# **APPENDIX 8**

TRAFFIC IMPACT ASSESSMENTREVIOUSLY SUBMITTED FOR THE SECOND PLANNING APPLICATION (A/YL/289)

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1. INTRODUCTION

#### 1.1 Background

- 1.1.1 The application site is located at Lots nos. 1695 S.E SS. 1 RP, 1695 S.F SS.1, 1695 S.H RP and adjoining Government Land in D.D. 120, Tai Kei Leng, Yuen Long, New Territories. The site location is shown in Figure 1.1.
- 1.1.2 The applicant intends to develop a proposed Residential Care Home for the Elderly (RCHE) and convert an existing Grade 3 historic building, called "Siu Lo" for "House" use. A planning application proposed minor relaxation of building height restriction from 3 to 5 storeys [Planning application no. A/YL/256] had been submitted and approved in year 2020. The applicant intends to apply a new minor relaxation of building height restriction from 3 to 6 storeys.
- 1.1.3 In support of the aforesaid application, a traffic impact assessment is required to review and appraise any possible traffic impact induced by the proposed development on the adjacent road network.
- 1.1.4 CTA Consultants Limited (CTA) was therefore commissioned as the traffic consultant to prepare the Traffic Impact Assessment (TIA) and provide technical justifications in supporting the application from traffic engineering point of view.
- 1.2 Study Objectives
- 1.2.1 Main objectives of this study are listed below:
  - To assess the existing and proposed traffic arrangement & provision of internal transport facilities at the subject site;
  - To assess the existing traffic condition in the vicinity of the proposed development;
  - To estimate traffic trips related to the proposed development;

- To carry out forecasts about traffic demand of the adjacent road network in design year 2028;
- To appraise any possible traffic impact induced by the proposed development

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on the adjacent road network;

• To recommend traffic improvement measures to alleviate any foreseeable traffic problem to the surrounding road network, if any.



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#### 2. THE PROPOSED DEVELOPMENT

#### 2.1 Site Location

2.1.1 The application site is located at Lots nos. 1695 S.E SS. 1 RP, 1695 S.F SS.1, 1695 S.H RP and adjoining Government Land in D.D. 120, Tai Kei Leng, Yuen Long, New Territories. The site location is shown in Figure 1.1.

#### 2.2 Development Proposal

2.2.1 Parameters of the proposed development are listed in Table 2.1.

	Proposed Scheme	Approved scheme (A/YL/256)
Proposed Use	roposed Use Residential Care Home Residential for the Elderly (RCHE) for the Elder	
Site Area	About 1,953 m <sup>2</sup> About 1,714.2	
Total Accountable GFA	About 5,768 m <sup>2</sup> (excluding car park GFA)	About 4,267 m <sup>2</sup>
No. of Storeys	6	5 (include 1 basement)
No. of Beds	281 (or within a range of 260 – 300)	170

 Table 2.1
 Parameters of the Proposed Development

- 2.2.2 It is anticipated that the proposed development will be commissioned in year 2025. Therefore, design year 2028 (i.e. 3 years after the planned commencement year of the proposed development) is adopted for the Traffic Impact Assessment.
- 2.2.3 The proposed RCHE will operate 24 hours a day with 3 shifts of workers, the working hour hours are:
  - (i) 7am to 3pm,
  - (ii) 3pm to 10pm, and
  - (iii) 10pm to 7am.

Thus, trips by the staffs actually would not occur at the morning peak hour

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2.2.4 It is understood that Hong Kong workers mainly go to works by public transport. Bus stops are provided near the proposed development which is convenience for the staff to travel by public transport. Moreover, staffs will not be allowed to use the parking spaces unless authorization is obtained from the management. Thus, most of the staff would be controlled to use public transport for their mode of transport.

#### 2.3 Provision of Internal Transport Facilities

2.3.1 It is revealed that there is no parking standard for "Residential Home for Elderly" in HKPSG, therefore, the parking provision of other existing RCHEs has been referenced and are summarized in **Table 2.2** below:

#### Table 2.2 Examples of Existing RCHE

Name of RCHE	Location	No. of beds	No. of Staff	Observed no. of Parking Provision	Parking Facilities <sup>(1)(2)(3)</sup> (Category 1/2/3)
Assemblies of God Holy Light Church Aged Home	91 Sung Ching Sun Tsuen, Tai Tong Road, Yuen Long	60	19	Nil	Category 1
Chinese Christian Worker's Fellowship Wah Hei Elderly Home (Comet Mansion	G/F & M/F, Shop 27, Comet Mansion, 45- 67 Fung Cheung Road, Yuen Long	105	29	Nil	Category 1
Pok Oil Hospital Jockey Club Care and Attention Home	Lot 1392 & 837 R.P. in D.D. 115, Au Tau, Yuen Long	213	124	Nil	Category 2
Po Leung Kuk Tin Yan Home for the Elderly cum Green Joy Day Care Centre for the Elderly	3/F and 4/F, Ancillary Facilities Block, Tin Yan Estate, Tin Shui Wai	106	74	Nil	Category 2
Yan Oi Tong Tin Ka Ping Care and Attention Home	G/F & 1/F, Wah Ping House, Long Ping Estate, Yuen Long	85	51	Nil	Category 2
T.W.G.Hs. Y. C. Liang Memorial Home for the Elderly	G/F & 1/F, Yiu Yat House, Tin Yiu Estate, Tin Shui Wai	88	47	Nil	Category 1
Caritas Ying Shui Home	3/F, Ying Shui House, Shui Pin Wai Estate, Yuen Long	75	47	Nil	Category 2
Salvation Army Kam Tin Residence for Senior Citizens (The)	103 Kam Tin Road, Yuen Long	150	81	1 car parking space + 1 light bus parking spaces	Category 3
Pok Oi Hospital Yeung Chun Pui Care and Attention Home	58 Sha Chau Lei Tsuen, Ha Tsuen, Yuen Long	143	92	2 car parking spaces + 1 light bus parking spaces	Category 3
Pok Oi Hospital Tai	G/F-3/F & KW 307,	109	75	Nil	Category 2

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Name of RCHE	Location	No. of beds	No. of Staff	Observed no. of Parking Provision	Parking Facilities <sup>(1)(2)(3)</sup> (Category 1/2/3)
Kwan Care & Attention Home	Shui Kwok House, Tin Shui Estate, Tin Shui Wai, Yuen Long				
Ching Chung Taoist Association of Hong Kong Limited Ching Chung Care and Attention Home for the Aged	57 Sha Chau Lei Chuen, Ping Ha Road, Yuen Long	120	61	1 car parking space + 1 light bus parking spaces	Category 3

Note: (1) Category 1 refers to homes with nil provision of car parking spaces within the Site and no public

car parking spaces can be found in the close proximity.

(2) Category 2 refers to homes with nil provision of car parking spaces within the Site but may use the public car parking spaces of nearby car park.

(3) Category 3 refers to homes with provision of car parking spaces within the Site.

#### Proposed Internal Transport Facilities Provision

2.3.2 With reference to **Table 2.2** above, only one to two private parking spaces are provided by other RCHE. Taking reference to Salvation Army Kam Tin Residence for Senior Citizens (The), it has 1 car parking space and 1 light bus parking spaces for 150 beds are sufficient for their daily operation needs. Taking into consideration that 260 to 300 beds will be provided in our proposed development, double the parking provision should be sufficient for the daily operation needs of the proposed development. The internal transport facilities provisions are proposed and summarized as **Table 2.3** below:

Table 2.3 Proposed Provisions of Internal Transport Facilities	Table 2.3	Proposed	Provisions	of Internal	Transport	Facilities
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Туре	Proposed Dimensions	Proposed Number of Spaces
Private Cars	5m(L) x 2.5m(W) x min.2.4m(H)	1
Private Cars for Disabilities	5m(L) x 3.5m(W) x min.2.4m(H)	1
Light bus	8m(L) x 3m(W) x min.3.3m(H)	2

Note: The provision of PV parking space for disabilities is determined by referring to "Parking for persons with disabilities" stipulated in the latest HKPSG that 1 accessible parking space should be provided for 1-50 parking spaces

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2.3.3 The ground floor layout plans of the proposed development showing the proposed internal transport provision is shown in **Figures 2.1**.

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#### 3. EXISTING TRAFFIC CONDITION

#### 3.1 Existing Road Network

- 3.1.1 Shap Pat Heung Road is a duel two-lane two-way primary distributor. It is the major road connecting Shap Pat Heung Interchange and Yuen Long Highway.
- 3.1.2 Tai Tong Road is a two-lane two-way district distributor connecting Man Tong Road and Shap Pat Heung Road. It is the only access road connecting the proposed development. It serves for the traffic travelling North and South in vicinity.
- 3.1.3 Yuen Long Highway is expressway connecting which form as a section of New Territories Circular Road. It is the major road connects Yuen Long with other area in New Territories.

#### 3.2 Critical Junctions

3.2.1 Five junctions are identified to be critical for the Traffic Impact Assessment due to the proposed development. Relevant details are listed in Table 3.1 and shown in Figure 3.1. Existing junction layouts are tabulated in Figures 3.2 to Figure 3.6 respectively.

Ref.	Junction	Туре	Figure No.
А	Ma Tong Road / Tai Tong Road	Signalized	3.2
В	Tai Tong Road / Shap Pat Heung Road	Signalized	3.3
С	Shap Pat Heung Road / Fung Ki Road	Signalized	3.4
D	Shap Pat Heung Road / Tai Kei Leung Road	Signalized	3.5
Е	Shap Pat Heung Interchange	Roundabout	3.6

#### Table 3.1 Identified Critical Junctions

3.2.2 It is revealed that people would visit RCHE mainly during off-peak from 10 am to 5 pm rather than at peak hours. The assessment of the impact due to the proposed development will therefore base on the traffic flow determine from off-peak.

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- 3.2.3 In order to study the existing traffic condition of the above critical junctions, traffic survey in the form of manual-classified count was conducted for the critical junctions during the off-peak periods on a typical weekday on 16 December 2021 from 10:00 AM to 12:00 noon and 15:00 PM to 17:00 PM respectively. The survey provides most up-to-date details of the traffic condition within the study area under normal operation. Based on the observed traffic flows, it reveals that peak of Off-peak hour occurred from 11:00 AM to 12:00 noon, 16:00 PM to 17:00 PM respectively.
- 3.2.4 The 2021 traffic flows are presented in **Figure 3.7**. The operational performances of the critical junctions are listed in **Table 3.2** below.

Table 3.2         Operational Performances of Critical Junctions in 2021
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Def	T and the	Method		Year 2021 RC/DFC <sup>(1)</sup>		
Ref.	Junction	of Control	AM Off-Peak	PM Off-Peak		
А	Ma Tong Road / Tai Tong Road	Signalized	+40%	+39%		
В	Tai Tong Road / Shap Pat Heung Road	Signalized	+55%	+44%		
С	Shap Pat Heung Road / Fung Ki Road	Signalized	>+100%	+98%		
D	Shap Pat Heung Road / Tai Kei Leung Road	Signalized	+98%	>+100%		
Е	Shap Pat Heung Interchange	Roundabout	0.62	0.69		

Notes: (1) RC = Reserve Capacity for Signal Junction;

DFC = Design Ratio of Flow to Capacity for Priority Junction/Roundabout

- 3.2.5 The assessment results in **Table 3.2** indicate that all critical junctions are at present operating with ample capacities during the off-peak hours.
- 3.2.6 Queue length assessment has been carried out shown in Figures 3.8 and 3.9 and summarized in Table 3.3 below.

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Table 3.3	Queue Length	Analysis o	f Identified	Junctions	in 2021
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		Method of		Length of Road	Observed Queue Length (m)	
Ref.	lunction	Control	Direction	Segment (m)	Existing AM Off- Peak	Scenario PM Off- Peak
	Shap Pat		Ma Tong Road (WB)	260	30	24
А	Heung Road /	Priority	Tai Tong Road (NB)	290	42	42
Α	Tai Shu Ha	Thomy	Ma Tong Road (EB)	350	18	18
	Road East		Tai Tong Road (SB)	240	36	36
	Tai Tong Road		Shap Pat Heung Road (WB)	150	30	36
в	/ Shap Pat Signalize Heung Road	Signalized	Tai Tong Road (NB)	160	24	18
Б		Signalized	Shap Pat Heung Road (EB)	230	18	24
			Tai Tong Road (SB)	290	36	36
			Shap Pat Heung Road (WB)	230	30	36
С	Shap Pat Heung Road /	Signalized	The Access Road of The Reach (NB)	40	0	0
	Fung Ki Road		Shap Pat Heung Road (EB)	250	18	24
		1	Fung Ki Road (SB)	180	30	48
	Shap Pat		Shap Pat Heung Road (SB)	280	36	24
D	Heung Road /	Signalized	Shap Pat Heung Road (NB)	90	30	24
D	Tai Kei Leung Road	Signalized	Tai Kei Leng Road (EB) (RT)	400	48	18
	Shap Pat		Yuen Long Highway (WB)	770	12	12
Е	Heung	Roundabout	Yuen Long Highway (EB)	590	30	30
	Interchange		Shap Pat Heung Road (SB)	90	30	30

3.2.7 The assessment results in **Table 3.3** indicate that all queues are queuing within the allowable road segments during the peak hours.

### 3.3 Public Transport Services in the Vicinity

3.3.1 Numerous road-based public transport services, for instance, franchised buses and GMB are also provided in vicinity of the proposed development. Details of the current services of franchised buses and GMB routes within the catchment area of 500 meters are listed in **Table 3.5** and shown in **Figure 3.8**.

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 Table 3.5
 Public Transport Services in the Vicinity of the Proposed Development

Service	Route	Origin - Destination	Frequency (mins)
Franchised Bus	68E	Yuen Long Park – Tsing Yi Railway Station Bus Terminus	15 - 30
Francinseu Bus	68F	Yuen Long Park – Park Yoho (Circular)	30
	K66	Tai Tong – Long Ping	4 - 15
GMB	39	Kung Um - Yuen Long (Fung Cheung Road)	5 - 8
GIVIB	73 <sup>(1)</sup>	Long Ping Station (Ma Wang Road) – Sung Shan San Tsuen	10 - 15

Note: (1) Morning peak hour service

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#### 4. FUTURE TRAFFIC CONDITION & TRAFFIC IMPACT ASSESSMENT

#### 4.1 Design Year

4.1.1 It is anticipated that the proposed development would be completed in 2025 tentatively with full intended operation. In order to assess the possible traffic impacts to the local road network due to the proposed development, year 2028 (i.e. 3 years after completion) has been adopted as the design year for this study.

#### 4.2 Traffic Forecast

4.2.1 To estimate the reference traffic flow in year 2028 (without the proposed development) in the local road network, an appropriate growth factor has to be identified for the area in the first instance. The following approaches have been adopted to derive the growth factor for the Area of Influence.

#### Historical Trend

4.2.2 Numerous traffic-count stations are located in the vicinity of the proposed development. The traffic counts reported in the Annual Traffic Census (ATC), which is published by Transport Department, over a period of five years, i.e. 2015 to 2019 are summarized in **Table 4.1**.

ATC		Annual Average Daily Traffic (AADT)						
Stn	Road Name	2015	2016	2017	2018	2019	Annual Growth Rate	
5711	Shap Pat Heung Rd (From Shap Pat Heung INT to Tai Tong Rd)	23,020	21,960	21,810*	22,500*	23,400*	0.41%	
	Total	23,020	21,960	21,810	22,500	23,400	+0.41%	

#### Table 4.1 Historical Traffic Data from Annual Traffic Census (ATC)

Note: \*AADT estimated by Growth factor

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#### Planning Data

4.2.3 Reference has also been made to the latest 2016-Based Territorial Population Employment Data Matrices (TPEDM) planning data published by the Planning Department in December 2019 for projection of population and employment within the study district. The average annual growth rates in terms of population and employment from 2021 to 2026 are tabulated in Table 4.2.

#### Table 4.2 2016-Based Planning Data from 2021 to 2026

Data	Ye	ar	Average Annual	
Data	2021	2026	Growth Rate	
Population	175,200	180,000	+0.54%	
Employment	68,000	69,100	+0.32%	
Total	243,200	249,100	+0.48%	

#### Adopted Growth Rate

- 4.2.4 A.A.D.T. of ATC indicates that the traffic flow of the local road network has an average annual growth rate of +0.41% from year 2015 to year 2019.
- 4.2.5 Whilst, the planning data indicates that the population and employment of the study area are expected to grow with an average annual growth rate of +0.48%.
- 4.2.6 As a conservative approach, annual growth rate +1% p.a. which is used in previous TIA is adopted. It is deemed sufficient to allow for any unexpected future growth as a result of some changes in land use or development in the study area.

#### **Reference Traffic Flow in Year 2028** 4.3

4.3.1 The year 2028 reference traffic flow is estimated by applying the adopted growth rate to the year 2021 adopted traffic flow.

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#### Adjacent New Developments

4.3.2 Additional traffic generation and attraction of major committed/planned developments in the vicinity have been estimated and superimposed onto the road network to derive the year 2028 reference traffic flow. The committed/planned developments in the vicinity are summarized and illustrated in Table 4.3 and Figure 4.1.

J		1 v
Application No.	Proposed Use	Development Parameters
A/YL/252 (Yuen Long Baptist Church Redevelopment)	Kindergarten and Church	16 classrooms for Kindergarten 1 for Special Education 680 seats for Church
Youth Hostel Development at Ma Tin Pok	Youth Hostel	1,248 Units
Lot 4041 in DD120 (A/YL/185)	Residential	16 Units
Atrium (Lot 4056 in DD120)	Residential	313 Units
A/YL/263	RCHE	380 beds
A/YL/276	RCHE	197 beds

#### Table 4.3 Major Planned/ Committed Development in the Vicinity

4.3.3 Based on the TIA reports of the vicinity developments, the trip generated and attracted by the proposed development in vicinity are summarized in the Table 4.4.

			Traffic	Trips	
Application No.	AM	Peak	PM	Peak	
		Gen.	Att.	Gen.	Att.
A/YL/252					
(Yuen Long Baptist Ch		42	53	45	13
Redevelopment) <sup>(1)</sup>					
Youth Hostel at Ma Tin	Pok <sup>(2)</sup>	31	29	23	26
Lot 4041 in DD120 (A/YL/185) <sup>(2)</sup>		5	3	3	4
Atrium	Trip Rate (60 m <sup>2</sup> )	0.08633	0.06835	0.04317	0.05755
(Lot 4056 in DD120) <sup>(3)</sup>	Traffic Trips	22	13	9	12
A/YL/263 <sup>(1)</sup>			26	16	22
A/YL/276 <sup>(1)</sup>		17	13	9	11

Table 4.4 - Estimated Traffic Trips of the Proposed Development

1) According its TIA

2) According to TIA of A/YL/261

3) Trip rate of 60m<sup>2</sup> flat size in TPDM is used as conservative approach

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4.3.4 Besides, Yuen Long South (YLS) Development has also been considered. The population intake year of YLS Development will be in stages. The design year of our development is Year 2028, therefore only Stage 1 of YLS Development would be consider in our assessment as other stages are beyond our design year.

Tuble no Th	inicu i opunation	under the ruen	Hong South De	ciopinent
Development	Population	Popu	Employment	
Stage	Intake year	Public	Places	
Stage 1	2028	13,222	35(VRT)	780
Existing	population	-	2,400	-

Table 4.5 Planned Population under the Yuen Long South Development

Note: (1) VRT - Village Removal Terms

(2) Source: Yuen Long District Council Committees Meetings Discussion Papers 14/2020 and "Planning and Engineering Study for Housing Sites in Yuen Long South -

Investigation Final Traffic and Transport Impact Assessment Report (June 2020)"

4.3.5 Based on the DC paper and TIA reports of the YLS developments, the trip generated and attracted by the YLS developments (Stage 1) are estimated and summarized in the Table 4.6.

				Traffic T	rip Rate				Traffic	Trips	
Land Use	τ	Jnits	AM	Peak	PM I	Peak	Trip Rate Unit	AM I	Peak	PM I	Peak
			Gen.	Att.	Gen.	Att.		Gen.	Att.	Gen.	Att.
Residential – Public (50sqm)	4,320	flats	0.048	0.028	0.024	0.035	pcu/hr/flat	207	121	104	151
Commercial	16,620	GFA (m <sup>2</sup> )	0.129	0.153	0.236	0.262	pcu/hr/ 100m <sup>2</sup> GFA	21	25	39	44
Kindergarten	12	classroom	2.2	2.4	2.3	2.1	pcu/hr/ classroom	27	29	28	26
GIC	14,210	GFA (m <sup>2</sup> )	0.235	0.235	0.115	0.115	pcu/hr/ 100m <sup>2</sup> GFA	34	34	17	17
			Total					289	209	188	238

Table 4.6 – Estimated Traffic Trips of the YLS Development (Stage 1)

Note: (1) Reference to Yuen Long District Council Committees Meetings Discussion Papers 14/2020 and "Planning and Engineering Study for Housing Sites in Yuen Long South -Investigation Final Traffic and Transport Impact Assessment Report (June 2020)"

#### 4.3.6 The 2028 reference traffic flows are presented in Figure 4.2.

2028 Reference Flows (without	2021		Adopted Growth Factor		Adjacent
proposed development)	= Adopted Flows	x	i.e. +1 % p.a. for 7 years	+	Developments

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#### Traffic Trips of the Proposed Development 4.4

- 4.4.1 It is noted that traffic rates of both generation and attraction for proposed development uses are not specified in the latest Transport Planning & Design Manual (TPDM).
- 4.4.2 The estimation of traffic trips related to the proposed development is based on inhouse surveys carried out at Tung Wah Group of Hospitals - Wong Cho Tong Social Service Building and summarized in the Table 4.7.

	Table 4.7	In-house	Traffic	Trip	<b>Rates of Proposed</b>	1 Development
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Use	Units /	AM	Peak	PM Peak					
Use	Parameters	Gen.	Att.	Gen.	Att.				
	Tra	ffic Trip Rate							
TWGHs Wong Cho Tong Social Service Building – IN/OUT of Building	(pcu/hr)	14	11	14	11				
TWGHs Wong Cho Tong Social Service Building – Loading/Unloading activities of Building	(pcu/hr)	10	8	10	8				
Total Trip	(pcu/hr)	24	19	24	19				
Adopted Traffic Trip Rates (278beds)	(pcu/hr/bed)	0.08633	0.06835	0.04317	0.05755				
Traffic Trips									
Estimated Traffic Trips (300 beds) <sup>(1)</sup>	(pcu/hr)	26	21	13	17				

1) Upper range of no. of beds is adopted as conservative approach.

#### 4.5 Traffic Forecast for Design Year 2028

4.5.1 The net traffic trips of the proposed development, which is shown in Figure 4.3, is then superimposed onto the year 2028 reference traffic flow (without the proposed development) as shown in Figure 4.2 to derive the year 2028 design traffic flow (with the proposed development).

Development) Development Development	Year 2028 Design Flow (with the Proposed Development)	Year 2028 Reference = Flow (without the Proposed Development)	Traffic Trips of the + Proposed Development	
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4.5.2 The traffic flow during AM and PM peak periods in the design year 2028 (with the proposed development) are shown in Figure 4.4.

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#### 4.6 Operational Assessment

4.6.1 To assess traffic impacts due to the proposed development, operational assessment of the critical junctions identified in Chapter 3 are carried out for both reference (without the proposed development) and design (with the proposed development) scenarios in year 2028. The results are summarized in Table 4.8.

				Year RC/D		
Ref.	Junction	Method of Control	Refer Scen (Without th Develo	ario ne Proposed	Des Scen (With the Develo	ario Proposed
			AM Off-Peak	PM Off-Peak	AM Off-Peak	PM Off-Peak
А	Ma Tong Road / Tai Tong Road	Signalized	+29%	+29%	+29%	+28%
В	Tai Tong Road / Shap Pat Heung Road	Signalized	+20%	+16%	+18%	+15%
	Shap Pat Heung Road / Fung Ki Road	Signalized	+90%	+74%	+85%	+73%
D	Shap Pat Heung Road / Tai Kei Leung Road	Signalized	+67%	+75%	+66%	+74%
	Shap Pat Heung Interchange	Roundabout	0.73	0.79	0.73	0.79

#### Table 4.8 Operational Performance of Critical Junctions in Year 2028

Notes: (1) RC = Reserve Capacity for Signal Junction;

DFC = Design Ratio of Flow to Capacity for Priority Junction/Roundabout

(2) Junction Improvement scheme would be carried out on Junction E under Yuen Long South Development project (PWP Item Nos. 7817CL and 7827CL(part)). Please refer to Figure 4.9

- 4.6.2 The assessment result in **Table 4.6** reveals that all Junctions operate with ample capacities in both reference and design scenarios in year 2028.
- 4.6.3 Queue length assessment has been carried out shown in Figures 4.5 to 4.8 and summarized in Table 4.9 below.

