Appendix VI

Traffic Junction Assessment

Residential Redevelopment at 8 Ka Shue Road, Sai Kung, Tseung Kwan O, New Territories, Hong Kong

Junction Assessment Report

December 2024

Ho Wang SPB Limited
香港上環蘇杭街41 - 47號蘇杭商業大廈5樓
5 Floor, So Hong Commercial Building,
41 - 47 Jervois Street, Sheung Wan, Hong Kong
Tel : (852) 2865 0090 Fax : (852) 2866 4332
E-mail : info@howangspb.com
Website : www.howangspb.com

HWSPB 何黃
Traffic & Transportation Consultants

Residential Redevelopment at 8 Ka Shue Road, Sai Kung, Tseung Kwan O, New Territories, Hong Kong

Junction Assessment Report

December 2024

CONTENTS

TABLES

FIGURE

APPENDIX

1. INTRODUCTION

1.1 Background

1.1.1 The application site is located at Lot 1109 R.P. (part) in D.D. 253, 8 Ka Shue Road, Sai Kung as shown in **Figure 1.1**.

1.1.2 The application site is currently occupied by a residential building with 8-units (namely Block G and Block H) of Clear Water Bay Apartments. In 2018, a Traffic Impact Assessment (TIA) study was carried out to support a Section 16 planning application (No. A/SK-TLS/56) ("previous approved application") for 14 residential flats. That application was approved with conditions by the Town Planning Board (TPB) on 13 December 2019.

1.1.3 A fresh Section 16 planning application for proposed minor relaxation of site coverage and building height restrictions for 14 residential units. There is no increase in GFA/No. of flats compared to those in the previously approved application.

1.1.4 In September 2024, a junction assessment is being conducted to support this application. Ho Wang SPB Limited is commissioned by Brilliant Genius Limited (the Applicant) as the traffic consultant to undertake this Junction Assessment.

1.1.5 This report focuses on the presentation and elaboration of the followings:-

- present the peak hour traffic survey result at 07:30-19:30 and 17:00-19:00 on a typical weekday;
- forecast the future traffic flows;
- presents the vehicular traffic generation/attraction of the proposed development; and
- assess the traffic impact due to the development.

1.2 Structure of this Traffic Impact Assessment Report

1.2.1 Following this introductory chapter, this report comprises of the following chapters:

Chapter 2 – Existing Traffic Condition
Chapter 3 – Future Traffic Condition
Chapter 4 – Traffic Impact Assessment
Chapter 5 – Summary and Conclusion

