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香港房屋委員會
Hong Kong Housing Authority

Agreement No. CB20180686 Term Traffic and Environmental Consultancy Services 2019 – 2021 for Kowloon Central and West and Islands Region

Instruction No. K15 Proposed Public Housing Development at Pak Tin Estate Traffic Impact Assessment (TIA)

Final Report

Hong Kong Housing Authority

March 2024

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1. The Hong Kong Housing Authority proposed to redevelop the existing Pak Tin Estate Phase 12 in Shek Kip Mei.

2. Atkins China Limited has been commissioned by Hong Kong Housing Authority to conduct a Traffic Impact Assessment Study to assess the traffic impact of the Proposed Redevelopment in Pak Tin Estate Phase 12 to the surrounding road networks taken into account the other planned developments.

3. The Proposed Redevelopment will consist of 3 residential blocks providing 2,091 flats and some social welfare facilities and office for population intake at year 2028/29.

4. The vehicular accesses for the Proposed Redevelopment will be located at existing estate road / EVA in Pak Tin Estate connecting to Pak Wan Street.

5. Vehicular traffic surveys were conducted to establish the current traffic condition in the vicinity of the Proposed Redevelopment.

6. 2,200 flats are adopted for assessment purpose. The Proposed Redevelopment would produce about 118 pcu/hr and 84 pcu/hr vehicular traffic during the morning and evening peak hour periods respectively.

7. Junction capacity assessments were undertaken for the critical junctions with respect to the traffic generation of the Proposed Redevelopment with consideration of adjacent planned developments.

8. It was found that most of the junctions would operate with an acceptable performance, except the junction of Nam Cheong Street / Cornwall Street (J1). Junction J1 would encounter capacity problem even without the Proposed Redevelopment. Traffic improvement schemes should not constitute an essential development requirement for the Proposed Redevelopment. Nevertheless, improvement scheme for Junction J1 are suggested for the consideration by the relevant government departments. With this in place, the problematic junction would be operated with acceptable performance.

9. Capacity assessments were also undertaken for the pedestrian facilities adjacent to the Proposed Redevelopment. It was found that all the assessed pedestrian facilities would operate with acceptable performance even with the Proposed Redevelopment.

10. Public transport utilization assessments were also undertaken for the public transport services adjacent to the Proposed Redevelopment. It was found that the public transport services are adequate to cater for the additional passenger demand generated from the Proposed Redevelopment.

行政摘要

1. 香港房屋委員會建議重建位於石硤尾的白田邨第十二期。
2. 香港房屋委員會委託阿特金斯顧問有限公司進行交通影響評估，以評估擬建的白田邨第十二期重建對附近道路的影響，並考慮其他已規劃的發展項目。
3. 項目將會重建現有一幢住宅大廈，提供 2,091 個住宅單位、社會福利設施及辦公室，預計最终遷入為 2028/29 年。
4. 重建項目的行車通道將設於位於白田邨內連接白雲街的現有行車路。
5. 本研究進行了交通調查，以查明在重建項目附近現有的交通情況。
6. 本研究將以 2,200 個住宅單位作評估用途，重建項目於早上及下午繁忙時段將會分別產生每小時 118 客車架次及 84 客車架次。
7. 本研究根據重建項目產生的交通對主要路口進行道路交匯處容量評估，並考慮了附近其他已規劃的發展項目。
8. 結果顯示，除了南昌街／歌和老街路口以外，其他主要路口將於可接受的通行能力運作。即使沒有重建項目，南昌街／歌和老街路口亦將會遇到容量問題，因此道路改善措施並不構成擬建項目的發展要求。本研究建議道路改善措施供有關政府部門考慮以提升前述的路口的通行能力。有改善措施的路口將能夠承受增加的交通需求。
9. 本研究亦對重建項目附近的行人設施進行容量評估。結果顯示，即使考慮了重建項目，附近的行人設施均具備可接受的服務水平。
10. 本研究亦對重建項目附近的公共交通服務進行使用率評估。結果顯示，附近的公共交通服務能夠承受重建項目帶來的額外公共交通需求。

1. Introduction

1.1. Background

1.1.1. The Hong Kong Housing Authority (HKHA) proposed to redevelop the existing Pak Tin Estate Phase 12 in Shek Kip Mei.

1.1.2. Atkins China Limited (Atkins) was commissioned by HKHA to conduct a Traffic Impact Assessment (TIA) Study to assess the traffic impact of the proposed redevelopment in Pak Tin Estate Phase 12 (hereafter the Proposed Redevelopment) to the surrounding road network taken into account the other planned developments.

1.1.3. This report is to present the results and recommendations of the TIA study.

1.2. Scope

1.2.1. The scope of this TIA is outlined as follow:

- conduct surveys to collect the existing traffic flows in the vicinity;
- estimate vehicular and pedestrian traffic demand generated by the Proposed Redevelopment;
- forecast the future vehicular and pedestrian traffic demand in the vicinity at an appropriate design year;
- analyse the vehicular and pedestrian traffic impact of the Proposed Redevelopment to the surrounding road network;
- recommend improvement measures to the problematic roads, junctions and pedestrian facilities, if considered necessary, due to the Proposed Redevelopment wherever applicable.

1.3. Report Structure

1.3.1. Following this introductory chapter, there are 5 further chapters.

- **Chapter 2** – The Proposed Redevelopment, presents the proposed redevelopment schedule and internal transport facilities;
- **Chapter 3** – Traffic Context, describes the road network and transport facilities in the vicinity;
- **Chapter 4** – Traffic Forecasts, describes the methodology of traffic forecasting;
- **Chapter 5** – Traffic Impact Assessment, presents the results of the TIA at the adopted design year, and recommends any improvement measures to alleviate the foreseeable traffic problem, if considered necessary; and
- **Chapter 6** – Summary and Conclusion, summarizes the findings of the study and presents the conclusion accordingly.

2. The Proposed Redevelopment

2.1. Site Location

2.1.1. The Subject Site is located in Pak Tin Estate. It is bounded by Nam Cheong Street on the east and north, and the estate road of Pak Tin Estate on the south and existing slope on the west and north. The location of the Subject Site is indicated in **Figure 2.1**.

2.2. Redevelopment Schedule

2.2.1. The Subject Site currently includes 1 residential block providing 899 flats and suspended Pak Tin Catholic Primary School site. It will be redeveloped into public housing development with some social welfare facilities and offices. The Proposed Redevelopment schedule is summarized in **Table 2.1**.

Table 2.1 – Proposed Redevelopment Schedule

Phases	Parameters	Completion Year	Population Intake Year
Domestic	2,091 PRH flats (1)	2028	2028/2029
Social Welfare Facilities	3,940 m^2 GFA		
Office	2,200 m^2 GFA		

Remarks: (1) Conservative scenario with 2,200 flats is considered for assessment purpose.

2.3. Parking and Loading/unloading Provision

2.3.1. The proposed provision of parking space and loading/unloading (L/UL) facilities in the approved Planning Brief has been made reference to the Hong Kong Planning Standard and Guideline (HKPSG) published by Planning Department (PlanD) as well as requests from relevant government departments.

Table 2.2 – Proposed Parking and Loading / Unloading Facilities Provision

Parking and L/UL Facilities	HKPSG/ Government Department Requirement	Required Provision (nos.)	Proposed Provision (nos.)
Domestic (2,091 flats including 586 1p/2p flats in 3 nos. of blocks)			
Private Car Parking Space	0.52 spaces per 4-7 flats excluding one person / two persons flats	112 – 196	135(1)(2)
Private Car (Visitor) Parking Space	Up to 5 visitor spaces per residential block	15	15
Motorcycle Parking Space	1 space per 110 flats excluding one person / two persons flats	14	14
Light Goods Vehicle / Light Bus Parking Space	1 space per 260 flats excluding one person / two persons flats	6	6
L/UL Bay	2 bays per residential	6	6(3)
Non-domestic (3,940m² GFA of social welfare facilities & 2,200m² GFA of HA's office)			
Light Bus Bay (Social Welfare Facilities)	-	-	4(4)
Private Car Parking Space (HA's Office)	1 car space per 150 - 200m² GFA for the first 15,000m² GFA	11 – 15	11(5)
Loading/unloading bay for goods vehicles (HA's office)	1 loading/unloading bay for goods vehicles per 2,000 – 3,000m² GFA	1	- (6)
Taxi and Private Car Layby (HA's office)	1 picking up/ setting down layby for taxis and private cars per 20,000m² GFA for site of at least 5,000m² net site area	1	- (6)

Remarks: *(1) The high-end provision cannot be provided due to site constraints.*

(2) Including 2 accessible parking spaces;

(3) Shared-used by HA's Office, coaches/buses and M/HGV loading/unloading bay for service vehicles and overnight parking, while overnight parking requirement should be applied with due consideration of the site constraint and local situation;

(4) Parking provision of private light bus (with tail-lift) as requested by Social Welfare Department (SWD) for their operational needs. 2 nos. for for Community Rehabilitation Day Centre (CRDC), 1 no. for District Support Centre for Persons with Disabilities (DSC) and 1 no. for Home Care Services (HCS) for Frail Elderly Persons;

(5) Parking provision for HD's office as requested by HD for their operational needs.

(6) Nil Parking provision for HD's office as requested by HD.

2.3.2. The Proposed Redevelopment will provide minimum 135 nos. of car parking space, 15 nos. of visitor parking space, 14 nos. motorcycle parking space, 6 nos. light goods vehicle parking spaces, 6 nos. of L/UL bay for domestic purpose, 4 nos. of light bus bay for social welfare facilities and 11 nos. of car parking space for HD's office.

2.4. Vehicular Access Arrangement

2.4.1. The vehicular accesses of the Proposed Redevelopment will be located at existing estate road in Pak Tin Estate that connecting to Pak Wan Street as shown in **Figure 2.1** similar to existing situation.

2.4.2. Vehicles can access the Proposed Redevelopment at Pak Wan Street via Nam Cheong Street, Wai Lun Street and Pak Tin Street. The vehicular ingress/ egress routes to/ from the Proposed Redevelopment are shown in **Figure 2.2**.

2.5. Internal Road Arrangement

2.5.1. The internal road system within the Proposed Redevelopment is subject to detailed design. The Emergency Vehicular Access (EVA) should be of a minimum 6m in width wherever applicable in the internal road system.

2.6. Pedestrian Access Arrangement

2.6.1. The existing pedestrian facilities are well-developed in the vicinity of the Proposed Redevelopment. Pedestrians can access the Proposed Redevelopment via the surrounding footpaths and at-grade crossings to/ from nearby bus and green minibus (GMB) servicing points and the Pak Tin Estate Public Transport Interchange (PTI).

2.6.2. Moreover, there are two planned footbridges to be constructed by others, one will be connecting between Phases 12 and 13, and another will be connecting between Phase 12 and The Pak Tin Extension.

3. Traffic Context

3.1. Road Network

3.1.1. The Proposed Redevelopment will be served by the district distributors Nam Cheong Street and local distributors Pak Wan Street, Wai Lun Street and Pak Tin Street.

3.1.2. Nam Cheong Street runs in north-south direction providing linkage to the urban trunk road Lung Cheung Road on the north and urban trunk road West Kowloon Corridor on the south. Pak Wan Street runs in north-south direction providing linkage to Nam Cheong Street on the north and Pak Tin Street on the south. Wai Lun Street runs in east-west direction providing linkage to Nam Cheong Street on the east and Pak Tin Street on the west. Pak Tin Street runs in north-south direction providing linkage to Wai Lun Street on the north and the urban trunk road Tai Po Road on the south.

3.1.3. The urban trunk roads Lung Cheung Road, West Kowloon Corridor and Tai Po Road serve both north-south and east-west directions traffic in Kowloon area to/ from other areas in the territory. It is anticipated that the Proposed Redevelopment will be well served by the existing road networks in the vicinity as shown in **Figure 2.2**.

3.2. Public Transport Services

3.2.1. Currently, there are several bus and GMB services with service points along Nam Cheong Street, Pak Wan Street, Wai Lun Street, Pak Tin Street and Woh Chai Street in the vicinity of the Proposed Redevelopment. The public transport interchange in Pak Tin Estate Redevelopment Phase 7 has also been in operation in January 2022. The service details of the existing public transport services in the vicinity are given in **Table 3.1**. The existing public transport service points are shown in **Figure 3.1**.

Table 3.1 – Existing Public Transport Services

Route No.		Origin & Destination	Remarks
Bus	2B	Cheung Sha Wan ↔ Chuk Yuen Estate	Daily
	2D	Tung Tau Estate ↔ Chak On Estate	Daily
	2E	Kowloon City Ferry ↔ Pak Tin	Daily
	2F	Cheung Sha Wan ↔ Tsz Wan Shan (North)	Daily
	86	Mei Foo ↔ Wong Nai Tau B/T	Daily
	86A	Cheung Sha Wan (Kom Tsun Street) ↔ Sha Tin Wai	Daily
	86C	Cheung Sha Wan ↔ Lee On B/T	Daily
	87B	Island Harbourview ↔ Sun Tin Wai	Daily
	104	Kennedy Town ↔ Pak Tin	Daily
	702A	Aqua Marine/ Hoi Lai Estate ↔ Pak Tin	Schooldays only
GMB	9M	Upper Pak Tin Estate ↔ Shek Kip Mei Station	Daily, Circular
	12	Pak Tin ↔ Mong Kok East Station	Daily
	30A	Chak On Estate ↔ Mong Kok Station	Daily
	30B	Chak On Estate ↔ Shek Kip Mei Station	Daily, Circular
	32M	Lung Ping Road ↔ Shek Kip Mei	Daily, Circular
	42	Chak On Estate ↔ Cheung Sha Wan	Daily

3.2.2. The Proposed Redevelopment will be well served by the public transport facilities provided in the vicinity.

4. Traffic Forecasts

4.1. Methodology

4.1.1. The Proposed Redevelopment is scheduled to be completed by year 2028. It is anticipated that population intake would be taken place by year 2028/29. As such, year 2032 (three years after population intake) has been adopted as design year.

4.1.2. The background traffic forecasts for the design year 2032 were projected by applying a growth factor to the observed traffic flows obtained from traffic surveys taking into account the traffic generations of the adjacent planned / committed developments. The growth factor used was derived by making reference to the past traffic growth trend and traffic model of Pak Tin areas and also the population and employment planning data of Sham Shui Po areas.

4.1.3. Trip generations of the Proposed Redevelopment were estimated by using appropriate trip generation rates. 2,200 flats are considered for assessment purpose. Traffic generations were then assigned to the surrounding road network and superimposed onto the reference traffic forecasts to create the design year forecasts for assessment at design years.

4.2. Traffic Survey

4.2.1. Manual classified traffic count surveys were conducted to identify the existing traffic flows during the peak hour periods from 07:30 to 09:30 and from 17:00 to 19:00 on typical weekday on 14 September 2021. The locations of the surveyed junctions in the vicinity are listed in **Table 4.1** and shown in **Figure 2.1**.

Table 4.1 – Location of Critical Junctions

Index *(1)*	Junctions	Junction Type
J1	Nam Cheong Street / Cornwall Street	Signal
J2	Pak Wan Street near Bus Terminus	Signal
J3	Nam Cheong Street / Pak Wan Street	Signal
J4	Pak Tin Street / Pak Wan Street / Wai Lun Street	Signal
J5	Nam Cheong Street / Tai Hang Sai Street / Wai Lun Street	Signal
J6	Nam Cheong Street / Wai Chi Street	Signal
J7	Pak Tin Street / Woh Chai Street	Signal
J8	Nam Cheong Street / Woh Chai Street	Signal

*Remarks: (1) Refer to **Figure 2.1**.*

4.2.2. The morning and evening peak hours were identified as 07:45 – 08:45 and 17:45 – 18:45 respectively. The observed traffic flows are presented in **Figure 4.1**.

4.3. Growth Rate Determination

4.3.1. Traffic forecasts for the design year were projected by applying an appropriate growth rate to the observed traffic flows. The growth rates were determined with reference to the Annual Traffic Census (ATC) reports and the 2015-based Base District Traffic Models (BDTM) published by TD, the 2019-based Territory Population and Employment Data Matrices (TPEDM) planning data published by PlanD and 2020-based Hong Kong Population Projections published by Census and Statistics Department.

Annual Traffic Census

4.3.2. The historical traffic growth trend of the major roads in the vicinity of the Proposed Redevelopment was reviewed making reference to the ATC reports. The Annual Average Daily Traffic (AADT) data from year 2011 to year 2018 were extracted and the estimated average annual growth rate of +1.16% p.a. are given in **Table 4.2**.

Table 4.2 – Traffic Growth Rate from ATC

Stn No.	Road Name	AADT									
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
3252	Nam Cheong St	*11,660*	*11,670*	10,390	10,080	*10,070*	*9,910*	*9,960*	10,830	10,580	*9,900*
3431	Tai Po Rd	*30,390*	*31,730*	32,360	32,450	33,620	*33,090*	*33,240*	*33,380*	29,420	27,200
3631	Tai Po Rd	27,100	*28,290*	*28,860*	*28,730*	26,810	29,460	*29,690*	*29,890*	*29,740*	25,630
3657	Woh Chai St	7,700	*7,700*	*7,630*	*7,490*	8,370	8,420	*8,460*	*8,490*	*8,560*	8,420
3847	Nam Cheong St	8,180	8,020	*7,960*	*7,810*	*7,800*	7,440	7,550	*7,580*	*7,640*	*7,150*
3848	Woh Chai St	12,030	11,230	*11,130*	*10,930*	*10,920*	9,970	10,000	*10,040*	*10,110*	*9,460*
4047	Nam Cheong St	*11,950*	10,510	11,510	*11,300*	*11,280*	*11,110*	10,280	9,780	*9,850*	*9,220*
4053	Shek Kip Mei St	*13,820*	14,520	13,260	*13,010*	*13,000*	*12,800*	12,360	11,640	*11,720*	*10,970*
4206	Cornwall St	20,390	19,620	20,090	20,660	20,980	21,090	21,340	21,440	20,260	18,960
4645	Wai Chi St	2,810	2,960	2,730	2,660	2,570	2,820	2,440	2,600	2,910	2,640
Growth Rate (p.a.)		**+1.16%**									

Notes: *(1) The italic AADT figures are estimated values based on the ATC Reports. Those estimated figures are excluded in calculating the weighted average annual growth rate.*

(2) Data in 2019 and 2020 are excluded due to the abnormal traffic condition during social event in 2019 and COVID-19 pandemic in 2020.

Based District Traffic Models

4.3.3. The growth rate was determined with reference to the 2015-based BDTM. The AM and PM peak hours traffic flows of the key road links in Pak Tin area from year 2021 to year 2026 and the estimated growth rates of +0.68% p.a. are given in **Table 4.3**.

Table 4.3 – Traffic Growth Rate from 2015-based BDTM

Road Name	Traffic Demand (pcu/hr)			
	AM		PM	
	2021	2026	2021	2026
Tai Po Road	3,973	3,998	3,349	3,514
Nam Cheong Street	945	1,073	855	956
Cornwall Street	1,981	2,119	2,194	2,089
Pak Wan Street	277	320	221	237
Pak Tin Street	191	212	90	89
Tai Hang Sai Street	788	712	560	611
Total	**8,155**	**8,434**	**7,269**	**7,496**
Growth Rate (p.a.)	**+0.68%**			

Territory Population and Employment Data Matrices

4.3.4. With reference to the 2019-based TPEDM from year 2019 to year 2031 in Sham Shui Po area, the average annual growth rates in terms of population and employment planning data was estimated as -0.13% p.a. as shown in **Table 4.4**.

Table 4.4 – Traffic Growth Rate from 2019-based TPEDM

District	Population			Employment		
	2019	2026	2031	2019	2026	2031
Sham Shui Po	454,450	492,450	464,900	246,800	243,300	236,350
Growth Rate (p.a.)	**-0.13%**					

Hong Kong Population Projections

4.3.5. With reference to the 2020-based Hong Kong Population Projections, the average annual growth rates from 2022 to 2032 was estimated as +0.41% p.a. as shown in **Table 4.5**.

Table 4.5 – Traffic Growth Rate from 2020-based Hong Kong Population Projections

Reference time-point (Mid-year)	Hong Kong Resident Population (in thousand)
2022	7,650.0
2032	7,971.2
Growth Rate (p.a.)	**+0.41%**

Adopted Growth Rate

4.3.6. In order to present a more conservative scenario, a growth rate of +1.16% per annum is adopted to produce the year 2032 background traffic flows from the observed traffic flows.

4.4. Other Planned Development

4.4.1. There are several planned / committed developments in the vicinity of the Proposed Redevelopment. Development trips generated by the planned / committed developments were estimated making reference to the Transport Planning and Design Manual (TPDM) published by TD and in-house trip generation rate database. Adopted trip rates and traffic generation of the planned / committed developments are summarized in **Table 4.6**.

Table 4.6 – Traffic Generation of the Planned / Committed Developments

Development	Year of Population Intake	Parameters	Trip Rates (Domestic: pcu/hr/flats; Retail, GIC: pcu/hr/100m² GFA)				Traffic Demand (pcu/hr)			
			AM		PM		AM		PM	
			Gen	Att	Gen	Att	Gen	Att	Gen	Att
Pak Tin Estate Redevelopment Phases 10, 11 and 13 (1)	Phase 10: 2023; Phase 11: 2021; Phase 13: 2027	Domestic: 2,968 PRH flats	0.0432	0.0326	0.0237	0.0301	128	97	70	89
		Retail: 3,420 m² GFA	0.1285	0.1525	0.2360	0.2622	4	5	8	9
		GIC: 3,700 m² GFA	0.1045	0.1646	0.1217	0.0840	4	6	5	3
		Kindergarten: 1,400 m² GFA	Minimal							
Chak On Road South (2)	2030/31	Domestic: 584 SSF flats	0.0622	0.0426	0.030	0.0401	36	25	17	23
		GIC: 1,470 m² GFA	0.1045	0.1646	0.1217	0.0840	2	2	2	1
Pak Tin Extension (2)	2031/32	Domestic: 563 PRH flats	0.0622	0.0426	0.030	0.0401	35	24	17	23
		GIC: 1,320 m² GFA	0.1045	0.1646	0.1217	0.0840	1	2	2	1
Tai Hang Sai Estate Redevelopment (3)	2027	Domestic: 1,289 PRH flats (4); 2,058 Private flats; Retail: 13,899m² GFA Kindergarten: 1,675m² GFA; G/IC: 6,500m² GFA	-				283	202	171	204

Notes: *(1) With reference to approved TIA report of Pak Tin Estate Phase 13 Redevelopment.*

(2) With reference to CEDD's TTIA study under Agreement No. CE 36/2021 (CE).

(3) With reference to TIA report of the approved TPB Application No. A/K4/76

(4) The proposed 1,289 PRH flats will be used for rehousing tenants of existing 1,289 flats in Tai Hang Sai Estate.

4.4.2. The traffic demand generated / attracted by the planned / committed developments will be assigned onto the surrounding road network and superimposed onto the background traffic flows to produce the reference traffic flows. **Figure 4.2** shows the year 2032 reference traffic flows.

4.5. Development Trip Generation

4.5.1. To estimate the traffic generation of the Proposed Redevelopment, appropriate trip rates should be adopted. Reference has been made to the TPDM published by TD and in-house trip generation rate database.

4.5.2. The adopted trip rates and estimated trip generation/ attraction demand of the Proposed Redevelopment are summarized in **Table 4.7**. The net flat gain of Proposed Redevelopment were adopted for assessment purpose. For assessment purpose, a conservative scenario with 2,200 flats is considered. The traffic generation of the Proposed Redevelopment for assessment purpose and associated facilities were estimated during the morning and evening peak hours are also summarized in **Table 4.7** and presented in **Figure 2.2**.

Table 4.7 – Traffic Generation of the Proposed Redevelopment

Development Type	Parameters	Trip Rates (Domestic: pcu/hr/flats; Social Welfare (1): pcu/hr/100m² GFA)				Traffic Demand (pcu/hr)			
		AM		PM		AM		PM	
		Gen	Att	Gen	Att	Gen	Att	Gen	Att
Domestic	1,301 flats (2)	0.0432	0.0326	0.0237	0.0301	56	42	31	39
Office	2,200 m² GFA	0.1703	0.2452	0.157	0.1175	4	5	3	3
Social Welfare	3,940 m² GFA	0.1045	0.1646	0.1217	0.0840	4	6	5	3
					Total	**64**	**54**	**39**	**45**

Remarks: (1) With reference to approved TIA report of Pak Tin Estate Phase 13 Redevelopment.
(2) 2,200 nos. of flat minus existing flats to be demolished, i.e. 2,200 flats – 899 flats = 1,301 flats.

4.5.3. As shown in **Table 4.7**, the Proposed Redevelopment would generate about 118 pcu/hr and 84 pcu/hr during the morning and evening peak hour periods respectively.

4.6. Design Traffic Flows

4.6.1. Traffic demand of the Proposed Redevelopment as shown in **Table 4.7** were assigned onto the road network and superimposed onto the reference traffic flows to produce the design traffic flows. Year 2032 design traffic flows are shown in **Figure 4.3**.

5. Traffic and Transport Impact Assessment

5.1. Methodology

5.1.1. Junction capacity analysis was carried out for the junctions which are likely to be affected by the Proposed Redevelopment. The critical junction locations are shown in **Figure 2.1**.

5.1.2. Capacity analysis was carried out in accordance with the procedures outlined in TPDM. The capacity analysis was based on the existing traffic flows and traffic forecasts at the design year under the Reference Scenario (without Proposed Redevelopment) and Design Scenario (with Proposed Redevelopment).

5.2. Junction Assessment

5.2.1. The results of the junction capacity analysis under the Observed Scenario, design year 2032 Reference and Design Scenarios are summarized in **Table 5.1**. The calculation sheets are attached in **Appendix A**.

Table 5.1 – Junction Performance

Index *(1)*	Junction	Reserve Capacity (RC)					
		Year 2021 Observed Scenario		Year 2032 Reference Scenario		Year 2032 Design Scenario	
		AM	PM	AM	PM	AM	PM
J1	Nam Cheong Street / Cornwall Street	36%	35%	**5%**	**7%**	**3%**	**6%**
J2	Pak Wan Street near Bus Terminus	321%	242%	79%	66%	42%	42%
J3	Nam Cheong Street / Pak Wan Street *(2)*	65%	85%	64%	78%	57%	66%
J4	Pak Tin Street / Pak Wan Street / Wai Lun Street	145%	76%	62%	31%	49%	26%
J5	Nam Cheong Street / Tai Hang Sai Street / Wai Lun Street	68%	78%	17%	33%	15%	32%
J6	Nam Cheong Street / Wai Chi Street	66%	61%	40%	37%	38%	34%
J7	Pak Tin Street / Woh Chai Street	79%	117%	45%	83%	40%	80%
J8	Nam Cheong Street / Woh Chai Street	61%	99%	29%	47%	28%	44%

Remark: *(1) Refer to **Figure 2.1**.*
*(2) Junction improvement schemes to be implemented by others as presented in **Appendix D** was adopted in the assessment in Year 2032.*

5.2.2. As shown in **Table 5.1**, most of the junctions would operate within acceptable performance with RC greater than 15% under all scenarios except junction of Nam Cheong Street / Cornwall Street (J1).

Junction of Nam Cheong Street / Cornwall Street (J1)

5.2.3. Although the junction of Nam Cheong Street / Cornwall Street (J1) would operate with an unacceptable performance with RC less than 15% even without the Proposed Redevelopment, it would still operate within capacity with RC greater than 0%.

5.2.4. Comparing the Reference and Design Scenarios, RC would be reduced by approx. 2% due to the Proposed Redevelopment. Hence, the traffic impact of the Proposed Redevelopment is considered minimal and insignificant. Associated traffic improvement schemes should not constitute an essential development requirement for the Proposed Redevelopment.

5.2.5. Nevertheless, improvement schemes are suggested as shown in **Appendix B** for the consideration by government departments to enhance the performance of this problematic junction performance. Based on the suggested improvement scheme, this problematic junction could operate with acceptable performance with RC of 16% and 17% during morning and evening peak hour periods respectively.

5.2.6. Besides, it is understood that Civil Engineering and Development Department (CEDD) is proposing an improvement scheme for this junction to enhance its performance. The improvement scheme proposed by CEDD is shown in **Appendix C**. Relevant government departments and authorities are suggested to further liaise for the implementation of the improvement schemes if considered applicable.

5.3. Pedestrian Assessment

5.3.1. Pedestrian count surveys were conducted to identify the existing pedestrian flows during the peak hour periods from 07:30 to 09:30 and from 17:00 to 19:00 on typical weekday on 19 July 2022. The pedestrian demand at the footpaths and crossings adjacent to the Proposed Redevelopment are presented in **Table 5.2** . The locations of those footpaths and crossings are shown in **Figure 2.1**.

Table 5.2 – Observed Pedestrian Demand

Footpaths / Crossings (1)	Location	Pedestrian Demand (pph) (2)	
		AM	PM
P1	Pak Wan Street Northern Footpath (near Ching Tin House)	600	550
P2	Pak Wan Street Northern Footpath (near Pak Tin Community Complex)	550	450
P3	Nam Cheong Street Western Footpath (near Pak Tin Community Complex)	150	150
P4 (3)	Pak Wan Street Southern Footpath (near Pak Tin Public Transport Interchange)	-	-
C1 (4)	Pedestrain Crossing across Pak Wan Street at Junction J2	600	500
C2	Pedestrain Crossing across Pak Wan Street at Junction J3	450	400

Remarks:
*(1) Refer to **Figure 2.1**.*
(2) Numbers are rounded up to nearest 50.
(3) The footpath was temporarily closed during the survey period.
(4) The crossing at junction J2 was temporarily suspended during the survey period. The crossing had been temporarily relocated to the west of the estate access road, south of Pak Tin Estate Block 9.

5.3.2. Capacity analysis was carried out in accordance with the procedures outlined in TPDM and Highway Capacity Manual (HCM) 2000 under the Observed Scenario.

5.3.3. General performance of walkway is measured by Level-of-Service (LOS) based on HCM 2000 (Exhibit 11-8). LOS measures the degree of congestion in pedestrian facilities. The definition of LOS is given in **Table 5.3**. TPDM states that "LOS C is desirable for most design at streets with dominant 'living pedestrian activities".

Table 5.3 – Pedestrian Walkway Level of Service

LOS	Flow Rate (ppm/m)	Description
A	≤ 16	Pedestrians move in desired paths without altering their movements in response to other pedestrians. Walking speeds are freely selected, and conflicts between pedestrians are unlikely.
B	16 – 23	There is sufficient area for pedestrians to select walking speeds freely, to bypass other pedestrians, and to avoid crossing conflicts. At this level, pedestrians begin to be aware of other pedestrians, and to respond to their presence when selecting a walking path.
C	23 – 33	Space is sufficient for normal walking speeds, and for bypassing other pedestrians in primarily unidirectional streams. Reverse-direction or crossing movements can cause minor conflicts, and speeds and flow rate are somewhat lower.
D	33 – 49	Freedom to select individual walkway speeds and to bypass other pedestrians is restricted. Crossing or reserve-flow movements face a high probability of conflict, requiring frequent changes in speed and position. The LOS provides reasonably fluid flow, but friction and interaction between pedestrians is likely.
E	49 – 75	Virtually all pedestrians restrict their normal walking speed, frequently adjusting their gait. At the lower range, forward movement is possible only by shuffling. Space is not sufficient for passing slower pedestrians. Cross- or reverse-flow movements are possible only with extreme difficulties. Design volumes approach the limit of walkway capacity, with stoppages and interruptions to flow.
F	> 75	All walking speeds are severely restricted, and forward progress is made only by shuffling. There is frequent, unavoidable contact with other pedestrians. Cross- and reverse-flow movements are virtually impossible. Flow is sporadic and unstable. Space is more characteristic of queued pedestrians than of moving pedestrian streams.

5.3.4. To derive the pedestrian flow per 5-minute, a peak factor of 1.2 was applied to the peak hour pedestrian flow to reflect the peak 5-minute in the peak hour. The LOS assessment results under Observed Scenario are shown in **Table 5.4**.

Table 5.4 – Observed Operational Assessment for Footpath

Index *(1)*	Clear Width (m)	Effective Width (m) *(2)*	Pedestrian Demand (pph) *(3)*		Flow Rate (ppm/m)		LOS *(4)*	
			AM	PM	AM	PM	AM	PM
P1	3.5	2.5	600	550	5	4	A	A
P2	4.0	3	550	450	3	3	A	A
P3	2.5	1.5	150	150	2	2	A	A
P4 (5)	3.5	2.5	-	-	-	-	-	-

Remarks:
*(1) Refer to **Figure 2.1**.*
(2) Effective Width = Clear Width – Dead Width (0.5m at each side of walkway).
*(3) Refer to **Table 5.2**.*
*(4) Refer to **Table 5.3**.*
(5) Footpath was temporarily closed during survey period.

5.3.5. As shown in **Table 5.4**, all surveyed footpaths would operate with LOS "A" under Observed Scenario.

5.3.6. The performances of the surveyed pedestrian crossings are summarised and presented in **Table 5.5**

Table 5.5 – Observed Operational Pedestrian Crossing Assessment

Index (1)	Crossing Width (m)	Crossing Capacity (ppm/hr) (2)	Pedestrian Demand (pph) (3)		V/C Ratio	
			AM	PM	AM	PM
C1	5	3,050	600	500	0.20	0.26
C2	5	1,750	450	400	0.26	0.23

Remarks: *(1) Refer to **Figure 2.1**.*
(2) The crossing capacity is determined with reference to Chapter 3.2 in Volume 4 in TPDM. Numbers are rounded up to nearest 50.
*(3) Refer to **Table 5.2**.*

5.3.7. **Table 5.5** shows the surveyed pedestrian crossings would operate within capacity under Observed Scenario.

5.3.8. Pedestrian forecasts at design year were projected by applying an appropriate growth rate to the observed pedestrian flows. The growth rates were determined with reference to the 2019-based TPEDM planning data published by PlanD (-0.13% p.a. from **Table 4.4**) and 2020-based Hong Kong Population Projections published by Census and Statistics Department (+0.41% p.a. from **Table 4.5**).

5.3.9. In order to present a conservative scenario, a growth rate of +1% per annum is adopted to produce the year 2032 background pedestrian flows from the observed pedestrian flows.

5.3.10. There are several planned / committed developments in the vicinity of the Proposed Redevelopment. Pedestrian demand generated by the planned / committed developments were estimated making reference to in-house pedestrian trip generation rate database. Adopted trip rates and pedestrian generation of the planned / committed developments are summarized in **Table 5.6**.

