersection. Table 4.4.5 shows the locations for the installation of traffic signal lights.

2) System Functions and Control Concept

a. System Function

In accordance with the objectives, the improvement of the traffic signal control system requires the following functions:

- Traffic signal phase system: a multi-phase type system which sets one phase for one direction should be operated by a simple phase system, because the existing multi-phase type leads to a long cycle length and decreases traffic capacity.
- Installation of signal lights at non-signalized intersections and U-turn points including bus stops on the median bus lane system: based on the calculated capacity, the signal phases and splits will be designed. The plan includes the channelization system.
- Bus priority signal control system: an ultra sonic vehicle detector is installed on the segregated median bus lane, in order to detect buses, and the detector transfers bus information to the signal control unit at the local facilities. The signal control unit decides whether it should change the timing of the signal on the basis of preset timing and received information about the bus.
- Synchronized traffic signal control system: the same cycle length at neighboring intersections will enable both to operate together by setting up the offset timing. It enables vehicle to drive without stopping at the intersection in the sub area of the synchronized traffic signal system.

Table 4.4.5 Locations for Installation of Traffic Signal Light

Street	No.	Type	Location	Type of Signal Control	
				Synchronized	Bus Priorty
Port Said St.	1 (a. b)	B2(2)	Qalyobeya Bus Terminal	O	O
	2	A(1)	Sawah St.	O	O
	3	B2(1)	Monstaamara St.	O	O
	4	B2(1)	Madinet El Ashraf	O	O
	5	A(1)	Sekket El Wayly St.	O	O
	6	B2(1)	Garag El Baladeya St.	O	O
	7	B2(1)	Farz St.	O	O
	8	B2(1)	Maamal El Saboon St.	O	O
	9	D	Ghamra Station. Metro Line 1.	O	O
	10	B2(1)	Daher St.	O	O
	11	A(1)	Mosheer Ahmed Ismail Sq.	O	O
	12	A(1)	Bab El Shaareya Sq.	O	
	13	C	Azhar St.	O	
	14	B1(2)	Ahmed Maher Pasha Sq.	O	O
	15	B1(1)	Sheikh Rehan St.	O	O
	16	B1(1)	Magles El Shaab St.	O	O
	17 (a, b)	B1(2)	Sayeda Zeinab Sq.	O	
	18	C	Saad El Deen St.	O	
	19	C	Yoosef El Sebaey St.	O	
Qalaa St.	20*	B1(2)	Same location of No. 14	O	
	21*	B1(2)	Same location of No. 17	O	
	22	C	Seroogeya St.	O	
	23	C	Qalaa Sq.	O	
	24	B1(2)	Salah Salem St.	O	
Salah Salem St.	25*	B1(2)	Same location of No.24	O	
	26	B1(2)	Magra El Oyoon St.	O	
	27	D	Masaken Ain El Seera St.	O	O
	28	B1(1)	Fostat St.	O	O
	29	A(2)	Malek El Saleh Br.	O	
	30	B1(1)	Qayrawan Sq.	O	O
	31	B1(1)	Giza Br.	O	O
	32	B1(1)	Bahr El Aazam St.	O	O
	33	A(2)	Giza Sq.	O	
	34	B2(2)	Entrance of Ahram St.	O	
Ahram St.	35	D	Tereat El Zomor El Sharqy St.	O	O
	36	D	Samy El Baroody St.	O	O
	37	D	Mesaha Sq.	O	O
	38	D	Naser El Thawra St.	O	O
	39	D	Madkoor Sq.	O	O
	40	D	Osman Moharam St.	O	O
	41	D	Nabarawy St.	O	O
	42	D	Sheikh El Shebeeny St.	O	O
	43	D	Taawon Sq.	O	O
	44	D	Sahl Hamza St.	O	O
	45	B1(2)	Maryoteya Rd.	O	
	46	A(1)	Mansooreya Rd.	O	O
Malek Feisal St.	47	B1(2)	Mansooreya Rd.	O	
	48	B2(2)	Abu Bakr El Sadeeq St.	O	
	49	A(2)	Maryoteya Rd.	O	
	50	B2(2)	Sahl Hamza St.	O	
	51	B2(2)	Safa Wel Marwa St.	O	
	52	B2(2)	Sheikh El Sherbeeny St.	O	
	53	B2(2)	Hassan Mohamed St.	O	
	54	B2(2)	Osman Moharam St.	O	
	55	B2(2)	Madkoor St.	O	
	56	B2(2)	Saad Ebn Aby Waqqas St.	O	
	57	B2(2)	Nady St.	O	

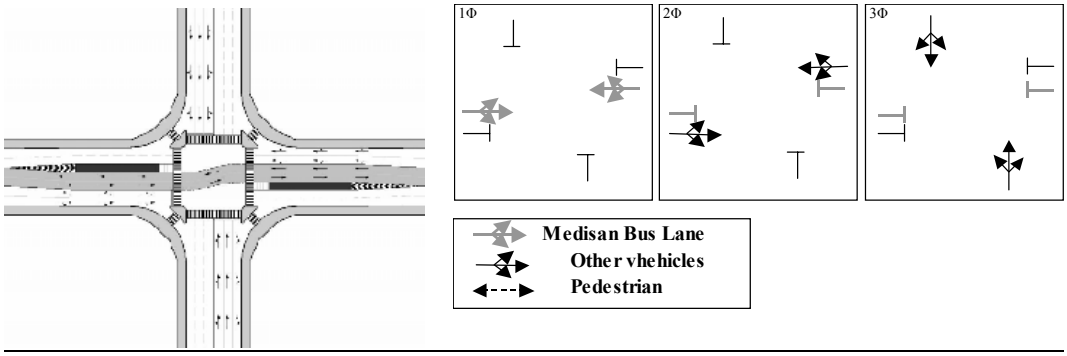
Source: JICA Study Team

b. Basic Control Concept

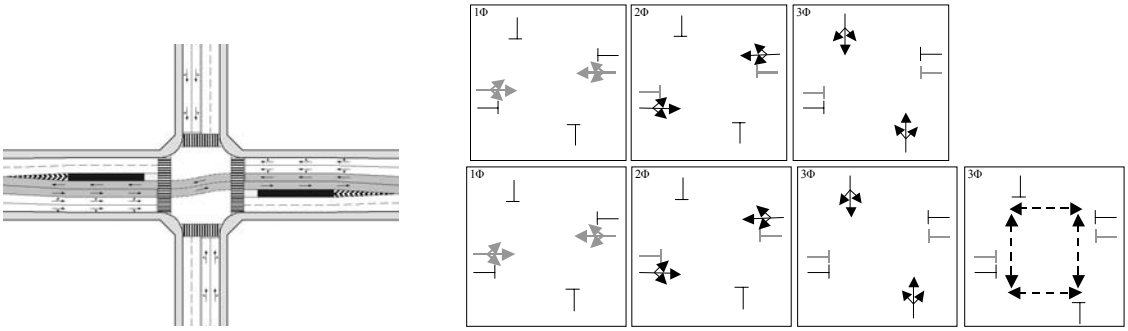
Traffic Signal Phase System

During peak periods, most major intersections were manually controlled by traffic policemen. This is because the current traffic congestion may be difficult to control with the existing system. Long cycle times of more than 4 minutes were observed in the field survey, due to the manual priority for heavy traffic directions. Thus, it is necessary to introduce a simple phase system setting one phase for two approaches. Figure 4.4.20 illustrates a sample of the proposed signal phase by typical intersections. In principle, the proposed signal phase is composed of three and four phases. A green arrow split for left-turn and the median bus lane, or all red for pedestrians. will be installed. These need to be modified according to specific traffic conditions.

Type A



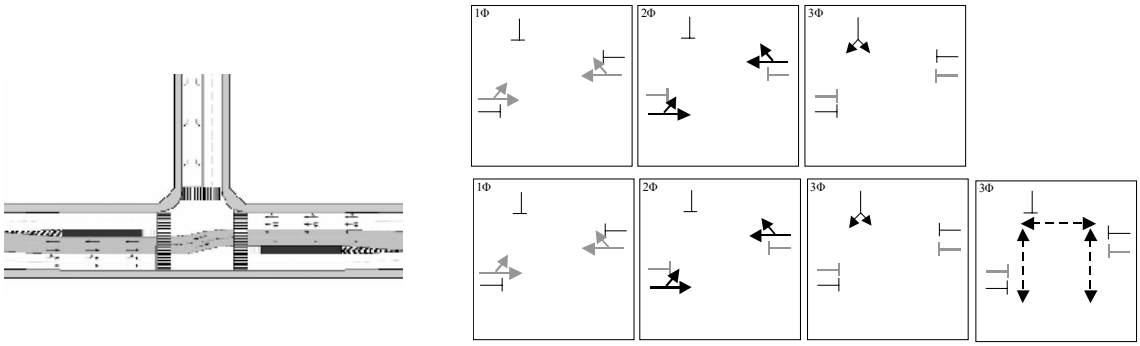
Type B 1



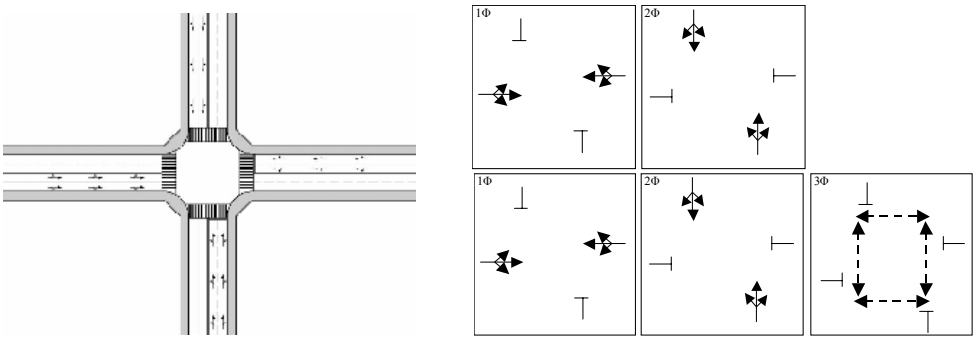
Source: JICA Study Team

Figure 4.4.20 Proposed Signal Phase by Type of Intersection

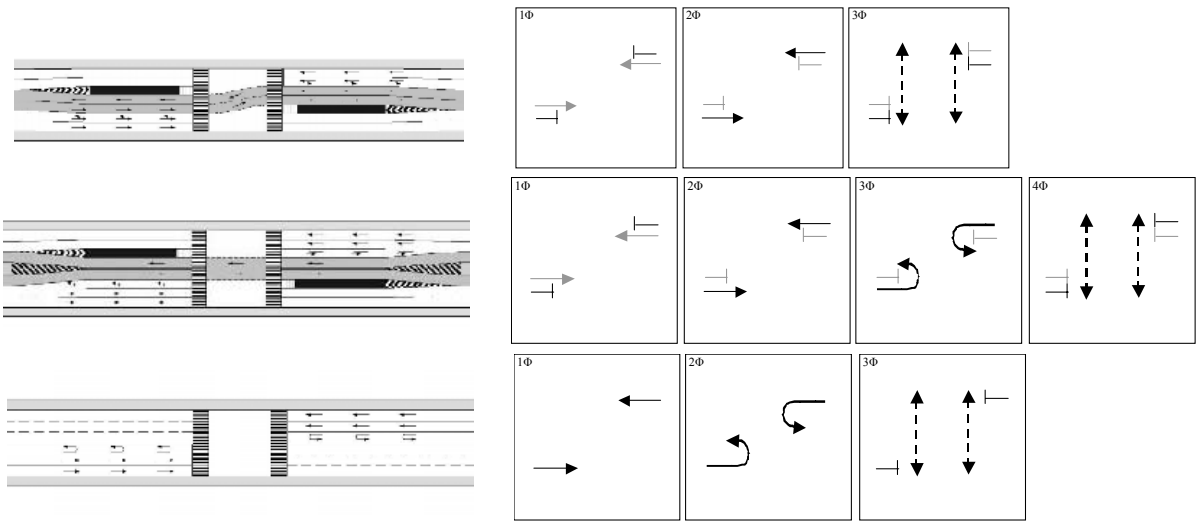
Type B 2



Type C



Type D



Source: JICA Study Team

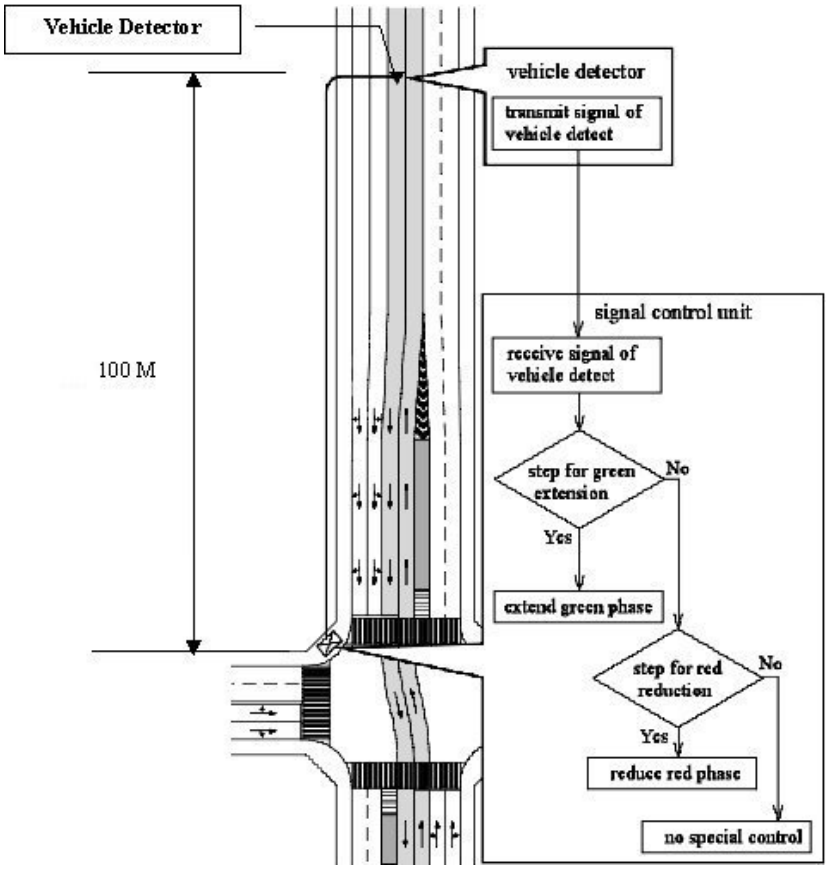
Figure 4.4.20 Proposed Signal Phase by Type of Intersection (continued)

Bus Priority Signal Control System

Figure 4.4.20 shows a basic control method for the bus priority signal control system by introducing an independent traffic-actuated control system. When a bus passes under an ultra sonic detector at the local facility, the vehicle detector transmits the signal detection to the local controller, the signal control unit sets a

step of green extension or a step of red reduction. This means that buses do not have to stop or the waiting time is shortened at intersections as much as possible.

The detectors for the bus priority signal control system will be placed at the entrance of each signalized intersection. Figure 4.4.21 shows the standard location plan of the detectors.



Source: JICA Study Team

Figure 4.4.21 Basic Control Method of Bus Priority Signal Control System

Synchronized Traffic Signal Control System

The synchronized traffic control means that the cycle time at each intersection has to be determined, depending on the signal control at adjacent intersections, and offset parameter must be established. A cycle and an offset is decided such that traffic delay (total or average) in the area of synchronized control is minimized. In the study, CREATS Program is a software application which has been designed for a traffic synchronized control system. This program creates the optimum offset pattern for a synchronized control system. A sample of the offset pattern, by introducing the through bands on Ahram St., is shown in Table 4.4.6 and Figure 4.4.22.

Key Intersection

The above-mentioned 54 intersections, subject to control by the synchronized control system, were divided into ten key intersections and 44 ordinary

intersections. A key intersection serves as the base point for determining the synchronized cycle, split and offset pattern. In principle, the key intersection will be controlled based on the type of offset pattern which is prepared in advance. Figure 4.4.23 (1) (2) shows the location of key intersections.

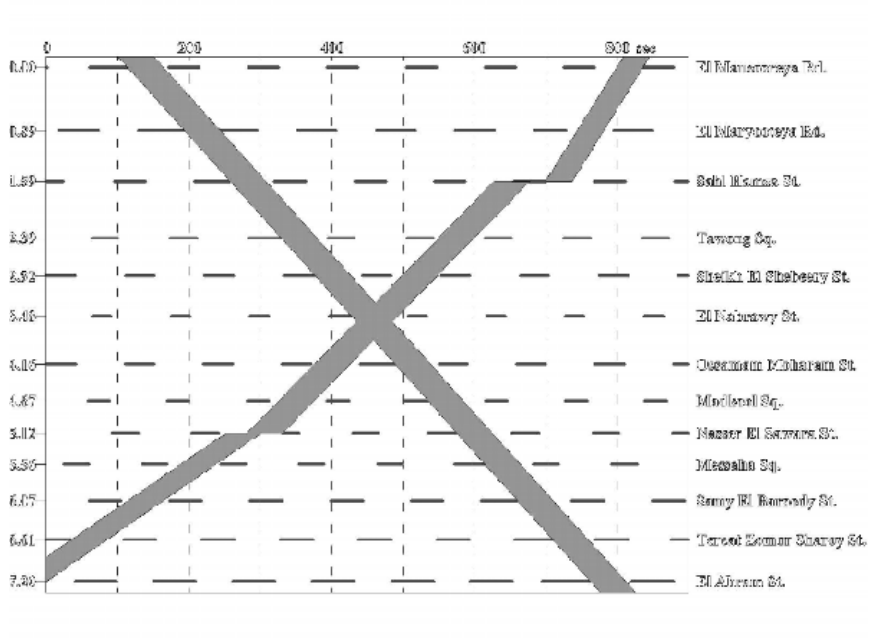
Sub Area

The sub area will be formulated based on the plan of the key intersection. The cycle length and offset pattern for a given sub area, which is made up of a number of signalized intersections, are selected from the control plans which are prepared in advance. All signals in the sub area thus have the same cycle length and appropriate offset pattern. In the same way, offsets at intersections which are located at the boundaries of two sub areas (included in each sub area) can be adjusted if two sub areas have the same cycle length.

Table 4.4.6 A Sample of Offset Pattern on Ahram St. during Morning Periods

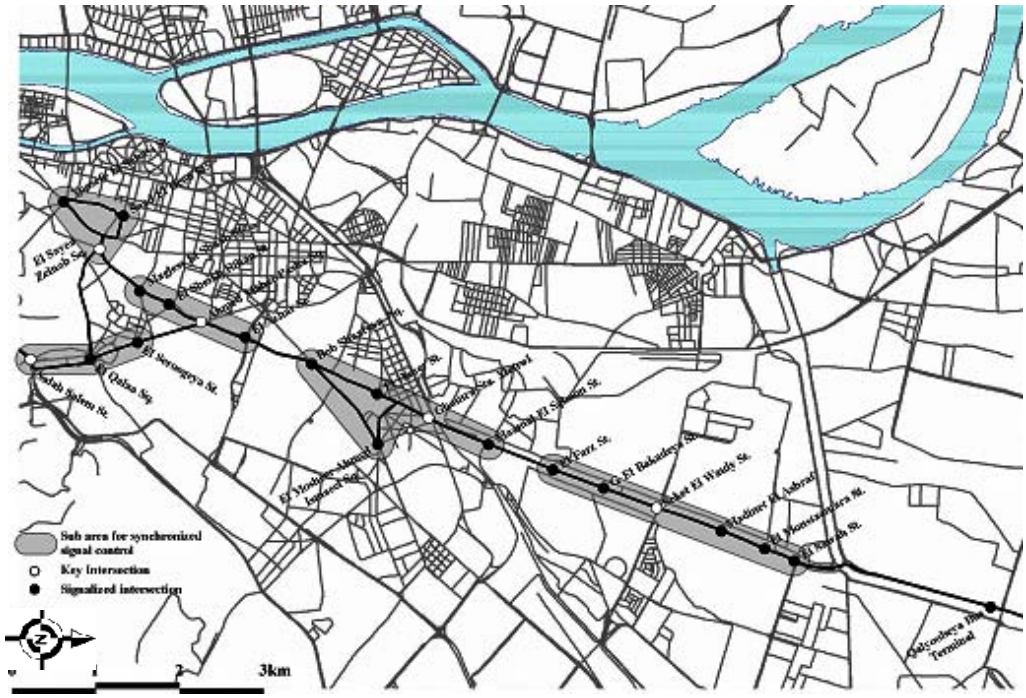
No.	Intersection	Distance (km)	Offset (sec)	Bus Green Time (sec)	Red Time (sec)
1	Mansooreya Rd.	0.00	0	66	44
2	Maryoteya Rd.	0.89	80	53	57
3	Sahl Hamza St.	0.70	33	66	44
4	Taawon Sq.	0.80	105	71	39
5	Sheikh El Shebeeny St.	0.53	43	73	37
6	Nabarawy St.	0.56	93	83	27
7	Osman Moharam St.	0.68	44	69	41
8	Madkoor Sq.	0.51	90	80	30
9	Naser El Thawra St.	0.45	21	72	38
10	Mesaha Sq.	0.44	60	75	35
11	Samy El Baroody St.	0.51	106	63	47
12	Tereat El Zomor El Sharqy St.	0.54	45	64	46
13	Entrance of Ahram St.	0.59	98	51	59

Source: JICA Study Team



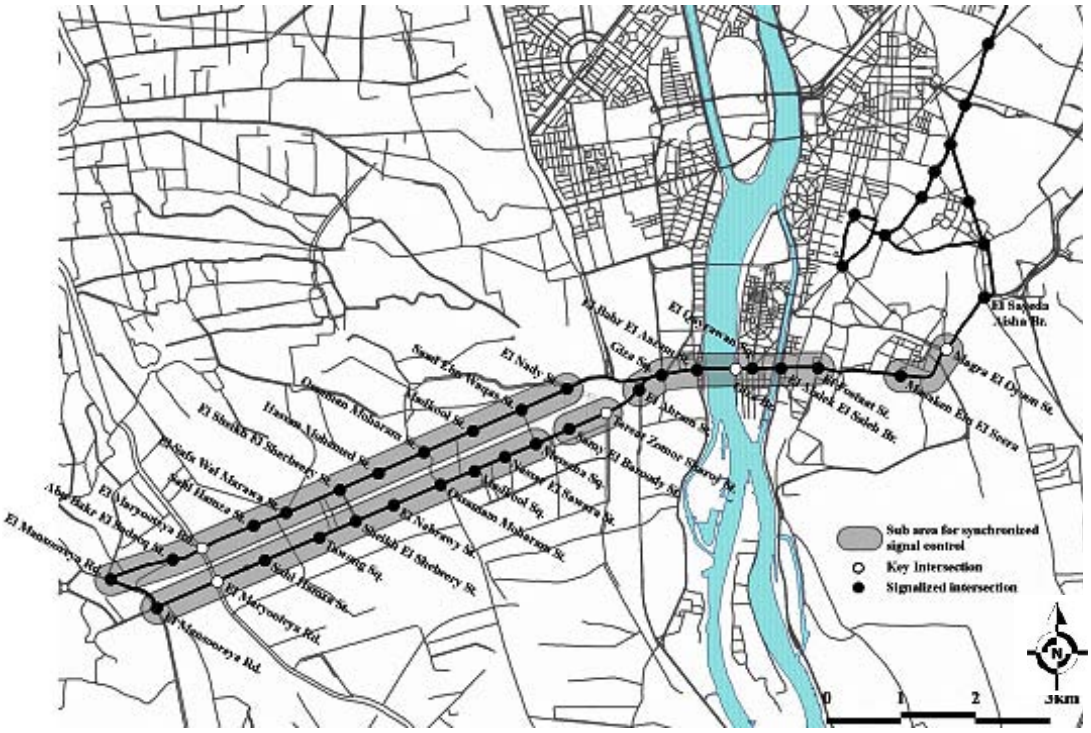
Source: JICA Study Team

Figure 4.4.22 A Sample of Offset Pattern and Through Bands on Ahram St. during Morning Peak Periods



Source: JICA Study Team

Figure 4.4.23 (1) Locations for Installation of Synchronized Traffic Signal Control System on Port Said St. and Qalaa St.



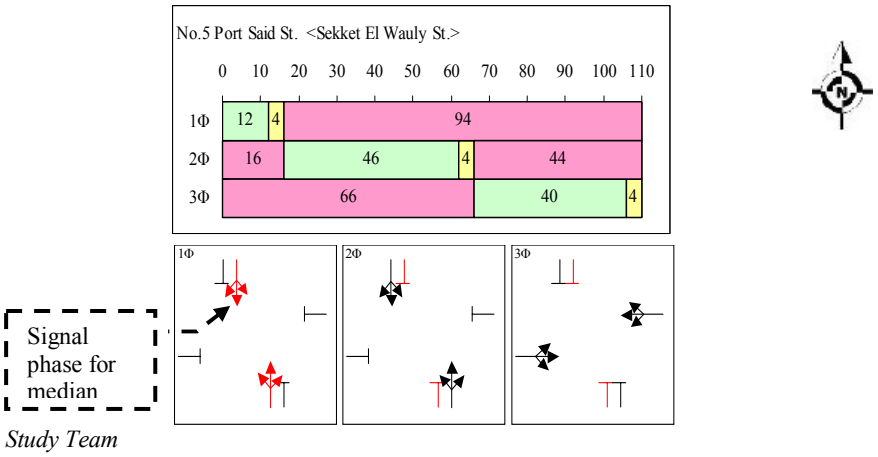
Source: JICA Study Team

Figure 4.4.23 (2) Locations for Installation of Synchronized Traffic Signal Control System on Salah Salem St., Ahram St. and Malek Feisal St.

c. Design of Signal Cycle Time an Split Time

The calculation of the saturation flow rate and the saturation degree of the intersection was carried out, in order to formulate adequate signal splits. A sample of the saturation flow rate and the saturation degree of an intersection is shown in Table 4.4.7. Figure 4.4.24 shows a sample of the plan of signal cycle time and splits (For the results of all the proposed phasing systems, refer to Appendix B.).

A Sample of Plan of Signal Cycle Time and Splits



Source: JICA Study Team

Figure 4.4.24 A Sample of Plan of Signal Cycle Time and Splits

Table 4.4.7 A Sample of Saturation Flow Rate and Saturation Degree of Intersection

Approach		Eastbound			Westbound			Northbound			Southbound			Bus Northbound			Bus Southbound				
		5 - 1			5 - 2			5 - 3			5 - 4			5 - 3B			5 - 4B				
		T+R	T	T+L	T+R	T	T+L	T+R	-	T	T+R	-	T	-	T+L+R	-	-	T+L+R	-		
1) No. of lanes		1	1	1	1	1	1	1	-	1	1	-	1	-	1	-	-	1	-		
2) Basic value of saturation flow rate		2,000	2,000	2,000	2,000	2,000	2,000	2,000	-	2,000	2,000	-	2,000	-	2,000	-	-	2,000	-		
3) Adjustment factor for left		1.00	1.00	0.97	1.00	1.00	0.98	1.00	-	1.00	1.00	-	1.00	-	0.99		-	1.00			
4) Adjustment factor for right		0.99	1.00	1.00	0.96	1.00	1.00	0.98	-	1.00	0.97	-	1.00	-	0.97	-	-	0.96	-		
5) Saturation flow rate		1,986	2,000	1,942	1,926	2,000	1,966	1,954	-	2,000	1,947	-	2,000	-	1,918	-	-	1,914	-		
			5,928			5,892			3,954			3,947			1,918			1,914			
7) PCU direction volume(bus)		33	149	43	35	140	95							50	106	16	63	99	5		
			224			270			0			0			173			166			
8) PCU direction volume(others)		84	1,026	434	529	665	160	285	780	265	309	848	89	0	0	0	0	0	0		
			1,544			1,354			1,330			1,246			0			0			
9) PCU direction volume (total)		116	1,176	477	564	805	255	285	780	265	309	848	89	50	106	16	63	99	5		
			1,769			1,624			1,330			1,246			173			166			
10) Flow rate			0.298			0.276			0.336			0.316			0.090			0.087		λi	Σλ
11) Necessary phase ratio	1Φ														0.090			0.087		0.090	
	2Φ								0.336			0.316								0.336	0.725
	3Φ		0.298			0.276														0.298	
	4Φ																			0.000	
13) Ratio of left turn		0%	0%	27%	0%	0%	16%	0%	0%	0%	0%	0%	0%	0%	9%	0%	0%	3%	0%		
14) Ratio of right turn		7%	0%	0%	35%	0%	0%	21%	0%	0%	25%	0%	0%	0%	29%	0%	0%	38%	0%		

PM Peak

Approach		Eastbound			Westbound			Northbound			Southbound			Bus Northbound			Bus Southbound				
		5 - 1			5 - 2			5 - 3			5 - 4			5 - 3B			5 - 4B				
		T+R	T	T+L	T+R	T	T+L	T+R	-	T	T+R	-	T	-	T+L+R	-	-	T+L+R	-		
1) No. of lanes		1	1	1	1	1	1	1	-	1	1	-	1	-	1	-	-	1	-		
2) Basic value of saturation flow rate		2,000	2,000	2,000	2,000	2,000	2,000	2,000	-	2,000	2,000	-	2,000	-	2,000	-	-	2,000	-		
3) Adjustment factor for left		1.00	1.00	0.97	1.00	1.00	0.98	1.00	-	1.00	1.00	-	1.00	-	0.99		-	1.00			
4) Adjustment factor for right		0.99	1.00	1.00	0.98	1.00	1.00	0.98	-	1.00	0.97	-	1.00	-	0.99	-	-	0.97	-		
5) Saturation flow rate		1,979	2,000	1,940	1,954	2,000	1,969	1,956	-	2,000	1,948	-	2,000	-	1,958	-	-	1,938	-		
			5,919			5,923			3,956			3,948			1,958			1,938			
7) PCU direction volume(bus)		33	148	58	35	83	115							16	103	9	30	79	3		
			238			233			0			0			128			111			
8) PCU direction volume(others)		132	903	416	338	1,025	132	359	1,085	294	286	786	101								
			1,450			1,494			1,738			1,173			0			0			
9) PCU direction volume (total)		164	1,050	473	373	1,107	247	359	1,085	294	286	786	101	16	103	9	30	79	3		
			1,688			1,727			1,738			1,173			128			111			
10) Flow rate			0.285			0.292			0.439			0.297			0.065			0.057		λi	Σλ
11) Necessary phase ratio	1Φ														0.065			0.057		0.065	
	2Φ								0.439			0.297								0.439	0.796
	3Φ		0.285			0.292														0.292	
	4Φ																			0.000	
13) Ratio of left turn		0%	0%	28%	0%	0%	14%	0%	0%	0%	0%	0%	0%	0%	7%	0%	0%	2%	0%		
14) Ratio of right turn		10%	0%	0%	22%	0%	0%	21%	0%	0%	24%	0%	0%	0%	13%	0%	0%	27%	0%		

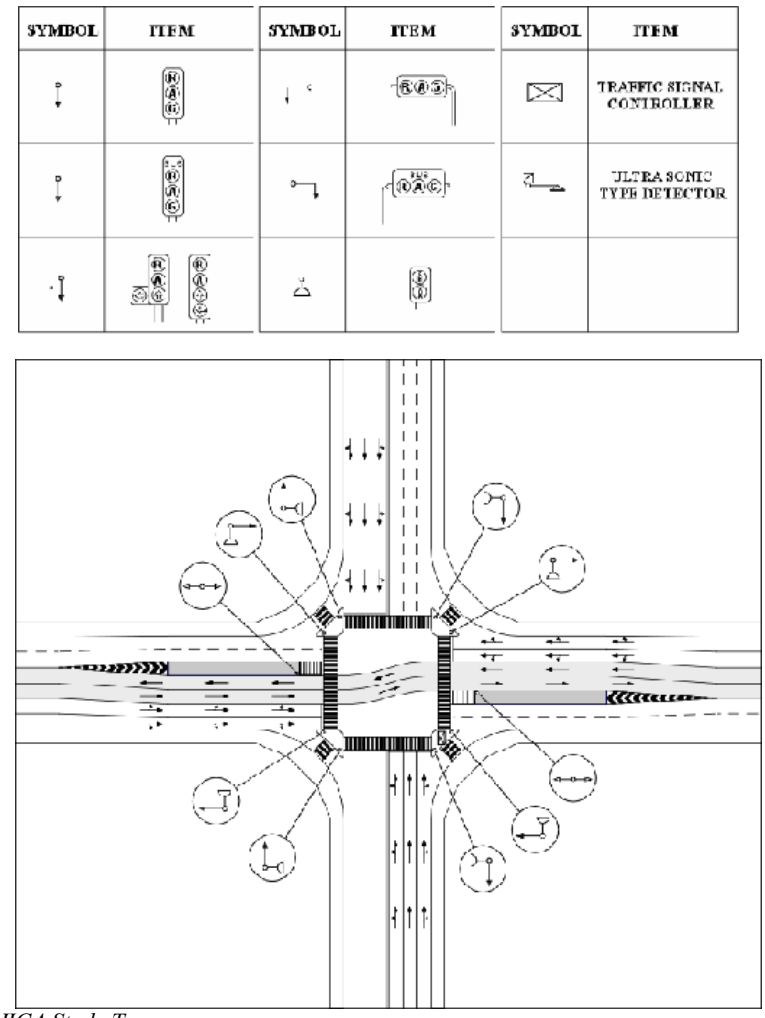
Source: JICA Study Team

d. Standard Installation of Local Facilities

Standard local facilities near intersections are as follows: signal light, local controller, cabling and vehicle detector for buses. The standard installation of the plan for local facilities near intersections is shown by type of intersection.

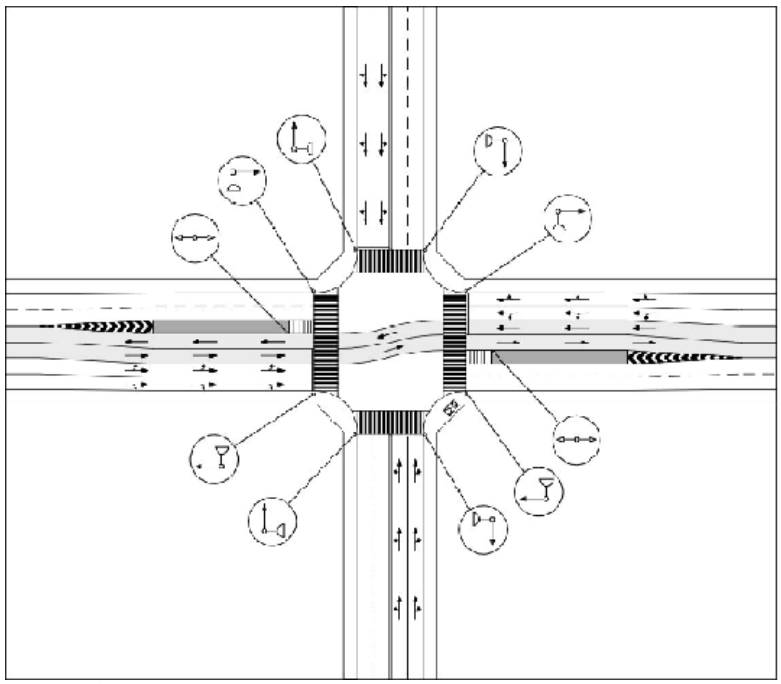
<u>Standard Installation Plan for Signal Lights</u>

There are nine types of intersections, as given in Table 4.4.4 Type of Intersection. Of these, the standard installation plans, for major types of intersections, are shown in Figure 4.4.25 (1)-(5), based on the standard design of lights by using symbols.