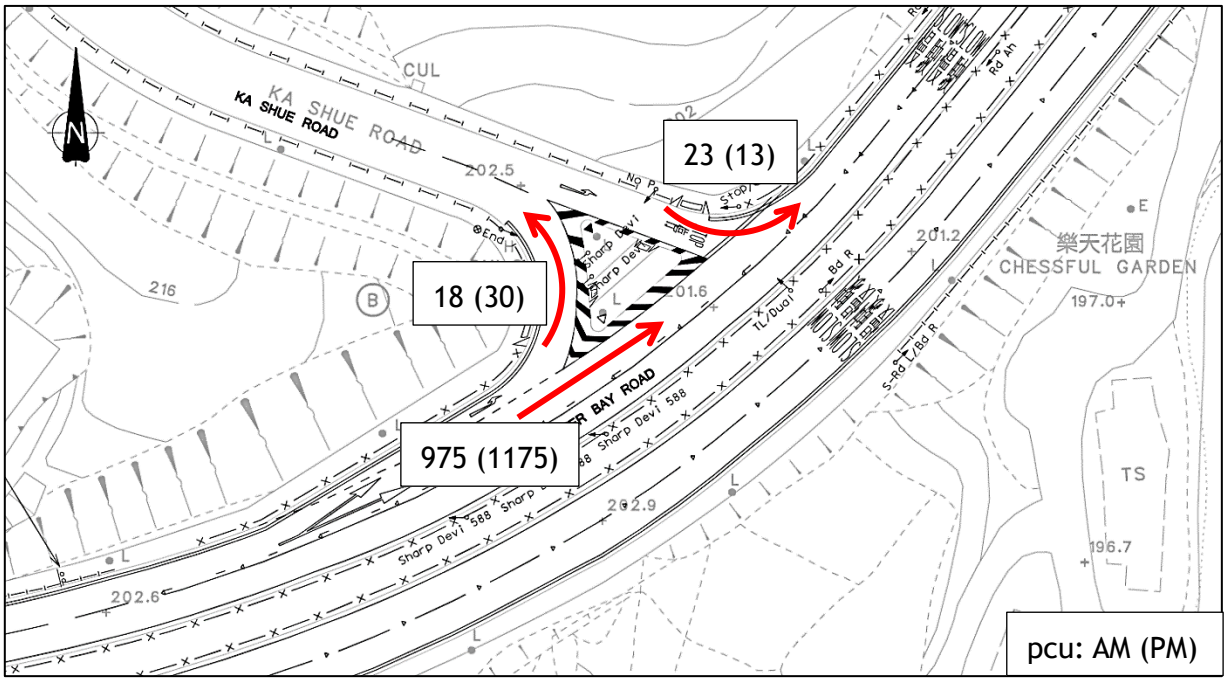
2. EXISTING TRAFFIC CONDITION

2.1 Traffic Count Survey

2.1.1 A traffic survey was undertaken at the junction of Clear Water Bay Road / Ka Shue Road on a typical day during the AM and PM peak hours (07:30-19:30 and 17:00-19:00) in September 2024 (with fine weather condition) to collect the most up-to-date traffic data at this junction for the traffic analysis.

2.2 2024 Observed Traffic Flows

2.2.1 The surveyed traffic data have indicated that the AM peak hour and PM peak hour are from 08:15 to 09:15 and 18:00 to 19:00 respectively. The 2024 surveyed traffic flows for AM and PM peak hours at the junction of Clear Water Bay Road / Ka Shue Road are presented below.



2.3 2024 Existing Junction Capacity Assessment

2.3.1 The junction capacity analysis for the concerned junction during the critical AM and PM peak periods in 2024 has been assessed and the results of the junction capacity analysis are summarized in **Table 2.1**.

Table 2.1 2024 Existing Junction Performance

Junction Location	Junction Type	AM Peak	PM Peak
Clear Water Bay Road / Ka Shue Road	Priority (DFC)	0.04	0.03

2.3.2 The results of the junction performance have concluded that the concerned junction is operating with adequate junction capacity during the AM and PM peak periods under the existing traffic condition.

3. FUTURE TRAFFIC CONDITION

3.1 Design Year for Traffic Impact Assessment

3.1.1 The tentative completion year of the redevelopment will be 2028. Hence, the design year 2031 is adopted for traffic assessment [i.e. 3 years upon redevelopment].

3.2 Forecast Methodology for Future Traffic Condition

3.2.1 Traffic Forecast can be developed by means of the following data:

- Historical traffic flow growth factor derived from Annual Traffic Census data
- 2019-based Territorial Population and Employment Data Matrix (TPEDM) extracted from publicly available planning data

3.2.2 These approaches are considered valid under the condition of no major highway infrastructure planned within close vicinity of the application site during the forecasting horizon of 2026. According to the latest highway infrastructure assumption, there are no highway improvements that are likely to affect the validity of using trend growth approach for traffic forecasting.

Historical trend growth trend from the Annual Traffic Census (ATC)

3.2.3 The relevant Annual Average Daily Traffic (AADT) data from 2017 to 2022 in the vicinity of the Site are summarized in **Table 3.1**.

Table 3.1 AADT at Counting Stations in the Vicinity of the Site [Extracted from ATC (2017 to 2022)]

Stn No.	Road	Between		2017	2018	2019	2020	2021	2022
5017	Clear Water Bay Road	On Sau Rd	Hiram's Highway	26,910	28,450	28,980	28,900	29,100	27,720
Average Growth Rate (% p. a.)					5.72%	1.86%	-0.28%	0.69%	-4.74%
Overall Growth Rate (% p.a.) from 2017 to 2022				**+0.59%**					
Overall Growth Rate (% p.a.) from 2017 to 2021				**+1.98%**					

3.2.4 After reviewing the ATC from 2017-2022, there is an overall growth of +0.59% p.a. in Clear Water Bay Road. In view that 2022 affected by COVID19 has a dramatic negative annual growth of -4.74%, the overall annual growth rate of +1.98% p.a. from 2017 to 2021 is then adopted for traffic forecast as conservative.

2019-based Territorial Population and Employment Data Matrix (TPEDM) publicly available planning data

3.2.5 The population and employment data of the Planning Data District are extracted from the 2019-based TPEDM issued by the Planning Department's website. The estimation of the growth rates from 2019 to 2026 in Southeast New Territories are summarized in **Table 3.2**.

Table 3.2 Growth Rate of Southeast New Territories by 2019-based TPEDM Planning Data

District	2019	2026	2031	2019-2026 Growth Rate (%) p.a.	2026-2031 Growth Rate (%) p.a.
Southeast New Territories	96,150	93,550	87,850	-0.39%	-1.25%

3.2.6 According to the 2019-based TPEDM, the future population and employment will decrease between 2019 and 2031 in the Southeast New Territories.

3.2.7 After reviewing the above ATC AADT traffic data and future planning data forecast from TPEDM, a **+1.98% p.a.** growth is adopted for conservative.

