Legislative Council Public Works Subcommittee meeting on 30 January 2019

821CL –Site formation and infrastructure works for public housing development at Yan Wing Street, Yau Tong

Supplementary Information

PURPOSE

When the captioned project was considered at the Legislative Council Public Works Subcommittee meeting on 30 January 2019 (PWSC(2018-19)36 refers), Members requested the following supplementary information -

(i) the layout of the public housing development at Yan Wing Street, Yau Tong (PHDYT), and any barrier-free access and lift tower connecting the PHDYT with the nearby bus terminus, shopping centers and housing developments;

(ii) the details of ancillary social welfare facilities provided in the PHDYT including the area, the number of users and the scope of services of each facilities;

(iii) the number of full-day places provided by the kindergarten and child care center in the PHDYT;

(iv) any plan to be implemented by the government to increase the number of goods vehicles parking spaces in Yau Tong and Lei Yue Mun districts; and

(v) the details of public and private housing developments in the coming years in Yau Tong and Lei Yue Mun districts, including location plans, no. of flats, anticipated years of population intake, and the traffic impact assessment to the local district traffic. Please provide the relevant traffic impact assessment report.

GOVERNMENT RESPONSES

2. After consolidating the information provided by relevant departments, we provide a reply to the related issues point to point as follows:

(i) There is an existing barrier-free covered walkway and lift system linking Lei Yue Mun Estate, Domain Shopping Mall and Bus Terminus, Yau Mei Court, and Yau Tong MTR Station. This existing barrier-free covered walkway will be extended and connected to the PHDYT.

A barrier-free covered walkway layout is at Enclosure 1.

(ii)&(iii) The details of the ancillary welfare facilities provided in PHDYT including day child care centre and kindergarten are as follows:

(1) Day Child Care Centre: The aided standalone Child Care Centre (CCC) provides 100 full-day child care places for children aged under 3. The service hours are from 8:00 a.m. to 6:00 p.m. from Monday to Friday and from 8:00 a.m. to 1:00 p.m. on Saturday. The CCC also provides ancillary services including Extended Hours Service and Occasional Child Care Service, so as to assist the parents, who have long working hours or have to deal with sudden engagements/commitments, in taking care of their children.

(2) Kindergarten-Cum-Child Care Centre (KG-cum-CCC): It provides 140 full-day child care and education services places for children aged from 2 to under 6. The KG-cum-CCC also provides ancillary services including Extended Hours Service, Occasional Child Care Service and Integrated Programme in KG-cum-CCC. The service hours are similar to the aided standalone CCC mentioned above.

(3) Office bases of On-site Pre-school Rehabilitation Services (OPRS): It provides an office for two inter-disciplinary service teams of OPRS. These teams will provide on-site rehabilitation

services and training at centres equipped with rehabilitation facilities for about 200 pre-school children with mild disabilities aged under 6 attending the kindergartens /KG-cum-CCCs participating the OPRS. They also render on-site professional consultation services and demonstration/ talks/ workshops/ seminars for teachers and child care workers, and talks/ workshops/ seminars for parents/ carers.

(4) Day Care Centre for the Elderly (DE): It provides a range of centre-based care and support services during daytime to enable 60 frail or elders with dementia suffering from moderate or severe level of impairment to maintain their optimal level of functioning, develop their potentials, improve their quality of life such that they can live in their own homes wherever feasible and possible. Besides, DE provides various kinds of support and assistance to the carers in order to enable them to continue to assume their responsibilities as carers.

(5) Residential Care Home for the Elderly (RCHE): It provides 250 residential care places (including subsidised and non-subsidised places), and aims to provide residential care, meals, personal care, regular basic medical and nursing care, and social support for elders who suffer from poor health or physical/mental disabilities with deficiency in activities of daily living but are mentally suitable for communal living, and are assessed to be of moderate or severe impairment level under the Standardised Care Need Assessment Mechanism for Elderly Services.

(6) Neighbourhood Elderly Centre (NEC): It provides a range of support services for about 700 elders at neighbourhood level including social, recreational and developmental activities, outreaching services, volunteer services, community health education, counselling and carer support services to enable elders to lead a healthy and dignified life. The target groups of the NEC include elders living in the locality, carers as well as the community at large.

(7) Social and Recreational Centre for the Disabled: It provides

opportunities to the people with disabilities at different ages to participate in and to organise a variety of activities such as social, recreational and sports activities.

(8) Support Centre for Persons with Autism (SPA): It provides a range of professional support and training per annum for about 80 young persons aged 15 and above with high-functioning autism which enhance their living, social and vocational skills, etc, to cope with various challenges during their transition into adulthood. SPA also offers support services for their parents/carers; and provides consultations services and professional training for frontline workers serving persons with autism.

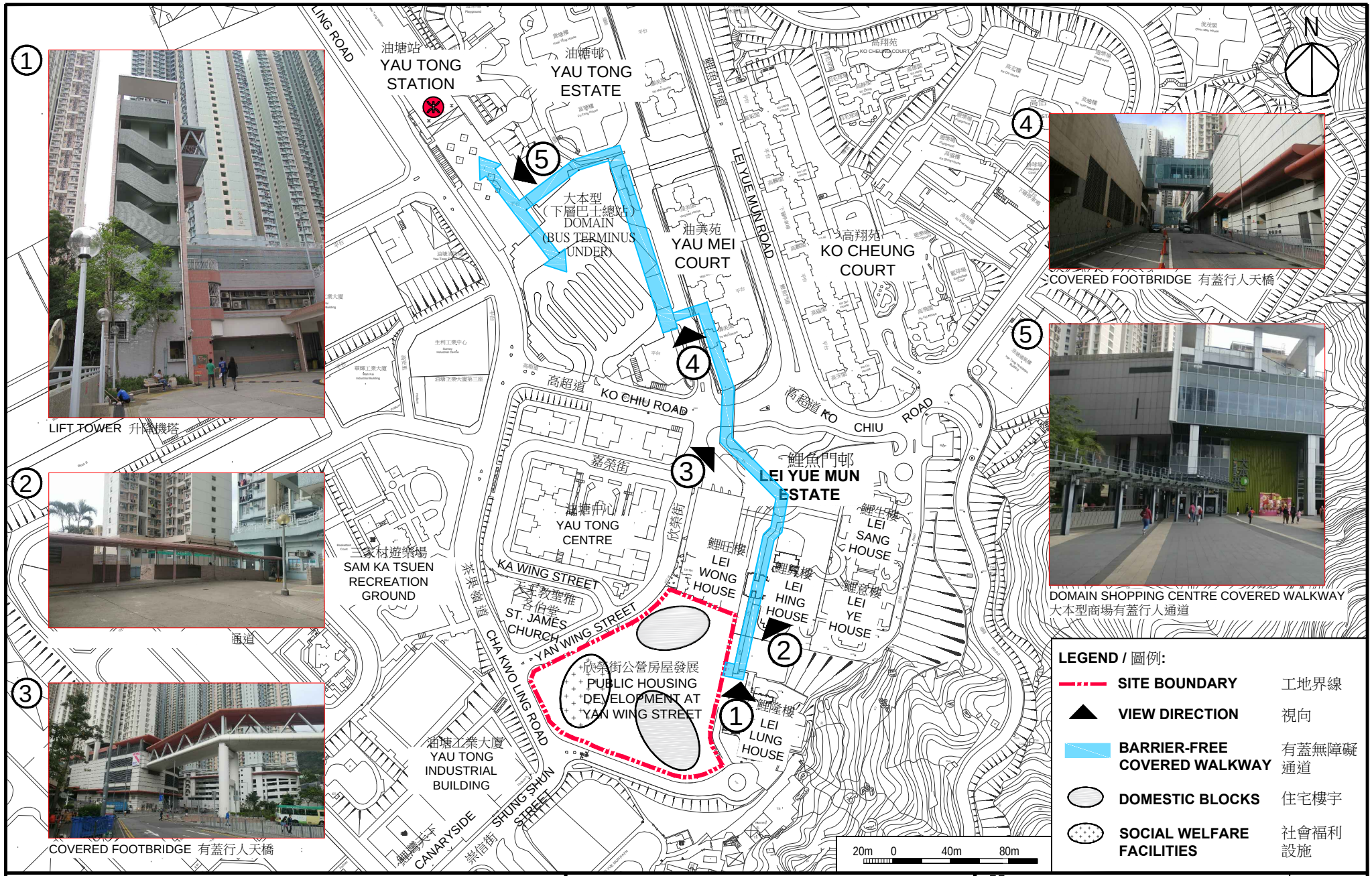
(iv) In order to increase the supply of parking spaces in the district, Transport Department has requested development projects to adopt the high-end vehicle parking standards under the Hong Kong Planning Standards and Guidelines as the planning target, which include provision of parking spaces for light goods vehicles, medium and heavy goods vehicles and/ or coaches. Furthermore, in response to the demand of parking in the vicinity of development projects, the requirement of providing additional public vehicle parking spaces has already been stipulated in the lease conditions. Apart from the public parking spaces for private cars, the residential development at Lei Yue Mun Path will provide 10 public parking spaces for light goods vehicles; the Comprehensive Development Area (CDA) site at the junction of Yan Yue Wai and Shung Shun Street will provide 24 public parking spaces for light goods vehicles and 25 public parking spaces for medium and heavy goods vehicles; and the CDA site at Yau Tong Bay will provide 2 public parking spaces for coaches.

(v) While a certain part of the Transport Impact Assessment (TIA) report for PHDYT prepared by the consultant commissioned by the Hong Kong Housing Authority in 2016 includes third party information which the data provider does not wish to disclose, the TIA report with concerned third party information redacted is now provided for reference (Enclosure 2).

The planned public and private housing developments in the Yau Tong and Lei Yue Mun districts have been considered in the TIA. For the relevant development parameters, anticipated completion years and the location plans, please refer to Table 4.2 and Drawing No. 4.1 of the TIA report.

Transport and Housing Bureau
Housing Department
Social Welfare Department
Transport Department

February 2019



PROJECT / 工程項目

PUBLIC HOUSING DEVELOPMENT AT YAN WING STREET, YAU TONG

油塘欣榮街公營房屋發展

DRAWING TITLE / 圖標題

BARRIER-FREE COVERED WALKWAY PLAN

有蓋無障礙通道平面圖

房屋署
HOUSING DEPARTMENT

DATE / 日期
14/2/2019

DRAWING NO. / 圖編號
KT25/4/A/SK-014

Enclosure 1 附件一

Enclosure 2 附件二

26/01/2016

Reference number: [redacted]

TERM TRAFFIC AND ENVIRONMENTAL CONSULTANCY SERVICES 2015 - 2016
INSTRUCTION NO. M28
PUBLIC HOUSING DEVELOPMENT AT LEI YUE MUN ESTATE PHASE 4
TRAFFIC IMPACT ASSESSMENT STUDY
FINAL REPORT

Hong Kong Housing Authority
香港房屋委員會

In association with
Mott MacDonald Hong Kong Ltd.
ENVIRON Hong Kong Ltd.
Cinotech Consultants Ltd.
Maurice Lee & Associates Ltd.

MVA
SYSTRA GROUP

PUBLIC HOUSING DEVELOPMENT AT LEI YUE MUN ESTATE PHASE 4

TRAFFIC IMPACT ASSESSMENT STUDY

IDENTIFICATION TABLE	
Client/Project owner	Hong Kong Housing Authority
Project	Public Housing Development at Lei Yue Mun Estate Phase 4
Study	Traffic Impact Assessment Study
Type of document	Final Report
Date	26/01/2016
File name	[redacted]
Reference number	[redacted]

APPROVAL					
Version	**Name**		**Position**	**Date**	**Modifications**
1	Author	[redacted]	[redacted]	26/01/2016	
	Checked by	[redacted]	[redacted]	26/01/2016	
	Approved by	[redacted]	[redacted]	26/01/2016	

TABLE OF CONTENTS

1.	**INTRODUCTION**	**5**
1.1	BACKGROUND	5
1.2	STUDY OBJECTIVES	5
1.3	STRUCTURE OF THE REPORT	5
2.	**THE PROPOSED DEVELOPMENT**	**7**
2.1	SITE LOCATION	7
2.2	PROPOSED DEVELOPMENT	7
2.3	VEHICULAR ACCESS OF PROPOSED DEVELOPMENT	7
2.4	PARKING AND SERVICING FACILITIES PROVISIONS OF PROPOSED DEVELOPMENT	7
3.	**EXISTING TRAFFIC CONDITIONS**	**9**
3.1	EXISTING ROAD NETWORK	9
3.2	CRITICAL JUNCTIONS	9
4.	**FUTURE TRAFFIC CONDITIONS**	**11**
4.1	DESIGN YEAR	11
4.2	REFERENCE TRAFFIC FLOWS	11
4.3	DEVELOPMENT TRAFFIC GENERATION	14
4.4	DESIGN TRAFFIC FORECASTS	15
5.	**TRAFFIC IMPACT ASSESSMENT**	**16**
5.1	OPERATIONAL ASSESSMENT	16
5.2	PROPOSED JUNCTION IMPROVEMENT SCHEME	17
5.3	SENSITIVITY TEST (WITHOUT YAU TONG BAY PROPOSED JUNCTION MODIFICATION)	18
6.	**PUBLIC TRANSPORT PROVISIONS AND PEDESTRIAN FACILITIES**	**20**
6.1	PUBLIC TRANSPORT SERVICES	20
6.2	PEDESTRIAN FACILITIES	21
7.	**SUMMARY AND CONCLUSION**	**22**
7.1	SUMMARY	22
7.2	CONCLUSION	23

LIST OF DRAWINGS NO.

Drawing 1.1	Site Location
Drawing 2.1	Ground Floor Plan of Proposed Development
Drawing 3.1	Existing Road Network and Critical Junctions
Drawing 3.2	Existing Junction Layout of Lei Yue Mun Road / Ko Chiu Road (N) (A)
Drawing 3.3	Existing Junction Layout of Lei Yue Mun Road / Yau Tong Estate Southern Access (B)
Drawing 3.4	Existing Junction Layout of Lei Yue Mun Road / Ko Chiu Road (S)(C)
Drawing 3.5	Existing Junction Layout of Cha Kwo Ling Road / Ko Fai Road (D)
Drawing 3.6	Existing Junction Layout of Cha Kwo Ling Road / Ko Chiu Road (E)
Drawing 3.7	Existing Junction Layout of Cha Kwo Ling Road / Sze Shan Street (F)
Drawing 3.8	Existing Junction Layout of Cha Kwo Ling Road / Yan Wing Street (G)
Drawing 3.9	Existing Junction Layout of Cha Kwo Ling Road / Access Road (H)
Drawing 3.10	2015 Observed Traffic Flows
Drawing 4.1	Planned / Committed Developments
Drawing 4.2	2027 Reference Traffic Flows (Without Development)
Drawing 4.3	Development Traffic Flow
Drawing 4.4	2027 Design Traffic Flows (With Development)
Drawing 5.1	Planned Junction Layout of Cha Kwo Ling Road / Ko Fai Road (D) (Under Proposed Development at Yau Tong Bay)
Drawing 5.2	Proposed Junction Improvement Scheme of Cha Kwo Ling Road / Ko Chiu Road (E)
Drawing 6.1	Existing Bus Services in the Vicinity
Drawing 6.2	Existing GMB Services in the Vicinity
Drawing 6.3	Existing Pedestrian Crossing Facilities

LIST OF TABLES

Table 2.1	Development Parameters	7
Table 2.2	Proposed Parking Provisions for Proposed Development	8
Table 3.1	Critical Junctions for Assessment	9
Table 3.2	Operational Performance of Critical Junctions in 2015	10
Table 3.3	Year 2015 Observed Traffic Queue	10
Table 4.1	Population Growth in the Local Area	11
Table 4.2	Planned/committed developments in the vicinity of the proposed Public Housing Development at Yan Wing Street	12
Table 4.3	Adopted Trip Rate of Planned/Committed Development	12
Table 4.4	Traffic Generations of Planned/Committed Development (pcu/hr)	14
Table 4.5	Adopted Trip Rates	14
Table 4.6	Traffic Generations of Proposed Development (pcu/hr)	15
Table 5.1	Detailed Layout Arrangement of Critical Junctions in 2027	16
Table 5.2	Operational Performance of Critical Junctions in 2027	16
Table 5.3	Operational Performance of Critical Junctions in 2027	17
Table 5.4	Operational Performance of Crossings at Ko Chiu Road (Junction E) in Year 2027	17
Table 5.5	Year 2027 Anticipated Traffic Queue	18
Table 5.6	Operational Performance of Junction D (Without Yau Tong Bay Proposed Junction Modification) in 2027	19
Table 6.1	Existing Public Transport Services in the vicinity	20
Table 6.2	Year 2027 Anticipated Outbound Direction PT Demand	21

1. INTRODUCTION

1.1 Background

1.1.1 MVA Hong Kong Limited (MVA) was commissioned by the Hong Kong Housing Authority (HKHA) in 2015 to conduct a Traffic Impact Assessment (TIA) study for Lei Yue Mun Estate Phase 4. **Drawing No. 1.1** shows the location of the development site.

1.1.2 This TIA study is to examine the impact of the traffic generated by the proposed development on the existing road networks in the near vicinity. Any deficiency would be identified and improvement proposals would be recommended if necessary to resolve any foreseeable problem.

1.2 Study Objectives

1.2.1 The main objectives of the study are as follows:

1.2.2 to assess the existing traffic conditions in the vicinity of the proposed development;

1.2.3 to forecast traffic demands on the adjacent road network in the design year 2027;

1.2.4 to estimate the likely traffic generated by the proposed development based on the updated planning parameters;

1.2.5 to assess the impacts of traffic generated by the proposed development on the adjacent road network;

1.2.6 to recommend improvement measures, if necessary, to alleviate any traffic problems on the road network; and

1.2.7 to investigate the public transport and pedestrian needs in the near vicinity.

1.3 Structure of the Report

1.3.1 Following this introductory chapter, there are six further chapters.

1.3.2 **Chapter 2 – The Proposed Development**, which presents the planning parameters of the proposed development.

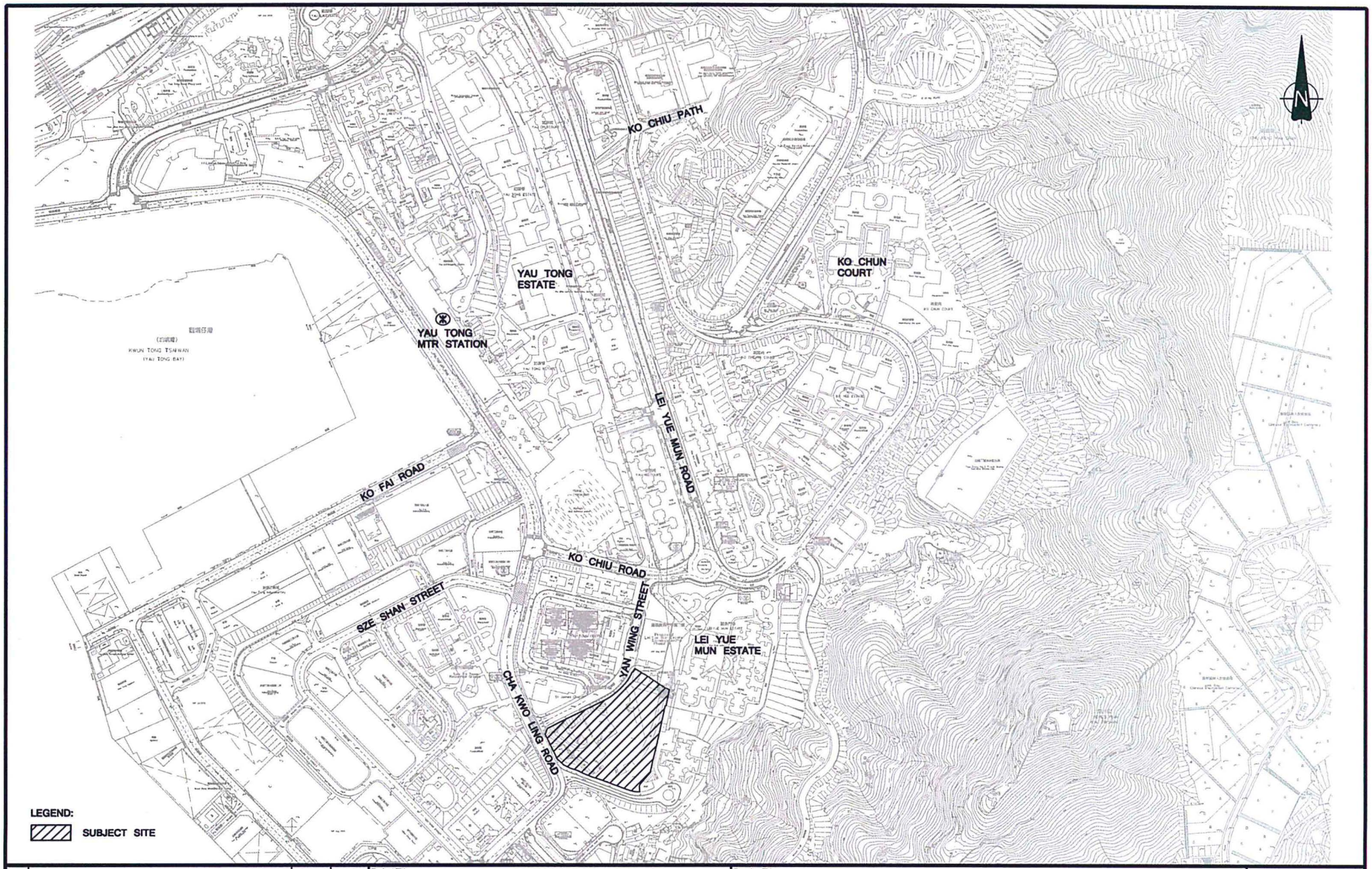
1.3.3 **Chapter 3 – Existing Traffic Conditions**, which describes the existing road network in the vicinity of the proposed development, presents the summary of traffic count survey and assesses the existing traffic conditions.

1.3.4 **Chapter 4 – Future Traffic Conditions**, which discusses the potential traffic generations and attractions of the proposed development under the updated development proposal. It also summarises the methodology for future traffic forecasts.

1.3.5 **Chapter 5 – Traffic Impact Assessment**, which presents the findings of the traffic impact assessment in the future design year and recommends improvement measures, if necessary.

1.3.6 **Chapter 6 – Public Transport Provisions Service and Pedestrian Facilities**, which provides an examination of the provisions of public transport and pedestrian facilities in the vicinity of the proposed development.

1.3.7 **Chapter 7 – Summary and Conclusion**, which summarises the findings of the study and presents the conclusion regarding the traffic issues of the proposed development.



Rev.	Description	Checked	Date
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

Project Title

PUBLIC HOUSING DEVELOPMENT
AT LEI YUE MUN ESTATE PHASE 4

Drawing Title

SITE LOCATION

Designed	Checked	Scale	Date	Drawing No.	Rev.
[redacted]	[redacted]	1:4000(A3)	SEP 2015	1.1	-

MVA SYSTRA GROUP

[redacted]

2. THE PROPOSED DEVELOPMENT

2.1 Site Location

2.1.1 As shown in **Drawing No. 1.1**, the development site is located at Yan Wing Street which is bounded by Yan Wing Street to the North, Cha Kwo Ling Road to the West and Lei Lung House to the East.

2.2 Proposed Development

2.2.1 The proposed development is planned as an integrated development consist of public housing use and ancillary facilities. **Table 2.1** summarises the development parameters. The proposed development is scheduled to be completed by 2024.

Table 2.1 Development Parameters

Component	Development Parameter
Public Rental Housing (PRH)	2,400 flats (including 612 flats of 1/2P)
Welfare Facilities at the Basement Floor	Podium

2.3 Vehicular Access of Proposed Development

2.3.1 As shown in **Drawing No. 2.1**, the vehicular access of the proposed development will be located at Yan Wing Street. At present Yan Wing Street is a single-2 lane one-way carriageway running in north-west direction.

2.3.2 Taking into account of the level difference within the site, a separate vehicular access for the welfare facilities (at the basement floor) will be located at the estate road of Lei Yue Mun Estate at the end of Cha Kwo Ling Road.

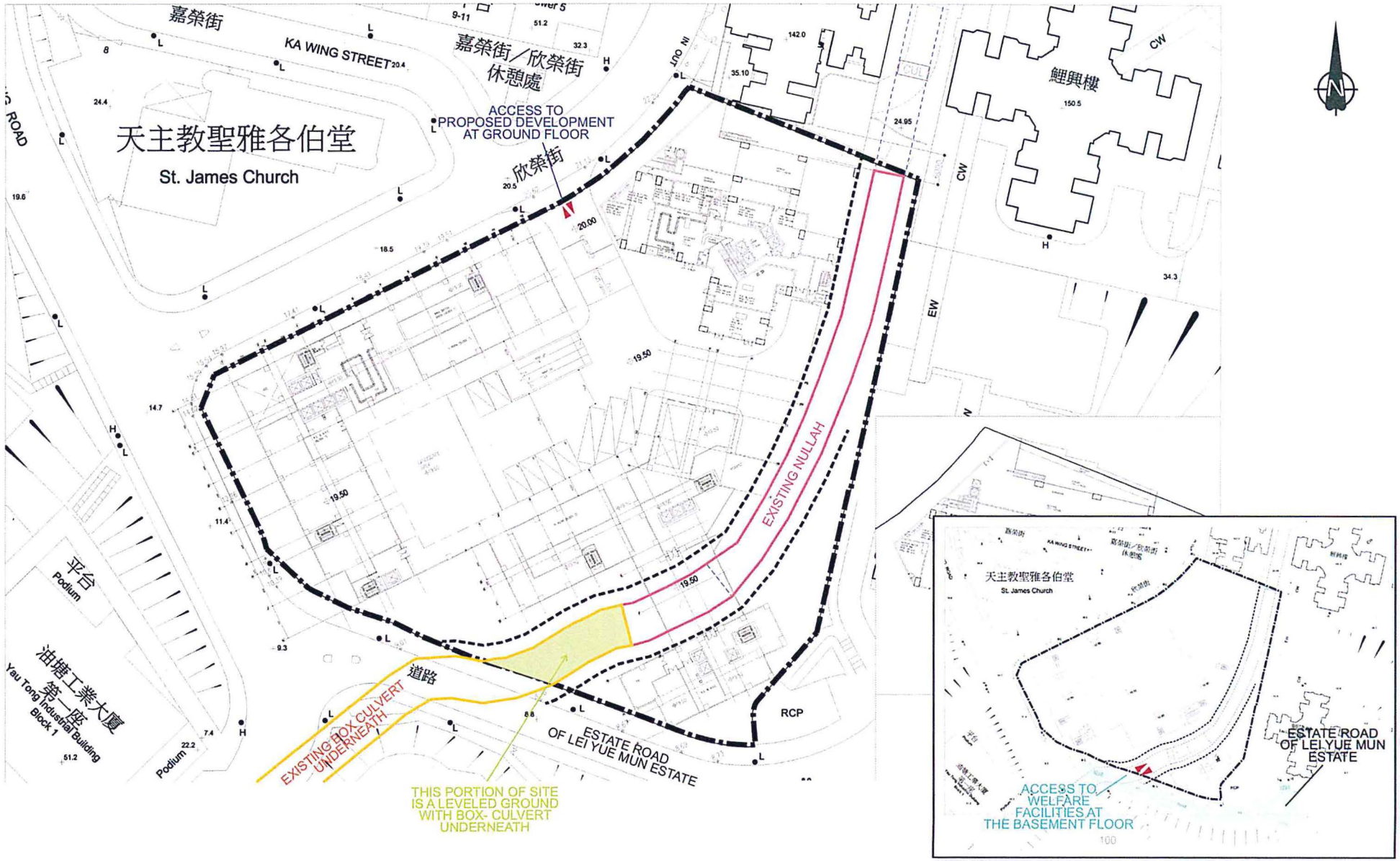
2.4 Parking and Servicing Facilities Provisions of Proposed Development

2.4.1 Based on the proposed development parameters in **Table 2.1**, Hong Kong Planning Standards and Guidelines (HKPSG) and District-based Parking Standards (DBPS), the proposed parking provisions for the proposed development are summarized in **Table 2.2**.

Table 2.2 Proposed Parking Provisions for Proposed Development

Parking Facilities	Standard	Requirements	Proposed Provision
Public Rental Housing (PRH)			
Car Parking Spaces	1 per 34-37 flats (2400 flats including 612 1/2P flats) (1)(2)	49-53	54 (4)
Motorcycle Parking	1 per 130 flats (2400 flats including 612 1/2P flats) (1)(2)	14	14
LGV Parking Spaces	1 per 200-400 flats (2400 flats including 612 1/2P flats) (1)(2)	5-9	9
L/UL Bay	1 HGV per block (3 Blocks) (3)	3 HGV	3 HGV

Remark:
(1) Based on DBPS Requirements (Kwun Tong District)
(2) 1/2P flats are excluded from parking provision
(3) Based on HKPSG Requirements
(4) According to HKPSG, the current proposal of 54 parking spaces includes 2 accessible parking spaces (HKPSG Requirement: 1 for 1-50 carparking space, 2 for 51-150 carparking space, 3 for 151-250 carparking space, 4 for 251-350 carparking space and 5 for 351-450 carparking space and 6 for above 450 carparking space)



Rev.	Description	Checked	Date
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

Project Title

PUBLIC HOUSING DEVELOPMENT
AT LEI YUE MUN ESTATE PHASE 4

Drawing Title

GROUND FLOOR PLAN OF PROPOSED DEVELOPMENT

Designed	Checked	Scale	Date	Drawing No.	Rev.
[redacted]	[redacted]	NTS	OCT 2015	2.1	-

MVA
SYSTRA GROUP

[redacted]

3. EXISTING TRAFFIC CONDITIONS

3.1 Existing Road Network

3.1.1 **Drawing No. 3.1** shows the existing road network that serves the proposed development. The proposed development is mainly served by Ko Chiu Road, Cha Kwo Ling Road and Lei Yue Mun Road.

3.1.2 Yan Wing Street is a single-2 lane one-way carriageway running from north to west, which is the immediate access of the proposed development.

3.1.3 Ko Chiu Road is a local distributor which links up Yau Tong with various estates in the upper Lam Tin area and connects to Sau Mau Ping Road.

3.1.4 Lei Yue Mun Road is a dual-2 lanes primary distributor whereas Cha Kwo Ling Road is mainly a single-4 lanes district distributor and both of them provide direct and convenient connections to the Eastern Harbour Crossing linking to Hong Kong Island, to the Kwun Tong Bypass linking to other parts of Kowloon and the New Territories. They also connect to Tseung Kwan O Road at Lam Tin linking to Tseung Kwan O.

3.2 Critical Junctions

3.2.1 Eight junctions were identified to be critical for assessment of traffic impact due to the proposed development. They are listed in **Table 3.1** below.

Table 3.1 Critical Junctions for Assessment

Ref.	Junction	Type	Drawing No.
A	Lei Yue Mun Road / Ko Chiu Road (N)	Signal	3.2
B	Lei Yue Mun Road / Yau Tong Estate Southern Access	Signal	3.3
C	Lei Yue Mun Road/Ko Chiu Road (S)	Roundabout	3.4
D	Cha Kwo Ling Road/Ko Fai Road	Priority	3.5
E	Cha Kwo Ling Road / Ko Chiu Road	Signal	3.6
F	Cha Kwo Ling Road / Sze Shan Street	Priority	3.7
G	Cha Kwo Ling Road / Yan Wing Street	Priority	3.8
H	Cha Kwo Ling Road / Access Road	Priority	3.9

3.2.2 The locations of the above eight junctions are illustrated in **Drawing No. 3.1**. The existing junction layout arrangements and method of control for Junction A to Junction H are shown in **Drawings No. 3.2** to **3.9** respectively.

3.2.3 In order to appraise the existing traffic conditions of these junctions, a traffic survey in the form of manual classified count was conducted at a typical weekday in September 2015. Analysis of the observed traffic data indicates that the AM and PM peak hour flows occurred from 7:30 to 8:30 and from 17:30 to 18:30 respectively. The results are shown in **Drawing No. 3.10**.

3.2.4 Existing operational performance of the critical junctions and the results are listed in **Table 3.2** below.

Table 3.2 Operational Performance of Critical Junctions in 2015

Ref.	Junction	Type	2015 RC/RFC	
			AM Peak	PM Peak
A	Lei Yue Mun Road / Ko Chiu Road (N)	Signal	73%	>100%
B	Lei Yue Mun Road / Yau Tong Estate Southern Access	Signal	>100%	>100%
C	Lei Yue Mun Road/Ko Chiu Road (S)	Roundabout	0.34	0.43
D	Cha Kwo Ling Road/Ko Fai Road	Priority	0.79	0.80
E	Cha Kwo Ling Road / Ko Chiu Road	Signal	63%	72%
F	Cha Kwo Ling Road / Sze Shan Street	Priority	0.22	0.27
G	Cha Kwo Ling Road / Yan Wing Street	Priority	0.32	0.57
H	Cha Kwo Ling Road / Access Road	Priority	0.01	0.01

Remark: RC = Reserve Capacity, RFC = Ratio of Flow to Capacity

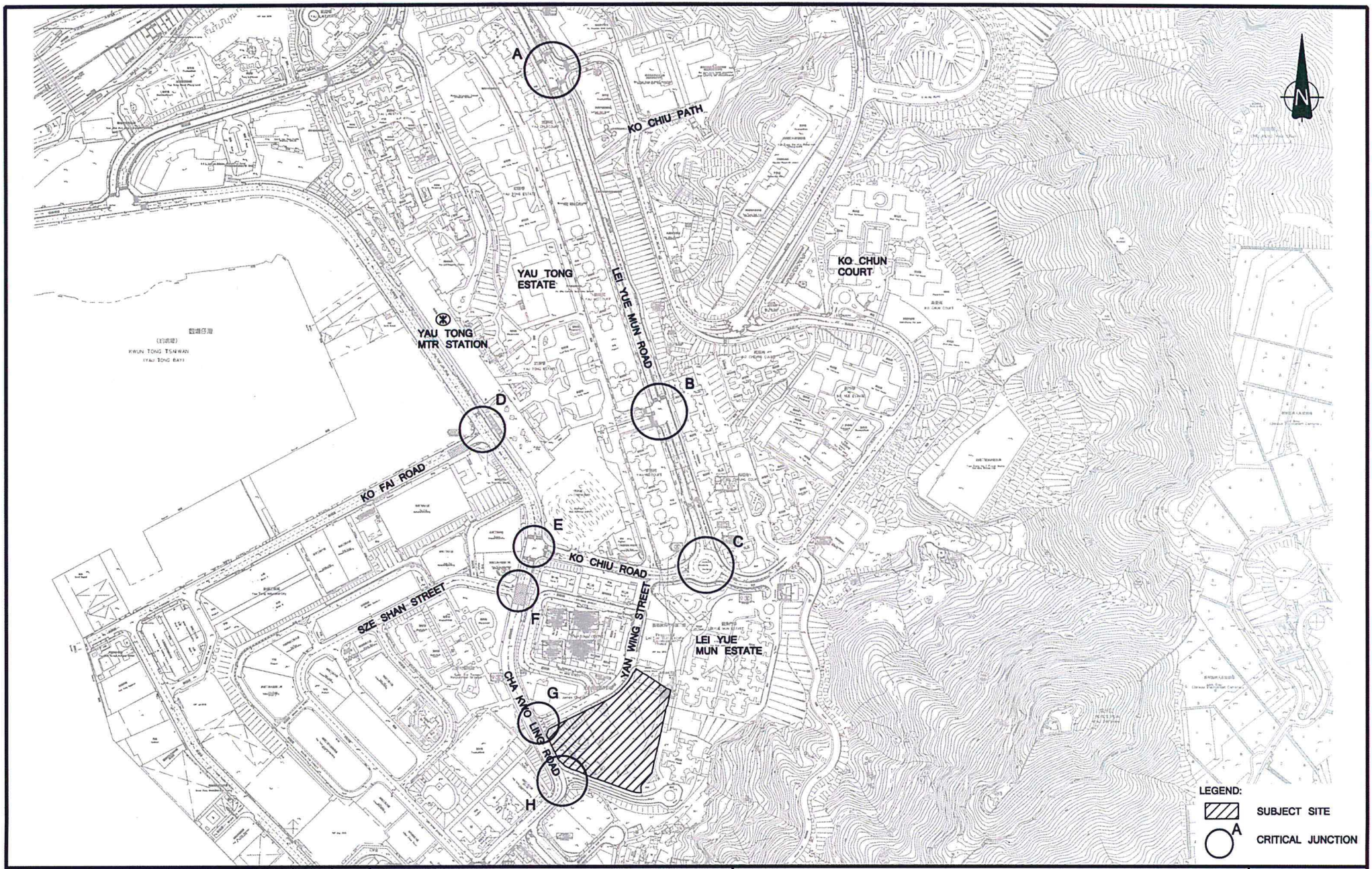
3.2.5 The assessment results in **Table 3.2** indicate that all critical junctions are at present operating within capacities.

3.2.6 Queue length survey at critical junctions have also been carried out and the results are summarized in **Table 3.3**.

Table 3.3 Year 2015 Observed Traffic Queue

Index	Junction	Approach	Capacity (m)	Average Queue Length (m)		Within Capacity	
				AM Peak	PM Peak	AM Peak	PM Peak
A	Lei Yue Mun Road / Ko Chiu Road (N)	Lei Yue Mun Road SB	220	40	40	Yes	Yes
		Ko Chiu Road WB	415	35	10	Yes	Yes
		Lei Yue Mun Road NB	370	40	25	Yes	Yes
B	Lei Yue Mun Road / Yau Tong Estate Southern Access	Lei Yue Mun Road SB	375	20	25	Yes	Yes
		Lei Yue Mun Road NB	95	35	25	Yes	Yes
		Yau Tong Estate Southern Access EB	30	15	15	Yes	Yes
E	Cha Kwo Ling Road / Ko Chiu Road	Cha Kwo Ling Road SB	120	20	15	Yes	Yes
		Ko Chiu Road WB	115	10	15	Yes	Yes
		Cha Kwo Ling Road NB	150	40	40	Yes	Yes

3.2.7 As observed on site, there are sufficient allowable queue lengths at the surveyed junctions.



Rev.	Description	Checked	Date
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

Project Title

PUBLIC HOUSING DEVELOPMENT
AT LEI YUE MUN ESTATE PHASE 4

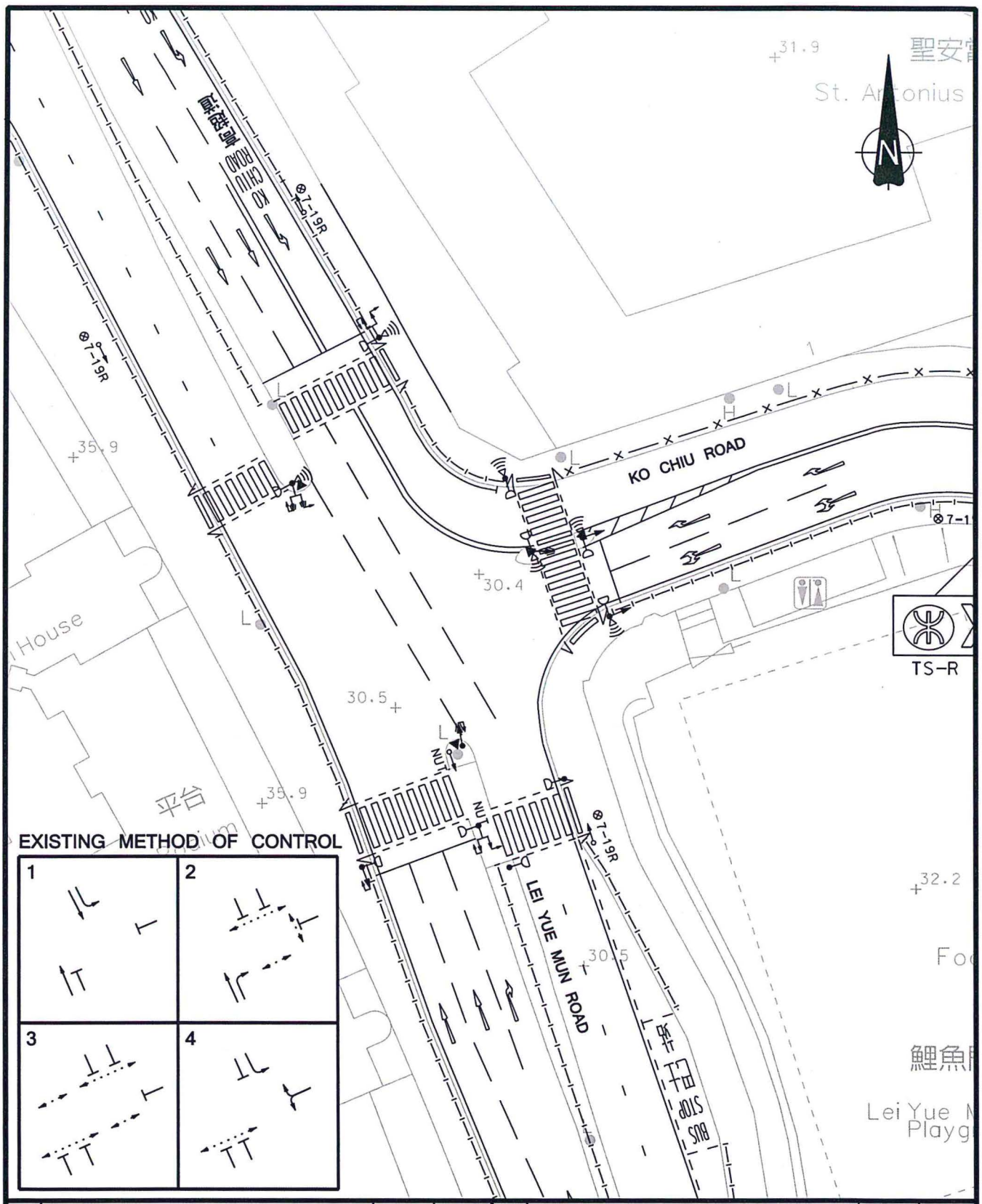
Drawing Title

EXISTING ROAD NETWORK AND CRITICAL JUNCTIONS

Designed	Checked	Scale	Date	Drawing No.	Rev.
[redacted]	[redacted]	1:4000(A3)	SEP 2015	3.1	-

MVA
SYSTRA GROUP

[redacted]



Rev.	Description	Checked	Date	Rev.	Description	Checked	Date
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-

Project Title

PUBLIC HOUSING DEVELOPMENT
AT LEI YUE MUN ESTATE PHASE 4

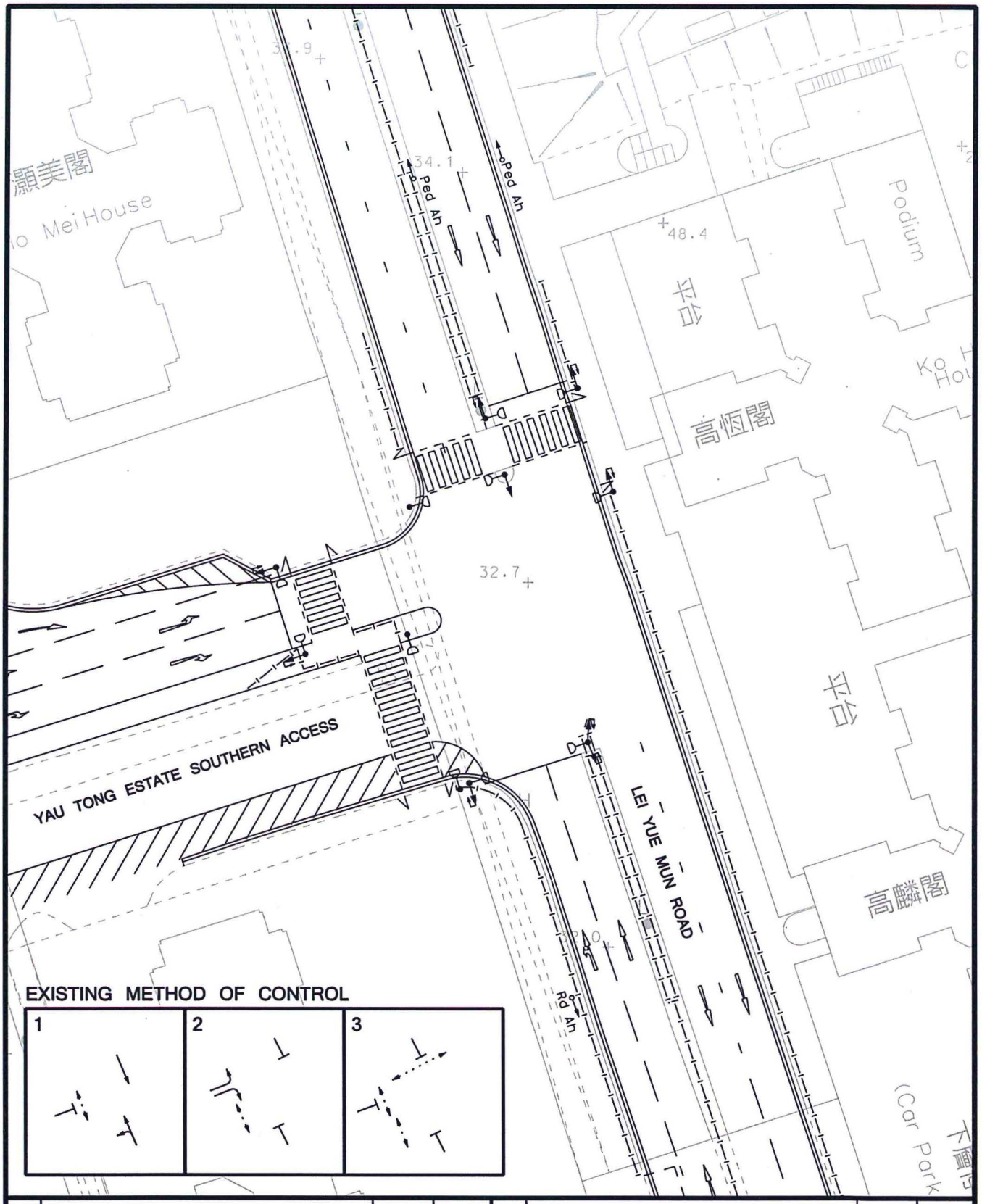
Drawing Title

EXISTING JUNCTION LAYOUT OF
LEI YUE MUN ROAD / KO CHIU ROAD (N) (A)