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### Table 4.9 Queue Length Analysis of Identified Junctions in 2028

			-		Calcu	ilated Qu	eue Lengt	h (m)	
Ref.	Junction	Method of Control	Direction	Length of Road Segment (m)	Refer Scer (Witho Prop Develo	rence nario out the osed pment) PM Off-	Design Scenario (With the Proposed Development) AM Off- PM Of		
					Peak	Peak	Peak	Peak	
			M a Tong Road (WB)	260	36	30	36	30	
			Tai Tong Road (NB) (STR & LT)	290	42	48	48	48	
	Shap Pat		Tai Tong Road (NB) (RT)	290	6	6	6	6	
А	Heung Road / Tai Shu Ha	Priority	M a Tong Road (EB) (LT)	350	18	12	18	18	
	Road East		M a Tong Road (EB) (STR & RT)	350	18	24	18	24	
			Tai Tong Road (SB) (STR & LT)	240	42	42	42	42	
			Tai Tong Road (SB) (RT)	240	12	18	12	18	
			Shap Pat Heung Road (WB) (STR & RT)	150	48	54	48	54	
			Shap Pat Heung Road (WB) (LT)	150	18	18	18	18	
в	Tai Tong Road / Shap Pat	Signalized	Tai Tong Road (NB) (STR & LT & RT)	160	36	36	36	36	
	Heung Road	-	Shap Pat Heung Road (EB) (STR)	230	36	36	36	36	
			Shap Pat Heung Road (EB) (LT)	230	12	18	12	18	
			Tai Tong Road (SB) (STR & LT & RT)	290	42	42	42	42	
			Shap Pat Heung Road (WB) (RT)	230	36	48	36	48	
			Shap Pat Heung Road (WB) (STR & LT)	230	42	42	42	42	
	Shap Pat		The Access Road of The Reach (NB) (LT)	40	0	0	0	0	
С	Heung Road / Fung Ki Road	Signalized	The Access Road of The Reach (NB) (STR & RT)	40	0	6	0	6	
	-		Shap Pat Heung Road (EB) (LT)	250	18	24	18	24	
			Shap Pat Heung Road (EB) (STR)	250	36	36	36	36	
			Fung Ki Road (SB) (LT)	180	36	42	36	42	
			Fung Ki Road (SB) (STR & RT)	180	6	12	6	12	
	Shap Pat		Shap Pat Heung Road (SB)	280	30	30	30	30	
D	Heung Road / Tai Kei Leung	Signalized	Shap Pat Heung Road (NB) Tai Kei Leng Road (EB) (RT)	90 400	24 24	24 24	24 24	24 24	
	Road		• • • • •	770	18	24	18	18	
Е	Shap Pat Heung	Roundabout	Yuen Long Highway (WB) Yuen Long Highway (EB)	590	6	12	6	18	
	Interchange		Shap Pat Heung Road (SB)	90	0	0	0	0	

4.6.4 The assessment results in **Table 4.7** indicate that all queues are queuing within the allowable road segments during the peak hours. The traffic generated by the proposed development would induce insignificant impact on the surrounding road network. Therefore, the application is supported from the traffic points of view.

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#### 5. SUMMARY AND CONCLUSION

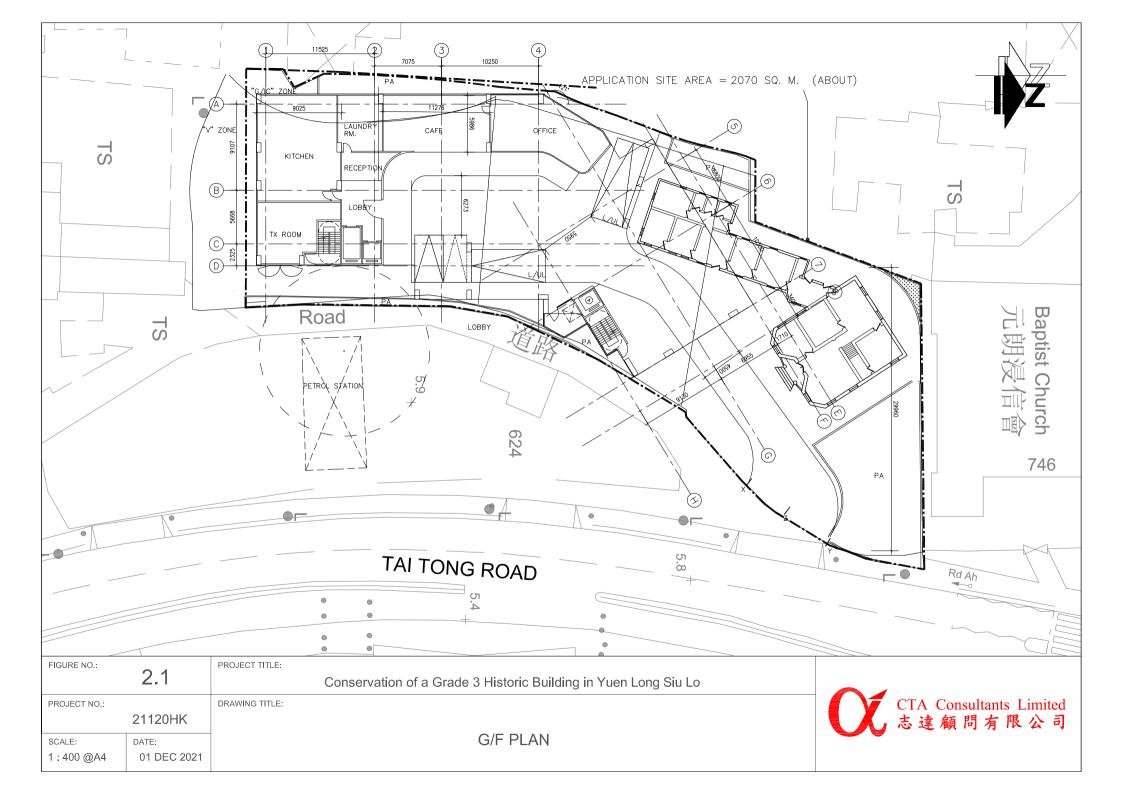
#### 5.1 Summary

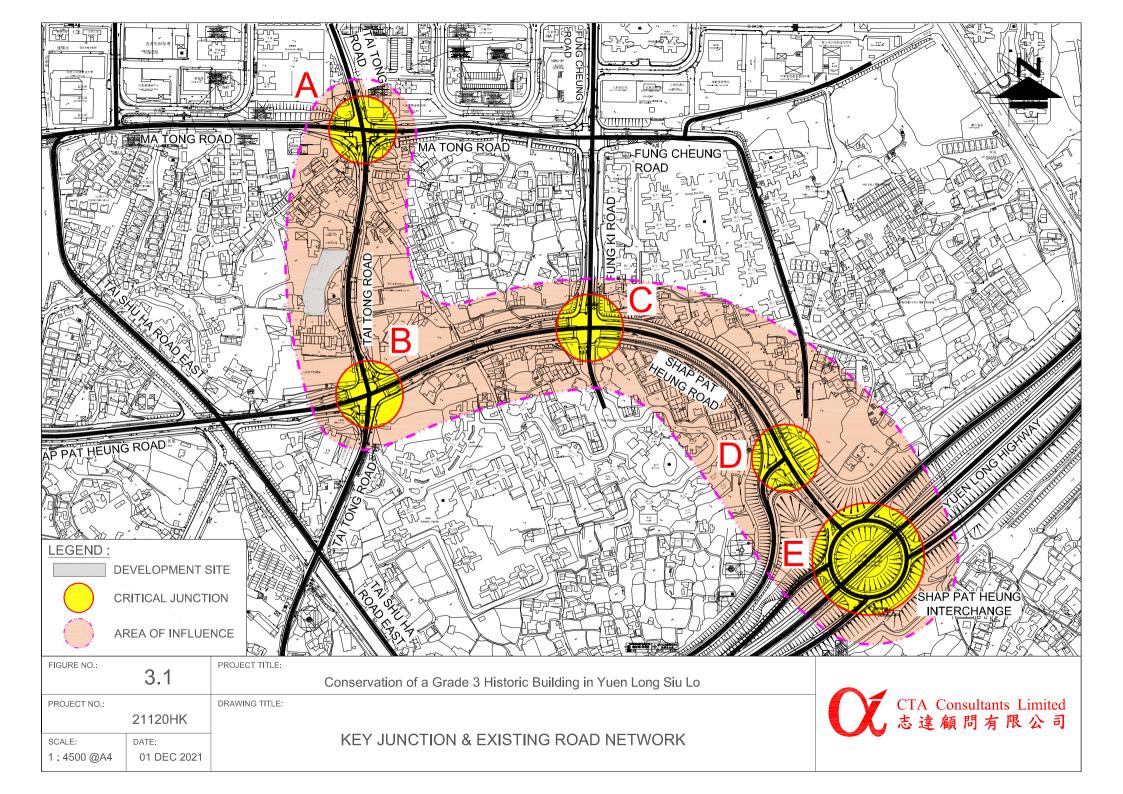
- 5.1.1 The application site intends to develop to Residential Care Home for the Elderly (RCHE).
- 5.1.2 CTA Consultants Limited (CTA), are therefore commissioned as the traffic consultant to prepare the Traffic Impact Assessment (TIA) and provide technical justifications in supporting the application from traffic engineering point of view.
- 5.1.3 To appraise the existing traffic condition, a vehicular survey in the form of manualclassified count was conducted at the surrounding road network of the proposed development. Current operational performance of the critical junctions has been assessed with the observed traffic flow. The results reveal that all critical junctions are at present operating within its capacities.
- 5.1.4 Assessment of operational performance of the critical junctions indicates that all critical junctions will still operate within their capacities in both reference and design scenarios in year 2028.
- 5.1.5 The traffic generated by the proposed development would induce insignificant impact on the surrounding road network. Therefore, the application is supported from the traffic points of view.

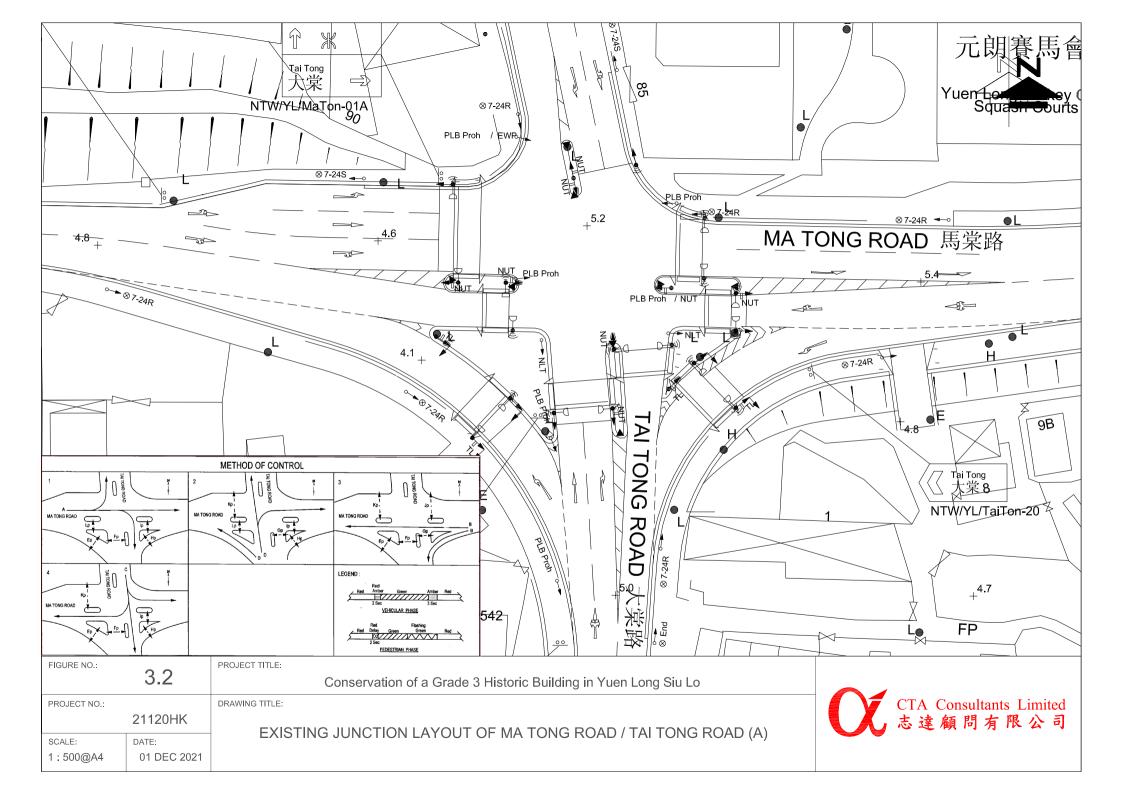
#### 5.2 Conclusion

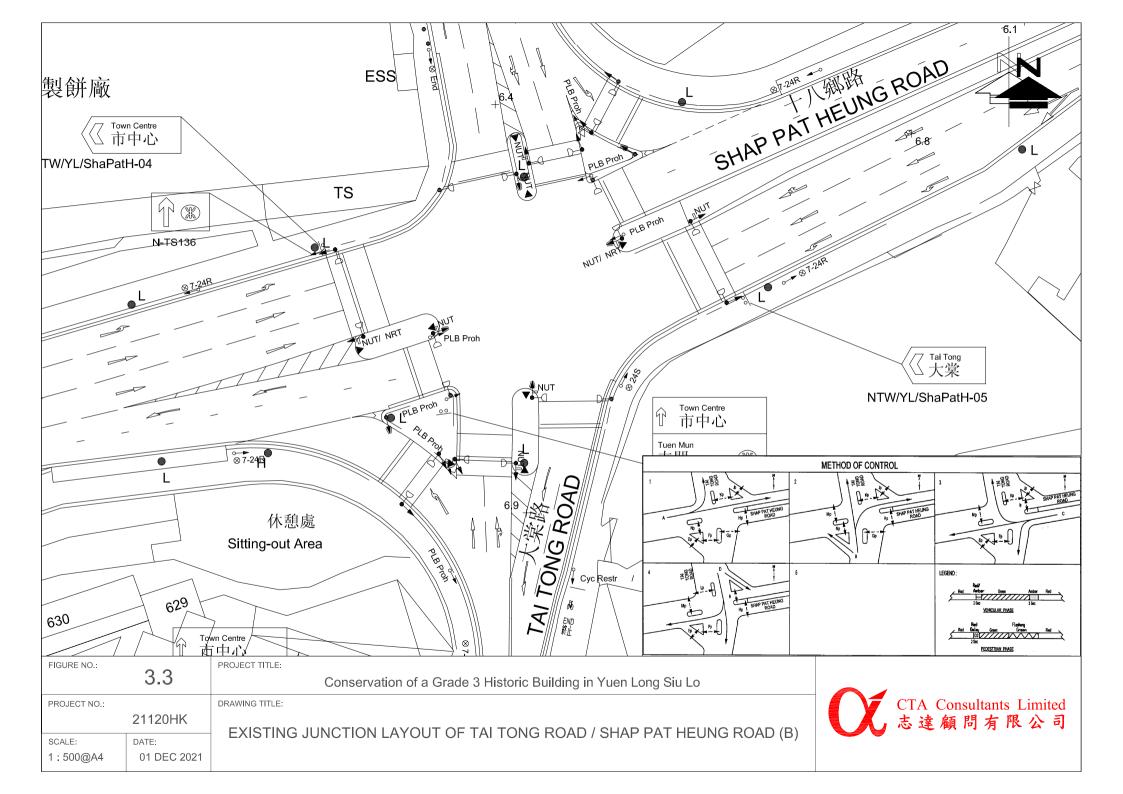
- 5.2.1 In conclusion, this Traffic Impact Assessment (TIA) study demonstrated that the related traffic trips related to the proposed development can be absorbed by the nearby road network and no significant traffic impact will be induced.
- 5.2.2 Therefore, the proposed development of RCHE is reckoned feasible from traffic engineering point of view.

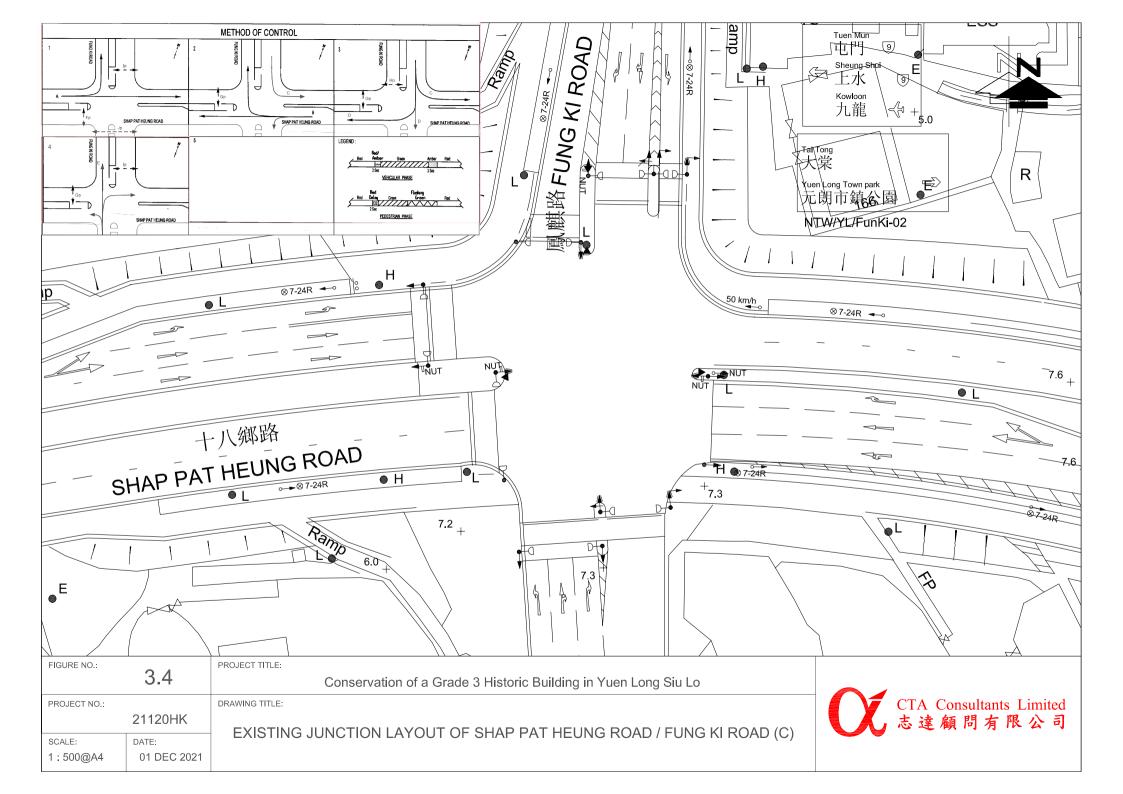
		ROAD CHEUNG
	MA TONG ROAD MA	
LEGEND: FIGURE NO.: 1.1	PROJECT TITLE:	
PROJECT NO.:         21120HK           SCALE:         DATE:           1:4000 @A4         29 SEP 2021	Conservation of a Grade 3 Historic Building in Yuen Long Siu Lo DRAWING TITLE: SITE LOCATION	CTA Consultants Limited 志達顧問有限公司