3.3 Traffic Generated / Attracted by the Adjacent Committed Developments

3.3.1 In addition to the growth rate derived above, the committed and planned developments in the vicinity of the Site that are likely to be occupied with in-take by year 2031 will also be taken into consideration for the future traffic forecast.

3.3.2 The committed developments in the vicinity of the Site are summarized in **Table 3.3**.

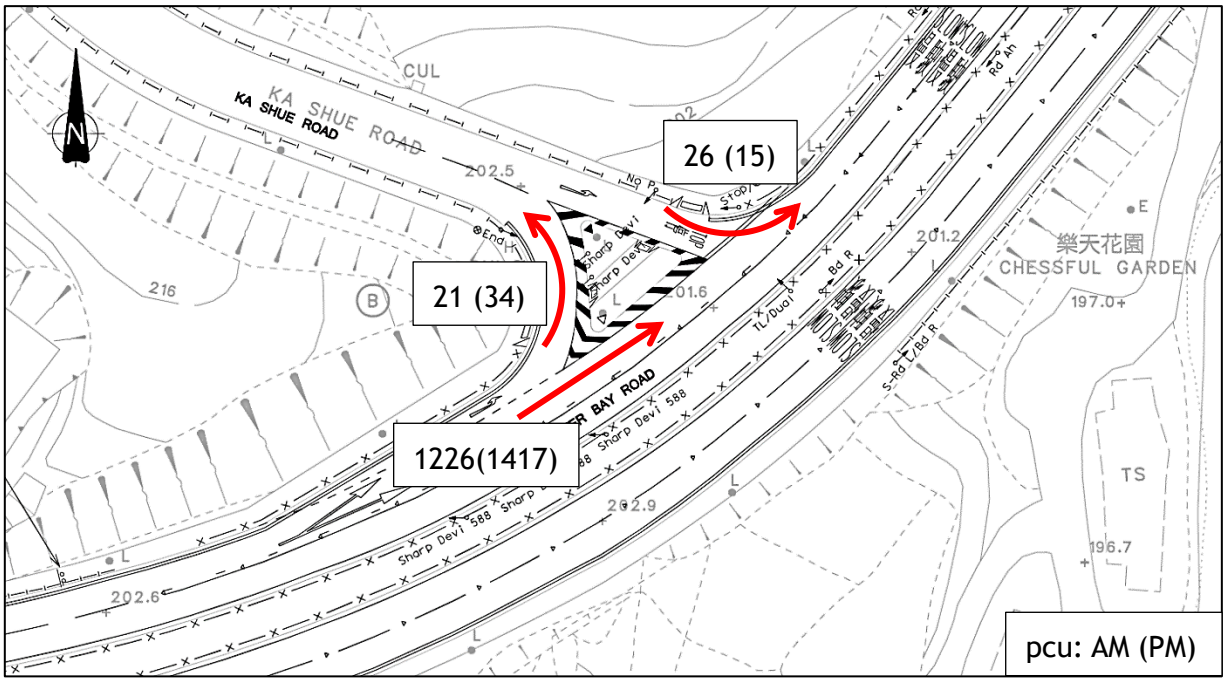
Table 3.3 Summary of Future Planned / Committed Developments in the Vicinity of the Site

Planned Development	
1	Anderson Road Quarry Site (ARQ)
2	Proposed Primary School at Site KT2a at On Sau Road
3	Proposed Primary School at Site KT2c at On Yan Street
4	Tai Sheung Tok Transfer Station
5	Joint Cavern Development at Anderson Road Quarry Site
6	Development of Community Health Centre Building at Anderson Road
7	Fire Station Cum Ambulance Depot with Departmental Quarters at Anderson Road

3.3.3 The resultant 2031 Reference traffic flows are derived as follows:

2024 Existing Traffic Flows x $(1+1.98\%)^{(2031-2024)}$ + Traffic Generations from Adjacent planned / committed developments.

3.3.4 The 2031 reference traffic flows for AM and PM peak periods are presented below.



4. TRAFFIC IMPACT ASSESSMENT

4.1 Proposed Development Traffic Generations

4.1.1 The estimated trip generations for the proposed Development Scheme based on the adopted trip rates are summarized in **Table 4.1**.