Table 5.6 – Trip Rates and Pedestrian Demand of Planned/Committed Developments

Development Type	Parameters	Trip Rates (Domestic: pph/flat)				Pedestrian Demand (pph) (1)			
		AM		PM		AM		PM	
		Gen	Att	Gen	Att	Gen	Att	Gen	Att
Pak Tin Estate Redevelopment Phases 10 (2)									
Domestic	924 flats	0.61	0.17	0.22	0.45	565	155	205	415
Retail	1,800 m² GFA	2.32	2.26	3.13	3.30	40	40	55	60
Pak Tin Estate Redevelopment Phases 13 (2)									
Domestic	2,627 flats	0.61	0.17	0.22	0.45	1,600	445	580	1,180
Retail	220 m² GFA	2.32	2.26	3.13	3.30	5	5	5	5
Social Welfare Facilities (3)	3,700 m² GFA	-				50	50	50	50
Kindergarten (3)	800 m² GFA								
Car Park (3)	8,000 m² GFA								
Chak On Road South & Pak Tin Extension									
Domestic	1,147 flats	0.61	0.17	0.22	0.45	700	195	250	515
Social Welfare Facilities (4)	2,790 m² GFA	-				40	40	40	40

Remarks: (1) Numbers are rounded to nearest 5.

(2) With reference to approved TIA report of Pak Tin Estate Phase 13 Redevelopment.

(3) It is anticipated the pedestrian demand for the social welfare facilities, kindergarten and car park would be mainly generated by Pak Tin Estate Redevelopment Phases 13. The demand on public footpaths is anticipated to be minimal and 50pph is assumed for assessment purpose.

(4) The pedestrian demands for social welfare facilities are determined with reference to the approved TIA report of Pak Tin Estate Redevelopment Phases 13 on a pro rata basis for assessment purpose. It is anticipated the pedestrian demand for the social welfare facilities would be mainly generated by Proposed Redevelopment. The demand on public footpaths is anticipated to be minimal.

5.3.11. The pedestrian demand generated / attracted by the planned / committed developments will be assigned onto the surrounding footpath network and superimposed onto the background pedestrian flows to produce the reference pedestrian flows.

5.3.12. The pedestrian demand generated by the Proposed Redevelopment are summarized in **Table 5.7**.

Table 5.7 – Trip Rates and Pedestrian Demand

Development Type	Parameters	Trip Rates (Domestic: pph/flat(1), Office and Social Welfare Facilities: pph/100m² GFA(2))				Pedestrian Demand (pph)			
		AM		PM		AM		PM	
		Gen	Att	Gen	Att	Gen	Att	Gen	Att
Domestic	2,200 flats	0.61	0.17	0.22	0.45	1,340	375	485	990
Office (3)	2,200 m² GFA	0.34	0.73	0.45	0.24	21	45	28	15
Social Welfare Facilities (3)	3,940 m² GFA								

Remarks: (1) Adopted rates referred to approved TIA report of Pak Tin Estate Phase 13 Redevelopment.

(2) The pedestrian demands for office and social welfare facilities are determined with reference to the survey result of Tuen Mun Siu Lun Government Complex, which including offices and social welfare facilities.

5.3.13. The pedestrian demand at the footpaths adjacent to the Proposed Redevelopment at year 2032 under the scenario with the Proposed Redevelopment are shown in **Table 5.8**.

Table 5.8 – Pedestrian Demand in 2032 with Proposed Redevelopment

Index (1)	Pedestrian Demand (pph) (2)(3)	
	AM	PM
P1	1,900	1,650
P2	1,650	1,350
P3	600	550
P4	2,450	2,150
C1	2,000	1,750
C2	1,150	1,050

*Remarks: (1) Refer to **Figure 2.1**.*
(2) Seasonal factor has been adopted as the survey date is closed to summer holiday.
(3) Numbers are rounded up to nearest 50.

5.3.14. To derive the pedestrian flow per 5-minute, a peak factor of 1.2 was applied to the peak hour pedestrian flow to reflect the peak 5-minute in the peak hour. The LOS assessment results are shown in **Table 5.9**.

Table 5.9 – Operational Assessment for Footpath in 2032 with Proposed Redevelopment

Index (1)	Clear Width (m)	Effective Width (m) (2)	Pedestrian Demand (pph) (3)		Flow Rate (ppm/m)		LOS (4)	
			AM	PM	AM	PM	AM	PM
P1	3.5	2.5	1,900	1,650	15	13	A	A
P2	4.0	3	1,650	1,350	11	9	A	A
P3	2.5	1.5	600	550	8	7	A	A
P4	3.5	2.5	2,450	2,150	19	17	B	B

*Remarks: (1) Refer to **Figure 2.1**.*
(2) Effective Width = Clear Width – Dead Width (0.5m at each side of walkway).
*(3) Refer to **Table 5.8**.*
*(4) Refer to **Table 5.3**.*

5.3.15. As shown in **Table 5.9**, the footpaths adjacent to the Proposed Redevelopment would operate with LOS "A" or "B". The footpaths would be adequate to cater for the additional pedestrian demand generated from the Proposed Redevelopment.

5.3.16. The performances of the surveyed crossings are summarised and presented in **Table 5.10**.

Table 5.10 – Operational Assessment for Pedestrian Crossing in 2032 with Proposed Redevelopment

Index (1)	Crossing Width (m)	Crossing Capacity (ppm/hr) (2)	Pedestrian Demand (pph) (3)		V/C Ratio	
			AM	PM	AM	PM
C1	5	3,050	2,000	1,750	0.66	0.57
C2	5	1,750	1,150	1,050	0.66	0.60

*Remarks: (1) Refer to **Figure 2.1**.*
(2) The crossing capacity is determined with referencing Chapter 3.2 in Volume 4 in TPDM. Numbers are rounded up to nearest 50.
*(3) Refer to **Table 5.8**.*

5.3.17. **Table 5.10** shows the surveyed pedestrian crossings would operate within capacity in 2032 even with the Proposed Redevelopment. The pedestrian crossings would be adequate to cater for the additional pedestrian demand generated from the Proposed Redevelopment.

5.4. Public Transport Assessment

5.4.1. The public transport service utilization survey was conducted to identify the public transport utilization during the peak hour periods from 07:30 to 09:30 and from 17:00 to 19:00 on typical weekday on 19 July 2022. The surveyed locations are shown in **Figure 2.1**. The survey results are summarised in **Table 5.11**.

Table 5.11 – Results of Observed Public Transport Utilization

Index (1)	Location	Type	Peak Hour	Capacity (pax/hr) (2) (3)	Observed Demand (pax/hr) (4)	Utilization (5)
Stop1	Pak Tin Estate Public Transport Interchange	Bus	AM	1,440	160	12%
			PM	960	40	5%
		GMB	AM	240	120	50%
			PM	170	40	24%
Stop2	Fu Tin House Pak Tin Estate Bus Stop (Northbound)	Bus	AM	1,440	530	37%
			PM	2,040	1,070	53%
Stop3	Shui Tin House Pak Tin Estate Bus Stop (Southbound)	Bus	AM	3,120	1,430	46%
			PM	2,520	1,070	43%
Total			AM	6,240	2,240	36%
			PM	5,690	2,220	40%

Remarks:
*(1) Refer to **Figure 2.1**.*
(2) Assumed the capacity of a double-deck bus is 120 persons, and the capacity of a GMB is 19 persons.
(3) Numbers are rounded down to nearest 10.
(4) Numbers are rounded up to nearest 10.
(5) Percentages are rounded up to nearest 1%.

5.4.2. **Table 5.11** shows the overall public transport utilization in the vicinity of the Proposed Redevelopment in AM and PM peak hours are some 36% and 40% respectively, which are both lower the maximum allowed occupancy 75% with reference to Bus Route Planning Programme 2022-2023 of Sham Shui Po District published by TD.

5.4.3. Based on the Proposed Redevelopment parameters presented in **Table 2.1** the estimated peak hour patronage of the Proposed Redevelopment are evaluated and presented in **Table 5.12**.

Table 5.12 – Estimated Peak Hour Patronage

Item	Parameter
No. of PRH Flats	2,200 nos.
Estimated Population (1)	6,160 Persons
Estimated Mechanized Trip (2)	11,273 Trips
Estimated Peak Hour Patronage (3)	1,353 pax/hr
Estimated 1-way Peak Hour Patronage (4)	812 pax/hr

Remarks: *(1) Assumed 2.8 person per flat.*
(2) Adopted rate of mechanized trip per person 1.83 with reference to "Travel Characteristics Survey 2011" (TCS 2011) which is published by TD.
(3) Adopted peak hour factor 12% with reference to "Travel Characteristics Survey 2011" (TCS 2011) which is published by TD.
(4) Peak direction split of 60% are anticipated.

5.4.4. **Table 5.12** shows the estimated 1-way peak hour patronage of the Proposed Redevelopment will be 812 pax/hr.

5.4.5. By making reference to 2016 Population By-census Statistics for Shek Kip Mei, the estimated modal split of the Proposed Redevelopment and the 1-way patronage for different mode of transport are presented in **Table 5.13**.

Table 5.13 – Estimated Modal Split

Transport Mode	Modal Split			1-way Peak Hour Patronage (pax/hr)
	Working Population	Persons Attending Full-time Courses in Educational Institutions in Hong Kong	Average	
Feeder to Railway Stations	58%	31%	52%	420
Bus & Public Light Bus	18%	13%	17%	135
		Total	68%	555

5.4.6. **Table 5.13** shows that the estimated 1-way peak hour patronage taking feeder to railway stations and bus & public light bus is 555 pax/hr.

5.4.7. By considering other developments in the vicinity of the Proposed Redevelopment, the estimated public transport utilization in the design year are evaluated and presented in **Table 5.14**.

Table 5.14 – Estimated Public Transport Utilization in 2032 with Proposed Redevelopment

Scenario	Peak Hour	Capacity (pax/hr) (1)	Estimated Demand (pax/hr) (2)(3)	Utilization
2032 Reference (without the Proposed Redevelopment)	AM	6,240	3,700	59%
	PM	5,690	3,660	64%
2032 Design (with the Proposed Redevelopment)	AM	6,240	4,260	68%
	PM	5,690	4,220	74%

Remarks: *(1) It is anticipated that the capacities of bus and GMB during peak hour in year 2032 remain unchanged as existing for assessment purpose. The capacities are refer to **Table 5.11**.*
(2) Seasonal factor has been adopted as the survey date is closed to summer holiday.
(3) Numbers are rounded up to nearest 10.

5.4.8. **Table 5.14** shows the public transport utilization with the Proposed Redevelopment in AM and PM peak hours are 68% and 74% respectively, which are both below the maximum allowed occupancy 75%. Therefore, the public transport services would be adequate to cater for the additional passenger demand generated from the Proposed Redevelopment.

6. Summary and Conclusion

6.1. Summary

6.1.1. Atkins China Limited has been commissioned by Hong Kong Housing Authority to conduct a Traffic Impact Assessment Study to investigate the traffic impact induced by the Proposed Redevelopment at Pak Tin Estate Phase 12 in Shek Kip Mei.

6.1.2. The Proposed Redevelopment will provide 2,091 flats within the area of 3 residential blocks for population intake at year 2028/29.

6.1.3. The Proposed Redevelopment will provide minimum 135 nos. of car parking space, 15 nos. of visitor parking space, 14 nos. motorcycle parking space, 6 nos. light goods vehicle parking spaces, 6 nos. of loading and unloading bay for domestic purpose, 4 nos. of light bus bay for social welfare facilities and 11 nos. of car parking space for Hong Kong Housing Authority's office.

6.1.4. The vehicular accesses for the Proposed Redevelopment will be located at existing estate road / EVA in Pak Tin Estate that connecting to Pak Wan Street.

6.1.5. Vehicular traffic surveys were conducted to establish the current traffic condition in the vicinity of the Proposed Redevelopment.

6.1.6. 2,200 flats is adopted for assessment purpose. The Proposed Redevelopment would produce about 118 pcu/hr and 84 pcu/hr vehicular traffic during the morning and evening peak hour periods respectively.

6.1.7. Junction capacity assessments were undertaken for the critical junctions with respect to the traffic generation of the Proposed Redevelopment with consideration of adjacent planned developments.

6.1.8. It was found that most of the junctions would operate with an acceptable performance except the junction of Nam Cheong Street / Cornwall Street (J1). Junction J1 would encounter capacity problem even without the Proposed Redevelopment. Traffic improvement schemes should not constitute an essential development requirement for the Proposed Redevelopment. Nevertheless, improvement scheme for Junction J1 is suggested for the consideration by the relevant government departments. With these in place, the problematic junctions would be operated with acceptable performance.

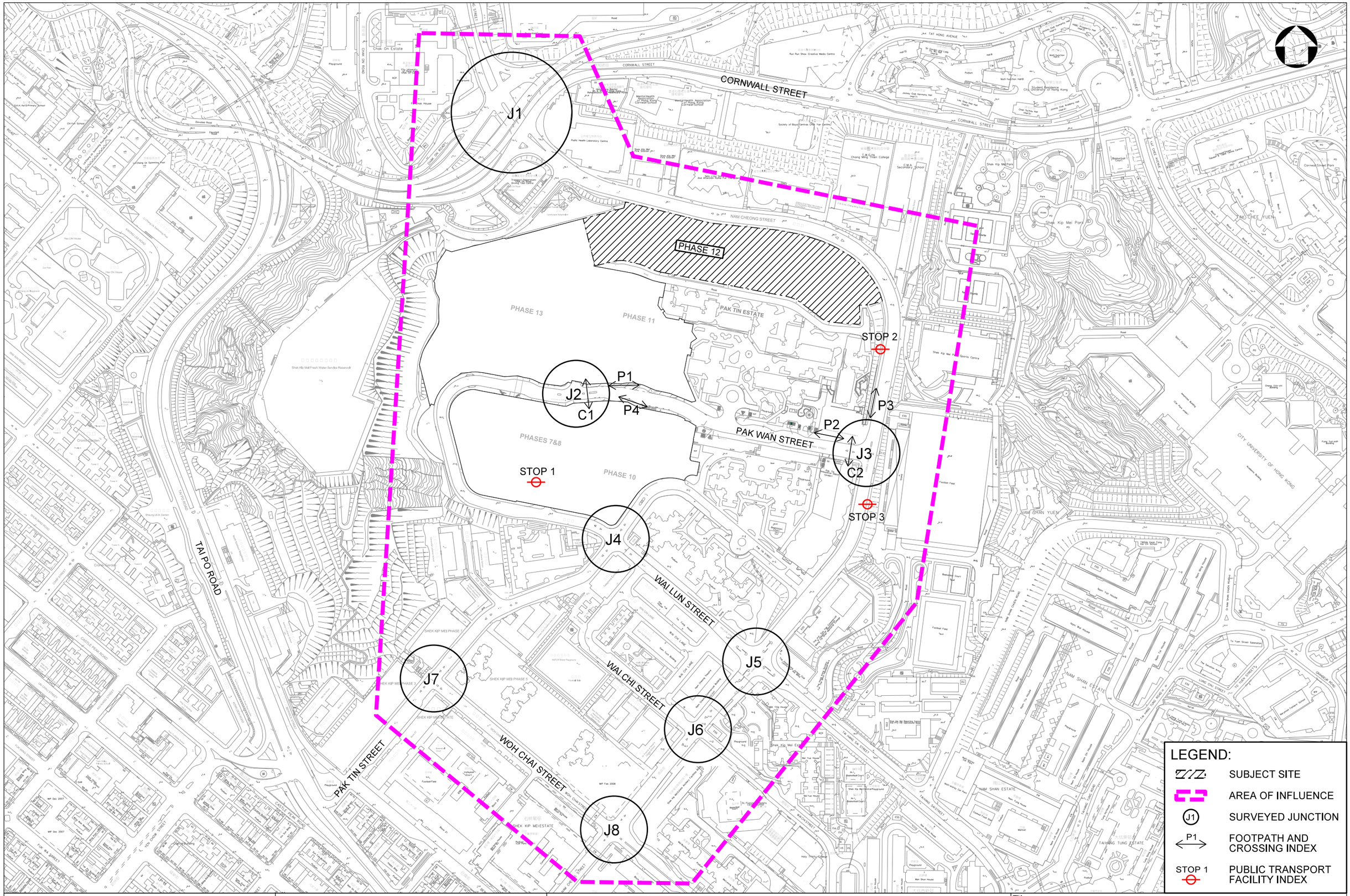
6.1.9. Capacity assessments were also undertaken for the footpaths and pedestrian crossings adjacent to the Proposed Redevelopment. It was found that all the assessed footpaths and pedestrian crossings would operate with acceptable performance even with the Proposed Redevelopment.

6.1.10. The public transport services are anticipated to be adequate to cater for the additional passenger demand generated from the Proposed Redevelopment.

6.2. Conclusion

6.2.1. Based on the above discussion, it is concluded that the Proposed Redevelopment at Pak Tin Estate Phase 12 would not induce adverse traffic impact on the surrounding road network upon completion. Therefore, the Proposed Redevelopment is considered acceptable in traffic point of view.

Figures



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FOR KOWLOON CENTRAL AND WEST AND ISLANDS REGION
INSTRUCTION NO. K15
PUBLIC HOUSING DEVELOPMENT AT PAK TIN ESTATE PHASE 12
TRAFFIC IMPACT ASSESSMENT (TIA)

Title

LOCATION PLAN

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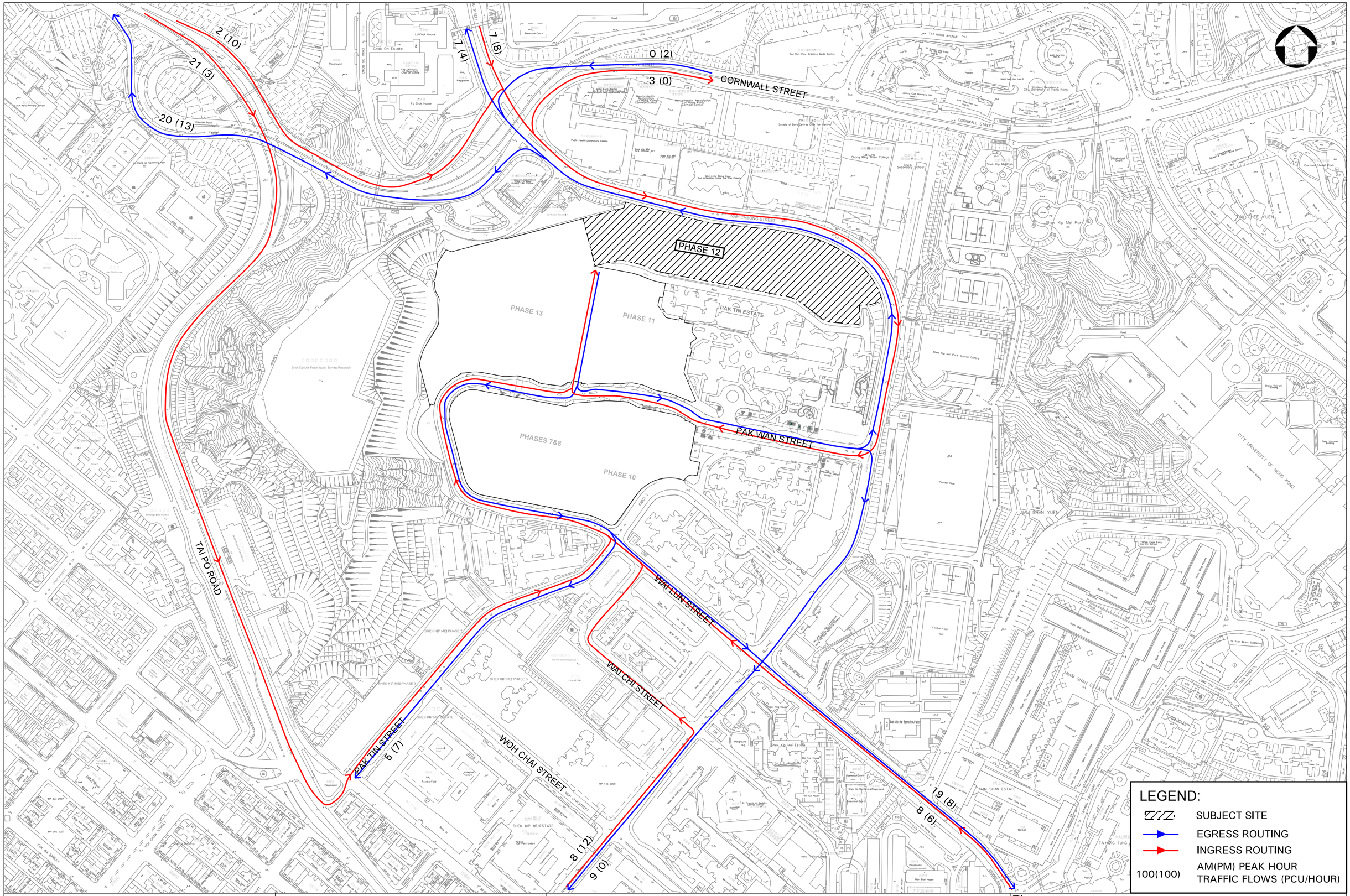

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PUBLIC HOUSING DEVELOPMENT AT PAK TIN ESTATE PHASE 12
TRAFFIC IMPACT ASSESSMENT (TIA)

Title

ACCESSIBILITY TO / FROM THE PROPOSED REDEVELOPMENT

Scale at A3	Date	Figure No.
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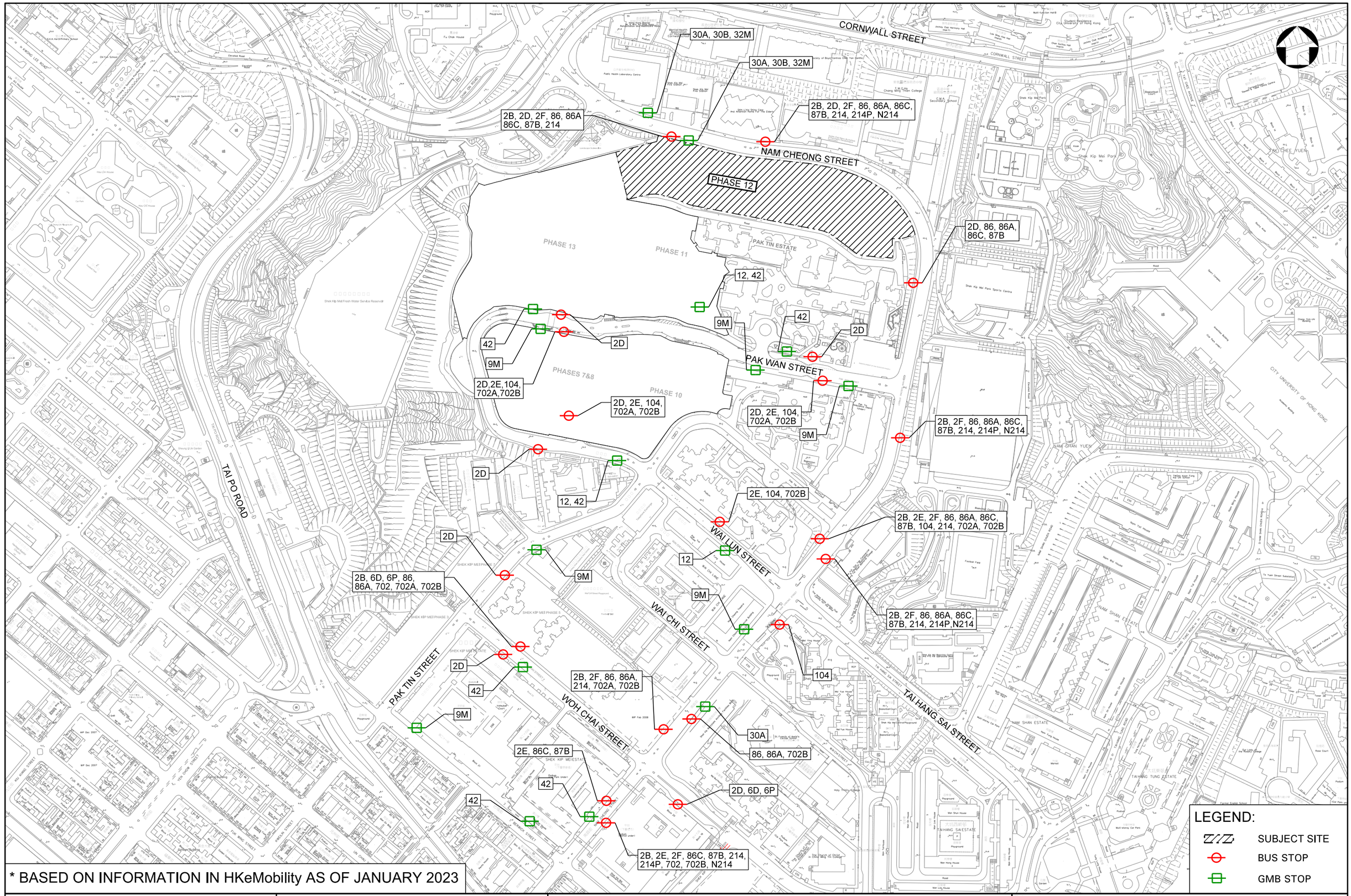

* BASED ON INFORMATION IN HKeMobility AS OF JANUARY 2023

LEGEND:

- SUBJECT SITE
- BUS STOP
- GMB STOP

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FOR KOWLOON CENTRAL AND WEST AND ISLANDS REGION
INSTRUCTION NO. K15
PUBLIC HOUSING DEVELOPMENT AT PAK TIN ESTATE PHASE 12
TRAFFIC IMPACT ASSESSMENT (TIA)

Title

PUBLIC TRANSPORT SERVICE POINTS

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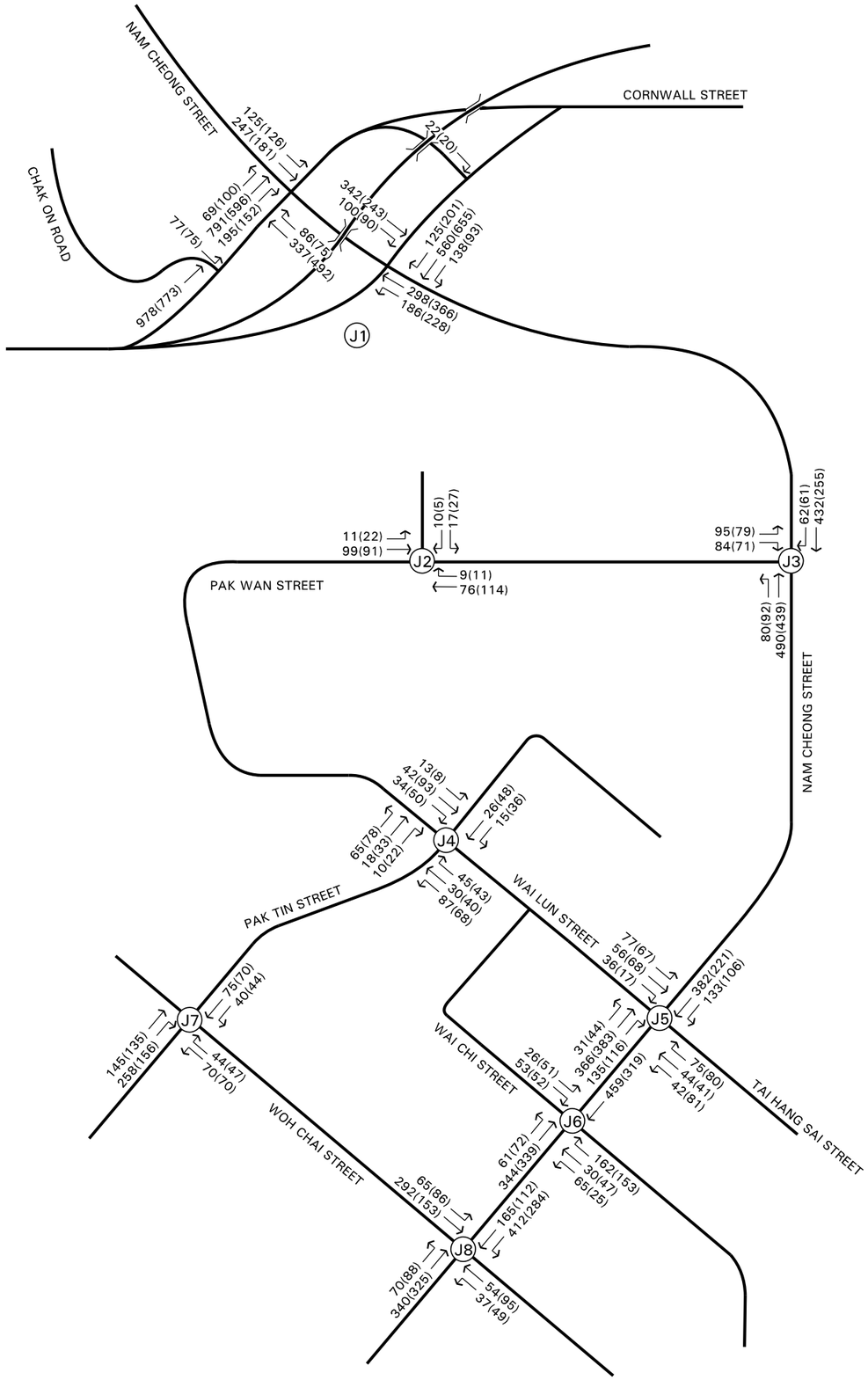

LEGEND:

(J1)	JUNCTION INDEX
100(100)	AM(PM) PEAK HOUR TRAFFIC FLOWS (PCU/HOUR)

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INSTRUCTION NO. K15
PUBLIC HOUSING DEVELOPMENT AT PAK TIN ESTATE PHASE 12
TRAFFIC IMPACT ASSESSMENT (TIA)

Title

YEAR 2021 OBSERVED TRAFFIC FLOWS

Scale at A3	Date	Figure No.
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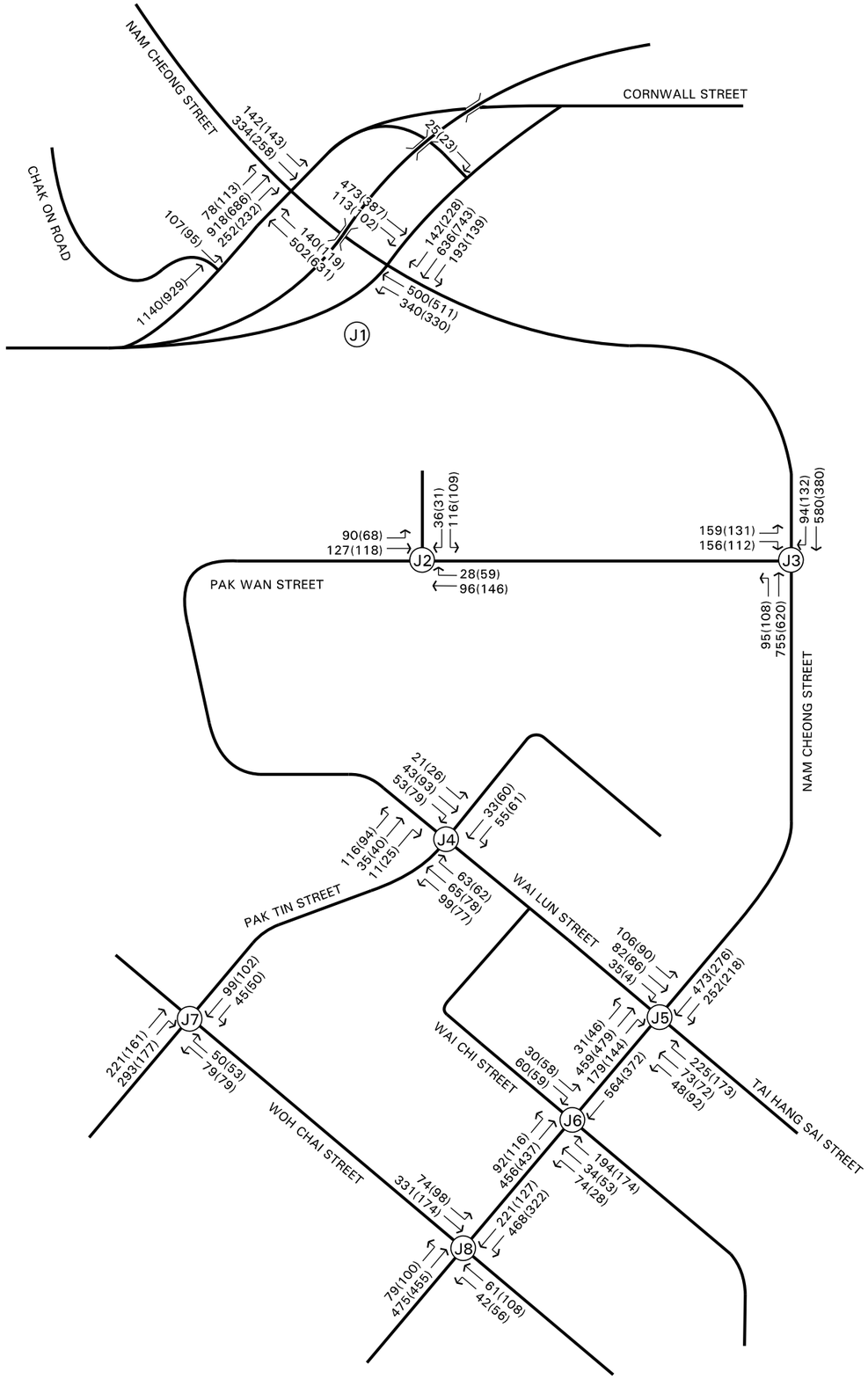

LEGEND:

(J1)	JUNCTION INDEX
100(100)	AM(PM) PEAK HOUR TRAFFIC FLOWS (PCU/HOUR)

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INSTRUCTION NO. K15
PUBLIC HOUSING DEVELOPMENT AT PAK TIN ESTATE PHASE 12
TRAFFIC IMPACT ASSESSMENT (TIA)