MVA
SYSTRA GROUP

Designed	Checked	Scale	Date	Drawing No.	Rev.
[redacted]	[redacted]	1:500(A4)	SEP 2015	3.2	-

[redacted]



Rev.	Description	Checked	Date	Rev.	Description	Checked	Date
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-

Project Title

PUBLIC HOUSING DEVELOPMENT
AT LEI YUE MUN ESTATE PHASE 4

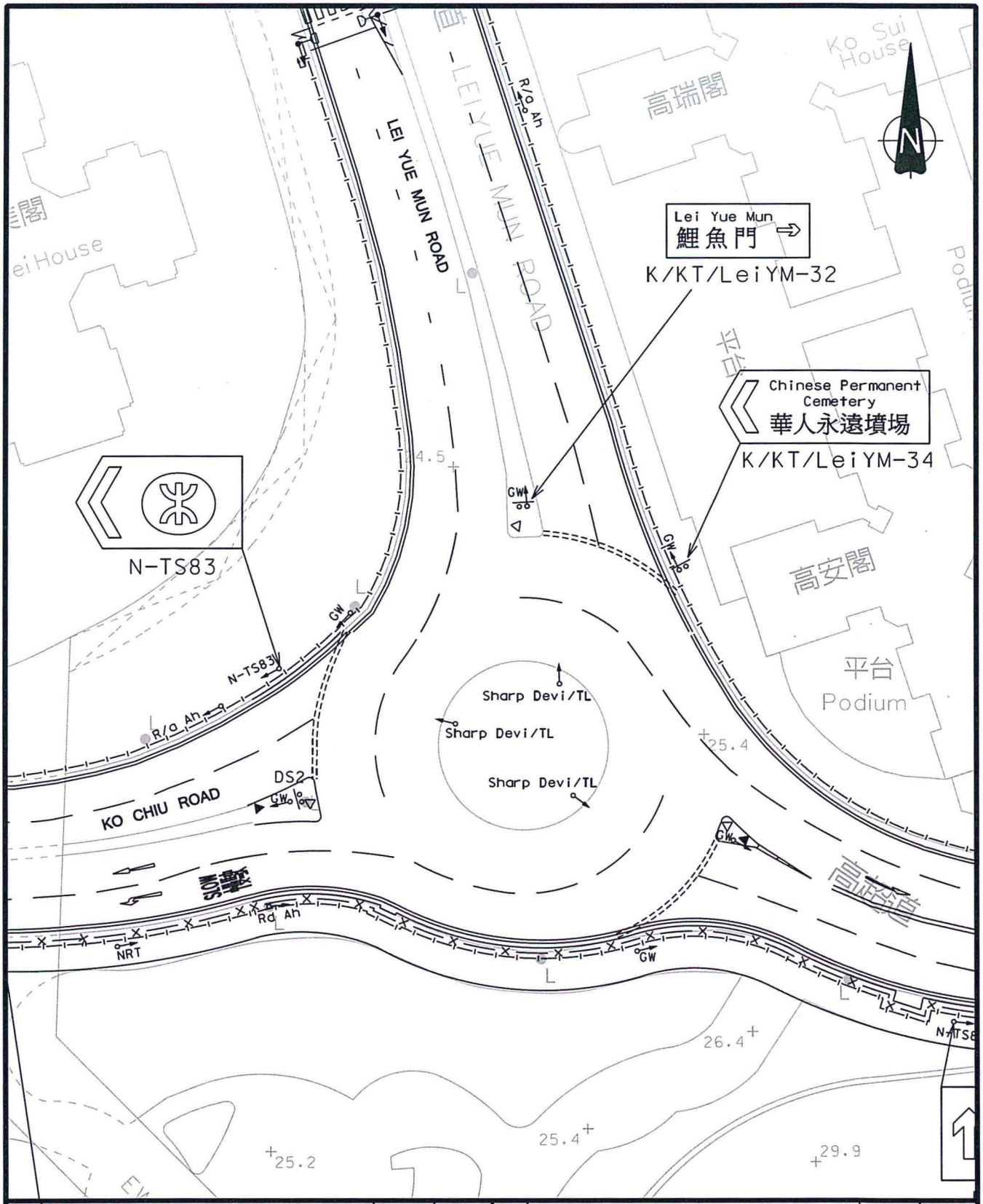
Drawing Title

EXISTING JUNCTION LAYOUT OF LEI YUE MUN ROAD / YAU TONG ESTATE SOUTHERN ACCESS (B)

MVA SYSTRA GROUP

Designed	Checked	Scale	Date	Drawing No.	Rev.
[redacted]	[redacted]	1:500(A4)	SEP 2015	3.3	-

[redacted]



Rev.	Description	Checked	Date	Rev.	Description	Checked	Date
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-

Project Title

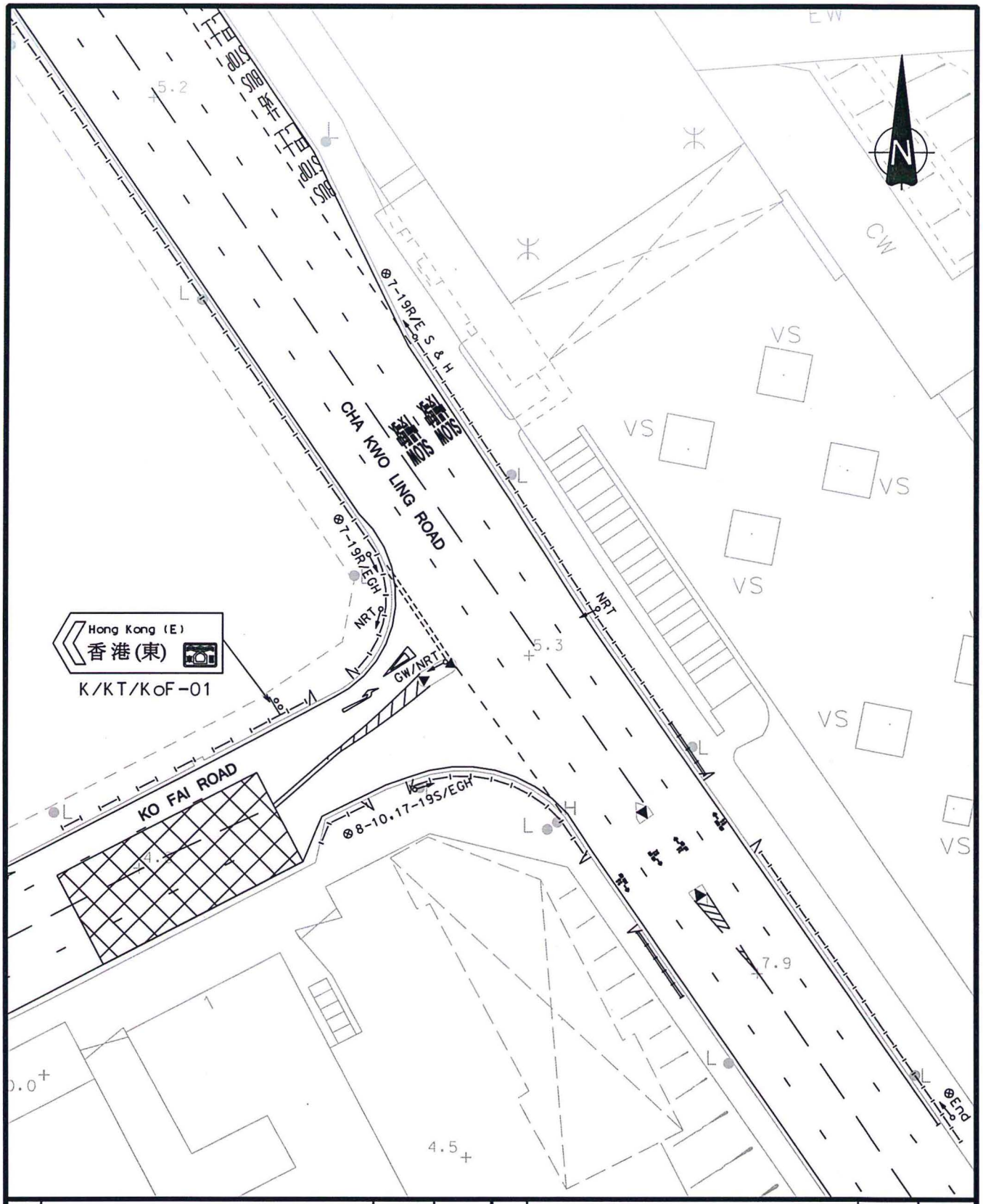
PUBLIC HOUSING DEVELOPMENT
AT LEI YUE MUN ESTATE PHASE 4

Drawing Title

EXISTING JUNCTION LAYOUT OF
LEI YUE MUN ROAD / KO CHIU ROAD (S) (C)

MVA
SYSTRA GROUP

Designed	Checked	Scale	Date	Drawing No.	Rev.
[redacted]	[redacted]	1:500(A4)	SEP 2015	3.4	-



Rev.	Description	Checked	Date	Rev.	Description	Checked	Date
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-

Project Title

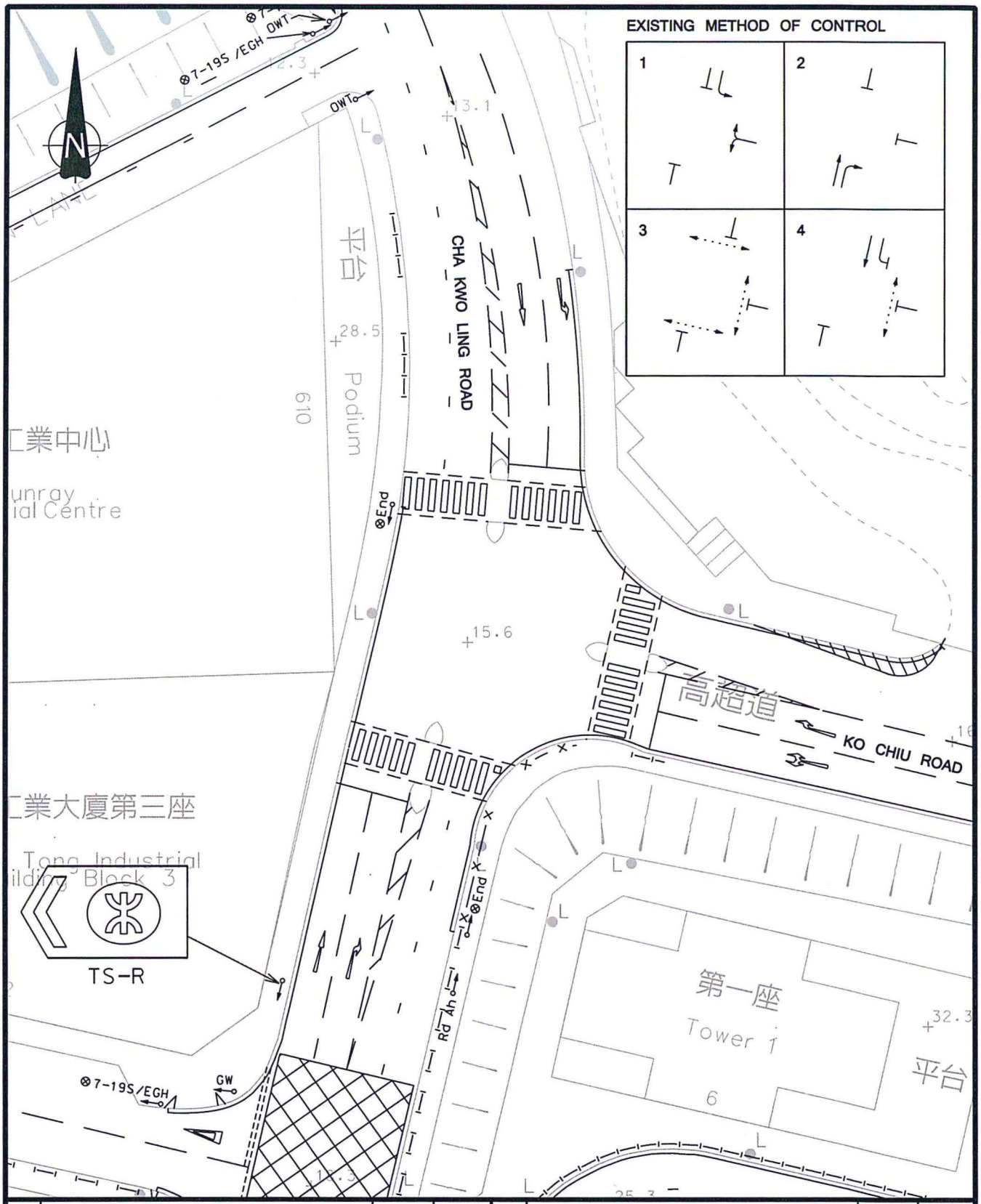
PUBLIC HOUSING DEVELOPMENT
AT LEI YUE MUN ESTATE PHASE 4

Drawing Title

EXISTING JUNCTION LAYOUT OF
CHA KWO LING ROAD / KO FAI ROAD (D)

MVA
SYSTRA GROUP

Designed	Checked	Scale	Date	Drawing No.	Rev.
[redacted]	[redacted]	1:500(A4)	SEP 2015	3.5	-



Rev.	Description	Checked	Date	Rev.	Description	Checked	Date
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-

Project Title

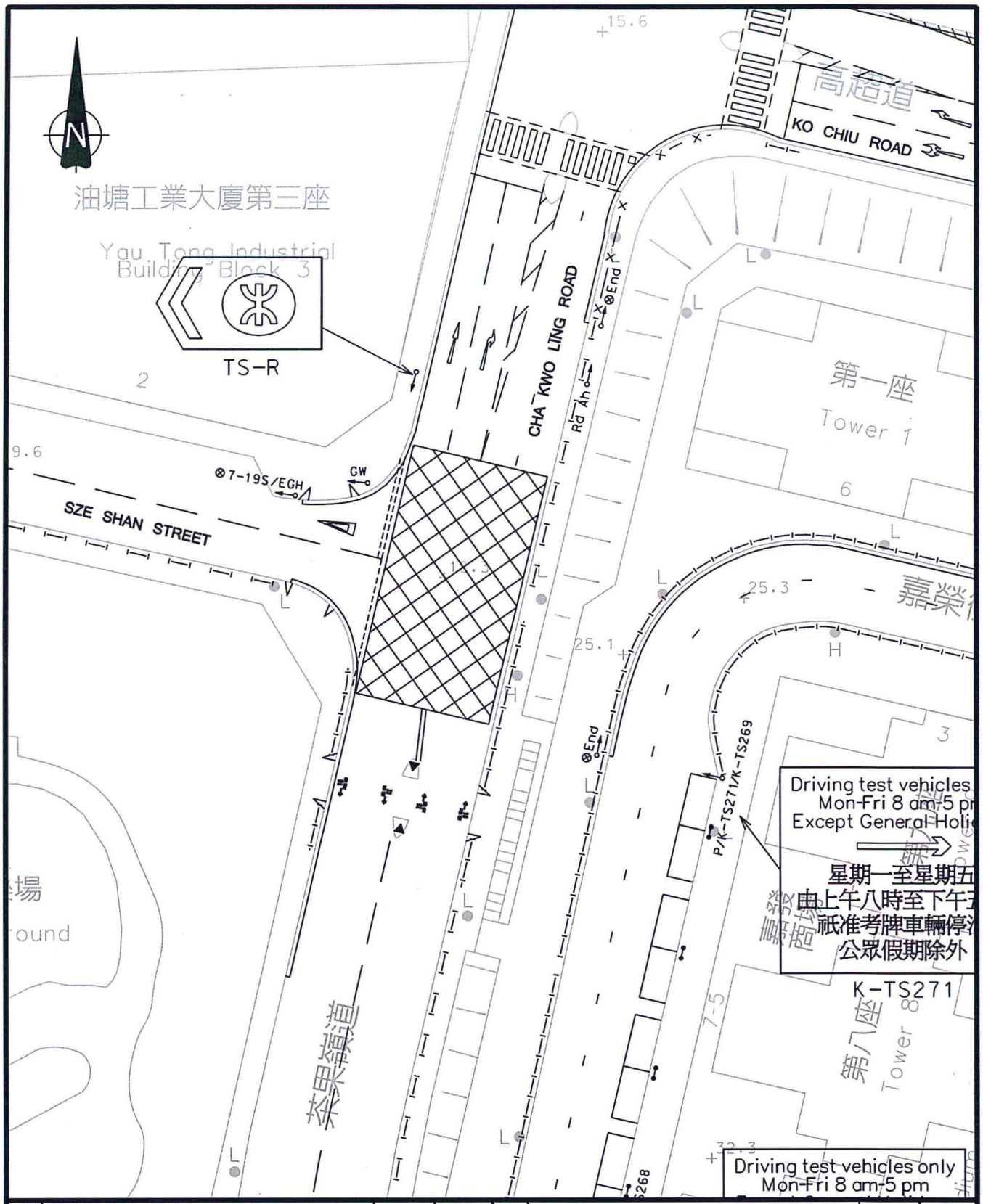
PUBLIC HOUSING DEVELOPMENT
AT LEI YUE MUN ESTATE PHASE 4

Drawing Title

EXISTING JUNCTION LAYOUT OF CHA KWO LING ROAD / KO CHIU ROAD (E)

MVA SYSTRA GROUP

Designed	Checked	Scale	Date	Drawing No.	Rev.
[redacted]	[redacted]	1:500(A4)	SEP 2015	3.6	-



Rev.	Description	Checked	Date	Rev.	Description	Checked	Date
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-

Project Title

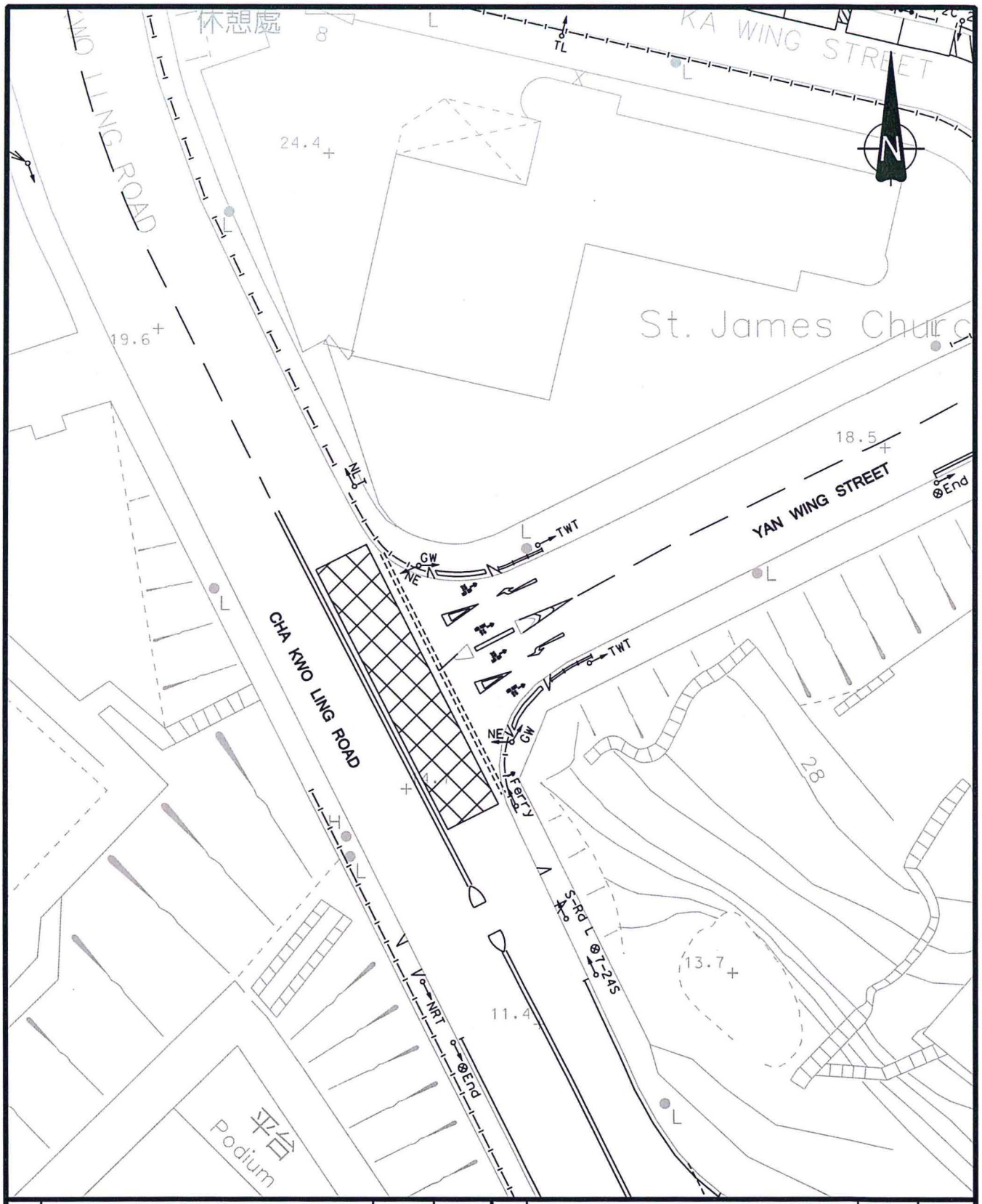
PUBLIC HOUSING DEVELOPMENT
AT LEI YUE MUN ESTATE PHASE 4

Drawing Title

EXISTING JUNCTION LAYOUT OF
CHA KWO LING ROAD / SZE SHAN STREET (F)

MVA
SYSTRA GROUP

Designed	Checked	Scale	Date	Drawing No.	Rev.
[redacted]	[redacted]	1:500(A4)	SEP 2015	3.7	-



Rev.	Description	Checked	Date	Rev.	Description	Checked	Date
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-

Project Title

PUBLIC HOUSING DEVELOPMENT
AT LEI YUE MUN ESTATE PHASE 4

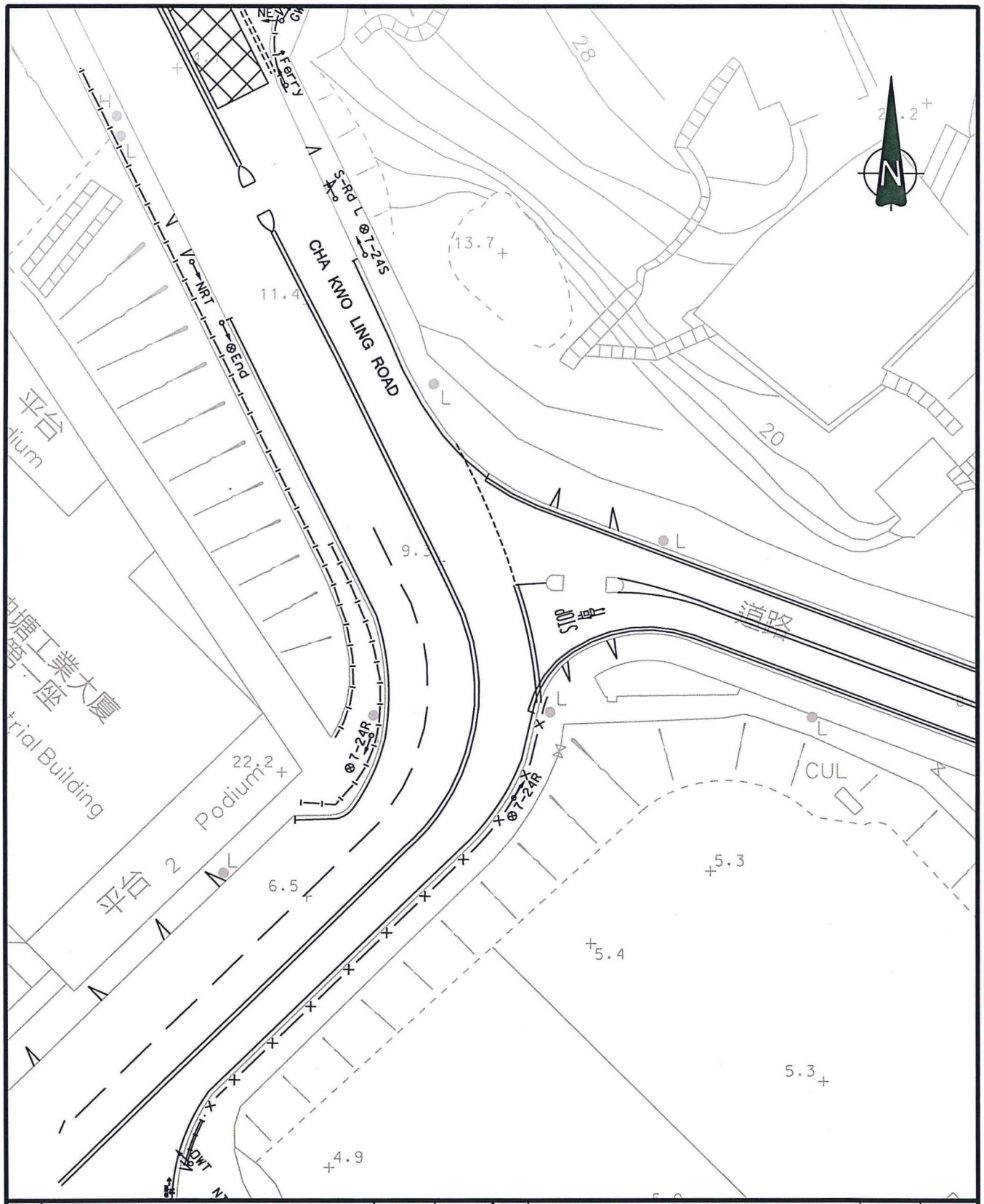
Drawing Title

EXISTING JUNCTION LAYOUT OF CHA KWO LING ROAD / YAN WING STREET (G)

MVA SYSTRA GROUP

Designed	Checked	Scale	Date	Drawing No.	Rev.
[redacted]	[redacted]	1:500(A4)	SEP 2015	3.8	-

[redacted]



Rev.	Description	Checked	Date	Rev.	Description	Checked	Date
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-

Project Title

PUBLIC HOUSING DEVELOPMENT
AT LEI YUE MUN ESTATE PHASE 4

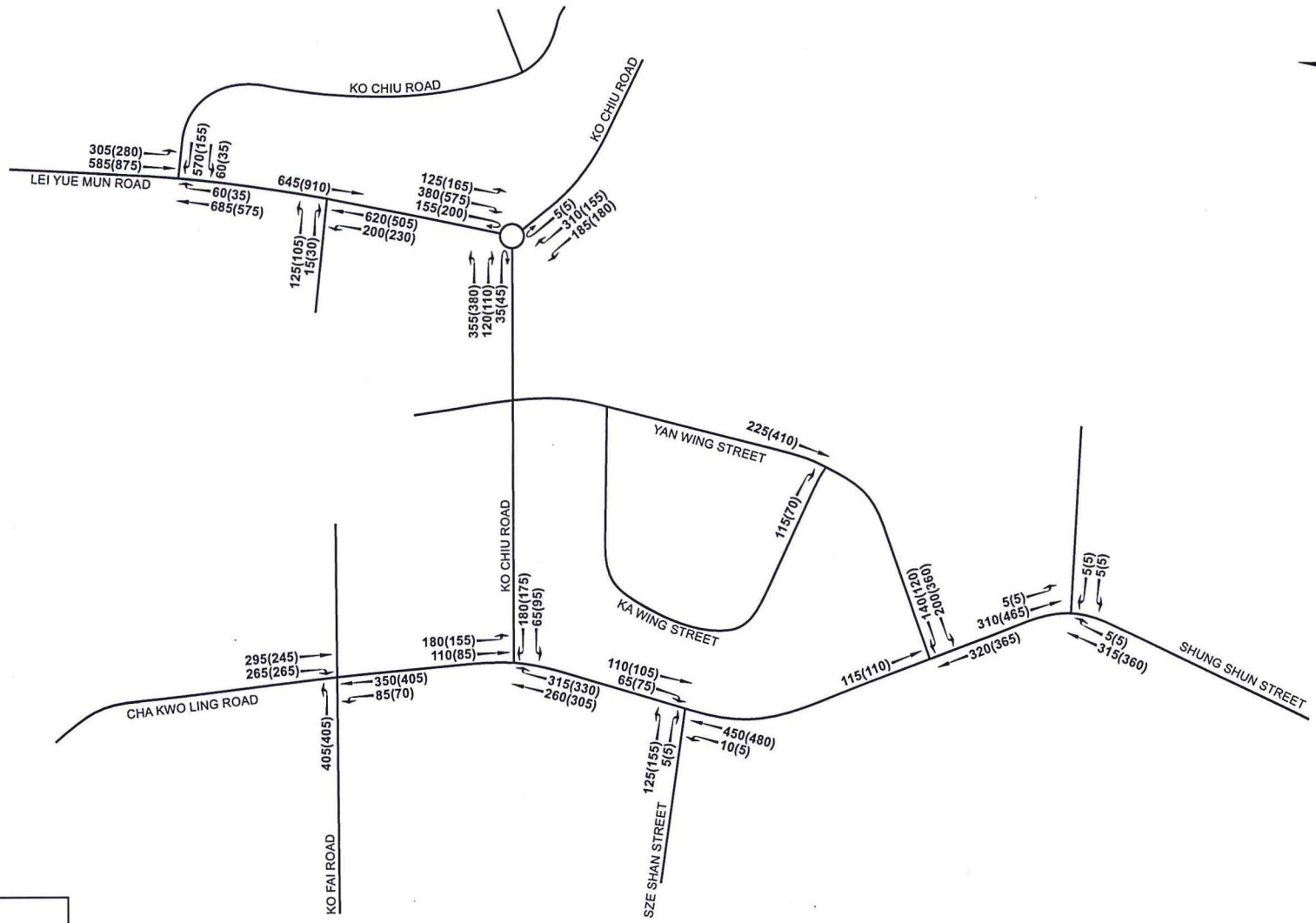
Drawing Title

EXISTING JUNCTION LAYOUT OF CHA KWO LING ROAD / ACCESS ROAD (H)

MVA SYSTRA GROUP

Designed	Checked	Scale	Date	Drawing No.	Rev.
[redacted]	[redacted]	1:500(A4)	SEP 2015	3.9	-

[redacted]



LEGEND :

225(110) AM(PM) PEAK HOUR TRAFFIC FLOWS IN PCU/HR

Rev.	Description	Checked	Date
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

Project Title: PUBLIC HOUSING DEVELOPMENT AT LEI YUE MUN ESTATE PHASE 4

Drawing Title: **2015 OBSERVED TRAFFIC FLOWS**

Designed | Checked | Scale: NTS | Date: OCT 2015 | Drawing No. 3.10 | Rev. -

MVA SYSTRA GROUP

4. FUTURE TRAFFIC CONDITIONS

4.1 Design Year

4.1.1 It is anticipated that the proposed development will be completed by year 2024. In order to assess the impact of the development related traffic on the local road network, it is necessary to forecast the traffic flows for year 2027, the adopted design year, which is 3 years upon completion.

4.2 Reference Traffic Flows

Growth Rate

4.2.1 To estimate the 2027 reference traffic flows (without the proposed development) in the local road network, an appropriate growth factor has to be identified for the area in the first instance.

4.2.2 Reference has also been made to the latest 2011-Based Enhanced Territorial Population and Employment Data Matrices (TPEDM) planning data published by Planning Department for years 2016 and 2026 in the area. The average annual growth rate in terms of population from years 2016 to 2026 is illustrated in **Table 4.1**.

Table 4.1 Population Growth in the Local Area

TPEDM Zone	Population	
	2016	2026
126(1)	15,650	20,083
127(2)	40,750	42,044
355(3)	18,650	21,122
Total	**75,050**	**83,249**
	Growth Rate per annum (%)	**1.04%**

Notes: (1) Trip generation from Yau Tong Inland Lot No.42 at Lei Yue Mun Path, Yau Tong, 5 Tung Yuen Street and adjacent Government land site and 13 and 15 Sze Shan Street site will be added separately and will not be included as part of the population growth.

(2) Trip generation from Yau Tong Bay Development will be added separately and will not be included as part of the population growth.

(3) Trip generation from Paik Wan Road Housing sites will be added separately and will not be included as part of the population growth.

4.2.3 From **Table 4.1**, it can be seen that the average annual growth rate of population in the area from year 2016 to 2026 is +1.04% per annum.

4.2.4 Therefore, an annual growth rate of 1.04% p.a. was adopted to project the 2015 observed flows to 2027 traffic flows.

Committed Development Traffic

4.2.5 In the vicinity of the subject site, there are some planned/committed developments as summarised in **Table 4.2.** The location plan for the planned/committed developments is also shown in **Drawing No. 4.1.** The planned/committed developments in the vicinity of the proposed development has been confirmed with Housing Department and PlanD.

Table 4.2 Planned/committed developments in the vicinity of the proposed Public Housing Development at Yan Wing Street

Index	Planned / Committed Development	Component	Development Parameters	Anticipated Completion Year
1	Pik Wan Road Housing Sites	Home Ownership Scheme	3000 Flats	2025
		Retail	5300 sqm	
2	Lei Yue Mun Phase 3	Public Rental Housing	443 Flats	2016
3	Yau Tong Inland Lot No.42 at Lei Yue Mun Path, Yau Tong	Private Housing	505 flats	N/A
		Non-domestic	9090 sqm (7653 sqm for PVP)	
4	3-11 Tung Yuen Street (Peninsula East)	Private Housing	256 flats	N/A
		Non-domestic	3960 sqm	
5	13 and 15 Sze Shan Street	Private Housing	326 flats	N/A
		Non-domestic	3808 sqm	
6	Yau Tong Bay Development	Private Housing	6556 flats	2021
		Retail	12304 sqm	
		Hotel	889 rooms	
		GIC	7109 sqm	
7	5 and 8 Tung Yuen Street, and adjoining Government Land ("CDA(1) zone")	Private Housing	754 flats	N/A
8	Shung Shun Street and Yan Yue Wai site ("CDA(5) zone")	Private Housing	886 flats	N/A
		Retail	500 sqm	
9	Ko Chiu Road Site	Private Housing	980 flats	N/A

4.2.6 In order to estimate the traffic generation and attraction of the planned/committed development in the vicinity, reference has been made to the trip generation rates as stipulated in Volume 1 Chapter 3 Appendix D Table 1 of the latest T.P.D.M. The adopted trip rates are summarised in **Table 4.3**.

Table 4.3 Adopted Trip Rate of Planned/Committed Development

Planned/Committed Development		AM Peak		PM Peak	
		Generation	Attraction	Generation	Attraction
Pik Wan Road Housing sites	Subsidised Housing: HOS/PSPS (Avg. Flat Size: 50 m^2) (pcu/flat/hr)	0.0622	0.0426	0.0297	0.0401
	Retail (pcu/hr/100m^2 GFA)	0.2296	0.2434	0.3100	0.3563

Planned/Committed Development		AM Peak		PM Peak	
		Generation	Attraction	Generation	Attraction
Lei Yue Mun Phase 3	Subsidised Housing: Public Rental (Avg. Flat Size: 40 m2) (pcu/flat/hr)	0.0432	0.0326	0.0237	0.0301
Yau Tong Inland Lot No.42 at Lei Yue Mun Path, Yau Tong	Private Housing R(A) (Avg. Flat Size: 60 m^2) (pcu/flat/hr)	0.0718	0.0425	0.0286	0.0370
	Retail (pcu/hr/100m^2 GFA)	0.2296	0.2434	0.3100	0.3563
3-11 Tung Yuen Street (Peninsula East)	Private Housing R(A) (Avg. Flat Size: 80 m^2) (pcu/flat/hr)	0.1058	0.0605	0.0426	0.0590
	Retail (pcu/hr/100m^2 GFA)	0.2296	0.2434	0.3100	0.3563
13 and 15 Sze Shan Street	Private Housing R(A) (Avg. Flat Size: 60 m^2) (pcu/flat/hr)	0.0718	0.0425	0.0286	0.0370
	Retail (pcu/hr/100m^2 GFA)	0.2296	0.2434	0.3100	0.3563
Yau Tong Bay Development	Private Housing R(A) (Avg. Flat Size: 60 m^2) (pcu/flat/hr)	0.0718	0.0425	0.0286	0.0370
	Retail (pcu/hr/100m^2 GFA)	0.2296	0.2434	0.3100	0.3563
	Hotel (pcu/hr/guest room)	0.1329	0.1457	0.1290	0.1546
	GIC	-	-	-	-
5 and 8 Tung Yuen Street, and adjoining Government Land ("CDA(1) zone")	Private Housing R(A) (Avg. Flat Size: 60 m^2) (pcu/flat/hr)	0.0718	0.0425	0.0286	0.0370
Shung Shun Street and Yan Yue Wai site ("CDA(5) zone")	Private Housing R(A) (Avg. Flat Size: 60 m^2) (pcu/flat/hr)	0.0718	0.0425	0.0286	0.0370
	Retail (pcu/hr/100m^2 GFA)	0.2296	0.2434	0.3100	0.3563
Ko Chiu Road Site	Private Housing R(A) (Avg. Flat Size: 60 m^2) (pcu/flat/hr)	0.0718	0.0425	0.0286	0.0370

4.2.7 Based on the planned/committed development parameters and the adopted trip rate shown in **Table 4.2 to 4.3, Table 4.4** summarises the volume of traffic generated by the Committed Development.

Table 4.4 Traffic Generations of Planned/Committed Development (pcu/hr)

Planned/Committed Development	AM Peak		PM Peak	
	Generation	Attraction	Generation	Attraction
Pik Wan Road Housing sites	199	141	105	139
Lei Yue Mun Phase 3	19	14	10	13
Yau Tong Inland Lot No.42 at Lei Yue Mun Path, Yau Tong	57	43	42	51
3-11 Tung Yuen Street (Peninsula East)	36	25	23	29
13 and 15 Sze Shan Street	32	23	21	26
Yau Tong Bay Development	627	449	351	434
5 and 8 Tung Yuen Street, and adjoining Government Land ("CDA(1) zone")	54	32	22	28
Shung Shun Street and Yan Yue Wai site ("CDA(5) zone")	65	39	27	35
Ko Chiu Road Site	70	42	28	36

4.2.8 Based on an annual growth rate of 1.04% p.a. and the traffic generation of planned/committed development shown in **Table 4.4**, 2027 reference traffic flows have been projected from 2015 observed flows and shown in **Drawing No. 4.2**.

4.2.9 2027 Reference Flows = 2015 Observed Flows x Growth Factor (1.04% p.a. for 12 years) + Planned/Committed Development Traffic

4.3 Development Traffic Generation

4.3.1 In order to estimate the traffic generation and attraction of the proposed development, reference has been made to the trip generation rates as stipulated in Volume 1 Chapter 3 Appendix D Table 1 of the latest T.P.D.M. and the adopted trip rates and a trip generation survey conducted in September 2015. The adopted trip rates are summarised in **Table 4.5**.

Table 4.5 Adopted Trip Rates

	AM Peak		PM Peak	
	Generation	Attraction	Generation	Attraction
Subsidised Housing: Public Rental (PRH) (pcu/hr/flat)	0.0432	0.0326	0.0237	0.0301
Welfare Facilities at the Basement Floor(1)	10	10	10	10

Note: (1) Nominal figure assumed.

4.3.2 As a conservative approach, an additional 10% allowance had been allowed for the proposed development to cater for future design variation. The traffic impact assessment has been based on 2,640 PRH flats and a welfare facilities at the basement floor.

4.3.3 Based on the adopted trip rates given in **Table 4.5**, the total trips generated by the proposed development are computed and shown in **Table 4.6**.

Table 4.6 Traffic Generations of Proposed Development (pcu/hr)

Development Parameters	AM Peak		PM Peak	
	Generation	Attraction	Generation	Attraction
2,640 PRH Flats	114	86	63	79
Welfare Facilities at the Basement Floor	10	10	10	10
Total	**124**	**96**	**73**	**89**

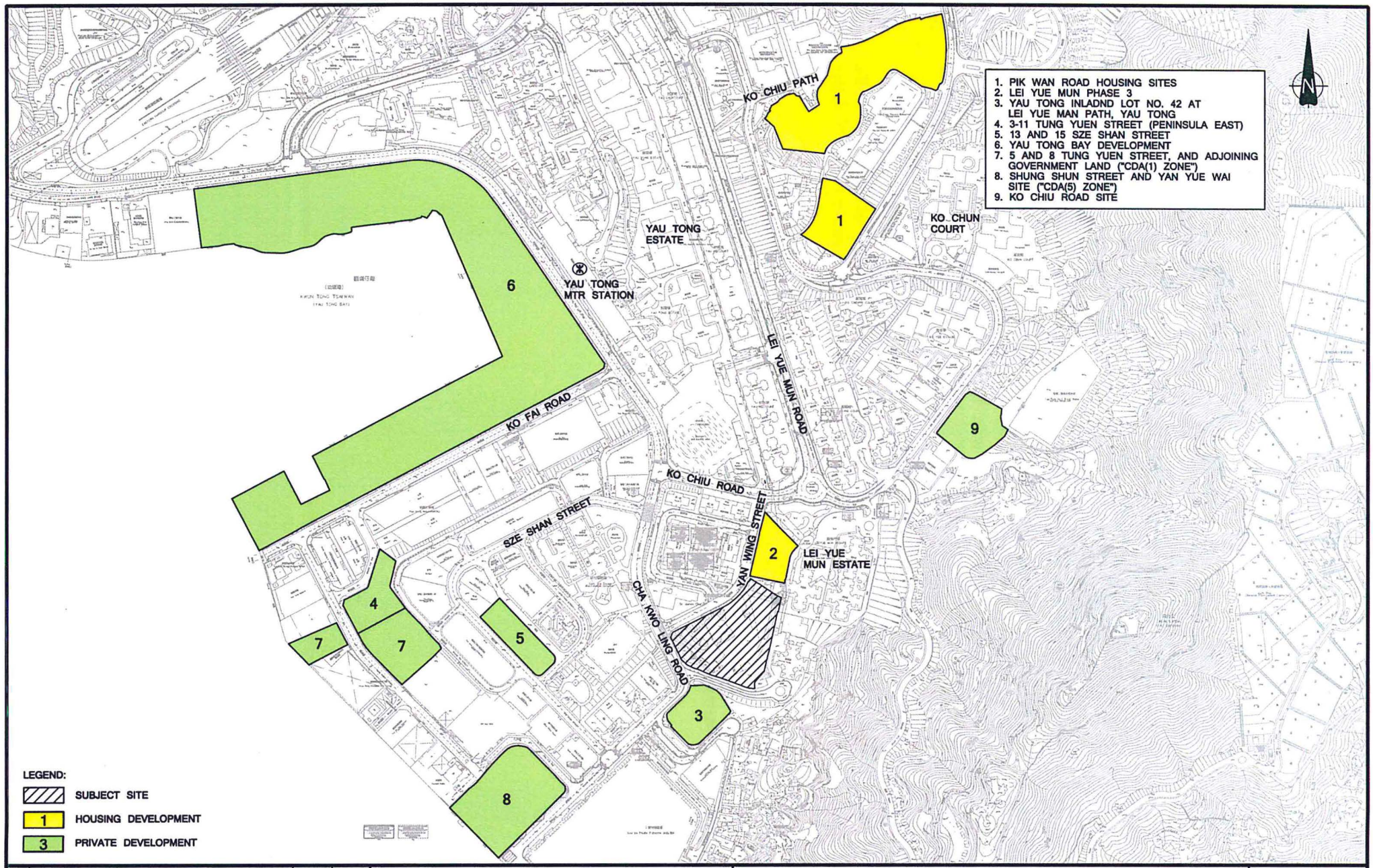
4.3.4 It is estimated that the proposed development will generate and attract about 124pcu/hr and 96pcu/hr in the AM peak hour, and generate and attract about 73pcu/hr and 89pcu/hr in the PM peak hour respectively. The development flows is shown in **Drawing No. 4.3**.