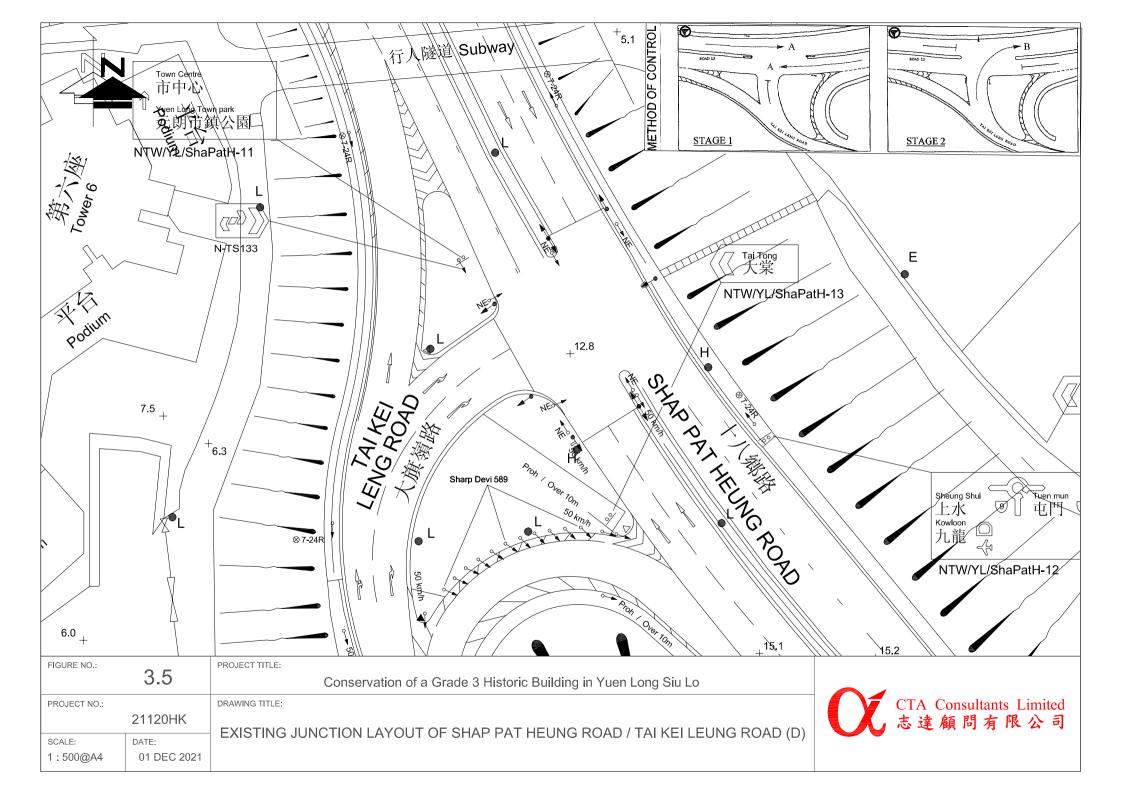


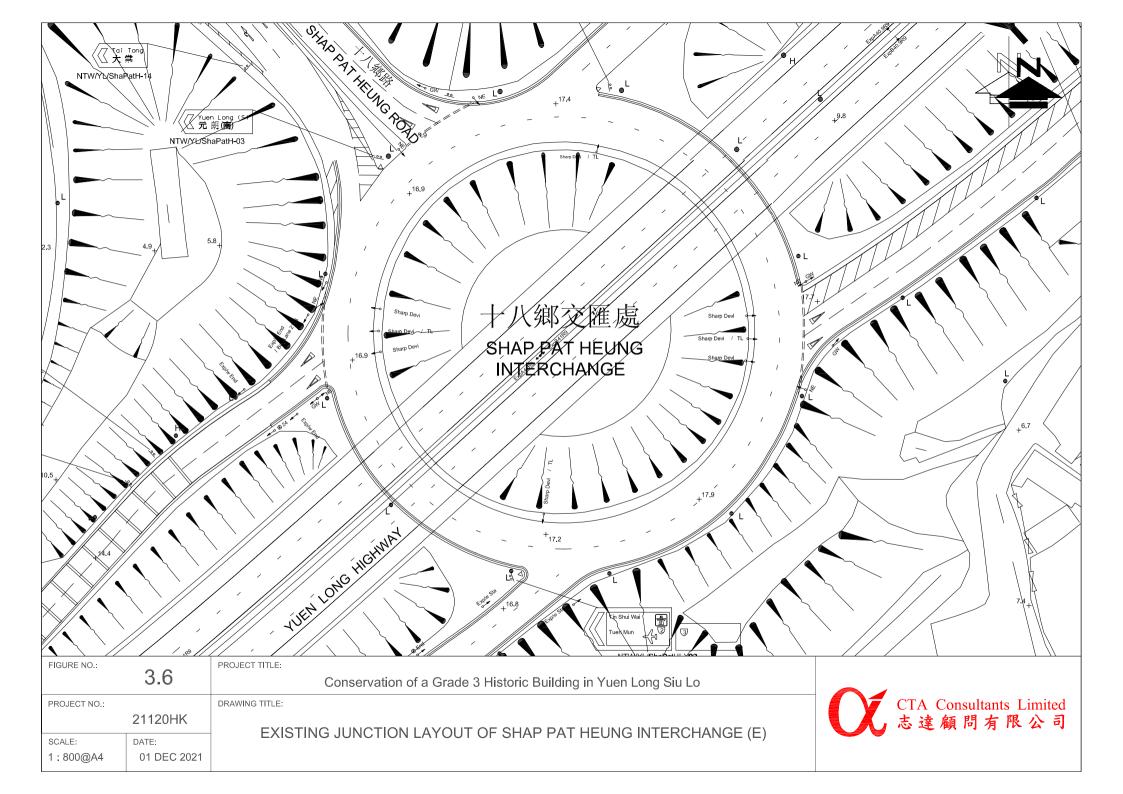


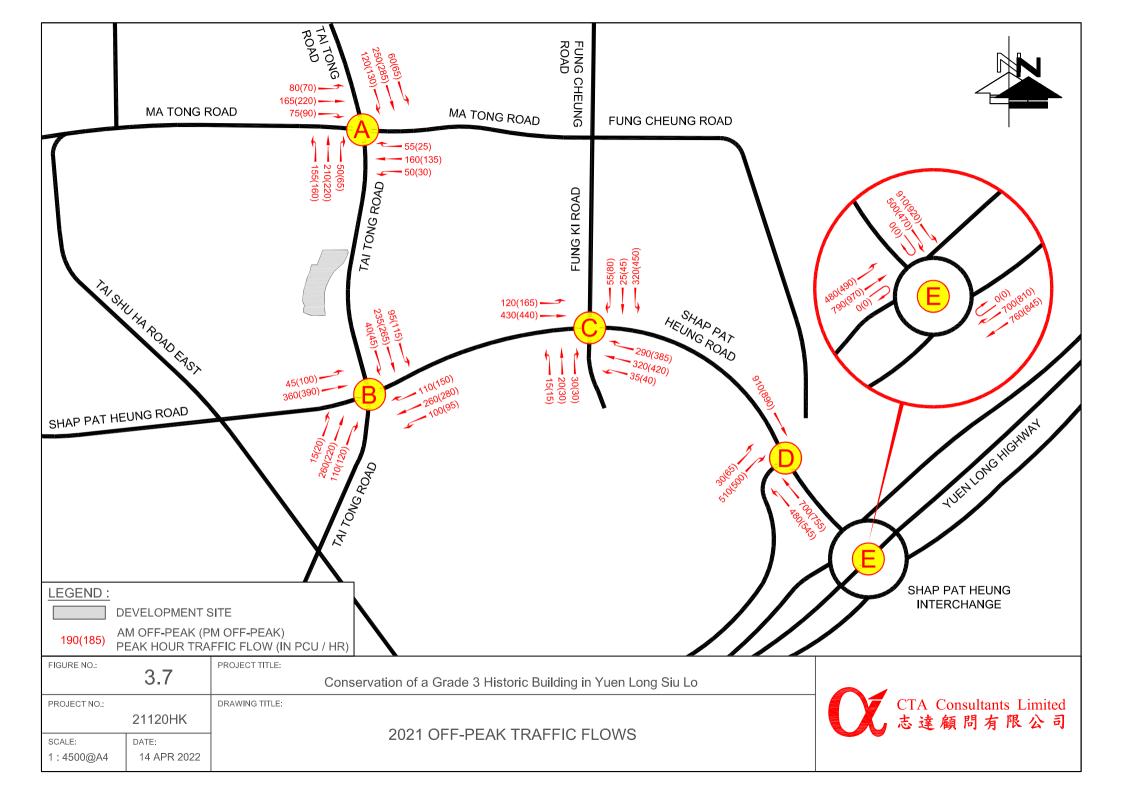


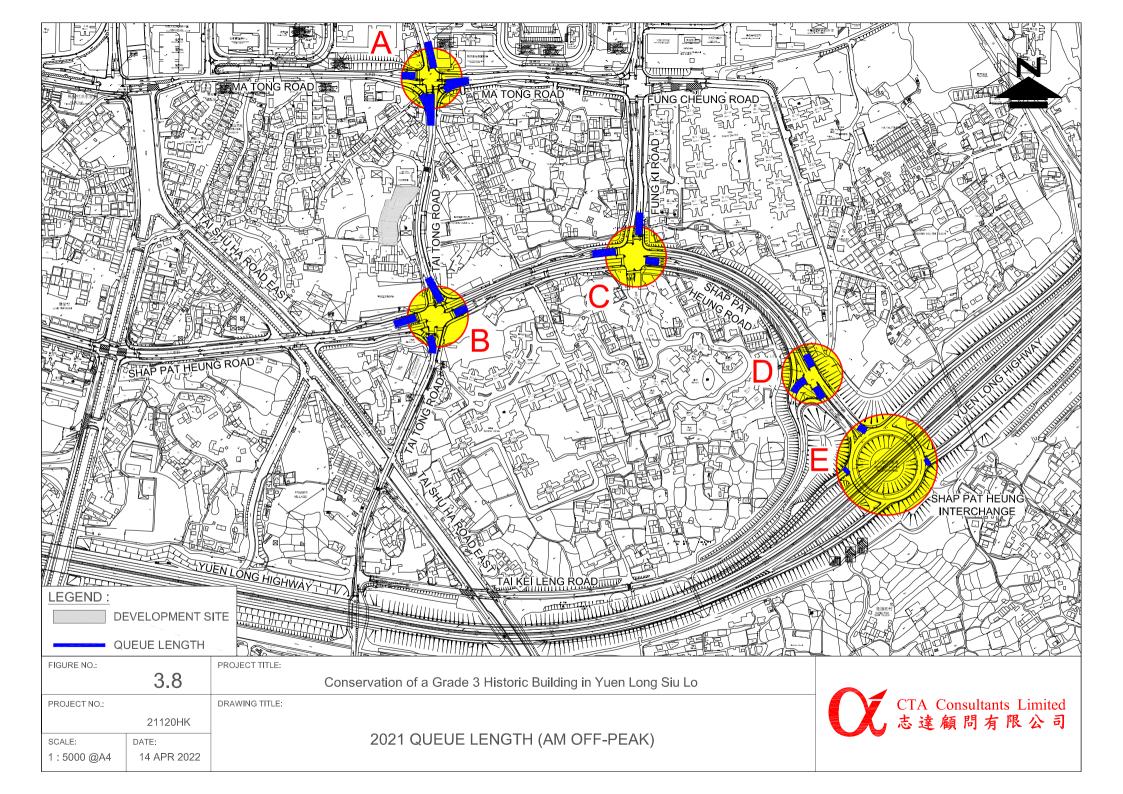


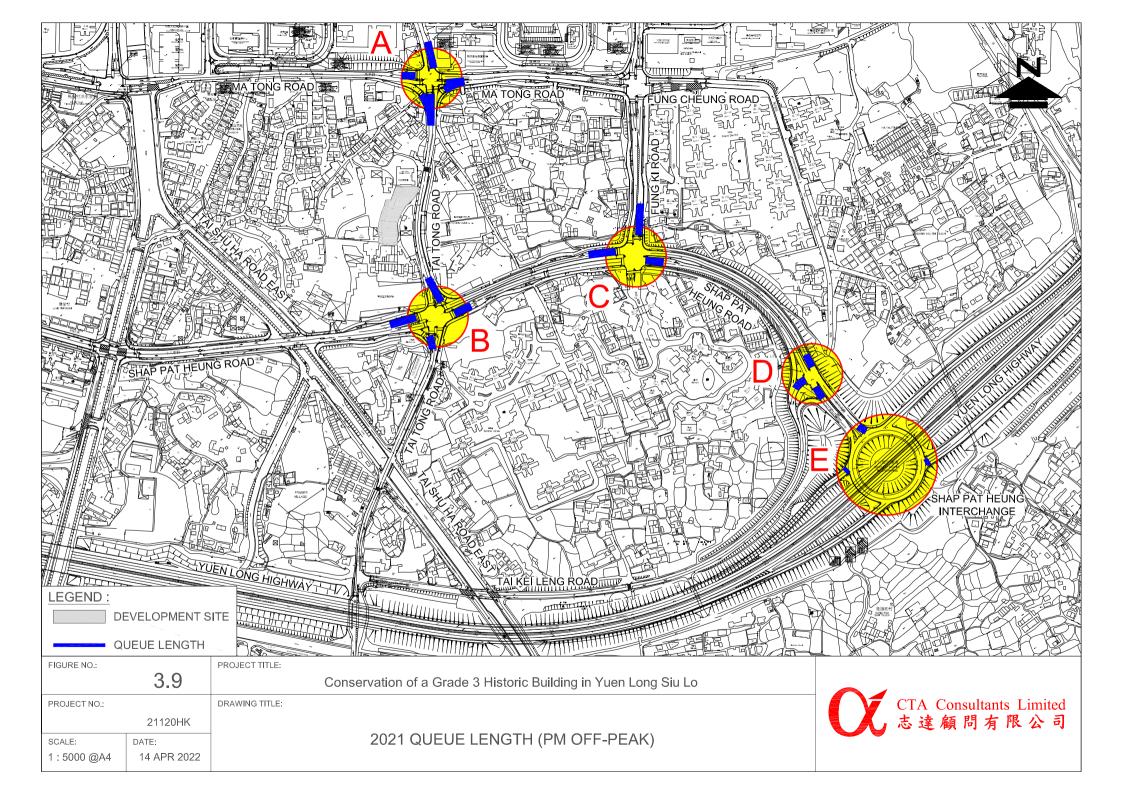


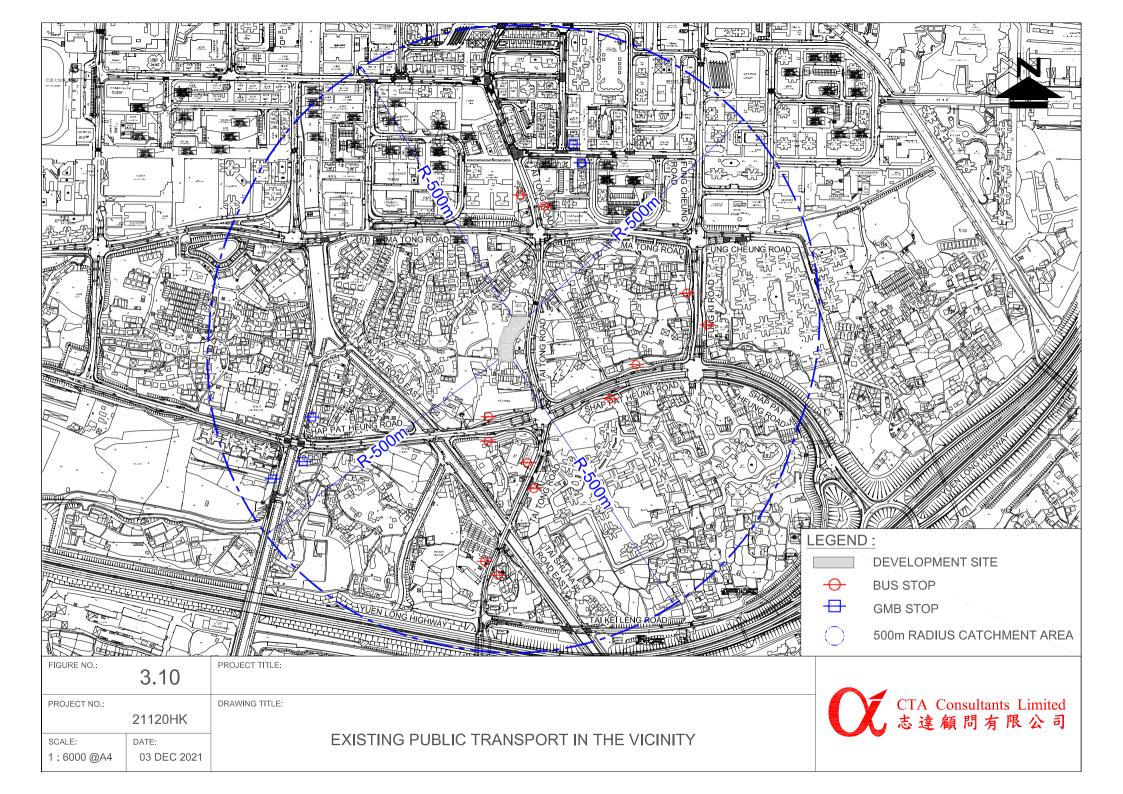


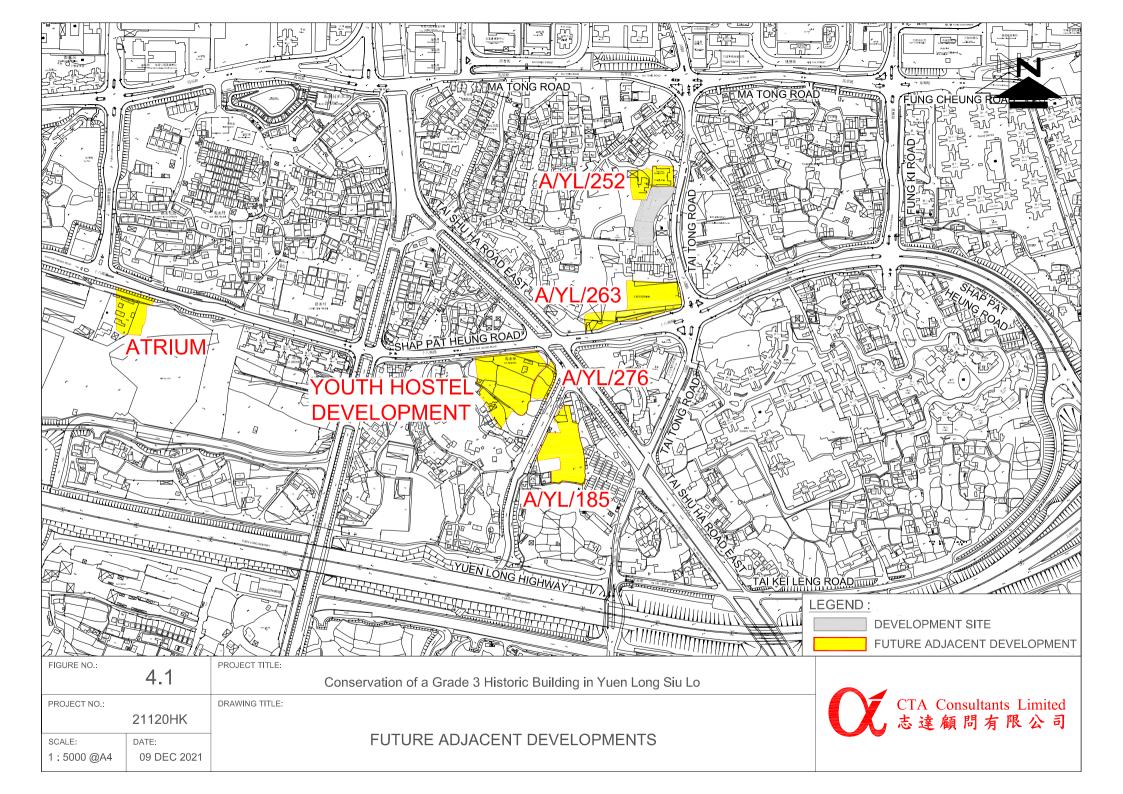


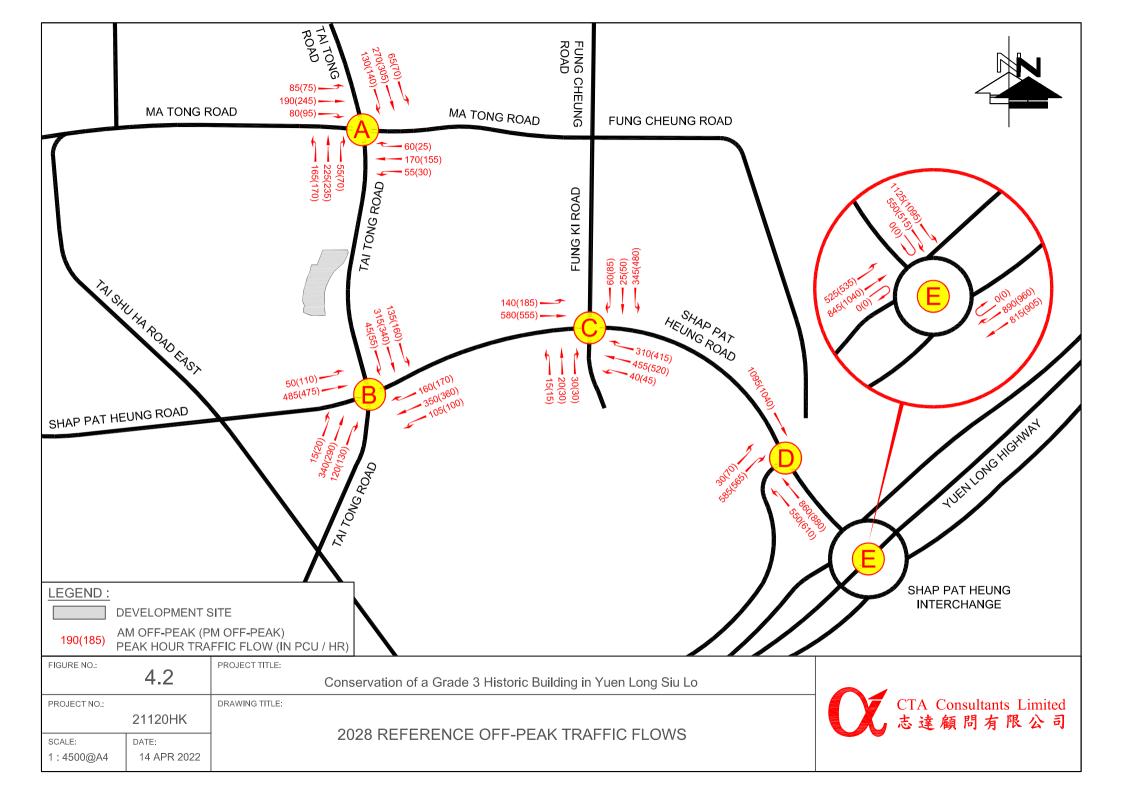


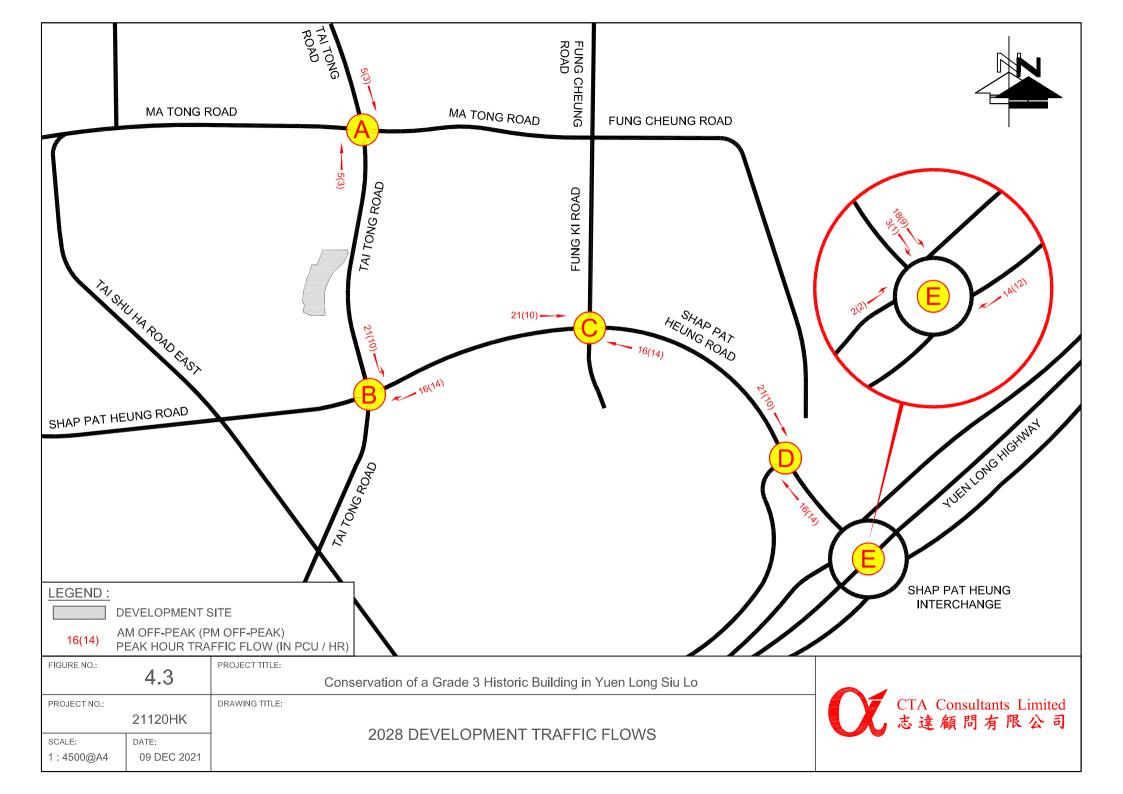


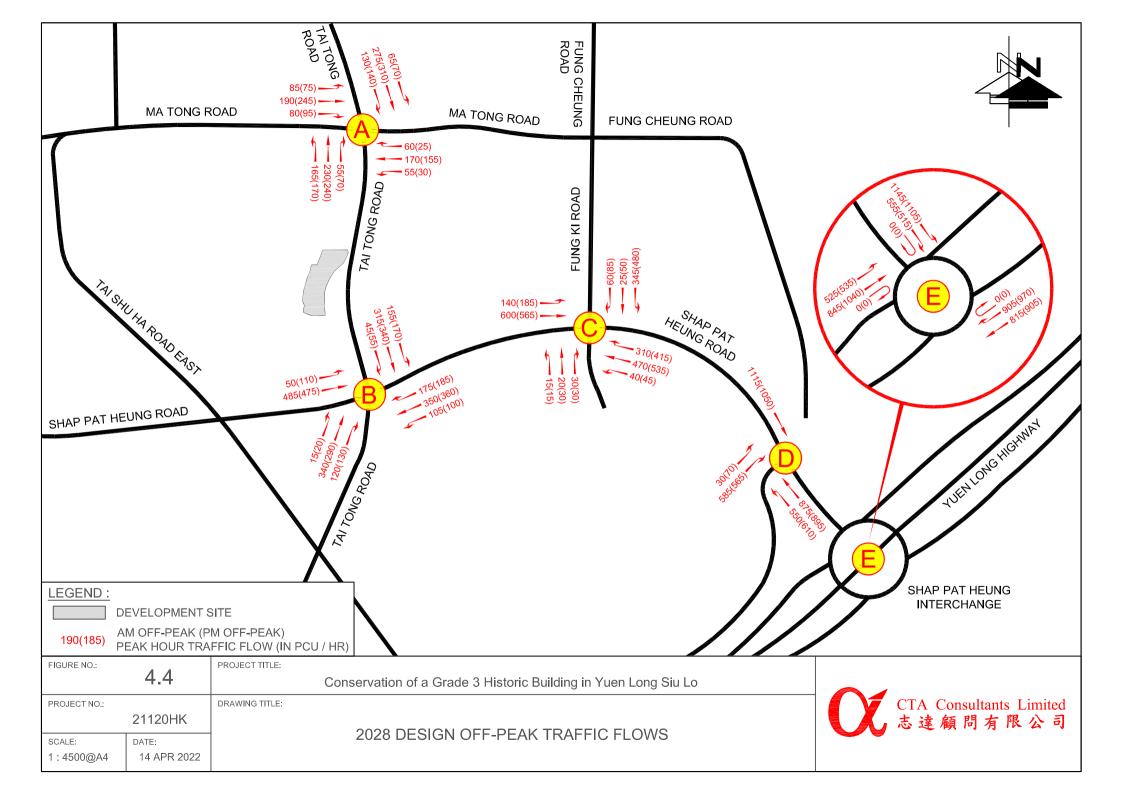


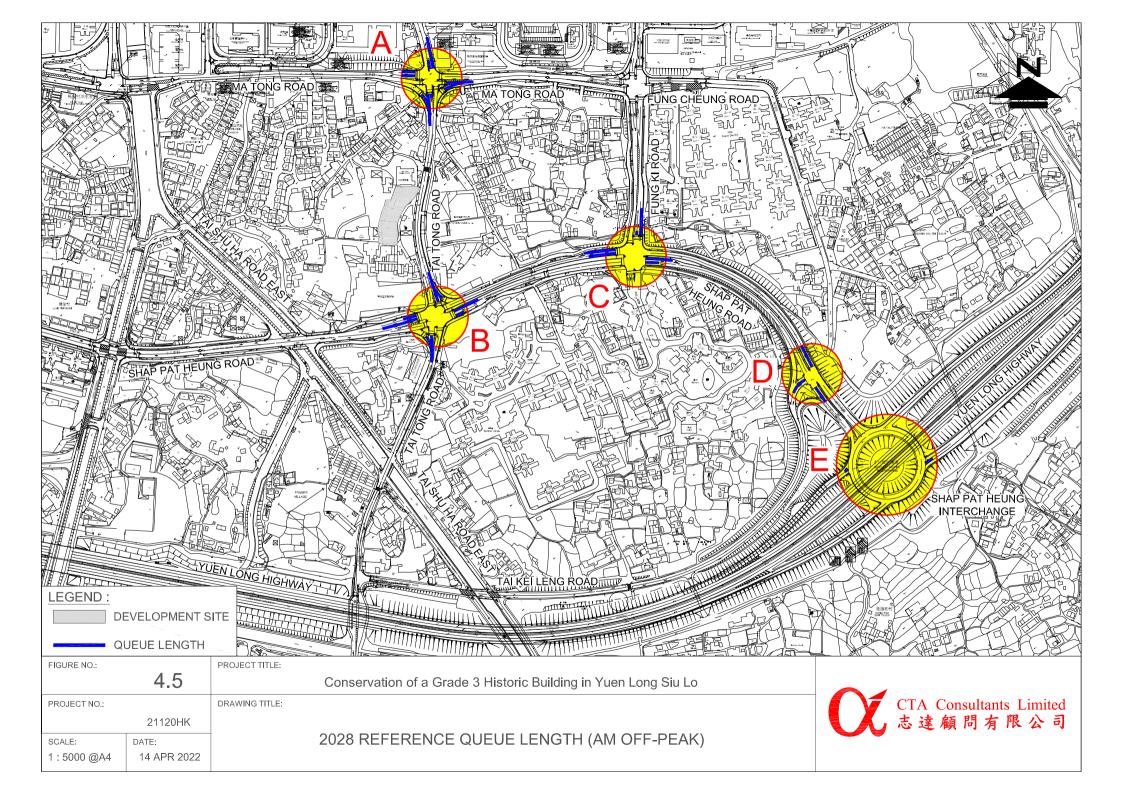


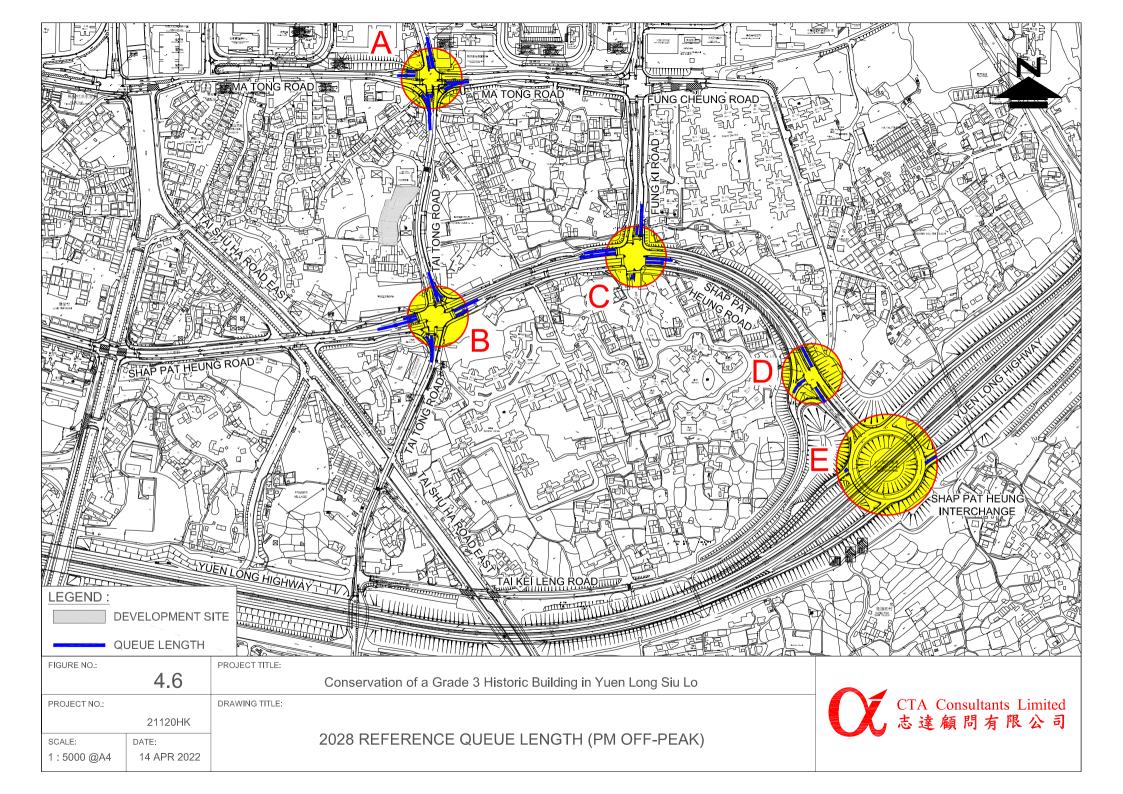


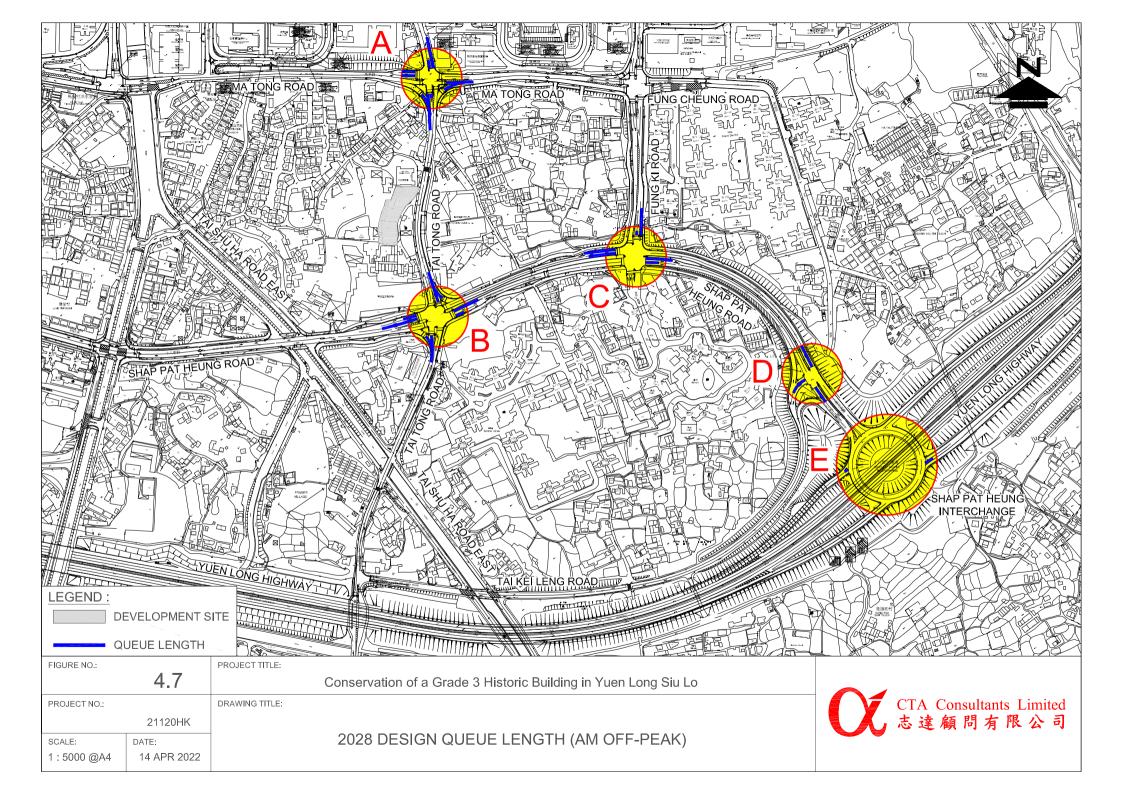












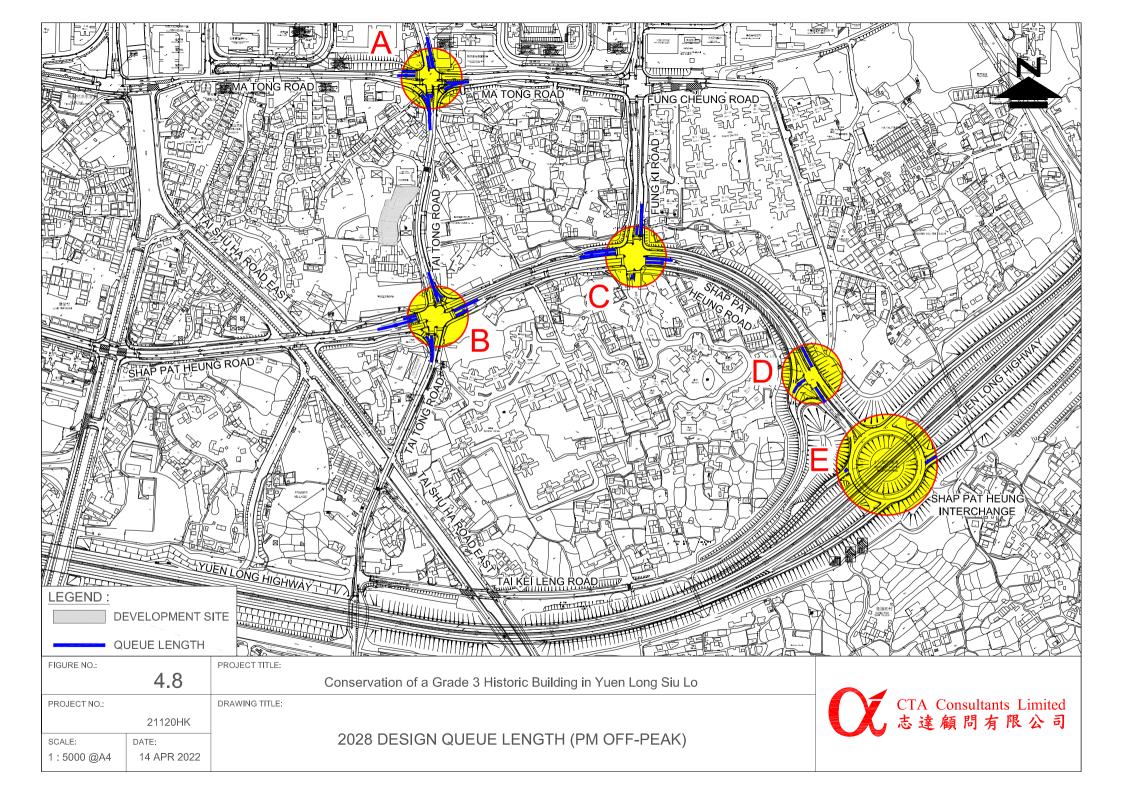


FIGURE NO.: FIGURE NO.: 4.9 PROJECT NO.: 21120HK SCALE: 1 : 1500@A4 14 APR 2022	PROJECT TITLE: Conservation of a Grade 3 Historic Building in Yuen Long Siu Lo DRAWING TITLE: PROPOSED JUNCTION LAYOUT OF SHAP PAT HEUNG INTERCHANGE (E) (CARRIED BY YUEN LONG SOUTH DEVELOPMENT)	et Ts CTA Consultants Limited 志達顧問有限公司

Junction		LATIO Ma To		oad / 1	fai Tor	19 Ros	1			Job No:	21120HK					CTA (	Consi	iltant	s Lt
Description																			
Approach	Direction	Movement notation	Phase	Stage	Width (m)	Radiu	ıs (m)	Nearside 0/1	Site Factor	Pro. Tur	ning (%)	Saturati (pcu	ı/hr)		A.M. Off-Pea	ık	1	P.M. Off-Pe	ak
, this care	Dire	Move	Ph	Stag	Widt	Left	Right	Nears	Site F	A.M Off- Peak	P.M Off- Peak	A.M Off- Peak	P.M Off- Peak	Flow (pcu/hr)	y Value	Critical y	Flow (pcu/hr)	y Value	Criti
Ma Tong Road (WB)	W W	₹ 4	B B	3 3	4.0 5.0	0 15	21 0	0	1 0.063	26% 100%	16% 100%	2235	2250	265	0.119	0.119	190	0.084	0.0
Tai Tong Road (NB)	N N	₹ T	D D	2 2	3.5 3.5	8 0	0 21	1 0	1.11 0.06	42% 100%	42% 100%	2140	2140	415	0.194	0.194	445	0.208	0.2
Ma Tong Road (EB)	E E	ר ל ל	A A A	1 1 1	3.5 3.5 3.5	18 0 0	0 0 30	1 0 0	0.9 0.9 0.9	100% 0% 63%	100% 0% 59%	5360	5365	320	0.060	0.060	380	0.071	0.0
Tai Tong Road (SB)	s	4	C C	4	3.5 3.5	0 8	24 0	0	1	100% 19%	100% 19%	3875	3880	430	0.111	0.111	480	0.124	0.
			Gp Hp Ip Jp	1,2 1,2,4 3,4 1,2,3 1,2,4	Min. C Min. C Min. C Min. C	Trossing Trossing Trossing Trossing	g Time = g Time = g Time = g Time = g Time =	= 5Gm - = 6Gm - = 5Gm - = 8Gm - = 10Gm	+ 6FGm = + 5FGm = + 6FGm = + 5FGm = + 8FGm = + 10FGr + 5FGm =	=10s =12s =10s =16s n=20s									
otes:						16	Flow (j 80(70) - 5(220) - 75(90) -			250(285)	[AM (PM 60(65)	55(25) 160(135 50(30)	N K )	εy L (sec) C (sec) y pract. R.C. (%)	Check Phase 0.483 30 120 0.675 40%	2	εy L (sec) C (sec) y pract. R.C. (%)	Check Phas 0.487 30 120 0.675 39%	c
								-	155(160)	↑ 210(220)	> 50(65)								
age / Phase Diagrams			2			1				3		_ <\$-	в	4	\$ *	2	5		

Conservation of a Grade 3 Historic Building in Yuen Long Siu Lo

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# Appendix 1

# **Junction Calculation Sheets**

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RAFFIC SIGNALS CALCU										Job No:	21120HK				(	CTA (	Consi	iltants	s Ltd
Junction: Description:							ng Roa	d											
		Jt .				Radiu	ıs (m)	0	ä	Pro. Tur	ning (%)	Rev	rised		A.M. Off-Pea	k		P.M. Off-Pe	ak
Approach	Direction	Movement	Phase	Stage	Width (m)	Left	Right	Nearside 0/1	Site Factor		P.M. Off- Peak	A.M. Off- Peak	P.M. Off- Peak	Flow (pcu/hr)	y Value	Critical y	Flow (pcu/hr)	y Value	Critical 3
Shap Pat Heung Road (WB)	W	<u>ح</u>	с	3	3.8	0	30	0	1	59%	69%	4385	4375	470	0.107	0.107	525	0.120	0.120
		÷	C C	3 3	3.8 3.5	0 15	0 0	0 1	0.95 0.15	0% 100%	0% 100%								
Tai Tong Road (NB)	N N	1	в	2	3.5 3.5	15 0	0 15	1 0	0.125 1	37% 32%	54% 37%	2275	2265	385	0.169	0.169	360	0.159	0.159
	.,		D	~	5.5	0		0		5270	5776								
shap Pat Heung Road (EB)	Е	÷	А	1	3.5	15	0	1	1	100%	100%	6055	6055	405	0.067	0.067	490	0.081	0.081
	E	>	Α	1	3.8	0	0	0	1	0%	0%								
	E	<b>→</b>	А	1	3.8	0	0	0	1	0%	0%								
Tai Tong Road (SB)	S	ţ,	D	4	3.5	15	0	1	0.135	100%	100%	2315	2315	370	0.160	0.160	425	0.184	0.184
	s	4	D	4	3.5	0	15	0	1	15%	15%								
			Ip Jp Kp Lp	1,2 1,2,4 3,4 1,2,3 1,2,4 4 2,3,4	Min. 0 Min. 0 Min. 0 Min. 0 Min. 0 Min. 0	Crossing Crossing Crossing Crossing Crossing Crossing	g Time g Time g Time g Time g Time g Time g Time g Time	= 8Gm = 10Gi = 8Gm = 6Gm = 6Gm = 9Gm = 10Gi	+ 7FGn + 8FGn n + 10FG + 8FGn + 8FGn + 8FGn + 6FGn + 9FGn n + 6FG + 6FGn	n =16s Gm =20s n =16s n =14s n =12s n =15s m =16s									
tes:						Traffic	Flow (	pcu / h	r)		[AM (PM)	]	N	εy	Check Phase 0.503		εy	Check Phase 0.543	2
									40(45)	235(265)	95(115)		R	L (sec) C (sec)	0.503 16 120		L (sec) C (sec)	0.543 16 120	
						4:	5(100)		i ∱	ΨĽ	> ∧	110(150	0	y pract. R.C. (%)	0.780		y pract. R.C. (%)	0.780	
							0(390)		-			260(280 100(95)	0						
									<	↑ [	>								
									15(20)	260(220)	110(120)								
ige / Phase Diagrams			2			1				3				4	↔ <sup>D</sup>				
						1	⊢					<≎	C	$\neg $	F				
Τ					÷						Ī				Т				
i = 7			I/G =	5	В					I/G = 7				I/G = 6					

	(C)e	han n	of U-	una D	ond / I	ung K	Dog -			305 140.	21120HK					CTA (	Const	mants	, 110
Description:						ung K	Noad						-				•		
	E	ă c	I		(î)	Radiu	s (m)	9	10	Pro. Tu	rning (%)	Rev	rised		A.M. Off-Pea	k	1	P.M. Off-Pe	ık
Approach	Direction	Movemen	Phase	Stage	Width (1	Left	Right	Nearside 0/1	Site Factor	A.M Off- Peak	P.M Off- Peak	A.M Off- Peak	P.M Off- Peak	Flow (pcu/hr)	y Value	Critical y	Flow (pcu/hr)	y Value	Critica
Shap Pat Heung Road (WB)	w	1	в	2	3.5	0	21	0	0.855	100%	100%	1800	1800	290	0.161	0.161	385	0.214	
	W	←	в	2	3.5	0	0	0	0.35	0%	0%	735	735	98	0.133		127	0.172	
	W	<₽	в	2	3.5	15	0	1	1	14%	12%	1940	1940	257	0.133		333	0.172	
The Access Road of The	Ν	ſ,	Е	4	3.5	15	0	1	1	100%	100%	1785	1785	15	0.008		15	0.008	
Reach	Ν	₽	Е	4	3.5	0	35	0	1	16%	34%	2090	2075	18	0.009		23	0.011	
	N	l,	E	4	3.5	0	30	0	1	100%	100%	2005	2005	17	0.009		22	0.011	
Shap Pat Heung Road (EB)	Е	ŕ	А	1	3.5	15	0	1	0.9	100%	100%	1610	1610	120	0.075	0.136	165	0.102	
	Е	≯	А	1	3.5	0	0	0	0.5	0%	0%	1052.5	1052.5	143	0.136		147	0.139	0.13
	Е	>	А	1	3.5	0	0	0	1	0%	0%	2105	2105	287	0.136		293	0.139	
Fung Ki Road (SB)	s	L	с	2,3	3.5	18	0	1	1	100%	100%	1815	1815	320	0.176		450	0.248	0.24
	s	-	D	3	3.5	0	23	0	1	39%	30%	2055	2065	41	0.020		64	0.031	
	s	ľ	D	3	3.5	0	21	0	1	100%	100%	1965	1965	39	0.020		61	0.031	
Pedestrian crossing			Fp Gp Hp		Min. C	rossing	Time	= 10Gr	+ 8FGr n + 10F + 7FGr	Gm=20s									
			Ip Jp		Min. C	rossing	Time		+ 7FGr n + 6FC										