Title

YEAR 2032 REFERENCE TRAFFIC FLOWS

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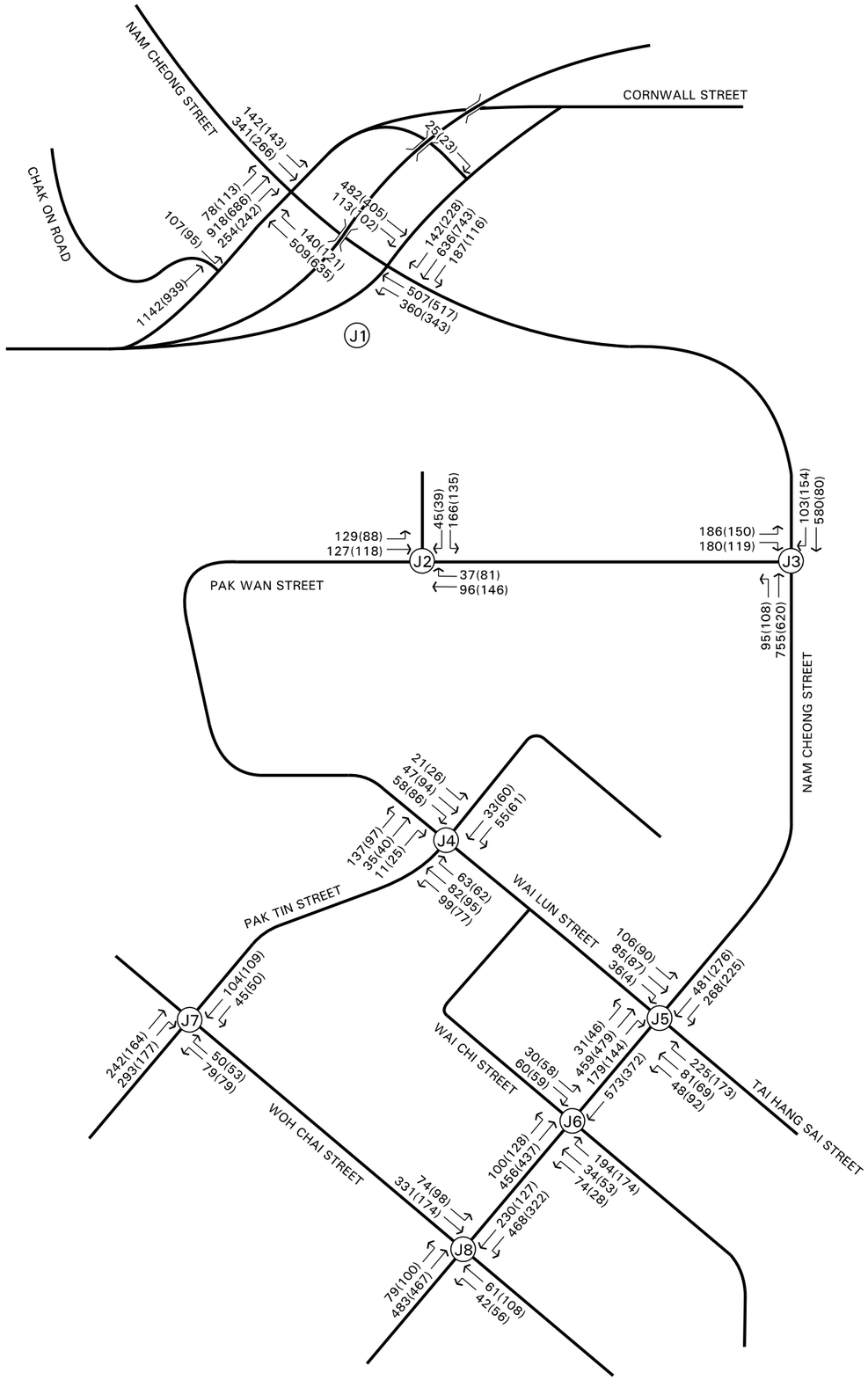

LEGEND:

J1	JUNCTION INDEX
100(100)	AM(PM) PEAK HOUR TRAFFIC FLOWS (PCU/HOUR)

香港房屋委員會
Hong Kong Housing Authority

SNC·LAVALIN

ATKINS
Member of the SNC-Lavalin Group

AGREEMENT NO. : CB 20180686 - TERM TRAFFIC AND ENVIRONMENTAL CONSULTANCY SERVICES 2019 - 2021 FOR KOWLOON CENTRAL AND WEST AND ISLANDS REGION
INSTRUCTION NO. K15
PUBLIC HOUSING DEVELOPMENT AT PAK TIN ESTATE PHASE 12
TRAFFIC IMPACT ASSESSMENT (TIA)

Title

YEAR 2032 DESIGN TRAFFIC FLOWS

Scale at A3	Date	Figure No.
N.T.S.	FEB 2023	4.3

PRINTED BY: HUK5188 2023-02-09 4:34:11 PM
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MODEL NAME: Default

Appendix A

Junction Calculation Sheets

TRAFFIC SIGNAL CALCULATION SHEET

ATKINS
Member of the SNC-Lavalin Group

JOB NO. : 5186651

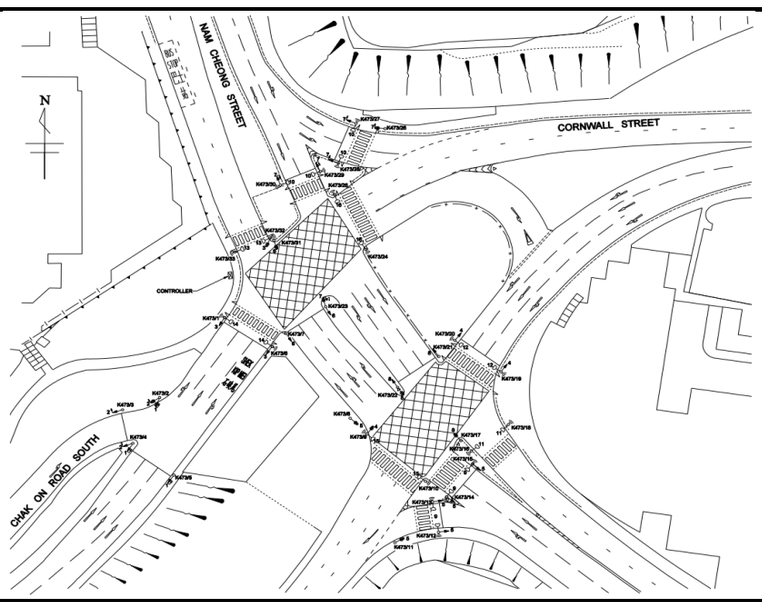
Junction : J1 - Nam Cheong Street / Cornwall Street

Design Year: 2021

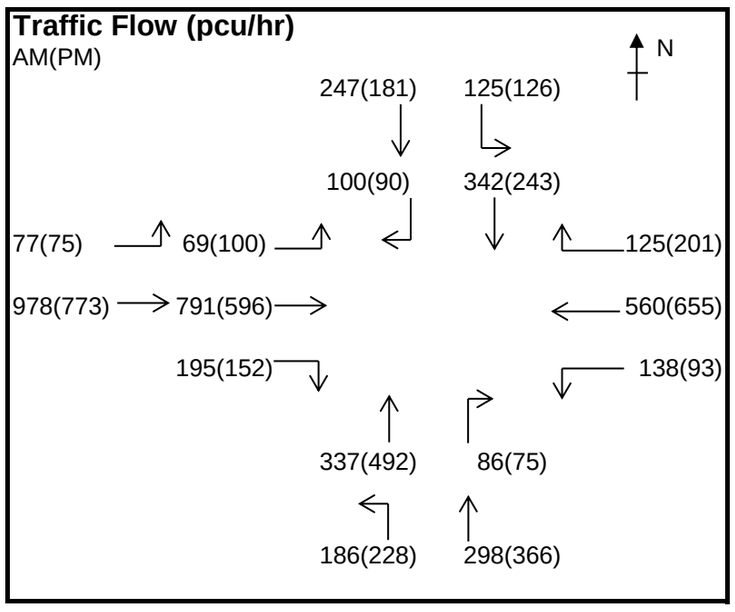
Scheme : Year 2021 Observed Flows

Designed by: DH

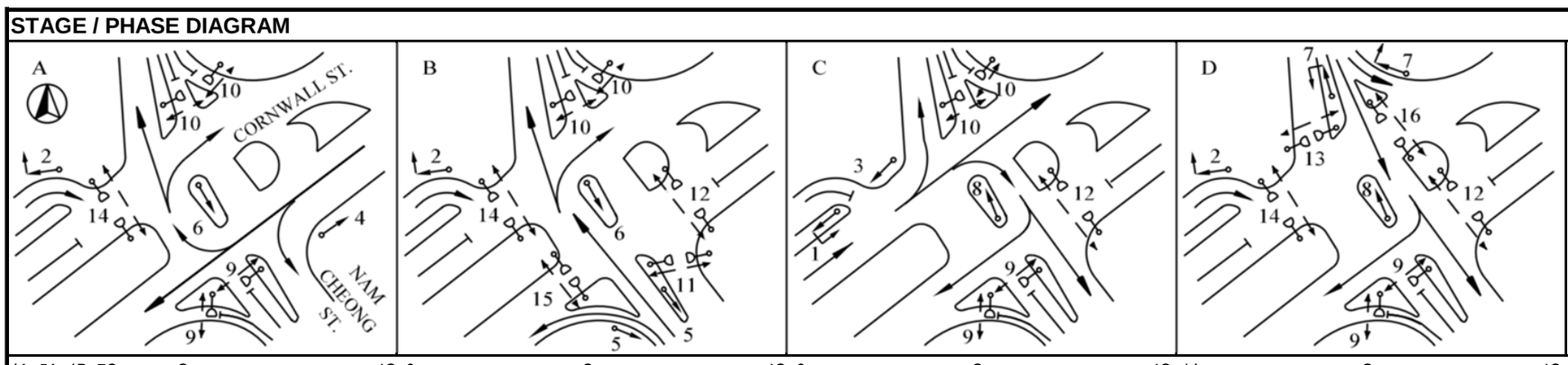
Checked by: PT



Traffic Flow (pcu/hr)
AM(PM)



STAGE / PHASE DIAGRAM



4A+5A+1B+7C	G=	IG=9	G=	IG=6	G=	IG=14	G=	IG=13	G=		
4A+5B+1B+7D	G=	IG=9	G=	IG=6	G=	IG=14	G=	IG=13	G=		

Capacity Calculations

Phase	Stage	Lane Width (m) ***w***	Nearside lane? (Y/N)	Opposed turn? (Y/N)	Radius for turning (m) ***r***	Gradient in % ***g***	AM Peak Design Flow ***q*** (pcu/hr)	AM Peak Proportion turning (%) ***f***	AM Peak Saturation flow ***S*** (pcu/hr)	AM Peak Flow factor ***y***	PM Peak Design Flow ***q*** (pcu/hr)	PM Peak Proportion turning (%) ***f***	PM Peak Saturation flow ***S*** (pcu/hr)	PM Peak Flow factor ***y***
Cornwall Street EB														
1A	C	3.30	N	N			257		1490	0.172	203		1490	0.136
1B	C	3.30	N	N			361		2085	**0.173**	285		2085	**0.137**
1C	C	3.30	N	N			360		2085	0.173	285		2085	0.137
2A	A,B,D	6.00	Y	N	20		77	100%	2060	0.037	75	100%	2060	0.036
3A	C	3.50	Y	N	20		342	20%	1935	0.177	272	37%	1910	0.142
3B	C	3.50	N	N			371		2105	0.176	299		2105	0.142
3C	C	3.50	N	N	10		342	57%	1940	0.176	277	55%	1945	0.142
Cornwall Street WB														
4A	A	3.30	Y	N	20		261	53%	1870	**0.140**	307	30%	1900	**0.162**
4B	A	3.30	N	N			290		2085	0.139	336		2085	0.161
4C	A	3.30	N	N	10		272	46%	1950	0.139	306	66%	1900	0.161
Nam Cheong Street NB														
5A	B	5.50	Y	N	30		186	100%	1855	**0.100**	228	100%	1855	0.123
5B	B	4.00	N	N			82		820	0.100	101		820	**0.123**
5C	B	4.00	N	N			216		2155	0.100	265		2155	0.123
6A	A,B	3.00	Y	N			163		1915	0.085	237		1915	0.124
6B	A,B	3.00	N	N	20		174	0%	2055	0.085	255	0%	2055	0.124
6C	A,B	3.00	N	N	15		86	100%	1870	0.046	75	100%	1870	0.040
Nam Cheong Street SB														
7A	D	4.00	Y	N	40		60	100%	870	0.069	61	100%	1065	0.057
7B	D	4.00	N	N	45		65	100%	935	0.070	65	100%	1140	0.057
7C	D	3.50	N	N			101		1450	**0.070**	60		1050	0.057
7D	D	3.50	N	N			146		2105	0.069	121		2105	**0.057**
8A	C,D	3.00	Y	N			165		1915	0.086	117		1915	0.061
8B	C,D	3.00	N	N	20		177	0%	2055	0.086	126	0%	2055	0.061
8C	C,D	3.00	N	N	15		100	100%	1870	0.053	90	100%	1870	0.048
9p	A,C,D		5GM +	7FG =	12s									
10p	A,B,C		5GM +	8FG =	13s									
11p	B		5GM +	8FG =	13s									
12p	B,C,D		5GM +	11FG =	16s									
13p	D		5GM +	7FG =	12s									
14p	A,B,D		5GM +	11FG =	16s									
15p	B		5GM +	10FG =	15s									
16p	D		6GM +	12FG =	18s									

Notes:

To achieve an equilibrium operational performance reflecting the actual driving behaviours for the flared apporaches, the following site factors have been applied for AM(PM) Peaks:

1) Cornwall Street EB, Phase 1A - 0.715 (0.715) - *Total saturation flow for Cornwall Street EB = 5660 (5660) pcu/hr*

2) Nam Cheong Street NB, Phase 5A - 0.900 (0.899)

3) Nam Cheong Street NB, Phase 5B - 0.380 (0.381) - *Total saturation flow for Nam Cheong Street NB = 4830 (4830) pcu/hr*

4) Nam Cheong Street SB, Phase 7A - 0.449 (0.548)

5) Nam Cheong Street SB, Phase 7BA - 0.449 (0.547)

6) Nam Cheong Street SB, Phase 7C - 0.690 (0.499) - *Total saturation flow for Nam Cheong Street SB = 5360 (5360) pcu/hr*

AM Peak	4A+5A+1B+7C	PM Peak	4A+5B+1B+7D
Sum of Critical *y* ***Y***	**0.483**	Sum of Critical *y* ***Y***	**0.479**
Lost Time ***L*** (sec)	38	Lost Time ***L*** (sec)	38
Cycle Time ***c*** (sec)	140	Cycle Time ***c*** (sec)	135
Practical *Y* ***Ypr***	0.656	Practical *Y* ***Ypr***	0.647
Reserve Capacity ***RC***	**36%**	Reserve Capacity ***RC***	**35%**

Date : 15-Feb-23 Junction : J1 - Nam Cheong Street / Cornwall Street

ATKINS CHINA LIMITED

TRAFFIC SIGNAL CALCULATION SHEET

ATKINS
Member of the SNC-Lavalin Group

JOB NO. : 5186651

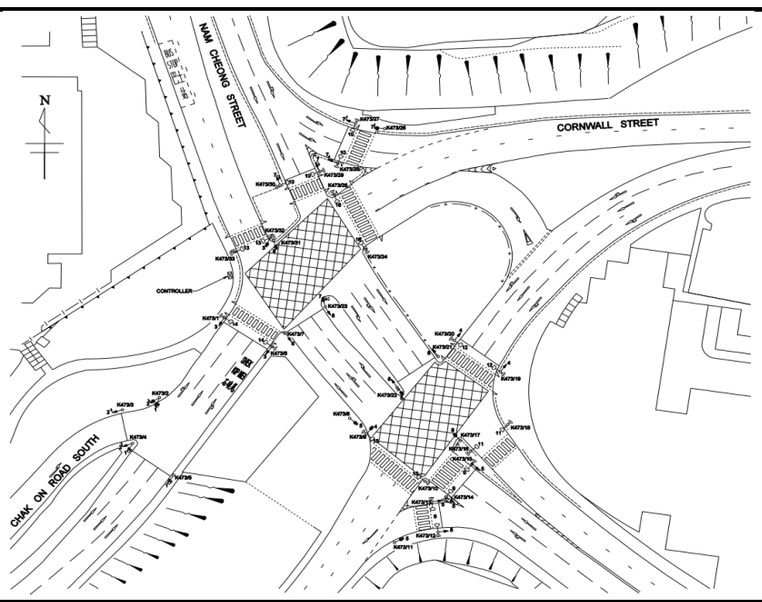
Junction : J1 - Nam Cheong Street / Cornwall Street

Design Year: 2032

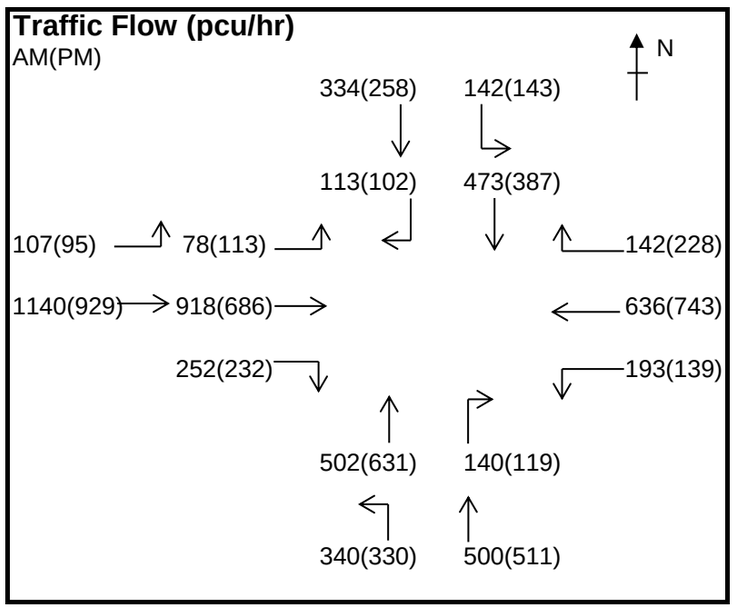
Scheme : Year 2032 Reference Flows

Designed by: DH

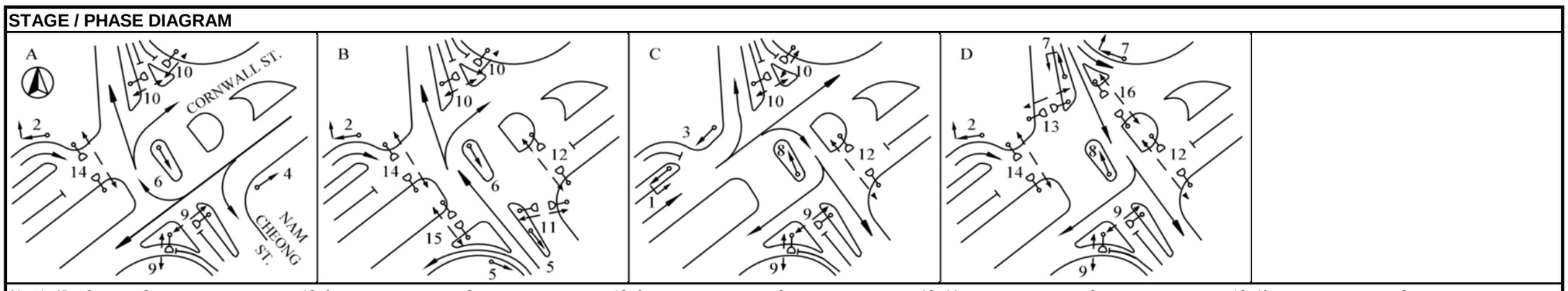
Checked by: PT



Traffic Flow (pcu/hr)
AM(PM)



STAGE / PHASE DIAGRAM



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4B+5C+1A+7D	G=	IG=9	G=	IG=6	G=	IG=14	G=	IG=13	G=		

Capacity Calculations

Phase	Stage	Lane Width (m) ***w***	Nearside lane? (Y/N)	Opposed turn? (Y/N)	Radius for turning (m) ***r***	Gradient in % ***g***	AM Peak Design Flow ***q*** (pcu/hr)	AM Peak Proportion turning (%) ***f***	AM Peak Saturation flow ***S*** (pcu/hr)	AM Peak Flow factor ***y***	PM Peak Design Flow ***q*** (pcu/hr)	PM Peak Proportion turning (%) ***f***	PM Peak Saturation flow ***S*** (pcu/hr)	PM Peak Flow factor ***y***
Cornwall Street EB														
1A	C	3.30	N	N			300		1490	0.201	245		1490	**0.164**
1B	C	3.30	N	N			420		2085	**0.201**	342		2085	0.164
1C	C	3.30	N	N			420		2085	0.201	342		2085	0.164
2A	A,B,D	6.00	Y	N	20		107	100%	2060	0.052	95	100%	2060	0.046
3A	C	3.50	Y	N	20		405	19%	1935	0.209	333	34%	1915	0.174
3B	C	3.50	N	N			440		2105	0.209	367		2105	0.174
3C	C	3.50	N	N	10		403	63%	1925	0.209	331	70%	1905	0.174
Cornwall Street WB														
4A	A	3.30	Y	N	20		306	63%	1855	**0.165**	357	39%	1890	0.189
4B	A	3.30	N	N			343		2085	0.165	394		2085	**0.189**
4C	A	3.30	N	N	10		322	44%	1955	0.165	359	64%	1905	0.188
Nam Cheong Street NB														
5A	B	5.50	Y	N	30		340	100%	1950	**0.174**	330	100%	1900	0.174
5B	B	4.00	N	N			126		725	0.174	135		775	0.174
5C	B	4.00	N	N			374		2155	0.174	376		2155	**0.174**
6A	A,B	3.00	Y	N			242		1915	0.126	304		1915	0.159
6B	A,B	3.00	N	N	20		260	0%	2055	0.127	327	0%	2055	0.159
6C	A,B	3.00	N	N	15		140	100%	1870	0.075	119	100%	1870	0.064
Nam Cheong Street SB														
7A	D	4.00	Y	N	40		68	100%	775	0.088	69	100%	925	0.075
7B	D	4.00	N	N	45		74	100%	835	0.089	74	100%	995	0.074
7C	D	3.50	N	N			147		1645	**0.089**	100		1335	0.075
7D	D	3.50	N	N			187		2105	0.089	158		2105	**0.075**
8A	C,D	3.00	Y	N			228		1915	0.119	187		1915	0.098
8B	C,D	3.00	N	N	20		245	0%	2055	0.119	200	0%	2055	0.097
8C	C,D	3.00	N	N	15		113	100%	1870	0.060	102	100%	1870	0.055
9p	A,C,D		5GM +	7FG =	12s									
10p	A,B,C		5GM +	8FG =	13s									
11p	B		5GM +	8FG =	13s									
12p	B,C,D		5GM +	11FG =	16s									
13p	D		5GM +	7FG =	12s									
14p	A,B,D		5GM +	11FG =	16s									
15p	B		5GM +	10FG =	15s									
16p	D		6GM +	12FG =	18s									

Notes:

To achieve an equilibrium operational performance reflecting the actual driving behaviours for the flared apporaches, the following site factors have been applied for AM(PM) Peaks:

1) Cornwall Street EB, Phase 1A - 0.715 (0.715) - *Total saturation flow for Cornwall Street EB = 5660 (5660) pcu/hr*

2) Nam Cheong Street NB, Phase 5A - 0.945 (0.922)
3) Nam Cheong Street NB, Phase 5B - 0.336 (0.360) - *Total saturation flow for Nam Cheong Street NB = 4830 (4830) pcu/hr*

4) Nam Cheong Street SB, Phase 7A - 0.400 (0.477)
5) Nam Cheong Street SB, Phase 7BA - 0.400 (0.477)
6) Nam Cheong Street SB, Phase 7C - 0.782 (0.635) - *Total saturation flow for Nam Cheong Street SB = 5360 (5360) pcu/hr*

AM Peak	4A+5A+1B+7C	PM Peak	4B+5C+1A+7D
Sum of Critical *y* ***Y***	**0.628**	Sum of Critical *y* ***Y***	**0.601**
Lost Time ***L*** (sec)	38	Lost Time ***L*** (sec)	38
Cycle Time ***c*** (sec)	140	Cycle Time ***c*** (sec)	135
Practical *Y* ***Ypr***	0.656	Practical *Y* ***Ypr***	0.647
Reserve Capacity ***RC***	**4%**	Reserve Capacity ***RC***	**8%**

Date : 15-Feb-23 Junction : J1 - Nam Cheong Street / Cornwall Street

ATKINS CHINA LIMITED

TRAFFIC SIGNAL CALCULATION SHEET

ATKINS
Member of the SNC-Lavalin Group

JOB NO. : 5186651

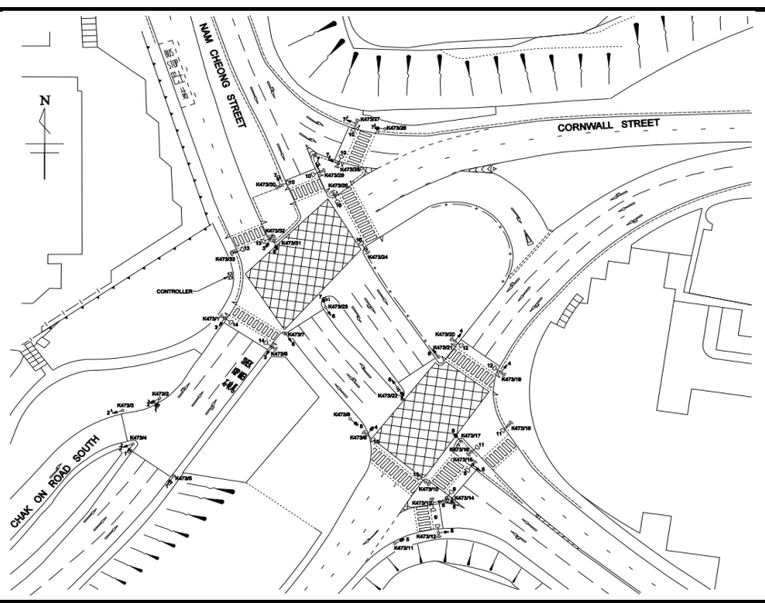
Junction : J1 - Nam Cheong Street / Cornwall Street

Design Year: 2032

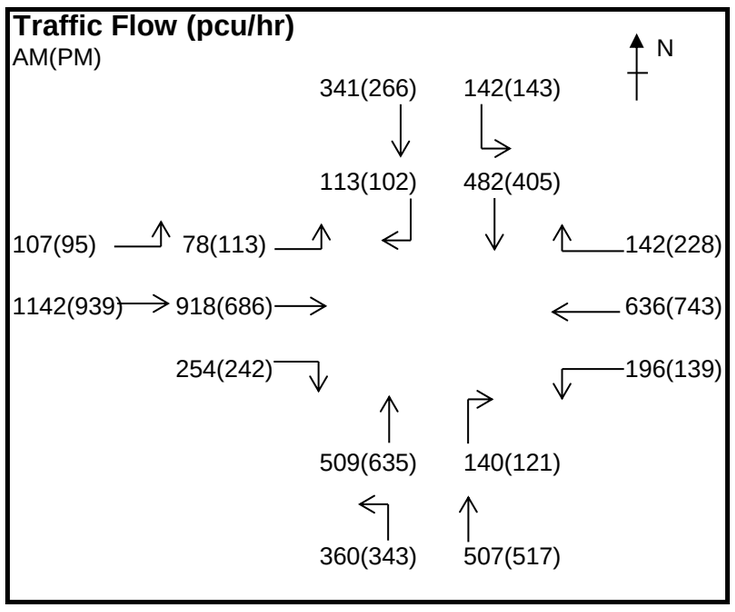
Scheme : Year 2032 Design Flows

Designed by: DH

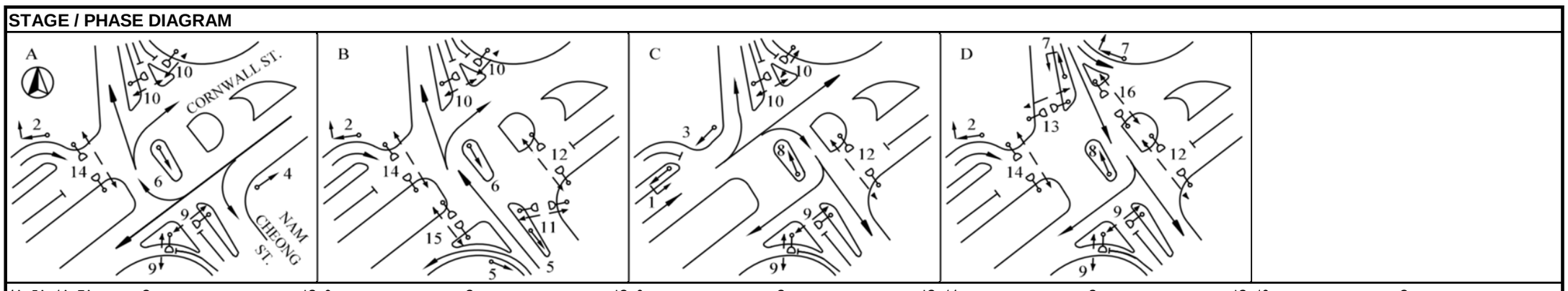
Checked by: PT



Traffic Flow (pcu/hr)
AM(PM)



STAGE / PHASE DIAGRAM



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4B+5C+1B+7C	G=	IG=9	G=	IG=6	G=	IG=14	G=	IG=13	G=		

Capacity Calculations

Phase	Stage	Lane Width (m) ***w***	Nearside lane? (Y/N)	Opposed turn? (Y/N)	Radius for turning (m) ***r***	Gradient in % ***g***	AM Peak Design Flow ***q*** (pcu/hr)	AM Peak Proportion turning (%) ***f***	AM Peak Saturation flow ***S*** (pcu/hr)	AM Peak Flow factor ***y***	PM Peak Design Flow ***q*** (pcu/hr)	PM Peak Proportion turning (%) ***f***	PM Peak Saturation flow ***S*** (pcu/hr)	PM Peak Flow factor ***y***
Cornwall Street EB														
1A	C	3.30	N	N			301		1490	**0.202**	247		1490	0.166
1B	C	3.30	N	N			420		2085	0.201	346		2085	**0.166**
1C	C	3.30	N	N			421		2085	0.202	346		2085	0.166
2A	A,B,D	6.00	Y	N	20		107	100%	2060	0.052	95	100%	2060	0.046
3A	C	3.50	Y	N	20		406	19%	1935	0.210	337	34%	1915	0.176
3B	C	3.50	N	N			441		2105	0.210	370		2105	0.176
3C	C	3.50	N	N	10		403	63%	1925	0.209	334	72%	1900	0.176
Cornwall Street WB														
4A	A	3.30	Y	N	20		307	64%	1855	**0.165**	357	39%	1890	0.189
4B	A	3.30	N	N			344		2085	0.165	394		2085	**0.189**
4C	A	3.30	N	N	10		323	44%	1955	0.165	359	64%	1905	0.188
Nam Cheong Street NB														
5A	B	5.50	Y	N	30		360	100%	1995	**0.180**	343	100%	1925	0.178
5B	B	4.00	N	N			122		680	0.179	133		750	0.177
5C	B	4.00	N	N			385		2155	0.179	384		2155	**0.178**
6A	A,B	3.00	Y	N			246		1915	0.128	306		1915	0.160
6B	A,B	3.00	N	N	20		263	0%	2055	0.128	329	0%	2055	0.160
6C	A,B	3.00	N	N	15		140	100%	1870	0.075	121	100%	1870	0.065
Nam Cheong Street SB														
7A	D	4.00	Y	N	40		69	100%	760	**0.091**	69	100%	910	0.076
7B	D	4.00	N	N	45		73	100%	815	0.090	74	100%	980	0.076
7C	D	3.50	N	N			151		1680	0.090	105		1365	**0.077**
7D	D	3.50	N	N			190		2105	0.090	161		2105	0.076
8A	C,D	3.00	Y	N			233		1915	0.122	195		1915	0.102
8B	C,D	3.00	N	N	20		249	0%	2055	0.121	210	0%	2055	0.102
8C	C,D	3.00	N	N	15		113	100%	1870	0.060	102	100%	1870	0.055
9p	A,C,D		5GM +	7FG =	12s									
10p	A,B,C		5GM +	8FG =	13s									
11p	B		5GM +	8FG =	13s									
12p	B,C,D		5GM +	11FG =	16s									
13p	D		5GM +	7FG =	12s									
14p	A,B,D		5GM +	11FG =	16s									
15p	B		5GM +	10FG =	15s									
16p	D		6GM +	12FG =	18s									

Notes:

To achieve an equilibrium operational performance reflecting the actual driving behaviours for the flared apporaches, the following site factors have been applied for AM(PM) Peaks:

1) Cornwall Street EB, Phase 1A - 0.715 (0.715) - *Total saturation flow for Cornwall Street EB = 5660 (5660) pcu/hr*

2) Nam Cheong Street NB, Phase 5A - 0.967 (0.933)

3) Nam Cheong Street NB, Phase 5B - 0.315 (0.347) - *Total saturation flow for Nam Cheong Street NB = 4830 (4830) pcu/hr*

4) Nam Cheong Street SB, Phase 7A - 0.391 (0.469)

5) Nam Cheong Street SB, Phase 7BA - 0.391 (0.469)

6) Nam Cheong Street SB, Phase 7C - 0.799 (0.648) - *Total saturation flow for Nam Cheong Street SB = 5360 (5360) pcu/hr*

AM Peak	4A+5A+1A+7A	PM Peak	4B+5C+1B+7C
Sum of Critical *y* ***Y***	**0.637**	Sum of Critical *y* ***Y***	**0.609**
Lost Time ***L*** (sec)	38	Lost Time ***L*** (sec)	38
Cycle Time ***c*** (sec)	140	Cycle Time ***c*** (sec)	135
Practical *Y* ***Ypr***	0.656	Practical *Y* ***Ypr***	0.647
Reserve Capacity ***RC***	**3%**	Reserve Capacity ***RC***	**6%**