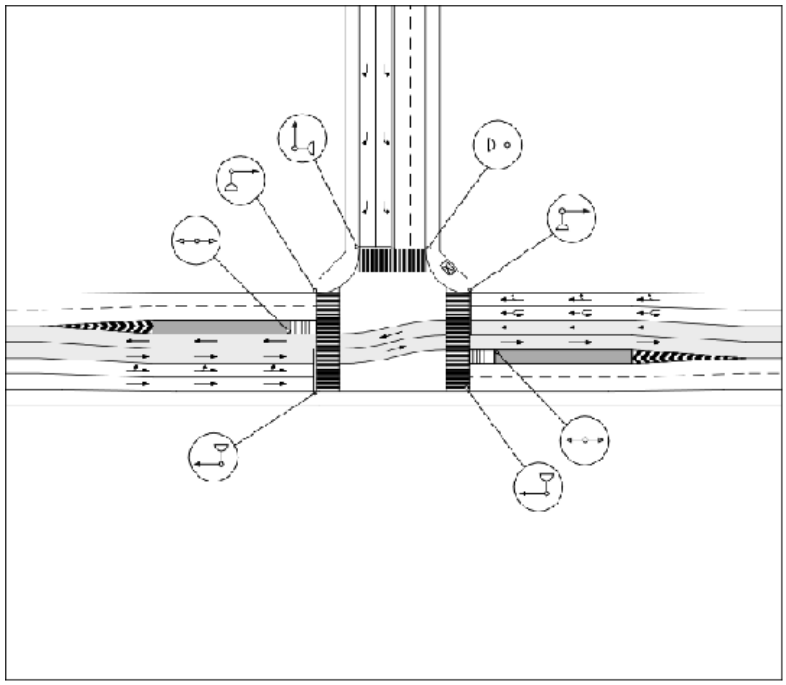
Source: JICA Study Team

Figure 4.4.25 (1) Standard Installation Plan of Traffic Signal Facility (Type A)



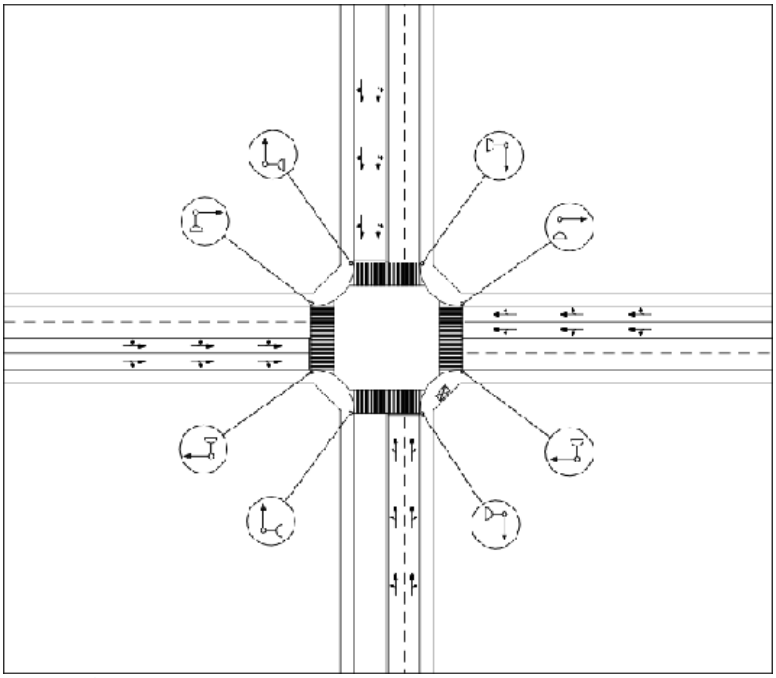
Source: JICA Study Team

Figure 4.4.25 (2) Standard Installation Plan of Traffic Signal Facility (Type B 1)



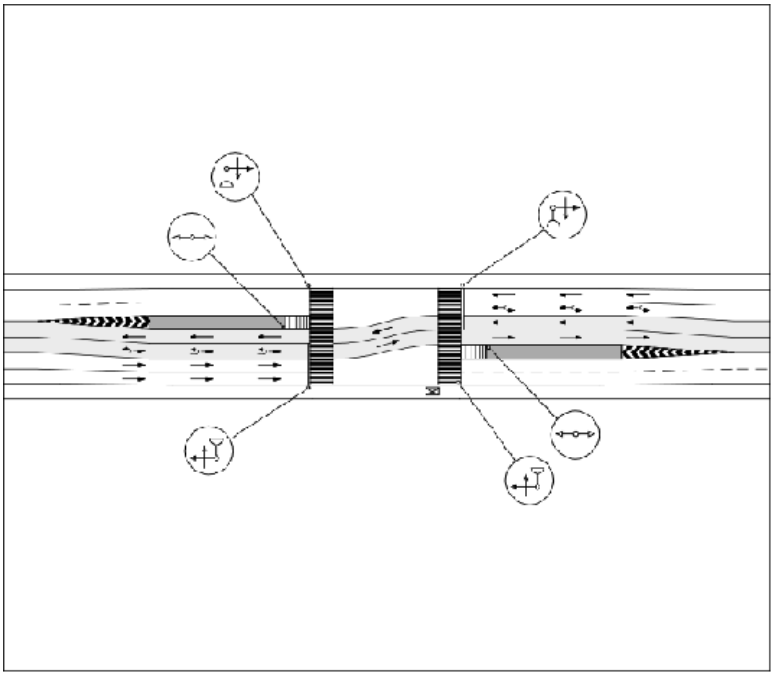
Source: JICA Study Team

Figure 4.4.25 (3) Standard Installation Plan of Traffic Signal Facility (Type B 2)



Source: JICA Study Team

Figure 4.4.25 (4) Standard Installation Plan of Traffic Signal Facility (Type C)

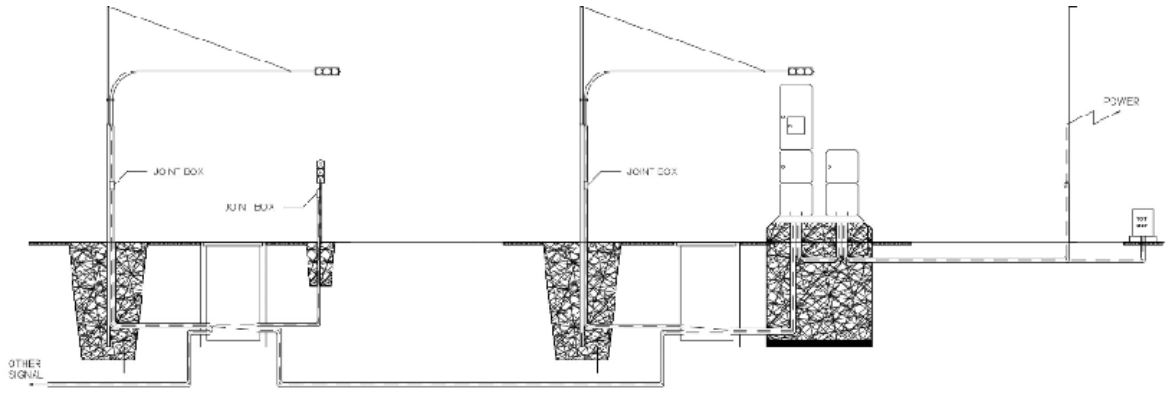


Source: JICA Study Team

Figure 4.4.25 (5) Standard Installation Plan of Traffic Signal Facility (Type D)

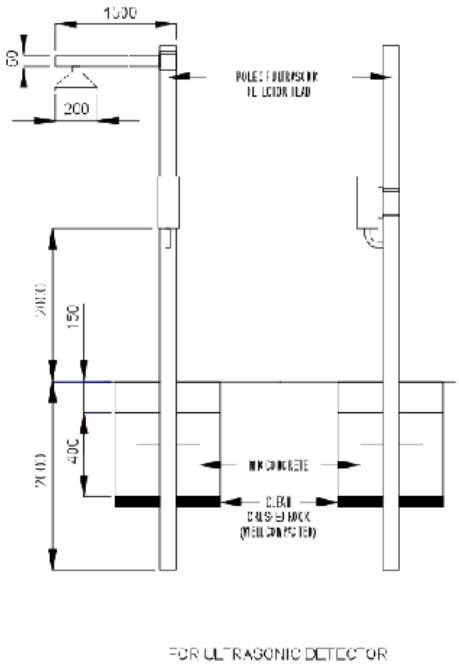
Standard Installation Plan for Signal Light Facilities

Figures 4.4.26 and Figure 4.4.27 show the standard design of a signal light, local controller and vehicle detector.



Source: JICA Study Team

Figure 4.4.26 Standard Design of Signal Light and Local Controller

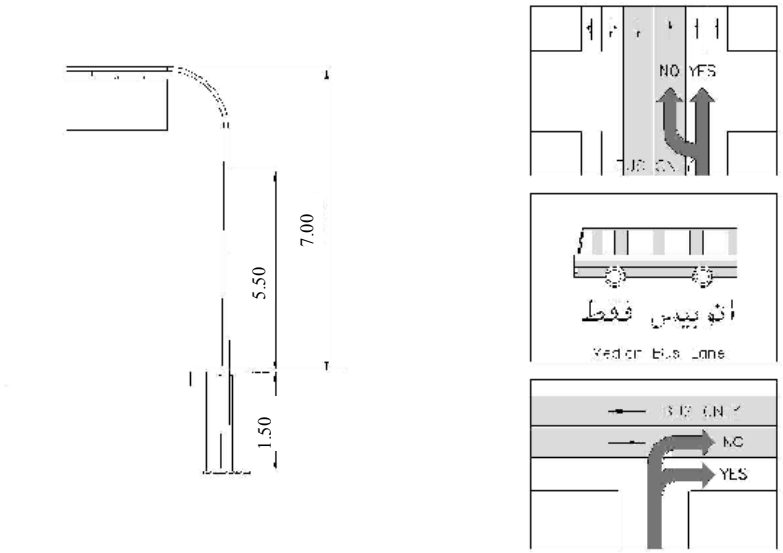


Source: JICA Study Team

Figure 4.4.27 Standard Design of Vehicle Detector

Standard Installation of Traffic Sign

Guide signs required for the operation of the median bus lane system are shown in Figure 4.4.28. At the intersection, and in the area outside the median bus lane, the guide signs will be installed in order to warn drivers.



Source: JICA Study Team

Figure 4.4.28 Standard Design of Guide Sign

4.4.3 Intersection Improvement Plan

(1) General

This plan will cover the intersections which, based on the analysis of the current situation, are considered to be bottlenecks, and will have traffic signal lights installed. The traffic capacity of each intersection will be calculated. At target intersections where the traffic volume is in excess of the calculated capacity, the signal phases will be improved and/or the approach will be widened. Traffic channelization will be introduced where it is deemed particularly necessary and where the shape of the intersection will change due to the widening of the approach.

(2) Improvement of Measures by Intersections

Along with the introduction of the bus priority system, the improvement of the traffic signal control system, the pedestrian-friendly system, and the traffic circulation system, it is necessary to improve intersections to enhance the beneficial effects of each system. This section discusses the improvement of intersections that should become necessary in conjunction with the installation of the above-mentioned traffic management program. The channelization plans were reviewed for intersection improvements, based on the following factors:

- Plan of bus priority system
- Addition of exclusive median bus lanes
- Addition of a bus stop station on median lanes

a. Installation of planned traffic signal lights

- Planned-signalized intersections (including U-turn points)
- Bus priority signal facilities
- Addition of exclusive left-turn/right-turn lanes
- Improvement of channelizing islands

b. Plan of pedestrian-friendly system

- Pedestrian crossing facilities
- Traffic safety facilities

c. Plan of traffic circulation system

- Traffic regulation
- Lane operation improvement for handling traffic flow

These reviews were conducting according to the existing traffic volume, the existing shape of the intersections, and existing committed plans.

1) Subject Intersections

The intersection improvement plan covers the 54 intersections that are to be planned for the traffic management program.

2) Planning Conditions

The intersection improvement plan was prepared on the basis of the following conditions:

1. Intersection improvement works shall be implemented without increasing the existing road width.
2. The planned traffic shall be used for the existing traffic volume.
3. Minimum lane width shall be 3.0 meters.

3) Improvement Items

In conjunction with the bus exclusive lane at existing intersections, as called for in the plan of the median bus lane system, a pavement marking plan for the intersections was prepared in order to achieve a smooth flow of traffic. In addition, in conjunction with the installation of traffic signal lights at non-signalized intersections, a channelization plan for these intersections was prepared in order to control traffic flow on major and miner approaches and to ensure the safety of pedestrians. These improvements are listed in Table 4.4.8. Salient points of the improvements are discussed below.

Table4.4.8 Improvement Measures

Improvement Measures	A. Plan of bus priority system	B. Installation of planed traffic signal lights	C. Plan of pedestrian -friendly system	D. Plan of traffic circulation system
1. Improvement of pavement markings where lane operation to be altered	○	○	○	○
2. Addition of exclusive left-turn/right-turn lanes		○		○
3. Installation of pedestrian crossings	○	○	○	○
4. Improvement of channelizing island	○	○	○	○
5. Improvement of median	○			
6. Improvement in conjunction with median bus lane system	○			
7. Improvement of corner cut	○	○		○

Source: JICA Study Team

a. Improvement of Pavement Markings Where Lane Operation is to be Altered

Pavement markings such as arrows, stop lines, exclusive bus lanes, and center lines will be improved at intersections where the median bus lane is segregated or where the system of lane operation is to be altered due to changes in traffic demand.

b. Addition of Exclusive Left-Turn/Right-Turn Lanes

Exclusive left-turn/right-turn lanes will be established at intersections with a high volume of left-turning traffic and right-turning traffic, in order to ensure the smooth flow of straight-through traffic and to process left-turning traffic and right-turning traffic more efficiently. The plan for the addition of lanes should be designed based on the following items:

- Exclusive left-turn lanes will be provided with left-turn pockets.
- Exclusive right-turn lanes will be provided with channelizing islands.
- Left-turn pockets will be constructed either by cutting off the median and allotting the resulting space to the pocket or, where there is no median, by shifting the center line to the lane in the opposite direction.

c. Installation of Pedestrian Crossings

In conjunction with the installation of signal lights and the median bus lanes, pedestrian crossings will be provided at intersections.

d. Improvement of Channelizing Islands

Improvements with respect to the locations and shapes of channelizing islands were reviewed for intersections which have a high volume of right-turning traffic

and which require more than the current number of exclusive right-turn lanes, and for intersections where the turning movement of vehicles will be altered by the bus stop station of the median bus lane system.

e. Improvement of Median

In conjunction with the installation of bus stop stations on the median bus lane system, medians that are located where U-turn traffic or left-turning traffic pass through will be cut away.

f. Improvement in Conjunction with the Median Bus Lane System

Markings and signs will be improved as necessary for the operation of the median bus lane system.

g. Improvement of Corner Cut

The corner cut will be reviewed as necessary for the operation of the median bus lane system, and at intersections where channelizing islands are provided.

The improvements required at each intersection are listed in Table 4.4.7.

4) Standard Intersection Layout

The subject intersections are divided into the nine (9) types e.g. Type A with/without bus lane, Type B1 with/without bus lane for 4-legs, Type B2 with/without bus lane for 3-legs, Type C and Type D (refer to Table 4.4.3 Type of Intersection). Table 4.4.9 shows the improvement measures by intersection. The standard layout of each type is shown in Figure 4.4.29.

Table 4.4.9 Improvement Measures by Intersection

Street	Intersection		Main Projects				Improvement Measures						
	No.	Type	A	B	C	D	1	2	3	4	5	6	7
Port Said St.	1	B2(2)		○	○		○	○	○	○	○	○	○
	2	A(1)	○	○	○		○	○	○	○			○
	3	B2(1)	○	○	○		○	○	○	○	○	○	○
	4	B2(1)	○	○	○		○	○	○	○	○	○	○
	5	A(1)	○	○	○		○	○	○	○	○	○	○
	6	B2(1)	○	○	○		○	○	○	○	○	○	○
	7	B2(1)	○	○	○		○	○	○	○	○	○	○
	8	B2(1)	○	○	○		○	○	○	○	○	○	○
	9	D	○	○	○		○	○	○	○	○	○	○
	10	B2(1)	○	○	○		○	○	○	○	○	○	○
	11	A(1)	○	○	○		○	○	○	○	○	○	○
	12	A(1)	○	○	○		○	○	○	○	○	○	○
	13	C		○	○		○	○	○	○			○
	14[*1]	B1(2)		○	○		○	○	○	○	○	○	○
	15	B1(1)	○	○	○		○	○	○	○	○	○	○
	16	B1(1)	○	○	○		○	○	○	○	○	○	○
	17[*2]	B1(2)		○	○	○	○	○	○	○	○	○	○
	18	C		○	○		○	○	○	○	○	○	○
	19	C		○	○		○	○	○	○	○	○	○

Street	Intersection		Main Projects				Improvement Measures						
	No.	Type	A	B	C	D	1	2	3	4	5	6	7
Qalaa St.	20*1	B1(2)	○	○	○	○	○	○	○	○	○	○	○
	21*2	B1(2)	○	○	○	○	○	○	○	○	○	○	○
	22	C	○	○	○	○	○	○	○	○	○	○	○
	23	C	○	○	○	○	○	○	○	○	○	○	○
	24*3	B1(2)	○	○	○	○	○	○	○	○	○	○	○
Salah Salem St.	25*3	B1(2)		○	○	○	○	○	○	○	○	○	○
	26	B1(2)		○	○		○	○	○	○	○	○	○
	27	D	○	○	○		○	○	○	○	○	○	○
	28	B1(1)	○	○	○		○	○	○	○	○	○	○
	29	A(2)		○	○		○	○	○	○			○
	30	B1(1)	○	○	○		○	○	○	○			○
	31	B1(1)	○	○	○		○	○	○	○	○	○	○
	32	B1(1)	○	○	○		○	○	○	○			○
	33	A(2)		○	○		○	○	○	○			○
	34	B2(2)		○	○		○	○	○	○			○
Ahram	35	D	○	○	○		○	○	○	○	○	○	○
	36	D	○	○	○		○	○	○	○	○	○	○
	37	D	○	○	○		○	○	○	○	○	○	○
	38	D	○	○	○		○	○	○	○	○	○	○
	39	D	○	○	○		○	○	○	○	○	○	○
	40	D	○	○	○		○	○	○	○	○	○	○
	41	D	○	○	○		○	○	○	○	○	○	○
	42	D	○	○	○		○	○	○	○	○	○	○
	43	D	○	○	○		○	○	○	○	○	○	○
	44	D	○	○	○		○	○	○	○	○	○	○
	45	B1(2)		○	○		○	○	○	○	○	○	○
	46	A(1)	○	○	○		○	○	○	○	○	○	○
Malek Feisal	47	B1(2)		○	○		○	○	○	○			○
	48	B2(2)		○	○		○	○	○	○			○
	49	A(2)		○	○		○	○	○	○			○
	50	B2(2)		○	○		○	○	○	○			○
	51	B2(2)		○	○		○	○	○	○			○
	52	B2(2)		○	○		○	○	○	○			○
	53	B2(2)		○	○		○	○	○	○			○
	54	B2(2)		○	○		○	○	○	○			○
	55	B2(2)		○	○		○	○	○	○			○
	56	B2(2)		○	○		○	○	○	○			○
	57	B2(2)		○	○		○	○	○	○			○

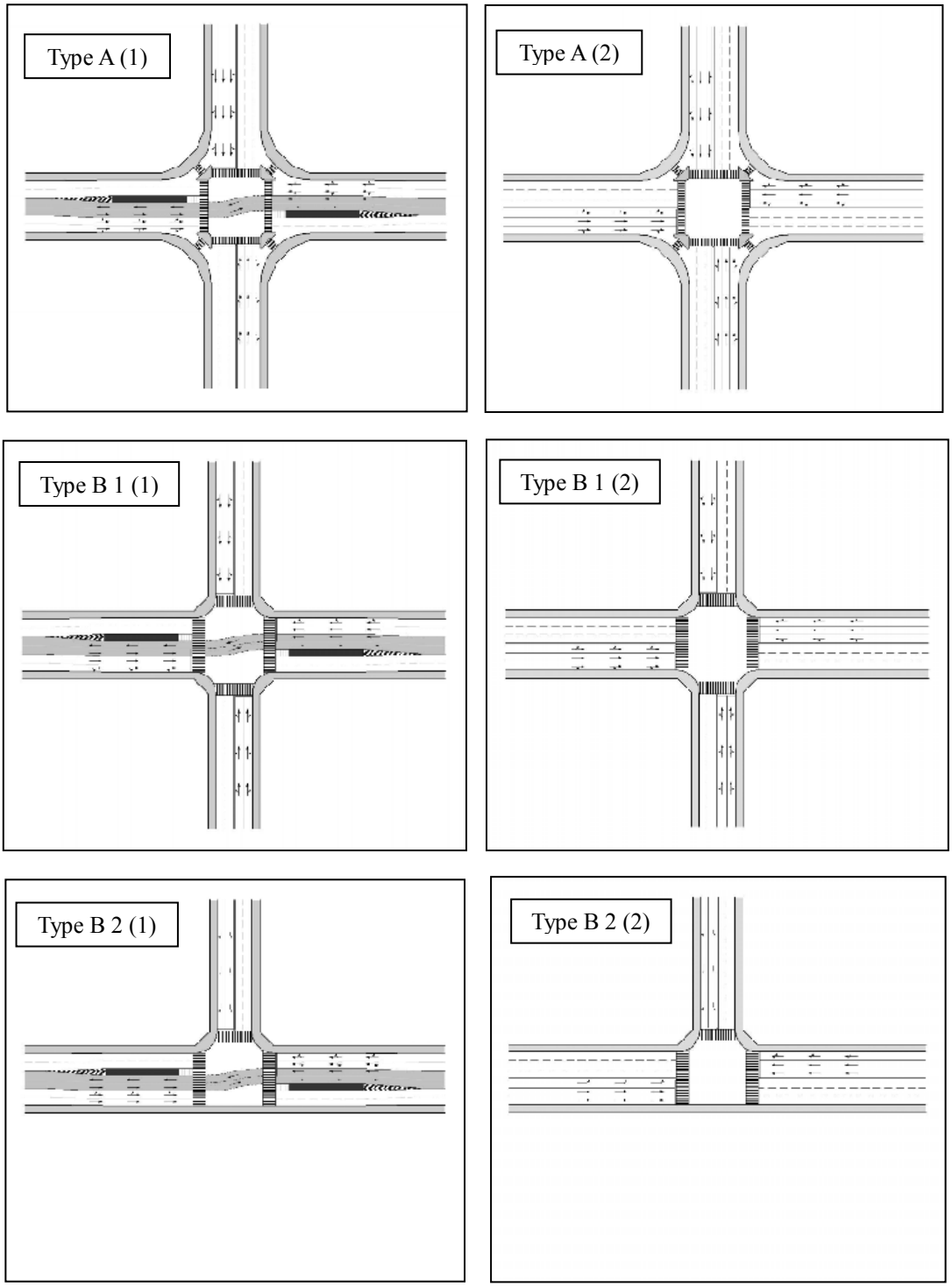
Note: 1) Type: Standard of typical intersection

2) Main Projects: A: Plan of bus priority system, B: Improvement of planed traffic signal lights, C: Plan of pedestrian-friendly system, E: Plan of traffic circulation system.

3) Improvement Measures: 1: Improvement of pavement markings where lane operation to be altered, 2: Addition of exclusive left-turn/right-turn lanes, 3: Installation of pedestrian crossings, 4: Improvement of channelizing island, 5: Improvement of median, 6: . Improvement in conjunction with median bus lane system, 7: Improvement of corner cut,

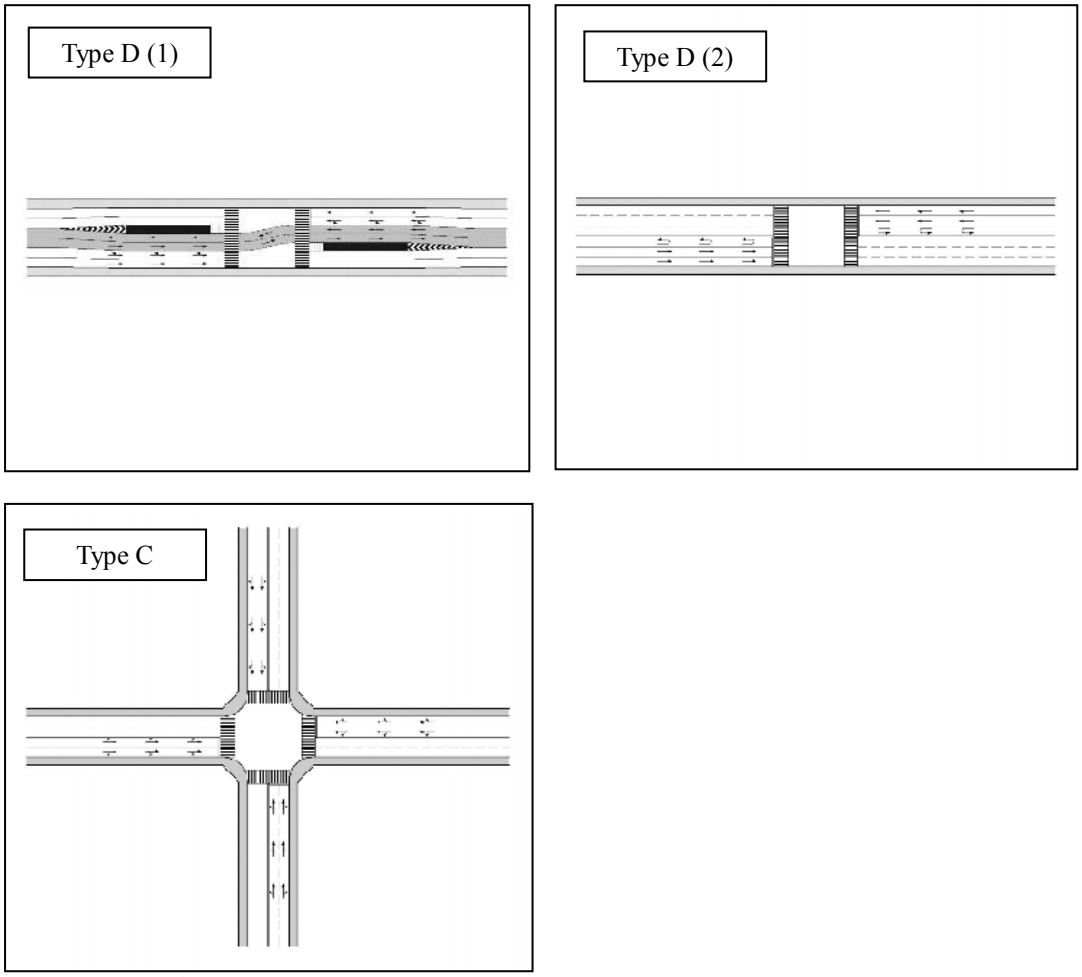
*4) *: Same location, $14^{*1} = 20^{*1,}$ $17^{*2} = 21^{*2,}$ $24^{*3} = 25^{*3}$*

Source: JICA Study Team



Source: JICA Study Team

Figure 4.4.29 Standard Typical Intersection



Source: JICA Study Team

Figure 4.4.29 Standard Typical Intersection (Continued)

5) Action Plan of intersection Improvement at Current Bottlenecks

As previously highlighted out in the analysis of current traffic congestion on Metro 4 Corridor, the serious bottlenecks will be improved by introducing several traffic measurements. Based on the above-mentioned, the plan of the bus priority system, the traffic signal control system and the channelization system, the action plans for intersection improvements at bottlenecks are shown below. The target bottlenecks are as follows:

- Port Said St.-Sawah St. intersection
- Salah Salem St.-Malek El Saleh Br. intersection
- Giza Sq. intersection

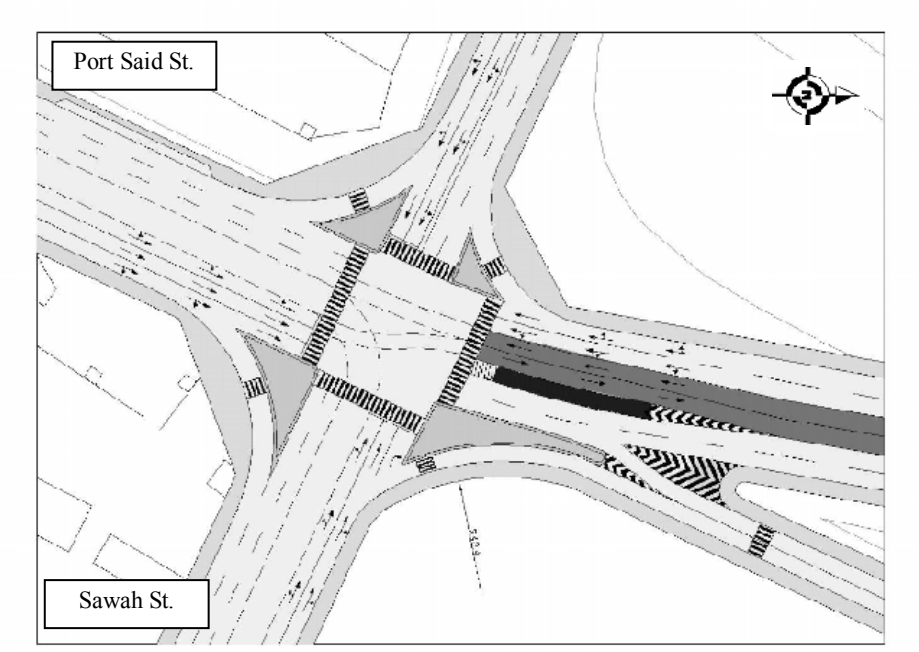
a. Action Plan for Port Said St.-Sawah St. Intersection

The current traffic issues at Port Said St.-Sawah St. intersection are as follows: the intersection will be improved by introducing a traffic signal control system and a

channelization system, in accordance with the plan of the median bus lane system. Figure 4.4.30 shows the improvement plan for the intersection.

Major Traffic Issues:

- Long traffic queues at approaches in the north and east directions due to the U-turn system;
- Complex turning movement due to multi-legs and the tram track, and
- Long cycle times due to manual priority for heavy traffic directions.



Source: JICA Study Team

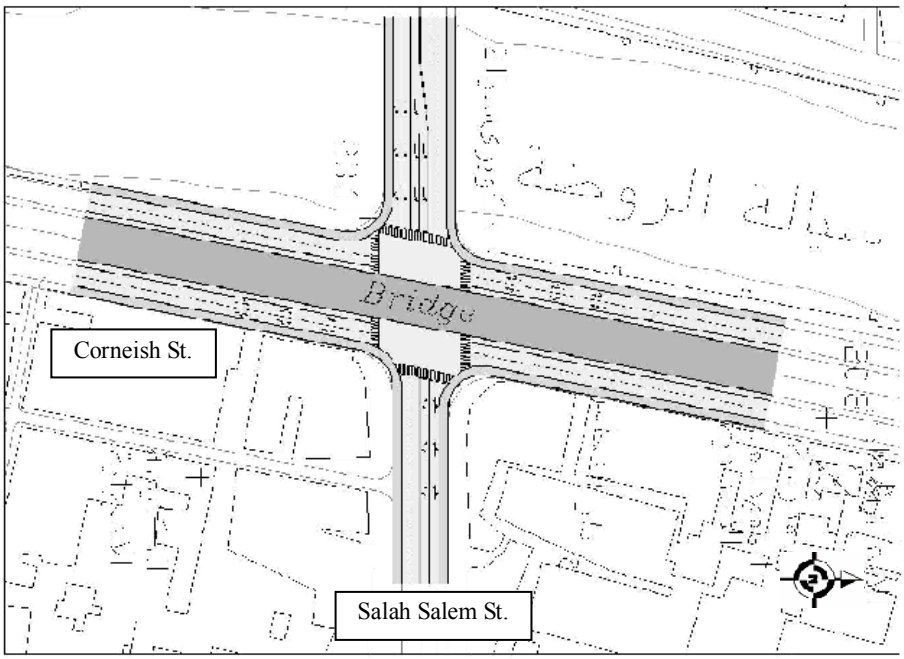
Figure 4.4.30 Improvement Plan for Port Said St.-Sawah St. Intersection

b. Action Plan of Salah Salem St.-Malek El Saleh Br. Intersection

The current traffic issues at Salah Salem St.-Malek El Saleh Br. intersection are as follows: the intersection will be improved by introducing a traffic signal control system and a channelization system, with the addition of exclusive left-turn lanes. Figure 4.4.31 shows the improvement plan for the intersection.

Major Traffic Issues:

- Long traffic queues at the approach for the west direction due to heavy right-turn vehicles, and
- Long cycle times due to the manual priority for heavy traffic directions.



Source: JICA Study Team

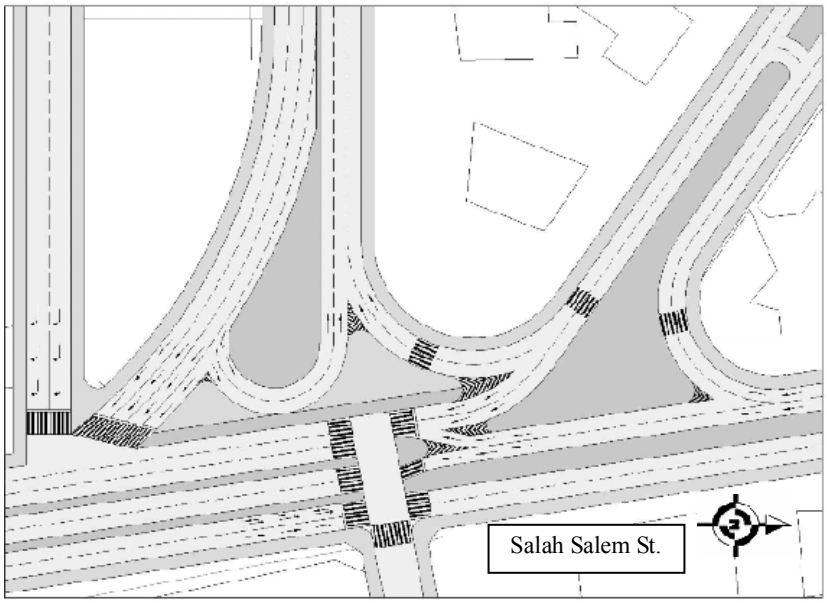
Figure 4.4.31 Improvement Plan for Salah Salem St.-Malek El Saleh Br. Intersection

c. Action Plan of Giza Sq. Intersection

The current traffic issues at Giza Sq. intersection are as follows: the intersection will be improved by introducing a traffic signal control system and a channelization system. Figure 4.4.32 shows the improvement plan for the intersection.

Major Traffic Issues:

- Long traffic queues at the approach for north and east/west directions due to the conflict with entering traffic;
- Serious conflict between U-turn traffic from a westerly direction and through traffic from an easterly direction;
- Conflict between buses and shared taxis near the intersection, and
- Complex turning movements due to multi-legs.



Source: JICA Study Team

Figure 4.4.32 Improvement Plan for Giza Sq. Intersection

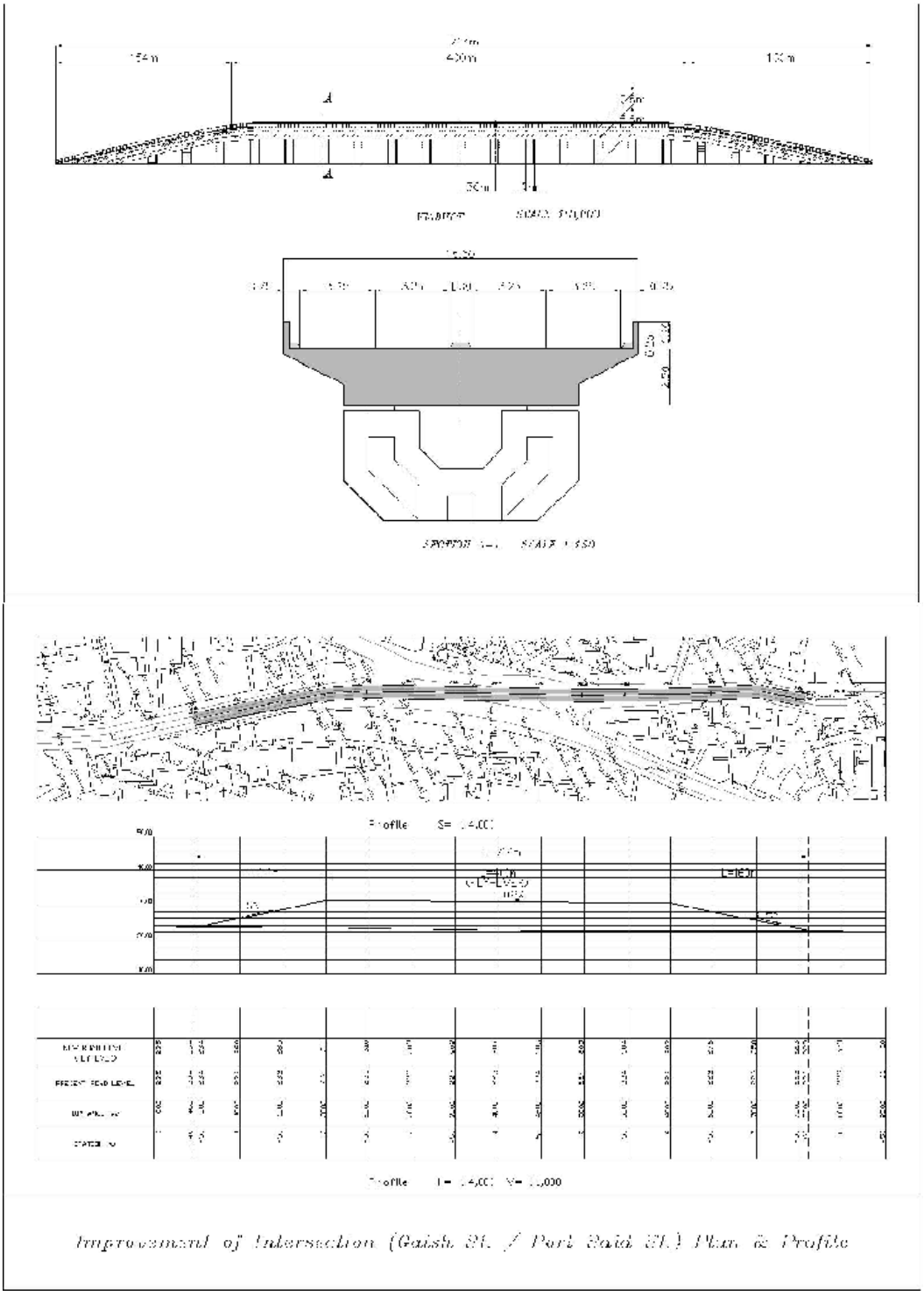
6) Grade-Separated Intersection (Viaduct)

As the results of the Master Plan, it was proposed that a grade-separated intersection (viaduct) should be constructed at Port Said St., Salah Salem St., Ahram St. and Malek Feisal St.. Proposed grade-separated intersections are as follows:

- Port Said St.: Port Said St.-Bab El Shaareya Sq.
- Salah Salem St.: Salah Salem St.- Magra El Oyoon St.
- Ahram St.: Ahram St.-Maryoteya Rd
- Malek Feisal St.: Malek Feisal St.- Maryoteya Rd

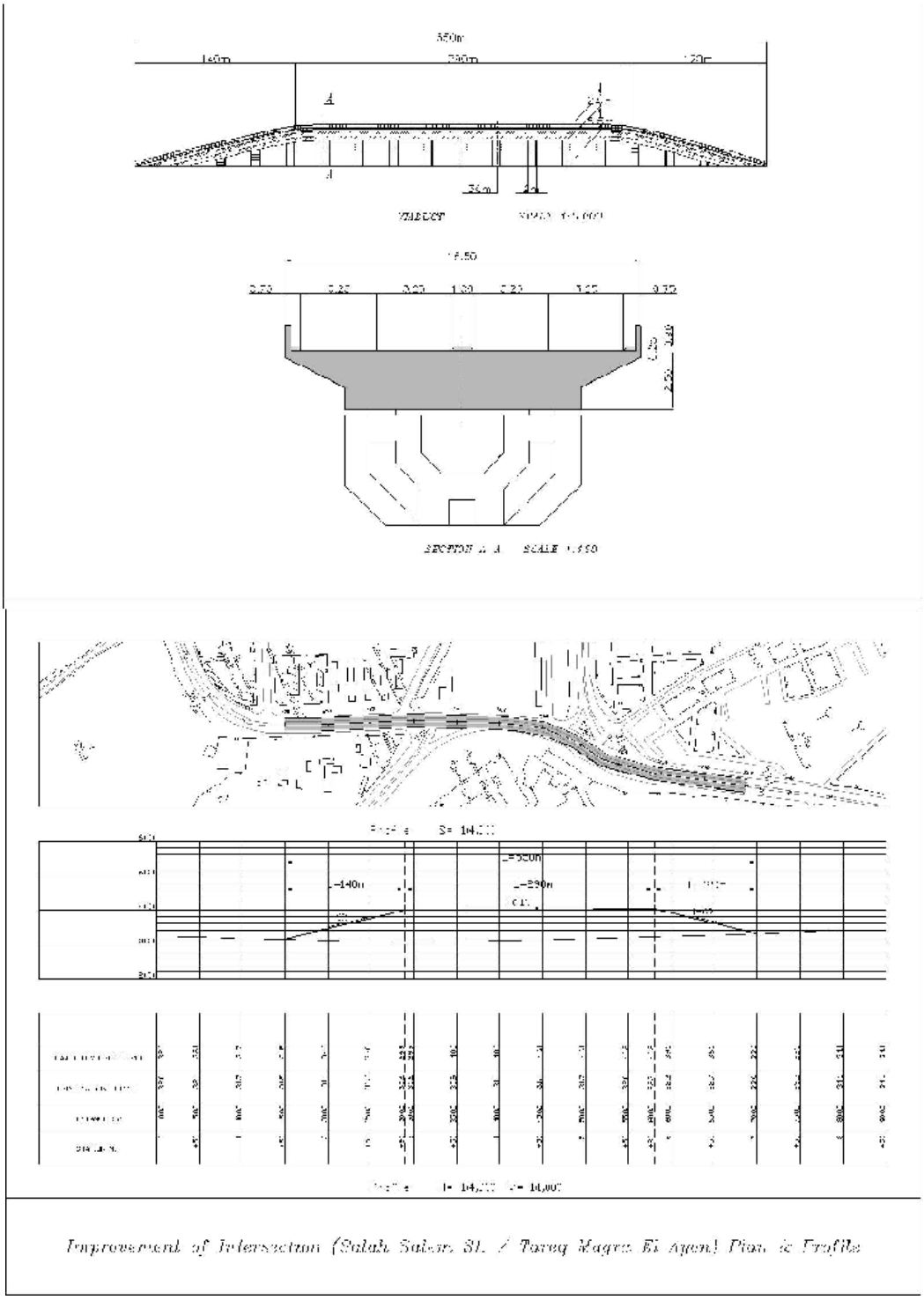
When a new road is designed, the American road design standards "A Policy on Geometric Design of Highways and streets (AASHTO)" is generally adopted. In determining the geometric design elements to be adopted in this study, it was decided to refer to two design manuals: the American standards and Japanese design standards. The major geometric design elements for Metro 4 Corridor are as follows: Minimum radius of horizontal curve, design speed 60-80km/h, 150-280m; maximum longitudinal grade, design speed 60-80km/h, 4-5%, 7-9% respectively; passing sight distance, design speed 60-80km/h, 250-400m, 350-514m respectively; design speed, 60-80km/h; vertical clearance, 5.5m.