iotes: ite factor are applied due to la videned to provide an additiono le factor of 0.95 is apply to fast WB). Further 10% dodace due to col Sire factor Road, which give col Sire factor WB)	al lane of the qui or of 0	e near f Shap eue bac 1.855	Îp Jp nes are the ju Pat He k effec	nction: rung Ro et from	Min. C Min. C y ad Fung	Traffic	Time Time	= 10Gr	n + 6FC		[AM (PM) 320(450)	290(385 320(420		Ey L (sec) C (sec) y pract. R.C. (%)	Check Phase 0.297 28 130 0.706 138%	-	εy L (sec) C (sec) y pract. R.C. (%)	Check Phase 0.387 19 130 0.768 98%	•
itte factor area applied due to la idened to provide an additions ike Factor 60 05 is apply to fast. WB). Further 10% deduce due to 1 K Road, which give total Site facter ite Factor 61 0.35 is apply to midd WB) ike Factor 61 0.55 is apply to near cad (EB) B)	al lane of lane of the qui or of 0 dle lan r side la	e near f Shap eue bac 1.855 e of Sh ane of S	Îp Jp Jp nes are the ju Pat He k effec ap Pat	nction: rung Ro ct from Heung 'at Heur	Min. C Min. C y ad Fung Road g	Traffic	Flow (	= 10Gr	r) 55(80) 4	im =16s	320(450)	290(385	5)	L (sec) C (sec) y pract.	0.297 28 130 0.706		εy L (sec) C (sec) y pract.	0.387 19 130 0.768	3
ite factor are applied due to la ridened to provide an additiona ite Factor of 0.95 is apply to fast l WB). Further 10% deduce due to t G Road, which give total Site factor ite Factor of 0.35 is apply to midd	al lane of lane of the qui or of 0 dle lan r side la	e near f Shap eue bac 1.855 e of Sh ane of S	Îp Jp Jp nes are the ju Pat He k effec ap Pat	nction: rung Ro ct from Heung 'at Heur	Min. C Min. C y ad Fung Road g	Traffic	Time Time Flow ( 0)(165) 0)(440)	= 10Gr	r) 55(80) 4	25(45)	320(450)	290(385 320(420	)) )) .c	L (sec) C (sec) y pract.	0.297 28 130 0.706		εy L (sec) C (sec) y pract.	0.387 19 130 0.768	

RAFFIC SIGNALS CALCU	LATI	ON								Job No:	21120HK				(	СТА (	Consu	ltant	s Ltd
Junction Description						ai Kei	Leung	Road									-		
Description	. 2021	on-p	Lan I	. anne							1 447				IN OFF			MORE	
A h	ction	ment	Phase	25	(m)		ıs (m)	Nearside 0/1	actor		ning (%) P.M Off-	A.M	P.M	Flow	A.M. Off-Peal		P	.M. Off-Pe	ак
Approach	Direction	Movemen notation	Ph	Stage	Width (m)	Left	Right	Nears 0/1	Site Factor	A.M Off- Peak	P.M Off- Peak	Off- Peak	Off- Peak	Flow (pcu/hr)	y Value	Critical y	Flow (pcu/hr)	y Value	Critical
Shap Pat Heung Road (SB)	s	Ļ	А	1	3.5	0	0	1	0.9	0%	0%	1768.5	1768.5	439	0.248	0.248	430	0.243	0.243
	s	Ψ.	А	1	3.5	0	0	0	0.9	0%	0%		1894.5	471	0.248		460	0.243	
	3																		
Shap Pat Heung Road (NB)	N	♠	А	1	3.5	0	0	1	1	0%	0%	1965	1965	338	0.172		365	0.186	
	Ν	↑	А	1	3.5	0	0	0	1	0%	0%	2105	2105	362	0.172		390	0.186	
Tai Kei Leng Road (EB)	Е	+	в	2	3.5	0	12	1	0.9	100%	100%	1570	1570	244	0.156	0.156	240	0.153	0.153
	Е	ł	в	2	3.5	0	13.5	0	0.9	100%	100%	1705	1705	266	0.156		260	0.153	
otes:						Traffic	: Flow (	pcu / h	r)		[AM (PM)]	]	N	_	Check Phase			heck Phas	e
te factor are applied due to tra	ffic qu	eue ext	ended	from	Shap								R	εy L (sec)	0.404 10		Ey L (sec)	0.396 10	
t Heung Interchange. ased on site observation, about	10%	lelav o	f the e	ffectiv	e						910(890) ↓			C (sec) y pract.	90 0.800		C (sec) y pract.	90 0.800	
		Pond to	S-bo	und.		51	0(500)		V		¥			R.C. (%)	98%		R.C. (%)	102%	
een right turning from Tai Kei	Leng	Road R				1													
milar 10% delay is also observ	Leng l	ng the S	s-Bou		roach.														
milar 10% delay is also observ te Factor of 0.9 is apply to Sha	Leng ed alou ap Pat	ng the S Heung	S-Bou Road	(SB)	roach.					个 700(755)									
milar 10% delay is also observ te Factor of 0.9 is apply to Sha te Factor of 0.9 is apply to Tai	Leng ed alou ap Pat	ng the S Heung	S-Bou Road	(SB)	roach.														
imilar 10% delay is also observ ite Factor of 0.9 is apply to Sha ite Factor of 0.9 is apply to Tai	Leng ed alou ap Pat	ng the S Heung	S-Bou Road	(SB) B)			L												
eren right turning from Tai Kei imilar (10% delay is also observ ite Factor of 0.9 is apply to Sha tie Factor of 0.9 is apply to Tai age / Phase Diagrams	Leng ed alou ap Pat	ng the S Heung eng Ro	S-Bou Road ad (El	(SB) B)	B.	 	L												

JUNCTION DELAY CALCULATION

**CTA Consultants Ltd.** 

Junction: (A) Ma Tong Road / Tai Tong Road Description: 2021 Off-peak Traffic Flows

TRRL Method (Transport Road Research Laboratory)

$$d = \frac{c(1 \lambda)^2}{2(1 \lambda)^2} + \frac{X}{2q(1 - X)} - \frac{0.65}{q^2} (c)^{\frac{1}{3}} X^{(2 + 5\lambda)}$$

where d = average delay per vehicle on the particular arm $<math>\lambda = proportion of the cycle which is effectively green for the phase under$ 

consideration i.e.f g/c

x = The degree of saturation. This is the ratio of actual flow to the maximum possible flow under the given setting of signals and equals 3600q/Es where S = saturation flow in veh/hour

where

- c = Cycle time in seconds
- g = Effective green time in seconds

q should be the flow in vehicles per second to give delay in seconds

	Ma Tong I	Road (WB)	Tai Tong	Road (NB)	Tai Tong	Road (NB)	Ma Tong I	Road (EB)	Ma Tong	Road (EB)	Tai Tong	Road (SB)	Tai Tong	Road (SB)
Approach:	(LT & ST	FR & RT)	(STR	& LT)	(R	(T)	(L	T)	(STR	& RT)	(STR	& LT)	(R	(T)
	A.M. Off-Peak	P.M. Off-Peak	A.M. Off-Peak	P.M. Off-Peal										
q (veh/hr)	196	141	270	281	37	48	59	52	178	230	230	259	89	96
g (sec)	18	13	31	31	31	31	9	7	9	7	29	32	29	32
c (sec)	120	120	120	120	120	120	120	120	120	120	120	120	120	120
s (veh/hr)	1,922	1,933	1,552	1,552	363	363	1,207	1,207	2,763	2,767	1,404	1,407	1,467	1,467
λ	0.15	0.11	0.26	0.26	0.26	0.26	0.07	0.06	0.07	0.06	0.24	0.26	0.24	0.26
х	0.68	0.68	0.68	0.70	0.40	0.51	0.68	0.70	0.89	1.35	0.68	0.70	0.25	0.25
M=qc	6.54	4.69	9.01	9.38	1.23	1.60	1.98	1.73	5.93	7.65	7.65	8.64	2.96	3.21
Delay														
d	53.67	59.32	44.39	45.14	46.15	51.63	77.30	87.68	106.32	-23.32	46.49	45.46	37.92	35.99
ction Delay (sec)	58.3	34.3												

From TPDM Vol4 Table 4.2.5

Average Queue N calculated by

N=q(r/2+d) or qr,whichever the greater

r = effective red timeq = flow (in same units as r and d) d = average delay per vehicle

	Shap Pat Heu	ng Road (EB)	Tai Tong Road	l (NB) (STR &	Shap Pat Heu	ng Road (EB)	Shap Pat Heur	ng Road (WB)	Shap Pat Heur	ng Road (WB)	Tai Tong Road	l (SB) (STR &	Tai Tong Road	d (SB) (STR &
Approach:	(L	Т)	LT &	z RT)	(S7	TR)	(STR a	& RT)	(L	T)	LT &	RT)	LT &	2 RT)
	A.M. Off-Peak	P.M. Off-Peak												
r (sec)	102	107	89	89	89	89	111	113	111	113	91	88	91	88
N (veh)	6	4	7	7	1	1	2	2	8	7	6	6	2	2
Average														
Queue length		• • •			6.0	6.0			• • •	• • •				
( <b>m</b> )	36.0	24.0	42.0	42.0	6.0	6.0	12.0	12.0	24.0	24.0	36.0	36.0	12.0	12.0