Date : 15-Feb-23 Junction : J1 - Nam Cheong Street / Cornwall Street

ATKINS CHINA LIMITED

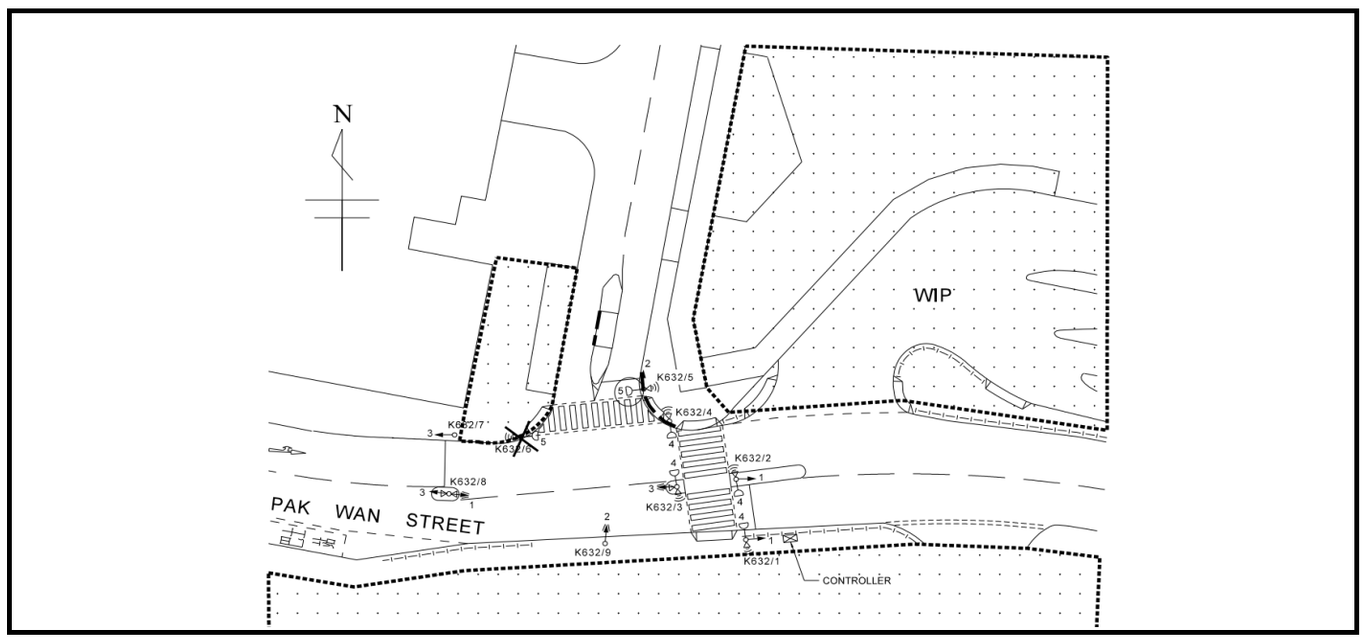
TRAFFIC SIGNAL CALCULATION SHEET

ATKINS
Member of the SNC-Lavalin Group

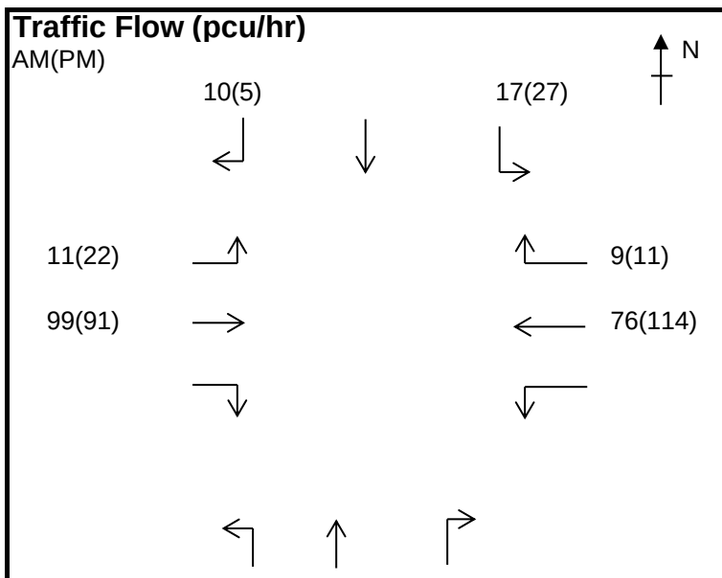
JOB NO. : 5186651

Junction : J2 - Pak Wan Street near Bus Terminus Design Year: 2021

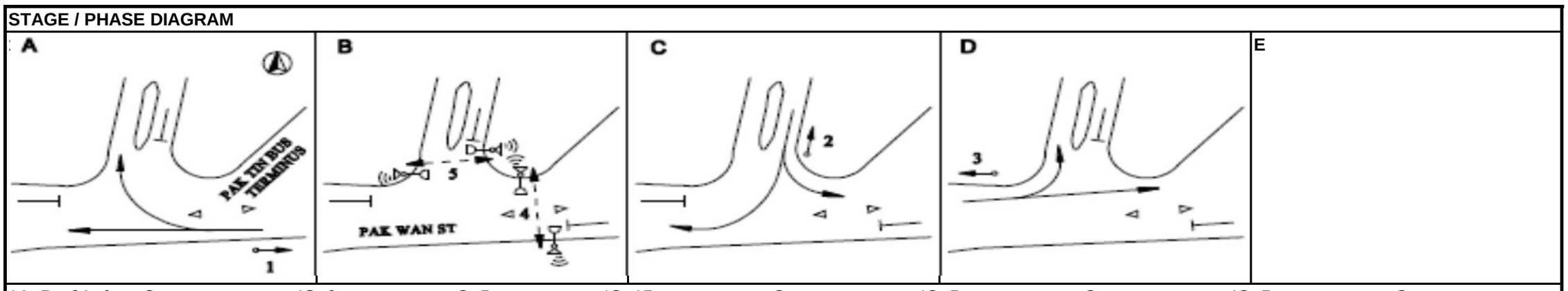
Scheme : Year 2021 Observed Flows Designed by: DH Checked by: PT



Traffic Flow (pcu/hr)
AM(PM)



STAGE / PHASE DIAGRAM



1A+5p+2A+3	G=	IG=9	G=5	IG=15	G=	IG=5	G=	IG=5	G=
1A+5p+2A+3A	G=	IG=9	G=5	IG=15	G=	IG=5	G=	IG=5	G=

Capacity Calculations

Phase	Stage	Lane Width (m) *w*	Nearside lane? (Y/N)	Opposed turn? (Y/N)	Radius for turning (m) *r*	Gradient in % *g*	AM Peak Design Flow *q* (pcu/hr)	AM Peak Proportion turning (%) *f*	AM Peak Saturation flow *S* (pcu/hr)	AM Peak Flow factor *y*	PM Peak Design Flow *q* (pcu/hr)	PM Peak Proportion turning (%) *f*	PM Peak Saturation flow *S* (pcu/hr)	PM Peak Flow factor *y*
Pak Wan Street WB														
1A	A	3.50	Y	N	15		85	11%	1945	**0.044**	125	9%	1950	**0.064**
Estate Road SB														
2A	C	3.50	Y	N	7.5/20		27	63% / 37%	1705	**0.016**	32	84% / 16%	1665	**0.019**
Pak Wan Street EB														
3A	D	5.50	Y	N	10		110	10%	2135	**0.052**	113	19%	2105	**0.054**
4p	B		5GM +	10FG =	15s									
5p	B		5GM +	10FG =	15s									

Notes:	**AM Peak**	**1A+5p+2A+3A**	**PM Peak**	**1A+5p+2A+3A**
	Sum of Critical *y* ***Y***	**0.111**	Sum of Critical *y* ***Y***	**0.137**
	Lost Time ***L*** (sec)	36	Lost Time ***L*** (sec)	36
	Cycle Time ***c*** (sec)	75	Cycle Time ***c*** (sec)	75
	Practical *Y* ***Ypr***	0.468	Practical *Y* ***Ypr***	0.468
	Reserve Capacity ***RC***	**321%**	Reserve Capacity ***RC***	**242%**

Date : 15-Feb-23 Junction : J2 - Pak Wan Street near Bus Terminus

ATKINS CHINA LIMITED

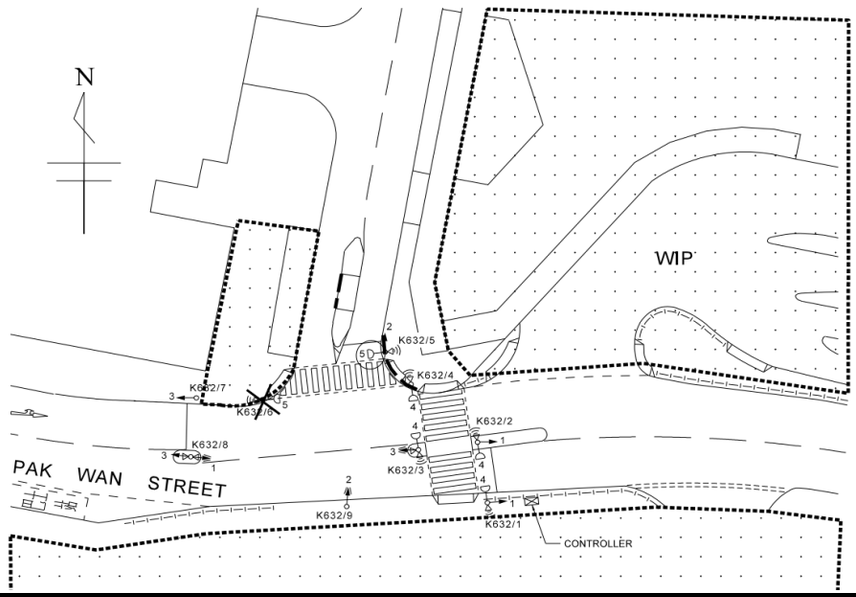
TRAFFIC SIGNAL CALCULATION SHEET

ATKINS
Member of the SNC-Lavalin Group

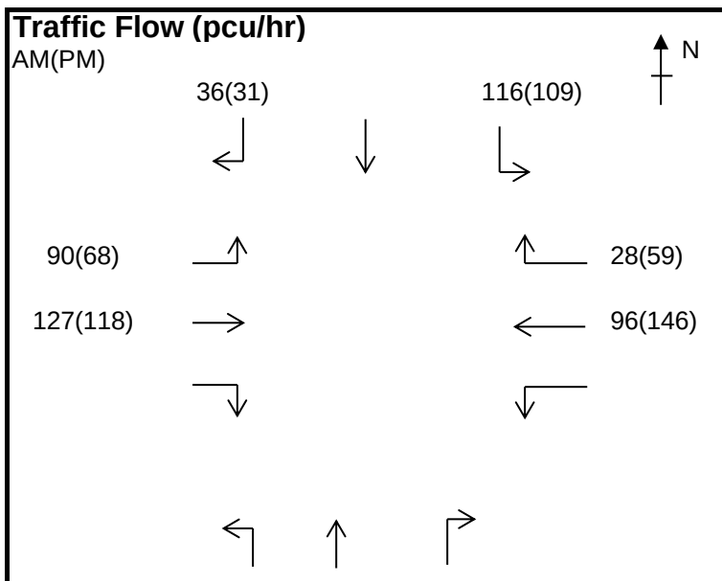
JOB NO. : 5186651

Junction : J2 - Pak Wan Street near Bus Terminus Design Year: 2032

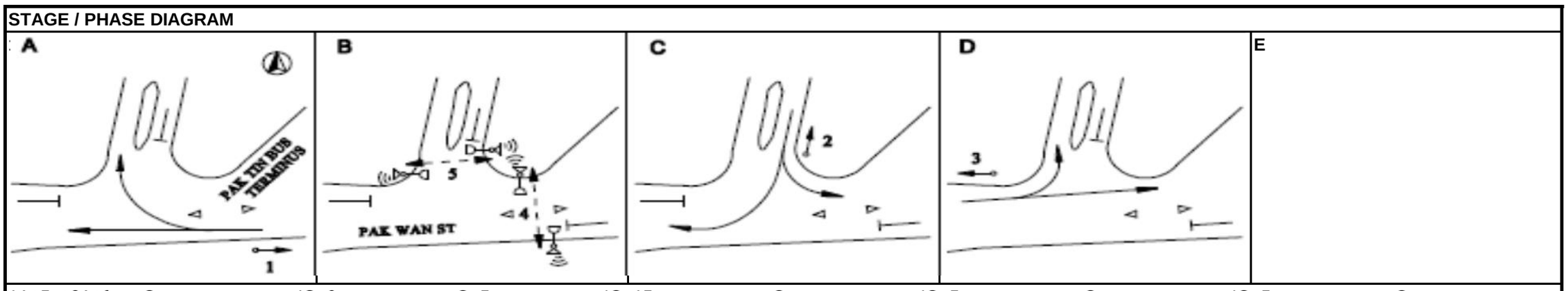
Scheme : Year 2032 Reference Flows Designed by: DH Checked by: PT



Traffic Flow (pcu/hr)
AM(PM)



STAGE / PHASE DIAGRAM



1A+5p+2A+3	G=	IG=9	G=5	IG=15	G=	IG=5	G=	IG=5	G=	
1A+5p+2A+3A	G=	IG=9	G=5	IG=15	G=	IG=5	G=	IG=5	G=	

Capacity Calculations

Phase	Stage	Lane Width (m) *w*	Nearside lane? (Y/N)	Opposed turn? (Y/N)	Radius for turning (m) *r*	Gradient in % *g*	AM Peak Design Flow *q* (pcu/hr)	AM Peak Proportion turning (%) *f*	AM Peak Saturation flow *S* (pcu/hr)	AM Peak Flow factor *y*	PM Peak Design Flow *q* (pcu/hr)	PM Peak Proportion turning (%) *f*	PM Peak Saturation flow *S* (pcu/hr)	PM Peak Flow factor *y*
Pak Wan Street WB														
1A	A	3.50	Y	N	15		124	23%	1920	**0.065**	205	29%	1910	**0.107**
Estate Road SB														
2A	C	3.50	Y	N	7.5/20		152	76% / 24%	1680	**0.090**	140	78% / 22%	1675	**0.084**
Pak Wan Street EB														
3A	D	5.50	Y	N	10		217	41%	2040	**0.106**	186	37%	2050	**0.091**
4p	B		5GM +	10FG =	15s									
5p	B		5GM +	10FG =	15s									

Notes:	**AM Peak**	**1A+5p+2A+3A**	**PM Peak**	**1A+5p+2A+3A**
	Sum of Critical *y* ***Y***	**0.261**	Sum of Critical *y* ***Y***	**0.282**
	Lost Time ***L*** (sec)	36	Lost Time ***L*** (sec)	36
	Cycle Time ***c*** (sec)	75	Cycle Time ***c*** (sec)	75
	Practical *Y* ***Ypr***	0.468	Practical *Y* ***Ypr***	0.468
	Reserve Capacity ***RC***	**79%**	Reserve Capacity ***RC***	**66%**

Date : 15-Feb-23 Junction : J2 - Pak Wan Street near Bus Terminus

ATKINS CHINA LIMITED

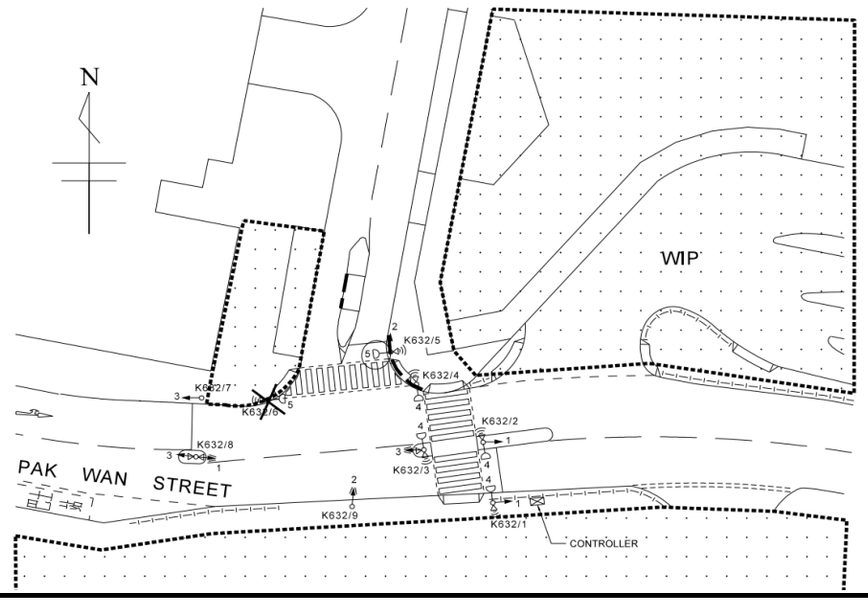
TRAFFIC SIGNAL CALCULATION SHEET

ATKINS
Member of the SNC-Lavalin Group

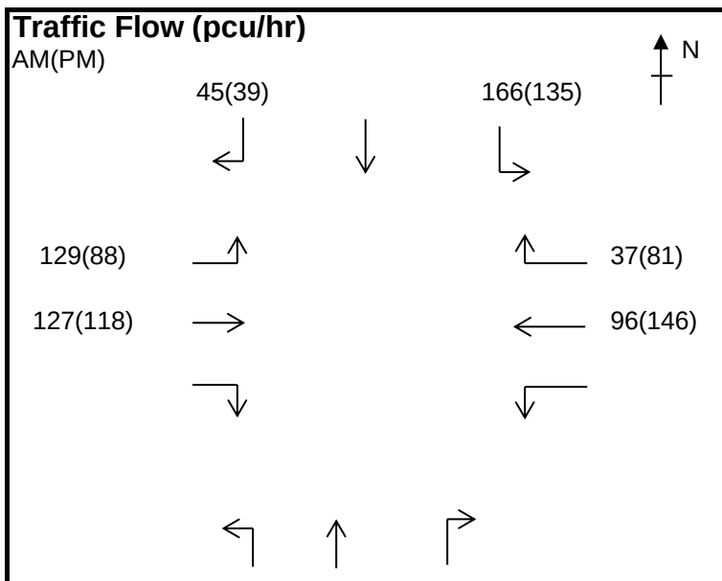
JOB NO. : 5186651

Junction : J2 - Pak Wan Street near Bus Terminus Design Year: 2032

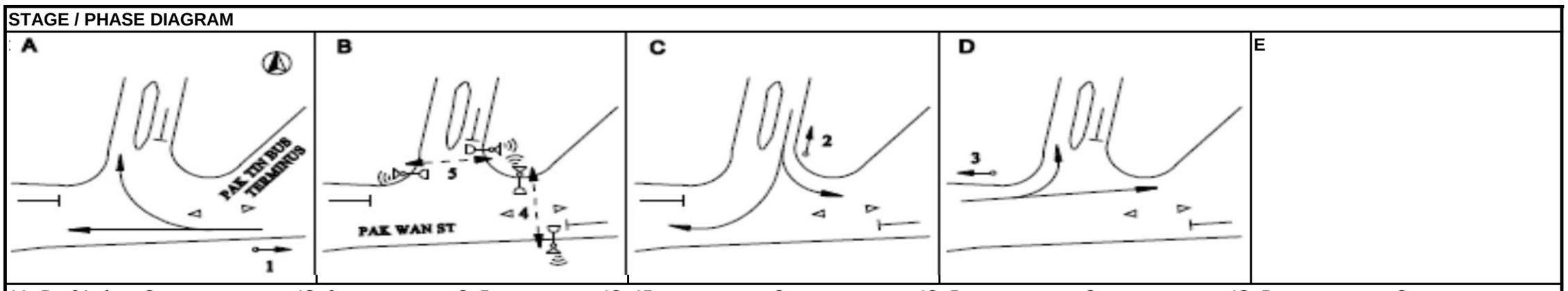
Scheme : Year 2032 Design Flows Designed by: DH Checked by: PT



Traffic Flow (pcu/hr)
AM(PM)



STAGE / PHASE DIAGRAM



1A+5p+2A+3	G=	IG=9	G=5	IG=15	G=	IG=5	G=	IG=5	G=
1A+5p+2A+3A	G=	IG=9	G=5	IG=15	G=	IG=5	G=	IG=5	G=

Capacity Calculations

Phase	Stage	Lane Width (m) *w*	Nearside lane? (Y/N)	Opposed turn? (Y/N)	Radius for turning (m) *r*	Gradient in % *g*	AM Peak Design Flow *q* (pcu/hr)	AM Peak Proportion turning (%) *f*	AM Peak Saturation flow *S* (pcu/hr)	AM Peak Flow factor *y*	PM Peak Design Flow *q* (pcu/hr)	PM Peak Proportion turning (%) *f*	PM Peak Saturation flow *S* (pcu/hr)	PM Peak Flow factor *y*
Pak Wan Street WB														
1A	A	3.50	Y	N	15		133	28%	1910	**0.070**	227	36%	1895	**0.120**
Estate Road SB														
2A	C	3.50	Y	N	7.5/20		211	79% / 21%	1675	**0.126**	174	78% / 22%	1675	**0.104**
Pak Wan Street EB														
3A	D	5.50	Y	N	10		256	50%	2015	**0.127**	206	43%	2035	**0.101**
4p	B		5GM +	10FG =	15s									
5p	B		5GM +	10FG =	15s									

Notes:	**AM Peak**	**1A+5p+2A+3A**	**PM Peak**	**1A+5p+2A+3A**
	Sum of Critical *y* ***Y***	**0.323**	Sum of Critical *y* ***Y***	**0.325**
	Lost Time ***L*** (sec)	36	Lost Time ***L*** (sec)	36
	Cycle Time ***c*** (sec)	75	Cycle Time ***c*** (sec)	75
	Practical *Y* ***Ypr***	0.468	Practical *Y* ***Ypr***	0.468
	Reserve Capacity ***RC***	**45%**	Reserve Capacity ***RC***	**44%**

Date : 15-Feb-23 Junction : J2 - Pak Wan Street near Bus Terminus

ATKINS CHINA LIMITED

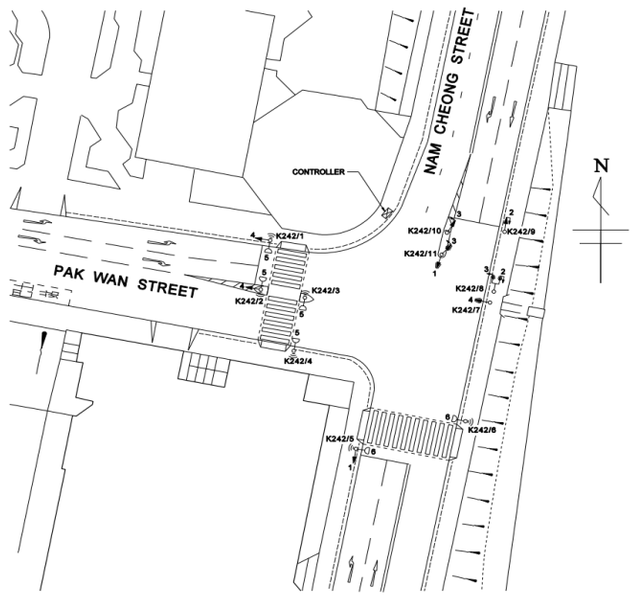
TRAFFIC SIGNAL CALCULATION SHEET

ATKINS
Member of the SNC-Lavalin Group

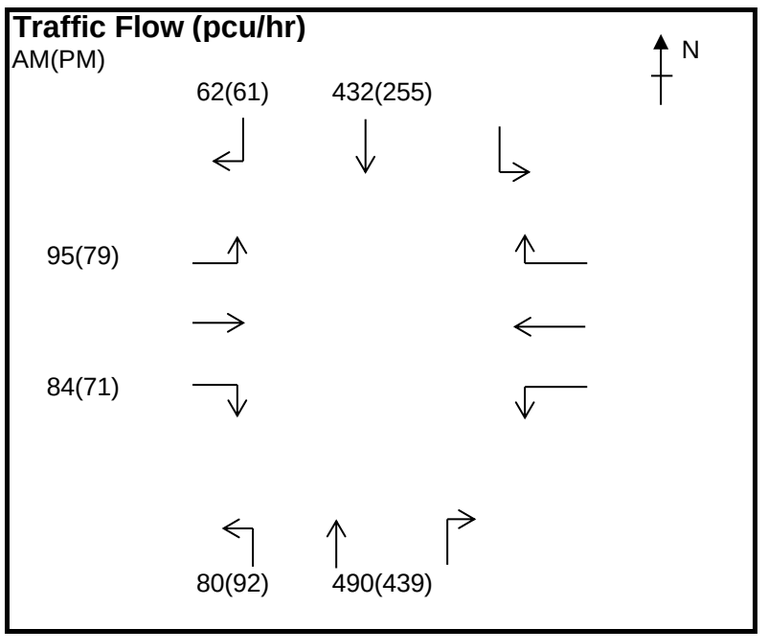
JOB NO. : 5186651

Junction : J3 - Nam Cheong Street / Pak Wan Street Design Year: 2021

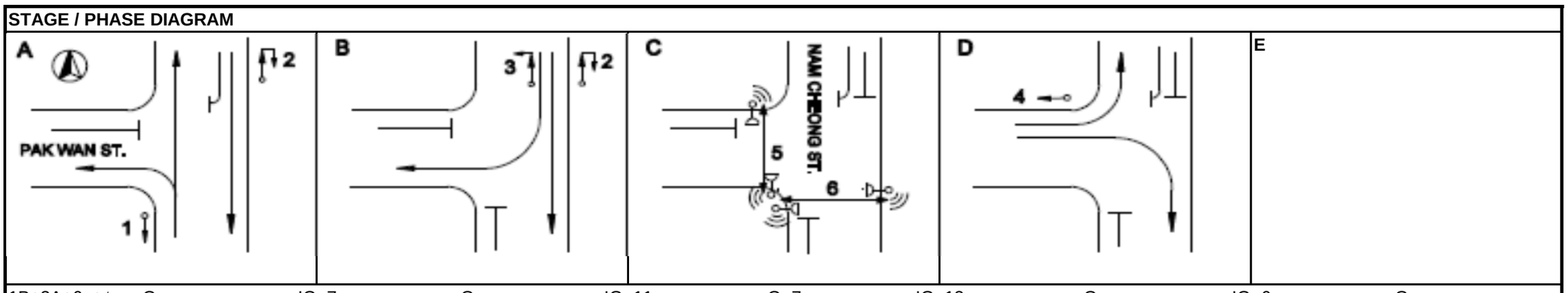
Scheme : Year 2021 Observed Flows Designed by: DH Checked by: PT



Traffic Flow (pcu/hr)
AM(PM)



STAGE / PHASE DIAGRAM



1B+3A+6p+4	G=	IG=7	G=	IG=11	G=7	IG=13	G=	IG=6	G=	
1B+3A+6p+4A	G=	IG=7	G=	IG=11	G=7	IG=13	G=	IG=6	G=	

Capacity Calculations

Phase	Stage	Lane Width (m) ***w***	Nearside lane? (Y/N)	Opposed turn? (Y/N)	Radius for turning (m) ***r***	Gradient in % ***g***	AM Peak Design Flow ***q*** (pcu/hr)	AM Peak Proportion turning (%) ***f***	AM Peak Saturation flow ***S*** (pcu/hr)	AM Peak Flow factor ***y***	PM Peak Design Flow ***q*** (pcu/hr)	PM Peak Proportion turning (%) ***f***	PM Peak Saturation flow ***S*** (pcu/hr)	PM Peak Flow factor ***y***
Nam Cheong Street NB														
1A	A	3.30	Y	N	8		80	100%	1620	0.049	92	100%	1620	0.057
1B	A	3.30	N	N			490		2085	**0.235**	439		2085	**0.211**
Nam Cheong Street SB														
2A	A,B	3.30	Y	N			432		1945	0.222	255		1945	0.131
3A	B	3.30	N	N	15		62	100%	1895	**0.033**	61	100%	1895	**0.032**
Pak Wan Street EB														
4A	D	3.30	Y	N	15		95	100%	1770	**0.054**	79	100%	1770	**0.045**
4B	D	3.30	N	N	20		84	100%	1940	0.043	71	100%	1940	0.037
5p	C		7GM +	6FG =	13s									
6p	C		7GM +	11FG =	18s									

Notes:	**AM Peak**	**1B+3A+6p+4A**	**PM Peak**	**1B+3A+6p+4A**
	Sum of Critical *y* ***Y***	**0.321**	Sum of Critical *y* ***Y***	**0.287**
	Lost Time ***L*** (sec)	41	Lost Time ***L*** (sec)	41
	Cycle Time ***c*** (sec)	100	Cycle Time ***c*** (sec)	100
	Practical *Y* ***Ypr***	0.531	Practical *Y* ***Ypr***	0.531
	Reserve Capacity ***RC***	**65%**	Reserve Capacity ***RC***	**85%**

Date : 15-Feb-23 Junction : J3 - Nam Cheong Street / Pak Wan Street

ATKINS CHINA LIMITED

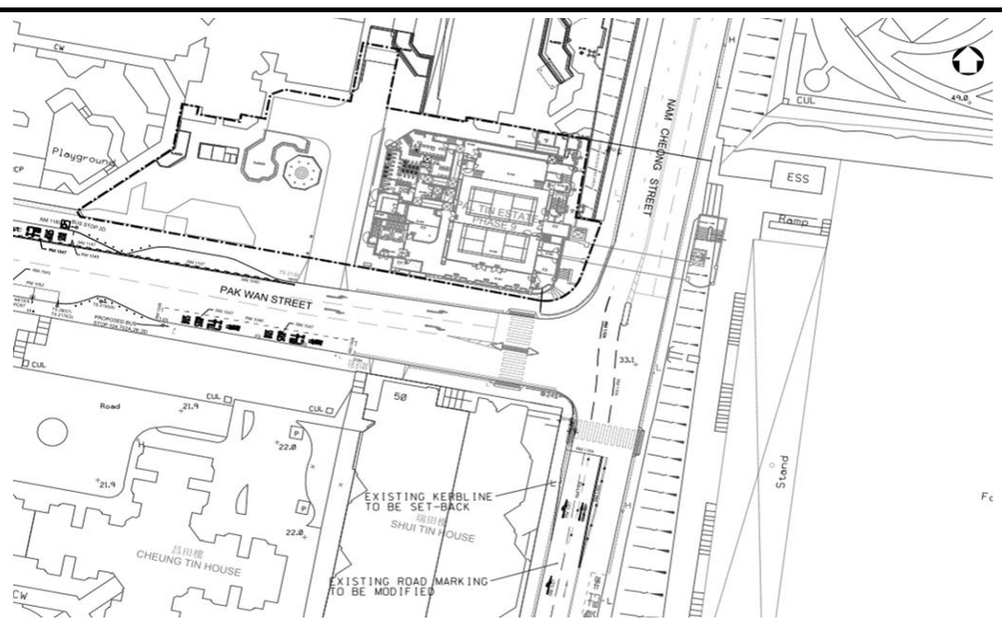
TRAFFIC SIGNAL CALCULATION SHEET

ATKINS
Member of the SNC-Lavalin Group

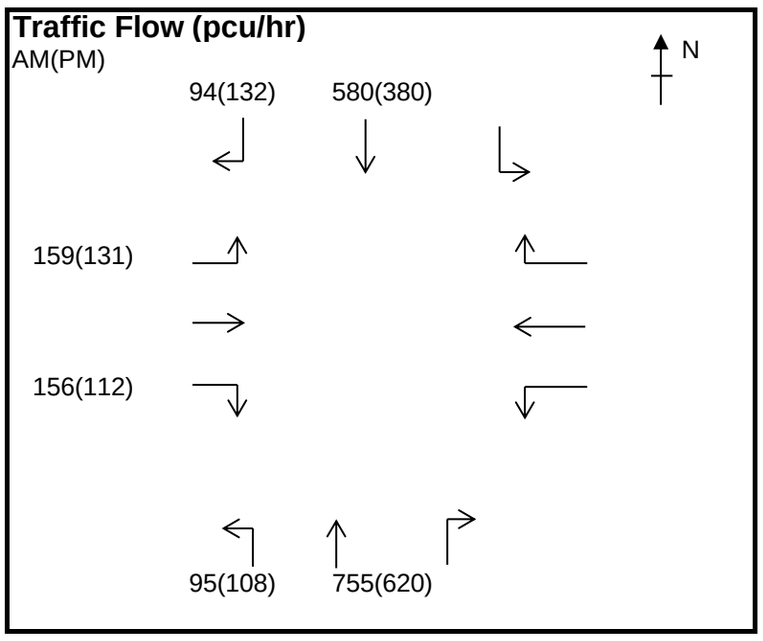
JOB NO. : 5148409

Junction : J3 - Nam Cheong Street / Pak Wan Street Design Year: 2032

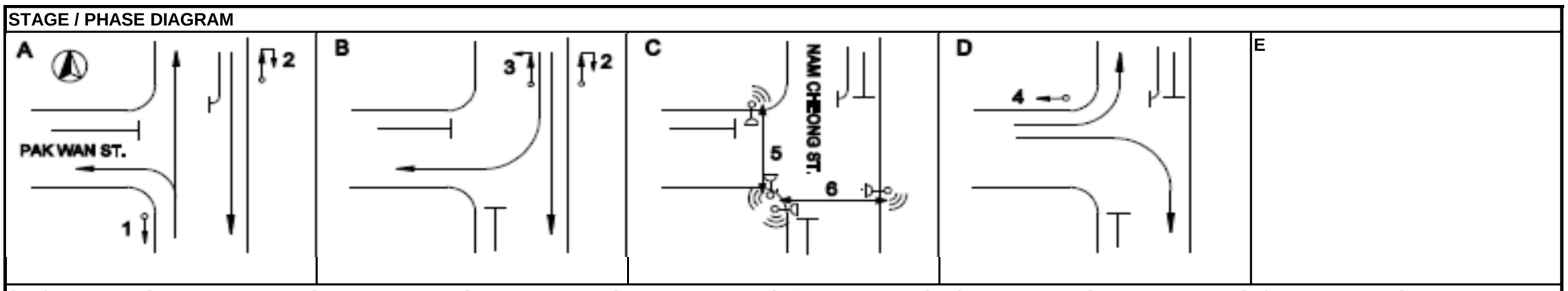
Scheme : Year 2032 Reference Flows - w/ Improvement Designed by: PT Checked by: JY



Traffic Flow (pcu/hr)
AM(PM)



STAGE / PHASE DIAGRAM



2A+6p+4A	G=	IG=	G=	IG=11	G=7	IG=13	G=	IG=6	G=
1B+3A+6p+4A	G=	IG=7	G=	IG=11	G=7	IG=13	G=	IG=6	G=

Capacity Calculations

Phase	Stage	Lane Width (m) *w*	Nearside lane? (Y/N)	Opposed turn? (Y/N)	Radius for turning (m) *r*	Gradient in % *g*	AM Peak Design Flow *q* (pcu/hr)	AM Peak Proportion turning (%) *f*	AM Peak Saturation flow *S* (pcu/hr)	AM Peak Flow factor *y*	PM Peak Design Flow *q* (pcu/hr)	PM Peak Proportion turning (%) *f*	PM Peak Saturation flow *S* (pcu/hr)	PM Peak Flow factor *y*
Nam Cheong Street NB														
1A	A	3.30	Y	N	8		400	24%	1855	0.216	340	32%	1830	0.186
1B	A	3.30	N	N			450		2085	0.216	388		2085	**0.186**
Nam Cheong Street SB														
2A	A,B	3.30	Y	N			580		1945	**0.298**	380		1945	0.195
3A	B	3.30	N	N	15		94	100%	1895	0.050	132	100%	1895	**0.070**
Pak Wan Street EB														
4A	D	3.30	Y	N	15		159	100%	1770	**0.090**	131	100%	1770	**0.074**
4B	D	3.30	N	N	20		156	100%	1940	0.080	112	100%	1940	0.058
5p	C		7GM +	6FG =	13s									
6p	C		7GM +	11FG =	18s									

Notes:	**AM Peak**	**2A+6p+4A**	**PM Peak**	**1B+3A+6p+4A**
	Sum of Critical *y* ***Y***	**0.388**	Sum of Critical *y* ***Y***	**0.329**
	Lost Time ***L*** (sec)	35	Lost Time ***L*** (sec)	41
	Cycle Time ***c*** (sec)	120	Cycle Time ***c*** (sec)	118
	Practical *Y* ***Ypr***	0.638	Practical *Y* ***Ypr***	0.587
	Reserve Capacity ***RC***	**64%**	Reserve Capacity ***RC***	**78%**