4.4 Design Traffic Forecasts

4.4.1 The development traffic flows were then superimposed onto the 2027 reference traffic flows (without development) as shown in **Drawing No. 4.2** to derive the 2027 design traffic forecasts (with development).

4.4.2 2027 Design Flows = 2027 Reference Flows + Proposed Development Traffic

4.4.3 The 2027 AM and PM peak design traffic forecasts (with development) are shown in **Drawing No. 4.4**.



Rev.	Description	Checked	Date
-	-	-	-
-	-	-	-
B	MINOR AMENDMENT	[redacted]	20JAN16
A	MINOR AMENDMENT	[redacted]	16DEC15

Project Title

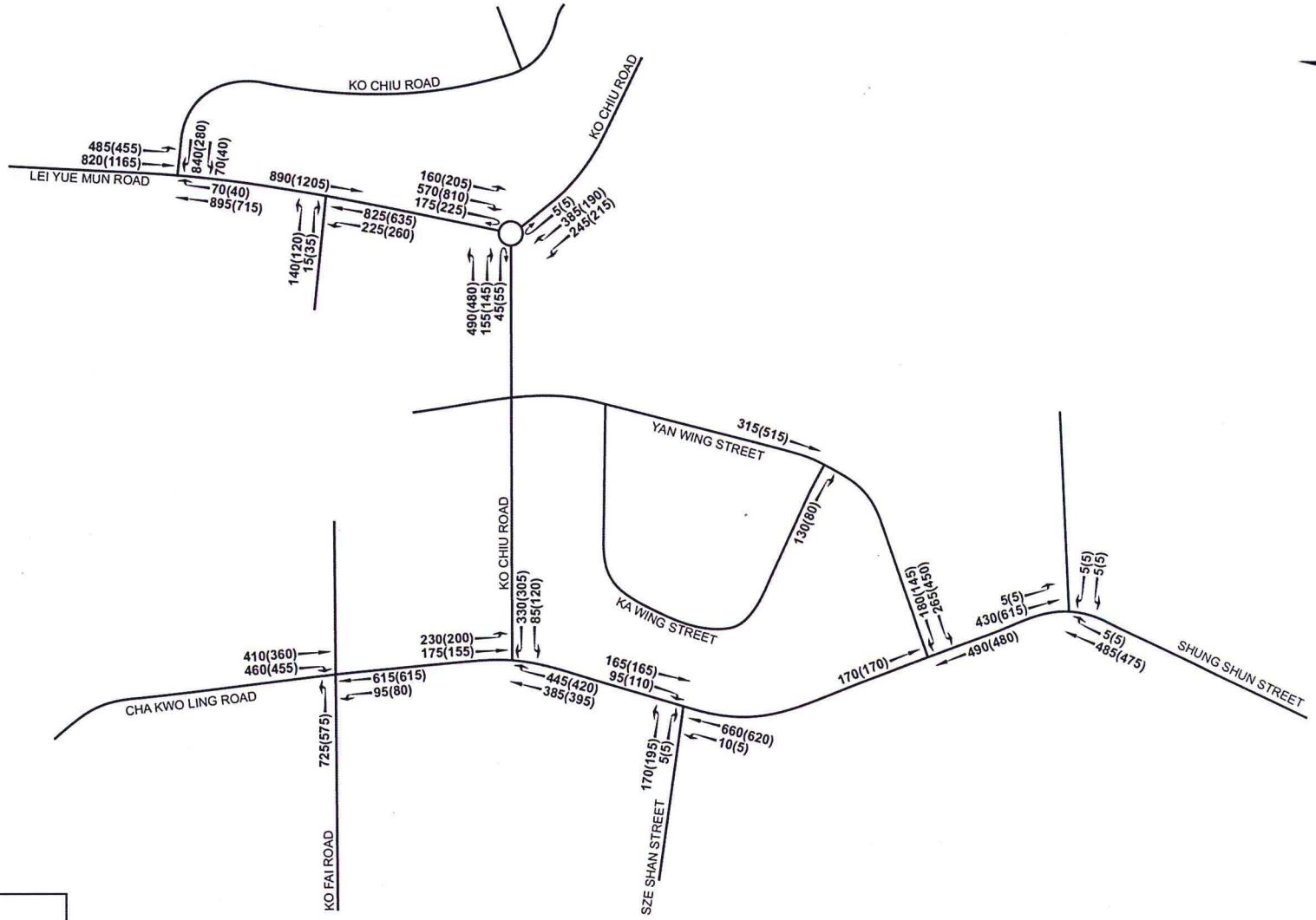
PUBLIC HOUSING DEVELOPMENT AT LEI YUE MUN ESTATE PHASE 4

Drawing Title

PLANNED / COMMITTED DEVELOPMENTS

Designed	Checked	Scale	Date	Drawing No.	Rev.
[redacted]	[redacted]	N.T.S.	DEC 2015	4.1	B

MVA SYSTRA GROUP



LEGEND :

225(110) AM(PM) PEAK HOUR TRAFFIC FLOWS IN PCU/HR

Rev.	Description	Checked	Date
-	-	-	-
-	-	-	-
B	MINOR AMENDMENT	[redacted]	20JAN16
A	MINOR AMENDMENT	[redacted]	16DEC15

[redacted]

Project Title

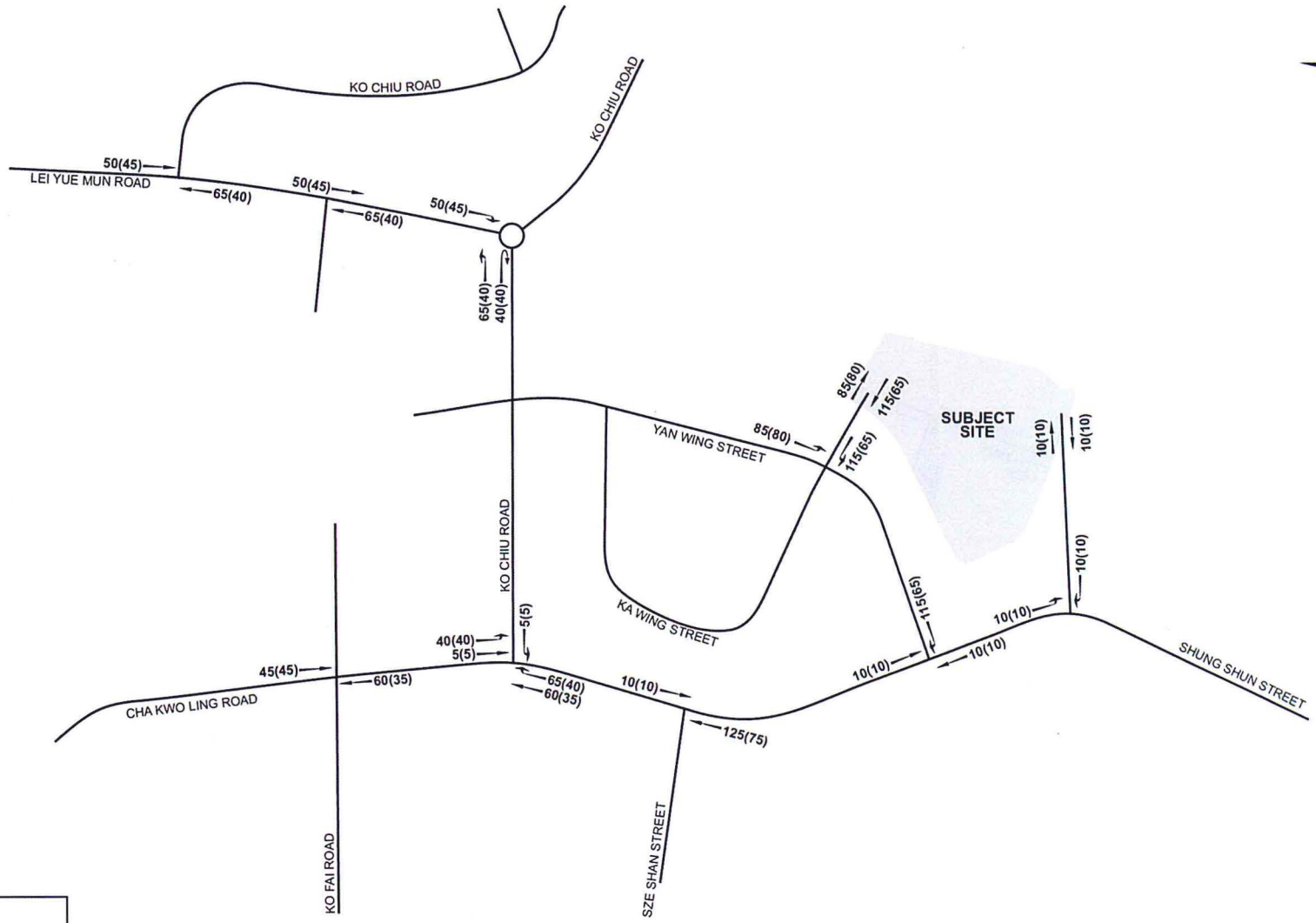
PUBLIC HOUSING DEVELOPMENT
AT LEI YUE MUN ESTATE PHASE 4

Drawing Title

2027 REFERENCE TRAFFIC FLOWS (WITHOUT DEVELOPMENT)

Designed	Checked	Scale	Date	Drawing No.	Rev.
[redacted]	[redacted]	NTS	OCT 2015	4.2	B

MVA SYSTRA GROUP



LEGEND :

225(110) AM(PM) PEAK HOUR TRAFFIC FLOWS IN PCU/HR

Rev.	Description	Checked	Date
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

[redacted]

Project Title

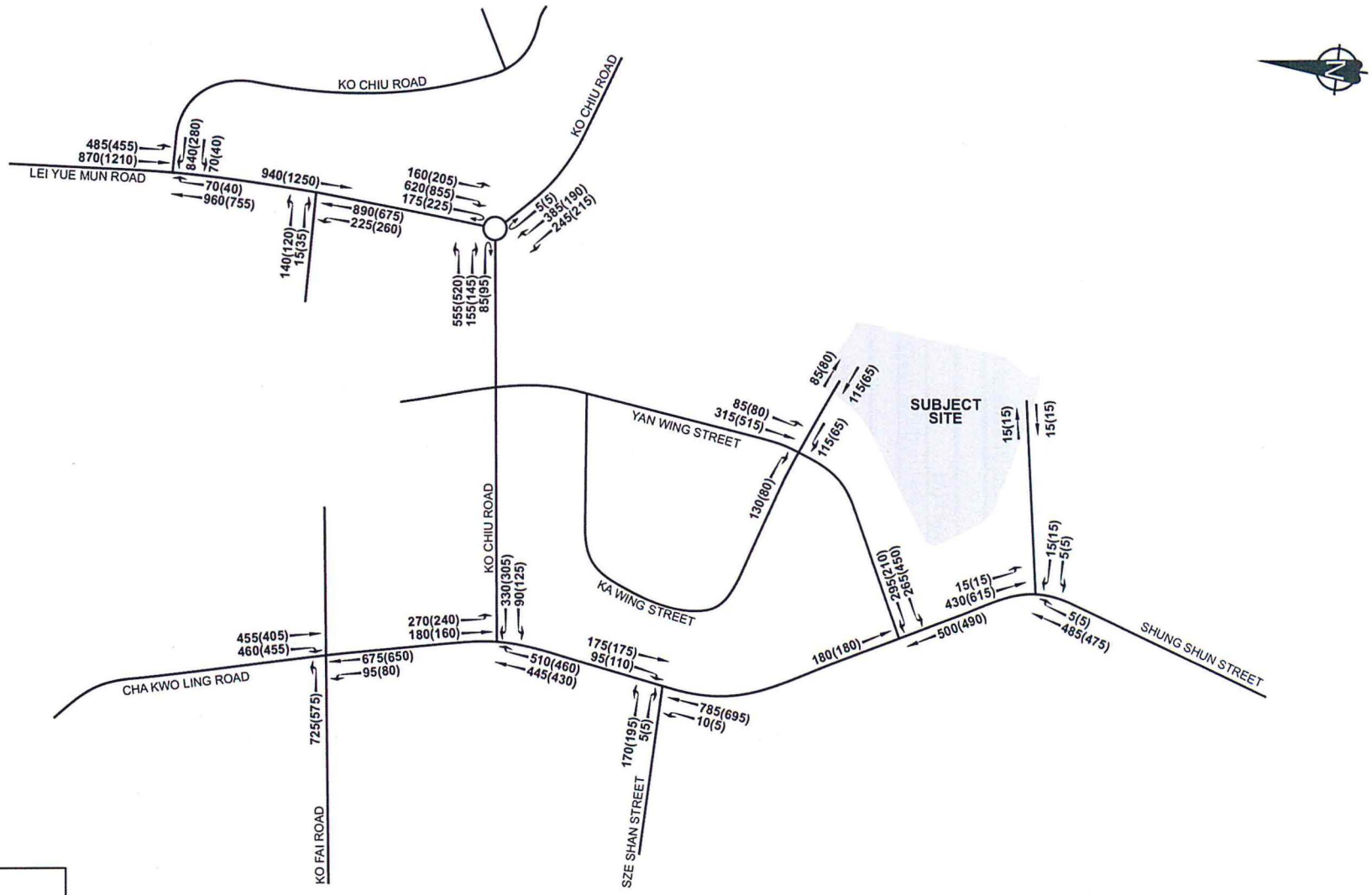
PUBLIC HOUSING DEVELOPMENT AT LEI YUE MUN ESTATE PHASE 4

Drawing Title

DEVELOPMENT TRAFFIC FLOW

Designed	Checked	Scale	Date	Drawing No.	Rev.
[redacted]	[redacted]	NTS	JAN 2016	4.3	-

MVA SYSTRA GROUP



LEGEND :

225(110) AM(PM) PEAK HOUR TRAFFIC FLOWS IN PCU/HR

Rev.	Description	Checked	Date
-	-	-	-
-	-	-	-
B	MINOR AMENDMENT	[redacted]	20JAN16
A	MINOR AMENDMENT	[redacted]	16DEC15

Project Title

PUBLIC HOUSING DEVELOPMENT
AT LEI YUE MUN ESTATE PHASE 4

Drawing Title

2027 DESIGN TRAFFIC FLOWS (WITH DEVELOPMENT)

Designed	Checked	Scale	Date	Drawing No.	Rev.
[redacted]	[redacted]	NTS	OCT 2015	4.4	B

MVA SYSTRA GROUP

5. TRAFFIC IMPACT ASSESSMENT

5.1 Operational Assessment

5.1.1 The existing / planned layouts in design year 2027 adopted for the operational assessments of the critical junctions were summarised in **Table 5.1**.

Table 5.1 Detailed Layout Arrangement of Critical Junctions in 2027

Ref.	Junction	Type	Layout	Drawing No.
A	Lei Yue Mun Road / Ko Chiu Road (N)	Signal	Existing	3.2
B	Lei Yue Mun Road / Yau Tong Estate Southern Access	Signal	Existing	3.3
C	Lei Yue Mun Road/Ko Chiu Road (S)	Roundabout	Existing	3.4
D	Cha Kwo Ling Road/Ko Fai Road	Signal	Planned	5.1
E	Cha Kwo Ling Road / Ko Chiu Road	Signal	Existing	3.6
F	Cha Kwo Ling Road / Sze Shan Street	Priority	Existing	3.7
G	Cha Kwo Ling Road / Yan Wing Street	Priority	Existing	3.8
H	Cha Kwo Ling Road / Access Road	Priority	Existing	3.9

5.1.2 The assessments of the junctions (except Junction D – Cha Kwo Ling Road/Ko Fai Road) were basically based on their existing layout arrangements and method of control. The assessment of Junction D was based on the future planned layout and method of control under the proposed development at Yau Tong Bay as illustrated in **Drawing No. 5.1**.

5.1.3 To assess the traffic impact due to the proposed development, capacity analysis of the identified critical junctions in the study area for both reference and design scenarios in year 2027 has been carried out. The results are summarised and presented in **Table 5.2**.

Table 5.2 Operational Performance of Critical Junctions in 2027

Ref.	Junction	Type	2027 RC/RFC			
			Reference Scenario (Without Development)		Design Scenario (With Development)	
			AM Peak	PM Peak	AM Peak	PM Peak
A	Lei Yue Mun Road / Ko Chiu Road (N)	Signal	22%	47%	19%	43%
B	Lei Yue Mun Road / Yau Tong Estate Southern Access	Signal	88%	82%	80%	77%
C	Lei Yue Mun Road/Ko Chiu Road (S)	Roundabout	0.48	0.57	0.50	0.60
D	Cha Kwo Ling Road/Ko Fai Road	Signal	41%	64%	38%	61%
E	Cha Kwo Ling Road / Ko Chiu Road	Signal	17%	25%	3%	15%
F	Cha Kwo Ling Road / Sze Shan Street	Priority	0.31	0.35	0.33	0.36
G	Cha Kwo Ling Road / Yan Wing Street	Priority	0.44	0.73	0.65	0.77
H	Cha Kwo Ling Road / Access Road	Priority	0.01	0.02	0.04	0.05

Remark: RC = Reserve Capacity, RFC = Ratio of Flow to Capacity

5.1.4 The assessment results in **Table 5.2** revealed that all critical junctions will still operate within their capacities in design year 2027 except Junction E – Cha Kwo Ling/Ko Chiu Road will operate close to its capacities.

5.2 Proposed Junction Improvement Scheme

5.2.1 In accordance with the results of junction capacity analysis result for design year 2027, Junction E will operate close to its capacities and junction improvement scheme have been proposed for Junction E.

5.2.2 Under the proposed improvement, the existing junction configuration (number of lanes, road marking) will be remain unchanged, the method of control of Junction E will be modified as illustrated in **Drawing No. 5.2**. Cha Kwo Ling Road southbound Left Turn traffic will be released in 2 stages (i.e. only 1 stage under existing method of control) which could help to improve the junction capacities.

5.2.3 The junction performance of Junction E in design year 2027 with proposed improvement scheme was assessed and the results are summarised and presented in **Table 5.3**.

Table 5.3 Operational Performance of Critical Junctions in 2027

Ref.	Junction	Type	2027 RC Design Scenario (With Development)	
			AM Peak	PM Peak
E	Cha Kwo Ling Road / Ko Chiu Road	Signal	15%	24%

Remark: RC = Reserve Capacity

5.2.4 The assessment results in **Table 5.3** revealed that Junction E – Cha Kwo Ling/Ko Chiu Road would be operating with ample capacities with the proposed method of control.

Pedestrian Crossing at Ko Chiu Road

5.2.5 For the modified method of control as proposed in **Drawing No. 5.2**, the operational performance of the crossing at Ko Chiu Road has been assessed and the results are summarized in **Table 5.4**.

Table 5.4 Operational Performance of Crossings at Ko Chiu Road (Junction E) in Year 2027

Scenario	Cycle Time (Sec)	Pedestrian Green Time (Sec)	Pedestrian Waiting Time (Sec)	Green Time Proportion	Lateral Width (m)	Pedestrian Capacity (Ped/hr)(1)	Anticipated 2-way Flow (Ped/hr)(2)	V/C Ratio
AM Peak								
Existing MOC	100	36	64	0.36	4	2736	920	0.34
Modified MOC	100	22	78	0.22	4	1672	920	0.55
PM Peak								
Existing MOC	100	36	64	0.36	4	2736	1200	0.44
Modified MOC	100	22	78	0.22	4	1672	1200	0.72

Remark: (1) PC = K x GTP x W (Refer to TPDM Volume 4, 3.2.5.6)
where PC = Pedestrian crossing capacity in pedestrians per hour
GTP = Green time proportion i.e. (Pedestrian green + flashing green time) / Cycle time
W = Lateral width of pedestrian crossing
K = A constant equivalent to saturation flow for pedestrians, may be taken as 1900 ped/metre/hours.
(2) The 2027 anticipated pedestrian flows is based on observed pedestrian flows with growth rate of 1.04% p.a. (population growth from TPEDM)

5.2.6 The proposed modification of method of control will increase the waiting time by 14s (from 64s under original method of control to 78s under proposed method control) in year 2027. The results in **Table 5.4** indicate that the concerned crossing will still operate with ample capacities in year 2027.

Anticipated Queue Lengths

5.2.7 The results of year 2027 anticipated traffic queues at critical junctions are listed in **Table 5.5** below.

Table 5.5 Year 2027 Anticipated Traffic Queue

Index	Junction	Approach	Capacity (m)	Average Queue Length (m)		Within Capacity	
				AM Peak	PM Peak	AM Peak	PM Peak
A	Lei Yue Mun Road / Ko Chiu Road (N)	Lei Yue Mun Road SB	220	45	45	Yes	Yes
		Ko Chiu Road WB	415	45	20	Yes	Yes
		Lei Yue Mun Road NB	370	45	25	Yes	Yes
B	Lei Yue Mun Road / Yau Tong Estate Southern Access	Lei Yue Mun Road SB	375	30	40	Yes	Yes
		Lei Yue Mun Road NB	95	35	30	Yes	Yes
		Yau Tong Estate Southern Access EB	30	15	15	Yes	Yes
D	Cha Kwo Ling Road / Ko Fai Road	Cha Kwo Ling Road SB	525	30	35	Yes	Yes
		Cha Kwo Ling Road NB	80	35	30	Yes	Yes
		Ko Fai Road EB	380	35	30	Yes	Yes
E	Cha Kwo Ling Road / Ko Chiu Road	Cha Kwo Ling Road SB	120	25	20	Yes	Yes
		Ko Chiu Road WB	115	25	25	Yes	Yes
		Cha Kwo Ling Road NB	150	45	40	Yes	Yes

5.2.8 The results in **Table 5.5** indicate that there are sufficient allowable queue lengths at the critical junctions.

5.3 Sensitivity Test (Without Yau Tong Bay Proposed Junction Modification)

5.3.1 According to the approved MLP of Yau Tong Bay development, the completion year of the proposed development and the modification at Junction D will be year 2021. The proposed junction modification will be in place before the completion of proposed PRH development in year 2024.

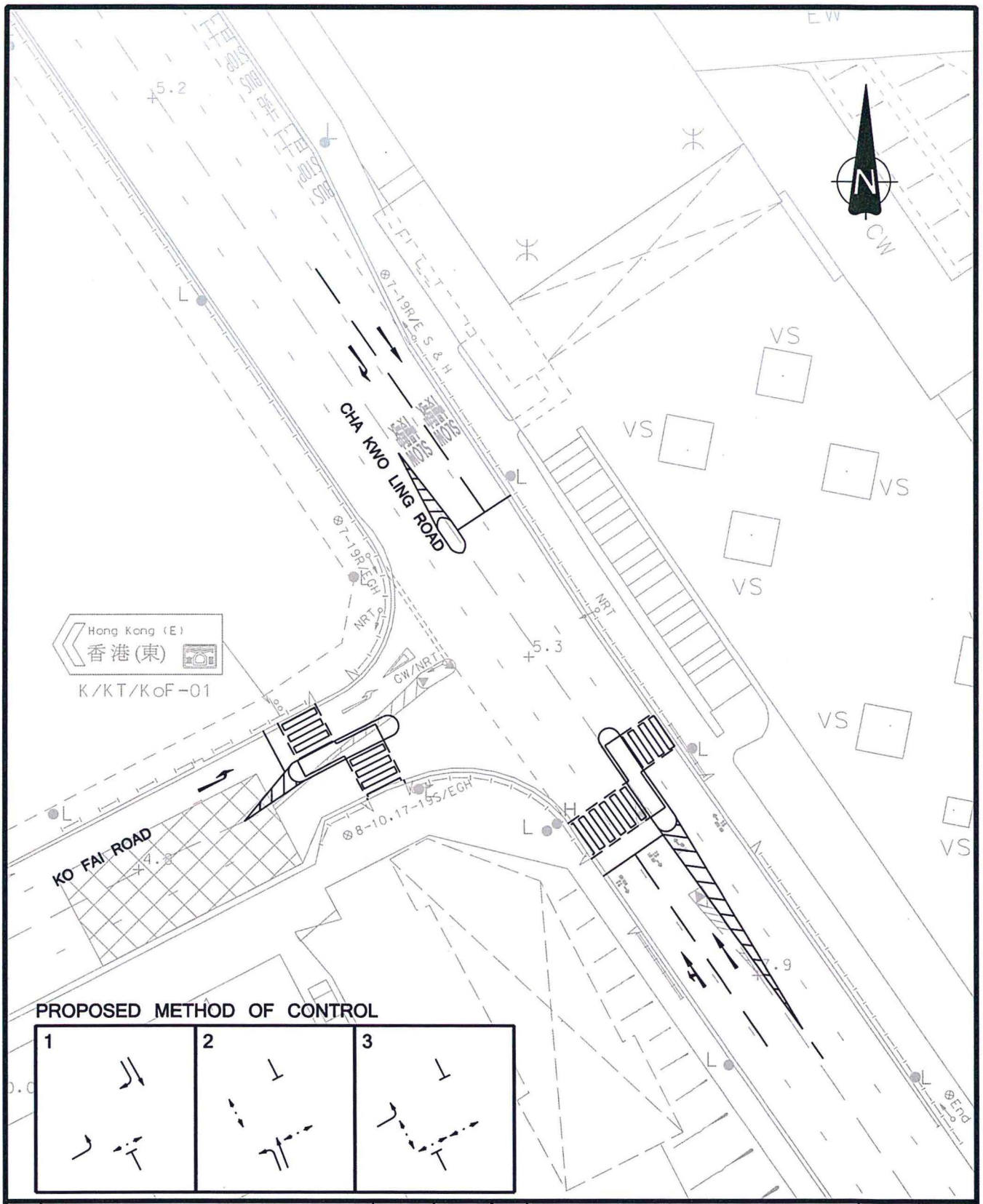
5.3.2 Despite the proposed junction modification will be in place before the completion of proposed PRH development, a test scenario is conducted for this junction with no junction modification in year 2027 (3 years after completion of proposed PRH). The modification at Junction D is proposed for the Yau Tong Bay development. For the scenario without the proposed junction modification, the Yau Tong Bay development should not appear. The operation performance of Junction D (without proposed junction modification and Yau Tong Bay development) is shown in **Table 5.6** below.

Table 5.6 Operational Performance of Junction D (Without Yau Tong Bay Proposed Junction Modification) in 2027

Ref.	Junction	2027 RFC			
		Reference Scenario (Without Development)		Design Scenario (With Development)	
		AM Peak	PM Peak	AM Peak	PM Peak
D	Cha Kwo Ling Road/Ko Fai Road	1.13	1.03	1.15	1.04

Remark: RFC = Ratio of Flow to Capacity

5.3.3 As shown in above table, the junction D will already be overloaded under reference scenario due to the background growth and other committed developments (excluding proposed PRH development). The increase in traffic impact due to the proposed PRH development at this junction is minimal.



Rev.	Description	Checked	Date	Rev.	Description	Checked	Date
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-

Project Title

PUBLIC HOUSING DEVELOPMENT
AT LEI YUE MUN ESTATE PHASE 4

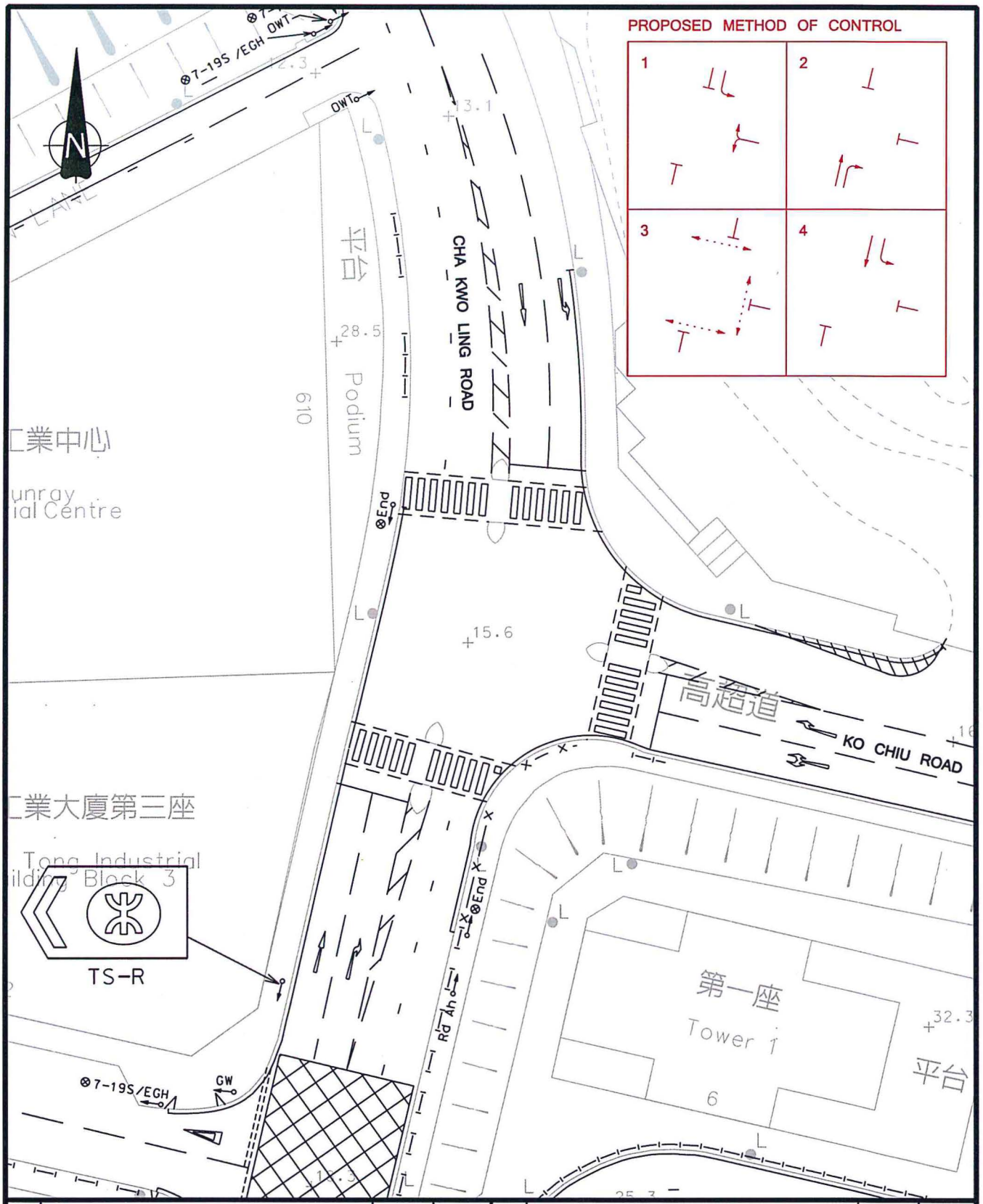
Drawing Title

PLANNED JUNCTION LAYOUT OF
CHA KWO LING ROAD / KO FAI ROAD (D)
(UNDER PROPOSED DEVELOPMENT AT YAU TONG BAY)

MVA SYSTRA GROUP

Designed	Checked	Scale	Date	Drawing No.	Rev.
[redacted]	[redacted]	1:500(A4)	SEP 2015	5.1	-

[redacted]



Rev.	Description	Checked	Date	Rev.	Description	Checked	Date
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-

Project Title

PUBLIC HOUSING DEVELOPMENT
AT LEI YUE MUN ESTATE PHASE 4

Drawing Title

PROPOSED JUNCTION IMPROVEMENT SCHEME OF CHA KWO LING ROAD / KO CHIU ROAD (E)

MVA
SYSTRA GROUP

Designed	Checked	Scale	Date	Drawing No.	Rev.
[redacted]	[redacted]	1:500(A4)	SEP 2015	5.2	-

[redacted]

6. PUBLIC TRANSPORT PROVISIONS AND PEDESTRIAN FACILITIES

6.1 Public Transport Services

6.1.1 The nearest rail station to the subject site would be Yau Tong Station, which is located within 500m from the proposed development. At present, there are currently bus routes and GMB routes operating in the near vicinity to the proposed development site.

6.1.2 Details of the existing public transport services in the vicinity are summarised in **Table 6.1** and illustrated in **Drawings No. 6.1 & 6.2**.

Table 6.1 Existing Public Transport Services in the vicinity

Route	Service	Destinations	Peak Hour Frequency (minutes)
MTR – Yau Tong Station (Drawing No. 6.1)			
Buses (Drawing No. 6.1)			
14	KMB	China Ferry B/T – Yau Tong B/T	12
14B	KMB	Lam Tin B/T – Ngau Tau Kok B/T	15
14D(1)	KMB	Yau Tong B/T – Choi Hung B/T	-
14X	KMB	Lei Yue Mun – Tsim Sha Tsui (Circular)	20
62X(2)	KMB	Tuen Mun Central B/T – Yau Tong B/T	10
215P(1)	KMB	Lam Tin B/T -> Kowloon Station	-
216M	KMB	Lam Tin B/T – Yau Tong Estate (Circular)	10
259D	KMB	Lung Mun Oasis – Yau Tong B/T	7
603	KMB	Ping Tin – Central Ferry Pier	7
603P(1)	KMB	Admiralty Railway Station -> Ping Tin	-
603S(1)	KMB	Ping Tin -> Central	-
889(1)	KMB	Ping Tin – Shatin Race Course B/T	-
N216(3)	KMB	Yau Tong B/T – Hung Hom Station B/T (Circular)	-
E22P(1)	CTB/NWFB	Yau Tong B/T – Airport (Asiaworld-Expo)	-
E22X(1)	CTB/NWFB		-
N26(3)	CTB/NWFB	Yau Tong B/T – Tung Chung MTR Station	-
GMB (Drawing No. 6.2)			
23C	GMB	Yau Tong Station – Sceneway Garden (Circular)	5
24	GMB	Lei Yue Mun (Sam Ka Tsuen Ferry Pier) – Lam Tin (Kai Tin Shopping Centre)	10
24M	GMB	Yau Tong – Hing Tin Estate	24M
86B	GMB	Yau Tong – United Christian Hospital	12

Notes: (1) Special trips.
(2) Peak hours service only.
(3) Night service only.

6.1.3 In addition to the above-mentioned scheduled services, there are also some Public Light Bus routes providing services to Mongkok, Jordan and Kwun Tong, etc. which have no fixed routing and schedule.

6.1.4 Based on our in-house MVCTS Public Transport Model, **Table 6.2** summarises the 2027 Peak outbound direction Public Transport (PT) Demand (rail and non-rail) due to the proposed PRH development. According to the model, the modal split for rail and non-rail (bus/GMB) is about [redacted]% and [redacted]%. Therefore, the demand for bus/GMB is estimated to be 268 patronage/hr ([redacted] x [redacted]%). There are two public transport terminus located in the near vicinity of the site including the Lei Yue Mun Estate Phase 3 bus terminus and Yau Tong Estate (DOMAIN) bus terminus with numerous bus and GMB routes. It is anticipated the minimal PT demand generated by the proposed PRH development can be well served by the existing PT services and no additional PT facilities is required.

Table 6.2 Year 2027 Anticipated Outbound Direction PT Demand

Site	Population	2027 AM Peak Outbound Direction Public Transport Demand (patronage/hr)
Lei Yue Mun Estate Phase 4	6,600 (1)	835

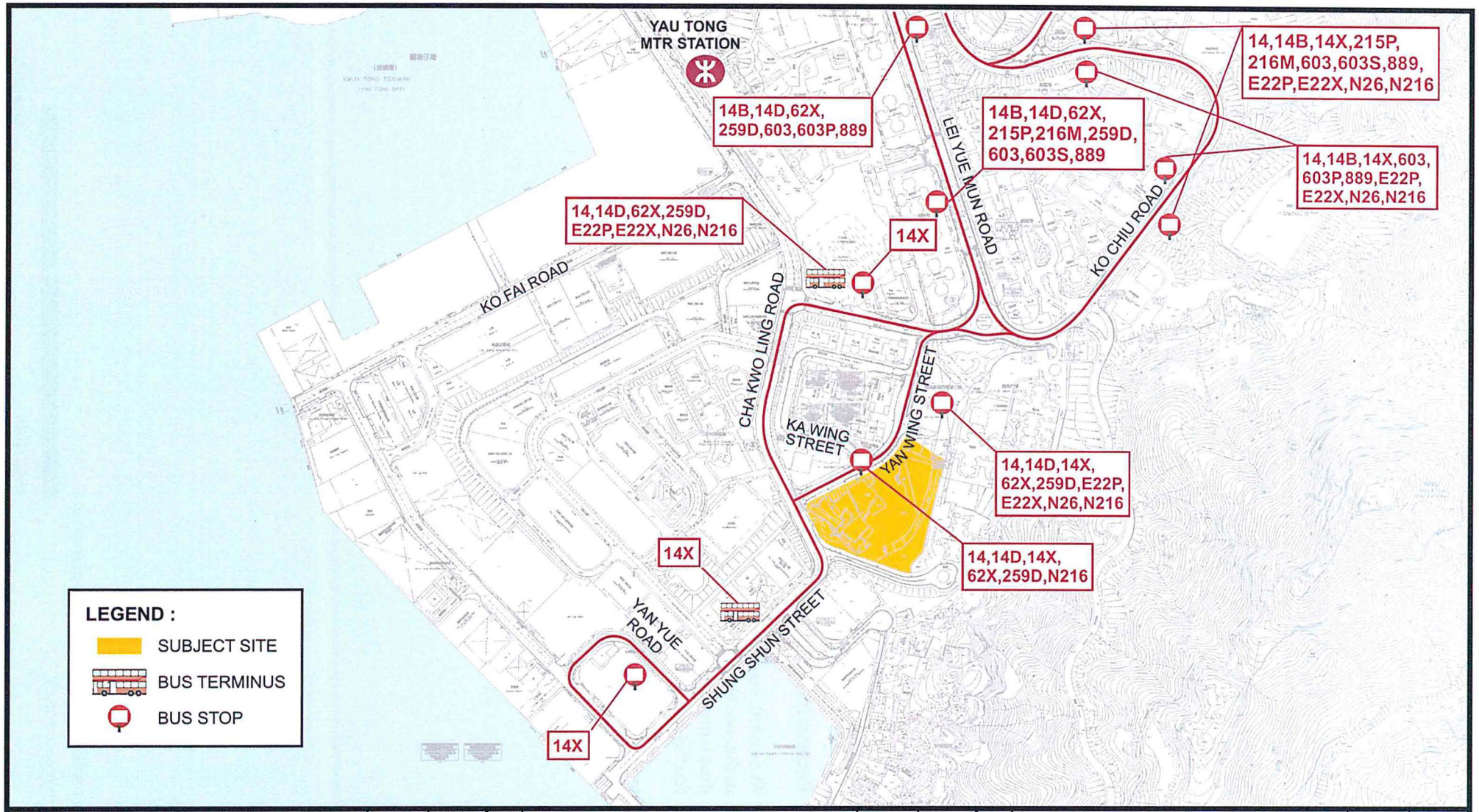
Notes: (1) A total of 2,400 PRH would be provided on Lei Yue Mun Estate Phase 4. To allow for 10% additional buffer and assume 2.5 persons per flat, a total population of 6,600 is assumed for Lei Yue Mun Estate Phase 4.

6.1.5 In view of the comprehensive coverage of the public transport services and the available different choices on transport modes, the proposed development is considered to have very good accessibility via the public transport.

6.2 Pedestrian Facilities

6.2.1 At present, numerous pedestrian crossings and footbridge are provided in the vicinity and at the nearby junctions to link up the proposed development and the surrounding housing developments and shopping centre. The locations of the pedestrian crossings and footbridges in the vicinity of the proposed development are shown in **Drawing No. 6.3**.

6.2.2 In view of the pedestrian facilities provision and the scale of the proposed development, it is not expected that there will be significant impact on the existing pedestrian facilities.



Rev.	Description	Checked	Date	Rev.	Description	Checked	Date	Rev.	Description	Checked	Date
A	MINOR AMENDMENT	[redacted]	27JAN16	-	-	-	-	-	-	-	-

Project Title

PUBLIC HOUSING DEVELOPMENT
AT LEI YUE MUN ESTATE PHASE 4

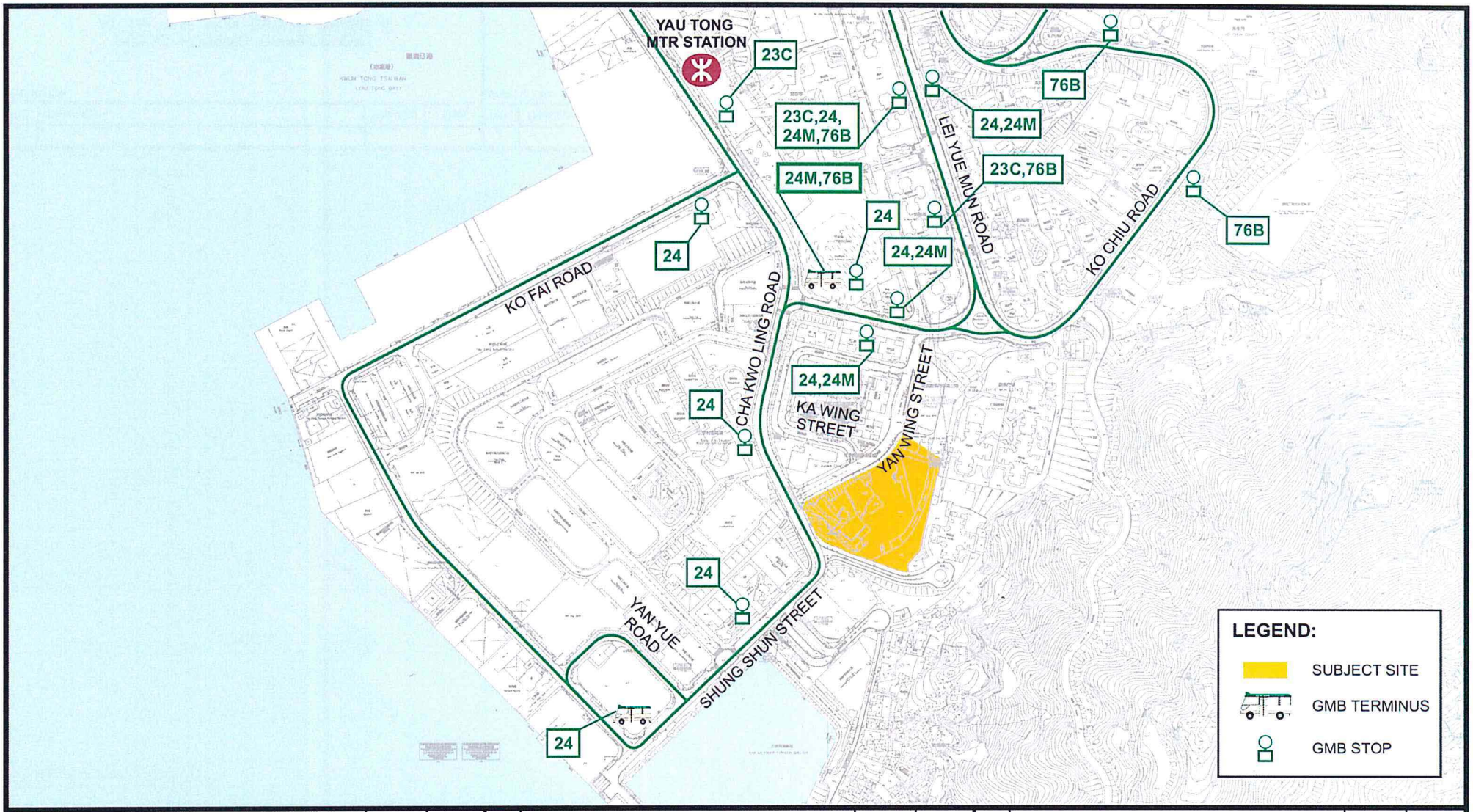
Drawing Title

EXISTING BUS SERVICES IN THE VICINITY

Designed	Checked	Scale	Date	Drawing No.	Rev.
[redacted]	[redacted]	NTS	SEP 2015	6.1	A

MVA
SYSTRA GROUP

[redacted]



Rev.	Description	Checked	Date	Rev.	Description	Checked	Date	Rev.	Description	Checked	Date
-	-	-	-	-	-	-	-	-	-	-	-

Project Title

PUBLIC HOUSING DEVELOPMENT
AT LEI YUE MUN ESTATE PHASE 4

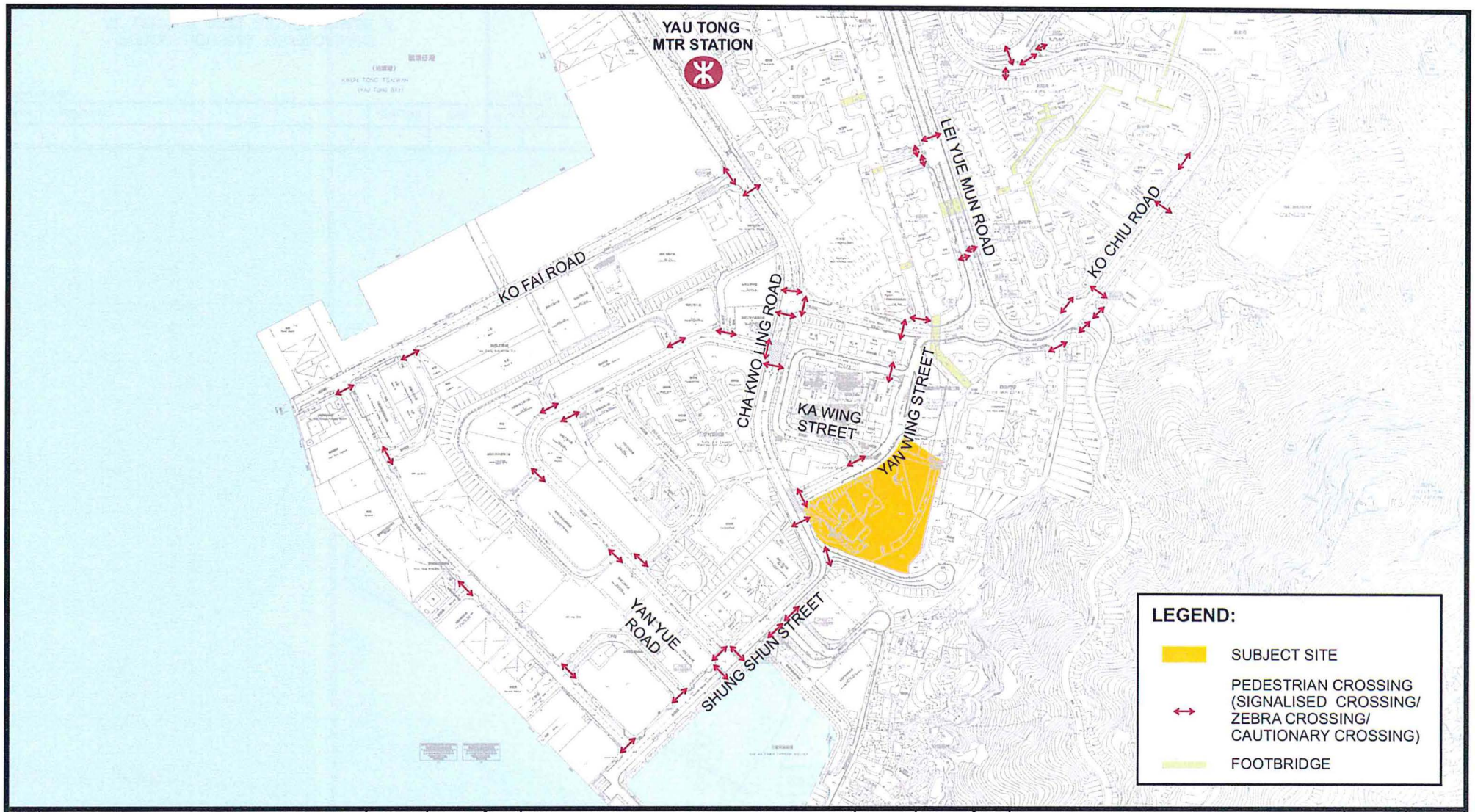
Drawing Title

EXISTING GMB SERVICES IN THE VICINITY

Designed	Checked	Scale	Date	Drawing No.	Rev.
[redacted]	[redacted]	NTS	OCT 2015	6.2	-

MVA SYSTRA GROUP

[redacted]



Rev.	Description	Checked	Date	Rev.	Description	Checked	Date	Rev.	Description	Checked	Date
-	-	-	-	-	-	-	-	-	-	-	-

Project Title

PUBLIC HOUSING DEVELOPMENT
AT LEI YUE MUN ESTATE PHASE 4

Drawing Title

EXISTING PEDESTRIAN CROSSING FACILITIES

Designed	Checked	Scale	Date	Drawing No.	Rev.
[redacted]	[redacted]	NTS	OCT 2015	6.3	-

MVA
SYSTRA GROUP

[redacted]

7. SUMMARY AND CONCLUSION

7.1 Summary

7.1.1 MVA Hong Kong Limited (MVA) was commissioned by the Hong Kong Housing Authority (HKHA) in 2015 to conduct a Traffic Impact Assessment (TIA) study for Lei Yue Mun Estate Phase 4.