**CTA Consultants Ltd.** 

Job No: 21120HK

Junction: (B) Shap Pat Heung Road/ Tai Kei Leng Road

Description: 2021 Off-peak Traffic Flows

TRRL Method (Transport Road Research Laboratory)

$$d = \frac{c(1 \lambda)^{2}}{2(1 \lambda)^{2}} + \frac{X}{2q(1 - X)} - 0.65 \quad (c)^{\frac{1}{3}} X^{(2 + 5\lambda)}$$

where d = average delay per vehicle on the particular arm

 $\lambda$  = proportion of the cycle which is effectively green for the phase under

consideration i.e.f g/c

x = The degree of saturation. This is the ratio of actual flow to the maximum possible flow under the given setting of signals and equals 3600q/¦Es where S = saturation flow in veh/hour

c = Cycle time in seconds

g = Effective green time in seconds

q should be the flow in vehicles per second to give delay in seconds

	Shap Pat Heur	ng Road (WB)	Shap Pat Heur	ng Road (WB)	Tai Tong I	Road (NB)	Shap Pat Heu	ng Road (EB)	Shap Pat Heu	ng Road (EB)	Tai Tong Road	l (SB) (STR &
Approach:	(STR	& RT)	(L	(T)	(STR & I	LT & RT)	(S7	TR)	(L	(T)	LT &	: RT)
	A.M. Off-Peak	P.M. Off-Peak										
q (veh/hr)	296	344	80	76	308	288	288	312	36	80	296	340
g (sec)	24	22	24	22	29	26	18	19	18	19	28	31
c (sec)	120	120	120	120	120	120	120	120	120	120	120	120
s (veh/hr)	3,284	3,276	716	716	2,316	2,304	3,416	3,416	1,428	1,428	2,308	2,304
λ	0.20	0.18	0.20	0.18	0.24	0.22	0.15	0.16	0.15	0.16	0.23	0.26
х	0.45	0.57	0.56	0.58	0.55	0.58	0.56	0.58	0.17	0.35	0.55	0.57
M=qc	9.87	11.47	2.67	2.53	10.27	9.60	9.60	10.40	1.20	2.67	9.87	11.33
Delay												
d	42.90	45.71	52.07	55.10	41.30	43.83	48.31	47.79	45.66	47.15	41.99	40.30
unction Delay (sec)	44.1	45.1										

Junction Delay (sec) 44.1

From TPDM Vol4 Table 4.2.5

Average Queue N calculated by

N=q(r/2+d) or qr, whichever the greater

where r = effective red time

q = flow (in same units as r and d) d = average delay per vehicle

	Shap Pat Heur	ng Road (WB)	Shap Pat Heur	ng Road (WB)	Tai Tong Road	l (NB) (STR &	Shap Pat Heur	ng Road (EB)	Shap Pat Heur	ng Road (EB)	Tai Tong Road	l (SB) (STR &
Approach:	(STR a	& RT)	(L	T)	LT &	z RT)	(ST	'R)	(L'	T)	LT &	RT)
	A.M. Off-Peak	P.M. Off-Peak										
r (sec)	96	98	96	98	91	94	102	101	102	101	92	89
N (veh)	8	9	2	2	8	8	8	9	1	2	8	8
Average												
Queue length												
( <b>m</b> )	30.0	36.0	12.0	12.0	30.0	30.0	24.0	24.0	6.0	12.0	30.0	36.0

JUNCTION DELAY CALCULATION

JUNCTION DELAY CALCULATION	Job No:	21120HK	CTA Consultants Ltd.
Junction: (C)Shap Pat Heung Road / Fung Ki Road			
Description: 2021 Off-peak Traffic Flows		_	
TRRL Method (Transport Road Research Laborato	ry)	1	
$d = \frac{c(1 \lambda)^2}{2(1 \lambda)^2} +$	$\frac{X}{2q(1 - X)} - 0$	0.65 (c) $\frac{1}{3} X^{(2+5\lambda)}$ $\frac{1}{q^2}$	

 $\lambda$  = proportion of the cycle which is effectively green for the phase under

consideration i.e.f g/c

 x = The degree of saturation. This is the ratio of actual flow to the maximum possible flow under the given setting of signals and equals 3600q/¦Es where S = saturation flow in veh/hour

where

c = Cycle time in seconds

g = Effective green time in seconds

q should be the flow in vehicles per second to give delay in seconds

	Shap Pat Heu	ng Road (WB)	Shap Pat Heur	ng Road (WB)	The Access	Road of The	The Access Road	of The Reach	Shap Pat Heu	ng Road (EB)	Shap Pat Heu	ng Road (EB)	Ever V: De		Fung Ki Road	(SB) (STR &
Approach:	(R	(T)	(STR	& LT)	Reach (N	NB) (LT)	(NB) (STR	& RT))	(L	.T)	(S7	ΓR)	Fung Ki Roa	id (SB) (LT)	R	Τ)
	A.M. Off-Peak	P.M. Off-Peak	A.M. Off-Peak	P.M. Off-Peak	A.M. Off-Peak	P.M. Off-Peak	A.M. Off-Peak	P.M. Off-Peak	A.M. Off-Peak	P.M. Off-Peak	A.M. Off-Peak	P.M. Off-Peak	A.M. Off-Peak	P.M. Off-Peak	A.M. Off-Peak	P.M. Off-Peak
q (veh/hr)	232	308	284	368	12	12	28	36	96	132	344	352	256	360	64	100
g (sec)	40	44	49	55	6	6	6	6	41	36	41	36	60	66	6	6
c (sec)	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130
s (veh/hr)	1,440	1,440	2,140	2,140	1,428	1,428	3,276	3,264	1,288	1,288	2,526	2,526	1,452	1,452	3,216	3,224
λ	0.31	0.34	0.38	0.42	0.05	0.05	0.05	0.05	0.32	0.28	0.32	0.28	0.46	0.51	0.05	0.05
х	0.52	0.63	0.35	0.41	0.18	0.18	0.19	0.24	0.24	0.37	0.43	0.50	0.38	0.49	0.43	0.67
M=qc	8.38	11.12	10.26	13.29	0.43	0.43	1.01	1.30	3.47	4.77	12.42	12.71	9.24	13.00	2.31	3.61
Delay																
d	39.53	39.41	30.00	27.12	62.42	62.42	60.40	60.64	34.08	39.80	36.20	40.58	24.24	22.69	62.13	71.03
function Delay (sec)	36.5	34.8														

Junction Delay (sec) 36.5

From TPDM Vol4 Table 4.2.5

Average Queue N calculated by

N=q(r/2+d) or qr, whichever the greater

r = effective red time q = flow (in same units as r and d)

d = average delay per vehicle

Approach:	Shap Pat Heur (R		Shap Pat Heur (STR)	ng Road (WB)	The Access Reach	Road of The	The Access Road		Shap Pat Heu	T)	Shap Pat Heu (S7	ng Road (EB)	Fung Ki Roa	ad (SB) (LT)	Fung Ki Road R	. , .
Approach.	``````````````````````````````````````	/	<u></u>						(L	/	( -	/		1		· ·
	A.M. Off-Peak	P.M. Off-Peak	A.M. Off-Peak	P.M. Off-Peak	A.M. Off-Peak	P.M. Off-Peak	A.M. Off-Peak	P.M. Off-Peak	A.M. Off-Peak	P.M. Off-Peak	A.M. Off-Peak	P.M. Off-Peak	A.M. Off-Peak	P.M. Off-Peak	A.M. Off-Peak	P.M. Off-Peak
r (sec)	90	86	81	75	124	124	124	124	89	94	89	94	70	64	124	124
N (veh)	6	7	6	8	0	0	1	1	2	3	9	9	5	6	2	4
Average																
Queue length																
(m)	36.0	42.0	24.0	30.0	0.0	0.0	0.0	6.0	12.0	18.0	24.0	30.0	30.0	36.0	6.0	12.0

UNCTION DELAY CAI			Job No:	21120HK			CTA Consultants 1
Junction: (D)Shap Pat Heur Description: 2021 Off-peak Tr	-	Leung Road		-			
		ah Tahanataa		-			
RRL Method (Transpor		•		1			
	d = c	$(1\lambda)^{2} +$	$\frac{X}{2q(1-X)} -0.$	65 (c) $\frac{1}{3}$ X	(2+5 <sub>2</sub> )		
	$\overline{2}$	<u>1λ</u> <u>X</u> )	2q(1 - X)	$\frac{1}{q^2}$			
		1	. 1.1				
			e delay per v tion of the c				e phase under
		consid	eration i.e.f	g/c			
						of actual flow	v to the als and equals
			¦Ës where S				and equans
		c = Cycle	time in seco	nds			
		-	ive green tim				
	q should	a be the flow	in vehicles	per second to	o give delay	in seconds	
	•	ng Road (SB)	<u>^</u>	ng Road (NB)		g Road (EB)	
Approach:	A.M. Off-Peak	R) P.M. Off-Peak	(ST A.M. Off-Peak	R) P.M. Off-Peak	(F A.M. Off-Peak	RT) P.M. Off-Peak	4
q (veh/hr)	728	712	560	604	408	400	1
g (sec)	49	49	49	49	31	31	
c (sec)	90	90	90	90	90	90	4
s (veh/hr)	2,930	2,930	3,256	3,256	2,620	2,620	
λ.	0.54	0.54	0.54	0.54	0.34	0.34	
X M-ac	0.46 18.20	0.45 17.80	0.32 14.00	0.34 15.10	0.45 10.20	0.44 10.00	
M=qc Delay	16.20	17.00	14.00	13.10	10.20	10.00	
d	13.16	13.06	11.70	11.93	23.90	23.80	
Junction Delay (sec)	10.3	9.5			•		
From TPDM	Vol4 Table 4.2	5					
	eue N calculate						
0 *	r qr,whichever	•			where	r = effective re	ed time
•·· /		-				q = flow (in sa	me units as r and d)
						d = average de	elay per vehicle
]	Shap Pat Heu	ng Road (SB)	Shap Pat Heu	ng Road (NB)	Tai Kei Ler	g Road (EB)	]
Approach:		FR)	(ST			RT)	4
r (sec)	A.M. Off-Peak 41	P.M. Off-Peak 41	A.M. Off-Peak 41	P.M. Off-Peak 41	A.M. Off-Peak 59	P.M. Off-Peak 59	4
N (veh)	8	8	6	7	7	7	
Average Queue length							3
Queue length (m)	24.0	24.0	18.0	18.0	18.0	18.0	

Description	: (A) ]	МаТ	no R	oad /'	Гаі Топ	o Roa	1				21120HK						Const	ultants	Lu
	tion	ion	sc	Stage	(m)	Radiu	s (m)	le 0/1	actor	Pro. Tur	ning (%)	Rev Saturati (pcu	on Flow		A.M. Off-Peak	¢.		P.M. Off-Pe	k
Approach	Direction	Movemen notation	Phase	Sta	Width (m)	Left	Right	Nearside 0/1	Site Factor	A.M Off- Peak	P.M Off- Peak	A.M Off- Peak	P.M Off- Peak	Flow (pcu/hr)	y Value	Critical y	Flow (pcu/hr)	y Value	Critica
Ma Tong Road (WB)	w w	.≁ ⊊	B B	3 3	4.0 5.0	0 15	21 0	0 1	1 0.063	26% 100%	14% 100%	2235	2255	285	0.128	0.128	210	0.093	0.093
Tai Tong Road (NB)	N N	¢  }	D D	2 2	3.5 3.5	8 0	0 21	1 0	1.11 0.06	42% 100%	42% 100%	2140	2140	445	0.208	0.208	475	0.222	0.22
Ma Tong Road (EB)	E E E	≏ ≁≁	A A A	1 1 1	3.5 3.5 3.5	18 0 0	0 0 30	1 0 0	0.9 0.9 0.9	100% 0% 60%	100% 0% 57%	5365	5365	355	0.066	0.066	415	0.077	0.07
Tai Tong Road (SB)	s s	4	C C	4 4	3.5 3.5	0 8	24 0	0 1	1 1	100% 19%	100% 19%	3875	3880	465	0.120	0.120	515	0.133	0.13
			Ip Jp	3,4 1,2,3	Min. C Min. C Min. C	rossing rossing rossing	Time Time Time	= 5Gm + = 8Gm + = 10Gm	+ 6FGm = + 5FGm = + 8FGm = + 10FGr + 5FGm =	=10s =16s m =20s									
te:						8 190	Flow () 35(75) - 0(245) <sup>-</sup> 30(95) <sup>-</sup>		130(140) <	270(305)	▲ ✓ ✓	60(25) 170(155 55(30)	N N D	Ey L (sec) C (sec) y pract. R.C. (%)	Check Phase 0.522 30 120 0.675 29%		εy L (sec) C (sec) y pract. R.C. (%)	Check Phase 0.525 30 120 0.675 29%	

RAFFIC SIGNALS CALC	-									JOD NO:	21120HK						CONSU	ıltants	LU
Junction: Description:								d											
	_														. M. OSP			BM OF B	
	tion	nent	8	2 C	Ē	Radiu		side	ictor		ning (%)	Rev A.M.	P.M.	l 1	A.M. Off-Pea	к		P.M. Off-Pea	ĸ
Approach	Direction	Movemen	Phase	Stage	Width	Left	Right	Nearside 0/1	Site Factor	A.M. Off- Peak	P.M. Off- Peak	Off- Peak	Off- Peak	Flow (pcu/hr)	y Value	Critical y	Flow (pcu/hr)	y Value	Critica
Shap Pat Heung Road (WB)	W	<u>_</u> 1	с	3	3.8	0	30	0	1	62%	64%	4380	4380	615	0.140	0.140	630	0.144	0.14
	W		С	3	3.8	0	0	0	0.95	0%	0%								
	W	Ļ	С	3	3.5	15	0	1	0.15	100%	100%								
Tai Tong Road (NB)	N	-1	в	2	3.5	15	0	1	0.125	30%	44%	2285	2280	475	0.208	0.208	440	0.193	0.19
	Ν	^>	в	2	3.5	0	15	0	1	28%	33%								
Shap Pat Heung Road (EB)	Е	£.	А	1	3.5	15	0	1	1	100%	100%	6055	6055	535	0.088	0.088	585	0.097	0.09
	Е	→	А	1	3.8	0	0	0	1	0%	0%								
	Е	→	А	1	3.8	0	0	0	1	0%	0%								
Tai Tong Road (SB)	s		- D	4	3.5	15	0	1	0.135	100%	100%	2320	2315	495	0.213	0.213	555	0.240	0.24
÷ (-)	s	-	D	4	3.5	0	15	0	1	13%	14%								
			Jp Kp Lp Mp Np	1,2,4 4 2,3,4	Min. 0 Min. 0 Min. 0	Crossing Crossing Crossing	Time Time Time	= 6Gm = 9Gm = 10Gi	+ 8FGm + 6FGm + 9FGm n + 6FGm + 6FGm	n=12s n=15s m=16s									
otes:						Traffic	Flow (	pcu / h	r)		[AM (PM)]	1	N	1	Check Phase			Check Phase	
								L	45(55)	315(340)	135(160)		R	Ey L (sec) C (sec)	0.650 16 120		Ey L (sec) C (sec)	0.673 16 120	
							)(110) 5(475) <sup>-</sup>		∱-	* -		160(170 350(360	)	y pract. R.C. (%)	0.780 20%		y pract. R.C. (%)	0.780 16%	
									<	个 「	∀ →	105(100							
									1 15(20)	340(290)	120(130)								
tage / Phase Diagrams			2							3		_		4	$\Leftrightarrow^{D}$	1			
			·		•	T	⊢					<≎	Ċ		F				
1			1												_				
T					++++++++++++++++++++++++++++++++++++++										Т				

	Direction	Movement				Radia	ows												
Shap Pat Heung Road (WB) The Access Road of The	W W	1_	Phase	Stage			ıs (m)												
Shap Pat Heung Road (WB) The Access Road of The	W W	1_	Phase	Stage					5	Pro. Tur	ning (%)	Rev	ised		A.M. Off-Pea	k		P.M. Off-Pe	ık
The Access Road of The	W				>	Left	Right	Nearside 0/1	Site Factor	A.M Off- Peak	P.M Off- Peak	A.M Off- Peak	P.M Off- Peak	Flow (pcu/hr)	y Value	Critical y	Flow (pcu/hr)	y Value	Critical
The Access Road of The	W		в	2	3.5	0	21	0	0.855	100%	100%	1800	1800	310	0.172	0.185	415	0.231	
	W	←	в	2	3.5	0	0	0	0.35	0%	0%	735	735	136	0.185	0.105	155	0.211	
		÷	в	2	3.5	15	0	1	1	11%	11%	1945	1945	359	0.185		410	0.211	
Reach	N	Ą	Е	4	3.5	15	0	1	1	100%	100%	1785	1785	15	0.008		15	0.008	
	Ν	ĵ≻	Е	4	3.5	0	35	0	1	16%	34%	2090	2075	18	0.009		23	0.011	
	Ν	۳	E	4	3.5	0	30	0	1	100%	100%	2005	2005	17	0.009		22	0.011	
Shap Pat Heung Road (EB)	Е	ŝ	А	1	3.5	15	0	1	0.9	100%	100%	1610	1610	140	0.087	0.184	185	0.115	
	Е	≯	А	1	3.5	0	0	0	0.5	0%	0%	1052.5	1052.5	193	0.184		185	0.176	0.17
	Е	<b>&gt;</b>	Α	1	3.5	0	0	0	1	0%	0%	2105	2105	387	0.184		370	0.176	
Fung Ki Road (SB)	s	L	С	2,3	3.5	18	0	1	1	100%	100%	1815	1815	345	0.190		480	0.264	0.26
	s	÷.	D	3	3.5	0	23	0	1	42%	28%	2050	2070	43	0.021		69	0.033	
	s	Į	D	3	3.5	0	21	0	1	100%	100%	1965	1965	42	0.021		66	0.033	
			Hp Ip Jp		Min. C	rossin	g Time =	= 7Gm	+ 7FGn + 7FGn n + 6FG										
ites:						Traffic	Flow (	pcu / h	r)		[AM (PM)]		N		Check Phase	;		Check Phase	;
te factor are applied due to lan idened to provide an additional									60(85)	25(50)	345(480)		X	Ey L (sec)	0.369 28		εy L (sec)	0.440 19	
te Factor of 0.95 is apply to fast la /B). Further 10% deduce due to th	ine of	f Shap I	Pat He	ung Ro	ad Euro					$\downarrow$	4			C (sec)	130 0.706		C (sec)	130 0.768	
Road, which give total Site factor			K erree	a nom	rung	14	0(185)				^	310(415	)	y pract. R.C. (%)	91%		y pract. R.C. (%)	75%	
te Factor of 0.35 is apply to middle /B)	e lan	e of Sh	ap Pat	Heung	Road	58	0(555)		~			455(520 40(45)	)						
te Factor of 0.95 is apply to near si ad (EB)	ide k	ane of S	Shap P	at Heur	ng				<	↑	^								
te Factor of 0.5 is apply to middle (B)	lane	of Shaj	o Pat F	Heung l	Road				15(15)	20(30)	30(30)								
age / Phase Diagrams			2			1				3		21.1		4					
			-		, T	! L; ∢	° ★		в	_	⊣ T		С		⊾ ₽ ⊦				
M: I/G = 6 M: I/G = 6			I/G = I/G =							I/G = 5 I/G = 5				I/G = 5+5 I/G = 5+5					

RAFFIC SIGNALS CALCU										Job No:	21120HK					CTA (	Consu	iltant	s Ltd
Junction Description								Road									-		
	E	n T			(ii)	Radi	1s (m)	0	tor	Pro. Tur	ning (%)	Rev			A.M. Off-Pea	ık	1	P.M. Off-Pe	ak
Approach	Direction	Movement notation	Phase	Stage	Width (	Left	Right	Nearside 0/1	Site Factor	A.M Off- Peak	P.M Off- Peak	A.M Off- Peak	P.M Off- Peak	Flow (pcu/hr)	y Value	Critical y	Flow (pcu/hr)	y Value	Critical
Shap Pat Heung Road (SB)	s s	$\stackrel{\checkmark}{\downarrow}$	A A	1 1	3.5 3.5	0 0	0 0	1 0	0.9 0.9	0% 0%	0% 0%	1768.5 1894.5		529 566	0.299 0.299	0.299	502 538	0.284 0.284	0.28
Shap Pat Heung Road (NB)	N N	<b>↑</b>	A A	1	3.5 3.5	0	0	1 0	1	0% 0%	0% 0%	1965 2105	1965 2105	415 445	0.211		425 455	0.216 0.216	
Tai Kei Leng Road (EB)	E E	<b>,</b>	В	2 2	3.5 3.5	0 0	12 13.5	1 0	0.9 0.9	100% 100%	100% 100%	1570 1705	1570 1705	280 305	0.179 0.179	0.179	271 294	0.173 0.173	0.17
tes:						Traffic	: Flow (	pcu / hi	r)		[AM (PM)	]	N		Check Phase	2		Check Phas	c
te factor are applied due to tra t Heung Interchange. Ised on site observation, about een right turning from Tai Kei	: 10% d	ielay of	f the e	ffectiv		58	5(565)		~		1095(1040 ↓	))	R	Ey L (sec) C (sec) y pract. R.C. (%)	0.478 10 90 0.800 68%		Ey L (sec) C (sec) y pract. R.C. (%)	0.456 10 90 0.800 75%	
milar 10% delay is also observ te Factor of 0.9 is apply to Sha	ap Pat I	Heung	Road	(SB)	roach.					↑ 860(880)									
e Factor of 0.9 is apply to Tai																			
te Factor of 0.9 is apply to Tai age / Phase Diagrams		Å ↓	2	7	, В	T	L			3									
age / Phase Diagrams		Ŷ	2 1/G =		, В	-	L			3 I/G =									

JUNCTION DELAY CALCULATION

**CTA Consultants Ltd.** 

Junction: (A) Ma Tong Road / Tai Tong Road Description: 2028 Reference Off-peak Traffic Flows

TRRL Method (Transport Road Research Laboratory)

$$d = \frac{c(1 \lambda)^{2}}{2(1 \lambda)^{2}} + \frac{X}{2q(1 - X)} - 0.65 \quad (c)^{\frac{1}{3}} X^{(2 + 5\lambda)}$$

where d = average delay per vehicle on the particular arm $<math>\lambda = proportion of the cycle which is effectively green for the phase under$ 

consideration i.e.f g/c

x = The degree of saturation. This is the ratio of actual flow to the maximum possible flow under the given setting of signals and equals 3600q/Es where S = saturation flow in veh/hour

where

- c = Cycle time in seconds
- g = Effective green time in seconds

q should be the flow in vehicles per second to give delay in seconds

Γ	Ma Tong I	Road (WB)	Tai Tong	Road (NB)	Tai Tong	Road (NB)	Ma Tong I	Road (EB)	Ma Tong	Road (EB)	Tai Tong	Road (SB)	Tai Tong	Road (SB)
Approach:	(LT & ST	FR & RT)	(STR	& LT)	(R	(T)	(L	T)	(STR	& RT)	(STR	& LT)	(R	(T)
	A.M. Off-Peak	P.M. Off-Peak												
q (veh/hr)	211	156	289	300	41	52	63	56	200	252	248	278	96	104
g (sec)	18	13	30	31	30	31	9	7	9	7	29	31	29	31
c (sec)	120	120	120	120	120	120	120	120	120	120	120	120	120	120
s (veh/hr)	1,922	1,937	1,552	1,552	363	363	1,207	1,207	2,767	2,767	1,404	1,407	1,467	1,467
λ	0.15	0.11	0.25	0.26	0.25	0.26	0.07	0.06	0.07	0.06	0.24	0.26	0.24	0.26
х	0.74	0.72	0.73	0.75	0.44	0.56	0.73	0.75	1.02	1.49	0.73	0.75	0.27	0.27
M=qc	7.04	5.19	9.63	10.00	1.36	1.73	2.10	1.85	6.67	8.40	8.27	9.26	3.21	3.46
Delay														
d	57.57	61.57	47.34	48.42	48.68	55.18	89.28	103.69	-539.19	-21.68	49.53	48.85	38.33	36.50
ction Delay (sec)	-50.9	37.3												

From TPDM Vol4 Table 4.2.5

Average Queue N calculated by

N=q(r/2+d) or qr,whichever the greater

r = effective red timeq = flow (in same units as r and d) d = average delay per vehicle

	Shap Pat Heu	ng Road (EB)	Tai Tong Road	I (NB) (STR &	Shap Pat Heu	ng Road (EB)	Shap Pat Heur	ng Road (WB)	Shap Pat Heur	ng Road (WB)	Tai Tong Road	d (SB) (STR &	Tai Tong Road	d (SB) (STR &
Approach:	(L	Т)	LT &	: RT)	(S7	TR)	(STR a	& RT)	(L	(T)	LT &	2 RT)	LT &	z RT)
	A.M. Off-Peak	P.M. Off-Peak												
r (sec)	102	107	90	89	90	89	111	113	111	113	91	89	91	89
N (veh)	6	5	7	8	1	1	3	2	6	8	7	7	2	3
Average														
Queue length				10.0		6.0	10.0		10.0	• • •			1	10.0
( <b>m</b> )	36.0	30.0	42.0	48.0	6.0	6.0	18.0	12.0	18.0	24.0	42.0	42.0	12.0	18.0