Date : 15-Feb-23 Junction : J3 - Nam Cheong Street / Pak Wan Street

ATKINS CHINA LIMITED

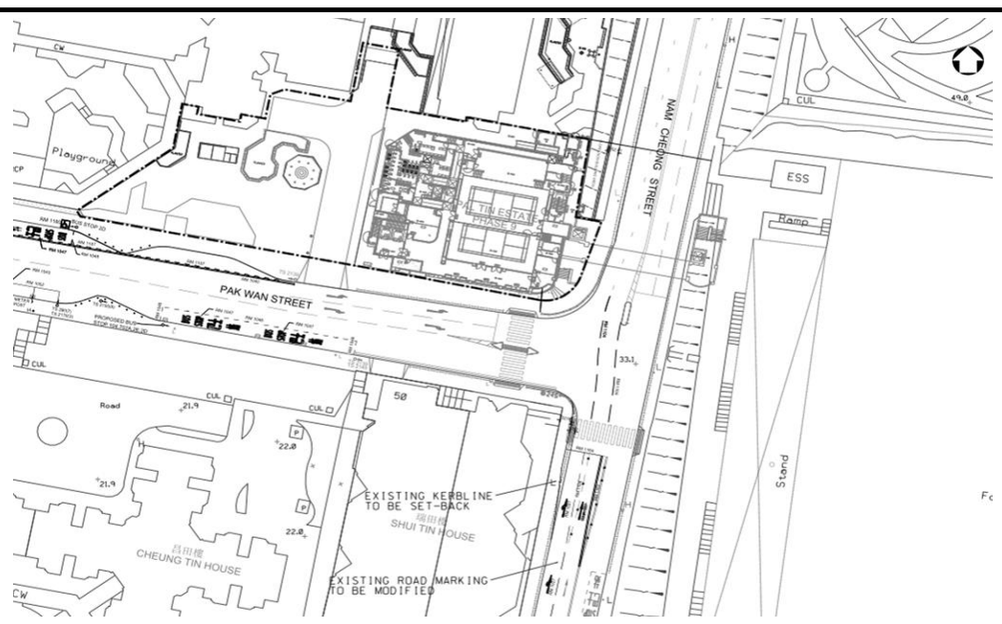
TRAFFIC SIGNAL CALCULATION SHEET

ATKINS
Member of the SNC-Lavalin Group

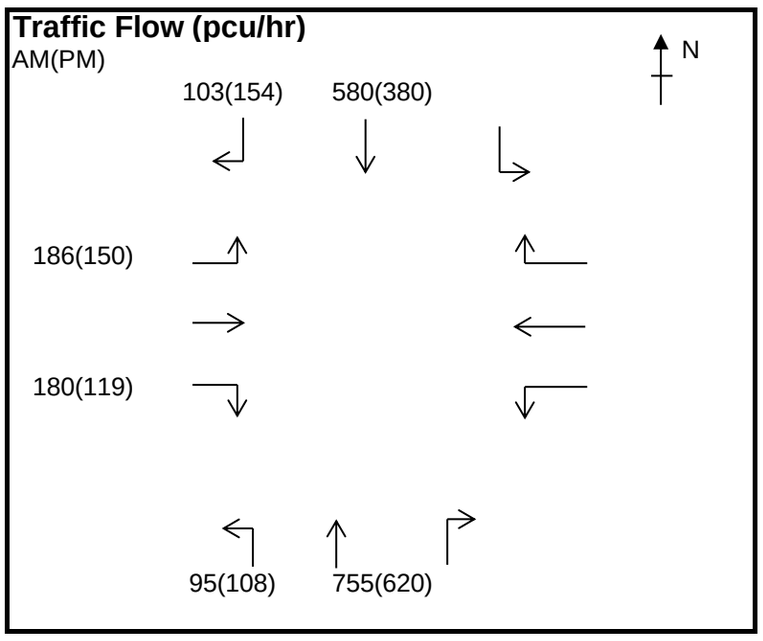
JOB NO. : 5148409

Junction : J3 - Nam Cheong Street / Pak Wan Street Design Year: 2032

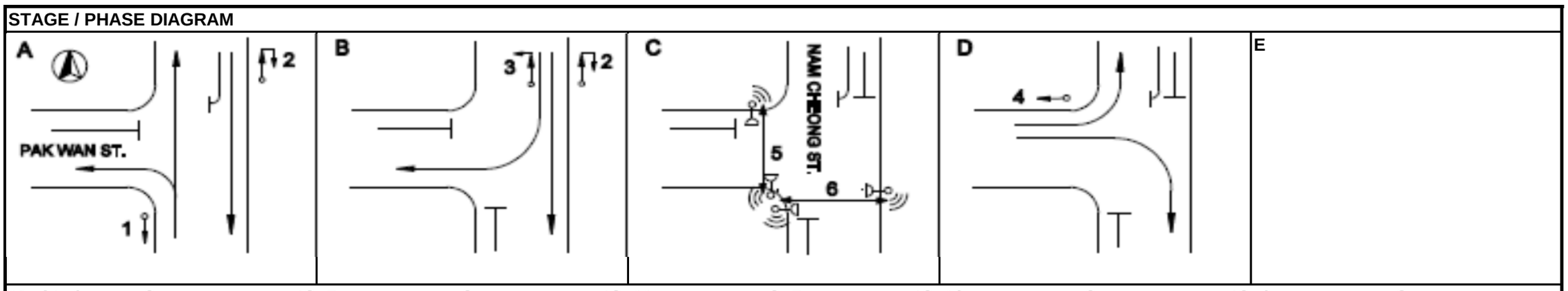
Scheme : Year 2032 Design Flows - w/ Improvement Designed by: PT Checked by: JY



Traffic Flow (pcu/hr)
AM(PM)



STAGE / PHASE DIAGRAM



1B+3A+6p+4	G=	IG=7	G=	IG=11	G=7	IG=13	G=	IG=6	G=	
1B+3A+6p+4A	G=	IG=7	G=	IG=11	G=7	IG=13	G=	IG=6	G=	

Capacity Calculations

Phase	Stage	Lane Width (m) ***w***	Nearside lane? (Y/N)	Opposed turn? (Y/N)	Radius for turning (m) ***r***	Gradient in % ***g***	AM Peak Design Flow ***q*** (pcu/hr)	AM Peak Proportion turning (%) ***f***	AM Peak Saturation flow ***S*** (pcu/hr)	AM Peak Flow factor ***y***	PM Peak Design Flow ***q*** (pcu/hr)	PM Peak Proportion turning (%) ***f***	PM Peak Saturation flow ***S*** (pcu/hr)	PM Peak Flow factor ***y***
Nam Cheong Street NB														
1A	A	3.30	Y	N	8		400	24%	1855	0.216	340	32%	1830	0.186
1B	A	3.30	N	N			450		2085	**0.216**	388		2085	**0.186**
Nam Cheong Street SB														
2A	A,B	3.30	Y	N			580		1945	0.298	380		1945	0.195
3A	B	3.30	N	N	15		103	100%	1895	**0.054**	154	100%	1895	**0.081**
Pak Wan Street EB														
4A	D	3.30	Y	N	15		186	100%	1770	**0.105**	150	100%	1770	**0.085**
4B	D	3.30	N	N	20		180	100%	1940	0.093	119	100%	1940	0.061
5p	C		7GM +	6FG =	13s									
6p	C		7GM +	11FG =	18s									

Notes:

AM Peak	**1B+3A+6p+4A**	**PM Peak**	**1B+3A+6p+4A**
Sum of Critical *y* ***Y***	**0.375**	Sum of Critical *y* ***Y***	**0.352**
Lost Time ***L*** (sec)	41	Lost Time ***L*** (sec)	41
Cycle Time ***c*** (sec)	120	Cycle Time ***c*** (sec)	118
Practical *Y* ***Ypr***	0.593	Practical *Y* ***Ypr***	0.587
Reserve Capacity ***RC***	**58%**	Reserve Capacity ***RC***	**67%**

Date : 15-Feb-23 Junction : J3 - Nam Cheong Street / Pak Wan Street

ATKINS CHINA LIMITED

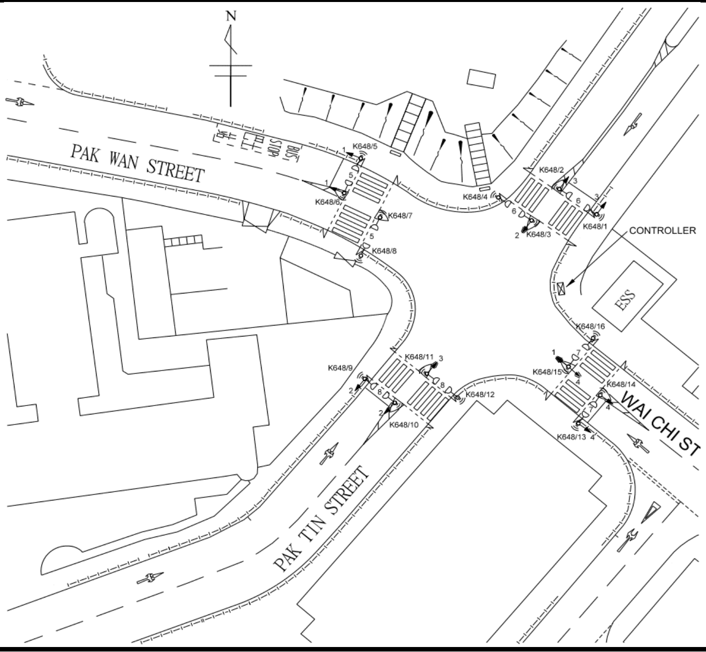
TRAFFIC SIGNAL CALCULATION SHEET

ATKINS
Member of the SNC-Lavalin Group

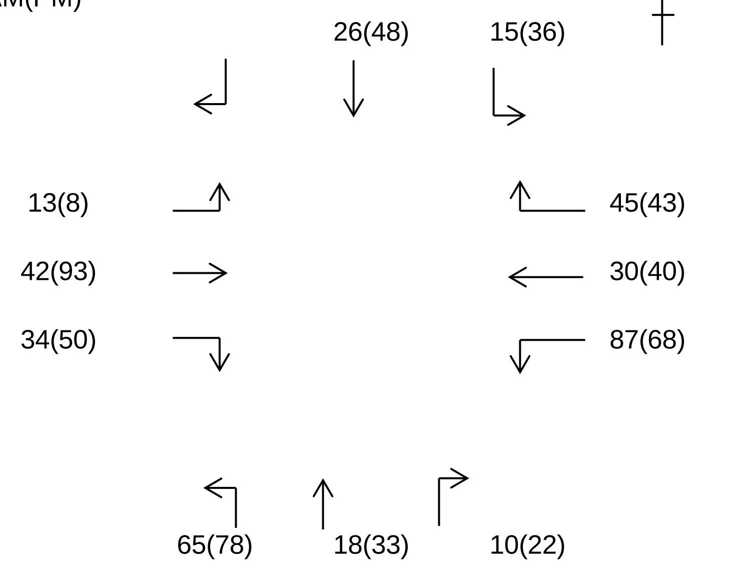
JOB NO. : 5186651

Junction : J4 - Pak Tin Street / Pak Wan Street / Wai Lun Street   Design Year: 2021

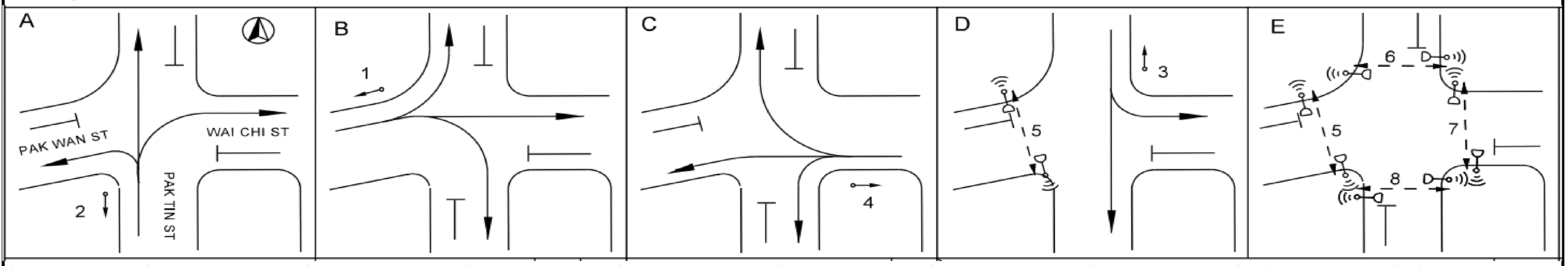
Scheme : Year 2021 Observed Flows   Designed by: DH   Checked by: PT



Traffic Flow (pcu/hr)
AM(PM)



STAGE / PHASE DIAGRAM



	A		B		C		D		E
2A+1A+4A+3	G=	IG=5	G=	IG=7	G=	IG=5	G=	IG=10	G=6
2A+1A+4A+3A+7p	G=	IG=5	G=	IG=7	G=	IG=5	G=	IG=10	G=6

Capacity Calculations

							AM Peak				**PM Peak**			
Phase	Stage	Lane Width (m) ***w***	Nearside lane? (Y/N)	Opposed turn? (Y/N)	Radius for turning (m) ***r***	Gradient in % ***g***	Design Flow ***q*** (pcu/hr)	Proportion turning (%) ***f***	Saturation flow ***S*** (pcu/hr)	Flow factor ***y***	Design Flow ***q*** (pcu/hr)	Proportion turning (%) ***f***	Saturation flow ***S*** (pcu/hr)	Flow factor ***y***
Pak Wan Street EB														
1A	B	5.00	Y	N	12.5/17.5		89	15% / 38%	1005	**0.089**	151	5% / 33%	1020	**0.148**
Pak Tin Street NB														
2A	A	3.00	Y	N	10/17.5		93	70% / 11%	1720	**0.054**	133	59% / 17%	1740	**0.076**
Pak Tin Street SB														
3A	D	3.00	Y	N	10		41	37%	1815	**0.023**	84	43%	1800	**0.047**
Wai Lun Street WB														
4A	C	3.00	Y	N	12.5/25		162	54% / 28%	1770	**0.092**	151	45% / 28%	1790	**0.084**
5p	D,E		6GM +	6FG =	12s									
6p	E		6GM +	6FG =	12s									
7p	E		6GM +	5FG =	11s									
8p	E		6GM +	5FG =	11s									

Notes:

AM Peak	**2A+1A+4A+3A+7p**	**PM Peak**	**2A+1A+4A+3A+7p**
Sum of Critical *y* ***Y***	**0.257**	Sum of Critical *y* ***Y***	**0.356**
Lost Time ***L*** (sec)	36	Lost Time ***L*** (sec)	36
Cycle Time ***c*** (sec)	120	Cycle Time ***c*** (sec)	118
Practical *Y* ***Ypr***	0.630	Practical *Y* ***Ypr***	0.625
Reserve Capacity ***RC***	**145%**	Reserve Capacity ***RC***	**76%**

Date : 15-Feb-23   Junction : J4 - Pak Tin Street / Pak Wan Street / Wai Lun Street

ATKINS CHINA LIMITED

TRAFFIC SIGNAL CALCULATION SHEET

ATKINS
Member of the SNC-Lavalin Group

JOB NO. : 5186651

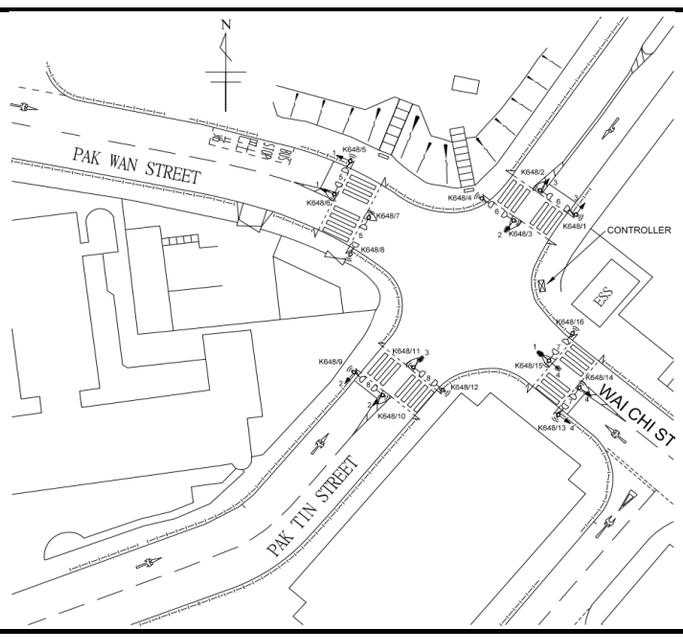
Junction : J4 - Pak Tin Street / Pak Wan Street / Wai Lun Street

Design Year: 2032

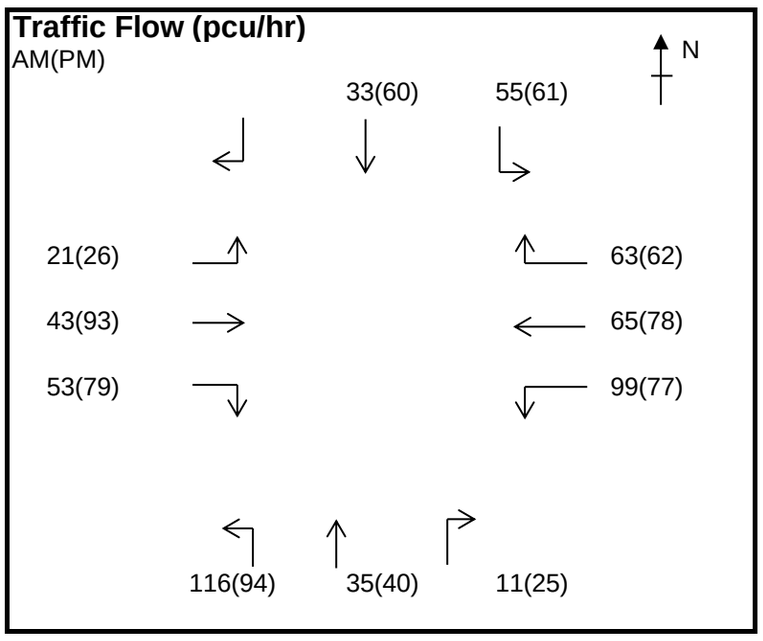
Scheme : Year 2032 Reference Flows

Designed by: DH

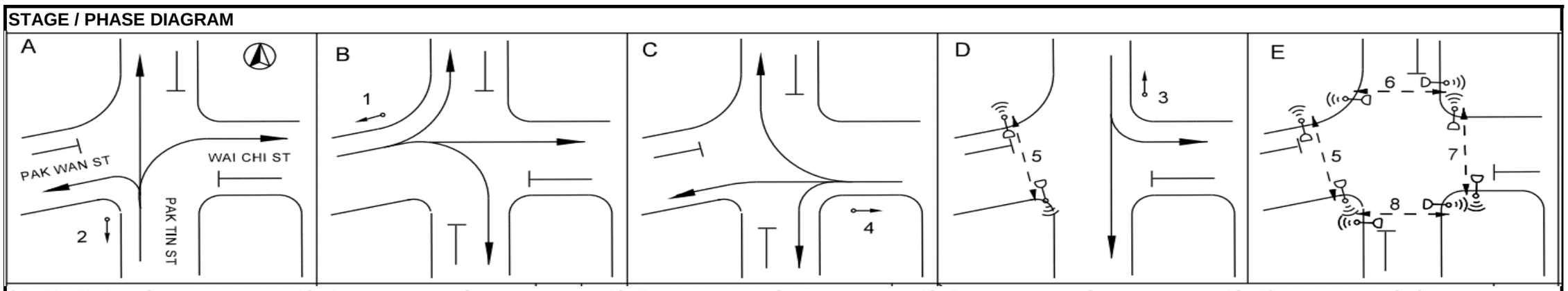
Checked by: PT



Traffic Flow (pcu/hr)
AM(PM)



STAGE / PHASE DIAGRAM



2A+1A+4A+3	G=	IG=5	G=	IG=7	G=	IG=5	G=	IG=10	G=6		
2A+1A+4A+3A+7p	G=	IG=5	G=	IG=7	G=	IG=5	G=	IG=10	G=6		

Capacity Calculations

Phase	Stage	Lane Width (m) ***w***	Nearside lane? (Y/N)	Opposed turn? (Y/N)	Radius for turning (m) ***r***	Gradient in % ***g***	AM Peak Design Flow ***q*** (pcu/hr)	AM Peak Proportion turning (%) ***f***	AM Peak Saturation flow ***S*** (pcu/hr)	AM Peak Flow factor ***y***	PM Peak Design Flow ***q*** (pcu/hr)	PM Peak Proportion turning (%) ***f***	PM Peak Saturation flow ***S*** (pcu/hr)	PM Peak Flow factor ***y***
Pak Wan Street EB														
1A	B	5.00	Y	N	12.5/17.5		117	18% / 45%	995	**0.118**	198	13% / 40%	1005	**0.197**
Pak Tin Street NB														
2A	A	3.00	Y	N	10/17.5		162	72% / 7%	1720	**0.094**	159	59% / 16%	1740	**0.091**
Pak Tin Street SB														
3A	D	3.00	Y	N	10		88	63%	1750	**0.050**	121	50%	1780	**0.068**
Wai Lun Street WB														
4A	C	3.00	Y	N	12.5/25		227	44% / 28%	1790	**0.127**	217	35% / 29%	1805	**0.120**
5p	D,E		6GM +	6FG =	12s									
6p	E		6GM +	6FG =	12s									
7p	E		6GM +	5FG =	11s									
8p	E		6GM +	5FG =	11s									

Notes:	**AM Peak**	**2A+1A+4A+3A+7p**	**PM Peak**	**2A+1A+4A+3A+7p**
	Sum of Critical *y* ***Y***	**0.389**	Sum of Critical *y* ***Y***	**0.477**
	Lost Time ***L*** (sec)	36	Lost Time ***L*** (sec)	36
	Cycle Time ***c*** (sec)	120	Cycle Time ***c*** (sec)	118
	Practical *Y* ***Ypr***	0.630	Practical *Y* ***Ypr***	0.625
	Reserve Capacity ***RC***	**62%**	Reserve Capacity ***RC***	**31%**

Date : 15-Feb-23 Junction : J4 - Pak Tin Street / Pak Wan Street / Wai Lun Street

ATKINS CHINA LIMITED

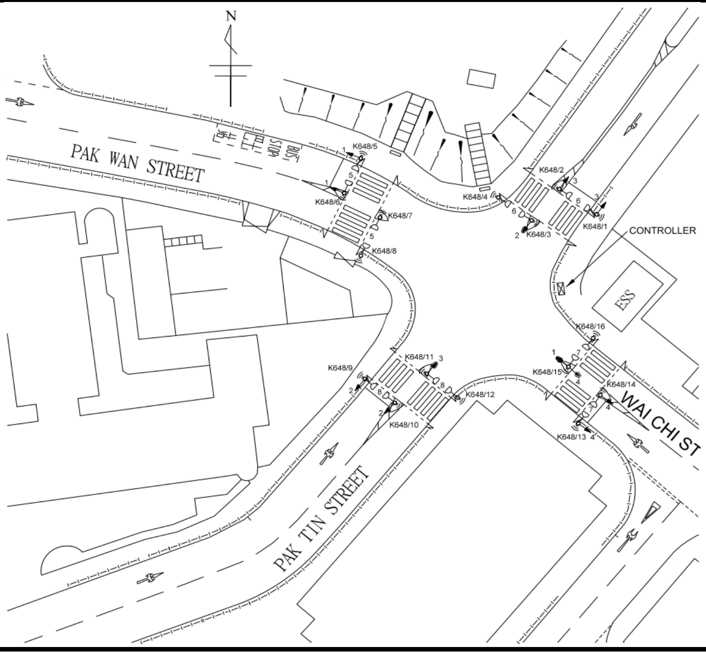
TRAFFIC SIGNAL CALCULATION SHEET

ATKINS
Member of the SNC-Lavalin Group

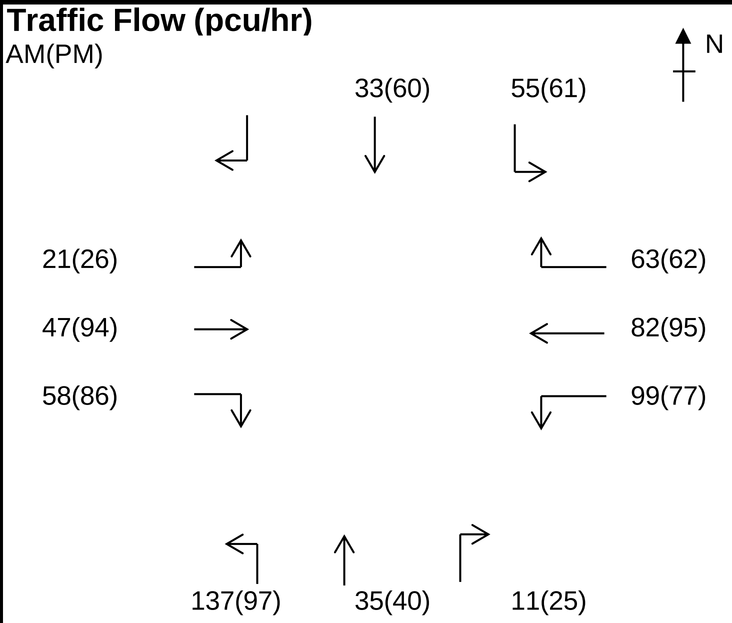
JOB NO. : 5186651

Junction : J4 - Pak Tin Street / Pak Wan Street / Wai Lun Street   Design Year: 2032

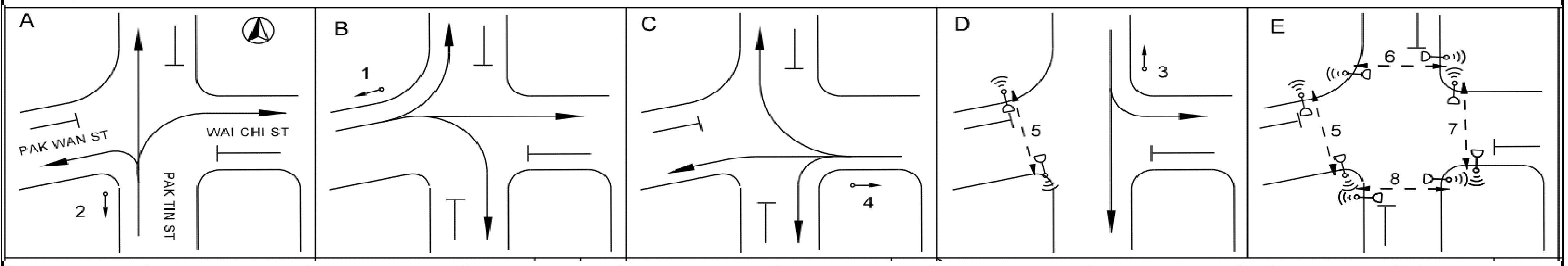
Scheme : Year 2032 Design Flows   Designed by: DH   Checked by: PT



Traffic Flow (pcu/hr)
AM(PM)



STAGE / PHASE DIAGRAM



2A+1A+4A+:	G=	IG=5	G=	IG=7	G=	IG=5	G=	IG=10	G=6
2A+1A+4A+3A+7p	G=	IG=5	G=	IG=7	G=	IG=5	G=	IG=10	G=6

Capacity Calculations

Phase	Stage	Lane Width (m) *w*	Nearside lane? (Y/N)	Opposed turn? (Y/N)	Radius for turning (m) *r*	Gradient in % *g*	AM Peak Design Flow *q* (pcu/hr)	AM Peak Proportion turning (%) *f*	AM Peak Saturation flow *S* (pcu/hr)	AM Peak Flow factor *y*	PM Peak Design Flow *q* (pcu/hr)	PM Peak Proportion turning (%) *f*	PM Peak Saturation flow *S* (pcu/hr)	PM Peak Flow factor *y*
Pak Wan Street EB														
1A	B	5.00	Y	N	12.5/17.5		126	17% / 46%	1000	**0.126**	206	13% / 42%	1005	**0.205**
Pak Tin Street NB														
2A	A	3.00	Y	N	10/17.5		183	75% / 6%	1715	**0.107**	162	60% / 15%	1735	**0.093**
Pak Tin Street SB														
3A	D	3.00	Y	N	10		88	63%	1750	**0.050**	121	50%	1780	**0.068**
Wai Lun Street WB														
4A	C	3.00	Y	N	12.5/25		244	41% / 26%	1800	**0.136**	234	33% / 26%	1815	**0.129**
5p	D,E		6GM +	6FG =	12s									
6p	E		6GM +	6FG =	12s									
7p	E		6GM +	5FG =	11s									
8p	E		6GM +	5FG =	11s									

Notes:

AM Peak	**2A+1A+4A+3A+7p**	**PM Peak**	**2A+1A+4A+3A+7p**
Sum of Critical *y* ***Y***	**0.419**	Sum of Critical *y* ***Y***	**0.495**
Lost Time ***L*** (sec)	36	Lost Time ***L*** (sec)	36
Cycle Time ***c*** (sec)	120	Cycle Time ***c*** (sec)	118
Practical *Y* ***Ypr***	0.630	Practical *Y* ***Ypr***	0.625
Reserve Capacity ***RC***	**51%**	Reserve Capacity ***RC***	**26%**

Date : 15-Feb-23   Junction : J4 - Pak Tin Street / Pak Wan Street / Wai Lun Street

ATKINS CHINA LIMITED

TRAFFIC SIGNAL CALCULATION SHEET

ATKINS
Member of the SNC-Lavalin Group

JOB NO. : 5186651

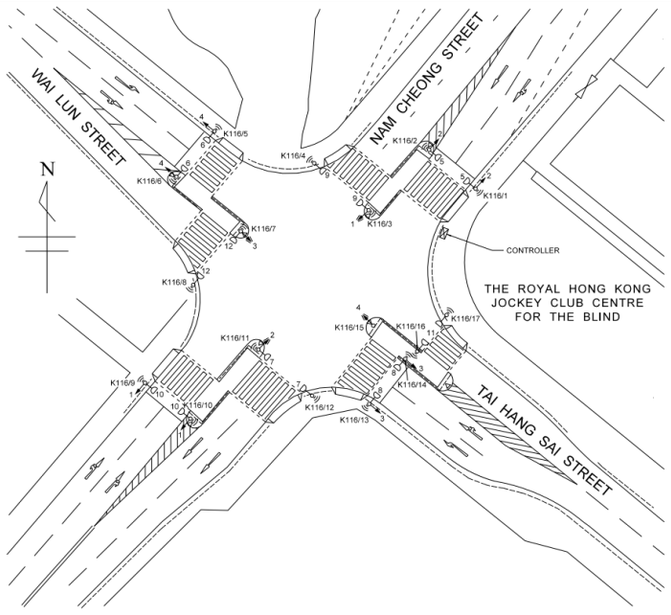
Junction : J5 - Nam Cheong Street / Tai Hang Sai Street / Wai Lun Street

Design Year: 2021

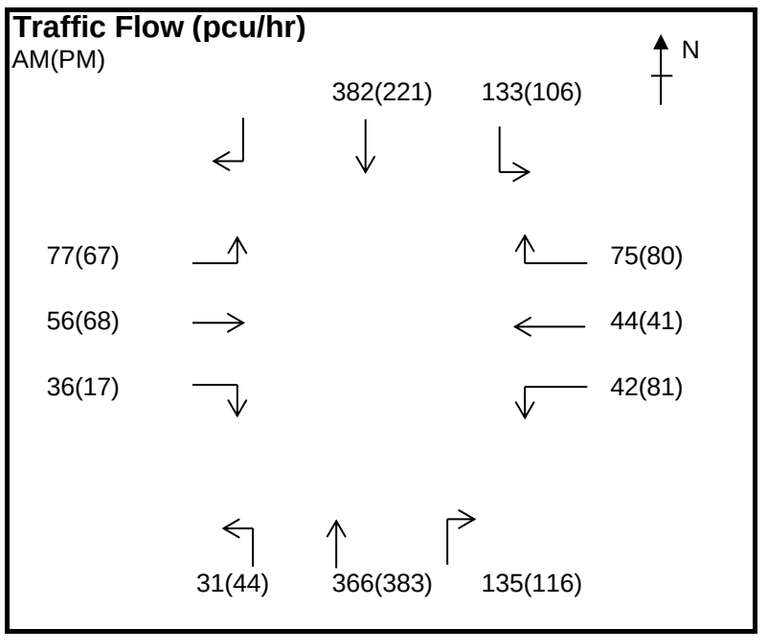
Scheme : Year 2021 Observed Flows

Designed by: DH

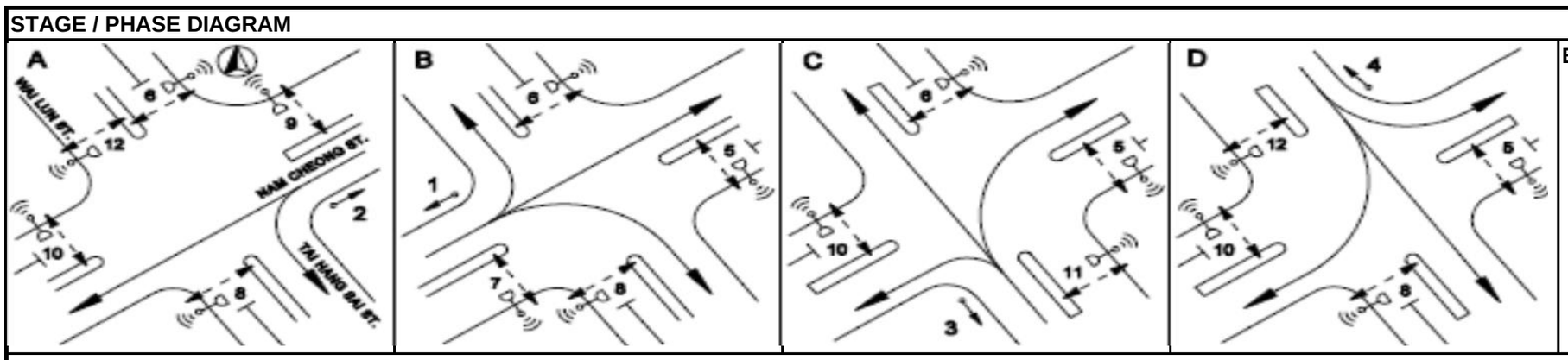
Checked by: PT



Traffic Flow (pcu/hr)
AM(PM)