Based on these geometric design elements and the current road situation, the general profile of four grade-separated intersection are shown in Figure 4.4.33 (1)-(4).



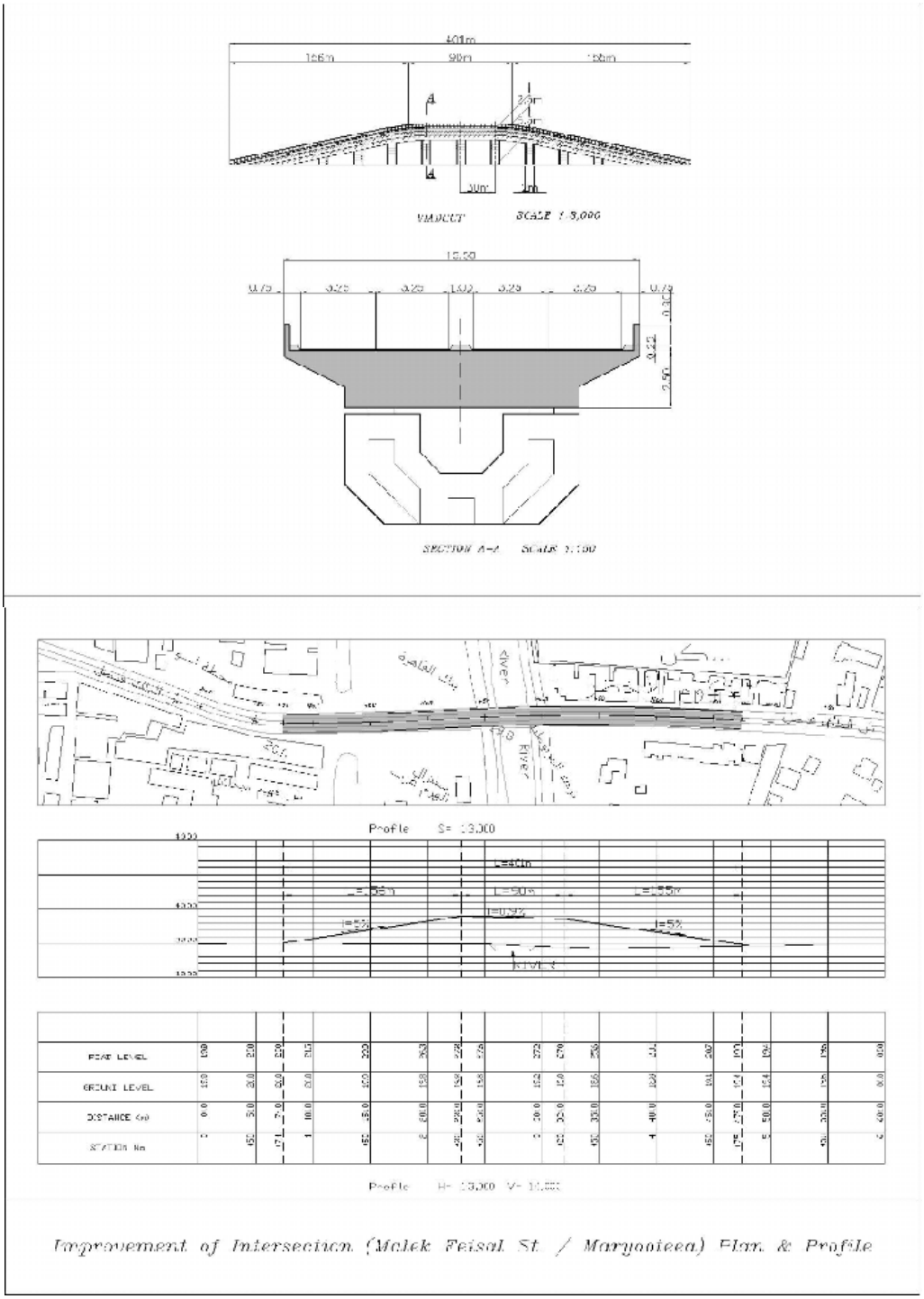
Source: JICA Study Team

Figure 4.4.33 (1) General Profile of Grade-Separated Intersection on Port Said St.-Bab El Shaareya Sq.



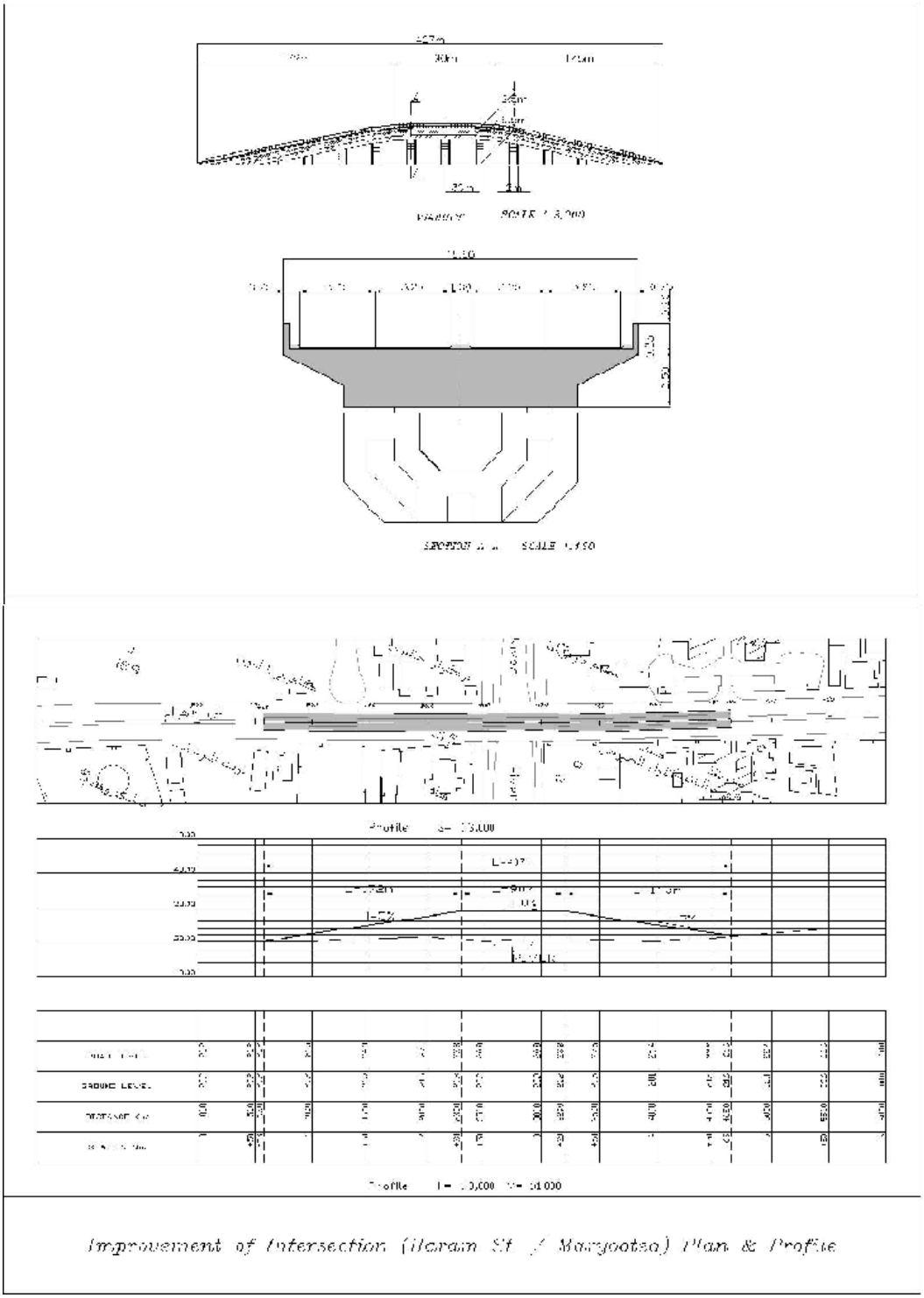
Source: JICA Study Team

Figure 4.4.33 (2) General Profile of Grade-Separated Intersection on Salah Salem St.- Magra El Oyoon St



Source: JICA Study Team

Figure 4.4.33 (3) General Profile of Grade-Separated Intersection on Ahram St.- Maryoteya Rd



Source: JICA Study Team

Figure4.4.33 (4) General Profile of Grade-Separated Intersection on Malek Feisal St.- Maryoteya Rd

APPENDIX A

AN INTRODUCTION TO THE MEDIAN BUS LANE SYSTEM FOR BOGOTA CITY IN THE REPUBLIC OF COLOMBIA (TRANSMILENIO)

APPENDIX A: AN INTRODUCTION TO THE MEDIAN BUS LANE SYSTEM FOR BOGOTA CITY IN THE REPUBLIC OF COLOMBIA (TRANSMILENIO)

This appendix presents a brief description of the introduction of the median bus lane system for Bogota City in the Republic of Colombia (Bus Rapid Transit mass transportation system called "Transmilenio"). The source of information is from project 46, "Transmilenio: a Way of Life, Colombia".

A-1 BACKGROUND, GOALS AND OBJECTIVES

TransMilenio is a mass transportation system based on buses in network-fed corridors in the city of Bogota. "TransMilenio" is based on two general objectives are to improve the citizens quality of life and to improve the productivity of the city; these are based on five principles:

- Respect for life: human treatment for the users and drivers, accident reduction and reducing the number of contaminating particles.
- Respect for the users time: reducing the travel time by 50 % so that the users can perform productive, cultural and recreational activities.
- Respect for human diversity: recognizing the differences between individuals giving everyone equal access without discrimination based on physical condition, age, sex and family income.
- Quality and Consistency: guaranteeing the service with the highest international standards for everyone, all the time.
- Reasonable costs: accessible to all users, profitable for the private operators and fundable by the state.

These principles attempt to solve problems such as:

- Slowness: the average trip of a citizen in Bogota・used to last 1 hour 10 minutes. This time is 100 % higher that the world average for comparable cities.
- Inefficiency: Public service routes that were too long (30 kilometers on average), operating with old buses (average age 14 years) with a low occupancy.
- Lack of security.

A-2 PROJECT TEAM AND SKILLS

TransMilenio is a public-private partnership project put together by a host of local agencies and private companies. Organization of the project is as follows:

Sector	Agency or Company	Skills
Public	Office of the Mayor	Leadership
	TRANSMILENIO S.A.	Public company
	Institute for Urban Development	Contracting infrastructure development and oversight
	Secretary of Transportation and Traffic	Reorganization of existing transit routes; enforcement; regulation; signalling
	Department of Planning	Insertion of the bus rapid transit system in the comprehensive plan; approval of road, public space and urban design
	Secretary of Finance	Budgeting and allocation of resources for infrastructure capital investments
	City Council (Local Elected Body)	Approval of plans, TRANSMILENIO S.A. creation and city budget
Private	Trunk Operation Concessionaries: SI99 S.A.; Expres del Futuro S.A.; SITM S.A.; Metrobus S.A.	Companies created out of existing transit operators for bus acquisition, drivers and maintenance personnel retention, operation and maintenance of buses
	Feeder Buses operation contractors: SIDAUTO, CODATERMIL; URIBE-URIBE; ALCON; ALNORTE	Existing transit operators, transformed to be able to operate feeder buses
	Fare Collection Concessionary: ANGELCOM S.A.	In charge of the billeting system, fare collection and money administration, using cutting edge technology
	Control centre provider: Electronic Traffic ETRA	Contractor of the installation and customisation of the largest real time control system for buses in Latin America and Spain
	Design, construction and supervision contractors	Companies providing their knowledge and capacity to design, build and supervise the system set up in 48 months

A-3 TECHNOLOGY/INNOVATIONS COMPONENTS

The control of the system is made through a satellite control centre that supervises in real time and permanently the operation of the buses and the number of passengers

that go in and out of the stations. Each vehicle that belongs to the network service has a GPS receiver that reports the location of the bus and a voice and data communication system through which information is sent and received to and from the Control Centre.

The entrance and departure gates in the stations are connected by radio and fiber-optic communication systems, so that it is possible to know the number of passengers that go in and out of the system. From the control centre changes are made to the services according to the operating conditions and the demand observed in real time.

The system has a combination of services (normal and express) that considerably increase the ability of the system to mobilize passengers. The express service serves specific origin-destination pairs in long trips and the normal service serves short routes since they stop at all the stations.

The achievements, capacity and mobility for "TransMilenio" are as follows:

- 401 network buses and 138 feeders in operation;
- Integrated ticket price $900 Pesos (US $ 0.40);
- 38 kilometers in operation;
- 60 stations in operation;
- 8 express routes, 2 normal and 19 feeder routes;
- 11 localities and more than 35 neighbourhoods under the influence of the system;
- 560.000 passengers mobilized daily. 10% of whom used to drive;
- Total number of passengers mobilized: 100.000.000, and
- Average speed for each trip: 26.7 Km/hr.

A-4 PROBLEMS ADDRESSED/OVERCOME

Taking into account the fact that public transportation in the city has always been provided with no controls, organization and without business parameters, in the beginning of the process there was opposition on behalf of the transportation businessmen, and the vehicle drivers and owners. This was more evident when the decision was made to physically dispose of 70 passenger buses to allow the entrance of an articulated bus in order to reduce the excess supply of transportation that existed in the city. The transportation businessmen made all the efforts to allow the vehicles to be disposed of using resources from the Capital District. However, after a lot of hours of negotiation, they were convinced that they were the ones who should provide the money and dispose of the vehicles. This resistance changed as the transportation businessmen and drivers participated in the design of the project.

A-5 VERIFIABLE INDICATORS

Comparing the years 1999 and 2001, there can be seen a reduction in 100 % of the fatalities and 54 % of the injured resulting from car accidents; this is the result of a

reduction of 86.4 % in simple crashes and 97.6 % in reported run-over accidents. Additionally, there has been an observed reduction of 47.2 % in reported theft. Reduction in the travel time by 50 % for the trips made within the system. The infrastructure work generated 7,300 direct jobs and 10,000 indirect jobs. 3,000 direct jobs have been generated in the operation. International alliances have been set up to make buses in Colombia, and this has been a beneficial result for the domestic automotive industry. Access for the handicapped: it will be estimated that 1 % of the users of the system (5,200 people per day) has some kind of handicap. To date 1,232 old buses have been retired from service with an average capacity of 60 passengers each. These vehicles had high contamination levels, physical deterioration, and an average use of 20 years. The noise and particle contamination has been reduced by 30 % in the corridors used by the system.

Central Lane System

Segregated from the General Traffic

Pedestrian Bridge linking to Bus Stop

Car Interior of Articulated Bus

A-6 PROJECT OGANIZATION, BACKING & ECONOMICS

(1) Owner and Collaborators

TRANSMILENIO S.A. is a stock based enterprise that performs, organizes and plans the massive urban passenger public transportation service in the city of Bogot・and its area of influence. The company is made up of the fund for education and road safety of the Secretary of Transit and Transportation of Bogot・(FONDATT) with 66.67 % of the stock, the Institute for Urban Development with 33.23 % of the stock,

the District Institute of Culture & Tourism (DICT), the Capital District, and Metrovivienda, each one with 0.0333% of the stock. All stockholders are public institutions from the District.

(2) Scale and Facilities

Number of technical devices in use: 401 articulated buses with a capacity for 160 passengers, 138 conventional buses with a capacity for 70 passengers, 53 single stations, 4 head stations, 4 intermediate stations 4 parking lots and shops, 26 pedestrian bridges, 1 fleet satellite control center.

(3) Operating Network

The size of operating network is 38 kilometers of network corridors that serve 11 localities and more than 35 neighborhoods. Number of persons concerned is 11,000 commuters and 550,000 residents

(4) Start and/or Duration of Project

- Start-up date of the project: 6 January 2001.
- Start-up date of the pilot project: 18 December 2000

A-7 LESSONS OF THE PAST AND LOOKING TO THE FUTURE

In 15 years TransMilenio plans to operate 388 kilometers of new routes in Bogota carrying 5 million people per day.

(1) Potential for Reliability

Bogota experience is recent and it lacks enough published materials. Nevertheless, it has been studied for implementation in other Colombian cities, and some other Latin American cities. Ibagua Bucaramanga and Pereira, medium size cities for Colombia (500,000 to 1 million inhabitants) are currently preparing projects to set-up bus systems, using bus ways and economic incentives for operations similar to those applied in Bogota. Valencia, Venezuela, Panama City and Lima, are looking into TransMilenio's experience to start up projects. TransMilenio's novel experience was also shared with 16 countries that visited Bogota in November 2001, for a seminar about the experience in Bogota.

The principles for TransMilenio's mobility strategy are universal in developing countries and could be considered, of course with an adaptation, to other conditions. The main recommendations for other cities are:

- Follow a continuous process with cooperative work among local, regional and national institutions, in which the objectives and strategies are clear from the very beginning.
- Create project task forces to provide coordination of the activities, especially if a complex institutional environment is in place.

- Assign important technical and financial resources for project preparation and implementation, with a clear goal to make them happen rather than making studies to decide what to do.
- Make an effort to involve stakeholders that may oppose project implementation to minimize political risks.
- Think in the long term, with specific actions that have immediate effects to show the potential of the initiatives.
- Seek financial sustainability of each initiative, using measures that also support the basic principles, such as fuel taxes, property value capture, tolls, privatisations, even if these measures are not popular.
- Leave in hands of the private sector the provision of services, but give the right incentives and improve the regulatory framework. Bogota · has had private provision of public transportation for many years (beginning 1932), nevertheless, operations are not adequate, as a result wrong economic incentives, inappropriate regulation and lack of effective control. It is expected that the success of TransMilenio will result in a gradual transformation of this situation.

Some important lessons of the system implementation are:

- Information campaigns are essential. It is necessary to create awareness on which is the transportation system the city deserves for existing and upcoming generations. This is a way for the project became owned by the community, increasing its participation in the benefits and making them politically, social and financially feasible. For instance, the system initiated operations without charge for three weeks, allowing more than 1 million users the get acquainted with TransMilenio.
- Participation of stakeholders that may feel that they would be affected is critical. For example, the participation of existing bus operators, enriched the way TransMilenio system was structured and helped avoid large traumas.
- Set up of task forces to allow for institutional coordination and fast execution of processes. These task forces helped in contracting and following up preparation studies, some of them with well-recognized international firms associated with local firms. These mechanisms achieved fast transfer of knowledge and technology; increased the quality and credibility, and facilitated the participation of local and international investors.
- Study previous experiences. Among lessons learned from other cities, it is worth to mention examples of organized bus systems in Curitiba, Sao Paulo, Santiago de Chile and Quito, which helped in planning TransMilenio.

The main recommendations of what not to do, are:

- Do not ask consultants what to do, ask them how. The transportation planning history of the city is full of studies and proposals that were never accomplished. Most of them were the result of comprehensive studies trying to indicate what should be done, without the adequate resources to make the projects happen. This time, it was clear for the city administration, what was possible and doable, and consultants helped shaping these ideas into feasible activities.

- Do not make one turnkey contract; be your own manager. Big contracts with everything inside have been disastrous in the Colombian experience. Usually they end up in endless court disputes. The city decided to have many contracts of specific pieces, with proper management and supervision from the Institute for Urban Development. This helped the local construction industry to have wider participation, and to have the best possible providers in each type of infrastructure (roads, metallic overpasses, stations, etc.). This is what usually a turnkey contractor does, at a very high administrative cost and overhead.
- Do not try to get everything done at the same time. TransMilenio was implemented gradually as the infrastructure and buses became available. This allowed for fast learning and made possible to make adjustments on the rest of the infrastructure and operations.

APPENDIX B

PROPOSED SIGNAL SYSTEM FOR SIGNALIZED INTERSECTION

APPENDIX B: PROPOSED SIGNAL SYSTEM FOR SIGNALIZED INTERSECTION

This appendix presents the results of proposed signal system along Metro 4 Corridor. The calculation of the saturation flow rate and the saturation degree of the intersection was carried out, in order to formulate adequate signal splits. All the saturation flow rate, the saturation degree of the intersection and the proposed signal phasing system are shown as follows:

B-1 SATURATION FLOW RATE AND SATURATION DEGREE BY TARGET INTERSECTIONS

The saturation flow rate and the saturation degree by the target intersections are shown in Table B.1.

B-2 PROPOSED SIGNAL PAHSING SYSTEM FOR KEY SIGNALIZED INTERSECTION

The proposed signal phasing system for key intersections is shown in Figure B.1.

Table B.1 Saturation Flow Rate and Saturation Degree by Target Intersections

Intersection No.1: Port Said St., Qalyoobeya Bus Terminal

AM Peak

Approach		Eastbound			Westbound			Northbound			Southbound			Bus Northbound			Bus Southbound				
		1 - 1			1 - 2			1 - 3			1 - 4			1 - 3B							
								T	L		T+R	T		-	T+L	-	-	T+R	-		
1) No. of lanes								1	1		1	1		-	1	-	-	1	-		
2) Basic value of saturation flow rate								2,000	1,800		2,000	2,000		-	2,000	-	-	2,000	-		
3) Adjustment factor for left								1.00	1.00		1.00	1.00		-	1.00		-	1.00			
4) Adjustment factor for right								1.00	1.00		0.98	1.00		-	1.00	-	-	1.00	-		
5) Saturation flow rate								2,000	1,800		1,968	2,000		-	1,996	-	-	1,997	-		
								2,000	1,800		3,968				1,996			1,997			
7) PCU direction volume(bus)														0	204	4	2	136			
															208			138			
8) PCU direction volume(others)								906	160		118	671		0	0	0	0	0	0		
								906	160		789				0			0			
9) PCU direction volume (total)								906	160		118	671		0	204	4	2	136	0		
								906	160		789				208			138			
10) Flow rate								0.453	0.089		0.199				0.104			0.069		λi	Σλ
11) Necessary phase ratio	1Φ														0.104			0.069		0.104	
	2Φ							0.453				0.199								0.453	0.646
	3Φ								0.089											0.089	
	4Φ							(All Red for Pedestrian)												0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	15%	0%	0%	0%	0%	0%	0%	1%	0%		

PM Peak

Approach		Eastbound			Westbound			Northbound			Southbound			Bus Northbound			Bus Southbound				
		1 - 1			1 - 2			1 - 3			1 - 4			1 - 3B							
								T	L		T+R	T			T+L			T+R			
1) No. of lanes								1	1		1	1			1			1			
2) Basic value of saturation flow rate								2,000	1,800		2,000	2,000			2,000			2,000			
3) Adjustment factor for left								1.00	1.00		1.00	1.00			0.98			1.00			
4) Adjustment factor for right								1.00	1.00		0.98	1.00			1.00			0.98			
5) Saturation flow rate								2,000	1,800		1,968	2,000			1,968			1,965			
								2,000	1,800		3,968				1,968			1,965			
7) PCU direction volume(bus)														0	12	2	3	15			
															14			18			
8) PCU direction volume(others)								982	173		147	836		0	0	0	0	0	0		
								982	173		983				0			0			
9) PCU direction volume (total)								982	173		147	836		0	12	2	3	15	0		
								982	173		983				14			18			
10) Flow rate								0.491	0.096		0.248				0.007			0.009		λi	Σλ
11) Necessary phase ratio	1Φ														0.007			0.009		0.009	
	2Φ							0.491				0.248								0.491	0.596
	3Φ								0.096											0.096	
	4Φ							(All Red for Pedestrian)												0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	15%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	15%	0%	0%	0%	0%	0%	0%	16%	0%		

Intersection No.2: Port Said St., Sawah St.

AM Peak

Approach		Eastbound			Westbound			Northbound			Southbound			BusSouthbound				
		2 - 1			2 - 2			2 - 3			2 - 4			2 - 4				
		R	T	T+L	R	T	T+L	R	T	T+L	R	T	T+L		T+L			
1) No. of lanes		1	1	1	1	1	1	1	2	1	1	1	1		1			
2) Basic value of saturation flow rate		1,800	2,000	2,000	1,800	2,000	2,000	1,800	2,000	2,000	1,800	2,000	2,000		2,000			
3) Adjustment factor for left		1.00	1.00	0.97	1.00	1.00	0.97	1.00	1.00	0.98	1.00	1.00	0.98		0.97			
4) Adjustment factor for right		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00			
5) Saturation flow rate		1,800	2,000	1,930	1,800	2,000	1,943	1,800	4,000	1,956	1,800	2,000	1,969		1,937			
		1,800	3,930		1,800	3,943		1,800	5,956		1,800	3,969			1,937			
7) PCU direction volume(bus)		246	354	265	194	341	132	33	329	66					113	48		
		246	619		194	473		33	395						160			
8) PCU direction volume(others)		324	732	266	305	534	188	91	642	182	407	1,161	196					
		324	998		305	722		91	823		407	1,357						
9) PCU direction volume (total)		570	1,086	531	498	875	320	124	970	248	407	1,161	196		113	48		
		570	1,617		498	1,195		124	1,219		407	1,357			160			
10) Flow rate		0.317	0.412		0.277	0.303		0.069	0.205		0.226	0.342			0.083		λi	Σλ
11) Necessary phase ratio	1Φ														0.083		0.083	
	2Φ							0.069	0.205		0.226	0.342					0.342	0.836
	3Φ	0.317	0.412		0.277	0.303											0.412	
	4Φ																0.000	
13) Ratio of left turn		0%	0%	33%	0%	0%	27%	0%	0%	20%	0%	0%	14%	0%	0%	30%		
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		

PM Peak

Approach		Eastbound			Westbound			Northbound			Southbound			BusSouthbound				
		2 - 1			2 - 2			2 - 3			2 - 4			2 - 4				
		R	T	T+L	R	T	T+L	R	T	T+L	R	T	T+L		T+L			
1) No. of lanes		1	1	1	1	1	1	1	2	1	1	1	1		1			
2) Basic value of saturation flow rate		1,800	2,000	2,000	1,800	2,000	2,000	1,800	2,000	2,000	1,800	2,000	2,000		2,000			
3) Adjustment factor for left		1.00	1.00	0.97	1.00	1.00	0.97	1.00	1.00	0.98	1.00	1.00	0.98		0.98			
4) Adjustment factor for right		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00			
5) Saturation flow rate		1,800	2,000	1,939	1,800	2,000	1,939	1,800	4,000	1,960	1,800	2,000	1,960		1,960			
		1,800	3,939		1,800	3,939		1,800	5,960		1,800	3,960			1,960			
7) PCU direction volume(bus)		135	225	90	213	354	142	85	277	64					120	28		
		135	316		213	496		85	341						148			
8) PCU direction volume(others)		481	801	320	592	987	395	280	912	210	317	959	221					
		481	1,122		592	1,382		280	1,122		317	1,181						
9) PCU direction volume (total)		616	1,027	411	805	1,341	536	366	1,189	274	317	959	221		120	28		
		616	1,437		805	1,878		366	1,463		317	1,181			148			
10) Flow rate		0.342	0.365		0.447	0.477		0.203	0.245		0.176	0.298			0.075		λi	Σλ
11) Necessary phase ratio	1Φ														0.075		0.075	
	2Φ							0.203	0.245		0.176	0.298					0.298	0.850
	3Φ	0.342	0.365		0.447	0.477											0.477	
	4Φ																0.000	
13) Ratio of left turn		0%	0%	29%	0%	0%	29%	0%	0%	19%	0%	0%	19%	0%	0%	19%		
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		

Intersection No.3: Port Said St., Monstaamara St

AM Peak

Approach		Eastbound			Westbound			Northbound			Southbound			Bus Northbound			Bus Southbound				
		3 - 1			3 - 2			3 - 3			3 - 4			3 - 3B			3 - 4B				
		R	-	L	-	-	-	-	T	T+L	T+R	T	-	-	T+L	-	-	T+R	-		
1) No. of lanes		1	-	1	-	-	-	-	1	1	1	1	-	-	1	-	-	1	-		
2) Basic value of saturation flow rate		1,800	-	1,800	-	-	-	-	2,000	2,000	2,000	2,000	-	-	2,000	-	-	2,000	-		
3) Adjustment factor for left		1.00	-	1.00	-	-	-	-	1.00	0.99	1.00	1.00	-	-	0.99		-	1.00			
4) Adjustment factor for right		1.00	-	1.00	-	-	-	-	1.00	1.00	0.99	1.00	-	-	1.00	-	-	0.99	-		
5) Saturation flow rate		1,800	-	1,800	-	-	-	-	2,000	1,978	1,978	2,000	-	-	1,978	-	-	1,978	-		
		3,600			-			3,978			3,978			1,978			1,978				
7) PCU direction volume(bus)		36	-	37	-	-	-	-	-	-	-	-	-		161	18	19	166	-		
		72			-			-			-			178			184				
8) PCU direction volume(others)		93	-	168	-	-	-	-	999	111	187	1,676	-	-	-	-	-	-	-		
		261			-			1,111			1,863			-			-				
9) PCU direction volume (total)		129	-	205	-	-	-	-	999	111	187	1,676	-	-	161	18	19	166	-		
		333			-			1,111			1,863			178			184				
10) Flow rate		0.093			-			0.279			0.468			0.090			0.093			λi	Σλ
11) Necessary phase ratio	1Φ														0.090			0.093		0.093	
	2Φ								0.279			0.468								0.468	0.654
	3Φ		0.093																	0.093	
	4Φ								(All Red for Pedestrian)											0.000	
13) Ratio of left turn		0%	0%	0%	-	-	-	-	0%	10%	0%	0%	-	0%	10%	0%	0%	0%	-		
14) Ratio of right turn		0%	0%	0%	-	-	-	-	0%	0%	10%	0%	-	0%	0%	0%	0%	10%	-		

PM Peak

Approach		Eastbound			Westbound			Northbound			Southbound			Bus Northbound			Bus Southbound				
		3 - 1			3 - 2			3 - 3			3 - 4			3 - 3B			3 - 4B				
		T+R	-	T+L	T+R	-	T+L	-	T	T+L	T+R	T	-	-	T+L	-	-	T+R	-		
1) No. of lanes		1	-	1	-	-	-	-	1	1	1	1	-	-	1	-	-	1	-		
2) Basic value of saturation flow rate		1,800	-	1,800	-	-	-	-	2,000	2,000	2,000	2,000	-	-	2,000	-	-	2,000	-		
3) Adjustment factor for left		1.00	-	1.00	-	-	-	-	1.00	0.99	1.00	1.00	-	-	0.99		-	1.00			
4) Adjustment factor for right		1.00	-	1.00	-	-	-	-	1.00	1.00	0.99	1.00	-	-	1.00	-	-	0.99	-		
5) Saturation flow rate		1,800	-	1,800	-	-	-	-	2,000	1,978	1,978	2,000	-	-	1,978	-	-	1,978	-		
		3,600			-			3,978			3,978			1,978			1,978				
7) PCU direction volume(bus)		44	0	35	-	-	-	-	-	-	-	-	-	-	196	22	18	159	-		
		79			-			-			-			218			176				
8) PCU direction volume(others)		143	0	141	-	-	-	-	1,483	165	159	1,429	-	-	-	-	-	-	-		
		284			-			1,649			1,588			-			-				
9) PCU direction volume (total)		187	-	176	-	-	-	-	1,483	165	159	1,429	-	-	196	22	18	159	-		
		363			-			1,649			1,588			218			176				
10) Flow rate		0.101			-			0.414			0.399			0.110			0.089			λi	Σλ
11) Necessary phase ratio	1Φ														0.110			0.089		0.110	
	2Φ								0.414			0.399								0.414	0.625
	3Φ		0.101																	0.101	
	4Φ								(All Red for Pedestrian)											0.000	
13) Ratio of left turn		0%	0%	0%	-	-	-	-	0%	10%	0%	0%	-	0%	10%	0%	0%	0%	-		
14) Ratio of right turn		0%	0%	0%	-	-	-	-	0%	0%	10%	0%	-	0%	0%	0%	0%	10%	-		

Intersection No.4: Port Said St., Madinet El Ashraf

AM Peak

Approach		Eastbound			Westbound			Northbound			Southbound			Bus Northbound			Bus Southbound				
		4 - 1			4 - 2			4 - 3			4 - 4			4 - 3B			4 - 4B				
		R	-	L	-	-	-	-	T	T+L	T+R	T	-	-	T+L	-	-	T+R	-		
1) No. of lanes		1	-	1	-	-	-	-	1	1	1	1	-	-	1	-	-	1	-		
2) Basic value of saturation flow rate		1,800	-	1,800	-	-	-	-	2,000	2,000	2,000	2,000	-	-	2,000	-	-	2,000	-		
3) Adjustment factor for left		1.00	-	0.94	-	-	-	-	1.00	0.99	1.00	1.00	-	-	0.99		-	1.00			
4) Adjustment factor for right		0.96	-	1.00	-	-	-	-	1.00	1.00	0.99	1.00	-	-	1.00	-	-	0.99	-		
5) Saturation flow rate		1,727	-	1,686	-	-	-	-	2,000	1,978	1,978	2,000	-	-	1,978	-	-	1,978	-		
		3,413			-			3,978			3,978			1,978			1,978				
7) PCU direction volume(bus)		36	-	37	-	-	-	-	-	-	-	-	-		155	17	17	150	-		
		72			-			-			-			173			166				
8) PCU direction volume(others)		93	-	168	-	-	-	-	1,197	133	125	1,121	-	-	-	-	-	-	-		
		261			-			1,330			1,246			-			-				
9) PCU direction volume (total)		129	-	205	-	-	-	-	1,197	133	125	1,121	-	-	155	17	17	150	-		
		333			-			1,330			1,246			173			166				
10) Flow rate		0.098			-			0.334			0.313			0.087			0.084			λi	Σλ
11) Necessary phase ratio	1Φ														0.087			0.084		0.087	
	2Φ								0.334			0.313								0.334	0.519
	3Φ		0.098																	0.098	
	4Φ								(All Red for Pedestrian)											0.000	
13) Ratio of left turn		0%	0%	61%	-	-	-	-	0%	10%	0%	0%	-	0%	10%	0%	0%	0%	-		
14) Ratio of right turn		39%	0%	0%	-	-	-	-	0%	0%	10%	0%	-	0%	0%	0%	0%	10%	-		

PM Peak

Approach		Eastbound			Westbound			Northbound			Southbound			Bus Northbound			Bus Southbound				
		4 - 1			4 - 2			4 - 3			4 - 4			4 - 3B			4 - 4B				
		T+R	-	T+L	T+R	-	T+L	-	T	T+L	T+R	T	-	-	T+L	-	-	T+R	-		
1) No. of lanes		1	-	1	-	-	-	-	1	1	1	1	-	-	1	-	-	1	-		
2) Basic value of saturation flow rate		1,800	-	1,800	-	-	-	-	2,000	2,000	2,000	2,000	-	-	2,000	-	-	2,000	-		
3) Adjustment factor for left		1.00	-	0.94	-	-	-	-	1.00	0.99	1.00	1.00	-	-	0.99		-	1.00			
4) Adjustment factor for right		0.96	-	1.00	-	-	-	-	1.00	1.00	0.99	1.00	-	-	1.00	-	-	0.99	-		
5) Saturation flow rate		1,723	-	1,690	-	-	-	-	2,000	1,978	1,978	2,000	-	-	1,978	-	-	1,978	-		
		3,413			-			3,978			3,978			1,978			1,978				
7) PCU direction volume(bus)		22	-	26	-	-	-	-	-	-	-	-	-	-	115	13	11	100	-		
		48			-			-			-			128			111				
8) PCU direction volume(others)		106	-	161	-	-	-	-	1,564	174	117	1,055	-	-	-	-	-	-	-		
		267			-			1,738			1,172			-			-				
9) PCU direction volume (total)		128	-	187	-	-	-	-	1,564	174	117	1,055	-	-	115	13	11	100	-		
		315			-			1,738			1,172			128			111				
10) Flow rate		0.092			-			0.437			0.295			0.064			0.056			λi	Σλ
11) Necessary phase ratio	1Φ														0.064			0.056		0.064	
	2Φ								0.437			0.295								0.437	0.594
	3Φ		0.092																	0.092	
	4Φ								(All Red for Pedestrian)											0.000	
13) Ratio of left turn		0%	0%	59%	-	-	-	-	0%	10%	0%	0%	-	0%	10%	0%	0%	0%	-		
14) Ratio of right turn		41%	0%	0%	-	-	-	-	0%	0%	10%	0%	-	0%	0%	0%	0%	10%	-		

Intersection No.5: Port Said St., Sekket El Wayly St.