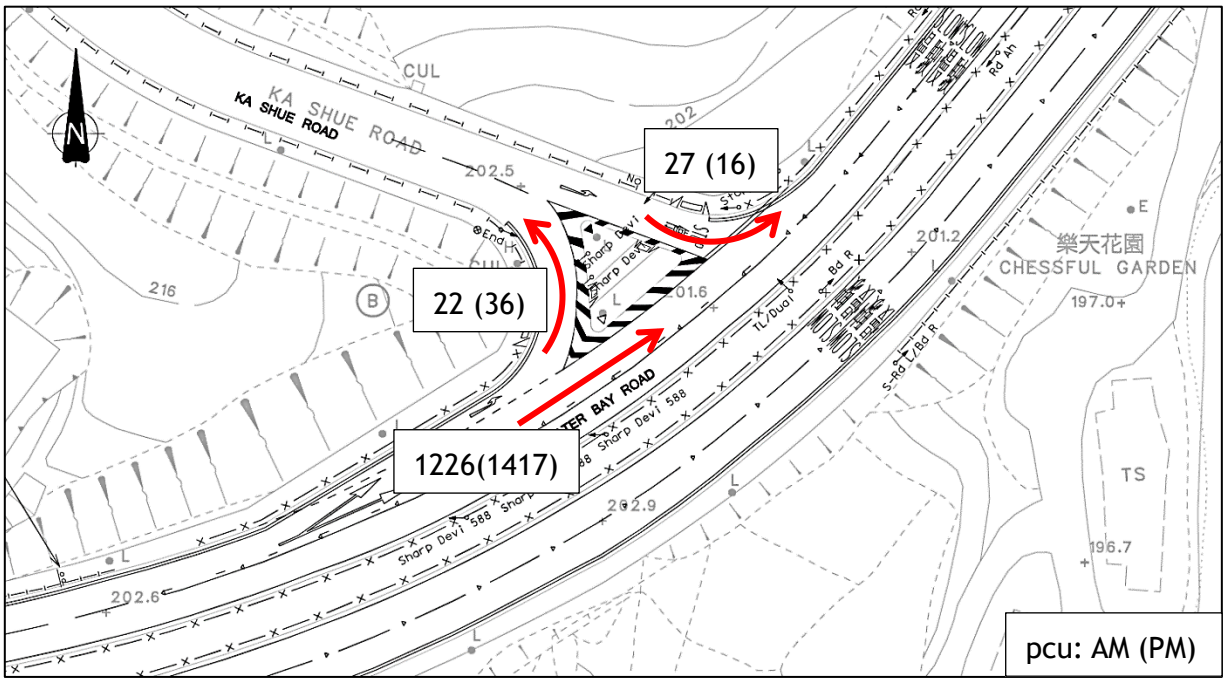
Table 4.1 Estimated Vehicular Traffic Generations

Component		AM Peak		PM Peak	
		Generation	Attraction	Generation	Attraction
Existing (8 Flats)	Adopted Trip Rates (1) (pcu/hr/flat)	0.2772	0.1769	0.1635	0.2394
	Estimated Vehicular Trips (pcu/hr)	**3**	**2**	**2**	**2**
Proposed (14 Flats)	Adopted Trip Rates (1) (pcu/hr/flat)	0.2772	0.1769	0.1635	0.2394
	Estimated Vehicular Trips (pcu/hr)	**4**	**3**	**3**	**4**
Net Difference		**+1**	**+1**	**+1**	**+2**

Note (1): Mean trip rate for private housing: low-density / R(C) of average flat size 180m^2 in TPDM Vol. 1, Ch.3, Appendix, Table 1.

4.1.2 The proposed development will generate and attract with additional 2 (i.e. 1+1) pcus in the AM peak hour and 3 (i.e. 1+2) pcus in the PM peak hour respectively, which are considered minimal.

4.1.3 The 2031 design traffic flows are derived by adding the 2031 reference traffic flows onto the development traffic as shown below.



4.2 Junction Capacity Performance

4.2.1 The junction performance for Clear Water Bay Road / Ka Shue Road junction based on the 2031 reference and 2031 design scenarios are summarized in **Table 4.1**.

Table 4.2 2031 Reference and Design Junction Performance

Junction Location	2031 Reference		2031 Design	
	AM Peak	PM Peak	AM Peak	PM Peak
Clear Water Bay Road / Ka Shue Road	0.05	0.03	0.05	0.03

4.2.2 The results of the junction performance have demonstrated that the concerned junction can operate with adequate junction capacity in both 2031 reference and 2031 design scenarios and no junction capacity problem is anticipated.

5. SUMMARY AND CONCLUSION

5.1 In September 2024, a junction assessment for Clear Water Bay Road / Ka Shue Road has been conducted to support the proposed minor relaxation of site coverage and building height restrictions for permitted residential development.

5.2 A traffic survey was undertaken on a normal weekday in September 2024 to collect the most up-to-date traffic data.

5.3 The results of the junction performance have demonstrated that the concerned junction is operating with adequate junction capacity during the AM and PM peak periods in 2024 (existing condition).

5.4 The tentative completion year of the redevelopment will be 2028. Hence, Year 2031 (Completion year + 3 years) is adopted for the junction assessment.