STAGE / PHASE DIAGRAM



2A+1A+3A+4	G=	IG=5	G=	IG=9	G=	IG=6	G=	IG=7	G=		
2B+1A+3A+4B	G=	IG=5	G=	IG=9	G=	IG=6	G=	IG=7	G=		

Capacity Calculations

Phase	Stage	Lane Width (m) *w*	Nearside lane? (Y/N)	Opposed turn? (Y/N)	Radius for turning (m) *r*	Gradient in % *g*	AM Peak Design Flow *q* (pcu/hr)	AM Peak Proportion turning (%) *f*	AM Peak Saturation flow *S* (pcu/hr)	AM Peak Flow factor *y*	PM Peak Design Flow *q* (pcu/hr)	PM Peak Proportion turning (%) *f*	PM Peak Saturation flow *S* (pcu/hr)	PM Peak Flow factor *y*
Nam Cheong Street NB														
1A	B	3.30	Y	N	15	5	259	12%	1715	**0.151**	263	17%	1705	**0.154**
1B	B	3.30	N	N	20	5	273	49%	1810	0.151	280	41%	1820	0.154
Nam Cheong Street SB														
2A	A	3.50	Y	N	17.5		243	55%	1875	**0.130**	153	69%	1855	0.082
2B	A	3.50	N	N			272		2105	0.129	174		2105	**0.083**
Tai Hang Sai Street WB														
3A	C	3.50	Y	N	15/17.5		161	26% / 47%	1845	**0.087**	202	40% / 40%	1830	**0.110**
Wai Lun Street EB														
4A	D	3.30	Y	N	15		77	100%	1770	0.044	67	100%	1770	0.038
4B	D	3.30	N	N	20		92	39%	2025	**0.045**	85	20%	2055	**0.041**
5p	B,C,D		8GM +	6FG =	14s									
6p	A,B,C		8GM +	6FG =	14s									
7p	B		8GM +	8FG =	16s									
8p	A,B,D		12GM +	10FG =	22s									
9p	A		7GM +	8FG =	15s									
10p	A,C,D		8GM +	7FG =	15s									
11p	C		5GM +	6FG =	11s									
12p	A,D		8GM +	6FG =	14s									

Notes:	**AM Peak**	**2A+1A+3A+4B**	**PM Peak**	**2B+1A+3A+4B**
	Sum of Critical *y* ***Y***	**0.413**	Sum of Critical *y* ***Y***	**0.389**
	Lost Time ***L*** (sec)	23	Lost Time ***L*** (sec)	23
	Cycle Time ***c*** (sec)	100	Cycle Time ***c*** (sec)	100
	Practical *Y* ***Ypr***	0.693	Practical *Y* ***Ypr***	0.693
	Reserve Capacity ***RC***	**68%**	Reserve Capacity ***RC***	**78%**

Date : 15-Feb-23 Junction : J5 - Nam Cheong Street / Tai Hang Sai Street / Wai Lun Street

ATKINS CHINA LIMITED

TRAFFIC SIGNAL CALCULATION SHEET

ATKINS
Member of the SNC-Lavalin Group

JOB NO. : 5186651

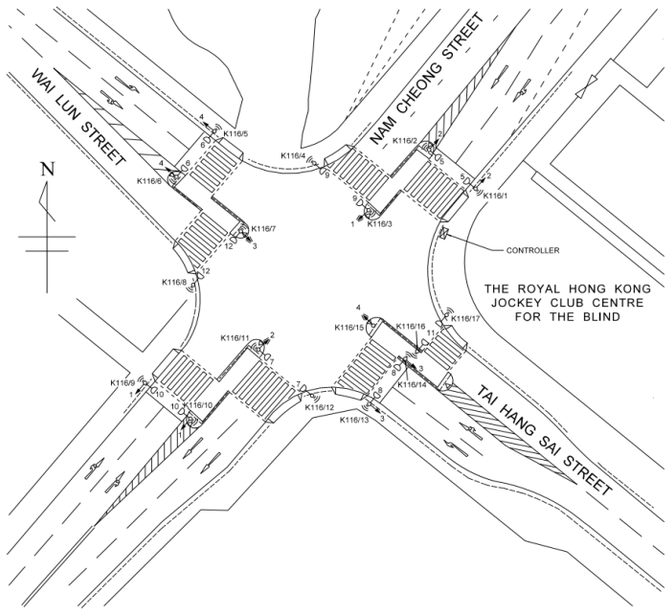
Junction : J5 - Nam Cheong Street / Tai Hang Sai Street / Wai Lun Street

Design Year: 2032

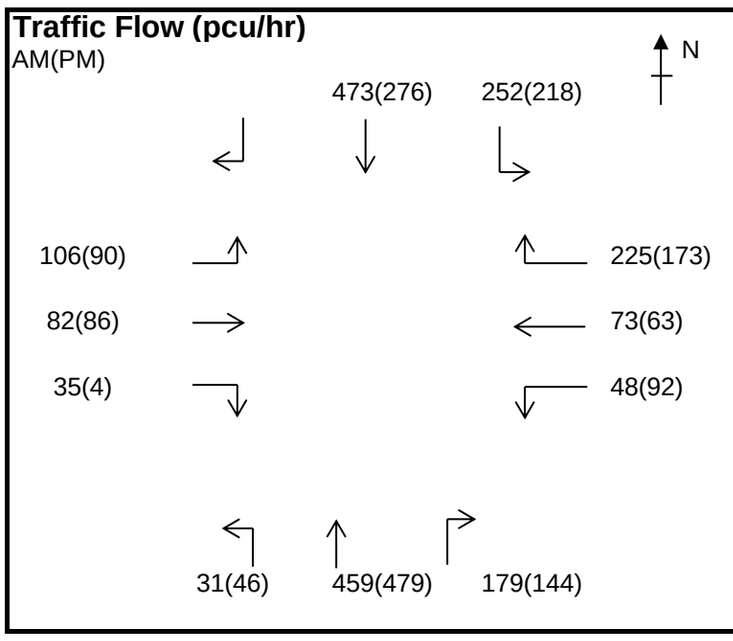
Scheme : Year 2032 Reference Flows

Designed by: DH

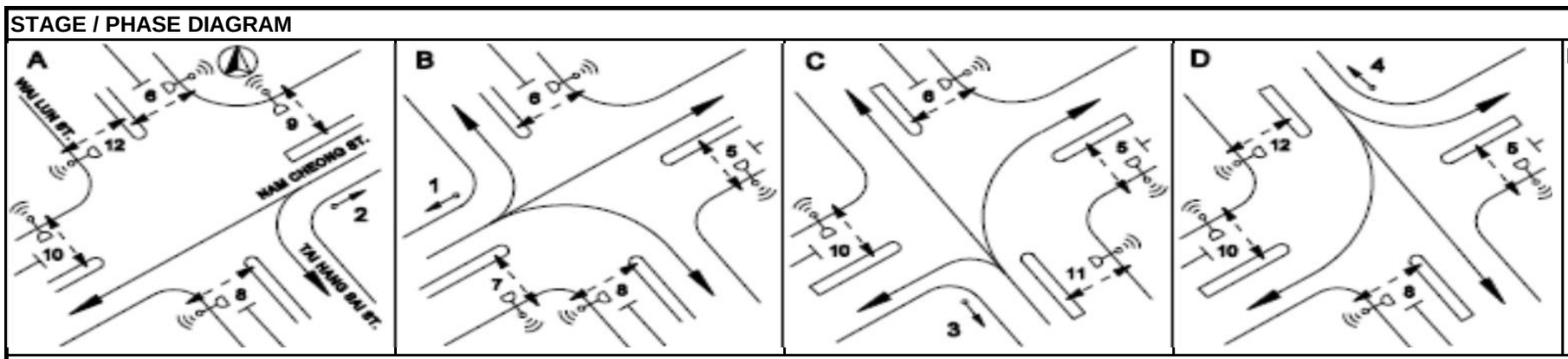
Checked by: PT



Traffic Flow (pcu/hr)
AM(PM)



STAGE / PHASE DIAGRAM



2A+1B+3A+4	G=	IG=5	G=	IG=9	G=	IG=6	G=	IG=7	G=		
2A+1B+3A+4A	G=	IG=5	G=	IG=9	G=	IG=6	G=	IG=7	G=		

Capacity Calculations

Phase	Stage	Lane Width (m) *w*	Nearside lane? (Y/N)	Opposed turn? (Y/N)	Radius for turning (m) *r*	Gradient in % *g*	AM Peak Design Flow *q* (pcu/hr)	AM Peak Proportion turning (%) *f*	AM Peak Saturation flow *S* (pcu/hr)	AM Peak Flow factor *y*	PM Peak Design Flow *q* (pcu/hr)	PM Peak Proportion turning (%) *f*	PM Peak Saturation flow *S* (pcu/hr)	PM Peak Flow factor *y*
Nam Cheong Street NB														
1A	B	3.30	Y	N	15	5	326	10%	1720	0.190	324	14%	1710	0.189
1B	B	3.30	N	N	20	5	343	52%	1805	**0.190**	345	42%	1820	**0.190**
Nam Cheong Street SB														
2A	A	3.50	Y	N	17.5		339	74%	1845	**0.184**	229	95%	1815	**0.126**
2B	A	3.50	N	N			386		2105	0.183	265		2105	0.126
Tai Hang Sai Street WB														
3A	C	3.50	Y	N	15/17.5		346	14% / 65%	1835	**0.189**	328	28% / 53%	1830	**0.179**
Wai Lun Street EB														
4A	D	3.30	Y	N	15		106	100%	1770	**0.060**	90	100%	1770	**0.051**
4B	D	3.30	N	N	20		117	30%	2040	0.057	90	4%	2080	0.043
5p	B,C,D		8GM +	6FG =	14s									
6p	A,B,C		8GM +	6FG =	14s									
7p	B		8GM +	8FG =	16s									
8p	A,B,D		12GM +	10FG =	22s									
9p	A		7GM +	8FG =	15s									
10p	A,C,D		8GM +	7FG =	15s									
11p	C		5GM +	6FG =	11s									
12p	A,D		8GM +	6FG =	14s									

Notes:	**AM Peak**	**2A+1B+3A+4A**	**PM Peak**	**2A+1B+3A+4A**
	Sum of Critical *y* ***Y***	**0.622**	Sum of Critical *y* ***Y***	**0.546**
	Lost Time ***L*** (sec)	23	Lost Time ***L*** (sec)	23
	Cycle Time ***c*** (sec)	120	Cycle Time ***c*** (sec)	118
	Practical *Y* ***Ypr***	0.728	Practical *Y* ***Ypr***	0.725
	Reserve Capacity ***RC***	**17%**	Reserve Capacity ***RC***	**33%**

Date : 15-Feb-23

Junction : J5 - Nam Cheong Street / Tai Hang Sai Street / Wai Lun Street

ATKINS CHINA LIMITED

TRAFFIC SIGNAL CALCULATION SHEET

ATKINS
Member of the SNC-Lavalin Group

JOB NO. : 5186651

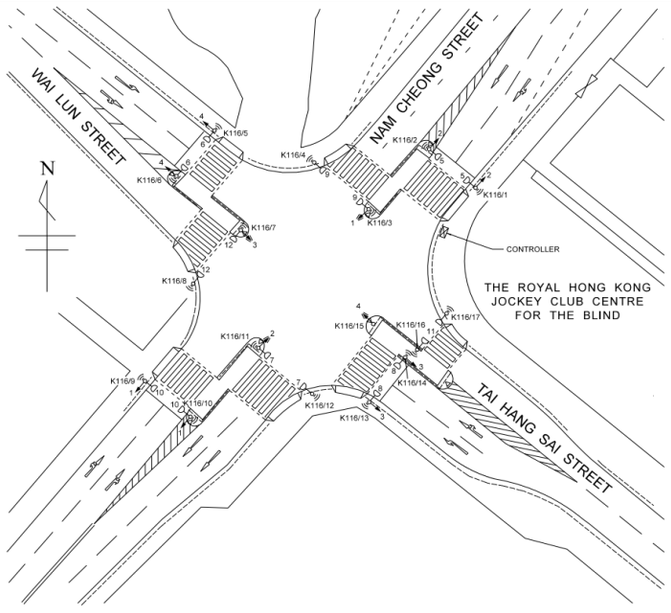
Junction : J5 - Nam Cheong Street / Tai Hang Sai Street / Wai Lun Street

Design Year: 2032

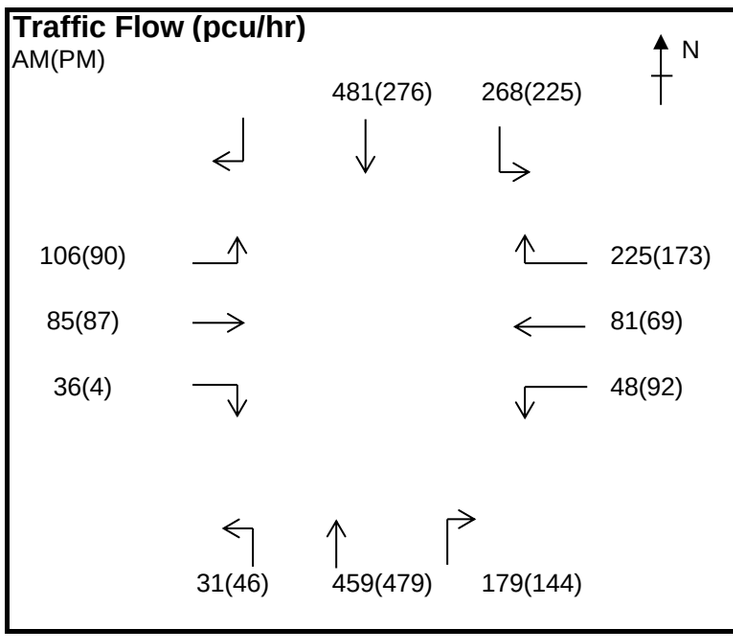
Scheme : Year 2032 Design Flows

Designed by: DH

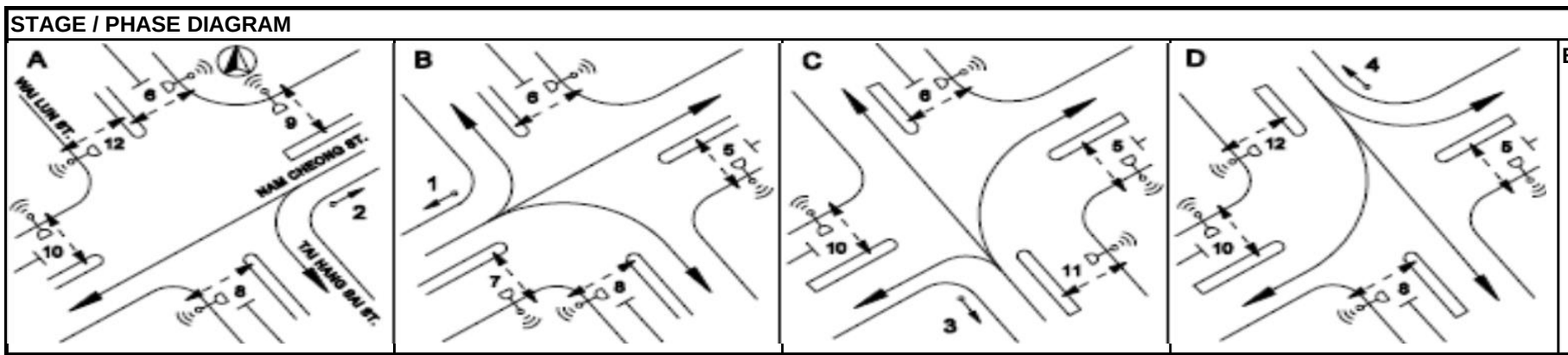
Checked by: PT



Traffic Flow (pcu/hr)
AM(PM)



STAGE / PHASE DIAGRAM



2A+1B+3A+4	G=	IG=5	G=	IG=9	G=	IG=6	G=	IG=7	G=		
2A+1B+3A+4A	G=	IG=5	G=	IG=9	G=	IG=6	G=	IG=7	G=		

Capacity Calculations

Phase	Stage	Lane Width (m) *w*	Nearside lane? (Y/N)	Opposed turn? (Y/N)	Radius for turning (m) *r*	Gradient in % *g*	AM Peak Design Flow *q* (pcu/hr)	AM Peak Proportion turning (%) *f*	AM Peak Saturation flow *S* (pcu/hr)	AM Peak Flow factor *y*	PM Peak Design Flow *q* (pcu/hr)	PM Peak Proportion turning (%) *f*	PM Peak Saturation flow *S* (pcu/hr)	PM Peak Flow factor *y*
Nam Cheong Street NB														
1A	B	3.30	Y	N	15	5	326	10%	1720	0.190	324	14%	1710	0.189
1B	B	3.30	N	N	20	5	343	52%	1805	**0.190**	345	42%	1820	**0.190**
Nam Cheong Street SB														
2A	A	3.50	Y	N	17.5		350	77%	1845	**0.190**	232	97%	1815	**0.128**
2B	A	3.50	N	N			399		2105	0.190	269		2105	0.128
Tai Hang Sai Street WB														
3A	C	3.50	Y	N	15/17.5		354	14% / 64%	1840	**0.192**	334	28% / 52%	1835	**0.182**
Wai Lun Street EB														
4A	D	3.30	Y	N	15		106	100%	1770	**0.060**	90	100%	1770	**0.051**
4B	D	3.30	N	N	20		121	30%	2040	0.059	91	4%	2080	0.044
5p	B,C,D		8GM +	6FG =	14s									
6p	A,B,C		8GM +	6FG =	14s									
7p	B		8GM +	8FG =	16s									
8p	A,B,D		12GM +	10FG =	22s									
9p	A		7GM +	8FG =	15s									
10p	A,C,D		8GM +	7FG =	15s									
11p	C		5GM +	6FG =	11s									
12p	A,D		8GM +	6FG =	14s									

Notes:	**AM Peak**	**2A+1B+3A+4A**	**PM Peak**	**2A+1B+3A+4A**
	Sum of Critical *y* ***Y***	**0.632**	Sum of Critical *y* ***Y***	**0.550**
	Lost Time ***L*** (sec)	23	Lost Time ***L*** (sec)	23
	Cycle Time ***c*** (sec)	120	Cycle Time ***c*** (sec)	118
	Practical *Y* ***Ypr***	0.728	Practical *Y* ***Ypr***	0.725
	Reserve Capacity ***RC***	**15%**	Reserve Capacity ***RC***	**32%**

Date : 15-Feb-23 Junction : J5 - Nam Cheong Street / Tai Hang Sai Street / Wai Lun Street

ATKINS CHINA LIMITED

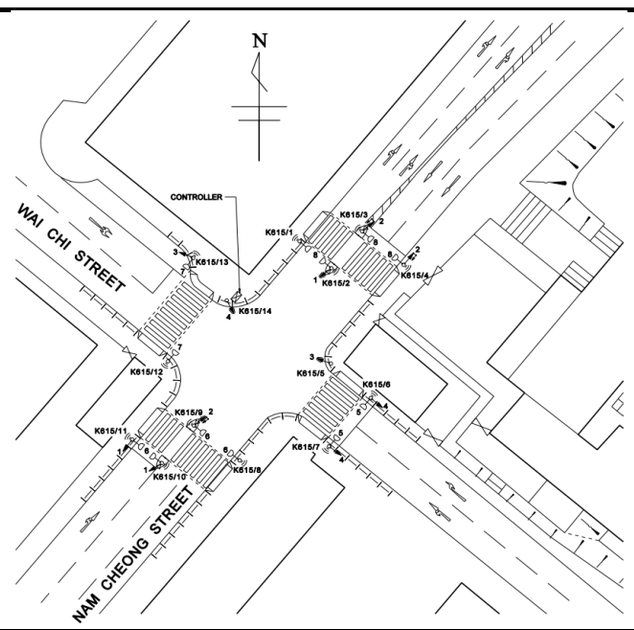
TRAFFIC SIGNAL CALCULATION SHEET

ATKINS
Member of the SNC-Lavalin Group

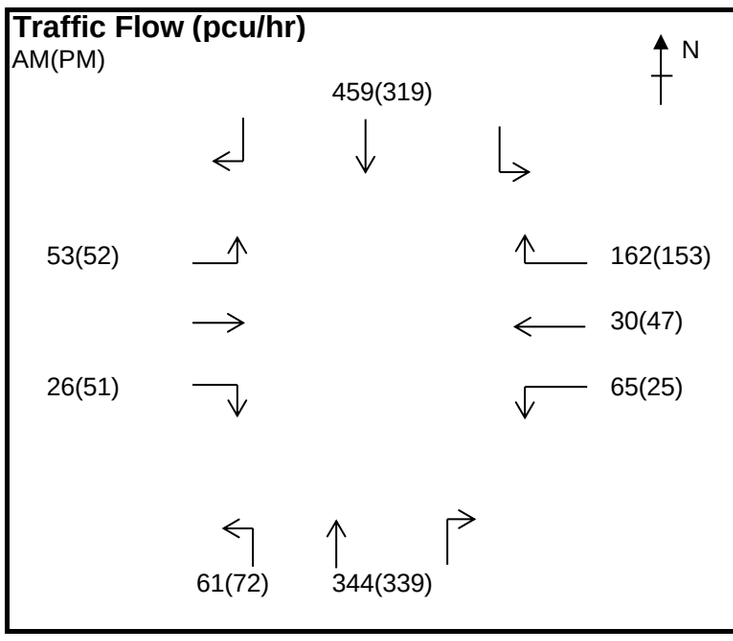
JOB NO. : 5186651

Junction : J6 - Nam Cheong Street / Wai Chi Street Design Year: 2021

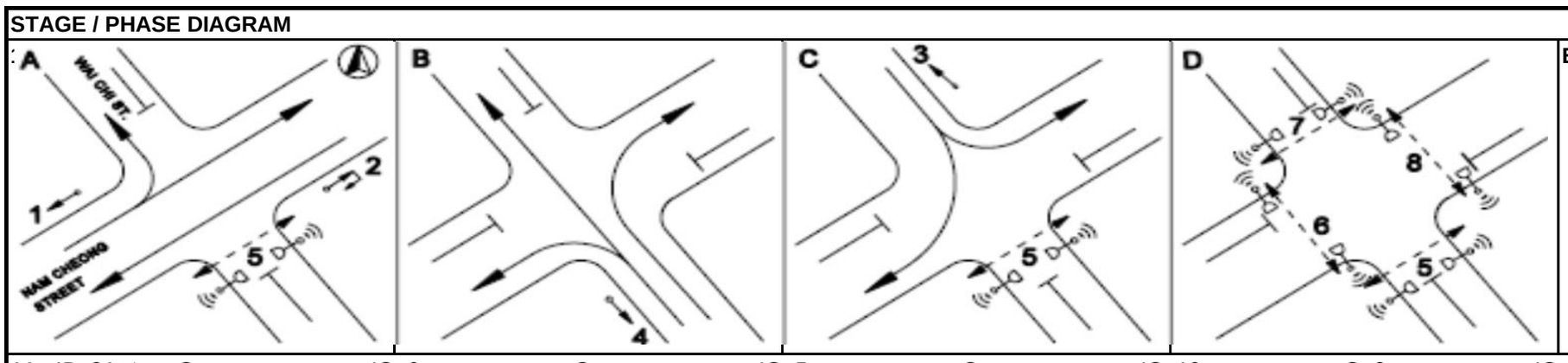
Scheme : Year 2021 Observed Flows Designed by: DH Checked by: PT



Traffic Flow (pcu/hr)
AM(PM)



STAGE / PHASE DIAGRAM



1A+4B+3A+(	G=	IG=6	G=	IG=5	G=	IG=10	G=8	IG=9	G=		
1A+4B+3A+6p	G=	IG=6	G=	IG=5	G=	IG=10	G=8	IG=9	G=		

Capacity Calculations

Phase	Stage	Lane Width (m) *w*	Nearside lane? (Y/N)	Opposed turn? (Y/N)	Radius for turning (m) *r*	Gradient in % *g*	AM Peak Design Flow *q* (pcu/hr)	AM Peak Proportion turning (%) *f*	AM Peak Saturation flow *S* (pcu/hr)	AM Peak Flow factor *y*	PM Peak Design Flow *q* (pcu/hr)	PM Peak Proportion turning (%) *f*	PM Peak Saturation flow *S* (pcu/hr)	PM Peak Flow factor *y*
Nam Cheong Street NB														
1A	A	4.00	Y	N	8	3	405	15%	1835	**0.221**	411	18%	1825	**0.225**
Nam Cheong Street SB														
2A	A	3.30	Y	N			222		1945	0.114	154		1945	0.079
2B	A	3.30	N	N			237		2085	0.114	165		2085	0.079
Wai Chi Street EB														
3A	C	5.00	Y	N	12.5/17.5		79	67% / 33%	1910	**0.041**	103	50% / 50%	1915	**0.054**
Wai Chi Street WB														
4A	B	3.65	Y	N	10		95	68%	1795	0.053	72	35%	1880	0.038
4B	B	3.65	Y	N	15		162	100%	1800	**0.090**	153	100%	1800	**0.085**
5p	A,C,D		8GM +	8FG =	16s									
6p	D		8GM +	6FG =	14s									
7p	D		10GM +	10FG =	20s									
8p	D		7GM +	6FG =	13s									

Notes:	**AM Peak**	**1A+4B+3A+6p**	**PM Peak**	**1A+4B+3A+6p**
	Sum of Critical *y* ***Y***	**0.352**	Sum of Critical *y* ***Y***	**0.364**
	Lost Time ***L*** (sec)	35	Lost Time ***L*** (sec)	35
	Cycle Time ***c*** (sec)	100	Cycle Time ***c*** (sec)	100
	Practical *Y* ***Ypr***	0.585	Practical *Y* ***Ypr***	0.585
	Reserve Capacity ***RC***	**66%**	Reserve Capacity ***RC***	**61%**

Date : 15-Feb-23 Junction : J6 - Nam Cheong Street / Wai Chi Street

ATKINS CHINA LIMITED

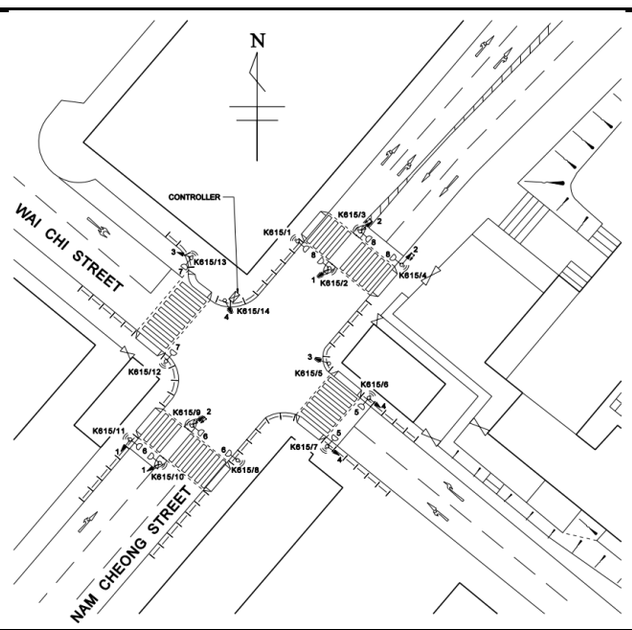
TRAFFIC SIGNAL CALCULATION SHEET

ATKINS
Member of the SNC-Lavalin Group

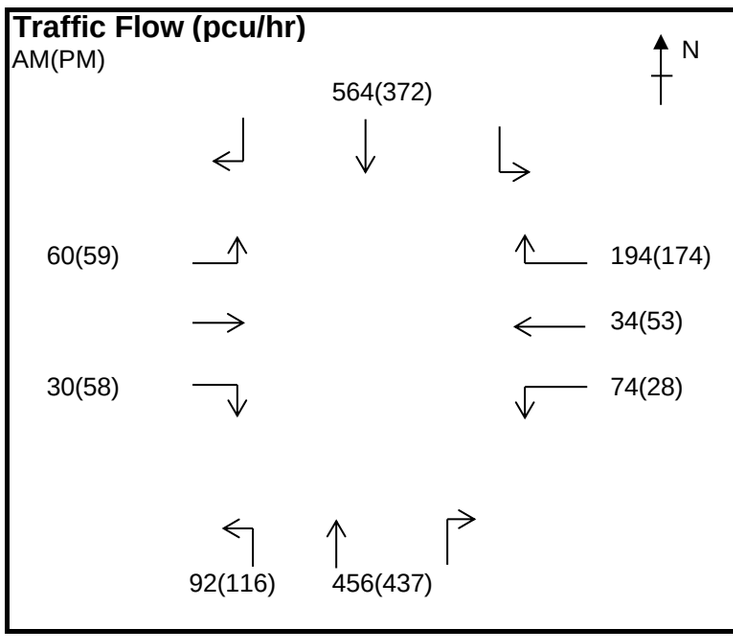
JOB NO. : 5186651

Junction : J6 - Nam Cheong Street / Wai Chi Street Design Year: 2032

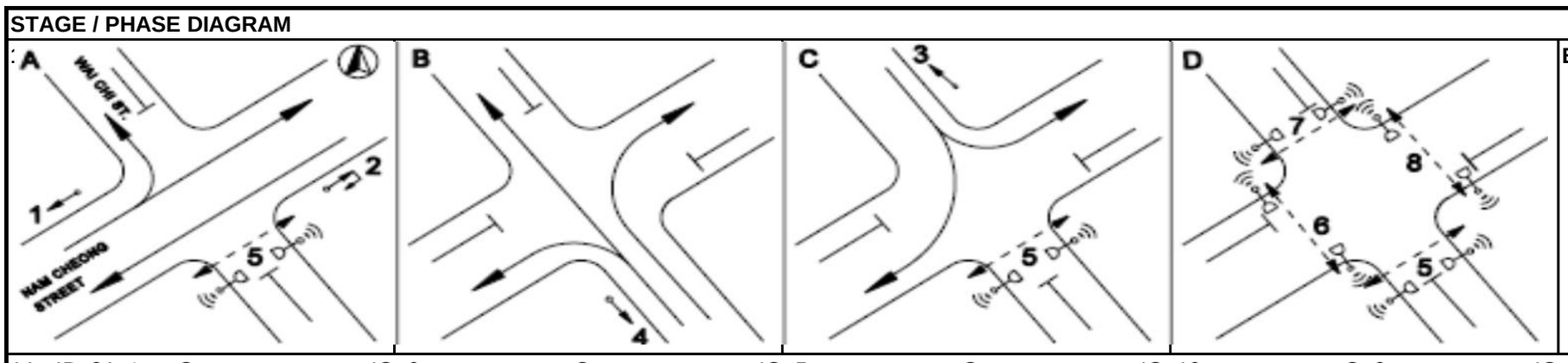
Scheme : Year 2032 Reference Flows Designed by: DH Checked by: PT



Traffic Flow (pcu/hr)
AM(PM)



STAGE / PHASE DIAGRAM



1A+4B+3A+(	G=	IG=6	G=	IG=5	G=	IG=10	G=8	IG=9	G=		
1A+4B+3A+6p	G=	IG=6	G=	IG=5	G=	IG=10	G=8	IG=9	G=		

Capacity Calculations

Phase	Stage	Lane Width (m) *w*	Nearside lane? (Y/N)	Opposed turn? (Y/N)	Radius for turning (m) *r*	Gradient in % *g*	AM Peak Design Flow *q* (pcu/hr)	AM Peak Proportion turning (%) *f*	AM Peak Saturation flow *S* (pcu/hr)	AM Peak Flow factor *y*	PM Peak Design Flow *q* (pcu/hr)	PM Peak Proportion turning (%) *f*	PM Peak Saturation flow *S* (pcu/hr)	PM Peak Flow factor *y*
Nam Cheong Street NB														
1A	A	4.00	Y	N	8	3	548	17%	1830	**0.299**	553	21%	1815	**0.305**
Nam Cheong Street SB														
2A	A	3.30	Y	N			272		1945	0.140	180		1945	0.093
2B	A	3.30	N	N			292		2085	0.140	192		2085	0.092
Wai Chi Street EB														
3A	C	5.00	Y	N	12.5/17.5		90	67% / 33%	1910	**0.047**	117	50% / 50%	1915	**0.061**
Wai Chi Street WB														
4A	B	3.65	Y	N	10		108	69%	1795	0.060	81	35%	1880	0.043
4B	B	3.65	Y	N	15		194	100%	1800	**0.108**	174	100%	1800	**0.097**
5p	A,C,D		8GM +	8FG =	16s									
6p	D		8GM +	6FG =	14s									
7p	D		10GM +	10FG =	20s									
8p	D		7GM +	6FG =	13s									

Notes:	**AM Peak**	**1A+4B+3A+6p**	**PM Peak**	**1A+4B+3A+6p**
	Sum of Critical *y* ***Y***	**0.454**	Sum of Critical *y* ***Y***	**0.462**
	Lost Time ***L*** (sec)	35	Lost Time ***L*** (sec)	35
	Cycle Time ***c*** (sec)	120	Cycle Time ***c*** (sec)	118
	Practical *Y* ***Ypr***	0.638	Practical *Y* ***Ypr***	0.633
	Reserve Capacity ***RC***	**40%**	Reserve Capacity ***RC***	**37%**