AM Peak

Approach		Eastbound			Westbound			Northbound			Southbound			Bus Northbound			Bus Southbound				
		5 - 1			5 - 2			5 - 3			5 - 4			5 - 3B			5 - 4B				
		T+R	T	T+L	T+R	T	T+L	T+R	-	T	T+R	-	T	-	T+L+R	-	-	T+L+R	-		
1) No. of lanes		1	1	1	1	1	1	1	-	1	1	-	1	-	1	-	-	1	-		
2) Basic value of saturation flow rate		2,000	2,000	2,000	2,000	2,000	2,000	2,000	-	2,000	2,000	-	2,000	-	2,000	-	-	2,000	-		
3) Adjustment factor for left		1.00	1.00	0.97	1.00	1.00	0.98	1.00	-	1.00	1.00	-	1.00	-	0.99		-	1.00			
4) Adjustment factor for right		0.99	1.00	1.00	0.96	1.00	1.00	0.98	-	1.00	0.97	-	1.00	-	0.97	-	-	0.96	-		
5) Saturation flow rate		1,986	2,000	1,942	1,926	2,000	1,966	1,954	-	2,000	1,947	-	2,000	-	1,918	-	-	1,914	-		
			5,928			5,892			3,954			3,947			1,918			1,914			
7) PCU direction volume(bus)		33	149	43	35	140	95							50	106	16	63	99	5		
			224			270			0			0			173			166			
8) PCU direction volume(others)		84	1,026	434	529	665	160	285	780	265	309	848	89	0	0	0	0	0	0		
			1,544			1,354			1,330			1,246			0			0			
9) PCU direction volume (total)		116	1,176	477	564	805	255	285	780	265	309	848	89	50	106	16	63	99	5		
			1,769			1,624			1,330			1,246			173			166			
10) Flow rate			0.298			0.276			0.336			0.316			0.090			0.087		λi	Σλ
11) Necessary phase ratio	1Φ														0.090			0.087		0.090	0.725
	2Φ								0.336			0.316								0.336	
	3Φ		0.298			0.276														0.298	
	4Φ																			0.000	
13) Ratio of left turn		0%	0%	27%	0%	0%	16%	0%	0%	0%	0%	0%	0%	0%	9%	0%	0%	3%	0%		
14) Ratio of right turn		7%	0%	0%	35%	0%	0%	21%	0%	0%	25%	0%	0%	0%	29%	0%	0%	38%	0%		

PM Peak

Approach		Eastbound			Westbound			Northbound			Southbound			Bus Northbound			Bus Southbound				
		5 - 1			5 - 2			5 - 3			5 - 4			5 - 3B			5 - 4B				
		T+R	T	T+L	T+R	T	T+L	T+R	-	T	T+R	-	T	-	T+L+R	-	-	T+L+R	-		
1) No. of lanes		1	1	1	1	1	1	1	-	1	1	-	1	-	1	-	-	1	-		
2) Basic value of saturation flow rate		2,000	2,000	2,000	2,000	2,000	2,000	2,000	-	2,000	2,000	-	2,000	-	2,000	-	-	2,000	-		
3) Adjustment factor for left		1.00	1.00	0.97	1.00	1.00	0.98	1.00	-	1.00	1.00	-	1.00	-	0.99		-	1.00			
4) Adjustment factor for right		0.99	1.00	1.00	0.98	1.00	1.00	0.98	-	1.00	0.97	-	1.00	-	0.99	-	-	0.97	-		
5) Saturation flow rate		1,979	2,000	1,940	1,954	2,000	1,969	1,956	-	2,000	1,948	-	2,000	-	1,958	-	-	1,938	-		
			5,919			5,923			3,956			3,948			1,958			1,938			
7) PCU direction volume(bus)		33	148	58	35	83	115							16	103	9	30	79	3		
			238			233			0			0			128			111			
8) PCU direction volume(others)		132	903	416	338	1,025	132	359	1,085	294	286	786	101								
			1,450			1,494			1,738			1,173			0			0			
9) PCU direction volume (total)		164	1,050	473	373	1,107	247	359	1,085	294	286	786	101	16	103	9	30	79	3		
			1,688			1,727			1,738			1,173			128			111			
10) Flow rate			0.285			0.292			0.439			0.297			0.065			0.057		λi	Σλ
11) Necessary phase ratio	1Φ														0.065			0.057		0.065	0.796
	2Φ								0.439			0.297								0.439	
	3Φ		0.285			0.292														0.292	
	4Φ																			0.000	
13) Ratio of left turn		0%	0%	28%	0%	0%	14%	0%	0%	0%	0%	0%	0%	0%	7%	0%	0%	2%	0%		
14) Ratio of right turn		10%	0%	0%	22%	0%	0%	21%	0%	0%	24%	0%	0%	0%	13%	0%	0%	27%	0%		

Intersection No.6: Port Said St., Garag El Baladeya St.

AM Peak

Approach		Eastbound			Westbound			Northbound			Southbound			Bus Northbound			Bus Southbound				
		6 - 1			6 - 2			6 - 3			6 - 4			6 - 3B			6 - 4B				
		R	-	L	-	-	-	-	T	T+L	T+R	T	-	-	T+L	-	-	T+R	-		
1) No. of lanes		1	-	1	-	-	-	-	1	1	1	1	-	-	1	-	-	1	-		
2) Basic value of saturation flow rate		1,800	-	1,800	-	-	-	-	2,000	2,000	2,000	2,000	-	-	2,000	-	-	2,000	-		
3) Adjustment factor for left		1.00	-	0.95	-	-	-	-	1.00	0.99	1.00	1.00	-	-	0.99		-	1.00			
4) Adjustment factor for right		0.95	-	1.00	-	-	-	-	1.00	1.00	0.99	1.00	-	-	1.00	-	-	0.99	-		
5) Saturation flow rate		1,709	-	1,703	-	-	-	-	2,000	1,978	1,978	2,000	-	-	1,978	-	-	1,978	-		
			3,412			-			3,978			3,978			1,978			1,978			
7) PCU direction volume(bus)		33	-	35	-	-	-	-	-	-	-	-	-		161	18	19	166	-		
			68			-			-			-			178			184			
8) PCU direction volume(others)		108	-	116	-	-	-	-	999	111	187	1,676	-	-	-	-	-	-	-		
			224			-			1,111			1,863			-			-			
9) PCU direction volume (total)		141	-	150	-	-	-	-	999	111	187	1,676	-	-	161	18	19	166	-		
			291			-			1,111			1,863			178			184			
10) Flow rate			0.085			-			0.279			0.468			0.090			0.093		λi	Σλ
11) Necessary phase ratio	1Φ														0.090			0.093		0.093	0.647
	2Φ								0.279			0.468								0.468	
	3Φ		0.085																	0.085	
	4Φ								(All Red for Pedestrian)											0.000	
13) Ratio of left turn		0%	0%	52%	-	-	-	-	0%	10%	0%	0%	-	0%	10%	0%	0%	0%	-		
14) Ratio of right turn		48%	0%	0%	-	-	-	-	0%	0%	10%	0%	-	0%	0%	0%	0%	10%	-		

PM Peak

Approach		Eastbound			Westbound			Northbound			Southbound			Bus Northbound			Bus Southbound				
		6 - 1			6 - 2			6 - 3			6 - 4			6 - 3B			6 - 4B				
		T+R	-	T+L	T+R	-	T+L	-	T	T+L	T+R	T	-	-	T+L	-	-	T+R	-		
1) No. of lanes		1	-	1	-	-	-	-	1	1	1	1	-	-	1	-	-	1	-		
2) Basic value of saturation flow rate		1,800	-	1,800	-	-	-	-	2,000	2,000	2,000	2,000	-	-	2,000	-	-	2,000	-		
3) Adjustment factor for left		1.00	-	0.95	-	-	-	-	1.00	0.99	1.00	1.00	-	-	0.99		-	1.00			
4) Adjustment factor for right		0.95	-	1.00	-	-	-	-	1.00	1.00	0.99	1.00	-	-	1.00	-	-	0.99	-		
5) Saturation flow rate		1,704	-	1,709	-	-	-	-	2,000	1,978	1,978	2,000	-	-	1,978	-	-	1,978	-		
			3,412			-			3,978			3,978			1,978			1,978			
7) PCU direction volume(bus)		44	0	35	-	-	-	-	-	-	-	-	-	-	196	22	18	159	-		
			79			-			-			-			218			176			
8) PCU direction volume(others)		143	0	141	-	-	-	-	1,483	165	159	1,429	-	-	-	-	-	-	-		
			284			-			1,649			1,588			-			-			
9) PCU direction volume (total)		187	-	176	-	-	-	-	1,483	165	159	1,429	-	-	196	22	18	159	-		
			363			-			1,649			1,588			218			176			
10) Flow rate			0.106			-			0.414			0.399			0.110			0.089		λi	Σλ
11) Necessary phase ratio	1Φ														0.110			0.089		0.110	0.631
	2Φ								0.414			0.399								0.414	
	3Φ		0.106																	0.106	
	4Φ								(All Red for Pedestrian)											0.000	
13) Ratio of left turn		0%	0%	49%	-	-	-	-	0%	10%	0%	0%	-	0%	10%	0%	0%	0%	-		
14) Ratio of right turn		51%	0%	0%	-	-	-	-	0%	0%	10%	0%	-	0%	0%	0%	0%	10%	-		

Intersection No.7: Port Said St., Farz St.

AM Peak

Approach	Eastbound			Westbound			Northbound			Southbound			Bus Northbound			Bus Southbound				
	7 - 1			7 - 2			7 - 3			7 - 4			7 - 3B			7 - 4B				
	R	-	L	-	-	-	-	T	T+L	T+R	T	-	-	T+L	-	-	T+R	-		
1) No. of lanes	1	-	1	-	-	-	-	1	1	1	1	-	-	1	-	-	1	-		
2) Basic value of saturation flow rate	1,800	-	1,800	-	-	-	-	2,000	2,000	2,000	2,000	-	-	2,000	-	-	2,000	-		
3) Adjustment factor for left	1.00	-	0.95	-	-	-	-	1.00	0.99	1.00	1.00	-	-	0.99		-	1.00			
4) Adjustment factor for right	0.95	-	1.00	-	-	-	-	1.00	1.00	0.99	1.00	-	-	1.00	-	-	0.99	-		
5) Saturation flow rate	1,709	-	1,703	-	-	-	-	2,000	1,978	1,978	2,000	-	-	1,978	-	-	1,978	-		
	3,412			-			3,978			3,978			1,978			1,978				
7) PCU direction volume(bus)	33	-	35	-	-	-	-	-	-	-	-	-		161	18	19	166	-		
	68			-			-			-			178			184				
8) PCU direction volume(others)	108	-	116	-	-	-	-	999	111	187	1,676	-	-	-	-	-	-	-		
	224			-			1,111			1,863			-			-				
9) PCU direction volume (total)	141	-	150	-	-	-	-	999	111	187	1,676	-	-	161	18	19	166	-		
	291			-			1,111			1,863			178			184				
10) Flow rate	0.085			-			0.279			0.468			0.090			0.093		λi	Σλ
11) Necessary phase ratio 1Φ													0.090			0.093		0.093	0.647
11) Necessary phase ratio 2Φ							0.279				0.468							0.468		
11) Necessary phase ratio 3Φ		0.085																0.085		
11) Necessary phase ratio 4Φ							(All Red for Pedestrian)											0.000		
13) Ratio of left turn	0%	0%	52%	-	-	-	-	0%	10%	0%	0%	-	0%	10%	0%	0%	0%	-		
14) Ratio of right turn	48%	0%	0%	-	-	-	-	0%	0%	10%	0%	-	0%	0%	0%	0%	10%	-		

PM Peak

Approach	Eastbound			Westbound			Northbound			Southbound			Bus Northbound			Bus Southbound				
	7 - 1			7 - 2			7 - 3			7 - 4			7 - 3B			7 - 4B				
	R	-	L	-	-	-	-	T	T+L	T+R	T	-	-	T+L	-	-	T+R	-		
1) No. of lanes	1	-	1	-	-	-	-	1	1	1	1	-	-	1	-	-	1	-		
2) Basic value of saturation flow rate	1,800	-	1,800	-	-	-	-	2,000	2,000	2,000	2,000	-	-	2,000	-	-	2,000	-		
3) Adjustment factor for left	1.00	-	0.95	-	-	-	-	1.00	0.99	1.00	1.00	-	-	0.99		-	1.00			
4) Adjustment factor for right	0.95	-	1.00	-	-	-	-	1.00	1.00	0.99	1.00	-	-	1.00	-	-	0.99	-		
5) Saturation flow rate	1,704	-	1,709	-	-	-	-	2,000	1,978	1,978	2,000	-	-	1,978	-	-	1,978	-		
	3,412			-			3,978			3,978			1,978			1,978				
7) PCU direction volume(bus)	44	0	35	-	-	-	-	-	-	-	-	-	-	196	22	18	159	-		
	79			-			-			-			218			176				
8) PCU direction volume(others)	143	0	141	-	-	-	-	1,483	165	159	1,429	-	-	-	-	-	-	-		
	284			-			1,649			1,588			-			-				
9) PCU direction volume (total)	187	-	176	-	-	-	-	1,483	165	159	1,429	-	-	196	22	18	159	-		
	363			-			1,649			1,588			218			176				
10) Flow rate	0.106			-			0.414			0.399			0.110			0.089		λi	Σλ
11) Necessary phase ratio 1Φ													0.110			0.089		0.110	0.631
11) Necessary phase ratio 2Φ							0.414				0.399							0.414		
11) Necessary phase ratio 3Φ		0.106																0.106		
11) Necessary phase ratio 4Φ							(All Red for Pedestrian)											0.000		
13) Ratio of left turn	0%	0%	49%	-	-	-	-	0%	10%	0%	0%	-	0%	10%	0%	0%	0%	-		
14) Ratio of right turn	51%	0%	0%	-	-	-	-	0%	0%	10%	0%	-	0%	0%	0%	0%	10%	-		

Intersection No.8: Port Said St., Maamal El Saboon St.

AM Peak

Approach	Eastbound			Westbound			Northbound			Southbound			Bus Northbound			Bus Southbound				
	8 - 1			8 - 2			8 - 3			8 - 4			8 - 3B			8 - 4B				
	-	-	-	-	-	-	-	T	T+U		T	T+U	-	T	-	-	T	-		
1) No. of lanes	-	-	-	-	-	-	-	1	1		1	1	-	1	-	-	1	-		
2) Basic value of saturation flow rate	-	-	-	-	-	-	-	2,000	2,000		2,000	2,000	-	2,000	-	-	2,000	-		
3) Adjustment factor for left	-	-	-	-	-	-	-	1.00	0.99		1.00	0.99	-	1.00		-	1.00			
4) Adjustment factor for right	-	-	-	-	-	-	-	1.00	1.00		1.00	1.00	-	1.00	-	-	1.00	-		
5) Saturation flow rate	-	-	-	-	-	-	-	2,000	1,982		2,000	1,980	-	2,000	-	-	2,000	-		
	-			-			3,982				3,980			2,000			2,000			
7) PCU direction volume(bus)	-	-	-	-	-	-	-	-	-	-	-	-		179			184	-		
	-			-			-				-			179			184			
8) PCU direction volume(others)	-	-	-	-	-	-	-	1,017	93		1,694	168	-	-	-	-	-	-		
	-			-			1,111				1,862			-			-			
9) PCU direction volume (total)	-	-	-	-	-	-	-	1,017	93		1,694	168	-	179			184	-		
	-			-			1,111				1,862			179			184			
10) Flow rate	-			-			0.279				0.468			0.089			0.092		λi	Σλ
11) Necessary phase ratio 1Φ														0.089			0.092		0.092	0.560
11) Necessary phase ratio 2Φ							0.279				0.468								0.468	
11) Necessary phase ratio 3Φ																			0.000	
11) Necessary phase ratio 4Φ							(All Red for Pedestrian)												0.000	
13) Ratio of left turn	-	-	-	-	-	-	-	0%	8%	0%	0%	9%	0%	0%	0%	0%	0%	-		
14) Ratio of right turn	-	-	-	-	-	-	-	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-		

PM Peak

Approach	Eastbound			Westbound			Northbound			Southbound			Bus Northbound			Bus Southbound				
	8 - 1			8 - 2			8 - 3			8 - 4			8 - 3B			8 - 4B				
	-	-	-	T+R	-	T+L	-	T	U		T	U	-	T	-	-	T	-		
1) No. of lanes	-	-	-	-	-	-	-	1	1		1	1	-	1	-	-	1	-		
2) Basic value of saturation flow rate	-	-	-	-	-	-	-	2,000	1,800		2,000	1,800	-	2,000	-	-	2,000	-		
3) Adjustment factor for left	-	-	-	-	-	-	-	1.00	0.99		1.00	0.99	-	1.00		-	1.00			
4) Adjustment factor for right	-	-	-	-	-	-	-	1.00	1.00		1.00	1.00	-	1.00	-	-	1.00	-		
5) Saturation flow rate	-	-	-	-	-	-	-	2,000	1,783		2,000	1,783	-	2,000	-	-	2,000	-		
	-			-			3,783				3,783			2,000			2,000			
7) PCU direction volume(bus)	-	-	-	-	-	-	-	-	-	-	-	-		218	-	-	177	-		
	-			-			-				-			218			177			
8) PCU direction volume(others)	-	-	-	-	-	-	-	1,505	143		1,447	141	-	-	-	-	-	-		
	-			-			1,649				1,588			-			-			
9) PCU direction volume (total)	-	-	-	-	-	-	-	1,505	143		1,447	141	-	218			177	-		
	-			-			1,649				1,588			218			177			
10) Flow rate	-			-			0.436				0.420			0.109			0.088		λi	Σλ
11) Necessary phase ratio 1Φ														0.109			0.088		0.109	0.545
11) Necessary phase ratio 2Φ							0.436				0.420								0.436	
11) Necessary phase ratio 3Φ																			0.000	
11) Necessary phase ratio 4Φ							(All Red for Pedestrian)												0.000	
13) Ratio of left turn	-	-	-	-	-	-	-	0%	9%	0%	0%	9%	0%	0%	0%	0%	0%	-		
14) Ratio of right turn	-	-	-	-	-	-	-	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-		

Intersection No.9: Port Said St., Ghamra Station. Metro Line 1

AM Peak

Approach		Eastbound 9 - 1			Westbound 9 - 2			Northbound 9 - 3			Southbound 9 - 4			Bus Northbound 9 - 3B			Bus Southbound 9 - 4B				
								T			T			T+L+R			T+L+R				
1) No. of lanes								2			2		-	1	-	-	1	-			
2) Basic value of saturation flow rate								2,000			2,000		-	2,000	-	-	2,000	-			
3) Adjustment factor for left								1.00			1.00		-	1.00		-	1.00				
4) Adjustment factor for right								1.00			1.00		-	1.00	-	-	1.00	-			
5) Saturation flow rate								4,000			4,000		-	2,000	-	-	2,000	-			
								4,000			4,000			2,000			2,000				
7) PCU direction volume(bus)														144			116				
														144			116				
8) PCU direction volume(others)								1,608			2,582		0	0	0	0	0	0			
								1,608			2,582			0			0				
9) PCU direction volume (total)								1,608			2,582		0	144	0	0	116	0			
								1,608			2,582			144			116				
10) Flow rate								0.402			0.645			0.072			0.058		λi	Σλ	
11) Necessary phase ratio	1Φ							0.402			0.645			0.072			0.058		0.645	0.645	
	2Φ							(All Red for Pedestrian)											0.000		
	3Φ																		0.000		
	4Φ																		0.000		
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			

PM Peak

Approach		Eastbound 9 - 1			Westbound 9 - 2			Northbound 9 - 3			Southbound 9 - 4			Bus Northbound 9 - 3B			Bus Southbound 9 - 4B				
								T			T			T+L+R			T+L+R				
1) No. of lanes								2			2		-	1	-	-	1	-			
2) Basic value of saturation flow rate								2,000			2,000		-	2,000	-	-	2,000	-			
3) Adjustment factor for left								1.00			1.00		-	1.00		-	1.00				
4) Adjustment factor for right								1.00			1.00		-	1.00	-	-	1.00	-			
5) Saturation flow rate								4,000			4,000		-	2,000	-	-	2,000	-			
								4,000			4,000			2,000			2,000				
7) PCU direction volume(bus)														134			159				
														134			159				
8) PCU direction volume(others)							0	2,033	0	0	2,080	0	0	0	0	0	0	0			
								2,033			2,080			0			0				
9) PCU direction volume (total)								2,033			2,080		0	134	0	0	159	0			
								2,033			2,080			134			159				
10) Flow rate								0.508			0.520			0.067			0.080		λi	Σλ	
11) Necessary phase ratio	1Φ							0.508			0.520			0.067			0.080		0.520	0.520	
	2Φ							(All Red for Pedestrian)											0.000		
	3Φ																		0.000		
	4Φ																		0.000		
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%			

Intersection No.10: Port Said St., Daher St.

AM Peak

Approach		Eastbound 10 - 1			Westbound 10 - 2			Northbound 10 - 3			Southbound 10 - 4			Bus Northbound 10 - 3B			Bus Southbound 10 - 4B				
		R					L				T+R	T	T+L				-	T+R	-		
1) No. of lanes		2					2				1	2	1				-	1	-		
2) Basic value of saturation flow rate		1,800					1,800				2,000	2,000	2,000				-	2,000	-		
3) Adjustment factor for left		1.00					1.00				1.00	1.00	1.00				-	0.98			
4) Adjustment factor for right		1.00					1.00				0.97	1.00	1.00				-	0.98	-		
5) Saturation flow rate		3,600					3,600				1,936	4,000	2,000				-	1,936	-		
		3,600			3,600						7,936							1,936			
7) PCU direction volume(bus)		110					110										23	106	23		
		110			110						0							152			
8) PCU direction volume(others)		823					823				548	1,279									
		823			823						1,827							0			
9) PCU direction volume (total)		933	0	0	0	0	933				548	1,279	0				23	106	23		
		933			933						1,827							152			
10) Flow rate		0.259			0.259						0.230							0.079		λi	Σλ
11) Necessary phase ratio	1Φ																	0.079		0.079	
	2Φ											0.230								0.230	0.568
	3Φ		0.259			0.259														0.259	
	4Φ							(All Red for Pedestrian)												0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	100%				0%	0%	0%				0%	15%	0%		
14) Ratio of right turn		100%	0%	0%	0%	0%	0%				30%	0%	0%				0%	15%	0%		

PM Peak

Approach		Eastbound 10 - 1			Westbound 10 - 2			Northbound 10 - 3			Southbound 10 - 4			Bus Northbound 10 - 3B			Bus Southbound 10 - 4B				
		R					L				T+R	T	T+L				-	T+R	-		
1) No. of lanes		2					2				1	2	1				-	1	-		
2) Basic value of saturation flow rate		1,800					1,800				2,000	2,000	2,000				-	2,000	-		
3) Adjustment factor for left		1.00					1.00				1.00	1.00	0.98				-	0.98			
4) Adjustment factor for right		1.00					1.00				0.98	1.00	1.00				-	0.98	-		
5) Saturation flow rate		3,600					3,600				1,968	4,000	1,968				-	1,936	-		
		3,600			3,600						7,935							1,936			
7) PCU direction volume(bus)		98					98										18	85	18		
		98			98						0							122			
8) PCU direction volume(others)		839					839	285	1,329	285	219	1,020	219								
		839									1,457							0			
9) PCU direction volume (total)		937	0	0	0	0	937				219	1,020	219				18	85	18		
		937			937						1,457							122			
10) Flow rate		0.260			0.260						0.184							0.063		λi	Σλ
11) Necessary phase ratio	1Φ																	0.063		0.063	
	2Φ											0.184								0.184	0.507
	3Φ		0.260			0.260														0.260	
	4Φ							(All Red for Pedestrian)												0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	100%				0%	0%	15%				0%	15%	0%		
14) Ratio of right turn		100%	0%	0%	0%	0%	0%				15%	0%	0%				0%	15%	0%		

Intersection No.11: Port Said St., Mosheer Ahmed Ismail Sq.

AM Peak

Approach		Eastbound			Westbound			Northbound			Southbound			Bus Northbound			Bus Southbound				
		11 - 1			11 - 2			11 - 3			11 - 4			11 - 3B							
					T+R	T		T+R	T	T+L	R	-	L	-	T+L+R	-					
1) No. of lanes					1	2		1	1	1	2	-	1	-	1	-					
2) Basic value of saturation flow rate					2,000	2,000		2,000	2,000	2,000	1,800	-	1,800	-	2,000	-					
3) Adjustment factor for left					1.00	1.00		1.00	1.00	0.94	1.00	-	1.00	-	0.99						
4) Adjustment factor for right					0.95	1.00		0.98	1.00	1.00	1.00	-	1.00	-	0.99	-					
5) Saturation flow rate					1,896	4,000		1,957	2,000	1,876	3,600	-	1,800	-	1,957	-					
						5,896			5,833			5,400			1,957						
7) PCU direction volume(bus)					55	55		65	65	194	218		94	19	150	19					
						110			324			312			187						
8) PCU direction volume(others)					403	403		388	388	1,165	536		230								
						806			1,942			765			0						
9) PCU direction volume (total)					458	458		453	453	1,360	754	0	323	19	150	19					
						916			2,266			1,077			187						
10) Flow rate						0.155			0.333			0.142			0.096					λi	Σλ
11) Necessary phase ratio	1Φ								0.333			0.142			0.096					0.333	
	2Φ					0.155														0.155	0.488
	3Φ																			0.000	
	4Φ																			0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	60%	0%	0%	0%	0%	10%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	50%	0%	0%	20%	0%	0%	0%	0%	0%	0%	10%	0%	0%	0%	0%		

PM Peak

Approach		Eastbound			Westbound			Northbound			Southbound			Bus Northbound			Bus Southbound				
		11 - 1			11 - 2			11 - 3			11 - 4			11 - 3B							
					T+R	T		T+R	T	T+L	R	-	L	-	T+L+R	-					
1) No. of lanes					1	2		1	1	1	2	-	1	-	1	-					
2) Basic value of saturation flow rate					2,000	2,000		2,000	2,000	2,000	1,800	-	1,800	-	2,000	-					
3) Adjustment factor for left					1.00	1.00		1.00	1.00	0.94	1.00	-	1.00	-	0.99						
4) Adjustment factor for right					0.95	1.00		0.98	1.00	1.00	1.00	-	1.00	-	0.99	-					
5) Saturation flow rate					1,896	4,000		1,957	2,000	1,876	3,600	-	1,800	-	1,957	-					
						5,896			5,833			5,400			1,957						
7) PCU direction volume(bus)					49	49		128	128	384	151		65	13	103	13					
						98			640			215			129						
8) PCU direction volume(others)					403	403		250	250	751	832		356								
						806			1,251			1,188			0						
9) PCU direction volume (total)					452	452	0	378	378	1,135	982	0	421	13	103	13					
						904			1,892			1,403			129						
10) Flow rate						0.153			0.215			0.220			0.066					λi	Σλ
11) Necessary phase ratio	1Φ								0.215			0.220			0.066					0.220	
	2Φ					0.153														0.153	0.373
	3Φ																			0.000	
	4Φ																			0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	60%	0%	0%	0%	0%	10%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	50%	0%	0%	20%	0%	0%	0%	0%	0%	0%	10%	0%	0%	0%	0%		

Intersection No.12: Port Said St., Bab El Shaareya Sq.

AM Peak

Approach		Eastbound			Westbound			Northbound			Southbound				
		12 - 1			12 - 2			12 - 3			12 - 4				
		R		L						L+U	R	T	L+U		
1) No. of lanes		1	-	1						2	2		1		
2) Basic value of saturation flow rate		1,800	-	1,800						1,800	1,800		1,800		
3) Adjustment factor for left		1.00	-	1.00						1.00	1.00		1.00		
4) Adjustment factor for right		1.00	-	1.00						1.00	1.00		1.00		
5) Saturation flow rate		1,800	-	1,800						3,600	3,600		1,800		
		3,600								3,600	3,600		1,800		
7) PCU direction volume(bus)		0		195						15	205		20		
		195								15	205		20		
8) PCU direction volume(others)		35		993						175	1,436		577		
		1,027								175	1,436		577		
9) PCU direction volume (total)		35	0	1,188						190	1,641		597		
		1,222								190	1,641		597		
10) Flow rate		0.340								0.053	0.456		0.332	λi	Σλ
11) Necessary phase ratio	1Φ		0.340									0.456	0.332	0.456	
	2Φ									0.053				0.053	0.508
	3Φ				(All Red for Pedestrian)									0.000	
	4Φ													0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		

PM Peak

Approach		Eastbound			Westbound			Northbound			Southbound				
		12 - 1			12 - 2			12 - 3			12 - 4				
		R		L						L+U	R		L+U		
1) No. of lanes		1	-	1						2	2		1		
2) Basic value of saturation flow rate		1,800	-	1,800						1,800	1,800		1,800		
3) Adjustment factor for left		1.00	-	1.00						1.00	1.00		1.00		
4) Adjustment factor for right		1.00	-	1.00						1.00	1.00		1.00		
5) Saturation flow rate		1,800	-	1,800						3,600	3,600		1,800		
		3,600								3,600	3,600		1,800		
7) PCU direction volume(bus)		0		143						5	165		20		
		143								5	165		20		
8) PCU direction volume(others)		75		1,157						329	1,068		932		
		1,232								329	1,068		932		
9) PCU direction volume (total)		75	0	1,300						334	1,233		952		
		1,374								334	1,233		952		
10) Flow rate		0.382								0.093	0.342		0.529	λi	Σλ
11) Necessary phase ratio	1Φ		0.382									0.342	0.529	0.529	
	2Φ									0.093				0.093	0.622
	3Φ				(All Red for Pedestrian)									0.000	
	4Φ													0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		

Intersection No.13: Port Said St., Azhar St.

AM Peak

Approach		Eastbound			Westbound			Northbound			Southbound				
		13 - 1			13 - 2			13 - 3			13 - 4				
		T+R	-	T+L	T+R	-	T+L	T+R	-	L	T+R	-	T+L		
1) No. of lanes		1	-	1	1	-	1	2	-	2	1	-	1		
2) Basic value of saturation flow rate		2,000	-	2,000	2,000	-	2,000	2,000	-	1,800	2,000	-	2,000		
3) Adjustment factor for left		1.00	-	0.97	1.00	-	0.97	1.00	-	1.00	1.00	-	0.96		
4) Adjustment factor for right		0.99	-	1.00	0.99	-	1.00	0.96	-	1.00	0.99	-	1.00		
5) Saturation flow rate		1,972	-	1,942	1,972	-	1,939	3,859	-	3,600	1,978	-	1,916		
		3,914			3,912			3,859		3,600	1,978		1,916		
7) PCU direction volume(bus)		15	5	10	5	15	0	148	305	53	0	0	0		
		30			20			505			0				
8) PCU direction volume(others)		57	328	142	71	338	171	657	703	555	14	68	54		
		527			580			1,915			136				
9) PCU direction volume (total)		72	333	152	76	353	171	805	1,008	608	14	68	54		
		557			600			2,420			136				
10) Flow rate		0.142			0.153			0.496			0.069			λi	Σλ
11) Necessary phase ratio	1Φ								0.496			0.069		0.496	0.649
	2Φ		0.142			0.153								0.153	
	3Φ					(All Red for Pedestrian)								0.000	
	4Φ													0.000	
13) Ratio of left turn		0%	0%	27%	0%	0%	29%	0%	0%	25%	0%	0%	40%		
14) Ratio of right turn		13%	0%	0%	13%	0%	0%	33%	0%	0%	10%	0%	0%		

PM Peak

Approach		Eastbound			Westbound			Northbound			Southbound				
		13 - 1			13 - 2			13 - 3			13 - 4				
		T+R	-	T+L	T+R	-	T+L	T+R	-	T+L	T+R	-	T+L		
1) No. of lanes		1	-	1	1	-	1	2	-	1	1	-	1		
2) Basic value of saturation flow rate		2,000	-	2,000	2,000	-	2,000	2,000	-	1,800	2,000	-	2,000		
3) Adjustment factor for left		1.00	-	0.98	1.00	-	0.95	1.00	-	1.00	1.00	-	0.97		
4) Adjustment factor for right		0.98	-	1.00	0.98	-	1.00	0.97	-	1.00	0.93	-	1.00		
5) Saturation flow rate		1,963	-	1,952	1,959	-	1,904	3,880	-	1,800	1,852	-	1,942		
		3,915			3,863			5,680			3,794				
7) PCU direction volume(bus)		10	8	5	0	0	3	110	315	5	0	0	0		
		23			3			430			0				
8) PCU direction volume(others)		172	642	234	109	202	261	668	1,006	672	13	0	5		
		1,048			572			2,346			18				
9) PCU direction volume (total)		182	649	239	109	202	264	778	1,321	677	13	0	5		
		1,071			575			2,776			18				
10) Flow rate		0.273			0.149			0.413			0.005			λi	Σλ
11) Necessary phase ratio	1Φ								0.413			0.005		0.413	0.686
	2Φ		0.273			0.149								0.273	
	3Φ					(All Red for Pedestrian)								0.000	
	4Φ													0.000	
13) Ratio of left turn		0%	0%	22%	0%	0%	46%	0%	0%	24%	0%	0%	27%		
14) Ratio of right turn		17%	0%	0%	19%	0%	0%	28%	0%	0%	73%	0%	0%		

Intersection No.14: Port Said St., Ahmed Maher Pasha Sq.

AM Peak

Approach		Eastbound			Westbound			Northbound			Southbound				
		14 - 1			14 - 2			14 - 3			14 - 4				
		R			T+R			T+R	T	L+U	R	T			
1) No. of lanes		3	-		1			1	2	2	1	2			
2) Basic value of saturation flow rate		1,800	-		2,000			1,800	2,000	1,800	1,800	2,000			
3) Adjustment factor for left		1.00	-		1.00			1.00	1.00	1.00	1.00	1.00			
4) Adjustment factor for right		1.00	-		0.94			0.99	1.00	1.00	1.00	1.00			
5) Saturation flow rate		5,400	-		1,890			1,782	4,000	3,600	1,800	4,000			
		5,400			1,890			5,782		3,600	5,800				
7) PCU direction volume(bus)		73			0	0			188	68	103	175			
		73			0			188		68	278				
8) PCU direction volume(others)		700			108	96		185	1,648	940	1,039	1,145			
		700			204			1,833		940	2,184				
9) PCU direction volume (total)		773	0	0	108	96	0	185	1,836	1,008	2,462				
		773			204			2,021		1,008	2,462				
10) Flow rate		0.143			0.108			0.350		0.280	0.424			λi	Σλ
11) Necessary phase ratio	1Φ								0.350			0.424		0.424	0.847
	2Φ									0.280				0.280	
	3Φ		0.143			0.108								0.143	
	4Φ					(All Red for Pedestrian)								0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	0%	53%	0%	9%	0%	0%	0%	0%	0%		

PM Peak

Approach		Eastbound			Westbound			Northbound			Southbound				
		14 - 1			14 - 2			14 - 3			14 - 4				
		R			T+R			T+R	T	L+U	R	T			
1) No. of lanes		3	-		1			1	2	2	1	2			
2) Basic value of saturation flow rate		1,800	-		2,000			1,800	2,000	1,800	1,800	2,000			
3) Adjustment factor for left		1.00	-		1.00			1.00	1.00	1.00	1.00	1.00			
4) Adjustment factor for right		1.00	-		0.95			0.98	1.00	1.00	1.00	1.00			
5) Saturation flow rate		5,400	-		1,909			1,765	4,000	3,600	1,800	4,000			
		5,400			1,909			5,765		3,600	5,800				
7) PCU direction volume(bus)		15			0	0			208	63	53	150			
		15			0			208		63	203				
8) PCU direction volume(others)		677			120	157		287	1,077	862	675	1,113			
		677			277			1,364		862	1,113				
9) PCU direction volume (total)		692	0	0	120	157	0	287	1,285	925	1,315				
		692			277			1,572		925	1,315				
10) Flow rate		0.128			0.145			0.273		0.257	0.227			λi	Σλ
11) Necessary phase ratio	1Φ								0.273			0.227		0.273	0.674
	2Φ									0.257				0.257	
	3Φ		0.128			0.145								0.145	
	4Φ					(All Red for Pedestrian)								0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	0%	43%	0%	18%	0%	0%	0%	0%	0%		

Intersection No.15: Port Said St., Sheikh Rehan St.

AM Peak

Approach		Eastbound			Westbound			Northbound			Southbound			Bus Northbound			Bus Southbound				
		15 - 1			15 - 2			15 - 3			15 - 4			15 - 3B			15 - 4B				
		T+R	-	T+L	T+R	-	T+L	T+R	-	T+L	T+R	-	T+L	-	T+L+R	-	-	T+L+R	-		
1) No. of lanes		1	-	1	1	-	1	1	-	1	1	-	1	-	1	-	-	1	-		
2) Basic value of saturation flow rate		2,000	-	2,000	2,000	-	2,000	2,000	-	2,000	2,000	-	2,000	-	2,000	-	-	2,000	-		
3) Adjustment factor for left		1.00	-	0.97	1.00	-	0.97	1.00	-	0.99	1.00	-	0.99	-	0.99		-	0.99			
4) Adjustment factor for right		0.97	-	1.00	0.97	-	1.00	0.99	-	1.00	0.99	-	1.00	-	0.99	-	-	0.99	-		
5) Saturation flow rate		1,946	-	1,942	1,940	-	1,944	1,989	-	1,989	1,988	-	1,988	-	1,978	-	-	1,978	-		
		3,889			3,884			3,978			3,975			1,978			1,978				
7) PCU direction volume(bus)		9	37	13	13	18	9							9	170	9	13	224	13		
		58			40						0			189			249				
8) PCU direction volume(others)		92	156	96	96	156	92	92	1,649	92	108	1,699	108								
		344			344			1,833			1,916			0			0				
9) PCU direction volume (total)		101	193	108	108	175	101	92	1,649	92	108	1,699	108	9	170	9	13	224	13		
		402			384			1,833			1,916			189			249				
10) Flow rate		0.103			0.099			0.461			0.482			0.095			0.126			λi	Σλ
11) Necessary phase ratio	1Φ													0.095			0.126			0.126	0.711
	2Φ							0.461			0.482									0.482	
	3Φ		0.103			0.099														0.103	
	4Φ							(All Red for Pedestrian)												0.000	
13) Ratio of left turn		0%	0%	27%	0%	0%	26%	0%	0%	5%	0%	0%	6%	0%	5%	0%	0%	5%	0%		
14) Ratio of right turn		25%	0%	0%	28%	0%	0%	5%	0%	0%	6%	0%	0%	0%	5%	0%	0%	5%	0%		

PM Peak

Approach		Eastbound			Westbound			Northbound			Southbound			Bus Northbound			Bus Southbound				
		15 - 1			15 - 2			15 - 3			15 - 4			15 - 3B			15 - 4B				
		T+R	-	T+L	T+R	-	T+L	T+R	-	T	T+R	-	T	-	T+L+R	-	-	T+L+R	-		
1) No. of lanes		1	-	1	1	-	1	1	-	1	1	-	1	-	1	-	-	1	-		
2) Basic value of saturation flow rate		2,000	-	2,000	2,000	-	2,000	2,000	-	2,000	2,000	-	2,000	-	2,000	-	-	2,000	-		
3) Adjustment factor for left		1.00	-	0.98	1.00	-	0.97	1.00	-	0.99	1.00	-	0.99	-	0.99		-	0.99			
4) Adjustment factor for right		0.98	-	1.00	0.97	-	1.00	0.99	-	1.00	0.99	-	1.00	-	0.99	-	-	0.99	-		
5) Saturation flow rate		1,965	-	1,954	1,934	-	1,950	1,987	-	1,987	1,988	-	1,988	-	1,978	-	-	1,978	-		
		3,919			3,884			3,975			3,976			1,978			1,978				
7) PCU direction volume(bus)		10	34	10	10	17	10							10	188	10	10	178	10		
		54			37			0			0			209			198				
8) PCU direction volume(others)		68	270	93	93	135	68	79	1,207	79	103	1,662	103								
		431			296			1,364			1,869			0			0				
9) PCU direction volume (total)		79	304	103	103	152	79	79	1,207	79	103	1,662	103	10	188	10	10	178	10		
		485			334			1,364			1,869			209			198				
10) Flow rate		0.124			0.086			0.343			0.470			0.106			0.100			λi	Σλ
11) Necessary phase ratio	1Φ													0.106			0.100			0.106	0.699
	2Φ							0.343			0.470									0.470	
	3Φ		0.124			0.086														0.124	
	4Φ							(All Red for Pedestrian)												0.000	
13) Ratio of left turn		0%	0%	21%	0%	0%	24%	0%	0%	6%	0%	0%	6%	0%	5%	0%	0%	5%	0%		
14) Ratio of right turn		16%	0%	0%	31%	0%	0%	6%	0%	0%	6%	0%	0%	0%	5%	0%	0%	5%	0%		

Intersection No.16: Port Said St., Magles El Shaab St.