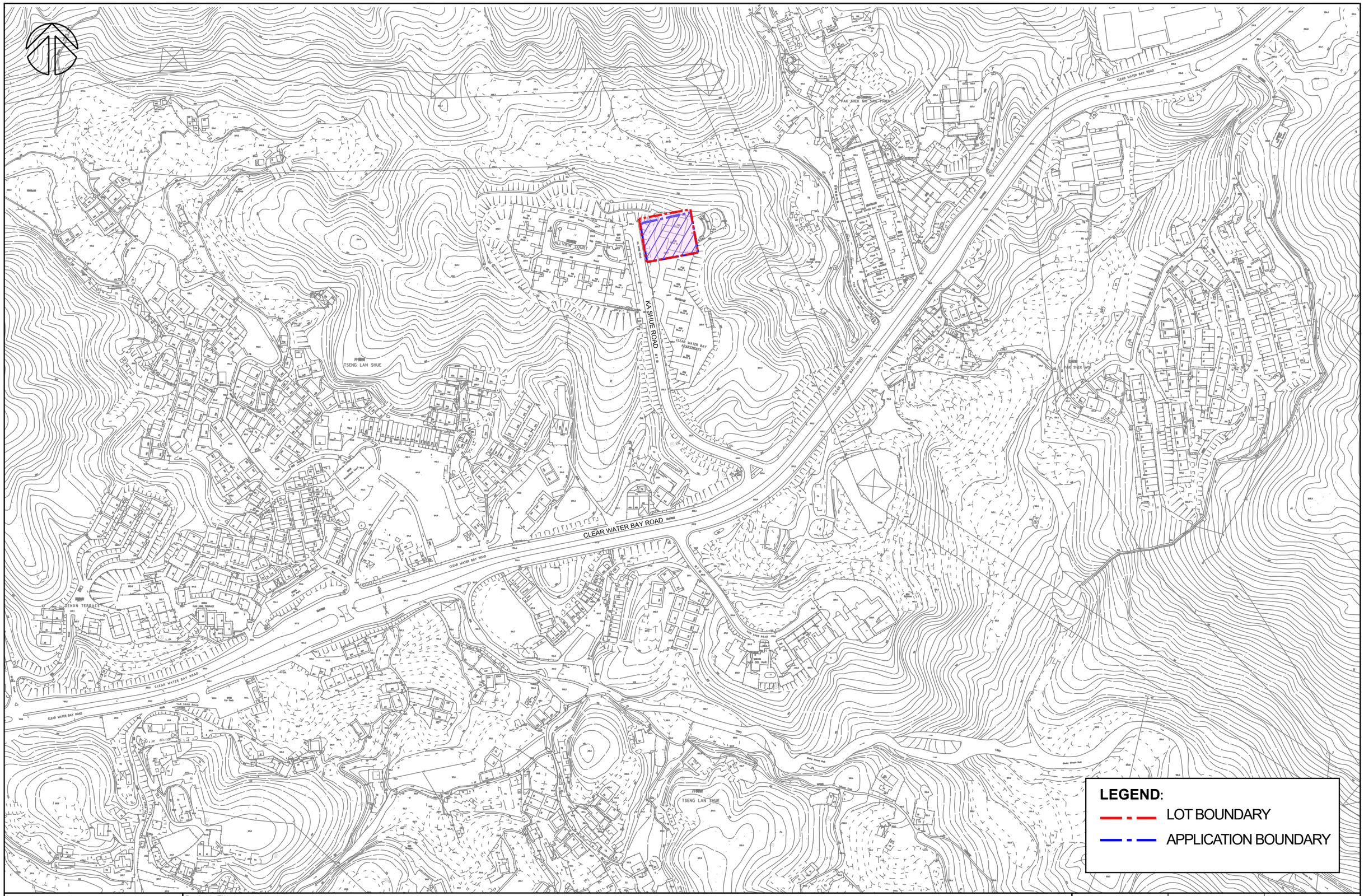
5.5 The proposed development will generate and attract with additional 2 pcus in the AM peak hour and 3 pcus in the PM peak hour respectively, which are considered minimal.

5.6 A +1.98% p.a. growth rate together with the planned / committed developments in the vicinity of the Site have been taken into consideration in the traffic forecast from 2024 to 2031.

5.7 The results of the junction performance have indicated that the concerned junction can operate with adequate junction capacity in both 2031 reference and 2031 design scenarios.

5.8 The proposed development will not cause any significant traffic impact onto the Clear Water Bay Road / Ka Shue Road junction and is therefore supported from the traffic engineering point of view.