**CTA Consultants Ltd** 

Job No: 21120HK

JUNCTION DELAY CALCULATION

Junction: (B) Shap Pat Heung Road/ Tai Kei Leng Road Description: 2028 Reference Off-peak Traffic Flows

TRRL Method (Transport Road Research Laboratory)

$$d = \frac{c(1 \lambda)^2}{2(1 \lambda)^2} + \frac{X}{2q(1 - X)} - 0.65 \quad (c)^{\frac{1}{3}} X^{(2 + 5\lambda)}$$

where d = average delay per vehicle on the particular arm

 $\lambda$  = proportion of the cycle which is effectively green for the phase under

consideration i.e.f g/c

x = The degree of saturation. This is the ratio of actual flow to the maximum possible flow under the given setting of signals and equals 3600q/¦Es where S = saturation flow in veh/hour

c = Cycle time in seconds

g = Effective green time in seconds

q should be the flow in vehicles per second to give delay in seconds

	Shap Pat Heur	ng Road (WR)	Shap Pat Heur	ng Road (WB)	Tai Tong I	Road (NB)	Shap Pat Heur	ng Road (FB)	Shan Pat Hou	ng Road (FR)	Tai Tong Road	I (SB) (STP &
	(STR		*	0 , ,	(STR & I	. ,	Shap I at Heul	0	•	0	LT &	. , .
Approach:	¥.		(L	/	(518 & 1		V	/	, ,	(T)		/
	A.M. Off-Peak	P.M. Off-Peak	A.M. Off-Peak	P.M. Off-Peak	A.M. Off-Peak	P.M. Off-Peak	A.M. Off-Peak	P.M. Off-Peak	A.M. Off-Peak	P.M. Off-Peak	A.M. Off-Peak	P.M. Off-Peak
q (veh/hr)	408	424	84	80	380	352	388	380	40	88	396	444
g (sec)	20	19	20	19	28	25	20	19	20	19	30	33
c (sec)	120	120	120	120	120	120	120	120	120	120	120	120
s (veh/hr)	3,280	3,280	716	716	2,324	2,312	3,416	3,416	1,428	1,428	2,308	2,304
λ	0.17	0.16	0.17	0.16	0.23	0.21	0.17	0.16	0.17	0.16	0.25	0.28
x	0.75	0.82	0.70	0.71	0.70	0.73	0.68	0.70	0.17	0.39	0.69	0.70
M=qc	13.60	14.13	2.80	2.67	12.67	11.73	12.93	12.67	1.33	2.93	13.20	14.80
Delay												
d	51.30	56.65	68.54	70.59	45.28	48.68	48.99	50.33	43.98	47.64	43.46	41.82
nction Delay (sec)	48.3	50.2										

48.3 Junction Delay (sec)

From TPDM Vol4 Table 4.2.5

Average Queue N calculated by

N=q(r/2+d) or qr, whichever the greater

d = average delay per vehicle

	Shap Pat Heur	ng Road (WB)	Shap Pat Heur	ng Road (WB)	Tai Tong Road	I (NB) (STR &	Shap Pat Heur	ng Road (EB)	Shap Pat Heur	ng Road (EB)	Tai Tong Road	l (SB) (STR &
Approach:	(STR a	& RT)	(L	T)	LT &	: RT)	(ST	R)	(L'	T)	LT &	: RT)
	A.M. Off-Peak	P.M. Off-Peak										
r (sec)	100	101	100	101	92	95	100	101	100	101	90	87
N (veh)	11	13	3	3	10	9	11	11	1	2	10	11
Average												
Queue length												
(m)	48.0	48.0	18.0	18.0	36.0	36.0	30.0	30.0	6.0	12.0	42.0	42.0

where r = effective red time q = flow (in same units as r and d)

JUNCTION DELAY CALCULATION Job No: 21120HK	CTA Consultants Ltd.
Junction: (C)Shap Pat Heung Road / Fung Ki Road	
Description: 2028 Reference Off-peak Traffic Flows	
TRRL Method (Transport Road Research Laboratory)	

$$d = \frac{c(1 \lambda)^2}{2(1 \lambda)^2} + \frac{X}{2q(1 - X)} - 0.65 \quad (c)^{\frac{1}{3}} X^{(2 + 5\lambda)}$$

where d = average delay per vehicle on the particular arm $<math>\lambda = proportion of the cycle which is effectively green for the phase under$ 

consideration i.e.f g/c

 The degree of saturation. This is the ratio of actual flow to the maximum possible flow under the given setting of signals and equals 3600q/¦Es where S = saturation flow in veh/hour

where

c = Cycle time in seconds

g = Effective green time in seconds

q should be the flow in vehicles per second to give delay in seconds

	Shap Pat Heur	ng Road (WB)	Shap Pat Heur	ng Road (WB)	The Access	Road of The	The Access Road	of The Reach	Shap Pat Heu	ng Road (EB)	Shap Pat Heu	ng Road (EB)	Ever K: De		Fung Ki Road	I (SB) (STR &
Approach:	(R	(T)	(STR	& LT)	Reach (N	NB) (LT)	(NB) (STR	& RT))	(L	.T)	(S7	TR)	Fung Ki Roa	id (SB) (L1)	R	T)
	A.M. Off-Peak	P.M. Off-Peak	A.M. Off-Peak	P.M. Off-Peak	A.M. Off-Peak	P.M. Off-Peak	A.M. Off-Peak	P.M. Off-Peak	A.M. Off-Peak	P.M. Off-Peak	A.M. Off-Peak	P.M. Off-Peak	A.M. Off-Peak	P.M. Off-Peak	A.M. Off-Peak	P.M. Off-Peak
q (veh/hr)	248	332	396	452	12	12	28	36	112	148	464	444	276	384	68	108
g (sec)	45	48	42	52	6	6	6	6	45	40	45	40	53	63	6	6
c (sec)	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130
s (veh/hr)	1,440	1,440	2,144	2,144	1,428	1,428	3,276	3,264	1,288	1,288	2,526	2,526	1,452	1,452	3,212	3,228
λ	0.35	0.37	0.32	0.40	0.05	0.05	0.05	0.05	0.35	0.31	0.35	0.31	0.41	0.48	0.05	0.05
х	0.50	0.62	0.57	0.53	0.18	0.18	0.19	0.24	0.25	0.37	0.53	0.57	0.47	0.55	0.46	0.72
M=qc	8.96	11.99	14.30	16.32	0.43	0.43	1.01	1.30	4.04	5.34	16.76	16.03	9.97	13.87	2.46	3.90
Delay																
d	35.70	36.60	38.10	30.98	62.42	62.42	60.40	60.64	31.60	37.06	35.16	39.05	29.97	25.54	62.55	76.38
unction Delay (sec)	36.6	36.0														

Junction Delay (sec) 36.6

From TPDM Vol4 Table 4.2.5

Average Queue N calculated by

N=q(r/2+d) or qr, whichever the greater

r = effective red time q = flow (in same units as r and d)

d = average delay per vehicle

	Shap Pat Heur	ng Road (WB)	Shap Pat Heur	ng Road (WB)	The Access	Road of The	The Access Road	l of The Reach	Shap Pat Heu	ng Road (EB)	Shap Pat Heur	ng Road (EB)	Fung Ki Roa	od (SB) (IT)	Fung Ki Road	l (SB) (STR &
Approach:	(R	T)	(STR	& LT)	Reach	ı (LT)	(STR &	: RT))	(L	T)	(S7	R)	I ung Ki Kot	(GB) (E1)	R	T)
	A.M. Off-Peak	P.M. Off-Peak	A.M. Off-Peak	P.M. Off-Peak	A.M. Off-Peak	P.M. Off-Peak	A.M. Off-Peak	P.M. Off-Peak	A.M. Off-Peak	P.M. Off-Peak	A.M. Off-Peak	P.M. Off-Peak	A.M. Off-Peak	P.M. Off-Peak	A.M. Off-Peak	P.M. Off-Peak
r (sec)	85	82	88	78	124	124	124	124	85	90	85	90	77	67	124	124
N (veh)	6	8	10	10	0	0	1	1	3	4	11	11	6	7	2	4
Average																
Queue length		10.0	260	12.0				6.0	10.0		20.0	26.0	24.0	10.0	6.0	10.0
(m)	36.0	48.0	36.0	42.0	0.0	0.0	0.0	6.0	18.0	24.0	30.0	36.0	36.0	42.0	6.0	12.0

UNCTION DELAY CAI			Job No:	21120HK			CTA Consultants I
Junction: (D)Shap Pat Heuro Description: 2028 Reference O	-	-					
			``				
RRL Method (Transpor		•					
	d = c	$(1\lambda)^{2} +$	X -0.	$\begin{array}{c} 65  (e) \stackrel{1}{3} \\ \overline{q}^{2} \end{array} X$	(2+5 <sub>2</sub> )		
	$\frac{c}{2}$	$\frac{1}{1}$ $\frac{\lambda}{X}$ $\frac{\lambda}{X}$	$\overline{2q(1 - X)}$	$\frac{1}{a^2}$			
				-			
		d = averag	e delay per v	ehicle on the	e particular	arm	1 1
		$\lambda = \text{propor}$	uon of the c	yele which is	serrectively	green for the	e phase under
			eration i.e.f				
	:					of actual flow	v to the als and equals
				= saturation			ais and equals
			time in secon				
				ie in seconds			
	q should	l be the flow	in vehicles	per second to	o give delay	in seconds	
					-		
-			-				-
A	-	ng Road (SB)		ng Road (NB)		ng Road (EB)	
Approach:	A.M. Off-Peak	P.M. Off-Peak	(ST A.M. Off-Peak	P.M. Off-Peak	A.M. Off-Peak	RT) P.M. Off-Peak	
q (veh/hr)	876	832	688	704	468	452	
g (sec)	50	50	50	50	30	30	
c (sec)	90 2,930	90 2,930	90 3,256	90 3,256	90 2,620	90 2,620	
s (veh/hr) λ	0.56	2,930	0.56	0.56	0.33	0.33	
x	0.54	0.51	0.38	0.39	0.54	0.52	
M=qc	21.90	20.80	17.20	17.60	11.70	11.30	
Delay d	13.58	13.26	11.79	11.88	25.58	25.34	
u Junction Delay (sec)	13.58 10.7	<u>13.20</u> 9.9	11./9	11.00	23.30	23.34	1
·			•				
	Vol4 Table 4.2						
	ue N calculate	-			whom	n - offootive	d time
n = q(r/2 + d) of	r qr,whichever	me greater			where	r = effective re a = flow (in sate	me units as r and d)
						d = average de	
г	Shan Dat II	ng Dood (CD)	Shan Dat II	ng Dood (ND)	Toi Voi I	Dond (ED)	1
Approach:	•	ng Road (SB) FR)	<u>^</u>	ng Road (NB) FR)		ng Road (EB) RT)	
FT	A.M. Off-Peak	P.M. Off-Peak	A.M. Off-Peak	P.M. Off-Peak	A.M. Off-Peak	P.M. Off-Peak	
r (sec)	40	40	40	40	60	60	
N (veh) Average	10	9	8	8	8	8	
Queue length	<b>.</b>						
(m)	30.0	30.0	24.0	24.0	24.0	24.0	

Description	: (A)	Ма Т.	no R	oad /	Гаі Тог	o Rose	1				21120HK						Const	ultants	
	tion	ion	se	şe	(m)	Radiu	s (m)	le 0/1	ictor	Pro. Tur	ning (%)	Rev Saturati (pcu	on Flow		A.M. Off-Peal	¢		P.M. Off-Pe	ık
Approach	Direction	Movement notation	Phase	Stage	Width (m)	Left	Right	Nearside 0/1	Site Factor	A.M Off- Peak	P.M Off- Peak	A.M Off- Peak	P.M Off- Peak	Flow (pcu/hr)	y Value	Critical y	Flow (pcu/hr)	y Value	Critical
Ma Tong Road (WB)		.≁ ⊊	B B	3 3	4.0 5.0	0 15	21 0	0 1	1 0.063	26% 100%	14% 100%	2235	2255	285	0.128	0.128	210	0.093	0.093
Tai Tong Road (NB)	N N	¢  }	D D	2 2	3.5 3.5	8 0	0 21	1 0	1.11 0.06	42% 100%	41% 100%	2145	2145	450	0.210	0.210	480	0.224	0.22
Ma Tong Road (EB)	E E	≏ ≁≁	A A A	1 1 1	3.5 3.5 3.5	18 0 0	0 0 30	1 0 0	0.9 0.9 0.9	100% 0% 60%	100% 0% 57%	5365	5365	355	0.066	0.066	415	0.077	0.07
Tai Tong Road (SB)	s s	↓ ↓	с с	4 4	3.5 3.5	0 8	24 0	0 1	1 1	100% 19%	100% 18%	3875	3880	470	0.121	0.121	520	0.134	0.13
			Ip Jp Kp Lp	1,2,3	Min. C Min. C	rossing rossing	Time Time	= 8Gm - = 10Gm	+ 5FGm = + 8FGm = + 10FGi + 5FGm =	=16s m =20s									
ie:						19	Flow ( 85(75) 9(245) 30(95)		130(140)	275(310)	▲ ✓ ✓	60(25) 170(155 55(30)	N N O	Ey L (sec) C (sec) y pract. R.C. (%)	Check Phase 0.525 30 120 0.675 29%		εy L (sec) C (sec) y pract. R.C. (%)	Check Phase 0.528 30 120 0.675 28%	5

	-									500110.	21120HK						JUIISU	ıltants	Lu
Junction: Description:	(B) 202	Tai T 8 Desi	ong R ign Of	f-peak	hap P: Traffi	at Heur c Flows	ng Roa	d											
	_	1									1 (0.1)			r	L M OR B			DM OF D	
	tion	ment	8	2c	(II)		ıs (m)	side	actor		ming (%)	Rev A.M.	P.M.		A.M. Off-Pea	ĸ		P.M. Off-Pea	ĸ
Approach	Direction	Movemen	Phase	Stage	Width (	Left	Right	Nearside 0/1	Site Factor	A.M. Off Peak	P.M. Off- Peak	Off- Peak	Off- Peak	Flow (pcu/hr)	y Value	Critical y	Flow (pcu/hr)	y Value	Critica
Shap Pat Heung Road (WB)	W	<u>ح</u>	с	3	3.8	0	30	0	1	66%	67%	4375	4375	630	0.144	0.144	645	0.147	0.14
	W		С	3	3.8	0	0	0	0.95	0%	0%								
	W	Ļ	С	3	3.5	15	0	1	0.15	100%	100%								
Tai Tong Road (NB)	N	-1	в	2	3.5	15	0	1	0.125	30%	44%	2285	2280	475	0.208	0.208	440	0.193	0.19
	Ν	≁	в	2	3.5	0	15	0	1	28%	33%								
Shap Pat Heung Road (EB)	Е	£.	А	1	3.5	15	0	1	1	100%	100%	6055	6055	535	0.088	0.088	585	0.097	0.09
	Е	→	A	1	3.8	0	0	0	1	0%	0%								
	Е	→	А	1	3.8	0	0	0	1	0%	0%								
T-: T B d (SB)	s	1.	- D	4	3.5	15	0	1	0.135	100%	100%	2320	2315	515	0.222	0.222	565	0.244	0.24
Tai Tong Road (SB)	s	∽.	р.	4	3.5	0	15	0	0.135	100%	100%	2320	2315	515	0.222	0.222	202	0.244	0.24
			Hp Ip Jp Kp Lp	1,2,4 3,4 1,2,3 1,2,4 4 2,3,4	Min. 0 Min. 0 Min. 0 Min. 0 Min. 0	Crossing Crossing Crossing Crossing Crossing Crossing	g Time g Time g Time g Time g Time g Time g Time	= 10Gi = 8Gm = 6Gm = 6Gm = 9Gm = 10Gi	n + 8FGm m + 10FC n + 8FGm n + 8FGm n + 6FGm m + 6FGm n + 6FGm	Gm =20s n =16s n =14s n =12s n =15s m =16s									
otes:						Traffic	Flow (	pcu/h		315(340)	[AM (PM) 155(170)	]	N N	εy L (sec) C (sec) y pract.	Check Phase 0.662 16 120 0.780	:	εy L (sec) C (sec) y pract.	Check Phase 0.681 16 120 0.780	
age / Phase Diagrams			2				0(110) 5(475)		15(20)	1 340(290)	<u>&lt;</u> √ →	175(185 350(360 105(100	)	R.C. (%)	18%		R.C. (%)	15%	
1			2			1				2				**	$\Leftrightarrow^{D}$	,			

Junction:	1000	61 ×					· n ·			JOD NO:	21120HK						Consi	manu	, Lu
Description:																			
	5	t		_	(iii	Radia	ıs (m)		i.	Pro. Tu	ning (%)	Rev	ised		A.M. Off-Pea	ık		P.M. Off-Pe	ak
Approach	Direction	Movemen	Phase	Stage	Width (m	Left	Right	Nearside 0/1	Site Factor	A.M Off- Peak	P.M Off- Peak	A.M Off- Peak	P.M Off- Peak	Flow (pcu/hr)	y Value	Critical y	Flow (pcu/hr)	y Value	Critica
Shap Pat Heung Road (WB)	w	1	в	2	3.5	0	21	0	0.855	100%	100%	1800	1800	310	0.172	0.191	415	0.231	
shap I at Heating Road (WB)	w		в	2	3.5	0	0	0	0.35	0%	0%	735	735	140	0.191	0.191	159	0.217	
	W	÷	в	2	3.5	15	0	1	1	11%	11%	1945	1945	370	0.190		421	0.216	
The Access Road of The	N	Ą	Е	4	3.5	15	0	1	1	100%	100%	1785	1785	15	0.008		15	0.008	
Reach	Ν		Е	4	3.5	0	35	0	1	16%	34%	2090	2075	18	0.009		23	0.011	
	Ν	1	Е	4	3.5	0	30	0	1	100%	100%	2005	2005	17	0.009		22	0.011	
Shap Pat Heung Road (EB)	Е	Ť	А	1	3.5	15	0	1	0.9	100%	100%	1610	1610	140	0.087	0.190	185	0.115	
	Е	$\rightarrow$	А	1	3.5	0	0	0	0.5	0%	0%	1052.5	1052.5	200	0.190		188	0.179	0.17
	Е	≯	А	1	3.5	0	0	0	1	0%	0%	2105	2105	400	0.190		377	0.179	
Fung Ki Road (SB)	s		с	2,3	3.5	18	0	1	1	100%	100%	1815	1815	345	0.190		480	0.264	0.26
	s	_	D	3	3.5	0	23	0	1	42%	28%	2050	2070	43	0.021		69	0.033	
	s		D	3	3.5	0	23	0	1	42%	28%	1965	1965	43	0.021		66	0.033	
	5	<j< td=""><td>D</td><td>5</td><td>3.5</td><td>0</td><td>21</td><td>0</td><td></td><td>10076</td><td>10070</td><td>1905</td><td>1905</td><td>42</td><td>0.021</td><td></td><td>00</td><td>0.055</td><td></td></j<>	D	5	3.5	0	21	0		10076	10070	1905	1905	42	0.021		00	0.055	
Pedestrian crossing			Fp Gp Hp		Min. C Min. C	rossin	g Time :	= 10Gr	+ 8FGr n + 10F + 7FGr	Gm=20s									
			Ip Jp						+ 7FGr n + 6FC										
otes: ite factor are applied due to la dichect to provide an addition. Ite Factor of 0.95 is apply to fast W. Further (10 <sup>4</sup> dichec due to to R and, which give total Site factor ite Factor of 0.35 is apply to midd	al lar lane c the qu or of ( lle lar	ne near of Shap ieue bao 0.855 ne of Sh	Jp hes an the ju Pat He k effer ap Pat	nction ung Ro t from Heung	Min. C ly : sad Fung :Road	Traffic		= 10Gn	n + 6FC	n =14s im =16s	←	310(415 470(535 40(45)		εy L (sec) C (sec) y pract. R.C. (%)	Check Phase 0.381 28 130 0.706 85%	2	εy L (sec) C (sec) y pract. R.C. (%)	Check Phase 0.443 19 130 0.768 73%	e
te factor are applied due to las idenced to provide an additions the Factor 00.05% is apply to fast (PB). Further 10% deduce due to 1 (Road, which give total Site factor the Factor of 0.35 is apply to midd (PB) the Factor of 0.5 is apply to meal and (EB) (B)	al lar lane o the qu or of ( ille lar side l	ne near of Shap ieue bao 0.855 ne of Sh lane of Sh	Jp hes ar the ju Pat He k effer ap Pat Shap P	nction rung Ro rt from Heung at Heur	Min. C ly : sad Fung ng	Traffic	g Time : Flow (	= 10Gn	n + 6FC	n =14s im =16s	345(480)	310(415 470(535	N 0	L (sec) C (sec) y pract.	0.381 28 130 0.706		Ey L (sec) C (sec) y pract.	0.443 19 130 0.768	c
te factor are applied due to las idenced to provide an addition; the Factor of 0.95 is apply to fast 1 /B). Further 10% deduce due to t Road, which give total Site factor to Factor of 0.35 is apply to midd (B) te Factor of 0.95 is apply to near add (EB)	al lar lane o the qu or of ( ille lar side l	ne near of Shap ieue bao 0.855 ne of Sh lane of Sh	Jp hes ar the ju Pat He k effer ap Pat Shap P	nction rung Ro rt from Heung at Heur	Min. C ly : sad Fung ng	Traffic	Flow ( 0(185) 0(565)	= 10Gn	r) 60(85) 4	n =14s im =16s	<sup>345(480)</sup> ↓ ↓ ↓	310(415 470(535		L (sec) C (sec) y pract. R.C. (%)	0.381 28 130 0.706		Ey L (sec) C (sec) y pract.	0.443 19 130 0.768	5

RAFFIC SIGNALS CALCU							_			Job No:	21120HK					CTA (	Const	iltant	s Ltd
Junction Description							Leung	Road											
	u u	с. С. с.			(ii	Radia	ıs (m)	le	tor	Pro. Tur	ning (%)	Rev			A.M. Off-Pea	ık		P.M. Off-Pe	ak
Approach	Direction	notation	Phase	Stage	Width (	Left	Right	Nearside 0/1	Site Factor	A.M Off- Peak	P.M Off- Peak	A.M Off- Peak	P.M Off- Peak	Flow (pcu/hr)	y Value	Critical y	Flow (pcu/hr)	y Value	Critica
Shap Pat Heung Road (SB)		↓ ↓	A A	1	3.5 3.5	0	0	1	0.9	0% 0%	0% 0%	1768.5 1894.5		538 577	0.304	0.304	507 543	0.287	0.28
	s	•	А	1	3.0	U	0	U	0.9	0%	0%	1894.5	1894.5	5//	0.304		543	0.287	
Shap Pat Heung Road (NB)	Ν	1	A	1	3.5	0	0	1	1	0%	0%	1965	1965	422	0.215		432	0.220	
	Ν	ſ	Α	1	3.5	0	0	0	1	0%	0%	2105	2105	453	0.215		463	0.220	
Tai Kei Leng Road (EB)	E E	•	в	2	3.5 3.5	0	12 13.5	1	0.9	100% 100%	100% 100%	1570 1705	1570 1705	280 305	0.179	0.179	271 294	0.173	0.17
	1	*	5	2	0.0	0	10.0	0	0.0	10070	10070	1705	1705	505	0.177		2,74	0.175	
Pedestrian crossing																			
tes:						Traffic	Flow (	pcu / h	r)		[AM (PM)]	]	N	εy	Check Phase 0.483		εy	Check Phas 0.459	c
e factor are applied due to tra t Heung Interchange. sed on site observation, about	: 10% de	lay of:	the ef	fective							1115(1050 ↓	))	R	L (sec) C (sec) y pract.	10 90 0.800		L (sec) C (sec) y pract.	10 90 0.800	
een right turning from Tai Kei nilar 10% delay is also observ					roach.	58:	5(565)		V					R.C. (%)	66%		R.C. (%)	74%	
e Factor of 0.9 is apply to Sha e Factor of 0.9 is apply to Tai										↑ 875(895)									
age / Phase Diagrams	A	Ì	2	~	в		L			3									
					-	T													

JUNCTION DELAY CALCULATION

**CTA Consultants Ltd.** 

Junction: (A) Ma Tong Road / Tai Tong Road Description: 2028 Design Off-peak Traffic Flows

TRRL Method (Transport Road Research Laboratory)

$$d = \frac{c(1 \lambda)^2}{2(1 \lambda)^2} + \frac{X}{2q(1 - X)} - \frac{0.65}{q^2} (c)^{\frac{1}{3}} X^{(2 + 5\lambda)}$$

where d = average delay per vehicle on the particular arm $<math>\lambda = proportion of the cycle which is effectively green for the phase under$ 

consideration i.e.f g/c

x = The degree of saturation. This is the ratio of actual flow to the maximum possible flow under the given setting of signals and equals 3600q/Es where S = saturation flow in veh/hour

where

- c = Cycle time in seconds
- g = Effective green time in seconds

q should be the flow in vehicles per second to give delay in seconds

	Ma Tong I	Road (WB)	Tai Tong	Road (NB)	Tai Tong	Road (NB)	Ma Tong I	Road (EB)	Ma Tong	Road (EB)	Tai Tong	Road (SB)	Tai Tong	Road (SB)
Approach:	(LT & ST	ΓR & RT)	(STR	& LT)	(R	(T)	(L	T)	(STR	& RT)	(STR	& LT)	(R	(T)
	A.M. Off-Peak	P.M. Off-Peak												
q (veh/hr)	211	156	293	304	41	52	63	56	200	252	252	281	96	104
g (sec)	18	13	31	31	31	31	8	7	8	7	29	32	29	32
c (sec)	120	120	120	120	120	120	120	120	120	120	120	120	120	120
s (veh/hr)	1,922	1,937	1,552	1,552	363	363	1,207	1,207	2,767	2,767	1,404	1,407	1,467	1,467
λ	0.15	0.11	0.25	0.26	0.25	0.26	0.07	0.06	0.07	0.06	0.24	0.26	0.24	0.26
х	0.75	0.73	0.74	0.76	0.44	0.56	0.74	0.76	1.03	1.51	0.74	0.76	0.27	0.27
M=qc	7.04	5.19	9.75	10.12	1.36	1.73	2.10	1.85	6.67	8.40	8.40	9.38	3.21	3.46
Delay														
d	58.30	62.29	47.62	48.78	48.50	54.92	91.40	106.67	-338.18	-22.26	49.81	49.21	38.18	36.38
ction Delay (sec)	-15.1	37.6												