Date : 15-Feb-23 Junction : J6 - Nam Cheong Street / Wai Chi Street

ATKINS CHINA LIMITED

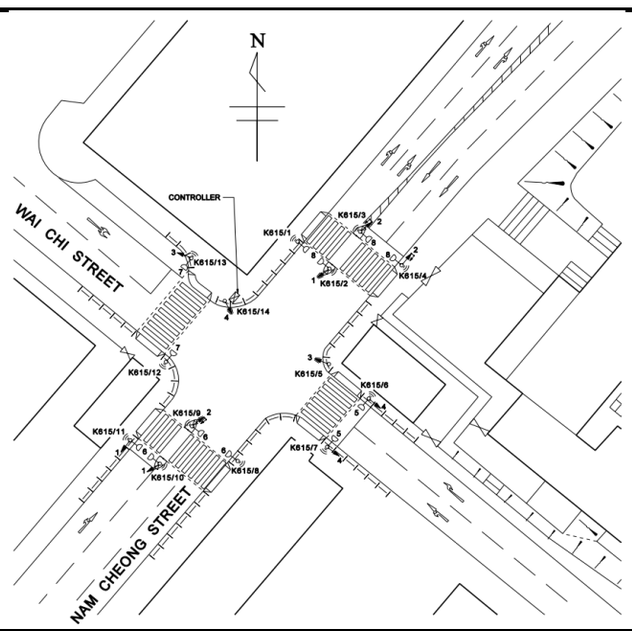
TRAFFIC SIGNAL CALCULATION SHEET

ATKINS
Member of the SNC-Lavalin Group

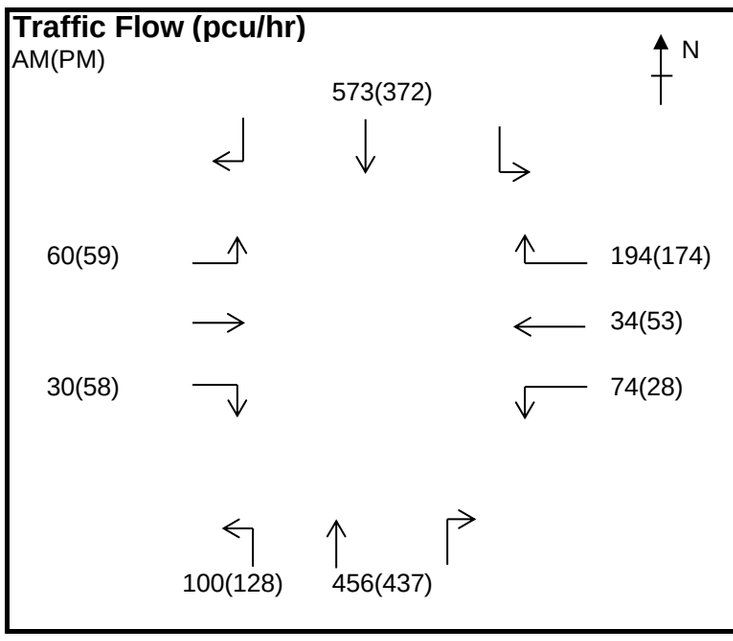
JOB NO. : 5186651

Junction : J6 - Nam Cheong Street / Wai Chi Street Design Year: 2032

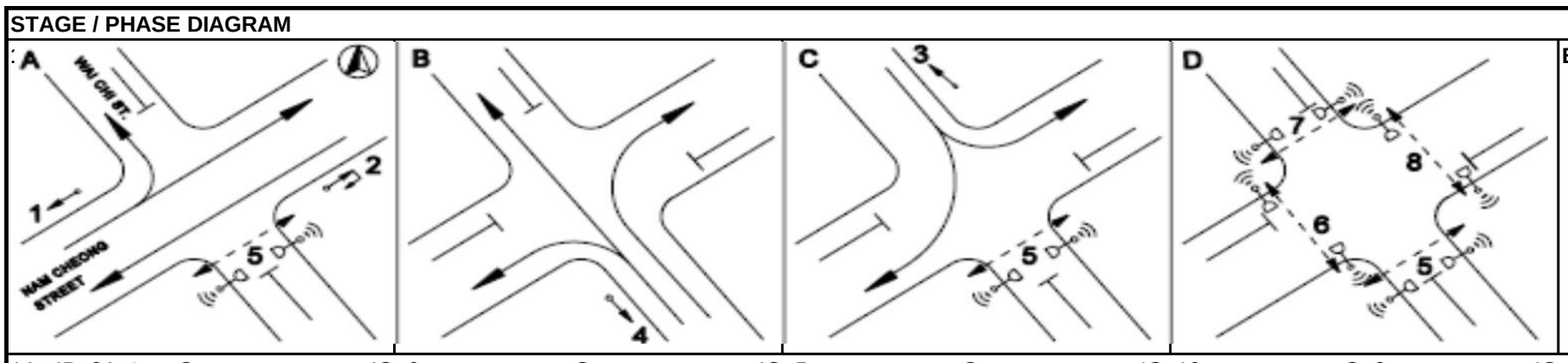
Scheme : Year 2032 Design Flows Designed by: DH Checked by: PT



Traffic Flow (pcu/hr)
AM(PM)



STAGE / PHASE DIAGRAM



1A+4B+3A+(	G=	IG=6	G=	IG=5	G=	IG=10	G=8	IG=9	G=		
1A+4B+3A+6p	G=	IG=6	G=	IG=5	G=	IG=10	G=8	IG=9	G=		

Capacity Calculations

Phase	Stage	Lane Width (m) *w*	Nearside lane? (Y/N)	Opposed turn? (Y/N)	Radius for turning (m) *r*	Gradient in % *g*	AM Peak Design Flow *q* (pcu/hr)	AM Peak Proportion turning (%) *f*	AM Peak Saturation flow *S* (pcu/hr)	AM Peak Flow factor *y*	PM Peak Design Flow *q* (pcu/hr)	PM Peak Proportion turning (%) *f*	PM Peak Saturation flow *S* (pcu/hr)	PM Peak Flow factor *y*
Nam Cheong Street NB														
1A	A	4.00	Y	N	8	3	556	18%	1825	**0.305**	565	23%	1805	**0.313**
Nam Cheong Street SB														
2A	A	3.30	Y	N			277		1945	0.142	180		1945	0.093
2B	A	3.30	N	N			296		2085	0.142	192		2085	0.092
Wai Chi Street EB														
3A	C	5.00	Y	N	12.5/17.5		90	67% / 33%	1910	**0.047**	117	50% / 50%	1915	**0.061**
Wai Chi Street WB														
4A	B	3.65	Y	N	10		108	69%	1795	0.060	81	35%	1880	0.043
4B	B	3.65	Y	N	15		194	100%	1800	**0.108**	174	100%	1800	**0.097**
5p	A,C,D		8GM +	8FG =	16s									
6p	D		8GM +	6FG =	14s									
7p	D		10GM +	10FG =	20s									
8p	D		7GM +	6FG =	13s									

Notes:	**AM Peak**	**1A+4B+3A+6p**	**PM Peak**	**1A+4B+3A+6p**
	Sum of Critical *y* ***Y***	**0.460**	Sum of Critical *y* ***Y***	**0.471**
	Lost Time ***L*** (sec)	35	Lost Time ***L*** (sec)	35
	Cycle Time ***c*** (sec)	120	Cycle Time ***c*** (sec)	118
	Practical *Y* ***Ypr***	0.638	Practical *Y* ***Ypr***	0.633
	Reserve Capacity ***RC***	**39%**	Reserve Capacity ***RC***	**34%**

Date : 15-Feb-23 Junction : J6 - Nam Cheong Street / Wai Chi Street

ATKINS CHINA LIMITED

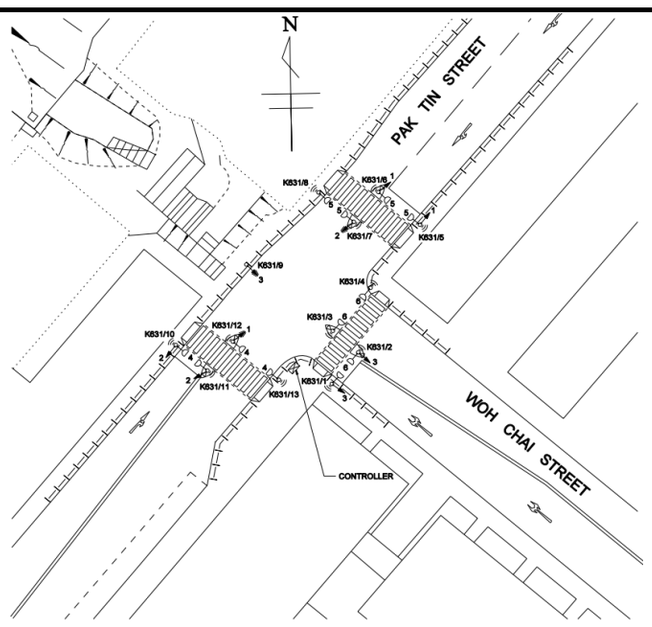
TRAFFIC SIGNAL CALCULATION SHEET

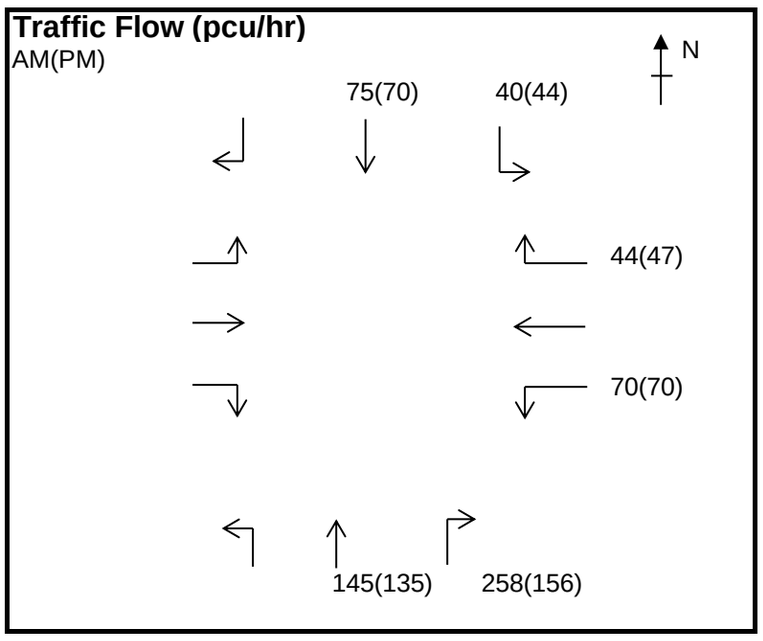
ATKINS
Member of the SNC-Lavalin Group

JOB NO. : 5186651

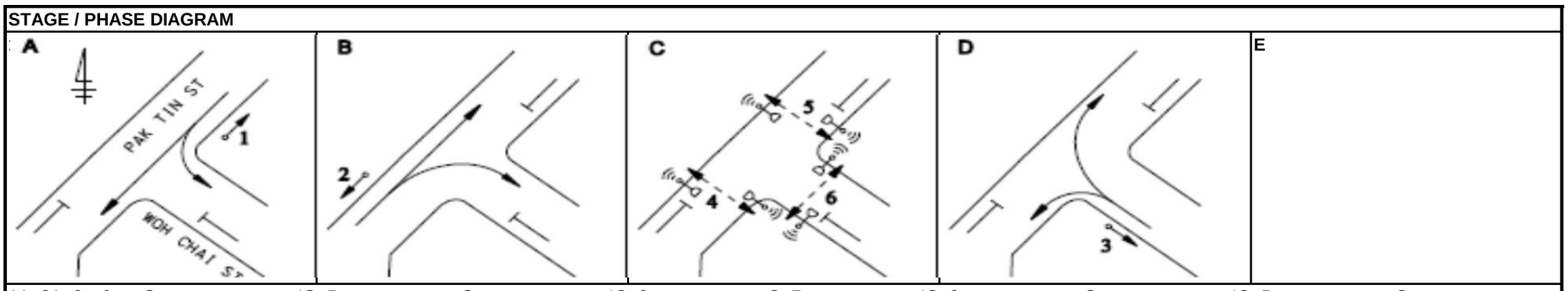
Junction : J7 - Pak Tin Street / Woh Chai Street Design Year: 2021

Scheme : Year 2021 Observed Flows Designed by: DH Checked by: PT





STAGE / PHASE DIAGRAM



1A+2A+6p+3	G=	IG=5	G=	IG=9	G=7	IG=9	G=	IG=5	G=	
1A+2A+6p+3A	G=	IG=5	G=	IG=9	G=7	IG=9	G=	IG=5	G=	

Capacity Calculations

Phase	Stage	Lane Width (m) ***w***	Nearside lane? (Y/N)	Opposed turn? (Y/N)	Radius for turning (m) ***r***	Gradient in % ***g***	AM Peak: Design Flow ***q*** (pcu/hr)	AM Peak: Proportion turning (%) ***f***	AM Peak: Saturation flow ***S*** (pcu/hr)	AM Peak: Flow factor ***y***	PM Peak: Design Flow ***q*** (pcu/hr)	PM Peak: Proportion turning (%) ***f***	PM Peak: Saturation flow ***S*** (pcu/hr)	PM Peak: Flow factor ***y***
Pak Tin Street SB														
1A	A	4.50	Y	N	7.5		115	35%	1930	**0.060**	114	39%	1915	**0.060**
Pak Tin Street NB														
2A	B	3.50	Y	N	17.5		403	64%	1865	**0.216**	291	54%	1880	**0.155**
Woh Chai Street WB														
3A	D	4.00	Y	N	7.5/12.5		114	61% / 39%	1725	**0.066**	117	60% / 40%	1725	**0.068**
4p	C		7GM +	6FG =	13s									
5p	C		6GM +	5FG =	11s									
6p	C		7GM +	6FG =	13s									

Notes:	**AM Peak**	**1A+2A+6p+3A**	**PM Peak**	**1A+2A+6p+3A**
	Sum of Critical *y* ***Y***	**0.342**	Sum of Critical *y* ***Y***	**0.282**
	Lost Time ***L*** (sec)	32	Lost Time ***L*** (sec)	32
	Cycle Time ***c*** (sec)	100	Cycle Time ***c*** (sec)	100
	Practical *Y* ***Ypr***	0.612	Practical *Y* ***Ypr***	0.612
	Reserve Capacity ***RC***	**79%**	Reserve Capacity ***RC***	**117%**

Date : 15-Feb-23 Junction : J7 - Pak Tin Street / Woh Chai Street

ATKINS CHINA LIMITED

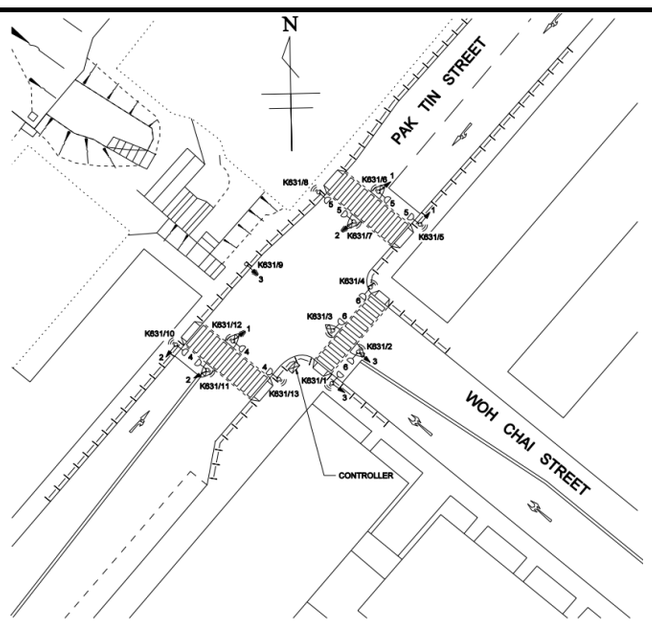
TRAFFIC SIGNAL CALCULATION SHEET

ATKINS
Member of the SNC-Lavalin Group

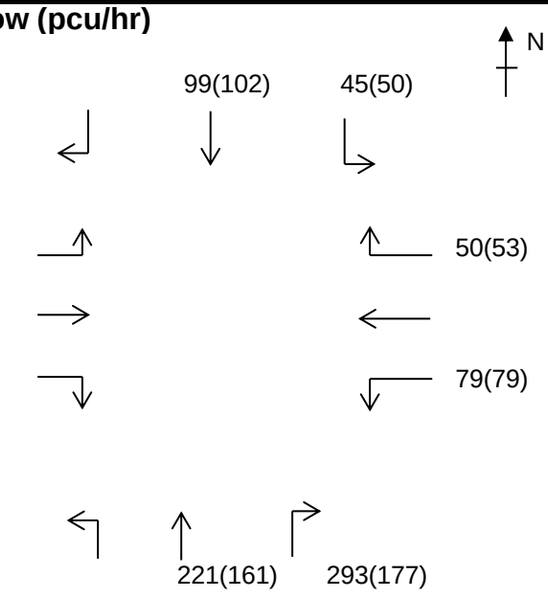
JOB NO. : 5186651

Junction : J7 - Pak Tin Street / Woh Chai Street Design Year: 2032

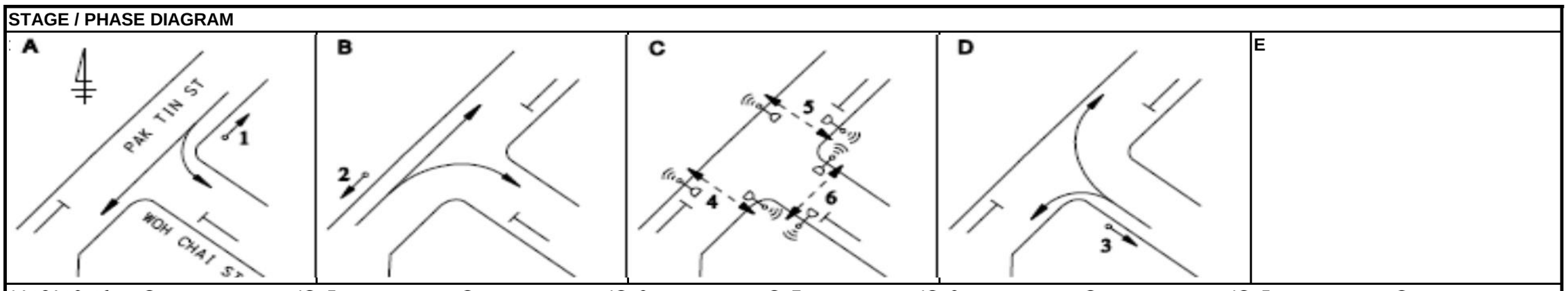
Scheme : Year 2032 Design Flows Designed by: DH Checked by: PT



Traffic Flow (pcu/hr)
AM(PM)



STAGE / PHASE DIAGRAM



1A+2A+6p+3	G=	IG=5	G=	IG=9	G=7	IG=9	G=	IG=5	G=	
1A+2A+6p+3A	G=	IG=5	G=	IG=9	G=7	IG=9	G=	IG=5	G=	

Capacity Calculations

Phase	Stage	Lane Width (m) ***w***	Nearside lane? (Y/N)	Opposed turn? (Y/N)	Radius for turning (m) ***r***	Gradient in % ***g***	AM Peak: Design Flow ***q*** (pcu/hr)	AM Peak: Proportion turning (%) ***f***	AM Peak: Saturation flow ***S*** (pcu/hr)	AM Peak: Flow factor ***y***	PM Peak: Design Flow ***q*** (pcu/hr)	PM Peak: Proportion turning (%) ***f***	PM Peak: Saturation flow ***S*** (pcu/hr)	PM Peak: Flow factor ***y***
Pak Tin Street SB														
1A	A	4.50	Y	N	7.5		144	31%	1945	**0.074**	152	33%	1940	**0.078**
Pak Tin Street NB														
2A	B	3.50	Y	N	17.5		514	57%	1875	**0.274**	338	52%	1880	**0.180**
Woh Chai Street WB														
3A	D	4.00	Y	N	7.5/12.5		129	61% / 39%	1725	**0.075**	132	60% / 40%	1725	**0.077**
4p	C		7GM +	6FG =	13s									
5p	C		6GM +	5FG =	11s									
6p	C		7GM +	6FG =	13s									

Notes:	**AM Peak**	**1A+2A+6p+3A**	**PM Peak**	**1A+2A+6p+3A**
	Sum of Critical *y* ***Y***	**0.423**	Sum of Critical *y* ***Y***	**0.335**
	Lost Time ***L*** (sec)	32	Lost Time ***L*** (sec)	32
	Cycle Time ***c*** (sec)	100	Cycle Time ***c*** (sec)	100
	Practical *Y* ***Ypr***	0.612	Practical *Y* ***Ypr***	0.612
	Reserve Capacity ***RC***	**45%**	Reserve Capacity ***RC***	**83%**

Date : 15-Feb-23 Junction : J7 - Pak Tin Street / Woh Chai Street

ATKINS CHINA LIMITED

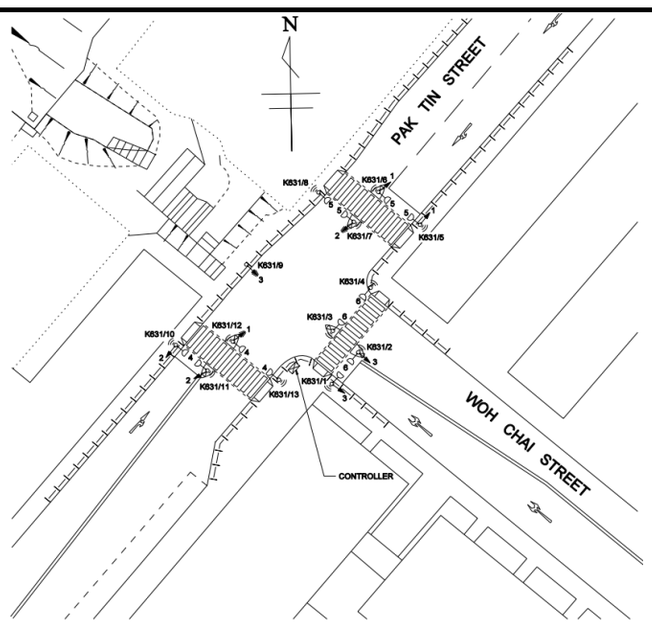
TRAFFIC SIGNAL CALCULATION SHEET

ATKINS
Member of the SNC-Lavalin Group

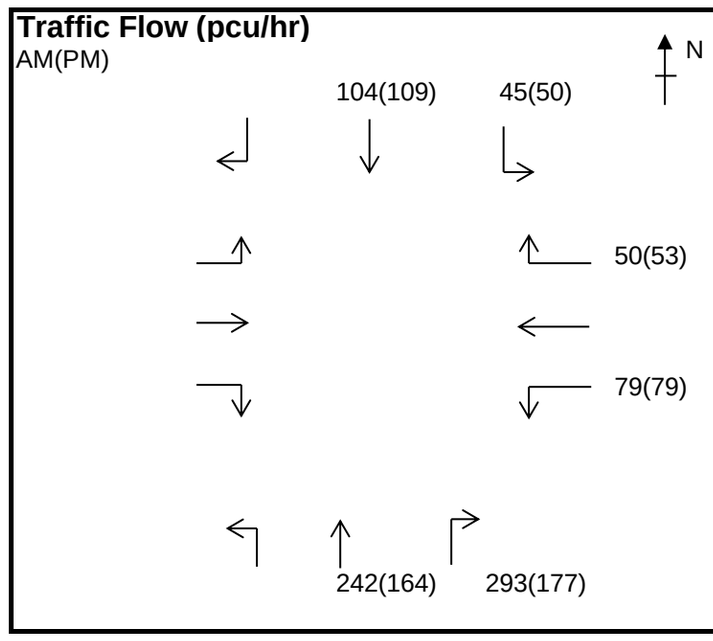
JOB NO. : 5186651

Junction : J7 - Pak Tin Street / Woh Chai Street Design Year: 2032

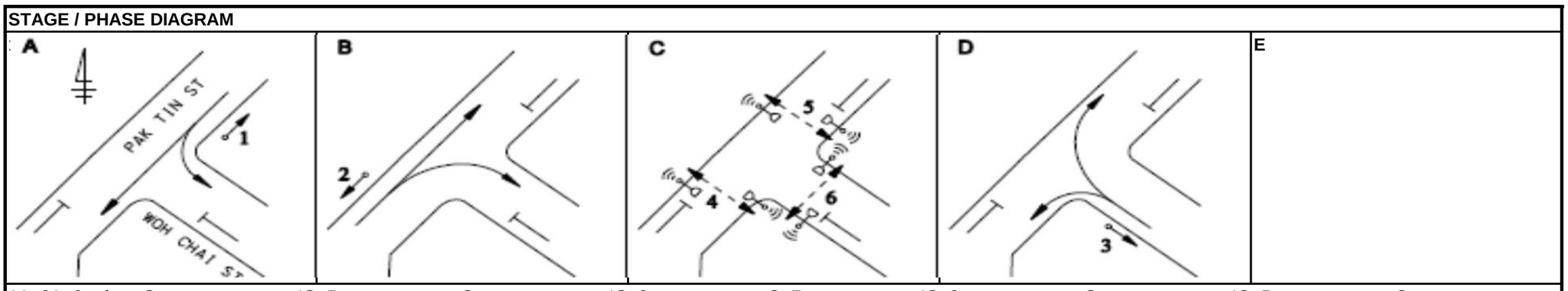
Scheme : Year 2032 Design Flows Designed by: DH Checked by: PT



Traffic Flow (pcu/hr)
AM(PM)



STAGE / PHASE DIAGRAM



1A+2A+6p+3	G=	IG=5	G=	IG=9	G=7	IG=9	G=	IG=5	G=	
1A+2A+6p+3A	G=	IG=5	G=	IG=9	G=7	IG=9	G=	IG=5	G=	

Capacity Calculations

Phase	Stage	Lane Width (m) ***w***	Nearside lane? (Y/N)	Opposed turn? (Y/N)	Radius for turning (m) ***r***	Gradient in % ***g***	AM Peak: Design Flow ***q*** (pcu/hr)	AM Peak: Proportion turning (%) ***f***	AM Peak: Saturation flow ***S*** (pcu/hr)	AM Peak: Flow factor ***y***	PM Peak: Design Flow ***q*** (pcu/hr)	PM Peak: Proportion turning (%) ***f***	PM Peak: Saturation flow ***S*** (pcu/hr)	PM Peak: Flow factor ***y***
Pak Tin Street SB														
1A	A	4.50	Y	N	7.5		149	30%	1945	**0.077**	159	31%	1945	**0.082**
Pak Tin Street NB														
2A	B	3.50	Y	N	17.5		535	55%	1875	**0.285**	341	52%	1880	**0.181**
Woh Chai Street WB														
3A	D	4.00	Y	N	7.5/12.5		129	61% / 39%	1725	**0.075**	132	60% / 40%	1725	**0.077**
4p	C		7GM +	6FG =	13s									
5p	C		6GM +	5FG =	11s									
6p	C		7GM +	6FG =	13s									

Notes:	**AM Peak**	**1A+2A+6p+3A**	**PM Peak**	**1A+2A+6p+3A**
	Sum of Critical *y* ***Y***	**0.437**	Sum of Critical *y* ***Y***	**0.340**
	Lost Time ***L*** (sec)	32	Lost Time ***L*** (sec)	32
	Cycle Time ***c*** (sec)	100	Cycle Time ***c*** (sec)	100
	Practical *Y* ***Ypr***	0.612	Practical *Y* ***Ypr***	0.612
	Reserve Capacity ***RC***	**40%**	Reserve Capacity ***RC***	**80%**

Date : 15-Feb-23 Junction : J7 - Pak Tin Street / Woh Chai Street

ATKINS CHINA LIMITED

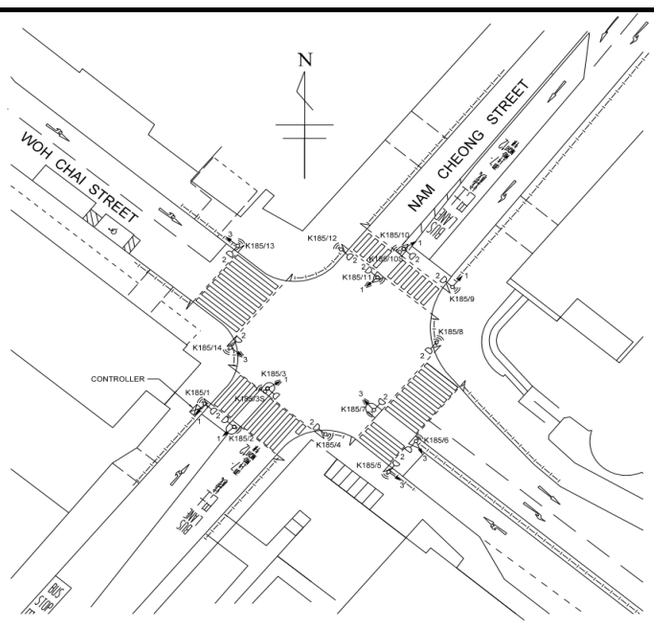
TRAFFIC SIGNAL CALCULATION SHEET

ATKINS
Member of the SNC-Lavalin Group

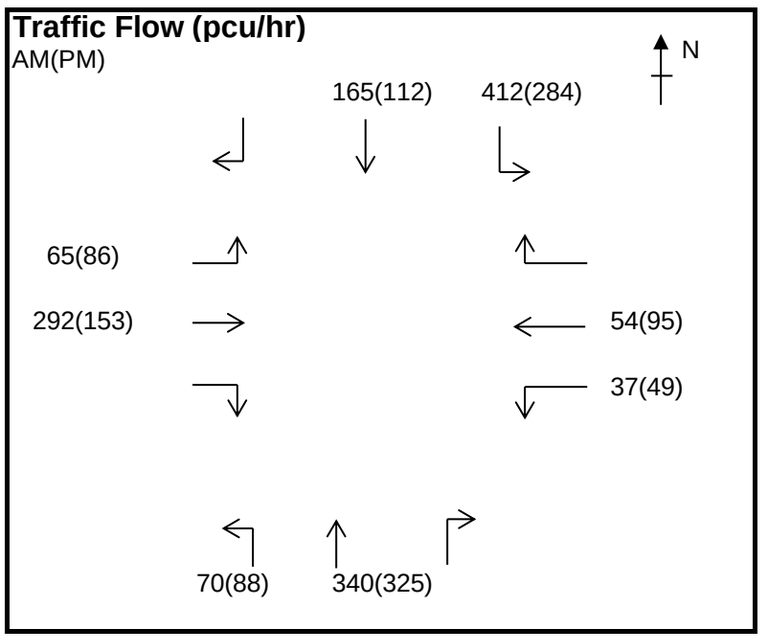
JOB NO. : 5186651

Junction : J8 - Nam Cheong Street / Woh Chai Street Design Year: 2021

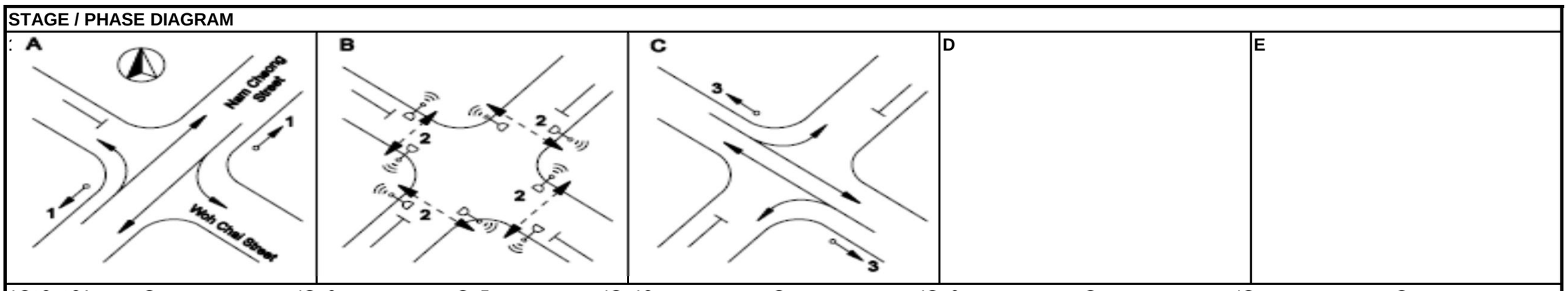
Scheme : Year 2021 Observed Flows Designed by: DH Checked by: PT



Traffic Flow (pcu/hr)
AM(PM)



STAGE / PHASE DIAGRAM



1C+2p+3A	G=	IG=9	G=5	IG=12	G=	IG=6	G=	IG=	G=
1A+2p+3A	G=	IG=9	G=5	IG=12	G=	IG=6	G=	IG=	G=

Capacity Calculations

Phase	Stage	Lane Width (m) *w*	Nearside lane? (Y/N)	Opposed turn? (Y/N)	Radius for turning (m) *r*	Gradient in % *g*	AM Peak Design Flow *q* (pcu/hr)	AM Peak Proportion turning (%) *f*	AM Peak Saturation flow *S* (pcu/hr)	AM Peak Flow factor *y*	PM Peak Design Flow *q* (pcu/hr)	PM Peak Proportion turning (%) *f*	PM Peak Saturation flow *S* (pcu/hr)	PM Peak Flow factor *y*
Nam Cheong Street NB														
1A	A	5.00	Y	N	15		410	17%	2080	0.197	413	21%	2070	**0.200**
Nam Cheong Street SB														
1C	A	4.00	Y	N	20		412	100%	1875	**0.220**	284	100%	1875	0.151
1D	A	4.00	N	N			165		2155	0.077	112		2155	0.052
Woh Chai Street EB														
3A	C	5.00	Y	N	15		357	18%	2075	**0.172**	239	36%	2040	**0.117**
Woh Chai Street WB														
3B	C	4.50	Y	N	15		91	41%	1985	0.046	144	34%	1995	0.072
2p	B		5GM +	8FG =	13s									

Notes:	**AM Peak**	**1C+2p+3A**	**PM Peak**	**1A+2p+3A**
	Sum of Critical *y* ***Y***	**0.392**	Sum of Critical *y* ***Y***	**0.317**
	Lost Time ***L*** (sec)	30	Lost Time ***L*** (sec)	30
	Cycle Time ***c*** (sec)	100	Cycle Time ***c*** (sec)	100
	Practical *Y* ***Ypr***	0.630	Practical *Y* ***Ypr***	0.630
	Reserve Capacity ***RC***	**61%**	Reserve Capacity ***RC***	**99%**

Date : 15-Feb-23 Junction : J8 - Nam Cheong Street / Woh Chai Street

ATKINS CHINA LIMITED

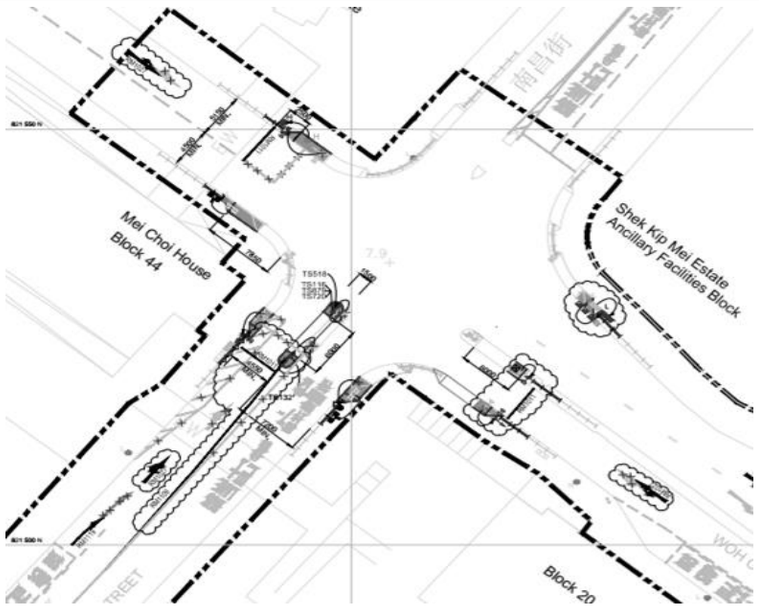
TRAFFIC SIGNAL CALCULATION SHEET

ATKINS
Member of the SNC-Lavalin Group

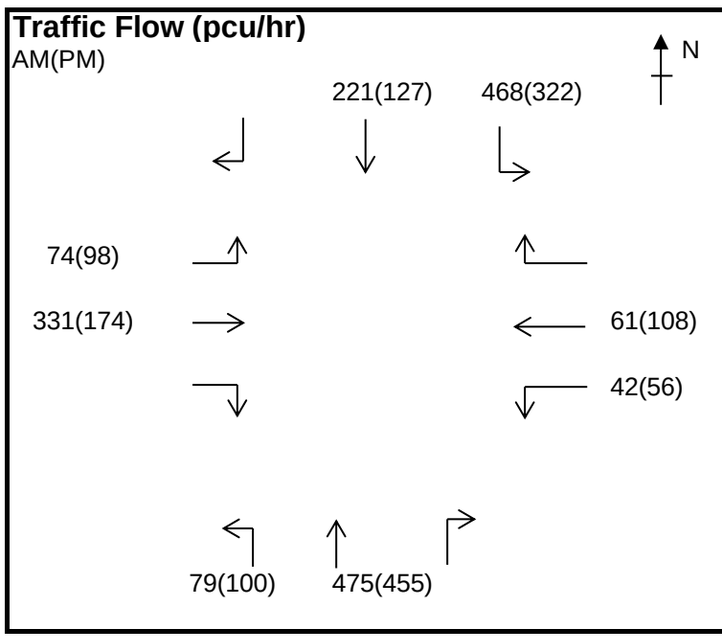
JOB NO. : 5186651

Junction : J8 - Nam Cheong Street / Woh Chai Street Design Year: 2032

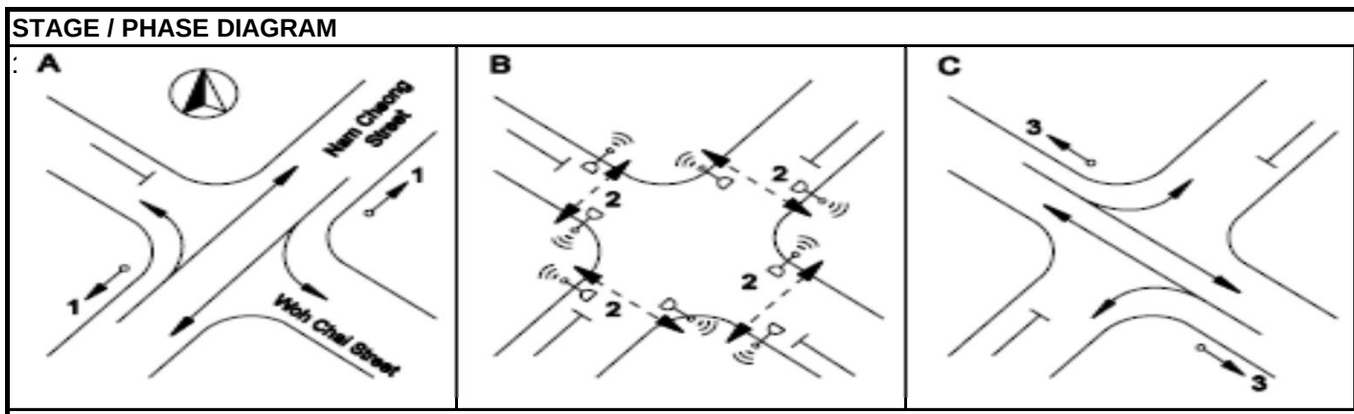
Scheme : Year 2032 Reference Flows Designed by: DH Checked by: PT