AM Peak

Approach		Eastbound			Westbound			Northbound			Southbound			Bus Northbound			Bus Southbound				
		16 - 1			16 - 2			16 - 3			16 - 4			16 - 3B			16 - 4B				
		T+R	-	T+L	T+R	-	T+L	T+R	-	T+L	T+R	-	T+L	-	T+L+R	-	-	T+L+R	-		
1) No. of lanes		1	-	1	1	-	1	1	-	1	1	-	1	-	1	-	-	1	-		
2) Basic value of saturation flow rate		2,000	-	2,000	2,000	-	2,000	2,000	-	2,000	2,000	-	2,000	-	2,000	-	-	2,000	-		
3) Adjustment factor for left		1.00	-	0.98	1.00	-	0.98	1.00	-	0.99	1.00	-	0.99	-	1.00		-	1.00			
4) Adjustment factor for right		0.99	-	1.00	0.98	-	1.00	0.99	-	1.00	0.99	-	1.00	-	1.00	-	-	1.00	-		
5) Saturation flow rate		1,981	-	1,969	1,950	-	1,969	1,978	-	1,978	1,978	-	1,978	-	1,980	-	-	1,980	-		
		3,950			3,919			3,956			3,956			1,980			1,980				
7) PCU direction volume(bus)		10	67	10	10	34	10							10	207	10	10	196	10		
		87			54						0			228			216				
8) PCU direction volume(others)		41	384	74	74	192	41	91	724	91	163	1,303	163								
		499			307			905			1,629			0			0				
9) PCU direction volume (total)		52	451	84	84	226	52	91	724	91	163	1,303	163	10	207	10	10	196	10		
		587			361			905			1,629			228			216				
10) Flow rate		0.148			0.092			0.229			0.412			0.115			0.109			λi	Σλ
11) Necessary phase ratio	1Φ													0.115			0.109			0.115	0.675
	2Φ							0.229			0.412									0.412	
	3Φ		0.148			0.092														0.148	
	4Φ							(All Red for Pedestrian)												0.000	
13) Ratio of left turn		0%	0%	14%	0%	0%	14%	0%	0%	10%	0%	0%	10%	0%	5%	0%	0%	5%	0%		
14) Ratio of right turn		9%	0%	0%	23%	0%	0%	10%	0%	0%	10%	0%	0%	0%	5%	0%	0%	5%	0%		

PM Peak

Approach		Eastbound			Westbound			Northbound			Southbound			Bus Northbound			Bus Southbound				
		16 - 1			16 - 2			16 - 3			16 - 4			16 - 3B			16 - 4B				
		T+R	-	T+L	T+R	-	T+L	T+R	-	T	T+R	-	T	-	T+L+R	-	-	T+L+R	-		
1) No. of lanes		1	-	1	1	-	1	1	-	1	1	-	1	-	1	-	-	1	-		
2) Basic value of saturation flow rate		2,000	-	2,000	2,000	-	2,000	2,000	-	2,000	2,000	-	2,000	-	2,000	-	-	2,000	-		
3) Adjustment factor for left		1.00	-	0.98	1.00	-	0.98	1.00	-	0.99	1.00	-	0.99	-	1.00		-	1.00			
4) Adjustment factor for right		0.99	-	1.00	0.98	-	1.00	0.99	-	1.00	0.99	-	1.00	-	1.00	-	-	1.00	-		
5) Saturation flow rate		1,981	-	1,969	1,951	-	1,969	1,978	-	1,978	1,978	-	1,978	-	1,980	-	-	1,980	-		
		3,950			3,919			3,956			3,956			1,980			1,980				
7) PCU direction volume(bus)		10	61	8	8	31	10							10	200	10	8	167	8		
		80			49			0			0			220			184				
8) PCU direction volume(others)		44	400	76	76	200	44	118	942	118	187	1,492	187								
		520			320			1,177			1,866			0			0				
9) PCU direction volume (total)		54	461	85	85	231	54	118	942	118	187	1,492	187	10	200	10	8	167	8		
		599			369			1,177			1,866			220			184				
10) Flow rate		0.152			0.094			0.297			0.472			0.111			0.093			λi	Σλ
11) Necessary phase ratio	1Φ													0.111			0.093			0.111	0.734
	2Φ							0.297			0.472									0.472	
	3Φ		0.152			0.094														0.152	
	4Φ							(All Red for Pedestrian)												0.000	
13) Ratio of left turn		0%	0%	14%	0%	0%	15%	0%	0%	10%	0%	0%	10%	0%	5%	0%	0%	5%	0%		
14) Ratio of right turn		9%	0%	0%	23%	0%	0%	10%	0%	0%	10%	0%	0%	0%	5%	0%	0%	5%	0%		

Intersection No.17-a: Port Said St., Sayeda Zeinab Sq.

AM Peak

Approach		Eastbound 17 - 1			Westbound 17 - 2			Northbound 17 - 3			Southbound 17 - 4				
		R	T		R	-	-				T	L+U			
1) No. of lanes		1	1		1	-	-				2	1			
2) Basic value of saturation flow rate		1,800	2,000		1,800	-	-				2,000	1,800			
3) Adjustment factor for left		1.00	1.00		1.00	-	-				1.00	1.00			
4) Adjustment factor for right		1.00	1.00		1.00	-	-				1.00	1.00			
5) Saturation flow rate		1,800	2,000		1,800	-	-				4,000	1,800			
			3,800			1,800					4,000	1,800			
7) PCU direction volume(bus)		113	278		0	0	0				325	26			
			391			0	0				325	26			
8) PCU direction volume(others)		216	1,301		39	0	0				1,663	223			
			1,517			39					1,663	223			
9) PCU direction volume (total)		329	1,579		39	0	0				1,988	249			
			1,908			39					1,988	249			
10) Flow rate			0.502			0.022					0.497	0.138	λi	Σλ	
11) Necessary phase ratio	1Φ					0.022					0.107	0.138	0.138	0.640	
	2Φ		0.502								0.390		0.502		
	3Φ				(All Red for Pedestrian)								0.000		
	4Φ												0.000		
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		

PM Peak

Approach		Eastbound 17 - 1			Westbound 17 - 2			Northbound 17 - 3			Southbound 17 - 4				
		R	T		R	-	-				T	L+U			
1) No. of lanes		1	1		1	-	-				2	1			
2) Basic value of saturation flow rate		1,800	2,000		1,800	-	-				2,000	1,800			
3) Adjustment factor for left		1.00	1.00		1.00	-	-				1.00	1.00			
4) Adjustment factor for right		1.00	0.98		1.00	-	-				1.00	1.00			
5) Saturation flow rate		1,800	1,957		1,800	-	-				4,000	1,800			
			3,757			1,800					4,000	1,800			
7) PCU direction volume(bus)		90	165		0	0	0				278	13			
			255			0	0				278	13			
8) PCU direction volume(others)		272	1,294		99	0					1,793	228			
			1,566			99					1,793	228			
9) PCU direction volume (total)		362	1,459		99	0					2,071	241			
			1,821			99					2,071	241			
10) Flow rate			0.485			0.055					0.518	0.134	λi	Σλ	
11) Necessary phase ratio	1Φ					0.055					0.112	0.134	0.134	0.619	
	2Φ		0.485								0.406		0.485		
	3Φ				(All Red for Pedestrian)								0.000		
	4Φ												0.000		
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		0%	20%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		

Intersection No.17-b: Port Said St., Sayeda Zeinab Sq.

AM Peak

Approach		Eastbound 17 - 1			Westbound 17 - 2			Northbound 17 - 3			Southbound 17 - 4				
		R	T	L	R	T	L	T+R	T	-	-	-	-		
1) No. of lanes		-	2	1	2	-	-	1	1	-	-	-	-		
2) Basic value of saturation flow rate		-	2,000	1,800	1,800	-	-	2,000	2,000	-	-	-	-		
3) Adjustment factor for left		-	1.00	1.00	1.00	-	-	1.00	1.00	-	-	-	-		
4) Adjustment factor for right		-	1.00	1.00	1.00	-	-	0.91	1.00	-	-	-	-		
5) Saturation flow rate		-	4,000	1,800	3,600	-	-	1,829	2,000	-	-	-	-		
		-	4,000	1,800	3,600	-	-		3,829		-	-	-		
7) PCU direction volume(bus)		-	103	3	325	-	-	111	20	0	-	-	-		
		-	103	3	325	-	-		130		-	-	-		
8) PCU direction volume(others)		-	452	118	1,663	-	-	484	85	0	-	-	-		
		-	452	118	1,663	-	-		569		-	-	-		
9) PCU direction volume (total)		-	554	121	1,988	-	-	594	105	0	-	-	-		
		-	554	121	1,988	-	-		699		-	-	-		
10) Flow rate		-	0.139	0.067	0.552	-	-		0.183		-	-	-	λi	Σλ
11) Necessary phase ratio	1Φ		0.139	0.067	0.238									0.238	0.552
	2Φ				0.314				0.183					0.314	
	3Φ				(All Red for Pedestrian)									0.000	
	4Φ													0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	85%	0%	0%	0%	0%	0%		

PM Peak

Approach		Eastbound 17 - 1			Westbound 17 - 2			Northbound 17 - 3			Southbound 17 - 4				
		R	T	L	R	T	L	T+R	T	-	-	-	-		
1) No. of lanes		-	2	1	2	-	-	1	1	-	-	-	-		
2) Basic value of saturation flow rate		-	2,000	1,800	1,800	-	-	2,000	2,000	-	-	-	-		
3) Adjustment factor for left		-	1.00	1.00	1.00	-	-	1.00	1.00	-	-	-	-		
4) Adjustment factor for right		-	1.00	1.00	1.00	-	-	0.91	1.00	-	-	-	-		
5) Saturation flow rate		-	4,000	1,800	3,600	-	-	1,829	2,000	-	-	-	-		
		-	4,000	1,800	3,600	-	-		3,829		-	-	-		
7) PCU direction volume(bus)		-	63	8	278	-	-	85	15	0	-	-	-		
		-	63	8	278	-	-		100		-	-	-		
8) PCU direction volume(others)		-	632	133	2,070	-	-	566	100	0	-	-	-		
		-	632	133	2,070	-	-		666		-	-	-		
9) PCU direction volume (total)		-	694	140	2,348	-	-	651	115	0	-	-	-		
		-	694	140	2,348	-	-		766		-	-	-		
10) Flow rate		-	0.174	0.078	0.652	-	-		0.200		-	-	-	λi	Σλ
11) Necessary phase ratio	1Φ		0.174	0.078	0.303									0.303	0.652
	2Φ				0.349				0.200					0.349	
	3Φ				(All Red for Pedestrian)									0.000	
	4Φ													0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	85%	0%	0%	0%	0%	0%		

Intersection No.18: Port Said St., Saad El Deen St.

AM Peak

Approach		Eastbound 18 - 1			Westbound 18 - 2			Northbound 18 - 3			Southbound 18 - 4				
		R		L	T+R		T+L				R	T			
1) No. of lanes		1		1	1		1				1	1			
2) Basic value of saturation flow rate		1,800		1,800	2,000		2,000				1,800	2,000			
3) Adjustment factor for left		1.00		1.00	1.00		0.94				1.00	1.00			
4) Adjustment factor for right		1.00		1.00	1.00		1.00				1.00	1.00			
5) Saturation flow rate		1,800		1,800	2,000		1,870				1,800	2,000			
		1,800		1,800	3,870						3,800				
7) PCU direction volume(bus)		49		39	29	67	164				14	96			
		49		39	260						110				
8) PCU direction volume(others)		251		201	167	325	838				74	492			
		251		201	1,330						566				
9) PCU direction volume (total)		301		240	196	392	1,002				88	588			
		301		240	1,590						676				
10) Flow rate		0.167		0.134	0.411						0.178			λi	Σλ
11) Necessary phase ratio	1Φ	0.167		0.134		0.411								0.411	0.589
	2Φ											0.178		0.178	
	3Φ					(All Red for Pedestrian)								0.000	
	4Φ													0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	63%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	12%	0%	0%	0%	0%	0%	13%	0%	0%		

PM Peak

Approach		Eastbound 18 - 1			Westbound 18 - 2			Northbound 18 - 3			Southbound 18 - 4				
		R		L	T+R		T+L				R	T			
1) No. of lanes		1		1	1		1				1	1			
2) Basic value of saturation flow rate		1,800		1,800	2,000		2,000				1,800	2,000			
3) Adjustment factor for left		1.00		1.00	1.00		0.94				1.00	1.00			
4) Adjustment factor for right		1.00		1.00	1.00		1.00				1.00	1.00			
5) Saturation flow rate		1,800		1,800	2,000		1,870				1,800	2,000			
		1,800		1,800	3,870						3,800				
7) PCU direction volume(bus)		42		34	25	57	140				5	30			
		42		34	222						35				
8) PCU direction volume(others)		271		217	193	337	904				29	194			
		271		217	1,434						223				
9) PCU direction volume (total)		313		251	218	394	1,044				34	224			
		313		251	1,656						257				
10) Flow rate		0.174		0.139	0.428						0.068			λi	Σλ
11) Necessary phase ratio	1Φ	0.174		0.139		0.428								0.428	0.496
	2Φ											0.068		0.068	
	3Φ					(All Red for Pedestrian)								0.000	
	4Φ													0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	63%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	13%	0%	0%	0%	0%	0%	13%	0%	0%		

Intersection No.19: Port Said St., Yoosef El Sebaey St.

AM Peak

Approach		Eastbound 19 - 1			Westbound 19 - 2			Northbound 19 - 3			Southbound 19 - 4				
		T+R		L				T+R	T	T+L	T+R	T	L		
1) No. of lanes		1		1				1	-	1	1	1	1		
2) Basic value of saturation flow rate		2,000		1,800				2,000	-	2,000	2,000	2,000	2,000		
3) Adjustment factor for left		1.00		1.00				1.00	-	0.95	1.00	1.00	0.90		
4) Adjustment factor for right		0.98		1.00				0.94	-	1.00	0.97	1.00	1.00		
5) Saturation flow rate		1,962		1,800				1,882	-	1,910	1,936	2,000	1,802		
		3,762						1,882		1,910	3,936		1,802		
7) PCU direction volume(bus)		18	24	18				14	11	11	29	69	98		
		59						25		11	98		98		
8) PCU direction volume(others)		42	197	42				34	25	25	141	329	470		
		282						59		25	470		470		
9) PCU direction volume (total)		60	221	60				48	36	36	170	398	568		
		341						84		36	568		568		
10) Flow rate		0.091						0.031		0.019	0.119		0.261	λi	Σλ
11) Necessary phase ratio	1Φ								0.031			0.119		0.119	0.471
	2Φ									0.019			0.261	0.261	
	3Φ		0.091											0.091	
	4Φ					(All Red for Pedestrian)								0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	43%	0%	0%	100%		
14) Ratio of right turn		18%	0%	0%	0%	0%	0%	57%	0%	0%	30%	0%	0%		

PM Peak

Approach		Eastbound 19 - 1			Westbound 19 - 2			Northbound 19 - 3			Southbound 19 - 4				
		T+R		L	T+R		L	T+R	T	T+L	T+R	T	L		
1) No. of lanes		1		1				1	-	1	1	1	1		
2) Basic value of saturation flow rate		2,000		1,800				2,000	-	2,000	2,000	2,000	2,000		
3) Adjustment factor for left		1.00		1.00				1.00	-	0.95	1.00	1.00	0.90		
4) Adjustment factor for right		0.98		1.00				0.94	-	1.00	0.97	1.00	1.00		
5) Saturation flow rate		1,962		1,800				1,882	-	1,910	1,936	2,000	1,802		
		3,762						1,882		1,910	3,936		1,802		
7) PCU direction volume(bus)		13	18	13				11	8	8	22	51	74		
		44						19		8	74		74		
8) PCU direction volume(others)		31	144	31				25	18	18	103	240	343		
		206						43		18	343		343		
9) PCU direction volume (total)		44	161	44				35	26	26	125	291	416		
		250						62		26	416		416		
10) Flow rate		0.066						0.023		0.014	0.087		0.190	λi	Σλ
11) Necessary phase ratio	1Φ								0.023			0.087		0.087	0.343
	2Φ									0.014			0.190	0.190	
	3Φ		0.066											0.066	
	4Φ					(All Red for Pedestrian)								0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	43%	0%	0%	100%		
14) Ratio of right turn		18%	0%	0%	0%	0%	0%	57%	0%	0%	30%	0%	0%		

Intersection No.22: Qalaa St., Seroogeya St.

AM Peak

Approach		NorthEastbound 22 - 1			SouthEastbound 22 - 2			Northbound 22 - 3		Southbound 22 - 4			Bus Northbound			Bus Southbound 22 - 4B			λi	Σλ
		R		L	R		L	T	T+L											
1) No. of lanes		1		1	1		1	2	1											
2) Basic value of saturation flow rate		1,800		1,800	1,800		1,800	2,000	2,000											
3) Adjustment factor for left		1.00		1.00	1.00		1.00	1.00	1.00											
4) Adjustment factor for right		1.00		1.00	1.00		1.00	1.00	1.00											
5) Saturation flow rate		1,800		1,800	1,800		1,800	4,000	2,000											
		3,600			3,600			6,000												
7) PCU direction volume(bus)		1		2	26		8	105	26											
		4			34															
8) PCU direction volume(others)		30		60	668		200	1,011	434											
		90			868			1,445												
9) PCU direction volume (total)		31		62	694		208	1,116	434											
		94			902			1,550												
10) Flow rate		0.026			0.251			0.258												
11) Necessary phase ratio	1Φ							0.258											0.258	0.535
	2Φ					0.251													0.251	
	3Φ		0.026																0.026	
	4Φ				(All Red for Pedestrian)														0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	28%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	

PM Peak

Approach		NorthEastbound 22 - 1			SouthEastbound 22 - 2			Northbound 22 - 3		Southbound 22 - 4			Bus Northbound 22 - 3B			Bus Southbound 22 - 4B			λi	Σλ
		R		L	R		L	T	T+L											
1) No. of lanes		1		1	1		1	2	1											
2) Basic value of saturation flow rate		1,800		1,800	1,800		1,800	2,000	2,000											
3) Adjustment factor for left		1.00		1.00	1.00		1.00	1.00	1.00											
4) Adjustment factor for right		1.00		1.00	1.00		1.00	1.00	1.00											
5) Saturation flow rate		1,800		1,800	1,800		1,800	4,000	2,000											
		3,600			3,600			6,000												
7) PCU direction volume(bus)		2		3	38		11	123	31											
		5			49															
8) PCU direction volume(others)		46		91	1,015		305	890	381											
		137			1,320			1,271												
9) PCU direction volume (total)		47		95	1,053		316	890	381											
		142			1,369			1,271												
10) Flow rate		0.039			0.380			0.212												
11) Necessary phase ratio	1Φ							0.212											0.212	0.632
	2Φ					0.380													0.380	
	3Φ		0.039																0.039	
	4Φ				(All Red for Pedestrian)														0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	30%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	

Intersection No.23: Qalaa St., Qalaa Sq.

AM Peak

Approach		Eastbound 23 - 1			Westbound 23 - 2			Northbound 23 - 3		Southbound 23 - 4			λi	Σλ
		T+R	-	T+L				T	L	R	T			
1) No. of lanes		1	-	1				2	1	1	2			
2) Basic value of saturation flow rate		2,000	-	2,000				2,000	1,800	1,800	2,000			
3) Adjustment factor for left		1.00	-	0.95				1.00	1.00	1.00	1.00			
4) Adjustment factor for right		0.95	-	1.00				1.00	1.00	1.00	1.00			
5) Saturation flow rate		1,896	-	1,896				4,000	1,800	1,800	4,000			
		3,791						4,000	1,800	1,800	4,000			
7) PCU direction volume(bus)		63		63				68	3	3	23			
		126						68	3	3	23			
8) PCU direction volume(others)		194		194				1,251	22	23	672			
		388						1,251	22	23	672			
9) PCU direction volume (total)		257	0	257				1,319	25	26	695			
		514						1,319	25	26	695			
10) Flow rate		0.136						0.330	0.014	0.014	0.174			
11) Necessary phase ratio	1Φ							0.330		0.014	0.014		0.330	0.479
	2Φ								0.014				0.014	
	3Φ		0.136										0.136	
	4Φ												0.000	
13) Ratio of left turn		0%	0%	50%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		50%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%		

PM Peak

Approach		Eastbound 23 - 1			Westbound 23 - 2			Northbound 23 - 3		Southbound 23 - 4			λi	Σλ
		T+R	-	T+L				T	L	R	T			
1) No. of lanes		1	-	1				2	1	1	2			
2) Basic value of saturation flow rate		2,000	-	2,000				2,000	1,800	1,800	2,000			
3) Adjustment factor for left		1.00	-	0.95				1.00	1.00	1.00	1.00			
4) Adjustment factor for right		0.95	-	1.00				1.00	1.00	1.00	1.00			
5) Saturation flow rate		1,896	-	1,896				4,000	1,800	1,800	4,000			
		3,791						4,000	1,800	1,800	4,000			
7) PCU direction volume(bus)		78		78				73	3	3	35			
		156						73	3	3	35			
8) PCU direction volume(others)		237		237				999	35	35	1,018			
		474						999	35	35	1,018			
9) PCU direction volume (total)		315	0	315				1,072	38	38	1,053			
		630						1,072	38	38	1,053			
10) Flow rate		0.166						0.268	0.021	0.021	0.263			
11) Necessary phase ratio	1Φ							0.268		0.021	0.021		0.268	0.455
	2Φ								0.021				0.021	
	3Φ		0.166										0.166	
	4Φ												0.000	
13) Ratio of left turn		0%	0%	50%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		50%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%		

Intersection No.24: Qalaa St., Salah Salem St. (Sayeda Aisha Br.)

AM Peak

Approach		Eastbound			Westbound			Northbound			SouthWestbound			SouthEastbound				
		25 - 1			25 - 2			25 - 3			25 - 4			25 - 5				
		T+R		T+L+U	T+R		T+L+U	T+R	-	T+L	T+R	-	T+L	T+R	-	T+L		
1) No. of lanes		1		1	1		1	1	-	1	1	-	1	1	-	1		
2) Basic value of saturation flow rate		2,000		2,000	2,000		2,000	2,000	-	2,000	2,000	-	2,000	2,000	-	2,000		
3) Adjustment factor for left		1.00		0.98	1.00		0.98	1.00	-	0.97	1.00	-	0.96	1.00	-	0.96		
4) Adjustment factor for right		0.98		1.00	0.98		1.00	0.97	-	1.00	0.96	-	1.00	0.96	-	1.00		
5) Saturation flow rate		1,968		1,968	1,968		1,968	1,936	-	1,936	1,916	-	1,916	1,916	-	1,916		
		3,935			3,935			3,872			3,831			3,831				
7) PCU direction volume(bus)		18	83	18	20	91	20	37	49	37	47	24	47	0	0	0		
		118			130			123			-			-				
8) PCU direction volume(others)		144	671	144	155	725	155	151	202	151	418	209	418	79	39	79		
		958			1,036			504			1,045			197				
9) PCU direction volume (total)		161	753	161	175	816	175	188	251	188	465	233	465	79	39	79		
		1,076			1,166			627			1,163			197				
10) Flow rate		0.273			0.296			0.162			0.304			0.051			λi	Σλ
11) Necessary phase ratio	1Φ		0.273			0.296											0.296	0.762
	2Φ											0.304					0.304	
	3Φ								0.162						0.051		0.162	
	4Φ							(All Red for Pedestrian)									0.000	
13) Ratio of left turn		0%	0%	15%	0%	0%	15%	0%	0%	30%	0%	0%	40%	0%	0%	40%		
14) Ratio of right turn		15%	0%	0%	15%	0%	0%	30%	0%	0%	40%	0%	0%	40%	0%	0%		

PM Peak

Approach		Eastbound			Westbound			Northbound			SouthWestbound			SouthEastbound				
		25 - 1			25 - 2			25 - 3			25 - 4			25 - 5				
		T+R		T+L+U	T+R		T+L+U	T+R	-	T+L	T+R	-	T+L	T+R	-	T+L		
1) No. of lanes		1		1	1		1	1	-	1	1	-	1	1	-	1		
2) Basic value of saturation flow rate		2,000		2,000	2,000		2,000	2,000	-	2,000	2,000	-	2,000	2,000	-	2,000		
3) Adjustment factor for left		1.00		0.98	1.00		0.98	1.00	-	0.97	1.00	-	0.96	1.00	-	0.96		
4) Adjustment factor for right		0.98		1.00	0.98		1.00	0.97	-	1.00	0.96	-	1.00	0.96	-	1.00		
5) Saturation flow rate		1,968		1,968	1,968		1,968	1,936	-	1,936	1,916	-	1,916	1,916	-	1,916		
		3,935			3,935			3,872			3,831			3,831				
7) PCU direction volume(bus)		13	62	13	27	125	27	29	38	29	35	18	35	1	1	1		
		88			178			95			-			-				
8) PCU direction volume(others)		157	734	157	151	705	151	167	223	167	469	234	469	100	50	100		
		1,049			1,007			557			1,172			251				
9) PCU direction volume (total)		171	796	171	178	830	178	196	261	196	504	252	504	102	51	102		
		1,137			1,185			652			1,260			254				
10) Flow rate		0.289			0.301			0.168			0.329			0.066			λi	Σλ
11) Necessary phase ratio	1Φ		0.289			0.301											0.301	0.798
	2Φ											0.329					0.329	
	3Φ								0.168						0.066		0.168	
	4Φ							(All Red for Pedestrian)									0.000	
13) Ratio of left turn		0%	0%	15%	0%	0%	15%	0%	0%	30%	0%	0%	40%	0%	0%	40%		
14) Ratio of right turn		15%	0%	0%	15%	0%	0%	30%	0%	0%	40%	0%	0%	40%	0%	0%		

Intersection No.26: Salah Salem St., Magra El Oyoon St.

AM Peak

Approach		NorthEastbound			SouthEastbound			Northbound			Southbound			Bus Northbound			Bus Southbound				
		26 - 1			26 - 2			26 - 3			26 - 4			26 - 3			26 - 4				
		R		L+U	R		L	-	T	-	R	-									
1) No. of lanes		2		2	1		1	-	2	-	2	-									
2) Basic value of saturation flow rate		1,800		1,800	1,800		1,800	-	2,000	-	1,800	-									
3) Adjustment factor for left		1.00		1.00	1.00		1.00	-	1.00		1.00	-									
4) Adjustment factor for right		1.00		1.00	1.00		1.00	-	1.00	-	1.00	-									
5) Saturation flow rate		3,600		3,600	1,800		1,800	-	4,000	-	3,600	-									
		3,600		3,600	3,600			4,000			3,600										
7) PCU direction volume(bus)		38		280	23		25		113		98	73									
		38		280	48			113			170										
8) PCU direction volume(others)		322		886	53		25				1,271										
		322		886	78						1,271										
9) PCU direction volume (total)		360		1,166	76		50	0	113	0	1,368	73	0								
		360		1,166	126			113			1,441										
10) Flow rate		0.100		0.324	0.035			0.028			0.353									λi	Σλ
11) Necessary phase ratio	1Φ								0.028											0.028	0.416
	2Φ	0.100		0.324								0.353								0.353	
	3Φ					0.035														0.035	
	4Φ							(All Red for Pedestrian)												0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		

PM Peak

Approach		NorthEastbound			SouthEastbound			Northbound			Southbound			Bus Northbound			Bus Southbound				
		26 - 1			26 - 2			26 - 3			26 - 4			26 - 3			26 - 4				
		R		L+U	R		L	-	T	-	R	-									
1) No. of lanes		2		2	1		1	-	2	-	2	-									
2) Basic value of saturation flow rate		1,800		1,800	1,800		1,800	-	2,000	-	1,800	-									
3) Adjustment factor for left		1.00		1.00	1.00		1.00	-	1.00		1.00	-									
4) Adjustment factor for right		1.00		1.00	1.00		1.00	-	1.00	-	1.00	-									
5) Saturation flow rate		3,600		3,600	1,800		1,800	-	4,000	-	3,600	-									
		3,600		3,600	3,600			4,000			3,600										
7) PCU direction volume(bus)		30		233	15		15		98		156	124									
		30		233	30			98			280										
8) PCU direction volume(others)		412		1,346	119		39				833		0								
		412		1,346	158						833										
9) PCU direction volume (total)		442		1,579	134		54	0	98	0	989	124	0								
		442		1,579	188			98			1,113										
10) Flow rate		0.123		0.439	0.052			0.024			0.231									λi	Σλ
11) Necessary phase ratio	1Φ								0.024											0.024	0.515
	2Φ	0.123		0.439								0.231								0.439	
	3Φ					0.052														0.052	
	4Φ							(All Red for Pedestrian)												0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		

Intersection No.27: Salah Salem St., Masaken Ain El Seera St.

AM Peak

Approach		Eastbound			Westbound			Northbound			Southbound			Bus Eatbound			Bus Westbound				
		27 - 1			27 - 2			27 - 3			27 - 4			27 - 1B			27 - 2B				
		-	T	U	-	T	U	-	-	-	-	-	-	-	T	-	-	T	-		
1) No. of lanes		-	2	1	-	2	1	-	-	-	-	-	-	-	1	-	-	1	-		
2) Basic value of saturation flow rate		-	2,000	1,800	-	2,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
3) Adjustment factor for left		-	1.00	1.00	-	1.00	1.00	-	-	-	-	-	-	-	1.00		-	1.00			
4) Adjustment factor for right		-	1.00	1.00	-	1.00	1.00	-	-	-	-	-	-	-	1.00	-	-	1.00	-		
5) Saturation flow rate		-	4,000	1,800	-	4,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
		-	4,000	1,800	-	4,000	1,800		-			-			2,000			2,000			
7) PCU direction volume(bus)															225			185			
		-	-	-	-	-	-		-			-			225			185			
8) PCU direction volume(others)		-	2,581	287	-	2,213	246														
		-	2,581	287	-	2,213	246		-			-			0			0			
9) PCU direction volume (total)		-	2,581	287	-	2,213	246	-	-	-	-	-	-	-	225	-	-	185	-		
		-	2,581	287	-	2,213	246		-			-			225			185			
10) Flow rate		-	0.645	0.159	-	0.553	0.137		-			-			0.113			0.093		λi	Σλ
11) Necessary phase ratio	1Φ		0.267			0.229									0.113			0.093		0.267	0.645
	2Φ		0.378	0.159		0.324	0.137													0.378	
	3Φ								(All Red for Pedestrian)											0.000	
	4Φ																			0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		

PM Peak

Approach		Eastbound			Westbound			Northbound			Southbound			Bus Eatbound			Bus Westbound				
		27 - 1			27 - 2			27 - 3			27 - 4			27 - 1B			27 - 2B				
		-	T	U	-	T	U	-	-	-	-	-	-	-	T	-	-	T	-		
1) No. of lanes		-	2	1	-	2	1	-	-	-	-	-	-	-	1	-	-	1	-		
2) Basic value of saturation flow rate		-	2,000	1,800	-	2,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
3) Adjustment factor for left		-	1.00	1.00	-	1.00	1.00	-	-	-	-	-	-	-	1.00		-	1.00			
4) Adjustment factor for right		-	1.00	1.00	-	1.00	1.00	-	-	-	-	-	-	-	1.00	-	-	1.00	-		
5) Saturation flow rate		-	4,000	1,800	-	4,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
		-	4,000	1,800	-	4,000	1,800		-			-			2,000			2,000			
7) PCU direction volume(bus)															195			278			
		-	-	-	-	-	-		-			-			195			278			
8) PCU direction volume(others)		-	1,958	218	-	2,377	264														
		-	1,958	218	-	2,377	264		-			-			0			0			
9) PCU direction volume (total)		-	1,958	218	-	2,377	264	-	-	-	-	-	-	-	195	-	-	278	-		
		-	1,958	218	-	2,377	264		-			-			195			278			
10) Flow rate		-	0.489	0.121	-	0.594	0.147		-			-			0.098			0.139		λi	Σλ
11) Necessary phase ratio	1Φ		0.219			0.265									0.098			0.139		0.265	0.594
	2Φ		0.271	0.121		0.329	0.147													0.329	
	3Φ								(All Red for Pedestrian)											0.000	
	4Φ																			0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		

Intersection No.28: Salah Salem St., Fostat St.

AM Peak

Approach		Eastbound			Westbound			Northbound			Southbound			Bus Eastbound			Bus Westbound				
		28 - 1			28 - 2			28 - 3			28 - 4			28 - 1B			28 - 2B				
		T+R		T+L+ U	T+R		T+L+ U	T+R	-	T+L	T+R	-	T+L	-	T+L+ R	-	-	T+L+ R	-		
1) No. of lanes		1		1	1		1	1	-	1	1	-	1	-	1	-	-	1	-		
2) Basic value of saturation flow rate		2,000		2,000	2,000		2,000	2,000	-	2,000	2,000	-	2,000	-	2,000	-	-	2,000	-		
3) Adjustment factor for left		1.00		0.98	1.00		0.98	1.00	-	0.96	1.00	-	0.96	-	0.98		-	0.98			
4) Adjustment factor for right		0.98		1.00	0.98		1.00	0.96	-	1.00	0.96	-	1.00	-	0.98	-	-	0.98	-		
5) Saturation flow rate		1,968		1,968	1,968		1,968	1,926	-	1,919	1,918	-	1,926	-	1,936	-	-	1,936	-		
		3,935			3,935			3,845			3,844			1,936			1,936				
7) PCU direction volume(bus)								11	34	11	9	28	9	52	244	52	41	193	41		
		0			0			56			46			348			275				
8) PCU direction volume(others)		213	992	213	192	895	192	192	121	213	213	121	192								
		1,417			1,279			526			526			0			0				
9) PCU direction volume (total)		213	992	213	192	895	192	203	155	224	222	149	201	52	244	52	41	193	41		
		1,417			1,279			582			572			348			275				
10) Flow rate		0.360			0.325			0.137			0.137			0.180			0.142			λi	Σλ
11) Necessary phase ratio	1Φ														0.180			0.142		0.180	0.677
	2Φ		0.360			0.325														0.360	
	3Φ								0.137			0.137								0.137	
	4Φ								(All Red for Pedestrian)											0.000	
13) Ratio of left turn		0%	0%	15%	0%	0%	15%	0%	0%	38%	0%	0%	35%	0%	15%	0%	0%	15%	0%		
14) Ratio of right turn		15%	0%	0%	15%	0%	0%	35%	0%	0%	39%	0%	0%	0%	15%	0%	0%	15%	0%		

Approach		Eastbound			Westbound			Northbound			Southbound			Bus Eastbound			Bus Westbound				
		28 - 1			28 - 2			28 - 3			28 - 4			28 - 1B			28 - 2B				
		T+R		T+L+ U	T+R		T+L+ U	T+R	-	T+L	T+R	-	T+L	-	T+L+ R	-	-	T+L+ R	-		
1) No. of lanes		1		1	1		1	1	-	1	1	-	1	-	1	-	-	1	-		
2) Basic value of saturation flow rate		2,000		2,000	2,000		2,000	2,000	-	2,000	2,000	-	2,000	-	2,000	-	-	2,000	-		
3) Adjustment factor for left		1.00		0.98	1.00		0.98	1.00	-	0.96	1.00	-	0.96	-	0.98		-	0.98			
4) Adjustment factor for right		0.98		1.00	0.98		1.00	0.96	-	1.00	0.96	-	1.00	-	0.98	-	-	0.98	-		
5) Saturation flow rate		1,968		1,968	1,968		1,968	1,925	-	1,920	1,919	-	1,924	-	1,936	-	-	1,936	-		
		3,935			3,935			3,845			3,843			1,936			1,936				
7) PCU direction volume(bus)								11	34	11	9	28	9	25	116	25	27	125	27		
		0			0			56			46			165			178				
8) PCU direction volume(others)		222	1,035	222	205	958	205	205	128	222	222	128	205								
		1,478			1,369			555			555			0			0				
9) PCU direction volume (total)		222	1,035	222	205	958	205	217	162	233	231	156	215	25	116	25	27	125	27		
		1,478			1,369			611			601			165			178				
10) Flow rate		0.376			0.348			0.144			0.144			0.085			0.092			λi	Σλ
11) Necessary phase ratio	1Φ														0.085			0.092		0.092	0.612
	2Φ		0.376			0.348														0.376	
	3Φ								0.144			0.144								0.144	
	4Φ								(All Red for Pedestrian)											0.000	
13) Ratio of left turn		0%	0%	15%	0%	0%	15%	0%	0%	38%	0%	0%	36%	0%	15%	0%	0%	15%	0%		
14) Ratio of right turn		15%	0%	0%	15%	0%	0%	35%	0%	0%	38%	0%	0%	0%	15%	0%	0%	15%	0%		

Intersection No.29: Salah Salem St., Malek El Saleh Br.

AM Peak

Approach		Eastbound			Westbound			Northbound			Southbound				
		29 - 1			29 - 2			29 - 3			29 - 4				
		T+R	T	L	T+R		T+L	T+R		L	T+R	T	T+L		
1) No. of lanes		1	1	2	1		1	1		2	1	1	1		
2) Basic value of saturation flow rate		2,000	2,000	1,800	2,000		2,000	2,000		1,800	2,000	2,000	2,000		
3) Adjustment factor for left		1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00		
4) Adjustment factor for right		0.97	1.00	1.00	0.98		1.00	0.99		1.00	0.90	1.00	1.00		
5) Saturation flow rate		1,932	2,000	3,600	1,962		2,000	1,983		3,600	1,802	2,000	2,000		
		3,932		3,600	3,962			5,583			5,802				
7) PCU direction volume(bus)		195	335	223	83	193		13	0	233	148	0	0		
		530		223	276			246			-				
8) PCU direction volume(others)		574	1,283	481	190	1,089		67	0	696	375	0	0		
		1,856		481	1,279			763			375				
9) PCU direction volume (total)		769	1,618	704	273	1,282	0	80	0	929	523	0	0		
		2,386		704	1,555			1,009			523				
10) Flow rate		0.472		0.195	0.392			0.181			0.090			λi	Σλ
11) Necessary phase ratio	1Φ		0.315			0.392								0.392	0.769
	2Φ		0.157	0.195										0.195	
	3Φ								0.181			0.090		0.181	
	4Φ													0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		32%	0%	0%	18%	0%	0%	8%	0%	0%	100%	0%	0%		

PM Peak

Approach		Eastbound			Westbund			Northbound			Southbound				
		29 - 1			29 - 2			29 - 3			29 - 4				
		T+R	T	L	T+R		T+L	T+R		L	T+R	-	T+L		
1) No. of lanes		1	1	2	1		1	1		2	1	-	1		
2) Basic value of saturation flow rate		2,000	2,000	1,800	2,000		2,000	2,000		1,800	2,000	-	2,000		
3) Adjustment factor for left		1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	-	1.00		
4) Adjustment factor for right		0.96	1.00	1.00	0.98		1.00	0.98		1.00	0.90	-	1.00		
5) Saturation flow rate		1,917	2,000	3,600	1,952		2,000	1,962		3,600	1,802	-	2,000		
		3,917		3,600	3,952			5,562			3,802				
7) PCU direction volume(bus)		163	160	175	50	128		5		123	115	0	0		
		323		175	178			128			-				
8) PCU direction volume(others)		718	1,184	536	298	1,071		163		674	622	0	0		
		1,902		536	1,369			837			622				
9) PCU direction volume (total)		881	1,344	711	348	1,199	0	168	0	797	737	0	0		
		2,225		711	1,547			965			737				
10) Flow rate		0.486		0.197	0.391			0.150			0.164			λi	Σλ
11) Necessary phase ratio	1Φ		0.323			0.391								0.391	0.752
	2Φ		0.163	0.197										0.197	
	3Φ								0.150			0.164		0.164	
	4Φ													0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		40%	0%	0%	22%	0%	0%	17%	0%	0%	100%	0%	0%		

Intersection No.30: Salah Salem St., Qayrawan Sq.