From TPDM Vol4 Table 4.2.5

Average Queue N calculated by

N=q(r/2+d) or qr,whichever the greater

r = effective red timeq = flow (in same units as r and d) d = average delay per vehicle

	Shap Pat Heu	ng Road (EB)	Tai Tong Road	I (NB) (STR &	Shap Pat Heu	ng Road (EB)	Shap Pat Heun	ig Road (WB)	Shap Pat Heur	ng Road (WB)	Tai Tong Road	d (SB) (STR &	Tai Tong Road	d (SB) (STR &
Approach:	(L	T)	LT &	: RT)	(S7	TR)	(STR &	& RT)	(L	Т)	LT &	2 RT)	LT &	z RT)
	A.M. Off-Peak	P.M. Off-Peak												
r (sec)	102	107	89	89	89	89	112	113	112	113	91	88	91	88
N (veh)	6	5	8	8	1	1	3	3	6	8	7	7	2	3
Average														
Queue length														
( <b>m</b> )	36.0	30.0	48.0	48.0	6.0	6.0	18.0	18.0	18.0	24.0	42.0	42.0	12.0	18.0

**CTA Consultants Ltd** 

Job No: 21120HK

JUNCTION DELAY CALCULATION

Junction: (B) Shap Pat Heung Road/ Tai Kei Leng Road Description: 2028 Design Off-peak Traffic Flows

TRRL Method (Transport Road Research Laboratory)

$$d = \frac{c(1 \lambda)^2}{2(1 \lambda)^2} + \frac{X}{2q(1 - X)} - 0.65 \quad (c)^{\frac{1}{3}} X^{(2 + 5\lambda)}$$

where d = average delay per vehicle on the particular arm

 $\lambda$  = proportion of the cycle which is effectively green for the phase under

consideration i.e.f g/c

x = The degree of saturation. This is the ratio of actual flow to the maximum possible flow under the given setting of signals and equals 3600q/¦Es where S = saturation flow in veh/hour

c = Cycle time in seconds

g = Effective green time in seconds

q should be the flow in vehicles per second to give delay in seconds

	Shap Pat Heur	ng Road (WB)	Shap Pat Heur	ng Road (WB)	Tai Tong I	Road (NB)	Shap Pat Heu	ng Road (EB)	Shap Pat Heu	ng Road (EB)	Tai Tong Road	1 (SB) (STR &
Approach:	(STR	& RT)	(L	.T)	(STR & I	LT & RT)	(S7	TR)	(L	(T)	LT &	: RT)
	A.M. Off-Peak	P.M. Off-Peak										
q (veh/hr)	420	436	84	80	380	352	388	380	40	88	412	452
g (sec)	19	18	19	18	27	25	19	18	19	18	32	34
c (sec)	120	120	120	120	120	120	120	120	120	120	120	120
s (veh/hr)	3,276	3,276	716	716	2,324	2,312	3,416	3,416	1,428	1,428	2,308	2,304
λ	0.16	0.15	0.16	0.15	0.23	0.21	0.16	0.15	0.16	0.15	0.27	0.28
х	0.81	0.89	0.74	0.74	0.73	0.73	0.72	0.74	0.18	0.41	0.67	0.69
M=qc	14.00	14.53	2.80	2.67	12.67	11.73	12.93	12.67	1.33	2.93	13.73	15.07
Delay												
d	56.07	69.41	76.57	79.69	46.94	48.68	50.80	52.55	44.93	48.76	41.63	40.90
unction Delay (sec)	50.2	54.0										

Junction Delay (sec) 50.2

From TPDM Vol4 Table 4.2.5

Average Queue N calculated by

N=q(r/2+d) or qr, whichever the greater

where r = effective red time

### q = flow (in same units as r and d) d = average delay per vehicle

	Shap Pat Heur	ng Road (WB)	Shap Pat Heur	ng Road (WB)	Tai Tong Road	l (NB) (STR &	Shap Pat Heur	ng Road (EB)	Shap Pat Heur	ng Road (EB)	Tai Tong Road	I (SB) (STR &
Approach:	(STR -	& RT)	(L	T)	LT &	2 RT)	(ST	R)	(L	T)	LT &	RT)
	A.M. Off-Peak	P.M. Off-Peak										
r (sec)	101	102	101	102	93	95	101	102	101	102	88	86
N (veh)	12	15	3	3	10	9	11	11	1	2	10	11
Average												
Queue length												
(m)	48.0	60.0	18.0	18.0	42.0	36.0	30.0	30.0	6.0	12.0	42.0	42.0

JUNCTION DELAY CALCULATION Job No: 21120HK	CTA Consultants Ltd.
Junction: (C)Shap Pat Heung Road / Fung Ki Road	
Description: 2028 Design Off-peak Traffic Flows	
TRRL Method (Transport Road Research Laboratory)	

$$d = \frac{c(1 \lambda)^2}{2(1 \lambda)^2} + \frac{X}{2q(1 - X)} - 0.65 \quad (c)^{\frac{1}{3}} X^{(2 + 5\lambda)}$$

where d = average delay per vehicle on the particular arm $<math>\lambda = proportion of the cycle which is effectively green for the phase under$ 

.

consideration i.e.f g/c

 The degree of saturation. This is the ratio of actual flow to the maximum possible flow under the given setting of signals and equals 3600q/¦Es where S = saturation flow in veh/hour

where

c = Cycle time in seconds

g = Effective green time in seconds

q should be the flow in vehicles per second to give delay in seconds

	Shap Dat Hau	ng Road (WB)	Shop Dot House	ng Dood (WP)	The Access	Dood of The	The Access Road	of The Deceb	Shap Dat Hau	ing Road (EB)	Shap Pat Heu	ng Bood (EP)	1		Eung Vi Book	1 (SB) (STR &
	1	0 ,	1	0 1					1	0 ,	1	0 ,	Fung Ki Roa	ad (SB) (LT)	U	. , .
Approach:	(F	RT)	(STR	& LT)	Reach (N	VB) (LT)	(NB) (STR	& RT))	(L	.T)	(S7	TR)	. 8		R	Γ)
	A.M. Off-Peak	P.M. Off-Peak	A.M. Off-Peak	P.M. Off-Peak	A.M. Off-Peak	P.M. Off-Peak	A.M. Off-Peak	P.M. Off-Peak	A.M. Off-Peak	P.M. Off-Peak	A.M. Off-Peak	P.M. Off-Peak	A.M. Off-Peak	P.M. Off-Peak	A.M. Off-Peak	P.M. Off-Peak
q (veh/hr)	248	332	408	464	12	12	28	36	112	148	480	452	276	384	68	108
g (sec)	45	48	41	51	6	6	6	6	45	40	45	40	52	62	6	6
c (sec)	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130
s (veh/hr)	1,440	1,440	2,144	2,144	1,428	1,428	3,276	3,264	1,288	1,288	2,526	2,526	1,452	1,452	3,212	3,228
λ	0.35	0.37	0.32	0.39	0.05	0.05	0.05	0.05	0.35	0.31	0.35	0.31	0.40	0.48	0.05	0.05
х	0.50	0.62	0.60	0.55	0.18	0.18	0.19	0.24	0.25	0.37	0.55	0.58	0.48	0.55	0.46	0.72
M=qc	8.96	11.99	14.73	16.76	0.43	0.43	1.01	1.30	4.04	5.34	17.33	16.32	9.97	13.87	2.46	3.90
Delay																ļ
d	35.70	36.60	39.37	32.04	62.42	62.42	60.40	60.64	31.60	37.06	35.47	39.23	30.77	26.31	62.55	76.38
Junction Delay (sec)	37.0	36.5														

From TPDM Vol4 Table 4.2.5

Average Queue N calculated by

N=q(r/2+d) or qr, whichever the greater

r = effective red time q = flow (in same units as r and d)

d = average delay per vehicle

	1	0	1	ng Road (WB)	The Access		The Access Road		Shap Pat Heu	0		0 . ,	Fung Ki Roa	ad (SB) (LT)	U	1 (SB) (STR &
Approach:	(R	T)	(STR	& LT)	Reach	ı (LT)	(STR &	: RT))	(L	T)	(S7	TR)	5		R	.T)
	A.M. Off-Peak	P.M. Off-Peak	A.M. Off-Peak	P.M. Off-Peak	A.M. Off-Peak	P.M. Off-Peak	A.M. Off-Peak	P.M. Off-Peak	A.M. Off-Peak	P.M. Off-Peak	A.M. Off-Peak	P.M. Off-Peak	A.M. Off-Peak	P.M. Off-Peak	A.M. Off-Peak	P.M. Off-Peak
r (sec)	85	82	89	79	124	124	124	124	85	90	85	90	78	68	124	124
N (veh)	6	8	10	10	0	0	1	1	3	4	11	11	6	7	2	4
Average																
Queue length																
(m)	36.0	48.0	42.0	42.0	0.0	0.0	0.0	6.0	18.0	24.0	36.0	36.0	36.0	42.0	6.0	12.0

NCTION DELAY CAI			Job No:	21120HK			CTA Consultants
Junction: (D)Shap Pat Heu escription: 2028 Design Off-		eung Road		-			
-				-			
RL Method (Transpor		-					
	d =(	$(1\lambda)^{2} +$	$\frac{X}{2q(1-X)} -0.$	65 (c) $\frac{1}{3}$ x	(2+5))		
	$\frac{c}{2(1)}$	$\frac{1}{1}$ $\frac{\lambda}{X}$ $\frac{\lambda}{X}$	$\overline{2q(1 - X)}$	$\frac{1}{a^2}$			
				-			
	where of	d = averag	e delay per v	vehicle on th	e particular	arm	
	,	∧= propor	tion of the c	yele which is	s effectively	green for the	e phase under
		consid	eration i.e.f	g/c			
	2					of actual flow	
		maxim 3600a	ium possible /¦És where S	= saturation	flow in veh	tting of signa /hour	als and equals
			time in secon			noui	
			ive green tim		5		
			in vehicles			in seconds	
	-						
	Shap Pat Heu	0	Shap Pat Heu			ig Road (EB)	
Approach:	(ST A.M. Off-Peak	P.M. Off-Peak	(ST A.M. Off-Peak	P.M. Off-Peak	A.M. Off-Peak	RT) P.M. Off-Peak	
q (veh/hr)	892	840	700	716	468	452	
g (sec)	50	50	50	50	30	30	
c (sec)	90	90	90	90	90	90	
s (veh/hr)	2,930	2,930	3,256	3,256	2,620	2,620	
λ	0.56	0.56	0.56	0.56	0.33	0.33	
х	0.55	0.52	0.39	0.40	0.54	0.52	
M=qc	22.30	21.00	17.50	17.90	11.70	11.30	
Delay							
d	13.70	13.31	11.86	11.94	25.58	25.34	
Junction Delay (sec)	10.7	9,9					
From TPDM	Vol4 Table 4.2.	5					
	eue N calculate						
	r qr,whichever	-			where	r = effective re	d time
· · · · · · · · · · · · · · · · · · ·		0					me units as r and d)
						d = average de	
	Shan Dat Hou	ng Road (SP)	Shan Dat Hou	ng Road (NP)	Tai Kai Lan	a Road (ER)	1
Approach	Shap Pat Heur		~	ng Road (NB) FR)		ng Road (EB) RT)	
Approach:	Shap Pat Heur (ST A.M. Off-Peak		~	ng Road (NB) TR) P.M. Off-Peak		ng Road (EB) RT) P.M. Off-Peak	
r (sec)	(ST A.M. Off-Peak 40	TR) P.M. Off-Peak 40	(ST A.M. Off-Peak 40	TR) P.M. Off-Peak 40	(F A.M. Off-Peak 60	RT) P.M. Off-Peak 60	
r (sec) N (veh)	(ST A.M. Off-Peak	TR) P.M. Off-Peak	(ST A.M. Off-Peak	FR) P.M. Off-Peak	(F A.M. Off-Peak	RT) P.M. Off-Peak	
r (sec)	(ST A.M. Off-Peak 40	TR) P.M. Off-Peak 40	(ST A.M. Off-Peak 40	TR) P.M. Off-Peak 40	(F A.M. Off-Peak 60	RT) P.M. Off-Peak 60	

	Junctions 8
	ARCADY 8 - Roundabout Module
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Path: \\PROJSRV\Project\CTA Consultants Limited\CTA - Project\21076HK (wkk) - Town planning application of Ma Tin Pok RCHE\Cal\2022-04-12 Report generation date: 12/4/2022 15:05:33

#### » Shap Pat Heung Interchange - 2021 Existing, AM Off-Peak

- » Shap Pat Heung Interchange 2021 Existing, PM Off-Peak
- » Shap Pat Heung Interchange 2028 Reference, AM Off-Peak
- » Shap Pat Heung Interchange 2028 Reference, PM Off-Peak
- » Shap Pat Heung Interchange 2028 Design, AM Off-Peak
- » Shap Pat Heung Interchange 2028 Design, PM Off-Peak

### Summary of junction performance

15L

	AM	Off-Peak			PM Off-Peak						
	Queue (PCU)	Delay (s)	RFC	LOS	Queue (PCU)	Delay (s)	RFC	LOS			
	S	hap Pat He	ung l	nterc	hange - 2021	Existing					
Arm 1	0.47	2.23	0.32	Α	2.23	4.88	0.69	А			
Arm 2	0.72	2.06	0.42	А	1.40	3.46	0.58	А			
Arm 3	1.63	4.19	0.62	А	1.79	4.64	0.64	А			
	s	hap Pat He	eung	Inter	change - 2028	Design					
Arm 1	2.73	5.74	0.73	Α	3.82	7.39	0.79	А			
Arm 2	1.28	3.37	0.56	А	1.92	4.40	0.66	А			
Arm 3	0.33	2.13	0.25	А	0.32	2.24	0.24	Α			
	Sh	ap Pat Heu	ng In	iterch	ange - 2028 F	Reference					
Arm 1	2.67	5.65	0.73	Α	3.73	7.24	0.79	Α			
Arm 2	1.27	3.35	0.56	А	1.90	4.36	0.66	А			
Arm 3	0.33	2.13	0.25	А	0.32	2.24	0.24	А			

Values shown are the maximum values over all time segments. Delay is the maximum value of average delay per arriving vehicle.

"D1 - 2021 Existing, AM Off-Peak " model duration: 11:00 - 12:00 "D2 - 2021 Existing, PM Off-Peak" model duration: 16:00 - 17:00

- "D3 2028 Reference, AM Off-Peak" model duration: 11:00 12:00
- D4 2028 Reference, PM Off-Peak\* model duration: 16:00 17:00
   \*D5 2028 Design, AM Off-Peak\* model duration: 11:00 12:00
   \*D6 2028 Design, PM Off-Peak\* model duration: 16:00 17:00

Run using Junctions 8.0.5.523 at 12/4/2022 15:05:30



2

#### File summary

(untitled)
11/10/2018
(new file)
ITADMIN

#### **Analysis Options**

Vehicle Length	Do Queue	Calculate Residual	Residual Capacity Criteria	RFC	Average Delay Threshold	Queue Threshold
(m)	Variations	Capacity	Type	Threshold	(s)	(PCU)
5.75			N/A	0.85	36.00	

### Units

1

Distance Units	Speed Units	Traffic Units Input	Traffic Units Results	Flow Units	Average Delay Units	<b>Total Delay Units</b>	Rate Of Delay Units
m	kph	PCU	PCU	perHour	s	-Min	perMin



#### **Demand Set Details**

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
2021 Existing, AM Off-Peak	2021 Existing	AM Off- Peak		FLAT	11:00	12:00	60	15		

# **Junction Network**

### Junctions

Junction	Name	Junction Type	Arm Order	Grade Separated	Large Roundabout	Junction Delay (s)	Junction LOS
Е	Shap Pat Heung Interchange	Roundabout	1,2,3			2.97	А

#### **Junction Network Options**

Driving Side Lighting Left Normal/unknown

# Arms

#### Arms

Arm	Arm	Name	Description
AIIII	AIIII	Naille	Description
1	1	Yuen Long Highway west bound	
<b>2</b> 2		Yuen Long Highway east bound	
<b>3</b> 3		Shap Pat Heung road	

# **Capacity Options**

Arm	Minimum Capacity (PCU/hr)	Maximum Capacity (PCU/hr)		
1	0.00	99999.00		
2	0.00	99999.00		
3	0.00	99999.00		

### **Roundabout Geometry**

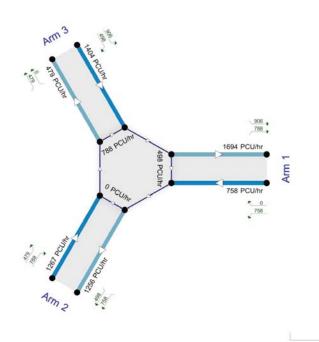
Arm	V - Approach road half- width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
1	7.30	9.70	20.00	26.36	100.00	41.00	
2	7.30	10.50	25.00	40.00	100.00	25.00	
3	7.30	10.20	30.00	30.00	100.00	50.00	

### Slope / Intercept / Capacity

### Roundabout Slope and Intercept used in model

A	rm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/hr)	Final Slope	Final Intercept (PCU/hr)				
	1		(calculated)	(calculated)	0.579	2665.145				
	2		(calculated)	(calculated)	0.643	3020.964				
	3		(calculated)	(calculated)	0.582	2729.917				
7	The slope and intercent shown shows include any corrections and ediustments									

The slope and intercept shown above include any corrections and adjustments



20.00 m

Shwere analysis for Proof Inches (POInt) Time Segment (1105-11:5) Shwere Analysis 64: "A1 - Shap Pat Heurg Interchange ", Demand Set "D1 - 2021 Existing, AM Off-Peak

The junction diagram reflects the last run of ARCADY.

# Shap Pat Heung Interchange - 2021 Existing, AM Off-Peak

#### Data Errors and Warnings

No errors or warnings

12L

#### **Analysis Set Details**

Name	Roundabout Capacity Model	Description	Locked	Network Flow Scaling Factor (%)	<b>Reason For Scaling Factors</b>
Shap Pat Heung Interchange	ARCADY			100.000	

4



# **Traffic Flows**

# **Demand Set Data Options**

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		~	~	HV Percentages	2.00				~	~

# **Entry Flows**

# **General Flows Data**

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
1	FLAT	~	760.00	100.000
2	FLAT	~	1270.00	100.000
3	FLAT	✓	1410.00	100.000

# **Direct/Resultant Flows**

### **Direct Flows Data**

Time Segment	Arm	Direct Demand Entry Flow (PCU/hr)	DirectDemandEntryFlowInPCU (PCU/hr)	Direct Demand Exit Flow (PCU/hr)	Direct Demand Pedestrian Flow (Ped/hr)
11:00-11:15	1	760.00	760.00		
11:00-11:15	2	1270.00	1270.00		
11:00-11:15	3	1410.00	1410.00		
11:15-11:30	1	760.00	760.00		
11:15-11:30	2	1270.00	1270.00		
11:15-11:30	3	1410.00	1410.00		
11:30-11:45	1	760.00	760.00		
11:30-11:45	2	1270.00	1270.00		
11:30-11:45	3	1410.00	1410.00		
11:45-12:00	1	760.00	760.00		
11:45-12:00	2	1270.00	1270.00		
11:45-12:00	3	1410.00	1410.00		

# **Turning Proportions**

### Turning Counts / Proportions (PCU/hr) - Junction E (for whole period)

		То						
		1	2	3				
From	1	0.000	760.000	0.000				
FIOIII	2	790.000	0.000	480.000				
	3	910.000	500.000	0.000				



	То					
		1	2	3		
From	1	0.00	1.00	0.00		
1 10111	2	0.62	0.00	0.38		
	3	0.65	0.35	0.00		

12L

# **Vehicle Mix**

### Average PCU Per Vehicle - Junction E (for whole period)

		То				
		1	2	3		
From	1	1.000	1.000	1.000		
	2	1.000	1.000	1.000		
	3	1.000	1.000	1.000		

### Heavy Vehicle Percentages - Junction E (for whole period)

		То					
From		1	2	3			
	1	0.0	0.0	0.0			
	2	0.0	0.0	0.0			
	3	0.0	0.0	0.0			

# Results

### Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	
1	0.32	2.23	0.47	А	
2	0.42	2.06	0.72	А	
3	0.62	4.19	1.63	Α	

### Main Results for each time segment

#### Main results: (11:00-11:15)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	760.00	758.13	497.70	0.00	2376.95	0.320	0.47	2.222	Α
2	1270.00	1267.11	0.00	0.00	3020.96	0.420	0.72	2.049	Α
3	1410.00	1403.53	788.20	0.00	2270.84	0.621	1.62	4.121	А



#### Main results: (11:15-11:30)

Arm	Total Demand (PCU/hr)	(PCU/hr) (PCU/hr) (PCU/hr)		Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	760.00	760.00	499.98	0.00	2375.63	0.320	0.47	2.227	Α
2	1270.00	1269.99	0.00	0.00	3020.96	0.420	0.72	2.055	Α
3	1410.00	1409.96	790.00	0.00	2269.79	0.621	1.63	4.186	Α

#### Main results: (11:30-11:45)

An	n Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	760.00	760.00	499.99	0.00	2375.62	0.320	0.47	2.227	А
2	1270.00	1270.00	0.00	0.00	3020.96	0.420	0.72	2.055	Α
3		1409.99	790.00	0.00	2269.79	0.621	1.63	4.186	Α

#### Main results: (11:45-12:00)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	760.00	760.00	500.00	0.00	2375.62	0.320	0.47	2.227	Α
2	1270.00	1270.00	0.00	0.00	3020.96	0.420	0.72	2.055	А
3	1410.00	1409.99	790.00	0.00	2269.79	0.621	1.63	4.186	Α

# Shap Pat Heung Interchange - 2021 Existing, PM Off-Peak

#### Data Errors and Warnings

No errors or warnings

### Analysis Set Details

Name	Roundabout Capacity Model	Description	Locked	Network Flow Scaling Factor (%)	<b>Reason For Scaling Factors</b>
Shap Pat Heung Interchange	ARCADY			100.000	

#### **Demand Set Details**

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
2021 Existing, PM Off-Peak	2021 Existing	PM Off- Peak		FLAT	16:00	17:00	60	15		

# **Junction Network**

### Junctions

Junction	Name	Junction Type	Arm Order	Grade Separated	Large Roundabout	Junction Delay (s)	Junction LOS
Е	Shap Pat Heung Interchange	Roundabout	1,2,3			4.35	А

# **Junction Network Options**

Driving Side	Lighting
Left	Normal/unknown



# Arms

### Arms

Arm	Arm	Name	Description
1	1 1 Yuen Long Highway west bound		
2	2	Yuen Long Highway east bound	
3	3	Shap Pat Heung road	

# **Capacity Options**

A	rm	Minimum Capacity (PCU/hr)	Maximum Capacity (PCU/hr)
	1	0.00	99999.00
	2	0.00	99999.00
;	3	0.00	99999.00

#### **Roundabout Geometry**

ſ	Arm	V - Approach road half- width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
	1	7.30	9.70	20.00	26.36	100.00	41.00	
ſ	2	7.30	10.50	25.00	40.00	100.00	25.00	
ſ	3	7.30	10.20	30.00	30.00	100.00	50.00	

### Slope / Intercept / Capacity

#### Roundabout Slope and Intercept used in model

Arm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/hr)	Final Slope	Final Intercept (PCU/hr)
1		(calculated)	(calculated)	0.579	2665.145
2		(calculated)	(calculated)	0.643	3020.964
3		(calculated)	(calculated)	0.582	2729.917

The slope and intercept shown above include any corrections and adjustments.