FIGURE



HWSPB 何黃 Traffic & Transportation Consultants Ho Wang SPB Limited	Project Title: TRAFFIC ENGINEERING CONSULTANCY SERVICES – RESIDENTIAL REDEVELOPMENT AT 8 KA SHUE ROAD, SAI KUNG, TSEUNG KWAN O, NEW TERRITORIES, HONG KONG	Scale: 1 : 3000	Date: SEP 2024 / Figure No.: 1.1
	Figure Title: SITE LOCATION PLAN	Project No.: J1732	CAD Ref.: J1732/TIA/F11A/2024-12-19 / Rev.: B

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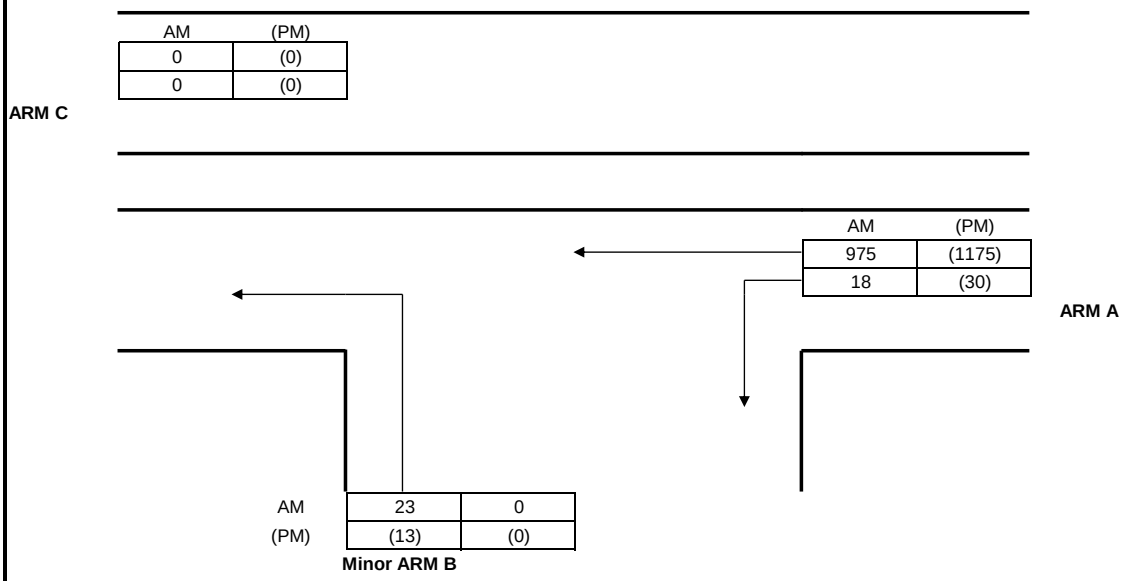
APPENDIX A

Junction Capacity Analysis

Simplified Priority Junction Capacity Calculation

Ho Wang SPB Limited
Traffic & Transportation Consultants

Job Title:	Traffic Engineering Consultancy Servies - Residential Redevelopment at 8 Ka Shue Road, Sai Kung, Tsuen Kwan O				
Junction:	Clear Water Bay Road / Ka Shue Road			Ref. No.:	2024 Exi
Scheme:	2024 Existing			Ref. No.:	
Year:	2024	Job No.:	J1732	Rev.:	-
ARM A:	Clear Water Bay Road				
ARM B:	Ka Shue Road				
ARM C:					



GEOMETRY

Major road width	W	14.60	Lane widths	w(b-a)	0.00
Central Reserve width	Wcr	0.00		w(b-c)	4.00
2 Lane Minor Arm (Y/N)		N		w(c-b)	0.00
Visibilities	Vr(b-a)	0	Calculated	D	0.53
	Vl(b-a)	0		E	0.96
	Vr(b-c)	42		F	0.59
	Vr(c-b)	0		Y	0.50

ANALYSIS

			AM PEAK	(PM) PEAK
TRAFFIC FLOWS	q(c-a)		0	0
	q(c-b)		0	0
	q(a-b)		18	30
	q(a-c)		975	1175
	q(b-a)		0	0
	q(b-c)		23	13
	f		1.00	1.00
		Factor		
CAPACITIES	Q(b-a)	1	240	220
	Q(b-c)	1	545	510
	Q(c-b)	1	331	309
	Q(b-ac)	1	545	510
RFC's	b-a		0.000	0.000
	b-c		0.042	0.025
	c-b		0.000	0.000
	b-ac		0.042	0.025
Worst RFC			**0.042**	**0.025**

Where Vl and Vr are visibility distances to the left or right of the respective streams

D = (1+0.094(w(b-a)-3.65))(1+0.0009(Vr(b-a)-120))(1+0.0006(Vl(b-a)-150))

E = (1+0.094(w(b-c)-3.65))(1+0.0009(Vr(b-c)-120))

F = (1+0.094(w(c-b)-3.65))(1+0.0009(Vr(c-b)-120))