AM Peak

Approach		Eastbound			Westbound			Northbound			Southbound			Bus Eastbound			Bus Westbound				
		30 - 1			30 - 2			30 - 3			30 - 4			30 - 1B			30 - 2B				
		T+R		T+L	T+R		T+L	T+R	-	T+L	T+R	-	T+L	-	T+L+R	-	-	T+L+R	-		
1) No. of lanes		1		1	1		1	1	-	1	1	-	1	-	1	-	-	1	-		
2) Basic value of saturation flow rate		2,000		2,000	2,000		2,000	2,000	-	2,000	2,000	-	2,000	-	2,000	-	-	2,000	-		
3) Adjustment factor for left		1.00		0.99	1.00		0.99	1.00	-	0.98	1.00	-	0.98	-	0.99		-	0.99			
4) Adjustment factor for right		0.99		1.00	0.99		1.00	0.98	-	1.00	0.98	-	1.00	-	0.99	-	-	0.99	-		
5) Saturation flow rate		1,982		1,982	1,982		1,982	1,960	-	1,968	1,968	-	1,960	-	1,964	-	-	1,964	-		
		3,964			3,964			3,928			3,928			1,964			1,964				
7) PCU direction volume(bus)								13	56	15	15	56	13	22	220	22	20	195	20		
		0			0			84			84			264			234				
8) PCU direction volume(others)		141	1,406	141	186	1,861	186	107	373	79	79	373	107								
		1,688			2,233			560			560			0			0				
9) PCU direction volume (total)		141	1,406	141	186	1,861	186	120	429	94	94	429	120	22	220	22	20	195	20		
		1,688			2,233			644			644			264			234				
10) Flow rate		0.426			0.563			0.143			0.143			0.134			0.119			λi	Σλ
11) Necessary phase ratio	1Φ														0.134			0.119		0.134	0.840
	2Φ		0.426			0.563														0.563	
	3Φ								0.143			0.143								0.143	
	4Φ								(All Red for Pedestrian)											0.000	
13) Ratio of left turn		0%	0%	8%	0%	0%	8%	0%	0%	15%	0%	0%	19%	0%	8%	0%	0%	8%	0%		
14) Ratio of right turn		8%	0%	0%	8%	0%	0%	19%	0%	0%	15%	0%	0%	0%	8%	0%	0%	8%	0%		

Approach		Eastbound			Westbund			Northbound			Southbound			Bus Eastbound			Bus Westbound				
		30 - 1			30 - 2			30 - 3			30 - 4			30 - 1B			30 - 2B				
		T+R		T+L	T+R		T+L	T+R	-	T+L	T+R	-	T+L	-	T+L+R	-	-	T+L+R	-		
1) No. of lanes		1		1	1		1	1	-	1	1	-	1	-	1	-	-	1	-		
2) Basic value of saturation flow rate		2,000		2,000	2,000		2,000	2,000	-	2,000	2,000	-	2,000	-	2,000	-	-	2,000	-		
3) Adjustment factor for left		1.00		0.99	1.00		0.99	1.00	-	0.98	1.00	-	0.98	-	0.99		-	0.99			
4) Adjustment factor for right		0.99		1.00	0.99		1.00	0.98	-	1.00	0.98	-	1.00	-	0.99	-	-	0.99	-		
5) Saturation flow rate		1,980		1,980	1,982		1,982	1,961	-	1,967	1,967	-	1,961	-	1,964	-	-	1,964	-		
		3,960			3,964			3,928			3,928			1,964			1,964				
7) PCU direction volume(bus)								16	63	15	15	63	16	22	220	22	24	243	24		
		0			0			94			94			264			292				
8) PCU direction volume(others)		156	1,556	156	187	1,867	187	94	344	78	78	344	94								
		1,868			2,240			516			516			0			0				
9) PCU direction volume (total)		156	1,556	156	187	1,867	187	110	406	93	93	406	110	22	220	22	24	243	24		
		1,712			2,240			610			610			264			292				
10) Flow rate		0.432			0.565			0.131			0.131			0.134			0.149			λi	Σλ
11) Necessary phase ratio	1Φ														0.134			0.149		0.149	0.845
	2Φ		0.432			0.565														0.565	
	3Φ								0.131			0.131								0.131	
	4Φ								(All Red for Pedestrian)											0.000	
13) Ratio of left turn		0%	0%	9%	0%	0%	8%	0%	0%	15%	0%	0%	18%	0%	8%	0%	0%	8%	0%		
14) Ratio of right turn		9%	0%	0%	8%	0%	0%	18%	0%	0%	15%	0%	0%	0%	8%	0%	0%	8%	0%		

Intersection No.31: Salah Salem St., Giza Br.

AM Peak

Approach		Eastbound 31 - 1			Westbound 31 - 2			Northbound 31 - 3			Southbound 31 - 4			Bus Eastbound 31 - 1B			Bus Westbound 31 - 2B			λi	Σλ
		T+R	T		T+R	T		T+R	-	T+L	R	-		-	T+R	-	-	T+R	-		
1) No. of lanes		1	1		1	1		1	-	1	2	-		-	1	-	-	1	-		
2) Basic value of saturation flow rate		2,000	2,000		2,000	2,000		2,000	-	2,000	1,800	-		-	2,000	-	-	2,000	-		
3) Adjustment factor for left		1.00	1.00		1.00	1.00		1.00	-	0.98	1.00	-		-	1.00		-	1.00			
4) Adjustment factor for right		0.98	1.00		0.98	1.00		0.99	-	1.00	1.00	-		-	0.99	-	-	1.00	-		
5) Saturation flow rate		1,968	2,000		1,968	2,000		1,988	-	1,958	3,600	-		-	1,989	-	-	1,997	-		
		3,968			3,968			3,945			3,600			1,989			1,997				
7) PCU direction volume(bus)								0	6	1	2	8		11	205		3	188			
		0			0			7			10			216			191				
8) PCU direction volume(others)		363	2,056		328	1,861		21	265	70	71	285									
		2,419			2,189			356			356			0			0				
9) PCU direction volume (total)		363	2,056		328	1,861		21	271	71	73	293		11	205		3	188			
		2,419			2,189			363			366			216			191				
10) Flow rate		0.610			0.552			0.090			0.099			0.108			0.096				
11) Necessary phase ratio	1Φ											0.099			0.108			0.096		0.108	0.808
	2Φ		0.610			0.552														0.610	
	3Φ								0.090											0.090	
	4Φ								(All Red for Pedestrian)											0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	20%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		15%	0%	0%	15%	0%	0%	6%	0%	0%	0%	0%	0%	0%	5%	0%	0%	2%	0%		

Approach		Eastbound 31 - 1			Westbound 31 - 2			Northbound 31 - 3			Southbound 31 - 4			Bus Eastbound 31 - 1B			Bus Westbound 31 - 2B			λi	Σλ
		T+R	T		T+R	T		T+R	-	T+L	R	-		-	T+R	-	-	T+R	-		
1) No. of lanes		1	1		1	1		1	-	1	2	-		-	1	-	-	1	-		
2) Basic value of saturation flow rate		2,000	2,000		2,000	2,000		2,000	-	2,000	1,800	-		-	2,000	-	-	2,000	-		
3) Adjustment factor for left		1.00	1.00		1.00	1.00		1.00	-	0.97	1.00	-		-	1.00		-	1.00			
4) Adjustment factor for right		0.98	1.00		0.98	1.00		1.00	-	1.00	1.00	-		-	0.99	-	-	1.00	-		
5) Saturation flow rate		1,968	2,000		1,968	2,000		1,991	-	1,932	3,600	-		-	1,989	-	-	1,992	-		
		3,968			3,968			3,923			3,600			1,989			1,992				
7) PCU direction volume(bus)								0	22	16	38	80		11	210		9	249			
		0			0			38			118			221			258				
8) PCU direction volume(others)		358	2,028		333	1,885		19	268	129	140	296									
		2,386			2,218			416			436			0			0				
9) PCU direction volume (total)		358	2,028		333	1,885		19	290	145	177	376		11	210		9	249			
		2,386			2,218			454			553			221			258				
10) Flow rate		0.601			0.559			0.106			0.121			0.111			0.129				
11) Necessary phase ratio	1Φ											0.121			0.111			0.129		0.129	0.837
	2Φ		0.601			0.559														0.601	
	3Φ								0.106											0.106	
	4Φ								(All Red for Pedestrian)											0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	32%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		15%	0%	0%	15%	0%	0%	4%	0%	0%	0%	0%	0%	0%	5%	0%	0%	3%	0%		

Intersection No.32: Salah Salem St., Bahr El Aazam St.

AM Peak

Approach		Eastbound 32 - 1			Westbound 32 - 2			Northbound 32 - 3			Southbound 32 - 4			Bus Eatbound 32 - 1B			Bus Westbound 32 - 2B			λi	Σλ
		-	T	U	-	T	U	-	-	-	-	-	-	-	T	-	-	T	-		
1) No. of lanes		-	2	1	-	2	1	-	-	-	-	-	-	-	1	-	-	1	-		
2) Basic value of saturation flow rate		-	2,000	1,800	-	2,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
3) Adjustment factor for left		-	1.00	1.00	-	1.00	1.00	-	-	-	-	-	-	-	1.00		-	1.00			
4) Adjustment factor for right		-	1.00	1.00	-	1.00	1.00	-	-	-	-	-	-	-	1.00	-	-	1.00	-		
5) Saturation flow rate		-	4,000	1,800	-	4,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
		-	4,000	1,800	-	4,000	1,800		-			-			2,000			2,000			
7) PCU direction volume(bus)															208			155			
		-	-	-	-	-	-		-			-			208			155			
8) PCU direction volume(others)			2,616	309		1,775	197														
		-	2,616	309	-	1,775	197		-			-			0			0			
9) PCU direction volume (total)		-	2,616	309	-	1,775	197	-	-	-	-	-	-	-	208	-	-	155	-		
		-	2,616	309	-	1,775	197		-			-			208			155			
10) Flow rate		-	0.654	0.172	-	0.444	0.110		-			-			0.104			0.078			
11) Necessary phase ratio	1Φ		0.247			0.167									0.104			0.078		0.247	0.654
	2Φ		0.407	0.172		0.276	0.110													0.407	
	3Φ								(All Red for Pedestrian)											0.000	
	4Φ																			0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		

PM Peak

Approach		Eastbound 32 - 1			Westbound 32 - 2			Northbound 32 - 3			Southbound 32 - 4			Bus Eatbound 32 - 1B			Bus Westbound 32 - 2B			λi	Σλ
		-	T	U	-	T	U	-	-	-	-	-	-	-	T	-	-	T	-		
1) No. of lanes		-	2	1	-	2	1	-	-	-	-	-	-	-	1	-	-	1	-		
2) Basic value of saturation flow rate		-	2,000	1,800	-	2,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
3) Adjustment factor for left		-	1.00	1.00	-	1.00	1.00	-	-	-	-	-	-	-	1.00		-	1.00			
4) Adjustment factor for right		-	1.00	1.00	-	1.00	1.00	-	-	-	-	-	-	-	1.00	-	-	1.00	-		
5) Saturation flow rate		-	4,000	1,800	-	4,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
		-	4,000	1,800	-	4,000	1,800		-			-			2,000			2,000			
7) PCU direction volume(bus)															170			293			
		-	-	-	-	-	-		-			-			170			293			
8) PCU direction volume(others)			2,254	250		2,677	313														
		-	2,254	250	-	2,677	313		-			-			0			0			
9) PCU direction volume (total)		-	2,254	250	-	2,677	313	-	-	-	-	-	-	-	170	-	-	293	-		
		-	2,254	250	-	2,677	313		-			-			170			293			
10) Flow rate		-	0.563	0.139	-	0.669	0.174		-			-			0.085			0.147			
11) Necessary phase ratio	1Φ		0.258			0.306									0.085			0.147		0.306	0.669
	2Φ		0.306	0.139		0.363	0.174													0.363	
	3Φ								(All Red for Pedestrian)											0.000	
	4Φ																			0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		

Intersection No.33: Salah Salem St., Giza Sq.

AM Peak

Approach		Eastbound 33 - 1			Westbound 33 - 2			Northbound 33 - 3			Southbound 33 - 4			Southbound-2 33 - 3			Suthbound-3 33 - 4				
		-		U		T					R				T		R				
1) No. of lanes		-		2		3					2				3		2				
2) Basic value of saturation flow rate		-		1,800		2,000					1,800				2,000		1,800				
3) Adjustment factor for left		-		1.00		1.00					1.00				1.00		1.00				
4) Adjustment factor for right		-		1.00		1.00					1.00				1.00		1.00				
5) Saturation flow rate		-		3,600		6,000					3,600				6,000		3,600				
		-	3,600			6,000						3,600			6,000			3,600			
7) PCU direction volume(bus)		-		45		133							58		1,622		93				
		-	45			133						58			1,622			93			
8) PCU direction volume(others)		-		835		1,507							1,129		1,398		710				
		-	835			1,507						1,129			1,398			710			
9) PCU direction volume (total)		-	0	880		1,640							1,187		3,020		803				
		-	880			1,640						1,187			3,020			803			
10) Flow rate		-	0.244			0.273						0.330			0.503			0.223		λi	Σλ
11) Necessary phase ratio	1Φ		0.244									0.330			0.503					0.503	
	2Φ					0.273												0.223		0.273	0.777
	3Φ							(All Red for Pedestrian)												0.000	
	4Φ																			0.000	
13) Ratio of left turn		0%	0%	0%	-	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	-	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		

PM Peak

Approach		Eastbound 33 - 1			Westbound 33 - 2			Northbound 33 - 3			Southbound 33 - 4			Southbound-2 33 - 3			Suthbound-3 33 - 4				
		-		U		T					R				T		R				
1) No. of lanes		-		2		3					2				3		2				
2) Basic value of saturation flow rate		-		1,800		2,000					1,800				2,000		1,800				
3) Adjustment factor for left		-		1.00		1.00					1.00				1.00		1.00				
4) Adjustment factor for right		-		1.00		1.00					1.00				1.00		1.00				
5) Saturation flow rate		-	0	3,600		6,000					3,600				6,000		3,600				
		-	3,600			6,000						3,600			6,000			3,600			
7) PCU direction volume(bus)		-		45		120							75		275		93				
		-	45			120						75			275			93			
8) PCU direction volume(others)		-		1,005		1,664							1,491		1,168		765				
		-	1,005			1,664						1,491			1,168			765			
9) PCU direction volume (total)		-	0	1,050		1,784							1,566		1,443		858				
		-	1,050			1,784						1,566			1,443			858			
10) Flow rate		-	0.292			0.297						0.435			0.241			0.238		λi	Σλ
11) Necessary phase ratio	1Φ		0.292									0.435			0.241					0.435	
	2Φ					0.297												0.238		0.297	0.732
	3Φ							(All Red for Pedestrian)												0.000	
	4Φ																			0.000	
13) Ratio of left turn		0%	0%	0%	-	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	-	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		

Intersection No.34: Salah Salem St., Entrance of Ahram St.

AM Peak

Approach		Eastbound 34 - 1			Westbound 34 - 2			Northbound 34 - 3			Southbound 34 - 4				
		R+T	T			T	L	R	-	-	-	-	-		
1) No. of lanes		1	1			2	2	2	-	-	-	-	-		
2) Basic value of saturation flow rate		2,000	2,000			2,000	1,800	1,800	-	-	-	-	-		
3) Adjustment factor for left		1.00	1.00			1.00	1.00	1.00	-	-	-	-	-		
4) Adjustment factor for right		0.95	1.00			1.00	1.00	1.00	-	-	-	-	-		
5) Saturation flow rate		1,906	2,000			4,000	3,600	3,600	-	-	-	-	-		
		3,906			4,000		3,600		3,600			-			
7) PCU direction volume(bus)		25	73		213	305	265		50						
		98			518		265		50						
8) PCU direction volume(others)		526	607		1,587	2,099	1,141		1,246						
		1,133			3,686		1,141		1,246			-			
9) PCU direction volume (total)		551	680		1,800	2,404	1,406		-		-	-	-		
		1,231			4,204		1,406		1,246			-			
10) Flow rate		0.315			1.051		0.391		0.346			-		λi	Σλ
11) Necessary phase ratio	1Φ		0.315											0.315	
	2Φ						0.391		0.346			-		0.391	0.706
	3Φ				(All Red for Pedestrian)									0.000	
	4Φ													0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	33%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		45%	0%	0%	43%	0%	0%	0%	0%	0%	0%	0%	0%		

PM Peak

Approach		Eastbound 34 - 1			Westbound 34 - 2			Northbound 34 - 3			Southbound 34 - 4				
		R+T	T			T	L	R	-	-	-	-	-		
1) No. of lanes		1	1			2	2	2	-	-	-	-	-		
2) Basic value of saturation flow rate		2,000	2,000			2,000	1,800	1,800	-	-	-	-	-		
3) Adjustment factor for left		1.00	1.00			1.00	1.00	1.00	-	-	-	-	-		
4) Adjustment factor for right		0.95	1.00			1.00	1.00	1.00	-	-	-	-	-		
5) Saturation flow rate		1,908	2,000			4,000	3,600	3,600	-	-	-	-	-		
		3,908			4,000		3,600		3,600			-			
7) PCU direction volume(bus)		43	54		288	483	225		60						
		97			771		225		60						
8) PCU direction volume(others)		444	573		2,078	2,659	1,064		791						
		1,016			4,737		1,064		791			-			
9) PCU direction volume (total)		486	627		2,365	3,142	1,289		-		-	-	-		
		1,113			5,507		1,289		791			-			
10) Flow rate		0.285			1.377		0.358		0.220			-		λi	Σλ
11) Necessary phase ratio	1Φ		0.285											0.285	
	2Φ						0.358		0.220			-		0.358	0.643
	3Φ				(All Red for Pedestrian)									0.000	
	4Φ													0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	23%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		44%	0%	0%	43%	0%	0%	0%	0%	0%	0%	0%	0%		

Intersection No.35: Ahram St., Tereat El Zomor El Sharqy St.

AM Peak

Approach		Eastbound 35 - 1			Westbound 35 - 2			Northbound 35 - 3			Southbound 35 - 4			Bus Eastbound 35 - 1B			Bus Westbound 35 - 2B				
		T+R	T		T+R	T		R	-		R	-		-	T+L+R	-	-	T+L+R	-		
1) No. of lanes		1	2		1	2		2	-		2	-		-	1	-	-	1	-		
2) Basic value of saturation flow rate		2,000	2,000		2,000	2,000		1,800	-		1,800	-		-	2,000	-	-	2,000	-		
3) Adjustment factor for left		1.00	1.00		1.00	1.00		1.00	-		1.00	-		-	1.00		-	1.00			
4) Adjustment factor for right		0.99	1.00		0.99	1.00		1.00	-		1.00	-		-	0.99	-	-	1.00	-		
5) Saturation flow rate		1,979	4,000		1,989	4,000		3,600	-		3,600	-		-	1,974	-	-	1,997	-		
		5,979			5,989			3,600			3,600			1,974			1,997				
7) PCU direction volume(bus)								130	0		40	0		15	114		2	127			
		0			0			130			40			129			129				
8) PCU direction volume(others)		341	3,183		109	2,045		937	0		417	0									
		3,524			2,154			937			417			0			0				
9) PCU direction volume (total)		341	3,183		109	2,045		1,067	0	0	457	0	0	15	114	0	2	127	0		
		3,524			2,154			1,067			457			129			129				
10) Flow rate		0.589			0.360			0.260			0.127			0.065			0.065			λi	Σλ
11) Necessary phase ratio	1Φ								0.026			0.013			0.065			0.065		0.065	0.655
	2Φ		0.589			0.360			0.234			0.114								0.589	
	3Φ								(All Red for Pedestrian)											0.000	
	4Φ																			0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		10%	0%	0%	5%	0%	0%	100%	0%	0%	0%	0%	0%	0%	12%	0%	0%	1%	0%		

Approach		Eastbound 35 - 1			Westbound 35 - 2			Northbound 35 - 3			Southbound 35 - 4			Bus Eastbound 35 - 1B			Bus Westbound 35 - 2B				
		T+R	T		T+R	T		R	-		R	-		-	T+L+R	-	-	T+L+R	-		
1) No. of lanes		1	2		1	2		2	-		2	-		-	1	-	-	1	-		
2) Basic value of saturation flow rate		2,000	2,000		2,000	2,000		1,800	-		1,800	-		-	2,000	-	-	2,000	-		
3) Adjustment factor for left		1.00	1.00		1.00	1.00		1.00	-		1.00	-		-	1.00		-	1.00			
4) Adjustment factor for right		0.98	1.00		0.99	1.00		1.00	-		1.00	-		-	0.98	-	-	1.00	-		
5) Saturation flow rate		1,956	4,000		1,983	4,000		3,600	-		3,600	-		-	1,958	-	-	1,996	-		
		5,956			5,983			3,600			3,600			1,958			1,996				
7) PCU direction volume(bus)								73	0		68	0		25	104		3	126			
		0			0			73			68			129			129				
8) PCU direction volume(others)		577	2,270		282	3,284		833	0		356	0									
		2,847			3,566			833			356			0			0				
9) PCU direction volume (total)		577	2,270		282	3,284		906	0	0	424	0	0	25	104	0	3	126	0		
		2,847			3,566			906			424			129			129				
10) Flow rate		0.478			0.596			0.252			0.118			0.066			0.065			λi	Σλ
11) Necessary phase ratio	1Φ								0.030			0.014			0.066			0.065		0.066	0.662
	2Φ		0.478			0.596			0.221			0.104								0.596	
	3Φ								(All Red for Pedestrian)											0.000	
	4Φ																			0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		20%	0%	0%	8%	0%	0%	100%	0%	0%	0%	0%	0%	0%	19%	0%	0%	2%	0%		

Intersection No.36: Ahram St., Samy El Baroody St.

AM Peak

Approach		Eastbound 36 - 1			Westbound 36 - 2			Northbound 36 - 3			Southbound 36 - 4			Bus Eatbound 36 - 1B			Bus Westbound 36 - 2B				
		-	T	U	-	T	U	-	-	-	-	-	-	-	T	-	-	T	-		
1) No. of lanes		-	2	1	-	2	1	-	-	-	-	-	-	-	1	-	-	1	-		
2) Basic value of saturation flow rate		-	2,000	1,800	-	2,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
3) Adjustment factor for left		-	1.00	1.00	-	1.00	1.00	-	-	-	-	-	-	-	1.00		-	1.00			
4) Adjustment factor for right		-	1.00	1.00	-	1.00	1.00	-	-	-	-	-	-	-	1.00	-	-	1.00	-		
5) Saturation flow rate		-	4,000	1,800	-	4,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
		-	4,000	1,800	-	4,000	1,800		-			-			2,000			2,000			
7) PCU direction volume(bus)															129			129			
		-	-	-	-	-	-		-			-			129			129			
8) PCU direction volume(others)		-	2,550	356		1,810	210														
		-	2,550	356	-	1,810	210		-			-			0			0			
9) PCU direction volume (total)		-	2,550	356	-	1,810	210	-	-	-	-	-	-	-	129	-	-	129	-		
		-	2,550	356	-	1,810	210		-			-			129			129			
10) Flow rate		-	0.638	0.198	-	0.453	0.117		-			-			0.065			0.065		λi	Σλ
11) Necessary phase ratio	1Φ		0.157			0.111									0.065			0.065		0.157	0.638
	2Φ		0.481	0.198		0.341	0.117													0.481	
	3Φ								(All Red for Pedestrian)											0.000	
	4Φ																			0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		

PM Peak

Approach		Eastbound 36 - 1			Westbound 36 - 2			Northbound 36 - 3			Southbound 36 - 4			Bus Eatbound 36 - 1B			Bus Westbound 36 - 2B				
		-	T	U	-	T	U	-	-	-	-	-	-	-	T	-	-	T	-		
1) No. of lanes		-	2	1	-	2	1	-	-	-	-	-	-	-	1	-	-	1	-		
2) Basic value of saturation flow rate		-	2,000	1,800	-	2,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
3) Adjustment factor for left		-	1.00	1.00	-	1.00	1.00	-	-	-	-	-	-	-	1.00		-	1.00			
4) Adjustment factor for right		-	1.00	1.00	-	1.00	1.00	-	-	-	-	-	-	-	1.00	-	-	1.00	-		
5) Saturation flow rate		-	4,000	1,800	-	4,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
		-	4,000	1,800	-	4,000	1,800		-			-			2,000			2,000			
7) PCU direction volume(bus)															129			129			
		-	-	-	-	-	-		-			-			129			129			
8) PCU direction volume(others)			2,583	339		2,591	318														
		-	2,583	339	-	2,591	318		-			-			0			0			
9) PCU direction volume (total)		-	2,583	339	-	2,591	318	-	-	-	-	-	-	-	129	-	-	129	-		
		-	2,583	339	-	2,591	318		-			-			129			129			
10) Flow rate		-	0.646	0.188	-	0.648	0.177		-			-			0.065			0.065		λi	Σλ
11) Necessary phase ratio	1Φ		0.165			0.165									0.065			0.065		0.165	0.648
	2Φ		0.481	0.188		0.483	0.177													0.483	
	3Φ								(All Red for Pedestrian)											0.000	
	4Φ																			0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		

Intersection No.37: Ahram St., Mesaha Sq.

AM Peak

Approach		Eastbound			Westbound			Northbound			Southbound			Bus Eatbound			Bus Westbound				
		37 - 1			37 - 2			37 - 3			37 - 4			37 - 1B			37 - 2B				
		-	T	U	-	T	U	-	-	-	-	-	-	-	T	-	-	T	-		
1) No. of lanes		-	2	1	-	2	1	-	-	-	-	-	-	-	1	-	-	1	-		
2) Basic value of saturation flow rate		-	2,000	1,800	-	2,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
3) Adjustment factor for left		-	1.00	1.00	-	1.00	1.00	-	-	-	-	-	-	-	1.00		-	1.00			
4) Adjustment factor for right		-	1.00	1.00	-	1.00	1.00	-	-	-	-	-	-	-	1.00	-	-	1.00	-		
5) Saturation flow rate		-	4,000	1,800	-	4,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
		-	4,000	1,800	-	4,000	1,800		-			-			2,000			2,000			
7) PCU direction volume(bus)														-	129	-	-	129	-		
		-	-	-	-	-	-		-			-			129			129			
8) PCU direction volume(others)		-	2,834	231	-	2,327	207														
		-	2,834	231	-	2,327	207		-			-			0			0			
9) PCU direction volume (total)		-	2,834	231	-	2,327	207	-	-	-	-	-	-	-	129	-	-	129	-		
		-	2,834	231	-	2,327	207		-			-			129			129			
10) Flow rate		-	0.709	0.128	-	0.582	0.115		-			-			0.065			0.065		λi	Σλ
11) Necessary phase ratio	1Φ		0.237			0.195									0.065			0.065		0.237	0.709
	2Φ		0.472	0.128		0.387	0.115													0.472	
	3Φ								(All Red for Pedestrian)											0.000	
	4Φ																			0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		

PM Peak

Approach		Eastbound			Westbound			Northbound			Southbound			Bus Eatbound			Bus Westbound				
		37 - 1			37 - 2			37 - 3			37 - 4			37 - 1B			37 - 2B				
		-	T	U	-	T	U	-	-	-	-	-	-	-	T	-	-	T	-		
1) No. of lanes		-	2	1	-	2	1	-	-	-	-	-	-	-	1	-	-	1	-		
2) Basic value of saturation flow rate		-	2,000	1,800	-	2,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
3) Adjustment factor for left		-	1.00	1.00	-	1.00	1.00	-	-	-	-	-	-	-	1.00		-	1.00			
4) Adjustment factor for right		-	1.00	1.00	-	1.00	1.00	-	-	-	-	-	-	-	1.00	-	-	1.00	-		
5) Saturation flow rate		-	4,000	1,800	-	4,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
		-	4,000	1,800	-	4,000	1,800		-			-			2,000			2,000			
7) PCU direction volume(bus)														-	129	-	-	109	20		
		-	-	-	-	-	-		-			-			129			129			
8) PCU direction volume(others)		-	2,258	244	0	2,376	424														
		-	2,258	244	-	2,376	424		-			-			0			0			
9) PCU direction volume (total)		-	2,258	244	-	2,376	424	-	-	-	-	-	-	-	129	-	-	109	-		
		-	2,258	244	-	2,376	424		-			-			129			109			
10) Flow rate		-	0.565	0.136	-	0.594	0.236		-			-			0.065			0.055		λi	Σλ
11) Necessary phase ratio	1Φ		0.182			0.192									0.065			0.055		0.192	0.594
	2Φ		0.383	0.136		0.403	0.236													0.403	
	3Φ								(All Red for Pedestrian)											0.000	
	4Φ																			0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		

Intersection No.38: Ahram St., Naser El Thawra St.

AM Peak

Approach		Eastbound			Westbound			Northbound			Southbound			Bus Eatbound			Bus Westbound				
		38 - 1			38 - 2			38 - 3			38 - 4			38 - 1B			38 - 2B				
		-	T	U	-	T	U	-	-	-	-	-	-	-	T	-	-	T	-		
1) No. of lanes		-	2	1	-	2	1	-	-	-	-	-	-	-	1	-	-	1	-		
2) Basic value of saturation flow rate		-	2,000	1,800	-	2,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
3) Adjustment factor for left		-	1.00	1.00	-	1.00	1.00	-	-	-	-	-	-	-	1.00		-	1.00			
4) Adjustment factor for right		-	1.00	1.00	-	1.00	1.00	-	-	-	-	-	-	-	1.00	-	-	1.00	-		
5) Saturation flow rate		-	4,000	1,800	-	4,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
		-	4,000	1,800	-	4,000	1,800		-			-			2,000			2,000			
7) PCU direction volume(bus)															129			129			
		-	-	-	-	-	-								129			129			
8) PCU direction volume(others)			2,730	292		2,484	96														
		-	2,730	292	-	2,484	96		-			-			0			0			
9) PCU direction volume (total)		-	2,730	292	-	2,484	96	-	-	-	-	-	-	-	129	-	-	129	-		
		-	2,730	292	-	2,484	96		-			-			129			129			
10) Flow rate		-	0.683	0.162	-	0.621	0.053		-			-			0.065			0.065		λi	Σλ
11) Necessary phase ratio	1Φ		0.194			0.177									0.065			0.065		0.194	0.683
	2Φ		0.488	0.162		0.444	0.053													0.488	
	3Φ								(All Red for Pedestrian)											0.000	
	4Φ																			0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		

Approach		Eastbound			Westbound			Northbound			Southbound			Bus Eatbound			Bus Westbound				
		38 - 1			38 - 2			38 - 3			38 - 4			38 - 1B			38 - 2B				
		-	T	U	-	T	U	-	-	-	-	-	-	-	T	-	-	T	-		
1) No. of lanes		-	2	1	-	2	1	-	-	-	-	-	-	-	1	-	-	1	-		
2) Basic value of saturation flow rate		-	2,000	1,800	-	2,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
3) Adjustment factor for left		-	1.00	1.00	-	1.00	1.00	-	-	-	-	-	-	-	1.00		-	1.00			
4) Adjustment factor for right		-	1.00	1.00	-	1.00	1.00	-	-	-	-	-	-	-	1.00	-	-	1.00	-		
5) Saturation flow rate		-	4,000	1,800	-	4,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
		-	4,000	1,800	-	4,000	1,800		-			-			2,000			2,000			
7) PCU direction volume(bus)															129			129			
		-	-	-	-	-	-		-			-			129			129			
8) PCU direction volume(others)			2,722	278		2,563	166														
		-	2,722	278	-	2,563	166		-			-			0			0			
9) PCU direction volume (total)		-	2,722	278	-	2,563	166	-	-	-	-	-	-	-	129	-	-	129	-		
		-	2,722	278	-	2,563	166		-			-			129			129			
10) Flow rate		-	0.681	0.155	-	0.641	0.092		-			-			0.065			0.065		λi	Σλ
11) Necessary phase ratio	1Φ		0.200			0.189									0.065			0.065		0.200	0.681
	2Φ		0.480	0.155		0.452	0.092													0.480	
	3Φ								(All Red for Pedestrian)											0.000	
	4Φ																			0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		

Intersection No.39: Ahram St., Madkoor Sq.

AM Peak

Approach		Eastbound			Westbound			Northbound			Southbound			Bus Eatbound			Bus Westbound				
		39 - 1			39 - 2			39 - 3			39 - 4			39 - 1B			39 - 2B				
		-	T	U	-	T	U	-	-	-	-	-	-	-	T	-	-	T	-		
1) No. of lanes		-	2	1	-	2	1	-	-	-	-	-	-	-	1	-	-	1	-		
2) Basic value of saturation flow rate		-	2,000	1,800	-	2,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
3) Adjustment factor for left		-	1.00	1.00	-	1.00	1.00	-	-	-	-	-	-	-	1.00		-	1.00			
4) Adjustment factor for right		-	1.00	1.00	-	1.00	1.00	-	-	-	-	-	-	-	1.00	-	-	1.00	-		
5) Saturation flow rate		-	4,000	1,800	-	4,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
		-	4,000	1,800	-	4,000	1,800		-			-			2,000			2,000			
7) PCU direction volume(bus)														-	129	-	-	129	-		
		-	-	-	-	-	-		-			-			129			129			
8) PCU direction volume(others)			3,059	186		2,131	115														
		-	3,059	186	-	2,131	115		-			-			0			0			
9) PCU direction volume (total)		-	3,059	186	-	2,131	115	-	-	-	-	-	-	-	129	-	-	129	-		
		-	3,059	186	-	2,131	115		-			-			129			129			
10) Flow rate		-	0.765	0.103	-	0.533	0.064		-			-			0.065			0.065		λi	Σλ
11) Necessary phase ratio	1Φ		0.294			0.205									0.065			0.065		0.294	0.765
	2Φ		0.471	0.103		0.328	0.064													0.471	
	3Φ								(All Red for Pedestrian)											0.000	
	4Φ																			0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		

PM Peak

Approach		Eastbound			Westbound			Northbound			Southbound			Bus Eatbound			Bus Westbound				
		39 - 1			39 - 2			39 - 3			39 - 4			39 - 1B			39 - 2B				
		-	T	U	-	T	U	-	-	-	-	-	-	-	T	-	-	T	-		
1) No. of lanes		-	2	1	-	2	1	-	-	-	-	-	-	-	1	-	-	1	-		
2) Basic value of saturation flow rate		-	2,000	1,800	-	2,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
3) Adjustment factor for left		-	1.00	1.00	-	1.00	1.00	-	-	-	-	-	-	-	1.00		-	1.00			
4) Adjustment factor for right		-	1.00	1.00	-	1.00	1.00	-	-	-	-	-	-	-	1.00	-	-	1.00	-		
5) Saturation flow rate		-	4,000	1,800	-	4,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
		-	4,000	1,800	-	4,000	1,800		-			-			2,000			2,000			
7) PCU direction volume(bus)														-	129	-	-	129	-		
		-	-	-	-	-	-		-			-			129			129			
8) PCU direction volume(others)			3,105	178		2,775	169														
		-	3,105	178	-	2,775	169		-			-			0			0			
9) PCU direction volume (total)		-	3,105	178	-	2,775	169	-	-	-	-	-	-	-	129	-	-	129	-		
		-	3,105	178	-	2,775	169		-			-			129			129			
10) Flow rate		-	0.776	0.099	-	0.694	0.094		-			-			0.065			0.065		λi	Σλ
11) Necessary phase ratio	1Φ		0.306			0.274									0.065			0.065		0.306	0.776
	2Φ		0.470	0.099		0.420	0.094													0.470	
	3Φ								(All Red for Pedestrian)											0.000	
	4Φ																			0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		

Intersection No.40: Ahram St., Osman Moharam St.

AM Peak

Approach		Eastbound			Westbound			Northbound			Southbound			Bus Eastbound			Bus Westbound				
		40 - 1			40 - 2			40 - 3			40 - 4			40 - 1B			40 - 2B				
			T	U		T	U	-	-	-	-	-	-	-	T	-	-	T	-		
1) No. of lanes			2	1		2	1	-	-	-	-	-	-	-	1	-	-	1	-		
2) Basic value of saturation flow rate			2,000	1,800		2,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
3) Adjustment factor for left			1.00	1.00		1.00	1.00	-	-	-	-	-	-	-	1.00		-	1.00			
4) Adjustment factor for right			1.00	1.00		1.00	1.00	-	-	-	-	-	-	-	1.00	-	-	1.00	-		
5) Saturation flow rate			4,000	1,800		4,000	1,800							-	2,000	-	-	2,000	-		
			4,000	1,800		4,000	1,800								2,000			2,000			
7) PCU direction volume(bus)															129			129			
															129			129			
8) PCU direction volume(others)			2,799	318	0	2,754	280														
			2,799	318		2,754	280								0			0			
9) PCU direction volume (total)			2,799	318		2,754	280							0	129	0	0	129	0		
			2,799	318		2,754	280								129			129			
10) Flow rate			0.700	0.177		0.688	0.155								0.065			0.065		λi	Σλ
11) Necessary phase ratio	1Φ		0.187			0.184									0.065			0.065		0.187	0.700
	2Φ		0.513	0.177		0.504	0.155													0.513	
	3Φ								(All Red for Pedestrian)											0.000	
	4Φ																			0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		

Approach		Eastbound			Westbound			Northbound			Southbound			Bus Eastbound			Bus Westbound				
		40 - 1			40 - 2			40 - 3			40 - 4			40 - 1B			40 - 2B				
			T	U		T	U	-	-	-	-	-	-	-	T	-	-	T	-		
1) No. of lanes			2	1		2	1	-	-	-	-	-	-	-	1	-	-	1	-		
2) Basic value of saturation flow rate			2,000	1,800		2,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
3) Adjustment factor for left			1.00	1.00		1.00	1.00	-	-	-	-	-	-	-	1.00		-	1.00			
4) Adjustment factor for right			1.00	1.00		1.00	1.00	-	-	-	-	-	-	-	1.00	-	-	1.00	-		
5) Saturation flow rate			4,000	1,800		4,000	1,800							-	2,000	-	-	2,000	-		
			4,000	1,800		4,000	1,800								2,000			2,000			
7) PCU direction volume(bus)															129			129			
															129			129			
8) PCU direction volume(others)			2,517	451	0	2,135	375														
			2,517	451		2,135	375														
9) PCU direction volume (total)			2,517	451		2,135	375								129			129			
			2,517	451		2,135	375								129			129			
10) Flow rate			0.629	0.251		0.534	0.209								0.065			0.065		λi	Σλ
11) Necessary phase ratio	1Φ		0.129			0.109									0.065			0.065		0.129	0.629
	2Φ		0.500	0.251		0.424	0.209													0.500	
	3Φ								(All Red for Pedestrian)											0.000	
	4Φ																			0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		

Intersection No.41: Ahram St., Nabarawy St.