Traffic Flow (pcu/hr)
AM(PM)



STAGE / PHASE DIAGRAM



1A+2p+3A	G=	IG=9	G=7	IG=17	G=	IG=6	G=	IG=	G=
1A+2p+3A	G=	IG=9	G=7	IG=17	G=	IG=6	G=	IG=	G=

Capacity Calculations

Phase	Stage	Lane Width (m) *w*	Nearside lane? (Y/N)	Opposed turn? (Y/N)	Radius for turning (m) *r*	Gradient in % *g*	AM Peak Design Flow *q* (pcu/hr)	AM Peak Proportion turning (%) *f*	AM Peak Saturation flow *S* (pcu/hr)	AM Peak Flow factor *y*	PM Peak Design Flow *q* (pcu/hr)	PM Peak Proportion turning (%) *f*	PM Peak Saturation flow *S* (pcu/hr)	PM Peak Flow factor *y*
Nam Cheong Street NB														
1A	A	3.50	Y	N	15		554	14%	1935	**0.286**	555	18%	1930	**0.288**
Nam Cheong Street SB														
1C	A	3.50	Y	N	20		468	100%	1830	0.256	322	100%	1830	0.176
1D	A	3.50	N	N			221		2105	0.105	127		2105	0.060
Woh Chai Street EB														
3A	C	5.00	Y	N	15		405	18%	2075	**0.195**	272	36%	2040	**0.133**
Woh Chai Street WB														
3B	C	5.00	Y	N	15		103	41%	2030	0.051	164	34%	2045	0.080
2p	B		7GM +	14FG =	21s									

Notes:	**AM Peak**	**1A+2p+3A**	**PM Peak**	**1A+2p+3A**
	Sum of Critical *y* ***Y***	**0.481**	Sum of Critical *y* ***Y***	**0.421**
	Lost Time ***L*** (sec)	37	Lost Time ***L*** (sec)	37
	Cycle Time ***c*** (sec)	120	Cycle Time ***c*** (sec)	118
	Practical *Y* ***Ypr***	0.623	Practical *Y* ***Ypr***	0.618
	Reserve Capacity ***RC***	**29%**	Reserve Capacity ***RC***	**47%**

Date : 15-Feb-23 Junction : J8 - Nam Cheong Street / Woh Chai Street

ATKINS CHINA LIMITED

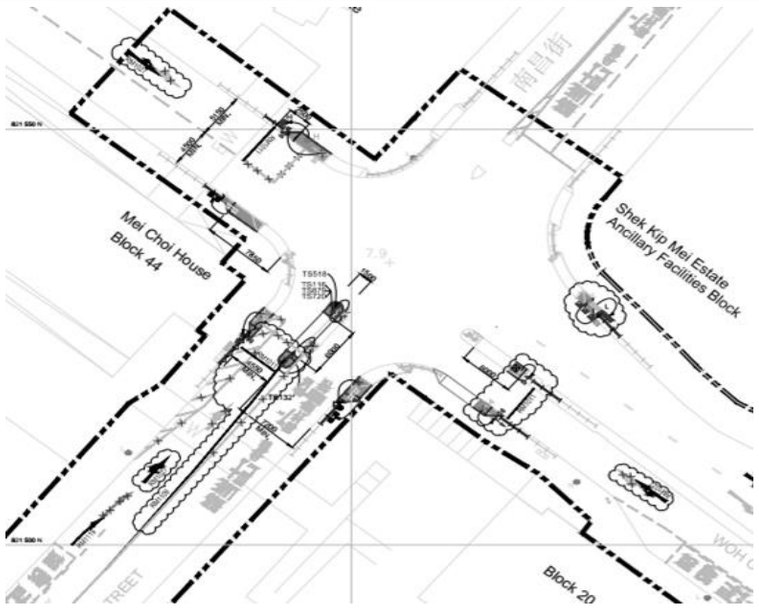
TRAFFIC SIGNAL CALCULATION SHEET

ATKINS
Member of the SNC-Lavalin Group

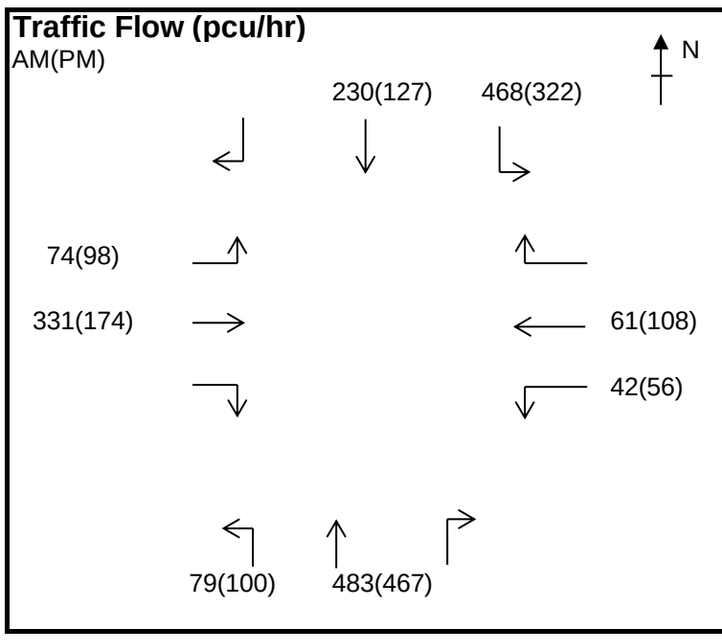
JOB NO. : 5186651

Junction : J8 - Nam Cheong Street / Woh Chai Street Design Year: 2032

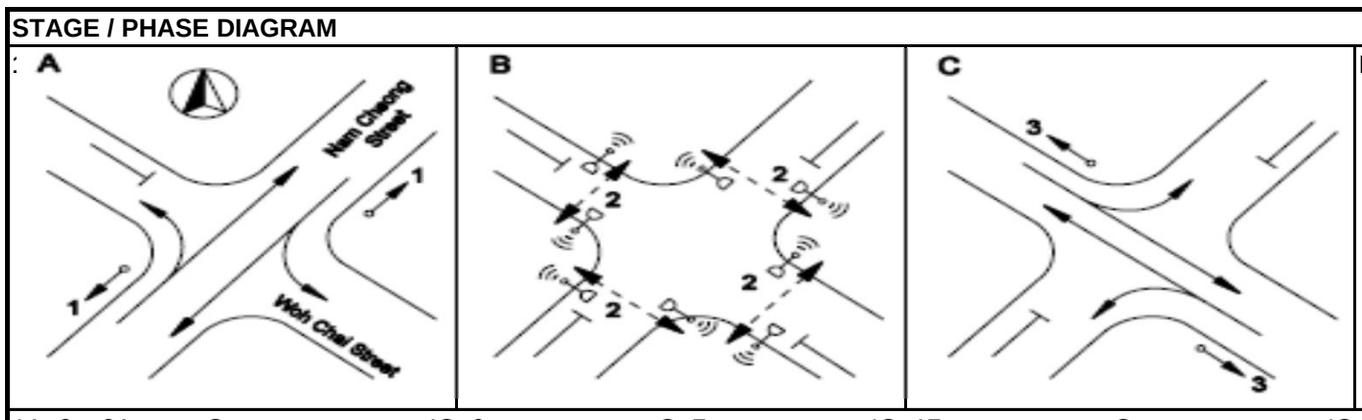
Scheme : Year 2032 Design Flows Designed by: DH Checked by: PT



Traffic Flow (pcu/hr)
AM(PM)



STAGE / PHASE DIAGRAM



1A+2p+3A	G=	IG=9	G=7	IG=17	G=	IG=6	G=	IG=	G=
1A+2p+3A	G=	IG=9	G=7	IG=17	G=	IG=6	G=	IG=	G=

Capacity Calculations

Phase	Stage	Lane Width (m) *w*	Nearside lane? (Y/N)	Opposed turn? (Y/N)	Radius for turning (m) *r*	Gradient in % *g*	AM Peak Design Flow *q* (pcu/hr)	AM Peak Proportion turning (%) *f*	AM Peak Saturation flow *S* (pcu/hr)	AM Peak Flow factor *y*	PM Peak Design Flow *q* (pcu/hr)	PM Peak Proportion turning (%) *f*	PM Peak Saturation flow *S* (pcu/hr)	PM Peak Flow factor *y*
Nam Cheong Street NB														
1A	A	3.50	Y	N	15		562	14%	1940	**0.290**	567	18%	1930	**0.294**
Nam Cheong Street SB														
1C	A	3.50	Y	N	20		468	100%	1830	0.256	322	100%	1830	0.176
1D	A	3.50	N	N			230		2105	0.109	127		2105	0.060
Woh Chai Street EB														
3A	C	5.00	Y	N	15		405	18%	2075	**0.195**	272	36%	2040	**0.133**
Woh Chai Street WB														
3B	C	5.00	Y	N	15		103	41%	2030	0.051	164	34%	2045	0.080
2p	B		7GM +	14FG =	21s									

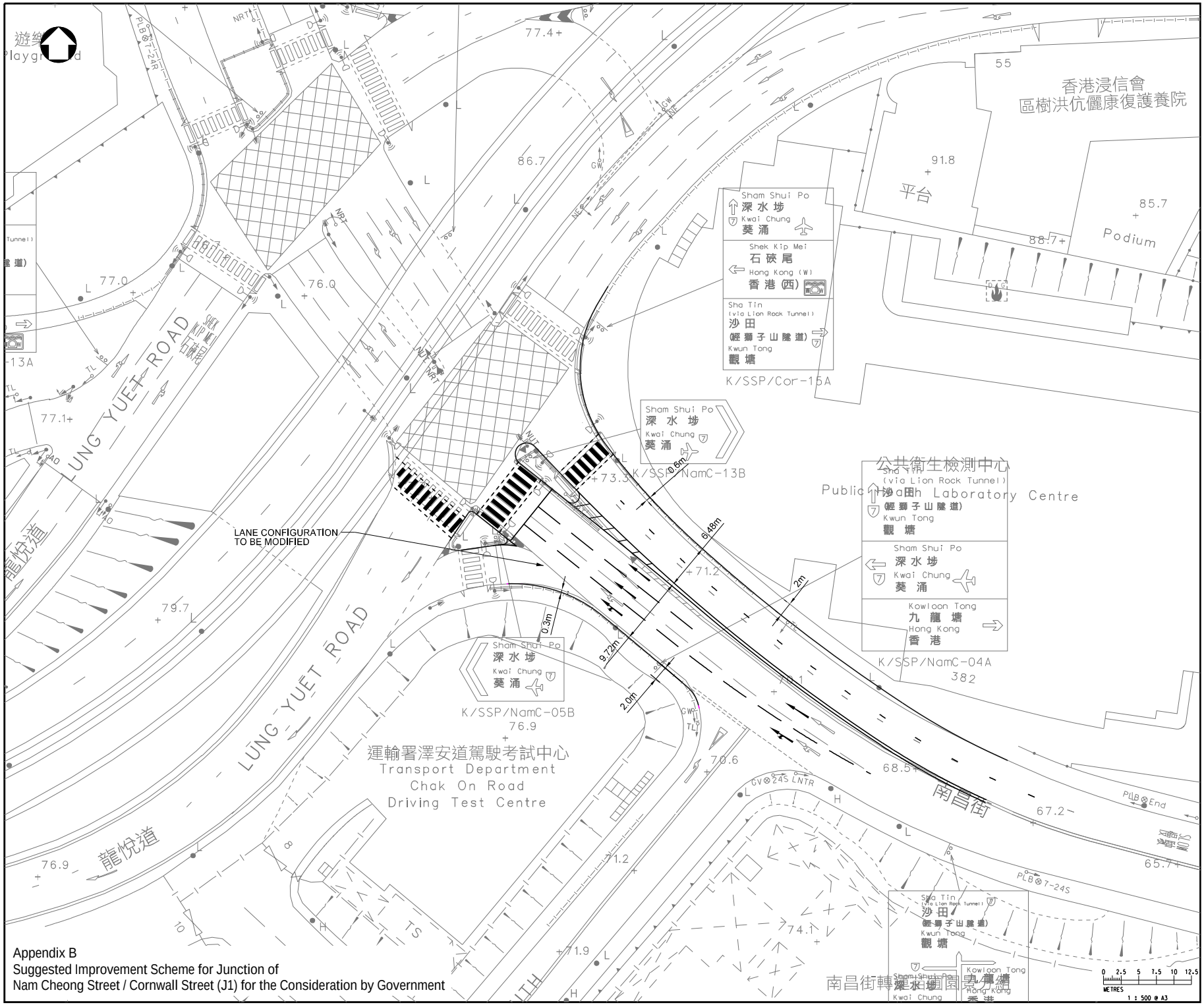
Notes:	**AM Peak**	**1A+2p+3A**	**PM Peak**	**1A+2p+3A**
	Sum of Critical *y* ***Y***	**0.485**	Sum of Critical *y* ***Y***	**0.427**
	Lost Time ***L*** (sec)	37	Lost Time ***L*** (sec)	37
	Cycle Time ***c*** (sec)	120	Cycle Time ***c*** (sec)	118
	Practical *Y* ***Ypr***	0.623	Practical *Y* ***Ypr***	0.618
	Reserve Capacity ***RC***	**28%**	Reserve Capacity ***RC***	**45%**

Date : 15-Feb-23 Junction : J8 - Nam Cheong Street / Woh Chai Street

ATKINS CHINA LIMITED

Appendix B

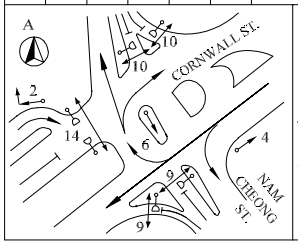
Suggested Improvement Scheme for Junction of Nam Cheong Street / Cornwall Street (J1) for the Consideration by Government

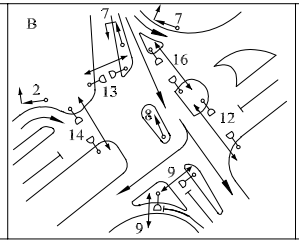


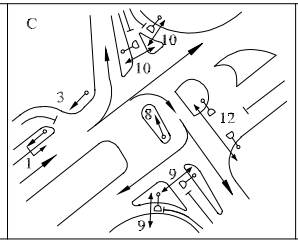
Appendix B
Suggested Improvement Scheme for Junction of
Nam Cheong Street / Cornwall Street (J1) for the Consideration by Government

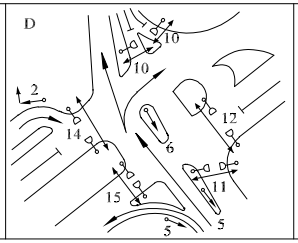
Appendix B
Suggested Improvement Scheme for Junction of
Nam Cheong Street / Cornwall Street (J1) for the Consideration by Government

PED. DELAY	PED. WALK	PED. CLEAR 1	PED. CLEAR 2	MIN. GREEN	ALL RED	ALT. MAX. GREEN / SIGNAL GROUP	A	B	C	D
						1			D1 — ECO3	
						2				
						3				
						4				
						5				
						6	D3		D1	
						7	D1			
						8	D1			D3
2	5	1	6			9	D2			D1
0	5	2	6			10				
2	5	5	3			11				D2
0	5	5	6			12				D 5
2	5	1	6			13	D2	D 5		
2	5	9	2			14		D1		D2
3	5	7	3			15				D3
3	6	5	7			16	D3	D 4		

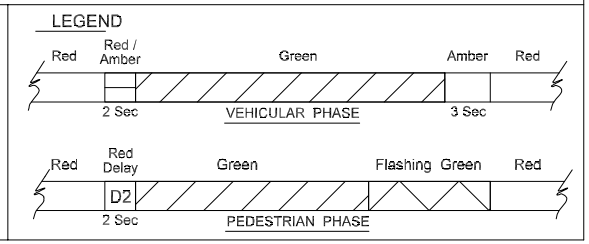








E



TRAFFIC SIGNAL CALCULATION SHEET

ATKINS
Member of the SNC-Lavalin Group

JOB NO. : 5186651

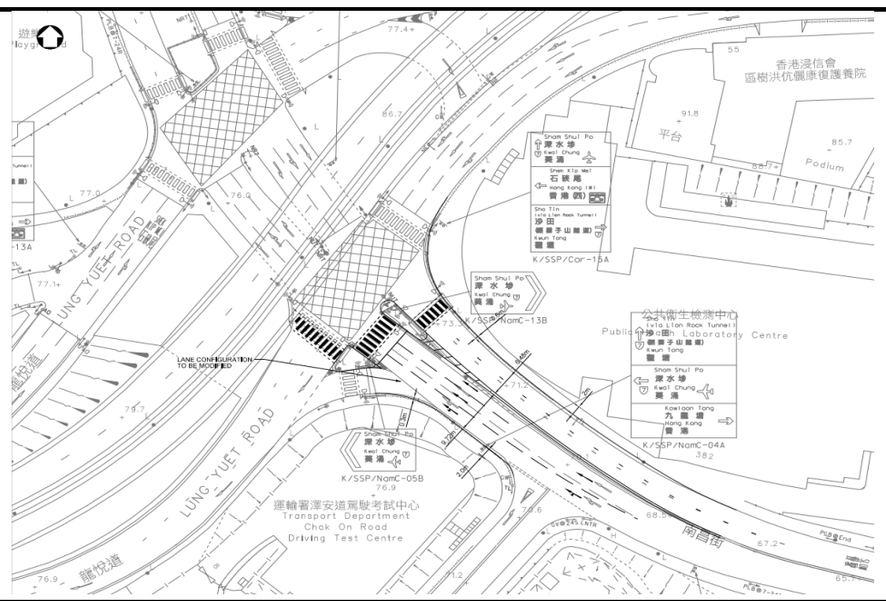
Junction : J1 - Nam Cheong Street / Cornwall Street

Design Year: 2032

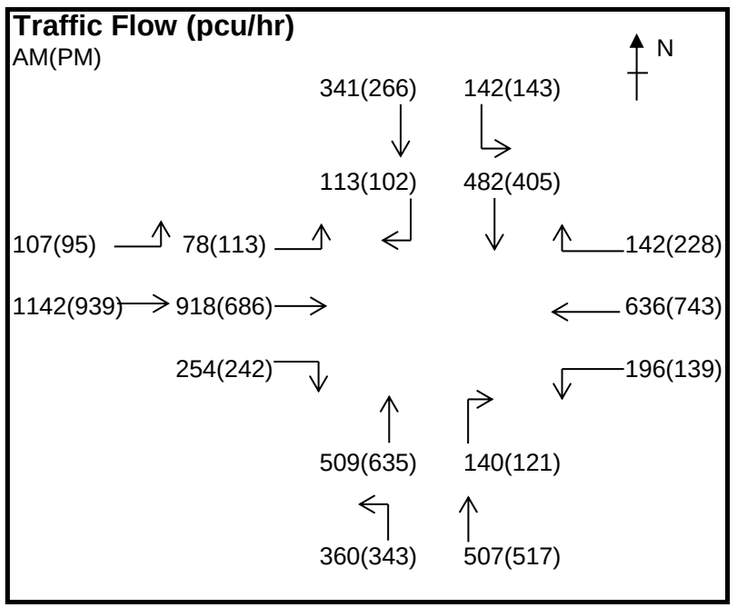
Scheme : Year 2032 Design Flows - w/ Improvement

Designed by: DH

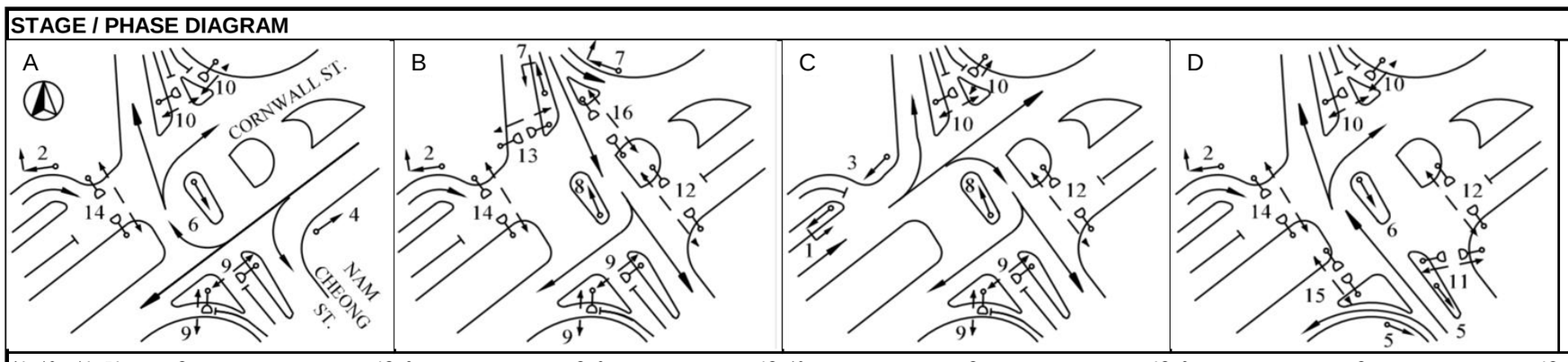
Checked by: PT



Traffic Flow (pcu/hr)
AM(PM)



STAGE / PHASE DIAGRAM



4A+16p+1A+5A	G=	IG=6	G=6	IG=19	G=	IG=8	G=	IG=5	G=	
4B+16p+1B+5C	G=	IG=6	G=6	IG=19	G=	IG=8	G=	IG=5	G=	

Capacity Calculations

Phase	Stage	Lane Width (m) ***w***	Nearside lane? (Y/N)	Opposed turn? (Y/N)	Radius for turning (m) ***r***	Gradient in % ***g***	AM Peak Design Flow ***q*** (pcu/hr)	AM Peak Proportion turning (%) ***f***	AM Peak Saturation flow ***S*** (pcu/hr)	AM Peak Flow factor ***y***	PM Peak Design Flow ***q*** (pcu/hr)	PM Peak Proportion turning (%) ***f***	PM Peak Saturation flow ***S*** (pcu/hr)	PM Peak Flow factor ***y***
Cornwall Street EB														
1A	C	3.30	N	N			301		1490	**0.202**	247		1490	0.166
1B	C	3.30	N	N			420		2085	0.201	346		2085	**0.166**
1C	C	3.30	N	N			421		2085	0.202	346		2085	0.166
2A	A,B,D	6.00	Y	N	20		107	100%	2060	0.052	95	100%	2060	0.046
3A	C	3.50	Y	N	20		406	19%	1935	0.210	337	34%	1915	0.176
3B	C	3.50	N	N			441		2105	0.210	370		2105	0.176
3C	C	3.50	N	N	10		403	63%	1925	0.209	334	72%	1900	0.176
Cornwall Street WB														
4A	A	3.30	Y	N	20		307	64%	1855	**0.165**	357	39%	1890	0.189
4B	A	3.30	N	N			344		2085	0.165	394		2085	**0.189**
4C	A	3.30	N	N	10		323	44%	1955	0.165	359	64%	1905	0.188
Nam Cheong Street NB														
5A	D	5.50	Y	N	30		360	100%	1995	**0.180**	343	100%	1925	0.178
5B	D	3.20	N	N			122		680	0.179	133		750	0.177
5C	D	3.20	N	N			385		2155	0.179	384		2155	**0.178**
6A	A,D	3.00	Y	N			246		1915	0.128	306		1915	0.160
6B	A,D	3.00	N	N	20		263	0%	2055	0.128	329	0%	2055	0.160
6C	A,D	3.00	N	N	15		140	100%	1870	0.075	121	100%	1870	0.065
Nam Cheong Street SB														
7A	B	4.00	Y	N	40		69	100%	760	0.091	69	100%	910	0.076
7B	B	4.00	N	N	45		73	100%	815	0.090	74	100%	980	0.076
7C	B	3.50	N	N			151		1680	0.090	105		1365	0.077
7D	B	3.50	N	N			190		2105	0.090	161		2105	0.076
8A	B,C	3.00	Y	N			233		1915	0.122	195		1915	0.102
8B	B,C	3.00	N	N	20		249	0%	2055	0.121	210	0%	2055	0.102
8C	B,C	3.00	N	N	15		113	100%	1870	0.060	102	100%	1870	0.055
9p	A,B,C		5GM +	7FG =	12s									
10p	A,C,D		5GM +	8FG =	13s									
11p	D		5GM +	8FG =	13s									
12p	B,C,D		5GM +	11FG =	16s									
13p	B		5GM +	7FG =	12s									
14p	A,B,D		5GM +	11FG =	16s									
15p	D		5GM +	10FG =	15s									
16p	B		6GM +	12FG =	18s									

Notes:

To achieve an equilibrium operational performance reflecting the actual driving behaviours for the flared apporaches, the following site factors have been applied for AM(PM) Peaks:

1) Cornwall Street EB, Phase 1A - 0.715 (0.715) - *Total saturation flow for Cornwall Street EB = 5660 (5660) pcu/hr*

2) Nam Cheong Street NB, Phase 5A - 0.967 (0.933)
3) Nam Cheong Street NB, Phase 5B - 0.315 (0.347) - *Total saturation flow for Nam Cheong Street NB = 4830 (4830) pcu/hr*

4) Nam Cheong Street SB, Phase 7A - 0.391 (0.469)
5) Nam Cheong Street SB, Phase 7BA - 0.391 (0.469)
6) Nam Cheong Street SB, Phase 7C - 0.799 (0.648) - *Total saturation flow for Nam Cheong Street SB = 5360 (5360) pcu/hr*

AM Peak	4A+16p+1A+5A	PM Peak	4B+16p+1B+5C
Sum of Critical *y* ***Y***	**0.548**	Sum of Critical *y* ***Y***	**0.533**
Lost Time ***L*** (sec)	41	Lost Time ***L*** (sec)	41
Cycle Time ***c*** (sec)	140	Cycle Time ***c*** (sec)	135
Practical *Y* ***Ypr***	0.636	Practical *Y* ***Ypr***	0.627
Reserve Capacity ***RC***	**16%**	Reserve Capacity ***RC***	**18%**

Date : 15-Feb-23 Junction : J1 - Nam Cheong Street / Cornwall Street

ATKINS CHINA LIMITED

Appendix C

Improvement Scheme for Junction of Nam Cheong Street / Cornwall Street (J1) Proposed by Civil Engineering and Development Department

Modification of MOC

Legend:
- Proposed Traffic Sign
- Proposed Road Marking
- Proposed Traffic Light
- Proposed Kerbline
- Proposed Railing

Proposed Traffic Directional Sign

Shek Kip Mei 石硤尾
Kowloon Tong 九龍塘
Hong Kong 香港
Hong Kong (W) 香港(西)
Sha Tin (via Lion Rock Tunnel) 沙田 (經獅子山隧道) Kwun Tong 觀塘

Existing Traffic Directional Sign

Kowloon Tong 九龍塘 Hong Kong 香港
Shek Kip Mei 石硤尾 Hong Kong (W) 香港(西)

Existing Traffic Sign to be modified

Existing Traffic Light to be modified

Existing MOC to be modified

Proposed Traffic Light to be provided

LANE CONFIGURATION TO BE MODIFIED

CHAK ON ROAD SOUTH SITE

PAK TIN EXTENSION SITE

CHAK ON ROAD
LUNG YUET ROAD
CORNWALL STREET
NAM CHEONG STREET
Flyover Road
Sharp Devi Sharp Devi

TS409
TS132

RM1017 RM1104 RM1011 RM1021 RM1027 RM1117 RM1118

1:750
0 15 30 45 60

Rev.	Description of Revision	Date	Ckd.
A	GENERAL REVISION	OCT 22	-

Client: CEDD CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Consultants: MANNINGS (Asia) Consultants Limited

Scale in A3	Date	
Designed JS	Drawn AC	Checked NS
Traffic Team Leader MC		Date
Approved LSF		Date

Project

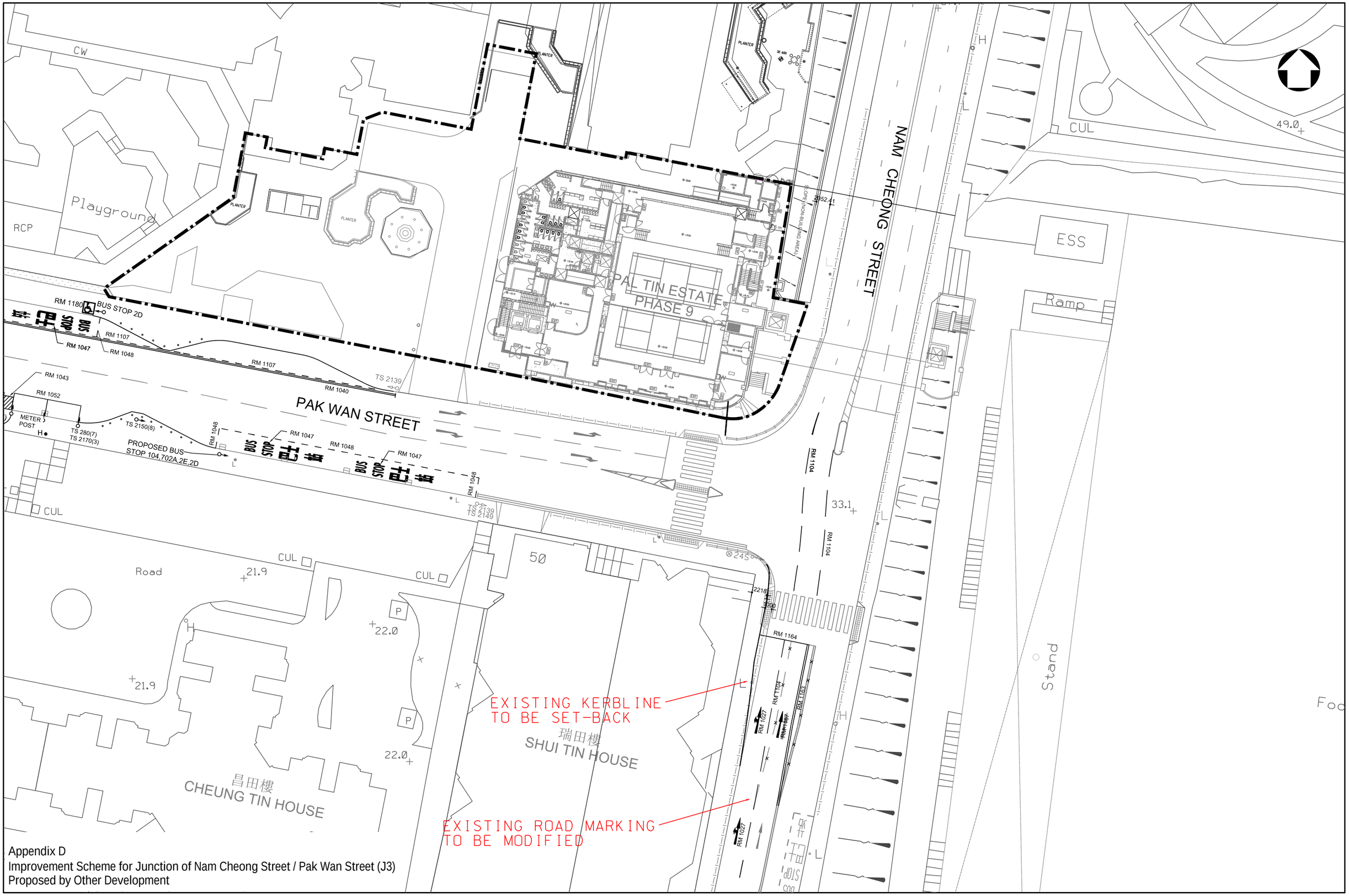
Title: JUNCTION IMPROVEMENT SCHEME

Drawing No.	Stage	Rev.
S1112/JI/001		A

K:*S1112 - CE 36 2021 Chak On Road Site Formation - IDC*Ustation*traffic*Ustation*S1112 JI-001A.dgn

Appendix D

Improvement Scheme for Junction of Nam Cheong Street / Pak Wan Street (J3) Proposed by Other Development



Appendix D
Improvement Scheme for Junction of Nam Cheong Street / Pak Wan Street (J3)
Proposed by Other Development

AtkinsRéalis

AtkinsRéalis
Atkins China Limited
13/F Wharf T&T Centre
Harbour City, Tsim Sha Tsui
Kowloon, Hong Kong

Tel (852) 2972 1000
Fax (852) 2890 6343

Info.HK@atkinsrealis.com