Y = 1-0.0345W

f = proportion of minor traffic turning left

Q (b-ac) = Q(b-c)*Q(b-a)/(1-f)*Q(b-c)+f*Q(b-a)

T.P.D.M.V.2.4
Appendix 1

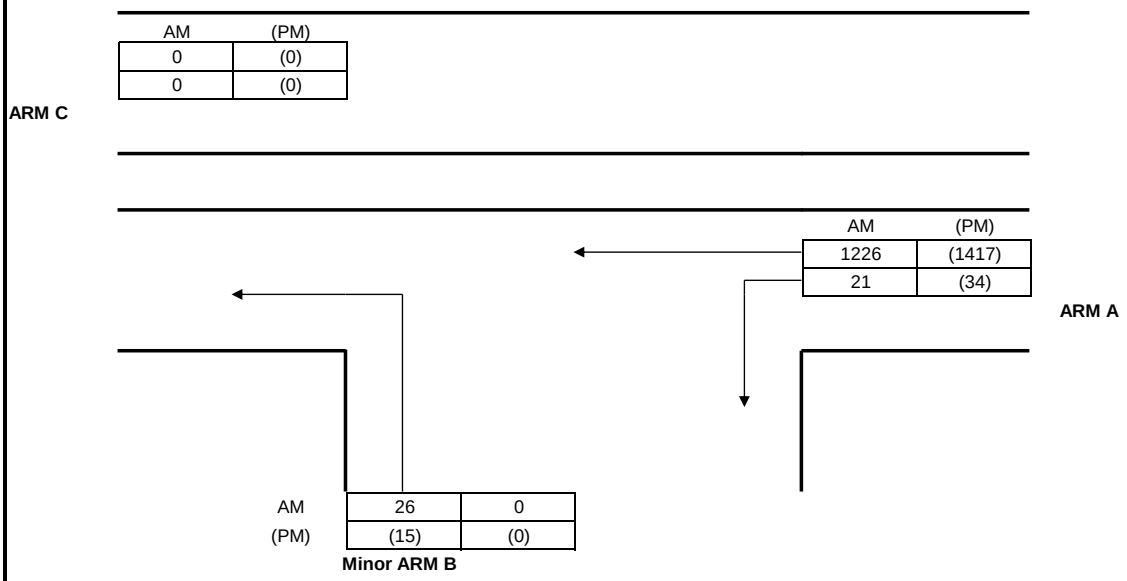
Capacity of combined streams
- in accordance with TPDM V2.4

Calculated by:	SL	Date:	Sep-24	Checked by:	TA

Simplified Priority Junction Capacity Calculation

Ho Wang SPB Limited
Traffic & Transportation Consultants

Job Title:	Traffic Engineering Consultancy Servies - Residential Redevelopment at 8 Ka Shue Road, Sai Kung, Tsuen Kwan O				
Junction:	Clear Water Bay Road / Ka Shue Road			Ref. No.:	2031 Ref
Scheme:	2031 Reference			Ref. No.:	
Year:	2031	Job No.:	J1732	Rev.:	-
ARM A:	Clear Water Bay Road				
ARM B:	Ka Shue Road				
ARM C:					



GEOMETRY					
Major road width	W	14.60	Lane widths	w(b-a)	0.00
Central Reserve width	Wcr	0.00		w(b-c)	4.00
2 Lane Minor Arm (Y/N)		N		w(c-b)	0.00
Visibilities	Vr(b-a)	0	Calculated	D	0.53
	Vl(b-a)	0		E	0.96
	Vr(b-c)	42		F	0.59
	Vr(c-b)	0		Y	0.50

ANALYSIS				
			AM PEAK	(PM) PEAK
TRAFFIC FLOWS	q(c-a)		0	0
	q(c-b)		0	0
	q(a-b)		21	34
	q(a-c)		1226	1417
	q(b-a)		0	0
	q(b-c)		26	15
	f		1.00	1.00
		Factor		
CAPACITIES	Q(b-a)	1	215	197
	Q(b-c)	1	501	467
	Q(c-b)	1	305	283
	Q(b-ac)	1	501	467
RFC's	b-a		0.000	0.000
	b-c		0.052	0.032
	c-b		0.000	0.000
	b-ac		0.052	0.032
Worst RFC			**0.052**	**0.032**

Where Vl and Vr are visibility distances to the left or right of the respective streams

D = (1+0.094(w(b-a)-3.65))(1+0.0009(Vr(b-a)-120))(1+0.0006(Vl(b-a)-150))

E = (1+0.094(w(b-c)-3.65))(1+0.0009(Vr(b-c)-120))

F = (1+0.094(w(c-b)-3.65))(1+0.0009(Vr(c-b)-120))