AM Peak

Approach		Eastbound 41 - 1			Westbound 41 - 2			Northbound 41 - 3			Southbound 41 - 4			Bus Eastbound 41 - 1B			Bus Westbound 41 - 2B				
		T+R	T	L+U	T+R	T	L+U	-	-	-	-	-	-	-	T	-	-	T	-		
1) No. of lanes			2	1		2	1	-	-	-	-	-	-	-	1	-	-	1	-		
2) Basic value of saturation flow rate			2,000	1,800		2,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
3) Adjustment factor for left			1.00	1.00		1.00	1.00	-	-	-	-	-	-	-	1.00		-	1.00			
4) Adjustment factor for right			1.00	1.00		1.00	1.00	-	-	-	-	-	-	-	1.00	-	-	1.00	-		
5) Saturation flow rate			4,000	1,800		4,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
			4,000	1,800		4,000	1,800		0			0			2,000			2,000			
7) PCU direction volume(bus)								-	-	-	-	-	-		129			129			
									0			0			129			129			
8) PCU direction volume(others)			3,182	140	0	3,158	147	-	-	-	-	-	-								
			3,182	140		3,158	147		0			0			0			0			
9) PCU direction volume (total)			3,182	140		3,158	147	-	-	-	-	-	-	0	129	0	0	129	0		
			3,182	140		3,158	147		0			0			129			129			
10) Flow rate			0.796	0.078		0.790	0.082		-			-			0.065			0.065		λi	Σλ
11) Necessary phase ratio	1Φ		0.351			0.349									0.065			0.065		0.351	0.796
	2Φ		0.444	0.078		0.441	0.082													0.444	
	3Φ								(All Red for Pedestrian)											0.000	
	4Φ																			0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		

Approach		Eastbound 41 - 1			Westbound 41 - 2			Northbound 41 - 3			Southbound 41 - 4			Bus Eastbound 41 - 1B			Bus Westbound 41 - 2B				
		T+R	T	L+U	T+R	T	L+U	-	-	-	-	-	-	-	T	-	-	T	-		
1) No. of lanes			2	1		2	1	-	-	-	-	-	-	-	1	-	-	1	-		
2) Basic value of saturation flow rate			2,000	1,800		2,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
3) Adjustment factor for left			1.00	1.00		1.00	1.00	-	-	-	-	-	-	-	1.00		-	1.00			
4) Adjustment factor for right			1.00	1.00		1.00	1.00	-	-	-	-	-	-	-	1.00	-	-	1.00	-		
5) Saturation flow rate			4,000	1,800		4,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
			4,000	1,800		4,000	1,800		0			0			2,000			2,000			
7) PCU direction volume(bus)								-	-	-	-	-	-		129			129			
									0			0			129			129			
8) PCU direction volume(others)			3,060	164		2,713	123	-	-	-	-	-	-								
			3,060	164		2,713	123		0			0			0			0			
9) PCU direction volume (total)			3,060	164		2,713	123	-	-	-	-	-	-	0	129	0	0	129	0		
			3,060	164		2,713	123		0			0			129			129			
10) Flow rate			0.765	0.091		0.678	0.069		-			-			0.065			0.065		λi	Σλ
11) Necessary phase ratio	1Φ		0.371			0.329									0.065			0.065		0.371	0.765
	2Φ		0.394	0.091		0.350	0.069													0.394	
	3Φ								(All Red for Pedestrian)											0.000	
	4Φ																			0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		

Intersection No.42: Ahram St., Sheikh El Sherbeeny St.

AM Peak

Approach		Eastbound 42 - 1			Westbound 42 - 2			Northbound 42 - 3			Southbound 42 - 4			Bus Eastbound 42 - 1B			Bus Westbound 42 - 2B				
		-	T	U	-	T	U	-	-	-	-	-	-	-	T	-	-	T	-		
1) No. of lanes		-	2	1	-	2	1	-	-	-	-	-	-	-	1	-	-	1	-		
2) Basic value of saturation flow rate		-	2,000	1,800	-	2,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
3) Adjustment factor for left		-	1.00	1.00	-	1.00	1.00	-	-	-	-	-	-	-	1.00		-	1.00			
4) Adjustment factor for right		-	1.00	1.00	-	1.00	1.00	-	-	-	-	-	-	-	1.00	-	-	1.00	-		
5) Saturation flow rate		-	4,000	1,800	-	4,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
		-	4,000	1,800	-	4,000	1,800		0			0			2,000			2,000			
7) PCU direction volume(bus)		-												-	129	-	-	129	-		
		-			-				0			0			129			129			
8) PCU direction volume(others)		-	2,566	176		2,537	253														
		-	2,566	176	-	2,537	253		0			0			0			0			
9) PCU direction volume (total)		-	2,566	176	-	2,537	253	0	0	0	0	0	0	-	129	-	-	129	-		
		-	2,566	176	-	2,537	253		0			0			129			129			
10) Flow rate		-	0.641	0.098	-	0.634	0.141		-			-			0.065			0.065		λi	Σλ
11) Necessary phase ratio	1Φ		0.202			0.199									0.065			0.065		0.202	0.641
	2Φ		0.440	0.098		0.435	0.141													0.440	
	3Φ								(All Red for Pedestrian)											0.000	
	4Φ																			0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		

Approach		Eastbound 42 - 1			Westbund 42 - 2			Northbound 42 - 3			Southbound 42 - 4			Bus Eastbound 42 - 1B			Bus Westbound 42 - 2B				
		-	T	U	-	T	U	-	-	-	-	-	-	-	T	-	-	T	-		
1) No. of lanes		-	2	1	-	2	1	-	-	-	-	-	-	-	1	-	-	1	-		
2) Basic value of saturation flow rate		-	2,000	1,800	-	2,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
3) Adjustment factor for left		-	1.00	1.00	-	1.00	1.00	-	-	-	-	-	-	-	1.00		-	1.00			
4) Adjustment factor for right		-	1.00	1.00	-	1.00	1.00	-	-	-	-	-	-	-	1.00	-	-	1.00	-		
5) Saturation flow rate		-	4,000	1,800	-	4,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
		-	4,000	1,800	-	4,000	1,800		0			0			2,000			2,000			
7) PCU direction volume(bus)														-	129	-	-	129	-		
		-			-				0			0			129			129			
8) PCU direction volume(others)		-	2,426	201	-	2,542	266														
		-	2,426	201	-	2,542	266		0			0			0			0			
9) PCU direction volume (total)		-	2,426	201	-	2,542	266	0	0	0	0	0	0	-	129	-	-	129	-		
		-	2,426	201	-	2,542	266		0			0			129			129			
10) Flow rate		-	0.607	0.112	-	0.635	0.148		-			-			0.065			0.065		λi	Σλ
11) Necessary phase ratio	1Φ		0.185			0.193									0.065			0.065		0.193	0.635
	2Φ		0.422	0.112		0.442	0.148													0.442	
	3Φ								(All Red for Pedestrian)											0.000	
	4Φ								-											0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		

Intersection No.43: Ahram St., Taawon Sq.

AM Peak

Approach		Eastbound			Westbound			Northbound			Southbound			Bus Eatbound			Bus Westbound				
		43 - 1			43 - 2			43 - 3			43 - 4			43 - 1B			43 - 2B				
		-	T	U	-	T	U	-	-	-	-	-	-	-	T	-	-	T	-		
1) No. of lanes		-	2	1	-	2	1	-	-	-	-	-	-	-	1	-	-	1	-		
2) Basic value of saturation flow rate		-	2,000	1,800	-	2,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
3) Adjustment factor for left		-	1.00	1.00	-	1.00	1.00	-	-	-	-	-	-	-	1.00		-	1.00			
4) Adjustment factor for right		-	1.00	1.00	-	1.00	1.00	-	-	-	-	-	-	-	1.00	-	-	1.00	-		
5) Saturation flow rate		-	4,000	1,800	-	4,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
		-	4,000	1,800	-	4,000	1,800		-			-			2,000			2,000			
7) PCU direction volume(bus)														-	129	-	-	129	-		
		-	-	-	-	-	-		-			-			129			129			
8) PCU direction volume(others)		-	1,846	250		2,416	250														
		-	1,846	250	-	2,416	250		-			-			0			0			
9) PCU direction volume (total)		-	1,846	250	-	2,416	250	-	-	-	-	-	-	-	129	-	-	129	-		
		-	1,846	250	-	2,416	250		-			-			129			129			
10) Flow rate		-	0.461	0.139	-	0.604	0.139		-			-			0.065			0.065		λi	Σλ
11) Necessary phase ratio	1Φ		0.146			0.192									0.065			0.065		0.192	0.604
	2Φ		0.315	0.139		0.412	0.139													0.412	
	3Φ								(All Red for Pedestrian)											0.000	
	4Φ																			0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		

PM Peak

Approach		Eastbound			Westbound			Northbound			Southbound			Bus Eatbound			Bus Westbound				
		43 - 1			43 - 2			43 - 3			43 - 4			43 - 1B			43 - 2B				
		-	T	U	-	T	U	-	-	-	-	-	-	-	T	-	-	T	-		
1) No. of lanes		-	2	1	-	2	1	-	-	-	-	-	-	-	1	-	-	1	-		
2) Basic value of saturation flow rate		-	2,000	1,800	-	2,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
3) Adjustment factor for left		-	1.00	1.00	-	1.00	1.00	-	-	-	-	-	-	-	1.00		-	1.00			
4) Adjustment factor for right		-	1.00	1.00	-	1.00	1.00	-	-	-	-	-	-	-	1.00	-	-	1.00	-		
5) Saturation flow rate		-	4,000	1,800	-	4,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
		-	4,000	1,800	-	4,000	1,800		-			-			2,000			2,000			
7) PCU direction volume(bus)														-	129	-	-	129	-		
		-	-	-	-	-	-		-			-			129			129			
8) PCU direction volume(others)		-	2,293	250	-	2,436	250														
		-	2,293	250	-	2,436	250		-			-			0			0			
9) PCU direction volume (total)		-	2,293	250	-	2,436	250	-	-	-	-	-	-	-	129	-	-	129	-		
		-	2,293	250	-	2,436	250		-			-			129			129			
10) Flow rate		-	0.573	0.139	-	0.609	0.139		-			-			0.065			0.065		λi	Σλ
11) Necessary phase ratio	1Φ		0.182			0.193									0.065			0.065		0.193	0.609
	2Φ		0.391	0.139		0.416	0.139													0.416	
	3Φ								(All Red for Pedestrian)											0.000	
	4Φ																			0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		

Intersection No.44: Ahram St., Sahl Hamza St.

AM Peak

Approach		Eastbound			Westbound			Northbound			Southbound			Bus Eatbound			Bus Westbound				
		44 - 1			44 - 2			44 - 3			44 - 4			44 - 1B			44 - 2B				
		-	T	U	-	T	U	-	-	-	-	-	-	-	T+L	-	-	T+R	-		
1) No. of lanes		-	2	1	-	2	1	-	-	-	-	-	-	-	1	-	-	1	-		
2) Basic value of saturation flow rate		-	2,000	1,800	-	2,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
3) Adjustment factor for left		-	1.00	1.00	-	1.00	1.00	-	-	-	-	-	-	-	1.00		-	1.00			
4) Adjustment factor for right		-	1.00	1.00	-	1.00	1.00	-	-	-	-	-	-	-	1.00	-	-	1.00	-		
5) Saturation flow rate		-	4,000	1,800	-	4,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
		-	4,000	1,800	-	4,000	1,800		-			-			2,000			2,000			
7) PCU direction volume(bus)														-	129	-	-	129			
									-			-			0			129			
8) PCU direction volume(others)		-	1,740	260	-	2,081	260							-							
		-	1,740	260	-	2,081	260		-			-			0			0			
9) PCU direction volume (total)		-	1,740	260	-	2,081	260	-	-	-	-	-	-	-	129	-	-	129	-		
		-	1,740	260	-	2,081	260		-			-			129			129			
10) Flow rate		-	0.435	0.144	-	0.520	0.144		-			-			0.065			0.065		λi	Σλ
11) Necessary phase ratio	1Φ		0.134			0.161									0.065			0.065		0.161	0.520
	2Φ		0.301	0.144		0.360	0.144													0.360	
	3Φ								(All Red for Pedestrian)											0.000	
	4Φ																			0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		

PM Peak

Approach		Eastbound			Westbound			Northbound			Southbound			Bus Eatbound			Bus Westbound				
		44 - 1			44 - 2			44 - 3			44 - 4			44 - 3B			44 - 4B				
		-	T	L+U	-	T	U	-	-	-	-	-	-	-	T+L	-	-	T+R	-		
1) No. of lanes		-	2	1	-	2	1	-	-	-	-	-	-	-	1	-	-	1	-		
2) Basic value of saturation flow rate		-	2,000	1,800	-	2,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
3) Adjustment factor for left		-	1.00	1.00	-	1.00	1.00	-	-	-	-	-	-	-	1.00		-	1.00			
4) Adjustment factor for right		-	1.00	1.00	-	1.00	1.00	-	-	-	-	-	-	-	1.00	-	-	1.00	-		
5) Saturation flow rate		-	4,000	1,800	-	4,000	1,800	-	-	-	-	-	-	-	2,000	-	-	2,000	-		
		-	4,000	1,800	-	4,000	1,800		-			-			2,000			2,000			
7) PCU direction volume(bus)														-	129	-	-	129			
									-			-			129			129			
8) PCU direction volume(others)			2,135	255	-	2,074	250														
			2,135	255	-	2,074	250		-			-			0						
9) PCU direction volume (total)			2,135	255	-	2,074	250	-	-	-	-	-	-	-	129	-	-	129	-		
			2,135	255	-	2,074	250		-			-			129			129			
10) Flow rate		-	0.534	0.142	-	0.519	0.139		-			-			0.065			0.065		λi	Σλ
11) Necessary phase ratio	1Φ		0.167			0.164									0.065			0.065		0.167	0.534
	2Φ		0.367	0.142		0.354	0.139													0.367	
	3Φ								(All Red for Pedestrian)											0.000	
	4Φ																			0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		

Intersection No.45: Ahram St., Maryoteya Rd.

AM Peak

Approach		Eastbound			Westbound			Northbound			Southbound			Bus Eastbound			Bus Westbound				
		45 - 1			45 - 2			45 - 3			45 - 4			45 - 1B			45 - 2B				
		R		L+U	R		L+U	T+R	-	T+L	T+R	-	T+L	-	T+L+R	-	-	T+L+R	-		
1) No. of lanes		1		1	1		1	1	-	1	1	-	1	-	1	-	-	1	-		
2) Basic value of saturation flow rate		1,800		1,800	1,800		1,800	2,000	-	2,000	2,000	-	2,000	-	2,000	-	-	2,000	-		
3) Adjustment factor for left		1.00		1.00	1.00		1.00	1.00	-	1.00	1.00	-	1.00	-	1.00		-	0.99			
4) Adjustment factor for right		1.00		1.00	1.00		1.00	0.99	-	1.00	1.00	-	1.00	-	0.98	-	-	0.99	-		
5) Saturation flow rate		1,800		1,800	1,800		1,800	1,976	-	2,000	1,993	-	2,000	-	1,954	-	-	1,962	-		
		1,800		1,800	1,800		1,800	3,976			3,993			1,954			1,962				
7) PCU direction volume(bus)								67	503	298	0	93	48	23	102	4	11	107	11		
		0			0			867			140			129			129				
8) PCU direction volume(others)		168		69	412		529	179	756	448	15	211	119								
		168		69	412		529	1,383			345			0			0				
9) PCU direction volume (total)		168		69	412		529	246	1,259	746	15	303	166	23	102	4	11	107	11		
		168		69	412		529	2,250			485			129			129				
10) Flow rate		0.094		0.038	0.229		0.294	0.348			0.086			0.066			0.066			λi	Σλ
11) Necessary phase ratio	1Φ														0.066			0.066		0.066	0.707
	2Φ	0.094		0.038	0.229		0.294													0.294	
	3Φ								0.348			0.086								0.348	
	4Φ								(All Red for Pedestrian)											0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	8%	0%		
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	11%	0%	0%	3%	0%	0%	0%	18%	0%	0%	9%	0%		

Approach		Eastbound			Westbound			Northbound			Southbound			Bus Eastbound			Bus Westbound				
		45 - 1			45 - 2			45 - 3			45 - 4			45 - 1B			45 - 2B				
		R		L+U	R		L+U	T+R	-	T+L	T+R	-	T+L	-	T+L+R	-	-	T+L+R	-		
1) No. of lanes		1		1	1		1	1	-	1	1	-	1	-	1	-	-	1	-		
2) Basic value of saturation flow rate		1,800		1,800	1,800		1,800	2,000	-	2,000	2,000	-	2,000	-	2,000	-	-	2,000	-		
3) Adjustment factor for left		1.00		1.00	1.00		1.00	1.00	-	1.00	1.00	-	1.00	-	1.00		-	0.97			
4) Adjustment factor for right		1.00		1.00	1.00		1.00	0.98	-	1.00	0.99	-	1.00	-	0.98	-	-	1.00	-		
5) Saturation flow rate		1,800		1,800	1,800		1,800	1,965	-	2,000	1,981	-	2,000	-	1,958	-	-	1,938	-		
		1,800		1,800	1,800		1,800	3,965			3,981			1,958			1,938				
7) PCU direction volume(bus)								30	383	85	8	43	10	22	104	3	2	91	36		
		0			0			498			60			129			129				
8) PCU direction volume(others)		233		89	318		606	296	832	379	31	244	100								
		233		89	318		606	1,508			376			0			0				
9) PCU direction volume (total)		233		89	318		606	326	1,214	464	39	287	110	22	104	3	2	91	36		
		233		89	318		606	2,005			436			129			129				
10) Flow rate		0.130		0.050	0.177		0.337	0.380			0.094			0.066			0.067			λi	Σλ
11) Necessary phase ratio	1Φ														0.066			0.067		0.067	0.784
	2Φ	0.130		0.050	0.177		0.337													0.337	
	3Φ								0.380			0.094								0.380	
	4Φ								(All Red for Pedestrian)											0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	28%	0%		
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	16%	0%	0%	9%	0%	0%	0%	17%	0%	0%	1%	0%		

Intersection No.46: Ahram St., Mansooreya Rd.

AM Peak

Approach		Eastbound				Westbound			Northbound			Southbound			Bus Eastbound			Bus Westbound				
		46 - 1				46 - 2			46 - 3			46 - 4			46 - 1B			46 - 2B				
		T+R	T	T+L+U		T+R	T	T+L+U	T+R	-	T+L	T+R	-	T+L	-	T+L+R	-	-	T+L+R	-		
1) No. of lanes		1	1	1		1	1	1	1	-	1	1	-	1	-	1	-	-	1	-		
2) Basic value of saturation flow rate		2,000	2,000	2,000		2,000	2,000	2,000	2,000	-	2,000	2,000	-	2,000	-	2,000	-	-	2,000	-		
3) Adjustment factor for left		1.00	1.00	1.00		1.00	1.00	1.00	1.00	-	0.94	1.00	-	0.98	-	1.00		-	0.98			
4) Adjustment factor for right		0.98	1.00	1.00		0.99	1.00	1.00	0.98	-	1.00	0.94	-	1.00	-	0.96	-	-	1.00	-		
5) Saturation flow rate		1,955	2,000	2,000		1,983	2,000	2,000	1,955	-	1,874	1,874	-	1,955	-	1,914	-	-	1,947	-		
		5,955				5,983			3,829			3,829			1,914			1,947				
7) PCU direction volume(bus)									28	29	120	52	15	18	52	76	1	3	97	28		
									178			85			129			129				
8) PCU direction volume(others)		550	2,092	6		216	2,566	33	162	133	434	186	55	64								
		2,647				2,815			729			305			0			0				
9) PCU direction volume (total)		550	2,092	6		216	2,566	33	190	162	555	238	70	82	52	76	1	3	97	28		
		2,647				2,815			907			390			129			129				
10) Flow rate		0.445				0.471			0.190			0.080			0.067			0.066			λi	Σλ
11) Necessary phase ratio	1Φ														0.067			0.066		0.067	0.728
	2Φ		0.445				0.471														0.471	
	3Φ									0.190			0.080								0.190	
	4Φ																				0.000	
13) Ratio of left turn		0%	0%	0%		0%	0%	1%	0%	0%	61%	0%	0%	21%	0%	1%	0%	0%	22%	0%		
14) Ratio of right turn		21%	0%	0%		8%	0%	0%	21%	0%	0%	61%	0%	0%	0%	40%	0%	0%	3%	0%		

Approach		Eastbound				Westbound			Northbound			Southbound			Bus Eastbound			Bus Westbound				
		46 - 1				46 - 2			46 - 3			46 - 4			46 - 1B			46 - 2B				
		R	T	T+L+U		R	T	T+L+U	T+R	-	T+L	T+R	-	T+L	-	T+L+R	-	-	T+L+R	-		
1) No. of lanes		1	1	1		1	1	1	1	-	1	1	-	1	-	1	-	-	1	-		
2) Basic value of saturation flow rate		1,800	2,000	2,000		1,800	2,000	2,000	2,000	-	2,000	2,000	-	2,000	-	2,000	-	-	2,000	-		
3) Adjustment factor for left		1.00	1.00	1.00		1.00	1.00	1.00	1.00	-	0.95	1.00	-	1.00	-	1.00		-	0.95			
4) Adjustment factor for right		0.97	1.00	1.00		0.98	1.00	1.00	0.96	-	1.00	1.00	-	1.00	-	0.96	-	-	0.98	-		
5) Saturation flow rate		1,748	2,000	1,994		1,773	2,000	1,993	1,924	-	1,901	2,000	-	1,998	-	1,917	-	-	1,870	-		
		5,743				5,765			3,826			3,998			1,917			1,870				
7) PCU direction volume(bus)									48	29	83	0	78	0	50	78	1	24	49	57		
									160			78			129			129				
8) PCU direction volume(others)		887	2,359	63		296	1,762	62	205	91	249	0	393	4								
		3,309				2,120			545			397			0			0				
9) PCU direction volume (total)		887	2,359	63		296	1,762	62	252	120	332	0	471	4	50	78	1	24	49	57		
		3,309				2,120			704			475			129			129				
10) Flow rate		0.576				0.368			0.142			0.099			0.067			0.069			λi	Σλ
11) Necessary phase ratio	1Φ														0.067			0.069		0.069	0.788
	2Φ		0.576				0.368														0.576	
	3Φ									0.142			0.099								0.142	
	4Φ																				0.000	
13) Ratio of left turn		0%	0%	3%		0%	0%	3%	0%	0%	47%	0%	0%	1%	0%	1%	0%	0%	44%	0%		
14) Ratio of right turn		27%	0%	0%		14%	0%	0%	36%	0%	0%	0%	0%	0%	0%	39%	0%	0%	19%	0%		

Intersection No.47: Malek Feisal St., Mansooreya Rd.

AM Peak

Approach		Eastbound			Westbound			Northbound			Southbound				
		47 - 1			47 - 2			47 - 3			47 - 4				
		-	-	-	R	-	L	R	T	-	-	T	L		
1) No. of lanes		-	-	-	2	-	2	1	2	-	-	2	1		
2) Basic value of saturation flow rate		-	-	-	1,800	-	1,800	2,000	2,000	-	-	2,000	1,800		
3) Adjustment factor for left		-	-	-	1.00	-	1.00	1.00	1.00	-	-	1.00	1.00		
4) Adjustment factor for right		-	-	-	1.00	-	1.00	1.00	1.00	-	-	1.00	1.00		
5) Saturation flow rate		-	-	-	3,600	-	3,600	2,000	4,000	-	-	4,000	1,800		
		-			7,200			6,000			5,800				
7) PCU direction volume(bus)		-	-	-	410	0	80	35	30	0	0	15	228		
		-			490			65			-				
8) PCU direction volume(others)		-	-	-	1,523	0	490	45	561	0	0	333	835		
		-			2,013			607			1,168				
9) PCU direction volume (total)		-	-	-	1,933	0	570	80	591	0	0	348	1,063		
		-			2,503			672			1,411				
10) Flow rate		-			0.280			0.112			0.243			λi	Σλ
11) Necessary phase ratio	1Φ					0.280								0.280	0.523
	2Φ								0.112			0.243		0.243	
	3Φ				(All Red for Pedestrian)									0.000	
	4Φ													0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		

PM Peak

Approach		Eastbound			Westbound			Northbound			Southbound				
		47 - 1			47 - 2			47 - 3			47 - 4				
		-	-	-	R	-	L	R	T	-	-	T	L		
1) No. of lanes		-	-	-	2	-	2	1	2	-	-	2	1		
2) Basic value of saturation flow rate		-	-	-	1,800	-	1,800	2,000	2,000	-	-	2,000	1,800		
3) Adjustment factor for left		-	-	-	1.00	-	1.00	1.00	1.00	-	-	1.00	0.92		
4) Adjustment factor for right		-	-	-	1.00	-	1.00	0.98	1.00	-	-	1.00	1.00		
5) Saturation flow rate		-	-	-	3,600	-	3,600	1,957	4,000	-	-	4,000	1,654		
		-			7,200			5,957			5,654				
7) PCU direction volume(bus)		-	-	-	240	0	75	30	53	0	0	15	335		
		-			315			83			-				
8) PCU direction volume(others)		-	-	-	1,054	0	548	85	400	0	0	300	930		
		-			1,602			485			1,230				
9) PCU direction volume (total)		-	-	-	1,294	0	623	115	453	0	0	315	1,265		
		-			1,917			567			1,580				
10) Flow rate		-			0.266			0.081			0.217			λi	Σλ
11) Necessary phase ratio	1Φ					0.266								0.266	0.484
	2Φ								0.081			0.217		0.217	
	3Φ				(All Red for Pedestrian)									0.000	
	4Φ													0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	80%		
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	20%	0%	0%	0%	0%	0%		

Intersection No.48: Malek Feisal St., Abu Bakr El Sadeeq St.

AM Peak

Approach		Eastbound			Westbound			Northbound			Southbound				
		48 - 1			48 - 2			48 - 3			48 - 4				
		T+R	T	L	T+R	T	L	T+R	-	T+L	T+R	-	T+L		
1) No. of lanes		1	2	1	1	2	1	1	-	1	1	-	1		
2) Basic value of saturation flow rate		2,000	2,000	1,800	2,000	2,000	1,800	2,000	-	2,000	2,000	-	2,000		
3) Adjustment factor for left		1.00	1.00	1.00	1.00	1.00	0.99	1.00	-	0.98	1.00	-	0.97		
4) Adjustment factor for right		0.99	1.00	1.00	0.99	1.00	1.00	0.97	-	1.00	0.98	-	1.00		
5) Saturation flow rate		1,989	4,000	1,800	1,989	4,000	1,790	1,940	-	1,953	1,953	-	1,940		
		5,989		1,800	5,989		1,790	3,893			3,893				
7) PCU direction volume(bus)		7	126	7	15	293	15	15	22	7	7	22	15		
		133		7	308		15	44			-				
8) PCU direction volume(others)		72	1,372	72	86	1,639	86	86	158	72	72	158	86		
		1,444		72	1,725		86	317			317				
9) PCU direction volume (total)		79	1,498	79	102	1,931	102	102	181	79	79	181	102		
		1,577		79	2,033		102	361			361				
10) Flow rate		0.241		0.044	0.288		0.057	0.093			0.093			λi	Σλ
11) Necessary phase ratio	1Φ		0.241			0.288								0.288	0.438
	2Φ			0.044			0.057							0.057	
	3Φ								0.093			0.093		0.093	
	4Φ				(All Red for Pedestrian)									0.000	
13) Ratio of left turn		0%	0%	5%	0%	0%	5%	0%	0%	22%	0%	0%	28%		
14) Ratio of right turn		5%	0%	0%	5%	0%	0%	28%	0%	0%	22%	0%	0%		

PM Peak

Approach		Eastbound			Westbound			Northbound			Southbound				
		48 - 1			48 - 2			48 - 3			48 - 4				
		T+R	T	L	T+R	T	L	T+R	-	T+L	T+R	-	T+L		
1) No. of lanes		1	2	1	1	2	1	1	-	1	1	-	1		
2) Basic value of saturation flow rate		2,000	2,000	1,800	2,000	2,000	1,800	2,000	-	2,000	2,000	-	2,000		
3) Adjustment factor for left		1.00	1.00	1.00	1.00	1.00	0.99	1.00	-	0.97	1.00	-	0.97		
4) Adjustment factor for right		0.99	1.00	1.00	0.99	1.00	1.00	0.97	-	1.00	0.97	-	1.00		
5) Saturation flow rate		1,989	4,000	1,800	1,989	4,000	1,790	1,946	-	1,947	1,947	-	1,946		
		5,989		1,800	5,989		1,790	3,893			3,893				
7) PCU direction volume(bus)		6	107	6	7	131	7	7	13	6	6	13	7		
		113		6	138		7	25			-				
8) PCU direction volume(others)		81	1,542	81	83	1,576	83	83	164	81	81	164	83		
		1,623		81	1,659		83	328			328				
9) PCU direction volume (total)		87	1,649	87	90	1,707	90	90	177	87	87	177	90		
		1,736		87	1,797		90	353			353				
10) Flow rate		0.271		0.048	0.277		0.050	0.084			0.084			λi	Σλ
11) Necessary phase ratio	1Φ		0.271			0.277								0.277	0.412
	2Φ			0.048			0.050							0.050	
	3Φ								0.084			0.084		0.084	
	4Φ				(All Red for Pedestrian)									0.000	
13) Ratio of left turn		0%	0%	5%	0%	0%	5%	0%	0%	25%	0%	0%	25%		
14) Ratio of right turn		5%	0%	0%	5%	0%	0%	25%	0%	0%	25%	0%	0%		

Intersection No.49: Malek Feisal St., Maryooteya Rd.

AM Peak

Approach		Eastbound 49 - 1			Westbound 49 - 2			Northbound 49 - 3			Southbound 49 - 4				
		R		L	R		L	T+R		T+L	T+R		T+L		
1) No. of lanes		1		1	1		1	1		1	1		1		
2) Basic value of saturation flow rate		1,800		1,800	1,800		1,800	2,000		2,000	2,000		2,000		
3) Adjustment factor for left		1.00		1.00	1.00		1.00	1.00		0.98	1.00		0.98		
4) Adjustment factor for right		1.00		1.00	1.00		1.00	0.99		1.00	0.98		1.00		
5) Saturation flow rate		1,800		1,800	1,800		1,792	1,975		1,951	1,958		1,966		
		1,800		1,800	1,800		1,792	3,926			3,924				
7) PCU direction volume(bus)		105		216	25		0	51	306	150	55	395	30		
		105		216	25		0	506			480				
8) PCU direction volume(others)		250		439	203		9	100	572	156	242	600	210		
		250		439	203		9	827			1,052				
9) PCU direction volume (total)		355		655	228		9	150	877	306	297	995	240		
		355		655	228		9	1,333			1,532				
10) Flow rate		0.139		0.364	0.113		0.005	0.340			0.390			λi	Σλ
11) Necessary phase ratio	1Φ		0.139	0.364		0.113	0.005							0.364	
	2Φ								0.340			0.390		0.390	0.754
	3Φ	(All Red for Pedestrian)												0.000	
	4Φ													0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	4%	0%	0%	23%	0%	0%	16%		
14) Ratio of right turn		0%	0%	0%	0%	0%	0%	11%	0%	0%	19%	0%	0%		

PM Peak

Approach		Eastbound 49 - 1			Westbound 49 - 2			Northbound 49 - 3			Southbound 49 - 4				
		T+R		L	T+R		L	T+R		T+L	T+R		T+L		
1) No. of lanes		1		1	1		1	1		1	1		1		
2) Basic value of saturation flow rate		2,000		1,800	2,000		1,800	2,000		2,000	2,000		2,000		
3) Adjustment factor for left		1.00		1.00	1.00		0.99	1.00		1.00	1.00		0.99		
4) Adjustment factor for right		0.90		1.00	0.90		1.00	0.98		1.00	0.99		1.00		
5) Saturation flow rate		1,802		1,800	1,802		1,786	1,970		1,998	1,973		1,976		
		1,802		1,800	1,802		1,786	3,967			3,949				
7) PCU direction volume(bus)		60		153	48		0	13	123	0	5	261	5		
		60		153	48		0	135			271				
8) PCU direction volume(others)		251		395	218		18	195	1,125	16	199	1,001	180		
		251		395	218		18	1,335			1,380				
9) PCU direction volume (total)		311	0	548	265	0	18	207	1,248	16	204	1,262	185		
		311		548	265		18	1,470			1,651				
10) Flow rate		0.139		0.304	0.121		0.010	0.371			0.418			λi	Σλ
11) Necessary phase ratio	1Φ		0.139	0.304		0.121	0.010							0.304	
	2Φ								0.371			0.418		0.418	0.723
	3Φ	(All Red for Pedestrian)												0.000	
	4Φ													0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	7%	0%	0%	1%	0%	0%	11%		
14) Ratio of right turn		100%	0%	0%	100%	0%	0%	14%	0%	0%	12%	0%	0%		

Intersection No.50: Malek Feisal St., Sahl Hamza St.

AM Peak

Approach		Eastbound 50 - 1			Westbound 50 - 2			Northbound 50 - 3			Southbound 50 - 4				
		T+R	T	U	-	T	L+U	R	-	L	-	-	-		
1) No. of lanes		1	2	1	-	3	1	1	-	1	-	-	-		
2) Basic value of saturation flow rate		2,000	2,000	1,800	-	2,000	1,800	1,800	-	1,800	-	-	-		
3) Adjustment factor for left		1.00	1.00	1.00	-	1.00	1.00	1.00	-	1.00	-	-	-		
4) Adjustment factor for right		0.98	1.00	1.00	-	1.00	1.00	1.00	-	1.00	-	-	-		
5) Saturation flow rate		1,959	4,000	1,800	-	6,000	1,800	1,800	-	1,800	-	-	-		
		5,959		1,800	-	6,000	1,800	3,600			-				
7) PCU direction volume(bus)		93	370	19	-	582	26	26		93	-	-	-		
		463		19	-	582	26	119			-				
8) PCU direction volume(others)		284	1,235	62	-	1,267	67	67		284	-	-	-		
		1,519		62	-	1,267	67	351			-				
9) PCU direction volume (total)		377	1,605	80	-	1,850	94	94	-	377	-	-	-		
		1,982		80	-	1,850	94	471			-				
10) Flow rate		0.255		0.045	-	0.308	0.052	0.131			-			λi	Σλ
11) Necessary phase ratio	1Φ		0.255			0.308								0.308	
	2Φ			0.045			0.052							0.052	0.491
	3Φ								0.131					0.131	
	4Φ	(All Red for Pedestrian)												0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	80%	0%	0%	0%		
14) Ratio of right turn		19%	0%	0%	0%	0%	0%	20%	0%	0%	0%	0%	0%		

PM Peak

Approach		Eastbound 50 - 1			Westbound 50 - 2			Northbound 50 - 3			Southbound 50 - 4				
		T+R	T	U	-	T	L+U	R	-	L	-	-	-		
1) No. of lanes		1	2	1	-	3	1	1	-	1	-	-	-		
2) Basic value of saturation flow rate		2,000	2,000	1,800	-	2,000	1,800	1,800	-	1,800	-	-	-		
3) Adjustment factor for left		1.00	1.00	1.00	-	1.00	1.00	1.00	-	1.00	-	-	-		
4) Adjustment factor for right		0.99	1.00	1.00	-	1.00	1.00	1.00	-	1.00	-	-	-		
5) Saturation flow rate		1,987	4,000	1,800	-	6,000	1,800	1,800	-	1,800	-	-	-		
		5,987		1,800	-	6,000	1,800	3,600			-				
7) PCU direction volume(bus)		10	243	12	-	107	44	44		10	-	-	-		
		253		12	-	107	44	54			-				
8) PCU direction volume(others)		108	1,633	82	-	1,287	244	244		108	-	-	-		
		1,741		82	-	1,287	244	352			-				
9) PCU direction volume (total)		118	1,876	94	-	1,394	288	288	-	118	-	-	-		
		1,994		94	-	1,394	288	406			-				
10) Flow rate		0.291		0.052	-	0.232	0.160	0.113			-			λi	Σλ
11) Necessary phase ratio	1Φ		0.291			0.232								0.291	
	2Φ			0.052			0.160							0.160	0.564
	3Φ								0.113					0.113	
	4Φ	(All Red for Pedestrian)												0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	29%	0%	0%	0%		
14) Ratio of right turn		6%	0%	0%	0%	0%	0%	71%	0%	0%	0%	0%	0%		

Intersection No.51: Malek Feisal St., Safa Wel Marwa St.

AM Peak

Approach		Eastbound			Westbound			Northbound			Southbound				
		51 - 1			51 - 2			51 - 3			51 - 4				
		-	T	L+U	T+R	T	U	-	-	-	R	-	L		
1) No. of lanes		-	3	1	1	2	1	-	-	-	1	-	1		
2) Basic value of saturation flow rate		-	2,000	1,800	2,000	2,000	1,800	-	-	-	1,800	-	1,800		
3) Adjustment factor for left		-	1.00	1.00	1.00	1.00	1.00	-	-	-	1.00	-	1.00		
4) Adjustment factor for right		-	1.00	1.00	0.99	1.00	1.00	-	-	-	1.00	-	1.00		
5) Saturation flow rate		-	6,000	1,800	1,989	4,000	1,800	-	-	-	1,800	-	1,800		
		-	6,000	1,800	5,989		1,800	-			3,600				
7) PCU direction volume(bus)			428	23	31	598	23				23	-	31		
		-	428	23	629		23	-			-				
8) PCU direction volume(others)		-	1,549	82	69	1,312	82	-	-	-	82	-	69		
		-	1,549	82	1,381		82	-			151				
9) PCU direction volume (total)		-	1,977	104	101	1,910	104	-	-	-	104	-	101		
		-	1,977	104	2,010		104	-			205				
10) Flow rate		-	0.329	0.058	0.231		0.058	-			0.057			λi	Σλ
11) Necessary phase ratio	1Φ		0.329			0.231								0.329	0.444
	2Φ			0.058			0.058		-					0.058	
	3Φ											0.057		0.057	
	4Φ					(All Red for Pedestrian)								0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	5%	0%	0%	0%	0%	0%	0%	0%	0%		

PM Peak

Approach		Eastbound			Westbound			Northbound			Southbound				
		51 - 1			51 - 2			51 - 3			51 - 4				
		-	T	L+U	T+R	T	U	-	-	-	R	-	L		
1) No. of lanes		-	3	1	1	2	1	-	-	-	1	-	1		
2) Basic value of saturation flow rate		-	2,000	1,800	2,000	2,000	1,800	-	-	-	1,800	-	1,800		
3) Adjustment factor for left		-	1.00	1.00	1.00	1.00	1.00	-	-	-	1.00	-	1.00		
4) Adjustment factor for right		-	1.00	1.00	0.99	1.00	1.00	-	-	-	1.00	-	1.00		
5) Saturation flow rate		-	6,000	1,800	1,989	4,000	1,800	-	-	-	1,800	-	1,800		
		-	6,000	1,800	5,989		1,800	-			3,600				
7) PCU direction volume(bus)			216	11	6	111	11				23	-	31		
		-	216	11	117		11	-			-				
8) PCU direction volume(others)		-	1,765	93	85	1,623	93	-	-	-	82	-	69		
		-	1,765	93	1,708		93	-			151				
9) PCU direction volume (total)		-	1,981	104	91	1,734	104	-	-	-	104	-	101		
		-	1,981	104	1,825		104	-			205				
10) Flow rate		-	0.330	0.058	0.285		0.058	-			0.057			λi	Σλ
11) Necessary phase ratio	1Φ		0.330			0.285								0.330	0.445
	2Φ			0.058			0.058		-					0.058	
	3Φ											0.057		0.057	
	4Φ					(All Red for Pedestrian)								0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		0%	0%	0%	5%	0%	0%	0%	0%	0%	0%	0%	0%		

Intersection No.52: Malek Feisal St., Sheikh El Sherbeeny St.