7.1.2 The public housing development comprise of 2,400 PRH flats with welfare facilities at the basement floor which is anticipated to be completed by 2024. As a conservative approach, an additional 10% allowance had been allowed for the proposed development to cater for future design variation. The traffic impact assessment has been based on 2,640 PRH flats and welfare facilities at the basement floor.

7.1.3 To appraise the existing traffic condition, traffic count surveys were conducted in the surrounding road network of the proposed development. Moreover, current operational performance of the critical junctions was assessed with the observed traffic flows. The operational assessment results revealed that all critical junctions are at present operating within capacities.

7.1.4 In order to assess the impact of the development related traffic on the local road network, it is necessary to forecast the traffic flows for 2027, the adopted design year, which is 3 years upon completion. The 2027 traffic flows have been projected with the basis on local area planning data published by government.

7.1.5 The planned/committed development traffic from adjacent Pik Wan Road Housing sites, Lei Yue Mun Phase 3, Yau Tong Inland Lot No.42 at Lei Yue Mun Path, Yau Tong, 3-11 Tung Yuen Street (Peninsula East), 13 and 15 Sze Shan Street, Yau Tong Bay Development, 5 and 8 Tung Yuen Street and adjoining Government Land ("CDA(1) zone"), Shung Shun Street and Yan Yue Wai site ("CDA(5) zone") and Ko Chiu Road Site are included in the assessment. The planned/committed developments in the vicinity of the proposed development has been confirmed with Housing Department and PlanD.

7.1.6 Traffic generation and attraction from the proposed development has been assessed. It is estimated that the proposed development will generate and attract about 124pcu/hr and 96pcu/hr in the AM peak hour, and generate and attract about 73pcu/hr and 89pcu/hr in the PM peak hour respectively.

7.1.7 Assessment of operational performance of the critical junctions revealed that all critical junctions will still operate within their capacities in design year 2027 except Junction E – Cha Kwo Ling/Ko Chiu Road will operate close to its capacities.

7.1.8 To tackle the junction capacity problem, the junction improvement scheme have been proposed for Junction E. The existing junction configuration will be remain unchanged and the method of control will be modified to improve junction capacities. The assessment result revealed that Junction E would be operating with ample capacities with the proposed method of control.

7.1.9 In view of the comprehensive coverage of the pedestrian facilities, public transport services and the available different choices on transport modes, the proposed development is considered to have good accessibility.

7.2 Conclusion

7.2.1 In conclusion, the traffic impact assessment has demonstrated that the traffic generated by the proposed development can be absorbed by the nearby road network. Hence it can be concluded that the proposed development is acceptable in traffic terms.

Appendix A – Junction Calculation Sheets

2015 Observed Flows

TRAFFIC SIGNALS CALCULATION

Job No.: [redacted] **MVA ASIA LIMITED**

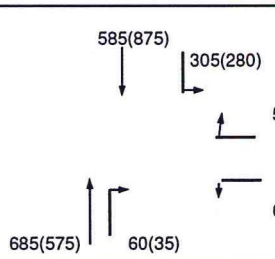
Junction: Lei Yue Mun Road / Ko Chiu Road (N) Design Year: 2015

Description: 2015 Observed Traffic Flows Designed By: [redacted] Checked By: [redacted]

Approach	Movement notation	Phase	Stage	Width (m)	Radius (m) Left	Radius (m) Right	(%) uphill Gradient	Pro. Turning (%) A.M.	Pro. Turning (%) P.M.	Revised Saturation Flow (pcu/hr) A.M.	Revised Saturation Flow (pcu/hr) P.M.	A.M. Peak Flow (pcu/hr)	A.M. Peak y Value	A.M. Peak Critical y	P.M. Peak Flow (pcu/hr)	P.M. Peak y Value	P.M. Peak Critical y
Ko Chiu Road	↰↑	E	4	3.300	12.5	25		20% / 80%	38% / 62%	1815	1795	303	0.167		91	0.051	0.051
WB	↰	E	4	3.300		22.5		100%	100%	1955	1955	327	0.167	0.167	99	0.051	
Lei Yue Mun Road	↳	C	1,4	3.500	15			100%	100%	1785	1785	305	0.171		280	0.157	
SB	↓	D	1	3.500						2105	2105	293	0.139	0.139	438	0.208	0.208
	↓	D	1	3.500						2105	2105	293	0.139		438	0.208	
Lei Yue Mun Road	↑	A	1,2	3.700						1985	1985	331	0.167		278	0.140	
NB	↑	A	1,2	3.700						2125	2125	354	0.167		297	0.140	
	↱	B	2	3.700		25		100%	100%	2005	2005	60	0.030	0.030	35	0.017	
Pedestrian		Fp	3	Min	9	+	9			=	18			*			*
		Gp	3,4	Min	10	+	10			=	20						
		Hp	2,3	Min	6	+	6			=	12						
		Ip	3	Min	7	+	7			=	14						
		Jp	2,3	Min	10	+	11			=	21						

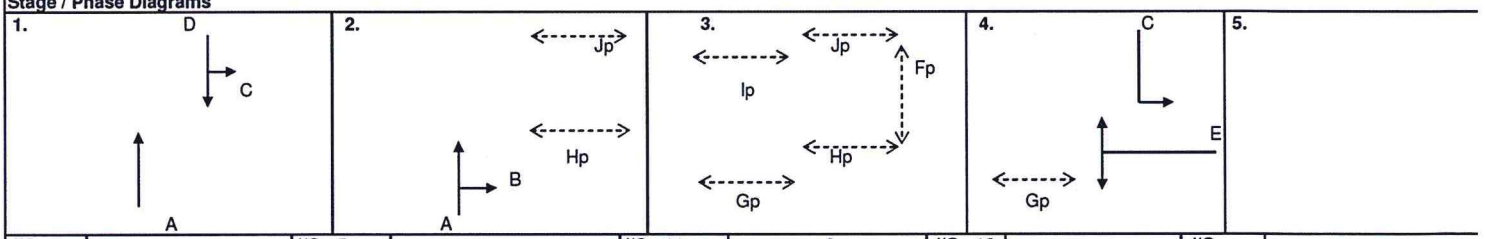
Notes:

Traffic Flow (pcu/hr)



Group	AFpE	DBFpE	Group	AFpE	DBFpE
y	0.334	0.336	y	0.191	0.259
L (sec)	35	39	L (sec)	35	45
C (sec)	110	110	C (sec)	110	110
y pract.	0.614	0.581	y pract.	0.614	0.532
R.C. (%)	84%	73%	R.C. (%)	222%	106%

Stage / Phase Diagrams



I/G= 5		I/G= 5		I/G= 11	9	I/G= 12		I/G=	
I/G= 5		I/G= 5	5	I/G= 11	9	I/G= 12		I/G=	

Date: 一月-16 **Junction:** A

TRAFFIC SIGNALS CALCULATION

Job No.: [redacted]

MVA ASIA LIMITED

Junction: Lei Yue Mun Road / Yau Tong Estate Southern Access

Design Year: 2015

Description: 2015 Observed Traffic Flows

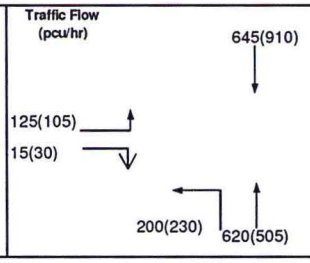
Designed By: [redacted]

Checked By: [redacted]

Approach	Movement notation	Phase	Stage	Width (m)	Radius (m) Left	Radius (m) Right	(%) uphill Gradient	Pro. Turning (%) A.M.	Pro. Turning (%) P.M.	Revised Saturation Flow (pcu/hr) A.M.	Revised Saturation Flow (pcu/hr) P.M.	A.M. Peak Flow (pcu/hr)	A.M. Peak y Value	A.M. Peak Critical y	P.M. Peak Flow (pcu/hr)	P.M. Peak y Value	P.M. Peak Critical y
Yau Tong Est.	↰	C	2	3.500	6			100%	100%	1570	1570	125	0.080	0.080	105	0.067	0.067
Access EB	↱	C	2	3.500		15				1915	1915	15	0.008		30	0.016	
Lei Yue Mun Rd SB	↓	B	1	3.700						1985	1985	312	0.157		440	0.221	0.221
	↓	B	1	3.700						2125	2125	333	0.157		470	0.221	
Lei Yue Mun Rd NB	↰↑	A	1	3.500	7.5			53%	69%	1775	1725	375	0.211	0.211	331	0.192	
	↑	A	1	3.500						2105	2105	445	0.211		404	0.192	
Pedestrian		Dp	1,3	Min	6	+	6			=	12						
		Ep	2,3	Min	9	+	9			=	18						
		Fp	3	Min	8	+	7			=	15			*			*

Notes:

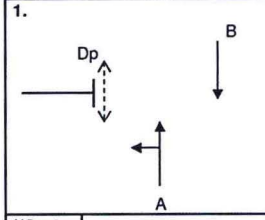
Traffic Flow (pcu/hr)



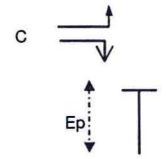
Group	BCFp	ACFp	Group	ACFp	BCFp
y	0.237	0.291	y	0.259	0.288
L (sec)	29	29	L (sec)	29	29
C (sec)	115	115	C (sec)	115	115
y pract.	0.673	0.673	y pract.	0.673	0.673
R.C. (%)	185%	131%	R.C. (%)	160%	133%

Stage / Phase Diagrams

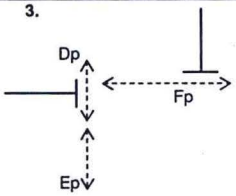
1.



2.



3.



4.

5.

I/G= 9		I/G= 5		I/G= 9	8	I/G=		I/G=	
I/G= 9		I/G= 5		I/G= 9	8	I/G=		I/G=	

Date: 一月-16

Junction: B

TRANSPORT RESEARCH LABORATORY

(C) COPYRIGHT 1998

CAPACITIES, QUEUES AND DELAYS AT ROUNDABOUTS

Visual ARCADY 4 ANALYSIS PROGRAM
RELEASE 2.1 (OCT 1998)

ADAPTED FROM ARCADY/3 WHICH IS CROWN COPYRIGHT
BY PERMISSION OF THE CONTROLLER OF HMSO

THE USER OF THIS COMPUTER PROGRAM FOR THE SOLUTION OF AN ENGINEERING PROBLEM IS IN NO WAY RELIEVED OF HIS RESPONSIBILITY FOR THE CORRECTNESS OF THE SOLUTION

.ROUNDABOUT CAPACITY AND DELAY
****

RUN TITLE
****
Lei Yue Mun Road/Ko Chiu Road (S) - 2015 Observed Flows (AM)

.INPUT DATA
****
ARM A - Ko Chiu Road EB
ARM B - Lei Yue Mun SB
ARM C - Ko Chiu Road WB

.GEOMETRIC DATA

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
ARM A	6.50	8.50	11.00	28.00	40.00	35.0	0.770	39.078
ARM B	7.50	9.00	17.00	40.00	40.00	45.0	0.804	42.574
ARM C	6.50	8.00	10.00	20.00	40.00	60.0	0.678	33.993

.TRAFFIC DEMAND DATA

.TIME PERIOD BEGINS 17.30 AND ENDS 19.00
.LENGTH OF TIME PERIOD - 90 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

.DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	TOP OF PEAK IS REACHED	FLOW STOPS IFALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK
ARM A	15.00	45.00	75.00	6.38	9.56	6.38
ARM B	15.00	45.00	75.00	8.25	12.38	8.25
ARM C	15.00	45.00	75.00	6.25	9.38	6.25

TIME	FROM/TO	TURNING PROPORTIONS TURNING COUNTS (VEH/HR) (PERCENTAGE OF H.V.S) ARM A	ARM B	ARM C
17.30 - 19.00	ARM A	0.069	0.696	0.235
		35.0	355.0	120.0
		(0.0)	(0.0)	(0.0)
	ARM B	0.576	0.235	0.189
		380.0	155.0	125.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.370	0.620	0.010
		185.0	310.0	5.0
		(0.0)	(0.0)	(0.0)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
17.30-17.45								
ARM A	6.38	34.56	0.184		0.0	0.2	3.3	
ARM B	8.25	40.97	0.201		0.0	0.3	3.7	
ARM C	6.25	29.16	0.214		0.0	0.3	4.0	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
17.45-18.00								
ARM A	7.61	33.68	0.226		0.2	0.3	4.3	
ARM B	9.85	40.65	0.242		0.3	0.3	4.7	
ARM C	7.46	28.23	0.264		0.3	0.4	5.3	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
18.00-18.15								
ARM A	9.32	32.47	0.287		0.3	0.4	5.9	
ARM B	12.07	40.22	0.300		0.3	0.4	6.3	
ARM C	9.14	26.93	0.339		0.4	0.5	7.5	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
18.15-18.30								
ARM A	9.32	32.47	0.287		0.4	0.4	6.0	
ARM B	12.07	40.22	0.300		0.4	0.4	6.4	
ARM C	9.14	26.93	0.339		0.5	0.5	7.7	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
18.30-18.45								
ARM A	7.61	33.67	0.226		0.4	0.3	4.5	
ARM B	9.85	40.65	0.242		0.4	0.3	4.9	
ARM C	7.46	28.22	0.264		0.5	0.4	5.5	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
18.45-19.00								
ARM A	6.38	34.54	0.185		0.3	0.2	3.4	
ARM B	8.25	40.96	0.201		0.3	0.3	3.8	
ARM C	6.25	29.15	0.214		0.4	0.3	4.2	

QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.45	0.2
18.00	0.3
18.15	0.4
18.30	0.4
18.45	0.3
19.00	0.2

QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.45	0.3
18.00	0.3
18.15	0.4

18.30	0.4
18.45	0.3
19.00	0.3

.QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.45	0.3	
18.00	0.4	
18.15	0.5	*
18.30	0.5	*
18.45	0.4	
19.00	0.3	

. QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

ARM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
A	699.3	466.2	27.5	0.04	27.5	0.04
B	905.0	603.3	29.9	0.03	29.9	0.03
C	685.6	457.1	34.2	0.05	34.2	0.05
ALL	2289.9	1526.6	91.6	0.04	91.6	0.04

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD.
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

TRANSPORT RESEARCH LABORATORY

(C) COPYRIGHT 1998

CAPACITIES, QUEUES AND DELAYS AT ROUNDABOUTS

Visual ARCADY 4 ANALYSIS PROGRAM
RELEASE 2.1 (OCT 1998)

ADAPTED FROM ARCADY/3 WHICH IS CROWN COPYRIGHT
BY PERMISSION OF THE CONTROLLER OF HMSO

THE USER OF THIS COMPUTER PROGRAM FOR THE SOLUTION OF AN ENGINEERING PROBLEM IS IN NO WAY RELIEVED OF HIS RESPONSIBILITY FOR THE CORRECTNESS OF THE SOLUTION

.ROUNDABOUT CAPACITY AND DELAY
****

RUN TITLE
****
Lei Yue Mun Road/Ko Chiu Road (S) - 2015 Observed Flows (PM)

.INPUT DATA
****
ARM A - Ko Chiu Road EB
ARM B - Lei Yue Mun SB
ARM C - Ko Chiu Road WB

.GEOMETRIC DATA

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
ARM A	6.50	8.50	11.00	28.00	40.00	35.0	0.770	39.078
ARM B	7.50	9.00	17.00	40.00	40.00	45.0	0.804	42.574
ARM C	6.50	8.00	10.00	20.00	40.00	60.0	0.678	33.993

.TRAFFIC DEMAND DATA

.TIME PERIOD BEGINS 17.30 AND ENDS 19.00
.LENGTH OF TIME PERIOD - 90 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

.DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	TOP OF PEAK IS REACHED	FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK
ARM A	15.00	45.00	75.00	6.69	10.03	6.69
ARM B	15.00	45.00	75.00	11.75	17.63	11.75
ARM C	15.00	45.00	75.00	4.25	6.38	4.25

TIME	FROM/TO	TURNING PROPORTIONS TURNING COUNTS (VEH/HR) (PERCENTAGE OF H.V.S) ARM A	ARM B	ARM C
17.30 - 19.00	ARM A	0.084	0.710	0.206
		45.0	380.0	110.0
		(0.0)	(0.0)	(0.0)
	ARM B	0.612	0.213	0.176
		575.0	200.0	165.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.529	0.456	0.015
		180.0	155.0	5.0

```
I                    I         I (  0.0)I (  0.0)I (  0.0)I
I                    I         I        I        I        I
-------------------------------------------------------
TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
```

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
17.30-17.45								
ARM A	6.69	35.62	0.188		0.0	0.2	3.4	
ARM B	11.75	40.97	0.287		0.0	0.4	5.9	
ARM C	4.25	27.06	0.157		0.0	0.2	2.7	
17.45-18.00								
ARM A	7.99	34.95	0.229		0.2	0.3	4.4	
ARM B	14.03	40.65	0.345		0.4	0.5	7.8	
ARM C	5.07	25.70	0.197		0.2	0.2	3.6	
18.00-18.15								
ARM A	9.78	34.02	0.288		0.3	0.4	6.0	
ARM B	17.18	40.22	0.427		0.5	0.7	11.0	
ARM C	6.22	23.84	0.261		0.2	0.4	5.2	
18.15-18.30								
ARM A	9.78	34.01	0.288		0.4	0.4	6.0	
ARM B	17.18	40.22	0.427		0.7	0.7	11.1	
ARM C	6.22	23.83	0.261		0.4	0.4	5.3	
18.30-18.45								
ARM A	7.99	34.94	0.229		0.4	0.3	4.5	
ARM B	14.03	40.65	0.345		0.7	0.5	8.0	
ARM C	5.07	25.68	0.198		0.4	0.2	3.8	
18.45-19.00								
ARM A	6.69	35.61	0.188		0.3	0.2	3.5	
ARM B	11.75	40.96	0.287		0.5	0.4	6.1	
ARM C	4.25	27.04	0.157		0.2	0.2	2.8	

QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.45	0.2
18.00	0.3
18.15	0.4
18.30	0.4
18.45	0.3
19.00	0.2

QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.45	0.4
18.00	0.5 *

18.15	0.7	*
18.30	0.7	*
18.45	0.5	*
19.00	0.4	

.QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
17.45	0.2
18.00	0.2
18.15	0.4
18.30	0.4
18.45	0.2
19.00	0.2

. QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

ARM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
A	733.6	489.1	27.8	0.04	27.8	0.04
B	1288.9	859.3	50.0	0.04	50.0	0.04
C	466.2	310.8	23.4	0.05	23.4	0.05
ALL	2488.7	1659.2	101.2	0.04	101.2	0.04

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD.
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

TRANSPORT RESEARCH LABORATORY

(C) COPYRIGHT 1998

CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

Visual PICADY 4 ANALYSIS PROGRAM
RELEASE 2.1 (DEC 1998)

ADAPTED FROM PICADY/3 WHICH IS CROWN COPYRIGHT
BY PERMISSION OF THE CONTROLLER OF HMSO

THE USER OF THIS COMPUTER PROGRAM FOR THE SOLUTION OF AN ENGINEERING PROBLEM IS IN NO WAY RELIEVED OF HIS RESPONSIBILITY FOR THE CORRECTNESS OF THE SOLUTION

RUN TITLE
****
Cha Kwo Ling Road/Ko Fai Road - 2015 Observed Flows (AM)

.MAJOR/MINOR JUNCTION CAPACITY AND DELAY
****

INPUT DATA

```
                    MAJOR ROAD (ARM C) --------------------- MAJOR ROAD (ARM A)
                                                I
                                                I
                                                I
                                                I
                                                I
                                                I
                                          MINOR ROAD (ARM B)
```

ARM A IS Cha Kwo Ling Road NB
ARM B IS Ko Fai Road EB
ARM C IS Cha Kwo Ling Road SB

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B

ETC.

.GEOMETRIC DATA

DATA ITEM	MINOR ROAD B
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	(W) 12.50 M.
CENTRAL RESERVE WIDTH	(WCR) 0.00 M.
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B) 2.70 M.
- VISIBILITY	(VC-B) 90.0 M.
- BLOCKS TRAFFIC	NO
MINOR ROAD - VISIBILITY TO LEFT	(VB-C) 35.0 M.
- VISIBILITY TO RIGHT	(VB-A) 59.0 M.
- LANE 1 WIDTH	(WB-C) 2.70 M.
- LANE 2 WIDTH	(WB-A) 3.30 M.

.

.TRAFFIC DEMAND DATA

TIME PERIOD BEGINS 07.30 AND ENDS 09.00

LENGTH OF TIME PERIOD - 90 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	TOP OF PEAK IS REACHED	FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK

ARM A	15.00	45.00	75.00	5.44	8.16	5.44
ARM B	15.00	45.00	75.00	5.06	7.59	5.06
ARM C	15.00	45.00	75.00	7.00	10.50	7.00

TIME	FROM/TO	ARM A	ARM B	ARM C
		TURNING PROPORTIONS TURNING COUNTS (VEH/HR) (PERCENTAGE OF H.V.S)		
07.30 - 09.00	ARM A	0.000	0.195	0.805
		0.0	85.0	350.0
		(0.0)	(0.0)	(0.0)
	ARM B	0.000	0.000	1.000
		0.0	0.0	405.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.527	0.473	0.000
		295.0	265.0	0.0
		(0.0)	(0.0)	(0.0)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
07.30-07.45								
B-C	5.06	9.83	0.515		0.0	1.0	14.4	
B-A	0.00	6.19	0.000		0.0	0.0	0.0	
C-A	3.69							
C-B	3.31	10.01	0.331		0.0	0.5	7.0	
A-B	1.06							
A-C	4.38							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.101	0.005			0.009
B-A	0.066	0.013	0.020	0.004	0.006
C-B	0.103	0.006		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
07.45-08.00								
B-C	6.05	9.67	0.625		1.0	1.6	22.4	
B-A	0.00	5.81	0.000		0.0	0.0	0.0	
C-A	4.40							
C-B	3.96	9.81	0.403		0.5	0.7	9.6	
A-B	1.27							
A-C	5.22							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.100	0.006			0.009
B-A	0.062	0.015	0.020	0.004	0.006
C-B	0.101	0.007		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.00-08.15								
B-C	7.40	9.44	0.785		1.6	3.2	42.4	
B-A	0.00	5.30	0.000		0.0	0.0	0.0	
C-A	5.39							
C-B	4.84	9.54	0.508		0.7	1.0	14.3	
A-B	1.55							
A-C	6.40							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.097	0.008			0.009

B-A	0.057	0.019	0.020	0.004	0.006	
C-B	0.098	0.009		0.009		

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.15-08.30								
B-C	7.40	9.44	0.785		3.2	3.4	49.9	
B-A	0.00	5.29	0.000		0.0	0.0	0.0	
C-A	5.39							
C-B	4.84	9.54	0.508		1.0	1.0	15.2	
A-B	1.55							
A-C	6.40							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.097	0.008			0.009
B-A	0.057	0.019	0.020	0.004	0.006
C-B	0.098	0.009		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.30-08.45								
B-C	6.05	9.67	0.625		3.4	1.7	28.5	
B-A	0.00	5.80	0.000		0.0	0.0	0.0	
C-A	4.40							
C-B	3.96	9.81	0.403		1.0	0.7	10.8	
A-B	1.27							
A-C	5.22							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.100	0.006			0.009
B-A	0.062	0.015	0.020	0.004	0.006
C-B	0.101	0.007		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.45-09.00								
B-C	5.06	9.83	0.515		1.7	1.1	17.3	
B-A	0.00	6.18	0.000		0.0	0.0	0.0	
C-A	3.69							
C-B	3.31	10.01	0.331		0.7	0.5	7.8	
A-B	1.06							
A-C	4.38							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.101	0.005			0.009
B-A	0.066	0.013	0.020	0.004	0.006
C-B	0.103	0.006		0.009	

QUEUE FOR STREAM B-C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
07.45	1.0	*
08.00	1.6	**
08.15	3.2	***
08.30	3.4	***
08.45	1.7	**
09.00	1.1	*

QUEUE FOR STREAM B-A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
07.45	0.0
08.00	0.0
08.15	0.0
08.30	0.0
08.45	0.0
09.00	0.0

QUEUE FOR STREAM C-B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
07.45	0.5	
08.00	0.7	*
08.15	1.0	*
08.30	1.0	*
08.45	0.7	*
09.00	0.5	*

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
B-C	555.3	370.2	175.0	0.32	175.1	0.32
B-A	0.0	0.0	0.0	0.00	0.0	0.00
C-A	404.5	269.7				
C-B	363.4	242.2	64.6	0.18	64.6	0.18
A-B	116.6	77.7				
A-C	479.9	319.9				
ALL	1919.7	1279.8	239.6	0.12	239.7	0.12

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD .
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

TRANSPORT RESEARCH LABORATORY

(C) COPYRIGHT 1998

CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

Visual PICADY 4 ANALYSIS PROGRAM
RELEASE 2.1 (DEC 1998)

ADAPTED FROM PICADY/3 WHICH IS CROWN COPYRIGHT
BY PERMISSION OF THE CONTROLLER OF HMSO

THE USER OF THIS COMPUTER PROGRAM FOR THE SOLUTION OF AN ENGINEERING PROBLEM IS IN NO WAY RELIEVED OF HIS RESPONSIBILITY FOR THE CORRECTNESS OF THE SOLUTION

RUN TITLE
****
Cha Kwo Ling Road/Ko Fai Road - 2015 Observed Flows (PM)

.MAJOR/MINOR JUNCTION CAPACITY AND DELAY
****

INPUT DATA

```
                    MAJOR ROAD (ARM C) --------------------- MAJOR ROAD (ARM A)
                                                I
                                                I
                                                I
                                                I
                                                I
                                                I
                                          MINOR ROAD (ARM B)
```

ARM A IS Cha Kwo Ling Road NB
ARM B IS Ko Fai Road EB
ARM C IS Cha Kwo Ling Road SB

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B

ETC.

.GEOMETRIC DATA

DATA ITEM	MINOR ROAD B
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	(W) 12.50 M.
CENTRAL RESERVE WIDTH	(WCR) 0.00 M.
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B) 2.70 M.
- VISIBILITY	(VC-B) 90.0 M.
- BLOCKS TRAFFIC	NO
MINOR ROAD - VISIBILITY TO LEFT	(VB-C) 35.0 M.
- VISIBILITY TO RIGHT	(VB-A) 59.0 M.
- LANE 1 WIDTH	(WB-C) 2.70 M.
- LANE 2 WIDTH	(WB-A) 3.30 M.

.

.TRAFFIC DEMAND DATA

TIME PERIOD BEGINS 07.30 AND ENDS 09.00

LENGTH OF TIME PERIOD - 90 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	TOP OF PEAK IS REACHED	FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK

ARM A	15.00	45.00	75.00	5.94	8.91	5.94
ARM B	15.00	45.00	75.00	5.06	7.59	5.06
ARM C	15.00	45.00	75.00	6.38	9.56	6.38

TIME	FROM/TO	TURNING PROPORTIONS TURNING COUNTS (VEH/HR) (PERCENTAGE OF H.V.S)		
		ARM A	ARM B	ARM C
07.30 - 09.00	ARM A	0.000 0.0 (0.0)	0.147 70.0 (0.0)	0.853 405.0 (0.0)
	ARM B	0.000 0.0 (0.0)	0.000 0.0 (0.0)	1.000 405.0 (0.0)
	ARM C	0.480 245.0 (0.0)	0.520 265.0 (0.0)	0.000 0.0 (0.0)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
07.30-07.45								
B-C	5.06	9.72	0.521		0.0	1.1	14.7	
B-A	0.00	6.15	0.000		0.0	0.0	0.0	
C-A	3.06							
C-B	3.31	9.91	0.334		0.0	0.5	7.1	
A-B	0.88							
A-C	5.06							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.100	0.006			0.009
B-A	0.066	0.013	0.020	0.004	0.006
C-B	0.102	0.007		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
07.45-08.00								
B-C	6.05	9.54	0.634		1.1	1.7	23.1	
B-A	0.00	5.77	0.000		0.0	0.0	0.0	
C-A	3.66							
C-B	3.96	9.70	0.408		0.5	0.7	9.8	
A-B	1.04							
A-C	6.05							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.098	0.007			0.009
B-A	0.062	0.015	0.020	0.004	0.006
C-B	0.100	0.008		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.00-08.15								
B-C	7.40	9.28	0.798		1.7	3.4	44.9	
B-A	0.00	5.25	0.000		0.0	0.0	0.0	
C-A	4.48							
C-B	4.84	9.41	0.515		0.7	1.0	14.7	
A-B	1.28							
A-C	7.40							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.096	0.009			0.009

B-A	0.056	0.019	0.020	0.004	0.005	
C-B	0.097	0.010		0.009		

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.15-08.30								
B-C	7.40	9.28	0.798		3.4	3.7	53.5	
B-A	0.00	5.24	0.000		0.0	0.0	0.0	
C-A	4.48							
C-B	4.84	9.41	0.515		1.0	1.0	15.6	
A-B	1.28							
A-C	7.40							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.096	0.009			0.009
B-A	0.056	0.019	0.020	0.004	0.005
C-B	0.097	0.010		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.30-08.45								
B-C	6.05	9.54	0.634		3.7	1.8	29.9	
B-A	0.00	5.76	0.000		0.0	0.0	0.0	
C-A	3.66							
C-B	3.96	9.70	0.408		1.0	0.7	11.0	
A-B	1.04							
A-C	6.05							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.098	0.007			0.009
B-A	0.062	0.016	0.020	0.004	0.006
C-B	0.100	0.008		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.45-09.00								
B-C	5.06	9.72	0.521		1.8	1.1	17.8	
B-A	0.00	6.14	0.000		0.0	0.0	0.0	
C-A	3.06							
C-B	3.31	9.91	0.334		0.7	0.5	7.9	
A-B	0.88							
A-C	5.06							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.100	0.006			0.009
B-A	0.066	0.013	0.020	0.004	0.006
C-B	0.102	0.007		0.009	

QUEUE FOR STREAM B-C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
07.45	1.1	*
08.00	1.7	**
08.15	3.4	***
08.30	3.7	****
08.45	1.8	**
09.00	1.1	*

QUEUE FOR STREAM B-A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
07.45	0.0
08.00	0.0
08.15	0.0
08.30	0.0
08.45	0.0
09.00	0.0

QUEUE FOR STREAM C-B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
07.45	0.5	
08.00	0.7	*
08.15	1.0	*
08.30	1.0	*
08.45	0.7	*
09.00	0.5	*

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
B-C	555.3	370.2	183.9	0.33	184.0	0.33
B-A	0.0	0.0	0.0	0.00	0.0	0.00
C-A	335.9	224.0				
C-B	363.4	242.2	66.0	0.18	66.0	0.18
A-B	96.0	64.0				
A-C	555.3	370.2				
ALL	1906.0	1270.7	249.9	0.13	250.0	0.13

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD .
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

TRAFFIC SIGNALS CALCULATION

Job No.: [redacted] **MVA ASIA LIMITED**

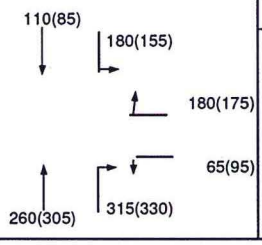
Junction: Cha Kwo Ling Road / Ko Chiu Road — Design Year: 2015

Description: 2015 Observed Traffic Flows — Designed By: [redacted] — Checked By: [redacted]

Approach	Movement notation	Phase	Stage	Width (m)	Radius (m) Left	Radius (m) Right	(%) uphill Gradient	Pro. Turning (%) A.M.	Pro. Turning (%) P.M.	Revised Saturation Flow (pcu/hr) A.M.	Revised Saturation Flow (pcu/hr) P.M.	A.M. Peak Flow (pcu/hr)	A.M. Peak y Value	A.M. Peak Critical y	P.M. Peak Flow (pcu/hr)	P.M. Peak y Value	P.M. Peak Critical y
Cha Kwo Ling Road	↑	C	2	3.375						1955	1955	260	0.133		305	0.156	
NB	↱	C	2	3.375		17.5		100%	100%	1925	1925	315	0.164	0.164	330	0.171	0.171
Cha Kwo Ling Road	↳	A	1	3.625	15			100%	100%	1800	1800	180	0.100	0.100	155	0.086	0.086
SB	↓	B	4	3.625						2120	2120	110	0.052	0.052	85	0.040	0.040
Ko Chiu Road	↑↳	D	1	3.800	9	20		56% / 44%	75% / 25%	1770	1745	116	0.066		127	0.073	
WB	↰	D	1	3.800		17.5		100%	100%	1965	1965	129	0.066		143	0.073	
Pedestrian		Ep	3,4	Min	6	+	12			=	18						
		Fp	3	Min	8	+	15			=	23			*			*
		Gp	3	Min	6	+	11			=	17						

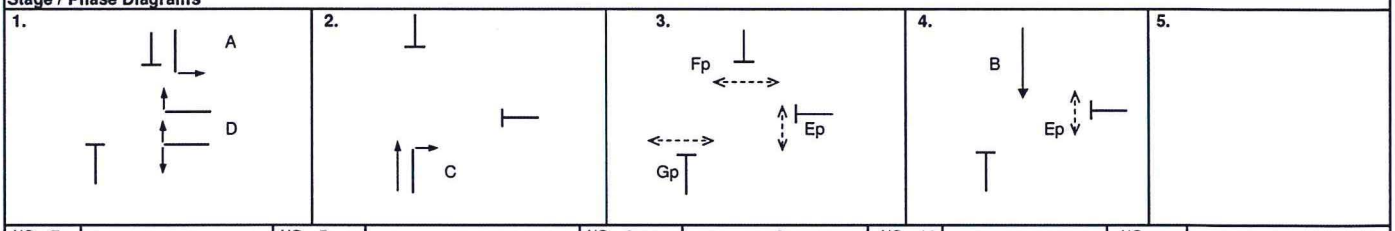
Notes:

Traffic Flow (pcu/hr)



Group	DCFpB	ACFpB	Group	DCFpB	ACFpB
y	0.281	0.316	y	0.284	0.298
L (sec)	41	43	L (sec)	41	43
C (sec)	100	100	C (sec)	100	100
y pract.	0.531	0.513	y pract.	0.531	0.513
R.C. (%)	89%	63%	R.C. (%)	87%	72%

Stage / Phase Diagrams



I/G= 7		I/G= 5		I/G= 8	8	I/G= 18		I/G=	
I/G= 7		I/G= 5		I/G= 8	8	I/G= 18		I/G=	

Date: 一月-16 **Junction:** E

TRANSPORT RESEARCH LABORATORY

(C) COPYRIGHT 1998

CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

Visual PICADY 4 ANALYSIS PROGRAM
RELEASE 2.1 (DEC 1998)

ADAPTED FROM PICADY/3 WHICH IS CROWN COPYRIGHT
BY PERMISSION OF THE CONTROLLER OF HMSO

THE USER OF THIS COMPUTER PROGRAM FOR THE SOLUTION OF AN ENGINEERING PROBLEM IS IN NO WAY RELIEVED OF HIS RESPONSIBILITY FOR THE CORRECTNESS OF THE SOLUTION

RUN TITLE
****
Cha Kwo Ling Road/Sze Shan Street - 2015 Observed Flows (AM)

.MAJOR/MINOR JUNCTION CAPACITY AND DELAY
****

INPUT DATA

```
                    MAJOR ROAD (ARM C) --------------------- MAJOR ROAD (ARM A)
                                                I
                                                I
                                                I
                                                I
                                                I
                                                I
                                           MINOR ROAD (ARM B)
```

ARM A IS Cha Kwo Ling Road NB
ARM B IS Ko Fai Road EB
ARM C IS Cha Kwo Ling Road SB

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B

STREAM B-AC CONTAINS TRAFFIC GOING FROM ARM B TO ARM A AND TO ARM C

ETC.

.GEOMETRIC DATA

DATA ITEM	MINOR ROAD B
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	(W) 13.50 M.
CENTRAL RESERVE WIDTH	(WCR) 0.00 M.
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B) 3.00 M.
- VISIBILITY	(VC-B) 90.0 M.
- BLOCKS TRAFFIC	NO
MINOR ROAD - VISIBILITY TO LEFT	(VB-C) 22.0 M.
- VISIBILITY TO RIGHT	(VB-A) 30.0 M.
- LANE 1 WIDTH	(WB-C) 5.00 M.
- LANE 2 WIDTH	(WB-A) 0.00 M.

.

.TRAFFIC DEMAND DATA

TIME PERIOD BEGINS 07.30 AND ENDS 09.00

LENGTH OF TIME PERIOD - 90 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

	NUMBER OF MINUTES FROM START WHEN	RATE OF FLOW (VEH/MIN)

ARM	FLOW STARTS TO RISE	TOP OF PEAK IS REACHED	FLOW STOPS FALLING	BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK
ARM A	15.00	45.00	75.00	5.75	8.63	5.75
ARM B	15.00	45.00	75.00	1.63	2.44	1.63
ARM C	15.00	45.00	75.00	2.19	3.28	2.19

TIME	FROM/TO	TURNING PROPORTIONS TURNING COUNTS (VEH/HR) (PERCENTAGE OF H.V.S) ARM A	ARM B	ARM C
07.30 - 09.00	ARM A	0.000	0.022	0.978
		0.0	10.0	450.0
		(0.0)	(0.0)	(0.0)
	ARM B	0.038	0.000	0.962
		5.0	0.0	125.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.629	0.371	0.000
		110.0	65.0	0.0
		(0.0)	(0.0)	(0.0)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
07.30-07.45								
B-AC	1.63	11.55	0.141		0.0	0.2	2.4	
C-A	1.38							
C-B	0.81	10.32	0.079		0.0	0.1	1.2	
A-B	0.13							
A-C	5.63							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-AC	0.122	0.005	0.013	0.006	0.008
C-B	0.103	0.007		0.010	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
07.45-08.00								
B-AC	1.94	11.33	0.171		0.2	0.2	3.0	
C-A	1.64							
C-B	0.97	10.12	0.096		0.1	0.1	1.5	
A-B	0.15							
A-C	6.72							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-AC	0.118	0.006	0.013	0.005	0.008
C-B	0.101	0.008		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.00-08.15								
B-AC	2.38	11.01	0.216		0.2	0.3	4.0	
C-A	2.01							
C-B	1.19	9.85	0.121		0.1	0.1	2.0	
A-B	0.18							
A-C	8.23							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-AC	0.113	0.008	0.013	0.005	0.008
C-B	0.099	0.010		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.15-08.30								
B-AC	2.38	11.01	0.216		0.3	0.3	4.1	
C-A	2.01							
C-B	1.19	9.85	0.121		0.1	0.1	2.0	
A-B	0.18							
A-C	8.23							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-AC	0.113	0.008	0.013	0.005	0.008
C-B	0.099	0.010		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.30-08.45								
B-AC	1.94	11.33	0.171		0.3	0.2	3.2	
C-A	1.64							
C-B	0.97	10.12	0.096		0.1	0.1	1.6	
A-B	0.15							
A-C	6.72							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-AC	0.118	0.006	0.013	0.005	0.008
C-B	0.101	0.008		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.45-09.00								
B-AC	1.63	11.55	0.141		0.2	0.2	2.5	
C-A	1.38							
C-B	0.81	10.32	0.079		0.1	0.1	1.3	
A-B	0.13							
A-C	5.63							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-AC	0.122	0.005	0.013	0.006	0.008
C-B	0.103	0.007		0.010	

QUEUE FOR STREAM B-AC

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
07.45	0.2
08.00	0.2
08.15	0.3
08.30	0.3
08.45	0.2
09.00	0.2

QUEUE FOR STREAM C-B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
07.45	0.1
08.00	0.1
08.15	0.1
08.30	0.1
08.45	0.1
09.00	0.1

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)

B-AC	178.3	118.8	19.2	0.11	19.2	0.11
C-A	150.8	100.6				
C-B	89.1	59.4	9.8	0.11	9.8	0.11
A-B	13.7	9.1				
A-C	617.0	411.4				
ALL	1049.0	699.3	29.0	0.03	29.0	0.03

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD .
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

TRANSPORT RESEARCH LABORATORY

(C) COPYRIGHT 1998

CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

Visual PICADY 4 ANALYSIS PROGRAM
RELEASE 2.1 (DEC 1998)

ADAPTED FROM PICADY/3 WHICH IS CROWN COPYRIGHT
BY PERMISSION OF THE CONTROLLER OF HMSO

THE USER OF THIS COMPUTER PROGRAM FOR THE SOLUTION OF AN ENGINEERING PROBLEM IS IN NO WAY RELIEVED OF HIS RESPONSIBILITY FOR THE CORRECTNESS OF THE SOLUTION

RUN TITLE
****
Cha Kwo Ling Road/Sze Shan Street - 2015 Observed Flows (PM)

.MAJOR/MINOR JUNCTION CAPACITY AND DELAY
****

INPUT DATA

```
                    MAJOR ROAD (ARM C) --------------------- MAJOR ROAD (ARM A)
                                                I
                                                I
                                                I
                                                I
                                                I
                                                I
                                          MINOR ROAD (ARM B)
```

ARM A IS Cha Kwo Ling Road NB
ARM B IS Ko Fai Road EB
ARM C IS Cha Kwo Ling Road SB

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B

STREAM B-AC CONTAINS TRAFFIC GOING FROM ARM B TO ARM A AND TO ARM C

ETC.