Y = 1-0.0345W

f = proportion of minor traffic turning left

Q (b-ac) = Q(b-c)*Q(b-a)/(1-f)*Q(b-c)+f*Q(b-a)

T.P.D.M.V.2.4
Appendix 1

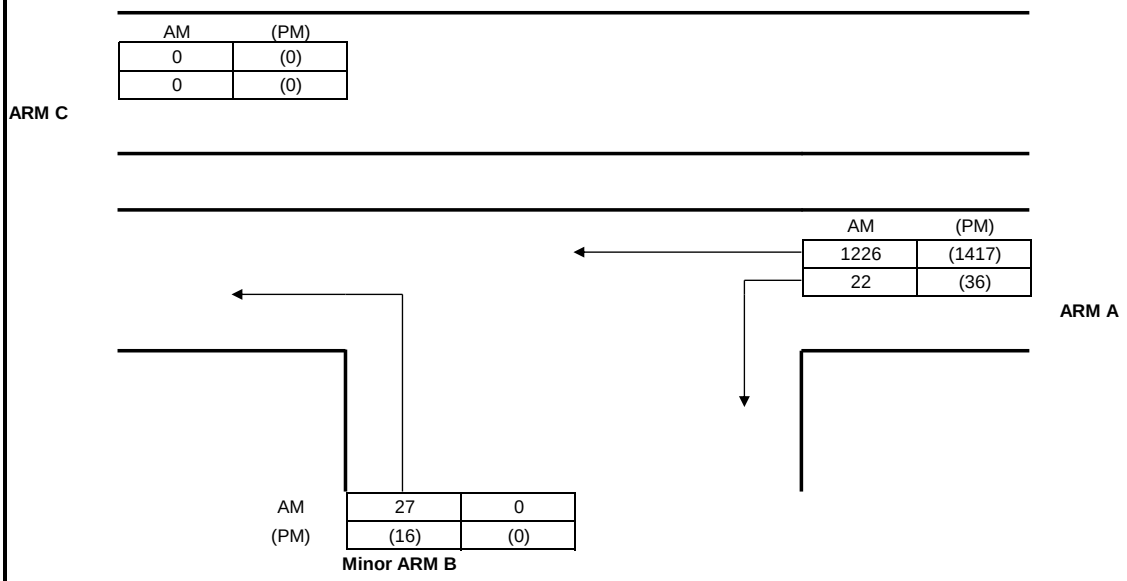
Capacity of combined streams
- in accordance with TPDM V2.4

Calculated by:	SL	Date:	Sep-24	Checked by:	TA

Simplified Priority Junction Capacity Calculation

Ho Wang SPB Limited
Traffic & Transportation Consultants

Job Title:	Traffic Engineering Consultancy Servies - Residential Redevelopment at 8 Ka Shue Road, Sai Kung, Tsuen Kwan O				
Junction:	Clear Water Bay Road / Ka Shue Road			Ref. No.:	2031 Des
Scheme:	2031 Design			Ref. No.:	
Year:	2031	Job No.:	J1732	Rev.:	-
ARM A:	Clear Water Bay Road				
ARM B:	Ka Shue Road				
ARM C:					



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Visibilities	Vr(b-a)	0	Calculated	D	0.53
	Vl(b-a)	0		E	0.96
	Vr(b-c)	42		F	0.59
	Vr(c-b)	0		Y	0.50

ANALYSIS				
			AM PEAK	(PM) PEAK
TRAFFIC FLOWS	q(c-a)		0	0
	q(c-b)		0	0
	q(a-b)		22	36
	q(a-c)		1226	1417
	q(b-a)		0	0
	q(b-c)		27	16
	f		1.00	1.00
		Factor		
CAPACITIES	Q(b-a)	1	215	196
	Q(b-c)	1	501	467
	Q(c-b)	1	304	283
	Q(b-ac)	1	501	467
RFC's	b-a		0.000	0.000
	b-c		0.054	0.034
	c-b		0.000	0.000
	b-ac		0.054	0.034
Worst RFC			**0.054**	**0.034**

Where Vl and Vr are visibility distances to the left or right of the respective streams

D = (1+0.094(w(b-a)-3.65))(1+0.0009(Vr(b-a)-120))(1+0.0006(Vl(b-a)-150))

E = (1+0.094(w(b-c)-3.65))(1+0.0009(Vr(b-c)-120))

F = (1+0.094(w(c-b)-3.65))(1+0.0009(Vr(c-b)-120))

Y = 1-0.0345W

f = proportion of minor traffic turning left

Q (b-ac) = Q(b-c)*Q(b-a)/(1-f)*Q(b-c)+f*Q(b-a)

T.P.D.M.V.2.4
Appendix 1

Capacity of combined streams
- in accordance with TPDM V2.4

Calculated by:	SL	Date:	Sep-24	Checked by:	TA