# **Traffic Flows**

### **Demand Set Data Options**

Default Vehicle Mix	Vehicle Mix Varies Over Time	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		~	~	HV Percentages	2.00				~	~

# **Entry Flows**

#### General Flows Data

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)	
1	FLAT	✓	1655.00	100.000	
2	FLAT	~	1460.00	100.000	
3	FLAT	~	1390.00	100.000	



# **Direct/Resultant Flows**

### **Direct Flows Data**

Time Segment	Arm	Direct Demand Entry Flow (PCU/hr)	DirectDemandEntryFlowInPCU (PCU/hr)	Direct Demand Exit Flow (PCU/hr)	Direct Demand Pedestrian Flow (Ped/hr)
16:00-16:15	1	1655.00	1655.00		
16:00-16:15	2	1460.00	1460.00		
16:00-16:15	3	1390.00	1390.00		
16:15-16:30	1	1655.00	1655.00		
16:15-16:30	2	1460.00	1460.00		
16:15-16:30	3	1390.00	1390.00		
16:30-16:45	1	1655.00	1655.00		
16:30-16:45	2	1460.00	1460.00		
16:30-16:45	3	1390.00	1390.00		
16:45-17:00	1	1655.00	1655.00		
16:45-17:00	2	1460.00	1460.00	ĺ	
16:45-17:00	3	1390.00	1390.00		

# **Turning Proportions**

#### Turning Counts / Proportions (PCU/hr) - Junction E (for whole period)

		То				
		1	2	3		
From	1	0.000	845.000	810.000		
FIOIII	2	970.000	0.000	490.000		
	3	920.000	470.000	0.000		

### Turning Proportions (PCU) - Junction E (for whole period)

		То			
		1	2	3	
From	1	0.00	0.51	0.49	
110111	2	0.66	0.00	0.34	
	3	0.66	0.34	0.00	

# **Vehicle Mix**

#### Average PCU Per Vehicle - Junction E (for whole period)

		То			
From		1	2	3	
	1	1.000	1.000	1.000	
110111	2	1.000	1.000	1.000	
	3	1.000	1.000	1.000	



#### Heavy Vehicle Percentages - Junction E (for whole period)

	То			
From		1	2	3
	1	0.0	0.0	0.0
110111	2	0.0	0.0	0.0
	3	0.0	0.0	0.0

# Results

### Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
1	0.69	4.88	2.23	А
2	0.58	3.46	1.40	А
3	0.64	4.64	1.79	А

### Main Results for each time segment

#### Main results: (16:00-16:15)

Arm	(PCU/hr) (PCU/hr) (PCU/hr)		Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS	
1	1655.00	1646.20	467.61	0.00	2394.37	0.691	2.20	4.758	Α
2	1460.00	1454.45	805.69	0.00	2502.69	0.583	1.39	3.416	Α
3	1390.00	1382.95	966.31	0.00	2167.10	0.641	1.76	4.550	Α

#### Main results: (16:15-16:30)

Ar	m	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	1	1655.00	1654.91	469.98	0.00	2393.00	0.692	2.22	4.875	Α
2	2	1460.00	1459.96	809.96	0.00	2499.95	0.584	1.40	3.460	Α
3	3	1390.00	1389.94	969.98	0.00	2164.96	0.642	1.78	4.644	А

### Main results: (16:30-16:45)

An	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	1655.00	1654.97	469.99	0.00	2393.00	0.692	2.23	4.877	Α
2	1460.00	1459.99	809.99	0.00	2499.93	0.584	1.40	3.460	А
3	1390.00	1389.98	969.99	0.00	2164.95	0.642	1.78	4.645	А

#### Main results: (16:45-17:00)

4	Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
	1	1655.00	1654.99	470.00	0.00	2392.99	0.692	2.23	4.877	Α
	2	1460.00	1460.00	809.99	0.00	2499.93	0.584	1.40	3.460	Α
	3	1390.00	1389.99	970.00	0.00	2164.95	0.642	1.79	4.645	Α

# Shap Pat Heung Interchange - 2028 Reference, AM Off-Peak

### **Data Errors and Warnings**

No errors or warnings

### Analysis Set Details

Name	Roundabout Capacity Model	Description	Locked	Network Flow Scaling Factor (%)	<b>Reason For Scaling Factors</b>
Shap Pat Heung Interchange	ARCADY			100.000	

#### **Demand Set Details**

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Locked
2028 Reference, AM Off-Peak	2028 Reference	AM Off- Peak		FLAT	11:00	12:00	60	15	

# **Junction Network**

#### Junctions

Junction	Name	Junction Type	Arm Order	Grade Separated	Large Roundabout	Junction Delay (s)	Junction LOS
E	Shap Pat Heung Interchange	Roundabout	1,2,3			4.25	А

# **Junction Network Options**

 Driving Side
 Lighting

 Left
 Normal/unknown

# Arms

### Arms

Arm	Arm	Name	Description
1	1	Yuen Long Highway west bound	
2	2	Yuen Long Highway east bound	
3	3	Shap Pat Heung road	

#### **Capacity Options**

Arm	Minimum Capacity (PCU/hr)	Maximum Capacity (PCU/hr)
1	0.00	99999.00
2	0.00	99999.00
3	0.00	99999.00

### **Roundabout Geometry**

Arm	V - Approach road half- width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
1	7.30	9.70	20.00	26.36	100.00	41.00	
2	7.30	10.50	25.00	40.00	100.00	25.00	
3	7.30	10.20	30.00	30.00	100.00	50.00	



# Slope / Intercept / Capacity

#### Roundabout Slope and Intercept used in model

Arm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/hr)	Final Slope	Final Intercept (PCU/hr)
1		(calculated)	(calculated)	0.579	2665.145
2		(calculated)	(calculated)	0.643	3020.964
3		(calculated)	(calculated)	0.582	2729.917

The slope and intercept shown above include any corrections and adjustments.

# **Traffic Flows**

### **Demand Set Data Options**

Default Vehicle Mix	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
	~	~	HV Percentages	2.00				~	~

# **Entry Flows**

### **General Flows Data**

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)	
1	FLAT ✓		1710.00	100.000	
2	FLAT 🗸		1370.00	100.000	
3	FLAT	~	550.00	100.000	

# **Direct/Resultant Flows**

### **Direct Flows Data**

Time Segment	Arm	Direct Demand Entry Flow (PCU/hr)	DirectDemandEntryFlowInPCU (PCU/hr)	Direct Demand Exit Flow (PCU/hr)	Direct Demand Pedestrian Flow (Ped/hr)
11:00-11:15	1	1710.00	1710.00		
11:00-11:15			1370.00		
11:00-11:15	<b>1:00-11:15 3</b> 550.00		550.00		
11:15-11:30	<b>30 1</b> 1710.00		1710.00		
11:15-11:30	1:15-11:30 2 1370.00		1370.00		
11:15-11:30	3	550.00	550.00		
11:30-11:45	1	1710.00	1710.00		
11:30-11:45			1370.00		
11:30-11:45			550.00		
11:45-12:00	1	1710.00	1710.00		
11:45-12:00	<b>11:45-12:00 2</b> 1370.00		1370.00		
11:45-12:00	3	550.00	550.00		

# **Turning Proportions**

#### Turning Counts / Proportions (PCU/hr) - Junction E (for whole period)

			То	
		1	2	3
From	1	0.000	815.000	895.000
110111	2	845.000	0.000	525.000
	3	0.000	550.000	0.000

#### Turning Proportions (PCU) - Junction E (for whole period)

		То					
		1	2	3			
From	1	0.00	0.48	0.52			
FIOIII	2	0.62	0.00	0.38			
	3	0.00	1.00	0.00			

# **Vehicle Mix**

#### Average PCU Per Vehicle - Junction E (for whole period)

			То	
		1	2	3
From	1	1.000	1.000	1.000
FIOIII	2	1.000	1.000	1.000
	3	1.000	1.000	1.000

#### Heavy Vehicle Percentages - Junction E (for whole period)



# **Results**

### Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
1	0.73	5.65	2.67	А
2	0.56	3.35	1.27	А
3	0.25	2.13	0.33	Α



### Main Results for each time segment

#### Main results: (11:00-11:15)

Arm 1		Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
Γ	1	1710.00	1699.51	548.70	0.00	2347.42	0.728	2.62	5.472	Α
	2	1370.00	1364.96	889.51	0.00	2448.78	0.559	1.26	3.307	Α
Г	3	550.00	548.70	841.89	0.00	2239.57	0.246	0.32	2.128	Α

#### Main results: (11:15-11:30)

	Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
	1	1710.00	1709.87	550.00	0.00	2346.67	0.729	2.65	5.651	Α
ſ	2	1370.00	1369.97	894.93	0.00	2445.29	0.560	1.27	3.347	Α
	3	550.00	550.00	844.98	0.00	2237.77	0.246	0.33	2.132	Α

#### Main results: (11:30-11:45)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	1710.00	1709.96	550.00	0.00	2346.67	0.729	2.67	5.653	Α
2	1370.00	1369.99	894.98	0.00	2445.26	0.560	1.27	3.347	Α
3	550.00	550.00	844.99	0.00	2237.76	0.246	0.33	2.132	Α

#### Main results: (11:45-12:00)

Am	m (PCU/hr) (PCU/hr) (PCU/hr)		Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS	
1	1710.00	1709.98	550.00	0.00	2346.67	0.729	2.67	5.653	Α
2	1370.00	1370.00	894.99 0.00	0.00	2445.25	0.560	1.27	3.347	Α
3	550.00	550.00	845.00	0.00	2237.76	0.246	0.33	2.132	Α

# Shap Pat Heung Interchange - 2028 Reference, PM Off-Peak

#### Data Errors and Warnings

No errors or warnings

# Analysis Set Details

Name	Roundabout Capacity Model	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
Shap Pat Heung Interchange	ARCADY			100.000	

### **Demand Set Details**

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
2028 Reference, PM Off-Peak	2028 Reference	PM Off- Peak		FLAT	16:00	17:00	60	15		



# **Junction Network**

### Junctions

Junction	Name	Junction Type	Arm Order	Grade Separated	Large Roundabout	Junction Delay (s)	Junction LOS
E	Shap Pat Heung Interchange	Roundabout	1,2,3			5.44	А

# Junction Network Options

 Driving Side
 Lighting

 Left
 Normal/unknown

# Arms

#### Arms

Arm	Arm	Name	Description
1	1	Yuen Long Highway west bound	
2	2 2 Yuen Long Highway east bound		
3	3	Shap Pat Heung road	

# **Capacity Options**

Arm	Minimum Capacity (PCU/hr)	Maximum Capacity (PCU/hr)
1	0.00	99999.00
2	0.00	99999.00
3	0.00	99999.00

# **Roundabout Geometry**

An	N V - Approach road half- width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
1	7.30	9.70	20.00	26.36	100.00	41.00	
2	7.30	10.50	25.00	40.00	100.00	25.00	
3	7.30	10.20	30.00	30.00	100.00	50.00	

### Slope / Intercept / Capacity

#### Roundabout Slope and Intercept used in model

Arm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/hr)	Final Slope	Final Intercept (PCU/hr)
1		(calculated)	(calculated)	0.579	2665.145
2		(calculated)	(calculated)	0.643	3020.964
3		(calculated)	(calculated)	0.582	2729.917

The slope and intercept shown above include any corrections and adjustments.

# **Traffic Flows**

### Demand Set Data Options

Default Vehicle Mix	Vehicle Mix Varies Over Time		Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		~	~	HV Percentages	2.00				~	~

# **Entry Flows**

### **General Flows Data**

Am	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
1	FLAT	~	1870.00	100.000
2	FLAT	~	1575.00	100.000
3	FLAT	✓	515.00	100.000

# **Direct/Resultant Flows**

#### **Direct Flows Data**

Time Segment	Arm	Direct Demand Entry Flow (PCU/hr)	DirectDemandEntryFlowInPCU (PCU/hr)	Direct Demand Exit Flow (PCU/hr)	Direct Demand Pedestrian Flow (Ped/hr)
16:00-16:15	1	1870.00	1870.00		
16:00-16:15	2	1575.00	1575.00		
16:00-16:15	3	515.00	515.00		
16:15-16:30	1	1870.00	1870.00		
16:15-16:30	2	1575.00	1575.00		
16:15-16:30	3	515.00	515.00		
16:30-16:45	1	1870.00	1870.00		
16:30-16:45	2	1575.00	1575.00		
16:30-16:45	3	515.00	515.00		
16:45-17:00	1	1870.00	1870.00		
16:45-17:00	2	1575.00	1575.00		
16:45-17:00	3	515.00	515.00		

# **Turning Proportions**

#### Turning Counts / Proportions (PCU/hr) - Junction E (for whole period)

		То					
	1		2	3			
From	1	0.000	905.000	965.000			
FIOIII	2	1040.000	0.000	535.000			
	3	0.000	515.000	0.000			

Turning Proportions (PCU) - Junction E (for whole period)

		То				
		1	2	3		
From	1	0.00	0.48	0.52		
11011	2	0.66	0.00	0.34		
	3	0.00	1.00	0.00		



# **Vehicle Mix**

#### Average PCU Per Vehicle - Junction E (for whole period)

		То					
		1	2	3			
From	1	1.000	1.000	1.000			
110111	2	1.000	1.000	1.000			
	3	1.000	1.000	1.000			

#### Heavy Vehicle Percentages - Junction E (for whole period)



# **Results**

# Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
1	0.79	7.24	3.73	А
2	0.66	4.36	1.90	Α
3	0.24	2.24	0.32	А

#### Main Results for each time segment

#### Main results: (16:00-16:15)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	1870.00	1855.51	513.73	0.00	2367.67	0.790	3.62	6.848	Α
2	1575.00	1567.51	957.52	0.00	2405.03	0.655	1.87	4.262	А
3	515.00	513.73	1035.06	0.00	2127.06	0.242	0.32	2.228	Α

#### Main results: (16:15-16:30)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	1870.00	1869.72	515.00	0.00	2366.94	0.790	3.69	7.229	А
2	1575.00	1574.92	964.86	0.00	2400.31	0.656	1.89	4.361	Α
3	515.00	515.00	1039.94	0.00	2124.21	0.242	0.32	2.236	Α

#### Main results: (16:30-16:45)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	1870.00	1869.91	515.00	0.00	2366.94	0.790	3.72	7.237	А
2	1575.00	1574.98	964.95	0.00	2400.25	0.656	1.90	4.361	Α
3	515.00	515.00	1039.98	0.00	2124.19	0.242	0.32	2.236	А



-	-	1		
		4	-	
-	/			

#### Main results: (16:45-17:00)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	1870.00	1869.95	515.00	0.00	2366.93	0.790	3.73	7.240	Α
2	1575.00	1574.99	964.98	0.00	2400.23	0.656	1.90	4.362	Α
3	515.00	515.00	1039.99	0.00	2124.18	0.242	0.32	2.236	Α

# Shap Pat Heung Interchange - 2028 Design, AM Off-Peak

### **Data Errors and Warnings**

No errors or warnings

#### **Analysis Set Details**

Name	Roundabout Capacity Model	Description	Locked	Network Flow Scaling Factor (%)	<b>Reason For Scaling Factors</b>
Shap Pat Heung Interchange	ARCADY			100.000	

# **Demand Set Details**

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
 2028 Design, AM Off-Peak	2028 Design	AM Off- Peak		FLAT	11:00	12:00	60	15		

# **Junction Network**

### Junctions

Junction	Name	Junction Type	Arm Order	Grade Separated	Large Roundabout	Junction Delay (s)	Junction LOS
E	Shap Pat Heung Interchange	Roundabout	1,2,3			4.30	А

### **Junction Network Options**

Driving Side	Lighting
Left	Normal/unknown

# Arms

### Arms

Arm	Arm	Name	Description
1	1	Yuen Long Highway west bound	
2	2	Yuen Long Highway east bound	
3	3	Shap Pat Heung road	

### **Capacity Options**

Arm	Minimum Capacity (PCU/hr)	Maximum Capacity (PCU/hr)
1	0.00	99999.00
2	0.00	99999.00
3	0.00	99999.00



# **Roundabout Geometry**

A	vm	V - Approach road half- width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
	1	7.30	9.70	20.00	26.36	100.00	41.00	
	2	7.30	10.50	25.00	40.00	100.00	25.00	
	3	7.30	10.20	30.00	30.00	100.00	50.00	

#### Slope / Intercept / Capacity

#### Roundabout Slope and Intercept used in model

Arm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/hr)	Final Slope	Final Intercept (PCU/hr)
1		(calculated)	(calculated)	0.579	2665.145
2		(calculated)	(calculated)	0.643	3020.964
3		(calculated)	(calculated)	0.582	2729.917

The slope and intercept shown above include any corrections and adjustments.

# **Traffic Flows**

### **Demand Set Data Options**

Default Vehicle Mix	Vehicle Mix Varies Over Time		Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
		~	~	HV Percentages	2.00				~	~

# **Entry Flows**

### **General Flows Data**

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
1	FLAT	~	1720.00	100.000
2	FLAT	~	1370.00	100.000
3	FLAT	✓	550.00	100.000

# **Direct/Resultant Flows**

### **Direct Flows Data**

Time Segment	Arm	Direct Demand Entry Flow (PCU/hr)	DirectDemandEntryFlowInPCU (PCU/hr)	Direct Demand Exit Flow (PCU/hr)	Direct Demand Pedestrian Flow (Ped/hr)
11:00-11:15	1	1720.00	1720.00		
11:00-11:15	2	1370.00	1370.00		
11:00-11:15	3	550.00	550.00		
11:15-11:30	1	1720.00	1720.00		
11:15-11:30	2	1370.00	1370.00		
11:15-11:30	3	550.00	550.00		
11:30-11:45	1	1720.00	1720.00		
11:30-11:45	2	1370.00	1370.00		
11:30-11:45	3	550.00	550.00		
11:45-12:00	1	1720.00	1720.00		
11:45-12:00	2	1370.00	1370.00		
11:45-12:00	3	550.00	550.00		

# **Turning Proportions**

#### Turning Counts / Proportions (PCU/hr) - Junction E (for whole period)

		То						
		1	2	3				
From	1	0.000	815.000	905.000				
From	2	845.000	0.000	525.000				
	3	0.000	550.000	0.000				

Turning Proportions (PCU) - Junction E (for whole period)

		То				
		1	2	3		
From	1	0.00	0.47	0.53		
	2	0.62	0.00	0.38		
	3	0.00	1.00	0.00		

# **Vehicle Mix**

#### Average PCU Per Vehicle - Junction E (for whole period)

		1	2	3
From	1	1.000	1.000	1.000
110111	2	1.000	1.000	1.000
	3	1.000	1.000	1.000

#### Heavy Vehicle Percentages - Junction E (for whole period)

	То					
		1	2	3		
From	1	0.0	0.0	0.0		
110111	2	0.0	0.0	0.0		
	3	0.0	0.0	0.0		

# **Results**

### Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
1	0.73	5.74	2.73	А
2	0.56	3.37	1.28	А
3	0.25	2.13	0.33	А

Main Res	ults for	each	time	segment
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#### Main results: (11:00-11:15)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	1720.00	1709.29	548.70	0.00	2347.42	0.733	2.68	5.553	А
2	1370.00	1364.93	899.36	0.00	2442.44	0.561	1.27	3.327	Α
3	550.00	548.70	841.87	0.00	2239.58	0.246	0.32	2.128	Α

#### Main results: (11:15-11:30)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	1720.00	1719.87	550.00	0.00	2346.67	0.733	2.71	5.739	А
2	1370.00	1369.97	904.93	0.00	2438.86	0.562	1.28	3.367	А
3	550.00	550.00	844.98	0.00	2237.77	0.246	0.33	2.132	Α

#### Main results: (11:30-11:45)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	1720.00	1719.96	550.00	0.00	2346.67	0.733	2.72	5.741	Α
2	1370.00	1369.99	904.98	0.00	2438.83	0.562	1.28	3.367	А
3	550.00	550.00	844.99	0.00	2237.76	0.246	0.33	2.132	Α

#### Main results: (11:45-12:00)

Arn	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	1720.00	1719.98	550.00	0.00	2346.67	0.733	2.73	5.744	Α
2	1370.00	1370.00	904.99	0.00	2438.82	0.562	1.28	3.367	Α
3	550.00	550.00	845.00	0.00	2237.76	0.246	0.33	2.132	Α

# Shap Pat Heung Interchange - 2028 Design, PM Off-Peak

#### **Data Errors and Warnings**

No errors or warnings

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### **Analysis Set Details**

Name	Roundabout Capacity Model	Description	Locked	Network Flow Scaling Factor (%)	Reason For Scaling Factors
Shap Pat Heung Interchange	ARCADY			100.000	

#### **Demand Set Details**

Name	Scenario Name	Time Period Name	Description	Traffic Profile Type	Model Start Time (HH:mm)	Model Finish Time (HH:mm)	Model Time Period Length (min)	Time Segment Length (min)	Single Time Segment Only	Locked
2028 Design, PM Off-Peak	2028 Design	PM Off- Peak		FLAT	16:00	17:00	60	15		

# **Junction Network**

#### Junctions

Γ	Junction	Name	Junction Type	Arm Order	Grade Separated	Large Roundabout	Junction Delay (s)	Junction LOS
Γ	Е	Shap Pat Heung Interchange	Roundabout	1,2,3			5.53	А

# **Junction Network Options**

Driving Side	Lighting
Left	Normal/unknown

# Arms

#### Arms

Arm	Arm	Name	Description
1	1	Yuen Long Highway west bound	
2	2	Yuen Long Highway east bound	
3	3	Shap Pat Heung road	

### **Capacity Options**

Arm	Minimum Capacity (PCU/hr)	Maximum Capacity (PCU/hr)
1	0.00	99999.00
2	0.00	99999.00
3	0.00	99999.00

### **Roundabout Geometry**

4	4rm	V - Approach road half- width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit Only
	1	7.30	9.70	20.00	26.36	100.00	41.00	
	2	7.30	10.50	25.00	40.00	100.00	25.00	
	3	7.30	10.20	30.00	30.00	100.00	50.00	

### Slope / Intercept / Capacity

#### Roundabout Slope and Intercept used in model

Arm	Enter slope and intercept directly	Entered slope	Entered intercept (PCU/hr)	Final Slope	Final Intercept (PCU/hr)
1		(calculated)	(calculated)	0.579	2665.145
2		(calculated)	(calculated)	0.643	3020.964
3		(calculated)	(calculated)	0.582	2729.917

The slope and intercept shown above include any corrections and adjustments.

# **Traffic Flows**

### **Demand Set Data Options**

Default Vehicle Mix	Vehicle Mix Varies Over Turn	Vehicle Mix Varies Over Entry	Vehicle Mix Source	PCU Factor for a HV (PCU)	Default Turning Proportions	Estimate from entry/exit counts	Turning Proportions Vary Over Time	Turning Proportions Vary Over Turn	Turning Proportions Vary Over Entry
	~	~	HV Percentages	2.00				~	~

# **Entry Flows**

### **General Flows Data**

Arm	Profile Type	Use Turning Counts	Average Demand Flow (PCU/hr)	Flow Scaling Factor (%)
1	FLAT	~	1880.00	100.000
2	FLAT	~	1575.00	100.000
3	FLAT	~	515.00	100.000

# **Direct/Resultant Flows**

#### **Direct Flows Data**

Time Segment	Arm	Direct Demand Entry Flow (PCU/hr)	DirectDemandEntryFlowInPCU (PCU/hr)	Direct Demand Exit Flow (PCU/hr)	Direct Demand Pedestrian Flow (Ped/hr)
16:00-16:15	1	1880.00	1880.00		
16:00-16:15	2	1575.00	1575.00		
16:00-16:15	3	515.00	515.00		
16:15-16:30	1	1880.00	1880.00		
16:15-16:30	2	1575.00	1575.00		
16:15-16:30	3	515.00	515.00		
16:30-16:45	1	1880.00	1880.00		
16:30-16:45	2	1575.00	1575.00		
16:30-16:45	3	515.00	515.00		
16:45-17:00	1	1880.00	1880.00		
16:45-17:00 2 1575.00		1575.00	1575.00		
16:45-17:00	3	515.00	515.00		

# **Turning Proportions**

### Turning Counts / Proportions (PCU/hr) - Junction E (for whole period)

			То	
		1	2	3
From	1	0.000	905.000	975.000
110111	2	1040.000	0.000	535.000
	3	0.000	515.000	0.000

#### Turning Proportions (PCU) - Junction E (for whole period)

		То							
		1	2	3					
From	1	0.00	0.48	0.52					
FIOIII	2	0.66	0.00	0.34					
	3	0.00	1.00	0.00					

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# **Vehicle Mix**

#### Average PCU Per Vehicle - Junction E (for whole period)

	То				
		1	2	3	
From	1	1.000	1.000	1.000	
FIOIII	2	1.000	1.000	1.000	
	3	1.000	1.000	1.000	

#### Heavy Vehicle Percentages - Junction E (for whole period)

То				
		1	2	3
From	1	0.0	0.0	0.0
FIOIII	2	0.0	0.0	0.0
	3	0.0	0.0	0.0

# Results

### Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	
1	0.79	7.39	3.82	А	
2	0.66	4.40	1.92	А	
3	0.24	2.24	0.32	А	

# Main Results for each time segment

### Main results: (16:00-16:15)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	1880.00	1865.15	513.73	0.00	2367.67	0.794	3.71	6.971	Α
2	1575.00	1567.46	967.30	0.00	2398.74	0.657	1.89	4.293	Α
3	515.00	513.73	1035.02	0.00	2127.08	0.242	0.32	2.228	А

# Main results: (16:15-16:30)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	1880.00	1879.71	515.00	0.00	2366.94	0.794	3.79	7.377	Α
2	1575.00	1574.91	974.85	0.00	2393.88	0.658	1.91	4.395	Α
3	515.00	515.00	1039.94	0.00	2124.21	0.242	0.32	2.236	Α

### Main results: (16:30-16:45)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	1880.00	1879.90	515.00	0.00	2366.94	0.794	3.81	7.386	А
2	1575.00	1574.98	974.95	0.00	2393.82	0.658	1.91	4.396	Α
3	515.00	515.00	1039.98	0.00	2124.19	0.242	0.32	2.236	Α

### Main results: (16:45-17:00)

Arm	Total Demand (PCU/hr)	Entry Flow (PCU/hr)	Circulating Flow (PCU/hr)	Pedestrian Demand (Ped/hr)	Capacity (PCU/hr)	RFC	End Queue (PCU)	Delay (s)	LOS
1	1880.00	1879.95	515.00	0.00	2366.93	0.794	3.82	7.389	Α
2	1575.00	1574.99	974.97	0.00	2393.80	0.658	1.92	4.396	А
3	515.00	515.00	1039.99	0.00	2124.18	0.242	0.32	2.236	А