.GEOMETRIC DATA

DATA ITEM	MINOR ROAD B
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	(W) 13.50 M.
CENTRAL RESERVE WIDTH	(WCR) 0.00 M.
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B) 3.00 M.
- VISIBILITY	(VC-B) 90.0 M.
- BLOCKS TRAFFIC	NO
MINOR ROAD - VISIBILITY TO LEFT	(VB-C) 22.0 M.
- VISIBILITY TO RIGHT	(VB-A) 30.0 M.
- LANE 1 WIDTH	(WB-C) 5.00 M.
- LANE 2 WIDTH	(WB-A) 0.00 M.

.

.TRAFFIC DEMAND DATA

TIME PERIOD BEGINS 07.30 AND ENDS 09.00

LENGTH OF TIME PERIOD - 90 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

	NUMBER OF MINUTES FROM START WHEN	RATE OF FLOW (VEH/MIN)

ARM	FLOW STARTS TO RISE	TOP OF PEAK IS REACHED	FLOW STOPS FALLING	BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK
ARM A	15.00	45.00	75.00	6.06	9.09	6.06
ARM B	15.00	45.00	75.00	2.00	3.00	2.00
ARM C	15.00	45.00	75.00	2.25	3.38	2.25

TURNING PROPORTIONS
TURNING COUNTS (VEH/HR)
(PERCENTAGE OF H.V.S)

TIME	FROM/TO	ARM A	ARM B	ARM C
07.30 - 09.00	ARM A	0.000 0.0 (0.0)	0.010 5.0 (0.0)	0.990 480.0 (0.0)
	ARM B	0.031 5.0 (0.0)	0.000 0.0 (0.0)	0.969 155.0 (0.0)
	ARM C	0.583 105.0 (0.0)	0.417 75.0 (0.0)	0.000 0.0 (0.0)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
07.30-07.45								
B-AC	2.00	11.51	0.174		0.0	0.2	3.0	
C-A	1.31							
C-B	0.94	10.27	0.091		0.0	0.1	1.5	
A-B	0.06							
A-C	6.00							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-AC	0.121	0.006	0.013	0.006	0.008
C-B	0.103	0.007		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
07.45-08.00								
B-AC	2.39	11.27	0.212		0.2	0.3	3.9	
C-A	1.57							
C-B	1.12	10.06	0.111		0.1	0.1	1.8	
A-B	0.07							
A-C	7.16							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-AC	0.117	0.007	0.013	0.005	0.008
C-B	0.101	0.008		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.00-08.15								
B-AC	2.92	10.94	0.267		0.3	0.4	5.3	
C-A	1.92							
C-B	1.37	9.77	0.140		0.1	0.2	2.4	
A-B	0.09							
A-C	8.77							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-AC	0.111	0.008	0.013	0.005	0.008
C-B	0.098	0.010		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.15-08.30								
B-AC	2.92	10.94	0.267		0.4	0.4	5.4	
C-A	1.92							
C-B	1.37	9.77	0.140		0.2	0.2	2.4	
A-B	0.09							
A-C	8.77							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-AC	0.111	0.008	0.013	0.005	0.008
C-B	0.098	0.010		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.30-08.45								
B-AC	2.39	11.27	0.212		0.4	0.3	4.2	
C-A	1.57							
C-B	1.12	10.06	0.111		0.2	0.1	1.9	
A-B	0.07							
A-C	7.16							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-AC	0.117	0.007	0.013	0.005	0.008
C-B	0.101	0.008		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.45-09.00								
B-AC	2.00	11.51	0.174		0.3	0.2	3.2	
C-A	1.31							
C-B	0.94	10.27	0.091		0.1	0.1	1.5	
A-B	0.06							
A-C	6.00							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-AC	0.121	0.006	0.013	0.006	0.008
C-B	0.103	0.007		0.009	

QUEUE FOR STREAM B-AC

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
07.45	0.2
08.00	0.3
08.15	0.4
08.30	0.4
08.45	0.3
09.00	0.2

QUEUE FOR STREAM C-B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
07.45	0.1
08.00	0.1
08.15	0.2
08.30	0.2
08.45	0.1
09.00	0.1

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)

B-AC	219.4	146.3	25.1	0.11	25.1	0.11	
C-A	144.0	96.0					
C-B	102.8	68.6	11.6	0.11	11.6	0.11	
A-B	6.9	4.6					
A-C	658.2	438.8					
ALL	1131.2	754.2	36.6	0.03	36.6	0.03	

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD .
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

TRANSPORT RESEARCH LABORATORY

(C) COPYRIGHT 1998

CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

Visual PICADY 4 ANALYSIS PROGRAM
RELEASE 2.1 (DEC 1998)

ADAPTED FROM PICADY/3 WHICH IS CROWN COPYRIGHT
BY PERMISSION OF THE CONTROLLER OF HMSO

THE USER OF THIS COMPUTER PROGRAM FOR THE SOLUTION OF AN ENGINEERING PROBLEM IS IN NO WAY RELIEVED OF HIS RESPONSIBILITY FOR THE CORRECTNESS OF THE SOLUTION

RUN TITLE
****
Cha Kwo Ling Road/Yan Wing Street - 2015 Observed Flows (AM)

.MAJOR/MINOR JUNCTION CAPACITY AND DELAY
****

INPUT DATA

```
                    MAJOR ROAD (ARM C) --------------------- MAJOR ROAD (ARM A)
                                                I
                                                I
                                                I
                                                I
                                                I
                                                I
                                           MINOR ROAD (ARM B)
```

ARM A IS Cha Kwo Ling Road SB
ARM B IS Yan Wing Street WB
ARM C IS Cha Kwo Ling Road NB

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B

ETC.

.GEOMETRIC DATA

DATA ITEM	MINOR ROAD B
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	(W) 14.00 M.
CENTRAL RESERVE WIDTH	(WCR) 0.00 M.
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B) 3.00 M.
- VISIBILITY	(VC-B) 90.0 M.
- BLOCKS TRAFFIC	NO
MINOR ROAD - VISIBILITY TO LEFT	(VB-C) 20.0 M.
- VISIBILITY TO RIGHT	(VB-A) 25.0 M.
- LANE 1 WIDTH	(WB-C) 5.00 M.
- LANE 2 WIDTH	(WB-A) 5.00 M.

.

.TRAFFIC DEMAND DATA

TIME PERIOD BEGINS 07.30 AND ENDS 09.00

LENGTH OF TIME PERIOD - 90 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	TOP OF PEAK IS REACHED	FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK

ARM A	15.00		45.00		75.00		1.44		2.16		1.44
ARM B	15.00		45.00		75.00		4.25		6.38		4.25
ARM C	15.00		45.00		75.00		4.00		6.00		4.00

TIME	FROM/TO	TURNING PROPORTIONS TURNING COUNTS (VEH/HR) (PERCENTAGE OF H.V.S) ARM A	ARM B	ARM C
07.30 - 09.00	ARM A	0.000	0.000	1.000
		0.0	0.0	115.0
		(0.0)	(0.0)	(0.0)
	ARM B	0.412	0.000	0.588
		140.0	0.0	200.0
		(0.0)	(0.0)	(0.0)
	ARM C	1.000	0.000	0.000
		320.0	0.0	0.0
		(0.0)	(0.0)	(0.0)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
07.30-07.45								
B-C	2.50	11.92	0.210		0.0	0.3	3.8	
B-A	1.75	9.22	0.190		0.0	0.2	3.3	
C-A	4.00							
C-B	0.00	10.09	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	1.44							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.099	0.002			0.012
B-A	0.077	0.005	0.022	0.006	0.009
C-B	0.111	0.002		0.010	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
07.45-08.00								
B-C	2.99	11.74	0.254		0.3	0.3	4.9	
B-A	2.09	9.09	0.230		0.2	0.3	4.3	
C-A	4.78							
C-B	0.00	10.04	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	1.72							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.098	0.002			0.012
B-A	0.076	0.006	0.022	0.006	0.009
C-B	0.111	0.002		0.010	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.00-08.15								
B-C	3.66	11.49	0.318		0.3	0.5	6.7	
B-A	2.56	8.90	0.288		0.3	0.4	5.8	
C-A	5.85							
C-B	0.00	9.98	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	2.10							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.096	0.003			0.011

B-A	0.074	0.007	0.022	0.006	0.009	
C-B	0.110	0.002		0.010		

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.15-08.30								
B-C	3.66	11.49	0.318		0.5	0.5	6.9	
B-A	2.56	8.90	0.288		0.4	0.4	6.0	
C-A	5.85							
C-B	0.00	9.98	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	2.10							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.096	0.003			0.011
B-A	0.074	0.007	0.022	0.006	0.009
C-B	0.110	0.002		0.010	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.30-08.45								
B-C	2.99	11.74	0.254		0.5	0.3	5.3	
B-A	2.09	9.09	0.230		0.4	0.3	4.7	
C-A	4.78							
C-B	0.00	10.04	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	1.72							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.098	0.002			0.012
B-A	0.076	0.006	0.022	0.006	0.009
C-B	0.111	0.002		0.010	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.45-09.00								
B-C	2.50	11.92	0.210		0.3	0.3	4.1	
B-A	1.75	9.22	0.190		0.3	0.2	3.6	
C-A	4.00							
C-B	0.00	10.09	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	1.44							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.099	0.002			0.012
B-A	0.077	0.005	0.022	0.006	0.009
C-B	0.111	0.002		0.010	

QUEUE FOR STREAM B-C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
07.45	0.3
08.00	0.3
08.15	0.5
08.30	0.5
08.45	0.3
09.00	0.3

QUEUE FOR STREAM B-A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
07.45	0.2
08.00	0.3
08.15	0.4
08.30	0.4
08.45	0.3
09.00	0.2

QUEUE FOR STREAM C-B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
07.45	0.0
08.00	0.0
08.15	0.0
08.30	0.0
08.45	0.0
09.00	0.0

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
B-C	274.2	182.8	31.8	0.12	31.8	0.12
B-A	192.0	128.0	27.8	0.14	27.8	0.14
C-A	438.8	292.5				
C-B	0.0	0.0	0.0	0.00	0.0	0.00
A-B	0.0	0.0				
A-C	157.7	105.1				
ALL	1062.7	708.5	59.6	0.06	59.6	0.06

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD .
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

TRANSPORT RESEARCH LABORATORY

(C) COPYRIGHT 1998

CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

Visual PICADY 4 ANALYSIS PROGRAM
RELEASE 2.1 (DEC 1998)

ADAPTED FROM PICADY/3 WHICH IS CROWN COPYRIGHT
BY PERMISSION OF THE CONTROLLER OF HMSO

THE USER OF THIS COMPUTER PROGRAM FOR THE SOLUTION OF AN ENGINEERING PROBLEM IS IN NO WAY RELIEVED OF HIS RESPONSIBILITY FOR THE CORRECTNESS OF THE SOLUTION

RUN TITLE
****
Cha Kwo Ling Road/Yan Wing Street - 2015 Observed Flows (PM)

.MAJOR/MINOR JUNCTION CAPACITY AND DELAY
****

INPUT DATA

```
                    MAJOR ROAD (ARM C) --------------------- MAJOR ROAD (ARM A)
                                                I
                                                I
                                                I
                                                I
                                                I
                                                I
                                          MINOR ROAD (ARM B)
```

ARM A IS Cha Kwo Ling Road SB
ARM B IS Yan Wing Street WB
ARM C IS Cha Kwo Ling Road NB

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B

ETC.

.GEOMETRIC DATA

DATA ITEM		MINOR ROAD B
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	(W)	14.00 M.
CENTRAL RESERVE WIDTH	(WCR)	0.00 M.
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B)	3.00 M.
- VISIBILITY	(VC-B)	90.0 M.
- BLOCKS TRAFFIC		NO
MINOR ROAD - VISIBILITY TO LEFT	(VB-C)	20.0 M.
- VISIBILITY TO RIGHT	(VB-A)	25.0 M.
- LANE 1 WIDTH	(WB-C)	5.00 M.
- LANE 2 WIDTH	(WB-A)	5.00 M.

.

.TRAFFIC DEMAND DATA

TIME PERIOD BEGINS 07.30 AND ENDS 09.00

LENGTH OF TIME PERIOD - 90 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	TOP OF PEAK IS REACHED	FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK

ARM A	15.00	45.00	75.00	1.38	2.06	1.38
ARM B	15.00	45.00	75.00	6.00	9.00	6.00
ARM C	15.00	45.00	75.00	4.56	6.84	4.56

TURNING PROPORTIONS
TURNING COUNTS (VEH/HR)
(PERCENTAGE OF H.V.S)

TIME	FROM/TO	ARM A	ARM B	ARM C
07.30 - 09.00				
	ARM A	0.000	0.000	1.000
		0.0	0.0	110.0
		(0.0)	(0.0)	(0.0)
	ARM B	0.250	0.000	0.750
		120.0	0.0	360.0
		(0.0)	(0.0)	(0.0)
	ARM C	1.000	0.000	0.000
		365.0	0.0	0.0
		(0.0)	(0.0)	(0.0)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
07.30-07.45								
B-C	4.50	12.02	0.374		0.0	0.6	8.5	
B-A	1.50	9.17	0.164		0.0	0.2	2.8	
C-A	4.56							
C-B	0.00	10.10	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	1.38							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.100	0.002			0.012
B-A	0.076	0.005	0.022	0.006	0.009
C-B	0.111	0.002		0.010	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
07.45-08.00								
B-C	5.37	11.85	0.453		0.6	0.8	11.8	
B-A	1.79	9.02	0.199		0.2	0.2	3.6	
C-A	5.45							
C-B	0.00	10.06	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	1.64							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.099	0.002			0.012
B-A	0.075	0.006	0.022	0.006	0.009
C-B	0.111	0.002		0.010	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.00-08.15								
B-C	6.58	11.63	0.566		0.8	1.3	18.0	
B-A	2.19	8.82	0.249		0.2	0.3	4.8	
C-A	6.67							
C-B	0.00	10.00	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	2.01							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.097	0.002			0.011

B-A	0.074	0.007	0.022	0.006	0.009	
C-B	0.110	0.002		0.010		

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.15-08.30								
B-C	6.58	11.63	0.566		1.3	1.3	19.2	
B-A	2.19	8.82	0.249		0.3	0.3	4.9	
C-A	6.67							
C-B	0.00	10.00	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	2.01							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.097	0.002			0.011
B-A	0.074	0.007	0.022	0.006	0.009
C-B	0.110	0.002		0.010	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.30-08.45								
B-C	5.37	11.85	0.453		1.3	0.8	13.2	
B-A	1.79	9.02	0.199		0.3	0.3	3.9	
C-A	5.45							
C-B	0.00	10.06	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	1.64							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.099	0.002			0.012
B-A	0.075	0.006	0.022	0.006	0.009
C-B	0.111	0.002		0.010	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.45-09.00								
B-C	4.50	12.01	0.375		0.8	0.6	9.4	
B-A	1.50	9.17	0.164		0.3	0.2	3.0	
C-A	4.56							
C-B	0.00	10.10	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	1.38							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.100	0.002			0.012
B-A	0.076	0.005	0.022	0.006	0.009
C-B	0.111	0.002		0.010	

QUEUE FOR STREAM B-C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
07.45	0.6	*
08.00	0.8	*
08.15	1.3	*
08.30	1.3	*
08.45	0.8	*
09.00	0.6	*

QUEUE FOR STREAM B-A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
07.45	0.2
08.00	0.2
08.15	0.3
08.30	0.3
08.45	0.3
09.00	0.2

QUEUE FOR STREAM C-B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
07.45	0.0
08.00	0.0
08.15	0.0
08.30	0.0
08.45	0.0
09.00	0.0

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
B-C	493.6	329.1	80.1	0.16	80.1	0.16
B-A	164.5	109.7	23.0	0.14	23.0	0.14
C-A	500.5	333.7				
C-B	0.0	0.0	0.0	0.00	0.0	0.00
A-B	0.0	0.0				
A-C	150.8	100.6				
ALL	1309.5	873.0	103.1	0.08	103.1	0.08

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD .
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

TRANSPORT RESEARCH LABORATORY

(C) COPYRIGHT 1998

CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

Visual PICADY 4 ANALYSIS PROGRAM
RELEASE 2.1 (DEC 1998)

ADAPTED FROM PICADY/3 WHICH IS CROWN COPYRIGHT
BY PERMISSION OF THE CONTROLLER OF HMSO

THE USER OF THIS COMPUTER PROGRAM FOR THE SOLUTION OF AN ENGINEERING PROBLEM IS IN NO WAY RELIEVED OF HIS RESPONSIBILITY FOR THE CORRECTNESS OF THE SOLUTION

RUN TITLE
****
Cha Kwo Ling Road/Access Road - 2015 Observed Flows (AM)

.MAJOR/MINOR JUNCTION CAPACITY AND DELAY
****

INPUT DATA

```
                    MAJOR ROAD (ARM C) --------------------- MAJOR ROAD (ARM A)
                                                I
                                                I
                                                I
                                                I
                                                I
                                                I
                                          MINOR ROAD (ARM B)
```

ARM A IS Cha Kwo Ling Road SB
ARM B IS Access Road WB
ARM C IS Cha Kwo Ling Road NB

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B

ETC.

.GEOMETRIC DATA

DATA ITEM	MINOR ROAD B
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	(W) 13.00 M.
CENTRAL RESERVE WIDTH	(WCR) 0.00 M.
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B) 3.00 M.
- VISIBILITY	(VC-B) 90.0 M.
- BLOCKS TRAFFIC	NO
MINOR ROAD - VISIBILITY TO LEFT	(VB-C) 100.0 M.
- VISIBILITY TO RIGHT	(VB-A) 100.0 M.
- LANE 1 WIDTH	(WB-C) 2.50 M.
- LANE 2 WIDTH	(WB-A) 2.50 M.

.

.TRAFFIC DEMAND DATA

TIME PERIOD BEGINS 07.30 AND ENDS 09.00

LENGTH OF TIME PERIOD - 90 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	TOP OF PEAK IS REACHED	FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK

ARM A	15.00		45.00		75.00		3.94		5.91		3.94	
ARM B	15.00		45.00		75.00		0.13		0.19		0.13	
ARM C	15.00		45.00		75.00		4.00		6.00		4.00	

TURNING PROPORTIONS
TURNING COUNTS (VEH/HR)
(PERCENTAGE OF H.V.S)

TIME	FROM/TO	ARM A	ARM B	ARM C
07.30 - 09.00	ARM A	0.000 0.0 (0.0)	0.016 5.0 (0.0)	0.984 310.0 (0.0)
	ARM B	0.500 5.0 (0.0)	0.000 0.0 (0.0)	0.500 5.0 (0.0)
	ARM C	0.984 315.0 (0.0)	0.016 5.0 (0.0)	0.000 0.0 (0.0)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
07.30-07.45								
B-C	0.06	10.17	0.006		0.0	0.0	0.1	
B-A	0.06	7.78	0.008		0.0	0.0	0.1	
C-A	3.94							
C-B	0.06	10.62	0.006		0.0	0.0	0.1	
A-B	0.06							
A-C	3.88							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.107	0.004			0.009
B-A	0.082	0.007	0.020	0.005	0.007
C-B	0.106	0.005		0.010	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
07.45-08.00								
B-C	0.07	10.03	0.007		0.0	0.0	0.1	
B-A	0.07	7.56	0.010		0.0	0.0	0.1	
C-A	4.70							
C-B	0.07	10.48	0.007		0.0	0.0	0.1	
A-B	0.07							
A-C	4.63							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.106	0.005			0.009
B-A	0.080	0.008	0.020	0.005	0.007
C-B	0.105	0.005		0.010	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.00-08.15								
B-C	0.09	9.84	0.009		0.0	0.0	0.1	
B-A	0.09	7.27	0.013		0.0	0.0	0.2	
C-A	5.76							
C-B	0.09	10.29	0.009		0.0	0.0	0.1	
A-B	0.09							
A-C	5.67							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.104	0.006			0.009
B-A	0.077	0.010	0.020	0.004	0.007

C-B	0.103	0.007			0.010			

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.15-08.30								
B-C	0.09	9.84	0.009		0.0	0.0	0.1	
B-A	0.09	7.27	0.013		0.0	0.0	0.2	
C-A	5.76							
C-B	0.09	10.29	0.009		0.0	0.0	0.1	
A-B	0.09							
A-C	5.67							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.104	0.006			0.009
B-A	0.077	0.010	0.020	0.004	0.007
C-B	0.103	0.007		0.010	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.30-08.45								
B-C	0.07	10.03	0.007		0.0	0.0	0.1	
B-A	0.07	7.56	0.010		0.0	0.0	0.2	
C-A	4.70							
C-B	0.07	10.48	0.007		0.0	0.0	0.1	
A-B	0.07							
A-C	4.63							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.106	0.005			0.009
B-A	0.080	0.008	0.020	0.005	0.007
C-B	0.105	0.005		0.010	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.45-09.00								
B-C	0.06	10.17	0.006		0.0	0.0	0.1	
B-A	0.06	7.78	0.008		0.0	0.0	0.1	
C-A	3.94							
C-B	0.06	10.62	0.006		0.0	0.0	0.1	
A-B	0.06							
A-C	3.88							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.107	0.004			0.009
B-A	0.082	0.007	0.020	0.005	0.007
C-B	0.106	0.005		0.010	

QUEUE FOR STREAM B-C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
07.45	0.0
08.00	0.0
08.15	0.0
08.30	0.0
08.45	0.0
09.00	0.0

QUEUE FOR STREAM B-A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
07.45	0.0
08.00	0.0
08.15	0.0
08.30	0.0
08.45	0.0
09.00	0.0

QUEUE FOR STREAM C-B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
07.45	0.0
08.00	0.0
08.15	0.0
08.30	0.0
08.45	0.0
09.00	0.0

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
B-C	6.9	4.6	0.7	0.10	0.7	0.10
B-A	6.9	4.6	0.9	0.13	0.9	0.13
C-A	431.9	288.0				
C-B	6.9	4.6	0.7	0.10	0.7	0.10
A-B	6.9	4.6				
A-C	425.1	283.4				
ALL	884.4	589.6	2.3	0.00	2.3	0.00

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD .
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

TRANSPORT RESEARCH LABORATORY

(C) COPYRIGHT 1998

CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

Visual PICADY 4 ANALYSIS PROGRAM
RELEASE 2.1 (DEC 1998)

ADAPTED FROM PICADY/3 WHICH IS CROWN COPYRIGHT
BY PERMISSION OF THE CONTROLLER OF HMSO

THE USER OF THIS COMPUTER PROGRAM FOR THE SOLUTION OF AN ENGINEERING PROBLEM IS IN NO WAY RELIEVED OF HIS RESPONSIBILITY FOR THE CORRECTNESS OF THE SOLUTION

RUN TITLE
****
Cha Kwo Ling Road/Access Road - 2015 Observed Flows (PM)

.MAJOR/MINOR JUNCTION CAPACITY AND DELAY
****

INPUT DATA

```
                    MAJOR ROAD (ARM C) --------------------- MAJOR ROAD (ARM A)
                                                I
                                                I
                                                I
                                                I
                                                I
                                                I
                                           MINOR ROAD (ARM B)
```

ARM A IS Cha Kwo Ling Road SB
ARM B IS Access Road WB
ARM C IS Cha Kwo Ling Road NB

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B

ETC.

.GEOMETRIC DATA

DATA ITEM	MINOR ROAD B
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	(W) 13.00 M.
CENTRAL RESERVE WIDTH	(WCR) 0.00 M.
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B) 3.00 M.
- VISIBILITY	(VC-B) 90.0 M.
- BLOCKS TRAFFIC	NO
MINOR ROAD - VISIBILITY TO LEFT	(VB-C) 100.0 M.
- VISIBILITY TO RIGHT	(VB-A) 100.0 M.
- LANE 1 WIDTH	(WB-C) 2.50 M.
- LANE 2 WIDTH	(WB-A) 2.50 M.

.TRAFFIC DEMAND DATA

TIME PERIOD BEGINS 07.30 AND ENDS 09.00

LENGTH OF TIME PERIOD - 90 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	TOP OF PEAK IS REACHED	FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK

ARM A	15.00	45.00	75.00	5.88	8.81	5.88
ARM B	15.00	45.00	75.00	0.13	0.19	0.13
ARM C	15.00	45.00	75.00	4.56	6.84	4.56

TURNING PROPORTIONS
TURNING COUNTS (VEH/HR)
(PERCENTAGE OF H.V.S)

TIME	FROM/TO	ARM A	ARM B	ARM C
07.30 - 09.00	ARM A	0.000	0.011	0.989
		0.0	5.0	465.0
		(0.0)	(0.0)	(0.0)
	ARM B	0.500	0.000	0.500
		5.0	0.0	5.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.986	0.014	0.000
		360.0	5.0	0.0
		(0.0)	(0.0)	(0.0)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
07.30-07.45								
B-C	0.06	9.83	0.006		0.0	0.0	0.1	
B-A	0.06	7.38	0.008		0.0	0.0	0.1	
C-A	4.50							
C-B	0.06	10.27	0.006		0.0	0.0	0.1	
A-B	0.06							
A-C	5.81							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.104	0.006			0.009
B-A	0.078	0.009	0.020	0.005	0.007
C-B	0.103	0.007		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
07.45-08.00								
B-C	0.07	9.62	0.008		0.0	0.0	0.1	
B-A	0.07	7.09	0.011		0.0	0.0	0.2	
C-A	5.37							
C-B	0.07	10.06	0.007		0.0	0.0	0.1	
A-B	0.07							
A-C	6.94							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.101	0.008			0.009
B-A	0.075	0.011	0.020	0.004	0.007
C-B	0.101	0.008		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.00-08.15								
B-C	0.09	9.34	0.010		0.0	0.0	0.1	
B-A	0.09	6.69	0.014		0.0	0.0	0.2	
C-A	6.58							
C-B	0.09	9.77	0.009		0.0	0.0	0.1	
A-B	0.09							
A-C	8.50							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.098	0.009			0.009

B-A	0.071	0.014	0.020	0.004	0.006	
C-B	0.098	0.010		0.009		

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.15-08.30								
B-C	0.09	9.34	0.010		0.0	0.0	0.1	
B-A	0.09	6.69	0.014		0.0	0.0	0.2	
C-A	6.58							
C-B	0.09	9.77	0.009		0.0	0.0	0.1	
A-B	0.09							
A-C	8.50							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.098	0.009			0.009
B-A	0.071	0.014	0.020	0.004	0.006
C-B	0.098	0.010		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.30-08.45								
B-C	0.07	9.62	0.008		0.0	0.0	0.1	
B-A	0.07	7.09	0.011		0.0	0.0	0.2	
C-A	5.37							
C-B	0.07	10.06	0.007		0.0	0.0	0.1	
A-B	0.07							
A-C	6.94							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.101	0.008			0.009
B-A	0.075	0.011	0.020	0.004	0.007
C-B	0.101	0.008		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.45-09.00								
B-C	0.06	9.83	0.006		0.0	0.0	0.1	
B-A	0.06	7.38	0.008		0.0	0.0	0.1	
C-A	4.50							
C-B	0.06	10.27	0.006		0.0	0.0	0.1	
A-B	0.06							
A-C	5.81							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.104	0.006			0.009
B-A	0.078	0.009	0.020	0.005	0.007
C-B	0.103	0.007		0.009	

QUEUE FOR STREAM B-C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
07.45	0.0
08.00	0.0
08.15	0.0
08.30	0.0
08.45	0.0
09.00	0.0

QUEUE FOR STREAM B-A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
07.45	0.0
08.00	0.0
08.15	0.0
08.30	0.0
08.45	0.0
09.00	0.0

QUEUE FOR STREAM C-B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
07.45	0.0
08.00	0.0
08.15	0.0
08.30	0.0
08.45	0.0
09.00	0.0

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
B-C	6.9	4.6	0.7	0.10	0.7	0.10
B-A	6.9	4.6	1.0	0.14	1.0	0.14
C-A	493.6	329.1				
C-B	6.9	4.6	0.7	0.10	0.7	0.10
A-B	6.9	4.6				
A-C	637.6	425.1				
ALL	1158.7	772.4	2.4	0.00	2.4	0.00

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD .
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

2027 Reference Flows

TRAFFIC SIGNALS CALCULATION

Job No.: [redacted] **MVA ASIA LIMITED**

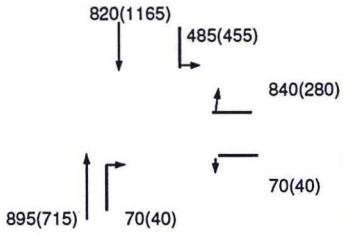
Junction: Lei Yue Mun Road / Ko Chiu Road (N) Design Year: 2027

Description: 2027 Reference Traffic Flows Designed By: [redacted] Checked By: [redacted]

Approach	Movement notation	Phase	Stage	Width (m)	Radius (m) Left	Radius (m) Right	(%) uphill Gradient	Pro. Turning (%) A.M.	Pro. Turning (%) P.M.	Revised Saturation Flow (pcu/hr) A.M.	Revised Saturation Flow (pcu/hr) P.M.	A.M. Peak Flow (pcu/hr)	A.M. Peak y Value	A.M. Peak Critical y	P.M. Peak Flow (pcu/hr)	P.M. Peak y Value	P.M. Peak Critical y
Ko Chiu Road	↰	E	4	3.300	12.5	25		16% / 84%	26% / 74%	1820	1810	439	0.241		154	0.085	
WB	↰	E	4	3.300		22.5		100%	100%	1955	1955	471	0.241	0.241	166	0.085	0.085
Lei Yue Mun Road	↳	C	1,4	3.500	15			100%	100%	1785	1785	485	0.272		455	0.255	
SB	↓	D	1	3.500						2105	2105	410	0.195	0.195	583	0.277	0.277
	↓	D	1	3.500						2105	2105	410	0.195		583	0.277	
Lei Yue Mun Road	↑	A	1,2	3.700						1985	1985	432	0.218		345	0.174	
NB	↑	A	1,2	3.700						2125	2125	463	0.218		370	0.174	
	↱	B	2	3.700		25		100%	100%	2005	2005	70	0.035		40	0.020	
Pedestrian		Fp	3	Min	9	+	9			=	18			*			*
		Gp	3,4	Min	10	+	10			=	20						
		Hp	2,3	Min	6	+	6			=	12						
		Ip	3	Min	7	+	7			=	14						
		Jp	2,3	Min	10	+	11			=	21						

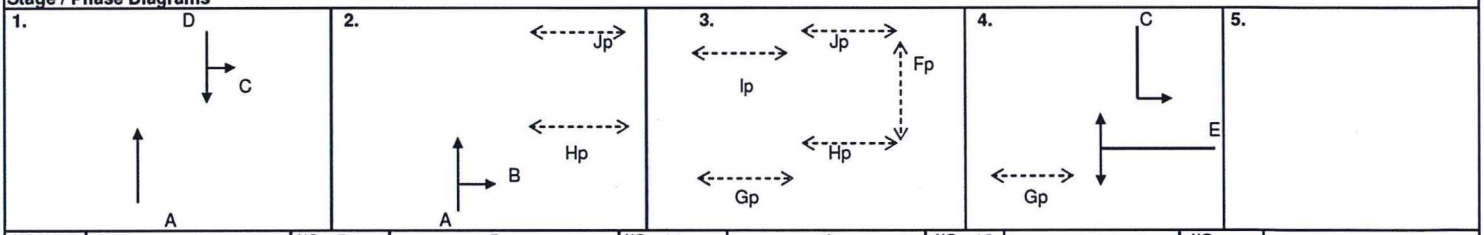
Notes:

Traffic Flow (pcu/hr)



Group	AFpE	DBFpE	Group	CBFp	DBFpE
y	0.459	0.436	y	0.255	0.362
L (sec)	35	45	L (sec)	41	45
C (sec)	110	110	C (sec)	110	110
y pract.	0.614	0.532	y pract.	0.565	0.532
R.C. (%)	34%	22%	R.C. (%)	121%	47%

Stage / Phase Diagrams



I/G= 5		I/G= 5	5	I/G= 11	9	I/G= 12		I/G=	
I/G= 5		I/G= 5	5	I/G= 11	9	I/G= 12		I/G=	

Date: 一月-16 **Junction:** A

TRAFFIC SIGNALS CALCULATION

Job No.: [redacted]

MVA ASIA LIMITED

Junction: Lei Yue Mun Road / Yau Tong Estate Southern Access

Design Year: 2027

Description: 2027 Reference Traffic Flows

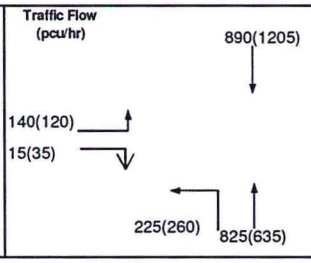
Designed By: [redacted]

Checked By: [redacted]

Approach	Movement notation	Phase	Stage	Width (m)	Radius (m) Left	Radius (m) Right	(%) uphill Gradient	Pro. Turning (%) A.M.	Pro. Turning (%) P.M.	Revised Saturation Flow (pcu/hr) A.M.	Revised Saturation Flow (pcu/hr) P.M.	A.M. Peak Flow (pcu/hr)	A.M. Peak y Value	A.M. Peak Critical y	P.M. Peak Flow (pcu/hr)	P.M. Peak y Value	P.M. Peak Critical y
Yau Tong Est.	↰	C	2	3.500	6			100%	100%	1570	1570	140	0.089	0.089	120	0.076	0.076
Access EB	↱	C	2	3.500		15				1915	1915	15	0.008		35	0.018	
Lei Yue Mun Rd SB	↓	B	1	3.700						1985	1985	430	0.217		582	0.293	0.293
	↓	B	1	3.700						2125	2125	460	0.217		623	0.293	
Lei Yue Mun Rd NB	↰↑	A	1	3.500	7.5			47%	64%	1800	1740	484	0.269		405	0.233	
	↑	A	1	3.500						2105	2105	566	0.269	0.269	490	0.233	
Pedestrian		Dp	1,3	Min	6	+	6			=	12						
		Ep	2,3	Min	9	+	9			=	18						
		Fp	3	Min	8	+	7			=	15			*			*

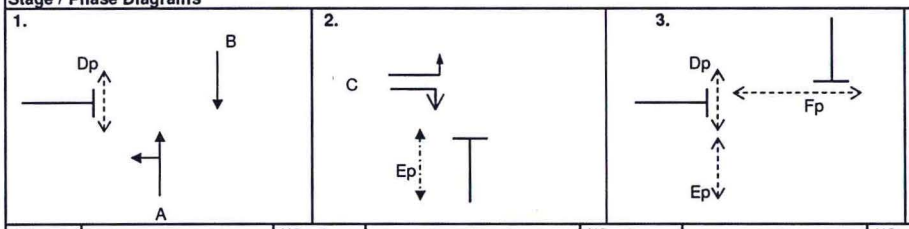
Notes:

Traffic Flow (pcu/hr)



Group	BCFp	ACFp	Group	ACFp	BCFp
y	0.306	0.358	y	0.309	0.370
L (sec)	29	29	L (sec)	29	29
C (sec)	115	115	C (sec)	115	115
y pract.	0.673	0.673	y pract.	0.673	0.673
R.C. (%)	120%	88%	R.C. (%)	118%	82%

Stage / Phase Diagrams



I/G= 9		I/G= 5		I/G= 9	8	I/G=		I/G=	
I/G= 9		I/G= 5		I/G= 9	8	I/G=		I/G=	

Date: 一月-16

Junction: B

TRANSPORT RESEARCH LABORATORY

(C) COPYRIGHT 1998

CAPACITIES, QUEUES AND DELAYS AT ROUNDABOUTS

Visual ARCADY 4 ANALYSIS PROGRAM
RELEASE 2.1 (OCT 1998)

ADAPTED FROM ARCADY/3 WHICH IS CROWN COPYRIGHT
BY PERMISSION OF THE CONTROLLER OF HMSO

THE USER OF THIS COMPUTER PROGRAM FOR THE SOLUTION OF AN ENGINEERING PROBLEM IS
IN NO WAY RELIEVED OF HIS RESPONSIBILITY FOR THE CORRECTNESS OF THE SOLUTION

.ROUNDABOUT CAPACITY AND DELAY
****

RUN TITLE
****
Lei Yue Mun Road/Ko Chiu Road (S) - 2027 Reference Flows (AM)

.INPUT DATA
****
ARM A - Ko Chiu Road EB
ARM B - Lei Yue Mun SB
ARM C - Ko Chiu Road WB

.GEOMETRIC DATA

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
ARM A	6.50	8.50	11.00	28.00	40.00	35.0	0.770	39.078
ARM B	7.50	9.00	17.00	40.00	40.00	45.0	0.804	42.574
ARM C	6.50	8.00	10.00	20.00	40.00	60.0	0.678	33.993

.TRAFFIC DEMAND DATA

.TIME PERIOD BEGINS 17.30 AND ENDS 19.00
.LENGTH OF TIME PERIOD - 90 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

.DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	TOP OF PEAK IS REACHED	FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK
ARM A	15.00	45.00	75.00	8.63	12.94	8.63
ARM B	15.00	45.00	75.00	11.31	16.97	11.31
ARM C	15.00	45.00	75.00	7.94	11.91	7.94

TIME	FROM/TO	TURNING PROPORTIONS TURNING COUNTS (VEH/HR) (PERCENTAGE OF H.V.S) ARM A	ARM B	ARM C
17.30 - 19.00	ARM A	0.065	0.710	0.225
		45.0	490.0	155.0
		(0.0)	(0.0)	(0.0)
	ARM B	0.630	0.193	0.177
		570.0	175.0	160.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.386	0.606	0.008
		245.0	385.0	5.0

```
I                    I         I (  0.0)I (  0.0)I (  0.0)I
I                    I         I        I        I        I
-------------------------------------------------------------
TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
```

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
17.30-17.45								
ARM A	8.63	33.66	0.256		0.0	0.3	5.1	
ARM B	11.31	40.52	0.279		0.0	0.4	5.7	
ARM C	7.94	27.31	0.291		0.0	0.4	6.0	
17.45-18.00								
ARM A	10.30	32.59	0.316		0.3	0.5	6.8	
ARM B	13.51	40.12	0.337		0.4	0.5	7.5	
ARM C	9.48	26.00	0.365		0.4	0.6	8.4	
18.00-18.15								
ARM A	12.61	31.14	0.405		0.5	0.7	10.0	
ARM B	16.54	39.56	0.418		0.5	0.7	10.6	
ARM C	11.61	24.21	0.480		0.6	0.9	13.3	
18.15-18.30								
ARM A	12.61	31.13	0.405		0.7	0.7	10.2	
ARM B	16.54	39.56	0.418		0.7	0.7	10.7	
ARM C	11.61	24.20	0.480		0.9	0.9	13.7	
18.30-18.45								
ARM A	10.30	32.57	0.316		0.7	0.5	7.1	
ARM B	13.51	40.11	0.337		0.7	0.5	7.8	
ARM C	9.48	25.99	0.365		0.9	0.6	8.9	
18.45-19.00								
ARM A	8.63	33.64	0.256		0.5	0.3	5.3	
ARM B	11.31	40.51	0.279		0.5	0.4	5.9	
ARM C	7.94	27.29	0.291		0.6	0.4	6.3	

QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.45	0.3	
18.00	0.5	
18.15	0.7	*
18.30	0.7	*
18.45	0.5	
19.00	0.3	

QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.45	0.4	
18.00	0.5	*

18.15	0.7	*
18.30	0.7	*
18.45	0.5	*
19.00	0.4	

.QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.45	0.4	
18.00	0.6	*
18.15	0.9	*
18.30	0.9	*
18.45	0.6	*
19.00	0.4	

. QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

ARM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
A	946.1	630.8	44.3	0.05	44.3	0.05
B	1240.9	827.3	48.2	0.04	48.2	0.04
C	870.7	580.5	56.6	0.06	56.6	0.06
ALL	3057.8	2038.5	149.1	0.05	149.1	0.05

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD.
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

TRANSPORT RESEARCH LABORATORY

(C) COPYRIGHT 1998

CAPACITIES, QUEUES AND DELAYS AT ROUNDABOUTS

Visual ARCADY 4 ANALYSIS PROGRAM
RELEASE 2.1 (OCT 1998)

ADAPTED FROM ARCADY/3 WHICH IS CROWN COPYRIGHT
BY PERMISSION OF THE CONTROLLER OF HMSO

THE USER OF THIS COMPUTER PROGRAM FOR THE SOLUTION OF AN ENGINEERING PROBLEM IS
IN NO WAY RELIEVED OF HIS RESPONSIBILITY FOR THE CORRECTNESS OF THE SOLUTION

.ROUNDABOUT CAPACITY AND DELAY
****

RUN TITLE
****
Lei Yue Mun Road/Ko Chiu Road (S) - 2027 Reference Flows (PM)

.INPUT DATA
****
ARM A - Ko Chiu Road EB
ARM B - Lei Yue Mun SB
ARM C - Ko Chiu Road WB

.GEOMETRIC DATA

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
ARM A	6.50	8.50	11.00	28.00	40.00	35.0	0.770	39.078
ARM B	7.50	9.00	17.00	40.00	40.00	45.0	0.804	42.574
ARM C	6.50	8.00	10.00	20.00	40.00	60.0	0.678	33.993

.TRAFFIC DEMAND DATA

.TIME PERIOD BEGINS 17.30 AND ENDS 19.00
.LENGTH OF TIME PERIOD - 90 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

.DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	TOP OF PEAK IS REACHED	FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK
ARM A	15.00	45.00	75.00	8.50	12.75	8.50
ARM B	15.00	45.00	75.00	15.50	23.25	15.50
ARM C	15.00	45.00	75.00	5.13	7.69	5.13

TIME	FROM/TO	TURNING PROPORTIONS TURNING COUNTS (VEH/HR) (PERCENTAGE OF H.V.S) ARM A	ARM B	ARM C
17.30 - 19.00	ARM A	0.081	0.706	0.213
		55.0	480.0	145.0
		(0.0)	(0.0)	(0.0)
	ARM B	0.653	0.181	0.165
		810.0	225.0	205.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.524	0.463	0.012
		215.0	190.0	5.0

```
I                    I         I (  0.0)I (  0.0)I (  0.0)I
I                    I         I        I        I        I
-------------------------------------------------------------
TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
```

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
17.30-17.45								
ARM A	8.50	35.05	0.243		0.0	0.3	4.7	
ARM B	15.50	40.52	0.383		0.0	0.6	9.1	
ARM C	5.13	24.78	0.207		0.0	0.3	3.8	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
17.45-18.00								
ARM A	10.15	34.26	0.296		0.3	0.4	6.2	
ARM B	18.51	40.11	0.461		0.6	0.9	12.6	
ARM C	6.12	22.97	0.266		0.3	0.4	5.3	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
18.00-18.15								
ARM A	12.43	33.18	0.375		0.4	0.6	8.8	
ARM B	22.67	39.56	0.573		0.9	1.3	19.4	
ARM C	7.50	20.50	0.366		0.4	0.6	8.4	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
18.15-18.30								
ARM A	12.43	33.17	0.375		0.6	0.6	9.0	
ARM B	22.67	39.56	0.573		1.3	1.3	20.0	
ARM C	7.50	20.48	0.366		0.6	0.6	8.6	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
18.30-18.45								
ARM A	10.15	34.24	0.296		0.6	0.4	6.4	
ARM B	18.51	40.11	0.461		1.3	0.9	13.2	
ARM C	6.12	22.94	0.267		0.6	0.4	5.6	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
18.45-19.00								
ARM A	8.50	35.03	0.243		0.4	0.3	4.9	
ARM B	15.50	40.51	0.383		0.9	0.6	9.5	
ARM C	5.13	24.74	0.207		0.4	0.3	4.0	

QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.45	0.3	
18.00	0.4	
18.15	0.6	*
18.30	0.6	*
18.45	0.4	
19.00	0.3	

QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.45	0.6	*
18.00	0.9	*

18.15	1.3	*
18.30	1.3	*
18.45	0.9	*
19.00	0.6	*

.QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.45	0.3	
18.00	0.4	
18.15	0.6	*
18.30	0.6	*
18.45	0.4	
19.00	0.3	

. QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

ARM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
A	932.4	621.6	40.0	0.04	40.0	0.04
B	1700.3	1133.5	83.8	0.05	83.8	0.05
C	562.2	374.8	35.7	0.06	35.7	0.06
ALL	3194.9	2129.9	159.5	0.05	159.5	0.05

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD.
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

TRAFFIC SIGNALS CALCULATION

Job No.: [redacted]

MVA ASIA LIMITED

Junction: Cha Kwo Ling Road / Ko Fai Road

Design Year: 2027

Description: 2027 Reference Traffic Flows

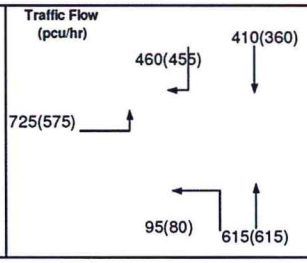
Designed By: [redacted]

Checked By: [redacted]

Approach	Movement notation	Phase	Stage	Width (m)	Radius (m) Left	Radius (m) Right	(%) uphill Gradient	Pro. Turning (%) A.M.	Pro. Turning (%) P.M.	Revised Saturation Flow (pcu/hr) A.M.	Revised Saturation Flow (pcu/hr) P.M.	A.M. Peak Flow (pcu/hr)	A.M. Peak y Value	A.M. Peak Critical y	P.M. Peak Flow (pcu/hr)	P.M. Peak y Value	P.M. Peak Critical y
Ko Fai Road	↰	C	1,3	4.000	12.5			100%	100%	1800	1800	725	0.403	0.403	575	0.319	
Cha Kwo Ling Rd	↓	A	1	3.000						1915	1915	410	0.214		360	0.188	
SB	↲	A	1	3.000		15		100%	100%	1870	1870	460	0.246		455	0.243	0.243
Cha Kwo Ling Rd	↰↑	B	2	3.400	15			28%	24%	1900	1910	338	0.178	0.178	331	0.173	
NB	↑	B	2	3.400						2095	2095	372	0.178		364	0.174	0.174
LRT/Pedestrian																	
		Ep	2,3	Min	5	+	5			=	10						
		Fp	2	Min	5	+	5			=	10						
		Gp	3	Min	5	+	5			=	10						*
		Hp	1,3	Min	5	+	6			=	11						

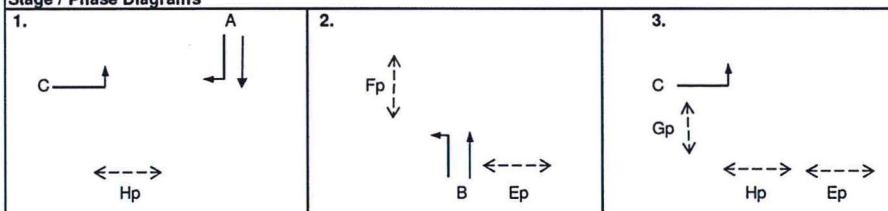
Notes:

Traffic Flow (pcu/hr)



Group	ABGp	CB	Group	CB	ABGp
y	0.424	0.581	y	0.493	0.417
L (sec)	24	9	L (sec)	9	24
C (sec)	100	100	C (sec)	100	100
y pract.	0.684	0.819	y pract.	0.819	0.684
R.C. (%)	61%	41%	R.C. (%)	66%	64%

Stage / Phase Diagrams



I/G=		I/G= 5		I/G= 6		I/G=		I/G=	
I/G= 7		I/G= 5		I/G= 9	5	I/G=		I/G=	

Date: 一月-16

Junction: D

TRAFFIC SIGNALS CALCULATION

Job No.: [redacted]

MVA ASIA LIMITED

Junction: Cha Kwo Ling Road / Ko Chiu Road

Design Year: 2027

Description: 2027 Reference Traffic Flows

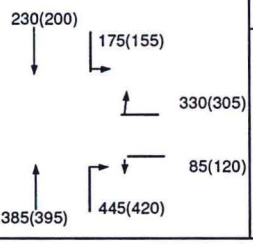
Designed By: [redacted]

Checked By: [redacted]

Approach	Movement notation	Phase	Stage	Width (m)	Radius (m) Left	Radius (m) Right	(%) uphill Gradient	Pro. Turning (%) A.M.	Pro. Turning (%) P.M.	Revised Saturation Flow (pcu/hr) A.M.	Revised Saturation Flow (pcu/hr) P.M.	A.M. Peak Flow (pcu/hr)	A.M. Peak y Value	A.M. Peak Critical y	P.M. Peak Flow (pcu/hr)	P.M. Peak y Value	P.M. Peak Critical y
Cha Kwo Ling Road	↑	C	2	3.375						1955	1955	385	0.197		395	0.202	
NB	↱	C	2	3.375		17.5		100%	100%	1925	1925	445	0.231	0.231	420	0.218	0.218
Cha Kwo Ling Road	↳	A	1	3.625	15			100%	100%	1800	1800	175	0.097	0.097	155	0.086	
SB	↓	B	4	3.625						2120	2120	230	0.108	0.108	200	0.094	0.094
Ko Chiu Road	⇄	D	1	3.800	9	20		43% / 57%	60% / 40%	1790	1765	198	0.111		201	0.114	0.114
WB	↰	D	1	3.800		17.5		100%	100%	1965	1965	217	0.111		224	0.114	
Pedestrian		Ep	3,4	Min	6	+	12			=	18						
		Fp	3	Min	8	+	15			=	23			*			*
		Gp	3	Min	6	+	11			=	17						

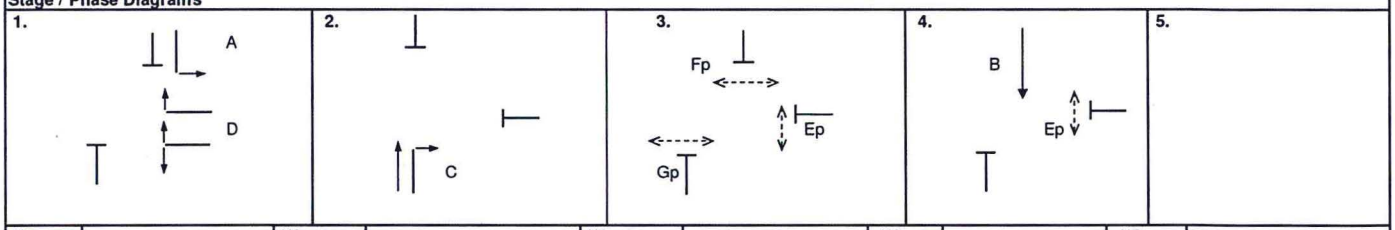
Notes:

Traffic Flow (pcu/hr)



Group	DCFpB	ACFpB	Group	ACFpB	DCFpB
y	0.450	0.437	y	0.399	0.426
L (sec)	41	43	L (sec)	43	41
C (sec)	100	100	C (sec)	100	100
y pract.	0.531	0.513	y pract.	0.513	0.531
R.C. (%)	18%	17%	R.C. (%)	29%	25%

Stage / Phase Diagrams



I/G= 7		I/G= 5		I/G= 8	8	I/G= 18		I/G=	
I/G= 5		I/G= 5		I/G= 8	8	I/G= 18		I/G=	

Date: 一月-16

Junction: E

TRANSPORT RESEARCH LABORATORY

(C) COPYRIGHT 1998

CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

Visual PICADY 4 ANALYSIS PROGRAM
RELEASE 2.1 (DEC 1998)

ADAPTED FROM PICADY/3 WHICH IS CROWN COPYRIGHT
BY PERMISSION OF THE CONTROLLER OF HMSO

THE USER OF THIS COMPUTER PROGRAM FOR THE SOLUTION OF AN ENGINEERING PROBLEM IS IN NO WAY RELIEVED OF HIS RESPONSIBILITY FOR THE CORRECTNESS OF THE SOLUTION

RUN TITLE
****
Cha Kwo Ling Road/Sze Shan Street - 2027 Reference Flows (AM)

.MAJOR/MINOR JUNCTION CAPACITY AND DELAY
****

INPUT DATA

```
                    MAJOR ROAD (ARM C) --------------------- MAJOR ROAD (ARM A)
                                                I
                                                I
                                                I
                                                I
                                                I
                                                I
                                          MINOR ROAD (ARM B)
```

ARM A IS Cha Kwo Ling Road NB
ARM B IS Ko Fai Road EB
ARM C IS Cha Kwo Ling Road SB

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B

STREAM B-AC CONTAINS TRAFFIC GOING FROM ARM B TO ARM A AND TO ARM C

ETC.

.GEOMETRIC DATA

DATA ITEM	MINOR ROAD B
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	(W) 13.50 M.
CENTRAL RESERVE WIDTH	(WCR) 0.00 M.
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B) 3.00 M.
- VISIBILITY	(VC-B) 90.0 M.
- BLOCKS TRAFFIC	NO
MINOR ROAD - VISIBILITY TO LEFT	(VB-C) 22.0 M.
- VISIBILITY TO RIGHT	(VB-A) 30.0 M.
- LANE 1 WIDTH	(WB-C) 5.00 M.
- LANE 2 WIDTH	(WB-A) 0.00 M.

.

.TRAFFIC DEMAND DATA

TIME PERIOD BEGINS 07.30 AND ENDS 09.00

LENGTH OF TIME PERIOD - 90 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

	NUMBER OF MINUTES FROM START WHEN	RATE OF FLOW (VEH/MIN)

ARM	FLOW STARTS TO RISE	TOP OF PEAK IS REACHED	FLOW STOPS FALLING	BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK
ARM A	15.00	45.00	75.00	8.38	12.56	8.38
ARM B	15.00	45.00	75.00	2.19	3.28	2.19
ARM C	15.00	45.00	75.00	3.25	4.88	3.25

TIME	FROM/TO	TURNING PROPORTIONS TURNING COUNTS (VEH/HR) (PERCENTAGE OF H.V.S) ARM A	ARM B	ARM C
07.30 - 09.00	ARM A	0.000	0.015	0.985
		0.0	10.0	660.0
		(0.0)	(0.0)	(0.0)
	ARM B	0.029	0.000	0.971
		5.0	0.0	170.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.635	0.365	0.000
		165.0	95.0	0.0
		(0.0)	(0.0)	(0.0)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
07.30-07.45								
B-AC	2.19	11.06	0.198		0.0	0.2	3.5	
C-A	2.06							
C-B	1.19	9.86	0.120		0.0	0.1	2.0	
A-B	0.13							
A-C	8.25							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-AC	0.113	0.008	0.013	0.005	0.008
C-B	0.099	0.010		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
07.45-08.00								
B-AC	2.61	10.72	0.244		0.2	0.3	4.7	
C-A	2.46							
C-B	1.42	9.57	0.148		0.1	0.2	2.5	
A-B	0.15							
A-C	9.85							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-AC	0.107	0.009	0.013	0.005	0.007
C-B	0.096	0.012		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.00-08.15								
B-AC	3.20	10.27	0.312		0.3	0.4	6.5	
C-A	3.02							
C-B	1.74	9.17	0.189		0.2	0.2	3.4	
A-B	0.18							
A-C	12.07							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-AC	0.099	0.012	0.013	0.004	0.007
C-B	0.092	0.014		0.008	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.15-08.30								
B-AC	3.20	10.27	0.312		0.4	0.4	6.7	
C-A	3.02							
C-B	1.74	9.17	0.189		0.2	0.2	3.5	
A-B	0.18							
A-C	12.07							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-AC	0.099	0.012	0.013	0.004	0.007
C-B	0.092	0.014		0.008	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.30-08.45								
B-AC	2.61	10.72	0.244		0.4	0.3	5.0	
C-A	2.46							
C-B	1.42	9.57	0.148		0.2	0.2	2.7	
A-B	0.15							
A-C	9.85							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-AC	0.107	0.009	0.013	0.005	0.007
C-B	0.096	0.012		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.45-09.00								
B-AC	2.19	11.06	0.198		0.3	0.2	3.8	
C-A	2.06							
C-B	1.19	9.86	0.120		0.2	0.1	2.1	
A-B	0.13							
A-C	8.25							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-AC	0.113	0.008	0.013	0.005	0.008
C-B	0.099	0.010		0.009	

QUEUE FOR STREAM B-AC

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
07.45	0.2
08.00	0.3
08.15	0.4
08.30	0.4
08.45	0.3
09.00	0.2

QUEUE FOR STREAM C-B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
07.45	0.1
08.00	0.2
08.15	0.2
08.30	0.2
08.45	0.2
09.00	0.1

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)

B-AC	240.0	160.0	30.3	0.13	30.3	0.13
C-A	226.2	150.8				
C-B	130.3	86.8	16.2	0.12	16.2	0.12
A-B	13.7	9.1				
A-C	905.0	603.3				
ALL	1515.2	1010.1	46.5	0.03	46.5	0.03

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD .
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

TRANSPORT RESEARCH LABORATORY

(C) COPYRIGHT 1998

CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

Visual PICADY 4 ANALYSIS PROGRAM
RELEASE 2.1 (DEC 1998)

ADAPTED FROM PICADY/3 WHICH IS CROWN COPYRIGHT
BY PERMISSION OF THE CONTROLLER OF HMSO

THE USER OF THIS COMPUTER PROGRAM FOR THE SOLUTION OF AN ENGINEERING PROBLEM IS IN NO WAY RELIEVED OF HIS RESPONSIBILITY FOR THE CORRECTNESS OF THE SOLUTION

RUN TITLE
****
Cha Kwo Ling Road/Sze Shan Street - 2027 Reference Flows (PM)

.MAJOR/MINOR JUNCTION CAPACITY AND DELAY
****

INPUT DATA

```
                    MAJOR ROAD (ARM C) --------------------- MAJOR ROAD (ARM A)
                                                I
                                                I
                                                I
                                                I
                                                I
                                                I
                                           MINOR ROAD (ARM B)
```

ARM A IS Cha Kwo Ling Road NB
ARM B IS Ko Fai Road EB
ARM C IS Cha Kwo Ling Road SB

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B

STREAM B-AC CONTAINS TRAFFIC GOING FROM ARM B TO ARM A AND TO ARM C

ETC.

.GEOMETRIC DATA

DATA ITEM	MINOR ROAD B
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	(W) 13.50 M.
CENTRAL RESERVE WIDTH	(WCR) 0.00 M.
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B) 3.00 M.
- VISIBILITY	(VC-B) 90.0 M.
- BLOCKS TRAFFIC	NO
MINOR ROAD - VISIBILITY TO LEFT	(VB-C) 22.0 M.
- VISIBILITY TO RIGHT	(VB-A) 30.0 M.
- LANE 1 WIDTH	(WB-C) 5.00 M.
- LANE 2 WIDTH	(WB-A) 0.00 M.

.

.TRAFFIC DEMAND DATA

TIME PERIOD BEGINS 07.30 AND ENDS 09.00

LENGTH OF TIME PERIOD - 90 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

	NUMBER OF MINUTES FROM START WHEN	RATE OF FLOW (VEH/MIN)

ARM	FLOW STARTS TO RISE	TOP OF PEAK IS REACHED	FLOW STOPS FALLING	BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK
ARM A	15.00	45.00	75.00	7.81	11.72	7.81
ARM B	15.00	45.00	75.00	2.50	3.75	2.50
ARM C	15.00	45.00	75.00	3.44	5.16	3.44

TIME	FROM/TO	TURNING PROPORTIONS TURNING COUNTS (VEH/HR) (PERCENTAGE OF H.V.S) ARM A	ARM B	ARM C
07.30 - 09.00	ARM A	0.000	0.008	0.992
		0.0	5.0	620.0
		(0.0)	(0.0)	(0.0)
	ARM B	0.025	0.000	0.975
		5.0	0.0	195.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.600	0.400	0.000
		165.0	110.0	0.0
		(0.0)	(0.0)	(0.0)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
07.30-07.45								
B-AC	2.50	11.18	0.224		0.0	0.3	4.1	
C-A	2.06							
C-B	1.38	9.96	0.138		0.0	0.2	2.3	
A-B	0.06							
A-C	7.75							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-AC	0.114	0.008	0.013	0.005	0.008
C-B	0.100	0.009		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
07.45-08.00								
B-AC	2.99	10.86	0.275		0.3	0.4	5.5	
C-A	2.46							
C-B	1.64	9.69	0.170		0.2	0.2	3.0	
A-B	0.07							
A-C	9.25							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-AC	0.108	0.009	0.013	0.005	0.007
C-B	0.097	0.011		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.00-08.15								
B-AC	3.66	10.44	0.350		0.4	0.5	7.7	
C-A	3.02							
C-B	2.01	9.31	0.216		0.2	0.3	4.0	
A-B	0.09							
A-C	11.33							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-AC	0.100	0.011	0.013	0.005	0.007
C-B	0.093	0.013		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.15-08.30								
B-AC	3.66	10.44	0.350		0.5	0.5	8.0	
C-A	3.02							
C-B	2.01	9.31	0.216		0.3	0.3	4.1	
A-B	0.09							
A-C	11.33							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-AC	0.100	0.011	0.013	0.005	0.007
C-B	0.093	0.013		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.30-08.45								
B-AC	2.99	10.86	0.275		0.5	0.4	5.9	
C-A	2.46							
C-B	1.64	9.69	0.170		0.3	0.2	3.2	
A-B	0.07							
A-C	9.25							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-AC	0.108	0.009	0.013	0.005	0.007
C-B	0.097	0.011		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.45-09.00								
B-AC	2.50	11.17	0.224		0.4	0.3	4.5	
C-A	2.06							
C-B	1.38	9.96	0.138		0.2	0.2	2.5	
A-B	0.06							
A-C	7.75							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-AC	0.113	0.008	0.013	0.005	0.008
C-B	0.100	0.009		0.009	

QUEUE FOR STREAM B-AC

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
07.45	0.3	
08.00	0.4	
08.15	0.5	*
08.30	0.5	*
08.45	0.4	
09.00	0.3	

QUEUE FOR STREAM C-B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
07.45	0.2
08.00	0.2
08.15	0.3
08.30	0.3
08.45	0.2
09.00	0.2

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)

B-AC	274.2	182.8	35.7	0.13	35.7	0.13	
C-A	226.2	150.8					
C-B	150.8	100.6	19.0	0.13	19.0	0.13	
A-B	6.9	4.6					
A-C	850.2	566.8					
ALL	1508.3	1005.6	54.7	0.04	54.7	0.04	

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD .
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

TRANSPORT RESEARCH LABORATORY

(C) COPYRIGHT 1998

CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

Visual PICADY 4 ANALYSIS PROGRAM
RELEASE 2.1 (DEC 1998)

ADAPTED FROM PICADY/3 WHICH IS CROWN COPYRIGHT
BY PERMISSION OF THE CONTROLLER OF HMSO

THE USER OF THIS COMPUTER PROGRAM FOR THE SOLUTION OF AN ENGINEERING PROBLEM IS IN NO WAY RELIEVED OF HIS RESPONSIBILITY FOR THE CORRECTNESS OF THE SOLUTION

RUN TITLE
****
Cha Kwo Ling Road/Yan Wing Street - 2027 Reference Flows (AM)

.MAJOR/MINOR JUNCTION CAPACITY AND DELAY
****

INPUT DATA

```
                    MAJOR ROAD (ARM C) --------------------- MAJOR ROAD (ARM A)
                                                I
                                                I
                                                I
                                                I
                                                I
                                                I
                                          MINOR ROAD (ARM B)
```

ARM A IS Cha Kwo Ling Road SB
ARM B IS Yan Wing Street WB
ARM C IS Cha Kwo Ling Road NB

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B

ETC.

.GEOMETRIC DATA

DATA ITEM	MINOR ROAD B
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	(W) 14.00 M.
CENTRAL RESERVE WIDTH	(WCR) 0.00 M.
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B) 3.00 M.
- VISIBILITY	(VC-B) 90.0 M.
- BLOCKS TRAFFIC	NO
MINOR ROAD - VISIBILITY TO LEFT	(VB-C) 20.0 M.
- VISIBILITY TO RIGHT	(VB-A) 25.0 M.
- LANE 1 WIDTH	(WB-C) 5.00 M.
- LANE 2 WIDTH	(WB-A) 5.00 M.

.

.TRAFFIC DEMAND DATA

TIME PERIOD BEGINS 07.30 AND ENDS 09.00

LENGTH OF TIME PERIOD - 90 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	TOP OF PEAK IS REACHED	FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK

ARM A	15.00		45.00		75.00		2.13		3.19		2.13
ARM B	15.00		45.00		75.00		5.56		8.34		5.56
ARM C	15.00		45.00		75.00		6.13		9.19		6.13

TIME	FROM/TO	TURNING PROPORTIONS TURNING COUNTS (VEH/HR) (PERCENTAGE OF H.V.S) ARM A	ARM B	ARM C
07.30 - 09.00				
	ARM A	0.000	0.000	1.000
		0.0	0.0	170.0
		(0.0)	(0.0)	(0.0)
	ARM B	0.404	0.000	0.596
		180.0	0.0	265.0
		(0.0)	(0.0)	(0.0)
	ARM C	1.000	0.000	0.000
		490.0	0.0	0.0
		(0.0)	(0.0)	(0.0)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
07.30-07.45								
B-C	3.31	11.60	0.286		0.0	0.4	5.7	
B-A	2.25	8.86	0.254		0.0	0.3	4.8	
C-A	6.13							
C-B	0.00	9.98	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	2.13							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.097	0.003			0.011
B-A	0.074	0.007	0.022	0.006	0.009
C-B	0.110	0.002		0.010	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
07.45-08.00								
B-C	3.96	11.34	0.349		0.4	0.5	7.7	
B-A	2.69	8.65	0.311		0.3	0.4	6.4	
C-A	7.31							
C-B	0.00	9.92	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	2.54							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.095	0.003			0.011
B-A	0.072	0.009	0.022	0.006	0.009
C-B	0.109	0.003		0.010	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.00-08.15								
B-C	4.84	10.98	0.441		0.5	0.8	11.2	
B-A	3.29	8.37	0.393		0.4	0.6	9.2	
C-A	8.96							
C-B	0.00	9.83	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	3.11							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.092	0.004			0.011

B-A	0.070	0.010	0.022	0.005	0.008	
C-B	0.108	0.004		0.010		

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.15-08.30								
B-C	4.84	10.98	0.441		0.8	0.8	11.7	
B-A	3.29	8.37	0.393		0.6	0.6	9.6	
C-A	8.96							
C-B	0.00	9.83	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	3.11							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.092	0.004			0.011
B-A	0.070	0.010	0.022	0.005	0.008
C-B	0.108	0.004		0.010	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.30-08.45								
B-C	3.96	11.33	0.349		0.8	0.5	8.4	
B-A	2.69	8.65	0.311		0.6	0.5	7.1	
C-A	7.31							
C-B	0.00	9.92	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	2.54							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.094	0.003			0.011
B-A	0.072	0.009	0.022	0.006	0.009
C-B	0.109	0.003		0.010	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.45-09.00								
B-C	3.31	11.59	0.286		0.5	0.4	6.2	
B-A	2.25	8.86	0.254		0.5	0.3	5.3	
C-A	6.13							
C-B	0.00	9.98	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	2.13							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.097	0.003			0.011
B-A	0.074	0.007	0.022	0.006	0.009
C-B	0.110	0.002		0.010	

QUEUE FOR STREAM B-C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
07.45	0.4	
08.00	0.5	*
08.15	0.8	*
08.30	0.8	*
08.45	0.5	*
09.00	0.4	

QUEUE FOR STREAM B-A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
07.45	0.3	
08.00	0.4	
08.15	0.6	*
08.30	0.6	*
08.45	0.5	
09.00	0.3	

QUEUE FOR STREAM C-B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
07.45	0.0
08.00	0.0
08.15	0.0
08.30	0.0
08.45	0.0
09.00	0.0

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
B-C	363.4	242.2	50.9	0.14	50.9	0.14
B-A	246.8	164.5	42.4	0.17	42.5	0.17
C-A	671.9	447.9				
C-B	0.0	0.0	0.0	0.00	0.0	0.00
A-B	0.0	0.0				
A-C	233.1	155.4				
ALL	1515.2	1010.1	93.4	0.06	93.4	0.06

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD .
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

TRANSPORT RESEARCH LABORATORY

(C) COPYRIGHT 1998

CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

Visual PICADY 4 ANALYSIS PROGRAM
RELEASE 2.1 (DEC 1998)

ADAPTED FROM PICADY/3 WHICH IS CROWN COPYRIGHT
BY PERMISSION OF THE CONTROLLER OF HMSO

THE USER OF THIS COMPUTER PROGRAM FOR THE SOLUTION OF AN ENGINEERING PROBLEM IS IN NO WAY RELIEVED OF HIS RESPONSIBILITY FOR THE CORRECTNESS OF THE SOLUTION

RUN TITLE
****
Cha Kwo Ling Road/Yan Wing Street - 2027 Reference Flows (PM)

.MAJOR/MINOR JUNCTION CAPACITY AND DELAY
****

INPUT DATA

```
                    MAJOR ROAD (ARM C) --------------------- MAJOR ROAD (ARM A)
                                                I
                                                I
                                                I
                                                I
                                                I
                                                I
                                           MINOR ROAD (ARM B)
```

ARM A IS Cha Kwo Ling Road SB
ARM B IS Yan Wing Street WB
ARM C IS Cha Kwo Ling Road NB

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B

ETC.

.GEOMETRIC DATA

DATA ITEM	MINOR ROAD B
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	(W) 14.00 M.
CENTRAL RESERVE WIDTH	(WCR) 0.00 M.
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B) 3.00 M.
- VISIBILITY	(VC-B) 90.0 M.
- BLOCKS TRAFFIC	NO
MINOR ROAD - VISIBILITY TO LEFT	(VB-C) 20.0 M.
- VISIBILITY TO RIGHT	(VB-A) 25.0 M.
- LANE 1 WIDTH	(WB-C) 5.00 M.
- LANE 2 WIDTH	(WB-A) 5.00 M.

.

.TRAFFIC DEMAND DATA

TIME PERIOD BEGINS 07.30 AND ENDS 09.00

LENGTH OF TIME PERIOD - 90 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	TOP OF PEAK IS REACHED	FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK

ARM A	15.00	45.00	75.00	2.13	3.19	2.13
ARM B	15.00	45.00	75.00	7.44	11.16	7.44
ARM C	15.00	45.00	75.00	6.00	9.00	6.00

TIME	FROM/TO	ARM A	ARM B	ARM C
		TURNING PROPORTIONS TURNING COUNTS (VEH/HR) (PERCENTAGE OF H.V.S)		
07.30 - 09.00	ARM A	0.000	0.000	1.000
		0.0	0.0	170.0
		(0.0)	(0.0)	(0.0)
	ARM B	0.244	0.000	0.756
		145.0	0.0	450.0
		(0.0)	(0.0)	(0.0)
	ARM C	1.000	0.000	0.000
		480.0	0.0	0.0
		(0.0)	(0.0)	(0.0)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
07.30-07.45								
B-C	5.63	11.75	0.479		0.0	0.9	12.7	
B-A	1.81	8.87	0.204		0.0	0.3	3.7	
C-A	6.00							
C-B	0.00	9.98	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	2.13							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.098	0.003			0.012
B-A	0.074	0.007	0.022	0.006	0.009
C-B	0.110	0.002		0.010	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
07.45-08.00								
B-C	6.72	11.53	0.583		0.9	1.4	19.2	
B-A	2.16	8.67	0.250		0.3	0.3	4.8	
C-A	7.16							
C-B	0.00	9.92	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	2.54							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.096	0.003			0.011
B-A	0.072	0.008	0.022	0.006	0.009
C-B	0.109	0.003		0.010	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.00-08.15								
B-C	8.23	11.22	0.733		1.4	2.6	34.7	
B-A	2.65	8.39	0.316		0.3	0.5	6.6	
C-A	8.77							
C-B	0.00	9.83	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	3.11							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.094	0.004			0.011

B-A	0.070	0.010	0.022	0.005	0.008	
C-B	0.108	0.004		0.010		

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.15-08.30								
B-C	8.23	11.22	0.733		2.6	2.6	39.1	
B-A	2.65	8.39	0.316		0.5	0.5	6.9	
C-A	8.77							
C-B	0.00	9.83	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	3.11							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.094	0.004			0.011
B-A	0.070	0.010	0.022	0.005	0.008
C-B	0.108	0.004		0.010	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.30-08.45								
B-C	6.72	11.53	0.583		2.6	1.4	23.1	
B-A	2.16	8.67	0.250		0.5	0.3	5.2	
C-A	7.16							
C-B	0.00	9.92	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	2.54							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.096	0.003			0.011
B-A	0.072	0.008	0.022	0.006	0.009
C-B	0.109	0.003		0.010	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.45-09.00								
B-C	5.63	11.74	0.479		1.4	0.9	14.7	
B-A	1.81	8.87	0.204		0.3	0.3	4.0	
C-A	6.00							
C-B	0.00	9.98	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	2.13							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.098	0.003			0.012
B-A	0.074	0.007	0.022	0.006	0.009
C-B	0.110	0.002		0.010	

QUEUE FOR STREAM B-C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
07.45	0.9	*
08.00	1.4	*
08.15	2.6	***
08.30	2.6	***
08.45	1.4	*
09.00	0.9	*

QUEUE FOR STREAM B-A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
07.45	0.3
08.00	0.3
08.15	0.5
08.30	0.5
08.45	0.3
09.00	0.3

QUEUE FOR STREAM C-B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
07.45	0.0
08.00	0.0
08.15	0.0
08.30	0.0
08.45	0.0
09.00	0.0

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
B-C	617.0	411.4	143.6	0.23	143.7	0.23
B-A	198.8	132.6	31.1	0.16	31.1	0.16
C-A	658.2	438.8				
C-B	0.0	0.0	0.0	0.00	0.0	0.00
A-B	0.0	0.0				
A-C	233.1	155.4				
ALL	1707.2	1138.1	174.8	0.10	174.8	0.10

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD .
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

TRANSPORT RESEARCH LABORATORY

(C) COPYRIGHT 1998

CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

Visual PICADY 4 ANALYSIS PROGRAM
RELEASE 2.1 (DEC 1998)

ADAPTED FROM PICADY/3 WHICH IS CROWN COPYRIGHT
BY PERMISSION OF THE CONTROLLER OF HMSO

THE USER OF THIS COMPUTER PROGRAM FOR THE SOLUTION OF AN ENGINEERING PROBLEM IS IN NO WAY RELIEVED OF HIS RESPONSIBILITY FOR THE CORRECTNESS OF THE SOLUTION

RUN TITLE
****
Cha Kwo Ling Road/Access Road - 2027 Reference Flows (AM)

.MAJOR/MINOR JUNCTION CAPACITY AND DELAY
****

INPUT DATA

```
                    MAJOR ROAD (ARM C) --------------------- MAJOR ROAD (ARM A)
                                                I
                                                I
                                                I
                                                I
                                                I
                                                I
                                           MINOR ROAD (ARM B)
```

ARM A IS Cha Kwo Ling Road SB
ARM B IS Access Road WB
ARM C IS Cha Kwo Ling Road NB

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B

ETC.

.GEOMETRIC DATA

DATA ITEM	MINOR ROAD B
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	(W) 13.00 M.
CENTRAL RESERVE WIDTH	(WCR) 0.00 M.
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B) 3.00 M.
- VISIBILITY	(VC-B) 90.0 M.
- BLOCKS TRAFFIC	NO
MINOR ROAD - VISIBILITY TO LEFT	(VB-C) 100.0 M.
- VISIBILITY TO RIGHT	(VB-A) 100.0 M.
- LANE 1 WIDTH	(WB-C) 2.50 M.
- LANE 2 WIDTH	(WB-A) 2.50 M.

.

.TRAFFIC DEMAND DATA

TIME PERIOD BEGINS 07.30 AND ENDS 09.00

LENGTH OF TIME PERIOD - 90 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	TOP OF PEAK IS REACHED	FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK

ARM A	15.00	45.00	75.00	5.44	8.16	5.44
ARM B	15.00	45.00	75.00	0.13	0.19	0.13
ARM C	15.00	45.00	75.00	6.13	9.19	6.13

TIME	FROM/TO	TURNING PROPORTIONS TURNING COUNTS (VEH/HR) (PERCENTAGE OF H.V.S) ARM A	ARM B	ARM C
07.30 - 09.00	ARM A	0.000	0.011	0.989
		0.0	5.0	430.0
		(0.0)	(0.0)	(0.0)
	ARM B	0.500	0.000	0.500
		5.0	0.0	5.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.990	0.010	0.000
		485.0	5.0	0.0
		(0.0)	(0.0)	(0.0)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
07.30-07.45								
B-C	0.06	9.90	0.006		0.0	0.0	0.1	
B-A	0.06	7.29	0.009		0.0	0.0	0.1	
C-A	6.06							
C-B	0.06	10.35	0.006		0.0	0.0	0.1	
A-B	0.06							
A-C	5.38							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.104	0.006			0.009
B-A	0.077	0.010	0.020	0.005	0.007
C-B	0.104	0.006		0.010	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
07.45-08.00								
B-C	0.07	9.72	0.008		0.0	0.0	0.1	
B-A	0.07	6.98	0.011		0.0	0.0	0.2	
C-A	7.24							
C-B	0.07	10.15	0.007		0.0	0.0	0.1	
A-B	0.07							
A-C	6.42							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.102	0.007			0.009
B-A	0.074	0.012	0.020	0.004	0.006
C-B	0.102	0.007		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.00-08.15								
B-C	0.09	9.45	0.010		0.0	0.0	0.1	
B-A	0.09	6.56	0.014		0.0	0.0	0.2	
C-A	8.87							
C-B	0.09	9.88	0.009		0.0	0.0	0.1	
A-B	0.09							
A-C	7.86							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.100	0.009			0.009

B-A	0.069	0.015	0.020	0.004	0.006	
C-B	0.099	0.009		0.009		

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.15-08.30								
B-C	0.09	9.45	0.010		0.0	0.0	0.1	
B-A	0.09	6.56	0.014		0.0	0.0	0.2	
C-A	8.87							
C-B	0.09	9.88	0.009		0.0	0.0	0.1	
A-B	0.09							
A-C	7.86							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.100	0.009			0.009
B-A	0.069	0.015	0.020	0.004	0.006
C-B	0.099	0.009		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.30-08.45								
B-C	0.07	9.72	0.008		0.0	0.0	0.1	
B-A	0.07	6.98	0.011		0.0	0.0	0.2	
C-A	7.24							
C-B	0.07	10.15	0.007		0.0	0.0	0.1	
A-B	0.07							
A-C	6.42							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.102	0.007			0.009
B-A	0.074	0.012	0.020	0.004	0.006
C-B	0.102	0.007		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.45-09.00								
B-C	0.06	9.90	0.006		0.0	0.0	0.1	
B-A	0.06	7.29	0.009		0.0	0.0	0.1	
C-A	6.06							
C-B	0.06	10.35	0.006		0.0	0.0	0.1	
A-B	0.06							
A-C	5.38							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.104	0.006			0.009
B-A	0.077	0.010	0.020	0.005	0.007
C-B	0.104	0.006		0.010	

QUEUE FOR STREAM B-C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
07.45	0.0
08.00	0.0
08.15	0.0
08.30	0.0
08.45	0.0
09.00	0.0

QUEUE FOR STREAM B-A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
07.45	0.0
08.00	0.0
08.15	0.0
08.30	0.0
08.45	0.0
09.00	0.0

QUEUE FOR STREAM C-B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
07.45	0.0
08.00	0.0
08.15	0.0
08.30	0.0
08.45	0.0
09.00	0.0

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
B-C	6.9	4.6	0.7	0.10	0.7	0.10
B-A	6.9	4.6	1.0	0.15	1.0	0.15
C-A	665.0	443.4				
C-B	6.9	4.6	0.7	0.10	0.7	0.10
A-B	6.9	4.6				
A-C	589.6	393.1				
ALL	1282.1	854.7	2.4	0.00	2.4	0.00

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD .
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

TRANSPORT RESEARCH LABORATORY

(C) COPYRIGHT 1998

CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

Visual PICADY 4 ANALYSIS PROGRAM
RELEASE 2.1 (DEC 1998)

ADAPTED FROM PICADY/3 WHICH IS CROWN COPYRIGHT
BY PERMISSION OF THE CONTROLLER OF HMSO

THE USER OF THIS COMPUTER PROGRAM FOR THE SOLUTION OF AN ENGINEERING PROBLEM IS IN NO WAY RELIEVED OF HIS RESPONSIBILITY FOR THE CORRECTNESS OF THE SOLUTION

RUN TITLE
****
Cha Kwo Ling Road/Access Road - 2027 Reference Flows (PM)

.MAJOR/MINOR JUNCTION CAPACITY AND DELAY
****

INPUT DATA

```
                    MAJOR ROAD (ARM C) --------------------- MAJOR ROAD (ARM A)
                                                I
                                                I
                                                I
                                                I
                                                I
                                                I
                                          MINOR ROAD (ARM B)
```

ARM A IS Cha Kwo Ling Road SB
ARM B IS Access Road WB
ARM C IS Cha Kwo Ling Road NB

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B

ETC.

.GEOMETRIC DATA

DATA ITEM	MINOR ROAD B
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	(W) 13.00 M.
CENTRAL RESERVE WIDTH	(WCR) 0.00 M.
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B) 3.00 M.
- VISIBILITY	(VC-B) 90.0 M.
- BLOCKS TRAFFIC	NO
MINOR ROAD - VISIBILITY TO LEFT	(VB-C) 100.0 M.
- VISIBILITY TO RIGHT	(VB-A) 100.0 M.
- LANE 1 WIDTH	(WB-C) 2.50 M.
- LANE 2 WIDTH	(WB-A) 2.50 M.

.

.TRAFFIC DEMAND DATA

TIME PERIOD BEGINS 07.30 AND ENDS 09.00

LENGTH OF TIME PERIOD - 90 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	TOP OF PEAK IS REACHED	FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK

ARM A	15.00	45.00	75.00	7.75	11.63	7.75
ARM B	15.00	45.00	75.00	0.13	0.19	0.13
ARM C	15.00	45.00	75.00	6.00	9.00	6.00

TIME	FROM/TO	TURNING PROPORTIONS TURNING COUNTS (VEH/HR) (PERCENTAGE OF H.V.S) ARM A	ARM B	ARM C
07.30 - 09.00	ARM A	0.000	0.008	0.992
		0.0	5.0	615.0
		(0.0)	(0.0)	(0.0)
	ARM B	0.500	0.000	0.500
		5.0	0.0	5.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.990	0.010	0.000
		475.0	5.0	0.0
		(0.0)	(0.0)	(0.0)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
07.30-07.45								
B-C	0.06	9.50	0.007		0.0	0.0	0.1	
B-A	0.06	6.91	0.009		0.0	0.0	0.1	
C-A	5.94							
C-B	0.06	9.92	0.006		0.0	0.0	0.1	
A-B	0.06							
A-C	7.69							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.100	0.008			0.009
B-A	0.073	0.012	0.020	0.004	0.006
C-B	0.099	0.009		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
07.45-08.00								
B-C	0.07	9.23	0.008		0.0	0.0	0.1	
B-A	0.07	6.53	0.011		0.0	0.0	0.2	
C-A	7.09							
C-B	0.07	9.65	0.008		0.0	0.0	0.1	
A-B	0.07							
A-C	9.18							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.097	0.010			0.008
B-A	0.069	0.015	0.020	0.004	0.006
C-B	0.097	0.011		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.00-08.15								
B-C	0.09	8.86	0.010		0.0	0.0	0.2	
B-A	0.09	6.00	0.015		0.0	0.0	0.2	
C-A	8.68							
C-B	0.09	9.26	0.010		0.0	0.0	0.1	
A-B	0.09							
A-C	11.24							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.093	0.012			0.008

B-A	0.063	0.018	0.020	0.004	0.005	
C-B	0.093	0.013		0.009		

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.15-08.30								
B-C	0.09	8.86	0.010		0.0	0.0	0.2	
B-A	0.09	6.00	0.015		0.0	0.0	0.2	
C-A	8.68							
C-B	0.09	9.26	0.010		0.0	0.0	0.1	
A-B	0.09							
A-C	11.24							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.093	0.012			0.008
B-A	0.063	0.018	0.020	0.004	0.005
C-B	0.093	0.013		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.30-08.45								
B-C	0.07	9.23	0.008		0.0	0.0	0.1	
B-A	0.07	6.53	0.011		0.0	0.0	0.2	
C-A	7.09							
C-B	0.07	9.65	0.008		0.0	0.0	0.1	
A-B	0.07							
A-C	9.18							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.097	0.010			0.008
B-A	0.069	0.015	0.020	0.004	0.006
C-B	0.097	0.011		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.45-09.00								
B-C	0.06	9.50	0.007		0.0	0.0	0.1	
B-A	0.06	6.91	0.009		0.0	0.0	0.1	
C-A	5.94							
C-B	0.06	9.92	0.006		0.0	0.0	0.1	
A-B	0.06							
A-C	7.69							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.100	0.008			0.009
B-A	0.073	0.012	0.020	0.004	0.006
C-B	0.099	0.009		0.009	

QUEUE FOR STREAM B-C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
07.45	0.0
08.00	0.0
08.15	0.0
08.30	0.0
08.45	0.0
09.00	0.0

QUEUE FOR STREAM B-A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
07.45	0.0
08.00	0.0
08.15	0.0
08.30	0.0
08.45	0.0
09.00	0.0

QUEUE FOR STREAM C-B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
07.45	0.0
08.00	0.0
08.15	0.0
08.30	0.0
08.45	0.0
09.00	0.0

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
B-C	6.9	4.6	0.8	0.11	0.8	0.11
B-A	6.9	4.6	1.1	0.16	1.1	0.16
C-A	651.3	434.2				
C-B	6.9	4.6	0.7	0.10	0.7	0.10
A-B	6.9	4.6				
A-C	843.3	562.2				
ALL	1522.0	1014.7	2.5	0.00	2.5	0.00

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD .
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

2027 Design Flows

TRAFFIC SIGNALS CALCULATION

Job No.: [redacted] **MVA ASIA LIMITED**

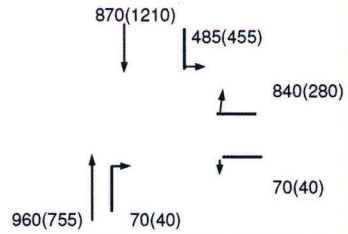
Junction: Lei Yue Mun Road / Ko Chiu Road (N) Design Year: 2027

Description: 2027 Design Traffic Flows Designed By: [redacted] Checked By: [redacted]

Approach	Movement notation	Phase	Stage	Width (m)	Radius (m) Left	Radius (m) Right	(%) uphill Gradient	Pro. Turning (%) A.M.	Pro. Turning (%) P.M.	Revised Saturation Flow (pcu/hr) A.M.	Revised Saturation Flow (pcu/hr) P.M.	A.M. Peak Flow (pcu/hr)	A.M. Peak y Value	A.M. Peak Critical y	P.M. Peak Flow (pcu/hr)	P.M. Peak y Value	P.M. Peak Critical y
Ko Chiu Road		E	4	3.300	12.5	25		16% / 84%	26% / 74%	1820	1810	439	0.241		154	0.085	
WB		E	4	3.300		22.5		100%	100%	1955	1955	471	0.241	0.241	166	0.085	0.085
Lei Yue Mun Road		C	1,4	3.500	15			100%	100%	1785	1785	485	0.272		455	0.255	
SB		D	1	3.500						2105	2105	435	0.207	0.207	605	0.287	0.287
		D	1	3.500						2105	2105	435	0.207		605	0.287	
Lei Yue Mun Road		A	1,2	3.700						1985	1985	464	0.234		365	0.184	
NB		A	1,2	3.700						2125	2125	496	0.234		390	0.184	
		B	2	3.700		25		100%	100%	2005	2005	70	0.035		40	0.020	
Pedestrian		Fp	3	Min	9	+	9			=	18			*			*
		Gp	3,4	Min	10	+	10			=	20						
		Hp	2,3	Min	6	+	6			=	12						
		Ip	3	Min	7	+	7			=	14						
		Jp	2,3	Min	10	+	11			=	21						

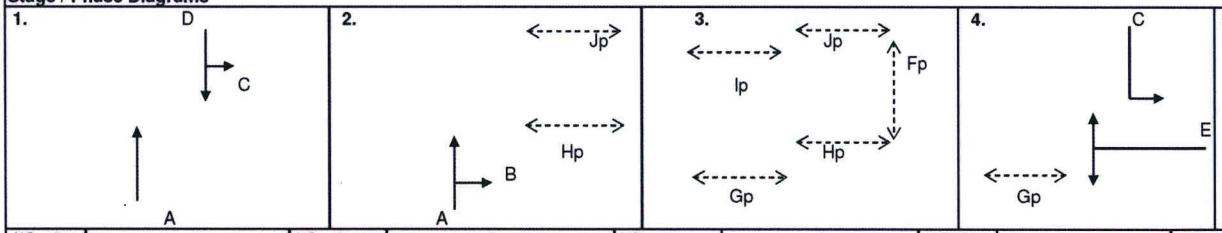
Notes:

Traffic Flow (pcu/hr)



Group	AFpE	DBFpE	Group	CBFp	DBFpE
y	0.475	0.448	y	0.255	0.372
L (sec)	35	45	L (sec)	41	45
C (sec)	110	110	C (sec)	110	110
y pract.	0.614	0.532	y pract.	0.565	0.532
R.C. (%)	29%	19%	R.C. (%)	121%	43%

Stage / Phase Diagrams



I/G= 5		I/G= 5	5	I/G= 11	9	I/G= 12		I/G=	
I/G= 5		I/G= 5	5	I/G= 11	9	I/G= 12		I/G=	

Date: 一月-16 **Junction:** A

TRAFFIC SIGNALS CALCULATION

Job No.: [redacted] **MVA ASIA LIMITED**

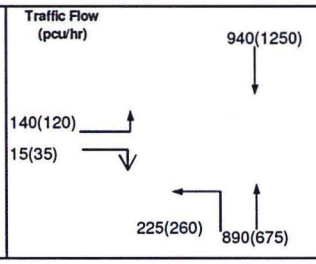
Junction: Lei Yue Mun Road / Yau Tong Estate Southern Access — Design Year: 2027

Description: 2027 Design Traffic Flows — Designed By: [redacted] — Checked By: [redacted]

Approach	Movement notation	Phase	Stage	Width (m)	Radius (m) Left	Radius (m) Right	(%) uphill Gradient	Pro. Turning (%) A.M.	Pro. Turning (%) P.M.	Revised Saturation Flow (pcu/hr) A.M.	Revised Saturation Flow (pcu/hr) P.M.	A.M. Peak Flow (pcu/hr)	A.M. Peak y Value	A.M. Peak Critical y	P.M. Peak Flow (pcu/hr)	P.M. Peak y Value	P.M. Peak Critical y
Yau Tong Est.	↳	C	2	3.500	6			100%	100%	1570	1570	140	0.089	0.089	120	0.076	0.076
Access EB	↴	C	2	3.500		15				1915	1915	15	0.008		35	0.018	
Lei Yue Mun Rd SB	↓	B	1	3.700						1985	1985	454	0.229		604	0.304	0.304
	↓	B	1	3.700						2125	2125	486	0.229		646	0.304	
Lei Yue Mun Rd NB	⇦↑	A	1	3.500	7.5			44%	61%	1805	1750	515	0.285	0.285	425	0.243	
	↑	A	1	3.500						2105	2105	600	0.285		510	0.243	
Pedestrian		Dp	1,3	Min	6	+	6			=	12						
		Ep	2,3	Min	9	+	9			=	18						
		Fp	3	Min	8	+	7			=	15			*			*

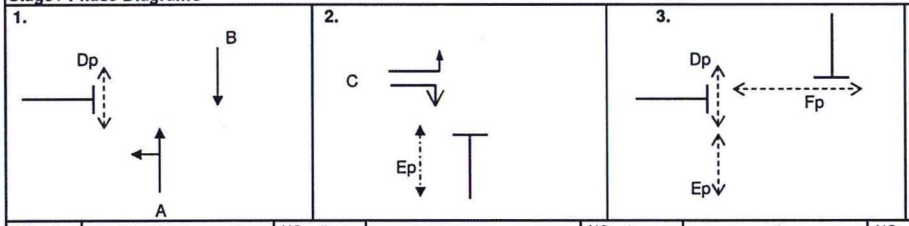
Notes:

Traffic Flow (pcu/hr)



Group	BCFp	ACFp	Group	ACFp	BCFp
y	0.318	0.375	y	0.319	0.381
L (sec)	29	29	L (sec)	29	29
C (sec)	115	115	C (sec)	115	115
y pract.	0.673	0.673	y pract.	0.673	0.673
R.C. (%)	112%	80%	R.C. (%)	111%	77%

Stage / Phase Diagrams



I/G= 9		I/G= 5		I/G= 9	8	I/G=		I/G=	
I/G= 9		I/G= 5		I/G= 9	8	I/G=		I/G=	

Date: 一月-16 **Junction:** B

TRANSPORT RESEARCH LABORATORY

(C) COPYRIGHT 1998

CAPACITIES, QUEUES AND DELAYS AT ROUNDABOUTS

Visual ARCADY 4 ANALYSIS PROGRAM
RELEASE 2.1 (OCT 1998)

ADAPTED FROM ARCADY/3 WHICH IS CROWN COPYRIGHT
BY PERMISSION OF THE CONTROLLER OF HMSO

THE USER OF THIS COMPUTER PROGRAM FOR THE SOLUTION OF AN ENGINEERING PROBLEM IS
IN NO WAY RELIEVED OF HIS RESPONSIBILITY FOR THE CORRECTNESS OF THE SOLUTION

.ROUNDABOUT CAPACITY AND DELAY
****

RUN TITLE
****
Lei Yue Mun Road/Ko Chiu Road (S) - 2027 Design Flows (AM)

.INPUT DATA
****
ARM A - Ko Chiu Road EB
ARM B - Lei Yue Mun SB
ARM C - Ko Chiu Road WB

.GEOMETRIC DATA

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
ARM A	6.50	8.50	11.00	28.00	40.00	35.0	0.770	39.078
ARM B	7.50	9.00	17.00	40.00	40.00	45.0	0.804	42.574
ARM C	6.50	8.00	10.00	20.00	40.00	60.0	0.678	33.993

.TRAFFIC DEMAND DATA

.TIME PERIOD BEGINS 17.30 AND ENDS 19.00
.LENGTH OF TIME PERIOD - 90 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

.DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	TOP OF PEAK IS REACHED	FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK
ARM A	15.00	45.00	75.00	9.94	14.91	9.94
ARM B	15.00	45.00	75.00	11.94	17.91	11.94
ARM C	15.00	45.00	75.00	7.94	11.91	7.94

TIME	FROM/TO	ARM A	ARM B	ARM C
		TURNING PROPORTIONS TURNING COUNTS (VEH/HR) (PERCENTAGE OF H.V.S)		
17.30 - 19.00	ARM A	0.107	0.698	0.195
		85.0	555.0	155.0
		(0.0)	(0.0)	(0.0)
	ARM B	0.649	0.183	0.168
		620.0	175.0	160.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.386	0.606	0.008
		245.0	385.0	5.0

```
I                    I         I (  0.0)I (  0.0)I (  0.0)I
I                    I         I        I        I        I
-------------------------------------------------------
TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
```

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
17.30-17.45								
ARM A	9.94	33.66	0.295		0.0	0.4	6.1	
ARM B	11.94	40.12	0.298		0.0	0.4	6.2	
ARM C	7.94	26.55	0.299		0.0	0.4	6.2	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
17.45-18.00								
ARM A	11.87	32.59	0.364		0.4	0.6	8.4	
ARM B	14.25	39.64	0.360		0.4	0.6	8.3	
ARM C	9.48	25.09	0.378		0.4	0.6	8.9	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
18.00-18.15								
ARM A	14.53	31.14	0.467		0.6	0.9	12.7	
ARM B	17.46	38.98	0.448		0.6	0.8	11.9	
ARM C	11.61	23.09	0.503		0.6	1.0	14.5	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
18.15-18.30								
ARM A	14.53	31.13	0.467		0.9	0.9	13.1	
ARM B	17.46	38.97	0.448		0.8	0.8	12.1	
ARM C	11.61	23.08	0.503		1.0	1.0	15.0	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
18.30-18.45								
ARM A	11.87	32.57	0.364		0.9	0.6	8.8	
ARM B	14.25	39.63	0.360		0.8	0.6	8.6	
ARM C	9.48	25.07	0.378		1.0	0.6	9.4	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
18.45-19.00								
ARM A	9.94	33.64	0.295		0.6	0.4	6.4	
ARM B	11.94	40.11	0.298		0.6	0.4	6.5	
ARM C	7.94	26.53	0.299		0.6	0.4	6.5	

QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.45	0.4	
18.00	0.6	*
18.15	0.9	*
18.30	0.9	*
18.45	0.6	*
19.00	0.4	

QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.45	0.4	
18.00	0.6	*

18.15	0.8	*
18.30	0.8	*
18.45	0.6	*
19.00	0.4	

.QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.45	0.4	
18.00	0.6	*
18.15	1.0	*
18.30	1.0	*
18.45	0.6	*
19.00	0.4	

. QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

ARM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
A	1090.1	726.7	55.6	0.05	55.6	0.05
B	1309.5	873.0	53.6	0.04	53.6	0.04
C	870.7	580.5	60.6	0.07	60.6	0.07
ALL	3270.3	2180.2	169.8	0.05	169.8	0.05

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD.
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

TRANSPORT RESEARCH LABORATORY

(C) COPYRIGHT 1998

CAPACITIES, QUEUES AND DELAYS AT ROUNDABOUTS

Visual ARCADY 4 ANALYSIS PROGRAM
RELEASE 2.1 (OCT 1998)

ADAPTED FROM ARCADY/3 WHICH IS CROWN COPYRIGHT
BY PERMISSION OF THE CONTROLLER OF HMSO

THE USER OF THIS COMPUTER PROGRAM FOR THE SOLUTION OF AN ENGINEERING PROBLEM IS IN NO WAY RELIEVED OF HIS RESPONSIBILITY FOR THE CORRECTNESS OF THE SOLUTION

.ROUNDABOUT CAPACITY AND DELAY
****

RUN TITLE
****
Lei Yue Mun Road/Ko Chiu Road (S) - 2027 Design Flows (PM)

.INPUT DATA
****
ARM A - Ko Chiu Road EB
ARM B - Lei Yue Mun SB
ARM C - Ko Chiu Road WB

.GEOMETRIC DATA

ARM	V (M)	E (M)	L (M)	R (M)	D (M)	PHI (DEG)	SLOPE	INTERCEPT (PCU/MIN)
ARM A	6.50	8.50	11.00	28.00	40.00	35.0	0.770	39.078
ARM B	7.50	9.00	17.00	40.00	40.00	45.0	0.804	42.574
ARM C	6.50	8.00	10.00	20.00	40.00	60.0	0.678	33.993

.TRAFFIC DEMAND DATA

.TIME PERIOD BEGINS 17.30 AND ENDS 19.00
.LENGTH OF TIME PERIOD - 90 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

.DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	TOP OF PEAK IS REACHED	FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK
ARM A	15.00	45.00	75.00	9.50	14.25	9.50
ARM B	15.00	45.00	75.00	16.06	24.09	16.06
ARM C	15.00	45.00	75.00	5.13	7.69	5.13

TIME	FROM/TO	ARM A	ARM B	ARM C
		TURNING PROPORTIONS		
		TURNING COUNTS (VEH/HR)		
		(PERCENTAGE OF H.V.S)		
17.30 - 19.00	ARM A	0.125	0.684	0.191
		95.0	520.0	145.0
		(0.0)	(0.0)	(0.0)
	ARM B	0.665	0.175	0.160
		855.0	225.0	205.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.524	0.463	0.012

```
I                    I         I  215.0 I  190.0 I    5.0 I
I                    I         I (  0.0)I (  0.0)I (  0.0)I
I                    I         I        I        I        I
-------------------------------------------------------
TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA
```

QUEUE AND DELAY INFORMATION FOR EACH 15 MIN TIME SEGMENT

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
17.30-17.45								
ARM A	9.50	35.05	0.271		0.0	0.4	5.5	
ARM B	16.06	40.12	0.400		0.0	0.7	9.8	
ARM C	5.13	24.06	0.213		0.0	0.3	4.0	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
17.45-18.00								
ARM A	11.34	34.26	0.331		0.4	0.5	7.3	
ARM B	19.18	39.64	0.484		0.7	0.9	13.7	
ARM C	6.12	22.11	0.277		0.3	0.4	5.6	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
18.00-18.15								
ARM A	13.89	33.18	0.419		0.5	0.7	10.6	
ARM B	23.49	38.98	0.603		0.9	1.5	21.9	
ARM C	7.50	19.45	0.385		0.4	0.6	9.1	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
18.15-18.30								
ARM A	13.89	33.17	0.419		0.7	0.7	10.8	
ARM B	23.49	38.97	0.603		1.5	1.5	22.6	
ARM C	7.50	19.43	0.386		0.6	0.6	9.4	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
18.30-18.45								
ARM A	11.34	34.24	0.331		0.7	0.5	7.6	
ARM B	19.18	39.63	0.484		1.5	0.9	14.5	
ARM C	6.12	22.08	0.277		0.6	0.4	5.9	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
18.45-19.00								
ARM A	9.50	35.03	0.271		0.5	0.4	5.7	
ARM B	16.06	40.11	0.400		0.9	0.7	10.2	
ARM C	5.13	24.02	0.213		0.4	0.3	4.2	

QUEUE AT ARM A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.45	0.4	
18.00	0.5	
18.15	0.7	*
18.30	0.7	*
18.45	0.5	
19.00	0.4	

QUEUE AT ARM B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.45	0.7	*

18.00	0.9	*
18.15	1.5	**
18.30	1.5	**
18.45	0.9	*
19.00	0.7	*

.QUEUE AT ARM C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
17.45	0.3	
18.00	0.4	
18.15	0.6	*
18.30	0.6	*
18.45	0.4	
19.00	0.3	

. QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

ARM	TOTAL DEMAND (VEH)	TOTAL DEMAND (VEH/H)	* QUEUEING * DELAY * (MIN)	* QUEUEING * DELAY * (MIN/VEH)	* INCLUSIVE QUEUEING * DELAY * (MIN)	* INCLUSIVE QUEUEING * DELAY * (MIN/VEH)
A	1042.1	694.7	47.3	0.05	47.3	0.05
B	1762.0	1174.7	92.7	0.05	92.7	0.05
C	562.2	374.8	38.1	0.07	38.1	0.07
ALL	3366.3	2244.2	178.1	0.05	178.1	0.05

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD.
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

TRAFFIC SIGNALS CALCULATION

Job No.: [redacted]

MVA ASIA LIMITED

Junction: Cha Kwo Ling Road / Ko Fai Road

Design Year: 2027

Description: 2027 Design Traffic Flows

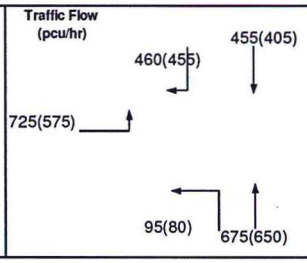
Designed By: [redacted]

Checked By: [redacted]

Approach	Movement notation	Phase	Stage	Width (m)	Radius (m) Left	Radius (m) Right	(%) uphill Gradient	Pro. Turning (%) A.M.	Pro. Turning (%) P.M.	Revised Saturation Flow (pcu/hr) A.M.	Revised Saturation Flow (pcu/hr) P.M.	A.M. Peak Flow (pcu/hr)	A.M. Peak y Value	A.M. Peak Critical y	P.M. Peak Flow (pcu/hr)	P.M. Peak y Value	P.M. Peak Critical y
Ko Fai Road	↰	C	1,3	4.000	12.5			100%	100%	1800	1800	725	0.403	0.403	575	0.319	
Cha Kwo Ling Rd	↓	A	1	3.000						1915	1915	455	0.238		405	0.211	
SB	↲	A	1	3.000		15		100%	100%	1870	1870	460	0.246		455	0.243	0.243
Cha Kwo Ling Rd	↰↑	B	2	3.400	15			26%	23%	1905	1910	367	0.193	0.193	348	0.182	0.182
NB	↑	B	2	3.400						2095	2095	403	0.192		382	0.182	
LRT/Pedestrian																	
		Ep	2,3	Min	5	+	5			=	10						
		Fp	2	Min	5	+	5			=	10						
		Gp	3	Min	5	+	5			=	10						*
		Hp	1,3	Min	5	+	6			=	11						

Notes:

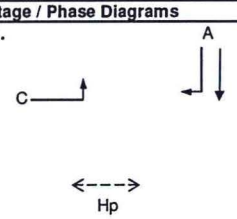
Traffic Flow (pcu/hr)



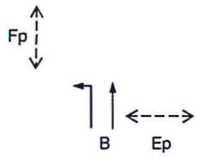
Group	ABGp	CB	Group	CB	ABGp
y	0.439	0.595	y	0.502	0.426
L (sec)	24	9	L (sec)	9	24
C (sec)	100	100	C (sec)	100	100
y pract.	0.684	0.819	y pract.	0.819	0.684
R.C. (%)	56%	38%	R.C. (%)	63%	61%

Stage / Phase Diagrams

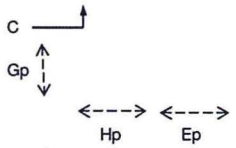
1.



2.



3.



4.

5.

I/G=		I/G= 5		I/G= 6		I/G=		I/G=	
I/G= 7		I/G= 5		I/G= 9	5	I/G=		I/G=	

Date: 一月-16

Junction: D

TRAFFIC SIGNALS CALCULATION

Job No.: [redacted] **MVA ASIA LIMITED**

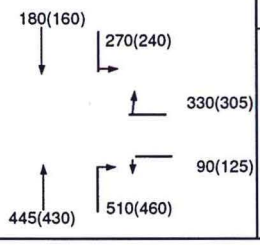
Junction: Cha Kwo Ling Road / Ko Chiu Road — Design Year: 2027

Description: 2027 Design Traffic Flows — Designed By: [redacted] — Checked By: [redacted]

Approach	Movement notation	Phase	Stage	Width (m)	Radius (m) Left	Radius (m) Right	(%) uphill Gradient	Pro. Turning (%) A.M.	Pro. Turning (%) P.M.	Revised Saturation Flow (pcu/hr) A.M.	Revised Saturation Flow (pcu/hr) P.M.	A.M. Peak Flow (pcu/hr)	A.M. Peak y Value	A.M. Peak Critical y	P.M. Peak Flow (pcu/hr)	P.M. Peak y Value	P.M. Peak Critical y
Cha Kwo Ling Road	↑	C	2	3.375						1955	1955	445	0.228		430	0.220	
NB	↱	C	2	3.375		17.5		100%	100%	1925	1925	510	0.265	0.265	460	0.239	0.239
Cha Kwo Ling Road	↳	A	1	3.625	15			100%	100%	1800	1800	270	0.150	0.150	240	0.133	0.133
SB	↓	B	4	3.625						2120	2120	180	0.085	0.085	160	0.075	0.075
Ko Chiu Road	↑↳	D	1	3.800	9	20		45% / 55%	61% / 39%	1785	1765	200	0.112		203	0.115	
WB	↰	D	1	3.800		17.5		100%	100%	1965	1965	220	0.112		227	0.115	
Pedestrian		Ep	3,4	Min	6	+	12			=	18						
		Fp	3	Min	8	+	15			=	23			*			*
		Gp	3	Min	6	+	11			=	17						

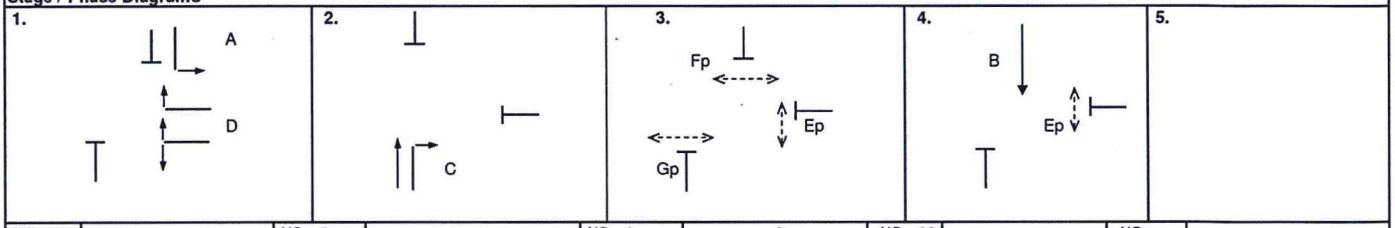
Notes:

Traffic Flow (pcu/hr)



Group	DCFpB	ACFpB	Group	DCFpB	ACFpB
y	0.462	0.500	y	0.430	0.448
L (sec)	41	43	L (sec)	41	43
C (sec)	100	100	C (sec)	100	100
y pract.	0.531	0.513	y pract.	0.531	0.513
R.C. (%)	15%	3%	R.C. (%)	24%	15%

Stage / Phase Diagrams



I/G= 7		I/G= 5		I/G= 8	8	I/G= 18		I/G=	
I/G= 7		I/G= 5		I/G= 8	8	I/G= 18		I/G=	

Date: 一月-16 **Junction:** E

TRAFFIC SIGNALS CALCULATION

Job No.: [redacted]

MVA ASIA LIMITED

Junction: Cha Kwo Ling Road / Ko Chiu Road

Design Year: 2027

Description: 2027 Design Traffic Flows (improvement)

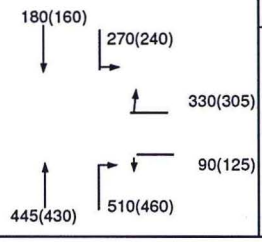
Designed By: [redacted]

Checked By: [redacted]

Approach	Movement notation	Phase	Stage	Width (m)	Radius (m) Left	Radius (m) Right	(%) uphill Gradient	Pro. Turning (%) A.M.	Pro. Turning (%) P.M.	Revised Saturation Flow (pcu/hr) A.M.	Revised Saturation Flow (pcu/hr) P.M.	A.M. Peak Flow (pcu/hr)	A.M. Peak y Value	A.M. Peak Critical y	P.M. Peak Flow (pcu/hr)	P.M. Peak y Value	P.M. Peak Critical y
Cha Kwo Ling Road	↑	C	2	3.375						1955	1955	445	0.228		430	0.220	
NB	↱	C	2	3.375		17.5		100%	100%	1925	1925	510	0.265	0.265	460	0.239	0.239
Cha Kwo Ling Road	↳	A	1,4	3.625	15			100%	100%	1800	1800	270	0.150		240	0.133	
SB	↓	B	4	3.625						2120	2120	180	0.085	0.085	160	0.075	0.075
Ko Chiu Road	⇅	D	1	3.800	9	20		45% / 55%	61% / 39%	1785	1765	200	0.112	0.112	203	0.115	
WB	↰	D	1	3.800		17.5		100%	100%	1965	1965	220	0.112		227	0.115	0.115
Pedestrian		Ep	3	Min	6	+	12			=	18						
		Fp	3	Min	8	+	15			=	23			*			*
		Gp	3	Min	6	+	11			=	17						

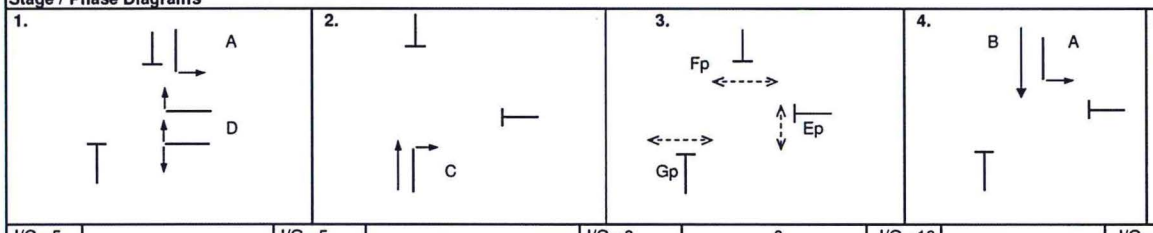
Notes:

Traffic Flow (pcu/hr)



Group		DCFpB	Group		DCFpB
y		0.462	y		0.430
L (sec)		41	L (sec)		41
C (sec)		100	C (sec)		100
y pract.		0.531	y pract.		0.531
R.C. (%)		15%	R.C. (%)		24%

Stage / Phase Diagrams



I/G= 5		I/G= 5		I/G= 8	8	I/G= 18		I/G=	
I/G= 5		I/G= 5		I/G= 8	8	I/G= 18		I/G=	

Date: 一月-16

Junction: E

TRANSPORT RESEARCH LABORATORY

(C) COPYRIGHT 1998

CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

Visual PICADY 4 ANALYSIS PROGRAM
RELEASE 2.1 (DEC 1998)

ADAPTED FROM PICADY/3 WHICH IS CROWN COPYRIGHT
BY PERMISSION OF THE CONTROLLER OF HMSO

THE USER OF THIS COMPUTER PROGRAM FOR THE SOLUTION OF AN ENGINEERING PROBLEM IS IN NO WAY RELIEVED OF HIS RESPONSIBILITY FOR THE CORRECTNESS OF THE SOLUTION

RUN TITLE
****
Cha Kwo Ling Road/Sze Shan Street - 2027 Design Flows (AM)

.MAJOR/MINOR JUNCTION CAPACITY AND DELAY
****

INPUT DATA

```
                    MAJOR ROAD (ARM C) --------------------- MAJOR ROAD (ARM A)
                                                I
                                                I
                                                I
                                                I
                                                I
                                                I
                                          MINOR ROAD (ARM B)
```

ARM A IS Cha Kwo Ling Road NB
ARM B IS Ko Fai Road EB
ARM C IS Cha Kwo Ling Road SB

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B

STREAM B-AC CONTAINS TRAFFIC GOING FROM ARM B TO ARM A AND TO ARM C

ETC.

.GEOMETRIC DATA

DATA ITEM	MINOR ROAD B
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	(W) 13.50 M.
CENTRAL RESERVE WIDTH	(WCR) 0.00 M.
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B) 3.00 M.
- VISIBILITY	(VC-B) 90.0 M.
- BLOCKS TRAFFIC	NO
MINOR ROAD - VISIBILITY TO LEFT	(VB-C) 22.0 M.
- VISIBILITY TO RIGHT	(VB-A) 30.0 M.
- LANE 1 WIDTH	(WB-C) 5.00 M.
- LANE 2 WIDTH	(WB-A) 0.00 M.

.

.TRAFFIC DEMAND DATA

TIME PERIOD BEGINS 07.30 AND ENDS 09.00

LENGTH OF TIME PERIOD - 90 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

	NUMBER OF MINUTES FROM START WHEN	RATE OF FLOW (VEH/MIN)

ARM	FLOW STARTS TO RISE	TOP OF PEAK IS REACHED	FLOW STOPS FALLING	BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK
ARM A	15.00	45.00	75.00	9.94	14.91	9.94
ARM B	15.00	45.00	75.00	2.19	3.28	2.19
ARM C	15.00	45.00	75.00	3.38	5.06	3.38

TIME	FROM/TO	TURNING PROPORTIONS TURNING COUNTS (VEH/HR) (PERCENTAGE OF H.V.S) ARM A	ARM B	ARM C
07.30 - 09.00	ARM A	0.000	0.013	0.987
		0.0	10.0	785.0
		(0.0)	(0.0)	(0.0)
	ARM B	0.029	0.000	0.971
		5.0	0.0	170.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.648	0.352	0.000
		175.0	95.0	0.0
		(0.0)	(0.0)	(0.0)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
07.30-07.45								
B-AC	2.19	10.74	0.204		0.0	0.3	3.7	
C-A	2.19							
C-B	1.19	9.58	0.124		0.0	0.1	2.0	
A-B	0.12							
A-C	9.81							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-AC	0.108	0.009	0.013	0.005	0.007
C-B	0.096	0.011		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
07.45-08.00								
B-AC	2.61	10.35	0.252		0.3	0.3	4.9	
C-A	2.61							
C-B	1.42	9.24	0.154		0.1	0.2	2.6	
A-B	0.15							
A-C	11.72							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-AC	0.102	0.011	0.013	0.005	0.007
C-B	0.092	0.014		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.00-08.15								
B-AC	3.20	9.80	0.326		0.3	0.5	6.9	
C-A	3.20							
C-B	1.74	8.76	0.198		0.2	0.2	3.6	
A-B	0.18							
A-C	14.35							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-AC	0.093	0.013	0.013	0.004	0.006
C-B	0.088	0.017		0.008	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.15-08.30								
B-AC	3.20	9.80	0.326		0.5	0.5	7.2	
C-A	3.20							
C-B	1.74	8.76	0.198		0.2	0.2	3.7	
A-B	0.18							
A-C	14.35							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-AC	0.093	0.013	0.013	0.004	0.006
C-B	0.088	0.017		0.008	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.30-08.45								
B-AC	2.61	10.35	0.252		0.5	0.3	5.3	
C-A	2.61							
C-B	1.42	9.24	0.154		0.2	0.2	2.8	
A-B	0.15							
A-C	11.72							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-AC	0.102	0.011	0.013	0.005	0.007
C-B	0.092	0.014		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.45-09.00								
B-AC	2.19	10.74	0.204		0.3	0.3	4.0	
C-A	2.19							
C-B	1.19	9.58	0.124		0.2	0.1	2.2	
A-B	0.12							
A-C	9.81							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-AC	0.108	0.009	0.013	0.005	0.007
C-B	0.096	0.011		0.009	

QUEUE FOR STREAM B-AC

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
07.45	0.3
08.00	0.3
08.15	0.5
08.30	0.5
08.45	0.3
09.00	0.3

QUEUE FOR STREAM C-B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
07.45	0.1
08.00	0.2
08.15	0.2
08.30	0.2
08.45	0.2
09.00	0.1

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)

B-AC	240.0	160.0	31.9	0.13	31.9	0.13	
C-A	240.0	160.0					
C-B	130.3	86.8	16.9	0.13	16.9	0.13	
A-B	13.7	9.1					
A-C	1076.4	717.6					
ALL	1700.3	1133.5	48.8	0.03	48.9	0.03	

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD .
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

TRANSPORT RESEARCH LABORATORY

(C) COPYRIGHT 1998

CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

Visual PICADY 4 ANALYSIS PROGRAM
RELEASE 2.1 (DEC 1998)

ADAPTED FROM PICADY/3 WHICH IS CROWN COPYRIGHT
BY PERMISSION OF THE CONTROLLER OF HMSO

THE USER OF THIS COMPUTER PROGRAM FOR THE SOLUTION OF AN ENGINEERING PROBLEM IS IN NO WAY RELIEVED OF HIS RESPONSIBILITY FOR THE CORRECTNESS OF THE SOLUTION

RUN TITLE
****
Cha Kwo Ling Road/Sze Shan Street - 2027 Design Flows (PM)

.MAJOR/MINOR JUNCTION CAPACITY AND DELAY
****

INPUT DATA

```
MAJOR ROAD (ARM C) --------------------- MAJOR ROAD (ARM A)
                                   I
                                   I
                                   I
                                   I
                                   I
                                   I
                              MINOR ROAD (ARM B)
```

ARM A IS Cha Kwo Ling Road NB
ARM B IS Ko Fai Road EB
ARM C IS Cha Kwo Ling Road SB

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B

STREAM B-AC CONTAINS TRAFFIC GOING FROM ARM B TO ARM A AND TO ARM C

ETC.

.GEOMETRIC DATA

DATA ITEM	MINOR ROAD B
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	(W) 13.50 M.
CENTRAL RESERVE WIDTH	(WCR) 0.00 M.
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B) 3.00 M.
- VISIBILITY	(VC-B) 90.0 M.
- BLOCKS TRAFFIC	NO
MINOR ROAD - VISIBILITY TO LEFT	(VB-C) 22.0 M.
- VISIBILITY TO RIGHT	(VB-A) 30.0 M.
- LANE 1 WIDTH	(WB-C) 5.00 M.
- LANE 2 WIDTH	(WB-A) 0.00 M.

.

.TRAFFIC DEMAND DATA

TIME PERIOD BEGINS 07.30 AND ENDS 09.00

LENGTH OF TIME PERIOD - 90 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

	NUMBER OF MINUTES FROM START WHEN	RATE OF FLOW (VEH/MIN)

ARM	FLOW STARTS TO RISE	TOP OF PEAK IS REACHED	FLOW STOPS FALLING	BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK
ARM A	15.00	45.00	75.00	8.75	13.13	8.75
ARM B	15.00	45.00	75.00	2.50	3.75	2.50
ARM C	15.00	45.00	75.00	3.56	5.34	3.56

TIME	FROM/TO	TURNING PROPORTIONS TURNING COUNTS (VEH/HR) (PERCENTAGE OF H.V.S) ARM A	ARM B	ARM C
07.30 - 09.00	ARM A	0.000	0.007	0.993
		0.0	5.0	695.0
		(0.0)	(0.0)	(0.0)
	ARM B	0.025	0.000	0.975
		5.0	0.0	195.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.614	0.386	0.000
		175.0	110.0	0.0
		(0.0)	(0.0)	(0.0)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
07.30-07.45								
B-AC	2.50	10.99	0.228		0.0	0.3	4.2	
C-A	2.19							
C-B	1.38	9.79	0.140		0.0	0.2	2.3	
A-B	0.06							
A-C	8.69							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-AC	0.111	0.008	0.013	0.005	0.008
C-B	0.098	0.010		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
07.45-08.00								
B-AC	2.99	10.64	0.281		0.3	0.4	5.6	
C-A	2.61							
C-B	1.64	9.49	0.173		0.2	0.2	3.0	
A-B	0.07							
A-C	10.37							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-AC	0.105	0.010	0.013	0.005	0.007
C-B	0.095	0.012		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.00-08.15								
B-AC	3.66	10.16	0.360		0.4	0.6	8.0	
C-A	3.20							
C-B	2.01	9.07	0.222		0.2	0.3	4.1	
A-B	0.09							
A-C	12.71							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-AC	0.096	0.012	0.013	0.004	0.007
C-B	0.091	0.015		0.008	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.15-08.30								
B-AC	3.66	10.16	0.360		0.6	0.6	8.3	
C-A	3.20							
C-B	2.01	9.07	0.222		0.3	0.3	4.2	
A-B	0.09							
A-C	12.71							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-AC	0.096	0.012	0.013	0.004	0.007
C-B	0.091	0.015		0.008	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.30-08.45								
B-AC	2.99	10.64	0.281		0.6	0.4	6.1	
C-A	2.61							
C-B	1.64	9.49	0.173		0.3	0.2	3.3	
A-B	0.07							
A-C	10.37							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-AC	0.105	0.010	0.013	0.005	0.007
C-B	0.095	0.012		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.45-09.00								
B-AC	2.50	10.99	0.228		0.4	0.3	4.6	
C-A	2.19							
C-B	1.38	9.79	0.140		0.2	0.2	2.5	
A-B	0.06							
A-C	8.69							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-AC	0.111	0.008	0.013	0.005	0.008
C-B	0.098	0.010		0.009	

QUEUE FOR STREAM B-AC

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
07.45	0.3	
08.00	0.4	
08.15	0.6	*
08.30	0.6	*
08.45	0.4	
09.00	0.3	

QUEUE FOR STREAM C-B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
07.45	0.2
08.00	0.2
08.15	0.3
08.30	0.3
08.45	0.2
09.00	0.2

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)

B-AC	274.2	182.8	36.9	0.13	36.9	0.13	
C-A	240.0	160.0					
C-B	150.8	100.6	19.5	0.13	19.5	0.13	
A-B	6.9	4.6					
A-C	953.0	635.3					
ALL	1624.9	1083.3	56.4	0.03	56.4	0.03	

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD .
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

TRANSPORT RESEARCH LABORATORY

(C) COPYRIGHT 1998

CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

Visual PICADY 4 ANALYSIS PROGRAM
RELEASE 2.1 (DEC 1998)

ADAPTED FROM PICADY/3 WHICH IS CROWN COPYRIGHT
BY PERMISSION OF THE CONTROLLER OF HMSO

THE USER OF THIS COMPUTER PROGRAM FOR THE SOLUTION OF AN ENGINEERING PROBLEM IS IN NO WAY RELIEVED OF HIS RESPONSIBILITY FOR THE CORRECTNESS OF THE SOLUTION

RUN TITLE
****
Cha Kwo Ling Road/Yan Wing Street - 2027 Design Flows (AM)

.MAJOR/MINOR JUNCTION CAPACITY AND DELAY
****

INPUT DATA

```
                    MAJOR ROAD (ARM C) --------------------- MAJOR ROAD (ARM A)
                                                I
                                                I
                                                I
                                                I
                                                I
                                                I
                                          MINOR ROAD (ARM B)
```

ARM A IS Cha Kwo Ling Road SB
ARM B IS Yan Wing Street WB
ARM C IS Cha Kwo Ling Road NB

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B

ETC.

.GEOMETRIC DATA

DATA ITEM	MINOR ROAD B
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	(W) 14.00 M.
CENTRAL RESERVE WIDTH	(WCR) 0.00 M.
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B) 3.00 M.
- VISIBILITY	(VC-B) 90.0 M.
- BLOCKS TRAFFIC	NO
MINOR ROAD - VISIBILITY TO LEFT	(VB-C) 20.0 M.
- VISIBILITY TO RIGHT	(VB-A) 25.0 M.
- LANE 1 WIDTH	(WB-C) 5.00 M.
- LANE 2 WIDTH	(WB-A) 5.00 M.

.

.TRAFFIC DEMAND DATA

TIME PERIOD BEGINS 07.30 AND ENDS 09.00

LENGTH OF TIME PERIOD - 90 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	TOP OF PEAK IS REACHED	FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK

ARM A	15.00	45.00	75.00	2.25	3.38	2.25
ARM B	15.00	45.00	75.00	7.00	10.50	7.00
ARM C	15.00	45.00	75.00	6.25	9.38	6.25

TIME	FROM/TO	TURNING PROPORTIONS TURNING COUNTS (VEH/HR) (PERCENTAGE OF H.V.S)		
		ARM A	ARM B	ARM C
07.30 - 09.00	ARM A	0.000 0.0 (0.0)	0.000 0.0 (0.0)	1.000 180.0 (0.0)
	ARM B	0.527 295.0 (0.0)	0.000 0.0 (0.0)	0.473 265.0 (0.0)
	ARM C	1.000 500.0 (0.0)	0.000 0.0 (0.0)	0.000 0.0 (0.0)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
07.30-07.45								
B-C	3.31	11.07	0.299		0.0	0.4	6.1	
B-A	3.69	8.82	0.418		0.0	0.7	9.9	
C-A	6.25							
C-B	0.00	9.96	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	2.25							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.092	0.003			0.011
B-A	0.074	0.007	0.022	0.006	0.009
C-B	0.110	0.003		0.010	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
07.45-08.00								
B-C	3.96	10.69	0.370		0.4	0.6	8.4	
B-A	4.40	8.61	0.511		0.7	1.0	14.5	
C-A	7.46							
C-B	0.00	9.89	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	2.69							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.089	0.003			0.011
B-A	0.072	0.009	0.022	0.006	0.008
C-B	0.109	0.003		0.010	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.00-08.15								
B-C	4.84	10.16	0.477		0.6	0.9	12.8	
B-A	5.39	8.31	0.649		1.0	1.7	24.1	
C-A	9.14							
C-B	0.00	9.80	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	3.29							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.085	0.004			0.010
B-A	0.069	0.011	0.022	0.005	0.008

C-B	0.108	0.004		0.010		

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.15-08.30								
B-C	4.84	10.14	0.478		0.9	0.9	13.5	
B-A	5.39	8.31	0.649		1.7	1.8	26.6	
C-A	9.14							
C-B	0.00	9.80	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	3.29							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.085	0.004			0.010
B-A	0.069	0.011	0.022	0.005	0.008
C-B	0.108	0.004		0.010	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.30-08.45								
B-C	3.96	10.66	0.371		0.9	0.6	9.3	
B-A	4.40	8.61	0.511		1.8	1.1	17.2	
C-A	7.46							
C-B	0.00	9.89	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	2.69							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.089	0.003			0.010
B-A	0.072	0.009	0.022	0.006	0.008
C-B	0.109	0.003		0.010	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.45-09.00								
B-C	3.31	11.04	0.300		0.6	0.4	6.7	
B-A	3.69	8.82	0.418		1.1	0.7	11.5	
C-A	6.25							
C-B	0.00	9.96	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	2.25							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.092	0.003			0.011
B-A	0.074	0.007	0.022	0.006	0.009
C-B	0.110	0.003		0.010	

QUEUE FOR STREAM B-C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
07.45	0.4	
08.00	0.6	*
08.15	0.9	*
08.30	0.9	*
08.45	0.6	*
09.00	0.4	

QUEUE FOR STREAM B-A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
07.45	0.7	*
08.00	1.0	*
08.15	1.7	**
08.30	1.8	**
08.45	1.1	*
09.00	0.7	*

QUEUE FOR STREAM C-B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
07.45	0.0
08.00	0.0
08.15	0.0
08.30	0.0
08.45	0.0
09.00	0.0

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
B-C	363.4	242.2	56.8	0.16	56.8	0.16
B-A	404.5	269.7	103.8	0.26	103.8	0.26
C-A	685.6	457.1				
C-B	0.0	0.0	0.0	0.00	0.0	0.00
A-B	0.0	0.0				
A-C	246.8	164.5				
ALL	1700.3	1133.5	160.5	0.09	160.6	0.09

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD .
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

TRANSPORT RESEARCH LABORATORY

(C) COPYRIGHT 1998

CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

Visual PICADY 4 ANALYSIS PROGRAM
RELEASE 2.1 (DEC 1998)

ADAPTED FROM PICADY/3 WHICH IS CROWN COPYRIGHT
BY PERMISSION OF THE CONTROLLER OF HMSO

THE USER OF THIS COMPUTER PROGRAM FOR THE SOLUTION OF AN ENGINEERING PROBLEM IS IN NO WAY RELIEVED OF HIS RESPONSIBILITY FOR THE CORRECTNESS OF THE SOLUTION

RUN TITLE
****
Cha Kwo Ling Road/Yan Wing Street - 2027 Design Flows (PM)

.MAJOR/MINOR JUNCTION CAPACITY AND DELAY
****

INPUT DATA

```
                    MAJOR ROAD (ARM C) --------------------- MAJOR ROAD (ARM A)
                                                I
                                                I
                                                I
                                                I
                                                I
                                                I
                                           MINOR ROAD (ARM B)
```

ARM A IS Cha Kwo Ling Road SB
ARM B IS Yan Wing Street WB
ARM C IS Cha Kwo Ling Road NB

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B

ETC.

.GEOMETRIC DATA

DATA ITEM	MINOR ROAD B
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	(W) 14.00 M.
CENTRAL RESERVE WIDTH	(WCR) 0.00 M.
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B) 3.00 M.
- VISIBILITY	(VC-B) 90.0 M.
- BLOCKS TRAFFIC	NO
MINOR ROAD - VISIBILITY TO LEFT	(VB-C) 20.0 M.
- VISIBILITY TO RIGHT	(VB-A) 25.0 M.
- LANE 1 WIDTH	(WB-C) 5.00 M.
- LANE 2 WIDTH	(WB-A) 5.00 M.

.