AM Peak

Approach		Eastbound			Westbound			Northbound			Southbound				
		52 - 1			52 - 2			52 - 3			52 - 4				
		T+R	T	L+U	T+R	T	L+U	T+R	-	T+L	T+R	-	T+L		
1) No. of lanes		1	2	1	1	2	1	1	-	1	1	-	1		
2) Basic value of saturation flow rate		2,000	2,000	1,800	2,000	2,000	1,800	2,000	-	2,000	2,000	-	2,000		
3) Adjustment factor for left		1.00	1.00	1.00	1.00	1.00	1.00	1.00	-	0.97	1.00	-	0.97		
4) Adjustment factor for right		1.00	1.00	1.00	1.00	1.00	1.00	0.97	-	1.00	0.97	-	1.00		
5) Saturation flow rate		1,991	4,000	1,800	1,994	4,000	1,800	1,936	-	1,936	1,936	-	1,936		
		5,991		1,800	5,994		1,800	3,872			3,872				
7) PCU direction volume(bus)		20	900	58	3	640	108	14	19	14	29	38	29		
		920		58	643		108	48			-				
8) PCU direction volume(others)		85	1,618	102	52	1,268	338	150	200	150	154	205	154		
		1,703		102	1,320		338	500			512				
9) PCU direction volume (total)		105	2,518	160	55	1,908	446	164	219	164	182	243	182		
		2,623		160	1,963		446	548			607				
10) Flow rate		0.284		0.089	0.220		0.248	0.142			0.157			λi	Σλ
11) Necessary phase ratio	1Φ		0.284			0.220								0.284	0.689
	2Φ			0.089			0.248							0.248	
	3Φ								0.142			0.157		0.157	
	4Φ					(All Red for Pedestrian)								0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	30%	0%	0%	30%		
14) Ratio of right turn		4%	0%	0%	3%	0%	0%	30%	0%	0%	30%	0%	0%		

PM Peak

Approach		Eastbound			Westbound			Northbound			Southbound				
		52 - 1			52 - 2			52 - 3			52 - 4				
		T+R	T	L+U	T+R	T	L+U	T+R	-	T+L	T+R	-	T+L		
1) No. of lanes		1	2	1	1	2	1	1	-	1	1	-	1		
2) Basic value of saturation flow rate		2,000	2,000	1,800	2,000	2,000	1,800	2,000	-	2,000	2,000	-	2,000		
3) Adjustment factor for left		1.00	1.00	1.00	1.00	1.00	1.00	1.00	-	0.97	1.00	-	0.97		
4) Adjustment factor for right		0.99	1.00	1.00	0.98	1.00	1.00	0.97	-	1.00	0.97	-	1.00		
5) Saturation flow rate		1,980	4,000	1,800	1,969	4,000	1,800	1,936	-	1,936	1,936	-	1,936		
		5,980		1,800	5,969		1,800	3,872			3,872				
7) PCU direction volume(bus)		33	145	20	25	328	35	22	29	22	13	17	13		
		178		20	353		35	73			-				
8) PCU direction volume(others)		158	1,733	213	267	1,407	416	167	223	167	149	198	149		
		1,891		213	1,674		416	558			495				
9) PCU direction volume (total)		191	1,878	233	292	1,734	451	189	252	189	161	215	161		
		2,068		233	2,026		451	631			538				
10) Flow rate		0.316		0.129	0.280		0.251	0.144			0.128			λi	Σλ
11) Necessary phase ratio	1Φ		0.316			0.280								0.316	0.711
	2Φ			0.129			0.251							0.251	
	3Φ								0.144			0.128		0.144	
	4Φ					(All Red for Pedestrian)								0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	30%	0%	0%	30%		
14) Ratio of right turn		9%	0%	0%	14%	0%	0%	30%	0%	0%	30%	0%	0%		

Intersection No.53: Malek Feisal St., Hassan Mohamed St.

AM Peak

Approach		Eastbound			Westbound			Northbound			Southbound				
		53 - 1			53 - 2			53 - 3			53 - 4				
		T+R	T	U	-	T	L+U	R	-	L	-	-	-		
1) No. of lanes		1	2	1	-	3	1	1	-	1	-	-	-		
2) Basic value of saturation flow rate		2,000	2,000	1,800	-	2,000	1,800	1,800	-	1,800	-	-	-		
3) Adjustment factor for left		1.00	1.00	1.00	-	1.00	1.00	1.00	-	1.00	-	-	-		
4) Adjustment factor for right		0.99	1.00	1.00	-	1.00	1.00	1.00	-	1.00	-	-	-		
5) Saturation flow rate		1,988	4,000	1,800	-	6,000	1,800	1,800	-	1,800	-	-	-		
		7,788		1,800	-	6,000	1,800		3,600			-			
7) PCU direction volume(bus)		34	611	34		528	28	28		31	-	-	-		
		645		34	-	528	28		58			-			
8) PCU direction volume(others)		83	1,496	83	0	1,672	88	88	0	75	-	-	-		
		1,579		83	-	1,672	88		163			-			
9) PCU direction volume (total)		117	2,107	117	-	2,200	116	116	-	105	-	-	-		
		2,224		117	-	2,200	116		221			-			
10) Flow rate		0.203		0.065	-	0.367	0.064		0.061			-		λi	Σλ
11) Necessary phase ratio	1Φ		0.203			0.367								0.367	0.493
	2Φ			0.065			0.064					-		0.065	
	3Φ								0.061					0.061	
	4Φ					(All Red for Pedestrian)								0.000	
13) Ratio of left turn		0%	0%	5%	-	0%	0%	0%	0%	48%	0%	0%	0%		
14) Ratio of right turn		5%	0%	0%	-	0%	0%	52%	0%	0%	0%	0%	0%		

PM Peak

Approach		Eastbound			Westbund			Northbound			Southbound				
		53 - 1			53 - 2			53 - 3			53 - 4				
		T+R	T	T+U	-	T	L+U	R	-	L	-	-	-		
1) No. of lanes		1	2	1	-	3	1	1	-	1	-	-	-		
2) Basic value of saturation flow rate		2,000	2,000	1,800	-	2,000	1,800	1,800	-	1,800	-	-	-		
3) Adjustment factor for left		1.00	1.00	1.00	-	1.00	1.00	1.00	-	1.00	-	-	-		
4) Adjustment factor for right		0.99	1.00	1.00	-	1.00	1.00	1.00	-	1.00	-	-	-		
5) Saturation flow rate		1,988	4,000	1,800	-	6,000	1,800	1,800	-	1,800	-	-	-		
		7,788		1,800	-	6,000	1,800		3,600			-			
7) PCU direction volume(bus)		5	94	5		136	7	7		5	-	-	-		
		99		5	-	136	7		12			-			
8) PCU direction volume(others)		112	2,010	112	0	2,163	114	114	0	100	-	-	-		
		2,121		112	-	2,163	114		214			-			
9) PCU direction volume (total)		117	2,103	117	-	2,299	121	121	-	105	-	-	-		
		2,220		117	-	2,299	121		226			-			
10) Flow rate		0.272		0.065	-	0.383	0.067		0.063			-		λi	Σλ
11) Necessary phase ratio	1Φ		0.272			0.383								0.383	0.513
	2Φ			0.065			0.067					-		0.067	
	3Φ								0.063					0.063	
	4Φ					(All Red for Pedestrian)								0.000	
13) Ratio of left turn		0%	0%	5%	-	0%	0%	0%	0%	46%	0%	0%	0%		
14) Ratio of right turn		5%	0%	0%	-	0%	0%	54%	0%	0%	0%	0%	0%		

Intersection No.54: Malek Feisal St., Osman Moharam St.

AM Peak

Approach		Eastbound			Westbound			Northbound			Southbound				
		54 - 1			54 - 2			54 - 3			54 - 4				
		T+R	T	L+U	T+R	T	L+U	T+R	-	T+L	T+R	-	T+L		
1) No. of lanes		1	2	1	1	2	1	1	-	1	1	-	1		
2) Basic value of saturation flow rate		2,000	2,000	1,800	2,000	2,000	1,800	2,000	-	2,000	2,000	-	2,000		
3) Adjustment factor for left		1.00	1.00	1.00	1.00	1.00	1.00	1.00	-	0.97	1.00	-	0.97		
4) Adjustment factor for right		0.99	1.00	1.00	0.97	1.00	1.00	0.97	-	1.00	0.97	-	1.00		
5) Saturation flow rate		1,981	4,000	1,800	1,940	4,000	1,800	1,936	-	1,936	1,936	-	1,936		
		5,981		1,800	5,940		1,800		3,872			3,872			
7) PCU direction volume(bus)		20	900	58	73	395	83	12	15	12	23	30	23		
		920		58	468		83		38			-			
8) PCU direction volume(others)		229	1,651	536	649	1,442	444	120	160	120	123	164	123		
		1,880		536	2,091		444		400			410			
9) PCU direction volume (total)		249	2,551	594	722	1,837	527	132	175	132	146	194	146		
		2,800		594	2,559		527		438			486			
10) Flow rate		0.314		0.330	0.352		0.293		0.113			0.125		λi	Σλ
11) Necessary phase ratio	1Φ		0.314			0.352								0.352	0.807
	2Φ			0.330			0.293							0.330	
	3Φ								0.113			0.125		0.125	
	4Φ					(All Red for Pedestrian)								0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	30%	0%	0%	30%		
14) Ratio of right turn		9%	0%	0%	28%	0%	0%	30%	0%	0%	30%	0%	0%		

PM Peak

Approach		Eastbound			Westbound			Northbound			Southbound				
		54 - 1			54 - 2			54 - 3			54 - 4				
		T+R	T	L+U	T+R	T	L+U	T+R	-	T+L	T+R	-	T+L		
1) No. of lanes		1	2	1	1	2	1	1	-	1	1	-	1		
2) Basic value of saturation flow rate		2,000	2,000	1,800	2,000	2,000	1,800	2,000	-	2,000	2,000	-	2,000		
3) Adjustment factor for left		1.00	1.00	1.00	1.00	1.00	1.00	1.00	-	0.97	1.00	-	0.97		
4) Adjustment factor for right		0.97	1.00	1.00	0.99	1.00	1.00	0.97	-	1.00	0.97	-	1.00		
5) Saturation flow rate		1,949	4,000	1,800	1,988	4,000	1,800	1,936	-	1,936	1,936	-	1,936		
		5,949		1,800	5,988		1,800		3,872			3,872			
7) PCU direction volume(bus)		15	230	88	65	175	5	18	23	18	10	14	10		
		245		88	240		5		58			-			
8) PCU direction volume(others)		600	1,731	366	83	2,356	530	121	160	121	119	158	119		
		2,331		366	2,439		530		402			396			
9) PCU direction volume (total)		615	1,961	454	148	2,531	535	138	183	138	129	172	129		
		2,576		454	2,679		535		460			430			
10) Flow rate		0.392		0.252	0.407		0.297		0.119			0.111		λi	Σλ
11) Necessary phase ratio	1Φ		0.392			0.407								0.407	0.823
	2Φ			0.252			0.297							0.297	
	3Φ								0.119			0.111		0.119	
	4Φ					(All Red for Pedestrian)								0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	30%	0%	0%	30%		
14) Ratio of right turn		24%	0%	0%	6%	0%	0%	30%	0%	0%	30%	0%	0%		

Intersection No.55: Malek Feisal St., Madkoor St.

AM Peak

Approach		Eastbound			Westbound			Northbound			Southbound				
		55 - 1			55 - 2			55 - 3			55 - 4				
		T+R	T		T+R	T	L+U	R	-	L					
1) No. of lanes		1	3		1	2	1	1	-	1					
2) Basic value of saturation flow rate		2,000	2,000		2,000	2,000	1,800	1,800	-	1,800					
3) Adjustment factor for left		1.00	1.00		1.00	1.00	1.00	1.00	-	0.95					
4) Adjustment factor for right		0.98	1.00		0.98	1.00	1.00	0.95	-	1.00					
5) Saturation flow rate		1,967	6,000		1,962	4,000	1,800	1,706	-	1,706					
		7,967			5,962		1,800	3,412							
7) PCU direction volume(bus)		104	587		80	373	80	98		98					
		691			453		80	195							
8) PCU direction volume(others)		298	1,688		280	1,308	280	343		343					
		1,986			1,588		280	685							
9) PCU direction volume (total)		402	2,275		360	1,681	360	440		440					
		2,677			2,041		360	880							
10) Flow rate		0.336			0.342		0.200	0.258						λi	Σλ
11) Necessary phase ratio	1Φ		0.336			0.342								0.342	0.800
	2Φ						0.200							0.200	
	3Φ								0.258					0.258	
	4Φ				(All Red for Pedestrian)									0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	50%					
14) Ratio of right turn		15%	0%	0%	18%	0%	0%	50%	0%	0%					

PM Peak

Approach		Eastbound			Westbound			Northbound			Southbound				
		55 - 1			55 - 2			55 - 3			55 - 4				
		T+R	T		T+R	T	L+U	R	-	L					
1) No. of lanes		1	3		1	2	1	1	-	1					
2) Basic value of saturation flow rate		2,000	2,000		2,000	2,000	1,800	1,800	-	1,800					
3) Adjustment factor for left		1.00	1.00		1.00	1.00	1.00	1.00	-	0.95					
4) Adjustment factor for right		0.99	1.00		0.98	1.00	1.00	0.95	-	1.00					
5) Saturation flow rate		1,971	6,000		1,961	4,000	1,800	1,706	-	1,706					
		7,971			5,961		1,800	3,412							
7) PCU direction volume(bus)		35	200		34	433	34	42		42					
		235			467		34	83							
8) PCU direction volume(others)		320	2,093		159	433	159	503		503					
		2,413			592		159	1,005							
9) PCU direction volume (total)		355	2,293		193	866	193	544		544					
		2,648			1,059		193	1,088							
10) Flow rate		0.332			0.178		0.107	0.295						λi	Σλ
11) Necessary phase ratio	1Φ		0.332			0.178								0.332	0.734
	2Φ						0.107							0.107	
	3Φ								0.295					0.295	
	4Φ				(All Red for Pedestrian)									0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	50%					
14) Ratio of right turn		13%	0%	0%	18%	0%	0%	50%	0%	0%					

Intersection No.56: Malek Feisal St., Saad Ebn Aby Waqqas St.

AM Peak

Approach		Eastbound			Westbound			Northbound			Southbound				
		56 - 1			56 - 2			56 - 3			56 - 4				
		T+R	T	U	T	L+U		R	-	L	-	-	-		
1) No. of lanes		1	2	1	3	1		1	-	1	-	-	-		
2) Basic value of saturation flow rate		2,000	2,000	1,800	2,000	1,800		1,800	-	1,800	-	-	-		
3) Adjustment factor for left		1.00	1.00	1.00	1.00	1.00		1.00	-	1.00	-	-	-		
4) Adjustment factor for right		1.00	1.00	1.00	1.00	1.00		1.00	-	1.00	-	-	-		
5) Saturation flow rate		1,996	4,000	1,800	6,000	1,800		1,800	-	1,800	-	-	-		
		7,796		1,800	6,000	1,800		3,600			-				
7) PCU direction volume(bus)		18	443	45	598	15		37	0	37	-	-	-		
		460		45	598	15		73			-				
8) PCU direction volume(others)		40	2,513	284	2,246	403		204	0	204	-	-	-		
		2,553		284	2,246	403		409			-				
9) PCU direction volume (total)		58	2,955	329	2,843	418		241	-	241	-	-	-		
		3,013		329	2,843	418		482			-				
10) Flow rate		0.327		0.183	0.474	0.232		0.134			-			λi	Σλ
11) Necessary phase ratio	1Φ		0.327		0.474									0.474	0.840
	2Φ			0.183		0.232						-		0.232	
	3Φ								0.134					0.134	
	4Φ				(All Red for Pedestrian)									0.000	
13) Ratio of left turn		0%	0%	11%	0%	0%		0%	0%	50%	0%	0%	0%		
14) Ratio of right turn		2%	0%	0%	0%	0%		50%	0%	0%	0%	0%	0%		

PM Peak

Approach		Eastbound			Westbound			Northbound			Southbound				
		56 - 1			56 - 2			56 - 3			56 - 4				
		T+R	T	T+U	T	L+U		R	-	L	-	-	-		
1) No. of lanes		1	2	1	3	1		1	-	1	-	-	-		
2) Basic value of saturation flow rate		2,000	2,000	1,800	2,000	1,800		1,800	-	1,800	-	-	-		
3) Adjustment factor for left		1.00	1.00	1.00	1.00	1.00		1.00	-	1.00	-	-	-		
4) Adjustment factor for right		1.00	1.00	1.00	1.00	1.00		1.00	-	1.00	-	-	-		
5) Saturation flow rate		1,993	4,000	1,800	6,000	1,800		1,800	-	1,800	-	-	-		
		7,793		1,800	6,000	1,800		3,600			-				
7) PCU direction volume(bus)		10	215	15	213	5		28	0	28	-	-	-		
		225		15	213	5		55			-				
8) PCU direction volume(others)		83	2,548	458	2,567	162		190	0	190	-	-	-		
		2,631		458	2,567	162		379			-				
9) PCU direction volume (total)		93	2,763	473	2,780	167		217	-	217	-	-	-		
		2,856		473	2,780	167		434			-				
10) Flow rate		0.338		0.263	0.463	0.093		0.121			-			λi	Σλ
11) Necessary phase ratio	1Φ		0.338		0.463									0.463	0.847
	2Φ			0.263		0.093						-		0.263	
	3Φ								0.121					0.121	
	4Φ				(All Red for Pedestrian)									0.000	
13) Ratio of left turn		0%	0%	17%	0%	0%		0%	0%	50%	0%	0%	0%		
14) Ratio of right turn		3%	0%	0%	0%	0%		50%	0%	0%	0%	0%	0%		

Intersection No.57: Malek Feisal St., Nady St.

AM Peak

Approach		Eastbound 57 - 1			Westbound 57 - 2			Northbound 57 - 3			Southbound 57 - 4				
		T+R	T		T+R	T	L+U	R	-		R	-			
1) No. of lanes		1	3		1	2	1	2	-		2	-			
2) Basic value of saturation flow rate		2,000	2,000		2,000	2,000	1,800	1,800	-		1,800	-			
3) Adjustment factor for left		1.00	1.00		1.00	1.00	1.00	1.00	-		1.00	-			
4) Adjustment factor for right		1.00	1.00		0.98	1.00	1.00	1.00	-		1.00	-			
5) Saturation flow rate		1,995	6,000		1,968	4,000	1,800	3,600	-		3,600	-			
		7,995			5,968		1,800	3,600			3,600				
7) PCU direction volume(bus)		3	242		8	218	66		3			10			
		245			225		66	3			10				
8) PCU direction volume(others)		71	3,172		405	2,154	473		71			185			
		3,243			2,559		473	71			185				
9) PCU direction volume (total)		74	3,414		412	2,372	538	0	74	0	0	195	0		
		3,488			2,784		538	74			195				
10) Flow rate		0.406			0.466		0.299	0.021			0.051			λi	Σλ
11) Necessary phase ratio	1Φ		0.406			0.466								0.466	0.766
	2Φ						0.299		0.021			0.051		0.299	
	3Φ					(All Red for Pedestrian)								0.000	
	4Φ													0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		2%	0%	0%	15%	0%	0%	0%	0%	0%	0%	0%	0%		

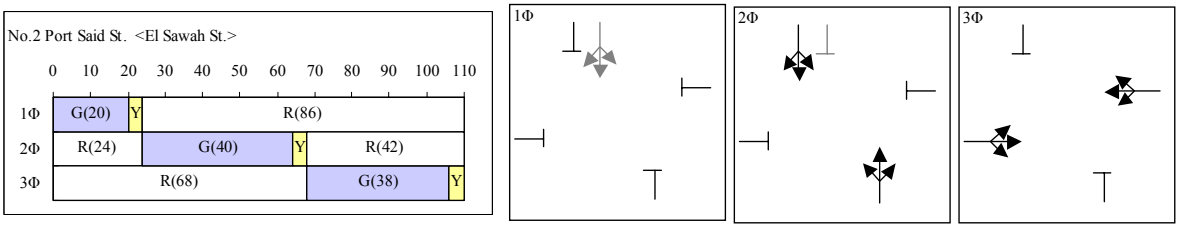
PM Peak

Approach		Eastbound 57 - 1			Westbund 57 - 2			Northbound 57 - 3			Southbound 57 - 4				
		T+R	T		T+R	T	L+U	R	-		R	-			
1) No. of lanes		1	3		1	2	1	2	-		2	-			
2) Basic value of saturation flow rate		2,000	2,000		2,000	2,000	1,800	1,800	-		1,800	-			
3) Adjustment factor for left		1.00	1.00		1.00	1.00	1.00	1.00	-		1.00	-			
4) Adjustment factor for right		1.00	1.00		0.99	1.00	1.00	1.00	-		1.00	-			
5) Saturation flow rate		1,991	6,000		1,979	4,000	1,800	3,600	-		3,600	-			
		7,991			5,979		1,800	3,600			3,600				
7) PCU direction volume(bus)		28	410		48	395	128		28			30			
		438			443		128	28			30				
8) PCU direction volume(others)		133	3,240		260	2,433	347		133			192			
		3,374			2,693		347	133			192				
9) PCU direction volume (total)		161	3,650		308	2,828	474	0	161	0	0	222	0		
		3,811			3,136		474	161			222				
10) Flow rate		0.422			0.524		0.263	0.037			0.053			λi	Σλ
11) Necessary phase ratio	1Φ		0.422			0.524								0.524	0.788
	2Φ						0.263		0.037			0.053		0.263	
	3Φ					(All Red for Pedestrian)								0.000	
	4Φ													0.000	
13) Ratio of left turn		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
14) Ratio of right turn		4%	0%	0%	10%	0%	0%	0%	0%	0%	0%	0%	0%		

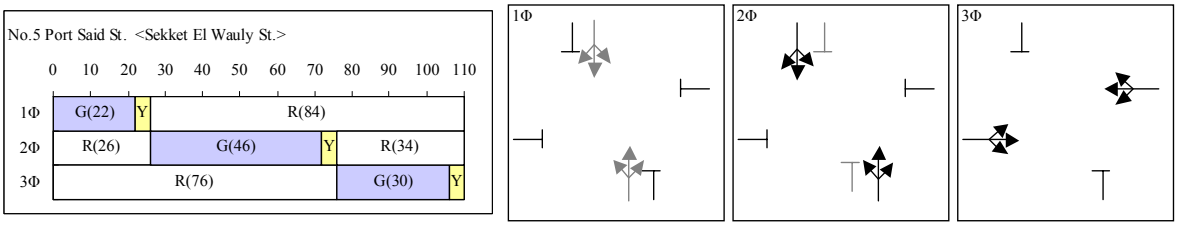
Source: JICA Study Team

Figure B.1 Proposed Signal Phasing System for Key Intersections

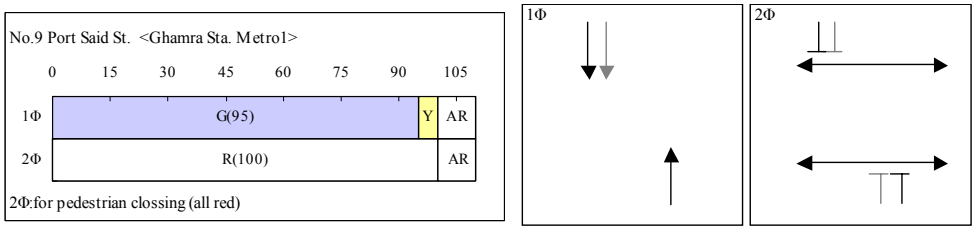
Intersection No.2: Port Said St., Sawah St.



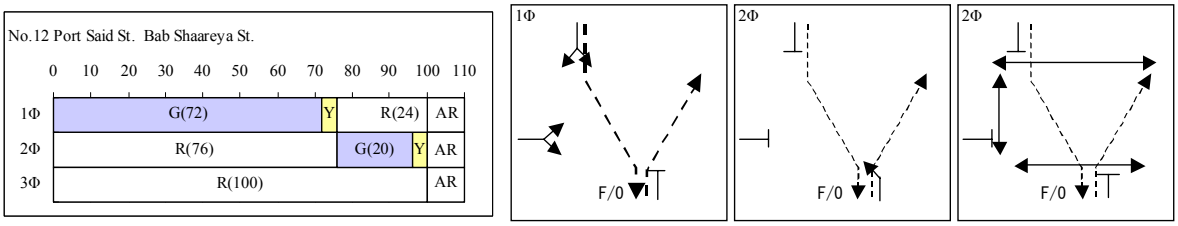
Intersection No.5: Port Said St., Sekket El Wayly St.



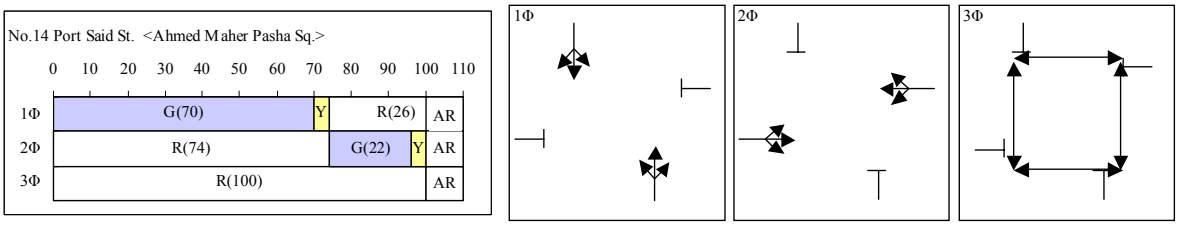
Intersection No. 9 : Port Said St., Ghamra Station. Metro Line 1.



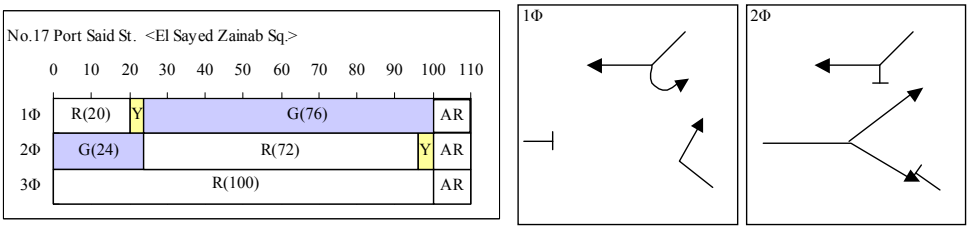
Intersection No.12: Port Said St., Bab EL Shaareya Sq.



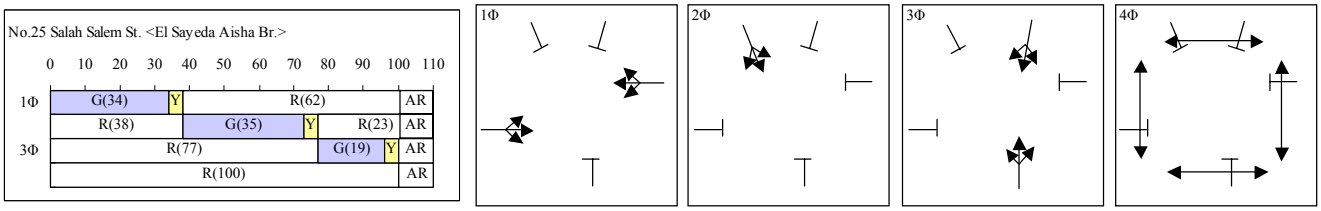
Intersection No.14: Port Said St., Ahmed Maher Pasha Sq.



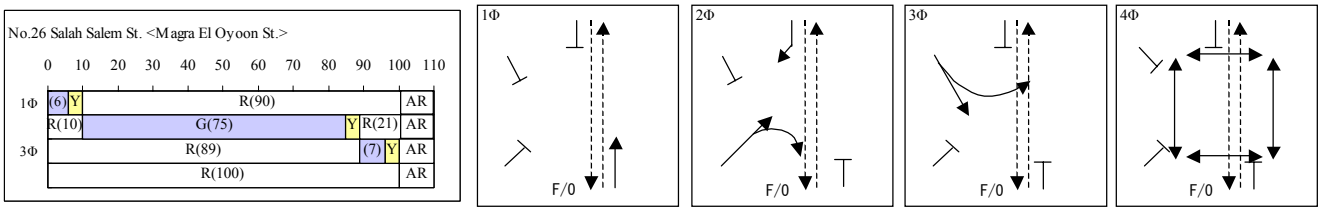
Intersection No.17: Port Said St., Sayeda Zeinab Sq.



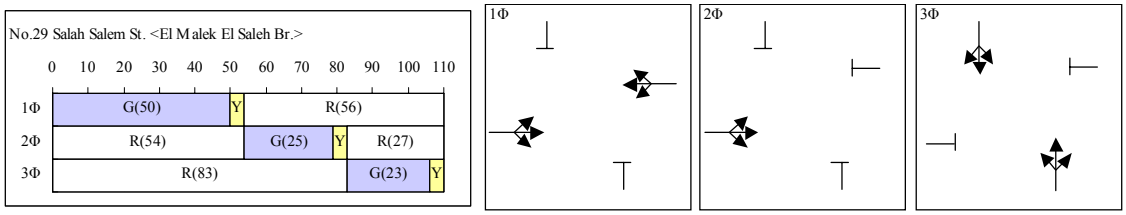
Intersection No.25: Qalaa St., Salah Salem St. (Salah Salem St., Sayeda Aisha Br)



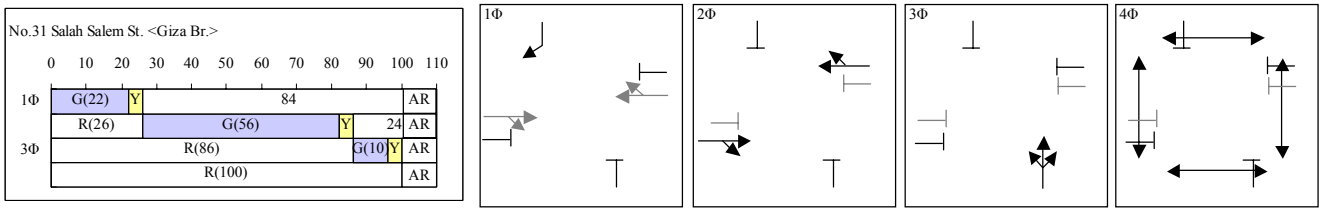
Intersection No.26: Salah Salem St., Magra El Oyoon St.



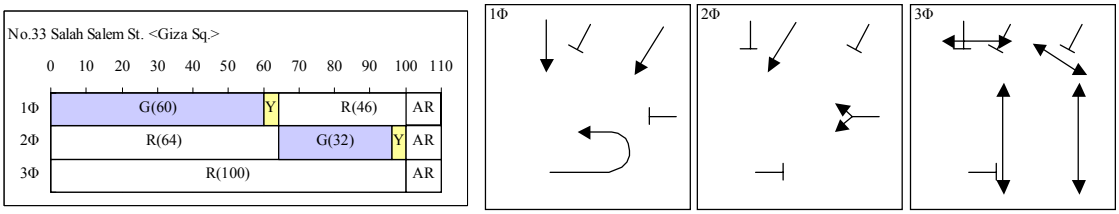
Intersection No.29: Salah Salem St., Malek El Saleh Br.



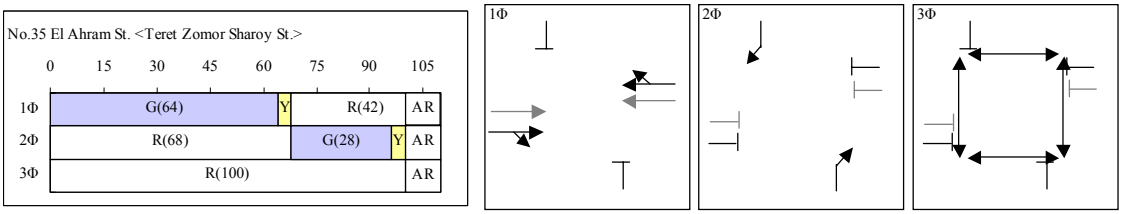
Intersection No.31: Salah Salem St., Malek El Saleh Br.



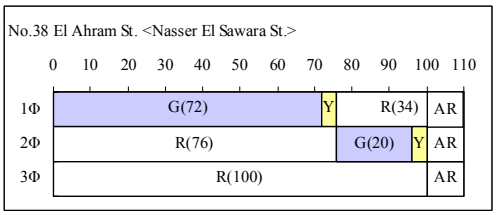
Intersection No.33: Salah Salem St., Giza Sq.

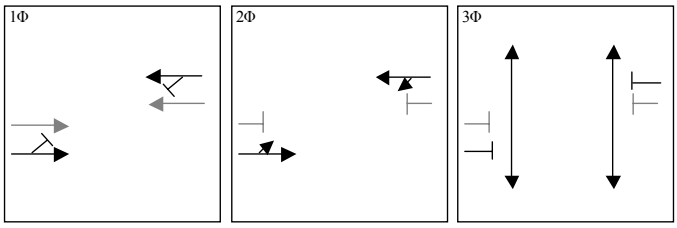


Intersection No.35: Ahram St, Tereat El Zomor El Sharqy St.

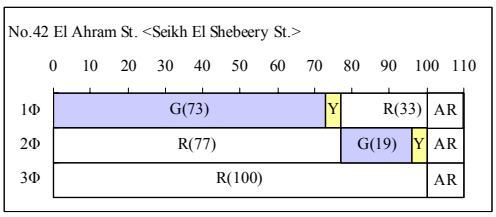


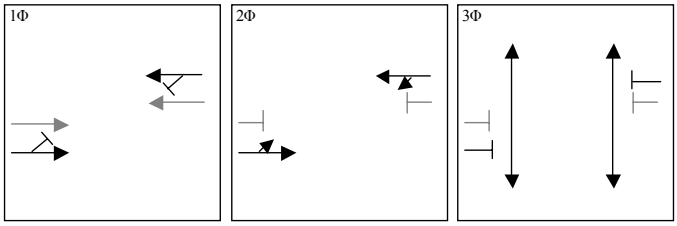
Intersection No.38: Ahram St, Nasser El Thawra St.



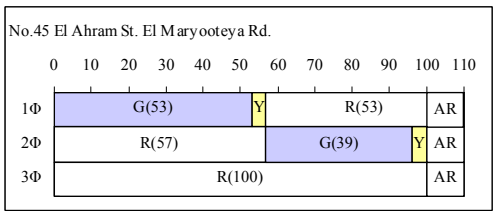


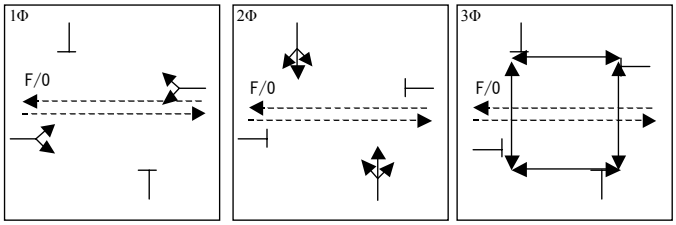
Intersection No.42: Ahram St, Sheikh El Sherbeeny St.



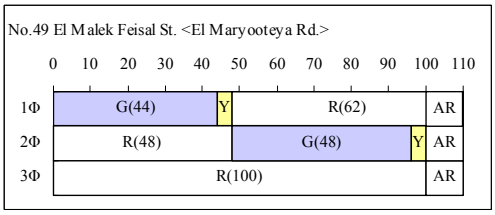


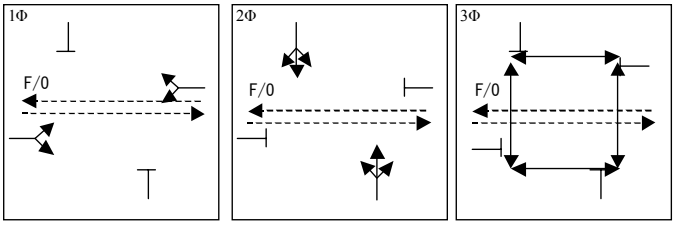
Intersection No.45: Ahram St, Maryoteya Rd.



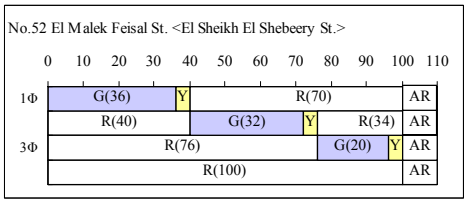


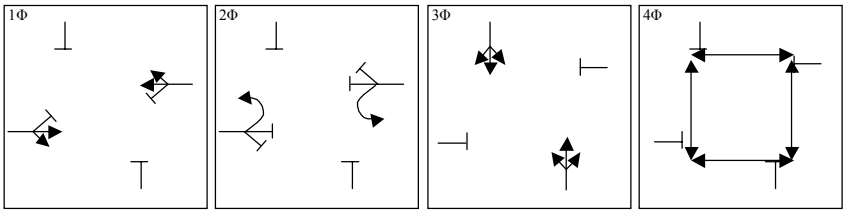
Intersection No.49: Malek Feisal St., Maryoteya Rd.



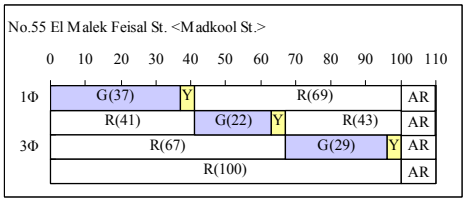


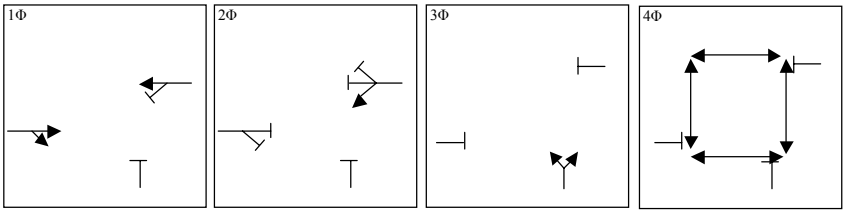
Intersection No.52: Malek Feisal St., Sheikh El Sherbeeny St.



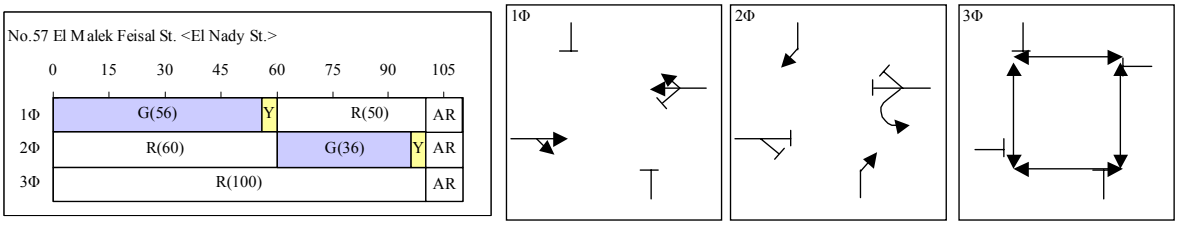


Intersection No.55: Malek Feisal St., Madkoor St.





Intersection No.57: Malek Feisal St., Nady St.



Source: JICA Study Team