.TRAFFIC DEMAND DATA

TIME PERIOD BEGINS 07.30 AND ENDS 09.00

LENGTH OF TIME PERIOD - 90 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	TOP OF PEAK IS REACHED	FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK

ARM A	15.00	45.00	75.00	2.25	3.38	2.25
ARM B	15.00	45.00	75.00	8.25	12.38	8.25
ARM C	15.00	45.00	75.00	6.13	9.19	6.13

TIME	FROM/TO	TURNING PROPORTIONS TURNING COUNTS (VEH/HR) (PERCENTAGE OF H.V.S)		
		ARM A	ARM B	ARM C
07.30 - 09.00	ARM A	0.000 0.0 (0.0)	0.000 0.0 (0.0)	1.000 180.0 (0.0)
	ARM B	0.318 210.0 (0.0)	0.000 0.0 (0.0)	0.682 450.0 (0.0)
	ARM C	1.000 490.0 (0.0)	0.000 0.0 (0.0)	0.000 0.0 (0.0)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
07.30-07.45								
B-C	5.63	11.44	0.492		0.0	0.9	13.3	
B-A	2.63	8.84	0.297		0.0	0.4	5.9	
C-A	6.13							
C-B	0.00	9.96	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	2.25							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.095	0.003			0.011
B-A	0.074	0.007	0.022	0.006	0.009
C-B	0.110	0.003		0.010	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
07.45-08.00								
B-C	6.72	11.15	0.602		0.9	1.5	20.7	
B-A	3.13	8.63	0.363		0.4	0.6	8.1	
C-A	7.31							
C-B	0.00	9.89	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	2.69							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.093	0.003			0.011
B-A	0.072	0.009	0.022	0.006	0.008
C-B	0.109	0.003		0.010	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.00-08.15								
B-C	8.23	10.74	0.766		1.5	3.0	39.6	
B-A	3.84	8.33	0.461		0.6	0.8	11.9	
C-A	8.96							
C-B	0.00	9.80	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	3.29							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.090	0.004			0.011

B-A	0.069	0.011	0.022	0.005	0.008	
C-B	0.108	0.004		0.010		

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.15-08.30								
B-C	8.23	10.74	0.766		3.0	3.1	45.8	
B-A	3.84	8.33	0.461		0.8	0.8	12.6	
C-A	8.96							
C-B	0.00	9.80	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	3.29							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.090	0.004			0.011
B-A	0.069	0.011	0.022	0.005	0.008
C-B	0.108	0.004		0.010	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.30-08.45								
B-C	6.72	11.14	0.603		3.1	1.6	25.5	
B-A	3.13	8.63	0.363		0.8	0.6	9.1	
C-A	7.31							
C-B	0.00	9.89	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	2.69							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.093	0.003			0.011
B-A	0.072	0.009	0.022	0.006	0.008
C-B	0.109	0.003		0.010	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.45-09.00								
B-C	5.63	11.43	0.492		1.6	1.0	15.6	
B-A	2.63	8.84	0.297		0.6	0.4	6.6	
C-A	6.13							
C-B	0.00	9.96	0.000		0.0	0.0	0.0	
A-B	0.00							
A-C	2.25							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.095	0.003			0.011
B-A	0.074	0.007	0.022	0.006	0.009
C-B	0.110	0.003		0.010	

QUEUE FOR STREAM B-C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
07.45	0.9	*
08.00	1.5	*
08.15	3.0	***
08.30	3.1	***
08.45	1.6	**
09.00	1.0	*

QUEUE FOR STREAM B-A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
07.45	0.4	
08.00	0.6	*
08.15	0.8	*
08.30	0.8	*
08.45	0.6	*
09.00	0.4	

QUEUE FOR STREAM C-B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
07.45	0.0
08.00	0.0
08.15	0.0
08.30	0.0
08.45	0.0
09.00	0.0

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
B-C	617.0	411.4	160.6	0.26	160.6	0.26
B-A	288.0	192.0	54.3	0.19	54.3	0.19
C-A	671.9	447.9				
C-B	0.0	0.0	0.0	0.00	0.0	0.00
A-B	0.0	0.0				
A-C	246.8	164.5				
ALL	1823.7	1215.8	214.8	0.12	214.9	0.12

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD .
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

TRANSPORT RESEARCH LABORATORY

(C) COPYRIGHT 1998

CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

Visual PICADY 4 ANALYSIS PROGRAM
RELEASE 2.1 (DEC 1998)

ADAPTED FROM PICADY/3 WHICH IS CROWN COPYRIGHT
BY PERMISSION OF THE CONTROLLER OF HMSO

THE USER OF THIS COMPUTER PROGRAM FOR THE SOLUTION OF AN ENGINEERING PROBLEM IS IN NO WAY RELIEVED OF HIS RESPONSIBILITY FOR THE CORRECTNESS OF THE SOLUTION

RUN TITLE
****
Cha Kwo Ling Road/Access Road - 2027 Design Flows (AM)

.MAJOR/MINOR JUNCTION CAPACITY AND DELAY
****

INPUT DATA

```
                    MAJOR ROAD (ARM C) --------------------- MAJOR ROAD (ARM A)
                                                I
                                                I
                                                I
                                                I
                                                I
                                                I
                                            MINOR ROAD (ARM B)
```

ARM A IS Cha Kwo Ling Road SB
ARM B IS Access Road WB
ARM C IS Cha Kwo Ling Road NB

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B

ETC.

.GEOMETRIC DATA

DATA ITEM	MINOR ROAD B
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	(W) 13.00 M.
CENTRAL RESERVE WIDTH	(WCR) 0.00 M.
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B) 3.00 M.
- VISIBILITY	(VC-B) 90.0 M.
- BLOCKS TRAFFIC	NO
MINOR ROAD - VISIBILITY TO LEFT	(VB-C) 100.0 M.
- VISIBILITY TO RIGHT	(VB-A) 100.0 M.
- LANE 1 WIDTH	(WB-C) 2.50 M.
- LANE 2 WIDTH	(WB-A) 2.50 M.

.

.TRAFFIC DEMAND DATA

TIME PERIOD BEGINS 07.30 AND ENDS 09.00

LENGTH OF TIME PERIOD - 90 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	TOP OF PEAK IS REACHED	FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK

ARM A	15.00	45.00	75.00	5.56	8.34	5.56
ARM B	15.00	45.00	75.00	0.25	0.38	0.25
ARM C	15.00	45.00	75.00	6.13	9.19	6.13

TURNING PROPORTIONS
TURNING COUNTS (VEH/HR)
(PERCENTAGE OF H.V.S)

TIME	FROM/TO	ARM A	ARM B	ARM C
07.30 - 09.00	ARM A	0.000	0.034	0.966
		0.0	15.0	430.0
		(0.0)	(0.0)	(0.0)
	ARM B	0.750	0.000	0.250
		15.0	0.0	5.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.990	0.010	0.000
		485.0	5.0	0.0
		(0.0)	(0.0)	(0.0)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
07.30-07.45								
B-C	0.06	9.85	0.006		0.0	0.0	0.1	
B-A	0.19	7.28	0.026		0.0	0.0	0.4	
C-A	6.06							
C-B	0.06	10.32	0.006		0.0	0.0	0.1	
A-B	0.19							
A-C	5.38							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.104	0.006			0.009
B-A	0.077	0.010	0.020	0.005	0.007
C-B	0.103	0.006		0.010	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
07.45-08.00								
B-C	0.07	9.65	0.008		0.0	0.0	0.1	
B-A	0.22	6.97	0.032		0.0	0.0	0.5	
C-A	7.24							
C-B	0.07	10.13	0.007		0.0	0.0	0.1	
A-B	0.22							
A-C	6.42							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.102	0.007			0.009
B-A	0.073	0.012	0.020	0.004	0.006
C-B	0.101	0.008		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.00-08.15								
B-C	0.09	9.37	0.010		0.0	0.0	0.1	
B-A	0.27	6.55	0.042		0.0	0.0	0.6	
C-A	8.87							
C-B	0.09	9.85	0.009		0.0	0.0	0.1	
A-B	0.27							
A-C	7.86							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.099	0.009			0.009
B-A	0.069	0.015	0.020	0.004	0.006

C-B	0.099	0.009		0.009		

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.15-08.30								
B-C	0.09	9.37	0.010		0.0	0.0	0.1	
B-A	0.27	6.55	0.042		0.0	0.0	0.7	
C-A	8.87							
C-B	0.09	9.85	0.009		0.0	0.0	0.1	
A-B	0.27							
A-C	7.86							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.099	0.009			0.009
B-A	0.069	0.015	0.020	0.004	0.006
C-B	0.099	0.009		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.30-08.45								
B-C	0.07	9.65	0.008		0.0	0.0	0.1	
B-A	0.22	6.97	0.032		0.0	0.0	0.5	
C-A	7.24							
C-B	0.07	10.13	0.007		0.0	0.0	0.1	
A-B	0.22							
A-C	6.42							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.102	0.007			0.009
B-A	0.073	0.012	0.020	0.004	0.006
C-B	0.101	0.008		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.45-09.00								
B-C	0.06	9.85	0.006		0.0	0.0	0.1	
B-A	0.19	7.28	0.026		0.0	0.0	0.4	
C-A	6.06							
C-B	0.06	10.32	0.006		0.0	0.0	0.1	
A-B	0.19							
A-C	5.38							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.104	0.006			0.009
B-A	0.077	0.010	0.020	0.005	0.007
C-B	0.103	0.006		0.010	

QUEUE FOR STREAM B-C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
07.45	0.0
08.00	0.0
08.15	0.0
08.30	0.0
08.45	0.0
09.00	0.0

QUEUE FOR STREAM B-A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
07.45	0.0
08.00	0.0
08.15	0.0
08.30	0.0
08.45	0.0
09.00	0.0

QUEUE FOR STREAM C-B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
07.45	0.0
08.00	0.0
08.15	0.0
08.30	0.0
08.45	0.0
09.00	0.0

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
B-C	6.9	4.6	0.7	0.10	0.7	0.10
B-A	20.6	13.7	3.1	0.15	3.1	0.15
C-A	665.0	443.4				
C-B	6.9	4.6	0.7	0.10	0.7	0.10
A-B	20.6	13.7				
A-C	589.6	393.1				
ALL	1309.5	873.0	4.5	0.00	4.5	0.00

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD .
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

TRANSPORT RESEARCH LABORATORY

(C) COPYRIGHT 1998

CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

Visual PICADY 4 ANALYSIS PROGRAM
RELEASE 2.1 (DEC 1998)

ADAPTED FROM PICADY/3 WHICH IS CROWN COPYRIGHT
BY PERMISSION OF THE CONTROLLER OF HMSO

THE USER OF THIS COMPUTER PROGRAM FOR THE SOLUTION OF AN ENGINEERING PROBLEM IS IN NO WAY RELIEVED OF HIS RESPONSIBILITY FOR THE CORRECTNESS OF THE SOLUTION

RUN TITLE
****
Cha Kwo Ling Road/Access Road - 2027 Design Flows (PM)

.MAJOR/MINOR JUNCTION CAPACITY AND DELAY
****

INPUT DATA

```
                    MAJOR ROAD (ARM C) --------------------- MAJOR ROAD (ARM A)
                                                I
                                                I
                                                I
                                                I
                                                I
                                                I
                                            MINOR ROAD (ARM B)
```

ARM A IS Cha Kwo Ling Road SB
ARM B IS Access Road WB
ARM C IS Cha Kwo Ling Road NB

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B

ETC.

.GEOMETRIC DATA

DATA ITEM	MINOR ROAD B
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	(W) 13.00 M.
CENTRAL RESERVE WIDTH	(WCR) 0.00 M.
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B) 3.00 M.
- VISIBILITY	(VC-B) 90.0 M.
- BLOCKS TRAFFIC	NO
MINOR ROAD - VISIBILITY TO LEFT	(VB-C) 100.0 M.
- VISIBILITY TO RIGHT	(VB-A) 100.0 M.
- LANE 1 WIDTH	(WB-C) 2.50 M.
- LANE 2 WIDTH	(WB-A) 2.50 M.

.

.TRAFFIC DEMAND DATA

TIME PERIOD BEGINS 07.30 AND ENDS 09.00

LENGTH OF TIME PERIOD - 90 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	TOP OF PEAK IS REACHED	FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK

ARM A	15.00	45.00	75.00	7.88	11.81	7.88
ARM B	15.00	45.00	75.00	0.25	0.38	0.25
ARM C	15.00	45.00	75.00	6.00	9.00	6.00

TIME	FROM/TO	TURNING PROPORTIONS TURNING COUNTS (VEH/HR) (PERCENTAGE OF H.V.S) ARM A	ARM B	ARM C
07.30 - 09.00	ARM A	0.000	0.024	0.976
		0.0	15.0	615.0
		(0.0)	(0.0)	(0.0)
	ARM B	0.750	0.000	0.250
		15.0	0.0	5.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.990	0.010	0.000
		475.0	5.0	0.0
		(0.0)	(0.0)	(0.0)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
07.30-07.45								
B-C	0.06	9.45	0.007		0.0	0.0	0.1	
B-A	0.19	6.90	0.027		0.0	0.0	0.4	
C-A	5.94							
C-B	0.06	9.90	0.006		0.0	0.0	0.1	
A-B	0.19							
A-C	7.69							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.100	0.008			0.009
B-A	0.073	0.012	0.020	0.004	0.006
C-B	0.099	0.009		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
07.45-08.00								
B-C	0.07	9.17	0.008		0.0	0.0	0.1	
B-A	0.22	6.52	0.034		0.0	0.0	0.5	
C-A	7.09							
C-B	0.07	9.62	0.008		0.0	0.0	0.1	
A-B	0.22							
A-C	9.18							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.097	0.010			0.008
B-A	0.069	0.015	0.020	0.004	0.006
C-B	0.096	0.011		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.00-08.15								
B-C	0.09	8.78	0.010		0.0	0.0	0.2	
B-A	0.27	5.99	0.046		0.0	0.0	0.7	
C-A	8.68							
C-B	0.09	9.23	0.010		0.0	0.0	0.1	
A-B	0.27							
A-C	11.24							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.092	0.012			0.008

B-A	0.063	0.018	0.020	0.004	0.005	
C-B	0.092	0.013		0.009		

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.15-08.30								
B-C	0.09	8.78	0.010		0.0	0.0	0.2	
B-A	0.27	5.99	0.046		0.0	0.0	0.7	
C-A	8.68							
C-B	0.09	9.23	0.010		0.0	0.0	0.2	
A-B	0.27							
A-C	11.24							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.092	0.012			0.008
B-A	0.063	0.018	0.020	0.004	0.005
C-B	0.092	0.013		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.30-08.45								
B-C	0.07	9.17	0.008		0.0	0.0	0.1	
B-A	0.22	6.52	0.034		0.0	0.0	0.6	
C-A	7.09							
C-B	0.07	9.62	0.008		0.0	0.0	0.1	
A-B	0.22							
A-C	9.18							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.097	0.010			0.008
B-A	0.069	0.015	0.020	0.004	0.006
C-B	0.096	0.011		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.45-09.00								
B-C	0.06	9.44	0.007		0.0	0.0	0.1	
B-A	0.19	6.90	0.027		0.0	0.0	0.4	
C-A	5.94							
C-B	0.06	9.90	0.006		0.0	0.0	0.1	
A-B	0.19							
A-C	7.69							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.099	0.008			0.009
B-A	0.073	0.012	0.020	0.004	0.006
C-B	0.099	0.009		0.009	

QUEUE FOR STREAM B-C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
07.45	0.0
08.00	0.0
08.15	0.0
08.30	0.0
08.45	0.0
09.00	0.0

QUEUE FOR STREAM B-A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
07.45	0.0
08.00	0.0
08.15	0.0
08.30	0.0
08.45	0.0
09.00	0.0

QUEUE FOR STREAM C-B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
07.45	0.0
08.00	0.0
08.15	0.0
08.30	0.0
08.45	0.0
09.00	0.0

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
B-C	6.9	4.6	0.8	0.11	0.8	0.11
B-A	20.6	13.7	3.3	0.16	3.3	0.16
C-A	651.3	434.2				
C-B	6.9	4.6	0.7	0.11	0.7	0.11
A-B	20.6	13.7				
A-C	843.3	562.2				
ALL	1549.5	1033.0	4.8	0.00	4.8	0.00

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD .
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

TRANSPORT RESEARCH LABORATORY

(C) COPYRIGHT 1998

CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

Visual PICADY 4 ANALYSIS PROGRAM
RELEASE 2.1 (DEC 1998)

ADAPTED FROM PICADY/3 WHICH IS CROWN COPYRIGHT
BY PERMISSION OF THE CONTROLLER OF HMSO

THE USER OF THIS COMPUTER PROGRAM FOR THE SOLUTION OF AN ENGINEERING PROBLEM IS IN NO WAY RELIEVED OF HIS RESPONSIBILITY FOR THE CORRECTNESS OF THE SOLUTION

RUN TITLE
****
Cha Kwo Ling Road/Ko Fai Road - 2027 Reference Flows (AM)

.MAJOR/MINOR JUNCTION CAPACITY AND DELAY
****

INPUT DATA

```
                    MAJOR ROAD (ARM C) --------------------- MAJOR ROAD (ARM A)
                                                I
                                                I
                                                I
                                                I
                                                I
                                                I
                                          MINOR ROAD (ARM B)
```

ARM A IS Cha Kwo Ling Road NB
ARM B IS Ko Fai Road EB
ARM C IS Cha Kwo Ling Road SB

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B

ETC.

.GEOMETRIC DATA

DATA ITEM	MINOR ROAD B
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	(W) 12.50 M.
CENTRAL RESERVE WIDTH	(WCR) 0.00 M.
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B) 2.70 M.
- VISIBILITY	(VC-B) 90.0 M.
- BLOCKS TRAFFIC	NO
MINOR ROAD - VISIBILITY TO LEFT	(VB-C) 35.0 M.
- VISIBILITY TO RIGHT	(VB-A) 59.0 M.
- LANE 1 WIDTH	(WB-C) 2.70 M.
- LANE 2 WIDTH	(WB-A) 3.30 M.

.

.TRAFFIC DEMAND DATA

TIME PERIOD BEGINS 07.30 AND ENDS 09.00

LENGTH OF TIME PERIOD - 90 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	TOP OF PEAK IS REACHED	FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK

ARM A	15.00	45.00	75.00	7.75	11.63	7.75
ARM B	15.00	45.00	75.00	6.81	10.22	6.81
ARM C	15.00	45.00	75.00	9.56	14.34	9.56

TIME	FROM/TO	TURNING PROPORTIONS TURNING COUNTS (VEH/HR) (PERCENTAGE OF H.V.S) ARM A	ARM B	ARM C
07.30 - 09.00	ARM A	0.000	0.153	0.847
		0.0	95.0	525.0
		(0.0)	(0.0)	(0.0)
	ARM B	0.000	0.000	1.000
		0.0	0.0	545.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.536	0.464	0.000
		410.0	355.0	0.0
		(0.0)	(0.0)	(0.0)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
07.30-07.45								
B-C	6.81	9.43	0.722		0.0	2.4	31.2	
B-A	0.00	5.43	0.000		0.0	0.0	0.0	
C-A	5.13							
C-B	4.44	9.58	0.463		0.0	0.8	11.8	
A-B	1.19							
A-C	6.56							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.097	0.008			0.009
B-A	0.058	0.018	0.020	0.004	0.006
C-B	0.099	0.009		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
07.45-08.00								
B-C	8.13	9.19	0.885		2.4	5.6	68.4	
B-A	0.00	4.90	0.000		0.0	0.0	0.0	
C-A	6.12							
C-B	5.30	9.30	0.569		0.8	1.3	18.1	
A-B	1.42							
A-C	7.84							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.095	0.009			0.009
B-A	0.052	0.021	0.020	0.003	0.005
C-B	0.096	0.010		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.00-08.15								
B-C	9.96	8.85	1.125		5.6	25.0	236.4	
B-A	0.00	4.18	0.000		0.0	0.0	0.0	
C-A	7.50							
C-B	6.49	8.92	0.727		1.3	2.4	33.0	
A-B	1.74							
A-C	9.60							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.091	0.011			0.008
B-A	0.045	0.026	0.020	0.003	0.004

C-B	0.092	0.013		0.008		

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.15-08.30								
B-C	9.96	8.85	1.125		25.0	42.4	506.3	
B-A	0.00	4.16	0.000		0.0	0.0	0.0	
C-A	7.50							
C-B	6.49	8.92	0.727		2.4	2.5	37.6	
A-B	1.74							
A-C	9.60							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.091	0.011			0.008
B-A	0.044	0.026	0.020	0.003	0.004
C-B	0.092	0.013		0.008	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.30-08.45								
B-C	8.13	9.19	0.885		42.4	29.7	540.6	
B-A	0.00	4.87	0.000		0.0	0.0	0.0	
C-A	6.12							
C-B	5.30	9.30	0.569		2.5	1.4	22.1	
A-B	1.42							
A-C	7.84							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.095	0.009			0.009
B-A	0.052	0.021	0.020	0.003	0.005
C-B	0.096	0.010		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.45-09.00								
B-C	6.81	9.43	0.722		29.7	3.1	200.7	
B-A	0.00	5.41	0.000		0.0	0.0	0.0	
C-A	5.13							
C-B	4.44	9.58	0.463		1.4	0.9	13.9	
A-B	1.19							
A-C	6.56							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.097	0.008			0.009
B-A	0.058	0.018	0.020	0.004	0.006
C-B	0.099	0.009		0.009	

QUEUE FOR STREAM B-C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
07.45	2.4	**
08.00	5.6	******
08.15	25.0	**********
08.30	42.4	**********
08.45	29.7	**********
09.00	3.1	***

QUEUE FOR STREAM B-A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
07.45	0.0
08.00	0.0
08.15	0.0
08.30	0.0
08.45	0.0
09.00	0.0

QUEUE FOR STREAM C-B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
07.45	0.8	*
08.00	1.3	*
08.15	2.4	**
08.30	2.5	***
08.45	1.4	*
09.00	0.9	*

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
B-C	747.3	498.2	1583.6	2.12	1584.1	2.12
B-A	0.0	0.0	0.0	0.00	0.0	0.00
C-A	562.2	374.8				
C-B	486.8	324.5	136.5	0.28	136.6	0.28
A-B	130.3	86.8				
A-C	719.9	479.9				
ALL	2646.4	1764.3	1720.1	0.65	1720.7	0.65

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD .
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

TRANSPORT RESEARCH LABORATORY

(C) COPYRIGHT 1998

CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

Visual PICADY 4 ANALYSIS PROGRAM
RELEASE 2.1 (DEC 1998)

ADAPTED FROM PICADY/3 WHICH IS CROWN COPYRIGHT
BY PERMISSION OF THE CONTROLLER OF HMSO

THE USER OF THIS COMPUTER PROGRAM FOR THE SOLUTION OF AN ENGINEERING PROBLEM IS IN NO WAY RELIEVED OF HIS RESPONSIBILITY FOR THE CORRECTNESS OF THE SOLUTION

RUN TITLE
****
Cha Kwo Ling Road/Ko Fai Road - 2027 Reference Flows (PM)

.MAJOR/MINOR JUNCTION CAPACITY AND DELAY
****

INPUT DATA

```
                    MAJOR ROAD (ARM C) --------------------- MAJOR ROAD (ARM A)
                                                I
                                                I
                                                I
                                                I
                                                I
                                                I
                                           MINOR ROAD (ARM B)
```

ARM A IS Cha Kwo Ling Road NB
ARM B IS Ko Fai Road EB
ARM C IS Cha Kwo Ling Road SB

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B

ETC.

.GEOMETRIC DATA

DATA ITEM	MINOR ROAD B
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	(W) 12.50 M.
CENTRAL RESERVE WIDTH	(WCR) 0.00 M.
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B) 2.70 M.
- VISIBILITY	(VC-B) 90.0 M.
- BLOCKS TRAFFIC	NO
MINOR ROAD - VISIBILITY TO LEFT	(VB-C) 35.0 M.
- VISIBILITY TO RIGHT	(VB-A) 59.0 M.
- LANE 1 WIDTH	(WB-C) 2.70 M.
- LANE 2 WIDTH	(WB-A) 3.30 M.

.

.TRAFFIC DEMAND DATA

TIME PERIOD BEGINS 07.30 AND ENDS 09.00

LENGTH OF TIME PERIOD - 90 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	TOP OF PEAK IS REACHED	FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK

ARM A	15.00	45.00	75.00	7.50	11.25	7.50
ARM B	15.00	45.00	75.00	6.25	9.38	6.25
ARM C	15.00	45.00	75.00	9.00	13.50	9.00

TURNING PROPORTIONS
TURNING COUNTS (VEH/HR)
(PERCENTAGE OF H.V.S)

TIME	FROM/TO	ARM A	ARM B	ARM C
07.30 - 09.00	ARM A	0.000	0.133	0.867
		0.0	80.0	520.0
		(0.0)	(0.0)	(0.0)
	ARM B	0.000	0.000	1.000
		0.0	0.0	500.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.500	0.500	0.000
		360.0	360.0	0.0
		(0.0)	(0.0)	(0.0)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
07.30-07.45								
B-C	6.25	9.46	0.661		0.0	1.8	24.6	
B-A	0.00	5.50	0.000		0.0	0.0	0.0	
C-A	4.50							
C-B	4.50	9.63	0.467		0.0	0.9	12.0	
A-B	1.00							
A-C	6.50							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.098	0.007			0.009
B-A	0.059	0.017	0.020	0.004	0.006
C-B	0.099	0.008		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
07.45-08.00								
B-C	7.46	9.22	0.809		1.8	3.7	47.5	
B-A	0.00	4.98	0.000		0.0	0.0	0.0	
C-A	5.37							
C-B	5.37	9.36	0.574		0.9	1.3	18.4	
A-B	1.19							
A-C	7.76							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.095	0.009			0.009
B-A	0.053	0.021	0.020	0.004	0.005
C-B	0.097	0.010		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.00-08.15								
B-C	9.14	8.89	1.028		3.7	14.0	143.2	
B-A	0.00	4.28	0.000		0.0	0.0	0.0	
C-A	6.58							
C-B	6.58	8.99	0.732		1.3	2.5	33.6	
A-B	1.46							
A-C	9.51							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.092	0.011			0.008

B-A	0.046	0.025	0.020	0.003	0.004	
C-B	0.093	0.012		0.008		

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.15-08.30								
B-C	9.14	8.89	1.028		14.0	20.8	263.3	
B-A	0.00	4.26	0.000		0.0	0.0	0.0	
C-A	6.58							
C-B	6.58	8.99	0.732		2.5	2.6	38.5	
A-B	1.46							
A-C	9.51							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.092	0.011			0.008
B-A	0.046	0.026	0.020	0.003	0.004
C-B	0.093	0.012		0.008	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.30-08.45								
B-C	7.46	9.22	0.809		20.8	5.5	171.2	
B-A	0.00	4.95	0.000		0.0	0.0	0.0	
C-A	5.37							
C-B	5.37	9.36	0.574		2.6	1.4	22.6	
A-B	1.19							
A-C	7.76							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.095	0.009			0.009
B-A	0.053	0.021	0.020	0.004	0.005
C-B	0.097	0.010		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.45-09.00								
B-C	6.25	9.46	0.661		5.5	2.1	36.1	
B-A	0.00	5.48	0.000		0.0	0.0	0.0	
C-A	4.50							
C-B	4.50	9.63	0.467		1.4	0.9	14.2	
A-B	1.00							
A-C	6.50							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.098	0.007			0.009
B-A	0.059	0.017	0.020	0.004	0.006
C-B	0.099	0.008		0.009	

QUEUE FOR STREAM B-C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
07.45	1.8	**
08.00	3.7	****
08.15	14.0	**********
08.30	20.8	**********
08.45	5.5	*****
09.00	2.1	**

QUEUE FOR STREAM B-A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
07.45	0.0
08.00	0.0
08.15	0.0
08.30	0.0
08.45	0.0
09.00	0.0

QUEUE FOR STREAM C-B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
07.45	0.9	*
08.00	1.3	*
08.15	2.5	***
08.30	2.6	***
08.45	1.4	*
09.00	0.9	*

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
B-C	685.6	457.1	686.1	1.00	686.3	1.00
B-A	0.0	0.0	0.0	0.00	0.0	0.00
C-A	493.6	329.1				
C-B	493.6	329.1	139.3	0.28	139.3	0.28
A-B	109.7	73.1				
A-C	713.0	475.4				
ALL	2495.6	1663.7	825.4	0.33	825.7	0.33

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD .
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

TRANSPORT RESEARCH LABORATORY

(C) COPYRIGHT 1998

CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

Visual PICADY 4 ANALYSIS PROGRAM
RELEASE 2.1 (DEC 1998)

ADAPTED FROM PICADY/3 WHICH IS CROWN COPYRIGHT
BY PERMISSION OF THE CONTROLLER OF HMSO

THE USER OF THIS COMPUTER PROGRAM FOR THE SOLUTION OF AN ENGINEERING PROBLEM IS IN NO WAY RELIEVED OF HIS RESPONSIBILITY FOR THE CORRECTNESS OF THE SOLUTION

RUN TITLE
****
Cha Kwo Ling Road/Ko Fai Road - 2027 Design Flows (AM)

.MAJOR/MINOR JUNCTION CAPACITY AND DELAY
****

INPUT DATA

```
                    MAJOR ROAD (ARM C) --------------------- MAJOR ROAD (ARM A)
                                                I
                                                I
                                                I
                                                I
                                                I
                                                I
                                          MINOR ROAD (ARM B)
```

ARM A IS Cha Kwo Ling Road NB
ARM B IS Ko Fai Road EB
ARM C IS Cha Kwo Ling Road SB

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B

ETC.

.GEOMETRIC DATA

DATA ITEM	MINOR ROAD B
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	(W) 12.50 M.
CENTRAL RESERVE WIDTH	(WCR) 0.00 M.
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B) 2.70 M.
- VISIBILITY	(VC-B) 90.0 M.
- BLOCKS TRAFFIC	NO
MINOR ROAD - VISIBILITY TO LEFT	(VB-C) 35.0 M.
- VISIBILITY TO RIGHT	(VB-A) 59.0 M.
- LANE 1 WIDTH	(WB-C) 2.70 M.
- LANE 2 WIDTH	(WB-A) 3.30 M.

.

.TRAFFIC DEMAND DATA

TIME PERIOD BEGINS 07.30 AND ENDS 09.00

LENGTH OF TIME PERIOD - 90 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	TOP OF PEAK IS REACHED	FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK

ARM A	15.00	45.00	75.00	8.50	12.75	8.50
ARM B	15.00	45.00	75.00	6.81	10.22	6.81
ARM C	15.00	45.00	75.00	10.13	15.19	10.13

TIME	FROM/TO	TURNING PROPORTIONS TURNING COUNTS (VEH/HR) (PERCENTAGE OF H.V.S) ARM A	ARM B	ARM C
07.30 - 09.00	ARM A	0.000	0.140	0.860
		0.0	95.0	585.0
		(0.0)	(0.0)	(0.0)
	ARM B	0.000	0.000	1.000
		0.0	0.0	545.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.562	0.438	0.000
		455.0	355.0	0.0
		(0.0)	(0.0)	(0.0)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
07.30-07.45								
B-C	6.81	9.30	0.732		0.0	2.5	32.5	
B-A	0.00	5.25	0.000		0.0	0.0	0.0	
C-A	5.69							
C-B	4.44	9.44	0.470		0.0	0.9	12.1	
A-B	1.19							
A-C	7.31							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.096	0.008			0.009
B-A	0.056	0.019	0.020	0.004	0.005
C-B	0.097	0.009		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
07.45-08.00								
B-C	8.13	9.03	0.901		2.5	6.1	73.7	
B-A	0.00	4.69	0.000		0.0	0.0	0.0	
C-A	6.79							
C-B	5.30	9.14	0.580		0.9	1.3	18.7	
A-B	1.42							
A-C	8.73							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.093	0.010			0.009
B-A	0.050	0.023	0.020	0.003	0.005
C-B	0.094	0.011		0.008	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.00-08.15								
B-C	9.96	8.66	1.151		6.1	27.9	261.3	
B-A	0.00	3.92	0.000		0.0	0.0	0.0	
C-A	8.32							
C-B	6.49	8.72	0.744		1.3	2.6	35.2	
A-B	1.74							
A-C	10.69							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.089	0.012			0.008

B-A	0.042	0.028	0.020	0.003	0.004	
C-B	0.090	0.014		0.008		

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.15-08.30								
B-C	9.96	8.66	1.151		27.9	48.0	570.3	
B-A	0.00	3.90	0.000		0.0	0.0	0.0	
C-A	8.32							
C-B	6.49	8.72	0.744		2.6	2.8	40.6	
A-B	1.74							
A-C	10.69							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.089	0.012			0.008
B-A	0.042	0.028	0.020	0.003	0.004
C-B	0.090	0.014		0.008	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.30-08.45								
B-C	8.13	9.03	0.901		48.0	37.3	640.1	
B-A	0.00	4.66	0.000		0.0	0.0	0.0	
C-A	6.79							
C-B	5.30	9.14	0.580		2.8	1.4	23.2	
A-B	1.42							
A-C	8.73							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.093	0.010			0.009
B-A	0.050	0.023	0.020	0.003	0.005
C-B	0.094	0.011		0.008	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.45-09.00								
B-C	6.81	9.30	0.732		37.3	4.2	307.5	
B-A	0.00	5.23	0.000		0.0	0.0	0.0	
C-A	5.69							
C-B	4.44	9.44	0.470		1.4	0.9	14.4	
A-B	1.19							
A-C	7.31							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.096	0.008			0.009
B-A	0.056	0.019	0.020	0.004	0.005
C-B	0.097	0.009		0.009	

QUEUE FOR STREAM B-C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
07.45	2.5	***
08.00	6.1	******
08.15	27.9	**********
08.30	48.0	**********
08.45	37.3	**********
09.00	4.2	****

QUEUE FOR STREAM B-A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
07.45	0.0
08.00	0.0
08.15	0.0
08.30	0.0
08.45	0.0
09.00	0.0

QUEUE FOR STREAM C-B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
07.45	0.9	*
08.00	1.3	*
08.15	2.6	***
08.30	2.8	***
08.45	1.4	*
09.00	0.9	*

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND		* QUEUEING * DELAY *		* INCLUSIVE QUEUEING * DELAY *	
	(VEH)	(VEH/H)	(MIN)	(MIN/VEH)	(MIN)	(MIN/VEH)
B-C	747.3	498.2	1885.4	2.52	1886.4	2.52
B-A	0.0	0.0	0.0	0.00	0.0	0.00
C-A	623.9	415.9				
C-B	486.8	324.5	144.2	0.30	144.3	0.30
A-B	130.3	86.8				
A-C	802.2	534.8				
ALL	2790.4	1860.3	2029.7	0.73	2030.7	0.73

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD .
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

TRANSPORT RESEARCH LABORATORY

(C) COPYRIGHT 1998

CAPACITIES, QUEUES, AND DELAYS AT 3 OR 4-ARM MAJOR/MINOR PRIORITY JUNCTIONS

Visual PICADY 4 ANALYSIS PROGRAM
RELEASE 2.1 (DEC 1998)

ADAPTED FROM PICADY/3 WHICH IS CROWN COPYRIGHT
BY PERMISSION OF THE CONTROLLER OF HMSO

THE USER OF THIS COMPUTER PROGRAM FOR THE SOLUTION OF AN ENGINEERING PROBLEM IS IN NO WAY RELIEVED OF HIS RESPONSIBILITY FOR THE CORRECTNESS OF THE SOLUTION

RUN TITLE
****
Cha Kwo Ling Road/Ko Fai Road - 2027 Design Flows (PM)

.MAJOR/MINOR JUNCTION CAPACITY AND DELAY
****

INPUT DATA

```
                    MAJOR ROAD (ARM C) --------------------- MAJOR ROAD (ARM A)
                                                I
                                                I
                                                I
                                                I
                                                I
                                                I
                                          MINOR ROAD (ARM B)
```

ARM A IS Cha Kwo Ling Road NB
ARM B IS Ko Fai Road EB
ARM C IS Cha Kwo Ling Road SB

STREAM LABELLING CONVENTION

STREAM A-B CONTAINS TRAFFIC GOING FROM ARM A TO ARM B

ETC.

.GEOMETRIC DATA

DATA ITEM	MINOR ROAD B
TOTAL MAJOR ROAD CARRIAGEWAY WIDTH	(W) 12.50 M.
CENTRAL RESERVE WIDTH	(WCR) 0.00 M.
MAJOR ROAD RIGHT TURN - WIDTH	(WC-B) 2.70 M.
- VISIBILITY	(VC-B) 90.0 M.
- BLOCKS TRAFFIC	NO
MINOR ROAD - VISIBILITY TO LEFT	(VB-C) 35.0 M.
- VISIBILITY TO RIGHT	(VB-A) 59.0 M.
- LANE 1 WIDTH	(WB-C) 2.70 M.
- LANE 2 WIDTH	(WB-A) 3.30 M.

.

.TRAFFIC DEMAND DATA

TIME PERIOD BEGINS 07.30 AND ENDS 09.00

LENGTH OF TIME PERIOD - 90 MINUTES.
LENGTH OF TIME SEGMENT - 15 MINUTES.

DEMAND FLOW PROFILES ARE SYNTHESISED FROM TURNING COUNT DATA

ARM	NUMBER OF MINUTES FROM START WHEN FLOW STARTS TO RISE	TOP OF PEAK IS REACHED	FLOW STOPS FALLING	RATE OF FLOW (VEH/MIN) BEFORE PEAK	AT TOP OF PEAK	AFTER PEAK

ARM A	15.00		45.00		75.00		7.94		11.91		7.94
ARM B	15.00		45.00		75.00		6.25		9.38		6.25
ARM C	15.00		45.00		75.00		9.56		14.34		9.56

TIME	FROM/TO	TURNING PROPORTIONS TURNING COUNTS (VEH/HR) (PERCENTAGE OF H.V.S) ARM A	ARM B	ARM C
07.30 - 09.00	ARM A	0.000	0.126	0.874
		0.0	80.0	555.0
		(0.0)	(0.0)	(0.0)
	ARM B	0.000	0.000	1.000
		0.0	0.0	500.0
		(0.0)	(0.0)	(0.0)
	ARM C	0.471	0.529	0.000
		360.0	405.0	0.0
		(0.0)	(0.0)	(0.0)

TURNING PROPORTIONS ARE CALCULATED FROM TURNING COUNT DATA

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
07.30-07.45								
B-C	6.25	9.38	0.666		0.0	1.9	25.1	
B-A	0.00	5.30	0.000		0.0	0.0	0.0	
C-A	4.50							
C-B	5.06	9.55	0.530		0.0	1.1	15.2	
A-B	1.00							
A-C	6.94							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.097	0.008			0.009
B-A	0.057	0.019	0.020	0.004	0.006
C-B	0.098	0.009		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
07.45-08.00								
B-C	7.46	9.13	0.818		1.9	3.8	49.3	
B-A	0.00	4.74	0.000		0.0	0.0	0.0	
C-A	5.37							
C-B	6.05	9.26	0.653		1.1	1.8	24.8	
A-B	1.19							
A-C	8.28							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.094	0.009			0.009
B-A	0.051	0.022	0.020	0.003	0.005
C-B	0.096	0.011		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.00-08.15								
B-C	9.14	8.78	1.042		3.8	15.2	152.6	
B-A	0.00	3.98	0.000		0.0	0.0	0.0	
C-A	6.58							
C-B	7.40	8.87	0.834		1.8	4.1	52.3	
A-B	1.46							
A-C	10.15							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.091	0.012			0.008

B-A	0.043	0.027	0.020	0.003	0.004	
C-B	0.092	0.013		0.008		

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.15-08.30								
B-C	9.14	8.78	1.042		15.2	23.1	288.8	
B-A	0.00	3.95	0.000		0.0	0.0	0.0	
C-A	6.58							
C-B	7.40	8.87	0.834		4.1	4.5	65.2	
A-B	1.46							
A-C	10.15							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.091	0.012			0.008
B-A	0.042	0.028	0.020	0.003	0.004
C-B	0.092	0.013		0.008	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.30-08.45								
B-C	7.46	9.13	0.818		23.1	6.1	204.1	
B-A	0.00	4.69	0.000		0.0	0.0	0.0	
C-A	5.37							
C-B	6.05	9.26	0.653		4.5	2.0	33.6	
A-B	1.19							
A-C	8.28							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.094	0.009			0.009
B-A	0.050	0.023	0.020	0.003	0.005
C-B	0.096	0.011		0.009	

TIME	DEMAND (VEH/MIN)	CAPACITY (VEH/MIN)	DEMAND/ CAPACITY (RFC)	PEDESTRIAN FLOW (PEDS/MIN)	START QUEUE (VEHS)	END QUEUE (VEHS)	DELAY (VEH.MIN/ TIME SEGMENT)	GEOMETRIC DELAY (VEH.MIN/ TIME SEGMENT)
08.45-09.00								
B-C	6.25	9.38	0.666		6.1	2.1	38.2	
B-A	0.00	5.27	0.000		0.0	0.0	0.0	
C-A	4.50							
C-B	5.06	9.55	0.530		2.0	1.2	18.6	
A-B	1.00							
A-C	6.94							

EFFECT ON CAPACITY (PCU/MIN) OF MARGINAL CHANGES IN:

MARGINAL CHANGE:	LANE WIDTH (.1M)	MAJOR RD. WIDTH (.1M)	CENT RES WIDTH (.1M)	VIS TO LEFT (AHEAD FOR MAJOR) (M)	VISIBILITY TO RIGHT (M)
B-C	0.097	0.008			0.009
B-A	0.056	0.019	0.020	0.004	0.006
C-B	0.098	0.009		0.009	

QUEUE FOR STREAM B-C

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
07.45	1.9	**
08.00	3.8	****
08.15	15.2	**********
08.30	23.1	**********
08.45	6.1	******
09.00	2.1	**

QUEUE FOR STREAM B-A

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE
07.45	0.0
08.00	0.0
08.15	0.0
08.30	0.0
08.45	0.0
09.00	0.0

QUEUE FOR STREAM C-B

TIME SEGMENT ENDING	NO. OF VEHICLES IN QUEUE	
07.45	1.1	*
08.00	1.8	**
08.15	4.1	****
08.30	4.5	****
08.45	2.0	**
09.00	1.2	*

QUEUEING DELAY INFORMATION OVER WHOLE PERIOD

STREAM	TOTAL DEMAND (VEH)	TOTAL DEMAND (VEH/H)	* QUEUEING * DELAY * (MIN)	* QUEUEING * DELAY * (MIN/VEH)	* INCLUSIVE QUEUEING * DELAY * (MIN)	* INCLUSIVE QUEUEING * DELAY * (MIN/VEH)
B-C	685.6	457.1	758.1	1.11	758.3	1.11
B-A	0.0	0.0	0.0	0.00	0.0	0.00
C-A	493.6	329.1				
C-B	555.3	370.2	209.6	0.38	209.7	0.38
A-B	109.7	73.1				
A-C	761.0	507.3				
ALL	2605.3	1736.9	967.7	0.37	968.0	0.37

* DELAY IS THAT OCCURRING ONLY WITHIN THE TIME PERIOD .
* INCLUSIVE DELAY INCLUDES DELAY SUFFERED BY VEHICLES WHICH ARE STILL QUEUEING AFTER THE END OF THE TIME PERIOD.
* THESE WILL ONLY BE SIGNIFICANTLY DIFFERENT IF THERE IS A LARGE QUEUE REMAINING AT THE END OF THE TIME PERIOD.

END OF JOB

MVA provides advice on transport, to central, regional and local government, agencies, developers, operators and financiers.

A diverse group of results-oriented people, we are part of a strong team of professionals worldwide. Through client business planning, customer research and strategy development we create solutions that work for real people in the real world.

For more information visit www.mvaasia.com

Abu Dhabi
AS Business Centre, First Floor, Suites 201-213,
Al Ain Road, Umm al Nar, P.O. Box 129865,
Abu Dhabi, UAE
T: +971 2 558 3809 F: +971 2 558 9961

Birmingham
Second Floor, 37a Waterloo Street
Birmingham B2 5TJ United Kingdom
T: +44 (0)121 233 7680 F: +44 (0)121 233 7681

Dublin
1st Floor, 12/13 Exchange Place,
Custom House Docks, IFSC, Dublin 1 Ireland
T: +353 (0)1 542 6000 F: +353 (0)1 542 6001

Edinburgh
Prospect House, 5 Thistle Street, Edinburgh EH2 1DF
United Kingdom
T: +44 (0)131 220 6966

Glasgow
Seventh Floor, 78 St Vincent Street
Glasgow G2 5UB United Kingdom
T: +44 (0)141 225 4400

Lille
86 Boulevard Carnot, 59000 Lille, France
T: +33 (0)3 74 07 00 F: +33 (0)1 53 17 36 01

London
Seventh Floor, 15 Old Bailey
London EC4M 7EF United Kingdom
T: +44 (0)20 7529 6500 F: +44 (0)20 3427 6274

Lyon
11, rue de la République, 69001 Lyon, France
T: +33 (0)4 72 10 29 29 F: +33 (0)4 72 10 29 28

Manchester
25th Floor, City Tower, Piccadilly Plaza
Manchester M1 4BT United Kingdom
T: +44 (0)161 236 0282 F: +44 (0)161 236 0095

Marseille
76, rue de la République, 13002 Marseille, France
T: +33 (0)4 91 37 35 15 F: +33 (0)4 91 91 90 14

Newcastle
PO Box 438, Newcastle upon Tyne, NE3 9BT
United Kingdom
T: +44 (0)191 2136157

Paris
72 rue Henry Farman, 75015 Paris, France
T: +33 (0)1 53 17 36 00 F: +33 (0)1 53 17 36 01

Woking
Dukes Court, Duke Street
Woking, Surrey GU21 5BH United Kingdom
T: +44 (0)1483 728051 F: +44 (0)1483 755207

Hong Kong
14th Floor West, Warwick House, TaiKoo Place,
979 King's Road, Island East, Hong Kong
T: +852 2529 7037 F: +852 2527 8490

Shenzhen
Room 905, Excellence Mansion, No.98, No.1 Fuhua Road,
Futian Central Zone, Shenzhen, PRC, Post Code : 518048
T : +86 755 3336 1898 F : +86 755 3336 2060

Shenzhen - Beijing Branch Office
Room 1503, Block C, He Qiao Mansion, No. 8 Guanghua Road,
Chaoyang District, Beijing, PRC, Post Code : 100026
T : +86 10 8557 0116 F : +86 10 8557 0126

Beijing Joint Venture
No. 60, Nan Li Shi Road, Xi Cheng District, Beijing, PRC,
Post Code : 100045
T : +86 10 8807 6320 F : +86 10 6804 3744

Singapore
25 Seah Street #04-01 Singapore 188381
T : +65 6227 3252 F : +65 6423 0178

Thailand
37th Floor, Unit F, Payatai Plaza Building,128/404-405 Payathai
Road, Rajthewee, Bangkok 10400, Thailand
T : +662 216 6652 F : +662 216 6651

Vietnam
5/F Perfect Building, Le Thi Hong Gam St, District 1,
Ho Chi Minh City, Vietnam
T : +84 8 3821 7183 F : +84 8 3821 6967

MVA
SYSTRA GROUP